1678

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)÷2 or 2 ft. added to 30.6 =32.6. For slopes of 1 on 1½ see inside of back cover.

1678

CITY ENGINEER'S OFFICE

This Field Book is manufactured 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.

Walker
Husaid
Hardin

July 27-1944

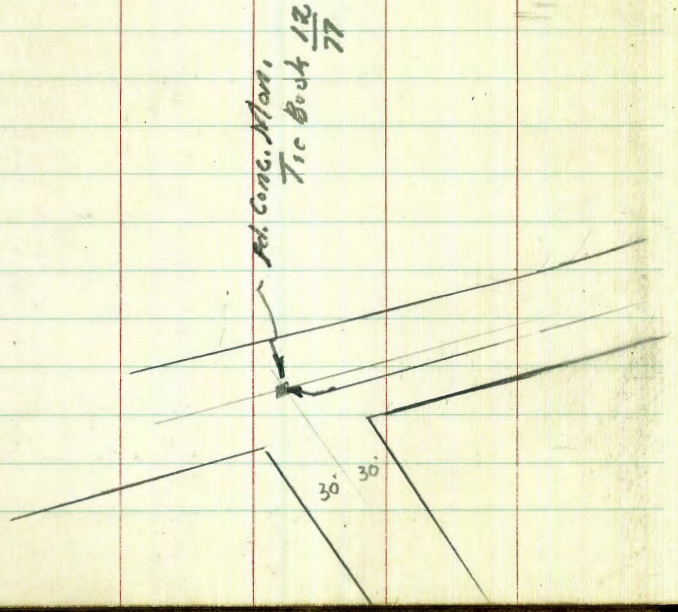
~ Encanto Ties ~

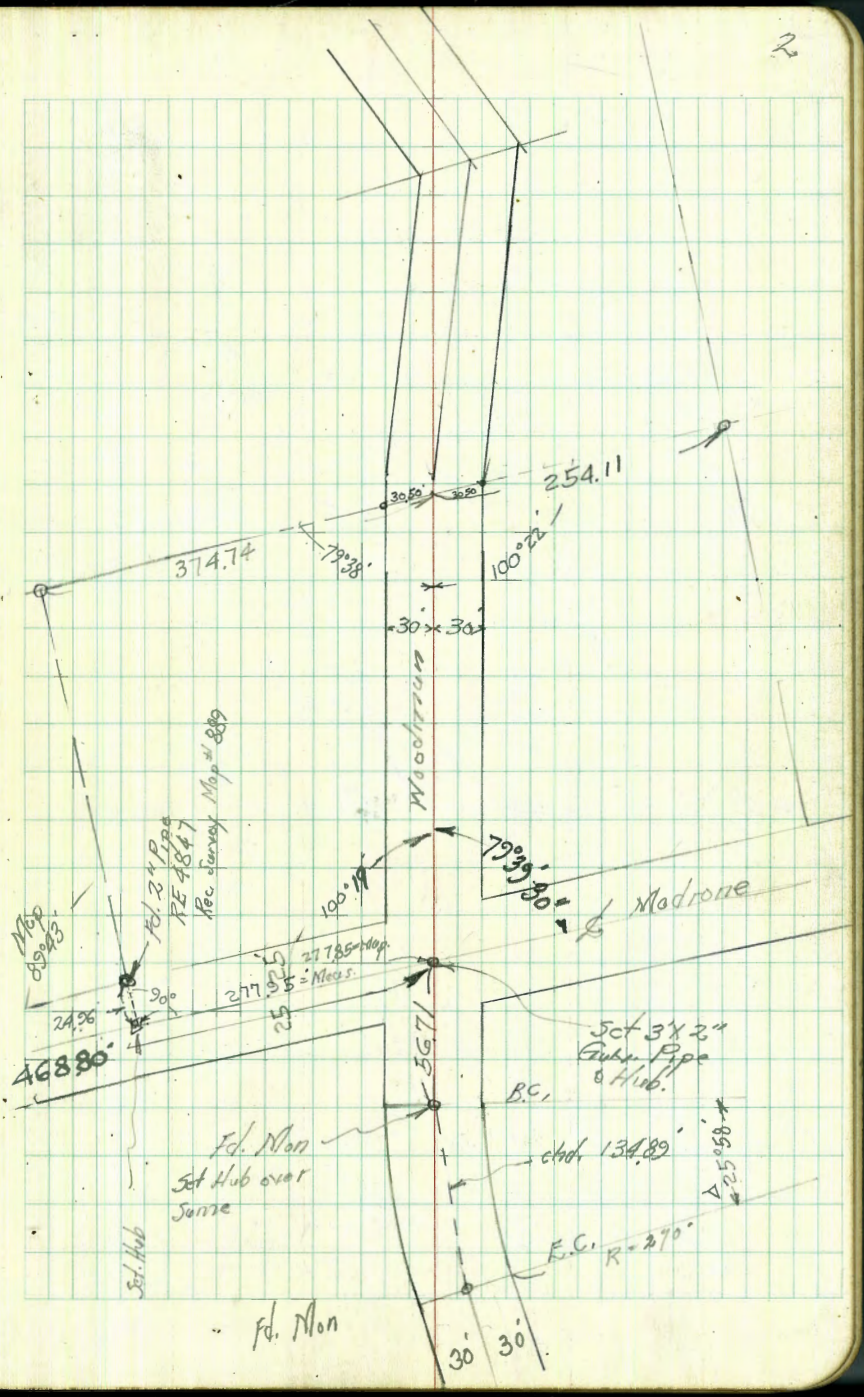
Preliminaries for Tie Point Work

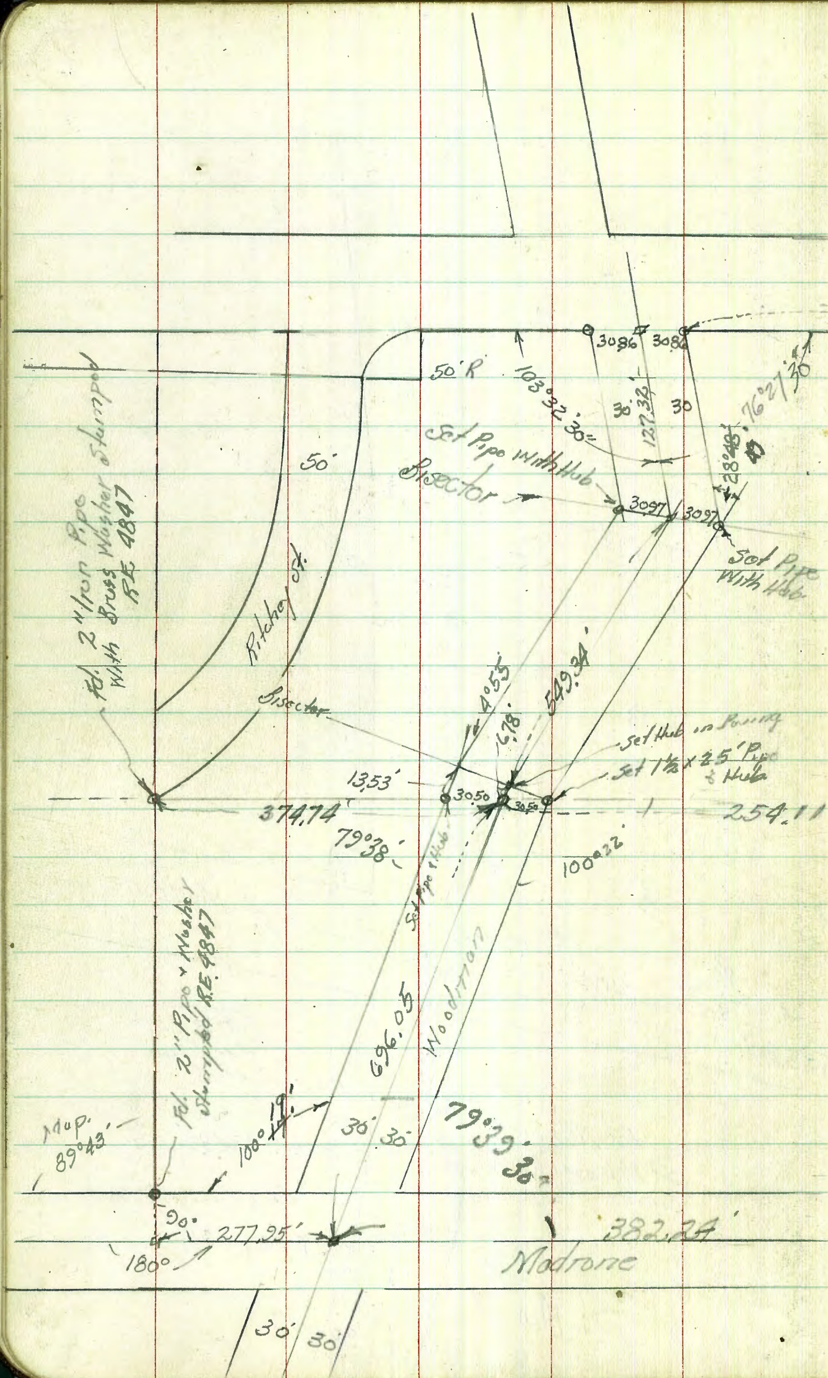
Page 1 to 5

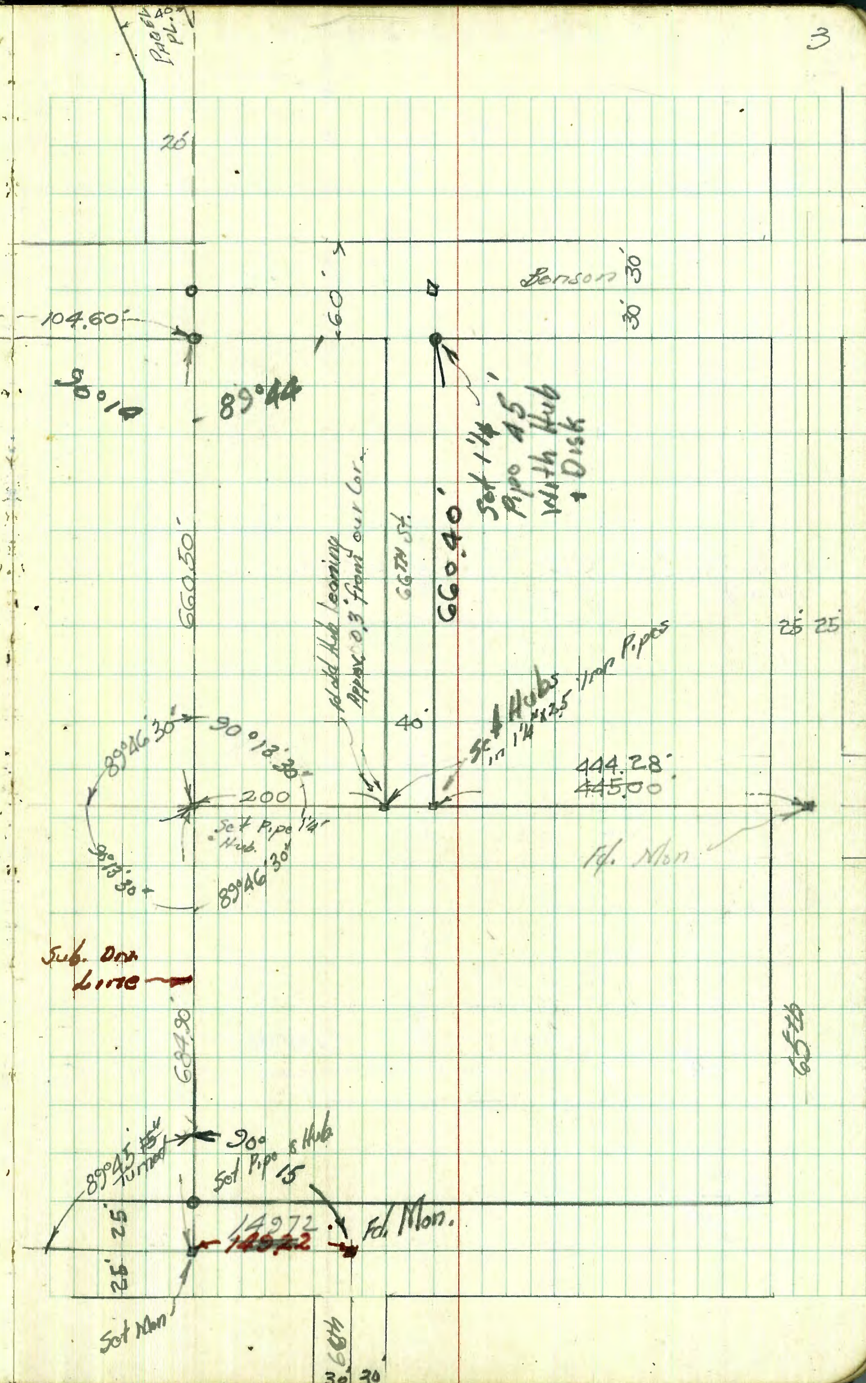
This Book Not Supposed to be used as a permanent record.

For final Ties see Tie Book #24

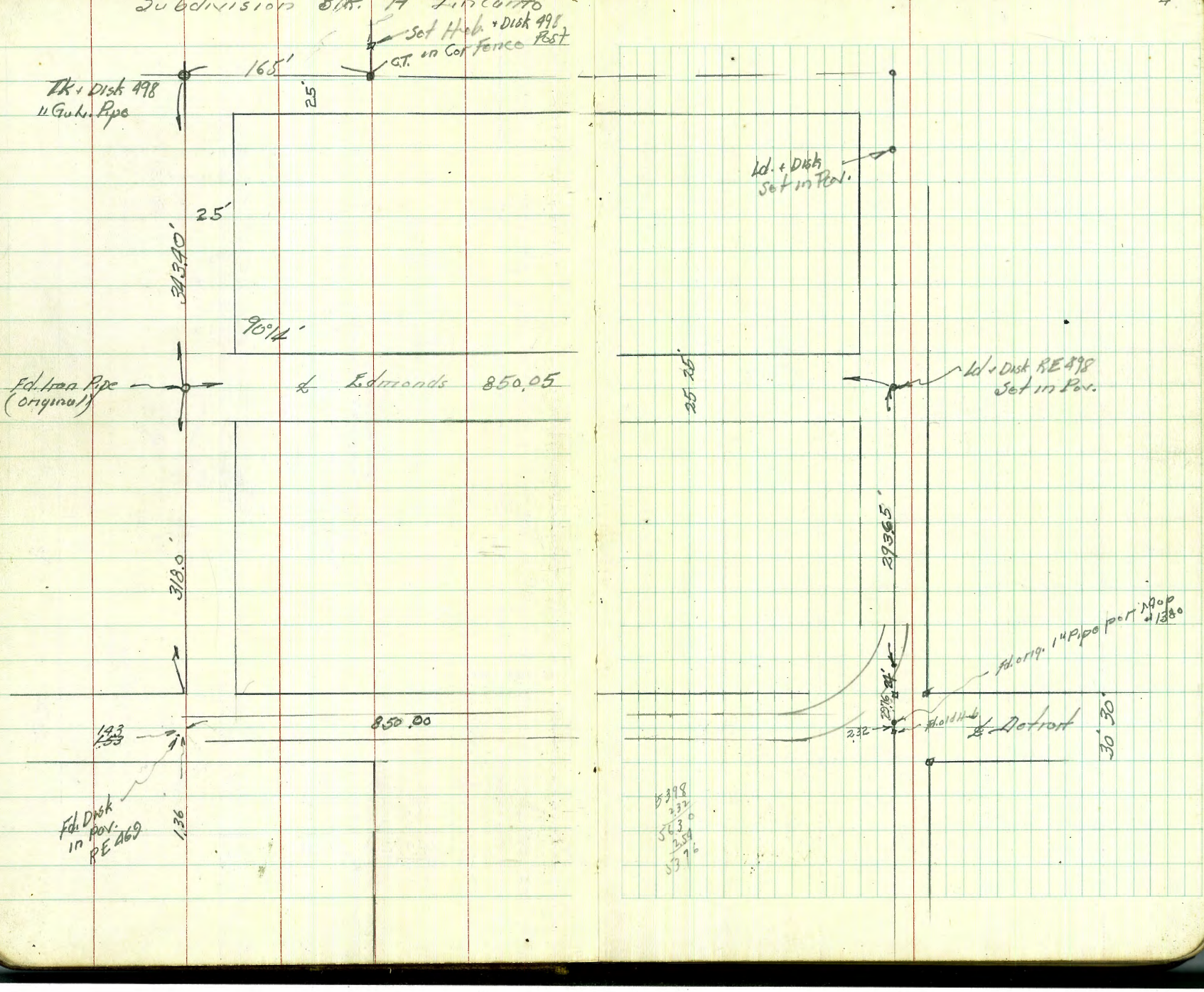





50' R
50'
Ritchey St.
Fd. 2" Iron Pipe With Brass Washer stamped RE 4847
Bisector
Set Pipe With Hub
Bisector
103°32'30"
127.32'
30
30'
3086
3084
3097
3097
76°27'30"
28.48'
Set Pipe With Hub
1353'
40.55'
16.78'
549.34'
Set Hub in Paving
Set 1½ x 2.5' Pipe & Hub
374.74'
254.11'
79°38'
100°22'
696.05
Woodman
Fd. 2" Pipe & Washer stamped RE 4847
Map 89°43'
100°19'
79°39'30"
30' 30'
90°
180°
277.95'
382.24'
Modrone
30' 30'


Proctor PL.
26'
104.60'
Benson
30' 30'
60'
90°14'
89°44'
660.50'
Fd. Hub leaning Approx. 0.3' Front our Cor.
66th St.
660.40'
Set 1¼ Pipe 4.5' With Hub & Disk
25' 25'
40'
Set 4 Hubs in 1¼ x 2.5 Iron Pipes
89°46'30"
90°13'30"
200
Set Pipe 1¼" Hub
90°13'30"
89°46'30"
444.28'
445.00
Fd. Mon.
Sub. Div. Line
684.90
90°
89°43'15" turned
Set Pipe & Hub
15
25' 25'
149.72'
149.22
Fd. Mon.
Set Mon.
66th
30' 30'
65th

Subdivision Blk. "H" Encanto



Walker
Hazard
Segg
1-11-05

Proposed Extension - WATER MAIN
from 28th And Thorn
to 7th & Lupine
Location } FB 1674
And Levels }

Levels Cont. from FB 1674 P-1

156.13 = R from P-1 FB 1674

68+10.62 = BC - Rt		1.66	154.47
7' Rt = Cb.			
55 Lt = Cb.			
68+50		3.11	153.02
68 Rt. = Cb			
55 Lt. "			
(68+62) 58 Rt = Cb			
60' Lt = Cb. PC. 2' R			
68+75		3.24	152.19
4.3' Rt = Cb.			
+90 29' Rt = Cb.			
69+00		4.66	151.27
+21 = End Paving.		5.46	150.67
+50		7.1	149.0
12.7' Lt Cobble Cb.			
69+62.53 = EC		7.55	148.58
12' Lt = Cb.			
(69+68) 25' Rt. = End 2.5' X 2.5' Conc. Box Culvert			= Beg. running Creek.
" Top Box		8.43	147.70
" Flow		11.93	144.20
150' NE Tan Int on Secret Rim Mk. Flow =		6.22	149.91

156.13

69+83.66 = BC. Lt		8.82	147.31
70+00		9.0	147.1
+50		10.2	145.9
2.2' Lt Cobble Wall			
70+62 - Int. & Cobble Wall		10.7	145.4
on Wall.		9.45	146.68
70+94 - Int. "		10.68	145.45
" East Ground		11.9	144.2
71+00		12.1	144.0
T.P. 1.53	145.56	12.10	144.03
71+50		2.4	143.2
7.7' Lt = Cobble Wall			
71+85 N edge dirt Road		2.7	142.9
72+00		3.1	142.5
12.6' Lt = Cobble Wall			
(72+09) 6' Rt. 10" Cyc Tree			
72+14 = End Cobble Wall 145' Lt.			
+39.79 = EC.		4.9	140.7
5.3 Rt & Bank Creek		5.8 7' wide.	139.8
" "		7.7	137.6 37.4
+51 3' Rt. Cyc Tree 12"			
(72+70) 8' Rt = Sand 8.5' Wide 10' Long Bridge W Bdry.			
+91.5 Int. Fence Wire		5.8	139.8 300.
T.P. 9.02	148.12	6.46	139.10

Proposed Water Main

148.12 ✓

72+93		10.1	138.0	
73+26		10.8	137.3	
+32	E edge Stream	12.9	135.2	
+39	Int " "	13.2	134.9	
+41		11.7	136.4	
+55		10.7	137.4	
+67		11.5	136.6	7.5 Lt 36" Cyc. T.
+77	Int. E edge N Branch Creek	12.8	135.3	
+88	" Int " "	12.6	135.5	
73+97		11.3	136.8	
74+38.92	Null	10.6	137.5	
+47		10.8	137.3	
+51		9.6	138.5	
+56	E edge Pond	9.29	138.83	
+80	Int " "	8.78	139.34	
+87		8.4	139.7	
+90		5.0	143.1	
+92	10" Oak on Line			
+93	5" " 7' Lt.			
+95	6' Rt. 14" Cyp.			
+98	on Line 18" "			
(75+00)	23' Lt. 18" "			
+06	on Line 14" "			
+10	9' Rt. " "			
+11	6' Lt. 3/4" Hyd.			
12	7.6' Lt. 12" "			

✓

148.12 ✓

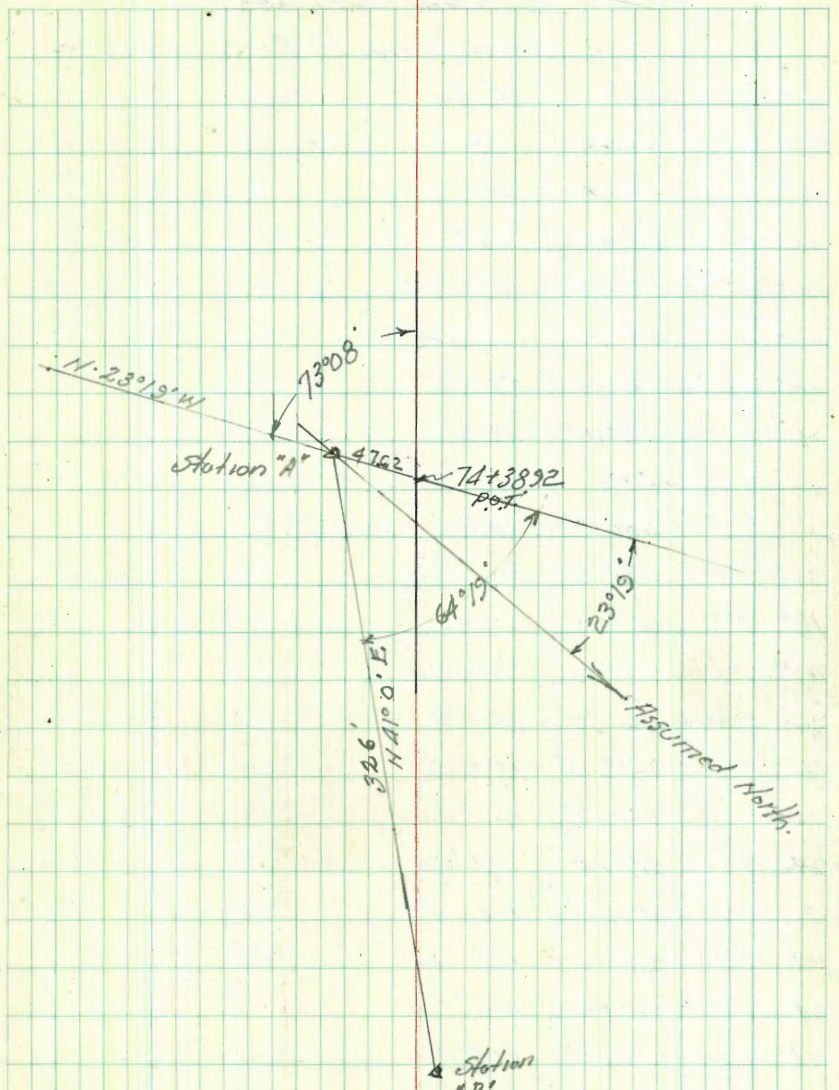
(75+17) on Line 14" Cy. Flow			
(74+95) 10' Lt 8" Drain	7.01	141.11	Steel Pipe
75+30	2.5	145.6	
2.7 Lt. on Top 8" Drain	7.56	145.56	
(75+35) 1.5' Lt.	2.16	145.96	Flow c. cobble stone valley Gut.
1.5' Lt. 12" Cy.			
(75+39) 3' Rt. 14" Cy.			
+40 12.5' Lt. 24" " ✓			
T.P. 11.63 159.67	0.08	148.04	
(75+48) 11' Lt. 14" Cy.			
75+58	10.7	149.0	5.8' Lt. 14" Cy.
6' Rt & 3' Cob. Gut.	4.2	148.5	
+65	8.1	151.6	6" Cy on Line
7.7' Lt. 14" Cy.			
(75+75) 2.5' Lt 10" Cy.			
3' Rt	6.4	153.3	
8' Rt	9.6	150.1	
75+75 E	3.4	156.3	
10' Lt.	9.2	159.5	
20' Rt. & Cob. Gut	10.4	149.3	
(75+68) 13' Lt. 16" Cy. ✓			
T.P. 11.87 171.42	0.12	159.55	
(75+86) 1' Rt 14" Cy.			
75+90 7.7' Lt. 20" Cy.			
75+90	8.8	162.6	
6' Rt.	10.5	160.9	
10' Rt.	13.2	158.2	
10' Lt.	11.8	159.6	

Cont. P. 11 ✓

Station Location Trees etc
for Water Main Data Near 11th St
Canyon.
Azimuths Clockwise from Assumed North
Readings from Station "A"

Station	Azimuth	Stadia	
18" Palm	147°36	63'	
" "	142°20	51	
30" Cyp. T.	202°10	76'	
28" " "	229°35	68	
" " "	231°40'	69	
20" " "	208°50	85'	
" " "	215°15'	112'	
28" " "	221°10'	107'	
16" " "	227°05	92'	
30" " "	240°40'	46'	
24" " "	265°44	52'	
16" " "	268°15'	59'	
30" Dbl. "	345°20'	34'	
24" Cyc. T	4°	37	
18" Syc. "	334°	85'	
New Sewer MH.	24°40	58'	
old Sewer MH.	23°	66	Sewer to 300 from here
Conc. Bridge			
NW cor "	34°30'	68'	
NE " "	38°50	89'	
SE " "	49°	79'	
SW " "	48°	58	

Cont. P-9



READINGS from Sta. "A"
Cont. from P. 8

Station	Az.	Stadia
30" Syc. T	26°30	93'
24" " "	37°	132'
16" " "	29°45	137'
N End Gate to Zoo	42°18'	160
S End Gate to Zoo	48°30	159
24" Cyp T	51°30'	138'
24" " "	55°14'	128'
" " "	58°	113'
" " "	56°20'	134'
20 " "	62°12'	120'
18" " "	66°20	111'
14" " "	67°30	120
3/4 Cor Zoo fence	66°30	140
14" Cyp.	69°20'	132'
16" "	67°30'	122'
24" "	71°20	99'
" "	71°25'	111
12" "	71°	122'
24" "	76°30'	116'
24" "	77°37'	104'
" Syc.	60°50	90'
20" Cyp.	97°40'	58'
36" Syc.	105°10	63

READINGS from "A" Cont.

