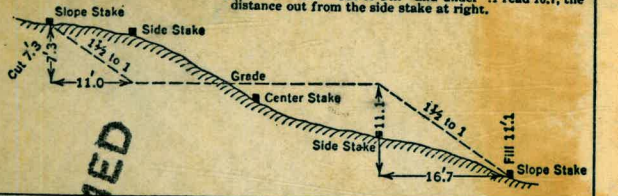
DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

Roadway of any Width. Side Slopes 1½ to 1.

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



Cut or Fill	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	Cut or Fill
	Distance out from Side or Shoulder Stake										
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59 7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

KEUFFEL & ESSER CO., N. Y.

#655

11,083-5. k, m, yc. kM.

573.90
573.17
.73

50) .0146
.7300
50
230
200
300

146

73.17

146
0
730

CHECK BLK #15

556 561.22

556.18 + 0.18 = 561.40

10+23.28 Gr = 561.05

10+20 Gallary Pipe L = 7.3

10+01 D.S. Form cor = .23 0.91 560.31
BLK #13 562.13

454 535.37 539.83
0.22 535.15

cor = .11 Mea. .14

5454.53
2328
43616424
109106
15365.9
109106
125.999384

6667
2328
53336
13334
13334
0.176
1552
4553
61.07

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BLK # 13		1
" # 7		2
" # 13	STAIRWAY	3
" # 18		4
" # 6		5
" # 13		6
" # 4		7
" # 13		8 - 9
" # 12		10
" # 17		11
" # 19		12
" # 20		13
" # 8		14
" # 17		15
" # 13		16
" # 18		17 ~~17 - 19~~
" # 13		18 - 19

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" #5	21	
" #19	22	
" #12	23	
" #13	24	
" #17	25	
" #4	26	
" #11	27	
" #16	28	
" #13	29-30	
" #18	31	
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" #14		47
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" #19	64
" #14	65
" #12	66
" #15	67
" #14	68
" #13	69
" #17	70
" #8	71

Blk 13				9-16-42	1
	9.65	493.22	483.57		
TP			0.58	492.64	Marked Rock Blk #13
9'R-E. on Axis			7.91	485.31	F 3.69 to Tower Wall Gr = 489.0
50°-9'R			8.02	485.20	F 3.80 to " "
" 14.62R			8.06	485.16	F 3.84 to " "
83°-14.62R			8.06	485.16	F 3.80 to " "
"-9'R			8.08	485.14	F 3.86 to
112°-14.62R			8.05	485.17	F 3.83 to " "
" 9'R			8.16	485.08	F 3.92 to " "
141°-14.62R			8.16	485.08	F 3.92 to " "
" 9'R			8.09	485.13	F 3.87 to " "
3' W. Axis W. 14.62R			8.16	485.06	F 3.92 to " "
W. Axis 9'R.			7.78	485.44	F 3.56 to " "
9+40			2.16	491.06	F 7.16 to Bott Fillet 17.26 N.A. Gr = 498.20
TP	0.52	493.16		492.64	
			4.49		
			~~3.49~~	488.67	C to off on Pipes Tower Forms Gr = 488.67

Blk# 7		Elevs.			2
B.M.	0.56	540.34		539.78	
T.P.	4.73	540.40	4.67	535.67	
check on B.M.			0.62	539.78	= 539.78
6+23.25			5.56	534.84	F 5.16 to El 540° (Guide wall)
℄			5.43	534.97	F 5.03 " " "
CHECK FORMS					
	~~5.23~~	~~540.90~~		535.67	
	4.95	540.62			
			0.52	540.10	Point on D.S. FORM. 86.03 S D-86.03
Elevs					
T.P.	4.89	~~545.05~~ 11		~~540.16~~ 22	~~Marked Rock Blk 7~~
			~~4.89~~	~~540.16~~ 22	~~F 4.... to El 545° = 82.30 S~~ 82.30
			~~4.57~~	~~540.42~~	~~CHECK on old form 85.75 S. D = 85.78~~
	5.40	545.18		539.78	
			4.98	540.20	F 4.80 to El. 545° 82.30 S (48 / 4.98)

Rogers

9-16-42 3

Blk # 13 STAIRWAY BLOCK

B.M.	5.40	490.05		484.65		
			10.05	480.00	F 5.00 ~~4.99~~ to El 485.0	N.E Cor
			7.17	482.88	F 2.12 " " "	S.E Cor
			8.73	481.32	F 3.68 " " "	S.W. Cor
	3.29	487.94	5.40	484.65		
			10.81	477.13	F 7.87 to " "	N. " "

Blk # 18

9-17-42 1

B.M.	12.53	587.86		575.33	
11+75			12.62	575.24	F 6.49 to Top Fillet 4.33 N. Gr 481.23
+70			12.43	575.43	F 4.57 to El. 480° 4.50 N.
+95.76			3.02	584.84	F 15.16 to Top Fillet 2.50 N. Gr = 600.00
"			2.63	585.23	F 6.34 to Bott. " 2.02 N. Gr = 591.57
TP.		2.63		585.23	Point on Rock Blk # 18

CHECK FORMS

9-22-42

BM	5.29	580.62		575.33	
			+1.08	581.70	Top of Fillet 4.33 N. Gr = 481.73

LOCATION & ELEV. OF GROUT HOLES

Hole #				
18-29			3.22	577.40	Sta 11+79 19° S Axis } Copied EB. # 618 P 21
18-~~26~~ 27.7			3.45	577.17	Top of Grout Pipe }
Elevs					
	9.87	591.01		581.14	
11+85			10.86	580.15	F 10.38 to Top Fillet 3.45 N Gr = 590.53
—			10.79	580.22	F 4.58 to El 585° 5.11 S
—	cont'd	P 17	9.90	581.11	DS. Toe Conc. 5.10 S.
E			10.95	580.06	F 4.94 to El 585° 4° H.

Blk # 6 CHECK FORMS				
B.M.	10.76	550.52		539.78
6+20			0.40	550.12
ELEVS.				
BM	13.09	552.87		539.78
TP	2.17	552.56	2.48	550.39
B.M.			12.78	539.78
TP	4.59	554.98		550.39
6+20			4.91	550.07
℄			4.85	550.13
6+20			4.98	550.00
℄			4.76	550.22
CHECK FORMS				
	5.03	555.42		550.39
			0.00	555.42

9-20-42

Marked Rock Blk # 5 = 539.78

F 4.93 to El 555° 7° N.

F 4.87 to El. 555° 7° N. Axis

F 5.00 to " " 73.95 S.

F 4.78 to " " " "

10-16-42

Point on D.S Form 73.645 D = 73.64

Rogers

9-18-42 6.

Bit #13

B.M.	0.28	497.92	497.64
	7.49	485.43	= 485.44 CHECK on Fill Point
	2.92	489.00	Bottom of Tower Walls
	2.88	489.04	Grade Strip Valve Bracket

Blk #4 ELEVS

B.M.	1.01	610.14		609.10	
T.P.	4.91	610.04	5.01	605.13	
B.M.			0.94	609.10	
5+20				604.95	F 5.05 to El 610° 2° N
℄				605.02	F 4.98 to El 610° 2° N.
5+20				604.84	F 5.16 to " " 32.1 S.
℄				604.89	F 5.11 to " " "

CHECK FORMS 9-23-62

	5.16	620.29		605.13	
				620.09	Point on D.S. Form 33.11 S. D = 32.08

9-25-62

Elevs

B.M.	4.31	614.92		610.61	
℄				610.12	F 4.88 to El 615° 1.7 N.
5+21				610.04	F 4.96 to " " "
A				609.95	F 5.05 to " " 28.3 S
℄				609.89	F 5.11 to " " "

Block #13 - Forms

B.M. 639 499.03 19		492.64		
9R-W-1' south	8.92	490.11	F = 4 89	To Elev 495.00
10RW-On Axis	8.87	490.16	F = 4 84	" " "
13RW-On Axis	8.95	490.08	F = 4 92	" " "
15.25W on Axis	9.01	490.02	F = 4 98	" " "
9RE-1' south	8.91	490.12	F = 4 88	" " "
10RE-On Axis	8.96	490.07	F = 4 93	" " "
10R ~ 54°	9.14	489.89	F = 5 11	" " "
13.5R ~ 54°	9.03	490.00	F = 5 00	" " "
10R ~ 83°	9.21	489.82	F = 5 18	" " "
13.5 ~ 83°	9.19	489.84	F = 5 16	" " "
10R ~ 141°	9.16	489.87	F = 5 13	" " "
13.5R ~ 141°	9.16	489.87	F = 5 13	" " "
9+25.68	9.12	489.91	12.64 N - F = 8 72	To Grade = 498.63
9+29.16	8.80	490.23	17.98 N - F = 0 66	" " = 490.89
9+40	8.98	490.05	11.63 N - F = 18 60	" " 508.65
9+40	7.97	491.06	17.24 N - F = 7 14	" " 498.20

Block #13 Forms

499.03

	6.02	493.01	
℄ Outlet Valve	6.02	493.01	Top of brass
	6.02	493.01	
	6.02	493.01	
℄ Power Conduits	8.62	490.41	29.29 From Valve Chamber
			F = 5.61 To Grade = 496.02
			9-22-42
B.M. 2.47 495.11		492.64	
	1.17	493.94	Cut off for Gallery Sophet (3½" allowance
	5.42	489.69	
	+0.39	496.50	
	6.20	488.91	F = 6.09 to El 495 - 119.55 S.
"I" Beam Grader			
B.M. 2.57 495.21		492.64	
	1.21	494.00	Top of "I" Beam

Block #12 - Check Forms

Sept. 21st 10

BM. 783 506.02

0.59

Elevs

12.35 510.54

℄

8+79

8+97.25

℄

Elevs

BM 12.04 510.63

Elevs

3.44 514.96

4.80 512.08

498.19

505.43

498.19

5.57 504.97

5.44 505.10

5.41 505.13

5.60 504.90

498.19

0.49 510.14

+2.39 513.02

511.52

4.68 510.28

3.56 511.52

4967.5 @ 126.01

9-23-12

F 5.03 to El. 510.0 115' N. Axis

F 4.90 to " " " "

F 4.87 to " " 108.90 S.

