112th Congress, 2d Session – – – – – – – – – – – – House Document 112–142

OHIO RIVER SHORELINE, PADUCAH, KENTUCKY RECONSTRUCTION PROJECT

COMMUNICATION

FROM

THE ASSISTANT SECRETARY OF THE ARMY, CIVIL WORKS, THE DEPARTMENT OF DEFENSE

TRANSMITTING

RECONSTRUCTION PROPOSAL FOR THE OHIO RIVER SHORELINE, PADUCAH, KENTUCKY

PART 2 OF 2

SEPTEMBER 19, 2012.—Referred to the Committee on Transportation and Infrastructure and ordered to be printed

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INFORMATION
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Ohio River Shoreline, Paducah, Kentucky

Volume 4 (Continued)

Slope Stability RDD

Slip Surface Limits

Left Coordinate: (0, 339.3218) ft
Right Coordinate: (224.5, 330.75) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
	0	302
	225	302

Piezometric Line 2

Coordinates

	X (ft)	Y (ft)
	132.5	350.2
	225	350.2

Vol. Water Content Functions

Embankment Clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.21999999)
Data Point: (0.018329807, 0.21999998)
Data Point: (0.033598183, 0.21999997)
Data Point: (0.061584821, 0.21999993)
Data Point: (0.11288379, 0.21999984)
Data Point: (0.20691381, 0.21999963)
Data Point: (0.37926902, 0.21999914)
Data Point: (0.6951928, 0.21999792)
Data Point: (1.274275, 0.21999489)
Data Point: (2.3357215, 0.21998722)
Data Point: (4.2813324, 0.21996761)
Data Point: (7.8475997, 0.21991719)
Data Point: (14.384499, 0.21978687)
Data Point: (26.366509, 0.21944947)

Data Point: (48.329302, 0.21857772)
Data Point: (88.586679, 0.21634893)
Data Point: (162.37767, 0.21082014)
Data Point: (297.63514, 0.19810028)
Data Point: (545.55948, 0.17327571)
Data Point: (1000, 0.13699113)

Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.22 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

Foundation Clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.37048224
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.37005407)
Data Point: (0.020691381, 0.37005407)
Data Point: (0.042813324, 0.37005407)
Data Point: (0.088586679, 0.37005407)
Data Point: (0.18329807, 0.37005407)
Data Point: (0.37926902, 0.37005407)
Data Point: (0.78475997, 0.37005407)
Data Point: (1.6237767, 0.37005407)
Data Point: (3.3598183, 0.37005407)
Data Point: (6.951928, 0.37005407)
Data Point: (14.384499, 0.37005407)
Data Point: (29.763514, 0.37005407)
Data Point: (61.584821, 0.37005407)
Data Point: (127.4275, 0.37005407)
Data Point: (263.66509, 0.37005407)
Data Point: (526.83766, 0.36911026)
Data Point: (1128.8379, 0.34318275)
Data Point: (2335.7215, 0.2703264)
Data Point: (4832.9302, 0.21728994)
Data Point: (10000, 0.18487617)

Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay

Slope Stability RDD

Saturated Water Content: 0.37 ft³/ft³
Liquid Limit: 35 %
Diameter at 10% passing: 0.0005
Diameter at 60% passing: 0.011
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft²)
Region 1	Foundation Clay	29,4,21,19,3,24,26,25,23,2,20,22,9,10,11,12,13,14,15,27,28,1	9822.254
Region 2	Embankment Fill	21,5,3,19	4.7054975
Region 3	Embankment Fill	8,2,20,22	4.8603244
Region 4	I wall	3,5,6,7,8,2,23,25,26,24	42.081158

Points

	X (ft)	Y (ft)
Point 1	0	339.3218
Point 2	134.73896	336.10876
Point 3	132.34	336.06
Point 4	103.5	340.15
Point 5	132.25	340.35
Point 6	132.5	350.25
Point 7	134.5	350.25
Point 8	134.75	341.05
Point 9	145.5	340.15
Point 10	160.5	334.75
Point 11	163.5	334.85
Point 12	191.5	333.75
Point 13	206.5	332.75
Point 14	208.5	333.05
Point 15	224.5	330.75
Point 16	259.5	324.15
Point 17	302.5	316.85
Point 18	363.5	307.85
Point 19	131.19568	336.11061
Point 20	135.75695	336.14638
Point 21	131.18517	340.34259
Point 22	135.72336	340.96851
Point 23	134.08446	336.13791
Point 24	133.23483	336.06672
Point 25	134.08	325.1
Point 26	133.24	325.1
Point 27	224.5	294
Point 28	0	294
Point 29	1.07396	339.2504

Critical Slip Surfaces

Slope Stability Steady state

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File Information

Title: Paducah 156+25 A
Comments: Earthen Levee
Created By: Minges, George C LRL
Revision Number: 37
Last Edited By: Minges, George C LRL
Date: 11/8/2009
Time: 11:22:46 AM
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Directory: S:\proj\112546\Others\FEASIBILITY FOLDER\Feasibility Writeup\BONNIE\ENGINEERING CALCULATIONS\FEASIBILITY GEOTECH CALC FILES\
Last Solved Date: 11/8/2009
Last Solved Time: 11:22:56 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Slope Stability Steady state

Kind: SLOPE/W
Parent: Steady-State Seepage
Method: Spencer
Settings
    PWP Conditions Source: Parent Analysis
SlipSurface
    Direction of movement: Left to Right
    Use Passive Mode: No
    Slip Surface Option: Auto-Search
    Critical slip surfaces saved: 1
    Optimize Critical Slip Surface Location: Yes
    Tension Crack
        Tension Crack Option: (none)
FOS Distribution

FOS Calculation Option: Constant

Advanced

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Embankment Clay

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 26 °
Vol. WC. Function: Embankment Clay

Clay and Silt

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 225 psf
Phi: 28 °
Vol. WC. Function: Clay and Silt

Clayey Gravel and Sand

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 31 °
Vol. WC. Function: Clayey Gravel and Sand

Slip Surface Limits

Left Coordinate: (0, 339.2011) ft
Right Coordinate: (428.1404, 328.001) ft

Vol. Water Content Functions

Embankment Clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure

Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.21999999)
Data Point: (0.018329807, 0.21999998)
Data Point: (0.033598183, 0.21999997)
Data Point: (0.061584821, 0.21999993)
Data Point: (0.11288379, 0.21999984)
Data Point: (0.20691381, 0.21999963)
Data Point: (0.37926902, 0.21999914)
Data Point: (0.6951928, 0.21999792)
Data Point: (1.274275, 0.21999489)
Data Point: (2.3357215, 0.21998722)
Data Point: (4.2813324, 0.21996761)
Data Point: (7.8475997, 0.21991719)
Data Point: (14.384499, 0.21978687)
Data Point: (26.366509, 0.21944947)
Data Point: (48.329302, 0.21857772)
Data Point: (88.586679, 0.21634893)
Data Point: (162.37767, 0.21082014)
Data Point: (297.63514, 0.19810028)
Data Point: (545.55948, 0.17327571)
Data Point: (1000, 0.13699113)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.22 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

Clay and Silt

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.30136034
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.25001108)
Data Point: (0.023357215, 0.25001108)
Data Point: (0.054555948, 0.25001108)
Data Point: (0.1274275, 0.25001108)

Data Point: (0.29763514, 0.25001108)
Data Point: (0.6951928, 0.25001108)
Data Point: (1.6237767, 0.25001108)
Data Point: (3.7926902, 0.25001108)
Data Point: (8.8586679, 0.25001108)
Data Point: (20.691381, 0.25001108)
Data Point: (48.329302, 0.25001108)
Data Point: (112.88379, 0.25001108)
Data Point: (263.66509, 0.25001108)
Data Point: (615.84821, 0.25001108)
Data Point: (1438.4499, 0.25001108)
Data Point: (3359.8183, 0.25001108)
Data Point: (7847.5997, 0.25001108)
Data Point: (22386.337, 0.24999713)
Data Point: (41676.621, 0.24961794)
Data Point: (100000, 0.24671383)

Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.25 ft^3/ft^3
Liquid Limit: 0.4 %
Diameter at 10% passing: 0.001
Diameter at 60% passing: 0.01
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20

Clayey Gravel and Sand

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.2015675
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.19079819)
Data Point: (0.023357215, 0.19079819)
Data Point: (0.054555948, 0.19079819)
Data Point: (0.1274275, 0.19079819)
Data Point: (0.29763514, 0.19079819)
Data Point: (0.6951928, 0.19079819)
Data Point: (1.6237767, 0.19079819)
Data Point: (3.7926902, 0.19079819)
Data Point: (8.8586679, 0.19079819)
Data Point: (20.691381, 0.19079819)
Data Point: (48.329302, 0.19079819)
Data Point: (112.88379, 0.19079819)
Data Point: (263.66509, 0.19079819)

Slope Stability Steady state

Data Point: (615.84821, 0.19079819)
Data Point: (1438.4499, 0.19079819)
Data Point: (3359.8183, 0.19079819)
Data Point: (7053.0967, 0.19063688)
Data Point: (21364.961, 0.18949932)
Data Point: (42813.324, 0.18069069)
Data Point: (100000, 0.14428002)

Estimation Properties

Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.19 ft^3/ft^3
Liquid Limit: 0.31 %
Diameter at 10% passing: 0.001
Diameter at 60% passing: 3.35
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft^2)
Region 1	Embankment Clay	6,7,8,9,23,10,18,11,20,22,21,19	1550.1716
Region 2	Clay and Silt	1,14,15,13,12,11,20,22,21,19,6,5,4,3,2	4858.5978
Region 3	Clayey Gravel and Sand	14,16,17,15	2996

Points

	X (ft)	Y (ft)
Point 1	0	339.2011
Point 2	29.1296	338.3419
Point 3	91.6863	326.041
Point 4	115.903	325.7188
Point 5	135.0478	329.2969
Point 6	177.4173	329.7749
Point 7	257.0184	348.8609
Point 8	260.4708	349.0436
Point 9	265.9396	348.834
Point 10	314.396	332.8219
Point 11	338.5169	328.774
Point 12	379.0807	328.269
Point 13	428.1404	328.001
Point 14	0	318.6
Point 15	428	318.6
Point 16	0	311.6
Point 17	428	311.6
Point 18	333	329.69983
Point 19	258	330
Point 20	266	330

Slope Stability Steady state

Point 21	259	324
Point 22	265	324
Point 23	282	343.52695

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	3.713	(303.545, 375.482)	28.63375	(261.924, 348.988)	(317.188, 332.353)
2	715	3.927	(303.545, 375.482)	45.74	(266.503, 348.648)	(318.26, 332.173)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	262.7439	348.05495	72.601023	76.722513	2.0101853	200
2	Optimized	264.38445	346.1891	176.80551	279.66165	50.166294	200
3	Optimized	265.57215	344.8691	254.62562	430.63752	85.846741	200
4	Optimized	267.0705	343.29065	350.2604	587.74469	115.82883	200
5	Optimized	269.16215	341.38815	468.48478	802.36384	162.8437	200
6	Optimized	271.08365	339.9658	559.00273	932.4102	182.12299	200
7	Optimized	273.0052	338.5434	649.9808	1062.4984	201.19827	200
8	Optimized	275.01835	337.17885	737.99829	1203.2484	226.91766	200
9	Optimized	277.12305	335.87215	822.80573	1317.8051	241.42731	200
10	Optimized	279.11235	334.76	895.31466	1435.542	263.48648	200
11	Optimized	280.9863	333.84235	955.41447	1509.4446	270.21857	200
12	Optimized	281.96165	333.3689	986.32104	1568.8123	284.09998	200
13	Optimized	282.9883	332.9775	1012.1476	1596.2443	284.88302	200
14	Optimized	284.96495	332.2239	1061.5471	1649.0475	286.54307	200
15	Optimized	286.73885	331.6267	1100.6433	1708.2033	296.32681	200
16	Optimized	288.30995	331.18595	1129.6302	1731.2457	293.42751	200
17	Optimized	289.88105	330.7452	1158.3106	1754.2268	290.64776	200
18	Optimized	291.8156	330.29465	1187.7129	1788.823	293.18096	200
19	Optimized	294.32245	329.86465	1215.8619	1803.8285	286.77045	200
20	Optimized	296.92915	329.56335	1235.6596	1803.5698	276.98831	200
21	Optimized	299.2514	329.44645	1243.5793	1785.884	264.49958	200
22	Optimized	301.39815	329.4156	1245.9547	1745.9203	243.84948	200
23	Optimized	303.54485	329.38475	1248.1905	1705.9565	223.26744	200
24	Optimized	305.58675	329.4074	1246.9939	1672.1501	207.36249	200
25	Optimized	307.52385	329.4836	1242.403	1622.6293	185.44879	200
26	Optimized	309.4139	329.7452	1226.167	1589.05	176.98987	200
27	Optimized	311.2656	330.22695	1196.2197	1493.4619	144.97469	200
28	Optimized	313.126	330.74345	1164.056	1386.2496	108.37104	200
29	Optimized	314.2261	331.07505	1143.3864	1344.299	97.991644	200
30	Optimized	315.09395	331.44965	1120.0519	1273.1061	74.649543	200
31	Optimized	316.48985	332.05215	1082.4954	1177.3403	46.258978	200

Slices of Slip Surface: **715**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)

Slope Stability Steady state

1	715	267.3636	347.5334	111.20914	101.46746	-4.7513308	200
2	715	269.08555	345.4315	234.56104	314.24684	38.865357	200
3	715	270.80745	343.5612	347.09966	504.06949	76.5593	200
4	715	272.5294	341.88345	450.02238	674.00944	109.24579	200
5	715	274.25135	340.3704	544.21065	826.39395	137.62999	200
6	715	275.97325	339.0014	630.37231	963.02505	162.24558	200
7	715	277.69515	337.7607	709.1903	1085.3428	183.46185	200
8	715	279.4171	336.63595	781.08967	1194.5004	201.63386	200
9	715	281.13905	335.6173	846.51804	1291.4197	216.99304	200
10	715	282.85255	334.7008	905.55341	1376.5311	229.71119	200
11	715	284.5576	333.87915	958.52441	1450.5652	239.98431	200
12	715	286.26265	333.1421	1006.1245	1514.481	247.94203	200
13	715	287.9677	332.48525	1048.5813	1568.7914	253.72343	200
14	715	289.67275	331.905	1086.0308	1613.7055	257.36415	200
15	715	291.3778	331.3983	1118.7239	1649.6485	258.94924	200
16	715	293.08285	330.96265	1146.8462	1676.8494	258.49981	200
17	715	294.7879	330.596	1170.5063	1695.3748	255.99548	200
18	715	296.49295	330.29665	1189.7836	1705.5187	251.54083	200
19	715	298.198	330.06325	1204.8396	1707.2784	245.05578	200
20	715	299.90305	329.8948	1215.7962	1700.7467	236.52614	200
21	715	301.6081	329.79055	1222.6185	1686.0006	226.00655	200
22	715	303.31315	329.7501	1225.3427	1662.9777	213.44883	200
23	715	305.0182	329.7733	1224.1359	1631.5951	198.73109	200
24	715	306.72325	329.86015	1218.8258	1591.8104	181.91673	200
25	715	308.4283	330.0111	1209.5455	1543.5088	162.88479	200
26	715	310.13335	330.2268	1196.1493	1486.4521	141.5901	200
27	715	311.8384	330.50815	1178.6806	1420.5189	117.95243	200
28	715	313.54345	330.8564	1157.0238	1345.3685	91.861857	200
29	715	315.3621	331.30585	1129.0407	1256.834	62.328953	200
30	715	317.29425	331.86885	1093.9271	1168.5108	36.376898	200

Slope Stability Steady State

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File Information

Title: 175+12A
Comments: Earthen Levee
Created By: Minges, George C LRL
Revision Number: 45
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File Name: Paducah 175+12B F.gsz
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Last Solved Date: 11/8/2009
Last Solved Time: 11:50:08 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Slope Stability Steady State

Kind: SLOPE/W
Parent: Steady-State Seepage
Method: Spencer
Settings
    PWP Conditions Source: Parent Analysis
SlipSurface
    Direction of movement: Right to Left
    Use Passive Mode: No
    Slip Surface Option: Auto-Search
    Critical slip surfaces saved: 1
    Optimize Critical Slip Surface Location: Yes
    Tension Crack
        Tension Crack Option: (none)
FOS Distribution

FOS Calculation Option: Constant

Advanced

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Embankment Clay

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 26 °
Vol. WC. Function: embankment clay

Debris

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 0 psf
Phi: 27 °
Vol. WC. Function: Debris

Clay and Silt

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 225 psf
Phi: 28 °
Vol. WC. Function: clay and silt

Clayey Gravel and Sand

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 31 °
Vol. WC. Function: clayey gravel and sand

Slip Surface Limits

Left Coordinate: (0, 335.125) ft
Right Coordinate: (574.1246, 337.6329) ft

Vol. Water Content Functions

Debris

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.19999934
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.1, 0.19999929)
Data Point: (0.14384499, 0.19999859)
Data Point: (0.20691381, 0.19999718)
Data Point: (0.29763514, 0.19999432)
Data Point: (0.42813324, 0.19998852)
Data Point: (0.61584821, 0.19997673)
Data Point: (0.88586679, 0.19995275)
Data Point: (1.274275, 0.19990397)
Data Point: (1.8329807, 0.19980471)
Data Point: (2.6366509, 0.19960286)
Data Point: (3.7926902, 0.19919303)
Data Point: (5.4555948, 0.19836402)
Data Point: (7.8475997, 0.19670002)
Data Point: (11.288379, 0.19341173)
Data Point: (16.237767, 0.18711026)
Data Point: (23.357215, 0.17571597)
Data Point: (33.598183, 0.15711748)
Data Point: (48.329302, 0.13126)
Data Point: (69.51928, 0.10214438)
Data Point: (100, 0.075804198)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Sand
Saturated Water Content: 0.2 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 100
Minimum: 0.1
Num. Points: 20

embankment clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %

Mv: 4.79e-007 /psf
Porosity: 0.22
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.21999999)
Data Point: (0.018329807, 0.21999998)
Data Point: (0.033598183, 0.21999997)
Data Point: (0.061584821, 0.21999993)
Data Point: (0.11288379, 0.21999984)
Data Point: (0.20691381, 0.21999963)
Data Point: (0.37926902, 0.21999914)
Data Point: (0.6951928, 0.21999792)
Data Point: (1.274275, 0.21999489)
Data Point: (2.3357215, 0.21998722)
Data Point: (4.2813324, 0.21996761)
Data Point: (7.8475997, 0.21991719)
Data Point: (14.384499, 0.21978687)
Data Point: (26.366509, 0.21944947)
Data Point: (48.329302, 0.21857772)
Data Point: (88.586679, 0.21634893)
Data Point: (162.37767, 0.21082014)
Data Point: (297.63514, 0.19810028)
Data Point: (545.55948, 0.17327571)
Data Point: (1000, 0.13699113)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.22 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

clayey gravel and sand

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.19342789
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.18997613)
Data Point: (0.023357215, 0.18997613)
Data Point: (0.054555948, 0.18997613)
Data Point: (0.1274275, 0.18997613)
Data Point: (0.29763514, 0.18997613)
Data Point: (0.6951928, 0.18997613)

Data Point: (1.6237767, 0.18997613)
Data Point: (3.7926902, 0.18997613)
Data Point: (8.8586679, 0.18997613)
Data Point: (20.691381, 0.18997613)
Data Point: (48.329302, 0.18997613)
Data Point: (112.88379, 0.18997613)
Data Point: (263.66509, 0.18997613)
Data Point: (615.84821, 0.18997613)
Data Point: (1438.4499, 0.18997613)
Data Point: (4769.8134, 0.18949932)
Data Point: (11131.953, 0.18790673)
Data Point: (21364.961, 0.18267395)
Data Point: (42813.324, 0.16246761)
Data Point: (100000, 0.14006886)

Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Silty Sand
Saturated Water Content: 0.19 ft^3/ft^3
Liquid Limit: 31 %
Diameter at 10% passing: 0.001
Diameter at 60% passing: 3.35
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20

clay and silt

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.2513675
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.24989967)
Data Point: (0.01610262, 0.24989967)
Data Point: (0.025929438, 0.24989967)
Data Point: (0.041753189, 0.24989967)
Data Point: (0.067233575, 0.24989967)
Data Point: (0.10826367, 0.24989967)
Data Point: (0.17433288, 0.24989967)
Data Point: (0.28072162, 0.24989967)
Data Point: (0.45203537, 0.24989967)
Data Point: (0.72789538, 0.24989967)
Data Point: (1.1721023, 0.24989967)
Data Point: (1.8873918, 0.24989967)
Data Point: (3.0391954, 0.24989967)
Data Point: (4.8939009, 0.24989967)
Data Point: (7.8804628, 0.24989967)

Data Point: (12.68961, 0.24989967)
Data Point: (20.433597, 0.24989967)
Data Point: (32.903446, 0.24989967)
Data Point: (52.983169, 0.24989967)
Data Point: (85.316785, 0.24989967)
Data Point: (137.38238, 0.24989967)
Data Point: (221.22163, 0.24989967)
Data Point: (356.22479, 0.24989967)
Data Point: (573.61525, 0.24989967)
Data Point: (923.67086, 0.24989967)
Data Point: (1812.7854, 0.2498454)
Data Point: (3414.0428, 0.24965581)
Data Point: (5730.6727, 0.24887847)
Data Point: (7641.3555, 0.24785682)
Data Point: (10000, 0.24514068)

Estimation Properties

Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.25 ft^3/ft^3
Liquid Limit: 40 %
Diameter at 10% passing: 0.01
Diameter at 60% passing: 0.001
Maximum: 10000
Minimum: 0.01
Num. Points: 30

Regions

	Material	Points	Area (ft^2)
Region 1	Clayey Gravel and Sand	34,32,33,35	6601
Region 2	Clay and Silt	33,28,29,11,12,13,14,15,30,26,27,31,32	10195.515
Region 3	Debris	25,27,31,21,22,20,19	1640.9231
Region 4	Debris	26,24,23,30	314.47259
Region 5	Debris	29,28,1,2,3,4,5,6,7,8,9,10,36	364.52734
Region 6	Embankment Clay	23,16,17,37,18,19,25,27,26,24	664.18275

Points

	X (ft)	Y (ft)
Point 1	0	335.125
Point 2	47.1877	334.6991
Point 3	52.7608	335.8419
Point 4	59.8609	335.6637
Point 5	62.8973	334.23
Point 6	65.4775	334.2425
Point 7	68.3984	335.378
Point 8	87.6283	335.665
Point 9	92.7868	334.9249

Point 10	105.1336	334.3675
Point 11	124.5526	327.4429
Point 12	136.5964	327.0624
Point 13	157.062	325.7087
Point 14	177.9576	326.025
Point 15	194.9604	325.3005
Point 16	280.1259	350.082
Point 17	288.2718	350.0541
Point 18	323.9674	339.1601
Point 19	334.8666	337.8629
Point 20	349.0074	337.4019
Point 21	574.1246	337.6329
Point 22	353.70395	337.06029
Point 23	236.89948	337.50396
Point 24	280.2	337.6
Point 25	288.2	337.7
Point 26	281.2	331.7
Point 27	287.2	331.7
Point 28	0	331.7
Point 29	113	331.7
Point 30	216.79302	331.70992
Point 31	574	331.7
Point 32	574	313.1
Point 33	0	313.1
Point 34	574	301.6
Point 35	0	301.6
Point 36	106.63124	333.83346
Point 37	304.85751	344.99228

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.979	(229.028, 404.635)	55.29042	(301.82, 345.919)	(180.201, 325.929)
2	725	1.997	(229.028, 404.635)	93.496	(301.794, 345.927)	(178.443, 326.004)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	182.64705	324.53135	102.0838	323.99022	117.98973	225
2	Optimized	187.54015	321.73525	321.52378	724.04955	214.02675	225
3	Optimized	192.47355	319.07705	554.40765	1055.012	266.17603	225
4	Optimized	197.52015	316.5198	796.76305	1544.4254	397.5391	225
5	Optimized	201.8034	314.71045	970.14834	1834.931	459.8131	225
6	Optimized	205.2504	313.68595	1070.7866	2129.6156	562.98938	225
7	Optimized	207.19065	313.13685	1123.4003	2171.3143	557.18579	225
8	Optimized	209.0571	312.81945	1155.5029	2261.6148	664.6191	0
9	Optimized	212.3565	312.2583	1211.9454	2475.8513	759.43131	0
10	Optimized	215.3996	311.874	1255.8296	2561.3628	784.44349	0

Slope Stability Steady State

11	Optimized	219.804	311.54625	1305.3537	2772.6658	881.65	0
12	Optimized	224.7214	311.36885	1349.2304	2874.6527	916.56614	0
13	Optimized	228.53425	311.4622	1369.1045	2999.193	979.456	0
14	Optimized	232.34715	311.5556	1389.2669	3123.7333	1042.1726	0
15	Optimized	235.57655	311.76215	1398.6237	3105.5637	1025.633	0
16	Optimized	239.16425	312.1957	1396.5337	3179.2206	1071.1463	0
17	Optimized	243.69375	312.74305	1394.4734	3275.0027	1129.936	0
18	Optimized	246.12775	313.05835	1392.3525	3186.1173	1077.8026	0
19	Optimized	248.2767	313.5868	1371.3054	3193.7935	969.03414	225
20	Optimized	252.4098	314.75445	1318.3215	3120.9071	958.45178	225
21	Optimized	256.7166	316.1161	1250.7981	3106.2955	986.58545	225
22	Optimized	260.9278	317.62855	1169.9571	2979.9733	962.40264	225
23	Optimized	265.04335	319.2919	1076.8048	2923.4286	981.86726	225
24	Optimized	268.84585	321.04365	976.30456	2730.8137	932.88906	225
25	Optimized	272.33535	322.8838	870.70194	2635.5027	938.36119	225
26	Optimized	275.82485	324.724	775.16275	2540.9521	938.88683	225
27	Optimized	278.84775	326.5131	694.88612	2315.8342	861.87336	225
28	Optimized	280.16295	327.4073	660.85863	2260.1508	850.35874	225
29	Optimized	280.7	327.77245	652.62533	2234.4632	841.0781	225
30	Optimized	282.73685	329.1573	657.25628	2108.1221	771.43906	225
31	Optimized	285.20225	330.9511	824.11503	1873.3507	557.88849	225
32	Optimized	286.74845	332.19815	1019.2064	1793.5513	377.67322	200
33	Optimized	287.78305	333.0326	1055.5437	1754.1682	355.96696	0
34	Optimized	288.2359	333.3979	1032.8775	1712.6453	346.35897	0
35	Optimized	288.8985	333.93235	999.70502	1651.6434	332.17917	0
36	Optimized	291.2752	336.0773	866.50581	1364.2077	253.59176	0
37	Optimized	294.02355	338.65215	699.16652	1014.4676	153.78261	200
38	Optimized	296.72135	341.1705	543.29691	721.10199	86.721335	200
39	Optimized	300.12025	344.33645	359.87284	352.101	-3.7905802	200

Slices of Slip Surface: 725

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	725	180.50795	324.7503	89.957918	313.33447	118.77142	225
2	725	184.6372	322.38205	270.1905	626.75755	189.59007	225
3	725	188.76645	320.28235	442.61665	883.37558	234.35568	225
4	725	192.89575	318.4315	610.22908	1092.1229	256.22748	225
5	725	196.83755	316.87755	762.94129	1354.1589	314.35598	225
6	725	200.5918	315.58955	893.39136	1671.0014	413.46259	225
7	725	204.34605	314.47625	1005.9333	1953.882	504.03323	225
8	725	208.10035	313.5312	1100.8441	2205.6602	587.44111	225
9	725	211.68135	312.77825	1174.884	2389.9929	730.11107	0
10	725	215.0891	312.19955	1233.3814	2574.8499	806.03556	0
11	725	218.80365	311.72135	1287.7562	2745.2291	875.73808	0
12	725	222.82495	311.3664	1336.6913	2897.889	938.06223	0
13	725	226.84625	311.18575	1375.0044	3023.3292	990.41342	0
14	725	230.86755	311.1784	1402.7599	3122.2721	1033.1871	0
15	725	234.88885	311.3443	1420.0512	3195.9031	1067.0395	0

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16	725	238.76255	311.6657	1426.9733	3247.3313	1093.7814	0
17	725	242.48865	312.1319	1424.203	3278.5936	1114.2303	0
18	725	246.2147	312.7515	1412.2929	3289.3531	1127.8515	0
19	725	250.08075	313.56305	1386.2504	3276.0435	1004.8208	225
20	725	254.0868	314.5835	1342.829	3239.8354	1008.6562	225
21	725	258.0928	315.7962	1284.2084	3179.6193	1007.8078	225
22	725	262.0988	317.2092	1209.9296	3094.9842	1002.3013	225
23	725	266.1048	318.83245	1120.2685	2985.3051	991.65756	225
24	725	270.11085	320.67815	1017.124	2849.8218	974.46268	225
25	725	274.1169	322.7614	905.04931	2688.406	948.22757	225
26	725	278.1229	325.1009	794.78991	2500.539	906.96288	225
27	725	280.16295	326.3615	753.57686	2399.0182	874.89666	225
28	725	280.7	326.7173	746.43745	2366.5882	861.44946	225
29	725	284.2	329.24435	783.27451	2082.2941	690.70095	225
30	725	287.36295	331.5699	1127.5186	1856.7184	387.72243	225
31	725	287.86295	331.97295	1121.6608	1860.0967	376.2519	0
32	725	288.2359	332.27525	1102.906	1823.4814	367.15147	0
33	725	291.29985	335.013	932.95738	1482.684	280.09969	0
34	725	296.19445	339.6506	638.82642	861.89507	108.79785	200
35	725	299.9275	343.7535	394.62612	386.33675	-4.0429934	200

Slope Stability Steady state

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File Information

Title: Paducah 177+05 C
Comments: earthen levee
Created By: Minges, George C LRL
Revision Number: 83
Last Edited By: Minges, George C LRL
Date: 11/8/2009
Time: 12:12:40 PM
File Name: Paducah 177+05c F.gsz
Directory: S:\proj\112546\Others\FEASIBILITY FOLDER\Feasibility Writeup\BONNIE\ENGINEERING CALCULATIONS\FEASIBILITY GEOTECH CALC FILES\
Last Solved Date: 11/8/2009
Last Solved Time: 12:13:10 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Slope Stability Steady state

Kind: SLOPE/W
Parent: Steady-State Seepage
Method: Spencer
Settings
    PWP Conditions Source: Parent Analysis
SlipSurface
    Direction of movement: Right to Left
    Use Passive Mode: No
    Slip Surface Option: Auto-Search
    Critical slip surfaces saved: 1
    Optimize Critical Slip Surface Location: Yes
    Tension Crack
        Tension Crack Option: (none)
FOS Distribution

FOS Calculation Option: Constant

Advanced

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Embankment Clay

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 26 °
Vol. WC. Function: embankment clay

Clay and Silt

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 225 psf
Phi: 28 °
Vol. WC. Function: clay and silt

Silty Mud

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 100 psf
Phi: 27 °
Vol. WC. Function: Silty Mud

Slip Surface Limits

Left Coordinate: (0, 329.44) ft
Right Coordinate: (261.8367, 327.54) ft

Vol. Water Content Functions

embankment clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure

Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.21999999)
Data Point: (0.020691381, 0.21999998)
Data Point: (0.042813324, 0.21999995)
Data Point: (0.088586679, 0.21999988)
Data Point: (0.18329807, 0.21999969)
Data Point: (0.37926902, 0.21999914)
Data Point: (0.78475997, 0.21999752)
Data Point: (1.6237767, 0.21999264)
Data Point: (3.3598183, 0.2199777)
Data Point: (6.951928, 0.2199314)
Data Point: (14.384499, 0.21978687)
Data Point: (29.763514, 0.2193343)
Data Point: (61.584821, 0.2179235)
Data Point: (127.4275, 0.21362613)
Data Point: (263.66509, 0.2014734)
Data Point: (545.55948, 0.17327571)
Data Point: (1128.8379, 0.12923352)
Data Point: (2335.7215, 0.087755139)
Data Point: (4832.9302, 0.060407646)
Data Point: (10000, 0.044010658)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.22 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 10000
Minimum: 0.01
Num. Points: 20

clay and silt

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.2601826
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.25998123)
Data Point: (0.020691381, 0.25998123)
Data Point: (0.042813324, 0.25998123)
Data Point: (0.088586679, 0.25998123)

Data Point: (0.18329807, 0.25998123)
Data Point: (0.37926902, 0.25998123)
Data Point: (0.78475997, 0.25998123)
Data Point: (1.6237767, 0.25998123)
Data Point: (3.3598183, 0.25998123)
Data Point: (6.951928, 0.25998123)
Data Point: (14.384499, 0.25998123)
Data Point: (29.763514, 0.25998123)
Data Point: (61.584821, 0.25998123)
Data Point: (127.4275, 0.25998123)
Data Point: (263.66509, 0.25998123)
Data Point: (545.55948, 0.25998123)
Data Point: (1151.9502, 0.2583442)
Data Point: (2335.7215, 0.24584199)
Data Point: (4832.9302, 0.21435066)
Data Point: (10000, 0.18619499)

Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.26 ft^3/ft^3
Liquid Limit: 30 %
Diameter at 10% passing: 0.01
Diameter at 60% passing: 0.001
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Silty Mud

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.37999999
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.37999999)
Data Point: (0.020691381, 0.37999997)
Data Point: (0.042813324, 0.37999992)
Data Point: (0.088586679, 0.3799998)
Data Point: (0.18329807, 0.37999947)
Data Point: (0.37926902, 0.37999851)
Data Point: (0.78475997, 0.37999571)
Data Point: (1.6237767, 0.37998729)
Data Point: (3.3598183, 0.37996148)
Data Point: (6.951928, 0.37988152)
Data Point: (14.384499, 0.37963187)
Data Point: (29.763514, 0.37885015)
Data Point: (61.584821, 0.37641332)

Slope Stability Steady state

Data Point: (127.4275, 0.36899059)
Data Point: (263.66509, 0.34799952)
Data Point: (545.55948, 0.2992944)
Data Point: (1128.8379, 0.22322153)
Data Point: (2335.7215, 0.15157706)
Data Point: (4832.9302, 0.10434048)
Data Point: (10000, 0.07601841)

Estimation Properties

Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.38 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft^2)
Region 1	Embankment Clay	5,27,6,7,8,25,26,9,13,16,15,14	1333.2343
Region 2	Silty Mud	21,19,17,18,20,22	2610
Region 3	Silty Mud	23,21,22,24	4489.2
Region 4	Clay and Silt	1,17,18,12,11,10,9,13,16,15,14,5,28,29,30,4,3,2	3534.0409
Region 5	Clay and Silt	30,29,28,5	16.401447

Points

	X (ft)	Y (ft)
Point 1	0	329.44
Point 2	2.6572	327.7818
Point 3	12.6443	327.7989
Point 4	14.7324	329.5039
Point 5	30.5158	330.8228
Point 6	93.2703	350.5922
Point 7	97.5013	350.874
Point 8	101.7313	350.6552
Point 9	162.9985	333.8041
Point 10	181.8955	332.5079
Point 11	214.0501	328.1119
Point 12	261.8367	327.54
Point 13	101.53514	332.42097
Point 14	93.47597	332.23961
Point 15	94.48622	326.23738
Point 16	100.52539	326.23738
Point 17	0	317.2
Point 18	261	317.2

Slope Stability Steady state

Point 19	0	313.2
Point 20	261	313.2
Point 21	0	307.2
Point 22	261	307.2
Point 23	0	290
Point 24	261	290
Point 25	122.17126	345.03334
Point 26	129.49354	343.0194
Point 27	67	342.31633
Point 28	30.5	326
Point 29	27	326
Point 30	27	330.52901

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.802	(45.108, 383.834)	49.97264	(106.113, 349.45)	(2.65736, 327.782)
2	166	1.829	(45.108, 383.834)	68.153	(104.249, 349.963)	(6.33089, 327.788)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	5.1264835	326.25265	126.21822	398.04834	144.53464	225
2	Optimized	10.119955	323.31275	374.2842	833.3257	244.07669	225
3	Optimized	13.11381	321.63965	538.92199	1157.2897	328.79194	225
4	Optimized	14.15786	321.16505	592.16144	1235.6221	342.1341	225
5	Optimized	17.16842	320.05295	707.88125	1499.7471	421.04254	225
6	Optimized	21.18223	318.66485	837.99618	1698.5763	457.57855	225
7	Optimized	24.33781	317.6883	933.115	1874.8276	500.71749	225
8	Optimized	26.4578	317.0322	996.53082	1943.288	482.39685	100
9	Optimized	27.444045	316.727	1023.9712	2032.6032	513.92367	100
10	Optimized	29.201945	316.3716	1061.4458	2021.7891	489.31932	100
11	Optimized	31.908245	315.9226	1114.0812	2084.6248	494.51668	100
12	Optimized	34.69313	315.46055	1170.0155	2267.3058	559.09733	100
13	Optimized	38.170145	315.1368	1226.0152	2352.732	574.09086	100
14	Optimized	42.3393	314.9514	1282.4697	2549.5558	645.61261	100
15	Optimized	45.964935	314.9706	1321.2932	2588.4481	645.64766	100
16	Optimized	49.04705	315.1944	1341.6153	2683.9426	683.94991	100
17	Optimized	52.129165	315.4182	1362.0022	2779.4371	722.21918	100
18	Optimized	55.79935	315.9476	1369.7235	2745.116	700.7975	100
19	Optimized	60.161605	316.80295	1364.5808	2811.5118	737.2482	100
20	Optimized	64.697365	318.2451	1325.2345	2589.8429	672.40422	225
21	Optimized	68.385995	319.8539	1266.6917	2537.616	675.76243	225
22	Optimized	71.157985	321.0629	1222.8782	2498.3326	678.17116	225
23	Optimized	74.31247	322.647	1160.6016	2339.9007	627.04443	225
24	Optimized	77.849455	324.60615	1080.5439	2245.1521	619.23317	225
25	Optimized	80.99156	326.48875	1002.3305	2076.5037	571.14801	225
26	Optimized	83.738785	328.29485	926.13828	1974.4274	557.38522	225

27	Optimized	86.985	330.6668	825.60003	1757.336	495.41282	225
28	Optimized	89.527435	332.6611	741.9628	1649.374	442.574	200
29	Optimized	91.733785	334.5801	658.99478	1466.1067	393.65479	200
30	Optimized	94.62713	337.20435	545.23231	1260.79	349.00081	200
31	Optimized	96.74263	339.2266	459.52596	1030.1371	278.30564	200
32	Optimized	99.14745	341.7358	359.42692	789.38575	209.70493	200
33	Optimized	101.26245	343.9819	281.52966	552.28079	132.05415	200
34	Optimized	103.92235	346.98015	169.46511	227.24075	28.179062	200

Slices of Slip Surface: 166

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	166	7.9092445	326.7594	85.204692	330.54803	130.45136	225
2	166	11.065948	324.8202	251.90018	608.43611	189.57352	225
3	166	13.68835	323.3672	411.43986	946.12598	284.29765	225
4	166	16.26585	322.1082	547.85667	1263.946	380.75147	225
5	166	19.33275	320.765	670.78381	1457.6207	418.3686	225
6	166	22.39965	319.5962	778.1076	1620.9269	448.13495	225
7	166	25.46655	318.59245	875.86961	1756.3288	468.14848	225
8	166	28.7579	317.6962	969.61517	1950.3027	521.44079	225
9	166	30.657735	317.2308	1020.0253	1937.4593	487.80833	225
10	166	32.389525	316.8979	1057.2492	2001.0153	480.87285	100
11	166	35.56924	316.371	1121.6183	2170.0274	534.19109	100
12	166	38.748955	315.99715	1178.1799	2313.8379	578.64668	100
13	166	41.928665	315.77385	1226.4772	2434.0738	615.30124	100
14	166	45.10838	315.6996	1266.1835	2532.0839	645.00848	100
15	166	48.288095	315.77385	1296.9727	2608.7732	668.39578	100
16	166	51.467805	315.99715	1318.4893	2664.8464	686.00319	100
17	166	54.64752	316.371	1330.5341	2700.8023	698.18655	100
18	166	57.827235	316.8979	1332.8773	2716.9193	705.20462	100
19	166	61.312815	317.66425	1323.8413	2703.735	733.70251	225
20	166	65.10427	318.71055	1301.034	2662.0254	723.65195	225
21	166	68.609625	319.88415	1267.2954	2598.3273	707.72221	225
22	166	71.82887	321.16195	1224.1594	2516.4689	687.13316	225
23	166	75.048115	322.63565	1169.4709	2412.3825	660.86781	225
24	166	78.26736	324.31995	1102.7371	2285.1986	628.72593	225
25	166	81.486605	326.23335	1023.6075	2133.8333	590.31749	225
26	166	84.705855	328.39965	931.85733	1956.86	545.00356	225
27	166	87.9251	330.85015	827.52012	1752.5519	491.84811	225
28	166	91.40251	333.8819	696.27139	1514.2558	398.95764	200
29	166	95.3858	337.92995	513.7516	1125.5587	298.39826	200
30	166	99.6163	343.0754	292.44676	595.38405	147.75239	200
31	166	102.99005	347.9333	110.69282	108.89016	-0.87921493	200

Slope Stability steady state

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File Information

Created By: Ghack, Mabior T LRL
Revision Number: 47
Last Edited By: Minges, George C LRL
Date: 11/8/2009
Time: 11:24:34 AM
File Name: Paducah 67+17A F.gsz
Directory: S:\proj\112546\Others\FEASIBILITY FOLDER\Feasibility Writeup\BONNIE\ENGINEERING CALCULATIONS\FEASIBILITY GEOTECH CALC FILES\
Last Solved Date: 11/8/2009
Last Solved Time: 11:25:14 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Slope Stability steady state

Kind: SLOPE/W
Parent: Steady-State Seepage
Method: Spencer
Settings
    PWP Conditions Source: Parent Analysis
SlipSurface
    Direction of movement: Right to Left
    Use Passive Mode: No
    Slip Surface Option: Auto-Search
    Critical slip surfaces saved: 1
    Optimize Critical Slip Surface Location: Yes
    Tension Crack
        Tension Crack Option: (none)
FOS Distribution
    FOS Calculation Option: Constant
Advanced

Slope Stability steady state

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

embankment fill

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 26 °
Vol. WC. Function: embankment fill

gravels

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 35 °
Vol. WC. Function: gravels

clay and silt

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 225 psf
Phi: 28 °
Vol. WC. Function: clay and silt

clayey gravel

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 0 psf
Phi: 31 °
Vol. WC. Function: clayey gravel

Slip Surface Limits

Left Coordinate: (0, 334.8625) ft
Right Coordinate: (374.9917, 321.3737) ft

Slope Stability steady state

Vol. Water Content Functions

embankment fill

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.21999999)
Data Point: (0.018329807, 0.21999998)
Data Point: (0.033598183, 0.21999997)
Data Point: (0.061584821, 0.21999993)
Data Point: (0.11288379, 0.21999984)
Data Point: (0.20691381, 0.21999963)
Data Point: (0.37926902, 0.21999914)
Data Point: (0.6951928, 0.21999792)
Data Point: (1.274275, 0.21999489)
Data Point: (2.3357215, 0.21998722)
Data Point: (4.2813324, 0.21996761)
Data Point: (7.8475997, 0.21991719)
Data Point: (14.384499, 0.21978687)
Data Point: (26.366509, 0.21944947)
Data Point: (48.329302, 0.21857772)
Data Point: (88.586679, 0.21634893)
Data Point: (162.37767, 0.21082014)
Data Point: (297.63514, 0.19810028)
Data Point: (545.55948, 0.17327571)
Data Point: (1000, 0.13699113)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.22 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

gravels

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.12977884

Slope Stability steady state

Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
- Data Point: (0.01, 0.13)
- Data Point: (0.018329807, 0.12999999)
- Data Point: (0.033598183, 0.12999999)
- Data Point: (0.061584821, 0.12999998)
- Data Point: (0.11288379, 0.12999996)
- Data Point: (0.20691381, 0.12999993)
- Data Point: (0.37926902, 0.12999986)
- Data Point: (0.6951928, 0.12999975)
- Data Point: (1.274275, 0.12999945)
- Data Point: (2.3357215, 0.12999692)
- Data Point: (4.2813324, 0.12994609)
- Data Point: (7.8475997, 0.12879092)
- Data Point: (14.384499, 0.1086857)
- Data Point: (26.366509, 0.048675218)
- Data Point: (48.329302, 0.025073057)
- Data Point: (88.586679, 0.016822363)
- Data Point: (162.37767, 0.012726241)
- Data Point: (297.63514, 0.010268092)
- Data Point: (545.55948, 0.0086222321)
- Data Point: (1000, 0.0074377998)

Estimation Properties
- Vol. WC Estimation Method: Sample functions
- Sample Material: Gravel
- Saturated Water Content: 0.13 ft^3/ft^3
- Liquid Limit: 0 %
- Diameter at 10% passing: 0
- Diameter at 60% passing: 0
- Maximum: 1000
- Minimum: 0.01
- Num. Points: 20

clayey gravel

Model: Data Point Function

Function: Vol. Water Content vs. Pore-Water Pressure
- Curve Fit to Data: 100 %
- Segment Curvature: 100 %
- Mv: 4.79e-007 /psf

Porosity: 0.19532101

Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
- Data Point: (0.01, 0.18997613)
- Data Point: (0.023357215, 0.18997613)
- Data Point: (0.054555948, 0.18997613)
- Data Point: (0.1274275, 0.18997613)
- Data Point: (0.29763514, 0.18997613)
- Data Point: (0.6951928, 0.18997613)
- Data Point: (1.6237767, 0.18997613)
- Data Point: (3.7926902, 0.18997613)

Slope Stability steady state

Data Point: (8.8586679, 0.18997613)
Data Point: (20.691381, 0.18997613)
Data Point: (48.329302, 0.18997613)
Data Point: (112.88379, 0.18997613)
Data Point: (263.66509, 0.18997613)
Data Point: (615.84821, 0.18997613)
Data Point: (1438.4499, 0.18997613)
Data Point: (3359.8183, 0.18997613)
Data Point: (10429.375, 0.18959155)
Data Point: (22804.218, 0.18312897)
Data Point: (42813.324, 0.16246761)
Data Point: (100000, 0.14006886)

Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Silty Sand
Saturated Water Content: 0.19 ft^3/ft^3
Liquid Limit: 31 %
Diameter at 10% passing: 0.001
Diameter at 60% passing: 3.35
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20

clay and silt

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.25114936
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.24989967)
Data Point: (0.020691381, 0.24989967)
Data Point: (0.042813324, 0.24989967)
Data Point: (0.088586679, 0.24989967)
Data Point: (0.18329807, 0.24989967)
Data Point: (0.37926902, 0.24989967)
Data Point: (0.78475997, 0.24989967)
Data Point: (1.6237767, 0.24989967)
Data Point: (3.3598183, 0.24989967)
Data Point: (6.951928, 0.24989967)
Data Point: (14.384499, 0.24989967)
Data Point: (29.763514, 0.24989967)
Data Point: (61.584821, 0.24989967)
Data Point: (127.4275, 0.24989967)
Data Point: (263.66509, 0.24989967)
Data Point: (545.55948, 0.24989967)
Data Point: (1128.8379, 0.24989967)

Slope Stability steady state

Data Point: (2282.0137, 0.2498454)
Data Point: (5107.633, 0.24853936)
Data Point: (10000, 0.24514068)

Estimation Properties

Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.25 ft^3/ft^3
Liquid Limit: 40 %
Diameter at 10% passing: 0.01
Diameter at 60% passing: 0.001
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft^2)
Region 1	embankment fill	14,26,13,12,11,10,9,8,7,16,18,19,17	2264.308
Region 2	gravels	1,2,3,4,5,6,7,16,18,24	2011.0898
Region 3	clayey gravel	20,22,23,21	4124.9087
Region 4	gravels	19,17,14,15,25	869.8555
Region 5	clay and silt	25,21,20,24,18,19	1124.9751

Points

	X (ft)	Y (ft)
Point 1	0	334.8625
Point 2	12.9496	334.8222
Point 3	51.8256	333.6227
Point 4	75.5322	325.9003
Point 5	92.5865	326.3688
Point 6	109.279	326.1716
Point 7	124.9974	326.2999
Point 8	141.2426	332.3327
Point 9	148.057	334.1276
Point 10	164.1967	335.7904
Point 11	205.5546	349.3855
Point 12	211.0685	349.9124
Point 13	216.8613	349.5456
Point 14	302.4014	324.8389
Point 15	374.9917	321.3737
Point 16	207	325.8
Point 17	215	325.8
Point 18	208	318.9
Point 19	214	318.9
Point 20	0	315.9
Point 21	374.9917	315.9
Point 22	0	304.9

Slope Stability steady state

Point 23	374.9917	304.9
Point 24	0	318.9
Point 25	374.9917	318.9
Point 26	239.52363	343

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.485	(153.66, 404.46)	55.3083	(224.653, 347.295)	(103.772, 326.237)
2	635	2.529	(153.66, 404.46)	91.826	(225.359, 347.091)	(105.6, 326.215)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	106.5253	324.95505	59.280099	199.4166	98.124634	0
2	Optimized	111.6646	322.56305	208.58202	569.97597	253.05077	0
3	Optimized	117.0323	320.1401	359.81518	943.26608	408.53672	0
4	Optimized	122.5059	317.6936	517.37598	1365.0506	450.71661	225
5	Optimized	125.7222	316.22985	616.31433	1629.6752	538.81354	225
6	Optimized	126.875	315.70525	651.4039	1726.5782	646.02987	0
7	Optimized	128.81795	315.1161	689.76751	1780.888	655.61132	0
8	Optimized	131.8479	314.32735	741.76517	2058.1237	790.94798	0
9	Optimized	135.95355	313.6102	790.79763	2258.7652	882.04388	0
10	Optimized	139.8934	313.25685	817.61708	2413.5042	958.90575	0
11	Optimized	143.6382	313.172	828.24008	2573.8396	1048.862	0
12	Optimized	147.0454	313.16645	834.20183	2623.6109	1075.1855	0
13	Optimized	150.07445	313.31245	830.74851	2665.8514	1102.6411	0
14	Optimized	154.10935	313.50695	827.45612	2694.3195	1121.7247	0
15	Optimized	158.1443	313.70145	825.8718	2722.54	1139.6333	0
16	Optimized	162.17925	313.89595	826.3669	2751.0081	1156.4411	0
17	Optimized	165.68715	314.06505	828.78158	2818.675	1195.6486	0
18	Optimized	169.66835	314.54285	815.69963	2806.9023	1196.4353	0
19	Optimized	174.64985	315.35475	789.68521	2907.7503	1272.6619	0
20	Optimized	177.3579	315.83035	775.5036	2801.9269	1217.598	0
21	Optimized	179.40245	316.4858	717.44072	2798.0527	1106.281	225
22	Optimized	183.0569	317.65735	593.82401	2798.3132	1172.1477	225
23	Optimized	185.48495	318.57155	481.43548	2570.051	1110.5366	225
24	Optimized	188.975	320.47935	339.20501	2463.9361	1487.7527	0
25	Optimized	194.7897	323.95765	122.21225	2198.1003	1453.5524	0
26	Optimized	198.2124	326.1793	-2.3854112	2112.6048	1030.3862	200
27	Optimized	200.42085	327.59125	-3.2743261	2050.8413	1000.2621	200
28	Optimized	203.84335	329.76975	82.991991	1948.1057	909.67675	200
29	Optimized	205.56915	330.86825	163.80959	1898.6618	846.14398	200
30	Optimized	208.3261	333.06505	286.87147	1621.1438	650.7681	200
31	Optimized	212.14395	336.11045	375.34506	1348.7634	474.76786	200
32	Optimized	215.04035	338.65685	371.61249	1038.1673	325.10053	200

33	Optimized	218.0922	341.4868	322.48994	729.48196	198.50327	200
34	Optimized	221.98805	344.96165	222.32131	339.57993	57.190847	200

Slices of Slip Surface: 635

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	635	107.4394	325.1431	47.551907	178.41182	91.6291	0
2	635	111.11925	323.1088	174.52172	495.89555	225.02838	0
3	635	114.7997	321.2867	288.25666	770.09575	337.38736	0
4	635	118.48015	319.66345	389.57252	1001.8009	428.68694	0
5	635	122.6589	318.0609	492.99787	1244.8413	399.76222	225
6	635	127.19235	316.5609	594.88754	1546.2975	505.87367	225
7	635	131.36315	315.4053	673.62978	1867.7627	717.50742	0
8	635	135.3149	314.50765	733.70033	2167.6777	861.62054	0
9	635	139.2667	313.79105	783.22887	2432.5356	991.00345	0
10	635	142.9462	313.2772	820.57647	2625.1976	1084.3258	0
11	635	146.3534	312.941	847.21068	2753.186	1145.2255	0
12	635	150.07445	312.72615	867.80477	2826.1481	1176.6914	0
13	635	154.10935	312.6572	881.29462	2843.3895	1178.9456	0
14	635	158.1443	312.7658	885.35225	2837.8008	1173.1494	0
15	635	162.17925	313.0525	880.21631	2809.9308	1159.4894	0
16	635	166.4859	313.56355	864.2979	2819.3548	1174.7167	0
17	635	171.0643	314.32865	836.52568	2858.9032	1215.167	0
18	635	175.6427	315.33535	796.99076	2866.0113	1243.1929	0
19	635	180.1986	316.58455	710.56231	2836.9702	1130.6311	225
20	635	184.73205	318.08455	544.28617	2774.6701	1185.9162	225
21	635	188.76105	319.6292	392.26317	2679.4076	1601.4758	0
22	635	192.2855	321.1757	295.79897	2582.707	1601.3102	0
23	635	195.80995	322.90375	187.98428	2464.6912	1594.1673	0
24	635	199.33445	324.82525	68.109184	2324.6908	1580.0754	0
25	635	203.32565	327.2702	36.070376	2185.8033	1048.4948	200
26	635	208.31155	330.7485	336.19657	1891.7158	758.67741	200
27	635	213.9649	335.31885	493.69973	1400.3489	442.20233	200
28	635	218.98575	339.99805	413.52247	849.60974	212.69397	200
29	635	223.23465	344.6211	250.53572	324.43032	36.040808	200

Slope Stability Steady State

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File Information

Title: Paducah 7+60 B
Comments: T-Wall
Created By: Minges, George C LRL
Revision Number: 43
Last Edited By: Minges, George C LRL
Date: 11/8/2009
Time: 11:29:22 AM
File Name: Paducah 7+60B F.gsz
Directory: S:\proj\112546\Others\GEOTECH SEEP AND SLOPE\FEASIBILITY\
Last Solved Date: 11/8/2009
Last Solved Time: 11:30:32 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Slope Stability Steady State

Kind: SLOPE/W
Parent: Steady-State Seepage
Method: Spencer
Settings
    PWP Conditions Source: Parent Analysis
SlipSurface
    Direction of movement: Left to Right
    Use Passive Mode: No
    Slip Surface Option: Auto-Search
    Critical slip surfaces saved: 1
    Optimize Critical Slip Surface Location: Yes
    Tension Crack
        Tension Crack Option: (none)
FOS Distribution
    FOS Calculation Option: Constant

Advanced
- Number of Slices: 30
- Optimization Tolerance: 0.01
- Minimum Slip Surface Depth: 2 ft
- Optimization Maximum Iterations: 2000
- Optimization Convergence Tolerance: 1e-007
- Starting Optimization Points: 8
- Ending Optimization Points: 16
- Complete Passes per Insertion: 1
- Driving Side Maximum Convex Angle: 5 °
- Resisting Side Maximum Convex Angle: 1 °

Materials

T-wall
Model: Bedrock (Impenetrable)

Foundation Clay
Model: Mohr-Coulomb
Unit Weight: 127 pcf
Cohesion: 285 psf
Phi: 27 °
Vol. WC. Function: Foundation Clay

Debris
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 0 psf
Phi: 27 °
Vol. WC. Function: Debris

Embankment Clay
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 26 °
Vol. WC. Function: Embankment Clay

existing retaining wall
Model: Bedrock (Impenetrable)

Slip Surface Limits
Left Coordinate: (0, 334.9629) ft
Right Coordinate: (359.2597, 312.6319) ft

Slope Stability Steady State

Vol. Water Content Functions

Embankment Clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.21999999)
Data Point: (0.018329807, 0.21999998)
Data Point: (0.033598183, 0.21999997)
Data Point: (0.061584821, 0.21999993)
Data Point: (0.11288379, 0.21999984)
Data Point: (0.20691381, 0.21999963)
Data Point: (0.37926902, 0.21999914)
Data Point: (0.6951928, 0.21999792)
Data Point: (1.274275, 0.21999489)
Data Point: (2.3357215, 0.21998722)
Data Point: (4.2813324, 0.21996761)
Data Point: (7.8475997, 0.21991719)
Data Point: (14.384499, 0.21978687)
Data Point: (26.366509, 0.21944947)
Data Point: (48.329302, 0.21857772)
Data Point: (88.586679, 0.21634893)
Data Point: (162.37767, 0.21082014)
Data Point: (297.63514, 0.19810028)
Data Point: (545.55948, 0.17327571)
Data Point: (1000, 0.13699113)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.22 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

Foundation Clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.3704873

Slope Stability Steady State

Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
- Data Point: (0.01, 0.36966087)
- Data Point: (0.023357215, 0.36966087)
- Data Point: (0.054555948, 0.36966087)
- Data Point: (0.1274275, 0.36966087)
- Data Point: (0.29763514, 0.36966087)
- Data Point: (0.6951928, 0.36966087)
- Data Point: (1.6237767, 0.36966087)
- Data Point: (3.7926902, 0.36966087)
- Data Point: (8.8586679, 0.36966087)
- Data Point: (20.691381, 0.36966087)
- Data Point: (48.329302, 0.36966087)
- Data Point: (112.88379, 0.36966087)
- Data Point: (263.66509, 0.36966087)
- Data Point: (602.85683, 0.36114733)
- Data Point: (1438.4499, 0.2901812)
- Data Point: (3359.8183, 0.21242878)
- Data Point: (7847.5997, 0.17220763)
- Data Point: (18329.807, 0.14645868)
- Data Point: (42813.324, 0.12590906)
- Data Point: (100000, 0.10784644)

Estimation Properties
- Vol. WC Estimation Method: Grain Size Function
- Sample Material: Clay
- Saturated Water Content: 0.37 ft^3/ft^3
- Liquid Limit: 31 %
- Diameter at 10% passing: 0.0005
- Diameter at 60% passing: 0.0006
- Maximum: 1e+005
- Minimum: 0.01
- Num. Points: 20

Debris

Model: Data Point Function

Function: Vol. Water Content vs. Pore-Water Pressure
- Curve Fit to Data: 100 %
- Segment Curvature: 100 %
- Mv: 4.79e-007 /psf

Porosity: 0.25999999

Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
- Data Point: (0.01, 0.25999998)
- Data Point: (0.018329807, 0.25999996)
- Data Point: (0.033598183, 0.25999988)
- Data Point: (0.061584821, 0.25999963)
- Data Point: (0.11288379, 0.25999885)
- Data Point: (0.20691381, 0.25999634)
- Data Point: (0.37926902, 0.2599882)
- Data Point: (0.6951928, 0.2599617)

Slope Stability Steady State

Data Point: (1.274275, 0.25987516)
Data Point: (2.3357215, 0.25959248)
Data Point: (4.2813324, 0.2586718)
Data Point: (7.8475997, 0.25571003)
Data Point: (14.384499, 0.24656017)
Data Point: (26.366509, 0.22150596)
Data Point: (48.329302, 0.17063801)
Data Point: (88.586679, 0.10916815)
Data Point: (162.37767, 0.065559185)
Data Point: (297.63514, 0.041878631)
Data Point: (545.55948, 0.029155966)
Data Point: (1000, 0.021736063)

Estimation Properties

Vol. WC Estimation Method: Sample functions
Sample Material: Sand
Saturated Water Content: 0.26 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft^2)
Region 1	Debris	12,27,7,30,29	43.292528
Region 2	Embankment Clay	6,14,12,27	32.306024
Region 3	T-wall	12,29,10,13,11,15,16,17,5,18,21,20,19,6,14	96.178322
Region 4	Debris	23,24,25,15	2.2524075
Region 5	Embankment Clay	23,28,26,5,17,16,15	31.157314
Region 6	Debris	26,28,22,1,2,3,4	636.27261
Region 7	Foundation Clay	29,10,13,11,15,25,24,23,28,22,31,32,9,8,36,35,30	14900.163

Points

	X (ft)	Y (ft)
Point 1	0	334.9629
Point 2	74.1988	335.4209
Point 3	133.6199	335.1982
Point 4	156.1492	333.8638
Point 5	189.94866	335.00041
Point 6	192.10634	335.14426
Point 7	217.58	333.7031
Point 8	305.4474	317.9361
Point 9	359.2597	312.6319
Point 10	203.30208	322.916
Point 11	200.21849	329.66493

Slope Stability Steady State

Point 12	203.30208	331.92348
Point 13	201.84227	322.89996
Point 14	192.1851	331.93952
Point 15	182.20486	329.69835
Point 16	182.20486	331.21898
Point 17	189.89112	332.34859
Point 18	190.25176	349.20939
Point 19	191.76033	349.22332
Point 20	191.76033	350.21665
Point 21	190.29354	350.25378
Point 22	0	331.5
Point 23	180.7	329.7
Point 24	180.7	328.2
Point 25	182.2	328.2
Point 26	180.7	334.65
Point 27	203.30926	334.51046
Point 28	180.7	331.5
Point 29	203.3	331.5
Point 30	223.13081	331.50496
Point 31	0	285
Point 32	359	285
Point 33	189.75	334.8
Point 34	192.25	335.2
Point 35	243	323.9
Point 36	243	319.6

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	3.509	(238.796, 355.884)	22.43748	(206.591, 334.325)	(247.427, 319.482)
2	925	3.852	(238.796, 355.884)	37.706	(207.914, 334.25)	(248.518, 319.453)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	207.1976	333.9672	1012.9213	1017.8222	2.4971274	0
2	Optimized	208.41035	333.252	1057.5265	1095.8102	19.506546	0
3	Optimized	209.62305	332.5368	1102.2027	1173.8693	36.515964	0
4	Optimized	210.7119	331.8406	1145.6287	1245.4662	50.869736	0
5	Optimized	211.8417	331.04775	1192.5416	1285.1705	47.196777	285
6	Optimized	213.1584	330.0625	1249.6218	1387.4348	70.219245	285
7	Optimized	214.45085	329.03775	1310.1645	1504.8244	99.184144	285
8	Optimized	215.69695	328.05025	1369.5373	1618.0353	126.61601	285
9	Optimized	216.95	327.07105	1429.0797	1733.479	155.09917	285
10	Optimized	218.155	326.1425	1486.1493	1837.8329	179.19177	285
11	Optimized	219.30505	325.2563	1540.975	1919.9338	193.08914	285
12	Optimized	220.82995	324.16505	1609.0978	2034.0047	216.50087	285
13	Optimized	222.4553	323.11655	1675.2032	2142.6352	238.16847	285

Slope Stability Steady State

14	Optimized	223.61705	322.42805	1718.9873	2200.5727	245.38	285
15	Optimized	225.06295	321.65585	1768.3117	2278.3551	259.88009	285
16	Optimized	226.7003	320.8829	1818.0276	2350.7854	271.45367	285
17	Optimized	228.05575	320.3051	1855.2867	2390.4199	272.66397	285
18	Optimized	229.55875	319.73925	1891.886	2443.978	281.30495	285
19	Optimized	231.2093	319.18535	1927.7272	2473.9031	278.29055	285
20	Optimized	232.75145	318.7255	1957.5324	2511.778	282.40223	285
21	Optimized	234.1852	318.35975	1981.3215	2523.4698	276.23834	285
22	Optimized	235.16595	318.1144	1997.1795	2534.6902	273.87537	285
23	Optimized	236.1915	317.909	2010.6455	2546.5338	273.0487	285
24	Optimized	237.71485	317.6232	2029.2267	2545.9531	263.28522	285
25	Optimized	239.2382	317.3374	2047.7435	2545.3724	253.55462	285
26	Optimized	240.74995	317.02305	2068.0611	2540.2018	240.56774	285
27	Optimized	242.25	316.68015	2090.0921	2667.7091	294.31054	285
28	Optimized	243.0058	316.50735	2101.2088	2269.2117	85.601754	285
29	Optimized	243.74745	317.002	2070.7145	2364.9452	149.91801	285
30	Optimized	245.21915	317.994	2009.2991	2226.2815	110.55808	285
31	Optimized	246.69085	318.98605	1947.6583	2087.6742	71.341682	285

Slices of Slip Surface: **925**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	925	208.4436	333.53025	1040.1704	1044.3096	2.109029	0
2	925	209.5038	332.1561	1125.927	1194.1452	34.758914	0
3	925	210.66275	330.7965	1206.1811	1278.7859	36.993978	285
4	925	211.92045	329.4519	1283.22	1442.0614	80.933736	285
5	925	213.1781	328.23	1355.1672	1592.2179	120.78338	285
6	925	214.43575	327.115	1422.1584	1730.5951	157.15635	285
7	925	215.69345	326.09485	1484.4396	1858.4084	190.54658	285
8	925	216.95115	325.1601	1542.3417	1976.4472	221.18784	285
9	925	218.27385	324.2627	1598.5352	2086.6491	248.70645	285
10	925	219.66155	323.40365	1652.8074	2172.3676	264.72914	285
11	925	221.04925	322.62465	1702.4734	2248.1575	278.03995	285
12	925	222.43695	321.9202	1747.7342	2314.8389	288.95427	285
13	925	223.7931	321.2987	1787.9738	2370.0211	296.56789	285
14	925	225.1177	320.75355	1823.4632	2415.3148	301.56349	285
15	925	226.4423	320.266	1855.3957	2453.3191	304.6572	285
16	925	227.76695	319.8337	1883.8272	2484.2407	305.92596	285
17	925	229.0916	319.45465	1908.8082	2508.3838	305.49902	285
18	925	230.4162	319.1272	1930.521	2525.9146	303.36821	285
19	925	231.7408	318.85005	1948.9289	2536.8706	299.57126	285
20	925	233.0654	318.62205	1964.2079	2541.5167	294.15352	285
21	925	234.39	318.44225	1976.3809	2539.9044	287.12955	285
22	925	235.7146	318.31	1985.4664	2532.0189	278.48242	285
23	925	237.0392	318.22485	1991.5509	2517.9254	268.20122	285
24	925	238.36385	318.1864	1994.6403	2497.6221	256.28203	285
25	925	239.6885	318.1945	1994.8165	2471.1997	242.72932	285
26	925	241.0131	318.2492	1991.9964	2438.4472	227.47803	285

27	925	242.3377	318.3507	1986.3991	2549.7971	287.06565	285
28	925	243.6897	318.5035	1977.4679	2069.261	46.77089	285
29	925	245.0691	318.7102	1964.7496	2045.4555	41.121722	285
30	925	246.4485	318.9696	1948.7028	2014.8616	33.709586	285
31	925	247.8279	319.2828	1929.2193	1977.0802	24.386381	285

Slope Steady State

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File Information

Title: Paducah 87+43 B
Comments: I-Wall
Created By: Minges, George C LRL
Revision Number: 44
Last Edited By: Minges, George C LRL
Date: 11/8/2009
Time: 11:37:26 AM
File Name: Paducah 87+43 B F.gsz
Directory: S:\proj\112546\Others\FEASIBILITY FOLDER\Feasibility Writeup\BONNIE\ENGINEERING CALCULATIONS\FEASIBILITY GEOTECH CALC FILES\
Last Solved Date: 11/8/2009
Last Solved Time: 11:38:34 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Slope Steady State

Kind: SLOPE/W
Parent: Steady-State Seepage
Method: Spencer
Settings
    PWP Conditions Source: Parent Analysis
SlipSurface
    Direction of movement: Right to Left
    Use Passive Mode: No
    Slip Surface Option: Auto-Search
    Critical slip surfaces saved: 1
    Optimize Critical Slip Surface Location: Yes
    Tension Crack
        Tension Crack Option: (none)
FOS Distribution

Slope Steady State

FOS Calculation Option: Constant

Advanced

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

I wall

Model: Bedrock (Impenetrable)

Embankment Fill

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 26 °
Vol. WC. Function: Embankment Clay

Foundation Clay

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion: 225 psf
Phi: 28 °
Vol. WC. Function: Foundation Clay

Slip Surface Limits

Left Coordinate: (0, 339.3218) ft
Right Coordinate: (224.5, 330.75) ft

Vol. Water Content Functions

Embankment Clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure

Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf

Porosity: 0.22

Slope Steady State

Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
- Data Point: (0.01, 0.21999999)
- Data Point: (0.018329807, 0.21999998)
- Data Point: (0.033598183, 0.21999997)
- Data Point: (0.061584821, 0.21999993)
- Data Point: (0.11288379, 0.21999984)
- Data Point: (0.20691381, 0.21999963)
- Data Point: (0.37926902, 0.21999914)
- Data Point: (0.6951928, 0.21999792)
- Data Point: (1.274275, 0.21999489)
- Data Point: (2.3357215, 0.21998722)
- Data Point: (4.2813324, 0.21996761)
- Data Point: (7.8475997, 0.21991719)
- Data Point: (14.384499, 0.21978687)
- Data Point: (26.366509, 0.21944947)
- Data Point: (48.329302, 0.21857772)
- Data Point: (88.586679, 0.21634893)
- Data Point: (162.37767, 0.21082014)
- Data Point: (297.63514, 0.19810028)
- Data Point: (545.55948, 0.17327571)
- Data Point: (1000, 0.13699113)

Estimation Properties
- Vol. WC Estimation Method: Sample functions
- Sample Material: Silty Clay
- Saturated Water Content: 0.22 ft^3/ft^3
- Liquid Limit: 0 %
- Diameter at 10% passing: 0
- Diameter at 60% passing: 0
- Maximum: 1000
- Minimum: 0.01
- Num. Points: 20

Foundation Clay

Model: Data Point Function

Function: Vol. Water Content vs. Pore-Water Pressure
- Curve Fit to Data: 100 %
- Segment Curvature: 100 %
- Mv: 4.79e-007 /psf

Porosity: 0.37048224

Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
- Data Point: (0.01, 0.37005407)
- Data Point: (0.020691381, 0.37005407)
- Data Point: (0.042813324, 0.37005407)
- Data Point: (0.088586679, 0.37005407)
- Data Point: (0.18329807, 0.37005407)
- Data Point: (0.37926902, 0.37005407)
- Data Point: (0.78475997, 0.37005407)
- Data Point: (1.6237767, 0.37005407)

Slope Steady State

Data Point: (3.3598183, 0.37005407)
Data Point: (6.951928, 0.37005407)
Data Point: (14.384499, 0.37005407)
Data Point: (29.763514, 0.37005407)
Data Point: (61.584821, 0.37005407)
Data Point: (127.4275, 0.37005407)
Data Point: (263.66509, 0.37005407)
Data Point: (526.83766, 0.36911026)
Data Point: (1128.8379, 0.34318275)
Data Point: (2335.7215, 0.2703264)
Data Point: (4832.9302, 0.21728994)
Data Point: (10000, 0.18487617)

Estimation Properties

Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.37 ft^3/ft^3
Liquid Limit: 35 %
Diameter at 10% passing: 0.0005
Diameter at 60% passing: 0.011
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft^2)
Region 1	Foundation Clay	29,4,21,19,3,24,26,25,23,2,20,22,9,10,11,12,13,14,15,27,28,1	9822.254
Region 2	Embankment Fill	21,5,3,19	4.7054975
Region 3	Embankment Fill	8,2,20,22	4.8603244
Region 4	I wall	3,5,6,7,8,2,23,25,26,24	42.081158

Points

	X (ft)	Y (ft)
Point 1	0	339.3218
Point 2	134.73896	336.10876
Point 3	132.34	336.06
Point 4	103.5	340.15
Point 5	132.25	340.35
Point 6	132.5	350.25
Point 7	134.5	350.25
Point 8	134.75	341.05
Point 9	145.5	340.15
Point 10	160.5	334.75
Point 11	163.5	334.85
Point 12	191.5	333.75
Point 13	206.5	332.75
Point 14	208.5	333.05

Slope Steady State

Point 15	224.5	330.75
Point 16	259.5	324.15
Point 17	302.5	316.85
Point 18	363.5	307.85
Point 19	131.19568	336.11061
Point 20	135.75695	336.14638
Point 21	131.18517	340.34259
Point 22	135.72336	340.96851
Point 23	134.08446	336.13791
Point 24	133.23483	336.06672
Point 25	134.08	325.1
Point 26	133.24	325.1
Point 27	224.5	294
Point 28	0	294
Point 29	1.07396	339.2504

Critical Slip Surfaces

Transient Seepage

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File Information

Title: Paducah 156+25 A
Comments: Earthen Levee
Created By: Minges, George C LRL
Revision Number: 23
Last Edited By: Minges, George C LRL
Date: 11/2/2009
Time: 1:47:34 PM
File Name: Paducah 156+25 A F.gsz
Directory: S:\proj\112546\Others\FEASIBILITY FOLDER\Feasibility Writeup\BONNIE\ENGINEERING CALCULATIONS\FEASIBILITY GEOTECH CALC FILES\
Last Solved Date: 11/2/2009
Last Solved Time: 1:49:10 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Mass(M) Units: lbs
Mass Flux Units: lbs/sec
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Transient Seepage

Kind: SEEP/W
Parent: Initial State for Transient
Method: Transient
Settings
    Initial PWP: Parent Analysis
    Include Air Flow: No
    Exclude cumulative values: Yes
Control
    Apply Runoff: Yes
Convergence
    Maximum Number of Iterations: 500
    Tolerance: 0.001
    Maximum Change in K: 0.1

Transient Seepage

Rate of Change in K: 1.02
Minimum Change in K: 1e-005
Equation Solver: Parallel Direct
Potential Seepage Max # of Reviews: 10

Time

Starting Time: 0 sec
Duration: 4233600 sec
# of Steps: 49
Step Generation Method: Linear
Save Steps Every: 5
Use Adaptive Time Stepping: No

Materials

Embankment Clay

Model: Saturated / Unsaturated
Hydraulic

K-Function: Embankment Clay
Vol. WC. Function: Embankment Clay
K-Ratio: 1
K-Direction: 0 °

Clay and Silt

Model: Saturated / Unsaturated
Hydraulic

K-Function: Clay and Silt
Vol. WC. Function: Clay and Silt
K-Ratio: 1
K-Direction: 0 °

Clayey Gravel and Sand

Model: Saturated / Unsaturated
Hydraulic

K-Function: Clayey Gravel and Sand
Vol. WC. Function: Clayey Gravel and Sand
K-Ratio: 1
K-Direction: 0 °

Boundary Conditions

Potential Seepage Face

Review: true
Type: Total Flux (Q) 0

Transient

Function: Paducah Feasibilty

Transient Seepage

Type: H (Q=0)

K Functions

Embankment Clay

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.6e-008
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.6e-008)
Data Point: (0.020691381, 1.59992e-008)
Data Point: (0.042813324, 1.5997795e-008)
Data Point: (0.088586679, 1.5995421e-008)
Data Point: (0.18329807, 1.5991072e-008)
Data Point: (0.37926902, 1.5982644e-008)
Data Point: (0.78475997, 1.5965385e-008)
Data Point: (1.6237767, 1.5929179e-008)
Data Point: (3.3598183, 1.5851103e-008)
Data Point: (6.951928, 1.5682796e-008)
Data Point: (14.384499, 1.5320437e-008)
Data Point: (29.763514, 1.4560234e-008)
Data Point: (61.584821, 1.3033595e-008)
Data Point: (127.4275, 1.0227837e-008)
Data Point: (263.66509, 5.9616669e-009)
Data Point: (545.55948, 1.7364398e-009)
Data Point: (1128.8379, 6.7715324e-011)
Data Point: (2335.7215, 1.176744e-011)
Data Point: (4832.9302, 2.699492e-012)
Data Point: (10000, 6.3101416e-013)
Estimation Properties
Volume Water Content Function: Embankment Clay
Hydraulic K Sat: 1.6e-008 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 10000
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.18 ft^3/ft^3

Clay and Silt

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.2e-010
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)

Transient Seepage

Data Point: (0.01, 1.2e-010)
Data Point: (0.023357215, 1.2e-010)
Data Point: (0.054555948, 1.2e-010)
Data Point: (0.1274275, 1.2e-010)
Data Point: (0.29763514, 1.1999998e-010)
Data Point: (0.6951928, 1.1999995e-010)
Data Point: (1.6237767, 1.1999984e-010)
Data Point: (3.7926902, 1.1999949e-010)
Data Point: (8.8586679, 1.1999836e-010)
Data Point: (20.691381, 1.1999473e-010)
Data Point: (48.329302, 1.1998306e-010)
Data Point: (112.88379, 1.1994554e-010)
Data Point: (263.66509, 1.1982494e-010)
Data Point: (615.84821, 1.1943727e-010)
Data Point: (1438.4499, 1.181921e-010)
Data Point: (3359.8183, 1.1421266e-010)
Data Point: (7847.5997, 1.0181826e-010)
Data Point: (18329.807, 6.7994015e-011)
Data Point: (42813.324, 1.7015298e-011)
Data Point: (100000, 6.7786075e-013)

Estimation Properties
Volume Water Content Function: Clay and Silt
Hydraulic K Sat: 1.2e-010 ft/sec
Hyd. K-Function Estimation Method: Van Genuchten Function
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.23 ft^3/ft^3

Clayey Gravel and Sand

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.6e-009
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.6e-009)
Data Point: (0.023357215, 1.6e-009)
Data Point: (0.054555948, 1.6e-009)
Data Point: (0.1274275, 1.6e-009)
Data Point: (0.29763514, 1.6e-009)
Data Point: (0.6951928, 1.6e-009)
Data Point: (1.6237767, 1.6e-009)
Data Point: (3.7926902, 1.6e-009)
Data Point: (8.8586679, 1.6e-009)
Data Point: (20.691381, 1.5999998e-009)
Data Point: (48.329302, 1.5999987e-009)
Data Point: (112.88379, 1.5999921e-009)

Data Point: (263.66509, 1.5999499e-009)
Data Point: (615.84821, 1.5996825e-009)
Data Point: (1438.4499, 1.5979845e-009)
Data Point: (3359.8183, 1.5871732e-009)
Data Point: (7847.5997, 1.5185885e-009)
Data Point: (18329.807, 1.1256886e-009)
Data Point: (42813.324, 1.78848e-010)
Data Point: (100000, 1.1840808e-012)

Estimation Properties
Volume Water Content Function: Clayey Gravel and Sand
Hydraulic K Sat: 1.6e-009 ft/sec
Hyd. K-Function Estimation Method: Van Genuchten Function
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.15 ft^3/ft^3

Hydraulic Boundary Functions

Paducah Feasibilty

Model: Spline Data Point Function
Function: Total Head vs. Time
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Y-Intercept: 325
Data Points: Time (sec), Total Head (ft)
Data Point: (0, 325)
Data Point: (86400, 325)
Data Point: (172800, 326.1)
Data Point: (259200, 327.7)
Data Point: (345600, 328.5)
Data Point: (432000, 329.1)
Data Point: (518400, 329.7)
Data Point: (604800, 330.3)
Data Point: (691200, 331.3)
Data Point: (777600, 331.7)
Data Point: (864000, 332.2)
Data Point: (950400, 333.4)
Data Point: (1036800, 334.9)
Data Point: (1123200, 336.1)
Data Point: (1209600, 338.5)
Data Point: (1296000, 341.1)
Data Point: (1382400, 343)
Data Point: (1468800, 344.3)
Data Point: (1555200, 346.2)
Data Point: (1641600, 347.2)
Data Point: (1728000, 347.7)

Data Point: (1814400, 348.1)
Data Point: (1900800, 348.5)
Data Point: (1987200, 348.8)
Data Point: (2073600, 349.1)
Data Point: (2160000, 349.3)
Data Point: (2246400, 349.4)
Data Point: (2332800, 349.4)
Data Point: (2419200, 349.2)
Data Point: (2505600, 349)
Data Point: (2592000, 348.5)
Data Point: (2678400, 348)
Data Point: (2764800, 347.5)
Data Point: (2851200, 346.8)
Data Point: (2937600, 345.8)
Data Point: (3024000, 344.6)
Data Point: (3110400, 343.3)
Data Point: (3196800, 342.2)
Data Point: (3283200, 341.1)
Data Point: (3369600, 339.8)
Data Point: (3456000, 338.4)
Data Point: (3542400, 337.3)
Data Point: (3628800, 336.2)
Data Point: (3715200, 334.9)
Data Point: (3801600, 333.4)
Data Point: (3888000, 331.6)
Data Point: (3974400, 329.6)
Data Point: (4060800, 327.5)
Data Point: (4147200, 325.3)
Data Point: (4233600, 323.3)

Vol. Water Content Functions

Embankment Clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.21999999)
Data Point: (0.018329807, 0.21999998)
Data Point: (0.033598183, 0.21999997)
Data Point: (0.061584821, 0.21999993)
Data Point: (0.11288379, 0.21999984)
Data Point: (0.20691381, 0.21999963)
Data Point: (0.37926902, 0.21999914)

Transient Seepage

Data Point: (0.6951928, 0.21999792)
Data Point: (1.274275, 0.21999489)
Data Point: (2.3357215, 0.21998722)
Data Point: (4.2813324, 0.21996761)
Data Point: (7.8475997, 0.21991719)
Data Point: (14.384499, 0.21978687)
Data Point: (26.366509, 0.21944947)
Data Point: (48.329302, 0.21857772)
Data Point: (88.586679, 0.21634893)
Data Point: (162.37767, 0.21082014)
Data Point: (297.63514, 0.19810028)
Data Point: (545.55948, 0.17327571)
Data Point: (1000, 0.13699113)

Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.22 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

Clay and Silt

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.30136034
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.25001108)
Data Point: (0.023357215, 0.25001108)
Data Point: (0.054555948, 0.25001108)
Data Point: (0.1274275, 0.25001108)
Data Point: (0.29763514, 0.25001108)
Data Point: (0.6951928, 0.25001108)
Data Point: (1.6237767, 0.25001108)
Data Point: (3.7926902, 0.25001108)
Data Point: (8.8586679, 0.25001108)
Data Point: (20.691381, 0.25001108)
Data Point: (48.329302, 0.25001108)
Data Point: (112.88379, 0.25001108)
Data Point: (263.66509, 0.25001108)
Data Point: (615.84821, 0.25001108)
Data Point: (1438.4499, 0.25001108)
Data Point: (3359.8183, 0.25001108)

Data Point: (7847.5997, 0.25001108)
Data Point: (22386.337, 0.24999713)
Data Point: (41676.621, 0.24961794)
Data Point: (100000, 0.24671383)

Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.25 ft^3/ft^3
Liquid Limit: 0.4 %
Diameter at 10% passing: 0.001
Diameter at 60% passing: 0.01
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20

Clayey Gravel and Sand

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.2015675
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.19079819)
Data Point: (0.023357215, 0.19079819)
Data Point: (0.054555948, 0.19079819)
Data Point: (0.1274275, 0.19079819)
Data Point: (0.29763514, 0.19079819)
Data Point: (0.6951928, 0.19079819)
Data Point: (1.6237767, 0.19079819)
Data Point: (3.7926902, 0.19079819)
Data Point: (8.8586679, 0.19079819)
Data Point: (20.691381, 0.19079819)
Data Point: (48.329302, 0.19079819)
Data Point: (112.88379, 0.19079819)
Data Point: (263.66509, 0.19079819)
Data Point: (615.84821, 0.19079819)
Data Point: (1438.4499, 0.19079819)
Data Point: (3359.8183, 0.19079819)
Data Point: (7053.0967, 0.19063688)
Data Point: (21364.961, 0.18949932)
Data Point: (42813.324, 0.18069069)
Data Point: (100000, 0.14428002)

Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.19 ft^3/ft^3
Liquid Limit: 0.31 %

Transient Seepage

Diameter at 10% passing: 0.001
Diameter at 60% passing: 3.35
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft²)
Region 1	Embankment Clay	6,7,8,9,23,10,18,11,20,22,21,19	1550.1716
Region 2	Clay and Silt	1,14,15,13,12,11,20,22,21,19,6,5,4,3,2	4858.5978
Region 3	Clayey Gravel and Sand	14,16,17,15	2996

Lines

	Start Point	End Point	Hydraulic Boundary
Line 1	1	2	Potential Seepage Face
Line 2	2	3	Potential Seepage Face
Line 3	3	4	Potential Seepage Face
Line 4	4	5	Potential Seepage Face
Line 5	5	6	Potential Seepage Face
Line 6	6	7	Potential Seepage Face
Line 7	7	8	
Line 8	8	9	
Line 9	11	12	Transient
Line 10	12	13	Transient
Line 11	16	17	
Line 12	14	15	
Line 13	10	18	Transient
Line 14	18	11	Transient
Line 15	6	19	
Line 16	19	21	
Line 17	21	22	
Line 18	22	20	
Line 19	20	11	
Line 20	1	14	
Line 21	15	13	
Line 22	14	16	
Line 23	17	15	
Line 24	9	23	Transient
Line 25	23	10	Transient

Points

	X (ft)	Y (ft)
Point 1	0	339.2011
Point 2	29.1296	338.3419

Transient Seepage

Point 3	91.6863	326.041
Point 4	115.903	325.7188
Point 5	135.0478	329.2969
Point 6	177.4173	329.7749
Point 7	257.0184	348.8609
Point 8	260.4708	349.0436
Point 9	265.9396	348.834
Point 10	314.396	332.8219
Point 11	338.5169	328.774
Point 12	379.0807	328.269
Point 13	428.1404	328.001
Point 14	0	318.6
Point 15	428	318.6
Point 16	0	311.6
Point 17	428	311.6
Point 18	333	329.69983
Point 19	258	330
Point 20	266	330
Point 21	259	324
Point 22	265	324
Point 23	282	343.52695

Transient Seepage

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File Information

Title: 175+12A
Comments: Earthen Levee
Created By: Minges, George C LRL
Revision Number: 38
Last Edited By: Minges, George C LRL
Date: 11/2/2009
Time: 10:02:55 AM
File Name: Paducah 175+12B F.gsz
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Last Solved Date: 11/2/2009
Last Solved Time: 10:06:50 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Mass(M) Units: lbs
Mass Flux Units: lbs/sec
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Transient Seepage

Kind: SEEP/W
Parent: Initial State for Transient
Method: Transient
Settings
    Initial PWP: Parent Analysis
    Include Air Flow: No
    Exclude cumulative values: Yes
Control
    Apply Runoff: Yes
Convergence
    Maximum Number of Iterations: 500
    Tolerance: 0.001
    Maximum Change in K: 0.1

Transient Seepage

Rate of Change in K: 1.02
Minimum Change in K: 1e-005
Equation Solver: Parallel Direct
Potential Seepage Max # of Reviews: 10

Time

Starting Time: 0 sec
Duration: 4233600 sec
# of Steps: 49
Step Generation Method: Linear
Save Steps Every: 5
Use Adaptive Time Stepping: No

Materials

Embankment Clay

Model: Saturated / Unsaturated
Hydraulic
K-Function: embankment clay
Vol. WC. Function: embankment clay
K-Ratio: 1
K-Direction: 0 °

Debris

Model: Saturated / Unsaturated
Hydraulic
K-Function: Debris
Vol. WC. Function: Debris
K-Ratio: 1
K-Direction: 0 °

Clay and Silt

Model: Saturated / Unsaturated
Hydraulic
K-Function: clay and silt
Vol. WC. Function: clay and silt
K-Ratio: 1
K-Direction: 0 °

Clayey Gravel and Sand

Model: Saturated / Unsaturated
Hydraulic
K-Function: clayey gravel and sand
Vol. WC. Function: clayey gravel and sand
K-Ratio: 1
K-Direction: 0 °

Transient Seepage

Boundary Conditions

Potential Seepage Face

Review: true
Type: Total Flux (Q) 0

Paducah Transient

Function: Paducah Feasibility
Type: H (Q=0)

Initial Water Tables

Initial Water Table 1

Max. negative head: 5
Coordinates
Coordinate: (0, 325) ft
Coordinate: (575, 325) ft

K Functions

embankment clay

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.6e-008
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.6e-008)
Data Point: (0.014873521, 1.6e-008)
Data Point: (0.022122163, 1.6e-008)
Data Point: (0.032903446, 1.6e-008)
Data Point: (0.048939009, 1.6e-008)
Data Point: (0.072789538, 1.5999999e-008)
Data Point: (0.10826367, 1.5999998e-008)
Data Point: (0.1610262, 1.5999996e-008)
Data Point: (0.23950266, 1.599999e-008)
Data Point: (0.35622479, 1.5999976e-008)
Data Point: (0.52983169, 1.5999944e-008)
Data Point: (0.78804628, 1.5999866e-008)
Data Point: (1.1721023, 1.5999682e-008)
Data Point: (1.7433288, 1.5999247e-008)
Data Point: (2.5929438, 1.5998213e-008)
Data Point: (3.8566204, 1.599576e-008)
Data Point: (5.7361525, 1.5989932e-008)
Data Point: (8.5316785, 1.5976086e-008)

Transient Seepage

Data Point: (12.68961, 1.5943115e-008)
Data Point: (18.873918, 1.586466e-008)
Data Point: (28.072162, 1.5677721e-008)
Data Point: (41.753189, 1.523511e-008)
Data Point: (62.101694, 1.4206105e-008)
Data Point: (92.367086, 1.1952872e-008)
Data Point: (137.38238, 7.8380216e-009)
Data Point: (204.33597, 2.9823935e-009)
Data Point: (303.91954, 5.0927599e-010)
Data Point: (452.03537, 4.4029597e-011)
Data Point: (672.33575, 2.707796e-012)
Data Point: (1000, 1.4845445e-013)

Estimation Properties
Volume Water Content Function: embankment clay
Hydraulic K Sat: 1.6e-008 ft/sec
Hyd. K-Function Estimation Method: Van Genuchten Function
Maximum: 1000
Minimum: 0.01
Num. Points: 30
Residual Water Content: 0.18 ft^3/ft^3

clayey gravel and sand

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.6e-009
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.6e-009)
Data Point: (0.026366509, 1.5095915e-009)
Data Point: (0.06951928, 1.419343e-009)
Data Point: (0.18329807, 1.3289936e-009)
Data Point: (0.48329302, 1.2387287e-009)
Data Point: (1.274275, 1.148433e-009)
Data Point: (3.3598183, 1.0580587e-009)
Data Point: (8.8586679, 9.6769824e-010)
Data Point: (23.357215, 8.7731688e-010)
Data Point: (61.584821, 7.8689671e-010)
Data Point: (162.37767, 6.9637844e-010)
Data Point: (428.13324, 6.055879e-010)
Data Point: (1128.8379, 5.140835e-010)
Data Point: (2976.3514, 4.2070495e-010)
Data Point: (8975.4623, 3.1570716e-010)
Data Point: (20041.075, 1.9531317e-010)
Data Point: (54555.948, 3.3990655e-011)
Data Point: (143844.99, 4.9019873e-012)
Data Point: (379269.02, 7.0441961e-013)
Data Point: (1000000, 1.0036437e-013)

Transient Seepage

Estimation Properties
Volume Water Content Function: clayey gravel and sand
Hydraulic K Sat: 1.6e-009 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 1e+006
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.15 ft^3/ft^3

clay and silt

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.2e-010
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.2e-010)
Data Point: (0.017433288, 1.1756382e-010)
Data Point: (0.030391954, 1.1512398e-010)
Data Point: (0.052983169, 1.1267788e-010)
Data Point: (0.092367086, 1.102229e-010)
Data Point: (0.1610262, 1.0777589e-010)
Data Point: (0.28072162, 1.0532911e-010)
Data Point: (0.48939009, 1.0288472e-010)
Data Point: (0.85316785, 1.0043686e-010)
Data Point: (1.4873521, 9.7990163e-011)
Data Point: (2.5929438, 9.5544187e-011)
Data Point: (4.5203537, 9.3097567e-011)
Data Point: (7.8804628, 9.0650388e-011)
Data Point: (13.738238, 8.8201874e-011)
Data Point: (23.950266, 8.5748855e-011)
Data Point: (41.753189, 8.3290469e-011)
Data Point: (72.789538, 8.0822601e-011)
Data Point: (126.8961, 7.8338225e-011)
Data Point: (221.22163, 7.5824956e-011)
Data Point: (385.66204, 7.3261299e-011)
Data Point: (672.33575, 7.0611702e-011)
Data Point: (1172.1023, 6.7796699e-011)
Data Point: (2043.3597, 6.4745683e-011)
Data Point: (3562.2479, 6.134204e-011)
Data Point: (6150.5143, 5.4797104e-011)
Data Point: (9377.0263, 4.4437815e-011)
Data Point: (18873.918, 2.0133151e-011)
Data Point: (32903.446, 6.646356e-012)
Data Point: (57361.525, 2.1767318e-012)
Data Point: (100000, 7.1688982e-013)
Estimation Properties
Volume Water Content Function: clay and silt

Transient Seepage

Hydraulic K Sat: 1.2e-010 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 1e+005
Minimum: 0.01
Num. Points: 30
Residual Water Content: 0.23 ft^3/ft^3

Debris

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 9e-006
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.1, 9e-006)
Data Point: (0.1268961, 8.9999911e-006)
Data Point: (0.1610262, 8.9999753e-006)
Data Point: (0.20433597, 8.999944e-006)
Data Point: (0.25929438, 8.999885e-006)
Data Point: (0.32903446, 8.9997719e-006)
Data Point: (0.41753189, 8.999557e-006)
Data Point: (0.52983169, 8.999148e-006)
Data Point: (0.67233575, 8.9983623e-006)
Data Point: (0.85316785, 8.9968758e-006)
Data Point: (1.0826367, 8.9940211e-006)
Data Point: (1.3738238, 8.9885789e-006)
Data Point: (1.7433288, 8.9782123e-006)
Data Point: (2.2122163, 8.9582365e-006)
Data Point: (2.8072162, 8.9203954e-006)
Data Point: (3.5622479, 8.8476358e-006)
Data Point: (4.5203537, 8.7087936e-006)
Data Point: (5.7361525, 8.4481832e-006)
Data Point: (7.2789538, 7.9578401e-006)
Data Point: (9.2367086, 7.0886025e-006)
Data Point: (11.721023, 5.6609867e-006)
Data Point: (14.873521, 3.7049725e-006)
Data Point: (18.873918, 1.7409597e-006)
Data Point: (23.950266, 5.4767929e-007)
Data Point: (30.391954, 1.1601479e-007)
Data Point: (38.566204, 1.8774804e-008)
Data Point: (48.939009, 2.6261967e-009)
Data Point: (62.101694, 3.4297071e-010)
Data Point: (78.804628, 4.3482228e-011)
Data Point: (100, 5.4441855e-012)
Estimation Properties
Volume Water Content Function: Debris
Hydraulic K Sat: 9e-006 ft/sec
Hyd. K-Function Estimation Method: Van Genuchten Function

Maximum: 100
Minimum: 0.1
Num. Points: 30
Residual Water Content: 0.15 ft^3/ft^3

Hydraulic Boundary Functions

Paducah Feasibility

Model: Spline Data Point Function
Function: Total Head vs. Time
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Y-Intercept: 325
Data Points: Time (sec), Total Head (ft)
Data Point: (0, 325)
Data Point: (86400, 325)
Data Point: (172800, 326.1)
Data Point: (259200, 327.7)
Data Point: (345600, 328.5)
Data Point: (432000, 329.1)
Data Point: (518400, 329.7)
Data Point: (604800, 330.3)
Data Point: (691200, 331.3)
Data Point: (777600, 331.7)
Data Point: (864000, 332.2)
Data Point: (950400, 333.4)
Data Point: (1036800, 334.9)
Data Point: (1123200, 336.1)
Data Point: (1209600, 338.5)
Data Point: (1296000, 341.1)
Data Point: (1382400, 343)
Data Point: (1468800, 344.3)
Data Point: (1555200, 346.2)
Data Point: (1641600, 347.2)
Data Point: (1728000, 347.7)
Data Point: (1814400, 348.1)
Data Point: (1900800, 348.5)
Data Point: (1987200, 348.8)
Data Point: (2073600, 349.1)
Data Point: (2160000, 349.3)
Data Point: (2246400, 349.4)
Data Point: (2332800, 349.4)
Data Point: (2419200, 349.2)
Data Point: (2505600, 349)
Data Point: (2592000, 348.5)
Data Point: (2678400, 348)
Data Point: (2764800, 347.5)

Transient Seepage

Data Point: (2851200, 346.8)
Data Point: (2937600, 345.8)
Data Point: (3024000, 344.6)
Data Point: (3110400, 343.3)
Data Point: (3196800, 342.2)
Data Point: (3283200, 341.1)
Data Point: (3369600, 339.8)
Data Point: (3456000, 338.4)
Data Point: (3542400, 337.3)
Data Point: (3628800, 336.2)
Data Point: (3715200, 334.9)
Data Point: (3801600, 333.4)
Data Point: (3888000, 331.6)
Data Point: (3974400, 329.6)
Data Point: (4060800, 327.5)
Data Point: (4147200, 325.3)
Data Point: (4233600, 323.3)

Vol. Water Content Functions

Debris

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.19999934
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.1, 0.19999929)
Data Point: (0.14384499, 0.19999859)
Data Point: (0.20691381, 0.19999718)
Data Point: (0.29763514, 0.19999432)
Data Point: (0.42813324, 0.19998852)
Data Point: (0.61584821, 0.19997673)
Data Point: (0.88586679, 0.19995275)
Data Point: (1.274275, 0.19990397)
Data Point: (1.8329807, 0.19980471)
Data Point: (2.6366509, 0.19960286)
Data Point: (3.7926902, 0.19919303)
Data Point: (5.4555948, 0.19836402)
Data Point: (7.8475997, 0.19670002)
Data Point: (11.288379, 0.19341173)
Data Point: (16.237767, 0.18711026)
Data Point: (23.357215, 0.17571597)
Data Point: (33.598183, 0.15711748)
Data Point: (48.329302, 0.13126)
Data Point: (69.51928, 0.10214438)

Data Point: (100, 0.075804198)

Estimation Properties

Vol. WC Estimation Method: Sample functions

Sample Material: Sand

Saturated Water Content: 0.2 ft^3/ft^3

Liquid Limit: 0 %

Diameter at 10% passing: 0

Diameter at 60% passing: 0

Maximum: 100

Minimum: 0.1

Num. Points: 20

embankment clay

Model: Data Point Function

Function: Vol. Water Content vs. Pore-Water Pressure

Curve Fit to Data: 100 %

Segment Curvature: 100 %

Mv: 4.79e-007 /psf

Porosity: 0.22

Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)

Data Point: (0.01, 0.21999999)

Data Point: (0.018329807, 0.21999998)

Data Point: (0.033598183, 0.21999997)

Data Point: (0.061584821, 0.21999993)

Data Point: (0.11288379, 0.21999984)

Data Point: (0.20691381, 0.21999963)

Data Point: (0.37926902, 0.21999914)

Data Point: (0.6951928, 0.21999792)

Data Point: (1.274275, 0.21999489)

Data Point: (2.3357215, 0.21998722)

Data Point: (4.2813324, 0.21996761)

Data Point: (7.8475997, 0.21991719)

Data Point: (14.384499, 0.21978687)

Data Point: (26.366509, 0.21944947)

Data Point: (48.329302, 0.21857772)

Data Point: (88.586679, 0.21634893)

Data Point: (162.37767, 0.21082014)

Data Point: (297.63514, 0.19810028)

Data Point: (545.55948, 0.17327571)

Data Point: (1000, 0.13699113)

Estimation Properties

Vol. WC Estimation Method: Sample functions

Sample Material: Silty Clay

Saturated Water Content: 0.22 ft^3/ft^3

Liquid Limit: 0 %

Diameter at 10% passing: 0

Diameter at 60% passing: 0

Maximum: 1000

Minimum: 0.01
Num. Points: 20

clayey gravel and sand

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.19342789
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.18997613)
Data Point: (0.023357215, 0.18997613)
Data Point: (0.054555948, 0.18997613)
Data Point: (0.1274275, 0.18997613)
Data Point: (0.29763514, 0.18997613)
Data Point: (0.6951928, 0.18997613)
Data Point: (1.6237767, 0.18997613)
Data Point: (3.7926902, 0.18997613)
Data Point: (8.8586679, 0.18997613)
Data Point: (20.691381, 0.18997613)
Data Point: (48.329302, 0.18997613)
Data Point: (112.88379, 0.18997613)
Data Point: (263.66509, 0.18997613)
Data Point: (615.84821, 0.18997613)
Data Point: (1438.4499, 0.18997613)
Data Point: (4769.8134, 0.18949932)
Data Point: (11131.953, 0.18790673)
Data Point: (21364.961, 0.18267395)
Data Point: (42813.324, 0.16246761)
Data Point: (100000, 0.14006886)
Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Silty Sand
Saturated Water Content: 0.19 ft^3/ft^3
Liquid Limit: 31 %
Diameter at 10% passing: 0.001
Diameter at 60% passing: 3.35
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20

clay and silt

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf

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Porosity: 0.2513675
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.24989967)
Data Point: (0.01610262, 0.24989967)
Data Point: (0.025929438, 0.24989967)
Data Point: (0.041753189, 0.24989967)
Data Point: (0.067233575, 0.24989967)
Data Point: (0.10826367, 0.24989967)
Data Point: (0.17433288, 0.24989967)
Data Point: (0.28072162, 0.24989967)
Data Point: (0.45203537, 0.24989967)
Data Point: (0.72789538, 0.24989967)
Data Point: (1.1721023, 0.24989967)
Data Point: (1.8873918, 0.24989967)
Data Point: (3.0391954, 0.24989967)
Data Point: (4.8939009, 0.24989967)
Data Point: (7.8804628, 0.24989967)
Data Point: (12.68961, 0.24989967)
Data Point: (20.433597, 0.24989967)
Data Point: (32.903446, 0.24989967)
Data Point: (52.983169, 0.24989967)
Data Point: (85.316785, 0.24989967)
Data Point: (137.38238, 0.24989967)
Data Point: (221.22163, 0.24989967)
Data Point: (356.22479, 0.24989967)
Data Point: (573.61525, 0.24989967)
Data Point: (923.67086, 0.24989967)
Data Point: (1812.7854, 0.2498454)
Data Point: (3414.0428, 0.24965581)
Data Point: (5730.6727, 0.24887847)
Data Point: (7641.3555, 0.24785682)
Data Point: (10000, 0.24514068)
Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.25 ft^3/ft^3
Liquid Limit: 40 %
Diameter at 10% passing: 0.01
Diameter at 60% passing: 0.001
Maximum: 10000
Minimum: 0.01
Num. Points: 30

Regions

	Material	Points	Area (ft^2)
Region 1	Clayey Gravel and Sand	34,32,33,35	6601
Region 2	Clay and Silt	33,28,29,11,12,13,14,15,30,26,27,31,32	10195.515

Transient Seepage

Region 3	Debris	25,27,31,21,22,20,19	1640.9231
Region 4	Debris	26,24,23,30	314.47259
Region 5	Debris	29,28,1,2,3,4,5,6,7,8,9,10,36	364.52734
Region 6	Embankment Clay	23,16,17,37,18,19,25,27,26,24	664.18275

Lines

	Start Point	End Point	Hydraulic Boundary
Line 1	1	2	Potential Seepage Face
Line 2	2	3	Potential Seepage Face
Line 3	3	4	Potential Seepage Face
Line 4	4	5	Potential Seepage Face
Line 5	5	6	Potential Seepage Face
Line 6	6	7	Potential Seepage Face
Line 7	7	8	Potential Seepage Face
Line 8	8	9	Potential Seepage Face
Line 9	9	10	Potential Seepage Face
Line 10	16	17	
Line 11	18	19	Paducah Transient
Line 12	19	20	Paducah Transient
Line 13	22	21	Paducah Transient
Line 14	20	22	Paducah Transient
Line 15	23	16	Potential Seepage Face
Line 16	23	24	
Line 17	24	26	
Line 18	26	27	
Line 19	27	25	
Line 20	25	19	
Line 21	35	34	
Line 22	32	33	
Line 23	30	26	
Line 24	27	31	
Line 25	34	32	
Line 26	33	35	
Line 27	33	28	
Line 28	28	29	
Line 29	29	11	Potential Seepage Face
Line 30	11	12	Potential Seepage Face
Line 31	12	13	Potential Seepage Face
Line 32	13	14	Potential Seepage Face
Line 33	14	15	Potential Seepage Face
Line 34	15	30	Potential Seepage Face
Line 35	31	32	
Line 36	31	21	
Line 37	23	30	Potential Seepage Face
Line 38	10	36	Potential Seepage Face
Line 39	36	11	
Line 40	28	1	

Transient Seepage

Line 41	36	29	Potential Seepage Face
Line 42	17	37	Paducah Transient
Line 43	37	18	Paducah Transient

Points

	X (ft)	Y (ft)
Point 1	0	335.125
Point 2	47.1877	334.6991
Point 3	52.7608	335.8419
Point 4	59.8609	335.6637
Point 5	62.8973	334.23
Point 6	65.4775	334.2425
Point 7	68.3984	335.378
Point 8	87.6283	335.665
Point 9	92.7868	334.9249
Point 10	105.1336	334.3675
Point 11	124.5526	327.4429
Point 12	136.5964	327.0624
Point 13	157.062	325.7087
Point 14	177.9576	326.025
Point 15	194.9604	325.3005
Point 16	280.1259	350.082
Point 17	288.2718	350.0541
Point 18	323.9674	339.1601
Point 19	334.8666	337.8629
Point 20	349.0074	337.4019
Point 21	574.1246	337.6329
Point 22	353.70395	337.06029
Point 23	236.89948	337.50396
Point 24	280.2	337.6
Point 25	288.2	337.7
Point 26	281.2	331.7
Point 27	287.2	331.7
Point 28	0	331.7
Point 29	113	331.7
Point 30	216.79302	331.70992
Point 31	574	331.7
Point 32	574	313.1
Point 33	0	313.1
Point 34	574	301.6
Point 35	0	301.6
Point 36	106.63124	333.83346
Point 37	304.85751	344.99228

Transient Seepage

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File Information

Created By: Ghack, Mabior T LRL
Revision Number: 42
Last Edited By: Minges, George C LRL
Date: 11/2/2009
Time: 11:40:49 AM
File Name: Paducah 67+17A F.gsz
Directory: S:\proj\112546\Others\FEASIBILITY FOLDER\Feasibility Writeup\BONNIE\ENGINEERING CALCULATIONS\FEASIBILITY GEOTECH CALC FILES\
Last Solved Date: 11/2/2009
Last Solved Time: 11:42:30 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Mass(M) Units: lbs
Mass Flux Units: lbs/sec
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Transient Seepage

Kind: SEEP/W
Parent: Initial state for Transient
Method: Transient
Settings
- Initial PWP: Parent Analysis
- Include Air Flow: No
- Exclude cumulative values: Yes

Control
- Apply Runoff: Yes

Convergence
- Maximum Number of Iterations: 50
- Tolerance: 0.1
- Maximum Change in K: 1
- Rate of Change in K: 1.1
- Minimum Change in K: 0.0001

Transient Seepage

Equation Solver: Parallel Direct
Potential Seepage Max # of Reviews: 10
Time
Starting Time: 0 sec
Duration: 4233600 sec
# of Steps: 49
Step Generation Method: Linear
Save Steps Every: 5
Use Adaptive Time Stepping: No

Materials

embankment fill

Model: Saturated / Unsaturated
Hydraulic
K-Function: embankment fill
Vol. WC. Function: embankment fill
K-Ratio: 1
K-Direction: 0 °

gravels

Model: Saturated / Unsaturated
Hydraulic
K-Function: gravels
Vol. WC. Function: gravels
K-Ratio: 1
K-Direction: 0 °

clay and silt

Model: Saturated / Unsaturated
Hydraulic
K-Function: clay and silt
Vol. WC. Function: clay and silt
K-Ratio: 1
K-Direction: 0 °

clayey gravel

Model: Saturated / Unsaturated
Hydraulic
K-Function: clayey gravel
Vol. WC. Function: clayey gravel
K-Ratio: 1
K-Direction: 0 °

Boundary Conditions

Transient Seepage

Potential Seepage Face

Review: true
Type: Total Flux (Q) 0

transient

Function: Paducah Transient
Type: H (Q=0)

Initial Water Tables

Initial Water Table 1

Max. negative head: 5

K Functions

embankment fill

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.6e-008
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.6e-008)
Data Point: (0.020691381, 1.59992e-008)
Data Point: (0.042813324, 1.5997795e-008)
Data Point: (0.088586679, 1.5995421e-008)
Data Point: (0.18329807, 1.5991072e-008)
Data Point: (0.37926902, 1.5982644e-008)
Data Point: (0.78475997, 1.5965385e-008)
Data Point: (1.6237767, 1.5929179e-008)
Data Point: (3.3598183, 1.5851103e-008)
Data Point: (6.951928, 1.5682796e-008)
Data Point: (14.384499, 1.5320437e-008)
Data Point: (29.763514, 1.4560234e-008)
Data Point: (61.584821, 1.3033595e-008)
Data Point: (127.4275, 1.0227837e-008)
Data Point: (263.66509, 5.9616669e-009)
Data Point: (545.55948, 1.7364398e-009)
Data Point: (1128.8379, 6.7715324e-011)
Data Point: (2335.7215, 1.176744e-011)
Data Point: (4832.9302, 2.699492e-012)
Data Point: (10000, 6.3101416e-013)
Estimation Properties
Volume Water Content Function: embankment fill
Hydraulic K Sat: 1.6e-008 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function

Maximum: 10000
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.18 ft^3/ft^3

gravels

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 0.0008
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 0.0008)
Data Point: (0.016237767, 0.00079999993)
Data Point: (0.026366509, 0.00079999983)
Data Point: (0.042813324, 0.00079999966)
Data Point: (0.06951928, 0.0007999994)
Data Point: (0.11288379, 0.00079999896)
Data Point: (0.18329807, 0.00079999835)
Data Point: (0.29763514, 0.00079999698)
Data Point: (0.48329302, 0.00079999593)
Data Point: (0.78475997, 0.00079999182)
Data Point: (1.274275, 0.00079998255)
Data Point: (2.0691381, 0.00080003501)
Data Point: (3.3598183, 0.00079962424)
Data Point: (5.4555948, 0.00080170144)
Data Point: (8.8586679, 0.00078543995)
Data Point: (14.384499, 0.00061725171)
Data Point: (23.357215, 0.00011475968)
Data Point: (37.926902, 5.5237849e-006)
Data Point: (61.584821, 6.1737905e-007)
Data Point: (100, 8.0741569e-008)
Estimation Properties
Volume Water Content Function: gravels
Hydraulic K Sat: 0.0008 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 100
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.11 ft^3/ft^3

clayey gravel

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.6e-009
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)

Transient Seepage

Data Point: (0.01, 1.6e-009)
Data Point: (0.018329807, 1.5999999e-009)
Data Point: (0.033598183, 1.5999997e-009)
Data Point: (0.061584821, 1.599999e-009)
Data Point: (0.11288379, 1.5999963e-009)
Data Point: (0.20691381, 1.5999869e-009)
Data Point: (0.37926902, 1.5999539e-009)
Data Point: (0.6951928, 1.5998379e-009)
Data Point: (1.274275, 1.5994303e-009)
Data Point: (2.3357215, 1.5979996e-009)
Data Point: (4.2813324, 1.5929479e-009)
Data Point: (7.8475997, 1.5751865e-009)
Data Point: (14.384499, 1.512945e-009)
Data Point: (26.366509, 1.304117e-009)
Data Point: (48.329302, 7.5127229e-010)
Data Point: (88.586679, 1.2970246e-010)
Data Point: (162.37767, 4.3854942e-012)
Data Point: (297.63514, 6.8944157e-014)
Data Point: (545.55948, 9.1880554e-016)
Data Point: (1000, 1.1915923e-017)

Estimation Properties
Volume Water Content Function: clayey gravel
Hydraulic K Sat: 1.6e-009 ft/sec
Hyd. K-Function Estimation Method: Van Genuchten Function
Maximum: 1000
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.15 ft^3/ft^3

clay and silt

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.2e-010
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.2e-010)
Data Point: (0.020691381, 1.2e-010)
Data Point: (0.042813324, 1.2e-010)
Data Point: (0.088586679, 1.2e-010)
Data Point: (0.18329807, 1.2e-010)
Data Point: (0.37926902, 1.2e-010)
Data Point: (0.78475997, 1.2e-010)
Data Point: (1.6237767, 1.2e-010)
Data Point: (3.3598183, 1.2e-010)
Data Point: (6.951928, 1.2e-010)
Data Point: (14.384499, 1.2e-010)
Data Point: (29.763514, 1.2e-010)

Data Point: (61.584821, 1.2e-010)
Data Point: (127.4275, 1.1999997e-010)
Data Point: (263.66509, 1.1999977e-010)
Data Point: (545.55948, 1.2000082e-010)
Data Point: (1128.8379, 1.200232e-010)
Data Point: (2335.7215, 1.2009837e-010)
Data Point: (4659.8728, 1.0483992e-010)
Data Point: (10000, 3.2744769e-011)

Estimation Properties
Volume Water Content Function: clay and silt
Hydraulic K Sat: 1.2e-010 ft/sec
Hyd. K-Function Estimation Method: Van Genuchten Function
Maximum: 10000
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.23 ft^3/ft^3

Hydraulic Boundary Functions

Paducah Transient

Model: Spline Data Point Function
Function: Total Head vs. Time
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Y-Intercept: 325
Data Points: Time (sec), Total Head (ft)
Data Point: (0, 325)
Data Point: (86400, 325)
Data Point: (172800, 326.1)
Data Point: (259200, 327.7)
Data Point: (345600, 328.5)
Data Point: (432000, 329.1)
Data Point: (518400, 329.7)
Data Point: (604800, 330.3)
Data Point: (691200, 331.3)
Data Point: (777600, 331.7)
Data Point: (864000, 332.2)
Data Point: (950400, 333.4)
Data Point: (1036800, 334.9)
Data Point: (1123200, 336.1)
Data Point: (1209600, 338.5)
Data Point: (1296000, 341.1)
Data Point: (1382400, 343)
Data Point: (1468800, 344.3)
Data Point: (1555200, 346.2)
Data Point: (1641600, 347.2)
Data Point: (1728000, 347.7)

Data Point: (1814400, 348.1)
Data Point: (1900800, 348.5)
Data Point: (1987200, 348.8)
Data Point: (2073600, 349.1)
Data Point: (2160000, 349.3)
Data Point: (2246400, 349.4)
Data Point: (2332800, 349.4)
Data Point: (2419200, 349.2)
Data Point: (2505600, 349)
Data Point: (2592000, 348.5)
Data Point: (2678400, 348)
Data Point: (2764800, 347.5)
Data Point: (2851200, 346.8)
Data Point: (2937600, 345.8)
Data Point: (3024000, 344.6)
Data Point: (3110400, 343.3)
Data Point: (3196800, 342.2)
Data Point: (3283200, 341.1)
Data Point: (3369600, 339.8)
Data Point: (3456000, 338.4)
Data Point: (3542400, 337.3)
Data Point: (3628800, 336.2)
Data Point: (3715200, 334.9)
Data Point: (3801600, 333.4)
Data Point: (3888000, 331.6)
Data Point: (3974400, 329.6)
Data Point: (4060800, 327.5)
Data Point: (4147200, 325.3)
Data Point: (4233600, 323.3)

Vol. Water Content Functions

embankment fill

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.21999999)
Data Point: (0.018329807, 0.21999998)
Data Point: (0.033598183, 0.21999997)
Data Point: (0.061584821, 0.21999993)
Data Point: (0.11288379, 0.21999984)
Data Point: (0.20691381, 0.21999963)
Data Point: (0.37926902, 0.21999914)

Transient Seepage

Data Point: (0.6951928, 0.21999792)
Data Point: (1.274275, 0.21999489)
Data Point: (2.3357215, 0.21998722)
Data Point: (4.2813324, 0.21996761)
Data Point: (7.8475997, 0.21991719)
Data Point: (14.384499, 0.21978687)
Data Point: (26.366509, 0.21944947)
Data Point: (48.329302, 0.21857772)
Data Point: (88.586679, 0.21634893)
Data Point: (162.37767, 0.21082014)
Data Point: (297.63514, 0.19810028)
Data Point: (545.55948, 0.17327571)
Data Point: (1000, 0.13699113)

Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.22 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

gravels

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.12977884
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.13)
Data Point: (0.018329807, 0.12999999)
Data Point: (0.033598183, 0.12999999)
Data Point: (0.061584821, 0.12999998)
Data Point: (0.11288379, 0.12999996)
Data Point: (0.20691381, 0.12999993)
Data Point: (0.37926902, 0.12999986)
Data Point: (0.6951928, 0.12999975)
Data Point: (1.274275, 0.12999945)
Data Point: (2.3357215, 0.12999692)
Data Point: (4.2813324, 0.12994609)
Data Point: (7.8475997, 0.12879092)
Data Point: (14.384499, 0.1086857)
Data Point: (26.366509, 0.048675218)
Data Point: (48.329302, 0.025073057)
Data Point: (88.586679, 0.016822363)

Transient Seepage

Data Point: (162.37767, 0.012726241)
Data Point: (297.63514, 0.010268092)
Data Point: (545.55948, 0.0086222321)
Data Point: (1000, 0.0074377998)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Gravel
Saturated Water Content: 0.13 ft³/ft³
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

clayey gravel

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.19532101
Data Points: Matric Suction (psf), Vol. Water Content (ft³/ft³)
Data Point: (0.01, 0.18997613)
Data Point: (0.023357215, 0.18997613)
Data Point: (0.054555948, 0.18997613)
Data Point: (0.1274275, 0.18997613)
Data Point: (0.29763514, 0.18997613)
Data Point: (0.6951928, 0.18997613)
Data Point: (1.6237767, 0.18997613)
Data Point: (3.7926902, 0.18997613)
Data Point: (8.8586679, 0.18997613)
Data Point: (20.691381, 0.18997613)
Data Point: (48.329302, 0.18997613)
Data Point: (112.88379, 0.18997613)
Data Point: (263.66509, 0.18997613)
Data Point: (615.84821, 0.18997613)
Data Point: (1438.4499, 0.18997613)
Data Point: (3359.8183, 0.18997613)
Data Point: (10429.375, 0.18959155)
Data Point: (22804.218, 0.18312897)
Data Point: (42813.324, 0.16246761)
Data Point: (100000, 0.14006886)
Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Silty Sand
Saturated Water Content: 0.19 ft³/ft³
Liquid Limit: 31 %

Diameter at 10% passing: 0.001
Diameter at 60% passing: 3.35
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20

clay and silt

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.25114936
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.24989967)
Data Point: (0.020691381, 0.24989967)
Data Point: (0.042813324, 0.24989967)
Data Point: (0.088586679, 0.24989967)
Data Point: (0.18329807, 0.24989967)
Data Point: (0.37926902, 0.24989967)
Data Point: (0.78475997, 0.24989967)
Data Point: (1.6237767, 0.24989967)
Data Point: (3.3598183, 0.24989967)
Data Point: (6.951928, 0.24989967)
Data Point: (14.384499, 0.24989967)
Data Point: (29.763514, 0.24989967)
Data Point: (61.584821, 0.24989967)
Data Point: (127.4275, 0.24989967)
Data Point: (263.66509, 0.24989967)
Data Point: (545.55948, 0.24989967)
Data Point: (1128.8379, 0.24989967)
Data Point: (2282.0137, 0.2498454)
Data Point: (5107.633, 0.24853936)
Data Point: (10000, 0.24514068)
Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.25 ft^3/ft^3
Liquid Limit: 40 %
Diameter at 10% passing: 0.01
Diameter at 60% passing: 0.001
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft^2)

Transient Seepage

Region 1	embankment fill	14,26,13,12,11,10,9,8,7,16,18,19,17	2264.308
Region 2	gravels	1,2,3,4,5,6,7,16,18,24	2011.0898
Region 3	clayey gravel	20,22,23,21	4124.9087
Region 4	gravels	19,17,14,15,25	869.8555
Region 5	clay and silt	25,21,20,24,18,19	1124.9751

Lines

	Start Point	End Point	Hydraulic Boundary
Line 1	13	12	
Line 2	12	11	
Line 3	11	10	Potential Seepage Face
Line 4	10	9	Potential Seepage Face
Line 5	9	8	Potential Seepage Face
Line 6	8	7	Potential Seepage Face
Line 7	7	16	
Line 8	16	18	
Line 9	18	19	
Line 10	19	17	
Line 11	17	14	
Line 12	1	2	Potential Seepage Face
Line 13	2	3	Potential Seepage Face
Line 14	3	4	Potential Seepage Face
Line 15	4	5	Potential Seepage Face
Line 16	5	6	Potential Seepage Face
Line 17	6	7	Potential Seepage Face
Line 18	24	1	
Line 19	20	21	
Line 20	20	22	
Line 21	22	23	
Line 22	23	21	
Line 23	18	24	
Line 24	14	15	transient
Line 25	15	25	
Line 26	25	19	
Line 27	25	21	
Line 28	20	24	
Line 29	14	26	transient
Line 30	26	13	transient

Points

	X (ft)	Y (ft)
Point 1	0	334.8625
Point 2	12.9496	334.8222
Point 3	51.8256	333.6227
Point 4	75.5322	325.9003
Point 5	92.5865	326.3688

Transient Seepage

Point 6	109.279	326.1716
Point 7	124.9974	326.2999
Point 8	141.2426	332.3327
Point 9	148.057	334.1276
Point 10	164.1967	335.7904
Point 11	205.5546	349.3855
Point 12	211.0685	349.9124
Point 13	216.8613	349.5456
Point 14	302.4014	324.8389
Point 15	374.9917	321.3737
Point 16	207	325.8
Point 17	215	325.8
Point 18	208	318.9
Point 19	214	318.9
Point 20	0	315.9
Point 21	374.9917	315.9
Point 22	0	304.9
Point 23	374.9917	304.9
Point 24	0	318.9
Point 25	374.9917	318.9
Point 26	239.52363	343

Transient Seepage

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File Information

Title: Paducah 7+60 B
Comments: T-Wall
Created By: Minges, George C LRL
Revision Number: 35
Last Edited By: Minges, George C LRL
Date: 11/2/2009
Time: 11:22:52 AM
File Name: Paducah 7+60B F.gsz
Directory: S:\proj\112546\Others\GEOTECH SEEP AND SLOPE\FEASIBILITY\
Last Solved Date: 11/2/2009
Last Solved Time: 11:25:08 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Mass(M) Units: lbs
Mass Flux Units: lbs/sec
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Transient Seepage

Kind: SEEP/W
Parent: initial state for transient
Method: Transient
Settings
    Initial PWP: Parent Analysis
    Include Air Flow: No
    Exclude cumulative values: Yes
Control
    Apply Runoff: Yes
Convergence
    Maximum Number of Iterations: 500
    Tolerance: 0.001
    Maximum Change in K: 0.1
    Rate of Change in K: 1.02

Transient Seepage

Minimum Change in K: 1e-005
Equation Solver: Parallel Direct
Potential Seepage Max # of Reviews: 10

Time

Starting Time: 0 sec
Duration: 4233600 sec
# of Steps: 49
Step Generation Method: Linear
Save Steps Every: 5
Use Adaptive Time Stepping: No

Materials

T-wall

Model: (none)

Foundation Clay

Model: Saturated / Unsaturated
Hydraulic

K-Function: Clay and Silt
Vol. WC. Function: Foundation Clay
K-Ratio: 8
K-Direction: 0 °

Debris

Model: Saturated / Unsaturated
Hydraulic

K-Function: Debris
Vol. WC. Function: Debris
K-Ratio: 1
K-Direction: 0 °

Embankment Clay

Model: Saturated / Unsaturated
Hydraulic

K-Function: Embankment Clay
Vol. WC. Function: Embankment Clay
K-Ratio: 8
K-Direction: 0 °

Boundary Conditions

Potential Seepage Face

Review: true
Type: Total Flux (Q) 0

Transient Seepage

transient

Function: Paducah Transient Feasibility
Type: H (Q=0)

Initial Water Tables

Initial Water Table 1

Max. negative head: 5

K Functions

Embankment Clay

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.6e-008
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.6e-008)
Data Point: (0.018329807, 1.5999372e-008)
Data Point: (0.033598183, 1.5998342e-008)
Data Point: (0.061584821, 1.5996774e-008)
Data Point: (0.11288379, 1.5994263e-008)
Data Point: (0.20691381, 1.5990033e-008)
Data Point: (0.37926902, 1.5982644e-008)
Data Point: (0.6951928, 1.5969208e-008)
Data Point: (1.274275, 1.5944374e-008)
Data Point: (2.3357215, 1.5897609e-008)
Data Point: (4.2813324, 1.5808533e-008)
Data Point: (7.8475997, 1.5639994e-008)
Data Point: (14.384499, 1.5320437e-008)
Data Point: (26.366509, 1.4727229e-008)
Data Point: (48.329302, 1.3658753e-008)
Data Point: (88.586679, 1.1823309e-008)
Data Point: (162.37767, 8.9682229e-009)
Data Point: (297.63514, 5.1544584e-009)
Data Point: (545.55948, 1.7364398e-009)
Data Point: (1000, 1.1616636e-010)
Estimation Properties
Volume Water Content Function: Embankment Clay
Hydraulic K Sat: 1.6e-008 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 1000
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.18 ft^3/ft^3

Transient Seepage

Clay and Silt

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 6.5e-009
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 6.5e-009)
Data Point: (0.020691381, 6.5e-009)
Data Point: (0.042813324, 6.5e-009)
Data Point: (0.088586679, 6.5e-009)
Data Point: (0.18329807, 6.5e-009)
Data Point: (0.37926902, 6.5e-009)
Data Point: (0.78475997, 6.5e-009)
Data Point: (1.6237767, 6.5e-009)
Data Point: (3.3598183, 6.5e-009)
Data Point: (6.951928, 6.5e-009)
Data Point: (14.384499, 6.4999998e-009)
Data Point: (29.763514, 6.4999983e-009)
Data Point: (61.584821, 6.5000048e-009)
Data Point: (127.4275, 6.5001689e-009)
Data Point: (263.66509, 6.501123e-009)
Data Point: (545.55948, 6.4937109e-009)
Data Point: (1396.6185, 5.2476121e-009)
Data Point: (2335.7215, 1.3806548e-009)
Data Point: (4832.9302, 6.7639102e-014)
Data Point: (10000, 3.9871948e-019)
Estimation Properties
Volume Water Content Function: Foundation Clay
Hydraulic K Sat: 6.5e-009 ft/sec
Hyd. K-Function Estimation Method: Van Genuchten Function
Maximum: 10000
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.25 ft^3/ft^3

Debris

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 0.0009
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 0.0009)
Data Point: (0.016237767, 0.00089999839)
Data Point: (0.026366509, 0.0008999939)
Data Point: (0.042813324, 0.00089998384)

Transient Seepage

Data Point: (0.06951928, 0.00089996132)
Data Point: (0.11288379, 0.00089990944)
Data Point: (0.18329807, 0.00089978997)
Data Point: (0.29763514, 0.00089951612)
Data Point: (0.48329302, 0.00089888542)
Data Point: (0.78475997, 0.00089743687)
Data Point: (1.274275, 0.00089419165)
Data Point: (2.0691381, 0.00088700001)
Data Point: (3.3598183, 0.00087122954)
Data Point: (5.4555948, 0.00083827851)
Data Point: (8.8586679, 0.00077289797)
Data Point: (14.384499, 0.00065139674)
Data Point: (23.357215, 0.00046382735)
Data Point: (37.926902, 0.00023682493)
Data Point: (61.584821, 7.6191529e-005)
Data Point: (100, 1.4636508e-005)

Estimation Properties
Volume Water Content Function: Debris
Hydraulic K Sat: 0.0009 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 100
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.2 ft^3/ft^3

Hydraulic Boundary Functions

Paducah Transient Feasibility

Model: Spline Data Point Function
Function: Total Head vs. Time
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Y-Intercept: 325
Data Points: Time (sec), Total Head (ft)
Data Point: (0, 325)
Data Point: (86400, 325)
Data Point: (172800, 326.1)
Data Point: (259200, 327.7)
Data Point: (345600, 328.5)
Data Point: (432000, 329.1)
Data Point: (518400, 329.7)
Data Point: (604800, 330.3)
Data Point: (691200, 331.3)
Data Point: (777600, 331.7)
Data Point: (864000, 332.2)
Data Point: (950400, 333.4)
Data Point: (1036800, 334.9)

Data Point: (1123200, 336.1)
Data Point: (1209600, 338.5)
Data Point: (1296000, 341.1)
Data Point: (1382400, 343)
Data Point: (1468800, 344.3)
Data Point: (1555200, 346.2)
Data Point: (1641600, 347.2)
Data Point: (1728000, 347.7)
Data Point: (1814400, 348.1)
Data Point: (1900800, 348.5)
Data Point: (1987200, 348.8)
Data Point: (2073600, 349.1)
Data Point: (2160000, 349.3)
Data Point: (2246400, 349.4)
Data Point: (2332800, 349.4)
Data Point: (2419200, 349.2)
Data Point: (2505600, 349)
Data Point: (2592000, 348.5)
Data Point: (2678400, 348)
Data Point: (2764800, 347.5)
Data Point: (2851200, 346.8)
Data Point: (2937600, 345.8)
Data Point: (3024000, 344.6)
Data Point: (3110400, 343.3)
Data Point: (3196800, 342.2)
Data Point: (3283200, 341.1)
Data Point: (3369600, 339.8)
Data Point: (3456000, 338.4)
Data Point: (3542400, 337.3)
Data Point: (3628800, 336.2)
Data Point: (3715200, 334.9)
Data Point: (3801600, 333.4)
Data Point: (3888000, 331.6)
Data Point: (3974400, 329.6)
Data Point: (4060800, 327.5)
Data Point: (4147200, 325.3)
Data Point: (4233600, 323.3)

Vol. Water Content Functions

Embankment Clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22

Transient Seepage

Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
- Data Point: (0.01, 0.21999999)
- Data Point: (0.018329807, 0.21999998)
- Data Point: (0.033598183, 0.21999997)
- Data Point: (0.061584821, 0.21999993)
- Data Point: (0.11288379, 0.21999984)
- Data Point: (0.20691381, 0.21999963)
- Data Point: (0.37926902, 0.21999914)
- Data Point: (0.6951928, 0.21999792)
- Data Point: (1.274275, 0.21999489)
- Data Point: (2.3357215, 0.21998722)
- Data Point: (4.2813324, 0.21996761)
- Data Point: (7.8475997, 0.21991719)
- Data Point: (14.384499, 0.21978687)
- Data Point: (26.366509, 0.21944947)
- Data Point: (48.329302, 0.21857772)
- Data Point: (88.586679, 0.21634893)
- Data Point: (162.37767, 0.21082014)
- Data Point: (297.63514, 0.19810028)
- Data Point: (545.55948, 0.17327571)
- Data Point: (1000, 0.13699113)

Estimation Properties
- Vol. WC Estimation Method: Sample functions
- Sample Material: Silty Clay
- Saturated Water Content: 0.22 ft^3/ft^3
- Liquid Limit: 0 %
- Diameter at 10% passing: 0
- Diameter at 60% passing: 0
- Maximum: 1000
- Minimum: 0.01
- Num. Points: 20

Foundation Clay

Model: Data Point Function

Function: Vol. Water Content vs. Pore-Water Pressure
- Curve Fit to Data: 100 %
- Segment Curvature: 100 %
- Mv: 4.79e-007 /psf

Porosity: 0.3704873

Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
- Data Point: (0.01, 0.36966087)
- Data Point: (0.023357215, 0.36966087)
- Data Point: (0.054555948, 0.36966087)
- Data Point: (0.1274275, 0.36966087)
- Data Point: (0.29763514, 0.36966087)
- Data Point: (0.6951928, 0.36966087)
- Data Point: (1.6237767, 0.36966087)
- Data Point: (3.7926902, 0.36966087)

Transient Seepage

Data Point: (8.8586679, 0.36966087)
Data Point: (20.691381, 0.36966087)
Data Point: (48.329302, 0.36966087)
Data Point: (112.88379, 0.36966087)
Data Point: (263.66509, 0.36966087)
Data Point: (602.85683, 0.36114733)
Data Point: (1438.4499, 0.2901812)
Data Point: (3359.8183, 0.21242878)
Data Point: (7847.5997, 0.17220763)
Data Point: (18329.807, 0.14645868)
Data Point: (42813.324, 0.12590906)
Data Point: (100000, 0.10784644)

Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.37 ft^3/ft^3
Liquid Limit: 31 %
Diameter at 10% passing: 0.0005
Diameter at 60% passing: 0.0006
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20

Debris

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.25999999
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.25999998)
Data Point: (0.018329807, 0.25999996)
Data Point: (0.033598183, 0.25999988)
Data Point: (0.061584821, 0.25999963)
Data Point: (0.11288379, 0.25999885)
Data Point: (0.20691381, 0.25999634)
Data Point: (0.37926902, 0.2599882)
Data Point: (0.6951928, 0.2599617)
Data Point: (1.274275, 0.25987516)
Data Point: (2.3357215, 0.25959248)
Data Point: (4.2813324, 0.2586718)
Data Point: (7.8475997, 0.25571003)
Data Point: (14.384499, 0.24656017)
Data Point: (26.366509, 0.22150596)
Data Point: (48.329302, 0.17063801)
Data Point: (88.586679, 0.10916815)
Data Point: (162.37767, 0.065559185)

Transient Seepage

Data Point: (297.63514, 0.041878631)
Data Point: (545.55948, 0.029155966)
Data Point: (1000, 0.021736063)

Estimation Properties

Vol. WC Estimation Method: Sample functions
Sample Material: Sand
Saturated Water Content: 0.26 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft^2)
Region 1	Debris	12,27,7,30,29	43.292528
Region 2	Embankment Clay	6,14,12,27	32.306024
Region 3	T-wall	12,29,10,13,11,15,16,17,5,18,21,20,19,6,14	96.178322
Region 4	Foundation Clay	23,24,25,15	2.2524075
Region 5	Embankment Clay	23,28,26,5,17,16,15	31.157314
Region 6	Debris	26,28,22,1,2,3,4	636.27261
Region 7	Foundation Clay	29,10,13,11,15,25,24,23,28,22,31,32,9,8,36,35,30	14900.163

Lines

	Start Point	End Point	Hydraulic Boundary	Right Side Material
Line 1	1	2	Potential Seepage Face	
Line 2	2	3	Potential Seepage Face	
Line 3	3	4	Potential Seepage Face	
Line 4	4	5	Potential Seepage Face	
Line 5	13	10		
Line 6	10	12		
Line 7	12	14		
Line 8	19	20	transient	
Line 9	20	21		
Line 10	21	18		
Line 11	18	17		
Line 12	17	16		
Line 13	16	15		
Line 14	15	11		
Line 15	11	13		
Line 16	23	15		
Line 17	15	25		
Line 18	25	24		
Line 19	24	23		
Line 20	6	27	transient	

Transient Seepage

Line 21	27	7	transient	
Line 22	12	27		
Line 23	7	30	transient	
Line 24	30	29		
Line 25	28	22		
Line 26	29	10		
Line 27	23	28		
Line 28	29	12		
Line 29	6	14		
Line 30	17	5		
Line 31	5	18		
Line 32	19	6	transient	
Line 33	28	26		
Line 34	26	5		
Line 35	22	1		
Line 36	4	26		
Line 37	30	35	transient	
Line 38	35	36	transient	T-wall
Line 39	36	8	transient	
Line 40	22	31		
Line 41	31	32		
Line 42	32	9		
Line 43	9	8	transient	

Points

	X (ft)	Y (ft)
Point 1	0	334.9629
Point 2	74.1988	335.4209
Point 3	133.6199	335.1982
Point 4	156.1492	333.8638
Point 5	189.94866	335.00041
Point 6	192.10634	335.14426
Point 7	217.58	333.7031
Point 8	305.4474	317.9361
Point 9	359.2597	312.6319
Point 10	203.30208	322.916
Point 11	200.21849	329.66493
Point 12	203.30208	331.92348
Point 13	201.84227	322.89996
Point 14	192.1851	331.93952
Point 15	182.20486	329.69835
Point 16	182.20486	331.21898
Point 17	189.89112	332.34859
Point 18	190.25176	349.20939
Point 19	191.76033	349.22332
Point 20	191.76033	350.21665
Point 21	190.29354	350.25378

Transient Seepage

Point 22	0	331.5
Point 23	180.7	329.7
Point 24	180.7	328.2
Point 25	182.2	328.2
Point 26	180.7	334.65
Point 27	203.30926	334.51046
Point 28	180.7	331.5
Point 29	203.3	331.5
Point 30	223.13081	331.50496
Point 31	0	285
Point 32	359	285
Point 33	189.75	334.8
Point 34	192.25	335.2
Point 35	243	323.9
Point 36	243	319.6

Transient Seepage

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File Information

Title: Paducah 87+43 B
Comments: I-Wall
Created By: Minges, George C LRL
Revision Number: 41
Last Edited By: Minges, George C LRL
Date: 11/2/2009
Time: 12:01:38 PM
File Name: Paducah 87+43 B F.gsz
Directory: S:\proj\112546\Others\FEASIBILITY FOLDER\Feasibility Writeup\BONNIE\ENGINEERING CALCULATIONS\FEASIBILITY GEOTECH CALC FILES\
Last Solved Date: 11/2/2009
Last Solved Time: 12:02:44 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Mass(M) Units: lbs
Mass Flux Units: lbs/sec
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Transient Seepage

Kind: SEEP/W
Parent: Initial State for Transient
Method: Transient
Settings
    Initial PWP: Parent Analysis
    Include Air Flow: No
    Exclude cumulative values: No
Control
    Apply Runoff: Yes
Convergence
    Maximum Number of Iterations: 500
    Tolerance: 0.001
    Maximum Change in K: 0.1

Transient Seepage

Rate of Change in K: 1.02
Minimum Change in K: 1e-005
Equation Solver: Parallel Direct
Potential Seepage Max # of Reviews: 10

Time

Starting Time: 0 sec
Duration: 2937600 sec
# of Steps: 34
Step Generation Method: Linear
Save Steps Every: 5
Use Adaptive Time Stepping: No

Materials

I wall

Model: (none)

Embankment Fill

Model: Saturated / Unsaturated

Hydraulic

K-Function: Embankment Clay
Vol. WC. Function: Embankment Clay
K-Ratio: 8
K-Direction: 0 °

Foundation Clay

Model: Saturated / Unsaturated

Hydraulic

K-Function: Foundation Clay
Vol. WC. Function: Foundation Clay
K-Ratio: 8
K-Direction: 0 °

Boundary Conditions

Potential Seepage Face

Review: true
Type: Total Flux (Q) 0

Transient certification

Function: Paducah Feasibilty
Type: H (Q=0)

Initial Water Tables

Transient Seepage

Initial Water Table 1

Max. negative head: 5
Coordinates
Coordinate: (0, 335) ft
Coordinate: (160, 335) ft

K Functions

Embankment Clay

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.6e-008
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.6e-008)
Data Point: (0.018329807, 1.5999372e-008)
Data Point: (0.033598183, 1.5998342e-008)
Data Point: (0.061584821, 1.5996774e-008)
Data Point: (0.11288379, 1.5994262e-008)
Data Point: (0.20691381, 1.5990032e-008)
Data Point: (0.37926902, 1.5982642e-008)
Data Point: (0.6951928, 1.5969207e-008)
Data Point: (1.274275, 1.5944375e-008)
Data Point: (2.3357215, 1.5897611e-008)
Data Point: (4.2813324, 1.5808536e-008)
Data Point: (7.8475997, 1.5639998e-008)
Data Point: (14.384499, 1.5320442e-008)
Data Point: (26.366509, 1.4727233e-008)
Data Point: (48.329302, 1.3658756e-008)
Data Point: (88.586679, 1.182331e-008)
Data Point: (162.37767, 8.9682235e-009)
Data Point: (297.63514, 5.1544587e-009)
Data Point: (545.55948, 1.73644e-009)
Data Point: (1000, 1.161664e-010)
Estimation Properties
Volume Water Content Function: Embankment Clay
Hydraulic K Sat: 1.6e-008 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 1000
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.18 ft^3/ft^3

