

W
375



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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 $30.6 + (20 - 16) \div 2$ or 2 ft. added to $30.6 = 32.6$. For slopes of 1 on $1\frac{1}{2}$ see inside of back cover.

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375

W. H. Simpson

S. D. W. D.

98299
7562

196598
589994

491425

688093

743337038

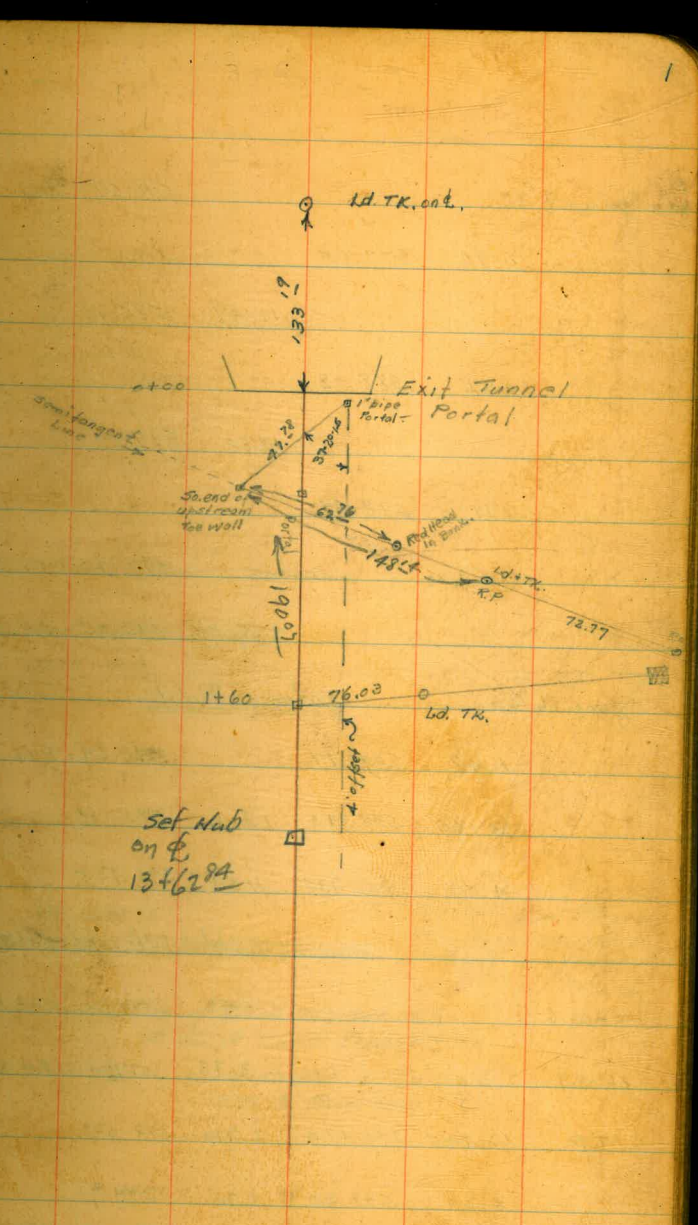
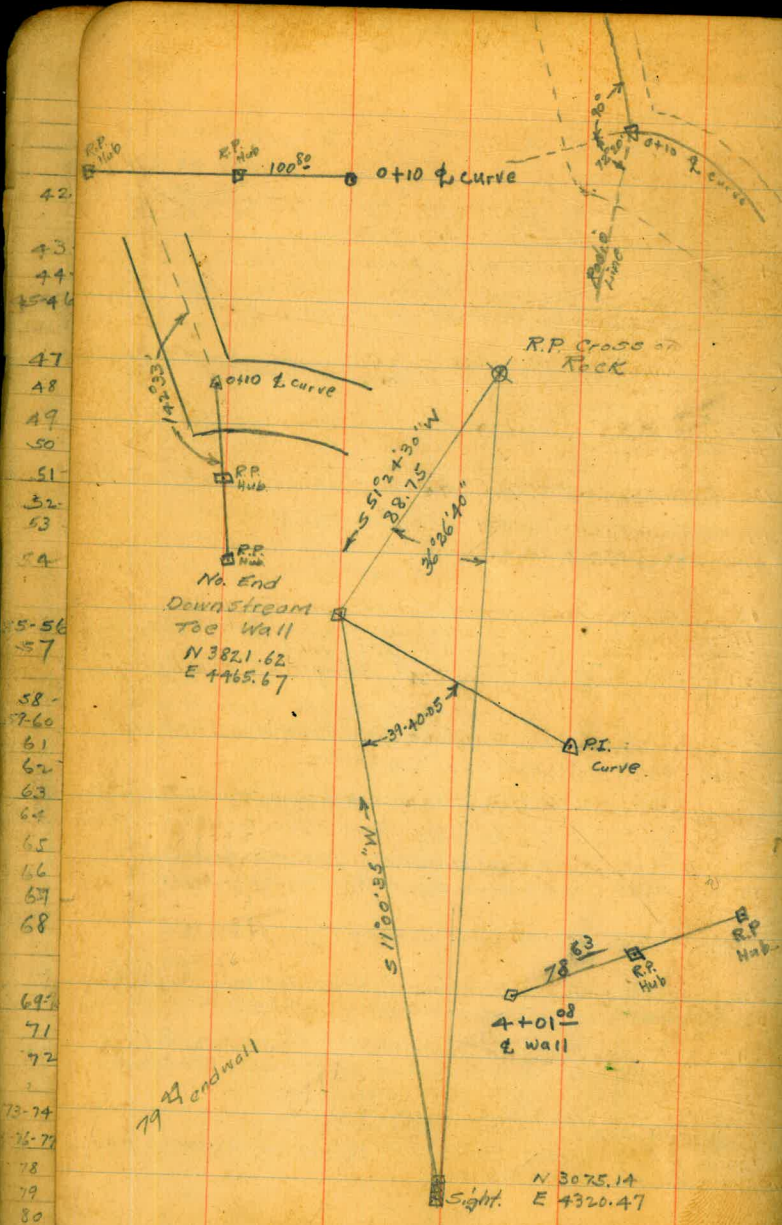
786
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1

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- 65 " " " " "
- 66 " " " " "
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June 9, '32

596.69 - B.M.

0.96 597.65

12.49 585.16

2.92 588.08

10.80 577.28

1.31 578.59

573.17 - Grade of Entrance Portal Division Tunnel

5.34 573.25 Set Spike 5' East of Portal (0-05)

5.32

June 16, '32

Entrance Portal

1.48 598.17 596.69 - B.M.

3.085 588.245 13.01 585.16

4.03 580.735 11.54 576.705

7.64 570.508 0.96 574.014 Set M. on Pipe - also on 4' offset (south)

See page 11

Set Permanent Pipe at end Portal structure, 0-50, 4' offset (south)

0-02.6 3.53 577.21 Set Red Head on South Side of first Timber Set 15' above Tunnel Grade (0-02.6)

04-08.9 3.73 577.01 Set Red Head on South Side of fourth Timber Set (at 029.56). 15' above Tunnel Grade

T.P. 12.445 590.470 2.710 578.025

8.42 598.20 0.70 589.77

1.51 596.69 - check on B.M. Et. 596.69

Tunnel Alignment And Grade

Header board
Grades.

Sta. Grade

11+60	544.35
+40	544.68
+20	545.02
+00	545.35
10+80	545.68
+60	546.02
+40	546.35
+20	546.68
10+40	547.01
+80	547.34
+60	547.68
+40	548.01
+20	548.34
+00	548.67

0-50 563.00 End Portal Structure

0+00 562.16 Entrance Portal

1+00 560.49

2+00 558.83

3+00 557.17

4+00 555.51

+20.59A 555.17 Rt. 28°04'05"

5+00 553.85

6+00 552.19

7+00 550.53

8+00 548.87

+17.15A 548.59 Rt. 21°57'21"

9+00 547.21

10+00 545.55

11+00 543.89

+72.77 542.67 Exit Portal

12+12.77 542.00 End Portal Structure

↑

S 71°59'45" W

X

+21' on offset

1667
834
47 21
48.104
2 22
50 26

N 84°56'10" W

X

X 8+16³²

N 62°58'49" W

↓

Exit Portal

Set Pipe with Hub + Tack on 4' offset,
(south) sta. 13+31.04
Elev 553.63 (By M.D.E.)

June 16 '32

2.55 559.53 556.98 T.P. Set BY M.D.E.

11+65.57

1.74 557.79 set Red Head 15' above floor grade
at first Timber set. (11+65.57)

5.64 559.27

553.63 = Pipe 13+31.04

5.11 554.16 on Pipe at Exit Portal (4' offset south)
(11+72.77)

5.04 559.20

554.16

4.93 554.27

0.93 558.27 set grade at sta 11+36⁶⁰ 15' above tunnel grade

July, 5, 1932 -

6.74 561.84

555.10 = Pipe 10+75

4.90 556.94 on pipe at sta. 9+78³³

Exit Portal.

June 22, '32

6.11 559.79 553.63

11+894

0.67 559.07 set Rod Head
in Timber, 15
"above Tunnel
Grade"

June 25, '32

0.81 564.46 563.65 = B.M.

5.11 559.59 9.98 554.48

5.97 553.62 check on
Pipe 13+310T.P. 5.555 559.725 5.92 554.17 = check on
Pipe at Exit
Portal 11+7274.620 555.105 = pipe at
Sta. 10+75

T.P. 4.63 559.265 5.090 554.635

10.00 564.765 4.500 554.765

1.105 563.660

July 15, 1932

7.60 562.70 555.10 = pipe 10+75

3.99 558.71

6.075 564.785 558.71

5.165 559.620 on pipe at
Angle point
8+16³¹

5

N 3957.56
E 8581.22L.I. & T.K.
P.P.

86.79

N. end upstream
Tee Wall N 3879.80
E 5543.35

2° 16' 35"

13+250

P.I.

Lower Axis
Signal
N 2976.54
E 5022.00

S 75° 18' E

N 4082.70
E 6006.87Large
BoulderN 3440.20
E 5543.35

56.43-0.8

N 30° 48' 09" E

83.40

N 3365.22
E 5579.87L.I. & T.K.
P.P.8499⁸⁶

July 23, 1932

East

B

West

8.05 560.05 552.00

Bottom of
Trench
Grade

Slope stakes Distr. Toe Wall

A.M.
July 5, 1932 - Downstream toe wall

B.M.	1.04	553.04		552.00		+50			
T.P.	6.14	547.70	11.48	541.56		+75			
T.P.	3.05	547.79	2.96	544.74		0+00			
	9.00	556.58	0.21	547.58					
	9.78	564.52	1.84	554.74					

0+25

c.4'
2"c.4'
10"

545.0

+50

c.5'
2"c.6'
11"

542.0

+75

c.5'
2"c.5'
12"

539.0

0+00

c.6'
2"

9'

553.0

15'

7.0'

B.M. 0.87 563.65 - check on B.M. EL. 563.65

July 21, 1932

Profile of B Downstream toe wall
shovel excavation

2.24 543.42 541.18

July 5, 1932 - P.M.

0.72 552.72 552.00

3+00

7.4 536.0 530.0

July 6, 1932 P.M.

0.53 552.53 552.00

2+50

7.7 35.7 530.5

2+25

7.5 35.9 531.0

July 7, 1932 A.M.

1.75 553.75 552.00

2+00

7.0 36.4 531.5

2.96 544.00 12.71 541.04

1+75

6.4 37.0 532.0

1+50

6.0 37.4 532.5

1+25

4.8 38.6 533.0

1+00

3.5 39.9 534.5

1.7 41.7 536.0

July, 21, 1932. 7

Profile of the Downstream Toe

Wall, location decomposed granite, coarse
gravel, etc — July 7, 1932

Staking Trenches &
Downstream toe wall
near line at elev. of excav.,
then vertical banks on trench.

4 Elev. of
excav. at present.



Bottom of Trench
Grades

Station	Dist	Elev	Notes
	0.25	600.12	599.87 = B.M.
	0.32	587.50	12.94 587.18
0-68		6.9	80.6
0-65		11.4	76.1
0-30		11.6	75.9
T.P.	0.60	575.39	12.71 574.79
0-16		4.2	71.2
T.P.	0.61	563.41	12.59 562.80
0-02		3.7	59.7
0+20		13.1	50.3
	0.56	551.10	12.87 550.54
+50		2.7	48.4
	+1.2		52.3
1+00		10.0	41.1
	8.5		42.6
	7.6		43.5

East	West	Bottom of Trench Grades
542.42		
$\frac{0.58}{20}$	$\frac{0.59}{13.3}$	536.0
$\frac{0.53}{20}$	$\frac{0.58}{13.8}$	534.5
$\frac{0.56}{22}$	$\frac{0.63}{14.3}$	533.0
$\frac{0.53}{20}$	$\frac{0.55}{14.5}$	532.5
$\frac{0.51}{20}$	$\frac{0.55}{14.2}$	532.0
$\frac{0.48}{20}$	$\frac{0.39}{14.2}$	531.5
$\frac{0.51}{20}$	$\frac{0.48}{15.0}$	531.0
$\frac{0.52}{22}$	$\frac{0.56}{15.2}$	530.5
$\frac{0.65}{20}$	$\frac{0.58}{15.3}$	530.0

Decomp. granite on
to 0-02

East, West

10.74	532.81	1.35	542.07
		0.81	552.00

Decomposed granite East of 0+50

West side of excavation app. 1+00

" " " " " 0+50

Cont on Page 8

551.10

	6.4	544.7	Decomposed granite, East Side opp. 1+50
1+50	12.6	38.5	"
	9.7	41.4	" " " " 1+50
	12.5	38.6	" " 100' West of 1+00
	9.2	41.7	Top of coarse gravel Deposit 100' West of 1+00
	8.1	43.0	" " " " " " of 1+50
	13.4	37.7	Top of decomposed granite 100' West of 1+50
	10.7	40.4	" " " " 25' East of 2+00
2+00 E	13.6	37.5	"
	12.9	38.2	" " " " 25' East of 2+75
2+50 E	15.0	36.1	
3+00 E	15.7	35.4	
	11.1	40.0	" " " " 12' East of 3+00
3+07 E	15.2	35.9	
T.P.	11.24	561.14	120
			549.90
3+42		1.0	60.1
+50		7.6	53.5
+75		8.3	52.8
4+02 ¹⁴ End Wall		7.0	54.1

July 8, 1932

Drains, Dwn. St. Tee Wall

10.79 562.79 552.00 B.M.