F 5.10 to " " " "

9-28-12

Point on DS Form 108.825 D: 108.80

Top of Inside Wall Cont. Joint 112.885

9-29-12

Blk #17

Pipe Boxes on Cont. Joints

BM	2.52	575.63	568.11	
11+00		3.21	572.22	Bottom of Lower Box
"		+8.76	584.39	Top of Upper Box
B.M.	5.09	580.42	575.33	
11+50		1.61	578.81	Bottom of Lower Box
		+12.09	592.51	Top " Upper "

CHECK FORMS 9-22-42

B.M.	9.73	600.57	590.84	
11+00		0.21	600.36	Point on Form 39.56 S. D= 39.58
+50		0.28	600.29	" " 39.32 S. D= 39.51
11+10±		3.66	596.91	Top of Grout Pipe on Axis } Copied F.B. #618 P. 21
11+36±		4.25	596.32	" " " " " " }

~~LOCATION OF GROUT HOLE~~

~~Hole # 18-39~~ A-17-23	3.27		~~STA 11+80 19° S. Axis~~
S. of Axis ℄	3.20	597.17	" of Gr. of Pipe "

Rogers

B.L.#19 CHECK FORMS 9-22-47 12

B.M.	3.37	614.97		611.60	
12+00			4.60	610.37	Point on Form 31.86 D=31.87
+10			3.13	611.84	Gr.=611.78
Elevs.					9-24-47
	3.49	615.09		611.60	
12+01			5.09	610.00	F 5.00 to El. 615° 1.75 N.
"			4.93	610.16	F 4.84 to " " 28.35 S.
12+10			5.09	610.00	F 4.98 to " " 1.75 N.
+25			1.58	613.51	F 5.69 to Bot. Fillet 4.47 N. Gr. 619.20
"			2.86	612.23	F 13.89 to Top. " 1.19 N. Gr.=626.12
+40					F to " " 0.80 N. " =633.92
"					to Bot. " 4.08 Gr.=627.00
12+01			5.08	610.01	F 3.98 to Invert 11° S. Gr.=613.99
+07.77			5.06	610.03	F 8.07 to Invert 11° S. Gr.=618.50

Blk #20 CHECK FORMS

~~B.M.~~	12,50	647.80	635.26	
12+70		+2.19	649.99	Top of Fillet Form On Axis Gr = 650.00
—		2.69	645.11	" of DS. Form
12+80		2.78	645.02	" " "
	12,87	648.13	635.26	
12+51		3.03	645.10	F 4.90 to El 650° on Axis
12+70		2.86	645.27	F 4.73 to " " 1° S. Axis
—		2.84	645.29	F 4.71 to " " 13° S. "
12+51		3.05	645.08	F 4.92 to " " 13° S

Rogers

9-23-42 14

Blk #8 CHECK Forms

B.M.	4.78	550.91			546.13
64+85				0.25	550.16
74+13				0.84	550.07
Elevs					
B.M.	13.28	553.06			539.78
T.P.	2.99	552.72	2.83		550.23
B.M.			12.94		539.78
T.P.	4.25	554.98			550.23
x/				4.92	550.06
E				0.90	550.08
E				4.85	550.13
x/				4.90	550.08
—				5.06	549.92
CHECK FORMS					
	5.20	555.43			550.23
74+13				+0.10	555.53
64+85				+0.19	555.62

Point on Form 78.36 S. D=78.38

" " " 78.43 S. D=78.45

Marked Rock Blk. #8

= 539.78

F 4.92 to E/ 55 E = 7° N

F 4.92 " " 7° N

E 4.87 to " " 74.70 S. (offset 55 E)

F 4.92 to " " " "

F 5.08 to " " " "

10-12-42

Point on D.S. Form D=20.26 D=74.30

D=74.47

Blk #17

B.M.	12.34	603.18			590.84	
T.P.	0.93	602.76	135		601.83	Marked Rock outside (S) Blk 17
B.M.			1193		590.83	=590.84
11+99				2.75	600.01	F 4.99 to E 1.605° 2.25 N
"				2.77	599.99	F 5.01 to " " 3.75 S
11+01				2.68	600.08	F 4.92 to " " 2.25 N.
——				2.74	600.02	F 4.98 to " " 3.75 S.
11+01				2.67	600.10	F F 4.86 to " " " "
CHECK FORMS						
B.M.	3.67	605.50			601.83	
11+01				0.26	605.24	Point on from 35.78 D = 35.78
11+99				0.29	605.21	Point 35.82 S. D = 35.79
				3.0	602.5	Top of Grout Pipe S. Axis ℄ Blk
						76.2
						393
						3.69
Gallery STAIRS						
	7.39	575.50			568.11	
11+00				0.90	576.40	GRADE Mark Floor of Gallery Gr 576.40
	8.31	589.95			581.10	
11+99				7.62	582.33	Top of stairs

Blk #13

BM.	5.94	498.58		492.64	
			3.58	495.00	Top of Pour.
TP.	2.99	495.63	5.94	492.64	
			0.60	495.03	
Elev.					9-26-62
BM	5.88+	504.07+		498.19	
TP.	0.97	503.95	1.09	502.98	
BM			5.76	498.19	= 498.19
TP.	0.63	503.61		502.98	
			7.86	495.75	Top of W. Parapet W/all Valve CHAMBER
			7.11	496.50	" " E " " " "
NE-Cor V. Chamb.			9.56	494.05	F 1.60 to Roof Gr = 495.65
N.W. " "			9.59	494.02	F 1.38 Gr = 495.40
S.W. " "			9.56	494.05	F 0.95 Gr = 495.00
S.E. " "			9.59	494.02	F 1.23 Gr = 495.25
					Gr = 495.18
			9.57	504.04	F 1.48 Gr = 495.52

Blk # 18 Elevs. (Cont'd from p. 4)

BM 7.70	588.84		581.14		
11+60		8.73	580.11	F 6.56 to Invert	11° S. Gr = 586.67
CHECK FORMS				9-29-02	
	9.68	590.82	581.14		
+85		0.31	590.51	Top of Fillet 30¢ N	Gr = 590.53
		4.44	586.38	Point on Invert 11° S.	Gr = 586.40
		9.75	581.1	Top of Grt. Pipe 20 ± S. Axis	} Copied FB = 618 P 41
18-33-1		14.00	576.8	Top of Grout Pipe on axis	
Elevs. For Forms				9-30-02	
	8.78	589.92	581.14		
11+75		4.85	585.07	F 4.93 to El 590 ± 35 N'	
+84.6		4.97	584.95	F 5.05 to ins. of Fillet ± El 590 ± 35 N	
+95.76		5.00	584.92	F 15.08 to Top of Fillet 2 ½ ON	Gr = 600.00
+70		4.81	585.11	F 8.22 to Invert	Gr = 593.33
+60		4.96	585.06	F 6.02 / 7.02 to Top Gallery Pipe	Gr = 591.08
GROUT HOLE ELEV				10-5-02	
T.P.	4.94	590.05	585.11		
HOLE # 18-33		3.78	586.3	Top of 2½" casing	

Rogers

Blk # 13 Elevs. (Con't from p. 16) 9-26-42. 18

	0.63	503.61		502.98		
			8.0	495.6	F 6.9 to conduit 6823 from V.C. Gr= 502.5.	
W/side Door			9.8	494.03	F 1.15 to Roof W. side Door	Gr= 495.18
Front &			9.7	494.04	F 1.05 to "	Gr= 495.09
	1.12	504.10	0.63	502.98		
Check on TP			10.07	494.03	= 494.03	
9+35			8.70	495.40	Point on D.S. Form, Toe of Conc	
℄			10.12	493.98	F 1.42 to Toe Conc	Gr= 495.40
9+13			9.83	494.27	F 1.13 to " "	
9+01			9.78	494.32	F 1.08 to " "	119.25 S
℄			9.97	494.53	F 5.97 to ℄ 1500	115.75.
9+13			9.91	494.59	F 5.91 to ℄ 1500	" "
9+01			9.97	494.53	F 5.97 to " "	" "
			4.10	500.0		
9+31.5			8.45	495.65		
9+50						

