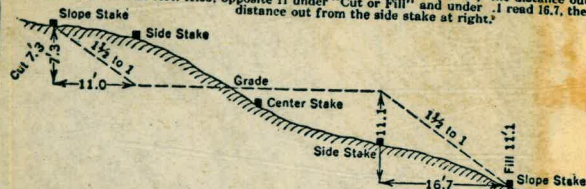


W

814

DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING
 Roadway of any Width. Side Slopes 1 1/2 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	Distance out from Side or Shoulder Stake										Cut or Fill
	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
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

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Cut or
Fill

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200 1-1982

INDEX

page

Final Cross-Section
of W Keyway 1-

INDEX

FINAL X SECTIONS	pages
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(cont'd)

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Final Cross-Section on
West Keyway of Dam

12/18/41
Fair-Worm

Dickinson
Jackson
Polak
Laing
King
Cote

Sta. + H.I. - I.S. Elev.
A-15
B.M. 680.35

1.74 682.09

3+01

50'S ✓ 4.2 677.9 ✓

40'S ✓ 4.3 677.8 ✓

30'S ✓ 6.7 675.4 ✓

20'S ✓ 11.9 670.2 ✓

3+11

50'S ✓ 6.5 675.6 ✓

40'S ✓ 8.3 673.8 ✓

30'S ✓ 8.4 673.7 ✓

3+21

50'S ✓ 11.9 670.2 ✓

40'S ✓ 11.2 670.9 ✓

T.P. 12.99 669.10 ✓

pl. ✓
10

Final Cross-Section on
West Keyway of Dam

12/18/41
Fair-Worm

Dickinson
Jackson
Polak
Laing
King
Cole

2

Sta + H.I. - I.S Elev

T.P. 669.10

1.24 670.34

3+21

30'S. 2.0 668.3

21'S. 4.3 666.0

20'S. 7.9 662.4

3+31

50'S. 6.8 663.5

40'S. 2.9 667.4

30'S. 4.3 666.0

20'S. 10.3 660.0

3+41

50'S. 12.1 658.2

30'S. 11.8 658.5

Handwritten signature or initials in red ink.

Final Cross-Sections on
West Keyway of Dam

12/18/41
Fair-Worm

Sta + H.I. - IS Elev

670.34

3+01

20'S ✓ 0.2 670.1 ✓

10'S ✓ 4.1 666.8² ✓

Axis ✓ 6.2 664.1 ✓

10'N ✓ 5.6 664.7 ✓

20'N ✓ 8.0 662.3 ✓

3+11

20'N ✓ ¹²⁶~~11.3~~ ^{57.1}~~667.7~~ ✓

10'N ✓ 9.1 661.2 ✓

1'N ✓ 9.0 661.3 ✓

Axis ✓ 12.7 657.6 ✓

10'S ✓ 11.8 658.5 ✓

15'S ✓ 9.4 660.9 ✓

20'S ✓ 2.6 667.7 ✓

plj

Final Cross-Section on
West Keyway of Dam

12/18/41
Fair-Warm

4

Sta + H.I. - T.S. Elev

670.34

3+07

Axis ✓ 7.8 662.5 ✓

10'S. ✓ 6.8 663.5 ✓

20'S. ✓ 2.5 667.8 ✓

3+09

Axis ✓ 11.8 658.5 ✓

3+21

10'N. ✓ 11.9 658.4 ✓

2'N. ✓ 12.8 657.5 ✓

T.P. 13.01 657.33 ✓

1.86 659.19 ✓

3+21

Axis ✓ 7.8 651.4 ✓

10'S. ✓ 6.4 652.8 ✓

ply

12/18/41
Fair-Worm

5

Sta + H.I. - I.S. Elev.

659.9

3+21

18'S. ↓ 2.0 657.2 ✓

3+31

19'S. ↓ 7.9 651.~~8~~³ ✓

10'S. ↓ 9.4 649.8 ✓

4'S. ↓ 11.1 648.1 ✓

3+01

30'N. ↓ 7.2 652.0 ✓

40'N. ↓ 8.6 650.6 ✓

50'N. ↓ 11.3 647.9 ✓

3+11

50'N. ↓ 12.9 646.3 ✓

40'N. ↓ 10.6 648.6 ✓

30'N. ↓ 7.4 651.8 ✓

pl. ✓

12/18/41

6

Sta + H.I. - I.S. Elev.

659.19

3+21

30'N. 11.7 647.5 ✓

20'N. 6.0 653.2 ✓

3+31

20'N. 9.2 650.0 ✓

10'N. 5.9 653.3 ✓

2'N. 7.9 651.3 ✓

3+41

20'N. 12.0 647.2 ✓

40'S. 2.3 656.9 ✓

3+51

50'S. 5.1 654.1 ✓

~~3+61~~~~50'S. Void 7.6 651.6 ✓~~NOTE

SECTIONS
 from STA 3+61 to Sta
 421 - retaken 1/17/43
See Page 43

M ✓

12/18/41
Fair-Warm

7

Sta	+ H.I.	- I.S	Elev
	659.19		
	3+51		
40'S		6.3	652.9
30'S		8.9	650.3
20'S		13.1	646.1
	3+41		
20'S		5.9	653.3
18'S		5.7	653.5
17'S		13.1	646.1
40'S	3+61	3.4	650.8
T.P	1306		646.1 ³
	0.25	646.3 ⁸	
	3+41		
10'S		2.1	644.3 ³
5'S		3.9	642.5 ³

NOTE
SECTIONS from
sta. 3+61 to Sta 4+21
retaken 1/17/43
See Page 43

pt

12/18/41
Fair-Warm

8

Sta.	+ H.I.	- I.S.	Elev.
	646.37 ⁸		
	3+41		
Axis		6.1	640.3 ⁸
3'N.		4.7	641.7 ⁸
10'N.		1.6	644.8 ⁸
30'N.		2.7	643.7 ⁸
40'N.		8.3	638.1 ⁸
50'N.		11.3	635.1 ⁸
	3+31		
50'N.		8.6	637.8 ⁸
40'N.		6.4	640.0 ⁸
30'N.		1.2	645.2 ⁸
	3+21		
40'N.		2.9	643.5 ⁸
50'N.		3.4	643.0 ⁸

pl

12/18/41
Fair - Warm

9

Sta	+	H.I.	-	I.S.	Elev
		646.3 ⁸			
		3+51			
40'N			9.7	636.7	
30'N.			6.5	639.9	
20'N			4.1	642.3	
10'N.			4.8	641.6	
8'N.			10.4	636.0	
5'N			12.5	633.9	
3'S			11.1	635.3	
10'S.			7.3	639.1	
18'S			4.2	642.2	
		3+31			
Axis.			1.4	645.0	
		3+61 VOID			
30'S.			1.0	645.4	

NOTE - SECTIONS
from sta. 3+61 to
sta 4+21 retaken
1/17/42
See Page 43

Final Cross-Section on
West Keyway of Dam

12/18/41
Fair-Warm

Dickinson
Jackson
Polak
Lainig
King
Cote

10

Sta + H.I. - I.S. Elev.