Drain #3

N 3760
E 4570
N 3700

E 4600 North Drain

N 3700 " "
E 4630 " "

N 3700 " "
E 4660 " "

N 3690
E 4686 East end of excavation so. side

N 3710 " " " " N. "
E 4686 " " " "

3.61 557.62 8.78 554.01 Grade

542.5

Drain #2

N 3620
E 4570 Mid. Drain

N 3620 " "
E 4600 " "

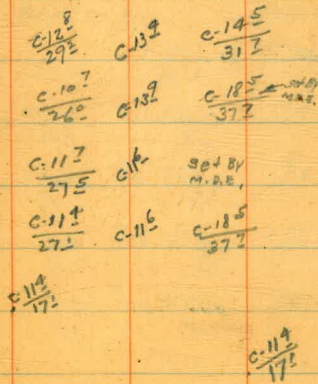
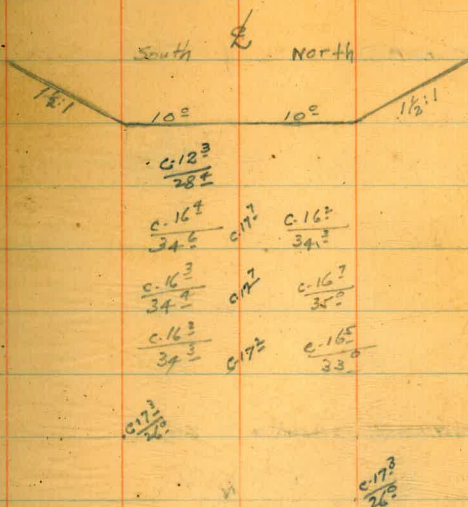
N 3620 " "
E 4630 " "

N 3620 " "
E 4660 " "

N 3610
E 4677 East end of excav. so. side

N 3630 " " " " N. "
E 4677 " " " "

cont. on Page 10



Fine Grade stakes for
Drains.

10

557.62

Drain #1 South Drain

Grade -
538.00

N 3550
E 4520 = West End cut for Drain

N 3550
E 4570

N 3550
E 4600

N 3550
E 4630

N 3550
E 4660

N 3540
E 4682 = East End of Excavation, S. side

N 3560
E 4682 = " " " " N. "

7.73 549.89 = check on T.P. 549.90

Drain #2

July 14, 1932 - cut on 10' cut pts in excav.

	0.35	552.35		552.00	B.M.
		South.	North.		
N 3620		F. 0.2	10°	C. 1.5	
E 4540		10°		10°	
N 3620		C. 0.7	10°	F. 0.2	
E 4580		10°		10°	
N 3620		C. 0.0	10°	F. 0.4	
E 4620		10°		10°	
N 3620		C. 0.12	10°	C. 0.9	
E 4660		10°		10°	

South. North

1:1 →	$\frac{C. 14.2}{24.4}$	C. 13.5	$\frac{C. 14.2}{31.2}$ ← 1/2:1
"	$\frac{C. 15.8}{25.2}$	C. 14.5	$\frac{C. 14.2}{31.2}$ "
"	$\frac{C. 16.6}{26.2}$	C. 14.7	$\frac{C. 14.2}{31.2}$ "
"	$\frac{C. 14.8}{24.2}$	C. 15.0	$\frac{C. 14.2}{31.2}$ "
	$\frac{C. 14.9}{22.2}$		$\frac{C. 15.0}{22.2}$

Profile of Drain #2 excavation
For Final Quantities

	2.68	547.12	544.44	B.M.
N 3620			8.1	539.0
E 4660				
N 3620			8.1	39.0
E 4640				
E 4620			8.2	38.9
E 4600			8.3	38.8
E 4580			8.2	38.9
E 4560			8.4	38.7
E 4540			8.2	38.9
E 4534			8.5	38.6
E 4531			10.5	36.6

cont. on next page

N3620 S
E45175

10.5

536.6

Top cong.
East edge
of Top Wall



offset B



Aug. 10, 1932

B.M. 2.74 569.21 566.47

0.25 557.17 12.29 556.92

B.M. 3.30 553.87

Set B.M. on
Large Boulder
N 35 to E
E 52.90

11.

July 11, 1932

Entrance Portal.

0.75 597.44 596.69 B.M.

1.44 585.86 13.02 584.42

B.M. = 13.00 572.86 on pipe at
0-50.

12.31 597.29 0.88 584.98

B.M. 0.59 596.70 B.M.

July 15, 1932.

5.44 578.30 572.86

B.M. 6.66 571.64 on pipe at
Sta. 1+00¹⁵

Aug. 3, '32

5.14 576.78 571.64 = B.M. 1+00¹⁵

B.M. 6.80 569.98: Set B.M. on
pipe at 2+52⁹³

Aug. 15, 1932.

4.89 574.87 569.98 = " "

B.M. 5.66 569.21 = set B.M. on
pipe at 3+60²³

Aug. 22, 1932

6.51 576.72 569.21

2.93 568.17 10.48 565.24

5.92 562.25 = check on
pipe at sta.
562.23. 6+20⁰³

Core Wall Slope stakes
Revised Grades.

12.

July 14, 1932 west $\frac{1}{2}$ east Grade

9.89 549.28 539.39

N 3580 $\frac{6.75}{61}$ 536.4

N 3790.00
E 4736.92 R.P. Hub.

July 15, 1932 -
B.M. 2.98 569.45 566.47

July 16, 1932
1.47 567.94 566.47

T.P. 1.01 563.13 5.82 562.12

set ginnie above
upstream toe wall
for stripping to
El. 550.0

E 4726.92

13.1 550.0 set stake

above core wall
for stripping

July 19, 1932
1.38 553.38 552.00 B.M.

8.8 544.6 = El. of

Area between core wall
and downstr. toe wall
that is stripped

T.P. 4.85 556.34 1.89 551.49

8.7 547.6 = El. of

Area that is stripped just
above core wall

T.P. 11.69 567.75 0.28 556.06

17.8 550.0 El. of

Area that is stripped just
below upstream toe wall

12.9 566.46 - check on
B.M. 566.47

3510

Oct. 8, 1932

11.53 563.53 552.00 P.M.

8.A.M. 1.10 568.33 567.23

T.P. 9.77 563.37 9.93 553.60
 $\frac{52.47}{10.90}$

4.30 557.90 553.60
 $\frac{52.47}{5.43}$

12.31 565.91 553.60

12.63 578.29 0.25 565.66

12.88 590.97 0.20 578.99

July 27, '32

2.47 612.94 610.47

1.09 601.93 12.60 600.34

1.31 590.03 12.71 588.72

2.82 579.81 13.04 576.99

1.67 568.55 12.93 566.88

Exit Tunnel Portal

Permanent Points.

14

July 29, '32

6.00 565.62 559.62 = B.M. pipe at \angle point

B.M.

4.64 560.98 set B.M. on pipe 7+57³⁵ set permanent pipe 7/29/32

Aug. 4, '32

6.65 566.27 559.62 = B.M. on pipe at \angle point

B.M.

5.24 561.03 = set B.M. on pipe Sta. 6+98²⁵

Aug. 12, 1932

B.M. 7.20 566.82 559.62 = B.M. on pipe at \angle point4.59 562.23 set B.M. on pipe - Sta. 6+20⁰⁰

Roof Plugs on ϕ Tunnel

Sept. 12, 1932

B.M. 4.69 574.67 569.98

B.M. 5.605 574.815 569.21

B.M. 5.795 569.020 3rd B.M. on pipe at ϕ pipe \angle 4+20⁵⁹

2.45 571.47

Sept. 16, 1932

B.M. 8.06 565.00 556.94 = Pipe on + offset 9+78³³

B.M. 5.86 559.14 on Hub on ϕ 56.9+17⁹⁰

Sept. 20, 1932

B.M. 8.12 565.06 556.94

Sept. 24, 1932

B.M. 5.87 565.01 559.14

Neat line
Roof ϕ 100

8+90⁹¹ Plug in Roof + 8.85 573.86 573.87 0⁰¹ Low

+17⁸⁷ Hub on ϕ floor

9+27⁴⁹ Plug in Roof + 8.93 573.34 573.30 0⁰³ High

8+17¹⁵ + 12.62 577.63 575.09 2⁵⁴ High

Tunnel Roof Plugs.

565.01

Neat Line
Roof End

7+60⁹³ Plug in Roof + 11.00 576.01 576.01 Grade

9/24/32 - P.M.

6.00 565.14 559.14

7+13⁷³ Plug in Roof + 11.66 576.80 576.80 Grade

Set & Hub 6+73¹³

B.M. 7.53 567.15 559.62

6+48⁰⁵ Plug in Roof + 10.74 577.89 577.89 Grade

6+10⁹⁴ Plug in Roof + 11.36 578.51 578.51 "

5+67⁷⁵ " " " + 12.08 579.23 579.23 " Set & Hub 5+73¹³

Sept. 30, 1932

B.M. 2.42 571.50 569.02 pipe + Angle point 4+20⁵⁹

5+22³⁰ Plug in Roof + 8.48 579.98 579.98 Grade

4+93⁴⁹ Plug in Roof + 9.29 580.79 580.79 "

Oct. 1, 1932

B.M. 6.73 575.75 569.02 Set & Hub 4+61¹⁵

4+20⁵⁹ Plug in Roof + 8.38 584.13 581.67 2^{1/2} High

4+07²⁴ " " " + 6.14 581.89 581.89 Grade

B.M. 4.80 574.78 569.98 - pipe on 4' offset line, Sta. 2+52⁹³

3+26⁸⁶ Plug in Roof + 8.44 583.22 583.22 grade

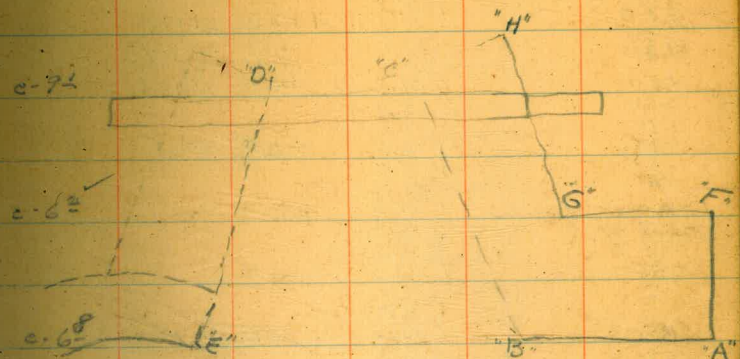
3+04⁹⁴ " + 8.81 583.59 583.59 "

2+68⁸⁴ " + 9.41 584.19 584.19 "

Portal Structure Footing
excavation cut stakes.

Sept. 27, 1932

B.M.	0.58	549.90	549.82	Grade
"A" S.W. cor. (So. side) Footing,	3.0	546.9	546.85	537.80
"B" N.W. cor. (So. side) Footing,	5.9	544.0	537.80	
"C"	4.7	545.2	537.42	
"D"	8.2	541.7	538.42	
"E"	8.2	541.7		
B.M.	0.83	550.15	549.82	
"G"	8.0	542.2	537.96	
"F"	7.7	542.5	537.96	
"H"	2.5	547.7	538.50	



Sept. 30, 1932

B.M.	7.76	548.65	540.89	= pipe sta 12+12 ⁷² and Portal structure
B.M.	7.96	540.69	set B.M.	on to pipe sta 12+22 ⁷²

Deflections for S Curve
Upstream Toe Wall

397
2052

North End Wall	
0+00	
+10	0°34.5
+20	1°08.5
+25	2°02.6
+30	1°42.7
+40	2°17.0
+50	2°51.2
+60	3°25.4
+70	3°59.7
+75	4°16.8
+80	4°33.7
+90	5°08.2
1+00	5°42.4
+10	6°16.6
+20	6°50.8
+25	7°08.0
+30	7°25.1
+40	7°59.4
+50	8°33.6
+60	9°07.8
+70	9°42.1
+75	9°59.2
+80	10°16.3
+90	10°50.6
2+00	11°24.8
+10	11°59.0
+20	12°33.3
+25	12°50.4
+30	13°07.5
+40	13°41.8
+50	14°16.0
+60	14°50.2
+70	15°24.5
+75	15°41.6
+80	15°58.7
+90	16°33.0
3+00	17°07.2
+10	17°41.4
+20	18°15.7
+25	18°32.8
+30	18°49.9
+40	19°24.2
+50	19°58.4
+60	20°32.6
+70	21°06.9
+75	21°24.0
+80	21°41.1
+90	22°15.4
4+00	22°49.6
+10	23°23.8
+20	23°58.0

4+15 = 23°41.0
+16 23°44.3
4+25 24°15.2
+30 24°32.3
+40 25°06.5
+50 25°40.8

+55 = 25°58' South end wall

Defl. 1' = 3.424'

20.74

Deflections for S Curve
Downstream Toe Wall

18

North end Wall	
0-25	
+25	1°46.9
+50	3°33.8
+75	5°20.7
1+00	7°07.6
+25	8°54.5
+50	10°41.4
+75	12°28.3
2+00	14°15.2
+25	16°02.1
+50	17°49.0
+75	19°35.9
3+00	21°22.8
+25	23°09.7
+50	24°56.6
+75	26°43.5
4+00	28°30.4
+02.4	28°39'21.7" South End Wall
+57.4	32°34.7

Defl. 1' = 4.276'

