W
385

ENGINEERS'
LEVEL BOOK
No. 412 F

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.

9.75

535

Hodges Reservoir Dam Strengthening. X'sec.s for Strut + Column excav. and general construction notes.

Index

Kill Soper - Remmen Isbell 3/18/36 clear

X sec. of spillway - Hodges

B.M.	1.51	316.51		315.00		Cross on spillway floor N end timberwall						
	314.66	314.58	314.74	314.68	314.57							
0+00	1.85	1.93	1.77	1.83	1.94							
	0	40	80	120	149							
	✓ 11.6	✓ 13.4	✓ 13.4	✓ 13.4	✓ 13.6	✓ 11.5	✓ 12.3	✓ 11.3	✓ 12.7	✓ 11.4	✓ 13.7	
0+00	4.9	3.1	3.1	3.1	2.9	5.0	4.2	5.2	3.8	5.1	2.8	
	0	10	20	30	40	50	60	70	80	90	100	
see page 33 for 0+03	✓ 13.5	✓ 13.9	✓ 14.6	✓ 15.7	✓ 14.6							
	3.0	2.6	1.9	0.8	1.9							
	110	120	130	140	149							
	14.0 ~~13.0~~	✓ 15.1	✓ 14.8	✓ 14.0	✓ 13.4	✓ 10.9	✓ 10.9	✓ 10.4	✓ 13.0	✓ 11.9	✓ 11.5	
0+06	2.6	1.4	1.7	2.5	3.1	5.6	5.6	6.1	3.5	4.6	5.0	
	148 red hd. 2.5	140	130	120	110	100	90	80	75	70	60	
	✓ 11.6	✓ 13.3	✓ 12.8	✓ 12.6	✓ 12.1	✓ 10.2						
	4.9	3.2	3.7	3.9	4.4	6.1						
	50	40	30	20	10	0						
	✓ 09.7	✓ 09.2	✓ 10.8	✓ 11.2	✓ 11.9	✓ 12.6	✓ 11.4	✓ 11.8	✓ 09.7	✓ 11.1	✓ 11.9	
0+18	6.8 conn.	7.3	5.7	5.3 cross	4.6	3.9	5.1	4.7	6.8	5.4	4.6	
	0	0	10	20	20	30	40	50	60	70	80	
	✓ 12.1	✓ 12.7	✓ 12.8	✓ 13.3	✓ 13.6	✓ 12.1						
	4.4	3.8	3.7	3.0	2.9	4.4						
	90	100	110	120	130	140						
	✓ 11.8	✓ 12.7	✓ 13.1	✓ 12.5		✓ 11.6	✓ 12.5	✓ 11.4		✓ 10.5	✓ 09.2	
0+30	4.7 cross	3.8	3.4	4.0	3'x4'x2'	4.9	4.0	5.1	5'x3'x2'	6.0	7.3	
	135	135	130	120	rock 120	110	100	90	rock at 90	80	70	

(cont.)

316.5-1 H.L.

0+30 (cont.)	310.1 6.4 60	309.9 6.6 50	311.4 5.1 40	311.8 4.7 30	311.5 5.0 20	309.7 6.8 10	307.6 8.9 0	309.1 7.4 (corner) 0			
0+40	06.7 9.8 (corner) 0	04.9 11.6 0	07.9 8.6 10	10.2 6.3 20	11.0 5.5 30	11.3 5.2 40	09.3 7.2 50	06.3 10.2 55	09.8 6.7 60	05.1 11.1 70	09.9 6.6 75
	11.0 5.5 80	12.0 4.5 90	10.5 6.0 100	12.7 3.8 110	12.6 3.9 120	12.2 4.3 130	14.0 2.5 135				
49.3 0+42	11.8 4.7 130	12.4 4.1 120	13.2 3.3 110	09.6 6.9 100	10.2 6.3 90	10.4 6.1 80	10.1 6.4 76	04.4 12.1 70	03.8 12.7 60	10.0 6.5 50	09.1 7.4 rd. kd. 40
	09.8 6.7 40	10.0 6.5 30	08.8 7.7 20	08.0 8.5 10	06.8 9.7 5	02.1 14.0 0	05.1 11.4 (corner) 0				
0+55	299.0 17.5 0	303.7 12.8 2	05.7 11.1 10	09.2 7.3 20	09.1 7.1 30	09.1 7.1 40	06.7 9.5 50	04.1 12.1 60	06.2 10.3 70	04.9 11.6 75	10.1 6.4 80
	09.4 7.1 90	11.9 4.6 100	12.8 3.7 110	12.7 3.8 120	12.1 4.4 130	13.2 3.3 135					
0+70	13.1 3.4 135	13.2 3.3 130	13.8 2.7 120	12.6 3.9 110	12.2 4.3 100	11.3 5.2 90	10.5 6.0 80	07.0 9.5 70	03.7 12.8 60	03.1 13.4 50	01.8 14.7 40
	02.4 14.1 30	04.1 12.1 20	300.9 15.6 10	296.8 19.7 0							

Elev's on top of dam at buttresses

B.M	10.63	325.63		315.00
T.P.			2.76	322.87
	12.06	334.93		
			4.84	330.09
Buttress #9			4.86	330.07
" 11			4.90	
" 13			4.93	
" 15			4.93	
" 17			4.86	
" 19			4.91	
" 21			4.88	
" 23			4.92	
" 25			4.81	
			4.77	

Iron pin in West end of walkway

Iron pin in Buttress #25 1' North of walkway

Water surface elev. at Hodges 4 P.M. 3/18/36

B.M.			315.00	X on spillway at N. end timber wall
	9.75	324.75		
			9.75	315.00	check on U.S.G.S. B.M. Elev. 315.00
B.M			315.00	
	0.65	315.65		
R.			11.92	303.73	
	2.75	306.48		
	~~5.63~~	~~309.36~~		
			11.41	295.07	Water elev. March 18-1936

3/19/36
clear

Hill
Soper
Remmes
Isbell

Cross section of ground at set "B"

B.M.	0.23	236.23		236.00
			0.07	236.16
	9.50	245.66		
			0.20	245.46
	10.19	255.65		
			0.24	255.41
	9.75	265.16		
			9.16	256.00
			1.16	264.00
0+00	E face "7		5.1	60.1
0+06.4			5.1	60.1
"			5.8	59.4
0+12			5.5	59.7
0+17			10.0	55.2
0+21.7			12.1	53.1

bet. buttresses 7 & 8

X on E. side buttress "7

Elev. on W. side but. "8 at set "B"

" " E. " " 7 " "

level

	L.		R.	
	59.8	59.8	58.5	57.9
	5.4	5.1	6.7	7.3
	4	2	2	4
	60.1	60.2	59.1	58.8
	5.1	5.0	6.1	6.4
	4	2	2	4
		55.7	55.2	
		9.5	10.0	
		4	4	
		54.2	50.1	51.3 50.8
		11.0	15.1	13.9 14.4
		4	4	2 4

Xsec. ground bet. buttresses 9 & 10 set "A"

B.M.	0.23	236.23	236.00	
0+00 E. face but. 9 at elev. 232.		4.3	231.9	
0+03.5		4.0	232.2	
0+10		8.0	28.2	
0+14		13.5	22.7	
0+17		14.5	21.7	
0+20.7	W. sid but. 10	14.6	21.6	

X on E. side but. 9

L.	R.	
32.4	31.8	
3.8 / 4	4.4 / 4	
33.0	31.9	
3.2 / 4	4.3 / 4	
27.8 / 8.1 / 4	27.2	28.6
	9.0 / 2	7.6 / 4
22.8	25.8	25.8
13.1 / 4	10.4 / 2	10.4 / 4
21.1	23.4	
16.1 / 4	12.8 / 4	
21.3	22.8	
14.9 / 4	13.4 / 4	

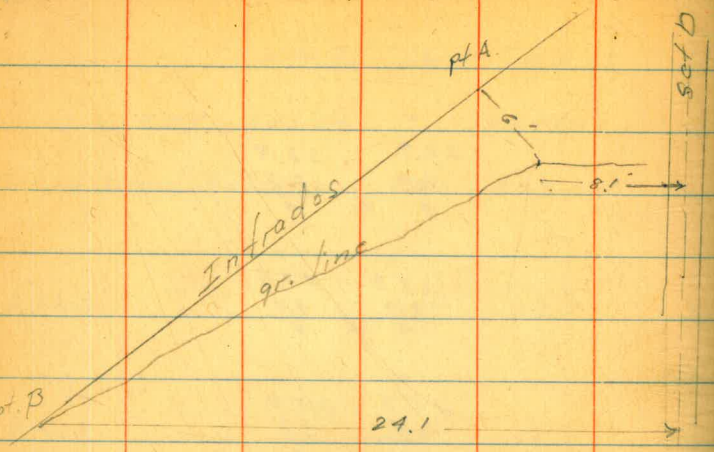
Set "B" bet. # 9 & 10

Station	Description		Rod	Elev.		L	¢	R	
		236.23							
0+00	E side #9 at elev. 233.7		2.5	233.7		34.4 / 1.8 / 4	¢	33.5 / 2.7 / 4	
0+04			1.8	34.4		34.2 / 2.0 / 4	¢	34.4 / 1.8 / 4	
0+15			8.6	27.6		27.2 / 9.0 / 4	¢	27.8 / 8.4 / 2	27.5 / 8.7 / 4
0+20.9	W. side #10		10.5	25.7		25.9 / 10.3 / 4		24.5 / 11.7 / 4	
	Set "C"								
0+00			0.9	35.3	31.1 / 5.1 / 4	31.1 / 5.1 / 3	¢	35.4 / 0.8 / 4	
0+06			3.0	33.2	31.1 / 5.1 / 4	31.1 / 5.1 / 2	¢	35.5 / 0.7 / 2	36.2 / 0.0 / 4
0+15			4.7	31.5	31.0 / 5.2 / 4	31.0 / 5.2 / 2	¢	31.2 / 5.0 / 2	30.7 / 5.5 / 4
0+20.8	W. side #10		5.7	30.5	31.0 / 5.2 / 4	31.0 / 5.2 / 2	¢	30.1 / 6.1 / 2	28.7 / 7.5 / 4

Set "D" bet. "9 + 10

					L.		R.	
	3.71	241.71		238.00				
0+00 E. face "9 at El. 233.1			8.6	233.1	32.9 / 8.8 / 4	℄	32.9 / 8.8 / 4	
0+04			5.4	36.3	35.8 / 6.9 / 4	℄	37.0 / 4.7 / 1	
0+09			3.9	35.8	35.2 / 6.5 / 4	℄	35.8 / 5.9 / 4	
0+14			7.4	34.3	35.2 / 6.5 / 4	35.2 / 6.5 / 2 ℄	32.9 / 8.8 / 2	31.9 / 9.8 / 4
0+20.8 W. side "10			9.9	31.8	32.2 / 9.5 / 4	℄	31.7 / 10.0 / 2	29.4 / 12.3 / 4

Xsec. for excav. at lower end of



B.M.	0.00	234.00		234.00
			2.0	232.0
			0.3	233.7
			10.7	223.3
			8.7	225.3

diag. reint. W. side bot. #10

10

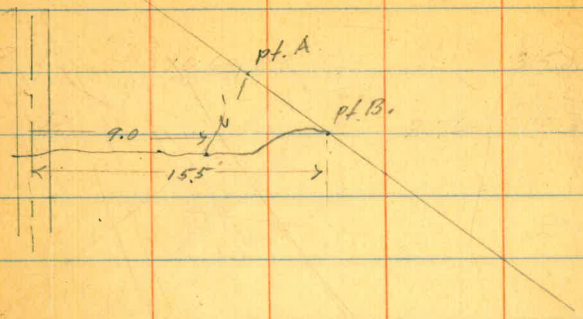
at face of wall pt. A. But. #10

1' W. of bot. #10 at pt A.

at face of wall pt B. " "

1' W. of bot #10 at pt B.

X see. for excav. at lower end of diag. cut. E side of but. #9



B M	-3.0	236.00		239.00
			4.8	ht face of wall pt. A
			3.9	" 1' E. of pt. A
			3.2	" face of wall pt. B
			1.9	" 1' E. of pt. B

Hill 3/20/36
Soper
Remmon clear
Isbell

Xsec ground bet. but "11 & 12 Set "A"

B.M.	5.07	221.07	216.00
0+00 E. face but. "11 at 216.		11.2	209.9
0+03		10.8	10.3
0+06		7.1	14.1
0+16		6.7	14.4
0+18		11.0	10.1
0+20.2		10.9	10.2

Set "B"

0+00 E face "11 at El. 212.		8.1	212.7
0+04		7.6	13.5

X on E. side but. "11

	L.	R.
10.3	10.8 / 4 ℄	09.9 11.2 / 4
	10.7 / 10.4 / 4 ℄	10.5 / 10.6 / 4
	14.3 / 6.8 / 4 ℄	13.7 / 7.4 / 4
	14.4 / 6.7 / 4 ℄	13.1 / 8.0 / 4
	10.9 / 10.2 / 4 ℄	09.5 / 11.6 / 4
	10.8 / 10.3 / 4 ℄	09.4 / 11.7 / 4
	13.4 / 7.7 / 4 ℄	12.0 / 9.1 / 4
	13.5 / 7.6 / 4 ℄	12.7 / 8.4 / 4

Set "B" (cont.)

221.07

0+07		4.3	16.8
0+15		5.8	15.3
0+17.5		7.2	13.9
0+20.3		7.8	13.3

Set "C"

0+00 E. face "11 at		5.8	215.3
0+02		5.9	15.2
0+06		4.1	17.0
0+12		5.8	15.6
0+17		8.1	13.0

	L	R
	16.6 4.5 4	16.8 4.3 4
	15.8 5.3 4	15.1 6.0 4
13.3 7.8 4	14.0 7.1 2	13.5 7.6 4
	13.4 7.7 4	13.3 7.8 4
	14.4 6.7 4	14.1 6.7 4
	14.4 6.7 4	14.4 6.7 4
	17.1 4.0 4	17.1 4.0 4
	15.0 5.1 4	15.8 5.3 4
	11.9 9.2 4	13.1 8.0 2
		12.5 8.6 4

Set C. (cont.)

