

Monthly Estimates

14

FIELD BOOK

361

W105

KEUFFEL & ESSER CO.

DRAWING MATERIALS

AND

SURVEYING INSTRUMENTS.

NEW YORK.

CHICAGO. ST. LOUIS. SAN FRANCISCO. MONTREAL.

Tables for Excavations and Embankments.

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

ROADWAY 18 FEET WIDE. SIDE SLOPES 1 TO 1.

FOR SINGLE TRACK EXCAVATION.

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	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	0
1	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	1
2	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	2
3	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	3
4	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	4
5	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	5
6	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	6
7	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	7
8	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	8
9	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	9
10	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	10
11	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	11
12	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	12
13	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	13
14	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	14
15	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	15
16	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	16
17	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	17
18	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	18
19	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	19
20	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	20
21	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	21
22	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	22
23	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	23
24	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	24
25	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	25
26	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	26
27	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	27
28	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	28
29	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	29
30	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	30
31	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	31
32	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	32
33	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	33
34	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	34
35	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	35
36	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	36

Calculated by Julien A. Hall, M. Am. Soc. C. E.

FOR KEITH'S RAILROAD CURVE TABLES SEE END OF BOOK.

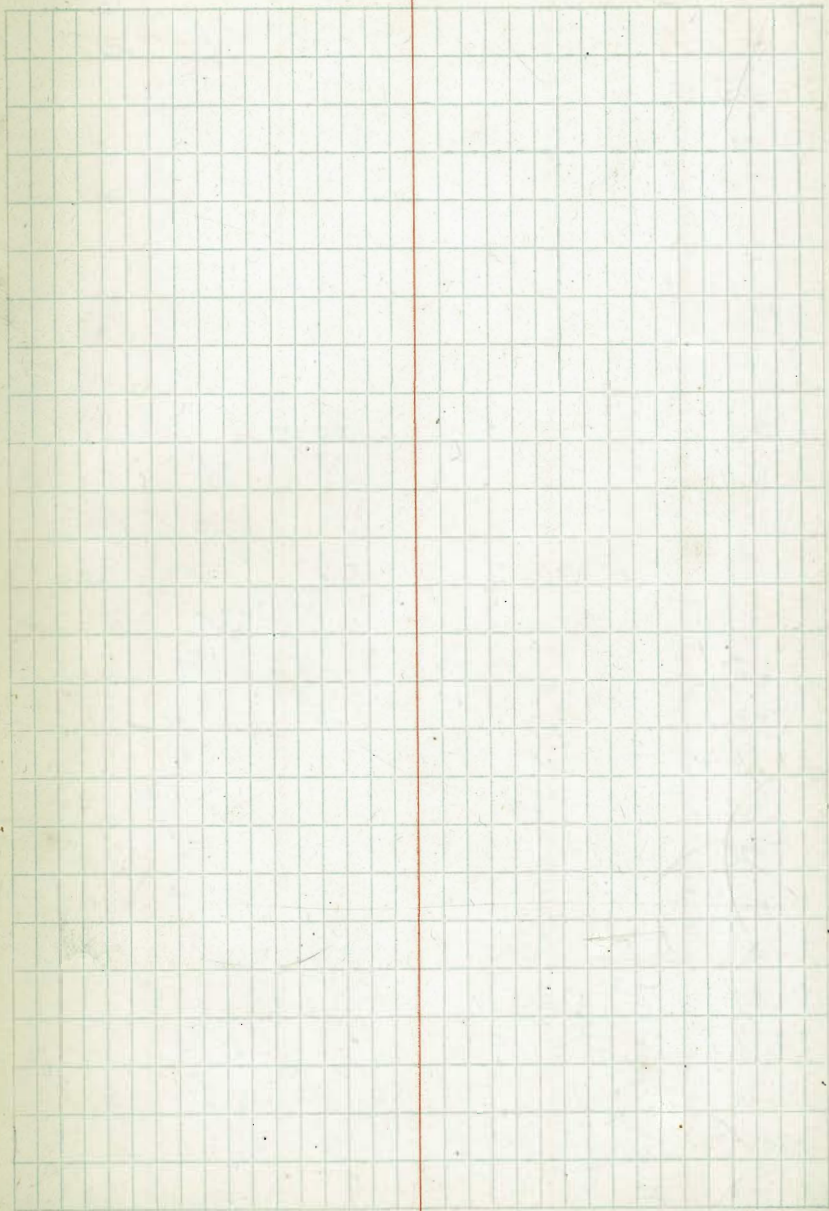
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Reinforcing Spillway
Total Steel in Spillway

~~Page~~

50

51



11/4/18

October Estimate

Sta	+	-	Elv
B.M.	940	382.06	372.66
T.B.M.		4.38	77.68
FP Road.	634	76.94	12.04

Sta. 2+79.²⁶ on R 325'

- 3.8 Rock	5.65	70.7
- 3. Concrete	10.15	66.2
0.	10.25	66.1
+ 10.	10.25	66.1
15.9	11.0	65.3
15.9	12.8	63.5
19.9	12.85	63.5
19.9	10.1	66.2
22	10.0	66.3
22	8.4	67.9
29	8.45	67.9
34	8.1	68.2
37	8.8	67.5
46	10.1	66.2

To d.s. face Balance Same as other Section

E11-10'5

0.0 = E 11.	+ 2.15	78.5
4	+ 1.15	77.5
5	- 0.85	75.5
7 Concrete	10.1	66.2

Continued from Book 11

Look in old Concrete Core Wall

Platted 11/4/18
H.R.B.

October Estimate

11 line - 10' South

+ H.I. - E/O
76.34

Sta	H.I.	E/O
20	10.6	65.7
26	11.45	64.9
26	12.8	63.5
30	12.75	63.6
30	10.85	65.5
41	9.1	67.2
46	8.8	67.5
54	11.6	64.7
70	10.55	65.8
90	10.55	65.8
100	10.2	66.1
110	9.9	66.4
120	10.05	66.3
11 line 20' South		
12.7	10.75	65.6
26.5	10.1	66.2
"	12.6	63.7
30.5	12.5	63.8
"	10.1	66.2
38	8.1	68.2
41	8.15	68.2
49	11.0	65.3
60	10.4	65.9
70	11.25	65.1

Plotted 11/4/15
JRS

October Estimate

Sta	+	H ₁	-	E/e
		76.34		
80			11.05	65.3
90			10.0	66.3
102			9.7	66.6
111			9.7	66.6

10-Line

135			10.75	65.6
25			10.3	66.0
31			10.0	66.3
36			8.1	68.2
42			8.0	68.3
49			10.3	66.0
63			11.1	65.2
77			11.1	65.2
86			11.0	65.3
94			9.35	67.0
100			9.3	67.0
107			9.8	67.5
112			8.4	67.9

9 Line

A			4.58	71.76
	13.25	85.01		
20			3.7	81.3
23			8.1	76.9
25			8.15	76.9

Plotted 11/4/15
HRB

October Estimate

4

Sta	+	Hi	-	= Lo
30		850.1	9.55	75.5
40			12.1	72.9
47			11.3	73.7
57			18.5	66.5
69			18.6	66.4
74			12.9	72.1
86			14.6	70.4
91			14.2	70.8
"	old concrete		7.7	77.3
96	Concrete wall -			
8 Line				
30			0.4	84.6
40			9.1	75.9
53			9.4	75.6
63			17.1	67.9
69			17.1	67.9
69			4.4	80.6
75			0.0	85.0
88			+8.0	93.0
8 Line - 13' South				
56			0.9	84.1
47			+1.5	86.5
40			-1.8	83.2
32			+1.3	86.3
"			+12.3	97.3

Plotted 11/4/15
R28

October Estimate

Sta	+	2H	-	Elev
E10	12.02	407.09		90.07
E10-12'E			15.4	86.7
E9			1.18	400.9
" -11'E			3.65	98.4
14'E			4.3	97.8
17'E			6.3	95.8
17'E			10.0	92.1
E9	6.66	407.65		400.99
E8 - 17'E			17.1	90.6
16'E			11.9	95.8
5'E			3.6	404.1
4.5'E	Same elev as E8		711.6	19.2
00				19.2
F7	5.11	314.7		76.36
	8 Line - 13'S			
0			6.3	25.2
14			8.1	23.4

End of Inspection Gallery
is now 1' N. of 10 Line -

Plotted 11/4/18
APG.

Schedule 1 - { Class 2
Class 3
Class 4

Summary October Estimate

Section	Dist. between Sta.	Class 4 End Area	Class 4 Cu. Yds.	Class 2 End Area	Class 2 Cu. Yds.
'6" line	↑	00			
	12'		47.5		
'6" " 12' 11"	×	214			
	13'		310.0		
'7" "	×	1074			
	12'		756.4		
'8" " 13' 5"	×	2330			
	13'		1306.0		
'8" line	×	3095			
	25'		2264.8		
'9" line	×	1797			
'9" " 13' 11"	↑		1413.4	00	48.4
	12' ↓		1096	218	
'10" line	×		1199.8		40.3
	5'		1042	218	
'11" " 20' 5"	×		334.6		83.5
	10'		765	233	
	10' 5"		210.0		81.3
2+79 ⁸⁶	×	315			18.5
07-330 ⁹⁴ -R.	5'		38.1		33.9
2+84 ⁹⁶	×	88			17.4
	10' ↓		6888.8		319.6

Oct. Estimate

Section	Dist. bet. Stations	Class 4		Class 2	
		End Area	Cu. Yds.	End Area	Cu. Yds.
	10'		8.2		32.2
2+74 ⁹⁶	↓	00		00	
			6888.8		319.6
			Old concrete see Nov 1917 Est.		
			Total Schedule 1 Class 4 to date =		
			6957.8 C.Y.		
			50 C.Y.		
			Sections above Contour 367-50 ft River =		
			6888.8		
			North of River Bottom =		
			470 May Est.		
			Sections above Contour 364 South of River =		
			11.2		
			From Topography up to Cont. 364 =		
			2852.71		
			Total Schedule 1 Class 2 to date =		
			318.35		

Schedule III Class 3+4
 Summary October 1918 Estimate
 Distance Class 3 Class 4
 Sta. bet Stations End Area Cu Yds

2+25	↑	00	
	25'		6.9
2+50	x	15	
	7'		18.5
2+57	x	128	
	73'		82.9
2+64 ³	x	485	
	10 ³ '		179.2
2+74 ⁶	x	453	
	74'		95.0
2+82	x	240	
	2'		16.3
2+84	↓	200	

Add. for Mud in Tunnel 10.0

Total Cu Yards =	408.8	c.y.	408.8
Total " III " 4	32.00	yds	
" " " 3	376.80	yds	

Schedule II

Schedule II class 4 Total to date = 1117.0 c.y.

Concrete Estimate by Sections.
 October 1918 7

Section of	Dist. bet Sta.	End Areas	Cu Yds.
10 line	↑		308
	5'		63.2
11 line 20's	x		375
	10'		201.1
11 line 10's	x		711
	10 ⁵ '		365.0
2+79 ⁸⁶ on 330 ⁹⁴ Radius	x		1166
	00'		000
2+79 ⁸⁶	x		1787
	45'		301.0
2+84 ⁹⁶	x		1826
	85'		657.8
2+94 ⁹⁶	x		2353
	85'		785.6
3+04 ⁹⁶	x		2638
	85'		841.5
3+14 ⁹⁶	x		2706
	85'		873.0
3+24 ⁹⁶	x		2840
	85'		920.8
3+34 ⁹⁶	x		3010
	85'		986.6
3+44 ⁹⁶	x		3258
	85'		1017.6
3+54 ⁹⁶	↓		3207

Estimate of old concrete removed 32 c.y.

Concrete Estimate by Sections
October 1918

Section of bet Sta.	Distance	End Area	Cu. yds.
3+64 ⁹⁶	8.5		1096.1
	*	3207	
3+74 ⁹⁶	8.5'		1011.1
	*	3216	
3+88 ⁸⁶	12'		1334.7
	*	2790	
3+88 ⁸⁶	00		00
	*	2210	
4+04 ⁹⁶	13.5		1069.5
	*	2068	
4+14 ⁹⁶	7.5'		538.7
	*	1811	
4+24 ⁹⁶	7.5'		448.4
	*	1418	
4+34 ⁹⁶	7'		328.3
	↓	1115	
Add for Pier 8x8x9 =			21.3
" " " 8x8x6.5 =			15.4
" " " 8x8x5 =			11.8
" " " 8x8x7 =			12.9
" " " 8x8x7 =			12.9
" " " 8x8x8.5 =			20.2
" " " 8x8x7 =			12
" " " 8x8x8 =			18.6
Derrick weights =			15.1

~~1296.940~~

October 1918 Estimate

8

Topography for Cu. yds at End of
Sections Sheet 45

Contour	Distance	Area sq. ft.	Cu. yds.
59.5		000	
60	↑ 0.5'		0.2
	↓	20	
62	↑ 2'		2.5
	↓	57	
64	↑ 2'		6.1
	↓	109	
66	↑ 2'		10.8
	↓	181	
19.6			
Sheet 25			
61		00	
	↑ 1'		20
62	↓	108	
	↑ 2'		140
64	↓	269	
	↑ 2'		30.6
66	↓	559	
			46.6

Total South End - 66.2 cu

Cont. next page.

