1648

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.

CITY ENGINEER

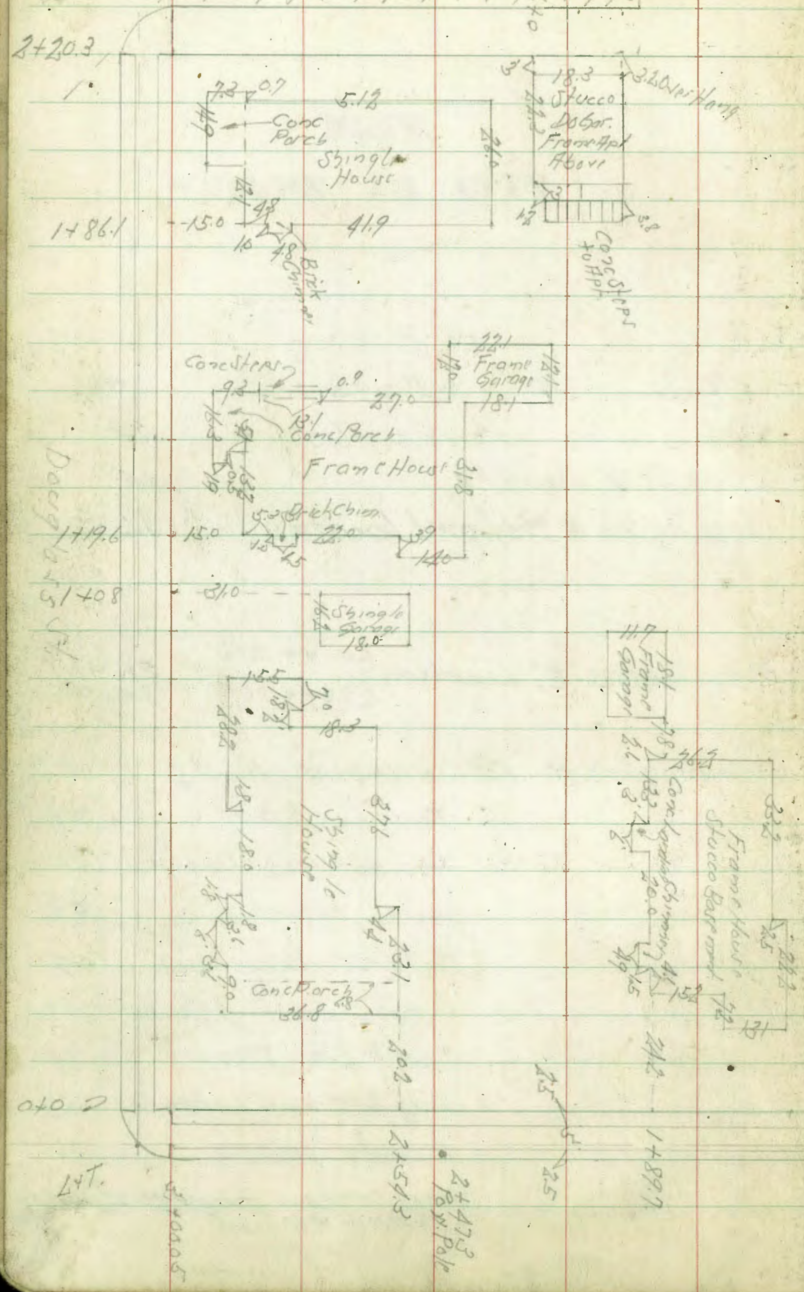
This Field Book is manufactured of a High Grade 50% Rag Paper having a WATER RESISTING SURFACE, and is sewed with Bing Special Enamel Waterproof thread.

Made in U. S. A.

NOTE

RETURN TO CITY

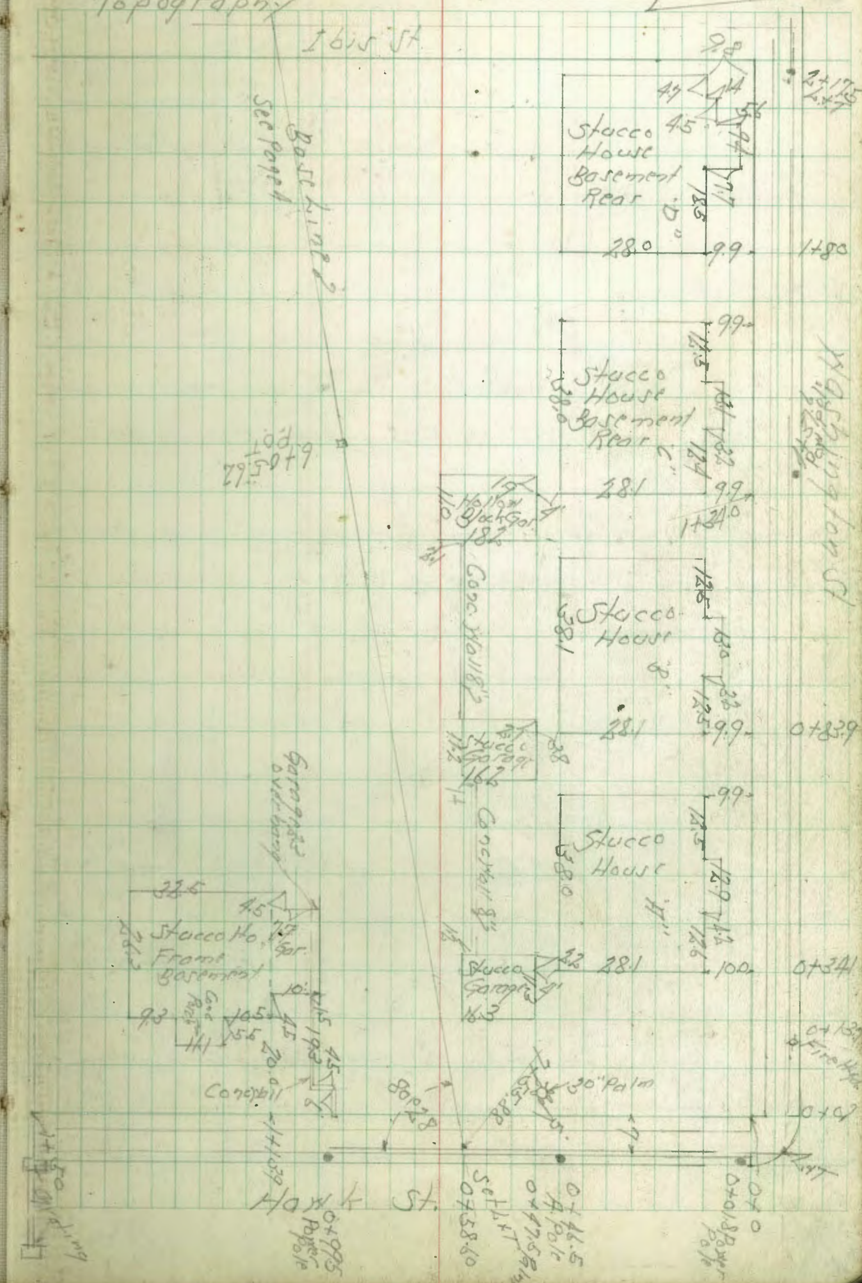
Indexed
C.S.K.

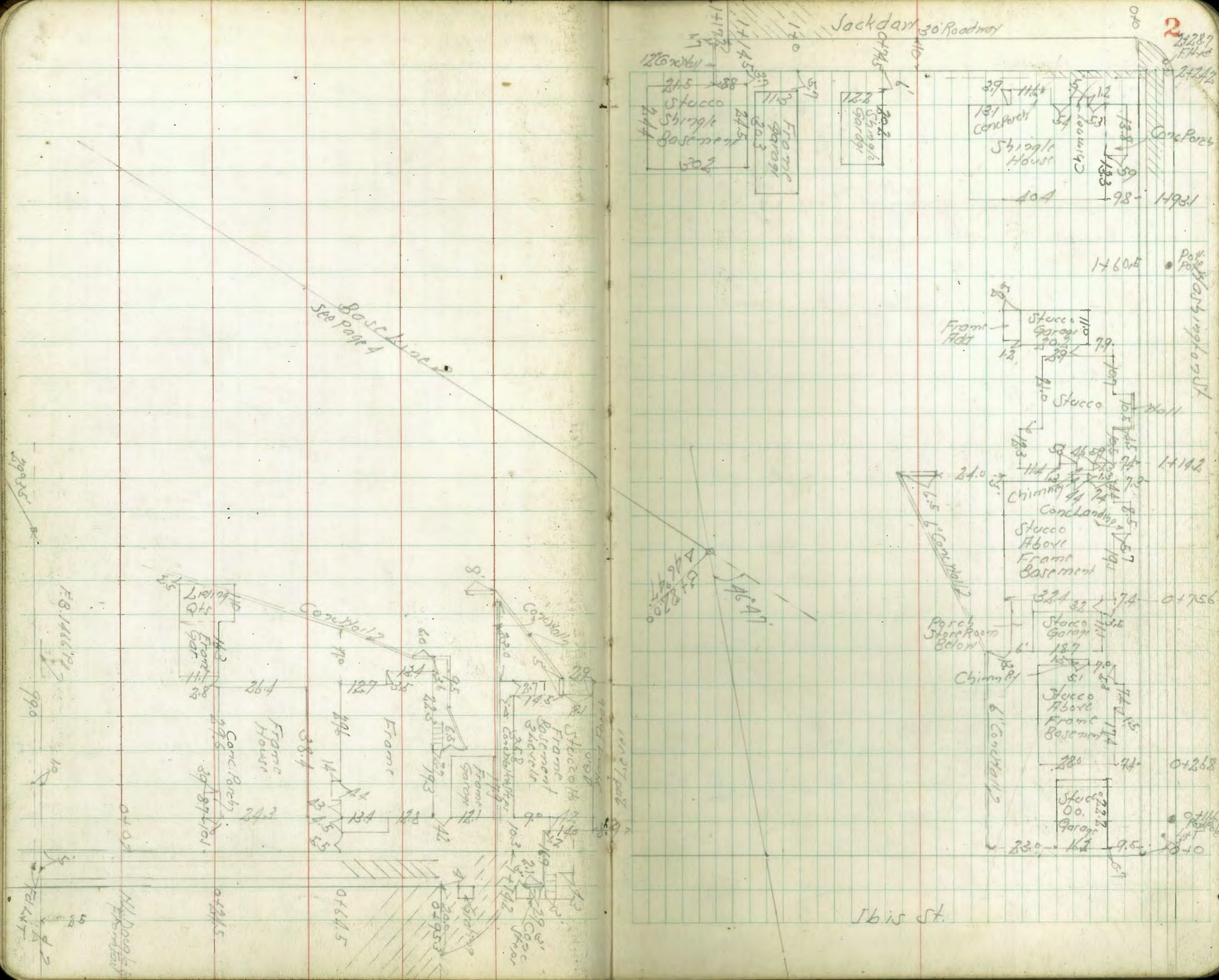


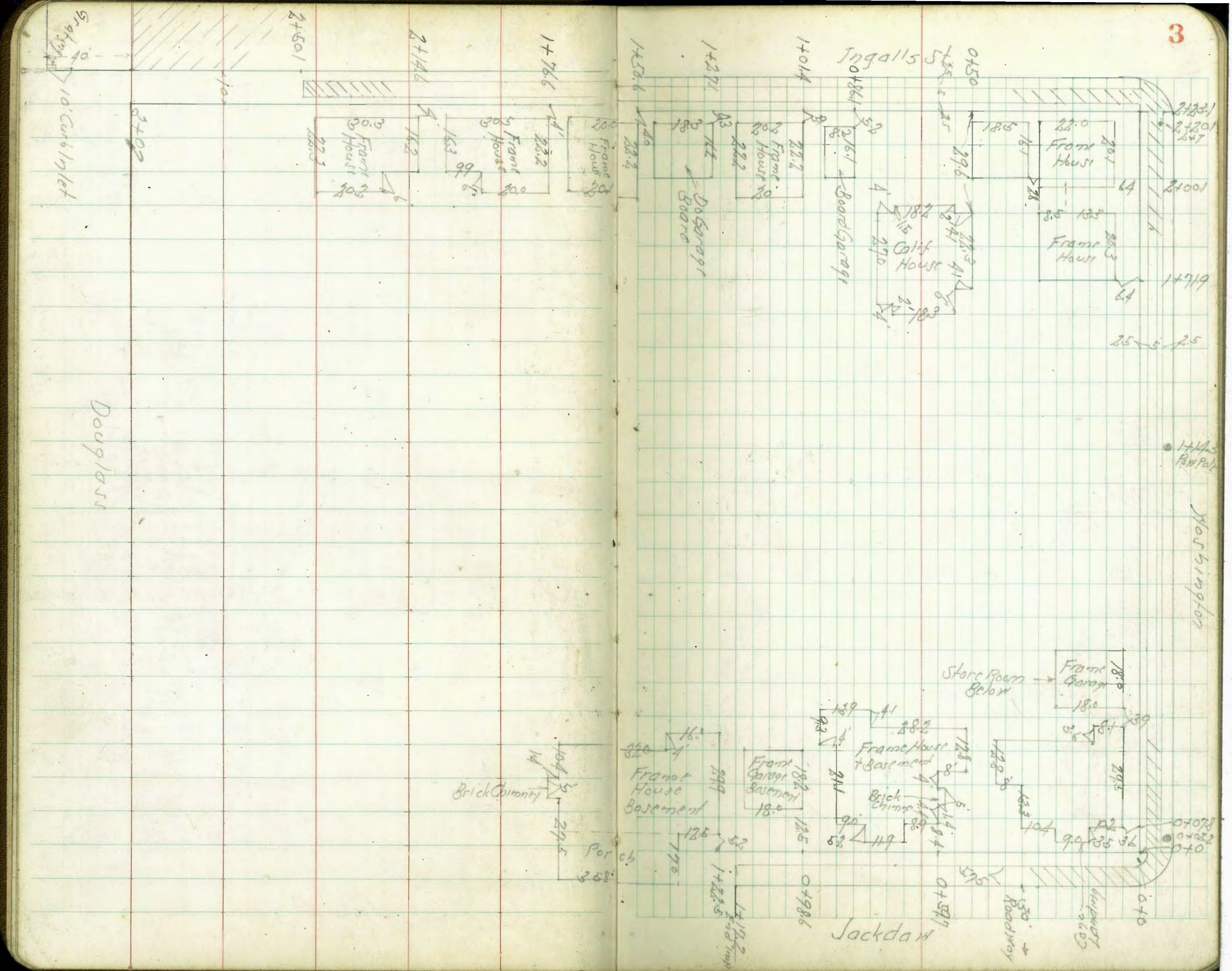
University Ave West Extension To Washington & Hawk Sts.

Topography

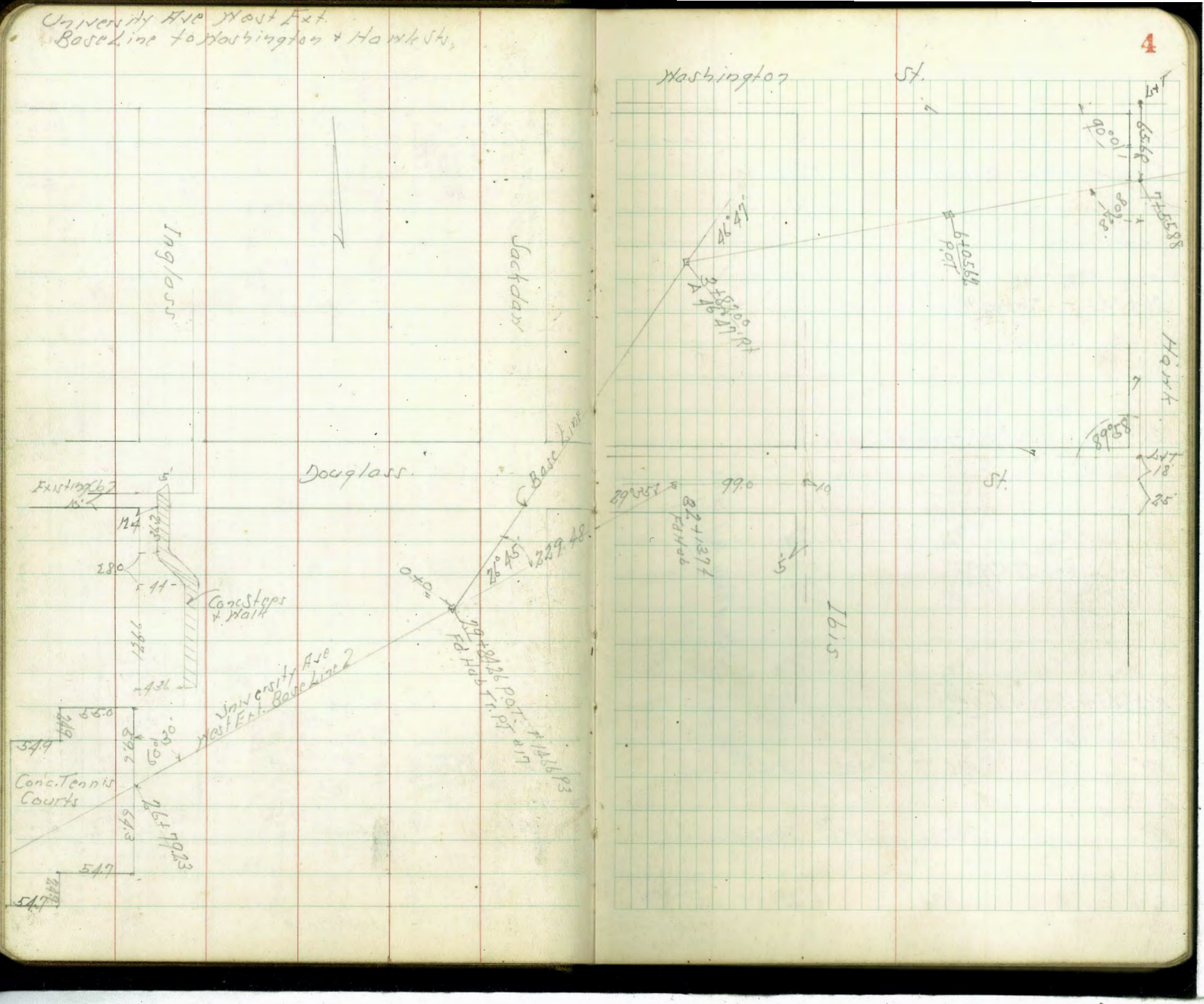
Oct 9-42
Sisson
Hazard
Writ




Jackdaw 30' Roadway
Stucco
Shingle
Basement
Frame Garage
Shingle House
Conc Porch
Chimney
Stucco Garage
Frame Add.
Stucco
Wall
Conc Landing
Stucco Above Frame Basement
6' Conc Wall 2
Porch Store Room Below
Stucco Garage
Chimney
Stucco Above Frame Basement
Stucco Co. Garage
6' Conc Wall 2
Ibis St.
Base Line See Page 4
Conc Wall 2
Frame House
Frame
Frame Garage
Conc Porch


Ingalls St
Jackdaw
Douglass
Washington
10' Curb Inlet
Frame House
Frame House
Frame House
Do Garage Board
Frame House
Board Garage
Colt House
Frame House
Frame House
Store Room Below
Frame Garage
Frame House + Basement
Brick Chimney
Frame Garage Basement
Frame House Basement
Brick Chimney
Porch
Roadway
Conc. Landing
Pow Pole
0+50
1+01.4
1+27.4
1+50.6
1+76.6
2+14.6
2+60.1
2+00.1
1+71.9
0+98.6
0+59.4
0+0

University Ave West Ext.
Baseline to Washington & Hawk St.



Levels on Tennis Courts

See Sketch Page 4

27+12 = Opp Inlet 24" Conc Culvert

26+94 Taken Angle of Court

26+90 Taken Angle of Court

East Line = 26+79.23

Hard Copy Roll 6034

West Line Tennis Court

TP	0.01	195.72	13.00	195.71	
TP	0.12	208.71	12.35	208.59	
BM	0.29	220.94		220.55	Base Line Hub 29+84.26 Tr. Pt. #17 #14.66 Page 13 Millers Survey

Oct 14-42
Sisson
Hazard
Bliss
Summermeyer
Beggs

Lt = N | Base Line | Rt = S

181.80
13.93
3.5 = Inlet 24" Conc Culv. Flow Line

186.2 9.5 | 189.7 6.0 9 | 190.5 5.2 36 | 197.2 +1.5 38 | 207.3 +11.6 74

186.1 9.6 | 188.3 7.4 35 | 196.7 6.0 65 = Bot Cut

189.4 6.3 1' N of Cor | 186.2 9.50 N E Cor Conc | 185.87 9.85 S E Cor Conc | 206.6 +10.9 5' So of Cor = Top Cut

194.7 1.0 16' N of Cor = Top Cut | 187.8 7.9 5' N of Cor = Bot Cut | 185.79 9.93 N W Cor | 185.39 10.33 S W Cor Conc | 186.2 9.5 35' So of Cor Bot Cut | 198.2 +2.5 38' S = Top Cut

195.72

University Ave West Extension
To Washington + Hawk Sts.

4+22	28 Rt of B = 8" Acacia Tree			
4+10	21.6 Rt of BL = 12" Euc Tree 24.5 Lt = 10" Pep Tree			
4+07	30.4 Rt of BL = 14" Euc. Tree			
3+82.0	Δ Rt 46°47' Taken on split			
3+60	14.5 Lt of BL = Do. 21" Pepper Tree			
3+50				
TP	13.33	240.02	1.52	226.69
3+0				
2+68	25' Lt of Base Line = Apricot Tree			
2+65	39' Lt of Base Line = 18" Pepper Tree			
2+0				
0+0 =	29+84.26 Univ. Ave West Ext.			
TP	12.17	228.21	0.08	216.04
TP	5.62	216.12	11.70	210.50
BM	1.65	222.20		220.55

Platted on Hard Copy Roll 6034
10-19-42 C.A.H.

Lt. N   Base line   Rt. S

243.2 +3.2 60' = Top Conc Wall
240.4 +0.4 60' = Base " Conc Wall
235.8 4.2 50
223.1 16.9 8
219.9 20.1
217.1 22.9 12
217.6 22.4 20
228.0 12.0 43
232.2 7.8 56
237.95 2.07 69 = Flr Line Hous front Floor Level

215.9 24.1 15 = M.H. on Rim

240.02

236.2 +8.0 83
228.2 0.0 64
218.1 9.5 39
213.0 15.2 20
212.4 15.8 8
214.5 13.7
225.3 2.9 21
234.2 +6.0 45
239.7 +11.5 58

233.4 +5.2 92
226.0 2.2 82
219.5 8.7 65
213.2 15.0 35
207.1 21.1 9
206.4 21.8
214.0 14.2 18
222.0 6.2 40
228.2 0.0 53

228.21

5+99.2 = Opp. Sewer M.H					
6+05.62					
TP	11.35	257.80	3.12	246.45	on ℄ Hub 6+05.62
5+91	50' Rt of ℄ = 30" Euc Tree ✓				
5+81	50' Rt of ℄ = 24" Euc Tree ✓				
5+79	53' Rt of ℄ = 24" Euc Tree ✓				
5+77					
5+74	9' Rt of ℄ = 36" Base of 3 Euc. Trees ✓				
5+57	14' Lt of ℄ = 12" Euc Tree ✓				
5+34	17' Lt of ℄ = 16" Euc Tree ✓				
5+0					
4+66	30.5' Rt of ℄ = 14" Tree ✓				
	33.5 Rt of ℄ = 12" Euc Tree ✓				
4+56	17 Lt of ℄ = 15" Pepper Tree ✓				
4+39	31' Rt of ℄ = 8" Acacia Tree ✓				
4+33	20.8 Lt of ℄ = 12" Pepper Tree ✓				
TP	11.18	249.57	1.63	238.39	Rock 10'S of E End Conc Wall
4+30	24' Rt of ℄ = 18" Euc Tree ✓				
4+25					

240.02

Lt. ℄ Rt

234.0 ✓
23.8 / 47=MH Rim

253.8 4.0/45=SW House · 253.8 4.0/31 · 252.3 5.5/20 · 250.7 7.1/7 · 246.5 11.3 · 241.7 16.1/14 · 240.8 17.0/22 · 233.0 24.8/33 · 235.8 22.0/63 · 248.4 9.4/97

257.80

252.4 +2.8/50=SW Line of House · 248.8 0.8/37 · 246.2 3.4/28 · 239.6 10.0 · 233.3 16.3/62.5 · 229.9 19.7/47 · 233.8 15.8/62 · 238.9 10.7/79 · 249.0 .6/100

249.3 0.3/60 · 238.8 10.8/44 · 239.0 10.6/33 · 235.1 14.5/30 · 226.6 23.0 · 225.6 24.0/10 · 226.9 22.7/20 · 237.2 12.4/48 · 249.6 0.0/74

249.57

244.5 +4.5/80=SW House · 243.8 +3.8/68 · 240.6 +0.6/68=Bot Conc Wall · 236.7 3.3/60 · 231.2 8.8/42 · 222.1 17.9/13 · 220.2 19.8 · 221.2 18.8/15 · 230.1 9.9/38 · 232.1 7.9/42=Hy Porch

240.02

BM			2.94	266.88	N.E.B.P. Washington & Goldfinch 267.02
TP	8.97	269.82	3.91	260.85	S.W. 2+T. Washington & Hawk 260.99 From Goldfinch
7+48.78	= ℄ Hawk Takes on Line of Hawk				
TP	10.78	264.76	3.82	253.98	
7+15					
7+12	32' Rt of ℄ = 24" Pepper Tree ✓				
6+85					
6+70	55' Rt of ℄ = Avocado Tree ✓				
6+67	15' Rt of ℄ = 3" Lemon Tree 44' Rt of ℄ = 6" Lemon Tr ✓				
6+50					
6+40	13' Rt of ℄ = 6" Apricot Tree ✓				
6+27	6.7 Lt of ℄ = 4" Loquat Tree ✓				
6+28	51.5 Rt of ℄ = 20" Euc Tree ✓				
6+21	51.5 Rt of ℄ = 18" Euc Tree ✓				
6+13	51.5 Rt of ℄ = 16" Euc. Tree ✓				

257.80

Lt ℄ Rt

261.1 3.7/50 — 261.2 3.6/40 — 261.1 3.7/20 — 260.5 4.3 — 259.7 5.1/20 — 259.6 5.2/40 — 259.2 5.6/60

264.76

260.0 +2.2 / 8 = Hgt. Floor of Garage — 258.8 +1.0 / 8.0 = S.W. Stucco Garage — 254.5 2.3 — 244.8 12.0/26 — 247.8 10.0/46 = H.L. House

259.9 +2.1 / 34 = S.W. Stucco House — 259.4 +1.6 / 15 = Top 8" Conc. Wall — 252.4 5.4 — 243.3 14.6/25 — 239.4 18.4/40 — 243.1 14.7/55 — 251.5 6.3/80 — 255.3 2.5/93 = H.L. House

259.3 +1.5 / 39.5 = S.W. House — 258.3 +0.5 / 19 = Top 8" Conc. Wall — 257.3 0.5/17 — 254.8 3.0/12 — 249.6 8.2 — 243.2 14.6/20 — 237.6 20.2/42 — 236.5 21.3/58 — 241.9 15.9/70 — 251.2 6.6/90

257.80

Cross Section Howk St.
Washington to Douglass

Indexed
C.S.I.K.

Plotted Profile 407 Oct 19-1942 C&H

0+75.

0+50

0+25 = S.L. Washington From East

0+12.3 = S.C.L. of Washington From East

0+0. = S.L. Washington From West.

0-25 = ℄ Washington From West

B.M.	5.99	266.98	260.99	S.W. 7 L.T. Washington Hawk

Lt. ℄ Rt.

9

261.24	260.64	260.38	260.86	260.52	259.79	260.08
5.74	6.24	6.10	6.12	6.46	7.19	6.90
20-CL	20-Gutter	10		10	20-Gutter	20-CL
261.65	261.01	261.24	261.26	260.93	260.22	260.58
5.33	5.97	5.74	5.72	6.05	6.76	6.40
20	20	10		10	20	20
261.92	261.25	261.31	261.20	261.05	260.90	261.20
5.06	5.73	5.67	5.78	5.93	6.08	5.78
20-CL	20-Gutter	10		10	20	20
261.99	261.55	261.45	261.06	260.87	260.78	260.78	261.11
4.99	5.43	5.53	5.92	6.11	6.20	6.20	5.87
30-CL Top	30-Gutter	20	10		10	20-Gutter	20-CL
262.21	262.05	261.80	261.36	260.98	260.60	260.96
4.77	4.93	5.18	5.62	6.00	6.38	6.02
30	20	10		10	20-Gutter	20-CL
	262.22	262.18	262.16	262.12	261.80
	4.76	4.86	4.82	4.86	5.18
	20	10		10	20

266.98

Hawk St

Sta.	Lt.			℄			Rt
2+25	261.94 / 5.04 / 20=Cb	261.28 / 5.70 / 20=Gutter	261.68 / 5.30 / 10	261.68 / 5.30	261.33 / 5.65 / 10	260.66 / 6.32 / 20=Gutter	261.25 / 5.73 / 20=Cb
2+0	261.52 / 5.46 / 20	260.91 / 6.07 / 20	261.23 / 5.75 / 10	261.13 / 5.85	260.79 / 6.19 / 10	260.14 / 6.84 / 20	260.73 / 6.25 / 20
1+75	261.06 / 5.92 / 20	260.41 / 6.57 / 20	260.67 / 6.31 / 10	260.61 / 6.37	260.21 / 6.77 / 10	259.50 / 7.48 / 20	260.08 / 6.90 / 20
1+50	260.55 / 6.43 / 20	259.73 / 7.25 / 20=Grating 25+27	260.06 / 6.92 / 10	260.14 / 6.84	259.54 / 7.44 / 10	258.91 / 8.07 / 20=Grating 25+72	259.58 / 7.40 / 20
1+25	260.75 / 6.23 / 20	260.06 / 6.92 / 10	260.33 / 6.65 / 10	260.31 / 6.67	259.90 / 7.08 / 10	259.13 / 7.85 / 20	259.54 / 7.44 / 20
1+0	261.00 / 5.98 / 20=Cb	260.36 / 6.62 / 20=Gutter	260.66 / 6.32 / 10	260.50 / 6.48	260.09 / 6.89 / 10	259.42 / 7.56 / 20=Gutter	259.81 / 7.17 / 20=Cb

266.98

266.98

Hank St.

BM		5.63	262.04	S.E.B.P. Douglass +1675 262.00
TP	4.47	3.78	262.20	
3+70	=N.L. Douglass			
2+75				
2+50				

26698

11

263.48	262.83	263.16	263.24	262.99	263.40	262.98
3.50	4.15	3.82	3.74	3.99	4.58	4.00
20-CL	20-South	10		10	20-South	20-CL
263.02	262.35	262.71	263.71	263.45	261.86	262.42
3.96	4.63	4.37	4.27	4.53	5.13	4.56
20	20	10		10	20	20
262.48	261.83	262.20	262.16	261.89	261.23	261.82
4.50	5.15	4.78	4.82	5.09	5.75	5.16
20-CL	20-South	10		10	20-South	20-CL

26698

Cross Section Washington St
Hawk to Ibis

Indexed
C.S.K.

Lt = S ℄ Rt = N

Station					℄				
1+0		260.35 / 4.96 / 15-Cb	259.80 / 5.51 / 15-Gutter	260.32 / 4.99 / 7.5	260.71 / 4.60	260.68 / 4.63 / 7.5	260.37 / 4.94 / 15	260.31 / 5.00 / 15 Gutter	261.33 / 3.98 / 15-Cb
0+95						261.30 / 4.01 / 13	261.37 / 3.94 / 15=Cb & Grating		
0+75		260.49 / 4.82 / 15	260.01 / 5.30 / 15	260.56 / 4.75 / 7.5	260.93 / 4.38	261.25 / 4.06 / 7.5	261.53 / 3.78 / 15=Cb+Pav.		
0+50		260.67 / 4.64 / 15	260.25 / 5.06 / 15	260.83 / 4.48 / 7.5	261.16 / 4.15	261.46 / 3.85 / 7.5	261.69 / 3.62 / 15=Cb+Pav.		
0+25		260.84 / 4.47 / 15	260.40 / 4.91 / 15	260.97 / 4.34 / 7.5	261.42 / 3.89	261.65 / 3.66 / 7.5	261.84 / 3.47 / 15=Cb+Paving		
0+0	= W.L. Hawk	260.98 / 4.33 / 15=Cb	260.52 / 4.79 / 15=Gutter	261.20 / 4.11 / 7.5	261.62 / 3.69	261.84 / 3.47 / 7.5	261.89 / 3.42 / 13	261.94 / 3.37 / 16.4=Cb+Pav	
BM	4.32	265.31	260.99	SW T&T Washington & Hawk	265.31				

Plotted on Profile 923 10-19-1942 CBH.