221.07

0+20.3	10.3	10.8

Set "D"

0+00 E. face "11	9.1	11.7
0+02	9.6	11.5
0+05	5.6	15.5
0+13	5.2	15.9
0+15	8.6	12.5
0+20.2	10.8	10.3

	L.	R.
	10.2	11.3
	10.9	9.8
	4 ℄	4
	10.5	11.7
	10.6	9.1
	4 ℄	4
	11.9	12.2
	9.2	5.9
	4 ℄	4
	15.3	15.5
	5.8	5.6
	4 ℄	4
	16.5	15.9
	4.6	5.2
	4 ℄	4
	10.8	11.7
	10.3	9.4
	4 ℄	4
	09.2	10.7
	11.9	10.4
	4 ℄	4

X'sec. of ground bet. buts 13+14

Hill
Soper
Remmer
Isbell
3/21/36

Set A

X on E. side but #13

					L.	R.	
B.M.	2.87	215.87		213.00			
0+00 E. face #13		8.8	07.1	✓	08.3 ✓ 7.6 / 4	07.4 ✓ 8.5 / 2	06.8 ✓ 9.1 / 4
0+02.5		7.2	08.7	✓	08.3 / 7.6 / 4	09.1 / 6.5 / 4	✓
0+16		9.4	06.5	✓	06.7 / 9.2 / 4	06.9 / 9.0 / 4	✓
0+20		9.9	06.0	✓	06.2 / 9.7 / 4	06.0 / 9.9 / 4	✓
	Set "B"						
0+00 E. face #13		6.5	09.4	✓	09.5 / 6.4 / 4	09.1 / 6.8 / 4	✓
0+08		6.6	09.3	✓	09.7 / 6.2 / 4	09.1 / 6.8 / 4	✓
0+20.1		7.2	08.7	✓	09.0 / 6.9 / 4	08.8 / 7.9 / 4	✓
	Set "C"						
0+00 E. face #13		5.6	10.3	✓	10.9 / 5.0 / 4	09.8 / 6.1 / 4	✓

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0+03		5.6	10.3	✓
0+06		5.2	10.7	✓
0+17		5.6	10.3	✓
0+20.2		6.5	09.4	✓

Set "D"

0+00 E face #13		7.7	08.2	✓
0+02		7.6	08.3	✓
0+06		4.5	11.4	✓
0+13		7.0	08.9	✓
0+18		6.3	09.6	✓

	L	R.		
	✓ 10.6	09.6 ✓		
	5.3	6.3		
	4	4		
	✓ 10.3	11.0 ✓		
	5.6	4.9		
	4	4		
rock	11.6 ✓ 4.3	10.1 ✓ 5.8	10.0 ✓ 5.9	09.3 ✓ 6.6
	4	2	2	4
	✓ 09.2	09.0 ✓	09.5 ✓	
	6.7	6.9	6.4	
	4	2	4	
	✓ 08.6	08.5 ✓		
	7.3	7.4		
	4	4		
	✓ 08.9	08.8 ✓		
	7.0	7.1		
	4	4		
	11.6 ✓	11.0 ✓	11.3 ✓	10.6 ✓
	4.3	4.9	4.6	5.3
	4	2	2	4
	✓ 09.5	08.9 ✓		
	6.4	7.0		
	4	4		
	09.0 ✓	09.4 ✓	09.1 ✓	07.4 ✓
	6.9	6.5	6.8	8.5
	4	2	2	4

Set "D" (cont.)

21587

07:20.2 7.0 08.9 ✓

L & R

08.4 07.8 ✓
7.5 8.1
4 & 4

Xsec. ground bet. bots 15 + 16 at set "A" 3/21/36

					L.	R.	
BM	1.86	208.86		207.00			
0+00 E. face "15		5.2	03.7	✓	03.9 / 5.0 / 4	03.9 / 5.0 / 4	✓
0+02		5.1	03.8	✓	04.0 / 4.9 / 4	04.2 / 4.7 / 4	✓
0+04		3.4	05.5	✓	04.9 / 4.0 / 4	05.9 / 3.0 / 4	✓
0+16		4.1	04.8	✓	04.3 / 4.6 / 4	04.7 / 4.2 / 4	✓
0+18		6.2	02.7	✓	02.7 / 6.2 / 4	02.4 / 6.5 / 4	✓
0+20.2		6.3	02.6	✓	02.7 / 6.2 / 4	02.5 / 6.4 / 4	✓
Set "B"							
0+00		5.7	03.2	✓	03.1 / 5.8 / 4	03.1 / 5.8 / 4	✓
0+03		5.7	03.2	✓	03.1 / 5.8 / 4	03.2 / 5.7 / 4	✓
0+06		4.7	04.2	✓	04.4 / 4.5 / 4	04.1 / 4.8 / 4	✓

Set B (cont.)

208.86

0+14		5.0	03.9	✓
0+19.9		5.7	03.2	✓
	Set "C"			
0+00		5.9	03.0	✓
0+05		5.4	03.5	✓
0+16		5.4	03.5	✓
0+19.9		6.1	02.8	✓
	Set "D"			
0+00		6.9	02.0	✓
0+03		7.3	01.6	✓
0+05		44	04.5	✓

	L.	R.	
✓	03.8 / 5.1 / 4 ℄	04.0 / 4.9 / 4	✓
✓	03.2 / 5.7 / 4 ℄	03.4 / 5.5 / 4	✓
✓	02.9 / 6.5 / 4 ℄	03.5 / 5.4 / 4	✓
✓	03.7 / 5.2 / 4 ℄	03.6 / 5.3 / 4	✓
✓	03.5 / 5.4 / 4 ℄	03.5 / 5.4 / 4	✓
✓	02.6 / 6.3 / 4 ℄	03.0 / 5.9 / 4	✓
✓	01.7 / 7.2 / 4 ℄	01.9 / 7.0 / 4	✓
✓	01.7 / 7.2 / 4 ℄	01.9 / 7.0 / 4	✓
✓	04.9 / 4.0 / 4 ℄	04.1 / 4.8 / 4	✓

Set "D" (cont)

20886

						upstream	L.		R. — Downstream	
0+11		5.5	03.4	✓		✓	03.7 5.2 4	℄	03.2 5.7 4	✓
0+17		5.8	03.1	✓		✓	03.0 5.9 4	℄	02.9 6.0 4	✓
0+19.9		7.1	01.8	✓		✓	01.5 7.4 4	℄	01.2 7.7 4	✓

X'sec. ground bet. bchs 19 & 20

B.M.	2.00	222.00		220.00
0+00 E. side "19			15.1	206.9
0+05			12.0	210.0
0+08.5			8.7	213.3
0+10.5			2.8	219.2
0+20.1	Set "B"		3.5	218.5
0+00 E. side "19			14.5	210.5
0+03			11.1	210.9
0+10			8.0	214.0
0+11			4.0	218.0

Set "A"

X on W. wall but. "20

	L.	R.
	07.2	07.1
	14.8	14.9
	4	4
	10.7	11.3
	14.3	10.7
	4	4
	12.5	12.9
	9.5	9.1
	4	4
	18.7	19.4
	3.3	2.6
	4	4
	18.1	18.8
	3.9	3.2
	4	4
	11.5	09.6
	10.5	12.1
	4	4
	12.7	10.0
	9.3	12.0
	4	4
	14.7	13.6
	7.3	8.4
	4	4
	17.7	18.1
	4.3	3.9
	4	4

Set "B" (cont.)

					L.	R.
	222.00					
0+20.4		4.3	17.7		17.9 / 4.1 / 4	17.8 / 4.2 / 4
	Set "C"					
0+00		9.3	12.7		09.7 / 12.3 / 4	13.7 / 8.3 / 4
0+08		6.2	15.8		15.2 / 6.8 / 4	16.3 / 5.7 / 4
0+06		2.3	19.7		19.4 / 2.6 / 4	19.9 / 2.1 / 4
0+14		4.0	18.0		18.3 / 3.7 / 4	18.0 / 4.0 / 4
0+20.4		5.8	16.2		17.0 / 5.0 / 4	17.1 / 4.9 / 4
	Set "D"					
0+00		16.1	05.9		06.4 / 15.6 / 4	05.7 / 16.3 / 4
0+07		12.7	09.3		10.4 / 11.6 / 4	09.2 / 12.8 / 4

Set "D" Contd.

	222.00			
0+09		4.7	17.3	
0+16		5.8	16.2	
0+20.3		6.2	15.8	

Lt.	&	Rt.
17.4		16.6
4.6		5.4
4		4.0
15.3		16.4
6.7		5.6
4		4
13.3		16.4
8.7		5.6
4		4

X-sect. of ground bet. Butts 21-22 Set "A"

B.M	9.31	254.31		245.00	
0+00			12.5	41.8	✓
0+18			3.7	50.6	✓
0+21.4			4.0	50.3	✓
		Set "B"			
0+00			14.0	40.3	✓
0+02			13.4	40.9	✓
0+08			8.8	45.5	✓
0+15			6.6	47.7	✓
0+21.2			7.7	46.6	✓

x on East side but #21

Lt.	Rt.
41.5	42.1 42.6
12.8 / 4	11.9 / 2 11.7 / 4
50.2	50.3 51.0
4.1 / 4	4.0 / 2 3.3 / 4
50.5	51.0
3.8 / 4	3.3 / 4
40.2	40.8
14.1 / 4	13.5 / 4
40.4	40.9
13.9 / 4	13.4 / 4
44.2 45.2	44.9
10.1 / 4 9.1 / 2	9.4 / 4
46.7	48.8
7.6 / 4	5.5 / 4
45.0 46.5	48.5
9.3 / 4 7.8 / 2	5.8 / 4

Set "C"

254.31

				Lt	Rt
0+00		15.3	39.0 ✓	36.5 ✓ / 17.8 / 4	39.3 ✓ / 14.8 / 4.0
0+13		9.9	44.1 ✓	44.5 ✓ / 9.8 / 4	44.9 ✓ / 9.4 / 4
0+15		10.3	44.0 ✓	44.5 ✓ / 9.8 / 4	44.3 ✓ / 10.0 / 4
0+19		14.0	40.3 ✓	38.2 ✓ / 16.1 / 4	40.7 ✓ / 13.6 / 4
0+21.2		14.9	39.4 ✓	38.0 ✓ / 16.3 / 4	40.7 ✓ / 13.6 / 4

X'sec. ground bet. buts 17 & 18

Set "A"

B.M.	0.00	202.34		202.34
0+00			2.5	199.8 ✓
0+06			1.0	201.3 ✓
0+20			1.0	201.3 ✓

Set "B"

0+00 E. face "17			2.3	200.0 ✓
0+10			1.9	200.4 ✓
0+20			1.8	200.5 ✓

Set "C"

0+00 E. face "17			2.5	199.8 ✓

Hill
Soper
Rammen
Isbell

3/23/36
cloudy

L & R.

✓	199.8 / 2.5 / 4	199.8 / 2.5 / 4 ✓
✓	201.0 / 1.3 / 4	201.3 / 1.0 / 4 ✓
✓	201.6 / 0.7 / 4	201.4 / 0.9 / 4 ✓
✓	199.9 / 2.1 / 4	200.3 / 2.0 / 4 ✓

level

✓	200.9 / 1.4 / 4	200.5 / 1.8 / 4 ✓
✓	199.9 / 2.1 / 4	199.8 / 2.5 / 4 ✓

Set "C" (cont.)

202.34

0+10	2.5	199.8	✓
0+20	1.8	200.5	✓

Set "D"

0+00	3.0	199.3	✓
0+04	1.7	200.6	✓
0+12	1.2	201.1	✓
0+15	+0.6	202.8	✓
0+20	0.7	201.6	✓

	L	℄	R
	level		
✓	200.4 1.9 4		200.5 ✓ 1.8 4
✓	199.3 3.0 4		200.3 ✓ 2.0 4
✓	200.7 1.6 4		200.5 ✓ 1.8 4
✓	200.7 1.6 4		200.5 ✓ 1.8 4
? ✓	203.0 201.6 +0.7 4		201.3 +0.3 4
✓	201.9 0.1 4		201.3 ✓ 1.0 4

Ground elev. and dist from set "C" to where diag. reinf. intersects ground at arch.

9 3/23/36

B.M.	0.00	238.00		238.00
			7.0	231.00

xon W. wall but. "9, Set "C" top of walk

Buttress	Side	El. gr. at arch	Dist. from ℄ set "C"
9	W	247.0	24.6
9	E	232.8	38.5
10	W	230.1	40.6
10	E.	222.5	47.6
11	W	217.9	53.7
11	E.	214.5	57.1
12	W	212.1	59.0
12	E	212.9	58.2
13	W	212.3	58.4
13	E.	208.8	62.4
14	W.	"	"
14	E.	206.7	64.2

Buttress	Side	El ground at arch	Dist. from ℄ set "C"	
15	W	204.3	66.0	
15	E.	201.6	69.0	
16	W.	203.1	68.0	
16	E.	208.2	62.8	} concr. foundation of blowoffs.
17	W	208.2	62.8	
17	E.	202.2	68.5	
18	W.	200.9	69.6	
18	E.	205.0	66.5	221.5
19	W	205.0	66.5	
19	E	209.4	61.9	
20	W	209.4	61.9	
20	E	212.3	58.9	

(cont.)

Buttress	Side	El gr. at arch	Dist. from & set "C"
21	W	221.3	49.9
21	E.	232.7	36.2
22	W	237.2	31.7 From & A'
22	E.	258.2	63.9
23	W.	268.5	53.5
23	E	277.5	45.0
24	W	281.6	41.0
24	E.	289.6	32.8

Elev. of 3' offset points set on side of buttresses at sets A, B, C & D.

Buttress	Elev of point
7	264.
8	256.
9	239.
10	238.
11	216.
12	216.
13	213.
14	212.
15	207.
16	207.
17	205.
18	205.
19	219.
20	220.

Buttress	Elev. of point
21	215.
22	252. Set A
	217. " B
	215. " C

Grades in Spillway

Sta.	Grade	Gr.elev.		Sta.	Grade	Gr.elev.		Sta.	Grade	Gr.elev.	
0+00-0	313.7	311.6	-7.1	0+00-0	312.0	310.4	-1.6	0+18.0	311.0	309.2	-1.8
20W	"	13.4	-0.3	20W		12.6	+0.6	20W		311.2	+0.2
40	"	13.6	-0.1	40		13.3	+1.3	40		11.4	+0.4
50	"	11.5	-2.2						311.0 back		+0.8
60	"	12.3	-1.4	50		11.6	-0.4	50	310.6 ahead	11.8	+1.2
70		11.3	-2.4	60		11.5	-0.5	60		09.7	-0.9
75		13.2	+0.5	75	312.0 back 313.3 ahead	11.3	-0.7 -2.0	75	310.6 back 312.8 ahead	11.1	+0.5 -1.3
90		11.3	-2.5								
~~80~~		~~12.7~~	~~+1.0~~	80		10.4	-2.9	80		11.9	-0.5
100		13.7	0.0	100		10.9	-2.4	100		12.7	+0.3
120		13.9	+0.2	120		14.0	+0.7	120		13.5	+1.1
140		15.7		140		14.0	+0.7	140		12.1	-0.3
145		14.6		145		13.0	-0.3				

Hill Hough 4/1/36 clear

(cont.)

