Morena Reservoir Dam and Spillway and Safe Duty Enlargement.

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Index

Retaining Wall Additional Work = Page 77.

Spans + Gates Length = " 78.

Index

Subject. Estimates.	Page
X section Excavation Masonry Wall.	1-5
X section Old Masonry Wall.	7-10
Elevation Top of New Rubble Masonry Wall	11
X section Road South of Dam	15-18
X sections Road May estimate.	20-22
May estimate Rubble Wall	23
X sections Channel below Spillway	24-28
June Estimate Road South Dam.	29-33
June Estimate Channel Spillway opposite	39-41
Final Estimate Outlet Tower.	42
X sections Channel Spillway opposite	34-37
Final Estimate Parapet Wall	43-44
Final Estimate Piers & Steel Bridge	46-47
Record of Spans & Gates Lengths.	78
July Estimate Channel below Spillway	48-51
Structural Steel Spillway	47
Retaining Walls N.E. end Spillway.	76
Concrete Deck Slab Irregular Section	75
Back Fill Retaining Walls N.E. End Spillway.	74
Concrete Piers (Field Meas.)	72
Final Record on Drill Holes in Spillway.	12
Final Record on Drill Holes in Parapet Wall	13-14 52-53
Final X section Spillway Last revised.	54-59
Final X sections Road S. of Dam	60-68
Pipe Rails	73.

Morena Reservoir Dam Spillway S.D. Enlg. 4/7/30

X-sections for Excavations along Parapet Wall

Bonham Dewing Moore

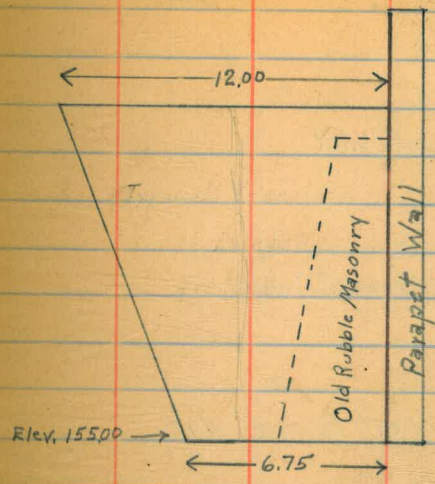
Sta	+	℄	−	Elev.	
	9.58	168.20		158.62	T.P.
			1.77	166.43	B.M. Bolt on South Pilaster

0+00

+03.2

+30 Angle Pt.

+31.5 ℄ Diagonal line = 0+30 Parapet Wall



Typical X-section of Excavation for New Rubble Masonry Wall.

Excavation	Sq. Ft.	Cu. Ft.
164.2 / 4.2 / 0	0	
		152.63
163.6 / 4.6 / 12 ; 164.2 / 4.2 / 0	82.50	
		2157.39
163.6 / 4.6 / 12 ; 163.8 / 4.± / 0	81.56	
		122.34
163.6 / 4.6 / 12 ; 163.8 / 4.± / 0	81.56	
		122.34

Note — Excavation quantities given include old rubble masonry. To obtain correct amount of excavation deduct cu yds. of old rubble masonry as obtained pages 7-10.

Notes copied from Bk # 310 pages 1-4

W.F.B.

Sta	+	℄	−	Elev
		168.20		
0+33 ℄ = 0+30		0+30 Parapet Wall		
+51.5 ℄		Angle PT. = 0+50 Parapet Wall		
+52.35 ℄		On Diagonal = 0+50 Parapet Wall		
℄ 53 ℄ +50		= 0+50 " "		
+75		= 0+75 " "		
1+00				
+25				
+50				

		Excavation Sq FT	Excavation Cu. FT.
163.6 / 4.6 / 12	163.8 / 4.1 / 0	81.56	
			1718.28
163.0 / 5.2 / 12	163.7 / 4.5 / 0	78.28	
			58.71
163.0 / 5.2 / 12	163.7 / 4.5 / 0	78.28	
			58.53
162.9 / 5.3 / 12	163.7 / 4.5 / 0	77.81	
			1916.00
162.6 / 5.6 / 12	163.5 / 4.2 / 0	75.47	
			1875.00
162.7 / 5.5 / 12	163.2 / 5.0 / 0	74.53	
			1904.25
162.9 / 5.3 / 12	163.7 / 4.5 / 0	77.81	
			1939.38
163.0 / 5.2 / 12	163.5 / 4.7 / 0	77.34	
			1957.00

Sta	+	℄	−	Elev.	Excavation Sq. Ft.	Excavation Cu. FT.
		168.20				
1+75					79.22	
						1986.38
2+00					79.69	
						1974.63
+25					78.28	
						1992.13
+50					81.09	
						2015.50
+75					80.15	
						1997.88
3+00					79.68	
						2009.63
+25					81.09	
						2027.25
+50					81.09	
						2021.50

$163\frac{1}{12}$ $163\frac{8}{0}$

$163\frac{2}{12}$ $163\frac{8}{0}$

$163\frac{2}{12}$ $163\frac{5}{0}$

$163\frac{4}{12}$ $163\frac{7}{0}$

$163\frac{3}{12}$ $163\frac{8}{0}$

$163\frac{2}{12}$ $163\frac{8}{0}$

$163\frac{5}{12}$ $163\frac{8}{0}$

$163\frac{3}{12}$ $164\frac{0}{0}$

Sta	+	℄	−	Elev.	Excavation Sq FT	Excavation Cu. FT.
		168.20				
3+75				163.2 / 5.0 / 12 — 164.2 / 4.3 / 0	80.63	
						2021.50
4+00				163.2 / 5.0 / 12 — 164.1 / 4.1 / 0	81.09	
						2015.50 / 2015.15
+25				163.2 / 5.0 / 12 — 163.9 / 4.3 / 0	80.15	
						1997.88
+50				163.2 / 5.0 / 12 — 163.8 / 4.2 / 0	79.68	
						1997.88
+75				163.2 / 5.0 / 12 — 163.9 / 4.3 / 0	80.15	
						1997.88
5+00				163.2 / 5.2 / 12 — 164.0 / 4.3 / 0	79.68	
						1986.25
+25				163.4 / 4.8 / 12 — 163.5 / 4.7 / 0	79.22	
						592.39
+32.5	BC.			163.2 / 5.0 / 12 — 163.6 / 4.6 / 0	78.75	
						565.31

Sta	+	H.I.	−	Elev.	
		168.20			
5+39.7 ℄					
5+48.1 ℄					
5+57.1 ℄					
5+65.8 ℄					
5+75.0 ℄					
			1.66	166.54	B.M. on Bolt on North Pilaster
T.P.			9.22	158.98	
	0.76	159.74			
			6.89	152.85	old Elev. 152.84 on rock Eastend spillway

		Excavation Sq.Ft.	Excavation Cu.FT.
163.2 / 5.0 / 12	163.5 / 4.7 / 0	78.28	
			672.90
163.2 / 5.2 / 12	163.1 / 5.1 / 0	76.41	
			656.59
162.9 / 5.3 / 12	163.0 / 5.2 / 0	74.53	
			638.18
162.6 / 5.6 / 12	162.8 / 5.4 / 0	72.18	
			657.57
163.6 / 5.6 / 12	162.5 / 5.7 / 0	70.77	
		Total	45,806.23
			45,806.58 ✓

cu.ft.
45,806.23 ÷ 1696.53 cu.yds. excavation

Computed W.M.C. Chkd-4/30/30-WDW ✓ 1696.54
Checked B.F.M. 279.82 ✓
Total cu.yds to parapet wall 1696.53 1416.72 ✓
Total old rubble wall (see pages 7-10) 279.84
(see next Page.) Total excavation 1416.69 cu.yds.

5+75°

5+79

Excavation

	Sq. ft.	Cu. yds.
Corrected Total of Excavation		1416.72
	70.77	
		10.48
	70.77	
		1427.20
Extra old Rubble Wall {See page 10}		3.01
Grand Total Excavation.		1424.19

Computed W.M.B.

Note:-

Chkd - 5/29/30 - H.D.W.

X-section for quantities of old Rubble Masonry along Parapet of Dam

4/15/30
Bonham
Dewing
Merre

Sta	+	π	−	Elev.
	0.75	167.18		166.43

B.M. Bolt on South Pilaster

0+00

+25

+30

+50

+75

1+00

+25

+50

Notes copied from BK #310
Pages 18-20

7

	0=Edge Parapet	Old Rubble Masonry Wall	
		Sq. Ft.	Cu Yds.
155.0 / 1.2	163.8 / 3.4 / 1.6	163.8 / 3.4 / 0	
		15.40	
			17.95
Not Plotted or Computed: 155.0 / 2.1	162.5 / 4.7 / 1.2	162.5 / 4.7 / 0	
155.2 / 2.1	162.2 / 5.0 / 2	162.2 / 5.0 / 0	
		16.92	
			12.27
155.0 / 2.2	162.2 / 5.0 / 1.8	162.2 / 5.0 / 0	
		16.20	
			14.05
155.0 / 2.3	161.9 / 5.3 / 1.8	161.9 / 5.3 / 0	
		14.15	
			12.56
155.0 / 2.3	161.5 / 5.7 / 1.8	161.5 / 5.7 / 0	
		13.00	
			11.90
155.0 / 2.3	161.5 / 5.7 / 1.6	161.5 / 5.7 / 0	
		12.68	
			12.32
155.0 / 2.6	161.2 / 6.0 / 1.7	161.2 / 6.0 / 0	
		13.95	
			12.73

Sta	+	℄	−	Elev.
		167.18		
1+75				
2+00				
+25				
+50				
+75				
3+00				
+25				
+50				

Old Rubble Masonry Wall

			Sq Ft	Cu Yds.
155.9 / 2.3	161.3 / 5.9 / 2.0	161.3 / 5.2 / 0	13.55	
				11.50
155.0 / 1.9	161.1 / 6.1 / 1.8	161.1 / 6.1 / 0	11.29	
				10.60
155.0 / 2.0	161.2 / 6.1 / 1.8	161.2 / 6.1 / 0	11.59	
				11.54
155.0 / 2.3	161.2 / 6.0 / 2.0	161.2 / 6.0 / 0	13.33	
				12.06
155.0 / 2.2	161.2 / 6.0 / 1.9	161.2 / 6.0 / 0	12.71	
				11.30
155.0 / 2.1	161.0 / 6.2 / 1.8	161.0 / 6.2 / 0	11.70	
				11.15
155.0 / 2.4	160.2 / 6.3 / 1.8	160.2 / 6.3 / 0	12.39	
				11.74
155.0 / 2.4	160.2 / 6.3 / 2.0	160.2 / 6.3 / 0	12.98	
				10.83

Sta	+	π	−	Elev	sq. ft.	cu. yds.
		167.18				
3+75					10.40	
						9.98
4+00					11.16	
						10.35 ✓ 10.37
+25					11.20	
						10.79
+50					12.09	
						11.57
+75					12.92	
						11.62
5+00					12.20	
						10.54
+25					10.56	
						3.47
+32.5					14.43	
						5.12

Sta	+	π	−	Elev.
		167.18		
5+39				
5+48				
5+57				
5+65				
5+75				
5+83 ℄				

Old Rubble Masonry Wall

			Sq. Ft	Cu Yds.
155.0 / 3.4	162.5 / 3.0	162.5 / 0	24.00	
				7.54
155.9 / 3.7	161.8 / 3.0	161.8 / 0	22.78	
				6.01
155.0 / 2.4	161.6 / 2.0	161.6 / 0	14.52	
				4.41
155.0 / 2.2	161.6 / 1.7	161.6 / 0	12.87	
				3.92
155.0 / 1.7	162.0 / 1.2	162.0 / 0	10.15	
		Total	279.84	
			279.82	
		10.15		3.01
				282.83

Computed E.H.D.
Checked W.M.B.
Chkd-4/30/30-HDW

W.M.B. 5-26-30.

Elevation Top of New Rubble Masonry Wall.

	H.I. 166.00	- S	Elev.
0+00		6.6	159.4
0+25		7.0	159.0
0+30		6.5	159.5
0+50		7.0	159.0
0+75		6.5	159.5
1+00		7.1	158.9
1+25		7.3	158.7
1+50		6.8	159.2
1+75		7.0	159.0
2+00		7.3	158.7
2+25		7.5	158.5
2+50		6.7	159.3
2+75		5.1	160.9
3+00		5.5	160.5
3+25		7.6	158.4
3+50		7.4	158.6
3+75		8.4	157.6
4+00		8.3	157.7
4+25		8.7	157.3
4+50		8.6	157.4

H.I. 166 is the Elev. Top of old Parapet Wall.

Note:- Elevations taken for April estimate only.

Notes copied from Book 310 Page 35-37

Final Drill Record. On Holes in Spillway.

April 22, 1930
" 23, "
W. M. Bortham.

