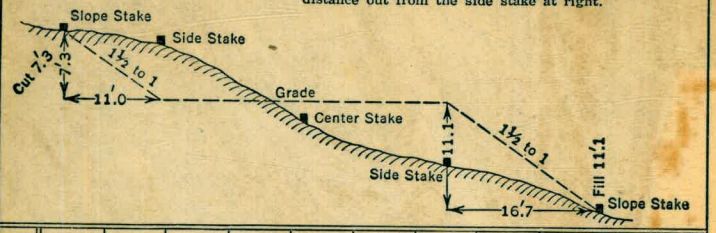
BUTRESS

DATA

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.

For Curve Tables see end of book.

BUTTRESS - X-SECTIONS

8-52
HKS

INDEX

Mounted original

40-44 FINAL X-SECTIONS TO L1016 #6

44-46 RE-X SECTION TO L1010 #6

46-47 TBM's

49 Original Ground Butt #18

D1900

X-SECT OF BUTTRESS # 15

TBM 2018.49
+S 2.42
H.I. 2020.91

STATION

TBM 2018.49
+S 5.34
H.I. 2023.83

L 1075
1070
1065
1060
1055
1050
1045
1040
1035
1030
1025

#15

EAST & WEST

BASE LINE 1975 DISTANCES MEASURED SOUTH (65', 63')

H.I. 2020.91

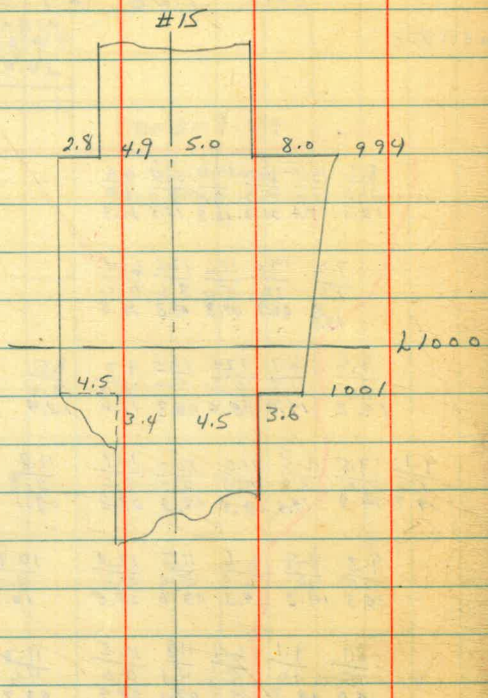
H.I. 2023.83

H.I. 2023.83

③

D 1900 ℄ #15

℄ 1020
40' 1015
35' 1010
30' 1005
25 1000
20 995
15 990
10 985
5 980
0 975



#15

EAST ℄ WEST

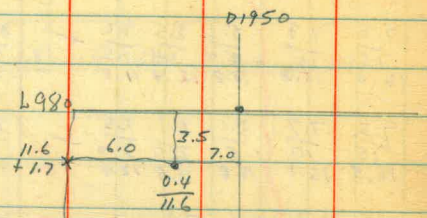
H.I. 2023.83 (east) · H.I. 2020.91 (℄) · H.I. 2023.83 (west)

					℄					
✓		6.5/15 (17.3)	7.9/10 (15.9)	5.6/5.0 (15.3)	9.3/2.5 (11.6)	—	9.0/2.6 (11.9)	5.1/5 (15.8)	2.6/10 (18.3)	1.2/15 (22.6)
✓	7.5/15 (16.3)	7.9/10 (15.9)	5.7/5.0 (15.2)	8.5/2.4 (12.4)	9.2/1.5 (11.7)	—	8.7/2.9 (12.2)	5.7/3.7 (15.2)	4.9/5.0 (16.0)	2.8/10 (18.1)	1.3/15 (22.5)
	7.3/15 (16.5)	7.7/10 (16.1)	5.1/5 (15.8)	5.1/4.5 (15.8)	8.5/2.0 (12.4)	—	8.3/2.5 (12.6)	5.0/4.2 (15.9)	4.5/5.0 (16.4)	2.8/10 (18.1)	2.1/15 (21.7)
✓	5.5/15 (18.3)	6.7/10 (17.1)	4.4/5.0 (16.5)	7.1/3.0 (13.8)	8.3/1.5 (12.6)	—	8.2/2 (12.7)	4.4/5 (16.5)	2.8/10 (18.1)	1.9/15 (21.9)	
✓	5.0/15 (18.8)	5.9/10 (17.9)	3.4/7.5 (17.5)	6.5/6.5 (14.4)	7.5/3.7 (13.4)	—	7.8/1.5 (13.1)	6.3/6.0 (14.6)	4.2/7.2 (16.7)	3.2/10 (17.7)	2.8/15 (21.0)
✓	4.5/15 (19.3)	5.5/10 (18.3)	3.0/7.0 (17.9)	3.3/5.0 (17.6)	7.0/2.5 (13.9)	—	7.1/2.4 (13.8)	4.2/5.0 (16.7)	3.2/7.8 (17.7)	1.3/13.8 (19.6)	0.4/15 (20.5)
✓	4.9/15 (18.9)	6.7/10 (17.1)	2.9/5.0 (18.0)	2.9/3.7 (18.0)	6.8/3.0 (14.1)	—	6.6/2.3 (14.3)	2.7/5 (18.2)	2.0/6.5 (18.9)	4.2/10 (19.6)	1.8/15 (22.0)
✓	3.5/15 (17.4)	2.5/10 (18.4)	2.3/5.0 (18.6)	2.4/4.2 (18.5)	6.4/3.0 (14.5)	—	5.2/1.7 (15.7)	1.8/5 (19.1)	3.2/10 (20.6)	1.6/15 (22.2)	
✓		4.7/15 (16.2)	3.3/10 (17.6)	2.5/5 (18.4)		1.4/0.0 (19.5)	3.5/5 (20.3)	2.2/10 (21.6)	0.5/15 (23.3)		
✓		7.5/15 (13.4)	7.1/10 (13.8)	5.3/5 (15.6)		4.1/0.0 (19.7)	2.6/5 (21.2)	1.7/10 (22.1)	0.4/15 (23.4)		

✓

(4) TBM 2034.54
1.70
H.I. 2036.24 X-SECTION OF BUTTRESS #16

L 1090	✓
1080	✓
1070	✓
1060	✓
1050	✓
1043	✓
1040	✓
1030	✓
1020	✓
1010	✓
1005	✓
1000	✓



#16
D1960
℄
EAST WEST 7-28 29-52
BASE LINE D1950 = 0'
H.I. 2036.67
H.I. 2045.14
H.I. 2036.24
H.I. 2036.67
2045.14

(5)

995

990

D 980

TBM STA 1980.00
+2042.51
+S 2.63
H.I. 2045.14
-10.72
2034.42
2.25
H.I. 2036.67

#16

D 1950

H.I. 2036.24

H.I. 2036.67

5.8 / 1.0 / 30.9	2.5 / 0 / 34.2	0.4 / 6.0 / 35.8	10.3 / 10.9 / 25.9	10.5 / 8.7 / 25.7	+1.8 / 16 / 38.0	5.4 / 2.0 / 39.7	2.6 / 3.0 / 42.8
5.8 / 1.6 / 30.9	2.6 / 0 / 34.1				4.6 / 2.0 / 40.5	2.0 / 3.0 / 43.1	

7.7 / 7.8 / 28.5

3.1 / 13.6 / 29.1

H.I. 2045.14

⑥ X-Section of Buttress #17 = D-2020

D-2020 = ☆ ↗ = Base line for ⊙

Sta.	+	↑	−	Elev.
⊡	~~11.31~~	~~2053.82~~		~~2042.51~~
⊡	0.49	2050.30		2049.81
L-980 ✓				
L-985 ✓				
L-990 ✓				
L-1000 ✓				
L-1002 = Same as L-1000 ✓				
L-1004 ✓				
L-1010 ✓				
L-1013 = Same as L-1010 ✓				
⊡		~~3.99~~	~~2049.83~~	(2049.81)

11-Aug. '52 Dallas-⊡ Dave-~~Tape & ☆~~ 6

Stanley-↑ Clyde Tape & ☆

West ☆ East

~~Top Stk @ D-1980 on Axis line~~

Top Stk. @ D-2010 on Axis line

(2050.30)

56.6 +6.4 10 | 55.9 +4.9 5 | 55.2 +2.6 10

54.2 +3.7 10 | 52.3 +2.0 5 | 51.4 +1.1 0 | 51.8 +1.5 10

53.1 +2.8 10 | 50.0 0.3 3 | 50.2 0.1 0 | 50.3 0.0 4 | 50.6 +0.3 10

51.8 +1.5 10 | 49.8 0.4 5 | 49.4 1.2 0 | 49.3 1.0 10

51.6 +1.3 10 | 42.6 0.7 5 | 48.4 1.9 3 | 42.4 7.9 2.5 | 42.4 7.9 0 | 42.4 7.9 1.5 | 44.2 2.6 2 | 48.8 1.5 10

50.5 0.3 10 | 47.1 2.6 3.5 | 43.1 7.1 2.5 | 42.0 8.3 0 | 42.0 8.3 1.5 | 44.1 2.6 2.5 | 48.4 1.9 10

2x2 Hub @ 2010 on Axis line ✓

 11-Aug. '52

Sta.	+	⊼	−	Elev.
		2050.30		
L-1014 ✓				
L-1020 ✓				
L-1030 ✓				
⊡			7.79	2042.51

Same party as page 6

West ℄ East

(2050.30)

	[illegible]/10 (49.7)	3.0/4 (47.3)	7.7/1 (42.6)	7.9/0 (42.4)	6.7/2.5 (43.6)	2.6/5.5 (47.7)	2.2/10 (48.1)
0.2/10 (50.1)	1.5/7.5 (48.8)	2.5/4 (47.8)	5.0/2 (45.3)	7.1/0 (43.2)	7.3/3 (43.0)	3.0/7 (47.3)	2.7/10 (47.6)
	1.7/10 (48.6)	3.8/4 (46.5)	3.9/0 (46.4)	9.0/1 (41.3)	9.0/5 (41.3)	4.4/10 (45.9)	

Top of 2x2 @ D-1980 on Axis Line

✓

(8) X-Section of #18 Buttress Excavation
@ D-2080 = ℄ ↗ = Base line for ⊙

Sta.	+	↑	—	Elev.
⊡	1.83	2067.90		2066.07
L-985 ✓				
L-990 ✓				
L-997 ✓				
L-999 5 ✓				
L-1010 ✓				
L-1011 5 ✓				
L-1020 ✓				
⊡			8.22	2059.68 (2059.68)

11-August 1952 Page 6 for party (8)

West East

Top of 2x2 hub @ D 2070 on Axis line

(2067.90)

+6.5	+6.0	+4.0	+1.7	+0.8
10	5	0	4	10
74 1	73 9	71 9	69 6	68 7

+6.3	+3.9	+0.7	0.7
10	6.5	0	10
74 2	71 8	68 6	67 2

+1.8	1.4	2.2	2.2	2.2
10	3	0	5.5	10
69 7	66 5	65 7	65 7	65 7

+0.8	2.4	4.1	15.3	15.4	16.4	2.7	2.7
10	3.7	2.5	1.8	0	1.8	2.5	10
68 7	65 5	63 8	2.2 52 6	52 5	51 5	65 2	65 2

0.5	3.3	4.1	16.0	15.7	15.6	4.3	4.6
10	5.5	1.9	1.8	0	1.8	2.5	10
67 4	64 6	1.5 63 8	1.5 51 3	52 2	2.5 52 3	2.5 63 6	63 3

0.0	3.5	4.6	4.8
10	5.5	0	10
67 9	64 1	63 3	63 1

0.7	4.8	5.3	5.7	5.6
10	3	0	5	10
67 2	63 1	62 6	62 3	62 3

Top of 2x2 @ D-2040 on Axis line ✓

(9) 11- Aug. 1952

Sta.	+	℄	−	Elev.
		2067.90		
L-1030	✓			
L-1040	✓			
L-1050	✓			

Page 6 for party (9)

West (2067.90) East

~~3.9 / 10~~	2.9 / 10	6.7 / 2	7.0 / 0	7.3 / 5	7.7 / 10
	65^{0}	61^{2}	60^{9}	60^{6}	60^{2}
5.3 / 10	7.9 / 4		8.5 / 0	9.4 / 5.5	10.0 / 10
62^{6}	60^{0}		59^{4}	58^{5}	57^{9}
7.9 / 10	9.4 / 4.5		10.4 / 0	11.6 / 5	11.7 / 10
60^{0}	58^{5}		57^{5}	56^{3}	56^{2}

✓

(10) 11-August 1952 page 6 for party.