Oct. 1918 Concrete Estimate

Topography on North Side

Contour	Field Sheets					Totals	Cu. Yds.
	68	48	28	47	49		
41	-	-	-	-	-	0	
42	8	110				118	22
44	62	319				381	18.5
46	82	414				496	32.5
47		110				410	16.8
48		107				407	15.1
50		286				386	25.7
52		234				234	19.2
54		191				191	15.7
56		201	1	6		208	14.8
58		225	1	24		250	17.0
60		218	7	36		261	18.9
62		215	74	64	4	357	22.8
64		194	38	124	27	383	27.4
66		173	50	140	47	410	29.4
68			55			55	17.2

Total Cu yds North End = 2932 cy.
 " " " South End = 66.2
 " " " from Sections = 12969.40
13328.80

Total cu yds = 13328.80
 Deduct for Inspection Gallery = 120.00
13208.80

Curtain wall = 1747.00
 Total Cy Cyclopean Masonry to Date = 11461.80

11-30-18
Willcomb
Bub
Mixer

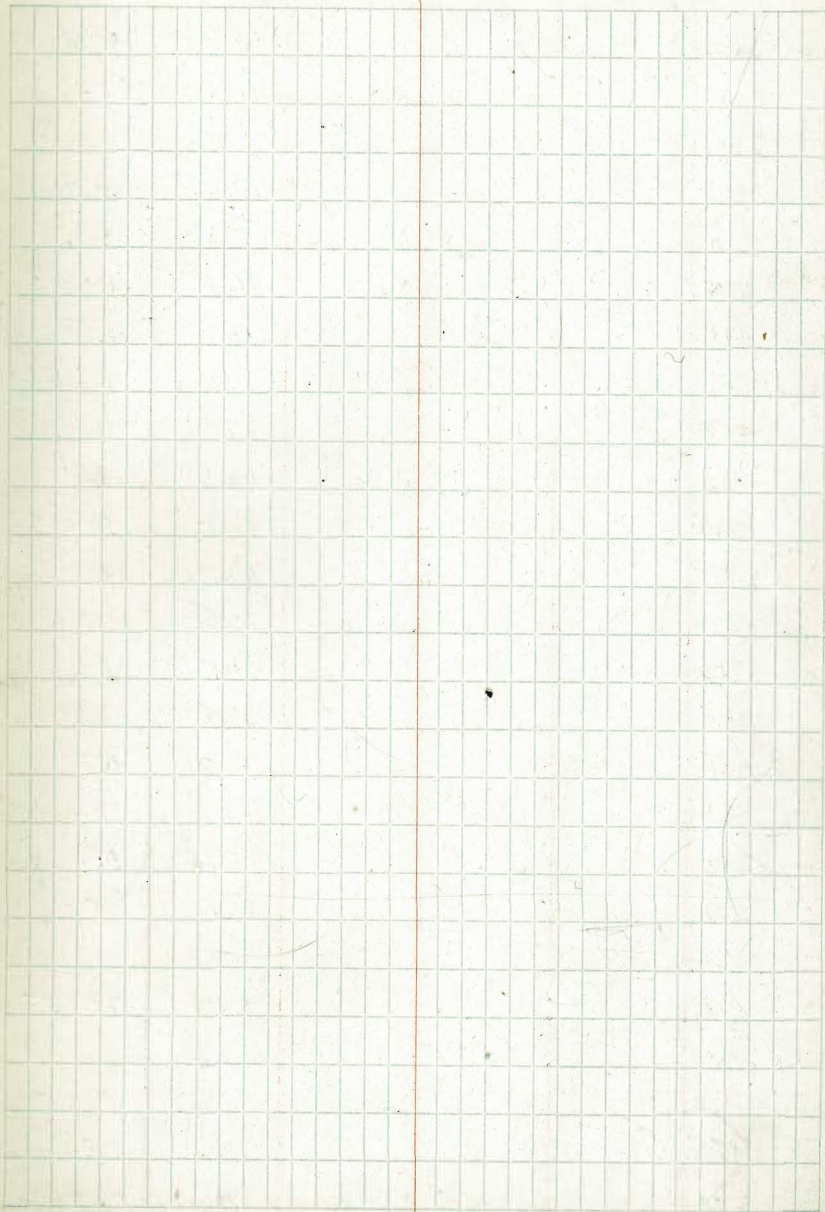
November Estimate -
Sand Stock Pile

10

P.M.	1.80	496.69	494.89
0+37	0.0	clear across	
0+50 - 300'		6.5	90 ✓
- 272'		6.0	90 7
- 259' G.S.		6.2	90.5
0+75 - 253		9.4	87.3
271		9.1	87.6
280		7.1	87.6
300.		7.4	89.3
330		8.8	87.9
363		10.2	86.5
374		10.4	86.3
400		12.1	84.6
428		13.6	83.1
458		14.4	82.3
0+50 436		16.6	80.1
427		15.5	81.2
411		14.5	82.2 ✓
400		14.6	82.1
343		7.7	89.0
1+00 250		11.7	85.0
272		11.4	85.3
279		10.6	86.1
300		10.4	86.3

Plotted
Dec 3, 1918
H.P.S.

✓



Nov. 1918

Sand Estimate

496.69

1400	305	9.5	87.2
	326	11.3	85.4
	351	11.7	85.0
	384	17.6	79.1
	400	17.3	79.4
	458	16.1	80.6
	478	16.1	80.6
1425-500		17.9	78.8
	458	17.1	79.6
	400	18.7	78.0
	349	18.7	78.0
	341	17.1	79.6
	320	16.0	80.7
	318	18.1	78.6
	300	13.8	82.9
	284	13.0	83.7
	240	13.2	83.5
	213	15.2	81.5
	207	17.1	79.6
Δ		12.14	484.55
	305	487.60	
1450-195		12.0	75.6
	200	10.1	77.5

Plotted
11/3/18
JHP

Nov 1918

Sand Estimate

487.60

1450	213	9.2	784
	225	6.0	816
	240	5.6	820
	261	5.9	817
	275	7.8	798
	300	9.9	777
	318	13.4	742
	329	11.7	759
	355	11.3	763
	393	11.9	757
	400	10.4	772
	430	9.1	785
	458	8.7	789
	500	8.9	787
✓	539	10.0	776
✓	560	13.9	737
1475	458	10.4	772
	500	10.3	773
	525	12.2	754
	542	17.4	702
	432	10.4	772
	410	11.4	762
	400	13.6	740
	350	13.5	741
	332	13.4	742

2 Tallet
12/13/18
J.P.P.

12

Nov 1918
Sand Estimate

487.60

175	310	15.6	72.0
	300	15.4	72.2
	282	12.8	74.8
	271	12.5	75.1
	253	8.0	79.6
	236	9.1	78.5
	223	11.5	76.1
	205	13.2	74.4
	195	13.2	74.4
	185	16.4	71.2

Δ 12.76 474.84

1.91 476.75

2+00-175		9.8	67.0
	183	6.5	70.3
	200	5.6	71.2
	215	4.7	72.1
	240	2.4	74.4
	256	2.2	74.6
	267	8.4	68.4
	271	7.5	69.3
	289	10.7	66.1
	300	12.6	64.2
	318	12.3	64.5

Plotted
11/3/18
J.H.D.

Nov. 1918
Sand Estimate

476.75

2400	327	10.4	66.4
	343	10.0	66.8
	354	7.8	69.0
	374	6.2	70.6
	391	5.6	71.2
	400	5.3	71.5
	415	4.4	72.4
	431	1.8	75.0
	458	0.9	75.9
	487	1.0	75.8
	500	3.8	73.0
	521	11.3	65.5
2+25	505	15.4	61.4
	472	4.6	72.2
	458	4.2	72.6
	443	5.2	71.6
	433	8.4	68.3
	400	10.9	65.9
	362	18.1	58.7
	331	21.6	55.2
	300	22.6	54.1
	287	21.8	55.0
	277	17.8	59.0
	267	16.6	60.2
	246	6.7	70.1

Dated
11/3/18
B

✓

Nov 1918
Sand Estimate

476.75

15

2+25-231			7.2	696
209			9.3	675
200			10.9	659
191			13.5	633
184			11.2	656
175			16.1	657
169			13.9	62.9
Δ			12.75	464.00
	1.88	465.88		
2+50 166			5.9	600
176			2.0	639
200			2.4	635
221			0.5	654
232			1.2	647
241			4.7	612
269			10.4	555
2+75 256			11.6	543
248			8.0	579
238			7.3	586
230			6.5	594
216			5.7	602
200			6.1	598
181			7.0	589
167			10.0	559

Plated
12/3/18
JB

1704 1918

Sand Estimate

16

3+00-177	6588	11.6	543
186		8.6	573
200		8.0	579
209		9.5	564
216		9.1	568
227		10.5	554
238		9.2	567
248		12.9	530
2+50 400		8.7	572
410		5.8	601
450		+1.0	669
473		9.1	568
2+75 442		12.2	537
428		8.4	575
415		10.9	550
400		13.2	527
390		15.3	506
3+00 413		16.8	491
410		16.2	497
405		16.3	496
400		18.3	476
377		19.6	463
2+50 290		17.2	487
300		18.2	477
318		18.4	475

Started
3/13/18
M.P.

Nov 1918
Sand Estimate

2+50-327	65.88	22.4	43.5
339		19.3	46.6
2+75 250		22.4	43.5
345		21.4	44.5
340		24.4	41.5
* 335		24.3	41.6
313		24.3	41.6

Platted
3/12/18
OKP

Summary Sand Storage Estimate to 12/1/1819

Storage North of Road Storage South of Road 17

Sto	Distance	End Area, Cu Yds	End Area, Cu Yds
0+10		00	41.6
0+25		150	
0+35		198.2	00
0+50		278	11.65 323.6
0+75		180	1910 1423.6
1+00		230	189.8 1746 1692.6
1+25		233	214.3 2264 1856.5
1+50		105	156.5 3298 2575.0
1+75		75	83.3 3581 3184.8
2+00		55	60.2 3523 3288.9
2+10		00	25.5

Total cu yds North of Road = 1181.4 cy 2696.8

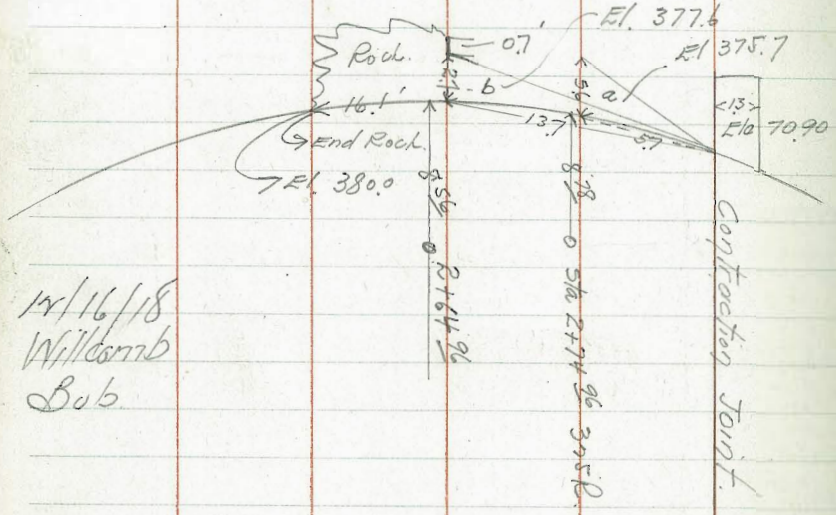
2+25		230	230.2
2+25		30.2	2000 00
2+50		290	274.1 1266.2
2+75		205	229.2 125 3981
3+00		202	188.4 24 69.0
3+15		00	56.1 00 67

747.8 cy 18781.8 cy

Total Storage North of Road = 1181.4
 " North of Draw = 747.8
 " South of Road = 18781.8
 Total Storage to Date = 20711.0
 See Section Sheet # 2.