Sta.	Grade	Gr. elev		Sta.	Grade	Gr. elev		Sta.	Grade	Gr. elev	
0+30-0	310.0	307.6	-2.4	0+40-0	309.3	304.9	-4.4	0+48-0	308.5	302.1	-6.4
20W		311.5	+1.5	20W		10.2	+0.9	20W		08.8	+0.3
40		311.4	+1.4	40		11.3	+2.0	40W		09.1	+0.6
50	310.0 back 308.1 ahead	09.9	-0.1 +1.8	50	309.3 back 305.7 ahead	09.3	0.0 +3.6	50	308.5 back 304.5 ahead	10.0	+1.5 +5.5
60		310.1	+2.0	60		09.8	+4.1	60		03.8	-0.7
75	308.1 back 311.5 ahead	09.9	+1.8 -1.6	75	305.7 back 310.7 ahead	09.9	+4.2 -0.8	75	304.5 back 310.0 ahead	08.1	C3.9 -1.6
80		10.5	-1.0	80		11.0	+0.3	80		10.4	+0.4
100		12.5	+1.0	100		10.6	-0.2	100		09.6	-0.4
120		12.8	+1.0	120		12.6	+1.9	120		12.4	+2.4
135		11.8	+0.3	135		14.0		130		11.8	+1.8

Add. sections along spillway lip.

B.M.	5'-0	320.1	314.6	
0+03.0		9.4	310.7 ✓	0+03 = 3' S. of edge of concrete
10W		7.6	12.5 ✓	0 for distances = W. face of
20		7.3	12.8 ✓	corner retaining wall ✓
30		7.4	12.7 ✓	
40		6.6	13.5 ✓	
5-0		8.7	11.4 ✓	
60		7.9	12.2 ✓	
70		9.1	11.0 ✓	
75		7.2	12.9 ✓	
80		8.5	11.6 ✓	
90		9.1	11.0 ✓	
100		8.4	11.7 ✓	
110		6.6	13.5 ✓	
120		6.2	13.9 ✓	
130		5-8	14.3 ✓	
140		5-1	15.0 ✓	
148		5.7	14.4 ✓	

See pages 293

Spillway April 18-36

Hill
Hough
Baur
Brackmann

Final — X See. Before. Concrete poured

0.73 316.73 315.00

0+00	311.6	312.0	313.4	313.4	313.0	313.9	313.5	311.4	312.4	313.2	313.3	313.1	313.2	313.7	313.5	313.3	313.4	313.08			
	4.1	3.7	2.3	2.3	2.7	1.8	2.7	4.3	3.3	2.5	2.4	2.6	2.5	2.0	2.2	2.4	2.3	1.65			
	0	7	10	20	30	35	40	50	60	70	80	90	100	110	120	130	140	149			
0+03	314.88	312.6	313.5	313.1	313.0	312.9	313.6	311.3	312.3	312.9	313.0	313.2	313.3	313.4	313.8	313.1	313.1	313.4	313.7		
	4.85	3.1	2.7	2.6	2.7	2.8	2.1	4.4	3.4	2.8	2.7	2.5	2.4	2.3	1.9	2.6	2.6	2.3	2.0		
	0	10	15	20	30	35	40	50	60	70	80	90	100	110	115	120	130	140	149.8		
0+06	310.48	311.7	311.2	312.1	312.5	312.6	312.8	311.5	310.1	311.2	312.5	312.6	312.7	313.1	313.0	313.3	313.7	313.2	312.9	312.5	313.1		314.7
	5.25	4.0	4.5	3.6	3.2	3.1	2.9	4.2	5.6	4.5	3.2	3.1	3.0	2.6	2.7	2.4	2.0	2.5	2.8	3.7	2.6		1.5
	0.0	5.0	10	15	20	30	40	50	55	62	66	70	80	90	100	110	115	120	130	140	148		148.9
0+13	308.8	310.2	310.8	311.1	311.6	312.0	311.0	310.3	309.5	309.9	312.0	311.8	311.8	311.9	311.7	311.4	312.4	312.3	312.1	312.5	312.8	313.7	Top Conc. Grade
	6.9	5.5	4.9	4.6	4.1	3.7	4.7	5.4	6.2	5.8	3.7	3.9	3.9	3.8	4.0	4.3	3.3	3.2	3.4	3.6	3.6	2.9	2.0
	0.0	10	20	30	35	40	50	55	60	63	65	70	80	90	100	108	110	115	120	130	140	145.	150
0+18	309.2	309.5	310.6	310.5	310.9	310.4	310.3	310.2	309.4	310.8	310.8	310.7											313.3
	6.5	6.2	5.1	5.2	4.8	5.3	5.4	5.5	6.3	4.9	4.9	5.0											2.4
	0.0	10	15	20	30	40	50	60	63	65	70	80	90	100	110	115	120	130	140				143.
0+30	307.1	308.6	308.7	308.8	309.3	309.1	308.1	308.5	309.0	309.7	309.0	309.1											312.3
	8.0	7.1	7.0	6.9	6.6	6.6	7.0	7.2	6.7	4.5	6.7	6.6											3.4
	0.0	10	20	25	30	40	50	60	70	80	90	100	105	110	120	125	130	135					136.4

April — 20 — 1936

Hill-Hough-Baur-Brackman

0.86 315.86 315.00

2.68 312.39 6.15 309.71

4-21-36	306.9	307.2	305.2	305.7	306	308.4	308.1	308.1	308.0	308.2	308.3	308.7	308.7	308.7	309.3	311.3	310.8	311.0	312.0		
0+35	5.5	5.2	7.2	6.7	3.8	4.0	4.3	4.3	4.4	4.2	4.1	3.7	3.7	3.7	3.1	1.1	1.6	1.4	0.4		311.9
	0.0	6.	6.	10	12.	20	30	40	50	60	70	80	90	100	106.	110	120	130	132.3		

Spillway Cont. 4-20-36

312.39

0+40
050 07.3 07.1 07.4 07.3 07.3 07.1 04.4 04.4 07.2 06.4 07.2 07.6 07.4 07.6 09.0 10.6 10.6 10.8 311.5
7.4/00 5.1/7.0 5.3/10. 5.0/20 5.1/30 5.1/40 5.3/50 8.0/53 8.0/56 5.2/60. 6.0/65 5.2/70 4.8/80 5.0/90 4.8/100 3.4/108 1.8/110 1.8/120 1.6/129 0.9/130

0+45.8
Top N.
03.4 06.3 06.3 06.0 06.7 06.6 06.3 06.2 06.3 03.6 04.4 03.7 05.3 06.2 06.6 06.8 07.1 07.2 09.6 10.1 10.0 311.2
9.0/0.0 6.1/7.0 6.1/10 6.4/15 5.7/20 5.8/30 6.1/40 6.2/50 6.1/53 8.8/58 8.0/60 8.6/66 7.1/70 6.2/72 5.8/80 5.6/90 5.3/100 5.2/104 2.7/110 2.3/120 2.4/126 1.2/129.2

Trench 30"
0+45.8
Trench Bottom
07.4 02.0 299.7 297.5 97.2 97.7 300.2 300.2 299.8 299.8 299.8 300.0 299.6 99.2 98.7 98.2 99.2 99.5 02.6 03.8
4.82 4.77 4.73 4.73 4.9 4.8 4.8 4.9
5.0/0.00 10.4/1.2/0.4 12.7/2.0/1.2 10.1/6.0 10.4/10. 10.0/15.0 7.5/15.6 12.2/20 12.6/30 12.6/40 12.6/50 12.4/60 12.8/70 13.2/81.5 9.3/82.5 9.4/90 8.4/100 8.0/101 9.8/103 8.6/106.5

05.1 08.4 08.6 08.9 311.0
7.3/107.5 4.0/114. 3.8/120 3.5/126. 1.4/128.8

12.39
1.46/10.93 Form (N. 5.25/107.14/100.) 5.06/107.33 5.23 311.0

T.P. 2.67 309.72
Check
B.M. 7.08 316.80 1.80

0+08.5
312.39 Nail
5.22
307.17 ✓

0+48.3
S-Top Trench

Final Xsec's for Sets B + A?

BM.	-4.0	260.0	264.0

Set A

	-4.0	260.0	264.0

Set B

between buttresses 7-8 36

9/4/36
Hall
Breakaway

260.0	260.0	254.6	253.0	252.0	242.0	241.5	241.5	242.1	243.8
0.0	0.0	5.1	7.0	8.0	18.0	18.5	18.5	17.9	16.2
Eface 7	6.3	6.3	9	10	12	14	16	18	W face 8

260.0	260.0	257.0	254.0	246.2	245.3	244.1	244.6	245.2
0.0	0.0	3.0	6.0	13.8	14.7	15.3	15.4	14.8
Eface 7	6.2	6.2	9	10	13	16	18	W face 8

Final Xsecs for Sets A.B.C & D

Set A

-8.5	230.5	239.0

B

-5.1	233.6	239.0

C

5.5	236.5	231.0

D

0.0	235.0	236.00

between buttresses 9-10 .37

Hill 6/24/36
Brackman

229.0	227.0	227.1	226.1	220.5	219.3	218.3	215.9	212.9
1.5	3.5	3.1	4.0	10.0	11.4	12.2	14.6	17.6
E face 9	1	6	9	13	16	18	18	20±

230.1	229.9	228.4	227.9	225.0	223.0	
3.2	3.7	5.2	5.7	8.6	10.6	
E face 9	6	6	10	17	20±	W. face 9-10

229.5	229.5	230.1	229.9	228.2	227.9	220.0	
7.0	7.0	6.9	6.6	8.3	8.6	16.5	
E face 9	1	6	8	10	12	20±	E face

231.5	229.9	229.4	229.1	223.3		
3.5	5.1	5.6	5.6	11.7		
E face	3	5	13	20±	E face 10	

original on Page 7

Final Xsecs for Sets A B C+D between buttresses 11-12

Sets A.B. by Hill + Brockmann 5/13/36

Set A	-6.0	210.00	216.00	208.2 / 1.8 E.face #11; 208.2 / 1.8 / 10; 208.5 / 1.5 / 12; 209.0 / 1.0 / 14; 207.4 / 2.6 / 20± W.face #12
Set B	-4.0	212.0	216.00	209.5 / 2.5 E.face #11; 210.2 / 1.8 / 4; 208.8 / 3.2 / 9; 208.3 / 3.7 / 12; 210.2 / 1.8 / 14; 208.6 / 3.4 / 16; 209.2 / 2.8 / 20± W.face #12
Set C	-6.0	210.0	216.00	209.8 / 0.2 E.face; 207.5 / 2.5 / 3; 207.5 / 2.5 / 7; 206.0 / 4.0 / 9; 205.6 / 4.4 / 12; 205.4 / 4.6 / 14; 205.4 / 4.6 / 20± W.face #12
Set D	0.0	216.00	216.00	209.9 / 6.1 E.face #11; 209.7 / 6.3 / 4; 206.1 / 9.9 / 10; 205.8 / 10.2 / 13; 203.4 / 12.6 / 20± W.face #12

original Ground Page #13

3' footing to elev. 210.0 = class -3-

Original Ground Page 14

N.B. 4' footing to el. 207.3 = class -3-

Final Xsecs for sets A.B. C & D

-6.0 207.0 213.00

Set A

Set B

Mag 9 HI 209.0 ℄

Set C

HI 209.0 ℄

-3.8 208.2 212.00

Set D

bet. buttresses 13-14

sets A & D by Hill 5/15/36
Brackmann

205.6	206.0	205.8	205.0	203.3	203.0	203.1	203.2
1.3	1.0	1.2	2.0	3.7	4.0	3.3	3.8
E face 13	3	7	10	13	15	17	19.8± W face 14

E Face

208.1	208.1	207.4	207.7	207.2	208.0	207.8	207.4
0.9	0.9	1.6	1.3	1.8	1.0	1.2	1.6
0	2	5.0	7.5	9	12	18	20

W Face

E.F.

207.0	208.0	207.8	207.2	208.5	207.7
2.9	1.0	1.2	1.8	0.5	1.3
0	5	9.5	14.	15	20.15

W F

✓ 206.5	✓ 206.2	✓ 206.0	✓ 206.5	✓ 206.9	✓ 206.4	✓ 206.2
1.7	2.0	2.2	1.7	1.2	1.8	2.0
E face 13	1	8	10	12	16	19.8± W face 14

Final Xsec's for sets A B C & D bet. buttresses 15-16

B.M. -3.0 204.00 207.00

Set A by Hill & Brachman 5/13/36

Set A

✓ 199.3	✓ 198.6	✓ 198.8	✓ 201.3	✓ 199.1	✓ 199.6
4.7	5.4	5.2	2.7	4.3	4.4
E. face is	4	12	14.5	17	19.7 ± W. face 16

Set B

May 9. HI 201.0 ℄

E Face

199.6	99.8	200.5	199.5	200.1	199.0	199.0
1.4	1.2	0.5	1.5	0.9	20	2.0
00	3	6	8.5	11	14.	19.85

Set C

May 9 " HI 203.0 ℄

200.8	200.0	201.3	201.6	200.7	200.6	201.0	200.0
2.2	3.0	1.7	1.4	2.3	2.4	2.0	3.0
0	6	6.5	8.5	10	12.5	16.0	19.85

Set D

May 9. " HI 203.0 ℄

W Face

200.0	199.4	200.0	199.6	199.9	200.6
3.0	3.6	3.0	3.4	3.1	2.4
0	5	7	10	12	19.85

9.35

Final Xsec's for sets A.B.C+D bet. buttresses 17-18

Set A

-8.0 200.00 205.00

✓	✓	✓	✓	✓	✓	✓
198.5	198.0	199.1	198.5	198.9	199.6	199.0
1.5	2.0	0.9	1.5	1.1	0.7	1.0
E. face 17	4	6	8	12	15	17

19.6 ± W. face 18

Set B

May 9 HI 200.0

E Face.