+10 = 0°41.8
0+20 = 1°25.5

+30 = 2°08.3
+40 = 2°51.0

+60 = 2°46.5
+70 = 4°29.3

+80 = 5°42.0
+90 = 6°24.8

1+10 = 7°50.4
1+20 = 8°33.1

1+30 = 9°15.9
1+40 = 9°58.6

+60 = 11°24.2
+70 = 12°06.9

+80 = 12°49.7
+90 = 13°32.4

2+10 = 14°58.0
+20 = 15°40.7

+30 = 16°23.5
+40 = 17°06.2

+60 = 18°31.8
+70 = 19°14.5

+80 = 19°57.3
+90 = 20°40.0

3+10 = 22°05.6
+20 = 22°48.3

+30 = 23°31.1
+40 = 24°13.8

+60 = 25°39.4
+70 = 26°22.1

+80 = 27°04.9
+90 = 27°47.6

+95 = 28°09.0

5
4 27.6
33.0
38.5
11.0
220
235.180
3°55.2
2839.5
3234.7
3232.7
1969
34-216

July 1, 1932
 Core Wall Slope stakes
 50 Down str. 100 upstream

Sept. 30, 1932

Station	1.06	563.80	562.74	Grade	-5.88	567.99	573.87	Roof Plug 8790.49
N 3660		$\frac{0.22^\circ}{84^\circ}$	$\frac{0.28^\circ}{143^\circ}$	532.0	7+27	9.1	58.9	Floor Grade 546.76 Height instrument +16.2 62.9
N 3700		$\frac{0.22^\circ}{84^\circ}$	$\frac{0.25^\circ}{139^\circ}$	530.0	7+32	5.6	62.4	546.68 +3.2 65.8
N 3740		$\frac{0.25^\circ}{82^\circ}$	$\frac{0.15^\circ}{123^\circ}$	538.0	+37	4.4	63.6	546.60 -0.9
N 3780			$\frac{0.6^\circ}{107^\circ}$	547.50	+42	4.0	64.0	546.52 -1.2
N 3820			$\frac{0.0^\circ}{100^\circ}$	559.50	+47	3.6	64.4	546.44 -1.2

July 14, 1932 West Revised Grades East

Station	3.07	565.81	562.74	Grades
	5.29	558.64	12.46	553.35
N 3500		$\frac{1.09}{557.55}$ +33	$\frac{0.17^\circ}{126.7}$	526.00
N 3540		561.88	$\frac{0.21^\circ}{131.6}$	536.20
N 3580			$\frac{0.18^\circ}{127.0}$	536.40
N 3620			$\frac{0.16^\circ}{124.0}$	536.60
N 3660		$\frac{0.15^\circ}{79.4}$	$\frac{0.21^\circ}{32.0}$	526.80
N 3700		$\frac{0.17^\circ}{75.5}$	$\frac{0.18^\circ}{127.0}$	537.00
N 3740	N 3730 →	$\frac{0.17^\circ}{76.6}$	$\frac{0.16^\circ}{124.3}$	537.20
N 3780			$\frac{0.18^\circ}{127.0}$	537.40
N 3800			$\frac{0.17^\circ}{25.0}$	537.5

Profile, Excavation upstream
Toe-wall E.

20

July 2, 1932

	0.11	566.58		566.47
	0.09	553.76	12.91	553.67
0+50			2.2	
1+00			5.6	
+50			7.7	
T.P.	3.41	544.11	13.06	540.70
2+00			5.6	
+50			6.9	
3+00			7.2	
+50			6.7	
			1.4	
+1.0				

= Decomp.

Granite on west side of excavation app. 3+00

" at so. end of "

Slope stakes, upstr. Toe Wall
per Revised Grades 7/5/32

July 5, 1932

Station	Grade	Grade	Grade	Grade	Grade	Grade
	0.95	566.92	566.47	2+50	544.91	532.0
+155	$\frac{0.173}{25.9}$	$\frac{0.41}{17.9}$	563.33	+75	544.91	532.0
+25	$\frac{0.116}{22.8}$	$\frac{0.60}{22.2}$	553.33	3+00	544.91	532.0
4+00	$\frac{0.203}{27.2}$	$\frac{0.106}{27.2}$	545.00	+25	544.91	532.0
+50			538.50	+50	544.91	532.0

July 6, 1932 -

Station	Grade	Grade	Grade	Grade	Grade	Grade
	0.66	567.13	566.47	4+00		
	0.56	554.71	12.98	554.15		
	2.87	544.91	12.67	542.04		
	9.37	551.40	2.88	542.03		
0+50	4.36	554.53	1.23	550.17	547.0	547.0
+75	0.35	0.38	544.7		554.53	553.66
1+00	0.54	0.56	542.7	12.89	566.55	
+25	0.68	0.65	540.5		0.11	566.44
+50	0.81	0.76	538.3			
+75	0.81	0.57	536.2			
2+00	0.81	0.47	534.0			
+25	0.69	0.51	533.0			

Grades as
shown by
M.D.E. for
5' above
grade as
shown on
profile

⊕

Slope stakes, Stripping area
above Downstream toe wall.

22

July, 15, 1932

9.91 561.91 552.00

N 3730	1.9	560.0	C-14 ² 21 ⁰
N 3670	5.1	556.8	C-10 ³ 16 ²
N 3640	10.5	551.4	C-5 ⁴ 8 ¹
N 3610	10.4	551.5	C-5 ⁵ 8 ²
N 3580	9.6	552.3	C-6 ³ 9 ¹
N 3550	9.8	552.1	C-6 ¹ 9 ¹
N 3520	6.1	555.8	C-9 ⁸ 14 ³

E 4730 92.4

Profile of Drains #1, 2, 3, also elevs.
of Toe wall excav's, and Trench west
side of Toe Wall Excav.

23

July 20, 1932

0.96 552.96 552.00 = B.M.

T.P. 4.53 547.81 9.68 543.28

Drain #3

8.8 39.0 = Aver.

Ground El. in toe wall excav. west of Drain #3

13.5 34.3 = Bottom

of Trench west side of toe wall excav.

N 3700
E 4529

8.6 39.2

N 3700
E 4535

5.5 42.3

N 3700
E 4540

5.2 42.6

N 3700
E 4580

5.8 42.0

N 3700
E 4620

6.2 41.6

N 3700
E 4658

5.8 42.0

N 3700
E 4660

5.2 42.6

N 3700
E 4667

0.0 47.8 = top of

1/2:1 slope at East end of Drain #3

Drain #2

14.1 38.7 = Bottom

of Trench west side of Toe Wall excav. opp. Drain #2

10.4 37.4 = Aver.

Ground El. in toe wall excav. west of Drain #2

N 3626
E 4540

8.7 39.1

547.81

N 3620
E 4580

8.0 39.8

N 3620
E 4620

8.2 39.6

N 3620
E 4657

8.3 39.5

N 3620
E 4666

2.5 45.3

Drain #1

14.2 533.6 : Bottom

12.1 535.7 : Aver.

N 3550
E 4540

10.2 37.6

N 3550
E 4580

10.2 37.6

N 3550
E 4620

10.1 37.7

N 3550
E 4650

9.8 38.0

N 3550
E 4660

2.6 45.2

N 3550
E 4662

2.1 45.7

T.P.

7.20

552.99

2.02

545.79

1.00

551.99

: check

on B.M. E 1552.00

$$\begin{array}{r} 566.69 \\ 0.90 \\ \hline 565.79 \\ 973 \end{array}$$

$$\begin{array}{r} 564.64 \\ 78.96 \\ \hline 566.60 \\ 8.77 \\ 2.96 \end{array}$$

24

* Top of 1/2:1 slope at east end of Drain #2

* Trench, west side of toe wall excav., opp. Drain #1

ground elev. in toe wall excav. opp. Drain #1

$$\begin{array}{r} 1687 \\ 28 \\ \hline 195 \end{array}$$

28

560.24

$$\begin{array}{r} 75.37 \\ 566.60 \\ \hline 8.77 \end{array}$$

$$\begin{array}{r} 1250 \\ 292 \\ \hline 1542 \end{array}$$

16.5

1666

990

990

990

165

2748 90

9.03

Neat Line stakes for Trench
at upstream toe wall
(see page 7 sketch showing method
of staking)

July 25, 1932

Bottom of
Trench
grades.

	0.50	566.97		566.47	
	0.25	554.56	12.76	534.21	
B.M.	2.58	544.62	12.52	542.04	
		East	\$	West	
0+50		$\frac{0.45}{9.2}$		$\frac{0.32}{2.0}$	547.00
+75		$\frac{0.45}{10.8}$		$\frac{0.41}{2.0}$	544.67
1+00		$\frac{0.42}{11.2}$		$\frac{0.55}{2.0}$	542.33
+25		$\frac{0.52}{12.0}$		$\frac{0.37}{2.0}$	540.00
+50		$\frac{0.65}{12.2}$		$\frac{0.24}{2.0}$	537.67
+75		$\frac{0.52}{13.0}$		$\frac{0.40}{2.0}$	535.33
2+00		$\frac{0.87}{14.2}$		$\frac{0.54}{2.0}$	533.00
+25		$\frac{0.67}{14.2}$		$\frac{0.56}{2.0}$	532.50
+50		$\frac{0.44}{14.2}$		$\frac{0.58}{2.0}$	12.6 X 532.00
+75		$\frac{0.42}{14.2}$		$\frac{0.25}{2.0}$	532.00
3+00		$\frac{0.60}{14.2}$		$\frac{0.29}{2.0}$	532.00
+25		$\frac{0.69}{14.2}$		$\frac{0.51}{2.0}$	532.00
+50		$\frac{0.68}{14.2}$		$\frac{0.40}{2.0}$	532.00
+60		$\frac{0.69}{14.2}$		$\frac{0.43}{2.0}$	532.00

Set B.M. on
Large Boulder
west side of
upstream toe
wall extn.
+000 C. 200
Corner 24
Aug. 1 '32

Neat Line stakes for Trench
at upstream Toe Wall, as
Revised Grades

25

Aug. 3, 1932.

	1.03	567.50		566.47	
	0.15	554.89	12.76	554.74	
	1.04	545.98	7.95	549.94	
			3.95	542.03	check on B.M.
					544.50
					542.17
					539.83
					537.50
					535.17
					532.83
					530.50
					530.00
					529.150
					529.50

Aug. 4, '32

2.50 568.97 566.47

B.M.

0.16

558.94 = Ht. for final

X section C, N. side
of Bottom of core
wall and upstr. toe wall

10.19 558.78

Set B.M. on

Large Boulder
125' west of
upstr. toe wall
N. side

July 30, 1932. Puddle Core Excavation slope stakes.

B.M.	472	544.11	539.39	Trench Grades by No.
N 3500				526.0
3540				527.2
3580				528.4
3620				529.6
3660				530.8
3680				531.4
3700				534.7
3720				538.0

Aug. 1, 32

472 539.39

B.M. 1162 551.01

3740				537.5
3760				541.0

1:1	Down	Axis	Up	1:1
	23°		13°	
C-7 ⁶				C-10 ⁷
30 ⁶				23 ⁷
C-8 ⁵				C-10 ⁶
31 ⁵				23 ⁶
C-8 ⁶				C-10 ⁷
31 ⁵				23 ⁷
C-9 ⁴				C-9 ⁵
32 ⁴				22 ⁵
C-11 ¹				C-8 ⁸
34 ¹				21 ⁸
C-13 ¹				C-10 ⁶
36 ¹				23 ⁶
C-12 ²				C-10 ⁷
35 ²				23 ⁷
C-12 ¹				C-9 ³
35 ¹				22 ³

Aug. 13, 1932

upstream toe wall stakes
for forms steps in wall

42.04

29

B.M.	1.60	553.19	551.59	Grades for steps in concrete	Grades for Calc. neat lines	Downstream	up stream
0 + 50			up. 5.27 Dn. 4.24	547.92 48.95	552.0	F.3 ⁰⁵	F.4 ⁰⁸ out 9 ⁶⁷
0 + 50			up. Dn. same		549.0	F.0 ⁰⁵	F.1 ⁰⁸ out 9 ⁶⁷
+ 60			up. 5.12 Dn. 5.80	48.07 47.39	549.0	F.1 ⁶¹	F.0 ⁹³ " 9 ⁹⁸
+ 70			up. 5.85 Dn. 5.84	47.34 47.35	549.0	F.1 ⁶⁵	F.1 ⁶⁶ " 10 ²⁹
+ 80			up. 4.94 Dn. 6.34	48.25 46.85	549.0	F.2 ¹⁵	F.0 ⁷⁵ " 10 ⁶⁰
+ 90			up. 6.32 Dn. 6.56	46.87 46.63	549.0	F.2 ²¹	F.2 ¹³ " 10 ⁷¹
1 + 00 Aug. 8, 1932.			up. 7.29 Dn. 7.52	45.90 45.67	549.0	F.3 ³³	F.3 ¹⁰ " 11 ²²