Foundation Clay

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure

Transient Seepage

Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 8.1e-010
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 8.1e-010)
Data Point: (0.023357215, 8.0994448e-010)
Data Point: (0.054555948, 8.098889e-010)
Data Point: (0.1274275, 8.0983285e-010)
Data Point: (0.29763514, 8.0977596e-010)
Data Point: (0.6951928, 8.0971714e-010)
Data Point: (1.6237767, 8.0965382e-010)
Data Point: (3.7926902, 8.0958e-010)
Data Point: (8.8586679, 8.0948154e-010)
Data Point: (20.691381, 8.0932544e-010)
Data Point: (48.329302, 8.0903319e-010)
Data Point: (112.88379, 8.0840618e-010)
Data Point: (263.66509, 8.068192e-010)
Data Point: (615.84821, 7.8897265e-010)
Data Point: (1438.4499, 3.7419198e-010)
Data Point: (3359.8183, 2.606661e-011)
Data Point: (7847.5997, 1.7973317e-012)
Data Point: (18329.807, 1.7906888e-013)
Data Point: (42813.324, 3.2981673e-014)
Data Point: (100000, 6.0490098e-015)
Estimation Properties
Volume Water Content Function: Foundation Clay
Hydraulic K Sat: 8.1e-010 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 1e+005
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.26 ft^3/ft^3

Hydraulic Boundary Functions

Paducah Feasibilty

Model: Spline Data Point Function
Function: Total Head vs. Time
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Y-Intercept: 334
Data Points: Time (sec), Total Head (ft)
Data Point: (0, 334)
Data Point: (86400, 334)
Data Point: (172800, 334.9)
Data Point: (259200, 336.1)
Data Point: (345600, 338.5)

Transient Seepage

Data Point: (432000, 341.1)
Data Point: (518400, 343)
Data Point: (604800, 344.3)
Data Point: (691200, 346.2)
Data Point: (777600, 347.2)
Data Point: (864000, 347.7)
Data Point: (950400, 348.1)
Data Point: (1036800, 348.5)
Data Point: (1123200, 348.8)
Data Point: (1209600, 349.1)
Data Point: (1296000, 349.3)
Data Point: (1382400, 349.4)
Data Point: (1468800, 349.4)
Data Point: (1555200, 349.2)
Data Point: (1641600, 349)
Data Point: (1728000, 348.5)
Data Point: (1814400, 348)
Data Point: (1900800, 347.5)
Data Point: (1987200, 346.8)
Data Point: (2073600, 345.8)
Data Point: (2160000, 344.6)
Data Point: (2246400, 343.3)
Data Point: (2332800, 342.2)
Data Point: (2419200, 341.1)
Data Point: (2505600, 339.8)
Data Point: (2592000, 338.4)
Data Point: (2678400, 337.3)
Data Point: (2764800, 336.2)
Data Point: (2851200, 334.9)
Data Point: (2937600, 334)

Vol. Water Content Functions

Embankment Clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.21999999)
Data Point: (0.018329807, 0.21999998)
Data Point: (0.033598183, 0.21999997)
Data Point: (0.061584821, 0.21999993)
Data Point: (0.11288379, 0.21999984)
Data Point: (0.20691381, 0.21999963)

Transient Seepage

Data Point: (0.37926902, 0.21999914)
Data Point: (0.6951928, 0.21999792)
Data Point: (1.274275, 0.21999489)
Data Point: (2.3357215, 0.21998722)
Data Point: (4.2813324, 0.21996761)
Data Point: (7.8475997, 0.21991719)
Data Point: (14.384499, 0.21978687)
Data Point: (26.366509, 0.21944947)
Data Point: (48.329302, 0.21857772)
Data Point: (88.586679, 0.21634893)
Data Point: (162.37767, 0.21082014)
Data Point: (297.63514, 0.19810028)
Data Point: (545.55948, 0.17327571)
Data Point: (1000, 0.13699113)

Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.22 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 1000
Minimum: 0.01
Num. Points: 20

Foundation Clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.37048224
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.37005407)
Data Point: (0.020691381, 0.37005407)
Data Point: (0.042813324, 0.37005407)
Data Point: (0.088586679, 0.37005407)
Data Point: (0.18329807, 0.37005407)
Data Point: (0.37926902, 0.37005407)
Data Point: (0.78475997, 0.37005407)
Data Point: (1.6237767, 0.37005407)
Data Point: (3.3598183, 0.37005407)
Data Point: (6.951928, 0.37005407)
Data Point: (14.384499, 0.37005407)
Data Point: (29.763514, 0.37005407)
Data Point: (61.584821, 0.37005407)
Data Point: (127.4275, 0.37005407)
Data Point: (263.66509, 0.37005407)

Transient Seepage

Data Point: (526.83766, 0.36911026)
Data Point: (1128.8379, 0.34318275)
Data Point: (2335.7215, 0.2703264)
Data Point: (4832.9302, 0.21728994)
Data Point: (10000, 0.18487617)

Estimation Properties

Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.37 ft^3/ft^3
Liquid Limit: 35 %
Diameter at 10% passing: 0.0005
Diameter at 60% passing: 0.011
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft^2)
Region 1	Foundation Clay	29,4,21,19,3,24,26,25,23,2,20,22,9,10,11,12,13,14,15,27,28,1	9822.254
Region 2	Embankment Fill	21,5,3,19	4.7054975
Region 3	Embankment Fill	8,2,20,22	4.8603244
Region 4	I wall	3,5,6,7,8,2,23,25,26,24	42.081158

Lines

	Start Point	End Point	Hydraulic Boundary
Line 1	29	4	Potential Seepage Face
Line 2	4	21	Potential Seepage Face
Line 3	21	19	
Line 4	19	3	
Line 5	3	24	
Line 6	24	26	
Line 7	26	25	
Line 8	25	23	
Line 9	23	2	
Line 10	2	20	
Line 11	20	22	
Line 12	22	9	Transient certification
Line 13	9	10	Transient certification
Line 14	10	11	Transient certification
Line 15	11	12	Transient certification
Line 16	12	13	Transient certification
Line 17	13	14	Transient certification
Line 18	14	15	Transient certification
Line 19	15	27	
Line 20	27	28	
Line 21	28	1	

Transient Seepage

Line 22	1	29	Potential Seepage Face
Line 23	21	5	Potential Seepage Face
Line 24	5	3	
Line 25	8	2	
Line 26	22	8	Transient certification
Line 27	5	6	
Line 28	6	7	
Line 29	7	8	

Points

	X (ft)	Y (ft)
Point 1	0	339.3218
Point 2	134.73896	336.10876
Point 3	132.34	336.06
Point 4	103.5	340.15
Point 5	132.25	340.35
Point 6	132.5	350.25
Point 7	134.5	350.25
Point 8	134.75	341.05
Point 9	145.5	340.15
Point 10	160.5	334.75
Point 11	163.5	334.85
Point 12	191.5	333.75
Point 13	206.5	332.75
Point 14	208.5	333.05
Point 15	224.5	330.75
Point 16	259.5	324.15
Point 17	302.5	316.85
Point 18	363.5	307.85
Point 19	131.19568	336.11061
Point 20	135.75695	336.14638
Point 21	131.18517	340.34259
Point 22	135.72336	340.96851
Point 23	134.08446	336.13791
Point 24	133.23483	336.06672
Point 25	134.08	325.1
Point 26	133.24	325.1
Point 27	224.5	294
Point 28	0	294
Point 29	1.07396	339.2504

Transient Seepage w/o toe drain

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File Information

Title: Paducah 177+05 C
Comments: earthen levee
Created By: Minges, George C LRL
Revision Number: 74
Last Edited By: Minges, George C LRL
Date: 11/5/2009
Time: 2:30:21 PM
File Name: Paducah 177+05c F.gsz
Directory: S:\proj\112546\Others\FEASIBILITY FOLDER\Feasibility Writeup\BONNIE\ENGINEERING CALCULATIONS\FEASIBILITY GEOTECH CALC FILES\
Last Solved Date: 11/5/2009
Last Solved Time: 2:32:26 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Mass(M) Units: lbs
Mass Flux Units: lbs/sec
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Transient Seepage w/o toe drain

Kind: SEEP/W
Parent: Initial State for Transient
Method: Transient
Settings
    Initial PWP: Parent Analysis
    Include Air Flow: No
    Exclude cumulative values: No
Control
    Apply Runoff: Yes
Convergence
    Maximum Number of Iterations: 500
    Tolerance: 0.001
    Maximum Change in K: 0.1

Transient Seepage w/o toe drain

Rate of Change in K: 1.02
Minimum Change in K: 1e-005
Equation Solver: Parallel Direct
Potential Seepage Max # of Reviews: 10

Time

Starting Time: 0 sec
Duration: 4233600 sec
# of Steps: 49
Step Generation Method: Linear
Save Steps Every: 5
Use Adaptive Time Stepping: No

Materials

Embankment Clay

Model: Saturated / Unsaturated
Hydraulic

K-Function: embankment clay
Vol. WC. Function: embankment clay
K-Ratio: 8
K-Direction: 0 °

Clay and Silt

Model: Saturated / Unsaturated
Hydraulic

K-Function: clay and silt
Vol. WC. Function: clay and silt
K-Ratio: 10
K-Direction: 0 °

Silty Mud

Model: Saturated / Unsaturated
Hydraulic

K-Function: Silty Mud
Vol. WC. Function: Silty Mud
K-Ratio: 10
K-Direction: 0 °

Boundary Conditions

Potential Seepage Face

Review: true
Type: Total Flux (Q) 0

New Boundary Condition

Function: Paducah Feasibility

Transient Seepage w/o toe drain

Type: H (Q=0)

Initial Water Tables

Initial Water Table 1

Max. negative head: 5
Coordinates
Coordinate: (0, 325) ft
Coordinate: (320, 325) ft

K Functions

embankment clay

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1.6e-008
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1.6e-008)
Data Point: (0.020691381, 1.5999304e-008)
Data Point: (0.042813324, 1.5998111e-008)
Data Point: (0.088586679, 1.5996064e-008)
Data Point: (0.18329807, 1.5992334e-008)
Data Point: (0.37926902, 1.5985098e-008)
Data Point: (0.78475997, 1.5970267e-008)
Data Point: (1.6237767, 1.5939037e-008)
Data Point: (3.3598183, 1.5872196e-008)
Data Point: (6.951928, 1.5726386e-008)
Data Point: (14.384499, 1.5413972e-008)
Data Point: (29.763514, 1.4755734e-008)
Data Point: (61.584821, 1.3421874e-008)
Data Point: (127.4275, 1.0951722e-008)
Data Point: (263.66509, 7.1227362e-009)
Data Point: (545.55948, 2.945564e-009)
Data Point: (1128.8379, 6.0232013e-010)
Data Point: (2335.7215, 6.5262204e-011)
Data Point: (4832.9302, 4.9979777e-012)
Data Point: (10000, 2.0104652e-013)
Estimation Properties
Volume Water Content Function: embankment clay
Hydraulic K Sat: 1.6e-008 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Residual Water Content: 0.18 ft³/ft³

clay and silt

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 5.5e-009
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 5.5e-009)
Data Point: (0.020691381, 5.4942437e-009)
Data Point: (0.042813324, 5.4884677e-009)
Data Point: (0.088586679, 5.4826814e-009)
Data Point: (0.18329807, 5.4769073e-009)
Data Point: (0.37926902, 5.4711211e-009)
Data Point: (0.78475997, 5.4653099e-009)
Data Point: (1.6237767, 5.4594492e-009)
Data Point: (3.3598183, 5.4534852e-009)
Data Point: (6.951928, 5.4473076e-009)
Data Point: (14.384499, 5.4406881e-009)
Data Point: (29.763514, 5.4331511e-009)
Data Point: (61.584821, 5.4237205e-009)
Data Point: (127.4275, 5.4104318e-009)
Data Point: (263.66509, 5.3893615e-009)
Data Point: (545.55948, 5.3488586e-009)
Data Point: (1128.8379, 5.1693186e-009)
Data Point: (2335.7215, 3.3469211e-009)
Data Point: (4832.9302, 7.1749718e-010)
Data Point: (10000, 8.922774e-011)
Estimation Properties
Volume Water Content Function: clay and silt
Hydraulic K Sat: 5.5e-009 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 10000
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.23 ft³/ft³

Silty Mud

Model: Data Point Function
Function: X-Conductivity vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
K-Saturation: 1e-007
Data Points: Matric Suction (psf), X-Conductivity (ft/sec)
Data Point: (0.01, 1e-007)
Data Point: (0.020691381, 9.9995926e-008)
Data Point: (0.042813324, 9.9988463e-008)

Data Point: (0.088586679, 9.9975661e-008)
Data Point: (0.18329807, 9.995235e-008)
Data Point: (0.37926902, 9.9907134e-008)
Data Point: (0.78475997, 9.9814436e-008)
Data Point: (1.6237767, 9.961925e-008)
Data Point: (3.3598183, 9.9201491e-008)
Data Point: (6.951928, 9.8290169e-008)
Data Point: (14.384499, 9.6337563e-008)
Data Point: (29.763514, 9.2223569e-008)
Data Point: (61.584821, 8.3886926e-008)
Data Point: (127.4275, 6.8448433e-008)
Data Point: (263.66509, 4.4517209e-008)
Data Point: (545.55948, 1.8409823e-008)
Data Point: (1128.8379, 3.764511e-009)
Data Point: (2335.7215, 4.0788978e-010)
Data Point: (4832.9302, 3.1237397e-011)
Data Point: (10000, 1.2565461e-012)

Estimation Properties
Volume Water Content Function: Silty Mud
Hydraulic K Sat: 1e-007 ft/sec
Hyd. K-Function Estimation Method: Fredlund-Xing Function
Maximum: 10000
Minimum: 0.01
Num. Points: 20
Residual Water Content: 0.3 ft^3/ft^3

Hydraulic Boundary Functions

Paducah Feasibility

Model: Spline Data Point Function
Function: Total Head vs. Time
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Y-Intercept: 325
Data Points: Time (sec), Total Head (ft)
Data Point: (86400, 325)
Data Point: (172800, 326.1)
Data Point: (259200, 327.7)
Data Point: (345600, 328.5)
Data Point: (432000, 329.1)
Data Point: (518400, 329.7)
Data Point: (604800, 330.3)
Data Point: (691200, 331.3)
Data Point: (777600, 331.7)
Data Point: (864000, 332.2)
Data Point: (950400, 333.4)
Data Point: (1036800, 334.9)

Data Point: (1123200, 336.1)
Data Point: (1209600, 338.5)
Data Point: (1296000, 341.1)
Data Point: (1382400, 343)
Data Point: (1468800, 344.3)
Data Point: (1555200, 346.2)
Data Point: (1641600, 347.2)
Data Point: (1728000, 347.7)
Data Point: (1814400, 348.1)
Data Point: (1900800, 348.5)
Data Point: (1987200, 348.8)
Data Point: (2073600, 349.1)
Data Point: (2160000, 349.3)
Data Point: (2246400, 349.4)
Data Point: (2332800, 349.4)
Data Point: (2419200, 349.2)
Data Point: (2505600, 349)
Data Point: (2592000, 348.5)
Data Point: (2678400, 348)
Data Point: (2764800, 347.5)
Data Point: (2851200, 346.8)
Data Point: (2937600, 345.8)
Data Point: (3024000, 344.6)
Data Point: (3110400, 343.3)
Data Point: (3196800, 342.2)
Data Point: (3283200, 341.1)
Data Point: (3369600, 339.8)
Data Point: (3456000, 338.4)
Data Point: (3542400, 337.3)
Data Point: (3628800, 336.2)
Data Point: (3715200, 334.9)
Data Point: (3801600, 333.4)
Data Point: (3888000, 331.6)
Data Point: (3974400, 329.6)
Data Point: (4060800, 327.5)
Data Point: (4147200, 325.3)
Data Point: (4233600, 323.3)

Vol. Water Content Functions

embankment clay

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.22

Transient Seepage w/o toe drain

Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
- Data Point: (0.01, 0.21999999)
- Data Point: (0.020691381, 0.21999998)
- Data Point: (0.042813324, 0.21999995)
- Data Point: (0.088586679, 0.21999988)
- Data Point: (0.18329807, 0.21999969)
- Data Point: (0.37926902, 0.21999914)
- Data Point: (0.78475997, 0.21999752)
- Data Point: (1.6237767, 0.21999264)
- Data Point: (3.3598183, 0.2199777)
- Data Point: (6.951928, 0.2199314)
- Data Point: (14.384499, 0.21978687)
- Data Point: (29.763514, 0.2193343)
- Data Point: (61.584821, 0.2179235)
- Data Point: (127.4275, 0.21362613)
- Data Point: (263.66509, 0.2014734)
- Data Point: (545.55948, 0.17327571)
- Data Point: (1128.8379, 0.12923352)
- Data Point: (2335.7215, 0.087755139)
- Data Point: (4832.9302, 0.060407646)
- Data Point: (10000, 0.044010658)

Estimation Properties
- Vol. WC Estimation Method: Sample functions
- Sample Material: Silty Clay
- Saturated Water Content: 0.22 ft^3/ft^3
- Liquid Limit: 0 %
- Diameter at 10% passing: 0
- Diameter at 60% passing: 0
- Maximum: 10000
- Minimum: 0.01
- Num. Points: 20

clay and silt

Model: Data Point Function

Function: Vol. Water Content vs. Pore-Water Pressure
- Curve Fit to Data: 100 %
- Segment Curvature: 100 %
- Mv: 4.79e-007 /psf

Porosity: 0.2601826

Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
- Data Point: (0.01, 0.25998123)
- Data Point: (0.020691381, 0.25998123)
- Data Point: (0.042813324, 0.25998123)
- Data Point: (0.088586679, 0.25998123)
- Data Point: (0.18329807, 0.25998123)
- Data Point: (0.37926902, 0.25998123)
- Data Point: (0.78475997, 0.25998123)
- Data Point: (1.6237767, 0.25998123)

Data Point: (3.3598183, 0.25998123)
Data Point: (6.951928, 0.25998123)
Data Point: (14.384499, 0.25998123)
Data Point: (29.763514, 0.25998123)
Data Point: (61.584821, 0.25998123)
Data Point: (127.4275, 0.25998123)
Data Point: (263.66509, 0.25998123)
Data Point: (545.55948, 0.25998123)
Data Point: (1151.9502, 0.2583442)
Data Point: (2335.7215, 0.24584199)
Data Point: (4832.9302, 0.21435066)
Data Point: (10000, 0.18619499)

Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Sample Material: Clay
Saturated Water Content: 0.26 ft^3/ft^3
Liquid Limit: 30 %
Diameter at 10% passing: 0.01
Diameter at 60% passing: 0.001
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Silty Mud

Model: Data Point Function
Function: Vol. Water Content vs. Pore-Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Mv: 4.79e-007 /psf
Porosity: 0.37999999
Data Points: Matric Suction (psf), Vol. Water Content (ft^3/ft^3)
Data Point: (0.01, 0.37999999)
Data Point: (0.020691381, 0.37999997)
Data Point: (0.042813324, 0.37999992)
Data Point: (0.088586679, 0.3799998)
Data Point: (0.18329807, 0.37999947)
Data Point: (0.37926902, 0.37999851)
Data Point: (0.78475997, 0.37999571)
Data Point: (1.6237767, 0.37998729)
Data Point: (3.3598183, 0.37996148)
Data Point: (6.951928, 0.37988152)
Data Point: (14.384499, 0.37963187)
Data Point: (29.763514, 0.37885015)
Data Point: (61.584821, 0.37641332)
Data Point: (127.4275, 0.36899059)
Data Point: (263.66509, 0.34799952)
Data Point: (545.55948, 0.2992944)
Data Point: (1128.8379, 0.22322153)

Transient Seepage w/o toe drain

Data Point: (2335.7215, 0.15157706)
Data Point: (4832.9302, 0.10434048)
Data Point: (10000, 0.07601841)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Sample Material: Silty Clay
Saturated Water Content: 0.38 ft^3/ft^3
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum: 10000
Minimum: 0.01
Num. Points: 20

Regions

	Material	Points	Area (ft^2)
Region 1	Embankment Clay	5,27,6,7,8,25,26,9,13,16,15,14	1333.2343
Region 2	Silty Mud	21,19,17,18,20,22	2610
Region 3	Silty Mud	23,21,22,24	4489.2
Region 4	Clay and Silt	1,17,18,12,11,10,9,13,16,15,14,5,28,29,30,4,3,2	3534.0409
Region 5	Clay and Silt	30,29,28,5	16.401447

Lines

	Start Point	End Point	Hydraulic Boundary
Line 1	6	7	
Line 2	7	8	
Line 3	13	9	
Line 4	5	14	
Line 5	14	15	
Line 6	15	16	
Line 7	16	13	
Line 8	17	18	
Line 9	21	19	
Line 10	19	17	
Line 11	18	20	
Line 12	20	22	
Line 13	22	21	
Line 14	23	21	
Line 15	22	24	
Line 16	24	23	
Line 17	8	25	New Boundary Condition
Line 18	25	26	New Boundary Condition
Line 19	26	9	New Boundary Condition
Line 20	5	27	Potential Seepage Face
Line 21	27	6	
Line 22	5	28	

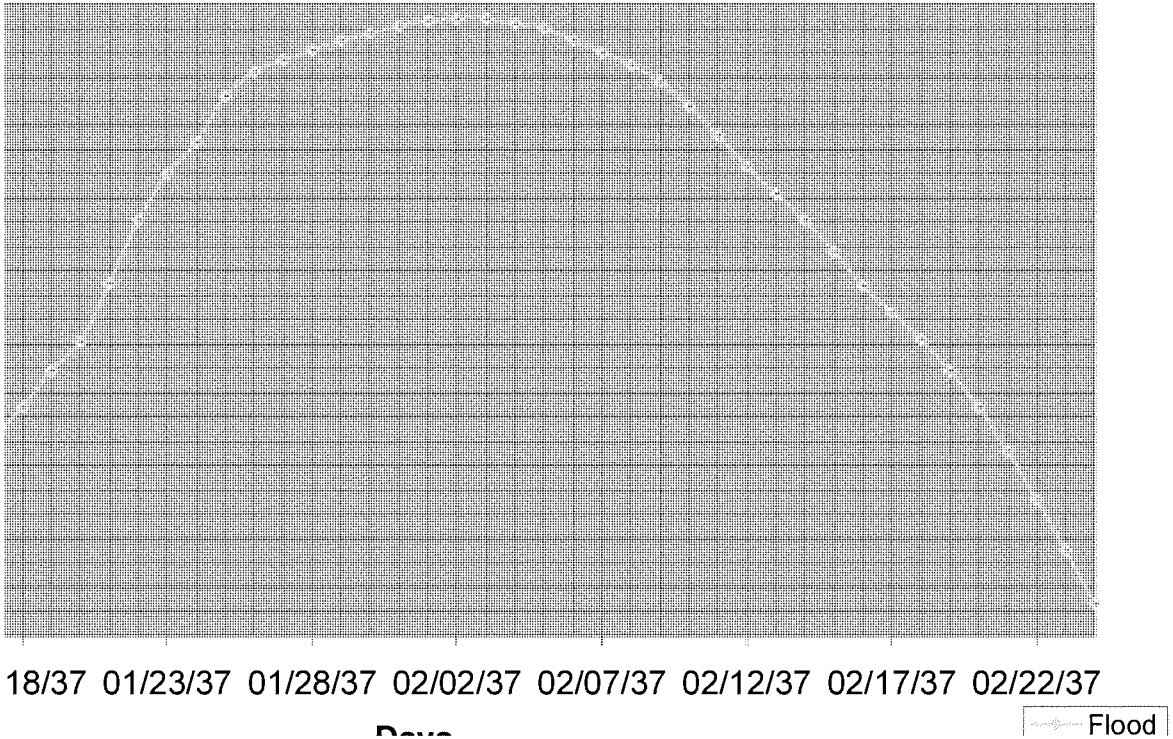
Transient Seepage w/o toe drain

Line 23	28	29	
Line 24	29	30	
Line 25	1	17	
Line 26	18	12	
Line 27	12	11	New Boundary Condition
Line 28	11	10	New Boundary Condition
Line 29	10	9	New Boundary Condition
Line 30	30	4	Potential Seepage Face
Line 31	4	3	Potential Seepage Face
Line 32	3	2	Potential Seepage Face
Line 33	2	1	Potential Seepage Face
Line 34	5	30	Potential Seepage Face

Points

	X (ft)	Y (ft)
Point 1	0	329.44
Point 2	2.6572	327.7818
Point 3	12.6443	327.7989
Point 4	14.7324	329.5039
Point 5	30.5158	330.8228
Point 6	93.2703	350.5922
Point 7	97.5013	350.874
Point 8	101.7313	350.6552
Point 9	162.9985	333.8041
Point 10	181.8955	332.5079
Point 11	214.0501	328.1119
Point 12	261.8367	327.54
Point 13	101.53514	332.42097
Point 14	93.47597	332.23961
Point 15	94.48622	326.23738
Point 16	100.52539	326.23738
Point 17	0	317.2
Point 18	261	317.2
Point 19	0	313.2
Point 20	261	313.2
Point 21	0	307.2
Point 22	261	307.2
Point 23	0	290
Point 24	261	290
Point 25	122.17126	345.03334
Point 26	129.49354	343.0194
Point 27	67	342.31633
Point 28	30.5	326
Point 29	27	326
Point 30	27	330.52901

hio River Design Flood at Paducah, KY.



US Army Corps of Engineers
Louisville District

Project:	Paducah LFPP Feasibility Study	Prepared By:	S. Alsip	Date:	03 Nov 2009
Subject:	Strip Footings for Pump Station 14	Checked By:	C. Neutz	Date:	23 Nov 2009
	Borings AD-1 and AD-2				
		Status:	Final		

Settlement of Cohesionless Soils - Schmertmann Method

Ref: Schmertmann, J. H. "Static Cone to Compute Static Settlement over Sand." *Journal of Soil Mechanics and Foundation Division*, ASCE, May 1970, Vol. 96, No. SM3, pp. 1011-1043.
Schmertmann, J. H., et al. "Improved Strain Influence Factor Diagrams." *Journal of the Geotechnical Engineering Division*, ASCE, Aug. 1978, Vol. 104, No. GT8, pp. 1131-1135.

Contact Pressure, p	2,000 psf	Contact Pressure, p	1.00 tsf	Zone of Influence	8.0 feet
Overburden Pressure, p_o	165 psf	Overburden Pressure, p_o	0.08 tsf	Depth of Peak Influence Factor, I_{zp}	2.0 feet
Width of Footing, B	2.0 feet	Net Pressure, $\Delta p = p - p_o$	0.92 tsf	Initial Effective Vertical Pressure at I_{zp}, σ'_{vp}	0.21 tsf
Length of Footing, L	40.0 feet	Footing Aspect Ratio, L/B	20.0	Peak Influence Factor, $I_{zp}=0.5+0.1\cdot(\Delta p/\sigma'_{vp})^{0.5}$	0.710
Embedment Depth, D	2.00 feet	Cut Depth, z_c	0.0 feet	Time Since Application of Load, t	1.0 years

Soil	q_c/N	Soil Type and Description
1	2.0	Silt, sandy silt, slightly cohesive silt-sand mixture
2	3.5	Clean fine to medium sand and slightly silty sand
3	5.0	Coarse sand and sand with little gravel
4	6.0	Sandy gravel and gravel

Depth Factor, $C_1 = 1 - 0.5\cdot(p_o/\Delta p) \geq 0.5$	0.96
Secondary Creep Factor, $C_2 = 1 + 0.2\cdot\log(t/0.1)$	1.20
Shape Factor, $C_3 = 1.03 - 0.03\cdot(L/B) \geq 0.73$	0.73

Layer No.	Remarks	Soil Type	z_{top} (feet)	z_{bot} (feet)	z_{mid} (feet)	Δz (feet)	γ' (pcf)	$(N_1)_{60}$ (bpf)	E_s (tsf)	I_z	$H\cdot(I_z/E_s)$	ρ (in)
1	GC	6	0.0	2.0	1.0	2.0	125	8	168.0	0.455	0.0054	0.05
2		6	2.0	4.0	3.0	2.0	125	23	483.0	0.592	0.0025	0.02
3		6	4.0	6.0	5.0	2.0	125	25	525.0	0.355	0.0014	0.01
4		6	6.0	8.0	7.0	2.0	125	25	525.0	0.118	0.0005	0.00
5		6	8.0	8.0	8.0	0.0	125	25	525.0	0.000	0.0000	0.00
6		6	8.0	8.0	8.0	0.0	125	25	525.0	0.000	0.0000	0.00
7		6	8.0	8.0	8.0	0.0	125	25	525.0	0.000	0.0000	0.00
8		6	8.0	8.0	8.0	0.0	125	25	525.0	0.000	0.0000	0.00
9		6	8.0	8.0	8.0	0.0	125	25	525.0	0.000	0.0000	0.00
10		6	8.0	8.0	8.0	0.0	125	25	525.0	0.000	0.0000	0.00

Total Settlement, $\rho = C_1\cdot C_2\cdot C_3\cdot\Delta p\cdot\Sigma[(I_z/E_s)\cdot\Delta z]$ 0.09 inches

Notes: Overburden pressure is due to footing embedment or cut, and σ'_{vp} is initial vertical stress from original ground surface.
Stratigraphy and layer numbers must start at the bottom of the footing, where $z_{top} = 0$.
A stratum break is required where I_{zp} occurs and at the bottom of the Zone of Influence; reference cells in a formula if necessary.
If all 10 layers are not required, enter the depth for Zone of Influence for z_{bot} for each of the remaining layers,

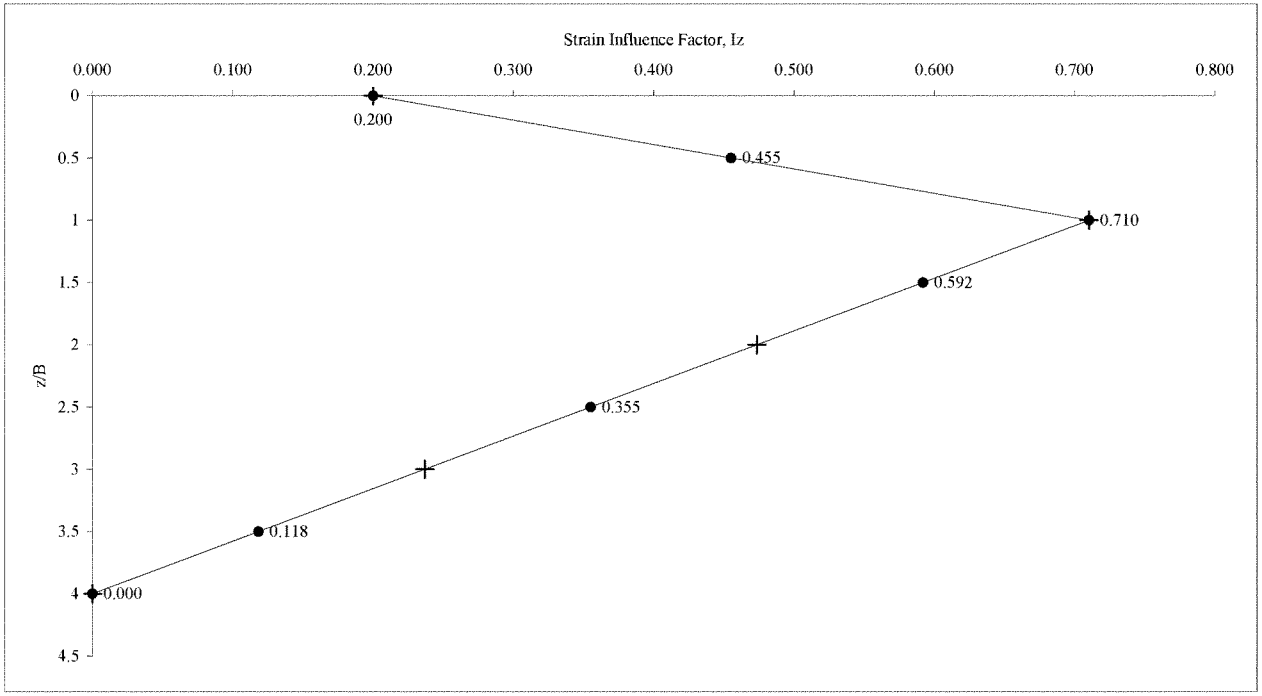
$z/B = 2$ and $I_z = 0.1$ (L/B = 1)
$z/B = 4$ and $I_z = 0.2$ (L/B ≥ 10)
$E_s = 2.5\cdot q_c$ (L/B = 1)
$E_s = 3.5\cdot q_c$ (L/B ≥ 10)

US Army Corps of Engineers
Louisville District

Project:	Paducah LFPP Feasibility Study	Prepared By:	S. Alsip	Date:	03 Nov 2009
Subject:	Strip Footings for Pump Station 14	Checked By:	C. Neutz	Date:	23 Nov 2009
	Borings AD-1 and AD-2	Status:	Final		

Settlement of Cohesionless Soils - Schmertmann Method

Ref: Schmertmann, J. H. "Static Cone to Compute Static Settlement over Sand." *Journal of Soil Mechanics and Foundation Division* , ASCE, May 1970, Vol. 96, No. SM3, pp. 1011-1043.
Schmertmann, J. H., et al. "Improved Strain Influence Factor Diagrams." *Journal of the Geotechnical Engineering Division* , ASCE, Aug. 1978, Vol. 104, No. GT8, pp. 1131-1135.



US Army Corps of Engineers
Louisville District

Project:	Paducah Feasibility Report	Prepared By:	S. Alsip	Date:	03 Nov 2009
Subject:	Bearing Capacity Check for Strip Footings	Checked By:	C. Neutz	Date:	23 Nov 2009
	Pump Station 14 at STA 111+67A				
	Using Borings AD-1 and AD-2	Status:	Final		

Bearing Capacity of Soil-Supported Shallow Foundations: Comparison of Bearing Capacity Models

Ref: EM 1110-1-1905, *Bearing Capacity of Soils*, 30 October 1992.

Foundation Dimensions

Foundation Width, B		2.0 feet
Foundation Length, L		40.0 feet
Reduction Factor, $r_\gamma = 1\text{-}0.25\cdot\log(B/6)$	(for $B \geq 6$)	1.00

Soil Parameters for Overburden

Embedment Depth, D	2.00 feet
Wet Unit Weight, $\gamma_{wet,D}$	110.0 pcf
Saturated Unit Weight, $\gamma_{sat,D}$	120.0 pcf
Slope of Ground away from Base, β (Downward = Positive)	0.0 deg

Layer-Weighted Soil Parameters within Effective Shear Depth of Interest

USCS Soil Classification	GC									
Layer Thickness, h (feet)	20.0									
Angle of Internal Friction, ϕ (deg)	31									
Cohesion Interept, c (psf)	0									
Wet Unit Weight, $\gamma_{wet,H}$ (pcf)	115.0									
Saturated Unit Weight, $\gamma_{sat,H}$ (pcf)	125.0									

Σh (Must Equal H)	20.0 feet
Angle of Internal Friction, ϕ	31 deg
Cohesion Interept, c	0 psf
Wet Unit Weight, $\gamma_{wet,H}$	115.0 pcf
Saturated Unit Weight, $\gamma_{sat,H}$	125.0 pcf

Effective Shear Depth of Interest

Effective Shear Depth of Interest, $H = 0.5\cdot B\cdot\tan(45 + \phi/2)$	1.8 feet
$K_{p\gamma} = (0.435\text{-}0.00716\cdot\phi)^{(-1/0.383)}$	56.43
$N_\phi = \tan^2(45 + \phi/2)$	3.12
$k = D/B$ for $D/B \leq 1$, else $k = \tan^{-1}(D/B)$	1.00

Effect of Water Table on Bearing Capacity

Depth to Water Table from Ground Surface, D_{GWT}		2.0 feet
$\gamma_{eff,D} = \gamma_{wet,D} - \gamma_w\cdot(D - D_{GWT})/D$	(for $0 < D_{GWT} \leq D$)	110.0 pcf
$\gamma_{eff,H} = \gamma'_H + \gamma_w\cdot(D - D_{GWT})/H$	(for $D < D_{GWT} \leq D + H$)	62.6 pcf

Bearing Capacity Summary

Factor of Safety, FS: 3.0

Method of Analysis	B. C. Factors			Shape Factors			Depth Factors			Ground Factors			Bearing Capacity (psf)			
	N_q	N_c	N_γ	s_c	s_q	s_γ	d_c	d_q	d_γ	s_c	s_q	s_γ	Gross q_{ult}	Gross q_a	Net q_{ult}	Net q_a
Terzaghi	25.28	40.41	22.77	1.00	NA	1.00	NA	NA	NA	NA	NA	NA	6,988	2,329	6,768	2,256
Meyerhof	20.63	32.67	18.56	1.03	1.02	1.02	1.35	1.18	1.18	NA	NA	NA	6,813	2,271	6,593	2,198
Hansen	20.63	32.67	17.69	1.03	1.03	0.98	1.40	1.28	1.00	1.00	1.00	1.00	7,082	2,361	6,862	2,287
Vesić	20.63	32.67	25.99	1.03	1.03	0.98	1.40	1.28	1.00	1.00	1.00	1.00	7,591	2,530	7,371	2,457

Recommended Maximum Net Allowable Bearing Pressure (based on settlement considerations): 2,000 psf

PADUCAH_KY TOE DRAIN STATIONING

Toe Drain Location

As-Builts are illegible in areas due to low quality copies
This color denotes station numbers estimated by scaling

Levee Section: A

Start	to	Stop
53+00		62+10
70+33		79+52
131+00		134+47.19=133+87.02
133+87.02		138+00
144+71		147+25
148+25		151+25
152+01		152+84.84=149+54.27
149+54.27		157+63
172+20		191+80

Levee Section: B

Start	to	Stop		
3+91		11+25		
11+25		16+82		
19+11		22+55		
22+25		23+23.16=22+94.62	Drawing Number 933-12.3/4	
22+94.62		23+50.1		
23+50.1		26+86.8	mh1 @	26+86.8
26+86.8		28+49	mh2 @	28+49
28+49		31+75		
31+75		35+00		
35+00		96+91.96=46+15.75		
54+47.31		55+05		
55+05		60+00	mh4 @	57+97.9
62+50		66+28		
66+28		72+12.12	mh5 @	69+86.0
74+00		77+45	mh6 @	74+40
77+45		77+64.94=77+21		
77+21		80+00		

Levee Section: C

Start	to	Stop
171+00		181+37.75=109+32.87
109+32.87		150+05
150+05		181+37.75=169+32.87
169+32.87		171+00
171+00		174+80.5
218+85		229+00
229+00		244+65

ELSEVIER

Engineering Geology 46 (1997) 369–383

ENGINEERING GEOLOGY

Seismic investigation of near-surface geological structure in the Paducah, Kentucky, area: application to earthquake hazard evaluation

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Abstract

Seismic methods were used to evaluate shallow geological conditions at 33 sites in the vicinity of Paducah, Kentucky. A combined set of P- and S-wave seismic refraction and reflection soundings were used, in addition to local borehole information, to produce structure maps of (1) a shallow (<30 m deep) horizon believed to represent an unconformity surface at the top of the Eocene, and (2) the Paleozoic bedrock surface (<85 to >160 m deep). Shear-wave velocity contrasts across the shallow unconformity were generally 2-to-1 while the contrast at the top of the Paleozoic bedrock exceeds 5-to-1. These seismic boundaries have been determined to be very important in modelling and interpreting earthquake ground motion amplification in the Paducah area. The quality and accuracy of the data, and the cost-effective nature of the methods, suggest that other communities in areas at risk to damage from seismic activity, with foundation conditions comparable to Paducah, might benefit from similar characterization in order (1) to identify seismically hazardous, near-surface, geological conditions, and (2) to develop geological models that could be used in computer simulations of site response.

Keywords: Seismic reflection; Seismic refraction; Shear wave; Earthquake hazards

1. Introduction

Damage as a result of earthquakes has been recognized to be greater in populated areas built on sedimentary basins. Recent studies have demonstrated that damage patterns at the surface are strongly influenced by the three-dimensional geometry of a basin and are most often a result of resonant amplification in unconsolidated basin sediments and/or amplification due to impedance contrasts at basin boundaries. For example, the shape of the lake bed that underlies part of Mexico City was instrumental in trapping and amplifying seismic waves from the 19 September 1985 Michoacán earthquake that killed more than 10 000 people (Sánchez-Sesma et al., 1988). Likewise, damage in the Marina district of San Francisco from the 18 October 1989 Loma Prieta earthquake was believed to be in part due to focusing of seismic energy caused by the shape of the basin underlying the area (Boatwright et al.,

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1991; Bonilla, 1991). More recently, studies of the Northridge earthquake (17 January 1994) have further stressed the importance of local geological structure in interpreting observed variations in site response (Gao et al., 1996; Hartzell et al., 1996; Spudich et al., 1996). In the previous investigations, as well as in studies based on computer simulations to predict ground motion patterns (Frankel and Vidale, 1992; Rial et al., 1992; Frankel, 1993; Graves, 1993), most authors have stressed the need for knowledge of the subsurface geological structure of the area and for accurate estimates of key geophysical parameters (e.g., seismic velocities and velocity contrasts). P-wave (compressional wave) seismic investigations targeting shallow geological deformation (Sexton and Jones, 1986; Treadway et al., 1988), depth to structure of the bedrock surface (Miller et al., 1989; Pullan and Hunter, 1990), and the geometry of near-surface sedimentary deposits (Jongerius and Helbig, 1988; Knapp, 1988) have successfully been performed in areas where geological conditions are favorable (e.g., shallow water table, fine-grained surface material) for the collection of high-quality data. Nevertheless, there are situations where S-wave (shear wave) methods (or the combined use of S- and P-wave methods) are more suitable for solving particular problems. Unconsolidated, water-saturated sediment sequences are ideal for the use of S-waves. In such environments, P-waves travel with the velocity of the fluid and are often insensitive to lithological changes. Because S-waves travel with the velocity of the sediment framework, they are not affected by the degree of saturation and therefore indicate the lithology more accurately than P-waves. For example, S-wave seismic techniques have been used successfully in bedrock mapping below the water table (Pullan et al., 1990; Hasbrouck, 1991; Goforth and Hayward, 1992), imaging geological structure within the saturated zone (Suyama et al., 1987; Zhang, 1990; Woolery et al., 1993), and determining engineering properties of sediments (Sirles and Viksne, 1990; Liu et al., 1994; Wang et al., 1994).

The purpose of this investigation was to examine near-surface geological conditions in the vicinity of Paducah, Kentucky, using standard shallow seismic methods which are known to be fast, accurate, and cost effective. Shallow seismic refraction and reflection methods were used to determine the geometry of near-surface impedance boundaries that have the potential to amplify earthquake waves from seismic activity in the nearby New Madrid Seismic Zone (NMSZ). Using results from P- and S-wave seismic soundings, integrated with local borehole data, we produced structure maps of the Paleozoic bedrock surface and a shallower unconformity that, in part of the study area, is believed to be associated with the base of a Pleistocene-age lake deposit. Ground motion modelling (Harris et al., 1994) and observations (Street et al., 1997, this volume) have emphasized the importance of these two surfaces for earthquake hazard analysis in the Paducah area.

2. Geological setting

Stauder et al. (1976) first recognized the three linear trends of seismicity that make up the NMSZ (Fig. 1). The southern segment trends northeast from near Marked Tree, Arkansas, to Ridgely, Tennessee; the central zone of seismicity extends northwest from Ridgely to New Madrid, Missouri; and the northern trend stretches northeast from New Madrid toward Charleston, Missouri, and, although the pattern of seismicity becomes more diffuse, possibly as far northeast as southern Illinois. The study area for our investigation is located in the vicinity of Paducah, Kentucky, near the northeastern extent of the NMSZ (Fig. 1).

The Paducah area is situated on a thick sequence of unconsolidated to poorly consolidated sands, clays, and gravels of Late Cretaceous to Holocene age that unconformably overlie Mississippian-age limestone bedrock at depths ranging from less than 85 m to more than 160 m below the ground surface (Pree et al., 1957). Following is a brief geological description of the Paducah area based on work by Pree et al. (1957), Finch (1966, 1967), and Olive (1966a,b):

The western and central parts of the study area are capped by a layer of Holocene alluvium or Pleistocene loess. The alluvium is found adjacent to the Ohio River or in tributary stream valleys,

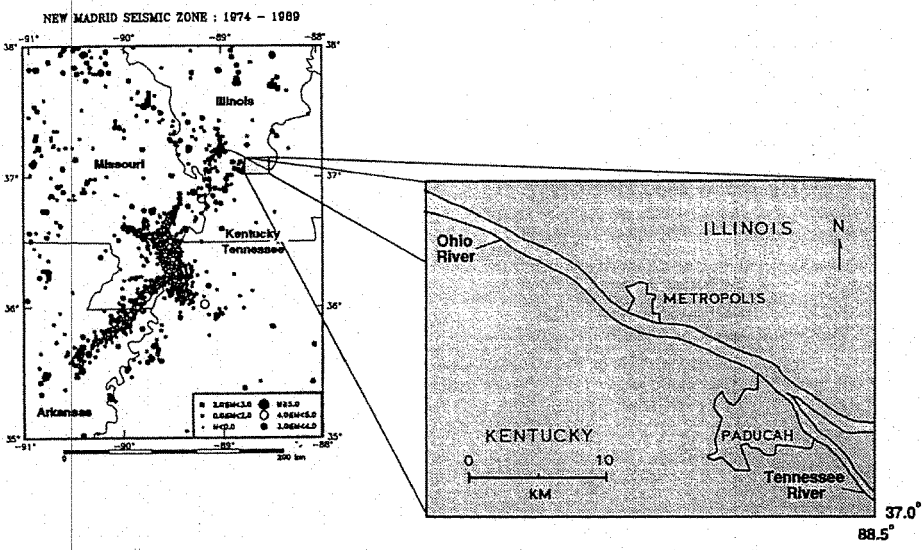


Fig. 1. Map of the study area and its relationship to contemporary seismicity in the New Madrid Seismic Zone (seismicity data from Center for Earthquake Research and Information, University of Memphis).

and the loess usually covers terraces adjacent to the river. An upland region, covered by Pliocene and Pleistocene silts, sands, clays, and gravels called "continental deposits", is present in the south-central part of the study area. The continental deposits occur in the subsurface to the west and, at their base, contain a regional gravel aquifer. The surficial deposits in the eastern part of the study area are composed of thick (up to 50 m) alluvial and lacustrine material. An erosional surface of Eocene age or later underlies the loess, continental deposits, alluvium, and lacustrine deposits. In the southern part of the study area, Eocene sands (Claiborne and Wilcox Formations) and a Paleocene clay (Porters Creek Clay) are the sub-erosional strata, while to the north the surface is cut on sands and clays of the McNairy Formation (Late Cretaceous). The McNairy Formation makes up the majority of the soil column and lies unconformably over the Paleozoic bedrock. A borehole log (Finch, 1967) from the western part of the study area has identified bedrock as the Warsaw Limestone (Mississippian).

3. Methods

Shallow seismic data were collected at 33 sites. The approach was a seismic sounding technique in which P- and SH-wave (horizontally polarized shear waves) seismic refraction and reflection data were used to investigate the shallow geological setting of the study area. The method chosen to collect the data was similar to a walkaway noise test (Sheriff and Geldart, 1982: section 5.3.4). Each site was sampled by a variety of source-receiver offsets to identify first-arrivals from near-surface sediments, and bedrock reflections from within the "optimum window" (Hunter et al., 1984; Pullan and Hunter, 1990). The main advantage of this setup was its adaptability to a variety of unforeseen site conditions, particularly those that occur in a

congested, urban setting (in which most of this study was conducted).

3.1. Field procedure

To collect the P-wave data at each site, an inline spread of 12 40-Hz vertical geophones, on 8-cm spikes, were deployed at 3-m spacings, and the energy source (a 5-kg sledgehammer vertically impacted on an aluminum plate) was activated at offsets of 6, 30, 60 and, when possible, 91 m. The SH-wave data were recorded using a 12-element inline spread of 4.5-Hz horizontal geophones (at 3-m spacings) that were coupled to the ground with 8-cm spikes. The shear-wave energy source was a section of railroad tie standing 18 cm high and measuring 23 × 79 cm at its base. The source was mounted on plywood and coupled to the ground using 25-cm spikes. For SH-wave generation, the source was oriented perpendicular to the spread and impacted horizontally with the sledgehammer [the choice of SH as the preferred shear-wave phase was based on our greater ability to identify these arrivals because pure SH energy reflects and refracts only as an SH-wave and, unlike P- and SV-waves (shear waves polarized in a vertical plane), does not experience mode conversion]. Source offsets of 6, 30, 61, 91 and, when possible, 122 and 152 m, were used. To ensure accurate identification of SH events, data from each offset were recorded for impacts on both sides of the source. Therefore, on the field record, a pure SH event appeared 180° out-of-phase with the same signal recorded from an impact on the opposite side of the energy source. An SH-wave field record from site J-3, located in the western part of the study area, is shown in Fig. 2.

The seismic data were recorded with an EG&G 2415F 24-channel signal enhancement seismograph and a DMT-911 tape recorder. An 8-bit digital word was recorded on tape in SEG-D format following analog-to-digital conversion of the fixed-gain data. The analog low-cut filters, with a slope of 12 db/octave, were generally set at 50 Hz for the P-wave data and at 10 Hz for the SH-wave data. Two thousand and forty-eight samples were recorded for each seismic trace, with sampling intervals of 1/8 ms (1/4-s record length) for the P-wave data and 1 ms (2-s record length) for the SH-wave data.

3.2. Seismic data reduction

For both the P- and SH-wave data, individual "offset panels" were displayed and combined to form composite sections that present the data over the entire range of source-receiver offsets used at each site. The SH-wave offset panels were made by subtracting the records created by an impact on one side of the SH-wave source from the comparable records created by an impact on the opposite side of the source. Through this process, SH-wave signals interfered constructively (stacked), while unwanted P-wave energy was canceled. A suite of SH-wave offset panels from site J-3 is shown in Fig. 3 and the corresponding composite section on which several seismic events have been identified is presented in Fig. 4.

First-arrival data from the offset panels and composite sections were utilized to calculate velocities and layer thicknesses for the near-surface material using the intercept time method (Lankston, 1990), whose details are presented in many introductory textbooks (e.g., Dobrin and Savit, 1988: section 11-2). When they could be confidently identified, reflected arrivals from the bedrock were picked from the composite sections, measured, and plotted on X^2 (offset^2) vs. T^2 (time^2) plots, as is customary for most manual velocity-depth analyses of seismic reflection data. Stacking velocities and intercept times were determined from the plots and used to calculate depths to bedrock (i.e., Dobrin and Savit, 1988: section 7-6).

4. Seismic data quality

Figs. 5 and 6 display, respectively, examples of SH- and P-wave composite seismic sections showing variations in data quality that were encountered in the study. Variability in the quality of the P-wave data was appreciably greater than for the SH-wave data, probably due to the effects that differences in the degree of water saturation in the very near surface have on transmission of P-wave

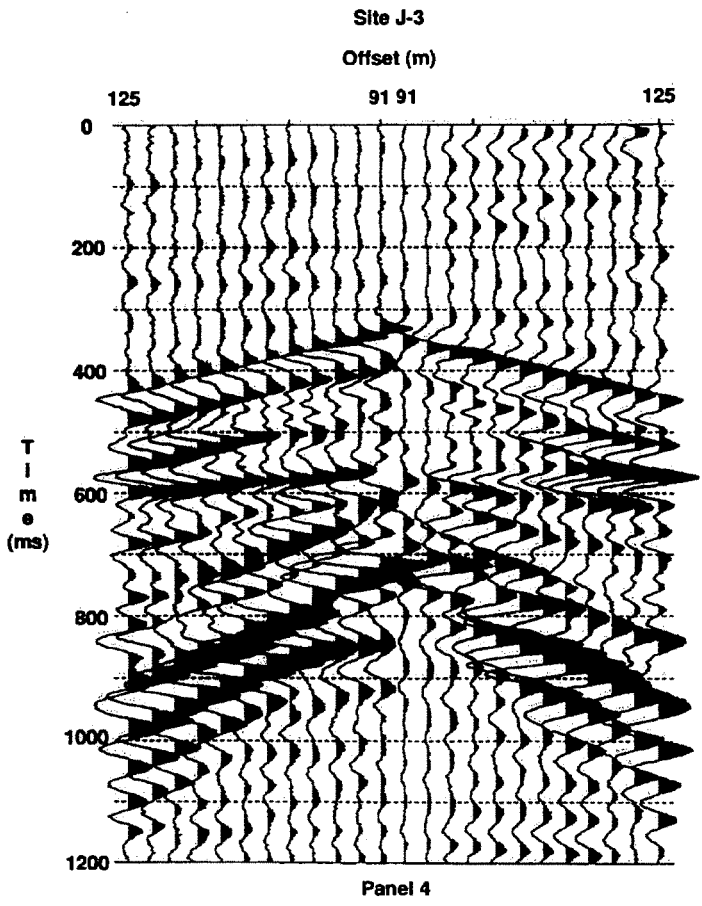


Fig. 2. SH-wave field record showing the phase reversal produced by impacts on opposite sides of the energy source.

seismic energy. The SH-wave first-arrival data were consistent and, in spite of occasional noise, were almost always interpretable. The P-wave data were very good at sites with a shallow water table. However, at sites with thick unsaturated zones, rapid attenuation hindered the recognition of first breaks.

Although it was only identified at approximately half of the sites, the bedrock reflection was frequently a very strong arrival on both the SH- and P-wave data. An explanation for the inconsistent recognition of the bedrock reflection is that, throughout much of the study area, a rubble zone (locally called the Little Bear soil), primarily composed of weathered bedrock, is encountered at the base of the sediment column. The zone is variable

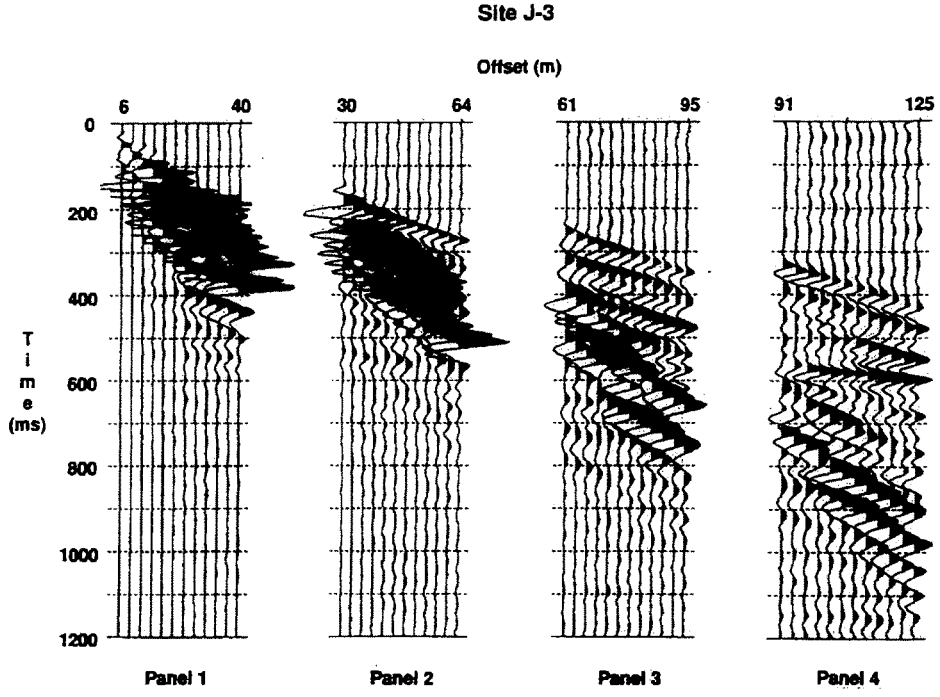


Fig. 3. SH-wave offset panels.

in thickness, but can be as thick as 20 m (A. Burgess (Burgess Drilling), pers. commun., 1992) in the Paducah area. Scattering and attenuation of seismic energy due to the irregularity of the rubble zone could likely lead to incoherent, indistinguishable bedrock reflections at some sites.

Reflections from within the sediment column were rare and difficult to identify because shear-wave velocity variations in the Tertiary and Cretaceous sediments were not generally large enough to produce strong reflections. Shallower reflections on the SH-wave sections were almost impossible to identify because of interference with "ringing" (multiple) refractions and high-amplitude surface (Love) waves. The uniform nature of the P-wave velocity in water-saturated, near-surface sediments did not generally provide adequate impedance boundaries to generate strong reflections from within the sediment column.

5. Results

Interpretations of the direct and refracted arrivals on the SH-wave sections, following comparison with local borehole data (Pree et al., 1957; Finch, 1966, 1967; Olive, 1966a,b), correlate moderately well with the shallow geology of the area. At most of the sites, the P-wave first arrivals were characterized by a direct wave travelling, with velocities ranging from 350 to 610 m s^{-1}, in the unsaturated surface material and a sharp refraction (typical velocities were in the 1500–1650 m s^{-1} range) from the top of a shallow (<5 m deep) water table,

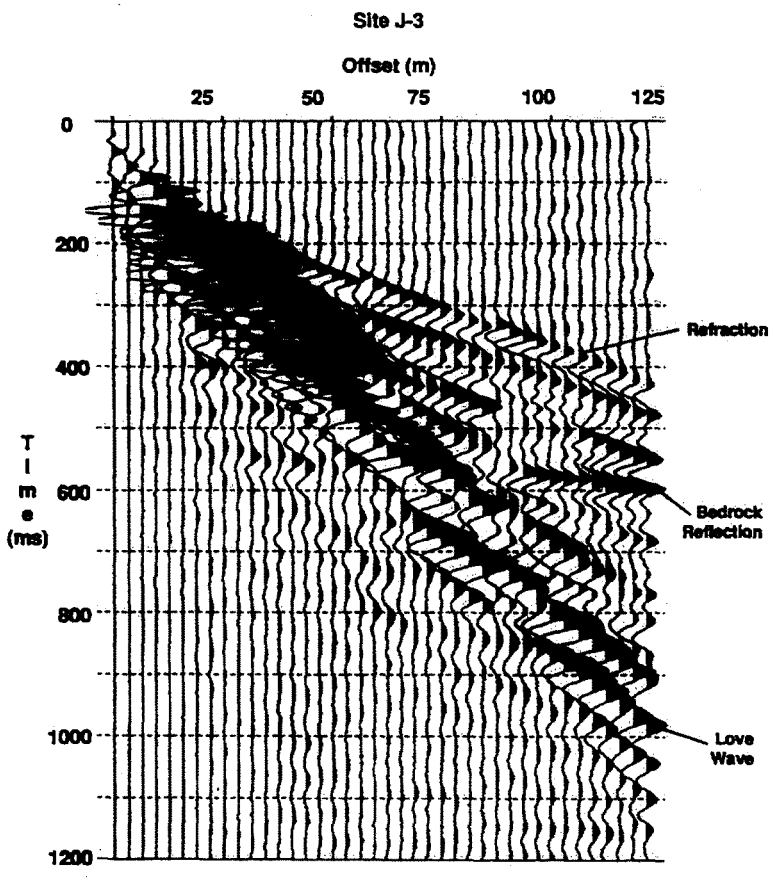


Fig. 4. Composite SH-wave seismic section with various events identified.

except in the western part of the study area, where a thick (10–25 m) unsaturated zone severely attenuated first-arrival information (e.g., sites J-4 and H-7 in Fig. 6). As was typical for most sites where SH-wave reflection data were collected, reflections from the bedrock are identifiable at the longer offsets on the SH-wave sections (Fig. 5). Characteristic of the P-wave reflection data gathered throughout most of the study area, bedrock reflections can be seen in the vicinity of 150 ms for the sites in the central and eastern part of the study area (Fig. 6). However, as was the case with the P-wave refraction data, little P-wave reflection information was identified for sites in the western part of the study area.

Fig. 7 shows a direct comparison between SH- and P-wave data collected in the central (site PW-11) and western (site H-3) parts of the study area. The SH-wave sections (Figs. 7(a) and (c)) show similar direct arrivals, refracted arrivals from

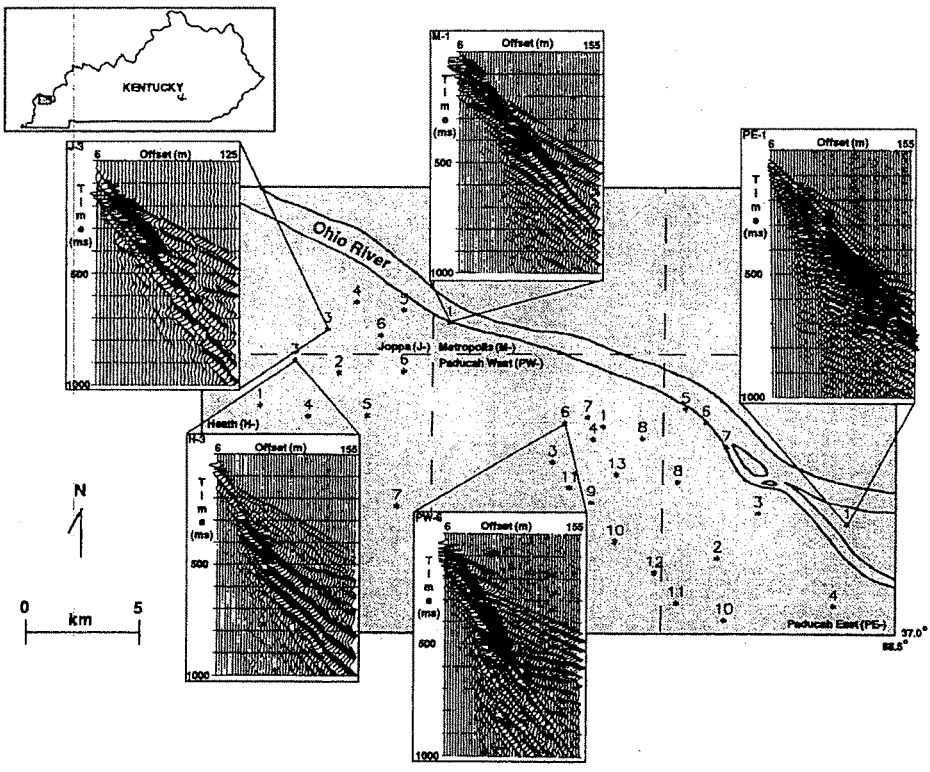


Fig. 5. Map showing the distribution of investigated sites in the study area, the site numbers, and geological quadrangle names. An example SH-wave composite section from each of the five quadrangles investigated in the study shows the consistent quality of the shear-wave data.

a shallow horizon, and reflections from the top of bedrock (≈650 ms at site PW-11 and ≈550 ms at site H-3). The P-wave data (Figs. 7(b) and (d)), however, are quite different from each other. The section from site PW-11 shows a strong refraction from the top of a shallow water table (calculated to be ≈2 m deep) and an easily identifiable bedrock reflection (≈160 ms), while the section at site H-3 exhibits little, if any, useable information. From a boring log at site H-3 (Staub et al., 1991), water was first encountered at a depth of 15 m and the near-surface, unsaturated material consisted of a heterogeneous deposit of silt, clay, and pebbly sand. These shallow conditions (thick, attenuative unsaturated zone) were prevalent throughout the western portion of the study area and, as noted above, impeded the collection of high-quality P-wave data in that area.

5.1. Shallow structure

Because the P-wave refraction data were highly influenced (both in quality and geological significance) by the degree of water saturation in the

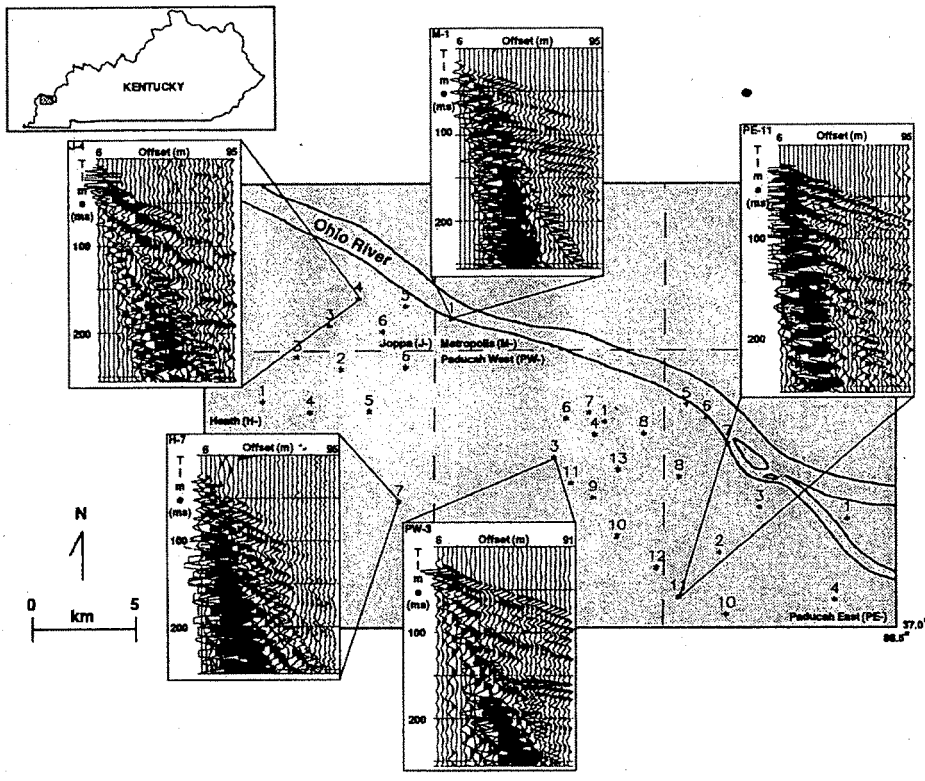


Fig. 6. Map of the Paducah area showing representative examples of P-wave data collected in the study.

near-surface material and showed no correlation with lithology, SH-wave refraction data were used exclusively to develop a shallow map (< 30 m deep) for the study area. The map (Fig. 8) shows the interpreted geological structure of the first major refractor picked from the SH-wave first-arrival data. Logs from water wells, oil and gas wells, and engineering boreholes (Pree et al., 1957; Finch, 1966, 1967; Olive, 1966a,b) were used as control points in an attempt to correlate the SH-wave data to stratigraphy. The main features that are evident on the map include a relatively uniform northeast-dipping surface in the western part of the study area, a prominent high in the south-central part of the study area, and an elongated depression, with a north–south-trending axis, in the eastern part of the study area. The sediments above the refracting surface generally had shear-wave velocities in the range of 175–260 m s^{-1}, while the strata below the surface had velocities that ranged from 350 to 610 m s^{-1}, with an average value of approximately 470 m s^{-1}. Correlation of the SH-wave refraction data with the borehole information indicated that, throughout most of the study area, the refractor is the unconformity at the top of the Eocene strata. However, in the western part of the

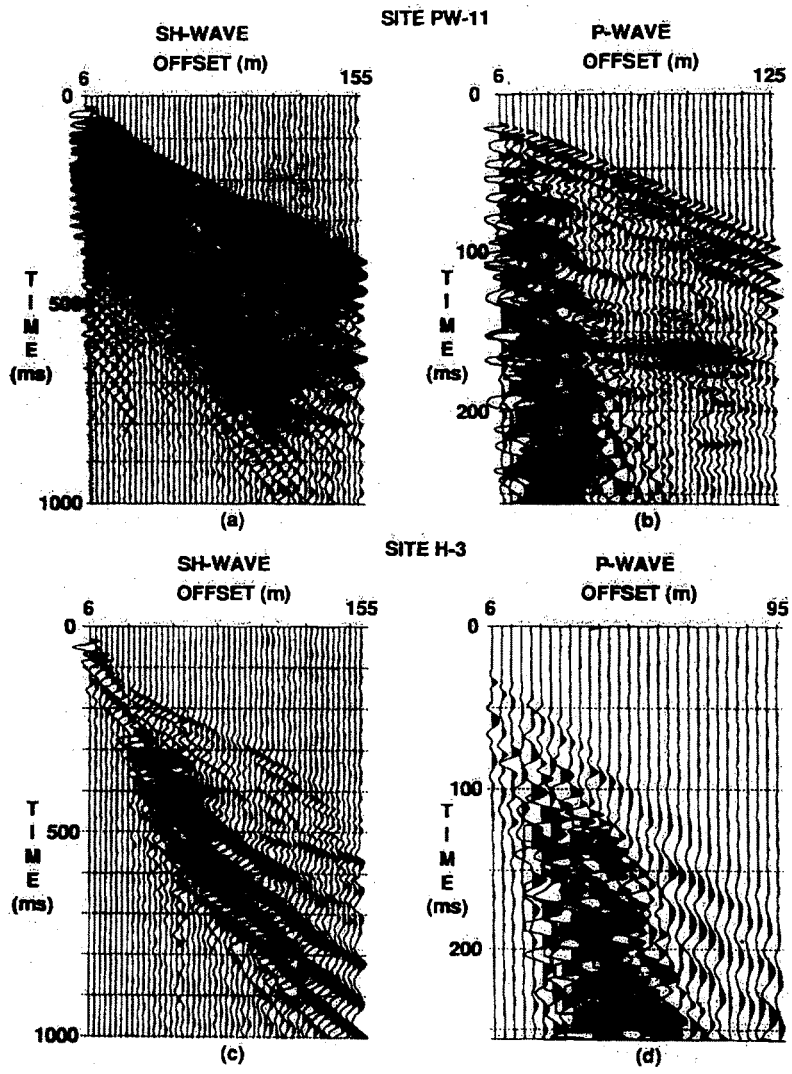


Fig. 7. Example seismic sections from the study area showing the effects that near-surface saturation conditions had on the quality of the SH- and P-wave data. Site locations are presented in Fig. 5. Notice the decrease in P-wave data quality (as opposed to the relative consistency in SH-wave data quality) between site PW-11 (water table ≈2 m deep) and site H-3 (water table ≈15 m deep).

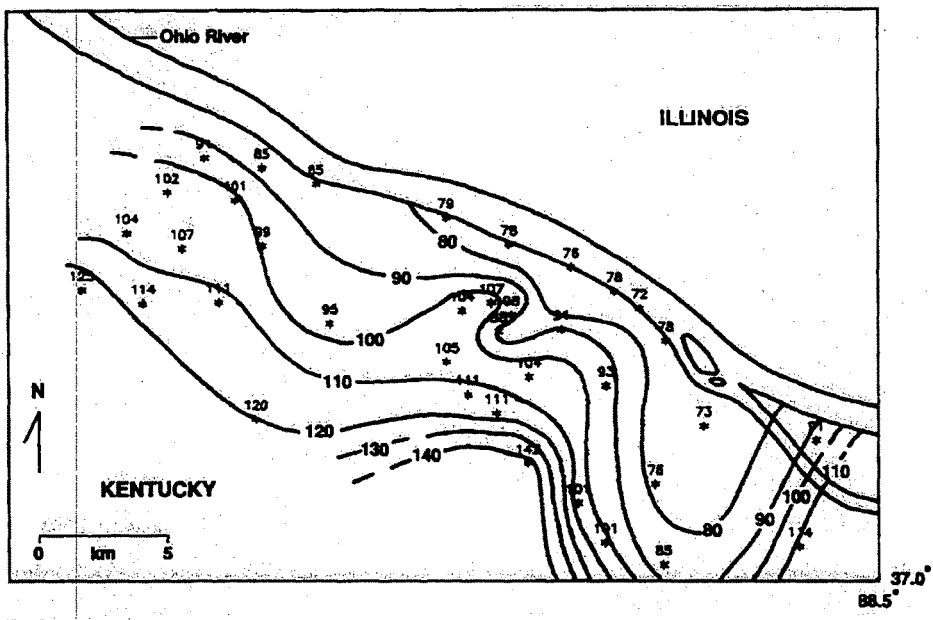


Fig. 8. Structure map of the shallow acoustic impedance boundary (interpreted to represent an unconformity surface of Eocene or later age) based on SH-wave refraction data. Elevations (m) are relative to sea level, and the contour interval is 10 m.

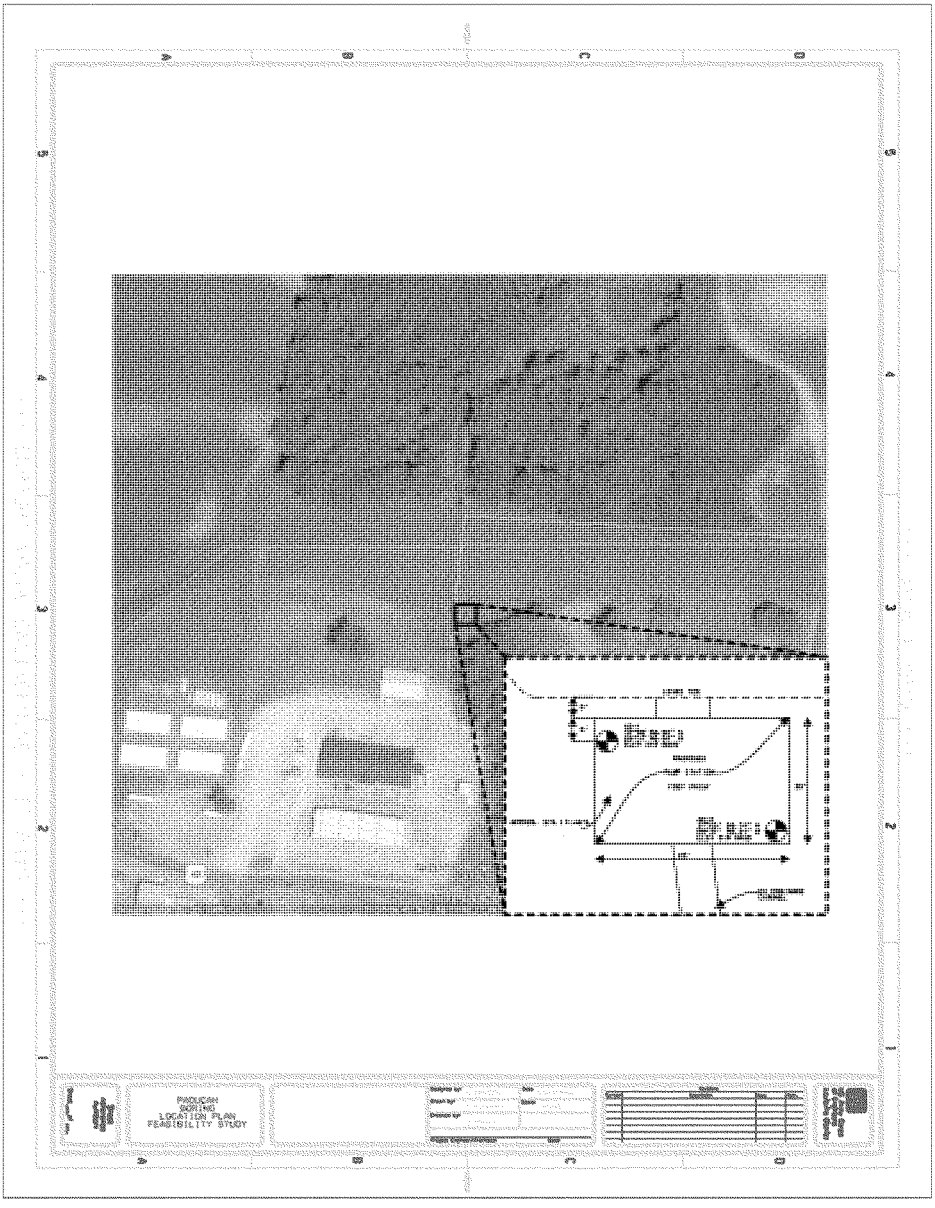
study area, the refractor may not be completely associated with a geological horizon (e.g., the unconformity), but could be a compaction boundary related to age, depth of burial, and lithology.

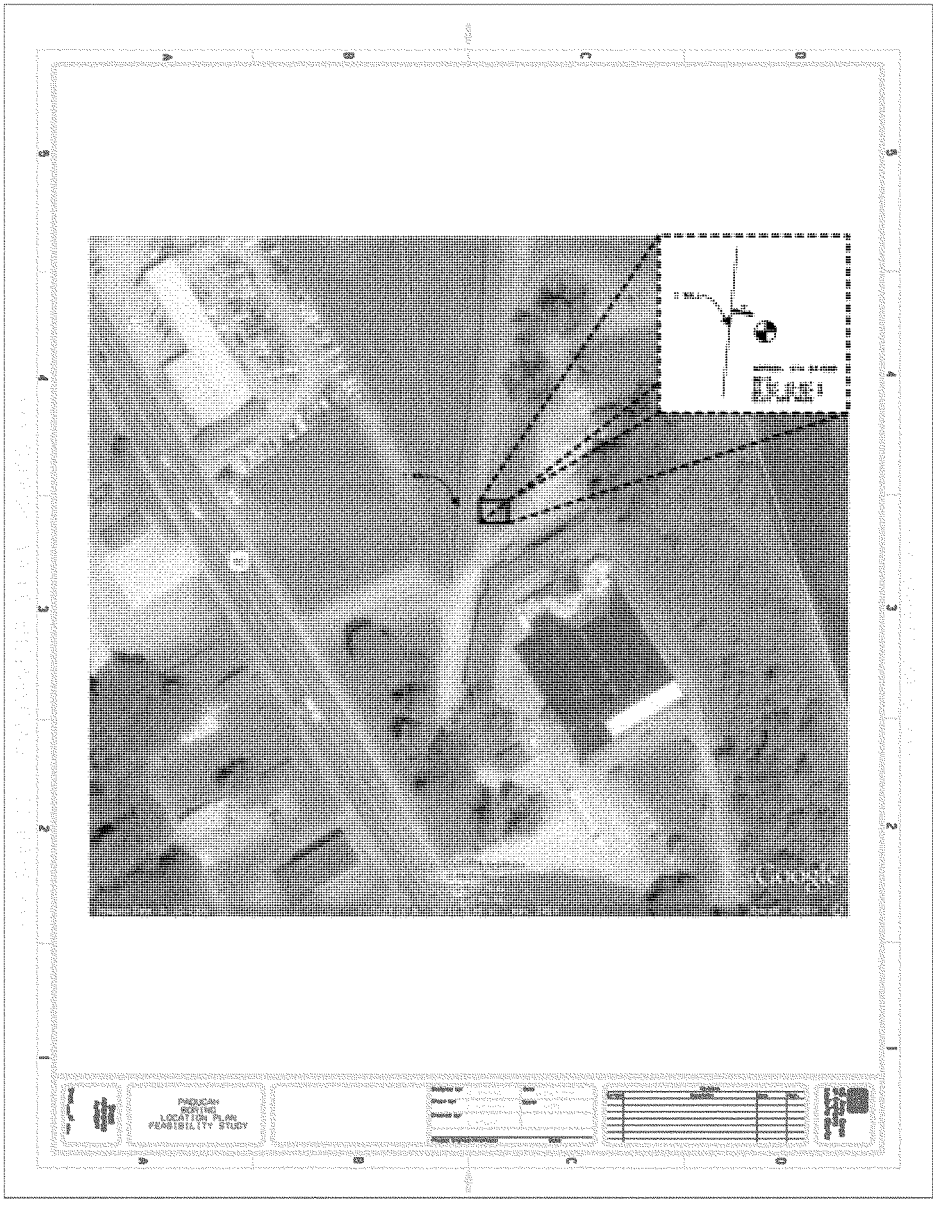
5.2. *Bedrock structure*

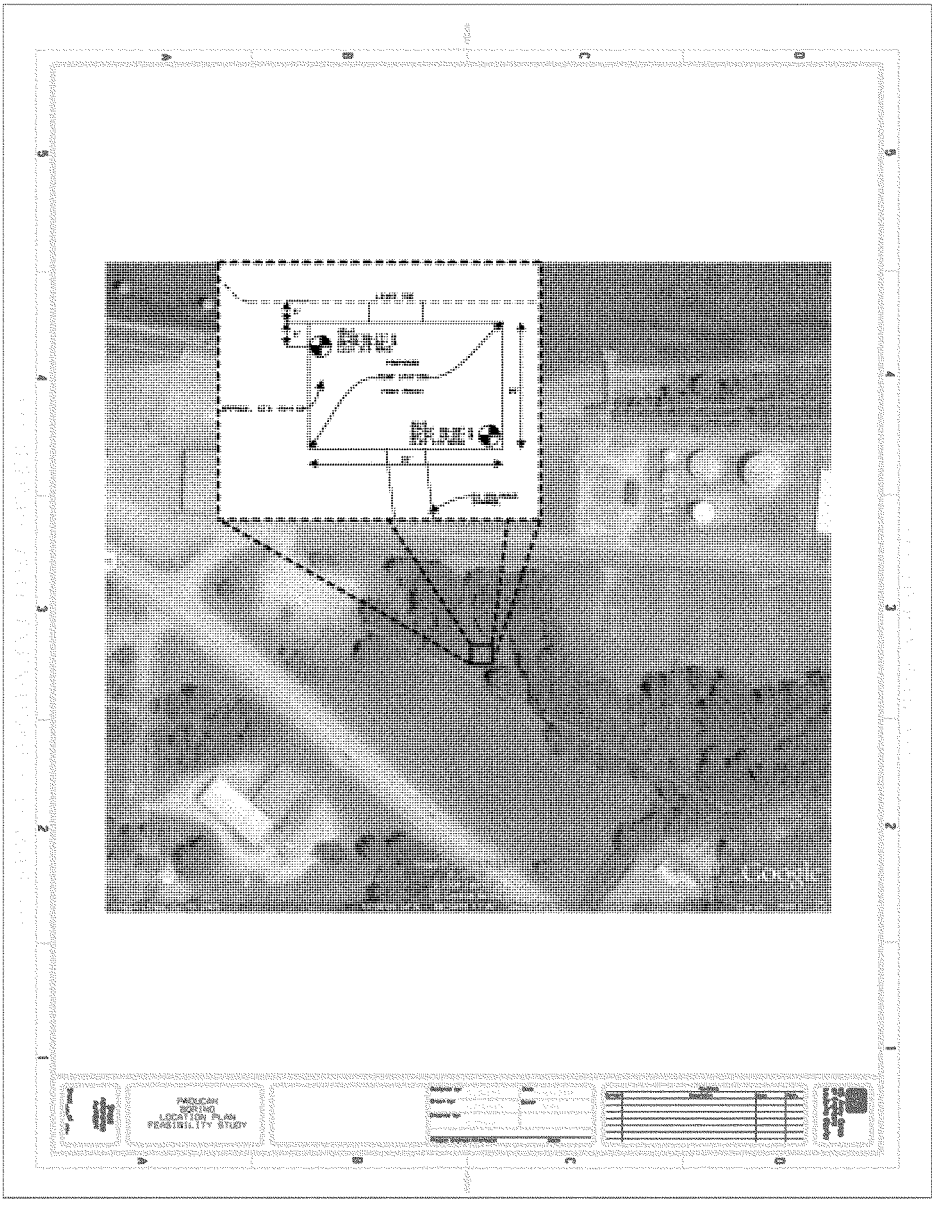
Bedrock depths were calculated from reflection events at 19 sites in the study area (seven sites using SH-wave data, eight sites using P-wave data, and four sites using a combination of both SH- and P-wave data). Twenty additional depths were available from borings that penetrated the bedrock (Finch, 1966, 1967; Olive, 1966a,b; Staub et al., 1991). Fig. 9 presents the bedrock structure map (top of Mississippian limestone) constructed for the study area. The general trend of the bedrock surface shows a gentle dip (<1°) to the southwest toward the axis of the Mississippi Embayment; however, there are several localized lobes that probably result from the erosional nature of the bedrock surface. The depth to the bedrock surface in the study area varied from less than 85 to more than 160 m, calculated P-wave stacking velocities ranged from 1340 to 1910 m s^{-1}, and calculated SH-wave stacking velocities ranged from 415 to 540 m s^{-1}.

6. Implications for seismic hazard

One of the primary mechanisms for damage in communities located on thick deposits of unconsolidated material is ground motion amplification due to resonance. Resonance is a frequency-dependent phenomenon that, at sites underlain by unconsolidated sediments with low material damping (stiffness), can greatly increase earthquake amplitudes


PADUCAH
BORING
LOCATION PLAN
FEASIBILITY STUDY


PADUCAH
MAYFIELD
LOCATION PLAN
FEASIBILITY STUDY



PADUCAH
SORTING
LOCATION PLAN
FEASIBILITY STUDY

BORING NO. AD-1 SHEET 1 OF 2

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1932251.31 E 800550.79	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon, 3" Tube
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 318
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 25.5	15. ELEVATION GROUND WATER 318 24 hr.
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/9/09 COMPLETED 6/9/09
8. TOTAL DEPTH OF HOLE 25.5	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ____ DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
318.0	Brown, gray & tan, lean CLAY.		CL	1	D	2 2 3	26.9	1.5				V 0
				2	D	1 2 5	19.6	1.5				1 2
				3	D	3 4 4	25.0	1.5				3 4 5
312.0	Beige, gray & tan, lean CLAY.		CL	4	U		23.1	2.0	60			6 7
310.0	Brown, clayey GRAVEL with sand.		GC	5	D	5 8 13	26.7	1.5			Poor recovery, rock in end of spoon.	8 9 10
306.0	Tan, well-graded GRAVEL with clay and sand (and/or silty clay and sand).		GW-GC	6	D	12 28 36	13.6	1.5				11 12 13 14 15 16 17
300.7	Tan, well-graded SAND with clay and gravel (and/or silty clay and gravel).		SW-SC			5						18 19

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE. SYMBOLS: V - WATER LEVEL AT COMPLETION

PROJECT Paducah LFPP Feasibility Study > - PARTIAL LOSS OF DRILL FLUID

HOLE NO. AD-1

BORING NO. AD-1 SHEET 2 OF 2

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1932251.31 E 800550.79	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon, 3" Tube
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 318
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 25.5	15. ELEVATION GROUND WATER 318 24 hr.
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/9/09 COMPLETED 6/9/09
8. TOTAL DEPTH OF HOLE 25.5	17. INSPECTOR
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ___ DEG. FROM VERT	

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
	Tan, well-graded SAND with clay and gravel (and/or silty clay and gravel). *(continued)*			7	D	16 32	17.0	1.5				21
												22
												23
												24
				8	D	5 27 26	20.0	1.5				25
	No Auger Refusal & Boring Terminated @ 25.5' (Elev. 292.5).											26
												27
												28
												29
												30
												31
												32
												33
												34
												35
												36
												37
												38
												39

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE. SYMBOLS: V - WATER LEVEL AT COMPLETION PROJECT Paducah LFPP Feasibility Study > - PARTIAL LOSS OF DRILL FLUID HOLE NO. AD-1

BORING N0. AD-2 SHEET 1 OF 2

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1932248.84 E 800631.77	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 318
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 25.5	15. ELEVATION GROUND WATER 318 24 hr.
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/9/09 COMPLETED 6/9/09
8. TOTAL DEPTH OF HOLE 25.5	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ___ DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	ROD (%)	REMARKS	DEPTH SCALE (FT)
318.0	Brown, lean CLAY with sand.		CL	1	D	2 3 3	31.1	1.5				V
				2	D	3 3 3	23.9	1.5				1 2 3
314.2	Brown & tan, clayey GRAVEL with sand.		GC									4
				3	D	1 3 5	18.3	1.5				5 6 7 8
				4	D	12 8 17	15.2	1.5				9 10 11 12 13
				5	D	30 29 22	14.6	1.5				14 15 16 17 18 19
						7						

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE. SYMBOLS: V - WATER LEVEL AT COMPLETION

PROJECT Paducah LFPP Feasibility Study > - PARTIAL LOSS OF DRILL FLUID

HOLE NO. AD-2

BORING NO. AD-2 SHEET 2 OF 2

1. PROJECT: Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL): MSL
2. LOCATION: N 1932248.84 E 800631.77	
3. DRILLING AGENCY: Florence & Hutcheson, Inc.	12. DRILL METHOD: 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER: D. Hertter	13. ELEVATION TOP OF HOLE: 318
5. DRILL TYPE: CME 45C	14. TOTAL NUMBER CORE BOXES: N/A
6. THICKNESS OF OVERBURDEN: 25.5	15. ELEVATION GROUND WATER: 318 24 hr.
7. DEPTH DRILLED INTO ROCK: N/A	16. DATE HOLE STARTED: 6/9/09 COMPLETED: 6/9/09
8. TOTAL DEPTH OF HOLE: 25.5	17. INSPECTOR
9. DIRECTION OF HOLE: VERTICAL ☐ INCLINED ☐ ___ DEG. FROM VERT	

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
	Brown & tan, clayey GRAVEL with sand. *(continued)*			6	D	15 16	15.1	1.5				21
												22
295.5	Gray & tan, silty SAND.		SM									23
												24
				7	D	2 7 14	32.2	1.5				25
	No Auger Refusal & Boring Terminated @ 25.5' (Elev. 292.5).											26
												27
												28
												29
												30
												31
												32
												33
												34
												35
												36
												37
												38
												39

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE. SYMBOLS: V - WATER LEVEL AT COMPLETION > - PARTIAL LOSS OF DRILL FLUID

PROJECT Paducah LFPP Feasibility Study

HOLE NO. AD-2

BORING NO. AD-3 SHEET 1 OF 3

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1924318.89 E 811901.93	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 339
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 51	15. ELEVATION GROUND WATER 334 24 hr.
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/9/09 COMPLETED 6/10/09
8. TOTAL DEPTH OF HOLE 51	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ____ DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	ROD (%)	REMARKS	DEPTH SCALE (FT)
339.0	Black topsoil, silt & sand.			1	D	2 2 2	18.4	1.5				1
337.5	Tan, brown, black & gray, gravelly lean CLAY with sand.		CL	2	D	1 2 1	23.9	1.5				2
				3	D	1 1 1	35.0	1.5				3 4
				4	D	0 1 1	27.8	1.5				V 5
333.0	Gray & tan, lean CLAY.		CL	5	D	0 1 1	31.0	1.5				6 7
				6	D	0 0 1	26.3	1.5				8 9
				7	D	3 3 6	26.4	1.5				10
328.5	Tan & brown, lean CLAY.		CL	8	D	1 1 2	38.1	1.5				11 12
				9	D	3 4 5	24.5	1.5				13
325.5	Tan, lean CLAY.		CL	10	D	3 6 8	27.5	1.5				14 15
				11	D	3 6 7	20.0	1.5				16
				12	D	4 6 7	22.7	1.5				17
				13	D	3 5 5	22.8	1.5				18 19
						4						

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE SYMBOLS: V - WATER LEVEL AT COMPLETION PROJECT Paducah LFPP Feasibility Study > - PARTIAL LOSS OF DRILL FLUID HOLE NO. AD-3

BORING NO. AD-3 SHEET 2 OF 3

1. PROJECT: Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL): MSL
2. LOCATION: N. 1924316.89 E. 811901.93	
3. DRILLING AGENCY: Florence & Hutcheson, Inc.	12. DRILL METHOD: 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER: D. Hertter	13. ELEVATION TOP OF HOLE: 339
5. DRILL TYPE: CME 45C	14. TOTAL NUMBER CORE BOXES: N/A
6. THICKNESS OF OVERBURDEN: 51	15. ELEVATION GROUND WATER: 334 24 hr.
7. DEPTH DRILLED INTO ROCK: N/A	16. DATE HOLE: STARTED 6/9/09 COMPLETED 6/10/09
8. TOTAL DEPTH OF HOLE: 51	
9. DIRECTION OF HOLE: VERTICAL ☐ INCLINED ☐ ____ DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
	Tan, lean CLAY. *(continued)*			14	D	4 4 7	24.9	1.5				21
				15	D	2 4 5	22.7	1.5				22
				16	D	1 5 8	21.7	1.5				23
				17	D	4 8 12	21.9	1.5				24 25
313.5	Tan, lean CLAY.		CL	18	D	3 6 9	23.7	1.5				26
				19	D	7 11 13	23.0	1.5				27 28
				20	D	6 9 10	21.7	1.5				29
				21	D	6 9 11	25.0	1.5				30 31
				22	D	4 6 7	27.7	1.5				32
				23	D	3 7 9	21.7	1.5				33 34
				24	D	3 8 13	28.3	1.5				35
				25	D	5 7 10	22.2	1.5				36 37
301.5	Brown, tan & gray, lean CLAY.		CL	26	D	4 7 10	22.2	1.5				38
				27	D	4 5	21.5	1.5				39

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE. SYMBOLS: V - WATER LEVEL AT COMPLETION > - PARTIAL LOSS OF DRILL FLUID PROJECT Paducah LFPP Feasibility Study HOLE NO. AD-3

BORING N0. AD-3 SHEET 3 OF 3

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1924318.89 E 811901.93	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 339
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 51	15. ELEVATION GROUND WATER 334 24 hr.
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/9/09 COMPLETED 6/10/09
8. TOTAL DEPTH OF HOLE 51	17. INSPECTOR
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ____ DEG. FROM VERT	

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	ROD (%)	REMARKS	DEPTH SCALE (FT)
	Brown, tan & gray, lean CLAY. *(continued)*											41
				28	D	5 8 9	22.8	1.5				42
				29	D	3 4 5	25.8	1.5				43
				30	D	3 5 5	22.4	1.5				44
294.0	Gray & tan, lean CLAY.		CL									45
				31	D	2 3 4	27.5	1.5				46
				32	D	0 3 4	30.6	1.5				47
				33	D	1 2 2	33.7	1.5				48
				34	D	1 3 4	30.2	1.5				49
	No Auger Refusal & Boring Terminated @ 51.0' (Elev. 288.0).											50
												51
												52
												53
												54
												55
												56
												57
												58
												59

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE. SYMBOLS: V - WATER LEVEL AT COMPLETION > - PARTIAL LOSS OF DRILL FLUID PROJECT Paducah LFPP Feasibility Study HOLE NO. AD-3

BORING NO. AD-3A SHEET 1 OF 1

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1924318.89 E 811901.93	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 3" Tube
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 339
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 17	15. ELEVATION GROUND WATER
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/10/09 COMPLETED 6/10/09
8. TOTAL DEPTH OF HOLE 17	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ___ DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
339.0	Gray, tan & brown, gravelly lean CLAY with sand.		CL									0
				1	U		24.8	2.0	80			5
328.4	Tan & gray, lean CLAY.		CL									10
				2	U		24.1	2.0	80			15
	No Auger Refusal & Boring Terminated @ 17.0' (Elev. 322.0).											17

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE. SYMBOLS: V - WATER LEVEL AT COMPLETION > - PARTIAL LOSS OF DRILL FLUID PROJECT Paducah LFPP Feasibility Study HOLE NO. AD-3A

BORING N0. AD-4 SHEET 1 OF 2

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1919929.48 E 809823.94	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon, 3" Tube
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 319
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 25.5	15. ELEVATION GROUND WATER 317 24 hr.
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/13/09 COMPLETED 6/13/09
8. TOTAL DEPTH OF HOLE 25.5	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ____ DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
319.0	Black topsoil, silt & sand.			1	D	1 1 1	29.9	1.5				1
317.5	Brown & tan, lean CLAY with sand.		CL	2	D	1 1 1	37.9	1.5				V 2 3
315.2	Tan, lean CLAY.		CL	3	D	2 3 6	24.1	1.5				4 5 6 7 8 9
				4	D	4 6 7	27.6	1.5				10
308.5	Light brown, lean CLAY.		CL	5	U		23.3	2.0	98			11 12
306.3	Gray, lean CLAY.		CL	6	D	4 4 6	20.2	1.5				13 14 15 16 17 18 19
						2						

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE SYMBOLS: V - WATER LEVEL AT COMPLETION PROJECT Paducah LFPP Feasibility Study > - PARTIAL LOSS OF DRILL FLUID HOLE NO. AD-4

BORING NO. AD-4 SHEET 2 OF 2

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1919929.48 E 809823.94	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon, 3" Tube
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 319
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 25.5	15. ELEVATION GROUND WATER 317 24 hr.
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/13/09 COMPLETED 6/13/09
8. TOTAL DEPTH OF HOLE 25.5	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ___ DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
	Gray, lean CLAY. *(continued)*			7	D	3 4	27.1	1.5				21
												22
296.5	Tan & gray, lean CLAY.		CL									23
												24
				8	D	3 4 5	29.7	1.5				25
	No Auger Refusal & Boring Terminated @ 25.5' (Elev. 293.5).											26
												27
												28
												29
												30
												31
												32
												33
												34
												35
												36
												37
												38
												39

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE. SYMBOLS: V - WATER LEVEL AT COMPLETION

PROJECT Paducah LFPP Feasibility Study > - PARTIAL LOSS OF DRILL FLUID

HOLE NO. AD-4

BORING N0. AD-5 SHEET 1 OF 2

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1919780.95 E 814765.5	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 319
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 25.5	15. ELEVATION GROUND WATER 316 24 hr.
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/13/09 COMPLETED 6/13/09
8. TOTAL DEPTH OF HOLE 25.5	17. INSPECTOR
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ____ DEG. FROM VERT	

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
319.0	Brown & tan, lean CLAY with sand.		CL	1	D	2 1 3	30.0	1.5				1
				2	D	1 2 2	30.6	1.5				2
												V 3
315.2	Gray, lean CLAY with sand.		CL									4
				3	D	2 2 3	28.6	1.5				5
												6
												7
311.5	Tan, lean CLAY.		CL									8
												9
				4	D	3 6 8	28.6	1.5				10
												11
307.0	Brown, lean CLAY.		CL									12
												13
				5	D	3 5 6	20.8	1.5				14
												15
												16
												17
301.7	Gray, lean CLAY.		CL									18
												19
						3						

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE. SYMBOLS: V - WATER LEVEL AT COMPLETION

PROJECT Paducah LFPP Feasibility Study > - PARTIAL LOSS OF DRILL FLUID

HOLE NO. AD-5

BORING NO. AD-5 SHEET 2 OF 2

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N. 1919780.95 E. 814765.5	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 319
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 25.5	15. ELEVATION GROUND WATER 316 24 hr.
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/13/09 COMPLETED 6/13/09
8. TOTAL DEPTH OF HOLE 25.5	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ____--- DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
	Gray, lean CLAY. *(continued)*			6	D	3	26.9	1.5				21
												22
												23
												24
				7	D	3 4 5	31.5	1.5				25
	No Auger Refusal & Boring Terminated @ 25.5' (Elev. 293.5).											26
												27
												28
												29
												30
												31
												32
												33
												34
												35
												36
												37
												38
												39

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE SYMBOLS: V - WATER LEVEL AT COMPLETION PROJECT Paducah LFPP Feasibility Study > - PARTIAL LOSS OF DRILL FLUID HOLE NO. AD-5

BORING NO. AD-6 SHEET 1 OF 3

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1919650.75 E 815734.59	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 336
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 51	15. ELEVATION GROUND WATER 317 Immediate
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/11/09 COMPLETED 6/11/09
8. TOTAL DEPTH OF HOLE 51	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ____ DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
336.0	Brown & gray, lean CLAY with sand.		CL	1	D	4 6 10	15.5	1.5				1
				2	D	6 6 10	21.5	1.5				2
				3	D	4 6 10	19.8	1.5				3
				4	D	3 4 8	20.5	1.5				5
330.0	Brown & gray, lean CLAY with sand.		CL	5	D	4 6 6	21.6	1.5				6 7
328.5	Brown & gray, lean CLAY.		CL	6	D	2 4 6	25.6	1.5				8
				7	D	1 2 4	23.3	1.5				9 10
				8	D	0 2 4	23.2	1.5				11
				9	D	2 3 5	24.5	1.5				12 13
322.5	Brown & gray lean CLAY.		CL	10	D	3 3 5	28.5	1.5				14
				11	D	1 2 3	28.1	1.5				15 16
				12	D	0 3 3	26.5	1.5				17
				13	D	1 3 3	27.0	1.5				18 V 19
316.5	Brown, lean CLAY.		CL			2						

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE. SYMBOLS: V - WATER LEVEL AT COMPLETION > - PARTIAL LOSS OF DRILL FLUID PROJECT Paducah LFPP Feasibility Study HOLE NO. AD-6

BORING NO. AD-6 SHEET 2 OF 3

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N. 1919650.75 E. 815734.59	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 336
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 51	15. ELEVATION GROUND WATER 317 Immediate
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/11/09 COMPLETED 6/11/09
8. TOTAL DEPTH OF HOLE 51	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ___--- DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
	Brown, lean CLAY. *(continued)*			14	D	2 2 3	28.5	1.5				21
				15	D	0 0 1	31.0	1.5				22
				16	D	2 2 3	29.6	1.5				23
				17	D	0 2 3	27.6	1.5				24
				18	D	0 2 3	31.0	1.5				25
				19	D	2 2 3	28.4	1.5				26
				20	D	1 2 3	32.4	1.5				27
306.0	Gray, lean CLAY.		CL									28
				21	D	0 1 3	26.5	1.5				29
				22	D	3 5 6	24.9	1.5				30
				23	D	4 5 7	27.9	1.5				31
				24	D	3 5 6	24.5	1.5				32
				25	D	4 5 5	24.0	1.5				33
				26	D	2 3 3	39.4	1.5				34
				27	D	0 2	39.2	1.5				35
												36
												37
												38
												39

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE. SYMBOLS: ▽ - WATER LEVEL AT COMPLETION PROJECT Paducah LFPP Feasibility Study > - PARTIAL LOSS OF DRILL FLUID HOLE NO. AD-6

BORING N0. AD-6 SHEET 3 OF 3

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1919650.75 E 815734.59	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 1" Spoon
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 336
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 51	15. ELEVATION GROUND WATER 317 Immediate
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/11/09 COMPLETED 6/11/09
8. TOTAL DEPTH OF HOLE 51	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ____ DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
	Gray, lean CLAY. *(continued)*					2						
				28	D	0 1 2	32.9	1.5				41
294.0	Gray & brown, sandy, silty CLAY.		CL-ML									42
				29	D	0 0 2	37.1	1.5				43
				30	D	3 4 4	31.1	1.5				44
				31	D	0 2 2	31.6	1.5				45
				32	D	1 3 5	26.6	1.5				46
				33	D	6 9 11	22.2	1.5				47
				34	D	3 5 6	23.3	1.5				48
	No Auger Refusal & Boring Terminated @ 51.0' (Elev. 285.0).											49
												50
												51
												52
												53
												54
												55
												56
												57
												58
												59

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE. SYMBOLS: V - WATER LEVEL AT COMPLETION PROJECT Paducah LFPP Feasibility Study > - PARTIAL LOSS OF DRILL FLUID HOLE NO. AD-6

BORING NO. AD-6A SHEET 1 OF 2

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1919650.75 E 815734.59	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 3" Tube
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 336
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 23	15. ELEVATION GROUND WATER
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/12/09 COMPLETED 6/12/09
8. TOTAL DEPTH OF HOLE 23	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ___ DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	RQD (%)	REMARKS	DEPTH SCALE (FT)
336.0	Tan, beige & brown, lean CLAY.		CL									0
												1
												2
												3
												4
												5
												6
												7
												8
				1	U		25.3	2.0				9
												10
												11
												12
												13
												14
												15
320.5	Tan, beige & brown, lean CLAY.		CL									16
												17
												18
												19

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE. SYMBOLS: V - WATER LEVEL AT COMPLETION > - PARTIAL LOSS OF DRILL FLUID

PROJECT Paducah LFPP Feasibility Study

HOLE NO. AD-6A

BORING N0. AD-6A SHEET 2 OF 2

1. PROJECT Paducah LFPP Feasibility Study	11. DATUM FOR ELEVATION SHOWN (TBM OR MSL) MSL
2. LOCATION N 1919650.75 E 815734.59	
3. DRILLING AGENCY Florence & Hutcheson, Inc.	12. DRILL METHOD 3 1/2" I.D. HSA, 3" Tube
4. NAME OF DRILLER D. Hertter	13. ELEVATION TOP OF HOLE 336
5. DRILL TYPE CME 45C	14. TOTAL NUMBER CORE BOXES N/A
6. THICKNESS OF OVERBURDEN 23	15. ELEVATION GROUND WATER
7. DEPTH DRILLED INTO ROCK N/A	16. DATE HOLE STARTED 6/12/09 COMPLETED 6/12/09
8. TOTAL DEPTH OF HOLE 23	
9. DIRECTION OF HOLE VERTICAL ☐ INCLINED ☐ ____ DEG. FROM VERT	17. INSPECTOR

ELEVATION	CLASSIFICATION OF MATERIALS	LEGEND	USCS CLASS	SAMPLE #	SAMPLE TYPE	BLOWS PER 6-INCH	MOISTURE (%)	PENETRATION	RECOVERY (%)	ROD (%)	REMARKS	DEPTH SCALE (FT)
	Tan, beige & brown, lean CLAY. *(continued)*											21
				2	U		27.6	1.5				22
313.5	Dark orange & beige, lean CLAY.		CL	2	U		27.4	0.5				23
	No Augur Refusal & Boring Terminated @ 23.0' (Elev. 313.0).											24
												25
												26
												27
												28
												29
												30
												31
												32
												33
												34
												35
												36
												37
												38
												39

LRL FORM 1202 JUNE 2000 PREVIOUS EDITIONS ARE OBSOLETE SYMBOLS: V - WATER LEVEL AT COMPLETION PROJECT Paducah LFPP Feasibility Study > - PARTIAL LOSS OF DRILL FLUID HOLE NO. AD-6A

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS

Moisture Data

(AASHTO T255-T265)

Project Name : Paducah LFPP Feasibility Drilling
Location : McCracken County, Kentucky
Job Number : 09124

Soil No.	Boring No.	Station & Offset	Sample No.	Depth		Description of Soil	pH	Natural Moisture Content (%)
1	AD-1		SS-1	0.0	1.5	Brown Lean Clay		26.9
1			SS-2	1.5	3.0	Gray & Tan Lean Clay		19.6
1			SS-3	4.5	6.0	Brown Lean Clay		25.0
2			ST-1	6.0	6.9	Beige, Gray & Tan Lean Clay		23.1
3			SS-4	9.0	10.5	Brown Clayey Gravel with Sand		26.7
4			SS-5	13.5	15.0	Tan Well-Graded Gravel with Clay and Sand (and(or Silty Clay and Sand)		13.6
5			SS-6	19.5	21.0	Tan Well-Graded Sand with Clay and Gravel (and/or Silty Clay and Gravel)		17.0
5			SS-7	24.0	25.5	Tan Well-Graded Sand with Clay and Gravel (and/or Silty Clay and Gravel)		20.0
6	AD-2		SS-1	0.0	1.5	Brown Lean Clay with Sand		31.1
6			SS-2	1.5	3.0	Brown Lean Clay with Sand		23.9
7			SS-3	4.5	6.0	Brown & Tan Clayey Gravel with Sand		18.3
7			SS-4	9.0	10.5	Tan Clayey Gravel with Sand		15.2
7			SS-5	13.5	15.0	Tan Clayey Gravel with Sand		14.6
7			SS-6	19.5	21.0	Tan Clayey Gravel with Sand		15.1
8			SS-7	24.0	25.5	Gray & Tan Silty Sand		32.2
	AD-3		SS-1	0.0	1.5	Black Topsoil, Silt & Sand		18.4
14			SS-2	1.5	3.0	Tan & Brown Gravelly Lean Clay with Sand		23.9
14			SS-3	3.0	4.5	Black Gravelly Lean Clay with Sand		35.0
14			SS-4	4.5	6.0	Tan & Gray Gravelly Lean Clay with Sand		27.6
9			SS-5	6.0	7.5	Gray Lean Clay		31.0
9			SS-6	7.5	9.0	Gray Lean Clay		26.3
9			SS-7	9.0	10.5	Tan Lean Clay		26.4
10			SS-8	10.5	12.0	Tan Lean Clay		38.1
10			SS-9	12.0	13.5	Brown Lean Clay		24.5
15			SS-10	13.5	15.0	Tan Lean Clay		27.5
15			SS-11	15.0	16.5	Tan Lean Clay		20.0
15			SS-12	16.5	18.0	Tan Lean Clay		22.7
15			SS-13	18.0	19.5	Tan Lean Clay		22.8
15			SS-14	19.5	21.0	Tan Lean Clay		24.9
15			SS-15	21.0	22.5	Tan Lean Clay		22.7
15			SS-16	22.5	24.0	Tan Lean Clay		21.7
15			SS-17	24.0	25.5	Tan Lean Clay		21.9
11			SS-18	25.5	27.0	Tan Lean Clay		23.7
11			SS-19	27.0	28.5	Tan Lean Clay		23.0
11			SS-20	28.5	30.0	Tan Lean Clay		21.7
11			SS-21	30.0	31.5	Tan Lean Clay		25.0
11			SS-22	31.5	33.0	Tan Lean Clay		27.7
11			SS-23	33.0	34.5	Tan Lean Clay		21.7
11			SS-24	34.5	36.0	Tan Lean Clay		28.3
11			SS-25	36.0	37.5	Tan Lean Clay		22.2
12			SS-26	37.5	39.0	Brown Lean Clay		22.2
12			SS-27	39.0	40.5	Brown Lean Clay		21.5
12			SS-28	40.5	42.0	Tan Lean Clay		22.8
12			SS-29	42.0	43.5	Tan & Gray Lean Clay		25.8
12			SS-30	43.5	45.0	Gray & Tan Lean Clay		22.4
13			SS-31	45.0	46.5	Gray Lean Clay		27.5
13			SS-32	46.5	48.0	Gray Lean Clay		30.6
13			SS-33	48.0	49.5	Gray & Tan Lean Clay		33.7
13			SS-34	49.5	51.0	Gray Lean Clay		30.2
14	AD-3A		ST-1	5.0	6.1	Gray, Tan & Brown Gravelly Lean Clay with Sand		24.8
15			ST-2	15.0	16.2	Tan & Gray Lean Clay		24.1
	AD-4		SS-1	0.0	1.5	Black Topsoil, Silt & Sand		29.9
16			SS-2	1.5	3.0	Brown & Tan Lean Clay with Sand		37.9
17			SS-3	4.5	6.0	Tan Lean Clay		24.1
17			SS-4	9.0	10.5	Tan Lean Clay		27.6

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Florence & Hutcheson, Inc.
CONSULTING ENGINEERS

Moisture Data

(AASHTO T255-T265)

Project Name : Paducah LFPP Feasibility Drilling
Location : McCracken County, Kentucky
Job Number : 09124

Soil No.	Boring No.	Station & Offset	Sample No.	Depth		Description of Soil	pH	Natural Moisture Content (%)
18			ST-1	10.5	11.9	Light Brown Lean Clay		23.3
19			SS-5	13.5	15.0	Gray Lean Clay		20.2
19			SS-6	19.5	21.0	Gray Lean Clay		27.1
20			SS-7	24.0	25.5	Tan & Gray Lean Clay		29.7
16	AD-5		SS-1	0.0	1.5	Brown Lean Clay with Sand		30.0
16			SS-2	1.5	3.0	Brown & Tan Lean Clay with Sand		30.6
21			SS-3	4.5	6.0	Gray Lean Clay with Sand		28.6
22			SS-4	9.0	10.5	Tan Lean Clay		28.6
23			SS-5	13.5	15.0	Brown Lean Clay		20.8
24			SS-6	19.5	21.0	Gray Lean Clay		26.9
24			SS-7	24.0	25.5	Gray Lean Clay		31.5
16	AD-6		SS-1	0.0	1.5	Brown Lean Clay with Sand		15.5
16			SS-2	1.5	3.0	Brown Lean Clay with Sand		21.5
16			SS-3	3.0	4.5	Brown Lean Clay with Sand		19.8
16			SS-4	4.5	6.0	Brown & Gray Lean Clay with Sand		20.5
21			SS-5	6.0	7.5	Brown & Gray Lean Clay with Sand		21.6
29			SS-6	7.5	9.0	Brown & Gray Lean Clay		25.6
29			SS-7	9.0	10.5	Brown Lean Clay		23.3
29			SS-8	10.5	12.0	Brown Lean Clay		23.2
29			SS-9	12.0	13.5	Brown & Gray Lean Clay		24.5
25			SS-10	13.5	15.0	Brown Lean Clay		28.5
25			SS-11	15.0	16.5	Brown & Gray Lean Clay		28.1
25			SS-12	16.5	18.0	Brown Lean Clay		26.5
25			SS-13	18.0	19.5	Brown Lean Clay		27.0
26			SS-14	19.5	21.0	Brown Lean Clay		26.5
26			SS-15	21.0	22.5	Brown Lean Clay		31.0
26			SS-16	22.5	24.0	Brown Lean Clay		29.6
26			SS-17	24.0	25.5	Brown Lean Clay		27.8
26			SS-18	25.5	27.0	Brown Lean Clay		31.0
26			SS-19	27.0	28.5	Brown Lean Clay		28.4
26			SS-20	28.5	30.0	Brown Lean Clay		32.4
27			SS-21	30.0	31.5	Gray Lean Clay		26.5
27			SS-22	31.5	33.0	Gray Lean Clay		24.9
27			SS-23	33.0	34.5	Gray Lean Clay		27.9
27			SS-24	34.5	36.0	Gray Lean Clay		24.5
27			SS-25	36.0	37.5	Gray Lean Clay		24.0
27			SS-26	37.5	39.0	Gray Lean Clay		39.4
27			SS-27	39.0	40.5	Gray Lean Clay		39.2
27			SS-28	40.5	42.0	Gray Lean Clay		32.9
28			SS-29	42.0	43.5	Gray Sandy Silty Clay		37.1
28			SS-30	43.5	45.0	Gray Sandy Silty Clay		31.1
28			SS-31	45.0	46.5	Gray Sandy Silty Clay		31.6
28			SS-32	46.5	48.0	Gray & Brown Sandy Silty Clay		26.6
28			SS-33	48.0	49.5	Gray & Brown Sandy Silty Clay		22.2
28			SS-34	49.5	51.0	Gray & Brown Sandy Silty Clay		23.3
29	AD-6A		ST-1	8.0	10.0	Tan, Beige & Brown Lean Clay		25.3
30			ST-2	21.0	22.5	Tan, Beige & Brown Lean Clay		27.6
31			ST-2	22.5	23.0	Dark Orange & Beige Lean Clay		27.4

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Florence & Hutcheson, Inc.
CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 2
Project County	: McCracken	Sample Loc.	: Boring No. AD - 1
Project State	: Kentucky	Sample Depth	: 1.5' to 3.0'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Gray & Tan Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	100.0
3/4	in.	19	mm	94.6
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	94.6
1/4		6.3	mm	
No.4		4.75	mm	94.6
No.6		3.35	mm	
No.10		2	mm	93.2

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	91.9
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	87.1
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0263	mm	83.8
Hyd. Rd.	# 2	0.0173	mm	76.1
Hyd. Rd.	# 3	0.0105	mm	65.0
Hyd. Rd.	# 4	0.0076	mm	59.3
Hyd. Rd.	# 5	0.0055	mm	52.8
Hyd. Rd.	# 6	0.0028	mm	44.2
Hyd. Rd.	# 7	0.0012	mm	36.2

D_{50} = 0.0044 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) (AASHTO T265) : 19.6
Liquid Limit (AASHTO T89) : 39
Plastic Limit (AASHTO T90) : 19
Plasticity Index : 20
Liquidity Index : 0.05
Activity : 0.49
Sp. Gr. (AASHTO T100) : 2.692
AASHTO Classification: M145 : A-6 (17)
ASTM Classification: D2487 : CL

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 6.8
Coarse Sand (-No.10 + No.40)	: 1.3
Fine Sand (-No.40 + No.200)	: 4.8
Silt (-No.200 + 0.002mm)	: 46.1
Clay (-0.002mm + 0.001mm)	: 7.5
Colloids (-0.001mm)	: 33.5

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 5.4
Fine Gravel (-3/4in. + No.4)	: 0.0
Coarse Sand (-No.4 + No.10)	: 1.4
Medium Sand (-No.10 + No.40)	: 1.3
Fine Sand (-No.40 + No.200)	: 4.8
Silt (-No.200 + 0.005mm)	: 35.6
Clay (-0.005mm + 0.001mm)	: 18.0
Colloids (-0.001mm)	: 33.5

Approved By : _____ Soil No. 1

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Florence & Hutcheson, Inc.
CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: ST - 1
Project County	: McCracken	Sample Loc.	: Boring No. AD - 1
Project State	: Kentucky	Sample Depth	: 6.0' to 6.9'
Laboratory No.	: 09124	Date Tested	: 07/15/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Beige, Gray & Tan Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	98.4

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	96.1
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	89.3
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0267	mm	81.2
Hyd. Rd.	# 2	0.0175	mm	73.3
Hyd. Rd.	# 3	0.0106	mm	63.6
Hyd. Rd.	# 4	0.0077	mm	54.8
Hyd. Rd.	# 5	0.0056	mm	48.8
Hyd. Rd.	# 6	0.0028	mm	39.3
Hyd. Rd.	# 7	0.0012	mm	34.3

D_{50} = 0.006 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 1.6
Coarse Sand (-No.10 + No.40) : 2.3
Fine Sand (-No.40 + No.200) : 6.8
Silt (-No.200 + 0.002mm) : 52.0
Clay (-0.002mm + 0.001mm) : 5.5
Colloids (-0.001mm) : 31.8

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 1.6
Medium Sand (-No.10 + No.40) : 2.3
Fine Sand (-No.40 + No.200) : 6.8
Silt (-No.200 + 0.005mm) : 42.1
Clay (-0.005mm + 0.001mm) : 15.4
Colloids (-0.001mm) : 31.8

Natural Moisture (%) (AASHTO T265) : 23.1
Liquid Limit (AASHTO T89) : 40
Plastic Limit (AASHTO T90) : 18
Plasticity Index : 22
Liquidity Index : 0.25
Activity : 0.59
Sp. Gr. (AASHTO T100) : 2.724
AASHTO Classification: M145 : A-6 (20)
ASTM Classification: D2487 : CL

Approved By : _____ Soil No. 2

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Florence & Hutcheson, Inc.
CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 4
Project County	: McCracken	Sample Loc.	: Boring No. AD - 1
Project State	: Kentucky	Sample Depth	: 9.0' to 10.5'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Brown Clayey Gravel with Sand		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	100.0
1 1/4	in.	31.5	mm	
1	in.	25	mm	77.5
3/4	in.	19	mm	77.5
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	71.7
1/4		6.3	mm	
No.4		4.75	mm	65.8
No.6		3.35	mm	
No.10		2	mm	57.7

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	51.9
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	40.6
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0338	mm	39.3
Hyd. Rd.	# 2	0.0215	mm	36.6
Hyd. Rd.	# 3	0.0126	mm	31.0
Hyd. Rd.	# 4	0.0089	mm	26.7
Hyd. Rd.	# 5	0.0064	mm	22.6
Hyd. Rd.	# 6	0.0031	mm	18.7
Hyd. Rd.	# 7	0.0013	mm	13.4

D_{50} = 0.3175 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) (AASHTO T265) : 26.7
Liquid Limit (AASHTO T89) : 35
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 15
Liquidity Index : 0.42
Activity : 0.94
Sp. Gr. (AASHTO T100) : 2.660
AASHTO Classification: M145 : A-6 (2)
ASTM Classification: D2487 : GC

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 42.3
Coarse Sand (-No.10 + No.40) : 5.8
Fine Sand (-No.40 + No.200) : 11.3
Silt (-No.200 + 0.002mm) : 24.7
Clay (-0.002mm + 0.001mm) : 4.0
Colloids (-0.001mm) : 11.9

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 22.5
Fine Gravel (-3/4in. + No.4) : 11.7
Coarse Sand (-No.4 + No.10) : 8.1
Medium Sand (-No.10 + No.40) : 5.8
Fine Sand (-No.40 + No.200) : 11.3
Silt (-No.200 + 0.005mm) : 19.3
Clay (-0.005mm + 0.001mm) : 9.3
Colloids (-0.001mm) : 11.9

Approved By : _____

Soil No. 3

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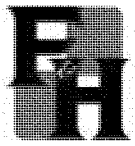

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CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 5
Project County	: McCracken	Sample Loc.	: Boring No. AD - 1
Project State	: Kentucky	Sample Depth	: 13.5' to 15.0'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan Well-Graded Gravel with Clay and Sand (and(or Silty Clay and Sand)		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	100.0
1 1/4	in.	31.5	mm	
1	in.	25	mm	95.2
3/4	in.	19	mm	84.9
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	69.1
1/4		6.3	mm	
No.4		4.75	mm	53.0
No.6		3.35	mm	
No.10		2	mm	39.3

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	22.7
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	10.7
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0315	mm	9.2
Hyd. Rd.	# 2	0.0201	mm	8.6
Hyd. Rd.	# 3	0.0118	mm	7.8
Hyd. Rd.	# 4	0.0084	mm	7.6
Hyd. Rd.	# 5	0.0060	mm	7.0
Hyd. Rd.	# 6	0.0030	mm	6.1
Hyd. Rd.	# 7	0.0013	mm	5.2

D_{50} = 3.9304 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 60.7
Coarse Sand (-No.10 + No.40) : 16.6
Fine Sand (-No.40 + No.200) : 12.0
Silt (-No.200 + 0.002mm) : 5.0
Clay (-0.002mm + 0.001mm) : 1.0
Colloids (-0.001mm) : 4.7

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 15.1
Fine Gravel (-3/4in. + No.4) : 31.9
Coarse Sand (-No.4 + No.10) : 13.7
Medium Sand (-No.10 + No.40) : 16.6
Fine Sand (-No.40 + No.200) : 12.0
Silt (-No.200 + 0.005mm) : 3.9
Clay (-0.005mm + 0.001mm) : 2.1
Colloids (-0.001mm) : 4.7

Natural Moisture (%) (AASHTO T265) : 13.6
Liquid Limit (AASHTO T89) : 26
Plastic Limit (AASHTO T90) : 15
Plasticity Index : 11
Liquidity Index : -0.12
Activity : 1.93
Sp. Gr. (AASHTO T100) : 2.680
AASHTO Classification: M145 : A-2-6 (0)
ASTM Classification: D2487 : GW-GC

Approved By : _____

Soil No. 4

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 6
Project County	: McCracken	Sample Loc.	: Boring No. AD - 1
Project State	: Kentucky	Sample Depth	: 19.5' to 21.0'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan Well-Graded Sand with Clay and Gravel (and/or Silty Clay and Gravel)		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	100.0
1 1/4	in.	31.5	mm	
1	in.	25	mm	95.5
3/4	in.	19	mm	91.1
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	72.6
1/4		6.3	mm	
No.4		4.75	mm	55.3
No.6		3.35	mm	
No.10		2	mm	38.3

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	15.4
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	7.3
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0345	mm	6.4
Hyd. Rd.	# 2	0.0219	mm	6.1
Hyd. Rd.	# 3	0.0127	mm	5.7
Hyd. Rd.	# 4	0.0090	mm	4.9
Hyd. Rd.	# 5	0.0064	mm	4.3
Hyd. Rd.	# 6	0.0031	mm	3.8
Hyd. Rd.	# 7	0.0013	mm	3.4

D_{50} = 3.6272 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) (AASHTO T265) : 17
Liquid Limit (AASHTO T89) : 30
Plastic Limit (AASHTO T90) : 16
Plasticity Index : 14
Liquidity Index : 0.08
Activity : 3.91
Sp. Gr. (AASHTO T100) : 2.701
AASHTO Classification: M145 : A-2-6 (1)
ASTM Classification: D2487 : SW-SC

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 61.7
Coarse Sand (-No.10 + No.40)	: 22.9
Fine Sand (-No.40 + No.200)	: 8.1
Silt (-No.200 + 0.002mm)	: 3.7
Clay (-0.002mm + 0.001mm)	: 0.6
Colloids (-0.001mm)	: 3.0

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 8.9
Fine Gravel (-3/4in. + No.4)	: 35.8
Coarse Sand (-No.4 + No.10)	: 17.0
Medium Sand (-No.10 + No.40)	: 22.9
Fine Sand (-No.40 + No.200)	: 8.1
Silt (-No.200 + 0.005mm)	: 3.2
Clay (-0.005mm + 0.001mm)	: 1.1
Colloids (-0.001mm)	: 3.0

Approved By : _____ Soil No. 5

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 2
Project County	: McCracken	Sample Loc.	: Boring No. AD - 2
Project State	: Kentucky	Sample Depth	: 1.5' to 3.0'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Brown Lean Clay with Sand		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
1/4		6.3	mm	
No.4		4.75	mm	98.8
No.6		3.35	mm	
No.10		2	mm	96.4

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	91.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	72.6
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0293	mm	64.0
Hyd. Rd.	# 2	0.0190	mm	58.1
Hyd. Rd.	# 3	0.0114	mm	48.4
Hyd. Rd.	# 4	0.0082	mm	43.6
Hyd. Rd.	# 5	0.0059	mm	39.8
Hyd. Rd.	# 6	0.0030	mm	30.2
Hyd. Rd.	# 7	0.0013	mm	20.0

D_{50} = 0.0124 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 3.6
Coarse Sand (-No.10 + No.40) : 4.6
Fine Sand (-No.40 + No.200) : 19.2
Silt (-No.200 + 0.002mm) : 47.2
Clay (-0.002mm + 0.001mm) : 7.3
Colloids (-0.001mm) : 18.1

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 1.2
Coarse Sand (-No.4 + No.10) : 2.4
Medium Sand (-No.10 + No.40) : 4.6
Fine Sand (-No.40 + No.200) : 19.2
Silt (-No.200 + 0.005mm) : 35.0
Clay (-0.005mm + 0.001mm) : 19.5
Colloids (-0.001mm) : 18.1

Natural Moisture (%) (AASHTO T265) : 23.9
Liquid Limit (AASHTO T89) : 31
Plastic Limit (AASHTO T90) : 17
Plasticity Index : I4
Liquidity Index : 0.48
Activity : 0.55
Sp. Gr. (AASHTO T100) : 2.677
AASHTO Classification: M145 : A-6 (8)
ASTM Classification: D2487 : CL

Approved By : _____ Soil No. 6

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 4
Project County	: McCracken	Sample Loc.	: Boring No. AD - 2
Project State	: Kentucky	Sample Depth	: 9.0' to 10.5'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan Clayey Gravel with Sand		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	100.0
3/4	in.	19	mm	93.1
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	73.3
1/4		6.3	mm	
No.4		4.75	mm	55.0
No.6		3.35	mm	
No.10		2	mm	40.2

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	29.1
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	13.2
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0330	mm	11.3
Hyd. Rd.	# 2	0.0210	mm	10.9
Hyd. Rd.	# 3	0.0122	mm	10.1
Hyd. Rd.	# 4	0.0086	mm	9.7
Hyd. Rd.	# 5	0.0061	mm	9.0
Hyd. Rd.	# 6	0.0030	mm	8.0
Hyd. Rd.	# 7	0.0013	mm	6.3

D_{50} = 3.5463 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) (AASHTO T265) : 15.2
Liquid Limit (AASHTO T89) : 27
Plastic Limit (AASHTO T90) : 14
Plasticity Index : 13
Liquidity Index : 0.06
Activity : 1.81
Sp. Gr. (AASHTO T100) : 2.720
AASHTO Classification: M145 : A-2-6 (1)
ASTM Classification: D2487 : GC

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 59.8
Coarse Sand (-No.10 + No.40)	: 11.1
Fine Sand (-No.40 + No.200)	: 15.9
Silt (-No.200 + 0.002mm)	: 6.0
Clay (-0.002mm + 0.001mm)	: 1.5
Colloids (-0.001mm)	: 5.7

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 6.9
Fine Gravel (-3/4in. + No.4)	: 38.1
Coarse Sand (-No.4 + No.10)	: 14.8
Medium Sand (-No.10 + No.40)	: 11.1
Fine Sand (-No.40 + No.200)	: 15.9
Silt (-No.200 + 0.005mm)	: 4.5
Clay (-0.005mm + 0.001mm)	: 3.0
Colloids (-0.001mm)	: 5.7

Approved By : _____ Soil No. 7

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 7
Project County	: McCracken	Sample Loc.	: Boring No. AD - 2
Project State	: Kentucky	Sample Depth	: 24.0' to 25.5'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Gray & Tan Silty Sand		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	100.0
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	97.0
1/4		6.3	mm	
No.4		4.75	mm	94.3
No.6		3.35	mm	
No.10		2	mm	90.2

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	87.6
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	14.3
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0334	mm	11.2
Hyd. Rd.	# 2	0.0213	mm	10.3
Hyd. Rd.	# 3	0.0124	mm	8.5
Hyd. Rd.	# 4	0.0089	mm	7.2
Hyd. Rd.	# 5	0.0063	mm	6.3
Hyd. Rd.	# 6	0.0031	mm	5.2
Hyd. Rd.	# 7	0.0013	mm	4.3

D_{50} = 0.1746 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moistnre (%) (AASHTO T265) : 32.2
Liquid Limit (AASHTO T89) : NP
Plastic Limit (AASHTO T90) : NP
Plasticity Index : NP
Liquidity Index : NA
Activity : NA
Sp. Gr. (AASHTO T100) : 2.709
AASHTO Classification: M145 : A-2-4 (0)
ASTM Classification: D2487 : SM

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 9.8
Coarse Sand (-No.10 + No.40)	: 2.6
Fine Sand (-No.40 + No.200)	: 73.3
Silt (-No.200 + 0.002mm)	: 9.6
Clay (-0.002mm + 0.001mm)	: 0.9
Colloids (-0.001mm)	: 3.9

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 5.7
Coarse Sand (-No.4 + No.10)	: 4.1
Medium Sand (-No.10 + No.40)	: 2.6
Fine Sand (-No.40 + No.200)	: 73.3
Silt (-No.200 + 0.005mm)	: 8.4
Clay (-0.005mm + 0.001mm)	: 2.1
Colloids (-0.001mm)	: 3.9

Approved By : _____

Soil No. 8

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Florence & Hutcheson, Inc.
CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 7
Project County	: McCracken	Sample Loc.	: Boring No. AD - 3
Project State	: Kentucky	Sample Depth	: 9.0' to 10.5'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	99.9

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	91.6
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0269	mm	79.6
Hyd. Rd.	# 2	0.0180	mm	66.7
Hyd. Rd.	# 3	0.0108	mm	55.9
Hyd. Rd.	# 4	0.0078	mm	49.9
Hyd. Rd.	# 5	0.0057	mm	42.0
Hyd. Rd.	# 6	0.0029	mm	34.6
Hyd. Rd.	# 7	0.0012	mm	24.7

D_{50} = 0.0079 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) (AASHTO T265) : 26.4
Liquid Limit (AASHTO T89) : 34
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 14
Liquidity Index : 0.45
Activity : 0.46
Sp. Gr. (AASHTO T100) : 2.756
AASHTO Classification: M145 : A-6 (13)
ASTM Classification: D2487 : CL

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 0.1
Coarse Sand (-No.10 + No.40)	: 1.1
Fine Sand (-No.40 + No.200)	: 7.2
Silt (-No.200 + 0.002mm)	: 61.2
Clay (-0.002mm + 0.001mm)	: 7.7
Colloids (-0.001mm)	: 22.6

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.0
Coarse Sand (-No.4 + No.10)	: 0.1
Medium Sand (-No.10 + No.40)	: 1.1
Fine Sand (-No.40 + No.200)	: 7.2
Silt (-No.200 + 0.005mm)	: 51.0
Clay (-0.005mm + 0.001mm)	: 18.0
Colloids (-0.001mm)	: 22.6

Approved By : _____

Soil No. 9

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 9
Project County	: McCracken	Sample Loc.	: Boring No. AD - 3
Project State	: Kentucky	Sample Depth	: 12.0' to 13.5'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Brown Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
1/4		6.3	mm	
No.4		4.75	mm	99.7
No.6		3.35	mm	
No.10		2	mm	99.5

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	94.5
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0265	mm	82.2
Hyd. Rd.	# 2	0.0175	mm	72.4
Hyd. Rd.	# 3	0.0106	mm	61.5
Hyd. Rd.	# 4	0.0078	mm	52.5
Hyd. Rd.	# 5	0.0056	mm	44.7
Hyd. Rd.	# 6	0.0029	mm	35.4
Hyd. Rd.	# 7	0.0012	mm	25.4

D_{50} = 0.007 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) (AASHTO T265) : 24.5
Liquid Limit (AASHTO T89) : 39
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 19
Liquidity Index : 0.23
Activity : 0.61
Sp. Gr. (AASHTO T100) : 2.748
AASHTO Classification: M145 : A-6 (19)
ASTM Classification: D2487 : CL

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 0.5
Coarse Sand (-No.10 + No.40)	: 0.7
Fine Sand (-No.40 + No.200)	: 4.3
Silt (-No.200 + 0.002mm)	: 63.3
Clay (-0.002mm + 0.001mm)	: 7.8
Colloids (-0.001mm)	: 23.3

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.3
Coarse Sand (-No.4 + No.10)	: 0.2
Medium Sand (-No.10 + No.40)	: 0.7
Fine Sand (-No.40 + No.200)	: 4.3
Silt (-No.200 + 0.005mm)	: 51.5
Clay (-0.005mm + 0.001mm)	: 19.7
Colloids (-0.001mm)	: 23.3

Approved By : _____

Soil No. 10

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 20
Project County	: McCracken	Sample Loc.	: Boring No. AD - 3
Project State	: Kentucky	Sample Depth	: 28.5' to 30.0'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	100.0

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	97.0
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0252	mm	90.1
Hyd. Rd.	# 2	0.0164	mm	84.3
Hyd. Rd.	# 3	0.0098	mm	78.3
Hyd. Rd.	# 4	0.0071	mm	71.4
Hyd. Rd.	# 5	0.0052	mm	62.6
Hyd. Rd.	# 6	0.0027	mm	51.4
Hyd. Rd.	# 7	0.0012	mm	33.6

D_{50} = 0.0025 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) (AASHTO T265) : 21.7
Liquid Limit (AASHTO T89) : 36
Plastic Limit (AASHTO T90) : 18
Plasticity Index : 18
Liquidity Index : 0.18
Activity : 0.40
Sp. Gr. (AASHTO T100) : 2.776
AASHTO Classification: M145 : A-6 (18)
ASTM Classification: D2487 : CL

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.0
Coarse Sand (-No.10 + No.40) : 0.2
Fine Sand (-No.40 + No.200) : 2.8
Silt (-No.200 + 0.002mm) : 52.1
Clay (-0.002mm + 0.001mm) : 13.7
Colloids (-0.001mm) : 31.2

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.0
Medium Sand (-No.10 + No.40) : 0.2
Fine Sand (-No.40 + No.200) : 2.8
Silt (-No.200 + 0.005mm) : 35.2
Clay (-0.005mm + 0.001mm) : 30.6
Colloids (-0.001mm) : 31.2

Approved By : _____

Soil No. 11

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 29
Project County	: McCracken	Sample Loc.	: Boring No. AD - 3
Project State	: Kentucky	Sample Depth	: 42.0' to 43.5'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan & Gray Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	100.0

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	93.5
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0282	mm	72.0
Hyd. Rd.	# 2	0.0187	mm	59.1
Hyd. Rd.	# 3	0.0115	mm	44.0
Hyd. Rd.	# 4	0.0083	mm	37.0
Hyd. Rd.	# 5	0.0060	mm	31.0
Hyd. Rd.	# 6	0.0030	mm	23.3
Hyd. Rd.	# 7	0.0013	mm	17.9

D_{50} = 0.0139 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) (AASHTO T265) : 25.8
Liquid Limit (AASHTO T89) : 27
Plastic Limit (AASHTO T90) : 18
Plasticity Index : 9
Liquidity Index : 0.87
Activity : 0.43
Sp. Gr. (AASHTO T100) : 2.709
AASHTO Classification: M145 : A-4 (7)
ASTM Classification: D2487 : CL

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.0
Coarse Sand (-No.10 + No.40) : 0.2
Fine Sand (-No.40 + No.200) : 6.3
Silt (-No.200 + 0.002mm) : 72.8
Clay (-0.002mm + 0.001mm) : 4.5
Colloids (-0.001mm) : 16.2

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.0
Medium Sand (-No.10 + No.40) : 0.2
Fine Sand (-No.40 + No.200) : 6.3
Silt (-No.200 + 0.005mm) : 64.6
Clay (-0.005mm + 0.001mm) : 12.7
Colloids (-0.001mm) : 16.2

Approved By : _____ Soil No. 12

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 33
Project County	: McCracken	Sample Loc.	: Boring No. AD - 3
Project State	: Kentucky	Sample Depth	: 48.0' to 49.5'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Gray & Tan Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	99.9

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.7
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	96.2
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0269	mm	83.4
Hyd. Rd.	# 2	0.0178	mm	73.4
Hyd. Rd.	# 3	0.0109	mm	58.3
Hyd. Rd.	# 4	0.0080	mm	49.4
Hyd. Rd.	# 5	0.0058	mm	41.2
Hyd. Rd.	# 6	0.0030	mm	29.4
Hyd. Rd.	# 7	0.0013	mm	20.2

D_{50} = 0.0082 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) (AASHTO T265) : 33.7
Liquid Limit (AASHTO T89) : 35
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 15
Liquidity Index : 0.90
Activity : 0.60
Sp. Gr. (AASHTO T100) : 2.694
AASHTO Classification: M145 : A-6 (15)
ASTM Classification: D2487 : CL

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.1
Coarse Sand (-No.10 + No.40) : 0.2
Fine Sand (-No.40 + No.200) : 3.5
Silt (-No.200 + 0.002mm) : 71.2
Clay (-0.002mm + 0.001mm) : 6.8
Colloids (-0.001mm) : 18.3

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.1
Medium Sand (-No.10 + No.40) : 0.2
Fine Sand (-No.40 + No.200) : 3.5
Silt (-No.200 + 0.005mm) : 57.7
Clay (-0.005mm + 0.001mm) : 20.2
Colloids (-0.001mm) : 18.3

Approved By : _____

Soil No. 13

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: ST - 1
Project County	: McCracken	Sample Loc.	: Boring No. AD - 3A
Project State	: Kentucky	Sample Depth	: 5.0' to 6.1'
Laboratory No.	: 09124	Date Tested	: 07/16/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Gray, Tan & Brown Gravelly Lean Clay with Sand		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	100.0
1 1/4	in.	31.5	mm	
1	in.	25	mm	81.5
3/4	in.	19	mm	81.5
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	75.2
1/4		6.3	mm	
No.4		4.75	mm	69.9
No.6		3.35	mm	
No.10		2	mm	65.1

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	58.7
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	50.1
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0293	mm	43.1
Hyd. Rd.	# 2	0.0191	mm	37.9
Hyd. Rd.	# 3	0.0114	mm	32.6
Hyd. Rd.	# 4	0.0082	mm	29.2
Hyd. Rd.	# 5	0.0059	mm	25.2
Hyd. Rd.	# 6	0.0030	mm	20.5
Hyd. Rd.	# 7	0.0013	mm	15.3

D_{50} = 0.074 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 34.9
Coarse Sand (-No.10 + No.40) : 6.4
Fine Sand (-No.40 + No.200) : 8.6
Silt (-No.200 + 0.002mm) : 32.0
Clay (-0.002mm + 0.001mm) : 4.2
Colloids (-0.001mm) : 13.9

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 18.5
Fine Gravel (-3/4in. + No.4) : 11.6
Coarse Sand (-No.4 + No.10) : 4.8
Medium Sand (-No.10 + No.40) : 6.4
Fine Sand (-No.40 + No.200) : 8.6
Silt (-No.200 + 0.005mm) : 26.0
Clay (-0.005mm + 0.001mm) : 10.2
Colloids (-0.001mm) : 13.9

Natural Moisture (%) (AASHTO T265) : 24.1
Liquid Limit (AASHTO T89) : 34
Plastic Limit (AASHTO T90) : 18
Plasticity Index : 16
Liquidity Index : 0.38
Activity : 0.88
Sp. Gr. (AASHTO T100) : 2.682
AASHTO Classification: M145 : A-6 (5)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 14

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: ST - 2
Project County	: McCracken	Sample Loc.	: Boring No. AD - 3A
Project State	: Kentucky	Sample Depth	: 15.5' to 16.2'
Laboratory No.	: 09124	Date Tested	: 07/16/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan & Gray Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	99.9

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.7
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	98.0
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0248	mm	94.9
Hyd. Rd.	# 2	0.0164	mm	86.9
Hyd. Rd.	# 3	0.0099	mm	76.9
Hyd. Rd.	# 4	0.0073	mm	67.0
Hyd. Rd.	# 5	0.0053	mm	61.1
Hyd. Rd.	# 6	0.0027	mm	47.1
Hyd. Rd.	# 7	0.0012	mm	33.2

D_{50} = 0.0031 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) (AASHTO T265) : 24.8
Liquid Limit (AASHTO T89) : 39
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 19
Liquidity Index : 0.27
Activity : 0.45
Sp. Gr. (AASHTO TI00) : 2.771
AASHTO Classification: M145 : A-6 (20)
ASTM Classification: D2487 : CL

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.1
Coarse Sand (-No.10 + No.40) : 0.2
Fine Sand (-No.40 + No.200) : 1.7
Silt (-No.200 + 0.002mm) : 56.1
Clay (-0.002mm + 0.001mm) : 11.1
Colloids (-0.001mm) : 30.8

ASTM Compositiou of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.1
Medium Sand (-No.10 + No.40) : 0.2
Fine Sand (-No.40 + No.200) : 1.7
Silt (-No.200 + 0.005mm) : 38.1
Clay (-0.005mm + 0.001mm) : 29.1
Colloids (-0.001mm) : 30.8

Approved By : _____

Soil No. 15

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 2
Project County	: McCracken	Sample Loc.	: Boring No. AD - 4
Project State	: Kentucky	Sample Depth	: 1.5' to 3.0'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Brown & Tan Lean Clay with Sand		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	99.8

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	96.7
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	82.4
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0290	mm	65.2
Hyd. Rd.	# 2	0.0191	mm	55.2
Hyd. Rd.	# 3	0.0114	mm	45.1
Hyd. Rd.	# 4	0.0083	mm	39.0
Hyd. Rd.	# 5	0.0060	mm	31.8
Hyd. Rd.	# 6	0.0030	mm	24.2
Hyd. Rd.	# 7	0.0013	mm	18.8

D_{50} = 0.0146 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.2
Coarse Sand (-No.10 + No.40) : 3.1
Fine Sand (-No.40 + No.200) : 14.3
Silt (-No.200 + 0.002mm) : 60.8
Clay (-0.002mm + 0.001mm) : 4.6
Colloids (-0.001mm) : 17.0

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.2
Medium Sand (-No.10 + No.40) : 3.1
Fine Sand (-No.40 + No.200) : 14.3
Silt (-No.200 + 0.005mm) : 52.6
Clay (-0.005mm + 0.001mm) : 12.8
Colloids (-0.001mm) : 17.0

Natural Moisture (%) (AASHTO T265) : 37.9
Liquid Limit (AASHTO T89) : 31
Plastic Limit (AASHTO T90) : 17
Plasticity Index : 14
Liquidity Index : 1.47
Activity : 0.65
Sp. Gr. (AASHTO T100) : 2.710
AASHTO Classification: M145 : A-6 (10)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 16

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Florence & Hutcheson, Inc.
CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 3
Project County	: McCracken	Sample Loc.	: Boring No. AD - 4
Project State	: Kentucky	Sample Depth	: 4.5' to 6.0'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	99.9

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.9
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	95.2
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0256	mm	88.3
Hyd. Rd.	# 2	0.0167	mm	82.3
Hyd. Rd.	# 3	0.0101	mm	73.2
Hyd. Rd.	# 4	0.0073	mm	66.2
Hyd. Rd.	# 5	0.0053	mm	59.4
Hyd. Rd.	# 6	0.0028	mm	44.0
Hyd. Rd.	# 7	0.0012	mm	31.6

D_{50} = 0.0036 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) (AASHTO T265) : 24.1
Liquid Limit (AASHTO T89) : 41
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 21
Liquidity Index : 0.18
Activity : 0.54
Sp. Gr. (AASHTO T100) : 2.766
AASHTO Classification: M145 : A-7-6 (21)
ASTM Classification: D2487 : CL

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 0.1
Coarse Sand (-No.10 + No.40)	: 1.0
Fine Sand (-No.40 + No.200)	: 3.7
Silt (-No.200 + 0.002mm)	: 56.1
Clay (-0.002mm + 0.001mm)	: 9.8
Colloids (-0.001mm)	: 29.2

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.0
Coarse Sand (-No.4 + No.10)	: 0.1
Medium Sand (-No.10 + No.40)	: 1.0
Fine Sand (-No.40 + No.200)	: 3.7
Silt (-No.200 + 0.005mm)	: 37.3
Clay (-0.005mm + 0.001mm)	: 28.6
Colloids (-0.001mm)	: 29.2

Approved By : _____

Soil No. 17

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: ST - 1
Project County	: McCracken	Sample Loc.	: Boring No. AD - 4
Project State	: Kentucky	Sample Depth	: 10.5' to 11.9'
Laboratory No.	: 09124	Date Tested	: 07/15/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Light Brown Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	100.0

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.5
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	95.5
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0253	mm	91.2
Hyd. Rd.	# 2	0.0166	mm	84.3
Hyd. Rd.	# 3	0.0100	mm	74.3
Hyd. Rd.	# 4	0.0073	mm	69.5
Hyd. Rd.	# 5	0.0053	mm	62.5
Hyd. Rd.	# 6	0.0027	mm	49.7
Hyd. Rd.	# 7	0.0012	mm	34.8

D_{50} = 0.0028 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.0
Coarse Sand (-No.10 + No.40) : 0.5
Fine Sand (-No.40 + No.200) : 4.0
Silt (-No.200 + 0.002mm) : 51.3
Clay (-0.002mm + 0.001mm) : 11.8
Colloids (-0.001mm) : 32.3

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.0
Medium Sand (-No.10 + No.40) : 0.5
Fine Sand (-No.40 + No.200) : 4.0
Silt (-No.200 + 0.005mm) : 34.1
Clay (-0.005mm + 0.001mm) : 29.1
Colloids (-0.001mm) : 32.3

Natural Moisture (%) (AASHTO T265) : 23.3
Liquid Limit (AASHTO T89) : 36
Plastic Limit (AASHTO T90) : 18
Plasticity Index : 18
Liquidity Index : 0.28
Activity : 0.41
Sp. Gr. (AASHTO T100) : 2.748
AASHTO Classification: M145 : A-6 (17)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 18

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 6
Project County	: McCracken	Sample Loc.	: Boring No. AD - 4
Project State	: Kentucky	Sample Depth	: 19.5' to 21.0'
Laboratory No.	: 09124	Date Tested	: 07/06/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Gray Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	99.2

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.9
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	93.0
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0280	mm	78.0
Hyd. Rd.	# 2	0.0183	mm	71.4
Hyd. Rd.	# 3	0.0110	mm	62.2
Hyd. Rd.	# 4	0.0079	mm	56.3
Hyd. Rd.	# 5	0.0057	mm	50.3
Hyd. Rd.	# 6	0.0029	mm	40.8
Hyd. Rd.	# 7	0.0012	mm	30.7

D_{50} = 0.0056 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) (AASHTO T265) : 27.1
Liquid Limit (AASHTO T89) : 40
Plastic Limit (AASHTO T90) : 18
Plasticity Index : 22
Liquidity Index : 0.42
Activity : 0.60
Sp. Gr. (AASHTO T100) : 2.670
AASHTO Classification: M145 : A-6 (21)
ASTM Classification: D2487 : CL

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 0.8
Coarse Sand (-No.10 + No.40)	: 0.3
Fine Sand (-No.40 + No.200)	: 5.9
Silt (-No.200 + 0.002mm)	: 56.6
Clay (-0.002mm + 0.001mm)	: 8.4
Colloids (-0.001mm)	: 28.0

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.0
Coarse Sand (-No.4 + No.10)	: 0.8
Medium Sand (-No.10 + No.40)	: 0.3
Fine Sand (-No.40 + No.200)	: 5.9
Silt (-No.200 + 0.005mm)	: 44.6
Clay (-0.005mm + 0.001mm)	: 20.4
Colloids (-0.001mm)	: 28.0

Approved By : _____ Soil No. 19

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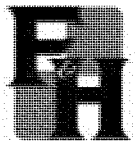

Florence & Hutcheson, Inc.

CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 7
Project County	: McCracken	Sample Loc.	: Boring No. AD - 4
Project State	: Kentucky	Sample Depth	: 24.0' to 25.5'
Laboratory No.	: 09124	Date Tested	: 07/07/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan & Gray Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	100.0

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.1
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	96.6
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0259	mm	88.5
Hyd. Rd.	# 2	0.0170	mm	80.7
Hyd. Rd.	# 3	0.0103	mm	70.7
Hyd. Rd.	# 4	0.0075	mm	63.8
Hyd. Rd.	# 5	0.0054	mm	57.0
Hyd. Rd.	# 6	0.0028	mm	42.6
Hyd. Rd.	# 7	0.0012	mm	32.5

D_{50} = 0.0039 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.0
Coarse Sand (-No.10 + No.40) : 0.9
Fine Sand (-No.40 + No.200) : 2.5
Silt (-No.200 + 0.002mm) : 58.0
Clay (-0.002mm + 0.001mm) : 8.5
Colloids (-0.001mm) : 30.1

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.0
Medium Sand (-No.10 + No.40) : 0.9
Fine Sand (-No.40 + No.200) : 2.5
Silt (-No.200 + 0.005mm) : 41.4
Clay (-0.005mm + 0.001mm) : 25.1
Colloids (-0.001mm) : 30.1

Natural Moisture (%) (AASHTO T265) : 29.7
Liquid Limit (AASHTO T89) : 41
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 21
Liquidity Index : 0.47
Activity : 0.54
Sp. Gr. (AASHTO T100) : 2.772
AASHTO Classification: M145 : A-7-6 (22)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 20

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 3
Project County	: McCracken	Sample Loc.	: Boring No. AD - 5
Project State	: Kentucky	Sample Depth	: 4.5' to 6.0'
Laboratory No.	: 09124	Date Tested	: 07/07/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Gray Lean Clay with Sand		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	100.0
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	99.4
1/4		6.3	mm	
No.4		4.75	mm	97.5
No.6		3.35	mm	
No.10		2	mm	96.7

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	86.3
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	76.6
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0282	mm	67.7
Hyd. Rd.	# 2	0.0185	mm	58.2
Hyd. Rd.	# 3	0.0112	mm	46.6
Hyd. Rd.	# 4	0.0081	mm	40.8
Hyd. Rd.	# 5	0.0059	mm	34.0
Hyd. Rd.	# 6	0.0029	mm	25.6
Hyd. Rd.	# 7	0.0013	mm	17.7

D_{50} = 0.013 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) (AASHTO T265) : 28.6
Liquid Limit (AASHTO T89) : 36
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 16
Liquidity Index : 0.53
Activity : 0.73
Sp. Gr. (AASHTO T100) : 2.767
AASHTO Classification: M145 : A-6 (11)
ASTM Classification: D2487 : CL

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 3.3
Coarse Sand (-No.10 + No.40) : 10.4
Fine Sand (-No.40 + No.200) : 9.7
Silt (-No.200 + 0.002mm) : 54.6
Clay (-0.002mm + 0.001mm) : 6.0
Colloids (-0.001mm) : 16.1

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 2.5
Coarse Sand (-No.4 + No.10) : 0.8
Medium Sand (-No.10 + No.40) : 10.4
Fine Sand (-No.40 + No.200) : 9.7
Silt (-No.200 + 0.005mm) : 44.5
Clay (-0.005mm + 0.001mm) : 16.0
Colloids (-0.001mm) : 16.1

Approved By : _____

Soil No. 21

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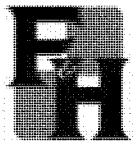

Florence & Hutcheson, Inc.

CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 4
Project County	: McCracken	Sample Loc.	: Boring No. AD - 5
Project State	: Kentucky	Sample Depth	: 9.0' to 10.5'
Laboratory No.	: 09124	Date Tested	: 07/07/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	100.0

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.6
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	95.6
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0254	mm	89.3
Hyd. Rd.	# 2	0.0167	mm	82.3
Hyd. Rd.	# 3	0.0100	mm	75.4
Hyd. Rd.	# 4	0.0073	mm	68.5
Hyd. Rd.	# 5	0.0053	mm	61.7
Hyd. Rd.	# 6	0.0027	mm	48.3
Hyd. Rd.	# 7	0.0012	mm	30.4

D_{50} = 0.0029 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.0
Coarse Sand (-No.10 + No.40) : 0.4
Fine Sand (-No.40 + No.200) : 4.0
Silt (-No.200 + 0.002mm) : 54.0
Clay (-0.002mm + 0.001mm) : 13.5
Colloids (-0.001mm) : 28.1

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.0
Medium Sand (-No.10 + No.40) : 0.4
Fine Sand (-No.40 + No.200) : 4.0
Silt (-No.200 + 0.005mm) : 35.0
Clay (-0.005mm + 0.001mm) : 32.5
Colloids (-0.001mm) : 28.1

Natural Moisture (%) (AASHTO T265) : 28.6
Liquid Limit (AASHTO T89) : 40
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 20
Liquidity Index : 0.42
Activity : 0.48
Sp. Gr. (AASHTO T100) : 2.797
AASHTO Classification: M145 : A-6 (20)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 22

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Florence & Hutcheson, Inc.
CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 5
Project County	: McCracken	Sample Loc.	: Boring No. AD - 5
Project State	: Kentucky	Sample Depth	: 13.5' to 15.0'
Laboratory No.	: 09124	Date Tested	: 07/07/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Brown Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
1/4		6.3	mm	
No.4		4.75	mm	99.8
No.6		3.35	mm	
No.10		2	mm	99.4

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	97.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	86.5
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0278	mm	73.5
Hyd. Rd.	# 2	0.0180	mm	68.5
Hyd. Rd.	# 3	0.0107	mm	61.6
Hyd. Rd.	# 4	0.0077	mm	55.6
Hyd. Rd.	# 5	0.0056	mm	49.9
Hyd. Rd.	# 6	0.0028	mm	42.2
Hyd. Rd.	# 7	0.0012	mm	27.3

D_{50} = 0.0056 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) (AASHTO T265) : 20.8
Liquid Limit (AASHTO T89) : 32
Plastic Limit (AASHTO T90) : 18
Plasticity Index : 14
Liquidity Index : 0.22
Activity : 0.39
Sp. Gr. (AASHTO T100) : 2.752
AASHTO Classification: M145 : A-6 (11)
ASTM Classification: D2487 : CL

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 0.6
Coarse Sand (-No.10 + No.40)	: 1.6
Fine Sand (-No.40 + No.200)	: 11.3
Silt (-No.200 + 0.002mm)	: 50.4
Clay (-0.002mm + 0.001mm)	: 11.1
Colloids (-0.001mm)	: 25.0

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.2
Coarse Sand (-No.4 + No.10)	: 0.4
Medium Sand (-No.10 + No.40)	: 1.6
Fine Sand (-No.40 + No.200)	: 11.3
Silt (-No.200 + 0.005mm)	: 37.8
Clay (-0.005mm + 0.001mm)	: 23.7
Colloids (-0.001mm)	: 25.0

Approved By : _____

Soil No. 23

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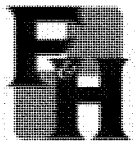

Florence & Hutcheson, Inc.

CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 7
Project County	: McCracken	Sample Loc.	: Boring No. AD - 5
Project State	: Kentucky	Sample Depth	: 24.0' to 25.5'
Laboratory No.	: 09124	Date Tested	: 07/07/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Gray Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	99.9

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.7
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	97.1
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0266	mm	82.1
Hyd. Rd.	# 2	0.0173	mm	76.2
Hyd. Rd.	# 3	0.0106	mm	64.1
Hyd. Rd.	# 4	0.0076	mm	59.3
Hyd. Rd.	# 5	0.0055	mm	51.4
Hyd. Rd.	# 6	0.0028	mm	39.4
Hyd. Rd.	# 7	0.0012	mm	30.5

D_{50} = 0.0051 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.1
Coarse Sand (-No.10 + No.40) : 0.2
Fine Sand (-No.40 + No.200) : 2.6
Silt (-No.200 + 0.002mm) : 61.3
Clay (-0.002mm + 0.001mm) : 7.6
Colloids (-0.001mm) : 28.2

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.1
Medium Sand (-No.10 + No.40) : 0.2
Fine Sand (-No.40 + No.200) : 2.6
Silt (-No.200 + 0.005mm) : 47.5
Clay (-0.005mm + 0.001mm) : 21.4
Colloids (-0.001mm) : 28.2

Natural Moisture (%) (AASHTO T265) : 31.5
Liquid Limit (AASHTO T89) : 40
Plastic Limit (AASHTO T90) : 19
Plasticity Index : 21
Liquidity Index : 0.60
Activity : 0.59
Sp. Gr. (AASHTO T100) : 2.766
AASHTO Classification: M145 : A-6 (21)
ASTM Classification: D2487 : CL

Approved By : _____

Soil No. 24

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 11
Project County	: McCracken	Sample Loc.	: Boring No. AD - 6
Project State	: Kentucky	Sample Depth	: 15.0' to 16.0'
Laboratory No.	: 09124	Date Tested	: 07/07/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Brown & Gray Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	100.0
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	99.6
1/4		6.3	mm	
No.4		4.75	mm	99.4
No.6		3.35	mm	
No.10		2	mm	99.4

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	97.1
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0263	mm	84.2
Hyd. Rd.	# 2	0.0174	mm	74.3
Hyd. Rd.	# 3	0.0107	mm	60.4
Hyd. Rd.	# 4	0.0078	mm	52.7
Hyd. Rd.	# 5	0.0056	mm	46.9
Hyd. Rd.	# 6	0.0029	mm	34.0
Hyd. Rd.	# 7	0.0012	mm	24.1

D_{50} = 0.0067 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) (AASHTO T265) : 28.1
Liquid Limit (AASHTO T89) : 38
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 18
Liquidity Index : 0.44
Activity : 0.60
Sp. Gr. (AASHTO T100) : 2.767
AASHTO Classification: M145 : A-6 (18)
ASTM Classification: D2487 : CL

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 0.6
Coarse Sand (-No.10 + No.40)	: 0.6
Fine Sand (-No.40 + No.200)	: 1.7
Silt (-No.200 + 0.002mm)	: 67.3
Clay (-0.002mm + 0.001mm)	: 7.7
Colloids (-0.001mm)	: 22.1

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.6
Coarse Sand (-No.4 + No.10)	: 0.0
Medium Sand (-No.10 + No.40)	: 0.6
Fine Sand (-No.40 + No.200)	: 1.7
Silt (-No.200 + 0.005mm)	: 52.4
Clay (-0.005mm + 0.001mm)	: 22.6
Colloids (-0.001mm)	: 22.1

Approved By : _____

Soil No. 25

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 16
Project County	: McCracken	Sample Loc.	: Boring No. AD - 6
Project State	: Kentucky	Sample Depth	: 22.5' to 24.0'
Laboratory No.	: 09124	Date Tested	: 07/07/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Brown Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
1/4		6.3	mm	
No.4		4.75	mm	99.8
No.6		3.35	mm	
No.10		2	mm	99.5

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	97.1
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	89.2
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0284	mm	71.4
Hyd. Rd.	# 2	0.0188	mm	60.5
Hyd. Rd.	# 3	0.0114	mm	45.5
Hyd. Rd.	# 4	0.0083	mm	38.6
Hyd. Rd.	# 5	0.0060	mm	31.7
Hyd. Rd.	# 6	0.0030	mm	24.5
Hyd. Rd.	# 7	0.0013	mm	16.6

D_{50} = 0.0133 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.5
Coarse Sand (-No.10 + No.40) : 2.4
Fine Sand (-No.40 + No.200) : 7.9
Silt (-No.200 + 0.002mm) : 68.5
Clay (-0.002mm + 0.001mm) : 5.7
Colloids (-0.001mm) : 15.0

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.2
Coarse Sand (-No.4 + No.10) : 0.3
Medium Sand (-No.10 + No.40) : 2.4
Fine Sand (-No.40 + No.200) : 7.9
Silt (-No.200 + 0.005mm) : 59.4
Clay (-0.005mm + 0.001mm) : 14.8
Colloids (-0.001mm) : 15.0

Natural Moisture (%) (AASHTO T265) : 29.6
Liquid Limit (AASHTO T89) : 29
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 9
Liquidity Index : 1.05
Activity : 0.43
Sp. Gr. (AASHTO T100) : 2.714
AASHTO Classification: M145 : A-4 (7)
ASTM Classification: D2487 : CL

Approved By : _____ Soil No. 26

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 21
Project Connty	: McCracken	Sample Loc.	: Boring No. AD - 6
Project State	: Kentucky	Sample Depth	: 30.0' to 31.5'
Laboratory No.	: 09124	Date Tested	: 07/07/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Gray Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
1/4		6.3	mm	
No.4		4.75	mm	99.9
No.6		3.35	mm	
No.10		2	mm	99.9

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.6
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	95.9
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0264	mm	85.6
Hyd. Rd.	# 2	0.0175	mm	75.8
Hyd. Rd.	# 3	0.0106	mm	63.9
Hyd. Rd.	# 4	0.0076	mm	59.8
Hyd. Rd.	# 5	0.0056	mm	50.3
Hyd. Rd.	# 6	0.0029	mm	38.1
Hyd. Rd.	# 7	0.0012	mm	24.3

D_{50} = 0.0055 mm

California Bearing Ratio : NA
Maxinum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.1
Coarse Sand (-No.10 + No.40) : 0.3
Fine Sand (-No.40 + No.200) : 3.7
Silt (-No.200 + 0.002mm) : 63.7
Clay (-0.002mm + 0.001mm) : I0.0
Colloids (-0.001mm) : 22.2

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.1
Coarse Sand (-No.4 + No.10) : 0.0
Medium Sand (-No.10 + No.40) : 0.3
Fine Sand (-No.40 + No.200) : 3.7
Silt (-No.200 + 0.005mm) : 47.6
Clay (-0.005mm + 0.001mm) : 26.2
Colloids (-0.001mm) : 22.2

Natural Moisture (%) (AASHTO T265) : 26.5
Liquid Limit (AASHTO T89) : 33
Plastic Limit (AASHTO T90) : 19
Plasticity Index : 14
Liquidity Index : 0.55
Activity : 0.44
Sp. Gr. (AASHTO T100) : 2.735
AASHTO Classification: M145 : A-6 (13)
ASTM Classification: D2487 : CL

Approved By : _____ Soil No. 27

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: SS - 30
Project County	: McCracken	Sample Loc.	: Boring No. AD - 6
Project State	: Kentucky	Sample Depth	: 43.5' to 45.0'
Laboratory No.	: 09124	Date Tested	: 07/07/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Gray Sandy Silty Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
1/4		6.3	mm	
No.4		4.75	mm	99.6
No.6		3.35	mm	
No.10		2	mm	99.2

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.2
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	60.9
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0312	mm	48.4
Hyd. Rd.	# 2	0.0202	mm	40.6
Hyd. Rd.	# 3	0.0120	mm	33.6
Hyd. Rd.	# 4	0.0086	mm	29.7
Hyd. Rd.	# 5	0.0061	mm	24.8
Hyd. Rd.	# 6	0.0031	mm	20.5
Hyd. Rd.	# 7	0.0013	mm	14.8

D_{50} = 0.0348 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.8
Coarse Sand (-No.10 + No.40) : 1.0
Fine Sand (-No.40 + No.200) : 37.3
Silt (-No.200 + 0.002mm) : 43.3
Clay (-0.002mm + 0.001mm) : 4.4
Colloids (-0.001mm) : 13.3

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.4
Coarse Sand (-No.4 + No.10) : 0.4
Medium Sand (-No.10 + No.40) : 1.0
Fine Sand (-No.40 + No.200) : 37.3
Silt (-No.200 + 0.005mm) : 37.4
Clay (-0.005mm + 0.001mm) : 10.2
Colloids (-0.001mm) : 13.3

Natural Moisture (%) (AASHTO T265) : 31.1
Liquid Limit (AASHTO T89) : 22
Plastic Limit (AASHTO T90) : 17
Plasticity Index : 5
Liquidity Index : 2.86
Activity : 0.28
Sp. Gr. (AASHTO T100) : 2.696
AASHTO Classification: M145 : A-4 (0)
ASTM Classification: D2487 : CL-ML

Approved By : _____

Soil No. 28

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: ST - 1
Project County	: McCracken	Sample Loc.	: Boring No. AD - 6A
Project State	: Kentucky	Sample Depth	: 8.0' to 10.0'
Laboratory No.	: 09124	Date Tested	: 07/15/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan, Beige & Brown Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
1/4		6.3	mm	
No.4		4.75	mm	99.8
No.6		3.35	mm	
No.10		2	mm	99.6

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.9
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	89.9
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0283	mm	67.0
Hyd. Rd.	# 2	0.0191	mm	50.3
Hyd. Rd.	# 3	0.0114	mm	40.6
Hyd. Rd.	# 4	0.0082	mm	35.6
Hyd. Rd.	# 5	0.0059	mm	30.7
Hyd. Rd.	# 6	0.0030	mm	23.1
Hyd. Rd.	# 7	0.0013	mm	18.1

D_{50} = 0.0188 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) (AASHTO T265) : 25.3
Liquid Limit (AASHTO T89) : 30
Plastic Limit (AASHTO T90) : 21
Plasticity Index : 9
Liquidity Index : 0.48
Activity : 0.43
Sp. Gr. (AASHTO TI00) : 2.756
AASHTO Classification: M145 : A-4 (8)
ASTM Classification: D2487 : CL

AASHTO Composition of Total Sample: M145

Gravel (3in. + No.10)	: 0.4
Coarse Sand (-No.10 + No.40)	: 0.7
Fine Sand (-No.40 + No.200)	: 9.0
Silt (-No.200 + 0.002mm)	: 69.1
Clay (-0.002mm + 0.001mm)	: 4.3
Colloids (-0.001mm)	: 16.5

ASTM Composition of Total Sample: D2487

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.2
Coarse Sand (-No.4 + No.10)	: 0.2
Medium Sand (-No.10 + No.40)	: 0.7
Fine Sand (-No.40 + No.200)	: 9.0
Silt (-No.200 + 0.005mm)	: 61.0
Clay (-0.005mm + 0.001mm)	: 12.4
Colloids (-0.001mm)	: 16.5

Approved By : _____ Soil No. 29

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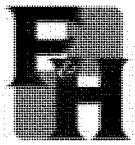

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CONSULTING ENGINEERS

SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: ST - 2
Project County	: McCracken	Sample Loc.	: Boring No. AD - 6A
Project State	: Kentucky	Sample Depth	: 21.0' to 22.5'
Laboratory No.	: 09124	Date Tested	: 07/15/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Tan, Beige & Brown Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
1/4		6.3	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.10		2	mm	100.0

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.2
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	96.3
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0263	mm	81.0
Hyd. Rd.	# 2	0.0171	mm	75.3
Hyd. Rd.	# 3	0.0104	mm	64.4
Hyd. Rd.	# 4	0.0076	mm	54.6
Hyd. Rd.	# 5	0.0055	mm	47.9
Hyd. Rd.	# 6	0.0028	mm	35.3
Hyd. Rd.	# 7	0.0012	mm	24.5

D_{50} = 0.0061 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 0.0
Coarse Sand (-No.10 + No.40) : 0.8
Fine Sand (-No.40 + No.200) : 2.9
Silt (-No.200 + 0.002mm) : 65.4
Clay (-0.002mm + 0.001mm) : 8.3
Colloids (-0.001mm) : 22.6

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.0
Medium Sand (-No.10 + No.40) : 0.8
Fine Sand (-No.40 + No.200) : 2.9
Silt (-No.200 + 0.005mm) : 50.3
Clay (-0.005mm + 0.001mm) : 23.4
Colloids (-0.001mm) : 22.6

Natural Moisture (%) (AASHTO T265) : 27.6
Liquid Limit (AASHTO T89) : 35
Plastic Limit (AASHTO T90) : 19
Plasticity Index : 16
Liquidity Index : 0.53
Activity : 0.52
Sp. Gr. (AASHTO T100) : 2.785
AASHTO Classification: M145 : A-6 (16)
ASTM Classificatiou: D2487 : CL

Approved By : _____

Soil No. 30

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SOIL CLASSIFICATION

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: ST - 2
Project County	: McCracken	Sample Loc.	: Boring No. AD - 6A
Project State	: Kentucky	Sample Depth	: 22.5' to 23.0'
Laboratory No.	: 09124	Date Tested	: 07/15/09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07/20/09
Soil Type	: Dark Orange & Beige Lean Clay		

AASHTO T27 :

				% Passing
4	in.	101.6	mm	
3.5	in.	88.9	mm	
3	in.	76.2	mm	
2.5	in.	63.5	mm	
2	in.	50.8	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	100.0
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	99.0
1/4		6.3	mm	
No.4		4.75	mm	97.8
No.6		3.35	mm	
No.10		2	mm	96.4

AASHTO T88

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	94.0
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	85.2
No.270		0.053	mm	
Hyd. Rd.	# 1	0.0279	mm	70.0
Hyd. Rd.	# 2	0.0187	mm	55.7
Hyd. Rd.	# 3	0.0114	mm	43.3
Hyd. Rd.	# 4	0.0083	mm	35.5
Hyd. Rd.	# 5	0.0060	mm	29.8
Hyd. Rd.	# 6	0.0030	mm	20.3
Hyd. Rd.	# 7	0.0013	mm	14.7

D_{50} = 0.0149 mm

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) (AASHTO T265) : 27.4
Liquid Limit (AASHTO T89) : 28
Plastic Limit (AASHTO T90) : 20
Plasticity Index : 8
Liquidity Index : 0.93
Activity : 0.45
Sp. Gr. (AASHTO TI00) : 2.733
AASHTO Classification: M145 : A-4 (6)
ASTM Classification: D2487 : CL

AASHTO Composition of Total Sample: M145
Gravel (3in. + No.10) : 3.6
Coarse Sand (-No.10 + No.40) : 2.4
Fine Sand (-No.40 + No.200) : 8.8
Silt (-No.200 + 0.002mm) : 67.6
Clay (-0.002mm + 0.001mm) : 4.4
Colloids (-0.001mm) : 13.3

ASTM Composition of Total Sample: D2487
Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 2.2
Coarse Sand (-No.4 + No.10) : 1.4
Medium Sand (-No.10 + No.40) : 2.4
Fine Sand (-No.40 + No.200) : 8.8
Silt (-No.200 + 0.005mm) : 57.8
Clay (-0.005mm + 0.001mm) : 14.1
Colloids (-0.001mm) : 13.3

Approved By : _____

Soil No. 31

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UNIT WEIGHT TEST

PROJECT NAME	: Paducah LFPP Feasibility / Certification Study		
PROJECT #	: W912QR-06-D-0027, Task Order No. 0039	SAMPLE #	: SS - 3
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. AD -1
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 4.5' to 6.0'
LABORATORY #	: 09124	DATE TESTED	: 06-24-09
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 07-20-09
SOIL TYPE	: Gray & Brown Silty Clay		

SAMPLE DATA

INITIAL HEIGHT	:	2.77 in
INITIAL DIAMETER	:	1.42 in

RESULTS

MOISTURE	:	26.3 %
WET DENSITY	:	125.3 pcf
DRY DENSITY	:	99.2 pcf

Comments :

APPROVED BY: _____

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UNIT WEIGHT TEST

PROJECT NAME	Paducah LFPP Feasibility / Certification Study		
PROJECT #	W912QR-06-D-0027, Task Order No. 0039	SAMPLE #	SS - 6
PROJECT COUNTY	McCracken	SAMPLE LOC.	Boring No. AD -2
PROJECT STATE	Kentucky	SAMPLE DEPTH	19.5' to 21.5'
LABORATORY #	09124	DATE TESTED	06-24-09
SUBMITTED BY	Florence & Hutcheson, Inc.	DATE REPORTED	07-20-09
SOIL TYPE	Brown Sand		

SAMPLE DATA

INITIAL HEIGHT	2.68	in
INITIAL DIAMETER	1.39	in

RESULTS

MOISTURE	14.8	%
WET DENSITY	131.1	pcf
DRY DENSITY	114.2	pcf

Comments :

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UNIT WEIGHT TEST

PROJECT NAME	: Paducah LFPP Feasibility / Certification Study		
PROJECT #	: W912QR-06-D-0027, Task Order No. 0039	SAMPLE #	: SS - 16
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. AD -3
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 22.5' to 24.0'
LABORATORY #	: 09124	DATE TESTED	: 06-24-09
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 07-20-09
SOIL TYPE	: Brown Silty Clay		

SAMPLE DATA

INITIAL HEIGHT	:	2.80 in
INITIAL DIAMETER	:	1.37 in

RESULTS

MOISTURE	:	21.2 %
WET DENSITY	:	137.9 pcf
DRY DENSITY	:	113.8 pcf

Comments :

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UNIT WEIGHT TEST

PROJECT NAME	: Paducah LFPP Feasibility / Certification Study		
PROJECT #	: W912QR-06-D-0027, Task Order No. 0039	SAMPLE # :	SS - 17
PROJECT COUNTY	: McCracken	SAMPLE LOC. :	Boring No. AD -3
PROJECT STATE	: Kentucky	SAMPLE DEPTH :	24.0' to 25.5'
LABORATORY #	: 09124	DATE TESTED :	06-24-09
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED :	07-20-09
SOIL TYPE	: Light Brown Silty Clay		

SAMPLE DATA

INITIAL HEIGHT	:	2.81 in
INITIAL DIAMETER	:	1.39 in

RESULTS

MOISTURE	:	21.6 %
WET DENSITY	:	133.6 pcf
DRY DENSITY	:	109.8 pcf

Comments :

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UNIT WEIGHT TEST

PROJECT NAME	: Paducah LFPP Feasibility / Certification Study		
PROJECT #	: W912QR-06-D-0027, Task Order No. 0039	SAMPLE #	: SS - 4
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. AD -4
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 9.0' to 10.5'
LABORATORY #	: 09124	DATE TESTED	: 06-24-09
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 07-20-09
SOIL TYPE	: Dark Brown Silty Clay		

SAMPLE DATA

INITIAL HEIGHT	:	2.82 in
INITIAL DIAMETER	:	1.36 in

RESULTS

MOISTURE	:	22.2 %
WET DENSITY	:	131.8 pcf
DRY DENSITY	:	107.9 pcf

Comments :

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UNIT WEIGHT TEST

PROJECT NAME	: Paducah LFPP Feasibility / Certification Study		
PROJECT #	: W912QR-06-D-0027, Task Order No. 0039	SAMPLE #	: SS - 11
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. AD -6
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 15.0' to 16.5'
LABORATORY #	: 09124	DATE TESTED	: 06-24-09
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 07-20-09
SOIL TYPE	: Brown Silty Clay		

SAMPLE DATA

INITIAL HEIGHT	:	2.81 in
INITIAL DIAMETER	:	1.32 in

RESULTS

MOISTURE	:	28.9 %
WET DENSITY	:	127.8 pcf
DRY DENSITY	:	99.1 pcf

Comments :

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UNCONFINED COMPRESSION TEST

Project Name	: Paducah LFPP Feasibility / Certification Study			
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	:	ST - 1
Project County	: McCracken	Sample Loc.	:	Boring No_AD-1
Project State	: Kentucky	Sample Depth	:	6.4' to 6.9'
Laboratory No.	: 09124	Date Tested	:	06-25-09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	:	07-20-09
Soil Type	: Beige, Gray & Tan Lean Clay			
Wet Density	: 127.3 pcf	Initial Height	:	5.71 in
Dry Density	: 103.4 pcf	Initial Diameter	:	2.84 in
Moisture	: 23.1 %	Proving Ring	:	#22734

RESULTS:

#	Axial Load lbs	Corrected Area sf	Unit Strain %	Stress Ksf
1	0.0	0.04	0.0	0.00
2	36.0	0.04	0.3	0.82
3	44.0	0.04	0.5	1.00
4	52.0	0.04	0.8	1.17
5	59.0	0.04	1.1	1.33
6	67.0	0.04	1.3	1.50
7	74.0	0.04	1.6	1.66
8	81.0	0.04	1.8	1.81
9	87.0	0.04	2.1	1.94
10	94.0	0.05	2.5	2.08
11	101.0	0.05	2.8	2.23
12	107.7	0.05	3.2	2.37
13	114.4	0.05	3.5	2.51
14	121.6	0.05	3.9	2.66
15	126.9	0.05	4.4	2.76
16	132.6	0.05	4.6	2.88
17	137.4	0.05	4.9	2.97
18	143.2	0.05	5.3	3.08
19	148.0	0.05	5.7	3.17
20	153.6	0.05	6.1	3.28
21	159.3	0.05	6.6	3.38
22	163.5	0.05	7.0	3.46
23	166.8	0.05	7.4	3.51
24	169.6	0.05	7.9	3.55
25	172.0	0.05	8.3	3.58
26	171.5	0.05	8.8	3.56
27	164.9	0.05	9.6	3.39
28	158.8	0.05	10.5	3.23

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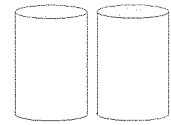
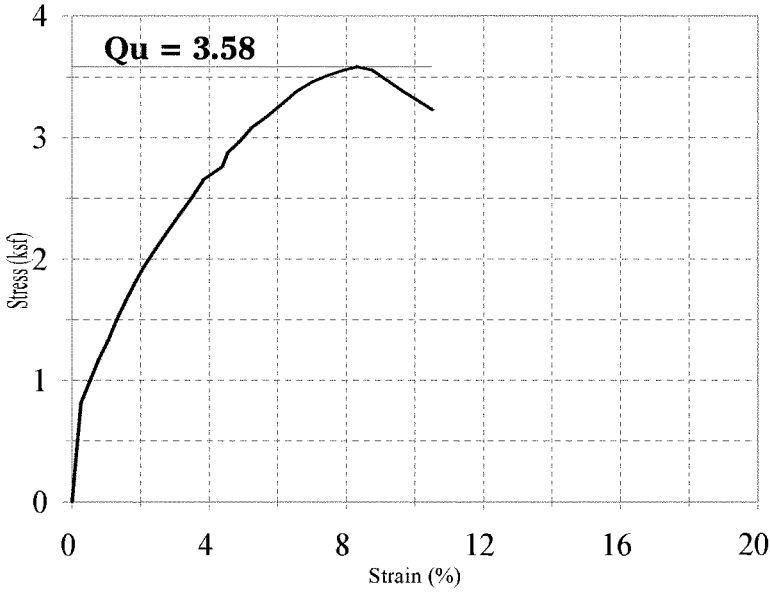
UNCONFINED COMPRESSION TEST

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: ST - 1
Project County	: McCracken	Sample Loc.	: Boring No_AD-1
Project State	: Kentucky	Sample Depth	: 6.4' to 6.9'
Laboratory No.	: 09124	Date Tested	: 06-25-09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07-20-09
Soil Type	: Beige, Gray & Tan Lean Clay		
Wet Density	: 127.3 pcf	Initial Height	: 5.71 in
Dry Density	: 103.4 pcf	Initial Diameter	: 2.84 in
Moisture	: 23.1 %	Proving Ring	: #22734
Deg. of Sat.	: 97.7 %	Specific Gravity	: 2.724
COMMENTS	: AASHTO: T-208		





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UNCONFINED COMPRESSION TEST

Project Name	: Paducah LFPP Feasibility / Certification Study			
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	:	ST - 1
Project County	: McCracken	Sample Loc.	:	Boring No_AD-4
Project State	: Kentucky	Sample Depth	:	10.5' to 11.0'
Laboratory No.	: 09124	Date Tested	:	06-26-09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	:	07-20-09
Soil Type	: Light Brown Lean Clay			
Wet Density	: 128.8 pcf	Initial Height	:	5.73 in
Dry Density	: 104.0 pcf	Initial Diameter	:	2.84 in
Moisture	: 23.9 %	Proving Ring	:	#22734

RESULTS:

#	Axial Load lbs	Corrected Area sf	Unit Strain %	Stress Ksf
1	0.0	0.04	0.0	0.00
2	11.0	0.04	0.3	0.25
3	22.0	0.04	0.5	0.50
4	30.0	0.04	0.8	0.68
5	39.0	0.04	1.0	0.88
6	49.0	0.04	1.3	1.10
7	60.0	0.04	1.6	1.34
8	71.0	0.04	1.8	1.58
9	83.0	0.05	2.1	1.84
10	98.0	0.05	2.4	2.17
11	114.4	0.05	2.8	2.52
12	127.8	0.05	3.1	2.81
13	140.3	0.05	3.5	3.07
14	151.8	0.05	3.8	3.31
15	164.0	0.05	4.4	3.56
16	173.4	0.05	4.5	3.76
17	180.9	0.05	4.9	3.90
18	187.5	0.05	5.2	4.03
19	194.1	0.05	5.7	4.15
20	198.7	0.05	6.1	4.23
21	203.3	0.05	6.5	4.31
22	207.9	0.05	7.0	4.39
23	209.7	0.05	7.4	4.41
24	209.7	0.05	7.9	4.38
25	207.0	0.05	8.3	4.31
26	200.5	0.05	8.7	4.15

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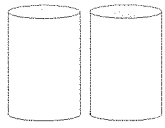
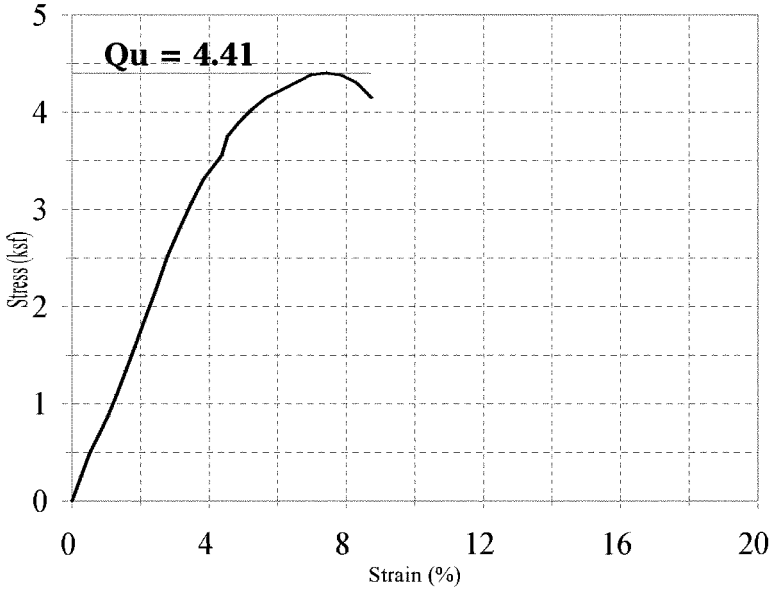
UNCONFINED COMPRESSION TEST

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Sample No.	: ST - 1
Project County	: McCracken	Sample Loc.	: Boring No_AD-4
Project State	: Kentucky	Sample Depth	: 10.5' to 11.0'
Laboratory No.	: 09124	Date Tested	: 06-26-09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07-20-09
Soil Type	: Light Brown Lean Clay		
Wet Density	: 128.8 pcf	Initial Height	: 5.73 in
Dry Density	: 104.0 pcf	Initial Diameter	: 2.84 in
Moisture	: 23.9 %	Proving Ring	: #22734
Deg. of Sat.	: 100.0 %	Specific Gravity	: 2.748
COMMENTS	: AASHTO: T-208		





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Florence & Hutcheson, Inc.
CONSULTING ENGINEERS

TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Submitted By : Florence & Hutcheson, Inc.
Soil Type : Light Brown Lean Clay
Wet Density : 129.1 pcf
Dry Density : 104.7 pcf
Moisture : 23.3 %
Delta Height : NA
Delta Volume : NA
Chamber Pressure. : 9.7 psi
Point No. : 1
Sample Loc. : Boring No. AD - 4
Sample Depth : 11.0' to 11.5'
Date Tested : 06-29-09
Date Reported : 07-21-09
Initial Height : 14.60 cm
Initial Diameter : 7.21 cm
Init. Pore Pres. : NA

RESULTS:

	ε a	σ 3 (psi)	σ 1 (psi)	σ1 / σ3
1	0.00	9.72	9.72	1.00
2	0.09	9.72	12.24	1.26
3	0.17	9.72	13.03	1.34
4	0.26	9.72	13.66	1.41
5	0.35	9.72	14.13	1.45
6	0.43	9.72	14.68	1.51
7	0.52	9.72	15.38	1.58
8	1.04	9.72	18.28	1.88
9	1.57	9.72	21.60	2.22
10	2.09	9.72	25.14	2.59
11	2.61	9.72	27.77	2.86
12	3.13	9.72	29.56	3.04
13	3.48	9.72	30.57	3.15
14	4.35	9.72	32.51	3.35
15	5.22	9.72	33.88	3.49
16	6.09	9.72	34.97	3.60
17	6.96	9.72	35.90	3.69
18	7.83	9.72	36.68	3.77
19	8.70	9.72	37.29	3.84
20	9.57	9.72	37.65	3.87
21	10.44	9.72	38.11	3.92
22	11.30	9.72	38.44	3.96
23	12.17	9.72	38.69	3.98
24	13.04	9.72	38.94	4.01
25	13.91	9.72	39.35	4.05
26	14.78	9.72	39.40	4.05
27	15.65	9.72	39.55	4.07
28	16.52	9.72	39.59	4.07
29	17.39	9.72	39.61	4.08
30	18.26	9.72	39.64	4.08
31	19.13	9.72	39.66	4.08
32	20.00	9.72	39.56	4.07

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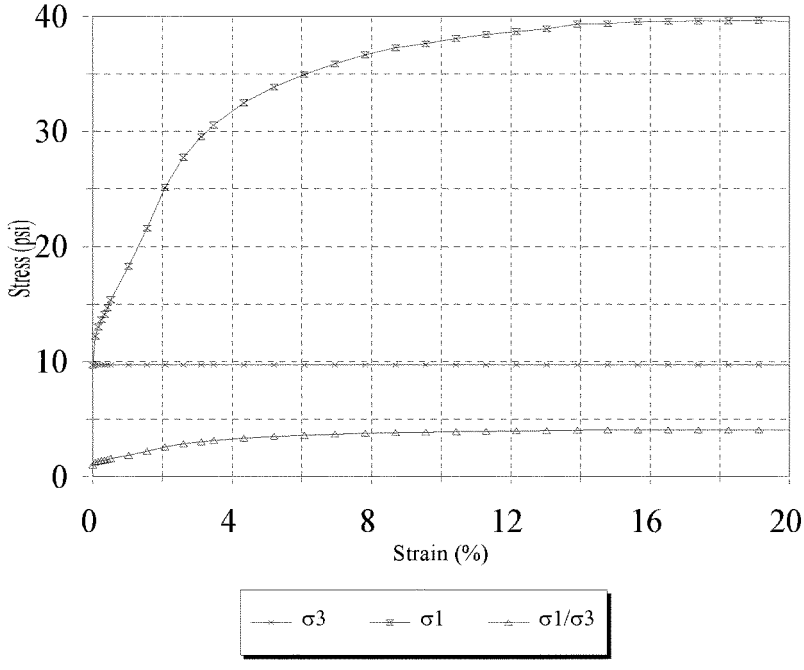
TRIAXIAL COMPRESSION TEST

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Point No.	: 1
Project County	: McCracken	Sample Loc.	: Boring No. AD - 4
Project State	: Kentucky	Sample Depth	: 11.0' to 11.5'
Laboratory No.	: 09124	Date Tested	: 06-29-09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07-21-09

Final Moisture : 23.3 %	Eff. Cons. Stress : 9.72 psi	Init.Void Ratio : 0.6385
Final Height : 11.68 cm	Total Back Pressure : NA	Final Void Ratio : 0.6385
Final Diameter : 8.06 cm	Pore Pres. After Sat. : NA	Specific Gravity : 2.748
Initial Saturation : 100 %	Final Saturation : 100 %	Comments : AASHTO T-296

RESULTS:



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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken — Sample Loc. : Boring No. AD - 4
Project State : Kentucky — Sample Depth : 11.0' to 11.5'
Laboratory No. : 09124 — Date Tested : 06-29-09
Submitted By : Florence & Hutcheson, Inc. — Date Reported : 07-21-09

COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES :

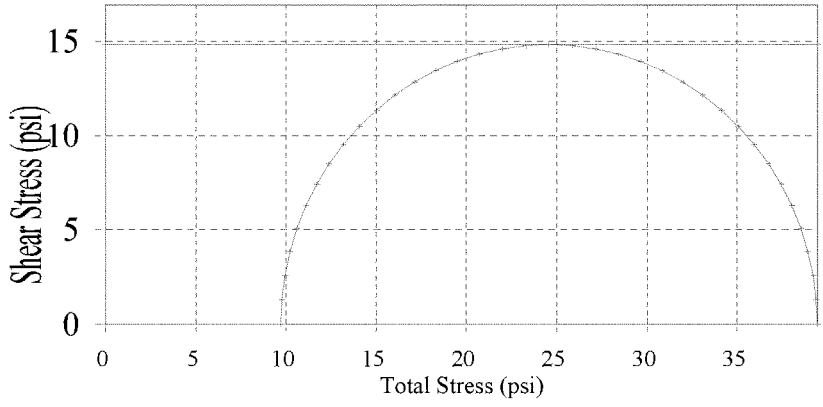
Test	Lateral	Total
1	9.72	39.44

Compressive Strength = 4279 psf
Cohesion = 2140 psf
Phi = 0.0 deg
Tan (Phi) = 0.0000

At Maximum Deviator Stress

Triaxial Mohr's Circles

Unconsolidated Undrained Triaxial Test



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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Submitted By : Florence & Hutcheson, Inc.
Soil Type : Tan, Beige & Brown Lean Clay

Point No. : 1
Sample Loc. : Boring No. AD - 6A
Sample Depth : 8.0' to 9.5'
Date Tested : 06-25-09
Date Reported : 07-21-09

Wet Density : 126.5 pcf
Dry Density : 101.9 pcf
Moisture : 24.2 %

Delta Height : NA
Delta Volume : NA
Chamber Pressure. : 4.0 psi

Initial Height : 14.69 cm
Initial Diameter : 7.18 cm
Init. Pore Pres. : NA

RESULTS:

	ε a	σ 3 (psi)	σ 1 (psi)	σ1 / σ3
1	0.00	4.01	4.01	1.00
2	0.09	4.01	5.76	1.44
3	0.17	4.01	6.40	1.60
4	0.26	4.01	7.03	1.75
5	0.35	4.01	7.51	1.87
6	0.43	4.01	8.14	2.03
7	0.52	4.01	8.93	2.23
8	1.04	4.01	13.97	3.48
9	1.56	4.01	20.20	5.04
10	2.07	4.01	19.84	4.95
11	2.59	4.01	19.48	4.86
12	3.11	4.01	20.08	5.01
13	3.46	4.01	20.56	5.13
14	4.32	4.01	21.36	5.32
15	5.19	4.01	21.73	5.42
16	6.05	4.01	21.83	5.44
17	6.92	4.01	21.80	5.44
18	7.78	4.01	21.89	5.46
19	8.65	4.01	21.92	5.46
20	9.51	4.01	21.81	5.44
21	10.37	4.01	22.02	5.49
22	11.24	4.01	22.28	5.56
23	12.10	4.01	22.41	5.59
24	12.97	4.01	21.80	5.44
25	13.83	4.01	22.05	5.50
26	14.70	4.01	22.23	5.54
27	15.56	4.01	22.40	5.58
28	16.43	4.01	22.68	5.65
29	17.29	4.01	22.72	5.66
30	18.16	4.01	22.92	5.72
31	19.02	4.01	23.01	5.74
32	19.88	4.01	22.97	5.73

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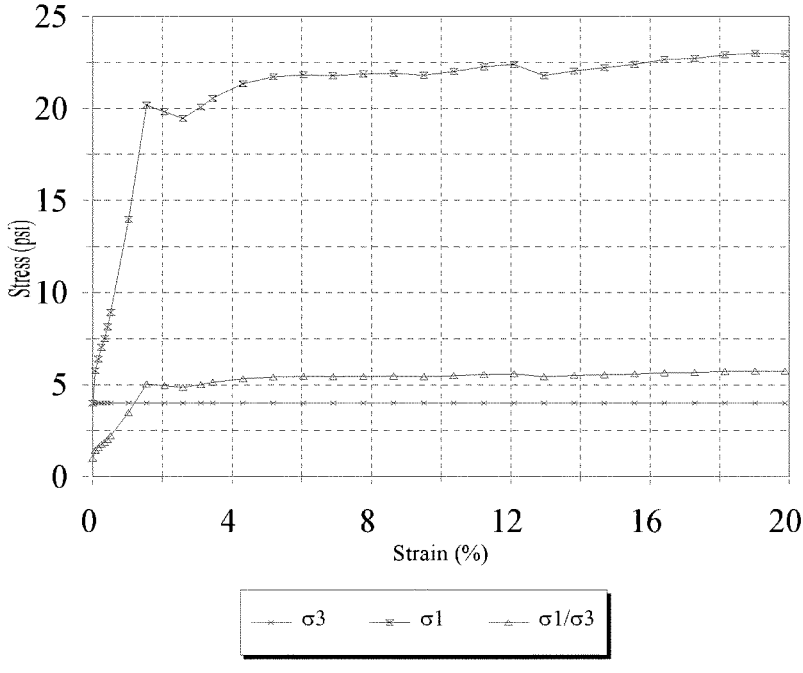
TRIAXIAL COMPRESSION TEST

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Point No.	: 1
Project County	: McCracken	Sample Loc.	: Boring No. AD - 6A
Project State	: Kentucky	Sample Depth	: 8.0' to 9.5'
Laboratory No.	: 09124	Date Tested	: 06-25-09
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07-21-09

Final Moisture : 24.2 %	Eff. Cons. Stress : 4.01 psi	Init.Void Ratio : 0.6880
Final Height : 11.77 cm	Total Back Pressure : NA	Final Void Ratio : 0.6880
Final Diameter : 8.02 cm	Pore Pres. After Sat. : NA	Specific Gravity : 2.756
Initial Saturation : 97 %	Final Saturation : 97 %	Comments : AASHTO T-296

RESULTS:



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TRIAXIAL COMPRESSION TEST

PROJECT NAME : Paducah LFPP Feasibility / Certification Study
PROJECT # : W912QR-06-D-0027, Task Order N **POINT #** : 2
PROJECT COUNTY : McCracken **SAMPLE LOC.** : Boring No. AD - 6A
PROJECT STATE : Kentucky **SAMPLE DEPTH** : 8.0' to 9.5'
LABORATORY # : 09124 **DATE TESTED** : 06-25-09
SUBMITTED BY : Florence & Hutcheson, Inc. **DATE REPORTED** : 07-21-09
SOIL TYPE : Tan, Beige & Brown Lean Clay
WET DENSITY : 126.4 pcf **DELTA HEIGHT** : NA **INITIAL HEIGHT** : 14.58 cm
DRY DENSITY : 100.9 pcf **DELTA VOLUME** : NA **INITIAL DIAMETEI** : 7.19 cm
MOISTURE : 25.3 % **CHAMBER PRES.** : 8.02 psi **INIT. PORE PRES.** : NA
RESULTS:

	ε_a	$\sigma 3$ (psi)	$\sigma 1$ (psi)	$\sigma 1 / \sigma 3$
1	0.00	8.02	8.02	1.00
2	0.09	8.02	9.60	1.20
3	0.17	8.02	10.55	1.32
4	0.26	8.02	11.34	1.41
5	0.35	8.02	11.97	1.49
6	0.44	8.02	12.76	1.59
7	0.52	8.02	13.54	1.69
8	1.05	8.02	19.26	2.40
9	1.57	8.02	25.65	3.20
10	2.09	8.02	28.70	3.58
11	2.61	8.02	26.14	3.26
12	3.14	8.02	24.01	3.00
13	3.48	8.02	23.55	2.94
14	4.36	8.02	23.14	2.89
15	5.23	8.02	24.33	3.04
16	6.10	8.02	25.10	3.13
17	6.97	8.02	25.85	3.22
18	7.84	8.02	26.65	3.32
19	8.71	8.02	27.43	3.42
20	9.58	8.02	28.13	3.51
21	10.45	8.02	28.31	3.53
22	11.32	8.02	28.73	3.58
23	12.20	8.02	29.02	3.62
24	13.07	8.02	28.57	3.56
25	13.94	8.02	28.36	3.54
26	14.81	8.02	28.15	3.51
27	15.68	8.02	28.07	3.50
28	16.55	8.02	28.32	3.53
29	17.42	8.02	28.23	3.52
30	18.29	8.02	28.47	3.55
31	19.16	8.02	28.42	3.55
32	20.04	8.02	28.31	3.53

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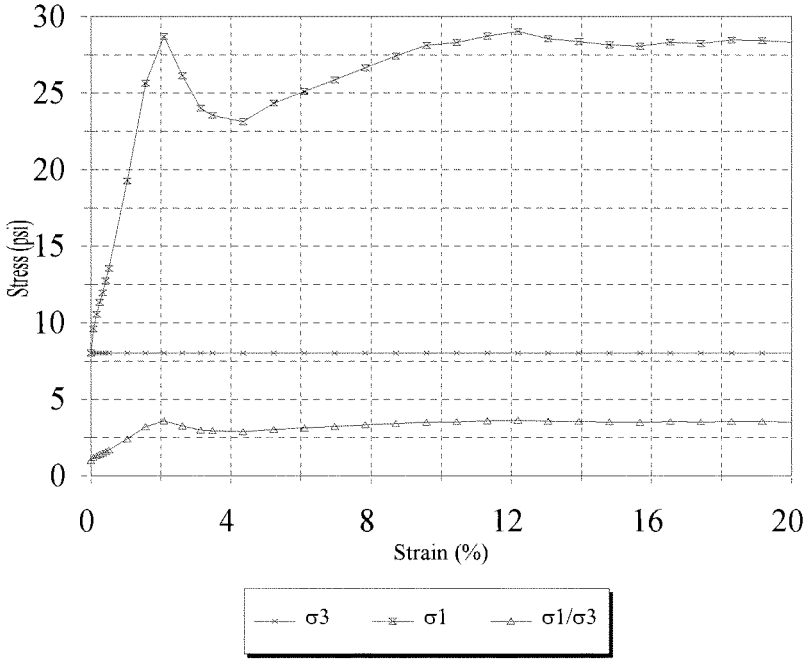
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS

TRIAXIAL COMPRESSION TEST

PROJECT NAME	: Paducah LFPP Feasibility / Certification Study		
PROJECT #	: W912QR-06-D-0027, Task Order N	**POINT #**	: 2
PROJECT COUNTY	: McCracken	**SAMPLE LOC.**	: Boring No. AD - 6A
PROJECT STATE	: Kentucky	**SAMPLE DEPTH**	: 8.0' to 9.5'
LABORATORY #	: 09124	**DATE TESTED**	: 06-25-09
SUBMITTED BY	: Florence & Hutcheson, Inc.	**DATE REPORTED**	: 07-21-09

FINAL MOISTURE	: 25.3 %	**EFF. CONS. STRESS**	: 8.02 psi	**INIT.VOID RATIO**	: 0.7056
FINAL HEIGHT	: 11.66 cm	**TOTAL BACK PRESSURE**	: NA	**FINAL VOID RATIO**	: 0.7056
FINAL DIAMETER	: 8.04 cm	**PORE PRES. AFTER SAT.**	: NA	**SPECIFIC GRAVITY**	: 2.756
INTIAL SATURATION	: 99 %	**FINAL SATURATION**	: 99 %	**COMMENTS**	: AASHTO T-296

RESULTS:



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TRIAXIAL COMPRESSION TEST

PROJECT NAME : Paducah LFPP Feasibility / Certification Study
PROJECT # : W912QR-06-D-0027, Task Order N **POINT #** : 3
PROJECT COUNTY : McCracken **SAMPLE LOC.** : Boring No. AD - 6A
PROJECT STATE : Kentucky **SAMPLE DEPTH** : 8.0' to 9.5'
LABORATORY # : 09124 **DATE TESTED** : 06-25-09
SUBMITTED BY : Florence & Hutcheson, Inc. **DATE REPORTED** : 07-21-09
SOIL TYPE : Tan, Beige & Brown Lean Clay
WET DENSITY : 124.8 pcf **DELTA HEIGHT** : NA **INITIAL HEIGHT** : 14.67 cm
DRY DENSITY : 98.8 pcf **DELTA VOLUME** : NA **INITIAL DIAMETEI** : 7.17 cm
MOISTURE : 26.3 % **CHAMBER PRES.** : 16.02 psi **INIT. PORE PRES.** : NA
RESULTS:

	ε_a	$\sigma 3$ (psi)	$\sigma 1$ (psi)	$\sigma 1 / \sigma 3$
1	0.00	16.02	16.02	1.00
2	0.09	16.02	19.22	1.20
3	0.17	16.02	20.81	1.30
4	0.26	16.02	22.40	1.40
5	0.35	16.02	23.67	1.48
6	0.43	16.02	24.73	1.54
7	0.52	16.02	25.61	1.60
8	1.04	16.02	30.47	1.90
9	1.56	16.02	34.46	2.15
10	2.08	16.02	37.26	2.33
11	2.60	16.02	38.79	2.42
12	3.12	16.02	38.94	2.43
13	3.46	16.02	39.13	2.44
14	4.33	16.02	39.86	2.49
15	5.19	16.02	39.78	2.48
16	6.06	16.02	39.96	2.49
17	6.92	16.02	40.26	2.51
18	7.79	16.02	40.17	2.51
19	8.65	16.02	40.45	2.52
20	9.52	16.02	40.35	2.52
21	10.39	16.02	40.37	2.52
22	11.25	16.02	40.51	2.53
23	12.12	16.02	40.39	2.52
24	12.98	16.02	40.40	2.52
25	13.85	16.02	40.40	2.52
26	14.71	16.02	40.27	2.51
27	15.58	16.02	40.50	2.53
28	16.44	16.02	40.13	2.50
29	17.31	16.02	40.12	2.50
30	18.17	16.02	39.98	2.49
31	19.04	16.02	39.84	2.49
32	19.91	16.02	39.81	2.48

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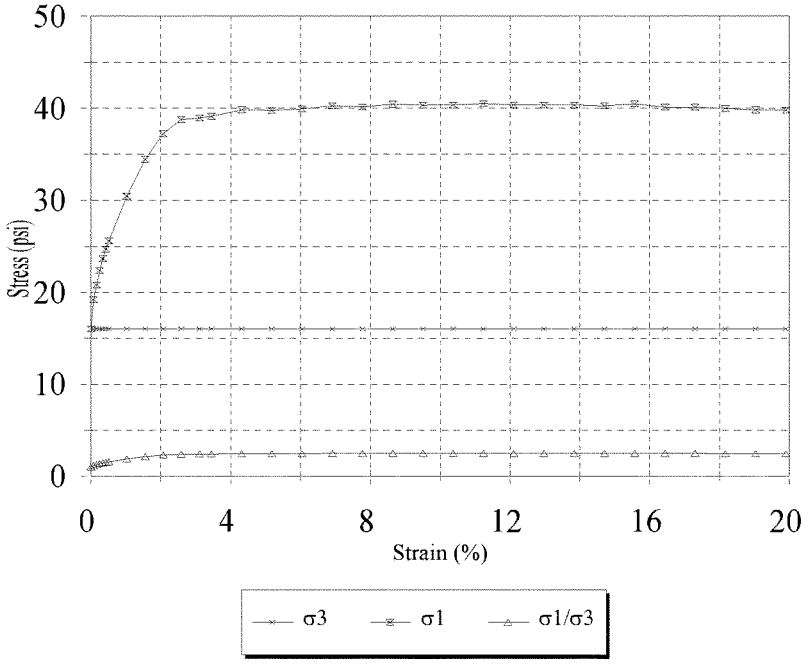
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS

TRIAXIAL COMPRESSION TEST

PROJECT NAME	: Paducah LFPP Feasibility / Certification Study		
PROJECT #	: W912QR-06-D-0027, Task Order N	**POINT #**	: 3
PROJECT COUNTY	: McCracken	**SAMPLE LOC.**	: Boring No. AD - 6A
PROJECT STATE	: Kentucky	**SAMPLE DEPTH**	: 8.0' to 9.5'
LABORATORY #	: 09124	**DATE TESTED**	: 06-25-09
SUBMITTED BY	: Florence & Hutcheson, Inc.	**DATE REPORTED**	: 07-21-09

FINAL MOISTURE	: 26.3 %	**EFF. CONS. STRESS**	: 16.02 psi	**INIT.VOID RATIO**	: 0.7421
FINAL HEIGHT	: 11.75 cm	**TOTAL BACK PRESSURE**	: NA	**FINAL VOID RATIO**	: 0.7421
FINAL DIAMETER	: 8.01 cm	**PORE PRES. AFTER SAT.**	: NA	**SPECIFIC GRAVITY**	: 2.756
INTIAL SATURATION	: 98 %	**FINAL SATURATION**	: 98 %	**COMMENTS**	: AASHTO T-296

RESULTS:



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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken — Sample Loc. : Boring No. AD - 6A
Project State : Kentucky — Sample Depth : 8.0' to 9.5'
Laboratory No. : 09124 — Date Tested : 06-25-09
Submitted By : Florence & Hutcheson, Inc. — Date Reported : 07-21-09

COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES :

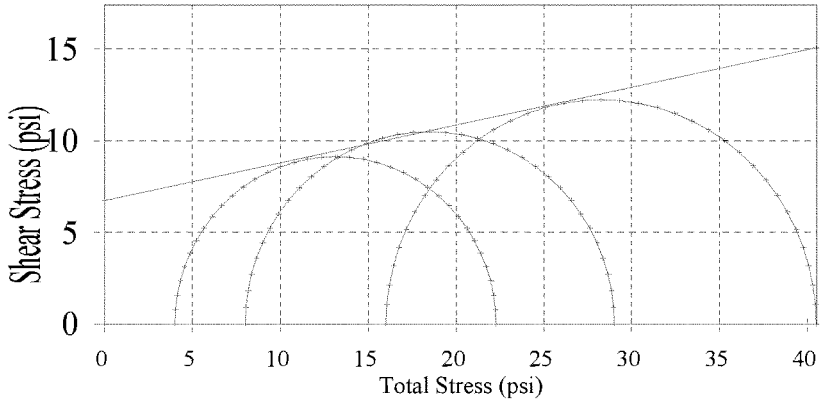
Test	Lateral	Total
1	4.01	22.29
2	8.02	29.02
3	16.02	40.51

Compressive Strength = 2632 psf
Cohesion = 969 psf
Phi = 11.7 deg
Tan (Phi) = 0.2063

At Maximum Deviator Stress

Triaxial Mohr's Circles

Unconsolidated Undrained Triaxial Test



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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.
Soil Type : Tan, Beige & Brown Lean Clay

Point No. : 1
Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

Wet Density : 126.8 pcf
Dry Density : 101.6 pcf
Moisture : 24.9 %

Delta Height : 0.14 cm
Delta Volume : 1.70 cc
Chamber Pres. : 49.9 psi

Initial Height : 14.55 cm
Initial Diameter : 7.13 cm
Init. Pore Pres. : 39.97 psi

RESULTS:

	Δ μ (psi)	ε a	σ'3 (psi)	σ'1 (psi)	σ'1 / σ'3	q (psi)	p' (psi)
1	0.00	0.00	9.93	9.93	1.00	0.00	9.93
2	1.91	0.11	8.03	10.89	1.36	1.43	9.46
3	2.66	0.21	7.27	11.03	1.52	1.88	9.15
4	3.26	0.32	6.67	11.03	1.65	2.18	8.85
5	3.76	0.42	6.17	11.12	1.80	2.47	8.65
6	4.01	0.53	5.92	11.01	1.86	2.55	8.47
7	4.26	0.63	5.67	11.06	1.95	2.69	8.36
8	4.56	0.74	5.37	10.94	2.04	2.78	8.15
9	4.61	0.85	5.32	11.14	2.10	2.91	8.23
10	4.71	0.95	5.22	11.26	2.16	3.02	8.24
11	5.12	1.06	4.82	11.08	2.30	3.13	7.95
12	5.72	2.12	4.22	12.04	2.86	3.91	8.13
13	5.82	3.17	4.12	13.27	3.22	4.58	8.69
14	5.82	4.23	4.12	14.86	3.61	5.37	9.49
15	5.57	5.29	4.37	16.38	3.75	6.01	10.37
16	5.52	6.35	4.42	17.52	3.97	6.55	10.97
17	5.32	7.41	4.62	18.85	4.08	7.12	11.73
18	4.87	8.46	5.07	20.24	3.99	7.59	12.66
19	4.56	9.52	5.37	21.53	4.01	8.08	13.45
20	4.21	10.58	5.72	22.83	3.99	8.56	14.28
21	3.71	11.64	6.22	23.93	3.85	8.85	15.08
22	3.36	12.70	6.57	24.92	3.79	9.18	15.75
23	3.11	13.75	6.82	25.67	3.76	9.42	16.25
24	2.76	14.81	7.17	26.43	3.68	9.63	16.80
25	2.41	15.87	7.53	27.19	3.61	9.83	17.36
26	2.01	16.93	7.93	27.98	3.53	10.03	17.95
27	1.66	17.98	8.28	28.58	3.45	10.15	18.43
28	1.40	19.04	8.53	28.94	3.39	10.21	18.73
29	1.10	20.10	8.83	29.34	3.32	10.26	19.09

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS

TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

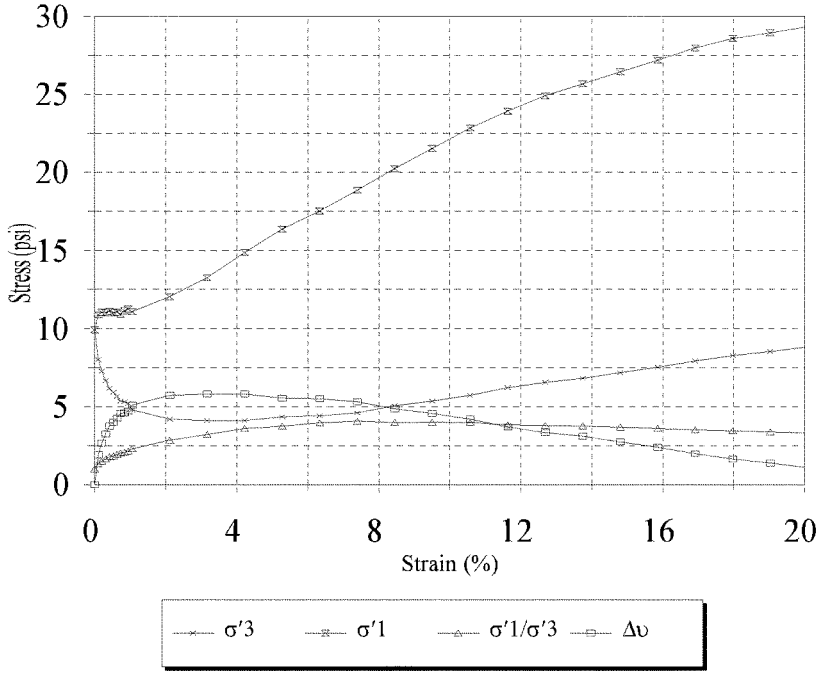
Point No. : 1
Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

Final Moisture : 24.7 %
Final Height : 13.27 cm
Final Diameter : 7.43 cm
Initial Saturation : 97 %

Eff. Cons. Stress : 9.93 psi
Total Back Pressure : 39.90 psi
Pore Pres. After Sat. : 40.82 psi
Final Saturation : 99 %

Init. Void Ratio : 0.7118
Final Void Ratio : 0.6947
Specific Gravity : 2.785
COMMENTS : AASHTO T-297

RESULTS:



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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.
Soil Type : Tan, Beige & Brown Lean Clay

Point No. : 2
Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

Wet Density : 126.4 pcf
Dry Density : 99.0 pcf
Moisture : 27.6 %

Delta Height : 0.14 cm
Delta Volume : 23.60 cc
Chamber Pres. : 59.90 psi

Initial Height : 14.51 cm
Initial Diameter : 7.16 cm
Init. Pore Pres. : 40.30 psi

RESULTS:

	Δ μ (psi)	ε a	σ'3 (psi)	σ'1 (psi)	σ'1 / σ'3	q (psi)	p' (psi)
1	0.00	0.00	19.60	19.60	1.00	0.00	19.60
2	2.80	0.11	16.80	22.55	1.34	2.87	19.67
3	4.60	0.21	15.00	23.03	1.54	4.02	19.02
4	5.60	0.32	14.00	23.49	1.68	4.75	18.74
5	6.50	0.42	13.10	23.37	1.78	5.14	18.23
6	7.10	0.53	12.50	23.55	1.88	5.52	18.02
7	7.60	0.64	12.00	23.67	1.97	5.83	17.83
8	7.90	0.74	11.70	23.98	2.05	6.14	17.84
9	8.26	0.85	11.35	24.09	2.12	6.37	17.72
10	8.61	0.95	11.00	24.12	2.19	6.56	17.56
11	9.01	1.06	10.60	24.18	2.28	6.79	17.39
12	10.06	2.12	9.55	26.30	2.75	8.38	17.92
13	10.01	3.18	9.60	29.10	3.03	9.75	19.35
14	9.91	4.24	9.70	32.49	3.35	11.40	21.09
15	9.36	5.30	10.25	35.19	3.44	12.47	22.72
16	8.76	6.36	10.85	37.89	3.49	13.52	24.37
17	8.16	7.42	11.45	40.39	3.53	14.47	25.92
18	7.15	8.48	12.45	42.39	3.41	14.97	27.42
19	6.35	9.54	13.25	44.19	3.34	15.47	28.72
20	5.60	10.60	14.00	45.90	3.28	15.95	29.95
21	4.90	11.66	14.70	46.96	3.20	16.13	30.83
22	4.20	12.73	15.40	47.81	3.10	16.20	31.60
23	3.65	13.79	15.95	48.55	3.04	16.30	32.25
24	3.10	14.85	16.50	48.83	2.96	16.17	32.67
25	2.50	15.91	17.10	49.16	2.87	16.03	33.13
26	2.20	16.97	17.40	48.99	2.82	15.80	33.20
27	2.00	18.03	17.60	48.73	2.77	15.56	33.16
28	1.75	19.09	17.85	48.20	2.70	15.18	33.03
29	1.75	20.15	17.85	47.68	2.67	14.92	32.77

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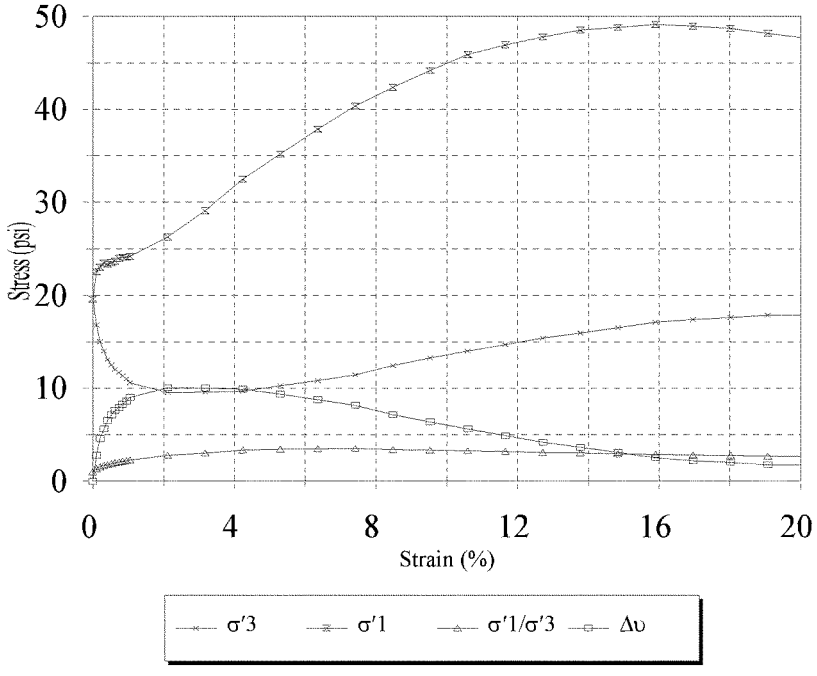
CONSULTING ENGINEERS

TRIAXIAL COMPRESSION TEST

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Point No.	: 2
Project County	: McCracken	Sample Loc.	: Boring No. AD - 6A
Project State	: Kentucky	Sample Depth	: 21.0' to 22.5'
Laboratory No.	: 09124	Date Tested	: 06-24-09
Sumbitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07-21-09

Final Moisture	: 25.1 %	Eff. Cons. Stress	: 19.60 psi	Init. Void Ratio	: 0.7553
Final Height	: 13.23 cm	Total Back Pressure	: 39.90 psi	Final Void Ratio	: 0.7381
Final Diameter	: 7.46 cm	Pore Pres. After Sat.	: 40.70 psi	Specific Gravity	: 2.785
Initial Saturation	: 100 %	Final Saturation	: 95 %	COMMENTS	: AASHTO T-297

RESULTS:



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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.
Soil Type : Tan, Beige & Brown Lean Clay

Point No. : 3
Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

Wet Density : 127.9 pcf
Dry Density : 100.7 pcf
Moisture : 27.0 %

Delta Height : 0.29 cm
Delta Volume : 30.70 cc
Chamber Pres. : 79.90 psi

Initial Height : 14.59 cm
Initial Diameter : 7.16 cm
Init. Pore Pres. : 40.73 psi

RESULTS:

	Δ μ (psi)	ε a	σ'3 (psi)	σ'1 (psi)	σ'1 / σ'3	q (psi)	p' (psi)
1	0.00	0.00	39.17	39.17	1.00	0.00	39.17
2	4.66	0.11	34.51	44.29	1.28	4.89	39.40
3	8.02	0.21	31.16	45.77	1.47	7.31	38.46
4	10.07	0.32	29.10	45.97	1.58	8.44	37.54
5	12.02	0.43	27.15	45.71	1.68	9.28	36.43
6	13.23	0.53	25.95	45.81	1.77	9.93	35.88
7	14.53	0.64	24.64	45.57	1.85	10.46	35.10
8	15.58	0.75	23.59	45.31	1.92	10.86	34.45
9	16.38	0.85	22.79	45.37	1.99	11.29	34.08
10	17.13	0.96	22.04	45.21	2.05	11.59	33.62
11	17.84	1.07	21.34	45.11	2.11	11.89	33.22
12	21.19	2.13	17.98	46.25	2.57	14.14	32.12
13	22.19	3.20	16.98	48.22	2.84	15.62	32.60
14	22.24	4.26	16.93	51.12	3.02	17.10	34.02
15	22.19	5.33	16.98	54.04	3.18	18.53	35.51
16	21.74	6.39	17.43	56.68	3.25	19.63	37.05
17	21.04	7.46	18.13	59.37	3.27	20.62	38.75
18	20.29	8.52	18.88	61.68	3.27	21.40	40.28
19	19.39	9.59	19.78	63.75	3.22	21.99	41.77
20	18.69	10.65	20.48	65.30	3.19	22.41	42.89
21	17.74	11.72	21.44	66.80	3.12	22.68	44.12
22	16.78	12.79	22.39	67.87	3.03	22.74	45.13
23	16.13	13.85	23.04	68.22	2.96	22.59	45.63
24	15.58	14.92	23.59	68.35	2.90	22.38	45.97
25	15.13	15.98	24.04	68.36	2.84	22.16	46.20
26	14.73	17.05	24.44	68.33	2.80	21.94	46.39
27	14.43	18.11	24.74	68.19	2.76	21.72	46.47
28	14.18	19.18	24.99	67.88	2.72	21.44	46.44
29	13.93	20.24	25.24	67.44	2.67	21.10	46.34

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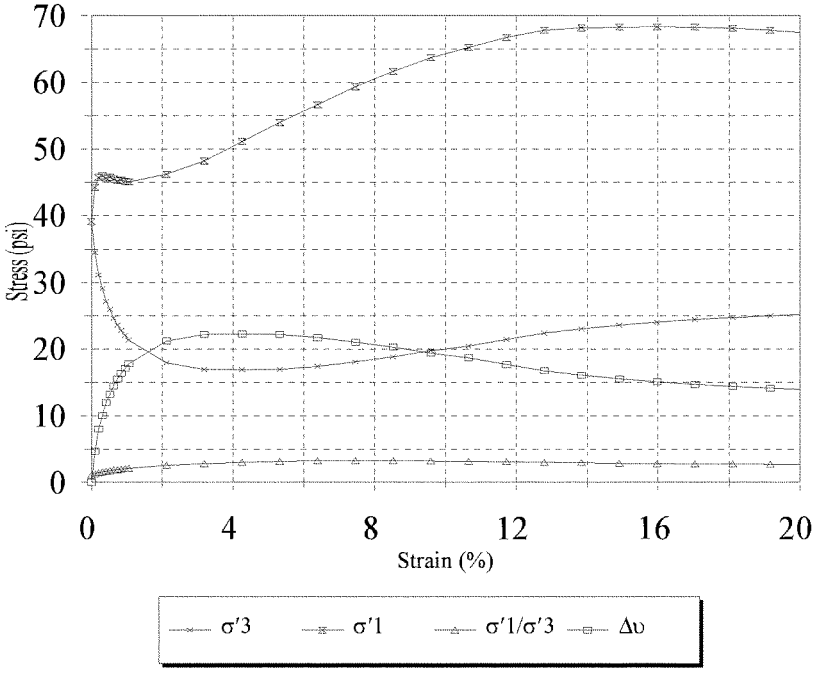
TRIAXIAL COMPRESSION TEST

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Point No.	: 3
Project County	: McCracken	Sample Loc.	: Boring No. AD - 6A
Project State	: Kentucky	Sample Depth	: 21.0' to 22.5'
Laboratory No.	: 09124	Date Tested	: 06-24-09
Sumbitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07-21-09

Final Moisture : 23.8 %	Eff. Cons. Stress : 39.17 psi	Init. Void Ratio : 0.7266
Final Height : 13.16 cm	Total Back Pressure : 39.90 psi	Final Void Ratio : 0.6926
Final Diameter : 7.45 cm	Pore Pres. After Sat. : 40.98 psi	Specific Gravity : 2.785
Initial Saturation : 100 %	Final Saturation : 96 %	COMMENTS : AASHTO T-297

RESULTS:



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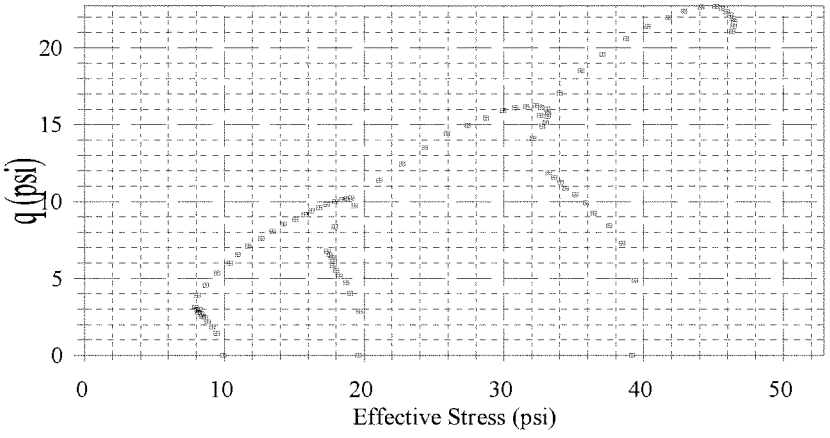
TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

Triaxial Failure Envelopes

Consolidated Undrained



sin(phi') = tan(alpha)
alpha = _____
phi' = _____

c' = a / cos(phi')
a = _____
c' = _____

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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.
Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES

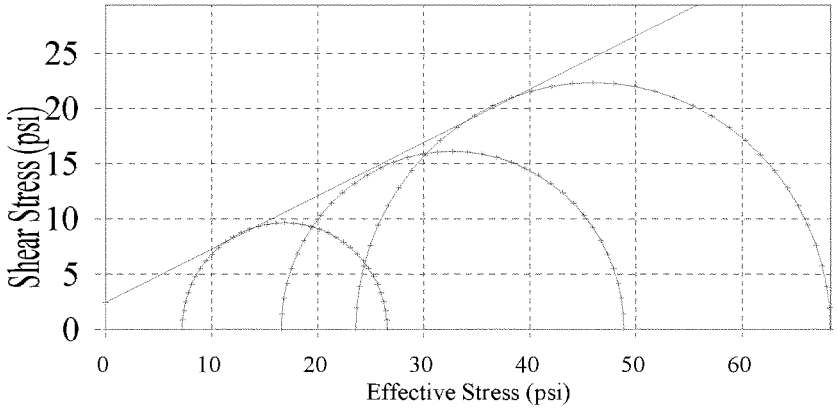
Test	Eff Lateral	Eff Total
1	7.24	26.56
2	16.59	48.88
3	23.63	68.35

Eff Cohesion =	348	psf
Eff Phi =	25.8	deg
Tan (Phi) =	0.4838	

At Maximum Deviator Stress

Triaxial Mohr's Circles

Consolidated Undrained



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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.
Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

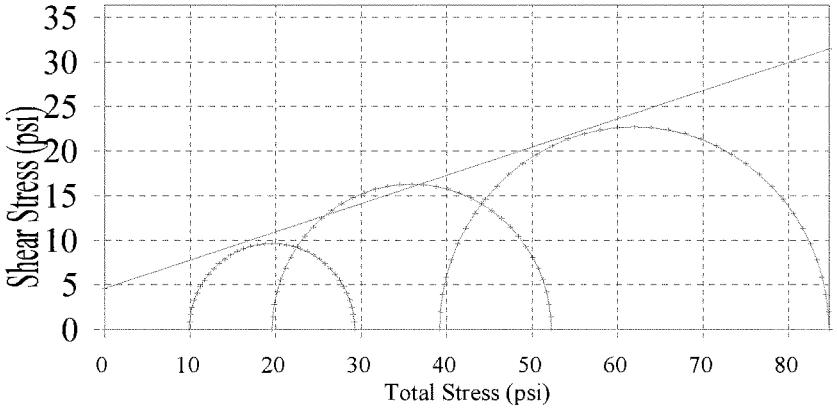
COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES

Test	Lateral	Total			
1	9.93	29.26	Cohesion =	663	psf
2	19.60	52.21	Phi =	17.6	deg
3	39.17	84.65	Tan (Phi) =	0.3176	

At Maximum Deviator Stress

Triaxial Mohr's Circles

Consolidated Undrained



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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.
Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES :

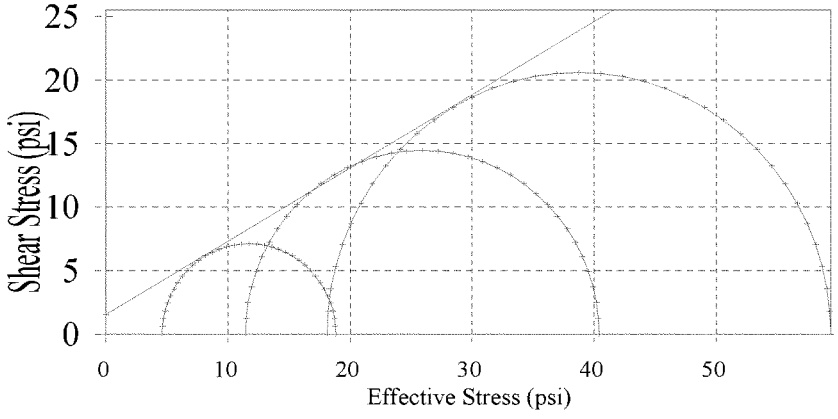
Test	Eff Lateral	Eff Total
1	4.62	18.85
2	11.45	40.39
3	18.13	59.37

Eff Cohesion = 222 psf
Eff Phi = 30.0 deg
Tan (Phi) = 0.5774

At Maximum Stress Ratio

Triaxial Mohr's Circles

Consolidated Undrained



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TRIAXIAL COMPRESSION TEST

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Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.
Sample Loc. : Boring No. AD - 6A
Sample Depth : 21.0' to 22.5'
Date Tested : 06-24-09
Date Reported : 07-21-09

COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES

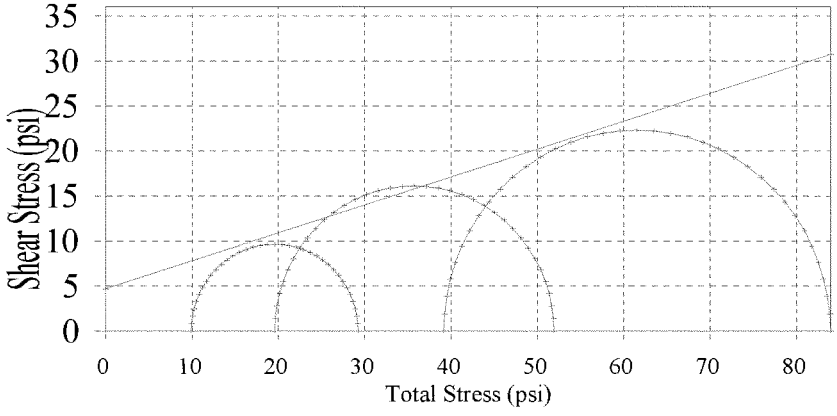
Test	Lateral	Total
1	9.93	29.26
2	19.60	51.90
3	39.17	83.89

Cohesion =	680	psf
Phi =	17.2	deg
Tan (Phi) =	0.3104	

At Maximum Stress Ratio

Triaxial Mohr's Circles

Consolidated Undrained



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CONSULTING ENGINEERS

PERMEABILITY TEST

PROJECT NAME	:	Paducah LFPP Feasibility / Certification Study			
PROJECT NO.	:	W912QR-06-D-0027, Task Order No. 0039	SAMPLE NO.	:	ST - 1
PROJECT COUNTY	:	McCracken	SAMPLE LOC.	:	Broing No. AD - 6A
PROJECT STATE	:	Kentucky	SAMPLE DEPTH	:	9.5' to 9.7'
LABORATORY NO.	:	09124	DATE TESTED	:	06-24-09
SUBMITTED BY	:	Florence & Hutcheson, Inc.	DATE REPORTED	:	07-21-09
SOIL TYPE	:	Tan, Beige & Brown Lean Clay			

$K_{20} = (Q \times L \times Rt)/(h \times A \times t)$

Area of Specimen, A =	40.082 cm²	Specific Gravity =	2.756
Dry Sample, Ws =	496.9 grams	Wet Weight =	621.7 grams
Height of Specimen, L =	7.489 cm	Diameter of Specimen, D =	7.205 cm

Test 1	Test 2	Test 3	Test 4
Q = 1.10 cm³	Q = 2.80 cm³	Q = 5.95 cm³	Q = 3.25 cm³
t = 7200 sec.	t = 21600 sec.	t = 50400 sec.	t = 28800 sec.
Rt = 0.8955	Rt = 0.9310	Rt = 0.9599	Rt = 0.9599
h = 162.28 cm	h = 156.99 cm	h = 148.17 cm	h = 137.58 cm
K_{20} = 1.58E-07	K_{20} = 1.44E-07	K_{20} = 1.43E-07	K_{20} = 1.47E-07

Average K_{20} = 1.48E-07 cm/sec.
Dry Density = 103.3 pcf
Moisture = 25.1 %
Saturation = 100 %
Compaction = Na

Comments: ASTM: D5084

Approved by: _____

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PERMEABILITY TEST

PROJECT NAME	:	Paducah LFPP Feasibility / Certification Study			
PROJECT NO.	:	W912QR-06-D-0027, Task Order No. 0039	SAMPLE NO.	:	ST - 2
PROJECT COUNTY	:	McCracken	SAMPLE LOC.	:	Broing No. AD - 6A
PROJECT STATE	:	Kentucky	SAMPLE DEPTH	:	22.5' to 23.0'
LABORATORY NO.	:	09124	DATE TESTED	:	06-24-09
SUBMITTED BY	:	Florence & Hutcheson, Inc.	DATE REPORTED	:	07-21-09
SOIL TYPE	:	Dark Orange & Beige Lean Clay			

$K_{20} = (Q \times L \times Rt)/(h \times A \times t)$

Area of Specimen, A =	39.623 cm²	Specific Gravity =	2.733
Dry Sample, Ws =	933.6 grams	Wet Weight =	1189.5 grams
Height of Specimen, L =	14.368 cm	Diameter of Specimen, D =	7.177 cm

Test 1	Test 2	Test 3	Test 4
Q = 1.30 cm³	Q = 2.43 cm³	Q = 9.73 cm³	Q = 4.30 cm³
t = 7200 sec.	t = 14400 sec.	t = 61200 sec.	t = 28800 sec.
Rt = 0.9206	Rt = 0.9188	Rt = 0.9488	Rt = 0.9574
h = 305.15 cm	h = 289.28 cm	h = 275.17 cm	h = 262.82 cm
K_{20} = 1.98E-07	K_{20} = 1.94E-07	K_{20} = 1.99E-07	K_{20} = 1.97E-07

Average K_{20} = 1.97E-07 cm/sec.
Dry Density = 102.3 pcf
Moisture = 27.4 %
Saturation = 100 %
Compaction = Na

Comments: ASTM: D5084

Approved by: _____

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Florence & Hutcheson, Inc.
CONSULTING ENGINEERS

PERMEABILITY TEST

PROJECT NAME	:	Paducah LFPP Feasibility / Certification Study			
PROJECT NO.	:	W912QR-06-D-0027, Task Order No. 0039	SAMPLE NO.	:	ST - 1
PROJECT COUNTY	:	McCracken	SAMPLE LOC.	:	Broing No. AD - 1
PROJECT STATE	:	Kentucky	SAMPLE DEPTH	:	6.0' to 6.3'
LABORATORY NO.	:	09124	DATE TESTED	:	07-10-09
SUBMITTED BY	:	Florence & Hutcheson, Inc.	DATE REPORTED	:	07-22-09
SOIL TYPE	:	Dark Orange & Beige Lean Clay			

$K_{20} = (Q \times L \times Rt)/(h \times A \times t)$

Area of Specimen, A =	40.635 cm²	Specific Gravity =	2.724
Dry Sample, Ws =	526.6 grams	Wet Weight =	667.9 grams
Height of Specimen, L =	8.229 cm	Diameter of Specimen, D =	7.182 cm

Test 1	Test 2	Test 3	Test 4
Q = 0.20 cm³	Q = 0.73 cm³	Q = 0.33 cm³	Q = 0.15 cm³
t = 32400 sec.	t = 153000 sec.	t = 66600 sec.	t = 25200 sec.
Rt = 0.9237	Rt = 0.9102	Rt = 0.9090	Rt = 0.9096
h = 276.93 cm	h = 269.88 cm	h = 262.82 cm	h = 264.58 cm
K_{20} = 4.17E-09	K_{20} = 3.24E-09	K_{20} = 3.42E-09	K_{20} = 4.14E-09

Average K_{20} = 3.74E-09 cm/sec.
Dry Density = 98.3 pcf
Moisture = 26.8 %
Saturation = 100 %
Compaction = Na

Comments: ASTM: D5084

Approved by: _____

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Florence & Hutcheson, Inc.
CONSULTING ENGINEERS

PERMEABILITY TEST

PROJECT NAME	:	Paducah LFPP Feasibility / Certification Study			
PROJECT NO.	:	W912QR-06-D-0027, Task Order No. 0039	SAMPLE NO.	:	ST - 1
PROJECT COUNTY	:	McCracken	SAMPLE LOC.	:	Broing No. AD - 3A
PROJECT STATE	:	Kentucky	SAMPLE DEPTH	:	5.5' to 6.0'
LABORATORY NO.	:	09124	DATE TESTED	:	07-10-09
SUBMITTED BY	:	Florence & Hutcheson, Inc.	DATE REPORTED	:	07-22-09
SOIL TYPE	:	Gray, Tan & Brown Gravelly Lean Clay with Sand			

$K_{20} = (Q \times L \times Rt)/(h \times A \times t)$

Area of Specimen, A =	39.625 cm²	Specific Gravity =	2.682
Dry Sample, Ws =	753.0 grams	Wet Weight =	934.8 grams
Height of Specimen, L =	11.257 cm	Diameter of Specimen, D =	7.145 cm

Test 1		Test 2		Test 3		Test 4	
Q =	1.08 cm³	Q =	1.50 cm³	Q =	5.30 cm³	Q =	1.85 cm³
t =	39600 sec.	t =	54000 sec.	t =	153000 sec.	t =	66600 sec.
Rt =	0.9421	Rt =	0.9396	Rt =	0.9163	Rt =	0.9188
h =	354.54 cm	h =	351.01 cm	h =	333.38 cm	h =	331.61 cm
K_{20} =	2.05E-08	K_{20} =	2.11E-08	K_{20} =	2.70E-08	K_{20} =	2.19E-08

Average K_{20} = 2.26E-08 cm/sec.
Dry Density = 105.3 pcf
Moisture = 24.1 %
Saturation = 100 %
Compaction = Na

Comments: ASTM: D5084

Approved by: _____

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PERMEABILITY TEST

PROJECT NAME	:	Paducah LFPP Feasibility / Certification Study			
PROJECT NO.	:	W912QR-06-D-0027, Task Order No. 0039	SAMPLE NO.	:	ST - 1
PROJECT COUNTY	:	McCracken	SAMPLE LOC.	:	Broing No. AD - 4
PROJECT STATE	:	Kentucky	SAMPLE DEPTH	:	11.6' to 11.9'
LABORATORY NO.	:	09124	DATE TESTED	:	07-10-09
SUBMITTED BY	:	Florence & Hutcheson, Inc.	DATE REPORTED	:	07-22-09
SOIL TYPE	:	Gray, Tan & Brown Gravelly Lean Clay with Sand			

$K_{20} = (Q \times L \times Rt)/(h \times A \times t)$

Area of Specimen, A =	40.753 cm²	Specific Gravity =	2.748
Dry Sample, Ws =	506.1 grams	Wet Weight =	622.4 grams
Height of Specimen, L =	7.467 cm	Diameter of Specimen, D =	7.164 cm

Test 1	Test 2	Test 3	Test 4
Q = 0.88 cm³	Q = 4.45 cm³	Q = 1.95 cm³	Q = 0.78 cm³
t = 32400 sec.	t = 153000 sec.	t = 66600 sec.	t = 25200 sec.
Rt = 0.9237	Rt = 0.9114	Rt = 0.9127	Rt = 0.9127
h = 215.19 cm	h = 204.61 cm	h = 201.08 cm	h = 201.08 cm
K_{20} = 2.12E-08	K_{20} = 2.37E-08	K_{20} = 2.43E-08	K_{20} = 2.56E-08

Average K_{20} = 2.37E-08 cm/sec.
Dry Density = 103.8 pcf
Moisture = 23.0 %
Saturation = 100 %
Compaction = Na

Comments: ASTM: D5084

Approved by: _____

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PERMEABILITY TEST

PROJECT NAME	:	Paducah LFPP Feasibility / Certification Study			
PROJECT NO.	:	W912QR-06-D-0027, Task Order No. 0039	SAMPLE NO.	:	ST - 2
PROJECT COUNTY	:	McCracken	SAMPLE LOC.	:	Broing No. AD - 3A
PROJECT STATE	:	Kentucky	SAMPLE DEPTH	:	15.5' to 16.0'
LABORATORY NO.	:	09124	DATE TESTED	:	07-10-09
SUBMITTED BY	:	Florence & Hutcheson, Inc.	DATE REPORTED	:	07-22-09
SOIL TYPE	:	Tan & Gray Lean Clay			

$K_{20} = (Q \times L \times Rt)/(h \times A \times t)$

Area of Specimen, A =	39.837 cm²	Specific Gravity =	2.771
Dry Sample, Ws =	969.2 grams	Wet Weight =	1209.9 grams
Height of Specimen, L =	14.441 cm	Diameter of Specimen, D =	7.145 cm

Test 1		Test 2		Test 3		Test 4	
Q =	1.33 cm³	Q =	0.88 cm³	Q =	1.25 cm³	Q =	2.38 cm³
t =	46800 sec.	t =	36000 sec.	t =	50400 sec.	t =	86400 sec.
Rt =	0.9433	Rt =	0.9445	Rt =	0.9317	Rt =	0.9421
h =	336.90 cm	h =	328.08 cm	h =	322.79 cm	h =	352.78 cm
K_{20} =	2.87E-08	K_{20} =	2.54E-08	K_{20} =	2.59E-08	K_{20} =	2.66E-08

Average K_{20} = 2.67E-08 cm/sec.
Dry Density = 105.1 pcf
Moisture = 24.8 %
Saturation = 100 %
Compaction = Na

Comments: ASTM: D5084

Approved by: _____

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CONSULTING ENGINEERS

TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.
Soil Type : Tan & Gray Lean Clay

Point No. : 1
Sample Loc. : Boring No. AD - 3A
Sample Depth : 15.5' to 16.0'
Date Tested : 07-10-09
Date Reported : 07-22-09

Wet Density : 130.1 pcf
Dry Density : 104.2 pcf
Moisture : 24.8 %

Delta Height : 0.05 cm
Delta Volume : 12.60 cc
Chamber Pres. : 46.9 psi

Initial Height : 14.49 cm
Initial Diameter : 7.14 cm
Init. Pore Pres. : 43.28 psi

RESULTS:

	Δ μ (psi)	ε a	σ'3 (psi)	σ'1 (psi)	σ'1 / σ'3	q (psi)	p' (psi)
1	0.00	0.00	3.62	3.62	1.00	0.00	3.62
2	1.35	0.11	2.27	4.73	2.09	1.23	3.50
3	1.55	0.21	2.07	5.38	2.60	1.65	3.72
4	1.65	0.32	1.97	5.73	2.91	1.88	3.85
5	1.65	0.42	1.97	6.27	3.18	2.15	4.12
6	1.70	0.53	1.92	6.59	3.44	2.34	4.26
7	1.75	0.63	1.87	6.85	3.66	2.49	4.36
8	1.85	0.74	1.77	7.05	3.99	2.64	4.41
9	1.85	0.84	1.77	7.35	4.16	2.79	4.56
10	1.95	0.95	1.67	7.62	4.57	2.98	4.64
11	1.90	1.06	1.72	7.82	4.55	3.05	4.77
12	1.70	2.11	1.92	10.00	5.21	4.04	5.96
13	1.30	3.17	2.32	11.92	5.14	4.80	7.12

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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

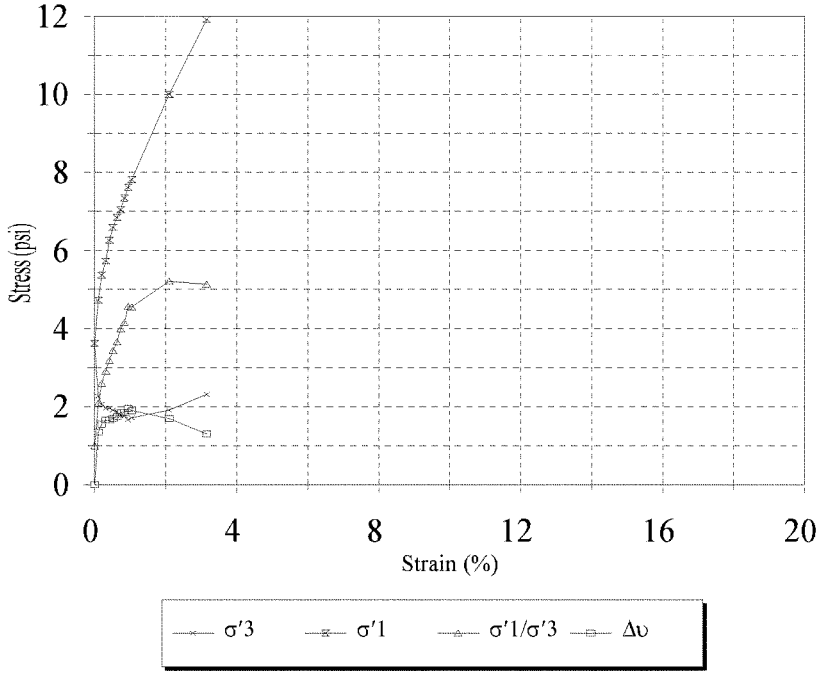
Point No. : 1
Sample Loc. : Boring No. AD - 3A
Sample Depth : 15.5' to 16.0'
Date Tested : 07-10-09
Date Reported : 07-22-09

Final Moisture : 23.5 %
Final Height : 14.26 cm
Final Diameter : 7.19 cm
Initial Saturation : 100 %

Eff. Cons. Stress : 3.62 psi
Total Back Pressure : 39.90 psi
Pore Pres. After Sat. : 41.03 psi
Final Saturation : 100 %

Init. Void Ratio : 0.6605
Final Void Ratio : 0.6552
Specific Gravity : 2.771
COMMENTS : AASHTO T-297

RESULTS:



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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.
Soil Type : Tan & Gray Lean Clay

Point No. : 2
Sample Loc. : Boring No. AD - 3A
Sample Depth : 15.5' to 16.0'
Date Tested : 07-10-09
Date Reported : 07-22-09

Wet Density : 130.1 pcf
Dry Density : 104.2 pcf
Moisture : 24.8 %

Delta Height : 0.44 cm
Delta Volume : 23.60 cc
Chamber Pres. : 53.90 psi

Initial Height : 14.49 cm
Initial Diameter : 7.14 cm
Init. Pore Pres. : 40.53 psi

RESULTS:

	Δ μ (psi)	ε a	σ'3 (psi)	σ'1 (psi)	σ'1 / σ'3	q (psi)	p' (psi)
1	0.00	3.25	13.38	13.38	1.00	0.00	13.38
2	2.81	3.36	10.57	15.74	1.49	2.59	13.16
3	4.11	3.47	9.27	16.95	1.83	3.84	13.11
4	4.71	3.58	8.67	17.77	2.05	4.55	13.22
5	5.21	3.69	8.17	18.39	2.25	5.11	13.28
6	5.61	3.80	7.76	18.88	2.43	5.56	13.32
7	5.91	3.91	7.46	19.61	2.63	6.07	13.54
8	6.11	4.01	7.26	20.15	2.77	6.44	13.71
9	6.26	4.12	7.11	20.66	2.90	6.77	13.89
10	6.41	4.23	6.96	21.09	3.03	7.06	14.03
11	6.51	4.34	6.86	21.57	3.14	7.35	14.22
12	6.46	5.42	6.91	24.64	3.56	8.86	15.78
13	5.81	6.51	7.56	27.02	3.57	9.73	17.29

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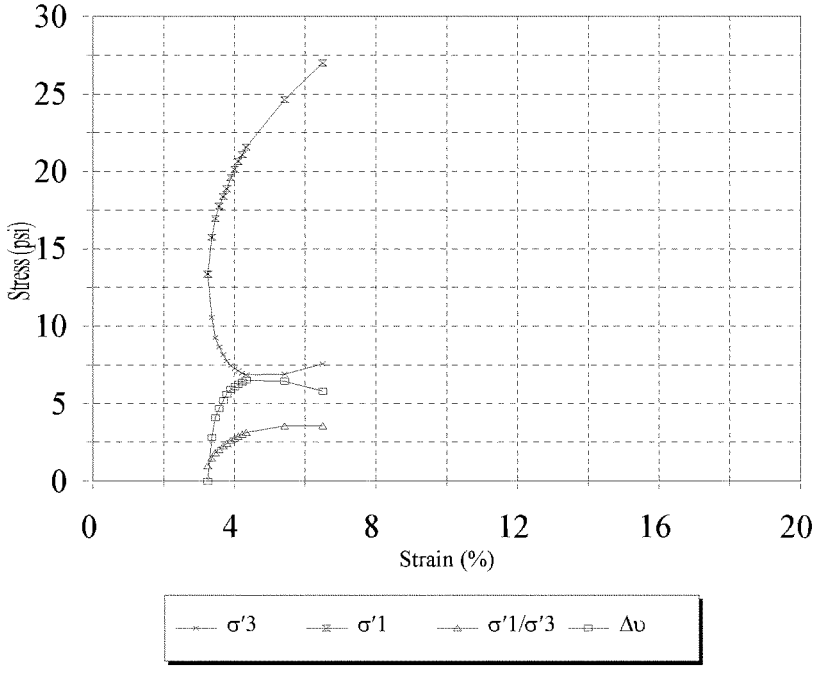
TRIAXIAL COMPRESSION TEST

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Point No.	: 2
Project County	: McCracken	Sample Loc.	: Boring No. AD - 3A
Project State	: Kentucky	Sample Depth	: 15.5' to 16.0'
Laboratory No.	: 09124	Date Tested	: 07-10-09
Sumbitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07-22-09

Final Moisture : 22.4 %	Eff. Cons. Stress : 13.38 psi	Init. Void Ratio : 0.6605
Final Height : 13.69 cm	Total Back Pressure : 39.90 psi	Final Void Ratio : 0.6104
Final Diameter : 7.24 cm	Pore Pres. After Sat. : 41.03 psi	Specific Gravity : 2.771
Initial Saturation : 100 %	Final Saturation : 100 %	COMMENTS : AASHTO T-297

RESULTS:



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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.
Soil Type : Tan & Gray Lean Clay

Point No. : 3
Sample Loc. : Boring No. AD - 3A
Sample Depth : 15.5' to 16.0'
Date Tested : 07-10-09
Date Reported : 07-22-09

Wet Density : 130.1 pcf
Dry Density : 104.2 pcf
Moisture : 24.8 %

Delta Height : 0.90 cm
Delta Volume : 33.80 cc
Chamber Pres. : 67.90 psi

Initial Height : 14.49 cm
Initial Diameter : 7.14 cm
Init. Pore Pres. : 40.73 psi

RESULTS:

	Δ μ (psi)	ε a	σ'3 (psi)	σ'1 (psi)	σ'1 / σ'3	q (psi)	p' (psi)
1	0.00	6.73	27.17	27.17	1.00	0.00	27.17
2	4.21	6.84	22.97	29.84	1.30	3.44	26.40
3	6.71	6.96	20.46	31.76	1.55	5.65	26.11
4	8.62	7.07	18.56	33.33	1.80	7.39	25.94
5	9.37	7.18	17.80	34.28	1.93	8.24	26.04
6	10.12	7.29	17.05	35.21	2.06	9.08	26.13
7	10.82	7.40	16.35	36.03	2.20	9.84	26.19
8	11.32	7.52	15.85	36.89	2.33	10.52	26.37
9	11.72	7.63	15.45	37.89	2.45	11.22	26.67
10	12.02	7.74	15.15	38.70	2.55	11.77	26.92
11	12.22	7.85	14.95	39.60	2.65	12.33	27.27
12	12.73	8.97	14.45	44.37	3.07	14.96	29.41
13	11.92	10.10	15.25	47.39	3.11	16.07	31.32
14	11.72	11.22	15.45	50.12	3.24	17.33	32.78
15	11.02	12.34	16.15	51.73	3.20	17.79	33.94
16	10.27	13.46	16.90	52.82	3.13	17.96	34.86
17	9.52	14.58	17.65	53.37	3.02	17.86	35.51
18	8.87	15.71	18.31	53.03	2.90	17.36	35.67
19	8.62	16.83	18.56	51.93	2.80	16.69	35.24
20	8.42	17.95	18.76	50.92	2.71	16.08	34.84
21	8.32	19.07	18.86	50.21	2.66	15.68	34.53
22	8.32	20.19	18.86	49.28	2.61	15.21	34.07
23	8.27	21.32	18.91	48.90	2.59	15.00	33.91

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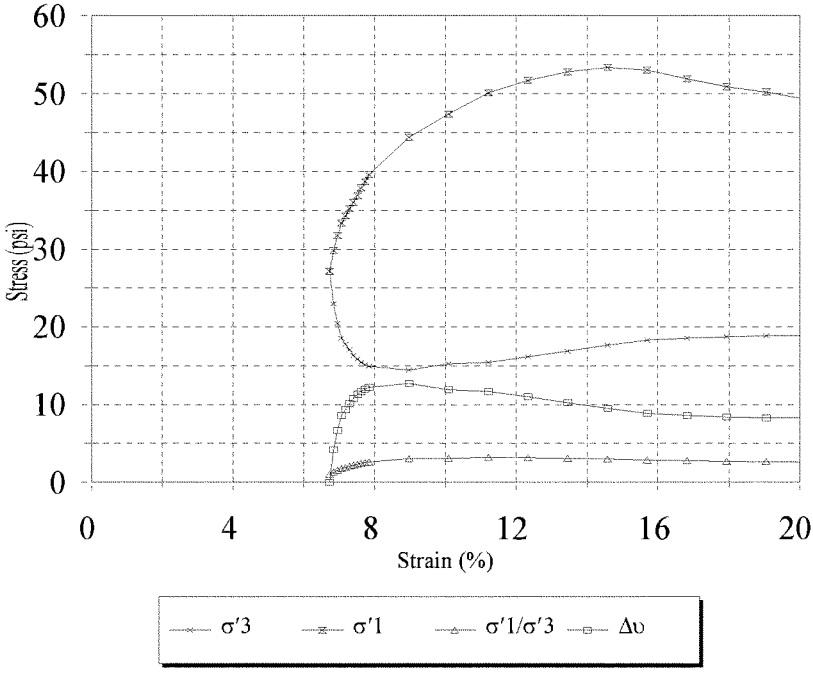
TRIAXIAL COMPRESSION TEST

Project Name	: Paducah LFPP Feasibility / Certification Study		
Project No.	: W912QR-06-D-0027, Task Order No. 0039	Point No.	: 3
Project County	: McCracken	Sample Loc.	: Boriug No. AD - 3A
Project State	: Kentucky	Sample Depth	: 15.5' to 16.0'
Laboratory No.	: 09124	Date Tested	: 07-10-09
Sumbitted By	: Florence & Hutcheson, Inc.	Date Reported	: 07-22-09

Final Moisture : 21.3 %	Eff. Cons. Stress : 27.17 psi	Init. Void Ratio : 0.6605
Final Height : 12.44 cm	Total Back Pressure : 39.90 psi	Final Void Ratio : 0.5571
Final Diameter : 7.44 cm	Pore Pres. After Sat. : 41.03 psi	Specific Gravity : 2.771
Initial Saturation : 100 %	Final Saturation : 100 %	COMMENTS : AASHTO T-297

RESULTS:



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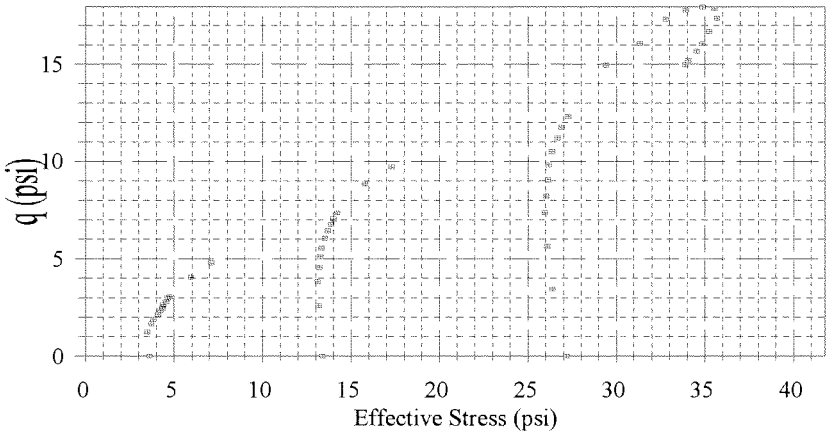
TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

Sample Loc. : Boring No. AD - 3A
Sample Depth : 15.5' to 16.0'
Date Tested : 07-10-09
Date Reported : 07-22-09

Triaxial Failure Envelopes

Consolidated Undrained



sin(phi') = tan(alpha)
alpha = _____
phi' = _____

c' = a / cos(phi')
a = _____
c' = _____

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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.

Sample Loc. : Boring No. AD - 3A
Sample Depth : 15.5' to 16.0'
Date Tested : 07-10-09
Date Reported : 07-22-09

COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES :

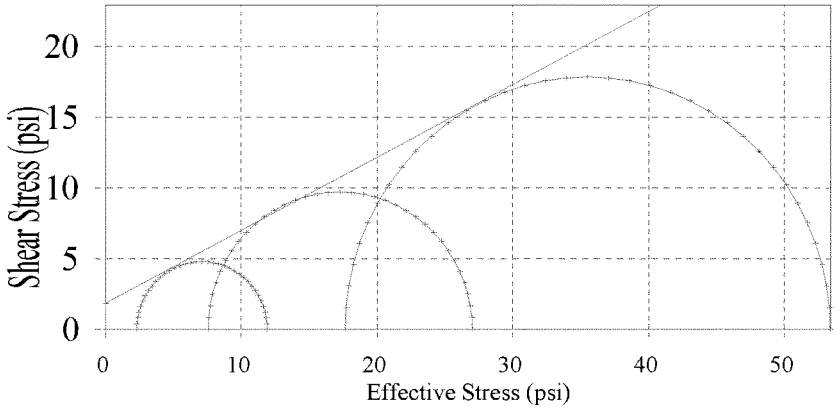
Test	Eff Lateral	Eff Total
1	2.32	11.92
2	7.56	27.02
3	17.65	53.37

Eff Cohesion = 266 psf
Eff Phi = 27.3 deg
Tan (Phi) = 0.5156

At Maximum Deviator Stress

Triaxial Mohr's Circles

Consolidated Undrained



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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken — Sample Loc. : Boring No. AD - 3A
Project State : Kentucky — Sample Depth : 15.5' to 16.0'
Laboratory No. : 09124 — Date Tested : 07-10-09
Sumbitted By : Florence & Hutcheson, Inc. — Date Reported : 07-22-09

COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES

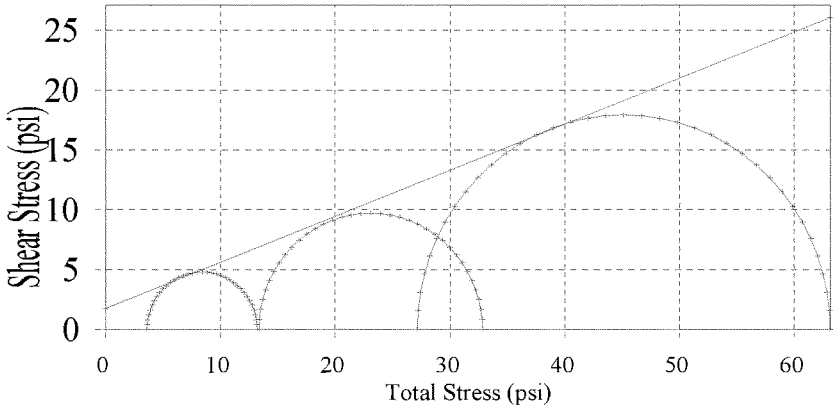
Test	Lateral	Total
1	3.62	13.22
2	13.38	32.83
3	27.17	63.09

Cohesion =	253	psf
Phi =	21.1	deg
Tan (Phi) =	0.3854	

At Maximum Deviator Stress

Triaxial Mohr's Circles

Consolidated Undrained



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TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.
Sample Loc. : Boring No. AD - 3A
Sample Depth : 15.5' to 16.0'
Date Tested : 07-10-09
Date Reported : 07-22-09

COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES

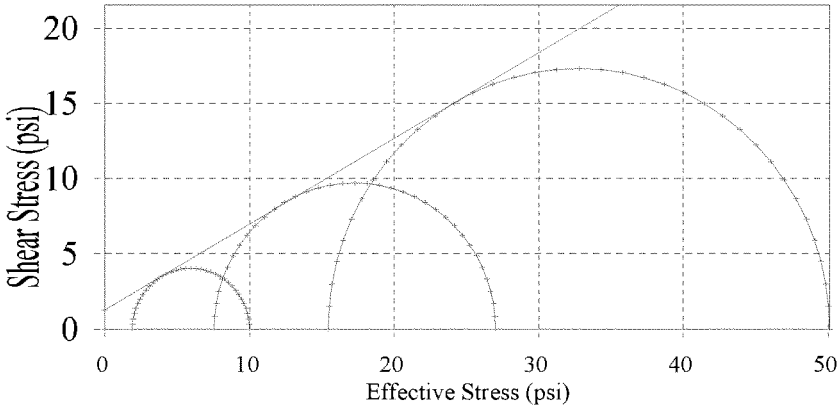
Test	Eff Lateral	Eff Total
1	1.92	10.00
2	7.56	27.02
3	15.45	50.12

Eff Cohesion = 185 psf
Eff Phi = 29.7 deg
Tan (Phi) = 0.5701

At Maximum Stress Ratio

Triaxial Mohr's Circles

Consolidated Undrained



APPROVED BY: _____

P O Box 7267 • Paducah, KY 42002 • 2550 Irvin Cobb Dr • Paducah, KY 42003 • 270/444-9691 • fax 270/443-3943
mail@flohut.com

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS

TRIAXIAL COMPRESSION TEST

Project Name : Paducah LFPP Feasibility / Certification Study
Project No. : W912QR-06-D-0027, Task Order No. 0039
Project County : McCracken
Project State : Kentucky
Laboratory No. : 09124
Sumbitted By : Florence & Hutcheson, Inc.
Sample Loc. : Boring No. AD - 3A
Sample Depth : 15.5' to 16.0'
Date Tested : 07-10-09
Date Reported : 07-22-09

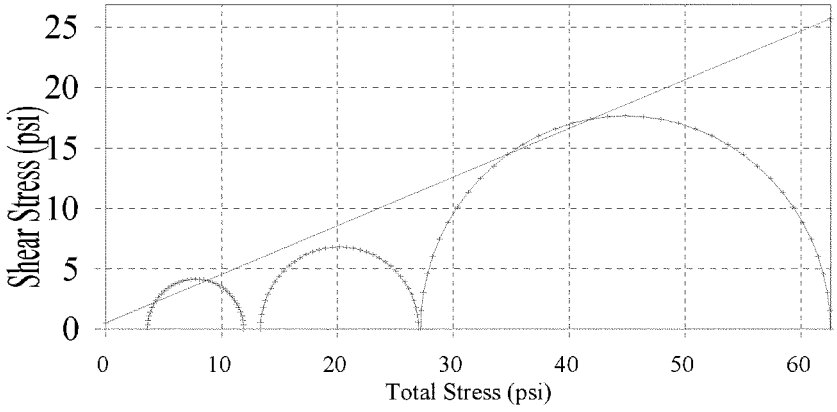
COEFFICIENT OF INTERNAL FRICTION AND COHESION BY THE METHOD OF LEAST SQUARES :

Test	Lateral	Total			
1	3.62	11.92	Cohesion =	73	psf
2	13.38	27.02	Phi =	22.0	deg
3	27.17	62.52	Tan (Phi) =	0.4034	

At Maximum Stress Ratio

Triaxial Mohr's Circles

Consolidated Undrained



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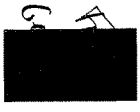
In Association With
Paducah's Feasibility & Certification
This Is An Adjacent Project's

GEOTECHNICAL EXPLORATION REPORT

OF

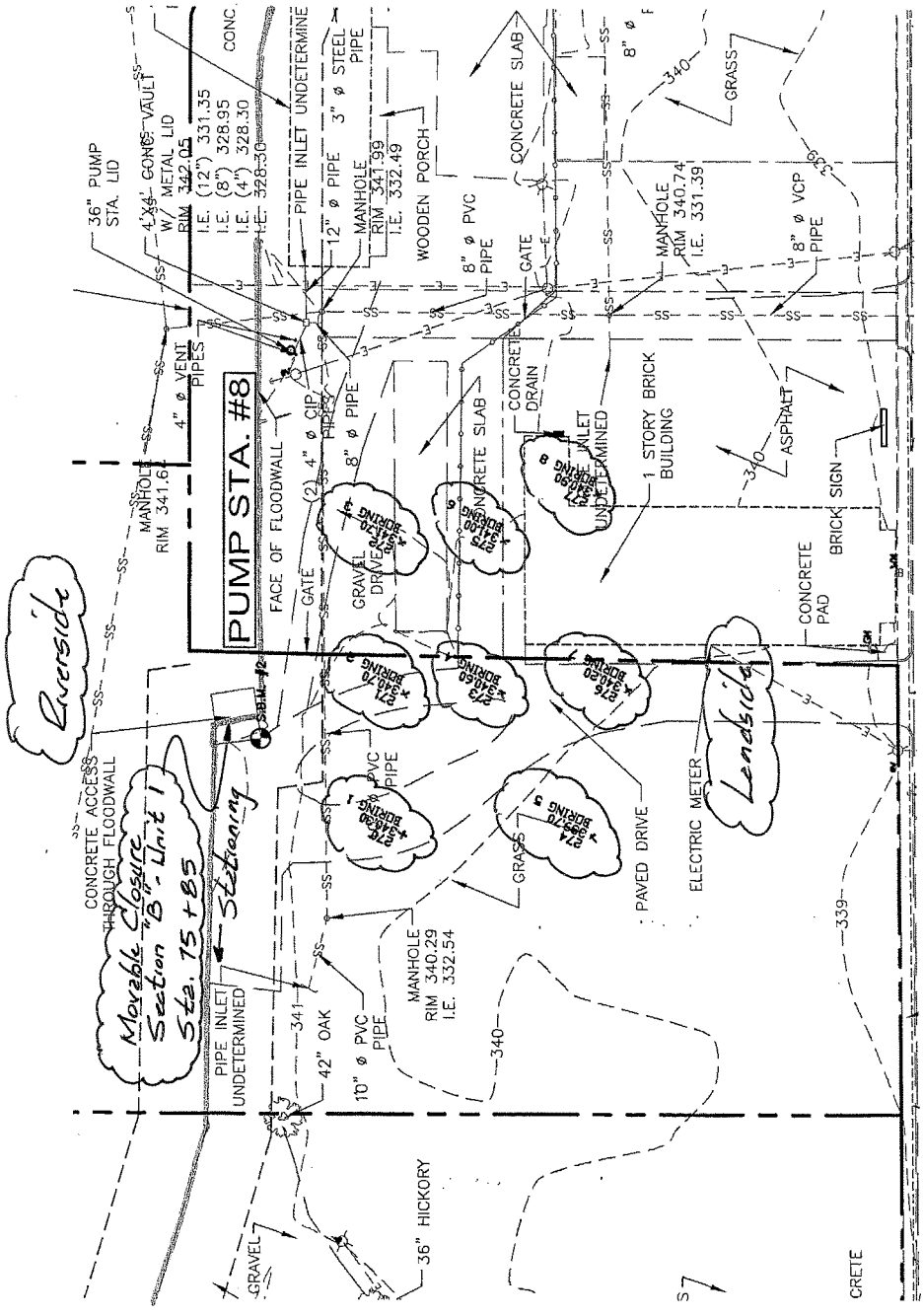
PROPOSED INGRAM OFFICE BUILDING
THIRD STREET
PADUCAH, KENTUCKY

8 Borings, Landside Left
of Movable Closure
Section "B - Unit I"
Sta. 75 +85 +/- (See Appendix B)



Submitted By:

Geotech Engineering & Testing, Inc.


Riverside
Movable Closure Section "B" - Unit 1
Sta. 75+85
Stairway
PUMP STA. #8
36" PUMP STA. LID
4'X4' CONC. VAULT W/ METAL LID
RIM 342.05
I.E. (12") 331.35
I.E. (8") 328.95
I.E. (4") 328.30
CONC.
4" ø VENT PIPES
MANHOLE RIM 341.6
FACE OF FLOODWALL
GATE
(2) 4" ø CIP PIPES
8" ø PIPE
GRAVEL DRIVE
CONCRETE ACCESS THROUGH FLOODWALL
PIPE INLET UNDETERMINED
12" ø PIPE
3" ø STEEL PIPE
MANHOLE RIM 341.99 I.E. 332.49
WOODEN PORCH
8" ø PVC PIPE
GATE
CONCRETE SLAB
CONCRETE DRAIN
PIPE INLET UNDETERMINED
1 STORY BRICK BUILDING
MANHOLE RIM 340.74 I.E. 331.39
8" ø VCP PIPE
ASPHALT
CONCRETE PAD
BRICK SIGN
GRASS
Landside
ELECTRIC METER
PAVED DRIVE
GRASS
MANHOLE RIM 340.29 I.E. 332.54
10" ø PVC PIPE
42" OAK
36" HICKORY
GRAVEL
CRETE
340
341
339

GEOTECH Engineering & Testing, Inc.
(270) 443-1995 (270) 443-1904 fax
www.geotechengineers.net

SUBSURFACE BORING LOG

Boring No. : **B-1**

Project : Proposed Ingram Office Building

Project Location : Paducah, KY

Boring Started : August 24, 2005 **Boring Diameter :** 4-1/2 Inch Dia **Driller :** C. Smith / B. Watkins

Date Completed : August 24, 2005 **Drilling Method :** Hollow Stem Auger **Drill Equipment :** B-50 Mobile Drill

Surface Elevation : 340 **Sampling Methods :** SPT, Hammer

Split spoon | Shelby Tube | Rock Core | GW @ drilling | GW @ 24 hrs

Depth in Feet	Elev. in Feet	Sample Type	DESCRIPTION	Lithology	Counts Blows (per 6")	PID Readings (PPM)	Unconfined Strength, (psf)	Standard Penetration Resistance (N-Values)	Moisture Content (%)	Qu (tsf)
0	340		ASPHALT: Approximately 2 inches thick.							
			DGA: Approximately 1.0 feet thick.							
			CL: Brown-gray silty CLAY (CL); with dark brown mottling, medium plasticity, stiff in consistency.		6 - 5 - 7					
5	335					107.7	5,351			
					3 - 6 - 9					
10	330									
			Some sand intermixed and interlensing.		3 - 4 - 8					
15	325									
					2 - 5 - 8					
20	320									
					4 - 8 - 14					
25	315									
			Sample moist.		2 - 11 - 15					
30	310		Boring terminated @ 30 feet bgs.							
35	305									

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SUBSURFACE BORING LOG

Boring No. : **B-2**

Project : Proposed Ingram Office Building

Project Location : Paducah, KY

Page 1 of 1

Boring Started : August 27, 2005 **Boring Diameter :** 4-1/2 Inch Dia **Driller :** C. Smith / B. Watkins

Date Completed : August 27, 2005 **Drilling Method :** Hollow Stem Auger **Drill Equipment :** B-50 Mobile Drill

Surface Elevation : 340 **Sampling Methods :** SPT, Hammer

Split spoon | Shelby Tube | Rock Core | GW @ drilling | GW @ 24 hrs

Depth in Feet	Elev. in Feet	Sample Type	DESCRIPTION	Lithology	Counts Blows (per 6")	PID Readings (PPM)	Unconfined Strength, (psf)	Standard Penetration Resistance (N-Values)	Moisture Content (%)	Qu (tsf)
0	340		ASPHALT: Approximately 2 inches thick.							
			DGA: Approximately 1.0 feet thick.							
			CL: Brown-gray silty CLAY (CL); with dark brown mottling, medium plasticity, stiff to very stiff in consistency.		5 - 5 - 7					
5	335					101.2	5,576			
					4 - 6 - 8					
10	330									
			Brown, with gray silt lineations.		3 - 7 - 9					
15	325									
					3 - 5 - 6					
20	320									
					2 - 6 - 10					
25	315									
			Sample moist.		3 - 5 - 8					
30	310		Boring terminated @ 30 feet bgs.							
35	305									

In Association With The City of Paducah's Feasibility & Certification, This Is An Adjacent Project's

Florence & Hutcheson, Inc.

CONSULTING ENGINEERS

P.O. Box 7267 • Paducah, Kentucky 42002-7267
2550 Irvin Cobb Drive • Paducah, Kentucky 42003

SUBSURFACE INVESTIGATION

FOUR RIVERS CENTER

SITE NO. 2

PADUCAH, KENTUCKY

17 Borings, Landside Left of Movable Closure, Section B-Unit II Sta. 114+98 ±

PREPARED BY

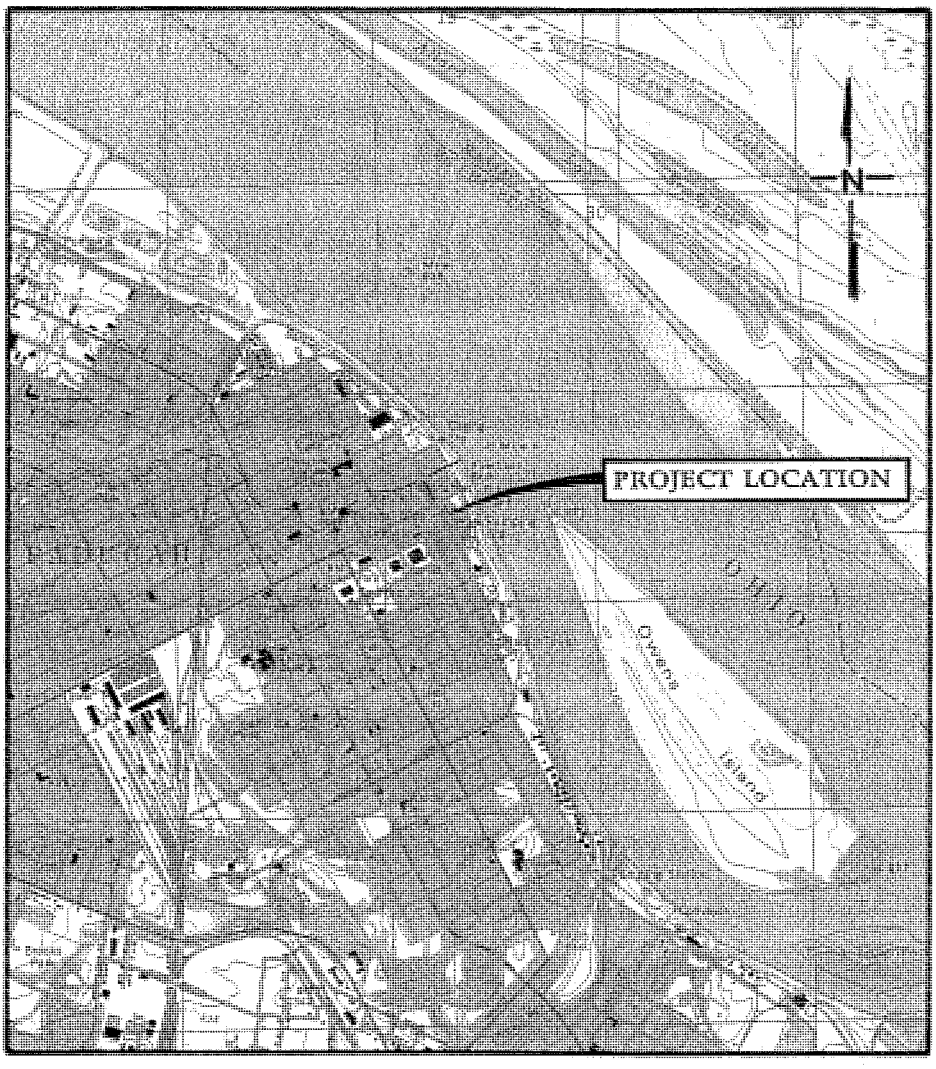
FLORENCE & HUTCHESON, INC.