Right Abutment
Steps in face of Dam.

E10	165	391.72	390.07
Top lift a		16.00	75.72
Top lift b		14.10	77.62
Top forms upstream Face		11.6	380.1
" " " " Rock Contact		11.7	380.0



12/16/18
Willcomb
Sub.

Willcomb
Bub

1/6/18

Outlet Tower

X sections for Backfill Base of Tower

	6.08	412.16	406.08
Floor of Forebay x		17.3	94.86
Wing Wall = 0+00			
4.3 L		9.7	402.5'
Bottom of Conc.			
11.3 "		11.6	400.6'
18.7 "		7.9	043'
Top of Wall			
18.3 "		6.8	054'
18.3'		4.7	075'
19.3'		3.7	085'
0+07			
7'			
4.0 L		13.3	98.9'
7'			
7.0 L		13.7	98.5'
7'			
13.0 L		7.4	048'
7'			
16.0 L		6.8	054'
17.0'			
16.5 L		5.6	066'
7'			
20.0 L		3.3	089'
7'			
22.0 L		0.7	115'
0+14 N. side Tower			
7'			
4.0 L		14.3	97.9'
7'			
10.0 L		14.0	98.7'
7'			
16.0 L		11.0	017'
7'			
20.0 L		6.6	056'
7'			
29.0 L		0.0	177'

19

	241	Red	E/E
Sta 0+295			
South Side Tower	412.16		
9.0 L		13.5+	98.7'
15.0 L		11.6	006'
19' L		6.2	06.0'
25' L		2.0	10.7'
35' L		+3.3	
		Natural ground	15.5'
6' South of S. side Tower 0+355			
3.5' L		13.3	98.9'
7.0 L		13.7	98.5'
10.0 L		11.4	008'
10.0 L		4.4	07.8'
13.0 L		4.3	07.9'
15.5 L		2.6	09.6'
Top old Concrete			
18.5 L		1.6	10.6'
Top of old Paving			
19.5 L		+2.7	14.9'
11' South of S. side Tower = 0+405			
14.0 L		0.0	177'
20.0 L		+2.9	15.1'
35 L		12.9	99.3'
Top Concrete			
3.5 L		24.1	88.1'
Undercut 6'x5'x7'			
3.5 R		14.0	98.2'
3.5 R		26.0	86.2'
Undercut 6'x5'x9'			
Δ		10.46	401.70

Station	Height	Reading	Sum
0+35 ^E A			401.70 ✓
6' South S. side Tower	5.68	407.38	
3.5' R		10.3	97.1 ✓
7.0' R		8.2	99.2 ✓
9.0' R		8.1	99.3 ✓
Top Conc - 9.0' R		+0.5	407.9 ✓
South side Tower	0+29 ^E		
5.0' R		10.2	97.2 ✓
12.0' R		9.2	98.2 ✓
15.0' R		5.4	020 ✓
16.0' R		4.9	075 ✓
17.0' R		1.9	055 ✓
South west corner	0+24 ⁹⁶		
7.8' R		9.5	97.9 ✓
14.8' R		9.3	98.1 ✓
18.8' R		4.5	029 ✓
22.0' R		0.0	074 ✓
Northwest Corner	0+18 ⁵⁴		
7.8' R		9.4	98.0 ✓
14.8' R		9.5	97.9 ✓
16' R		5.1	023 ✓
18' R		4.8	026 ✓
21' R		0.0	074 ✓

Station	Height	Reading	Sum
0+14			407.38
North Side Tower	0+11		
7' R		9.3	98.1 ✓
13.2' R		9.2	98.2 ✓
17.2' R		3.5	039 ✓
21.2' R		0.0	074 ✓
7' South of Wing Wall			
7' R		6.9	005 ✓
11.2' R		6.4	010 ✓
13.2' R		3.4	040 ✓
18.2' R		0.3	071 ✓
S. side Wing Wall	0+00		
4.2' R		3.2	042 ✓
11.2' R		3.9	035 ✓
14.2' R		5.8	016 ✓
Δ		1.84	405.54
		10.09	415.63
S. side Wing Wall			
19.2' R		11.9	037 ✓
19.7' R also top of wall		10.7	049 ✓
21.7' R		6.7	089 ✓
33.7' R		7.2	134 ✓
7' South of Wing Wall			
24.2' R		7.4	082 ✓
25.7' R		5.2	104 ✓
28.2' R		4.7	109 ✓

7' South Wing Wall	415.63		
29' R	2.5	13.1	✓
33' R	2.0	13.6	✓
35' R	0.6	15.0	✓
North Side Tower 0+14	+0.3		
33' R -	+0.3	15.9	✓
N.W. Corner			
34' R	+0.5	16.1	✓
S.W. Corner			
35' R	+1.0	16.6	✓
S. side Tower 0+29 ^S	±		
27' R	2.9	17.7	✓
36' R	+1.5	17.1	✓
6' S. South side Tower 0+35 ^S			
	8.1	407.5	
21' R	+1.1	16.7	✓
11' S. South Side Tower 0+40 ^S			
16' R	3.2	17.4	✓
31' R	+1.5	17.1	✓

Checking Top of brass on Saucer Valves

Top of Old Conc. P.P.M.	11.07	427.98	416.91
Δ			
	11.71	439.31	427.60
	11.85	450.45	438.60
Hub P.P. & Tunnel	0.81		449.64 ✓
Top of brass - Saucer Valve # 5	2.70		442.25
Top of bracket " " # 6	1.71		449.04 OK.

Copied Book 7

2/6/19

Bub
Kitter

Final Sand Sections

Hub ⁰⁺⁵⁰ 458 ²	957	93.24	836.7
hub ⁰⁺²⁵ 300		225	90.99

B.M. Basin	128	496.17	494.89
------------	-----	--------	--------

PR	571	94.08	780	88.37
----	-----	-------	-----	-------

hub ⁰⁺⁵⁰ 458 ²		1040	83.68
--------------------------------------	--	------	-------

0+35 = 00 Area of S Storage

0+50 line

267	9408	3.7	90.4
-----	------	-----	------

300 ⁰⁺⁵⁰		4.1	90.0
---------------------	--	-----	------

366		6.3	87.8
-----	--	-----	------

400		9.8	84.3
-----	--	-----	------

404		12.6	81.5
-----	--	------	------

426		12.0	82.1
-----	--	------	------

436		14.0	80.1
-----	--	------	------

0+75 line

458 ² ⁰⁺⁷⁵	9408	11.4	83.7
----------------------------------	------	------	------

427		11.0	83.1
-----	--	------	------

412		8.5	85.6
-----	--	-----	------

400		7.9	86.2
-----	--	-----	------

358		6.8	87.3
-----	--	-----	------

300		5.0	89.1
-----	--	-----	------

268		5.7	88.4
-----	--	-----	------

72

Note Call 0+50
00 Area on North
Pile

Check against

Plated
Feb 6 1918

1-12

2-43

26

46

132

153

46.2

cy. from Storage

2/6/19

Sand Sections Final

73

+ 2/1 - Ele

494.08

0+75 liqe

251 55 886

244 41 900 off liqe

231 60 88.1 " "

1400 liqe

94.08

216. 99 84.2

226. 63 87.8

232 76 86.5

238 62 87.9

246. 82 85.9

262 74 86.7

300 67 87.4

350 80 86.1

400 85 85.6

458 80 86.1

473 83 85.8

493 125 81.6

P Rack 117 88.30 695 87.13

1425 liqe

528 99 78.4

506 89 79.4

494 55 82.8

479 28 85.5 ✓

Plotted
2/6/19

2/6/19

Final Sand Sections

	+	2/1	-	E/a
		488.30		
458	<u>1425</u>		2.5	85.8
400			3.1	85.2
350			3.3	85.0
		<u>1425</u> line	cont.	
206			8.8	79.5
216			6.6	81.7
234			2.8	85.5
249			4.1	84.2
263			3.8	84.5
271			2.0	86.3
287			2.2	86.1
300			4.0	84.3
		<u>1450</u> line		
200		88.30	11.8	76.5
225			7.3	81.0
240			6.7	81.6
268			6.6	81.7
300			10.4	77.9
340			5.3	83.0
400			4.2	84.1
458			3.7	84.6
480			9.5	78.8
490			8.7	79.6
510			10.3	78.0

24

Plotted
4/17/19

2/ Plate Coll.

2/6/19.

Final Sand section

+ + 241 - Ele

48830

545 1450 ligo Capt. 120 76.3

558 146 73.7

P. Rock 627 8354 1103 47727

1475 ligo

542 48354 13.7 698

525 81 754

510 66 769

485 49 786

475 40 795

467 54 781

458 2.2 81.3

443 40.5 840

424 40.5 840

400 0.5 830

364 25 810

300 118 717

272 85 750

263 63 772

216 73 762

200 88 747

188 123 712

25

Plotted
2/17/19

2/6/19

Fossil Sand Sections

2+00 line.

483.54

P. Rock	480	7760	1074	472.80
174			106	670
184			75	70.1
200			64	71.2
257			50	72.6
267			8.9	68.7
272			8.7	68.9
300			14.2	63.4
350			11.4	66.2
400			16	76.0
419			22.0	79.6
446			2.5	75.1
489			2.2	75.4
500			4.8	72.8
523			12.4	65.2
P. Rock	682	71.97	12.45	65.15

2+25 line

503			11.9	60.1
470			00	72.0
458			40.5	72.5
438			2.6	69.4
410			3.8	68.2

26

Plotted
2/7/19

2/6/19

Final Sand Sections

2+25 line Cont.

375	471.97	114	606
360		140	680
300		159	561
292		169	551
277		134	586
268		124	596
250		43	677
230		55	665
205		50	670
200		60	660
190		90	630
184		67	653
175		66	654
167		93	627
R-Rock	784 6741	1240	5957

2+50 line

165.5		82	592
174		50	624
188		43	631
200		45	629
207		59	615
229	✓	45	629

27

Plotted
2/7/19

7/6/19

Final Sand Sections

R+50 line

241	46741	7.7	60.3
252		7.5	59.9
268	End sand north	12.4	55.0
294	" " South	19.0	48.4
300		19.8	47.6
359		16.5	50.9
375		13.2	54.2
400		10.8	56.6
408		8.0	59.4
428		5.5	61.9
448		1.1	66.3
478		11.0	56.4
R-Rock	340 60.55	10.26	457.15

R+75 line

445		6.8	53.8
428		3.3	57.3
400		17.1	53.5
389		10.2	50.4
375		11.9	48.7
355		15.5	45.1
338		18.5	42.1
313		18.5	42.1
300		18.0	42.6
285		16.0	44.6
283		13.2	47.4

375
-13
=28

28

Platted
7/7/19

Final Sand Estimate

258	End Sand	460.55	70	536
247			29	577
217			35	571
200			26	580
181			22	584
166			47	559

3+00 = 00 Area for Sand
South of Draw

179

3+00 line

460.55

179			74	532
185			56	550
200			50	556
206			57	549
216			38	568
238			43	563
248			79	527
250			84	522
AP Top Rock	256	✓	857	51.98

~~Plotted~~
7/17/10

Set up
at
D 8 68

Concrete Est.

Feb 12-19

H I Rod

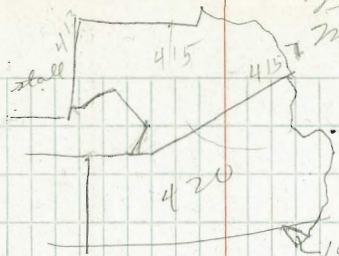
Set up at	Sight to	H	I	Rod	
D 8 68	1015	425	66		15.51
①	20.9	194°		5.3	
	21.2	"		12.6	
②	300	144°		54	
	300	"		15.7	
mm H	294	146°30'		12.1	
4	20.1	116°15'		11.2	
	20.1	"		14.9	
5	22.5	118°15'		11.5	
	22.5	"		15.1	
6	283	109°30'		109	
	"	"		19.2	
7	449	127°30'		12.1	
	449	127°30'		15.5	
8	437	139°15'		123	
	"	"		15.5	
9	452	142		123	
edge	"	"		15.3	
10	430	144°45'		15.6	
"	1815	97°30'		54	
	"	"		108	
11	486	48		58	
	"	"		10.0	
12	65.0	64°1/2'		99	
				107	
13	64.7	89°15'		105	
14	60.6	"		104	

Johnson

13 in.