	198.0	199.0	199.3
℄	2.0	1.0	0.7
	0	10.0	19.85

Set C

May 9 HI 201.0

	E. Face.						W. Face.
	198.7	199.0	199.0	199.0	199.7	200.0	199.0
upStream	2.3	2.0	2.0	2.0	1.3	1.0	2.0
	0	3.5	9.5	14.0	15.0	17.0	19.75
Down Stream	2.3	2.0	2.0	2.0	1.3	1.0	2.0
	0	3.5	9.5	14.0	15.0	17.0	19.75

Set D

May 9 HI 203.0

	198.7	98.7	200.2	200.3	200.8	201.9	202.6	201.9	201.9	201.3	200.8
up Stream	4.3	4.3	2.8	2.7	2.2	1.1	0.4	1.1	1.1	0.7	2.2
	00	1.2	2.6	4.5	12.0	13.8	15.0	16.5	18.5	18.5	19.95

Down Stream: E Face Same. W. Face

Final Xsecs for sets A.B.C & D

Set A

-0.3 218.7

B

-0.3 218.7 219.00

C

-11.8 207.2 219.00

D

-11.8 207.2 219.00

bet. buttresses 19-20

Hill 6/25/36
Brackmann

Set A

14.0	12.2	12.3	9.6	10.0	4.6	4.1
E.face 19	4	6	11	16	18	20 ± W face

B

13.3	12.3	11.8	11.0	11.2	8.2	9.7
E.face	4	8	10	17	18	20 ± W face

add. meas. by Brackmann 7/17/36

2.0	0.0	0.1	0.1	+1.6	
E.face 19	19	14	18	20 ± W.face 20	

add. meas by Brackmann 7/17/36

2.0	0.4	0.4	+1.0	
E.face 19	19	17	20 ± W.face 20	

orig page 21-

Xsecs of concrete apron roll

5/20/36 Hill Brachmann

B.M.	0.64	315.64	316.00			
0+03			314.22	314.29	314.49	314.45
			1.42	1.35	1.15	1.19
			94	105	110	120
0+06			313.75	313.87	314.24	314.22	314.20
			1.89	1.77	1.40	1.42	1.44
			94	104	109	120	130
0+13			312.65	312.84	313.62	313.65	313.63
			2.99	2.80	2.02	1.99	2.01
			94	103	109	120	130
0+18			311.81	312.08	313.12	313.21	313.22
			3.80	3.56	2.52	2.43	2.42
			94	102	109	120	130
0+30			309.96	310.34	311.02	312.17	312.34	312.32
			5.68	5.30	4.62	3.47	3.30	3.31
			94	100	105	109	120	130
0+35			309.20	309.66	310.31	311.76	311.94	311.91
			6.44	5.98	5.30	3.88	3.70	3.73
			94	100	104.5	109	120	130
0+40			308.44	309.00	309.74	311.42	311.64	311.59
			7.20	6.64	5.90	4.22	4.09	4.05
			94	99.2	104	109	120	130
0+45.8			307.54	308.10	309.03	310.88	311.09	311.07	311.11
			8.10	7.54	6.59	4.76	4.57	4.53
			94	98.6	103.7	109	1+11	113	129
0+48.3			307.18	307.79	308.69	310.70	310.92	310.91
			8.46	7.85	6.95	4.91	4.72	4.73
			94	98.6	103.7	109	111	127

8/4/36 Hill
Brachman

Original ground elevs. at Sets A + B Bay 7-8.

	-4.0	260.00	264.00
Set A			
	6.00	264.00	261.0
Set B			

260.0	260.0	255.4	255.1	258.0	257.1	251.0	250.5
0.0	0.0	4.6	4.3	2.0	2.3	6.0	5.5
Elev 7	6.3	6.3	8.0	11	13	16	20'± Width 8

260.2	260.2	260.0	259.1	260.4	259.3	256.9	251.0
3.8	3.8	4.0	4.3	3.6	4.7	7.1	10.0
0 Elev 7	6.3	6.3	10	12	14	16	20'±

Final Cross-sections Sets A, B & C Bay 21-22

	5.00	250.00	245.00							
Set A				233.9	233.0	237.9	238.2	246.6	247.6	249.4
				17.0	17.0	12.1	11.8	3.4	2.4	0.6
				E. face 21	4	6	8	13	17	20± W face 22
	0.0	242.00	237.0	231.1	230.9	230.0	235.1	235.3	237.1	238.1
Set B				15.3	17.0	17.0	11.3	11.7	9.9	8.3
				E face 21	3	4	6	8	9	13
	0.00	246.00	241.00	227.9	227.3	226.8	231.2	236.3	238.4	238.3
Set C				16.2	17.7	18.2	7.8	8.5	6.6	6.7
				E. face 21	2	5	13	18	19	20±

Aug-26-1936- Excavation-

By F. Brockmann

Ground line

Buttress 22 E- @ A. El. 263.0

" " " @ B. 261.0

Rt. angles to Butt. level 4'

or across Bay.

Buttress 7 Set B. ground line

West side El. 266.0 Level 4' out.

After excav.

El. bot. 261.5

Ar. dim. 2'x 2'

9/22/36 Hill Brachmann

Addl. meas. taken to show what excav. was actually done by Contr.

Buttress

22 E El. gr. 264.0 11.5 from intrados (hor.) Av. W. 4'

22 W Av. W. 5'

21 E El. gr. 241.0 - 11.5 from intrados (hor.) Av. W. 4'.

21 W Bot. width Av. 4' top 6' under side 1' (hor.)

20 E Water

20 W Av. W. 6'

19 E Av. W. 4'

18 E Av. W. 2.5'

16 W " W. 4'

15 W " W 4'

14 W " W 4'

13 W " W 3'

12 W " W 4

12 E

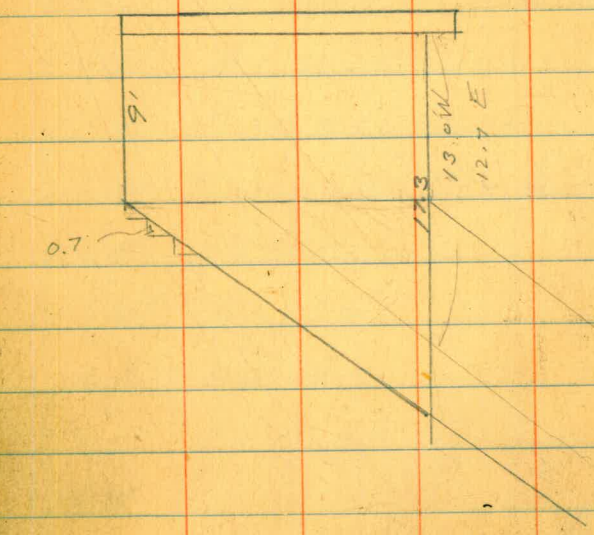
11 W " W. 4'

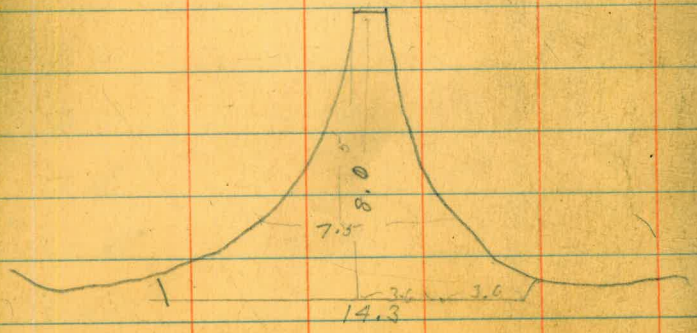
10 W " W 4'

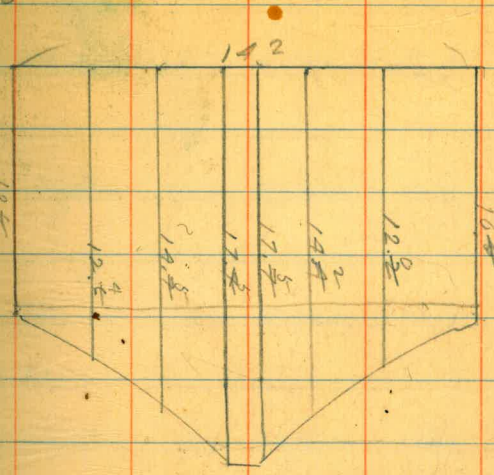
9 W " W 6' " " 1'

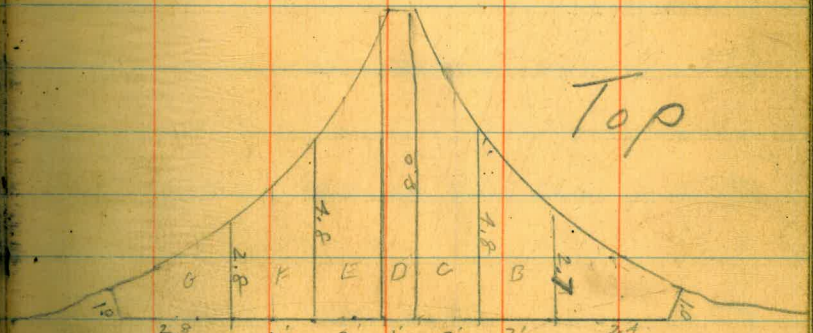
Void rec book 1 45

Meas. for But. "24 Reint. 12/16/36









Levels over P Line - Foster north

Hill
Isbell
Lockey
Brooks

10/28/35

Sta.	+	H	−	Elev.	
B.M.	5.62	447.98	11.94	442.36	Spk in Power pole W. side Hwy. 75' S. of 0+00
TP	0.44	454.30	2.70	453.86	
TP	5.40	456.56	2.65	451.16	
TP	4.96	453.81	5.16	448.85	
TP	3.21	454.01	6.85	450.80	
TP	2.44	457.65	7.72	455.21	
TP	4.22	462.93	8.81	458.71	
TP	1.03	467.52	12.77	466.49	
	0.15	479.26 ✓			
B.M.				479.11	Top Culvert marker E. side pavement at Dam Axis

Sta.	+S	H.I.	−S	Elev.	Grade
+50			6.0	44.0	✓ 453.5 (~~452.0~~)
7			7.1	42.9	✓ 454.0
+56			7.1	42.9	✓
+50			8.1	41.9	✓
6			8.4	41.6	✓
T.P.	8.36	450.01 ✓	6.33	441.65	✓
5			5.8	42.2	✓
+13			7.2	40.8	✓
4			7.0	41.0	✓ 454.0
3			6.2	41.8	✓ 452.1 (~~[illegible]~~)
2			7.1	40.9	✓ 448.0 (~~[illegible]~~)
+79			7.2	40.8	✓ 447.2 (~~[illegible]~~)
+43			4.9	43.1	✓ 445.7 (~~[illegible]~~)
1+06.2			5.43	42.55	✓ 444.2 (~~[illegible]~~)
1+00					444.0
0+00			6.38	41.60	✓ 441.6
0−14+00			6.97	441.01	✓
		447.98 ✓			

Xsections Dec. 13-1938 ℄ 50

Hill
Isbell
Leckey
Brooks

Note	Left		℄	Right		
V.C.		+0°30' / 50'	·	+0°30' / 50'		
×		+0°50' / 50'	·	+0°30' / 50'		
N. bank San Vicente crk.	−0°15' / 50'	+2° / 38'	·	−5°10' / 14'	−1°35 / 50'	
0.0% Pile trestle bridge	+0°45' / 50' · +3°05 / 40'	+13°30' / 5'	·	−0°30' / 50'		
		−0°35' / 50'	·	+0°15' / 50'		
		−1°25' / 50'	·	−1°25' / 50'		
S. Bank San Vicente crk.						
×		−0°50' / 50'	·	+3° / 50'		
← 100' V.C.						
×		−0°55' / 50'	·	−0°30' / 33'	−2° / 42' · +6°50' / 55'	W. Edge Hwy. Berm
+1.9%		−1°05 / 50'	·	+6°05' / 8'	+12°50 / 16' · +3°05' / 50'	
		−0°50' / 50'	·	+19°55' / 6'	+1°15' / 50'	
	−3°05' / 50'	−19°15' / 5'	·	+0.1' / 7' E.P.	−0.1' / 25' E.P. · 0°5' / 50'	
N. edge pave.		−3°15' / 50'	·	−0.5' / E.P.	−2° / 50'	
× 1+00 ← 100' V.C.						
℄ pave. B.C. Hwy. curve ×	−2° / 50'	+0.15' / E.P.	·	−0.3' / E.P.	+0°05' / 50'	
on ℄ pave.	−1.8° / 50'	−0.05' / E.P.	·	−0.2' / E.P.	+0.4° / 50'	

E.P. = Edge of Pavement. 18' Pavement

× Sections taken slope measurement from ℄

⊼ moved out as shown

℄

Sta.	+S	H.I.	-S	Elev.	Grade	V.E.		
15			5.0	44.8	✓ 450.0	X	-0°10'/75'	0°0'/75'
	+5.0		4.7	45.1	✓		-0°05'/50'	0°0'/50'
14			4.9	44.9	✓		-0°15'/50'	+0°05'/50'
	+5.0		5.1	44.7	✓		-0°10'/50'	+0°10'/50'
13			5.2	44.6	✓		+0°10'/50'	0°0'/50'
	+5.0		5.1	44.7	✓		-0°45'/50'	+0°05'/50'
12			5.0	44.8	✓		0°0'/50'	0°0'/50'
T.P.	4.68	449.78 ✓	4.91	445.10	✓			
	+5.0		5.0	45.0	✓	0.0%	-0°15'/50'	+0°20'/50'
11			5.0	45.0	✓		+0°05'/50'	0°0'/50'
	+5.0		4.4	45.6	✓		-0°15'/50'	0°0'/50'
10			4.4	45.6	✓		-0°15'/50'	+0°15'/50'
	+5.0		4.6	45.4	✓		+0°10'/50'	+0°10'/50'
9			4.7	45.3	450.0	X	-0°25'/50'	-0°15'/50'
	+5.0		4.5	45.5	450.5		-0°25'/50'	-1°05'/50'
8			5.5	44.5	✓ 462.0	V.E.	+0°15'/50'	-0°35'/50'
		450.01						

Sta	+S	H.I.	-S	Elev.	Grade
21			10.4	81.4	468.6
	15.0		6.4	85.4	467.8
20			2.4	89.4	466.5
	8.0		3.0	88.8	465.8
	5.7		4.3	87.5	464.7
19			12.0	79.8	462.9
T.P.	15.47	491.80	0.94	476.33	
	1.8		10.8	66.5	
T.P	15.98	477.27	0.02	461.29	
18			0.3	61.0	
	15.0		15.8	45.5	460.4
B.M.	15.82	461.31	4.29	445.49	
17			4.8	46.0	463.5
	5.0		5.0	44.8	462.0
16			4.8	45.0	460.9
18 + 5.0			4.9	44.9	459.2
		449.78			

℄

	-10°40' / 75'	+11°45' / 68'	+12°40' / 80'	
	-10°10' / 75'	+13°05' / 80'		
-11°45' / 17'	-4°55' / 63'	+11°55' / 66	+16°35' / 80'	
	-2°10' / 75'	+9°0' / 49'	+12°50' / 80'	
+0°05' / 80'	-10°55' / 53'	+9°05' / 55'	+11°35' / 80'	
	-4°05' / 75'	+7°10' / 46'	+4°45' / 75'	
	-10°45' / 75'	+10°30' / 36'	-7°10' / 41'	
	-9°10' / 84'	+16°40' / 35'	-16°55' / 31'	-9°05' / 55'
	-0°50' / 75'	+11°0' / 18'	+10°05' / 47'	+4°50' / 75'
	-0°30 / 75'	-0°15' / 75'		
	-0°15 / 75'	0°0' / 75'		
	-0°10 / 75'	0°0' / 75'		
	0°0' / 75'	0°0' / 75'		