Station	Az.	Stadia	
& Stream 7' wide	104°	78'	
W edge "	32°50	122	8' wide
" " " 24' wide	11°	90'	" "
& Pool	318°45	107'	11th Ave Canyon
E "	300°55	48'	24' wide
" "	196°	29	" "
" "	162°40'	74	" "
" "	155°25	118	" "

READINGS from Sta "B"

Station	Az	Stadia	
S. edge Rd. &	217°20'	120'	
End Wall	217°10'	101'	S side Road
Cob. "	216°35'	82	" " "
36" Dole T	212°36'	34'	
30" Cyp	198°10'	89'	
" "	183°50'	44'	
24" "	144°	30'	
" "	132°	46	
Cob. Wall	70°35'	44	" " "
E. Tree 18"	43°30'	19'	
18" E. "	47°30'	39'	
" " "	49°40	52'	
" " "	52°30'	72'	

Readings from "B" Cont.

Station	Az.	Stadia	
24" E. Tree	52°30	77'.	
18" E. "	54°45'	111'.	
Cob. Wall	67°10	57'.	S side Road
" "	66°30	66	" "
" "	67°40	128	" "
S End			Conc.
2.5'x2.5'	55°40	166	Box Culvert
N edge	Road 56°50'		S end.
E. Box Culvert	~~56°50~~	222'.	of cob. Wall. Crane Pond.
end Sewer	53°12'	107'.	S edge Creek.
30" Cyp.	91°30'	45'.	
36" "	76°45'	93'.	
SE Cor House	313°17	36'	22' Wide
NE " "	330°15'	65'.	

171.42 ✓ Cont. from P-7

76+00		5.1	166.3	6" Ac. (Dead) 7.3' Lt
10' Lt.		4.8	166.6	
10' Rt.		7.2	164.2	
(76+14)	2' Lt.	4" Ac. Dead		
T.P.	12.60	183.70 ✓	0.32	171.10
(76+17)	5.5' Rt.	16" Ac.		
+25	5.5 Lt.	12" Ac. (Dead)		
76+27	87 - P.O.T.		7.90	175.80 Power Pole
10' Rt.			9.0	174.7
10' Lt.			6.5	177.2
76+35	1.5' W	18" Ac.	50% Dead	
+38	8' Rt.	6" Ac.	" "	
76+46	4" Ac. on Line	(Dead)		
T.P.	11.39	194.98 ✓	0.11	183.59
76+50			10.9	184.1
10' Lt.			10.0	185.0
10' Rt.			12.0	183.0
76+65			7.2	187.8
+80			1.3	193.7
T.P.	10.37	205.03 ✓	0.32	194.66

Note from Station 76+50 to 78+25 Shrubs

77+00			4.7	200.3
10' Lt.			2.7	202.3
10' Rt.			6.0	199.0
T.P.	13.07	216.74 ✓	1.36	203.67
(76+32)	6" Tree on Line			

✓

✓ 216.74

77+25			9.2	207.5
77+33	24" Water Valve			
77+43			3.0	213.7
T.P.	10.50	227.11 ✓	0.13	216.61
77+62			10.5	216.6
(77+69)	5' Rt.	Two 8" Ac		
77+80	2.7' Rt.	8"		
77+80			5.1	222.0
10' Rt.			6.4	220.7
10' Lt.			4.7	222.4
T.P.	11.61	238.50 ✓	0.22	226.89
(78+12)	2.3 Lt.	10" Ac.		
(78+14)	6' Rt.	10" Ac		
(78+22)	1' Rt.	6" "		
+31	9.3 Lt.	6" "		
78+17			9.3	229.2
10' Rt.			10.4	228.1
10' Lt.			8.1	230.8
(78+35)	4' Rt.	14" Ac.		
+47	24' W	14"	Tree	
78+47			1.8	236.7
10' Lt.			1.5	237.0
10' Rt.			3.5	235.0
78+51	15' Rt.	6" Tree		
+58	5' Rt.	6" "		
(78+62)	4' Rt.	12"		

✓

Proposed Water Main Levels

	238.50				
(78+66)	12" Tree on Line				
+70	2.7' Lt.	14" T			
(78+82)	1' Lt.	24"			
I.P.	7.18	243.98	1.70	236.80	
78+85			3.1	240.9	7' Rt. 18" T
+89	1' Rt.	Two 10" T			
+98	0.3 Lt.	10" "			
+93	12' Rt.	12" "			
79+02	9' Rt.	6" "			
"	12'	12" "			
79+07.10	=B.C. Rt.		2.4	241.6	
+10	10' Rt.	16" T.			
+17	4.5'	10" "			
+23	10' Rt.	6" "			
+28	1' Rt.	6" "			
+29	10' Lt.	6" "			
+33	11 Rt.	18" " Ac.			
+34	12' Lt.	16" "			
79+50			0.5	243.5	
+52	2' Rt.	3" Ac.			
+55	10.5 Lt.	16" T.			
+68	4.4' Lt.	6" "			
+85	1' Lt.	12" "			
+95	7' Lt.	5" "			
+99	9.4' Lt.	5" "			
"	10.9' Rt.	12"			

		243.98		
T.P.	6.43	250.19	0.22	243.76
80+00			5.8	244.4
+10	3' Lt.	5" T		
+15	8' Lt.	18" Ac.		
+25	0.2' Lt.	12" T		
+30	1' Lt.	18" "		
+33	3.3' Rt.	20" T.		
+40	9' Rt.	3/4" Hyd.		
+49	11"	18" T.		
+50			5.2	245.0
+53	10.3' Rt.	5" T.		
+58	11.8"	10" T.		
+62	11.8"	16" T.		
+68	8.6' Rt.	12" T		
+69	6.5 Lt.	Lamp Std.		
+76	10.5 Rt.	18" T.		
+85	3' Rt.	12" T		
81+00			4.9	245.3
+09			4.9	"
+09' on Wall			2.22	247.97
+10' on Pov. Sidewalk			4.92	245.27
+50			5.00	245.19
81+87.75=E.C.			4.91	245.28
T.P.	6.55	251.75	4.99	245.20

Cont. P-13

Proposed Water Main Levels.

	251.75 ✓		
82+00		6.38	245.37
+50		5.87	245.88
83+00		5.40	246.35
+50		4.90	246.85
+62.68 ± 7°41'Lt.		4.79	246.96
+99.7 ± Int cb. on cb-		4.34	247.41
" " Ext.		4.81	246.94
84+23		4.38	247.37
+52.78 = Δ 7°41' Rt.		4.11	247.64
84+62.78 =		4.00	247.75 ✓
=96+22 FB 1674:40			247.76
			0.01

✓

Walker
Hazard
Bagg
1-13-45

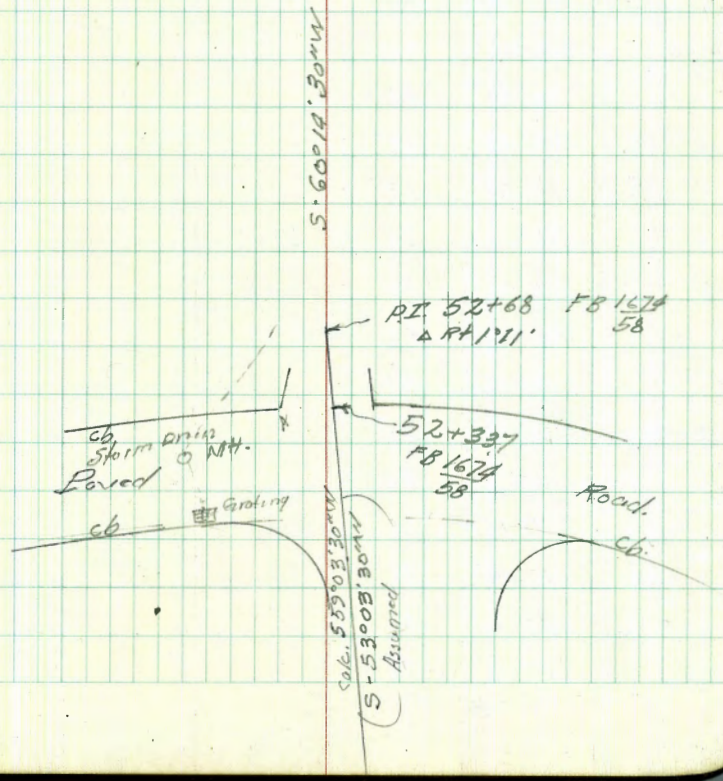
Supplementary Topog.
WATER LINES SURVEY. - Thru. 300.

FB 1674-67

READINGS From 52+337 Elev 2840?
Az from Assumed North Clockwise

Station	Azimuth	Stadia	Vert Δ	Horiz Dist	Diff Elev.
E. cb.	346°50'	166'			
" "	353°05'	100'			
" "	0°28'	70'			
" " PC Ret	15°10'	49'			
Lamp Std.	16°46'	51'			
Approx ℄ Ret cb.	21°10'	47'			
E.C. cb Ret N side Road	28°20'	52'			
End cb.	33°50'	62'			
S side Ret End cb.	57°45'	57'			
PC. Ret..	59°20'	45'			
Approx ℄ Ret. cb	64°37'	38'			
EC. cb Ret	75°50'	37'			
Lamp Std.	77°37'	40'			
℄ 2.2' x 3.5' Grating	81°40'	36'			
E cb. Road	101°50'	49'			
" " "	122°50'	87'			
W " "	146°30'	82'			
" " "	147°15'	49'			
P.I. cb ℄	148°25'	12'			
End cb. of walk.	183°30'	12'			
N side End cb at Walk	280°	9'			

Cont. D-13



Readings from 52+33.7

Station	Azimuth	Stadia
P.I. cb. NW.	326°	7.5
W cb. Road.	329°30'	34'
W " "	331°45'	79'
Cocos Palm ℄ 8"	325°20'	95'
" "	322°	30'
" " "	312°	14'
Iron Sign ℄ 4" Post	305°	10'
℄ 10" Palm	162°	17'
" 8" "	155°	32'
℄ " "	152°20'	47'
℄ 1.2 x 2' Grating at cb W side Rd	146°	22'
℄ 6" Palm	176°40'	44'
℄ 8" "	189°45	32'
℄ " "	215°44'	23'
℄ 6" "	256°45'	22'
℄ 8" "	285°0	30'
" " "	300°	43'
" " "	308°06'	56'
NE. Cor Wire Fence	303°15'	58'
W Cor Above Fence	282°53'	80'
East End cb of Fence	279°12	35'
Angle in Above cb.	262°10'	75'
W End Above cb.	249°30'	158'
Wire Fence	171°38'	67'
" "	159°23'	112'

READINGS from Station 54+75 Elev 279.0

Station	Azimuth	Stadia	V Δ	Horiz.	Diff Elev.
S End Conc. Rt + Wall	303°15	16'			
Δ in " " " (Wall curves)	308°45	21'			
on Wall	354°50'	27			
" "	9°45'	43'			
Sharp Curve on Wall	12°40'	64'			
" "	11°05	76			
End of Wall on Cobble	7°25'	89'			
Wall W Side Road	348°	91'			
on Cob. W	350°05'	75'			
" " "	340°30'	56			
" " "	310°45	50'			
" " "	301°	53'			
" " "	294°55	57'			
" " "	278°55'	86'			
N end Dam	291°40'	97'			
30" E Tree	26°45	59'			
24" E "	23°05'	62'			
30" " "	20°55'	64			
18" " "	19°45'	58'			
24" " "	20°15'	52'			
8" Palm	24°25'	34'			
" "	18°15'	21'			
" "	337°40'	10'			

Top of Wall has 3 Wire Fence

This is old S end Conc. Dam 97' Thick

READINGS from 6475 Cont.

Station	Az.	Stadia
"8" Palm	270°45'	14'
" "	258°25'	26'
" "	255°45'	40'
" "	253°55'	57'
" "	252°35'	75'
" "	249°40'	92'
" "	246°30'	111'
" "	242°40'	129'
" "	238°35'	146'
W edge Pav. 16' Road	235°55	150'
" " "	239°35'	134
" " "	245°	109'
N side Road	248°30'	85
"	250°	62'
" "	250°50	34'
P.C. Cob. Rd. N side Road	255°25	16'
S Cob. Rd. N edge Bluff	275°35'	12'
"	293°05'	18'
"	268°20'	32'
"	257°	56'
"	254°25'	75'
"	253°30'	100'
"	252°10'	122'
Cob. cb. PC.	226°	39'
EC.	215°55	37

S side 16' Road
8' Path.

Readings from 5475

Station	Bg.	Stadia
End 8' Path at arcade	198°40	46'
End 8' Path at Arcade	191°05	40'
P.C. Cob. Rd.		
8' Path E side	210°55	30
Cob Rd.		
S side 16' Rd	212°05	26'
" " Road		
Cob. Rd	199°45	23'
" Rd.	175°05	30'
" "	171°35	35'
" "	176°10	39'
" "	183°20'	41'
" "	178°25	48'
" "	172°35	46
W side Road	168°25'	49'
" " "	160°50'	94'
" "	158°70'	136'
E " "	150°25'	134'
" " P.C. Par.	148°25	72'
E side Road	138°40	50'
"	108°15'	37'
"	72°55	43'
"	54°45'	59
E 64' Turnstile	51°15'	71
End Par	57°30	61
" "	49°50	74
Edge "	38°15	78

W side Road

N side 8' Path
N side of arcade
S " 8' Path of "
" " N "
Cob. Cb.

Wire Fence 4' E
" " "
" " "
" " "
" " "

Angle in Par

of Gate
N and Turnstile

Station	Azimuth	Stadia
East Edge Pav.	30°40	86'
" "	23°45'	97'
" "	21°40'	106'
" "	24°0	119'
" "	21°55'	125'
" "	16°05'	121'
" "	13°15'	126'
" "	9°05'	144'
" "	5°30'	169'
W edge Road.	358°15	150'
N side Road	359°25'	137'
"	357°55'	124
" 16' Wide	350°40'	120'
N "	334°10	132'
S " "	330°10'	116
24" E. Tree	33°45'	86'
24" " "	32°55'	98'
" " "	29°20	92'
" " "	28°35'	100'
" " "	" "	109'
28" " "	23°	98'

of Wire Fence
" cob. Rot.
" " "
" " 46.

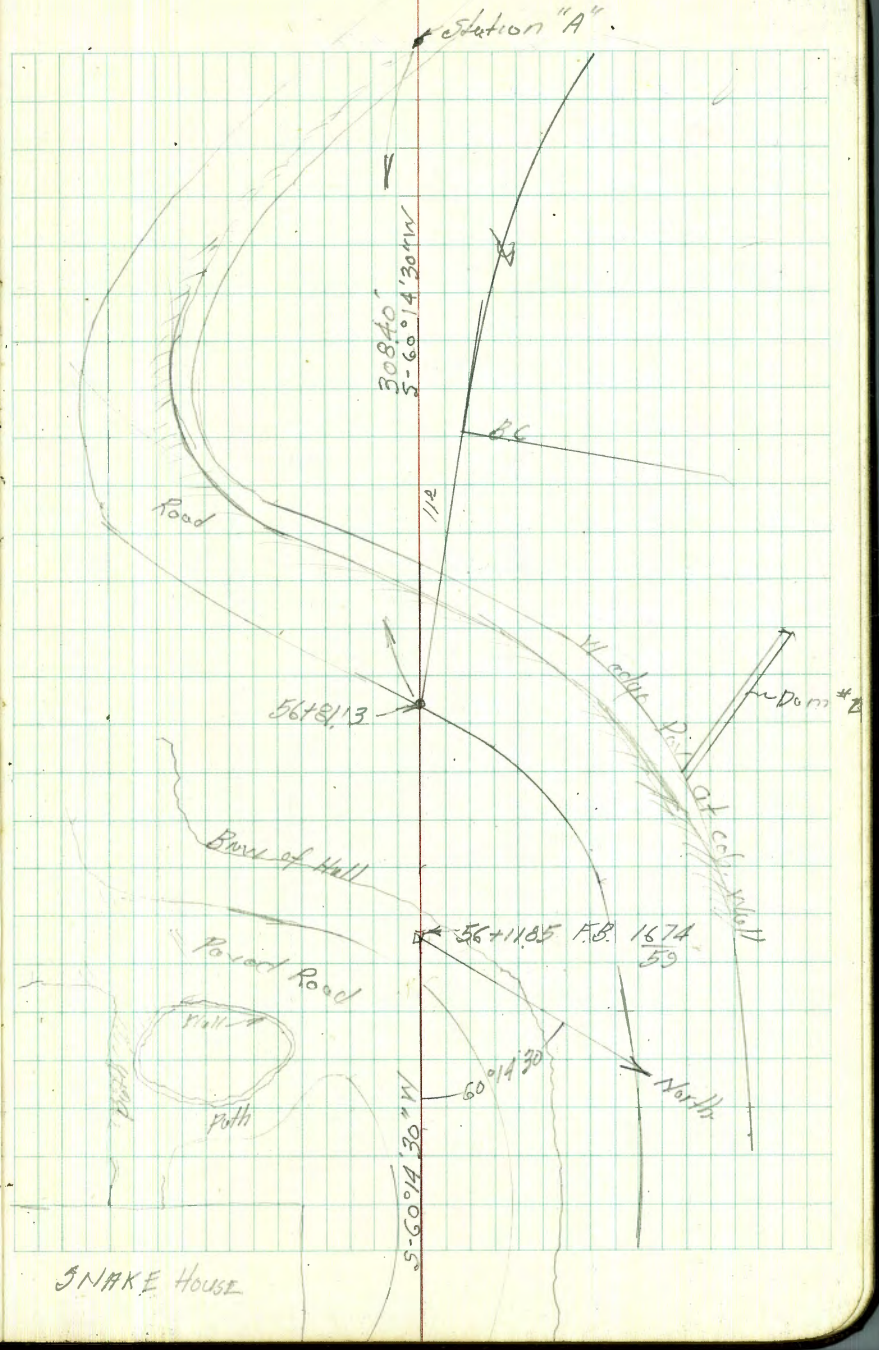
Readings from 56+11.85

Station	Azimuth	Station	
Road			on curve
W edge Pav	197°45'	28'	
W " "	190°25'	75'	
" " "	183°30'	106	P.R.C. St
" " "	182°05'	129	
E " "	169°15'	128'	
" " "	172°30'	84'	W Edge Island
E " "	174°45'	65'	W E
Island			S edge
N edge	169°05'	47'	Path.
" "Island	151°15'	51	"
N edge Path	152°20'	44	
" " "	165°45'	36	
E " Pav.	167°30'	31'	
S " "	101°25'	20'	
Brow Hill	347°15'	25'	Top
" "	239°05'	10'	
" "	209°	30	
" "	206°35'	56	

READINGS FROM 56+81.13

NW edge Pav.	24°05'	109'	Cob. at Wall
W " Pav	13°45'	91	"
W edge "	6°25'	74'	"
at Wall	309°25'	21	"
" "	236°10'	42'	
" "	224°	84'	

Cont. P-21



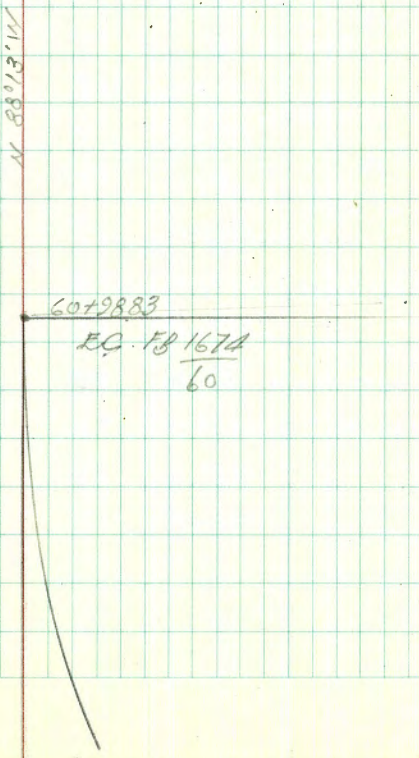
READINGS from 56+81.13

Station	Azimuth	Stadia	Remarks
W edge Road at Wall	223°45'	121'	
E edge Pov.	223°	171	
E Edge Pov	214°40'	121'	
" " "	209°35'	70'	
" " "	209°35'	18'	
" " "	18°50'	18'	
" " "	21°15'	57'	
" " "	24°40	76'	
S.E. End Dam #2	10°10'	85	2' Wide (Top)
N W End Dam #2	338°	160'	
℄ Creek	344°45	126'	at Dam #2
" "	317°05	71	
℄ 6' Spillway Dam #3	282°20'	48	℄ Creek
N W End Dam #4	248°30	133°	
" "	240°15	132'	85 ELY ℄ 7' Spillway
8' E of End Dam #4	223°05	138	

Readings from station "A"

Station	Az.	Stadia.	
E. Edge Pav	83°20'	108'	
" " "	97°30	96'	Approx. B.C. Rd
" " "	129°45	19'	
" " "	228°25'	20	E.C.
" " "	263°30	89'	B.C. Lt.
" " "	264°50'	121'	E.C.
" " "	264°30'	175'	
" " "	259°55	188'	Branch to S.E.
North side Road			
P.C. Cobble Wall	274°40'	154'	N side Road
P.R.C. " "	273°50'	124'	" "
E.C. " "	275°25'	98'	" "
B.C. " "	281°	32'	" "
N side Road	291°15	15'	S. end Dam #5
on curve Cob. Wall	58°20	12'	N Side Road
" "	72°10	33'	
E.C. "			
N side Road	72°55'	50	
" "	73°	90'	
B.C. " " Cob Wall	72°40'	123	
E.C.	72°05'	158'	
on curve S end Dam #4	71°	184°	
℄ Creek	56°15'	132'	
" "	47°	92'	
" "	31°10'	54'	
N end Dam #5	356°55	58'	
℄ 8' Spillway Dam #5	343°50'	32'	℄ Creek

Station	Azimuth	Stadia		
	300°30	76'		
	Reading from 60+98.83			
Cobb Wall	203°15'	54'		
Cob. "				
E edge Path	207°	25'		N. Wall
" " "	81°40'	6'		" "
" " "	43°	35'	on curve	" "
" " "	40°45'	56'	" "	" "
SE " " "	45°30'	78'	" "	" "
E.C. "	51°10	87		" "
S edge Path	66°	110'	7' N - Sand Bird Cage	Steps 7' W
Beg. Steps				
W edge Path	43°	105'		
on curve	35°20	80		
W edge Path				
E.C.	29°40	55'		
W. edge Path	11°55	12'		
P.C.				
W edge Path	241°05'	14'		
E.C. " "	232°50'	40'		
N.W. " "				
	235°	68'		
" " " "				
E.C.	237°30'	95'		
N " Road	247°50	122'		
S Side "	243°05'			
= N. Side Duck Pond		135'		
P.C.				
S Side Road	231°15'	120	= N.E. Side Duck Ponds	
EC " "	225°10	120	" " "	"
N.E. Cor Duck Pond				
= S.W. edge Road	204°50	152'		
E Side				
Above Road	193°40	160'		



Readings from 60+98.83 Cont.