CONSULTING ENGINEERS

PADUCAH, KENTUCKY

NOVEMBER 1999

LIMIT OF DETAILED STUDY
ZONE AE
RADNOR GAGE (JEFFERSON STREET)
TENNESSEE RIVER
CIVIL 70 DETAILED STUDY
CORPORATE LIMITS
MCGHAGEN COUNTY
CORPORATE LIMITS
N
350
340
330
320
280
270
260
ELEVATION (FEET NGVD)



PADUCAH EAST QUADRANGLE
KENTUCKY-ILLINOIS
7.5 MINUTE SERIES (TOPOGRAPHIC) 1-SE
SE/4 PADUCAH 15' QUADRANGLE

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

Moisture Data

Project Name : Four River Center
Location : McCracken County, Kentucky
Project Job No. : 99013

Soil No.	Boring No.	Station & Offset	Sample No.	Depth		Description of Soil	pH	Natural Moisture Content (%)
1	1		SS-1	2.0	3.5	Greenish Gray, Brown & Black Fill, Demolition Debris		25.8
1			SS-2	5.0	6.5	Greenish Gray, Tan & Black Fill, Demolition Debris		25.3
3			ST-1	10.0	11.9	Greenish Gray Lean Clay with Sand		21.3
7			SS-3	15.0	16.5	Light Grayish Tan Lean Clay		19.6
7			SS-4	20.0	21.5	Light Grayish Tan Lean Clay		18.1
9			SS-5	25.0	26.5	Beige & Brown Lean Clay		23.8
9			SS-6	30.0	31.5	Tanish Beige Lean Clay		17.9
11			SS-7	35.0	36.5	Gray, White & Brown Sandy Lean Clay		30.0
12			SS-8	40.0	41.5	Dark Gray & White Lean Clay with Sand		28.4
12			SS-9	45.0	46.5	Dark Brown & Tan Lean Clay with Sand		24.7
13			SS-10	50.0	51.5	White Silty Sand		22.7
13			SS-11	55.0	56.5	White & Tan Silty Sand		22.1
14			SS-12	60.0	61.5	White, Dark Brown & Tan Silt with Sand		20.3
15			SS-13	65.0	66.5	White & Dark Gray Silt with Sand		31.2
15			SS-14	70.0	71.5	White & Dark Gray Silt with Sand		30.2
15			SS-15	75.0	76.5	White & Dark Gray Silt with Sand		23.9
15			SS-16	80.0	81.5	White & Dark Gray Silt with Sand		24.9
15			SS-17	85.0	86.5	White & Dark Gray Silt with Sand		22.2
16			SS-18	90.0	91.5	White & Dark Gray Silty Sand		18.5
16			SS-19	95.0	95.4	White Silty Sand		21.0
17			SS-20	100.0	101.5	White & Dark Gray Silty Sand		26.9
1	2		SS-1	2.0	3.5	Black & Dark Tan Fill, Demolition Debris		29.6
1			SS-2	5.0	6.5	Black & Dark Tan Fill, Demolition Debris		35.6
1			SS-3	10.0	11.5	Black & Brown Fill, Demolition Debris		85.0
3			SS-4	15.0	16.5	Greenish Gray & White Lean Clay with Sand		21.8
9			SS-5	20.0	21.5	Grayish Tan Lean Clay		21.8
9			SS-6	25.0	26.5	Grayish Tan Lean Clay		23.9
1	4		SS-1	2.0	6.5	Black & White Fill, Demolition Debris		23.5
1			ST-1	5.0	5.7	Black, Red, Brown & Etc. Fill, Demolition Debris		25.9
1			ST-1	5.7	6.1	Brown, Tan, Gray & Black Fill, Demolition Debris		24.7
1			SS-2	10.0	11.5	Dark Gray & Greenish Tan Fill, Demolition Debris		28.6
1			SS-3	15.0	16.5	Gray Fill, Demolition Debris		38.4
1			SS-4	20.0	21.5	Beige & Gray Fill, Demolition Debris		26.8
9			SS-5	25.0	26.5	Grayish Tan Lean Clay		25.9
1	5		SS-1	2.0	3.5	Copper & Gray Fill, Demolition Debris		18.2
1			SS-2	5.0	6.5	Dark Brown Roots Fill, Demolition Debris		79.1
1			SS-3	10.0	11.5	Grayish Beige Fill, Demolition Debris		38.5
1			SS-4	15.0	16.5	Copper Fill, Demolition Debris		24.0
1			SS-5	20.0	21.5	Gray & Red Fill, Demolition Debris		25.1
9			SS-6	25.0	26.5	Beige Lean Clay		23.1
9			ST-1	30.0	31.6	Tanish Brown Lean Clay		19.1
11			SS-7	35.0	36.5	Gray, White & Brown Sandy Lean Clay		32.0
12			SS-8	40.0	41.5	White & Dark Gray Lean Clay with Sand		31.9
19			SS-9	45.0	45.8	Brown, Copper & Tan Silty Sand with Gravel		19.7
13			SS-10	50.0	50.4	White Silty Sand		24.3
13			SS-11	55.0	55.5	Yellowish White Silty Sand		21.0
14			SS-12	60.0	61.5	Tan & White Silt with Sand		29.2
15			SS-13	65.0	66.5	White & Dark Gray Silt with Sand		30.6
15			SS-14	70.0	71.5	White & Dark Gray Silt with Sand		27.8
15			SS-15	75.0	76.5	White & Dark Gray Silt with Sand		25.5

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

Moisture Data

Project Name : Four River Center
Location : McCracken County, Kentucky
Project Job No. : 99013A

Soil No.	Boring No.	Station & Offset	Sample No.	Depth		Description of Soil	pH	Natural Moisture Content [%]
20	1A		SS-1	2.0	3.5	Beige & Gray Lean Clay		17.5
20			SS-2	5.0	6.5	Tan & Gray Lean Clay		20.6
21			SS-3	10.0	11.5	Light Tan & Gray Lean Clay		23.7
21			SS-4	15.0	16.5	Light Tan & Copper Lean Clay		21.5
21			SS-5	20.0	21.5	Beige & Copper Lean Clay		19.1
21			SS-6	25.0	26.5	Beige & Copper Lean Clay		20.9
22			SS-7	30.0	31.5	Tan Poorly Graded Gravel with Silt and Sand		15.5
22			SS-8	35.0	36.5	Tan Poorly Graded Gravel with Silt and Sand		17.6
23			SS-9	40.0	41.5	Tan & Copper Sandy Silt		28.0
24			SS-10	45.0	46.5	Tan & Gray Silty Sand		24.6
24			SS-11	50.0	50.5	White & Brown Silty Sand		23.7
24			SS-12	55.0	56.5	White & Tan Silty Sand		18.7
26			SS-13	60.0	61.5	Olive Gray & White Silty Clay with Sand		23.5
26			SS-14	65.0	66.5	Olive Gray & White Silty Clay with Sand		27.2
26			SS-15	70.0	71.5	Olive Gray & White Silty Clay with Sand		26.6
26			SS-16	75.0	76.5	Olive Gray & White Silty Clay with Sand		28.7
26			SS-17	80.0	81.5	Olive Gray & White Silty Clay with Sand		27.1
27			SS-18	85.0	86.5	Olive Gray & White Silty Sand		25.4
27			SS-19	90.0	90.8	Olive Gray & White Silty Sand		20.7
27			SS-20	95.0	95.9	White & Olive Gray Silty Sand		17.8
28			SS-21	100.0	101.4	Olive Gray & White Silt		25.8
20	2A		SS-1	2.0	3.5	Brown & Beige Lean Clay		14.6
20			SS-2	5.0	6.5	Tan & Copper Lean Clay		14.7
21			SS-3	10.0	11.5	Beige Lean Clay		17.5
21			SS-4	15.0	16.5	Beige Lean Clay		20.3
21			ST-1	20.0	21.5	Tanish Beige & Copper Lean Clay		19.5
21			SS-5	25.0	26.5	Tan & Gray Lean Clay		23.3
1	3A		SS-1	2.0	3.5	Tanish Brown & Gray Fill, Demolition Debris		8.6
20			SS-2	5.0	6.5	Gray & Tan Lean Clay		19.2
20			ST-1	10.0	11.6	Tan, Gray & Copper Lean Clay		17.2
21			SS-3	15.0	16.5	Beige & Copper Lean Clay		20.9
21			SS-4	20.0	21.5	Beige & Copper Lean Clay		20.3
21			SS-5	25.0	26.5	Beige & Brown Lean Clay		18.5
1	4A		SS-1	2.0	3.5	Brown & Gray Fill, Demolition Debris		21.1
20			SS-2	5.0	6.5	Beige & Brown Lean Clay		18.9
20			SS-3	10.0	11.5	Tan & Gray Lean Clay		20.5
21			SS-4	15.0	16.5	Beige & Copper Lean Clay		22.5
21			SS-5	20.0	21.5	Tan & Beige Lean Clay		19.3
21			SS-6	25.0	26.5	Beige & Brown Lean Clay		18.9
21			SS-7	30.0	31.5	Tan & Gray Lean Clay		15.6
22			SS-8	35.0	36.5	Tan Poorly Graded Gravel with Silt and Sand		12.9
23			SS-9	40.0	41.5	Gray, Yellow & Copper Sandy Silt		32.3
24			SS-10	45.0	46.3	Tan Silty Sand		22.3
24			SS-11	50.0	51.2	White & Dark Tan Silty Sand		23.2
24			SS-12	55.0	55.8	Tan Silty Sand		19.8
25			SS-13	60.0	61.5	Gray-White & Tan Silt with Sand		29.8
25			SS-14	65.0	66.5	Gray-White & Copper Silt with Sand		28.3
26			SS-15	70.0	71.5	Light Olive Gray, White & Tan Silty Clay with Sand		30.4
26			SS-16	75.0	76.5	Olive Gray & White Silty Clay with Sand		26.7

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

Moisture Data

Project Name : Four River Center
Location : McCracken County, Kentucky
Project Job No. : 99013A

Soil No.	Boring No.	Station & Offset	Sample No.	Depth		Description of Soil	pH	Natural Moisture Content (%)
26			SS-17	80.0	81.5	Olive Gray & White Silty Clay with Sand		25.6
26			SS-18	85.0	86.5	Olive Gray & White Silty Clay with Sand		28.6
27			SS-19	90.0	90.9	White & Olive Gray Silty Sand		23.6
28			SS-20	95.0	96.5	Olive Gray & White Silt		27.6
28			SS-21	100.0	101.5	Olive Gray & White Silt		26.1
20	5A		SS-1	2.5	4.0	Tan, Gray & Copper Lean Clay		21.6
21			SS-2	5.0	6.5	Tan, Gray & Copper Lean Clay		20.5
21			SS-3	10.0	11.5	Tanish Beige & Copper Lean Clay		22.0
21			ST-1	15.0	16.1	Tan, Brown & Copper Lean Clay		22.0
21			SS-4	20.0	21.5	Tanish Beige & Copper Lean Clay		21.3
21			SS-5	25.0	26.5	Grayish, Brown & Copper Lean Clay		25.0
20	6A		SS-1	2.0	3.5	Tan, Gray & Copper Lean Clay		19.3
21			SS-2	5.0	6.5	Tan & Copper Lean Clay		19.1
21			SS-3	10.0	11.5	Tanish Beige & Copper Lean Clay		22.2
21			SS-4	15.0	16.5	Beige, Tan & Copper Lean Clay		21.6
21			ST-1	20.0	21.2	Tanish Brown & Copper Lean Clay		18.9
21			SS-5	25.0	26.5	Tanish Beige & Copper Lean Clay		25.5
20	7A		SS-1	2.0	3.5	Tan & Copper Lean Clay		19.9
20			SS-2	5.0	6.5	Tanish Beige & Copper Lean Clay		19.1
21			SS-3	10.0	11.5	Beige Lean Clay		17.6
21			SS-4	15.0	16.5	Beige & Copper Lean Clay		20.6
21			SS-5	20.0	21.5	Beige & Copper Lean Clay		20.3
21			SS-6	25.0	26.5	Beige & Copper Lean Clay		21.1
22			SS-7	30.0	31.5	Tan Poorly Graded Gravel with Silt and Sand		13.4
23			SS-8	35.0	36.5	Olive Gray & White Sandy Silt		33.8
23			SS-9	40.0	41.5	Olive Gray, White, Tan & Brown Sandy Silt		29.3
24			SS-10	45.0	46.5	Yellow, White & Brown Silty Sand		25.7
24			SS-11	50.0	50.8	Yellowish White & Brown Silty Sand		22.4
24			SS-12	55.0	56.4	Yellowish White & Brown Silty Sand		18.4
26			SS-13	60.0	61.5	Olive Gray, White & Tan Silty Clay with Sand		24.5
26			SS-14	65.0	66.5	Olive Gray & White Silty Clay with Sand		26.4
26			SS-15	70.0	71.5	Olive Gray & White Silty Clay with Sand		30.2
26			SS-16	75.0	76.5	Olive Gray & White Silty Clay with Sand		26.3
20	8A		SS-1	2.0	3.5	Beige & Copper Lean Clay		21.7
20			SS-2	5.0	6.5	Greenish Gray & Tan Lean Clay		23.9
21			SS-3	10.0	11.5	Greenish Gray Lean Clay		21.1
21			ST-1	15.0	16.3	Greenish Tan Lean Clay		21.8
21			SS-4	20.0	21.5	Tan & Copper Lean Clay		18.5
21			SS-5	25.0	26.5	Greenish Gray & Brown Lean Clay		26.7
20	9A		SS-1	5.0	6.5	Tan & Copper Lean Clay		19.9
21			SS-2	10.0	11.5	Dark Yellowish Tan Lean Clay		20.4
21			SS-3	15.0	16.5	Dark Yellowish Tan & Copper Lean Clay		21.1
21			SS-4	20.0	21.5	Dark Beige & Copper Lean Clay		16.5
21			SS-5	25.0	26.5	Dark Beige & Copper Lean Clay		22.9
21			SS-6	30.0	31.5	Dark Tan & Copper Lean Clay		22.7
23			SS-7	35.0	36.5	Dark Greenish Gray Sandy Silt		23.0
23			SS-8	40.0	41.5	Olive Gray & White Sandy Silt		31.9
24			SS-9	45.0	46.5	Tan Silty Sand		27.4

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

Moisture Data

Project Name : Four River Center
Location : McCracken County, Kentucky
Project Job No. : 99013A

Soil No.	Boring No.	Station & Offset	Sample No.	Depth		Description of Soil	pH	Natural Moisture Content (%)
24			SS-10	50.0	50.8	Grayish White Silty Sand		26.2
24			SS-11	55.0	56.5	Tanish White Silty Sand		21.6
24			SS-12	60.0	61.5	Tan & White Silty Sand		27.8
26			SS-13	65.0	66.5	Olive Gray & White Silty Clay with Sand		29.2
26			SS-14	70.0	71.5	Olive Gray & White Silty Clay with Sand		26.2
26			SS-15	75.0	76.5	Olive Gray & White Silty Clay with Sand		29.4
20	10A		SS-1	5.0	6.5	Brown & Tan Lean Clay		19.7
21			SS-2	10.0	11.5	Light Tan Lean Clay		21.4
21			SS-3	15.0	16.5	Beige & Brown Lean Clay		22.1
21			SS-4	20.0	21.5	Tanish Beige & Copper Lean Clay		19.2
21			SS-5	25.0	26.5	Tanish Beige & Copper Lean Clay		21.8
20	11A		SS-1	5.0	6.5	Tan & Gray Lean Clay		20.7
21			SS-2	10.0	11.5	Tanish Beige & Copper Lean Clay		20.2
21			SS-3	15.0	16.5	Tanish Beige & Copper Lean Clay		22.4
21			SS-4	20.0	21.5	Tanish Beige & Copper Lean Clay		20.5
21			SS-5	25.0	26.5	Beige & Brown Lean Clay		21.7
21			SS-6	30.0	31.5	Beige & Copper Lean Clay		22.3
23			SS-7	35.0	36.5	Olive Gray & White Sandy Silt		33.7
23			SS-8	40.0	41.5	Olive Gray & White Sandy Silt		32.2
23			SS-9	45.0	46.5	Olive Gray, White & Tan Sandy Silt		23.7
24			SS-10	50.0	51.0	Dark Yellow Silty Sand		24.6
24			SS-11	55.0	56.5	Yellowish White Silty Sand		19.9
26			SS-12	60.0	61.5	Olive Gray & White Silty Clay with Sand		31.4
26			SS-13	65.0	66.5	Olive Gray & White Silty Clay with Sand		27.2
26			SS-14	70.0	71.5	Olive Gray & White Silty Clay with Sand		31.1
26			SS-15	75.0	76.5	Olive Gray & White Silty Clay with Sand		29.1
20	12A		SS-2	10.0	6.5	Dark Yellowish Tan & Copper Lean Clay		18.0
21			ST-1	15.0	15.5	Tanish Beige & Copper Lean Clay		24.5
21			SS-3	20.0	21.5	Tanish Beige Lean Clay		19.6
21			SS-4	25.0	26.5	Tanish Beige & Copper Lean Clay		21.0
20	13A		SS-1	5.0	6.5	Brown & Gray Lean Clay		20.9
21			SS-2	10.0	11.5	Dark Tan & Copper Lean Clay		21.0
21			SS-3	15.0	16.5	Dark Tan & Copper Lean Clay		20.7
21			SS-4	20.0	21.5	Tanish Beige & Copper Lean Clay		19.0
21			SS-5	25.0	26.5	Tanish Beige & Copper Lean Clay		21.3

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers
2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: ST-1
Project County	: McCracken	Sample Loc.	: Boring No. 1
Project State	: Kentucky	Sample Depth	: 10.0' to 11.9'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: Greenish Gray Lean Clay with Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	98.9

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	87.1
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	83.1
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 21.3
Maximum Dry Density	: NA	Liquid Limit	: 33
Optimum Moisture	: NA	Plastic Limit	: 19
		Plasticity Index	: 14
AASHTO Composition of Total Sample		Liquidity Index	: 0.16
Gravel (3in. + No.10)	: 1.1	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 11.8	Specific Gravity	: 2.763
Fine Sand (-No.40 + No.200)	: 4.0	AASHTO Classification	: A-6 (11)
Silt + Clay (-No.200)	: 83.1	ASTM Classification	: CL

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.0
Coarse Sand (-No.4 + No.10)	: 1.1
Medium Sand (-No.10 + No.40)	: 11.8
Fine Sand (-No.40 + No.200)	: 4.0
Silt + Clay (-No.200)	: 83.1

Approved By : SPW

Soil No. 3

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers
2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: ST-1
Project County	: McCracken	Sample Loc.	: Boring No. 7
Project State	: Kentucky	Sample Depth	: 15.8' to 17.0'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: Tanish Brown Lean Clay		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	100.0
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	99.7
No.4		4.75	mm	99.4
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	99.3

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	97.6
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	92.6
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 22.9
Maximum Dry Density	: NA	Liquid Limit	: 33
Optimum Moisture	: NA	Plastic Limit	: 19
		Plasticity Index	: 14
AASHTO Composition of Total Sample		Liquidity Index	: 0.28
Gravel (3in. + No.10)	: 0.7	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 1.7	Specific Gravity	: 2.752
Fine Sand (-No.40 + No.200)	: 5.0	AASHTO Classification	: A-6 (13)
Silt + Clay (-No.200)	: 92.6	ASTM Classification	: CL

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.6
Coarse Sand (-No.4 + No.10)	: 0.1
Medium Sand (-No.10 + No.40)	: 1.7
Fine Sand (-No.40 + No.200)	: 5.0
Silt + Clay (-No.200)	: 92.6

Approved By : SPN

Soil No. 7

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: ST-2
Project County	: McCracken	Sample Loc.	: Boring No. 3
Project State	: Kentucky	Sample Depth	: 25.2' to 26.5'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: Tanish Brown & Gray Lean Clay		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
No.4		4.75	mm	99.8
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	99.8

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.3
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	97.1
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 21.9
Maximum Dry Density	: NA	Liquid Limit	: 41
Optimum Moisture	: NA	Plastic Limit	: 22
		Plasticity Index	: 19
AASHTO Composition of Total Sample		Liquidity Index	: -0.01
Gravel (3in. + No.10)	: 0.2	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 0.5	Specific Gravity	: 2.722
Fine Sand (-No.40 + No.200)	: 2.2	AASHTO Classification	: A-7-6 (20)
Silt + Clay (-No.200)	: 97.1	ASTM Classification	: CL

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.2
Coarse Sand (-No.4 + No.10)	: 0.0
Medium Sand (-No.10 + No.40)	: 0.5
Fine Sand (-No.40 + No.200)	: 2.2
Silt + Clay (-No.200)	: 97.1

Approved By : SPW

Soil No. 9

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: SS - 7 & 8
Project County	: McCracken	Sample Loc.	: Boring No. 13
Project State	: Kentucky	Sample Depth	: 35.0' to 41.5'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: White & Tan Sandy Lean Clay		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	98.8

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	76.1
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	62.9
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 30.6
Maximum Dry Density	: NA	Liquid Limit	: 28
Optimum Moisture	: NA	Plastic Limit	: 18
		Plasticity Index	: 10
AASHTO Composition of Total Sample		Liquidity Index	: 1.26
Gravel (3in. + No.10)	: 1.2	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 22.7	Specific Gravity	: NA
Fine Sand (-No.40 + No.200)	: 13.2	AASHTO Classification	: A-4 (4)
Silt + Clay (-No.200)	: 62.9	ASTM Classification	: CL

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.0
Coarse Sand (-No.4 + No.10)	: 1.2
Medium Sand (-No.10 + No.40)	: 22.7
Fine Sand (-No.40 + No.200)	: 13.2
Silt + Clay (-No.200)	: 62.9

Approved By : SPW

Soil No. 11

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers
2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: SS - 7 & 8
Project County	: McCracken	Sample Loc.	: Boring No. 3
Project State	: Kentucky	Sample Depth	: 40.0' to 46.5'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: White & Dark Gray Lean Clay with Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
No.4		4.75	mm	95.2
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	90.6

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	86.5
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	76.8
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 28.7
Maximum Dry Density	: NA	Liquid Limit	: 29
Optimum Moisture	: NA	Plastic Limit	: 21
		Plasticity Index	: 8
AASHTO Composition of Total Sample		Liquidity Index	: 0.96
Gravel (3in. + No.10)	: 9.4	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 4.1	Specific Gravity	: NA
Fine Sand (-No.40 + No.200)	: 9.7	AASHTO Classification	: A-4 (5)
Silt + Clay (-No.200)	: 76.8	ASTM Classification	: CL

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 4.8
Coarse Sand (-No.4 + No.10)	: 4.6
Medium Sand (-No.10 + No.40)	: 4.1
Fine Sand (-No.40 + No.200)	: 9.7
Silt + Clay (-No.200)	: 76.8

Approved By : SPW

Soil No. 12

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers
2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: SS - 9 thru 12
Project County	: McCracken	Sample Loc.	: Boring No. 13
Project State	: Kentucky	Sample Depth	: 45.0' to 61.5'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: Tan & White Silty Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
No.4		4.75	mm	99.9
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	99.5

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	96.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	12.6
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 23.8
Maximum Dry Density	: NA	Liquid Limit	: NA
Optimum Moisture	: NA	Plastic Limit	: NA
		Plasticity Index	: NA
AASHTO Composition of Total Sample		Liquidity Index	: NA
Gravel (3in. + No.10)	: 0.5	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 2.7	Specific Gravity	: NA
Fine Sand (-No.40 + No.200)	: 84.2	AASHTO Classification	: A-2-4 (0) *
Silt + Clay (-No.200)	: 12.6	ASTM Classification	: SM *
		* Visual Classsification	

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.1
Coarse Sand (-No.4 + No.10)	: 0.4
Medium Sand (-No.10 + No.40)	: 2.7
Fine Sand (-No.40 + No.200)	: 84.2
Silt + Clay (-No.200)	: 12.6

Approved By : SPW

Soil No. 13

SOIL CLASSIFICATION

FLORENCE
& HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: SS - 12 & 13
Project County	: McCracken	Sample Loc.	: Boring No. 10
Project State	: Kentucky	Sample Depth	: 60.0' to 66.0'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: Gray & Orange Silt with Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	99.8

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.6
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	71.4
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 28.9
Maximum Dry Density	: NA	Liquid Limit	: 25
Optimum Moisture	: NA	Plastic Limit	: 21
		Plasticity Index	: 4
AASHTO Composition of Total Sample		Liquidity Index	: 1.97
Gravel (3in. + No.10)	: 0.2	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 1.2	Specific Gravity	: NA
Fine Sand (-No.40 + No.200)	: 27.2	AASHTO Classification	: A-4 (1)
Silt + Clay (-No.200)	: 71.4	ASTM Classification	: ML

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.0
Coarse Sand (-No.4 + No.10)	: 0.2
Medium Sand (-No.10 + No.40)	: 1.2
Fine Sand (-No.40 + No.200)	: 27.2
Silt + Clay (-No.200)	: 71.4

Approved By : SPW

Soil No. 14

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers
2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: SS - 13 thru 17
Project County	: McCracken	Sample Loc.	: Boring No. 1
Project State	: Kentucky	Sample Depth	: 65.0' to 86.5'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: White & Dark Gray Silt with Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	99.9

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	74.3
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 26.5
Maximum Dry Density	: NA	Liquid Limit	: 21
Optimum Moisture	: NA	Plastic Limit	: 20
		Plasticity Index	: 1
AASHTO Composition of Total Sample		Liquidity Index	: 6.50
Gravel (3in. + No.10)	: 0.1	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 1.1	Specific Gravity	: NA
Fine Sand (-No.40 + No.200)	: 24.5	AASHTO Classification	: A-4 (0)
Silt + Clay (-No.200)	: 74.3	ASTM Classification	: ML

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.0
Coarse Sand (-No.4 + No.10)	: 0.1
Medium Sand (-No.10 + No.40)	: 1.1
Fine Sand (-No.40 + No.200)	: 24.5
Silt + Clay (-No.200)	: 74.3

Approved By : SPW

Soil No. 15

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: SS - 18 & 19
Project County	: McCracken	Sample Loc.	: Boring No. 1
Project State	: Kentucky	Sample Depth	: 90.0' to 95.4'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: White Silty Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	100.0
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	98.7
No.4		4.75	mm	97.3
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	96.9

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	82.5
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	14.3
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 19.8
Maximum Dry Density	: NA	Liquid Limit	: NA
Optimum Moisture	: NA	Plastic Limit	: NA
		Plasticity Index	: NA
AASHTO Composition of Total Sample		Liquidity Index	: NA
Gravel (3in. + No.10)	: 3.1	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 14.4	Specific Gravity	: NA
Fine Sand (-No.40 + No.200)	: 68.2	AASHTO Classification	: A-2-4 (0) *
Silt + Clay (-No.200)	: 14.3	ASTM Classification	: SM *
		* Visual Classsification	

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 2.7
Coarse Sand (-No.4 + No.10)	: 0.4
Medium Sand (-No.10 + No.40)	: 14.4
Fine Sand (-No.40 + No.200)	: 68.2
Silt + Clay (-No.200)	: 14.3

Approved By : SPW

Soil No. 16

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: SS - 17 & 18
Project County	: McCracken	Sample Loc.	: Boring No. 13
Project State	: Kentucky	Sample Depth	: 85.0' to 90.8'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: Dark Gray & White Silty Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	99.6

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.1
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	47.8
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 27.2
Maximum Dry Density	: NA	Liquid Limit	: NP
Optimum Moisture	: NA	Plastic Limit	: NP
		Plasticity Index	: NP
AASHTO Composition of Total Sample		Liquidity Index	: NA
Gravel (3in. + No.10)	: 0.4	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 0.5	Specific Gravity	: NA
Fine Sand (-No.40 + No.200)	: 51.3	AASHTO Classification	: A-4 (0)
Silt + Clay (-No.200)	: 47.8	ASTM Classification	: SM

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.0
Coarse Sand (-No.4 + No.10)	: 0.4
Medium Sand (-No.10 + No.40)	: 0.5
Fine Sand (-No.40 + No.200)	: 51.3
Silt + Clay (-No.200)	: 47.8

Approved By : SPW

Soil No. 17

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers
2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013	Sample No.	: SS - 19
Project County	: McCracken	Sample Loc.	: Boring No. 5
Project State	: Kentucky	Sample Depth	: 45.0' to 45.8'
Laboratory No.	: 99013	Date Tested	: 03-10-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 03-15-99
Soil Type	: Brown, Copper & Tan Silty Sand with Gravel		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	100.0
1 1/4	in.	31.5	mm	
1	in.	25	mm	89.9
3/4	in.	19	mm	84.7
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	81.5
No.4		4.75	mm	77.7
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	73.3

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	69.5
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	17.5
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 19.7
Maximum Dry Density	: NA	Liquid Limit	: NA
Optimum Moisture	: NA	Plastic Limit	: NA
		Plasticity Index	: NA
AASHTO Composition of Total Sample		Liquidity Index	: NA
Gravel (3in. + No.10)	: 26.7	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 3.8	Specific Gravity	: NA
Fine Sand (-No.40 + No.200)	: 52.0	AASHTO Classification	: A-2-4 (0) *
Silt + Clay (-No.200)	: 17.5	ASTM Classification	: SM *
		* Visual Classsification	

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 15.3
Fine Gravel (-3/4in. + No.4)	: 7.0
Coarse Sand (-No.4 + No.10)	: 4.4
Medium Sand (-No.10 + No.40)	: 3.8
Fine Sand (-No.40 + No.200)	: 52.0
Silt + Clay (-No.200)	: 17.5

Approved By : SPW

Soil No. 19

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013A	Sample No.	: ST - 1
Project County	: McCracken	Sample Loc.	: Boring No. 3A
Project State	: Kentucky	Sample Depth	: 10.0' to 11.6'
Laboratory No.	: 99013A	Date Tested	: 10-05-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 10-08-99
Soil Type	: Tan, Gray & Copper Lean Clay		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
No.4		4.75	mm	99.8
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	99.7

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	97.8
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	87.4
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample

Gravel (3in. + No.10) : 0.3
Coarse Sand (-No.10 + No.40) : 1.9
Fine Sand (-No.40 + No.200) : 10.4
Silt + Clay (-No.200) : 87.4

Natural Moisture (%) : 17.2
Liquid Limit : 24
Plastic Limit : 16
Plasticity Index : 8
Liquidity Index : 0.15
Activity : NA
Specific Gravity : 2.708
AASHTO Classification : A-4 (5)
ASTM Classification : CL

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.2
Coarse Sand (-No.4 + No.10) : 0.1
Medium Sand (-No.10 + No.40) : 1.9
Fine Sand (-No.40 + No.200) : 10.4
Silt + Clay (-No.200) : 87.4

Approved By : _____

Soil No. 20

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013A	Sample No.	: ST - 1
Project County	: McCracken	Sample Loc.	: Boring No. 5A
Project State	: Kentucky	Sample Depth	: 15.0' to 16.1'
Laboratory No.	: 99013A	Date Tested	: 10-05-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 10-08-99
Soil Type	: Tan, Brown & Copper Lean Clay		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	100.0

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	98.4
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	92.0
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample

Gravel (3in. + No.10) : 0.0
Coarse Sand (-No.10 + No.40) : 1.6
Fine Sand (-No.40 + No.200) : 6.4
Silt + Clay (-No.200) : 92.0

Natural Moisture (%) : 22.0
Liquid Limit : 27
Plastic Limit : 19
Plasticity Index : 8
Liquidity Index : 0.38
Activity : NA
Specific Gravity : 2.736
AASHTO Classification : A-4 (6)
ASTM Classification : CL

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.0
Coarse Sand (-No.4 + No.10) : 0.0
Medium Sand (-No.10 + No.40) : 1.6
Fine Sand (-No.40 + No.200) : 6.4
Silt + Clay (-No.200) : 92.0

Approved By : _____

Soil No. 21

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013A	Sample No.	: SS - 7 & 8
Project County	: McCracken	Sample Loc.	: Boring No. 1A
Project State	: Kentucky	Sample Depth	: 30.0' to 36.5'
Laboratory No.	: 99013A	Date Tested	: 10-05-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 10-08-99
Soil Type	: Tan Poorly Graded Gravel with Silt and Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	100.0
1 1/4	in.	31.5	mm	
1	in.	25	mm	92.3
3/4	in.	19	mm	88.6
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	66.3
No.4		4.75	mm	41.5
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	28.1

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	18.2
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	7.1
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) : 16.6
Liquid Limit : 18
Plastic Limit : 18
Plasticity Index : NP
Liquidity Index : NA
Activity : NA
Specific Gravity : NA
AASHTO Classification : A-1-a (0)
ASTM Classification : GP-GM

AASHTO Composition of Total Sample

Gravel (3in. + No.10) : 71.9
Coarse Sand (-No.10 + No.40) : 9.9
Fine Sand (-No.40 + No.200) : 11.1
Silt + Clay (-No.200) : 7.1

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.) : 11.4
Fine Gravel (-3/4in. + No.4) : 47.1
Coarse Sand (-No.4 + No.10) : 13.4
Medium Sand (-No.10 + No.40) : 9.9
Fine Sand (-No.40 + No.200) : 11.1
Silt + Clay (-No.200) : 7.1

Approved By : _____

Soil No. 22

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013A	Sample No.	: SS - 7, 8 & 9
Project County	: McCracken	Sample Loc.	: Boring No. 11A
Project State	: Kentucky	Sample Depth	: 35.0' to 46.5'
Laboratory No.	: 99013A	Date Tested	: 10-06-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 10-08-99
Soil Type	: Olive Gray & White Sandy Silt		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
No.4		4.75	mm	98.7
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	95.3

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	88.5
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	59.3
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) : 29.9
Liquid Limit : NP
Plastic Limit : NP
Plasticity Index : NP
Liquidity Index : NA
Activity : NA
Specific Gravity : NA
AASHTO Classification : A-4 (0)
ASTM Classification : ML

AASHTO Composition of Total Sample

Gravel (3in. + No.10) : 4.7
Coarse Sand (-No.10 + No.40) : 6.8
Fine Sand (-No.40 + No.200) : 29.2
Silt + Clay (-No.200) : 59.3

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 1.3
Coarse Sand (-No.4 + No.10) : 3.4
Medium Sand (-No.10 + No.40) : 6.8
Fine Sand (-No.40 + No.200) : 29.2
Silt + Clay (-No.200) : 59.3

Approved By : _____

Soil No. 23

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013A	Sample No.	: SS - 9 thru 12
Project County	: McCracken	Sample Loc.	: Boring No. 9A
Project State	: Kentucky	Sample Depth	: 45.0' to 61.5'
Laboratory No.	: 99013A	Date Tested	: 10-06-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 10-08-99
Soil Type	: Tan & White Silty Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
No.4		4.75	mm	98.5
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	96.9

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	94.0
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	23.1
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) : 25.8
Liquid Limit : NP
Plastic Limit : NP
Plasticity Index : NP
Liquidity Index : NA
Activity : NA
Specific Gravity : NA
AASHTO Classification : A-2-4 (0)
ASTM Classification : SM

AASHTO Composition of Total Sample

Gravel (3in. + No.10) : 3.1
Coarse Sand (-No.10 + No.40) : 2.9
Fine Sand (-No.40 + No.200) : 70.9
Silt + Clay (-No.200) : 23.1

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 1.5
Coarse Sand (-No.4 + No.10) : 1.6
Medium Sand (-No.10 + No.40) : 2.9
Fine Sand (-No.40 + No.200) : 70.9
Silt + Clay (-No.200) : 23.1

Approved By : _____

Soil No. 24

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013A	Sample No.	: SS - 13 & 14
Project County	: McCracken	Sample Loc.	: Boring No. 4A
Project State	: Kentucky	Sample Depth	: 60.0' to 66.5'
Laboratory No.	: 99013A	Date Tested	: 10-06-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 10-08-99
Soil Type	: Gray - White Silt with Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	
No.4		4.75	mm	100.0
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	99.1

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	95.9
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	72.2
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio	: NA	Natural Moisture (%)	: 29.1
Maximum Dry Density	: NA	Liquid Limit	: 24
Optimum Moisture	: NA	Plastic Limit	: 23
		Plasticity Index	: 1
AASHTO Composition of Total Sample		Liquidity Index	: 6.10
Gravel (3in. + No.10)	: 0.9	Activity	: NA
Coarse Sand (-No.10 + No.40)	: 3.2	Specific Gravity	: NA
Fine Sand (-No.40 + No.200)	: 23.7	AASHTO Classification	: A-4 (0)
Silt + Clay (-No.200)	: 72.2	ASTM Classification	: ML

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.)	: 0.0
Fine Gravel (-3/4in. + No.4)	: 0.0
Coarse Sand (-No.4 + No.10)	: 0.9
Medium Sand (-No.10 + No.40)	: 3.2
Fine Sand (-No.40 + No.200)	: 23.7
Silt + Clay (-No.200)	: 72.2

Approved By : _____

Soil No. 25

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013A	Sample No.	: SS - 12 thru 15
Project County	: McCracken	Sample Loc.	: Boring No. 11A
Project State	: Kentucky	Sample Depth	: 60.0' to 76.5'
Laboratory No.	: 99013A	Date Tested	: 10-06-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 10-08-99
Soil Type	: Olive Gray & White Silty Clay with Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	100.0
3/4	in.	19	mm	94.7
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	94.7
No.4		4.75	mm	94.1
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	92.8

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	90.7
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	72.0
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

Natural Moisture (%) : 29.7
Liquid Limit : 23
Plastic Limit : 18
Plasticity Index : 5
Liquidity Index : 2.34
Activity : NA
Specific Gravity : NA
AASHTO Classification : A-4 (1)
ASTM Classification : CL-ML

AASHTO Composition of Total Sample

Gravel (3in. + No.10) : 7.2
Coarse Sand (-No.10 + No.40) : 2.1
Fine Sand (-No.40 + No.200) : 18.7
Silt + Clay (-No.200) : 72.0

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.) : 5.3
Fine Gravel (-3/4in. + No.4) : 0.6
Coarse Sand (-No.4 + No.10) : 1.3
Medium Sand (-No.10 + No.40) : 2.1
Fine Sand (-No.40 + No.200) : 18.7
Silt + Clay (-No.200) : 72.0

Approved By : _____

Soil No. 26

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers
2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013A	Sample No.	: SS - 18 thru 20
Project County	: McCracken	Sample Loc.	: Boring No. 1A
Project State	: Kentucky	Sample Depth	: 85.0' to 96.5'
Laboratory No.	: 99013A	Date Tested	: 10-06-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 10-08-99
Soil Type	: Olive Gray & White Silty Sand		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	100.0
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	99.5
No.4		4.75	mm	99.3
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	98.5

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	87.3
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	30.6
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample

Gravel (3in. + No.10) : 1.5
Coarse Sand (-No.10 + No.40) : 11.2
Fine Sand (-No.40 + No.200) : 56.7
Silt + Clay (-No.200) : 30.6

Natural Moisture (%) : 21.3
Liquid Limit : 25
Plastic Limit : 22
Plasticity Index : 3
Liquidity Index : -0.23
Activity : NA
Specific Gravity : NA
AASHTO Classification : A-2-4 (0)
ASTM Classification : SM

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.7
Coarse Sand (-No.4 + No.10) : 0.8
Medium Sand (-No.10 + No.40) : 11.2
Fine Sand (-No.40 + No.200) : 56.7
Silt + Clay (-No.200) : 30.6

Approved By : _____

Soil No. 27

SOIL CLASSIFICATION

FLORENCE & HUTCHESON, INC.
Consulting Engineers
2550 Irvin Cobb Drive
Paducah, KY 42003

Project Name	: Four River Center		
Project No.	: 99013A	Sample No.	: SS - 20 & 21
Project County	: McCracken	Sample Loc.	: Boring No. 4A
Project State	: Kentucky	Sample Depth	: 95.0' to 101.5'
Laboratory No.	: 99013A	Date Tested	: 10-06-99
Submitted By	: Florence & Hutcheson, Inc.	Date Reported	: 10-08-99
Soil Type	: Olive Gray & White Silt.		

				% Passing
4	in.	100	mm	
3 1/2	in.	90	mm	
3	in.	75	mm	
2 1/2	in.	63	mm	
2	in.	50	mm	
1 3/4	in.	45	mm	
1 1/2	in.	38.1	mm	
1 1/4	in.	31.5	mm	
1	in.	25	mm	
3/4	in.	19	mm	
1/2	in.	12.5	mm	
3/8	in.	9.5	mm	100.0
No.4		4.75	mm	99.9
No.6		3.35	mm	
No.8		2.36	mm	
No.10		2	mm	99.7

				% Passing
No.16		1.18	mm	
No.30		0.6	mm	
No.40		0.425	mm	99.2
No.50		0.3	mm	
No.60		0.25	mm	
No.80		0.18	mm	
No.100		0.15	mm	
No.200		0.075	mm	89.8
No.270		0.053	mm	
Hyd. Rd.	# 1		mm	
Hyd. Rd.	# 2		mm	
Hyd. Rd.	# 3		mm	
Hyd. Rd.	# 4		mm	
Hyd. Rd.	# 5		mm	
Hyd. Rd.	# 6		mm	
Hyd. Rd.	# 7		mm	

California Bearing Ratio : NA
Maximum Dry Density : NA
Optimum Moisture : NA

AASHTO Composition of Total Sample

Gravel (3in. + No.10) : 0.3
Coarse Sand (-No.10 + No.40) : 0.5
Fine Sand (-No.40 + No.200) : 9.4
Silt + Clay (-No.200) : 89.8

Natural Moisture (%) : 26.9
Liquid Limit : 28
Plastic Limit : 23
Plasticity Index : 5
Liquidity Index : 0.78
Activity : NA
Specific Gravity : NA
AASHTO Classification : A-4 (4)
ASTM Classification : ML

ASTM Composition of Total Sample

Coarse Gravel (3in. + 3/4in.) : 0.0
Fine Gravel (-3/4in. + No.4) : 0.1
Coarse Sand (-No.4 + No.10) : 0.2
Medium Sand (-No.10 + No.40) : 0.5
Fine Sand (-No.40 + No.200) : 9.4
Silt + Clay (-No.200) : 89.8

Approved By : _____

Soil No. 28

UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	:	Four River Center			
PROJECT #	:	99013	SAMPLE #	:	ST - 1
PROJECT COUNTY	:	McCracken	SAMPLE LOC.	:	Boring No. 1
PROJECT STATE	:	Kentucky	SAMPLE DEPTH	:	10.0' to 10.9'
LABORATORY #	:	99013	DATE TESTED	:	03-03-99
SUBMITTED BY	:	Florence & Hutcheson, Inc.	DATE REPORTED	:	03-15-99
SOIL TYPE	:	Greenish Gray Lean Clay with Sand			
WET DENSITY	:	130.9 pcf	INITIAL HEIGHT	:	5.82 in
DRY DENSITY	:	107.9 pcf	INITIAL DIAMETER	:	2.83 in
MOISTURE	:	21.3 %	PROVING RING	:	#22734

RESULTS:

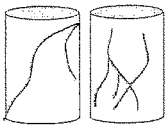
#	Axial Load lbs	Corrected Area sf	Unit Strain %	Stress Ksf
1	0.0	0.04	0.0	0.00
2	26.4	0.04	0.3	0.60
3	38.2	0.04	0.5	0.87
4	48.0	0.04	0.8	1.09
5	59.8	0.04	1.0	1.35
6	71.6	0.04	1.3	1.62
7	83.5	0.04	1.5	1.88
8	94.3	0.04	1.8	2.12
9	103.4	0.04	2.1	2.32
10	110.6	0.04	2.4	2.47
11	115.3	0.04	2.7	2.56
12	116.8	0.05	3.1	2.59
13	115.3	0.05	3.4	2.55
14	110.6	0.05	3.8	2.44
15	105.5	0.05	4.1	2.31
16	98.3	0.05	4.5	2.15

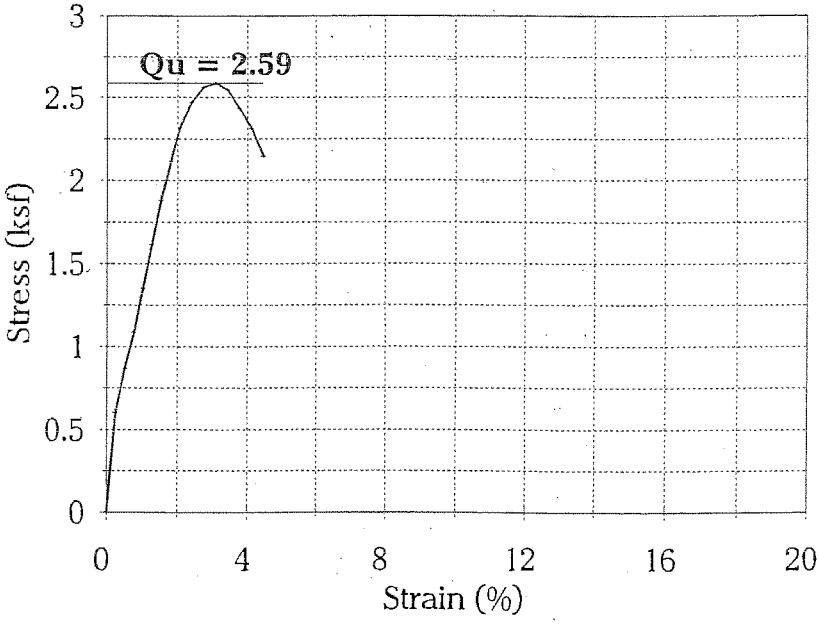
UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers
2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 1
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 10.0' to 10.9'
LABORATORY #	: 99013	DATE TESTED	: 03-03-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 03-15-99
SOIL TYPE	: Greenish Gray Lean Clay with Sand		
WET DENSITY	: 130.9 pcf	INITIAL HEIGHT	: 5.82 in
DRY DENSITY	: 107.9 pcf	INITIAL DIAMETER	: 2.83 in
MOISTURE	: 21.3 %	PROVING RING	: #22734
DEG. OF SAT.	: 98.3 %		

COMMENTS : AASHTO: T-208





APPROVED BY: SPW

TRIAXIAL COMPRESSION TEST

FLORENCE HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013	POINT #	: 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 5
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 30.0' to 31.6'
LABORATORY #	: 99013	DATE TESTED	: 03-04-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 03-15-99

SOIL TYPE	: Tanish Brown Lean Clay				
WET DENSITY	: 134.2 pcf	DELTA HEIGHT	: NA	INITIAL HEIGHT	: 14.73 cm
DRY DENSITY	: 112.6 pcf	DELTA VOLUME	: NA	INITIAL DIAMETER	: 7.18 cm
MOISTURE	: 19.1 %	CHAMBER PRES.	: 15.2 psi	INIT. PORE PRES.	: NA

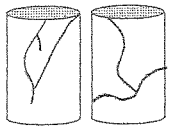
RESULTS:

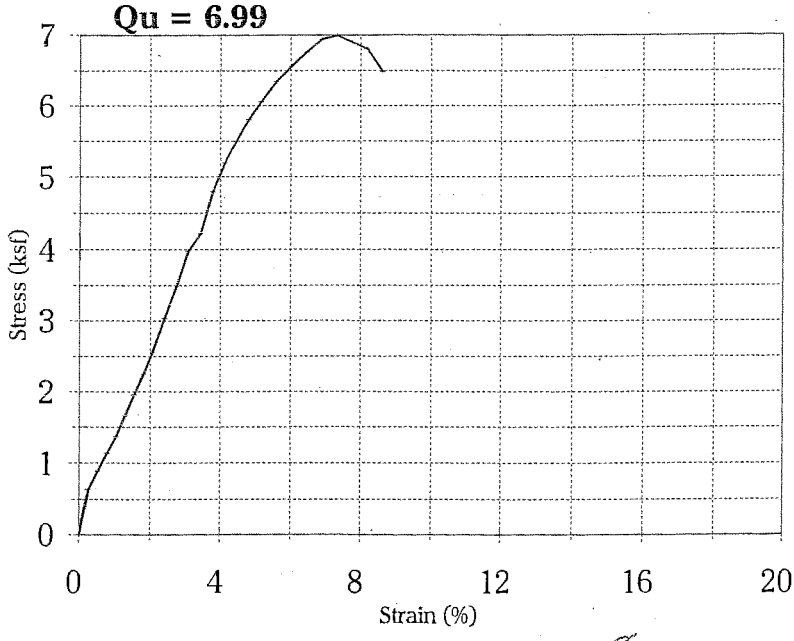
	ε a	σ 3 (psi)	σ 1 (psi)	σ1 / σ3
1	0.00	15.20	15.20	1.00
2	0.09	15.20	17.03	1.12
3	0.17	15.20	17.98	1.18
4	0.26	15.20	18.69	1.23
5	0.34	15.20	19.31	1.27
6	0.43	15.20	19.89	1.31
7	0.52	15.20	20.47	1.35
8	1.03	15.20	23.37	1.54
9	1.55	15.20	26.88	1.77
10	2.07	15.20	29.98	1.97
11	2.59	15.20	32.75	2.15
12	3.10	15.20	35.20	2.32
13	3.45	15.20	36.68	2.41
14	4.31	15.20	39.65	2.61
15	5.17	15.20	41.62	2.74
16	6.03	15.20	43.33	2.85
17	6.90	15.20	44.60	2.93
18	7.76	15.20	45.84	3.02
19	8.62	15.20	46.63	3.07
20	9.48	15.20	47.60	3.13
21	10.34	15.20	48.31	3.18
22	11.21	15.20	48.77	3.21
23	12.07	15.20	49.22	3.24
24	12.93	15.20	49.68	3.27
25	13.79	15.20	49.91	3.28
26	14.66	15.20	50.06	3.29
27	15.52	15.20	50.19	3.30
28	16.38	15.20	50.39	3.32
29	17.24	15.20	50.44	3.32
30	18.10	15.20	50.41	3.32
31	18.97	15.20	50.48	3.32
32	19.83	15.20	50.47	3.32

UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers
2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013A	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 3A
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 10.0' to 11.6'
LABORATORY #	: 99013A	DATE TESTED	: 09-27-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 10-08-99
SOIL TYPE	: Tan, Gray & Copper Lean Clay		
WET DENSITY	: 136.2 pcf	INITIAL HEIGHT	: 5.80 in
DRY DENSITY	: 116.2 pcf	INITIAL DIAMETER	: 2.83 in
MOISTURE	: 17.2 %	PROVING RING	: #22734
DEG. OF SAT.	: 100.0 %		
COMMENTS	: AASHTO: T-208		





APPROVED BY: _____

UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers
2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013A	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 5A
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 15.0' to 16.1'
LABORATORY #	: 99013A	DATE TESTED	: 09-27-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 10-08-99
SOIL TYPE	: Tan, Brown & Copper Lean Clay		
WET DENSITY	: 129.6 pcf	INITIAL HEIGHT	: 5.83 in
DRY DENSITY	: 106.2 pcf	INITIAL DIAMETER	: 2.84 in
MOISTURE	: 22.0 %	PROVING RING	: #22734

RESULTS:

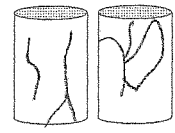
#	Axial Load lbs	Corrected Area sf	Unit Strain %	Stress Ksf
1	0.0	0.04	0.0	0.00
2	19.1	0.04	0.3	0.43
3	26.1	0.04	0.7	0.59
4	34.1	0.04	1.0	0.77
5	43.2	0.04	1.4	0.97
6	53.3	0.04	1.7	1.19
7	63.4	0.04	2.1	1.41
8	75.7	0.05	2.4	1.68
9	86.9	0.05	2.7	1.92
10	98.1	0.05	3.1	2.16
11	107.1	0.05	3.4	2.35
12	118.1	0.05	3.9	2.58
13	127.1	0.05	4.3	2.76
14	135.1	0.05	4.7	2.92
15	141.1	0.05	5.1	3.04
16	143.0	0.05	5.6	3.07
17	144.0	0.05	6.0	3.07
18	140.1	0.05	6.4	2.97
19	132.1	0.05	6.9	2.79
20	126.1	0.05	7.3	2.65

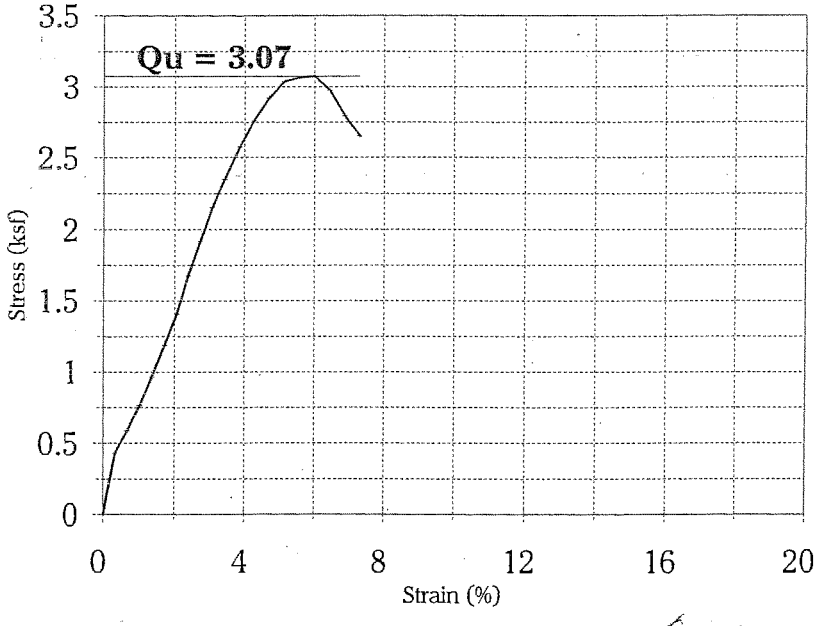
UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers
2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013A	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 5A
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 15.0' to 16.1'
LABORATORY #	: 99013A	DATE TESTED	: 09-27-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 10-08-99
SOIL TYPE	: Tan, Brown & Copper Lean Clay		
WET DENSITY	: 129.6 pcf	INITIAL HEIGHT	: 5.83 in
DRY DENSITY	: 106.2 pcf	INITIAL DIAMETER	: 2.84 in
MOISTURE	: 22.0 %	PROVING RING	: #22734
DEG. OF SAT.	: 98.9 %		

COMMENTS : AASHTO: T-208





APPROVED BY: _____

UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013A	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 6A
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 20.0' to 21.2'
LABORATORY #	: 99013A	DATE TESTED	: 09-28-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 10-08-99
SOIL TYPE	: Tan, Brown & Copper Lean Clay		
WET DENSITY	: 132.6 pcf	INITIAL HEIGHT	: 5.79 in
DRY DENSITY	: 111.5 pcf	INITIAL DIAMETER	: 2.84 in
MOISTURE	: 18.9 %	PROVING RING	: #22734

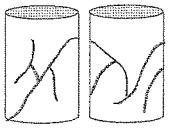
RESULTS:

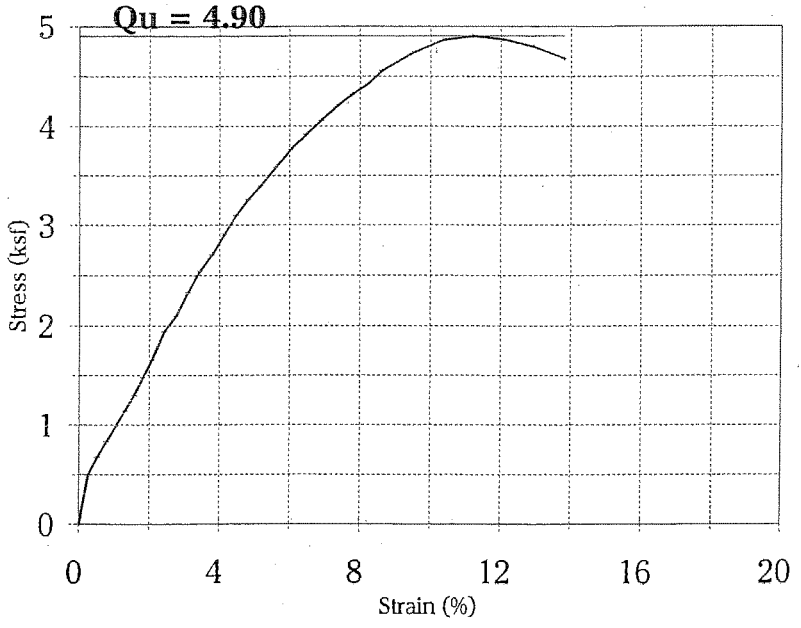
#	Axial Load lbs	Corrected Area sf	Unit Strain %	Stress Ksf
1	0.0	0.04	0.0	0.00
2	22.1	0.04	0.3	0.50
3	30.1	0.04	0.5	0.68
4	37.1	0.04	0.8	0.84
5	44.2	0.04	1.0	0.99
6	51.2	0.04	1.3	1.15
7	58.4	0.04	1.6	1.30
8	66.5	0.04	1.8	1.48
9	74.7	0.05	2.1	1.66
10	87.9	0.05	2.4	1.95
11	95.0	0.05	2.8	2.10
12	106.1	0.05	3.1	2.33
13	116.1	0.05	3.5	2.54
14	124.1	0.05	3.8	2.71
15	134.1	0.05	4.1	2.92
16	143.0	0.05	4.5	3.10
17	151.0	0.05	4.8	3.26
18	157.7	0.05	5.2	3.39
19	167.3	0.05	5.6	3.58
20	176.8	0.05	6.0	3.77
21	184.5	0.05	6.5	3.91
22	192.1	0.05	6.9	4.06
23	199.8	0.05	7.3	4.20
24	206.5	0.05	7.8	4.32
25	212.3	0.05	8.2	4.42
26	220.0	0.05	8.6	4.56
27	230.5	0.05	9.5	4.73
28	239.2	0.05	10.4	4.86
29	243.5	0.05	11.2	4.90
30	244.2	0.05	12.1	4.87
31	242.8	0.05	12.9	4.79
32	239.4	0.05	13.8	4.68

UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers
2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013A	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 6A
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 20.0' to 21.2'
LABORATORY #	: 99013A	DATE TESTED	: 09-28-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 10-08-99
SOIL TYPE	: Tan, Brown & Copper Lean Clay		
WET DENSITY	: 132.6 pcf	INITIAL HEIGHT	: 5.79 in
DRY DENSITY	: 111.5 pcf	INITIAL DIAMETER	: 2.84 in
MOISTURE	: 18.9 %	PROVING RING	: #22734
DEG. OF SAT.	: NA		
COMMENTS	: AASHTO: T-208		





APPROVED BY: _____

UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013A	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 8A
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 15.0' to 16.3'
LABORATORY #	: 99013A	DATE TESTED	: 09-27-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 10-08-99
SOIL TYPE	: Greenish Tan Lean Clay		
WET DENSITY	: 131.0 pcf	INITIAL HEIGHT	: 5.77 in
DRY DENSITY	: 107.6 pcf	INITIAL DIAMETER	: 2.83 in
MOISTURE	: 21.8 %	PROVING RING	: #22734

RESULTS:

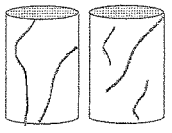
#	Axial Load lbs	Corrected Area sf	Unit Strain %	Stress Ksf
1	0.0	0.04	0.0	0.00
2	23.1	0.04	0.3	0.53
3	32.1	0.04	0.7	0.73
4	41.2	0.04	1.0	0.93
5	50.2	0.04	1.4	1.13
6	61.4	0.04	1.7	1.38
7	71.6	0.04	2.1	1.60
8	83.8	0.04	2.4	1.87
9	95.0	0.05	2.8	2.11
10	105.1	0.05	3.1	2.33
11	115.1	0.05	3.5	2.54
12	126.1	0.05	3.8	2.77
13	135.1	0.05	4.2	2.96
14	144.0	0.05	4.5	3.14
15	152.0	0.05	4.8	3.30
16	159.6	0.05	5.2	3.46
17	168.2	0.05	5.6	3.63
18	176.8	0.05	6.1	3.79
19	184.5	0.05	6.5	3.94
20	191.2	0.05	6.9	4.06
21	197.9	0.05	7.4	4.19
22	202.7	0.05	7.8	4.27
23	208.4	0.05	8.2	4.37
24	213.2	0.05	8.7	4.45
25	220.0	0.05	9.5	4.55
26	220.9	0.05	10.4	4.52
27	216.1	0.05	11.3	4.38
28	206.5	0.05	12.1	4.15

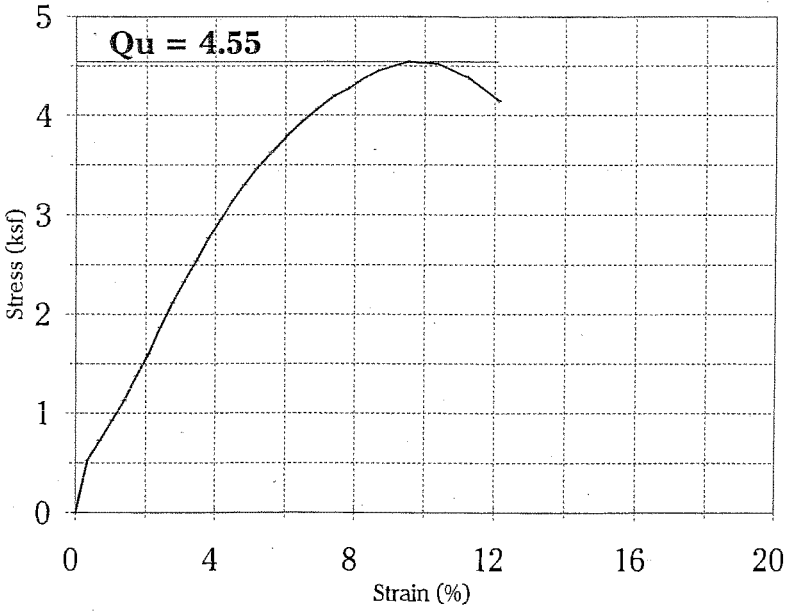
UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013A	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 8A
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 15.0' to 16.3'
LABORATORY #	: 99013A	DATE TESTED	: 09-27-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 10-08-99
SOIL TYPE	: Greenish Tan Lean Clay		
WET DENSITY	: 131.0 pcf	INITIAL HEIGHT	: 5.77 in
DRY DENSITY	: 107.6 pcf	INITIAL DIAMETER	: 2.83 in
MOISTURE	: 21.8 %	PROVING RING	: #22734
DEG. OF SAT.	: NA		
COMMENTS	: AASHTO: T-208		





APPROVED BY: _____

UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	:	Four River Center			
PROJECT #	:	99013A	SAMPLE #	:	ST - 1
PROJECT COUNTY	:	McCracken	SAMPLE LOC.	:	Boring No. 12A
PROJECT STATE	:	Kentucky	SAMPLE DEPTH	:	15.0' to 15.5'
LABORATORY #	:	99013A	DATE TESTED	:	09-27-99
SUBMITTED BY	:	Florence & Hutcheson, Inc.	DATE REPORTED	:	10-08-99
SOIL TYPE	:	Tanish Beige & Copper Lean Clay			
WET DENSITY	:	128.5 pcf	INITIAL HEIGHT	:	5.76 in
DRY DENSITY	:	103.3 pcf	INITIAL DIAMETER	:	2.82 in
MOISTURE	:	24.5 %	PROVING RING	:	#22734

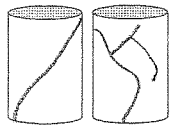
RESULTS:

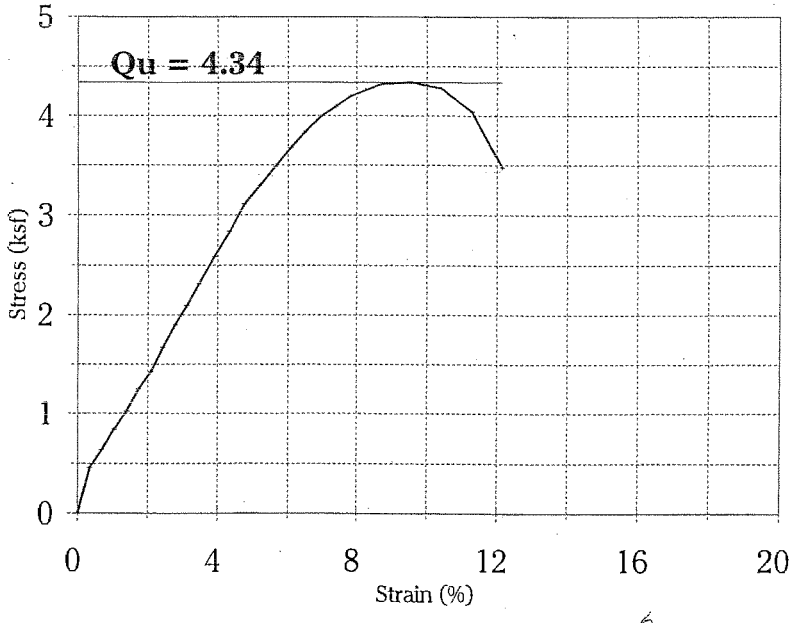
#	Axial Load lbs	Corrected Area sf	Unit Strain %	Stress Ksf
1	0.0	0.04	0.0	0.00
2	20.1	0.04	0.3	0.46
3	28.1	0.04	0.7	0.64
4	37.1	0.04	1.0	0.85
5	45.2	0.04	1.4	1.03
6	55.3	0.04	1.7	1.25
7	63.4	0.04	2.1	1.43
8	74.7	0.04	2.4	1.68
9	84.8	0.04	2.8	1.90
10	94.0	0.04	3.1	2.10
11	104.1	0.05	3.5	2.31
12	117.1	0.05	3.9	2.59
13	129.1	0.05	4.3	2.84
14	142.1	0.05	4.8	3.11
15	151.0	0.05	5.2	3.29
16	160.6	0.05	5.6	3.49
17	170.2	0.05	6.1	3.68
18	178.8	0.05	6.5	3.85
19	186.4	0.05	6.9	3.99
20	192.1	0.05	7.4	4.09
21	197.9	0.05	7.8	4.20
22	201.7	0.05	8.3	4.26
23	205.6	0.05	8.7	4.32
24	208.4	0.05	9.6	4.34
25	207.5	0.05	10.4	4.28
26	197.9	0.05	11.3	4.04
27	172.1	0.05	12.2	3.48

UNCONFINED COMPRESSION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers
2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	: Four River Center		
PROJECT #	: 99013A	SAMPLE #	: ST - 1
PROJECT COUNTY	: McCracken	SAMPLE LOC.	: Boring No. 12A
PROJECT STATE	: Kentucky	SAMPLE DEPTH	: 15.0' to 15.5'
LABORATORY #	: 99013A	DATE TESTED	: 09-27-99
SUBMITTED BY	: Florence & Hutcheson, Inc.	DATE REPORTED	: 10-08-99
SOIL TYPE	: Tanish Beige & Copper Lean Clay		
WET DENSITY	: 128.5 pcf	INITIAL HEIGHT	: 5.76 in
DRY DENSITY	: 103.3 pcf	INITIAL DIAMETER	: 2.82 in
MOISTURE	: 24.5 %	PROVING RING	: #22734
DEG. OF SAT.	: NA		
COMMENTS	: AASHTO: T-208		





APPROVED BY: _____

CONSOLIDATION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	:	Four River Center			
PROJECT #	:	99013A	SAMPLE #	:	ST - 1
PROJECT COUNTY	:	McCracken	SAMPLE LOC.	:	Boring No. 3A
PROJECT STATE	:	Kentucky	SAMPLE DEPTH	:	10.25' to 10.50'
LABORATORY #	:	99013A	DATE TESTED	:	09-28-99
SUBMITTED BY	:	Florence & Hutcheson, Inc.	DATE REPORTED	:	10-08-99
SOIL TYPE	:	Tan, Gray & Copper Lean Clay			
COMMENTS	:	AASHTO: T-216			

SAMPLE DATA

Initial Saturation	:	95.5	Final Saturation	:	100.0
Initial Void Ratio	:	0.4934	Final Void Ratio	:	0.4437
Initial Dial Reading	:	0.1600 in.	Final Dial Reading	:	0.2009 in.
			Dry wt. of Soil	:	143.87 gms.
Intial Sample Vol.	:	79.339 cm^3	Ht. of Solids	:	1.6795 cm
Initial Ht. of Voids	:	0.8287 cm	Spec. Gravity	:	2.708

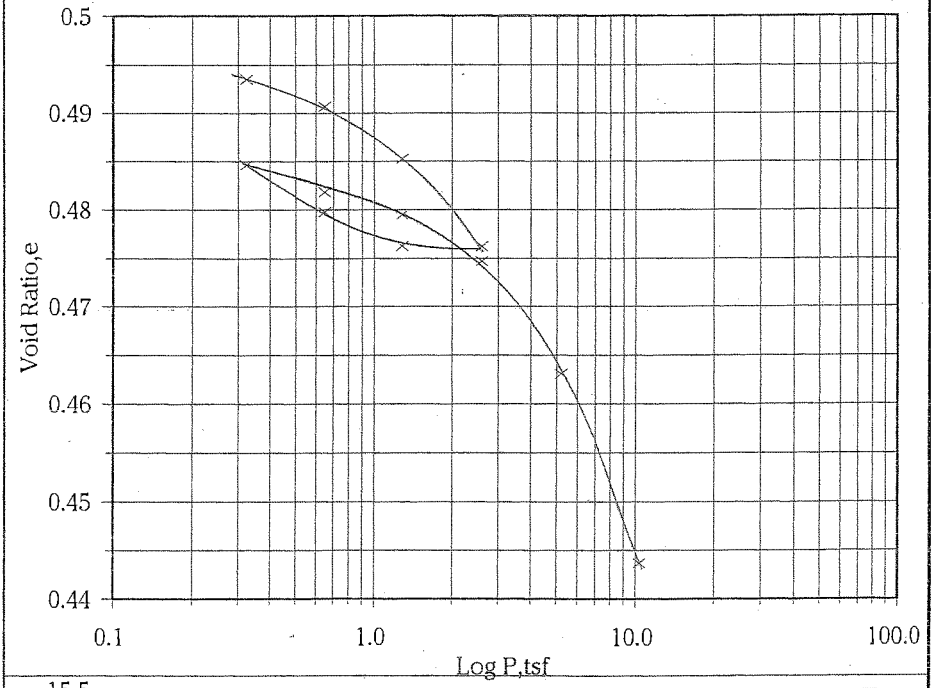
Computations for Void Ratio and Coeff. of Consolidation

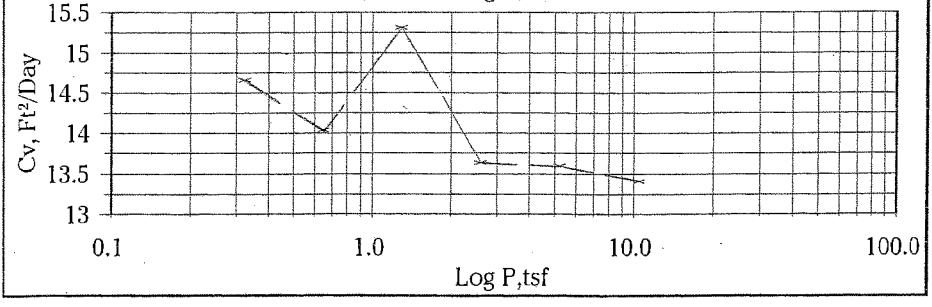
Load, tsf	Corrected Def. Dial Reading at End of Load, in.	Inst. Void Ratio e	Average Ht. for Load, in.	Hc in.	Time for 90% Consol., min.	Coef. of Consol. Cv, ft^2/Day
0.324	0.1599	0.4935	0.9875	0.4938	0.141	14.66
0.649	0.1618	0.4907	0.9866	0.4933	0.147	14.04
1.294	0.1654	0.4853	0.9839	0.4920	0.134	15.32
2.599	0.1714	0.4762	0.9791	0.4896	0.149	13.64
0.649	0.1690	0.4798	0.9773	0.4887		
1.294	0.1713	0.4763	0.9773	0.4887		
2.599	0.1724	0.4747	0.9757	0.4878		
5.217	0.1801	0.4631	0.9713	0.4856	0.147	13.61
10.423	0.1929	0.4437	0.9610	0.4805	0.146	13.41
1.294	0.1692	0.4795	0.9665	0.4832		
0.649	0.1677	0.4818	0.9791	0.4895		
0.324	0.1658	0.4846	0.9808	0.4904		

CONSOLIDATION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers
2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	:	Four River Center			
PROJECT #	:	99013A	SAMPLE #	:	ST - 1
PROJECT COUNTY	:	McCracken	SAMPLE LOC.	:	Boring No. 3A
PROJECT STATE	:	Kentucky	SAMPLE DEPTH	:	10.25' to 10.50'
LABORATORY #	:	99013A	DATE TESTED	:	09-28-99
SUBMITTED BY	:	Florence & Hutcheson, Inc.	DATE REPORTED	:	10-08-99
SOIL TYPE	:	Tan, Gray & Copper Lean Clay	APPROVED BY	:	AWT
COMMENTS	:	AASHTO: T-216			





CONSOLIDATION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	:	Four River Center			
PROJECT #	:	99013A	SAMPLE #	:	ST - 1
PROJECT COUNTY	:	McCracken	SAMPLE LOC.	:	Boring No. 5A
PROJECT STATE	:	Kentucky	SAMPLE DEPTH	:	15.25' to 15.50'
LABORATORY #	:	99013A	DATE TESTED	:	09-28-99
SUBMITTED BY	:	Florence & Hutcheson, Inc.	DATE REPORTED	:	10-08-99
SOIL TYPE	:	Tan, Brown & Copper Lean Clay			
COMMENTS	:	AASHTO: T-216			

SAMPLE DATA

Initial Saturation	:	98.1	Final Saturation	:	100.0
Initial Void Ratio	:	0.6092	Final Void Ratio	:	0.5290
Initial Dial Reading	:	0.1600 in.	Final Dial Reading	:	0.2173 in.
			Dry wt. of Soil	:	135.18 gms.
Intial Sample Vol.	:	79.508 cm^3	Ht. of Solids	:	1.5626 cm
Initial Ht. of Voids	:	0.9520 cm	Spec. Gravity	:	2.736

Computations for Void Ratio and Coeff. of Consolidation

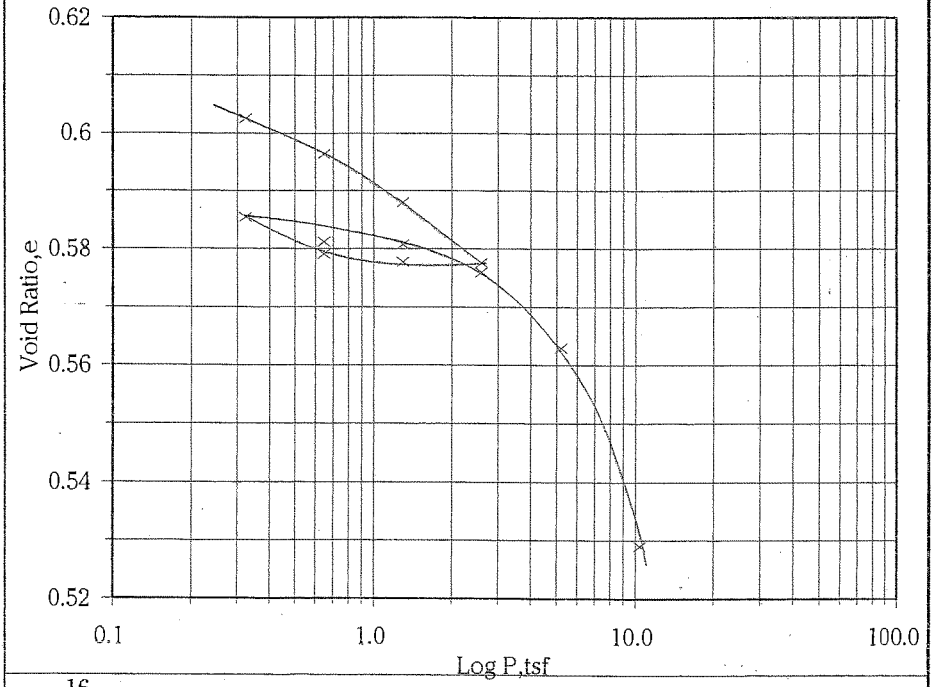
Load, tsf	Corrected Def. Dial Reading at End of Load, in.	Inst. Void Ratio e	Average Ht. for Load, in.	Hc in.	Time for 90% Consol., min.	Coef. of Consol. Cv, ft^2/Day
0.324	0.1641	0.6025	0.9880	0.4940	0.134	15.44
0.648	0.1679	0.5964	0.9840	0.4920	0.172	11.93
1.296	0.1730	0.5880	0.9795	0.4898	0.160	12.71
2.603	0.1794	0.5776	0.9738	0.4869	0.169	11.89
0.648	0.1785	0.5791	0.9710	0.4855		
1.296	0.1793	0.5778	0.9711	0.4855		
2.603	0.1804	0.5760	0.9701	0.4851		
5.212	0.1885	0.5630	0.9656	0.4828	0.181	10.92
10.451	0.2094	0.5290	0.9511	0.4756	0.538	3.56
1.296	0.1775	0.5807	0.9566	0.4783		
0.648	0.1772	0.5812	0.9726	0.4863		
0.324	0.1746	0.5855	0.9741	0.4870		

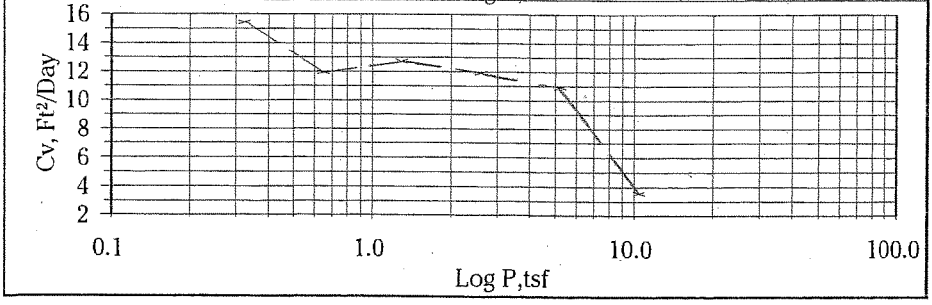
CONSOLIDATION TEST

FLORENCE & HUTCHESON, INC.
Consulting Engineers

2550 Irvin Cobb Drive
Paducah, Ky 42003

PROJECT NAME	:	Four River Center			
PROJECT #	:	99013A	SAMPLE #	:	ST - 1
PROJECT COUNTY	:	McCracken	SAMPLE LOC.	:	Boring No. 5A
PROJECT STATE	:	Kentucky	SAMPLE DEPTH	:	15.25' to 15.50'
LABORATORY #	:	99013A	DATE TESTED	:	09-28-99
SUBMITTED BY	:	Florence & Hutcheson, Inc.	DATE REPORTED	:	10-08-99
SOIL TYPE	:	Tan, Brown & Copper Lean Clay	APPROVED BY	:	
COMMENTS	:	AASHTO: T-216			





In Association With
Paducah's Feasibility & Certification
This Is An Adjacent Project's

GEOTECHNICAL EXPLORATION REPORT

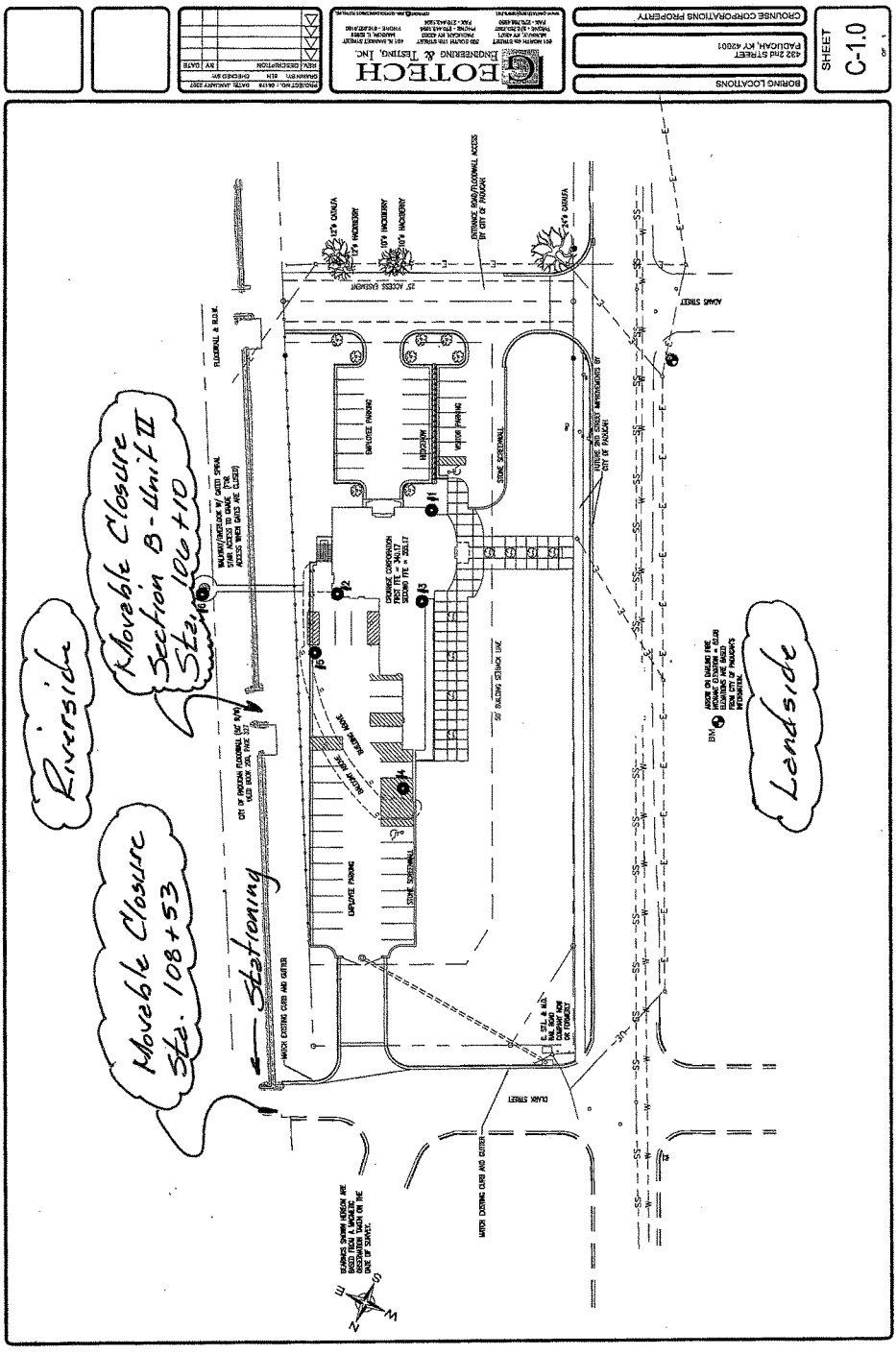
OF

PROPOSED CROUNSE CORPORATION HEADQUARTERS
432 SECOND STREET
PADUCAH, KENTUCKY

Borings #1-#5 Landside Left of
Boring #6 Riverside Right of
Moveable Closure
Section "B - Unit II"
Sta. 106+10 +/- (See Appendix B)

Submitted By:

Geotech Engineering & Testing, Inc.


Riverside
Movable Closure
Section B - Unit II
Sta. 100+10
Movable Closure
Sta. 108+53
Sheetpiling
Landside
SHEET
C-1.0
BORING LOCATIONS
CROWLEY CORPORATIONS PROPERTY
432 2nd STREET
PADUCAH, KY 42001
EOTECH
ENGINEERING & TESTING, INC.
FLOODWALL & R.O.W.
37' ACCESS EASEMENT
EMPLOYEE PARKING
VISITOR PARKING
STONE SCREENWALL
ADAMS STREET
CLARK STREET
EXISTING DOOR TO FLOODWALL ACCESS BY CITY OF PADUCAH
CROWLEY CORPORATION
TRACT TITE = 3.0117
DEEDED TITE = 3.0117
BENCHMARKS SHOWN HEREON ARE BASED ON NGVD 29 AND ARE OBSERVATION MADE ON THE DATE OF SURVEY.

GEOTECH Engineering & Testing, Inc.
(270) 443-1995 (270) 443-1904 fax
www.geotechengineers.net

SUBSURFACE BORING LOG

Boring No. : **B-1**

Project : Crounse Headquarters

Project Location : Paducah, KY

Boring Started : December 21, 2006 **Boring Diameter :** 4-1/2 Inch Dia **Driller :** C. Smith/B. Watkins

Date Completed : December 21, 2006 **Drilling Method :** Hollow Stem Auger **Drill Equipment :** CME - 45B

Surface Elevation : 339.82 **Sampling Methods :** SPT, Shelby Tubes

Split spoon ▽ GW @ drilling
Shelby Tube ▼ GW @ 24 hrs
Auger cuttings

Depth in Feet	Elev. in Feet	Sample Type	DESCRIPTION	Lithology	Counts Blows (per 6")	Dry Density (pcf)	Unconfined Strength, (psf)	Standard Penetration Resistance (N-Values)	Moisture Content (%)	Qu (tsf)
0			DEBRIS: Consisting primarily of soil intermixed with gravel, asphalt, concrete, and metal fragments.					10 20 30 40	10 20 30	1 2
			CL: Grayish brown silty CLAY (CL); medium plasticity, very soft to firm in consistency.		0 - 0 - 2					
5	335					99.06	1,991			
10	330				1 - 3 - 5					
15	325				1 - 2 - 4					
20	320				1 - 3 - 5					
			Boring terminated @ approximately 21.0 feet bgs.							
25	315									

GEOTECH Engineering & Testing, Inc.
(270) 443-1995 (270) 443-1904 fax
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SUBSURFACE BORING LOG

Boring No. : **B-2**

Project : Crounse Headquarters

Project Location : Paducah, KY

Page 1 of 1

Boring Started : December 21, 2006 **Boring Diameter :** 4-1/2 Inch Dia **Driller :** C. Smith/B. Watkins

Date Completed : December 21, 2006 **Drilling Method :** Hollow Stem Auger **Drill Equipment :** CME - 45B

Surface Elevation : 340.42 **Sampling Methods :** SPT, Shelby Tubes

Split spoon | GW @ drilling | Shelby Tube | GW @ 24 hrs | Auger cuttings

Depth in Feet	Elev. in Feet	Sample Type	DESCRIPTION	Lithology	Counts Blows (per 6")	Dry Density (pcf)	Unconfined Strength, (psf)	Standard Penetration Resistance (N-Values)	Moisture Content (%)	Qu (tsf)
0	340		DEBRIS: Consisting primarily of soil intermixed with gravel, asphalt, concrete, and metal fragments.							
			CL: Grayish brown silty CLAY (CL); medium plasticity, very soft to firm in consistency.		1 - 1 - 1					
5	335					99.42	2,241			
10	330				1 - 2 - 4					
15	325				1 - 3 - 4					
20	320				1 - 2 - 5					
			Boring terminated @ approximately 21.0 feet bgs.							
25										

Standard Penetration Resistance (N-Values): 10 20 30 40

Moisture Content (%): 10 20 30

Qu (tsf): 1 2

GEOTECH Engineering & Testing, Inc.
(270) 443-1995 (270) 443-1904 fax
www.geotechengineers.net

SUBSURFACE BORING LOG

Boring No. : B-3

Project : Crounse Headquarters

Project Location : Paducah, KY

Page 1 of 2

Boring Started : December 18, 2006 **Boring Diameter :** 4-1/2 Inch Dia **Driller :** C. Smith/B. Watkins

Date Completed : December 20, 2006 **Drilling Method :** Hollow Stem Auger **Drill Equipment :** CME-45B

Surface Elevation : 339.94 **Sampling Methods :** SPT, Shelby Tubes

Split spoon ▽ GW @ drilling
Shelby Tube ▼ GW @ 24 hrs
Auger cuttings

Depth in Feet	Elev. in Feet	Sample Type	DESCRIPTION	Lithology	Counts Blows (per 6")	Dry Density (pcf)	Unconfined Strength, (psf)	Standard Penetration Resistance (N-Values)	Moisture Content (%)	Qu (tsf)
0			DEBRIS: Consisting primarily of intermixed gravel and soil with some pieces of glass, metal, and brick.		2 - 1 - 3					
5	335		CL: Brownish gray silty CLAY (CL); medium plasticity, soft to very stiff in consistency.			105.5	5,733			
10	330				2 - 3 - 5					
15	325				1 - 4 - 4					
20	320				2 - 3 - 5					
25	315				3 - 5 - 10					
30	310				3 - 5 - 10					
35	305				4 - 8 - 16					
40	300				1 - 2 - 1					
45	295		SM: Dark gray laminated SILT and light gray well-graded SAND (SM); interlensing, micaceous; very loose to firm in consistency.		3 - 5 - 9					
50	290		Boring Continued on Following Page							

Standard Penetration Resistance (N-Values): 10 20 30 40
Moisture Content (%): 10 20 30
Qu (tsf): 1 2

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SUBSURFACE BORING LOG

Boring No. : **B-3**

Project : Crounse Headquarters

Project Location : Paducah, KY

Page 1 of 1

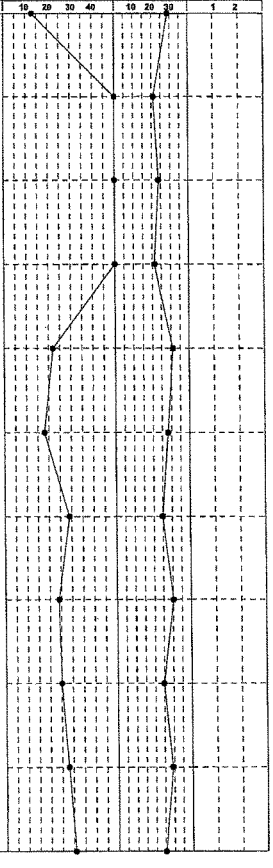
Boring Started : December 18, 2006 **Boring Diameter :** 4-1/2 Inch Dia **Driller :** C. Smith/B. Watkins

Date Completed : December 20, 2006 **Drilling Method :** Hollow Stem Auger **Drill Equipment :** CME-45B

Surface Elevation : 339.94 **Sampling Methods :** SPT, Shelby Tubes

Split spoon ▽ GW @ drilling
Shelby Tube ▼ GW @ 24 hrs
Auger cuttings

Depth in Feet	Elev. in Feet	Sample Type	DESCRIPTION	Lithology	Counts Blows (per 6")	Dry Density (pcf)	Unconfined Strength, (psf)	Standard Penetration Resistance (N-Values)	Moisture Content (%)	Qu (tsf)
50			SM: Dark gray laminated SILT and light gray well-graded SAND (SM); micaceous, interlensing, very loose to firm in consistency.		4 - 5 - 8					
55	285		SW: Reddish to light brown silty SAND (SW); well sorted, with iron staining, very dense in consistency.		45 - 50+					
60	280				42 - 50+					
65	275				11 - 36 - 50+					
70	270		SM: Dark gray laminated SILT and light gray well-graded SAND (SM); micaceous, interlensing, firm to dense in consistency; can be correlated to the Clayton and McNairy formations.		13 - 9 - 13					
75	265				5 - 7 - 11					
80	260				5 - 12 - 17					
85	255				5 - 11 - 13					
90	250				3 - 10 - 15					
95	245				4 - 12 - 16					
100	240		Boring Terminated @ 100 Feet							



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SUBSURFACE BORING LOG

Boring No. : **B-4**

Project : Crounse Headquarters

Project Location : Paducah, KY

Boring Started : December 21, 2006 **Boring Diameter :** 4-1/2 Inch Dia **Driller :** C. Smith/B. Watkins
Date Completed : December 21, 2006 **Drilling Method :** Hollow Stem Auger **Drill Equipment :** CME - 45B
Surface Elevation : 339.15 **Sampling Methods :** SPT, Shelby Tubes

Split spoon ▽ GW @ drilling
Shelby Tube ▼ GW @ 24 hrs
Auger cuttings

Depth in Feet	Elev. in Feet	Sample Type	DESCRIPTION	Lithology	Counts Blows (per 6")	Dry Density (pcf)	Unconfined Strength, (psf)	Standard Penetration Resistance (N-Values)	Moisture Content (%)	Qu (tsf)
0			DEBRIS: Consisting primarily of soil intermixed with gravel, asphalt, concrete, and metal fragments.					10 20 30 40	10 20 30	1 2
			CL: Grayish brown silty CLAY (CL); medium plasticity, very soft to firm in consistency.		3 - 3 - 7					
5	335									
	330				1 - 2 - 4					
10										
	325				2 - 4 - 7					
15										
	320				3 - 4 - 4					
20			Boring terminated @ approximately 21.0 feet bgs.							
	315									
25										

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SUBSURFACE BORING LOG

Boring No. : **B-5**

Project : Crounse Headquarters

Project Location : Paducah, KY

Page 1 of 1

Boring Started : December 21, 2006 **Boring Diameter :** 4-1/2 Inch Dia **Driller :** C. Smith/B. Watkins
Date Completed : December 21, 2006 **Drilling Method :** Hollow Stem Auger **Drill Equipment :** CME - 45B
Surface Elevation : 340.55 **Sampling Methods :** SPT, Shelby Tubes

Split spoon | GW @ drilling
Shelby Tube | GW @ 24 hrs
Auger cuttings

Depth in Feet	Elev. in Feet	Sample Type	DESCRIPTION	Lithology	Counts Blows (per 6")	Dry Density (pcf)	Unconfined Strength, (psf)	Standard Penetration Resistance (N-Values)	Moisture Content (%)	Qu (tsf)
0	340		DEBRIS: Consisting primarily of soil intermixed with gravel, asphalt, concrete, and metal fragments.							
			CL: Grayish brown silty CLAY (CL); medium plasticity, very soft to firm in consistency.		2 - 1 - 2					
5	335					102.53	3,124			
10	330				1 - 3 - 4					
15	325				1 - 2 - 5					
20	320				1 - 3 - 7					
			Boring terminated @ approximately 21.0 feet bgs.							
25										

Standard Penetration Resistance (N-Values): 10 20 30 40
Moisture Content (%): 10 20 30
Qu (tsf): 1 2

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SUBSURFACE BORING LOG

Boring No. : **B-6**

Project : Crounse Headquarters

Project Location : Paducah, KY

Boring Started : December 21, 2006 **Boring Diameter :** 4-1/2 Inch Dia **Driller :** C. Smith/B. Watkins

Date Completed : December 21, 2006 **Drilling Method :** Hollow Stem Auger **Drill Equipment :** CME - 45B

Surface Elevation : 337.58 **Sampling Methods :** SPT, Shelby Tubes

Split spoon ▽ GW @ drilling
Shelby Tube ▼ GW @ 24 hrs
Auger cuttings

Depth in Feet	Elev. in Feet	Sample Type	DESCRIPTION	Lithology	Counts Blows (per 6")	Dry Density (pcf)	Unconfined Strength, (psf)	Standard Penetration Resistance (N-Values)	Moisture Content (%)	Qu (tsf)
0			DEBRIS: Consisting primarily of soil intermixed with gravel, asphalt, concrete, and metal fragments.							
	335		CL: Grayish brown silty CLAY (CL); medium plasticity, very soft to firm in consistency.		3 - 2 - 5					
5						114.02	8,496			
	330									
10					0 - 2 - 4					
	325									
15					2 - 3 - 7					
	320									
20					2 - 4 - 5					
	315		Boring terminated @ approximately 21.0 feet bgs.							
25										

Standard Penetration Resistance (N-Values): 10 20 30 40
Moisture Content (%): 10 20 30
Qu (tsf): 1 2

Appendix D

Soil Laboratory Datasheets

Geotech Engineering & Testing, Inc.
Soils Reports

Project.	Crounse Headquarters
Location.	Paducah, KY
Job No.	6178

Boring No.	Depth Feet	Moisture Content %	Minus No. 200	Liquid Limit	Plastic Limit	Plasticity Index	Classification	Unconfined Compression	Dry-Unit Wt. lbs/c.f.	Blow Count	Remarks
B-1	2' - 3.5'	22.70					CL			2	
	4.5' - 6.5'	23.70					CL	1,991 psf	99.08		
	9.5' - 11'	21.80					CL			8	
	14.5' - 16'	20.40					CL			6	
	19.5' - 21'	21.90					CL			8	
B-2	2' - 3.5'	23.40					CL			2	
	4.5' - 6.5'	23.90					CL	2,241 psf	99.42		
	9.5' - 11'	20.50					CL			6	
	14.5' - 16'	21.90					CL			7	
	19.5' - 21'	23.60					CL			7	
B-3	2' - 3.5'						CL			4	*No Recovery*
	4.5' - 6.5'	19.80		49	21	29	CL	5,733 psf	105.5		
	9.5' - 11'	22.60					CL			8	
	14.5' - 16'	22.40					CL			8	
	19.5' - 21'	22.00					CL			8	
	24.5' - 26'	21.80					CL			15	
	29.5' - 31'	22.40					CL			15	

Special Notes: _____

Geotech Engineering & Testing, Inc.
Soils Reports

Project.	Crounse Headquarters
Location.	Paducah, KY
Job No.	5176

Boring No.	Depth Feet	Moisture Content %	Minus No. 200	Liquid Limit	Plastic Limit	Plasticity Index	Classification	Unconfined Compression	Dry-Unit Wt. lbs/c.f.	Blow Count	Remarks
B-3	34.5' - 36'	21.70					CL			24	
	39.5' - 41'	25.20					SM			3	
	44.5' - 46'	31.00					SM			14	
	49.5' - 51'	28.90					SM			13	
	54.5' - 56'	21.00					SW			50+	
	59.5' - 61'	23.70					SW			50+	
	64.5' - 66'	21.30					SW			50+	
	69.5' - 71'	30.90					SW/SM			22	*Material Change @ 70.5'*
	74.5' - 76	28.10					SM			18	
	79.5' - 81'	24.80					SM			29	
	84.5' - 86'	30.20					SM			24	
	89.5' - 91'	24.80					SM			25	
	94.5' - 96'	29.20					SM			28	
	99.5' - 101'	25.40					SM			31	
B-4	2' - 3.5'	14.80					CL			10	
	4.5' - 6.5'	19.50					CL				
	9.5' - 11'	21.10					CL			6	
	14.5' - 16'	21.30					CL			11	

Special Notes: _____

Geotech Engineering & Testing, Inc.
Soils Reports

Project.	Crounse Headquarters
Location.	Paducah, KY
Job No.	6176

Boring No.	Depth Feet	Moisture Content %	Minus No. 200	Liquid Limit	Plastic Limit	Plasticity Index	Classification	Unconfined Compression	Dry-Unit Wt. lbs/c.f.	Blow Count	Remarks
B-4	19.5' - 21'	22.20					CL			8	
B-5	2' - 3.5'	23.40					CL			3	
	4.5' - 6.5'	22.80					CL	3,124 psf	102.53		
	9.5' - 11'	20.30					CL			7	
	14.5' - 16'	35.30					CL			7	
	19.5' - 21'	23.50					CL			10	
B-6	2' - 3.5'	21.00					CL			7	
	4.5' - 6.5'	16.30		36	18	18	CL	8, 496 psf	114.02		
	9.5' - 11'	19.90					CL			6	
	14.5' - 16'	24.70					CL			10	
	19.5' - 21'	22.20					CL			9	

Special Notes: _____

SCOPE OF WORK

PROOF TESTS OF SLIPLINING TECHNOLOGY
PADUCAH, KENTUCKY LOCAL FLOOD PROTECTION PROJECTS
HUBZONE SET-ASIDE MATOC TASK ORDER

22 JULY 2009

REVISED 30 JULY 2009

1.0 BACKGROUND

1.1 Problem

Corrugated metal pipe (CMP) culverts and drainage structures located beneath vital transportation and flood management infrastructure in the Louisville Engineer District (CELRL) are significantly deteriorated. CMP design life is generally considered to be 50 years. However, there is ample documentation that actual service life is as long as 65 or 70 years. Most of the CMPs in the CELRL levees were installed in the post-Depression era of the late 1930's to early 1950's. Collapse failures have occurred in a limited number of these structures within CELRL. Conventional repairs of failed or failing CMPs using open-cut excavations with complete pipe replacements are costly.

1.2 Remedy

CMP rehabilitation using trenchless technology eliminates the necessity for open-cut excavation, generally results in no loss of hydraulic capacity or efficiency, and extends the drainage structure design life an additional 50 to 100+ years. Rehabilitation of CMP culverts by sliplining entails inserting (or "slipping") or spiral-winding a new, slightly smaller diameter pipe through the existing CMP. The annular space between the old and new pipe is pressure grouted. Typical wall thickness of the new pipe is about one to two inches and the grout annulus is between one and five inches. The cost savings of this trenchless repair over traditional open cut excavation and replacement is estimated at more than 50%, and the procedure minimizes the disruption of surface roads and activities that occur when conventional "cut and cover" repairs are employed.

A CELRL team developed a sliplining process including pipe condition assessment; hydraulic, geotechnical and structural analysis; and contracting procedures. The process meets current USACE engineering standards and specifications. The team is working with the local sponsor of the Paducah, Kentucky Local Flood Protection Project (LFPP) to rehabilitate 37 CMPs using sliplining technology. Many of these pipes contain significant holes and some voids are present in the surrounding backfill soil due to piping along the outside of the CMP.

1.3 General Scope of Work

Work on this contract is performed in accordance with the requirements of the CELRL Multiple Award Task Order Contract (MATOC). This Scope of Work identifies site and job specific requirements that are added to the MATOC requirements. The requirement is for design/build construction as a Civil project.

CELRL is performing proof tests on three sliplined CMPs at the Paducah LFPP to demonstrate the efficacy of slipliner technology to grout both the annular space between the CMP and liner pipe as well as void spaces outside the CMP.

The Contractor will investigate the integrity of slipliner technology to rehabilitate deteriorated CMP installations at the Paducah Local Flood Protection Project. The project involves four phases:

a) Non-destructive inspection of one CMP using gamma ray logging and thermographic imaging before and after the CMP is sliplined,
b) Hydraulic proof load testing of one CMP before and after the CMP is sliplined,
c) Excavation, inspection, and dissection of three CMPs after sliplining, grouting, and non-destructive testing are completed, and,
d) Replacement of the three demolished sliplined CMPs using conventional construction methods.

Sliplining of the CMPs is not included in this contract and is currently underway by others. The successful Offeror coordinates activities with the sliplining contractor to ensure that both projects proceed efficiently.

The District Office point of contact is Christina Neutz, 502.315.6305, christina.m.neutz@usace.army.mil, and the Construction Division representative is Stephen Casner, 502.315.7250, stephen.w.casner@usace.army.mil. The current Paducah sliplining project is contracted to Larry Smith Contractors, Inc., Cleves, Ohio, represented by Jay Smith, 513.367.0218, jay@techunder.com. The project designer is Florence & Hutcheson, Inc., Paducah, Kentucky, represented by Jason Petersen, 270.444.9691, jpetersen@flohut.com.

2.0 LOCATION

Three CMP locations are selected for this project (Sites A, B, and C, listed in Table 1). The project location is depicted in Figure 1, and the as-built drawings of Site A, B, and C CMPs are shown in Figures 2, 3, and 4, respectively. The plan-view locations of Sites A and C are shown on Figure 5, and the location of Site B is shown on Figure 6.

Table 1. CMP Locations and Descriptions at Paducah LFPP

Site	Location	Description
A	Station 150+05, Paducah LFPP Section C Pre-Slipline CMP Condition: Fair Scope: Grout Penetration Inspection and Pipe Replacement	24 Inch Outside Diameter CMP CMP Length of 60 Feet Levee Height of 12 Feet
B	Station 147+25, Paducah LFPP Section A Pre-Slipline CMP Condition: Poor Scope: Grout Penetration Inspection and Pipe Replacement	24 Inch Outside Diameter CMP CMP Length of 80 Feet Levee Height of 18 Feet
C	Station 128+80, Paducah LFPP Section C Pre-Slipline CMP Condition: Very Poor Scope: Non-Destructive Inspection, Hydraulic Loading Test, Grout Penetration Inspection and Pipe Replacement	48 Inch Outside Diameter CMP CMP Length of 135 Feet Levee Height of 12 Feet

Approximate latitude/longitude coordinates for the sites are:

Site A: N37.02528, W88.56682
Site B: N37.09346, W88.63747
Site C: N37.02208, W88.57335

All work on this contract occurs within the existing Paducah, Kentucky LFPP Right of Way (ROW). Areas available for site access, staging, and soil stockpiles were discussed during the pre-bid site visit. Drawings showing the City's ROW are provided at ftp://ftp.usace.army.mil/pub/lrl/Paducah%20slipliner%20proof%20test/. The Contractor Limits of Work coincide the City ROW, except at Site B as discussed in Section 3.5.

The CMPs at Sites A and B were installed during the original levee construction circa 1938 to 1939. The Site C CMP was installed under permit in 1980. The permit drawings for the Site C CMP identify it's location as "125+95 Section C". More recent drawings cite the location of the CMP as "128+80 Section C", and that designation is used in this contract. The dimensions provided in this Scope of Work are approximate and the Contractor is responsible to determine the actual quantities for bidding purposes.

A City of Paducah contractor (Florence & Hutcheson, Inc.) performed video-logging of the CMPs in 2007; those digital files are provided to Offerors via the CELRL ftp site. Contact Richard Hockett, 502.315.6329, rick.hockett@us.army.mil for instructions on ftp site access.

3.0 DETAILS OF SCOPE OF WORK

Prior to performing any work at the project site other than planning and reconnaissance, the Contractor submits a Project Work Plan for USACE approval. The Work Plan

describes each part of the work in sufficient detail to ensure that the deliverables are suitable for use.

3.1 Non-Destructive Existing Condition Evaluation Of Site B CMP

Non-destructive testing is performed at Site B, a 24-inch CMP. Work at Site B requires extensive coordination with the slipliner contractor, because the work on this contract has the potential to significantly impact the sliplining contract.

a) Gamma ray logging is used to evaluate the presence of voids in the soil backfill surrounding the CMP. The Contractor provides a device to hold a standard gamma-ray well-logging tool proximal to the wall of the CMPs, and produces longitudinally-oriented gamma logs at six locations separated by 60 degrees around the CMP circumference (12, 2, 4, 6, 8, and 10 o'clock positions with 12 o'clock being the top of the CMP).
b) Thermographic inspection is used to evaluate surface micro-temperature differentials on the interior of the CMP. These data are interpreted to evaluate the presence of voids outside the CMP.
c) A 21-day hydraulic proof test is conducted. A temporary cofferdam is designed and constructed by the Contractor. The cofferdam surrounds the CMP outlet on the riverside of the levee to impound water, and is at least ten ft from either side of the CMP. The flap gate on the riverside of the CMP is temporarily sealed to prevent ingress of water through the riverside end of the CMP. If necessary, additional measures are taken to ensure complete sealing of the CMP at the riverside. The cofferdam and sealed CMP are flooded with water to create a six-foot head measured from the top of the CMP. Sufficient water (supplied by the Contractor) is added to the impoundment to maintain the six-foot head as needed to ensure that the water level inside the cofferdam does not vary more than 0.1 ft. The volume of water added to the cofferdam impoundment to maintain the constant head is metered and documented. The volume of water discharging from the land side of the CMP is monitored using a weir and continuously recorded for the duration of the test. Any other seepage exterior to the pipe is also recorded. Video inspection of the interior of the entire length of the CMP is performed once per day during the proof test. Transient ground water head is documented continuously throughout the test using a minimum of three temporary piezometers installed along the axis of the CMP with 2-ft screens positioned at the pipe diameter elevation. The Contractor provides all monitoring equipment, a primary power source, and a backup power source.

Contractors that expressed capability to perform non-destructive testing to CELRL include:

a) Terracon, Cincinnati, Ohio; contact Jason Sander 513.321.5816
b) Technos Inc., Miami, Florida, Lynn Yuhr, 305.718.9594

Other contractors are likely available as well. CELRL does not warrant the suitability of these contractors, only their expressed interest.

3.2 Sliplining

Upon completion of the pre-existing conditions evaluation, the Site B CMP is rehabilitated by Larry Smith Contractors, Inc. (LSC) under a separate contract using sliplining technology. No significant delay occurs to the project as a result of coordination with LSC. The City directs LCS to slipline and grout the 48" CMP at Site C first. The Contractor destructively tests the Site C CMP as the first task on the contract, concurrent with the Site B non-destructive testing.

Based on the results of the Site C destructive testing, the City of Paducah may direct LSC to modify the grout mixture to enhance performance, if needed. Rapid execution of the Site C destructive testing is a high priority to ensure efficient coordination of activities with LSC for the remainder of the City of Paducah sliplining contract. If grout mixture modification is required, this process may be repeated at a second CMP location.

3.3 Non-destructive post-rehabilitation evaluation of Site B CMP.

After sliplining rehabilitation at Site B, the battery of non-destructive tests described in section 3.1 is repeated on the Site B 24-inch CMP. The hydraulic proof test is conducted no sooner than five days after sliplining and grouting are completed. The five-day waiting period for hydraulic testing at Site B is waived if the three-day grout strength tests indicate the grout has reached the design strength (300 psi).

Gamma logging, thermographic imagery, and hydraulic proof testing are repeated using the same protocols as used in the existing condition evaluation prior to sliplining. Upon completion of the hydraulic proof testing, the temporary cofferdam is removed and a bentonite-water mixture is used to seal any holes resulting from the removal of sheet piling or other below-grade structures used in the cofferdam construction, if any. The post-rehabilitation conditions and the existing conditions are compared, using the existing conditions evaluation as a baseline, and the efficacy of sliplining technology is evaluated. Particular emphasis is directed at evaluating the capability of the pressure grouting process to seal voids on the exterior of the pipe.

3.4 Destructive Post-Rehabilitation Evaluation of Sites A, B, and C CMPs.

After completion of sliplining, the three CMPs (Sites A, B, and C) are excavated for visual inspection and destructive testing. Excavation is performed by open cut trenching with appropriate side slopes for the site conditions as specified in Section 25 of Engineer Manual 385-1-1 (2008 edition). Excavated soil is stockpiled on the riverside of the levee and reserved for installation of the replacement pipe. Top soil is stripped and stockpiled separately. Soil stockpiles are protected using appropriate erosion

control measures. The excavation is performed so that a two-ft thick section of soil remains in place surrounding the CMP, along with any slipliner grout that is extruded from the CMP during rehabilitation.

Contractor carefully removes the existing flap gates to minimize damage and provides the salvaged flap gates to the City Floodwall Shop at 4th & Elizabeth Streets.

It is assumed that the temporary piezometers are removed when the Site B CMP is excavated for destructive testing. All casing, screen, and sand pack material not in the limits of the excavation is removed and the resulting void backfilled with bentonite grout.

No sooner than seven days after grouting is complete, careful excavation of the soil remaining around the CMP is incrementally performed so that the presence of extruded slipliner grout is observed and documented. Observations of the capability of the grouting process to fill voids around the CMP are vital to this process. The Contractor documents the excavation process with video and digital still cameras. The procedure to accomplish this task is described in detail in the Proposal, and is approved by CELRL in the Work Plan.

Florence & Hutcheson, Inc. performs grout strength tests at 3, 7, and 28 days from slipliner grout samples at Sites A, B, and C. The seven-day curing period before destructive testing is waived if the three-day strength tests indicate the grout has reached the design strength (300 psi).

When excavation of all remaining soil and extruded grout is complete, the grouted pipe is carefully removed from the excavation in manageable sections and positioned for dissection. Beginning at the end of the pipe distal from the grout injection, the pipe is transversely sawed into sections so that the annular grout between the slipliner and the CMP is not disturbed. Cuts are spaced at 1-ft intervals and every fourth cut is made on a 30-degree skew from perpendicular to provide oblique sections exposing more pipe area. The pipe cuts are made using a diamond wire rope saw so that smooth cut surfaces are produced for grout inspection. Alternate cutting methodology must be approved by CELRL, and will be evaluated based on capability to achieve the project objectives.

Contractors that expressed capability to perform destructive testing to CELRL include:

a) Ohio Concrete Sawing and Drilling, Inc., Franklin, Ohio, Doug Schuchhardt, 513.723.0099
b) Capital Drilling and Sawing of Kentucky, Elizabethtown, Kentucky, 270.765.7377

Other contractors are likely available as well. CELRL does not warrant the suitability of these contractors, only their expressed interest.

The condition and completeness of the grout fill is documented with video and still photo cameras. Selected 1-ft sections are sawed longitudinally, with video and still photo

documentation of the process, if necessary to define the extent of voids noted in the transverse cuts. Based on the findings of the inspection of the first portion of each CMP, the spacing of cuts may be increased up to a maximum of five ft. CELRL anticipates cuts on 1-ft spacing for the first 10 ft of pipe, followed by five cuts at 3-ft spacing, followed by 5-ft spacing for the remainder of the pipe. At a maximum, each pipe may be cut on 1-ft spacing if deemed necessary by CELRL. Regardless of the spacing of cuts, each fourth cut will be made on a 30 degree skew as noted above. The Offeror is instructed to include the cost for ten perpendicular cuts and three skew cuts per pipe in the base bid. The bid schedule also includes line items for additional perpendicular and skew cuts on a per cut basis as directed by CELRL.

3.5 Replacement of three CMPs with new pipe.

The destructively-tested pipes are replaced with a Glass Fiber Reinforced Thermosetting Resin (GFRTR) sewer pipe of the same type as the slipliner pipe used to rehabilitate the CMPs. The pipe invert is placed at the same grade as the original CMP installation. The riverside 2/3rds of the pipe length is placed so that at least 1.0 ft of flowable fill surrounds the pipe. The landside 1/3 of the pipe length is placed so that at least 1.5 ft of granular fill material completely surrounds the pipe to create a drainage fill meeting the requirements of Section 8-5 of Engineer Manual 1110-2-1913. Seep rings are not included.

The levee embankment is replaced to original condition. The tie-in surfaces of the existing levee are benched at least 24 inches horizontally and scarified to allow new material to make good contact with the existing levee embankment section. The proposed slope for the excavation and the details of the scarified tie-in benching are provided in the Contractor's Work Plan. Using the previously excavated levee material, the levee embankment is replaced in maximum 8-inch lifts.

The toe drain at Site B is replaced to original as-built condition if it is disturbed by the cofferdam installation.

The top elevation of the new levee replacement section is constructed level with the existing levee section with the compacted soil. After the final lift of compacted soil is placed and compacted to meet the surrounding top-of-levee grade, a 6-inch layer of topsoil is placed over the new levee embankment to provide for settlement. The rebuilt levee embankment and all other disturbed areas are shaped, seeded, and covered with a biodegradable erosion control fabric to provide a suitable grass cover. Restoration of the levee includes placement of eight inches of compacted aggregate to match the existing driving surface on top of the levee. Top soil is not placed under the compacted aggregate.

All previously installed drainage features and devices are replaced. New cast-in-place concrete headwalls are installed meeting the requirements of Kentucky Transportation Cabinet 2008 Standard Specifications Section 710, adjusted to original as-built

dimensions. The flap gates, frames, and anchors are replaced with new items of like design and materials meeting the requirements of Section 05 50 05.

The Site A west headwall appears to encroach on private property and is not aligned well with the drainage ditch to the west. Contractor installs new cast-in-place headwall five ft to the east to resolve the encroachment issue. New west headwall includes a 90 degree wing wall tied into the existing hand-placed rip rap to alleviate the ditch alignment issue. Rip-rap is place in a trench at the transition of the wing wall to the surrounding soil. The City coordinates construction activities with the adjacent landowner.

After all other work is completed, the Contractor performs a video inspection of the three pipes to document the post-installation conditions. This is provided to the COR for approval. All defects discovered during the post-installation video inspection are corrected by the Contractor at his expense before the work under the Contract is considered for Substantial Completion. After all defects, if any, are corrected in accordance with manufacturer's recommendations, the affected pipe segment(s) are video inspected a second time as a follow-up inspection.

4.0 SPECIFICATIONS

4.1 Geotechnical Requirements

4.1.1 Placement and Compaction

Compaction layer thickness and densities are as stated in Section 3.5. Each layer is spread uniformly on a soil surface that is moistened or aerated as necessary, and scarified or otherwise broken up so that the fill bonds with the surface on which it is placed (refer to Section 3.5 for tie-in benching description). After spreading, each layer is plowed, disked, or otherwise broken up; moistened or aerated as necessary; thoroughly mixed; and compacted to 95% maximum dry density per ASTM D-698. Compaction is accomplished by sheepsfoot-type rollers or other approved equipment well suited to the soil being compacted. Material is moistened or aerated as necessary to plus or minus three percent of optimum moisture to provide the moisture content that readily facilitates obtaining the specified compaction with the equipment used.

4.1.2 Materials

During excavation and backfill of the levee materials, the suitability of the excavated materials for reuse is verified by the Contractor. Satisfactory materials used in the levee embankment and other clay fill consist of materials classified by ASTM D 2487 as clays, silty clays, sandy clays, and clayey sands. All compacted embankments are constructed from satisfactory materials free of roots and other organic matter, trash, debris, frozen material, and rocks. Soil additives such as lime or cement may be requested by the COR if soil conditions warrant. Materials are within the following limits:

Table 2. Gradation of Levee Embankment Material

Sieve Size	% Passing by Weight
¼ in.	100
No. 200	50-100

If for any reason additional fill material is required, the borrow source meets the requirements of all specifications for fill material. The Contractor submits an "if-needed" borrow source to USACE in the Work Plan for approval.

4.1.3 Field In-place Density Quality Control

Field in-place density is determined in accordance with ASTM D 2922. When ASTM D 2922 is used, the calibration curves are checked and adjusted using only the sand cone method as described in ASTM D 1556. In place density testing is performed at a rate of one test per 400 square feet, or fraction thereof, of each lift of embankment or backfill for the levee.

4.1.4 Optimum Moisture and Laboratory Maximum Density

Tests are made for each type material or source of material including borrow material to determine the optimum moisture and laboratory maximum dry density values. One representative test is performed per borrow site, per stockpile of excavated material, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum density. Additional laboratory compaction tests are required if soil additives are requested to facilitate fill construction.

4.1.5 Certification

Testing is performed by a Commercial laboratory and is overseen and approved by a professional geotechnical engineer retained by the Contractor. Subsequent to construction, an independent geotechnical engineer certifies in writing that the fill was placed in accordance with the requirements herein and provide the backup data including the soil test results, testing locations, and testing elevations. Sketches and photographs are provided such that all testing locations and elevations can be verified. The Contractor's Work Plan details these testing requirements and outlines his plan to report the testing results.

4.1.6 Frozen Material

Material is not placed on surfaces that are muddy, frozen, or contain frost. This includes previously placed lifts that become frozen or saturated.

4.1.7 Seeding and Covering

All new levee embankments and any disturbed areas are seeded and covered. Prior to seeding, the area is raked to a depth of 2 to 4 inches. Once the seed bed has been prepared, the seed mixture in Table 3 (Section 4.4) is applied. The seeded areas are covered with a non-woven, bio-degradable erosion control fabric to prevent surface rutting from rainfall until grass is established.

4.2 Flowable Fill

Flowable fill meets the specifications contained in Kentucky Transportation Cabinet Standard Specifications for Road and Bridge Construction, 2008 Edition, Subsection 601.03.03 (B)(5)(a).

4.3 Drainage Fill Sand

Drainage fill sand meets the specifications for concrete sand (natural) listed in ASTM C-33 or Kentucky Transportation Cabinet Standard Specifications for Road and Bridge Construction, 2008 Edition, Section 804.03. CELRL verifies that concrete sand is an appropriate filter drain material based on the characteristics of the levee materials prior to placement.

4.4 Seed

Table 3. Seed Mixture

Botanical Name	Common Name	lbs/acre
Festuca rubra	Creeping Red Fescue	20
Lolium multiflorum	Annual Rye	25
Phleum praiense	Timothy	10
Poa pratensis	Kentucky Blue Grass	25
Agrostis alba	Redtop	20
Lolium perfenne	Perennial Rye	10
	Seed Oats	20

4.5 Glass Fiber-Reinforced Plastic Pipe Requirements

4.5.1 Reference Standards

Unless otherwise noted, reference is made to the latest version of the documents listed below. All work complies with the following reference standards unless specifically stated otherwise in this Specification.

a) ASTM D2412 – Standard Test Method for Determination of External Loading Characteristics on Plastic Pipe by Parallel Plate Loading
b) ASTM D3262 – Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting Resin) Sewer Pipe
c) ASTM D3681 – Standard Test Method for Chemical Resistance of Fiberglass (Glass-Fiber-Reinforced Thermosetting Resin) Pipe in a Deflected Condition
d) ASTM D4161 – Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting Resin) Pipe Joints Using Flexible Elastomeric Seals
e) ASTM F477 – Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

4.5.2 Pipe

Provide Glass Fiber Reinforced Thermosetting Resin sewer pipe in accordance with ASTM D3262, cell classification Type 1, Liner 2, Grade 3. Nominal pipe diameter is selected to match the previous CMP. Minimum pipe stiffness is 36 when tested in accordance with ASTM D2412. The glass is a commercial grade of E-type glass fibers with the amount, location and orientation of the chopped glass-fiber reinforcement specifically designed for each application. Sand is a minimum 98 % silica kiln-dried and graded. The polyester wall resin is an isophthalic, orthophthalic or other approved resin with a minimum tensile elongation of 2 %. Pipe is marked at both ends and inside every 5 feet on the outside to identify the manufacturer's number, diameter, stiffness, ASTM designation and lot number.

All pipes are specifically applicable for installation and use in the environment as required by this specification.

4.5.3 Joints

Joints meet the performance requirements of ASTM D4161. All pipes are provided with joints designed so that neither the outside diameter of the pipe is increased nor the internal diameter of the pipe is decreased at the joint. Joints are water-tight over the range of head pressure as specified as a design requirement in this Specification.

4.5.4 Design Criteria for Replacement Pipe

The Contractor demonstrates that the selected liner pipe is suitable for installation based on a detailed evaluation given the following parameters:

a) Long-term analysis is considered 50 years.
b) Live load need not be considered.
c) Allowable long-term deflection is 5%.
d) All pipes are designed based on information shown on Drawing G003 from the column labeled "Bury Depth from Corps Drawings (ft)" with water table located 5 feet below the ground surface for the life of the pipe.
e) Use a Safety Factor of 2.0 for all parameters and calculations.
f) Modulus of soil reaction is 1500 psi.
g) Saturated unit weight of soil is 120 pcf.

4.5.5 UV End Treatment

All replacement pipes terminating at an open end or headwall receive a coating applied to the interior surface of the pipe to resist deterioration from ultraviolet radiation. The application of both prime and finish coats is performed by the pipe manufacturer in a climate-controlled environment prior to pipe delivery to the job site.

a) Two coats of Induron Perma-Clean II semi-gloss epoxy (or approved equal) are applied at 4.0 to 6.0 mils per coat to each open end of the interior of the liner pipe for a distance of 2 times the ID of the liner pipe.

b) Surface preparation is in accordance with the recommendations of the

coating supplier as well as the pipe manufacturer. In the case of a discrepancy, the more conservative approach governs.

c) Prime coat color is "Almond". Finish color is "Polar White", or similar shade subject to approval by the COR.

Upon completion of installation, the Contractor repairs all damaged areas in the UV coating in accordance with the manufacturer's recommendations.

4.6 Site Preparation and Maintenance

Contractor documents existing site conditions before performing any work with video and still digital photography. That documentation serves as the baseline for site restoration when the project is complete.

4.6.1 Roads and Walks
Keep roads and walks free of dirt and debris at all times.

4.6.2 Trees, Shrubs, and Existing Facilities.
Trees and vegetation to be left standing are protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require.

4.6.3 Clearing
Clearing consists of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared. Clearing also includes the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work. Trees, stumps, roots, brush, and other vegetation in areas to be cleared are cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. Trees designated to be left standing within the cleared areas are trimmed of dead branches 1.5 inches or more in diameter and are trimmed of all branches to the heights indicated or directed. Limbs and branches to be trimmed are neatly cut close to the bole of the tree or main branches.

Contractor includes proposed limits of clearing on a scaled drawing in the Work Plan. Those limits are only exceeded with approval of the COR.

4.6.4 Tree Removal
Where indicated or directed, trees and stumps that are designated as trees are removed from areas designated for clearing and grubbing. This work includes the felling of such trees and the removal of their stumps and roots as specified in paragraph 4.6.5. Trees are disposed of as specified in paragraph 4.6.7.

4.6.5 Grubbing

Grubbing consists of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas. Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, is removed to a depth of not less than 6 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings, and areas to be paved. Depressions made by grubbing are filled with material meeting the soil requirements described in Section 4.1.2 and compacted as in Sections 3.5 and 4.1.1 to make the surface conform to the original adjacent surface of the ground.

4.6.7 Disposal of Materials

Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations, except for salable timber, are disposed of in accordance with local practice and regulations with preference given to recycling if locally available. The contractor removes all left over construction/demolition debris to an inert disposal site for construction/demolition materials at no cost to the Contractor. Access to the inert disposal site is provided by the City (location provided in Figure 1). The same area will be used to stage selected cut sections of destructively tested pipes for future inspection. The contractor includes the expense to carefully transport up to ten cut pipe sections to the inert site so they are not damaged during transportation. Those ten pipe sections are selected by CELRL to represent the various grout conditions observed during the destructive testing of the sliplined pipes.

5.0 SUBMITTALS

Submittals are made electronically and with paper copies. Electronic submittal files are compatible with Microsoft Office or Adobe Acrobat software (Portable Document Format) and are provided on CD or DVD media. Hard copies are provided on 8.5 x 11 inch paper with plan sheets provided on 11 x 17 inch paper. Five paper copies are provided to the COR. The COR is provided a five-day review period for all submittals.

5.1 Geotechnical Submittals

The followings geotechnical submittals are made to CELRL:

a) Biodegradable erosion control fabric specifications,
b) Soil test results,
c) Potential borrow source,
d) Seed mix design.

5.2 Pipe Submittals

The followings geotechnical submittals are made to CELRL:

a) Detailed analysis and calculations are submitted demonstrating suitable application based on the following parameters:
   1. Deflection
   2. Confined buckling
   3. Long-term (50 yr) hydrostatic buckling
b) Test results and certification of compliance for materials.
c) Documentation of manufacturer's certification of installers (as applicable).

5.3 Project Reports

The contractor submits for review and approval to the COR the following submittals:

Title of Data Item	Frequency	Remarks
Pollution Prevention Plan	One time	Due 5 days prior to pre-work conference
Accident Prevention Plan & Safety and Health Plan	One time	Due 5 days prior to pre-work conference
Quality Control Plan	One time	Due within 5 days
Activity Hazard Analysis and Risk Analysis	As required	Due 5 days minimum before start of each phase
Work Plan*/Work Schedule	One time	Due prior to pre-work conference
EP Plan	One time	Due with in 5 days
Contingency Plan for Emergency Flood Management	One time	Included in Work Plan
Site Safety & Health Officer Qualifications	One time	Due with in 5 days
Project Report**	Two reports: draft and final	At completion of work
Post-installation videos	One time	At completion of work
Accident Reports	As required	

*Detailed Work Plan outlining the following items in addition to the items contained in the Scope of Work:

a) Proposed construction sequencing and scheduling
b) Areas requiring special construction techniques
c) Proposed methods for control of water (if applicable)
d) Proposed access and staging areas
e) Proposed work hours
f) Detailed description and drawings, as needed, to fully explain how the work is executed and project objectives are achieved.

**The Project Report includes narrative and photo documentation of all work performed, conditions encountered, and final as-built drawings. Copies of all project documentation are included in the Project Report. Still photo and video documentation is provided on DVD as well as in the assembled report. All saw cuts, pipe condition descriptions, and video and photo documentation are referenced to the pipe position established in the video inspection records provided with this Scope of Work on DVD. Photos and videos are annotated with specific reference locations. The results of the destructive post-rehabilitation evaluation of Sites A, B, and C CMPs are presented in the project report with photos and description of each cut location and the approximate percentage of void and grout observed in each cut. An illustrated narrative interpretation of the gamma and thermographic logging is provided.

6.0 MEETINGS

A mandatory scope-validation meeting is attended by the Contractor, potential subcontractors, and COR to facilitate common agreement and understanding of the work to be performed. Prior to the meeting, resumes of subcontractor project superintendant or project managers are supplied to the COR for consideration or elimination.

7.0 SPECIAL CLAUSES

7.1 Commencement, Prosecution, and Completion of Work

The Contractor is required to commence work within ten (10) day after notice to proceed and complete the work within 90 calendar days. If the contractor fails to complete the work within the time specified in this Task Order, the Contractor pays liquidated damages to the Government in the amount of $1,010.00 for each calendar day of delay until the work is completed or accepted. If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination.

7.2 Utilities

Contractor supplies all utilities and is responsible for all connections and payments. Contractor clears all utilities with the Kentucky Underground Protection, Inc. Non-member utilities are cleared individually.

7.3 Government Furnished Equipment

No Government Furnished Equipment is included in this contract.

7.3 Variations in Quantities

No difficult to quantify items are included in this contract, and no items are subject to the Variations Clause.

7.4 Work Hours and Work Days

Normal work hours are 7 days/week, 07:00 to 17:00, or whatever is required to complete the contract within 90 calendar days. During the 21-day hydraulic proof tests, work hours are 24 hours per day. The Contractor may choose to work an alternate schedule with authorization from the Contracting Officers Representative.

7.4 As-built Documents

The Contractor submits as-built drawings of the pipe installations in digital Adobe Acrobat Portable Document Format on CD or DVD.

7.5 Wage Rates

Wage rates are required as per the MATOC contract. The Wage Rate Determination for this contract is provided herein as Attachment 1.

7.6 Kentucky Sales and Use Tax Information

Required as per the MATOC contract.

7.7 Time Extensions for Unusually Severe Weather

The Monthly Anticipated Adverse Weather Delay Work Days based on the nearby Olmstead area. The table below is used in lieu of the sample table in the base MATOC specifications. The contractor works as many days per week as needed to complete the contract within the given period of performance.

MONTHLY ANTICIPATED ADVERSE WEATHER CONDITION DELAY WORK DAYS BASED ON 7-DAY WORK WEEK

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
11	10	9	8	7	6	6	5	5	5	8	11

MONTHLY ANTICIPATED ADVERSE WEATHER CONDITION DELAY WORK DAYS BASED ON 6-DAY WORK WEEK

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
9	9	8	7	6	5	5	4	4	4	7	9

MONTHLY ANTICIPATED ADVERSE WEATHER CONDITION DELAY WORK DAYS BASED ON 5-DAY WORK WEEK

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
8	7	6	6	5	4	4	4	4	4	6	8

7.8 Safety and Health Requirements Manual

The Safety and Health Manual is available at
http://www.usace.army.mil/CESO/Documents/EM385-1-1FINAL.pdf

7.9 Activity Environmental Analysis

As required by the MATOC contract.

7.10 Pollution Prevention Plan

The Contractor is responsible for preparing the Pollution Prevention Plan, which is included in the Work Plan.

7.10 City of Paducah

The project occurs entirely on City of Paducah (the City) Right of Way, and the successful Offeror coordinates activities with the City. The City will also be named as an additional ensured on the Contractor's Certificate of Insurance.

7.11 Contingency Plan for Emergency Flood Management

Contractor submits a Contingency Plan for Emergency Flood Management as part of the Work Plan. The submittal describes the measures taken in the event of a flood event during the project while the levee is breached for pipe replacement as well as the plan to handle surface drainage from the landside while the CMP is sealed and/or the temporary cofferdam is in place for hydraulic proof testing.

Hydrographs for the Ohio River are provided at the USACE ftp site ftp://ftp.usace.army.mil/pub/lrl/Paducah%20slipliner%20proof%20test/. These hydrographs may assist Offerors evaluate risk of high water levels during the project period of performance.

7.11.1 Temporary Levee Closure

Provisions for the flood level or flood event that trigger the construction of a temporary emergency closure are determined during the project planning process. USACE Hydrology & Hydraulics (H&H) Design personnel review the base elevations of a proposed closure and then, using this information along with the rate of river rise, provide a trigger elevation that is provided to the Contractor and incorporated into the Work Plan.

The contractor provides the method of temporary closure to the Corps of Engineers for approval once the contract has been awarded. If required as a result of a potential flood event, the emergency closure is in place within 72 hours of notification by the City of Paducah, Kentucky or USACE. Because the crest of a flood often rises, falls and then rises again, the closure system is designed to be flexible and have the capacity to

be raised if necessary to match the top elevation of the rest of the flood protection system. The structural elements (if the temporary closure is structural) have the capacity to resist the full height flood. This does not mean that all structural components providing protection up to the full floodwall height would need to be installed for every flood event. Calculations are provided showing that the temporary closure can withstand a full height flood.

The Contractor provides documentation that the proposed emergency closure system consists of components presently owned, or are obtainable within the 72-hour time frame, and that all components can be installed within the same time frame.

For cost estimation purposes, except for any contractor-caused delays or problems, the Offeror is instructed to assume that the cost of execution of the temporary levee closure plan will be paid as a contract modification and that the base bid is not to include any cost for temporary levee closure except preparation of the plan.

7.11.2 Landside Drainage
The Work Plan includes a description of the plan to manage surface water drainage on the landside of the levee while the CMP is sealed and/or the temporary cofferdam is in place for hydraulic proof testing. The contractor installs a system for use during the CMP closure that will accommodate the flow expected during the closure period. The plan also describes additional equipment needed for severe flooding and the sources used to obtain that equipment within 72 hours of notification from the local sponsor or USACE. The plan includes adequate provisions to ensure that landside flooding does not occur as a result of the CMP closure. For cost estimation purposes, the Offeror is instructed to include the cost of all landside surface water management in the bid item for hydraulic proof testing (items 0004 and 0006).

7.12 Additional Clauses from Basic MATOC Hubzone Contract

Unless otherwise noted below, all provisions of the Hubzone MATOC apply to this Contract.

SECTION 00 80 00.00 06
Section 1.1 Project completion is specified in SOW Section 7.1.
Section 1.2 Liquidated Damages are specified in SOW Section 7.1.
Section 1.5 Utilities are specified in SOW Section 7.2.
Section 1.10 Mobilization and Demobilization are included in the Work Items.
Section 1.1 Variations in Quantities are specified in SOW Section 7.3.
SECTION 00 80 50.00 06
Section 1.1 does not apply. Submittals are specified in SOW Section 5.
Section 1.2 (b) does not apply.
Section 1.3 does not apply.
Section 1.4 does not apply
Section 1.14 does not apply
Section 1.16 applies as modified in SOW Section 7.7

Section 1.17 Wage Rates are provided in SOW Attachment 1.
Section 1.20 does not apply.
Section 1.21 does not apply.
Section 1.23 does not apply.
Section 1.24 does not apply.
Section 1.25 does not apply.
Section 1.31 does not apply.
Section 1.33 does not apply.
Section 1.36 does not apply.
Sections 1.57 c and j do not apply.
Section 1.43 does not apply.
Section 1.45 does not apply.
Section 1.49 does not apply.
Section 1.55 No asbestos or HTRW issues are identified on this project.

SECTION 01 11 00.00 06

Section 1.4 Submittals are specified in SOW Section 5.
Section 3.5 No asbestos or HTRW issues are identified on this project.

SECTION 01 11 00.20 06

This Section does not apply.

SECTION 01 21 00.00 06

This Section does not apply.

SECTION 01 21 00.00 48

This Section does not apply.

SECTION 01 32 01.00 06

This Section does not apply.

SECTION 01 33 00.00 06

This Section does not apply.

SECTION 01 33 00.10 06

Submittals are specified in SOW Section 5.

SECTION 01 41 00.00 06

This Section does not apply.

SECTION 01 46 00.00 06

This Section does not apply.

SECTION 01 57 20.00 10

Section 1.7.2(q) A pesticide treatment plan will not be required for this project.
Section 1.9 No special environmental requirements have been identified in association with this project.
Section 1.12-1.13 HTRW air monitoring and emission control requirements are not required for this project.
Section 3.5.4 There shall be no storage of fuel on the project site. Fuel must be brought to the project site each day that work is performed.
Section 3.10 Integrated pest management will not be required for this project.
Section 3.13 Military munitions are not expected to be encountered at this project site.

SECTION 01 78 23.00 06

This Section does not apply.

8.0 BID SCHEDULE

PROJECT: Proof Tests of Sliplining Technology

LOCATION: Paducah, Kentucky

OFFEROR'S NAME: _____

SITE A DESTRUCTIVE TESTING ITEMS

ITEM NO.	DESCRIPTION	QTY	UNIT	AMOUNT
0001	Site Access	1	LS	$ _____
0002	Prep Work	1	LS	$ _____
0003	Levee Excavation and Pipe Removal	1	LS	$ _____
0004	Pipe Assessment & Dissection, base bid	1	LS	$ _____
0005	Additional perpendicular cuts, each _____			
0006	Additional skew cuts, each _____			
0007	Pipe Replacement	1	LS	$ _____
0008	Levee Embankment Replacement	1	LS	$ _____
	SITE A DESTRUCTIVE TESTING SUBTOTAL			$ _____

SITE B DESTRUCTIVE TESTING ITEMS

ITEM NO.	DESCRIPTION	QTY	UNIT	AMOUNT
0001	Site Access	1	LS	$ _____
0002	Prep Work	1	LS	$ _____
0003	Levee Excavation and Pipe Removal	1	LS	$ _____
0004	Pipe Assessment & Dissection, base bid	1	LS	$ _____
0005	Additional perpendicular cuts, each _____			
0006	Additional skew cuts, each _____			
0007	Pipe Replacement	1	LS	$ _____
0008	Levee Embankment Replacement	1	LS	$ _____
	SITE B DESTRUCTIVE TESTING SUBTOTAL			$ _____

SITE B NON-DESTRUCTIVE INSPECTION AND HYDRAULIC PROOF TESTING ITEMS

ITEM NO.	DESCRIPTION	QTY	UNIT	AMOUNT
0001	Site Access	1	LS	$ _____
0002	Prep Work	1	LS	$ _____
0003	Video, Gamma, and Thermographic Inspection Before Sliplining	1	LS	$ _____
0004	Hydraulic Proof Testing Before Sliplining	1	LS	$ _____
0005	Video, Gamma, and Thermographic Inspection After Sliplining	1	LS	$ _____
0006	Hydraulic Proof Testing After Sliplining	1	LS	$ _____

SITE B INSPECTION AND PROOF TESTING BID SUBTOTAL $ _____

SITE C DESTRUCTIVE TESTING ITEMS

ITEM NO.	DESCRIPTION	QTY	UNIT	AMOUNT
0001	Site Access	1	LS	$ _____
0002	Prep Work	1	LS	$ _____
0003	Levee Excavation and Pipe Removal	1	LS	$ _____
0004	Pipe Assessment & Dissection, base bid	1	LS	$ _____
0005	Additional perpendicular cuts, each _____			
0006	Additional skew cuts, each _____			
0007	Pipe Replacement	1	LS	$ _____
0008	Levee Embankment Replacement	1	LS	$ _____

SITE C DESTRUCTIVE TESTING SUBTOTAL $ _____

SITES A, B, AND C BID TOTAL **$** _____

Notes:

1. Pipe Assessment & Dissection, base bid includes the cost for ten perpendicular cuts and three (3) skew cuts per pipe. The line items for additional perpendicular and skew cuts on a per cut basis are not included in the Subtotals or Total.

2. Pipe Replacement includes all costs associated with installing the new pipe, headwalls, flap gates and pipe backfill to the one foot level above the pipe, including all flowable fill and the granular fill material.
3. Levee Embankment Replacement includes all embankment replacement above the one foot level above the top of the replacement pipe, final grading, seeding, mulching, etc.
4. Hydraulic Proof Testing Before Sliplining includes cofferdam construction, pipe sealing, and all testing procedures. Hydraulic Proof Testing After Sliplining includes all test procedures, cofferdam removal upon completion of testing, and repairs required to cofferdam area, if any.

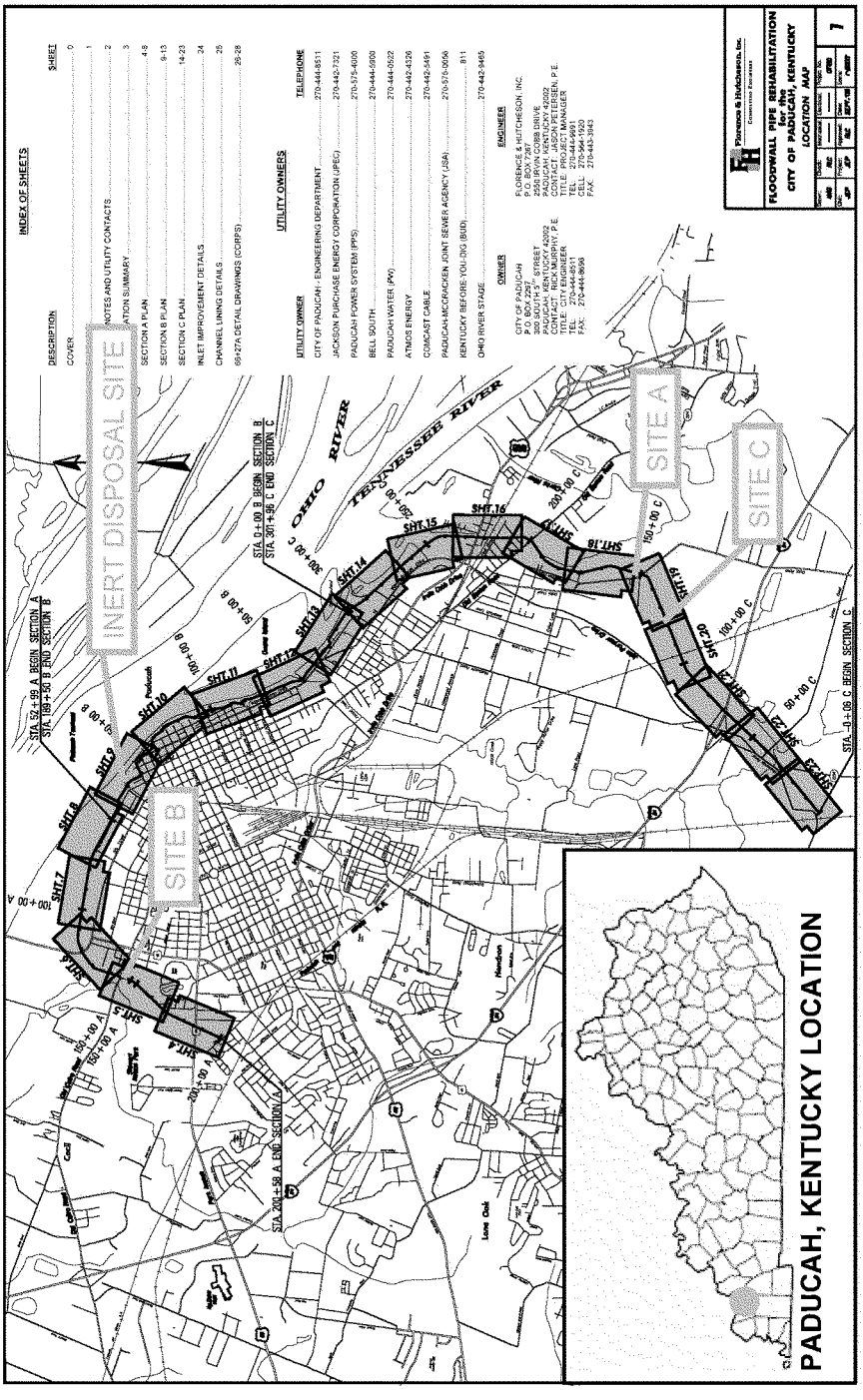

FIGURE 1. PROJECT LOCATION MAP.