Nail in pow pole 30' R 17+34

Sta.	+S	HI	-S	Elev.	Grade			
27			6.3	71.6	✓ 472.3 ~~472.0~~			
						-7°20' / 70'	+8°15' / 70'	
+50			6.2	71.7	✓ 472.0 ~~472.0~~			
						-6°25' / 70'	+9°45' / 70'	
+33			6.4	71.5	✓ 471.9 ~~472.0~~			
T.P.	0.69	477.93	13.18	477.24	✓			
26			16.4	76.0	✓ 471.7 ~~472.0~~	bot of draw?		
						-7°05' / 75'	+4°35' / 34'	+7°35' / 75'
+50			11.4	81.0	✓ 471.4 ~~472.0~~			
						-5°50' / 75'	+6°20' / 36'	+7°45' / 75'
25			6.9	85.5	✓ 471.1 ~~472.0~~			
						-7°55' / 75'	+8°35' / 75'	
+50			5.6	86.8	✓ 470.85 ~~472.0~~			
						-6°55' / 75'	+7°44' / 75'	
24			4.9	87.5	✓ 470.6 ~~472.0~~			
						-8°55' / 75'	+7°55' / 75'	
+50			5.1	87.3	✓ 470.7 ~~472.0~~			
						-7°35' / 75'	+9°0' / 49'	+8°05' / 75'
23			5.2	87.2	✓ 470.0 ~~472.0~~			
						-8°55' / 75'	+11°15' / 75'	
T.P.	7.12	492.42 ✓	6.50	485.30	✓			
+50			7.0	84.8	✓ 469.7 ~~472.0~~			
						-8°30' / 75'	+10°25' / 52'	+12°50' / 75'
22			13.0	78.8	✓ 469.1 ~~472.0~~			
						-5°30' / 75'	+11°50' / 46'	+15°05' / 75'
+80			18.1	73.7	✓ 469.2 ~~472.0~~	bot of draw		
						-2°0' / 75'	+14°55' / 75'	
21 +50			15.5	76.3	✓ 469.15 ~~472.0~~			
						-12°10' / 75'	-14°20' / 63'	+14°0' / 75'
		491.80						

X sec. Dec. 14-1938 (cloudy)
Hill
Isbell
Locker
Brooks

Sta.	+S	HI	-S	Elev.	Grade			
36			11.3	75.8	✓ 477.4		-7°15' / 70'	+8°00' / 75'
35			7.6	79.5	✓ 476.8		-5°00' / 70'	+6°00' / 75'
	+67		5.5	81.6	✓ 476.6		-4°40' / 75'	+5°45' / 75'
	+33		5.1	82.0	✓ 476.4	7.38 on stadia line	-5°00' / 75'	+5°55' / 75'
34			5.6	81.5	✓ 476.7		-5°15' / 75'	+5°35' / 75'
33			7.9	79.2	✓ 475.7		-5°45' / 75'	+6°10' / 75'
32			10.1	76.7	✓ 475.1		-6°25' / 75'	+4°35' / 75'
T.P.	1412	487.09	5.26	472.67	✓			
31			6.1	71.8	✓ 474.6	-5°30' / 75'	-4°00' / 40'	-1°10' / 75'
	+34		17.5	60.4	✓ 474.2	-2°40' / 85'	0°0' / 40'	+3°15' / 75'
30			19.2	58.7	✓ 474.6		-4°05' / 75'	+4°10' / 75'
	+80		18.2	59.7	✓ 473.7		-3°35' / 75'	+7°05' / 75'
29			16.2	61.7	✓ 473.4	-4°05' / 75'	-5°05' / 56'	+6°25' / 75'
	+60		13.3	64.6	✓ 473.1		-3°45' / 70'	+6°0' / 75'
28			10.2	67.7	✓ 472.8		-5°15' / 70'	+5°05' / 75'
27+80			7.9	70.0	✓ 472.8		-6°15" / 70'	+7°0' / 70'
		477.93						

Sta.	+S	HI	-S	Elev	Grade
					480.5
+57			12.8	482.4	✓ 480.6
					480.2
A1			10.6	484.6	✓ 480.3
					480.1
+80			11.2	484.0	✓ 480.2
					480.0
+63			16.7	478.5	✓ 480.2
					479.8
+40			12.5	482.7	✓ 480.8
					479.6
40			12.3	482.9	✓ 480.6
					479.4
+74			12.8	482.4	✓ 480.4
T.P.	15.76	495.20	7.64	479.45	✓
					479.1
+15			8.6	78.5	✓ 480.0
					479.1
39			11.3	75.8	✓ 480.9
					478.7
+40			11.1	76.0	✓ 480.5
					478.6
38			11.7	75.4	✓ 480.2
					478.2
+50			12.5	74.6	✓ 480.0
					477.9
+12			15.2	71.9	✓ 479.7
					477.9
37			14.2	72.9	✓ 479.6
			12.0	75.1	✓
		487.09			

bot. of draw

+0.56%

bot. of draw

	−8°50′ / 75′	+15°00′ / 75′		
	−12°40′ / 75′	+13°00′ / 75′		
	−12°40′ / 75′	+8°05′ / 40′	+12°50′ / 75′	
	−11°05′ / 75′	+7°00′ / 13′	+16°30′ / 35′	+14°20′ / 75′
−12°35′ / 75′	−15°35′ / 45′	+20°15′ / 19′	+17°00′ / 75′	
−18°10′ / 75′	−18°05′ / 30′	+16°50′ / 75′		
	−13°50′ / 75′	+15°35′ / 75′		
−11°30′ / 75′	−18°25′ / 20′	+17°25′ / 36′	+13°00′ / 75′	
	−9°10′ / 75′	+18°00′ / 35′	+13°55′ / 75′	
−9°40′ / 80′	−11°25′ / 60′	+17°00′ / 25′	+15°05′ / 75′	
	−9°20′ / 80′	+13°00′ / 75′		
	−9°00′ / 75′	+10°05′ / 75′		
	−7°00′ / 75′	+8°50′ / 75′		
	−6°55′ / 75′	+8°25′ / 75′		

Sta.	+S	H.I.	−S	Elev	Grade
+79			5.6	85.0	484.0 ✓ ~~487.5~~
+50			11.2	79.4	484.7 ✓ ~~487.3~~
+27			19.1	71.5	484.3 ✓ ~~487.2~~
48			20.0	70.6	484.1 ✓ ~~487.0~~
+50			21.6	69.0	483.9 ~~486.6~~
47			12.4	78.2	483.6 ✓ ~~486.3~~
+50			8.9	81.7	483.3 ✓ ~~486.0~~
46			7.3	83.3	483.0 ✓ ~~[illegible]~~
+50			2.4	88.2	482.7 ✓ ~~[illegible]~~
B.M.	7.53	490.58	✓ 12.15	483.05	✓
45			2.6	92.6	482.5 ✓ ~~485.0~~
+60			2.1	93.1	482.3 ✓ ~~[illegible]~~
44			6.3	89.9	481.9 ✓ ~~[illegible]~~
43			9.5	85.7	481.3 ✓ ~~[illegible]~~
+70			12.4	82.8	481.0 ✓ ~~[illegible]~~
42			10.0	85.2	480.8 ✓ ~~[illegible]~~
		495.20			

18 5-6

℄

V.C.			−2°10' / 75'	+1°15' / 55'	+1°20' / 75'
		−0°50' / 75'	+0°10' / 23'	−2°50' / 26'	−1°50' / 75'
	+1°55' / 75'	+3°15' / 54'	+5°30' / 27'	+3°30' / 75'	
×			−2°20' / 75'	+4°15' / 75'	
bot. of draw		−2°40' / 75'	+1°05' / 27'	+4°00' / 75'	
	−10°25' / 88'	−9°15' / 75'	−8°20' / 35'	+5°50' / 75'	
+0.55%		−6°25' / 75'	−4°50' / 49'	+5°20' / 75'	
			−6°00' / 75'	+8°05' / 44'	+6°30' / 75'
		−11°10' / 75'	−12°55' / 45'	+10°00' / 35'	+8°55' / 75'

Hub 30' L of sta 45+00 (142+09)

Same elev. as pt. 34 of last stadia line.

	−14°10' / 75'	+11°00' / 53'	+10°35' / 75'
	−13°55' / 75'	+13°45' / 40'	+13°10' / 75'
	−13°00' / 75'	+14°15' / 75'	
	−9°30' / 75'	+13°05' / 75'	
	−8°10' / 75'	+13°00' / 75'	
	−10°50' / 75'	+13°05' / 75'	

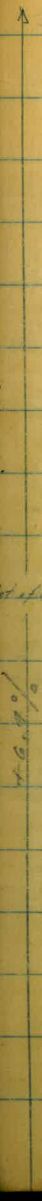
Rain.

Sta	+S	H.I.	-S	Elev	Grade			℄		
56			4.0	27.4	✓ 526.7		−22°50 / 75'	+25°10' / 16'	+23°15' / 75'	
55			4.6	26.8	✓ 520.3		−24°10' / 75'	+26°20' / 75'		
54			5.8	25.6	✓ 513.9	−23°10' / 75'	−27°05' / 45'	+28°25' / 52'	+26°15' / 75'	
+10			8.5	22.9	✓ 508.1		−24°00' / 75'	+25°20' / 47'	+27°50' / 63'	+24°35' / 75'
53			12.3	19.1	✓ 507.5		−22°40' / 75'	+19°20' / 27'	+24°50' / 64'	+23°20' / 75'
T.P.	16.02	531.39	0.78	515.37	✓					
+50			4.3	11.9	✓ 504.3		−19°35' / 75'	+20°05' / 75'		
52			10.1	06.1	✓ 501.1		−18°25' / 75'	+19°00' / 75'		
T.P.	15.74	516.15 ✓	2.86	500.41	✓					
+50			4.8	98.5	✓ 497.9		−16°00' / 75'	+18°30' / 75'		
51			9.7	93.6	✓ ~~491.7~~ 494.60		−14°00' / 75'	+15°20' / 75'		
+50			13.5	489.8	✓ ~~491.5~~ 491.6	−12°05' / 75'	−12°55' / 46'	+13°45' / 60'	+12°40' / 75'	
T.P.	15.25	503.27	2.56	488.02	✓					
50			3.8	86.8	✓ ~~488.2~~ 489.2	−8°00' / 85'	−8°25' / 72'	+10°40' / 32'	+10°00' / 75'	
+50			4.7	85.9	✓ ~~488.0~~ 487.2		−4°50' / 75'	+5°05' / 75'		
49			4.5	86.1	✓ ~~487.6~~ 485.7		−3°35' / 75'	+2°55' / 75'		
		490.58								

+6.1%

V.C.

Sta.	+S	H.I.	−S	Elev	Grade
62			4.1	70.3	✓ 565.1
+50			9.0	65.4	✓ 561.9
TP	16.03	574.40	✓ 1.05	558.37	✓
61			0.2	59.2	✓ 558.7
+50			5.8	53.6	✓ 555.5
60			11.7	47.7	✓ 552.3
T.P.	15.55	559.42	2.55	543.87	✓
+20			10.9	35.5	✓ 547.2
59			21.2	25.2	✓ 546° ht. of dam
+80			14.0	32.1	✓ 549.6
58			8.6	37.8	✓ 553.5
+50			8.6	37.8	✓ 553.3
57			11.4	35.0	✓ 553.1
+80			14.6	31.8	✓ 553.8
T.P.	15.15	546.42	0.12	531.27	✓
+50			5.5	25.9	✓ 529.9
		531.39			



℄			
	−18°25' / 75'	+17°30' / 75'	
	−19°15' / 75'	+18°50' / 75'	
	−20°45' / 75'	+20°35' / 75'	
	−21°10' / 75'	+21°00' / 75'	
	−20°40' / 75'	+20°35' / 75'	
	−18°45' / 75'	+15°45' / 42'	+12°00' / 75'
	−19°35' / 75'	+15°45' / 43'	+21°05' / 75'
	−17°15' / 75'	+17°40' / 56'	+20°15' / 75'
	−20°25' / 75'	+21°35' / 75'	
	−20°45' / 75'	+23°20' / 75'	
	−21°50' / 75'	+23°30' / 75'	
−21°35' / 75'	−25°05' / 30'	+22°40' / 34'	+23°45' / 75'
	−21°15' / 75'	+25°35' / 75'	

Sta.	+	X	−	Elev.	Grade
69			14.0	603.4	✓ 609.8 ~~619.8~~
T.P.	15.64	617.4	0.61	601.77	✓
+68			7.1	95.3	✓ 607.3 ~~611.6~~
+22			12.0	90.4	✓ 602.4 ~~602.4~~
68			9.0	93.4	✓ 605.4 ~~608.4~~
67			8.1	94.3	✓ 597.0 ~~599.0~~
+33			6.5	95.9	✓ 592.7 ~~595.7~~
66			8.2	94.2	✓ 590.6 ~~592.6~~
65			13.7	88.7	✓ 581.2 ~~584.2~~
T.P.	16.36	602.38	1.64	587.02	
+50			2.9	65.8	✓ 581.9 ~~584.9~~
64			6.0	82.7	✓ 577.8 ~~580.8~~
+50			9.4	79.3	✓ 574.4 ~~576.4~~
63			12.6	76.1	✓ 571.1 ~~574.1~~
TP	15.46	588.66	1.20	573.20	✓
62+50			1.0	73.4	~~574.3~~
		574.40			

	−13°15'/100'	+15°45'/100'		
−10°55'/100'	−9°25'/32'	+15°15'/30'	+17°30'/100'	
−13°25'/75'	−16°40'/50'	+20°30'/75'		
	−17°50'/75'	+16°55'/45'	+19°35'/75'	
−20°20'/75'	−15°50'/21'	+20°00'/50'	+20°50'/75'	
−19°50'/75'	−19°45'/21'	+15°15'/22'	+20°10'/48'	+19°15'/75'
−18°10'/75'	−15°45'/30'	+16°10'/25'	+19°50'/57'	+19°25'/75'
−15°45'/75'	−15°25'/25	+18°55'/50'	+19°00'/75'	
	−16°15'/75'	+18°00'/75'		
	−17°10'/75'	+14°25'/32'	+18°20'/75'	
	−17°35'/75'	+15°30'/33'	+18°35'/75'	
	−17°45'/75'	+18°00'/73'		
	−18°00'/75'	+17°50'/75'		