B.M.	5.31	547.35	542.04			Downstream	up stream
1 + 10				549.0	546.40	F.3 ⁷⁰	F.3 ⁶⁰ out 11 ⁵³
+ 20				549.0	545.47	F.4 ²⁰	F.3 ⁵⁰ " 11 ⁸⁴
+ 20				546.0	545.47	F.1 ⁴⁰	F.0 ⁵⁰ " 11 ⁸⁴
+ 30				546.0	544.54	F.1 ⁵⁰	F.0 ⁴⁰ " 12 ¹⁵
+ 40				546.0	543.61	F.2 ²⁰	F.1 ⁵ " 12 ⁴⁶
+ 50				546.0	542.68	F.2 ⁵⁰	F.1 ⁸⁰ " 12 ⁷⁷
+ 60				546.0	541.75	F.3 ⁵⁰	F.2 ⁴ " 13 ⁰⁸
+ 70				546.0	540.82	F.3 ⁴⁰	F.3 ⁰⁰ " 13 ³⁹
+ 70				543.0	540.82	F.0 ⁴⁰	F.0 ⁰⁰ " 13 ³⁹
+ 80				543.0	539.89	F.1 ⁸⁰	

cont. on next page

upstream toe wall stakes for
Forms, steps in wall

Aug. 9, 1932		Red Reading.	Grades for Steps.	Grades for Calc. West Lines		Downstream out 2'	upstream
B.M.	0.50	542.54	542.04				
		Up. 0.84	541.70				
1+90		Dn. 2.18	540.36	543.0	538.93	F-2 ⁶⁴	F-1 ³⁰ out 14 ⁰³
		up. 1.58	540.96				
2+00		Dn. 2.44	540.10	543.0	538.00	F-2 ⁹⁰	F-2 ⁰⁴ " 14 ³³
		up. 1.63	540.91				
+10		Dn. 3.05	539.49	543.0		F-3 ⁵¹	F-2 ⁰⁹ " 14 ⁴⁰
		up. 2.32	540.22				
+20 North		Dn. 3.83	538.71	543.0		North. F-4 ²⁹	F-2 ⁷⁸ 14 ⁴⁷
		up. 2.32	540.22				
+20 South		Dn. 3.83	538.71	540.0		South. F-1 ²⁹	C-0 ⁵² " 14 ⁴⁷
		up. 3.67	538.87				
+30		Dn. 4.81	537.73	540.0		F-2 ⁵³	F-1 ¹² " 14 ⁵³
		up. 4.31	538.23				
+40		Dn. 4.98	537.56	540.0		F-2 ⁴⁴	F-1 ⁷⁷ " 14 ⁶⁰
		up. 5.17	537.37				
+50		Dn. 4.53	538.01	540.0	537.0	F-1 ⁹⁹	F-2 ⁶³ " 14 ⁶⁷
Aug. 12, 1932							
B.M.	0.58	542.62	542.04				
		up. 4.95	537.67				
2+60		Dn. 5.19	37.43	540.0	537.0	F-2 ⁵⁷	F-2 ³³ " 14 ⁶⁷
		up. 4.92	37.70				
+70		Dn. 5.03	37.59	540.0	537.0	F-2 ⁴¹	F-2 ³⁰ " 14 ⁶⁷
		up. 5.26	37.36				
+80		Dn. 5.28	37.34	540.0	537.0	F-2 ⁶⁶	F-2 ⁶⁴ " 14 ⁶⁷
		up. 4.96	37.66				
+90		Dn. 5.29	37.33	540.0	537.0	F-2 ⁶⁷	F-2 ³⁴ " 14 ⁶⁷
		Dn. 5.19	37.43				
3+00		Dn. 5.52	37.10	540.0	537.0	F-2 ⁹⁰	F-2 ⁵⁷ " 14 ⁶⁷
		up. 5.18	37.44				
+10		Dn. 5.86	36.76	540.0	537.0	F-3 ²⁴	F-2 ⁵⁶ " 14 ⁶⁷
		up. 5.85	36.77				
+20		Dn. 6.05	36.57	540.0	537.0	F-3 ⁴³	F-3 ²³ " 14 ⁶⁷

Aug. 15, 1932

upstream toe wall, stakes for forms, steps in wall

31

B.M.	0.79	542.83	542.04	Grades For steps in concrete	Grades For Calc. neat Line Widths	Downstream	↑	upstream
			up. 5.67	37.16				
3+30			Dn. 4.26	38.57	540.0	537.0	F.1 ⁸³	F.2 ⁸⁴ out 14 ⁶⁷
+40			up. 5.00	37.83				
			Dn. 5.15	37.68	540.0	537.0	F.2 ³²	F.2 ¹⁷ " 14 ⁶⁷
+50			up. 4.69	38.14				
			Dn. 5.14	37.69	540.0	537.0	F.2 ³¹	F.1 ⁸⁶ " 14 ⁶⁷
+60			up. 4.72	38.11				
			Dn. 5.01	37.82	540.0	537.0	F.2 ¹⁸	F.1 ⁸⁹ " 14 ⁶⁷
+70			up. 3.38	39.45				
			Dn. 4.65	38.18	540.0	537.4	F.1 ⁸²	F.0 ⁵⁵ " 13 ⁸⁷

Aug. 17, 1932

B.M.	4.69	546.73	542.04					
			up. 4.59	42.14				
3+80			Dn. 5.96	40.77				
+90			up. 3.26	43.47				
			Dn. 4.92	41.81				
4+00			up. 2.28	44.45				
			Dn. 3.34	43.37				
+10			up					
			Dn. 1.78	44.25				

Fills To Elev. 545 For FORMS.

F.4 ²³	F.2 ⁸⁶ out 12 ⁹⁵
F.3 ¹⁹	F.1 ⁵³ out 12 ⁵¹
F.1 ⁶¹	F.0 ⁵⁵ out 12 ¹⁸
F.0 ⁰⁵	

Aug. 19, 1931

	7.96	550.00	542.04		
			upstr. 4.81	545.19	
4+00			Dnstr.		out 11 ⁹⁴
			upstr. 4.96	545.04	
3+90			Dnstr.		" 11 ⁹⁹
			upstr. 4.98	545.02	
+80			Dnstr.		" 11 ⁹⁹
			upstr. 5.04	44.96	
+70			Dnstr.		" 12 ⁰¹
			upstr. 5.00	545.00	
+60			Dnstr.		" 12 ⁰⁰
			upstr. 5.03	544.97	
+50					" 12 ⁰¹

Elevs. of Top of Trench, both sides
at upstream Toe wall.

32

Aug. 10, 1932

B.M.	10.25	552.29	542.04
0+75 East		2.7	549.6
0+75 west		3.7	48.6
1+00 East		4.5	47.8
1+00 west		4.1	48.2
+25 East		6.9	45.4
+25 west		7.4	44.9
+50 East		7.4	44.9
+50 west		9.3	43.0
+75 East		9.3	43.0
+75 west		10.6	41.7
2+00 East		10.8	41.5
2+00 west		12.4	39.9
+25 East		12.2	40.1
+25 west		14.1	38.2
T.P.	0.51	542.55	10.25 542.04
+50 East		4.1	38.5
+50 west		4.9	37.7

542.55

2+75 East	4.0	538.6
+75 west	5.7	36.9

Aug. 15, 1932

	11.66	553.70	542.04
3+76			
+78			
+85			
+87			
4+00			
+05			
+10			
+16			
up. 9.6		44.1	
DN. 8.9		44.8	
up. 8.7		45.0	
DN. 7.3		46.4	
up. 7.6		46.1	
DN. 4.9		48.8	
up. 7.0		46.7	
DN. 3.8		49.9	
up. 5.1		48.6	
DN. 0.2		53.5	
up. 4.6		49.1	
DN. 0.0		53.7	
up. 3.7		50.0	
DN. +1.9		55.6	
up. 2.4		51.3	
DN. +1.9		55.6	

Elevs. of Top of Trench at
Downstream Toe wall

33

Aug. 10, 1922

547.57

B.M.	B.13	547.57	544.44	2+75 East	11.7	535.9
0+75	East side	3.4	44.2	2+75 West	11.9	35.7
0+75	West	3.4	44.2	3+00 East	10.8	36.8
1+00	East	6.0	41.6	3+00 West	11.8	35.8
1+00	West	5.5	42.1			
+25	East	7.6	40.0			
+25	West	7.2	40.4			
+50	East	9.2	38.4			
+50	West	8.5	39.1			
+75	East	9.7	37.9			
+75	West	9.3	38.3			
2+00	East	10.4	37.2			
2+00	West	9.8	37.8			
+25	East	11.2	36.4			
+25	West	9.9	37.7			
+50	East	11.7	35.9			
+50	West	11.4	36.2			

Profile of E. upstream Toe
Wall, in Trench excavation

Aug. 10, 1932

	8.02	550.06	542.04
3+50		18.2	531.8
+75		15.3	34.8
+89		13.6	36.5
4+00		7.1	43.0
	12.36	562.17	0.25 549.81
+12		8.6	53.6
+25		4.9	57.3
+48		0.0	62.2
+55 ² End Wall		+4.8	67.0
+62		+5.0	67.2
+70		+8.8	71.0
+76		+12.8	575.0

Profile of E. upstream Toe Wall
in Trench excavation, also Top of
Trench, for final quantities.

34

Aug. 11, 1932

	0.40	542.44	542.04
2+75	⊥	12.6	29.8
"	Dn. str. Top.	5.2	37.2
"	upstr. Top.	4.0	38.4
3+00	⊥	12.7	29.7
"	Dn. str. Top.	5.1	37.3
"	upstr. Top.	4.2	38.2
3+25	⊥	12.8	29.6
"	Dn. str. Top.	5.0	37.4
"	upstr. Top.	4.1	38.3
	0.40	542.04	B.M.
Aug. 13, 1932			
	0.41	542.53	
3+27 ⁷	up. 4.2	538.3	
	Dn. 4.3	38.2	
+30	up. 4.1	38.3	
	Dn. 4.2	38.3	
+40	up. 3.9	38.6	
	Dn. 4.2	38.3	
+50	up. 3.7	38.8	
	Dn. 3.3	39.2	
+60	up. 3.6	38.9	
	Dn. 3.3	39.2	
+70	up. 2.6	39.9	
	Dn. 1.0	41.5	
+73	up. 2.2	40.3	
	0.0.7	41.8	

See Page 32
for continuation
of these notes

Neat line stakes at South end
of upstream Toe Wall (For Trench)

Aug. 10, 1932

4

B. M.			Rod Reading	542.04	Grades for Neat Line Widths.	Grades for Bottom of Trench	upstream	Down stream
3 + 50			up: 8.8 Dn: 12.7	536.8 532.9	537.0	529.5	c-7 ³ 14 ⁶⁷	c-3 ¹ 2 ⁰ c-3 ² 3/12/32
+ 75			up: 10.2 Dn: 9.5	535.4 536.1	540.0	532.25	c-3 ² 13 ⁶⁷	c-3 ⁹ 2 ⁰ c-2 ⁰ 8/12/32
4 + 00			up: 2.8 Dn: 0.4	542.8 545.2	543.0	538.0	c-7 ⁸ 12 ⁶⁷	c-10 ² 2 ⁰ c-7 ² 8/12/32
T.P.	12.14	557.57	0.20	545.43				
	1.79	556.80	2.56	555.01				
4 + 15	North		up: 7.4 Dn: 1.5	547.4 555.3	552.0	540.0 X	c-9 ⁴ 9 ⁶⁷	c-15 ³ 2 ⁰
+ 15	South		up: 7.4 Dn: 1.5	547.4 555.3	552.0	547.0 X	c-2 ⁴ 9 ⁶⁷	c-8 ³ 2 ⁰
+ 25		12.05	567.06 578.0	1.79 556.4 557.7	555.01 555.33	549.90	c-6 ⁵ 8 ⁶⁷	c-7 ⁸ 2 ⁰
+ 30					557.0	551.35	8 ⁰⁰	
+ 40					560.0	554.75	9 ⁰⁰	
+ 50			up: 5.0 Dn: 0.4	562.1 566.7	562.5	557.0 X	c-5 ¹ 6 ¹⁷	c-9 ⁷ 2 ⁰
+ 60					565.0	561.0	3 ³³	
+ 75			up: + 8.1 Dn: + 10.2	575.2 579.3	567.0	567.0 X	c-8 ¹ 4 ⁶⁷	c-10 ³ 2 ⁰

567.00

Shovel Excavation slope
stakes, at south end of
Downstream Toe Wall

Aug. 11, 1932

	12.17	575.82		563.65	
	2.69	565.67	12.84	562.98	Shovel on Grades.
3+00	1:1	c-168 33°			535.5
3+25	1:1	c-24 41°			537.1
+50	1/2:1	c-32 33°			538.7
+75	1/2:1	c-33 33°			540.4

36

Aug. 22, 1932

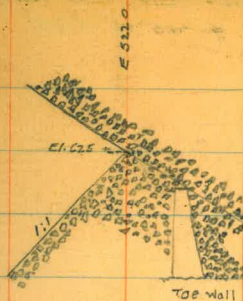
B.M.	0.81	564.96			563.65
	3.32	555.06	12.72		551.74
B.M.	2.60	552.58	5.08		549.98
B.M.			3.97		548.61
	1.745	547.510	6.815		545.765

on Large Boulder
60' ± s.E. of N. end
Down. Str. Toe Wall

Toe of Rock Fill above
Core Wall

Aug. 11, 1932.

	0.20	558.98		558.78
E 5151.3				
N 3840	Toe Rock		2.7	556.3
E 5148.1	"			
N 3800			5.9	553.1
E 5144.3	"			
N 3760			9.7	549.3
E 5144.2	"			
N 3680			9.8	549.2
E 5144.8	"			
N 3620			9.2	549.8
E 5144.2	"			
N 3560			9.8	549.2
E 5143.0	"			
N 3500			11.0	548.0
	9.84	568.62	0.20	558.78
	12.90	581.27	0.25	563.37
E 5175.5				
N 3880	Toe Rock		0.8	580.5



Downstream Toe Wall stakes
for forms of steps.

Aug. 11, 1932

B.M.	0.56	545.00	Rod Reading	544.44	Grades for steps	Grades for Calc. Head knees	upstream out 2'	Downstream
			up. 4.70	540.30				
+05			Dn. 3.79	541.21	543.0	540.70	F-2 ⁷⁰	F-1 ⁷¹ out 13 ⁷³
			up. 4.78	540.22				
+10			Dn. 4.40	540.60	543.0	540.40	F-2 ⁷¹	F-2 ⁷⁰ " 13 ⁵³
			up. 4.90	540.10				
+20			Dn. 4.32	540.68	543.0	539.80	F-2 ⁹⁰	F-2 ³² " 13 ⁷³
			up. 5.65	539.35				
+30			Dn. 4.52	540.48	543.0	537.20	F-3 ⁶⁵	F-2 ⁵² " 13 ⁹³
			up. 6.29	538.71				
+40			Dn. 5.47	539.53	543.0	539.20	F-4 ⁴⁹	F-3 ⁴⁷ " 14 ¹³
+40			up. Same	same	540.0	538.60	F-1 ²⁹	" Step. 14 ¹³
			Dn. Same	same	540.0	538.60	F-1 ²⁹	" 14 ¹³
+50			up. 6.34	538.66				
			Dn. 5.72	539.18	540.0	538.00	F-1 ³⁴	F-0 ⁷² " 14 ³³

Aug. 12, 1932.