Mixer

30



2.5-2.5-10.3 bedmit

5-2 1/2-6

3-3-3 = 19d

147
283

		425.66		
15	6.44	126°15'	12.1	413.54
16	7.6	11 1/2°	5.4	
17	7.5	5 1/2°	9.0	
18	18.5	347°	5.5	
19	15.5	337°30'	9.0	
20	75.5	172°30'	12.6	
21	75.0	189°	13.3	
	35.35	135°		11.68 413.98

new
P4
C9 old 142 415.40 H.I.
315°

22	10.5	181°30'	5.6	
23	17.2	175°	43.8	wood
24	49.7	182°3/4	5.8	
25	50.83	175 1/2°	5.8	
25	50.83	175 1/2°	30.8	edge step.
	"	"	46.6	cur S.
26	57.9	150°	6.0	"

At D18.

D18	49	406.8		401.9
27	28.9	57°	9.3	5
28	61.0	71°	7.8	
29	52.6	40°3/4	8.8	
30	63.3	28 1/2°	8.7	
31	76.3	20°3/4	8.7	

$$5 \times 5 - 366 \frac{1}{2} \times 45 = 49$$

$$5 \frac{1}{2} - 3 \frac{1}{2} \text{ for } 366$$

24 1/2

Redund.

3-3-3

3-3-3

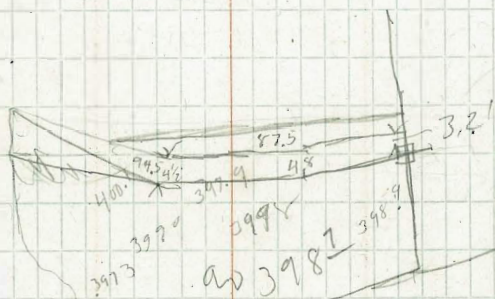
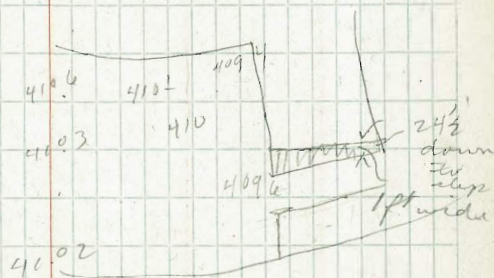
3-3-3

3-3-3

7

3-3-18

3-3-23

3-3-3
3-3-3

400.1
365.7
-00.1
27
20
21
8.8
11
7.6
1.3

526 40³/₄ 123

9
17 -0.20 73.07 73.27

4.4

5.7

7.1

6.3

East Hall

av. elev. 367.0

5.80 74.21

7.2

7.1

7.8

av - 367.0

4.0

32

2
5-5-44

5-5-44

3-3-16

3-3-16

3-3-12.2

3-3-12.2

block to add
Pair ~~6~~ 8¹/₂
8 x 8 x 6.5

3-2¹/₂-28

4-5-43

Bob Outlet Tower Backfill.
 Johnson
 X in Base Valve # ✓ ✓

	10.91	416.99		406.08
		0+00		
00	edge of concrete	East	13.1	403.9 ✓
12'	E		12.7	04.3 ✓
14'	E		11.4	05.6 ✓
14'	E		9.7	07.3 ✓
19'	E		7.0	410.0 ✓
		West		
00			13.0	404.0 ✓
10			12.7	04.3 ✓
17			8.9	08.1 ✓
23			4.2	12.8 ✓
		Sta 0+07.0		
		West		
00			13.0	04.0 ✓
8			12.8	04.2 ✓
21			4.0	13.0 ✓
26			2.6	14.4 ✓
		East		
0			13.1	03.9 ✓
11			12.1	04.9 ✓
19			5.9	11.1 ✓
24			5.5	11.5 ✓

41698 33

N Side Tower

00	East	416.99	13.2	03.8 ✓
11			11.8	05.7 ✓
19			5.2	11.8 ✓
24			4.5	12.5 ✓
	West			
00			13.1	03.9 ✓
7			12.6	04.4 ✓
20			3.5	13.5 ✓
25			2.3	14.7 ✓
	NE Cor Tower			
00	East		12.5	04.5 ✓
6	"		12.6	04.4 ✓
14	"		4.9	12.1 ✓
21	"		3.2	13.8 ✓
	SE Cor Tower			
	East			
0.0	East		11.8	05.2 ✓
5	"		11.3	05.7 ✓
13			4.4	12.6 ✓
21			2.4	14.6 ✓

Platted 2/25/19

✓

✓

Sections for Backfill at

416.98

S. Edge Tower

00	East	416.99	11.7	053 ✓
4	"		11.4	056 ✓
10	"		8.4	086 ✓
17	"		3.7	13.3 ✓
23	"		2.5	14.5 ✓

6' S of tower

00	East		9.4	076 ✓
12			6.1	10.9 ✓
19			1.9	15.1 ✓
23			0.9	16.1 ✓

11' S of

00			5.9	11.1 ✓
6			5.9	11.1 ✓
17			0.8	16.4 ✓
25			0.5	16.5 ✓

T.P.

2.09 419.08

NW. Tower Cor

0	West		14.6	04.5 ✓
2	"		14.6	04.5 ✓
14	"		5.3	13.8 ✓
23			3.0	16.1 ✓

Outlet Tower

34

SW Cor Tower

00	West	419.08	13.6	055 ✓
4			12.4	06.7 ✓
12			5.2	13.9 ✓
20			2.4	16.7 ✓

5 side Tower

00			13.8	053 ✓
5			12.7	06.4 ✓
18			4.1	15.0 ✓
25			1.9	17.2 ✓

6' S Tower

00	West			
13	"		9.2	40.9 ✓
22			2.5	16.6 ✓
26			1.4	17.7 ✓

11' S Tower

00	West			
12			5.0	14.1 ✓
20			1.2	17.9 ✓
25			0.7	18.4 ✓

241
41908
Tower

18' 5

200		1.8	17.3
23	West	0.7	18.4
23	East	1.7	17.4

2/26/19 Setup at B8 - 3' N.
Topog Right Abutment
M.J.B. Feb 26 - 19

A B 3' N	441	20.21		1580 old (1430)	579	14.42
Red 47 Corform	✓ 143	66°				
cor 47	✓ 152	75°	H18 20	✓ 297	30 1/2	
old conc 416 cont	✓ 21.0	85 1/2°	" 4 "	✓ 277	35°	
416	42 ✓ 20.9	80 1/2°	" 4 "	✓ 260	38 1/2°	
" "	✓ 190	68 1/2°	418	✓ 177	57°	
" "	✓ 164	72 1/2°	" "	✓ 160	64°	
" "	✓ 161	69°	" "	✓ 161	70°	
" "	✓ 16.2	63°	" "	✓ 16.8	72°	
" "	✓ 17.1	57°	" "	✓ 191	68°	
" "	✓ 20.4	47°	" "	✓ 20.9	81°	
" "	✓ 236	38°	" "	✓ 210	82°	
" "	✓ 25.2	31 1/2°	H20	✓ 20.9	80°	
" "	✓ 26.4	36 1/2°	" "	✓ 19.0	67°	
" "	✓ 27.7	34 1/2°	" "	✓ 17.6	70°	
" "	✓ 32.3	22 1/2°	" "	✓ 17.1	64 1/2°	
418 & 420	"	"	"	✓ 18.3	58°	

32
324
114
29
35

Estimate Class 4 for Feb. 1919

420	237	42 1/2°		✓
cor forms 416 cont	392	340 1/2°	- 418	✓
"	387	342 1/2°	- 418	✓
"	359	350°	- 418 - 420	✓
"	338	0°	- 418 - 420	✓
"	329	17 1/4°	- 418 - 420	✓
420 02	407	341		✓
" "	390	342		✓
" "	385	346°		✓

Topog RT Abut. M.J.B. 2-26-19

Setup 27 N 70° E EG
27' - 110°

G 5 416	4.66	443.97	39.31	
432 (rod)	743	110°		✓
"	713	111 1/4°		✓
"	694	110°		✓
"	675	108°		✓
"	644	109 3/4°		✓
"	597	101 3/4°		✓
"	544	100°	50 1/2° 100 1/2°	✓
"	496	100 3/4°	48 7/8° 97 1/2°	✓
"	472	99 1/4°		✓
"	429	95°		✓
"	386	93 1/4°		✓

2/26/19 27' N 70° E of EG
At Auxil Point from EG

436	797	44397	436-797
✓	72.7	111 1/4	✓ 14' 72°
✓	67.3	106 1/2	✓ 11' 73°
✓	65.2	105 1/2	✓ 10.9 87°
✓	64.0	103 3/4	✓ 9.7 101°
✓	62.1	102 1/4	✓ 9.0 105°
✓	69.1	101°	✓ 10.7 145°
✓	68.3	98°	✓ 11.0 158°
✓	55.4	96 1/2	✓ 11.3 170°
✓	49.4	94 3/4	✓ 9.0 218°
✓	48.6	91 1/4	
✓	44.2	85°	440-397 ✓ 12.3 327°
✓	39.2	92°	✓ 7.0 3°
✓	38.0	91 1/2	✓ 10.1 29°
✓	37.4	90 1/4	✓ 9.5 67°
✓	34.4	88 1/2	✓ 14.9 69 1/2°
✓	34.2	85 3/4	✓ 17.5 71°
✓	34.3	80 1/2	✓ 18.8 64°
✓	33.0	78°	✓ 20.8 63°
✓	31.8	75 1/4	✓ 24.7 67 1/4°
✓	25.5	72 1/2	✓ 25.0 68 1/4°
✓	25.2	74 1/2	✓ 29.0 70 1/2°
✓	22.2	73 1/2	✓ 29.3 69 1/2°
✓	18.9	67 3/4	✓ 31.0 70°
✓	17.2	73 1/2	✓ 32.9 75 1/2°
✓	14.7	70°	✓ 34.6 75°

2: Topog
Feb Estimate 1919 2/26/19 36
Class 4 Excavation

440-397	35.7	78°	✓	444-00	55.0	91°
"	37.2	78°	✓	"	53.8	91°
"	38.0	79 1/4°	✓	"	52.1	89 1/2°
"	41.2	81 1/2°	✓	"	48.1	88°
"	42.3	78 1/4°	✓	"	46.7	84 1/4°
"	46.1	82 1/2°	✓	"	46.2	80 3/4°
"	47.0	85°	✓	✓	44.9	80°
"	48.0	88 1/4°	✓	✓	43.5	72 1/2°
"	51.2	89 3/4°	✓	✓	39.8	68 1/2°
"	51.6	91 1/2°	✓	✓	37.3	71°
"	55.0	94°	✓	✓	28.0	64 1/4°
"	58.0	97 1/4°	✓	✓	25.4	66 1/2°
"	61.3	98°	✓	✓	18.5	63 1/4°
"	62.2	102 1/4°	✓	✓	16.9	64°
"	63.9	102°	✓	✓	14.9	59°
"	63.7	100 1/2°	✓	✓	13.2	42 1/2°
"	65.1	100 3/4°	✓			
"	65.5	99 1/2°	✓	Coll		
old conc 440-397	66.1	99°	✓			
old conc " "	73.5	106 3/4°	✓			
444 old conc " "	73.2	106 1/4°	✓			
" " "	65.3	98°	✓			
" " "	62.2	95 1/4°	✓			
" " "	60° 50.0	95 1/2°	✓			
" " "	55.1	93 3/4°	✓			

9.11.19

Feb. 1919 Concrete

227-19

Estimate

At Auxil Point from 319

Top Form 41.9 42840

424.21

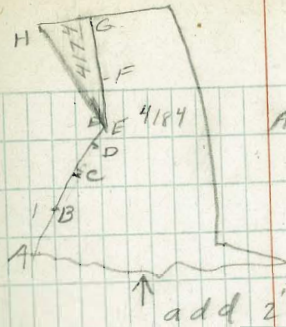
B19 32.94 213.19°

(9.4, 9.9, 10.5, 10.4 97). 100

cor	A form	8.5'	359°
/	B	20.0'	333°
/	C	30.0	325½°
/	D	40.0	321½°
/	E	50.4	318¾°
/	F	70.2	321¼°
/	G	84.7	322° 40'
/	H	80.2	329° 0'
/		11.4	
/	I	82.3	327½°
/	J	83.3	324½°
/	K	85.3	329½°
/	L	97.8	331°
/	M	98.1	331°
/	N	98.8	328°
/	O	116.3	332¼°
/	P	130.0	335° 50'
/	Q	136.6	332° 10'
/	R	156.5	338° 40'
/	S	169.7	337½°
/	T	169.0	340½°
/	V	178.8	345¼°

117.4 2' 3" lower 14.0

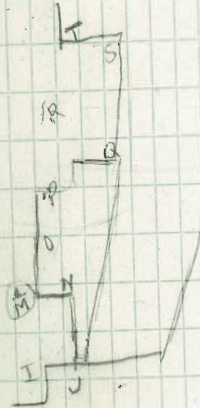
270
13.0
-1227°



Add 35 cu yds for rock

add 2'-2'-3' for rock

2 boxes 3x3=17 fl



3/27/19 Feb. Concrete Estimate

38

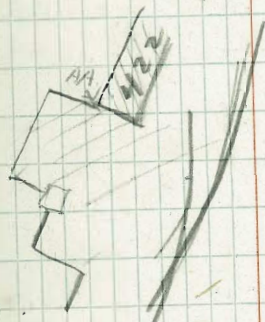
179.0 341 $\frac{1}{2}$ $\begin{matrix} 2^{\circ} 03' \\ -1^{\circ} 22' \end{matrix}$

Set up 325 Rad. Sta. (2774⁹⁶ 279496)
Plate 00° Tang pointing N.