Sta	H.I.	I.S.	Elev.
	6463 ⁸		
	3+61 VOID		
24'S		7.0	6394
20'S		12.7	6337
40'N		11.1	6353
30'N		9.2	6372
20'N		9.0	6374
11'N		10.2	6362
T.P.		12.95	6334
	368	6371	
	3+61 VOID		
10'N		8.4	6287
9'N		9.6	6275
10'S		4.2	6329

NOTE - SECTIONS
from sta 3+61 to
421 retaken 1/17/42
See Page 43

Final Cross-Section on
West Keyway of Dam

12/18/41
Fair-Warning

Dickinson
Jackson
Polak
Laing
King
Cote

11

Sta + H.I. - I.S. Elev.

637.10

~~3+61~~

~~20'S~~

~~3.8 633.3~~

3+51

Axis

5.5 631.6

T.P.

10.97

626.13

7.44 633.5⁸

3+51

50'N

2.5 631.1

~~3+61~~
VOID

~~50'N~~

6.6 627.0

C-1

T.B.M.

11.40

622.13⁰⁰

622.13

Error 0.04⁵

NOTE - Section's
from sta. 3+61 to
sta 4+21 retaken

1/17/42

See Page 43

Final Cross-section on
West Keyway of Dam

12/22/41
Fair-Warm

Dickinson
Jackson
Polak
Laing
King
Cole

Sta + H.I. - I.S. Elev.
A-16
B.M. 649.55

1.00 650.55

3+71
VOID

~~30'S 9.3 641.2 ✓ Rock~~

~~33'S 7.7 642.8 ✓ "~~

~~36'S 1.0 649.5 ✓ "~~

~~40'S 0.7 649.8 ✓ "~~

~~50'S 3.2 647.3 ✓ "~~

~~60'S 2.7 647.8 ✓ Natural ground~~

3+75

~~60'S 4.4 646.1 ✓ "~~

~~50'S 5.7 644.8 ✓ Rock~~

~~40'S 2.9 647.6 ✓ "~~

~~36'S 3.1 647.4 ✓ "~~

~~33'S 8.8 641.7 ✓ "~~

~~30'S 8.7 641.8 ✓ "~~

VOID

See Page 44

12/22/41

13

Sta.	+	H.I.	-	I.S.	Elev.	
		650.55				
		3+81				
60'S.				7.2	643.3	Natural ground
56'S.				7.5	643.0	" " top of bank
		3+91				
60'S.		Void		12.6	637.9	" " " "
T.P.			1297		637.58	
		082 638.40				
		4+01				
55'S.				8.8	629.6	Natural ground - top of bank
60'S.				8.2	630.4	" "
70'S.				6.4	632.0	" "
80'S.				6.6	631.8	" "
		4+11				
90'S.				11.1	627.3	" "

SEE PAGE
40

12/22/41

14

Sta + H.I. - I.S. Elev

638.40

4+07

80'S 7.6 630.8

Natural ground

66'S 9.4 629.0

" "

3+81

50'S 5.3 633.1

Rock

SEE PAGE
41

40'S 11.1 627.3

"

3 46'S 11.1 627.3

"

30'S 10.3 628.1

"

26'S 11.9 626.5

"

3+71

26'S 3.9 634.5

"

23'S 5.7 632.7

"

22'S 9.4 629.0

"

20'S 10.2 628.2

"

12/22/41

15

Sta	+ H.I.	- I.S.	Elev.	
	638.40			
	3+71			
10'S		12.3	626.1	Rock
10'N		8.2	630.2	"
20'N	VOID	5.7	632.7	Loose rock
30'N		5.7	632.7	" "
40'N		4.3	634.1	" "
3 50'N		10.2	628.2	" "
	3+81			
40'N		9.7	628.7	" "
50'N		13.3	625.1	" "
30'N		11.1	627.3	" "
20'N		11.3	627.1	
	3+91			
40'N		13.3	625.1	
50'N		14.1	624.3	

See Page 46

12/22/41

16

Sta	+	H.I.	-	I.S.	Elev	
		63840				
T.P.			1288		625.52	
	1.37	626.89				
		3+71				
Axis				3.7	623.22	Rock
12'S.				2.7	624.28	"
4'N.				3.4	623.58	"
		3+81				
		<u>VOID</u>				
10'N.				3.5	623.42	"
4'N.				9.5	617.4	"
Axis				9.9	617.0	"
6'S.				6.0	620.9	"
10'S.				5.7	621.2	"
20'S.				5.6	621.3	"

SEE PAGE
47

12/22/41

17

Sta.	+ H.I. -	I.S.	Elev.	
	62689			
	3+91			
20'S.		10.5	616.4	Rock
22'S		8.1	618.8	"
30'S		7.4	619.5	"
40'S		6.5	620.4	"
46'S		6.2	620.7	"
50'S		2.8	624.1	"
30'N		2.2	624.7	Loose rock
20'N		3.9	623.0	"
10'N		9.4	617.5	Rock
20'N		11.0	615.9	Loose rock
30'N		6.3	620.3	" "
40'N		4.4	622.5	" "
50'N		5.1	621.8	" "

SEE PAGE 47

VOID
4+51

12/22/41
Fair - Warm

Dickinson 18
Jackson
Polak
Laing
King
Cole

Final Cross-Section of
West Keyway of Dam.

Sta + H.I. - I.S. Elev

~~52689
4411
PAGE
47~~

40' N.

3.3 613.6 Loose rock

T.P.

3.78 623.11

3.86 626.97

C-1

T.B.M.

4.83 622.14 622.13

Final Cross-Section on
West Keyway of Dam

12/23/41
Cool-Cloudy

Jackson
Polak
Laing

19

Sta.	+ H.I.	- IS	Elev.	
C-1 T.B.M.			622.13	
	440 626.53 ✓			
	4+01			
46'S.		32 ✓	613.3	Rock - toe of bank
	4+11			
53'S.		41 ✓	22.4	Natural ground - top of bank
60'S.		34 ✓	23.1	" " " "
67'S.		19 ✓	24.6	Loose rock
70'S.		43 ✓	22.2	" " " "
80'S.		25 ✓	24.0	" " " "
	4+21			
100'S.		74 ✓	19.1	Natural ground
90'S.		40 ✓	22.5	Loose rock
80'S.		71 ✓	19.4	" " " "
70'S.		100 ✓	16.5	" " " "
60'S.		123 ✓	14.2	" " " "

V010

SE
E
P
48

12/23/41
Fair-Worm

Jackson
Polak
Lainy

20

Sta. + H.I. - I.S. Elev

626.53 ✓

4+21

52'S.

11.3

15.2 ✓

Natural ground-top of bank

T.P.

12.79

613.74 ✓

0.84 614.58 ✓

4+11

30'N

1.6

613.0 ✓

Loose rock

20'N

2.2

12.4 ✓

" "

14'N

4.5

10.1 ✓

Rock

10'N

9.0

5.6 ✓

"

8'N

10.7

3.9 ✓

"

4+21

20'N

6.7

7.9 ✓

Loose rock

30'N

6.5

8.1 ✓

" "

40'N

5.7

8.9 ✓

" "

~~VOID~~

~~SEE PAGE 46~~

12/23/41
Fair-Warm

Jackson
Polak
Laing

21

Sta. + H.I. - I.S. Elev.