Station	Ag.	Stadia	
B.C. E side Road	197°50	140	
N Edge Paving - Road	164°30	80	
N edge Pav. "	184°45'	78'	
" " " "	211°25'	85	
" " " "	226°15	90'	= Int E edge Paved Path
E edge Path	227°35'	81'	
" " "	226°15	71'	
" " "	221°45	53'	
" " "	208°15'	27'	Int. Path with Cob. Wall
	Bird Cage		Adjacent Conc. Steps 7' wide
S. end E W & S. Axis	65°45'	122	
SW end Cage on Curve	49°20'	108'	
W Side Cage E.C.	39°20'	128'	
on E.C. SE. end Cage	62°55'	177	
Wire Fence on Conc. Wall	37°45	117	at W edge Conc Steps. 7'
" Wire Fence	21°10	75'	Δ in Fence " End Conc. Wall
" "	359°40	33'	
B.C. Wire Fence	265°40	23'	
Δ in " "	253°20'	30'	
B.C. " "	245°	82'	
" "	251°45'	109'	

Readings from 637.50.89

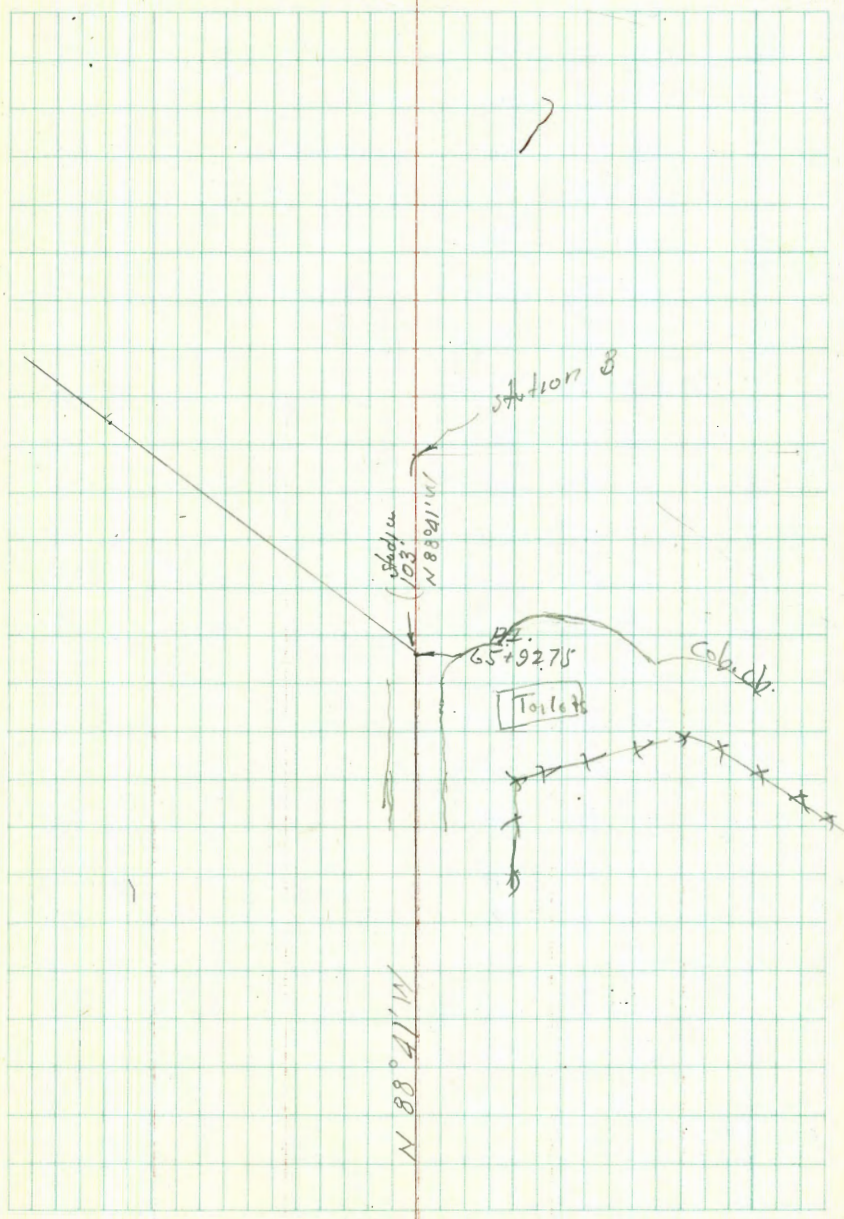
Station	Azimuth	Stadia	
Wire Fence	103°10'	114'	
Δ " "	63°35'	33'	
Δ " "	3°45'	21'	
Δ " "	286°35'	115'	
" "	277°	222'	Fence Δ to Rt Appx 80°
N-Side Road EC	102°25'	66'	
Δ in Road S side	116°	51	N Side Duck Ponds
Δ in Road S-side	127°30	8'	

637.50.89

N 88°41' W

Readings from P.I. 65+92.75

Station	Azimuth		
NW Cor 5' Gate	117°40'	19'	
20" E Tree	121°40'	27.5'	
SW Cor Gate	134°	19'	at Wall - Log in Pav.
Δ in Cob Wall	207°	16'	E edge Road
Δ in Wall	212°	21'	
W edge Conc. Slab.	203°30	22'	
NE Cor Conc. Slab.	189°50	24'	
SE " "	195°05'	29'	
SW End Conc. Slab.	206°	28'	
Δ in Wall	213°15'	27'	E side Road
	199°40	25'	& Drinking Fountain
	214°	57'	E side Road
	226°45'	66'	W " " P.C.
on Curve	241°25'	46'	" " "
" "	261°55	47'	" " "
" "	268°	59'	S " "
EC P.C.	267°10'	69'	
N-Side Road	42°05'	9'	
" " "	332°30	17'	on curve
	331°50'	24'	" "
	331°20'	39'	" "
NW Cor Brick Toilets	345°40	33'	
SW "	10°15'	13'	
SE "	10.4' across SLY end		

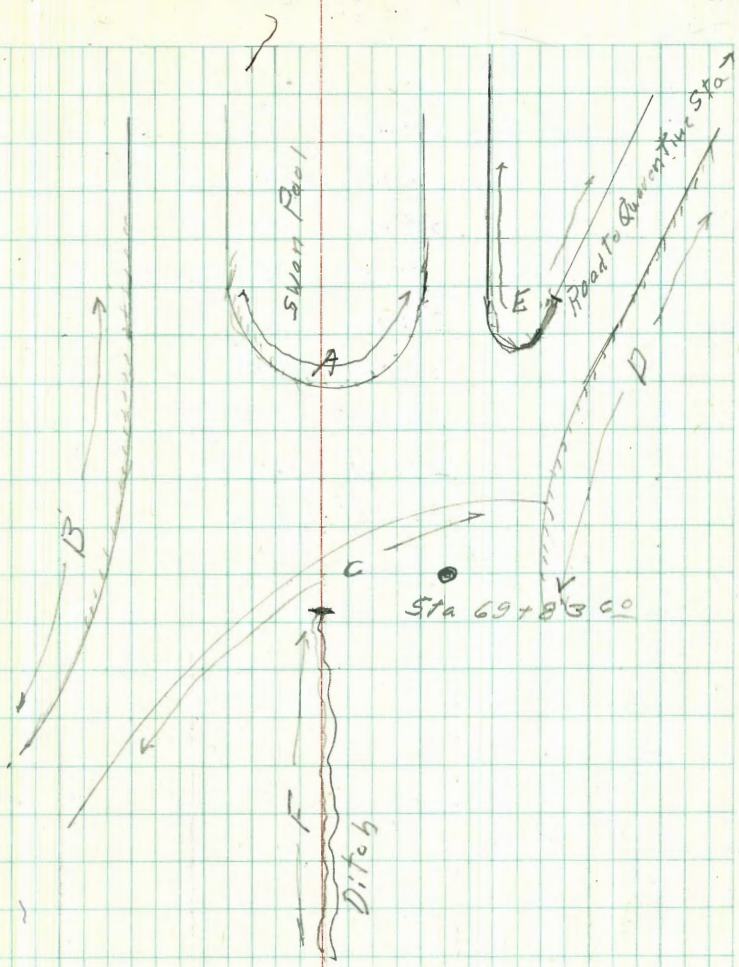


Readings from Station "B"

Station	Az.	Stadia	
△ in cb. E side Road	65°	105'	= Point "C" 1674 61
" " "	58°40'	114'	on Curve
" " "	55°45'	129'	" "
" " "	54°20'	176	E.C. "
" " "	54°30'	224'	= P.C. N
W " "	50°20'	228'	} straight
" " " △ in cb.	46°20'	127'	
S end Emu Pen	53°25'	50'	
△ in Emu "	20°45'	50'	
△ " " "	7°15'	116'	
△ in Fence	61°40	128'	East side Road
P.C. cb. Alley Way	56°35	38	
" "	47°40	35'	
" "	35 40	24'	
at Cob cb.	49°50	19'	
W side Road.	58°55	14'	
" "	254°50	5'	
" "	239°05'	39'	△ in Cob. cb.
" "	233°	70'	
" "	228°25'	106'	
" "	222°25'	149'	
" "	218°15	204	
E side Road P.I.	219°	66	
White Fence E side Road	approx 45°	214'	

Readings from Sta 69+83.66

Station	Azi	Stadia	
Wire Fence Swan Pool (BC)	57°50'	98	A
" " " "	56°50'	88	
" " " "	50°50'	79	
" " " "	38°50'	76	
" " " "	32°10'	82	
" " " " EC	29°05'	91	
N side Road 16' Wide Rubble wall	22°40'	127	B
" "	20°25'	101	
" "	14°40'	76	
" "	3°25'	61	W side Culvert opening 3' Wide
" "	341°50'	55	
" "	323°45'	59	
" "	309°55'	70	
" "	289°00'	123	
S ridge Rd oil paving	282°20'	115	C
"	326°15'	42	
"	35°20'	57	
"	63°50'	65	
S edge Rd - dirt Rubble wall	89°55'	29	D
" " " " "	70°45'	75	Oil paving begins
" " oil " "	68°50'	92	Rd 14' Wide
" " " " "	67°30'	182	
N " " " (No wall)	63°00'	183	E
N " " " Wall Begins	62°40'	159	



Not to any scale

Station	Azi.	Stadia	
Wedge Rd. at Paving Rabbit Well	61°45'	124	E
Edge " " " " "	60°15'	123	E
" " " " "	58°05'	140	
Sedge A Ditch	7°15'	27	end of drain from Swan Pool
"	274°55'	27	
"	262°20'	95	F
"	254°20'	115	F
"	248°50'	161	F

Walker
Hazard
Hendin
2-1-95

PROPOSED CHANGE IN LINE.
36" WATER LINE SURVEY
from station 42+08.29 to station 72+39.79
FB 1674
Levels this Line Pages 39

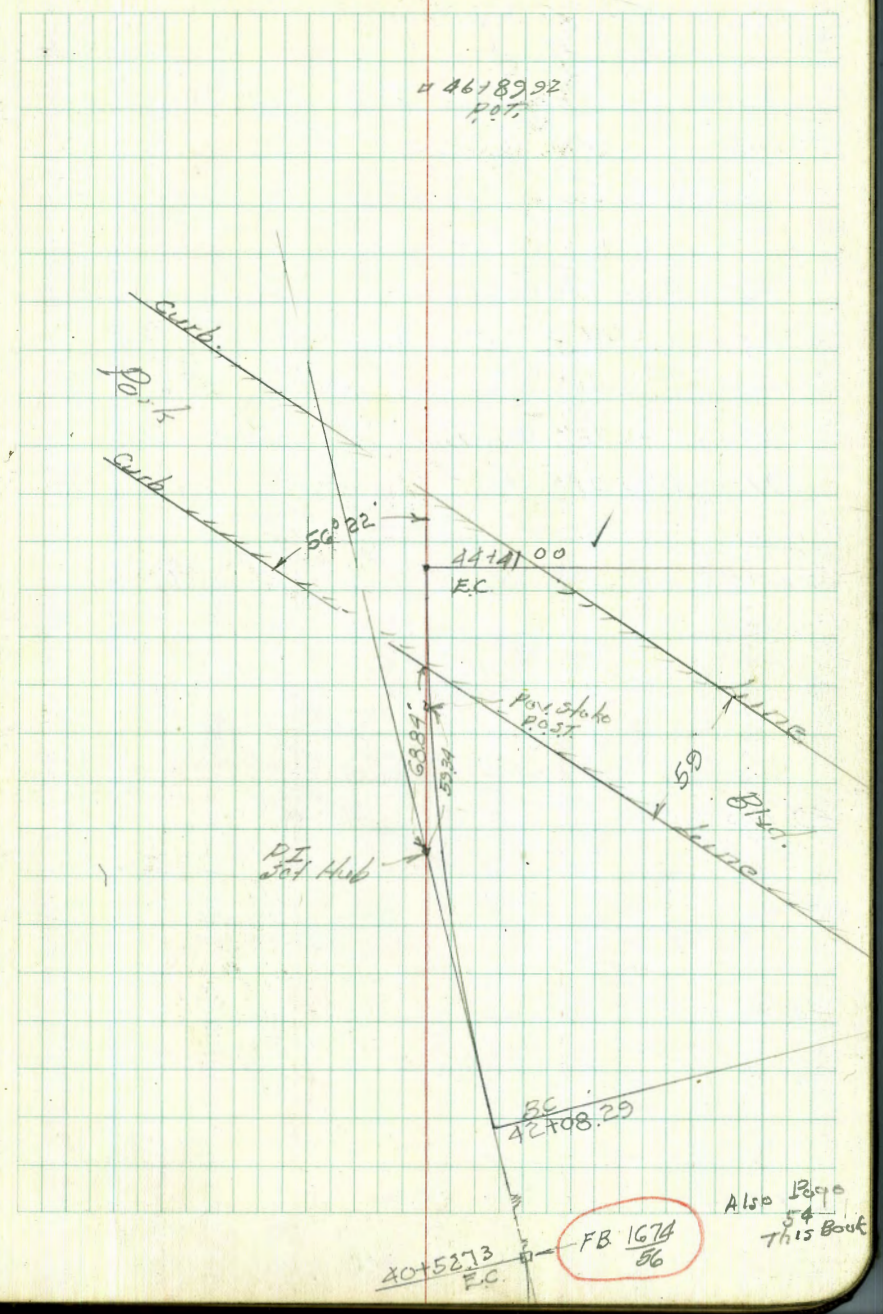
46+00

45+00

44+41.00 = E.C.

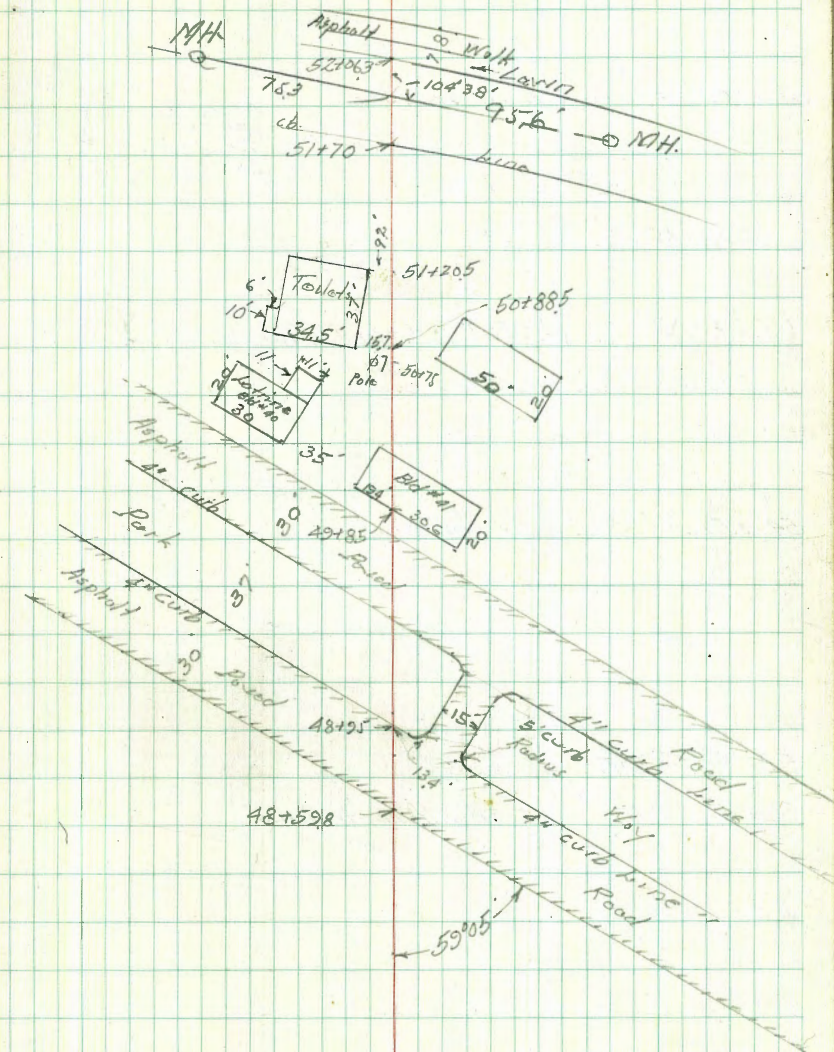
Δ = 13°20
R = 1000'
L = 232.71
T = 116.88

42+08.29 = B.C. Pt.



Also Page 54 This Book

52+29 5.5 Lt 6" Cocos Palm — Meas. Parallel to cb.
8.8' R. 5" " "
9.4' Rt. " " " 8" " "
+10.4 5' Lt. parallel to cb. 8" Cocos Palm
52+00
51+88.9 Int. Sewer
+02 8' Rt. Two 4" Trees
51+01 6.5' Lt 36" Euc. Tree.
51+00
50+98 5 Lt 16" Euc. Tree
+97 5' Rt 28" " "
50+00
49+00
48+00
47+00



56+35.01 = E.C. Set Nail in Pav.

Δ = 29°30
R = 90'
T = 23.98
L = 46.86

P.T. set " " "

55+88.15 = B.C. " " " "

(55+31.7) 6.9' Rt. = End 10" Steel Pipe Culvert

55+24.2 = Int. West Face Conc. Dam

64+51.71 = P.O.T. Set Anc Stub.

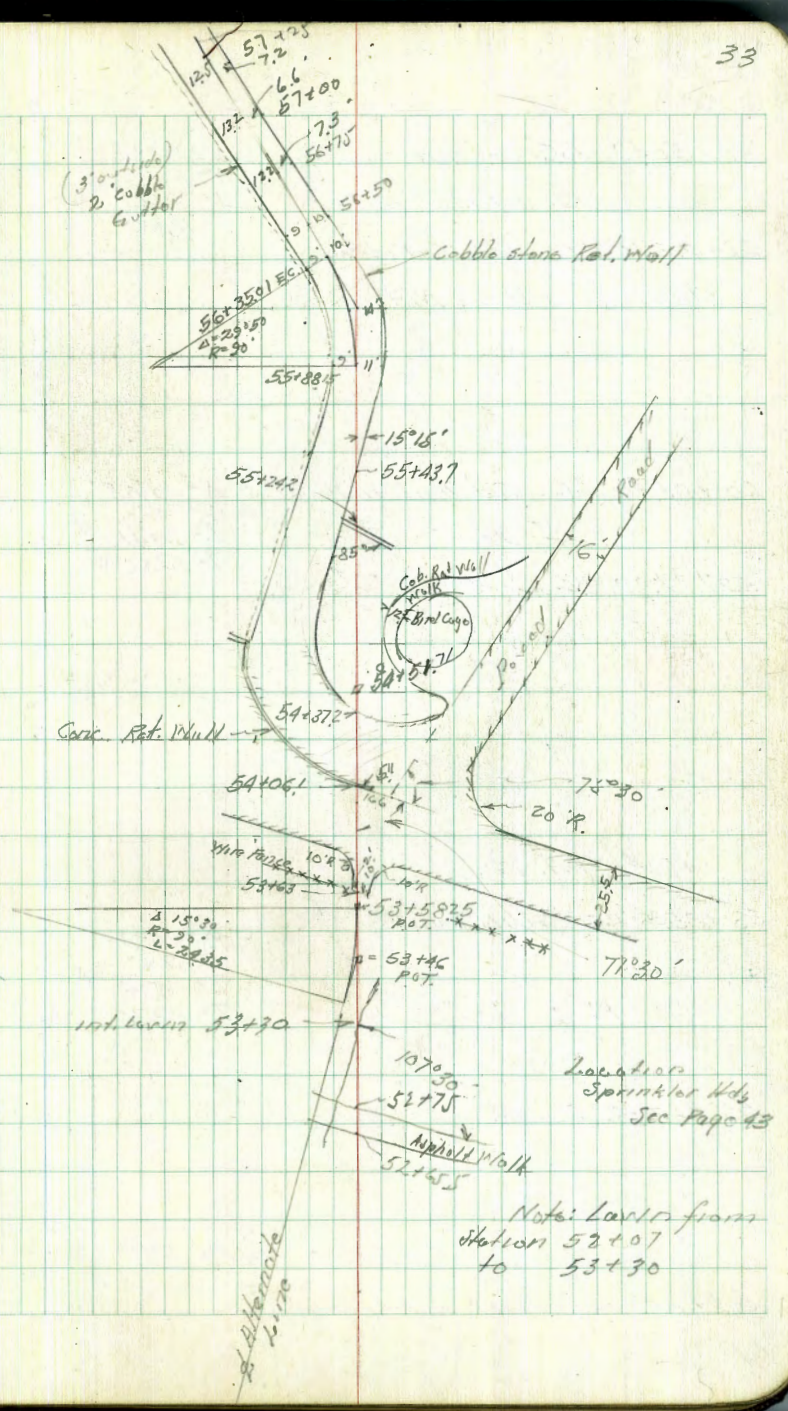
53+58.25 = P.O.T.

53+46 = P.O.T. = PT on Alternate Line

53+00

52+65.8 = Int. E edge Asphalt Walk

52+00



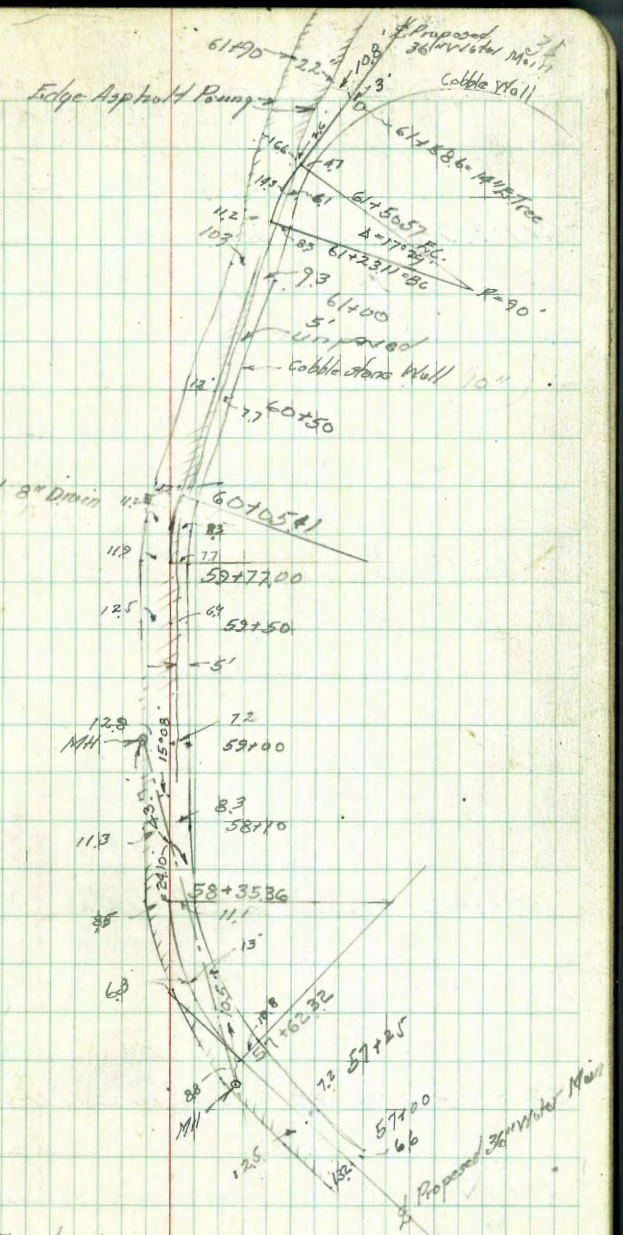
61+50.57 = E.C. Set Hub. Δ 17°29'
P.I. Set Null in Pav R = 90'
61+23.11 = B.C. Set Null in Pav. L = 27.46
(61+27.5) 13' Lt = ℄ MH T = 13.83

60+05.41 = E.C. Set Null in Pav. Δ = 18°05'
P.I. Set " " " R = 90'
59+77.00 = B.C. P.I. " " " L = 28.41
T = 14.32

+59.46 = Int. Sewer

58+35.36 = E.C. Set Null in Pav. Δ = 46°30'
P.I. " " " " R = 90'
" " " " L = 73.04
57+62.32 = B.C. P.I. T = 38.76 38.67

Unpaved Portion
from 57+15 to 58+70 on Rt. from 4 to 5' wide; from 58+70 to 61+23
57+15 Find Full width Pav Unpaved portion on Rt = 5'



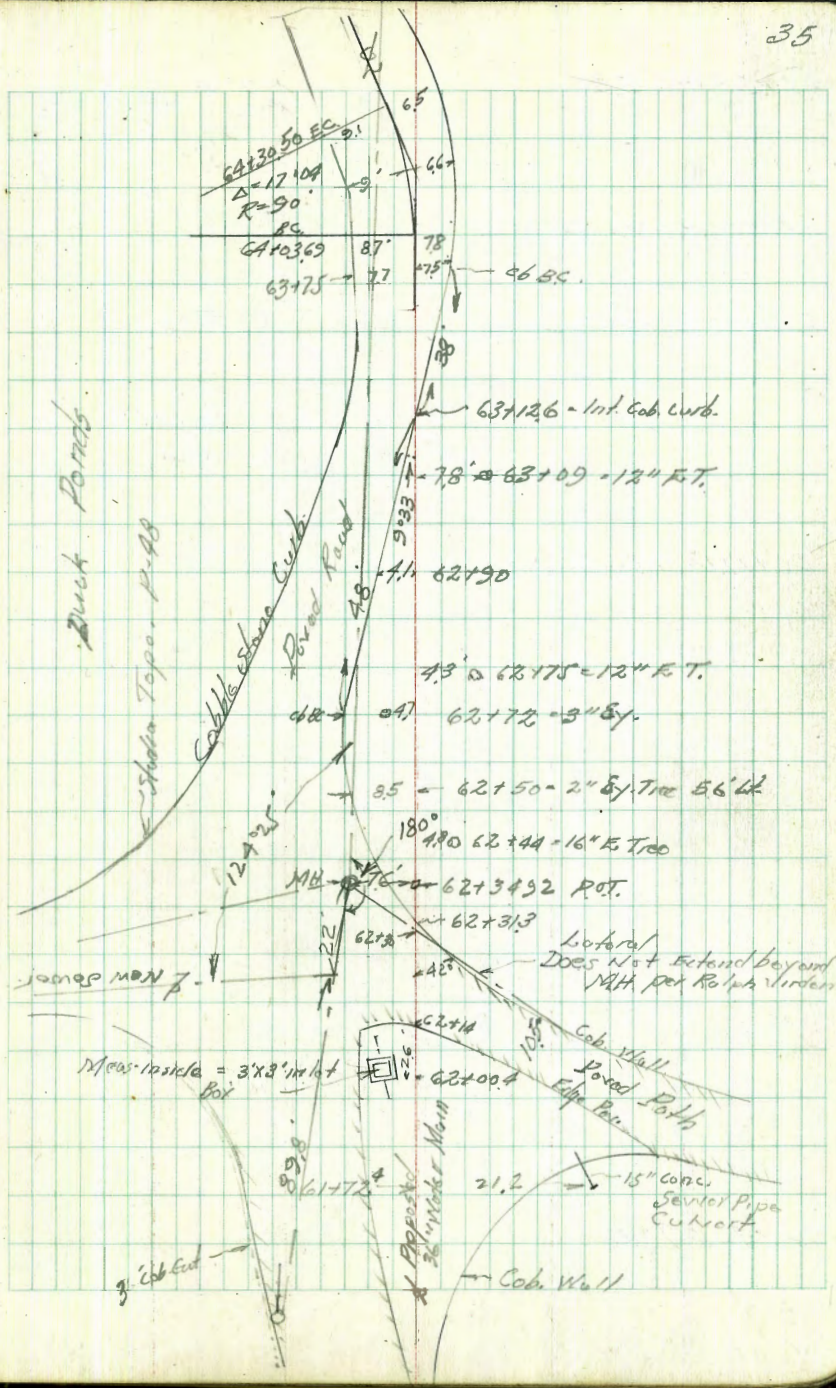
64+30.50 = E.C. set Nail in Pav. $\Delta = 17°04'$ ✓
$R = 90'$
$L = 26.81$ ✓
P.T. set Nail in Pave $T = 13.50$ ✓

64+03.69 = P.C. Lt. set Nail in Pave

62+34.92 = P.O.T. 7.6' Lt = INH

62+00.4 = opp NE Cor Inlet Box 2.6' Lt = outside Col. Box

(61+72.4) 21.2' Rt = 15" Conc. Culvert (Sewer Pipe)



67+98.24 = E.C.