	0.28	544.72	0.56	544.44				
+60			up. 6.75	37.77				
			Dn. 6.08	38.64	540.0	537.80	F-2 ⁸³	F-1 ³⁶ " 14 ⁴⁰
+70			up. 7.11	37.61				
			Dn. 6.28	38.44	540.0	537.60	F-2 ³⁹	F-1 ⁵⁶ " 14 ⁴⁶

Downstream Toe Wall Form
Stakes, cont.

Aug. 12 1932	544.72	Rod Reading	grades for steps	Crossed for Calc. Next lines	upstream out 2'	±	Downstream
1+80		up. 7.30 Dn. 6.93	537.92 37.79	540.0	537.90	F. 2 ⁵⁸	F. 2 ²¹ out. 14 ⁵³
1+90		up. 7.56 Dn. 6.77	37.16 37.95	540.0	537.20	F. 2 ⁸⁴	F. 2 ²⁵ " 14 ⁶⁰
1+00		up. 7.71 Dn. 6.88	37.01 37.84	540.0	537.00	F. 2 ⁹⁹	F. 2 ¹⁶ " 14 ⁶⁷
+10		up. 7.92 Dn. 7.19	36.80 37.53	540.0	536.80	F. 3 ²⁰	F. 2 ⁴⁷ " 14 ⁷³
+20		up. 8.35 Dn. 7.32	36.37 37.40	540.0	536.60	F. 3 ⁶³	F. 2 ⁶⁰ " 14 ⁸⁰
+30		up. 8.47 Dn. 7.80	36.25 36.92	540.0	536.40	F. 3 ⁷⁵	F. 3 ⁰⁸ " 14 ⁸⁶
+40		up. 9.00 Dn. 8.53	35.72 36.17	540.0	536.20	F. 4 ²⁸	F. 3 ²¹ " 14 ⁹³
+40	↑ step	up. same Dn. same	same	537.0	536.20	F. 1 ²⁸	F. 0 ⁸¹ " 14 ⁹³
+50		up. 9.44 Dn. 8.82	35.28 35.90	537.0	536.00	F. 1 ⁷²	F. 1 ¹⁰ " 15 ⁰⁰
+60		up. 9.11 Dn. 8.82	35.61 35.89	537.0	535.80	F. 1 ³⁹	F. 1 ¹¹ " 15 ⁰⁷
+70		up. 8.84 Dn. 8.69	35.88 36.03	537.0	535.60	F. 1 ¹²	F. 0 ⁹⁷ " 15 ¹³
+80		up. 9.17 Dn. 8.96	35.55 35.76	537.0	535.40	F. 1 ⁴⁵	F. 1 ²⁴ " 15 ¹⁹
+90		up. 8.89 Dn. 9.20	35.83 35.52	537.0	535.20	F. 1 ¹²	F. 1 ⁴⁸ " 15 ²⁶
3+00		up. Dn.		537.0	535.00		" 15 ³³

Downstream Toe wall
Form points.

40

Aug. 27, 1932

B.M. 2.13 547.90 545.77

5.00 542.90
+ 4.71 = Height next lift
547.61 = El. for Calc

Next line on section from Sta. 1+40 to 2+00
Set next line points 11¹³ out

4.94 542.96 = El. for Calc
+ 4.71
547.67 = El. for Calc

Next line on section from Sta. 1+00 to 1+20 out 12⁶¹

Next line on next lift " " " " out 11¹¹

Aug. 28, 1932

3.46 553.44 549.98

7.46 545.98 = El. for Calc

Next line on section from Sta. 0+60 to 0+90; out 11⁶⁷

3.54 552.52 3.46 549.98

4.51 549.01 = El. for Calc

Next line on section from Sta. 0+30 to 0+60; out 10⁶⁷

Aug. 31, 1932

5.13 555.11 549.98

Sept. 1st, 1932

2.60 552.51 = El. for Calc

Next line on section from Sta. 1+10 to 2+00; out 9⁵⁰ (Next Lift)

B.M. 3.75 552.73 549.98

Top Form Paired Concrete =

2.00 547.73
+ 4.70
552.43 = El. for Calc

Next line on section from Sta. 0+60 to 1+10; out 9⁵² (Next Lift)

Neat line stakes for Trench
Excavation at North end
of upstream toe wall

Aug. 13, 1922

B.M. 11.98 553.97 542.04
7.98 559.57 2.38 551.59

Grades for
Calc. Neat
lines

Downstream $\frac{1}{2}$ upstream
out 2'

0+25	up +12.2	571.8	560.0	560.0	c.0'	c.11'	out 7'00
0+25	Dn		555.0	560.0	c.5'	c.16'	" 7'00
0+30	up						
0+30	Dn. same		555.0	555.0	c.1'	c.6'	out 8'67
0+30	up. +2.3	561.9					
0+30	Dn. 3.5	556.1	552.0	555.0	c.4'	c.9'	out 8'67
+40	up 5.4	554.2					
+40	Dn. 5.6	548.0	548.0	552.0	c.6'	c.6'	out 9'67
0+20			567.0	565.0	c.1'		out 5'33
0+20			560.0	565.0	c.8'		5'33

steps

steps

steps

steps

steps

steps

Profile of Bottom of Trench
at south end of upstream
Toe Wall, for final Quantities

Aug. 15, 1932

B.M. 3.71 545.75 542.04

4+16 6.4 539.4

+10 7.7 38.1

+05 9.7 36.1

4+00 10.1 35.7

3+87 11.4 34.4

+85 12.5 33.3

+78 12.8 32.0

+76 15.1 30.7

+72 14.5 31.3

42

Aug 19, 1932

4.69 546.73 542.04

4+16 upstr. Top concrete 0.9 545.8

4+16 Dnstr. " " 1.7 45.0

3+73 upstr. Top concrete 5.2 541.5

3+73 Dnstr. " " 6.4 40.3

upstream Toe Wall, Neat Line
Stakes For Forms.

Aug. 19, 1932

B.M.	6.16	548.20	542.04	
2+20		5.14	543.06	out 12 ⁵⁵
+10		4.97	43.23	" 12 ⁵⁹
+00		4.91	43.29	" 12 ⁵⁷
1+90		4.94	43.26	" 12 ⁵³
+80		4.90	43.20	" 12 ⁵⁷
+70		5.26	42.94	" 12 ⁴⁹
+70	AR	2.18	46.02	" 11 ⁵⁷
+60		2.06	46.14	" 11 ⁵²
+50		2.09	46.11	" 11 ⁵³
+40		2.11	46.09	" 11 ⁵⁰
+30		2.14	46.06	" 11 ⁴⁵
+20		2.24	45.96	" 11 ⁴⁴

78 52
10 94
~~81.73~~
56

43

77.6

F. 2⁰⁹

F. 1⁹⁷

F. 2⁰⁰

F. 2⁰²

F. 2⁰⁵

F. 2¹⁵

Upstream Toe Wall, Form
Points

Aug. 16, 1932

	9.05	551.09	542.04	
1+20			535	545.74 548.11
+30			4.96	46.13
+40			4.99	46.10
+50			5.78	45.31
+60			5.64	45.45
+80			7.91	43.18
+90			8.11	42.98
2+00			8.60	42.49
+10			8.72	42.37
+20			8.08	43.01
	8.33	550.37		542.04
2+20			7.36	
+10			7.41	
2+00			7.39	
1+90			7.34	
1+80			7.35	
+70			4.38	

44

Fill on
to Nails
To Elev. 548.11
For FORMS.

F.2³⁷

F.1⁹⁸

F.2⁰¹

F.2⁸⁰

F.2⁶⁶

F.4⁹³

F.5¹³

F.5⁶²

F.5⁷⁴

F.5¹⁰

Fill on Nails in
West Form Pannels.

F.5¹⁰

F.5¹⁵

F.5¹³

F.5⁰⁸

F.5⁰⁹

F.2¹²

Neat Line Stakes For Trench at
North End of Downstream Toe Wall

45

upstream ♀ Downstream
out 2.0

B.M. 3.75 548.19 544.44

T.P. 11.78 555.96 9.01 549.18

0+0.0	up. 12.5	543.5					
	Dn. 4.2	551.8	540.0	548.0	c. 3.5	c. 11.8	out 11.00
+ 25	up. 12.0	544.0					
	Dn. 5.9	550.1	539.0	546.25	c. 5.0	c. 11.1	" 11.58
+ 50	up. 10.0	546.0					
	Dn. 7.8	548.2	538.0	544.50	c. 8.0	c. 10.2	" 12.17
+ 75	up. 12.2	543.8					
	Dn. 12.0	544.0	537.0	542.75	c. 6.8	c. 7.0	" 12.75
+ 100			536.0	541.0		"	13.33

Grade

4.69 546.73 542.09

12.74 558.11 1.36 548.37

4+15

11.1 547.0 547.0

3rd Red Head in wall To
Grade

+25

8.2 549.9 549.9

" " " " " "

Aug. 17, 1932

Neat Line Stakes For Trench of
North end of Downstream Toe Wall

B.M. 8.36 552.80

544.44

Bottom of
Trench
Grades

North

±

South
out 2'

0-03

N 1.2

551.6

S. 5.3

547.5

540.0

548.0

C-11⁶ - out 11'C-7⁵

0-12

N

6.0.0

552.8

540.0

548.0

C-12⁹

Sept. 14, 1934

0-20

Downstr.
upstr

573.7

574.0

543.0

552.0

C-31⁷
800

±

C-31⁰
20

0-20

558.0

552.0

C-15⁷
800C-16⁰
20

Profile of Subgrade, Drain #1
For Calc. of Final Quantities

47

548.91

B.M.	A.AT	548.91	544.44
N 3560			
E 4670	top cut	4.0	544.9
E 4660		11.8	37.1
E 4650		11.8	37.1
E 4640		11.8	37.1
E 4630		11.8	37.1
E 4620		11.9	37.0
E 4610		12.0	36.9
E 4600		12.0	36.9
E 4590		12.0	36.9
E 4580		12.0	36.9
E 4570		11.9	37.0
E 4560		12.0	36.9
E 4550		12.2	36.7
E 4540		11.9	37.0
E 4530		12.1	36.8

E 4520

12.8 536.1

E 4511

13.0 35.9 Top Bank.

Form points upstream toe wall

B.M.	10.52	552.56	542.04	
2+40		4.45	548.11	out 10 ⁹⁶
+20		4.32	48.14	" 10 ⁹⁵
Aug. 20, 1932				
B.M.	12.21	554.25	542.04	
		1.25	553.00	

Core Wall Trench Elevs.
for inspectors use.

48

Sept. 9, 1932

B.M.	0.90	540.29	539.39	
E5003				
N3980	12.24	528.05	528.05	set spike in cribbing
N3520	12.34	527.95	527.95	"
N3580	11.68	528.61	528.61	"
N3640	11.84	528.45	528.45	"
N3700	8.66	531.63	531.63	set spike in Bank of Trench
N3740	4.92	535.37	535.37	"

Sept. 12, 1932

	0.36	539.75	539.39	
N3470 ^t	13.17	526.58	526.58	set spike in Cribbing
T.P.	5.44	536.02	530.64	
N3510 ^t	10.0	526.1	526.1	"
N3560 ^t	10.2	525.9	525.9	
N3600 ^t	9.2	526.9	526.9	
N3650 ^t	8.2	527.9	527.9	
N3680 ^t	7.5	528.6	528.6	
N3720 ^t	5.2	530.9	530.9	

Profile of Bottom of Trench
at North end of Downstream Toe
Wall, for final quantities.

49

Aug. 20, 1937

5.82 550.26 544.44

0-11 \$ 10.3 540.0
Top Bank upstr. 1.6

0+00 Top Bank Dnstr. + 1.8
0+00 \$ 10.2 40.1
Top Bank upstr. 2.5
+10 " " 2.7
+10 " " Dnstr. + 0.9

+25 \$ 11.0 39.3
Top Bank upstr. 3.6
" " Dnstr. 0.2

+50 \$ 12.4 37.9
Top Bank upstr. 4.2
" " Dnstr. 2.0

+75 \$ 13.3
Top Bank upstr. 5.9
Dnstr. 5.7

1+00 \$ 13.8 36.5
Top Bank upstr. 8.7
" " Dnstr. 8.2

				Grade			
	3.32	547.76			547.91		
N 3700							
E 4660						7.0	540.9
						6.9	41.0
E 4620	0.12	5.76	542.00	541.00		7.1	40.8
E 4620	0.12	5.76	542.00			7.1	40.8
E 4580	0.12	5.76	542.00			7.5	40.4

Aug 20 1932 Profile of Excavation Drain #3 (N3700) For Final Quantities

B.M.	3.47	547.91		547.91			
N3700							
E4660			7.0	40.9			
E4650			7.2	40.7			
E4640			7.2	40.7			
E4630			7.0	40.9			
E4620			7.0	40.9			
E4610			7.0	40.9			
E4600			6.9	41.0			
E4590			6.9	41.0			
E4580			6.9	41.0			

= West edge of toe wall.

cont. on right hand side this page

Neat Line stakes For Trench at
Downstream Toe Wall

3170
23
6
1

51

Aug. 20, 1932 -
P.M.