X sec. Dec. 19 1938 Isbell
Rain & Cloudy. Leekey
Brooks

Sta.	+S	H.I.	-S	Elev.	Grade						
	15.96	679.31 ✓	0.03	663.35	✓						
75			5.9	57.5	✓ 650.0 ~~[illegible]~~		-1°35' / 100'	-0°05' / 73'	-3°20' / 35'	+1°15' / 55'	+6°45' / 100'
+46			15.1	48.3	✓ 646.2 ~~667.0~~		-2°35' / 100'	-3°10' / 25'	+1°55' / 35'	+12°00' / 100'	
Check pt.			8.6	54.8	✓	On pt. 26 of 7% stadia line (last)					
B.M.	15.77	663.38 ✓	0.17	647.61	✓	Hub 65' L of sta. 74+63					
+23			4.8	43.0	✓ 644.6 ~~[illegible]~~	Crk. bed -1°25' / 100'	-0°45' / 55'	-8°05' / 15'	+5°15' / 18'	+13°20' / 60'	+14°55' / 100'
74			3.8	44.0	✓ 643.0 ~~648.8~~		-3°00' / 100'	-8°50' / 40'	+11°45' / 50'	+13°50' / 100'	
+55			7.5	40.3	✓ 639.9 ~~[illegible]~~	-6°10' / 100'	-8°35' / 83'	-14°40' / 20'	+16°30' / 40'	+15°35' / 100'	
73			7.3	40.5	✓ 636.0 ~~[illegible]~~		-9°00' / 100	-13°20' / 50'	+14°20' / 50'	+16°10' / 100'	
+60			7.6	40.2	✓ 633.2 ~~[illegible]~~		-11°20' / 100'	-14°45' / 72'	+14°05' / 50'	+15°35' / 100'	
72			11.4	36.4	✓ 629.0 ~~[illegible]~~		-13°10' / 100'	-13°00' / 75'	+14°05' / 45'	+17°55' / 100'	
T.P.	15.93	647.78 ✓	0.37	631.86	✓						
+36			0.8	31.4	✓ 624.9 ~~[illegible]~~		-12°25' / 100'	-13°10' / 60'	+14°30' / 30'	+17°00' / 100'	
71			5.0	27.2	✓ 622.6 ~~627.8~~		-12°45' / 100'	-12°25' / 60'	+15°50' / 60'	+12°25' / 100'	
70			13.7	18.5	✓ 616.2 ~~[illegible]~~		-13°50' / 100'	-11°10' / 35'	+12°45' / 54'	+15°45' / 100'	
T.P.	15.60	632.22 ✓	0.79	616.62	✓						
		617.41									

+7%

+6.1%

Dec. 21-1938
x sec.
Rain

Sta.	+S	H.I.	-S	Elev.	Grade
80.			13.8	668.6	✓685.0
+50			4.4	678.0	✓681.5
TP	1.17	682.44 ✓	15.97	681.27	✓
79			10.6	86.6	✓678.0
+50			3.6	93.6	✓674.5
T.P.	0.97	697.24	14.66	69627	✓
78			8.7	702.2	✓671.0
+50			2.2	708.7	✓667.5
+23			+0.4	711.3	✓665.6
77			0.3	710.6	✓664.0
+50			12.6	698.3	✓660.5
T.P.	15.88	710.93	0.21	695.05	✓
+30			2.8	92.5	✓659.1
76			8.2	87.1	✓657.0
T.P.	16.08	695.26	0.13	679.18	✓
75-75-8			3.1	676.2	✓654.1
		679.31			

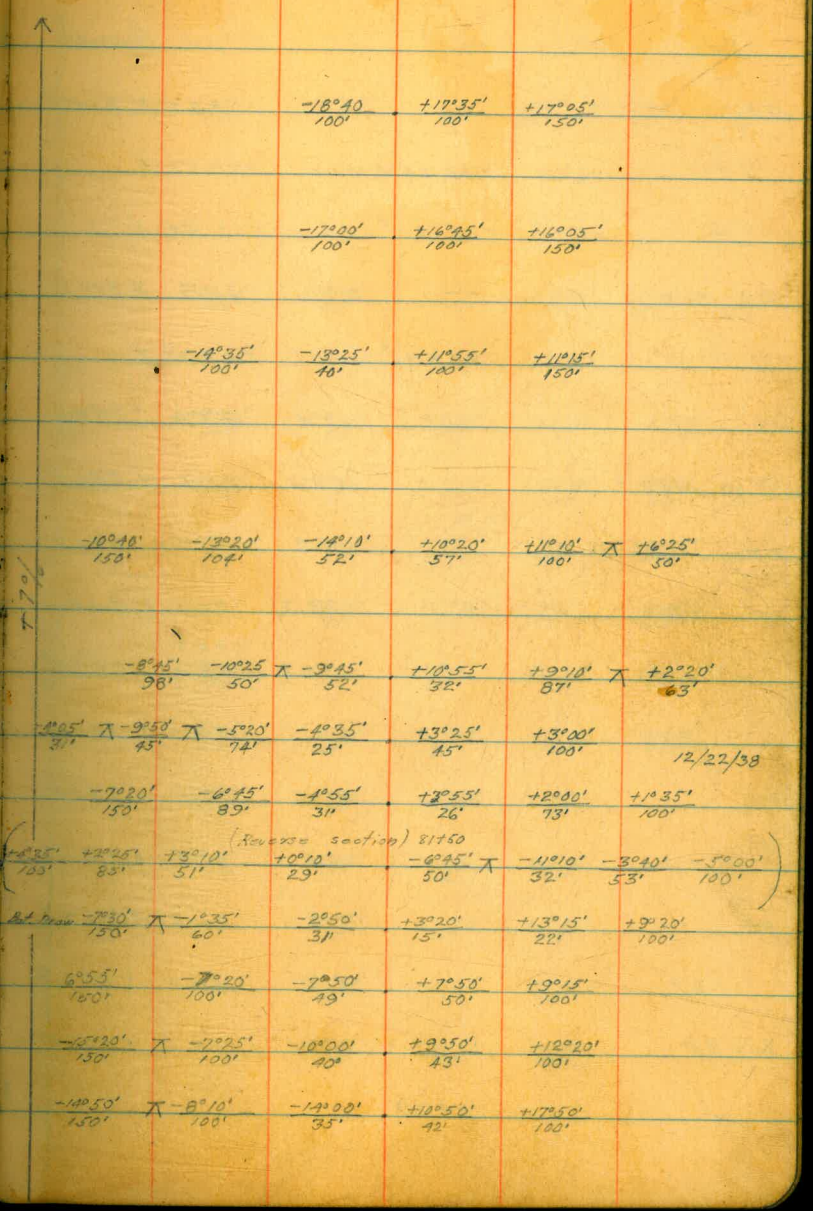
-13°35' / 60'	π -8°15' / 100'	-12°55' / 38'	+10°10' / 37'	+15°30' / 70'	+19°30' / 100'	
-12°00' / 150'	-11°00' / 118'	-12°30' / 73'	-15°10' / 55'	-19°30' / 21'	+20°15' / 52'	+22°40' / 100'
-11°05' / 100'	-13°55' / 65'	-13°55' / 50'	-15°25' / 35'	+23°50' / 100'		
-10°45' / 100'	-11°20' / 61'	-19°05' / 24'	+27°25' / 55'	+24°30' / 100'		

10/29/38
Sta 78 +42 - 3' Lt.

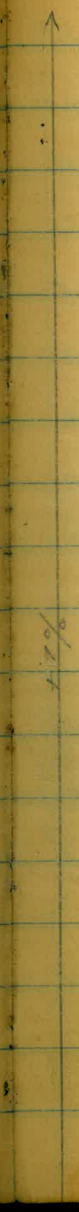
-10°00' / 100'	-10°15' / 80'	-20°15' / 30'	+25°45' / 62'	+22°40' / 100'		
-14°30' / 100'	-17°20' / 70'	-23°30' / 32'	+21°05' / 77'	+17°10' / 77'	π +4°35' / 23'	
-15°20' / 100'	-17°35' / 70'	-19°55' / 50'	+17°45' / 18'	+11°00' / 62'	π -0°15' / 38'	
	-14°30' / 100'	-15°55' / 79'	+7°35' / 64'	π -0°50' / 36'		
	-9°25' / 100'	-7°45' / 62'	-0°20' / 21'	-2°15' / 54'	-3°50' / 100'	
	-7°20 / 100'	-5°40' / 60'	+3°10' / 31'	+0°20' / 60'	-0°50' / 100'	
	-5°00' / 100'	-3°00' / 60'	-4°00' / 35'	-7°30' / 100'	x sec. 12/21/38	
-3°40' / 100'	-1°45' / 80'	+0°45' / 30'	-6°55' / 54'	-7°30' / 75'	-3°25' / 100'	

Dec. 22-1938
X sec. Clear.

Sta.	+	⊼	−	Elev.	Grade
85			3.0	45.4	720.0
	5.32	748.39	0.28	743.07 ✓	
+50			5.1	38.3 ✓	716.5
T.P.	15.64	743.35 ✓	0.10	727.71 ✓	
84			2.1	25.4 ✓	713.0
T.P.	15.47	727.81 ✓	0.01	712.34 ✓	
T.P.	15.83	712.35	0.11	696.82 ✓	
83			4.0	92.9 ✓	706.0
T.P.	15.49	696.93	1.00	681.44 ✓	
+50			11.9	70.5 ✓	702.5
82			29.9	52.5 ✓	689.0
+80			36.4	46.0 ✓	697.7
+50			43.2	39.2 ✓	695.6
+25			48.4	34.0 ✓	693.5
81			38.9	43.5 ✓	692.0
+50			22.5	59.9 ✓	688.5
80 +20			16.2	66.2 ✓	686.4
		682.44			



Sta.	+S	H.I.	-S	Elev.	Grade
90			13.9	80.5 ✓	758.0
T.P.	15.93	794.44 ✓	0.00	778.51 ✓	
T.P.	15.96	778.51 ✓	0.16	762.55 ✓	
	+50		2.9	60.3 ✓	757.5
T.P.	15.32	762.71 ✓	1.00	747.39 ✓	
89			9.4	39.0 ✓	748.0
	+50		28.3	20.1 ✓	744.5
88			43.9	704.5 ✓	741.0
	+62		59.3	89.1 ✓	738.3
	+50		51.7	692.4	737.5
	+29		44.5	83.9 ✓	736.0
87			38.0	10.4 ✓	734.0
	+61		28.0	20.4 ✓	731.3
86			11.8	36.6 ✓	727.0
	+67		3.9	44.5 ✓	724.7
85+35			1.6	46.8 ✓	722.5
		718.39			



+3°35'/100'	+4°35'/27'	−2°30'/50'	−1°30'/100'	⌒ +2°05'/46'	+4°35'/100'
+3°35'/100'	+3°10'/85'	−1°50'/55'	+0°25'/100'	+2°10'/150'	⌒ +8°30'/50'
+3°20'/100'	+1°10'/40'	+2°50'/100'	+2°10'/167'	+4°00'/200'	
+2°15'/100'	+0°20'/40'	+3°00'/42'	+2°40'/100'	⌒ −3°00'/38'	+15°20'/100'
		O.K. JAI.			
−3°00'/100'	−4°15'/50'	−3°50'/48'	+6°10'/100'	⌒ +22°15'/100'	
−4°10'/100'	−2°40'/44'	+20°35'/55'	+19°25'/100'	+19°35'/200'	
−8°50'/100'	−15°45'/44'	+25°40'/34'	+21°10'/62'	+20°30'/200	
−18°35'/115'	−19°50'/40'	+15°40'/35'	+17°50'/100'	+18°50'/200'	
−16°50'/100'	−15°05'/30'	+18°50'/100'	+19°30'/150'		
−18°15'/100'	−16°25'/55'	+17°35'/62'	+19°15'/150'		
	−19°05'/100'	+17°55'/60'	+17°20'/150'		
	−20°40'/100'	+18°05'/100	+18°10'/150'		
	−19°55'/100'	+19°20'/85'	+18°00'/150'		

Sta	+S	H.I.	-S	Elev	Grade
96			11.8	794.9	✓ 797.0
+46			10.1	96.3	✓ 793.2
95			13.2	93.5	✓ 790.0
+50			15.5	91.2	✓ 786.5
94			14.8	91.9	✓ 783.0
+50			8.2	798.5	✓ 779.5
93			4.3	802.4	✓ 776.0
T.P.+BM.	0.54	806.65	15.92	806.11	✓
+50			11.1	10.9	✓ 772.5
92			3.6	18.4	✓ 769.0
+75			1.8	20.2	✓ 767.3
+50			2.5	19.5	✓ 765.5
91			11.2	810.8	✓ 762.0
T.P.	12.95	822.03	0.38	809.08	
+50			10.7	798.8	✓ 755.5
T.P.	15.06	809.46 ✓	0.04	794.40	✓
		794.44			

℄

$\frac{-16°35'}{50'} \cdot \frac{+20°00'}{50'}$

$\frac{-19°10'}{50'} \quad \frac{-18°10'}{20'} \cdot \frac{+19°30'}{12'} \quad \frac{+14°25'}{50'}$

$\frac{-19°15'}{50'} \cdot \frac{+30°20'}{12'} \times \frac{+12°45'}{58'}$ 12/27/38

$\frac{-15°45'}{100'} \quad \frac{-19°55'}{50'} \cdot \frac{+19°00'}{100'} \times \frac{+17°55'}{100'}$

$\frac{-14°10'}{100'} \quad \frac{-14°10'}{60'} \cdot \frac{+19°05'}{100'} \times \frac{+18°00'}{65'} \quad \frac{+17°10'}{100'}$

$\frac{-16°00'}{100'} \quad \frac{-17°45'}{69'} \cdot \frac{+17°25'}{100'} \times \frac{+15°40'}{65'} \times \frac{+7°10'}{35'}$

$\frac{-17°00'}{100'} \quad \frac{-17°15'}{73'} \cdot \frac{+17°15'}{100'} \times \frac{+8°50'}{55'} \times \frac{+3°00'}{45'}$

Hub on ℄ Sta. 92+75

$\frac{-19°25'}{100'} \cdot \frac{+14°10'}{85'} \times \frac{+7°10'}{15} \quad \frac{+4°45'}{44'} \quad \frac{+1°30'}{115'}$

$\frac{-19°55'}{35'} \times \frac{-19°55'}{65'} \cdot \frac{+13°05'}{25'} \quad \frac{+8°45'}{60'} \times \frac{0°00'}{40'} \quad \frac{-1°10'}{140'}$

$\frac{-20°30'}{56'} \times \frac{-15°00'}{44'} \quad \frac{-11°00'}{20'} \cdot \frac{+6°20'}{42'} \quad \frac{+8°25'}{100'} \times \frac{+0°20'}{100'}$

$\frac{-17°55'}{62'} \times \frac{-10°00'}{38'} \cdot \frac{+3°10'}{33'} \quad \frac{+0°30'}{100'} \quad \frac{+0°25'}{200'}$

$\frac{-5°45'}{100'} \quad \frac{-2°45'}{70'} \quad \frac{-0°45'}{40'} \cdot \frac{0°00'}{40'} \quad \frac{-1°40'}{100'} \quad \frac{-1°00'}{200'}$

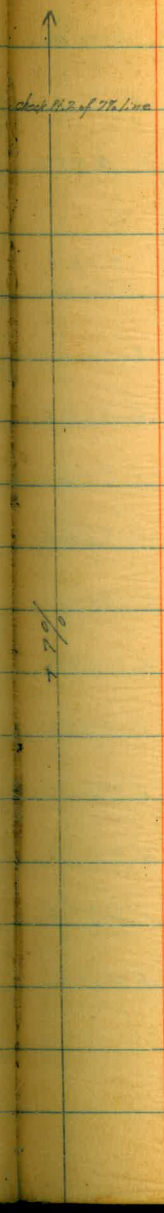
$\frac{+0°55'}{100'} \quad \frac{+2°20'}{65'} \cdot \frac{-0°45'}{27'} \quad \frac{-1°45'}{100'} \quad \frac{-1°15'}{155'} \quad \frac{+0°10'}{200'}$