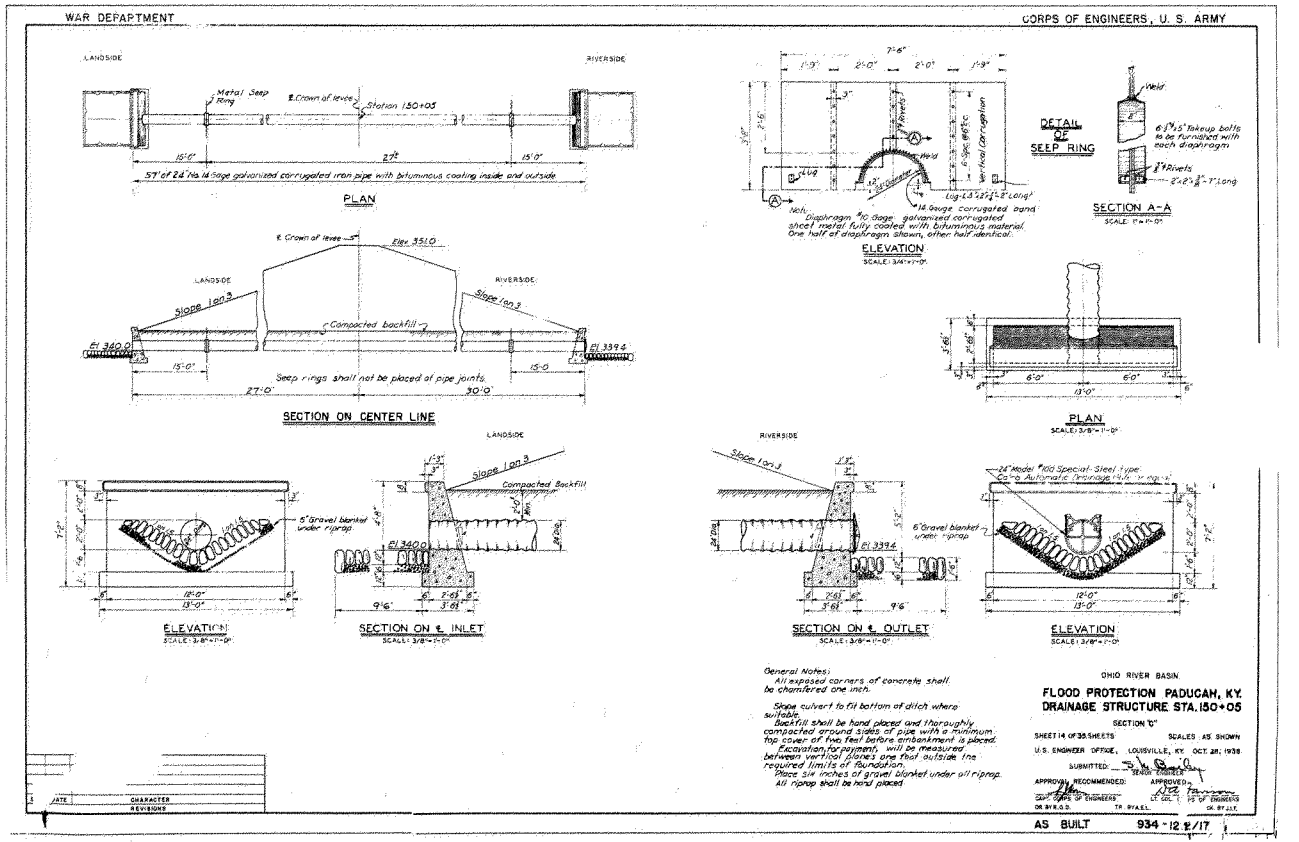

FIGURE 2. SITE A AS-BUILT DRAWING.

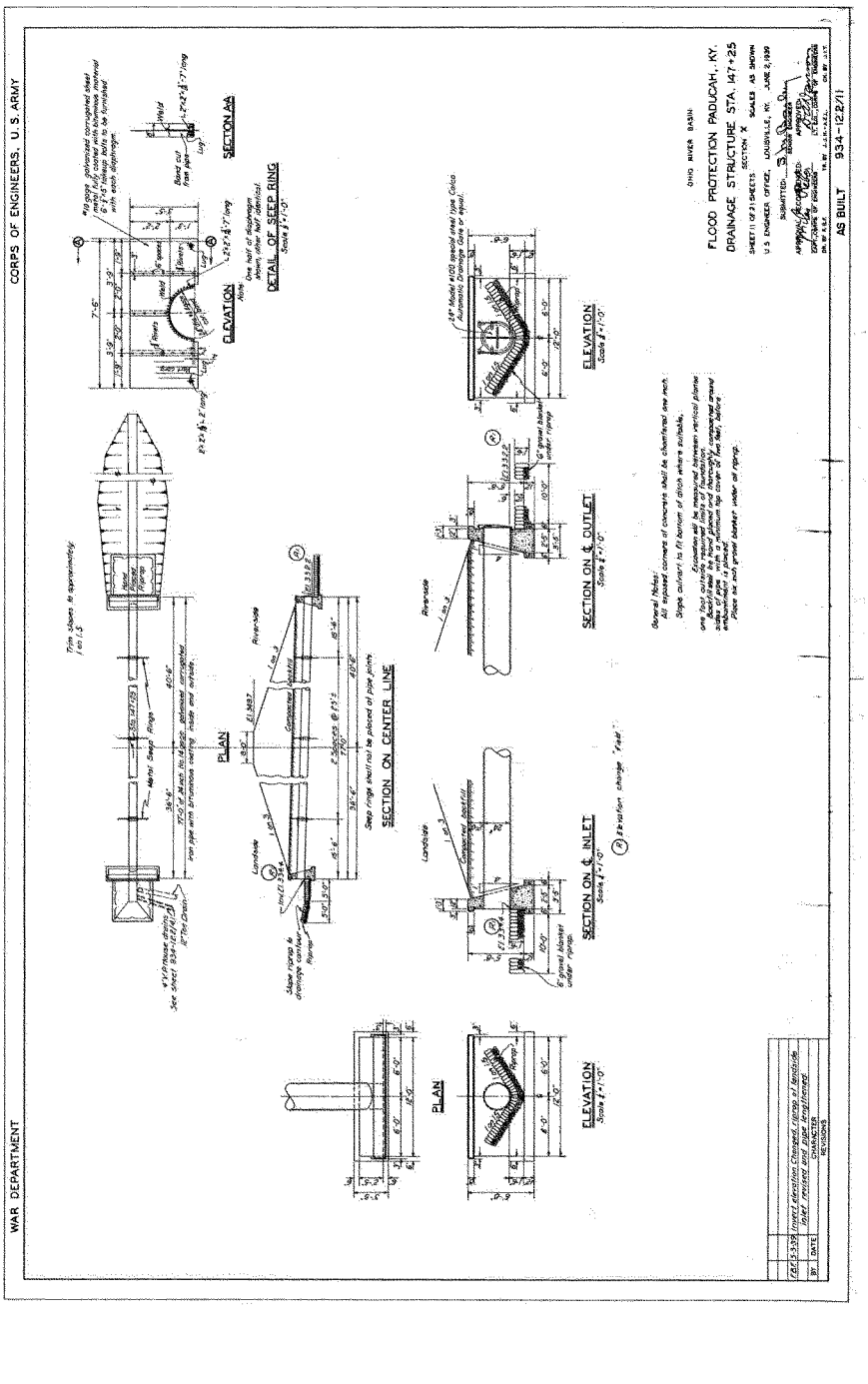

FIGURE 3. SITE B AS-BUILT DRAWING.

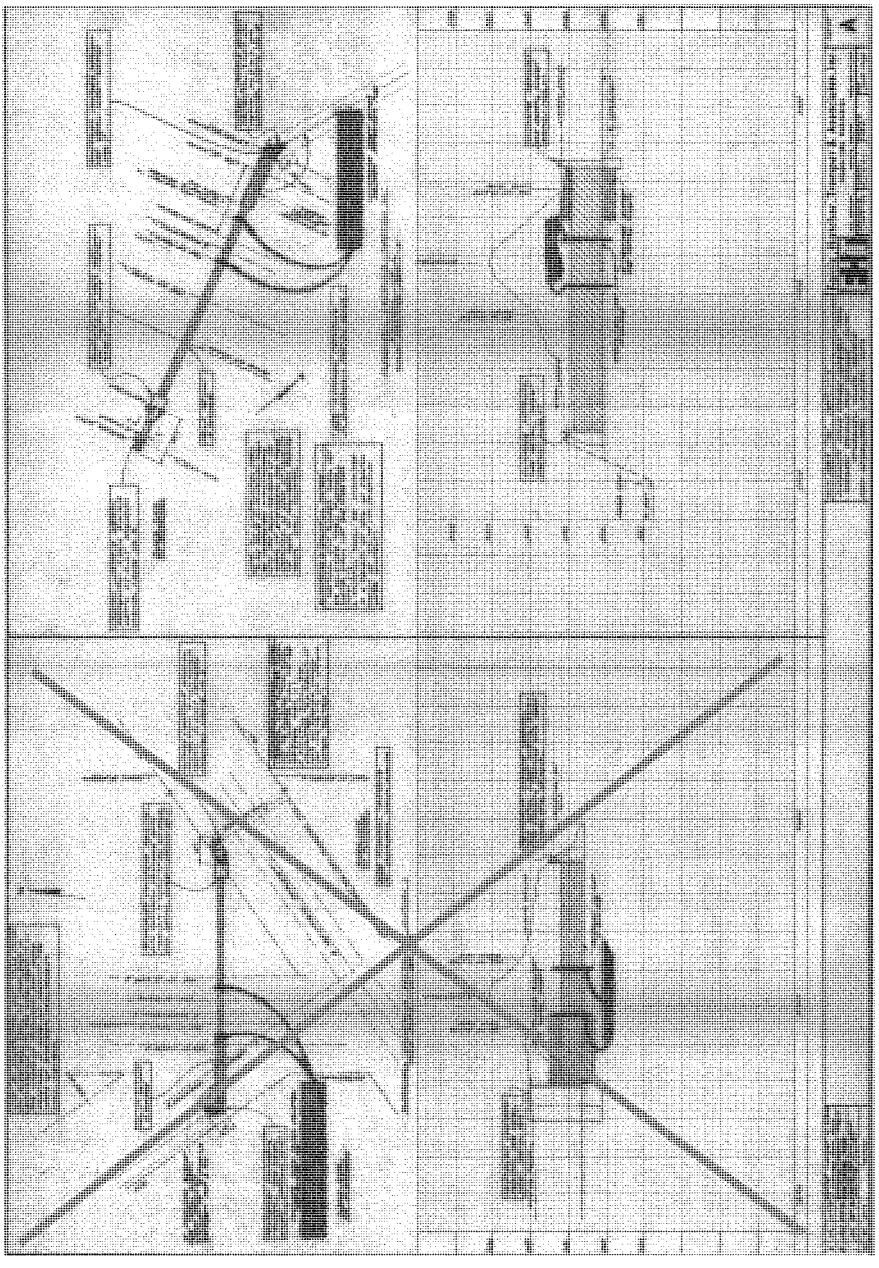

FIGURE 4. SITE C AS-BUILT DRAWING.

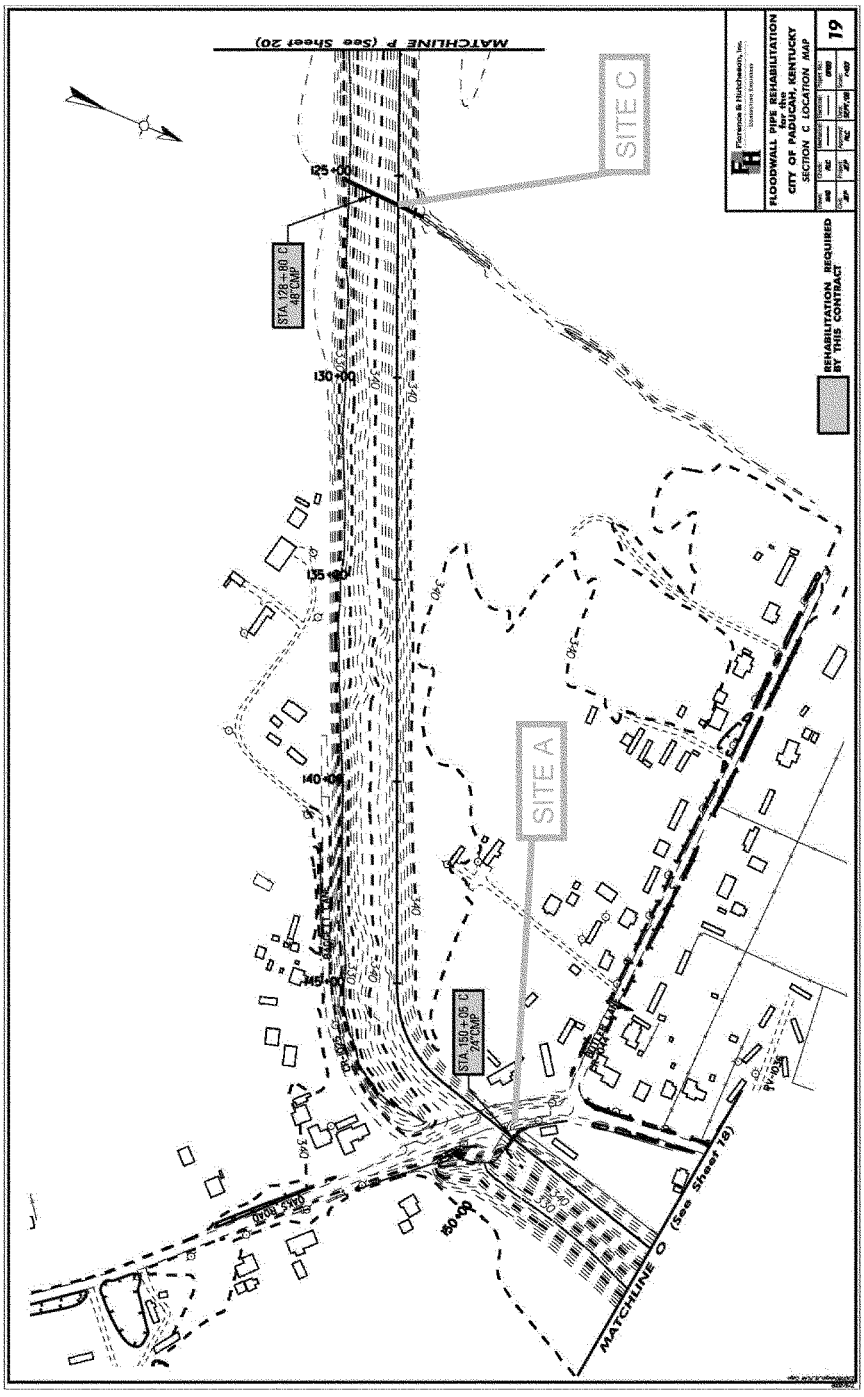

FIGURE 5. SITES A AND C LOCATION.

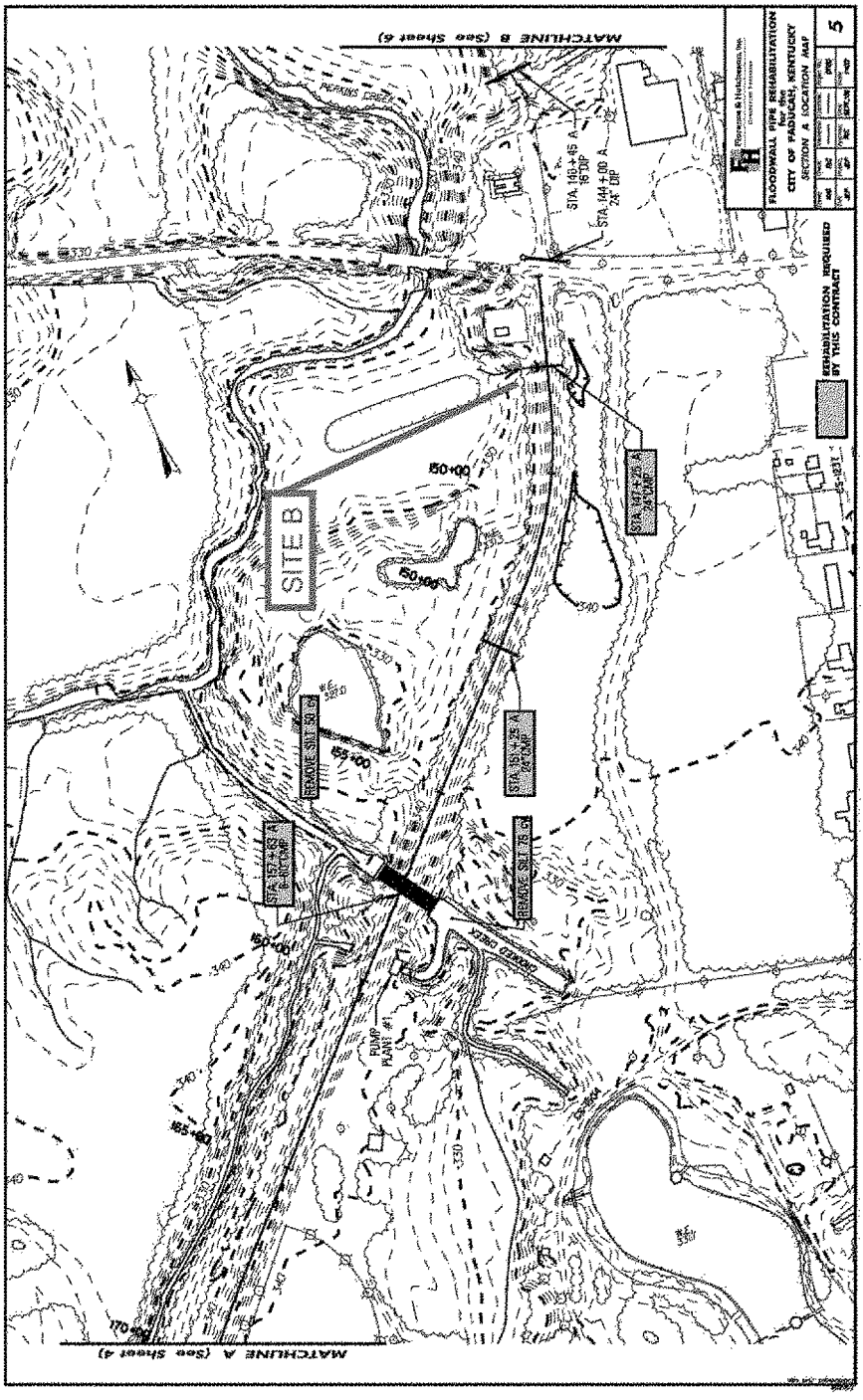

FIGURE 6. SITE B LOCATION.

AMENDMENT #1

SCOPE OF WORK

PROOF TESTS OF SLIPLINING TECHNOLOGY
PADUCAH, KENTUCKY LOCAL FLOOD PROTECTION PROJECTS
HUBZONE SET-ASIDE MATOC TASK ORDER

30 JULY 2009

This amendment to the Scope of Work (SOW) entitled Proof Tests of Sliplining Technology Paducah, Kentucky Local Flood Protection Projects, dated 22 July 2009, is the result of site observations and discussion with Offerors during the pre-bid site visit on 29 July 2009. Offerors are instructed to modify their proposals as described in the following table. Other than these changes, all requirements of the 22 July 09 SOW remain in effect.

SOW Section	Summary of Revision/Clarification
Revision Sections 2.0, 3.1, 3.2, 3.3,	The nondestructive testing described at Site C is changed to Site B. Site C is evaluated using only destructive testing. Site B is evaluated using a combination of non-destructive and destructive testing.
Clarification Table 1	Approximate latitude/longitude coordinates for the sites are: Site A: N37.02528, W88.56682 Site B: N37.09346, W88.63747 Site C: N37.02208, W88.57335
Revision Section 3.2	No significant delay occurs to the project as a result of coordination with Larry Smith Contracting (LSC), who is providing sliplining services to the City of Paducah (the City). The City directs LCS to slipline the 48" CMP at Site C first. The Contractor destructively tests the Site C CMP as the first task on the contract, concurrent with the Site B non-destructive testing. Based on the results of the Site C destructive testing, the City of Paducah may direct LSC to modify the grout mixture to enhance performance, if needed. Rapid execution of the Site C destructive testing is a high priority to ensure efficient coordination of activities with LSC for the remainder of the City of Paducah sliplining contract. If grout mixture modification is required, this process may be repeated at a second and third pipe.
Clarification Section 3.1	Gamma ray and thermographic logging is required only at one site (Site B).
Revision Section 7.11	Hydrographs for the Ohio River are provided at the USACE ftp site ftp://ftp.usace.army.mil/pub/lrl/Paducah%20slipliner%20proof%20test/. These hydrographs may assist Offerors evaluate risk of high water levels during the project period of performance.

Revision Section 4.6.7	The City of Paducah provides access to an inert disposal site for construction/demolition materials at no cost to the Contractor. The same area will be used to stage selected cut sections of destructively tested pipes for future inspection. The site location is shown on Figure 1.
Revision Section 3.5	The Site A west headwall appears to encroach on private property and is not aligned well with the drainage ditch to the west. Contractor installs new cast-in-place headwall five ft to the east to resolve the encroachment issue. New west headwall includes a 90 degree wing wall tied into the existing hand-placed rip rap to alleviate the ditch alignment issue. Rip-rap is place in a trench at the transition of the wing wall to the surrounding soil. The City coordinates construction activities with the adjacent landowner.
Revision Section 3.5	New headwalls are cast-in-place and meet Kentucky Transportation Cabinet 2008 Standard Specifications Section 710, adjusted to original as-built dimensions.
Revision Section 3.5	Restoration of the levee includes eight inches of compacted aggregate to match the existing driving surface on top of the levee.
Revision Sections 3.4,	F&H performs grout strength tests at 3, 7, and 28 days from slipline grout samples at Sites A, B, and C. The seven-day curing period before destructive testing is waived if the three-day strength tests indicate the grout has reached the design strength (300 psi).
Revision Section 3.3	The post-hydraulic proof test is conducted no sooner than five days after sliplining and grouting are completed. The five-day waiting period for hydraulic testing at Site B is waived if the three-day grout strength tests indicate the grout has reached the design strength (300 psi).
Revision Section 3.4	Staging areas and stockpiles are located on the riverside at each site.
Revision Section 3.4	Prescriptive methodology for soil /grout evaluation is deleted. Offeror to propose a suitable method.
Revision Section 4.3	USACE verifies that concrete sand is an appropriate filter drain material based on the characteristics of the levee materials.
Revision Section 3.5	It is assumed that the temporary piezometers are removed when the Site B CMP is excavated for destructive testing. All casing, screen, and sand pack material not in the limits of the excavation is removed and the resulting void backfilled with bentonite grout.
Revision Section 3.6 (new)	Warning signs are installed along Oaks Road while work is performed at Site A. Signs and traffic control measures comply with Kentucky Transportation Cabinet 2008 Standard Specifications Section 112.03
Revision Section 3.4	Contractor carefully removes the existing flap gates to minimize damage and provides the salvaged flap gates to the City Floodwall Shop at 4th & Elizabeth Streets.
Revision Table 1	Levee height at Site C is about 12 ft.

Revision Figure 5	The Site A and Site C labels are switched.
Revision Section 3.1	Contractors that expressed capability to perform non-destructive testing to CELRL include: Terracon, Cincinnati, Ohio; contact Jason Sander 513.321.5816 Technos Inc., Miami, Florida, Lynn Yuhr, 305.718.9594 Other contractors are likely available as well. CELRL does not warrant the suitability of these contractors, only their expressed interest.
Clarification Section 3.5	The toe drain at Site B is replaced to original as-built condition if it is disturbed by the cofferdam installation.
Revision Section 7.4	Work hours are extended to 24 hours per day during hydraulic proof testing.
Revision Section 3.1(c)	Changed the third sentence to read: "The cofferdam surrounds the CMP outlet on the riverside of the levee to impound water, and is at least ten ft from either side of the CMP."
Revision Section 3.4	Contractors that expressed capability to perform destructive testing to CELRL include: a) Ohio Concrete Sawing and Drilling, Inc., Franklin, Ohio, Doug Schuchhardt, 513.723.0099 b) Capital Drilling and Sawing of Kentucky, Elizabethtown, Kentucky, 270.765.7377 Other contractors are likely available as well. CELRL does not warrant the suitability of these contractors, only their expressed interest.

AMENDMENT #2
SCOPE OF WORK
PROOF TESTS OF SLIPLINING TECHNOLOGY
PADUCAH, KENTUCKY LOCAL FLOOD PROTECTION PROJECTS
HUBZONE SET-ASIDE MATOC TASK ORDER

4 August 2009

This amendment to the Scope of Work (SOW) entitled Proof Tests of Sliplining Technology Paducah, Kentucky Local Flood Protection Projects, dated 29 July 2009, is the result of questions from some of the MATOC contractors and their subs which. Offerors are instructed to modify their proposals as described in the following table. Other than these changes, all requirements of the 29 July 09 SOW remain in effect.

SOW Section	Summary of Revision/Clarification
Revision Section 2.0, Table 1	**Site B Scope**: has been revised to state "Non-destructive Inspection, Hydraulic Loading Test, Grout Penetration Inspection and Pipe Replacement". **Site C** scope will only involve Grout Penetration Inspection and Pipe Replacement. Also See Revised Table 1 attached as Enclosure 1 at the end of this amendment.
Revision/Additional Information Section 3.1 paragraph c)	After Sentence beginning with the words "Sufficient water..." Sentence added to state the following "There is an existing fire hydrant located approximately 300 ft from the riverside headwall for the CMP designated as Site B. Contractor shall call Paducah Water Distribution, Point of Contact Barry Bolen at 270-444-0522 to coordinate access to the fire hydrant for water supply for the Hydraulic Loading Test. The contractor will be required to meter this and pay for all costs associated with the use of water supplied from this location.
Revision Section 3.5	Revise the following sentence "The flap gates, frames, and anchors are replaced with new items of like design and materials meeting the requirements of Section 05 50 05." – To state "**The flap gates, frames, and anchors are replaced with new items per added Section 7.13 titled Flap Gates in the subject SOW. Section 7.13 is attached as Enclosure 2 at the end of this amendment.**"

ENCLOSURE 1

Table 1. CMP Locations and Descriptions at Paducah LFPP

Site	Location	Description
A	Station 150+05, Paducah LFPP Section C Pre-Slipline CMP Condition: Fair Scope: Grout Penetration Inspection and Pipe Replacement	24 Inch Outside Diameter CMP CMP Length of 60 Feet Levee Height of 12 Feet
B	Station 147+25, Paducah LFPP Section A Pre-Slipline CMP Condition: Poor Scope: Non-Destructive Inspection, Hydraulic Loading Test, Grout Penetration Inspection and Pipe Replacement	24 Inch Outside Diameter CMP CMP Length of 80 Feet Levee Height of 18 Feet
C	Station 128+80, Paducah LFPP Section C Pre-Slipline CMP Condition: Very Poor Scope: Grout Penetration Inspection and Pipe Replacement	48 Inch Outside Diameter CMP CMP Length of 135 Feet Levee Height of 12 Feet

ENCLOSURE 2

7.13 Flap gates

Flap gates shall be standard products conforming with the requirements hereinafter specified and shall be of the size indicated. The flap gate, size as indicated on the drawings, will be flange framed with resilient or bronze seats. The body will be cast iron, ASTM A126 Class B. The angle of the cover to the vertical, when seated shall be between 2 degrees and 5 degrees from the vertical and be consistent with the proper operation of the gate. Resilient seat, neoprene or Buna-N, will not deteriorate under extremely moist and corrosive conditions; will prevent sticking of the gate flap after the gate has remained closed for long periods of time, and will be bonded in a groove machined in the body to provide a wide seating surface for the seat machined on the cover. Bronze seats, when specified ASTM B21 C464 or ASTM B133 C110, will be pneumatically impacted into dovetailed grooves machined in the cast iron body and cover and machined to a 63 micro-inch finish for maximum water tightness. The cover, or flap, will be cast iron, ASTM A126 Class B, with spherically dished design to withstand maximum operating loads. The hinge arms will be No. 1 manganese bronze, ASTM B584 C865. The hinge pins, designed in double shear, will be silicon bronze, ASTM B98 C655, or Type 304 stainless steel. Each hinge arm will have two pivot points, an adjustable lower pivot with limited rotation and a threaded upper hinge post to adjust flap valve sensitivity. A lubrication fitting will be supplied for each pivot. Type of service is gravity discharge and mounting type is anchor bolts to either an existing concrete headwall or to a new concrete headwall. Anchor bolts shall be stainless steel epoxy type. The anchor size(s), number of anchors and locations for connection to gate shall be based upon the manufacturer's recommendations.

Each gate shall be designed so that it will operate freely and function properly under all conditions of operation from minimum to maximum head and will seat true and be watertight when seated. All flap gates shall have the capability to resist a seating head of 60 feet. The seat rings will be in contact in the entire perimeter, when gate is closed, and the actual bearing of the disc seat ring on the frame seat ring will be not less than 75 percent of the total bearing area at all points on the perimeter. The frames shall be designed so as to fasten securely to the concrete walls, or pipes, and shall be so attached that no leakage will occur between the frame and the wall when the gates are closed. Gates shall be designed to operate with 6-inch head differential.

FABRICATION DRAWINGS

Fabrication drawings shall be provided showing complete details of materials, tolerances, connections, and proposed welding sequences which clearly differentiate shop welds and field welds.

SHOP ASSEMBLY DRAWINGS

Shop assembly drawings shall be provided showing details for connecting the adjoining fabricated components in the shop to assure satisfactory field installation.

DELIVERY DRAWINGS

Delivery drawings shall be provided showing descriptions of methods of delivering components to the site, including details for supporting fabricated components during shipping to prevent distortion or other damages.

FIELD INSTALLATION DRAWINGS

Field installation drawings shall be provided showing a detailed description of the field installation procedures. The description shall include the location and method of support of installation and handling equipment; provisions to be taken to protect concrete and other work during installation; method of maintaining components in correct alignment; and methods for installing appurtenant items.

PAINTING OF CAST-IRON FLAP GATES

Flap gates shall be thoroughly cleaned (surface preparation to be sand blasted in accordance with SSPC SP 6), primed and painted at the factory in accordance with manufacturer's recommendations with exterior epoxy type paint for submergence applications.

ACCEPTANCE TRIAL OPERATION

After completion of installation, the Contracting Officer will examine the flapgate installations for final acceptance. The individual components of the flapgate installations will be examined first to determine whether or not the workmanship conforms to the specification requirements. Required repairs or replacements to correct defects, shall be made at no cost to the Government. The trial operation shall be repeated after defects are corrected.

AMENDMENT #3
SCOPE OF WORK
PROOF TESTS OF SLIPLINING TECHNOLOGY
PADUCAH, KENTUCKY LOCAL FLOOD PROTECTION PROJECTS
HUBZONE SET-ASIDE MATOC TASK ORDER

4 August 2009

This amendment to the Scope of Work (SOW) entitled Proof Tests of Sliplining Technology Paducah, Kentucky Local Flood Protection Projects, dated 29 July 2009, is the result of questions from some of the MATOC contractors and their potential subs contractors. Offerors are instructed to modify their proposals as described in the following table. Other than this change along with the Amendment #2 changes, all requirements of the 29 July 09 SOW remain in effect.

SOW Section	Summary of Revision/Clarification
Revision Section 3.1, paragraph c)	Add a sentence at the end of this paragraph which states "The contractor will be required to construct a temporary elevated cover over the cofferdam to prevent rainwater from entering the cofferdam area during both the pre and post Hydraulic Proof Test which could skew the test results. "

OHIO RIVER SHORELINE, PADUCAH, KENTUCKY LFPP RECONSTRUCTION FEASIBILITY REPORT VOLUME 4 APPENDIX C

SECTION 3 STRUCTURAL CALCULATIONS

April 2011
Final Submittal

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Near Locust St.
Station 4+50 B-1

Page 1 of 26
Computed by: J. Kelly 12-Jun-09
Checked by:

Geometry:

Dimensions								
From As-Builts			Derived			Flood		
AB	7.354	ft. (width)	BC	7.278	ft	Sill El.	338.20	ft. (NAVD)
AI	2.818		CG	4.580		Flood El.	344.80	
IC	3.583		GD	3.965		AH	7.378	
CD	4.417		AJ	5.938				
DE	2.271		IJ	4.117				
EF	1.500							
BF	11.708	(height)	Θ_{IAB}	63.4505	°	Θ_{JAB}	25.1183	°
BG	6.615		Θ_{ABC}	51.8796		Θ_{IAJ}	38.3322	
W	7.500	supported skinplate	Θ_{ACB}	64.6699		BJ	3.204	
		width	Θ_{BCG}	63.0659		CJ	4.075	

Nodes					
Truss				Beam y = 0, z = 0	
	x	y	z		x
1-A	0.000	0.000	0.000	1-A	0.000
2-I	1.259	2.521	0.000	Purlin A	0.818
3-C	2.861	5.726	0.000	3-I	2.818
4-D	4.835	9.677	0.000	4-C	6.401
5-E	5.850	11.708	0.000	5-D	10.818
6-F	7.354	11.708	0.000	6-E	13.089
7-G	7.354	6.615	0.000		
8-B	7.354	0.000	0.000	Load dist	1.642
9-J	5.376	2.521	0.000		

Members (from As-Builts)					
	Check				Check
AB	2L2-1/2X2-1/2X1/4		Purlin at A:	W8X15	
AI	2L2-1/2X2-1/2X1/4		Purlin at I :	W8X15	
IC	2L2-1/2X2-1/2X1/4		Purlin at C:	W8X15	
CD	2L2-1/2X2-1/2X1/4		Purlin at D:	W8X15	N/A
DE	2L2-1/2X2-1/2X1/4				
EF	2L2-1/2X2-1/2X1/4			Skin Plate	X
FG	2L3X2-1/2X1/4SLBB				
BG	2L3X2-1/2X1/4SLBB				
AJ	2L2-1/2X2X1/4LLBB				
IJ	2L2-1/2X2X1/4LLBB				
BJ	2L2-1/2X2-1/2X1/4		CG	2L2-1/2X2X1/4LLBB	
CJ	2L2-1/2X2-1/2X1/4		DG	2L2-1/2X2X1/4LLBB	

Hydrostatic Force:

Resultant Hydrostatic Force at Center of Pressure, CP

$R = \gamma h_{CG} A =$ $62.4\ lb/ft^3 \times (AH/2 \times \sin\Theta_{IAB})ft \times (AH \times W)ft^2$ = 11,394.6 lbs

$R_V = R\cos\Theta_{IAB} = 11394.6\cos(63.5°)lb =$ 5,093.1

$R_H = R\sin\Theta_{IAB} = 11394.6\sin(63.5°)lb =$ 10,193.0

Check: $Sqrt(R_V^2 + R_H^2) - R = 0$ 0.0

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Reach Leg/Leaf 5R
Station 4+50 Bt 1

Page 2 of 26
Computed by: J. Kelly 12-Jun-09
Checked by:

CP *(Neglecting ambient pressure)*

$y_{cp} = -(I_{xx}\sin\Theta_{IAB}) / (h_{cg}A) =$ -1.230 ft

$x_{cp} = 0$ 0.000

Location of Resultant Force, R, (distance fr. A) 2.459 ft

Results (Condition DL=Dead Load)

Forces [Kip] | Moments [Kip*ft] | Forces [Kip]

Support Reactions (Truss)[1]

Node	FX	FY	MX	MY
1-A	-10.194	1.281	0.000	0.000
8-B	0.000	3.810	0.000	0.000
SUM	-10.194	5.091	0.000	0.000
Check	-0.001	-0.002		

Beam

Node	FY
Purlin A	1.451
3-I	10.345
4-C	-0.461
5-D	0.059
SUM	11.395
Check	0.000

Members

	Axial	M_{33}
1-AI	-5.589	-1.562
2-IC	-0.069	0.328
3-CD	0.005	-0.029
4-DE	-0.005	-0.004
5-EF	0.003	0.007
6-FG	0.008	-0.008
7-GB	-0.035	0.043
8-AB	2.998	0.387
9-AJ	9.622	-0.139
10-BJ	-4.754	-0.084
11-CJ	0.406	0.190
12-IJ	-11.989	0.219
13-CG	0.014	-0.026
14-DG	-0.034	-0.011

Notes: 1. Neglecting weight of truss, & assuming pin connection at A, roller at B. Although assuming a roller at B is not completely accurate, effort will be made to ensure that the least conservative method is used in this analysis.
2. Material used is designated as AL 27S-T; closest match to today's standards is 2014-T4. This analysis uses A36 steel.

Member Design Data:

F_y = 42 ksi E = 10,600 ksi G = 4,000 ksi

US Army Corps of Engineers
Louisville District

Subject: Pedestrian Lateral Certification
Near Lorraine St
Station 4+50 Rt

Page 3 of 26
Computed by: J. Kelly 12-Jun-09
Checked by:

Member AI

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	-5,589.00 lbs	M_r =	-1,562.00 lb-ft	L =	33.813 in
L_b =	33.813 in	K =	1.000	A_g =	2.370 in²
d =	2.500 in	b_f =	5.000 in	t_f =	0.250 in
r =	0.764 in	r_o =	1.420 in	H =	0.829
S_x =	0.773 in^3	Z_x =	1.390 in^3	I_y =	2.563 in^4
J =	0.051 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 44 Slender Element? No Therefore use Chapter E3.

$K \cdot L/r \le 4.71\sqrt{(E/Fy)} = 75$ $F_e = \pi^2E/(K \cdot L/r)^2 =$ 53.41 ksi

Therefore, $F_{cr} =$ [0.658^(Fy/Fe)]Fy *(E3-2)*

$=$ 30.22 ksi

$P_n = F_{cr} \cdot A_g =$ 30.22 x 2.37 = 71.62 kips

$=$ 71,624 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2 =$ 42.50 ksi *(E4-3)*

$F_{cry} = F_{cr,FB} =$ 30.22 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$

$=$ 24.51 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g =$ 24.51 x 2.37 = 58.09 kips

$=$ 58,092 lbs

$P_n =$ 58,092 lbs *Lowest value obtained through limit states.

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p = F_yZ_x \le 1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension

$F_yZ_x =$ 58.38 kip-in $1.6M_y =$ 51.95 kip-in

Therefore: $M_{n,Y} =$ 51.95 kip-in $=$ 4,329 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)/L_b}] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*

$B = 2.3(d/L_b)\sqrt{(I_y/J)} =$ 1.208 *(F9-5)*

$=$ 606.08 kip-in $=$ 50,506 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Near Levee St
Station 4+50 B-1

Page 4 of 26
Computed by: J. Kelly 12-Jun-09
Checked by:

M_n = 4,329 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \phi_c P_n$ = 0.9 x 58092 = 52,283 lbs
$M_c = \phi_b M_n$ = 0.9 x 4329 = 3,896 lb-ft

P_r/P_c = -0.107 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0
-0.454 ≤ 1.0 Therefore OK.

Member AI is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

Member IC

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	-69.00 lbs	M_r =	328.000 lb-ft	L =	43.000 in
L_b =	43.000 in	K =	1.000	A_g =	2.370 in²
d =	2.500 in	b_f =	5.000 in	t_f =	0.250 in
r =	0.764 in	r_o =	1.420 in	H =	0.829
S_x =	0.773 in^3	Z_x =	1.390 in^3	I_y =	2.563 in^4
J =	0.051 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 56 Slender Element? No Therefore use Chapter E3.

K·L/r ≤ 4.71√(E/Fy) = 75 $F_e = \pi^2E/(K \cdot L/r)^2$ = 33.03 ksi

Therefore, F_{cr} = [0.658^(Fy/Fe)]Fy *(E3-2)*
= 24.67 ksi

$P_n = F_{cr} \cdot A_g$ = 24.67 x 2.37 = 58.46 kips
= 58,456 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2$ = 42.50 ksi *(E4-3)*
$F_{cry} = F_{cr,FB}$ = 24.67 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 21.11 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g$ = 21.11 x 2.37 = 50.02 kips
= 50,020 lbs

P_n = 50,020 lbs *Lowest value obtained through limit states.

US Army Corps of Engineers
Louisville District

Subject: Paducah Lance Certification
Navel Locust St
Station 4+50 B-1

Page 5 of 26
Computed by: J. Kelly 12-Jun-09
Checked by:

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p =$ $F_yZ_x \leq$ $1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension

$F_yZ_x =$ 58.38 kip-in $1.6M_y =$ 51.95 kip-in

Therefore: $M_{n,Y} =$ 51.95 kip-in = 4,329 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*

$B = 2.3(d/L_b)\sqrt{(I_y/J)} =$ 0.950 *(F9-5)*

= 399.83 kip-in = 33,319 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

$M_n =$ 4,329 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \varphi_cP_n =$ 0.9 x 50020 = 45,018 lbs

$M_c = \varphi_bM_n =$ 0.9 x 4329 = 3,896 lb-ft

$P_r/P_c =$ -0.002 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0

0.083 ≤ 1.0 Therefore OK.

Member IC is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Reach 1 and 2 SI
Station 4+50 B-1

Page 6 of 26
Computed by: J. Kelly 12-Jun-09
Checked by:

Member CD

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	5.00 lbs	M_r =	-29.000 lb-ft	L =	53.000 in
L_b =	53.000 in	K =	1.000	A_g =	2.370 in^2
d =	2.500 in	b_f =	5.000 in	t_f =	0.250 in
r =	0.764 in	r_o =	1.420 in	H =	0.829
S_x =	0.773 in^3	Z_x =	1.390 in^3	I_y =	2.563 in^4
J =	0.051 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 69 Slender Element? No Therefore use Chapter E3.

$K \cdot L/r > 4.71\sqrt{(E/Fy)} = 75$ $F_e = \pi^2E/(K \cdot L/r)^2 =$ 21.74 ksi

Therefore, $F_{cr} =$ [0.658^(Fy/Fe)]Fy *(E3-2)*
= 18.71 ksi

$P_n = F_{cr} \cdot A_g =$ 18.71 x 2.37 = 44.34 kips
= 44,341 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2 =$ 42.50 ksi *(E4-3)*
$F_{cry} = F_{cr,FB} =$ 18.71 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 16.82 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g =$ 16.82 x 2.37 = 39.87 kips
= 39,874 lbs

$P_n =$ 39,874 lbs *Lowest value obtained through limit states.

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p = F_yZ_x \leq 1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension
$F_yZ_x =$ 58.38 kip-in $1.6M_y =$ 51.95 kip-in

Therefore: $M_{n,Y} =$ 51.95 kip-in = 4,329 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*
$B = 2.3(d/L_b)\sqrt{(I_y/J)} =$ 0.771 *(F9-5)*
= 283.17 kip-in = 23,597 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

M_n = 4,329 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \varphi_c P_n$ = 0.9 x 39874 = 35,887 lbs
$M_c = \varphi_b M_n$ = 0.9 x 4329 = 3,896 lb-ft

P_r/P_c = 0.000 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0
-0.007 ≤ 1.0 Therefore OK.

Member CD is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

Member DE

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	-5.00 lbs	M_r =	-4.000 lb-ft	L =	27.250 in
L_b =	27.250 in	K =	1.000	A_g =	2.370 in²
d =	2.500 in	b_f =	5.000 in	t_f =	0.250 in
r =	0.764 in	r_o =	1.420 in	H =	0.829
S_x =	0.773 in^3	Z_x =	1.390 in^3	I_y =	2.563 in^4
J =	0.051 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 36 Slender Element? No Therefore use Chapter E3.

$K \cdot L/r \le 4.71\sqrt{(E/Fy)}$ = 75 $F_e = \pi^2 E/(K \cdot L/r)^2$ = 82.24 ksi

Therefore, F_{cr} = [0.658^(Fy/Fe)]Fy *(E3-2)*
= 33.92 ksi

$P_n = F_{cr} \cdot A_g$ = 33.92 x 2.37 = 80.38 kips
= 80,382 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2$ = 42.50 ksi *(E4-3)*
$F_{cry} = F_{cr,FB}$ = 33.92 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 26.46 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g$ = 26.46 x 2.37 = 62.70 kips
= 62,704 lbs

P_n = 62,704 lbs *Lowest value obtained through limit states.

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Reach Levee 51
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Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p =$ $F_yZ_x \leq$ $1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension

$F_yZ_x =$ 58.38 kip-in $1.6M_y =$ 51.95 kip-in

Therefore: $M_{n,Y} =$ 51.95 kip-in = 4,329 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*

$B = 2.3(d/L_b)\sqrt{(I_y/J)} =$ 1.499 *(F9-5)*

= 894.15 kip-in = 74,512 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

$M_n =$ 4,329 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \phi_cP_n =$ 0.9 x 62704 = 56,434 lbs

$M_c = \phi_bM_n =$ 0.9 x 4329 = 3,896 lb-ft

$P_r/P_c =$ 0.000 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0

-0.001 ≤ 1.0 Therefore OK.

Member DE is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

US Army Corps of Engineers
Louisville District

Subject: Pedestrian Levee Certification
Reach 1 Inside St
Station 4+50 Bank

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Member EF

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	3.00 lbs	M_r =	7.000 lb-ft	L =	18.000 in
L_b =	18.000 in	K =	1.000	A_g =	2.370 in²
d =	2.500 in	b_f =	5.000 in	t_f =	0.250 in
r =	0.764 in	r_o =	1.420 in	H =	0.829
S_x =	0.773 in^3	Z_x =	1.390 in^3	I_y =	2.563 in^4
J =	0.051 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 24 Slender Element? No Therefore use Chapter E3.

$K \cdot L/r \le 4.71\sqrt{(E/Fy)} = 75$ $F_e = \pi^2E/(K \cdot L/r)^2 =$ 188.47 ksi

Therefore, $F_{cr} =$ [0.658^(Fy/Fe)]Fy *(E3-2)*
$=$ 38.26 ksi

$P_n = F_{cr} \cdot A_g =$ 38.26 x 2.37 = 90.68 kips
$=$ 90,676 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2 =$ 42.50 ksi *(E4-3)*
$F_{cry} = F_{cr,FB} =$ 38.26 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
$=$ 28.43 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g =$ 28.43 x 2.37 = 67.39 kips
$=$ 67,389 lbs

$P_n =$ 67,389 lbs *Lowest value obtained through limit states.

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p = F_yZ_x \le 1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension
$F_yZ_x =$ 58.38 kip-in $1.6M_y =$ 51.95 kip-in

Therefore: $M_{n,Y} =$ 51.95 kip-in $=$ 4,329 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*
$B = 2.3(d/L_b)\sqrt{(I_y/J)} =$ 2.270 *(F9-5)*
$=$ 1947.56 kip-in $=$ 162,297 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

M_n = 4,329 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \phi_c P_n$ = 0.9 x 67389 = 60,650 lbs
$M_c = \phi_b M_n$ = 0.9 x 4329 = 3,896 lb-ft

P_r/P_c = 0.000 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0
0.002 ≤ 1.0 Therefore OK.

Member EF is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

Member FG

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	8.00 lbs	M_r =	-8.000 lb-ft	L =	61.125 in
L_b =	61.125 in	K =	1.000	A_g =	2.640 in²
d =	2.500 in	b_f =	6.000 in	t_f =	0.250 in
r =	0.746 in	r_o =	1.590 in	H =	0.890
S_x =	0.794 in^3	Z_x =	1.410 in^3	I_y =	4.462 in^4
J =	0.056 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 82 Slender Element? No Therefore use Chapter E3.

$K \cdot L/r > 4.71\sqrt{(E/Fy)}$ = 75 $F_e = \pi^2 E/(K \cdot L/r)^2$ = 15.58 ksi

Therefore, F_{cr} = 0.877Fe *(E3-3)*
= 13.67 ksi

$P_n = F_{cr} \cdot A_g$ = 13.67 x 2.64 = 36.08 kips
= 36,079 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2$ = 33.56 ksi *(E4-3)*
$F_{cry} = F_{cr,FB}$ = 13.67 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 12.80 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g$ = 12.8 x 2.64 = 33.79 kips
= 33,787 lbs

P_n = 33,787 lbs *Lowest value obtained through limit states.

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Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p =$ $F_yZ_x \leq$ $1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension

$F_yZ_x =$ 59.22 kip-in $1.6M_y =$ 53.36 kip-in

Therefore: $M_{n,Y} =$ 53.36 kip-in = 4,446 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*

$B = 2.3(d/L_b)\sqrt{(I_y/J)} =$ 0.840 *(F9-5)*

= 358.88 kip-in = 29,907 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

$M_n =$ 4,446 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \varphi_cP_n =$ 0.9 x 33787 = 30,408 lbs

$M_c = \varphi_bM_n =$ 0.9 x 4446 = 4,002 lb-ft

$P_r/P_c =$ 0.000 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0

-0.002 ≤ 1.0 Therefore OK.

Member FG is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

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Member BG

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	-35.00 lbs	M_r =	43.000 lb-ft	L =	79.375 in
L_b =	79.375 in	K =	1.000	A_g =	2.640 in^2
d =	2.500 in	b_f =	6.000 in	t_f =	0.250 in
r =	0.746 in	r_o =	1.590 in	H =	0.890
S_x =	0.794 in^3	Z_x =	1.410 in^3	I_y =	4.462 in^4
J =	0.056 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 106 Slender Element? No Therefore use Chapter E3.

$K \cdot L/r > 4.71\sqrt{(E/Fy)} = 75$ $F_e = \pi^2E/(K \cdot L/r)^2 =$ 9.24 ksi

Therefore, $F_{cr} =$ 0.877Fe *(E3-3)*
= 8.10 ksi

$P_n = F_{cr} \cdot A_g =$ 8.1 x 2.64 = 21.40 kips
= 21,395 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2 =$ 33.56 ksi *(E4-3)*
$F_{cry} = F_{cr,FB} =$ 8.10 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 7.84 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g =$ 7.84 x 2.64 = 20.70 kips
= 20,701 lbs

$P_n =$ 20,701 lbs *Lowest value obtained through limit states.

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p = F_yZ_x \leq 1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension
$F_yZ_x =$ 59.22 kip-in $1.6M_y =$ 53.36 kip-in

Therefore: $M_{n,Y} =$ 53.36 kip-in = 4,446 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*
$B = 2.3(d/L_b)\sqrt{(I_y/J)} =$ 0.647 *(F9-5)*
= 236.69 kip-in = 19,724 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

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M_n = 4,446 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \varphi_c P_n$ = 0.9 x 20701 = 18,631 lbs
$M_c = \varphi_b M_n$ = 0.9 x 4446 = 4,002 lb-ft

P_r/P_c = -0.002 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0
0.010 ≤ 1.0 Therefore OK.

Member BG is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

Member AB

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	2,998 lbs	M_r =	387.000 lb-ft	L =	88.250 in
L_b =	88.250 in	K =	1.000	A_g =	2.370 in²
d =	2.500 in	b_f =	5.000 in	t_f =	0.250 in
r =	0.764 in	r_o =	1.420 in	H =	0.829
S_x =	0.773 in^3	Z_x =	1.390 in^3	I_y =	2.563 in^4
J =	0.051 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 116 Slender Element? No Therefore use Chapter E3.

K·L/r > 4.71√(E/Fy) = 75 $F_e = \pi^2E/(K \cdot L/r)^2$ = 7.84 ksi

Therefore, F_{cr} = 0.877Fe *(E3-3)*
= 6.88 ksi

$P_n = F_{cr} \cdot A_g$ = 6.88 x 2.37 = 16.30 kips
= 16,297 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2$ = 42.50 ksi *(E4-3)*
$F_{cry} = F_{cr,FB}$ = 6.88 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 6.66 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g$ = 6.66 x 2.37 = 15.79 kips
= 15,795 lbs

P_n = 15,795 lbs *Lowest value obtained through limit states.

US Army Corps of Engineers
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Subject: Paducah Levee Certification
Near Locust St
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Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p =$ $F_yZ_x \leq$ $1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension

$F_yZ_x =$ 58.38 kip-in $1.6M_y =$ 51.95 kip-in

Therefore: $M_{n,Y} =$ 51.95 kip-in = 4,329 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*

$B = 2.3(d/L_b)\sqrt{(I_y/J)} =$ 0.463 *(F9-5)*

= 130.88 kip-in = 10,906 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

$M_n =$ 4,329 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \phi_cP_n =$ 0.9 x 15795 = 14,215 lbs

$M_c = \phi_bM_n =$ 0.9 x 4329 = 3,896 lb-ft

$P_r/P_c =$ 0.211 ≥ 0.2, Therefore use Equation (H1-1a)

$Pr/Pc + (8/9)\cdot(Mr/Mc) \leq 1.0$

$0.299 \leq 1.0$ Therefore OK.

Member AB is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

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Member AJ

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	9,622.00 lbs	M_r =	-139.000 lb-ft	L =	71.254 in
L_b =	71.254 in	K =	1.000	A_g =	2.140 in²
d =	2.500 in	b_f =	4.000 in	t_f =	0.250 in
r =	0.782 in	r_o =	1.290 in	H =	0.744
S_x =	0.762 in^3	Z_x =	1.380 in^3	I_y =	1.349 in^4
J =	0.046 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

$K \cdot L/r$ = 91 Slender Element? No Therefore use Chapter E3.

$K \cdot L/r > 4.71\sqrt{(E/Fy)}$ = 75 $F_e = \pi^2E/(K \cdot L/r)^2$ = 12.60 ksi

Therefore, F_{cr} = 0.877Fe *(E3-3)*
= 11.05 ksi

$P_n = F_{cr} \cdot A_g$ = 11.05 x 2.14 = 23.65 kips
= 23,649 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2$ = 51.19 ksi *(E4-3)*
$F_{cry} = F_{cr,FB}$ = 11.05 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 10.38 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g$ = 10.38 x 2.14 = 22.20 kips
= 22,204 lbs

P_n = 22,204 lbs *Lowest value obtained through limit states.

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p = F_yZ_x \leq 1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension
F_yZ_x = 57.96 kip-in $1.6M_y$ = 51.21 kip-in

Therefore: $M_{n,Y}$ = 51.21 kip-in = 4,267 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*
$B = 2.3(d/L_b)\sqrt{(I_y/J)}$ = 0.439 *(F9-5)*
= 109.00 kip-in = 9,084 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

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Near Levee 51
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M_n = 4,267 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \phi_c P_n$ = 0.9 x 22204 = 19,983 lbs
$M_c = \phi_b M_n$ = 0.9 x 4267 = 3,840 lb-ft

P_r/P_c = 0.482 ≥ 0.2, Therefore use Equation (H1-1a)

Pr/Pc + (8/9)·(Mr/Mc) ≤ 1.0
0.449 ≤ 1.0 Therefore OK.

Member AJ is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

Member IJ

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	-11,989 lbs	M_r =	219.000 lb-ft	L =	49.403 in
L_b =	49.403 in	K =	1.000	A_g =	2.140 in²
d =	2.500 in	b_f =	4.000 in	t_f =	0.250 in
r =	0.782 in	r_o =	1.290 in	H =	0.744
S_x =	0.762 in^3	Z_x =	1.380 in^3	I_y =	1.349 in^4
J =	0.046 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 63 Slender Element? No Therefore use Chapter E3.

K·L/r ≤ 4.71√(E/Fy) = 75 $F_e = \pi^2 E/(K \cdot L/r)^2$ = 26.21 ksi

Therefore, F_{cr} = [0.658^(Fy/Fe)]Fy *(E3-2)*
= 21.48 ksi

$P_n = F_{cr} \cdot A_g$ = 21.48 x 2.14 = 45.96 kips
= 45,963 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2$ = 51.19 ksi *(E4-3)*
$F_{cry} = F_{cr,FB}$ = 21.48 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 18.72 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g$ = 18.72 x 2.14 = 40.05 kips
= 40,053 lbs

P_n = 40,053 lbs *Lowest value obtained through limit states.

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Louisville District

Subject: Paducah Lanes Certification
Near Locust St
Station 4+50 R-1

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Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p =$ $F_yZ_x \leq$ $1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension

$F_yZ_x =$ 57.96 kip-in $1.6M_y =$ 51.21 kip-in

Therefore: $M_{n,Y} =$ 51.21 kip-in = 4,267 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*

$B = 2.3(d/L_b)\sqrt{(I_y/J)} =$ 0.633 *(F9-5)*

= 186.55 kip-in = 15,546 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

$M_n =$ 4,267 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \varphi_cP_n =$ 0.9 x 40053 = 36,048 lbs

$M_c = \varphi_bM_n =$ 0.9 x 4267 = 3,840 lb-ft

$P_r/P_c =$ -0.333 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0

-0.109 ≤ 1.0 Therefore OK.

Member IJ is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification, Reach L Levee STA, Station 4+50 BJ

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Member BJ

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	-4,754.00 lbs	M_r =	-84.000 lb-ft	L =	38.447 in
L_b =	38.447 in	K =	1.000	A_g =	2.370 in²
d =	2.500 in	b_f =	5.000 in	t_f =	0.250 in
r =	0.764 in	r_o =	1.420 in	H =	0.829
S_x =	0.773 in^3	Z_x =	1.390 in^3	I_y =	2.563 in^4
J =	0.051 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 50 Slender Element? No Therefore use Chapter E3.

$K \cdot L/r \le 4.71\sqrt{(E/Fy)} = 75$ $F_e = \pi^2E/(K \cdot L/r)^2 =$ 41.31 ksi

Therefore, $F_{cr} =$ [0.658^(Fy/Fe)]Fy *(E3-2)*

$=$ 27.44 ksi

$P_n = F_{cr} \cdot A_g =$ 27.44 x 2.37 = 65.04 kips

$=$ 65,042 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2 =$ 42.50 ksi *(E4-3)*

$F_{cry} = F_{cr,FB} =$ 27.44 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$

$=$ 22.88 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g =$ 22.88 x 2.37 = 54.23 kips

$=$ 54,229 lbs

$P_n =$ 54,229 lbs *Lowest value obtained through limit states.

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p = F_yZ_x \le 1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension

$F_yZ_x =$ 58.38 kip-in $1.6M_y =$ 51.95 kip-in

Therefore: $M_{n,Y} =$ 51.95 kip-in $=$ 4,329 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*

$B = 2.3(d/L_b)\sqrt{(I_y/J)} =$ 1.063 *(F9-5)*

$=$ 484.09 kip-in $=$ 40,341 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

US Army Corps of Engineers
Louisville District

Subject: Pedestrian Lateral Stability
Tunnel Portal S1
Station 4+50 Rt

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M_n = 4,329 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \varphi_c P_n$ = 0.9 x 54229 = 48,806 lbs
$M_c = \varphi_b M_n$ = 0.9 x 4329 = 3,896 lb-ft

P_r/P_c = -0.097 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0
-0.070 ≤ 1.0 Therefore OK.

Member BJ is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

Member CJ

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	406.00 lbs	M_r =	190.000 lb-ft	L =	48.894 in
L_b =	48.894 in	K =	1.000	A_g =	2.370 in²
d =	2.500 in	b_f =	5.000 in	t_f =	0.250 in
r =	0.764 in	r_o =	1.420 in	H =	0.829
S_x =	0.773 in^3	Z_x =	1.390 in^3	I_y =	2.563 in^4
J =	0.051 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 64 Slender Element? No Therefore use Chapter E3.

K·L/r ≤ 4.71√(E/Fy) = 75 $F_e = \pi^2E/(K \cdot L/r)^2$ = 25.54 ksi

Therefore, F_{cr} = [0.658^(Fy/Fe)]Fy *(E3-2)*
= 21.10 ksi

$P_n = F_{cr} \cdot A_g$ = 21.1 x 2.37 = 50.02 kips
= 50,017 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2$ = 42.50 ksi *(E4-3)*
$F_{cry} = F_{cr,FB}$ = 21.10 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 18.62 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g$ = 18.62 x 2.37 = 44.13 kips
= 44,133 lbs

P_n = 44,133 lbs *Lowest value obtained through limit states.

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Near Locust St
Station 4+50 R.T.

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Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p =$ $F_yZ_x \leq$ $1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension

$F_yZ_x =$ 58.38 kip-in $1.6M_y =$ 51.95 kip-in

Therefore: $M_{n,Y} =$ 51.95 kip-in = 4,329 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*

$B = 2.3(d/L_b)\sqrt{(I_y/J)} =$ 0.836 *(F9-5)*

= 322.83 kip-in = 26,903 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

$M_n =$ 4,329 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \phi_cP_n =$ 0.9 x 44133 = 39,719 lbs

$M_c = \phi_bM_n =$ 0.9 x 4329 = 3,896 lb-ft

$P_r/P_c =$ 0.010 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0

0.054 ≤ 1.0 Therefore OK.

Member CJ is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

US Army Corps of Engineers
Louisville District

Subject: Pedicam Lower Certification
Tower 1 Inside SR
Station 4+50 B-1

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Member CG

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	14.00 lbs	M_r =	-26.000 lb-ft	L =	54.961 in
L_b =	54.961 in	K =	1.000	A_g =	2.140 in²
d =	2.500 in	b_f =	4.000 in	t_f =	0.250 in
r =	0.782 in	r_o =	1.290 in	H =	0.744
S_x =	0.762 in^3	Z_x =	1.380 in^3	I_y =	1.349 in^4
J =	0.046 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 70 Slender Element? No Therefore use Chapter E3.

$K \cdot L/r > 4.71\sqrt{(E/Fy)} = 75$ $F_e = \pi^2E/(K \cdot L/r)^2 =$ 21.18 ksi

Therefore, $F_{cr} =$ [0.658^(Fy/Fe)]Fy *(E3-2)*
= 18.31 ksi

$P_n = F_{cr} \cdot A_g =$ 18.31 x 2.14 = 39.19 kips
= 39,191 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2 =$ 51.19 ksi *(E4-3)*
$F_{cry} = F_{cr,FB} =$ 18.31 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 16.35 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g =$ 16.35 x 2.14 = 34.99 kips
= 34,988 lbs

$P_n =$ 34,988 lbs *Lowest value obtained through limit states.

Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p = F_yZ_x \leq 1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension
$F_yZ_x =$ 57.96 kip-in $1.6M_y =$ 51.21 kip-in

Therefore: $M_{n,Y} =$ 51.21 kip-in = 4,267 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*
$B = 2.3(d/L_b)\sqrt{(I_y/J)} =$ 0.569 *(F9-5)*
= 158.73 kip-in = 13,227 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Near Lincoln St
Station 4+50 B-1

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M_n = 4,267 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \phi_c P_n$ = 0.9 x 34988 = 31,489 lbs
$M_c = \phi_b M_n$ = 0.9 x 4267 = 3,840 lb-ft

P_r/P_c = 0.000 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0
-0.007 ≤ 1.0 Therefore OK.

Member CG is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

Member DG

Steel Design, Steel Construction Manual, AISC 13th Edition

P_r =	-34.00 lbs	M_r =	-11.000 lb-ft	L =	47.583 in
L_b =	47.583 in	K =	1.000	A_g =	2.140 in²
d =	2.500 in	b_f =	4.000 in	t_f =	0.250 in
r =	0.782 in	r_o =	1.290 in	H =	0.744
S_x =	0.762 in^3	Z_x =	1.380 in^3	I_y =	1.349 in^4
J =	0.046 in^4				

Nominal Axial Compressive Strength, Limit State of Flexural Buckling, Chapter E

K·L/r = 61 Slender Element? No Therefore use Chapter E3.

$K \cdot L/r \le 4.71\sqrt{(E/Fy)}$ = 75 $F_e = \pi^2 E/(K \cdot L/r)^2$ = 28.26 ksi

Therefore, F_{cr} = [0.658^(Fy/Fe)]Fy *(E3-2)*
= 22.55 ksi

$P_n = F_{cr} \cdot A_g$ = 22.55 x 2.14 = 48.25 kips
= 48,247 lbs

Limit State of Flexural-Torsional and Torsional Buckling, Chapter E4

$F_{crz} = GJ/A_g r_o^2$ = 51.19 ksi *(E4-3)*
$F_{cry} = F_{cr,FB}$ = 22.55 ksi *(E3-2)*

$F_{cr} = ((F_{cry} + F_{crz}) / 2H) \cdot [1 - \sqrt{(1 - (4F_{cry}F_{crz}H) / (F_{cry} + F_{crz})^2)}]$
= 19.48 ksi *(E4-2)*

$P_n = F_{cr} \cdot A_g$ = 19.48 x 2.14 = 41.69 kips
= 41,690 lbs

P_n = 41,690 lbs *Lowest value obtained through limit states.

US Army Corps of Engineers
Louisville District

Subject: Paducah Lange Certification
Near Locust St
Station 41+50 B-1

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Nominal Flexural Strength, Chapter F9

Yielding, F9.1

$M_n = M_p =$ $F_yZ_x \leq$ $1.6M_y$ *(F9-1 and F9-2)* Due to stem in tension

$F_yZ_x =$ 57.96 kip-in $1.6M_y =$ 51.21 kip-in

Therefore: $M_{n,Y} =$ 51.21 kip-in = 4,267 lb-ft

Lateral-Torsional Buckling, F9.2

$M_n = M_{cr} = [\pi\sqrt{(EI_yGJ)}/L_b] \cdot [B+\sqrt{(1+B^2)}]$ (B positive for tension) *(F9-4)*

$B = 2.3(d/L_b)\sqrt{(I_y/J)} =$ 0.657 *(F9-5)*

= 197.67 kip-in = 16,472 lb-ft

Flange Local Buckling, F9.3

$M_n = F_{cr}S_{xc}$ *(F9-6)*

Compact section? Yes Therefore flange buckling does not apply

$M_n =$ 4,267 lb-ft *Lowest value obtained through limit states.

Design of Members for Combined Forces and Torsion, Chapter H

$P_c = \varphi_cP_n =$ 0.9 x 41690 = 37,521 lbs

$M_c = \varphi_bM_n =$ 0.9 x 4267 = 3,840 lb-ft

$P_r/P_c =$ -0.001 < 0.2, Therefore use Equation (H1-1b)

Pr/2Pc + Mr/Mc ≤ 1.0

-0.003 ≤ 1.0 Therefore OK.

Member DG is ADEQUATE according to AISC Steel Construction Manual, 13th Edition.

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Near Levee St
Station 4+50 Rt

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Purlin Design
Data

A =	W8X15	L =	8.167 ft	Note: Structure is designed for design flood loads, where Purlin D should not experience load. An analysis of Purlin D should be performed if this is not the case.	
I =	W8X15	L_b =	8.167 ft		
C =	W8X15	F_y =	60 ksi		
		E =	29,000 ksi		
		G =	11,200 ksi		

$M_{max} = (wL^2/8)$

w_A =	177.7 lb/ft	w_I =	1,266.7 lb/ft	w_C =	-56.4 lb/ft
M_A =	1,481.5 lb-ft	M_I =	10,560.3 lb-ft	M_C =	-470.2 lb-ft

Purlin A, Steel Design

Steel Design, Steel Construction Manual, AISC 13th Edition

M_r =	1,481 lb-ft	L =	98 in	L_b =	98 in
d =	8.11 in	$b_f/2t_f$ =	6.37	S_x =	11.8 in^3
Z_x =	13.6 in^3	I_y =	3.41 in^4	J =	0.137 in^4
r_y =	0.876 in	C_w =	51.8 in^6	h_o =	7.795 in
r^2_{ts} =	$\sqrt{(I_y*C_w)/S_x}$ =	1.126 in^2	*(F2-7)*		

Nominal Flexural Strength

Yielding, F2.1

Mn = Mp = FyZx = 816.00 kip-in
Mn,y = 816.00 kip-in = 68,000 lb-ft

Lateral-Torsional Buckling, F2.2

$L_p = 1.76 r_y \sqrt{(E/F_y)} =$ 33.90 in *(F2-5)*

$L_r = 1.95 r_{ts} \cdot (E/0.7F_y) \sqrt{(Jc/S_x h_o)} \sqrt{(1+\sqrt{(1+6.76 \cdot ((0.7F_y/E) \cdot (S_x h_o/Jc))^2)})}$

= 106.35 in *(F2-6)*

Lp < Lb ≤ Lr

$Mn = Cb [Mp - (Mp - 0.7FySx) \times (Lb - Lp) / (Lr - Lp)] \leq Mp$

M_n = 532.51 kip-in

$F_{cr} = C_b \pi^2 E/(L_b/r_{ts})^2 \cdot \sqrt{(1 + 0.078 \cdot (Jc/S_x h_o)*(L_b/r_{ts})^2)}$

= 47.36 ksi

$M_{n,LTB}$ = 532.51 kip-in = 44,375.81 lb-ft

Compression Flange Local Buckling Does not Apply

M_n = 44,376 lb-ft *Lowest value obtained through limit states.

φM_n = 0.9 x 44376 = 39,938 lb-ft > Mr = 1481 lb-ft, Therefore OK.

US Army Corps of Engineers
Louisville District

Subject: Pedestrian Lateral Certification
Near Levee St
Station 4+50 B-1

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Purlin I, Steel Design

Steel Design, Steel Construction Manual, AISC 13th Edition

M_r =	10,560 lb-ft	L =	98 in	L_b =	98 in
d =	8.11 in	$b_f/2t_f$ =	6.37	S_x =	11.8 in^3
Z_x =	13.6 in^3	I_y =	3.41 in^4	J =	0.137 in^4
r_y =	0.876 in	C_w =	51.8 in^6	h_o =	7.795 in
r^2_{ts} =	$\sqrt{(I_y * C_w)/S_x}$ =	1.126 in^2	*(F2-7)*		

Nominal Flexural Strength

Yielding, F2.1

Mn = Mp = FyZx = 816.00 kip-in

Mn,y = 816.00 kip-in = 68,000 lb-ft

Lateral-Torsional Buckling, F2.2

$L_p = 1.76 r_y \sqrt{(E/F_y)}$ = 33.895 in *(F2-5)*

$L_r = 1.95 r_{ts} \cdot (E/0.7F_y) \sqrt{(Jc/S_x h_o)} \sqrt{(1+\sqrt{(1+6.76 \cdot ((0.7F_y/E) \cdot (S_x h_o/Jc))^2)})}$

= 106.35 in *(F2-6)*

Lp < Lb ≤ Lr

Mn = Cb [Mp - (Mp - 0.7FySx) x (Lb - Lp) / (Lr - Lp)] ≤ Mp

M_n = 532.51 kip-in

$F_{cr} = C_b \pi^2 E/(L_b/r_{ts})^2 \cdot \sqrt{(1 + 0.078 \cdot (Jc/S_x h_o) * (L_b/r_{ts})^2)}$

= 47.36 ksi

$M_{n,LTB}$ = 532.51 kip-in = 44,376 lb-ft

Compression Flange Local Buckling Does not Apply

M_n = 44,376 lb-ft *Lowest value obtained through limit states.

φM_n = 0.9 x 44376 = 39,938 lb-ft > Mr = 10560 lb-ft, Therefore OK.

US Army Corps of Engineers
Louisville District

Subject: Paducah Levee Certification
Near Levee #3
Station 4+50 E-1

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Purlin C, Steel Design

Steel Design, Steel Construction Manual, AISC 13th Edition

M_r = (470) lb-ft L = 98 in L_b = 98 in
d = 8.11 in $b_f/2t_f$ = 6.37 S_x = 11.8 in^3
Z_x = 13.6 in^3 I_y = 3.41 in^4 J = 0.137 in^4
r_y = 0.876 in C_w = 51.8 in^6 h_o = 7.795 in
r^2_{ts} = $\sqrt{(I_y*C_w)/S_x}$ = 1.126 in^2 *(F2-7)*

Nominal Flexural Strength

Yielding, F2.1

Mn = Mp = FyZx = 816.00 kip-in
Mn,y = 816.00 kip-in = 68,000 lb-ft

Lateral-Torsional Buckling, F2.2

$L_p = 1.76 r_y \sqrt{(E/F_y)}$ = 33.895 in *(F2-5)*

$L_r = 1.95 r_{ts} \cdot (E/0.7F_y) \sqrt{(Jc/S_x h_o) \sqrt{(1+\sqrt{(1+6.76 \cdot ((0.7F_y/E) \cdot (S_x h_o/Jc))^2)}}}$
= 106.35 in *(F2-6)*

Lp < Lb ≤ Lr

Mn = Cb [Mp - (Mp - 0.7FySx) x (Lb - Lp) / (Lr - Lp)] ≤ Mp
M_n = 532.51 kip-in

$F_{cr} = C_b \pi^2 E/(L_b/r_{ts})^2 \cdot \sqrt{(1 + 0.078 \cdot (Jc/S_x h_o)*(L_b/r_{ts})^2)}$
= 47.36 ksi

$M_{n,LTB}$ = 532.51 kip-in = 44,376 lb-ft

Compression Flange Local Buckling Does not Apply

M_n = 44,376 lb-ft *Lowest value obtained through limit states.
φM_n = 0.9 x 44376 = 39,938 lb-ft > Mr = -470 lb-ft, Therefore OK.

Skin Plate *EM 1110-2-2705*

t = 0.1345 in L = 1.000 ft* F_y = 30 ksi
E = 10000 ksi *Spacing of extrusions

Notes: *Material used is designated as 10 gage corr. sheet, closest match to today's standards is A570*

p = 62.4 x flood height = 62.4 pcf x 6.6 ft = 411.84 psf
p = 0.00286 ksi L = 12.00 in

$M = pL^2/12$ = 0.0343 k-in
F_b = (5/6) x 0.75 x F_y = 18.75 ksi *Case I1, Design Flood Loading*

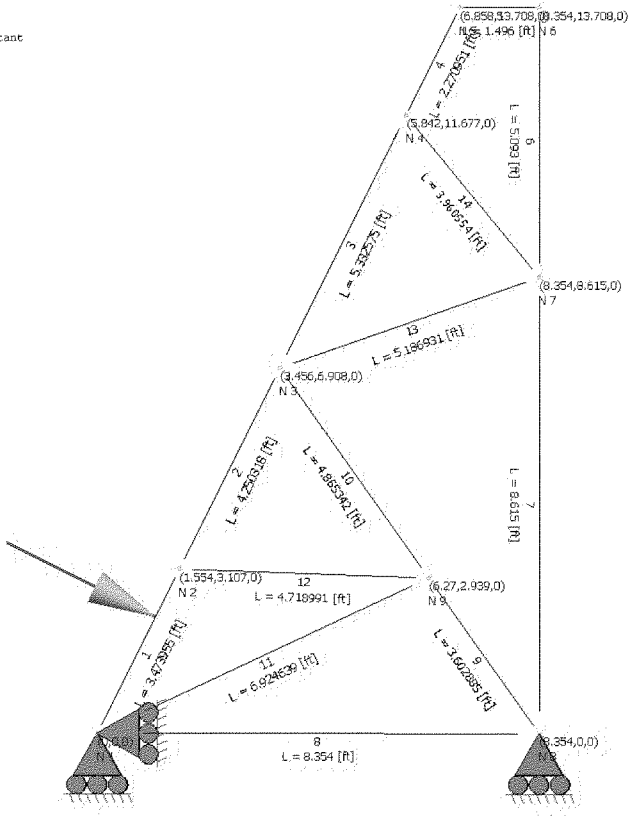
$t_{min\ for\ stress} = \sqrt{(6M / F_b)}$ = $\sqrt{(6 \cdot 0.0343 / 18.8)}$ = 0.1048 in
$t_{min\ for\ defl} = (pL^4 / 12.8E)^{0.25}$ = (0.00286 · 12^4 / 12.8 · 10000)^0.25
= 0.1467 in

t_{min} = 0.1467 **in > t = 0.1345 in, therefore skin plate is NOT GOOD.**

Stations 93+57, 94+64, 114+99, 119 +63, 123+80, 128+20, 132+41, 135+23, 138+23, 145+74, 149+87, 161+53.

Magnitude and position of resultant hydrostatic load vary with sill elevation.

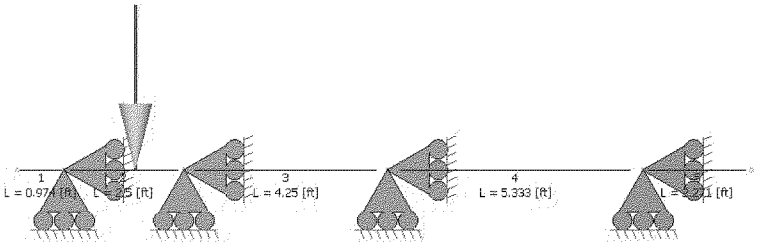
See 935-12.2/102.

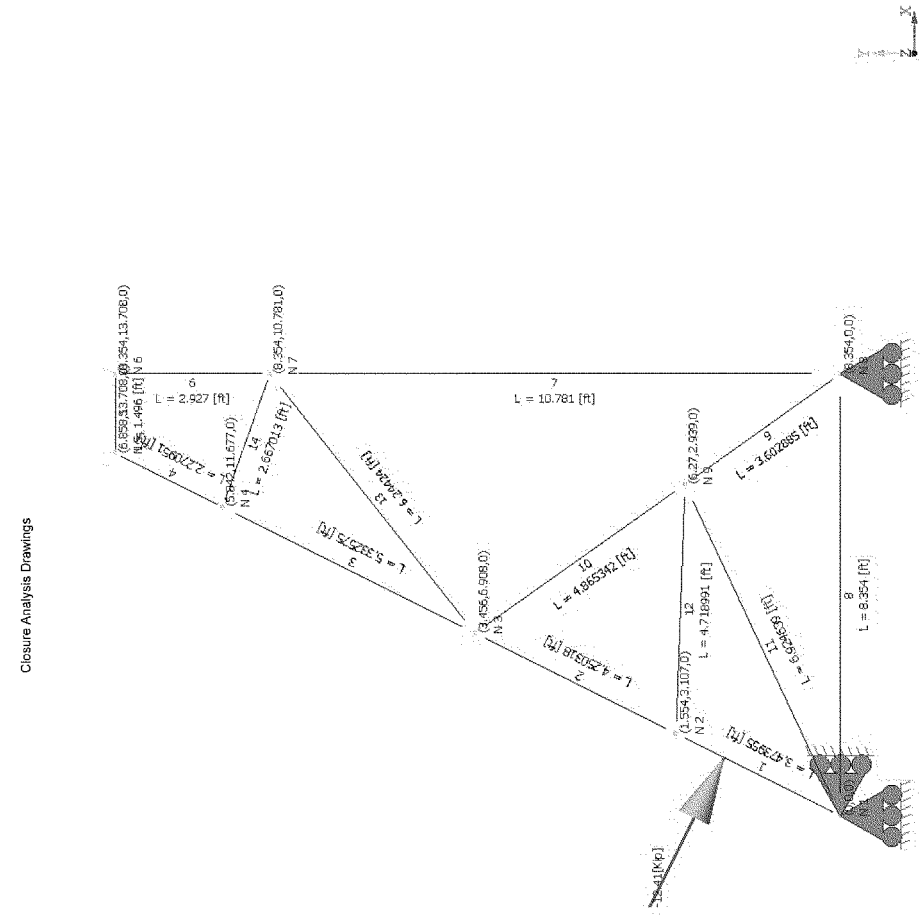


Stations 93+57, 94+64, 114+99, 119+63, 123+80, 128+20, 132+41, 135+23, 138+23, 145+74, 149+87, 161+53.

Magnitude and position of resultant hydrostatic load vary with sill elevation; nodes 2 - 5 represent purlins.

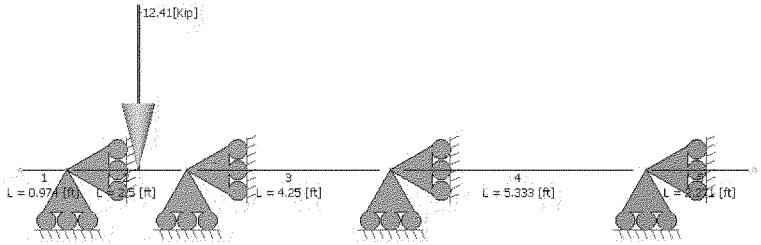
See 935-12.2/102.




Paducah Levee Certification
Closure Analysis Drawings
Stations 98+89 & 108+53.
See 935-12.2/102.
(6,659,33,708,0)
N 6
(8,354,13,708,0)
N 7
(8,354,0,0)
N 8
(6,27,2,939,0)
N 9
(3,456,6,908,0)
N 3
(1,554,3,107,0)
N 2
(0,0,0)
N 1
L = 1,496 [ft]
L = 2.927 [ft]
L = 10.781 [ft]
L = 11.677,0)
L = 2.667013 [ft]
L = 2.270951 [ft]
L = 5.335675 [ft]
L = 5.44428 [ft]
L = 4.865342 [ft]
L = 4.253518 [ft]
L = 4.718991 [ft]
L = 6.624639 [ft]
L = 3.473955 [ft]
L = 3.602885 [ft]
L = 8.354 [ft]
1544 [lb]
7/9/09
3 of 20

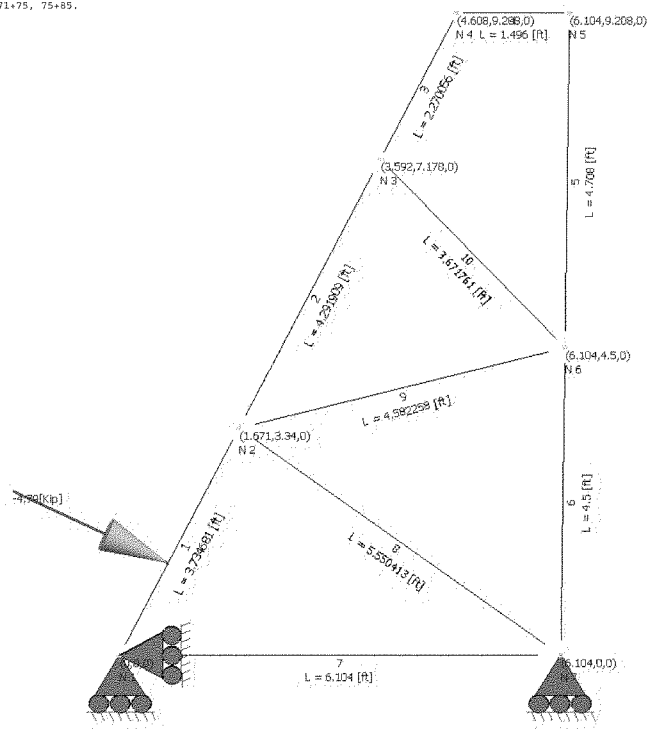
Stations 98+89 & 108+53.
Nodes 2 - 5 represent
purlins.

See 935-12.2/102.



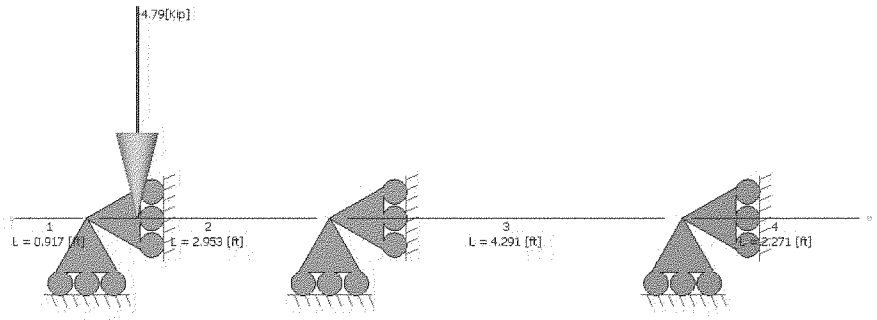
Stations 31+51, 62+84, 71+75, 75+85.

See 935-12.2/103.



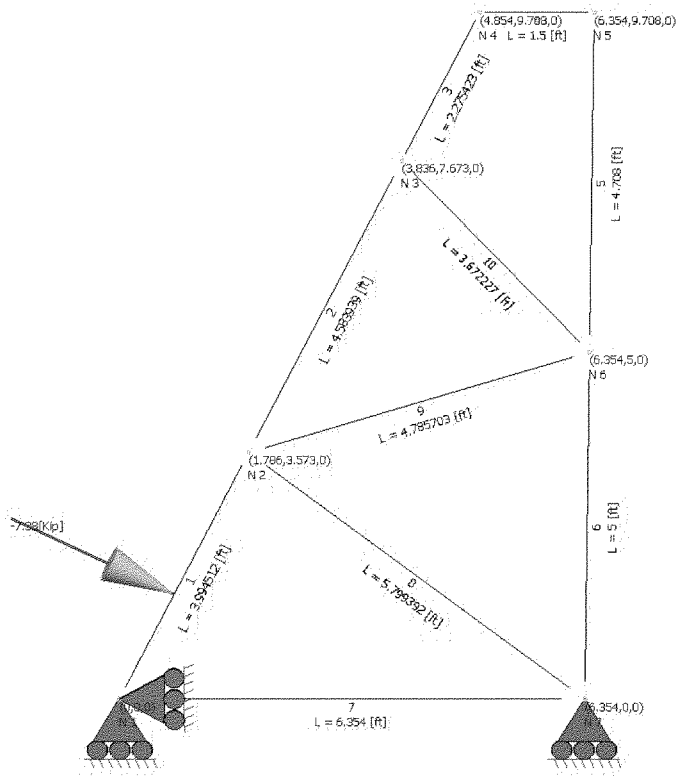
Stations 31+51, 62+84, 71+75, 75+85. Nodes 2 - 4 represent purlins.

See 935-12.2/103.



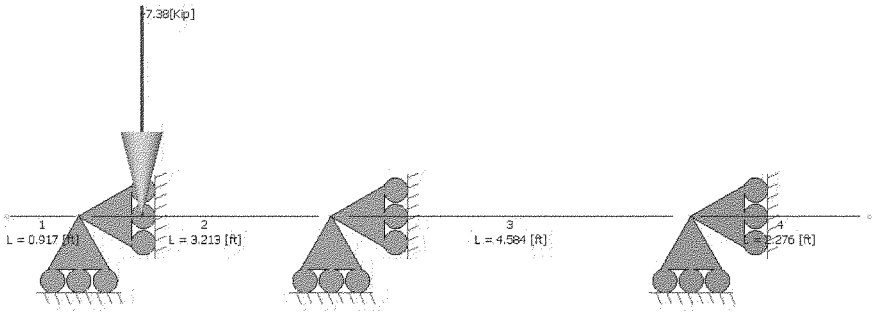
Station 26+90.

See 935-12.2/103.



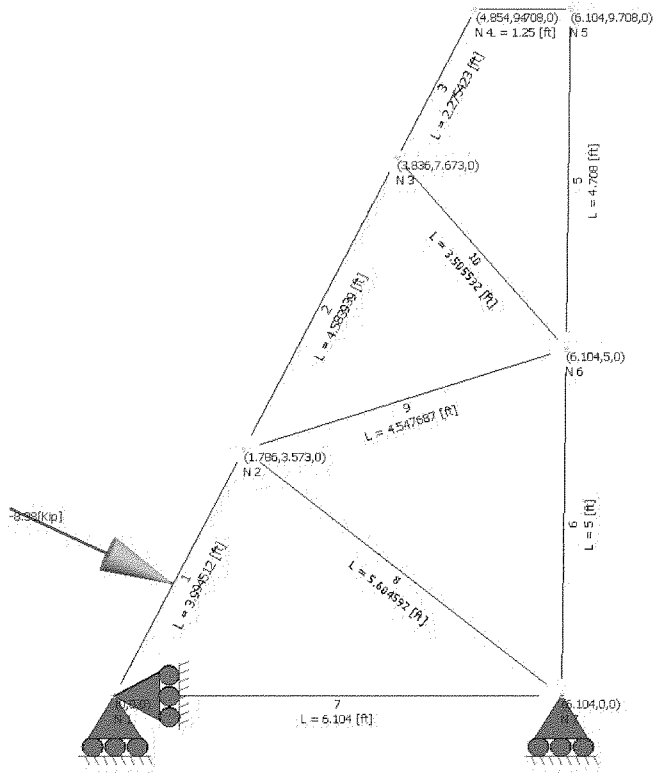
Station 26+90. Nodes 2 - 4 represent purlins.

See 935-12.2/103.



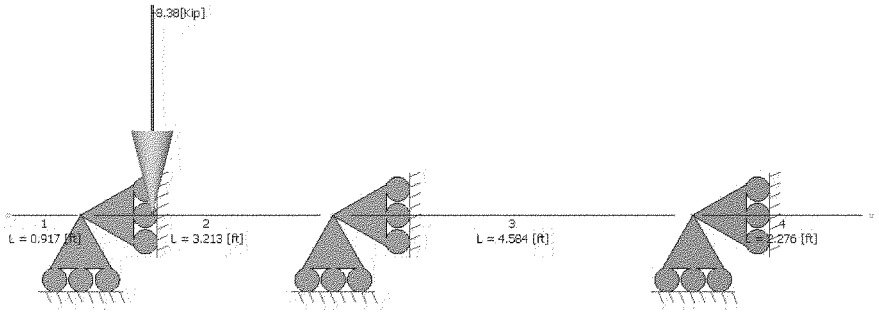
Station 106+10.

See 935-12.2/103.



Station 106+10. Nodes 2 - 4
represent purlins.

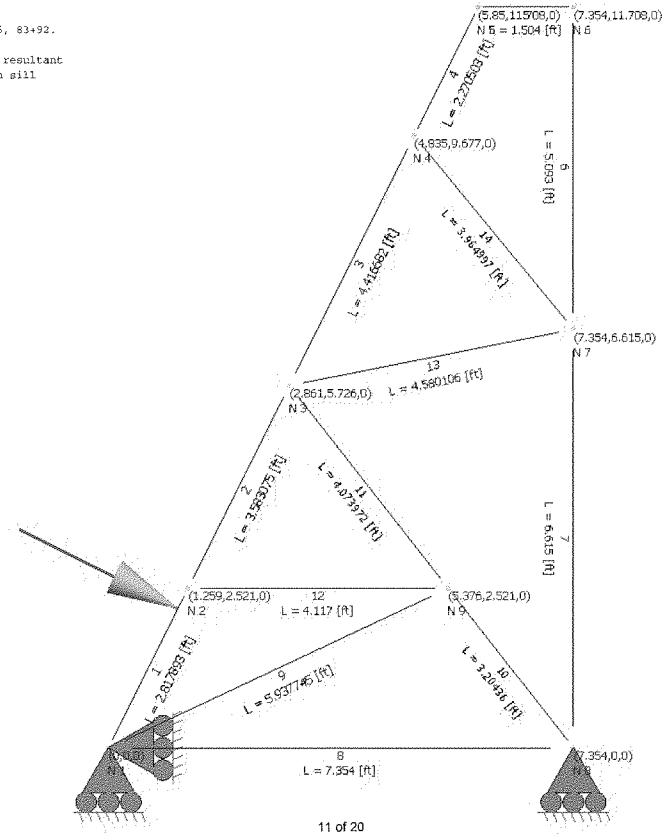
See 935-12.2/103.



Stations 4+50, 5+35, 25+15, 83+92.

Magnitude and position of resultant hydrostatic load vary with sill elevation.

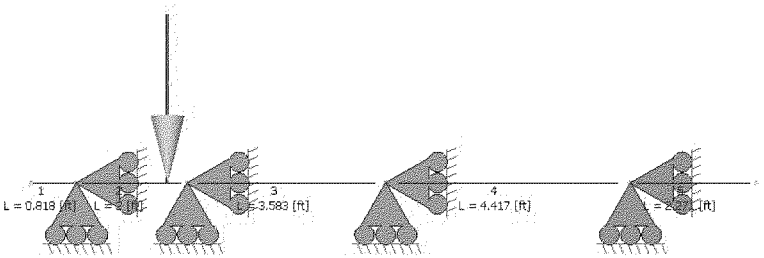
See 935-12.2/104.



Stations 4+50, 5+35, 25+15, 83+92.

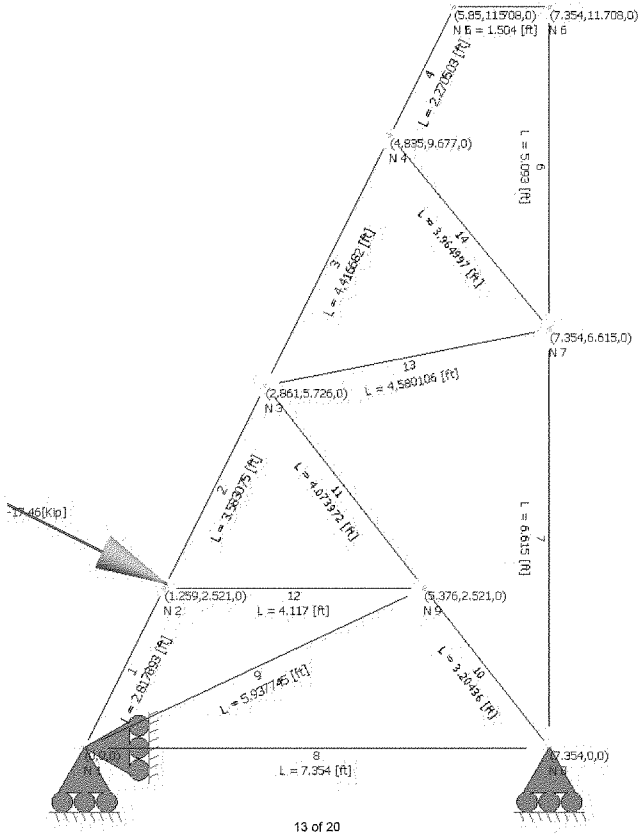
Magnitude and position of resultant hydrostatic load vary with sill elevation; nodes 2 - 5 represent purlins.

See 935-12.2/104.



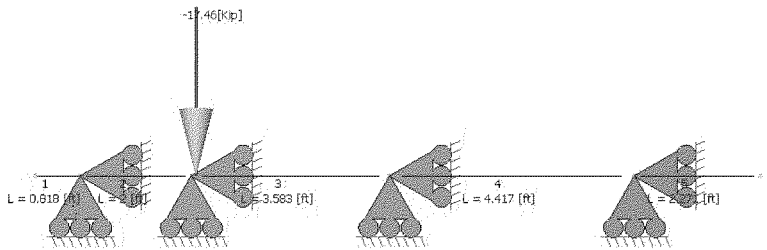
Station 157+26.

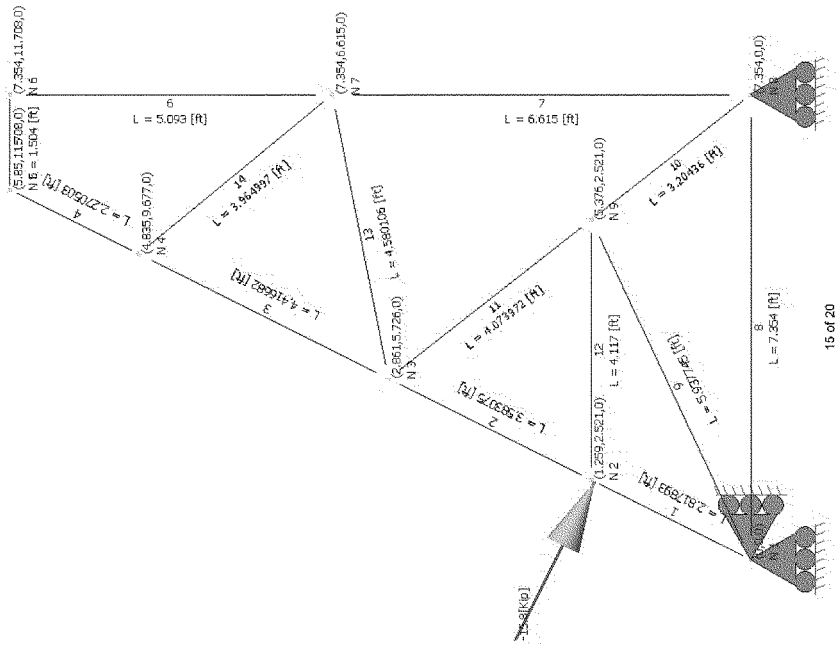
See 935-12.2/104.



Station 157+26. Nodes 2 - 5
represent purlins.

See 935-12.2/104.





Paducah Levee Certification

Closure Analysis Drawings

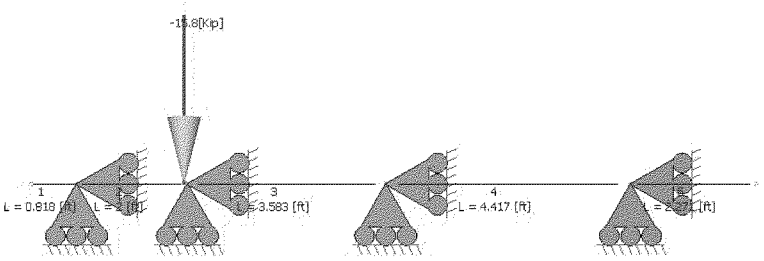
Station 170+04.

See 935-12.2/104.

7/9/09

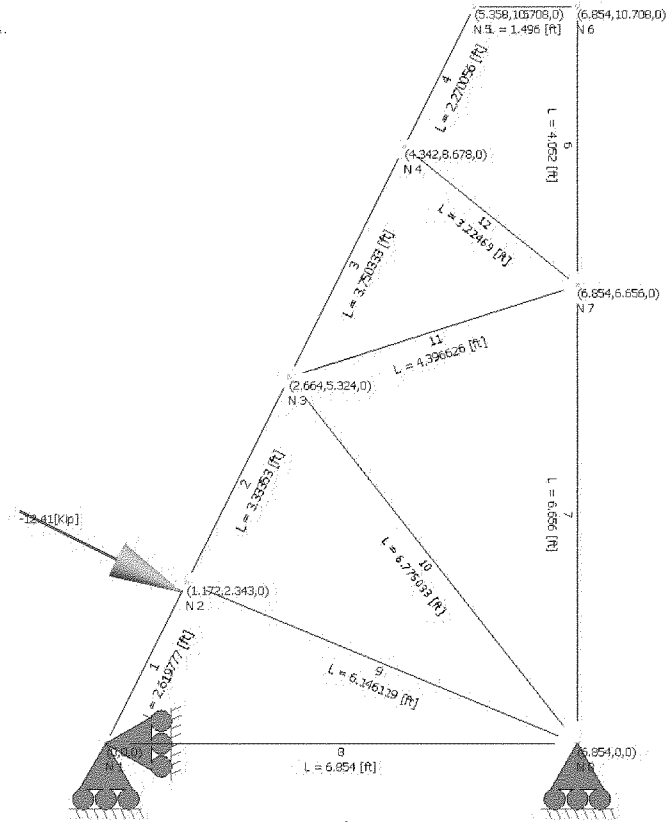
Station 170+04. Nodes 2 - 5
represent purlins.

See 935-12.2/104.



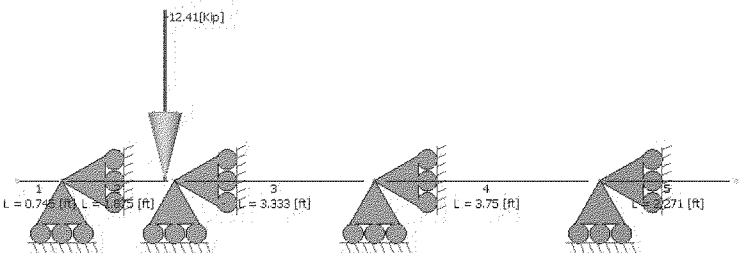
Stations 90+41 & 103+64.

See 935-12.2/105.



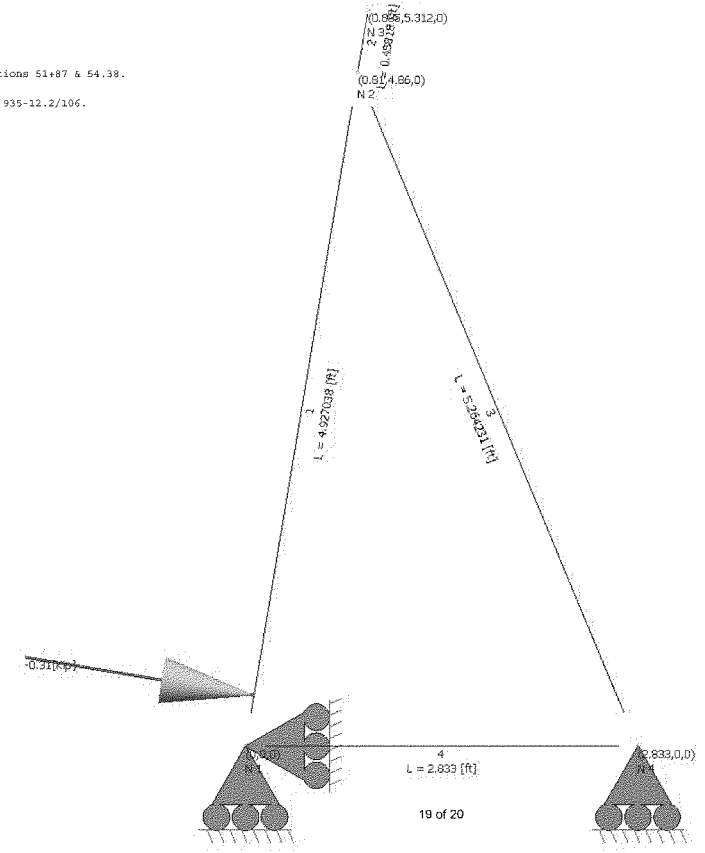
Stations 90+41 & 103+64. Modes 2 - 5 represent purlins.

See 935-12.2/105.



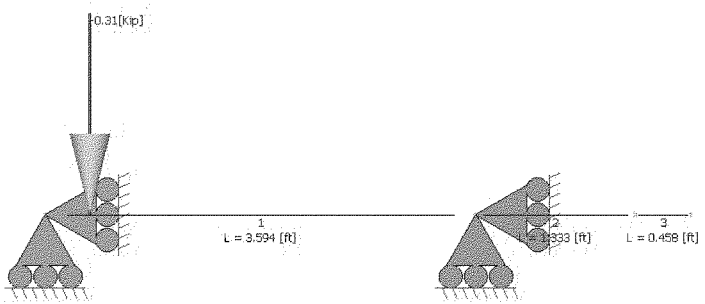
Stations 51+87 & 54.38.

See 935-12.2/106.



Stations 51+87 & 54.38.
Nodes 1 & 2 represent
purlins.

See 935-12.2/106.



Lwall0+7.7

********** Echoprint of Input Data **********

Date: 2009/11/16 Time: 11.17.29

Structural geometry data:

Elevation of top of stem (ELTS)	=	351.00 ft
Height of stem (HTS)	=	11.00 ft
Thickness top of stem (TTS)	=	1.25 ft
Thickness bottom of stem (TBS)	=	1.25 ft
Dist. of batter at bot. of stem (TBSR)	=	0.00 ft
Depth of heel (THEEL)	=	6.00 ft
Distance of batter for heel (BTRH)	=	0.00 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	0.00 ft
Distance of batter for toe (BTRT)	=	0.00 ft
Width of base (BWIDTH)	=	15.00 ft
Depth of key (HK)	=	4.50 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.50 ft

Structure coordinates:

x (ft)	y (ft)
0.00	334.00
0.00	340.00
13.75	340.00
13.75	351.00
15.00	351.00
15.00	338.50
3.00	338.50
1.50	334.00

NOTE: X=0 is located at the left-hand side
of the structure. The Y values correspond
to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
26.00	0.000	0.125	0.125	17.33	342.00

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

Driving side soil profile:

Lwall0+7.7

Soil point	x (ft)	y (ft)
1	-1486.25	342.00
2	13.75	342.00

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
30.00	0.000	0.120	0.125	342.00	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	15.00	342.00
2	515.00	342.00

Foundation property data:
  phi for soil-structure interface = 30.00 (deg)
  c for soil-structure interface = 0.000 (ksf)
  phi for soil-soil interface = 30.00 (deg)
  c for soil-soil interface = 0.000 (ksf)

Water data:
  Driving side elevation = 351.00 ft
  Resisting side elevation = 342.00 ft
  Unit weight of water = 0.0624 kcf
  Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
  Sliding FS = 1.50
  Overturning = 100.00% base in compression

Crack options:
  o Crack depth is to be calculated
  o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

****
* Overturning *
****

*** Not Satisfied ***
Required base in comp. = 100.00 %
Actual base in comp. = 89.05 %
Overturning ratio = 1.77

To increase stability try one or a combination

of the following:
1. Increase the base width
2. Slope the base of the structure
3. Lower the wall base
4. Add/remove key

Xr (measured from toe) = 4.45 ft
Resultant ratio = 0.2968
Stem ratio = 0.0000
Base pressure at x= 13.36 ft from toe = 0.0000 ksf
Base pressure at toe = 1.6928 ksf

********** *** Satisfied ***
* Sliding * Min. Required = 1.50
********** Actual FS = 3.53

********** Output Results **********

Date: 2009/11/16 Time: 11.17.29

****
** Overturning Results **
****

Solution converged in 1 iterations.

SMF used to calculate K's = 0.6667
Alpha for the SMF = -32.2855
Calculated earth pressure coefficients:
Driving side at rest K = 0.3730
Driving side at rest Kc = 0.8510
Resisting side at rest K = 0.5000
Resisting side at rest Kc = 0.7071
At-rest K's for resisting side calculated.

Depth of cracking = 0.00 ft

** Driving side pressures **

Water pressures:

Elevation (ft)	Pressure (ksf)
351.00	0.0000
342.00	0.5616
334.00	0.8954

Earth pressures:

Elevation (ft)	Pressure (ksf)
342.00	0.0000
334.00	0.2485

** Resisting side pressures **

Water pressures:

Elevation (ft)	Pressure (ksf)

Elevation (ft)	Pressure (ksf)
342.00	0.0000
338.50	0.2908
338.50	0.5038
334.00	0.8688

Earth pressures:

Elevation (ft)	Pressure (ksf)
342.00	0.0000
338.50	0.0734

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
338.50	1.2497
334.00	1.2497

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	0.8954
1.50	0.8688
3.00	0.5038
15.00	0.2908

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	6.956		-6.84	-47.61
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	3.438		-8.12	-27.93
Water above structure.....	0.000		0.00	0.00
Water above soil.....	7.722		-8.12	-62.74
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.994	-1.83	-1.82
Shear (due to delta).....	0.310		-15.00	-4.65
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		8.355	1.40	11.73
Resisting side:				
Effective earth loads.....		-0.128	1.17	-0.15
Balancing earth load.....		-5.624	-2.25	12.65
Water loads.....		-3.597	-1.94	6.97
Foundation:				
Vertical force on base.....	-11.306		-4.45	50.34

```
                                        Lwall0+7.7
  Uplift.....................   -7.120                  -8.88     63.21
================================================================================
** Statics Check **    SUMS =     0.000      0.000                    0.00

Angle of base         =    16.70 degrees
Normal force on base =   12.445 kips
Shear force on base  =    2.138 kips
Max. available shear force =    8.818 kips

Base pressure at x=  13.36 ft from toe =   0.0000 ksf
Base pressure at toe                   =   1.6928 ksf

Xr (measured from toe) =     4.45 ft
Resultant ratio        =   0.2968
Stem ratio             =   0.0000
Base in compression    =    89.05 %
Overturning ratio      =     1.77

Volume of concrete =     1.72 cubic yds/ft of wall

NOTE:  The engineer shall verify that the computed
bearing pressures below the wall do not exceed the
allowable foundation bearing pressure, or, perform a
bearing capacity analysis using the program CBEAR.
Also, the engineer shall verify that the base pressures
do not result in excessive differential settlement of
the wall foundation.



************************
**  Sliding Results  **
************************

Solution converged.  Summation of forces = 0.

          Horizontal   Vertical
  Wedge      Loads       Loads
  Number    (kips)      (kips)
  ==================================
     1       0.000      11.251
     2       2.527       7.722
     3       0.000       0.000

  Water pressures on wedges:

            Top      Bottom
    Wedge   press.   press.   x-coord.    press.
    number  (ksf)    (ksf)     (ft)       (ksf)
  ================================================
      1    0.5616    0.8954
      2                        0.0000     0.8954
      2                       15.0000     0.2908
      3    0.0000    0.2908

Points of sliding plane:
  Point 1 (left),  x =     0.00 ft,   y =   334.00 ft
  Point 2 (right), x =    15.00 ft,   y =   338.50 ft

Depth of cracking =     0.00 ft

          Failure   Total    Weight    Submerged   Uplift
```

Wedge number	angle (deg)	length (ft)	of wedge (kips)	Lwall0+7.7 length (ft)	force (kips)
1	-21.768	21.572	10.017	21.572	15.715
2	16.699	15.660	13.347	15.660	9.288
3	40.387	5.402	0.900	5.402	0.785

Wedge number	Net force (kips)
1	-6.943
2	6.078
3	0.865
SUM =	0.000

Factor of safety =	3.526

****
** Bearing Results **
****

Base width =	15.660 (ft)
Xr =	4.453 (ft)
Effective base width = (measured along slope)	9.298 (ft)
Base slope =	16.6992 (deg)
Phi =	30.000 (deg)
C =	0.000 (ksf)
Effective Gamma =	0.0626 (kcf)
Normal load =	12.445 (kips)
Load inclination =	9.747 (deg)
Load eccentricity =	3.181 (ft)
Surcharge =	0.2191 (kips)
Embedment =	3.500 (ft)
Ground slope =	0.0000 (deg)

Bearing Capacity Factors

	C	Q	G
Bearing	30.1396	18.4011	15.6680
Embedment	1.1304	1.0652	1.0652
Inclination	0.7951	0.7951	0.4558
Base Tilt	0.6741	0.6918	0.6918
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 3.7652 (ksf)

Factor of safety =	2.813

Lwall27+01.8

********** Echoprint of Input Data **********

Date: 2009/11/16 Time: 11.19.07

Structural geometry data:

Elevation of top of stem (ELTS)	=	351.00 ft
Height of stem (HTS)	=	12.00 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	1.95 ft
Dist. of batter at bot. of stem (TBSR)	=	0.00 ft
Depth of heel (THEEL)	=	6.67 ft
Distance of batter for heel (BTRH)	=	0.00 ft
Depth of toe (TTOE)	=	2.00 ft
Width of toe (TWIDTH)	=	0.00 ft
Distance of batter for toe (BTRT)	=	0.00 ft
Width of base (BWIDTH)	=	17.00 ft
Depth of key (HK)	=	4.67 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.17 ft

Structure coordinates:

x (ft)	y (ft)
0.00	332.33
0.00	339.00
15.05	339.00
15.50	351.00
17.00	351.00
17.00	337.00
2.67	337.00
1.50	332.33

NOTE: X=0 is located at the left-hand side
of the structure. The Y values correspond
to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
27.00	0.285	0.127	0.127	18.00	339.91

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

Driving side soil profile:

Lwall27+01.8

Soil point	x (ft)	y (ft)
1	-1484.92	339.91
2	15.08	339.91

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
27.00	0.285	0.127	0.127	339.91	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	17.00	339.91
2	517.00	339.91

Foundation property data:
  phi for soil-structure interface = 27.00 (deg)
  c for soil-structure interface = 0.000 (ksf)
  phi for soil-soil interface = 27.00 (deg)
  c for soil-soil interface = 0.285 (ksf)

Water data:
  Driving side elevation = 351.00 ft
  Resisting side elevation = 339.91 ft
  Unit weight of water = 0.0624 kcf
  Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
  Sliding FS = 1.50
  Overturning = 100.00% base in compression

Crack options:
  o Crack *is* down to bottom of heel
  o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

****
* Overturning *
****

*** Not Satisfied ***
Required base in comp. = 100.00 %
Actual base in comp. = 69.95 %
Overturning ratio = 1.56

To increase stability try one or a combination

of the following:
1. Increase the base width
2. Slope the base of the structure
3. Lower the wall base
4. Add/remove key

Xr (measured from toe) = 3.96 ft
Resultant ratio = 0.2332
Stem ratio = 0.0000
Base pressure at x= 11.89 ft from toe = 0.0000 ksf
Base pressure at toe = 2.2066 ksf

********** *** Satisfied ***
* Sliding * Min. Required = 1.50
********** Actual FS = 4.62

********** Output Results **********

Date: 2009/11/16 Time: 11.19.07

****
** Overturning Results **
****

Solution converged in 1 iterations.

SMF used to calculate K's = 0.6667
Alpha for the SMF = -48.5902
Calculated earth pressure coefficients:
Driving side at rest K = 0.4263
Driving side at rest Kc = 0.6134
Resisting side at rest K = 0.5460
Resisting side at rest Kc = 0.7389
At-rest K's for resisting side calculated.

Depth of cracking = 4.31 ft
Crack extends to bottom of base of structure.

** Driving side pressures **

Water pressures:

Elevation (ft)	Pressure (ksf)
351.00	0.0000
335.60	0.9607
332.33	1.0699

Earth pressures:

Elevation (ft)	Pressure (ksf)
339.91	0.0000
335.60	0.0000
332.33	0.0695

** Resisting side pressures **

Water pressures:

Lwall27+01.8

Elevation (ft)	Pressure (ksf)
339.91	0.0000
337.00	0.2661
337.00	0.6218
332.33	1.0699

Earth pressures:

Elevation (ft)	Pressure (ksf)
339.91	0.0000
337.00	0.0565

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
337.00	1.3735
332.33	1.3735

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.0699
1.50	1.0326
2.67	0.6218
17.00	0.2661

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	9.666		-7.17	-69.31
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	1.741		-9.47	-16.48
Water above structure.....	0.000		0.00	0.00
Water above soil.....	10.582		-9.35	-98.98
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.114	-3.58	-0.41
Shear (due to delta).....	0.037		-17.00	-0.63
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		10.720	1.63	17.46
Resisting side:				
Effective earth loads.....		-0.082	0.97	-0.08
Balancing earth load.....		-6.414	-2.34	14.98
Water loads.....		-4.337	-2.23	9.67

Lwall27+01.8

```
Foundation:
  Vertical force on base.....  -13.120                -3.96      52.00
  Uplift.....                   -8.907               -10.30      91.78
================================================================================
** Statics Check **   SUMS =     0.000      0.000                  0.00

Angle of base        =    15.36 degrees
Normal force on base =   14.350 kips
Shear force on base  =    2.710 kips
Max. available shear force =   14.206 kips

Base pressure at x=  11.89 ft from toe =   0.0000 ksf
Base pressure at toe                   =   2.2066 ksf

Xr (measured from toe) =     3.96 ft
Resultant ratio        =   0.2332
Stem ratio             =   0.0000
Base in compression    =    69.95 %
Overturning ratio      =     1.56

Volume of concrete =     2.39 cubic yds/ft of wall

NOTE:  The engineer shall verify that the computed
bearing pressures below the wall do not exceed the
allowable foundation bearing pressure, or, perform a
bearing capacity analysis using the program CBEAR.
Also, the engineer shall verify that the base pressures
do not result in excessive differential settlement of
the wall foundation.



**********************
**  Sliding Results  **
**********************

Solution converged.  Summation of forces = 0.

          Horizontal   Vertical
  Wedge      Loads       Loads
  Number    (kips)      (kips)
  ==================================
     1       0.000       0.000
     2      10.875      10.582
     3       0.000       0.000

  Water pressures on wedges:

            Top      Bottom
    Wedge   press.   press.   x-coord.    press.
    number  (ksf)    (ksf)     (ft)       (ksf)
  ================================================
      1    0.0000    0.0000
      2                         0.0000     1.1650
      2                        17.0000     0.2796
      3    0.0000    0.2796

Points of sliding plane:
  Point 1 (left),  x =     0.00 ft,   y =   332.33 ft
  Point 2 (right), x =    17.00 ft,   y =   337.00 ft

Depth of cracking =     7.58 ft
```

Lwall27+01.8

Crack extends to bottom of base of structure.

Wedge number	Failure angle (deg)	Total length (ft)	Weight of wedge (kips)	Submerged length (ft)	Uplift force (kips)
1	0.000	0.000	0.000	0.000	0.000
2	15.361	17.630	15.212	17.630	12.734
3	42.015	4.348	0.597	4.348	0.608

Wedge number	Net force (kips)
1	0.000
2	-0.971
3	0.971
SUM =	0.000

+----------------------------+
| Factor of safety = 4.616 |
+----------------------------+

****
** Bearing Results **
****

Base width =	17.630 (ft)
Xr =	3.964 (ft)
Effective base width = (measured along slope)	8.221 (ft)
Base slope =	15.3606 (deg)
Phi =	27.000 (deg)
C =	0.000 (ksf)
Effective Gamma =	0.0646 (kcf)
Normal load =	14.350 (kips)
Load inclination =	10.693 (deg)
Load eccentricity =	4.704 (ft)
Surcharge =	0.1880 (kips)
Embedment =	2.910 (ft)
Ground slope =	0.0000 (deg)

Bearing Capacity Factors

	C	Q	G
Bearing	23.9422	13.1992	9.4626
Embedment	1.1155	1.0578	1.0578
Inclination	0.7765	0.7765	0.3648
Base Tilt	0.7246	0.7455	0.7455
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 2.1269 (ksf)

+------------------------------+
| Factor of safety = 1.219 |

Lwall82+18.87

********** Echoprint of Input Data **********

Date: 2009/11/16 Time: 11.19.40

Structural geometry data:

Elevation of top of stem (ELTS)	=	351.00 ft
Height of stem (HTS)	=	12.00 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	1.97 ft
Dist. of batter at bot. of stem (TBSR)	=	0.00 ft
Depth of heel (THEEL)	=	6.67 ft
Distance of batter for heel (BTRH)	=	0.00 ft
Depth of toe (TTOE)	=	2.00 ft
Width of toe (TWIDTH)	=	0.00 ft
Distance of batter for toe (BTRT)	=	0.00 ft
Width of base (BWIDTH)	=	17.00 ft
Depth of key (HK)	=	4.67 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.17 ft

Structure coordinates:

x (ft)	y (ft)
0.00	332.33
0.00	339.00
15.03	339.00
15.50	351.00
17.00	351.00
17.00	337.00
2.67	337.00
1.50	332.33

NOTE: X=0 is located at the left-hand side
of the structure. The Y values correspond
to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
28.00	0.225	0.130	0.130	18.67	340.64

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

Driving side soil profile:

Lwall82+18.87

Soil point	x (ft)	y (ft)
1	-1484.91	340.64
2	15.09	340.64

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
28.00	0.225	0.130	0.130	340.64	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	17.00	340.64
2	517.00	340.64

Foundation property data:
- phi for soil-structure interface = 28.00 (deg)
- c for soil-structure interface = 0.000 (ksf)
- phi for soil-soil interface = 28.00 (deg)
- c for soil-soil interface = 0.225 (ksf)

Water data:
- Driving side elevation = 351.00 ft
- Resisting side elevation = 340.64 ft
- Unit weight of water = 0.0624 kcf
- Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
- Sliding FS = 1.50
- Overturning = 100.00% base in compression

Crack options:
- o Crack depth is to be calculated
- o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

**********	*** Not Satisfied ***	
* Overturning *	Required base in comp.	= 100.00 %
**********	Actual base in comp.	= 78.99 %
	Overturning ratio	= 1.64

To increase stability try one or a combination

of the following:
1. Increase the base width
2. Slope the base of the structure
3. Lower the wall base
4. Add/remove key

Xr (measured from toe) = 4.48 ft
Resultant ratio = 0.2633
Stem ratio = 0.0000
Base pressure at x= 13.43 ft from toe = 0.0000 ksf
Base pressure at toe = 2.0430 ksf

********** *** Not Satisfied ***
* Sliding * Min. Required = 1.50
********** Actual FS = -11.20

To increase stability try one or a combination
of the following:
1. Increase the base width
2. Slope the base of the structure
3. Lower the wall base
4. Add a key

********** Output Results **********

Date: 2009/11/16 Time: 11.19.40

****
** Overturning Results **
****

Solution converged in 1 iterations.

SMF used to calculate K's = 0.6667
Alpha for the SMF = -51.9984
Calculated earth pressure coefficients:
Driving side at rest K = 0.4093
Driving side at rest Kc = 0.5835
Resisting side at rest K = 0.5305
Resisting side at rest Kc = 0.7284
At-rest K's for resisting side calculated.

Depth of cracking = 3.29 ft

** Driving side pressures **

Water pressures:

Elevation (ft)	Pressure (ksf)
351.00	0.0000
337.35	0.8517
332.33	1.0416

Earth pressures:

Elevation (ft)	Pressure (ksf)
340.64	0.0000

337.35	0.0000
332.33	0.1386

** Resisting side pressures **

Water pressures:

Elevation (ft)	Pressure (ksf)
340.64	0.0000
337.00	0.3166
337.00	0.6176
332.33	1.0416

Earth pressures:

Elevation (ft)	Pressure (ksf)
340.64	0.0000
337.00	0.0831

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
337.00	1.3516
332.33	1.3516

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.0416
1.50	1.0101
2.67	0.6176
17.00	0.3166

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	9.684		-7.16	-69.34
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	3.211		-9.47	-30.41
Water above structure.....	0.000		0.00	0.00
Water above soil.....	9.889		-9.35	-92.47
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.348	-3.00	-1.04
Shear (due to delta).....	0.118		-17.00	-2.00

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Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		10.565	1.69	17.82
Resisting side:				
Effective earth loads.....		-0.151	1.21	-0.18
Balancing earth load.....		-6.312	-2.33	14.74
Water loads.....		-4.450	-2.05	9.12
Foundation:				
Vertical force on base.....	-13.717		-4.48	61.40
Uplift.....	-9.184		-10.06	92.36
** Statics Check ** SUMS =		0.000	0.000	0.00

Angle of base = 15.36 degrees
Normal force on base = 14.899 kips
Shear force on base = 2.453 kips
Max. available shear force = 13.885 kips

Base pressure at x= 13.43 ft from toe = 0.0000 ksf
Base pressure at toe = 2.0430 ksf

Xr (measured from toe) = 4.48 ft
Resultant ratio = 0.2633
Stem ratio = 0.0000
Base in compression = 78.99 %
Overturning ratio = 1.64

Volume of concrete = 2.39 cubic yds/ft of wall

NOTE: The engineer shall verify that the computed bearing pressures below the wall do not exceed the allowable foundation bearing pressure, or, perform a bearing capacity analysis using the program CBEAR. Also, the engineer shall verify that the base pressures do not result in excessive differential settlement of the wall foundation.

****
** Sliding Results **
****

Factor of safety < 0.2. Last iteration printed.

Wedge Number	Horizontal Loads (kips)	Vertical Loads (kips)
1	-0.479	35.052
2	3.349	9.889
3	0.000	0.000

Water pressures on wedges:

Wedge number	Top press. (ksf)	Bottom press. (ksf)	x-coord. (ft)	press. (ksf)
1	0.6002	1.1650		
2			0.0000	1.1650
2			17.0000	0.3378
3	0.0000	0.3378		

Lwall82+18.87

Points of sliding plane:
  Point 1 (left), x = 0.00 ft, y = 332.33 ft
  Point 2 (right), x = 17.00 ft, y = 337.00 ft

Depth of cracking = -0.74 ft

Wedge number	Failure angle (deg)	Total length (ft)	Weight of wedge (kips)	Submerged length (ft)	Uplift force (kips)
1	-9.477	54.971	26.676	54.971	48.518
2	15.361	17.630	16.789	17.630	13.247
3	81.359	3.682	0.131	3.682	0.622

Wedge number	Net force (kips)
1	-10.844
2	2.917
3	0.426
SUM =	-7.502

+----------------------------+
| Factor of safety = -11.198 |
+----------------------------+

****
** Bearing Results **
****

Base width = 17.630 (ft)
Xr = 4.476 (ft)
Effective base width = 9.284 (ft)
(measured along slope)
Base slope = 15.3606 (deg)

Phi = 28.000 (deg)
C = 0.000 (ksf)
Effective Gamma = 0.0676 (kcf)

Normal load = 14.899 (kips)
Load inclination = 9.349 (deg)
Load eccentricity = 4.173 (ft)

Surcharge = 0.2461 (kips)
Embedment = 3.640 (ft)
Ground slope = 0.0000 (deg)

Bearing Capacity Factors

	C	Q	G
Bearing	25.8033	14.7199	11.1897
Embedment	1.1305	1.0653	1.0653
Inclination	0.8030	0.8030	0.4437
Base Tilt	0.7159	0.7352	0.7352
Ground Slope	1.0000	1.0000	1.0000

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Net ultimate bearing pressure = 3.3435 (ksf)

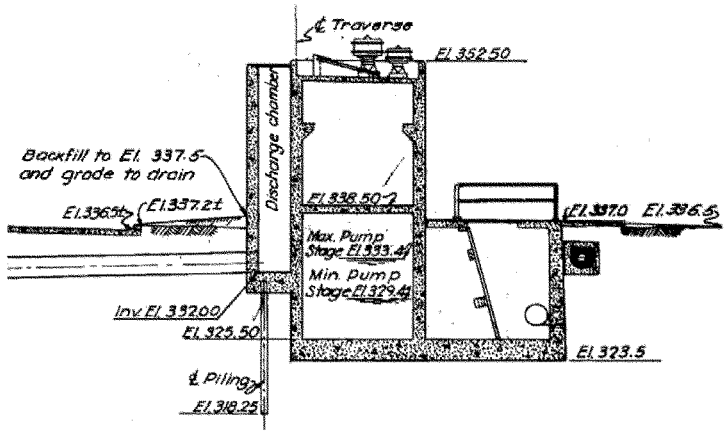
| Factor of safety = 2.083 |

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY LSE
Pump Station #3
Global Stability (Unusual Condition)

Page 1 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

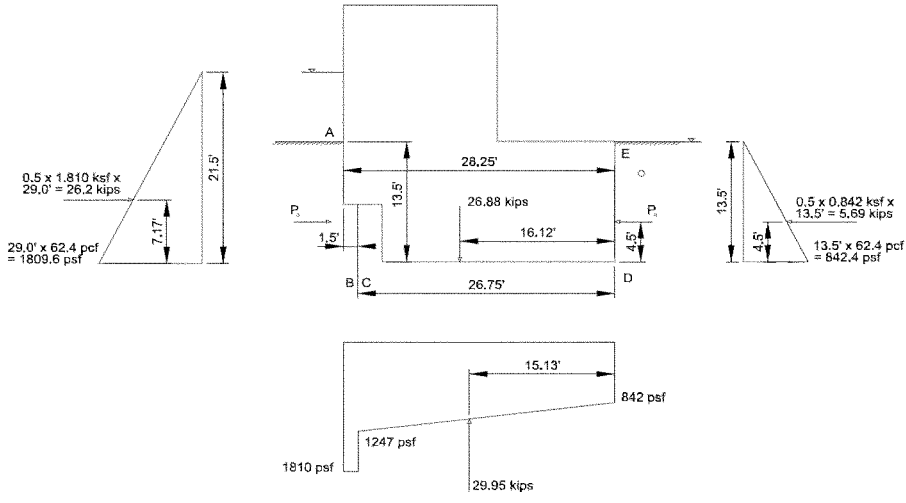
Elevation



Data

Weight =	396000 lbs	φ =	28 °	Min_{Stage} =	2129 lbs/ft
γ_s =	125 pcf	c =	200 psf	Cutoff =	19%
Weight =	24750 lbs/ft				

Analysis



US Army Corps of Engineers
Louisville District

Subject: Paducah, KY LSE
Pump Station #3
Global Stability (Unusual Condition)

Page 2 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Water Pressures

Full-head pressure on headwater side of sheet pile at point B
= (21.5 ft) x (62.4 pcf) = 1341.6 psf
= 1.342 ksf

Pressure at Point D
= (13.5 ft) x (62.4 pcf) = 842.4 psf
= 0.842 ksf

Pressure on tailwater side of sheet pile at point C
= full-head pressure at C - 19% (full-head pressure at C - pressure at D)
= 1.34 - 19% x (1.34 - 0.84) =
1.247 ksf

Uplift = 29.95 kips $\bar{x}$ = 13.12 ft

Horizontal Soil Forces

Resisting $P_P = 0.5 \times K_R \times \gamma \times h^2$ *EM 1110-2-2100, 5-3
K_R = 1.00 *EM 1110-2-2502, 3-10d, N-64
= 11390.63 lb/ft $\bar{x}$ = 4.50 ft

Driving $P_D = 0.5 \times K_D \times \gamma \times h^2$
$K_D = (1-\sin\varphi)$ = 0.53 *EM 1110-2-2502, Eq. 3-4
P_A = 6043.05 lb/ft $\bar{x}$ = 4.50 ft

Overturning Stability (about point D)

*Weight	26.88 kips x 16.12 ft =	433.30 kip-ft	
*Vert. Fric.	6.04 kips x 28.25 ft =	170.72 kip-ft	
*Uplift	-29.95 kips x 15.13 ft =	-453.18 kip-ft	
ΣV =	14.36 kips		
	5.69 kips x 4.5 ft =	25.59 kip-ft	
	-14.42 kips x 7.17 ft =	-103.36 kip-ft	
	-6.04 kips x 4.5 ft =	-27.19 kip-ft	
ΣH =	-3.39 kips	45.86 kip-ft / 14.36 kips =	3.19 ft = x_R

a = $3x_R$ = 9.58 ft > b = 28.25 ft *(Inside middle third, Therefore a = b)*

Percent of base in compression (a/b)*100 = 100.00% > 75%

Therefore criteria is satisfied. Suitable in Overturning.

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Subject: Paducah, KY LSE
Pump Station #3
Global Stability (Unusual Condition)

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Computed by: N. Cash 10-Nov-09
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Sliding Stability

N' = ΣV = 14.36 kips
T = ΣH = 3.39 kips

$FS_s = \frac{N' \tan\phi + cL}{T}$ *Eq. 3-1, EM 1110-2-2100*
**Over 1 foot section*

$FS_s = \frac{14.36 \text{ kips x } \tan(28°) + 0.2 \text{ ksf x } 28.25 \text{ ft}}{3.39 \text{ kips}}$

$FS_s = 3.92$

FSs > 1.5, therefore criteria is satisfied. Suitable in Sliding.

Flotation

$FS_f = \frac{W_S + W_C + S}{U - W_G}$

$FS_f = \frac{24.75 \text{ kips} + 2.13 \text{ kips} + 17.43 \text{ kips}}{29.95 \text{ kips} - 0 \text{ kips}}$

$FS_f = 1.48$

FSf > 1.2, therefore criteria is satisfied. Suitable in Flotation.

Bearing Capacity **From EM 1110-2-2502*

$N_c = 25.80$ $N_q = 14.72$ $N_\gamma = 11.19$ *Tbl. 5-1, φ = 28°*

$\delta = \tan^{-1}\left(\frac{\sum H}{\sum V}\right) = \tan^{-1}(3.39 / 14.36) = 13.28°$

$e = B/2 - x_R = \frac{1}{2} \text{ x } 28.25 \text{ ft} - 3.19 \text{ ft} = 10.93 \text{ ft}$

$\bar{B} = B - 2e = 28.25 \text{ ft} - 2 \text{ x } 10.93 \text{ ft} = 6.39 \text{ ft}$

$\gamma' = \gamma_s - \gamma_w = 125 \text{ pcf} - 62.4 \text{ pcf} = 62.60 \text{ pcf}$

$q_o = \gamma' D = 62.6 \text{ pcf x } 13.5 \text{ ft} = 845.10 \text{ lb/ft}$

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Subject: Paducah, KY LSE
Pump Station #3
Global Stability (Unusual Condition)

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Computed by: N. Cash 10-Nov-09
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Bearing Capacity, continued

ξ_{cd} = 1+ 0.2(D / B) x tan(45° + φ/2) = 1 + 0.2*(13.5 / 6.39) x tan(45° + 28°/2)
= 1.70

$\xi_{qd} = \xi_{\gamma d}$ = 1+ 0.1(D / B) x tan(45° + φ/2) = 1 + 0.1*(13.5 / 6.39) x tan(45° + 28°/2)
1.35

$\xi_{qi} = \xi_{ci}$ = (1 - δ / 90°)^2 = (1 - 13.28° / 90°)² = 0.73

$\xi_{\gamma i}$ = (1 - δ / φ)² = (1 - 13.28° / 28°)² = 0.28

$\xi_{\gamma g} = \xi_{qg}$ = (1 - tan(β))^2 = (1 - tan(0))² = 1.00

ξ_{cg} = ξqg - (1 - ξqg) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$\xi_{qt} = \xi_{\gamma t}$ = (1 - α x tan(φ))^2 = (1 - 0 x tan(28°))² = 1.00

ξ_{ct} = ξqt - (1 - ξqt) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$$Q = \overline{B}\left[\left(\xi_{cd}\xi_{ci}\xi_{ct}\xi_{cg}cN_c\right)+\left(\xi_{qd}\xi_{qi}\xi_{qt}\xi_{qg}q_oN_q\right)+\frac{\left(\xi_{\gamma d}\xi_{\gamma i}\xi_{\gamma t}\xi_{\gamma g}\overline{B}\gamma N_\gamma\right)}{2}\right] =$$

= 6.39 ft x [(1.7 x 0.73 x 1 x 1 x 200 x 25.8) +
(1.35 x 0.73 x 1 x 1 x 845.1 x 14.72) +
½ x (1.35 x 0.28 x 1 x 1 x 6.39 ft x 125 pcf x 11.19)] =

= 129539.37 lbs

FS = 1.15Q / N' = 148.97 kips / 14.36 kips = 10.38 > 3

Therefore criteria is satisfied. Suitable in bearing.

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Louisville District

Subject: Paducah, KY Feasability
Pump Station #3
Global Stability (Extreme Condition)

Page 1 of 4
Computed by: N. Cash 10-Nov-09
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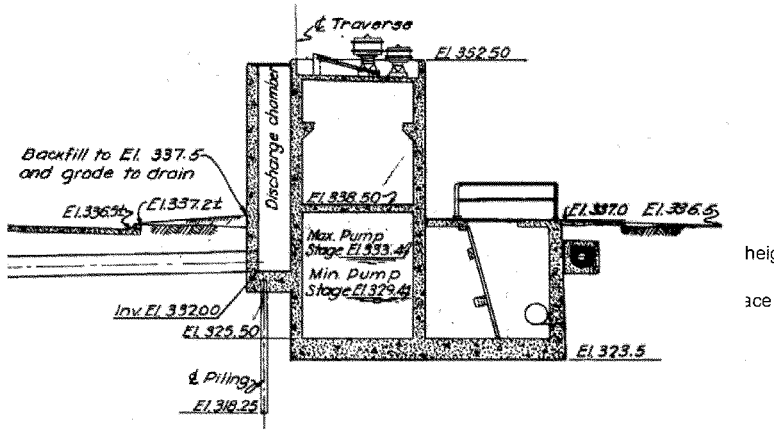
Elevation



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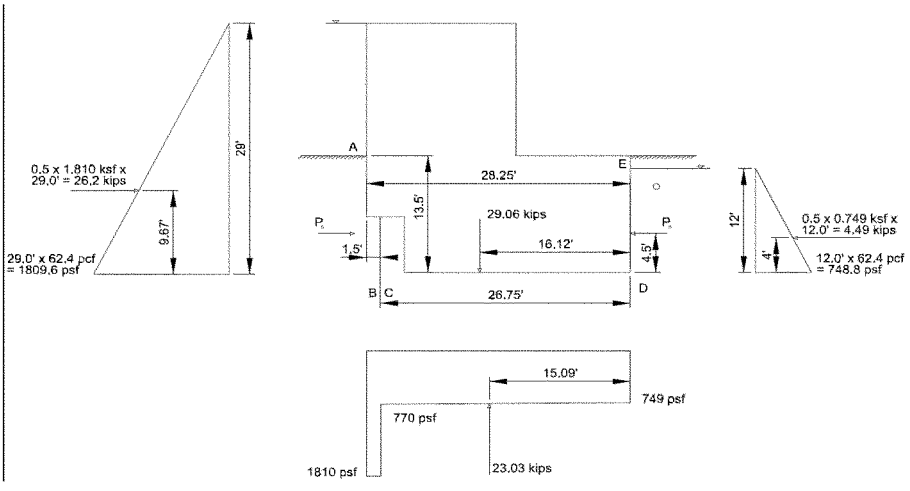
Data

Weight =	396000 lbs	φ =	28 °	Max_{Stage} =	4313 lbs/ft
γ_s =	125 pcf	c =	200 psf	Cutoff =	95%
Weight =	24750 lbs/ft				

*Lowered water 1.5 ft below TOG on LS. Toe drain is 4 ft below TOG. Need to determine if a lower Cutoff is more desirable.

Analysis



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Subject: Paducah, KY Feasability
Pump Station #3
Global Stability (Extreme Condition)

Page 2 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Water Pressures

Full-head pressure on headwater side of sheet pile at point B
= (29 ft) x (62.4 pcf) = 1809.6 psf
= 1.810 ksf

Pressure at Point D
= (9.6 ft) x (62.4 pcf) = 599.04 psf
= 0.599 ksf

Pressure on tailwater side of sheet pile at point C
= full-head pressure at C - 95% (full-head pressure at C - pressure at D)
= 1.81 - 95% x (1.81 - 0.6) =
0.660 ksf

Uplift = 19.55 kips $\bar{x}$ = 12.73 ft

Horizontal Soil Forces

Resisting $P_P = 0.5 \times K_R \times \gamma \times h^2$ *EM 1110-2-2100, 5-3
K_R = 1.00 *EM 1110-2-2502, 3-10d, N-64
= 11390.63 lb/ft $\bar{x}$ = 4.50 ft

Driving $P_D = 0.5 \times K_D \times \gamma \times h^2$
$K_D = (1-\sin\varphi)$ = 0.53 *EM 1110-2-2502, Eq. 3-4
P_A = 6043.05 lb/ft $\bar{x}$ = 4.50 ft

Overturning Stability (about point D)

*Weight	29.06 kips x 16.12 ft =	468.50	kip-ft
*Vert. Fric.	6.04 kips x 28.25 ft =	170.72	kip-ft
*Uplift	-19.55 kips x 15.52 ft =	-303.41	kip-ft
ΣV =	26.95 kips		
	2.88 kips x 3.2 ft =	9.20	kip-ft
	11.39 kips x 4.5 ft =	51.26	kip-ft
	-26.24 kips x 9.67 ft =	-253.65	kip-ft
	-6.04 kips x 4.5 ft =	-27.19	kip-ft
ΣH =	-18.02 kips	115.43 kip-ft / 26.95 kips =	4.28 ft = x_R

a = $3x_R$ = 12.85 ft > b = 28.25 ft *(Inside middle third, Therefore a = b)*

Percent of base in compression (a/b)*100 = 100.00% > 75%

Criteria for Extreme Load Condition satisfied, resultant is within base.
See EM 1110-2-2100, Section 3-9, Table 3-5.

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #3
Global Stability (Extreme Condition)

Page 3 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Sliding Stability

N' = ΣV = 26.95 kips
T = ΣH = 18.02 kips

$FS_s = \frac{N' \tan\phi + cL}{T}$ *Eq. 3-1, EM 1110-2-2100*
**Over 1 foot section*

$FS_s = \frac{26.95 \text{ kips x } \tan(28°) + 0.2 \text{ ksf x } 28.25 \text{ ft}}{18.02 \text{ kips}}$

$FS_s = 1.11$

FSs > 1.1, therefore criteria is satisfied. Suitable in Sliding.

Flotation

$FS_f = \frac{W_S + W_C + S}{U - W_G}$

$FS_f = \frac{24.75 \text{ kips} + 4.31 \text{ kips} + 0 \text{ kips}}{19.55 \text{ kips} - 0 \text{ kips}}$

$FS_f = 1.49$

FSf > 1.1, therefore criteria is satisfied. Suitable in Flotation.