Washington St

Station		Rod	Elev.	Remarks		Lt.		℄		Rt.	
BM		4.76	260.55	NERP Washington & Ibis 260.54							
2+10.3 = EL of Ibis St					259.52 5.79 15	259.06 6.25 15	259.53 5.78 7.5	259.88 5.43	259.88 5.43 7.5	259.71 5.60 15	260.50 4.81 15
2+0					259.60 5.71 15	259.11 6.20 7.5	259.57 5.74 7.5	259.93 5.38	259.95 5.36 7.5	259.69 5.62 15 = Gutter	260.56 4.75 15 = Cb
1+75					259.79 5.52 15	259.3? 6.0 7.5	259.74 5.57 7.5	260.11 5.20	260.13 5.18 7.5	259.81 5.50 15	260.75 4.56 15
1+50					259.96 5.35 15	259.49 5.82 15	259.92 5.39 7.5	260.3? 5.0	260.31 5.00 7.5	260.02 5.29 15	260.96 4.35 15
1+25						259.70 5.61 15 = Gutter 15 Drive	260.16 5.15 7.5	260.54 4.77	260.47 4.84 7.5	260.16 5.15 15 = Gutter	261.10 4.21 15 = Cb

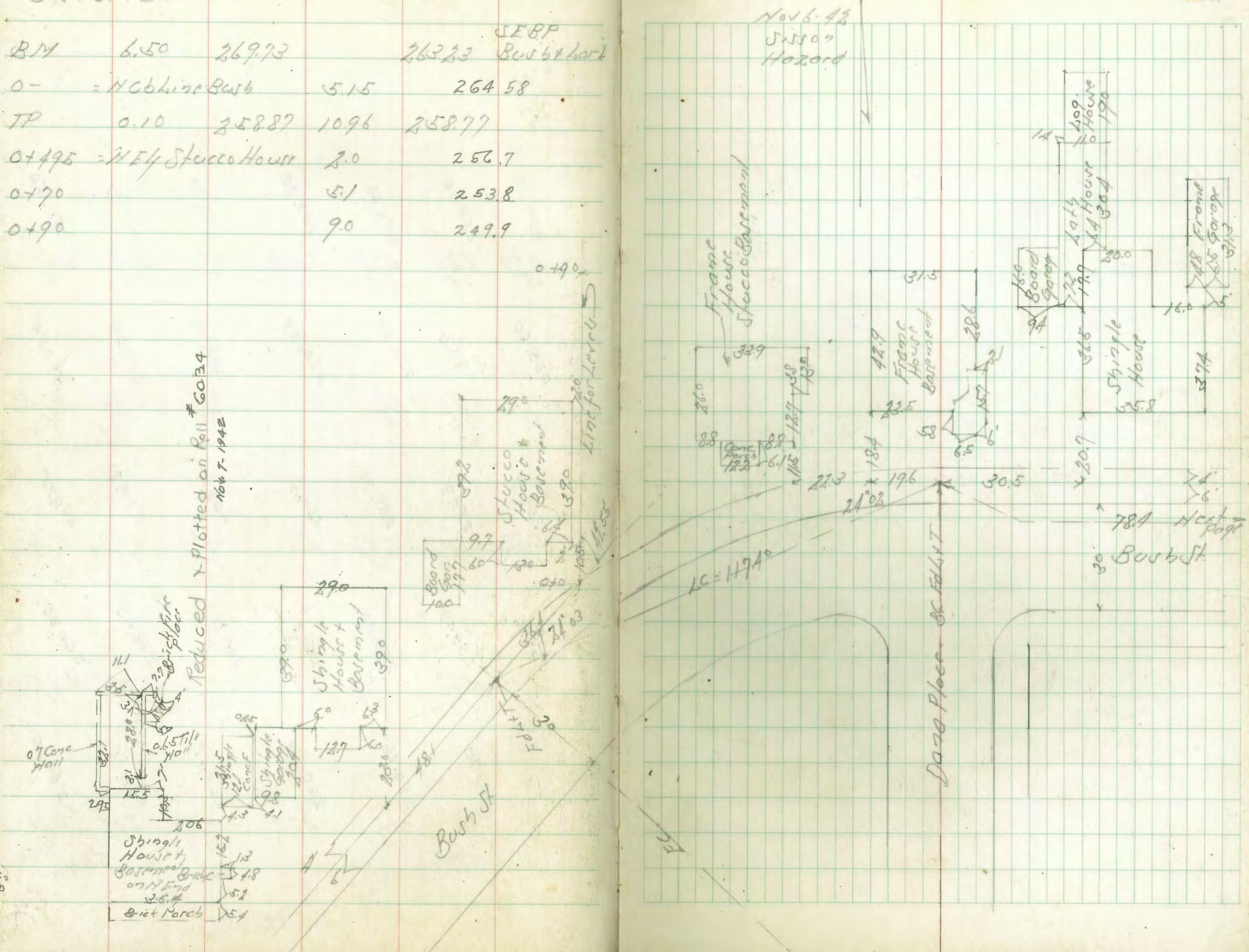
265.31

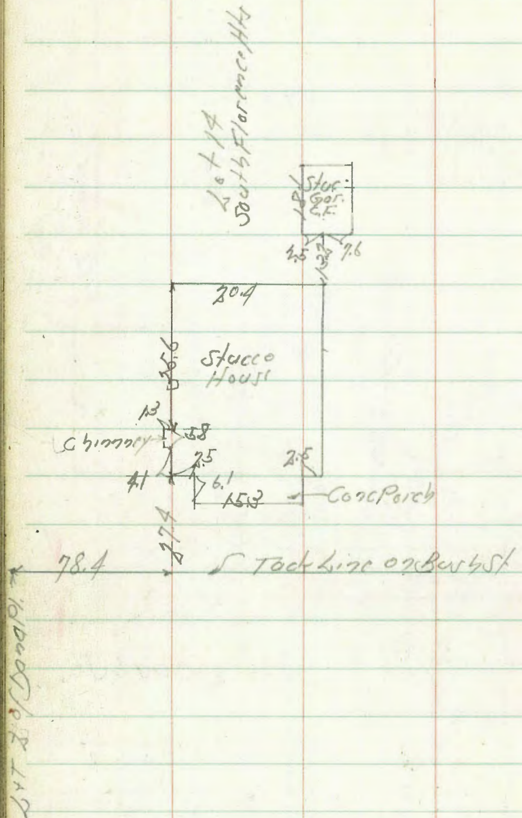
265.31

House Locations
Bush St & Dana Place

Indexed
G.S.K.

BM	6.50	269.73		263.23	SEBP Bush & Lark
0-	= N Cb Line Bush		5.15	264.58	
TP	0.10	258.87	10.96	258.77	
0+49.5	= NE 4 Stucco House		2.0	256.7	
0+70			5.1	253.8	
0+90			9.0	249.9	




Lot 14
South Florence Hts
Stuc.
Gar.
C.F.
4.5
7.6
30.4
Stucco
House
Chimney
2.5
2.5
6.1
Conc Porch
78.4
Track Line on Burk St

"A" LINE

WASHINGTON ST. EXTENSION

Walker
Harding
Wirt
11-23-42

from Hawk st. To India st.

Location of Proposed L.

as per Contour Projection.

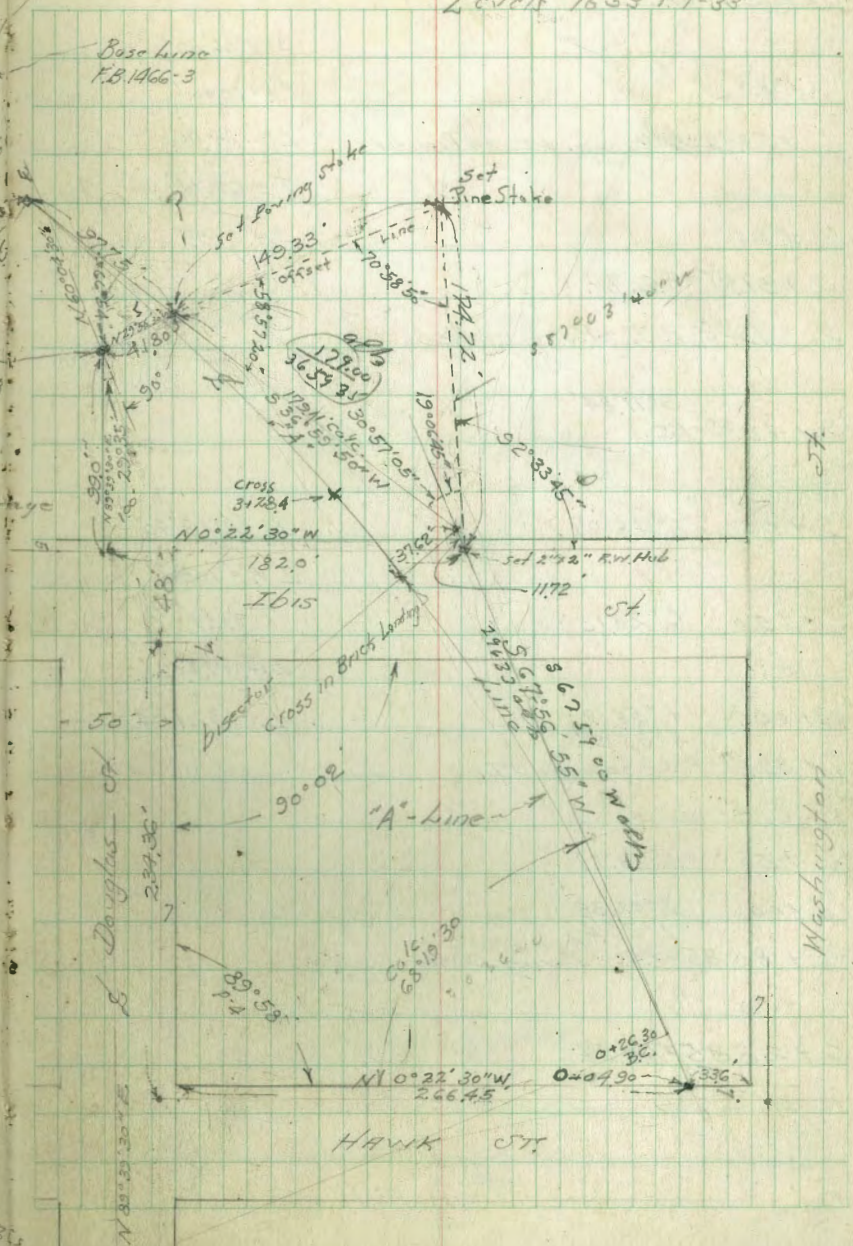
Base Line of Contour Map see F.B. 1466 Page 1-4

	15°28.53'	
5+66.50 = E.C.		
+50	15°00.07'	
5+00	13°34.13'	
+69.85	12°40.95' = P.O.C Stake	
+50	12°08.19'	
4+00	10°42.25'	
+50	9°16.31'	
+28.4	8°39.3' = P.O.C chisled cross in Conc. Drive = Front of Garage	
3+00	7°50.37'	
	7°44.26'	
2+96.40 = P.O.C = chisled cross in Brick Landing		Δ = 30°57'05"
+50	6°24.46'	Σ R = 1000'
		" L = 540.20'
2+00	4°58.52'	"St. = 276.86'
		Ext. = 37.62'
+50	3°32.58'	
1+00	2°06.64'	
	0°31.86'	
0+44.13 = P.O.C Paving Stake		
0+26.30 = B.C. L.H.		
0-04.90 = H.L. Hawk st. Set R.W. Hub.		

Note: Set 2"x2" Redwood Hubs at all P.T.s
" 1"x1" Pine Paving Stakes at all E.C.s & B.C.s
" " " " " " & P.O.C.s

Indexed
C.S.K.

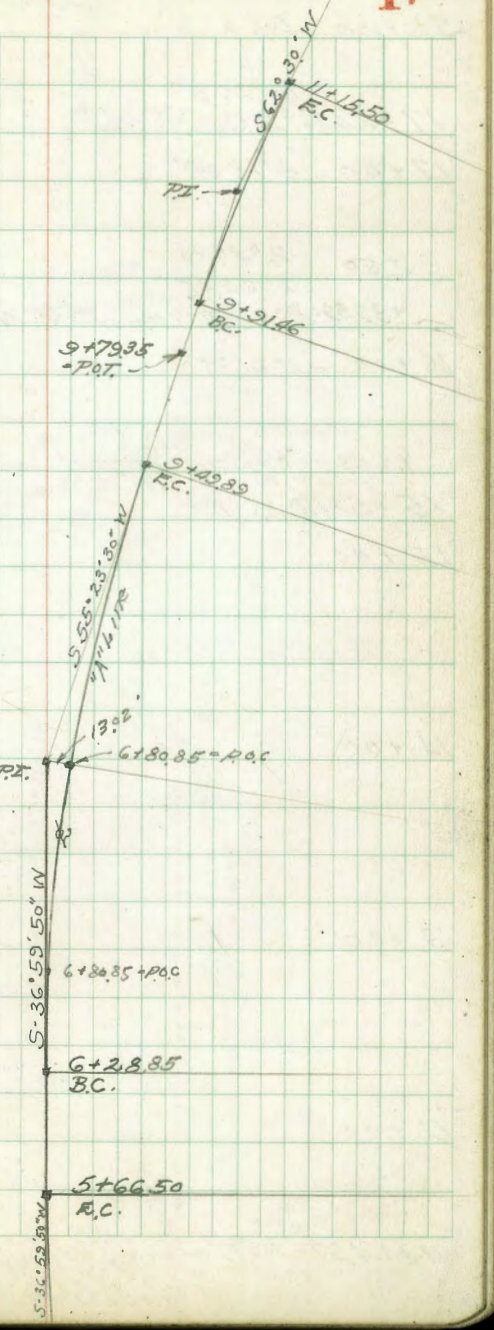
Level # 1653 P 1-33



"A" Line
Cont. P-18

Station	Def ∠	
11+15.50 = E.C.		
		Δ = 7°06'30"
		D R = 1000'
+53.49 = P.O.C opp. P.I. on Bisector		L = 124.06
		T = 62.11'
10+00		Ext. = 1.93'
9+91.46 = B.C. Pt.		
9+79.35 = P.O.T. = Paving Stake		
	9°11.84'	
9+49.89 = E.C.		
		Δ = 18°23'40"
9+00	7°46.07'	D R = 1000'
+50	6°20.13'	T = 161.91'
–		Ext. = 13.02'
8+00	4°54.19'	L = 321.04'
	4°35.9'	
7+89.37 = P.O.C = opposite P.I.		
+50	3°28.27'	
7+00	2°02.32'	
	1°29.4'	
6+80.85 = P.O.C = Paving Stake		
+50		
6+28.85 = B.C. Pt.		

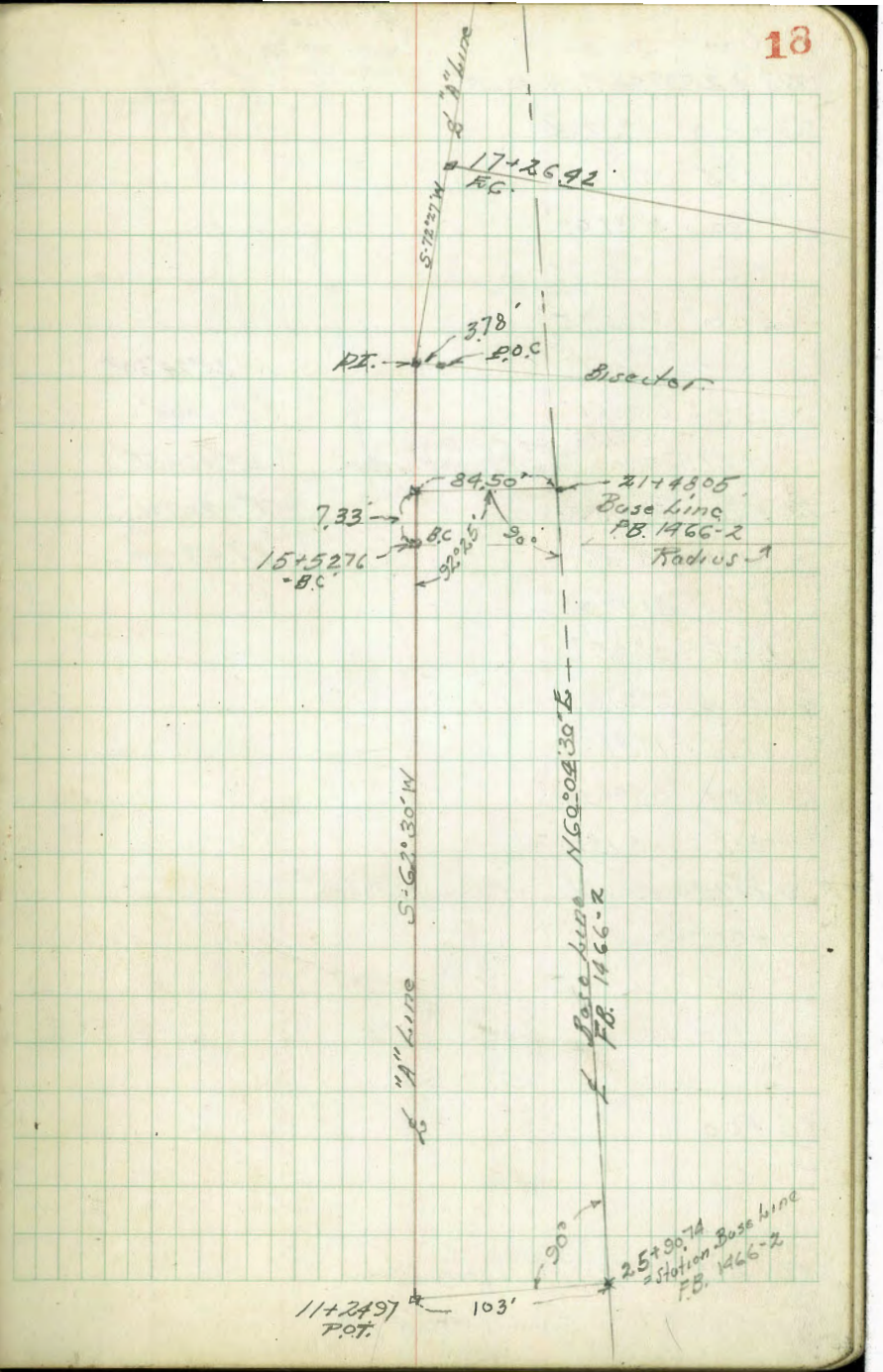
Cont. from P-16



"A" Line
Cont. P-19

Station	Def. Δ	
	17°26.5'	
17+26.42 = E.C.		
17+00	4°13.04'	Δ = 9°57'
		R = 1000'
		L = 17366'
		T = 87.05'
+50	2°47.10'	Ext = 3.78'
	2°29.25'	
+39.59 = P.O.C paving stake opp P.I. on bisector		
16+00	1°21.25'	
+60.09 on Semi Tangent		
15+52.76 = B.C. P.I.		
15+00		
14+00		
13+00		
12+00		
11+24.97 = P.O.T. - Paving Stake		

Cont. from P-17



"A" Line
Cont. P. 20

Station	Def Δ
23+25.97 = E.C.	11°42.25'
23+00	10°57.63'
+75	10°14.63'
+50	9°31.69'
+25	8°48.75'
22+00	8°05.75'
+75	7°22.75'
+50	6°39.81'
	5°51.12' Set Pav. Stake
+21.69 = P.O.C. opp P.I. on Bisector	
21+00	5°13.85'
+75	4°31'
+50	3°47.91'
+25	3°05'
20+00	2°21.97'
+75	1°39'
19+50	0°56.03'
+25	0°13'
19+17.42 = B.C. Ld. Set Paving Stake	
19+00	

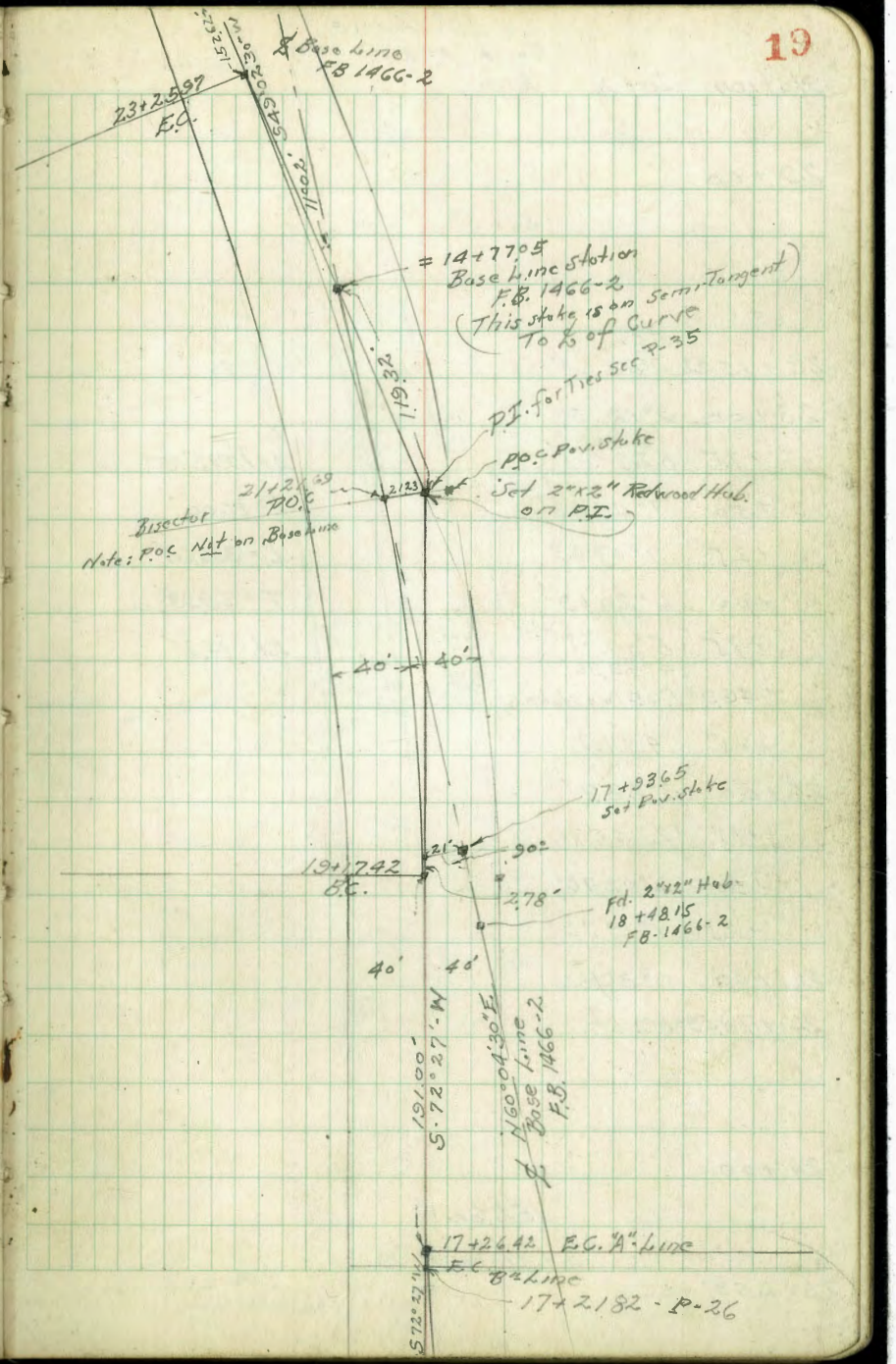
Δ = 23°24'30"
L.R. = 1000'
L = 408.55'
T = 207.16'
Ext. = 21.23'

191.00'

18+00

17+26.42 = E.C. Set Paving Stake

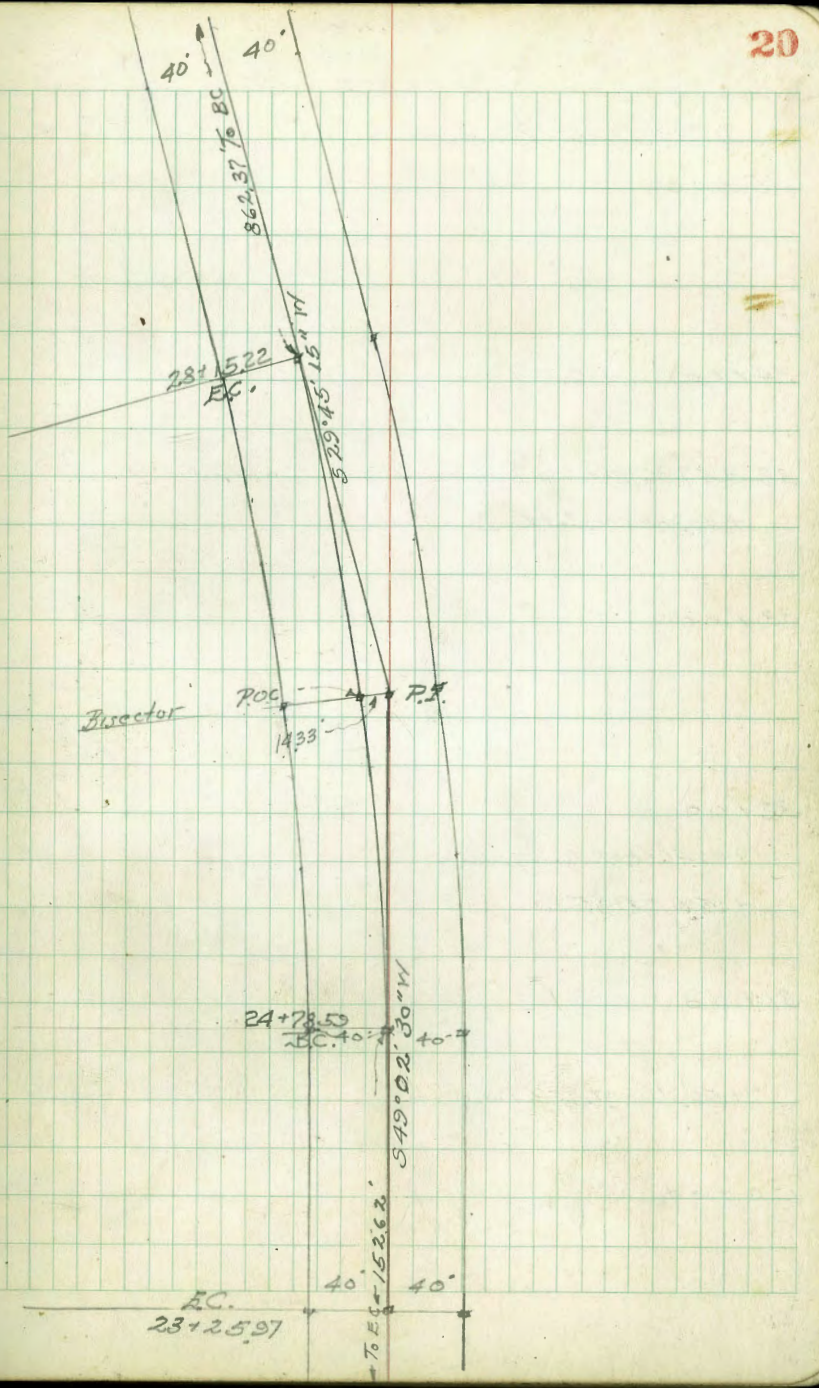
Cont. from P. 18



"A" Line
Cont P. 21

Station	Defs	Align
29+00		
		862.37'
	E.C.	
28+15.22	9°38.63'	
28+00	9°12.57'	
+75	8°29.57'	
+50	7°46.63'	
+25	7°03.63	
27+00	6°20.69'	
+75	5°37.69'	
	4°49.36'	
+46.9 = P.O.S. Pin & Stake		
+25	4°11.7	
26+00	3°28.7'	
+75	2°45.76	
+50	2°02.76'	
+25	1°19.76	
25+00	0°36.82	
24+78.59 = BC. Lt.		
24+00		
		152.62
	Cont. from P-15	
23+25.97 = EC.		

℄
Δ = 19°17'15"
R = 1000'
L = 336.63'
T = 169.93'
Et. = 14.33'



"A" Line

Cont P-22

35+27.59 = P.O.T. Pav. Stake

35+00

34+00

33+47.36 set cap Tack in House 1.4' N of SE Cor 1' Above Conc. Porch.

+40.90 = chisled Cross in Walk or Porch

33+00

32+00

+96.46 = P.O.T. Paving Stake

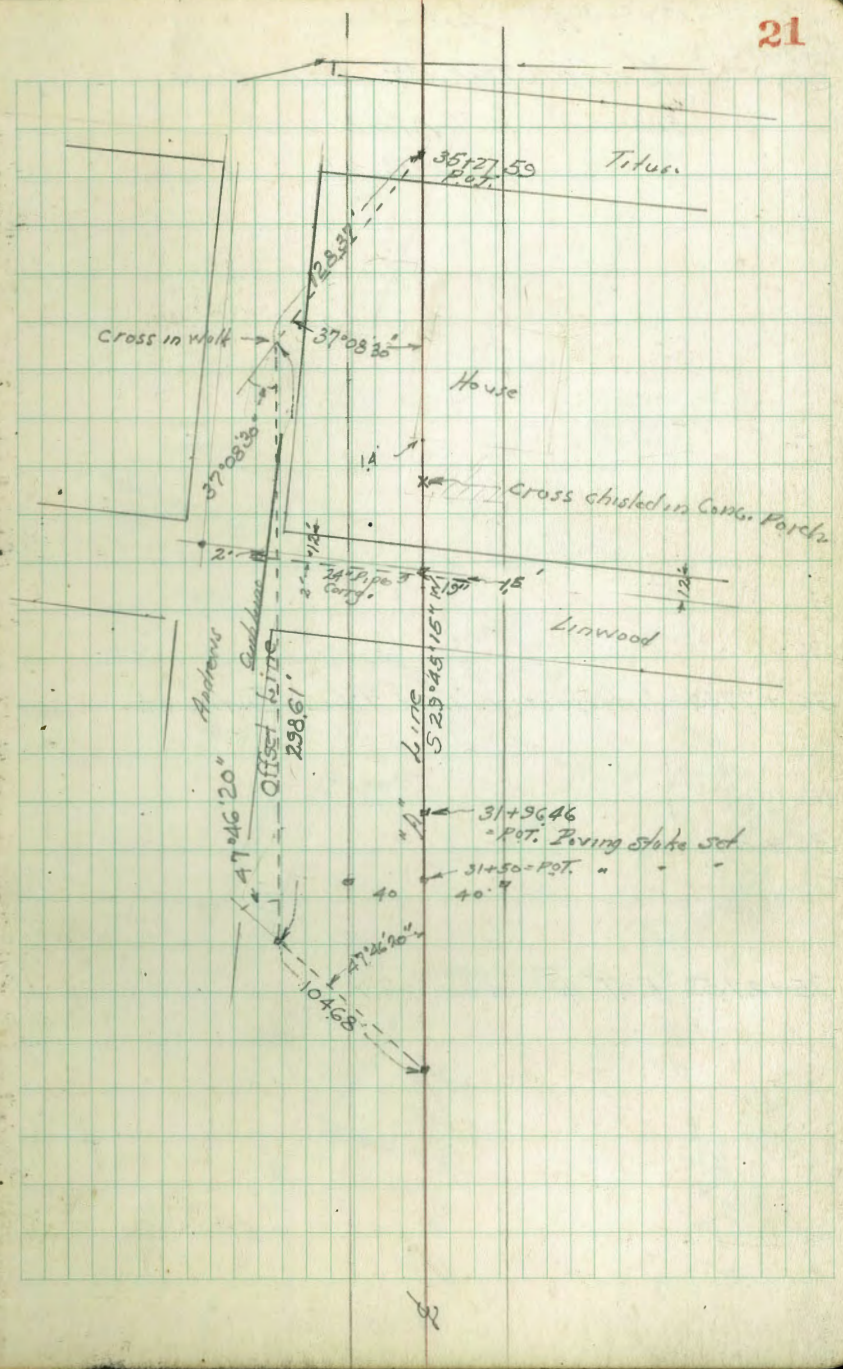
+50 = P.O.T. " "

31+00

+56.31 = P.O.T. Set Pav. Stake

30+00

Cont. from P-20



Walker
(12-4-42 completed)

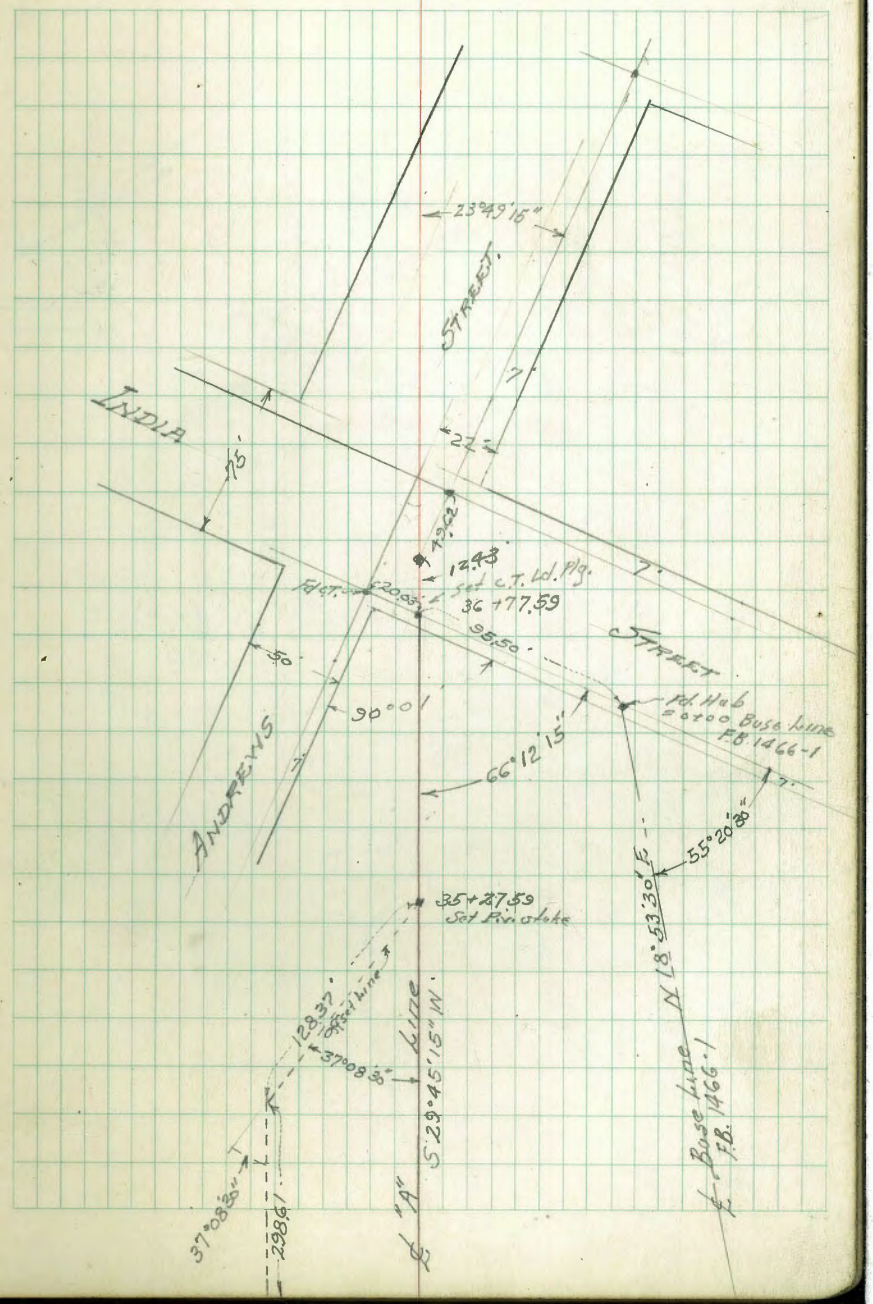
"A" Line

WASHINGTON ST. EXTENSION
From Hawk To INDIA St.
Cont. from P. 21

36 + 77.59 = Intersection East 7' Line India St.