61458

3+91

Axis

5.5 9.1

Rock

10'S.

4.3 10.3

"

4+01

40'S.

1.7 12.9

"

VOID

30'S.

2.1 12.5

"

20'S.

5.2 9.4

"

16'S

9.9 4.7

"

10'S.

10.5 4.1

"

Axis

12.2 2.4

"

7'N

8.0 6.6

"

10'N

2.6 12.0

"

4+11

46'S.

7.5 7.1

"

toe of bank

SEE Page 47

12/23/41
Fair - Warm

Jackson
Polak
Laird

22

Sta + H.I. - I.S. Elev.

614.58

4+11

40'S. 8.1 6.5

30'S. 11.2 3.4

20'S. 12.0 2.6

4+21

47'S. 13.3 601.3

T.P. 1297 601.61

0.93 602.54

4+21

40'S. 36 598.9

30'S. 51 597.4

20'S. 8.5 594.0

10'S. 10.3 592.2

Axis 11.3 591.2

Rock

"

"

"

toe of bank

Rock

"

"

"

"

SEE Page 49

12/23/41
Fair-Warm

Jackson
Polak
Laing

23

Final Cross-section on
West-Keyway of Dam

Sta.	+	H.I.	-	I.S.	Elev.	
		602.54				
		4+21				
8'N				13.2	589.3	Rock - toe of bank
10'N				1.6	600.9	Lower rock
		4+01				
4'S.				2.5	600.0	Rock
		4+11				
7'N						
8'N				3.5	599.0	"
AXIS				7.4	595.1	"
10'S.				5.4	597.1	"
T.E.			10.55		591.99	
	4.88	596.87				
C-2						
T.B.M.			0.39	596.48	596.48	

VOID

SEE PAGE 49

Final Cross-Section on
East Keyway of Dam

Sta. + H.I. - IS. Elev
A-31
B.M. 663.09

10.88 673.97
13+00.

50'N. 10.0 664.0

40'N. 8.0 66.0

30'N. 6.4 67.6

20'N. 3.4 70.6

10'N. 2.5 71.5

20'N. 12.2 61.8

10'N. 13.3 60.7

10'S. 0.6 73.4

12+80

20'S. 10.6 63.4

~~OLD
F.B
SEE PAGE 1~~

12/19/41
Fair-Warm

Dickinson
Jackson
Polak
Loing
King
Cole

30

Loose rock & gravel

Rock

12/19/41

Fair-Worm

31

Sta	+	H.I.	-	I.S.	Elev				
		67397							
		12+70							
30'S				59	668.1			Rock	
		12+60							
40'S				99	64.1			"	
50'S				0.9	73.1			"	
60'S				53				Looserock & gravel	
		12+70							
40'S				84				" " " "	
		12+40							
80'S				48	69.2			" " " "	
		12+30							
80'S				113	62.7			" " " "	
90'S				7.1	66.9			" " " "	
		12+20							
90'S				124	61.6			" " " "	

VOID
FB
SET

12/19/41

32

Fair-Warm

Sta	+	H.I.	-	IS	Elev	
		67397				
		12+20				
100'S				88 79	66.4	Loose rock & gravel
110'S				6.9	67.1	W edge of dirt road
110'S				12.8	61.2	Loose rock & gravel
100'S				4.1	69.9	W edge of dirt road
50'S				9.3	64.7	Loose rock & gravel
40'S				13.1	60.9	Rock
60'S				5.5	68.5	Loose rock & gravel
70'S				1.5	72.5	" " " "
		12+40				
70'S				84	65.6	" " " "

VOID
SEE FB # 622

12/19/41

33

Fair-Warm

Sta	+ H.I.	- I.S.	Elev.	
	67397			
T.P.	1.95		67202	
	10.2668228			
	13+00			
Axis		7.6	74.7	Loose rock & gravel
10'S.		3.1	79.2	" " " "
	12+90			
20'S.		6.6	75.7	" " " "
	12+80			
30'S.		6.4	75.9	" " " "
40'S.		0.4	81.9	" " " "
	12+70			
40'S.		6.8	75.5	" " " "
50'S.		0.8	81.5	" " " "
	12+60			
60'S.		6.5	75.8	" " " "

VOID
SEE F.B. #622

12/19/41
Fair-Worm

34

Sta	+	H.I.	-	I.S.	Elev.	
		682.28				
		12+60				
70'S			4.0	678.3		W. edge of dirt road
		12+50				
80'S			7.0	75.3		" " " "
T.P.		8.09	0.24	682.04		
		690.13				
		13+00				
30'S			1.7	688.4		W. edge of dirt road
20'S			6.3	83.8		Loose rock and gravel
		12+90				
30'S			7.4	82.7		" " " "
40'S			4.3	85.8		W. edge of dirt road
		12+80				
50'S			6.6	83.5		" " " "

~~VOID~~
SEE F.B. # 62

12/19/41
Fair-Warm

35

Sta	+	H.I.	-	I.S.	Elev.	
		690.13				
		12+70				
60'S				8.5	681.6	W edge of dirt road
T.P.			1248		677.65	
	1.55	679.20				
T.P.			1241		666.79	
	0.39	667.18				
		12+90				
Axis				6.7	660.5	Rock
30'N				7.6	59.6	Lower rock & gravel
40'N				9.8	57.4	" " " "
50'N				11.5	55.7	" " " "
		12+80				
30'N				13.3	53.9	" " " "
20'N				13.2	54.0	" " " "

~~VOID~~

#622

SEE P. B.

12/19/41
Fair-Warm

36

Sta	+	H.I.	-	I.S.	Elev.	
		667.18				
		12+80				
10'S.				10.5	656.7	Rock
		12+70				
20'S.				9.6	57.6	"
		12+60				
30'S.				9.9	57.3	"
		12+40				
60'S.				7.2	60.0	Loose rock and gravel
50'S.				11.1	56.1	Rock
		12+30				
70'S.				7.7	59.5	Loose rock "
T.P.						
		12.16			655.02	
		0.17			655.19	

~~VOID~~
~~SEE P.B.~~

622

12/19/41
Fair-Warm

37

Sta	+	H.I.	-	I.S.	Elev	
		655.19				
		12+30				
60'S.				33	651.9	Rock
		12+80				
Axis				46	50.6	"
10'N.				4.2	51.0	Loose rock and gravel
50'N.				4.8	50.4	" " " "
40'N.				4.0	51.2	" " " "
		12+70				
50'N.				8.3	46.9	" " " "
40'N.				8.0	47.2	" " " "
30'N.				8.7	46.5	" " " "
20'N.				8.7	46.5	Rock
10'N.				10.7	44.5	"

~~VOID~~

~~F.B.~~

~~SEE~~

~~622~~

12/19/41
Fair - Warm

38

Sta. + H.I. - I.S. Elev.

655.19

12+60

30'N.

12.3 642.9

Loose rock & gravel

40'N

12.3 42.9

" " " "

12+90

50'N.