Bearing Capacity **From EM 1110-2-2502*

$N_c = 25.80$ $N_q = 14.72$ $N_\gamma = 11.19$ *Tbl. 5-1, φ = 28°*

$\delta = \tan^{-1}\left(\frac{\sum H}{\sum V}\right)$ $= \tan^{-1}(18.02 / 26.95) =$ 33.76 °

e = B/2 - x_R = ½ x 28.25 ft - 4.28 ft = 9.84 ft

$\bar{B}$ = B - 2e = 28.25 ft - 2 x 9.84 ft = 8.57 ft

γ' = $\gamma_s - \gamma_w$ = 125 pcf - 62.4 pcf = 62.60 pcf

q_o = γ' D = 62.6 pcf x 13.5 ft = 845.10 lb/ft

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #3
Global Stability (Extreme Condition)

Page 4 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Bearing Capacity, continued

ξ_{cd} = 1+ 0.2(D / B) x tan(45° + φ/2) = 1 + 0.2*(13.5 / 8.57) x tan(45° + 28°/2)
= 1.52

$\xi_{qd} = \xi_{yd}$ = 1+ 0.1(D / B) x tan(45° + φ/2) = 1 + 0.1*(13.5 / 8.57) x tan(45° + 28°/2)
1.26

$\xi_{qi} = \xi_{ci}$ = (1 - δ / 90°)^2 = (1 - 33.76° / 90°)² = 0.39

ξ_{yi} = 0

$\xi_{yg} = \xi_{qg}$ = (1 - tan(β))^2 = (1 - tan(0))² = 1.00

ξ_{cg} = ξqg - (1 - ξqg) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$\xi_{qt} = \xi_{yt}$ = (1 - α x tan(φ))^2 = (1 - 0 x tan(28°))² = 1.00

ξ_{ct} = ξqt - (1 - ξqt) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$$Q = \overline{B}\left[\left(\xi_{cd}\xi_{ci}\xi_{ct}\xi_{cg}cN_c\right)+\left(\xi_{qd}\xi_{qi}\xi_{qt}\xi_{qg}q_oN_q\right)+\frac{\left(\xi_{\gamma d}\xi_{\gamma i}\xi_{\gamma t}\xi_{\gamma g}\overline{B}\gamma N_\gamma\right)}{2}\right] =$$

= 8.57 ft x [(1.52 x 0.39 x 1 x 1 x 200 x 25.8) +
(1.26 x 0.39 x 1 x 1 x 845.1 x 14.72) +
½ x (1.26 x 0 x 1 x 1 x 8.57 ft x 125 pcf x 11.19)] =

= 78833.25 lbs

FS = 1.5Q / N' = 118.25 kips / 26.95 kips = 4.39 > 3

Therefore criteria is satisfied. Suitable in bearing.

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY LSE
Pump Station #6
Global Stability (Unusual Condition)

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Computed by: N. Cash 10-Nov-09
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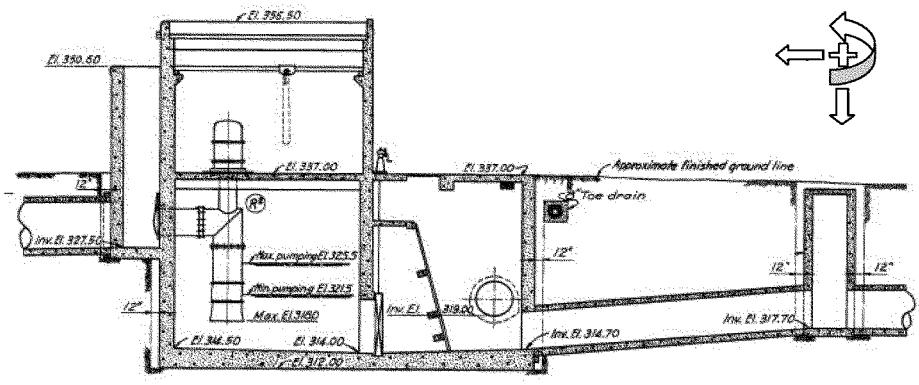
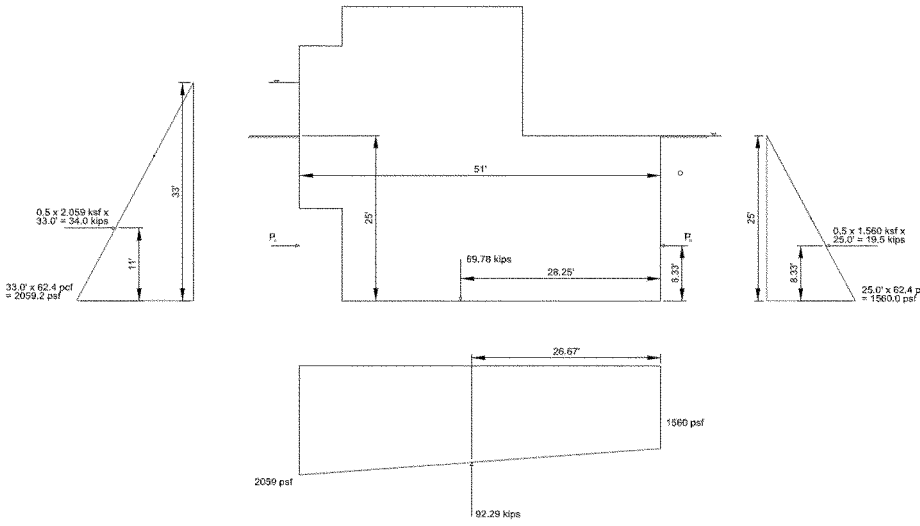
Elevation



Data

Weight =	2266000 lbs	φ =	28 °	Min_{Stage} =	10149 lbs/ft
γ_s =	130 pcf	c =	225 psf	Weight =	59632 lbs/ft

Analysis



US Army Corps of Engineers
Louisville District

Subject: Paducah, KY LSE
Pump Station #6
Global Stability (Unusual Condition)

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Computed by: N. Cash 10-Nov-09
Checked by:

Water Pressures

Pressure on Riverside
= (33 ft) x (62.4 pcf) = 2059.2 psf
= 2.059 ksf

Pressure on Landside
= (25 ft) x (62.4 pcf) = 1560 psf
= 1.560 ksf

Uplift = 92.29 kips $\bar{x}$ = 24.33 ft

Horizontal Soil Forces (at Rest Pressures)

Resisting $P_R = 0.5 \times K_R \times \gamma \times h^2$ *EM 1110-2-2100, 5-3
K_R = 1.000 *EM 1110-2-2502, 3-10d, N-64
P_R = 40625 lb/ft $\bar{x}$ = 8.33 ft

Driving $P_D = 0.5 \times K_D \times \gamma \times h^2$
$K_D = (1-\sin\varphi)$ = 0.53 *EM 1110-2-2502, Eq. 3-4
P_D = 21553 lb/ft $\bar{x}$ = 8.33 ft

Overturning Stability (about bottom corner of Landside)

*Weight	69.78 kips x 28.25 ft =	1971.56 kip-ft
*Vert. Fric.	21.55 kips x 51 ft =	1099.19 kip-ft
*Uplift	-92.29 kips x 26.67 ft =	-2461.59 kip-ft
ΣV =	39.67 kips	
	19.5 kips x 8.33 ft =	162.50 kip-ft
	40.63 kips x 8.33 ft =	338.54 kip-ft
	-33.98 kips x 11 ft =	-373.74 kip-ft
	-21.55 kips x 8.33 ft =	-179.61 kip-ft
ΣH =	4.60 kips	556.85 kip-ft / 39.67 kips = 14.04 ft = x_R

a = $3x_R$ = 42.11 ft > b = 51 ft *(Outside middle third)*

Percent of base in compression (a/b)*100 = 82.57% > 75%

Therefore criteria is satisfied. Suitable in Overturning.

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY LSE
Pump Station #6
Global Stability (Unusual Condition)

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Computed by: N. Cash 10-Nov-09
Checked by:

Sliding Stability

N' = ΣV = 39.67 kips
T = ΣH = 4.60 kips

$FS_s = \frac{N' \tan\phi + cL}{T}$ *Eq. 3-1, EM 1110-2-2100*
**Over 1 foot section*

$FS_s = \frac{39.67 \text{ kips x } \tan(28°) + 0.23 \text{ ksf x } 51 \text{ ft}}{4.6 \text{ kips}}$

$FS_s = 7.09$

FSs > 1.5, therefore criteria is satisfied. Suitable in Sliding.

Flotation

$FS_f = \frac{W_S + W_C + S}{U - W_G}$

$FS_f = \frac{59.63 \text{ kips} + 10.15 \text{ kips} + 0 \text{ kips}}{92.29 \text{ kips} - 0 \text{ kips}}$

$FS_f = 1.43$

FSf > 1.2, therefore criteria is satisfied. Suitable in Flotation.

Bearing Capacity **From EM 1110-2-2502*

N_c = 25.80 N_q = 14.72 N_γ = 11.19 *Tbl. 5-1, φ = 28°*

$\delta = \tan^{-1}\left(\frac{\sum H}{\sum V}\right)$ = $\tan^{-1}$(4.6 / 39.67) = 6.61 °

e = B/2 - x_R = ½ x 51 ft - 14.04 ft = 11.46 ft

$\bar{B}$ = B - 2e = 51 ft - 2 x 11.46 ft = 28.07 ft

γ' = $\gamma_s - \gamma_w$ = 130 pcf - 62.4 pcf = 67.60 pcf

q_o = γ' D = 67.6 pcf x 25 ft = 1690.00 lb/ft

US Army Corps of Engineers
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Subject: Paducah, KY LSE
Pump Station #6
Global Stability (Unusual Condition)

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Computed by: N. Cash 10-Nov-09
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Bearing Capacity, continued

ξ_{cd} = 1+ 0.2(D / $\bar{B}$) x tan(45° + φ/2) = 1 + 0.2*(25 / 28.07) x tan(45° + 28°/2)
= 1.30

$\xi_{qd} = \xi_{\gamma d}$ = 1+ 0.1(D / B) x tan(45° + φ/2) = 1 + 0.1*(25 / 28.07) x tan(45° + 28°/2)
1.15

$\xi_{qi} = \xi_{ci}$ = (1 - δ / 90°)^2 = (1 - 6.61° / 90°)² = 0.86

$\xi_{\gamma i}$ = (1 - δ / φ)² = (1 - 6.61° / 28°)² = 0.58

$\xi_{\gamma g} = \xi_{qg}$ = (1 - tan(β))^2 = (1 - tan(0))² = 1.00

ξ_{cg} = ξqg - (1 - ξqg) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$\xi_{qt} = \xi_{\gamma t}$ = (1 - α x tan(φ))^2 = (1 - 0 x tan(28°))² = 1.00

ξ_{ct} = ξqt - (1 - ξqt) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$$Q = \overline{B}\left[\left(\xi_{cd}\xi_{ci}\xi_{ct}\xi_{cg}cN_c\right)+\left(\xi_{qd}\xi_{qi}\xi_{qt}\xi_{qg}q_oN_q\right)+\frac{\left(\xi_{\gamma d}\xi_{\gamma i}\xi_{\gamma t}\xi_{\gamma g}\overline{B}\gamma N_\gamma\right)}{2}\right] =$$

= 28.07 ft x [(1.3 x 0.86 x 1 x 1 x 225 x 25.8) +
(1.15 x 0.86 x 1 x 1 x 1690 x 14.72) +
½ x (1.15 x 0.58 x 1 x 1 x 28.07 ft x 130 pcf x 11.19)] =

= 1254108 lbs

FS = 1.15Q / N' = 1442.22 kips / 39.67 kips = 36.36 > 3

Therefore criteria is satisfied. Suitable in bearing.

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #6
Global Stability (Extreme Condition)

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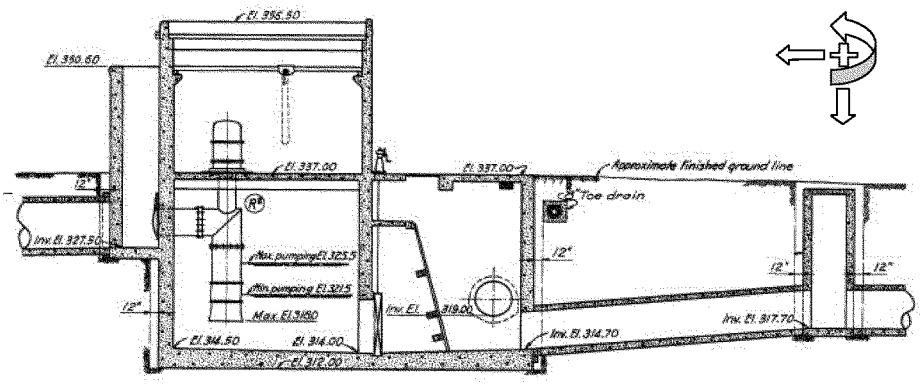
Computed by: N. Cash 10-Nov-09
Checked by:

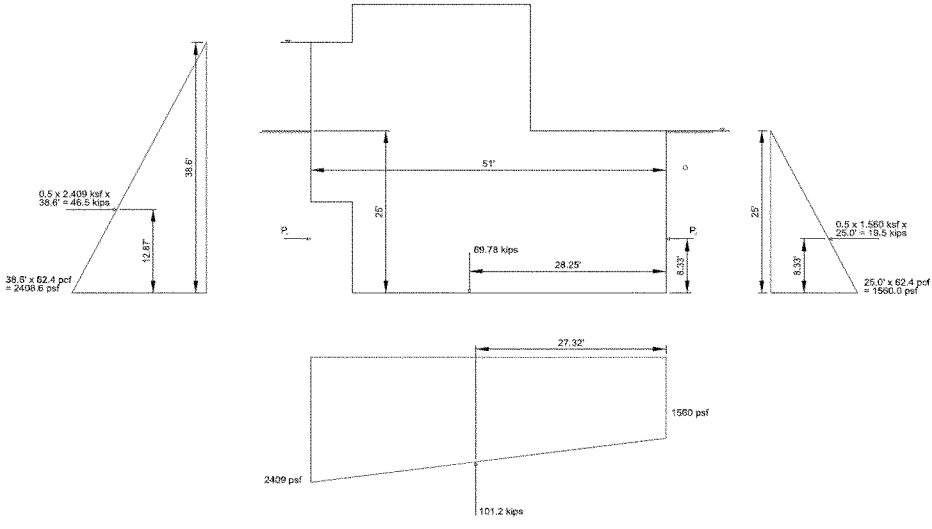
Elevation



Data

Weight =	2266000 lbs	φ =	28 °	Min_{Stage} =	10149 lbs/ft
γ_s =	130 pcf	c =	225 psf	Weight =	59632 lbs/ft

Analysis



US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #6
Global Stability (Extreme Condition)

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Computed by: N. Cash 10-Nov-09
Checked by:

Water Pressures

Pressure on Riverside
= (38.6 ft) x (62.4 pcf) = 2408.64 psf
= 2.409 ksf

Pressure on Landside
= (25 ft) x (62.4 pcf) = 1560 psf
= 1.560 ksf

Uplift = 101.20 kips $\bar{x}$ = 23.68 ft

Horizontal Soil Forces (at Rest Pressures)

Resisting $P_R = 0.5 \times K_R \times \gamma \times h^2$ *EM 1110-2-2100, 5-3
K_R = 1.000 *EM 1110-2-2502, 3-10d, N-64
P_R = 40625 lb/ft $\bar{x}$ = 8.33 ft

Driving $P_D = 0.5 \times K_D \times \gamma \times h^2$
$K_D = (1-\sin\varphi)$ = 0.53 *EM 1110-2-2502, Eq. 3-4
P_D = 21553 lb/ft $\bar{x}$ = 8.33 ft

Overturning Stability (about bottom corner of Landside)

*Weight	69.78 kips x 28.25 ft =	1971.56 kip-ft
*Vert. Fric.	21.55 kips x 51 ft =	1099.19 kip-ft
*Uplift	-101.2 kips x 27.32 ft =	-2764.55 kip-ft
ΣV =	30.76 kips	
	19.5 kips x 8.33 ft =	162.50 kip-ft
	40.63 kips x 8.33 ft =	338.54 kip-ft
	-46.49 kips x 12.87 ft =	-598.13 kip-ft
	-21.55 kips x 8.33 ft =	-179.61 kip-ft
ΣH =	-7.91 kips	29.5 kip-ft / 30.76 kips = 0.96 ft = x_R

a = $3x_R$ = 2.88 ft > b = 51 ft *(Outside middle third)*

Percent of base in compression (a/b)*100 = 5.64% < 75%

Criteria for Extreme Load Condition satisfied, resultant is within base.
See EM 1110-2-2100, Section 3-9, Table 3-5.

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #6
Global Stability (Extreme Condition)

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Computed by: N. Cash 10-Nov-09
Checked by:

Sliding Stability

N' = ΣV = 30.76 kips
T = ΣH = 7.91 kips

$FS_s = \frac{N' \tan\phi + cL}{T}$ *Eq. 3-1, EM 1110-2-2100*
**Over 1 foot section*

$FS_s = \frac{30.76 \text{ kips x } \tan(28°) + 0.23 \text{ ksf x } 51 \text{ ft}}{7.91 \text{ kips}}$

$FS_s = 3.52$

FSs > 1.1, therefore criteria is satisfied. Suitable in Sliding.

Flotation

$FS_f = \frac{W_S + W_C + S}{U - W_G}$

$FS_f = \frac{59.63 \text{ kips} + 10.15 \text{ kips} + 0 \text{ kips}}{101.2 \text{ kips} - 0 \text{ kips}}$

$FS_f = 1.30$

FSf > 1.1, therefore criteria is satisfied. Suitable in Flotation.

Bearing Capacity *From EM 1110-2-2502

N_c = 25.80 N_q = 14.72 N_γ = 11.19 *Tbl. 5-1, φ = 28°*

$\delta = \tan^{-1}\left(\frac{\sum H}{\sum V}\right)$ = tan⁻¹(7.91 / 30.76) = 14.43 °

e = B/2 - x_R = ½ x 51 ft - 0.96 ft = 24.54 ft

$\bar{B}$ = B - 2e = 51 ft - 2 x 24.54 ft = 1.92 ft

γ' = $\gamma_s - \gamma_w$ = 130 pcf - 62.4 pcf = 67.60 pcf

q_o = γ' D = 67.6 pcf x 25 ft = 1690.00 lb/ft

US Army Corps of Engineers
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Subject: Paducah, KY Feasability
Pump Station #6
Global Stability (Extreme Condition)

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Computed by: N. Cash 10-Nov-09
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Bearing Capacity, continued

ξ_{cd} = 1+ 0.2(D / $\bar{B}$) x tan(45° + φ/2) = 1 + 0.2*(25 / 1.92) x tan(45° + 28°/2)
= 5.34

$\xi_{qd} = \xi_{\gamma d}$ = 1+ 0.1(D / B) x tan(45° + φ/2) = 1 + 0.1*(25 / 1.92) x tan(45° + 28°/2)
3.17

$\xi_{qi} = \xi_{ci}$ = (1 - δ / 90°)^2 = (1 - 14.43° / 90°)² = 0.71

$\xi_{\gamma i}$ = (1 - δ / φ)² = (1 - 14.43° / 28°)² = 0.23

$\xi_{\gamma g} = \xi_{qg}$ = (1 - tan(β))^2 = (1 - tan(0))² = 1.00

ξ_{cg} = ξqg - (1 - ξqg) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$\xi_{qt} = \xi_{\gamma t}$ = (1 - α x tan(φ))^2 = (1 - 0 x tan(28°))² = 1.00

ξ_{ct} = ξqt - (1 - ξqt) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

Q = $\overline{B}\left[\left(\xi_{cd}\xi_{ci}\xi_{ct}\xi_{cg}cN_c\right)+\left(\xi_{qd}\xi_{qi}\xi_{qt}\xi_{qg}q_oN_q\right)+\frac{\left(\xi_{\gamma d}\xi_{\gamma i}\xi_{\gamma t}\xi_{\gamma g}\overline{B}\gamma N_\gamma\right)}{2}\right]$ =

= 1.92 ft x [(5.34 x 0.71 x 1 x 1 x 225 x 25.8) +
(3.17 x 0.71 x 1 x 1 x 1690 x 14.72) +
½ x (3.17 x 0.23 x 1 x 1 x 1.92 ft x 130 pcf x 11.19)] =

= 150528 lbs

FS = 1.5Q / N' = 225.79 kips / 30.76 kips = 7.34 > 3

Therefore criteria is satisfied. Suitable in bearing.

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY LSE
Pump Station #7
Global Stability (Unusual Condition)

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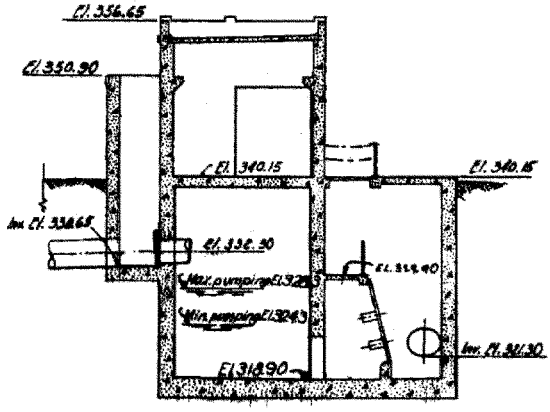
Computed by: N. Cash 10-Nov-09
Checked by:

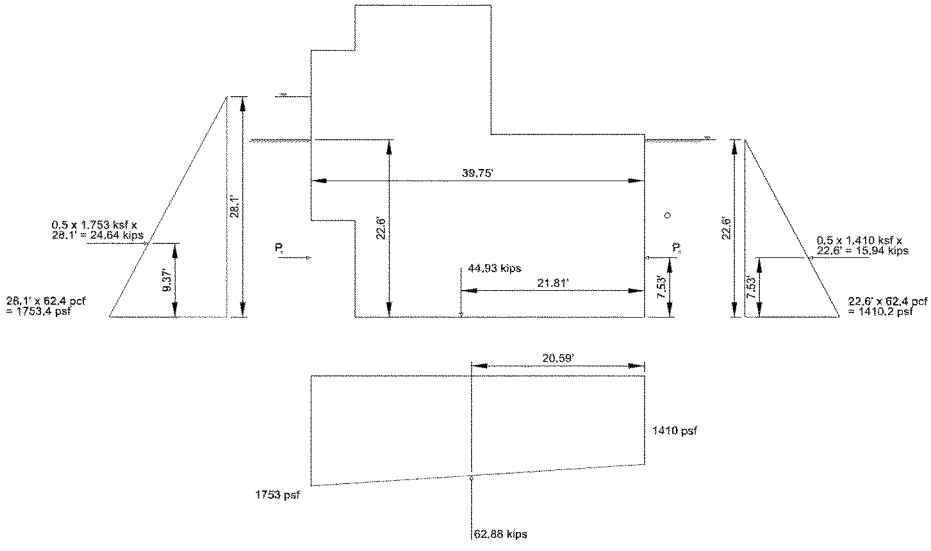
Elevation



Data

Weight =	944126 lbs	φ =	28 °	Min_{Stage} =	3882 lbs/ft
γ_s =	130 pcf	c =	225 psf	Weight =	41049 lbs/ft

Analysis



US Army Corps of Engineers
Louisville District

Subject: Paducah, KY LSE
Pump Station #7
Global Stability (Unusual Condition)

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Computed by: N. Cash 10-Nov-09
Checked by:

Water Pressures

Pressure on Riverside
= (28.1 ft) x (62.4 pcf) = 1753.44 psf
= 1.753 ksf

Pressure on Landside
= (22.6 ft) x (62.4 pcf) = 1410.24 psf
= 1.410 ksf

Uplift = 62.88 kips $\bar{x}$ = 19.16 ft

Horizontal Soil Forces (at Rest Pressures)

Resisting $P_R = 0.5 \times K_R \times \gamma \times h^2$ *EM 1110-2-2100, 5-3
K_R = 1.000 *EM 1110-2-2502, 3-10d, N-64
P_R = 33199 lb/ft $\bar{x}$ = 7.53 ft

Driving $P_D = 0.5 \times K_D \times \gamma \times h^2$
$K_D = (1-\sin\varphi)$ = 0.53 *EM 1110-2-2502, Eq. 3-4
P_D = 17613 lb/ft $\bar{x}$ = 7.53 ft

Overturning Stability (about bottom corner of Landside)

*Weight	44.93 kips x 21.81 ft =	979.78 kip-ft
*Vert. Fric.	17.61 kips x 39.75 ft =	700.13 kip-ft
*Uplift	-62.88 kips x 20.59 ft =	-1294.89 kip-ft
ΣV =	32.87 kips	
	15.94 kips x 7.53 ft =	120.05 kip-ft
	33.2 kips x 7.53 ft =	250.10 kip-ft
	-24.64 kips x 9.37 ft =	-230.76 kip-ft
	-17.61 kips x 7.53 ft =	-132.69 kip-ft
ΣH =	6.89 kips	391.72 kip-ft / 32.87 kips = 11.92 ft = x_R

a = $3x_R$ = 35.76 ft > b = 39.75 ft *(Outside middle third)*

Percent of base in compression (a/b)*100 = 89.95% > 75%

Therefore criteria is satisfied. Suitable in Overturning.

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY LSE
Pump Station #7
Global Stability (Unusual Condition)

Page 3 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Sliding Stability

N' = ΣV = 32.87 kips
T = ΣH = 6.89 kips

$FS_s = \frac{N' \tan\phi + cL}{T}$ *Eq. 3-1, EM 1110-2-2100*
**Over 1 foot section*

$FS_s = \frac{32.87 \text{ kips x } \tan(28°) + 0.23 \text{ ksf x } 39.75 \text{ ft}}{6.89 \text{ kips}}$

$FS_s = 3.84$

FSs > 1.5, therefore criteria is satisfied. Suitable in Sliding.

Flotation

$FS_f = \frac{W_S + W_C + S}{U - W_G}$

$FS_f = \frac{41.05 \text{ kips} + 3.88 \text{ kips} + 0 \text{ kips}}{62.88 \text{ kips} - 0 \text{ kips}}$

$FS_f = 1.52$

FSf > 1.2, therefore criteria is satisfied. Suitable in Flotation.

Bearing Capacity *From EM 1110-2-2502*

N_c = 25.80 N_q = 14.72 N_γ = 11.19 *Tbl. 5-1, φ = 28°*

$\delta = \tan^{-1}\left(\frac{\sum H}{\sum V}\right)$ = tan⁻¹(6.89 / 32.87) = 11.83 °

e = B/2 - x_R = ½ x 39.75 ft - 11.92 ft = 7.96 ft

$\bar{B}$ = B - 2e = 39.75 ft - 2 x 7.96 ft = 23.84 ft

γ' = $\gamma_s - \gamma_w$ = 130 pcf - 62.4 pcf = 67.60 pcf

q_o = γ' D = 67.6 pcf x 22.6 ft = 1527.76 lb/ft

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY LSE
Pump Station #7
Global Stability (Unusual Condition)

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Computed by: N. Cash 10-Nov-09
Checked by:

Bearing Capacity, continued

ξ_{cd} = 1+ 0.2(D / $\bar{B}$) x tan(45° + φ/2) = 1 + 0.2*(22.6 / 23.84) x tan(45° + 28°/2)
= 1.32

$\xi_{qd} = \xi_{\gamma d}$ = 1+ 0.1(D / B) x tan(45° + φ/2) = 1 + 0.1*(22.6 / 23.84) x tan(45° + 28°/2)
1.16

$\xi_{qi} = \xi_{ci}$ = (1 - δ / 90°)^2 = (1 - 11.83° / 90°)² = 0.75

$\xi_{\gamma i}$ = (1 - δ / φ)² = (1 - 11.83° / 28°)² = 0.33

$\xi_{\gamma g} = \xi_{qg}$ = (1 - tan(β))^2 = (1 - tan(0))² = 1.00

ξ_{cg} = ξqg - (1 - ξqg) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$\xi_{qt} = \xi_{\gamma t}$ = (1 - α x tan(φ))^2 = (1 - 0 x tan(28°))² = 1.00

ξ_{ct} = ξqt - (1 - ξqt) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$$Q = \overline{B}\left[\left(\xi_{cd}\xi_{ci}\xi_{ct}\xi_{cg}cN_c\right)+\left(\xi_{qd}\xi_{qi}\xi_{qt}\xi_{qg}q_oN_q\right)+\frac{\left(\xi_{\gamma d}\xi_{\gamma i}\xi_{\gamma t}\xi_{\gamma g}\overline{B}\gamma N_\gamma\right)}{2}\right] =$$

= 23.84 ft x [(1.32 x 0.75 x 1 x 1 x 225 x 25.8) +
(1.16 x 0.75 x 1 x 1 x 1527.76 x 14.72) +
½ x (1.16 x 0.33 x 1 x 1 x 23.84 ft x 130 pcf x 11.19)] =

= 765029 lbs

FS = 1.15Q / N' = 879.78 kips / 32.87 kips = 26.77 > 3

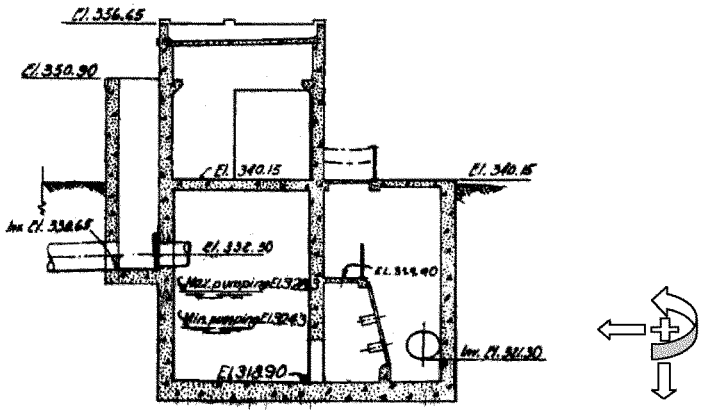
Therefore criteria is satisfied. Suitable in bearing.

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #7
Global Stability (Extreme Condition)

Page 1 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

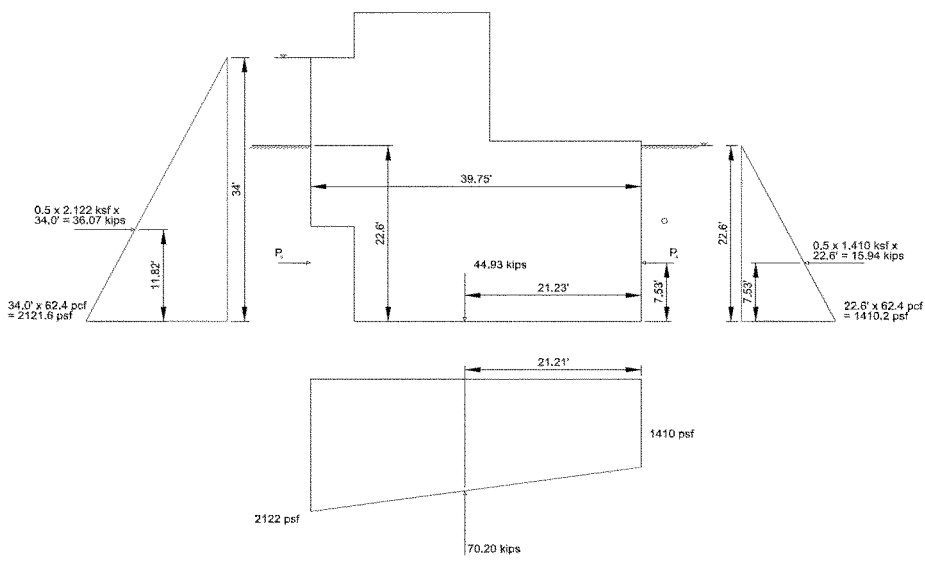
Elevation



Data

Weight =	944126 lbs	φ =	28 °	Min_{Stage} =	3882 lbs/ft
γ_s =	130 pcf	c =	225 psf	Weight =	41049 lbs/ft

Analysis



US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #7
Global Stability (Extreme Condition)

Page 2 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Water Pressures

Pressure on Riverside
= (34 ft) x (62.4 pcf) = 2121.6 psf
= 2.122 ksf

Pressure on Landside
= (22.6 ft) x (62.4 pcf) = 1410.24 psf
= 1.410 ksf

Uplift = 70.20 kips $\bar{x}$ = 18.54 ft

Horizontal Soil Forces (at Rest Pressures)

Resisting $P_R = 0.5 \times K_R \times \gamma \times h^2$ *EM 1110-2-2100, 5-3
K_R = 1.000 *EM 1110-2-2502, 3-10d, N-64
P_R = 33199 lb/ft $\bar{x}$ = 7.53 ft

Driving $P_D = 0.5 \times K_D \times \gamma \times h^2$
$K_D = (1-\sin\varphi)$ = 0.53 *EM 1110-2-2502, Eq. 3-4
P_D = 17613 lb/ft $\bar{x}$ = 7.53 ft

Overturning Stability (about bottom corner of Landside)

*Weight	44.93 kips x 21.81 ft =	979.78 kip-ft
*Vert. Fric.	17.61 kips x 39.75 ft =	700.13 kip-ft
*Uplift	-70.2 kips x 21.21 ft =	-1488.80 kip-ft
ΣV =	25.55 kips	
	15.94 kips x 7.53 ft =	120.05 kip-ft
	33.2 kips x 7.53 ft =	250.10 kip-ft
	-36.07 kips x 11.33 ft =	-408.76 kip-ft
	-17.61 kips x 7.53 ft =	-132.69 kip-ft
ΣH =	-4.55 kips	19.81 kip-ft / 25.55 kips = 0.78 ft = x_R

a = $3x_R$ = 2.33 ft > b = 39.75 ft *(Outside middle third)*

Percent of base in compression (a/b)*100 = 5.85% < 75%

Criteria for Extreme Load Condition satisfied, resultant is within base.
See EM 1110-2-2100, Section 3-9, Table 3-5.

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #7
Global Stability (Extreme Condition)

Page 3 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Sliding Stability

N' = ΣV = 25.55 kips
T = ΣH = 4.55 kips

$FS_s = \frac{N' \tan\phi + cL}{T}$ *Eq. 3-1, EM 1110-2-2100*
**Over 1 foot section*

$FS_s = \frac{25.55 \text{ kips} \times \tan(28°) + 0.23 \text{ ksf} \times 39.75 \text{ ft}}{4.55 \text{ kips}}$

$FS_s = 4.96$

FSs > 1.1, therefore criteria is satisfied. Suitable in Sliding.

Flotation

$FS_f = \frac{W_S + W_C + S}{U - W_G}$

$FS_f = \frac{41.05 \text{ kips} + 3.88 \text{ kips} + 0 \text{ kips}}{70.2 \text{ kips} - 0 \text{ kips}}$

$FS_f = 1.36$

FSf > 1.1, therefore criteria is satisfied. Suitable in Flotation.

Bearing Capacity **From EM 1110-2-2502*

N_c = 25.80 N_q = 14.72 N_γ = 11.19 *Tbl. 5-1, φ = 28°*

$\delta = \tan^{-1}\left(\frac{\sum H}{\sum V}\right)$ = $\tan^{-1}$(4.55 / 25.55) = 10.09 °

e = B/2 - x_R = ½ x 39.75 ft - 0.78 ft = 19.10 ft

$\bar{B}$ = B - 2e = 39.75 ft - 2 x 19.1 ft = 1.55 ft

γ' = $\gamma_s - \gamma_w$ = 130 pcf - 62.4 pcf = 67.60 pcf

q_o = γ' D = 67.6 pcf x 22.6 ft = 1527.76 lb/ft

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #7
Global Stability (Extreme Condition)

Page 4 of 4
Computed by: N. Cash 10-Nov-09
Checked by:

Bearing Capacity, continued

ξ_{cd} = 1+ 0.2(D / $\bar{B}$) x tan(45° + φ/2) = 1 + 0.2*(22.6 / 1.55) x tan(45° + 28°/2)
= 5.85

$\xi_{qd} = \xi_{\gamma d}$ = 1+ 0.1(D / B) x tan(45° + φ/2) = 1 + 0.1*(22.6 / 1.55) x tan(45° + 28°/2)
3.43

$\xi_{qi} = \xi_{ci}$ = (1 - δ / 90°)^2 = (1 - 10.09° / 90°)² = 0.79

$\xi_{\gamma i}$ = (1 - δ / φ)² = (1 - 10.09° / 28°)² = 0.41

$\xi_{\gamma g} = \xi_{qg}$ = (1 - tan(β))^2 = (1 - tan(0))² = 1.00

ξ_{cg} = ξqg - (1 - ξqg) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

$\xi_{qt} = \xi_{\gamma t}$ = (1 - α x tan(φ))^2 = (1 - 0 x tan(28°))² = 1.00

ξ_{ct} = ξqt - (1 - ξqt) / (Nc x tan(φ)) = 1 - (1 - 1) / (25.8 x tan(28°))
= 1.00

Q = $\overline{B}\left[\left(\xi_{cd}\xi_{ci}\xi_{ct}\xi_{cg}cN_c\right)+\left(\xi_{qd}\xi_{qi}\xi_{qt}\xi_{qg}q_oN_q\right)+\frac{\left(\xi_{\gamma d}\xi_{\gamma i}\xi_{\gamma t}\xi_{\gamma g}\overline{B}\gamma N_\gamma\right)}{2}\right]$ =

= 1.55 ft x [(5.85 x 0.79 x 1 x 1 x 225 x 25.8) +
(3.43 x 0.79 x 1 x 1 x 1527.76 x 14.72) +
½ x (3.43 x 0.41 x 1 x 1 x 1.55 ft x 130 pcf x 11.19)] =

= 138163 lbs

FS = 1.5Q / N' = 207.25 kips / 25.55 kips = 8.11 > 3

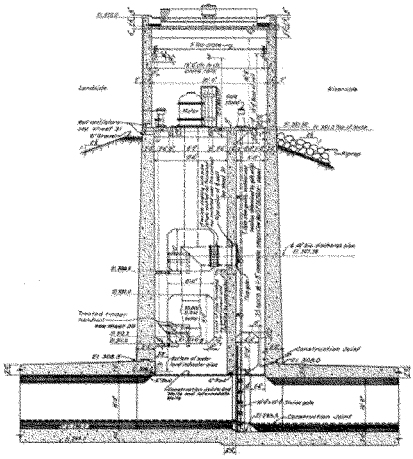
Therefore criteria is satisfied. Suitable in bearing.

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #11
Global Stability (Extreme Condition)

Page 1 of 4
Computed by: N. Cash 13-Oct-09
Checked by:

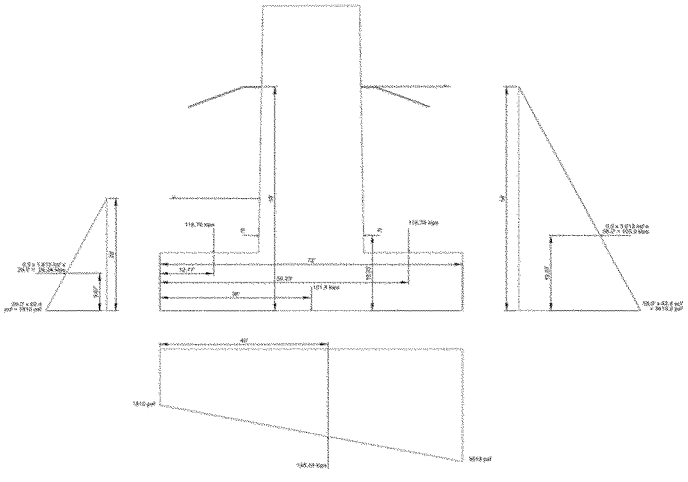
Elevation



Data

Weight =	930700	lbs
Weight/ft =	101808	lbs/ft
γ_s =	125	pcf
φ =	26	°
c =	200	psf
WC =	18%	
Max_{Stage} =	23368	lbs/ft
Slope =	-2.5	V:1H

Analysis



US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #11
Global Stability (Extreme Condition)

Page 2 of 4
Computed by: N. Cash 13-Oct-09
Checked by:

Vertical Soil Weight

Landside Soil Weight = Riverside Soil Weight = 116.76 kips

$\bar{x}$ = 11.73 ft from face of Pump Station

Landside Moment Arm = 12.77 ft
Riverside Moment Arm = 59.23 ft

Water Pressures

Pressure on Riverside
= (58 ft) x (62.4 pcf) = 3619.2 psf
= 3.619 ksf

Pressure on Landside
= (29 ft) x (62.4 pcf) = 1809.6 psf
= 1.810 ksf

Uplift = 195.44 kips $\bar{x}$ = 32.00 ft

Horizontal Soil Forces

Resisting $P_P = 0.5 \times K_P \times \gamma_b \times h^2$

$K_P = K_O \times (1 + \sin\beta) =$ 0.35

$K_O = (1 - \sin\varphi) =$ 0.56

= 74227.74 lb/ft $\bar{x}$ = 19.33 ft

Driving $\Phi_d = \tan^{-1}(\tan(\varphi)/1.5) =$ 18.01 °

$\beta =$ -21.80 °

$c_1 = 2\tan\Phi_d =$ 0.650

$c_2 = 1-\tan\Phi_d\tan\beta - \tan\beta / \tan\Phi_d =$ 2.360

$\alpha = \tan\text{-}1(\frac{1}{2} \times (c_1 + \sqrt{(c_1^2 + 4c_2)}) =$ 62.19 °

$$K_1 = \frac{\cos^2\phi_d}{\left[1+\sqrt{\frac{\sin\phi_d \sin(\phi_d - \beta)}{\cos\beta}}\right]^2} = 0.423$$

P_A = 75412.15 lb/ft $\bar{x}$ = 19.33 ft

Overturning Stability (about bottom corner of Landside)

	125.18 kips x 36 ft =	4506.34 kip-ft
	116.76 kips x 12.77 ft =	1491.54 kip-ft
	116.76 kips x 59.23 ft =	6914.91 kip-ft
	-195.44 kips x 40 ft =	-7817.47 kip-ft
ΣV =	163.25 kips	

	26.24 kips x 9.67 ft =	253.65 kip-ft	
	74.23 kips x 19.33 ft =	1435.07 kip-ft	
	-104.96 kips x 19.33 ft =	-2029.16 kip-ft	
	-75.41 kips x 19.33 ft =	-1457.97 kip-ft	
ΣH =	-79.90 kips	3296.9 kip-ft / 163.25 kips =	20.20 ft = x_R

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #11
Global Stability (Extreme Condition)

Page 3 of 4
Computed by: N. Cash 13-Oct-09
Checked by:

Overturning Stability, continued

a = $3x_R$ = 60.59 ft > b = 72 ft *(Outside middle third)*

Percent of base in compression (a/b)*100 = 84.15% < 100%

Criteria for Extreme Load Condition satisfied, resultant is within base.
See EM 1110-2-2100, Section 3-9, Table 3-5.

Sliding Stability

N' = ΣV = 163.25 kips
T = ΣH = 79.90 kips

$FS_s = \frac{N' \tan\phi + cL}{T}$ *Eq. 3-1, EM 1110-2-2100*
**Over 1 foot section*

$FS_s = \frac{163.25 \text{ kips} \times \tan(26°) + 0.2 \text{ ksf} \times 72 \text{ ft}}{79.9 \text{ kips}}$

FS_s = 1.18

FSs > 1.1, therefore criteria is satisfied. Suitable in Sliding.

Flotation

$FS_f = \frac{W_S + W_C + S}{U - W_G}$

$FS_f = \frac{335.32 \text{ kips} + 23.37 \text{ kips} + 0 \text{ kips}}{195.44 \text{ kips} - 0 \text{ kips}}$

FS_f = 1.84

FSf > 1.1, therefore criteria is satisfied. Suitable in Flotation.

Bearing Capacity **From EM 1110-2-2502*

N_c = 22.25 N_q = 11.85 N_γ = 8.00 *Tbl. 5-1, φ = 26°*

$\delta = \tan^{-1}\left(\frac{\sum H}{\sum V}\right)$ = tan⁻¹(79.9 / 163.25) = 26.08 °

US Army Corps of Engineers
Louisville District

Subject: Paducah, KY Feasability
Pump Station #11
Global Stability (Extreme Condition)

Page 4 of 4
Computed by: N. Cash 13-Oct-09
Checked by:

Bearing Capacity, continued

e = $B/2 - x_R$ = ½ x 72 ft - 20.2 ft = 15.80 ft

$\overline{B}$ = B - 2e = 72 ft - 2 x 15.8 ft = 40.39 ft

γ' = $\gamma_s - \gamma_w$ = 125 pcf - 62.4 pcf = 62.60 pcf

q_o = $\gamma' D$ = 62.6 pcf x 58 ft = 3630.80 lb/ft

ξ_{cd} = $1 + 0.2(D / \overline{B}) \times \tan(45° + \varphi/2)$ = 1 + 0.2*(58 / 40.39) x tan(45° + 26°/2)
= 1.46

$\xi_{qd} = \xi_{\gamma d}$ = $1 + 0.1(D / B) \times \tan(45° + \varphi/2)$ = 1 + 0.1*(58 / 40.39) x tan(45° + 26°/2)
1.23

$\xi_{qi} = \xi_{ci}$ = $(1 - \delta / 90°)^2$ = (1 - 26.08° / 90°)² = 0.50

$\xi_{\gamma i}$ = 0

$\xi_{\gamma g} = \xi_{qg}$ = $(1 - \tan(\beta))^2$ = (1 - tan(-21.8°))² = 1.96

ξ_{cg} = $\xi qg - (1 - \xi qg) / (Nc \times \tan(\varphi))$ = 1.96 - (1 - 1.96) / (22.25 x tan(26°))
= 1.09

$\xi_{qt} = \xi_{\gamma t}$ = $(1 - \alpha \times \tan(\varphi))^2$ = (1 - 62.19° x tan(26°))² = 0.22

ξ_{ct} = $\xi qt - (1 - \xi qt) / (Nc \times \tan(\varphi))$ = 0.22 - (1 - 0.22) / (22.25 x tan(26°))
= 0.15

Q = $$\overline{B}\left[\left(\xi_{cd}\xi_{ci}\xi_{ct}\xi_{cg}cN_c\right)+\left(\xi_{qd}\xi_{qi}\xi_{qt}\xi_{qg}q_oN_q\right)+\frac{\left(\xi_{\gamma d}\xi_{\gamma i}\xi_{\gamma t}\xi_{\gamma g}\overline{B}\gamma N_\gamma\right)}{2}\right] =$$

= 40.39 ft x [(1.46 x 0.5 x 0.15 x 1.09 x 200 x 22.25) +
(1.23 x 0.5 x 0.22 x 1.96 x 3630.8 x 11.85) +
½ x (1.23 x 0 x 0.22 x 1.96 x 40.39 ft x 125 pcf x 8)] =

= 489781 lbs

FS = 1.5Q / N' = 734.67 kips / 163.25 kips = 4.50 > 3

Therefore criteria is satisfied. Suitable in bearing.

Subject: Phase II Evaluation
Paducah, KY

Station 51+30
Drained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

```
  PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
  DATE: 1-AUGUST-2007                                        TIME: 11:43:51

                              ****************
                              *  INPUT DATA  *
                              ****************

       I.--HEADING
      'Phase II I-Wall Evaluation
      'Paducah, KY
      'Stations 51+00.00 - 51+47.64
      'Monolith 143/144, Drained

      II.--CONTROL
         CANTILEVER WALL DESIGN
         FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
         FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

     III.--WALL DATA
         ELEVATION AT TOP OF WALL    = 351.00 FT.

      IV.--SURFACE POINT DATA

           IV.A.--RIGHTSIDE
              DIST. FROM     ELEVATION
              WALL (FT)         (FT)
                   0.00        344.00

           IV.B.--LEFTSIDE
              DIST. FROM     ELEVATION
              WALL (FT)         (FT)
                   0.00        344.00

       V.--SOIL LAYER DATA

          V.A.--RIGHTSIDE
              LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
              LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                  ANGLE OF          ANGLE OF                          <-SAFETY->
   SAT.    MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
  WGHT.    WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
  (PCF)    (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
 125.00   125.00    26.00    0.00    17.33    0.00                   DEF  DEF

          V.B.--LEFTSIDE
              LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
              LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                  ANGLE OF          ANGLE OF                          <-SAFETY->
   SAT.    MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
  WGHT.    WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
  (PCF)    (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
 125.00   125.00    26.00    0.00    17.33    0.00                   DEF  DEF

      VI.--WATER DATA
         UNIT WEIGHT          = 62.40 (PCF)
         RIGHTSIDE ELEVATION = 351.00 (FT)
         LEFTSIDE ELEVATION  = 344.00 (FT)
```

Subject: Phase II Evaluation
Paducah, KY

Station 51+30
Drained
Page 2 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 11:44:59

****
* SOIL PRESSURES FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+00.00 - 51+47.64
'Monolith 143/144, Drained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.0	436.8	152.6	20.7	304.9	568.7	20.7	152.6
342.0	436.8	305.2	41.5	173.1	700.5	41.5	305.2
341.0	436.8	457.8	62.2	41.2	832.4	62.2	457.8
340.7	436.8	505.5	68.7	0.0	873.6	68.7	505.5
340.0	436.8	610.4	83.0	-90.6	964.2	83.0	610.4
339.0	436.8	763.0	103.7	-222.5	1096.1	103.7	763.0
338.0	436.8	915.6	124.5	-354.3	1227.9	124.5	915.6
337.0	436.8	1068.2	145.2	-486.2	1359.8	145.2	1068.2

Subject: Phase II Evaluation
Paducah, KY

Station 51+30
Drained
Page 3 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

336.0	436.8	1220.8	166.0	-618.0	1491.6	166.0	1220.8
335.0	436.8	1373.4	186.7	-749.9	1623.5	186.7	1373.4
334.0	436.8	1526.0	207.4	-881.7	1755.3	207.4	1526.0
333.0	436.8	1678.6	228.2	-1013.6	1887.2	228.2	1678.6
332.0	436.8	1831.2	248.9	-1145.5	2019.1	248.9	1831.2
331.0	436.8	1983.8	269.7	-1277.3	2150.9	269.7	1983.8
330.0	436.8	2136.4	290.4	-1409.2	2282.8	290.4	2136.4
329.0	436.8	2289.0	311.2	-1541.0	2414.6	311.2	2289.0
328.0	436.8	2441.6	331.9	-1672.9	2546.5	331.9	2441.6
327.0	436.8	2594.2	352.6	-1804.7	2678.3	352.6	2594.2
326.0	436.8	2746.8	373.4	-1936.6	2810.2	373.4	2746.8
325.0	436.8	2899.4	394.1	-2068.4	2942.0	394.1	2899.4
324.0	436.8	3052.0	414.9	-2200.3	3073.9	414.9	3052.0
323.0	436.8	3204.6	435.6	-2332.1	3205.7	435.6	3204.6
322.0	436.8	3357.2	456.4	-2464.0	3337.6	456.4	3357.2
321.0	436.8	3509.8	477.1	-2595.9	3469.5	477.1	3509.8
320.0	436.8	3662.4	497.9	-2727.7	3601.3	497.9	3662.4
319.0	436.8	3815.0	518.6	-2859.6	3733.2	518.6	3815.0
318.0	436.8	3967.6	539.3	-2991.4	3865.0	539.3	3967.6
317.0	436.8	4120.2	560.1	-3123.3	3996.9	560.1	4120.2
316.0	436.8	4272.8	580.8	-3255.1	4128.7	580.8	4272.8
315.0	436.8	4425.4	601.6	-3387.0	4260.6	601.6	4425.4
314.0	436.8	4578.0	622.3	-3518.8	4392.4	622.3	4578.0
313.0	436.8	4730.6	643.1	-3650.7	4524.3	643.1	4730.6

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 11:45:00

****
* SUMMARY OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+00.00 - 51+47.64
'Monolith 143/144, Drained

II.--SUMMARY

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

WALL BOTTOM ELEV. (FT) : 327.02
PENETRATION (FT) : 16.98

Subject: Phase II Evaluation
Paducah, KY

Station 51+30
Drained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

MAX. BEND. MOMENT (LB-FT) : 1.9006E+04
AT ELEVATION (FT) : 334.84

MAX. SCALED DEFL. (LB-IN^3): 5.2447E+09
AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 11:45:00

****
* COMPLETE OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+00.00 - 51+47.64
'Monolith 143/144, Drained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	5.2447E+09	0.00
350.00	1.0400E+01	31.	4.8924E+09	62.40
349.00	8.3200E+01	125.	4.5402E+09	124.80
348.00	2.8080E+02	281.	4.1881E+09	187.20
347.00	6.6560E+02	499.	3.8365E+09	249.60
346.00	1.3000E+03	780.	3.4861E+09	312.00
345.00	2.2464E+03	1123.	3.1380E+09	374.40
344.00	3.5672E+03	1529.	2.7938E+09	436.80
343.00	5.2924E+03	1900.	2.4559E+09	304.95
342.00	7.3226E+03	2139.	2.1271E+09	173.09
341.00	9.5259E+03	2246.	1.8110E+09	41.24
340.69	1.0230E+04	2252.	1.7154E+09	0.00
340.00	1.1770E+04	2221.	1.5114E+09	-90.62
339.00	1.3924E+04	2065.	1.2321E+09	-222.47
338.00	1.5856E+04	1776.	9.7689E+08	-354.33
337.00	1.7433E+04	1356.	7.4898E+08	-486.18
336.00	1.8524E+04	804.	5.5112E+08	-618.04
335.00	1.8996E+04	120.	3.8519E+08	-749.89
334.00	1.8719E+04	-696.	2.5197E+08	-881.74
333.00	1.7561E+04	-1644.	1.5097E+08	-1013.60
332.00	1.5388E+04	-2723.	8.0175E+07	-1145.45
331.52	1.3933E+04	-3293.	5.5692E+07	-1209.31
331.00	1.2093E+04	-3802.	3.5803E+07	-763.43
330.00	8.0537E+03	-4133.	1.2219E+07	101.19
329.00	4.1153E+03	-3600.	2.5668E+06	965.80

328.00	1.1426E+03	-2202.	1.6435E+05	1830.42
327.02	0.0000E+00	0.	0.0000E+00	2675.32

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION	PRESSURE	PASSIVE	ACTIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.00	437.	153.	21.	21.	153.
342.00	437.	305.	41.	41.	305.
341.00	437.	458.	62.	62.	458.
340.69	437.	506.	69.	69.	506.
340.00	437.	610.	83.	83.	610.
339.00	437.	763.	104.	104.	763.
338.00	437.	916.	124.	124.	916.
337.00	437.	1068.	145.	145.	1068.
336.00	437.	1221.	166.	166.	1221.
335.00	437.	1373.	187.	187.	1373.
334.00	437.	1526.	207.	207.	1526.
333.00	437.	1679.	228.	228.	1679.
332.00	437.	1831.	249.	249.	1831.
331.52	437.	1905.	259.	259.	1905.
331.00	437.	1984.	270.	270.	1984.
330.00	437.	2136.	290.	290.	2136.
329.00	437.	2289.	311.	311.	2289.
328.00	437.	2442.	332.	332.	2442.
327.02	437.	2594.	353.	353.	2594.
326.00	437.	2747.	373.	373.	2747.

Subject: Phase II Evaluation
Paducah, KY

Station 51+30
Undrained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:30:18

****
* INPUT DATA *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+00.00 - 51+47.64
'Monoliths 143 & 144, Undrained

II.--CONTROL
CANTILEVER WALL DESIGN
FACTOR OF SAFETY FOR ACTIVE PRESSURES = 1.00
FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

III.--WALL DATA
ELEVATION AT TOP OF WALL = 351.00 FT.

IV.--SURFACE POINT DATA

IV.A.--RIGHTSIDE

DIST. FROM WALL (FT)	ELEVATION (FT)
0.00	344.00

IV.B.--LEFTSIDE

DIST. FROM WALL (FT)	ELEVATION (FT)
0.00	344.00

V.--SOIL LAYER DATA

V.A.--RIGHTSIDE
LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE = DEFAULT
LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

SAT. WGHT. (PCF)	MOIST WGHT. (PCF)	ANGLE OF INTERNAL FRICTION (DEG)	COH-ESION (PSF)	ANGLE OF WALL FRICTION (DEG)	ADH-ESION (PSF)	<--BOTTOM--> ELEV. (FT)	SLOPE (FT/FT)	<-SAFETY-> <-FACTOR-> ACT.	PASS.
125.00	125.00	0.00	1000.00	0.00	500.00			DEF	DEF

V.B.--LEFTSIDE
LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE = DEFAULT
LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

SAT. WGHT. (PCF)	MOIST WGHT. (PCF)	ANGLE OF INTERNAL FRICTION (DEG)	COH-ESION (PSF)	ANGLE OF WALL FRICTION (DEG)	ADH-ESION (PSF)	<--BOTTOM--> ELEV. (FT)	SLOPE (FT/FT)	<-SAFETY-> <-FACTOR-> ACT.	PASS.
125.00	125.00	0.00	1000.00	0.00	500.00			DEF	DEF

VI.--WATER DATA
UNIT WEIGHT = 62.40 (PCF)
RIGHTSIDE ELEVATION = 351.00 (FT)
LEFTSIDE ELEVATION = 344.00 (FT)

Subject: Phase II Evaluation
Paducah, KY

Station 51+30
Undrained
Page 2 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:31:36

****
* SOIL PRESSURES FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+00.00 - 51+47.64
'Monoliths 143 & 144, Undrained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0+	436.8	0.0	0.0	436.8	436.8	0.0	0.0
344.0-	436.8	1333.3	0.0	-896.5	1770.1	0.0	1333.3
343.0	436.8	1695.6	0.0	-1258.8	2132.4	0.0	1695.6
342.0	436.8	1758.2	0.0	-1321.4	2195.0	0.0	1758.2
341.0	436.8	1820.8	0.0	-1384.0	2257.6	0.0	1820.8
340.0	436.8	1883.4	0.0	-1446.6	2320.2	0.0	1883.4
339.0	436.8	1946.0	0.0	-1509.2	2382.8	0.0	1946.0
338.0	436.8	2008.6	0.0	-1571.8	2445.4	0.0	2008.6
337.0	436.8	2071.2	0.0	-1634.4	2508.0	0.0	2071.2
336.0	436.8	2133.8	0.0	-1697.0	2570.6	0.0	2133.8
335.0	436.8	2196.4	0.0	-1759.6	2633.2	0.0	2196.4

334.0	436.8	2259.0	0.0	-1822.2	2695.8	0.0	2259.0
333.0	436.8	2321.6	0.0	-1884.8	2758.4	0.0	2321.6
332.0	436.8	2384.2	0.0	-1947.4	2821.0	0.0	2384.2
331.0	436.8	2446.8	0.0	-2010.0	2883.6	0.0	2446.8
330.0	436.8	2509.4	0.0	-2072.6	2946.2	0.0	2509.4
329.0	436.8	2572.0	0.0	-2135.2	3008.8	0.0	2572.0
328.0	436.8	2634.6	0.0	-2197.8	3071.4	0.0	2634.6
327.0	436.8	2697.2	0.0	-2260.4	3134.0	0.0	2697.2
326.0	436.8	2759.8	0.0	-2323.0	3196.6	0.0	2759.8
325.0	436.8	2822.4	0.0	-2385.6	3259.2	0.0	2822.4
324.0	436.8	2885.0	0.0	-2448.2	3321.8	0.0	2885.0
323.0	436.8	2947.6	0.0	-2510.8	3384.4	0.0	2947.6
322.0	436.8	3010.2	0.0	-2573.4	3447.0	0.0	3010.2
321.0	436.8	3072.8	0.0	-2636.0	3509.6	0.0	3072.8
320.0	436.8	3135.4	0.0	-2698.6	3572.2	0.0	3135.4
319.0	436.8	3198.0	0.0	-2761.2	3634.8	0.0	3198.0
318.0	436.8	3260.6	0.0	-2823.8	3697.4	0.0	3260.6
317.0	436.8	3323.2	0.0	-2886.4	3760.0	0.0	3323.2
316.0	436.8	3385.8	0.0	-2949.0	3822.6	0.0	3385.8
315.0	436.8	3448.4	0.0	-3011.6	3885.2	0.0	3448.4
314.0	436.8	3511.0	0.0	-3074.2	3947.8	0.0	3511.0
313.0	436.8	3573.6	0.0	-3136.8	4010.4	0.0	3573.6

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:31:37

****
* SUMMARY OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+00.00 - 51+47.64
'Monoliths 143 & 144, Undrained

II.--SUMMARY

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

WALL BOTTOM ELEV. (FT) : 338.97
PENETRATION (FT) : 5.03

MAX. BEND. MOMENT (LB-FT) : 4.6677E+03
AT ELEVATION (FT) : 342.64

MAX. SCALED DEFL. (LB-IN^3): 2.8613E+08

Subject: Phase II Evaluation
Paducah, KY

Station 51+30
Undrained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:31:37

****
* COMPLETE OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+00.00 - 51+47.64
'Monoliths 143 & 144, Undrained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	2.8613E+08	0.00
350.00	1.0400E+01	31.	2.4966E+08	62.40
349.00	8.3200E+01	125.	2.1323E+08	124.80
348.00	2.8080E+02	281.	1.7695E+08	187.20
347.00	6.6560E+02	499.	1.4119E+08	249.60
346.00	1.3000E+03	780.	1.0661E+08	312.00
345.00	2.2464E+03	1123.	7.4329E+07	374.40
344.00	3.5672E+03	1529.	4.5979E+07	436.80
344.00	3.5672E+03	1529.	4.5979E+07	-896.53
343.00	4.5873E+03	451.	2.3755E+07	-1258.85
342.00	4.3986E+03	-839.	9.2808E+06	-1321.45
341.60	3.9610E+03	-1368.	5.6850E+06	-1346.29
341.00	2.9425E+03	-1923.	2.2186E+06	-492.09
340.00	1.0097E+03	-1707.	1.7038E+05	923.92
339.00	8.3395E-01	-75.	-1.3745E-01	2339.94
338.97	0.0000E+00	0.	0.0000E+00	2384.83

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION (FT)	PRESSURE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
351.00	0.	0.	0.	0.	0.

Subject: Phase II Evaluation
Paducah, KY

Station 51+30
Undrained
Page 5 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00+	437.	0.	0.	0.	0.
344.00+	437.	1333.	0.	0.	1333.
343.00	437.	1696.	0.	0.	1696.
342.00	437.	1758.	0.	0.	1758.
341.60	437.	1783.	0.	0.	1783.
341.00	437.	1821.	0.	0.	1821.
340.00	437.	1883.	0.	0.	1883.
339.00	437.	1946.	0.	0.	1946.
338.97	437.	2009.	0.	0.	2009.
337.00	437.	2071.	0.	0.	2071.

Subject: Phase II Evaluation
Paducah, KY

Station 51+60
Drained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

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 PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
 DATE: 1-AUGUST-2007                                          TIME: 11:51:08

                            ****************
                            *  INPUT DATA  *
                            ****************

      I.--HEADING
      'Phase II I-Wall Evaluation
      'Paducah, KY
      'Stations 51+47.64 - 51+67.64
      'Monolith 145, Drained

      II.--CONTROL
         CANTILEVER WALL DESIGN
         FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
         FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

     III.--WALL DATA
         ELEVATION AT TOP OF WALL    = 351.00 FT.

      IV.--SURFACE POINT DATA

           IV.A.--RIGHTSIDE
              DIST. FROM     ELEVATION
              WALL (FT)         (FT)
                   0.00        344.50

           IV.B.--LEFTSIDE
              DIST. FROM     ELEVATION
              WALL (FT)         (FT)
                   0.00        344.50

       V.--SOIL LAYER DATA

          V.A.--RIGHTSIDE
              LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
              LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                 ANGLE OF          ANGLE OF                          <-SAFETY->
  SAT.   MOIST   INTERNAL  COH-      WALL     ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION   ESION  FRICTION    ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)    (PSF)    (DEG)     (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00     0.00    17.33      0.00                   DEF  DEF

          V.B.--LEFTSIDE
              LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
              LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                 ANGLE OF          ANGLE OF                          <-SAFETY->
  SAT.   MOIST   INTERNAL  COH-      WALL     ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION   ESION  FRICTION    ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)    (PSF)    (DEG)     (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00     0.00    17.33      0.00                   DEF  DEF

      VI.--WATER DATA
         UNIT WEIGHT          = 62.40 (PCF)
         RIGHTSIDE ELEVATION = 351.00 (FT)
         LEFTSIDE ELEVATION  = 344.50 (FT)
```

Subject: Phase II Evaluation
Paducah, KY

Station 51+60
Drained
Page 2 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 11:51:31

****
* SOIL PRESSURES FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+47.64 - 51+67.64
'Monolith 145, Drained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.5	405.6	0.0	0.0	405.6	405.6	0.0	0.0
344.0	405.6	76.3	10.4	339.7	471.5	10.4	76.3
343.5	405.6	152.6	20.7	273.7	537.5	20.7	152.6
343.0	405.6	228.9	31.1	207.8	603.4	31.1	228.9
342.0	405.6	381.5	51.9	76.0	735.2	51.9	381.5
341.4	405.6	469.4	63.8	0.0	811.2	63.8	469.4
341.0	405.6	534.1	72.6	-55.9	867.1	72.6	534.1
340.0	405.6	686.7	93.3	-187.7	998.9	93.3	686.7
339.0	405.6	839.3	114.1	-319.6	1130.8	114.1	839.3

Subject: Phase II Evaluation
Paducah, KY

Station 51+60
Drained
Page 3 of 5

Computed by: N. Cash
Date: 1 August 2007
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338.0	405.6	991.9	134.8	-451.5	1262.7	134.8	991.9
337.0	405.6	1144.5	155.6	-583.3	1394.5	155.6	1144.5
336.0	405.6	1297.1	176.3	-715.2	1526.4	176.3	1297.1
335.0	405.6	1449.7	197.1	-847.0	1658.2	197.1	1449.7
334.0	405.6	1602.3	217.8	-978.9	1790.1	217.8	1602.3
333.0	405.6	1754.9	238.6	-1110.7	1921.9	238.6	1754.9
332.0	405.6	1907.5	259.3	-1242.6	2053.8	259.3	1907.5
331.0	405.6	2060.1	280.0	-1374.4	2185.6	280.0	2060.1
330.0	405.6	2212.7	300.8	-1506.3	2317.5	300.8	2212.7
329.0	405.6	2365.3	321.5	-1638.1	2449.3	321.5	2365.3
328.0	405.6	2517.9	342.3	-1770.0	2581.2	342.3	2517.9
327.0	405.6	2670.5	363.0	-1901.9	2713.1	363.0	2670.5
326.0	405.6	2823.1	383.8	-2033.7	2844.9	383.8	2823.1
325.0	405.6	2975.7	404.5	-2165.6	2976.8	404.5	2975.7
324.0	405.6	3128.3	425.3	-2297.4	3108.6	425.3	3128.3
323.0	405.6	3280.9	446.0	-2429.3	3240.5	446.0	3280.9
322.0	405.6	3433.5	466.7	-2561.1	3372.3	466.7	3433.5
321.0	405.6	3586.1	487.5	-2693.0	3504.2	487.5	3586.1
320.0	405.6	3738.7	508.2	-2824.8	3636.0	508.2	3738.7
319.0	405.6	3891.3	529.0	-2956.7	3767.9	529.0	3891.3
318.0	405.6	4043.9	549.7	-3088.5	3899.7	549.7	4043.9
317.0	405.6	4196.5	570.5	-3220.4	4031.6	570.5	4196.5
316.0	405.6	4349.1	591.2	-3352.3	4163.5	591.2	4349.1
315.0	405.6	4501.7	611.9	-3484.1	4295.3	611.9	4501.7
314.0	405.6	4654.3	632.7	-3616.0	4427.2	632.7	4654.3

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 11:51:33

****
* SUMMARY OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+47.64 - 51+67.64
'Monolith 145, Drained

II.--SUMMARY

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

WALL BOTTOM ELEV. (FT) : 328.74
PENETRATION (FT) : 15.76

Subject: Phase II Evaluation
Paducah, KY

Station 51+60
Drained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

MAX. BEND. MOMENT (LB-FT) : 1.5217E+04
AT ELEVATION (FT) : 336.00

MAX. SCALED DEFL. (LB-IN^3): 3.6208E+09
AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 11:51:33

****
* COMPLETE OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+47.64 - 51+67.64
'Monolith 145, Drained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	3.6208E+09	0.00
350.00	1.0400E+01	31.	3.3588E+09	62.40
349.00	8.3200E+01	125.	3.0970E+09	124.80
348.00	2.8080E+02	281.	2.8352E+09	187.20
347.00	6.6560E+02	499.	2.5740E+09	249.60
346.00	1.3000E+03	780.	2.3140E+09	312.00
345.00	2.2464E+03	1123.	2.0563E+09	374.40
344.50	2.8561E+03	1318.	1.9288E+09	405.60
344.00	3.5632E+03	1505.	1.8025E+09	339.67
343.50	4.3551E+03	1658.	1.6777E+09	273.75
343.00	5.2155E+03	1778.	1.5549E+09	207.82
342.00	7.0757E+03	1920.	1.3163E+09	75.96
341.42	8.1904E+03	1942.	1.1842E+09	0.00
341.00	9.0119E+03	1930.	1.0900E+09	-55.89
340.00	1.0892E+04	1808.	8.7927E+08	-187.74
339.00	1.2585E+04	1555.	6.8732E+08	-319.60
338.00	1.3958E+04	1169.	5.1707E+08	-451.45
337.00	1.4879E+04	652.	3.7087E+08	-583.31
336.00	1.5217E+04	3.	2.5030E+08	-715.16
335.00	1.4840E+04	-779.	1.5592E+08	-847.02
334.00	1.3616E+04	-1691.	8.7064E+07	-978.87
333.00	1.1413E+04	-2736.	4.1595E+07	-1110.73
332.91	1.1155E+04	-2840.	3.8450E+07	-1122.93
332.00	8.2238E+03	-3503.	1.5698E+07	-338.33

Subject: Phase II Evaluation
Paducah, KY

Station 51+60
Drained
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Computed by: N. Cash
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331.00	4.6961E+03	-3409.	3.9620E+06	526.29
330.00	1.6947E+03	-2450.	4.1705E+05	1390.91
329.00	8.4230E+01	-627.	8.5914E+02	2255.52
328.74	0.0000E+00	0.	0.0000E+00	2484.22

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION	PRESSURE	PASSIVE	ACTIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.50	406.	0.	0.	0.	0.
344.00	406.	76.	10.	10.	76.
343.50	406.	153.	21.	21.	153.
343.00	406.	229.	31.	31.	229.
342.00	406.	381.	52.	52.	381.
341.42	406.	469.	64.	64.	469.
341.00	406.	534.	73.	73.	534.
340.00	406.	687.	93.	93.	687.
339.00	406.	839.	114.	114.	839.
338.00	406.	992.	135.	135.	992.
337.00	406.	1144.	156.	156.	1144.
336.00	406.	1297.	176.	176.	1297.
335.00	406.	1450.	197.	197.	1450.
334.00	406.	1602.	218.	218.	1602.
333.00	406.	1755.	239.	239.	1755.
332.91	406.	1769.	240.	240.	1769.
332.00	406.	1907.	259.	259.	1907.
331.00	406.	2060.	280.	280.	2060.
330.00	406.	2213.	301.	301.	2213.
329.00	406.	2365.	322.	322.	2365.
328.74	406.	2518.	342.	342.	2518.
327.00	406.	2670.	363.	363.	2670.

Subject: Phase II Evaluation
Paducah, KY

Station 51+60
Undrained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:34:23

****
* INPUT DATA *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+47.64 - 51+ 67.64
'Monolith 145, Undrained

II.--CONTROL
CANTILEVER WALL DESIGN
FACTOR OF SAFETY FOR ACTIVE PRESSURES = 1.00
FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

III.--WALL DATA
ELEVATION AT TOP OF WALL = 351.00 FT.

IV.--SURFACE POINT DATA

IV.A.--RIGHTSIDE

DIST. FROM WALL (FT)	ELEVATION (FT)
0.00	344.50

IV.B.--LEFTSIDE

DIST. FROM WALL (FT)	ELEVATION (FT)
0.00	344.50

V.--SOIL LAYER DATA

V.A.--RIGHTSIDE
LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE = DEFAULT
LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

SAT. WGHT. (PCF)	MOIST WGHT. (PCF)	ANGLE OF INTERNAL FRICTION (DEG)	COH-ESION (PSF)	ANGLE OF WALL FRICTION (DEG)	ADH-ESION (PSF)	<--BOTTOM--> ELEV. (FT)	SLOPE (FT/FT)	<-SAFETY-> <-FACTOR-> ACT.	PASS.
125.00	125.00	0.00	1000.00	0.00	500.00			DEF	DEF

V.B.--LEFTSIDE
LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE = DEFAULT
LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

SAT. WGHT. (PCF)	MOIST WGHT. (PCF)	ANGLE OF INTERNAL FRICTION (DEG)	COH-ESION (PSF)	ANGLE OF WALL FRICTION (DEG)	ADH-ESION (PSF)	<--BOTTOM--> ELEV. (FT)	SLOPE (FT/FT)	<-SAFETY-> <-FACTOR-> ACT.	PASS.
125.00	125.00	0.00	1000.00	0.00	500.00			DEF	DEF

VI.--WATER DATA
UNIT WEIGHT = 62.40 (PCF)
RIGHTSIDE ELEVATION = 351.00 (FT)
LEFTSIDE ELEVATION = 344.50 (FT)

Subject: Phase II Evaluation
Paducah, KY

Station 51+60
Undrained
Page 2 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:34:42

****
* SOIL PRESSURES FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+47.64 - 51+ 67.64
'Monolith 145, Undrained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.5+	405.6	0.0	0.0	405.6	405.6	0.0	0.0
344.5-	405.6	1333.3	0.0	-927.7	1738.9	0.0	1333.3
344.0	405.6	1664.3	0.0	-1258.7	2069.9	0.0	1664.3
343.5	405.6	1695.6	0.0	-1290.0	2101.2	0.0	1695.6
343.0	405.6	1726.9	0.0	-1321.3	2132.5	0.0	1726.9
342.0	405.6	1789.5	0.0	-1383.9	2195.1	0.0	1789.5
341.0	405.6	1852.1	0.0	-1446.5	2257.7	0.0	1852.1
340.0	405.6	1914.7	0.0	-1509.1	2320.3	0.0	1914.7
339.0	405.6	1977.3	0.0	-1571.7	2382.9	0.0	1977.3
338.0	405.6	2039.9	0.0	-1634.3	2445.5	0.0	2039.9
337.0	405.6	2102.5	0.0	-1696.9	2508.1	0.0	2102.5

Subject: Phase II Evaluation
Paducah, KY

Station 51+60
Undrained
Page 3 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

336.0	405.6	2165.1	0.0	-1759.5	2570.7	0.0	2165.1
335.0	405.6	2227.7	0.0	-1822.1	2633.3	0.0	2227.7
334.0	405.6	2290.3	0.0	-1884.7	2695.9	0.0	2290.3
333.0	405.6	2352.9	0.0	-1947.3	2758.5	0.0	2352.9
332.0	405.6	2415.5	0.0	-2009.9	2821.1	0.0	2415.5
331.0	405.6	2478.1	0.0	-2072.5	2883.7	0.0	2478.1
330.0	405.6	2540.7	0.0	-2135.1	2946.3	0.0	2540.7
329.0	405.6	2603.3	0.0	-2197.7	3008.9	0.0	2603.3
328.0	405.6	2665.9	0.0	-2260.3	3071.5	0.0	2665.9
327.0	405.6	2728.5	0.0	-2322.9	3134.1	0.0	2728.5
326.0	405.6	2791.1	0.0	-2385.5	3196.7	0.0	2791.1
325.0	405.6	2853.7	0.0	-2448.1	3259.3	0.0	2853.7
324.0	405.6	2916.3	0.0	-2510.7	3321.9	0.0	2916.3
323.0	405.6	2978.9	0.0	-2573.3	3384.5	0.0	2978.9
322.0	405.6	3041.5	0.0	-2635.9	3447.1	0.0	3041.5
321.0	405.6	3104.1	0.0	-2698.5	3509.7	0.0	3104.1
320.0	405.6	3166.7	0.0	-2761.1	3572.3	0.0	3166.7
319.0	405.6	3229.3	0.0	-2823.7	3634.9	0.0	3229.3
318.0	405.6	3291.9	0.0	-2886.3	3697.5	0.0	3291.9
317.0	405.6	3354.5	0.0	-2948.9	3760.1	0.0	3354.5
316.0	405.6	3417.1	0.0	-3011.5	3822.7	0.0	3417.1
315.0	405.6	3479.7	0.0	-3074.1	3885.3	0.0	3479.7
314.0	405.6	3542.3	0.0	-3136.7	3947.9	0.0	3542.3

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:34:42

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*****************************
*  SUMMARY OF RESULTS FOR   *
*  CANTILEVER WALL DESIGN   *
*****************************
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I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+47.64 - 51+ 67.64
'Monolith 145, Undrained

II.--SUMMARY

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

WALL BOTTOM ELEV. (FT) : 340.13
PENETRATION (FT) : 4.37

MAX. BEND. MOMENT (LB-FT) : 3.6196E+03
AT ELEVATION (FT) : 343.40

Subject: Phase II Evaluation
Paducah, KY

Station 51+60
Undrained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

MAX. SCALED DEFL. (LB-IN^3): 1.7908E+08
AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF
ELASTICITY IN PSI TIMES PILE MOMENT
OF INERTIA IN IN^4 TO OBTAIN DEFLECTION
IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS
DATE: 1-AUGUST-2007 TIME: 13:34:42

****
* COMPLETE OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+47.64 - 51+ 67.64
'Monolith 145, Undrained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	1.7908E+08	0.00
350.00	1.0400E+01	31.	1.5396E+08	62.40
349.00	8.3200E+01	125.	1.2886E+08	124.80
348.00	2.8080E+02	281.	1.0392E+08	187.20
347.00	6.6560E+02	499.	7.9500E+07	249.60
346.00	1.3000E+03	780.	5.6262E+07	312.00
345.00	2.2464E+03	1123.	3.5315E+07	374.40
344.50	2.8561E+03	1318.	2.6190E+07	405.60
344.50	2.8561E+03	1318.	2.6190E+07	-927.73
344.00	3.3854E+03	772.	1.8297E+07	-1258.75
343.50	3.6126E+03	134.	1.1855E+07	-1290.05
343.00	3.5172E+03	-518.	6.9627E+06	-1321.35
342.53	3.1235E+03	-1150.	3.7263E+06	-1350.93
342.00	2.3666E+03	-1650.	1.5166E+06	-543.76
341.00	7.0022E+02	-1428.	8.2305E+04	986.76
340.13	0.0000E+00	0.	0.0000E+00	2311.95

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF
ELASTICITY IN PSI TIMES PILE MOMENT
OF INERTIA IN IN^4 TO OBTAIN DEFLECTION
IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION (FT)	PRESSURE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)

Subject: Phase II Evaluation
Paducah, KY

Station 51+60
Undrained
Page 5 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.50+	406.	0.	0.	0.	0.
344.50+	406.	1333.	0.	0.	1333.
344.00	406.	1664.	0.	0.	1664.
343.50	406.	1696.	0.	0.	1696.
343.00	406.	1727.	0.	0.	1727.
342.53	406.	1757.	0.	0.	1757.
342.00	406.	1790.	0.	0.	1790.
341.00	406.	1852.	0.	0.	1852.
340.13	406.	1915.	0.	0.	1915.
339.00	406.	1977.	0.	0.	1977.

Subject: Phase II Evaluation
Paducah, KY

Station 53+10
Drained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

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PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                        TIME: 11:56:50

                            ****************
                            *  INPUT DATA  *
                            ****************

 I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+96.90 - 54+17.98
'Monolith 151, Drained

II.--CONTROL
   CANTILEVER WALL DESIGN
   FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
   FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

III.--WALL DATA
   ELEVATION AT TOP OF WALL    = 351.00 FT.

 IV.--SURFACE POINT DATA

      IV.A.--RIGHTSIDE
         DIST. FROM     ELEVATION
         WALL (FT)         (FT)
              0.00        344.00

      IV.B.--LEFTSIDE
         DIST. FROM     ELEVATION
         WALL (FT)         (FT)
              0.00        344.00

  V.--SOIL LAYER DATA

     V.A.--RIGHTSIDE
         LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
         LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

            ANGLE OF          ANGLE OF                          <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33    0.00                  DEF  DEF

     V.B.--LEFTSIDE
         LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
         LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

            ANGLE OF          ANGLE OF                          <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33    0.00                  DEF  DEF

 VI.--WATER DATA
     UNIT WEIGHT          = 62.40 (PCF)
     RIGHTSIDE ELEVATION  = 351.00 (FT)
     LEFTSIDE ELEVATION   = 344.00 (FT)
```

Subject: Phase II Evaluation
Paducah, KY

Station 53+10
Drained
Page 2 of 5

Computed by: N. Cash
Date: 1 August 2007
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Date: 18 Sept 07

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 11:57:18

****
* SOIL PRESSURES FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+96.90 - 54+17.98
'Monolith 151, Drained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.0	436.8	152.6	20.7	304.9	568.7	20.7	152.6
342.0	436.8	305.2	41.5	173.1	700.5	41.5	305.2
341.0	436.8	457.8	62.2	41.2	832.4	62.2	457.8
340.7	436.8	505.5	68.7	0.0	873.6	68.7	505.5
340.0	436.8	610.4	83.0	-90.6	964.2	83.0	610.4
339.0	436.8	763.0	103.7	-222.5	1096.1	103.7	763.0
338.0	436.8	915.6	124.5	-354.3	1227.9	124.5	915.6
337.0	436.8	1068.2	145.2	-486.2	1359.8	145.2	1068.2

Subject: Phase II Evaluation
Paducah, KY

Station 53+10
Drained
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Computed by: N. Cash
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336.0	436.8	1220.8	166.0	-618.0	1491.6	166.0	1220.8
335.0	436.8	1373.4	186.7	-749.9	1623.5	186.7	1373.4
334.0	436.8	1526.0	207.4	-881.7	1755.3	207.4	1526.0
333.0	436.8	1678.6	228.2	-1013.6	1887.2	228.2	1678.6
332.0	436.8	1831.2	248.9	-1145.5	2019.1	248.9	1831.2
331.0	436.8	1983.8	269.7	-1277.3	2150.9	269.7	1983.8
330.0	436.8	2136.4	290.4	-1409.2	2282.8	290.4	2136.4
329.0	436.8	2289.0	311.2	-1541.0	2414.6	311.2	2289.0
328.0	436.8	2441.6	331.9	-1672.9	2546.5	331.9	2441.6
327.0	436.8	2594.2	352.6	-1804.7	2678.3	352.6	2594.2
326.0	436.8	2746.8	373.4	-1936.6	2810.2	373.4	2746.8
325.0	436.8	2899.4	394.1	-2068.4	2942.0	394.1	2899.4
324.0	436.8	3052.0	414.9	-2200.3	3073.9	414.9	3052.0
323.0	436.8	3204.6	435.6	-2332.1	3205.7	435.6	3204.6
322.0	436.8	3357.2	456.4	-2464.0	3337.6	456.4	3357.2
321.0	436.8	3509.8	477.1	-2595.9	3469.5	477.1	3509.8
320.0	436.8	3662.4	497.9	-2727.7	3601.3	497.9	3662.4
319.0	436.8	3815.0	518.6	-2859.6	3733.2	518.6	3815.0
318.0	436.8	3967.6	539.3	-2991.4	3865.0	539.3	3967.6
317.0	436.8	4120.2	560.1	-3123.3	3996.9	560.1	4120.2
316.0	436.8	4272.8	580.8	-3255.1	4128.7	580.8	4272.8
315.0	436.8	4425.4	601.6	-3387.0	4260.6	601.6	4425.4
314.0	436.8	4578.0	622.3	-3518.8	4392.4	622.3	4578.0
313.0	436.8	4730.6	643.1	-3650.7	4524.3	643.1	4730.6

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 11:57:20

****
* SUMMARY OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+96.90 - 54+17.98
'Monolith 151, Drained

II.--SUMMARY

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

WALL BOTTOM ELEV. (FT) : 327.02
PENETRATION (FT) : 16.98

Subject: Phase II Evaluation
Paducah, KY

Station 53+10
Drained
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Computed by: N. Cash
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MAX. BEND. MOMENT (LB-FT) : 1.9006E+04
AT ELEVATION (FT) : 334.84

MAX. SCALED DEFL. (LB-IN^3): 5.2447E+09
AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 11:57:20

****
* COMPLETE OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+96.90 - 54+17.98
'Monolith 151, Drained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	5.2447E+09	0.00
350.00	1.0400E+01	31.	4.8924E+09	62.40
349.00	8.3200E+01	125.	4.5402E+09	124.80
348.00	2.8080E+02	281.	4.1881E+09	187.20
347.00	6.6560E+02	499.	3.8365E+09	249.60
346.00	1.3000E+03	780.	3.4861E+09	312.00
345.00	2.2464E+03	1123.	3.1380E+09	374.40
344.00	3.5672E+03	1529.	2.7938E+09	436.80
343.00	5.2924E+03	1900.	2.4559E+09	304.95
342.00	7.3226E+03	2139.	2.1271E+09	173.09
341.00	9.5259E+03	2246.	1.8110E+09	41.24
340.69	1.0230E+04	2252.	1.7154E+09	0.00
340.00	1.1770E+04	2221.	1.5114E+09	-90.62
339.00	1.3924E+04	2065.	1.2321E+09	-222.47
338.00	1.5856E+04	1776.	9.7689E+08	-354.33
337.00	1.7433E+04	1356.	7.4898E+08	-486.18
336.00	1.8524E+04	804.	5.5112E+08	-618.04
335.00	1.8996E+04	120.	3.8519E+08	-749.89
334.00	1.8719E+04	-696.	2.5197E+08	-881.74
333.00	1.7561E+04	-1644.	1.5097E+08	-1013.60
332.00	1.5388E+04	-2723.	8.0175E+07	-1145.45
331.52	1.3933E+04	-3293.	5.5692E+07	-1209.31
331.00	1.2093E+04	-3802.	3.5803E+07	-763.43
330.00	8.0537E+03	-4133.	1.2219E+07	101.19
329.00	4.1153E+03	-3600.	2.5668E+06	965.80

Subject: Phase II Evaluation
Paducah, KY

Station 53+10
Drained
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Computed by: N. Cash
Date: 1 August 2007
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Date: 18 Sept 07

328.00	1.1426E+03	-2202.	1.6435E+05	1830.42
327.02	0.0000E+00	0.	0.0000E+00	2675.32

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION (FT)	PRESSURE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.00	437.	153.	21.	21.	153.
342.00	437.	305.	41.	41.	305.
341.00	437.	458.	62.	62.	458.
340.69	437.	506.	69.	69.	506.
340.00	437.	610.	83.	83.	610.
339.00	437.	763.	104.	104.	763.
338.00	437.	916.	124.	124.	916.
337.00	437.	1068.	145.	145.	1068.
336.00	437.	1221.	166.	166.	1221.
335.00	437.	1373.	187.	187.	1373.
334.00	437.	1526.	207.	207.	1526.
333.00	437.	1679.	228.	228.	1679.
332.00	437.	1831.	249.	249.	1831.
331.52	437.	1905.	259.	259.	1905.
331.00	437.	1984.	270.	270.	1984.
330.00	437.	2136.	290.	290.	2136.
329.00	437.	2289.	311.	311.	2289.
328.00	437.	2442.	332.	332.	2442.
327.02	437.	2594.	353.	353.	2594.
326.00	437.	2747.	373.	373.	2747.

Subject: Phase II Evaluation
Paducah, KY

Station 53+10
Undrained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:37:37

****
* INPUT DATA *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+96.90 - 54+17.98
'Monolith 151, Undrained

II.--CONTROL
CANTILEVER WALL DESIGN
FACTOR OF SAFETY FOR ACTIVE PRESSURES = 1.00
FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

III.--WALL DATA
ELEVATION AT TOP OF WALL = 351.00 FT.

IV.--SURFACE POINT DATA

IV.A.--RIGHTSIDE

DIST. FROM WALL (FT)	ELEVATION (FT)
0.00	344.00

IV.B.--LEFTSIDE

DIST. FROM WALL (FT)	ELEVATION (FT)
0.00	344.00

V.--SOIL LAYER DATA

V.A.--RIGHTSIDE
LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE = DEFAULT
LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

SAT. WGHT. (PCF)	MOIST WGHT. (PCF)	ANGLE OF INTERNAL FRICTION (DEG)	COH-ESION (PSF)	ANGLE OF WALL FRICTION (DEG)	ADH-ESION (PSF)	<--BOTTOM--> ELEV. (FT)	SLOPE (FT/FT)	<-SAFETY-> <-FACTOR-> ACT.	PASS.
125.00	125.00	0.00	1000.00	0.00	500.00			DEF	DEF

V.B.--LEFTSIDE
LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE = DEFAULT
LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

SAT. WGHT. (PCF)	MOIST WGHT. (PCF)	ANGLE OF INTERNAL FRICTION (DEG)	COH-ESION (PSF)	ANGLE OF WALL FRICTION (DEG)	ADH-ESION (PSF)	<--BOTTOM--> ELEV. (FT)	SLOPE (FT/FT)	<-SAFETY-> <-FACTOR-> ACT.	PASS.
125.00	125.00	0.00	1000.00	0.00	500.00			DEF	DEF

VI.--WATER DATA
UNIT WEIGHT = 62.40 (PCF)
RIGHTSIDE ELEVATION = 351.00 (FT)
LEFTSIDE ELEVATION = 344.00 (FT)

Subject: Phase II Evaluation
Paducah, KY

Station 53+10
Undrained
Page 2 of 5

Computed by: N. Cash
Date: 1 August 2007
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Date: 18 Sept 07

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:38:05

****
* SOIL PRESSURES FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+96.90 - 54+17.98
'Monolith 151, Undrained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0+	436.8	0.0	0.0	436.8	436.8	0.0	0.0
344.0-	436.8	1333.3	0.0	-896.5	1770.1	0.0	1333.3
343.0	436.8	1695.6	0.0	-1258.8	2132.4	0.0	1695.6
342.0	436.8	1758.2	0.0	-1321.4	2195.0	0.0	1758.2
341.0	436.8	1820.8	0.0	-1384.0	2257.6	0.0	1820.8
340.0	436.8	1883.4	0.0	-1446.6	2320.2	0.0	1883.4
339.0	436.8	1946.0	0.0	-1509.2	2382.8	0.0	1946.0
338.0	436.8	2008.6	0.0	-1571.8	2445.4	0.0	2008.6
337.0	436.8	2071.2	0.0	-1634.4	2508.0	0.0	2071.2
336.0	436.8	2133.8	0.0	-1697.0	2570.6	0.0	2133.8
335.0	436.8	2196.4	0.0	-1759.6	2633.2	0.0	2196.4

Subject: Phase II Evaluation
Paducah, KY

Station 53+10
Undrained
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Computed by: N. Cash
Date: 1 August 2007
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334.0	436.8	2259.0	0.0	-1822.2	2695.8	0.0	2259.0
333.0	436.8	2321.6	0.0	-1884.8	2758.4	0.0	2321.6
332.0	436.8	2384.2	0.0	-1947.4	2821.0	0.0	2384.2
331.0	436.8	2446.8	0.0	-2010.0	2883.6	0.0	2446.8
330.0	436.8	2509.4	0.0	-2072.6	2946.2	0.0	2509.4
329.0	436.8	2572.0	0.0	-2135.2	3008.8	0.0	2572.0
328.0	436.8	2634.6	0.0	-2197.8	3071.4	0.0	2634.6
327.0	436.8	2697.2	0.0	-2260.4	3134.0	0.0	2697.2
326.0	436.8	2759.8	0.0	-2323.0	3196.6	0.0	2759.8
325.0	436.8	2822.4	0.0	-2385.6	3259.2	0.0	2822.4
324.0	436.8	2885.0	0.0	-2448.2	3321.8	0.0	2885.0
323.0	436.8	2947.6	0.0	-2510.8	3384.4	0.0	2947.6
322.0	436.8	3010.2	0.0	-2573.4	3447.0	0.0	3010.2
321.0	436.8	3072.8	0.0	-2636.0	3509.6	0.0	3072.8
320.0	436.8	3135.4	0.0	-2698.6	3572.2	0.0	3135.4
319.0	436.8	3198.0	0.0	-2761.2	3634.8	0.0	3198.0
318.0	436.8	3260.6	0.0	-2823.8	3697.4	0.0	3260.6
317.0	436.8	3323.2	0.0	-2886.4	3760.0	0.0	3323.2
316.0	436.8	3385.8	0.0	-2949.0	3822.6	0.0	3385.8
315.0	436.8	3448.4	0.0	-3011.6	3885.2	0.0	3448.4
314.0	436.8	3511.0	0.0	-3074.2	3947.8	0.0	3511.0
313.0	436.8	3573.6	0.0	-3136.8	4010.4	0.0	3573.6

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:38:06

****
* SUMMARY OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+96.90 - 54+17.98
'Monolith 151, Undrained

II.--SUMMARY

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

WALL BOTTOM ELEV. (FT) : 338.97
PENETRATION (FT) : 5.03

MAX. BEND. MOMENT (LB-FT) : 4.6677E+03
AT ELEVATION (FT) : 342.64

MAX. SCALED DEFL. (LB-IN^3): 2.8613E+08

Subject: Phase II Evaluation
Paducah, KY

Station 53+10
Undrained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF
ELASTICITY IN PSI TIMES PILE MOMENT
OF INERTIA IN IN^4 TO OBTAIN DEFLECTION
IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS
DATE: 1-AUGUST-2007 TIME: 13:38:06

****
* COMPLETE OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 51+96.90 - 54+17.98
'Monolith 151, Undrained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	2.8613E+08	0.00
350.00	1.0400E+01	31.	2.4966E+08	62.40
349.00	8.3200E+01	125.	2.1323E+08	124.80
348.00	2.8080E+02	281.	1.7695E+08	187.20
347.00	6.6560E+02	499.	1.4119E+08	249.60
346.00	1.3000E+03	780.	1.0661E+08	312.00
345.00	2.2464E+03	1123.	7.4329E+07	374.40
344.00	3.5672E+03	1529.	4.5979E+07	436.80
344.00	3.5672E+03	1529.	4.5979E+07	-896.53
343.00	4.5873E+03	451.	2.3755E+07	-1258.85
342.00	4.3986E+03	-839.	9.2808E+06	-1321.45
341.60	3.9610E+03	-1368.	5.6850E+06	-1346.29
341.00	2.9425E+03	-1923.	2.2186E+06	-492.09
340.00	1.0097E+03	-1707.	1.7038E+05	923.92
339.00	8.3395E-01	-75.	-1.3745E-01	2339.94
338.97	0.0000E+00	0.	0.0000E+00	2384.83

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF
ELASTICITY IN PSI TIMES PILE MOMENT
OF INERTIA IN IN^4 TO OBTAIN DEFLECTION
IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION (FT)	PRESSURE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
351.00	0.	0.	0.	0.	0.

Subject: Phase II Evaluation
Paducah, KY

Station 53+10
Undrained
Page 5 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00+	437.	0.	0.	0.	0.
344.00+	437.	1333.	0.	0.	1333.
343.00	437.	1696.	0.	0.	1696.
342.00	437.	1758.	0.	0.	1758.
341.60	437.	1783.	0.	0.	1783.
341.00	437.	1821.	0.	0.	1821.
340.00	437.	1883.	0.	0.	1883.
339.00	437.	1946.	0.	0.	1946.
338.97	437.	2009.	0.	0.	2009.
337.00	437.	2071.	0.	0.	2071.

Subject: Phase II Evaluation
Paducah, KY

Station 60+70
Drained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

```
  PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                              BY CLASSICAL METHODS
  DATE: 1-AUGUST-2007                                          TIME: 12:00:48

                                ****************
                                *  INPUT DATA  *
                                ****************

       I.--HEADING
       'Phase II I-Wall Evaluation
       'Paducah, KY
       'Stations 60+17.30 - 61+02.05
       'Monolith 187, Drained

       II.--CONTROL
          CANTILEVER WALL DESIGN
          FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
          FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

      III.--WALL DATA
          ELEVATION AT TOP OF WALL    = 351.00 FT.

       IV.--SURFACE POINT DATA

            IV.A.--RIGHTSIDE
               DIST. FROM     ELEVATION
               WALL (FT)         (FT)
                    0.00        342.50

            IV.B.--LEFTSIDE
               DIST. FROM     ELEVATION
               WALL (FT)         (FT)
                    0.00        342.50

        V.--SOIL LAYER DATA

           V.A.--RIGHTSIDE
               LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
               LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                  ANGLE OF          ANGLE OF                          <-SAFETY->
    SAT.   MOIST  INTERNAL  COH-      WALL     ADH-    <--BOTTOM-->  <-FACTOR->
   WGHT.   WGHT.  FRICTION  ESION  FRICTION   ESION   ELEV.  SLOPE  ACT. PASS.
   (PCF)   (PCF)    (DEG)   (PSF)    (DEG)    (PSF)   (FT)  (FT/FT)
  125.00  125.00    26.00    0.00    17.33     0.00                   DEF  DEF

           V.B.--LEFTSIDE
               LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
               LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                  ANGLE OF          ANGLE OF                          <-SAFETY->
    SAT.   MOIST  INTERNAL  COH-      WALL     ADH-    <--BOTTOM-->  <-FACTOR->
   WGHT.   WGHT.  FRICTION  ESION  FRICTION   ESION   ELEV.  SLOPE  ACT. PASS.
   (PCF)   (PCF)    (DEG)   (PSF)    (DEG)    (PSF)   (FT)  (FT/FT)
  125.00  125.00    26.00    0.00    17.33     0.00                   DEF  DEF

       VI.--WATER DATA
          UNIT WEIGHT          = 62.40 (PCF)
          RIGHTSIDE ELEVATION = 351.00 (FT)
          LEFTSIDE ELEVATION  = 342.50 (FT)
```

Subject: Phase II Evaluation
Paducah, KY

Station 60+70
Drained
Page 2 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:01:07

****
* SOIL PRESSURES FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 60+17.30 - 61+02.05
'Monolith 187, Drained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.0	499.2	0.0	0.0	499.2	499.2	0.0	0.0
342.5	530.4	0.0	0.0	530.4	530.4	0.0	0.0
342.0	530.4	76.3	10.4	464.5	596.3	10.4	76.3
341.5	530.4	152.6	20.7	398.5	662.3	20.7	152.6
341.0	530.4	228.9	31.1	332.6	728.2	31.1	228.9
340.0	530.4	381.5	51.9	200.8	860.0	51.9	381.5
339.0	530.4	534.1	72.6	68.9	991.9	72.6	534.1
338.5	530.4	613.8	83.4	0.0	1060.8	83.4	613.8

338.0	530.4	686.7	93.3	-62.9	1123.7	93.3	686.7
337.0	530.4	839.3	114.1	-194.8	1255.6	114.1	839.3
336.0	530.4	991.9	134.8	-326.7	1387.5	134.8	991.9
335.0	530.4	1144.5	155.6	-458.5	1519.3	155.6	1144.5
334.0	530.4	1297.1	176.3	-590.4	1651.2	176.3	1297.1
333.0	530.4	1449.7	197.1	-722.2	1783.0	197.1	1449.7
332.0	530.4	1602.3	217.8	-854.1	1914.9	217.8	1602.3
331.0	530.4	1754.9	238.6	-985.9	2046.7	238.6	1754.9
330.0	530.4	1907.5	259.3	-1117.8	2178.6	259.3	1907.5
329.0	530.4	2060.1	280.0	-1249.6	2310.4	280.0	2060.1
328.0	530.4	2212.7	300.8	-1381.5	2442.3	300.8	2212.7
327.0	530.4	2365.3	321.5	-1513.3	2574.1	321.5	2365.3
326.0	530.4	2517.9	342.3	-1645.2	2706.0	342.3	2517.9
325.0	530.4	2670.5	363.0	-1777.1	2837.9	363.0	2670.5
324.0	530.4	2823.1	383.8	-1908.9	2969.7	383.8	2823.1
323.0	530.4	2975.7	404.5	-2040.8	3101.6	404.5	2975.7
322.0	530.4	3128.3	425.3	-2172.6	3233.4	425.3	3128.3
321.0	530.4	3280.9	446.0	-2304.5	3365.3	446.0	3280.9
320.0	530.4	3433.5	466.7	-2436.3	3497.1	466.7	3433.5
319.0	530.4	3586.1	487.5	-2568.2	3629.0	487.5	3586.1
318.0	530.4	3738.7	508.2	-2700.0	3760.8	508.2	3738.7
317.0	530.4	3891.3	529.0	-2831.9	3892.7	529.0	3891.3
316.0	530.4	4043.9	549.7	-2963.7	4024.5	549.7	4043.9
315.0	530.4	4196.5	570.5	-3095.6	4156.4	570.5	4196.5
314.0	530.4	4349.1	591.2	-3227.5	4288.3	591.2	4349.1
313.0	530.4	4501.7	611.9	-3359.3	4420.1	611.9	4501.7
312.0	530.4	4654.3	632.7	-3491.2	4552.0	632.7	4654.3

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:01:08

****
* SUMMARY OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 60+17.30 - 61+02.05
'Monolith 187, Drained

II.--SUMMARY

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

Subject: Phase II Evaluation
Paducah, KY

Station 60+70
Drained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

WALL BOTTOM ELEV. (FT) : 321.88
PENETRATION (FT) : 20.62

MAX. BEND. MOMENT (LB-FT) : 3.4029E+04
AT ELEVATION (FT) : 331.38

MAX. SCALED DEFL. (LB-IN^3): 1.3846E+10
AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:01:08

****
* COMPLETE OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 60+17.30 - 61+02.05
'Monolith 187, Drained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	1.3846E+10	0.00
350.00	1.0400E+01	31.	1.3080E+10	62.40
349.00	8.3200E+01	125.	1.2314E+10	124.80
348.00	2.8080E+02	281.	1.1549E+10	187.20
347.00	6.6560E+02	499.	1.0783E+10	249.60
346.00	1.3000E+03	780.	1.0019E+10	312.00
345.00	2.2464E+03	1123.	9.2576E+09	374.40
344.00	3.5672E+03	1529.	8.4998E+09	436.80
343.00	5.3248E+03	1997.	7.7483E+09	499.20
342.50	6.3869E+03	2254.	7.3757E+09	530.40
342.00	7.5776E+03	2503.	7.0060E+09	464.47
341.50	8.8843E+03	2719.	6.6395E+09	398.55
341.00	1.0291E+04	2901.	6.2768E+09	332.62
340.00	1.3337E+04	3168.	5.5655E+09	200.76
339.00	1.6583E+04	3303.	4.8773E+09	68.91
338.48	1.8316E+04	3321.	4.5286E+09	0.00
338.00	1.9899E+04	3306.	4.2177E+09	-62.94
337.00	2.3151E+04	3177.	3.5925E+09	-194.80
336.00	2.6209E+04	2916.	3.0073E+09	-326.65
335.00	2.8940E+04	2524.	2.4673E+09	-458.51
334.00	3.1212E+04	1999.	1.9773E+09	-590.36
333.00	3.2895E+04	1343.	1.5411E+09	-722.22

Subject: Phase II Evaluation
Paducah, KY

Station 60+70
Drained
Page 5 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

332.00	3.3855E+04	555.	1.1617E+09	-854.07
331.00	3.3961E+04	-365.	8.4064E+08	-985.93
330.00	3.3081E+04	-1417.	5.7812E+08	-1117.78
329.00	3.1083E+04	-2601.	3.7260E+08	-1249.63
328.00	2.7835E+04	-3916.	2.2061E+08	-1381.49
327.34	2.4946E+04	-4856.	1.4704E+08	-1468.44
327.00	2.3213E+04	-5306.	1.1652E+08	-1174.02
326.00	1.7464E+04	-6048.	5.2382E+07	-309.41
325.00	1.1406E+04	-5925.	1.8373E+07	555.21
324.00	5.9031E+03	-4937.	4.1543E+06	1419.83
323.00	1.8200E+03	-3085.	3.4020E+05	2284.44
322.00	2.1306E+01	-368.	4.0821E+01	3149.06
321.88	0.0000E+00	0.	0.0000E+00	3248.59

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION (FT)	PRESSURE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.00	499.	0.	0.	0.	0.
342.50	530.	0.	0.	0.	0.
342.00	530.	76.	10.	10.	76.
341.50	530.	153.	21.	21.	153.
341.00	530.	229.	31.	31.	229.
340.00	530.	381.	52.	52.	381.
339.00	530.	534.	73.	73.	534.
338.48	530.	614.	83.	83.	614.
338.00	530.	687.	93.	93.	687.
337.00	530.	839.	114.	114.	839.
336.00	530.	992.	135.	135.	992.
335.00	530.	1144.	156.	156.	1144.
334.00	530.	1297.	176.	176.	1297.
333.00	530.	1450.	197.	197.	1450.
332.00	530.	1602.	218.	218.	1602.
331.00	530.	1755.	239.	239.	1755.
330.00	530.	1907.	259.	259.	1907.
329.00	530.	2060.	280.	280.	2060.
328.00	530.	2213.	301.	301.	2213.
327.34	530.	2313.	314.	314.	2313.
327.00	530.	2365.	322.	322.	2365.
326.00	530.	2518.	342.	342.	2518.
325.00	530.	2670.	363.	363.	2670.
324.00	530.	2823.	384.	384.	2823.
323.00	530.	2976.	405.	405.	2976.
322.00	530.	3128.	425.	425.	3128.
321.88	530.	3281.	446.	446.	3281.

Subject: Phase II Evaluation
Paducah, KY

Station 60+70
Undrained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:41:53

****
* INPUT DATA *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 60+17.30 - 61+02.05
'Monolith 187, Undrained

II.--CONTROL
CANTILEVER WALL DESIGN
FACTOR OF SAFETY FOR ACTIVE PRESSURES = 1.00
FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

III.--WALL DATA
ELEVATION AT TOP OF WALL = 351.00 FT.

IV.--SURFACE POINT DATA

IV.A.--RIGHTSIDE

DIST. FROM WALL (FT)	ELEVATION (FT)
0.00	342.50

IV.B.--LEFTSIDE

DIST. FROM WALL (FT)	ELEVATION (FT)
0.00	342.50

V.--SOIL LAYER DATA

V.A.--RIGHTSIDE
LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE = DEFAULT
LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

SAT. WGHT. (PCF)	MOIST WGHT. (PCF)	ANGLE OF INTERNAL FRICTION (DEG)	COH-ESION (PSF)	ANGLE OF WALL FRICTION (DEG)	ADH-ESION (PSF)	<--BOTTOM--> ELEV. (FT)	SLOPE (FT/FT)	<-SAFETY-> <-FACTOR-> ACT.	PASS.
125.00	125.00	0.00	1000.00	0.00	500.00			DEF	DEF

V.B.--LEFTSIDE
LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE = DEFAULT
LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

SAT. WGHT. (PCF)	MOIST WGHT. (PCF)	ANGLE OF INTERNAL FRICTION (DEG)	COH-ESION (PSF)	ANGLE OF WALL FRICTION (DEG)	ADH-ESION (PSF)	<--BOTTOM--> ELEV. (FT)	SLOPE (FT/FT)	<-SAFETY-> <-FACTOR-> ACT.	PASS.
125.00	125.00	0.00	1000.00	0.00	500.00			DEF	DEF

VI.--WATER DATA
UNIT WEIGHT = 62.40 (PCF)
RIGHTSIDE ELEVATION = 351.00 (FT)
LEFTSIDE ELEVATION = 342.50 (FT)

Subject: Phase II Evaluation
Paducah, KY

Station 60+70
Undrained
Page 2 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:42:08

****
* SOIL PRESSURES FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 60+17.30 - 61+02.05
'Monolith 187, Undrained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.0	499.2	0.0	0.0	499.2	499.2	0.0	0.0
342.5+	530.4	0.0	0.0	530.4	530.4	0.0	0.0
342.5-	530.4	1333.3	0.0	-802.9	1863.7	0.0	1333.3
342.0	530.4	1664.3	0.0	-1133.9	2194.7	0.0	1664.3
341.5	530.4	1695.6	0.0	-1165.2	2226.0	0.0	1695.6
341.0	530.4	1726.9	0.0	-1196.5	2257.3	0.0	1726.9
340.0	530.4	1789.5	0.0	-1259.1	2319.9	0.0	1789.5
339.0	530.4	1852.1	0.0	-1321.7	2382.5	0.0	1852.1
338.0	530.4	1914.7	0.0	-1384.3	2445.1	0.0	1914.7
337.0	530.4	1977.3	0.0	-1446.9	2507.7	0.0	1977.3

Subject: Phase II Evaluation
Paducah, KY

Station 60+70
Undrained
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Computed by: N. Cash
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336.0	530.4	2039.9	0.0	-1509.5	2570.3	0.0	2039.9
335.0	530.4	2102.5	0.0	-1572.1	2632.9	0.0	2102.5
334.0	530.4	2165.1	0.0	-1634.7	2695.5	0.0	2165.1
333.0	530.4	2227.7	0.0	-1697.3	2758.1	0.0	2227.7
332.0	530.4	2290.3	0.0	-1759.9	2820.7	0.0	2290.3
331.0	530.4	2352.9	0.0	-1822.5	2883.3	0.0	2352.9
330.0	530.4	2415.5	0.0	-1885.1	2945.9	0.0	2415.5
329.0	530.4	2478.1	0.0	-1947.7	3008.5	0.0	2478.1
328.0	530.4	2540.7	0.0	-2010.3	3071.1	0.0	2540.7
327.0	530.4	2603.3	0.0	-2072.9	3133.7	0.0	2603.3
326.0	530.4	2665.9	0.0	-2135.5	3196.3	0.0	2665.9
325.0	530.4	2728.5	0.0	-2198.1	3258.9	0.0	2728.5
324.0	530.4	2791.1	0.0	-2260.7	3321.5	0.0	2791.1
323.0	530.4	2853.7	0.0	-2323.3	3384.1	0.0	2853.7
322.0	530.4	2916.3	0.0	-2385.9	3446.7	0.0	2916.3
321.0	530.4	2978.9	0.0	-2448.5	3509.3	0.0	2978.9
320.0	530.4	3041.5	0.0	-2511.1	3571.9	0.0	3041.5
319.0	530.4	3104.1	0.0	-2573.7	3634.5	0.0	3104.1
318.0	530.4	3166.7	0.0	-2636.3	3697.1	0.0	3166.7
317.0	530.4	3229.3	0.0	-2698.9	3759.7	0.0	3229.3
316.0	530.4	3291.9	0.0	-2761.5	3822.3	0.0	3291.9
315.0	530.4	3354.5	0.0	-2824.1	3884.9	0.0	3354.5
314.0	530.4	3417.1	0.0	-2886.7	3947.5	0.0	3417.1
313.0	530.4	3479.7	0.0	-2949.3	4010.1	0.0	3479.7
312.0	530.4	3542.3	0.0	-3011.9	4072.7	0.0	3542.3

```
PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                        BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                        TIME: 13:42:09

                        ****************************
                        *  SUMMARY OF RESULTS FOR  *
                        *  CANTILEVER WALL DESIGN  *
                        ****************************

    I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 60+17.30 - 61+02.05
     'Monolith 187, Undrained

   II.--SUMMARY

        RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

        LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

   WALL BOTTOM ELEV. (FT)     :       335.55
         PENETRATION (FT)     :         6.95

   MAX. BEND. MOMENT (LB-FT)  :  8.7439E+03
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Subject: Phase II Evaluation
Paducah, KY

Station 60+70
Undrained
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Computed by: N. Cash
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AT ELEVATION (FT) : 340.50

MAX. SCALED DEFL. (LB-IN^3): 9.0332E+08
AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:42:09

****
* COMPLETE OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 60+17.30 - 61+02.05
'Monolith 187, Undrained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	9.0332E+08	0.00
350.00	1.0400E+01	31.	8.1239E+08	62.40
349.00	8.3200E+01	125.	7.2150E+08	124.80
348.00	2.8080E+02	281.	6.3077E+08	187.20
347.00	6.6560E+02	499.	5.4055E+08	249.60
346.00	1.3000E+03	780.	4.5152E+08	312.00
345.00	2.2464E+03	1123.	3.6477E+08	374.40
344.00	3.5672E+03	1529.	2.8197E+08	436.80
343.00	5.3248E+03	1997.	2.0539E+08	499.20
342.50	6.3869E+03	2254.	1.7035E+08	530.40
342.50	6.3869E+03	2254.	1.7035E+08	-802.93
342.00	7.3998E+03	1770.	1.3807E+08	-1133.95
341.50	8.1418E+03	1195.	1.0898E+08	-1165.25
341.00	8.5924E+03	605.	8.3398E+07	-1196.55
340.00	8.5884E+03	-623.	4.3398E+07	-1259.15
339.00	7.3253E+03	-1914.	1.8058E+07	-1321.75
338.86	7.0485E+03	-2097.	1.5616E+07	-1330.39
338.00	4.8739E+03	-2802.	5.1946E+06	-306.56
337.00	2.1165E+03	-2515.	7.0874E+05	881.27
336.00	2.4030E+02	-1040.	7.0667E+03	2069.09
335.55	0.0000E+00	0.	0.0000E+00	2598.24

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

Subject: Phase II Evaluation
Paducah, KY

Station 60+70
Undrained
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Computed by: N. Cash
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III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION	PRESSURE	PASSIVE	ACTIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.00	499.	0.	0.	0.	0.
342.50+	530.	0.	0.	0.	0.
342.50+	530.	1333.	0.	0.	1333.
342.00	530.	1664.	0.	0.	1664.
341.50	530.	1696.	0.	0.	1696.
341.00	530.	1727.	0.	0.	1727.
340.00	530.	1790.	0.	0.	1790.
339.00	530.	1852.	0.	0.	1852.
338.86	530.	1861.	0.	0.	1861.
338.00	530.	1915.	0.	0.	1915.
337.00	530.	1977.	0.	0.	1977.
336.00	530.	2040.	0.	0.	2040.
335.55	530.	2103.	0.	0.	2103.
334.00	530.	2165.	0.	0.	2165.

Subject: Phase II Evaluation
Paducah, KY

Station 61+90
Drained
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Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

```
 PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
 DATE: 1-AUGUST-2007                                          TIME: 12:04:12

                            ****************
                            *  INPUT DATA  *
                            ****************

      I.--HEADING
     'PHASE II I-WALL EVALUATION
     'PADUCAH, KY
     'STATIONS 61+02.05 - 62+75.13
     'MONOLITH 193, DRAINED

     II.--CONTROL
        CANTILEVER WALL DESIGN
        FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
        FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

    III.--WALL DATA
        ELEVATION AT TOP OF WALL    = 351.00 FT.

     IV.--SURFACE POINT DATA

          IV.A.--RIGHTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        343.50

          IV.B.--LEFTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        343.50

      V.--SOIL LAYER DATA

         V.A.--RIGHTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                          <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33    0.00                  DEF  DEF

         V.B.--LEFTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                          <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33    0.00                  DEF  DEF

      VI.--WATER DATA
         UNIT WEIGHT          = 62.40 (PCF)
         RIGHTSIDE ELEVATION = 351.00 (FT)
         LEFTSIDE ELEVATION  = 343.50 (FT)
```

Subject: Phase II Evaluation
Paducah, KY

Station 61+90
Drained
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Computed by: N. Cash
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NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:04:13

****
* SOIL PRESSURES FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'PHASE II I-WALL EVALUATION
'PADUCAH, KY
'STATIONS 61+02.05 - 62+75.13
'MONOLITH 193, DRAINED

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.5	468.0	0.0	0.0	468.0	468.0	0.0	0.0
343.0	468.0	76.3	10.4	402.1	533.9	10.4	76.3
342.5	468.0	152.6	20.7	336.1	599.9	20.7	152.6
342.0	468.0	228.9	31.1	270.2	665.8	31.1	228.9
341.0	468.0	381.5	51.9	138.4	797.6	51.9	381.5
340.0	468.0	534.1	72.6	6.5	929.5	72.6	534.1
340.0	468.0	541.6	73.6	0.0	936.0	73.6	541.6
339.0	468.0	686.7	93.3	-125.3	1061.3	93.3	686.7

Subject: Phase II Evaluation
Paducah, KY

Station 61+90
Drained
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Computed by: N. Cash
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338.0	468.0	839.3	114.1	-257.2	1193.2	114.1	839.3
337.0	468.0	991.9	134.8	-389.1	1325.1	134.8	991.9
336.0	468.0	1144.5	155.6	-520.9	1456.9	155.6	1144.5
335.0	468.0	1297.1	176.3	-652.8	1588.8	176.3	1297.1
334.0	468.0	1449.7	197.1	-784.6	1720.6	197.1	1449.7
333.0	468.0	1602.3	217.8	-916.5	1852.5	217.8	1602.3
332.0	468.0	1754.9	238.6	-1048.3	1984.3	238.6	1754.9
331.0	468.0	1907.5	259.3	-1180.2	2116.2	259.3	1907.5
330.0	468.0	2060.1	280.0	-1312.0	2248.0	280.0	2060.1
329.0	468.0	2212.7	300.8	-1443.9	2379.9	300.8	2212.7
328.0	468.0	2365.3	321.5	-1575.7	2511.7	321.5	2365.3
327.0	468.0	2517.9	342.3	-1707.6	2643.6	342.3	2517.9
326.0	468.0	2670.5	363.0	-1839.5	2775.5	363.0	2670.5
325.0	468.0	2823.1	383.8	-1971.3	2907.3	383.8	2823.1
324.0	468.0	2975.7	404.5	-2103.2	3039.2	404.5	2975.7
323.0	468.0	3128.3	425.3	-2235.0	3171.0	425.3	3128.3
322.0	468.0	3280.9	446.0	-2366.9	3302.9	446.0	3280.9
321.0	468.0	3433.5	466.7	-2498.7	3434.7	466.7	3433.5
320.0	468.0	3586.1	487.5	-2630.6	3566.6	487.5	3586.1
319.0	468.0	3738.7	508.2	-2762.4	3698.4	508.2	3738.7
318.0	468.0	3891.3	529.0	-2894.3	3830.3	529.0	3891.3
317.0	468.0	4043.9	549.7	-3026.1	3962.1	549.7	4043.9
316.0	468.0	4196.5	570.5	-3158.0	4094.0	570.5	4196.5
315.0	468.0	4349.1	591.2	-3289.9	4225.9	591.2	4349.1
314.0	468.0	4501.7	611.9	-3421.7	4357.7	611.9	4501.7
313.0	468.0	4654.3	632.7	-3553.6	4489.6	632.7	4654.3

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:04:14

****
* SUMMARY OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'PHASE II I-WALL EVALUATION
'PADUCAH, KY
'STATIONS 61+02.05 - 62+75.13
'MONOLITH 193, DRAINED

II.--SUMMARY

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

WALL BOTTOM ELEV. (FT) : 325.31

Subject: Phase II Evaluation
Paducah, KY

Station 61+90
Drained
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Computed by: N. Cash
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PENETRATION (FT) : 18.19

MAX. BEND. MOMENT (LB-FT) : 2.3377E+04
AT ELEVATION (FT) : 333.69

MAX. SCALED DEFL. (LB-IN^3): 7.4052E+09
AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:04:14

****
* COMPLETE OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'PHASE II I-WALL EVALUATION
'PADUCAH, KY
'STATIONS 61+02.05 - 62+75.13
'MONOLITH 193, DRAINED

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	7.4052E+09	0.00
350.00	1.0400E+01	31.	6.9410E+09	62.40
349.00	8.3200E+01	125.	6.4768E+09	124.80
348.00	2.8080E+02	281.	6.0127E+09	187.20
347.00	6.6560E+02	499.	5.5492E+09	249.60
346.00	1.3000E+03	780.	5.0868E+09	312.00
345.00	2.2464E+03	1123.	4.6268E+09	374.40
344.00	3.5672E+03	1529.	4.1706E+09	436.80
343.50	4.3875E+03	1755.	3.9447E+09	468.00
343.00	5.3208E+03	1973.	3.7207E+09	402.07
342.50	6.3545E+03	2157.	3.4990E+09	336.15
342.00	7.4723E+03	2309.	3.2801E+09	270.22
341.00	9.8941E+03	2513.	2.8524E+09	138.36
340.00	1.2454E+04	2585.	2.4418E+09	6.51
339.95	1.2582E+04	2586.	2.4220E+09	0.00
339.00	1.5021E+04	2526.	2.0527E+09	-125.34
338.00	1.7462E+04	2335.	1.6896E+09	-257.20
337.00	1.9646E+04	2012.	1.3566E+09	-389.05
336.00	2.1441E+04	1557.	1.0575E+09	-520.91
335.00	2.2716E+04	970.	7.9540E+08	-652.76
334.00	2.3337E+04	251.	5.7244E+08	-784.62
333.00	2.3174E+04	-599.	3.8970E+08	-916.47
332.00	2.2094E+04	-1582.	2.4687E+08	-1048.33

Subject: Phase II Evaluation
Paducah, KY

Station 61+90
Drained
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Computed by: N. Cash
Date: 1 August 2007
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331.00	1.9966E+04	-2696.	1.4206E+08	-1180.18
330.12	1.7137E+04	-3781.	7.8638E+07	-1295.69
330.00	1.6658E+04	-3935.	7.1591E+07	-1188.48
329.00	1.2274E+04	-4691.	2.9739E+07	-323.87
328.00	7.5650E+03	-4582.	9.0503E+06	540.75
327.00	3.3971E+03	-3609.	1.5112E+06	1405.37
326.00	6.3467E+02	-1772.	4.4783E+04	2269.98
325.31	0.0000E+00	0.	0.0000E+00	2866.41

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION (FT)	PRESSURE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.50	468.	0.	0.	0.	0.
343.00	468.	76.	10.	10.	76.
342.50	468.	153.	21.	21.	153.
342.00	468.	229.	31.	31.	229.
341.00	468.	381.	52.	52.	381.
340.00	468.	534.	73.	73.	534.
339.95	468.	542.	74.	74.	542.
339.00	468.	687.	93.	93.	687.
338.00	468.	839.	114.	114.	839.
337.00	468.	992.	135.	135.	992.
336.00	468.	1144.	156.	156.	1144.
335.00	468.	1297.	176.	176.	1297.
334.00	468.	1450.	197.	197.	1450.
333.00	468.	1602.	218.	218.	1602.
332.00	468.	1755.	239.	239.	1755.
331.00	468.	1907.	259.	259.	1907.
330.12	468.	2041.	277.	277.	2041.
330.00	468.	2060.	280.	280.	2060.
329.00	468.	2213.	301.	301.	2213.
328.00	468.	2365.	322.	322.	2365.
327.00	468.	2518.	342.	342.	2518.
326.00	468.	2670.	363.	363.	2670.
325.31	468.	2823.	384.	384.	2823.
324.00	468.	2976.	405.	405.	2976.

Subject: Phase II Evaluation
Paducah, KY

Station 61+90
Undrained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

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 PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                              BY CLASSICAL METHODS
 DATE: 1-AUGUST-2007                                          TIME: 13:45:00

                                ****************
                                *  INPUT DATA  *
                                ****************

       I.--HEADING
      'Phase II I-Wall Evaluation
      'Paducah, KY
      'Stations 61+02.05 - 62+75.13
      'Monolith 193, Undrained

      II.--CONTROL
         CANTILEVER WALL DESIGN
         FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
         FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

     III.--WALL DATA
         ELEVATION AT TOP OF WALL    = 351.00 FT.

      IV.--SURFACE POINT DATA

           IV.A.--RIGHTSIDE
              DIST. FROM     ELEVATION
              WALL (FT)         (FT)
                   0.00        343.50

           IV.B.--LEFTSIDE
              DIST. FROM     ELEVATION
              WALL (FT)         (FT)
                   0.00        343.50

       V.--SOIL LAYER DATA

          V.A.--RIGHTSIDE
              LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
              LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                 ANGLE OF          ANGLE OF                          <-SAFETY->
  SAT.    MOIST  INTERNAL  COH-     WALL     ADH-     <--BOTTOM-->  <-FACTOR->
 WGHT.    WGHT.  FRICTION  ESION  FRICTION  ESION    ELEV.  SLOPE  ACT. PASS.
 (PCF)    (PCF)    (DEG)   (PSF)    (DEG)   (PSF)    (FT)  (FT/FT)
125.00  125.00     0.00 1000.00     0.00  500.00                    DEF  DEF

          V.B.--LEFTSIDE
              LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
              LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                 ANGLE OF          ANGLE OF                          <-SAFETY->
  SAT.    MOIST  INTERNAL  COH-     WALL     ADH-     <--BOTTOM-->  <-FACTOR->
 WGHT.    WGHT.  FRICTION  ESION  FRICTION  ESION    ELEV.  SLOPE  ACT. PASS.
 (PCF)    (PCF)    (DEG)   (PSF)    (DEG)   (PSF)    (FT)  (FT/FT)
125.00  125.00     0.00 1000.00     0.00  500.00                    DEF  DEF

      VI.--WATER DATA
         UNIT WEIGHT          = 62.40 (PCF)
         RIGHTSIDE ELEVATION  = 351.00 (FT)
         LEFTSIDE ELEVATION   = 343.50 (FT)
```

Subject: Phase II Evaluation
Paducah, KY

Station 61+90
Undrained
Page 2 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS
DATE: 1-AUGUST-2007 TIME: 13:45:23

****
* SOIL PRESSURES FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 61+02.05 - 62+75.13
'Monolith 193, Undrained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.5+	468.0	0.0	0.0	468.0	468.0	0.0	0.0
343.5-	468.0	1333.3	0.0	-865.3	1801.3	0.0	1333.3
343.0	468.0	1664.3	0.0	-1196.3	2132.3	0.0	1664.3
342.5	468.0	1695.6	0.0	-1227.6	2163.6	0.0	1695.6
342.0	468.0	1726.9	0.0	-1258.9	2194.9	0.0	1726.9
341.0	468.0	1789.5	0.0	-1321.5	2257.5	0.0	1789.5
340.0	468.0	1852.1	0.0	-1384.1	2320.1	0.0	1852.1
339.0	468.0	1914.7	0.0	-1446.7	2382.7	0.0	1914.7
338.0	468.0	1977.3	0.0	-1509.3	2445.3	0.0	1977.3
337.0	468.0	2039.9	0.0	-1571.9	2507.9	0.0	2039.9

Subject: Phase II Evaluation
Paducah, KY

Station 61+90
Undrained
Page 3 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

336.0	468.0	2102.5	0.0	-1634.5	2570.5	0.0	2102.5
335.0	468.0	2165.1	0.0	-1697.1	2633.1	0.0	2165.1
334.0	468.0	2227.7	0.0	-1759.7	2695.7	0.0	2227.7
333.0	468.0	2290.3	0.0	-1822.3	2758.3	0.0	2290.3
332.0	468.0	2352.9	0.0	-1884.9	2820.9	0.0	2352.9
331.0	468.0	2415.5	0.0	-1947.5	2883.5	0.0	2415.5
330.0	468.0	2478.1	0.0	-2010.1	2946.1	0.0	2478.1
329.0	468.0	2540.7	0.0	-2072.7	3008.7	0.0	2540.7
328.0	468.0	2603.3	0.0	-2135.3	3071.3	0.0	2603.3
327.0	468.0	2665.9	0.0	-2197.9	3133.9	0.0	2665.9
326.0	468.0	2728.5	0.0	-2260.5	3196.5	0.0	2728.5
325.0	468.0	2791.1	0.0	-2323.1	3259.1	0.0	2791.1
324.0	468.0	2853.7	0.0	-2385.7	3321.7	0.0	2853.7
323.0	468.0	2916.3	0.0	-2448.3	3384.3	0.0	2916.3
322.0	468.0	2978.9	0.0	-2510.9	3446.9	0.0	2978.9
321.0	468.0	3041.5	0.0	-2573.5	3509.5	0.0	3041.5
320.0	468.0	3104.1	0.0	-2636.1	3572.1	0.0	3104.1
319.0	468.0	3166.7	0.0	-2698.7	3634.7	0.0	3166.7
318.0	468.0	3229.3	0.0	-2761.3	3697.3	0.0	3229.3
317.0	468.0	3291.9	0.0	-2823.9	3759.9	0.0	3291.9
316.0	468.0	3354.5	0.0	-2886.5	3822.5	0.0	3354.5
315.0	468.0	3417.1	0.0	-2949.1	3885.1	0.0	3417.1
314.0	468.0	3479.7	0.0	-3011.7	3947.7	0.0	3479.7
313.0	468.0	3542.3	0.0	-3074.3	4010.3	0.0	3542.3

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:45:23

****
* SUMMARY OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 61+02.05 - 62+75.13
'Monolith 193, Undrained

II.--SUMMARY

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

WALL BOTTOM ELEV. (FT) : 337.92
PENETRATION (FT) : 5.58

MAX. BEND. MOMENT (LB-FT) : 5.7741E+03
AT ELEVATION (FT) : 341.99

Subject: Phase II Evaluation
Paducah, KY

Station 61+90
Undrained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

MAX. SCALED DEFL. (LB-IN^3): 4.2084E+08
AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF
ELASTICITY IN PSI TIMES PILE MOMENT
OF INERTIA IN IN^4 TO OBTAIN DEFLECTION
IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:45:23

****
* COMPLETE OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 61+02.05 - 62+75.13
'Monolith 193, Undrained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	4.2084E+08	0.00
350.00	1.0400E+01	31.	3.7127E+08	62.40
349.00	8.3200E+01	125.	3.2174E+08	124.80
348.00	2.8080E+02	281.	2.7236E+08	187.20
347.00	6.6560E+02	499.	2.2350E+08	249.60
346.00	1.3000E+03	780.	1.7582E+08	312.00
345.00	2.2464E+03	1123.	1.3043E+08	374.40
344.00	3.5672E+03	1529.	8.8981E+07	436.80
343.50	4.3875E+03	1755.	7.0419E+07	468.00
343.50	4.3875E+03	1755.	7.0419E+07	-865.33
343.00	5.1430E+03	1240.	5.3750E+07	-1196.35
342.50	5.6120E+03	634.	3.9293E+07	-1227.65
342.00	5.7740E+03	12.	2.7249E+07	-1258.95
341.00	5.1460E+03	-1278.	1.0545E+07	-1321.55
340.77	4.8144E+03	-1586.	8.0024E+06	-1336.05
340.00	3.3018E+03	-2220.	2.5471E+06	-314.13
339.00	1.1463E+03	-1869.	2.1000E+05	1015.81
338.00	6.6521E+00	-188.	2.3679E+00	2345.75
337.92	0.0000E+00	0.	0.0000E+00	2450.27

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF
ELASTICITY IN PSI TIMES PILE MOMENT
OF INERTIA IN IN^4 TO OBTAIN DEFLECTION
IN INCHES.

III.--WATER AND SOIL PRESSURES

Subject: Phase II Evaluation
Paducah, KY

Station 61+90
Undrained
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Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION	PRESSURE	PASSIVE	ACTIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.50+	468.	0.	0.	0.	0.
343.50+	468.	1333.	0.	0.	1333.
343.00	468.	1664.	0.	0.	1664.
342.50	468.	1696.	0.	0.	1696.
342.00	468.	1727.	0.	0.	1727.
341.00	468.	1790.	0.	0.	1790.
340.77	468.	1804.	0.	0.	1804.
340.00	468.	1852.	0.	0.	1852.
339.00	468.	1915.	0.	0.	1915.
338.00	468.	1977.	0.	0.	1977.
337.92	468.	2040.	0.	0.	2040.
336.00	468.	2103.	0.	0.	2103.

Subject: Phase II Evaluation
Paducah, KY

Station 72+90
Drained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

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 PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
 DATE: 1-AUGUST-2007                                        TIME: 12:10:56

                            ****************
                            *  INPUT DATA  *
                            ****************

      I.--HEADING
     'Phase II I-Wall Evaluation
     'Paducah, KY
     'Stations 72+18.54 - 74+03.04
     'Monolith 240, Drained

     II.--CONTROL
        CANTILEVER WALL DESIGN
        FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
        FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

    III.--WALL DATA
        ELEVATION AT TOP OF WALL    = 351.00 FT.