B.M.	0.78	545.22	544.44	Grades for Bottom of Trench	Grades for Toe of Foot Walls	upstream out 2'	£	Downstream
3+00				530.0	535.0			out 15 ³³
+25		upstr. 8.0 Dnstr. 8.1	37.2 37.1	530.5	536.75	c-6 ⁷	c-6 ⁵	14 ⁷⁵
+50		upstr. 4.3 Dnstr. 6.0	40.9 39.2	531.0	531.50	c-9 ⁹	c-8 ²	14 ¹⁷
+60				39.20				13 ⁹⁴
+70				39.90				13 ⁷¹
+75		upstr. 3.5 Dnstr. 3.2	41.7 42.0	531.5	540.25	c-10 ²	c-10 ⁵	13 ⁵⁹
+80					40.60			13 ⁴⁸
+90					41.30			13 ²⁸
4+00				532.0	542.0			" 13 ⁰⁰
+02 ¹⁴	end wall	upstr. 1.5 Dnstr. 2.5	43.7 42.7	532.04	542.15	c-11 ⁷	c-10 ⁷	" 12 ⁹⁵

Profile of Bottom of Trench at North
End of upstream Toe Wall, for Calc. final
Quantities

	8.01	559.60	551.59
0+37		8.7	
		Top Bank upstr. +1.8	
		" " Dnstr. 1.6	
0+30		7.1	
		Top Bank upstr. +6.4	
		" " Dnstr. +2.7	
0+30		4.5	
0+25		2.5	
0+25		+0.2	
		Top Bank Dnstr. +12.7	
		" " upstr. +12.9	
Sept. 14	8.01	577.41	567.99
0+15		10.4	
0+10		10.3	
0+00		7.9	

577.41

52

0+20	Top Bank Dnstr.	+0.5
0+20	" " upstr.	+1.1
0+15	" " Dnstr.	+1.5
0+15	" " upstr.	+1.4
0+10	" " Dnstr.	+1.6
0+10	" " upstr.	+1.7
0+00	upstr.	+2.1
0+00	Dnstr.	+2.1

0.23 548.84 548.61

13.05 555.82 6.09 542.75

1.5 54.3 = cut slope
at Sta. R+74.05
30' South
to Tunnel

Profile of Portal cut
exit Tunnel Portal.

Aug. 25 1932

0.26	563.91	563.65
15+10	13.1	50.8
14+00	8.9	
13+54	9.4	
1,36	552.73	12.54 551.37
13+45	7.0	
+32	7.4	
+12	10.0	

552.73

13+00

10.5

12+79

10.4

+60

7.3

+50

8.9

12+12² End Portal struct.

12.2

9.98 542.75

upstream Toe Wall
Form Points.

54

B.M. 0.88 567.35 566.47

B.M. 12.73 554.62

on Boulder
60' west
of Sta 210
upstream
Toe Wall.

3.04 557.66

Aug. 27, 1932

2.71 557.33 554.62

T.P. 9.78 562.77 4.34 552.99

5.00 557.77

+ 4.71
562.98 = El. for calc.

Neat line on out 6¹⁷ set Batter Points for next Lift.
Section Sta. 116 to 240

9.92 552.85

+ 4.71
557.56 = El. for calc.

Neat line on { out 7²¹ set Batter Points for next Lift.
Section, Sta. 240 to 340

B.M. 3.81 562.65 3.93 558.84 set B.M.

on Boulder 40' east of Sta. 0+80 upstream Toe Wall.

4.76 557.89

+ 4.71
562.60 = El. for calc.

Neat line on Section Sta. 0+50 to 0+80, out 6¹⁸ set Batter Points for next Lift.

4.96 558.19

+ 4.71
562.90 = El. for calc.

Neat line on Section Sta. 0+30 to 0+50 out 6²³ set Batter Points for next Lift.

Upstream Toe Wall Form Points

Aug. 29, 1932

8.80 567.64 558.84

5.12 562.52 = El. for calc. of next line, section at 80 to 1160

+ 4.70

567.22 " " " " " " " " " " " "

Next Lift out 4⁵¹

Aug. 30, 1932

7.79 562.41 554.62

Top Form -

4.78 557.63 = El. for calc. next line on section 210.3+20 to 2100

+ 4.70

562.33 " " " " " " " " " " " "

next Lift out 6²²

5.59 567.09 0.91 561.50

0.60 567.49 = Check on B.M. El. 567.47

4.46 562.63 = El. of top form section 1160 to 2140

+ 4.70

567.33 = El. for calc. Next line of next lift 56. 1160 to 2140 out 4⁵⁶

Aug. 31, 1932

B.M. 8.47 563.09 554.62

+4⁷⁰

+100

0.71 62.38 67.08

out 4⁶⁴ = better point for next lift.

+90

0.70 62.39 67.09

" 4⁵⁴

+80

0.65 62.44 67.14

" 4⁶²

+70

0.60 62.49 67.19

" 4⁶⁰

+60

0.55 62.54 67.24

" 4⁵⁸

+50

0.50 62.59 67.29

" 4⁵¹

+40

0.55 62.54 67.34

" 4⁵³

+30

0.67 62.42 67.12

" 4⁶³

+20

0.75 62.34 67.09

" 4⁶⁵

Sept. 1st 1932

B.M. 0.50 566.97 566.47

3+10	1.41	562.56
3+00	1.34	62.63
2+90	4.31	62.66
+80	4.21	62.76
+70	4.31	62.66
+60	4.30	62.67
+50	4.32	62.65
+40	4.27	62.70

out 6"⁴ = batter points
 " 6"⁰
 " 6"⁸
 " 6"⁰
 " 6"⁸
 " 6"⁰
 " 6"⁸
 " 6"⁶

TP 5.75 572.32 0.42 566.57

Top Form This Lift.

4.87 567.45

+ 4.70

572.15 = El. for Cur. next line on Section 1+60 to 2+40 for next lift out 2⁹⁵

B.M. 9.40 568.24 558.84

B.M. 0.25 567.99 set B.M.

spike in Bank N East of sta. 0+30.

0+80	0.86	67.38
+70	0.75	67.49
+60	0.62	67.62
+50	0.75	67.49
+40	0.52	67.72
+30	0.18	68.06

out 4⁵⁷ set Batter points for next lift.
 " 4⁵⁰
 " 4⁴⁶
 " 4⁵⁰
 " 4⁴³
 " 4³¹

Sept. 1st 1932

B.M. 7.30 561.92 554.62

4+00 7.12 52.80 +4.70 587.50 out 7⁵⁰

TP 8.97 532.95

Cont. on Page 59.

Profile in Bottom of Trench
Downstream Toe Wall, For final
Quantities, also Top Trench both sides

57

Aug. 30, 1932

	2.44	544.83	542.39
3+00		\$ 14.4	30.4
"	Top Bank upstr.	9.1	35.7
"	" " Dn.str.	8.7	36.1
3+25		\$ 14.4	30.4
"	Top Bank upstr.	7.2	37.6
"	" " Dn.str.	7.8	37.0
3+50		\$ 14.1	30.7
"	Top Bank upstr.	4.3	40.5
"	" " Dn.str.	4.3	40.5
3+75		\$ 13.5	31.3
"	Top Bank upstr.	2.9	41.9
"	" " Dn.str.	2.7	42.1
3+87.5		\$ 13.1	31.7
"	Top Bank upstr.	1.5	43.3
"	" " Dn.str.	2.5	42.3

Profile of Bottom of Puddle core Trench

58

	1.37	540.76	529.39	
E 5000				
43470		12.5	528.3	✓
3480		12.9	527.9	✓
3490		12.7	528.1	✓
3500		12.8	528.0	✓
3510		12.7	528.1	✓
3520		12.8	528.0	✓
3530		12.2	528.6	✓
3540		11.9	528.9	✓
3550		12.0	528.8	✓
3560		11.5	529.3	✓

Upstream Toe Wall Form Points

9.15

59

Sept. 6, 1932

	5.24	571.71		566.47	Next Line width as Poured	Next Line width for Next Lift. (4" Higher)
4+00 Top Form poured -			4.56	67.15	out 4.60	out 3.05
3+90			4.51	67.20	" 4.60	" 3.03
3+80			4.44	67.27	" 4.58	" 3.01
3+70			4.40	67.31	" 4.57	" 3.00
3+60			4.34	67.37	" 4.55	" 2.98
3+40			4.35	67.36	" 4.55	" 2.98
3+30			4.45	67.26	" 4.58	" 3.01
3+20			4.55	67.16	" 4.60	" 3.05

T.P	3.44	564.31	10.84	560.87		
4+00			6.69	57.62	out 7.71	out 6.22
+10			6.59	57.72	" 7.76	" 6.10
+20			6.62	57.69	" 7.77	" 6.20
+30			6.51	57.80	" 7.73	" 6.16

	5.10	571.57		566.47		
	4.17	571.59	4.15	567.42		
0+80			4.25	67.34	out 4.55	out 2.98
+90			4.25	67.34	" 4.55	" 2.98
1+00			4.20	67.39	" 4.53	" 2.96
+10			4.18	67.31	" 4.56	" 2.99
+20			4.32	67.27	" 4.57	" 3.00
+30			4.36	67.23	" 4.57	" 3.02
+40			4.34	67.25	" 4.58	" 3.01
+50			4.31	67.28	" 4.57	" 3.00
+60			4.24	67.35	" 4.55	" 2.98

upstream Toe Wall Form Points.

Sept. 6, 1932

	9.37	576.79	567.42	Neat Line widths as now Point	Neat Line widths for Next Lift (4' Higher)
+60			4.58	72.21	out 2 $\frac{78}{90}$
+70			4.48	72.31	" 2 $\frac{90}{90}$
+80			4.56	72.23	" 2 $\frac{92}{90}$
+90			4.54	72.25	" 2 $\frac{92}{90}$
2+00			4.53	72.26	" 2 $\frac{91}{90}$
+10			4.58	72.21	" 2 $\frac{93}{90}$
+20			4.60	72.19	" 2 $\frac{94}{90}$
+30			4.57	72.22	" 2 $\frac{93}{90}$
+40			4.62	72.17	" 2 $\frac{94}{90}$

Sept. 7, 1932

	5.62	572.09	566.47		
B.M.					
3+20			9.77	62.32	out 4 $\frac{63}{69}$
3+10			9.63	62.46	" 4 $\frac{61}{69}$
3+00			9.58	62.51	" 4 $\frac{62}{69}$
2+90			9.58	62.51	" 4 $\frac{64}{69}$
2+80			9.51	62.58	" 4 $\frac{64}{69}$
2+70			9.56	62.53	" 4 $\frac{66}{69}$
2+60			9.55	62.54	" 4 $\frac{65}{69}$
2+50			9.53	62.56	" 4 $\frac{65}{69}$
2+40			9.37	62.72	" 4 $\frac{69}{69}$

set Points for Next Lift.

Sept. 7, 1932

	7.46	575.45	567.99		
B.M.					
0+80			3.28	72.17	out 2 $\frac{96}{96}$
0+70			3.33	72.12	" 2 $\frac{96}{96}$
0+60			3.32	72.13	" 2 $\frac{96}{96}$
0+50			3.26	72.19	" 2 $\frac{94}{96}$
0+40			3.02	72.43	" 2 $\frac{96}{96}$
0+30			2.74	72.71	" 2 $\frac{96}{96}$
0+20			2.64	72.81	" 2 $\frac{92}{96}$

set Points for Next Lift.

upstream Toe Wall Form Points

Sept. 8, 1932

B.M. 9.06 577.05 567.99

9.60 577.11 9.54 567.51

5.14 572.65 567.51

2+40

+50

+60

+70

+80

+90

3+00

+10

+20

5.20 67.45

5.26 67.39

5.31 67.34

5.29 67.36

5.23 67.42

5.33 67.32

5.34 67.31

5.36 67.29

5.47 67.18

Neat Line
widths at
New Range

out 4⁵²

" 4⁵⁴

" 4⁵⁵

" 4⁵⁵

" 4⁵³

" 4⁵⁶

" 4⁵⁶

" 4⁵⁷

" 4⁵⁷

Neat Line
widths for
Next Lift

out 2⁹¹

" 2⁹²

" 2⁹⁸

" 2⁹⁸

" 2⁹⁶

" 2⁹⁷

" 2⁹⁷

" 3⁰⁰

" 3⁰³

4⁷³ Higher

Sept. 9, 1932

B.M. 1.12 567.59 566.47

4+00

+10

+20

+30

+40

+50

5.13 62.96

5.03 62.56

4.89 62.70

4.86 62.73

4.95 62.64

5.08 62.51

out 6¹³

" 6¹⁵

" 6¹²

" 6⁰⁹

" 6¹²

" 6¹⁶

out 4⁶¹

" 4⁵⁸

" 4⁵³

" 4⁵²

" 4⁵²

" 4⁵²

Set Neat Line points for Next Lift.

B.M. 9.20 577.19 567.99

4.19 573.00

Sept. 10, 1932

10.27 576.74 566.47

set nails in on stream fill 2" for Top Wall section on 20 to +80

upstream toe wall form points

Sept. 12, 1932

	6.23	572.70	566.47	
4+00			0.62	72.08 out 2 ⁹⁷
+10			0.52	72.18 " 2 ⁹⁴
+20			0.35	72.35 " 2 ⁸⁸
+30			0.28	72.42 " 2 ⁸⁶
+40			0.23	72.47 " 2 ⁸⁴
+50			0.33	72.37 " 2 ⁸⁸
+65			0.77	71.93 " 3 ²²

Sept. 13, 1932

10.75 571.22 566.47

4+22 573.00 Set Rod heads in Dwn. str. form, section 2+40 to 3+20
F-2' for Top wall

70
6.78
81.78
6.08
14.8

62

Set next line points for next lift

out 4⁵⁷

Downstream Tee Wall Form Points

Sept. 7, 1932

B.M.	2.66	547.68	545.02
3+50	Downstream	10.08	537.60
"	upstream	8.11	39.57
		4.93	42.75

cut 14⁴⁷ set neat line } Step F4⁴⁰ South.
 " 2⁰⁰ " " " } Fill 2⁴³ South.