Δ = 9°24'
R = 90'
L = 14.77'
T = 7.40'

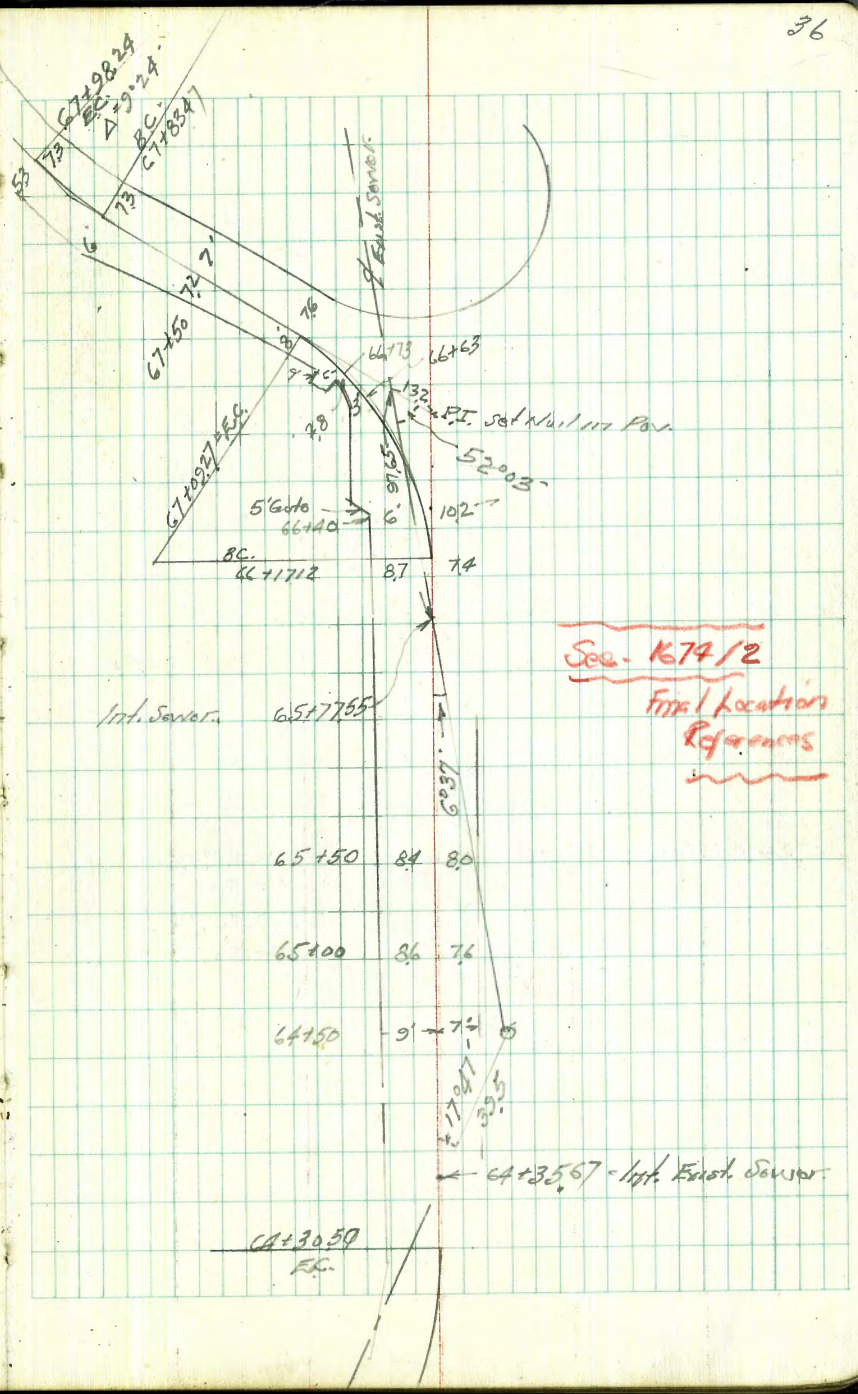
67+83.47 = B.C. ℄

67+09.27 = E.C. Set Nail in Pav.

Δ 58°40'
R = 90'
L = 92.15'
T = 50.57'
Ext. = 13.24'

66+17.12 = B.C. ℄ Set Nail in Pav.

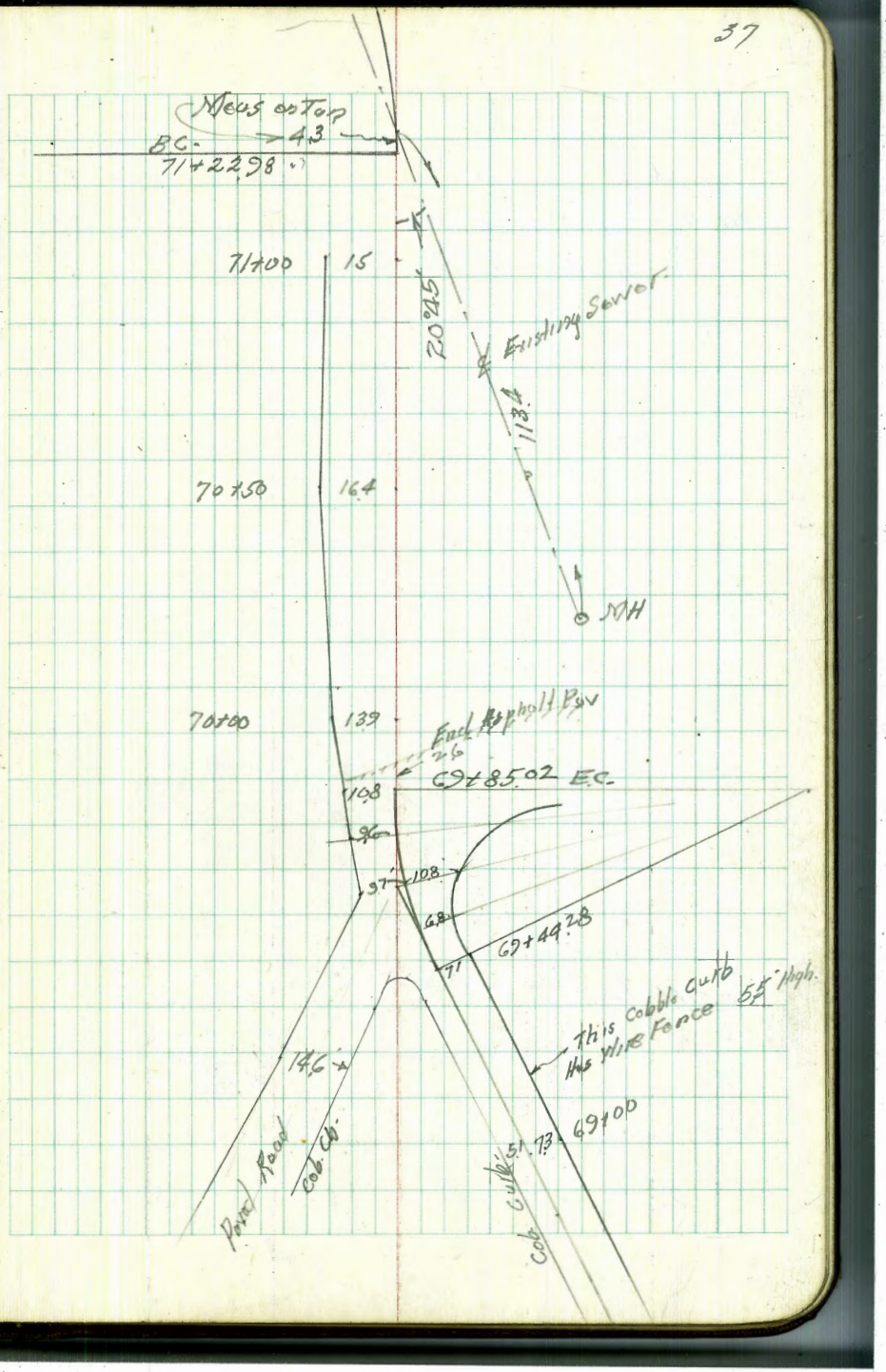
64+30.57 = E.C.



71+22.98 = B.C. L.L.

69+85.02 = E.C. Set Nail in Pav. Δ = 25°56'
R = 90'
L = 40.74 ✓
T = 20.72 ✓
P.I. Set Nail in Pav.

69+44.28 = B.C. Set Nail in Pav.



72+39.79 ↑ Equation
73+11.64 ↓ =P.O.T. This Line   Nail

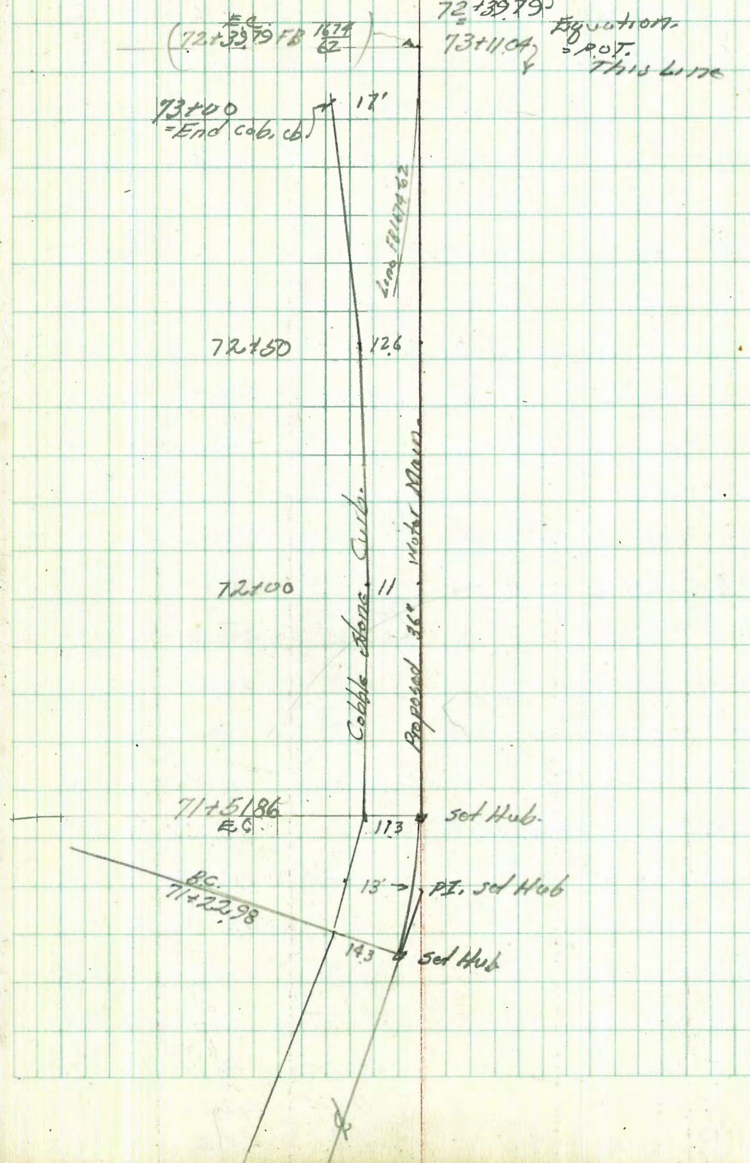
71+51.86 = E.C.

Δ = 18°23'
R = 90'
L = 28.88
T = 14.56

71+22.98 = BC

← Line FB 1674/62

72+39.79 ↓ Equation
73+11.64 ↓ = P.O.T. This Line



Walker
Hogard
Hardin
2-6-45

Levels for Proposed Line Change
36" Water thru Zoo
Location Pages 31-38

	1.06	289.12		288.06	B.M. Nail 44+39.25 F.B. 1674-66
42+08.29 = BC. Rt.	on Hub		12.32	276.80	
+50			11.1	278.0	
43+00			9.6	279.5	
+56			7.0	282.1	
+67			5.8	283.3	
+80			1.1	288.0	
	E. cb. Park Blvd		1.15	287.97	
	Gut. on Paving		1.72	287.40	
	Approx ℄ Park Blvd		0.92	288.20	
44+41.00 = EC.			0.92	"	
	W. Gut. No cb.		1.49	287.63	
TP	12.06	300.93	0.25	288.87	
45+00			11.5	289.4	
+50			8.2	292.7	
46+00			6.2	294.7	
+50			4.6	296.3	
+89.92 = P.O.T. Hub.			4.66	296.27	
47+00			4.6	296.3	
+50			5.2	295.7	
48+00			6.2	294.7	
+59.8± = E edge Pav.			7.75	293.18	
+95	Gut.		8.22	292.71	
"	on cb		7.64	293.29	
49+00			8.4	292.5	

39

300.93

49+30	8.5	292.4
49+38.13 on cb	8.94	291.99
" " Gut.	9.42	291.51
49+78.10 = W edge Paving	9.56	291.37
+85 at Barrack's Bld.	10.2	290.7
TP 0.30 291.36	9.87	291.06
50+12 = W side Barrack Bld.	1.1	290.3
+75	3.3	288.1
+96	4.0	287.4
51+00	5.2	286.2
+50	6.5	284.9
+70 E cb. (Roadway)	6.89	284.47
" Gut. on Pav.	7.27	284.09
+88± ℄ Road	7.01	284.35
52+06.3 W Gut	7.36	284.00
" " cb.	7.03	284.33
+13.4 = E. edge Asphalt Side Walk	7.75	283.61
21.5 W " " "	7.76	283.60
+65.5 on E " " "	8.71	282.65
+75 " W " " "	8.89	282.47
53+00	9.6	281.8
+46 = POT. - PI Alternate on Hub	10.55	280.81
+58.75 = POT - EC. "	~~10.74~~ 10.64	~~280.62~~ 280.72
TP 0.53 280.98	10.91	280.45
53+63 = E edge Asphalt Pav.	0.41	280.57
54+00 on " "	0.96	280.02

			280.98		
54+05	at Wall on Pav.			1.19	279.79
+06.1	on "			0.61	280.37
+06.1	on Pav. Branch Road			2.38	278.60
+37.2	" " " "			5.29	275.69
"	" cb.			4.71	276.27
+51.7'	= POT. Stub.			3.40	277.58
+61				5.3	275.7
+72				10.5	270.5
+85				12.7	268.3
T.P.		0.16	268.37	12.77	268.21
55+24.2	on Dam			3.76	264.61
"	" Ground			6.9	261.5
(55+31.7)	7' Rt.	10" Steel Culvert End		12.9	256.5
55+42				7.2	261.2
+43.7	on Cobble Wall			5.48	262.89
"	" Pav.			6.29	262.08
+75				8.55	259.82
+88.75	= B.C. Lt.			2.96	258.41
56+1.68	℄ Curve			12.73	255.64
T.P.		0.42	256.06	12.73	255.64
56+35.01	= E.C.			3.18	252.88
+75				8.97	247.09
57+00				12.50	243.56
T.P.		0.39	243.57	12.88	243.18
+25				3.66	239.91

			243.57		
57+62.32 = B.C.				8.87	234.70
T.P.		0.43	230.99	13.01	230.56
+98.84 ℄ Curve				0.96	230.03
58+35.36 = E.C.				4.90	226.09
+59.46	on Pav. (Ctl. Sewer)			7.49	223.50
+70				8.66	222.33
59+00				11.95	219.04
T.P.		1.14	219.41	12.72	218.27
	Lt. on Rim M.H.			1.33	218.08
	" Floor "			5.68	213.73
59+50				6.11	213.30
+77.40 = B.C.				9.19	210.22
60+05.41 = E.C.				12.12	207.29
T.P.		0.99	207.44	12.96	206.45
(60+00)	13' Lt. on Grating			0.20	207.24
	" " " Flow			2.20	205.24
60+23.7				2.11	205.33
1.8	Rt. on Flow outlet 8" Drain			5.59	201.85
60+50				4.94	202.50
61+00				10.76	196.68
T.P.		0.59	195.05	12.98	194.46
61+23.4 = B.C.				1.22	193.83
(61+27.5)	13' Lt. on Rim MH			3.11	191.94
	" Floor "			8.32	186.73
+39	on Pav.			3.17	191.88
+42	Edge Pav.			3.69	191.36

		195.05			
61+50.57 = E.C. on Hub			5.00	190.05	2.6 Lt N edge Pav.
+90			2.6	185.4	
(61+72.4) 21.2' Rt. on Flow 15" main			9.92	185.13	
62+00.4			10.2	184.8	
2.6' Lt. Grating			11.20	183.8	
on Flow inlet			16.50	178.55	
T.P.	3.94	186.70	12.29	182.76	
62+14 on E edge Paving			2.71	183.99	
62+31.3 on Gut. at Cob. cb.			3.78	182.92	
" " cb.			3.07	183.63	
62+34.92 P.O.T. Pav. stake			2.97	183.73	
7.6' Lt. on Rim MH			4.49 (4.30)	182.21	
" Flow			8.79	177.91	
+44			.05	186.65	
+50			0.2	186.5	
4' Lt			4.2	182.5	
+77			1.1	185.6	
2' Lt			5.2	181.5	
+87			2.9	183.8	
+93			5.9	180.8	
63+12.6 on cb.			6.25	180.45	
" " Pav.			7.19	179.51	
63+50 " "			7.91	178.79	
64+03.69 B.C.			9.30	177.40	
64+30.50			10.27	176.43	

		186.70			
T.P.	0.59	177.86	9.43	177.27	
64+50			1.90		175.96
64+91			3.59		174.27
65+00			4.15		173.71
+50			7.33		170.53
+66			8.35		169.51
65+77.55 on Pav (Int. Sewer)			9.18		168.68
66+17.12 = B.C.			12.45		165.41
T.P.	1.07	166.32	12.61	165.25	
66+40			2.70		163.62
+63 3' Lt = cb			4.57		161.75
+68 1.5' Lt = cb					
+73 2.8 " "					
+86			6.61		159.71
67+09.27 = E.C.			7.53		158.79
+50			8.61		157.71
+83.47 = B.C. Rt.			9.38		156.94
+98.24 = E.C.			9.77		156.55
T.P.	1.67	157.83	10.16	156.16	
68+50			2.58		155.25
69+00			4.21		153.62
+44.78 = B.C. Rt.			5.53		152.30
+64.5			6.10		151.73
+85.02 = E.C.			6.89		150.94
+87.6 = Edge Pav.			7.08		150.75
70+00			7.9		149.9

	157.83 ✓			
70+50		9.8	148.0	
+80		10.9	147.8	
5' Rt		11.6	146.7	
7' Rt. Sedge 6' Creek		15.5	142.3	
71+00		11.3	146.5	
(70+94) 8.6 Rt. 18" E Tree				10' Rt. Sedge 4' Crk.
T.R	1.15	148.31 ✓	10.67	147.16
71+22.98 = B.C.			2.06	146.25
+29 3' Rt 18" E Tree				
13' R 30" E "				
17 Rt. Sedge 5' Creek				
71+49 4' Rt 16" E Tree				
71+57.86 = E.C. on Hub			2.17	145.64
+63 5' Rt = 18" E Tree				
15' Rt Sedge 5' Creek				
71+82.28 P.O.T.			3.86	142.95
6' Rt 14" E Tree				
72+00			4.3	144.0
+08 7.5' Rt 16" E Tree				
+50			5.7	142.6
73+00			7.2	141.1
73+11.04 = 72+39.79	Equation on P-6		7.5	140.8

	148.31 ✓			
T.R	5.24	153.64 ✓	0.91	147.40
Csk. 69+62.53 P-6			4.02	148.62 ✓
		148.58		
		0.04 Error		

Location Sprinkler Hds.
from Proposed 36" Water Line P-3.3

52+12	5.5' Rt. Sprinkler Hd.
+15	7.2' Lt. " "
+19	10' Rt " "
+24	3' Lt. " "
+35	6' Rt " "
+38	7.4' Lt. " "
+53	8.8' Lt. " "
+60	5.3' Rt " "
+73	10.6' Rt. " "
+86	11' Lt. " "
+88	1.9' Rt " "
53+00	5.7 Rt. " "
"	7.6' Lt. " "
+11	8' Rt. " "
+13	4.2' Lt. " "
+25	10.8' Lt. " "
+27	0.5' Lt. " "
+38	13' Rt. " "
+40	3.6' Rt. " "
+53	7.5' Rt. " "

Location Sprinkler Hds
from Alternate Line PA6

52+55	24' Rt Sprinkler Hd.
+68	7' Rt " "
+80	6.5' Rt " "
53+08	5' Rt " "