Blk #13 Elevs (from p. 18)

B.M.	0.00	502.38		502.98	
9+29.56			8.25	494.13	F 6.22 to Top Fillet 12.37 N. Gr = 501.35
9+40			8.20	494.18	F 13.47 to " " 11.63 N. Gr = 508.65
			4.63	498.75	F 1.25 to El. 500 = 12.5 N.
			5.06	498.32	
	5.82	504.0		498.19	
#1 (Points E to W)			8.88	495.13	F 4.87 to El. 500 = 13.40 from ℄.
#2			9.03	494.98	F 5.02 to " " " "
#3			8.94	495.07	F 4.93 to " "
#4			8.94	495.07	F 4.93 to " " " "
#5			8.91	495.10	F 4.90 to " " " "
9+10			8.69	495.32	F 8.05 Gr = 503.37
			8.68	495.37	F 11.47 Gr = 506.84

Elevs. Valve Chamber 9-29-42

BM	1.13	504.11		502.98	
STAIRWAY BRACKET			5.82	498.29	Top of Bracket

Blk # 10

9-28-42 20

B.M.	0.69	545.11			544.42	
T.P.	4.64	545.01	4.71		540.40	
B.M.			0.63		544.41	= 544.42
8+06				505	539.99	F 501 to E1 545 = 8° N.
"				511	539.93	F 507 to E1 " = 82.30 S.
7+615				513	539.91	F 509 " " = 8° N
"				507	539.97	F 503 " " = 82.30 S.
				504	540.00	F 500 to " " "

CHECK FORMS 10-5-42

B.M.	486	545.26		540.00	
East			+.02	545.28	Point on DS. Form 82.07 S Axis D = 82.09
West			+0.05	545.31	" " " " 82.09 " D = 82.07

Rogers

9-29-42 21

Blk #		Elevs				
B.M.	10	585.46		574.89		
TP.	5.31	585.50	5.28	580.16		
B.M.			10.62	574.88		
℄			5.46	580.06	F 4.96 to El. 585°	4° N.
5+70			5.53	579.97	F 5.03 to " "	" "
"			5.53	579.97	F 5.03 to " "	51.15 S
℄			5.48	580.02	F 4.98 to " "	" "

Check Forms

Oct. 19th

TP.			580.16		
	5.27	585.43			
		.08	585.35	- 0.27 Ht	
		.25	585.18	- 0.14	
				10-21-42	
Elevs					
B.M.	12.81	587.70	574.89		
5+70			2.79	584.91	F 5.09 to El 590° 47.35 S
"			2.70	585.00	F 5.00 " " " 35 N
℄			2.70	585.00	F 5.00 " " " "
℄ TP.			2.73	584.97	F 5.03 " " 42 3S

El on Block = 585.46

Check Forms Blk 19

B.M.	3.69	615.29			611.60
+07.77				+3.21	618.50
12+01.				+0.25	615.54
12+25				+3.92	619.21
Elev					
B.M.	8.41	620.01			611.60
12+01				5.09	614.95
+10				5.17	614.87
+10				4.64	615.43
12+01				4.95	615.09
+18.6				4.97	615.07
+25				5.02	615.02
B.M.			8.41		611.60
B.M.	0.34	635.60			635.26
12+40				12.03	623.57
B.M.	8.34	619.90			611.60
12+10				4.57	615.37
+16.5				5.09	614.85
+06.5				5.05	614.89

Point on Invert 11°S G= 618.50

D= 24.94 D=24.92

447 N G= 619.80

10-9-42

F 5.03 to El 620 = 24.78 S.

F 3.40 to Gallery invert 25.925 Gr = 618.27

F 3.07 to " " 11°S Gr = 618.50

F 4.91 to El. 620 = 1.50 N

F 4.93 to " " 1.50 N

F 11.10 to Top Fillet 1.99 N Gr = 626.12

F 3.43 to Bot. Fillet 4.08 N Gr 622.00

F 7.13 to Top Gallery Pipe Gr = 622.50

F 4.51 to Bottom Poarch key Gr = 619.36

F 4.47 to " "

Blk # 12									
	4.66	514.94			510.28				
℄				5.03	509.91	F 5.09	to El	515°	11° N
8+99				4.96	510.00	F 5.00	to "	"	11° N
8+92.5				5.03	509.91	F 5.09	to "	"	10 510 S.
℄				4.93	510.01	F 4.99	to "	"	"
CHECK						10-7-02			
B.M.	4.80	515.08			510.28				
				+0.37	515.45	Point on D.S. Form			104.76 S D: 102.76
Elevs									
B.M.	4.80	520.14			515.34				
℄				5.19	514.95	F 5.05	to El	520°	10.5 N
8+99				5.14	515.00	F 5.00	to "	"	" N
"				5.23	514.91	F 5.09	to "	"	101.30 S
℄				5.21	514.93	F 5.07	to "	"	"
B.M.			8.63		511.51	= 511.52			

Blk #13 CHECK FORMS 9-30-17 ZA

B.M. 1.2	504.23		502.98		
9+01		3.81	500.39	Point on D.S. FORM 115.46 S.	D = 115.95
℄		4.03	500.20	" " " " 115.60	D = 115.60
9+01		8.81	495.39	Bottom of DS Form	Gr. = 495.40
℄ Form		8.71	495.52	" " "	Gr = 495.52
9+34		8.59	495.64		Gr = 495.65
9+34		7.71	496.52	Top of Parapet	Gr = ~~498.29~~ 496.53
		8.11	495.29		
		10.18	491.05		115.75
		8.45	595.78	= 595.75	
		1.11	~~505.34~~ 503.17	Point on Gallery 11° S.	Gr = 503.12
9+40		+4.20	508.13		Gr = 508.15
		2.91	501.32	Top of Fillet	12.37 ∠ D = 12.37 Gr = 501.35

111.95
33.30
6.65

Rojas

Blk # 17							10-1-42	25°
	8.39	610.22		601.83				
11+49			5.16	610.08	F 4.92 to E1	610°	2° W Axis	
"			5.01	610.21	F 4.79 to "	"	32.N S.	
11+01			5.02	610.20	F 4.80 to "	"	" S.	
"			5.26	604.95	F 5.02 to "	"	2° W	
			5.10	605.12	F 4.88 to "	"	32.N S.	
CHECK								
B.M.	8.71	610.54		601.83				
W.			0.23	610.31	Point on DS-Form		31.96	D=31.91
E.			0.30	610.24	" " " "		31.96	D=31.97
Elevs					10-8-42			
	3.23	614.38		611.N				
11+49			4.29	610.09	F 4.91 to E1	61N°	1.7N W	
11+01			4.36	610.02	F 4.98 to "	"	" "	
"			4.27	610.11	F 4.89 to "	"	28.3N S	
℄			4.41	609.97	F 5.06 to "	"	" "	
11+49			4.23	610.N	F 4.8N to "	"	" "	

Blk #2 10-1-42 26

	4.36	614.97		610.61		
			40.20	615.17	Point on D.S. Form 28.19	D= 28.22
Elevs						
B.M.	11.22	620.32		609.10		
T.P.	4.80	620 614.23	4.89	615.43	Marked Rock	
B.M.			11.13	609.10	= 609.10	
℄			5.11	614.12	F 4.88 to El 620 = 15 N	
5+21			5.25	614.98	F 5.02 to " " " N	
"			5.09	614.72	F 5.26 to " " 20.79 S	
℄			5.15	615.08	F 4.92 " " "	
CHECK					10-8-42	
B.M.	~~4.85~~ 4.85	~~613.95~~ 614.46		~~609.10~~ ~~610.61~~		
			~~10.08~~	614.54	~~Point on D.S. Form~~ 24.38	

57
1162

Blk # 11	CHECK Forms					10-1-42	27
B.M.	5.23	525.42		520.19			
8+52.5			0.25'	525.17	Point on D.S. Form 97.375. D=97.37		
BM	1.39	530.42		529.03		Oct 3rd	
℄			5.49	524.93	F 5.07 to El. 530° 9.5 N Axis		
8+52.5			5.50	524.92	F 5.08 " " " "		
℄			5.54	524.88	F 5.12 to El 530° 93.7° S Axis		
8+52.5			5.46	52196	F 5.04 " " " "		
Elevs					10-8-42		
BM	1.48	530.51		529.03			
			0.83	530.18	Point on DS Form 93.575 D=93.7		
Elevs					10-10-42		
T.P.	4.53	535.17		530.64	Marked rock Blk # 11		
℄			5.19	~~534~~ 529 .98	F 5.02 to El 535° 9° N		
8+52.5			5.24	529.93	F 5.07 to " " 9° N		
"			5.08	530.09	F 4.91 to - 89.90 S.		
℄			5.16	530.03	F 4.97 to " "		