12.3 55.5

" " " "

12+40

40'S

6.3 48.9

Rock

12+70

10'S

9.3 45.9

" "

12+40

30'S

8.4 46.8

Rock

12+60

20'S

6.7 48.5

" "

12+50

30'S

1.5 53.7

" "

~~VOID #62
SEE P.B.~~

12/19/41
Fair-Worm

39

Sta.	+	H.I.	-	I.S.	Elev.				
		655.19							
		12+50							
20'S				12.0	643.2	Rock			
T.P.			12.44		642.75				
	0.35	643.10							
		12+70							
AXIS				3.5	639.6	"			
		12+90							
AXIS				11.4	31.7	"			
3'N.				10.7	32.4	"			
10'N				4.0	39.1	"			
20'N.				3.2	39.9	"			
5'S.				9.9	33.2	"			
10'S.				4.3	38.8	"			
16'S.				2.5	40.6	"			

~~VOID #622
SEE B.~~

12/19/41

40

Fair-Worm

Sta	+	H.I.	-	I.S.	Elev				
		64310							
		12+50							
16'S.				6.4	33.7		Rock		
10'S.				9.6	33.5		"		
		12+60							
40'N.				1.1	42.0		Loose rock & gravel		
50'N.				3.1	40.0		"	"	"
		12+50							
50'N.				12.5	30.4		"	"	"
40'N.				11.1	32.0		"	"	"
30'N.				9.3	33.8		"	"	"
20'N.				10.0	33.1		"	"	"
10'N.				9.7	33.4		"	"	"
		12+40							
10'N.				12.9	30.2		"	"	"
20'N.				12.6	30.5		"	"	"

~~VOID~~
 SEE
 # 62

12/19/41
Fair-Warm

41

Sta	+	H.I.	-	IS.	Elev	
		643.10				
		12+40				
30'N			128	130.3		Fill rock & gravel
		12+30				
50'S			102	43.3		Rock
40'S			94	33.7		"
30'S			122	30.9		"
		12+20				
50'S			109	32.2		"
T.P.			1281	630.29		
	2.31	632.60				
		12+50				
AXIS.			5.1	27.5		"
		12+40				
40'N			44	28.2		Loose rock & gravel
50'N			6.8	25.8		" " " "

~~VOID #6 22~~
~~SEE #3~~

Final Cross-Section on
East Keyway of Dam

12/19/41
Fair-Warm

Dickinson
Jackson 42
Patak
Laing
King
Cole

Sta	+	H.I.	-	I.S.	Elev
A-32		63260			
B.M.			6.51 ²	626.09	626.06

~~VOID #6²
SEE FB.~~

Final Cross-section
of West Abutement

1/17/42
Fair-Cool

Dickinson
Jackson
Polak
Cole 43

Sta.	+	H.I.	-	I.S.	Elev.				
A-16					649.55				
B.M.									
	3.93	653.48							
3+61				1.4	652.1	60'	South of Axis	-	Ground
3+61				2.5	651.0	50'	"	-	Rock
3+61				7.4	646.1	40'	"	-	"
3+61				8.9	644.6	30'	"	-	"
3+61				9.1	644.4	26'	"	-	"
3+71				5.5	648.0	60'	"	-	"
3+71				12.8	640.7	50'	"	-	"
3+81				11.0	642.5	60'	"	-	Rock
T.P.			12.72		640.76				
	1.56	642.32							
3+91				4.1	638.2	60'	"	-	Rock
4+01				10.3	632.0	70'		-	Ground
4+01				12.3	630.0	60'	"	-	Rock

pl

1/17/42
Fair-Cool

Dickinson
Jackson
Polak
Cole 44

Final Cross

Section of West Abutement

Sta + H.I. - I.S. Elev.

642.32

4+01			130	629.3	55'	South of Axis-Ground		
3+71			6.0	636.3	40'	" " " - Rock		
3+71			7.4	634.9	30'	" " " - "		
3+71			9.0	633.3	24'	" " " - "		
3+81			11.1	631.2	50'	" " " - "		
3+71			13.3	629.0	20'	" " " - "		
3+61			9.1	633.2	20'	" " " - "		
3+61			9.5	632.8	10'	" " " - "		
3+61			5.9	636.4	11'	North " " - "		
3+61			4.3	638.0	20'	" " " - Loose Rock		
3+61			4.9	637.4	30'	" " " - "		
3+71			9.2	633.1	30'	" " " - "		
3+71			10.0	632.3	20'	" " " - "		
3+71			12.0	630.3	10'	" " " - Rock		
T.P.		12.15		630.17				

pt

Final Cross1/17/42
Fair-CoolDickinson
Jackson
Polak
Cole

45

Section of West Abutement

Sta	+	H.I.	-	I.S.	Elev.				
T.P.					630.17				
	1.03	631.20							
3+61			4.0	627.2	Axis				Rock
3+61			3.2	628.0	10' North of Axis				Rock
3+71			8.0	623.2	Axis				"
3+71			5.1	626.1	10' South	"	"	"	"
3+81			3.7	627.5	40'	"	"	"	"
3+81			2.7	628.5	30'	"	"	"	"
3+81			9.8	621.4	20'	"	"	"	"
3+81			10.1	621.1	10'	"	"	"	"
3+81			10.7	620.5	5'	"	"	"	"
3+81			8.3	622.9	10' North	"	"	"	"
3+81			4.1	627.1	20'	"	"	"	L. Rock
3+81			3.9	627.3	30'	"	"	"	"
3+91			6.6	624.6	30'	"	"	"	"
3+91			8.7	622.5	20'	"	"	"	"

Final Cross Section

1/17/42
Fair-Cool

Dickinson
Jackson
Polak
Cole

46

on West Abutement

Sta	+ H.I.	- I.S.	Elev.				
	631.20						
3+91		13.3	617.9	10'	North of Axis	-	Rock
4+01		10.8	620.4	40'	"	"	- Loose Rock
4+01		10.5	620.7	30'	"	"	- " "
3+91		6.5	624.7	50'	South	"	Rock
3+91		11.0	620.2	40'	"	"	"
3+91		11.9	619.3	30'	"	"	"
4+21		9.3	621.9	90'	"	"	Ground
4+21		12.3	618.9	80'	"	"	"
4+11		7.1	624.1	80'	"	"	"
4+11		9.1	622.1	70'	"	"	"
4+11		8.6	622.6	60'	"	"	Rock
4+01		10.6	620.6	50'	"	"	"
4+11		9.9	621.3	54'	"	"	"
4+01		1.9	629.3	55'	"	"	"
T.B.M.	9.80		621.40	Elev. of T.B.M. = 621.43			

pl

Final Cross-Section

1/17/42
Fair-Warm

Dickinson
Jackson
Polak
Cole

47

on West Abutement

Sta.	+	H.I.	-	I.S.	Elev.				
T.B.M.					621.43				
	0.40	621.83							
3+81				4.8	617.0	Axis			Rock
3+81				3.9	617.9	5'	North of Axis		"
3+91				5.5	616.3	20'	South	"	"
3+91				11.0	610.8	10'	"	"	"
3+91				11.5	610.3	Axis			"
4+01				10.0	611.8	10'	North	"	"
4+01				5.8	616.0	20'	"	"	Loose Rock
4+11				8.3	613.5	40'	"	"	"
4+11				8.8	613.0	30'	"	"	"
4+11				9.7	612.1	20'	"	"	"
4+11				11.8	610.0	12'	"	"	Rock
4+01				12.2	609.6	20'	South	"	"
4+01				8.9	612.9	30'	"	"	"
4+01				9.0	612.8	40'	"	"	"