Sta.	+	⊼	—	Elev.
⊡	2,01	2078.25		2076.24
D-2100				
D-2110				
D 21 20				
D-2130				

Non-excavated Sections between D-2100 & D-2130 & L-1000 = ⊼ = 0 (10)

2 x 2 hub on Axis Line ⓒ D-2100 (2078.25)

South — North

16.7/50 11.9/34 8.6/22 5.8/13 4.3/7 2.5/3 -2.3/0 3.0/1 2.1/15

14.0/50 11.8/40 8.6/30 5.5/17 3.6/12 1.7/0 -1.0/3 +1.7/5 +5.7/15

11.3/50 9.1/40 5.8/30 4.8/24 3.4/20 1.8/14 +1.8/3 +3.9/0 +7.7/10 +7.8/15

+3.3/2.5

6.4/50 5.7/45 2.7/37 1.9/20 0.8/12 +1.8/10 +4.8/4 +8.0/0 +8.5/8 +8.0/15

(11) 11-Aug. 1952 Page 6 for party.

Sta.	+	℄	—	Elev.
℄	6.25	2025.76		2019.51
L-980				
L-990				
L-1000				
L-1010				
L-1020				
L-1030				
L-1035 same as L-1040				
L-1040				
			6.26	2019.50 (2019.51)

X-Sections for #3 Buttress = D-1180 & (11)
℄ Buttress = 0

West East

T.B.M. Top of big rock @ D-1180 & L 1000
(2025.76)

~	8.5/10 17.2	7.6/5 18.1	7.1/0 18.6	5.6/5 20.1	1.8/12 23.9	
~	8.0/10 17.7	7.9/5 17.8	7.6/0 18.2	6.4/7.0/5 19.3	4.7/8 21.0	+0.5/14 26.2
✓	7.7/10 18.1	7.6/5 18.2	7.1/0 18.1	7.2/4 18.6	3.3/9.5 22.5	+1.8/15 27.6
✓	6.7/10 19.1	7.4/4 18.4		7.2/0 18.6	6.7/4 19.1	3.0/10 22.8	1.8/15 24.0
✓		5.4/10 20.4	7.0/3 18.8	7.1/0 18.7	4.8/6 21.0	0.9/11.5 25.8	+1.4/14 27.2
✓	4.5/10 21.3	6.2/5 19.6	7.7/2.5 18.1	7.5/0 18.3	5.5/3.5 20.3	1.0/10 24.8	+4.4/17 30±
✓		5.0/10 20.8	4.7/6 21.1	4.8/0 21.0		3.5/7 22.3	+4.0/16 29.8

Continue to L-1090

Continued on page 12

(12) 12- Aug. 1952

Sta.	+	Δ	−	Elev.	
□	6.29	2025.80		2019.51	
L=1					
L-1050					
L-1060					
L-1070					
L-1080					
L-1090					
□			6.29	2019.51	(2019.51)

Dallas - □□
Stanley - Δ & Tape
Curley - ⊕ & Tape
Clyde → Tape & Axe

Continued from page 11

(12)

T.B.M. Top of big rock @ D-1180 & L-1000

West — East

(2025.80)

5.0 / 10	5.1 / 5	5.0 / 0	4.6 / 3	2.2 / 8	+3.5 / 15	
20.8	20.7	20.8	21.7	23.6	29.3	
5.3 / 10	4.4 / 7	4.6 / 4	4.1 / 0	2.9 / 4	+0.3 / 8	+2.1 / 14
20.5	21.4	21.7	21.7	24.9	26.1	27.9
6.5 / 10	5.0 / 5.5	3.4 / 2.5	2.9 / 0		1.2 / 6.5	+1.0 / 12.5
19.3	20.8	22.4	22.9		24.6	26.8
~~3.8 / 10~~	7.8 / 10	7.1 / 6.5	5.0 / 2	3.8 / 0	3.0 / 2.5	2.2 / 6	1.1 / 10
	18.0	18.7	20.8	22.0	22.8	23.6	24.7
9.9 / 10		8.5 / 6		5.8 / 0	3.6 / 5	1.1 / 11	
15.9		17.3		20.0	23.2	24.7	

Top of rock @ D-1180 & L-1000

(13) 12-Aug. 1952 Page 12 for party.

Sta.	+	Δ	—	Elev.
⊡	0.67	2063.41		2062.74
T.P.	1.51	~~2053.39~~ 2053.39	~~11.33~~ 11.59	~~2052.08~~ 2051.87
T.P.	2.10	~~2047.68~~ 2047.37	~~8.07~~ 8.06	~~2045.52~~ 2045.27
L-980				
L-990				
L-1000				
L-1005				
L-1007	same as L-1010			
L-1010				
L-1013				

X-Sections for #2 Buttress = D-1120 ℄ ℄ of Buttress = 0

(13)

West East

T.B.M. Top of Sta. on Axis @ D-1071.41

1X2 Hub on Axis @ D-1100 ±

2x2 ⊡ Tack on Axis line ⊡ ℄ #Buttress = D-1120 ±

(2047.37) (2053.39)

7.9/0 39.5 | 11.9/5 41.4 | 9.9/0 43.4 | 8.3/5 45.1 | 6.4/10 46.9

6.7/10 40.6 | 4.8/5 42.5 | 3.3/0 44.0 | 6.6/7 46.7 | 5.2/10 48.1

6.2/10 41.1 | 5.0/7.5 42.3 | 2.6/0 44.1 | 6.7/4 46.6 | 4.8/10 48.5

5.4/10 41.9 | 2.3/0 45.0 | 6.4/5 46.9 | 4.7/10 48.6

4.2/10 43.1 | 4.0/0 43.3 | 8.8/3.5 44.5 | 5.6/6.5 47.7 | 4.4/10 48.9

4.1/10 43.2 | 4.1/3.5 43.2 | 8.9/2 38.4 | 9.1/0 38.2 | 6.4/3.7 40.9 | 6.2/5.2 47.1 | 4.4/10 48.9

3.3 = 44.3

(14) 12-Aug.'52 Page 13 for party

Sta.	+	✻	—	Elev.
L-1020				
L-1022	= Same as L-1020			
		2053.33/59		
		,	8.06	2045.27/33
L-1024		2047.37/63	2.10	20
L-1028	= Same as L-1024			
			2.10	2045.27/33
L-1030				
L-1040				
L-1050				
L-1060				
L-1070				
		2053.33/59		
	11.08	2062.91 / 2063.17	1.50	2051.83 / 2052.09
L-1080			0.14	
			0.17	2062.74 2062.74

Check ✻

(14)

(2047.37/63) West (2053.33/59) East +

4.2 / 10	4.0 / 3.5	10.4 / 2	9.9 / 0	9.3 / 2	3.7 / 6.3	5.2 / 7.5	4.2 / 10
43.1	43.3	36.9	37.4	38.0	43.6	42.1 / 48.1	43.1 / 49.1
4.3 / 10	3.8 / 5		3.8 / 0	3.4 / 2.3	5.5 / 6	4.3 / 10	
43.0	43.5		43.5	43.9	47.8	49.0	

(2053.33/59) (2047.63)

42.1 / 10.6 / 10	44.1 / 9.2 / 4.7	45.9 / 7.4 / 0		47.3 / 6.0 / 5	48.8 / 4.5 / 10

42.1 / 11.2 / 10	43.8 / 9.5 / 5	45.3 / 2047. / 8.0 / 0	(2053.33/59) / 6.1 / 5 / 41.2	3.5 / 10 / 49.8

41.7 / 11.6 / 10	43.8 / 9.5 / 4.2	(2053.33/59) 41.8 / 7.9 / 0	7.2 / 2.3	5.5 / 5	50.1 / 3.2 / 10
		45.4	46.1		

40.1					
(2047.37/63) 42.2 / 6.7 / 10	5.2 / 5	44.4 / 2.9 / 0		46.2 (2053.33/59) / 7.1 / 4.5	5.9 / 10 / 47.4

(2047.37/63) / 39.1 / 8.3 / 10	40.9 / 6.5 / 4.5	42.5 / 10.8 / 0		44.7 (2053.33/59) / 8.6 / 6	7.8 / 10 / 45.5

(2047.37/63) / 10.1 / 10	8.6 / 5	7.3 / 0	6.0 / 4		(2053.33/59) / 10.3 / 10
37.2	38.7	40.0	41.3		43.0

(15) 12-Aug. 1952 Page 13 for party

Sta.	+	⊼	−	Elev.
⊡	3.27	2066.01		2062.74
L-980				
L-990				
L-1000				
L-1003				
L-1010				
L-1012.5 = same as L-1010				
L-1014				
L-1020				
L-1022				

X-Sections for #1 Buttress = D-1060 ℄

℄ of Buttress = 0

(15)

West					East
		(2066.01)			
6.1 / 10	4.5 / 5	3.8 / 0 / 63.2	2.7 / 1.4		11.5 / 10
5.4 / 10 / 60.6	4.1 / 6 / 61.9	2.3 / 0 / 63.7	1.9 / 1 / 63.1		11.3 / 10 / 54.7
3.4 / 10 / 62.6	3.6 / 8 / 62.4	5.2 / 4 / 60.8	5.8 / 0 / 60.2	5.7 / 2 / 60.3	10.8 / 10 / 55.2
3.0 / 10 / 63.01	5.6 / 3 / 60.4	8.3 / 1.5 / 57.7	8.3 / 0 / 57.7	8.3 / 2 / 57.7	10.7 / 10 / 55.3
3.3 / 10 / 62.7	5.9 / 5.5 / 60.1	8.4 / 1.5 / 57.6	8.4 / 0 / 57.6	8.4 / 2 / 57.6	8.0 / 3.5 / 58.0	5.6 / 4.5 / 60.9	5.6 / 5.5 / 60.4	9.2 / 10 / 56.8
	3.0 / 10 / 63.01	3.5 / 8.5 / 62.5	5.4 / 6 / 60.6	5.6 / 0 / 60.9		5.1 / 5 / 60.9		9.2 / 10 / 56.8
2.9 / 10 / 63.1	3.0 / 7.5 / 63.	2.9 / 6 / 62.1		3.9 / 0 / 62.1	3.7 / 5.5 / 62.3	8.6 / 10 / 57.8		
	2.9 / 10 / 63.1	1.8 / 4 / 64.2		1.2 / 0 / 64.8	2.0 / 4.5 / 64.	8.6 / 10 / 57.4		

(16) 12- Aug. '52 Page 13 for party

Sta.	+	⏊	−	Elev.	
L-1030		2066.01			
L-1038					
⊡			3.27	2062.74	2062.74
⊡	5.61	2056.21		2050.60	
L-1050					
L-1060					