Sta.	+S	H.I.	-S	Elev	Grade
					844.6
+80			31.0	27.6	✓ Bot. Wash
+40			23.9	38.7	✓ 841.8
T.P.	15.79	862.60	12.60	846.81	✓
				846.5	
102			12.9	49.5	839.0
+50			10.3	49.1	✓ 835.6
101			4.5	54.9	✓ 832.0
+61			3.1	56.3	✓ 829.3
+24			2.7	56.7	✓ 826.7
100			4.3	58.1	✓ 825.0
T.P.	15.86	859.41	✓ 0.07	843.55	✓
99			1.3	39.3	✓ 818.2
T.P.	15.38	843.62	0.11	828.04	✓
98			6.3	21.9	✓ 811.0
T.P.	15.44	828.15	✓ 0.00	812.71	✓
97			12.0	800.7	✓ 804.0
T.P.	16.96	812.71	9.90	796.75	✓
		806.65			

−22°00′ / 82′	−16°10′ / 23′	+19°15′ / 25′	+24°25′ / 50′
−21°00′ / 75′	−19°45′ / 50′	+22°10′ / 20′	+24°15′ / 50′
	−23°05′ / 50′	+21°35′ / 50′	
	−18°00′ / 50′	+22°30′ / 50′	
	−17°35′ / 50′	+16°50′ / 31′	+17°50′ / 50′
−20°05′ / 50′	−12°40′ / 11′	+17°50′ / 50′	
−25°25′ / 50′	−22°45′ / 24′	+18°15′ / 50′	
−26°15′ / 50′	−25°10′ / 37′	+18°50′ / 50′	
−25°10′ / 50′	−24°15′ / 22′	+22°40′ / 50′	
−25°00′ / 50′	−20°30′ / 17′	+19°55′ / 50′	
−21°50′ / 50′	−19°55′ / 19′	+21°50′ / 50′	

Sta.	+S	H.I.	-S	Elev						
109			12.5	897.7	✓ 8880				0.02	
TP	15.95	909.68 ✓	0.27	893.73	✓	−15°55' / 50'	−14°25' / 39'	+18°50' / 17'	+14°20' / 50'	
T.P.	15.57	894.00 ✓	0.02	878.43	✓					
+16			10.3	68.2	✓ 8822	−15°45' / 75'	−19°10' / 30'	+16°40' / 50'		
					881.0					
108			21.3	57.2	✓ Bot. of Draw	−17°55' / 75'	−21°10' / 35'	+17°35' / 50'		
+80			14.2	64.3	✓ 879.6		−20°30' / 75'	+23°50' / 50'		
107			8.7	69.8	✓ 874.0	−22°55' / 50'	−20°55' / 25'	+25°50' / 32'	+25°20' / 50'	✓
+50			6.9	71.6	✓ 870.5		−21°55' / 50'	+24°50' / 50'		✓
106			8.3	69.2	✓ 8670	−22°00' / 50'	−22°50' / 30'	+25°10' / 50'		✓
+50			11.1	67.4	✓ 8635		−20°50' / 50'	+23°50' / 50'		✓
T.P.	15.90	878.45 ✓	0.05	862.55	✓					
105			0.2	62.4	✓ 8600	−16°15' / 50'	−18°00' / 30'	+19°50 / 50'		
+50			1.8	60.8	✓ 8565	−17°15' / 50'	−15°30' / 35'	+15°40' / 50'		
104			5.6	57.0	✓ 8539	−17°00' / 50'	−14°00' / 27'	+14°25' / 50'		
+50			12.8	49.8	✓ 8495		−18°15' / 50'	+10°25' / 50'		
103			24.2	38.4	✓ 8460		−18°50' / 75'	+2°15' / 49' Bot. Draw	+7°00' / 50'	
		862.60								

Sta.	+S	H.I.	-S	Elev.	Grade	
P.I. 115+30.6 = Pt 2 of 7%			5.0	36.2 ✓		
+50			7.6	33.6 ✓	9265	
T.P.	15.74	941.21 ✓	0.00	925.47 ✓		
114			6.7	19.1 ✓	9230	
				904.3		
+50				501.3	9195	
+26				896.1	917.8 Bot. of Ogee	
113				901.0 ✓	916.0	
+50			13.3	12.2 ✓	912.5	
+30			8.2	17.3 ✓	911.1	
112			4.7	20.8 ✓	909.6	
+25			5.0	20.5 ✓	903.8	
111			7.4	18.1 ✓	902.0	
+60			11.0	14.5 ✓	899.2	
110			11.0	14.5 ✓	895.0	
T.P.	15.79	925.47 ✓	0.00	909.68 ✓		
+50			0.5	909.2 ✓	891.5	
		909.68				

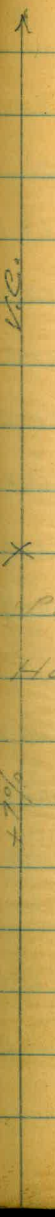


−10°30' / 50'	+12°40' / 50'
−16°15' / 50'	+14°20' / 50'
−9°10' / 50'	+15°45' / 50'
−16°55' / 75'	+17°10' / 50'
−17°10' / 50'	+17°45' / 50'
−18°30' / 50'	+17°05' / 50'
−18°55' / 50'	+15°10' / 50'
−18°10' / 50'	+15°30' / 50'
−16°25' / 50'	+13°45' / 50'
−17°25' / 50'	+14°55' / 50'
−16°50' / 50'	+17°50' / 50'
−21°35' / 50'	+17°00' / 50'
−19°50' / 50'	+22°10' / 50'

Sta.	+S	H.I.	-S	Elev.	Grade
T.P.	15-49	1003.68 ✓	0.00	988.19 ✓	
122			6.0	82.2 ✓	979.0
T.P.	15-95	988.19 ✓	0.10	972.24 ✓	
121			4.2	68.1	972.0 ✓ Bot. Draw
T.P.	15-87	972.31	0.09	956.47 ✓	
120			0.8	55.8 ✓	965.0
119			5.0	51.6 ✓	958.0
	+32		9.0	47.6 ✓	953.2
118			10.0	46.6 ✓	951.0
	+50		10.2	46.4 ✓	947.5
117			10.0	46.6 ✓	944.0
	+50		10.2	46.4 ✓	940.5
116			8.9	47.7 ✓	937.0
	+62		9.5	47.1 ✓	933.5
115			13.0	43.6 ✓	930.0
T.P.	15-55	956.56	0.20	941.01 ✓	
		941.21			

	+6°55'/50'	−6°00'/20' Bot. Draw	+0°30'/50'	
	+1°10'/50'	+5°15'/50'		
−3°55'/50'	−8°30'/34' Bot. crk.	+10°15'/50'		
−14°45'/50'	−17°10'/25'	+14°15'/50'		
	−15°10'/50'	+16°10'/50'		
	−15°15'/50'	+16°10'/50'		
	−15°50'/50'	+14°30'/50'		
−14°40'/50'	−11°05'/20'	+14°55'/50'		
−12°10'/50'	−9°00'/27'	+15°10'/50'		
−10°50'/50'	−12°55'/25'	+13°55'/50'		
−11°45'/50'	−8°00'/26'	+9°50'/20'	+12°35'/50'	
−10°10'/50'	−11°10'/25'	+6°55'/30'	+8°15'/50'	

Sta.	+S	H.I.	-S	Elev.	Grade
	+50		26.5	100.5.5	✓ 1020.8
129			30.3	04.7	✓ 1020.1
	+50		29.6	05.4	✓ 1019.0
128			26.3	08.7	✓ 1017.5
	+50		19.2	15.8	✓ 1015.5
127			10.9	24.1	✓ 1013.1
	+50		8.0	27.0	✓ 1010.3
126			11.0	24.0	✓ 1007.0
Pt. o Oat Hill			11.7	1023.3	✓
B.M.	15.71	1034.95 ✓	0.07	1019.24	✓
	+50		2.1	17.2	✓ 1003.5
125			6.0	11.3	✓ 1000.0
	+50		12.0	1007.3	✓ 996.5
T.P.	15.70	1019.31	0.07	1003.61	✓
124			2.2	1001.5	✓ 993.0
					987.0
123			13.5	990.2	✓ Bot. Draw.
		1003.68			



+18°05' / 50'	−17°10' / 50'
+17°05' / 50'	−15°50' / 50'
+15°35' / 50'	−14°15' / 50'
+16°30' / 50'	−9°58' / 50'
+12°50' / 50'	−10°00' / 50'
+5°05' / 50	−10°10' / 50'
+1°35' / 50'	−6°15' / 50'
−0°10' / 50'	−1°10' / 50'

Pt. o at 6⅛ 7⅛ lines

Hub 43' R of 125+50 (Oat Hill)

+0°10' / 50'	+2°45' / 50'
−1°10' / 50'	+4°35' / 50'
−2°45' / 50'	+3°00' / 50'
−1°00' / 50' Bot. Draw	+2°00' / 50'
+5°50' / 50'	+1°10' / 50'

Sta.	+S	H.I.	-S	Elev.	
136			37.7	999.3	✓1019.0
B.M.	12.20	1037.01	1.00	1024.81	✓
+70			15.0	10.8	✓1019.1
+44			10.4	15.4	✓1019.2
135			18.9	1006.9	✓1019.4
+38			45.2	980.6	✓1019.7
134			31.3	994.5	✓1019.8
+60			18.0	1007.8	✓1020.0
133			8.1	1017.7	✓1020.2
T.P.	1.12	1025.81✓	15.16	1024.69	✓
132			3.3	38.6	✓1020.6
+50			0.8	39.1	✓1020.8
131			4.8	35.1	✓1021.0
T.P.	4.90	1039.85✓	0.00	1034.95	✓
+50			9.3	25.7	✓1021.0
130			19.1	15.9	✓1021.0
		1034.95			

11/18/38 ℄ Hill, Isbell, Laakey, Brooks

-0.4% | 0.0% | V.C.

Hub 30' L of 135+50 232+54

+20°10' / 50'	-14°50' / 42'	-16°15' / 50'
+18°45' / 50'	-13°50' / 45'	-17°25' / 60'
+21°15' / 50'	-13°50' / 46'	-16°30' / 75'
+26°10' / 50'	-31°05' / 63'	-26°50' / 100'
+25°00' / 50'	-24°45' / 38'	-27°05' / 75'
+20°05' / 50'	-22°45' / 57'	-24°45' / 75'
+19°50' / 50'	-15°35' / 50'	
+11°50' / 50'	-7°15' / 20'	-14°15' / 50'
+14°30' / 50'	-8°15' / 24'	-11°20' / 50'
+14°25' / 50'	-11°05' / 50	
+15°30' / 50'	-12°35' / 50'	
+17°20' / 50'	-15°00' / 50'	

Sta.	+S	HI.	-S	Elev. Grade	
142			14.6	22.9	√1016.6
	+50		9.9	27.1	√1016.8
141			6.4	30.6	√1017.0
	+50		6.7	30.3	√1017.2
140			6.8	30.2	√1017.4
	+50		5.1	31.9	√1017.6
139			1.4	35.6	√1017.8
	+50		2.2	34.8	√1018.0
138			7.7	29.3	√1018.2
	+68		14.5	22.5	√1018.3
	+50		24.0	13.0	√1018.4
137			23.3	13.7	√1018.6
	+84		32.4	1004.6	√1018.7
	+39		39.9	997.1	√
	+25		42.1	994.6	√1018.9
136+10			46.5	990.5	√1019.0
		1037.01			

℄

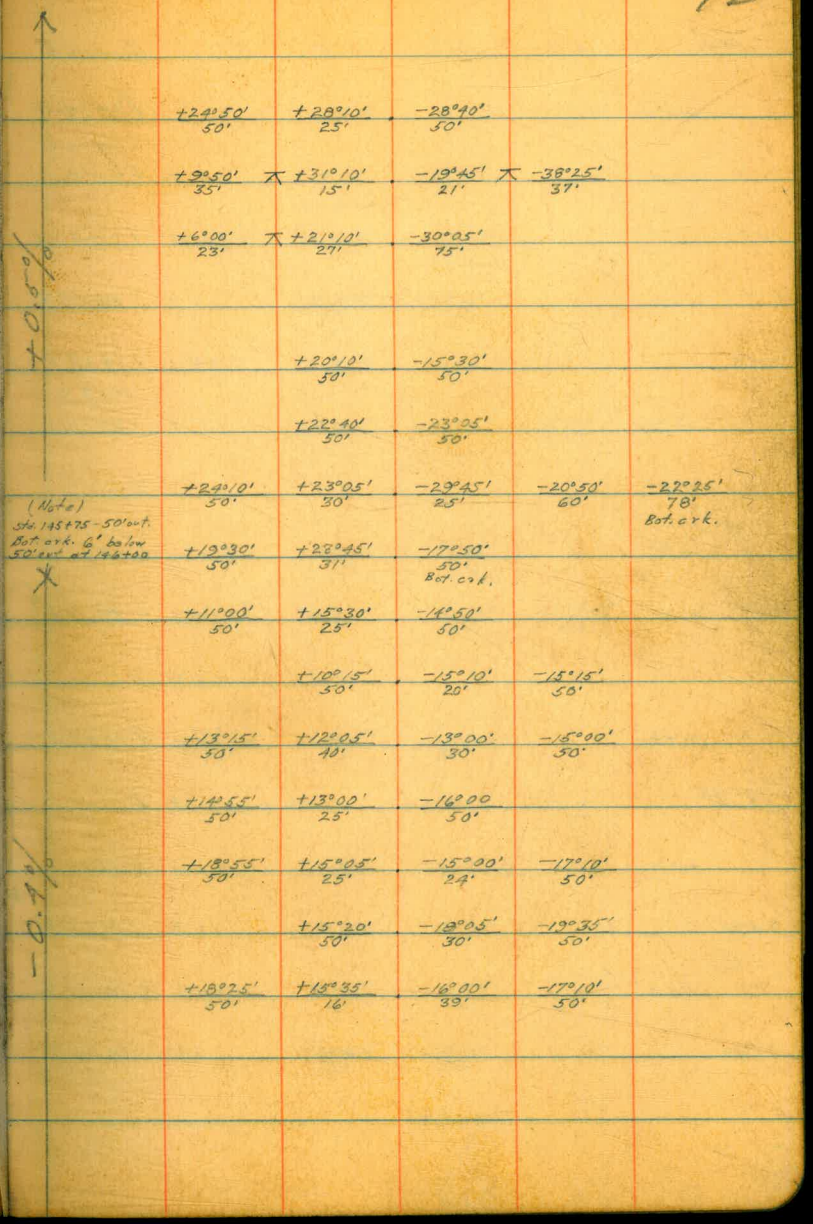
	+20°00' / 50'	−18°55' / 25'	−17°50' / 50'
	+20°50' / 50'	−20°40' / 30'	−20°10' / 50'
	+20°10' / 50'	−23°25' / 30'	−21°15' / 50'
	+21°00' / 50'	−23°15' / 50'	
	+22°30' / 50'	−29°05' / 50'	
	+23°25' / 50'	−26°00' / 50'	
	+23°25' / 50'	−23°00' / 27'	−26°00' / 50'
	+21°05' / 50'	−25°15' / 26'	−27°25' / 50'
+31°40' / 50'	+33°45' / 37'	−22°15' / 23'	−26°15' / 50'
	+34°20' / 50'	−24°50' / 35'	−28°00' / 75'
	+34°15' / 50'	−32°45' / 37'	−34°50' / 100'
	+29°00' / 50'	−33°00' / 25'	−35°55' / 100'
	+34°48' / 50'	−24°34' / 18'	−31°50' / 100'
	+33°10' / 50'	−30°40' / 82'	−31°15' / 100'
	+29°50' / 50'	−23°15' / 66'	−26°55' / 100'