Blk # 12						
	2.56	514.08		511.52		
9+65			2.37	511.71	F 0.51 to Bott. Fillet 15.84 N	Gr = 512.22
"			6.79	507.29	F 15.38 to Top " 10.23 N.	Gr = 522.67
9+59			10.28	503.80	F 5.61 to Bott. " 15.84 N	Gr = 509.41
"			10.78	503.30	F 16.56 to Top " 10.52 N	Gr = 519.86
B.M.	2.37	505.35		502.98		
					F to top of Fillet 10.91N	Gr. 515.65
Elevs.				511.52	10-6-42	
B.M.	2.53	514.05		511.52		~~Gr = 516.12~~
9+51			8.98	505.07	F 11.05	Gr = 516.12
"			9.00	505.05	F 4.95 to El 510 = 108.1 S. Axis	
CHECK FORMS					10-9-42	
	3.96	515.48		511.52		
			+0.25	515.73		
			5.40	510.08	Point on D.S. Form	D = 108.09
			10.19	G		

Blk #113

	2.37	505.35		502.98	
			4.29	500.56	F 6.30 to Conduit Gr = 506.86
9+50	Copper Elec.		9.50	495.85	Bott of Copper. Next Page
B.M.	7.17	505.36		498.19	
#1			5.48	499.88	F 5.12 to El 505° Tower 13.30 N. Axis
#2			5.49	499.87	F 5.13 " " " "
#3			5.53	499.83	F 5.17
#4			5.46	499.90	F 5.10
#5			5.34	500.02	F 4.98
#6			5.24	500.12	F 4.88
11+34.78			5.35 / 5.42	500.01 / 499.94	F 4.99 / F 5.06 to El 505° 11.50 N Axis
9+20			4.40	500.96	F 7.07 Gallery 11° S Axis Gr = 510.03
9+08			4.68	500.68	F 6.16 Riser 9.08 " " Gr = 506.89
9+10.7			4.58	500.78	F 6.10 to Valve Galv Pipe Gr = 506.88
+16.07			4.56	500.80	F 9.66 " " " " 510.46
			4.53	500.83	F 4.17 to El 505° Top of Batter at end of Curve
B.M.	7.38	505.57		498.19	
9+48			5.48	500.09	F 14.16 to Top of Fillet 11.07 N Axis Gr = 514.25

Blk #13 Elevs.				
	7.08	505.27		498.19
			5.96	499.81
9+50 Copper			10.7	494.6
TP.	7.19	505.38	7.08	498.19
Bottom of Risers				
9+30			20.5	484.9
+19			25.6	479.8
+08			28.7	476.7
9+50			1.5	503.9
BM, 6.52		504.71		498.19
9+07			4.62	500.09 ~~499.09~~
"			4.56	500.15
			3.78	500.93

F 5.19 to El. 505.00 12.0 N.
Bottom of Copper (Copied F.B. #618

Bottom of hole } Copied F.B. #618
" "
" "

F 4.91 to El 505.00 111.95 S.
F 4.85 to " " " "

Blk #18					10-6-42	
BM.	2.3 ↓	593.19		590.84		
11+67.5 ℄			1.53	591.66	Point on Invert 11° S.	Gr = ~~596.66~~ 591.66 67
12+00 Copper			5.1	587.8	Bottom of Copper 18-19	
Elevs.			6.93		10-8-42	
BM.	4.4 ↓	595.29		590.84		
11+97.6			5.42	589.87	F 10.13 to top Fillet 2.50 N	Gr = 600.00
℄			5.08	590.21	F 6.45 to Invert 11° S.	Gr = 596.66
℄			5.22	590.07	F 0.93 to El. 595 = ~~2.5°~~ 5° N	
11+20			4.92	590.37	F 7.77 to Top C.I. Pipe	Gr = 598.14
CHECK FORMS					10-13-42	
	4.69	595.53		590.84	580	
			4.99	600.02	Top of Fillet 2.48 N - D = 2.50	Gr = 600.00
11+75.3			+1.39	596.92	Point on Fillet 11° S.	Gr = 596.95
Elevs	9.39	600.23		590.84	10-15-42	
℄			5.20	595.03	F 4.97 to El 600 = 2.50 N	
11+95.6			5.37	590.86	F 5.14 to . . = 2.50 N	
11+83			4.28	595.45	F 6.55 to Invert 11° S	Gr. 602.00
			4.64	595.09	F 9.22 to C.I. Pipe	Gr = 604.8

Blk # 10 Elevs

B.M.	5.95	550.87		544.92	
T.P.	4.87	550.22	5.07	545.35	Point on Rock Blk # 10
B.M.			5.80	544.42	= 544.42
W.			5.29	544.93	F 5.07 to El 550° 75' N.
E.			5.19	545.03	F 4.97 to " " " "
E			5.27	544.95	F 5.05 to " " 78.505
W			5.23	544.99	F 5.01 to " " "
E			5.14	545.08	F 4.92 to " " " "

CHECK FORMS

10-15-42

B.M.	4.86	550.21		545.35	
E.			+0.14	550.35	Point on D.S. Form 78.225 D = 78.24 S.
W.			+0.20	550.41	" " " " 78.195 D = 78.195

Elevs

10-17-42

10.85	555.27		544.42	
4.93	555.26	4.92	550.33	
		10.84	544.42	= 544.42

Blk #13

B.M.	3.8'	511.33		511.52			
			6.98	508.35	Point on Invert		Gr=
9+02±			9.84	505.49	" " D.S. Form	111.58 S	D=111.98
~~9+02±~~ ℄			10.17	505.16	" " " "	111.80 S	D=111.83
B.M.		3.8'		511.52	= 511.52		
B.M.	2.5'	505.70		498.19			
			12.69	508.39			
Elevs					10-10-12		
B.M.	12.14	510.33		498.19			
9+16.07			5.02	505.31	F 5.60 to Top GALV. Pipe Valve	9.N.S.	Gr=510.91
			5.02	505.31	F 8.86 Top C.I. Pipe		Gr=514.17
Conduit			5.0	505.3	F 5.9 to Conduit	1922 S. Gal.	Gr=511.20
9+24.86			5.32	505.01	F 5.13 to El 510 14/100	11.09 N.	
2			5.41	504.92	F 5.22 to " "	13.30 from C. Tower	
3			5.30	505.03	F 5.11 to " " " "		
4			5.32	505.01	F 5.13 to " "		
5			5.32	505.01	F 5.13 to " "		
6			5.33	505.00	F 5.14 to " " " "		

Blk #14

B.M.	4.08	515.60		511.52			
			5.61	509.99	F 5.01 to El 515.2	10.35 S Axis	
9+51			5.39	510.21	F 5.91 to Top Fillet	10.89 N.	Gr. 516.12
+59			~~4.85~~	~~510.75~~	~~F 9.11 to Top Bot~~	~~10.52 N~~	~~Gr=519.86~~
+66			4.85	510.75	F 12.39 to Top	10.18 N.	Gr: 523.14
					~~F to Bott.~~	~~15.79 N.~~	~~Gr: 512.69~~
+90					F to Top	9.06 N	Gr. 530.37
"			+0.11	511.21	F 8.21 to Both	14.67 N	Gr: 523.92
+76			4.48	511.12	F 16.70 to Top	9.72	Gr: 527.82
"			1.69	513.91	F 3.46 to Both.	15.33 N.	Gr: 517.39

CHECK FORMS 10-16-42

	6.78	518.30		511.52			
9+60			8.3	510.0	~~Bottom~~ of Riser		
+70			6.5	511.8	"		
+80			4.1	514.2	"	"	"
9+51			3.04	515.26	Point on D.S. Form		D-104.

Blk # 17 CHECK FORMS

	4.21	615.36	611.15	
			+0.02	615.38
			0.11	615.25
Elevs				
	879	619.94	611.15	
11+49			4.91	615.03
"			4.89	615.05
11+01			4.91	615.03
"			4.94	615.00
4			5.14	614.80

CHECK FORMS

B.M.	9.32	620.47	611.15	
T.P.	0.34	620.50	0.31	620.16
B.M.			9.34	611.16
11+01			0.51	619.99
+49			0.47	620.03

Point on D.S. FORM 28.095 D=28.07

" " " " 28.20 D=28.16

10-15-42

F 4.97 to El. 620 = 24.79 S.

F 4.95 to " " 1.00 "

F 4.97 to " " " "

F 5.00 to " " 24.79 S.

F 5.20 to " " " S.

10-20-42

= 611.15

Point on D.S. Form 24.79 S.

" " " " " S.