Pier No		15' Hole	10' Hole	5' Hole	4' Hole	4' Hole.
0+00	1	7.0	10.0	5.0	4.0	4.0
0+16 25	2	15.0	10.0	5.0	4.0	4.0
0+30 50	3	15.0	10.0	5.0	4.0	4.0
0+44 75	4	15.0	10.0	5.0	4.0	4.0
0+59 00	5	15.0	10.0	5.0	4.0	4.0
0+73 25	6	15.0	10.0	5.0	4.0	4.0
0+87 50	7	15.0	10.0	5.0	4.0	4.0
1+01 75	8	14.0	10.0	5.0	4.0	4.0
1+16 00	9	15.0	10.0	5.0	4.0	4.0
1+30 25	10	15.0	10.0	5.0	4.0	4.0
1+44 50	11	15.0	10.0	5.0	4.0	4.0
1+58 75	12	15.0	10.0	5.0	4.0	4.0
1+73 00	13	15.0	10.0	5.0	4.0	4.0
1+87 25	14	15.0	10.0	5.0	4.0	4.0
2+01 50	15	15.0	10.0	5.0	4.0	4.0
2+15 75	16	15.0	10.0	5.0	4.0	4.0
2+30 00	17	15.0	10.0	5.0	4.0	4.0
2+44 25	18	15.0	10.0	5.0	4.0	4.0
2+58 50	19	15.0	10.0	5.0	4.0	4.0
2+72 75	20	15.0	10.0	5.0	4.0	4.0
2+87 00	21	15.0	10.0	5.0	40	3.5
3+01 25	22	15.0	8.5	5.0	4.0	4.0
3+14 50	23	15.0	10.0	5.0	4.0	4.0
		336 ft A.C.L.	228.5 ft A.C.L.	115 ft A.C.L.	92 ft A.C.L.	91.5 ft A.C.L.

Next to Parapet Wall

Note — All holes for pier are 2" holes.

A.C.L. 10/2/30

863.0 ft - 2" Holes.

Struck Pocket

Computed W.M.B.

Checked 8/21/30
W.D.L.

N.E End of Spillway.

A.C.L. 10/2/30

Final Record on Drill Holes in Parapet Wall.

Pilaster No	5' Hole	5' Hole	5' Hole	2' Hole	2' Hole.
1	—	2.0	—	2.0	—
2	5.0	4.0	4.0	1.5	2.0
3	5.0	4.5	4.0	2.0	2.0
4	4.5	4.0	5.0	2.0	2.0
5	4.0	4.5	4.0	1.5	2.0
6	5.0	5.0	5.0	1.5	1.5
7	4.0	5.0	5.0	2.0	1.5
8	5.0	5.0	5.0	2.0	2.0
9	4.0	5.0	5.0	1.5	2.0
10	5.0	5.0	5.0	2.0	2.0
11	5.0	5.0	5.0	2.0	2.0
12	5.0	5.0	5.0	2.0	2.0
13	5.0	5.0	5.0	2.0	2.0
14	5.0	5.0	5.0	2.0	2.0
15	5.0	5.0	4.0	2.0	2.0
16	5.0	5.0	5.0	2.0	2.0
17	5.0	4.0	4.0	2.0	2.0
18	4.5	4.5	4.5	2.0	2.0
19	4.0	5.0	3.5	2.0	1.5
20	5.0	5.0	5.0	2.0	2.0
21	5.0	5.0	5.0	2.0	1.5
22	5.0	5.0	5.0	2.0	2.0
23	5.0	5.0	5.0	2.0	2.0
24	5.0	5.0	5.0	2.0	2.0
25	5.0	5.0	2.0	2.0	2.0

Next to cliff at south end of parapet wall.

Note:- All holes in pilasters are 2" holes.

A.L.L. 10/4/20

2" Holes = 503.0 ft.

Final Record of Drill Holes in Parapet Wall.

Pilaster No	5' Hole	5' Hole	5' Hole	2' Hole	2' Hole.
26	4.0	5.0	3.5	2.0	2.0
27	4.5	3.0	5.0	2.0	1.5
28	4.0	5.0	5.0	2.0	2.0
29	4.5	5.0	3.5	2.0	2.0
	A.C.V.	A.C.V.	A.C.V.	A.C.V.	A.C.V.
	132 ft	134.5 ft	127.0 ft	56 ft	53.5 ft

132 ft
134.5 "
127.0
56.0
53.5
A.C.V. 10/21/30
503.0

North End at Parapet Wall

Computed W.M.B.

Checked 8/21/30

W.D.L.

X-sections "A" Line Rd. South of Dam
Final Location

4/15/30
Bonham
Dewing
Moore

Sta	+	⊼	−	Grade	Elev.	Left — ℄ — Right
	1.89	168.32			166.43	
0+00				167.00		
+50				167.00		
+86	Note excavation begins at this pluss 167.00					167^0/28 167^0/8 167^0 159^5/10 158^7/20^5 F 8^3
			0.34		167.98	
	12.16	180.14				
+88				167.00		174^2/30 174^5/20 C 5^7/13^7 172^7 168^0 166^8/3^5 159^5/10 158^7/20^5 155^2/33 — L.R. ⟷ L.R.
1+00				167.96		180^2/39 176^9/27 174^3/17^5 174^5/12 170^3 168^9/7^5 168^0/8 160^1/19 160^0/29 — L.R. ⟷ L.R.
+25				169.96		184^4/45 181^9/25 175^1/15^7 171^5 170^0/13^5 169^3/16 162^1/23 162^4/39 — L.R. ⟷ L.R.
+34.45	(Interpolated).		1.04		179.10	1+34.45: 187.6/45 185.0/31 185.0/24 178.0/16 175.0/10 172.4/0.0 170.0/2.7 169.5/5.0 162.3/34.0; 169.7/16.5 165.0/20.0
	5.45	184.55				Isolated boulder 6.0 × 6.0 × 12 = 16.0 cu. yds.
+50				171.96		189^6/44 187^7/31^6 187^7/23^5 175^8/10 173^3 172^0/2^5 168^0/5 165^8/17^3 164^8/31
+75				173.96		195^5/49 193^0/36^5 193^0/32 179^4/11 175^1/1 174^2 170^1/1 163^4/21^2 161^8/25

0+00 to +88: level; +88 to end: 8% (arrows in Sta column)

Left | ℄ | Right

Left ℄ Right

Sta	+	⊼	−	Grade	Elev.	Cross-section (Left — ℄ — Right)
		184.55				
2+00				175.96		Isolated Boulders 10 cu. yds. — 200.0 / 49, 199.0 / 42.5, 199.0 / 36, 172.2, 171.2 / 6, 171.2 / 15.2, 164.8 / 21
+25				177.96		203.1 / 58, 202.0 / 44, 202.2 / 41, 174.8 / 3, 174.8, 174.7 / 9, 163.2 / 20, 155.0 / 42.5
+40 P.C.				179.16		198.0 / 35, 179.2 / 12, 180.1 / 12, 180.6 / 10.2, 175.2, 178.0 / 9.8, 168.2 / 20
+62				180.92		Isolated Boulders. 60 cu. yds. — 198.0 / 35, 186.2 / 13.2, 184.6, 181.4 / 8.5, 181.8 / 12, 183.1 / 30, 176.4 / 43
+84				182.68		198.0 / 35, 194.3 / 23, 195.0 / 20.2, 198.1 / 12, 198.2 / 5, 197.2, 204.0 / 10, 194.5 / 19.8, 198.5 / 50
3+06				184.44		198.0 / 35, 196.1 / 30, 199.2 / 26.4, 200.1 / 24, 205.1 / 24, 212.2, 221.2 / 13, 225.3 / 26, 225.2 / 33, 232.2 / 33, 243.2 / 60
+28				186.20		198.0 / 35, 200.3 / 29.2, 221.2, 245.5 / 29, 262.2 / 46, 288.5 / 81, 293.2 / 105
+49.96				187.96		198.0 / 35, 203.2 / 29, 205.6 / 17, 221.1, 244.4 / 27, 257.8 / 43, 298.0 / 92

STA	+	⊼	-	Grade	Elev.
	2.35	213.83			T.P. on Pipe 211.48
3+75				189.96	
4+00				191.96	
4+25 71 Angle Pt.				194.02	
+46				195.64	
+46				195.64	
+75				197.96	
+95 94 Angle Pt.		X-sections	90° to back	tangent 199.63	
5+25				201.96	

℄

3+75	201.8 / 24.5	203.2 / 16	205.8 / 3	213.2	222.0 / 5	239.2 / 34	267.0 / 55	290.8 / 96	296.2 / 109
4+00	196.2 / 33	197.8 / 24	200.0 / 20	208.2 / 7	210.0	231.8 Face Ledge Rock / 20	244.4 / 42	256.3 / 49	269.0 / 54 · 297.9 / 86.0
4+25	192.5 / 23.5	194.2 / 10	209.2 / 4	208.2	217.8 Face Ledge Rock / 15	240.8 / 41	256.3 / 54	272.0 / 62	296.5 / 86
+46	195.6 / 22	210.4 / 5	210.3	210.2 / 5	241.4 / 41	248.6 / 42	261.6 / 49	271.0 / 57	
+46	195.6 / 22	210.4 / 5	210.3	210.3 P.L.P. / 9	230.8 / 18.5	238.4 T.L.P. / 22	237.5 / 24.5	255.5 / 35	
+75	202.5 / 20	L Rock / 14	212.9 / 4	213.3	213.2 / 11	258.5 / 34	258.8 / 41.5	274.8 / 59.5	
+95	204.8 / 23	213.8 Top Ledge Rock / 15	214.2	215.8 / 9	219.1 / 14	245.1 / 20	251.2 / 28		
5+25	203.5 / 22	214.4 Ledge Rock / 12	215.1	215.4 Toe / 5.5	243.6 / 23	250.3 / 34.5			

STa	+	⊼	−	Grade	Elev.
	8.06	219.54			T.P. on Pipe 211.48
5+50				203.96	
5+75				205.96	
6+00				207.96	
			4/19/30		

℄

Sta				℄			
5+50		208.0 / 18	213.4 / 9	213.2	213.8 Toe / 4	227.1 / 11	233.5 / 19
5+75	204.5 Top Ledge Rock / 24	206.0 / 22.15	211.5 / 13	211.1 Toe	219.5 / 6	225.4 / 17	
6+00	201.0 / 23	208.0 / 11.5	209.0 / 10	208.5 Toe	216.3 / 6	223.5 / 19.5	

X-sections for May Estimate Rd South of Dam.
Bonham
Dewing
5/24/30

Sta	+	Π	-	Elev.
	13.5	203.2		189.70
4+00				
3+75				
3+50				
3+28				
3+06				
2+84				
2+62				
2+40				

℄

20

59-ft.	Cu.-ft.
508.0	
	17,125.0
862.0	
	29,750.0
1518.0	
	34,716.0
1638.0	
	28,820.0
982.0	
	15,246.0
404.0	
	5,104.0
60.0	
	836.0
16.0	
	1,485.0

203.2

205⁵ 205⁵ 221⁰
+2³ +2³ +18⁰
12 33

187⁵ 193⁵ 193⁵ 197⁰ 207⁵
15⁵ 9⁶ 9⁵ 4⁷ +4⁴
34 38 16 27

190⁵ 191⁶ 195⁵ 200³
12.4 11⁵ 8⁰ 9⁹
35 18 13

190⁸ 190⁸ 195⁷ 190⁷
12⁴ 12⁵ 7⁵ 2⁵
35 6 13

190⁷ 190⁷ 194⁸
12⁵ 12⁵ 8⁷
35 11

190⁷ 190³ 194³
12⁷ 12¹ 8⁹
35 26

189⁷ 187⁷ 182.7 181.1
13⁵ 13⁵ 20.5 22.1
40 6 18

193⁷ 193⁵ 185⁴ 172⁷
10⁰ 10⁰ 17⁸ 30.5
40 7 10

Sta	+	℄	−	Elev.
		203.2		
	0.0	190.1	13.1	190.1
2+25				
2+00				
1+75				
			12.1	178.0
	1.1	179.1		
1+50				
1+25				
1+00				
0+88				
0+86				

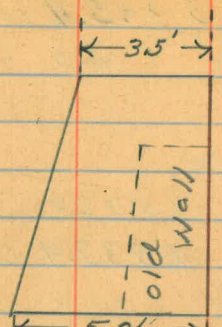
	Sq. ft.	Cu. ft.
186.8 185.8 182.2 174.5 3.1 3.3 7.2 15.6 4.0 6	182.0	
	70.0	3,150.0
184.6 184.5 181.3 174.0 5.5 5.5 8.8 15.3 22 7 13	70.0	
		1,625.0
181.1 180.5 174.0 173.5 174.5 9.5 9.5 14.1 16.6 16.1 22 8 19 12	60.0	
		2,450.0
175.2 174.2 171.3 170.2 3.9 4.2 7.8 8.2 21 9 11	136.0	
		2,100.0
170.5 8.6	32.0	
		1,275.0
167.2 11.2	70.0	
		612.0
167.0 12.1	32.0	
		32.0
167.4 12.1	0.0	
		144,826.0

See Next Page

144,326.0 cu.ft. = 5,345.4 cu.yds.
Isolated Boulder sta 1+50 16.0 " "
Material not shown on
Xsections Caused by slide
of April 28 1.5720 " "
6933.4 cu.yds.
Isolated Boulder Sta. 2+05 10.0 " "
" " Sta. 2+62 60.0 " "
Total 7,003.4 cu.yds.

Planimetered, Computed. W.M.B. 5/27/30.
Checked. Planimeter computation only by R.O.E. 5/29/30
Chkd. 5/29/30

May Estimate
Rubble Wall.



Xsection Rubble Wall.