(16)

West (2066.01) East

3.8 / 10	2.7 / 7	1.3 / 4	1.0 / 0	1.0 / 5	6.3 / 10
62.2	63.3	64.7	2065.0	65.0	59.7
5.7 / 10	4.7 / 6		3.2 / 0	2.7 / 4	6.7 / 10
60.3	61.3		62.8	63.3	59.3

2x2 @ D-1071 ℄ on Axis

2x2 Hub @ D-1000 on Axis

(2056.21)

4.5 / 10	3.8 / 0	3.1 / 10
51.7	52.4	53.1
5.8 / 10	5.7 / 0	5.3 / 10
50.4	50.5	50.9

(17) 12-Aug, 1952 Page 13 for party

Sta.	+	⏊	—	Elev.
		2056.21		
100' South				
~~90' S~~			10.9	
90' So			9.3	
77 So.			6.7	
42 So			3.5	
23 So			4.8	
0 '			6.1	
10 North			7.0	
19 No.			5.9	
25 "			8.0	
38			10.3	
58			11.6	
74			12.5	
T.P.	0.65	2044.97	11.89	2044.32
100' South			4.4	
118' "			6.2	
136 "			8.7	
150 "			9.5	
175 "			11.3	
T.P.	1.05	2033.85	12.17	2032.80
200 No.			4.0	
225 "			7.3	
250 "			10.4	
287 "			11.0	
300 North			10.8	

Profile of D-1000 & L-1000 = 0
SPILLWAY

(17)

0 = D-1000 @ L-1000

Top of rock pile @ L-923 ± & D-1000

Top of rock @ L-818 & D-1000

(18) 12-Aug, 1952

Sta	+	⊼	−	Elev	
		2033.85			
		2045.83			
		~~2044.02~~			
T. P.	12.~~52~~ 32	2044.02	0.35	2033.50	
	~~50~~	2056.19		2045.79 ~~49~~	
T. P.	10.~~60~~	~~2054.37~~	0.23	~~2043.79~~	
				2050.~~78~~	
⊡			5.61	~~2048.78~~	(2050.60)

Page 13 for party. (18)

Continued from page

Rock @ D-1003 ℄ L-822

Hub @ D-1000 ℄ L-1000

(19)

Ring # G-7 = D 1360 – 1420

Sta.	X-Sections +	X-Sections ⊼	—	Elev.	
T.P.	0.40	1954.66		1954.26	
D-1370					
D-1380					
T.P.	0.55	1943.40	11.81	1942.85	
D-1390					
D-1400					
T.P.	4.36	1935.64	12.12	1931.28	
D-1410					
D-1420					
⊡			10.21	1925.43	(1925.43)

Base line for 0 = L-1166.80

15-Aug, 1952

Dallas - ⊞
Stanley - ⊼
Dave - ¢ Tape
Curley - ¢ Tape
Clyde - ¢ Tape

South — North

Rock @ D-1361 ∃ L-1158

(1954.66)

4.1/0 3.7/1.3 5.4/17 4.2/22 7.8/30.5 7.3/37.5 5.1/42 4.4/50

(1954.66)

10.4/0 8.0/10 17.2/14.5 14.5/20.5 4.3/27 3.2/33

Rock @ D-1386 ∃ L-1164

(1943.40)

4.4/7 3.5/0 3.5/4 5.0/6.5 12.8/8 8.3/18 2.8/19.5 +1.3/21.5 +4.0/24.5 +6.8/32

(1943.40)

8.8/7 0 8.5/2.5 18.3/8 18.4/12 11.5/17 8.8/19 3.4/26 +0.5/27 +1.4/33 4.0/36 1.9/41

Rock @ D-1415 ∃ L-1180

(1935.64)

4.3/9 4.5/0 7.3/6 14.6/8 14.6/17.5 8.6/17.5 2.8/28

(1935.64)

6.3/10 6.6/1 0 11.3/6

Check on liner pipe in ring #9-10 16' S.E. of Buttress #10

(20)

BUTTRESS #7
D-1420

STA	+	⊼	−	ELEV
TBM	3.37	1928.07	—	1924.70
L 1030				
L 1020				
L 1010				
L 1006 4				
L 1003				
L 1000				
L 992				
L 990				
L 980				
L 970				
L 960				

8-4-52

#7

℄

EAST WEST

(1928.07)

4
8.0 / 4.7 — 20.1
9.6 / 4.3 — 18.5
9.4 / 0 — 18.7
8.1 / 9 — 20.0
7.1 / 12 — 21.0
4.6 / 14 — 23.5
3.0 / 17 — 25.1
2.8 / 20 — 25.3

(1928.07)

4
6.3 / 8 — 21.8
9.5 / 4.6 — 18.6
9.5 / 0 — 18.6
8.4 / 7 — 19.7
7.1 / 10 — 21.0
4.5 / 13.5 — ~~26.5~~ 23.6
2.4 / 17 — 25.7
2.4 / 20 — 25.7

(1928.07)

4
7.2 / 8.6 — 20.9
8.5 / 7 — 13.6
9.0 / 5 — 19.1
9.5 / 0 — 18.6
9.2 / 6 — 18.9
7.1 / 10 — 21.0
4.0 / 14 — 24.1
2.6 / 20 — 25.5

4
4.4 / 9.2 — 23.7
9.0 / 6.10 — 19.1
9.4 / 5 — 18.5
9.4 / 0 — 18.7
9.5 / 4 — 18.6
9.3 / 4.5 — 18.8
8.9 / 7 — 19.2
5.6 / 13 — 22.5
2.8 / 20 — 27.3

4
9.5 / 8.6 — 18.6
10.2 / 6.1 — 17.9
11.4 / 3.7 — 16.7
11.3 / 2.1 — 16.8
10.8 / 0 — 17.3
11.0 / 5 — 17.1
10.2 / 8 — 17.9
8.6 / 9 — 19.5
5.7 / 14 — 22.4
4.2 / 18 — 23.9
3.1 / 18.5 — 25.0
3.1 / 20 — 25.0

4
9.6 / 9.7 — 18.5
10.8 / 5 — 17.3
10.8 / 0 — 17.3
10.9 / 8 — 17.2
10.0 / 12 — 18.1
6.7 / 15 — 21.4
3.4 / 20 — 24.7

4
9.3 / 9 — 18.8
11.0 / 4.4 — 17.1
10.7 / 0 — 17.4
10.5 / 6.5 — 17.6
10.0 / 10.5 — 18.1
8.3 / 13 — 19.8
3.7 / 20 — 24.2

4
9.0 / 6 — 19.1
11.1 / 4 — 17.0
10.6 / 0 — 17.5
10.5 / 5 — 17.6
5.7 / 13 — 22.4
3.9 / 20 — 24.2

4
8.3 / 7.6 — 19.8
10.3 / 4.6 — 17.8
11.1 / 4 — ~~17.0~~ 17.0
10.6 / 2 — 17.5
10.3 / 0 — 17.8
10.3 / 4 — 17.8
9.6 / 7 — 18.5
7.4 / 12 — 20.5
4.4 / 19 — 23.7
4.8 / 20 — 23.3

4
9.3 / 5.8 — 18.8
11.1 / 4 — 17.0
11.3 / 3 — 16.8
10.1 / 0 — 18.0
10.5 / 2 — 17.6
10.2 / 5 — 17.9
8.1 / 12 — 20.0
5.5 / 18 — 22.6
6.7 / 20 — 21.4

4
9.3 / 7.5 — 18.8
10.9 / 3 — 17.2
10.7 / 0 — 17.4
10.9 / 4 — 17.2
10.3 / 6 — 17.8
10.1 / 8 — 18.0
8.0 / 13 — 20.1
6.6 / 15 — 21.5
9.5 / 20 — 18.6

✓

(21) BUTTRESS #7 (CONT)

EAST (1928.07) WEST

L 950		6.7 / 10 / 21.4	9.0 / 4.7 / 19.1	10.7 / 0 / 17.4	10.8 / 6 / 17.3	9.9 / 8 / 18.2	10.1 / 12 / 18.0	9.4 / 15 / 18.7	9.6 / 20 / 18.5	
L 940				8.7 / 0 / 19.4	10.8 / 10 / 17.3	11.3 / 13 / 16.8		11.3 / 20 / 16.8		
L 1150		7.3 / 11.7 / 20.8	7.9 / 5.5 / 20.2	7.9 / 0 / 20.2	7.2 / 6 / 20.9	6.4 / 8 / 21.7	3.8 / 10.5 / 24.3	4.1 / 17.5 / 24.0	5.1 / 20 / 23.0	
L 1140		6.2 / 11 / 21.9	7.0 / 6.3 / 21.1	7.3 / 0 / 20.8	6.7 / 5 / 21.4	2.1 / 11 / 26.0	1.5 / 15 / 26.6	5.9 / 20 / 22.2		
L 1130		1.4 / 1.0 / 26.7	4.6 / 7.3 / 23.5	6.9 / 3.4 / 21.2	7.1 / 0 / 21.0	7.1 / 5 / 21.0	2.5 / 8.5 / 25.6	2.0 / 10 / 26.1	2.0 / 16 / 26.1	5.4 / 20 / 22.7
L 1120	+1.3 / 13.6 / 29.4	0.0 / 12 / 28.1	1.8 / 10.5 / 26.3	4.1 / 6.6 / 24.0	6.6 / 6 / 21.5	6.8 / 3.6 / 21.3	7.0 / 0 / 21.1	6.8 / 6 / 21.3	2.2 / 10.5 / 25.3	1.6 / 13.5 / 26.5	4.1 / 20 / 24.0
L 1110	3.4 / 10.6 / 24.7	3.5 / 8.3 / 24.6	5.4 / 7.7 / 22.7	6.8 / 4 / 21.3	7.0 / 0 / 21.1	7.1 / 4.5 / 21.0	5.3 / 10 / 22.8	3.5 / 11.5 / 24.6	3.2 / 13 / 24.9	1.0 / 17 / 27.1	2.7 / 20 / 25.4
L 1100	3.1 / 10.2 / 23.0	5.1 / 8.5 / 23.0	6.1 / 5.7 / 22.0	6.6 / 3.7 / 21.5	6.9 / 0 / 21.2	7.1 / 5 / 21.0	3.5 / 9 / 24.6	3.4 / 13 / 24.7	1.7 / 16.5 / 26.4	3.4 / 20 / 24.7	
L 1090	3.5 / 10 / 24.6	5.1 / 8.5 / 23.0	6.2 / 6.8 / 21.9	7.0 / 0 / 21.1	6.6 / 6 / 21.5	4.2 / 9 / 23.9	3.8 / 11 / 24.3	3.1 / 13 / 25.0	1.7 / 15 / 26.4	3.5 / 20 / 24.6	
L 1080	1.0 / 10.2 / 27.1	3.2 / 6 / 24.9	6.5 / 4 / 21.6	7.1 / 0 / 21.0	7.1 / 4 / 21.0	6.1 / 7 / 22.0	4.1 / 11 / 24.0	3.9 / 16 / 24.2	5.6 / 20 / 22.5		
L 1070	0.0 / 11 / 28.1	1.4 / 8.7 / 26.7	3.8 / 6.7 / 24.3	5.5 / 3.6 / 22.6	7.1 / 3.5 / 21.0	7.0 / 0 / 21.1	7.2 / 5 / 20.9	4.6 / 10 / 23.5	4.1 / 16 / 24.0	5.1 / 20 / 23.0	
L 1065.8	0.5 / 12.9 / 27.6	4.1 / 8 / 24.0	7.3 / 5 / 20.8	7.2 / 0 / 20.9	7.2 / 7 / 20.9	5.1 / 9 / 23.0	2.8 / 14 / 25.3	3.7 / 20 / 24.4		