See Page 61

Retaken

pl

Final Cross-Section

1/17/42
Fair - Cool

Dickinson
Jackson
Potok
Cole

48

on West Abutement

Sta.	+ H.I.	- I.S.	Elev.				
	621.83						
4+01		7.7	614.1	46'	South of Axis	Rock	
4+11		8.4	613.4	50'	"	"	"
4+11		12.4	609.4	48'	"	"	"
4+21		6.2	615.6	70'	"	"	Ground
4+21		9.4	612.4	60'	"	"	Rock
4+21		9.9	611.9	54'	"	"	"
4+31		6.8	615.0	90'	"	"	Ground
4+31		9.6	612.2	80'	"	"	"
4+31		12.3	609.5	70'	"	"	"
4+41		12.9	608.9	90'	"	"	"
T.B.M.	12.73		609.10	Elev of T.B.M. = 609.10			
	0.48	609.58					
3+91		2.0	607.6	4'	North of Axis	Rock	
4+01	See Page 61		5.5	604.1	8'	"	" Retaken
4+01		6.9	602.7	AXIS		"	"

Final Cross

1/17/42
Fair-Warm

Dickinson
Jackson
Polak
Cole

Section of West Abutement

Sta + H.I. - IS. Elev

609.58

~~4+01 10.3 599.3 5' South of Axis - Rock Retaken~~

~~4+01 See Page 61 5.5 604.1 10' " " " "~~

~~4+01 4.1 605.5 16' " " " " Retaken~~

~~4+14 Void See Page 61 3.4 606.2 40' " " " "~~

~~4+14 Void " " " 5.5 604.1 30' " " " "~~

~~4+14 Void " " " 7.1 602.5 20' " " " "~~

~~4+14 Void " " " 12.2 597.3 10' " " " "~~

4+21 1.0 608.6 40' North " " Loose Rock

4+21 2.0 607.6 30' " " " "

4+21 1.2 608.4 20' " " " "

4+21 9.1 600.5 10' " " " Rock

4+31 6.0 603.6 40' " " " Loose Rock

4+31 6.7 602.9 30' " " " "

4+31 5.9 603.7 20' " " " Rock pl

Final Cross-Section
of West Abutement

1/17/42
Fair-Worm

Dickinson
Jackson
Polak
Cole

50

Sta	+ H.I.	- I.S.	Elev					
	609.58							
4+41		7.9	601.7	40'	North of Axis	-	L. Rock	
4+41		9.0	600.6	30'	"	"	"	"
4+41		8.8	600.8	20'	"	"	Rock	
4+51		9.2	600.4	40'	"	"	L. Rock	
4+21		4.3	605.3	30'	South	"	Rock	
4+21		8.0	601.3	47'	"	"	"	
4+21	Void See Page 59	10.5	599.7	40'	"	"	"	
4+21	Void " " "	12.1	599.5	30'	"	"	"	
			97.5					
4+31		7.1	602.5	60'	"	"	"	
4+31	See FB #625-P33	12.7	596.9	50'	"	"	"	
4+31		2.8	606.3	62'	"	"	"	
4+41		3.1	606.5	80'	"	"	L. Rock	
4+51		8.9	600.7	90'	"	"	"	
4+51		11.1	598.5	80'	"	"	"	

Final Cross11/17/42
Fair - WarmDickinson
Jackson
Palak
Cole 51Section of West Abutement

Sta	+	H.I.	-	I.S. Elev		
		609.58				
4+51			12.4	597.2	76' South of Axis - Rock	
T.P.			12.60	596.98		
	1.02	598.00				
4+51			5.0	593.0	30' North of Axis - L. Rock	
4+51			5.1	592.9	20' " " " " Rock	
4+51			7.1	590.9	15' " " " " "	
4+61			10.5	587.5	40' " " " " L. Rock	
4+61			12.5	585.5	30' " " " " " "	
4+41	See F.B.^H 625 P.3324			595.6	70' South " " Rock	
4+61			8.1	589.9	90' South " " Ground	
4+61			11.1	586.9	100' " " " " "	
4+41	Void See Page 59			2.3	595.7	Axis " " Rock
4+41	Void " " "			40.5	598.5	7' North " " " "
4+21	Void - See Page 59			8.4	589.6	8' " " " " "
4+21	Void - See Page 59			6.9	591.1	Axis " " " "

Final Cross-Section
on West Abutement

11/17/42
Fair-Warm

Dickinson
Jackson
Polak
Cole

52

Sta.	+ H.I.	- I.S.	Elev				
	598.00						
4+21	VOID	see Page 59	5.7	592.3	10'	South of Axis	Rock
4+21	VOID	" "	4.0	594.0	20'	" "	" "
4+31		↑	12.2	585.8	AXIS		" "
4+31			10.9	587.1	10'	" "	" "
4+31		See FB 625	10.5	587.5	20'	" "	" "
4+31		Page 33	10.2	587.8	30'	" "	" "
4+31		↓	7.6	590.4	40'	" "	" "
4+41		SEE FB #625	6.3	591.7	60'	" "	" "
4+41		Page 32	13.0	585.0	50'	" "	" "
T.P.		11.83		586.17			
	0.77	586.94					
4+31		SEE FB #625	3.2	583.7	9'	North	" "
4+31		Page 32	0.3	586.6	10'	" "	" "
4+41		SEE FB #623	2.8	584.1	75'	" "	" "
4+41		Page 45	5.3	581.6	11'	" "	" "

Final Cross-Section
on West Abutement

1/17/42
Fair-Worm

Jackson
Polak
Cole

53

Sta + H.I. - I.S. Elev

586.94

~~4+41~~ ~~100~~ ~~576.9~~

~~10' North of Axis - Rock~~

~~4+41~~ ~~78~~ ~~579.1~~

~~Axis~~ " "

~~4+41~~ ~~76~~ ~~579.3~~

~~10' South~~ " " "

See FB# 623

~~4+41~~ ~~98~~ ~~577.1~~

~~20'~~ " " "

Pages 44-45

~~4+41~~ ~~97~~ ~~577.2~~

~~30'~~ " " "

~~4+41~~ ~~61~~ ~~580.8~~

~~40'~~ " " "

4+51 50 581.9

13' North " " "

4+51 22 584.7

70' South " " "

4+51 57 581.2

60' " " "

4+51 85 578.4

50' " " "

4+51 52 581.7

11' North " " "

4+61 50 581.9

20' North " " L. Rock

4+61 61 580.8

15' " " "

4+61 +34 590.3

80' South " " Rock

4+61 16 585.8

73' " " "

T.P. 1240 574.54

0.00 574.54

W/D

Final Cross-Section
on West Abutement

1/17/42

Fair-Worm

Jackson
Polak
Cole

54

Sta. + H.I. - I.S. Elev.