Blk # 15	Elevs				
	11.50	540.53		529.03	
10+00			10.34	530.19	F 9.81 to El. 540 = 85.355.
"			6.18	534.35	DS. Toe Conc. 89.625.
	7.49	536.52	11.50	529.03	
10+00			13.62	522.90	F 5.70 to Bott. Fillet 13.32 N Gr=528.60
"			10.93	525.59	F 11.44 to Top " 8.80 N = 537.03
10+10			7.89	528.68	F 5.52 to Bott. " 8.29 N Gr: 534.20
"			6.33	530.19	F 12.44 to Top 542.63
10+20			2.35	534.17	F 14.06 to " " 7.68 N 548.23
"			1.41	535.11	F 4.69 to Bott. " 12.20 N 539.80
BM.	5.76	534.79		529.03	
10+00			9.9	523.9	Elev. at bottom Copper Water Stop (Copied F.B #618)
Elevs					10-20-42
	11.64	540.67		529.03	
10+10			9.75	530.92	F 11.71 to Top Fillet 8.29 N Gr: 542.63
+30			1.72	538.95	F 6.45 to Bott. " 11.64 N Gr: 645.40

10-13-42 36

Blk #13 Elevs (Contd from p 33)

510.33

9+42.13			5.40	505.93	F 5.21 to El 510.14 11.09 N.
9+25			5.07	505.26	F 8.11 to Invert 11° S. Gr=513.37
"			5.50	504.83	IE 5.17 to El. 510± 108.5 S
9+02±			5.23	505.10	F 4.90 to " " 5

Check Forms #3

	2.22	513.74		511.52	
℄			3.45	510.29	Point on D.S. Form 107.93 S D=107.87
9+02±			3.36	510.38	" " " D=107.86

Elevs 10-20-47

BM 7	3.73	515.25		511.52	
9+34.50			5.23	510.02	F 9.68 to Invert 11° S. Gr: 519.70
TP	3.42	514.94	3.73	511.52	
#1			5.07	509.87	F 5.13 to El 515± Inter. outside R & Battered wall
#2			5.02	509.92	IE 5.08 to " " Outside radius
#3			5.01	509.93	F 4.97 to " " "
#4			4.95	509.99	IE 5.01 to " " "
#5			4.94	510.00	F 5.00 to " " "
#6			4.93	510.02	F 4.98 to " " "

Blk #12					
B.M.	4.87	520.21		515.34	
			+0.09	520.30	Point on DS. Form D = 520.08
					10-14-02
Elevs					
B.M.	12.35	523.87		511.52	
T.P.	3.31	623.61	3.57	520.30	
B.M.			12.09	511.52	= 511.52
0+99			3.97	620.02	F 4.98 to El. 620.0 10 = N
"			3.98	620.03	F 4.97 to " 97.505
℄			3.74	619.87	F 5.13 to " 97.505
Check Form =					10-21-02
T.P.	4.87	525.17		520.30	
8+97.75			+0.22	520.39	Point on DS. Form 97.20 S D = 97.20
Elevs					10-31-02
	4.76	535.24		530.48	Marked Rock Blk #12
℄			5.25	529.99	F 5.01 to El 535.0 7.0 N
E			5.11	530.13	F 4.87 to " " "
E			4.76	530.08	F 4.92 to " " 89.90 S
℄			4.74	530.10	F 4.90 to " " "

Blk #11

	4.53	535.17		530.64			
			4.01	535.18	Point on Form 89.		D = 89.76
					10-16-42		
Eks. Fore Forms							
T.P.	4.68	540.33		535.65	Marked Rock Blk #11		
East			5.39	534.94	F 5.06 to El	540°	8.5 N
East			5.45	534.88	F 5.12 to "	"	86.10 S.
			5.39	534.94	F 5.06 to "	"	86.10 S
					10-22-42		
CHECK FORMS							
	4.69	540.34		535.65			
			0.20	540.14	Point on D.S. Form	86.00 S	D = 86.00
Eks							
B.M.	4.76	544.96		540.20	Marked Rock		
&			4.86	540.10	F 4.90 to El	545°	8.0 N
E			4.87	540.09	F 4.91 to "	"	"
E			4.83	540.13	F 4.87 to "	"	82.30 S.
			4.86	540.10	F 4.90 to	"	"

Blk #14 CHECK FORMS

	7+93	519.05		511.52	
			+3.69	523.14	Top Fillet 10.17 N D = 10.18 Gr = 523.14
			3.57	516.08	
Elevs					10-16-62
BM	8.58	520.10		511.52	
9+51			5.02	515.08	F 8.92 to El 520 = 10.50 N
+59.3			5.21	514.89	F 5.11 to " " "
+85			4.50	515.60	F 16.93 to Top Fillet 9.30 N. Gr = 532.03
+87			5.22	514.88	F 5.12 to El 520 = 100.35
BM	8.94	520.46		511.52	
9+70			5.17	515.29	F = 9.72 To Elev 525.01 — 10.00 North
Elevs					10-20-62
~~+~~	~~1.64~~	~~520.67~~		~~529.03~~	
~~10+10~~			~~9.75~~	~~530.92~~	~~F 11.71 to Top Fillet 8.20 N. Gr = 542.63~~
~~10+30~~			~~7.72~~	~~538.95~~	~~F 6.45~~ 545.40
		5.56			
		525.11			

Blk #3

B.M.	8.71	660.13		651.42				
0+70			5.11	655.02	F 3.98	To El	659	1° S. Axis
"			5.08	655.05	F 3.95	to "	"	13° S "
"			5.12	655.01	F 3.9	to "	"	" S.

CHK FORMS

10-21-42

	1.01	664.15		663.14

Blk #10 Elevs 10-17-42

493 555.26

		550.33	Rock Blk #10	
W	5.26	550.00	F 5.00	to E 1 555 = 7° N
W	5.23	550.03	F 4.97	to E 1 555 = 74.70 S.
E	5.19	550.07	F 4.93	to E 1 " " "
℄	5.20	550.06	F 4.94	to " " "
W	5.26	550.00	F 5.00	to " " "

CHECK FORMS 10-23-42

B.M. 4.80 555.13

550.33

+0.13	555.26	Point on O.S. Form	74.50	D = 74.50
+0.09	555.22	" " "	74.50	D = 74.53
10.00	555.13	" " "	74.62	D = 74.61

Elevs

B.M. 545 560.81

		555.36	Rock on #10	
W	5.79	555.02	F 4.98	to E 1 560 = 6.5° N
E	5.60	555.21	F 4.79	to " " "
E	5.81	560.00	F 5.00	to " " 70.90
℄	5.72	560.09	F 4.91	to " " "
W	5.83	559.98	F 5.02	to " " "

Block #6 - Forms

T.P.	560.24		4.94	555.30	
BM			1.68	558.56	
	1.65	560.21			
TP			4.91	555.30	
℄	———	———	———	———	F= To Elev 560° — 6.5 North
E		5.11		555.10	F=490 " " " " "
E		5.16		555.05	F=495 " " 560° — 70.15 South
E		5.13		555.08	F=492 " " " " "
Check Forms					
	4.79	560.09		555.30	
			+0.11	560.53	Point on D.S. Form 69.75 S. D=69.75
Elevs					
	4.86	565.12		560.26	
℄			5.08	560.04	F=4.96 to El 565° 6° N
6+21			5.02	560.10	F=4.90 " "
"			5.05	560.07	F=4.93
℄			5.08	560.04	F=4.96 to " " 66.35

BLOCK #8 - Forms

T.P	4.90	560.20		555.30	On Rock in Block #6
TP			4.81	555.39	" " " " #8
TP			9.86	550.34	Check to T.P. on rock block #10 - El = 550.33
	9.85	560.19			
E			5.18	555.01	Fill = 4^{99} To Elev. 560^{0} - 6^{5} North
℄					F = " " " " 6^{5} "
W			5.10	555.09	F = 4^{91} " " " 6^{5} "
E			5.16	555.03	F = 4^{97} " " " 70^{90}
℄			5.13	555.06	F = 4^{94} 70^{90}
W			5.06	555.13	F = 4^{87} 70^{90}
				479 555.40	Check to T.P. BLOCK #8
				4.90 555.29	" " " " #6

CHECK FORMS

10-23-44

B.M	4.76	560.15		555.39	
				+002 560.17	Point on D.S. Form 70.77 D = 70.77
				+0.43 560.58	" " " " D = 70.46
				+0.11 560.26	D = 70.70

Blk #18					
	9.79	600.63		590.84	
11+83.31			+1.60	602.23	Point on Gallery Invert 11° S. Gr=602.23
	+81S	621.47		613.32	
Hole #	18-37½		8.8	617.7	Top 2" Grout Pipe
" #	A18-29		4.1	617.4	" 3½" Grout Pipe
" #	18-12½		3.3	618.2	" 2" " "
					10-30 SE
12+00	-3.08	610.24		613.32	Invert in Blk #19
			5.08	605.16	F 6.30 to Top C.I. Pipe Gr=611-9.6

13.32
6.67
606-65
9.81
611.46

Blk # 13

	3.88	515.40		511.52
9+16.5			4.07	511.33
9+02 ±			5.56	509.84
℄			5.41	509.99
+37 ±			5.31	510.09

Elev Bracket & Poarch

BM.	3.78	515.30		511.52
9+50			+1.43	516.73
9+10			12.9	497.4

CHECK FORMS

	4.08	515.60		511.52
9+33.41			3.33	518.93
			+0.50	515.10
			+1.13	516.73
			0.36	515.26

F 4.18 to End of Conduit 13.5 S. G = 514.55

F 5.16 to E' 515² 104.35 S.