Total & distance New Rubble Masonry Wall 581 linear feet.

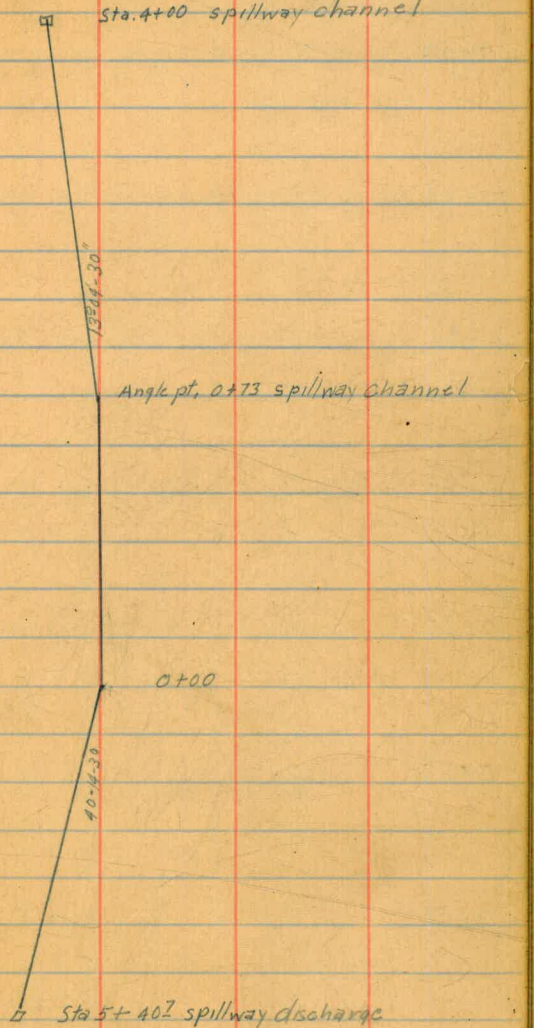
$581 \times 12 \times \frac{3.5+5.0}{2} = 29,631$ cu.ft. = 1097.44 cu.yds.

Old Rubble Wall {see page 10.} 282.83 " "

Total 814.61 cu.yds.

X Sections Channel Below Spillway.

Ties between spillway discharge + spillway channel



Sta		Grade
0+00	On Diagonal Line	
0+00		120.0
0+13		
0+25		112.5
0+38		
0+50		
0+68		
0+73		87.9 95.9 100.9 100.9
0+75		87.9 95.9 95.0

Base Line

117.7 122.7 (29) 124.6 (30) 124.9 (33.3) 126.4 (46) 131.9 (53) 156.1 (55) 164.3 (68) 241.5 (136) 248.2 (160)

✓ 117.7 119.1 (18) 117.1 (19) 117.8 (23) 117.6 (25) 116.7 (26) 116.8 (27.5) 119.2 (29) 122.1 (31) 122.4 (36) 123.5 (40) 125.1 (40.2) 125.7 (42) 128.3 (42) 129.2 (47) 129.6 (50) 166.3 (72) 228.1 (133) 236.2 (162)

✓ 114.3 115.2 (145) 116.6 (25) 118.8 (35) 123.8 (35) 127.7 (42) 128.7 (46) 130.4 (50) 141.9 (60) 158.2 (72) 168.6 (82) 175.1 (91) 208.1 (114) 223.1 (135) 230.6 (149)

✓ 110.2 113.5 (29) 121.2 (32) 128.4 (50) 140.1 (63) 161.2 (82) 169.7 (94) 191.2 (114) 217.0 (135) 225.5 (176)

✓ 103.6 103.6 (10) 106.2 (13) 107.7 (31) 127.9 (50) 157.9 (80) 170.5 (94) 173.5 (112) 209.3 (135) 219.8 (175)

✓ 93.2 93.2 (13) 101.9 (15) 104.1 (19) 108.6 (33) 127.7 (43) 129.2 (50) 146.8 (65) 195.6 (117) 212.6 (154)

✓ 87.9 87.9 (17) 101.3 (24) 116.0 (38) 117.8 (50) 135.9 (65) 192.6 (120) 199.1 (143) 202.8 (160) 206.1 (174)

✓ 87.2 86.1 (14) 104.8 (34) 116.2 (50) 191.8 (122) 203.8 (176)

✓ 87.9 87.9 (21) 101.3 (30) 106.6 (50) 127.3 (69) 127.9 (90) 177.2 (111) 216.2 (179)

Base Line

Base Line

Sta														
0+82	✓	89 60	95 26	91 12	84	95 25	94 36	103 50	122 67	133 81	155 100	170 110	186 135	200 162	207 174
1+00		92 64	92 22	87 12	88	86 29	98 50	111 66	122 72	128 81	152 105	175 135	184 162		
1+13	✓	77 67	80 21	80 12	79	82 23	96 50	117 70	127 81	128 86	139 100	151 115	154 128		
1+25		62 70	68 29	74 12	76	77 14	89 42	96 45	99 50	127 80	134 86	128 92			
1+50		55 65	64 37	46 14	71	72 20	92 50	123 112							
1+63	✓	99 68	61 28	60 16	62	62 20	76 42	79 50	119 104						
1+75		42 70	57 39	54 18	58	66 29	72 50	115 94							
1+85		44 50	50 37	63		63 26	67 50	85 93							

Base Line

Base Line

Sta.						
2+00	31 4/82	37 7/32	49 3/10	45 2/50	53 2/26	55 2/43	65 2/50
2+25	31 2/57	10 4/10	38 4/50	38 7/44	41 0/50		
2+41	20.0/59.0	30 4/2	37 4/50	34 4/50			
2+50	17 5/35	22 2/50	15 0/10	18 6/26	26 4/40	16 2/50	
2+62 4.0	12.8/27	3 3/50	12 5/22	9 7/50			
2+75	10 7/108	7 8/27	1 4/50	7 5/45	-0 5/50		
3+00	-0 3/76	-7 6/50	-6 2/40	-14 6/50			
3+25	-22 5/50	-21 6/26	-21 7/50	Isolated boulder 32 X 15 X 27 = 480 cu yds.			

Base Line

Base Line

Sta.			
3+50		-25 L	$-\frac{31}{50}$
3+58		-29 L	$-\frac{37}{50}$
			Isolated boulder 5'x10'x16' = 29 cu. yds.
3+75		-38 R	$-\frac{46}{50}$
4+00		-33 R	$-45\frac{0}{3}$ $-\frac{47}{50}$

Base Line

6/21/38

X-sections Road South of Dam for June Estimate

Banham
Dewing

Sta	+	π	−	Elev.
	10.00	176.00		166.00
0+86				
0+88				
1+00				
+25				
+50				
+75				
	7.10	182.70	6.40	175.60
2+00				
+25				
	4.71	196.11		191.40
2+40 P.C.				
2+62				
2+84				
3+06				

$\frac{167.0}{16}$	167.0	167.2		
$\frac{172.0}{20}$	$\frac{167.2}{11}$	167.5	$\frac{167.5}{9}$	
$\frac{176.7}{22}$	$\frac{169.2}{11}$	$\frac{168.4}{}$	$\frac{168.6}{12}$	
$\frac{176.1}{22}$	$\frac{171.6}{8}$	$\frac{170.8}{}$	$\frac{170.3}{16}$	
$\frac{187.8}{31}$	$\frac{178.5}{22}$	$\frac{177.2}{15}$	$\frac{172.1}{10}$	$\frac{172.9}{}$ $\frac{172.2}{10}$
$\frac{193.0}{37}$	$\frac{182.1}{24}$	$\frac{181.0}{19}$	$\frac{174.9}{8}$	$\frac{174.9}{}$ 173.3
$\frac{199.0}{42}$	$\frac{188.0}{31}$	$\frac{184.9}{25}$	$\frac{176.5}{7}$	$\frac{176.2}{}$ $\frac{175.7}{12}$
$\frac{202.0}{43}$	$\frac{191.1}{33}$	$\frac{187.2}{24}$	$\frac{178.3}{7}$	$\frac{177.5}{}$ $\frac{177.0}{13}$
$\frac{190.9}{35}$	$\frac{189.5}{24}$	$\frac{178.9}{8}$	$\frac{178.4}{}$	$\frac{178.1}{13}$
$\frac{190.2}{35}$	$\frac{190.9}{24}$	$\frac{180.0}{6}$	$\frac{177.7}{}$	$\frac{179.7}{10}$ $\frac{181.1}{16}$ $\frac{185.3}{21}$
$\frac{190.2}{35}$	$\frac{191.0}{21}$	$\frac{182.1}{8}$	$\frac{181.6}{}$	$\frac{182.1}{8}$ $\frac{208.0}{43}$
$\frac{190.9}{35}$	$\frac{192.0}{20}$	$\frac{185.2}{9}$	184.0	$\frac{186.9}{10}$ $\frac{218.4}{25}$ $\frac{225.2}{26}$

Sta	+	H	−	Elev.
		196.11		
3+28				
3+49.27 PT.				
	9.43	200.83		191.40
3+75				
4+00				
4+25.27				
4+46				
4+46				
4+75				
4+95.84				
	10.12	210.01	0.94	199.89
5+25				
5+50				
5+75				

℄

190.9 (35) 191.5 (17) 186.4 (9) 186.6 188.7 (8) 197.0 (14) 219.6 (14) 263.2 (46)

190.9 (35) 192.9 (16) 188.2 (8) 188.9 190.1 (8) 198.9 (11) 200.5 (14) 222.7 (12) 258.0 (43)

201.0 (24) 196.2 (21) 190.0 (10) 190.4 190.6 (3) 204.6 (24) 226.6 (32) 237.0 (34)

200.6 (22) 192.2 (13) 191.8 192.0 (2) 198.4 (10) 212.0 (13) 218.0 (23) 221.0 (33)

197.8 (20) 193.5 (16) 193.7 194.2 (3) 213.8 (27) 235.9 (37) 241.0 (41)

194.2 (33) 195.7 210.8 (31) 241.0 (41)

194.3 (33) 195.7 210.8 (31) 239.5 (31) 256.0 (35)

196.8 (24) 197.7 202.2 (7) 223.5 (23) 237.0 (23)

198.8 (19) 198.6 198.4 (6) 260.7 (11) 219.0 (14)

200.2 (19) 201.4 201.5 (4) 204.2 (7) Vertical Bank

204.7 (16) 204.4 204.6 (2) 211.0 (6) Vertical Bank

205.7 205.7 (4) Vertical Bank

℄

Sta	+	π	−	Elev.
		210.01		
6+00				
6+05				

206 1/2 / 17 207 1/2 207 1/2 / 6

208 1/2 / 8 208 1/2 208 1/2 / 8

Note:-
See page 32-33 for quantities.

Note:-
From pages
29-31.

Sta.	Sq. ft.	Cu. ft.
0+86	0.0	
		60.0
0+88	60.0	
		792.0
1+00	72.0	
		1.450.0
1+25.	44.0	
		1,925.0
1+50	110.0	
		2.850.0
1+75	118.0	
		3.375.0
2+00	152.0	
		3.200 0
2+25	104.0	
		1.035.0
P.C. 2+40.	34.0	
		2,156.0
2+62	162.0	
		8.844.0
2+84	642.0	
		19.954.0
3+06	1,172.0	
		28,116.0
3+28	1,384.0	
		29.216.0

Sta. p.t.	Sq.ft.	Cu.ft.
3+50	1.272.0	
		30,200.0
3+75	1,144.0	
		25,075.0
4+00	862.0	
		19.300.7
4+25.7	640.0	
		14.920.5
4+46.	830.0	
		0.0
4+46.	952.0	
		20,735.0
4+75	478.0	
		10,420.8
4+95.8	524.0	
		13.110.8
5+25	374.0	
		7.025.0
5+50	188.0	
		3.650.0
5+75	104.0	
		1.925.0
6+00	50.0	
		125.0
6+05.	0.0	

Computed W.M.B. 6-28-30
Checked

X sections	9.239.0 cu.yds.	
Isolated Boulders.	86.0 "	"
Slide	1,572.0 "	"
	10,897. cu.yds.	

249.460.8 cu.ft. = 9,239 cu.yds.

Spillway Discharge
Original X-sections

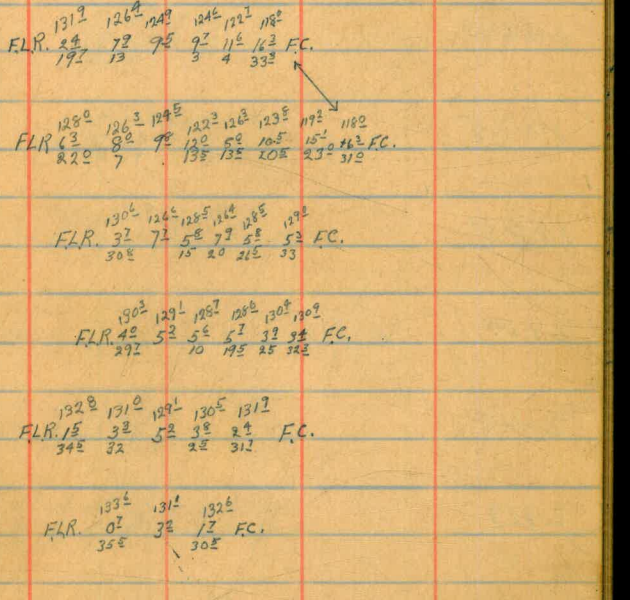
4/8/30
Bonham
Deming
Moore

Sta	+	=	−	Elev.	
	3.35 ✓	156.19 ✓		152.84	B.M. East End Spillway
T.P.			12.54 ✓	143.65 ✓	
	1.58 ✓	145.23 ✓			
T.P.			11.86 ✓	133.37 ✓	
	0.96 ✓	134.33 ✓			
			5.58 ✓	128.75 ✓	T.P. set at W. end Spillway
0+00		on split of angle			
0+10.3		at right angles			
0+25					
0+50					
0+75 ✓					
1+00					
			0.96 ✓	133.37 ✓	
	8.64 ✓	142.01 ✓			

✓ A.L.