−0.1%

12/30/38

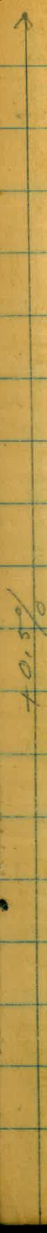
End 11-27-38

Sta.	+S	H.I.	-S	Elev	Grade
+40			24.1	11.4	✓1016.2
148			14.5	21.3	✓1016.0
+62			13.1	22.7	✓1015.8
T.P.	10.33	1035.81	1.20	1025.48	✓
+25			16.7	1019.0	✓1015.6
147			20.8	1005.9	✓1015.6
+50			24.2	1002.5	✓1015.2
					1015.0
146			31.0	995.7	✓Bot. ctk.
145			19.0	12.7	✓1015.4
+74			9.7	17.0	✓1015.5
+50			9.0	17.7	✓1015.6
144			10.3	16.4	✓1015.8
+50			11.2	15.5	✓1016.0
143			9.5	17.2	✓1016.2
142+50			8.0	18.7	✓1016.4
T.P.	4.27	1026.68 ✓	14.60	1022.41	
		1037.01			



+24°50'/50'	+28°10'/25'	-28°40'/50'		
+9°50'/35'	+31°10'/15'	-19°45'/21'	-38°25'/37'	
+6°00'/23'	+21°10'/27'	-30°05'/75'		
	+20°10'/50'	-15°30'/50'		
	+22°40'/50'	-23°05'/50'		
+24°10'/50'	+23°05'/30'	-23°45'/25'	-20°50'/60'	-22°25'/78' Bot. ctk.
+19°30'/50'	+28°45'/31'	-17°50'/50' Bot. ctk.		
+11°00'/50'	+15°30'/25'	-14°50'/50'		
	+10°15'/50'	-15°10'/20'	-15°15'/50'	
+13°15'/50'	+12°05'/40'	-13°00'/30'	-15°00'/50'	
+14°55'/50'	+13°00'/25'	-16°00/50'		
+18°55'/50'	+15°05'/25'	-15°00'/24'	-17°10'/50'	
	+15°20'/50'	-18°05'/30'	-19°35'/50'	
+18°25'/50'	+18°35'/16'	-16°00'/39'	-17°10'/50'	

Sta.	+S	HI	-S	Elev.	Grade
+50			+5.0	34.6	✓1018.7
					1018.5
+25			5.3	24.3	Bot. Draw
15+3			+0.2	29.8	✓1018.4
+50			+3.7	33.3	✓1018.2
15+2			+3.0	32.6	✓1018.0
					1017.9
+70			14.7	14.9	✓Bot. Draw.
+50			7.5	22.1	✓
+31			8.2	21.4	✓1017.7
+15			15.5	14.1	✓1017.6
15+1			16.1	13.5	✓
+72			15.2	14.4	✓1017.4
T.P.	9.55	1029.64	15.72	1020.09	✓
+37			13.7	22.1	✓1017.2
15+0			13.9	21.9	✓1017.0
+60			12.6	23.2	✓1016.8
149			24.3	11.5	✓1016.6
		1035.81			



	+25°20' / 50'	−32°20' / 60'	−30°00' / 100'
	+26°35' / 50' Bot. Draw	−25°30' / 67'	−25°25' / 100'
+28°10' / 50'	+35°00' / 26'	−32°25' / 100' Bot. Draw	
	+32°15' / 50'	−29°15' / 100'	
+24°35' / 50'	+26°55' / 35'	−30°45' / 100'	
	+22°45' / 50'	−21°15' / 48'	−23°15' / 100'
+22°00' / 50'	+28°15' / 29'	−30°35' / 100' Bot. Draw	
+25°00' / 50'	+33°10' / 25'	−23°00' / 48'	−25°45' / 100'
+24°00' / 50'	+18°50' / 20'	−24°20' / 84'	
	+17°25' / 50'	−31°10' / 100'	
	+20°45' / 50'	−33°25' / 100'	
+20°50' / 50'	+27°45' / 25'	−36°50' / 100'	
	+27°20' / 50'	−31°15' / 50'	

Sta.	+S	H.I.	−S	Elev.	Grade
T.P.	2.10	1029.81	0.89	1027.91	✓
15-8			6.1	22.2	✓ 1014.8
+87			17.9	10.4	✓ 1016.1
+74			11.6	16.7	✓ 1016.4
+50			16.5	12.8	✓ 1016.0
+40			12.8	15.5	✓ 1016.3
15-7			11.9	16.4	✓ 1017.0
+50			9.4	18.9	✓ 1017.8
15-6			16.8	12.5	✓ 1018.4
+50			14.3	14.0	✓ 1018.9
+10			14.0	14.3	✓ 1019.0
15-5			10.8	17.5	✓ 1019.1
T.P.	2.83	1028.30 ✓	11.17	1018.47	✓
+50			+1.5	31.1	✓ 1019.15
15-4			+8.0	37.6	✓ 1019.0
15-3+75			+8.3	37.9	✓ 1018.7
		1029.64			

℄

	+8°45' / 50'	-2°05' / 17' ⌅	-30°45' / 33'	
	+20°10' / 50'	-17°00' / 75'		
	+5°35' / 50'	-20°55' / 75'		
-1°30' / 20' ⌅	+26°10' / 30'	-15°50' / 33' ⌅	-30°15' / 35'	
+0°45' / 33' ⌅	+30°00' / 17'	-9°55' / 28' ⌅	-27°10' / 25' ⌅	-36°20' / 35'
	+10°50' / 50'	-15°45' / 33'	-20°50' / 75'	
+11°40' / 50'	+14°35' / 32'	-18°00' / 65'		
	+16°00' / 50'	-21°15' / 100'		
+20°40' / 50'	+19°15' / 30'	-17°40' / 30'	-20°55' / 100'	
	+27°05' / 50'	-28°00' / 56'	-24°40' / 100'	
	+26°15' / 50	-28°00' / 60'	-25°40' / 100'	
	+30°30' / 50'	-31°00' / 90'	-27°35' / 100'	
	+30°35' / 50'	-33°30' / 60'	-31°05' / 100'	

Sta.	+ S	HI	− S	Elev.	Grade
B.M.	10.88	1014.25	0.46	1003.37	
+50			5.8	998.0	1002.4
163			13.5	990.3	1002.7
+50			18.7	985.1	1003.3
162			9.3	994.5	1009.4
T.P.	1.02	1003.83	14.03	1002.81	
+50			11.5	1005.3	1005.7
161			11.9	1009.9	1007.0
+50			5.4	11.4	1008.3
T.P.	2.99	1016.89	15.96	1013.85	
160			13.8	16.0	1009.6
+50			5.7	24.1	1010.9
159			1.7	28.1	1012.2
+82			+1.2	31.0	1012.7
+50			1.7	28.1	1013.5
158+29			1.5	28.3 ~~T.P.~~	1014.0
		1029.81			

Hub 38' L of sta. 163+89

	+7°50' / 50'	−17°20' / 50'		
	+10°45' / 50'	−14°05' / 50'		
	+11°15' / 50'	−20°25' / 27'	−18°40' / 50'	
	+7°55' / 50'	−15°05' / 29'	−19°05' / 50'	
	+3°35' / 50'	−20°10' / 15'	−0°45' / 40'	−11°50' / 30'
+14°15' / 50'	+8°10' / 15'	−15°15' / 25'	−19°55' / 50'	
+14°45' / 50'	+17°15' / 28'	−16°45' / 33'	−18°35' / 50'	
	+19°05' / 50'	−18°50' / 50'		
+23°20' / 50'	+25°20' / 15'	−27°15' / 13'	−16°50' / 33'	−19°50' / 50'
+23°00' / 50'	+21°15' / 15'	−19°30' / 16'	−16°45' / 50'	
+17°55' / 50'	+16°00' / 31'	−25°00' / 19'	−18°35' / 50'	
+16°55' / 50'	+20°15' / 28'	−19°50' / 50'		

1/3/39

Nov. 26-1938
Isbell
Leckey
Brooks

℄

Sta.	+	π	−	Elev.	Grade
+50	8.7			1028.1	1007.5
169	3.9			1023.3	1007.1
+50			5.7	1013.7	1006.6
					1006.3
+15			18.3	1001.1	Bot. Draw
168			15.9	1003.5	1006.2
+50			18.9	1000.5	1005.8
167			18.6	1000.8	1005.3
+50			10.7	1008.7	1009.9
166			7.0	1012.4	1004.9
+50			7.0	1012.4	1004.0
165+00			7.9	1011.5	1003.6
+50			14.3	1005.1	1003.1
+16			22.9	996.5	1002.8
164+00			16.3	1003.1	1002.1
B.M.	15.97	1019.34			1003.37
			1.0	1013.3	✓
		1014.25			

+0.88%

+5°00'/50'	+6°25'/25'	−10°15'/30'		
−2°00'/73' Bot. Draw	+1°10'/39'	−7°45'/50'		
+1°00'/50'	−9°10'/30' Bot. Draw	+0°45'/30'	−3°10'/50'	
	+17°50'/50'	+10°10'/23'	+5°25'/50'	
	+16°45'/50'	−20°35'/18' Bot. Draw	−4°00'/38'	−5°30'/50'
	+21°30'/50'	−16°50'/56' Bot. Draw	−11°45'/75'	
	+16°55'/50'	−13°45'/50'	−12°10'/75'	
+16°05'/50'	+19°05'/28'	−19°50'/25'	−16°45'/50'	
	+19°00'/50'	−17°30'/50'		
+15°10'/50'	+12°00'/32'	−14°45'/25'	−12°25'/50'	
	+5°30'/50'	−5°15'/18'	−11°15'/50'	
	+3°25'/50'	−6°55'/23'	−12°30'/50'	
	+5°20'/50'	−8°45'/50'		
+10°55'/50'	−4°45'/20'	−9°25'/27'	−14°50'/50'	

Check on N 22

Sta.	+	⊼	−	Elev.				℄		
TP	15.81	1041.68	0.48	1025.87	✓					
175			3.0	1023.4	~~1017.0~~ ✓ 1017.2			+3°00' / 50'	−3°00' / 50'	
174+50			10.3	1016.1	~~1014.8~~ ✓ 1015.0			+2°15' / 50'	−3°15' / 50'	
TP	15.71	1026.35 ✓	0.10	1010.64	✓					
174			1.2	1009.5	~~1012.6~~ 1013.2			+1°05' / 50'	−1°10' / 75'	
+50			8.4	1002.3	~~1011.3~~ ✓ 1011.8			−1°45' / 50'	+0°15' / 75'	
173			15.3	995.4	~~1010.6~~ ✓ 1010.8	+0°50' / 85' Bot. Draw	+0°55' / 50'	−9°20' / 17'	+1°50' / 75'	
+76			19.3	991.4	1010.5 ✓ Bot. Draw			+7°15' / 50'	+3°40' / 75'	
+50			16.8	993.9	✓ 1010.2			+7°05' / 50'	−13°30' / 17' Bot. Draw	+0°25' / 75'
172			12.2	998.5	✓ 1009.7			+9°25' / 50'	−11°00' / 55' Bot. Draw	−5°55' / 75'
+66	P.C.C.		5.7	1005.0	✓ 1009.4	P.C.C.		+9°55' / 50'	−10°30' / 23'	−13°30' / 45'	−11°05' / 94' Bot. Draw
171+50			1.7	1009.0	✓ 1009.3			+11°00' / 50'	−13°45' / 23'	−12°10' / 50'	−13°00' / 75'
TP	7.27	1010.74 ✓	15.87	1003.47	✓					
171			2.8	1016.6	✓ 1008.8			+14°35' / 50'	−14°05' / 50'	−12°15' / 75'
+50	3.8			1023.2	✓ 1008.7			+14°45' / 50'	−19°50' / 38'	−16°45' / 50'
170+00	7.6			1027.0	✓ 1008.0			+11°15' / 50'	−12°15' / 50'	
		1019.34								

V.C.

+0.88%

Sta.	+	⊼	−	Elev.	

Continued in Book 551

TP			0.47	1041.21 ✓	
175+50			5.0	1036.7	✓ 1019.8
		1041.68			

BM. 474.73 at Dam

Pt. 34

26	666.1
10	846.4
2	947.4
0	1034.6

℄

+8.5 ft

V.C.

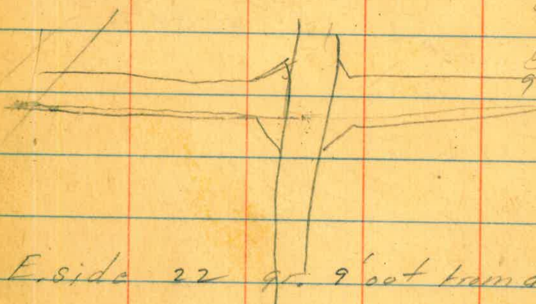
+7°45′ / 50′ — −6°20′ / 50′

Finish X sec. 1/3/39
Isbell
Leckey
Brooks

E. side 23 gr. 296.0 3.5 out from arch at elev. 296.
at arch elev. 294

.08
.5
.40

48.4"
2.6"
45'-10"



6.5
1.4
25.0
6.5
9.0

E. side 22 gr. 9' out from arch 260.0
at arch 258.0

202.3
1.0

W. side Lot. 19 46.6 from set
El. 200.9

E. " " 17 45.5 from
El. 202.2

264
1.01
265.01
5.6
9.01

108

219.0
11.8
207.2

31.7

13.5
3.2
10.3

15.8
8.1
23.9

7.85 .510 .0653
368
420
390
330
340
24 8.1 0
660

22.9
12.1
35.0

10.8
7.3
3.2

22.9
2.3
24.2

2.5
1.4
10.0
25
35.0

2. 7.15
3.57

869.4
24.5
837.9

11.5
.06
16.9

G.

8
39
40

line to
tenths of
example
9 = 43.9.

Germany.

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) and ½ the roadbed =w, add the triangles formed by taking the distance out to each bank 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.

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.

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