F 5.01 to " " "

F 4.91 to " " "

Top of Stairway Bracket

Bottom of Riser

Grade = 518.97

496.70

Top of Poarch Bracket

Point on D.S. Form 100.155 D = 108.15

Blk # 16					
B.M.	12.85	524.37		511.52	
			+10.60	520.97	Top of Fillet 10.0'N D=10.00 Gr=
			4.05	520.32	Point on Form 100.31 S. D=100.31
Elevs					10-22-47
B.M.	1.40	530.43		529.03	
9+51			10.55	529.88	F 5.12 to El 525° 96.75 S.
—			10.23	520.20	F 4.80 to " " "
			5.51	524.92	
P.I.	3.80	523.91	10.32	520.11	
			12.40	511.51	
9+51			3.89	520.02	F 4.98 to El 525° 10° N
9+70			3.90	520.01	F 5.00 to " 525° 10° N
+90			3.24	520.67	F 13.70 to Top Fillet 90 N Gr=534.37
Elevs	Blk #12				10-23-47
	4.13	529.89		525.76	
8+99			4.89	525.00	F 5.00 to El 530° 95 N
+97.25			4.85	525.04	F 4.96 to " " 93.20 S
℄			4.87	525.02	F 4.98 to " " "

Blk #17

10-21-42 48

	4.89	625.05		620.16					
11+49			4.77	620.28	F 4.72	to	El	625=	1.25 N
℄			5.13	619.92	F 5.08	to	"	"	21.66 S
12+01			5.02	620.03	F 4.97	to	"	"	1.25 N
"			4.89	620.16	F 4.84	to	"	"	21.66
11+49			4.92	620.13	F 4.87	to	"	"	21.66
~~Elevs~~. CHECK FORMS					10-27-42				
BM.	5.68	625.84		620.16					
			0.15	625.69					D = 21.14
			0.30	625.54					D = 21.24
Elevs					10-30-42				
BM1	4.05	630.11		626.06					
T.P.	5.13	630.21	5.03	625.08					
			4.15	625.06	= 625.06				
E.			5.23	524.98	F 5.02	to	El	630=	ON Axis
W			5.34	524.87	F 5.13	to	"	"	" "
W			5.25	524.96	F 5.04	to	"	"	18.92 S.
℄			5.26	524.95	F 5.05	to	"	"	" "
E			5.22	524.99	F 5.01	to	"	"	" "

Blk #16

	7.48	557.90		544.42			
10+50			8.38	503.52	F 4.38	to Bott. Fillet	11.39 N. Gr=547.90
"			8.99	542.91	F 13.42	to Top "	6.87 N Gr=556.33
10+65			7.73	544.17	F 5.83	to Bott. "	11.18 N Gr=550.00
"			7.11	540.79	F 13.64	to Top "	6.66 N Gr=538.43
+80			5.16	546.74	F 5.36	to Bott. "	10.97 Gr=552.10
11+00			3.6	548.3	Bottom of Copper (Coded F.B. #618)		
CHECK FOR ANTS.					10-27-42		
BM	8.97	553.34		544.42			
10+65			5.10	558.44	Top Fillet 11.18 N		D=11.18 Gr=558.43
10+50			2.99	555.33	" " 6.85 N.		D=6.87 Gr=556.33
Elevs					10-30-42		
	10.89	555.31		544.42			
10+80			4.96	550.35	F 10.18	to Top Fillet	6.45 Gr=560.33
+65			5.15	550.16	F 8.27	" " "	6.66 N Gr 558.43
+51			5.40	549.91	F 6.56	to " "	6.86 N Gr=556.47

B/L# N. CHECK FORMS 10-26-42 50

1,2,2 545.84 544.42

10+10 3.23 542.62 Top of Fillet 8.29 N D=8.24 Gr=542.63

10+0 8.91 536.90

10+00 14.2 Bottom Riser

Elevs 10-26 10-27-42

B.M. 2.30 546.72 544.42

10+01 10.90 535.82 F 4.18 to El 540±

7.26 538.96 = 538.9±

10+05.3 10.92 535.80 F 4.20 to " 540±

+15 10.82 535.90 F 9.53 to Top Fillet 2.96 N Gr=545.03

+30 7.49 539.23 F 14.60 to " " 7.12 N Gr=553.83

+35 5.73 540.99 F 5.04 to " " 11.57 N Gr=546.03

CHECK FORMS 10-30-42

3.64 548.06 544.42

Elevs 11-4-42

B.M. 12.99 557.41 544.42

10+51 2.33 555.08 F 4.92 to El 560± 6.5 N

+76.22 2.38 555.03 F 4.97 to " " "

Blk #19					
	12.91	524.54		511.60	
PI	9.81	525.18	4.17	520.37	Rock "Blk #19
12+01			5.21	519.97	F 5.03 to El 625= 1.25 N.
+16.11			5.22	519.96	F 5.04 to " " " "
12+01			5.20	519.98	F 5.06 to " " 21.67 S.
12+06 S			5.94	519.24	F 1.12 top Key " 23.80 S. Gr-620.36
12+16 S			5.62	519.56	F 0.80 top " 23.80 S. Gr-620.36
—			5.24	519.94	F 5.06 to El. 625= 21.67 S.
12+25			4.97	520.21	F 5.91 to Top Fillet 1.19 N Gr-526.12
+40			2.09	523.09	F 10.83 to " " 0.80 N Gr=633-92
PI	9.27	524.59	9.86	514.32	
B.M.			12.99	511.60	= 511.60
	6.33	632.39		626.06	
			11.08	621.31	Bottom Bolt in Doorway 19.12 S.
12+40			+1.59	633.98	

Blk # 18 CHECK FORMS

1.91 530.94 529.03

9+90 +3.44 534.38 Top of Fillet 9.03 ℄. D= 9.06 Gr= 534.37

557 525.37 Point on DS. Form 93.425 D= 93.42

Elevs 10-29-62

1.29 530.32 529.03

9+67.00 Gallery Adit GRADES

℄ Gallery

03.5 S of Gal 4.89 625.93 F 1.55 Gr=526.98

19.5 S " 4.82 525.50 F 1.46 to Invert Gr= 526.96

35.5 S " 4.93 525.39 F 1.31 to " Gr=526.70

51.5 S " 4.87 525.45 F 0.99 to " Gr=526.44

62.5 S " 5.21 525.11 F 1.07 to " Gr=526.18

82.97 " 4 5.11 625.21 F 0.70 Gr=525.91

9+72.27 5.25 625.07 F 0.59 to " Gr=525.66

+77.27 Gr=527.02

9+01 Gr=530.37

5.22 525.10 F 1.21 to Invert 11° S Gr=526.81

Contd p 57

10-26-62 52

Blk #1

B.M.	5.72	624.84		
℄			4.77	620.07
5+20			4.85	619.99
"			4.89	619.95
"			4.87	619.97

F 4.93 to EI 625 = 1.25 ✓
F 5.01 " " "
F 5.05 to " " 21.66 S
F 5.03 to " " "

Blk #2 Elevs.

B.M.	8.53	529.96		
				621.43
5+20			4.98	524.98
"			5.00	524.96
℄			4.93	525.03

F 5.02 to EI 530 = On Hub (0.25 offset)
F 5.00 to " " 18.97 S.
F 4.97 to " " "

CHECK Forms

11-13-42

Blk "J" CHECK FORMS

BM	4.86	590.32		585.46
			+0.12	590.20
Elevs				
BM	2.77	595.19		592.42
TP	4.92	595.07	5.04	590.15
			2.65	592.42
℄			5.10	589.97
5+71			5.01	590.06
"			5.14	589.93
℄			5.16	589.93
CHECK				
	4.92	595.07		590.15
5+20			+0.09	595.16
Elevs				
BM	7.43	599.85		592.42
TP	4.52	599.92	4.95	595.40
BM			7.50	592.42

10-27-42 3-4

Point on DS Form 47.27 S. D=47.20

10-30-42

Rock on "J"

=592.42

F 5.03 to El 595° 3° W

F 4.91 to " " "

F 5.07 to " " 43.55

F 5.07 to " " "

11-6-42

Point on D.S. Form 43.43 S. D=43.40

Blk # 7

B.M.	5.46	545.68		540.22	
			0.54	545.14	Point on D.S. Form 82.20S D=82.19
Elevs					11-1-42
T.P.	4.82	550.16		545.34	Marked Rock
E			4.84	545.32	F 4.68 to E 1 555° 78.50S
6+23.2S			4.95	545.21	F 4.79 to " " " "
CHECK FORMS					11-10-42
T.P.	4.25	550.09		545.84	
6+23.2S			+0.18	550.27	Point on D.S. Form 78.31S, D=78.30S
Elevs					11-12-42
T.P.	2.51	552.58		550.07	Rock on Block
6+23.2S			2.63	549.95	F 5.05 to E 1 555° 74.70S
			2.55	550.03	F 4.97 to " " "