✓

Walker
Hazen
Hudin
2-6-45

Alternate Location for Proposed 36" Water Main from station 46+22.97 to 53+81.14

Stations

Levels - P-50

48+50 6°10.9

48+00 4°44.9

Δ = 28°50'30"
R = 1000'
L = 503.38 ✓
T = 257.17 ✓

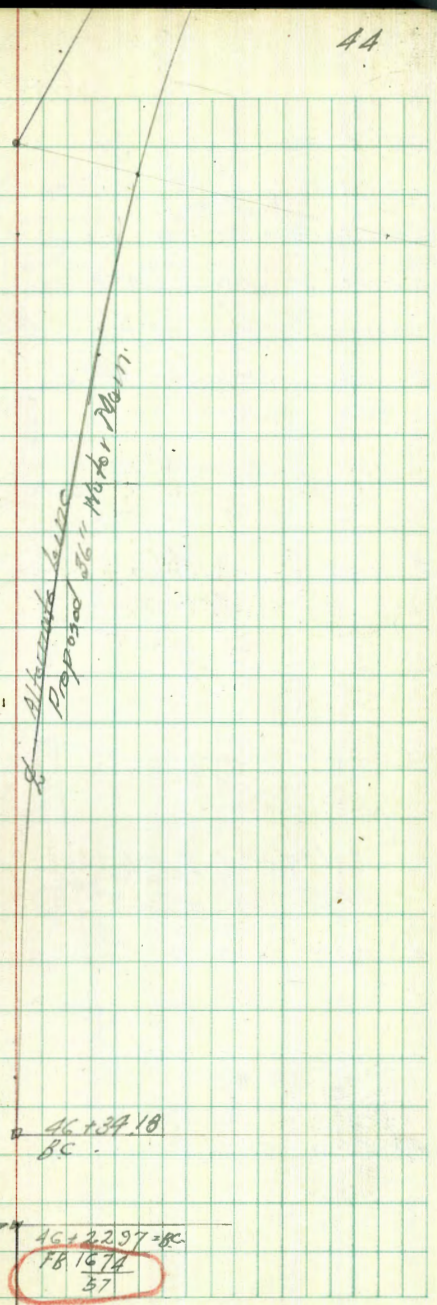
47+50 3°18.2

47+00 1°52.9

46+50 0°26.9

46+34.18 BC RL Set Hub

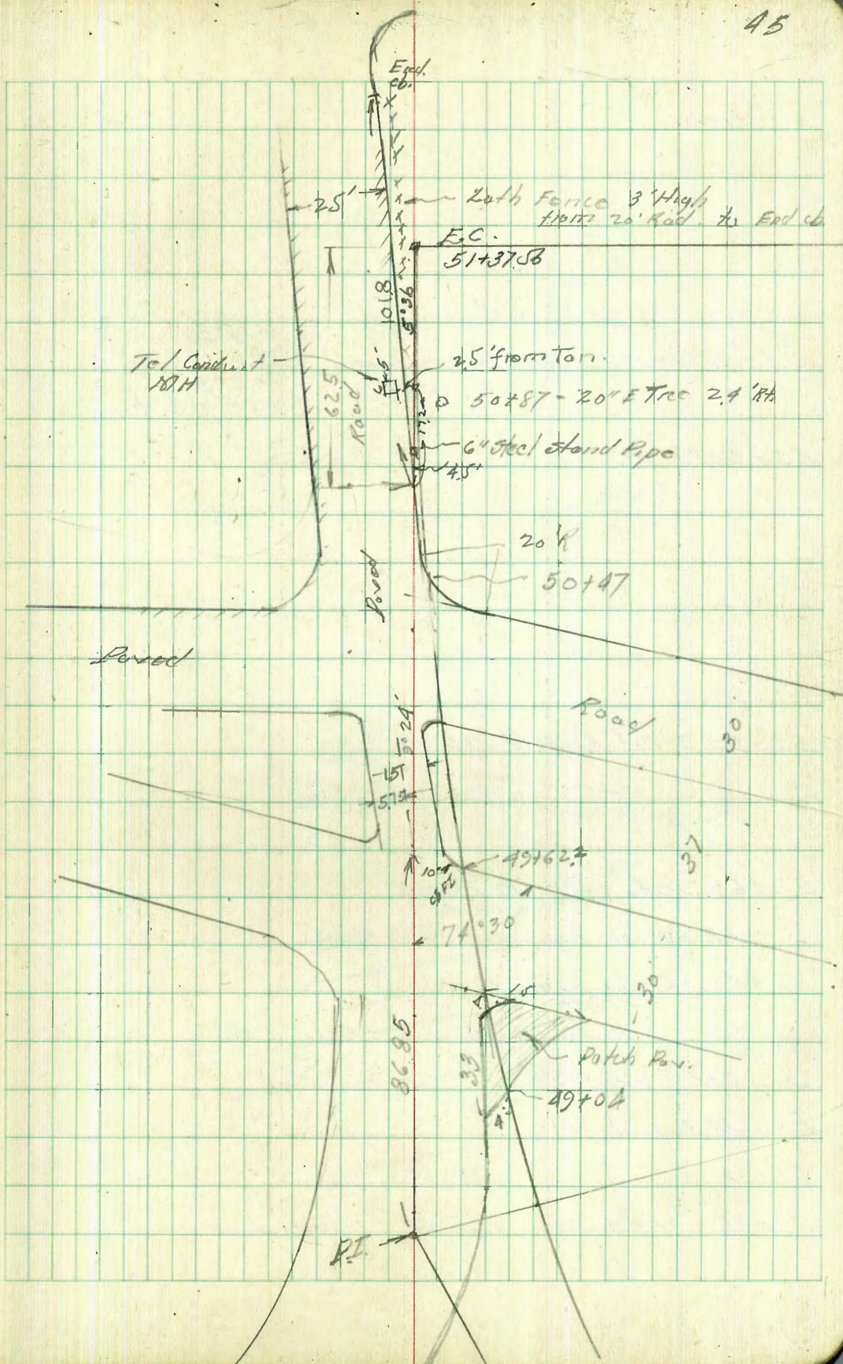
46+22.97 = P.O.T. Fd Hub



Alternate Line
Cont. from P-44

Stations

51+50	1.3' Rt. 14°25.5'	5" Tree
51+37.56 = E.C.		0.3' Lt 3" E Tree
51+32.5	6' Rt = 30" E Tree	
51+07	3' Rt = 10" E Tree	5' Rt 10" 7' Rt 12" E Trees.
51+00	13°20.9'	
50+50	11°54.9'	
50+00	10°28.9	
+71 = 8" Tel Pole 0.2' Lt. of N. edge		
+62.2 = Int. 4" curb		
49+50	9°02.9	
49+00	7°36.9	



Stations

=53+58.25=P-33

53+81.17=E.C. -End Alternate Line

Δ=15°30'
R=90'
L=24.38
T=12.25'

2+35 ✓

53+56.79=B.C

52+92.3-Int Asphalt Side Walk.

52+60-Int 6.5' Wire Fence

+48 =West edge Walk

52+40 -E edge Asphalt Walk

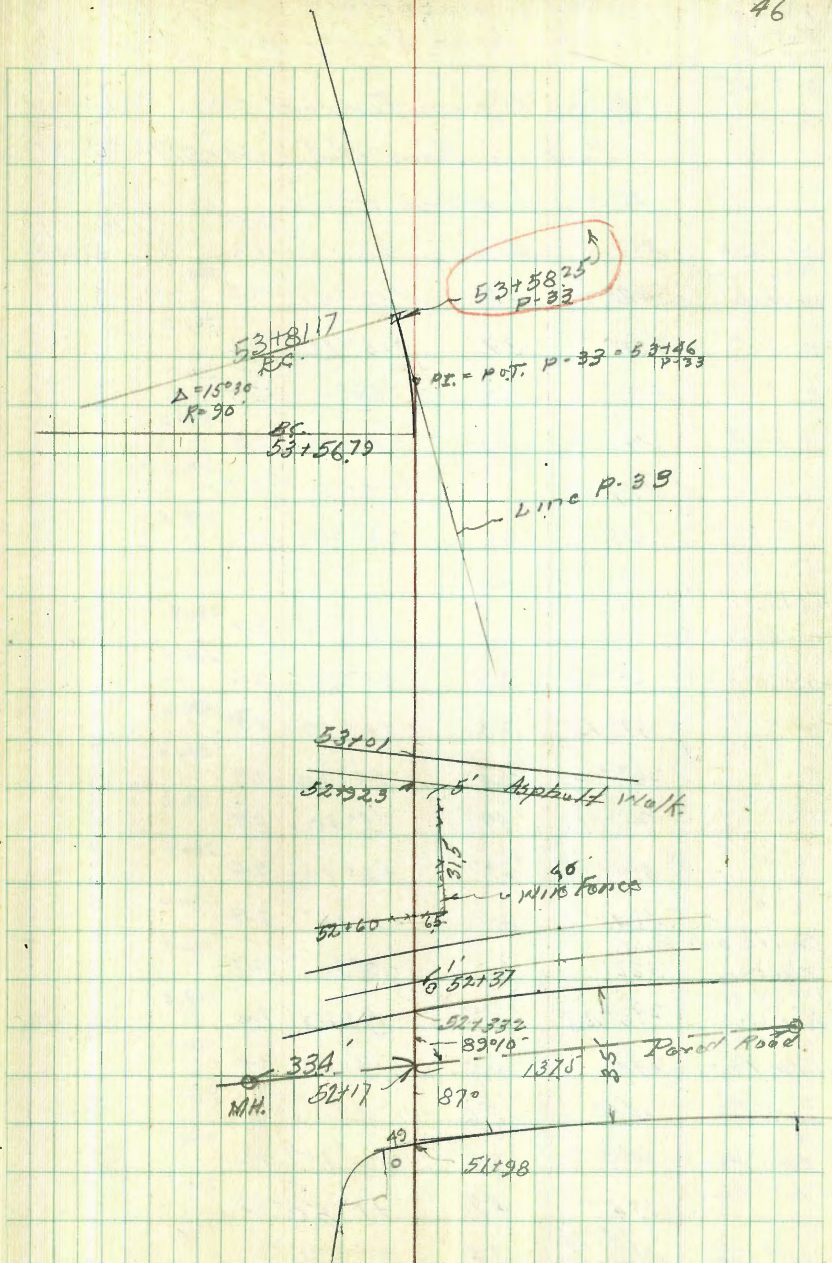
+37 8" Lucas Plumosa 15' High 1' Rt.

52+33.2 =Int W cb

52+17 =Int Sewer

51+98

51+95 Lamp Std. 2.5' Lt. - N edge Base



Walker Hazard Hardin 2-7-15

Station Location Topography
Water Line Survey thru 300

Azimuths from Forward Sta. Clockwise

Readings from station 54+51.7 El. = 271.58 P-40

Horiz ∠ to Nearest 15'

Station Readings	Az	Stadia	V.A.	Diff Elev.		Horiz Dist.
on N.C.L.	342°	46'	-12°10	9.5	268.1	
" " "	338°	37	-13°10	8.2	269.4	
" " "	214	20	-18°	5.9	271.7	
" " "	246°	10'	-21°50'	3.8	274.2	
" " "	171°15	17'	- 2°30'	0.7	276.9	
" " "	148°15'	25'	+2°30'	1.1	278.7	
on wall Ground Bird Cage	92°	31	+5°	2.7	280.3	
on Wall " "	61°30	22	+6°50	2.6	280.4	
" "	37°15	23	+6°10	2.8	280.0	
" "	26°30	24	+4°20	1.8	279.8	
" "	26°45	49	+3°10	2.7	280.3	
" "	30°	69'	+2°10	2.6	280.2	
" "	35°45'	81	+1°40'	2.9	280.0	
South side Road edge Pav.	322°	60	-10°30	10.7	266.9	
SWLY Cor Ret. Wall	293°45	47	-9°40	7.8	269.8	
" " Edge Pav	270°	40	-9°10'	6.3	271.3	
" at wall	241°	36	-7°	4.9	273.2	
" " Edge Pav	207°	39	-2°15'	1.5	276.1	
End Wall	174°	47	+1°50'	1.5	276.1	
12" Cocos	74°15 Plumosa	14'	+9°30	-2.3	275.3	

Ground outside
3.5' below
5.6' below
5.3 "
4.3' "

Edge Pav

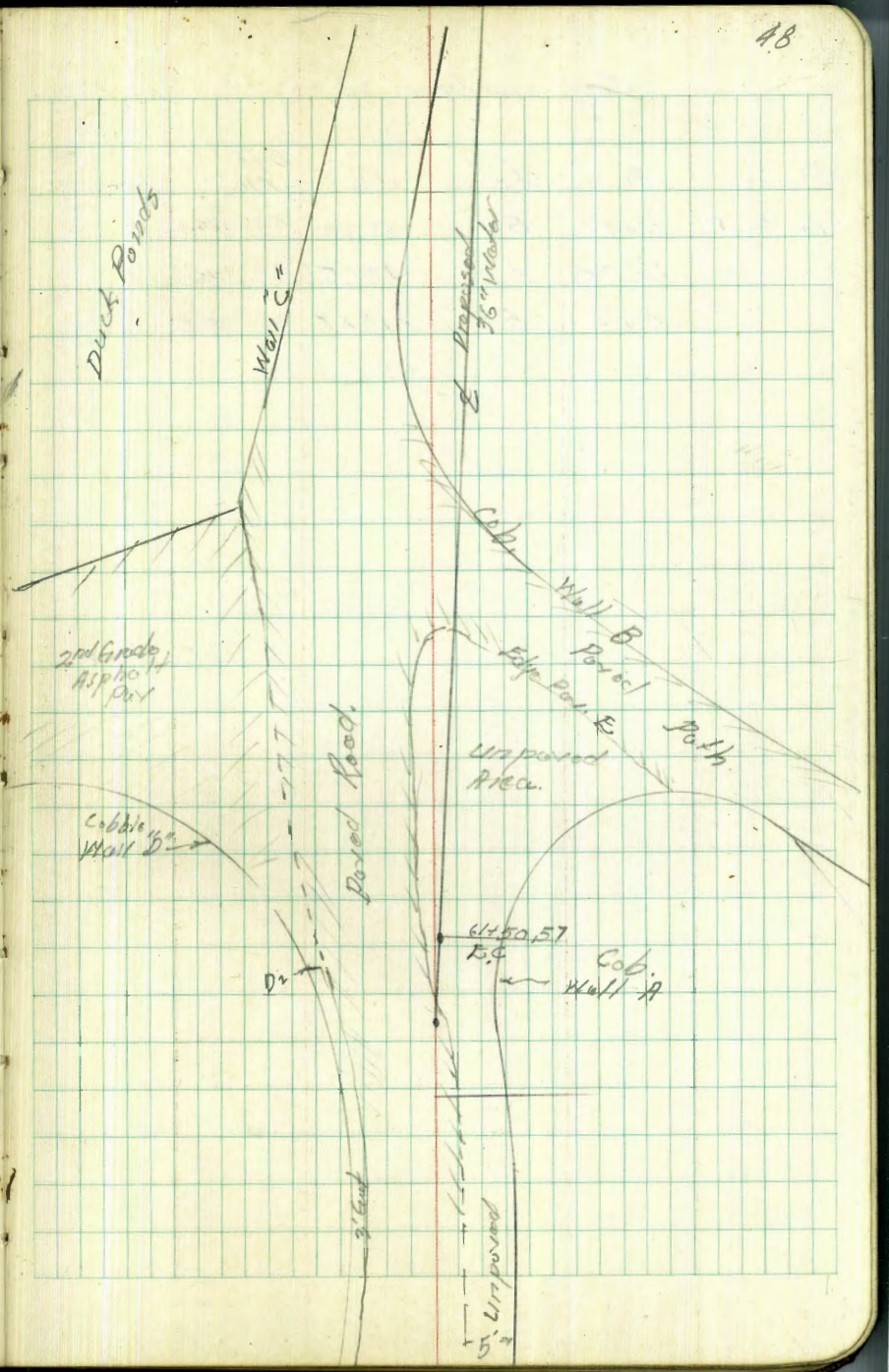
Station Readings — P-39

from 61+50.57 = EC = Elev = 190.05

Az. from Forward Tan Clockwise

Station	Az.	Stadia	V∠	Diff Elev	Horiz. dist.
Wall "A"	156°	45'	+9°10'	7.1	197.1
Wall A	150°30'	12'	+13°15'	2.7	192.7
" "	19°30'	14'	+0°25'	0.1	190.2
" "	34°	33'	+0°15'	0.1	190.2
" "	60°	54'	+2°50'	2.7	192.8
" "	74°	72'	+5°40'	7.1	197.2
Wall "B"	63°30'	72'	+4°20'	5.4	195.4
" "	44°30'	61'	+0°30'	0.5	190.6
" "	19°30'	64'	-3°10'	3.5	186.6
" "	2°15'	78'	-4°30'	6.1	189.0
Wall "C"	347°15'	116'	-3°50'	7.7	182.4
" "	342°15'	96'	-4°10'	7.0	183.0
" "	337°	86	-4°15'	6.7	183.3
" "	319°30'	84	-4°30'	6.6	183.4
" "	292°45'	92'	-4°05'	6.5	183.6
Wall D	285°15'	74'	-3°10'	4.1	186.0
" "	295°30'	61	-3°50'	4.1	186.0
" " Dx	302°	40	-4°45'	3.3	186.8
South Edge Pav.	201°	30	+6°25'	3.3	193.4
Edge Pav. E	163°	51	+7°30'	6.6	196.6
" "	270°	2.6'	0°	0	190.0
" "	335'	23'	-8°10'	3.2	186.8
" "	351°	58'	-6°20'	6.4	183.6

Cont. P. 49



Readings from 61 +50.57 Elev 190.05

Station	Az.	Stadia	V. Δ	Diff. Elev	Horiz.
Edge Pav. E	1°45	63	-5°20	5.8	189.2
" " "	19°30	52	-4°15'	3.8	186.2
" " "	57°	53	+1°55	1.8	191.8

at W½ N ¼ 4

Walker Hazard Hardin

2-7-45

Levels — Alternate Line proposed 36" Water Main

Location P-40

Station	1.92	298.19		296.27	871. on stub 46+89.92 P 39
46+22.97 = P.O.T.			4.18	294.01	
+34.18 = B.C. Rt.			3.60	294.59	
+50			3.1	295.1	
47+00			1.9	296.3	
+50			2.0	296.2	
48+00			2.6	295.6	
+50			3.5	294.7	
49+00			5.0	293.2	
+04 on Pav.			5.16	293.03	
+50 " "			6.62	291.57	
+62.2 " " of cb.			6.86	291.33	
49+63 " on cb			6.36	291.89	
			6.6	291.6	
50+00			7.9	290.3	
+05 on cb			7.90	290.29	
" Gut.			8.49	289.75	
50+47 Edge Pav.			8.76	289.93	
T.P.	1.81	289.88	10.12	288.07	
51+00			2.1	287.8	
+37.56 = E.C. on Hub			3.74	286.14	
+50			4.5	285.4	
+98 on cb			5.32	284.56	
" Gut. Pavmy			5.77	284.11	

289.88

52+17		5.50	284.38
13.75 Rt. on XH		5.68	284.20
" " " Pav.		17.38	277.58
52+33.2 Wch Gut.		5.85	284.03
" on "		5.47	284.41
+40 on Asphalt Walk		5.99	283.89
+48 " " "		6.00	283.88
+60		6.5	283.4
+92.3 " " "		7.32	282.56
53+01 " " "		7.46	282.42
+56.79 = B.C. Rt.		8.95	280.93
+81.17 = E.C.		9.18	280.70 280.70
			280.72
			.02
Chk. 53+46.0 P-39		9.05	280.83
			280.81
			.02
Chk cb 51+47 P-39		5.46	284.48
			284.47
			.01

Walker
Hugard
Hurdin
3-5-45

PROPOSED CHANGE IN ALIGNMENT
of Preliminary Survey 36" Water Main → Across Balboa Park
For original Location see FB 1674-6
Profile Levels p-55

Stations

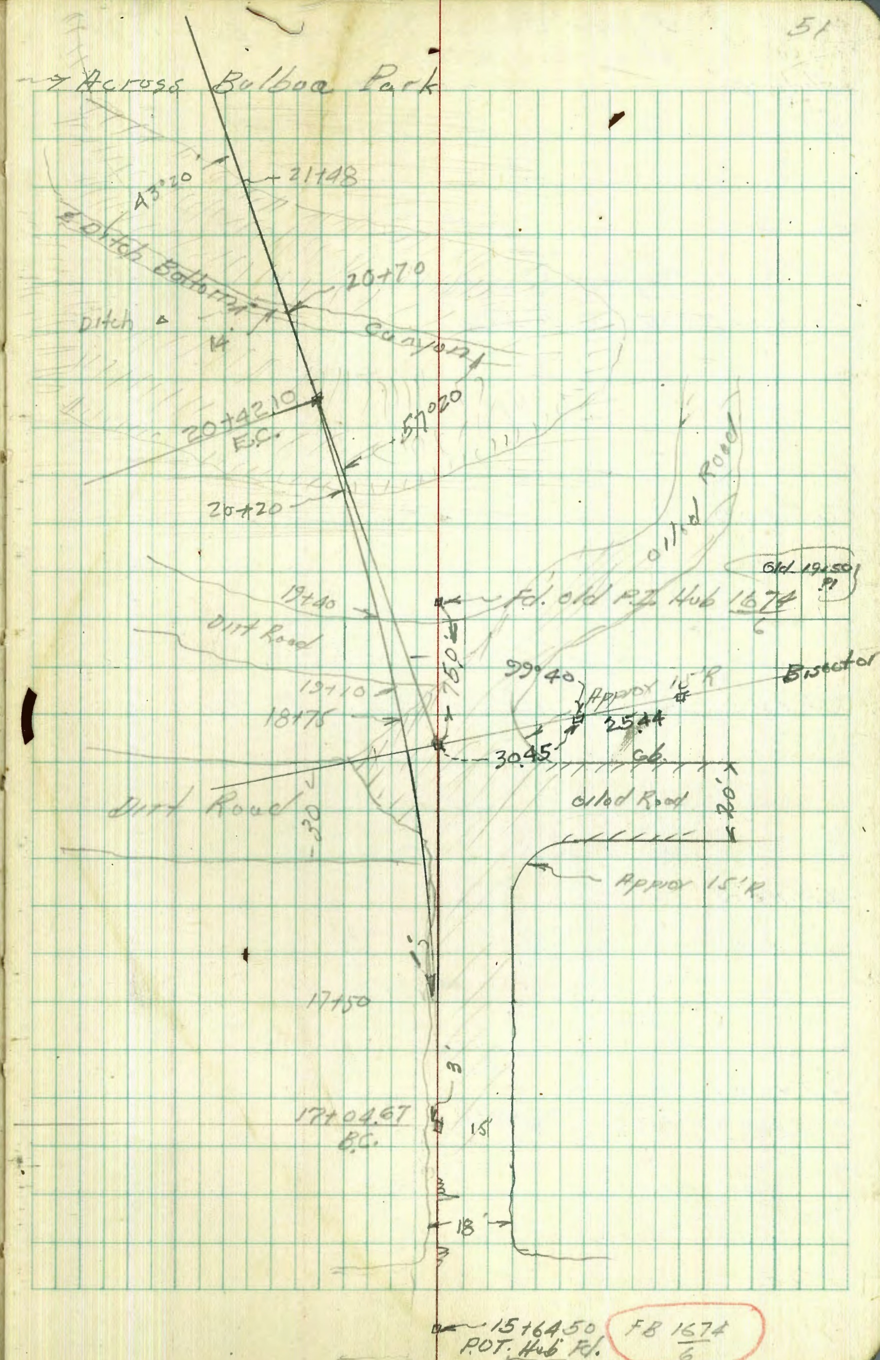
20+42.10 = E.C. ✓

20+00

+50

19+00
+75 = P.I. Δ = 19°20'
+50 R = 1000
 T = 170.33 ✓
18+00 L = 337.43 ✓
 Ext. = 14.40
+50

17+04.67 = B.C. Lt.



Proposed Change in Line 36" Water Main across Balboa Park

Cont. from P-31

Stations

27+00

26+50

26+00 = P.O.T. Set Hub.

25+00

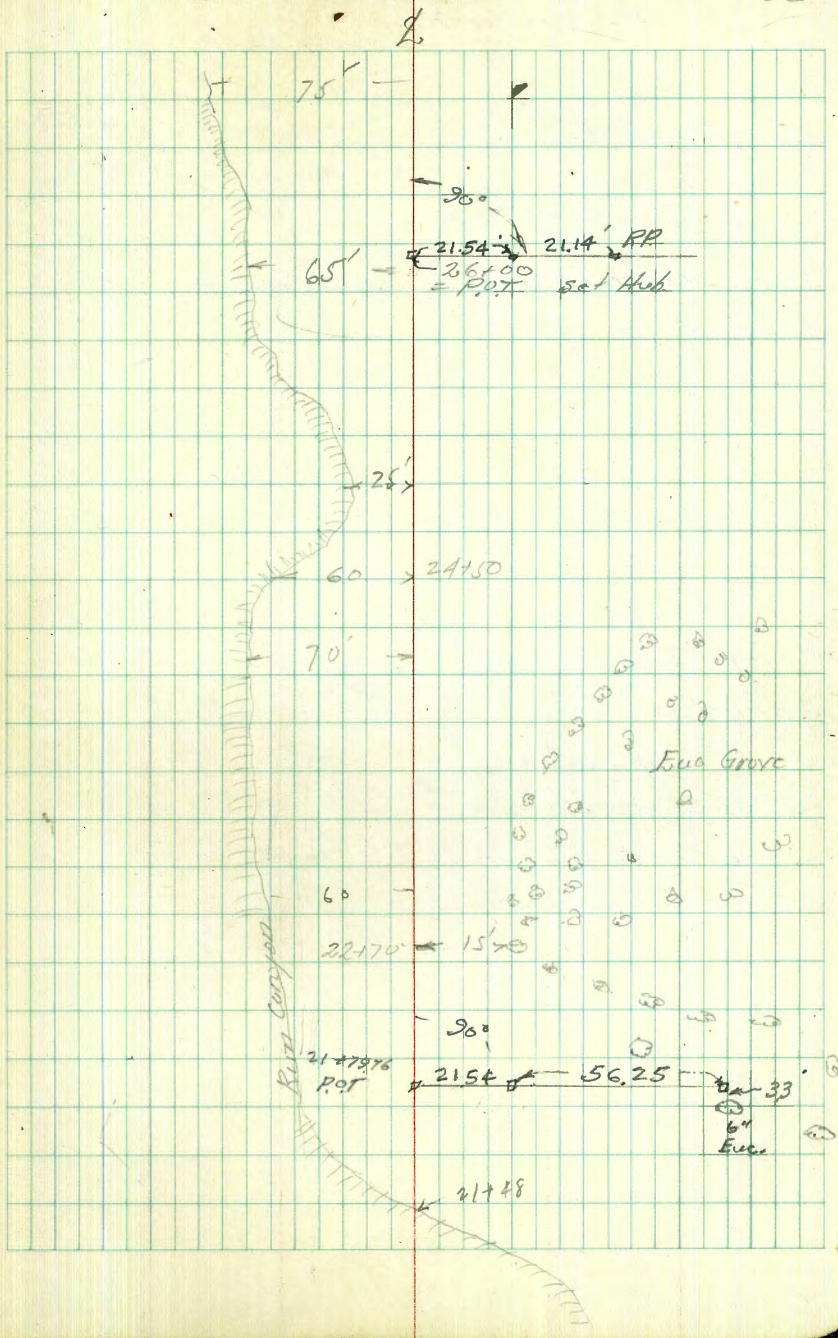
24+00

23+00

22+00

+79.76 = P.O.T.