574.54

4+51 2.6 571.9

10' North of Axis - Rock

~~4+51 54 569.1~~

see page 65

~~5' " " " "~~

~~4+51 5.0 569.5~~

~~Axis " " "~~

~~4+51 5.7 568.8~~

~~10' South " " "~~

pg 65

~~4+51 4.9 569.6~~

~~20' " " " "~~

1)

~~4+51 4.5 570.0~~

~~30' " " " "~~

1)

~~4+51 2.4 572.1~~

~~40' " " " "~~

"

~~4+61 10.4 564.1~~

~~10' North " " "~~

see Page 64

~~4+61 13.9 560.6~~

~~8' " " " "~~

~~4+61 12.7 561.8~~

~~Axis~~

~~4+61 9.8 564.7~~

~~10' South " " "~~

~~4+61 9.5 565.0~~

~~20' " " " "~~

~~4+61 9.8 564.7~~

~~30' " " " "~~

~~4+61 8.4 566.1~~

~~40' " " " "~~

4+61 *ok* 1.0 573.5

11' North " " "

pl

Final Cross-Section
of West Abutement

1/17/42
Fair-Worm

Jackson
Polak
Cole

55

Sta. + H.I. - I.S. Elev

574.54

~~4+61 61 568.4~~

See Page 64

~~50' South of Axis - Rock~~

~~4+61 54 569.1~~

~~60' " " " "~~

4+61 1.9 572.6

70' " " " "

T.B.M. 1112 563.42

Elev of T.B.M. = 563.42

2/1

LIMITS OF KEYWAY

MAR 16, 1942 56

DICKINSON
ROGERSSTATION - OFFSET - ELEV

A-16					
B.M	12.25	661.83		649.58	
3+08		2.83		659.00	On Axis
3+09		2.83		659.00	8' south
3+12		2.83		659.00	8' "
3+12		2.83		659.00	13' "
3+16		2.83		659.00	14' "
3+23		11.83		650.00	ON AXIS
3+31		11.83		650.00	14 SOUTH
T.P	0.83	649.92	12.74	649.09	
3+41		5.6		644.3	14' SOUTH
3+41		9.1		640.8	2.8 North
3+51		10.1		639.8	14.6 SOUTH
T.P	0.44	637.61	12.75	637.17	
3+51		5.8		631.8	3' North
3+61		10.0		627.6	3.3 "
3+61		4.6		633.0	17.5 South

LIMITS OF KEYWAY (Contd)

MAR 11, 1942 57

DICKINSON
ROGERS

637.61

~~3171 9.5 6281 17.9
20 South~~

T.P. 0.10 625.72 11.99 625.62

~~3171 2.6 623.1 3.9 North~~~~3181 8.2 617.5 4.5 "~~

3181 1.4 624.3 22.0 South

3191 6.6 619.1 25.1 "

T.P. 0.22 613.05 12.89 612.83

3191 1.3 611.7 5.0 North

~~4101 9.3 603.7 5.4 "~~~~4101 0.1 613.0 30.3 South~~

4111 8.0 605.0 35.8 "

T.P. 0.41 600.83 12.63 600.42

4111 3.1 597.7 5.7 North

~~4121 11.7 589.5 6.8 "~~~~4121 1.6 599.2 40.6 South~~~~4131 8.0 592.8 45.4~~

Retaken

Retaken

LIMITS OF KEYWAY (contd)

Mar 11, 1925

DICKINSON
Rogers

600.83

T.P. 0.79 588.86 1276 588.07

4+31 6.0 582.9 7.3 North

4+41 11.6 577.3 7.8 "

~~4+41 2.7 586.2 50.4 South~~

4+51 8.4 580.5 55.3 "

T.P. 1.02 577.17 1271 576.15

~~4+51 5.2 572.0 8.4 North~~~~4+61 11.6 565.6 9.7 "~~~~4+61 7.2 570.0 62.1 SOUTH~~

T.P. 3.23 571.01 9.39 567.78

T.BM 7.55 563.46 BM. Marked E.I. 563.42

CROSS SECTION OF KEYWAYAFTER CLEANUP

MAR. 27

59

DIGKIN, JOHN

POLAK

BM 2.59 601.25 ✓ 598.66

4+21

7N 12.6 ✓ 588.7 ✓

5N 12.1 ✓ 589.2 ✓

4N 10.9 ✓ 590.4 ✓

AXIS 10.6 ✓ 590.7 ✓

10S 8.9 ✓ 592.4 ✓

20S 7.1 ✓ 594.2 ✓

30S 4.8 ✓ 596.5 ✓

40S 2.3 ✓ 599.0 ✓

40.55 2.2 ✓ 599.1 ✓

Downstream slope

4+11

8N 25 ✓ 598.8 ✓

4N 5.8 ✓ 595.5 ✓

AXIS 5.6 ✓ 595.7 ✓

4S 61 ✓ 595.2 ✓

pt

CROSS SECTION (Contd)

MAR 27: 60
DICKINSON

601.25

4+11

10.5 4.7 596.6 ✓

14.5 4.6 596.7 ✓

15.5 2.3 599.0 ✓

4+18

AXIS 10.1 591.2 ✓

10.5 8.9 592.4 ✓

15.5 8.5 592.8 ✓

20.5 5.6 595.7 ✓

4+06

8.14 2.5 598.8 ✓

3.11 1.8 599.5 ✓

AXIS 3.5 597.8 ✓

5.5 3.9 597.4 ✓

10.5 0.6 600.7 ✓

T.P. 0.56 600.69 ✓

pl ✓

CROSS SECTION (Contd)

MAR 27 61

DICKINSON

T.P. 13.03 613.72 600.69

4+11

20 S 12.0 601.7 ✓

30 S 10.1 603.6 ✓

36 S 8.7 605.0 ✓

Downstream slope

40 S 7.3 606.4 ✓

4+01

8 N 8.1 605.6 ✓

31 N 12.2 601.5 ✓

Axis 11.9 601.8 ✓

5 S 14.9 598.8 ✓

H.L. ✓

10 S 9.6 604.1 ✓

16 S 9.3 604.4 ✓

17 S 6.5 607.2 ✓

20 S 4.9 608.8 ✓

30 S 1.0 612.7 ✓

Downstream Toe

T.P. 1.18 612.54 ✓

pl

CROSS SECTION (Cont'd)

TP. 11.26/2380

612.54

TBM. 422

619.58

Marked El. = 619.58

MAR. 27

62

DICKINSON

T.B.M. 7.45 57087 563.42

4+71

10 N 10.9 560.0

AXIS 11.9 559.0

10 S 12.2 558.7

20 S 12.8 558.1

30 S 12.0 558.9

40 S 13.1 557.8

44 S 13.4 557.5

48 S 9.9 561.0

50 S 9.6 561.3

60 S 9.7 561.2

67 S 6.4 564.5

Downstream Slope

4+61

62.6 0.9 570.0

60 S 1.6 569.3

Downstream Slope

PH
✓

570.87
4+61

50S	46	566.3	✓
40S	65	564.4	✓
30S	60	564.9	✓
20S	57	565.2	✓
10S	64	564.5	✓
AXN	9.1	561.8	✓
8N	9.6	561.3	✓
9N	68	564.1	✓
10N	4+67		
AXIS	9.8	561.1	✓
	10.9	560.0	✓
5S	12.7	558.2	✓
10S	12.9	558.0	✓
20S	12.7	558.2	✓
30S	13.0	557.9	✓
40S	8.1	562.8	✓
45S	6.9	564.0	✓