Blk #13 Elevs

BM. 9.13 520.65			511.52	
#1 (All Rods from Etk'l)	5.55	515	510.10	F 4.90 to Int. Batter wall & Tower 10" N
#2	5.67		514.78	F 5.02 to El 620.° Outside ℄
#3	5.66		514.99	F 5.01 to " " " "
#4	5.65		514.90	F 5.00 to " " " "
#5	5.68		514.97	F 5.03 to " " " "
#6	5.64		515.01	F 4.99 to " " " "
#7	5.62		515.03	F 4.97 to " " " "
#8	5.59		515.06	F 4.94 to " " " "
9+44.33	5.64		515.01	F 11.75 to Invert N° 5. Gr=526.26
℄	5.56		515.09	F 4.91 to ℄ 520° 100.55 S
9+04±	5.71		514.94	F 5.06 to " " " "
				10-30-42
9+30	9.78	521.30	511.52	
			6.19	515.11 F 6.40 to Top Cl. Pipe Gr=521.57

Blk # 14 Contd from p 52

530.32

9+63.5				5.28	625.04	F 2.63 to Top Key 93.97 S	Gr = 527.67
9+70.5				5.30	625.02	F 2.65 to " " " S	"
℄				5.26	625.06	F 0.91 to El 630° 92.95 S	
9+51				5.34	624.98	F 5.02 to " " "	
R	1.50	530.53	1.29		529.03		
9+72.27				5.11	625.42	F 4.95 to Invert 11° S	Gr = 530.37
9+72.27				5.13	525.40	F 1.64 to " 11° S.	Gr = 527.04
9+51.				5.58	524.95	F 5.05 to El 530° 95 N	
9+80.66				5.29	525.24	F 4.76 to " " 95 N.	
				5.03	525.50	F 8.87 to Top Fillet 906 N	Gr = 538.37
						Oct 30-41	
9+60				5.47	525.11	F 5.79 to Top Cl. Rec	Gr = 530.90
+70				5.14	525.39	F 5.61 to " " "	Gr = 540.00
	4.88	533.91			529.03		

106
683
701
705

537.85
527.08
526.90
526.86

-1 3/8 low
0.2
84 3/4 low
80.

31k#6 CHECK FORMS

T.P.	4.91	565.06		560.10	
			5.01	560.03	= 560.03 check on TP
			+0.52	565.56	
BM	11.56	570.12		558.56	Oct. 31 5th
TP			4.92	565.22	
	4.74	569.96			check
TP			4.74	565.22	
℄			4.95	565.01	F = 4.99 To Elev 570 - 5.50 North
East			5.02	564.94	F = 5.06 " " " " " ⊕
East			4.86	565.10	F = 4.90 " " " — 62.50 South
℄			4.88	564.08	F = 4.92 62.50 South

B.L #10 CHECK FORMS 10-30-42 59

	4.74	560.10			555.36			
				+0.26	560.36	Point on DS Form	70.63 S	D = 70.63
				+0.28	560.38	" " "	70.62 S	D = 70.61
B.M					558.56			
	6.69	565.25	4.89		560.36			Nov 22d
T.P.	6.74	565.30	4.94		560.36			
W				5.27	560.03	F = 4.97 To Elev 565.00	—	6.00 North
E				5.28	560.02	F = 4.98 " " "		" "
E				5.33	559.97	F = 5.03 " " "	—	67.10 South
E				5.25	560.05	F = 4.95 " " "		" "
W				5.37	537.93	F = 5.07 " " "		" "
	4.91	565.27			560.36			
E				+0.11	565.38	Point on DS Form	66.85	D = 66.82
W				+0.07	565.34	" " "	66.87	D 66.84

Blk #11 Elevs

	4.93	550.30		545.37			
			5.27	545.08	F 4.97	to El	7.5° N 78.50S.
			5.24	545.06	F 4.94	to El.	550° 78.50S
			5.28	545.02	F 4.98	to "	" "
					11-5-42		
CHECK							
B.M.	4.85	550.22		545.37			
8+52 S			+0.23	540.45	Point on D.S Form 78.15 S.		D= 78.14
					11-7-42		
Elevs							
TP	4.62	555.30		550.68	Rock on Blk #11		
℄			5.16	550.14	F 4.86 to El	5.5°	7° N
E			5.27	550.03	F 4.97 to "		" "
E			5.15	550.15	F 4.85 to		74.70 S
℄			5.27	550.03	F 4.97 "		" "
CHECK Forms							
					11-12-42		
TP	4.40	555.08		550.68			
			+0.37	555.45	Point on D.S. Form		D= 74.34

B/L #6

10-31-42 61

T.P.	4.74	569.96		565.22
CHECK				11-9-41
	5,13	570.07		564.94
E.			+05.2	570.17 Point on D.S. Form 62.15 S D-62.11
℄			+04.1	570.08 " " " ? ?

E. & S. Page 72

625
94
11

Blk # 15

BM1	1.40	545.82		544.42
10+01			5.13	540.69
+14.23			4.60	541.22
+30			5.24	540.58
			4.77	541.05

Forms CHECKED

Elevs

TP	~~1.28~~ 1.02	555.70	554.68

10-31-42 67

F 4.31 to El 545.2 8° ✓

F 3.78 to " " " (Ints.)

F 13.25 to Top El = 553.83

F 3.95 to El 545.2 8 1/2 S.

11-~~12~~ 11 = 42

11-12-42

Rock outside Block

16-148

Blk # 13

B.M.	9.55	521.07	9.55	511.52
T.T.	4.82	520.99	4.90	516.17
			9.46	511.53
T.P.	3.96	520.15		516.19
9+23.17			2.79	517.36
	4.19	520.36	3.96	516.17
			.04	520.32
			.019	520.17
CHECK Form 5				
T.P.	3.88	520.05		516.17
9+39.01			+2.78	522.83
B.M.	3.47	523.82		520.35
#1			3.87	520.00
#4			3.78	520.04
9+45.70			3.56	520.26

Marked Rock Blk # 13

Point on D.S. Form 100325 D= 100.31

11-9-42

	Rod	El.	F		Rod	El.	F
#1			F5.00	#2	3.78	520.04	4.96
#4			F4.96	#5	3.77	520.05	4.95
				#6	3.85	519.98	502

F 6.50 to invert 11-8 Gr=526.76

Blk #19						11-3-92 62
TP	4.96	630.02			625.06	Rock on Blk #19
12+01				5.04	624.98	F 5.02 to ℄ 630° on Axis 1° offset
12+32.96				4.51	625.51	F 4.49 to " " " "
+40				4.93	625.09	F 8.83 to " " 0.80 N. Gr = 633.92
	3.76	628.82	4.96		625.06	
+01				3.89	624.93	F 5.07 to " " 18.92 S.
℄				3.67	625.15	F 4.85 to " " " "
Elevs.		Blk #17				11-6-92
	8.69	633.75			625.06	
11+49				3.74	630.01	F 4.99 to ℄ 630° on Axis offset 9"
11+01				3.83	629.92	F 5.08 to " " " "
"				3.90	629.85	F 5.15 to " " " 16.94 S.
℄				3.79	629.96	F 5.04 to " " " "
11+49				3.77	629.98	F 5.02 to " " " "

Blk # 14								11-9-42	65°
B.M.	6.04	535.07			529.03				
9+51				5.17	536.90	F 5.10	to	El 535°	89.15
℄				5.06	530.01	F 4.99	to	" "	"
—				4.82	530.25	F 4.75	to	" —	"
T.P.	4.77	535.15	4.69		530.38	Rock on Blk # 14			
B.M.			6.12		529.03	= 529.03			
T.P.	4.62	535.00			530.38				
9+67.0				6.91	528.09	End of Gallery Floor			
				6.75	528.25	Floor	"	88.32.5	
9+50				5.69	529.31	"	"		
+60				5.59	529.41	"	"		
+71.5				5.47	529.53	"	"		
9+67				5.48	529.52	"	"	13 S.	
"				6.50	528.50	"	"	23 S	
"				6.24	528.76	"	"	58 S	
"				5.99	529.01	"	"	43 S	
				5.73	529.27	"	"	28 S	

Blk # 14

	4.60	535.08		530.48				
			0.02	535.06				
			+0.35	535.43				
Elevs.					11-6-42			
TP	4.71	540.15		535.44				
8+87.25			5.13	535.02	F 4.98	to El	540.15	86.10 S
℄			5.19	529.96	F 5.04	to	-	-
8+87.25			5.09	535.06	F 4.94	to	"	8.5 N
CHECK					11-11-42			
	4.92	540.36		535.44				~~D=85.84~~
℄			0.11	540.25	Point on D.S. Form			D=85.94
			0.13	540.23	" " "			
	4.34	539.78	4.92	535.44				
Elevs								
BM	1.22	545.66		544.42				
TP	5.04	540.45	5.23	540.21				
			1.03	544.42	= 544.42			

B/L# 15					544.42	
	1.47	545.89				
10+29.5				+7.72	553.61	Top Fillet 7.14 N D=7.14 Gr=553.08
10+01				+.35	546.24	Point on DS. Form 8065. D=8061
T.P.	4.37	548.79	1.47		544.42	
10+50				5.70	543.1	Bottom of Copper
	5.73	550.15			544.42	
10+01			5.14		545.01	F=4.99 To Elev 550° - 7.5 North
10+23.16			4.93		545.22	F=4.78 " " " " "
10+30°			5.06		545.09	F=8.74 " 553.83 7.12 "
10+01			5.08		545.07	F=4.93 " " 550° 7.75 South
B.M.	5.29	549.71			544.42	11-10-42
10+00				4.18	545.53	Invert Grade on Form 11° S. Gr=545.53
+10				4.67	545.04	F 7.16 to Invert 11° S Gr=552.20