(22)

BUTTRESS # 7 (CONT)

L 1060

L 1057

L 1050

L 1040

ADDITIONAL SHOTS

L 1090 +	1.0 / 11	1936.1	
L 1080 +	3.6 / 15	1933.5	HI 1937.10
L 1070 X	0.1 / 18	1937.0	
L 1060 +	2.7 / 13.6	1934.4	
L 1040 +	6.5 / 11	1931.7	
L 1030 +	6.8 / 14.5	1931.84	HI 1938.20
L 1020 +	7.2 / 13.5	1931.0	
L 1010 +	1.7 / 14.7	1935.4	
L 1000 +	1.7 / 14	1935.4	
L 990 +	1.2 / 14	1935.9	HI 1937.10
L 980 +	9.2 / 15	1927.9	
L 970 +	9.0 / 10	1928.1	
L 960 +	11.2 / 11.5	1925.9	

EAST (1928.07) WEST

4	3.7 / 9	8.6 / 6.4	9.5 / 0	9.6 / 4	9.0 / 8	4.3 / 13	4.0 / 16	3.4 / 18	3.5 / 20
	24.4	19.5	18.6	18.5	19.1	23.8	24.1	24.7	24.6
4	4.6 / 10.6	9.7 / 4.6	SAME AS 1060						
	23.5	18.4							
4	5.5 / 10.3	9.6 / 3.8	9.3 / 0	9.6 / 6.5	8.9 / 9	8.7 / 11	6.2 / 13	3.8 / 19	3.6 / 20
	22.6	18.5	18.8	18.5	19.2	19.4	21.9	24.3	24.5
4	6.3 / 7.7	8.9 / 5.2	9.5 / 3.6	9.6 / 0	9.2 / 3	7.1 / 8	5.6 / 12	4.0 / 13	3.8 / 19	4.3 / 20
	21.8	19.2	18.6	18.5	18.9	21.0	22.5	24.1	24.3	23.8

L 1130 X	3.6 / 13	1937.3	
L 1120 X	2.2 / 17.6	1938.7	HI 1940.90
L 1110 X	3.3 / 13.4	1937.6	
L 1100 -	4.1 / 11	1936.8	
L 1050 +	1934.40 / 16		

✓

(23)

BUTTRESS #5
D = 1300

STATION	+	⊼	—	E/E
⊡	4.93	1974.62	—	1969.69
L 950				
L 960				
L 970				
L 980				
L 990				
⊡	4.21	1998.25	—	1994.04 D 125 43
L995				
L1002				
L1005				
L1010				
L1020				
L1030				

WEST EAST

TBM @ AXIS HUB @ D 1332 34

(1974.6)

5.0/10/69.6 4.0/0/70.6 4.5/4/76.1 3.5/10/71.1 +1.5/1.3/76.1

(1974.6)

5.0/10/69.6 4.8/4/69.8 6.7/0/67.9 6.2/3/68.4 4.6/4/70.0 4.0/8/70.6 +2.0/13/76.6

1974.6

5.0/10/69.6 4.9/6.5/69.7 8.8/3/65.8 10.0/0/64.6 9.0/3.5/65.6 4.8/5.5/69.8 4.0/9/70.6 1.1/12/73.5 +4.5/1.5/79.1

1974.6

4.9/10/69.7 4.8/5.5/69.8 9.8/3.5/64.8 10.3/0/64.3 7.3/4/67.3 1.8/9/72.8 +5.5/14/80.1

1998.3

1974.6

4.7/10/67.9 4.7/6/69.9 9.7/3.5/64.9 10.8/0/63.8 9.4/2/65.2 7.2/5/67.4 3.2/8/71.4 15.3/14/83.0 13.1/20/85.2

1998.3

1974.6

4.8/10/69.8 8.0/7.5/66.6 9.8/3.5/64.8 10.0/0/64.6 10.3/2/64.3 7.8/6/66.8 3.2/8/71.4 14.2/15/84.1 10.2/20/88.1

1998.3

1974.6

4.8/10/69.8 8.9/7/65.7 9.5/4/65.1 9.6/0/65.0 5.6/6/69.0 3.7/9/70.9 14.3/13/84.0 8.8/20/89.5

1974.6

1998.3

4.5/10/70.1 4.8/6/69.8 9.4/5/65.2 9.6/0/65.0 5.6/6/69.0 3.7/9/70.9 14.3/13/84.0 8.8/20/89.8

1974.6

1998.3

4.7/10/69.9 4.8/6/69.8 9.5/4/65.1 9.1/0/65.0 9.4/4/65.2 5.0/5/69.6 2.2/7/72.4 +0.5/9/75.1 8.3/19/90.0

1974.6

5.0/10/69.6 5.0/6/69.6 8.0/3.5/66.6 7.3/0/67.3 3.3/7/71.3 +1.0/9/75.6 5.5/2.2/92.8

1974.6

5.2/10/69.4 5.5/6/69.1 6.9/4/67.7 6.3/0/68.3 4.0/6/70.6 +1.4/10/76.0 5.0/23/93.3

(24) BUTTRESS # 5 (CONT)

L1040 ✓

L1050 ✓

L1060 ✓

L1070 ✓

L1080 ✓

L1090 ✓

L1100

⊡ 4.93 1969.69 1969.66

1974.6 1998.3

4.5/10 70.1 | 4.6/6.6 70.0 | 6.8/3 67.8 | 6.8/0 67.8 | 3.1/5 71.5 | +2.1/10 76.7 | 4.7/23 93.6

1974.6

4.3/10 70.3 | 5.8/4.5 68.8 | 5.4/0 69.2 | 4.5/3.0 70.1 | 1.4/6.5 73.2 | +4.5/11 79.1 | 4.3/22 94.0

1974.6

3.9/10 70.7 | 3.9/7 70.7 | 6.4/5 68.2 | 5.4/0 69.2 | 4.8/1.5 69.8 | 2.7/5 71.9 | +2.6/7.5 77.2 | 9.5/14 88.8 | 3.9/23 94.4

1974.6

4.2/10 70.4 | 4.4/7 70.2 | 6.1/4.3 68.5 | 5.3/0 69.3 | 3.0/3 71.6 | 0.2/6.5 74.4 | +4.7/9 79.3 | 9.4/12 88.9 | 4.6/20 93.7

1974.6

4.5/10 70.1 | 5.0/5.5 69.6 | 5.6/2 69.0 | 2.5/2.5 72.1 | +2.0/9 76.6 | 9.0/13.5 89.3 | 4.7/18 93.6

1974.6

1.2/14 73.4 | 4.3/7 70.3 | 4.1/2 70.5 | 0 | 0.9/5 73.7 | +10.5/7 85.1 | 12.9/7.5 85.4 | 3.6/19 94.7

1974.6

0.9/18.5 73.7 | 2.6/15.5 72.0 | 3.4/10 71.2 | 2.4/3.5 72.2 | 1.0/0 73.6 | +0.8/2 75.4 | +9.1/5 83.7 | 12.0/10 86.3 | 3.9/20 94.4

TIM ON AXIS @ 01332 ✓

(25)

X-SECTIONS BUT #4

D = 1240

STA	+	Δ	−	ELE ✓
		1998.25		
L 970				
L 975				
L 980				
L 990				
L 995				
L 1001				
L 1003				
L 1010				
L 1020				
L 1030				
L 1040				
L 1050				

6 AUG 52

WEST

EAST

1991.8 1992.1 1998.3 1992.7 1995.8 1999.8 2002.2 2012.9

6.5/10 6.2/4 6.5/10 5.6/4 2.5/8 +1.5/11 10.7/17

1992.2 1992.5 1988.0 1998.3 1987.9 1989.3 1994.5 2001.3 2012.9 2002.4

6.1/10 5.8/4 10.3/2 10.8/0 10.4/2 9.0/4 3.8/8 11.6/13 10.5/17

1992.5 1993.0 1987.2 1987.0 1988.2 1993.7 2001.5 2002.5

5.8/10 5.3/5 11.1/2 11.3/0 10.1/3.5 4.6/7 11.4/13 10.4/16

1993.1 1993.4 1987.7 87.0 1986.6 1987.3 1989.6 1994.5 2002.2 2004.0

5.2/10 4.9/4.5 10.6/3.5 11.7/0 11.0/2 8.7/4.5 3.8/7.5 10.7/12 8.9/16

1993.5 1993.3 1987.9 1986.7 1986.6 1987.1 1988.9 1990.1 1995.4 2002.6 2004.9

4.8/10 5.0/9 8.4/6 11.6/2 11.7/0 11.2/2.5 9.4/5 8.2/7 2.9/9 10.3/11 8.5/15

1993.8 1993.6 1990.3 1987.2 1986.8 1987.6 1988.8 1990.6 1996.1 2003.9 2005.7

4.5/10 4.7/8 8.0/7 11.1/3 11.5/0 10.1/2 9.5/4 7.7/7 3.2/9 9.0/13 7.2/18

1994.0 1994.1 1989.0 1987.1 1988.2 1990.3 1992.2 1995.7 2004.2 2006.0

4.3/10 4.2/7 9.3/4 11.2/0 10.1/3 8.0/4 6.1/6 2.4/7.5 8.7/12 6.9/17

1994.2 1994.3 1988.3 1987.4 1987.9 1994.2 2000.9 2004.7 2006.4

4.1/10 4.0/5 10.0/2 10.9/0 10.4/3 4.1/5 12.0/11 8.2/12 6.5/16

1994.7 1994.7 1989.4 1988.9 1990.3 1991.9 1995.1 2005.7 2007.9

3.6/10 3.6/6 8.9/3 9.4/0 8.0/3 6.4/4.5 3.2/6 7.2/13 5.0/18

1995.2 1995.1 1990.8 1989.5 1991.4 1996.0 2006.9 2008.9

3.1/10 3.2/6 7.5/3 8.8/0 6.9/4 2.3/6.5 6.0/14 4.0/20

1995.6 1995.1 1990.7 1989.8 1990.9 1995.1 2002.6 2008.0 1998.0 2009.8

2.7/10 3.2/5 7.6/3 8.5/0 7.4/4.5 3.2/4.7 10.3/12.5 4.9/15 3.1/20

1995.1 1995.0 1991.9 1991.5 1992.2 1997.7 2007.4 2009.9

3.2/10 3.3/3 6.4/2.5 6.8/0 6.1/4 0.6/8 5.5/12 3.0/20

✓

(26)

Bot #4 (cont.)