21+00



Proposed Change in Line of 36" Water Main
Cont. from P. 52

Stations

(MH. 2.7 Lt.) Rings & Cover to be salvaged by Sewer Dept.

32+82.5 = Int. Abandoned Trunk Sewer

32+04.28 = P.O.T. & Powder Canyon Paved Road

32+00

31+00

+15 = P.O.T. Set Hub

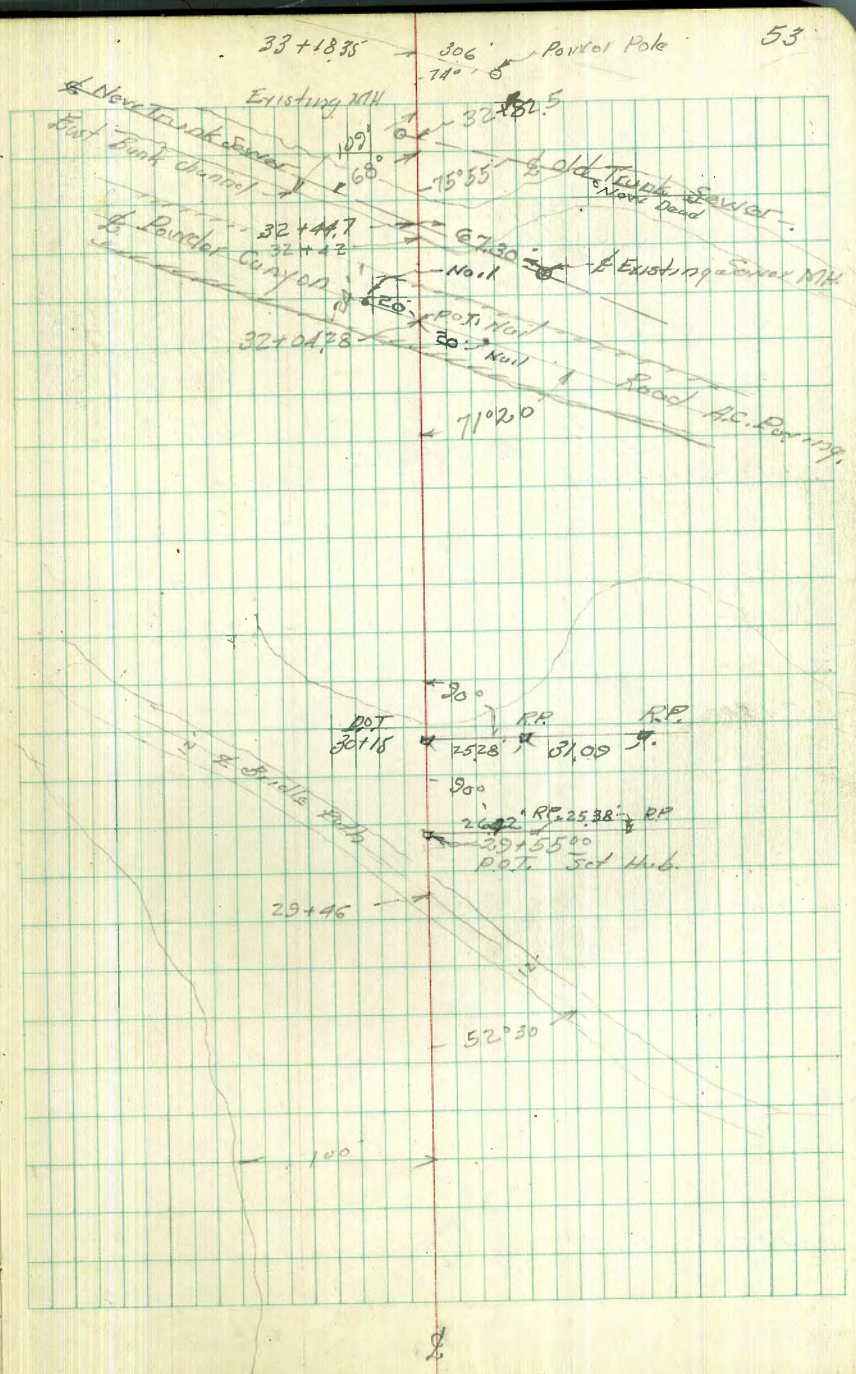
30+00

29+55.00 = P.O.T. Set Hub.

+15 = ℄ 12' Bridle Path

29+00

28+00



38+64.67 = B.C. Lt. (FB 1674/56)

38+63.39 Ahead = 38+12.56 Back } Equation E.C.

FB 1674/56

38+00

+75

+50

37+25 Set P.O.C on Bisector To P.I.

36+96.82 = ctr. curve		Δ = 17°41'
		R = 750'
+75		T = 116.66 ✓
+50		L = 231.47 ✓
+25		Ext. = 2.04'

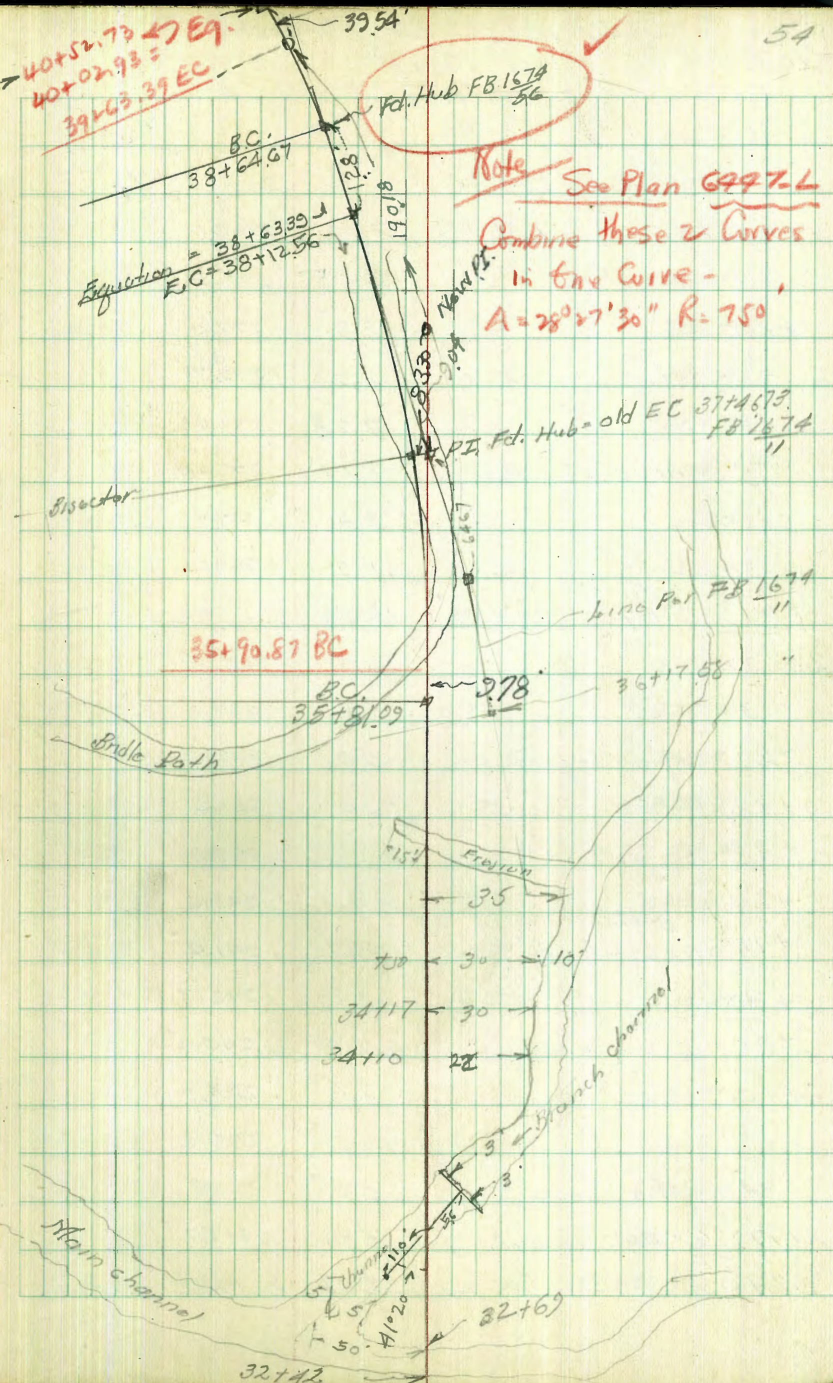
36+00

35+81.09 = B.C. Lt.

35+00

34+00

33+32.6 = Int. 12" Corrugated Culvert (Not in use / Plugged up)



LEVELS — for Proposed Change in Line 36" Water Main Location P-51-54

Station	Description	B.S.	H.I.	F.S.	Elev.	Remarks
		11.20	279.91		268.71	BM + 19+50 P.J. Hub F.B. 1874-22
17+04.67	B.C. Lt. on Hub			3.00	276.91	
+50	on oil Pav			4.60	275.31	
18+00				5.9	274.0	
+20	Int. " "			6.20	273.71	
+50	on " "			7.28	272.63	
+75	Int End oil Pav			8.51	271.40	
19+00				9.8	270.1	
+50				11.7	268.2	
T.P.		0.70	267.52	13.09	266.82	
20+00				2.0	265.5	
+13				3.3	264.2	
+20	Rim Canyon			5.0	262.5	
20+42.10	= E.C.			16.0	251.5	
+55				20.2	247.3	
+60				24.0	243.5	
+70	Bottom Canyon in Ditch 5' Wide			26.1	241.4	
+80				23.8	243.7	
+90				22.5	245.0	
21+00				17.6	249.9	
+31				12.2	255.3	
+48	= Rim Canyon			6.7	260.8	
21+79.76	= P.O.T. on Hub			5.88	261.64	
T.P. 22+00		1.84	263.29	6.07	261.45	on Rock

Station	Description	B.S.	H.I.	F.S.	Elev.
			263.29		
22+50				3.0	260.3
23+00				4.2	259.1
+50				5.5	257.8
+80				6.7	256.6
24+00				8.1	255.2
+10				8.8	254.5
+50				9.2	254.1
+60				8.6	254.7
25+00				9.4	253.9
+50				10.3	253.0
T.P. 26+00	P.O.T. Hub	1.02	251.91	12.40	250.89
+60				4.9	247.0
27+00				7.5	244.4
+50				10.5	241.4
28+00				13.2	238.7
TP		0.94	239.82	13.03	238.88
+50				2.9	236.9
29+00				4.8	235.0
+25				6.4	233.4
+39				7.7	232.1
+40				8.3	231.5
29+52				8.9	230.9
29+55	P.O.T.			9.52	230.30
+72				12.5	227.3
T.P.		0.16	227.22	12.76	227.06

		227.22 ✓			
29+98			4.4		222.8
30+10			6.9		220.3
30+15	POT. on Hub		7.26		219.96
+28	Rim Canyon		8.4		218.8
+25			10.8		216.4
+27			13.7		213.5
T.P.	0.13	214.31 ✓	13.04	214.18 ✓	
30+37			7.5		206.81
+44			11.6		202.7
+45			12.1		202.2
T.P.	0.23	201.81 ✓	12.73	201.58 ✓	
+56			5.9		195.9
+65			9.7	Inv. 1 198.1	
+71			11.4		190.4
T.P.	0.19	189.14 ✓	12.86	188.95 ✓	
+80			4.1		185.0
31+05			12.5		176.6
+20			14.3		172.2
+35			15.5		173.6
+50			16.9		172.2
T.P.	12.1	178.32 ✓	12.03	177.11 ✓	
+76			6.6		171.7
+81			5.0		173.3
+91.16	E side Powder Canyon Road		4.31		174.01
32+04.28	℄ Paved Road		4.17		174.15
+16.35	W Side		4.34		173.98
			✓		

178.32 ✓ 56

32+30	5.0	173.3	
+42 on Bank channel	6.9	171.4	
+43	10.0	168.3	
32+44.7 ℄ Int. Trunk Sewer	10.1	168.2 ✓	Ground
+58 in Channel	9.9	168.4	
462	3.7	174.6	
+70	0.1	178.2	
Chk 32+02.14 FB1674-24 Nail in Paving	1.95	176.37 ✓	176.34 = Nail 0.03 Error
TP 12.61 190.63 ✓	0.30	178.02 ✓	
	12.4	178.2	
32+82.5 ℄ Abandoned Tank Sewer			
27' Lt. on Rim N.H.	12.14	178.48	
" " on Flow line North.	23.21	167.43	
" " " " South.	25.12	165.51	
32+92	11.2	179.4	
33+23	10.1	180.5	
+30	11.7	178.9	
+31 in Channel	14.5	176.1	
+32.6 on 12" Pipe Corrg. Culvert	12.60	178.03	Not in use
+40 in Channel	15.2	175.4	
+91	9.9	180.7	
(33+37.6) 5' Rt. on Rubble Dam	10.6	180.0	
+45	9.0	181.6	
+50	8.5	182.1	
+55	7.5	183.1	
+75	5.1	185.5	
		✓	

		190.63		
33+92			1.3	189.3
T.P. 1	12.59	202.86	0.26	190.27
34+30			8.9	198.0
+50			6.1	196.8
+73			1.8	201.1
+75 erosion			2.6	200.3
+98			0.6	202.3
T.P.	12.14	214.74	0.26	202.60
35+19			9.5	205.2
+20 Erosion			10.9	203.8
+23 "			10.7	204.0
+25			8.6	206.1
+32			6.8	207.9
+50			4.1	210.6
T.P.	10.57	225.02	0.29	214.45
35+81.09 = B.C. Lt			9.33	215.69
+94 E edge Bridle Path			4.7	220.3
36+00 in Bridle Path.			4.9	220.1
+25 W edge " "			4.3	220.7
T.P.	11.85	236.54	0.33	224.69
(36+25) 5' Rt			15.6	220.9
1' Lt. on Bank			12.9	223.6
6' Lt.			11.0	225.5
36+30			12.3	224.2
1' Rt in Path			15.7	220.8

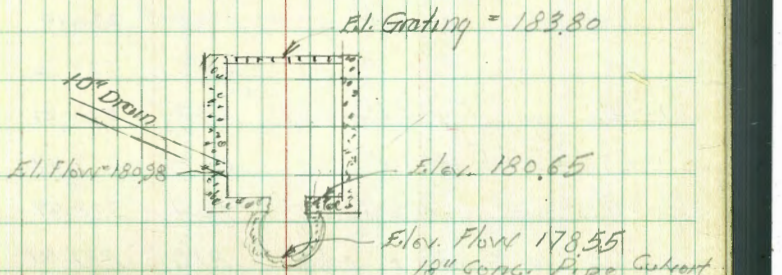
36+50	10.1	226.4
1' Rt.	10.5	226.0
2' in Path.	13.6	222.9
5' Lt.	8.8	227.7
36+75	4.4	232.1
5' Lt.	3.0	233.5
1' Rt. S edge Path.	10.5	226.0
36+80 " " "	10.0	226.5
1' Lt. on Bank	4.0	232.5
5' Lt. S. Edge Path.	2.0	234.5
36+96.82 = POC on Hub.	7.89	228.65
2' Lt.	2.5	234.0
5' Lt.	1.5	235.0
37+25	6.3	230.2
8' Lt. at Bank in Path	6.3	230.2
12' Rt	5.8	230.7
37+50	4.2	232.3
6' Lt. at Bank "	4.2	232.3
10' Rt. N edge "	3.8	232.7
37+75	2.2	234.3
6' Lt. S edge "	2.2	234.3
7' Lt. on Bank	4.0	230.5
8' Rt.	2.0	238.5
38+00	0.7	235.8
7' Lt. S edge Path	0.7	235.8
6.5 Rt. N Bank	0.3	236.2

		236.54 ✓		
T.P.	8.24	242.77	2.01	234.53
38+1258 = EC = 38+63.39	Equation.		6.34	236.43
38+64.67 = BC Lt. Conc.			6.39	236.38 ✓
chk Elev		✓	6.86	~~235.91~~
T.P.	12.90	255.55	0.12	242.65 ✓
chk Hub	40+52.73 = EC Hub FB 1674 66		1.49	254.06 ✓ 254.05 0.01

Proposed Sewer Levels Cont. from P-59

		211.03 ✓		Edge Pav.
3+00			8.40	202.63 4.3 Lt.
T.P.	0.73	198.96 ✓	12.80	198.23 ✓
3+46 = Int. Edge Gut. = Edge Pav			1.97	196.99
+50 In Gut. = End of Line			2.89	196.07
3+81.68 on Rim Exist. MH			6.98	191.98
Flow N.H. Page 40		=	186.73	
T.P.	3.54	189.88 ✓	12.62	186.34 ✓

T chkd out P-61



Box #9 / P-61

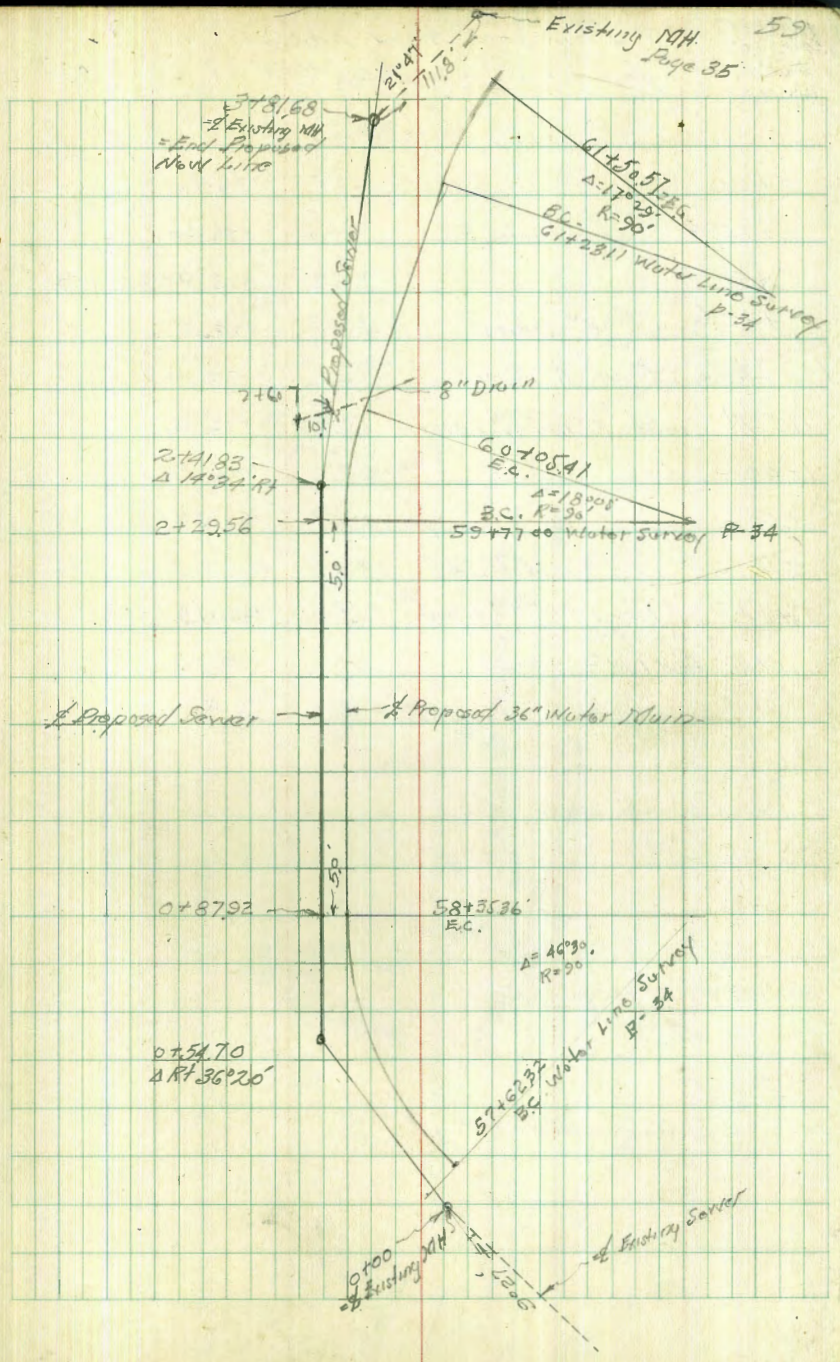
Walker, Hazard, Hardin - 3-7-45

Alignment for Proposed change of location and Reconstruction of Existing Sewer to give clearance of Proposed 36" Water Main - 300 Grouting

Line "A"

	1.24	235.94		234.70	BM Elev. Nail 57+62.32 P-40
0+00 on Run MH			0.58	235.36	
Flow				230.55	6"CI 36+88.48 FB1674-68
West edge cobble Cont = 1.0' Lt.					
0+31.5 = Int. W edge "			4.53	231.39	
+44 = ℄ "			5.75	230.19	
+47 on "			6.58	229.36	
+48 on Top Cobble Wall			5.73	230.21	
0+54.7 = Δ Rt. 36°20'			5.95	229.99	
+62 Int. E edge Wall			7.27	228.67	
63 in Cut E. edge			8.10	227.84	
+67 " " W "			8.64	227.30	
+70 on Paving E "			8.35	227.59	Edge Pav.
+87.92 5' Lt. of Water Survey E.C.			10.15	225.79	3' Lt. Edge Pav.
1+00 on Pav.			11.42	224.52	5' Lt.
T.P.	0.23	223.13	13.04	222.90	Edge Pav.
1+50			3.95	219.18	7' Lt.
2+00			2.70	213.83	Edge Pav. 7.3' Lt.
T.P.	0.76	211.03	12.86	210.27	Edge Pav.
2+41.83 = Δ Rt. 14°34			1.97	209.06	= 5' Lt.
2+60.7 = Int 8" Drain			4.07	206.96	
10.1' Lt. on Grating			3.84	207.19	

Cont. P-58

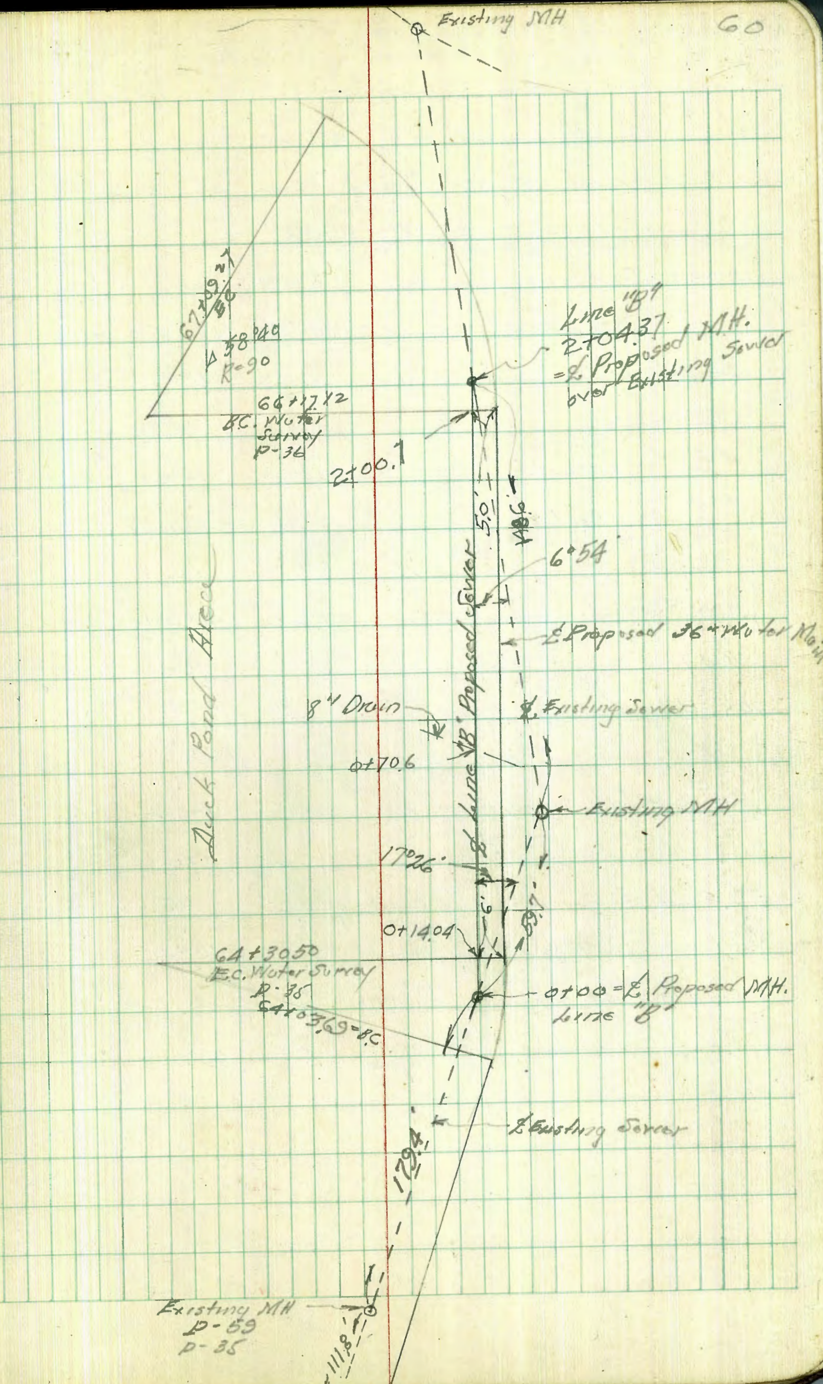


Walker
Hazard
Hodin
~~37-45~~

Proposed New Location for Sewer Line "B"