B/L# 14

	5.03	534.91		530.38
9+51			4.91	530.00
9+90			4.80	530.11
"			4.42	530.49
+80			4.49	530.42
CHECK FORMS				530.38
9+86.80	5.31	535.69	+1.04	536.73
℄			0.46	535.23
+69.50			+0.07	535.76
			4.52	531.17
E/Evs				
	4.95	540.14		535.19
9+51			5.06	535.08
℄			4.99	535.15
℄			4.95	535.19
9+51			5.22	534.92
9+43			4.79	535.35
			4.80	535.34

F 5.00 to EI 535 = 8° N. (1° offset)

F 4.26 to Top Fillet. 9.06 N. Gr = 534.37

F 8.42 to Invert 11° S Gr = 538.86

F 6.58 to Top Ext. Pipe Gr = 537.00

11-9-02

Point on Invert 11° S. Gr = 536.72

" " D.S. Form 88.98 D = 88.98

Top of Door recess Gr = 535.25

Pipe rail recess Gr = 531.17

11-11-02

F 4.92 to EI 540° 8.5 N

F 4.85 to " " "

F 4.81 to " " 85.35 S

F 5.08 to " " "

F 5.51 to invt Gr

F 8.33 to Top C.I. Pipe

Blk #3 Elevs Cont'd from p 63

	3.47	523.82		520.35	
℄			3.76	520.06	
9+00 ℄			3.68	520.16	
	4.98	525.34	3.47	520.35	
			5.18	520.16	
CHECK Forms					
I.P.	4.99	525.34		520.35	
9+05 ℄			0.11	525.23	
℄			0.05	525.29	
	4.19	524.54	4.99	520.35	
9+33.17			0.53	524.01	
9+47.10			12.21	526.25	
Elev. for T.P.					
	1.05	530.08		529.03	
T.P.	4.34	529.96	4.46	525.62	
			0.93	529.03	

F9.94 to El 525.0 = 96.75 S.

F4.86 to " " " "

F8.01 to Top C.I. Pipe Gr. 528.17

11-10-42

Point on D.S. Form 96.56 S. D=96.58

" " " " 96.53 S. D=96.53

Grade for feeder Pipe

Point on Invert. 11° S Gr. = 526.76

Blk #17 Elevs: *

*See page 64

10-6-42 70

Blk #8

	4.83	565.18		560.35				
West			5.08	560 ~~560~~.10	F 4.90	L	15.565	6° W
E.			5.23	559 ~~560~~.95	F 5.05	L	"	"
E			5.13	560 ~~560~~.05	F 4.95	L	"	67.10 S.
E			5.16	560 ~~560~~.02	F 4.98	L	"	"
W			5.10	560 ~~560~~.08	F 4.92	L	"	"

Blk #10

Q 7029

W			5.26	565.03	F 4.97 to EI 470 = 5° W
E			5.21	565.08	F 4.92 to " " "
W			5.24	565.05	F 4.95 to " " 63.30
℄			5.30	564.99	F 5.01 to " " "
E			5.26	565.03	F 4.97 to " " "
					11-10-42
Elevs Blk #6					
B.M.	4.63	574.88		570.25	
6+20			4.79	570.09	F 4.91 to 575 = 5° W.
6+20			4.82	570.06	F 4.94 to " " "
℄			4.82	570.06	F 4.94 to " " "
"			4.88	570.00	F 5.00 to " " "
					11-12-42
CHECK Forms					
	~~574.38~~			~~570.36~~	
	5.02	574.21		570.19	
	5.39	570.47		565.08	
		45 / 02			
E			0.03	570.44	Point on D.S. Form 629.75 D=62.97
W			0.28	570.19	" " " " 621.55 D=63.18
			0.45	570.02	" " " " D=6

Blk #19

	1083	636.89		626.06	
E			6.66	630.23	F 4.77 to EI 635° 16' 15"
℄			6.77	630.12	F 4.88 to " " "
W			6.95'	629.94	F 5.06 to " " "
W.			6.76	630.13	F 4.87 to " On Axis 0.25' offset
℄			6.74	630.15	F 4.85 to " " "
12+40			6.61	630.28	F 3.68 to Top Fillet (0.80) (offset) Gr = 633.92

B/C #16 11-10-42 74

1.54 569.65 568.11

10+51 9.25 559.90 F 5.10 to Elev. 565 ± 0 6° N'

— 9.41 560.24 F 4.76 to " " " "

B/k # 5

	1.02	553.70		554.68		
10+01			5.70	550.00	F 5.00 to E/ 555° 93.95	
"			5.61	550.09	F 4.91 to " " 7° N	
+30			5.57	550.13	F 3.70 to Top Fillet	Gr=553.83
+39.35			5.49	550.11	F 4.89 to E/ 555° 7.0 N	
10+15			5.42	550.58	F 4.95 to Invert 11° S	Gr=553.53
10+10			5.42	550.18	F 6.83 to Top Cl. Pipe	Gr=553.01

45 53 481
11 48 667
53.01 11.48

Blk #5 Elevs				
	4.52	599.92		595.40
℄			4.94	594.98
5+70			4.88	595.04
"			4.92	595.00
℄			4.96	594.96
Blk #16 Elevs				
	2.39	574.76		572.37
10+W-1			4.76	570.02
"			4.73	570.03 (6.92)
10+65			4.72	570.04
+81.5			4.39	570.37
+60			4.76	570.00
+70			4.60	570.16
+80			4.51	570.25
+90			4.47	570.29
			0.86	573.90

11-21-02

F 4.98 to El 575° 5° W

F 3.15 (3.26) to Invert 11° S Gr = 573.18

F 3.36 to " " Gr = 573.40

F 3.26 to " " Gr = 573.63

F 8.13 to C.I. Pipe Gr = 578.13

F 8.11 to " " Gr = 578.27

F 8.17 to " " Gr = 578.07

F 8.27 to " " Gr = 578.17

CHECK on Conc Invert Gr = 573.90

F 5.02 to El 600 250 W

F 4.96 to " " "

F 5.00 to " " 39.75 S

F 5.04 to " " "

32.19 - 40° - 44 24.382

32.72 - 41° - 48 - 24.39

7454
3272
14908
52178
14908
22362
24389488

25.00
24.39
.61

995 540.14 435.19

Elev. of Grout Pipes 4.1 536.0

Hole # 14-12.5 4.1 536.0

" 14-37.5 3.9 536.2

5-26.98 5-29.53 77
17 2.50
5-26.81 5-27.03

5-0.37
2.79
5-2.96

5-30.37
2.59
5-32.96

38
43
43.50
.43
.43

GALLERY C.I. PIPES

12+10	Blk #19	4.8	Upper
9+80	" 14	6.6	Lower
9+70	" 14	5.4	Upper
9+60	" 14	5.4	"
9+30	" 13	8.3	Lower

Lengths of Gallery Pipes

Sta		Length	Blk#		
11+10		5.3	17	Upper	✓
+20		4.8	"	"	✓
+30		4.6	"	"	✓
+40		4.1	"	"	✓
Oct-					
11+60		6.0	18	Lower	✓
+50		6.3		Upper	✓
9+08		6.3	13	Lower	✓
11+70		7.8	18	"	✓
9+19		8.8	13	"	✓
9+00		5.7	13	Upper	✓
11+80		8.7	18	Lower	✓
11+60		5.3	18	Upper	✓
9+08		5.3	13	"	
9+19	November	5.3	13	"	
9+30		6.4	13	Lower	

12 = 8+√3√-
13 = 9+00
9+50

99.03
912 98.63
98.63
8991
872

6667
1758
76 6
18
608
76
√.1886

9+50 46√-
3√-

5 0√.43
96.7√.
8.68
.76
√.208

76
38
608
228
.28886076
6.√968

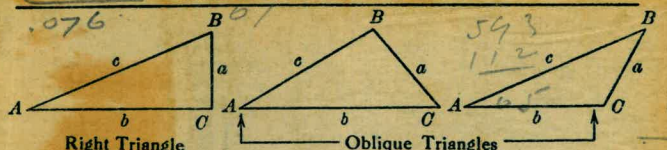
126.01
6.60
119.41
√.98
114.43

76
3√- 11270
380660
38
228 19.31
2660

17√8
6667
12306
10548
10548
10548
11.720√-86

√45.√3
3√0.√3

TRIGONOMETRIC FORMULÆ



Right Triangle — Oblique Triangles

Solution of Right Triangles

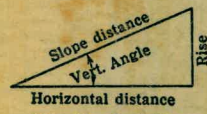
For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\operatorname{cosec} = \frac{c}{a}$

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

Solution of Oblique Triangles

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

REDUCTION TO HORIZONTAL



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

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

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