L1060				
L1070				
L1080				
L1090	5.39	1999.43	—	1994.04
L1100				

1995.6 1998.3 1994.7 1993.2 1993.0 1993.1 1995.8 2007.3 2012.9 2009.5
2.7/10 3.6/5 5.1/2 5.3/0 5.2/3.5 2.5/8.5 +9.0/15 3.4/20

1995.1 1994.7 1994.4 1996.9 1999.5 2007.3 2009.4
3.2/10 3.6/3 3.9/0 1.4/5 +1.2/10 +9.0/15 3.5/20

1994.5 1995.3 1998.5 2000.8 2004.5 2007.1 2008.7
3.8/10 3.0/5 +0.2/0 +2.5/5 +6.2/9 +8.8/17 4.2/20

1994.3 1994.9 1995.9 1997.5 2003.2 (1993.2) 2005.1 2007.1
4.0/10 3.4/4 2.4/0 0.8/3.5 +4.9/8 +6.8/15 5.8/20

1994.4 1994.5 1999.4 1995.6 2000.6 2002.1 2005.1
5.0/10 4.7/5 3.8/0 +1.2/5.5 +2.7/12 7.8/20

(27) X-SECTION BUTTRESS #6

STA	+	℄	−	ELEV
⊡	4.93	1974.62		1969.69
⊡	5.00	1952.68		1947.68
L 950				
L 956				
L 960				
L 970				
⊡	4.05	1951.73		1947.68
T.P.	0.83	1940.58	11.98	1939.75
L 980				
L 990				
L 991.5				
L 996				
L 1001				
L 1010				

BASE LINE D 1360 ℄ #6
5-6 AUG '52

STK ON AXIS D-1332 3/4

W ← HI. 1952.7 → E

1974.6

6.2 / 10 / 46.5 | 0.7 / 0 / 52.0 | 2.3 / 7 / 50.4 | 1.6 / 10 / 51.1 | 0.0 / 12 / ~~40.9~~ 1952.7 | 16.6 / 20 / 58.0

1952.7

6.3 / 10 / 46.4 | 5.9 / 3 / 46.8 | 5.6 / 0 / 1947.1 | 2.6 / 9 / 1950.1 | 19.6 / 17 / 1955.0 | 16.0 / 17 / 58.6

1952.7 | 1940.6

6.1 / 10 / 46.6 | 5.9 / 6 / 46.8 | 10.3 / 4 / 41.4 | 1.7 / 0 / 1938.9 | 1.7 / 3 / 38.3 | +4.0 / 4.7 / 44.6 | 19.1 / 10.5 / 55.5 | 14.2 / 17.5 / 60.4

1952.7 | 1940.6

47.1 / 5.6 / 10 | 46.7 / 6.0 / 5 | ~~32.6~~ 8.0 / 4.5 | ~~34.7~~ 7.9 / 0 | ~~34.4~~ 6.2 / 5 | 18.1 / 9 / 56.5 | 13.2 / 14 / 61.4

48.7 / 3.0 / 10 | 1951.7 ~~46.7~~ 5.0 / 5 | 31.2 / 9.4 / 3.5 | 1940.6 ~~31.2~~ 9.9 / 0 | 33.2 / 7.4 / 5 | 59.6 / 15.0 / 13 | 62.1 / 12.5 / 17

1951.7 | 1940.6

3.1 / 10 / 48.6 | 4.2 / 7 / 47.5 | 5.0 / 4 / 46.7 | 10.2 / 4 / 30.4 | 10.2 / 0 / 30.4 | 9.3 / 5 / 31.3 | +7.4 / 5.5 / 48.0 | 13.9 / 14 / 60.7 | 10.5 / 19 / 64.1

1951.7 | 1940.6

3.4 / 10 / 48.3 | 4.4 / 7 / 47.3 | 5.1 / 4 / 46.6 | 10.2 / 4 / 30.4 | 10.2 / 0 / 30.4 | 9.3 / 5 / 31.3 | +7.4 / 5.5 / 48.0 | 13.9 / 14 / 60.7 | 10.5 / 19 / 64.1

1951.7 | 1940.6

5.0 / 6 / 46.7 | 7.0 / 6 / 33.6 | 7.6 / 4 / 33.0 | 8.9 / 0 / 31.7 | 8.4 / 2 / 32.2 | 5.2 / 5 / 35.4 | 7.8 / 10 / 37.8 | 12.4 / 15 / 62.2 | 10.1 / 19 / 64.5

1951.7 | 1940.6

4.6 / 10 / 47.1 | 4.0 / 7 / 36.6 | 4.0 / 2.6 / 34.6 | 8.2 / 0 / 32.4 | 8.1 / 1 / ~~40.5~~ 32.5 | 5.0 / 5 / ~~45.6~~ 35.6 | 1.7 / 10 / 38.9 | 12.8 / 19 / 61.8 | 10.1 / 17 / 64.5

1951.7 | 1940.6

2.3 / 10 / 49.4 | 4.1 / 5 / 47.6 | 7.1 / 3.5 / 33.5 | 8.0 / 0 / 32.6 | 7.1 / 5.5 / 33.5 | +5.7 / 6 / 46.3 | 12.9 / 13 / 61.7 | 9.3 / 18.5 / 65.3

CONT PAGE (36)

(28) 14-15 ARCH RING LOCATION

STATION	+	⊼	—	ELEV
BM L1071 98	0.98	2015.18 ✓		2014.20 ✓
D 1893.58 ✓				
D 1885.86 23.58				
			11.84	2003.34 ✓
D 1879.0 15.86				
		2003.33	1.09	2002.24 ✓
D 1870.0 ✓ 9.0			4.02	1999.31 ✓
D 1861.0 15.86			6.05	1997.28 ✓
D 1854.14			7.87	1995.46 ✓
D 1846.42				
	0.70	2003.33 ✓	12.55	2002.63 ✓

ARCH 14-15

Aug 29, 1952

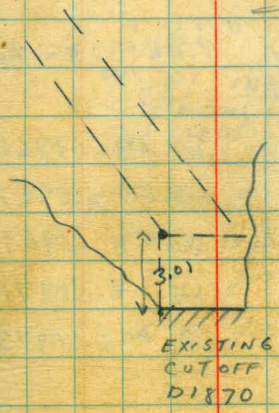
TAPE DIST FROM BASE LINE L1071 98

P.K. IN WEST SIDE # 14 BUT

DIST	STATION OF EXISTING INTRA.				INTRA
					0
S-4.8	L 1076.78 ✓	F2.8 ✓	18.0 EXTR ✓		14.37
S-11.3	L 1083.28 ✓	F 2.5 ✓	22.9 EXTR ✓		19.47
S-16	L 1087.98 ✓	F 3.0 ✓	24.9 EXTR ✓		21.7
S-16.4	L 1088.38 ✓	F 2.3 ✓	23.0 EXTR ✓	TO BRING CUT OFF TO ARCH 18.4 EXTR ✓	19.47
S-13.5	L 1085.03 ✓	F 2.4 ✓			14.37
					0

D 1870

2068.56
1999.31
69.29 CH ROD
- 21.7
90.99
87.98
F 3.01



(29)

D 1810 ℄

ARCH RING 13-14

BASE LINE L 1084.03

STATION	+	℄	−	ELEV	DIST
	1.76	1992.84			
D 1794.2			10.66	1982.1	17.0 S
D 1801			9.07	1983.7	18.8 S
D 1810			6.8	1986.0	19.0 S
D 1819			4.5	1988.3	14.7 S
D 1825.9			2.3	1990.5	8.5 S

D 1750 ℄

ARCH RING 13-12

1976.22 ← SEE PAGE (31)

D 1734.2			10.23	1966.0	13.3 S
D 1741.0			8.50	1967.7	16.3 S
D 1750			6.59	1969.6	15.8 S
D 1759			4.28	1971.9	10.0 S
D 1766			2.60	1973.6	3.7 S

Aug 29, 52

CALCULATED STATION	C OR F ABOVE EXISTING CONE		CALCULATIONS		RADIUS
			2668.50 / 1982.1	1101 / 1100.8	
L 1101	C 0.2	EXTRADOS 19.13	86.40 / 14.4 / 100.8		14.4
L 1102.8	F 1.5	23.7		2668.5 / 1986.0	19.5
L 1103	F 1.2	25.6	2668.5 / 1983.7 / 84.8 / 19.5 / 1104.3	825 / 21.7 / 1104.2	21.7
L 1098.7	F 1.0	23.4			19.5
L 1092.5	C 0.1	18.7		2658.5 / 1988.3 / 8.0.2 / 19.5 / 1099.7	14.4
			2668.5 / 1990.5 / 1078.0 / 14.4 / 1092.4		

BASE LINE L 1104.96

			2068.50 / 1966	2068.50 / 1967.7	
L 1117.3	C 0.4	EXTRADOS 20.05 / 20.5	102.50 / 14.4 / 116.90	100.80 / 19.5 / 120.30	
L 1120.3	OK	24.5			
L 1117.8	F 0.8	26.4	2068.50 / 1969.5 / 98.9 / 21.7 / 120.6 / 119.8 / 0.8	2068.50 / 1971.9 / 96.60 / 19.5 / 116.10 / 114 / 2.1	
L 1114.0	F 2.1	24.3			
L 1107.7	F 1.6	19.6			
			2068.50 / 1973.6 / 94.90 / 14.4 / 109.3 / 107.7 / 1.6		

℄ D1690 — ARCH RING 11-12

STATION	+	⊼	−	ELEV	DIST
IRON PIPE	8.04	1961.71		1953.67	
D 1705.9			1.92	1959.79	1.5 N
D 1699			3.86	1957.85	3.5 S
D 1690			8.0	1953.71	8.0 S
D 1681			9.71	1952.00	7.8 S
D 1674.2			11.47	1950.24	5.8 S

℄ 1630 — ARCH RING 10-11

STATION	+	⊼	−	ELEV	DIST
Rock ~~I. P.~~	3.65	1943.93		1940.28	
D 1645.9			2.21	1941.72	13.3 S.
D 1639			4.47	1939.46	20.3 S
D 1630			7.12	1936.81	24.2 S
D 1621			8.17	1935.76	24.4 S
D 1614.2			8.77	1935.16	21.4 S

℄ D 1570 — ARCH RING 9-10

STATION	+	⊼	−	ELEV	DIST
I. P.	2.96	1928.39		1925.43	
D 1585.9			6.87	1921.52	9.6 S
D 1579			8.75	1919.64	17.5 S
D 1570			11.38	1917.01	20.8 S
D 1561	5.72	1923.18	12.65	1915.74	22.4 S
D 1554.2			10.04	1913.14	18.5 S

1917.46
5.72
1923.18

SEPT 2, 1952

BASE LINE L1128.63

CALCUL STATION	~~C OK F~~ ROD					EXTRAD	INTRA
SEE	PAGE	(31)					
	ROD						
L1127.13	5.9	C4.0	2068.5 127.1 1941.4 14.4 1955.8		2068.5 132.1 1936.4 19.5 1955.9	20.5	14.4
L1132.13	5.8	C2.0				25.1	19.5
L1136.63	8.1	OK	2068.5 136.6 1931.9 21.7 1953.6		2068.5 136.4 1932.1 19.5 1951.6	27.3	21.7
L1136.43	10.1	C0.4				25.4	19.5
L1134.43	13.2	C1.8		2068.5 134.4 1934.1 14.4 1948.5		21.1	14.4

BASE LINE L1128.63

Rock	ROD					EXTRAD
L1141.93	2.9	C0.7	2068.50 141.9 1926.60 14.4 1941.00	2068.50 148.9 1919.60 19.5 1939.10	2068.50 152.8 1915.70 21.7 1937.40 1936.8	21.6
L1148.93	4.8	C0.36				26.14 (25.5)
L1152.83	6.5	F0.6				28.2
L1153.03	5.6	C(1.2) 1.76	2068.50 1530 1915.50 19(0) .5 1934.(50) .00	2068.50 150 1918.50 14.4 1932.90		26.4
L1150.03	11.0	C2.2				22.1

BASE LINE L1151.39

SEE P. ~~(31)~~ 32					Extrad
L1160.99	F(0.48) 0.57	2068.50 160.99 1907.69 14.4 1922.09	2068.50 168.9 1899.60 19.5 1919.10	2068.50 172.2 1896.30 21.7 1918.00	23.0
L1168.89	C 0.54				27.35
L1172.19	F 1.0	2068.50 173.8 1894.70 19.5 1914.20		2068.50 169.9 1898.60 14.4 1913.00	29.37
L1173.79	C 1.5				27.59
L1169.89	(C 0.1)				23.70

(31)