✓	23 $\frac{1}{2}$	326°
✓	27 $\frac{0}{2}$	307°
✓	217	290°
✓	23 $\frac{1}{2}$	281 $\frac{1}{4}$
✓	32 $\frac{8}{2}$	276 $\frac{1}{2}$
✓	344	251°
✓	16 $\frac{1}{2}$	226
✓	AA 23.9	242 $\frac{1}{2}$

Setup N70°E of EG

63.9	173 $\frac{1}{2}$
39.2	158 $\frac{1}{4}$
42.5	153 $\frac{1}{2}$
32.5	134 $\frac{3}{4}$
38.8	92 $\frac{3}{4}$



3-3-13.8

M. J. B. Topog for Quarry Feb 27-19

Line of Tunnel	Dist	HI	HT	Rod	D. Elev
		0° 0'	107.6		
Hub Line Tunnel mouth	137	0° 0'		-7.6	100.0
Tunnel mouth	145	0° 0'		-7.3	100.3
	138.5	35 1/2°		-6.5	101.1
	136	34 1/2°		-7.9	99.7
	132	33 1/4°		-8.1	99.5
	129	32 1/2°		-10.9	96.7
	158	32 90°	L-0.0 +10.55'	+5.3	112.9
	174	32 7° 10'	L-0.0 +20.54'	+8.8	116.4
191	193	32 7° 20'	L-0 +4° 14'	+14.2	121.8
197	198	32 5° 20'	L-0 3° 35'	+12.3	119.9
158	242	32 1/2°	L-0 20.4'	+8.8	110.4
	145	5 3/4°		-5.3	102.3
138.5	142	17 3/4°	L-10.0 +8° 41'	+11.2	118.8
140	143	23 1/2°	L-0.0 +8° 22.1'	-12.6	128.2
130	134	24°	L-10.0 +10° 10'	+13.2	120.8
	117	28°	L-0.0 +2° 15'	+4.6	112.2
118	119	36 1/2°	L-0.0 +4° 50'	+10.0	107.6
122	124	42 1/2°	L-0.0 +6° 20'	+13.6	121.2
	84	44 1/2°		-11.6	96.0
	102	25 0°		-9.5	98.1
	122	10°		-9.8	97.8
203	208	32 1/4°	L-10 +9° 06'	+22.6	130.2
213	220	32 7° 20'	L-10 +9° 5'	+24.2	131.8
233	241	32 1/2°	L-10.0 +9° 42'	+30.0	137.6
243	250	32 8° 10'	L-10.0 9° 50'	+32.0	139.6

Yardage in Quarry above #3 Coyote Hole A.I. 39

124 1/2

Plotted 2/28/18

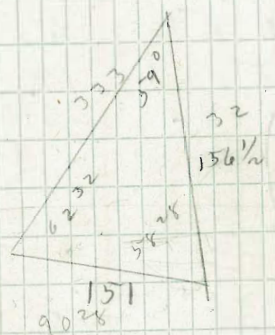
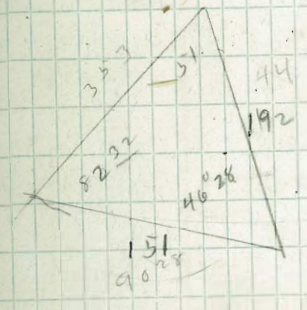
Line of Tunnel	Dist	HI	HT	Rod	D. Elev
150 TP	151	270° 28'			
Setup at TP					
at top of tunnel		90° 28'			
Hub	204	47° 40'		-7° 1'	100.00
146	147	26 3/4°		-4° 50'	112.3
	160	34°		-1.0	123.7
199	201	14°		+6° 3'	145.7
					239° 56'
Hub	163	188	28 1/4°	+13° 42'	164.5
	184	192	27°	+16° 24'	178.9
	173	180	24 1/4°	+14° 40'	170.3
	164	167	33 1/2°	+11° 28'	158.3
	177 1/2	183	39 1/4°	+14° 0'	169.0
	188	194	37 1/4°	+14° 27'	173.1
	206	215	45 1/2°	+16° 30'	185.8
	198	207	37 3/4°	+17° 20'	186.5
	220	231	42°	+17° 46'	195.3
	237	252	40°	+19° 48'	210°
	213	227	37°	+20° 1'	202.4
	195	208	30°	+20° 19'	197.1
	196	209	24 3/4°	+20° 23'	197.5
	217	237	20 3/4°	+23° 28'	219.0
	241	204	19 1/4°	+23° 53'	231.9
	253	266	25 1/4°	+23° 33'	235.1

Hor	Dist	Slope	Azim	Vert. L	Diff elev	Elev
234	255'	27 1/4	+22°35'	98°0	212.7	
212.5	250	29 1/4	+22°25'	87°8	212.5	
225	241	34 3/4	+21°17'	87°5	212.2	
239.5	257	34 1/2	+21°14'	93°0	217.7	
263.5	285	32 1/4	+22°25'	108°5	233.2	
272	293	34 1/2	+22°1'	110°0	234.7	
260	278	37°	+20°35'	97°7	222.4	
240	255	40 1/2	+19°33'	85°4	210.1	
228	239	42 1/2	+17°40'	72°6	197.3	
20	250	44 1/2				
201	204	48 1/2	+12°42'	45°3	170.0	
222.5	227	53°50'	+11°27'	45°0	169.7	
227	233	51°20'	+12°59'	52°5	177.2	
233	241	50 3/4	+15°3'	62°8	187.5	
247	258	47 1/2	+16°46'	73°4	198.1	
283	340	43°	+19°10'	98°5	223.2	
302	322	40 1/2	+20°42'	113°7	249.4	
341	363'	46 1/2	+19°58'	124°4	249.1	
327	342'	49 1/2	+17°58'	105°4	230.1	
310	322'	53°	+15°50'	88°0	212.7	
298	307	56°	+13°55'	74°0	198.7	
270	275	59°10'	+11°24'	54°5	179.2	
262	265	61	+9°10'	42°2	166.9	
257	254	66 1/4	+5°5'	22°5	147.2	
256	257	69 1/4	+5°6'	22°8	147.5	

Hor	Dist	Slope	Azim	Vert. L	Diff elev	Elev
284	287'	70 1/4	+5°15'	26°3	151.0	
294	297	67	+7°40'	39°6	164.3	
305	309	64 1/4	+9°50'	52°8	177.5	
317	323	63 3/4	+11°29'	64°2	198.9	
329	338	60	+12°55'	75°6	200.3	
339	345	54 1/4	+16°53'	109°0	233.7	
①			+6°18'	+21°2	145.9	
②			+4°14'	+11°6	136.3	

To crack over tunnel
 192' ^{on point} 150 1/2
 44° 32°
 from 1st pt
 ① 353°
 ② 333°

Platted 2/28/19
 HJ



$$\frac{151}{\sin 51} = \frac{x}{\sin 82.22}$$

129

MJB ⁹⁴⁹⁶ Concrete Estimate Mar 1st 69

TP. 1307 425.46 412.39

105 10.1 89, 87, 93) av 95

Av elev conc = 416.0

center downstream

2.7 lower than form

430 - 2.7 = 427.3

Sta 3+35 to 3+89

front face

elev section at Left abut

225 From elev forms Book 17

242 av elev = 423.3

~~3.68~~ 427.8 4242

(53, 50, 51, 47, 43, 38 4)

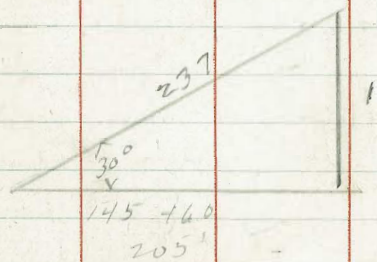
av 45 = 4233

Quarry

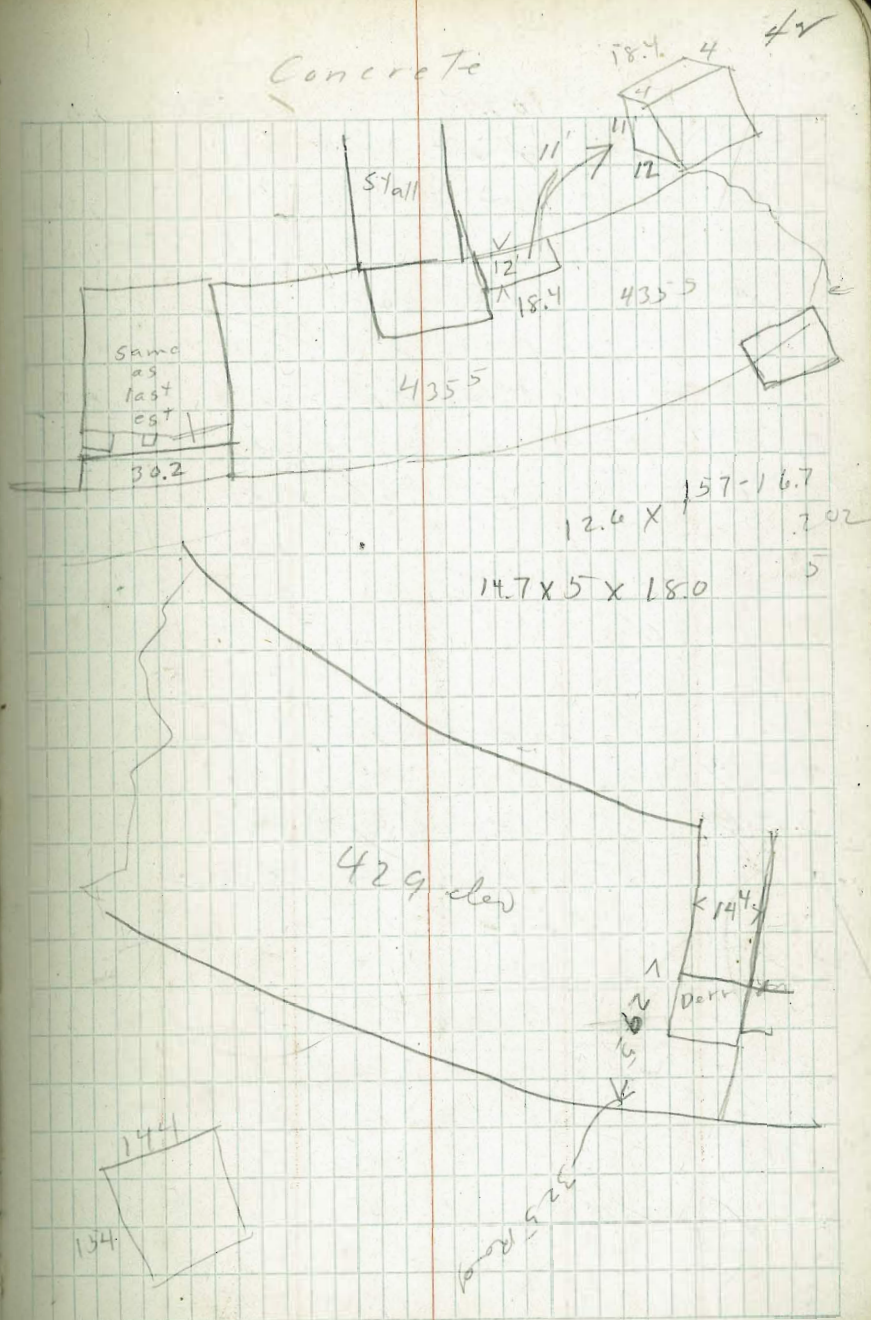
Rid	7.4	107.4		0.0
Mouth Tunnel	136'	0° 0'		
Avy Pt.	164'	294° 32'	rod 1.9	0.55
Avy Pt				
1st Pt	164'	114° 32'	BS. 10.3 4.8	
	93'	50° 0'	4-00 +0° 47'	+1.3 11.6
	91'	44 1/2°	4-2.0 +2° 35'	+2.1 12.4
	95'	38 1/4°	4-00 +3° 13'	+5.2 15.5
	103'	32°	00 +6° 20'	+11.4 21.7
	109'	31°	00 +10° 35'	+19.6 29.9
	114'	28°	00 +10° 17'	+20.3 30.6
	124'	27 3/4°	00 +14° 34'	+31.2 41.5

Setting Quarry stripping stakes

J-B Mar 25-19



Concrete



6-30-19 - 3 P.M.