Base

F.L.R. = Face Ledge Rock F.C. = Face Concrete



Sta	+	π	−	Elev	Base
		142.01 ✓			
1+25					133^{4} 134^{5} 133^{9} 132^{1} 132^{4} 133^{7} F.L.R. 8^{6} 7^{5} 8^{1} 9^{6} 9^{6} 8^{3} F.C. 36^{5} 29 4 20 30
1+38					135^{7} 135^{1} 133^{6} 134^{8} 134^{7} 134^{7} 133^{3} 134^{8} F.L.R. 6^{3} 6^{9} 8^{4} 7^{2} 7^{3} 7^{3} 8^{7} 7^{2} F.C. 36^{5} 25 15 9 10 21 29
1+50					136^{8} 134^{3} 133^{4} 134^{5} F.L.R. 5^{3} 7^{7} 8^{6} 7^{5} F.C. 37 12 29
1+65					137^{5} 135^{9} 133^{5} 133^{6} 135^{3} 4^{5} 6^{1} 8^{5} 8^{4} 6^{7} F.C. 38^{5} 21 17 29
1+75					136^{8} 133^{8} 134^{3} 133^{6} 133^{8} 135^{9} F.L.R. 5^{2} 8^{2} 7^{7} 8^{4} 8^{2} 6^{1} F.C. 38^{5} 13 2^{5} 15 38^{5}
1+85					136^{5} 134^{4} 135^{5} 134^{7} 134^{0} 136^{3} F.L.R. 5^{5} 7^{6} 6^{5} 7^{3} 8^{0} 5^{7} F.C. 39^{5} 15 7 5 28^{5}
2+00					137^{5} 136^{2} 136^{0} 136^{9} 136^{4} 138^{1} 135^{3} 137^{1} 137^{2} F.L.R. 4^{5} 5^{8} 6^{0} 5^{1} 5^{6} 3^{9} 3^{7} 4^{9} 4^{8} F.C. 41 33 20^{5} 6 13 21 24^{5} 27^{5}
2+10					138^{8} 136^{2} 136^{0} 135^{7} 136^{4} 137^{2} 137^{3} F.L.R. 3^{2} 5^{8} 6^{0} 6^{3} 5^{6} 4^{8} 4^{7} F.C. 45^{5} 35 26 13 13 27
2+19					139^{1} 136^{0} 134^{3} 135^{2} 137^{5} 137^{7} 139^{2} 138^{0} 137^{8} F.L.R. 2^{9} 6^{0} 7^{7} 6^{8} 4^{5} 4^{3} 2^{0} 4^{0} 4^{2} F.C. 47^{5} 42^{5} 31 17 7 13 19 27
2+31		Slush bottom on right side			141^{5} 135^{4} 134^{7} 135^{0} 136^{6} 137^{4} F.L.R. 0^{5} 6^{6} 7^{3} 7^{0} 5^{4} 4^{6} Toe Concrete Spillway 52 41 33 17 23
2+50					138^{8} 135^{8} 135^{8} 135^{8} 136^{9} 137^{7} F.L.R. 3^{5} 6^{2} 6^{2} 6^{2} 5^{1} 4^{3} T.C.S. 46^{5} 31 20^{5} 8 20
2+75					139^{7} 137^{6} 137^{0} 135^{8} 135^{2} 136^{7} 138^{7} 138^{4} F.L.R. 2^{3} 4^{6} 5^{0} 6^{4} 6^{8} 5^{3} 4^{3} 3^{6} T.C.S. 50 46 40 36 26 12 18

Base

Sta.	+	H.I.	−	Elev.
		142.01		
3+02				
3+25				
3+50				
			0.26	141.75
	12.75	154.50		
3+66				
3+75				
3+75				
3+97				
3+97				
4+13				
4+13				
4+25				
4+25				

138.9 137.2 139.0 139.3 139.5
F.L.R. 1.0 4.8 3.9 2.7 2.5 T.C.S.
49.5 31 16 16

F.L.R.
40.2 | 38.6 | 39.0 | 140.1 | 140.1 | 140.6
1.8 3.4 3.0 1.9 1.8 1.4 T.S.
51 39 31.0 27.5 14.3

F.L.R.
143.2 | 143.0 | 141.1 | 140.8 | 141.0
+3.2 + 1.0 0.9 1.2 1.0 T.S.
49 40.0 25 12.2

153.3 | 144.0 | 141.5 | 141.7
F.L.R. 1.2 10.5 13.0 12.8 T.S.
49.2 21.5 11.2

T.L.R. 173.5 157.0
5.5 49.

154.5 | 153.8 | 149.1 | 143.4 | 143.4 | 141.9 | 141.8
5.4 11.1 11.1 12.6 12.7 T.S.
42 37 22.0 19.5 16 10.7

T.L.R. F.L.R.
173.5 | 157.0 | 163.0 | 162.5
55 49 47 43

154.5 | 153.8 | 149.1 | 143.4 | 143.4 | 141.9 | 141.8
5.4 11.1 11.1 12.6 12.7 T.S.
42 37 22 19.5 16 10.7

226.0 216.5 189.9
97. 84 73

163.6 | 144.6 | 155.2 | 143.9 | 144.5 | 143.4 | 142.7
10.6 10.0 11.1 11.8 T.S.
40 36 32 13.5 7.5 8.6

226.0 216.5 189.9 163.6 160.9 155.2 152.8
97.0 84 73 40 37 32 26

156.4 | 156.8 | 151.6 | 143.9 | 144.5 | 143.4 | 142.7
10.6 10.0 11.1 11.8 T.S.
25 19 16 13.5 7.5 8.6

227.0 219.5 196.0 180.0
97 87 68.0 61

171.1 | 157.0 | 153.6 | 147.9 | 154.6 | 144.3 | 143.9 | 143.3
6.6 10.2 10.6 11.2 T.S.
58.5 36 26 24.5 17 14.5 7.5

226.6 222.3 194.0
96 90 70

178.0 | 172.1 | 157.0 | 147.9 | 145.8 | 144.3 | 143.9 | 143.3
6.6 8.7 10.2 10.6 11.2 T.S.
60 58.5 36 24.5 18.5 14.5 7.5

224.0 211.5 198.5
95 80 70

142.7 | 156.8 | 153.8 | 149.9 | 144.3 | 143.8 | 143.9
4.6 10.2 10.7 10.6 T.S.
50 41 30 26 13 6.5

130.0
225.0 213.0 198.5
95 80 70

178.5 | 156.8 | 153.8 | 149.9 | 144.3 | 143.8 | 143.9
4.5 10.2 10.7 10.6 T.S.
50 41 30 26 13 6.5

A.C.L. 9/24/30

154.50

4+50

4+75

5+00 T.L.R 157.4 / 2.1

5+15 T.L.R. 157.9 / 11.5

5+25. T.L.R. 158.4 / 15.5

5+35

5+40.7

5+44.05

Base

210.0 198.0 179.5 158.3 153.9 144.7 144.9
85 70 50 40 0.6 9.8 9.6 T.S.
33.5 5.5

T.L.R. F.L.R. 149.9 146.5 145.7
182.1 181.6 173.3 155.1 4.6 9.0 8.8 T.S.
69 51 43 29 28 3.5

165.6 152.9 147.1 147.3 147.5
182.0 181.0 172.6 1.6 7.4 7.2 7.0 T.S.
62 52 40 37 11.5 8 3.5

T.L.R F.L.R.
182.0 181.0 181.1 164.7 157.9 149.9 147.9 148.1
62 52 40 25 11.5 4.6 6.6 6.4 T.C.S.
11.5 1.5

Isolate Boulder 31 cu. yds. F.L.R.
182.0 181.0 181.1 168.2 158.4 150.4 148.4 148.5
62 52 40 25 15.5 4.1 6.1 6.0 T.S
15.5 1.0

F.L.R.
183.5 180.6 169.1 T.L.R. 159.0 152.7 150.0 148.8
50 38 23 18 15 1.8 4.5 5.7 T.S.
11.0

F.L.R.
182.8 149.6
37 4.9

A.L.L.
9/29/20

166.0 153.5
16.0 1.0

Ledge Rock motion X sections.

20 x 12.5 x $\frac{12+0?}{2}$ = 55.5 cu. yds.
10 x 10 x 25 = 92.6 " "
26 x $\frac{10}{2}$ x $\frac{12}{2}$ = 29.9 " "
8 x 7 x 15 = 31.1 " "
Total 208.1 cu. yds.

spillway
June estimate.

Sta.	+	H.I.	−	Elev.
B.M.	4.58	157.42		152.84
	0.74	149.14	9.02	148.40
3+25				
3+50				
3+62				
3+75				
3+75				
3+97				
3+97				
4+13				
4+13				
4+25				
4+25				
4+50	Start of ledge rock.			
4+75				
5+00				
5+15				
B.M.	6.73	159.57		152.84

Base

Sta.	sq. ft.	cu. ft.
Final is the same original X section	0.0	
		600.0
	48.0	
		1,896.0
	189.0	
		2,829.5
	262.0	
	308.0	13,002.0
	874.0	
	936.0	18,152.0
	708.0	
	556.0	6,510.0
	529.0	
	760.0	16,325.0
	546.0	
		8,150.0
	106.0	
		3,000.0
	134.0	
		2,535.0
	204.0	
		1,670.0

Duplicate 2nd section

Sta.	+	M.I	−	Elev.
5+25				
5+35				
5+40.7				
5+44.05				

Base

181.0 181.0 178.8 163.1 F.L.R. 152.2 148.6 148.1 148.6
52 47 43 21 18.4 13.5 8.7

182.5 165.3 158.5 154.6 148.6 148.8
46 22 19 19 11.4

182.8 F.L.R. 160.0 F.L.R. 157.3 153.4 157.2
37 12 12 7.5

166.0 153.5
16

59 ft.	cu. ft.
130.0	
	1.190.0
108.0	
	359.1
18.0	
	30.1
0.0	
	70,448.7 = 2.609.2 cu. yds.

Computed W.M.B. 6-29-30
Checked.

Xsections 2.609.2 cu. yds.
Isolated Boulders 31.0 " "
Measured Ledge 208.0
(Backfill retaining walls page 74) 72.7
2,920.9

Total Yardage 2,920.9 cu. yds.
Ledge Rock. 340 cu. yds.
Total Class 1. 2,580.9 cu yds.

Computed W.M.B. 9-24-30
checked W.D.L 9-24-30
Checked

Spillway
Ledge Rock
June estimate.

Sta.	Sq. ft.	Cu. ft.
4+50.	0	
		275
4+75	22	
		825
5+00	44	
		1.245
5+15	122	
		815
5+25	41	
		280
5+35	15	
		94.05
5+40.7	18	
		30.15
5+44.05	0	

3.564.2 = 132 Cu. yds.

Measured Ledge Rock 208 " "

Total Ledge Rock 340 Cu. yds.

Computed W.M.B. 6-29-30
Checked W.D.L 9-24-30

Final Estimate
Outlet Tower.

July 3, 1930

Concrete Work.

		cu.ft.
℄ Diam. Barrel = 19'-10" Cir. = 62.31 ft.		
Barrel		205.45
4'-6" + 5'-4" x 8" x 62.31' = 4.917 x 0.67 x 62.31 =		204.24
Key 2 / 62.31' x 2" x 4" = 62.31 x .33 x .17 =		3.46
Steps		5.27
9 x 3.0' x 8" x 7" x 1/2 = 9 x 3.0 x 0.67 x 0.5 x .583 =		5.25
Key in Well. 7.0		0.39
4" x 2" x 5.5' =		0.30
		17.58
Well.		
1'-11"+1'-11"+3'-8" = 7'-6" x 8" x 3'-6" =		17.50
Roof. Lower ℄ Diameter. 20'-11 7/8" = 20.9896' Cir. = 65.9673'		
Roof upper ℄ Diameter. 9'-3 3/16" = 9.2656' Cir. = 29.1086'		
2 | 95.0759		
47.538'		
Average Slope of Roof = 8.7083		
47.538' x 8" x 8.7083'	=	276.98
Top of roof		
9'-7" + 9'-0" = 9'-3 1/2" ℄ Diam.	=	67.84
2 / Total		574.57
Deductions.		
Dome Diam. 5'-6" = 3.1416 x (5.5/2)² x 8" =	15.84 cu.ft.	
Manhole Diam. 22" = 3.1416 x (11")² x 8" =	1.76 " "	
		17.60
		556.97
	=	20.63 cu.yds.
		(20.52) " "

120 bags of cement.