← El. of Form between Drains #1 & 2

3+40	Downstream	10.37	37.31
3+30	"	10.62	37.06
+20	"	10.90	36.78
+10	"	11.16	36.52
3+00	"	11.34	36.34

cut 14⁵⁶ set neat line

set neat line points for
 Next Lift to El. 542.75
 out 12⁷⁵ neat line for Next Lift

"	14 ⁶⁵	"	"	"	"	"	"	"	"
"	14 ⁷⁴	"	"	"	"	"	"	"	"
"	14 ⁸³	"	"	"	"	"	"	"	"
"	14 ⁸⁹	"	"	"	"	"	"	"	"

Sept. 8, 1932

B.M.	1.37	546.39	545.02
------	------	--------	--------

3+10	Downstream	9.89	536.50
+30	"	9.31	37.08
+50	"	8.82	37.57
3+50	upstream	9.30	37.09
+30	"	9.91	36.48
+10	"	10.35	36.04

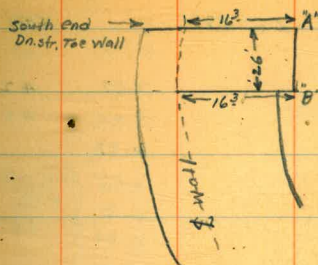
Fill 6²⁵ set Fills to El. 542⁷⁵ for Next Lift.

"	5 ⁶⁷
"	5 ¹⁸
"	5 ⁶⁶
"	6 ²⁷
"	6 ⁷¹

Sept. 8th 1932

Grade

B.M.	1.79	546.81	545.02	
"A"			542.5	532.0 c-10 ⁵
"B"			542.1	532.0 c-10 ¹

Sept. 8th 1932

	11.92	561.90	549.98	
0 + 30			9.41	
+ 40			9.39	
+ 50			9.36	
+ 60			9.34	
+ 70			9.34	
+ 80			9.37	
+ 90			9.37	
1400			9.39	
+ 10				
Average =	9.37	552.53	537.23	+ 7 ²⁰

out 7⁹² set next line points for next lift.

Sept. 9, 1932

B.M.	11.92	561.90	549.98	
1 + 10			4.59	
+ 20			4.52	
+ 30			4.46	
+ 40			4.51	
+ 50			4.59	
+ 60			4.61	
+ 70			4.60	
+ 80			4.60	
+ 90			4.64	
2400			4.64	
Average =	4.60	557.30	562.00	+ 7 ²⁰

out 6³³ set batter points for next lift.

Sept. 12, 1932

B.M.	2.56	547.58	545.02	root line widths as now poured	root line widths for next lift.	
2+90			4.78	42.80	out 12 ⁷³	out 11 ¹⁶
+80			4.87	42.71	" 12 ⁷⁶	" 11 ¹⁹
+73 Top Dog house #1			3.04	44.54	" 12 ⁸⁵	" 11 ¹⁸
+68			4.83			
+60			4.83			
+50			4.81			
+40			4.81			
+30			4.83			
+20			4.84			
+10 Top Dog house #2			1.50	546.08	out 11 ⁶⁹	out 11 ¹⁵
2+00			4.65	42.93	" 12 ⁶⁹	" 11 ¹²

Sept. 13, 1932

B.M.	11.93	561.91	549.98			
B.M.			0.50	561.91	Set B.M.	Spoke in Bank 3 South 0-11 north end Dwn. sl. Tee Wall
0+30			4.59			
+40			4.59			
+50			4.57	average		
+60			4.52			
+70			4.53			
+80			4.53	557.34	out 7 ⁸⁹	out 6 ²² set root line points for next lift.
+90			4.57			
1+00			4.62			
+10			4.59			

Sept. 14, 1932

B.M.	2.32	547.34	545.02			
3+00			4.53			
+10			4.58			
+20			4.61	average 4.58		
+30			4.60			
+40			4.60	542.76	out 12 ⁷⁵	out 11 ¹⁸ set root line points for next lift.
+50			4.56			
+60			5.41			
+70			5.40	541.94	out 13 ⁰²	out 11 ⁹⁵
+80			5.40			

Sept 15, 1932

B.M.	7.63	552.65	545.02
2+00			4.98
+10			4.98
+20			5.06
+30			5.13
+40			5.05
+50			5.06
+60			5.08
+70			5.06
+80			5.07
+90			5.02

Average 5.06
547.59 out 11^{1/2}

out 957 set next line points for next lift.

Sept 16, 1932

B.M.	5.76	567.17	561.41
0+30			5.05
+40			5.07
+50			5.05
+60			4.93
+70			4.97
+80			4.96
+90			5.04
1+00			5.06
+10			5.03

Average 5.00
as poured
562.17 out 6^{1/2}

Next Lift.

out 971 set next line points for next lift.

B.M.	7.43	552.45	545.02
2+90			4.86
3+00			4.86
+10			4.85
+20			4.87
+30			4.90
+40			4.91
+50			4.84
+60			4.74

Average 4.86
547.59 out 11^{1/2}

out 959

Sept. 17, 1932

				561.41	next line widths as cont. batter	next line widths to next lift
1+10	6.67	568.08	5.94	62.14	out 6 ²¹	out 4 ⁷²
+20			5.85	62.23	" 6 ²⁵	" 4 ⁶⁸
+30			5.81	62.27	" 6 ²⁸	" 4 ⁶⁷
+40			5.80	62.28	" 6 ²⁴	" 4 ⁶⁷
+50			5.94	62.14	" 6 ²⁸	" 4 ⁷¹
+60			6.02	62.06	" 6 ³¹	" 4 ⁷⁴
+70			6.02	62.06	" 6 ³¹	" 4 ⁷⁹
+80			6.04	62.04	" 6 ³²	" 4 ⁷⁵
+90			6.04	62.04	" 6 ³²	" 4 ⁷⁵
+100			6.11	61.97	" 6 ³¹	" 4 ⁷⁷

Sept 19, 1932

B.M. 12.42 562.40 549.98

B.M. 10.07 572.06 0.41 561.99 Spike in bank 30' east of 0+10

B.M. 0.54 571.52 on batter East of 0+10

0+30

+40

+50

+60

+70

+80

+90

+100

+10

0.54

5.12

5.15

5.07

5.04

5.07

5.08

5.12

5.10

5.08

Average 5.09

566.97 out 4⁶⁸out 3¹¹

Start Batter 3+60 to 3+87 = 541.94

Start Batter 3+87.5 = 540.14

" " 4+02 = 540.20

114 550.46

549.32

424

2.76

547.70

out 11⁰

= next line for points 3+60 to 3+87

Downstream Toe Wall Form Points

68

Sept 19, 1932

B.M.	7.95	567.27	547.32	Neat Line width as Poured	Neat Line width for Neat Left (at Right)
2+90			4.84		
3+00			4.81		
+10			4.85		
+20			4.82	Average 4.85	
+30			4.85	552.42 out 9 ⁵³	out 7 ¹⁶
+40			4.92		
+50			4.87		
+60			4.86		

1.34 548.34 547.00
37.81
105.3

Sept 20, 1932

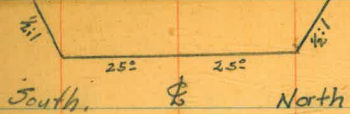
B.M.	11.72	571.78	560.00		
+10			4.80	66.98	out 4 ⁶⁷
+20			4.68	67.10	" 4 ⁶³
+30			4.71	67.07	" 4 ⁶⁴
+40			4.71	67.07	" 4 ⁶⁴
+50			4.82	66.96	" 4 ⁶⁸
+60			4.91	66.87	" 4 ⁷¹
+70			4.94	66.84	" 4 ⁷²
+80			4.89	66.94	" 4 ⁶⁹
+90			4.85	66.93	" 4 ⁶⁹
+100			4.94	66.84	" 4 ⁷²

16.34
5
71.00

B.M.	4.16	566.15	561.99		
0+30			4.61	61.54	out 6 ⁴¹
+20			4.59	61.56	" 6 ⁴³
+10			4.50	61.65	" 6 ⁴⁵
0+00			4.25	61.90	" 6 ³⁷
0+10		4.36	4.27	61.88	" 6 ³⁷
0+20		out 6 ⁴⁰	4.21	61.94	" 6 ³⁵
Angle Point.		" 4 ⁸³	4.42	61.73	" 6 ⁴² - out 6 ⁰¹

cont. on page 72

Exit Tunnel Portal Cut
 slope stakes, Revised Grade



Aug. 29, 1933

Grade

	9.80	552.19		542.39
12+12 ⁷⁷			End Portal structure.	542.0
12+52				542.0
13+00				X-542.0
+25				543.0
+50				544.0
T.P.	13.03	564.03	1.14	551.95
+75				545.0
14+25				547.0
+50				548.0

+4.0%

South		North
C-45		
27°		
C-75		C-105
28°		25°
		C-15
		25°
C-18		Grade
34°		25°
C-14		C-6
32°		25°
C-11		C-9
30°		29°
C-10		C-8
30°		29°
C-10		C-7
30°		29°

cont on next page

564.06

South & North

14+75

549.0

C.11°
30.5

C.12°
25.6

15+00

550.0

C.11°
30.9

Grade
25.0

T.P.

5.37

561.35

8.10

553.98

+30

551.2

Grade
25.2

Sept. 29, 1932

Downstream Top Wall Form Points

B.M.

12.90

562.22

549.32

Next line widths
for next list

3+60

+70

+80

+90

+95

4+01.4

4.97

4.97

4.89

4.90

4.88

57.25

57.25

57.33

57.32

57.34

out 7.92
" 7.72
" 7.89
" 7.89
" 7.89

at 6.25
" 6.35
" 6.32
" 6.32
" 6.32

Oct. 14, 1932

B.M.

4.77

576.24

571.52

0-30 to 0+30

4.29

572.00

set nails in upstream form. Fill 3" for top wall

B.M.

8.71

580.23

571.52

B.M.

5.23

575.00

set B.M. on yellow head of wall, Sta. 1+90

1.62

576.62

cont. on page 71

Entrance Tunnel Portal Cut
slope stakes.

Aug. 13, 1932

6.38	579.24	572.86	Grade
			563.0
0-50			
-1+00			
-1+50			
-2+00			
-2+25			

T.P.

12.73 566.51

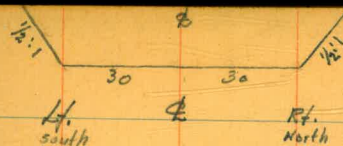
Downstream Tee Wall Form Points

Oct. 3, 1932

B.M.	7.16	567.16	560.00	
3+60				
+70		5.16	562.00	out 6 ³³
+80		5.12	562.09	" 6 ³²
+90		5.03	62.13	" 6 ²⁹
+95		5.03	62.13	" 6 ²⁹
4+01 ¹⁴		5.00	62.16	" 6 ²⁸
For Key		4.2	563.0	

Oct 7, 1932

B.M.	11.47	571.47	560.00	
3+60				
+70		4.66	566.81	out 4 ⁷³
+80		4.71	66.76	" 4 ⁷⁵
+90		4.68	66.79	" 4 ⁷⁴
+95		4.66	66.81	" 4 ⁷³
4+01 ¹⁴		4.66	66.81	" 4 ⁷³



71

c-10 ⁸	c-12 ⁰
35 ¹	36 ²
c-20 ⁵	c-11 ⁹
40 ²	35 ²
X	c-15 ⁰
	37 ⁵
c-12 ⁰	c-9 ⁶
36 ⁰	34 ⁸
	c-13 ⁴
	36 ⁷

Next Line Width
as next Pour

Next line widths
for next Lift.

15' = width at top next Lift

Sept. 21, 1932

2.10 562.10 560.00

2+10

4.78

Neat Line
widths as
Now PairedNeat line
widths for
Next lift 2" Higher

+20

4.78

+30

4.82

Average 4.80

+40

4.82

557.30 out 7⁹⁰out 6³³

+50

4.79

+60

4.89

+70

4.85

+80

4.84

+90

4.80

Sept. 21, 1932

B.M. 4.92 576.44 571.52

0+30 to 1+10

4.44

572.00

Set Nails

in upstream Form F-3⁰⁰ for Top Wall

12.65 561.97 549.32

2+90

+0.06

3+00

+0.14

+10

+0.26

Average

+20

+0.15

+0.14

+30

+0.13

562.11

out 6³⁰

+40

+0.17

" 6³⁸

+50

-0.10

" 6³⁷

+60

+0.07

Sept. 22, 1932

5.15 576.67 571.52

1+10 to 2+00

4.67

572.00

Set Nails

in upstream Form F-3⁰⁰ for Top Wall

Cont. on page 78

June 9, 1932

Cross-sections East end of Dam
Dumping Area.

B.M.

575.39 = B.M. on

Appl. "E"

0.64 576.03

12.96 563.07

10.44 573.51

1.00 572.51

0.58 573.09

12.3 560.8 = flow

line of 24" Division pipe at inlet,

T.P.

0.58 572.51

1.19 573.70

8.59 565.11

9.99 575.10

0.05 575.05

11.21 586.26

0.85 585.41 check

on B.M. 585.43

0.30 563.95

563.65 = B.M.

13.9 550.0 = flow

line of 24" Division pipe at outlet.

73

cross-sections Dumping area west
of Tunnel Exit

6/10/32

12.64 576.29 563.65 B.M.