B-M.F

June - Concrete Estimate
323' Line Gravity Section
length cu yds.

To 5+45.04 190.7 $\times 15.34 =$ 108.3
7+35.74 El. Approx 491.00

Overflow Section

5+21.59 23.45 = $22.87 \times 133.29 =$ 112.9
5+45.04 El. Approx 474.9

3+95.20 125.89 = $122.77 \times 513.12 =$ 2337.25
5+21.59 El. Approx 457.0

Crest Completed from

2+80.77
3+95.70 114.93 = $233.39 \times 0 =$ 0.0
7 Piers completed El. 485.2
80.55 $\times 7 = 563.85 =$ 20.8

Gravity Section

2+76.85 3.87 = $3.79 \times 119.48 =$ 16.8
2+80.77 El. Approx 484.7

Right Divide Wall Completed
El. 454.7 1.3

Deductions

Gravity Section

2+50.24 26.64 = $25.98 \times 15.34 =$ 14.8
2+76.85 Completed El. 491.0

2+22.44 Completed El. 492.3 0.0
2+50.24

1+98.44 24.00 = $23.40 \times 15.34 =$ 13.3
2+22.44 Completed El. 491.0

1+71.24 Completed El. 492.3 0.0
1+98.44

1+44.69 26.55 = $25.87 \times 15.34 =$ 14.7
1+71.24 Completed El. 491.0

0+34 Gravity Section
Dam Completed 0.0
1+44.69 0.0

Total length Completed Parapet

0+35.88 To 2+76.85 241.0 53.5
Completed North Mass Rock Recess 0.0
South Mass Rock Recess 3⁵ 99.0
Yardage 0-00 To 0+34.0 424.5
Left Divide wall Complete El. 474.0 5.6
Total - 6723.0

43

cu yds
14.8

17.04 Est. Class 3

Concrete Estimate July 1919
Parapet & Abutment
325 line.

7+41.0	End of dam	1 =	492.20
7+41.0	" " 4' Wall	.18"	= 6.0
7+41.81	PC	= 325 depth of 18" - 2' of 3'	= 10.88
7+49.81	" " "	18" - 3' " 3'	= 14.96
7+54.81	" " "	18" - 3' " 3'	= 14.30
7+59.81	" " "	18" - 3' " 3'	= 11.33
7+64.81	" " "	18" - 3' - 3'	= 10.65
7+69.81	" " "	18" - 3' - 3'	= 10.43
7+74.81	" " "	18" - 3' - 3'	= 9.9
7+76.31	END - 18" Wall	" " 18' - 3' - 3'	= 9.9
7+95.02	= 3.6 of 3' Wall		= 10.8

Reinforcing to 7+76.31 only

Top of dam only
Gravity Section Left Abut 210 Standards
hand rail 4.35 long 2 1/2" dia Pipe
233 x 21 = 48.93 lin ft x 5.789# per ft = 280.81# @

See page (46)

Right abutment top of dam only
24 pcs - 2 1/2" dia pipe standards 23.3' long
= 55.92 lin ft @ 5.737# per ft = 320.92#

7+41.00	End 4' Wall
5+45.96	PT
1.9504	length 4' Parapet
1170.24	=
7+41.00	to 7+95.02

1.5
4
6.0 5ft Hd
See Page 46 for
total Concrete
43.4 cy

3216	44 bars 1" dia 40' long	Reinforcing Lower end Spillway
5965	17 60/38 Waste	Sides 1" dia
6520	17 24	1722 lin ft
5908	Ad for Ends 7 bars 17'-10"	125 "
5495	2 " 15' = 30 "	
5270	2 " 12' = 24 "	
5083	2 " 9' = 18 "	
1485	2 " 5' = 10 "	
20407	2 " 3' = 6 "	
591.49	Total lin ft 1" = 1935'	
54	3.4# per ft	
51	7740	
37	5805	
24	6579.0#	

54	51	37	24
7/8 Bars	35' long	266.0	
13 "	37.5 "	487.5	
7 "	25.5 "	178.5	
1 "	29.0 "	29.0	
1 "	32.0 "	32.0	
Floor Longitudinal 1/2" dia			
20 bars	128' long	2560.0	
1 "	71' "	71.0	
7 "	117' "	819.0	
1 "	59' "	59.0	
1/2" dia Sides			
2 bars	91' long = 182		
2 bars	86 " = 172		
2 bars	80 " = 160		
2 bars	30 " = 60		
2 bars	40 " = 80		
2 "	47 " = 94		
2 "	53 " = 106		
2 "	58 " = 116		
2 "	63 " = 126		
2 "	67 " = 134		
2 "	78 " = 156		
	139'		

7043.0
13627.0#
Total no#
Reinforcing in
lower end
Spillway
See page
48.

6896.0 lin ft
1390.0
Total 1/2" = 8286.0 lin ft
.85# per ft
41430
66288
7043.10

Reinforcing in floor - overflow section
 longitudinal Transverse

16 bars	14 bars
15 "	14.5 lengths per bar
31 bars 20' long	70
$\frac{70}{620}$ lin ft $\frac{3}{4}$ "	$\frac{14}{2030}$ lin ft. of $\frac{1}{2}$ "
$\frac{1.913 \# \text{ per lin ft } \frac{3}{4}"$	$\frac{.85 \# \text{ per lin ft.}}$
$\frac{620}{38760}$	$\frac{1015}{1624}$
11478	$\frac{174.55 \#}{1186.06}$
1186060 #	1186.06 # per Panel.
Total	$\frac{1358.61}{18}$
	$\frac{1086888}{135861}$
Total	24454.98 # in floor.

Piers - Reinforcing.

Vertical Reinforcing $\frac{1}{2}$ " = 23 bars total lin ft. 1220	
Horizontal " $\frac{1}{2}$ " = 8 bars. 14.5' long = 116.0	
Bull Nose 4 bars 6.7' long	270
U Bars 12 bars 4' long	480
Total lin ft. =	3130
* Per lin ft.	.85
	1565
	250 #
* Per Pier	266.05
No. of Piers	17
	1867.35
Totals # in Piers	26605
	4522.85 #

Date 7/29/19 45

Reinforcing Parapet.

Sta 07 325 R.	$\frac{0+35.88}{5+45.96}$ to $\frac{2+82.51}{7+41.00}$	=	$\frac{24663 \text{ lin ft.}}{195.09 \text{ "}}$
Total length of 4' Parapet to date			441.67 " "
15/44167	294.4 Bars		
$\frac{80}{141}$	$\frac{2}{294.4}$		
$\frac{1.25}{60}$	147 Bars 8' long =	1176 lin ft $\frac{1}{2}$ "	
$\frac{67}{147}$	147 " 8.3 " =	1220 " " $\frac{1}{2}$ "	
		2396 " " $\frac{1}{2}$ "	
		.85 # per lin ft.	
40/44167	11 bars 40' long = 15' lap.		
	442 lin ft.	$\frac{3}{45}$ total lap.	2036.60 # Vertical $\frac{1}{2}$ "
	3 bars $\frac{1}{2}$ "		
	1326		
	45		
	1371 lin ft $\frac{1}{2}$ " horizontal		442 lin ft.
	.85		2- $\frac{5}{8}$ " bars.
	6855		884
	10768		30' lap.
	1165.35 # $\frac{1}{2}$ " horizontal		914 lin ft $\frac{5}{8}$ bars.
			1.33 # per lin ft.
			2742
			2742
			914
			1115.62 # $\frac{5}{8}$ "
See page 47 for Balance of Parapet.			
Left End Dam			
	7+44.00 to 7+74.81 only.	=	3- $\frac{1}{2}$ " - 35' long = 102'
	depth of Reinforced Concrete runs from 4' to 6 inches		20- $\frac{1}{2}$ " - 6' long = 120
			2- $\frac{5}{8}$ " - 35' long = 70
	70 lin ft.	$\frac{222 \text{ lin ft.}}{.85 \# \text{ per lin ft.}}$	2036.60 #
	133 # per lin ft.	1110	1165.35 #
	9310 # $\frac{5}{8}$ "	1776	1215.62 #
		188.7 # $\frac{1}{2}$ "	93.10 #
			188.70 #
Total Reinforcing in Parapet to date			4699.37 #

Reinforced Concrete 7/29/19

$$0 + 35 \frac{88}{10} + 2 + 82 \frac{51}{10} = 246 \frac{63}{10} \text{ lin ft. on 325 R}$$

$$5 + 45 \frac{96}{10} + 7 + 41 \frac{00}{10} = 195 \frac{04}{10} \text{ " " " "}$$

$$441 \frac{67}{10} \text{ " " " "}$$

Center Gravity = 323.5R = 441.20 lin ft

END Area $\frac{6}{52} \text{ ft.}$

See sheet
20 Estimate
con for Balance

Add for toe $\frac{2646 \text{ cu ft.}}{37 \text{ cu ft.}}$

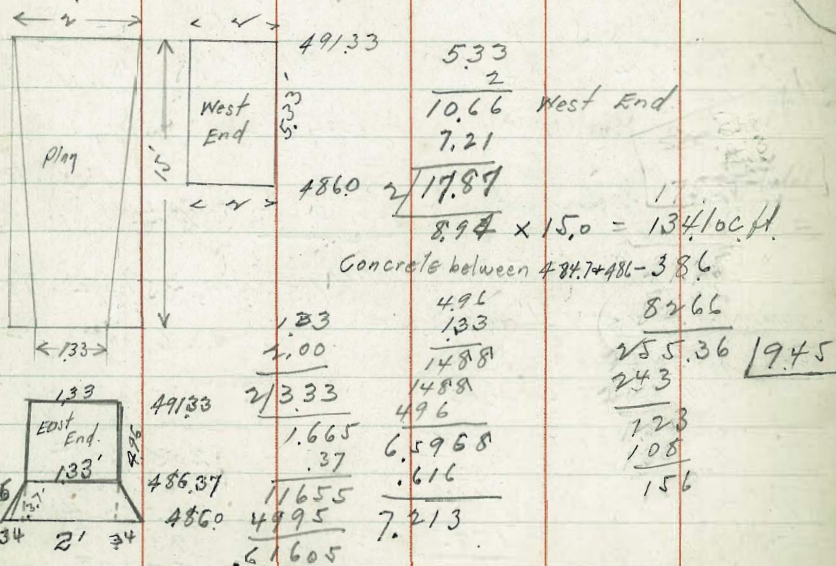
2678 cu ft.

27 | 2678 | 179.2 c.y.

$\frac{243}{248}$ | 21.9 Add for left end See page 44

$\frac{243}{50}$ | 121.1 c.y. in Parapet to date.

New Section for Piers



7/29/19 46

Metal Work in Dam

See page 44 {2 1/2" Pipe}

21 Standards 2 1/2" Dia - 7.35 long = 280.81 #

24 " " " " 7.33 " = 320.92 #

Overflow Section

51 Standards 2 1/2" dia 7.33 long = 681.97 #

Standards for stairs + rail to be added 1243.70

8" Pipe

18 pos 2' long 8" dia .025 thick @ 25# per lin ft =

36 lin ft. @ 25# per lin ft. = 900 #

956 in Pier proper before change in Section

9.45

.11 c.y. less

18 = 17 Piers + 2 ends

88

198 deduct from total

171.83 = total Piers + Cut waters

1.98

169.85 = total Piers + Cut waters

Balance of
Reinforcing in Parapet.

$-0 + 38.47$ to $0 + 35.88 = 74.35$ lin ft.
1.13 add for curve

75.5 lin ft.
3 - 1/2" bars

75.48 length

2 - 5/8" bars

151.0 lin ft. 5/8"

$- 246.5$ lin ft 1/2"

15 | 755
75
5

50 bars

25 bars 8' long = 200' lin ft.