     IV.--SURFACE POINT DATA

          IV.A.--RIGHTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        342.00

          IV.B.--LEFTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00        342.00

      V.--SOIL LAYER DATA

         V.A.--RIGHTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF          ANGLE OF                          <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-      WALL     ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION   ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)    (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33     0.00                   DEF  DEF

         V.B.--LEFTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF          ANGLE OF                          <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-      WALL     ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION   ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)    (PSF)   (FT)  (FT/FT)
125.00  125.00    26.00    0.00    17.33     0.00                   DEF  DEF

      VI.--WATER DATA
         UNIT WEIGHT          = 62.40 (PCF)
         RIGHTSIDE ELEVATION  = 351.00 (FT)
         LEFTSIDE ELEVATION   = 342.00 (FT)
```

Subject: Phase II Evaluation
Paducah, KY

Station 72+90
Drained
Page 2 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:11:44

****
* SOIL PRESSURES FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 72+18.54 - 74+03.04
'Monolith 240, Drained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.0	499.2	0.0	0.0	499.2	499.2	0.0	0.0
342.0	561.6	0.0	0.0	561.6	561.6	0.0	0.0
341.0	561.6	152.6	20.7	429.7	693.5	20.7	152.6
340.0	561.6	305.2	41.5	297.9	825.3	41.5	305.2
339.0	561.6	457.8	62.2	166.0	957.2	62.2	457.8
338.0	561.6	610.4	83.0	34.2	1089.0	83.0	610.4
337.7	561.6	650.0	88.4	0.0	1123.2	88.4	650.0
337.0	561.6	763.0	103.7	-97.7	1220.9	103.7	763.0

Subject: Phase II Evaluation
Paducah, KY

Station 72+90
Drained
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Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

336.0	561.6	915.6	124.5	-229.5	1352.7	124.5	915.6
335.0	561.6	1068.2	145.2	-361.4	1484.6	145.2	1068.2
334.0	561.6	1220.8	166.0	-493.2	1616.4	166.0	1220.8
333.0	561.6	1373.4	186.7	-625.1	1748.3	186.7	1373.4
332.0	561.6	1526.0	207.4	-756.9	1880.1	207.4	1526.0
331.0	561.6	1678.6	228.2	-888.8	2012.0	228.2	1678.6
330.0	561.6	1831.2	248.9	-1020.7	2143.9	248.9	1831.2
329.0	561.6	1983.8	269.7	-1152.5	2275.7	269.7	1983.8
328.0	561.6	2136.4	290.4	-1284.4	2407.6	290.4	2136.4
327.0	561.6	2289.0	311.2	-1416.2	2539.4	311.2	2289.0
326.0	561.6	2441.6	331.9	-1548.1	2671.3	331.9	2441.6
325.0	561.6	2594.2	352.6	-1679.9	2803.1	352.6	2594.2
324.0	561.6	2746.8	373.4	-1811.8	2935.0	373.4	2746.8
323.0	561.6	2899.4	394.1	-1943.6	3066.8	394.1	2899.4
322.0	561.6	3052.0	414.9	-2075.5	3198.7	414.9	3052.0
321.0	561.6	3204.6	435.6	-2207.3	3330.5	435.6	3204.6
320.0	561.6	3357.2	456.4	-2339.2	3462.4	456.4	3357.2
319.0	561.6	3509.8	477.1	-2471.1	3594.3	477.1	3509.8
318.0	561.6	3662.4	497.9	-2602.9	3726.1	497.9	3662.4
317.0	561.6	3815.0	518.6	-2734.8	3858.0	518.6	3815.0
316.0	561.6	3967.6	539.3	-2866.6	3989.8	539.3	3967.6
315.0	561.6	4120.2	560.1	-2998.5	4121.7	560.1	4120.2
314.0	561.6	4272.8	580.8	-3130.3	4253.5	580.8	4272.8
313.0	561.6	4425.4	601.6	-3262.2	4385.4	601.6	4425.4
312.0	561.6	4578.0	622.3	-3394.0	4517.2	622.3	4578.0
311.0	561.6	4730.6	643.1	-3525.9	4649.1	643.1	4730.6

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:11:45

****
* SUMMARY OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 72+18.54 - 74+03.04
'Monolith 240, Drained

II.--SUMMARY

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

WALL BOTTOM ELEV. (FT) : 320.17

Subject: Phase II Evaluation
Paducah, KY

Station 72+90
Drained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

PENETRATION (FT) : 21.83

MAX. BEND. MOMENT (LB-FT) : 4.0395E+04
AT ELEVATION (FT) : 330.23

MAX. SCALED DEFL. (LB-IN^3): 1.8427E+10
AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:11:45

****
* COMPLETE OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 72+18.54 - 74+03.04
'Monolith 240, Drained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	1.8427E+10	0.00
350.00	1.0400E+01	31.	1.7464E+10	62.40
349.00	8.3200E+01	125.	1.6501E+10	124.80
348.00	2.8080E+02	281.	1.5539E+10	187.20
347.00	6.6560E+02	499.	1.4577E+10	249.60
346.00	1.3000E+03	780.	1.3616E+10	312.00
345.00	2.2464E+03	1123.	1.2658E+10	374.40
344.00	3.5672E+03	1529.	1.1703E+10	436.80
343.00	5.3248E+03	1997.	1.0755E+10	499.20
342.00	7.5816E+03	2527.	9.8157E+09	561.60
341.00	1.0368E+04	3023.	8.8899E+09	429.75
340.00	1.3583E+04	3387.	7.9820E+09	297.89
339.00	1.7097E+04	3619.	7.0976E+09	166.04
338.00	2.0777E+04	3719.	6.2428E+09	34.18
337.74	2.1742E+04	3723.	6.0268E+09	0.00
337.00	2.4491E+04	3687.	5.4239E+09	-97.67
336.00	2.8107E+04	3523.	4.6473E+09	-229.53
335.00	3.1494E+04	3228.	3.9192E+09	-361.38
334.00	3.4519E+04	2801.	3.2456E+09	-493.24
333.00	3.7051E+04	2241.	2.6314E+09	-625.09
332.00	3.8958E+04	1550.	2.0813E+09	-756.94
331.00	4.0108E+04	728.	1.5983E+09	-888.80
330.00	4.0369E+04	-227.	1.1845E+09	-1020.65

Subject: Phase II Evaluation
Paducah, KY

Station 72+90
Drained
Page 5 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

329.00	3.9610E+04	-1314.	8.4034E+08	-1152.51
328.00	3.7698E+04	-2532.	5.6444E+08	-1284.36
327.00	3.4501E+04	-3882.	3.5350E+08	-1416.22
326.00	2.9889E+04	-5365.	2.0197E+08	-1548.07
325.95	2.9612E+04	-5444.	1.9568E+08	-1554.82
325.00	2.3870E+04	-6530.	1.0188E+08	-734.49
324.00	1.7117E+04	-6832.	4.2935E+07	130.13
323.00	1.0494E+04	-6270.	1.3584E+07	994.75
322.00	4.8657E+03	-4843.	2.5100E+06	1859.36
321.00	1.0967E+03	-2551.	1.1144E+05	2723.98
320.17	0.0000E+00	0.	0.0000E+00	3439.69

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION (FT)	PRESSURE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.00	499.	0.	0.	0.	0.
342.00	562.	0.	0.	0.	0.
341.00	562.	153.	21.	21.	153.
340.00	562.	305.	41.	41.	305.
339.00	562.	458.	62.	62.	458.
338.00	562.	610.	83.	83.	610.
337.74	562.	650.	88.	88.	650.
337.00	562.	763.	104.	104.	763.
336.00	562.	916.	124.	124.	916.
335.00	562.	1068.	145.	145.	1068.
334.00	562.	1221.	166.	166.	1221.
333.00	562.	1373.	187.	187.	1373.
332.00	562.	1526.	207.	207.	1526.
331.00	562.	1679.	228.	228.	1679.
330.00	562.	1831.	249.	249.	1831.
329.00	562.	1984.	270.	270.	1984.
328.00	562.	2136.	290.	290.	2136.
327.00	562.	2289.	311.	311.	2289.
326.00	562.	2442.	332.	332.	2442.
325.95	562.	2449.	333.	333.	2449.
325.00	562.	2594.	353.	353.	2594.
324.00	562.	2747.	373.	373.	2747.
323.00	562.	2899.	394.	394.	2899.
322.00	562.	3052.	415.	415.	3052.
321.00	562.	3205.	436.	436.	3205.
320.17	562.	3357.	456.	456.	3357.
319.00	562.	3510.	477.	477.	3510.

Subject: Phase II Evaluation
Paducah, KY

Station 72+90
Undrained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:48:21

****
* INPUT DATA *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 72+18.54 - 74+03.04
'Monolith 240, Undrained

II.--CONTROL
CANTILEVER WALL DESIGN
FACTOR OF SAFETY FOR ACTIVE PRESSURES = 1.00
FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

III.--WALL DATA
ELEVATION AT TOP OF WALL = 351.00 FT.

IV.--SURFACE POINT DATA

IV.A.--RIGHTSIDE

DIST. FROM WALL (FT)	ELEVATION (FT)
0.00	342.00

IV.B.--LEFTSIDE

DIST. FROM WALL (FT)	ELEVATION (FT)
0.00	342.00

V.--SOIL LAYER DATA

V.A.--RIGHTSIDE
LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE = DEFAULT
LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

SAT. WGHT. (PCF)	MOIST WGHT. (PCF)	ANGLE OF INTERNAL FRICTION (DEG)	COH-ESION (PSF)	ANGLE OF WALL FRICTION (DEG)	ADH-ESION (PSF)	<--BOTTOM--> ELEV. (FT)	SLOPE (FT/FT)	<-SAFETY-> <-FACTOR-> ACT.	PASS.
125.00	125.00	0.00	1000.00	0.00	500.00			DEF	DEF

V.B.--LEFTSIDE
LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE = DEFAULT
LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

SAT. WGHT. (PCF)	MOIST WGHT. (PCF)	ANGLE OF INTERNAL FRICTION (DEG)	COH-ESION (PSF)	ANGLE OF WALL FRICTION (DEG)	ADH-ESION (PSF)	<--BOTTOM--> ELEV. (FT)	SLOPE (FT/FT)	<-SAFETY-> <-FACTOR-> ACT.	PASS.
125.00	125.00	0.00	1000.00	0.00	500.00			DEF	DEF

VI.--WATER DATA
UNIT WEIGHT = 62.40 (PCF)
RIGHTSIDE ELEVATION = 351.00 (FT)
LEFTSIDE ELEVATION = 342.00 (FT)

Subject: Phase II Evaluation
Paducah, KY

Station 72+90
Undrained
Page 2 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:48:42

****
* SOIL PRESSURES FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 72+18.54 - 74+03.04
'Monolith 240, Undrained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.0	499.2	0.0	0.0	499.2	499.2	0.0	0.0
342.0+	561.6	0.0	0.0	561.6	561.6	0.0	0.0
342.0-	561.6	1333.3	0.0	-771.7	1894.9	0.0	1333.3
341.0	561.6	1695.6	0.0	-1134.0	2257.2	0.0	1695.6
340.0	561.6	1758.2	0.0	-1196.6	2319.8	0.0	1758.2
339.0	561.6	1820.8	0.0	-1259.2	2382.4	0.0	1820.8
338.0	561.6	1883.4	0.0	-1321.8	2445.0	0.0	1883.4
337.0	561.6	1946.0	0.0	-1384.4	2507.6	0.0	1946.0
336.0	561.6	2008.6	0.0	-1447.0	2570.2	0.0	2008.6
335.0	561.6	2071.2	0.0	-1509.6	2632.8	0.0	2071.2

334.0	561.6	2133.8	0.0	-1572.2	2695.4	0.0	2133.8
333.0	561.6	2196.4	0.0	-1634.8	2758.0	0.0	2196.4
332.0	561.6	2259.0	0.0	-1697.4	2820.6	0.0	2259.0
331.0	561.6	2321.6	0.0	-1760.0	2883.2	0.0	2321.6
330.0	561.6	2384.2	0.0	-1822.6	2945.8	0.0	2384.2
329.0	561.6	2446.8	0.0	-1885.2	3008.4	0.0	2446.8
328.0	561.6	2509.4	0.0	-1947.8	3071.0	0.0	2509.4
327.0	561.6	2572.0	0.0	-2010.4	3133.6	0.0	2572.0
326.0	561.6	2634.6	0.0	-2073.0	3196.2	0.0	2634.6
325.0	561.6	2697.2	0.0	-2135.6	3258.8	0.0	2697.2
324.0	561.6	2759.8	0.0	-2198.2	3321.4	0.0	2759.8
323.0	561.6	2822.4	0.0	-2260.8	3384.0	0.0	2822.4
322.0	561.6	2885.0	0.0	-2323.4	3446.6	0.0	2885.0
321.0	561.6	2947.6	0.0	-2386.0	3509.2	0.0	2947.6
320.0	561.6	3010.2	0.0	-2448.6	3571.8	0.0	3010.2
319.0	561.6	3072.8	0.0	-2511.2	3634.4	0.0	3072.8
318.0	561.6	3135.4	0.0	-2573.8	3697.0	0.0	3135.4
317.0	561.6	3198.0	0.0	-2636.4	3759.6	0.0	3198.0
316.0	561.6	3260.6	0.0	-2699.0	3822.2	0.0	3260.6
315.0	561.6	3323.2	0.0	-2761.6	3884.8	0.0	3323.2
314.0	561.6	3385.8	0.0	-2824.2	3947.4	0.0	3385.8
313.0	561.6	3448.4	0.0	-2886.8	4010.0	0.0	3448.4
312.0	561.6	3511.0	0.0	-2949.4	4072.6	0.0	3511.0
311.0	561.6	3573.6	0.0	-3012.0	4135.2	0.0	3573.6

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:48:43

****
* SUMMARY OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 72+18.54 - 74+03.04
'Monolith 240, Undrained

II.--SUMMARY

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

WALL BOTTOM ELEV. (FT) : 334.22
PENETRATION (FT) : 7.78

MAX. BEND. MOMENT (LB-FT) : 1.0729E+04
AT ELEVATION (FT) : 339.66

Subject: Phase II Evaluation
Paducah, KY

Station 72+90
Undrained
Page 4 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

MAX. SCALED DEFL. (LB-IN^3): 1.3188E+09
AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:48:43

****
* COMPLETE OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Stations 72+18.54 - 74+03.04
'Monolith 240, Undrained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	1.3188E+09	0.00
350.00	1.0400E+01	31.	1.1960E+09	62.40
349.00	8.3200E+01	125.	1.0733E+09	124.80
348.00	2.8080E+02	281.	9.5074E+08	187.20
347.00	6.6560E+02	499.	8.2869E+08	249.60
346.00	1.3000E+03	780.	7.0782E+08	312.00
345.00	2.2464E+03	1123.	5.8925E+08	374.40
344.00	3.5672E+03	1529.	4.7461E+08	436.80
343.00	5.3248E+03	1997.	3.6620E+08	499.20
342.00	7.5816E+03	2527.	2.6706E+08	561.60
342.00	7.5816E+03	2527.	2.6706E+08	-771.73
341.00	9.6625E+03	1574.	1.8100E+08	-1134.05
340.00	1.0659E+04	409.	1.1148E+08	-1196.65
339.00	1.0460E+04	-819.	6.0201E+07	-1259.25
338.00	9.0006E+03	-2110.	2.6819E+07	-1321.85
337.78	8.5132E+03	-2397.	2.1749E+07	-1335.39
337.00	6.3152E+03	-3097.	8.8054E+06	-451.41
336.00	3.1804E+03	-2985.	1.6391E+06	676.56
335.00	7.2215E+02	-1744.	6.5940E+04	1804.52
334.22	0.0000E+00	0.	0.0000E+00	2681.52

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

Subject: Phase II Evaluation
Paducah, KY

Station 72+90
Undrained
Page 5 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION	PRESSURE	PASSIVE	ACTIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.00	499.	0.	0.	0.	0.
342.00+	562.	0.	0.	0.	0.
342.00+	562.	1333.	0.	0.	1333.
341.00	562.	1696.	0.	0.	1696.
340.00	562.	1758.	0.	0.	1758.
339.00	562.	1821.	0.	0.	1821.
338.00	562.	1883.	0.	0.	1883.
337.78	562.	1897.	0.	0.	1897.
337.00	562.	1946.	0.	0.	1946.
336.00	562.	2009.	0.	0.	2009.
335.00	562.	2071.	0.	0.	2071.
334.22	562.	2134.	0.	0.	2134.
333.00	562.	2196.	0.	0.	2196.

Subject: Phase II Evaluation
Paducah, KY

Station 81+00/87+60
Drained
Page 1 of 6

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

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PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
DATE: 1-AUGUST-2007                                          TIME: 12:14:47

                            ****************
                            *  INPUT DATA  *
                            ****************

 I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Sta. 80+06.62 - 82+18.87 & 84+09.57 - 90+10.81
'Monoliths 280 & 307, Drained

II.--CONTROL
   CANTILEVER WALL DESIGN
   FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
   FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

III.--WALL DATA
   ELEVATION AT TOP OF WALL    = 351.00 FT.

 IV.--SURFACE POINT DATA

      IV.A.--RIGHTSIDE
         DIST. FROM     ELEVATION
         WALL (FT)         (FT)
              0.00        340.50

      IV.B.--LEFTSIDE
         DIST. FROM     ELEVATION
         WALL (FT)         (FT)
              0.00        340.50

  V.--SOIL LAYER DATA

     V.A.--RIGHTSIDE
         LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
         LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

            ANGLE OF          ANGLE OF                          <-SAFETY->
 SAT.  MOIST INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
WGHT.  WGHT. FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
(PCF)  (PCF)   (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00 125.00  26.00    0.00    17.33    0.00                  DEF  DEF

     V.B.--LEFTSIDE
         LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
         LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

            ANGLE OF          ANGLE OF                          <-SAFETY->
 SAT.  MOIST INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
WGHT.  WGHT. FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
(PCF)  (PCF)   (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00 125.00  26.00    0.00    17.33    0.00                  DEF  DEF

 VI.--WATER DATA
   UNIT WEIGHT          = 62.40 (PCF)
   RIGHTSIDE ELEVATION = 351.00 (FT)
   LEFTSIDE ELEVATION  = 340.50 (FT)
```

Subject: Phase II Evaluation
Paducah, KY

Station 81+00/87+60
Drained
Page 2 of 6

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:15:38

****
* SOIL PRESSURES FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Sta. 80+06.62 - 82+18.87 & 84+09.57 - 90+10.81
'Monoliths 280 & 307, Drained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.0	499.2	0.0	0.0	499.2	499.2	0.0	0.0
342.0	561.6	0.0	0.0	561.6	561.6	0.0	0.0
341.0	624.0	0.0	0.0	624.0	624.0	0.0	0.0
340.5	655.2	0.0	0.0	655.2	655.2	0.0	0.0
340.0	655.2	76.3	10.4	589.3	721.1	10.4	76.3
339.5	655.2	152.6	20.7	523.3	787.1	20.7	152.6
339.0	655.2	228.9	31.1	457.4	853.0	31.1	228.9
338.0	655.2	381.5	51.9	325.6	984.8	51.9	381.5

Subject: Phase II Evaluation
Paducah, KY

Station 81+00/87+60
Drained
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Computed by: N. Cash
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337.0	655.2	534.1	72.6	193.7	1116.7	72.6	534.1
336.0	655.2	686.7	93.3	61.9	1248.5	93.3	686.7
335.5	655.2	758.3	103.1	0.0	1310.4	103.1	758.3
335.0	655.2	839.3	114.1	-70.0	1380.4	114.1	839.3
334.0	655.2	991.9	134.8	-201.9	1512.3	134.8	991.9
333.0	655.2	1144.5	155.6	-333.7	1644.1	155.6	1144.5
332.0	655.2	1297.1	176.3	-465.6	1776.0	176.3	1297.1
331.0	655.2	1449.7	197.1	-597.4	1907.8	197.1	1449.7
330.0	655.2	1602.3	217.8	-729.3	2039.7	217.8	1602.3
329.0	655.2	1754.9	238.6	-861.1	2171.5	238.6	1754.9
328.0	655.2	1907.5	259.3	-993.0	2303.4	259.3	1907.5
327.0	655.2	2060.1	280.0	-1124.8	2435.2	280.0	2060.1
326.0	655.2	2212.7	300.8	-1256.7	2567.1	300.8	2212.7
325.0	655.2	2365.3	321.5	-1388.5	2698.9	321.5	2365.3
324.0	655.2	2517.9	342.3	-1520.4	2830.8	342.3	2517.9
323.0	655.2	2670.5	363.0	-1652.3	2962.7	363.0	2670.5
322.0	655.2	2823.1	383.8	-1784.1	3094.5	383.8	2823.1
321.0	655.2	2975.7	404.5	-1916.0	3226.4	404.5	2975.7
320.0	655.2	3128.3	425.3	-2047.8	3358.2	425.3	3128.3
319.0	655.2	3280.9	446.0	-2179.7	3490.1	446.0	3280.9
318.0	655.2	3433.5	466.7	-2311.5	3621.9	466.7	3433.5
317.0	655.2	3586.1	487.5	-2443.4	3753.8	487.5	3586.1
316.0	655.2	3738.7	508.2	-2575.2	3885.6	508.2	3738.7
315.0	655.2	3891.3	529.0	-2707.1	4017.5	529.0	3891.3
314.0	655.2	4043.9	549.7	-2838.9	4149.3	549.7	4043.9
313.0	655.2	4196.5	570.5	-2970.8	4281.2	570.5	4196.5
312.0	655.2	4349.1	591.2	-3102.7	4413.1	591.2	4349.1
311.0	655.2	4501.7	611.9	-3234.5	4544.9	611.9	4501.7
310.0	655.2	4654.3	632.7	-3366.4	4676.8	632.7	4654.3
309.0	655.2	4806.9	653.4	-3498.2	4808.6	653.4	4806.9
308.0	655.2	4959.5	674.2	-3630.1	4940.5	674.2	4959.5

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:15:38

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                    ****************************
                    *  SUMMARY OF RESULTS FOR  *
                    *  CANTILEVER WALL DESIGN  *
                    ****************************

 I.--HEADING
  'Phase II I-Wall Evaluation
  'Paducah, KY
  'Sta. 80+06.62 - 82+18.87 & 84+09.57 - 90+10.81
  'Monoliths 280 & 307, Drained

II.--SUMMARY

     RIGHTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
     AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.
```

Subject: Phase II Evaluation
Paducah, KY

Station 81+00/87+60
Drained
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Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

LEFTSIDE SOIL PRESSURES DETERMINED BY COULOMB COEFFICIENTS
AND THEORY OF ELASTICITY EQUATIONS FOR SURCHARGE LOADS.

WALL BOTTOM ELEV. (FT) : 315.03
PENETRATION (FT) : 25.47

MAX. BEND. MOMENT (LB-FT) : 6.4145E+04
AT ELEVATION (FT) : 326.76

MAX. SCALED DEFL. (LB-IN^3): 3.9827E+10
AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF
ELASTICITY IN PSI TIMES PILE MOMENT
OF INERTIA IN IN^4 TO OBTAIN DEFLECTION
IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 12:15:38

****
* COMPLETE OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Sta. 80+06.62 - 82+18.87 & 84+09.57 - 90+10.81
'Monoliths 280 & 307, Drained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	3.9827E+10	0.00
350.00	1.0400E+01	31.	3.8044E+10	62.40
349.00	8.3200E+01	125.	3.6260E+10	124.80
348.00	2.8080E+02	281.	3.4477E+10	187.20
347.00	6.6560E+02	499.	3.2694E+10	249.60
346.00	1.3000E+03	780.	3.0913E+10	312.00
345.00	2.2464E+03	1123.	2.9133E+10	374.40
344.00	3.5672E+03	1529.	2.7358E+10	436.80
343.00	5.3248E+03	1997.	2.5589E+10	499.20
342.00	7.5816E+03	2527.	2.3829E+10	561.60
341.00	1.0400E+04	3120.	2.2083E+10	624.00
340.50	1.2039E+04	3440.	2.1216E+10	655.20
340.00	1.3838E+04	3751.	2.0354E+10	589.27
339.50	1.5785E+04	4029.	1.9498E+10	523.35
339.00	1.7862E+04	4274.	1.8649E+10	457.42
338.00	2.2343E+04	4666.	1.6976E+10	325.56
337.00	2.7149E+04	4925.	1.5341E+10	193.71
336.00	3.2150E+04	5053.	1.3753E+10	61.86

Subject: Phase II Evaluation
Paducah, KY

Station 81+00/87+60
Drained
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Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

335.53	3.4525E+04	5068.	1.3026E+10	0.00
335.00	3.7212E+04	5049.	1.2220E+10	-70.00
334.00	4.2204E+04	4913.	1.0752E+10	-201.85
333.00	4.6994E+04	4645.	9.3566E+09	-333.71
332.00	5.1451E+04	4246.	8.0425E+09	-465.56
331.00	5.5442E+04	3714.	6.8172E+09	-597.42
330.00	5.8835E+04	3051.	5.6876E+09	-729.27
329.00	6.1500E+04	2256.	4.6596E+09	-861.13
328.00	6.3303E+04	1329.	3.7377E+09	-992.98
327.00	6.4113E+04	270.	2.9250E+09	-1124.83
326.00	6.3799E+04	-921.	2.2230E+09	-1256.69
325.00	6.2227E+04	-2244.	1.6311E+09	-1388.54
324.00	5.9267E+04	-3698.	1.1465E+09	-1520.40
323.00	5.4787E+04	-5284.	7.6404E+08	-1652.25
322.00	4.8655E+04	-7003.	4.7606E+08	-1784.11
321.77	4.7023E+04	-7410.	4.2292E+08	-1813.96
321.00	4.0815E+04	-8554.	2.7189E+08	-1145.12
320.00	3.1832E+04	-9267.	1.3809E+08	-280.50
319.00	2.2568E+04	-9115.	5.9249E+07	584.11
318.00	1.3889E+04	-8099.	1.9494E+07	1448.73
317.00	6.6585E+03	-6218.	3.9477E+06	2313.34
316.00	1.7413E+03	-3472.	2.4059E+05	3177.96
315.03	0.0000E+00	0.	0.0000E+00	4012.97

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION (FT)	PRESSURE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.00	499.	0.	0.	0.	0.
342.00	562.	0.	0.	0.	0.
341.00	624.	0.	0.	0.	0.
340.50	655.	0.	0.	0.	0.
340.00	655.	76.	10.	10.	76.
339.50	655.	153.	21.	21.	153.
339.00	655.	229.	31.	31.	229.
338.00	655.	381.	52.	52.	381.
337.00	655.	534.	73.	73.	534.
336.00	655.	687.	93.	93.	687.
335.53	655.	758.	103.	103.	758.
335.00	655.	839.	114.	114.	839.
334.00	655.	992.	135.	135.	992.
333.00	655.	1144.	156.	156.	1144.
332.00	655.	1297.	176.	176.	1297.
331.00	655.	1450.	197.	197.	1450.
330.00	655.	1602.	218.	218.	1602.

Subject: Phase II Evaluation
Paducah, KY

Station 81+00/87+60
Drained

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

329.00	655.	1755.	239.	239.	1755.
328.00	655.	1907.	259.	259.	1907.
327.00	655.	2060.	280.	280.	2060.
326.00	655.	2213.	301.	301.	2213.
325.00	655.	2365.	322.	322.	2365.
324.00	655.	2518.	342.	342.	2518.
323.00	655.	2670.	363.	363.	2670.
322.00	655.	2823.	384.	384.	2823.
321.77	655.	2858.	388.	388.	2858.
321.00	655.	2976.	405.	405.	2976.
320.00	655.	3128.	425.	425.	3128.
319.00	655.	3281.	446.	446.	3281.
318.00	655.	3433.	467.	467.	3433.
317.00	655.	3586.	487.	487.	3586.
316.00	655.	3739.	508.	508.	3739.
315.03	655.	3891.	529.	529.	3891.
314.00	655.	4044.	550.	550.	4044.

Subject: Phase II Evaluation
Paducah, KY

Station 81+00/87+60
Undrained
Page 1 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

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 PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
                          BY CLASSICAL METHODS
 DATE: 1-AUGUST-2007                                          TIME: 13:53:37

                             ****************
                             *  INPUT DATA  *
                             ****************

      I.--HEADING
      'Phase II I-Wall Evaluation
      'Paducah, KY
      'Sta. 80+06.62 - 82+18.87 & 84+09.57 - 90+10.81
      'Monoliths 280 & 307, Undrained

     II.--CONTROL
        CANTILEVER WALL DESIGN
        FACTOR OF SAFETY FOR ACTIVE PRESSURES  = 1.00
        FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.50

    III.--WALL DATA
        ELEVATION AT TOP OF WALL    = 351.00 FT.

     IV.--SURFACE POINT DATA

          IV.A.--RIGHTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00       340.50

          IV.B.--LEFTSIDE
             DIST. FROM     ELEVATION
             WALL (FT)         (FT)
                  0.00       340.50

      V.--SOIL LAYER DATA

         V.A.--RIGHTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                          <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00     0.00 1000.00     0.00  500.00                  DEF  DEF

         V.B.--LEFTSIDE
             LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE  = DEFAULT
             LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = DEFAULT

                ANGLE OF         ANGLE OF                          <-SAFETY->
  SAT.   MOIST  INTERNAL  COH-     WALL    ADH-    <--BOTTOM-->  <-FACTOR->
 WGHT.   WGHT.  FRICTION  ESION  FRICTION  ESION   ELEV.  SLOPE  ACT. PASS.
 (PCF)   (PCF)    (DEG)   (PSF)    (DEG)   (PSF)   (FT)  (FT/FT)
125.00  125.00     0.00 1000.00     0.00  500.00                  DEF  DEF

      VI.--WATER DATA
         UNIT WEIGHT          = 62.40 (PCF)
         RIGHTSIDE ELEVATION = 351.00 (FT)
         LEFTSIDE ELEVATION  = 340.50 (FT)
```

Subject: Phase II Evaluation
Paducah, KY

Station 81+00/87+60
Undrained
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Computed by: N. Cash
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NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:54:15

****
* SOIL PRESSURES FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Sta. 80+06.62 - 82+18.87 & 84+09.57 - 90+10.81
'Monoliths 280 & 307, Undrained

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

				<------NET------>			
	NET	<---LEFTSIDE--->		(SOIL + WATER)		<--RIGHTSIDE--->	
ELEV.	WATER	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
(FT)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
349.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
348.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
347.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
346.0	312.0	0.0	0.0	312.0	312.0	0.0	0.0
345.0	374.4	0.0	0.0	374.4	374.4	0.0	0.0
344.0	436.8	0.0	0.0	436.8	436.8	0.0	0.0
343.0	499.2	0.0	0.0	499.2	499.2	0.0	0.0
342.0	561.6	0.0	0.0	561.6	561.6	0.0	0.0
341.0	624.0	0.0	0.0	624.0	624.0	0.0	0.0
340.5+	655.2	0.0	0.0	655.2	655.2	0.0	0.0
340.5-	655.2	1333.3	0.0	-678.1	1988.5	0.0	1333.3
340.0	655.2	1664.3	0.0	-1009.1	2319.5	0.0	1664.3
339.5	655.2	1695.6	0.0	-1040.4	2350.8	0.0	1695.6
339.0	655.2	1726.9	0.0	-1071.7	2382.1	0.0	1726.9
338.0	655.2	1789.5	0.0	-1134.3	2444.7	0.0	1789.5
337.0	655.2	1852.1	0.0	-1196.9	2507.3	0.0	1852.1

336.0	655.2	1914.7	0.0	-1259.5	2569.9	0.0	1914.7
335.0	655.2	1977.3	0.0	-1322.1	2632.5	0.0	1977.3
334.0	655.2	2039.9	0.0	-1384.7	2695.1	0.0	2039.9
333.0	655.2	2102.5	0.0	-1447.3	2757.7	0.0	2102.5
332.0	655.2	2165.1	0.0	-1509.9	2820.3	0.0	2165.1
331.0	655.2	2227.7	0.0	-1572.5	2882.9	0.0	2227.7
330.0	655.2	2290.3	0.0	-1635.1	2945.5	0.0	2290.3
329.0	655.2	2352.9	0.0	-1697.7	3008.1	0.0	2352.9
328.0	655.2	2415.5	0.0	-1760.3	3070.7	0.0	2415.5
327.0	655.2	2478.1	0.0	-1822.9	3133.3	0.0	2478.1
326.0	655.2	2540.7	0.0	-1885.5	3195.9	0.0	2540.7
325.0	655.2	2603.3	0.0	-1948.1	3258.5	0.0	2603.3
324.0	655.2	2665.9	0.0	-2010.7	3321.1	0.0	2665.9
323.0	655.2	2728.5	0.0	-2073.3	3383.7	0.0	2728.5
322.0	655.2	2791.1	0.0	-2135.9	3446.3	0.0	2791.1
321.0	655.2	2853.7	0.0	-2198.5	3508.9	0.0	2853.7
320.0	655.2	2916.3	0.0	-2261.1	3571.5	0.0	2916.3
319.0	655.2	2978.9	0.0	-2323.7	3634.1	0.0	2978.9
318.0	655.2	3041.5	0.0	-2386.3	3696.7	0.0	3041.5
317.0	655.2	3104.1	0.0	-2448.9	3759.3	0.0	3104.1
316.0	655.2	3166.7	0.0	-2511.5	3821.9	0.0	3166.7
315.0	655.2	3229.3	0.0	-2574.1	3884.5	0.0	3229.3
314.0	655.2	3291.9	0.0	-2636.7	3947.1	0.0	3291.9
313.0	655.2	3354.5	0.0	-2699.3	4009.7	0.0	3354.5
312.0	655.2	3417.1	0.0	-2761.9	4072.3	0.0	3417.1
311.0	655.2	3479.7	0.0	-2824.5	4134.9	0.0	3479.7
310.0	655.2	3542.3	0.0	-2887.1	4197.5	0.0	3542.3
309.0	655.2	3604.9	0.0	-2949.7	4260.1	0.0	3604.9
308.0	655.2	3667.5	0.0	-3012.3	4322.7	0.0	3667.5

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:54:16

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                    ****************************
                    *  SUMMARY OF RESULTS FOR  *
                    *  CANTILEVER WALL DESIGN  *
                    ****************************

 I.--HEADING
  'Phase II I-Wall Evaluation
  'Paducah, KY
  'Sta. 80+06.62 - 82+18.87 & 84+09.57 - 90+10.81
  'Monoliths 280 & 307, Undrained

II.--SUMMARY

     RIGHTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.

     LEFTSIDE SOIL PRESSURES DETERMINED BY SWEEP SEARCH WEDGE METHOD.
```

Subject: Phase II Evaluation
Paducah, KY

Station 81+00/87+60
Undrained
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Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

WALL BOTTOM ELEV. (FT) : 330.34
PENETRATION (FT) : 10.16

MAX. BEND. MOMENT (LB-FT) : 1.7927E+04
AT ELEVATION (FT) : 337.24

MAX. SCALED DEFL. (LB-IN^3): 3.4143E+09
AT ELEVATION (FT) : 351.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS BY CLASSICAL METHODS

DATE: 1-AUGUST-2007 TIME: 13:54:16

****
* COMPLETE OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Phase II I-Wall Evaluation
'Paducah, KY
'Sta. 80+06.62 - 82+18.87 & 84+09.57 - 90+10.81
'Monoliths 280 & 307, Undrained

II.--RESULTS0. (LB))

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
351.00	0.0000E+00	0.	3.4143E+09	0.00
350.00	1.0400E+01	31.	3.1533E+09	62.40
349.00	8.3200E+01	125.	2.8924E+09	124.80
348.00	2.8080E+02	281.	2.6316E+09	187.20
347.00	6.6560E+02	499.	2.3713E+09	249.60
346.00	1.3000E+03	780.	2.1122E+09	312.00
345.00	2.2464E+03	1123.	1.8555E+09	374.40
344.00	3.5672E+03	1529.	1.6026E+09	436.80
343.00	5.3248E+03	1997.	1.3560E+09	499.20
342.00	7.5816E+03	2527.	1.1186E+09	561.60
341.00	1.0400E+04	3120.	8.9444E+08	624.00
340.50	1.2039E+04	3440.	7.8878E+08	655.20
340.50	1.2039E+04	3440.	7.8878E+08	-678.13
340.00	1.3661E+04	3018.	6.8832E+08	-1009.15
339.50	1.5042E+04	2506.	5.9375E+08	-1040.45
339.00	1.6164E+04	1978.	5.0567E+08	-1071.75
338.00	1.7595E+04	874.	3.5081E+08	-1134.35
337.00	1.7892E+04	-291.	2.2618E+08	-1196.95
336.00	1.6992E+04	-1519.	1.3229E+08	-1259.55
335.00	1.4832E+04	-2810.	6.7590E+07	-1322.15
334.59	1.3577E+04	-3354.	4.8819E+07	-1347.64
334.00	1.1387E+04	-3976.	2.8328E+07	-752.40

Subject: Phase II Evaluation
Paducah, KY

Station 81+00/87+60
Undrained
Page 5 of 5

Computed by: N. Cash
Date: 1 August 2007
Checked by: T. Sullivan
Date: 18 Sept 07

333.00	7.2021E+03	-4227.	8.6337E+06	251.77
332.00	3.2688E+03	-3473.	1.4214E+06	1255.94
331.00	5.9135E+02	-1715.	3.8481E+04	2260.11
330.34	0.0000E+00	0.	0.0000E+00	2924.36

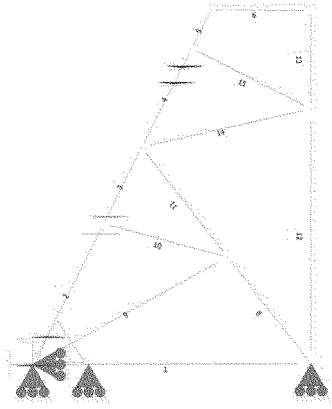
NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION (FT)	PRESSURE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
351.00	0.	0.	0.	0.	0.
350.00	62.	0.	0.	0.	0.
349.00	125.	0.	0.	0.	0.
348.00	187.	0.	0.	0.	0.
347.00	250.	0.	0.	0.	0.
346.00	312.	0.	0.	0.	0.
345.00	374.	0.	0.	0.	0.
344.00	437.	0.	0.	0.	0.
343.00	499.	0.	0.	0.	0.
342.00	562.	0.	0.	0.	0.
341.00	624.	0.	0.	0.	0.
340.50+	655.	0.	0.	0.	0.
340.50+	655.	1333.	0.	0.	1333.
340.00	655.	1664.	0.	0.	1664.
339.50	655.	1696.	0.	0.	1696.
339.00	655.	1727.	0.	0.	1727.
338.00	655.	1790.	0.	0.	1790.
337.00	655.	1852.	0.	0.	1852.
336.00	655.	1915.	0.	0.	1915.
335.00	655.	1977.	0.	0.	1977.
334.59	655.	2003.	0.	0.	2003.
334.00	655.	2040.	0.	0.	2040.
333.00	655.	2103.	0.	0.	2103.
332.00	655.	2165.	0.	0.	2165.
331.00	655.	2228.	0.	0.	2228.
330.34	655.	2290.	0.	0.	2290.
329.00	655.	2353.	0.	0.	2353.

Bentley USACE
Current Date: 10/21/2009 1:29 PM
Units system: English
File name: C:\Documents and Settings\h2edmbla\My Documents\Paducah, KY Levee Cert\paducah25+15.adv\

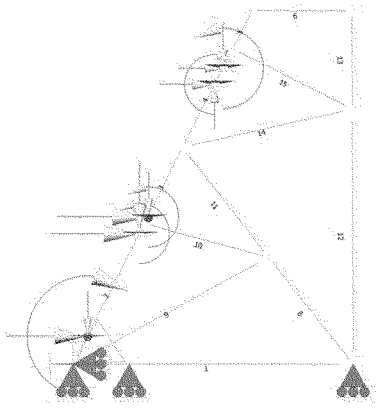
Closure 25+15
Members



Bentley USACE
Current Date: 10/21/2009 1:30 PM
Units system: English
File name: C:\Documents and Settings\h2edmbla\My Documents\Paducah, KY Levee Cert\paducah25+15.adv\

Closure 25+15

Loads



Bentley USACE Closure 25+15

Current Date: 10/22/2009 8:07 AM
Units system: English
File name: C:\Documents and Settings\h2edmbla\My Documents\Paducah, KY Levee Cert\paducah25+15.adv\

Steel Code Check

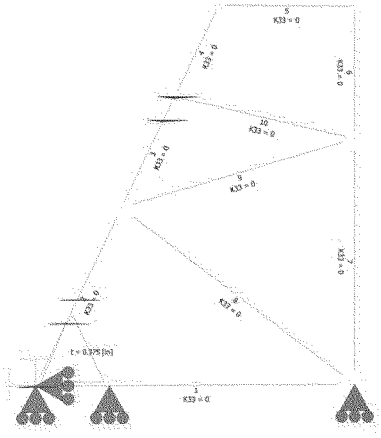
Report: Summary - For all selected load conditions

Load conditions to be included in design :
DS1=DL

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	T2L 2-1_2X2-1_2X1_4	**1**	DS1 at 20.83%	**0.11**	**OK**	(Sec. E)
		2	DS1 at 93.75%	**0.64**	**OK**	(H1-1b)
		3	DS1 at 0.00%	**0.21**	**OK**	(H1-1b)
		4	DS1 at 81.25%	**0.86**	**OK**	(H1-1b)
		5	DS1 at 0.00%	**0.26**	**OK**	(H1-1b)
		6	DS1 at 0.00%	**0.13**	**OK**	(H1-1b)
		8	DS1 at 0.00%	**0.24**	**OK**	(H1-1a)
		11	DS1 at 100.00%	**0.10**	**OK**	(H1-1b)
	T2LU 2-1_2X2X1_4LLBB	**9**	DS1 at 0.00%	**0.09**	**OK**	(Sec. E)
		10	DS1 at 100.00%	**0.24**	**OK**	(H1-1b)
		14	DS1 at 0.00%	**0.11**	**OK**	(H1-1b)
		15	DS1 at 0.00%	**0.35**	**OK**	(H1-1b)
	T2LU 3X2-1_2X1_4LLBB	**12**	DS1 at 0.00%	**0.08**	**OK**	(Sec. E)
		13	DS1 at 0.00%	**0.09**	**OK**	(H1-1b)

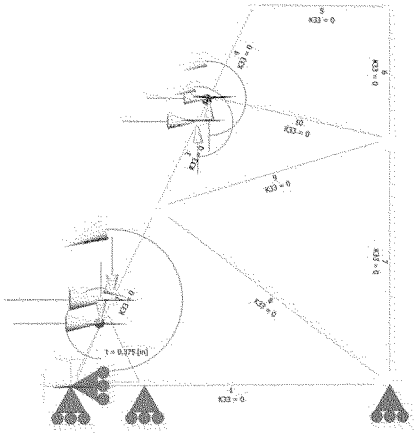
Bentley USACE
Current Date: 10/21/2009 1:32 PM
Units system: English
File name: C:\Documents and Settings\h2edmbla\My Documents\Paducah, KY Levee Cert\paducah75+85.adv\

Closure 75+85
Members



Bentley USACE
Current Date: 10/21/2009 1:33 PM
Units system: English
File name: C:\Documents and Settings\h2edmbla\My Documents\Paducah, KY Levee Cert\paducah75+85.adv\

Closure 75+85
Loads



Bentley USACE Closure 75+85

Current Date: 10/22/2009 8:17 AM
Units system: English
File name: C:\Documents and Settings\h2edmbla\My Documents\Paducah, KY Levee Cert\paducah75+85.adv\

Steel Code Check

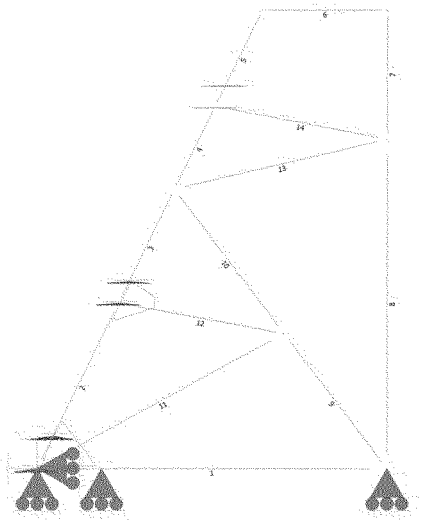
Report: Summary - For all selected load conditions

Load conditions to be included in design :
DS1=DL

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	T2L 2-1_2X2-1_2X1_4	**1**	DS1 at 0.00%	**0.15**	**OK**	(H1-1b)
		2	DS1 at 35.42%	**0.62**	**OK**	(H1-1b)
		3	DS1 at 97.92%	**0.39**	**OK**	(H1-1b)
		4	DS1 at 0.00%	**0.01**	**OK**	(H1-1b)
		5	DS1 at 100.00%	**0.01**	**OK**	(H1-1b)
		6	DS1 at 0.00%	**0.01**	**OK**	(H1-1b)
		7	DS1 at 0.00%	**0.06**	**OK**	(Sec. E)
	T2LU 2-1_2X2X1_4LLBB	**8**	DS1 at 0.00%	**0.13**	**OK**	(Sec. E)
		9	DS1 at 0.00%	**0.10**	**OK**	(Sec. E)
		10	DS1 at 0.00%	**0.12**	**OK**	(Sec. E)

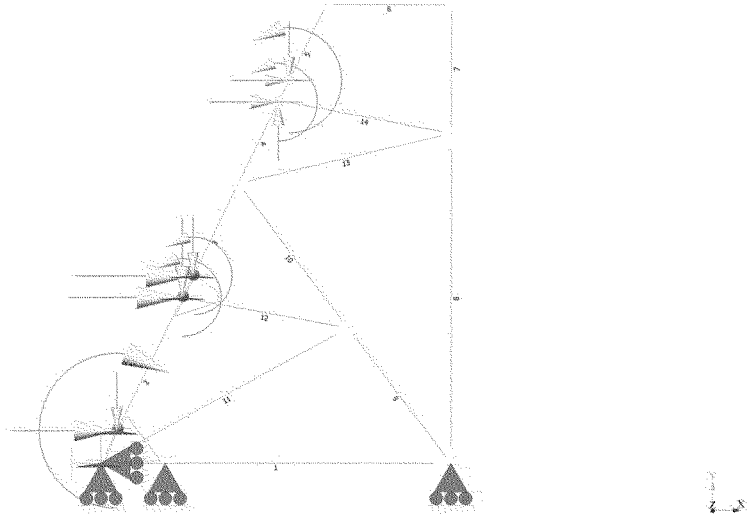
Bentley USACE
Current Date: 10/22/2009 8:09 AM
Units system: English
File name: C:\Documents and Settings\h2edmbla\My Documents\Paducah, KY Levee Cert\paducah83+92.adv\

Closure 83+92
Members



Bentley USACE
Current Date: 10/22/2009 8:11 AM
Units system: English
File name: C:\Documents and Settings\h2edmbla\My Documents\Paducah, KY Levee Cert\paducah83+92.adv\

Closure 83+92
Loads



Bentley USACE Closure 83+92

Current Date: 10/22/2009 8:06 AM
Units system: English
File name: C:\DOCUME-1\h2edmbla\MYDOCU-1\PADUCA-1\paducah83+92.adv\

Steel Code Check

Report: Summary - For all selected load conditions

Load conditions to be included in design :
DS1=DL

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	T2L 2-1_2X2-1_2X1_4	**1**	DS1 at 10.42%	**0.16**	**OK**	(H1-1b)
		2	DS1 at 0.00%	**0.34**	**OK**	(H1-1b)
		3	DS1 at 0.00%	**0.84**	**OK**	(H1-1b)
		4	DS1 at 100.00%	**0.33**	**OK**	(H1-1b)
		5	DS1 at 0.00%	**0.37**	**OK**	(H1-1b)
		6	DS1 at 100.00%	**0.03**	**OK**	(H1-1b)
	T2LU 2-1_2X2X1_4LLBB	**9**	DS1 at 0.00%	**0.36**	**OK**	(H1-1a)
		10	DS1 at 0.00%	**0.13**	**OK**	(Sec. E)
		11	DS1 at 0.00%	**0.18**	**OK**	(Sec. E)
		12	DS1 at 0.00%	**0.35**	**OK**	(H1-1a)
		13	DS1 at 0.00%	**0.11**	**OK**	(Sec. E)
		14	DS1 at 0.00%	**0.13**	**OK**	(Sec. E)
	T2LU 3X2-1_2X1_4SLBB	**7**	DS1 at 0.00%	**0.03**	**OK**	(H1-1b)
		8	DS1 at 0.00%	**0.07**	**OK**	(Sec. E)

Paducah Closure Connection Check

.5" dia. A325 bolt → F_{nv}/Ω= 30 ksi
Thread X, Single Shear (AISC 13th ed. Table 7-1)

Nominal Bolt Area= 0.19635 in^2

r_n/Ω_v= **5.89 k/ bolt**

Closure 83+92

Member 12

Axial Force=	12.3 k		min. edge distance=
# of bolts=	2		(Table J3.4)
capacity=	11.78 k	NOT OK	

Member 14

Axial Force=	4.9 k	
# of bolts=	2	
capacity=	11.78 k	OK

Closure 25+15

Member 10

Axial Force=	6.7 k	
# of bolts=	3	
capacity=	17.67 k	OK

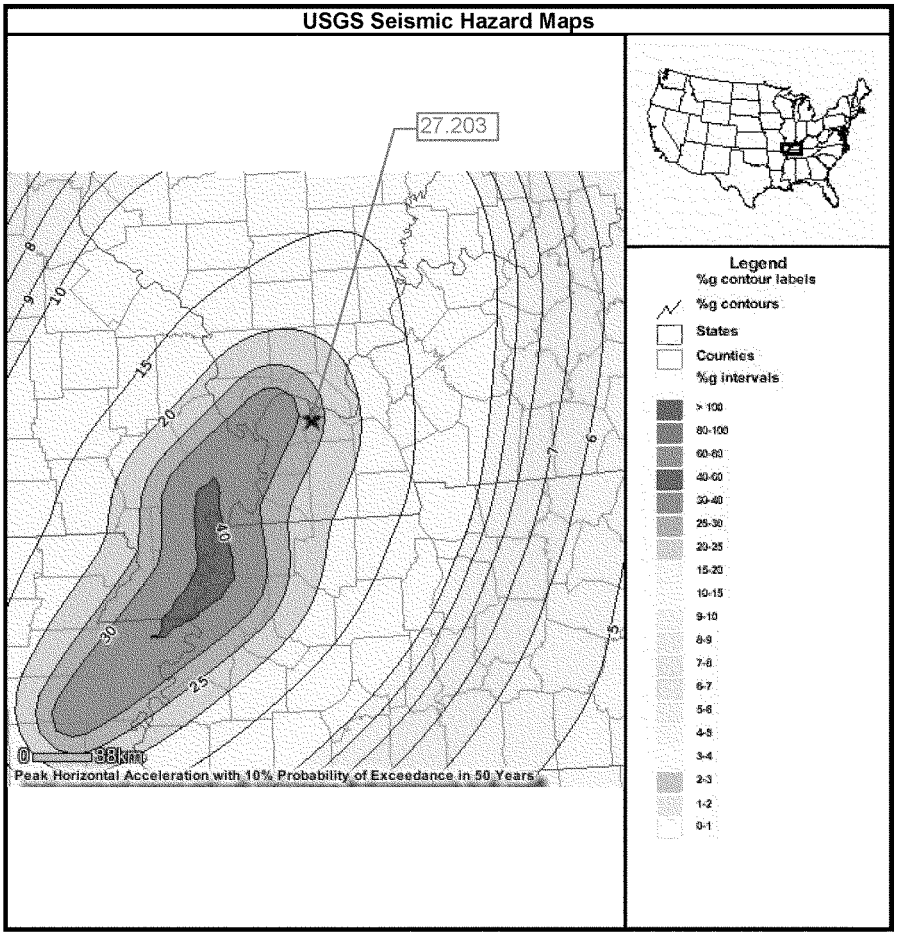
Member 14

Axial Force=	4.9 k	
# of bolts=	2	
capacity=	11.78 k	OK

Closure 75+85

Member 10

Axial Force=	4.39 k	
# of bolts=	1	
capacity=	5.89 k	OK


USGS Seismic Hazard Maps
27.203
Legend
%g contour labels
%g contours
States
Counties
%g intervals
> 100
80-100
60-80
40-60
30-40
25-30
20-25
15-20
10-15
9-10
8-9
7-8
6-7
5-6
4-5
3-4
2-3
1-2
0-1
0 38 km
Peak Horizontal Acceleration with 10% Probability of Exceedance in 50 Years

Conterminous 48 States
2006 International Building Code
Zip Code = 42001
Spectral Response Accelerations Ss and S1
Ss and S1 = Mapped Spectral Acceleration Values
Data are based on a 0.01 deg grid spacing

Period (sec)	Centroid Sa (g)	
0.2	1.552	(Ss)
1.0	0.522	(S1)

Period (sec)	Maximum Sa (g)	
0.2	2.223	(Ss)
1.0	0.600	(S1)

Period (sec)	Minimum Sa (g)	
0.2	1.500	(Ss)
1.0	0.461	(S1)

Conterminous 48 States
2006 International Building Code
Zip Code = 42001
Spectral Response Accelerations SMs and SM1
SMs = Fa x Ss and SM1 = Fv x S1
Site Class D

Period (sec)	Centroid Sa (g)	
0.2	1.552	(SMs, Fa = 1.000)
1.0	0.783	(SM1, Fv = 1.500)

Period (sec)	Maximum Sa (g)	
0.2	2.223	(SMs, Fa = 1.000)
1.0	0.900	(SM1, Fv = 1.500)

Period (sec)	Minimum Sa (g)	
0.2	1.500	(SMs, Fa = 1.000)
1.0	0.710	(SM1, Fv = 1.539)

Conterminous 48 States
2006 International Building Code
Zip Code = 42001
Spectral Response Accelerations SDs and SD1
SDs = 2/3 x SMs and SD1 = 2/3 x SM1
Site Class D

Period (sec)	Centroid Sa (g)	
0.2	1.035	(SDs)
1.0	0.522	(SD1)

Period (sec)	Maximum Sa (g)	
0.2	1.482	(SDs)
1.0	0.600	(SD1)

Period (sec)	Minimum Sa (g)	
0.2	1.000	(SDs)
1.0	0.473	(SD1)

Paducah LFPP
Pump Station 1
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1 - 0.50)}$ $T_{ROBE} = 144.27 \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1 - 0.10)}$ $T_{RMDE} = 949.122yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_s := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_s = 0.769$

$b_s := 10^{\left(4.7338 \log(S_{s475}) - 3.7338 \log(S_{s2475})\right)}$ $b_s = 4.685 \times 10^{-3}$

$S_{sOBE} := b_s \cdot 144^{m_s}$ $S_{sOBE} = 0.214$ $S_{sMDE} := b_s \cdot 950^{m_s}$ $S_{sMDE} = 0.911$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = 0.906$

$b_1 := 10^{\left(4.7338 \log(S_{1475}) - 3.7338 \log(S_{12475})\right)}$ $b_1 = 4.397 \times 10^{-4}$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = 0.04$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = 0.219$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} = 0.342$ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} = 0.228$

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} = 0.095$ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} = 0.063$

$F_{aM} := 1.1356$ ASCE 7-05 Table 11.4-1

$F_{vM} := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} = 1.035$ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} = 0.69$

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} = 0.43$ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} = 0.287$

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n1}^{\,x}$ $T_a = 0.327$

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} = 0.278$ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} = 0.416$

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} = 0.068$ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} = 0.207$ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}^{\,2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM} \cdot \left(\frac{R}{I}\right)}\right]$ $C_{sa} = 0.207$ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} = 0.207$

$V_M := C_{sM} \cdot W_{PS1}$ $V_M = 3.463 \times 10^5\ \text{lb}$

Wind Loading

$$Wind := 15\frac{lb}{ft^2}$$

$Ra := Wind \cdot h_{n1} \cdot ft \cdot 40ft$ $\quad Ra = 2.49 \times 10^4 \cdot lb$

$if\left(V_M > Ra, "Seismic\ Controls", "Seismic\ Does\ Not\ Control"\right) = "Seismic\ Controls"$

Pump Station 1

Building is integrated with LOP

$h_{n1} := 41.5\,\text{feet}$

Section B on sheet 934-12.3/3

$\text{Wall}_{15b} := 2 \cdot 25\text{ft} \cdot 24\text{in}$

$\text{Wall}_{26b} := 2 \cdot 14.5\text{ft} \cdot 12\text{in}$

$\text{Wall}_{37b} := 2 \cdot 1.5\text{ft} \cdot 6\text{in}$

$\text{Wall}_{48b} := 2 \cdot 6\text{in} \cdot 12\text{in} + 1\text{ft} \cdot 1\text{ft}$

$\text{Wall}_{910b} := 2 \cdot 1.5\text{ft} \cdot 6\text{in}$

$\text{Roof}_{11b} := 20\text{ft} \cdot 6\text{in}$

$\text{Floor}_{12b} := 20\text{ft} \cdot 8\text{in} + 2 \cdot 3\text{in} \cdot 9\text{in}$

$\text{Floor}_{13b} := 20\text{ft} \cdot 24\text{in}$

$\text{Roof}_{14b} := 5\text{ft} \cdot 6\text{in}$

$\text{Floor}_{15b} := 38\text{ft} \cdot 1.5\text{ft}$

$\text{WWall}_{1617b} := 2 \cdot 18\text{in} \cdot \left[33\text{ft} \cdot \left(\frac{14\text{ft} + 9\text{in}}{2} \right) \right]$

$\text{Depth}_b := 40\text{ft}$

$\text{Total}_b := \text{WWall}_{1617b} + \text{Depth}_b \cdot \left(\begin{matrix} \text{Wall}_{15b} + \text{Wall}_{26b} + \text{Wall}_{37b} + \text{Wall}_{48b} + \text{Wall}_{910b} + \text{Roof}_{11b} \cdots \\ + \text{Floor}_{12b} + \text{Floor}_{13b} + \text{Roof}_{14b} + \text{Floor}_{15b} \end{matrix} \right)$

$\text{Total}_b = 1.102 \times 10^4 \cdot \text{ft}^3$

Building Total

$\text{Volume} := \text{Total}_b$

$\text{Volume} = 1.102 \times 10^4 \cdot \text{ft}^3$

$W_c := 150 \frac{\text{lb}}{\text{ft}^3}$

$W_{equip} := 200001\text{b}$

$W_{PS1} := W_c \cdot \text{Volume} + W_{equip} \qquad W_{PS1} = 1.673 \times 10^6\,\text{lb}$

Paducah LFPP
Pump Station 2
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1 - 0.50)}$ $T_{ROBE} = 144.27 \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1 - 0.10)}$ $T_{RMDE} = 949.122 \cdot yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_s := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_s = 0.769$

$b_s := 10^{\left(4.7338 \log(S_{s475}) - 3.7338 \log(S_{s2475})\right)}$ $b_s = 4.685 \times 10^{-3}$

$S_{sOBE} := b_s \cdot 144^{m_s}$ $S_{sOBE} = 0.214$ $S_{sMDE} := b_s \cdot 950^{m_s}$ $S_{sMDE} = 0.911$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = 0.906$

$b_1 := 10^{\left(4.7338 \log(S_{1475}) - 3.7338 \log(S_{12475})\right)}$ $b_1 = 4.397 \times 10^{-4}$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = 0.04$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = 0.219$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} = 0.342$ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} = 0.228$

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} = 0.095$ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} = 0.063$

$F_a := 1.1356$ ASCE 7-05 Table 11.4-1

$F_v := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} = 1.035$ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} = 0.69$

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} = 0.43$ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} = 0.287$

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n2}^{\,x}$ $T_a = 0.327$

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} = 0.278$ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} = 0.416$

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} = 0.068$ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} = 0.207$ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}^{\,2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM} \cdot \left(\frac{R}{I}\right)}\right]$ $C_{sa} = 0.207$ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} = 0.207$

$V_M := C_{sM} \cdot W_{PS2}$ $V_M = 5.198 \times 10^5 \text{ lb}$

$\theta := 0deg$ $\gamma := 125\frac{lb}{ft^3}$

$\phi := 29deg$

$\beta := 0deg$

$\alpha := \frac{29}{3}deg$

Because backfill is horizontal and building face is vertical...

$k_a := \frac{1 - \sin(\phi)}{1 + \sin(\phi)}$ $k_a = 0.347$

$k_p := \frac{1 + \sin(\phi)}{1 - \sin(\phi)}$ $k_p = 2.882$

$Ra := \frac{1}{2}k_p \cdot \gamma \cdot (h_{n2} \cdot ft - 23 \cdot ft)^2 \cdot 34.5ft$ $Ra = 2.127 \times 10^6 lb$

$if(V_M > Ra, "Seismic Controls", "Seismic Does Not Control") = "Seismic Does Not Control"$

Pump Station 2

Building is integrated with LOP

$h_{n2} := 41.5\,\text{feet}$

Section A on sheet 934-12.3/17

$\text{Wall}_{15a} := 2 \cdot 34.5\text{ft} \cdot 24\text{in}$

$\text{Wall}_{26a} := 2 \cdot 20.75\text{ft} \cdot 12\text{in}$

$\text{Wall}_{37a} := 2 \cdot 1.5\text{ft} \cdot 9\text{in}$

$\text{Wall}_{4a} := 24.5\text{ft} \cdot 18\text{in}$

$\text{Wall}_{8a} := 5\text{ft} \cdot 12\text{in}$

$\text{Roof}_{9a} := 34.5\text{ft} \cdot 6\text{in}$

$\text{Floor}_{10a} := 34.5\text{ft} \cdot 6\text{in}$

$\text{Floor}_{11a} := 3 \cdot 1\text{ft} \cdot 6\text{in}$

$\text{Roof}_{12a} := 4\text{ft} \cdot 18\text{in}$

$\text{Roof}_{13a} := 8.75\text{ft} \cdot .5\text{ft}$

$\text{Depth}_a := 61\text{ft} + 10\text{in}$

$$\text{Total}_a := \text{Depth}_a \cdot \left(\begin{array}{l} \text{Wall}_{15a} + \text{Wall}_{26a} + \text{Wall}_{37a} + \text{Wall}_{4a} + \text{Wall}_{8a} + \text{Roof}_{9a} + \text{Floor}_{10a} \ldots \\ + \text{Floor}_{11a} + \text{Roof}_{12a} + \text{Roof}_{13a} \end{array} \right)$$

$\text{Total}_a = 1.669 \times 10^4 \cdot \text{ft}^3$

Section B on sheet 934-12.3/17

$Wall_{15b} := 2 \cdot 34.5ft \cdot 24in$

$Wall_{26b} := 2 \cdot 21.5ft \cdot 12in$

$Wall_{37b} := 2 \cdot 1.5ft \cdot 9in$

$Wall_{4b} := 5 \cdot 18in \cdot 12in$

$Roof_{8b} := 61ft \cdot 6in$

$Floor_{9b} := 6 \cdot 28in \cdot 18in$

$Floor_{10b} := 61ft \cdot 8in$

$Floor_{11b} := 61ft \cdot 3ft$

$Depth_b := 34.5ft$

$$Total_b := Depth_b \cdot \left(\begin{matrix} Wall_{15b} + Wall_{26b} + Wall_{37b} + Wall_{4b} + Roof_{8b} \dots \\ + Floor_{9b} + Floor_{10b} + Floor_{11b} \end{matrix} \right)$$

$Total_b = 1.607 \times 10^4 \cdot ft^3$

Building Total

$Volume := Total_b$

$Volume = 1.607 \times 10^4 \cdot ft^3$

$W_c := 150 \frac{lb}{ft^3}$

$W_{equip} := 5 \cdot 20000 lb$

$W_{PS2} := W_c \cdot Volume + W_{equip}$ $W_{PS2} = 2.511 \times 10^6 lb$

Wind Loading

$$Wind := 15\frac{lb}{ft^2}$$

$Ra := Wind \cdot h_{n2} \cdot ft \cdot 61ft$ $\quad Ra = 3.797 \times 10^4 \cdot lb$

Paducah LFPP
Pump Station 3
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1 - 0.50)}$ $T_{ROBE} = 144.27 \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1 - 0.10)}$ $T_{RMDE} = 949.122 \cdot yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_s := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_s = 0.769$

$b_s := 10^{\left(4.7338 \log(S_{s475}) - 3.7338 \log(S_{s2475})\right)}$ $b_s = 4.685 \times 10^{-3}$

$S_{sOBE} := b_s \cdot 144^{m_s}$ $S_{sOBE} = 0.214$ $S_{sMDE} := b_s \cdot 950^{m_s}$ $S_{sMDE} = 0.911$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = 0.906$

$b_1 := 10^{\left(4.7338 \log(S_{1475}) - 3.7338 \log(S_{12475})\right)}$ $b_1 = 4.397 \times 10^{-4}$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = 0.04$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = 0.219$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} = 0.342$ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} = 0.228$

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} = 0.095$ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} = 0.063$

$F_{aM} := 1.1356$ ASCE 7-05 Table 11.4-1

$F_{vM} := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} = 1.035$ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} = 0.69$

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} = 0.43$ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} = 0.287$

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n3}^{\,x}$ $T_a = 0.25$

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} = 0.278$ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} = 0.416$

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} = 0.068$ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} = 0.207$ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}^{\,2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM} \cdot \left(\frac{R}{I}\right)}\right]$ $C_{sa} = 0.207$ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} = 0.207$

$V_M := C_{sM} \cdot W_{PS3}$ $V_M = 8.197 \times 10^4 \text{ lb}$

Water Loading

$$\gamma := 62.4 \frac{lb}{ft^3}$$

$$Ra := \frac{1}{2} \cdot \gamma \cdot \left(h_{n3} \cdot ft\right)^2 \cdot 13ft \qquad Ra = 3.411 \times 10^5 \cdot lb$$

$$if\left(V_M > Ra, \text{"Seismic Controls"}, \text{"Seismic Does Not Control"}\right) = \text{"Seismic Does Not Control"}$$

Pump Station 3

Building is integrated with LOP

$h_{n3} := 29$ feet

Section B on sheet 934-12.3/33

$Wall_{1b} := 22.5ft \cdot 12in$

$Wall_{2b} := 27.75ft \cdot 12in$

$Wall_{3b} := 27.25ft \cdot 12in$

$Wall_{4b} := 13.5ft \cdot 18in$

$Wall_{5b} := 1.25ft \cdot 6in$

$Wall_{6b} := 1.5ft \cdot 6in$

$Roof_{7b} := 10ft \cdot 5in$

$Floor_{8b} := 10ft \cdot 12in$

$Roof_{9b} := 3.25ft \cdot 6in$

$Floor_{10b} := 3ft \cdot 2ft$

$Floor_{11b} := 10ft \cdot 2ft$

$Floor_{12b} := 11ft \cdot 2ft$

$Depth_b := 16ft$

$$Total_b := Depth_b \cdot \left(\begin{array}{l} Wall_{1b} + Wall_{2b} + Wall_{3b} + Wall_{4b} + Wall_{5b} + Wall_{6b} + Roof_{7b} + Floor_{8b} \ldots \\ + Roof_{9b} + Floor_{10b} + Floor_{11b} + Floor_{12b} \end{array} \right)$$

$Total_b = 2.607 \times 10^3 \cdot ft^3$

Building Total

$Volume := Total_b$

$Volume = 2.607 \times 10^3 \cdot ft^3$

$W_c := 150 \frac{lb}{ft^3}$

$W_{equip} := 5000lb$

$W_{PS3} := W_c \cdot Volume + W_{equip}$ $\quad W_{PS3} = 3.96 \times 10^5 lb$

Paducah LFPP
Pump Station 4
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1 - 0.50)}$ $T_{ROBE} = 144.27 \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1 - 0.10)}$ $T_{RMDE} = 949.122 \cdot yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_s := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_s = 0.769$

$b_s := 10^{\left(4.7338 \log(S_{s475}) - 3.7338 \log(S_{s2475})\right)}$ $b_s = 4.685 \times 10^{-3}$

$S_{sOBE} := b_s \cdot 144^{m_s}$ $S_{sOBE} = 0.214$ $S_{sMDE} := b_s \cdot 950^{m_s}$ $S_{sMDE} = 0.911$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = 0.906$

$b_1 := 10^{\left(4.7338 \log(S_{1475}) - 3.7338 \log(S_{12475})\right)}$ $b_1 = 4.397 \times 10^{-4}$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = 0.04$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = 0.219$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} = 0.342$ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} = 0.228$

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} = 0.095$ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} = 0.063$

$F_a := 1.1356$ ASCE 7-05 Table 11.4-1

$F_v := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} = 1.035$ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} = 0.69$

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} = 0.43$ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} = 0.287$

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n4}^{x}$ $T_a = 0.203$

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} = 0.278$ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} = 0.416$

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} = 0.068$ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} = 0.207$ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}^{2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM} \cdot \left(\frac{R}{I}\right)}\right]$ $C_{sa} = 0.207$ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} = 0.207$

$V_M := C_{sM} \cdot W_{PS4}$ $V_M = 1.107 \times 10^{5}\,\text{lb}$

$\theta := 0\text{deg}$ $\gamma := 125\frac{\text{lb}}{\text{ft}^3}$

$\phi := 29\text{deg}$

$\beta := 0\text{deg}$

$\alpha := \frac{29}{3}\text{deg}$

Because backfill is horizontal and building face is vertical...

$k_a := \frac{1 - \sin(\phi)}{1 + \sin(\phi)}$ $k_a = 0.347$

$k_p := \frac{1 + \sin(\phi)}{1 - \sin(\phi)}$ $k_p = 2.882$

$Ra := \frac{1}{2} k_p \cdot \gamma \cdot (h_{n4} \cdot \text{ft})^2 \cdot 13\text{ft}$ $Ra = 1.133 \times 10^6\,\text{lb}$

Pump Station 4

Building is a "can" underground.

$h_{n4} := 22$ feet

Section C on sheet 934-12.7/3

$Wall_{1c} := 20.5ft \cdot 18in$

$Wall_{2c} := 20.5ft \cdot 18in$

$Wall_{3c} := 1.5ft \cdot 9in$

$Wall_{4c} := 1.5ft \cdot 9in$

$Wall_{5c} := 4ft \cdot 9in$

$Wall_{6c} := 4ft \cdot 9in$

$Roof_{78c} := 2 \cdot 4.5ft \cdot 6in$

$Floor_{9c} := 13ft \cdot 2ft$

$Depth_c := 13ft + 4in$

$$Total_c := Depth_c \cdot \left(Wall_{1c} + Wall_{2c} + Wall_{3c} + Wall_{4c} + Wall_{5c} + Wall_{6c} + Roof_{78c} + Floor_{9c}\right)$$

$$Total_c = 1.337 \times 10^3 \cdot ft^3$$

Section D on sheet 934-12.7/4

$Wall_{1d} := 17ft \cdot 18in$

$Wall_{2d} := 17ft \cdot 18in$

$Wall_{3d} := 3.2ft \cdot 9in$

$Wall_{4d} := 4.2ft \cdot 9in$

$Roof_{5d} := 10ft \cdot 12in$

$Floor_{6d} := 13ft \cdot 1.2 \cdot ft$

$Depth_d := 10ft + 2in$

$$Total_d := Depth_d \cdot \left(Wall_{1d} + Wall_{2d} + Wall_{3d} + Wall_{4d} + Roof_{5d} + Floor_{6d}\right)$$

$$Total_d = 835.192 \cdot ft^3$$

Section F on sheet 934-12.7/4

$Wall_{1f} := 22ft \cdot 18in$

$Wall_{2f} := 17ft \cdot 18in$

$Wall_{3f} := 17ft \cdot 18in$

$Wall_{4f} := 8ft \cdot 6in$

$Wall_{5f} := 1.5ft \cdot 9in$

$Wall_{6f} := 4ft \cdot 9in$

$Wall_{7f} := 5ft \cdot 15in$

$Wall_{8f} := 4.2ft \cdot 9in$

$Wall_{9f} := 4.2ft \cdot 9in$

$Roof_{10f} := 1.5ft \cdot 9in$

$Roof_{11f} := 1.5ft \cdot 6in$

$Roof_{12f} := 18.5ft \cdot 9in$

$Roof_{1314f} := 2 \cdot 16in \cdot 15in$

$Floor_{15f} := 24.75ft \cdot 2.5ft$

$Depth_f := 13ft$

$$Total_f := Depth_f \cdot \left(\begin{array}{l} Wall_{1f} + Wall_{2f} + Wall_{3f} + Wall_{4f} + Wall_{5f} + Wall_{6f} + Wall_{7f} + Wall_{8f} \dots \\ + Wall_{9f} + Roof_{10f} + Roof_{11f} + Roof_{12f} + Roof_{1314f} + Floor_{15f} \end{array} \right)$$

$Total_f = 2.413 \times 10^3 \cdot ft^3$

Building Total

$$Volume := Total_c + Total_d + Total_f - Depth_f \cdot \left(Roof_{10f} + Roof_{11f} + Roof_{12f} + Roof_{1314f} + Floor_{15f}\right)$$

$$Volume = 3.533 \times 10^3 \cdot ft^3$$

$$W_c := 150 \frac{lb}{ft^3}$$

$$W_{equip} := 5000lb$$

$$W_{PS4} := W_c \cdot Volume + W_{equip} \qquad W_{PS4} = 5.349 \times 10^5 \cdot lb$$

Paducah LFPP
Pump Station 5
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1 - 0.50)}$ $T_{ROBE} = 144.27 \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1 - 0.10)}$ $T_{RMDE} = 949.122 \cdot yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_s := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_s = 0.769$

$b_s := 10^{\left(4.7338 \log(S_{s475}) - 3.7338 \log(S_{s2475})\right)}$ $b_s = 4.685 \times 10^{-3}$

$S_{sOBE} := b_s \cdot 144^{m_s}$ $S_{sOBE} = 0.214$ $S_{sMDE} := b_s \cdot 950^{m_s}$ $S_{sMDE} = 0.911$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = 0.906$

$b_1 := 10^{\left(4.7338 \log(S_{1475}) - 3.7338 \log(S_{12475})\right)}$ $b_1 = 4.397 \times 10^{-4}$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = 0.04$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = 0.219$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} = 0.342$ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} = 0.228$

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} = 0.095$ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} = 0.063$

$F_a := 1.1356$ ASCE 7-05 Table 11.4-1

$F_v := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} = 1.035$ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} = 0.69$

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} = 0.43$ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} = 0.287$

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n5}^{x}$ $T_a = 0.26$

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} = 0.278$ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} = 0.416$

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} = 0.068$ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} = 0.207$ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}^{2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM} \cdot \left(\frac{R}{I}\right)}\right]$ $C_{sa} = 0.207$ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} = 0.207$

$V_M := C_{sM} \cdot W_{PS5}$ $V_M = 3.269 \times 10^{5}\,\text{lb}$

$\theta := 0deg$ $\gamma := 125 \frac{lb}{ft^3}$

$\phi := 29deg$

$\beta := 0deg$

$\alpha := \frac{29}{3} deg$

Because backfill is horizontal and building face is vertical...

$k_a := \frac{1 - \sin(\phi)}{1 + \sin(\phi)}$ $k_a = 0.347$

$k_p := \frac{1 + \sin(\phi)}{1 - \sin(\phi)}$ $k_p = 2.882$

$Ra := \frac{1}{2} k_p \cdot \gamma \cdot (h_{n5} \cdot ft - 23 \cdot ft)^2 \cdot 34.5 ft$ $Ra = 3.496 \times 10^5 lb$

$if(V_M > Ra, "Seismic Controls", "Seismic Does Not Control") = "Seismic Does Not Control"$

Pump Station 5

Building is integrated with LOP

$h_{n5} := 30.5\,\text{feet}$

Section A on sheet 934-12.3/43

$Wall_{1a} := 25\text{ft}\cdot 18\text{in}$

$Wall_{25a} := 2\cdot 24\text{ft}\cdot 18\text{in}$

$Wall_{36a} := 2\cdot 15\text{ft}\cdot 13\text{in}$

$Wall_{47a} := 2\cdot 6\text{in}\cdot 18\text{in}$

$Wall_{8a} := 2\cdot 6\text{in}\cdot 12\text{in} + 1\text{ft}\cdot 1\text{ft}$

$Roof_{9a} := 19\text{ft}\cdot 6\text{in}$

$Floor_{10a} := 19\text{ft}\cdot 8\text{in}$

$Floor_{11a} := 4.5\cdot\text{ft}\cdot 15\text{in}$

$Floor_{12a} := 19\text{ft}\cdot 2\text{ft}$

$315.5 - 328 = -12.5$

$3\sqrt{17} = 12.369$

$WWall_{1617a} := 15\text{in}\cdot 22\text{ft}\cdot 13\text{ft}$

$Depth_a := 47.5\text{ft}$

$$Total_a := WWall_{1617a} + Depth_a\cdot\left(\begin{matrix}Wall_{1a} + Wall_{25a} + Wall_{36a} + Wall_{47a} + Wall_{8a} + Roof_{9a} \ldots \\ + Floor_{10a} + Floor_{11a} + Floor_{12a}\end{matrix}\right)$$

$Total_a = 1.039 \times 10^4\cdot\text{ft}^3$

Building Total

$Volume := Total_a$

$Volume = 1.039 \times 10^4\cdot\text{ft}^3$

$W_c := 150\,\frac{\text{lb}}{\text{ft}^3}$

$W_{equip} := 20000\text{lb}$

$W_{PS5} := W_c\cdot Volume + W_{equip}$ $\quad W_{PS5} = 1.579 \times 10^6\,\text{lb}$

Wind Loading

$$Wind := 15\frac{lb}{ft^2}$$

$Ra := Wind \cdot h_{n5} \cdot ft \cdot 40ft$ $\quad Ra = 1.83 \times 10^{4} \cdot lb$

$if\left(V_M > Ra, "Seismic\ Controls", "Seismic\ Does\ Not\ Control"\right) = "Seismic\ Controls"$

Paducah LFPP
Pump Station 6
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1 - 0.50)}$ $T_{ROBE} = 144.27 \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1 - 0.10)}$ $T_{RMDE} = 949.122 \cdot yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_s := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_s = 0.769$

$b_s := 10^{\left(4.7338 \log(S_{s475}) - 3.7338 \log(S_{s2475})\right)}$ $b_s = 4.685 \times 10^{-3}$

$S_{sOBE} := b_s \cdot 144^{m_s}$ $S_{sOBE} = 0.214$ $S_{sMDE} := b_s \cdot 950^{m_s}$ $S_{sMDE} = 0.911$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = 0.906$

$b_1 := 10^{\left(4.7338 \log(S_{1475}) - 3.7338 \log(S_{12475})\right)}$ $b_1 = 4.397 \times 10^{-4}$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = 0.04$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = 0.219$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} = 0.342$ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} = 0.228$

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} = 0.095$ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} = 0.063$

$F_a := 1.1356$ ASCE 7-05 Table 11.4-1

$F_v := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} = 1.035$ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} = 0.69$

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} = 0.43$ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} = 0.287$

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n6}^{x}$ $T_a = 0.345$

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} = 0.278$ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} = 0.416$

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} = 0.068$ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} = 0.207$ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}^{2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM} \cdot \left(\frac{R}{I}\right)}\right]$ $C_{sa} = 0.207$ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} = 0.207$

$V_M := C_{sM} \cdot W_{PS6}$ $V_M = 4.69 \times 10^{5}\,\text{lb}$

$\theta := 0deg$ $\gamma := 125\frac{lb}{ft^3}$

$\phi := 29deg$

$\beta := 0deg$

$\alpha := \frac{29}{3}deg$

Because backfill is horizontal and building face is vertical...

$k_a := \frac{1 - \sin(\phi)}{1 + \sin(\phi)}$ $k_a = 0.347$

$k_p := \frac{1 + \sin(\phi)}{1 - \sin(\phi)}$ $k_p = 2.882$

$Ra := \frac{1}{2}k_p \cdot \gamma \cdot (h_{n6} \cdot ft - 23 \cdot ft)^2 \cdot 34.5ft$ $Ra = 2.873 \times 10^6 lb$

$if(V_M > Ra, "Seismic Controls", "Seismic Does Not Control") = "Seismic Does Not Control"$

Water Loading

$\gamma_w := 62.4\frac{lb}{ft^3}$

$Ra := \frac{1}{2} \cdot \gamma \cdot (h_{n6} \cdot ft)^2 \cdot 13ft$ $Ra = 8.032 \times 10^5 \cdot lb$

$if(V_M > Ra, "Seismic Controls", "Seismic Does Not Control") = "Seismic Does Not Control"$

Pump Station 6

Building is integrated with LOP

$h_{n6} := 44.5\,\text{feet}$

$\text{Wall}_{1a} := 24.6\text{ft}\cdot 18\text{in}$

$\text{Wall}_{25a} := 2\cdot 25\text{ft}\cdot 21\text{in}$

$\text{Wall}_{36a} := 2\cdot 18.5\text{ft}\cdot 18\text{in} + (2\cdot 6\text{in}\cdot 12\text{in} + 1\text{ft}\cdot 1\text{ft})$

$\text{Wall}_{47a} := 2\cdot 27\text{in}\cdot 9\text{in}$

$\text{Wall}_{8a} := 25\text{ft}\cdot 18\text{in}$

$\text{Roof}_{9a} := 25.5\text{ft}\cdot 6\text{in}$

$\text{Floor}_{10a} := 25.5\text{ft}\cdot 8\text{in}$

$\text{Floor}_{11a} := 18\cdot\text{ft}\cdot 12\text{in}$

$\text{Floor}_{12a} := 45\text{ft}\cdot 2.5\text{ft}$

$\text{WWall}_{13a} := 18\text{in}\cdot 5\text{ft}$

$\text{Depth}_a := 38\text{ft} + 4\text{in}$

$$\text{Total}_a := \text{Depth}_a\cdot\left(\begin{matrix}\text{Wall}_{1a} + \text{Wall}_{25a} + \text{Wall}_{36a} + \text{Wall}_{47a} + \text{Wall}_{8a} + \text{Roof}_{9a} \ldots \\ + \text{Floor}_{10a} + \text{Floor}_{11a} + \text{Floor}_{12a} + \text{WWall}_{13a}\end{matrix}\right)$$

$\text{Total}_a = 1.497\times 10^4\cdot\text{ft}^3$

Building Total

$\text{Volume} := \text{Total}_a$

$\text{Volume} = 1.497\times 10^4\cdot\text{ft}^3$

$W_c := 150\,\frac{\text{lb}}{\text{ft}^3}$

$W_{equip} := 20000\text{lb}$

$W_{PS6} := W_c\cdot\text{Volume} + W_{equip}$ $\qquad W_{PS6} = 2.266\times 10^6\,\text{lb}$

Paducah LFPP
Pump Station 7
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1 - 0.50)}$ $T_{ROBE} = 144.27 \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1 - 0.10)}$ $T_{RMDE} = 949.122 \cdot yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_s := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_s = 0.769$

$b_s := 10^{\left(4.7338 \log(S_{s475}) - 3.7338 \log(S_{s2475})\right)}$ $b_s = 4.685 \times 10^{-3}$

$S_{sOBE} := b_s \cdot 144^{m_s}$ $S_{sOBE} = 0.214$ $S_{sMDE} := b_s \cdot 950^{m_s}$ $S_{sMDE} = 0.911$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = 0.906$

$b_1 := 10^{\left(4.7338 \log(S_{1475}) - 3.7338 \log(S_{12475})\right)}$ $b_1 = 4.397 \times 10^{-4}$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = 0.04$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = 0.219$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} = 0.342$ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} = 0.228$

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} = 0.095$ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} = 0.063$

$F_{aM} := 1.1356$ ASCE 7-05 Table 11.4-1

$F_{vM} := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} = 1.035$ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} = 0.69$

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} = 0.43$ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} = 0.287$

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n7}^{x}$ $T_a = 0.318$

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} = 0.278$ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} = 0.416$

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} = 0.068$ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} = 0.207$ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}^{2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM} \cdot \left(\frac{R}{I}\right)}\right]$ $C_{sa} = 0.207$ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} = 0.207$

$V_M := C_{sM} \cdot W_{PS7}$ $V_M = 1.929 \times 10^{5}\,\text{lb}$

$\theta := 0deg$ $\gamma := 125\frac{lb}{ft^3}$

$\phi := 29deg$

$\beta := 0deg$

$\alpha := \frac{29}{3}deg$

Because backfill is horizontal and building face is vertical...

$k_a := \frac{1 - \sin(\phi)}{1 + \sin(\phi)}$ $k_a = 0.347$

$k_p := \frac{1 + \sin(\phi)}{1 - \sin(\phi)}$ $k_p = 2.882$

$Ra := \frac{1}{2}k_p \cdot \gamma \cdot (23 \cdot ft)^2 \cdot D_2$ $Ra = 1.112 \times 10^6 lb$

$if(V_M > Ra, "Seismic Controls", "Seismic Does Not Control") = "Seismic Does Not Control"$

Water Loading

$\gamma_w := 62.4\frac{lb}{ft^3}$

$Ra := \frac{1}{2} \cdot \gamma \cdot (h_{n7}\,ft)^2 \cdot D_2$ $Ra = 5.824 \times 10^5 \cdot lb$

$if(V_M > Ra, "Seismic Controls", "Seismic Does Not Control") = "Seismic Does Not Control"$

Pump Station 7

Building is integrated with LOP

$h_{n7} := 40$ feet

Section A on Sheet 934-12.3/66

$D_1 := 23ft \qquad D_2 := 11ft + 8in$

$Wall_{1a} := D_1 \cdot 21.75ft \cdot 15in$

$Wall_{25a} := D_1 \cdot 2 \cdot 23.25ft \cdot 18in$

$Wall_{36a} := D_1 \cdot 2 \cdot 15ft \cdot 15in + D_1 \cdot (2 \cdot 6in \cdot 12in + 1ft \cdot 1ft)$

$Wall_{47a} := D_1 \cdot 2 \cdot 27in \cdot 9in$

$Wall_{8a} := D_2 \cdot 23.17ft \cdot 18in$

$Roof_{9a} := D_1 \cdot 16.25ft \cdot 6in$

$Floor_{10a} := D_1 \cdot 16.25ft \cdot 12in$

$Floor_{11a} := D_2 \cdot 11.5 \cdot ft \cdot 8in$

$Floor_{12a} := D_1 \cdot 34.5ft \cdot (2ft + 2in)$

$WWall_{13a} := D_2 \cdot (12in \cdot 5ft + 2 \cdot 18in \cdot 10in)$

$$Total_a := \begin{pmatrix} Wall_{1a} + Wall_{25a} + Wall_{36a} + Wall_{47a} + Wall_{8a} + Roof_{9a} \dots \\ + Floor_{10a} + Floor_{11a} + Floor_{12a} + WWall_{13a} \end{pmatrix}$$

$Total_a = 6.078 \times 10^3 \cdot ft^3$

Building Total

$Volume := Total_a$

$Volume = 6.078 \times 10^3 \cdot ft^3$

$W_c := 150 \frac{lb}{ft^3}$

$W_{equip} := 20000lb$

$W_{PS7} := W_c \cdot Volume + W_{equip} \qquad W_{PS7} = 9.317 \times 10^5 lb$

Paducah LFPP
Pump Station 9
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1 - 0.50)}$ $T_{ROBE} = 144.27 \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1 - 0.10)}$ $T_{RMDE} = 949.122 \cdot yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_s := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_s = 0.769$

$b_s := 10^{\left(4.7338 \log(S_{s475}) - 3.7338 \log(S_{s2475})\right)}$ $b_s = 4.685 \times 10^{-3}$

$S_{sOBE} := b_s \cdot 144^{m_s}$ $S_{sOBE} = 0.214$ $S_{sMDE} := b_s \cdot 950^{m_s}$ $S_{sMDE} = 0.911$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = 0.906$

$b_1 := 10^{\left(4.7338 \log(S_{1475}) - 3.7338 \log(S_{12475})\right)}$ $b_1 = 4.397 \times 10^{-4}$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = 0.04$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = 0.219$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} = 0.342$ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} = 0.228$

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} = 0.095$ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} = 0.063$

$F_a := 1.1356$ ASCE 7-05 Table 11.4-1

$F_v := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} = 1.035$ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} = 0.69$

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} = 0.43$ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} = 0.287$

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n9}^{\,x}$ $T_a = 0.339$

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} = 0.278$ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} = 0.416$

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} = 0.068$ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} = 0.207$ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}^{\,2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM} \cdot \left(\frac{R}{I}\right)}\right]$ $C_{sa} = 0.207$ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} = 0.207$

$V_M := C_{sM} \cdot W_{PS9}$ $V_M = 9.014 \times 10^4 \text{ lb}$

$\theta := 0\text{deg}$ $\gamma := 125\frac{\text{lb}}{\text{ft}^3}$

$\phi := 29\text{deg}$

$\beta := 0\text{deg}$

$\alpha := \frac{29}{3}\text{deg}$

Because backfill is horizontal and building face is vertical...

$k_a := \frac{1 - \sin(\phi)}{1 + \sin(\phi)}$ $k_a = 0.347$

$k_p := \frac{1 + \sin(\phi)}{1 - \sin(\phi)}$ $k_p = 2.882$

$Ra := \frac{1}{2}k_p \cdot \gamma \cdot (28.3 \cdot \text{ft})^2 \cdot D_2$ $Ra = 7.213 \times 10^5\,\text{lb}$

$\text{if}\left(V_M > Ra, \text{"Seismic Controls"}, \text{"Seismic Does Not Control"}\right) = \text{"Seismic Does Not Control"}$

Pump Station 9

Building is integrated with LOP

$h_{n9} := 43.5\,\text{feet}$

Section A on Sheet 934-12.3/66

$D_1 := 16\text{ft} \qquad D_2 := 5\text{ft}$

$\text{Wall}_{1a} := D_2 \cdot 10.75\text{ft} \cdot 15\text{in}$

$\text{Wall}_{25a} := D_1 \cdot 2 \cdot 29\text{ft} \cdot 18\text{in}$

$\text{Wall}_{36a} := D_1 \cdot 2 \cdot 14.5\text{ft} \cdot 15\text{in} + D_1 \cdot (2 \cdot 6\text{in} \cdot 12\text{in} + 1\text{ft} \cdot 1\text{ft})$

$\text{Wall}_{47a} := D_1 \cdot 2 \cdot 24\text{in} \cdot 9\text{in}$

$\text{Roof}_{8a} := D_1 \cdot 10\text{ft} \cdot 10\text{in}$

$\text{Floor}_{9a} := D_1 \cdot 10\text{ft} \cdot 8\text{in}$

$\text{Floor}_{10a} := D_2 \cdot 6 \cdot \text{ft} \cdot 17\text{in}$

$\text{Floor}_{11a} := D_1 \cdot 20\text{ft} \cdot 1.4\text{ft}$

$$\text{Total}_a := \begin{pmatrix} \text{Wall}_{1a} + \text{Wall}_{25a} + \text{Wall}_{36a} + \text{Wall}_{47a} + \text{Roof}_{8a} \ldots \\ + \text{Floor}_{9a} + \text{Floor}_{10a} + \text{Floor}_{11a} \end{pmatrix}$$

$\text{Total}_a = 2.85 \times 10^3 \cdot \text{ft}^3$

Building Total

$\text{Volume} := \text{Total}_a$

$\text{Volume} = 2.85 \times 10^3 \cdot \text{ft}^3$

$W_c := 150 \dfrac{\text{lb}}{\text{ft}^3}$

$W_{equip} := 8000\text{lb}$

$W_{PS9} := W_c \cdot \text{Volume} + W_{equip} \qquad W_{PS9} = 4.355 \times 10^5\,\text{lb}$

Paducah LFPP
Pump Station 11
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1 - 0.50)}$ $T_{ROBE} = \blacksquare \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1 - 0.10)}$ $T_{RMDE} = \blacksquare \cdot yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_s := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_s = \blacksquare$

$b_s := 10^{\left(4.7338 \log(S_{s475}) - 3.7338 \log(S_{s2475})\right)}$ $b_s = \blacksquare$

$S_{sOBE} := b_s \cdot 144^{m_s}$ $S_{sOBE} = \blacksquare$ $S_{sMDE} := b_s \cdot 950^{m_s}$ $S_{sMDE} = \blacksquare$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = \blacksquare$

$b_1 := 10^{\left(4.7338 \log(S_{1475}) - 3.7338 \log(S_{12475})\right)}$ $b_1 = \blacksquare$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = \blacksquare$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = \blacksquare$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} =$ ▮ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} =$ ▮

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} =$ ▮ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} =$ ▮

$F_a := 1.1356$ ASCE 7-05 Table 11.4-1

$F_v := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} =$ ▮ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} =$ ▮

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} =$ ▮ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} =$ ▮

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n11}^{\,x}$ $T_a =$ ▮

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} =$ ▮ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} =$ ▮

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) =$ ▮

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) =$ ▮

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} =$ ▮ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} =$ ▮ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}^{\,2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM} \cdot \left(\frac{R}{I}\right)}\right]$ $C_{sa} =$ ▮ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} =$ ▮

$V_M := C_{sM} \cdot W_{PS11}$ $V_M =$ ▮

$\theta := 0\text{deg}$ $\gamma := 125\,\frac{\text{lb}}{\text{ft}^3}$

$\phi := 29\text{deg}$

$\beta := \text{atan}\left(\frac{-1}{2.5}\right)$ $\beta =$

$\alpha := \frac{29}{3}\text{deg}$

$k_o := 1 - \sin(\phi)$ $k_o =$

$k_{o\beta} := k_o \cdot (1 + \sin(\beta))$ $k_{o\beta} =$

$$k_a := \frac{\cos(\phi)^2}{\left(1 + \sqrt{\frac{\sin(\phi)\cdot\sin(\phi - \beta)}{\cos(\beta)}}\right)^2} \qquad k_a =$$

$$k_p := \frac{\cos(\phi)^2}{\left(1 - \sqrt{\frac{\sin(\phi)\cdot\sin(\phi + \beta)}{\cos(\beta)}}\right)^2} \qquad k_p =$$

$Ra := \frac{1}{2} k_p \cdot \gamma \cdot (56 \cdot \text{ft})^2 \cdot D_2$ $Ra =$

$\text{if}\left(V_M > Ra, \text{"Seismic Controls"}, \text{"Seismic Does Not Control"}\right) =$

Pump Station 11
(Island Creek Dam)

$h_{n11} := 80$ feet

Section B on Sheet 934-12.5/7

$D_1 := 62ft \qquad D_2 := 47.5ft$

$Wall_{14b} := 2D_1 \cdot 43ft \cdot 30in$

$Wall_{25b} := D_1 \cdot 2 \cdot 19ft \cdot 16in + D_1 \cdot (2 \cdot 6in \cdot 12in + 1ft \cdot 1ft)$

$Wall_{36b} := D_1 \cdot 2 \cdot 1.5ft \cdot 9in$

$Wall_{7b} := D_1 \cdot 2 \cdot 43ft \cdot 18in$

$Roof_{8b} := D_1 \cdot 20ft \cdot 6in$

$Floor_{9b} := D_1 \cdot 20ft \cdot 8in$

$Floor_{10b} := D_1 \cdot 43 \cdot ft \cdot 3ft$

$$Floor_{11b} := \frac{D_2 + D_1}{2} \cdot 20ft \cdot 2.5ft \cdot 2$$

$$WWall_{12b} := \frac{D_1 + D_2}{2} \cdot 20ft \cdot 2 \cdot 3ft$$

$$Total_b := \begin{pmatrix} Wall_{14b} + Wall_{25b} + Wall_{36b} + Wall_{7b} + Roof_{8b} \dots \\ + Floor_{9b} + Floor_{10b} + Floor_{11b} + WWall_{12b} \end{pmatrix}$$

$Total_b = \blacksquare \cdot ft^3$

Additional walls from Section A on 934-12.5/6

$D_1 := 23ft$

$Wall_{1a} := 2D_1 \cdot 5ft \cdot 10ft$

$Wall_{2a} := 3D_1 \cdot 5ft \cdot 10ft$

$Wall_{3a} := 2D_1 \cdot 45.5ft \cdot 2.5ft$

$Wall_{4a} := 3D_1 \cdot 45.5ft \cdot 18in$

$Total_a := Wall_{1a} + Wall_{2a} + Wall_{3a} + Wall_{4a}$

$Total_a = \blacksquare \cdot ft^3$

Building Total

$Volume := Total_a + Total_b$

$Volume = \blacksquare \cdot ft^3$

$W_c := 150 \frac{lb}{ft^3}$

$W_{equip} := 20000lb$

$W_{PS11} := W_c \cdot Volume + W_{equip}$ $W_{PS11} = \blacksquare$

Paducah LFPP
Pump Station 12
Latitude: 37.08
Longitude: -88.60

Site Class D

Mapped Spectral Values

	475 years	2475 years
PGA (g)	0.2746	0.9235
S_s (g)	0.535	1.903
S_1 (g)	0.117	0.522

from USGS:
http://earthquake.usgs.gov/research/hazmaps/design/

$S_{s475} := 0.535$ $S_{s2475} := 1.903$

$S_{1475} := 0.117$ $S_{12475} := 0.522$

Return Period for Design Earthquake:

$T_{ROBE} := \frac{-100yr}{\ln(1 - 0.50)}$ $T_{ROBE} = 144.27 \cdot yr$ $T_{RMDE} := \frac{-100yr}{\ln(1 - 0.10)}$ $T_{RMDE} = 949.122 \cdot yr$

Adjust spectral Values to specified Return period

For the spectral acceleration at 0.2 seconds

$m_S := \frac{\log(S_{s2475}) - \log(S_{s475})}{0.7169}$ $m_S = 0.769$

$b_S := 10^{\left(4.7338 \log(S_{s475}) - 3.7338 \log(S_{s2475})\right)}$ $b_S = 4.685 \times 10^{-3}$

$S_{sOBE} := b_S \cdot 144^{m_S}$ $S_{sOBE} = 0.214$ $S_{sMDE} := b_S \cdot 950^{m_S}$ $S_{sMDE} = 0.911$

For the spectral acceleration at 1 second

$m_1 := \frac{\log(S_{12475}) - \log(S_{1475})}{0.7169}$ $m_1 = 0.906$

$b_1 := 10^{\left(4.7338 \log(S_{1475}) - 3.7338 \log(S_{12475})\right)}$ $b_1 = 4.397 \times 10^{-4}$

$S_{1OBE} := b_1 \cdot 144^{m_1}$ $S_{1OBE} = 0.04$ $S_{1MDE} := b_1 \cdot 950^{m_1}$ $S_{1MDE} = 0.219$

Construct Standard Spectrum:

Adjust for Site Conditions

Site Class D

$F_a := 1.6$ ASCE 7-05 Table 11.4-1

$F_v := 2.4$ ASCE 7-05 Table 11.4-2

$S_{sO} := F_a \cdot S_{sOBE}$ $S_{sO} = 0.342$ $S_{DSO} := \frac{2}{3} S_{sO}$ $S_{DSO} = 0.228$

$S_{1O} := F_v \cdot S_{1OBE}$ $S_{1O} = 0.095$ $S_{D1O} := \frac{2}{3} S_{1O}$ $S_{D1O} = 0.063$

$F_a := 1.1356$ ASCE 7-05 Table 11.4-1

$F_v := 1.962$ ASCE 7-05 Table 11.4-2

$S_{sM} := F_a \cdot S_{sMDE}$ $S_{sM} = 1.035$ $S_{DSM} := \frac{2}{3} S_{sM}$ $S_{DSM} = 0.69$

$S_{1M} := F_v \cdot S_{1MDE}$ $S_{1M} = 0.43$ $S_{D1M} := \frac{2}{3} S_{1M}$ $S_{D1M} = 0.287$

Occupancy Category IV (ASCE 7-05 Table 1-1)
Seismic Design Category D (ASCE 7-05 Table 11.6-2)
Importance Factor 1.5 (ASCE 7-05 Table 11.5-1)

$I := 1.5$

$C_t := 0.02$ $x := 0.75$ (ASCE 7-05 Table 12.8-2)

$T_a := C_t \cdot h_{n12}^{\,x}$ $T_a = 0.305$

$T_{sO} := \frac{S_{D1O}}{S_{DSO}}$ $T_{sO} = 0.278$ $T_{sM} := \frac{S_{D1M}}{S_{DSM}}$ $T_{sM} = 0.416$

$\text{if}\left(T_a < 3.5 \cdot T_{sO}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

$\text{if}\left(T_a < 3.5 \cdot T_{sM}, \text{"Use ELFA"}, \text{"Use MRSA"}\right) = \text{"Use ELFA"}$

Seismic Force Resisting System (ASCE 7-05 Table 12.2-1)

A. Bearing Wall System: Special Reinforced Concrete Shear Walls

$R := 5$ $\Omega_0 := 2.5$ $C_d := 5$

$C_{sO} := \frac{S_{DSO}}{\left(\frac{R}{I}\right)}$ $C_{sO} = 0.068$ $C_{sMa} := \frac{S_{DSM}}{\left(\frac{R}{I}\right)}$ $C_{sMa} = 0.207$ (ASCE 7-05 12.8-2)

$T_L := 12$ (ASCE 7-05 Figure 22-15)

$C_{sa} := \text{if}\left[T_a > T_L, \frac{S_{D1M} \cdot T_L}{T_{sM}^{\,2}\left(\frac{R}{I}\right)}, \frac{S_{D1M}}{T_{sM}\left(\frac{R}{I}\right)}\right]$ $C_{sa} = 0.207$ (ASCE 7-05 12.8-2 through 12.8-6)

$C_{sM} := \text{if}\left(\text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right) < 0.01, 0.01, \text{if}\left(C_{sMa} > C_{sa}, C_{sa}, C_{sMa}\right)\right)$

$C_{sM} = 0.207$

$V_M := C_{sM} \cdot W_{PS12}$ $V_M = 1.369 \times 10^5\ \text{lb}$

$\theta := 0deg$ $\gamma := 125\frac{lb}{ft^3}$

$\phi := 29deg$

$\beta := 0deg$

$\alpha := \frac{29}{3}deg$

Because backfill is horizontal and building face is vertical...

$k_a := \frac{1 - \sin(\phi)}{1 + \sin(\phi)}$ $k_a = 0.347$

$k_p := \frac{1 + \sin(\phi)}{1 - \sin(\phi)}$ $k_p = 2.882$

$Ra := \frac{1}{2}k_p \cdot \gamma \cdot (21.5 \cdot ft)^2 \cdot D_2$ $Ra = 8.743 \times 10^5 lb$

$if\left(V_M > Ra, "Seismic\ Controls", "Seismic\ Does\ Not\ Control"\right) = "Seismic\ Does\ Not\ Control"$

Pump Station 12

$h_{n12} := 37.75\,\text{feet}$

Section A on Sheet 934-12.3/76

$D_1 := 24.5\text{ft} \qquad D_2 := 10.5\text{ft}$

$\text{Wall}_{1a} := D_1 \cdot 4\text{ft} \cdot 18\text{in}$

$\text{Wall}_{25a} := D_1 \cdot 2 \cdot 17\text{ft} \cdot 15\text{in}$

$\text{Wall}_{36a} := D_1 \cdot 2 \cdot 13.5\text{ft} \cdot 15\text{in} + D_1 \cdot (2 \cdot 6\text{in} \cdot 12\text{in} + 1\text{ft} \cdot 1\text{ft})$

$\text{Wall}_{47a} := D_1 \cdot 2 \cdot 21\text{in} \cdot 6\text{in}$

$\text{Roof}_{8a} := D_1 \cdot 18.5\text{ft} \cdot 6\text{in}$

$\text{Floor}_{9a} := D_1 \cdot 18.5\text{ft} \cdot 12\text{in}$

$\text{Floor}_{10a} := D_1 \cdot 34.5 \cdot \text{ft} \cdot 18\text{in}$

$\text{Floor}_{11a} := D_2 \cdot 5\text{ft} \cdot 6\text{in}$

$\text{WWall}_{12a} := \frac{(4\text{ft} + 11\text{in} + 8.75\text{ft})}{2} \cdot 16\text{ft} \cdot 2 \cdot 15\text{in}$

$$\text{Total}_a := \begin{pmatrix} \text{Wall}_{1a} + \text{Wall}_{25a} + \text{Wall}_{36a} + \text{Wall}_{47a} + \text{Roof}_{8a} \cdots \\ + \text{Floor}_{9a} + \text{Floor}_{10a} + \text{Floor}_{11a} + \text{WWall}_{12a} \end{pmatrix}$$

$\text{Total}_a = 4.354 \times 10^3 \cdot \text{ft}^3$

Building Total

$\text{Volume} := \text{Total}_a$

$\text{Volume} = 4.354 \times 10^3 \cdot \text{ft}^3$

$W_c := 150 \frac{\text{lb}}{\text{ft}^3}$

$W_{equip} := 8000\text{lb}$

$W_{PS12} := W_c \cdot \text{Volume} + W_{equip} \qquad W_{PS12} = 6.612 \times 10^5\,\text{lb}$

TB12

********** Echoprint of Input Data **********

Date: 2009/11/ 6 Time: 15.38.06

Structural geometry data:

Elevation of top of stem (ELTS)	=	351.00 ft
Height of stem (HTS)	=	9.75 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	1.83 ft
Dist. of batter at bot. of stem (TBSR)	=	0.16 ft
Depth of heel (THEEL)	=	5.50 ft
Distance of batter for heel (BTRH)	=	0.33 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	4.08 ft
Distance of batter for toe (BTRT)	=	0.75 ft
Width of base (BWIDTH)	=	12.00 ft
Depth of key (HK)	=	4.00 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.00 ft

Structure coordinates:

x (ft)	y (ft)
0.00	335.42
0.00	340.92
6.09	341.25
6.26	351.00
7.76	351.00
7.92	341.25
12.00	340.50
12.00	339.00
2.50	339.42
1.50	335.42

NOTE: X=0 is located at the left-hand side
of the structure. The Y values correspond
to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
27.00	0.285	0.127	0.129	18.00	341.55

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

TB12

Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1493.90	341.55
2	6.10	341.55

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
27.00	0.285	0.127	0.129	341.55	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	7.92	341.55
2	507.92	341.55

Foundation property data:
  phi for soil-structure interface = 27.00 (deg)
  c for soil-structure interface = 0.228 (ksf)
  phi for soil-soil interface = 27.00 (deg)
  c for soil-soil interface = 0.285 (ksf)

Water data:
  Driving side elevation = 351.00 ft
  Resisting side elevation = 339.05 ft
  Unit weight of water = 0.0624 kcf
  Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
  Sliding FS = 1.33
  Overturning = 75.00% base in compression

Crack options:
  o Crack *is* down to bottom of heel
  o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

****
* Overturning *
****
*** Satisfied ***
Required base in comp. = 75.00 %
Actual base in comp. = 76.65 %
Overturning ratio = 1.70

```
Xr (measured from toe) =   3.07 ft
Resultant ratio        = 0.2555
Stem ratio             = 0.3400
Base pressure at x=   9.20 ft from toe =    0.0000 ksf
Base pressure at toe                   =    1.6362 ksf

***********    *** Satisfied ***
* Sliding *    Min. Required =   1.33
***********    Actual FS     =   3.28


********************** Output Results **********************

Date: 2009/11/ 6                                  Time: 15.38.06


****************************
**  Overturning Results  **
****************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF         = -58.6270
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4005
  Driving side at rest Kc   =   0.5682
  Resisting side at rest K  =   0.5460
  Resisting side at rest Kc =   0.7389
  At-rest K's for resisting side calculated.

Depth of cracking =     4.18 ft
Crack extends to bottom of base of structure.

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       351.00     0.0000
       337.37     0.8505
       335.42     0.8720

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       341.55     0.0000
       337.37     0.0000
       335.42     0.0736

** Resisting side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       339.05     0.0000
       339.00     0.0057
```

335.42	0.8083

Earth pressures:

Elevation (ft)	Pressure (ksf)
341.55	0.0000
339.00	0.1738

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
339.00	1.6393
335.42	1.6393

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	0.8720
1.50	0.8083
2.50	0.3835
12.00	0.0057

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	6.848		-6.46	-44.23
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	0.365		-9.31	-3.40
Water above structure.....	0.000		0.00	0.00
Water above soil.....	3.643		-8.91	-32.46
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	0.350		-1.66	-0.58
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.072	-2.93	-0.21
Shear (due to delta).....	0.023		-12.00	-0.28
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		7.476	1.67	12.51
Resisting side:				
Effective earth loads.....		-0.222	0.85	-0.19
Balancing earth load.....		-5.869	-1.79	10.50
Water loads.....		-1.457	-2.38	3.47
Foundation:				
Vertical force on base.....	-7.525		-3.07	23.07
Uplift.....	-3.705		-8.59	31.81
** Statics Check ** SUMS =	0.000	0.000		0.00

TB12

Angle of base = 16.61 degrees
Normal force on base = 8.888 kips
Shear force on base = 3.473 kips
Max. available shear force = 9.139 kips

Base pressure at x= 9.20 ft from toe = 0.0000 ksf
Base pressure at toe = 1.6362 ksf

Xr (measured from toe) = 3.07 ft
Resultant ratio = 0.2555
Stem ratio = 0.3400
Base in compression = 76.65 %
Overturning ratio = 1.70

Volume of concrete = 1.69 cubic yds/ft of wall

NOTE: The engineer shall verify that the computed bearing pressures below the wall do not exceed the allowable foundation bearing pressure, or, perform a bearing capacity analysis using the program CBEAR. Also, the engineer shall verify that the base pressures do not result in excessive differential settlement of the wall foundation.

****
** Sliding Results **
****

Solution converged. Summation of forces = 0.

Wedge Number	Horizontal Loads (kips)	Vertical Loads (kips)
1	0.000	0.000
2	7.573	3.643
3	0.000	0.000

Water pressures on wedges:

Wedge number	Top press. (ksf)	Bottom press. (ksf)	x-coord. (ft)	press. (ksf)
1	0.0000	0.0000		
2			0.0000	0.9722
2			12.0000	0.0061
3	0.0000	0.0061		

Points of sliding plane:
Point 1 (left), x = 0.00 ft, y = 335.42 ft
Point 2 (right), x = 12.00 ft, y = 339.00 ft

Depth of cracking = 6.13 ft
Crack extends to bottom of base of structure.

Wedge number	Failure angle (deg)	Total length (ft)	Weight of wedge (kips)	Submerged length (ft)	Uplift force (kips)

TB12

1	0.000	0.000	0.000	0.000	0.000
2	16.612	12.523	9.695	12.523	6.125
3	40.706	3.910	0.480	0.077	0.000

Wedge number	Net force (kips)
1	0.000
2	-1.079
3	1.080
SUM =	0.000

Factor of safety =	3.281

****
** Bearing Results **
****

Base width =	12.523	(ft)
Xr =	3.066	(ft)
Effective base width = (measured along slope)	6.399	(ft)
Base slope =	16.6115	(deg)
Phi =	27.000	(deg)
C =	0.228	(ksf)
Effective Gamma =	0.0666	(kcf)
Normal load =	8.888	(kips)
Load inclination =	21.341	(deg)
Load eccentricity =	3.062	(ft)
Surcharge =	0.3208	(kips)
Embedment =	2.550	(ft)
Ground slope =	0.0000	(deg)

Bearing Capacity Factors

	C	Q	G
Bearing	23.9422	13.1992	9.4626
Embedment	1.1301	1.0650	1.0650
Inclination	0.5820	0.5820	0.0439
Base Tilt	0.7039	0.7264	0.7264
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 4.3579 (ksf)

Factor of safety =	3.137

TB14

********** Echoprint of Input Data **********

Date: 2009/11/ 6 Time: 15.39.57

Structural geometry data:

Elevation of top of stem (ELTS)	=	351.00 ft
Height of stem (HTS)	=	11.67 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	1.94 ft
Dist. of batter at bot. of stem (TBSR)	=	0.22 ft
Depth of heel (THEEL)	=	6.33 ft
Distance of batter for heel (BTRH)	=	0.25 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	4.86 ft
Distance of batter for toe (BTRT)	=	0.83 ft
Width of base (BWIDTH)	=	14.00 ft
Depth of key (HK)	=	4.67 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.17 ft

Structure coordinates:

x (ft)	y (ft)
0.00	332.75
0.00	339.08
7.20	339.33
7.42	351.00
8.92	351.00
9.14	339.33
14.00	338.50
14.00	337.00
2.67	337.42
1.50	332.75

NOTE: X=0 is located at the left-hand side
of the structure. The Y values correspond
to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
27.00	0.285	0.127	0.129	18.00	339.80

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

TB14

Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1492.79	339.80
2	7.21	339.80

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
27.00	0.285	0.127	0.129	339.80	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	9.13	339.80
2	509.13	339.80

Foundation property data:
  phi for soil-structure interface = 27.00 (deg)
  c for soil-structure interface = 0.228 (ksf)
  phi for soil-soil interface = 27.00 (deg)
  c for soil-soil interface = 0.285 (ksf)

Water data:
  Driving side elevation = 351.00 ft
  Resisting side elevation = 337.30 ft
  Unit weight of water = 0.0624 kcf
  Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
  Sliding FS = 1.33
  Overturning = 75.00% base in compression

Crack options:
  o Crack *is* down to bottom of heel
  o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

****
* Overturning *
****
*** Not Satisfied ***
Required base in comp. = 75.00 %
Actual base in comp. = 73.78 %
Overturning ratio = 1.66

```
  To increase stability try one or a combination
  of the following:
    1.  Increase the base width
    2.  Slope the base of the structure
    3.  Lower the wall base
    4.  Add/remove key

Xr (measured from toe) =   3.44 ft
Resultant ratio        = 0.2459
Stem ratio             = 0.3471
Base pressure at x=  10.33 ft from toe =    0.0000 ksf
Base pressure at toe                   =    1.8597 ksf

***********    *** Satisfied ***
* Sliding *    Min. Required =   1.33
***********    Actual FS     =   2.79


********************** Output Results **********************

Date: 2009/11/ 6                                  Time: 15.39.57


****************************
**  Overturning Results   **
****************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF         = -58.6270
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4005
  Driving side at rest Kc   =   0.5682
  Resisting side at rest K  =   0.5460
  Resisting side at rest Kc =   0.7389
  At-rest K's for resisting side calculated.

Depth of cracking =     4.18 ft
Crack extends to bottom of base of structure.

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       351.00     0.0000
       335.62     0.9597
       332.75     1.0009

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       339.80     0.0000
       335.62     0.0000
       332.75     0.1077

** Resisting side pressures **
```

Water pressures:

Elevation (ft)	Pressure (ksf)
337.30	0.0000
337.00	0.0331
332.75	1.0009

Earth pressures:

Elevation (ft)	Pressure (ksf)
339.80	0.0000
337.00	0.1764

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
337.00	1.8586
332.75	1.8586

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.0009
1.50	0.9412
2.67	0.4582
14.00	0.0331

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	8.402		-7.59	-63.81
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	0.553		-10.65	-5.89
Water above structure.....	0.000		0.00	0.00
Water above soil.....	5.112		-10.34	-52.87
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	0.546		-2.05	-1.12
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.155	-3.29	-0.51
Shear (due to delta).....	0.050		-14.00	-0.70
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		10.194	1.93	19.70
Resisting side:				
Effective earth loads.....		-0.247	0.93	-0.23
Balancing earth load.....		-7.899	-2.13	16.80

TB14

Water loads.....		-2.202	-2.78	6.12
Foundation:				
Vertical force on base.....	-9.605		-3.44	33.07
Uplift.....	-5.059		-9.77	49.44
** Statics Check ** SUMS =	0.000	0.000		0.00

Angle of base = 16.89 degrees
Normal force on base = 11.485 kips
Shear force on base = 4.768 kips
Max. available shear force = 11.501 kips

Base pressure at x= 10.33 ft from toe = 0.0000 ksf
Base pressure at toe = 1.8597 ksf

Xr (measured from toe) = 3.44 ft
Resultant ratio = 0.2459
Stem ratio = 0.3471
Base in compression = 73.78 %
Overturning ratio = 1.66

Volume of concrete = 2.07 cubic yds/ft of wall

NOTE: The engineer shall verify that the computed bearing pressures below the wall do not exceed the allowable foundation bearing pressure, or, perform a bearing capacity analysis using the program CBEAR. Also, the engineer shall verify that the base pressures do not result in excessive differential settlement of the wall foundation.

****
** Sliding Results **
****

Solution converged. Summation of forces = 0.

Wedge Number	Horizontal Loads (kips)	Vertical Loads (kips)
1	0.000	0.000
2	10.392	5.112
3	0.000	0.000

Water pressures on wedges:

Wedge number	Top press. (ksf)	Bottom press. (ksf)	x-coord. (ft)	press. (ksf)
1	0.0000	0.0000		
2			0.0000	1.1388
2			14.0000	0.0359
3	0.0000	0.0359		

Points of sliding plane:
Point 1 (left), x = 0.00 ft, y = 332.75 ft
Point 2 (right), x = 14.00 ft, y = 337.00 ft

TB14

Depth of cracking = 7.05 ft
Crack extends to bottom of base of structure.

Wedge number	Failure angle (deg)	Total length (ft)	Weight of wedge (kips)	Submerged length (ft)	Uplift force (kips)
1	0.000	0.000	0.000	0.000	0.000
2	16.887	14.631	12.534	14.631	8.593
3	40.043	4.352	0.593	0.466	0.008

Wedge number	Net force (kips)
1	0.000
2	-1.398
3	1.398
SUM =	0.000

+----------------------------+
| Factor of safety = 2.795 |
+----------------------------+

****
** Bearing Results **
****

Base width =	14.631 (ft)
Xr =	3.443 (ft)
Effective base width = (measured along slope)	7.196 (ft)
Base slope =	16.8868 (deg)
Phi =	27.000 (deg)
C =	0.228 (ksf)
Effective Gamma =	0.0666 (kcf)
Normal load =	11.485 (kips)
Load inclination =	22.547 (deg)
Load eccentricity =	3.717 (ft)
Surcharge =	0.3375 (kips)
Embedment =	2.800 (ft)
Ground slope =	0.0000 (deg)

Bearing Capacity Factors

	C	Q	G
Bearing	23.9422	13.1992	9.4626
Embedment	1.1270	1.0635	1.0635
Inclination	0.5617	0.5617	0.0272
Base Tilt	0.6994	0.7222	0.7222
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 4.2405 (ksf)

+------------------------------+

TB14

```
| Factor of safety =      2.657 |
+-------------------------------+
```

********** Echoprint of Input Data **********

Date: 2009/11/ 6 Time: 15.40.37

Structural geometry data:

Elevation of top of stem (ELTS)	=	351.00 ft
Height of stem (HTS)	=	13.00 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	1.96 ft
Dist. of batter at bot. of stem (TBSR)	=	0.23 ft
Depth of heel (THEEL)	=	6.75 ft
Distance of batter for heel (BTRH)	=	0.21 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	5.25 ft
Distance of batter for toe (BTRT)	=	0.88 ft
Width of base (BWIDTH)	=	15.00 ft
Depth of key (HK)	=	5.00 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.25 ft

Structure coordinates:

x (ft)	y (ft)
0.00	331.04
0.00	337.79
7.79	338.00
8.02	351.00
9.52	351.00
9.75	338.00
15.00	337.12
15.00	335.62
2.75	336.04
1.50	331.04

NOTE: X=0 is located at the left-hand side
of the structure. The Y values correspond
to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
27.00	0.285	0.127	0.129	18.00	340.00

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

TB15

Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1492.17	340.00
2	7.83	340.00

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
27.00	0.285	0.127	0.129	340.00	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	9.71	340.00
2	509.71	340.00

Foundation property data:
  phi for soil-structure interface = 27.00 (deg)
  c for soil-structure interface = 0.228 (ksf)
  phi for soil-soil interface = 27.00 (deg)
  c for soil-soil interface = 0.285 (ksf)

Water data:
  Driving side elevation = 351.00 ft
  Resisting side elevation = 337.50 ft
  Unit weight of water = 0.0624 kcf
  Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
  Sliding FS = 1.33
  Overturning = 75.00% base in compression

Crack options:
  o Crack depth is to be calculated
  o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

****
* Overturning *
****

*** Satisfied ***
Required base in comp. = 75.00 %
Actual base in comp. = 77.35 %
Overturning ratio = 1.64

TB15

```
Xr (measured from toe) =   3.87 ft
Resultant ratio        = 0.2578
Stem ratio             = 0.3500
Base pressure at x=  11.60 ft from toe =    0.0000 ksf
Base pressure at toe                   =    1.9952 ksf

***********    *** Satisfied ***
* Sliding *    Min. Required =   1.33
***********    Actual FS     =   4.94


********************** Output Results **********************

Date: 2009/11/ 6                                  Time: 15.40.37


****************************
**  Overturning Results  **
****************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF         = -58.6270
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4005
  Driving side at rest Kc   =   0.5682
  Resisting side at rest K  =   0.5460
  Resisting side at rest Kc =   0.7389
  At-rest K's for resisting side calculated.

Depth of cracking =     4.18 ft

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       351.00     0.0000
       335.82     0.9472
       331.04     1.0653

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       340.00     0.0000
       335.82     0.0000
       331.04     0.1584

** Resisting side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       337.50     0.0000
       335.62     0.1882
       331.04     1.0653
```

Earth pressures:

Elevation (ft)	Pressure (ksf)
340.00	0.0000
335.62	0.2030

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
335.62	1.9402
331.04	1.9402

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.0653
1.50	1.0184
2.75	0.5452
15.00	0.1882

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	9.294		-8.15	-75.70
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	2.120		-11.16	-23.66
Water above structure.....	0.000		0.00	0.00
Water above soil.....	5.438		-11.04	-60.03
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	1.577		-2.53	-4.00
Saturated soil.....	0.056		-0.76	-0.04
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.379	-2.99	-1.13
Shear (due to delta).....	0.123		-15.00	-1.85
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		11.999	2.25	27.06
Resisting side:				
Effective earth loads.....		-0.445	1.46	-0.65
Balancing earth load.....		-8.886	-2.29	20.34
Water loads.....		-3.047	-2.62	7.99
Foundation:				
Vertical force on base.....	-11.575		-3.87	44.77
Uplift.....	-7.032		-9.51	66.90
** Statics Check ** SUMS =	0.000	0.000		0.00

Angle of base = 16.98 degrees

TB15

Normal force on base = 13.665 kips
Shear force on base = 5.118 kips
Max. available shear force = 13.158 kips

Base pressure at x= 11.60 ft from toe = 0.0000 ksf
Base pressure at toe = 1.9952 ksf

Xr (measured from toe) = 3.87 ft
Resultant ratio = 0.2578
Stem ratio = 0.3500
Base in compression = 77.35 %
Overturning ratio = 1.64

Volume of concrete = 2.29 cubic yds/ft of wall

NOTE: The engineer shall verify that the computed bearing pressures below the wall do not exceed the allowable foundation bearing pressure, or, perform a bearing capacity analysis using the program CBEAR. Also, the engineer shall verify that the base pressures do not result in excessive differential settlement of the wall foundation.

****
** Sliding Results **
****

Solution did not converge in 30 iterations.
Results of last iteration is printed.

Wedge Number	Horizontal Loads (kips)	Vertical Loads (kips)
1	0.030	5.161
2	3.775	5.438
3	0.000	0.000

Water pressures on wedges:

Wedge number	Top press. (ksf)	Bottom press. (ksf)	x-coord. (ft)	press. (ksf)
1	0.7480	1.2455		
2			0.0000	1.2455
2			15.0000	0.2075
3	0.0000	0.2075		

Points of sliding plane:
Point 1 (left), x = 0.00 ft, y = 331.04 ft
Point 2 (right), x = 15.00 ft, y = 335.62 ft

Depth of cracking = 0.99 ft

Wedge number	Failure angle (deg)	Total length (ft)	Weight of wedge (kips)	Submerged length (ft)	Uplift force (kips)
1	-46.679	10.960	4.824	10.960	10.924

TB15

2	16.979	15.684	16.587	15.684	11.394
3	42.241	6.515	1.345	2.797	0.290

Wedge number	Net force (kips)
1	-7.264
2	5.209
3	2.012
SUM =	-0.043

Factor of safety =	4.942

****
** Bearing Results **
****

Base width =	15.684 (ft)
Xr =	3.868 (ft)
Effective base width = (measured along slope)	8.088 (ft)
Base slope =	16.9791 (deg)
Phi =	27.000 (deg)
C =	0.228 (ksf)
Effective Gamma =	0.0666 (kcf)
Normal load =	13.665 (kips)
Load inclination =	20.533 (deg)
Load eccentricity =	3.798 (ft)
Surcharge =	0.4427 (kips)
Embedment =	4.380 (ft)
Ground slope =	0.0000 (deg)

Bearing Capacity Factors

	C	Q	G
Bearing	23.9422	13.1992	9.4626
Embedment	1.1768	1.0884	1.0884
Inclination	0.5958	0.5958	0.0574
Base Tilt	0.6979	0.7208	0.7208
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 5.3097 (ksf)

Factor of safety =	3.142

TB17

********** Echoprint of Input Data **********

Date: 2009/11/ 6 Time: 15.41.16

Structural geometry data:

Elevation of top of stem (ELTS)	=	351.00 ft
Height of stem (HTS)	=	14.54 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	2.04 ft
Dist. of batter at bot. of stem (TBSR)	=	0.27 ft
Depth of heel (THEEL)	=	7.58 ft
Distance of batter for heel (BTRH)	=	0.13 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	6.48 ft
Distance of batter for toe (BTRT)	=	0.96 ft
Width of base (BWIDTH)	=	18.00 ft
Depth of key (HK)	=	5.67 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.42 ft

Structure coordinates:

x (ft)	y (ft)
0.00	328.75
0.00	336.33
9.48	336.46
9.75	351.00
11.25	351.00
11.52	336.46
18.00	335.50
18.00	334.00
2.92	334.42
1.50	328.75

NOTE: X=0 is located at the left-hand side
of the structure. The Y values correspond
to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
27.00	0.285	0.127	0.129	18.00	337.00

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

TB17

Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1490.51	337.00
2	9.49	337.00

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
27.00	0.285	0.127	0.129	337.00	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	11.51	337.00
2	511.51	337.00

Foundation property data:
  phi for soil-structure interface = 27.00 (deg)
  c for soil-structure interface = 0.228 (ksf)
  phi for soil-soil interface = 27.00 (deg)
  c for soil-soil interface = 0.285 (ksf)

Water data:
  Driving side elevation = 351.00 ft
  Resisting side elevation = 334.50 ft
  Unit weight of water = 0.0624 kcf
  Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
  Sliding FS = 1.33
  Overturning = 75.00% base in compression

Crack options:
  o Crack *is* down to bottom of heel
  o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

****
* Overturning *
****
*** Satisfied ***
Required base in comp. = 75.00 %
Actual base in comp. = 78.20 %
Overturning ratio = 1.66

TB17

```
Xr (measured from toe) =   4.69 ft
Resultant ratio        = 0.2607
Stem ratio             = 0.3600
Base pressure at x=  14.08 ft from toe =    0.0000 ksf
Base pressure at toe                   =    1.9094 ksf

***********    *** Satisfied ***
* Sliding *    Min. Required =   1.33
***********    Actual FS     =   2.35


********************** Output Results **********************

Date: 2009/11/ 6                                  Time: 15.41.16


****************************
**  Overturning Results  **
****************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF         = -58.6270
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4005
  Driving side at rest Kc   =   0.5682
  Resisting side at rest K  =   0.5460
  Resisting side at rest Kc =   0.7389
  At-rest K's for resisting side calculated.

Depth of cracking =     4.18 ft
Crack extends to bottom of base of structure.

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       351.00     0.0000
       332.82     1.1344
       328.75     1.2087

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       337.00     0.0000
       332.82     0.0000
       328.75     0.1500

** Resisting side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       334.50     0.0000
       334.00     0.0533
```

328.75	1.1533

Earth pressures:

Elevation (ft)	Pressure (ksf)
337.00	0.0000
334.00	0.1795

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
334.00	2.2735
328.75	2.2735

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.2087
1.50	1.1533
2.92	0.5838
18.00	0.0533

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	11.164		-9.87	-110.22
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	0.740		-13.43	-9.94
Water above structure.....	0.000		0.00	0.00
Water above soil.....	8.404		-13.19	-110.85
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	0.840		-2.73	-2.30
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.305	-3.89	-1.19
Shear (due to delta).....	0.099		-18.00	-1.79
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		15.080	2.31	34.90
Resisting side:				
Effective earth loads.....		-0.269	1.00	-0.27
Balancing earth load.....		-11.936	-2.63	31.34
Water loads.....		-3.181	-3.41	10.84
Foundation:				
Vertical force on base.....	-13.439		-4.69	63.06
Uplift.....	-7.808		-12.35	96.41
** Statics Check ** SUMS =	0.000	0.000		0.00

TB17

Angle of base = 16.26 degrees
Normal force on base = 16.243 kips
Shear force on base = 7.695 kips
Max. available shear force = 16.088 kips

Base pressure at x= 14.08 ft from toe = 0.0000 ksf
Base pressure at toe = 1.9094 ksf

Xr (measured from toe) = 4.69 ft
Resultant ratio = 0.2607
Stem ratio = 0.3600
Base in compression = 78.20 %
Overturning ratio = 1.66

Volume of concrete = 2.76 cubic yds/ft of wall

NOTE: The engineer shall verify that the computed bearing pressures below the wall do not exceed the allowable foundation bearing pressure, or, perform a bearing capacity analysis using the program CBEAR. Also, the engineer shall verify that the base pressures do not result in excessive differential settlement of the wall foundation.

****
** Sliding Results **
****

Solution did not converge in 30 iterations.
Results of last iteration is printed.

Wedge Number	Horizontal Loads (kips)	Vertical Loads (kips)
1	0.000	0.000
2	15.446	8.404
3	0.000	0.000

Water pressures on wedges:

Wedge number	Top press. (ksf)	Bottom press. (ksf)	x-coord. (ft)	press. (ksf)
1	0.0000	0.0000		
2			0.0000	1.3884
2			18.0000	0.0579
3	0.0000	0.0579		

Points of sliding plane:
Point 1 (left), x = 0.00 ft, y = 328.75 ft
Point 2 (right), x = 18.00 ft, y = 334.00 ft

Depth of cracking = 8.25 ft
Crack extends to bottom of base of structure.

Wedge number	Failure angle (deg)	Total length (ft)	Weight of wedge (kips)	Submerged length (ft)	Uplift force (kips)

TB17

1	0.000	0.000	0.000	0.000	0.000
2	16.260	18.750	17.790	18.750	13.559
3	39.349	4.732	0.697	0.789	0.023

Wedge number	Net force (kips)
1	0.000
2	-2.419
3	1.669
SUM =	-0.750

Factor of safety =	2.348

****
** Bearing Results **
****

Base width =	18.750 (ft)
Xr =	4.692 (ft)
Effective base width = (measured along slope)	9.775 (ft)
Base slope =	16.2602 (deg)
Phi =	27.000 (deg)
C =	0.228 (ksf)
Effective Gamma =	0.0666 (kcf)
Normal load =	16.243 (kips)
Load inclination =	25.349 (deg)
Load eccentricity =	4.487 (ft)
Surcharge =	0.3508 (kips)
Embedment =	3.000 (ft)
Ground slope =	0.0000 (deg)

Bearing Capacity Factors

	C	Q	G
Bearing	23.9422	13.1992	9.4626
Embedment	1.1002	1.0501	1.0501
Inclination	0.5160	0.5160	0.0037
Base Tilt	0.7097	0.7317	0.7317
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 3.9049 (ksf)

Factor of safety =	2.350

TB18

********** Echoprint of Input Data **********

Date: 2009/11/ 6 Time: 15.42.11

Structural geometry data:

Elevation of top of stem (ELTS)	=	351.00 ft
Height of stem (HTS)	=	15.50 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	2.08 ft
Dist. of batter at bot. of stem (TBSR)	=	0.29 ft
Depth of heel (THEEL)	=	8.00 ft
Distance of batter for heel (BTRH)	=	0.08 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	6.88 ft
Distance of batter for toe (BTRT)	=	1.00 ft
Width of base (BWIDTH)	=	19.00 ft
Depth of key (HK)	=	6.00 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.50 ft

Structure coordinates:

x (ft)	y (ft)
0.00	327.42
0.00	335.42
10.04	335.50
10.33	351.00
11.83	351.00
12.12	335.50
19.00	334.50
19.00	333.00
3.00	333.42
1.50	327.42

NOTE: X=0 is located at the left-hand side
of the structure. The Y values correspond
to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
27.00	0.285	0.127	0.129	18.00	336.27

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

TB18

Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1489.95	336.27
2	10.05	336.27

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
27.00	0.285	0.127	0.129	336.27	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	12.11	336.27
2	512.11	336.27

Foundation property data:
  phi for soil-structure interface = 27.00 (deg)
  c for soil-structure interface = 0.228 (ksf)
  phi for soil-soil interface = 27.00 (deg)
  c for soil-soil interface = 0.285 (ksf)

Water data:
  Driving side elevation = 351.00 ft
  Resisting side elevation = 333.77 ft
  Unit weight of water = 0.0624 kcf
  Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
  Sliding FS = 1.33
  Overturning = 75.00% base in compression

Crack options:
  o Crack *is* down to bottom of heel
  o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

****
* Overturning *
****

*** Satisfied ***
Required base in comp. = 75.00 %
Actual base in comp. = 77.59 %
Overturning ratio = 1.65

```
Xr (measured from toe) =   4.91 ft
Resultant ratio        = 0.2586
Stem ratio             = 0.3621
Base pressure at x=  14.74 ft from toe =    0.0000 ksf
Base pressure at toe                   =    2.0087 ksf

***********    *** Satisfied ***
* Sliding *    Min. Required =   1.33
***********    Actual FS     =   2.23


********************** Output Results **********************

Date: 2009/11/ 6                                  Time: 15.42.11


****************************
**  Overturning Results  **
****************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF         = -58.6270
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4005
  Driving side at rest Kc   =   0.5682
  Resisting side at rest K  =   0.5460
  Resisting side at rest Kc =   0.7389
  At-rest K's for resisting side calculated.

Depth of cracking =     4.18 ft
Crack extends to bottom of base of structure.

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       351.00     0.0000
       332.09     1.1799
       327.42     1.2725

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       336.27     0.0000
       332.09     0.0000
       327.42     0.1711

** Resisting side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       333.77     0.0000
       333.00     0.0808
```

327.42	1.2725

Earth pressures:

Elevation (ft)	Pressure (ksf)
336.27	0.0000
333.00	0.1835

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
333.00	2.3613
327.42	2.3613

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.2725
1.50	1.2191
3.00	0.6245
19.00	0.0808

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	12.042		-10.46	-125.95
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	1.050		-14.06	-14.76
Water above structure.....	0.000		0.00	0.00
Water above soil.....	9.368		-13.90	-130.25
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	1.110		-2.99	-3.32
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.400	-4.02	-1.61
Shear (due to delta).....	0.130		-19.00	-2.47
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		16.883	2.45	41.42
Resisting side:				
Effective earth loads.....		-0.300	1.09	-0.33
Balancing earth load.....		-13.176	-2.79	36.77
Water loads.....		-3.807	-3.58	13.62
Foundation:				
Vertical force on base.....	-14.807		-4.91	72.77
Uplift.....	-8.894		-12.83	114.12
** Statics Check ** SUMS =	0.000	0.000		0.00

TB18

Angle of base = 16.37 degrees
Normal force on base = 17.920 kips
Shear force on base = 8.470 kips
Max. available shear force = 17.557 kips

Base pressure at x= 14.74 ft from toe = 0.0000 ksf
Base pressure at toe = 2.0087 ksf

Xr (measured from toe) = 4.91 ft
Resultant ratio = 0.2586
Stem ratio = 0.3621
Base in compression = 77.59 %
Overturning ratio = 1.65

Volume of concrete = 2.97 cubic yds/ft of wall

NOTE: The engineer shall verify that the computed bearing pressures below the wall do not exceed the allowable foundation bearing pressure, or, perform a bearing capacity analysis using the program CBEAR. Also, the engineer shall verify that the base pressures do not result in excessive differential settlement of the wall foundation.

****
** Sliding Results **
****

Solution converged. Summation of forces = 0.

Wedge Number	Horizontal Loads (kips)	Vertical Loads (kips)
1	0.000	0.000
2	17.348	9.368
3	0.000	0.000

Water pressures on wedges:

Wedge number	Top press. (ksf)	Bottom press. (ksf)	x-coord. (ft)	press. (ksf)
1	0.0000	0.0000		
2			0.0000	1.4714
2			19.0000	0.0883
3	0.0000	0.0883		

Points of sliding plane:
Point 1 (left), x = 0.00 ft, y = 327.42 ft
Point 2 (right), x = 19.00 ft, y = 333.00 ft

Depth of cracking = 8.85 ft
Crack extends to bottom of base of structure.

Wedge number	Failure angle (deg)	Total length (ft)	Weight of wedge (kips)	Submerged length (ft)	Uplift force (kips)

TB18

1	0.000	0.000	0.000	0.000	0.000
2	16.367	19.802	19.895	19.802	15.443
3	38.698	5.230	0.848	1.232	0.054

Wedge number	Net force (kips)
1	0.000
2	-2.095
3	2.095
SUM =	0.000

Factor of safety =	2.234

****
** Bearing Results **
****

Base width =	19.802	(ft)
Xr =	4.914	(ft)
Effective base width = (measured along slope)	10.244	(ft)
Base slope =	16.3666	(deg)
Phi =	27.000	(deg)
C =	0.228	(ksf)
Effective Gamma =	0.0666	(kcf)
Normal load =	17.920	(kips)
Load inclination =	25.298	(deg)
Load eccentricity =	4.779	(ft)
Surcharge =	0.3688	(kips)
Embedment =	3.270	(ft)
Ground slope =	0.0000	(deg)

Bearing Capacity Factors

	C	Q	G
Bearing	23.9422	13.1992	9.4626
Embedment	1.1042	1.0521	1.0521
Inclination	0.5168	0.5168	0.0040
Base Tilt	0.7080	0.7301	0.7301
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 4.0014 (ksf)

Factor of safety =	2.287

TB20

********** Echoprint of Input Data **********

Date: 2009/11/ 6 Time: 15.42.55

Structural geometry data:

Elevation of top of stem (ELTS)	=	351.00 ft
Height of stem (HTS)	=	17.83 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	2.17 ft
Dist. of batter at bot. of stem (TBSR)	=	0.33 ft
Depth of heel (THEEL)	=	8.83 ft
Distance of batter for heel (BTRH)	=	0.00 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	7.67 ft
Distance of batter for toe (BTRT)	=	1.08 ft
Width of base (BWIDTH)	=	21.00 ft
Depth of key (HK)	=	6.67 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.67 ft

Structure coordinates:

x (ft)	y (ft)
0.00	324.34
0.00	333.17
11.16	333.17
11.50	351.00
13.00	351.00
13.33	333.17
21.00	332.09
21.00	330.59
3.17	331.01
1.50	324.34

NOTE: X=0 is located at the left-hand side
of the structure. The Y values correspond
to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
27.00	0.285	0.127	0.129	18.00	334.27

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

TB20

Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1488.82	334.27
2	11.18	334.27

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
27.00	0.285	0.127	0.129	334.27	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	13.31	334.27
2	513.31	334.27

Foundation property data:
  phi for soil-structure interface = 27.00 (deg)
  c for soil-structure interface = 0.228 (ksf)
  phi for soil-soil interface = 27.00 (deg)
  c for soil-soil interface = 0.285 (ksf)

Water data:
  Driving side elevation = 351.00 ft
  Resisting side elevation = 331.77 ft
  Unit weight of water = 0.0624 kcf
  Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
  Sliding FS = 1.33
  Overturning = 75.00% base in compression

Crack options:
  o Crack *is* down to bottom of heel
  o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

****
* Overturning *
****

*** Not Satisfied ***
Required base in comp. = 75.00 %
Actual base in comp. = 71.87 %
Overturning ratio = 1.60

```
  To increase stability try one or a combination
  of the following:
    1.  Increase the base width
    2.  Slope the base of the structure
    3.  Lower the wall base
    4.  Add/remove key

Xr (measured from toe) =   5.03 ft
Resultant ratio        = 0.2396
Stem ratio             = 0.3652
Base pressure at x=  15.09 ft from toe =    0.0000 ksf
Base pressure at toe                   =    2.3702 ksf

***********    *** Satisfied ***
* Sliding *    Min. Required =   1.33
***********    Actual FS     =   2.00


********************** Output Results **********************

Date: 2009/11/ 6                                  Time: 15.42.55


****************************
**  Overturning Results   **
****************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF         = -58.6270
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4005
  Driving side at rest Kc   =   0.5682
  Resisting side at rest K  =   0.5460
  Resisting side at rest Kc =   0.7389
  At-rest K's for resisting side calculated.

Depth of cracking =     4.18 ft
Crack extends to bottom of base of structure.

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       351.00     0.0000
       330.09     1.3047
       324.34     1.4243

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       334.27     0.0000
       330.09     0.0000
       324.34     0.2144

** Resisting side pressures **
```

Water pressures:

Elevation (ft)	Pressure (ksf)
331.77	0.0000
330.59	0.1227
324.34	1.4243

Earth pressures:

Elevation (ft)	Pressure (ksf)
334.27	0.0000
330.59	0.1895

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
330.59	2.6958
324.34	2.6958

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.4243
1.50	1.3722
3.17	0.7168
21.00	0.1227

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	13.988		-11.61	-162.36
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	1.585		-15.41	-24.43
Water above structure.....	0.000		0.00	0.00
Water above soil.....	11.839		-15.33	-181.48
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	1.599		-3.42	-5.46
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.617	-4.33	-2.67
Shear (due to delta).....	0.200		-21.00	-4.21
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		21.488	2.86	61.45
Resisting side:				
Effective earth loads.....		-0.349	1.23	-0.43
Balancing earth load.....		-16.849	-3.12	52.65

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Water loads.....		-4.907	-3.94	19.32
Foundation:				
Vertical force on base.....	-17.885		-5.03	89.98
Uplift.....	-11.326		-13.92	157.65
** Statics Check **	SUMS = 0.000	0.000		0.00

Angle of base = 16.57 degrees
Normal force on base = 21.948 kips
Shear force on base = 11.047 kips
Max. available shear force = 20.901 kips

Base pressure at x= 15.09 ft from toe = 0.0000 ksf
Base pressure at toe = 2.3702 ksf

Xr (measured from toe) = 5.03 ft
Resultant ratio = 0.2396
Stem ratio = 0.3652
Base in compression = 71.87 %
Overturning ratio = 1.60

Volume of concrete = 3.45 cubic yds/ft of wall

NOTE: The engineer shall verify that the computed bearing pressures below the wall do not exceed the allowable foundation bearing pressure, or, perform a bearing capacity analysis using the program CBEAR. Also, the engineer shall verify that the base pressures do not result in excessive differential settlement of the wall foundation.

****
** Sliding Results **
****

Solution converged. Summation of forces = 0.

Wedge Number	Horizontal Loads (kips)	Vertical Loads (kips)
1	0.000	0.000
2	22.176	11.839
3	0.000	0.000

Water pressures on wedges:

Wedge number	Top press. (ksf)	Bottom press. (ksf)	x-coord. (ft)	press. (ksf)
1	0.0000	0.0000		
2			0.0000	1.6636
2			21.0000	0.1350
3	0.0000	0.1350		

Points of sliding plane:
Point 1 (left), x = 0.00 ft, y = 324.34 ft
Point 2 (right), x = 21.00 ft, y = 330.59 ft

TB20

Depth of cracking = 9.93 ft
Crack extends to bottom of base of structure.

Wedge number	Failure angle (deg)	Total length (ft)	Weight of wedge (kips)	Submerged length (ft)	Uplift force (kips)
1	0.000	0.000	0.000	0.000	0.000
2	16.574	21.910	24.284	21.910	19.703
3	37.901	5.991	1.106	1.921	0.130

Wedge number	Net force (kips)
1	0.000
2	-2.725
3	2.724
SUM =	-0.001

+----------------------------+
| Factor of safety = 1.999 |
+----------------------------+

****
** Bearing Results **
****

Base width =	21.910 (ft)
Xr =	5.031 (ft)
Effective base width = (measured along slope)	10.497 (ft)
Base slope =	16.5740 (deg)
Phi =	27.000 (deg)
C =	0.228 (ksf)
Effective Gamma =	0.0666 (kcf)
Normal load =	21.948 (kips)
Load inclination =	26.716 (deg)
Load eccentricity =	5.706 (ft)
Surcharge =	0.3961 (kips)
Embedment =	3.680 (ft)
Ground slope =	0.0000 (deg)

Bearing Capacity Factors

	C	Q	G
Bearing	23.9422	13.1992	9.4626
Embedment	1.1144	1.0572	1.0572
Inclination	0.4944	0.4944	0.0001
Base Tilt	0.7046	0.7269	0.7269
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 3.9555 (ksf)

+------------------------------+

TB20

```
| Factor of safety =      1.892 |
+-------------------------------+
```

TB2-14

********** Echoprint of Input Data **********

Date: 2009/11/ 6 Time: 15.43.42

Structural geometry data:

Elevation of top of stem (ELTS)	=	350.80 ft
Height of stem (HTS)	=	11.67 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	1.92 ft
Dist. of batter at bot. of stem (TBSR)	=	0.21 ft
Depth of heel (THEEL)	=	6.33 ft
Distance of batter for heel (BTRH)	=	0.25 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	4.88 ft
Distance of batter for toe (BTRT)	=	0.83 ft
Width of base (BWIDTH)	=	14.00 ft
Depth of key (HK)	=	4.67 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.17 ft

Structure coordinates:

x (ft)	y (ft)
0.00	332.55
0.00	338.88
7.20	339.13
7.41	350.80
8.91	350.80
9.12	339.13
14.00	338.30
14.00	336.80
2.67	337.22
1.50	332.55

NOTE: X=0 is located at the left-hand side
of the structure. The Y values correspond
to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
28.00	0.225	0.130	0.131	16.67	340.60

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

TB2-14

Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1492.77	340.60
2	7.23	340.60

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
28.00	0.225	0.130	0.131	340.60	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	9.09	340.60
2	509.09	340.60

Foundation property data:
  phi for soil-structure interface = 28.00 (deg)
  c for soil-structure interface = 0.180 (ksf)
  phi for soil-soil interface = 28.00 (deg)
  c for soil-soil interface = 0.225 (ksf)

Water data:
  Driving side elevation = 350.80 ft
  Resisting side elevation = 338.10 ft
  Unit weight of water = 0.0624 kcf
  Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
  Sliding FS = 1.33
  Overturning = 75.00% base in compression

Crack options:
  o Crack *is* down to bottom of heel
  o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

****
* Overturning *
****
*** Satisfied ***
Required base in comp. = 75.00 %
Actual base in comp. = 84.42 %
Overturning ratio = 1.74

TB2-14

```
Xr (measured from toe) =   3.94 ft
Resultant ratio        = 0.2814
Stem ratio             = 0.3486
Base pressure at x=  11.82 ft from toe =    0.0000 ksf
Base pressure at toe                   =    1.7444 ksf

***********    *** Satisfied ***
* Sliding *    Min. Required =   1.33
***********    Actual FS     =   3.39


********************** Output Results **********************

Date: 2009/11/ 6                                  Time: 15.43.42


***************************
**  Overturning Results  **
***************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF         = -53.5517
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4149
  Driving side at rest Kc   =   0.5880
  Resisting side at rest K  =   0.5305
  Resisting side at rest Kc =   0.7284
  At-rest K's for resisting side calculated.

Depth of cracking =     3.25 ft
Crack extends to bottom of base of structure.