4.02 572.27

5.77 578.04

8.68 569.36

1.75 571.11

11.22 559.89

0.80 560.69

10.52 550.17

11.84 562.01

3.25 558.76

6.50 565.26

1.61 563.65 - check on B.M. 563.65

June 16/32

4.9 568.1 563.2

12.6 555.5

3.1 558.6

8.7 549.9 = Elevation of Bottom of excavation at upstream toe wall

11.9 546.7 = " " " " Sump for Pumping " " "

3.6 555.0 Set stake on slope of toe wall excavation

July 12, 1932

12.86	620.91		608.05 = B.M. on "A Hub Barrow Area."	N 3092.62 E 10355.42
12.99	633.00	0.90	620.01	
12.78	645.36	0.62	632.38	
12.86	657.70	0.52	644.84	
12.80	670.13	0.37	657.33	
12.72	682.25	0.60	669.53	

B.M. #3
July 13, 1932

9.20	689.39	2.06	680.19	Set B.M. on large Boulder at about N.E. cor. of Area "A"
10.54	699.46	0.47	688.92	
11.96	708.57	2.85	696.61	

B.M. #4

2.68	710.33	0.42	708.45	set B.M. RR spike in 20' oak stump about 150' S.W. of Apt. "G"
10.03	710.55	10.31	700.52	
7.32	705.27	12.60	697.95	

B.M. #5

2.99	704.48	3.78	701.49	set B.M. High point of large boulder about 125' N.E. of Apt. "F"
8.47	703.48	9.47	695.01	
3.33	704.82	1.99	701.49	

B.M. #6

0.68	700.00	5.50	699.32	set B.M. High point of Large Boulder about 800' S.E. of Apt. "F" at Head of Ravine running into chocolate creek,
0.73	687.72	13.01	686.99	

cont. on Page 76

		687.72				
July 16, '32	0.64	675.56	12.80	674.92		
T.P.	0.64	663.27	12.93	662.63	Granite and 2 markers	
	0.54	655.69	8.12	655.15		
B.M. #7	0.36	645.23	10.82	644.87	set B.M.	R.R. spike in 18" oak stump, North side of Ravine 600'± South of Apt. F.
	0.76	635.85	10.14	635.09		
	1.18	624.10	12.93	622.92		
B.M. #8	1.81	618.72	7.99	616.61	set B.M.	R.R. spike in 24" Live Oak Tree, East Bank of Chocolate creek.
	4.77	614.61	8.58	609.84		
	7.32	611.04	7.89	606.72		
B.M. #9	3.29	610.74	3.59	607.45	set B.M.	spike in 36" Oak stump south side of Rd. East of mouth Chocolate creek
	8.60	613.23	6.11	604.63		
			5.18	608.05	*check on	B.M. on Hub Δ F" El. 608.05.
	9.56	617.61		608.05	= B.M.	
B.M. #1	3.64	618.54	2.71	614.90	set B.M.	R.R. spike in 30" oak stump West side Rd.
	3.47	609.07	12.94	605.60		
B.M. #2			0.63	608.44	set B.M.	R.R. spike in East side of Elderberry Tree, West side of County Rd. 900'± N.E. of Sand Plant.

Cont. on Page 77

2.00 610.44 608.44

6.48 612.00 4.92 605.52

8.86 614.18 6.68 605.32

6.13 608.05 - checked B.M. A.F. El. 608.05

Sept. 26, 1932

Downstream Top Wall Form Points

	B.M.	11.69	571.69	560.00	next line width as now faired	next line width for next lift
2+00			4.92	66.77	out 4 74	out 3 17
+10			4.71	66.98	" 4 67	" 3 10
+20			4.68	67.01	" 4 66	" 3 09
+30			4.74	66.95	" 4 68	" 3 11
+40			4.66	67.03	" 4 66	" 3 09
+50			4.75	66.94	" 4 69	" 3 12
+60			4.83	66.86	" 4 71	" 3 14
+70			4.82	66.87	" 4 71	" 3 14
+80			4.87	66.82	" 4 70	" 3 13
+90			4.86	66.83	" 4 72	" 3 15

Sept. 27, 1932

	B.M.	7.72	559.09	549.32		
3+60						
+70			4.63	Average 4.57 552.47	out 9 51	out 7 94
+80			4.57			
+90			4.55			
+95			4.56			
4+02 1/2			4.56			

Sept. 28, 1932

	B.M.	11.78	571.78	560.00		
2+90						
3+00						
+10			4.78	567.00	out 7 67	out 3 10
+20			4.85	66.93	" 4 69	" 3 12
+30			4.84	66.94	" 4 69	" 3 12
+40			4.87	66.91	" 4 70	" 3 13
+50			4.84	66.94	" 4 69	" 3 12
+60			4.98	66.80	" 4 74	" 3 17
			4.93	66.85	" 4 72	" 3 15

cont. on page 70

Sept. 22, 1932

B.M.	6.76	566.76	560.00	Neat Line Widths as Now Paired	Neat Line Widths for Next Lift
2+10			4.61	62.15	out 6 ²⁸
+20			4.56	62.20	" 6 ²⁶
+30			4.61	62.15	" 6 ²⁸
+40			4.55	62.21	" 6 ²⁶
+50			4.62	62.14	" 6 ²⁸
+60			4.67	62.09	" 6 ³⁰
+70			4.67	62.09	" 6 ³⁰
+80			4.66	62.10	" 6 ³⁰
+90			4.74	62.02	" 6 ³²
3+00			4.63	62.13	" 6 ²⁹
+10			4.64	62.12	" 6 ²⁹
+20			4.66	62.10	" 6 ³⁰
+30			4.69	62.07	" 6 ³¹
+40			4.69	62.07	" 6 ³¹
+50			4.78	61.98	" 6 ³⁴
+60			4.73	62.03	" 6 ³²

549.32
0.75
550.07
37.88
12.24
7.82
9.37

550.1
12.2
37.9

550.07
7.82
52.25
50.07
47.5
45.52

50.1
10.7
39.4

37.87

10.0 12.24

Sept. 24, 1932

B.M.	9.05	571.04	561.99	Neat Line Widths as Now Paired	Neat Line Widths for Next Lift
0+30			4.72	66.32	out 4 ⁸⁷
0+20			4.65	66.39	" 4 ⁸⁷
0+10 "A"			4.52	66.52	" 4 ⁸³
" "B"			4.45	66.59	" 4 ⁸⁰
" "C"			4.27	66.77	" 4 ⁷⁴
0+00			4.23	66.81	" 4 ⁷³
0-10			4.34	66.70	" 4 ⁷²
0-20			4.33	66.71	" 4 ⁷⁶
0-20 concrete for start batter			4.48	66.56	" 4 ⁸¹
0-30			4.34	66.70	" 4 ⁷⁷



out 3³²
3³⁰
3²⁶
3²³
4⁰⁰
3¹⁷
3¹⁶
3²⁰
3¹⁹
3²⁹
3²⁵

550.07
37.75
12.32

50.07
37.80
12.22

50.07
37.90
12.17

Sept. 24, 1932

B.M.	3.07	552.39	549.32	Neat Line Widths as Now Paired	Neat Line Widths for Next Lift
3+60			4.69	47.70	out 11 ¹⁰
+70			4.82	47.57	" 11 ¹⁴
+80			4.68	47.71	" 11 ¹⁰
+90			4.64	47.75	" 11 ⁰⁸
+95			4.75	47.64	" 11 ¹²
4+02 ¹⁴			4.74	47.65	" 11 ¹²

550.1
11.8
38.3
66.7
1.6

50.1
12.3
37.8

cont. on page 77.

Downstream Toe Wall
Contraction Joints

Section

"A"	"B"	"C"	"D"	"E"	"F"
4+02.4	3+60	2+90	2+00	1+10	0+30
3+60	2+90	2+00	1+10	0+30	0-

Upstream Toe Wall Permanent Points



B.M. 12.43 578.90 566.47

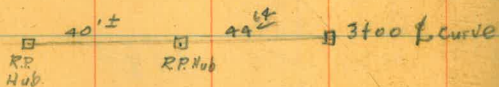
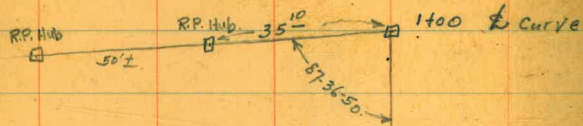
B.M. 3.92 574.98 set B.M.

Bolt set in
concrete North
side of weir
#4 Sta. 3+80
upstream toe
wall.

Oct. 4, 1932

B.M. 8.88 580.40 571.52

B.M. 5.37 575.03 set B.M.

Bolt set in
concrete at
Angle point
North end of
Downstream
Toe wall

Oct. 4, 1932

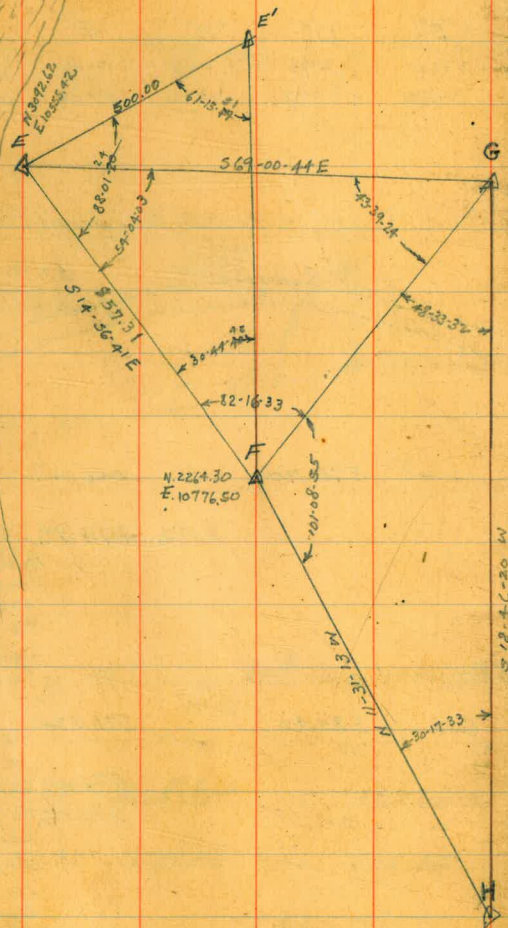
B.M. 1.58 565.23 563.65

11.55 576.08 0.70 564.53

B.M. set, 1.03 575.05

Triangulation system at Barrow

Pit Areas 'A', 'B'



79477
35
397385
238431
2781695

88-01-15
82355
5029
741195
164710
411775
414263295
3023
11.19

61-13-40
124455-10
61-13-47
30-44-40
4122-58-40
30-44-40
61-13-47
88-01-20
179.59-97

592.64
790
54994
185
548.09

90133
300
190
182
187 297377
885 3271387
185
182
61111
185
3510
3271
2.37

723845
90
623198
97023
58,21380

757
2218
6036
757
1517
1677026

N. 72-53-78 W
57 56 37
S 8-14-56 E
5497
324
3r

5756-37
895960
145641
750319

2900
2782
1.78

84774
52
339096
423870
4577794
3023
1535

510
1344
2310
2310

938740
6571530

7973
28417
56838
596799

9214
399 + 0
2.71
547.15

142.33
126.10
16.23

694.76

9214
399 + 0
2.71
547.15

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
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	2.77
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	5.23
20	.37	.74	1.11	1.48	1.85	2.22	2.59	2.96	3.33	3.70	4.07	4.44	4.81	5.18	5.56
21	.39	.78	1.17	1.55	1.94	2.33	2.72	3.11	3.50	3.89	4.28	4.67	5.06	5.44	5.83
22	.41	.81	1.22	1.63	2.04	2.44	2.85	3.26	3.67	4.07	4.48	4.89	5.30	5.70	6.11
23	.43	.85	1.28	1.70	2.13	2.56	2.98	3.41	3.83	4.26	4.68	5.11	5.54	5.96	6.39
24	.44	.89	1.33	1.78	2.22	2.67	3.11	3.56	4.00	4.44	4.89	5.33	5.78	6.22	6.67
25	.46	.92	1.39	1.85	2.31	2.78	3.24	3.70	4.17	4.63	5.09	5.56	6.02	6.48	6.94
26	.48	.96	1.44	1.92	2.41	2.89	3.37	3.85	4.33	4.82	5.30	5.78	6.26	6.74	7.24
27	.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50
28	.52	1.04	1.55	2.07	2.59	3.11	3.63	4.15	4.67	5.18	5.70	6.22	6.74	7.26	7.78
29	.54	1.07	1.61	2.15	2.68	3.22	3.76	4.30	4.83	5.37	5.91	6.44	6.98	7.52	8.06
30	.56	1.11	1.67	2.22	2.78	3.33	3.89	4.44	5.00	5.55	6.11	6.67	7.22	7.78	8.33
31	.57	1.15	1.72	2.30	2.87	3.44	4.02	4.59	5.17	5.74	6.32	6.89	7.46	8.04	8.61
32	.59	1.18	1.78	2.37	2.96	3.56	4.15	4.74	5.33	5.92	6.52	7.11	7.70	8.30	8.89
33	.61	1.22	1.83	2.44	3.05	3.67	4.28	4.89	5.50	6.11	6.72	7.33	7.94	8.55	9.17
34	.63	1.26	1.89	2.52	3.15	3.78	4.40	5.04	5.67	6.29	6.93	7.56	8.18	8.81	9.44
35	.65	1.30	1.94	2.59	3.24	3.89	4.53	5.18	5.83	6.48	7.13	7.78	8.42	9.08	9.72
36	.67	1.33	2.00	2.67	3.33	4.00	4.66	5.33	6.00	6.67	7.33	8.00	8.67	9.33	10.00
37	.68	1.37	2.06	2.74	3.42	4.11	4.79	5.48	6.17	6.85	7.54	8.22	8.91	9.59	10.28
38	.70	1.41	2.11	2.82	3.52	4.22	4.92	5.63	6.33	7.03	7.74	8.44	9.15	9.85	10.56
39	.72	1.44	2.17	2.89	3.61	4.33	5.05	5.78	6.50	7.22	7.95	8.67	9.39	10.11	10.83
40	.74	1.48	2.22	2.96	3.70	4.44	5.18	5.92	6.67	7.41	8.15	8.89	9.63	10.37	11.11

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

11.73

82032
163067
1043387

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

Roadway 16 feet wide. Side Slopes 1 on 1 1/2.
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 $41.9 + (20 - 16) \div 2$ or 2 ft. added to 41.9 = 43.9. For slopes of 1 on 1 see inside of front cover.

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