179.09 = x P-61

0+00			2.17	176.92	4.2' Lt. = cobble cb.
0+14.04 = 6' Lt of Water E.C.			2.49	176.60	3.1' Lt " "
+50			3.62	175.47	3' Lt. = cob. cb.
+70.6 int. 8" Drain			4.57	174.52	
12.8 Lt. Flow 8" Drain			8.39	170.70	°PP 0+66
13.5 Rt inlet 8" Drain Flow			7.03	172.06	
1+00			6.32	172.77	3' Lt. cob. wall
+50			9.51	169.58	3.2' Lt "
T.P.	143	167.47	13.05	166.04	
2+01.37 = ℄ Proposed MH = Int. Exist. Sewer Wall in Pav.			2.34	165.13	3.7' Lt. = Wall
chk. 66+17.12	P-41		2.09	165.38	
				165.41	
				.003	



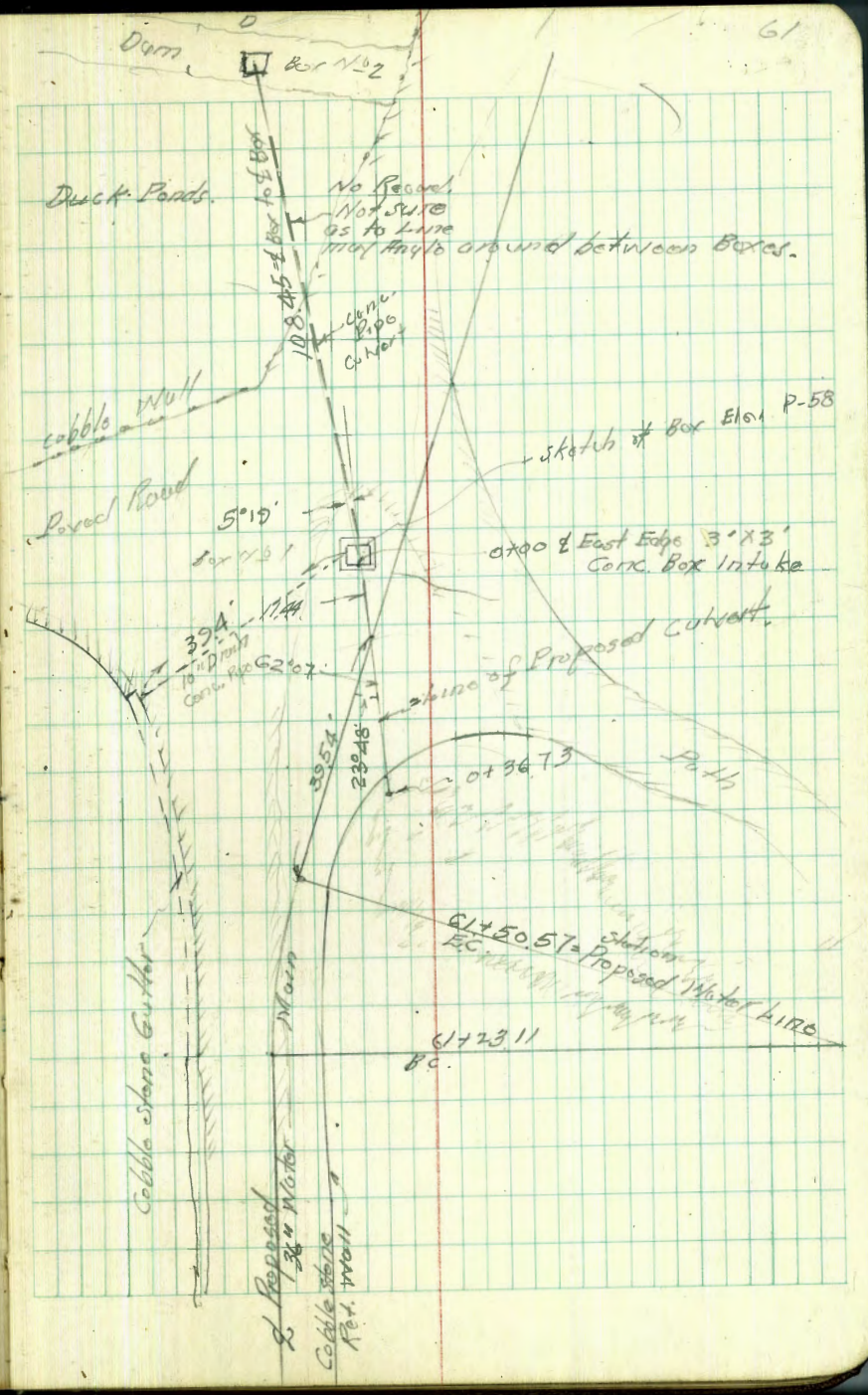
Walker

Location - for Proposed Change in Existing Culvert account of Interfering with grade of Proposed 36" Water Main Near Duck Ponds in 300.

189.88 π P-58

0+00 = East inside Edge Box on Grating.		6.08	183.80	✓
" on Flow		11.33	178.55	✓
0+05		5.2	184.7	9.2 Lt. 5 ctyo 20" Tree
+22		3.1	186.8	5.2 Rt 2 ctyo
+32.7	℄ Wall	2.0	187.9	14" Tree
" on Wall		0.29	189.59	
+34		3.9	186.0	
+36.7 = End Proposed Line on Stake		3.72	186.16	
+47		3.7	186.2	
chk stake	P.O.T. 62+34.92 P-41	6.18	183.70	✓
			183.73	
			0.03	
℄ Box No 2 on Grating.		10.81 8.41	179.07	
" " " Flow		19.22	170.66	
39.4' Lt. of Box No 1 on Grating		4.25	185.63	
" " on Flow	10" Drain	5.80	184.08	
on Flow at Box No 1	10" Drain	8.90	180.98	✓
T.P.	071 179.09 ✓	11.50	178.38	✓

Notes Reduced.

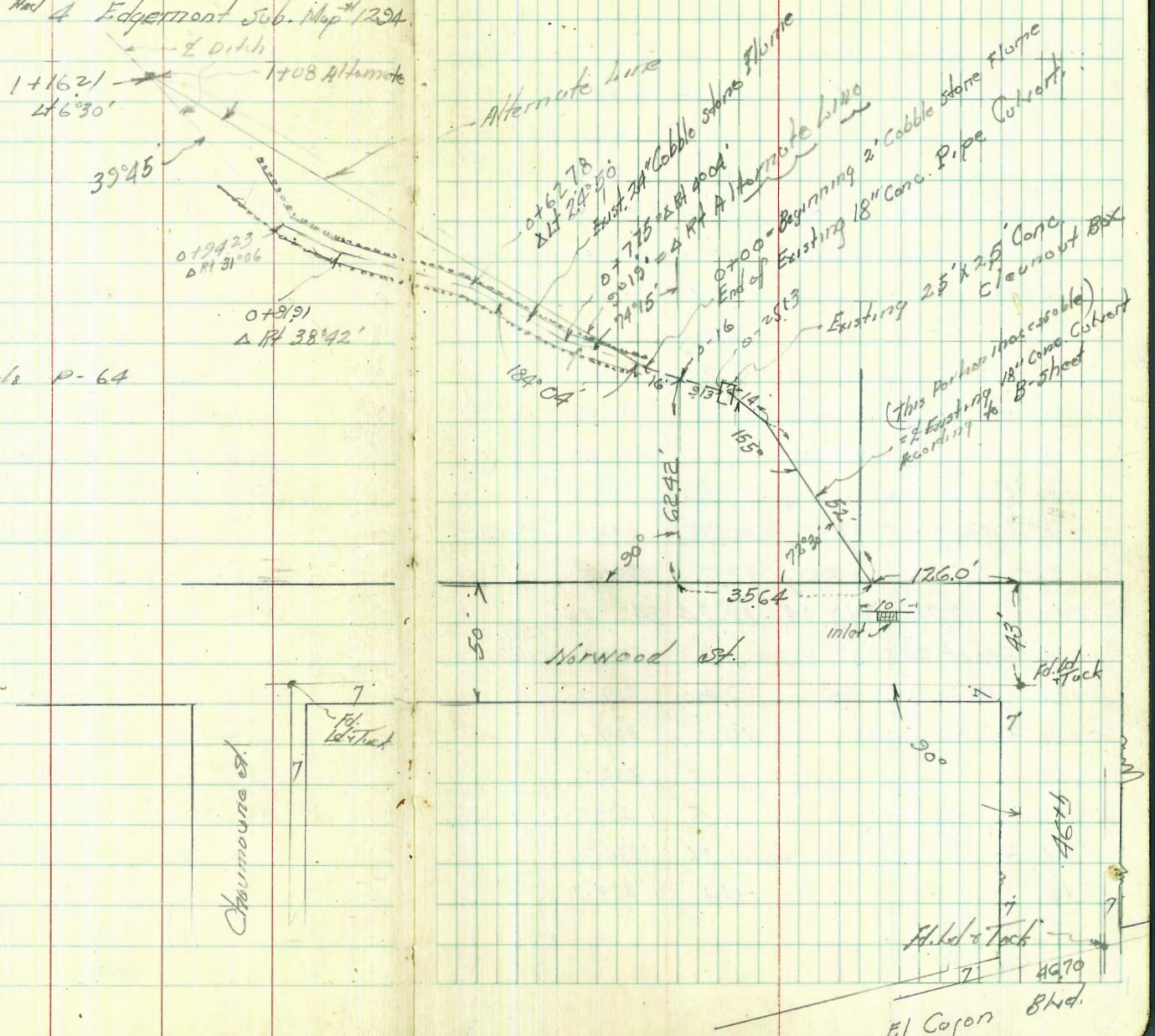


Walker
Hazard
Hardin
7-12-45

Location Existing Culvert
and Cobble Stone Flume and Line
for Proposed Culvert Extension
Across Lots 3 and 4 Edgemont Sub. Map #1294

Indexed
C.S.K.

63



Levels p-64

Flume Line

~~BM~~ FB 1372-15	1.56	354.68		353.12	~~SW. BP~~ Chaumount & Norwood
on cb & Inlet			5.13	349.55	
" Grating			6.16	348.52	
" Flow			8.91	345.77	
0-25.13 = West inside edge on Grating Cleanout Box			7.03	347.65	
0-16 = East edge Conc. Drive			7.00	347.68	
0-7.7 = W " " "			7.17	347.51	
0-3			7.3	347.4	
0+00 on Rubble Hd Wall			8.7	346.0	
0+00 on Flow 18" Pipe			11.29	343.39	
0+00 " " Cobble Flume			11.55	343.13	
0+7.75 = Δ Rt 4°04' " "			11.92	342.76	
0+20 Flow " "			12.7	342.0	2' Wide
+25 " " "			13.2	341.5	
TP	6.70	349.14 ✓	12.24	342.44	
0+62.78 = Δ Lt 24°50'			9.3	339.8	Flow 2.5 wide Cobble Flume
0+79 Flow 3' Wide			9.4	339.7	
0+81.91 = Δ Rt 38°42			10.0	339.1	
+83 on Flow 4' Wide			10.5	338.6	
0+94.23 = Δ Rt 31°06			11.5	337.6	Cobble Flow Ends here
1+16.21 Δ Lt 6°30 on Flow Ditch on stake			12.36	336.78	
+65			14.4	334.7	

Alternate Line

349.14

0+00 Same as opp Page				
0+09 N edge Flume			6.4	342.7
+10 on Flume wall			5.8	343.3
0+20			6.1	343.0
+35			7.2	341.9
+60			7.8	341.3
+70			7.0	342.1
+87			7.5	341.6
6' Lt = 2" Lime Tree				
6.5' Rt = 2" Orange				
0+95			9.4	339.7
1+08 Alternate = 1+16.21 Flume Line			12.36	336.78
			✓	
T.P.	12.17	354.58	6.73	342.41
Chk. starting B.M.			1.47	353.11 ✓
				353.12
				0.01

Cross Section Saranac St. South 30' 70th St to 300' West.

0+80					
TP	7.06	478.06	1.17	471.00	
0+40					
0+0 = W.L. 70th St.					
0-10 = W Cb of 70th St.					
BM			11.83	460.34	⊈ Lt T Saranac & 70th
TP	2.48	472.17	6.36	469.69	
BM	11.79	476.05		464.26	S.W. 8? Fr Ca jon? 70th

Aug. 28-45
S. Saro
Bliss Rod
Osborne R
BC99

Lt. S ⊈

indexed

0+80	73.5 / 4.6 / 30	71.6 / 6.5 / 20	70.9 / 7.2 / 20	70.9 / 7.2	478.06
0+40	71.4 / 0.8 / 30		69.6 / 5.6 / 20	69.6 / 5.6	
0+0	66.4 / 5.8 / 30	67.78 / 10.38 / 20=Cb	67.03 / 11.04 / 20=Gut	67.7 / 10.5	
0-10	67.9 / 10.28 / 30=Cb	67.37 / 10.80 / 30=Gd	67.14 / 11.03 / 20	60.5 / 11.6 on Ground	
				472.17	

Est. total
425 Cu. yds
Final total
439 Cu. yds
20' width
8" curb

Vertical banks

Plotted & computed
Aug. 29, '45
McKee

Lt.=5 | ℄

Station				
3+0	71.2 / 6.4 / 30	71.4 / 6.7 / 20	71.2 / 6.9 / 10	71.3 / 6.8
+50	72.3 / 5.8 / 30	72.0 / 6.1 / 20	71.8 / 5.5	72.1 / 6.0
2+0	73.1 / 5.0 / 30	72.9 / 5.2 / 20		72.7 / 5.4
1+60	73.1 / 4.4 / 30	73.4 / 4.7 / 20		73.1 / 5.0
1+20	74.0 / 4.1 / 30	73.7 / 4.4 / 20	72.8 / 5.3 / 10	72.9 / 5.3

478.06

478.06

Re Cross Section on Saranac St South 30'
70th St to 300' West
For Final Yardage

indexed
c.s.k.

1+60					
1+20					
0+80					
TP	8.36	476.13	2.82	467.77	
0+40					
0+0 = W.L. 70th St.					
0-10 = W Cb Line 70th St					
BM	10.25	470.59		460.34	℄ Lt 7 Saranac + 70th

Sept. 25-45 67
Sisson
Bliss
Osborne

Lt. 5				℄
73.6 / 2.5 / 30	73.3 / 2.8 / 23 = Top Hen Cut	70.7 / 5.4 / 20		71.1 / 5.0
73.9 / 2.2 / 30	73.6 / 2.5 / 22 = Top Hen Cut	69.6 / 6.5 / 20		70.3 / 5.8
73.4 / 2.7 / 30	72.3 / 3.8 / 23 = Top Hen Cut	67.1 / 8.5 / 20		68.2 / 7.9
				476.13
71.4 / +0.8 / 30	67.1 / 3.5 / 22 = Top Hen Cut	64.59 / 6.0 / 21	64.4 / 6.5 / 20	64.9 / 5.7
61.49 / 4.1 / 30	61.78 / 8.81 / 20 = Cb	61.22 / 9.37 / 20 = Gut.		60.9 / 9.7
61.92 / 8.67 / 30 = Cb	61.38 / 9.21 / 25 = Gutter	61.1 / 9.5 / 20	60.65 / 9.94 / 73 = Edge Pav.	60.3 / 10.3
				470.59

Total

439 Cu. yds

Computed by:-
A. McKee

Lt=5 20

Station				
3+0	21.6 / 4.5 / 30	21.4 / 4.7 / 21	20.9 / 5.2 / 20	20.9 / 5.2
2+50	22.2 / 3.9 / 30	21.7 / 4.4 / 23 - Top Hen Cut	20.5 / 5.6 / 20	21.1 / 5.0
2+0	23.1 / 3.0 / 30	22.9 / 3.2 / 23 - Top Hen Cut	20.7 / 5.4 / 20	21.2 / 4.9

476.13

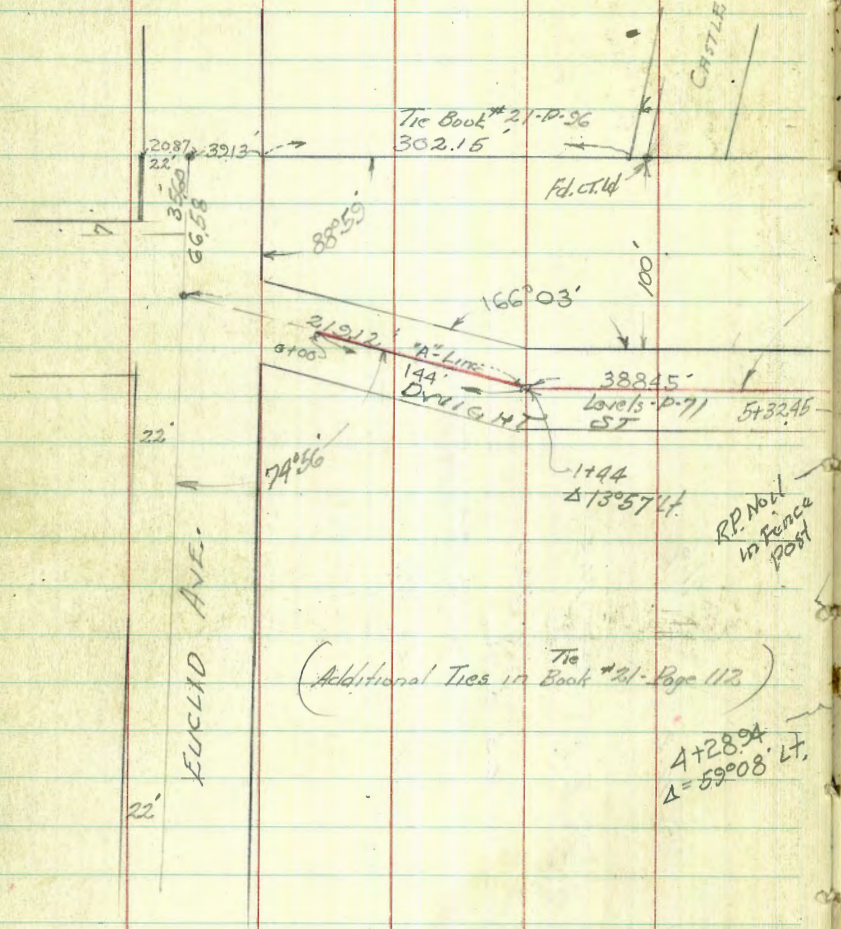
476.13

Walker
Hazard
Haldin
Begg
10-23-45

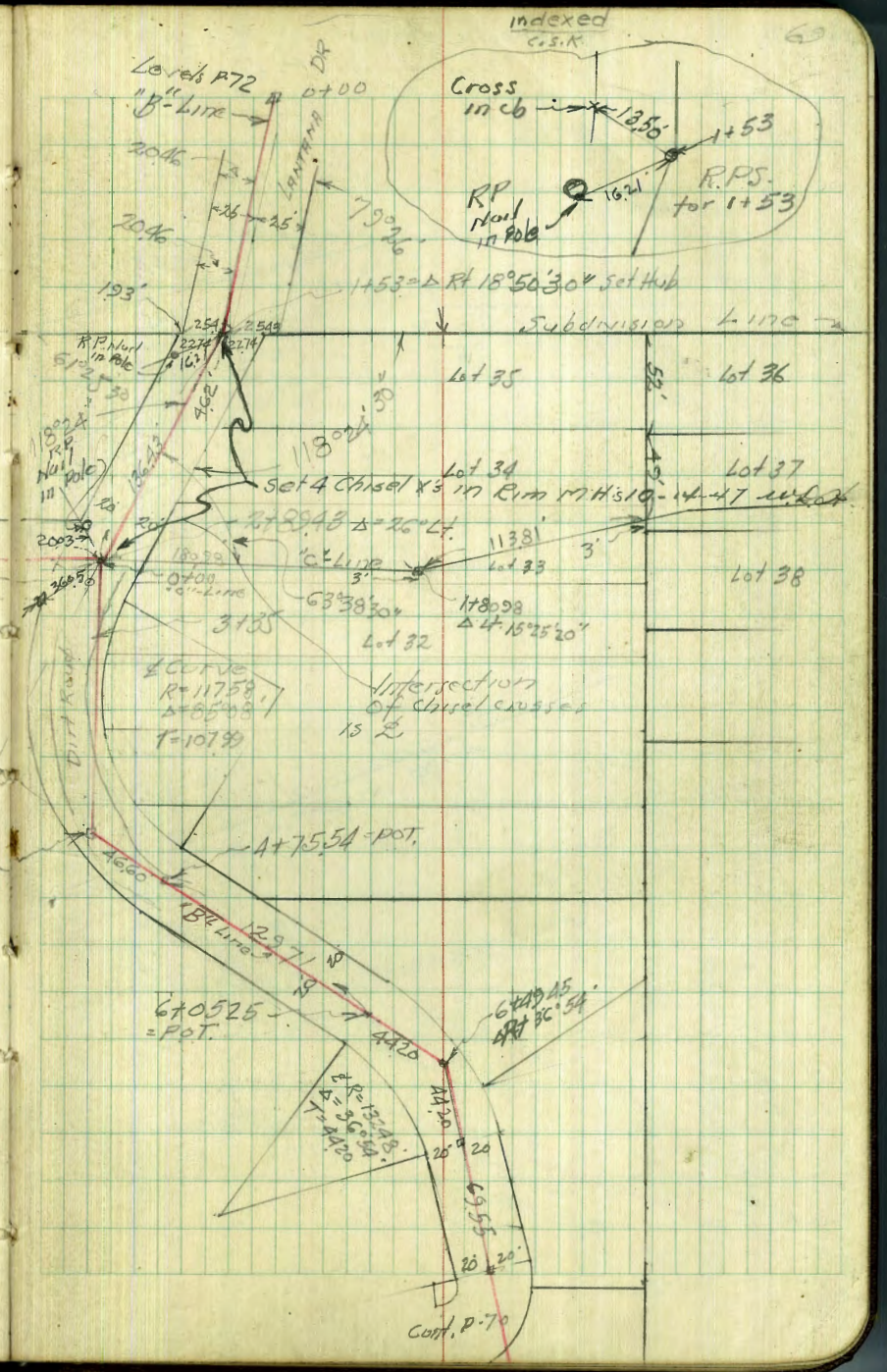
Location - Proposed Sewer in Dwight St. - Lantana Drive.

—— = Proposed Sewer

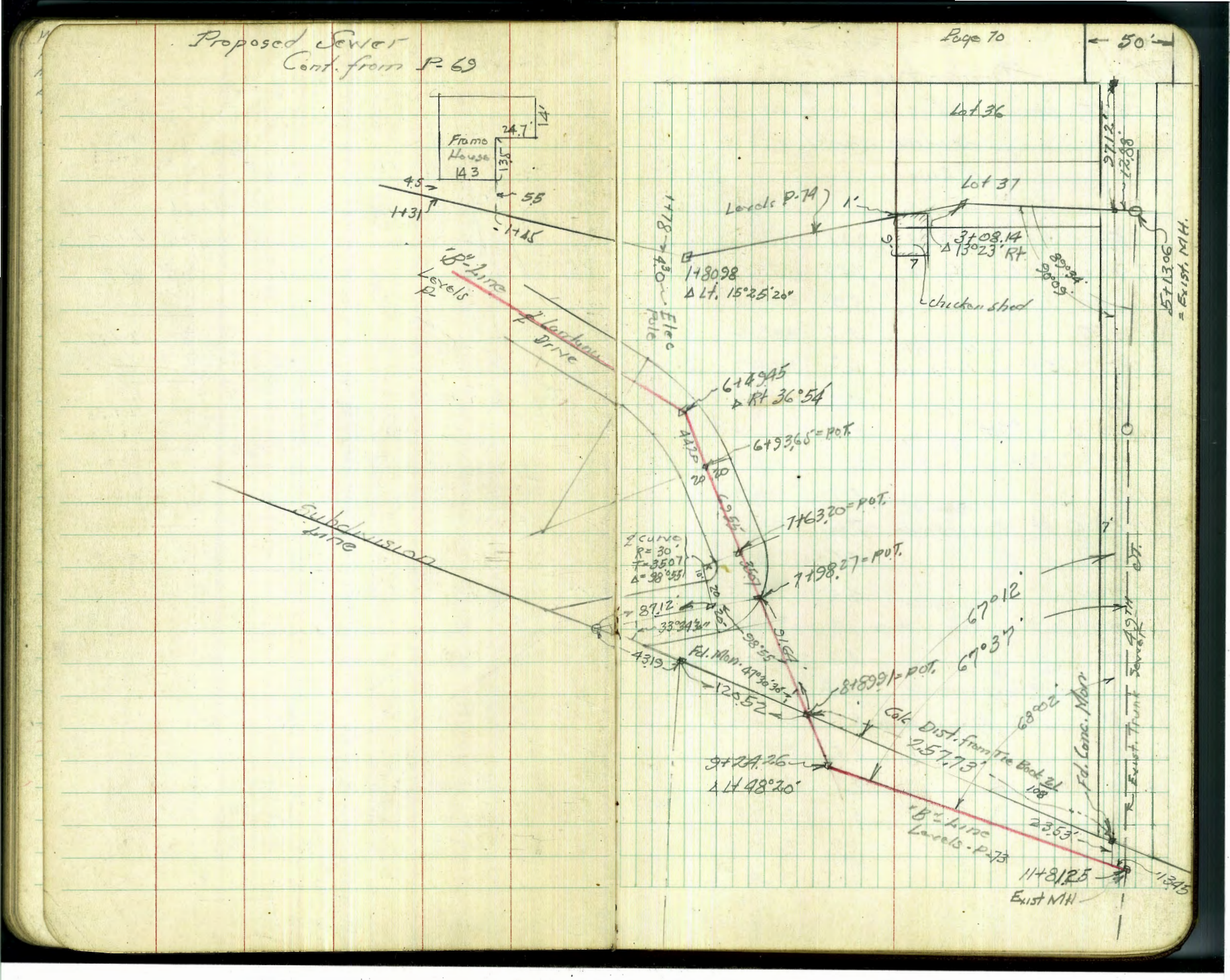
Levels P-71



Construction Notes for Portion Above Line in Grade-Book 229



Proposed Sewer
Cont. from P-69



Walker, Hazard, Hurdin

10-23-45

LEVELS - PROPOSED SEWER

DWIGHT ST.

between Euclid Ave and Lantana Dr.