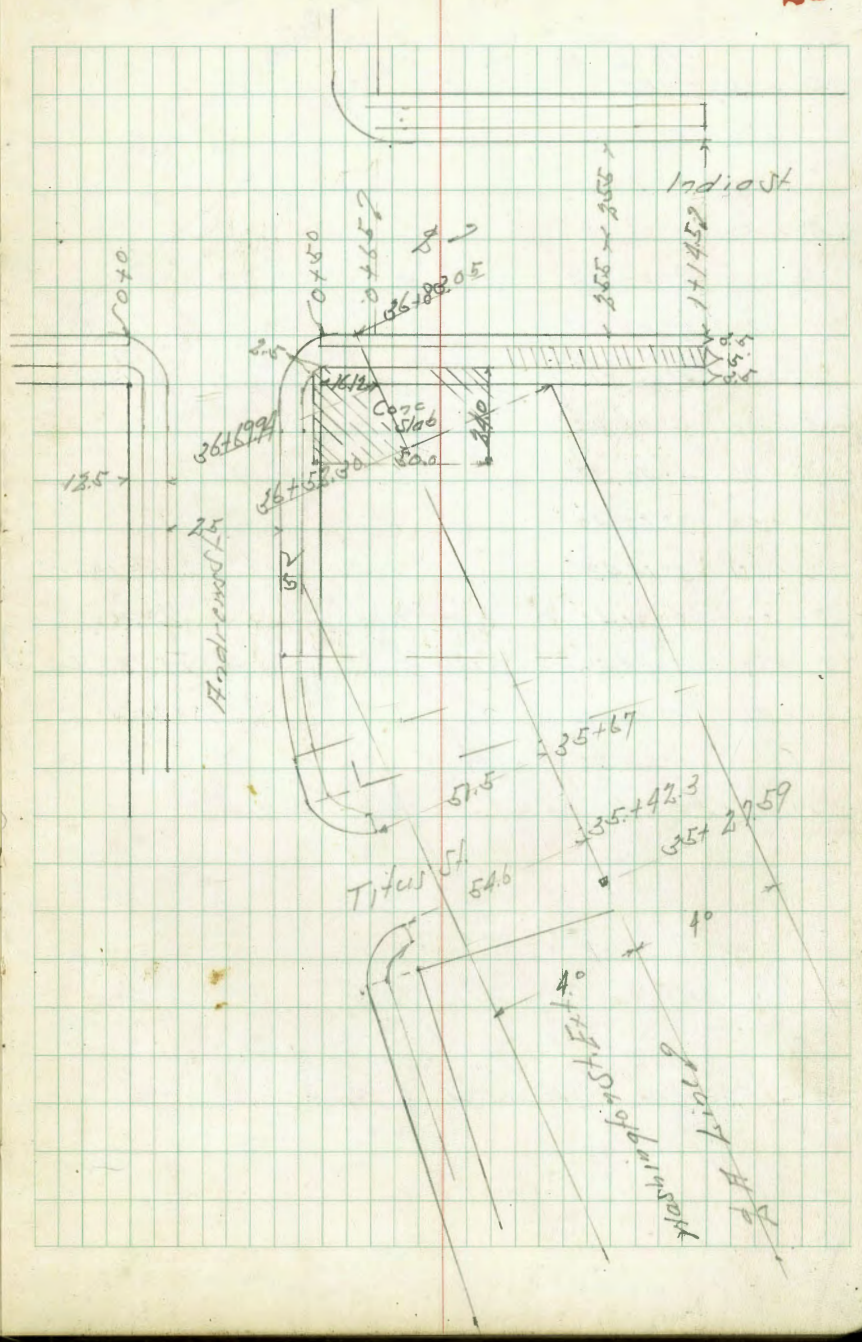
36 + 00

35 + 27.59 = P.O.T. Set Par. Stake



Cross Section Indio St At Andrews

For Levels See #1653 P32



Station	Deflection
5+72.69 = E.C.	10°20.35'
+50	9°41.2
+25	8°58.2
5+00	8°15.22'
+75	7°32.25'
+50	6°49.28'
+25	6°06.31'
4+00	5°23.34'
+75	4°40.37'
+50	3°57.40'
+25	3°14.43'
3+00	2°31.46'
+75	1°48.49'
+50	1°05.52'
+25	0°22.56'

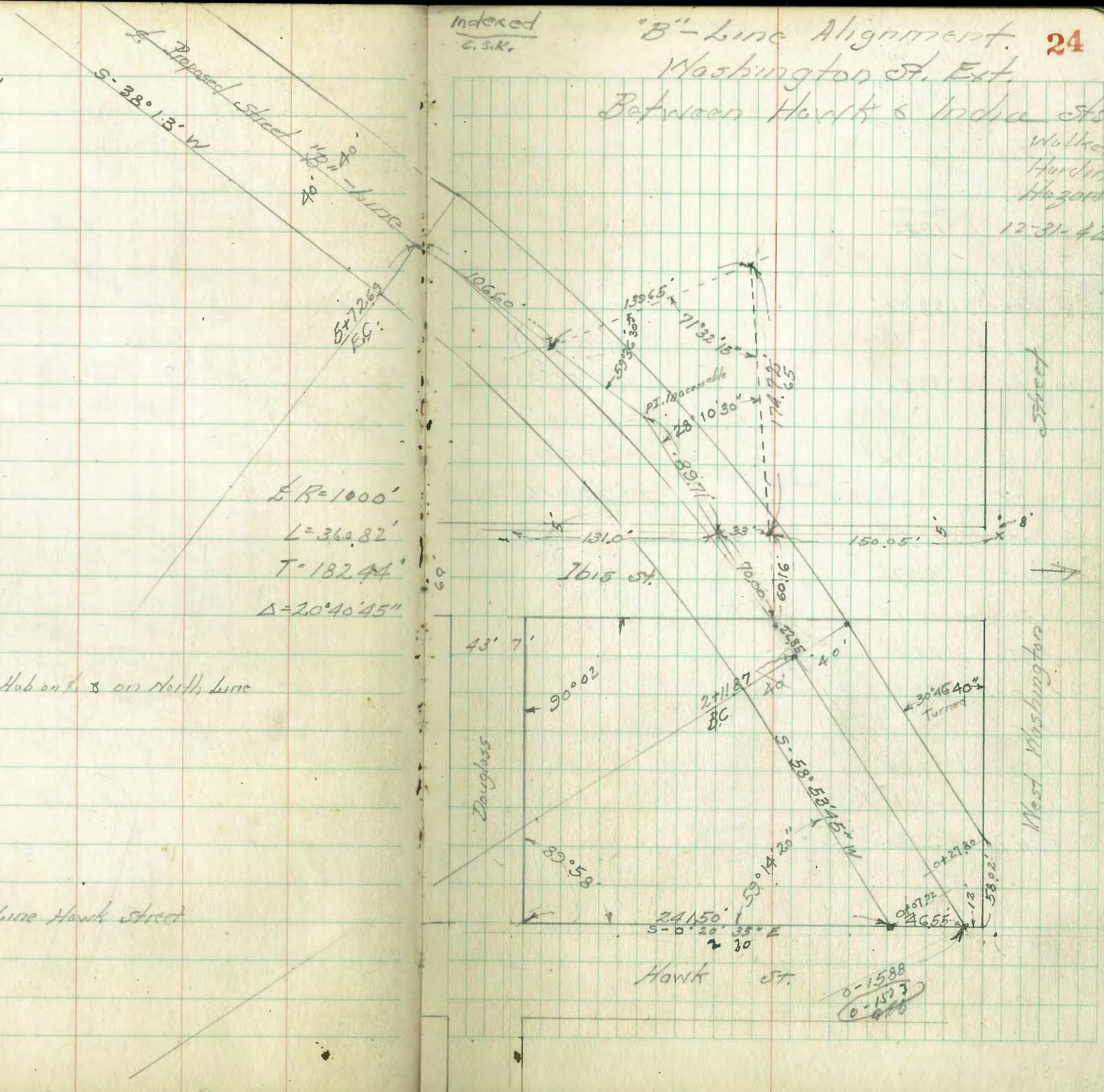
2+11.87 = B.C. Lt. Set Hub on ℄ & on North Line

0 - 15.88 = Int. West Line Hawk Street

Indexed
C.S.K.

"B"-Line Alignment.
Washington St. Ext.
Between Hawk & Indio Sts.

Walker
Hardin
Hazard
12-31-42



"B"-Line Alignment

Washington St. Extension

	12°28.25'
11+40.03 = E.C.	
+25	
11+00	11°19.46'
+75	
+50	9°53.52'
+25	
10+00	8°27.58'
+75	
+50	7°01.64'
+25	
9+00	5°35.7'
+75	4°52.76'
+50	4°09.76'
+25	3°26.8'
8+00	2°43.82'
+75	2°01'
+50	1°17.88'
+25	0°36.6'
7+04.72 = B.C. Rt	
6+00	

℄ Data

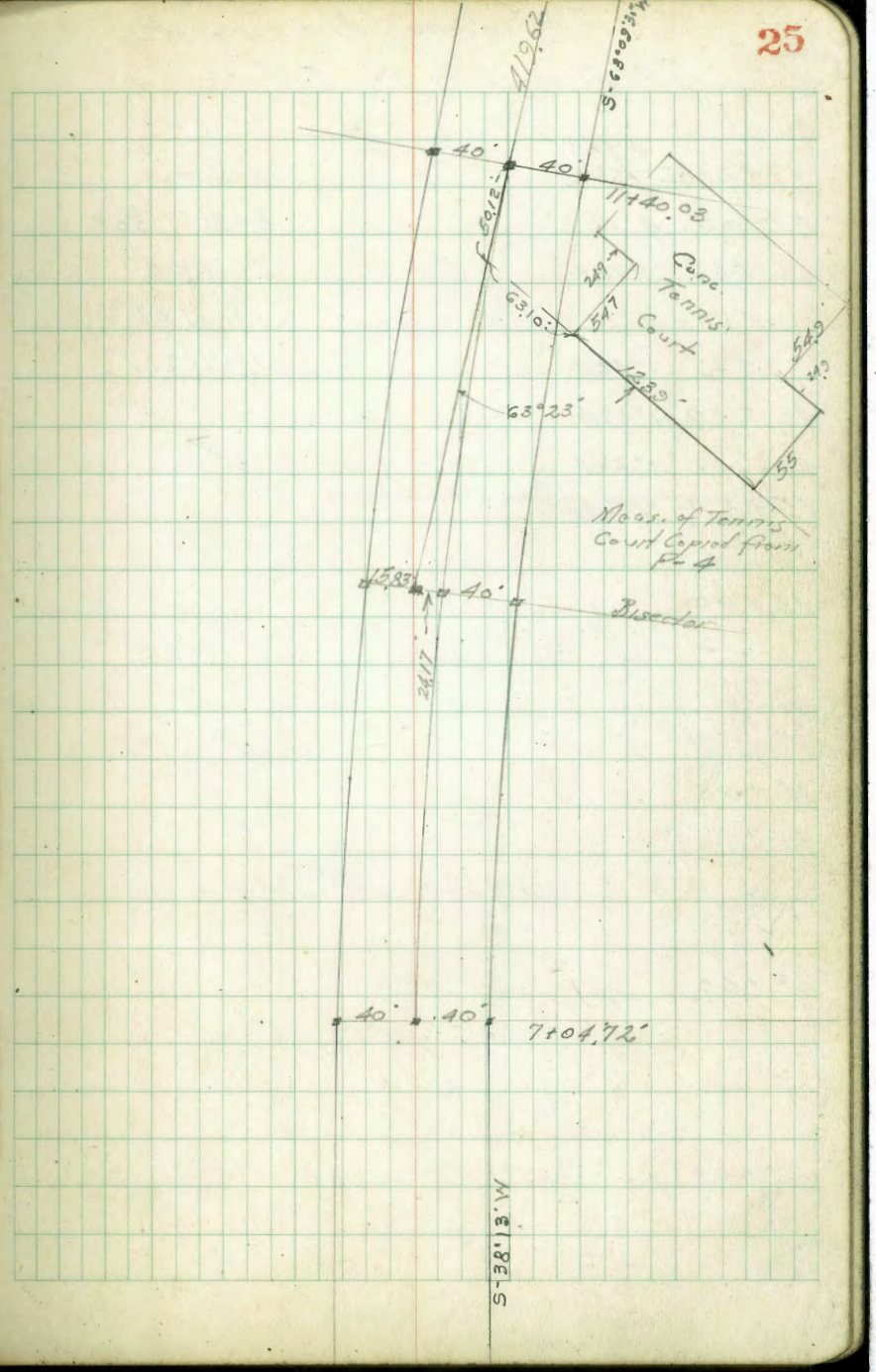
Δ = 24°56'30"

R = 1000'

L = 435.31'

T = 221.16'

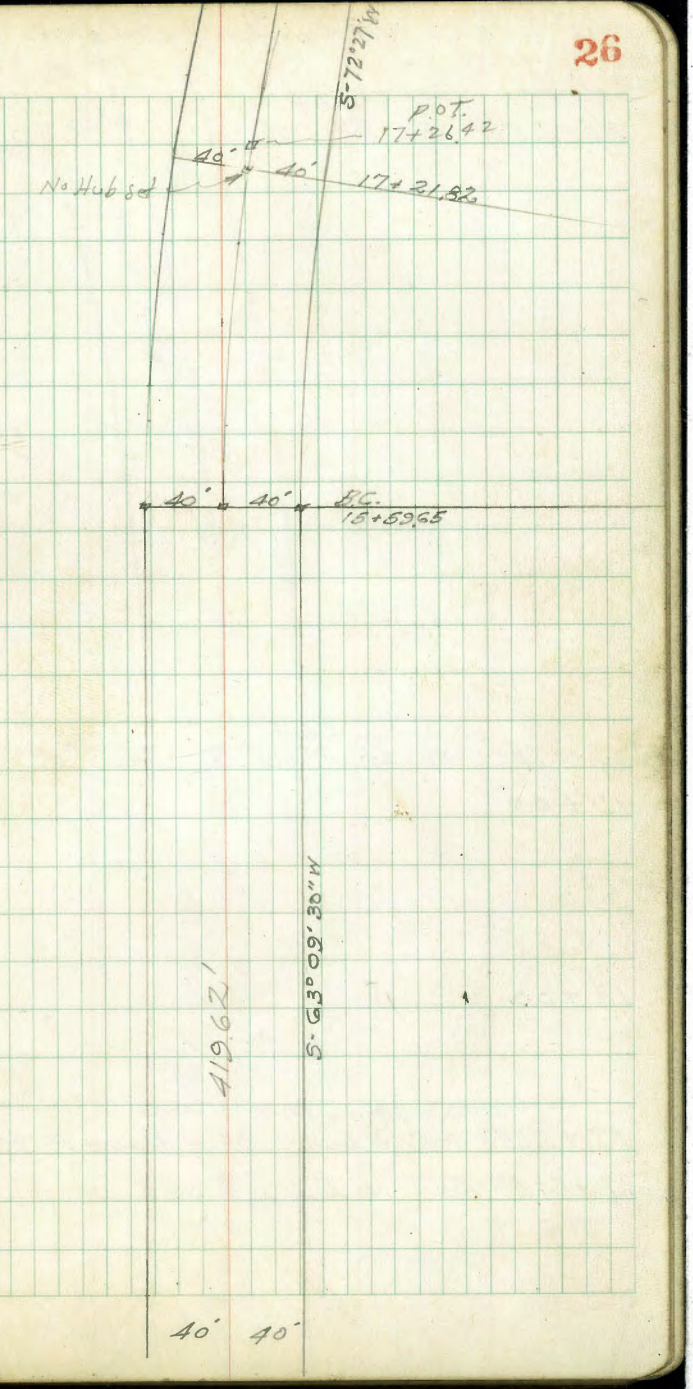
Ext. = 24.17'



"B" Line Alignment

Washington St. Extension

	4°38.75'	
17+21.82 - E.C.		E Data
17+00	4°01.4'	Δ = 9°17'30"
+75	3°18.4'	R = 1000'
+50	2°35.4'	T = 81.27'
+25	1°52.4'	L = 162.17'
16+00	1°09.40'	
+75	0°26.4'	
15+59.65 - B.C.		
15+00		
14+00		
	419.62	
13+00		
12+00		



Washington Extension

Cont.

23+25.97 = E.C. P-19

Cont.

19+17.42 = B.C. Lt. P-19

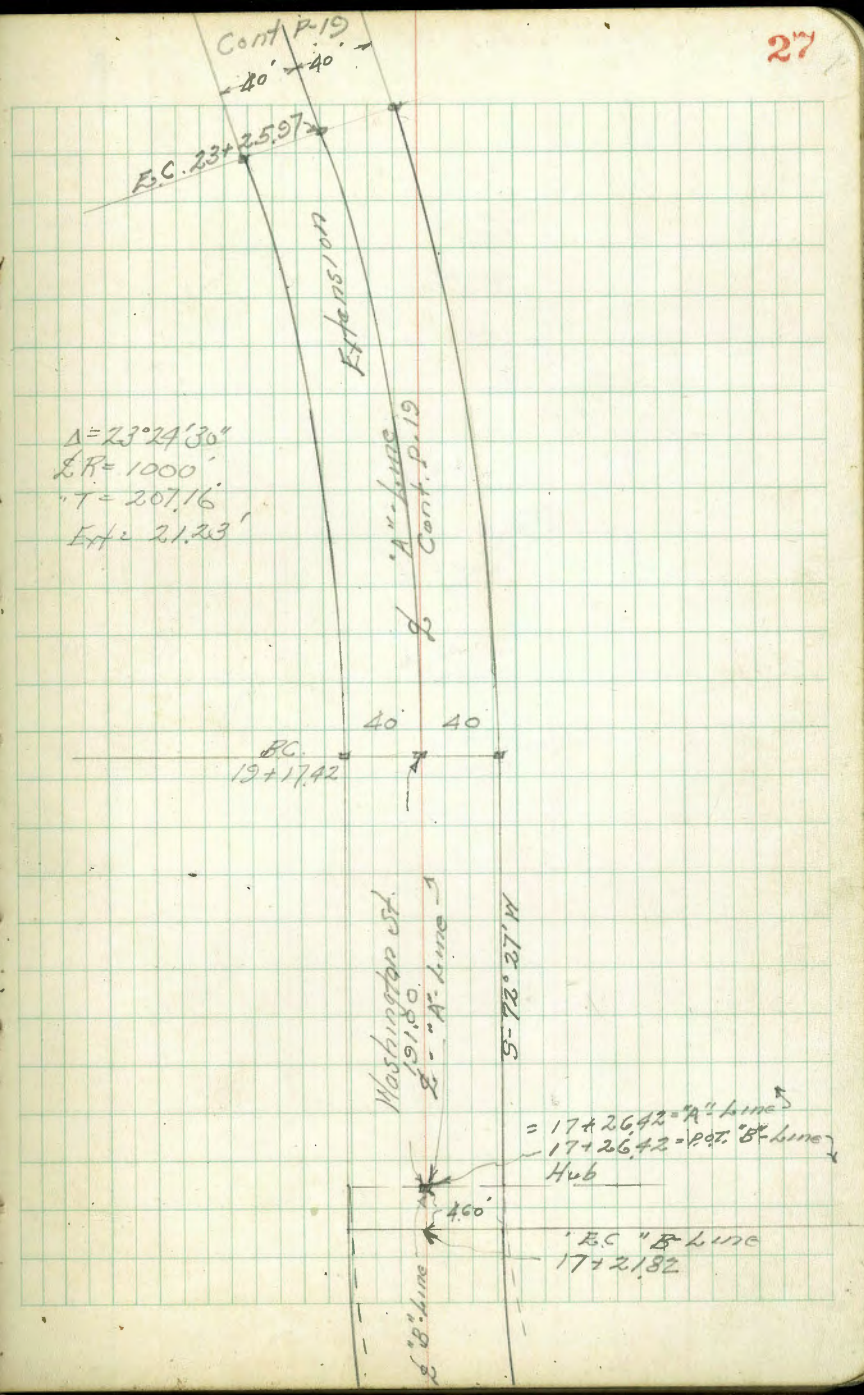
19+00

18+00

= Junction With "A" Line

17+26.42 = P.O.T. "B" Line = E.C. of "A" Line P-19

17+21.82 = E.C. No Hub set as L inaccessable



Washington St. Ext.

℄

31+50

+39 — 8" olive 51.3'R

+30 — 4" olive 50'R

+22 — 3" olive 48'R

31+00 — 4" olive 46'R

+84 — 6" olive 47'R

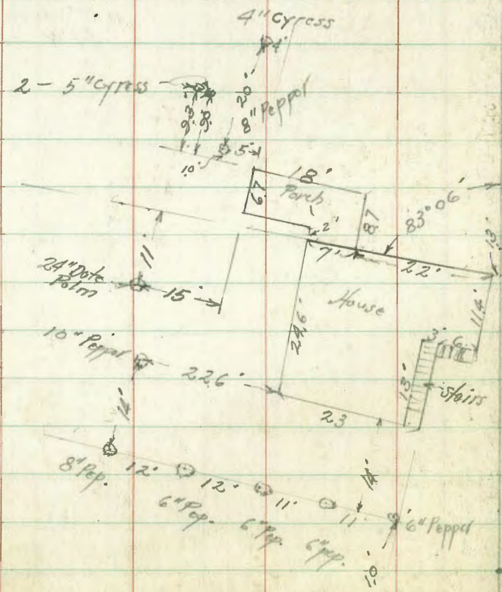
+72 — 2" olive 47'R

+58 — 3" olive 51'R

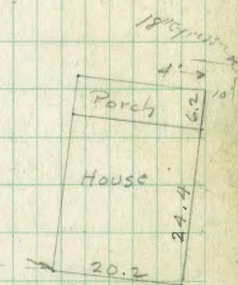
30+00

Washington St. Ext.
W-end.
Location Houses &c.

33+44 — 8" Pepper 38' L
33+32 — 24" Euc. 48' L
33+19 — Elec. Pole # 415145H 41' L
33+13 — 12" Pepper 3' L
+72 / 32+69 — 24" Euc. 5' L; 10" Euc. 8' L
32+59 — 24" Euc. 4' L.



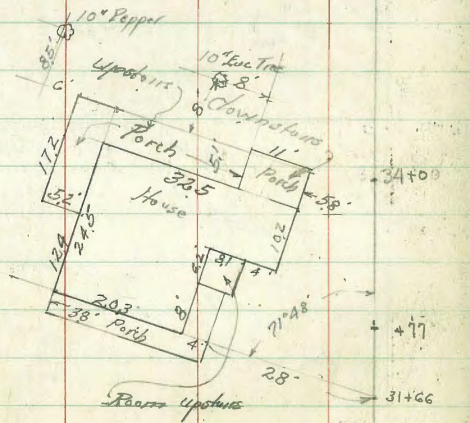
33+33 — 4" Apricot 9' R.
33+21, +18 — 6" Tree 15' R.; 12" Cypress 44' R.
33+14 — 10" Acacia 13' R
+13, +05, 33+00 — 14" Cypress 52.5' Rt; 6" Acacia 51.5 Rt; 33+04 14" Pepper 72' Rt.
32+70 — 4" Euc 10' R
32+57 — 5" Cypress
32+45 — 12" Euc. on ℄
32+36, 32+35 — 18" Euc.; 91.0
+24, +20 — 4" Camphor 26' R; 18" Date Palm 30' Rt
32+16 — Acacia 8"; 4" Acacia 38' R; 12" Camphor 33'; 6" " 44
32+00
+95 — 10" Euc Tree 58' R
+77, +75 — 10" Pep. 14' R; 6" Acacia 47' R
+62 — 10" Olive 62' R
+52, 31+50 — 6" Olive 56' R

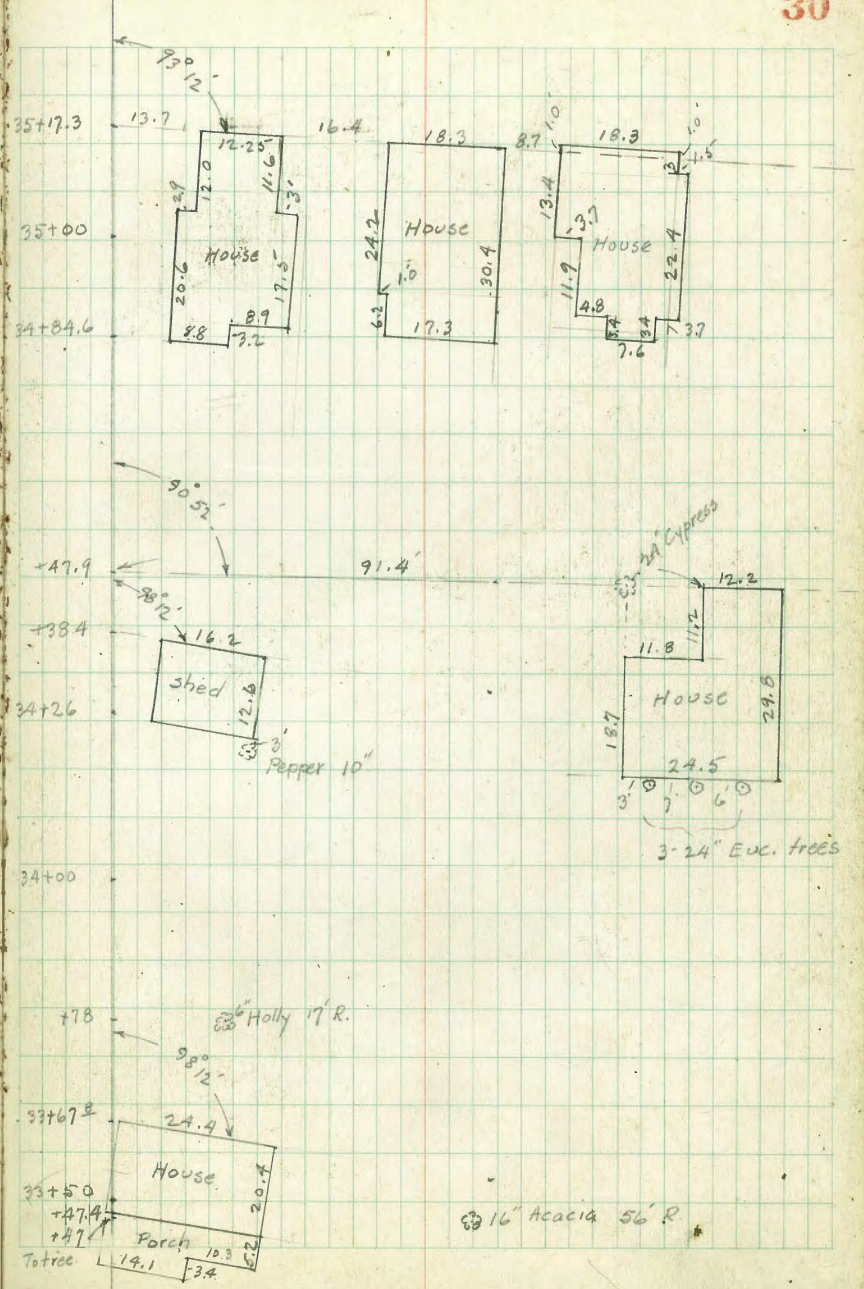


Washington St. Ext. - W. end
Location House etc.