A.C.L. 9/24/30

Holes:— 1"

10 - 1'-6" = 15 lin.ft.

Steel Rungs.

47.5 feet - 3/4" ℄ 1.502 #@ = 71 lbs. ✓

Reinforcing Steel

Barrel		Linear feet.	
59 - 7'-0"	5/8" ℄ =	413.0	✓
10 - 3'-0"	5/8" ℄ =	30.0	✓
40 - 19'-3"	5/8" ℄ =	770.0	✓
Top of Tower.			
1 - 9'-6"	5/8" ℄ =	9.5	✓
1 - 10'-0"	5/8" ℄ =	10.0	✓
2 - 3'-6"	5/8" ℄ =	7.0	✓
2 - 4'-0"	5/8" ℄ =	8.0	✓
2 - 9'-0"	5/8" ℄ =	18.0	✓
2 - 7'-6"	5/8" ℄ =	15.0	✓
2 - 3'-6"	5/8" ℄ =	7.0	✓
4 - 2'-6"	5/8" ℄ =	10.0	✓
1 - 5'-6"	5/8" ℄ =	5.5	✓
33 - 19'-3"	5/8" ℄ =	635.0	✓ = 635.25
1 - 6'-0"	5/8" ℄ =	6.0	✓
1 - 10'-0"	5/8" ℄ =	10.0	✓
59 - 10'-0"	5/8" ℄ =	590.0	✓
		2,549.0	x 1.05# = 2671.2 lbs.
6 - 10'-0"	5/8" ℄ =	60.0	} x 1.05# = 105.0 lbs.
8 - 5'-0"	5/8" ℄ =	40.0	
			2,776.2 lbs.

Computed 7/15/30 W.M.B.

Checked 8/21/30 W.D.L.

A.C.L. 10/1/30

Final Estimate

Parapet Wall.

Panel No.	Length.	Panel No.	Length.
28	6.2	3	8.2
27	20.1	2	8.7
26	17.8	1	8.7
25	14.8	Total length of Wall without pilasters.	528.3
24	22.0		
23	22.4	2" Holes	503.0 ft.
22	22.6		
21	22.1	1" Holes.	278.0 ft.
20	22.5		
19	23.4		
18	23.3		
17	22.1		
16	22.2		
15	22.2		
14	22.5		
13	22.7		
12	22.4		
11	22.6		
10	22.6		
9	22.1		
8	22.2		
7	22.8		
6	21.6		
5	8.8		
4	8.9		

Concrete Deduction.

Bridge Seat.

17.4 x 10" x 10" = 12.08 cu.ft.

2 x 2' x 2' x 1'-4" = 10.67 cu.ft.

2 x 1' x 1' x 1/3' = .67 cu.ft.

23.42 cu.ft. =

A.C.L. 10/1/30 0.87 cu.yds.

Checked 8/24/32
W.D.L.

Concrete in Wall

Key 528.3' x 1/6' x 1/3' = 29.35 ✓

Wall 528.3 x 5 x 5/6' = 2201.25 cu.ft. ✓

Pilasters 528.3 x 1 1/2" x 5" = 27.52 cu.ft. ✓

29 x 5' x 2' x 2' = 580.00 cu.ft. ✓

29 x 1' x 1' x 1/3' = (12.76) 9.67 cu.ft.

2847.79 cu.ft. = (105.59) 105.47 cu.yds. ✓

Deduct. (2850.88) 11 " 0.87 ✓

621 bags Cement. (104.72) 104.60 cu.yds. ✓

Steel reinforcement.

A.C.L. 10/1/30

1,177.5' { 1" □ = 3,[illegible] @ 3.43# = 14,038.83 ✓
1" □ = [illegible] @ 3.43# = } lbs.

971.5' of 5/8" ϕ = [illegible] @ 1.05# = 1,020.08# ✓

390 - 4'-7" 1/2" □ = 1,787.5 ft. @ 0.86# = (1537.25) ~~1,535.25~~ ✓
See page 44.

Misc. Lengths. 3/4" ϕ = 4374 ft. @ 1.52# = 6,648.48 ✓

140 - 8'-0" 5/8" ϕ = 1120 ft. @ 1.05# = 1,176.00 ✓

~~14,418.04~~ (14,420.64)

Note: For 1" □ take depth of 2" Holes drilled into Concrete and add 4'-9" for each Hole. 503.0 ft. of drilled Holes. A.C.L. 10/2/30

142 holes x 4'-9" 674.5 ft.

1177.5 ft. of 1" □ Steel

Note: For 5/8" ϕ anchors in Wall take depth of 2" holes drilled into concrete and add 4'-9" for each hole. 278.0 ft. of drilled Holes

146 holes x 4'-9" = 693.5 ft.

971.5 ft. of 5/8" ϕ Steel.

Computed. W.M.B. 8/15/30

Final Estimate
Parapet Wall
List of Steel Reinforcement.

2 - 16'-7"	= 33'-2"	3/4" ϕ	3 - 34'-6"	103'-6"	3/4" ϕ
4 - 22'-7"	= 90'-4"	"	3 - 35'-5"	106'-3"	"
2 - 22'-0"	= 44'-0"	"	3 - 35'-3"	105'-9"	"
2 - 22'-1"	= 44'-2"	"	3 - 34'-2"	102'-6"	"
2 - 35'-7"	= 71'-2"	"	3 - 34'-3"	102'-9"	"
2 - 36'-9"	= 73'-6"	"	3 - 34'-2"	102'-6"	"
6 - 36'-3"	= 217'-6"	"	3 - 34'-6"	103'-6"	"
6 - 36'-2"	= 217'-0"	"	3 - 34'-7"	103'-9"	"
8 - 36'-7"	= 292'-8"	"	3 - 34'-6"	103'-6"	
8 - 36'-6"	= 292'-0"	"	3 - 34'-7"	103'-9"	
2 - 37'-3"	= 74'-6"	"	3 - 34'-7"	103'-9"	
2 - 37'-5"	= 74'-10"	"	3 - 34'-2"	102'-6"	
2 - 36'-0"	= 72'-0"	"	3 - 34'-3"	102'-9"	
2 - 28'-10"	= 57'-8"	"	3 - 34'-9"	104-3"	
2 - 31'-10"	= 63'-8"	"	3 - 33'-7"	100'-9"	
2 - 34'-2"	= 68'-4"	"	3 - 20'-1"	60'-3"	
2 - 14'-0"	= 28'-0"	"	3 - 20'-7"	61'-9"	
3 - 13'-0"	= 39'-0"	"	3 - 20'-0"	60'-0"	
3 - 32'-2"	= 96'-6"	"	3 - 20'-7"	61'-9"	
3 - 29'-10"	= 89'-6"	"	3 - 15'-7"	46'-9"	
3 - 26'-10"	= 80'-6"	"		4374 feet.	
3 - 34'-0"	= 102'-0"	"	Transferred Page 43.		
3 - 34'-5"	= 103'-3"	"			
3 - 34'-7"	= 103'-9"	"			
3 - 34'-3"	= 102'-9"	"			

A.C.L. 10/11/30

W.M.B.
Computed 8-17-30

Checked 8/21/30
W.D.L.

Final Estimate
Piers & Bridge.

Reinforcing Steel. Piers.

22 - 21'-0"	1 1/8" □	= 462.0 ft. @ 4.34 # =	
1 - 13'-0"	1 1/8" □	= 13.0 ft @ 4.34 # =	
23 - 16'-0"	1 1/8" □	= 368.0 ft @ 4.34 # =	
23 - 11'-0"	1 1/8" □	= 253.0 ft @ 4.34 =	165
46 - 9'-0"	1 1/8" □	= 414.0 ft @ 4.34 # =	6,553.4
92 - 13'-0"	5/8" Φ	= 1196.0 ft @ 1.05 # =	
46 - 14'-0"	5/8" Φ	= 644.0 ft @ 1.05 # =	
46 - 14'-6"	5/8" Φ	= 667.0 ft. @ 1.05 # =	
- 16'-0"	5/8" Φ	= 736.0 ft @ 1.05 # =	
46 - 17'-6"	5/8" Φ	= 805.0 ft. @ 1.05 # =	4,250.4
46 - 9'-6"	1" □	= 437.0 ft @ 3.43 # =	
46 - 10'-6"	1" □	= 483. ft @ 3.43 # =	3,155.6
230 - 9'-6"	5/8" Φ	= 2,185.0 ft @ 1.05 # =	
12 - 8'-0"	5/8" Φ	= 96.0 ft @ 1.05 # =	
12 - 6'-0"	5/8" Φ	= 72.0 ft @ 1.05 # =	
12 - 4'-0"	5/8" Φ	= 48.0 ft @ 1.05 # =	2,521.05

A.C.L.

Computed 8/10/30
W.M.B.

Checked 8/21/30
W.D.L.

Reinforcing Steel Bridge Slab.

231	30'-0"	= 6,930.0 ft.	5/8" Φ @ 1.05 # =	
99	32'-0"	= 3,168.0 ft.	5/8" Φ @ 1.05 # =	
56	11'-0"	= 616.0 ft.	5/8" Φ @ 1.05 # =	165.
352	6'-6"	= 2,288.0 ft.	5/8" Φ @ 1.05 # =	13,652.0
4	12'-0"	= 48. ft.	3/4" Φ @ 1.52 # =	A.C.L.
4	16'-0"	= 64. ft.	3/4" Φ @ 1.52 # =	A.C.L.
1	20'-0"	= 20. ft.	3/4" Φ @ 1.52 # =	165.
				200.64
2	3'-6"	= 7. ft.	5/8" Φ @ 1.05 # =	
1	5'-0"	= 5. ft.	5/8" Φ @ 1.05 # =	
1	6'-0"	= 6. ft.	5/8" Φ @ 1.05 # =	
2	6'-6"	= 13. ft.	5/8" Φ @ 1.05 # =	
4	7'-0"	= 28. ft.	5/8" Φ @ 1.05 # =	
4	8'-0"	= 32. ft.	5/8" Φ @ 1.05 # =	
1	9'-0"	= 9. ft.	5/8" Φ @ 1.05 # =	
10	10'-0"	= 100. ft.	5/8" Φ @ 1.05 # =	
8	11'-0"	= 88 ft.	5/8" Φ @ 1.05 # =	
7	12'-0"	= 84 ft.	5/8" Φ @ 1.05 # =	
8	13'-0"	= 104 ft.	5/8" Φ @ 1.05 # =	
10	14'-0"	= 140 ft.	5/8" Φ @ 1.05 # =	
4	15'-0"	= 60 ft.	5/8" Φ @ 1.05 # =	
1	16'-0"	= 16 ft.	5/8" Φ @ 1.05 # =	
1	17'-0"	= 17 ft.	5/8" Φ @ 1.05 # =	
2	19'-0"	= 38 ft.	5/8" Φ @ 1.05 # =	
1	20'-0"	= 20 ft.	5/8" Φ @ 1.05 # =	10/2/30
1	23'-0"	= 23 ft.	5/8" Φ @ 1.05 # =	A.C.L.
2	40'-0"	= 80 ft.	5/8" Φ @ 1.05 # =	1913.50
		870 ft.		

Structural Steel. Spillway.

					lbs.
38	18'-2 1/4"	6"	15#	Channels	7516.875
1	13'-2 3/4"	6"	"	"	198.408
1	14'-7"	6"	"	"	218.750
1	14'-8"	6"	"	"	220.000
1	16'-0 1/4"	6"	"	"	240.312
1	16'-1 1/4"	6"	"	"	241.563
1	17'-5 1/2"	6"	15"	"	261.875
					8897.783
19	13'-9 1/4"	8"	34#	H Beams	8895.937
1	14'-6"	8"	"	"	493.000
1	15'-11 1/4"	8"	"	"	541.875
1	17'-4 1/2"	8"	34#	"	590.75
					19521.562

Total Weight. 19,419.345 lbs.

6" [Anchors. 251.02

Theoretical Check. 19,670. lbs. A.L.L. 10/2/30

Structural Steel as billed by McClintock-Marshall Co. and as allowed in the estimate 20,289 lbs

W.M.B.

W.M.B. Computed. 8/19/30

Checked 8/21/30

W.D.L.

Bonham
Deming
7/25/30

July Estimate
Channel below Spillway Lower end.

Sta	+	X	−	Elev.

Note – Base line elevations determined by levels
slopes by stadia + hand level See BK 309 - Page 29-30

	8.13	127.50		119.37
0+00	on Diagonal			

B.M. on Guide wall

Note:- Use 35' between Sections.

0+00	At right angles			
0+25				
T.P.	0.68	115.37	12.81	114.69
0+38				
0+50				
0+68				
0+75				
1+00				

Lt. Base Line Rt.

Sta	Lt.	Rt.	Sq. Ft	Cu. Ft
0+00	123^{0} 123^{2} (22) 149^{6} (61) 173^{8} (82) 223^{7} (136)		888.0	
				56,815.
0+00	123^{0} 121^{4} (24) 132^{6} (52) 137^{5} (53) 156^{0} (81) 217^{7} (160)		2.330.0	
				54,425.
0+25	114^{8} 115^{3} (32) 120^{4} (52) 149^{6} (94) 175^{0} (109) 184^{7} (119) 204^{8} (153) 217^{9} (163)		2.024.0	
0+38	115^{3}			55,150..
0+50	110^{9} 111^{4} (56) 131^{0} (86) 159^{3} (100) 173^{6} (119) 193^{2} (140) 203^{8} (162)		2.388.0	
0+68	108^{4}			41,350..
0+75	104^{5} (20) 109^{3} (46) 109^{4} (76) 126^{6} (98) 142^{3} (128) 172^{4} (143) 194^{4}		920.0	
				11,500..
1+00	95^{0} (12) 100^{0} 110^{7} (29) 121^{4} (70) 143^{2} (98)		0.0	
				218.740.