B.M. LEVELS

STATION	+	⊼	−	ELEV	
PK #14	-0.45	2013.75		2014.20	
T.P.	2.87	~~2006.00~~ OK	10.62	2003.13	WOOD PLUG ± ℄ ARCH 14-15
IRON PIPE			6.85	1999.15	
T.P.	0.88	1993.88	13.00	1993.00	HUB 2x2 L1084 D1816
IRON PIPE	3.08	1985.93 ~~1986.03~~	11.03	1982.85	1982.87
IRON PIPE			8.36	1977.~~67~~ 57	
IRON PIPE	2.04	1976.~~27~~ 17	11.80	1974.~~23~~ 13	
IRON PIPE			7.33	1968.~~74~~ 84	1967.78 OLD BM WRONG
IRON PIPE	1.39	1967.~~27~~ 11	10.45	1965.~~82~~ 72	
T.P.	2.36	1959.~~48~~ 38 ℞	10.09	1957.~~+2~~ 02	
BUT #11			0.21	~~1967.0~~ 1966.90	
IRON PIPE			5.71	1953.~~77~~ 67	
T.P.	0.06	1947.~~32~~ 22	12.22	1947.~~26~~ 16	
IRON PIPE			12.08	1935.~~24~~ 14	1935.16
Rock			6.96	1940.~~36~~ 26	1940.28
CHK	+13.83		-86.17		
	0.45		45		
	+12.68		-86.62		
			+86.52		
	~~2014.20~~		ERROR .10		
	1940.36				
	73.84				
	12.68				
	86.52				

SEPT. 2, 1952

NAIL IN WEST SIDE #14 BUT. 10' SOUTH L1000

3" PIPE CAP ARCH 15-14 -15' WEST ℄ #14

3" PIPE CAP ± 10' WEST ℄ #13 BUT ARCH 14-13

3" PIPE CAP ℄ BUT #13

3" PIPE CAP ARCH RING 12-13 ± D 1765

3" PIPE CAP ARCH RING 12-13 ± D 1740

3" " " 10' WEST ℄ #12 BUT ARCH 13-12

WEST WALL (CONC) BUT #11 ⊼

3" PIPE CAP (D 1684 L 1138) ARCH 12-11

3" PIPE CAP ARCH 11-10 ± D 1610

BM Rock ± D 1612 Rock SOUTH ARCH. 11-10

(32)

BM LEVELS

STATION	BS +	HI	FS −	ELEV	
IRON PIPE	2.20	1937.36		1935.16	BM
IRON PIPE	1.63	1927.06	11.93	1925.43	1925.43
IRON PIPE			9.61	1917.45	
IRON PIPE	9.96	1923.94	13.08	1913.98	
IRON PIPE			8.39	1915.55	
T.P.	11.95	1935.09	0.80	1923.14	
TP			12.16	1922.93	
2X2 HUB	11.43	1942.30 OK	4.22	1930.87 OK	
TREE STUMP			1.40	1940.90 OK	
T.P.	3.91	1926.84		1922.93	
4" PIPE			5.68	1921.16	
STUMP	12.92	1953.82 OK		1940.90	
2X2 HUB			6.13	1947.69	1947.68
T.P.	11.89	1965.08 OK	0.63	1953.19	
T.P.	12.21	1975.54 OK	1.75	1963.33	
STUMP	3.95	1974.48 OK	5.01	1970.53	
2X2 HUB			4.87	1969.61	1969.69
STUMP			9.97	1964.51	
T.P.	11.93	1983.55 OK	2.86	1971.62	
T.P.	10.70	1993.45 OK	0.80	1982.75	
STUMP			5.34	1988.11	
2X2 HUB			1.26	1992.19	1992.26

SEPT 2, 52

I.P. BM ARCH 11-10 ± L 1155

IRON PIPE CAP ARCH 9-10 ± D 1590

IRON PIPE CAP ARCH 9-10 ± D 1570

IRON PIPE CAP ARCH 9-10 ± D 1550

IRON PIPE CAP ARCH 8-9 ± ℄ ARCH

IRON REINFORCING BAR BUT # 7

L 1166.80 D 1415.12

NAIL & SHINER IN STUMP ± ℄ ARCH 7-6

4" OPEN END I. PIPE ℄ BUT # 7 ± 70' S L1000

NAIL & SHINER

D 1380.14 L1000.00

Rock

Rock

18" STUMP 20' WEST ℄ BUT # 5 ± L 1150

D 1332.34 L1000.00

15" STUMP ± L 1020.20 ± D 1347.0

Rock

Rock

8" STUMP ± L 990 D 1283

D 1273.48 L 1000

(33)

BM LEVELS

STATION	+	⊼	−	ELEV	
2X2 HUB	11.05	2003.24 ok		1992.19	1992.26
STUMP	12.21	2015.41 ok	0.04	2003.20	
STUMP			4.36	2011.05	CHECKED & okay
800.00	1.42	2085.46		2084.04	
T.P.	0.58	2078.05	7.99	2077.47	
T.P	0.20	2065.26	12.99	2065.06	
T.P.	0.62	2055.72	10.16	2055.10	
T.P.	0.60	2043.65	12.67	2043.05	
STUMP	2.78	2036.17	10.26	2033.39	
STUMP	1.18	2031.47	5.88	2030.29	
T.P.	0.22	2018.88	12.81	2018.66	
STUMP	5.65	2015.58	8.95	2009.93	
STUMP			4.90	2010.68	
STUMP			8.56	2002.12	
STUMP	0.00	2002.90	12.68	2002.90	2003.20
2X2 HUB	0.73	1992.99	10.66	1992.24	1992.26
STUMP			4.80	1988.19	
STUMP	0.68	1980.87	12.80	1980.19	
2X2 HUB			11.16	1969.71	1969.69
STUMP	2.96	1974.46	9.37	1971.50	
STUMP			9.84	1964.62	1964.57
STUMP			3.88	1970.58	1970.55
T.P.			12.24	1962.22	

CONT PAGE (34)

SEPT 3, 1952

D 1273 48

CLUSTER OF 3 (15" DIA) 20' EAST #4 BUT ± L 970

D 1220 L 993 15" DIA

CONC MONUMENT (NAIL IN TOP)

18" STUMP ± L 900 20' WEST ℄ # 2 BUT

18" STUMP ± L 980 20' EAST ℄ # 3 BUT

10" STUMP ± L 950' 20' WEST ℄ # 3 BUT

15" STUMP ± L 990 D 1220

12" STUMP ± L 995 D 1230

CLUSTER OF 3 12" ONE ± L 950 20' WEST # 4 BUT

L 1000 D 1273 48

± D 1280 ± L 988 15" STUMP

CLUSTER ± L 925 ± D 1290

D 1332 34 L 1000

CLUSTER 8" 30' WEST ℄ # 5 BUT ± L 1015

15" STUMP ± L 1020 ± D 1347

D1510

ARCH RING 9-8

STATION	+	⊼	—	ELEV	DIST
IRON PIPE	2.50	1918 05	———	1915 55	
D 1525 9			6.0	1912.1	9.3 N
D 1519			5.7	1912.4	5.6 N
D 1510			5.4	1912.7	3.3 N
D 1501			5.25	1912.8	3.9 N
D 1494 2			5.25	1912.8	8.0 N

BASE LINE L 1181 45

STATION CALCULATED		COR F	
ARCH RING 9-8			℄
L 1172	15	C 2.6	
L 1175	85	F 0.6	
L 1178	15	C 0.7	
L 1177	55	C 2.4	
L 1173	45	C 3.4	

2068.50
172.2
1896 30
14.4
1910.7

2068.50
178.2
1890 30
21 7
1912 00

2068.50
173.5
1895 00
14 4
1909 40

2068.50
175 9
1892 60
19 5
1912 10

2068.50
177.6
1890 90
19 5
1910 40

(35)

BM LEVELS

STATION	+	℄	−	ELEV	
T.P	0.13	1962.35	———	1962.22	
T.P.	0.65	1951.76	11.24	1951.11	
STUMP	4.58	1945.52	10.82	1940.94	~~1950.90~~
Rock BM	———	———	5.19	1940.33	1940.28
2X2 HUB			3.12	1942.15	CORRECTED FOR .05 ERROR

SEPT 3, 1952

20" STUMP ± ℄ ARCH 7-6 SOUTH ARCH RING

Rock BM SEE PAGE (31) ERROR .05

#4 BUT HUB ON TARGET LINE SOUTH DAM

BUTTRESS #6 (CONT)

STATION	+	⊼	−	ELEV	
L1020		1951.73			
L1030					
T.P.	11.96	1951.71	0.83	1939.75	
L1040					
L1046					
L1050					
L1060					
L1070		1951.73			
⊡			4.~	1947.69	(1947.68)
L1080					
L1090					
L1100					
L1110					
L1120					

W ⟵⟶ E

1951.7 · 1940.6 · 1974.6
3.1/10 48.6 · 4.2/7 47.5 // 4.4/4 36.2 · 4.8/0 35.8 · 3.0/4.6 37.6 · +6.8/6.5 47.4 // 13.8/12.5 60.8 · 10.2/19 64.4

1951.7 · 1940.6
3.6/10 48.1 · 4.2/6 47.5 // 2.8/3 37.8 · 2.1/0 38.5 · +0.8/5 41.4 · +9.6/7.5 50.2 // 10.6/17 64.0 · 7.3/22 67.3

1951.7 · 38.7 · 1951.7
3.3/10 48.4 · 3.9/6 47.8 // 13.0/4 38.7 · 11.9/0 39.8 · 11.8/4.5 39.9 · +0.7/6 52.4 // 9.9/15 64.7 · 6.5/20 68.1

1951.7 · 1951.7
2.7/10 49.0 · 3.8/5 47.9 // 10.6/4.5 41.1 · 11.1/0 40.6 · 9.5/5 42.2 · 1.7/5.5 50.0 // 8.7/14 65.9 · 6.3/20 68.3

1951.7 · 1951.7
4.1/10 47.6 // 8.4/5 42.3 · 10.8/3 40.9 · 10.3/0 41.4 · 6.5/6.5 45.2 · 0.0/7.5 51.7 // 7.6/16.5 67.0 · 5.7/21 68.9

1951.7 · 1951.7
2.4/10 49.3 · 3.2/7 48.5 // 9.4/4.5 42.3 · 8.2/0 43.5 · 5.4/5 46.3 · 1.6/10.5 50.1 // 12.0/19 62.6 · 1.8/22 72.8

1951.7 · 1951.7 · 1974.6
2.4/10 49.3 · 2.6/8 49.1 · 7.3/6 44.4 // 10.3/3 41.4 · 10.3/0 41.4 · 6.6/5.5 45.1 · 3.4/8.5 48.3 // 6.8/21.5 67.8 · 2.0/24 72.6

1951.7 · 1951.7
2.3/10 49.4 · 2.5/8 49.2 // 9.5/4 42.2 · 10.1/0 41.6 · 7.0/7 44.7 · 10/8.5 41.7 // 9.3/16 65.3 · 3.4/21 71.2

1951.7 · 1951.7
2.0/10 49.7 · 2.9/5 48.8 // 9.4/4 42.3 · 7.6/0 44.1 · 3.5/6 48.2 · +0.5/7 52.2 // 7.2/17 67.4 · 4.3/20 70.3

1951.7 · 1951.7
1.9/10 49.8 · 2.0/5 49.7 // 7.1/4.5 44.6 · 4.9/0 46.8 · 0.9/5 50.8 · +2.0/9.5 53.7 // 9.6/15 65.0 · 5.2/18 69.1

1951.7 · 1951.7
1.2/10 50.5 · 2.2/6 49.5 // 6.7/4.5 45.0 · 6.4/0 45.3 · 4.6/5 47.1 · +4.0/6 55.7 // 11.0/13 63.6 · 5.7/15 68.9