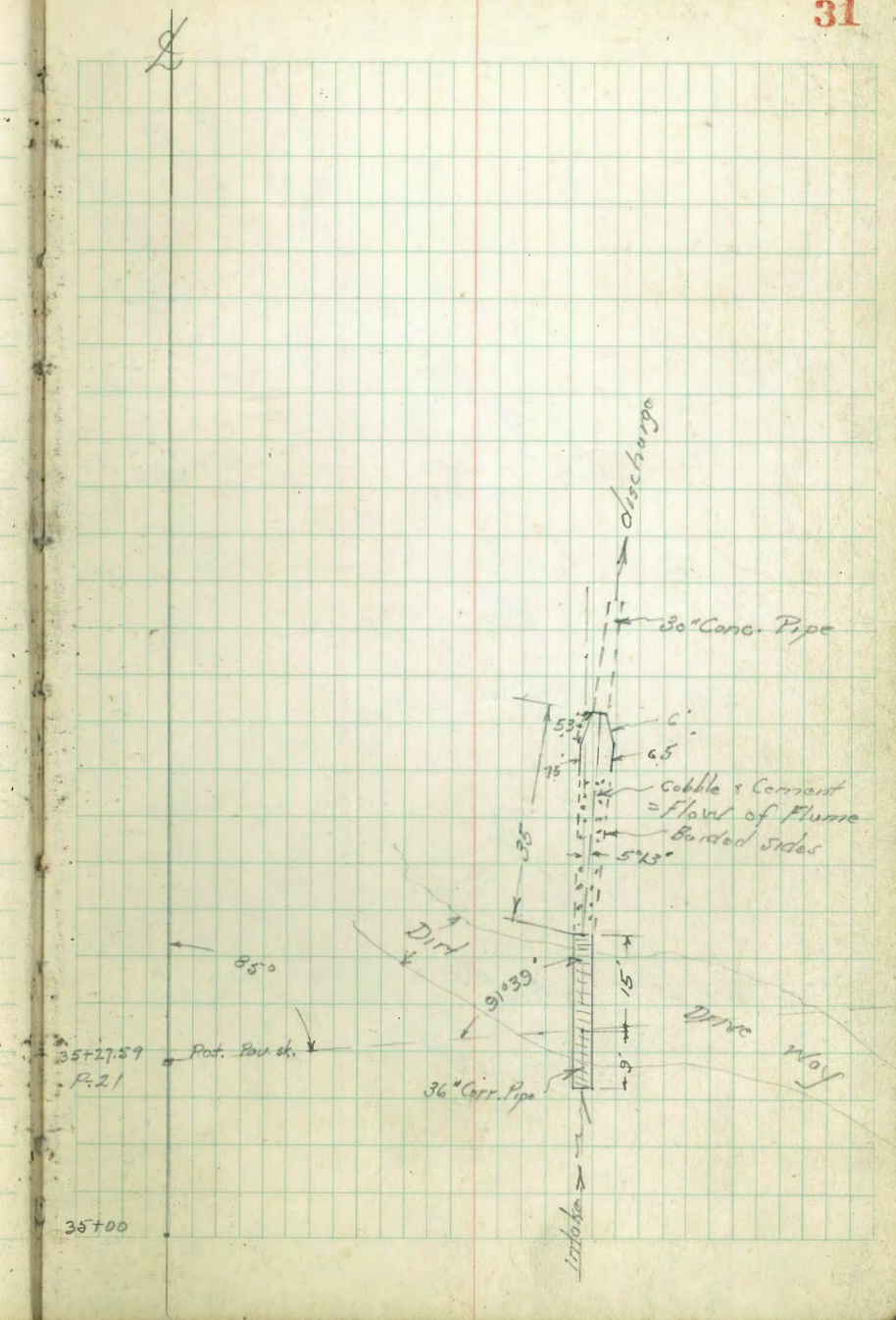
℄ L

℄ R



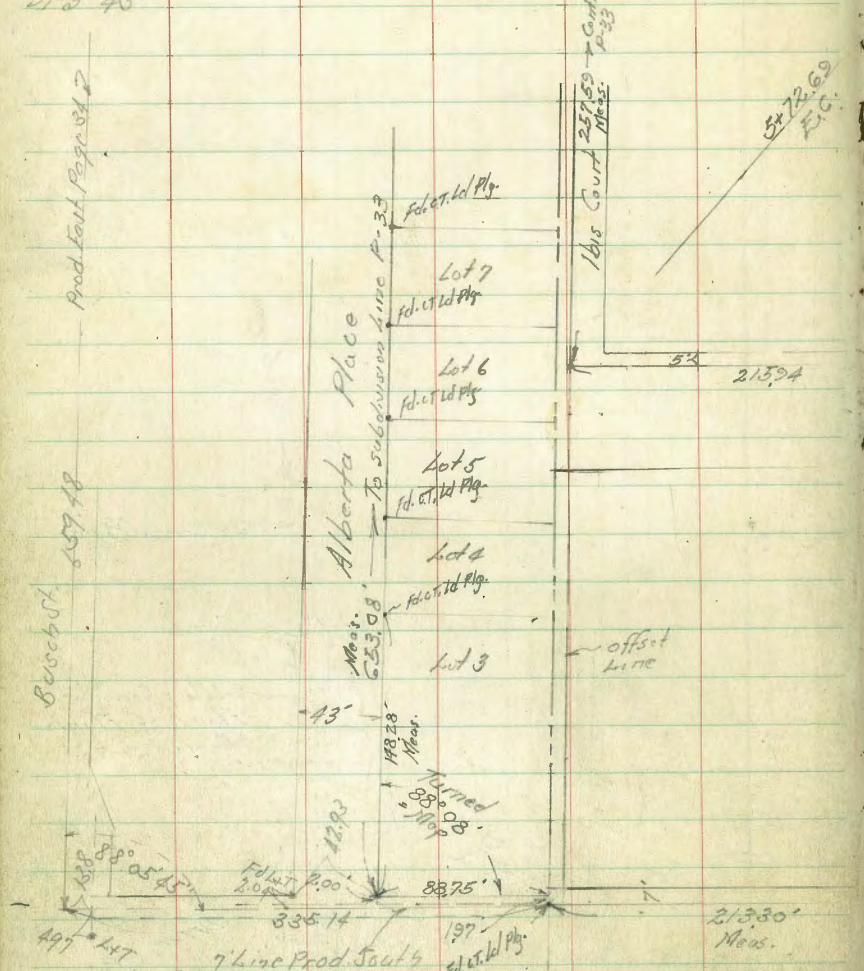


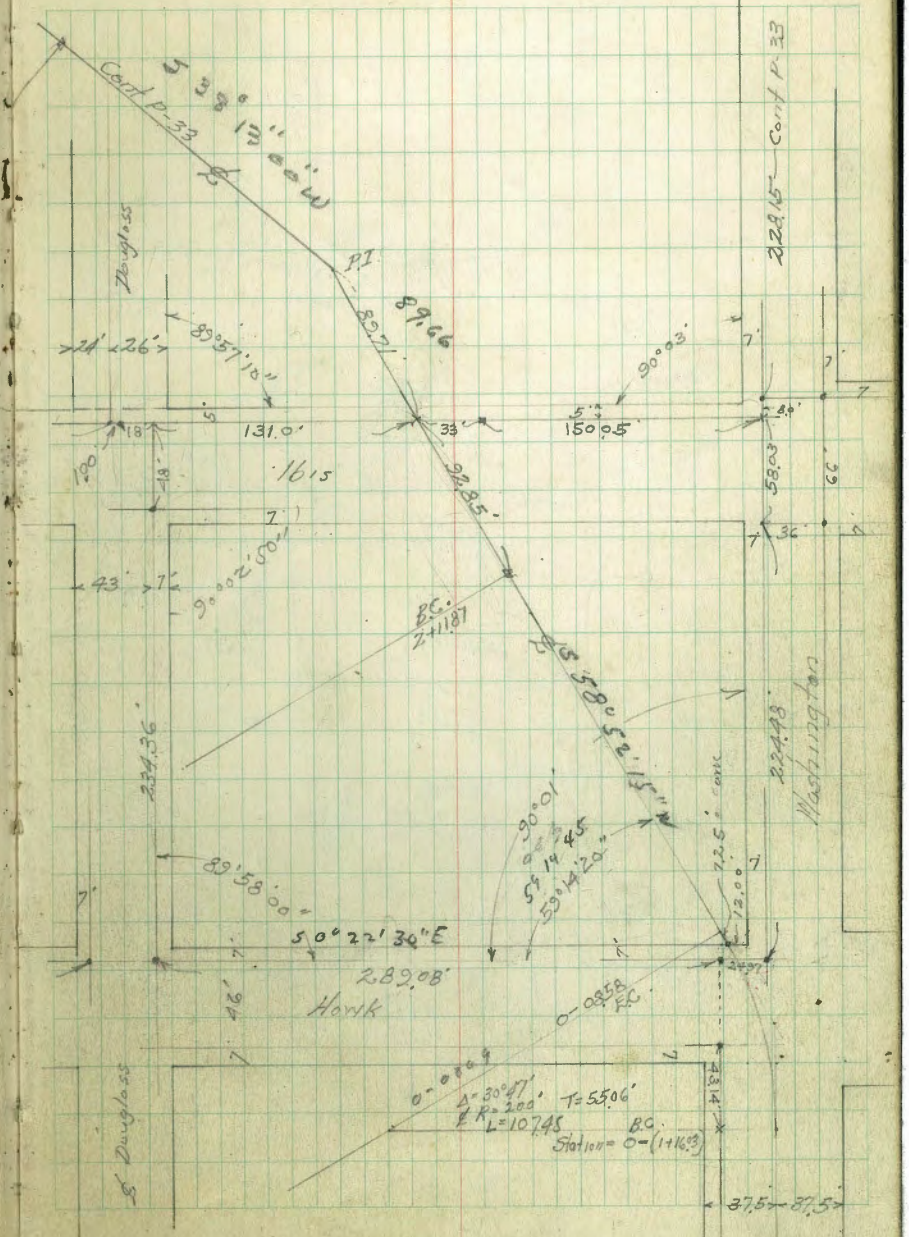
Washington Extension

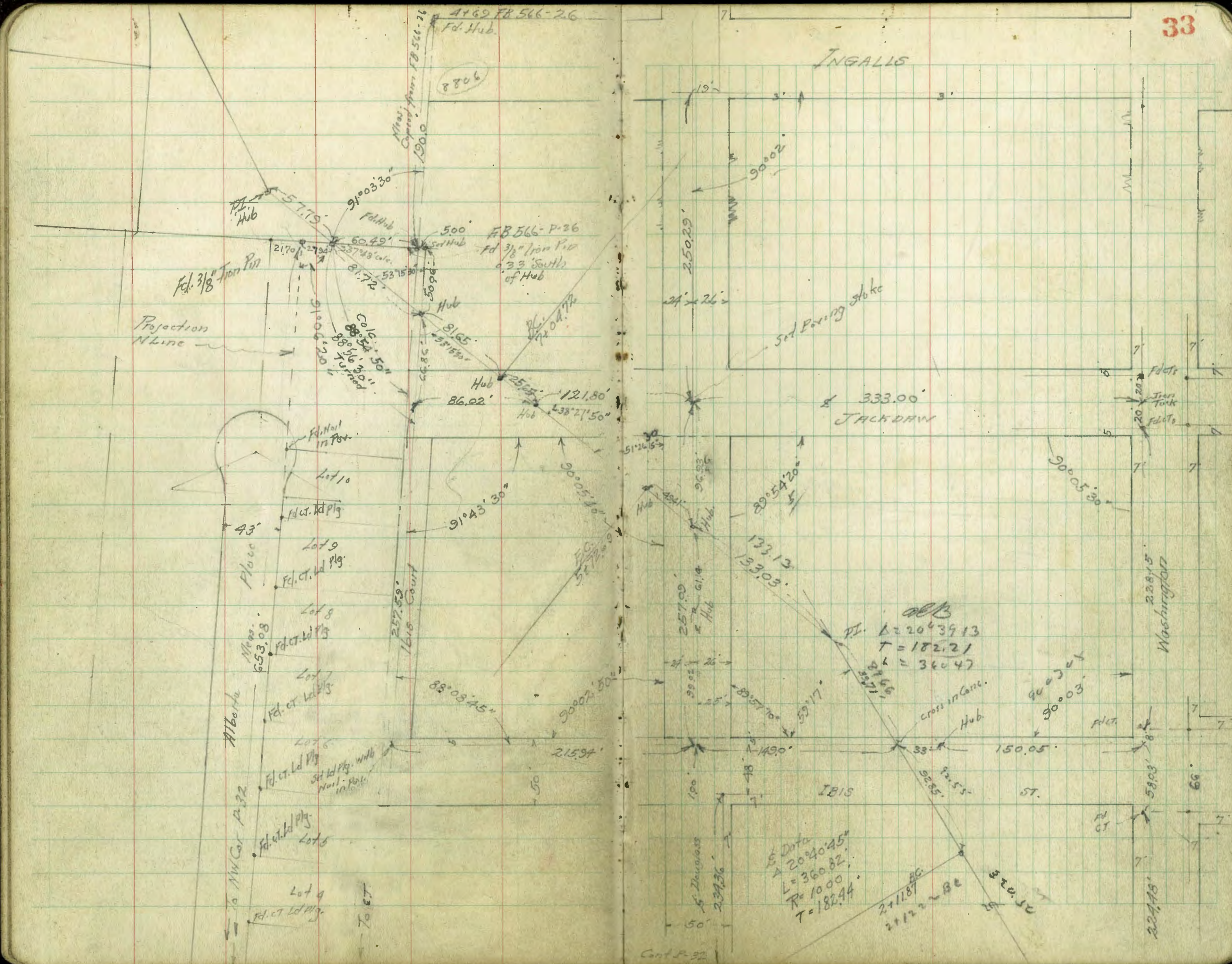


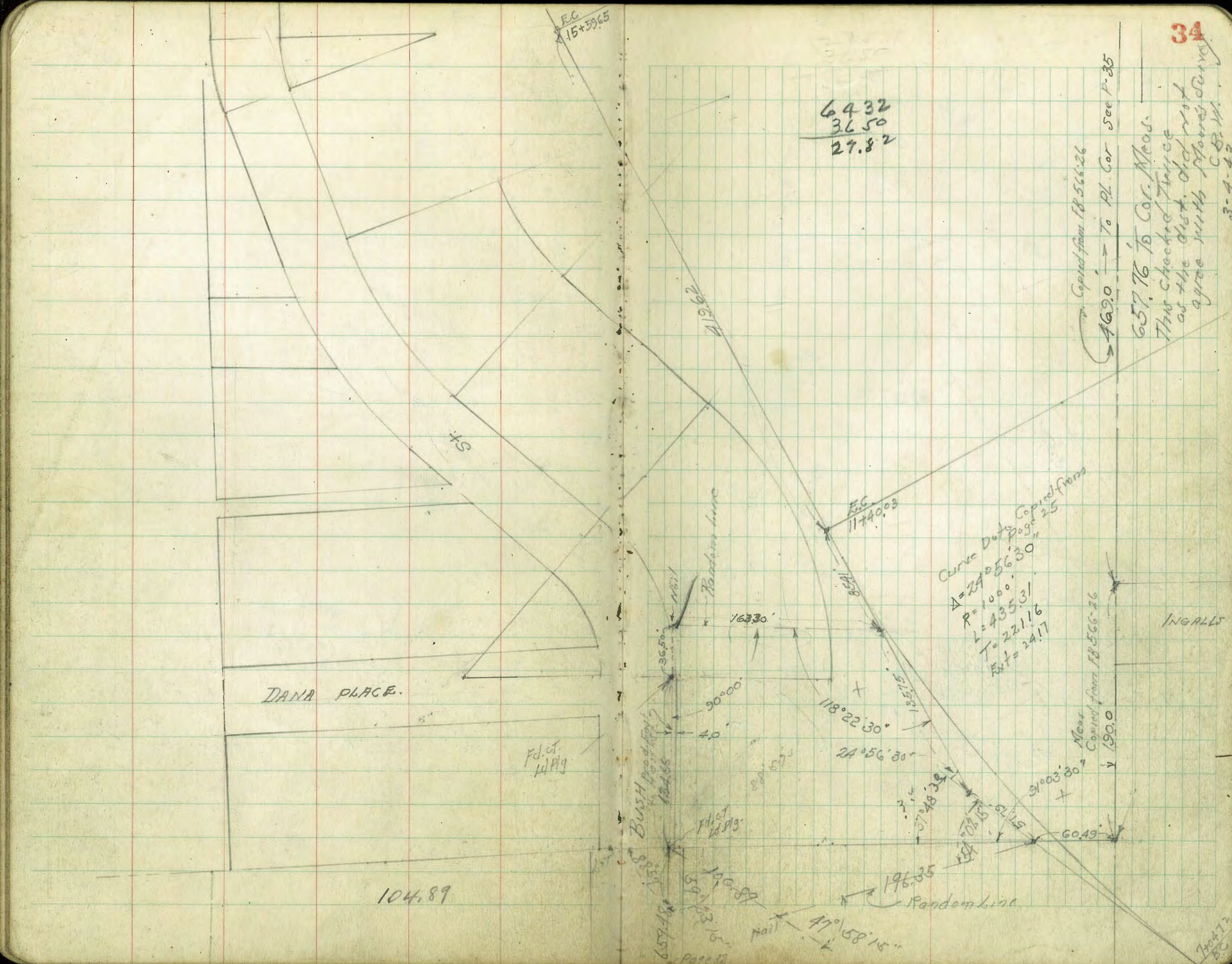
Walker
Osborne
Hardin
Hazard
2-3-43

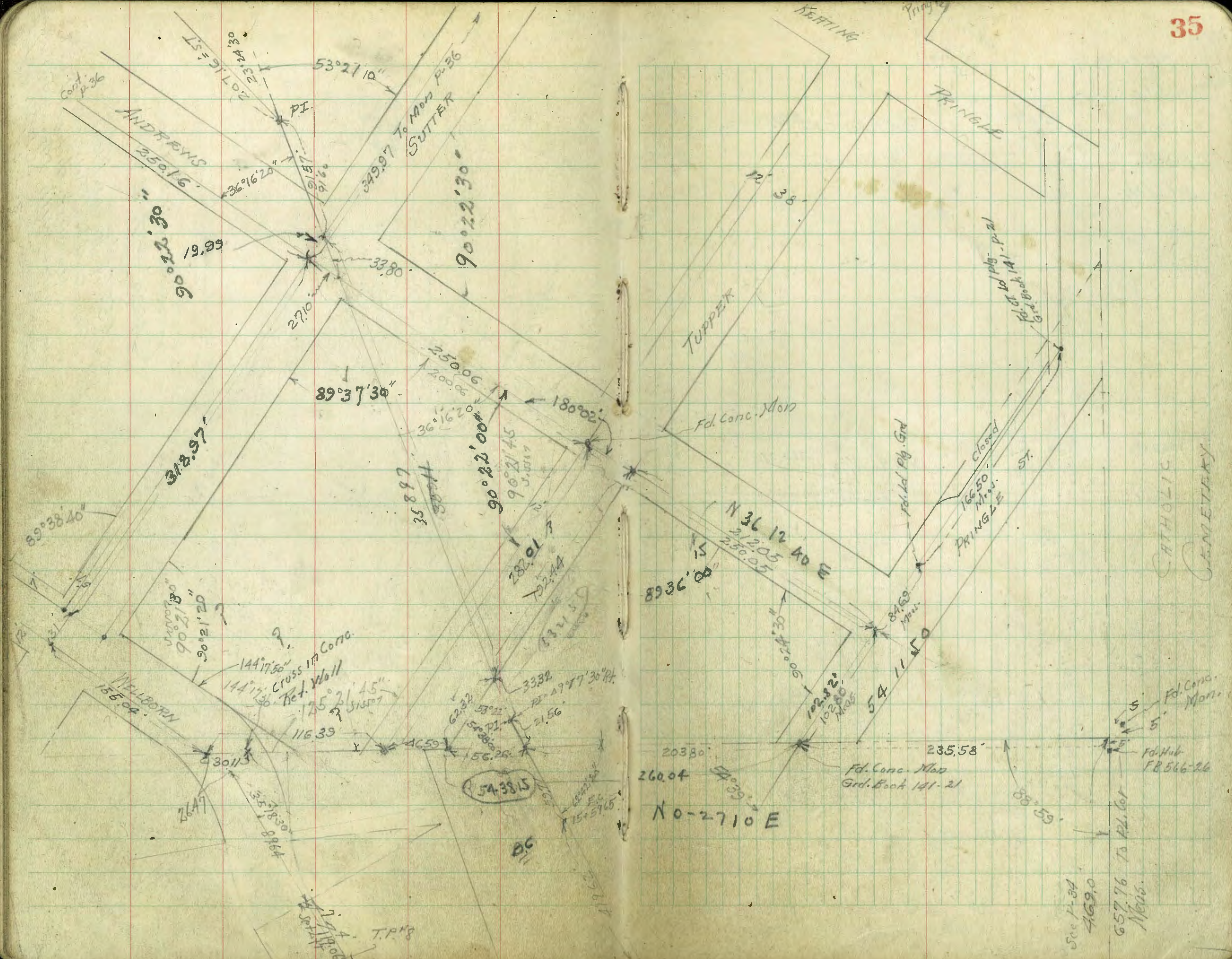
WASHINGTON ST. EXTENSION
Ties for Right of Way

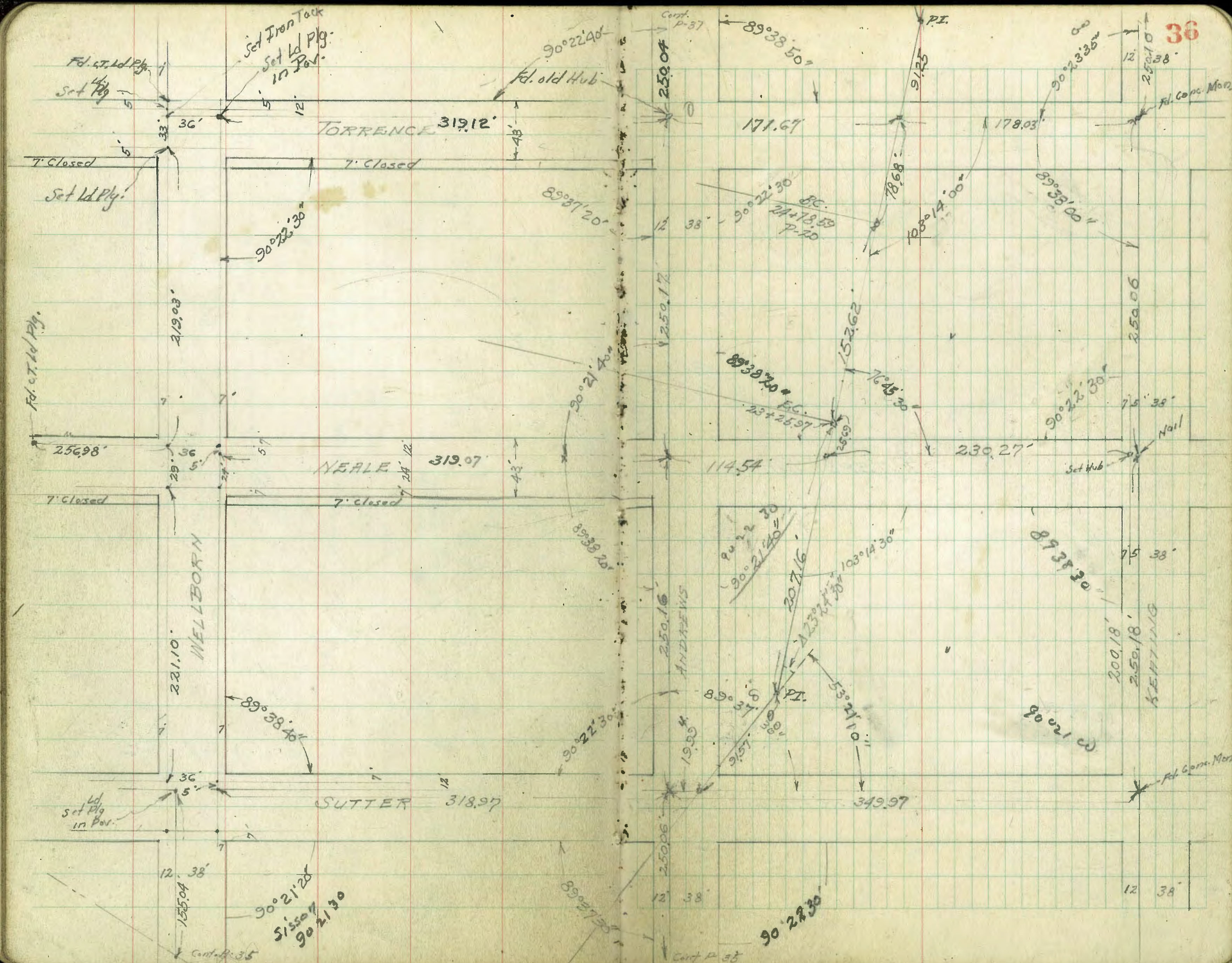


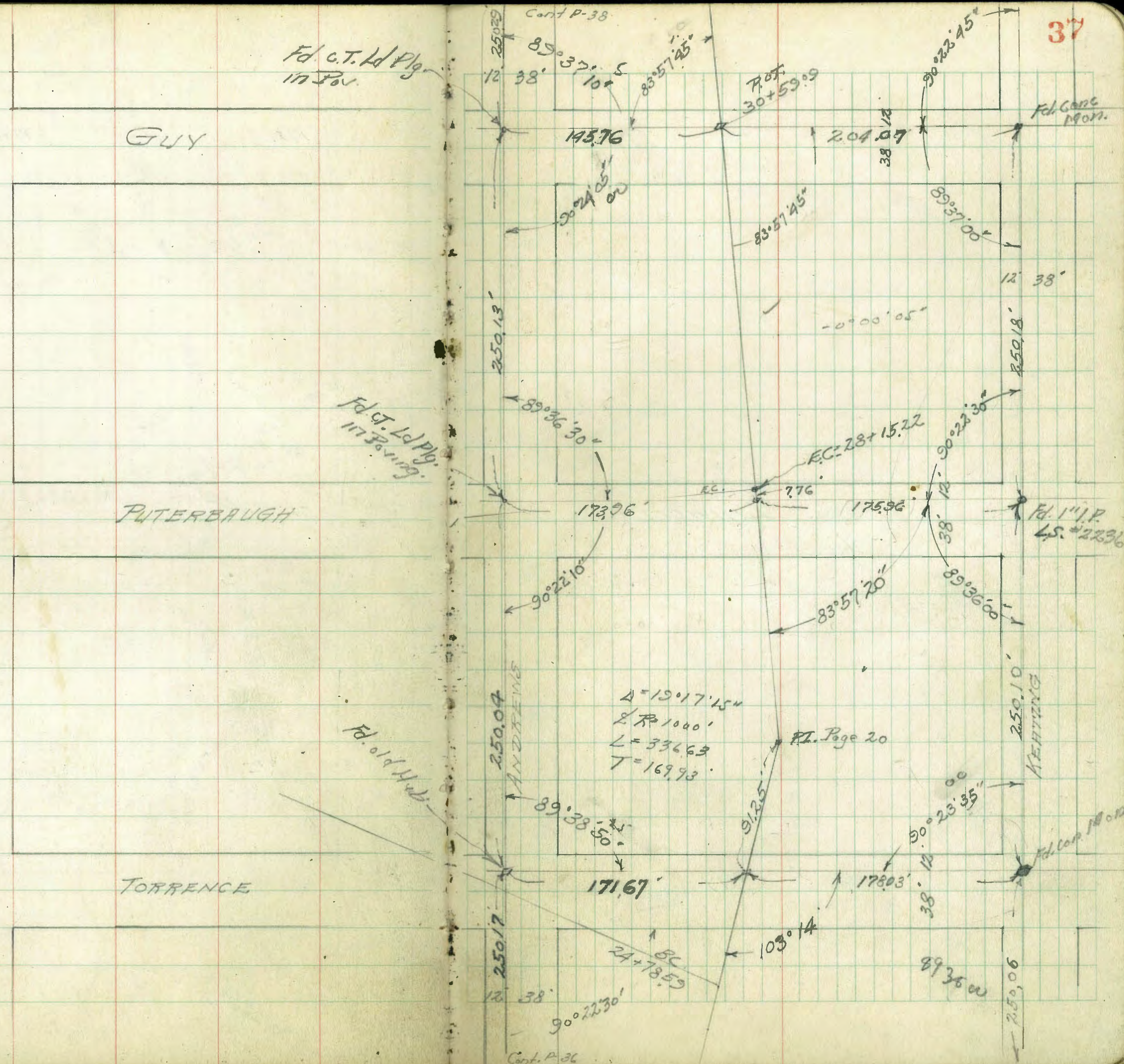


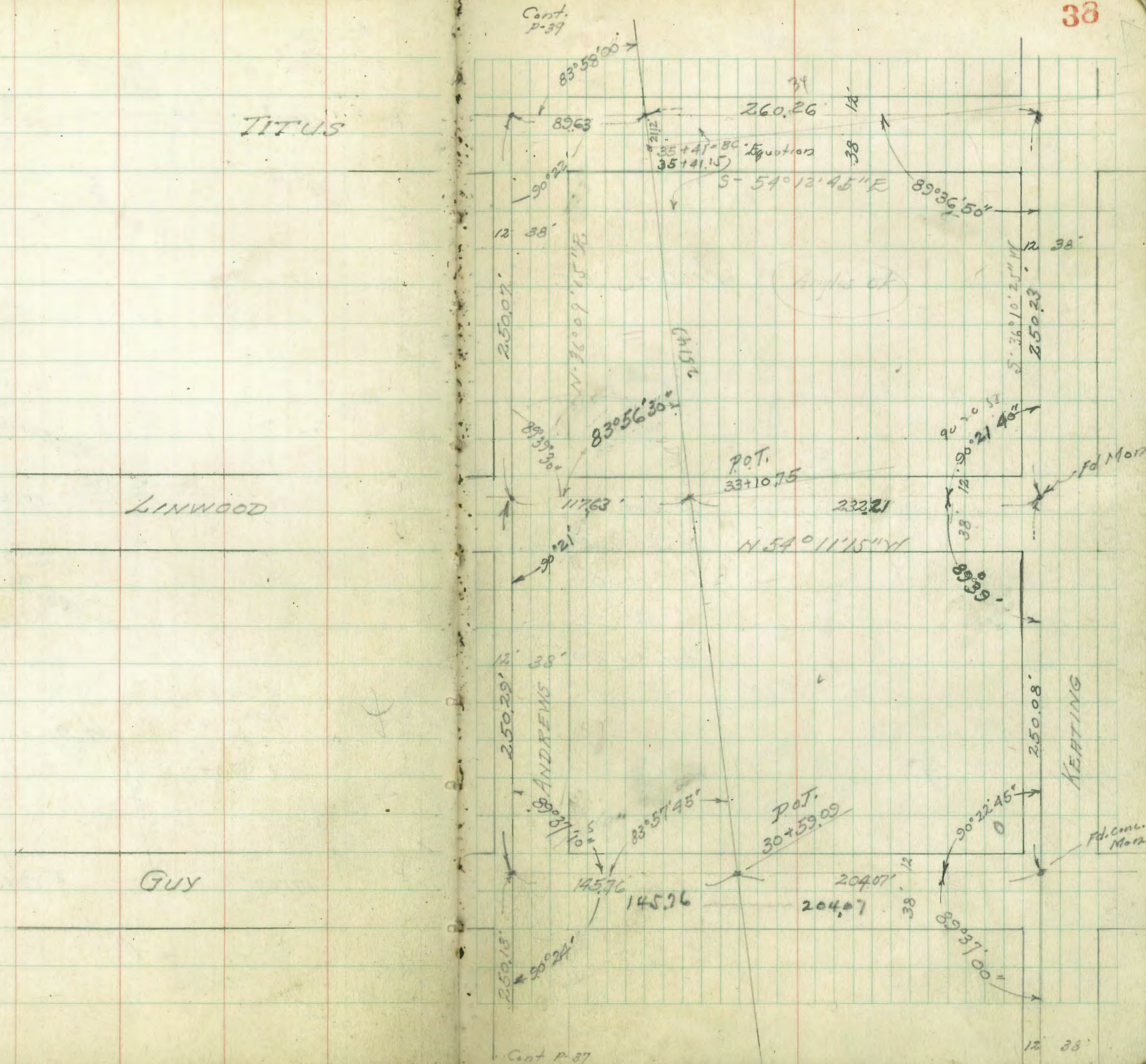

4+69 FB 566-26
Fd. Hub.
8806
190.0
FB 566- P-26
Fd 3/8" Iron Pin 0.33 'South of Hub
Fd. 3/8" Iron Pin
P.I. Hub
57.79'
91°03'30"
60.49'
.500'
81.72'
Hub
81.65
Projection N Line
Hub
86.02'
121.80'
91°43'30"
90°05'10"
88°03'45"
90°02'50"
215.94'
257.59'
Ibis Court
Lot 10
Lot 9
Lot 8
Lot 7
Lot 6
Lot 5
Lot 4
43'
Alberta Place
Meas. 653.08
to NW Cor P.32
INGALLS
19'
90°02'
250.29'
Set Boring Stake
333.00'
JACKDAW
89°54'20"
90°05'30"
133.13
133.03
257.09'
P.I.
Δ = 20°39'13
T = 182.21
L = 360.47
cross in Conc.
Hub
90°03'
150.05'
IBIS
ST.
Washington
℄ Data
Δ 20°40'45"
L = 360.82
R = 1000
T = 182.44
2+11.87 BC
3rd St.
℄ Douglass
Cont P-32


E.C. 15+59.65
6432
3650
27.82
219.62
45
DANA PLACE.
104.89
Fd. I.P.
Fd. I.P. 1/4 Pig.
BUSH
134.86
36.50
Nail
Random Line
163.30
90°00'
40
88°57'
118°22'30"
24°56'30"
E.C. 11+40.03
Curve Data Copied from page 25
Δ=24°56'30"
R=1000.
L=435.31
T=221.16
Ext=24.17
85.41
135.15
37°48'39"
91°03'30"
60.49
196.35
Random Line
140.89
Nail
47°58'15"
Page 26
Copied from FB 566-26
469.0 — To P.I. Cor. See P. 35
657.76 To Cor. Meas.
This checked twice as the dist. did not agree with Morey's survey
C.B.H.
3-4-43
INGALLS
Meas.
Copied from FB 566-26
190.0
7+47.3 B.C.


Cont p.36
ANDREWS
350.16
53°27'10"
P.I.
349.97 To Mon p.36
SUTTER
90°22'30"
90°22'30"
19.99
33.80
27.10
318.97'
89°37'30"
250.06
200.06
180°02'
36°16'20"
36°16'20"
90°22'00"
282.01
89°38'40"
90°21'30"
90°21'20"
144°17'50"
Cross in Conc. Ret. Wall
125°21'45"
WELLBORN
155.04
116.39
46.59
56.26
33.32
21.56
54-38.15
B.C.
T.P.
TUPPER
Fd. Conc. Mon
PRINGLE
KEATING
Fd. Ld. Plg. Grd
Closed
166.50 Meas.
PRINGLE ST.
N 36 12 40 E
250.05
8936'00"
90°24'30"
102.32
84.69 Meas.
54 11 50
203.80
235.58
260.04
N0-2710 E
Fd. Conc. Mon Grd. Book 141-21
88°59
Fd. Conc. Mon.
Fd. Hub FB 566-26
657.76 To Rd. Cor Meas.
CATHOLIC CEMETERY


TORRENCE
319.12'
NEALE
319.07
SUTTER
318.97
WELLBORN
ANDREWS
KEATING
7' Closed
Set Ld Plg.
Set Iron Tack
Set Ld Plg. in Pav.
Fd. old Hub
Fd. Conc. Mon.
Set Hub
Nail
P.I.
B.C. 24+78.59 P-70
E.C. 23+25.97
171.67
178.03'
230.27'
114.54
349.97
256.98'
219.03'
221.10'
155.04
250.04
250.17
250.16
250.06
250.18
200.18'
152.62
207.16
91.25
18.68
89°38'50"
90°22'40"
89°37'20"
90°22'30"
90°21'40"
89°38'20"
89°38'40"
90°22'30"
90°21'20"
Sisson 90°21'30
89°37'30"
90°22'30"
108°14'00"
103°14'30"
76°45'30"
53°21'10"
89°38'00"
89°38'30"
Cont. P. 35
Cont. P. 37


Cont P-38
Fd. C.T. Ld Plg. in Pav.
GUY
89°37' 10" S
83°57'45"
P.O.T. 30+59.9
90°22'45"
Fd. Conc. Mon.
145.76
204.07
12
38
38'
12'
90°24'05"
83°57'45"
89°37'00"
250.13'
250.18'
-0°00'05"
89°36'30"
Fd. C.T. Ld Plg. in Paving
E.C. 28+15.22
90°22'30"
E.C.
7.76
173.96'
175.96
PUTERBAUGH
Fd. 1" I.P. L.S. #2236
90°22'10"
83°57'20"
89°36'00"
ANDREWS
Δ=19°17'15"
R=1000'
L=336.63
T=169.93
P.I. Page 20
250.04
250.10'
KEATING
Fd. old Hub
89°38'50"
91.25
90°23'35"
Fd. Conc. Mon.
171.67'
178.03'
TORRENCE
103°14'
250.17
BC 24+78.59
89°36'00"
250.06
90°22'30'
Cont. P-36


Cont. P-39
TITUS
LINWOOD
GUY
ANDREWS
KEATING
83°58'00"
89.63
260.26
35+41.80 BC Equation
35+41.15
S-54°12'45"E
89°36'50"
90°22'
12 38'
250.07'
N.36°09'15"E
S.36°10'25"W
250.23'
Angles ck
83°56'30"
89°39'30"
P.O.T. 33+10.75
117.63'
232.21
90°21'40"
Fd Mon
90°21'
N.54°11'15"W
89°39'
12' 38'
250.29'
250.08'
89°37'10"
83°57'45"
P.O.T. 30+59.09
90°22'45"
Fd. Conc. Mon
145.76
204.07'
204.07
89°37'00"
250.15'
90°24'
Cont P-37
12 38'

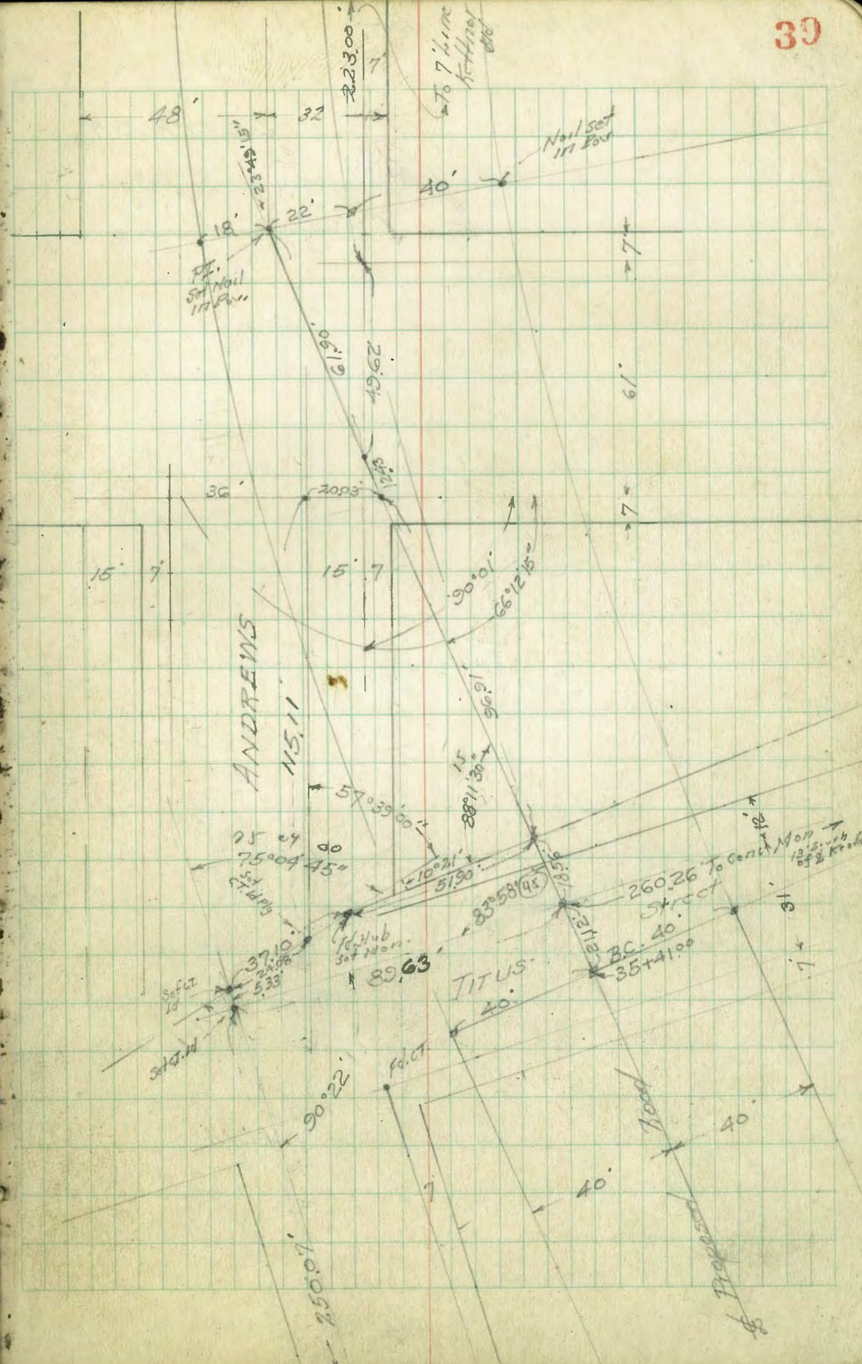
15 c 08

Washington St. Extension
Ties for Right of Way.