Final Est. 7/25/30 Bonham Dewing

July Estimate

Channel opposite Spillway upper end.

Sta	+	π	−	Elev.
	3.6	140.5		136.9
0+00	seepage 48 for 0+00 on diagonal			
0+10.3				
0+25				
0+50				
0+75				
1+00				
1+25				
1+38				
1+50				
1+65				
1+75				

Baseline

(Seepage 641)

[Final Est. 126.0 / 22.0 | 124.8 rv | 124.0 / 70 | 123.0 / 32]

146.2 / 25.5 | 128.8 | 129.5 / 12 | 123.8 / 31

[Final est. 128.0 / 30.8 | 126.0 / 40 | 126.5 / 20]

142.0 / 31 | 141.7 / 28 | 126.3 / 7 | 125.8 | 126.8 / 20

130.7 / 30 | 129.2 / 15 | 130.1 / 10 | 130.1 | 130.0 / 13

130.8 / 33 | 130.6 / 18 | 130.3

133.7 / 35 | 131.8 / 31 | 130.3 / 23 | 130.7 / 19 | 131.8

134.7 / 37 | 132.0 / 29 | 131.9 | 132.5 / 20

134.3 / 36 | 132.3 / 32 | 132.2 | 133.1 / 21

134.1 / 37 | 132.1 / 33 | 132.4 / 24 | 132.1 | 133.3 / 13

135.4 / 38 | 133.6 / 34 | 132.7 / 20 | 134.1 | 133.5 / 5

135.7 / 38 | 133.1 / 30 | 132.7 / 20 | 134.0

Excavation 49

Sq. ft.	Cu. ft.
32.0	
	779.1
74.0	
	1000.0
6.0	
	75.0
0.0	
	512.5
41.0	
	1489.5
78.0	
	1287.0
120.0	
	1392.0
112.0	
	1440.0
80.0	
	670.0
64.0	
	565.0
	12,87[illegible]

Sta	+	↑	−	Elev.
		140.5		
1+85				
2+00				
2+10				
2+19				
2+31				
2+50				

Base Line

$\frac{135.1}{40}$ $\frac{133.0}{32}$ $\frac{133.0}{21}$ 134.7

$\frac{137.5}{41}$ $\frac{134.1}{35}$ $\frac{134.1}{21}$ 136.1 $\frac{136.5}{4}$

$\frac{138.7}{45}$ $\frac{134.1}{32}$ $\frac{134.5}{18}$ 136.3

$\frac{139.8}{46}$ $\frac{135.5}{41}$ $\frac{134.0}{34}$ $\frac{135.2}{13}$ $\frac{136.3}{8}$ 136.7 $\frac{137.8}{21}$

$\frac{138.8}{48}$ $\frac{137.2}{41}$ $\frac{135.1}{24}$ $\frac{135.7}{7}$ 136.2

$\frac{138.5}{47}$ $\frac{135.8}{28}$ $\frac{136.5}{18}$ $\frac{136.0}{9}$ 137.2

Excavation 50

Sq. ft.	Cu. ft.
57.0	
	900.0
61.0	
	510.0
41.0	
	382.5
44.0	
	2640
0.0	
0.0	
A.L.L. 10/2/30	11,264.6
	417.2 cu. yds.

Total Excavation

Computed W.M.B. 9-22-30
Checked W.D.L. 9-23-30

July Estimate
Spillway Channel.
Showing Slide left in Channel.

Sta.		Sq. ft.	Cu. ft.
1+75		0.0	
			49.125.
1+00		1,310.0	
			29.000.0
0+75		1,010.0	
			17.625.0
0+50		400.0	
			6,250.0
0+25		100.0	
			3.625.0
0+0		190.0	
	10' Dist.		2.830.0
Diagonal 0+0		376.0	
			3.430.0
0+10.3		290.0	
			3.138.0
0+25		137.0	
			2.262.0
0+50		44.0	
			800.0
0+75		20.0	
			250.0
1+0		0.0	
Total			118,335.0 = 4.383 cu. yds.

Note:-
Excavation = 8.679 cu. yds.
Embankment = 4.383 " ".
left in Channel

Balance for July Estimate. 4.296 cu. yd.
Isolated Boulders 302 cu. yds.
Total 4.598 Cu. yds.
Computed. W.M.B. 7/26/30
Checked C.D. 7/26/30.

Exc. 8,739 cu. yds.
Emb. 4447 " ".
4292 cu. yds.
Boulders- 302 " "
Total — 4594 cu. yds.
A.C.L.
7/30/30

Final Record
Drill Holes in Parapet Wall

Panel No						
1	2.0	2.0				
2	2.0	2.0	2.0	2.0	2.0	2.0
3	2.0	2.0	2.0	2.0	2.0	
4	1.5	1.5	2.0	2.0		
5	2.0	1.5	2.0	2.0	1.5	1.5
6	1.0	2.0	2.0	1.5	1.5	2.0
7	2.0	2.0	2.0	2.0	2.0	2.0
8	2.0	2.0	2.0	1.5	2.0	2.0
9	2.0	2.0	2.0	2.0	2.0	2.0
10	2.0	2.0	2.0	2.0	1.5	0.5
11	2.0	2.0	2.0	2.0	2.0	2.0
12	2.0	2.0	2.0	2.0	2.0	2.0
13	2.0	2.0	2.0	2.0	2.0	2.0
14	2.0	1.5	2.0	2.0	2.0	2.0
15	2.0	2.0	2.0	2.0	2.0	2.0
16	1.5	2.0	2.0	2.0	1.5	1.0
17	2.0	1.5	1.5	2.0	1.5	1.5
18	2.0	2.0	2.0	1.5	2.0	2.0
19	2.0	2.0	2.0	2.0	2.0	2.0
20	2.0	2.0	2.0	2.0	2.0	2.0
21	2.0	2.0	2.0	2.0	2.0	2.0
22	2.0	2.0	2.0	2.0	2.0	2.0
23	2.0	2.0	2.0	2.0	2.0	2.0
24	2.0	2.0	2.0	—	—	—
25	1.5	2.0	2.0	—	—	—

South end of parapet wall next to cliff

Note → All holes in panel are 1" holes.

Final Record
on
Drill Holes in Parapet Wall.

Panel No						
26	1.5	1.5	1.5	—	—	—
27	2.0	2.0	2.0	-	-	-
28	2.0	2.0	2.0	—	—	—

A.L.L.

53.0 ft 53.5 ft 53.0 ft 42.5 ft (39.5 ft) 36.5 ft

53.0 ft
53.5
53.0
42.5
39.5
36.5
278.0 ft

A.L.L. 10/2/30

North end parapet wall

1" Holes = 278 feet.

Checked 8/21/30

W.D.L.

Final Cross sections of Spillway Channel

Sept. 1930.

Excavation 54

				Adjusted distance.		59 ft.	Cu. ft.
B.M.	8.68	128.09			119.41		
0+0.0 = 0+10.3 Baseline back.							
Rt. L to Base Back. F. 4° 49' to Section ahead:				6.00'		26.0'	4,760.0
0+0.0 Diagonal 14° 1/4' to Section ahead				8.40'			
0+0.0 Diagonal 9° 38' to Section ahead.				17.38'			
0+00 Rt. L to Base Line S.W.							
T.P.		128.09	8.69	13.0'	119.41		
	4.63	124.04					
0+13.							
				12.0'			
T.P.		124.04	11.38		112.66		

Base Line

123.2 / 0.0 — 123.8 / 4.0 — 125.0 / 21 — 125.6 / 55.0 Vertical Face

Duplicate Cross section ahead from this point.

123.7 / 0.0	123.7 / 4.0	124.2 / 17.0	123.4 / 27.0	126.4 / 42.0	132.3 / 55.0	
136.2 / 55.0	141.8 / 58.9	153.8 / 69.5	169.3 / 83.8	178.4 / 95.0	195.2 / 113.6	199.2 / 113.6
229.9 / 142.9	237.0 / 143.5	247.5 / 158.7	Vertical face.			

123.7 / 0.0	123.7 / 4.0	122.5 / 35.0	124.9 / 47.0	133.1 / 65.0	151.2 / 82.6	
175.9 / 103.1	212.5 / 144.6	222.6 / 160.3	226.6 / 160.3	1/4 : 1 Slope Up		

120.2 / 0.0	119.7 / 4.0	118.6 / 30.0	116.1 / 40.0	122.9 / 60.0	136.8 / 70.9	
150.5 / 82.0	167.6 / 103.5	170.3 / 105.5	180.7 / 118.1	183.7 / 118.5	191.7 / 125.4	205.7 / 141.6
219.5 / 165.6	Vertical face.					

2,341.0'	
	30,498.0
	26,856.0

Sta	+	H.I.	−	Adjusted Distance	Elev
T.P.	3.37	116.03			112.66
0+25				13.0	
T.P.		116.03	11.48		104.55
				13.0 ✓	
	3.96	108.51			
0+38				13.0	
				12.0 ✓	
B.M.	10.54	101.50			90.96
0+50					
T.P.		101.50	10.54		90.96
				18.0 ✓	
	1.75	92.71			
0+68					
				5.0	

Base Line

Excavation 55

Sq. ft.	Cu. ft.
112.7 111.7 111.8 116.5 128.6 166.3 / 0.0 4.0 33.0 56.5 69.3 108.0 / 179.0 139.3 208.2 218.7 Vertical face. / 114.3 131.0 152.8 166.8	
2,135.0 ✓	
	29,061.5
104.3 104.3 102.0 113.5 133.6 166.8 / 0.0 4.0 38.3 57.4 81.0 103.4 / 181.1 211.6 213.9 Note. Old ground Vertical Face / 121.3 162.2 162.2	
2,336.0 ✓	
	30,888.0
99.2 97.8 97.1 102.5 104.5 133.3 / 0.0 4.0 35.7 52.5 52.5 88.0 / 145.2 168.3 200.3 210.7 213.2 / 89.5 112.4 149.0 165.9 165.9 Note - Vertical face.	
2,812.0 ✓	
	46,980.0
90.1 88.1 88.5 95.1 108.2 111.1 / 0.0 4.0 40.9 54.7 55.2 64.2 / 162.2 190.2 200.5 original ground. / 108.6 135.3 149.0	
2,408.0 ✓	

Sta	+	H.I.	−	Adjusted Distance	Elev
		92.71			
0+73. Rt. to Back Base Line ∠ Lt 12°51'					
T.P.		92.71	1.75		90.96
	1.17	92.13		16.92	
0+73 Rt ∠ to base ahead.					
				2.0	
0+75					
				7.0	
0+82					
T.P.		92.13	3.43		88.70
				18.0	
	0.65	89.35			
1+00					
				13.0	
T.P.		89.35	12.84		76.51

Excavation 56

Sq. ft.	Cu. ft.
	10,947.5
1,971.0	
	31,555.8
1,759.0	
	3,518.0
1,759.0	
	11,123.0
1,419.0	
	15,813.0
338.0	
	3,802.5

Base Line

88.2 / 0.0 — 87.0 / 6.0 — 87.0 / 45.7 — 92.7 / 55.0 — 95.1 / 51.7 — 108.2 / 55.2 — 111.1 / 64.2

162.2 / 108.6 — 190.2 / 135.3 — 197.0 / 144.0 original ground.

88.1 / 0.0 — 86.2 / 47.0 — 134.4 / 90.0 — 162.3 / 117.6 — 172.0 / 128.0 — 194.0 / 143.0 Vertical Face.

88.1 / 0.0 — 86.2 / 47.0 — 134.4 / 90.0 — 162.3 / 117.6 — 172.0 / 128.0 — 194.0 / 143.0 Vertical Face.

Lt — Base Line — Rt

104.8 / 54.0 — 104.8 / 34.0 — 109.8 / 29.0 — 109.8 / 19.0 — 88.4 / 0.0 — 86.5 / 40 — 85.9 / 48 — 134.4 / 90

1½:1 slope down.

162.3 / 117.6 — 175.0 / 130.0 — 192.0 / 145.0 original ground.