25 bars @ 8.3' long 207.5"

→ 226.5"

151. lin ft 5/8"

1.33 # per lin. ft.

453

453

151 #

200.83

547.4 # Total

~~748.2~~

See Next Page
for Totals Reinforcing Parapet

lap = 634.0 lin ft.
lap 10

Total lin ft. 644 lin
1.85 # per ft.

3 x 10

51.52

547.40 #

Reinforcing Steel

Totals July Estimate

Reinforcing Lower End Spillway 13672
 " Upper End Spillway 8668
Total Floor July Estimate = 22290#
 See page 51 for final

Floor over overflow Section Dam 24455 #
 Piers " " 4523 #
 Parapet $\left. \begin{array}{l} 0+35^{88} \text{ to } 2+8^{51} \\ 5+45^{96} \text{ to } 7+41^{00} \\ 7+41^{22} \text{ to } 7+74^{91} \end{array} \right\} 4699 \#$
 Parapet $-0+38^{41} \text{ to } 0+35^{88} = 748 \#$
 July Estimate Total 34425#

Pipe 2 1/4"
 96 Standards not final 1284 #
 See Next Page

8" Standard Pipe 900 #
 18 pcc. total see Next Page.

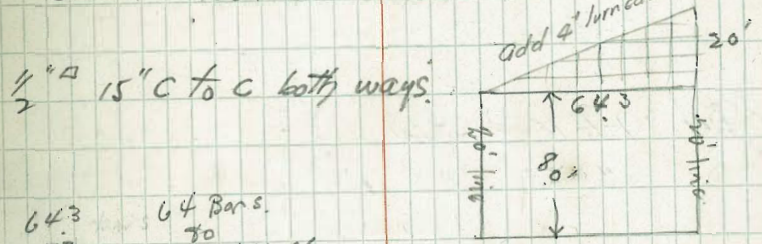
Sheet Copper. Contr Joints.

Remaining on job Aug. 6 1919
 16 Large Sheets @ 19# 304 #
 57 Small Sheets @ 16# 912 #
1216 #

Total Copper delivered on job = 2946.5
 Total copper used to date 1730.5 8/6/19

Reinforcing Spillway Floor Entrance

643' dist between 20' lines
 64 bars running length wise
 53 " across channel. 1X W Cor. Floor.



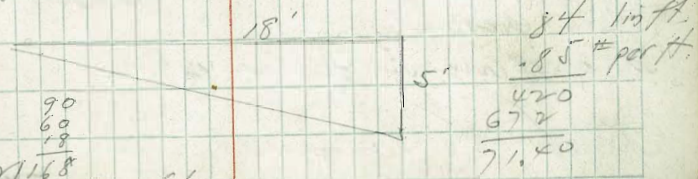
1/2" 15" c to c both ways.
 643 64 Bars.
 53 5120' lin ft.
 1949
 3215
3407.9 lin ft

64 53
 3 125
 194 265
 125 106
 960 53
 384 6625 lap.
 192
 4000 lap.
 66
306' lin ft lap.

1/2 Δ = 1280
 3408 lin ft.
 5120
 1280
 306
10114 lin ft.
 .85# per lin ft
 50570
 80912 #
8596.90 #
 7140
8668.30

5 bars
 18
 40
 90' lin ft 1/2"
 14 bars.
 5 90
 60' lin ft. 60
 18
 14 laps = 2168
 125 84' lin ft.
 230 = 18'

S.E. Cor. Floor



84' lin ft.
 .85# per ft.
 420
 672
7140

To July 31

Total Metal Work in Dam #

935# = 6" Pipe 1 935

Reducer = 555#

2-12' lengths 3000#

1-20" Nipple 167#

16" Outlet 1-6' length with Bell 900#

1-16" Gate & Bypass 11.00#

6 lengths @ 1500# 9000#

8" @ 133# 1064#

Total = 15786# - 16" Outlet #

15786

Copper Expansion Joints total = 1730#

3/4" Pipe band Rail 96 Standards @ 5.739 1284#

8" Pipe in Piers 18 Pcs @ 25# 900#

July Estimate 20635#

Steel doors 797

August Estimate Stairways Pipe 771

August Estimate = 22203#

Total

49

Estimate for Remaining Rail

to be installed

267' x 2

stairs 12 Standards

520' x 2

31

782' 1/2 ft 2"

2

1564' 1/2 ft

62' - 2"

124'

2 stairs

1688' 1/2 ft 2" Pipe @

124' 1/2 ft 2"

3652#

= 6165#

96 Standards in

17 " for stairs

108 total 2 1/2" Pipe

2

216 Standards 2.331029 = 503.28 @ 5.739 = 2888

Say 216" 2 1/2" to 2" TS = @ 3" = 648

See page 53 New figures

for total pipe

+ Metal Work

9701#

1284

8417

20635

29057

8/8/19 In. Spillway all $\frac{1}{2}$ "^D bars.

F-B.

Additional Floor.

31 bars 10' running length wise =	310 lin ft
31 laps 40'	40"
7 bars across channel 39' long	273"

North Wing Wall Inside


52 Vertical bars 8' to 18' Average 10' =	520 lin ft
19 bars horizontal Average 40'	760"
52 laps 68 lin ft	68"

15.6
67

South Wing Wall Inside

13 35' long = 27 bars = ^{8 bars 9' long} Average 15' long	72 lin ft
8 horizontal bars 35' long	280"
10 " " Average 13'	130"

Piers + Bull Mases.

3  - 7.3 = 22'	
4 - 6' horizontal bars 24	
6 - 5' " " 30'	
6 - 6' Vertical " 36	
1 - 10' bar in Mase = 10'	
2 - 15 bars = 3	

175 x 13 Piers = 1625 lin ft

4363"

In Spillway all $\frac{1}{2}$ "^D bars. 50

S.E. Cor.

9 Vertical bars 8' long =	72 lin ft
6 horizontal " 10' " =	60"

SW Cor. + NW Cor.

13 Vertical bars 8' long	104"
7 horizontal bars 8' long =	56"
7 " " 5' " =	35"

Two Corners — 195
390"

South O.G. Section

15 horizontal bars 84' long	1260 lin ft
15 laps @ 1.3	20"
64 bars Vert. 26' long	1664"

North O.G. Section

15 horizontal bars 64' long	960"
54 bars Vertical 26' long	1404"
15 laps @ 1.3	20"

North East Corner

7' bars horizontal @ 302	210 lin ft
23' " Vertical 8'	184"

6244

8/8/19

Carried forward 10607

B-F.

Wing Walls outside

length 43' = 43 bars Average 28 = 344 lbs

6 bars horizontal average 43 = 258 "

602
Walls. 2
1204 lbs

11811

72290

Add July Estimate

Total Steel in Spillway 34101

In Error.

total length 11811 lin ft.
.85 # per ft.

59055

94488 #

1003935

72290.00 July Estimate

34379.35 # total numberpound in Completed Spillway
Deduct pounds in Piers asst
WO #15.

51

WO #15 - Reinforcing in
Piers + Bullnose Spillway

Piers + bullnose	1625 lin ft.
S.E. Cor.	132 " "
SW + NW Cor.	390 " "
N.E. Cor.	394 " "
Outside Wing Walls	1204
	3745 lin ft.
	.85
	18725
	29960
	318325 # to WO #15

37379.35 total in Spillway
3183.2539146.0 # final total

9/6/19

Excavation Roadway Approach
End of dam Rt. Abutment.

	Right	Left	width	
00 = East line of dam	30cut	00	13.0	19.5
+25	50	00	13.0	32.5
+50	45	00	15.0	33.8
+70	55	00	15.0	41.3
+85	65	00	15.0	48.8
+110	6.0	00	17.0	51.0
+110	6.0	2.5	17.0	72.3
+148	6.0	2.5	17.0	72.3
+148	6.0	00	17.0	51.0
+168	5.4	00	17.0	45.9
+175	4.0	00	17.0	34.0
2+00	4.5	00	10.	22.5
2+20	00	00	00	00

52

650,00

828.8

751.0

67.58

1247.5

2747.4 to be removed after tower is dismantled

996.9

279.7

706.0

2250

82081

5554

27/82081 / 304

$$\begin{array}{r} 81 \\ \hline 108 \\ 108 \end{array}$$

$$\begin{array}{r} 82081 \\ 2747.4 \\ \hline 5460.7 \end{array}$$

$$\begin{array}{r} 5460.7 \\ \hline 5460 \end{array} \quad (202)$$

Give 75 cu yds to August Estimate

75 cu yds to August Estimate

127 " " to Sept Estimate

102 " " when yardage under tower

304 " " in Cut when Completed

Total Pipe on Dam
& Stairways

	#
12 + R" posts 4.33' length = $52 \frac{1}{2}$ lin ft 2" pipe @ 5.739# per ft	298.5
12 - 2 x 1/2 Crosses @ 3#	36
12 - 2 x 1/2 tees @ 2#	24
8 - 1/4 Ells. @ 1#	8
4 - 2 x 1/2 Ells. @ 2#	8
148 lin ft 1/2" pipe @ 2.68	396.6

Upstream face Spillway

25 - standards 4.33 - 2 1/2" pipe @ 5.74 = 108.25	621.4
25 - 2 1/2 x 2 Crosses @ 6.25#	156.3
25 - 2 1/2 x 2 tees @ 5.5#	137.5
530 lin ft 2" pipe @ 3.61	1913.3

Gravity section left Abut.

21 - 2 1/2" pipe 4.33 - 91.0 lin ft @ 5.74	522.3
21 - 2 1/2 x 2 Crosses @ 6.25	131.3
21 - 2 1/2 x 2 tees @ 5.5	115.5
380 lin ft 2" pipe @ 3.61	1371.8

Downstream face Spillway

25 standards 2 1/2" x 4.33 = 108.25 @ 5.74	621.4
25 - 2 1/2 x 2 Crosses @ 6.25#	156.3
25 - 2 1/2 x 2 tees @ 5.5	137.5
500 lin ft 2" pipe @ 3.61	1805.0

Total Metal placed in Dam

53

Gravity section Right abut.

28 - posts 2 1/2" x 4.33 = 121.24 x 5.74 =	696.0
28 - 2 1/2 x 2 Crosses @ 6.25	175.0
28 - 2 1/2 x 2 tees @ 5.5	154.0
560 lin ft 2" pipe @ 3.61	2021.6
add for ells + fittings in concrete	25.0

Steel Doors @ 15.3# per sq'

Area of 1/2 Circle 2' R = 6.28

Area 2 x 5 = 10

16.28 sq ft

15.3#

48.84

81.40

16.28

749.084

3 doors

747.254

747.3

Add for fittings

50.0

Total Pipe + doors = 12329.6

6" Pipe 935.0

16" Outlet 15786.0

8" Pipe 900.0

Copper 1730.0

Total Metal in Dam 31680.6

9/16/19 sections of Balance of Sand
 Bob-Mixer in stock file.