INDIA ST.

℄ Data
$\Delta = 23°49'15''$
$R = 1000'$
$T = 210.92$
Ext. = 22.0'

35+41.00 = B.C. ℄

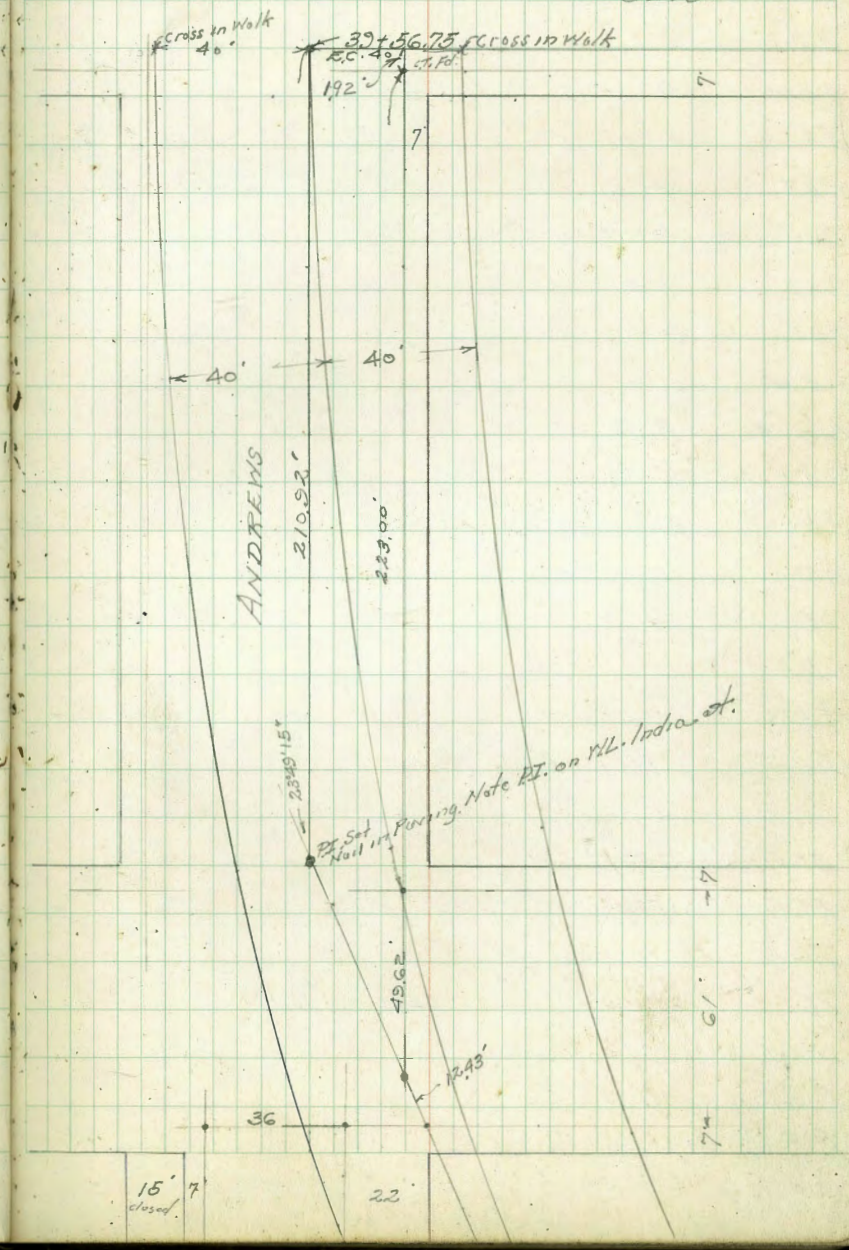


Washington Ext.

KETTNER

INDIA

BLVD.

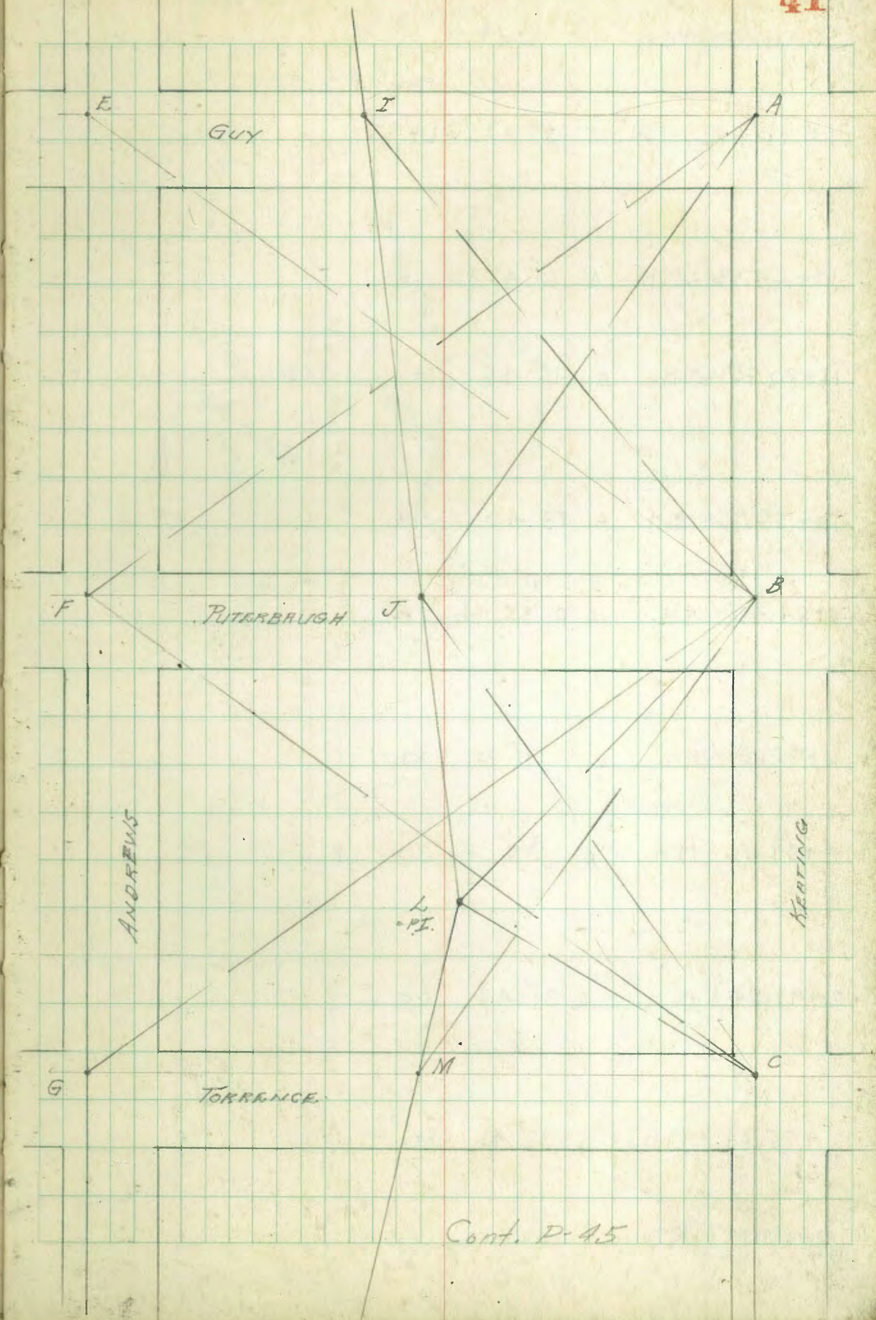


TRIANGULATION

Washington St. Extension

	Δ Turned	
BAE	89°37'10	
BAF	54°11'45"	
FAE	35°25'25"	
BAJ	34°59'55"	
FAJ=calc.	19°11'50"	
ABI	39°21'50"	
CBL	44°11'00	
CBM	35°19'05"	
LBM	8°51'55"	
CBF	89°36'00	
ABE	54°41'35"	
FBG	35°25'05"	
GBC	54°10'55"	
FBA	90°22'55"	
FBE	35°41'20"	
IBJ	51°01'05"	
BCF	54°42'30"	54°42'35"
BCG	90°22'50"	
FCG	35°40'10"	35°40'15" Adjusted
JCB	35°15'42"	
BCL	60°54'55"	60°54'50" Adjusted
MCL	29°28'00	
AEF	90°23'55"	
AEB	35°41'25"	
BEF	54°42'20"	

Cont. P-45



Location of M.H. on Sewer along Washington St. Ext.

Levels see P- 59-60

15+09.86 = M.H. Δ 5° 04' Lt.

13+64.86 = M.H. Δ 6° 43' 30" Rt.

11+80.76 = M.H. Δ 16° 35' Lt.

10+26.76 = M.H. Δ 13° 40' Rt.

8+54.46 = M.H. Δ 0° 55' 30" Rt.

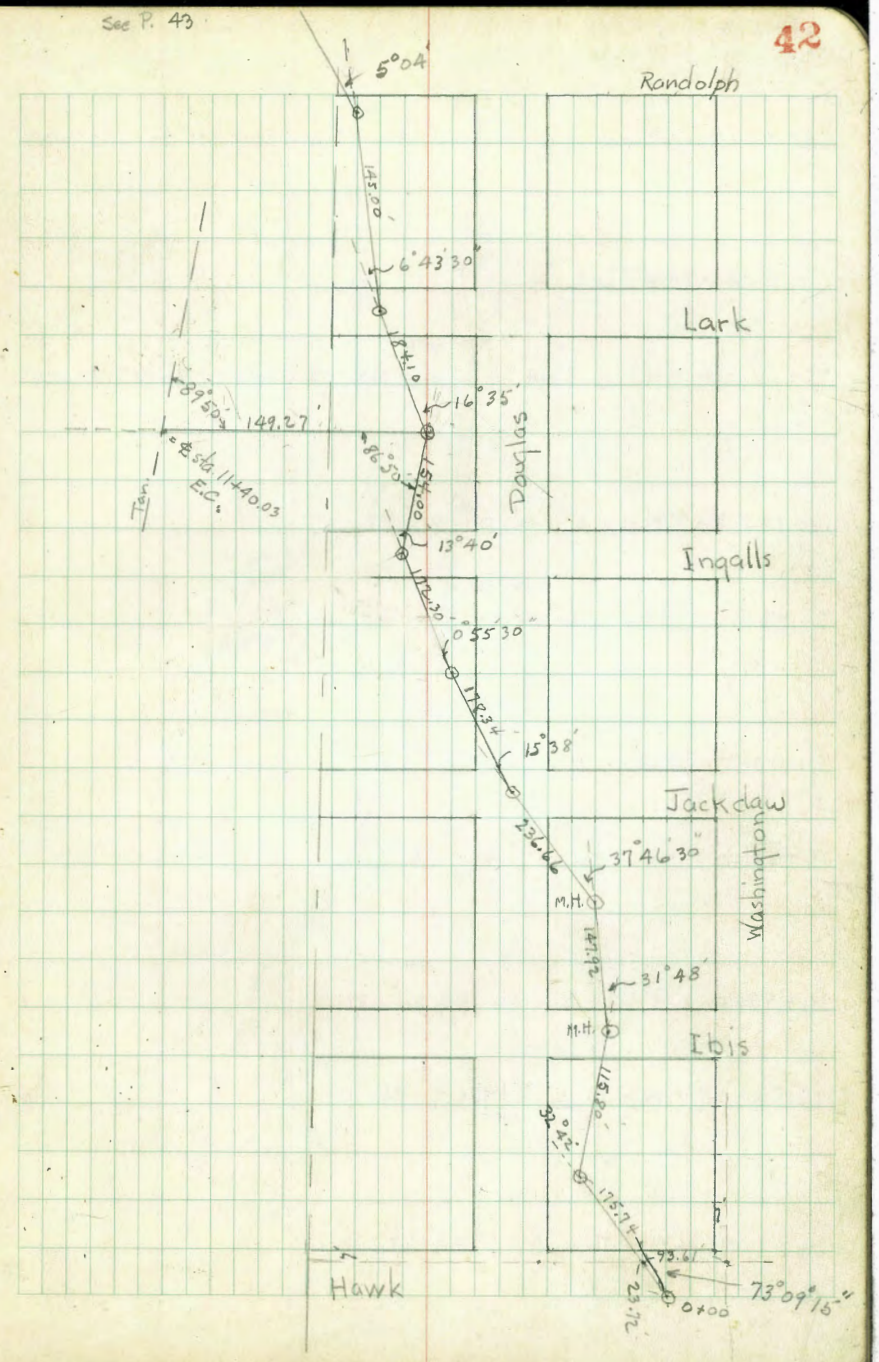
6+76.12 = M.H. Δ 15° 38' Rt.

4+39.46 = M.H. Δ 37° 46' 30" Lt.

2+91.54 = M.H. Δ 31° 48' Lt.

1+75.74 = M.H. Δ 32° 42' Rt.

0+00 = M.H. in Hawk St.



28+95.12

27+69.72 = M.H. Δ 12° 42' Lt. From Backsite on 25+17.00

125' to M.H. in building

25+17.00 = M.H. Δ 9° 44' Lt. to Next M.H. Δ 3° 42' 15" Lt. to M.H. at 27+69.72

23+88.80 = M.H. Δ 6° 03' 30" Rt.

22+65.60 = M.H. Δ 28° 55' 30" Lt.

21+10.00 = M.H. Δ 6° 51' 30" Rt.

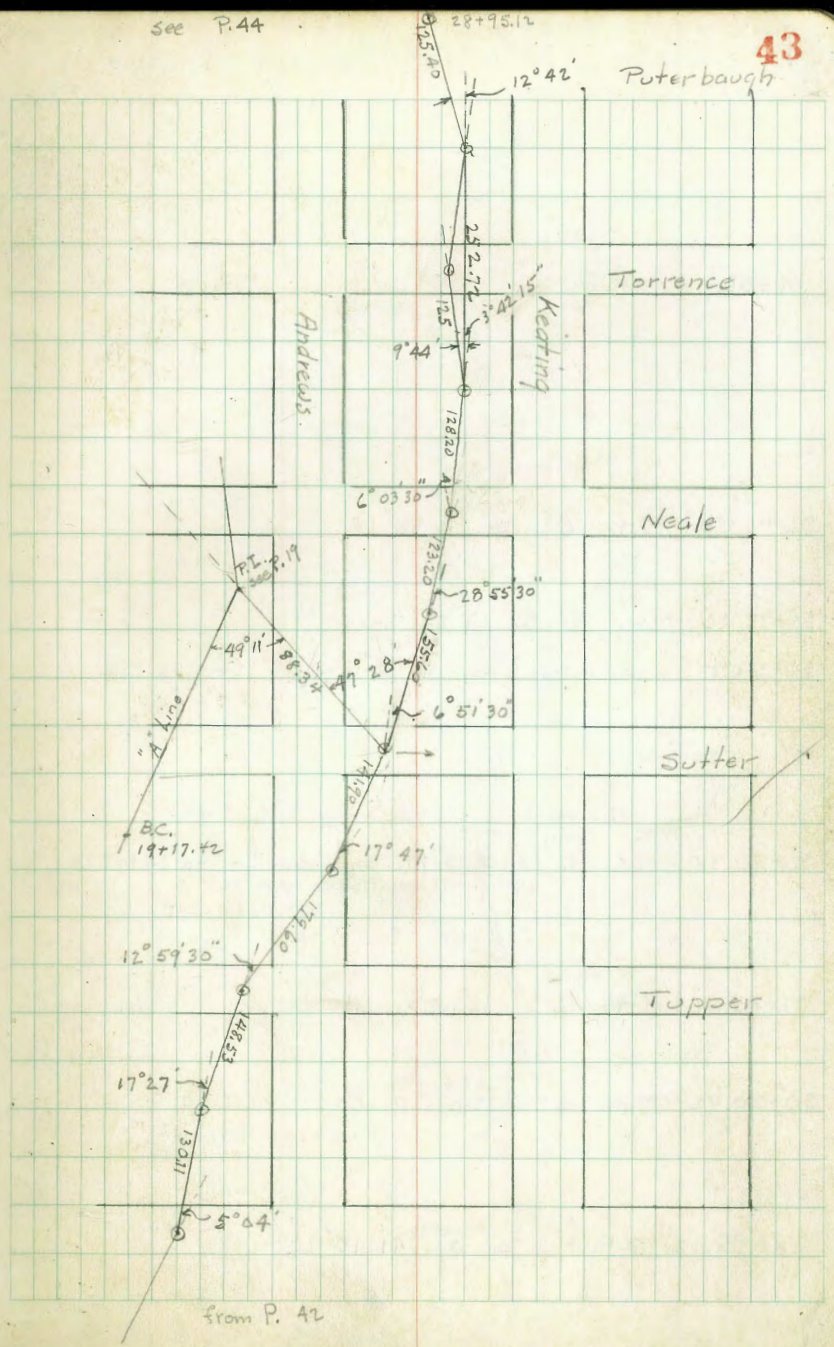
19+68.10 = M.H. Δ 17° 47' Lt.

17+88.50 = M.H. Δ 12° 59' 30" Rt.

16+39.97 M.H. Δ 17° 27' Rt.

15+09.86 = M.H. Δ 5° 04' Lt.

See P. 44



38+06.30 = M.H.

36+63.10 = M.H. Δ 10° 20' 30" Lt.

35+38.46 = M.H. Δ 32° 19' 30" Rt.

34+59.73 = Δ in Random Line Δ 34° 04' 45" Lt. to M.H.

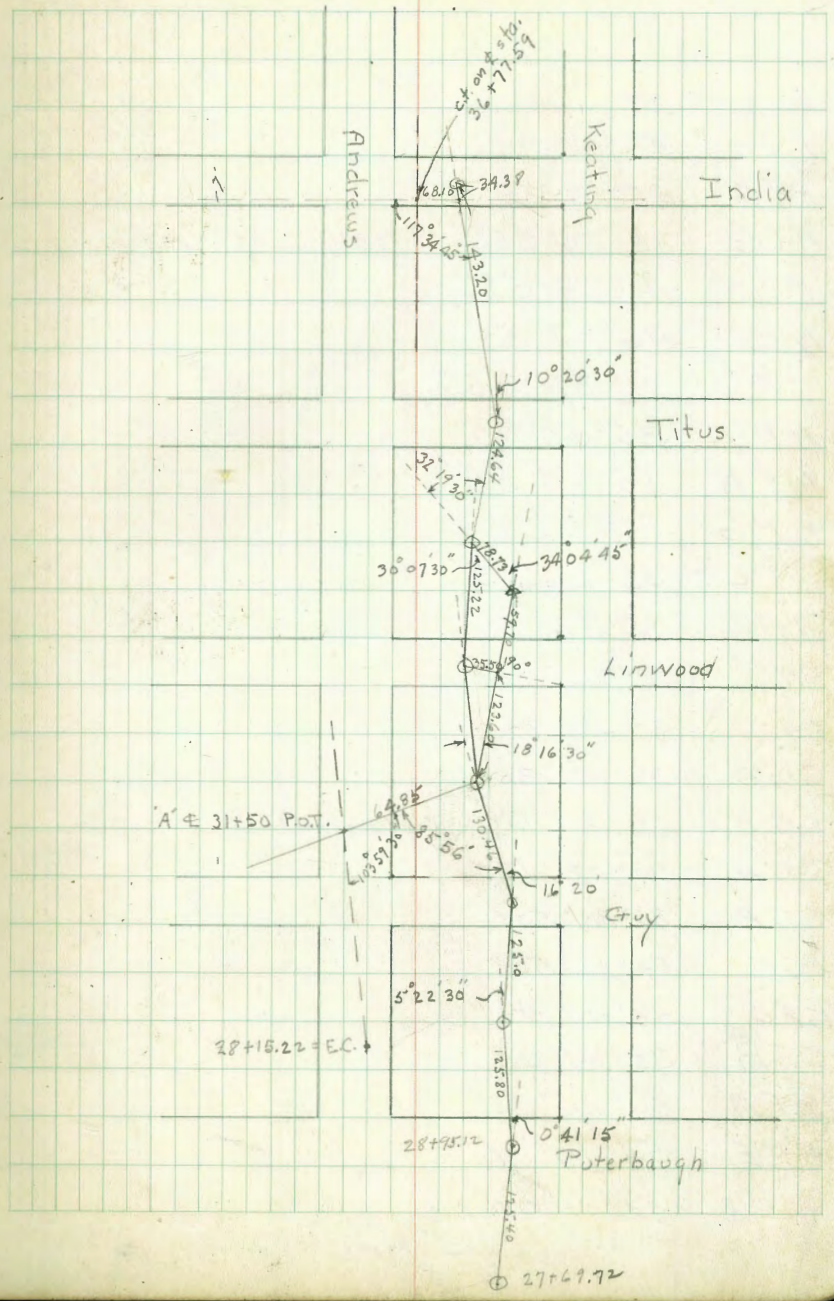
123.60' to point 35.50' from M.H. at 90°

32+76.38 = M.H. Δ 18° 16' 30" Rt. on random line to 34+59.73
M.H. Ahead inaccessable from Here

31+45.92 = M.H. Δ 16° 20' Lt.

30+20.92 = M.H. Δ 5° 22' 30" Rt.

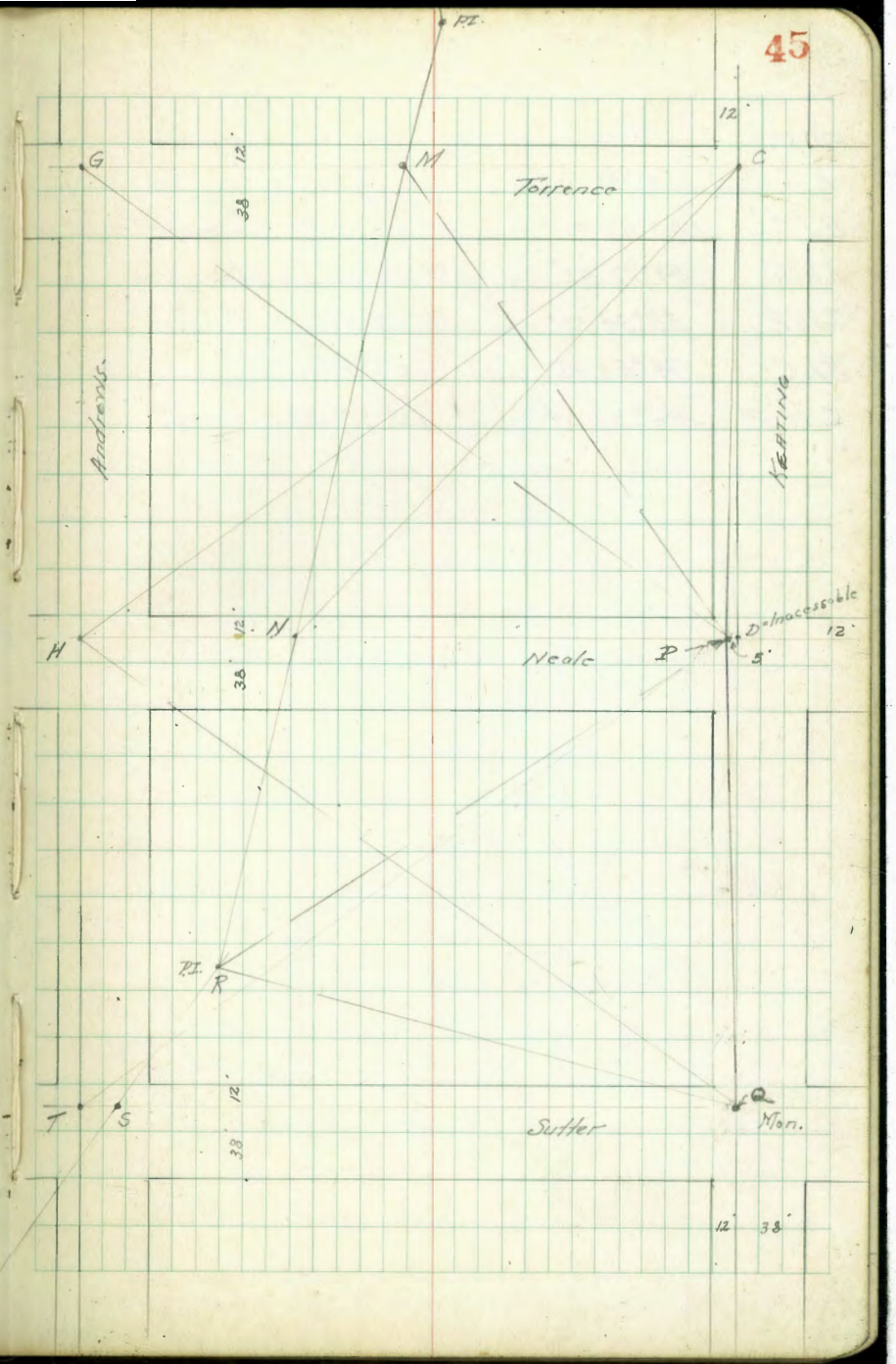
28+95.12 = M.H. Δ 0° 41' 15" Lt.



Triangulation
Washington St. Ext. Cont from P-41

Angle	Δ Turned	
PCH	53°02'00"	
PCG	88°28'25"	
HCG	35°26'35"	35°26'25" Adg.
PCN	41°54'52"	
NCM	46°33'33"	
CPH	91°31'35"	
HPT	35°50'00"	
MPN	55°34'55"	
HPG	36°05'25"	
GPC	55°26'15"	
MPC	35°56'40"	
PHC	35°26'20"	
PHQ	35°42'30"	
CGP	36°05'30"	
CGB	35°26'00	Sketch P-41
CGH	20°22'17"	
CGF	89°38'50"	
BGF	54°12'50"	
GFC	54°40'42"	
CFB	35°41'08"	
BFA	35°25'35"	
AFE	54°10'30"	
AEB	51°01'00	

Cont. P-46



Triangulation Washington St. Ext. Cont.
from P-45

Angle	Δ Turned	
AJB	54°37'10"	
BJC	55°08'45"	55°08'17" To close 0°00'27" Too Large
BMC	54°17'52"	54°18'05" To close
CMP	55°34'50"	55°34'55" "
BLC	74°53'45	74°54'10" "
CNP	46°33'04"	46°33'33" "

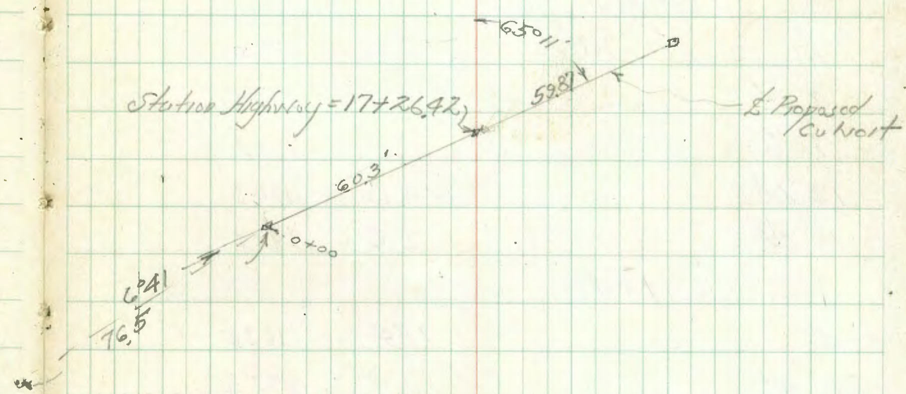
Walker
Osborne
Hagard
3-27-43

Location Proposed Culvert
Washington Extension Sta. 17+26.42

		⊼ opp. Page			B.M. on Hub ℄ 15+59.65 = B.C.
	11.00	203.02		192.02	℄
Chk.			12.05	190.97	P.I. Hub
T.P.	12.76	215.73	0.05	202.97	
T.P.	6.76	222.05	0.44	215.29	
0-76.5 = End Existing 12" Corrugated Iron Culvert					
on Flow Line Pipe			1.89	220.16	
" " " Conc. Lip			2.1	220.0	
0-70 = End " "			3.4	218.7	℄
0-70 on Ground			13.1	209.0	℄
10 Lt.			7.4	214.7	
10' Rt			7.4	214.7	
0-55					
			18.9	203.2	℄
10' Lt.			10.9	211.2	
10' Rt			10.9	211.2	
T.P.	0.42	209.85	12.62	209.43	
0-50			10.3	199.6	
0-48			13.8	196.1	
0-44			15.3	194.6	
0-26					
10 Lt.			6.2	203.7	
15' R			8.2	201.7	
T.P.	0.38	197.58	12.65	197.20	
0-02			5.5	192.1	14 R
0-02			0.0	197.6	15 Lt.

Conc. Mon 13' Line Sub Lt
& Ely Middletown
F.B. 165 3-15 = 196.10
0.27 +
196.37
5.40 -
PI Hub 190.97
12.05 +
203.02 = ⊼

Sketched on Hard Copy - 5/5/1943



		197.58			
T.P.	0.73	185.35	12.96	184.62	
0-43			6.1	179.3	
0-26			7.3	178.1	
10'R			8.1	177.3	
15'R			1.0	184.4	
9'Lt.			0.0	185.4	
0-02			2.3	183.1	13'R
℄			10.7	174.7	
14'Lt.			9.6	175.8	
0+05					
℄			11.5	173.9	
8'Rt.			+6.3	191.7	
0+25					
℄			13.4	172.0	
3'Lt.			15.3	170.1	
9 "			15.3	170.1	
12'Lt.			10.6	174.8	
11'Lt.			2.6	182.8	
0+48					
℄			17.4	168.0	
10'Lt.			10.0	175.4	
10'R			14.2	171.2	
20'R			8.7	176.7	
T.P.	1.13	182.76	3.72	181.63	on Hub EL Sutter [illegible]

182.76

0+60.3

℄		12.5	170.3	
12'R		12.2	170.6	
10'Lt.		9.7	173.1	
6'Rt. = Bottom Ditch		20.4	162.4	on ℄ Hub = 0+60.3
T.P	0.94	12.54	170.22	

0+82

℄		8.5	162.7	
10'L		6.9	164.3	
8'R		10.3	160.8	
12'R = ℄ ditch		15.7	155.5	
23'R		8.5	162.7	
I.P	1.73	12.42	158.74	

1+03 = SL'y edge Gulch

℄	8.9	151.6	
30'R in Gulch	8.1	152.4	
10'Lt	4.5	156.0	
20 "	3.5	157.0	
1+12 = ℄ Gulch	9.3	151.2	

1+20.17

℄	5.7	154.8	
30'R	4.0	156.5	
9'Lt.	6.6	153.9	
13'Lt. Bottom Gulch	9.8	150.7	
30'Lt. = W edge " Bottom	10.4	150.1	
39' " " Bank	4.6	155.9	

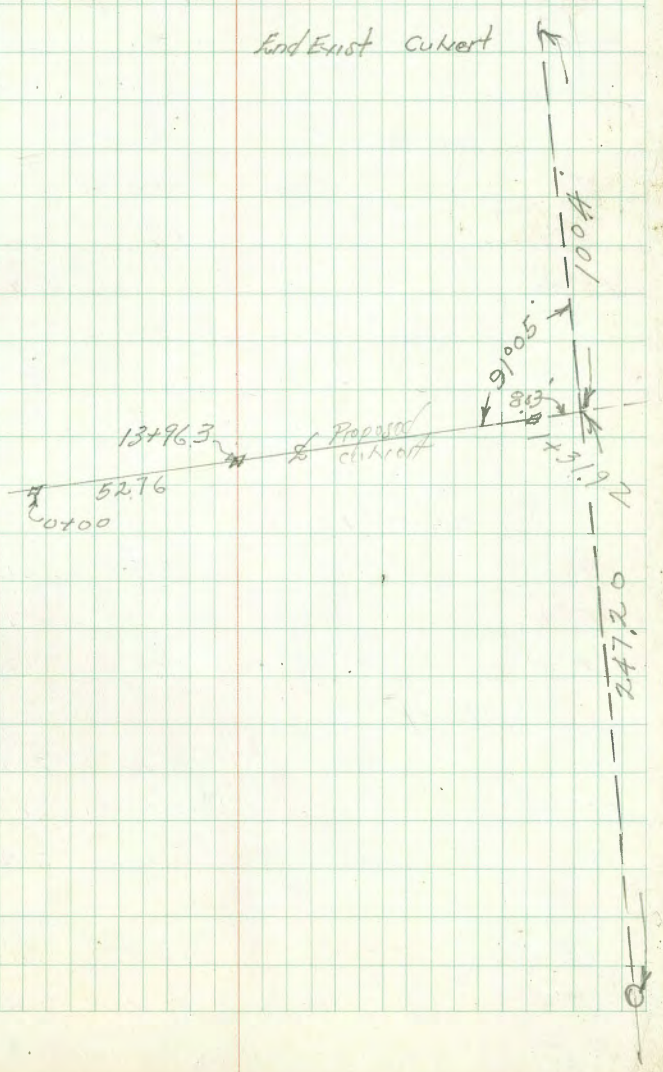
160.47

(1+26) 4.5'R on Rim NH	4.58

Wulkas
osborne
Hazard
3-29-43

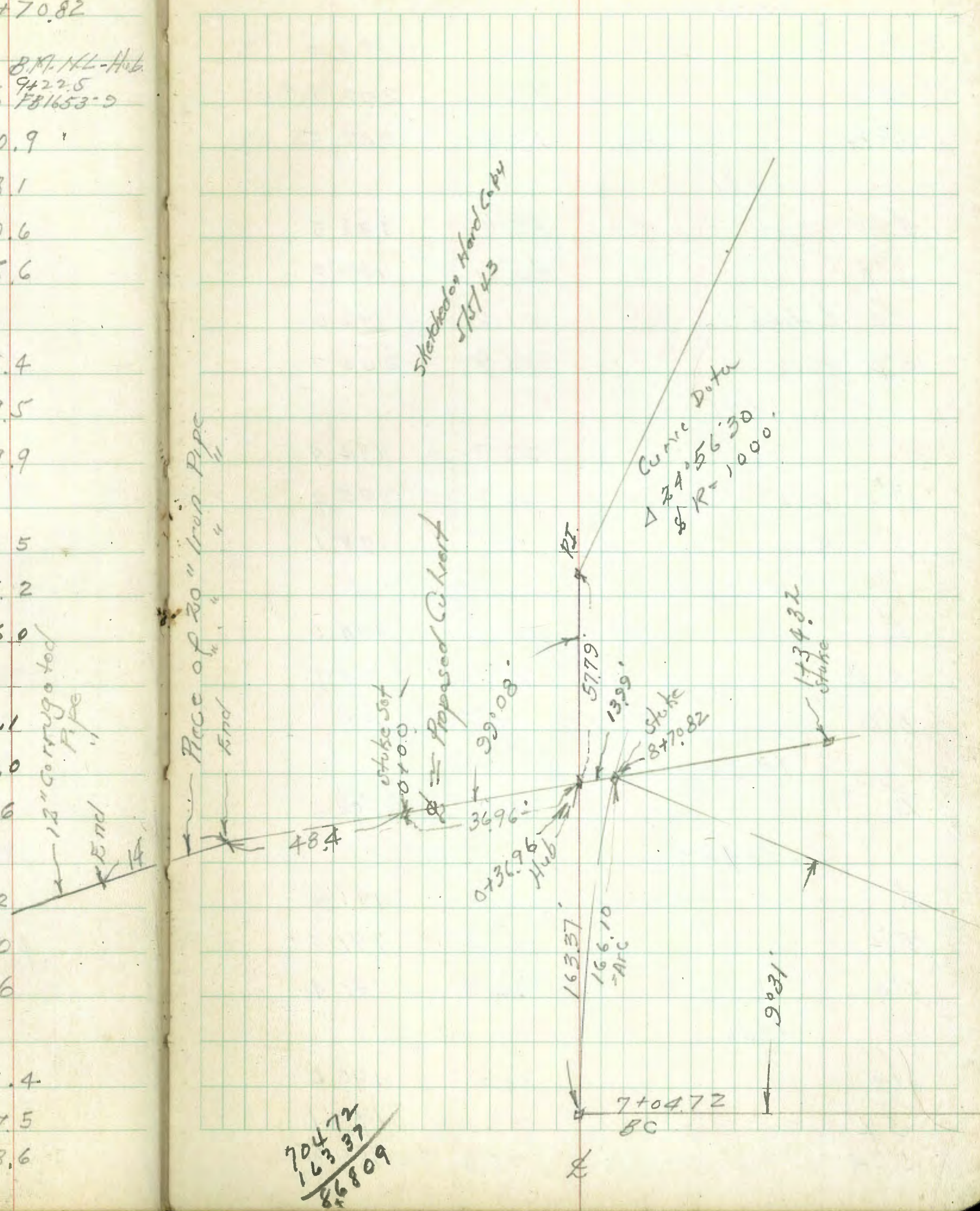
Location Proposed Culvert
Washington Ext. Sta. 13+96.3

	12.73	204.75		192.02	51.2 Hub 45+59.65 P-47
0+00			12	203.6	
+27			11.3	193.5	
+52.76			19.2	185.6	
+83			28.3	176.5	
1+14			29.4	174.4	
+17			33.0	171.8	
+28			33.0	171.8	
+29			29.1	175.7	
1+31.92			28.7	176.1	
	10.90	181.12	170.22	170.22	Flow-2 Hub 0+60.3 P-49
chk 1+31.92			5.1	176.0	
1+39.95 = Int Exist Culvert			5.25	175.87	
100.4 Lt. on Flow 24"			22.1	159.0	
	9.37	190.01	0.48	180.64	
247.2 Rt. on Rim MH			4.38	185.63	Culvert
" " " Flow "			14.08	175.93	"
chk. Finish Conc. Tennis ct.			4.40	185.61	
chk. " "S.W.Cor " "			4.54	185.47	
				185.39 P-5	
				0.08 diff.	