1951.7 · 1951.7
2.0/10 49.7 · 2.1/8 49.6 // 6.7/6.5 45.0 · 7.1/0 44.6 · 4.4/7 47.3 · 0.1/11.5 51.6 // 9.7/16 64.9 · 6.8/21 67.8

✓

(37) Setting T. B. M's

	+	⊼	−	Elev
⊡	3.94	2090.53		2086.59
T. P.	0.565	2078.175	12.92	2077.61
T. B. M.	0.88	2066.77	12.285	2065.890
T. P.	1.51	2055.51	12.77	2054.00
T. B. M.	3.18	2045.70	12.99	2042.52
T. P.	1.02	2033.71	13.01	2032.69
Check T. P.			7.50	2026.21
T. P.	0.04	2021.07	12.68	2021.03
T. B. M.	0.54	2013.68	6.85	2014.22
T. P.	0.25	2000.93	13.00	2000.68
Check T. P.			1.77	1999.16
T. B. M.	2.77	1998.16	0.00	2000.93
T. P.	4.16	1989.62	12.70	1985.46
T. B. M.	0.69	1978.27	12.04	1977.58
Check			4.09	1974.18
Check			12.53	1965.72
T. B. M.	11.89	1988.76	9.40	1968.87
			0.00	1980.76
T. B. M.	0.73	1969.60		1968.87
T. B. M.	3.09	1966.51	0.00	1969.60
T. B. M.	1.12	1954.79	12.84	1953.67
T. B. M.	0.58	1942.37	13.00	1941.79
⊡			2.08	1940.29

See page 38

Oct. 31 - 1952

Dick - Level
Dallas - Notes
Doane - ϕ

Nail in road
2 x 2 ⊼ Tack @ Axis ⊼ D - 2074
1 x 2 near 17 Butt
2 x 2 Hub @ Axis ⊼ D - 1980
Nail 20' S. W. of # 16 Butt.
2 x 2 Hub @ D - 1920 on Axis (2026.20)
Nail 6' N.W. of # 15 Butt.
P.K. in West wall of # 14 Butt. (2014.20)
2" Pipe in # 14 - 15 Ring
2" Pipe in # 14 - 15 Ring (1999.15)
Mark on W/S # 13 Butt. South Pilaster
1" Iron Bar in # 13 - 14 ring,
2" Iron Pipe @ S. Base of # 13 Butt. 97787
2" Iron Pipe in 12 - 13 ring (1974.13)
2" Iron Pipe 10' S.W. of # 12 Butt. (1965.72)
2" Iron Pipe in # 12 - 13 ring (1968.84)
Mark on West Wall # 12 Butt. 15' S. of S. Pilaster

Mark on West Face # 11 Butt. 15' S. of S. Pilaster
2" Iron Pipe in # 11 - 12 ring (1953.67)
Mark on W. Face # 10 Butt. 10' N. of So. Pilaster
Big rock 30' South of # 10 Buttress (1940.28)

(38) 31-Oct. 1952 Continued from page 37

	+	⊼	−	Elev.
		1942.37		
T.B.M.	2.14	1937.32	7.19	1935.18
			7.89	1929.43
T.B.M.	0.22	1925.66	11.88	1925.44
Check			8.20	1917.46
T.B.M.	5.00	1918.98	11.68	1913.98
			0.00	1918.98
T.B.M.	12.50	1925.405	6.075	1912.905
T.P.	11.625	1936.47	0.56	1924.845
T.B.M.	12.76	1948.46	0.77	1935.70
T.B.M.	12.83	1960.19	1.10	1947.36
T.P.	12.99	1972.28	0.90	1959.29
T.B.M. Check			7.68	1964.60
T.B.M.			2.58	1969.70
T.B.M.	11.43	1976.03		1964.60
T.P.	9.40	1983.92	1.51	1974.52
T.P.	10.54	1994.43	0.03	1983.89
Side Shot	~~0.75~~		4.33	1990.10
T.P.	10.32	2004.00	0.75	1993.68

See page 39

Page 37 for party

2" Iron Pipe 20' S.W. of #10 Butt. (1935 1/6)
Mark on W. Face #9 Butt. 2' So. of S. Pilaster
2" Iron Pipe 15' S.E. of #10 Butt. (1925.48)
2" Iron Pipe in #9-10 ring
2" Iron Pipe 15' S.W. #9 Butt
Mark on W. Wall #8 Butt. 20' S. of S. Pilaster
6" Eyelet @ Entrados near ℄ #8-9 Arch Ring

3-Oct. 1952 Stanley-⊼ Dallas-□ & ⌀

5/8" Bolt on valve @ 4" pipe 50'± S.W. of #7 Butt.
Big rock on ℄ #7 Butt @ L-1200±
Big rock in 6-7 ring D-1395± & L-1105±
1x2 hub ℄ #6 Butt @ L-900±
16" Stump L-1020 & D-1347 page 32 elev. 1964.51
2x2 Hub & Tack L-1000 & D-1332 3/4 page 32 el 1969 69

4-Oct. 1952 Dick-⊼ Dallas-□ & ⌀

1x2 hub @ L-900± & D-1300±
1x2 hub @ L-850± & D-1250±
L-1000 & D-1272 36 2x2 Hub & Tack
Big rock @ L-825± & D-1215±

(39) Continued from page 38

	+	⊼	—	Elev.
		2004.00		
T. B. M.	12.86	2013.99	2.87	2001.13
T. B. M. Stump			3.28	2010.71
Stump			6.94	2007.05
Stump			11.06	2002.93
T. B. M.	3.10	2013.81		2010.71
Check			6.76	2007.05
T. B. M.	12.84	2026.56	0.09	2013.72
T. P.	6.07	2032.42	0.21	2026.35
T. B. M. Rock			1.44	2030.98

4-Oct. 1952 Dick - ⊼ Dallas - Notes & ϕ (39) 2031.02

40 penny nail in 8" Stump @ D-1225 ± & L-920 ±

12" Stump @ D-1220 & L-990

Nail in 12" Stump @ D-1222 & L-996

Nail in 12" Stump @ D-1222 & L-950

6-Oct. 1952 Dallas - ⊼ & Notes Curley - ϕ

Boulder @ L-800 ± & D-1140 ±

Big rock @ L-725 ± & D-1080 ±

+	℄	−	Elev.

40

Final X-Sections #6 Buttress

	+	⊼	−	Elev.
		1938.3		
L-968.8 ↑ L-970 Same				
	0.0	1934.0		1934.0
		1951.78		
L-979 ↑ L-980 Same				
L-987 5	2.6	1930.6		1928.0
L-990 Same				
L-991 6				

22-Dec. '52. (42)

East ⊼ West

(1951.8) 6.4 / 5.0 / 46.8 ‖ (1938.3) 5.6 / 5.1 / 33.2 ; 3.8 / 5.5 / 32.8 ; 0.3 / 7.3 / 31.0 ; 0 / 6.2 / 32.1 ; 4 / 7.2 / 31.1 ‖ (1951.8) 4.6 / 5.0 / 46.8 ; 5.3 / 5.0 / 46.5 / 46.8

(1934.0) 4.9 / 3.3 / 30.7 ; 4.5 / 4.3 / 29.7 ; 3.6 / 5.4 / 28.6 ; 1.3 / 6.8 / 27.2 ; 0 / 6.8 / 27.2 ; 2 / 6.8 / 27.2 ; 2.7 / 4.6 / 29.4 ; 3.2 / 4.5 / 29.5 ; 3.7 / 3.9 / 30.1

(1951.8) 6.5 / 5.1 / 46.7 ‖ (1951.8) 5.0 / 5.1 / 46.7 ‖ 4.5 / 3.9 / 30.1

(1951.8) 7.3 / 5.0 / 46.8 ‖ 4 / 3.1 / 27.5 ‖ (1930.6) 3.6 / 4.4 / 26.2 ; 0 / 4.6 / 26.0 ; 1.7 / 4.7 / 25.9 ; 3.2 / 5.3 / 25.3 ; 4 / 2.5 / 28.1 ‖ (1951.8) 4.2 / 5.0 / 46.8

(1951.8) 8.5 / 4.5 / 47.3 ‖ (1930.6) 3.6 / 8.6 / 27.0 ; 0 / 5.3 / 25.3 ; 2.8 / 5.4 / 25.2 ‖ (1951.8) 7 / 4.5 / 47.3

SEE PAGE 45

(43) Final X-Sections #6 Buttress

Sta	+	⊼	−	Elev
L-9923		1930.6		
		1951.78		
L-9947	0.0	1928.0		1928.0
L-10000				
L-10001				
L-10005				
L-10009	0.0	1934.0		1934.0
L-10010 same				

see pg. 45

see pg. 46

22-Dec. '52.

℄ ST ↑

(43)

(1951.8) East + (1930.6) (1951.8) West

8.0		4.5		0		5.6		7.2				
4.3		8.7		8.9		5.6		4.5				
47.3		21.9		21.7		25.0		47.3				

(1951.8) (1928.0) (1951.8)

9.1		9		4.7		3.2		0		9.5		8.8
5.1		3.8		5.2		6.2		6.4		7.0		5.1
46.7		24.2		22.8		21.8		21.6		21.0		46.7

(1951.8) (1928.0) (1951.8)

9.3		9		7		5		0		4		5.7		10		9.0
5.7		3.7		4.4		6.0		7.6		6.8		6.7		6.4		5.7
46.1		24.3		23.6		22.0		20.4		21.2		21.3		21.6		46.1

(1951.8) (1928.0) (1951.8)

6.6		4		0		3		8.7
3.5		2.4		7.1		6.7		3.5
48.3		25.6		20.9		21.3		48.3

see pg. 46

(1951.8) (1934.0) (1951.8)

6.6		5.0		3.0		1.8		0		2.2		2.4		5.1
4.3		6.8		8.1		8.0		8.6		9.8		7.8		4.3
47.5		27.2		25.9		26.0		25.4		24.2		26.2		47.5

Final X-Sections #6 Buttress

Sta.	+	⊼	−	Elev.
L-1016.4		1934.0		
Bulkhead ↑				

22-Dec. '52. ℄ 5↑

(1951.8) East (1934.0) West

6.3	4.7	3.8	3.2	0	1	1.2	3.6	4.4
4.4	6.2	7.9	9.4	9.7	9.4	8.3	8.0	4.5
47.4	27.8	26.1	24.6	24.3	24.6	25.5	26.0	29.5

(1951.8)
4.9
4.4
47.4

✓

12-31-52

Sta	+	⊼	−	Elev.
⊡	0.0	1940		1940
L-959				
L-960.3				
L-961				
L-962.2				
	4.0	1932.0		1928.0
~~L-992.3~~ L-992.3				
L-1000				

6 Buttress Excavation (RE-X SECTION) ℄ West

Dick Dallas Ben Curley

Zero Section

(1940.0)

0 1.2 4
2.5 0.1 +0.5
9.3 7.5 39.9 40.5

(1940.0)

3.0 0 1.6 4
5.5 5.4 5.9 +0.5
34.6 1934.1 40.5

(1940.0)

X 0 0.6 0.8 4
7.1 7.1 6.1 6.7
32.9 32.9 33.9 33.3

(1932.0)