✓

57087

4+67

50S 75 563.4 ✓

60S 67 564.2 ✓

64S 64 564.5 ✓

4+56

9N 40 566.9 ✓

8N 67 564.2 ✓

AXIS 7.9 563.0 ✓

5S 5.9 565.0 ✓

4+51

9N 40.6 571.5 ✓

8N 1.7 569.2 ✓

AXIS 1.5 569.4 ✓

10S 2.5 568.4 ✓

20S 1.1 569.8 ✓

30S 1.0 569.9 ✓

40S 1.8 569.1 ✓

0.1

MAR 27 66
DICKINSON

570.87

4+55

40S	1.3	569.6	✓
30S	1.0	569.9	✓
20S	2.6	568.3	✓
15S	2.2	568.7	✓
14S	5.2	565.7	✓
10S	4.4	566.5	✓
5S	4.1	566.8	✓
AXIS	4.4	566.5	✓
7N	6.0	564.9	✓
9N	0.7	570.2	✓
TBM	7.45	563.42	MARKED 563.42

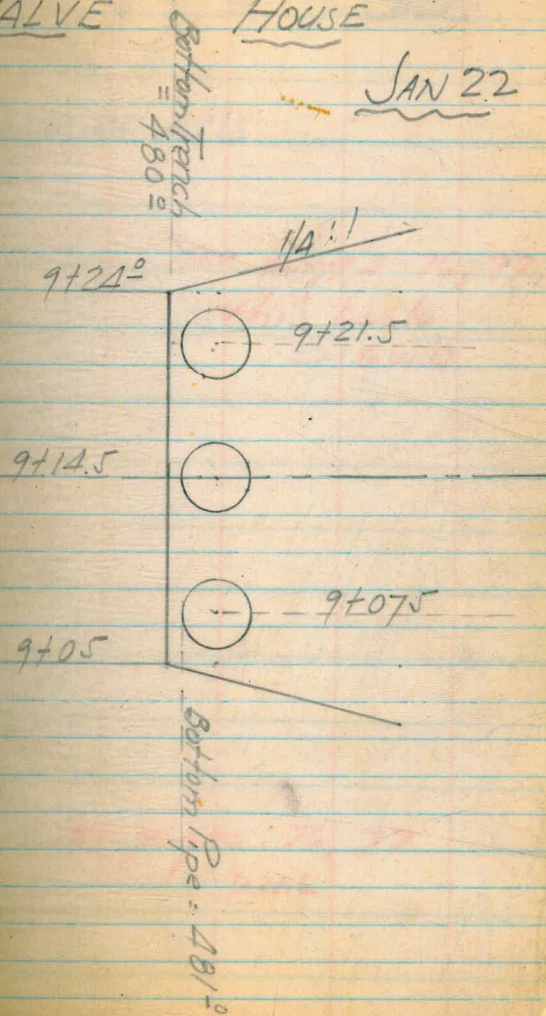
CROSS SECTION OF ORIGINAL
GROUND - EXCAVATION FOR
OUTLET PIPES SOUTH OF
VALVE CHAMBER

T.B.M. 7.23	482.46		475.23
9+35.5		3.0	479.5
9+35.5		1.0	481.5
9+21.5		6.4	476.1
9+21.5		4.9	477.6
9+14.5		8.1	474.4
9+14.5		6.0	476.5
9+07.5		8.7	473.8
9+07.5		6.1	476.4
9+07.5		0.3	482.2
8+98		3.3	479.2
8+98		5.3	477.2
8+98		10.6	471.9
T.P.	0.46		482.00

10.74 492.74

SECTION USED TO SET
SLOPE STAKES FOR
EXCAVATION OF TRENCH
FOR OUTLET PIPES SOUTH
OF VALVE HOUSE

JAN 22



CROSS SECTION OF ORIGINAL
GROUND - EXCAVATION FOR
OUTLET PIPES SOUTH OF
VALVE CHAMBER

JAN 21, 1921

68

DICKINSON
POLACK
LAING
KING
COLE

T.B.M.	7.23	482.46	475.23	
9+35.5	3.0	479.5	145	SOUTH OF AXIS
9+35.5	1.0	481.5	158	"
9+21.5	6.4	476.1	145	"
9+21.5	4.9	477.6	153	"
9+14.5	8.1	474.4	145	"
9+14.5	6.0	476.5	154	"
9+07.5	8.7	473.8	145	"
9+07.5	6.1	476.4	172	
9+07.5	0.3	482.2	186	
8+98	3.3	479.2	205	
8+98	5.3	477.2	180	
8+98	10.6	471.9	145	"
T.P.	0.46	482.00		

See pages 76, 77,
this book

D.W.L.

See pages 76, 77
D.W.L.

10.74 492.74

CROSS SECTION - ORIGINAL GROUND
EXCAVATION FOR OUTLET PIPES

JAN 21 1912

69

SOUTH OF VALVE CHAMBER

19274

Dickinson
POLACK
LAING
KING
COLE

9+35.5	3.2	489.5	158	SOUTH OF AXIS
9+35.5	3.4	489.3	162	" " "
9+21.5	7.5	485.2	160	" " "
9+21.5	4.2	488.5	178	"
9+21.5	4.2	488.5	205	"
9+21.5	6.3	486.4	218	"
9+21.5	5.7	487.0	243	"
9+21.5	6.7	486.0	268	"
9+21.5	5.1	487.6	285	"
9+14.5	5.2	487.5	285	"
9+14.5	9.9	482.8	235	"
9+14.5	8.6	484.1	216	"
9+14.5	7.4	485.3	205	"
9+14.5	8.3	484.4	185	"
9+07.5	10.8	481.9	205	"

see pages 76, 77
D.W.L.

(Contd from Page 69)

492.74

9+07.5	11.5	481.2	216	SOUTH OF AXIS
9+07.5	10.4	482.3	235	" " "
9+07.5	5.8	486.9	285	" " "
8+98	6.2	486.5	285	" " "
8+98	10.5	482.2	245	" " "

TP 12.30 504.43 0.61 492.13

9+35.5	8.2	496.2	170	" " "
9+35.5	5.4	499.0	180	" " "
9+35.5	9.4	495.0	188	" " "
9+35.5	9.1	495.3	205	" " "
9+35.5	10.4	494.0	220	" " "
9+35.5	8.4	496.0	232	" " "
9+35.5	10.2	494.2	255	" " "
9+35.5	8.6	495.8	285	" " "

T.B.M.