Location Proposed Culvert
Washington Extension Sta 8+70.82

	12.05	217.61		205.56 B.M. HL-Hub 9+22.5 FB1653-9
0-484	on Flow 20" Pipe		+23.3	240.9
0-38			+20.5	238.1
0-15			+13.0	230.6
0+00			+8.0	225.6
	0+13			
℄			+1.8	218.4
5' Lt.			+1.9	219.5
10' Rt.			+2.3	219.9
	0+25			
℄			3.1	214.5
5'R			2.4	215.2
5'L			1.6	216.0
	0+50.95			
℄			7.5	210.1
5'L			6.6	211.0
5'R			7.0	210.6
	0+62			
℄			10.4	207.2
5'R			9.6	208.0
5'Lt			8.0	219.6
	0+63			
℄			12.2	205.4
5'R			10.1	207.5
5'L			9.0	208.6



217.61

0+86		
℄	18.6	199.0
5'R	15.6	202.0
5'Lt.	15.1	202.5
1+01		
℄	19.1	198.5
5'R	20.3	197.3
5'L ℄ ditch	21.6	196.0
10'L Bank	16.9	200.7
1+05		
℄	22.7	194.9
5'R Bank	20.7	196.9
7'L Bank	19.5	198.1
1+25		
℄	23.6	194.0
5'R	23.8	193.8
5'L	22.5	195.1
1+30		
℄	27.0	193.6
1+34.32		
℄	26.2	191.4
5'L	26.2	191.4
5'R	26.2	191.4
1+46		
℄	27.6	190.0
5'L	27.5	190.1
5'R	27.8	189.8

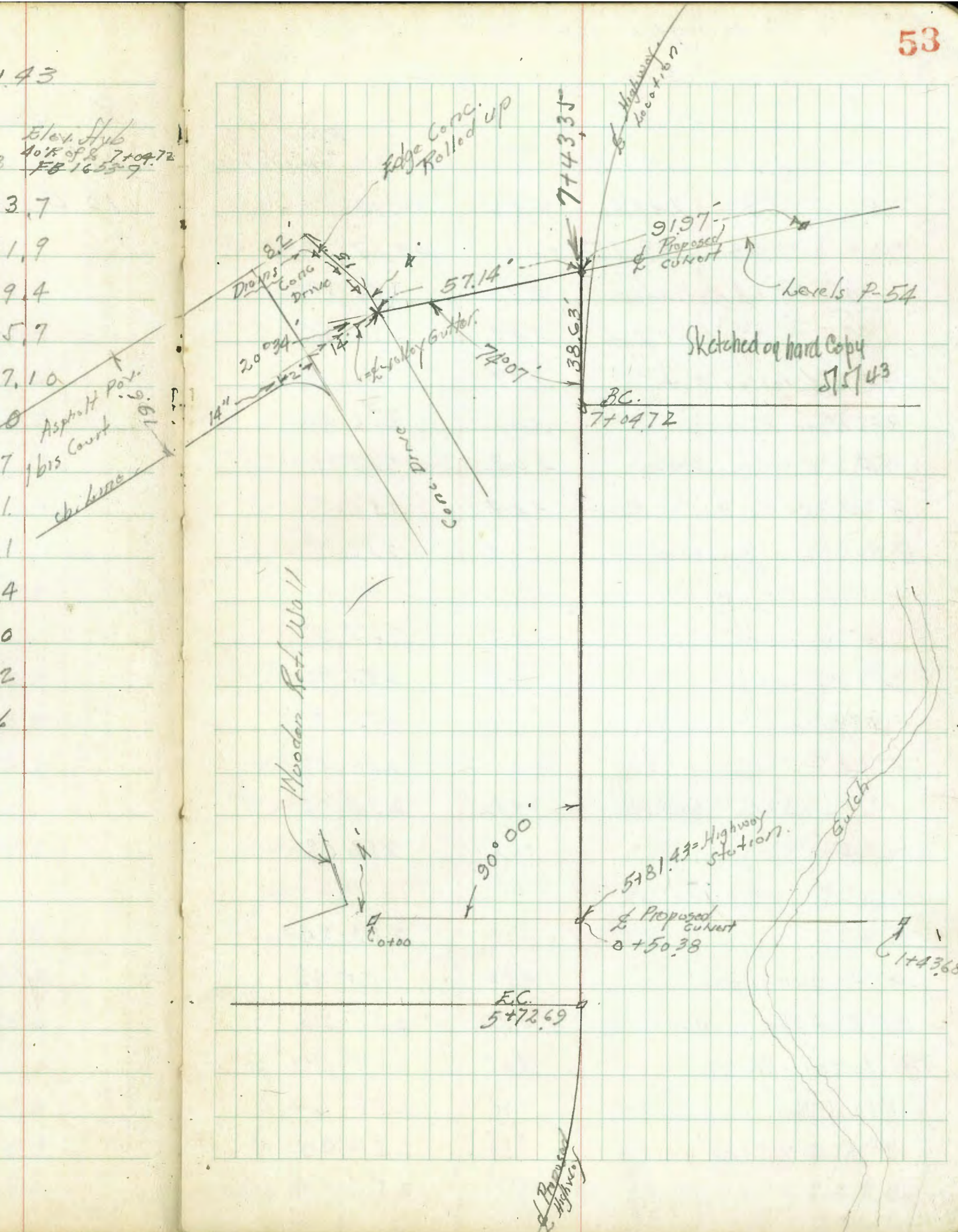
1+55 = 54' edge channel

℄	30.8	186.8
10'R	30.7	186.9
10'L	30.9	186.7

Walker
Osborne
Hazard

Location Proposed Culvert
Washington Ext. Sta. 5+81.43

	4.34	224.67		219.83	Elev. Hub 40' Rt of ℄ 7+04.72 FB 1655-9
0-4' at Base Wooden Ret Wall			+9.0	233.7	
0+00			+7.2	231.9	
0+08			+4.7	229.4	
0+22			-1.0	225.7	
0+50.38 on Pav. stake			7.57	217.10	
+75			14.7	210.0	
1+00			21.0	203.7	
+22 = ℄ Gulch			21.6	203.1	
25' R "			19.6	205.1	
25' L " "			26.3	198.4	
1+28 = WLY edge Gulch			22.7	202.0	
1+34 = Top Bank			19.5	205.2	
1+43.68 = End			17.1	207.6	



Washington Ext. Station 7+

Levels for Proposed Culvert

Location P-53

	11.70	231.53		219.83	B.M. Hub 40' R of ℄ 7+04.72 P-53
T.P.	12.52	243.66	0.39	231.14	
T.P.	16.08	259.75	+0.01	243.67	
0-16 = P.C. cb Ret. on cb.			2.92	256 83	
" " " " Gut.			3.47	256 28	
0-14 in ℄ Valley Gut.			3.58	256 17	
14" R on Roll Conc.			3.41	256 34	
7.4' " Conc. Drive			4.62	255 13	
8' Lt. ℄ Ibs Court Pav.			3.24	256.51	
18.6' Lt. S edge Pave			3.12	256 73	
	0-08				
℄ Valley Gut.			4.18	255 57	
14" Rt. on Roll Conc			4.03	255 72	
3.4' Rt. Blk in Drive			4.38	255 37	
10' Rt.	on	"	4.85	254 90	
2' Lt.	on Roll Conc Valley		3.99	255 76	
18.6' Lt.	" Con.		3.67	256 08	
	0+00				
℄			4.91	254 84	
4' Lt. - ℄ in Drive			4.32	255 43	
2.5' E of Above in Valley			4.47	255 28	
8' Lt.	on edge Con.		4.05	255 70	
1' R of Above in Valley Gut.			4.15	255 60	
14" R on Roll Conc. Drive			4.85	254 90	
10' R	"	"	5.21	254 54	

259.75

0+01 on Cobble Gut			5.57		254.18
0+14			6.3		253.5
+24			11.6		248.2
T.P.	0.04	243.71	16.08	243.67	
0+40			1.8		241.9
0+51			6.4		237.3
8' R			8.1		235.6
18' R			5.8		237.9
10' L			5.4		238.3
0+57.14 on Stake			8.70		235.01
0+60			10.3		233.4
10' L			9.6		234.1
1' R			10.3		233.4
2' R			18.8		224.9
16' R			18.1		225.6
17' R			10.1		233.6
27' R			8.5		235.2
T.P.	0.46	231.60	12.57	231.14	
0+62			7.4		224.2
0+69			9.5		222.1
4' Lt.			7.1		224.5
6' Lt.			3.5 (3.6)		228.1
10' Lt.			3.2		228.4
3' R			10.4		221.2
5' R			14.8		216.8
14' R			14.9		216.7
16' R			10.7 / 4.2		227.4
26' R			5.0		226.6

		23160		
T.R	0.02	218.52	1.310	218.50
	0+77			
℄			5.5	213.0
1'L			5.7	212.8
2'L			+1.3	219.8
7'L			+2.8	221.3
8'L			+4.5	223.0
15'L			+4.0	222.5
2'R			2.9	215.6
4'R			1.1	217.4
9'R			+0.4	218.9
11'R			+3.3	221.8
15'R			+4.5	223.0
	1+00			
℄			7.3	211.2
6'L			9.3	209.2
11'L			6.1	212.4
15'L			3.5	215.0
5'R			5.5	213.0
10'R			4.5	214.0
	1+22			
℄			14.0	204.5
10'R			14.2	204.3
10'L			12.6	205.9
1+37			17.1	201.4
1+49.1			21.6	

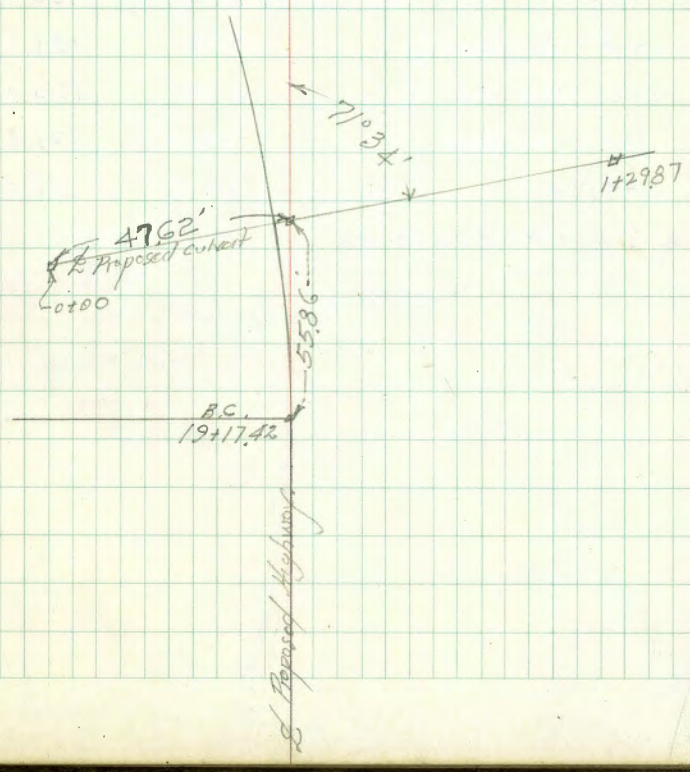
21852

1+67 = ℄ Gulch	3.03 -	1+67
20'R in "	3.00	
20'L " "	30.6	
1+80	26.0	
2+00	21.4	
Chk. Hub 9+22.5 P-51	12.94	205.58
		205.56
		0.02

Walker
Osborne
Hogard
3-30-43

Location & Levels Proposed Culvert
Washington Ext. Sta. 19+

	3.15	173.37		170.22	El. B.M. 0+60.3 P-49
T.P.	1.48	163.84	11.01	162.36	
0-30			+32.2	196.0	
0-20			+27.0	190.8	
0-10			+24.0	187.8	
0-4			+20.6	184.4	
0+00			+17.2	181.0	
0+12			+10.8	174.6	
+30			+6.0	169.8	
+47.62 on stake			3.29	160.5	
+60			10.0	153.8	
+70			11.5	152.3	
+80			19.2	144.6	
+94 = ℄ Gulch			24.7	139.1	
25' Lt. in ℄ Gulch			25.4		
25' R " " "			23.8		
0+97			22.2		
1+15			18.8		
1+29.87			16.8	147.0	
1+40			13.6	150.2	
chk ℄	19+75 FB 1653-P-17		2.1	161.7 ✓	

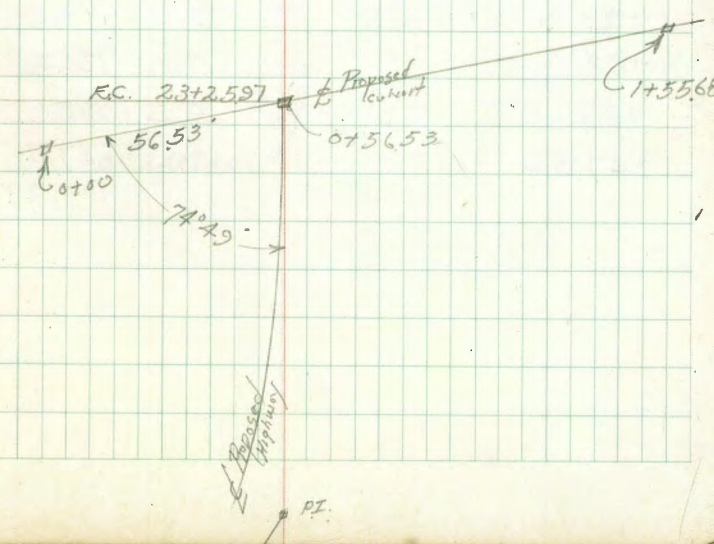


Walker
Osborne
Hazard
3-30-43

Location & Levels Proposed Culvert

Washington Ext. Station 23+25.97

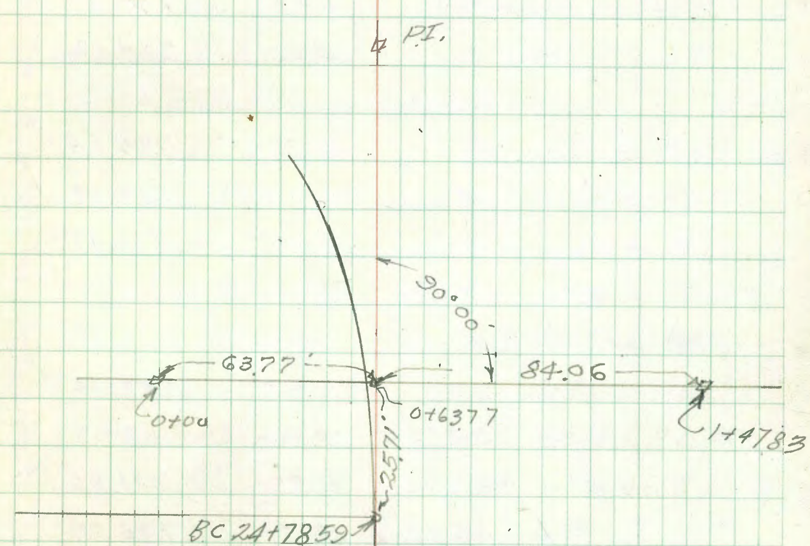
	4.92	152.38		147.46	El. ℄ Hub 23+25.97 FB 1653-20
0-25			+25.0	177.4	
0+00			+17.0	169.4	
+20			+12.2	164.6	
+30			+5.6	158.0	
+45			0.0	152.4	
+56.53 = ℄ on Hub			4.92	147.5	
0+70			9.7	142.7	
+85			13.9	138.5	
+99			19.3	133.1	
1+10 = SLY Bank			21.3	131.1	
1+21 = ℄ Gulch			28.4	124.0	
1+29 = NLY Bank			23.6	128.8	
1+55.68			16.2	136.2	
chk 23+50 ℄ FB 1653-20			4.2	148.2 148.1 0.1 diff	



Walker
Osborne
Hazard
3-30-43

Location & Levels Proposed Culvert
Washington Ext. Sta. 25+

		↑ Hand Level			
	13.0	173.2		160.2	El. Ground 25+25 40' Lt FB 1653-22
0-20			+2.7	175.9	
0+00			5.6	167.6	
T.P.	0.0	160.2	13.0	160.2	
0+24			3.9	156.3	
+36			11.7	148.5	
T.P.	0.4	147.9	12.7	147.5	
0+50			5.6	142.3	
+63.77			10.6	137.3	
T.P.	-0.1	134.8	13.0	134.9	
0+82			7.6	127.2	
+90			11.1	123.7	
T.P.	6.8	128.3	13.3	121.5	
+91 in Gulch			11.0	117.3	
1+00 " "			9.0	119.3	
+02			7.1	121.2	
+27			5.2	123.1	
1+47.83			1.1	127.2	
				127.25	P 60



Walker
Osborne
Hazard
3-31-43
FB 1653
Page 1

LEVELS on EXISTING M.Hs.
WASHINGTON Extension
from Hawk To India
Location this Book Page 42, 44

FB 1653 Page 1	0.17	267.19		267.02	N.E.B.P. Washington & Goldfinch
0+00	Rim MH.		6.37	260.82	
"	Flow MH.		26.11 (19.74)	241.08	
T.P.	0.45	254.92	12.72	254.47	
T.P.	1.16	243.13	12.95	241.97	
1+75.74	on Rim MH		8.73	234.40	
"	" Flow "		14.00	229.13	
T.P.	0.43	230.90	12.66	230.47	
2+91.54	on Rim MH.		4.36	226.54	
"	" Flow " Main line		11.71	219.19	
"	" Flow from North		11.41	219.49	
T.P.	0.20	218.96	12.14	218.76	
4+39.46	on Rim MH.		2.88	216.08	
"	" Flow "		9.84	209.12	
T.P.	1.29	207.35	12.90	206.06	
6+76.12	on Rim MH.		5.39	201.96	
"	" Flow " Main Line		11.15	196.20	
"	" " from Jackdaw		11.05	196.30	
"	" " " Douglass		10.15	197.20	
T.P.	0.25	195.55	12.05	195.30	
8+54.46	on Rim MH.		3.62	191.93	
"	" Flow "		9.33	186.22	
10+26.76	on Rim MH.		9.98	185.57	
"	" Flow " Mainline		15.37	180.18	

Notes Reduced June 3-43 C.B.H.

195.55

10+26.76	Flow MH from Ingalls		15.07	180.48
"	Flow from East		14.87	180.68
T.P.	1.21	186.51	10.25	185.30
chk. Rim Drain MH P58			0.83	185.68 / 185.63 / 0.05
		⊼ Cont. 186.51		
11+80.76	on Rim MH.		1.13	185.38
"	" Flow "		13.28	173.23
13+64.86	on Rim MH.		9.44	177.07
"	" Flow inaccessable on Acct Barrage Baloon Cable			
T.P.	0.08	174.49	12.10	174.41
15+09.86	on Rim MH.		2.02	172.47
"	" Flow "		15.30	159.19
16+39.97	on Rim "		11.55	162.94
"	" Flow "		19.76	154.73
T.P.	0.94	163.88	11.55	162.94
17+88.50	on Rim MH.		7.94	155.94
"	" Flow "		14.73	149.15
T.P.	2.62	154.67	11.83	152.05 on Bab.
19+68.10	on Rim MH.		9.65	145.02
"	" Flow Main Line		15.46	139.21
Flow S.E. & N.E.			14.76	139.91
T.P.	2.11	149.50	7.28	147.39
21+10.00	on Rim MH.		10.88	138.62
"	" Flow Main line		17.26	132.24
"	" Flow S.E.		13.28	136.22

Cont. P-60

Levels on Washington Ext. MHs.
Cont. from P-59

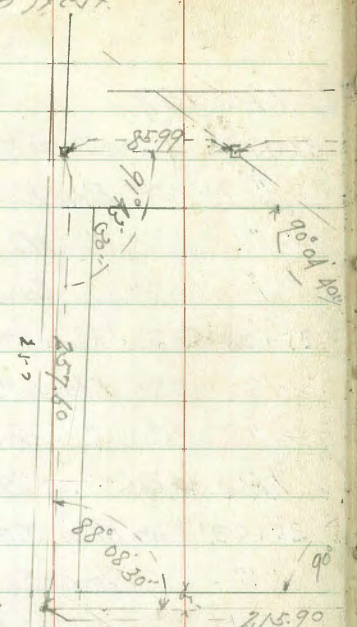
			149.50			
(15)	22+65.6 =	on Rim MH.		11.42		138.08
	"	" Flow "		22.37		127.13
	T.P.	0.89	137.59	12.80	136.70	
(16)	23+88.8	on Rim MH		7.43		130.16
	"	" Flow "		13.40		124.19
	T.P.	1.90	128.62	10.87	126.72	
(17)	25+17	on Rim MH		1.90		135.69
	"	" Flow "		7.46		130.13
	Left Elev. on Stake 1+47.83 P-58			1.37	127.25	
(18)	26+42	on Rim MH.		8.73		119.89 Torrence St.
	"	" Flow "		15.45		113.17
	T.P.	0.08	117.17	11.53	117.09	
(19)	27+69.72	on Rim MH		2.11		115.06
		" Flow "		8.44		108.73
(20)	28+95.12	" Rim MH.		7.27		109.90
	"	" Flow Main Line		12.96		104.21
	"	" " North Line		12.66		104.51
	T.P.	1.43	105.88	12.72	104.45	
(21)	30+20.92	on Rim MH		3.23		102.65
	"	" Flow "		8.17		97.71
(22)	31+45.92	on Rim "		9.75		96.13
	"	" Flow "		15.65		90.23
	T.P.	0.98	96.23	10.63	95.25	
(23)	32+76.38	on Rim MH.		2.87		93.36
	"	" Flow "		10.96		85.27

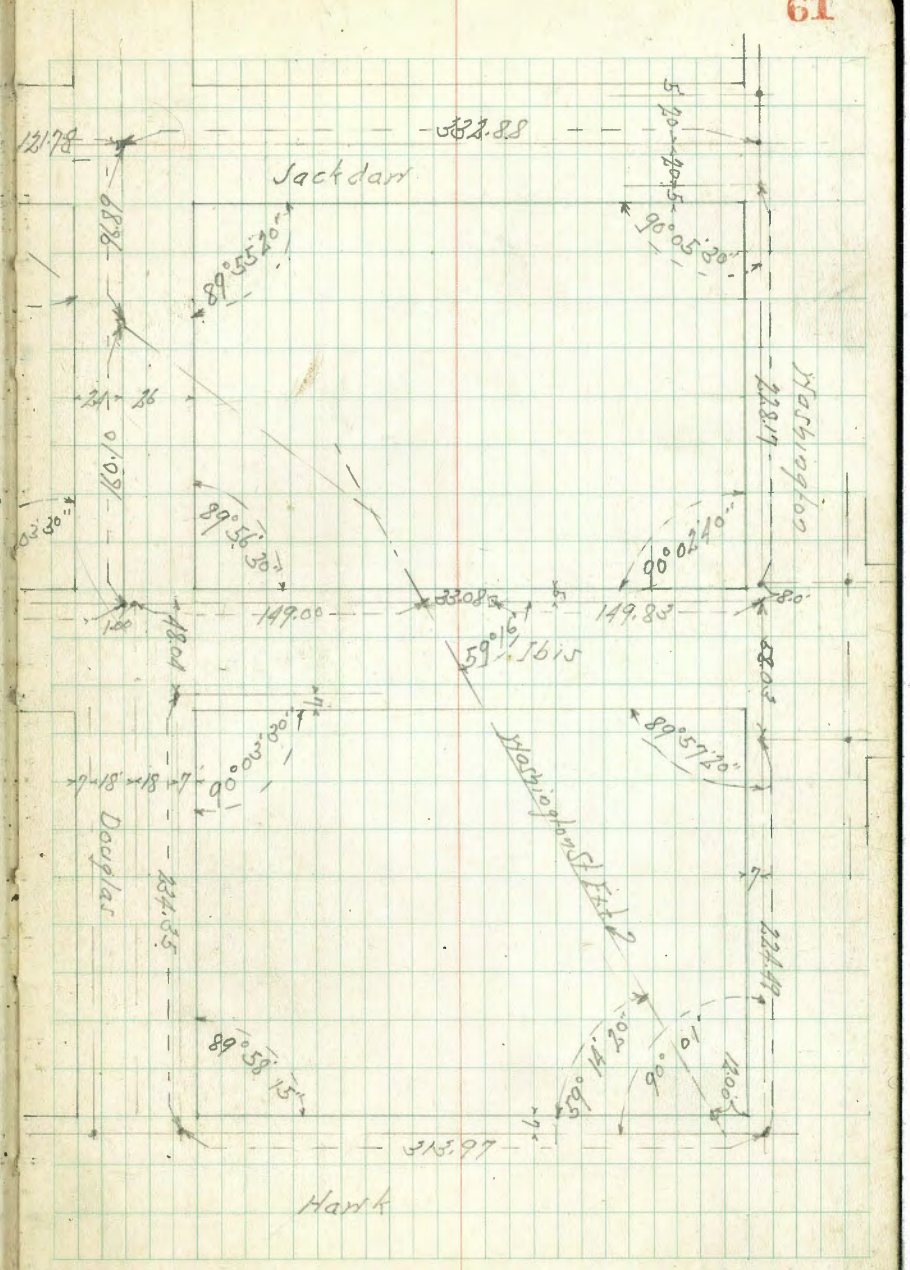
			96.23			
(24)	T.P.	1.57	89.14	8.66	87.57	
	33+99.98 (35.5' Lt)	on Rim MH		3.49	85.65	in Linwood St
	"	" Flow Main Line		9.46	79.68	
	"	" " North		8.96	80.18	
	"	" " South		8.86	80.28	
(25)	35+38.46	on Rim MH		3.50	85.64	
	"	" Flow " Main Line		14.98	74.16	
	"	" " South		14.68	74.46	
	T.P.	4.66	90.34	3.46	85.68	
	36+63.10	on Rim MH.		8.32	82.02	
	"	" Flow "		21.07	69.27	Flow To North = 0.7' Above
	38+06.3	on Rim MH		10.30	80.04	India st.
	"	" Flow "		26.09 (15.79)	64.25	
	Chk N.W. B.P. India & Andrews			12.26	78.08	
					77.97	
					0.11	diff.