Hub-0+50-4582 2.90 86.57 83.67

0+50 line

300	+0.5	87.1
325	48	86.9
350	10.3	76.3
375	12.2	74.4
392	15.4	71.2
400	14.6	72.0
425	9.0	77.6
4582	2.9	83.67

0+75 line

4582	40	82.6
438	73	79.3
400	16.0	70.6
375	16.6	70.0
350	15.5	71.1
325	8.7	77.9
300	2.6	84.0

8 m #6.
 Rock in Wind Basin 0.83 95.72 494.89
 TP Rock 2.10 85.67 12.15 83.57

0+85 line = 00

125	90	76.7
150	50	80.7
175	12	84.5
185	42	81.5

1+25 line

178	82	77.5
175	73	78.4
170	49	80.8
150	62	79.5
125	84	77.3
100	140	71.7
90	17.5	68.2

TP Rock 341 78.43 10.65 75.02

9/16/19

Sections Balance Sand
Stock Pile1+00 line
8657

300		51	815
325		102	764
350		17.5	69.1
375		17.9	68.7
400	✓	16.6	70.0
425		13.0	73.6
458		6.6	80.0
475		5.5	81.1

T.P. Rocks 372 78.54 1175 74.82

1+25 line

500		1.2	77.3
475		3.0	75.5
458		3.7	74.8
425		6.4	72.1
400		10.4	68.1
375	✓	11.3	67.2
350		11.3	67.2
325		8.2	70.3
300		2.2	76.3
275		+1.4	79.9

✓

55

7843

1+50 line

115		9.2	69.2
120		6.5	71.9
125		7.6	70.8
150		2.4	76.0
160	✓	1.0	77.4
170		3.7	74.7
175		4.0	74.4

1+75 line

165		8.2	70.2
159		5.2	73.2
150		6.3	72.1
140		9.4	69.0
135		8.0	70.4
125		10.7	67.7
123 Ground		11.3	67.1

2+00 line

125		14.0	64.4
130		13.7	64.7
143		9.8	68.6
150		11.6	66.8
160 Ground		12.6	65.8

2+10 = 00

✓

1+50 line
78.5-4

277.5			
275		3.8	74.7
300		7.0	71.5
325		12.0	66.5
335		14.7	63.8
350		15.2	63.3
375		14.5	64.0
400		12.5	66.0
425		10.1	68.4
458		7.3	71.2
475		6.8	71.7
500		4.5	74.0

1+75 line

500		9.4	69.1
475		9.6	68.9
458		9.9	68.6
425		12.9	65.6
400		16.0	62.5
375		17.0	61.5
350		19.0	59.5
325		18.7	59.8
300		13.0	65.5
275		9.0	69.5
250		5.8	72.7

Gravel Sections

56

00 = 00 Area

0+50	$\frac{9.2}{15}$	6.1	$\frac{5.5}{50}$	$\frac{18.0}{22}$	
1+00	$\frac{4.4}{40}$	$\frac{2.0}{25}$	2.8	$\frac{3.0}{10}$	$\frac{15.6}{35}$
1+50	$\frac{4.0}{18}$	0.8	0.0	$\frac{2.0}{17.0}$	$\frac{10.0}{33}$
1+75		1.0	0.0	$\frac{1.4}{14}$	$\frac{5.4}{22.0}$

TP Rock. 7854
313 69.82 1185 66.69

R+00 line

2+50	12	58.6
2+75	59	63.9
300	101	59.7
306	123	57.5
325	125	57.3
350	128	57.0
375	126	57.2
400	96	60.2
420	84	61.4
458	40	65.8
475	34	66.4
500	46	65.2

R+25 line

500	83	61.5
485	43	65.5
475	55	64.3
458	66	63.4
445	88	61.0
400	115	58.3
375	147	55.1

	2+25 line		
350	69.82	16.6	53.8
325		15.4	54.4
300		13.5	56.3
275		11.5	58.3
250		6.7	63.1
225		5.2	64.6

TP Root. 1.60 59.72 11.70 58.12
2+50 line

225		7.0	60.7
250		0.7	59.0
275		4.3	55.4
290		10.0	49.7 119
300		10.7	49.0
325		7.0	52.7
350		6.0	53.7
375		6.1	53.6
400		3.0	56.7
425		0.0	59.7
458		12.0	61.7
	655	63.72	2.55 57.17
458		1.0	62.7
470		6.8	56.9

458
1.8
443 58

	2+75 line		
443	63.72	10.0	53.7
425		6.0	57.7
400		10.5	53.2
375		14.5	49.2
350		18.8	44.9
325		21.3	42.4

Bulkhead Average 2+60

✓

5 17 17
 5 26 24
 2 27
 546 6

10 0 52 53
 20 1 45 45
 30 2 38 38
 40 3 31 31
 50 4 24 24

60
 70
 80
 90
 100

84848

29496
 54596
 32496
 221

17° 37 36
 1 45 45
 5 17

18 87 98

4.9-28-5

Stack of graph paper with various handwritten notes and diagrams.

Top sheet (white):

- Handwritten numbers: 100, 70, 65, 55, 45, 35, 25, 15, 5.
- Diagram: A triangle with vertices labeled 'REP', 'L' (top), and 'R' (right). Side lengths include 100, 70, 65, 55, 45, 35, 25, 15, 5. Angles are marked with '17°' and '37°'. Other labels include 'L' and 'R' near vertices.
- Text: "L' 27", "100", "70", "65", "55", "45", "35", "25", "15", "5".

Second sheet (white):

- Handwritten numbers: 100, 70, 65, 55, 45, 35, 25, 15, 5.
- Diagram: A triangle with vertices labeled 'REP', 'L' (top), and 'R' (right). Side lengths include 100, 70, 65, 55, 45, 35, 25, 15, 5. Angles are marked with '17°' and '37°'. Other labels include 'L' and 'R' near vertices.
- Text: "L' 27", "100", "70", "65", "55", "45", "35", "25", "15", "5".

Third sheet (white):

- Handwritten numbers: 100, 70, 65, 55, 45, 35, 25, 15, 5.
- Diagram: A triangle with vertices labeled 'REP', 'L' (top), and 'R' (right). Side lengths include 100, 70, 65, 55, 45, 35, 25, 15, 5. Angles are marked with '17°' and '37°'. Other labels include 'L' and 'R' near vertices.
- Text: "L' 27", "100", "70", "65", "55", "45", "35", "25", "15", "5".

Bottom sheet (white):

- Handwritten numbers: 100, 70, 65, 55, 45, 35, 25, 15, 5.
- Diagram: A triangle with vertices labeled 'REP', 'L' (top), and 'R' (right). Side lengths include 100, 70, 65, 55, 45, 35, 25, 15, 5. Angles are marked with '17°' and '37°'. Other labels include 'L' and 'R' near vertices.
- Text: "L' 27", "100", "70", "65", "55", "45", "35", "25", "15", "5".

Sin 43° 11' = .6843

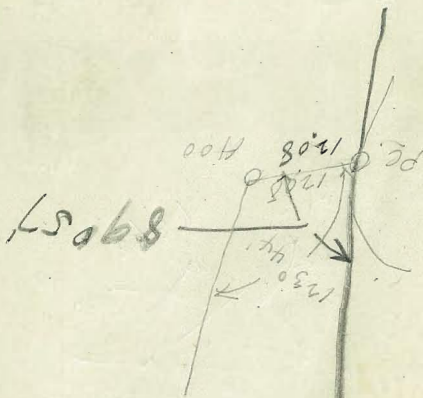
6843

10136
7602
15202

6843

16065.56
13726
33395
20529
28566

23
4



pc to A00
1533
1506
1508

0634
7070
15202
15202
15202
15202
15202
15202
15202
15202

19600
14880
50160

2700000 (3702)

3703
238
5937
27
27
56
18710
1534085

Tan 43° 11' = .9643

8938 : 27
64
284
128
9035

6322 : 27 : 9388 : X

21
328
6841
4224
2294
8938

84
15
420
84
1860
8938 = 6320
13 - 6810

$$\begin{array}{r} 57 \\ 13/84 \end{array}$$

$$\begin{array}{r} 57 \\ 13/84 \end{array}$$

$$\begin{array}{r} 51 \\ 13/84 \end{array}$$

$$\begin{array}{r} 57 \\ 13/84 \end{array}$$

$$\begin{array}{r} 31 \\ 13/84 \end{array}$$

$$\begin{array}{r} 128 \\ 13 \\ \hline 1625 \end{array}$$

$$\begin{array}{r} 4872 \\ 1004 \end{array}$$

$$497.24$$

$$5.04$$

$$63.2$$

$$62.2$$

$$\begin{array}{r} 65 \\ 50 \\ \hline 1150 \\ 559 \\ \hline 999 \end{array}$$

$$59.2$$

$$\begin{array}{r} 13 \\ 43 \\ \hline 39 \\ 52 \end{array}$$



$$\begin{array}{r} 13 \\ 2795 \\ \hline 3354 \\ 2136335 \end{array}$$

$$125/19$$

$$19 \times \frac{25}{3}$$

$$\begin{array}{r} 19 \\ 15 \\ \hline 13 \\ 15 \\ \hline 13 \\ 15 \end{array}$$

200

$$15.18$$

$$\begin{array}{r} 400 \\ 200 \end{array}$$

$$63.2$$

$$\begin{array}{r} 37.5 \\ 15 \\ \hline 500000 \\ 500000 \\ 500000 \\ 500000 \\ 500000 \\ 500000 \\ 500000 \\ 500000 \\ 500000 \\ 500000 \end{array}$$

$$\begin{array}{r} 27 \\ 15 \\ \hline 15 \\ 15 \\ \hline 15 \\ 15 \end{array}$$

92
87
5

5 17
5 17 17
26 24
2 27
546 6

10 0 52 53
20 1 45 45
30 2 38 38
40 3 31 31
50 4 24 24
60
70
80
90
100 8 48 48

29490
54596
32496
221

17° 37 36
1 45 45
5 17

18 87 98

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.
ROADWAY 14 FEET WIDE. SIDE SLOPES 1½ TO 1.
FOR SINGLE TRACK EMBANKMENT.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	7.0	7.2	7.3	7.5	7.6	7.8	7.9	8.1	8.2	8.4	0
1	8.5	8.7	8.8	9.0	9.1	9.3	9.4	9.6	9.7	9.9	1
2	10.0	10.2	10.3	10.5	10.6	10.8	10.9	11.1	11.2	11.4	2
3	11.5	11.7	11.8	12.0	12.1	12.3	12.4	12.6	12.7	12.9	3
4	13.0	13.2	13.3	13.5	13.6	13.8	13.9	14.1	14.2	14.4	4
5	14.5	14.7	14.8	15.0	15.1	15.3	15.4	15.6	15.7	15.9	5
6	16.0	16.2	16.3	16.5	16.6	16.8	16.9	17.1	17.2	17.4	6
7	17.5	17.7	17.8	18.0	18.1	18.3	18.4	18.6	18.7	18.9	7
8	19.0	19.2	19.3	19.5	19.6	19.8	19.9	20.1	20.2	20.4	8
9	20.5	20.7	20.8	21.0	21.1	21.3	21.4	21.6	21.7	21.9	9
10	22.0	22.2	22.3	22.5	22.6	22.8	22.9	23.1	23.2	23.4	10
11	23.5	23.7	23.8	24.0	24.1	24.3	24.4	24.6	24.7	24.9	11
12	25.0	25.2	25.3	25.5	25.6	25.8	25.9	26.1	26.2	26.4	12
13	26.5	26.7	26.8	27.0	27.1	27.3	27.4	27.6	27.7	27.9	13
14	28.0	28.2	28.3	28.5	28.6	28.8	28.9	29.1	29.2	29.4	14
15	29.5	29.7	29.8	30.0	30.1	30.3	30.4	30.6	30.7	30.9	15
16	31.0	31.2	31.3	31.5	31.6	31.8	31.9	32.1	32.2	32.4	16
17	32.5	32.7	32.8	33.0	33.1	33.3	33.4	33.6	33.7	33.9	17
18	34.0	34.2	34.3	34.5	34.6	34.8	34.9	35.1	35.2	35.4	18
19	35.5	35.7	35.8	36.0	36.1	36.3	36.4	36.6	36.7	36.9	19
20	37.0	37.2	37.3	37.5	37.6	37.8	37.9	38.1	38.2	38.4	20
21	38.5	38.7	38.8	39.0	39.1	39.3	39.4	39.6	39.7	39.9	21
22	40.0	40.2	40.3	40.5	40.6	40.8	40.9	41.1	41.2	41.4	22
23	41.5	41.7	41.8	42.0	42.1	42.3	42.4	42.6	42.7	42.9	23
24	43.0	43.2	43.3	43.5	43.6	43.8	43.9	44.1	44.2	44.4	24
25	44.5	44.7	44.8	45.0	45.1	45.3	45.4	45.6	45.7	45.9	25
26	46.0	46.2	46.3	46.5	46.6	46.8	46.9	47.1	47.2	47.4	26
27	47.5	47.7	47.8	48.0	48.1	48.3	48.4	48.6	48.7	48.9	27
28	49.0	49.2	49.3	49.5	49.6	49.8	49.9	50.1	50.2	50.4	28
29	50.5	50.7	50.8	51.0	51.1	51.3	51.4	51.6	51.7	51.9	29
30	52.0	52.2	52.3	52.5	52.6	52.8	52.9	53.1	53.2	53.4	30
31	53.5	53.7	53.8	54.0	54.1	54.3	54.4	54.6	54.7	54.9	31
32	55.0	55.2	55.3	55.5	55.6	55.8	55.9	56.1	56.2	56.4	32
33	56.5	56.7	56.8	57.0	57.1	57.3	57.4	57.6	57.7	57.9	33
34	58.0	58.2	58.3	58.5	58.6	58.8	58.9	59.1	59.2	59.4	34
35	59.5	59.7	59.8	60.0	60.1	60.3	60.4	60.6	60.7	60.9	35
36	61.0	61.2	61.3	61.5	61.6	61.8	61.9	62.1	62.2	62.4	36

Calculated by Julien A. Hall, M. Am. Soc. C. E.