2.77

501.66

EL = 501.66

Error = 0.0

JAN 21, 1942

70

DICKINSON
POLACK
LAING
KING
GOLF

CROSS SECTION OF OUTLET
TRENCH and TOWER

(Taken after excavation of
keyway completed.)

Jan 21, 1942

72

Dickinson
POLACK
LAING
KING
COLE

T.					
B.M.	1.60	491.00	489.40		
9+30			5.5	485.5	Axis
			4.9	486.1	12' North
			3.0	488.0	20' "
9+14.5			8.1	482.9	Axis
			7.4	483.6	12' North
			5.4	485.6	22' North
9+08			11.0	480.0	Axis
			10.3	480.7	12' North
			8.3	482.7	23' "
T.P.		11.73	479.25		
	2.68	481.95			
9+00			5.9	476.1	Axis

CROSS SECTION OF OUTLETT

TOWER AND TRENCH

(Taken after excavation of
Keyway Completed)

481.95

9+00

3.4

478.6

12' North

9+00

2.1

479.9

26' "

T.
BM

670

475.25

Elev = 475.23

Jan 21, 1942

Dickinson
POLACK
LAING
KING
COLE

73

CROSS SECTION OF OUTLET TRENCH
 Taken after excavation of keyway complete
 (Contd from page 75)

1/16/42
 Fair - Warm

Dickinson
 Jackson 74
 Polak
 Laing
 King
 Cole

Sta	H.I.	I.S.	Elev	
	48168			
9+08		7.3	474.4	8.5' South of Axis
9+08		6.9	474.8	70' " " "
9+08		6.8	474.9	62' " " "
9+08		5.2	476.5	47' " " "
9+08		3.5	478.2	33' " " "
9+08		2.5	479.2	15' " " "
T.B.M.	6.46		475.22	

CROSS SECTION OF OUTLET TRENCH

Taken after excavation of keyway complete

11/16/42

Fair - Warm

Dickinson 75
Jackson
Polak
Laing
King
Cole

Sta + H.I. - IS Elev.

T.B.M. 483.61

5.57 489.18

9+30 6.1 483.1 85' South of Axis

9+30 3.7 485.5 70' " " "

9+30 2.1 487.1 62' " " "

9+30 3.6 485.6 47' " " "

9+30 3.6 485.6 33' " " "

9+30 2.1 487.1 15' " " "

9+145 8.2 481.0 15' " " "

9+145 8.2 481.0 33' " " "

9+145 8.8 480.4 47' " " "

9+145 9.0 480.2 62' " " "

9+145 10.1 479.1 70' " " "

9+145 11.5 477.7 85' " " "

T.P. 11.54 477.64

4.04 481.68

(continued on Page 74)

CROSS SECTION OF VALVE CHAMBER

Taken after excavation of Keyway complete.

11/13/42
Fair - Warm

Dickinson 76
Jackson
Polak
Laing
King
Cole

Sta + H.I. - 1.5 Elev.

T.B.M. 489.40

11.70 501.10

9+45 +1.5 502.6 166' South of Axis - top of dirt ^{bank}

9+45 9.1 492.0 157' " " " - toe of bank

9+45 6.5 494.6 126' " " "

9+45 6.2 494.9 120' " " "

9+35 3.5 497.6 170' " " " - top of bank

9+35 11.1 490.0 160' " " " - toe " "

9+35 12.2 488.9 145' " " "

9+35 9.2 491.9 129' " " "

9+35 9.2 491.9 120' " " "

9+25 9.3 491.8 175' " " " - top of bank

T.P. 11.78 489.32

1.39 490.71

9+25 3.6 487.1 161' " " "

9+25 7.8 482.9 154' " " " toe of bank

CROSS SECTION OF VALVE CHAMBER
Taken after excavation of keyway complete.

1/13/41
Fair-Warm

77

Sta.	+	H.I.	-	I.S. Elev				
		490.71						
9+25				7.0 483.7	138'	South of	AXIS	
9+25				4.1 486.6	120'	"	"	"
T.P.			11.83	478.88				
	248	481.36						
8+98				6.7 474.7	155'	"	"	"
8+98				9.0 472.4	120'	"	"	"
T.B.M.			6.55	474.91				

Cross section of
original ground - Elevation
for outlet pipes south of

489.40

3.31

492.71

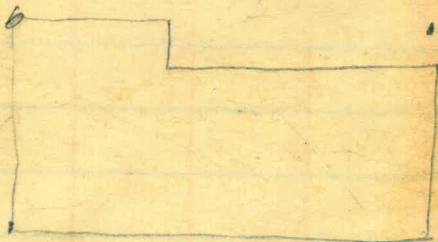
7.35

485.36

9+05-855

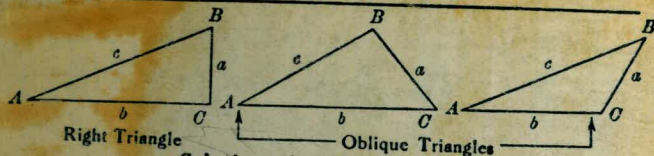
9+10-855

9+30-855



487

TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

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

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

$$B = 90^\circ - A, b = a \cot A, c = \frac{a}{\sin A}$$

A, b

B, a, c

$$B = 90^\circ - A, a = b \tan A, c = \frac{b}{\cos A}$$

A, c

B, a, b

$$B = 90^\circ - A, a = c \sin A, b = c \cos A$$

Solution of Oblique Triangles

Given

Required

A, B, a

b, c, C

$$b = \frac{a \sin B}{\sin A}, C = 180^\circ - (A + B), c = \frac{a \sin C}{\sin A}$$

A, a, b

B, c, C

$$\sin B = \frac{b \sin A}{a}, C = 180^\circ - (A + B), c = \frac{a \sin C}{\sin A}$$

a, b, C

A, B, c

$$A + B = 180^\circ - C, \tan \frac{1}{2}(A - B) = \frac{(a - b) \tan \frac{1}{2}(A + B)}{a + b}$$

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

a, b, c

A, B, C

$$s = \frac{a + b + c}{2}, \sin \frac{1}{2}A = \sqrt{\frac{(s - b)(s - c)}{bc}}$$

$$\sin \frac{1}{2}B = \sqrt{\frac{(s - a)(s - c)}{ac}}, C = 180^\circ - (A + B)$$

a, b, c

Area

$$s = \frac{a + b + c}{2}, \text{area} = \sqrt{s(s - a)(s - b)(s - c)}$$

A, b, c

Area

$$\text{area} = \frac{bc \sin A}{2}$$

A, B, C, a

Area

$$\text{area} = \frac{a^2 \sin B \sin C}{2 \sin A}$$

REDUCTION TO HORIZONTAL



Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 319.4 ft. Vert. angle = $5^\circ 10'$. From Table, Page IX, $\cos 5^\circ 10' = .9959$. Horizontal distance = $319.4 \times .9959 = 318.09$ 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. $\text{Cosine } 5^\circ 10' = .9959$. $1 - .9959 = .0041$. $319.4 \times .0041 = 1.31$. $319.4 - 1.31 = 318.09$ ft. When the rise is known, the horizontal distance is approximately $\frac{1}{2}$ 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.