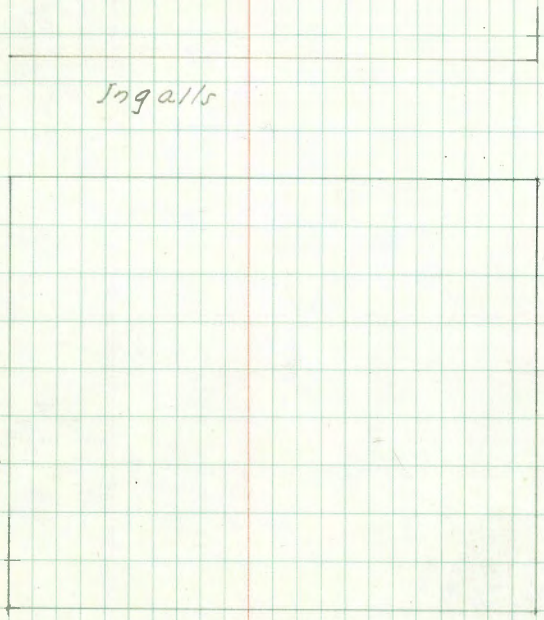
Washington St. Extension West
Check Ties Page 22-23

April 8: 1943
Sisson
Bliss
Walker

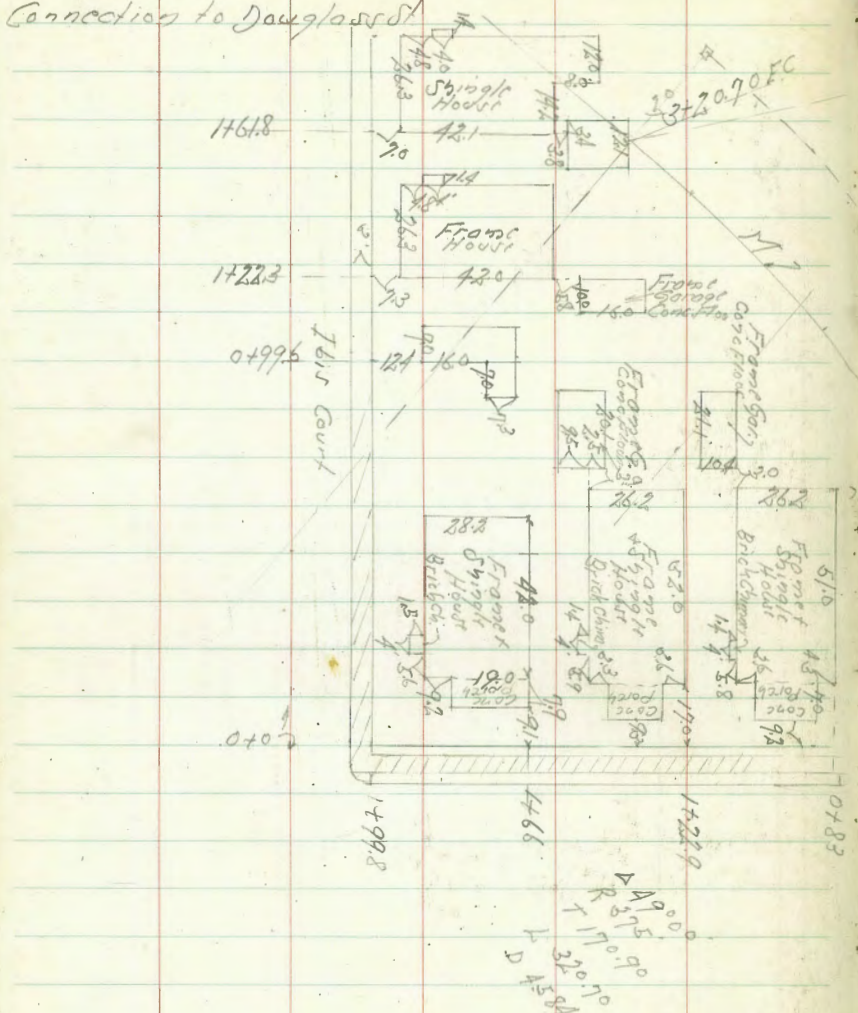
Cold
Strong Wind

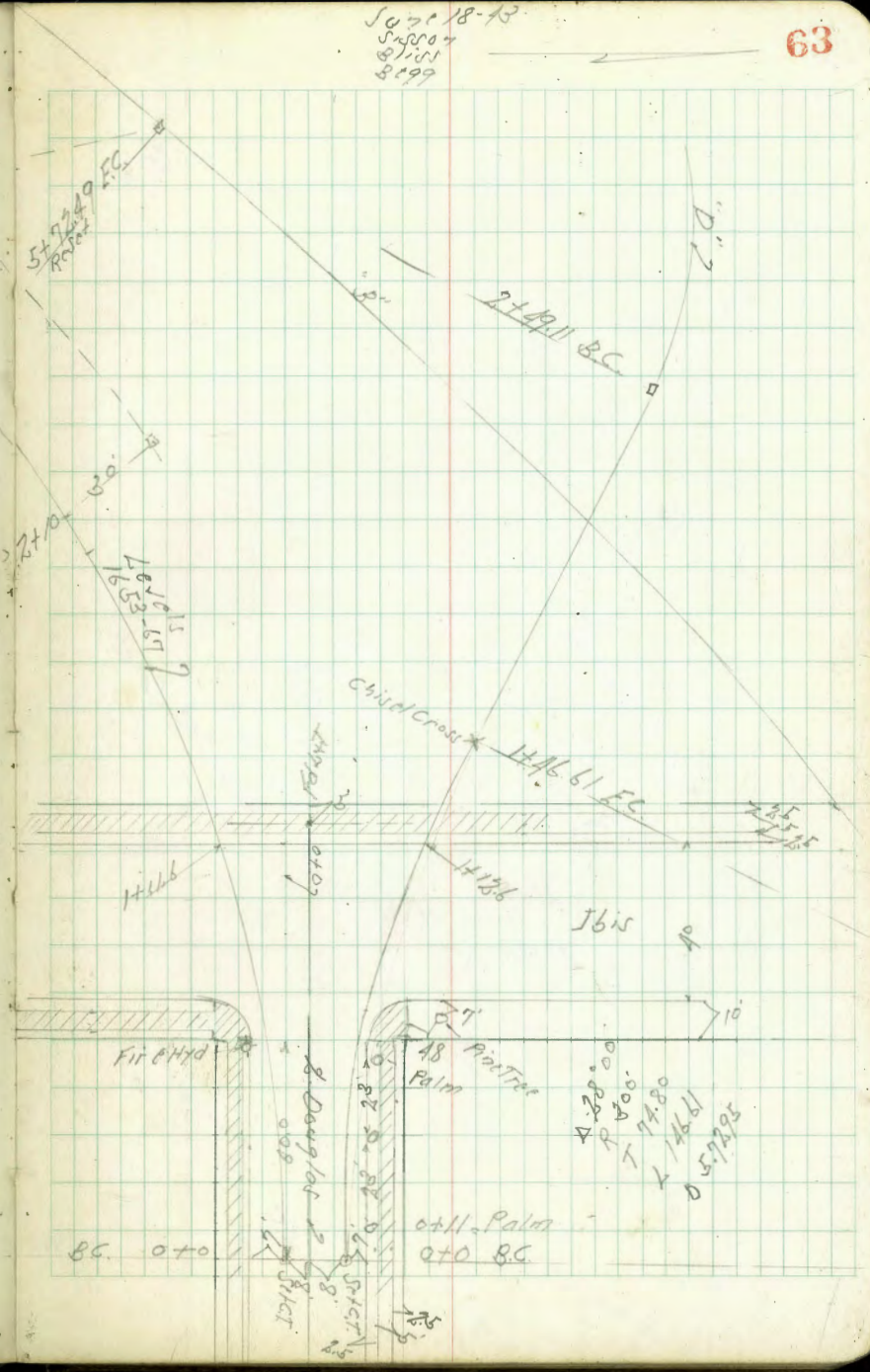


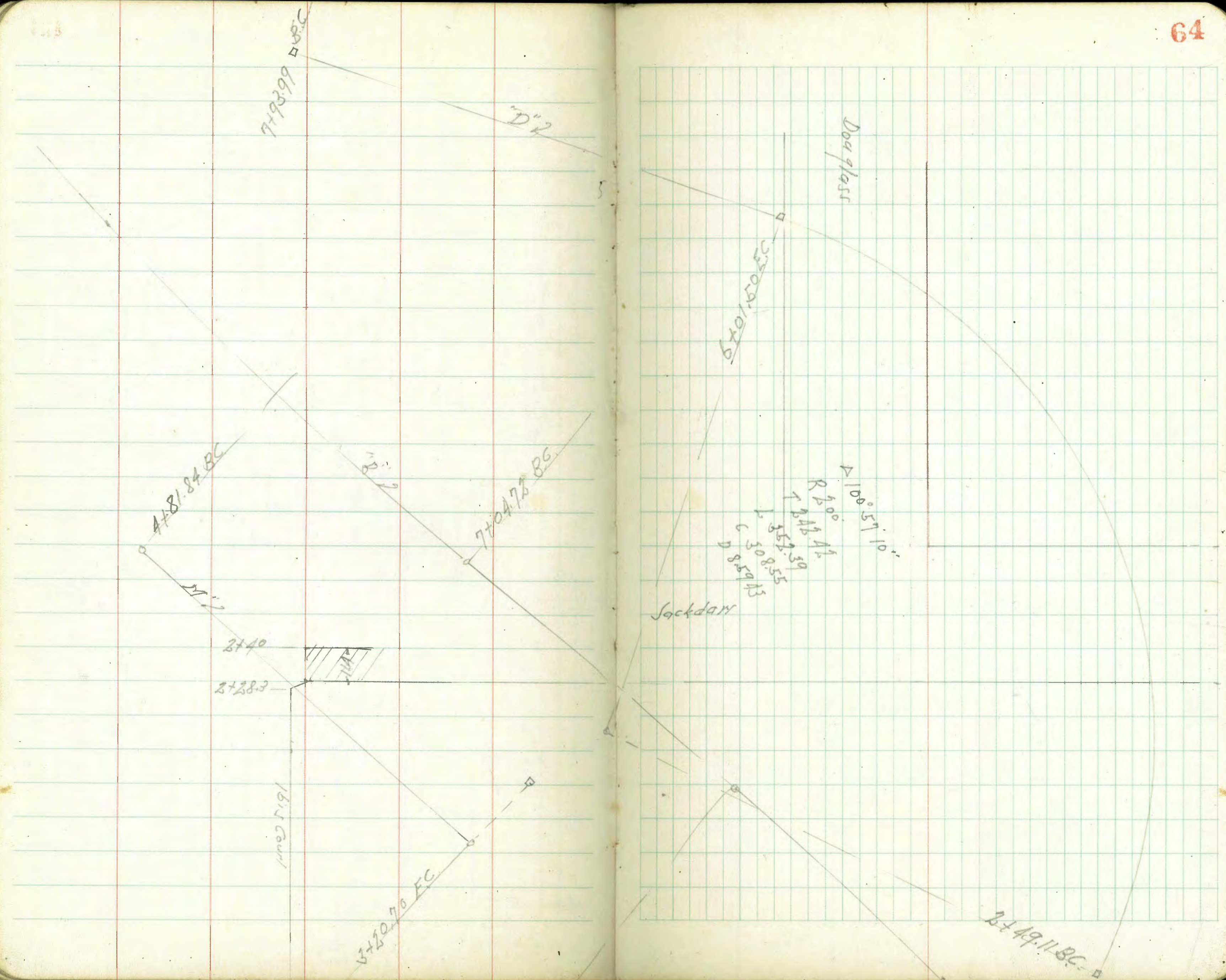


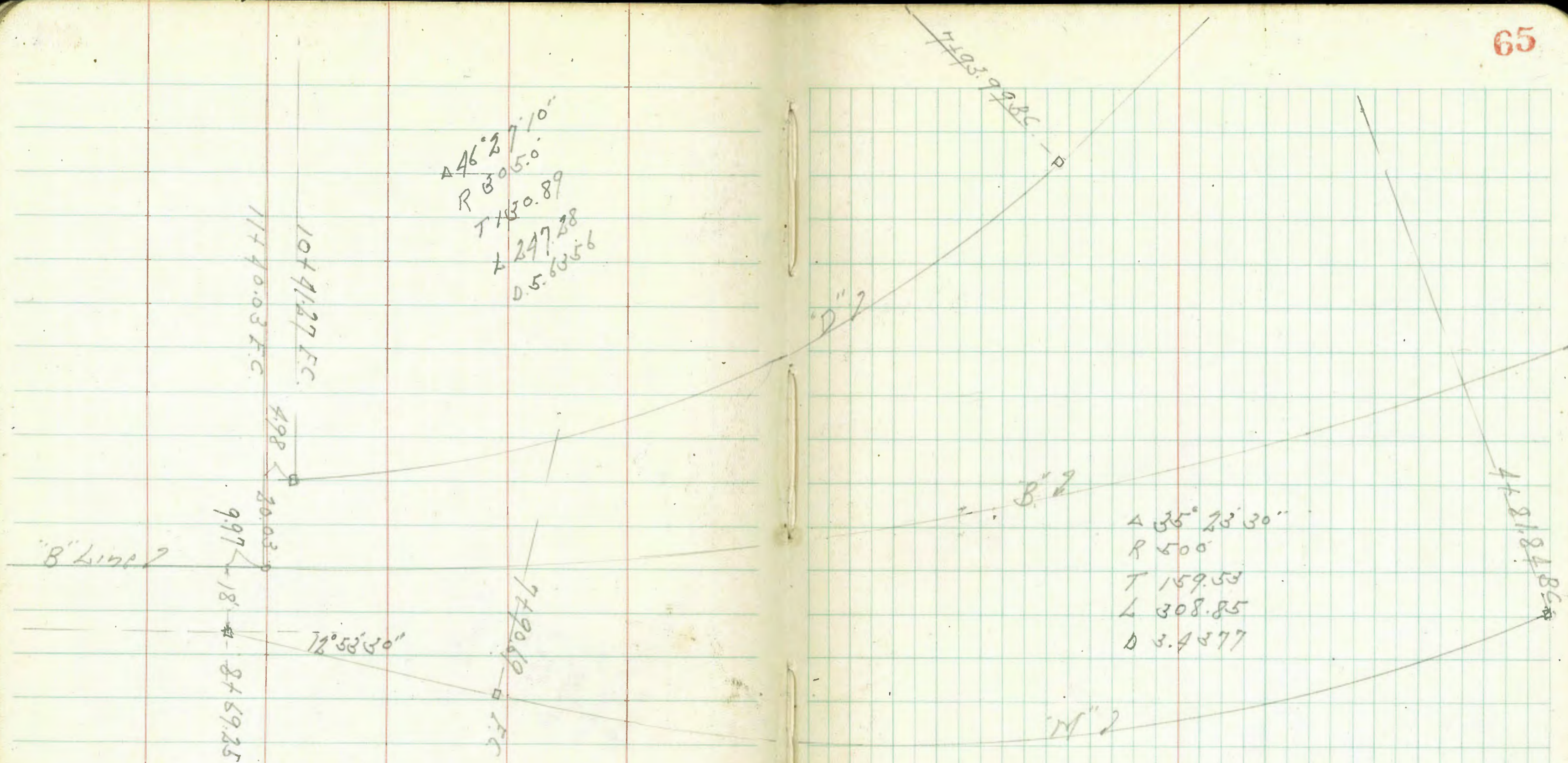

Ingalls

Washington St Extension Hook to India St.
Alignment of Grade Separation and
Connection to Douglass St

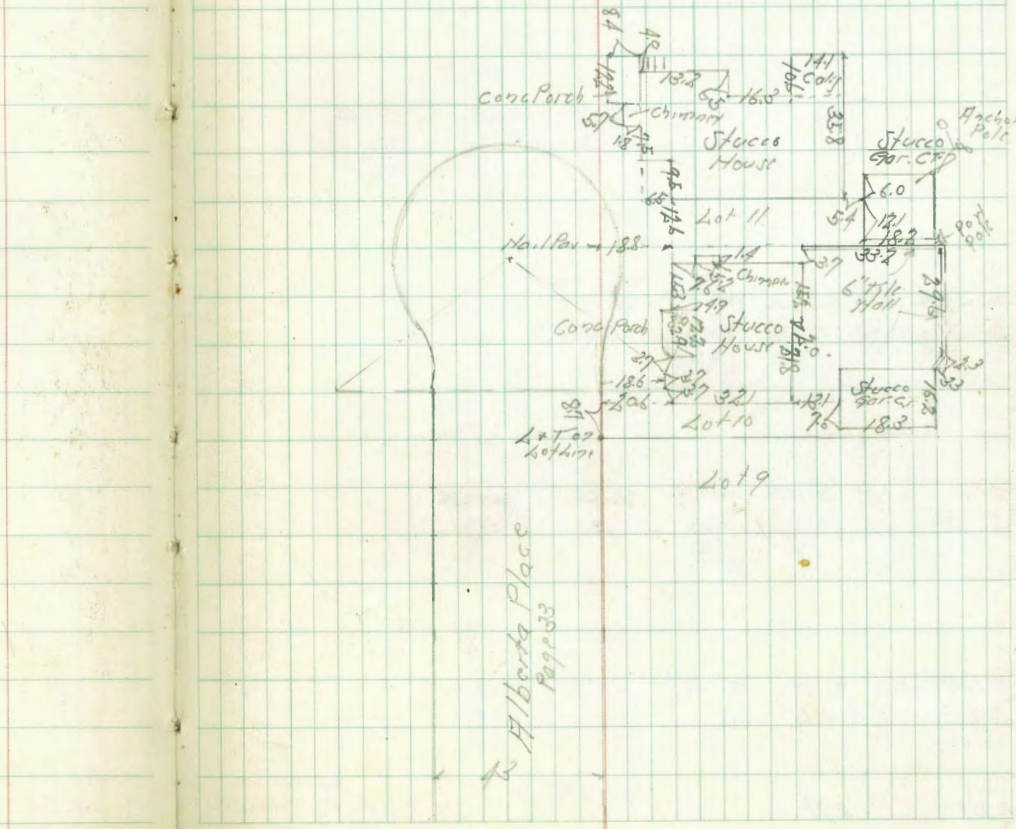





7+93.99 B.C.
"D"2
4+81.84 B.C.
"B"2
7+04.72 B.C.
2+40
2+28.3
16.5 Conn
3+50.70 E.C.
6+01.50 E.C.
Douglass
Δ 100°59'10"
R 200
T 241.41
L 352.39
C 308.55
D 8.59.43
Jackdaw
3+49.11 B.C.


Δ 46°27'10"
R 305.0'
T 130.89
L 247.28
D 5.6356
11+40.03 E.C.
10+41.27 E.C.
4.98
20.03
9.97
18'
8+59.25
"B" Line 2
72°53'30"
7+00.16
3.1
"D" 2
4+93.97 B.C.
"B" 2
Δ 35°23'30"
R 500'
T 159.53
L 308.85
D 3.4377
4+81.84 B.C.
"M" 2

Location of House Lots 10 + 11 Alberta Addition



Cross Section "D" Line Washington St Ext.
Grade Separation
Sketch page 63

TP	2.31	263.65	4.65	261.34	
1+25					
1+12.6 = H Cb of Ibis					
0+85					
0+60					
0+35					
0+0 = B.C. Rt.					
BM	3.99	265.99		262.00	S.E. B.P. Douglas + Ibis

Lt. S ℄ Rt. N

June 22-43
Simon
Bliss
Begg

Station							
1+25	262.5 / 3.5 / 15: Ft/Goo Porch	262.1 / 3.9 / 5	261.4 / 4.6	260.4 / 5.6 / 5	259.3 / 6.7 / 16	258.75 / 7.24 / 25 - Cb	258.08 / 7.91 / 25 - Gut
1+12.6	261.7 / 4.3 / 26	261.2 / 4.8 / 16	260.54 / 5.45 / Cb	260.00 / 5.99 / Gut	259.22 / 6.77 / 16	258.59 / 7.40 / 26	
0+85	261.47 / 4.52 / 26	261.42 / 4.57 / 16	261.27 / 4.72	260.54 / 5.45 / 16	259.85 / 6.14 / 26		
0+60	261.69 / 4.30 / 16	261.49 / 4.50	261.49 / 4.50 / 0.9 = Gut	262.04 / 3.95 / 0.9 = Cb	262.2 / 3.8 / 12	262.0 / 4.0 / 16	261.1 / 4.9 / 26
0+35	262.04 / 3.95 / 8	261.82 / 4.17	261.60 / 4.39 / 4.8 = Gut	262.15 / 3.84 / 4.8 = Cb	262.4 / 3.6 / 16	262.4 / 3.6 / 26	
0+0	262.28 / 3.71 / 8	262.16 / 3.83	261.75 / 4.24 / 7 = Gut	262.29 / 3.70 / 7 = Cb	262.4 / 3.6 / 16	262.0 / 4.0 / 26	

265.99

2+25					
TP	0.64	248.22	11.54	247.58	✓
2+13		13' Rt of ℄ = 10" Pepper Tree			
2+04.4	= 6" Conc Wall on ℄ 8' Lt of ℄ = N'ly Power Pole				
2+0					
TP	2.13	259.12	6.66	256.99	✓
1+81					
1+46.61	EC				

263.65

2+04.4 Conc Wall

Lt ℄ Rt.

237.2 11.0/55 — 238.6 9.6/40 — 240.9 7.8/16 — 239.5 8.7 — 240.7 7.5/16 — 240.1 8.1/30 — 239.8 8.4/50

248.22 ✓

242.6 16.5/40 — 244.8 14.3/16 — 244.9 14.2 — 245.2 13.9/16 — 249.6 9.5/35

248.8 10.3 00 Bot Wall — 253.58 5.54 on Wall

248.0 11.1/26 — 250.6 8.5/16 — 250.7 8.4/11 — 253.9 5.2 10 on Conc Wall — 254.9 4.2 — 255.4 3.7/5 — 255.7 3.4/16

259.12 ✓

257.5 6.2 10 = N'ly Garage — 257.5 6.2 — 257.5 6.2/16 — 257.0 6.7/26

261.7 2.0 4.4 = N'ly House — 261.7 2.0 on Conc Drive — 261.8 1.9 7 = S'ly House

263.65

"D" Line

TP	11.66	237.75 ✓	0.89	226.09		
3+75					207.7 22.3/110	205.5 21.6/90
3+50						
3+25						
3+22	19' Rt of ℄ = 12" Pepper Tree					
3+09	12' Rt of ℄ 10" Apricot Tree					
3+0						
2+75						
TP	1.30	226.98 ✓	11.45	225.68		
2+49.11	BC Lt					
TP	0.28	237.13 ✓	11.37	226.85 ✓		
		248.22				

Lt. ℄ Rt

3+75: 206.7 20.3/80 · 214.9 12.1/48 · 214.8 12.2/42 · 220.9 6.6/30 · 224.2 2.8/16 · 228.8 +1.8 · 232.8 +5.8/16 · 236.6 +9.6/30 · 243.2 +16.2/50

3+50: 207.8 22.2/95 · 208.5 18.5/60 · 211.5 15.5/50 · 215.0 12.0/30 · 218.6 8.4/16 · 222.3 4.7 · 226.0 1.0/16 · 230.5 +3.5/30 · 236.0 +9.0/50

3+25: 208.7 18.3/95 · 206.0 21.0/70 · 209.9 17.1/30 · 211.8 15.2/16 · 214.8 12.2 · 218.6 8.4/16 · 221.2 5.8/30 · 225.9 1.1/50 · 228.7 +1.7/65

3+0: 213.3 13.7/90 · 212.9 14.6/80 · 209.8 17.2/50 · 209.6 17.4/30 · 209.8 17.2/16 · 210.5 16.5 · 212.0 15.0/16 · 213.6 13.4/30 · 216.3 10.7/50 · 218.9 8.1/70 · 220.9 6.1/80

2+75: 217.2 9.8/85 · 220.3 6.7/50 · 220.2 6.8/30 · 219.0 8.0/16 · 218.0 9.0 · 217.4 9.6/16 · 215.9 11.1/30 · 214.2 12.8/50 · 215.0 12.0/80 · 216.0 11.0/90

226.98 ✓

2+49.11: 224.9 12.2/70 · 227.0 10.1/50 · 229.0 8.1/30 · 229.7 7.4/16 · 229.35 7.68 · 230.5 6.6/16 · 230.3 6.8/30 · 228.9 8.2/50 · 227.1 10.0/70

237.13 ✓

Sta.	B.S.	H.I.	F.S.	Elev.	Notes	Cross-section (Lt. — ℄ — Rt.)
5+0						
4+95					55.0 Rt of ℄ = 16" Euc. Tree	210.1/15.5/75 214.3/11.3/50 216.9/8.7/30 216.9/8.7/16 216.6/9.0 213.8/10.8/16 212.1/13.5/30 210.2/15.4/50 206.8/18.8/65 207.6/18.0/75
4+75					210.5/15.1/80	213.6/12.0/70 219.2/6.4/50 222.1/3.5/30 223.7/1.9/16 224.5/1.1 224.0/1.6/16 223.3/2.3/30 221.3/4.3/50 219.5/6.1/70
TP	0.27	225.58	11.70	225.31		225.58 ✓
4+50						207.7/29.3/80 214.4/22.6/65 222.5/14.5/40 225.3/11.7/30 228.4/8.6/16 230.2/6.8 230.9/6.1/16 230.9/6.1/30 230.6/6.4/50
4+49					3.5 Lt of ℄ : 8" Euc Tree	
4+41					35 Lt of ℄ : 14" " "	
4+28					20 Rt of ℄ : 30" Palm	
4+25					211.0/26.0/80	208.0/29.0/75 211.0/26.0/40 222.7/14.3/39 225.0/12.0/30 230.0/7.0/16 233.4/3.6 235.6/1.4/16 237.4/+0.4/30 238.4/+1.4/50
4+22					11.5 Lt of ℄ : Aly 12" Acacia Tree	
TP	6.15	237.01	6.89	230.86	on Rock 12' Rt of 4+50	237.01 ✓
4+13					209.8/28.0/80 219.3/18.5/50 222.3/15.5/35	210.7/27.1/34 210.3/27.5/26 213.3/24.5/20 215.0/22.8/9 231.5/6.3/7 233.8/4.1 237.1/0.7/16 239.1/+1.3/30 240.3/+2.5/40
4+03					16' Rt of ℄ = 54 Pepper Tree	
4+0					206.6/31.2/90	212.8/25.0/65 220.8/17.0/40 222.8/15.0/30 224.1/12.7/21 221.2/16.6/10 230.7/7.1/8 233.5/4.3 235.5/2.3/12 236.9/0.9/16 240.2/+2.4/30 240.4/+2.6/37 (12: Top of Conc Drain; 16 on Drain)

237.75   237.75 ✓

D 2.17c

TP	0.76	204.10	11.15	203.34
6+50				
6+25				
6+01.50	EC			
5+75				
5+50				
5+25				
TP	0.71	214.49	11.80	213.78

225.58

202.3 197.5 192.2
12.2 17.0 22.3
70 60 50

196.5
18.0
70

Lt. 2 Rt. 71

189.6 191.5 195.2 198.5 203.8 208.8 213.8 218.7
24.9 23.0 19.2 16.0 11.1 5.7 0.7 +4.2
45 40 30 16 30 45

193.2 191.7 196.9 197.1 199.9 204.2 210.2 216.2 220.5
21.3 22.8 18.6 17.4 14.6 10.3 4.3 +1.7 +6.0
50 40 36 30 16 16 30 45

196.0 196.2 193.9 192.7 198.9 204.53 211.0 216.5 223.1
18.5 19.3 20.6 19.8 15.6 9.96 3.5 +2.0 +8.6
80 50 30 36 16 .974 cfs 16 30 50

199.8 201.1 200.9 199.9 199.8 201.0 207.7 212.7 219.7
14.7 13.4 13.6 14.6 15.7 13.5 6.8 1.8 +5.2
75 50 30 16 3 16 30 50

203.6 206.1 206.1 206.0 203.5 201.7 202.8 203.3 204.5 208.2 208 215.6
10.9 8.4 8.4 8.5 11.0 12.8 12.1 11.2 10.0 6.3 5.7 +1.1
75 60 50 30 16 10 12 16 30 40 55

207.0 210.3 211.3 211.8 209.9 207.3 208.3 205.1 205.8 209.1 218.0
7.5 4.2 3.2 3.1 4.6 7.2 10.2 9.4 9.1 5.4 0.5
75 16 50 30 16 16 30 40 50 70

214.49

Lt. ℄ Rt.

Station												
7+93.99 = B.C. Rt		202.8 1.3 50	200.1 4.0 40	194.9 9.2 25	192.6 11.5 22	192.6 11.5 16	190.0 14.1	187.1 17.0 10	186.7 17.4 32	189.4 14.7 50	189.9 14.2 65	
7+75		203.4 0.7 50	199.3 4.8 38	194.6 9.5 27	193.1 11.0 16	188.3 15.8	186.8 17.3 5	186.9 17.2 16	186.9 17.2 24	190.6 13.5 30	193.1 11.0 50	196.7 7.4 65
7+50		204.9 +0.8 65	200.7 3.4 50	196.4 7.7 40	194.5 9.6 30	192.4 11.7 16	187.4 16.7	187.7 16.4 13	190.4 13.7 16	194.6 9.5 30	199.9 4.2 50	
7+25	203.0 1.1 65	197.5 6.6 50	195.9 8.2 40	192.2 11.9 30	188.1 16.0 20	188.3 15.8 16	188.9 15.2	190.5 13.6 10	193.1 11.0 16	200.1 4.0 30	203.1 1.0 40	205.7 +1.6 50
7+0		202.0 2.1 65	196.3 7.8 50	192.2 11.9 40	188.0 16.1 32	193.2 10.9 16	196.0 8.1	200.3 3.8 16	205.4 +1.3 30	211.6 +7.5 50		
6+75	200.2 3.9 65	197.8 6.3 55	194.5 9.6 50	188.8 15.3 42	192.2 11.9 30	196.1 8.0 16	200.1 4.0	206.0 +1.9 16	209.3 +5.2 30	215.9 +11.8 50		

204.10

204.10 ✓

D' Line

Sta.					
9+50					
9+25					
9+0					
TP	11.59	214.52 ✓	1.17	202.93	
8+75					
8+50					
8+25					
		20410			

Lt ℄ Rt

9+50

223.4	219.0	212.2	207.1	206.2	200.1	189.5	187.7	185.9
+8.9	+4.5	2.3	7.4	8.3	14.4	25.0	26.8	28.6
25	16		16	18	24	28	34	40 on Court

9+25

223.5	218.6	211.7	205.9	204.5	197.8	188.4	187.3	186.0
+9.0	+4.1	2.8	8.6	10.0	16.7	26.1	27.2	28.5
25	16		16	22	40	45	55	60 on Court

9+0

216.4	215.2	208.8	205.4	201.7	196.8	190.1	189.7	186.2
+1.9	+0.7	5.7	9.1	12.8	17.7	24.4	24.8	28.3
20	16		16	27	37	42	60	63

214.52 ✓

186.1
28.4
75 = Ely Tennis Court

8+75

216.7	211.6	206.1	199.4	195.1	192.4	191.2	186.7	185.7	185.8
+12.6	+7.5	+2.0	4.7	9.0	11.7	12.9	17.4	18.4	18.3
30	16		16	25	32	49	55	65	80

8+50

213.8	209.1	205.0	200.2	194.4	192.4	188.1	186.0	182.6	186.5
+9.7	+5.0	+0.9	3.9	9.7	11.7	16.0	18.1	21.5	17.6
50	32	16		16	30	37	50	56	80

8+25

205.9	204.1	200.7	196.0	192.3	191.7	189.1	186.1	186.1	186.1
+1.8	0.0	3.4	8.1	11.8	12.4	15.0	18.0	18.0	18.0
50	30	16		6	16	33	40	50	75

20410 ✓

BM			1.43	222.38 ✓	o/s ℄ Hub 11+40.03 "B" 222.10 1653-11
10+41.27	EC				
10+0					
TP	9.79	223.81 ✓	0,50	214.02	
9+75					
		214.52 ✓			

Lt. ℄ Rt.

10+41.27:

229.9	221.6	213.5	207.0	220.8
+6.1 / 35	2.2 / 16	10.8	16.8 / 16	23.0 / 35 : Top Cut

10+0:

231.1	226.8	222.8	215.9	210.6	209.0	203.3
+7.3 / 35	+3.0 / 25	1.0 / 16	8.4	13.2 / 11	14.8 / 16	20.5 / 81 : Top Cut

223.81 ✓

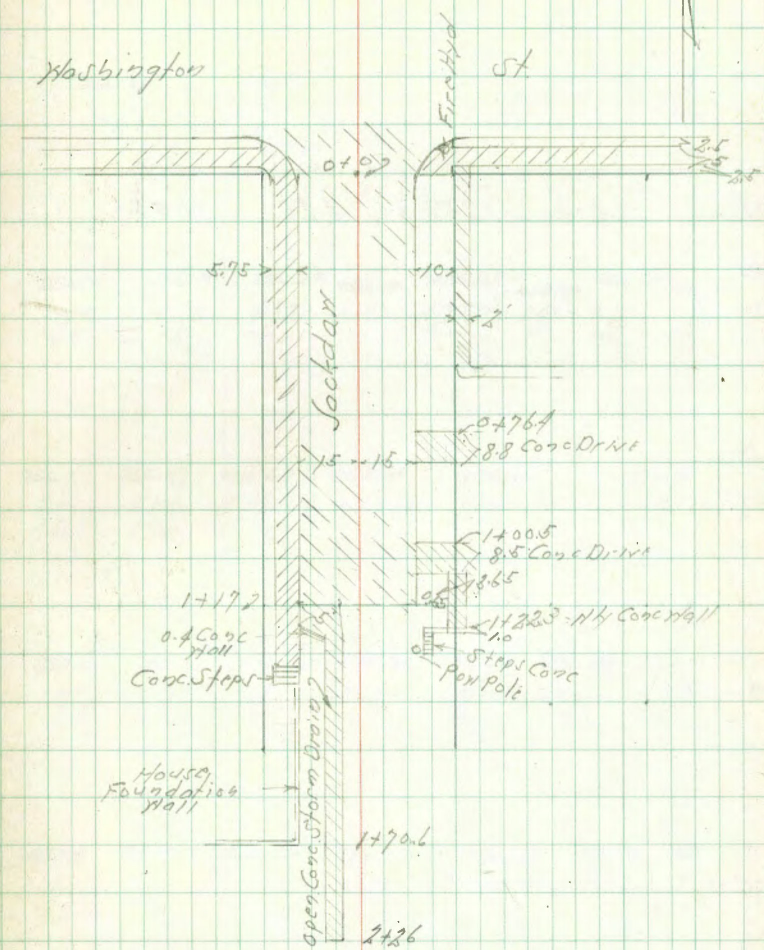
9+75:

229.8	224.0	221.5	214.5	211.3	208.0	205.7	187.7	185.9
+15.3 / 35	+9.5 / 25	+7.0 / 16	0.0	3.2 / 7	6.5 / 16	8.8 / 24	26.8 / 28	28.6 / 40 on Court

214.52 ✓

Cross Section Jackdaw St.
Washington St. to 217 South
Levels Next Page

June 26-43
Sisson
Bliss
Begg



Jackson St.