0 4
10.7 10.2
21.3 21.8

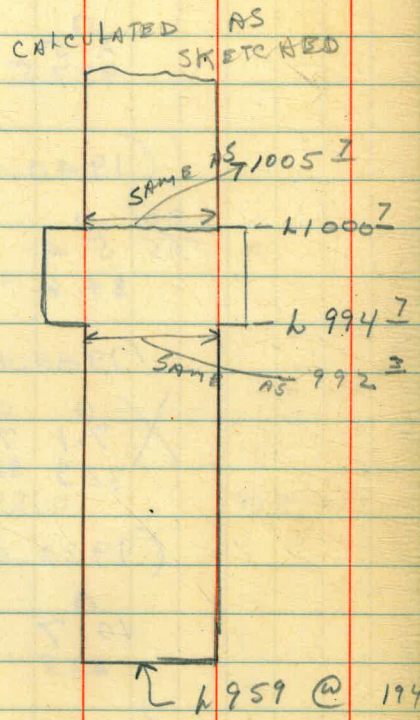
(1932.0)

0 4
11.9 11.6
20.1 20.4

Cont'd page 46

12-31-'52

Sta	+	℄	−	Elev
L-1005 I		1932.0		
L-1010				



℄ (1932.0) West

0	4.1
11.3	11.3
20.7	20.7

(1932.0)

0	4.1
6.6	8.5
1925.4	1923.5

Sta.	+	⊼	—	Elev.	
⊡	1.25	1965.85		1964.60	
T.P.	0.44	1953.66	12.63	1953.22	
T.B.M.			2.25	1951.41	
T.B.M.	5.42	1952.32	6.76	1946.90	
			12.32	1940.00	
Check			0.90	1951.42	
T.P.	3.03	1942.76	12.59	1939.73	
T.B.M.			2.45	1940.31	1940.28 ±

1-27-53

Dallas - Notes
Curley - ⊼
Ben L - ⊡

(47)

T.B.M. on ⊼ #6 Butt. & set elev. 1940 @ #6

See Page 38

Nail & Tin in 16" stump @ L-1020 ± & D-1347 ±
Small rock @ L-944 ± & D-1360 ±
L & T ⊼ #6 Butt. @ L-947.5 & D-1360
Big rock 7' West of ⊼ #6 Butt. @ L-967 ±
Mark on Bulkhead @ L-1068 in Butt. #6 for Archie

rock 25' ± S.E. of #7 Buttress form @ L-1108
Big rock @ 10-11 Arch Ring Elev. 1940.28 ±

EAST GRAVITY

" "

ORGINAL GRND

OCT 19 1952
SOYSTER
WELLS

48

ADDITIONAL SECTIONS

SOUTH OF AXIS FROM D 1840 – D2080

FOR ORGINAL GROUND TOPO.

STA	+	⊼	–	ELEV
□	6.6	(2058.0)	–	2051.4
L	48.4	33		
1070	0 / 1.6	1.5 / 6.2	30 / 9.8	45 / 13.3 ; 82 / 12.0
L		(2058.0)		(2050.0)
1090	0 / 2.4 ; 14 / 5.0	25 / 10.0	35 / 12.4 ; 46 / 16.9	72 / 12.6 ; 91 / 16.2
L		(2058.0)	(2050.0)	
1110	0 / 4.3 ; 10 / 7.2 ; 22 / 14.5		40 / 12.2 ; 65 / 16.1	
L	4.0	(2050.0)	12.0	2046.0 (2039.6)
1130	0 / 4.3	10 / 9.8 ; 22 / 12.7	25 / 13.3 ; 62 / 19.9	72 / 11.1 ; 84 / 12.0
+	(2050.0)		(2039.6)	
1150	0 / 11.2 ; 38	35 / 6.3 ; 33	62 / 12.4 ; 68 / 13.8 ; 27.2 ; 25	113 / 5.6

+	⊼	–	ELEV
0.8	2039.6	11.2	2038.8
0.2	2027.4	12.4	2027.2
3.4	2017.8	13.0	2014.4
1.8	2009.1	10.5	2007.3
3.8	2011.7	1.2	2007.9
		0.0	2011.7 (2012.0)

LOCKER ☆
NAILED ⊕
WELLS ⊗
SOYSTER ⊕

D 2080 = 0 = ℄ #18 BUTTRESS

(2050.0) 2027.4 → THIS SHOT SHOULD BE ALMOST THE SAME AS D 1950 L 1070 TOPO IN JULY '52

94 / 14.4 ; 102 / 15.8 ; 130 / 1.1

(2027.4)

115 / 19.3 ; 140 / 2.7 ; 155 / 6.4 ; 180 / 10.3 ; 190 / 14.4 → SHOULD BE SAME AS D-1890, L 1070, (2009)

(2039.6) (2027.4)

80 / 8.2 ; 97 / 11.5 ; 107 / 12.0 ; 135 / 4.2 ; 157 / 8.4 ; 180 / 12.7 ; 220 / 1.1 ; 240 / 6.0

(2027.4) (2009.1)

90 / 13.0 ; 120 / 4.5 ; 150 / 8.5 ; 189 / 17.0 ; (2009.1) 240 / 11.0

(2027.4) (2009.1)

144 / 10.7 ; 176 / 16.0 ; 240 / 11.0

✓

Natural Trigonometrical Functions

Angle.	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.	
° ′							° ′
32	.5299	.6249	1.1792	1.887	1.600	.84805	58
10	.5324	.6289	1.1813	1.878	1.590	.84650	50
20	.5348	.6330	1.1835	1.870	1.580	.84495	40
30	.5373	.6371	1.1857	1.861	1.570	.84339	30
40	.5398	.6412	1.1879	1.853	1.560	.84182	20
50	.5422	.6453	1.1901	1.844	1.550	.84025	10
33	.5446	.6494	1.1924	1.836	1.540	.83867	57
10	.5471	.6536	1.1946	1.828	1.530	.83708	50
20	.5495	.6577	1.1969	1.820	1.520	.83549	40
30	.5519	.6619	1.1992	1.812	1.511	.83389	30
40	.5544	.6661	1.2015	1.804	1.501	.83228	20
50	.5568	.6703	1.2039	1.796	1.492	.83066	10
34	.5592	.6745	1.2062	1.788	1.483	.82904	56
10	.5616	.6787	1.2086	1.781	1.473	.82741	50
20	.5640	.6830	1.2110	1.773	1.464	.82577	40
30	.5664	.6873	1.2134	1.766	1.455	.82413	30
40	.5688	.6916	1.2158	1.758	1.446	.82248	20
50	.5712	.6959	1.2183	1.751	1.437	.82082	10
35	.5736	.7002	1.2208	1.743	1.428	.81915	55
10	.5760	.7046	1.2233	1.736	1.419	.81748	50
20	.5783	.7089	1.2258	1.729	1.411	.81580	40
30	.5807	.7133	1.2283	1.722	1.402	.81412	30
40	.5831	.7177	1.2309	1.715	1.393	.81242	20
50	.5854	.7221	1.2335	1.708	1.385	.81072	10
36	.5878	.7265	1.2361	1.701	1.376	.80902	54
10	.5901	.7310	1.2387	1.695	1.368	.80730	50
20	.5925	.7355	1.2413	1.688	1.360	.80558	40
30	.5948	.7400	1.2440	1.681	1.351	.80386	30
40	.5972	.7445	1.2466	1.675	1.343	.80212	20
50	.5995	.7490	1.2494	1.668	1.335	.80038	10
37	.6018	.7536	1.2521	1.662	1.327	.79864	53
10	.6041	.7581	1.2549	1.655	1.319	.79688	50
20	.6065	.7627	1.2577	1.649	1.311	.79512	40
30	.6088	.7673	1.2605	1.643	1.303	.79335	30
40	.6111	.7720	1.2633	1.636	1.295	.79158	20
50	.6134	.7766	1.2661	1.630	1.288	.78980	10
38	.6157	.7813	1.2690	1.624	1.280	.78801	52
10	.6180	.7860	1.2719	1.618	1.272	.78622	50
20	.6202	.7907	1.2748	1.612	1.265	.78442	40
30	.6225	.7954	1.2778	1.606	1.257	.78261	30
40	.6248	.8002	1.2808	1.601	1.250	.78079	20
50	.6271	.8050	1.2838	1.595	1.242	.77897	10
	Cosin.	Cotg.	Cosec.	Sec.	Tan.	Sin.	Angle

Angle.	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.	
° ′							° ′
39	.6293	.8098	1.2868	1.589	1.235	.77715	51
10	.6316	.8146	1.2898	1.583	1.228	.77531	50
20	.6338	.8195	1.2929	1.578	1.220	.77347	40
30	.6361	.8243	1.2959	1.572	1.213	.77162	30
40	.6383	.8292	1.2991	1.567	1.206	.76977	20
50	.6406	.8342	1.3022	1.561	1.199	.76791	10
40	.6428	.8391	1.3054	1.556	1.192	.76604	50
10	.6450	.8441	1.3086	1.550	1.185	.76417	50
20	.6472	.8491	1.3118	1.545	1.178	.76229	40
30	.6494	.8541	1.3151	1.540	1.171	.76041	30
40	.6517	.8591	1.3184	1.535	1.164	.75851	20
50	.6539	.8642	1.3217	1.529	1.157	.75661	10
41	.6561	.8693	1.3251	1.524	1.150	.75471	49
10	.6583	.8744	1.3284	1.519	1.144	.75280	50
20	.6604	.8796	1.3318	1.514	1.137	.75088	40
30	.6626	.8847	1.3352	1.509	1.130	.74896	30
40	.6648	.8899	1.3386	1.504	1.124	.74703	20
50	.6670	.8952	1.3421	1.499	1.117	.74509	10
42	.6691	.9004	1.3456	1.494	1.111	.74314	48
10	.6713	.9057	1.3492	1.490	1.104	.74120	50
20	.6734	.9110	1.3527	1.485	1.098	.73924	40
30	.6756	.9163	1.3563	1.480	1.091	.73728	30
40	.6777	.9217	1.3600	1.476	1.085	.73531	20
50	.6799	.9271	1.3636	1.471	1.079	.73333	10
43	.6820	.9325	1.3673	1.466	1.072	.73135	47
10	.6841	.9380	1.3711	1.462	1.066	.72937	50
20	.6862	.9435	1.3748	1.457	1.060	.72737	40
30	.6884	.9490	1.3786	1.453	1.054	.72537	30
40	.6905	.9545	1.3824	1.448	1.048	.72337	20
50	.6926	.9601	1.3863	1.444	1.042	.72136	10
44	.6947	.9657	1.3902	1.440	1.036	.71934	46
10	.6967	.9713	1.3941	1.435	1.030	.71732	50
20	.6988	.9770	1.3980	1.431	1.024	.71529	40
30	.7009	.9827	1.4020	1.427	1.018	.71325	30
40	.7030	.9884	1.4061	1.422	1.012	.71121	20
50	.7050	.9942	1.4101	1.418	1.006	.70916	10
	.7071	1.	1.414	1.414	1.	.70711	45
	Cosin.	Cotg.	Cosec.	Sec.	Tan.	Sin.	Angle

NORTH FACE

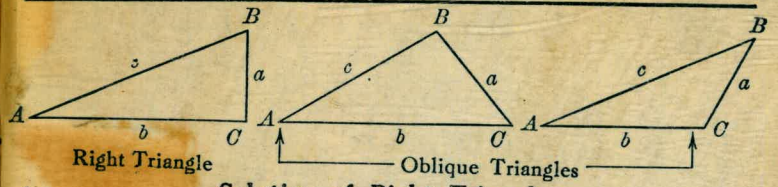
2068.50 = L996.0

S = .125

2002.32 = L987.73

S = 0.40

TRIGONOMETRIC FORMULÆ



Right Triangle — Oblique Triangles

Solution of Right Triangles

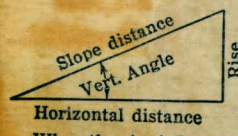
For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\operatorname{cosec} = \frac{c}{a}$

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.