1½:1 Slope down. 104.1 / 49.5 — 104.1 / 9.5 — 85.2 / 0.0 — 82.8 / 8.0 — 84.2 / 41.0 — 101.3 / 60.8

120.8 / 72.4 ← Use 118.8 / 72.4

Sta	+	HI	−		Elev
T.P.	8.35	84.86			76.51
1+13					
T.P.		84.86	8.35		76.51
				12.0	
	7.40	83.91			
1+25					
T.P.		84.86	12.93		70.98
				25.0	
	1.99	73.97			
1+50					
T.P.		73.97	12.36		61.61
				13.0	
	8.30	69.91			
1+63					
				12.0	

Excavation 57

Base Line

	Lt					Rt	Sq. ft.	Cu. ft.
	96.7 / 64.3	96.7 / 24.3	81.8 / 5.0	80.2 / 0.0	81.3 / 36.5	130.3 / 87.2	247.0	
	1½:1 slope down.			Original ground.				
								2,904.0
	94.8 / 65.8	94.8 / 25.8	82.3 / 10.1	79.1 / 0.0	78.6 / 33.3	91.0 / 49.0	108.5 / 70.0	237.0
	1½:1 slope down.			Original Ground.				
								6,887.5
	87.7 / 62.2	87.7 / 27.2	72.3 / 9.3	69.3 / 0.0	69.6 / 33.8	95.5 / 58.1	126.6 / 117.8	314.0
	1½:1 slope down.					Vertical face up.		
								2,736.5
	81.3 / 69.9	81.3 / 34.9	67.8 / 12.2	65.1 / 0.0	63.7 / 32.0	73.6 / 43.7	87.6 / 59.7	107.0
	1½:1 Slope down.							
								1,506.0

Make 96.7 / 58.1 O.G.

Make 87.0 / 59.7

Sta	+	H.I.	−		Elev
T.P.		69.91	8.30		61.61
	4.98	66.59			
1+75					
T.P.		66.59	4.98		61.61
				10.85'	
	2.19	63.80			
1+85.85					
				4.15'	
1+90.00	End of Excavation				
T.P.		63.80	12.15		51.65
	10.99	62.64			
2+00					
T.P.		62.64	12.90		49.65
	0.68	50.33			
2+25					

Excavation 58

	Lt.					Rt.	Sq. ft.	Cu. ft.
82.7 / 78.7	82.7 / 48.7	71.9 / 26.9	62.2 / 8.0	61.4 / 0.0	61.3 / 36.2	71.7 / 59.6	144.0	
1½:1 Slope down.				original ground.				
								1,898.8
80.7 / 53.1	68.1 / 15.4	60.5 / 7.2	59.5 / 0.0		61.9 / 44.0	74.0 / 62.0	206.0	
1½:1 Slope down.				original ground.				427.5
End of Excavation							0.0	
Total.								308,798.6 Cu ft
								11,436.98 Cu Yds.
68.0 / 48.3	66.3 / 22.7	58.0 / 0.0		57.2 / 44.0 Boulder.	¼:1 Slope up.			

Computed 9/23/30 W.M.B.
Checked 9/23/30 W.D.L.

(See Page 69).

50.3 / 50.0 — 42.8 / 0.0 — 40.0 / 51.0 Boulder — Vertical face

Sta	+	H_I	−	Elev
		50.33		
2+41 ±				
T.P.		50.33	0.68	49.65
	12.91	62.56	0.64	61.92
	12.20	74.12	0.50	73.62
	12.82	86.44	1.89	84.55
	8.38	92.93	1.96	90.97

B.M. = 90.96
90.97 = .01 Check.

Base Line.

Lt			Rt	
39.3	34	3	31.4	Big Boulder 25.9
50.0	0.0		35.0	51.0 Vertical face.

Final Cross Section of Roadway
South End of Dam.

Sta	+	Hi	−	Adjusted. Dist.	Elev.
B.M.	1.05	192.45			191.40
T.P.	0.22	182.08	10.59		181.86
T.P.	1.22	173.27	10.03		172.05
0+86.				2	
0+88					
T.P.		173.27	1.22		172.05
				12	
	2.42	174.47			
1+00					
T.P		174.47	2.42	25	172.05
	4.14	176.19			
1+25					
				9.12	
T.P.		176.19	4.14		172.05

Base Line

Sta	Lt			Rt			Total Excavation 60 Sq.ft.	Cu.ft.
0+86.	167.0 / 13.0	167.0 / 0.0		167.0 / 8.0			0.0	
								28.0
0+88	182.3 / 47.1	174.9 / 23.9	167.9 / 14.4	168.4 / 0.0	168.4 / 8.0	1½:1 Slope Down.	28.0	
			198.7 / 74.3					
T.P.								468.0
1+00	182.9 / 42.2	175.4 / 22.4	169.1 / 12.0	169.3 / 0.0	169.7 / 11.0	1½:1 Slope Down.	50.0	
			197.5 / 64.5					
T.P								875.0
1+25	197.0 / 51.9	178.3 / 22.9	171.6 / 8.0	171.0 / 0.0	171.2 / 6.6	170.2 / 15.0 1½:1 Slope down.	20.0	
								405.8
T.P.								

Sta	+	H.I.	-	Adjusted Dist.	Elev
T.P.	4.54	176.59			172.05
1+34 45 Diagonal					
T.P.		176.59	4.54	14.94	172.05
	5.82	177.87			
1+50					
T.P.		177.87	5.82	25.0	172.05
	7.76	179.81			
1+75					
T.P.		179.81	7.76	25.0	172.05
	9.21	181.26			
2+00					
				25.0	

Base Line

194.6 / 46.2	184.9 / 35.0	171.9 / 10.0	171.7 / 0.0	170.7 / 18.0	1½:1 Slope Down.	69.0
195.2 / 45.8	179.3 / 22.9	173.0 / 9.0	172.9 / 0.0	173.2 / 8.5	1½:1 Slope Down.	88.0
198.6 / 47.4	183.0 / 21.3	175.0 / 8.5	174.8 / 0.0	175.1 / 10.0	1½:1 Slope Down.	94.0
188.0 / 30.0	181.7 / 23.9	176.5 / 8.5	176.2 / 0.0	176.1 / 0.10	1½:1 Slope Down.	104.0
		200.0 / 46.4				

Total Excavation 61

Sq. ft.	Cu. ft.
	1,172.8 ✓
	2,275.0 ✓
	2,475.0 ✓
	2,087.5 ✓

Sta	+	Hi	−	Adjusted Dist.	Elev.
T.P.		181.26	9.21		172.05
	10.56	182.61			
2+25					
T.P.		182.61	10.56	15.0	172.05
	11.55	183.60			
2+40 P.C.					
T.P.		183.60	0.40	20.1	183.20
B.M.	9.83	193.03	1.62		191.41
B.M.	1.04	192.45			191.40
T.P.	3.77	185.63	10.59		181.86
2+62					
				22.0	

Base Line

193.1 / 36.9 | 189.0 / 24.1 | 178.4 / 8.7 | 177.6 / 0.0 | 177.1 / 12.7 | 1½:1 Slope Down

197.4 / 46.4 | 193.6 / 41.3

191.4 / 39.3 | 190.2 / 24.7 | 179.1 / 8.5 | 178.8 / 0.0 | 178.4 / 14.0 | 1½:1 Slope Down

193.1 / 54.3 | 193.0 / 43.7

B.M. = 191.40
191.41 − .01 Check.

190.8 / 35.5 | 191.0 / 24.9 | 180.7 / 9.0 | 180.6 / 0.0 | 180.1 / 11.4 | 186.2 / 23.6

185.1 / 34.9

Total Excavation 62

Sq. ft.	Cu. ft.
63.0	
	472.5
0.0	
	1,065.3
106.0	
	7,590.0

Sta	+	Hi	−	Adjusted Dist.	Elev
T.P.		185.63	1.93		183.70
	3.99	187.69			
2+84					
T.P.		185.63	3.99		183.70
				24.19	
	12.45	196.15			
3+06					
				23.88	
3+28					
				26.70	
3+49.92 P.T.					
T.P.		196.15	0.84		195.31
				25.06	
	0.35	196.66			

Base Line

Lt | Rt

191.5 / 21.7 | 182.9 / 10.3 | 187.6 / 0.0 | 183.0 / 10.0 | 211.3 / 49.2

Edge huge boulders

192.6 / 23.0 | 191.6 / 17.0 | 184.9 / 10.0 | 184.8 / 0.0 | 185.9 / 9.0 | 219.3 / 25.7

190.8 / 35.0 | 215.2 / 64.1 | 252.3 / 84.7 | 261.2 / 92.2

193.1 / 26.0 | 191.7 / 18.0 | 186.7 / 10.0 | 187.1 / 0.0 | 187.3 / 9.0 | 216.2 / 14.1 | 233.0 / 30.3

262.4 / 52.7 | 293.4 / 89.5

192.9 / 16.0 | 189.1 / 10.0 | 188.4 / 0.0 | 190.4 / 8.0 | 221.1 / 14.5 | 231.9 / 26.3

257.9 / 40.6 | 299.5 / 91.0

Total Excavation	Sq. ft.	Cu. ft.
	584.0	
		22,049.2
	1,239.0	
		35,559.3
	1,740.0	
		40,223.5
	1,273.0	
		29,533.2

Sta	+	Hi	−	Adjusted Dist.	Elev
		195.66			
3+75					
T.P		195.66	0.35		195.31
				25.0	
	2.19	197.50			
4+00					
T.P.		197.50	2.19		195.31
				24.42	
	3.04	198.35			
9+25.71 Diagonal.					
T.P.		198.35	3.04		195.31
				19.65	
	4.25	199.56			
4+46					
				0.0	

Base Line

Lt

198.4 / 25.4 | 196.2 / 25.0 | 196.7 / 19.5 | 190.9 / 10.0 | 191.1 / 0.0

200.5 / 22.0 | 192.5 / 13.5 | 192.5 / 0.0

198.1 / 21.0 | 193.7 / 16.5 | 193.9 / 0.0

194.9 / 31.0 | 195.2 / 17.0 | 195.9 / 2.0

Rt

191.5 / 6.0 | 199.9 / 15.2 | 206.4 / 25.6 | 225.9 / 25.6 | 241.2 / 37.2 | 252.0 / 48.4 | 261.2 / 50.7

192.9 / 3.2 | 198.3 / 9.5 | 212.1 / 11.9 | 221.3 / 26.7 | 231.6 / 33.1 | 243.6 / 41.6 | 252.9 / 49.8 | 268.1 / 53.7

194.9 / 4.5 | 215.1 / 27.3 | 232.4 / 31.3 | 244.5 / 44.1 | 253.9 / 54.5 | 272.0 / 61.9 | 291.7 / 80.8

207.7 / 11.4 | 218.2 / 23.5 | 227.2 / 26.8 | 237.3 / 36.2 | 248.2 / 41.5 | 255.1 / 51.3 | 271.8 / 57.4 | 294.9 / 81.3 | 0.6.

Total Excavation

Sq. ft.	Cu. ft.
1,084.0	24,100.0 ✓
844.0	17,118.4 ✓
558.0	10,483.3 ✓
509.0	
	0.0

Sta	+	HI	−	Adjusted Dist.	Elev	Lt	Base Line	Rt	Total Excavations Sq.ft.	Cu.ft.
		199.56								
4+46						194.9 / 31.0	195.2 / 17.0	195.4 / 2.0		
								209.6 / 16.6 Vertical until intersection of old ground.	418.0	
T.P.		199.56	4.25		195.31					
T.P.	4.46	199.77	0.87		198.90					
				29.0						12,151.0 ✓
T.P.	4.01	202.91								
4+75						196.7 / 26.5	197.7 / 17.0	197.9 / 0.0	198.7 / 4.0 — 218.7 / 18.3 Vertical face.	420.0
				20.9						9,300.5 ✓
4+95 BA Diagonal.							199.0 / 20.0	199.5 / 0.0	199.4 / 5.5 — 201.7 / 10.5 Vertical face.	470.0
T.P.		202.91	0.71		202.20					
				29.36						12,140.4 ✓
	10.40	212.60								
5+25						199.7 / 21.0	202.3 / 11.5	201.9 / 0.0	201.9 / 5.0 — 204.2 / 9.4 Vertical face.	357.0
				25.0						6,825.0 ✓

Sta	+	H.I.	−	Adjusted Dist.	Elev
		212.60			
5+50					
				25.0	
5+75					
				25.0	
6+00					
				5.0	
6+05					
T.P.		212.60	11.31		201.29
T.P.	1.25	202.54	6.05		196.49

Total Excavation road. 11,329.8 Cu. yds.
Ledge rock Class 2 2,712.3
Balance Class 1 8,617.5 cu. yds.

Base Line

Lt		Rt		Total Excavation sq. ft.	Cu. ft.
204.8 / 17.0	204.5 / 0.0	204.9 / 2.0	209.3 / 6.5 Vertical Face.	189.0	
					4,112.5
205.1 / 23.0	205.1 / 0.0	206.4 / 4.0 Vertical face.		140.0	
					2,337.5
206.7 / 16.5	207.3 / 0.0	207.8 / 6.0 Vertical face.		47.0	
					117.5
				0.0	
		Total.			244,976.2 =
					9,073.2 cu. yds.

BM. = 196.50
196.49 .01 check.

Computed W.M.B. 9-19-30
Checked W.D.L. 9-22-30

Total Cu. yds in X sections of Road.	=	9,073.2
Isolated Boulders.	=	86.0
Allowance for Removing Slide	=	1,894.6
Granite surfacing 92 loads 3 yds. @	=	276.0
Total allowed on road.	=	11,329.8 cu. yds

ch - W.D.L. 9/24/30
W.M.B.