1+22.3					
TP	4.04	259.85 ✓	6.25	255.81	
1+17	= Sly. Imp				
1+0					
0+50					
0+0 = S.L. Washington					
0-10 = S Cb Line of Washington					
BM	1.04	262.06 ✓		261.02	N.W. B.P. Washington Kite Ingalls

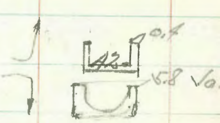
Lt.=E ℄ Rt.=W

1+22.3	256.27 3.61 28.65 = Top Wall Hy Hand	256.10 3.75 16.6 = Whi Conc Wall							
1+17	256.2 5.9 25	255.81 6.25 15 = Cb	255.27 6.82 15 = Gut	255.76 6.30	255.69 6.37 5.8 = El Conc Drain	255.06 7.00 13	255.27 6.79 15 = Gut	255.97 6.12 15 = Cb	256.9 5.7 25
1+0	256.1 6.0 25	256.03 6.03 15 = Cb	255.57 6.49 15 = Gut	255.89 6.17	255.31 6.75 15 = Gut in Drive	256.5 5.6 25			
0+50	257.2 4.9 25	256.76 5.30 15 = Cb	256.09 5.97 15 = Gut	256.38 5.68	255.65 6.41 15 = Gut	256.26 5.80 15 = Cb	257.06 5.0 25		
0+0	257.8 4.3 25 = Whi Conc Walk	257.52 4.54 15 = Cb	256.78 5.28 15 = Gut	256.97 5.09	256.05 6.01 15 = Gut	256.86 5.20 15 = Cb	257.1 5.0 25		
0-10	257.45 4.61 25 = Cb	257.03 5.03 25 = Gutter	257.07 4.99 15	257.05 5.01	256.32 5.74 13	256.16 5.90 25 = Gut	256.95 5.11 25 = Cb		

259.85

262.06 ✓

TP	1.45	239.80 ✓	11.76	238.35	
1+78	= Sly House on Rt.				
1+65	= 4.2 Conc Open Flume 5.8 " " "				
1+50					
1+45			2.40	247.71	Elev. Basement Floor House on E Lt.
TP	1.29	250.11 ✓	11.03	248.82	
1+35					
1+28	15.5 Lt of ℄ = Pow Pole				
1+26					
1+23					



259.85

Lt. ℄ Rt

229.4	235.6	236.7	237.9	237.8	241.7	243.28	242.36	243.31	243.0	243.6	243.3
20.7 / 50	14.5 / 25	13.4 / 20	12.2 / 15	12.3	8.7 / 4	6.83 / 4.4 = Top	7.75 / 6.5 = Bot	6.80 / 8.8 = Top	7.1 / 11 = SE Cor House Porch	7.1 / 7.5	6.8 / 4.5

232.8	239.4	241.4	241.9	244.1	244.41	245.29	246.19	246.0	249.39	249.5
17.3 / 50	10.7 / 25	8.7 / 18	8.2 / 15	6.0	3.70 / 3.3 = Top	4.82 / 5.4 = Bot	3.92 / 7.5 = Top	4.1 / 11 = Fl / Porch	0.72 / 11 = Floor Porch	5.6 / 15

237.0	240.0	244.2	246.3	248.7	250.1	248.66	250.36	249.3
13.1 / 50	10.1 / 40	5.9 / 25	3.8 / 15	1.4	0.0 / 3.2 = Top	1.45 / 5.6 = Bot	+0.25 / 8.7 = Top	0.8 / 15 = Ground Conc Found

250.11 ✓

248.9	249.0	251.1	253.8	253.6	253.84	252.19	254.08	253.4	255.29	255.99	256.85
11.0 / 28.6 = W'ly House	10.9 / 25	8.8 / 16	6.1 / 15	6.2 / 0.0	6.01 / 3.5 = Top	7.71 / 6 Bot	5.77 / 8.5 = Top	6.5 / 11 = Ground	4.56 / 11 = S'ly Conc Wall	3.86 / 15 = S'ly Top Cb	2.0 / 25

1.56 / 15 = Porch Floor 258.29

250.1	250.9	253.8	256.5	255.6	255.7	254.07	255.78	255.97	256.3
9.8 / 28.6 = W'ly House	9.0 / 25	6.1 / 15	4.4 / 8	4.3	4.20 / 8.5 = Top Drain	5.78 / 6.4 Bot Drain	4.07 / 9.3 = Top Drain	3.88 / 15 = Cb	3.6 / 25

251.4	253.1	255.9	255.7	255.70	254.74	254.83	255.99	256.3
8.5 / 28.6 = W'ly House	6.8 / 20	4.0 / 15	4.2	4.15 / 4 = E'ly Drain	5.11 / 10	5.02 / 14 = Top Drain	3.86 / 14 = Top Wall	3.6 / 25

259.85

Station	BS	HI	FS	Elev	Remarks
For Check			4.91	230.91 ✓	on Rock 12' Rt 4+50 O Line Page 95
TP	1.53	235.82 ✓	5.51	234.29	
2+26	= Sly of Storm Drain				
2+17	= Approx ℄ of "O" Line				
1+98	= Break Grade of Storm Drain				

Lt ℄ Rt

2+26: 230.65 (9.15, 9' = Top Wall of Drain) 229.65 (10.15, 11.1 = Bot) 230.76 (9.04, 13.2 = Top)

2+17: 219.5 (20.3 / 50) 226.3 (13.5 / 25) 228.6 (11.2 / 15) 230.3 (9.5) 233.4 (6.4 / 5) 233.22 (6.58, 8.2 = Top) 232.29 (7.51, 10.3 = Bot) 233.33 (6.47, 12.4 = Top) 234.4 (5.4 / 16) 235.4 (4.4 / 25) 234.8 (5.0 / 40)

1+98: 223.8 (16.0 / 50) 230.7 (9.1 / 25) 232.5 (7.3 / 15) 233.5 (6.3 / 10) 233.3 (6.5 / 5) 234.3 (5.5) 238.1 (1.7 / 6) 239.05 (0.75, 6.6 = Top) 237.96 (1.84, 8.7 = Bot) 239.09 (0.71, 10.8 = Top) 239.74 (0.6 / 25) 238.80 (1.0 / 40)

239.80

239.80 ✓

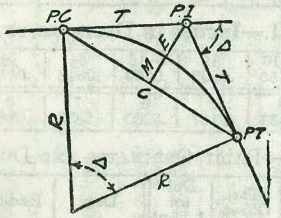
Floor Elevations of Houses South Side of Washington St. Between Hawk + Ibis

See Sketch Page 1

BM	4.94	265.48 ✓		260.54	N.E.B.P. Washington + Ibis
House "A"	Street Floor		2.41	263.07	
House B	"	"	2.94	262.54	
House C	"	"	3.37	262.11	
House D	"	"	3.32	262.16	
TP	4.17	257.76 ✓	11.89	253.59	
House D	Basement Floor		4.41	253.35	
House C	"	"	4.00	253.76	

Notes Reduced Pg. 67 to 79 [initials]
6-28-93

DIETZGEN'S RAILROAD CURVE AND REDUCTION TABLES



1299
309
1608

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$\frac{\Delta}{2}$ (3) Length of Curve=L=$100\frac{\Delta}{D}$ (4)

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

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

Long Chord=C=2 R sin.$\frac{\Delta}{2}$ (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	⅛	3-16	¼	5-16	⅜	½	⅝	¾	⅞
.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 VI.—Corrections for Sub-Chords and Long Chords.

D	FOR SUB-CHORDS ADD 10	20	30	40	50	60	70	80	90	Excess of arc per 100 ft.	D	LONG CHORDS 200	300	400	500
4°	.00	.00	.01	.01	.01	.01	.01	.01	.00	.02	1	199.99	299.97	399.92	499.85
6	.00	.01	.01	.02	.02	.02	.02	.01	01	.05	2	199.97	299.88	399.70	499.39
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	.05	.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 32	30	28	26	24	22	20	Deg. of Curve	LENGTH OF RAILS. 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=slope distance—slope distance (1—Cos. V. A.). Thus for slope distance of 248.7 ft. and V. A. of 4° 20′ from Table VIII Cos=.99714 and correction=1—.99714=.00286 per foot or total of .286× 2½ (near enough)=.57 and horizontal distance=248.7—.57=248.13 ft.

TRIGONOMETRICAL FORMULAS.

See fig. (a).

sin. $A=\frac{a}{c}$

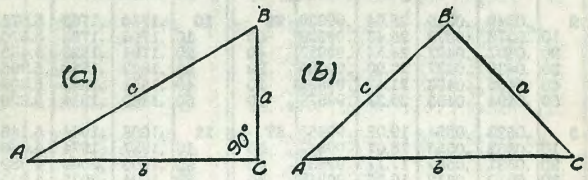
cos. $A=\frac{b}{c}$

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	$\sin. A=\frac{a}{c}$, $\cos. B=\frac{a}{c}$, $b=\sqrt{(c+a)(c-a)}$
a, b	A, B, c	$\tan. A=\frac{a}{b}$, $\cot. B=\frac{a}{b}$, $c=\sqrt{a^2+b^2}$.
A, a	B, b, c	$B=90°-A$, $b=a \cot. A$, $c=\frac{a}{\sin. A}$.
A, b	B, a, c	$B=90°-A$, $a=b \tan. A$, $c=\frac{b}{\cos. A}$.
A, c	B, a, b	$B=90°-A$, $a=c \sin. A$, $b=c \cos. A$
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	If $s=\frac{1}{2}(a+b+c)$, $\sin. \frac{1}{2}A=\sqrt{\frac{(s-b)(s-c)}{bc}}$; $\cos. \frac{1}{2}A=\sqrt{\frac{s(s-a)}{bc}}$, $\tan. \frac{1}{2}A=\sqrt{\frac{(s-b)(s-c)}{s(s-a)}}$; $\sin. A=\frac{2\sqrt{(s-a)(s-b)(s-c)\,s}}{bc}$
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	$s=\frac{1}{2}(a+b+c)$, $\text{area}=\sqrt{s(s-a)(s-b)(s-c)}$

Table VIII.—Natural Trigonometrical Functions.

Angle	Sine.	Tan.	Cotg.	Cosin.		Angle	Sine.	Tan.	Cotg.	Cosin.	
°						°					
0	0	0	00	1	90	8	.1392	.1405	7.115	.99027	82
10	.0029	.0029	343.8	1	50	10	.1421	.1435	6.968	.98986	50
20	.0058	.0058	171.9	.99998	40	20	.1449	.1465	6.827	.98944	40
30	.0087	.0087	114.6	.99996	30	30	.1478	.1495	6.691	.98902	30
40	.0116	.0116	85.94	.99993	20	40	.1507	.1524	6.561	.98858	20
50	.0145	.0145	68.75	.99989	10	50	.1536	.1554	6.435	.98814	10
1	.0175	.0175	57.29	.99985	89	9	.1564	.1584	6.314	.98769	81
10	.0204	.0204	49.10	.99979	50	10	.1593	.1614	6.197	.98723	50
20	.0233	.0233	42.96	.99973	40	20	.1622	.1644	6.084	.98676	40
30	.0262	.0262	38.19	.99966	30	30	.1650	.1673	5.976	.98629	30
40	.0291	.0291	34.37	.99958	20	40	.1679	.1703	5.871	.98580	20
50	.0320	.0320	31.24	.99949	10	50	.1708	.1733	5.769	.98531	10
2	.0349	.0349	28.64	.99939	88	10	.1736	.1763	5.671	.98481	80
10	.0378	.0378	26.43	.99929	50	10	.1765	.1793	5.576	.98430	50
20	.0407	.0407	24.54	.99917	40	20	.1794	.1823	5.485	.98378	40
30	.0436	.0437	22.90	.99905	30	30	.1822	.1853	5.396	.98325	30
40	.0465	.0466	21.47	.99892	20	40	.1851	.1883	5.309	.98272	20
50	.0494	.0495	20.21	.99878	10	50	.1880	.1914	5.226	.98218	10
3	.0523	.0524	19.08	.99863	87	11	.1908	.1944	5.145	.98163	79
10	.0552	.0553	18.07	.99847	50	10	.1937	.1974	5.066	.98107	50
20	.0581	.0582	17.17	.99831	40	20	.1965	.2004	4.989	.98050	40
30	.0610	.0612	16.35	.99813	30	30	.1994	.2035	4.915	.97992	30
40	.0640	.0641	15.60	.99795	20	40	.2022	.2065	4.843	.97934	20
50	.0669	.0670	14.92	.99776	10	50	.2051	.2095	4.773	.97875	10
4	.0698	.0699	14.30	.99756	86	12	.2079	.2126	4.705	.97815	78
10	.0727	.0729	13.73	.99736	50	10	.2108	.2156	4.638	.97754	50
20	.0756	.0758	13.20	.99714	40	20	.2136	.2186	4.574	.97692	40
30	.0785	.0787	12.71	.99692	30	30	.2164	.2217	4.511	.97630	30
40	.0814	.0816	12.25	.99668	20	40	.2193	.2247	4.449	.97566	20
50	.0843	.0846	11.83	.99644	10	50	.2221	.2278	4.390	.97502	10
5	.0872	.0875	11.43	.99619	85	13	.2250	.2309	4.331	.97437	77
10	.0901	.0904	11.06	.99594	50	10	.2278	.2339	4.275	.97371	50
20	.0929	.0934	10.71	.99567	40	20	.2306	.2370	4.219	.97304	40
30	.0958	.0963	10.39	.99540	30	30	.2334	.2401	4.165	.97237	30
40	.0987	.0992	10.08	.99511	20	40	.2363	.2432	4.113	.97169	20
50	.1016	.1022	9.788	.99482	10	50	.2391	.2462	4.061	.97100	10
6	.1045	.1051	9.514	.99452	84	14	.2419	.2493	4.011	.97030	76
10	.1074	.1080	9.255	.99421	50	10	.2447	.2524	3.962	.96959	50
20	.1103	.1110	9.010	.99390	40	20	.2476	.2555	3.914	.96887	40
30	.1132	.1139	8.777	.99357	30	30	.2504	.2586	3.867	.96815	30
40	.1161	.1169	8.556	.99324	20	40	.2532	.2617	3.821	.96742	20
50	.1190	.1198	8.345	.99290	10	50	.2560	.2648	3.776	.96667	10
7	.1219	.1228	8.144	.99255	83	15	.2588	.2679	3.732	.96593	75
10	.1248	.1257	7.953	.99219	50	10	.2616	.2711	3.689	.96517	50
20	.1276	.1287	7.770	.99182	40	20	.2644	.2742	3.647	.96440	40
30	.1305	.1317	7.596	.99144	30	30	.2672	.2773	3.606	.96363	30
40	.1334	.1346	7.429	.99106	20	40	.2700	.2805	3.566	.96285	20
50	.1363	.1376	7.269	.99067	10	50	.2728	.2836	3.526	.96206	10
					82						74
	Cosin.	Cotg.	Tan.	Sine.	Angle.		Cosin.	Cotg.	Tan.	Sine.	Angle.

33+99,98

Table VIII.—Natural Trigonometrical Functions.

Angle	Sine.	Tan.	Cotg.	Cosin.		Angle	Sine.	Tan.	Cotg.	Cosin.	
°						°					
16	.2756	.2867	3.487	.96126	74	24	.4067	.4452	2.246	.91355	66
10	.2784	.2899	3.450	.96046	50	10	.4094	.4487	2.229	.91236	50
20	.2812	.2931	3.412	.95964	40	20	.4120	.4522	2.211	.91116	40
30	.2840	.2962	3.376	.95882	30	30	.4147	.4557	2.194	.90996	30
40	.2868	.2994	3.340	.95799	20	40	.4173	.4592	2.177	.90875	20
50	.2896	.3026	3.305	.95715	10	50	.4200	.4628	2.161	.90753	10
17	.2924	.3057	3.271	.95615	73	25	.4226	.4663	2.145	.90631	65
10	.2952	.3089	3.237	.95545	50	10	.4253	.4699	2.128	.90507	50
20	.2979	.3121	3.204	.95459	40	20	.4279	.4734	2.112	.90383	40
30	.3007	.3153	3.172	.95372	30	30	.4305	.4770	2.097	.90259	30
40	.3035	.3185	3.140	.95284	20	40	.4331	.4806	2.081	.90133	20
50	.3062	.3217	3.108	.95195	10	50	.4358	.4841	2.066	.90007	10
18	.3090	.3249	3.078	.95106	72	26	.4384	.4877	2.050	.89879	64
10	.3118	.3281	3.048	.95015	50	10	.4410	.4913	2.035	.89752	50
20	.3145	.3314	3.018	.94924	40	20	.4436	.4950	2.020	.89623	40
30	.3173	.3346	2.989	.94832	30	30	.4462	.4986	2.006	.89493	30
40	.3201	.3378	2.960	.94740	20	40	.4488	.5022	1.991	.89363	20
50	.3228	.3411	2.932	.94646	10	50	.4514	.5059	1.977	.89232	10
19	.3256	.3443	2.904	.94552	71	27	.4540	.5095	1.963	.89101	63
10	.3283	.3476	2.877	.94457	50	10	.4566	.5132	1.949	.88968	50
20	.3311	.3508	2.850	.94361	40	20	.4592	.5169	1.935	.88835	40
30	.3338	.3541	2.824	.94264	30	30	.4617	.5206	1.921	.88701	30
40	.3365	.3574	2.798	.94167	20	40	.4643	.5243	1.907	.88566	20
50	.3393	.3607	2.773	.94068	10	50	.4669	.5280	1.894	.88431	10
20	.3420	.3640	2.747	.93969	70	28	.4695	.5317	1.881	.88295	62
10	.3448	.3673	2.723	.93869	50	10	.4720	.5354	1.868	.88158	50
20	.3475	.3706	2.699	.93769	40	20	.4746	.5392	1.855	.88020	40
30	.3502	.3739	2.675	.93667	30	30	.4772	.5430	1.842	.87882	30
40	.3529	.3772	2.651	.93565	20	40	.4797	.5467	1.829	.87743	20
50	.3557	.3805	2.628	.93462	10	50	.4823	.5505	1.816	.87603	10
21	.3584	.3839	2.605	.93358	69	29	.4848	.5543	1.804	.87462	61
10	.3611	.3872	2.583	.93253	50	10	.4874	.5581	1.792	.87321	50
20	.3638	.3906	2.560	.93148	40	20	.4899	.5619	1.780	.87178	40
30	.3665	.3939	2.539	.93042	30	30	.4924	.5658	1.767	.87036	30
40	.3692	.3973	2.517	.92935	20	40	.4950	.5696	1.756	.86892	20
50	.3719	.4006	2.496	.92827	10	50	.4975	.5735	1.744	.86748	10
22	.3746	.4040	2.475	.92718	68	30	.5000	.5774	1.732	.86603	60
10	.3773	.4074	2.455	.92609	50	10	.5025	.5812	1.720	.86457	50
20	.3800	.4108	2.434	.92499	40	20	.5050	.5851	1.709	.86310	40
30	.3827	.4142	2.414	.92388	30	30	.5075	.5890	1.698	.86163	30
40	.3854	.4176	2.394	.92276	20	40	.5100	.5930	1.686	.86015	20
50	.3881	.4210	2.375	.92164	10	50	.5125	.5969	1.675	.85866	10
23	.3907	.4245	2.356	.92050	67	31	.5150	.6009	1.664	.85717	59
10	.3934	.4279	2.337	.91936	50	10	.5175	.6048	1.653	.85567	50
20	.3961	.4314	2.318	.91822	40	20	.5200	.6088	1.643	.85416	40
30	.3987	.4348	2.300	.91706	30	30	.5225	.6128	1.632	.85264	30
40	.4014	.4383	2.282	.91590	20	40	.5250	.6168	1.621	.85112	20
50	.4041	.4417	2.264	.91472	10	50	.5275	.6208	1.611	.84959	10
					66						58
	Cosin.	Cotg.	Tan.	Sine.	Angle.		Cosin.	Cotg.	Tan.	Sine.	Angle.

Table VIII.—Natural Trigonometrical Functions.

Angle	Sine.	Tan.	Cotg.	Cosin.		Angle	Sine.	Tan.	Cotg.	Cosin.	
°						°					
32	.5299	.6249	1.600	.84805	58	30	.6225	.7954	1.257	.78261	30
10	.5324	.6289	1.590	.84650	50	40	.6248	.8002	1.250	.78079	20
20	.5348	.6330	1.580	.84495	40	50	.6271	.8050	1.242	.77897	10
30	.5373	.6371	1.570	.84339	30						
40	.5398	.6412	1.560	.84182	20	39	.6293	.8098	1.235	.77715	51
50	.5422	.6453	1.550	.84025	10	10	.6316	.8146	1.228	.77531	50
						20	.6338	.8195	1.220	.77347	40
33	.5446	.6494	1.540	.83867	57	30	.6361	.8243	1.213	.77162	30
10	.5471	.6536	1.530	.83708	50	40	.6383	.8292	1.206	.76977	20
20	.5495	.6577	1.520	.83549	40	50	.6406	.8342	1.199	.76791	10
30	.5519	.6619	1.511	.83389	30						
40	.5544	.6661	1.501	.83228	20	40	.6428	.8391	1.192	.76604	50
50	.5568	.6703	1.492	.83066	10	10	.6450	.8441	1.185	.76417	50
						20	.6472	.8491	1.178	.76229	40
34	.5592	.6745	1.483	.82904	56	30	.6494	.8541	1.171	.76041	30
10	.5616	.6787	1.473	.82741	50	40	.6517	.8591	1.164	.75851	20
20	.5640	.6830	1.464	.82577	40	50	.6539	.8642	1.157	.75661	10
30	.5664	.6873	1.455	.82413	30						
40	.5688	.6916	1.446	.82248	20	41	.6561	.8693	1.150	.75471	49
50	.5712	.6959	1.437	.82082	10	10	.6583	.8744	1.144	.75280	50
						20	.6604	.8796	1.137	.75088	40
35	.5736	.7002	1.428	.81915	55	30	.6626	.8847	1.130	.74896	30
10	.5760	.7046	1.419	.81748	50	40	.6648	.8899	1.124	.74703	20
20	.5783	.7089	1.411	.81580	40	50	.6670	.8952	1.117	.74509	10
30	.5807	.7133	1.402	.81412	30						
40	.5831	.7177	1.393	.81242	20	42	.6691	.9004	1.111	.74314	48
50	.5854	.7221	1.385	.81072	10	10	.6713	.9057	1.104	.74120	50
						20	.6734	.9110	1.098	.73924	40
36	.5878	.7265	1.376	.80902	54	30	.6756	.9163	1.091	.73728	30
10	.5901	.7310	1.368	.80730	50	40	.6777	.9217	1.085	.73531	20
20	.5925	.7355	1.360	.80558	40	50	.6799	.9271	1.079	.73333	10
30	.5948	.7400	1.351	.80386	30						
40	.5972	.7445	1.343	.80212	20	43	.6820	.9325	1.072	.73135	47
50	.5995	.7490	1.335	.80038	10	10	.6841	.9380	1.066	.72937	50
						20	.6862	.9435	1.060	.72737	40
37	.6018	.7536	1.327	.79864	53	30	.6884	.9490	1.054	.72537	30
10	.6041	.7581	1.319	.79688	50	40	.6905	.9545	1.048	.72337	20
20	.6065	.7627	1.311	.79512	40	50	.6926	.9601	1.042	.72136	10
30	.6088	.7673	1.303	.79335	30						
40	.6111	.7720	1.295	.79158	20	44	.6947	.9657	1.036	.71934	46
50	.6134	.7766	1.288	.78980	10	10	.6967	.6713	1.030	.71732	50
						20	.6988	.9770	1.024	.71529	40
38	.6157	.7813	1.280	.78801	52	30	.7009	.9827	1.018	.71325	30
10	.6180	.7860	1.272	.78622	50	40	.7030	.9884	1.012	.71121	20
20	.6202	.7907	1.265	.78442	40	50	.7050	.9942	1.006	.70916	10
							.7071	1.	1.	.70711	45
											°
	Cosin.	Cotg.	Tan.	Sine.	Angle.		Cosin.	Cotg.	Tan.	Sine.	Angle.

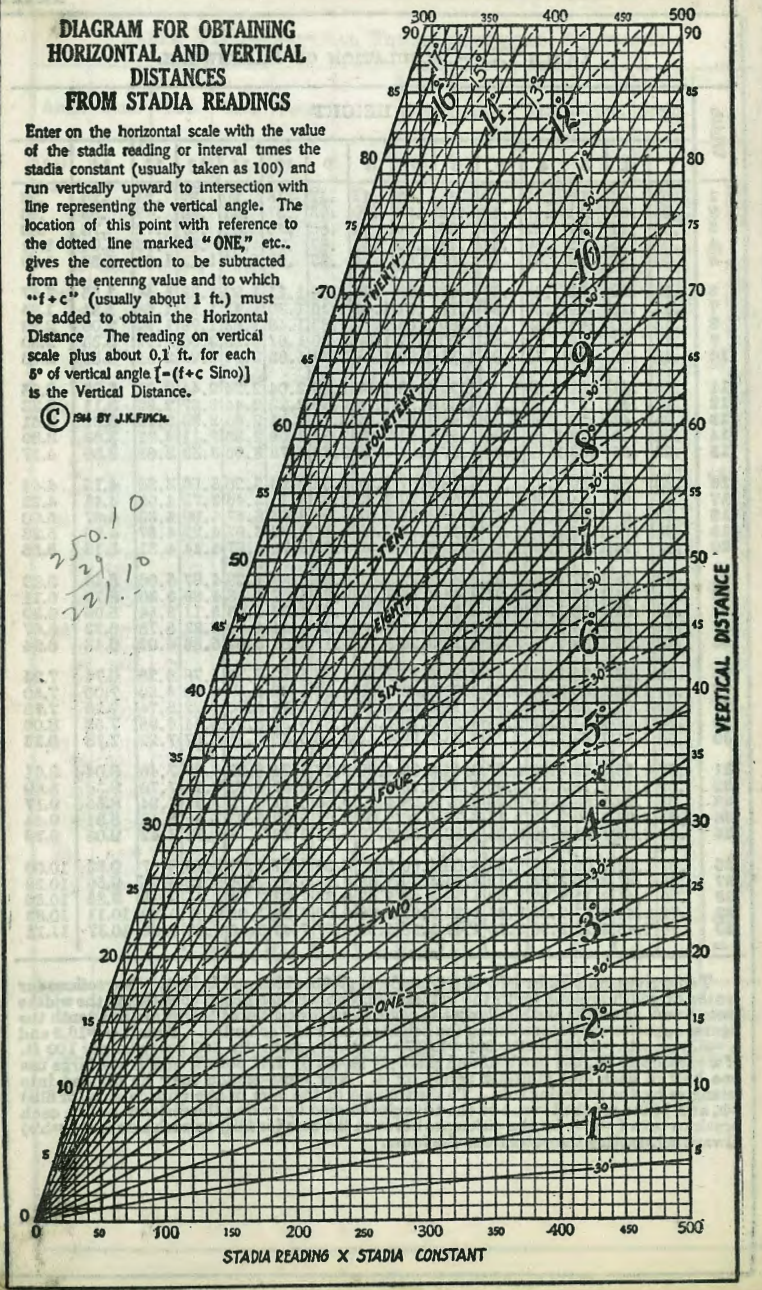
Table IX.—Calculation of Earthwork.

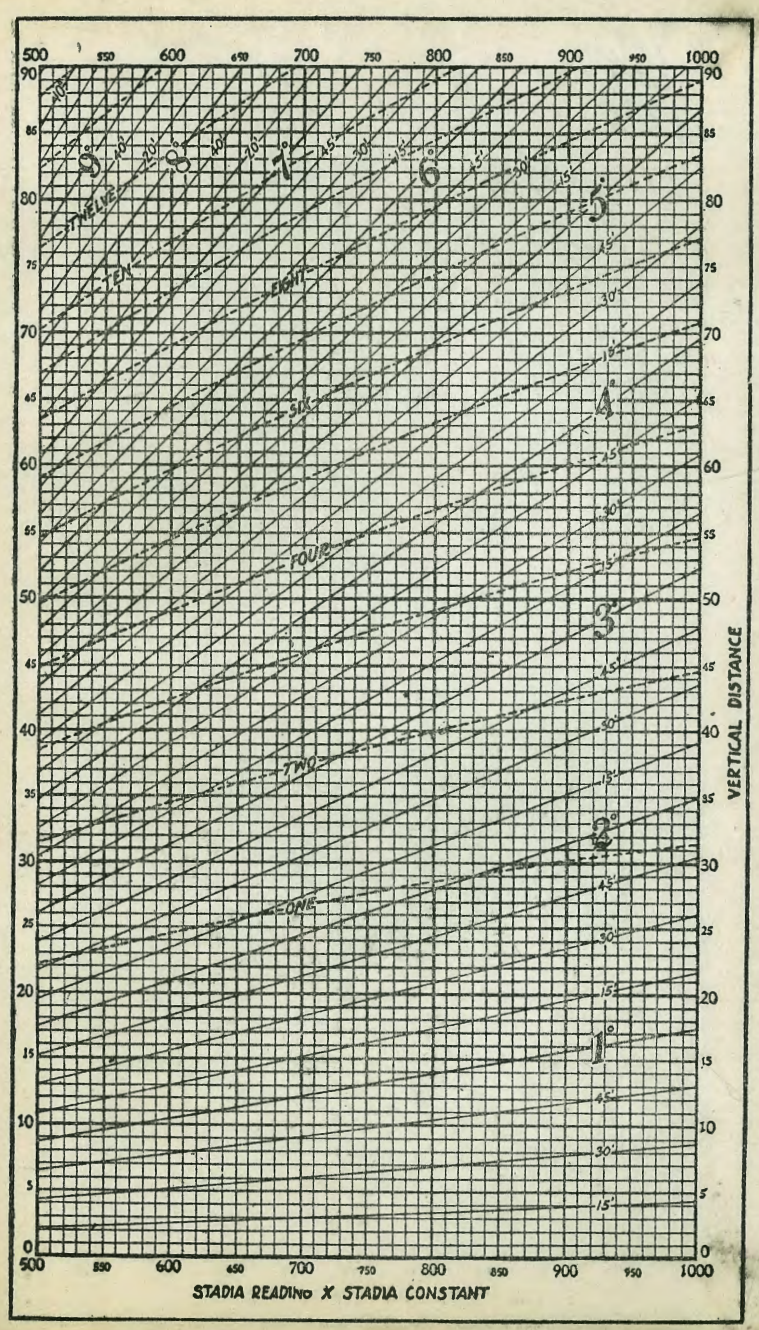
Width	HEIGHT														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	.02	.04	.06	.07	.09	.11	.13	.15	.17	.18	.20	.22	.24	.26	.28
2	.04	.07	.11	.15	.18	.22	.26	.30	.33	.37	.41	.44	.48	.52	.56
3	.06	.11	.17	.22	.28	.33	.39	.44	.50	.56	.61	.67	.72	.78	.83
4	.07	.15	.22	.30	.37	.44	.52	.59	.67	.74	.81	.89	.96	1.04	1.11
5	.09	.19	.28	.37	.46	.56	.65	.74	.83	.93	1.02	1.11	1.20	1.30	1.39
6	.11	.22	.33	.44	.56	.67	.78	.89	1.00	1.11	1.22	1.33	1.44	1.55	1.67
7	.13	.26	.39	.52	.65	.78	.91	1.04	1.16	1.30	1.42	1.55	1.68	1.81	1.94
8	.15	.30	.44	.59	.74	.89	1.04	1.19	1.33	1.48	1.63	1.78	1.92	2.08	2.22
9	.17	.33	.50	.67	.83	1.00	1.17	1.33	1.50	1.67	1.83	2.00	2.17	2.33	2.50
10	.18	.37	.56	.74	.93	1.11	1.30	1.48	1.67	1.85	2.04	2.22	2.41	2.59	2.78
11	.20	.41	.61	.82	1.02	1.22	1.43	1.63	1.83	2.04	2.24	2.44	2.65	2.85	3.06
12	.22	.44	.67	.89	1.11	1.33	1.56	1.78	2.00	2.22	2.44	2.67	2.89	3.11	3.33
13	.24	.48	.72	.96	1.20	1.44	1.68	1.92	2.16	2.41	2.65	2.89	3.13	3.37	3.61
14	.26	.52	.78	1.04	1.30	1.55	1.81	2.08	2.33	2.59	2.85	3.11	3.37	3.63	3.89
15	.28	.56	.83	1.11	1.39	1.67	1.94	2.22	2.50	2.78	3.06	3.33	3.61	3.89	4.17
16	.30	.59	.89	1.18	1.48	1.78	2.07	2.37	2.67	2.96	3.26	3.56	3.85	4.15	4.44
17	.31	.63	.94	1.26	1.57	1.89	2.20	2.52	2.83	3.15	3.46	3.78	4.09	4.41	4.72
18	.33	.67	1.00	1.33	1.67	2.00	2.33	2.67	3.00	3.33	3.67	4.00	4.33	4.67	5.00
19	.35	.70	1.06	1.41	1.76	2.11	2.46	2.82	3.17	3.52	3.87	4.22	4.57	4.92	5.28
20	.37	.74	1.11	1.48	1.85	2.22	2.59	2.96	3.33	3.70	4.07	4.44	4.81	5.18	5.56
21	.39	.78	1.17	1.55	1.94	2.33	2.72	3.11	3.50	3.89	4.28	4.67	5.06	5.44	5.83
22	.41	.81	1.22	1.63	2.04	2.44	2.85	3.26	3.67	4.07	4.48	4.89	5.30	5.70	6.11
23	.43	.85	1.28	1.70	2.13	2.56	2.98	3.41	3.83	4.26	4.68	5.11	5.54	5.96	6.39
24	.44	.89	1.33	1.78	2.22	2.67	3.11	3.56	4.00	4.44	4.89	5.33	5.78	6.22	6.67
25	.46	.92	1.39	1.85	2.31	2.78	3.24	3.70	4.17	4.63	5.09	5.56	6.02	6.48	6.94
26	.48	.96	1.44	1.92	2.41	2.89	3.37	3.85	4.33	4.82	5.30	5.78	6.26	6.74	7.24
27	.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50
28	.52	1.04	1.55	2.07	2.59	3.11	3.63	4.15	4.67	5.18	5.70	6.22	6.74	7.26	7.78
29	.54	1.07	1.61	2.15	2.68	3.22	3.76	4.30	4.83	5.37	5.91	6.44	6.98	7.52	8.06
30	.56	1.11	1.67	2.22	2.78	3.33	3.89	4.44	5.00	5.55	6.11	6.67	7.22	7.78	8.33
31	.57	1.15	1.72	2.30	2.87	3.44	4.02	4.59	5.17	5.74	6.32	6.89	7.46	8.04	8.61
32	.59	1.18	1.78	2.37	2.96	3.56	4.15	4.74	5.33	5.92	6.52	7.11	7.70	8.30	8.89
33	.61	1.22	1.83	2.44	3.05	3.67	4.28	4.89	5.50	6.11	6.72	7.33	7.94	8.55	9.17
34	.63	1.26	1.89	2.52	3.15	3.78	4.40	5.04	5.67	6.29	6.93	7.56	8.18	8.81	9.44
35	.65	1.30	1.94	2.59	3.24	3.89	4.53	5.18	5.83	6.48	7.13	7.78	8.42	9.08	9.72
36	.67	1.33	2.00	2.67	3.33	4.00	4.66	5.33	6.00	6.67	7.33	8.00	8.67	9.33	10.00
37	.68	1.37	2.06	2.74	3.42	4.11	4.79	5.48	6.17	6.85	7.54	8.22	8.91	9.59	10.28
38	.70	1.41	2.11	2.82	3.52	4.22	4.92	5.63	6.33	7.03	7.74	8.44	9.15	9.85	10.56
39	.72	1.44	2.17	2.89	3.61	4.33	5.05	5.78	6.50	7.22	7.95	8.67	9.39	10.11	10.83
40	.74	1.48	2.22	2.96	3.70	4.44	5.18	5.92	6.67	7.41	8.15	8.89	9.63	10.37	11.11

Table gives cu. yds. in 1 ft. of a triangle of given width and height. Corrections for tenths of width are one tenth the values found under each height considering the widths from 1 to 9 as tenths and similarly the corrections for tenths of height are one tenth the figures opposite width considering the heights from 1 to 9 as tenths. Thus if w =16.2 and h =5.3, cu. yds. =1.48+.028+.089 =1.597 cu. yds. or practically 160 cu. yds. per 100 ft. If w exceeds 40 ft., use one half and multiply result by 2, if both w and h are large use one half of each and multiply result by 4. Any cross-section may be divided into triangles by the following rule. To the triangle of the sum of the outside cuts (or fills) =h, and ½ the roadbed =w, add the triangles formed by taking the distance out to each break in turn (=w's) by the difference between the cuts (or fills) on each side of it (=h's) always subtracting the outer from the inner.

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 Sino)] is the Vertical Distance.





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DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

Roadway 16 feet wide. Side Slopes 1 on 1½

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.