Location Sketch P-69

"A" Line

	7.87	348.33		340.46 B.M. N.E. B.P. Euclid & Lantana
T.P.	1.11	339.93	9.51	338.82
T.P.	4.01	336.54	7.40	332.53
0+00			3.9	332.6
+50			4.1	332.4
(0+50)	75' Rt	on Ground opp Rear House	6.2	330.3
1+00			4.5	332.0
1+44	Δ 13°57' Lt.	on Hub on Ground.	4.91	331.63
(1+19)	75' Rt.	= Rear of House	7.1	329.4
1+70			4.7	331.8
(1+70)	60' Rt	on Ground = Rear of House	7.6	328.9
2+00			4.6	331.9
+50			4.1	332.4
(2+50)	90' Rt.	on ground Rear of House	7.3	329.2
3+00			4.0	332.5
		Storm Drain on Rim MH.	2.95	
(3+35)	90' Rt.	Rear of House	6.1	330.4
3+50			4.4	332.1
4+00	(outs = Above &)		4.9	331.6
+50	(" ")		6.7	329.8
+63			7.3	329.2
5+15			12.4	324.1

336.54

71

T.P.	12.09	336.04	12.59	323.95
5+32.45 on Hub			12.85	323.19

For check out see Cont. Levels P-72

LEVELS SEWER PRELIM. IN LANTANA DRIVE. = "B" LINE

Location 63, 70

336.04 ↑ P. 71

T.P.	2.44	338.02	0.96	335.58	
0+00	on Stub		0.70	337.3	
0+26			1.2	336.8	
(0+26)	70' Lt. Rear of House = Conc. Basement-House		7.9	330.1	plumbing 1.0' below floor.
0+50			1.9	336.1	
0+78			2.9	335.1	
(0+78)	26' Lt. Rear of House on Conc. Basement		9.3	328.7	plumbing 1.0' below floor.
1+00			3.9	334.1	
+53 = Δ 18°50'30" Rt. on Hub			6.20	331.8	
(1+55)	67' Lt. = North Side House Parallel to Lot Line. Conc. Basement		13.4	324.6	plumbing 1.0' below floor.
T.P.	0.73	332.55	6.20	331.82	1+53 on Hub
2+00			1.7	330.9	
+25			2.8	329.8	
+50			5.2	327.4	
+75			7.9	324.7	
2+89.93	(5+32.45 P.71)		9.36	323.19	
(2+95)	130' Lt. Parallel to Lot Line = Front of House		18.1	314.5	SW Cor House on Ground.
3+00			9.8	322.8	
+35	In Fill Ground		11.3	321.3	
T.P.	2.40	323.07	11.88	320.67	
3+50			5.0	318.1	
5' Rt. = E edge Dirt Road			2.1	321.0	
5' Lt.			7.1	316.0	
10' Lt. = Natural Ground			9.0	314.1	

323.07

3+75 In Fill Ground	5.1	318.0	
10' Lt. = Nat. "	8.6	314.5	
5' Rt. = East Edge dirt Rd	2.6	320.5	
3+90 = " " " "	2.7	320.4	
4+00	2.6	320.5	
+28 Δ Lt. 59°08'	2.6	320.5	
4+28.94 on Hub	2.85	320.2	
+80	4.9	318.2	
5+00	7.0	316.1	
10' Lt. Nat. Ground	9.5	312.0	
30' Lt.	12.3	310.8	
5+50	12.4	310.7	
40' Lt	17.7	305.4	
T.P. 0.15	12.88	310.49	
6+00	7.3	303.3	
50' Lt.	12.6	298.0	
T.P. 0.09	297.63	13.10	297.54
6+49.45 = Δ Rt 36°54 on Hub		1.34	296.3
20' Lt		6.8	290.8
55' Lt.		15.7	281.9
6+93 N. Side House		6.8	290.8
26' Lt. Soil Pipe		14.7	282.9
7+00		7.7	289.9
+50		13.7	281.9
T.P. 0.53	285.25	12.91	284.72

N.W. Cor House 7' in St

"B" - Line Cont. from P. 72

		285.25			
7+98[27]			7.01	278.3	4' Rt
8+04			7.1	278.2	= Elec Pole
8+30			13.5	271.8	
T.P.	0.47	273.01	12.71	272.54	
8+60			10.3	262.71	
T.P.	0.29	260.44	12.86	260.15	
8+90			6.3	254.1	
9+00			8.1	252.3	
+17			10.8	249.6	
9+24.26	△ Lt 48°20'				
T.P.	2.98	250.10	13.32	247.12	
3' Rt = ℄ 2' ditch			4.1	246.0	
9+50			3.3	246.8	
2' Rt " "			4.7	245.4	
9+90	℄ " "		4.9	245.2	
10+00			4.1	246.0	
+15			5.2	244.9	
+22	℄ 3' "		7.3	242.8	
+30			6.2	243.9	
10+50			7.1	243.0	
5' Rt = ℄ 3' ditch			8.8	241.3	
10+80			7.7	242.4	
12' Rt " 4' "			9.6	240.5	
11+00			8.8	241.3	
+10			9.8	240.3	
+50			10.8	239.3	

"B" - Line

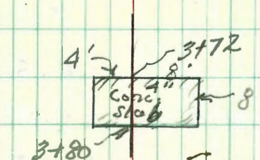
		250.10		
T.P.	3.25	242.23	11.12	238.98
11+81.25 = ℄ Exist. M.H. on Rim			3.70 (8.79)	238.5 / 229.70 = Plan
" on Flow MH			12.49	229.74
Set BM on Mon. W. 7 Line 49th Sub. Line Fair Haven Acres			4.69	237.54
Chk 3 Nails in Pole 15' Lt. 144+75 FB 1561-46			2.53	239.70 ✓

Walker
Hazard
~~Hardin~~
Begg 10-30-45

LEVELS PROPOSED SEWER
"C" Line - Location P-69

	2.39	325.58		323.19	BM on Hub Page-71 5+32.45
0+00			2.1	323.5	
+12			2.5	323.1	
+28			6.5	319.1	
+41	4.5' Rt = 3" Pepper Tree				
0+53	4' Rt " " "				
0+50			7.9	317.7	
1+00			9.9	315.7	
T.P.	0.13	314.18	11.53	314.05	
1+50			1.7	312.5	
1+80.98 = Δ Lt 15°25'20"	on Hub		6.98	307.2	
+86			7.7	306.5	
T.P.	0.64	301.72	13.10	301.08	
2+00			3.1	298.6	
+04			6.2	295.5	
+08			7.1	294.6	
2+23			16.3	285.4	
T.P.	0.59	289.07	13.34	288.38	
T.P.	0.12	276.37	12.72	276.25	
T.P.	0.49	263.84	13.02	263.35	
2+55			+4.0	259.8	
+75			2.0	261.8	
2+95			7.2	256.6	
3+08.14 = Δ Rt 13°23'	on Redwood Stub		9.68	254.16 / 254.2	

3+25			13.7	250.1
T.P.	3.85	254.66	13.03	250.81
3+34			7.1	247.6
+38	in channel		12.3	242.4
+47	" "		12.1	242.6
+49			11.0	243.7
+53			11.0	243.7
+57			10.3	244.4
+68			9.9	244.8
3' Lt 4' Rt = Pomegranate Trees				
3+72	on Conc. Slab		9.72	244.94



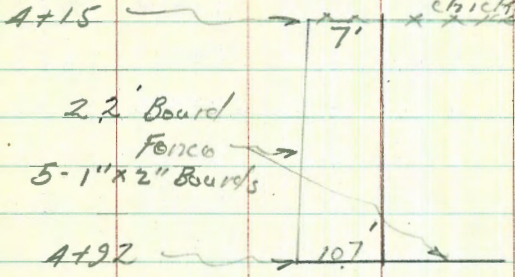
4+00			9.5	245.2

3+85 13' Lt = Quince Tree Bush
3+98 12.7 Lt = Plum " 4"
" 15' Rt = 6" Apricot Tree.
4+11 12.7 Lt = 3" Plum "
" 15' Rt = 8" Apricot "
4+15 = Int chicken Wire Fence 3' high at Rt & Lt
4+25 13' Lt 6" Apricot
4+20 10.7' Rt 2" Peach
+37 15' Rt 5" Peach
4+38 13' Lt 6" Apricot

"C" Line.

25466

4+50		8.7	246.0
"	13' Lt.	- 6" Apricot,	
4+78	13' Lt	" "	
+89	" "	5" "	
4+15			chicken wire Fence



4+92

4+94		7.6	247.1
4+99		6.6	248.1
5+13.96	2	6.44	248.22
"	on Flow	15.25	239.41
			239.23 = Plan
			0.18 diff.

15' Lt 14+75 Page 71
Chk. 3 Nails in Pole 14.95 239.71
239.70
0.01 Error.

Check of Pamela Park

Indexed
C.S.I.K.

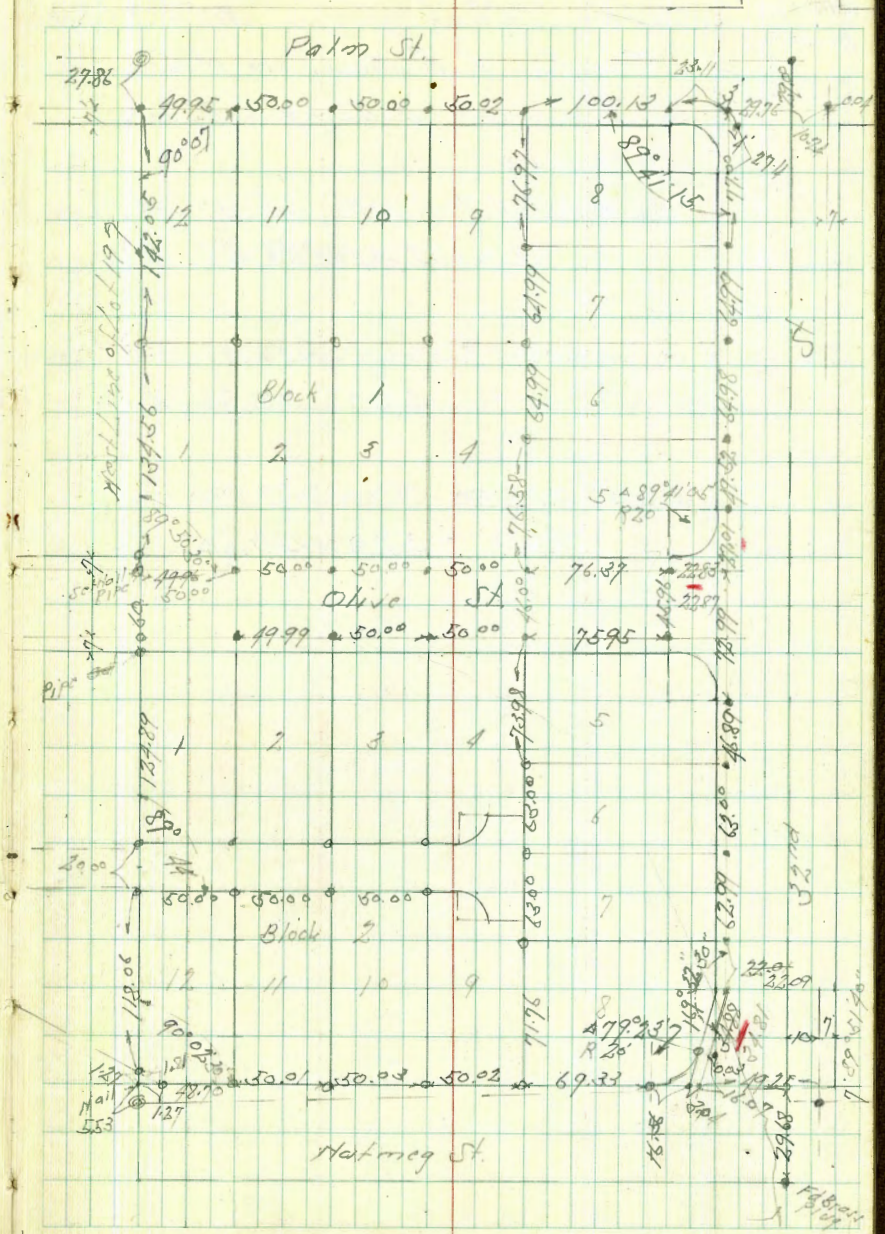
76

Final Check
Feb 23-16

Feb. 19-16
Sisson
Osborne
Waddel

- Lead+Tack Found
- ⊙ ¾" Pipe Lead+Tack
- ◎ 2" Pipe " "

Surveyed By Joseph F Covert
R.E. #2718



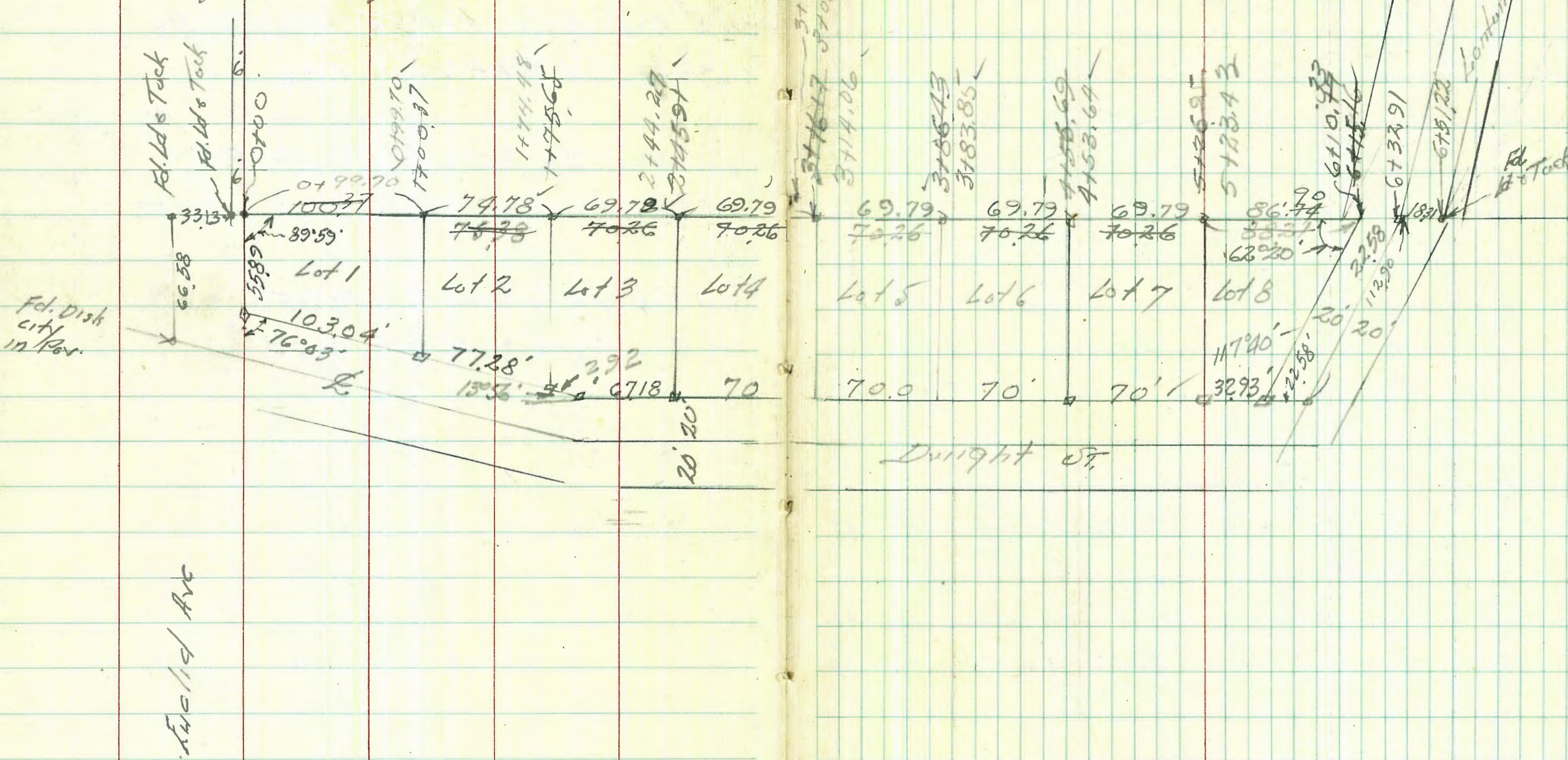
Walker
Hurlin
Hurley
12-12-46

36". Water Main Across Balboa Park from 30th & Thorn St.
Transfer of Elev. on Hubs To Reference Hubs - for Const. Purposes

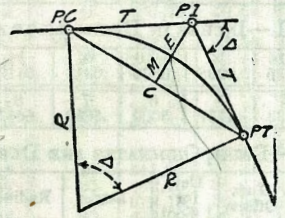
4.67	256.07		251.40	BM	on ℄ Hub B.C. 8+41.98 FB 1674-98
		2.51	253.56	BM	″ Stake 55' Rt. of 8+41.98
5.22	282.13		276.91	BM	on ℄ Hub B.C. 17+04.67 P-55
		6.22	275.84	BM	on Chisled cross East end CB on Rt 17+52
3.00	233.30		230.30	BM	on ℄ Hub = P.O.T. 29+55 P-55
		3.70	229.60		on RP 51.80' Rt 29+55 P-53

Set Preliminary Stubs
Along North Line Subdivision
Fair-Haven Acres
Between Euclid & Lantana
= Proposed Adjustment Lot Lines

Walker
Johnson
Pope
Crawford
8-22-49



DIETZGEN'S RAILROAD CURVE AND REDUCTION TABLES



CURVE FORMULAS

Radius=R=$\frac{50}{\text{sin. } D/2}$ (1) Degree of Curve=D and sin. $\frac{D}{2}=\frac{50}{R}$ (2)

Tangent=T=Rtan$\frac{\triangle}{2}$ (3) Length of Curve=L=100$\frac{\triangle}{D}$ (4)

Middle ordinate=M=R(1—cos. $\frac{\triangle}{2}$) (5)=Rvers $\frac{\triangle}{2}$ (6)

External=E=Ttan$\frac{\triangle}{4}$ (7)=R ÷ cos.$\frac{\triangle}{2}$—R(8)=Rexsec$\frac{\triangle}{2}$(9)

Long Chord=C=2 R sin.$\frac{\triangle}{2}$ (10) △=Central Angle

EXPLANATION AND USE OF TABLES

Stations.—Given P. I.=Sta. 161+60.35 to find Sta. of P. C. and P. T. △=62° 10′ D=8° 20′. From Table IV for 1° curve T=3454.1 and÷8⅓=414.49 ft. From Table V correction=.36 or T=414.85 ft. P. C.=Sta. P.I.—T=157 +45.50. Also from (4) L=746.00 and P. T.=Sta. P. C.+L=164+91.50.

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

Deflections.—Deflection angle=½ D for 100 ft., ¼ D for 50 ft., etc. For c ft.=(in minutes) .3 x C x D° or=defl. for 1 ft. from Table III x C. For Sta. 158 of above curve=.3 x 54.5 x 8⅓=136.2′ or 2° 16.2′, or=2.50 x 54.5=136.2′ from Table III. For Sta. 159 deflection angle=2° 16.2′ +8° 20′ ÷2=6° 26.2′, etc.

Externals.—May be found in similar manner to tangents. Thus E for curve above is 115.37. For from Table IV for 1° curve E=960.6 for 8° 20′=960.6÷8⅓=115.27 and from Table V correction=.10 or E=115.37 ft. Or suppose △=32° and E is measured and found to be 42 ft. What is D? From Table IV E=230.9 and ÷42=5.5 or D=5° 30′.

Table I.—Minutes in Decimals of a Degree.

1′	.0167	11′	.1833	21′	.3500	31′	.5167	41′	.6833	51′	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

Table II.—Inches in Decimals of a Foot.

1–16	3–32	1/8	3–16	1/4	5–16	3/8	1/2	5/8	3/4	7/8
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729

1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

Table III.—Radii, Ordinates and Deflections.

Deg.	Radius	Mid. Ord.	Tan. Offset	Def. for 1 Foot	Deg.	Radius	Mid. Ord.	Tan Offset	Def. for 1 Foot
0° 10′	34377.5	.036	.145	0.05′	7°	819.02	1.528	6.105	2.10′
20	17188.8	.073	.291	0.10	20′	781.84	1.600	6.395	2.20
30	11459.2	.109	.436	0.15	30	764.49	1.637	6.540	2.25
40	8594.42	.145	.582	0.20	40	747.89	1.673	6.685	2.30
50	6875.55	.182	.727	0.25					
					8	716.78	1.746	6.976	2.40
1	5729.65	.218	.873	0.30	20	688.16	1.819	7.266	2.50
10	4911.15	.255	1.018	0.35	30	674.69	1.855	7.411	2.55
20	4297.28	.291	1.164	0.40	40	661.74	1.892	7.556	2.60
30	3819.83	.327	1.309	0.45					
40	3437.87	.364	1.454	0.50	9	637.28	1.965	7.846	2.70
50	3125.36	.400	1.600	0.55	20	614.56	2.037	8.136	2.80
					30	603.80	2.074	8.281	2.85
2	2864.93	.436	1.745	0.60	40	593.42	2.110	8.426	2.90
10	2644.58	.473	1.891	0.65					
20	2455.70	.509	2.036	0.70	10	573.69	2.183	8.716	3.00
30	2292.01	.545	2.181	0.75	30	546 44	2.292	9.150	3.15
40	2148.79	.582	2.327	0.80	11	521.67	2.402	9.585	3.30
50	2022.41	.618	2.472	0.85	30	499.06	2.511	10.02	3.45
					12	478.34	2.620	10.45	3.60
3	1910.08	.655	2.618	0.90	30	459.28	2.730	10.89	3.75
10	1809.57	.691	2.763	0.95	13	441.68	2.839	11.32	3.90
20	1719.12	.727	2.908	1.00	30	425.40	2.949	11.75	4.05
30	1637.28	.764	3.054	1.05	14	410.28	3.058	12.18	4.20
40	1562.88	.800	3.199	1.10	30	396.20	3.168	12.62	4.35
50	1494.95	.836	3.345	1.15					
					15	383.07	3.277	13.05	4.50
4	1432.69	.873	3.490	1.20	30	370.78	3.387	13.49	4.65
10	1375.40	.909	3.635	1.25	16	359.27	3.496	13.92	4.80
20	1322.53	.945	3.718	1.30	30	348.45	3.606	14.35	4.95
30	1273.57	.982	3.926	1.35	17	338.27	3.716	14.78	5.10
40	1228.11	1.018	4.071	1.40	18	319.62	3.935	15.64	5.40
50	1185.78	1.055	4.217	1.45	19	302.94	4.155	16.51	5.70
5	1146.28	1.091	4.362	1.50	20	287.94	4.374	17.37	6.00
10	1109.33	1.127	4.507	1.55	21	274.37	4.594	18.22	6.30
20	1074.68	1.164	4.653	1.60	22	262.04	4.814	19.08	6.60
30	1042.14	1.200	4.798	1.65	23	250.79	5.035	19.94	6.90
40	1011.51	1.237	4.943	1.70	24	240.49	5.255	20.79	7.20
50	982.64	1.273	5.088	1.75					
					25	231.01	5.476	21.64	7.50
6	955.37	1.309	5.234	1.80	26	222.27	5.697	22.50	7.80
10	929.57	1.346	5.379	1.85	27	214.18	5.918	23.35	8.10
20	905.13	1.382	5.524	1.90	28	206.68	6.139	24.19	8.40
30	881.95	1.418	5.669	1.95	29	199.70	6.360	25.04	8.70
40	859.92	1.455	5.814	2.00	30	193.18	6.583	25.88	9.00

Note. Chord Deflection=2 times tangent deflection.

Table IV.—Tangents and Externals to a 1° Curve.

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

Table IV.—Tangents and Externals to a 1° Curve.

Central Angle	Tangent	External	Central Angle	Tangent	External	Central Angle	Tangent	External
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	483.8	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

1291

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
40	4061.8	1293.6	40	4864.8	1786.7	40	5796.7	2420.9
50	4074.4	1300.9	50	4879.2	1796.0	50	5813.6	2432.9

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