Final Cross sections
Road. South of Dam
Ledge Rock

Sta	Adjusted Dist.
0+86	
	2
0+88	
	12
1+00	
2+96.0	
	10.85
3+06.0	
	24.53
3+28.0	
	22.93
P.T. 3+49.96	
	25.04
3+75	
	25.0
4+0.0	
	24.79
4+25.71 20°53' R.	
	19.64
4+46.0	
	0.0
4+46.0	
	29.0

Excavation 67

Sq. ft.	Cu. ft.
0.0	
	28.0
28.0	
	168.0
0.0	
0.0	
	596.8
110.0	
	4,529.5
259.0	
	5,755.4
243.0	
	7,674.8
370.0	
	8,825.0
336.0	
	9,197.1
406.0	
	6,058.9
211.0	
	———
300.0	
	7,554.5

Sta.	Adjusted Dist.
4+75.0	
	21.09
4+96.84	
60.28' Rt.	29.36
5+25.0	
	25.0
5+50.0	

Excavation 68

Sq. ft.	Cu. ft.
221.0	
	7,054.6
448.0	
	11,553.2
339.0	
	4237.5
0.0	
	73.233.3
	=
	2,712.3
	Cu. yds.

Computed. W. M. B. 9-18-30
Checked. W. D. L. 9-22-30

Summary of Excavation
spillway channel below
spillway crest.

Cross sections pages 54-58	11,437.0 cu.yds.	
Allowance for removal of boulders at end of spillway channel. 2060 cu.yds.	293.0 cu.yds.	
Isolated Boulders.	——— cu.yds.	
Cross Sections pages 49-50.	417.2 cu.yds.	
Total All excavation.	12,147.2 cu.yds.	

Computed 9-24-30 W.M.B.
Checked

Total 12,147.2 cu.yds.

Allowance Class 2	4,000.0	
Balance-Class 1	8,147.2 cu.yds.	

W.M.B.

Checked W.D.L. 9/24/30

Concrete Piers.

Field Measurements

Pier	Average Top Elev.			Cu. ft.
#1	170.17	1 - 208.07	=	207.79
#2	168.89	1 - 192.08	=	191.89
#3	167.56	1 - 175.75	=	175.38
#4	166.23	1 - 159.14	=	158.86
#5-23	166.17	19 - 158.08 cu.ft.	@ =	3003.52
				3737.44 cu.ft.

A.C.L. 10/2/30 138.42 cu. yds.

Concrete in 1 ft. in height of piers above 155.0

1' x 1.33' x 8.67 = 11.53 cu.ft.

Bevels

1' x $\frac{1.33'}{2}$ x 0.67 x 2 = 0.89 cu.ft.

Total 12.42 cu.ft.

A.C.L. 10/2/30

Notes:- Concrete in Standard Piers.

Piers 5-23 Top Elev. 166.17

Bottom Elev. 155.00

11.17

11.17 x 1.33 x 8.67' = 128.80 cu.ft. (128.80 cu ft. A.C.L.)

Bevel above 155.0

11.17' x $\frac{1.33 \times 0.67}{2}$ x 2 = 9.90 cu.ft. (9.90 cu ft. A.C.L.)

Pier #18

Concrete from guage 155.0 down to old concrete.

4.5	3.5	2.5	1.7	1.1	0.8	0.4	0.2	0.2	0.3
cu.	1	2	3	4	5	6	7	8	8.33 =

12.73 ~~12.63~~ sq.ft. x 1.33' = ~~16.80~~ 16.93 cu.ft. ck.

(16.93 cu ft. A.C.L.)

Bevels below 155. A.C.L.

$\frac{5.1+4.5}{2}$ x $\frac{1.33}{2}$ x 0.67 = 2.15 ck.

$\frac{1.0+0.3}{2}$ x $\frac{1.33}{2}$ x 0.67 = 0.30

2.45 cu.ft.

A.C.L.

Total in Standard Pier.

above 155	138.70	A.C.L.
below 155	19.38	
	158.08 cu.ft.	

A.C.L.

Computed 8/19/30 W.M.B.

Checked 8/20/30 W.D.L.

Pipe Rails

Bonham
Leckey
8/19/30

From	To	Dist.	Field Measurement.
Parapet Wall	Pier #3	25.6'	South Side
Parapet Wall	Pier #3	38.5'	North Side
Pier #3	Pier #23	570.0'	Both Sides
Pier #23	End of Retaining, Wall #2	36.9	
Total		671.0 ✓	

Tower Rail

2 - 19.5 = 39.0'

A.L.L. 10/2/30

Total Pipe Rails = 710 Linear feet.

Computed 8/18/30
W.M.B.

Checked 8/20/30
W.D.L.

Back Fill Retaining Walls N.E. End of Spillway.

Leckey Barthorn 8/18/30

Checked 8/19/30 W.D.L

74

Class No. 1 Excavtion

						Sq.ft.	Cu.ft.
0+00	0.0 / 0.0				0.0 / 10.0	0.0	
							104.13.
+02	12.0 / 0.0	12.5 / 8.5				104.13.	
							226.20.
+04	12.4 / 0.0	13.3 / 9.5				122.07.	
							0.00.
+04	12.4 / 0.0	11.7 / 4.5	9.2 / 5.0	7.5 / 9.5		97.03.	
							456.26.
+08	11.6 / 0.0	10.5 / 1.5	9.6 / 3.0	8.6 / 6.5	4.4 / 13.0	105.75.	
							209.75.
+10	10.4 / 0.0	9.5 / 3.0	7.0 / 9.5	4.7 / 12.0	1.2 / 14.0	104.00.	
							296.94.
+14	9.9 / 0.0	8.2 / 2.5	0.0 / 13.0			65.68.	
							239.63.
+17	9.6 / 0.0	7.5 / 4.0	5.2 / 8.5	4.1 / 9.0	0.0 / 12.0	71.25.	
							61.00.
+18	7.6 / 0.0	7.2 / 4.0	5.4 / 5.0	0.0 / 10.5		50.75.	
							245.86.
+25	6.4 / 0.0	5.7 / 2.0	3.1 / 3.5	0.0 / 7.5		24.90.	
							144.94.
+32	4.8 / 0.0	4.0 / 2.5	0.6 / 3.5	0.0 / 5.0		13.25.	
							13.75.
+34	0.0 / 0.0					0.0	
							1998.46.
Deduct Pilasters Retaing Wall #2 (see Page #76)							34.92
Total Cu.ft.							1,963.54

A.L.L. 10/2/30

1,963.54 cu.ft. = 72.7 cu yds.

Computed 8/20/30 W.M.B.

Checked — W.D.L 8/19/30

Concrete Deck Slab

Bonham
Leekey.
8/19/30

Irregular section Floor = 10" thick

		sq.ft.
$\frac{32.6+30.0}{2} \times 10.0$	=	313.00
$\frac{11.2 \times 8.7}{2}$		48.72
$\frac{10.7 \times 1.0}{2}$		5.35
$9.5 \times 0.2 \times \frac{2}{3}$		1.27
$\frac{32.6 \times 8.0}{2}$		130.40
		498.74
Deduct $\frac{2}{3} \times 23.4 \times 2.1$	=	32.76
		465.98 sq.ft.
465.98 sq.ft. $\times 10"$	=	388.30 cu.ft.
Deduct Cover Plates $13.25' \times 0.55' \times 0.83' \times 22$	=	133.07 cu.ft.

A.C.L.

75

Note 2 Irregular section from north side-pier #3 to parapet wall.

	cu.ft.
Parapet Wall to N. side Pier #3 =	388.30
Pier #3 – N. side Pier #23 $285.0' \times 10' \times 5\frac{1}{2}'$ =	2375.00
Total	2,763.30
Deduct Cover Plate Slots.	133.07
	2,630.23 =
	97.41 cu.yds.

A.C.L.
10/1/30

Computed
W.M.B. 8/19/30

Checked 8/20/30
W.D.L.

Retaining Walls
M. E. End Spillway

Leekey
Bonham
8/18/30

Cu. ft.

Retaining Wall #2

12.9	12.8	12.6	12.2	11.3	10.1	9.2	8.9	8.4	6.9
0.0	4.2	10.7	12.5	14.0	17.6	20.8	23.1	25.1	26.1

A.C.L.

6.0	5.4	5.4	2.8	1.0	0.0
28.6	30.6	33.8	35.3	36.7	38.6

(12" thick.) 346.19

Counterfort #1 — $\frac{11.4' \times 3.0' \times 1.0'}{2}$ 17.10

Counterfort #2 — $\frac{9.4' \times 2.6' \times 1.0'}{2}$ 12.22

Counterfort #3 — $\frac{5.6' \times 2.0' \times 1.0'}{2}$ 5.60

Extra Bevel — $\frac{12.1' \times 0.67' \times 0.67'}{2}$ 2.72

A.C.L. 10/2/30

Total Wall #2. 383.83

Retaining Wall #1

17.9	17.5	17.0	9.7	8.7	7.9	6.7	5.8	4.2	1.4	0.0
0.0	1.3	2.5	4.7	5.3	6.7	7.5	8.1	8.4	11.7	16.0

(12" thick). 105.06

Deduct — $\frac{4.7' \times 1.2' \times 0.6'}{2}$ = 1.69 cu. ft. 1.69

Total Wall #1. 103.37

Total Walls #1 & #2 = 487.20 cu. ft. =
A.C.L. 10/2/30 18.04 cu. yds

Computed 8/19/30
W. M. B.

Checked 8/21/30
W. D. L.

Retaining Walls
Additional Work.

41'-2" Holes drilled.
12.5'-1" Holes drilled.
steel reinforcement.

4	9'-0" c	3/4" ϕ	36.0 ft.	1.52 # e		165 A.C.L.
3	5'-0" c	3/4" ϕ	15.0 ft.	1.52 # e		77.52 "
4	10'-0" c	1" □	40.0 ft.	3.43 # e		
2	9'-0" c	1" □	18.0 ft.	3.43 # e		A.C.L.
2	10'-0" c	1" □	20.0 ft.	3.43 # e		267.54 "
2	5'-0" c	3/4" ϕ	10. ft.	1.52 # e		A.C.L.
2	10'-0" c	3/4" ϕ	20 ft.	1.52 # e		45.60 "
1	40'-0"	5/8" ϕ	40 ft.	1.05 # e		
1	34'-0"	"	34. ft.	"		
2	33'-0" e	"	66 ft.	"		
1	28'-0"	"	28 ft.	"		
2	25'-0" e	"	50 "	"		
1	24'-0"	"	24 "	"		
4	17'-0"	"	68 "	"		
2	15'-0"	"	30 "	"		
1	13'-0"	"	13 "	"		
1	9'-6"	"	9.5 "	"		
3	20'-0"	"	60 "	"		
3	9'-0"	"	27 "	"		
3	5'-0" c	"	15 "	"		
9	8'-6" e	"	76.5 "	"		
9	12'-0" e	"	108.0 "	1.05 # e		

Anchors

5	6'-0" e	5/8" ϕ	30.0 ft.	1.05 # e	
2	10'-0"	"	20.0 "	"	
14	7'-0" e	"	98.0 "	"	
3	4'-6" e	"	13.5 "	"	
2	2'-6" e	"	5.0 "	"	
4	5'-6" e	"	22.0 "	"	
6	11'-0" e	"	66.0 "	1.05 # e	

903.5 ft 1.05 # e = 948.68 # 165. A.C.L. 10/4/30

(see page 76)
Concrete = 18.04 cu. yds.

Completed. 8/19/30
W.M.B.

Checked 8/21/30
W.D.L.

Spans & Gates Lengths.

Span	Clearance	Gates	Washer 2 @	Length outside Diam.
1	12'-11 1/8"	12'-8 5/8"	1"	2'-6"
2	12'-11 1/8"	12'-8 5/8"	1"	2'-6"
3	12'-11 1/8"	12'-8 5/8"	1"	2'-6"
4	12'-10 3/4"	12'-8 1/2"	7/8"	2'-5 5/8"
5	12'-11"	12'-8 5/8"	1"	2'-6"
6	12'-10 3/4"	12'-8 1/2"	7/8"	2'-5 5/8"
7	12'-11 1/4"	12'-8 1/2"	1 1/8"	2'-6 1/2"
8	12'-11"	12'-8 1/2"	1"	2'-6"
9	12'-11 3/8"	12'-8 1/2"	1 1/8"	2'-6 1/2"
10	12'-11"	12'-8 1/2"	1"	2'-6"
11	12'-10 7/8"	12'-8 5/8"	1 1/8"	2'-6 1/2"
12	12'-11"	12'-8 1/2"	1"	2'-6"
13	12'-11"	12'-8 1/2"	1"	2'-6"
14	12'-11"	12'-8 1/2"	1"	2'-6"
15	12'-11"	12'-8 1/2"	1"	2'-6"
16	12'-11"	12'-8 1/2"	1"	2'-6"
17	12'-10 7/8"	12'-8 1/2	1" or 7/8"	2'-6"
18	12'-11"	12'-8 3/8"	1" or 1 1/8"	2'-6"
19	12'-11 1/8"	12'-8 1/2"	1" or 1 1/8"	2'-6"
20	12'-11"	12'-8 9/16	1"	2'-6"
21	12'-11"	12'-8 9/16"	1"	2'-6"
22	12'-10 3/4"	12'-8 9/16"	7/8"	2'-5 5/8"

Note:- Washers figured to give 1/4" play on each end. W.M.B.

IMPROVED TABLES
AND
INFORMATION

Cement left. 66 bags. 1575 bbls.
16.5
1558.5 used.