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       350.80     0.0000
       337.35     0.8390
       332.55     0.9552

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       340.60     0.0000
       337.35     0.0000
       332.55     0.1804

** Resisting side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       338.10     0.0000
       336.80     0.1308
```

332.55	0.9077

Earth pressures:

Elevation (ft)	Pressure (ksf)
340.60	0.0000
336.80	0.1934

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
336.80	1.8175
332.55	1.8175

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	0.9552
1.50	0.9077
2.67	0.4638
14.00	0.1308

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	8.383		-7.60	-63.73
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	1.507		-10.49	-15.80
Water above structure.....	0.000		0.00	0.00
Water above soil.....	4.658		-10.34	-48.17
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	1.198		-2.27	-2.72
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.433	-2.65	-1.15
Shear (due to delta).....	0.130		-14.00	-1.82
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		9.951	2.03	20.21
Resisting side:				
Effective earth loads.....		-0.367	1.27	-0.46
Balancing earth load.....		-7.725	-2.13	16.42
Water loads.....		-2.292	-2.54	5.82
Foundation:				
Vertical force on base.....	-10.308		-3.94	40.61
Uplift.....	-5.568		-9.12	50.77
** Statics Check ** SUMS =	0.000	0.000		0.00

Angle of base = 16.89 degrees
Normal force on base = 12.108 kips
Shear force on base = 4.397 kips
Max. available shear force = 11.297 kips

Base pressure at x= 11.82 ft from toe = 0.0000 ksf
Base pressure at toe = 1.7444 ksf

Xr (measured from toe) = 3.94 ft
Resultant ratio = 0.2814
Stem ratio = 0.3486
Base in compression = 84.42 %
Overturning ratio = 1.74

Volume of concrete = 2.07 cubic yds/ft of wall

NOTE: The engineer shall verify that the computed bearing pressures below the wall do not exceed the allowable foundation bearing pressure, or, perform a bearing capacity analysis using the program CBEAR. Also, the engineer shall verify that the base pressures do not result in excessive differential settlement of the wall foundation.

****
** Sliding Results **
****

Solution converged. Summation of forces = 0.

Wedge Number	Horizontal Loads (kips)	Vertical Loads (kips)
1	0.000	0.000
2	10.392	4.658
3	0.000	0.000

Water pressures on wedges:

Wedge number	Top press. (ksf)	Bottom press. (ksf)	x-coord. (ft)	press. (ksf)
1	0.0000	0.0000		
2			0.0000	1.1388
2			14.0000	0.1458
3	0.0000	0.1458		

Points of sliding plane:
Point 1 (left), x = 0.00 ft, y = 332.55 ft
Point 2 (right), x = 14.00 ft, y = 336.80 ft

Depth of cracking = 8.05 ft
Crack extends to bottom of base of structure.

Wedge number	Failure angle (deg)	Total length (ft)	Weight of wedge (kips)	Submerged length (ft)	Uplift force (kips)

TB2-14

1	0.000	0.000	0.000	0.000	0.000
2	16.887	14.631	14.169	14.631	9.397
3	40.697	5.828	1.092	1.994	0.145

Wedge number	Net force (kips)
1	0.000
2	-1.839
3	1.840
SUM =	0.000

Factor of safety =	3.387

****
** Bearing Results **
****

Base width =	14.631	(ft)
Xr =	3.940	(ft)
Effective base width = (measured along slope)	8.234	(ft)
Base slope =	16.8868	(deg)
Phi =	28.000	(deg)
C =	0.180	(ksf)
Effective Gamma =	0.0686	(kcf)
Normal load =	12.108	(kips)
Load inclination =	19.959	(deg)
Load eccentricity =	3.198	(ft)
Surcharge =	0.4142	(kips)
Embedment =	3.800	(ft)
Ground slope =	0.0000	(deg)

Bearing Capacity Factors

	C	Q	G
Bearing	25.8033	14.7199	11.1897
Embedment	1.1536	1.0768	1.0768
Inclination	0.6056	0.6056	0.0825
Base Tilt	0.6901	0.7111	0.7111
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 5.0744 (ksf)

Factor of safety =	3.451

TB2-15

********** Echoprint of Input Data **********

Date: 2009/11/ 6 Time: 15.44.21

Structural geometry data:

Elevation of top of stem (ELTS)	=	350.80 ft
Height of stem (HTS)	=	12.63 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	1.96 ft
Dist. of batter at bot. of stem (TBSR)	=	0.23 ft
Depth of heel (THEEL)	=	6.75 ft
Distance of batter for heel (BTRH)	=	0.21 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	5.27 ft
Distance of batter for toe (BTRT)	=	0.88 ft
Width of base (BWIDTH)	=	15.00 ft
Depth of key (HK)	=	5.00 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.25 ft

Structure coordinates:

x (ft)	y (ft)
0.00	331.21
0.00	337.96
7.77	338.17
8.00	350.80
9.50	350.80
9.73	338.17
15.00	337.29
15.00	335.79
2.75	336.21
1.50	331.21

NOTE: X=0 is located at the left-hand side
of the structure. The Y values correspond
to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
28.00	0.225	0.130	0.131	18.67	339.20

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

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Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1492.21	339.20
2	7.79	339.20

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
28.00	0.225	0.130	0.131	339.20	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	9.71	339.20
2	509.71	339.20

Foundation property data:
  phi for soil-structure interface = 28.00 (deg)
  c for soil-structure interface = 0.180 (ksf)
  phi for soil-soil interface = 28.00 (deg)
  c for soil-soil interface = 0.225 (ksf)

Water data:
  Driving side elevation = 350.80 ft
  Resisting side elevation = 336.70 ft
  Unit weight of water = 0.0624 kcf
  Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
  Sliding FS = 1.33
  Overturning = 75.00% base in compression

Crack options:
  o Crack *is* down to bottom of heel
  o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

****
* Overturning *
****
*** Satisfied ***
Required base in comp. = 75.00 %
Actual base in comp. = 79.57 %
Overturning ratio = 1.71

```
Xr (measured from toe) =   3.98 ft
Resultant ratio        = 0.2652
Stem ratio             = 0.3513
Base pressure at x=  11.94 ft from toe =    0.0000 ksf
Base pressure at toe                   =    1.8844 ksf

***********    *** Satisfied ***
* Sliding *    Min. Required =   1.33
***********    Actual FS     =   2.71


********************** Output Results **********************

Date: 2009/11/ 6                                  Time: 15.44.21


****************************
**  Overturning Results  **
****************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF         = -53.5517
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4061
  Driving side at rest Kc   =   0.5756
  Resisting side at rest K  =   0.5305
  Resisting side at rest Kc =   0.7284
  At-rest K's for resisting side calculated.

Depth of cracking =     3.25 ft
Crack extends to bottom of base of structure.

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       350.80     0.0000
       335.95     0.9264
       331.21     1.0268

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       339.20     0.0000
       335.95     0.0000
       331.21     0.1837

** Resisting side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       336.70     0.0000
       335.79     0.0943
```

331.21	1.0268

Earth pressures:

Elevation (ft)	Pressure (ksf)
339.20	0.0000
335.79	0.1856

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
335.79	1.9691
331.21	1.9691

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.0268
1.50	0.9755
2.75	0.4873
15.00	0.0943

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	9.197		-8.17	-75.17
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	1.157		-11.23	-12.99
Water above structure.....	0.000		0.00	0.00
Water above soil.....	5.714		-11.05	-63.16
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	1.008		-2.38	-2.40
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.436	-3.00	-1.31
Shear (due to delta).....	0.147		-15.00	-2.21
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		11.510	2.15	24.73
Resisting side:				
Effective earth loads.....		-0.317	1.13	-0.36
Balancing earth load.....		-9.019	-2.29	20.65
Water loads.....		-2.610	-2.87	7.49
Foundation:				
Vertical force on base.....	-11.245		-3.98	44.74
Uplift.....	-5.978		-10.03	59.97
** Statics Check ** SUMS =	0.000	0.000		0.00

Angle of base = 16.98 degrees
Normal force on base = 13.389 kips
Shear force on base = 5.342 kips
Max. available shear force = 12.477 kips

Base pressure at x= 11.94 ft from toe = 0.0000 ksf
Base pressure at toe = 1.8844 ksf

Xr (measured from toe) = 3.98 ft
Resultant ratio = 0.2652
Stem ratio = 0.3513
Base in compression = 79.57 %
Overturning ratio = 1.71

Volume of concrete = 2.27 cubic yds/ft of wall

NOTE: The engineer shall verify that the computed bearing pressures below the wall do not exceed the allowable foundation bearing pressure, or, perform a bearing capacity analysis using the program CBEAR. Also, the engineer shall verify that the base pressures do not result in excessive differential settlement of the wall foundation.

****
** Sliding Results **
****

Solution did not converge in 30 iterations.
Results of last iteration is printed.

Wedge Number	Horizontal Loads (kips)	Vertical Loads (kips)
1	0.000	0.000
2	11.974	5.714
3	0.000	0.000

Water pressures on wedges:

Wedge number	Top press. (ksf)	Bottom press. (ksf)	x-coord. (ft)	press. (ksf)
1	0.0000	0.0000		
2			0.0000	1.2224
2			15.0000	0.1050
3	0.0000	0.1050		

Points of sliding plane:
Point 1 (left), x = 0.00 ft, y = 331.21 ft
Point 2 (right), x = 15.00 ft, y = 335.79 ft

Depth of cracking = 7.99 ft
Crack extends to bottom of base of structure.

Wedge number	Failure angle (deg)	Total length (ft)	Weight of wedge (kips)	Submerged length (ft)	Uplift force (kips)

TB2-15

1	0.000	0.000	0.000	0.000	0.000
2	16.979	15.684	14.958	15.684	10.410
3	39.760	5.332	0.909	1.423	0.075

Wedge number	Net force (kips)
1	0.000
2	-1.858
3	1.756
SUM =	-0.103

Factor of safety =	2.712

****
** Bearing Results **
****

Base width =	15.684 (ft)
Xr =	3.978 (ft)
Effective base width = (measured along slope)	8.319 (ft)
Base slope =	16.9791 (deg)
Phi =	28.000 (deg)
C =	0.180 (ksf)
Effective Gamma =	0.0686 (kcf)
Normal load =	13.389 (kips)
Load inclination =	21.750 (deg)
Load eccentricity =	3.682 (ft)
Surcharge =	0.3874 (kips)
Embedment =	3.410 (ft)
Ground slope =	0.0000 (deg)

Bearing Capacity Factors

	C	Q	G
Bearing	25.8033	14.7199	11.1897
Embedment	1.1364	1.0682	1.0682
Inclination	0.5751	0.5751	0.0498
Base Tilt	0.6885	0.7097	0.7097
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 4.5279 (ksf)

Factor of safety =	2.813

TB2-19

********** Echoprint of Input Data **********

Date: 2009/11/ 6 Time: 15.45.13

Structural geometry data:

Elevation of top of stem (ELTS)	=	350.60 ft
Height of stem (HTS)	=	16.46 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	2.13 ft
Dist. of batter at bot. of stem (TBSR)	=	0.31 ft
Depth of heel (THEEL)	=	8.42 ft
Distance of batter for heel (BTRH)	=	0.04 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	7.27 ft
Distance of batter for toe (BTRT)	=	1.04 ft
Width of base (BWIDTH)	=	20.00 ft
Depth of key (HK)	=	6.33 ft
Width of bottom of key (TK)	=	1.50 ft
Dist. of batter at bot. of key (BTRK)	=	1.58 ft

Structure coordinates:

x (ft)	y (ft)
0.00	325.68
0.00	334.10
10.60	334.14
10.92	350.60
12.42	350.60
12.73	334.14
20.00	333.10
20.00	331.60
3.08	332.01
1.50	325.68

NOTE: X=0 is located at the left-hand side
of the structure. The Y values correspond
to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
28.00	0.225	0.130	0.131	16.67	334.60

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

TB2-19

Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1489.39	334.60
2	10.61	334.60

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
28.00	0.225	0.130	0.131	334.60	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	12.72	334.60
2	512.72	334.60

Foundation property data:
  phi for soil-structure interface = 28.00 (deg)
  c for soil-structure interface = 0.180 (ksf)
  phi for soil-soil interface = 28.00 (deg)
  c for soil-soil interface = 0.225 (ksf)

Water data:
  Driving side elevation = 350.60 ft
  Resisting side elevation = 332.10 ft
  Unit weight of water = 0.0624 kcf
  Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
  Sliding FS = 1.33
  Overturning = 75.00% base in compression

Crack options:
  o Crack depth is to be calculated
  o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

****
* Overturning *
****
*** Satisfied ***
Required base in comp. = 75.00 %
Actual base in comp. = 77.54 %
Overturning ratio = 1.67

```
Xr (measured from toe) =   5.17 ft
Resultant ratio        = 0.2585
Stem ratio             = 0.3635
Base pressure at x=  15.51 ft from toe =    0.0000 ksf
Base pressure at toe                   =    2.1023 ksf

***********    *** Satisfied ***
* Sliding *    Min. Required =   1.33
***********    Actual FS     =   2.65


********************** Output Results **********************

Date: 2009/11/ 6                                  Time: 15.45.13


****************************
**  Overturning Results  **
****************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF         = -53.5517
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4149
  Driving side at rest Kc   =   0.5880
  Resisting side at rest K  =   0.5305
  Resisting side at rest Kc =   0.7284
  At-rest K's for resisting side calculated.

Depth of cracking =     3.25 ft

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       350.60     0.0000
       331.35     1.2009
       325.68     1.3127

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       334.60     0.0000
       331.35     0.0000
       325.68     0.2355

** Resisting side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       332.10     0.0000
       331.60     0.0526
       325.68     1.3127
```

Earth pressures:

Elevation (ft)	Pressure (ksf)
334.60	0.0000
331.60	0.1793

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
331.60	2.5393
325.68	2.5393

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.3127
1.50	1.2591
3.08	0.6312
20.00	0.0526

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	12.967		-11.04	-143.17
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	0.667		-14.77	-9.85
Water above structure.....	0.000		0.00	0.00
Water above soil.....	10.747		-14.62	-157.10
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	0.926		-2.99	-2.77
Saturated soil.....	0.000		0.00	0.00
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.668	-4.03	-2.69
Shear (due to delta).....	0.200		-20.00	-4.00
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		18.688	2.62	49.01
Resisting side:				
Effective earth loads.....		-0.269	1.00	-0.27
Balancing earth load.....		-15.033	-2.96	44.49
Water loads.....		-4.054	-3.86	15.64
Foundation:				
Vertical force on base.....	-16.301		-5.17	84.26
Uplift.....	-9.207		-13.74	126.46
** Statics Check ** SUMS =	0.000	0.000		0.00

Angle of base = 16.49 degrees

Normal force on base = 19.897 kips
Shear force on base = 9.788 kips
Max. available shear force = 18.574 kips

Base pressure at x= 15.51 ft from toe = 0.0000 ksf
Base pressure at toe = 2.1023 ksf

Xr (measured from toe) = 5.17 ft
Resultant ratio = 0.2585
Stem ratio = 0.3635
Base in compression = 77.54 %
Overturning ratio = 1.67

Volume of concrete = 3.20 cubic yds/ft of wall

NOTE: The engineer shall verify that the computed bearing pressures below the wall do not exceed the allowable foundation bearing pressure, or, perform a bearing capacity analysis using the program CBEAR. Also, the engineer shall verify that the base pressures do not result in excessive differential settlement of the wall foundation.

****
** Sliding Results **
****

Solution did not converge in 30 iterations.
Results of last iteration is printed.

Wedge Number	Horizontal Loads (kips)	Vertical Loads (kips)
1	0.078	7.021
2	7.987	10.747
3	0.000	0.000

Water pressures on wedges:

Wedge number	Top press. (ksf)	Bottom press. (ksf)	x-coord. (ft)	press. (ksf)
1	1.0973	1.5550		
2			0.0000	1.5550
2			20.0000	0.0582
3	0.0000	0.0582		

Points of sliding plane:
Point 1 (left), x = 0.00 ft, y = 325.68 ft
Point 2 (right), x = 20.00 ft, y = 331.60 ft

Depth of cracking = 1.59 ft

Wedge number	Failure angle (deg)	Total length (ft)	Weight of wedge (kips)	Submerged length (ft)	Uplift force (kips)
1	-46.205	10.162	4.839	10.162	13.476

TB2-19

2	16.489	20.858	21.036	20.858	16.824
3	39.611	4.705	0.707	0.784	0.023

Wedge number	Net force (kips)
1	-8.728
2	6.952
3	1.475
SUM =	-0.301

+----------------------------+
| Factor of safety = 2.647 |
+----------------------------+

****
** Bearing Results **
****

Base width =	20.858 (ft)
Xr =	5.169 (ft)
Effective base width = (measured along slope)	10.782 (ft)
Base slope =	16.4888 (deg)
Phi =	28.000 (deg)
C =	0.180 (ksf)
Effective Gamma =	0.0686 (kcf)
Normal load =	19.897 (kips)
Load inclination =	26.194 (deg)
Load eccentricity =	5.038 (ft)
Surcharge =	0.3593 (kips)
Embedment =	3.000 (ft)
Ground slope =	0.0000 (deg)

Bearing Capacity Factors

	C	Q	G
Bearing	25.8033	14.7199	11.1897
Embedment	1.0926	1.0463	1.0463
Inclination	0.5026	0.5026	0.0042
Base Tilt	0.6968	0.7174	0.7174
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 3.6499 (ksf)

+-----------------------------+
| Factor of safety = 1.978 |
+-----------------------------+

****************** Echoprint of Input Data ******************

Date: 2009/11/ 6 Time: 15.46.14

Structural geometry data:

Elevation of top of stem (ELTS)	=	350.30 ft
Height of stem (HTS)	=	19.25 ft
Thickness top of stem (TTS)	=	1.50 ft
Thickness bottom of stem (TBS)	=	2.25 ft
Dist. of batter at bot. of stem (TBSR)	=	0.38 ft
Depth of heel (THEEL)	=	3.92 ft
Distance of batter for heel (BTRH)	=	0.00 ft
Depth of toe (TTOE)	=	1.50 ft
Width of toe (TWIDTH)	=	8.88 ft
Distance of batter for toe (BTRT)	=	1.25 ft
Width of base (BWIDTH)	=	24.00 ft
Depth of key (HK)	=	1.58 ft
Width of bottom of key (TK)	=	2.83 ft
Dist. of batter at bot. of key (BTRK)	=	3.17 ft

Structure coordinates:

x (ft)	y (ft)
0.00	327.13
0.00	331.05
12.87	331.05
13.24	350.30
14.74	350.30
15.12	331.05
24.00	329.80
24.00	328.30
6.00	328.71
2.83	327.13

NOTE: X=0 is located at the left-hand side
of the structure. The Y values correspond
to the actual elevation used.

Structural property data:
Unit weight of concrete = 0.150 kcf

Driving side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Delta (deg)	Elev. soil (ft)
28.00	0.225	0.130	0.132	16.67	333.00

Driving side soil geometry:

Soil point	Batter (in:1ft)	Distance (ft)
1	0.00	500.00
2	0.00	0.00
3	0.00	500.00

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Driving side soil profile:

Soil point	x (ft)	y (ft)
1	-1487.09	333.00
2	12.91	333.00

Resisting side soil property data:

Phi (deg)	c (ksf)	Moist Unit wt. (kcf)	Saturated unit wt. (kcf)	Elev. soil (ft)	Batter (in:1ft)
28.00	0.225	0.130	0.132	333.00	0.00

Resisting side soil profile:

Soil point	x (ft)	y (ft)
1	15.08	333.00
2	515.08	333.00

Foundation property data:
  phi for soil-structure interface = 28.00 (deg)
  c for soil-structure interface   = 0.180 (ksf)
  phi for soil-soil interface   = 28.00 (deg)
  c for soil-soil interface   = 0.225 (ksf)

Water data:
  Driving side elevation   = 350.30 ft
  Resisting side elevation = 330.50 ft
  Unit weight of water   = 0.0624 kcf
  Seepage pressures computed by Line of Creep method.

Minimum required factors of safety:
  Sliding FS   = 1.33
  Overturning = 75.00% base in compression

Crack options:
  o Crack *is* down to bottom of heel
  o Computed cracks *will* be filled with water

Strength mobilization factor = 0.6667

At-rest pressures on the resisting side *are used*
in the overturning analysis.

Forces on the resisting side *are used* in the sliding analysis.

Do iterate in overturning analysis.

***** Summary of Results *****

********** *** Satisfied ***
* Overturning * Required base in comp. = 75.00 %
********** Actual base in comp. = 81.50 %
  Overturning ratio = 1.32

TB2-22

```
Xr (measured from toe) =   6.52 ft
Resultant ratio        = 0.2717
Stem ratio             = 0.3700
Base pressure at x=  19.56 ft from toe =    0.0000 ksf
Base pressure at toe                   =    1.7622 ksf

***********    *** Satisfied ***
* Sliding *    Min. Required =   1.33
***********    Actual FS     =   1.43


********************** Output Results **********************

Date: 2009/11/ 6                                  Time: 15.46.14


***************************
**  Overturning Results  **
***************************

Solution converged in  1 iterations.

SMF used to calculate K's =   0.6667
Alpha for the SMF         = -54.5578
Calculated earth pressure coefficients:
  Driving side at rest K    =   0.4125
  Driving side at rest Kc   =   0.5839
  Resisting side at rest K  =   0.5305
  Resisting side at rest Kc =   0.7284
  At-rest K's for resisting side calculated.

Depth of cracking =     3.22 ft
Crack extends to bottom of base of structure.

** Driving side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       350.30     0.0000
       329.78     1.2803
       327.13     1.3323

  Earth pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       333.00     0.0000
       329.78     0.0000
       327.13     0.0969

** Resisting side pressures **

  Water pressures:
    Elevation   Pressure
      (ft)        (ksf)
    ======================
       330.50     0.0000
       328.30     0.2314
```

327.13	1.3323

Earth pressures:

Elevation (ft)	Pressure (ksf)
333.00	0.0000
328.30	0.2037

Balancing earth pressures:

Elevation (ft)	Pressure (ksf)
328.30	12.8885
327.13	12.8885

** Uplift pressures **

Water pressures:

x-coord. (ft)	Pressure (ksf)
0.00	1.3323
2.83	1.2130
6.00	0.9650
24.00	0.2314

** Forces and moments **

Part	Force (kips) Vert.	Force (kips) Horiz.	Mom. Arm (ft)	Moment (ft-k)
Structure:				
Structure weight.....	14.605		-12.24	-178.83
Structure, driving side:				
Moist soil.....	0.000		0.00	0.00
Saturated soil.....	3.318		-17.56	-58.24
Water above structure.....	0.000		0.00	0.00
Water above soil.....	14.113		-17.46	-246.46
External vertical loads....	0.000		0.00	0.00
Ext. horz. pressure loads..		0.000	0.00	0.00
Ext. horz. line loads.....		0.000	0.00	0.00
Structure, resisting side:				
Moist soil.....	2.751		-4.29	-11.80
Saturated soil.....	0.230		-1.66	-0.38
Water above structure.....	0.000		0.00	0.00
Water above soil.....	0.000		0.00	0.00
Driving side:				
Effective earth loads.....		0.129	-0.29	-0.04
Shear (due to delta).....	0.039		-24.00	-0.92
Horiz. surcharge effects...		0.000	0.00	0.00
Water loads.....		16.599	6.62	109.81
Resisting side:				
Effective earth loads.....		-0.479	1.57	-0.75
Balancing earth load.....		-15.080	-0.58	8.81
Water loads.....		-1.169	-0.40	0.47
Foundation:				
Vertical force on base.....	-17.234		-6.52	112.37
Uplift.....	-17.822		-14.92	265.96
** Statics Check ** SUMS =	0.000	0.000		0.00

Angle of base = 2.79 degrees
Normal force on base = 17.948 kips
Shear force on base = 14.223 kips
Max. available shear force = 15.876 kips

Base pressure at x= 19.56 ft from toe = 0.0000 ksf
Base pressure at toe = 1.7622 ksf

Xr (measured from toe) = 6.52 ft
Resultant ratio = 0.2717
Stem ratio = 0.3700
Base in compression = 81.50 %
Overturning ratio = 1.32

Volume of concrete = 3.61 cubic yds/ft of wall

NOTE: The engineer shall verify that the computed bearing pressures below the wall do not exceed the allowable foundation bearing pressure, or, perform a bearing capacity analysis using the program CBEAR. Also, the engineer shall verify that the base pressures do not result in excessive differential settlement of the wall foundation.

****
** Sliding Results **
****

Solution converged. Summation of forces = 0.

Wedge Number	Horizontal Loads (kips)	Vertical Loads (kips)
1	0.000	0.000
2	16.750	14.113
3	0.000	0.000

Water pressures on wedges:

Wedge number	Top press. (ksf)	Bottom press. (ksf)	x-coord. (ft)	press. (ksf)
1	0.0000	0.0000		
2			0.0000	1.4458
2			24.0000	0.2409
3	0.0000	0.2409		

Points of sliding plane:
Point 1 (left), x = 0.00 ft, y = 327.13 ft
Point 2 (right), x = 24.00 ft, y = 328.30 ft

Depth of cracking = 5.87 ft
Crack extends to bottom of base of structure.

Wedge number	Failure angle (deg)	Total length (ft)	Weight of wedge (kips)	Submerged length (ft)	Uplift force (kips)

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1	0.000	0.000	0.000	0.000	0.000
2	2.791	24.029	22.648	24.029	20.265
3	34.840	8.227	2.070	3.851	0.464

Wedge number	Net force (kips)
1	0.000
2	-4.828
3	4.828
SUM =	0.000

Factor of safety =	1.430

****
** Bearing Results **
****

Base width =	24.029	(ft)
Xr =	6.520	(ft)
Effective base width = (measured along slope)	13.056	(ft)
Base slope =	2.7910	(deg)
Phi =	28.000	(deg)
C =	0.180	(ksf)
Effective Gamma =	0.0696	(kcf)
Normal load =	17.948	(kips)
Load inclination =	38.394	(deg)
Load eccentricity =	5.486	(ft)
Surcharge =	0.4781	(kips)
Embedment =	4.700	(ft)
Ground slope =	0.0000	(deg)

Bearing Capacity Factors

	C	Q	G
Bearing	25.8033	14.7199	11.1897
Embedment	1.1198	1.0599	1.0599
Inclination	0.3288	0.3288	0.0000
Base Tilt	0.9451	0.9489	0.9489
Ground Slope	1.0000	1.0000	1.0000

Net ultimate bearing pressure = 3.7853 (ksf)

Factor of safety =	2.754

OHIO RIVER SHORELINE, PADUCAH, KENTUCKY LFPP RECONSTRUCTION FEASIBILITY REPORT VOLUME 4 APPENDIX C

SECTION 4 AS-BUILT DRAWINGS

April 2011
Final Submittal

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93312.2	1	GENERAL PLAN	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	2.1	CONCRETE & BUTRESS DAM	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	3	CASE 1,CASE 2,SECTION C-C,SECTION D-D & MOTOR FLR	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	4	BORINGS	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	5	CELLULAR SHEET PILE DAM	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	6	TEST PITS - PLAN	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	7	ROLLED FILL LEVEE, CONC. CULVRTS & SEPRT PUMP PLNT	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	8	PLAN AND ELEVATION	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	9	PLAN AND ELEVATION	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	10	PLAN AND ELEVATION	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	A	ISLND CRK DAM-SLAB & BUTTRESS TYPE STABLTY ANALYS.	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.2	B	ISLAND CREEK DAM - EARTH DAM ANALYSIS	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK WALL & PUMPING PLANT
93312.3	0	TITLE SHEET	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	1	GENERAL PLAN	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	2	PLAN & PROFILE	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	3	PLAN & PROFILE	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	4	PLAN & PROFILE	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	5	PLAN & PROFILE	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	6	PLAN & PROFILE	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	7	PLAN & PROFILE	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	8	PLAN & PROFILE	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	9	PLAN, PROFILE & SECTIONS, WALL MONOLITHS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	10	BORINGS (DELETED)	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	11	BORINGS (DELETED)	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	12	PLAN, PROFILE & SECTIONS, WALL MONOLITHS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	13	PLAN, PROFILE & SECTIONS, WALL MONOLITHS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	14	PLAN, PROFILE & SECTIONS, WALL MONOLITHS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	15	PLAN, PROFILE 7 SECTIONS, WALL MONOLITHS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	16	"I" WALL DETAILS & MONOLITHS NO. 165	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	17	MISC. PIPES THRU WALL	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	18	DESIGN DATA STA. 72+50	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	19	SERVICE OPENINGS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	20	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS STA. NOS. 1, 429 & 12
93312.3	21	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 2 & 3
93312.3	22	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 10 & 11
93312.3	23	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 13
93312.3	24	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 14
93312.3	25	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 15, 17, 18 & 19
93312.3	26	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 16
93312.3	27	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 101
93312.3	28	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 102 TO 105
93312.3	29	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 106
93312.3	30	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 286 TO 289
93312.3	31	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 290

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93312.3	32	DESIGN DATA - 18 FT. "T" WALL	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	33	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 157
93312.3	34	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 158 TO 164
93312.3	35	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 166 TO 169 & 215 TO 227
93312.3	36	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 124 & 125
93312.3	37	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 126-137,170,171,174,207-214 & 228-234
93312.3	38	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 172 & 173
93312.3	39	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 119
93312.3	40	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 120-123,175-181,198-203,206,264-252 & 255-259
93312.3	41	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 204 & 205
93312.3	42	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 245
93312.3	43	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 246
93312.3	44	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 253
93312.3	45	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 254
93312.3	46	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 96
93312.3	47	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 97 TO 100 & 107
93312.3	48	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 108-112,138-140,142,182,183,260-270 & 273
93312.3	49	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 113 TO 117, 141 & 272
93312.3	50	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 118
93312.3	51	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 184 & 275
93312.3	52	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 242 & 271
93312.3	53	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 274
93312.3	54	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 20
93312.3	55	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 21, 22 & 23
93312.3	56	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 85, 86, 90 & 91
93312.3	57	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 87 TO 89 & 92 TO 94
93312.3	58	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 95
93312.3	59	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 24 TO 26, 44 TO 68, 70, 72 TO 74 & 77
93312.3	60	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 69 & 78
93312.3	61	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 75 & 76
93312.3	62	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NO. 71
93312.3	63	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 79 TO 84
93312.3	64	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 27 TO 31
93312.3	65	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 32 & 35 TO 43
93312.3	66	MASONRY & REINFORCING DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MONOLITHS NOS. 33 & 34
93312.3	67	MISCELLANEOUS DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	68	DESIGN DATA STA. 29+80.3,31+01.3,30+40.0 & 36+84.5	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	69	MVBLE CLOSRS STA. 4+49.5 & 5+34.5 - MASONRY DETS &	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULT STA. 4+00.0
93312.3	70	REINFORCING DETAILS STA. 4+49.5 & STA. 5+34.5	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	SILLS & ABUTMENTS
93312.3	71	REINFORCING DETAILS STAS. 4+00.0 & 83.28.1	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULTS
93312.3	72	MOVABLE CLOSURES STA. 9+44.0 & 10+40.0	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY DETAILS
93312.3	73	REINFORCING DETAILS STA. 9+44.0 & 10+40.0	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93312.3	74	REINFORCINC DETALS STA. 10+40.0--STORAGE VAULT	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	75	MASONRY DETAILS--MOVABLE CLOSURE STA. 25+15.4	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93312.3	76	REINFORCING DETAILS STA. 25+15.4	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	77	MASONRY DETAILS--STORAGE VAULT STA. 26+02.29	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	78	REINFORCING DETIALS STA. 26+02.29--STORAGE VAULT	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	79	MASONRY DETAILS--MOVABLE CLOSURE STA. 26+90.3	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	80	REINFORCING DETAILS STA. 26+90.3--SILL & ABUTMENTS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	81	MOVABLE CLOSRS STAS. 29+80.3,31+01.3 & 36+84.544 &	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULTS STAS. 30+32.8 & 36+40.0--MASONRY DETAILS
93312.3	82	REINFORCING DETAILS STA. 29+80.3,31+01.3 & 36+84.5	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93312.3	83	REINFORCING DETAILS STA. 30+32.8 & STA. 36+40.0	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULTS
93312.3	84	MOVABLE CLOSURES STA. 31+51.4, 71+74.5 & 75+85.1	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY DETAILS
93312.3	85	REINFORCING DETAILS STA. 31+51.4,71+74.5 & 75+85.1	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93312.3	86	REINFORCING DETAILS STA. 31+51.4,71+74.5 & 75+85.1	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULTS
93312.3	87	MOVABLE CLOSURES STAS. 51+87.3 & 54+37.6	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY DETAILS
93312.3	88	REINFORCING DETAILS STAS. 51+87.3 & 54+37.6	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	SILL, ABUTMENT & STORAGE VAULT
93312.3	89	MASONRY DETAILS--MOVABLE CLOSURE STA. 62+84.3	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	90	REINFORCING DETAILS STA. 62+84.3--SILL & ABUTMENTS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	91	REINFORCING DETAILS STA. 62+84.3--"T" WALL	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	92	MASONRY DETAILS--STORAGE VAULT STA. 68+61.0	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	93	REINFORCING DETAILS STA. 62+84.3 & STA. 68+61.0	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULTS
93312.3	94	MOVABLE CLOSURES STAS. 67+73.4 & 69+64.4	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY DETAILS
93312.3	95	REINFORCING DETAILS STA. 67+73.4 & 69+64.4	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93312.3	96	MASONRY DETAILS--MOVABLE CLOSURE STA. 83+92.1 &	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULT STA. 83+28.1
93312.3	97	REINFORCING DETAILS STA. 83+92.1--SILL & ABUTMENTS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	98	TRUSS ANCHORAGE DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	99	MISCELLANEOUS DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	100	MISCELLANEOUS DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	101	CATCH BASINS NOS. 1 & 5	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93312.3	102	CATCH BASIN NO. 2	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93312.3	103	CATCH BASINS NOS. 4 & 6 & DRAINAGE STR STA. 64+87	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93312.3	104	MANHOLE NO. 1	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93312.3	105	MANHOLE NO. 2	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93312.3	106	MANHOLE NO. 3	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93312.3	107	MANHOLE NO. 4	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93312.3	108	MANHOLE NO. 5	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93312.3	109	MANHOLE NO. 6	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93312.3	110	DRAINAGE STRUCTURE STA. 19+11	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	111	REINFORCING DETAILS STA. 19+11	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.3	112	SEWER OUTLET & DRAINAGE STRUCTURE DETAILS	SECTION "B" - UNIT 1	FLOOD PROTECTION - PADUCAH, KY	
93312.5	1	LOCATION PLAN, SITE PLAN & INDEX	ADDITIONAL GATES	FLOOD PROTECTION - PADUCAH, KY	
93312.5	2	SITE PLANS, MANHOLES NOS. 3A AND 4A	ADDITIONAL GATES	FLOOD PROTECTION - PADUCAH, KY	
93312.5	3	SITE PLANS, MANHOLE NOS. 6A AND 7A	ADDITIONAL GATES	FLOOD PROTECTION - PADUCAH, KY	
93312.5	4	SITE PLANS, MANHOLE NOS. 15A AND 16A	ADDITIONAL GATES	FLOOD PROTECTION - PADUCAH, KY	
93312.5	5	SITE PLANS, MANHOLE NOS. 2A AND 8A	ADDITIONAL GATES	FLOOD PROTECTION - PADUCAH, KY	
93312.5	6	SITE PLANS AND MANHOLE NO. 5A	ADDITIONAL GATES	FLOOD PROTECTION - PADUCAH, KY	
93314.1	1	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	

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93314.1	2	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	3	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	4	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	5	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	6	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	7	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	8	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	9	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	10	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	11	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	12	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93314.1	13	REINFORCEMENT SCHEDULE	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
93412.1	1P	PLAN & VICINITY MAP	LFPP	PADUCAH, KENTUCKY	
93412.1	2P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	3P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	4P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	5P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	6P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	7P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	8P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	9P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	10P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	11P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	12P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	13A-P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	13P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	14P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	15P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	16P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	17P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	18P	PLAN & PROFILE	LFPP	PADUCAH, KENTUCKY	
93412.1	19P	TYPICAL SECTIONS	LFPP	PADUCAH, KENTUCKY	
93412.2	0	TITLE SHEET	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	1	PADUCAH, KENTUCKY GENERAL MAP	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	2	PLAN & PROFILE	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	4.1	PLAN & PROFILE	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	5	PLAN & PROFILE	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	6	TYPICAL SECTIONS	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	7	DRAINAGE STRUCTURE STA. 84+00	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	8	DRAINAGE STRUCTURE STA. 111+67	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	9	REINFORCING DETAILS STA. 111+67	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	10	DRAINAGE STRUCTURE STA. 130+00	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	11	DRAINAGE STRUCTURE STA. 147+25	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	12	DRAINAGE STRUCTURE STA. 151+25	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93412.2	13	DRAINAGE STRUCTURE STA. 157+63	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	14	REINFORCING DETAILS STA. 157+63	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	17.1	HIGHWAY RAMP DETAILS	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	25	MOVABLE CLOSURE STA. 140+50.8 - MASONRY DETAILS	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	26	SILL & ABUTMENT WALLS	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETAILS STA. 140+45.8
93412.2	27	WING WALLS & SEEPAGE CUT-OFF WALLS	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETAILS STA. 140+45.8
93412.2	28	STORAGE VAULT	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETAILS STA. 140+45.8
93412.2	0	TITLE SHEET	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	1	PADUCAH, KENTUCKY GENERAL MAP	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	2	PLAN & PROFILE	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	3	PLAN & PROFILE	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	4	PLAN & PROFILE	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	5	PLAN & PROFILE	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	6	PLAN & PROFILE	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	7	TYPICAL SECTIONS	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	11	DRAINAGE STRUCTURE STA. 32+12	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	12	REINFORCING DETAILS STA. 32+12	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	13	GATE OPERATING TOWER DETAILS STA. 32+12	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	14	DRAINAGE STRUCTURE STA. 51+28	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	15	DRAINAGE STRUCTURE STA. 92+70	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	16	REINFORCING DETAILS STA. 92+70	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	17	DRAINAGE STRUCTURE STA. 150+05	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	18	DRAINAGE STRUCTURE STA. 172+08	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	19	DRAINAGE STRUCTURE STA. 176+47	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	20	DRAINAGE STRUCTURE STA. 176+90	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	21	REINFORCING DETAILS STA 176+90	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	22	DRAINAGE STRUCTURE STA. 199+80	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	23	DRAINAGE STRUCTURE STA. 200+55	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	24	DRAINAGE STRUCTURE STA. 217+35	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	25	DRAINAGE STRUCTURE STA. 223+57	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	26	DRAINAGE STRUCTURE STA. 224+17	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	27	DRAINAGE STRUCTURE STA. 224+65	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	28	DRAINAGE STRUCTURE STA. 254+06	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
~~93412.2~~	~~28~~	~~STORAGE VAULT~~	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETAILS STA. 140+45.8
93412.2	29	DRAINAGE STRUCTURE STA. 291+75	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	30	BEE BRANCH DIVERSION CHANNEL D3	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	31.1	MOVABLE CLOSURE STA. 104+96.17	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	31.1A	RAILROAD RAMP DETAILS	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	32.1	REINFORCING DETAILS STA. 104+96.17	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	33.1	REINFORCING DETAILS STA. 104+96.17	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	34.1	REINFORCING DETAILS STA. 104+96.17	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	35	CONCRETE CULVERT DETAILS STA. 0+90	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	36	REINFORCING DETAILS STA. 0+90	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.2	37	HIGHWAY RAMP DETAILS	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93412.3	0	TITLE SHEET	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
93412.3	1	GENERAL PLAN--PUMPING PLANTS NOS. 1,2,3,5,6,7 & 12	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
93412.3	2	GENERAL LAYOUT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.3	3	MASONRY DETAILS - PLANS & SECTIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.3	4	MASINRY DETAILS - ELEVATIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.3	5	REINF. DETS. - BASE SLAB,LOADING PLATFORM & STAIRS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.3	6	REINFORCING DETAILS - ROOF SLAB & MOTOR FLOOR	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.3	7	REINFORCING DETAILS - NORTH & SOUTH WALLS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.3	8	REINFORCING DETAILS - EAST, SOUTH & WEST WALLS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.3	9	PUMPING PLANTS NOS. 1, 5, 6 & 7 - WIRING DIAGRAM	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
93412.3	10	PUMPING PLANTS NOS. 1, 5 & 6 -- SUB-STATION	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
93412.3	11	MASONRY & REINFORCING DETS.--SUB-STATION PLATFORM	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANTS NOS. 1, 2, 5 & 6
93412.3	12	SUB-STATION VENTS - LOCATIONS, PLANS & DETAILS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANTS NOS. 1, 2, 5 & 6
93412.3	13	LIGHTING & POWER SYSTEM	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
93412.3	14	MASONRY & REINFORCING DETAILS - DISCHARGE HEADWALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
93412.3	15	GENERAL LAYOUT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	16	MASONRY DETAILS - PLANS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	17	MASONRY DETAILS - SECTIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	18	MASONRY DETAILS - ELEVATIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	19	BOTTOM BASE, WEIR & LOADING PLATFORM STEPS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2 (REINFORCING DETAILS)
93412.3	20	REINFORCING DETAILS - BASE,TOP REINFORCING & PIERS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	21	REINFORCING DETAILS - MOTOR FLOOR	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	22	REINFORCING DETAILS - NORTH WALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	23	REINFORCING DETAILS - S WALL & INTAKE CHAMBER WALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	24	REINFORCING DETAILS - EAST WALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	25	REINFORCING DETAILS - WEST WALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	26	ROOF SLAB, INTAKE & LOADING PLATFORMS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2 (REINFORCING DETAILS)
93412.3	27	WIRING DIAGRAM	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	28	SUB-STATION	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	29	LIGHTING & POWER SYSTEMS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	30	MASONRY DETAILS - DISCHARGE HEADWALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	31	REINFORCING DETAILS - DISCHARGE HEADWALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3	32	GENERAL LAYOUT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 3
93412.3	33	MASONRY DETAILS - PLAN & ELEVATIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 3
93412.3	34	MASONRY DETAILS - ELEVATIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 3
93412.3	35	MOTOR FLOOR, ROOF, TRASH RACK WALKWAY & BASE SLAB	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 3 (REINFORCING DETAILS)
93412.3	36	REINFORCING DETAILS - NORTH, SOUTH & WEST WALLS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 3
93412.3	37	EAST WALL, SURGE CHAMBER & WEST WALL, TRASH RACK	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 3 (REINFORCING DETAILS)
93412.3	38	PUMPING PLANTS NOS. 3 & 12 - WIRING DIAGRAMS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
93412.3	39	2-POLE TRANSFORMER SUB-STATION	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANTS NOS. 3, 7 & 12
93412.3	40	LIGHTING & POWER SYSTEMS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
93412.3	41	GENERAL LAYOUT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
93412.3	42	MASONRY DETAILS - PLANS & SECTIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
93412.3	43	MASONRY DETAILS - PLANS & SECITONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93412.3	44	MASONRY DETAILS - ELEVATIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
93412.3	45	REINFORCING DETAILS - SUPER & SUB-STRUCTURE	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
93412.3	46	REINFORCING DETAILS - EAST WALL & SEWER OPENINGS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
93412.3	47	LIGHTING & POWER SYSTEMS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
93412.3	49	GENERAL LAYOUT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	50	MASONRY DETAILS - PLANS & SECTIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	51	MASONRY DETAILS - ELEVATIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	52	MASONRY DETAILS - ROOF PLAN & SECTIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	53	REINFORCING DETAILS - BASE SLAB	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	54	REINFORCING DETAILS - NORTH WALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	55	REINFORCING DETAILS - SOUTH WALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	56	REINFORCING DETAILS - EAST WALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	57	REINFORCING DETAILS - WEST WALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	58	REINFORCING DETAILS - MOTOR FLOOR	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	59	ROOF SLAB, PULIN, PIER & NORTH WALL TRASH CHAMBER	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6 (REINFORCING DETAILS)
93412.3	60	DISCHARGE CHAMBER WALL,FLR & W WALL TRASH	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6 (REINFORCING DETAILS)
93412.3	61	LIGHTING & POWER SYSTEMS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	62	MASONRY DETIALS - CLARK SREET OUTFALL HEADWALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	63	REINFORCING DETAILS - CLARK ST. OUTFALL HEADWALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.3	64	GENERAL LAYOUT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.3	65	MASONRY DETAILS - BASE PLAN & SECTION	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.3	66	MASONRY DETAILS - PLAN & SECTION	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.3	67	MASONRY DETAILS - ELEVATIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.3	68	MASONRY DETAILS - ROOF PLAN & ELEVATIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.3	69	REINFORCING DETAILS - BASE SLB	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.3	70	EAST WALL,DISCHARGE CHAMBER WALL & FLOOR	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7 (REINFORCING DETAILS)
93412.3	71	DISCHARGE CHAMBER & WALLS,N,S & TRASH CHAMBER WLS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7 (REINFORCING DETAILS)
93412.3	72	RF SLB,TRSH CHMBR RF,SLB,TRSH CHMBR WLKWY & PRLINS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7 (REINFORCING DETAILS)
93412.3	73	REINFORCING DETAILS - WEST WALL & MOTOR FLOOR	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.3	74	LIGHTING & POWER SYSTEMS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.3	75	GENERAL LAYOUT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.3	76	MASONRY DETIALS - PLAN & SECTIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.3	77	MASONRY DETAILS - ROOF PLANS & ELEVATIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.3	78	REINFORCING DETAILS - BASE SLAB & WING WALLS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.3	79	REINFORCING DETAILS - SUPER STRUCTURAL WALLS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.3	80	SUB-STRUCTURAL WALLS & LOADING PLATFORM	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12 (REINFORCING DETAILS)
93412.3	81	REINFORCING DETAIS - MOTOR FLOOR & ROOF SLAB	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.3	82	LIGHTING & POWER SYSTEMS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.3	83	MASONRY & REINFORCING DETS. - DISCHARGE HEADWALL	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.3	84	MISCELLANEOUS DETAILS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MISCELLANEOUS DETAILS
93412.3	85	MISCELLANEOUS DETAILS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MISCELLANEOUS DETAILS
93412.3	86	MISCELLANEOUS DETAILS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MISCELLANEOUS DETAILS
93412.3	87	MISCELLANEOUS DETAILS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MISCELLANEOUS DETAILS
93412.3	88	MISCELLANEOUS DETAILS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MISCELLANEOUS DETAILS

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93412.3	89	MASONRY & REINFORCING T-WALL MONOLITHS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MISCELLANEOUS DETAILS
93412.3	90	MASONRY DETAILS - MOVABLE CLOSURE STA. 90+38.17B	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MOVABLE CLOSURE & STORAGE VAULTS
93412.3	91	REINFORCING DETAILS STA. 90+38.17B -SILL/ABUTMENTS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MOVABLE CLOSURE & STORAGE VAULTS
93412.3	92	REINFORCING DETAILS STA. 10.00B - STORAGE VAULT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MOVABLE CLOSURE & STORAGE VAULTS
93412.3	93	MASONRY & REINF. DETS STA. 108+63.17B STORAGE VLT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MOVABLE CLOSURE & STORAGE VAULTS
93412.3	94	MASONRY DETAILS STA. 162+01.57B - STORAGE VAULTS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MOVABLE CLOSURE & STORAGE VAULTS
93412.3	95	REINFORCING DETAILS STA 162+01.57B - STORAGE VAULT	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	MOVABLE CLOSURE & STORAGE VAULTS
93412.3	96	INTERCEPTING SEWER - PLAN & PROFILE	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER & MANHOLES
93412.3	97	INTERCEPTING SEWER - PLAN & PROFILE	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER & MANHOLES
93412.3	98	INTERCEPTING SEWER - PLAN & PROFILE	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER & MANHOLES
93412.3	99	MASONRY & REINF. DETS. - MONOLITHIC CONC. SEWERS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER & MANHOLES
93412.3	100	MANHOLES NOS. 1 & 2	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER NASONRY & REINFORCING DETAILS
93412.3	101	MANHOLES NOS. 3 & 4	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER MASONRY & REINFORCING DETAILS
93412.3	102	MANHOLES NOS. 5 & 6	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER MASONRY & REINFORCING DETAILS
93412.3	103	MANHOLES NOS. 7 & 8	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER MASONRY & REINFORCING DETAILS
93412.3	104	MANHOLE NO. 9	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER MASONRY & REINFORCING DETAILS
93412.3	105	MANHOLE NO. 10	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER MASONRY & REINFORCING DETAILS
93412.3	106	MANHOLE NO. 11	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTING SEWER MASONRY & REINFORCING DETAILS
93412.3	A	DESIGN DATA	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.3M	116	PUMPING PLANTS NOS. 2,3,4, & 6 - PIPING REVISIONS	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
93412.4	A	PUMPING PLANT NO. 11 & ISLAND CREEK DAM	DESIGN DATA	FLOOD PROTECTION - PADUCAH, KY	MULTIPLE BOX CULVERT
93412.5	0	INDEX	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	1	LOCATION PLAN	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	2	PLAN & PROFILE	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	3	GENERAL LAYOUT	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	4	SECTION & ELEVATION	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	5	BORINGS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	6	MASONRY DETAILS - PLAN & SECTION	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	7	MASONRY DETAILS - PLAN & SECTION	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	8	MASONRY DETAILS - ROOF PLAN & ELEVATIONS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	9	SEE REMARKS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	REINF. DETS. - LANDSIDE & RIVERSIDE SUPER STRUCTURE WALLS
93412.5	10	SEE REMARKS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETAILS - SUPER STRUCTURE & WALLS & ROOF SLAB
93412.5	11.1	REINFORCING DETAILS - MOTOR FLOOR	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	12.1	REINFORCING DETAILS - PUMPING PLANT BASE	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	13.1	REINFORCING DETAILS - PUMPING PLANT BASE	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	14.1	SEE REMARKS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETS. - LANDSIDE & RIVERSIDE SUB-STRUCTURE WALLS
93412.5	15.1	REINFORCING DETAILS - DISCHARGE CHAMBER WALL	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	16.1	SEE REMARKS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETAILS - EAST, WEST & INTERMEDIATE WALLS
93412.5	17	MASONRY DETAILS - STILLING BASIN PLAN	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	18	MASONRY DETAILS - STILLING BASIN SECTIONS & DETS.	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	19.1	SEE REMARKS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETAILS - STILLING BASIN SLAB, PIERS & BAFFLES
93412.5	20.1	REINFORCING DETAILS - STILLING BASIN WALL NO. 7	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	21.1	SEE REMARKS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	REINF. DETS. - STILLING BASIN WALLS NOS. 8-14 INCLUSIVE
93412.5	22.1	MASONRY & REINFORCING DETAILS - MONOLITH NO. 1	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93412.5	23.1	SEE REMARKS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS - MONOLITHS NOS. 2,3,4,5 & 6
93412.5	24	MASONRY DETAILS - LANDSIDE HEADWALL	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	25	REINFORCING DETAILS - LANDSIDE HEADWALL	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	26	MASONRY DETAILS - MULTIPLE BOX CULVERT	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	27.1	REINFORCING DETAILS - MULTIPLE BOX CULVERT	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	28.1	REINFORCING DETAILS - MULTIPLE BOX CULVERT	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	29	MISCELLANEOUS DETAILS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	30	MISCELLANEOUS DETAILS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	31	MISCELLANEOUS DETAILS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	32	LIGHTING & POWER SYSTEMS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	33	HYDROGRAPHS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5	34	BORROW PIT - LOCATIONS & BORINGS	ISLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.5S1	1	ANCHOR BOLT LAYOUT FOR GATE, ETC...	HIGHLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93412.6	1	EXT. TO DIVERSION CHANNEL D2	SECTION "C"	FLOOD PROTECTION - PADUCAH, KY	
93412.7	0	INDEX	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	
93412.7	1	GENERAL PLAN - PUMPING PLANTS 4, 8, 9 & 10	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	
93412.7	2	GENERAL LAYOUT	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	3	MASONRY DETAILS - PLANS & SECTIONS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	4	MASONRY DETAILS - PLANS & SECTIONS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	5.1	REINFORCING DETAILS - BASE SLAB	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	6	REINFORCING DETAILS - WALL & PLATFORM	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	7	REINFORCING DETAILS - NORTH & SOUTH WALLS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	8	REINFORCING DETAILS - WALLS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	9	REINFORCING DETAILS - ROOF SLAB	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	10	WIRING DIAGRAMS - PLANT NOS. 4 & 9	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	11	LIGHTING & POWER SYSTEM	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	12	TWO POLE TRANSFORMER SUB-STATION--PLANT NOS. 4 & 9	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4
93412.7	13	MASONRY & REINFORCING DETAILS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 8
93412.7	14	GENERAL LAYOUT	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	15	MASONRY DETAILS--MOTOR FLOOR, ROOF--PLAN & SECTION	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	16	MASONRY DETAILS - ELEVATION & SECTIONS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	17	REINFORCING DETAILS - BASE SLAB & MOTOR FLOOR	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	18	REINFORCING DETAILS - NORTH WALL	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	19	REINFORCING DETAILS - SOUTH WALL	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	20.1	SUPER STRUCTURE & SUB-STRUCTURE EAST WALL	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9 (REINFORCING DETAILS)
93412.7	21.1	REINF. DETS.--SUB-STRUCTURE WEST WALL & ROOF SLAB	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	22	REINFORCING DETAILS - SUPER STRUCTURE WALLS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	23.1	REINFORCING DETAILS - INTAKE CHAMBER	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	24	LIGHTING & POWER SYSTEM	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 9
93412.7	25	MASONRY DETAILS - PLAN & SECTIONS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 10
93412.7	26	POLE STRUCTURES	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 10
93412.7	27	MISCELLANEOUS DETAILS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	
93412.7	28	MISCELLANEOUS DETAILS	PUMPING PLANTS NOS. 4,8,9 & 10	FLOOD PROTECTION - PADUCAH, KY	
93412.7M	29	REVISED DETAILS FOR BASE OF TANK	LOCAL FLOOD PROTECTION	PADUCAH, KENTUCKY	

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93412.8	0	INDEX	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	1	GENERAL PLAN	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.8	2	PLANS & SECITONS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.8	3	LIGHT & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 1
93412.8	4	PLANS & SECTIONS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.8	5	SECTIONS & DETAILS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.8	6	LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 2
93412.8	7	PLANS & ELEVATIONS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 3
93412.8	8	LIGHT & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 3
93412.8	9	PLANS & SECTIONS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
93412.8	10	DETAILS & SECTIONS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
93412.8	11	LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
93412.8	12	LOCATION PLAN & SECITONS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.8	13	PLAN & SECTION	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.8	14	LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6
93412.8	15	PLAN & SECTION	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.8	16	PLAN & SECTION	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.8	17	LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 7
93412.8	18	PLANS & SECTIONS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.8	19	LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.8	20	MISCELLANEOUS DETAILS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 12
93412.8	21	LOCATION PLAN	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTER SEWER MANHOLES
93412.8	22	GATE INSTALLATION DETAILS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	INTERCEPTER SEWER MANHOLES
93412.8	23	LOCATION PLAN	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK DAM
93412.8	24	DETAILS--SECTIONS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK DAM
93412.8	25	PLAN & SECTION	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK DAM
93412.8	26	SUB-STATION SLAB & MISCELLANEOUS DETAILS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK DAM
93412.8	27	WIRING DIAGRAM	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK DAM
93412.8	28	SUB-STATION	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK DAM
93412.8	29	LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	ISLAND CREEK DAM
93412.8	30	GATES & TOWER	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	DRAINAGE STRUCTURE STA. 32+38.1
93412.8	31	TOWER & WALKWAY DETAILS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	DRAINAGE STRUCTURE STA. 32+38.1
93412.8	32	WALKWAY DETAILS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	DRAINAGE STRUCTURE STA. 32+38.1
93412.8	33	PUMPING PLANTS NOS. 1, 5, 6 & 7--WIRING DIAGRAMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	34	PUMPING PLANTS NOS. 1, 5, 6 & 7--WIRING DIAGRAMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	35	PUMPING PLANT NO. 2 - LIGHTING & POWER SYSTEM	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	36	PUMPING PLANT NO. 2 - WIRING DIAGRAM	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	37	PUMPING PLANT NO. 2 - WIRING DIAGRAM	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	38	FLOATLESS CONTROL CIRCUITS & ELECTRODE LAYOUT	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMING PLANT NO. 2 - WIRING DIAGRAM
93412.8	39	ELECTRODE WELLS, SECTIONS & DETAILS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NOS. 2, 3, 5, 6 & 7
93412.8	40	PUMPING PLANT NO. 3 - LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	41	PUMPING PLANTS NOS. 3, 7 & 12--WIRING DIAGRAMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	42	PUMPING PLANT NO. 5 - LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	43	FLOATLESS CONTROL CIRCUITS & ELECTRODE LAYOUT	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANTS NOS. 5 & 7 - WIRING DIAGRAM

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93412.8	44	PUMPING PLANT NO. 6 - LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.8	45	FLOATLESS CONTROL CIRCUITS & ELECTRODE LAYOUT	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 6 - WIRING DIAGRAM
93412.8	46	PUMPING PLANT NO. 7 - LIGHTING & POWER SYSTEMS	PUMPING EQUIPMENT & GATES	FLOOD PROTECTION - PADUCAH, KY	
93412.10	1	LIGHTING & POWER SYSTEM	HIGHLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	PUMPING & EQUIPMENT GATES
93412.10	2	WIRING DIAGRAM	HIGHLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	PUMPING & EQUIPMENT GATES
93412.11	0	INDEX	MOVABLE CLOSURE PARTS	FLOOD PROTECTION - PADUCAH, KY	
93412.11	1.1	STRUCTURAL DETAILS	MOVABLE CLOSURE PARTS	FLOOD PROTECTION - PADUCAH, KY	
93412.11	2.1	STRUCTURAL DETAILS & PINS	MOVABLE CLOSURE PARTS	FLOOD PROTECTION - PADUCAH, KY	
93412.11	3.1	STRUCTURAL DETAILS	MOVABLE CLOSURE PARTS	FLOOD PROTECTION - PADUCAH, KY	
93412.11	4.1	STRUCTURAL DETAILS	MOVABLE CLOSURE PARTS	FLOOD PROTECTION - PADUCAH, KY	
93412.13	1	SHEETING PANELS & WALKWAY OPENING BULKHEADS	MOVABLE CLOSURE PARTS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	1	GENERAL PLAN	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	2	PUMPING PLANT NO. 1	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	3	PUMPING PLANT NO. 1	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	4	PUMPING PLANT NO. 2	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	5	PUMPING PLANT NO. 2	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	6	PUMPING PLANT NO. 3	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	7	PUMPING PLANT NO. 3	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	8	PUMPING PLANT NO. 5	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	9	PUMPING PLANT NO. 5	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	10	PUMPING PLANT NO. 6	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	11	PUMPING PLANT NO. 6	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	12	PUMPING PLANT NO. 7	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	13	PUMPING PLANT NO. 7	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	14	PUMPING PLANT NO. 7	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	15	PUMPING PLANT NO. 9	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	16	PUMPING PLANT NO. 9	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	17	ISLAND CREEK	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	18	ISLAND CREEK	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	19	PUMPING PLANT NO. 12	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	20	PUMPING PLANT NO. 12	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	21	MISCELLANEOUS DETAILS	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.14	22	MISCELLANEOUS DETAILS	DEHUMIDIFICATION DETAILS	FLOOD PROTECTION - PADUCAH, KY	
93412.15	1	GENERAL PLANS	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	INSTALLATION OF AIR VENTS & VACUUM PRIMERS
93412.15	2	PUMPING PLANTS NO. 1 & 2	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	INSTALLATION OF AIR VENTS & VACUUM PRIMERS
93412.15	3	PLANS & SECTIONS--MANHOLE NOS. 4A, 5A & 16A	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	INSTALLATION OF AIR VENTS & VACUUM PRIMERS
93412.15	4	COVER PLATES & DETAILS	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	INSTALLATION OF AIR VENTS & VACUUM PRIMERS
93416.1	1	GENERAL PLAN	REMEDIAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93416.1	2	PLAN & DETAILS	REMEDIAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93416.1	3	PLAN & DETAILS	REMEDIAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93416.1	4	PLAN & DETAILS	REMEDIAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93416.1	5	PLAN & DETAILS	REMEDIAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93416.1	6	PLAN & DETAILS	REMEDIAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93416.1	7	DETAILS & SECTIONS	REMEDIAL WORK	FLOOD PROTECTION - PADUCAH, KY	

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93416.4	3	INSTALLATION OF FLAP GATE IN BRIDGE STREET MANHOLE	LOCAL FLOOD PROTECTION	PADUCAH, KENTUCKY	
93416.4	4	SEE REMARKS	LOCAL FLOOD PROTECTION	PADUCAH, KENTUCKY	BEE-BRANCH DIVERSION - CHANNEL CLEANOUT - PLAN & PROFILE
93416.4	5	SEE REMARKS	LOCAL FLOOD PROTECTION	PADUCAH, KENTUCKY	BEE-BRANCH DIVERSION - CHANNEL CLEANOUT - PLAN & PROFILE
93418.1	1	ACCESS DRIVES	PUMPING PLANTS NOS. 1, 2 & 6	FLOOD PROTECTION - PADUCAH, KY	
93418.2	1	MODIFICATION OF EXISTING CATCH BASIN & DITCH	LOCAL FLOOD PROTECTION	PADUCAH, KENTUCKY	VICINITY GULF REFINING CO.
93418.3	1	MISCELLANEOUS	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANTS - ADDITIONS AND REVISIONS
93418.3	2	MISCELLANEOUS	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANTS - ADDITIONS AND REVISIONS
93418.3	3	MISCELLANEOUS	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANTS - ADDITIONS AND REVISIONS
93418.3	4	PUMPING PLANT NO. 9 - MISCELLANEOUS	SEE REMARKS	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANTS - ADDITIONS AND REVISIONS
93418.6	1	REPAIRS TO 60-INCH DISCHARGE GATES	PUMPING PLANT NO. 2	FLOOD PROTECTION - PADUCAH, KY	
93418.6	2	REPAIRS TO 30-INCH & 40-INCH DISCHARGE GATES	PUMPING PLANT NO. 2	FLOOD PROTECTION - PADUCAH, KY	
93418.6	3	CALIBRATION OF INDICATOR BOARD	PUMPING PLANT NO. 2	FLOOD PROTECTION - PADUCAH, KY	
93418.6	4	FLAP GATE INDICATOR DETAILS	PUMPING PLANT NO. 2	FLOOD PROTECTION - PADUCAH, KY	
93419.2	1	GENERAL PLAN	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	2	OUTLET CHANNEL STA. 32+25 "C"	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	3	ADDITIONAL HANDRAIL STA. 32+25 "C"	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	4	BEE BRANCH DIVERSION CHANNEL CLEANING	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	5	BEE BRANCH DIVERSION CHANNEL CLEANING	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	6	SEE REMARKS	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	DRAINAGE STRUCTURE STA. 217+32.5 "C",CULVERT STA. 214+70 "C"
93419.2	7	DRAINAGE STRUCTURE DETAILS STA. 32.5 "C"	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	8	PUMPING FACILITIES STA. 291+75 "C"	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	9.1	INSTALLATION OF FLAP GATE-BRIDGE ST. AT LOCUST ST.	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	10	TRASH RACK & PLATFORM STA. 19+11 "B"	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	11	YEISER ST. DIVERSION SEWER	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	12	WAVE WASH REPAIR AND TERRELL ST. CULVERT	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	13.1	PINE ST. DIVERSION SEWER	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	14	DEHUMIDIFICATION EQUIPMENT - LOCATION PLANS	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	15	SEE REMARKS	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4 - MASONRY DETAILS - PLANS & SECTIONS
93419.2	16	SEE REMARKS	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 4 - MASONRY DETAILS - PLANS & SECTIONS
93419.2	17	DEHUMIDIFICATION EQUIPMENT PUMPING PLANT NO. 8	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93419.2	18	DEHUMIDIFICATION EQUIPMENT PUMPING PLANT NO. 10	SUPPLEMENTAL WORK	FLOOD PROTECTION - PADUCAH, KY	
93420.3	1	LEVEE AT CAIRO ROAD	LOCAL FLOOD PROTECTION	PADUCAH, KENTUCKY	
93420.4	1	WIRE GUARD FOR PUMP SHAFTS	PUMPING PLANTS NOS. 8 & 10	FLOOD PROTECTION - PADUCAH, KY	
934A1	1	MASONRY/REINFORCING DETS. - MANHOLES NOS. 12 & 13	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	PUMPING PLANT NO. 5
934A1	2	MANHOLE NO. 14	PUMPING PLNTS 1,2,3,5,6,7 & 12	FLOOD PROTECTION - PADUCAH, KY	
934A2	1	GENERAL PLAN	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934A2	2	SEE REMARKS	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	PLAN, PROFILE, BORING & MONOLITHS--STA. 91+49.33 TO 95+04.47
934A2	3	MASONRY DETAILS--MOVABLE CLOSURE STA. 91+96.00	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934A2	4	MASONRY DETAILS--MONOLITH NO. 14 & "T" WALL	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934A2	5	SEE REMARKS	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	MASONRY DETAILS--MOVABLE CLOSURES STA. 93+57.18 & 94+63.76
934A2	6	MISCELLANEOUS DETAILS	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934A2	7	MISCELLANEOUS DETAILS	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934A2	8	MISCELLANEOUS DETAILS	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934A2	9	REINFORCING DETAILS - MONOLITH NO. 14	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	

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934A2	10	REINFORCING DETAILS - "T" WALL MONOLITHS	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934A2	11	SEE REMARKS	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETAILS STA. 91+96.00 - SILL & ABUTMENTS
934A2	12	REINFORCING DETAILS--STA. 93+57.18--SILL	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934A2	13	REINFORCING DETAILS--STA. 93+57.18--ABUTMENTS	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934A2	14	SEE REMARKS	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	REINFORCING DETAILS--STA. 94+63.76--SILL & ABUTMENTS
934A2	15	REINFORCING DETAILS--STA. 94+63.76--STORAGE VAULT	SECTION "B"	FLOOD PROTECTION - PADUCAH, KY	
934C1	1	PLAN & PROFILE	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
934C1	2	HIGHWAY RAMP DETAILS	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
934C1	3	MISCELLANEOUS DETAILS	SECTION "A"	FLOOD PROTECTION - PADUCAH, KY	
934CM2	2	DRAINAGE STRUCTURE DETAILS STATION 32+38.1	LOCAL FLOOD PROTECTION	PADUCAH, KENTUCKY	
934CM3	1	MASONRY & HANDRAIL DETAILS	HIGHLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
934CM3	2	REINFORCING DETAILS - STILLING BASIN NO. 7	HIGHLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
934CM4	1	GUARDS FOR MULTIPLE BOX CULVERT	HIGHLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
934CM7	1	LIGHTING & POWER SYSTEM	HIGHLAND CREEK DAM	FLOOD PROTECTION - PADUCAH, KY	
93512.2	0	TITLE SHEET	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	1	GENERAL PLAN	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	2	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	3	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	4	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	5	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	6	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	7	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	8	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	9	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	10	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	11	PLAN & PROFILE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	12	ILLINOIS CENTRAL RAILROAD REVISIONS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	13	ILLINOIS CENTRAL RAILROAD REVISIONS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	14	STREET & RAILROAD REVISIONS, 1ST STRRET VICINITY	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	15	BORINGS (DELETED)	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	16	BORINGS (DELETED)	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	17	BORINGS & TYPICAL SECTION	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	18	WALL MONOLITHS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	19	WALL MONOLITHS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	20	WALL MONOLITHS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	21	WALL MONOLITHS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	22	STRIPPING & BACKFILL	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	23	MASONRY & REINFORCING DETAILS--MONOLITH NO. 14	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	24	MONOLITHS MOS. 16, 41 & 96	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	25	MONOLITHS NOS. 80 & 167	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	26	MONOLTHS NOS. 115,131,132 & BULKHEAD & FRAME DETS.	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	27	MONOLITHS NOS. 144, 151 & 182	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	28	MONOLITHS NOS. 150, 171 & 185	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	29	MONOLITH NO. 194	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS

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93512.2	30	MONOLITHS NOS. 204 & 223	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	31	MONOLITHS NOS. 225, 253 & 272	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	32	MONOLITH NO. 245	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	33	MONOLITHS NOS. 280, 281, 195 & 244	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	34	MONOLITHS NOS. 300 & 301	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	35	MASONRY & REINFORCING DETAILS--"T" WALL MONOLITHS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	36	MASONRY & REINFORCING DETAILS--"T" WALL MONOLITHS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	37	MASONRY & REINFORCING DETAILS--"T" WALL MONOLITHS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	38	MISCELLANEOUS PIPES THRU WALL & DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	39	MISCELLANEOUS PIPES THRU WALL & DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	40	GENERAL PLAN--WASHINGTON & 1ST STREETS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	41	GENERAL PLAN--KENTUCKY & 1ST STREETS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	42	GENERAL PLAN--BROADWAY & 1ST STREETS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	43	GENERAL PLAN--MADISON & 2ND STREETS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	44	GENERAL PLAN--3RD & HARRISON STREETS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	45	GENERAL PLAN--CLAY & 3RD STREETS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	46	GENERAL PLAN--4TH 5TH STREETS AT PARK AVENUE	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	47	SEE REMARKS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	TUNNEL APPROX. STA. 117+20 & U.S.G.S. GAGING STATION
93512.2	48	MOVABLE CLOSURES STAS. 90+41.17 & 103+63.50	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY DETAILS
93512.2	49	REINFORCING DETAILS--STAS. 90+41.17 & 103+63.50	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93512.2	50	REINF. DETS. STAS. 90+51.33,103+73.67 & 106+21.50	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULT
93512.2	51-58	DELETION OF PORTION OF WALL	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	DELETED ACCORDING TO TITLE SHEET
93512.2	59	MOVEABLE CLOSURES STAS. 98+88.50 & 108+53.00	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY DETAILS
93512.2	60	REINFORCING DETAILS--STAS. 98+88.50 & 108+53.00	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL AND SOUTH ABUTMENT
93512.2	61	REINFORCING DETAILS--STAS. 98+88.50 & 108+53.00	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	NORTH ABUTMENT AND STORAGE VAULT
93512.2	62	MASONRY DETAILS--MOVEABLE CLOSURE STA. 106+10.00	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	63	REINFORCING DETAILS--STA. 106+10.00	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93512.2	64	MASONRY DETAILS--MOVEABLE CLOSURE STA. 114+98.71	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	65	REINFORCING DETAILS--STA. 114+98.71	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93512.2	66	REINFORCING DETAILS--STA. 114+98.71--STORAGE VAULT	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	67	MOVEABLE CLOSURES STAS. 119+62.65 & 123+80.40	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY DETAILS
93512.2	68	REINFORCING DETAILS--STAS. 119+62.65 & 123+80.40	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93512.2	69	STAS. 120+07.65 & 124+25.40--STORAGE VAULTS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	70	MASONRY DETAILS--MOVEABLE CLOSURE STA. 128+19.75	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	71	REINFORCING DETAILS STA. 128+19.75	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL & EAST ABUTMENT
93512.2	72	MASONRY DETAILS--MOVEABLE CLOSURE STA. 132+40.50	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	73	REINFORCING DETAILS--STA. 132+40.50	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93512.2	74	REINFORCING DETAILS--STA. 132+40.50--STORAGE VAULT	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	75	MASONTRY DETAILS--MOVEABLE CLOSURE STA. 135+22.75	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	76	REINFORCING DETAILS-- STA. 135+22.75	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL & EAST ABUTMENT
93512.2	77	REINFORCING DETAILS--STAS. 128+19.75 & 135+22.75	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULT & WEST ABUTMENT
93512.2	78	MASONRY DETAILS--MOVEABLE CLOSURE STA. 145+74.30	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	79	REINFORCING DETAILS--STA. 145+74.30	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93512.2	80	MASONRY DETAILS--MOVEABLE CLOSURE STA. 138+23.25	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
93512.2	81	MASONRY DETAILS--MOVEABLE CLOSURE STA. 149+87.30	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	82	REINFORCING DETAILS-- STAS. 149+87.30 & 138+23.25	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL & ABUTMENTS
93512.2	83	REINFORCING DETAILS STAS. 149+27.80 & 137+65.25	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULT AND WALKWAY PLANKING SCHEDULE
93512.2	84	MASONRY DETAILS - MOVABLE CLOSURE STA. 157+26.10	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	85	REINFORCING DETAILS STA. 157+26.10	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL AND ABUTMENTS
93512.2	86	REINFORCING DETAILS STA. 166+48.50 - STORAGE VAULT	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	87	MASONRY DETAILS - MOVABLE CLOSURE STA. 161+53.15	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	88	REINFORCING DETAILS STA. 161+53.15	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL AND ABUTMENTS
93512.2	89	MASONRY DETAILS - MOVABLE CLOSURE STA. 166+48.50	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	90	REINFORCING DETAILS STA. 166+48.50	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL AND ABUTMENTS
93512.2	91	REINFORCING DETAILS STA. 166+48.50 - STORAGE VAULT	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	92	MASONRY DETAILS - MOVABLE CLOSURE STA. 170+04.36	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	93	REINFORCING DETAILS STA. 170+04.36	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	SILL AND EAST ABUTMENT
93512.2	94	REINFORCING DETAILS STA. 170+04.36	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	STORAGE VAULT AND MONOLITH NO. 340
93512.2	95	MISCELLANEOUS DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	96	MISCELLANEOUS DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	97	MISCELLANEOUS DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	98	STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	99	STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	100	STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	101	STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	102	STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	103	STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	104	STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	105	STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	106	STRUCTURAL & MISCELLANEOUS DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	107	MISCELLANOUS STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	108	MISCELLANOUS STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	109	MISCELLANOUS STRUCTURAL DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	110	CATCH BASINS AND MISCELLANEOUS DETAILS	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	111	LOCATION PLANS - MANHOLES NOS. 2, 3, 11 AND 12,	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	AND HEADWALL DETAILS STA. 128+61
93512.2	112	MASONRY & REINFORCING DETAILS - MANHOLE NO. 1	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	113	MANHOLES NOS. 2, 8, 12 AND 15	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	114	MASONRY DETAILS - MANHOLE NO. 3	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	115	REINFORCING DETAILS - MANHOLE NO. 3	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	116	MOANHOLE NOS. 4, 5, 9, 10, 17, 18, 19, 21 AND 22	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	117	MANHOLES NOS. 6 AND 16	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	118	MANHOLES NOS. 7 AND 11	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	119	MANHOLES NOS. 13 AND 14	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	120.1	MANHOLE NO. 20	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	121.1	SEWER STA. 66+27	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	122.1	MANHOLE NO. 23	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	123.1	MANHOLE NO. 24	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	MASONRY & REINFORCING DETAILS
93512.2	124	DRAINAGE STRUCTURE STA. 175+40	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	

CODE	SHT	TITLE	JOB	PROJECT	REMARKS
935C6	1	REINFORCING DETAILS - MONOLITHS NOS. 79A & 84A	SECTION B - UNIT 2	FLOOD PROTECTION - PADUCAH, KY	
93512.2	A	18' T-WALL	SECTION B - DESIGN DATA	FLOOD PROTECTION - PADUCAH, KY	
93512.2	B	19' T-WALL ON COMPACTED BACKFILL	SECTION B - DESIGN DATA	FLOOD PROTECTION - PADUCAH, KY	
93512.2	C	22' T-WALL STA. 129+41.25 TO STA. 131+70.33	SECTION B - DESIGN DATA	FLOOD PROTECTION - PADUCAH, KY	
93512.2	D	19' T-WALL ON BEARING PILES	SECTION B - DESIGN DATA	FLOOD PROTECTION - PADUCAH, KY	
93512.2	E	STAS. 96+88.50, 108+53.00, 99+09.17 & 108+73.67	SECTION B - DESIGN DATA	FLOOD PROTECTION - PADUCAH, KY	

MEMORANDUM OF UNDERSTANDING
BETWEEN
THE DEPARTMENT OF THE ARMY
AND THE
CITY OF PADUCAH, KENTUCKY
FOR WORK PROVIDED OR PERFORMED
PRIOR TO EXECUTION OF
A
PROJECT PARTNERSHIP AGREEMENT
FOR
PADUCAH, KENTUCKY
LOCAL FLOOD PROTECTION PROJECT

THIS MEMORANDUM OF UNDERSTANDING (hereinafter the "MOU") is entered into this 17th day of November, 2008 by and between the Department of the Army (hereinafter the "Government"), represented by the U.S. Army Engineer, Louisville District (hereinafter the "District Engineer") and the City of Paducah, Kentucky (hereinafter the "Non-Federal Interest"), represented by the Mayor.

WITNESSETH, THAT:

WHEREAS, Section 221(a) of the Flood Control Act of 1970, as amended by Section 2003 of the Water Resources Development Act of 2007, provides that a cost sharing partnership agreement may provide credit for the value of materials or services provided before the execution of such cost sharing partnership agreement if the Secretary and the non-Federal interest enter into an agreement under which the non-Federal interest shall carry out such work and only work carried out following the execution of such agreement shall be eligible for credit;

WHEREAS, the Non-Federal Interest understands and acknowledges that any credit for eligible in-kind contributions will be afforded only toward the required non-Federal contribution of funds (i.e. cash contribution) under the Project Partnership Agreement for the project or separable element of the project except such credit will not be afforded toward the non-Federal requirement to provide in cash 5 percent of the costs allocated to structural flood damage reduction; and

WHEREAS, by letter dated October 02, 2008, the Non-Federal Interest stated its intent to perform certain work (hereinafter the "Proposed Work", as defined in Paragraph 1 of this MOU) prior to the execution of the Project Partnership Agreement for the Paducah, Kentucky Local Flood Protection Project at Ohio River Mile 934.4 in Paducah, Kentucky.

NOW, THEREFORE, the Government and the Non-Federal Interest agree as follows:

1. The Non-Federal Interest shall provide or perform the Proposed Work in accordance

with the terms and conditions of this MOU. The Proposed Work shall consist of the reconstruction of existing drainage structures, including corrugated metal pipes, at the Paducah, Kentucky Local Flood Protection Project, as generally described in the Ohio River, Paducah, Kentucky Section 905(b) Analysis dated May 2000, and the above-referenced letter from the Non-Federal Interest.

2. The Non-Federal Interest shall develop all necessary engineering plans and specifications for the Proposed Work.

3. The Non-Federal Interest shall complete all necessary environmental coordination and obtain all applicable Federal, State, and local permits required for the performance of the Proposed Work.

4. The Non-Federal Interest shall comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970, Public Law 91-646, as amended (42 U.S.C. 4601-4655), and the Uniform Regulations contained in 49 C.F.R. Part 24, in acquiring lands, easements, and rights-of-way required for construction and subsequent operation and maintenance of the Proposed Work, and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

5. Nothing in this MOU creates any duty, obligation, or responsibility for the Government. Any activity undertaken by the Non-Federal Interest for the implementation of the Proposed Work is solely at the Non-Federal Interest's own risk and responsibility.

6. The Non-Federal Interest shall keep books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to this MOU to the extent and in such detail as will properly reflect total costs for the Proposed Work and the Non-Federal Interest shall make such evidence available for inspection and audit by authorized representatives of the Government.

7. The Non-Federal Interest understands that any costs incurred for the clean-up of hazardous material regulated by the Comprehensive Environmental Response, Compensation, and Liability Act (hereinafter "CERCLA"; 42 U.S.C. Sections 9601-9675), that may exist in, on, or under lands, easements, or rights-of-way required for the Proposed Work are a Non-Federal Interest responsibility and that no credit shall be afforded for such clean-up costs. In addition, the Non-Federal Interest understands that as between the Government and the Non-Federal Interest, the Non-Federal Interest shall be considered the operator of the Proposed Work for the purposes of CERCLA liability. To the maximum extent practicable, the Non-Federal Interest shall operate, maintain, repair, replace, and rehabilitate the Proposed Work in a manner that will not cause liability to arise under CERCLA.

8. The parties to this MOU shall each act in an independent capacity in the performance of their respective functions under this MOU, and neither party is to be considered the officer, agent, or employee of the other.

9. The Non-Federal Interest understands that to be eligible for credit for the costs of the Proposed Work:

a. The Government must make a determination that the Proposed Work is integral to the project;

b. The Proposed Work shall be subject to a review or on-site inspection, as applicable, and certification by the Government that the work was accomplished in a satisfactory manner and in accordance with applicable Federal laws, regulations, and policies;

c. The costs for the Proposed Work that may be eligible for credit shall be subject to an audit by the Government to determine the reasonableness, allocability, and allowability of such costs;

d. The costs incurred for the Proposed Work are not subject to interest charges, nor are they subject to adjustment to reflect changes in price levels between the time the Proposed Work is completed and the time that credit may be afforded;

e. The Non-Federal Interest shall not use Federal program funds (either funds or grants provided by a Federal agency as well as any non-Federal matching share or contribution that was required by such Federal agency for such program or grant) for the Proposed Work unless the Federal agency providing the Federal portion of such funds verifies in writing that expenditure of such funds for such purpose is expressly authorized by Federal law;

f. Only the costs of the Proposed Work that do not exceed the Government's estimate of the cost of such work if the work been accomplished by the Government may be eligible for credit;

g. Any contract awarded for the Proposed Work shall include provisions consistent with all applicable Federal laws and regulations and the Non-Federal Interest shall comply with all applicable Federal and State laws and regulations, including, but not limited to Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army";

h. The Non-Federal Interest must comply with applicable Federal labor laws covering non-Federal construction, including but not limited to, 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a *et seq.*), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 *et seq.*), and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c)); and

i. Crediting for the costs of the Proposed Work may be withheld, in whole or in part, as a result of the Non-Federal Interest's failure to comply with the terms of this MOU.

10. If the parties agree to enter into a Project Partnership Agreement for the Paducah, Kentucky Local Flood Protection Project at Ohio River Mile 934.4 in Paducah, Kentucky, then the Project Partnership Agreement will contain provisions regarding affording credit for costs of the Proposed Work, if the Secretary determines that the Proposed Work is integral to the project.

11. Execution of this MOU shall not be interpreted as a Federal assurance regarding later approval of any project; shall not commit the United States to any type of reimbursement or credit for the Proposed Work; does not alter any process to be followed by the Government in making a determination to execute a future Project Partnership Agreement; nor does it provide any assurance that any future agreement will ever be executed for the project, the Proposed Work, or any portion of the project. Further, this MOU shall not be interpreted to signify any Federal participation in or commitment to the project or the Proposed Work. Finally, this MOU shall not be construed as committing the Government to assume any responsibility placed upon the Non-Federal Interest or any other non-Federal entity or as preventing the Government from modifying the project that could result in the Proposed Work performed by the Non-Federal Interest no longer being an integral part of the design of the project.

IN WITNESS WHEREOF, the parties hereto have executed this MOU, which shall become effective upon the date it is signed by the District Engineer.

DEPARTMENT OF THE ARMY

BY: _____
Keith A. Landry
Colonel, Corps of Engineers
District Commander

DATE: 11/17/08

CITY OF PADUCAH, KENTUCKY

BY: _____
William F. Paxton
Mayor
City of Paducah

DATE: 11/17/08

CERTIFICATE OF AUTHORITY

I, W. David Denton, do hereby certify that I am the principal legal officer of the City of Paducah, Kentucky, that the City of Paducah, Kentucky is a legally constituted public body with full authority and legal capability to perform the terms of the MOU between the Department of the Army and the City of Paducah, Kentucky, in connection with the Proposed Work to be provided or performed prior to execution of a Project Partnership Agreement for the Paducah, Kentucky Local Flood Protection Project at Ohio River Mile 934.4 in Paducah, Kentucky, and that the persons who have executed this MOU on behalf of the City of Paducah, Kentucky have acted within their statutory authority.

IN WITNESS WHEREOF, I have made and executed this certification this 17 day of November 2008

BY: _____
W. David Denton
City Attorney,
City of Paducah, Kentucky

ADOPTED

MUNICIPAL ORDER NO. 1418

A MUNICIPAL ORDER AUTHORIZING THE MAYOR TO EXECUTE A MEMORANDUM OF UNDERSTANDING BETWEEN THE DEPARTMENT OF THE ARMY AND THE CITY OF PADUCAH FOR WORK PROVIDED OR PERFORMED PRIOR TO EXECUTION OF A PROJECT PARTNERSHIP AGREEMENT FOR THE CITY'S LOCAL FLOOD PROTECTION PROJECT

BE IT ORDERED BY THE CITY OF PADUCAH, KENTUCKY:

SECTION 1. That the City of Paducah hereby authorizes the Mayor to execute a Memorandum of Understanding between the Department of the Army, represented by the U.S. Army Engineer, Louisville District and the City of Paducah for work provided or performed prior to execution of a Project Partnership Agreement for Paducah Kentucky Local Flood Protection Project contingent upon the Assistant Secretary of the Army Civil Works approving an "Exception to Policy for Paducah".

SECTION 2. This Order shall be in full force and effect from and after the date of its adoption.

Mayor

ATTEST:

Tammara S. Brock, City Clerk

Adopted by the Board of Commissioners, November 11, 2008
Recorded by Tammara S. Brock, City Clerk, November 11, 2008
\mo\MOU-Local Flood Protection Project

CERTIFICATION

I hereby certify that the above is a true and correct copy of an Ordinance adopted by the City of Paducah, KY on November 11, 2008.

Tammara S. Brock, City Clerk

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
P. O. BOX 59
LOUISVILLE, KENTUCKY 40201-0059

RECEIVED
NOV 2 0 2008
ENGINEERING
DEPARTMENT

November 18, 2008

Civil Project Management Branch

Mr. Rick Murphy, P.E.
City Engineer
City of Paducah
300 South 5th Street
Paducah, Kentucky 42002-2267

Dear Mr. Murphy:

Enclosed are two executed copies of the November 17, 2008 Memorandum of Understanding between the Department of the Army and City of Paducah, Kentucky.

Please contact me at (502) 315-6783 if you have any questions regarding this agreement.

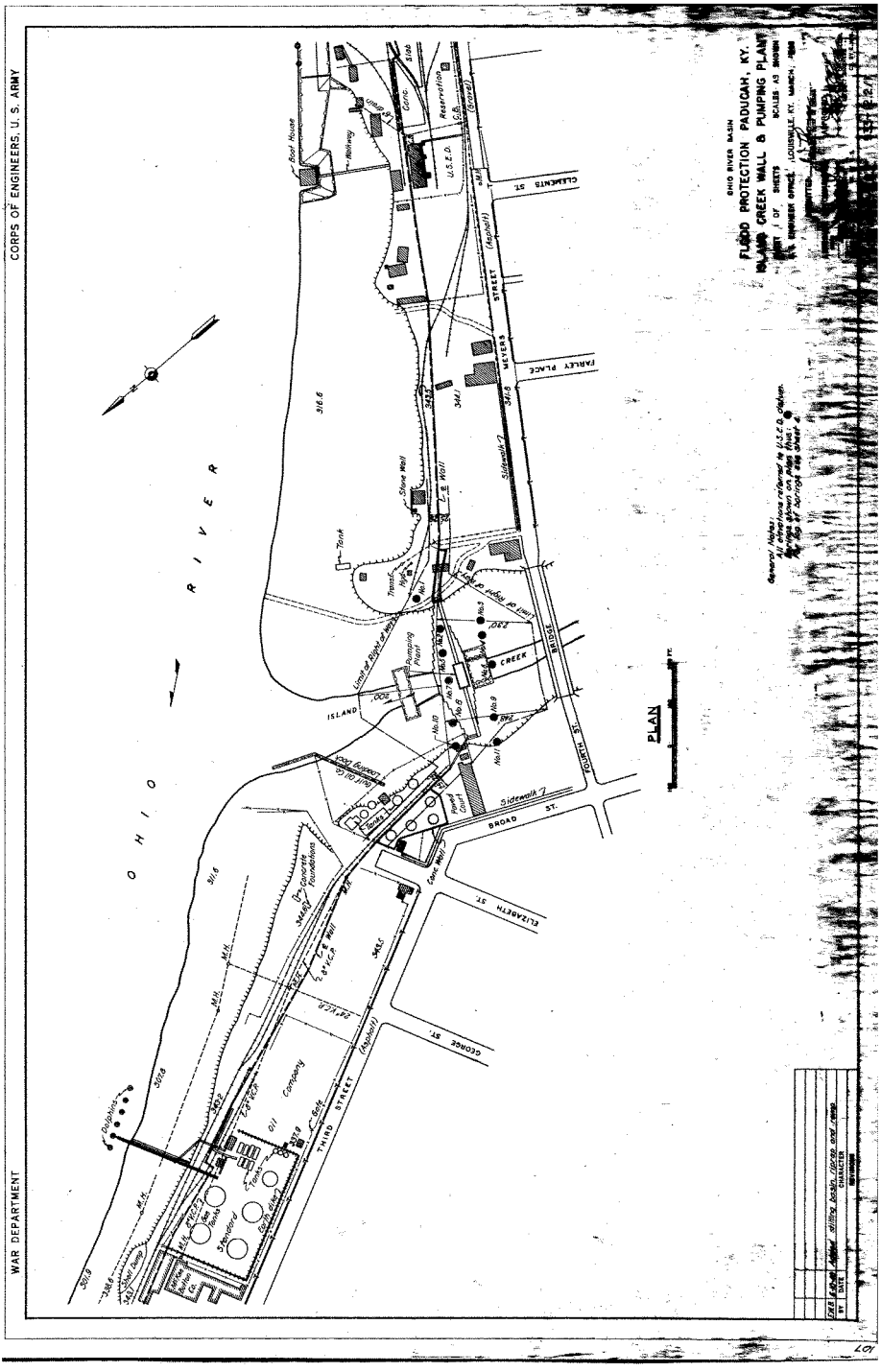
Sincerely,

Michael Q. Holley

Michael Q. Holley, P.E.
Project Manager

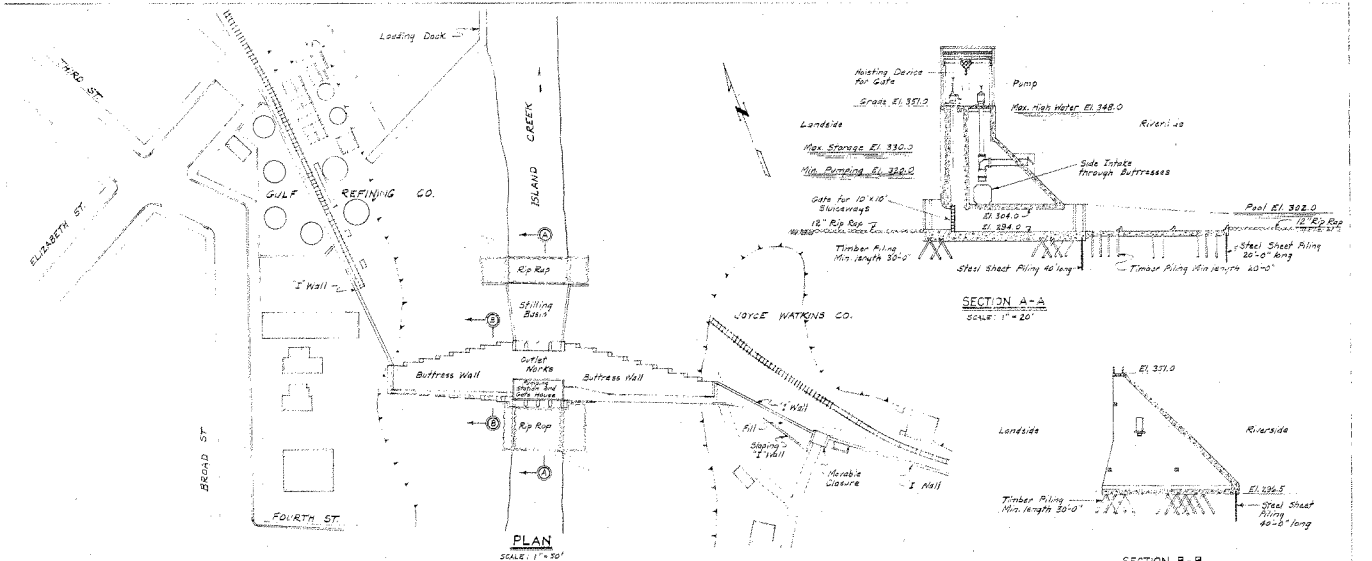
Tammy: This Information Is To Be Received & Filed For Our Corrugated Metal Pipe Rehab. Project w/ The Floodwall.

Thxs Rick


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PLAN
CREEK WALL & PUMPING PLANT
PLAN
SCALES AS SHOWN
LOUISVILLE, KY. MARCH, 1938
SUPERVISION OFFICE
OFFICE
DRAWN
TRACED
CHECKED
APPROVED
DATE
BY
CHARACTER OF REVISIONS
OHIO RIVER
ISLAND
CREEK
BROAD ST.
FOURTH ST.
ELIZABETH ST.
GEORGE ST.
THIRD STREET
CLEMENTS ST.
STREET
PARLEY PLACE
MEYERS
Sidewalk
Road House
Garage
Reservation
U.S.E.D.
Tank
Pumping Plant
Control House
Concrete Wall
Retaining Wall
Steel Piling
Concrete Foundations
Oil Company
Tanks
Boiler House
Coal Bunker
Coal Track
Paved Court
Dolphins
Gate
Valve
Manhole
Catch Basin
Inlet
Sewer
Pipe
Fence
Telephone Line
Electric Line
Gas Line
Water Line
Steam Line
Sanitary Sewer
Storm Sewer
Combined Sewer
Existing Roads, Curbs and Walks
Proposed Roads, Curbs and Walks
Existing Buildings
Proposed Buildings
Existing Railroads
Proposed Railroads
Existing Contours
Proposed Contours
Existing Ground Surface
Proposed Ground Surface
Existing Water Surface
Proposed Water Surface
Existing Bridges
Proposed Bridges
Existing Trees
Proposed Trees
Existing Shrubs
Proposed Shrubs
Existing Fences
Proposed Fences
Existing Poles
Proposed Poles
Existing Wires
Proposed Wires
Existing Pipes
Proposed Pipes
Existing Valves
Proposed Valves
Existing Hydrants
Proposed Hydrants
Existing Manholes
Proposed Manholes
Existing Catch Basins
Proposed Catch Basins
Existing Inlets
Proposed Inlets
Existing Sewers
Proposed Sewers
Existing Gas Lines
Proposed Gas Lines
Existing Water Lines
Proposed Water Lines
Existing Steam Lines
Proposed Steam Lines
Existing Electric Lines
Proposed Electric Lines
Existing Telephone Lines
Proposed Telephone Lines
Existing Fences
Proposed Fences
Existing Poles
Proposed Poles
Existing Wires
Proposed Wires
Existing Pipes
Proposed Pipes
Existing Valves
Proposed Valves
Existing Hydrants
Proposed Hydrants
Existing Manholes
Proposed Manholes
Existing Catch Basins
Proposed Catch Basins
Existing Inlets
Proposed Inlets
Existing Sewers
Proposed Sewers
Existing Gas Lines
Proposed Gas Lines
Existing Water Lines
Proposed Water Lines
Existing Steam Lines
Proposed Steam Lines
Existing Electric Lines
Proposed Electric Lines
Existing Telephone Lines
Proposed Telephone Lines

WAR DEPARTMENT

CORPS OF ENGINEERS U. S. ARMY



CONCRETE SLAB AND BUTTRESS DAM
COMBINED GATE STRUCTURE & PUMPING PLANT

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK WALL & PUMPING PLANT

SHEET OF SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE LOUISVILLE, KY. MAY 1940

SUBMITTED ENGINEER

APPROVAL RECOMMENDED APPROVED

SENIOR ENGINEER CHIEF, CORPS OF ENGINEERS

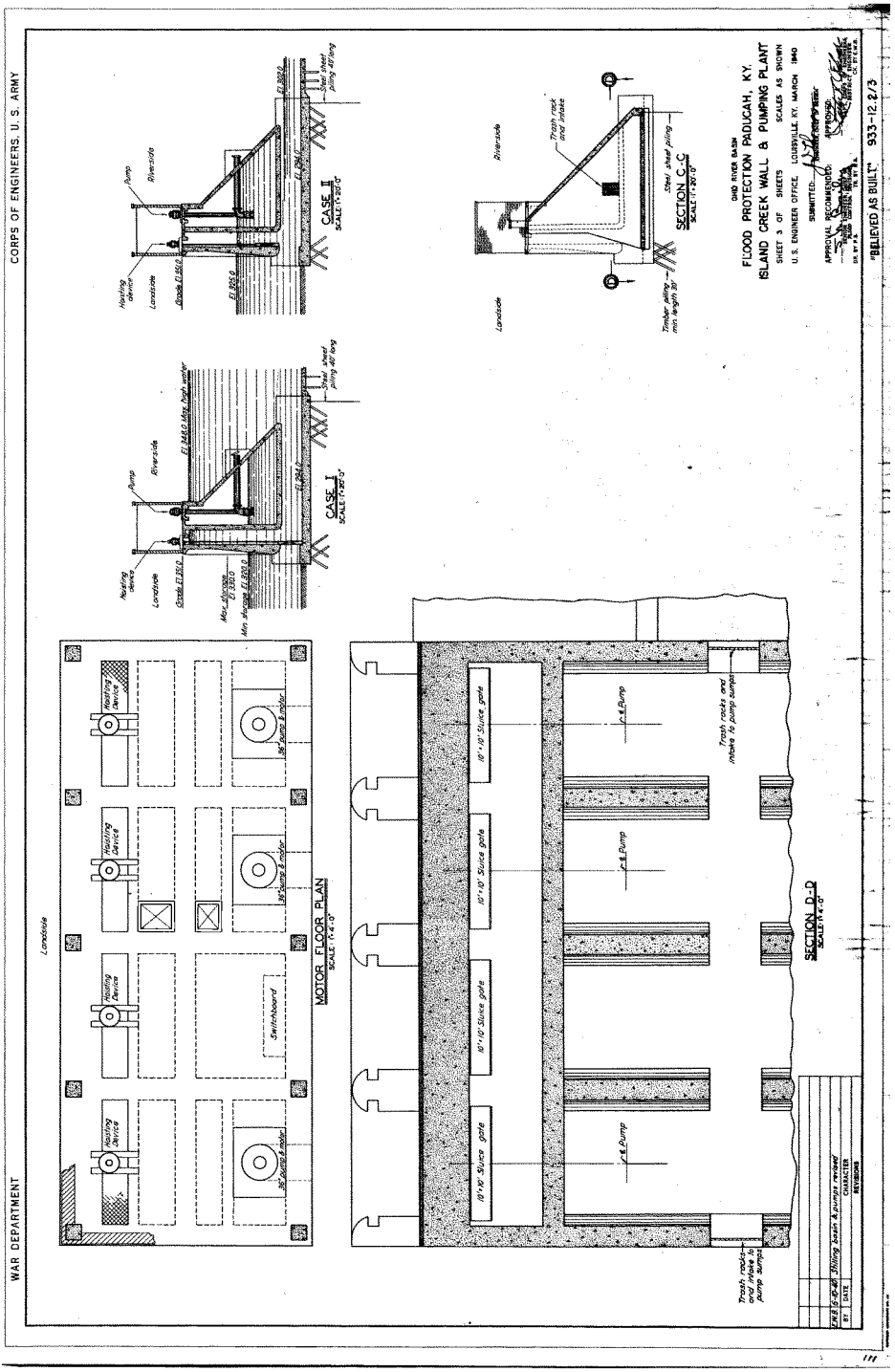
DR BY E.M.B. TR BY CK BY E.M.B.

BY	DATE	CHARACTER REVISIONS

"BELIEVED AS BUILT" 933-12.2/2.1

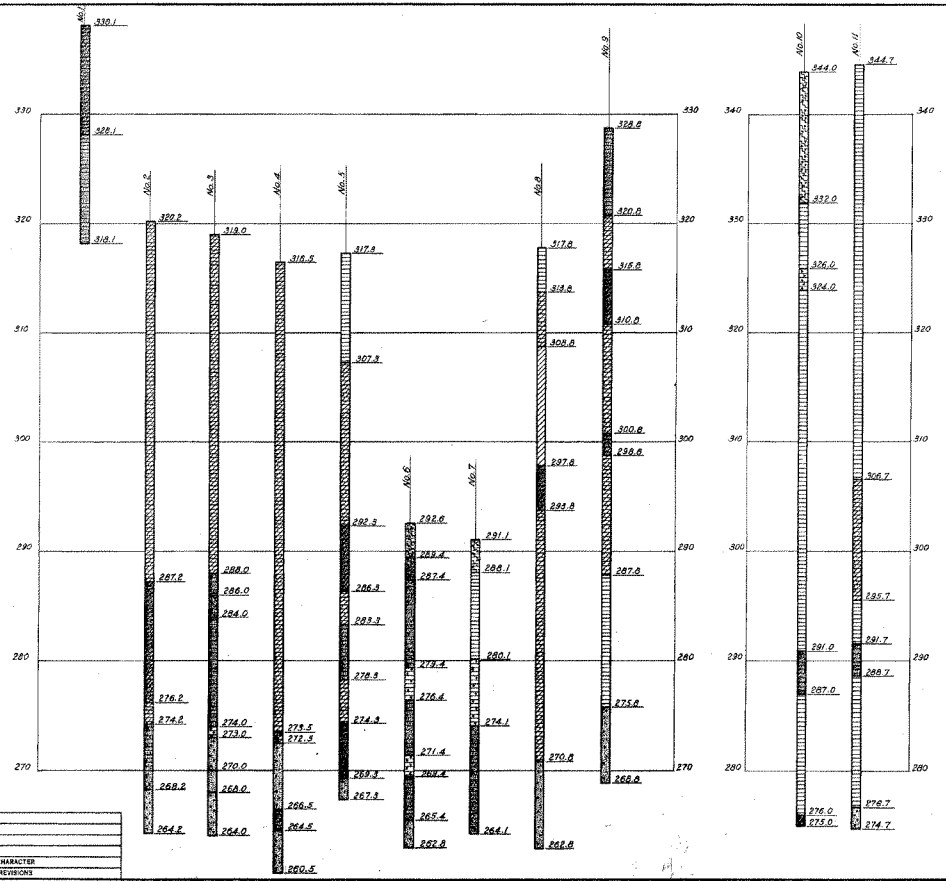
110

650


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
Louisville
MOTOR FLOOR PLAN
SCALE 1"=2'-0"
Hoisting Device
Switchboard
36" Sump & motor
36" Sump & motor
Hoisting devices
Louisville
Grade El 850.0
Pump
Riverside
El 848.0 Max. high water
Steel sheet piling 40' long
El 844.0
Min. El 780
Min. storage El 810.0
CASE I
SCALE 1"=20'-0"
Hoisting device
Louisville
Grade El 850.0
Pump
Riverside
El 825.0
El 844.0
Steel sheet piling 40'long
CASE II
SCALE 1"=20'-0"
Louisville
Riverside
Trash rack and intake
Steel sheet piling
Timber piling min. length 25'
SECTION C-C
SCALE 1"=20'-0"
10'-10" Sluice gate
10'-10" Sluice gate
10'-10" Sluice gate
10'-10" Sluice gate
4 Pump
4 Pump
4 Pump
Trash racks and intake to pump sumps
SECTION D-D
SCALE 1"=4'-0"
Trash racks and intake to pump sumps
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK WALL & PUMPING PLANT
SHEET 3 OF SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1940
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
"BELIEVED AS BUILT" 933-12.2/3
Sliding sash & pumps revised
CHARACTER
REVISIONS
DATE
BY

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



BORING SYMBOLS

Debris
Clay
Silt
Sand
Gravel
Mud

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

BORINGS

SHEET 4 OF SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1940

SUBMITTED: ENGINEER, CHIEF OF DIVISION

APPROVAL RECOMMENDED: APPROVED:

CHIEF, ENGINEERING DIVISION, FLOOD CONTROL DIVISION

DR. BY R.C.E.

CHIEF, ENGINEERING DIVISION, TN. RY. W.J.S.

CHIEF, PLANNING & CONSTRUCTION DIVISION, CK. BY E.W.H.

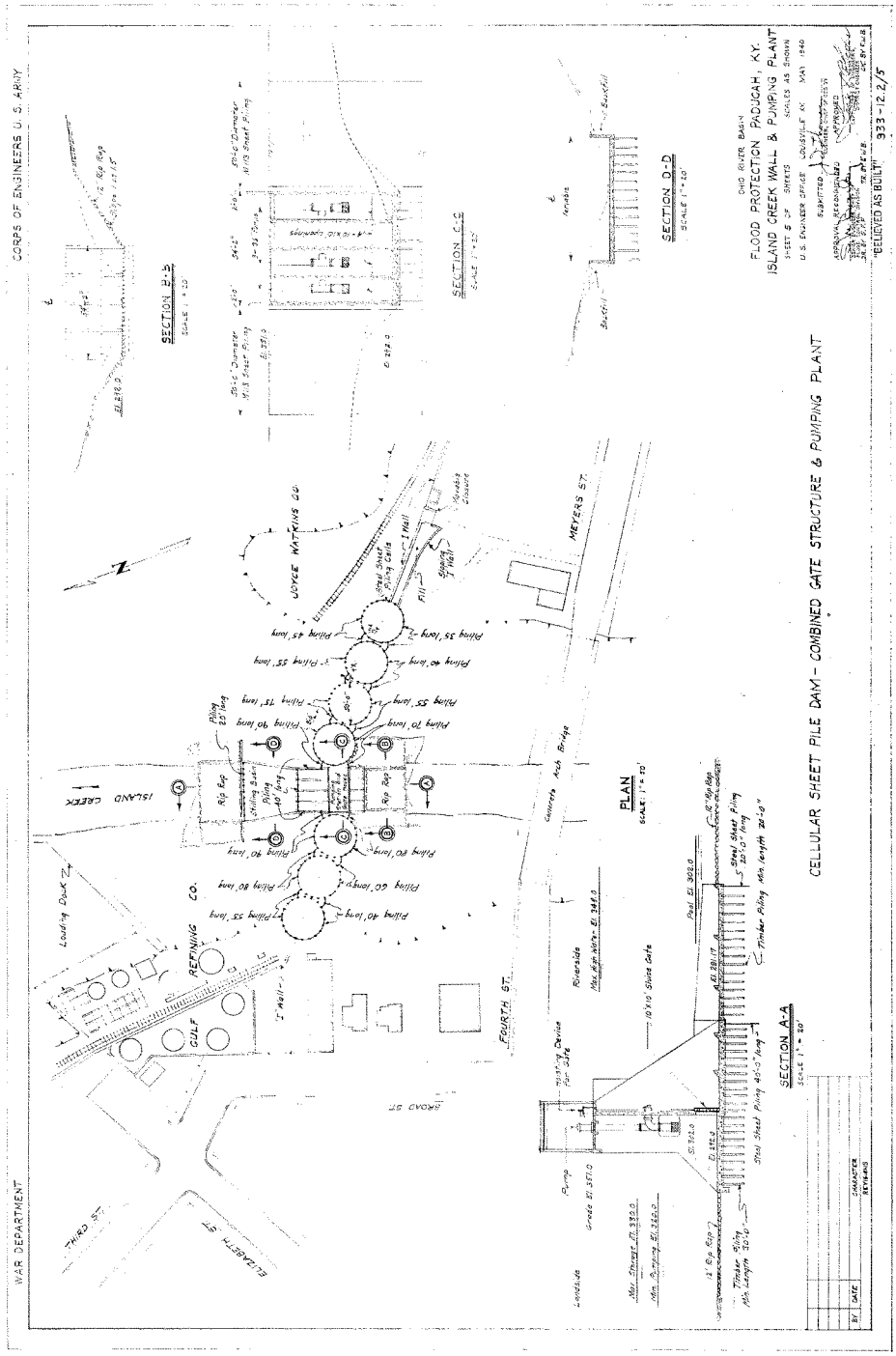
DIVISION ENGINEER

BY	DATE	CHARACTER REVISIONS

"BELIEVED AS BUILT" 933-12.2/4

112

652


WAR DEPARTMENT
CORPS OF ENGINEERS U. S. ARMY
CELLULAR SHEET PILE DAM - COMBINED GATE STRUCTURE & PUMPING PLANT
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK WALL & PUMPING PLANT
OHIO RIVER BASIN
SCALES AS SHOWN
U.S. ENGINEER OFFICE LOUISVILLE KY. MAY 1940
SUBMITTED
RECOMMENDED
APPROVED
"BELIEVED AS BUILT" 933-12.2/5
PLAN
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
ISLAND CREEK
GULF REFINING CO.
JOYCE WATKINS CO.
MEYERS ST.
FOURTH ST.
BROAD ST.
THIRD ST.
ELIZABETH ST.
Loading Dock
Pumping Station
Concrete Arch Bridge
Riprap
Steel Sheet Piling
Timber Piling
Pump
Riverside
Min. Low Water El. 314.0
Min. Summer El. 332.0
Min. Spring El. 338.0
Grade El. 315.0
Base El. 303.0
Base El. 301.17
Min. Length 30'-0"
Min. Length 40'-0"
Min. length 20'-0"
10'x10' Sluice Gate
Flushing Device
Pipe Gate
Concrete
Earth
Fill
Backfill
Sand
Gravel
Asphalt
Pavement
Rail Road
Trestle
Wall
Piling 45' long
Piling 55' long
Piling 40' long
Piling 70' long
Piling 60' long
Piling 80' long
Piling 35' long
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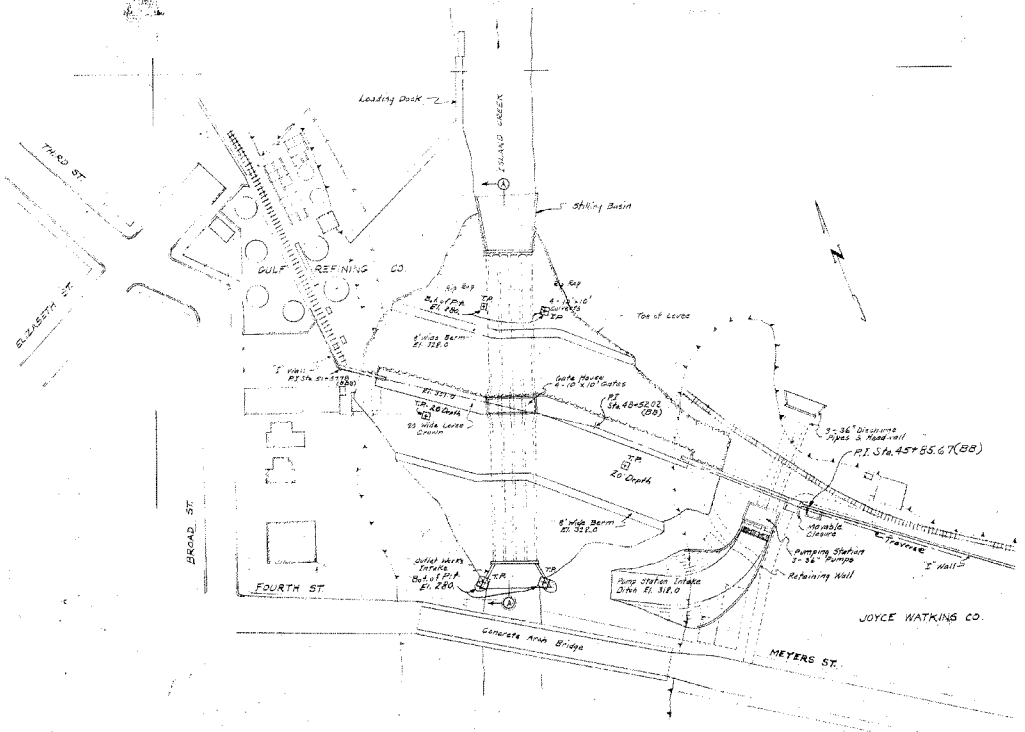
Piling 990' long
Piling 995' long
Piling 1000' long

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



PLAN

Note:
ROLLED FILL LEVEE, CONCRETE CULVERTS & SEPARATE PUMPING PLANT SHOWN ARE FROM PRELIMINARY DESIGNS AND SHOULD NOT INFLUENCE SELECTION OF BETTER TEST

BY	DATE	CHARACTER REVISION

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

TEST PITS FOR ISLAND CREEK WALL & PUMPING PLANT

SHEET 6 OF SHEETS SCALE: 1" = 50'

U.S. ENGINEER OFFICE LOUISVILLE, KY. MAY 1940

SUBMITTED

APPROVAL RECOMMENDED

APPROVED

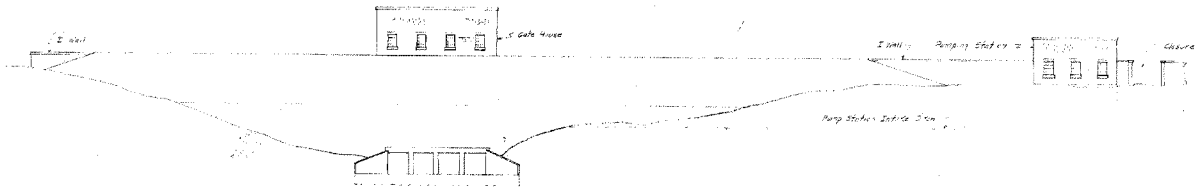
DR. BY E.W.B. TR. BY CK. BY E.W.B.

"BELIEVED AS BUILT" 933-12.2/6

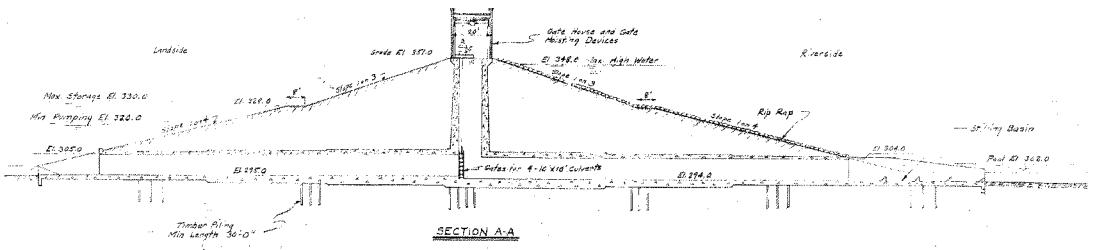
654

WAR DEPARTMENT

CORPS OF ENGINEERS U. S. ARMY



LANDSIDE ELEVATION



SECTION A-A

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK WALL & PUMPING PLANT

SHEET 7 OF SHEETS SCALE: 1" = 20'

U.S. ENGINEER OFFICE LOUISVILLE KY. MAY 1940

SUBMITTED

DISTRICT ENGINEER

APPROVAL RECOMMENDED

DIVISION ENGINEER

APPROVED

CHIEF OF ENGINEERS

DR. BY E.W.B. TR. BY CK. BY E.W.B.

BY	DATE	CHARACTER OF REVISIONS

ROLLED FILL LEVEE, CONCRETE CULVERTS & SEPARATE PUMPING PLANT

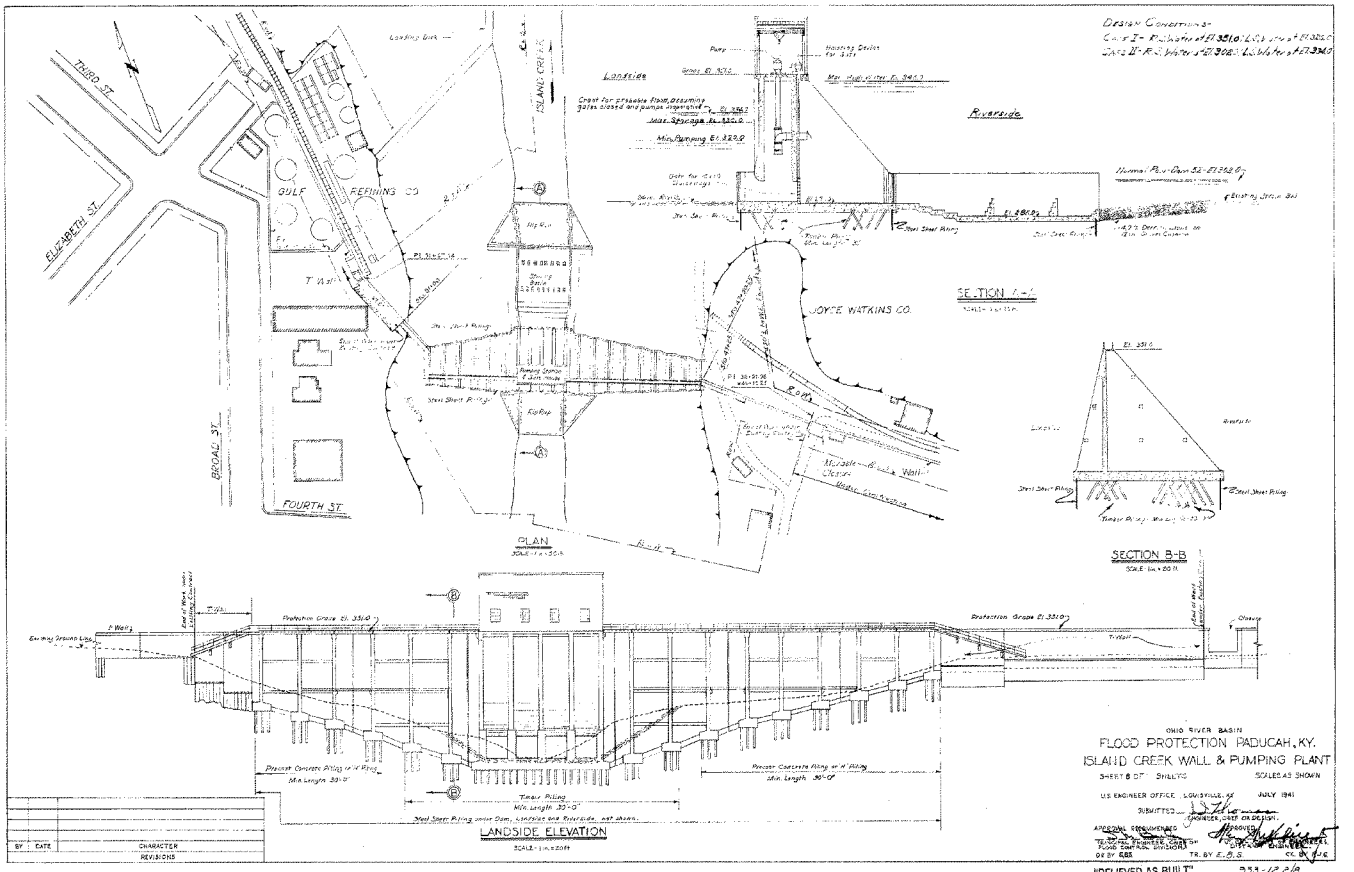
"BELIEVED AS BUILT" 933-12.2/7

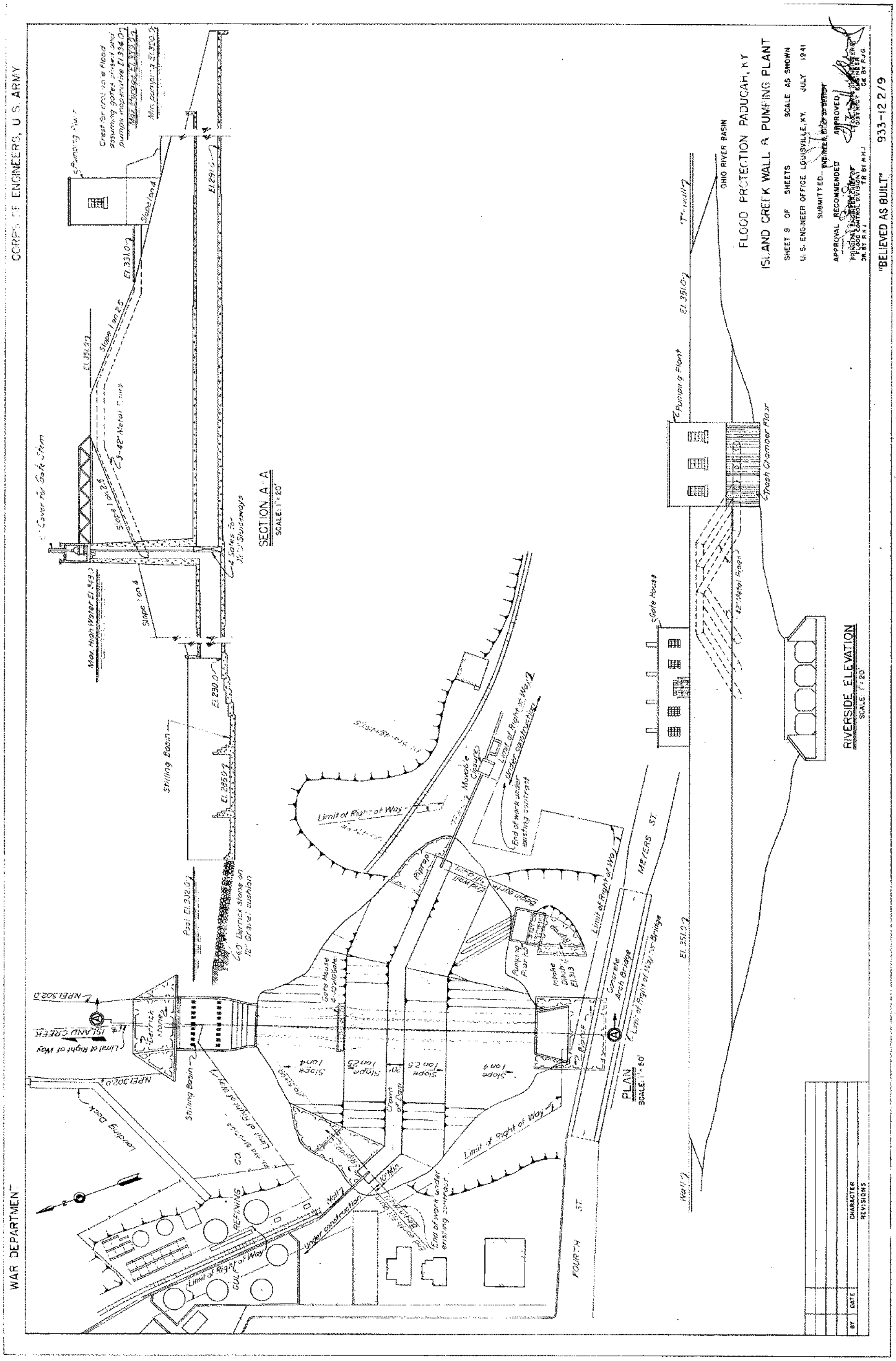
115

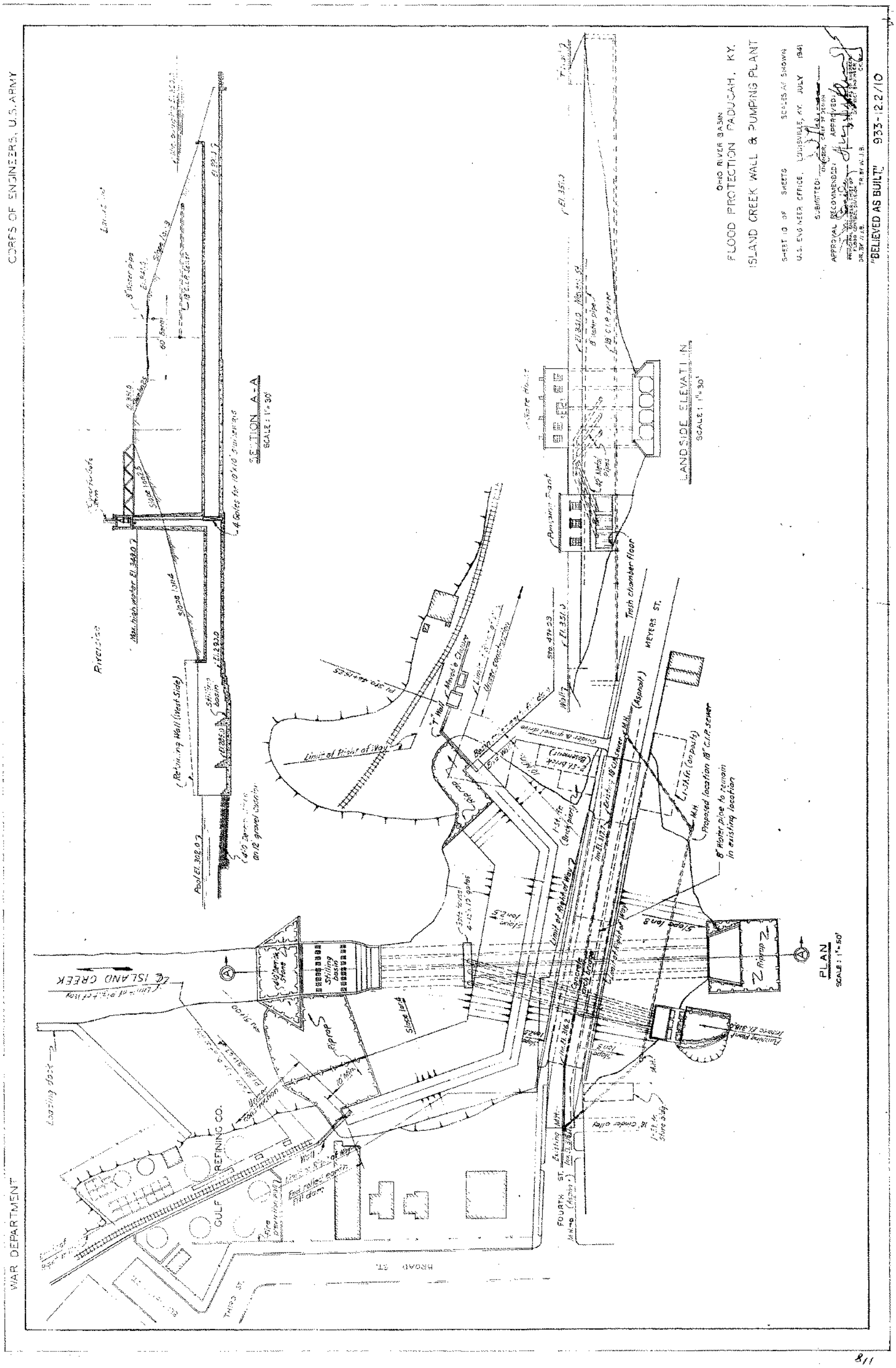
655

WAR DEPARTMENT

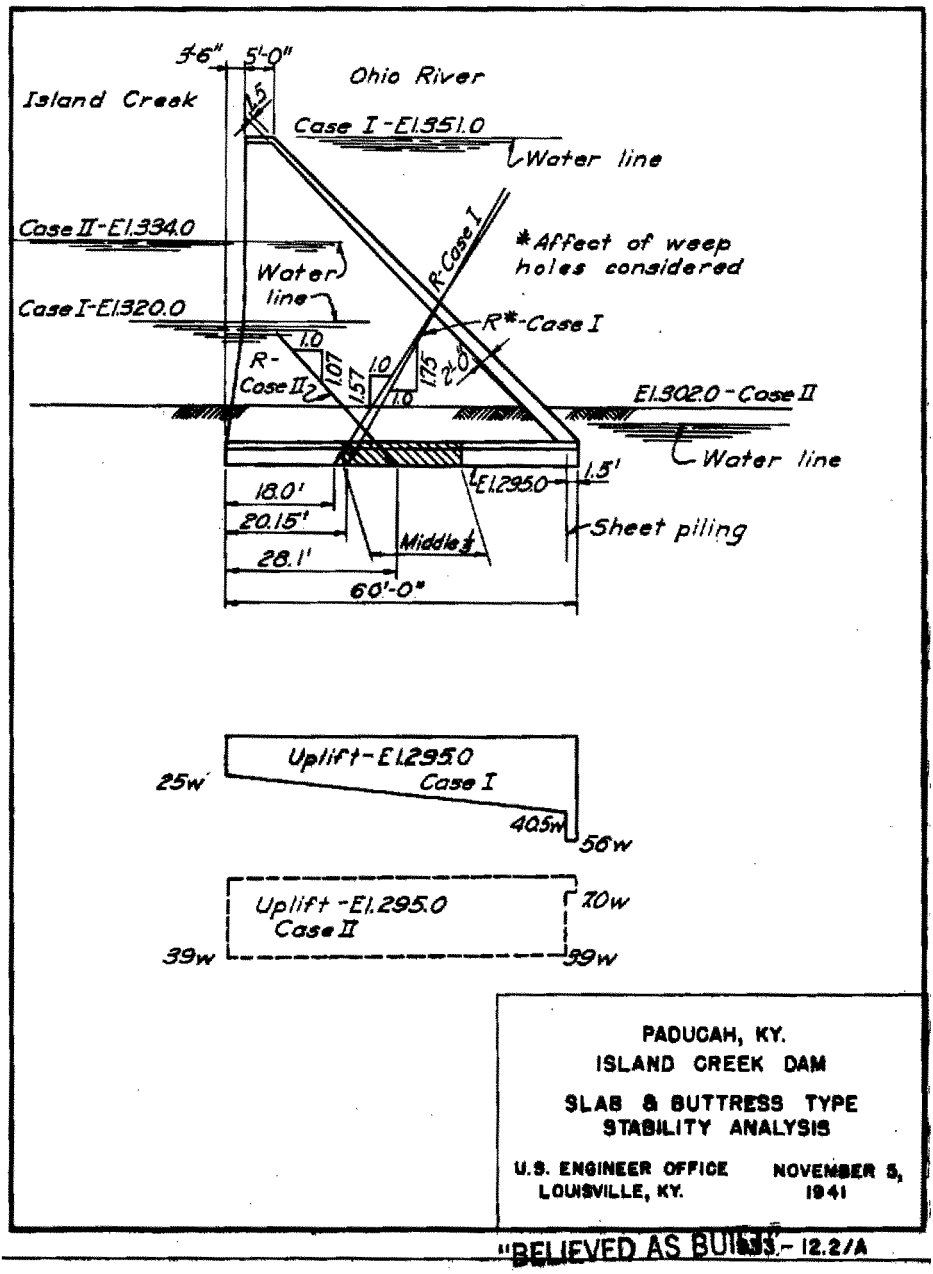
CORPS OF ENGINEERS, U.S. ARMY



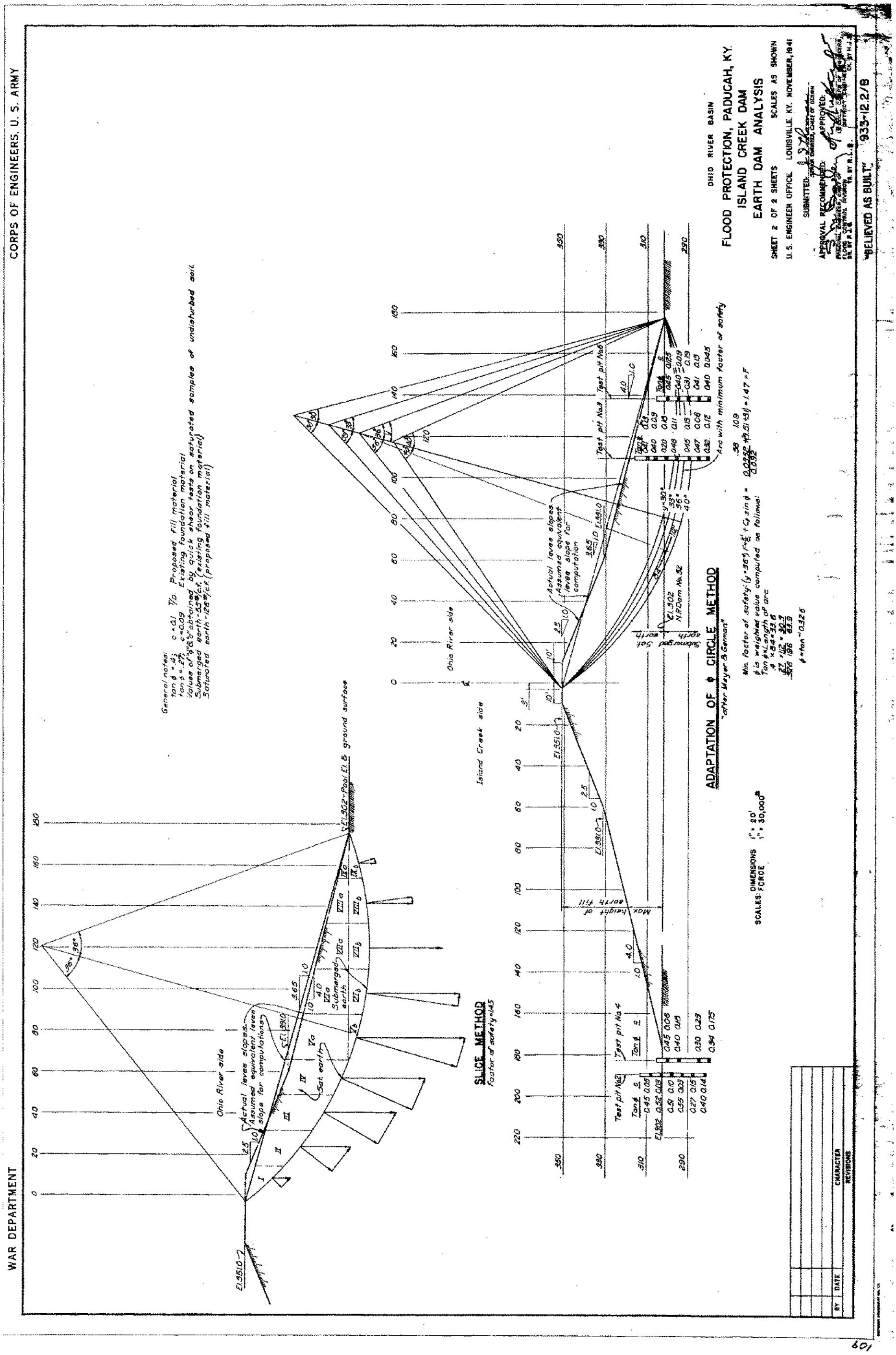

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
SECTION A-A
PLAN
RIVERSIDE ELEVATION
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY
ISLAND CREEK WALL & PUMPING PLANT
"BELIEVED AS BUILT"
933-12.2/9


CORPS OF ENGINEERS, U.S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK WALL & PUMPING PLANT
SHEET 10 OF SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. JULY 1941
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
"BELIEVED AS BUILT"
933-12.2/10
SECTION A-A
SCALE: 1"=30'
Riverside
Landside
Max. high water El. 348.0
Slope 1 on 4
Slope 1 on 3
4 Gates for 10'x10' conduits
Retaining Wall (West Side)
Stilling basin
Pool El. 302.0
4'-0 Derrick stone on 12" gravel blanket
8" Water pipe
18" C.I.P. Sewer
LANDSIDE ELEVATION
SCALE: 1"=30'
Pumping Plant
Store House
42" Metal Pipes
Trash chamber floor
El. 351.0
Sta. 47+23
MEYERS ST.
(Asphalt)
Limit of Right of Way
Movable Closure
"T" Wall
End Wall
Cinder & gravel drive
2-St. brick (Basement)
1-St. Fr. (Brick piers)
1-St. Fr. (on posts)
Existing 18" C.I.P. Sewer
Proposed location 18" C.I.P. sewer
8" Water pipe to remain in existing location
M.H.
Gate recess 4-12'x12' gates
Slope 1 on 2.5
Slope 1 on 3
Slope 1 on 8
Concrete arch bridge
Inv. El. 316.2
Riprap
Pumping Plant Intake El. 318.0
Derrick Stone
Stilling basin
℄ ISLAND CREEK
Loading dock
GULF REFINING CO.
Wall
Earth fill dam
10' Min.
Fire
FOURTH ST.
Existing M.H.
16' Cinder alley
1-St. Fr. Store bldg.
BROAD ST.
THIRD ST.
PLAN
SCALE: 1"=50'

8/11



"BELIEVED AS BUILT" - 12.2/A



CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
General notes:
tan ϕ = .4; c = 0.1 T/□ Proposed fill material
tan ϕ = .27; c = 0.09 Existing foundation material
Values of "ϕ" & "c" obtained by quick shear tests on saturated samples of undisturbed soil.
Submerged earth - 55#/c.f. (existing foundation material)
Saturated earth - 126#/c.f. (proposed fill material)
SLICE METHOD
Factor of safety = 1.45
Ohio River side
Island Creek side
Actual levee slopes
Assumed equivalent levee slopes for computations
Submerged earth
Sat. earth
El. 302 - Pool El. & ground surface
El. 351.0
El. 331.0
Max. height of earth fill
Test pit No. 2
Test pit No. 4
Test pit No. 3
Test pit No. 6
Arc with minimum factor of safety
ADAPTATION OF ϕ CIRCLE METHOD
"after Meyer & German"
Min. factor of safety (y = 36°) F = 1.47
ϕ is weighted value computed as follows:
Tan ϕ x Length of arc
ϕ = tan⁻¹ 0.326
El. 302 N.P. Dam No. 52
SCALES: DIMENSIONS 1" = 20'
FORCE 1" = 30,000#
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
ISLAND CREEK DAM
EARTH DAM ANALYSIS
SHEET 2 OF 2 SHEETS SCALES AS SHOWN
U. S. ENGINEER OFFICE. LOUISVILLE, KY. NOVEMBER, 1941
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
"BELIEVED AS BUILT"
933-12.2/8
BY DATE CHARACTER REVISIONS
601

AS BUILT

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B", UNIT 1

IN 112 SHEETS — TITLE SHEET

U.S. ENGINEER OFFICE, LOUISVILLE, KY.

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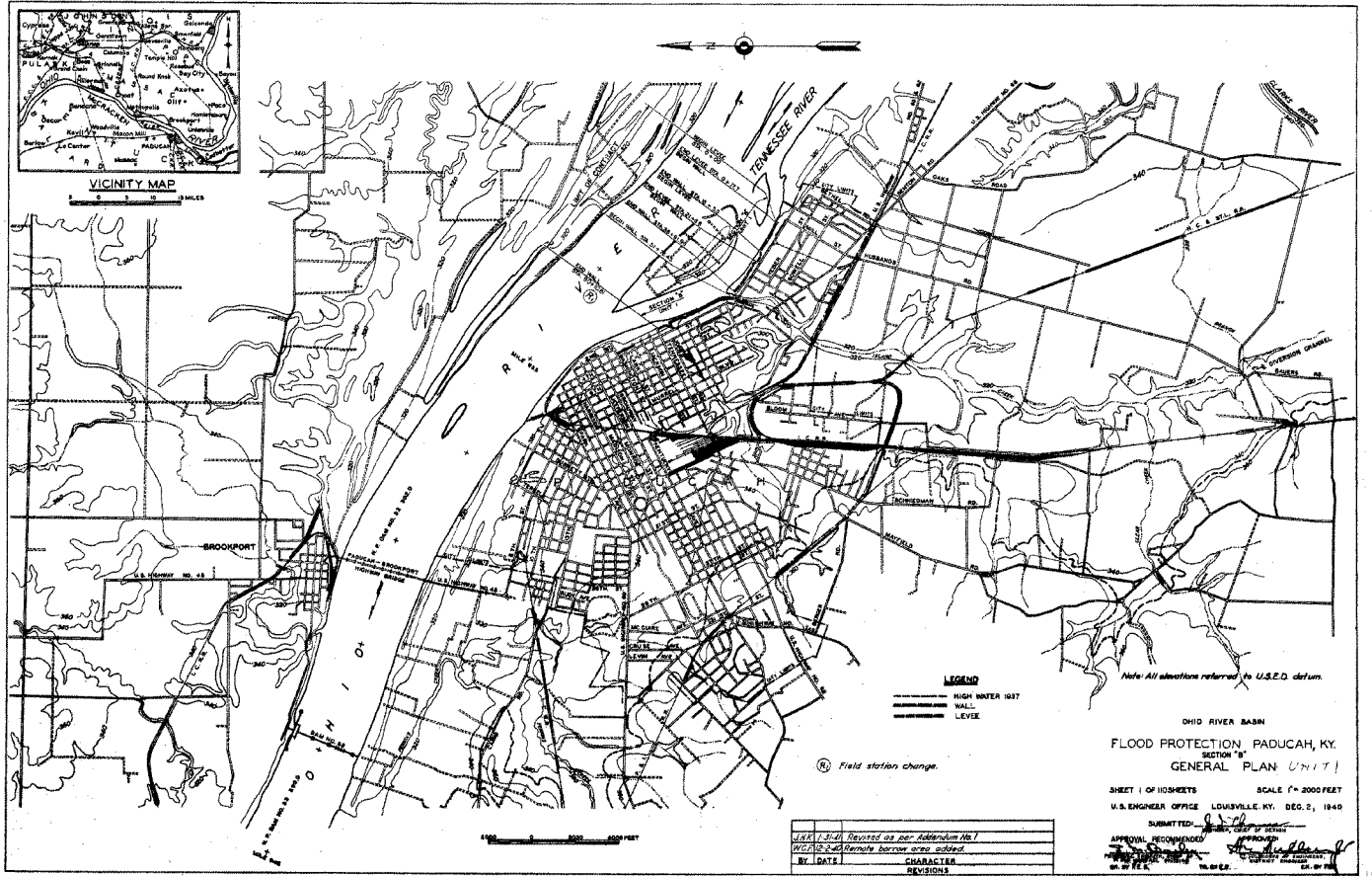
933-12.3/101 MASONRY & REINFORCING DETAILS CATCH BASINS NOS. 1 & 5
933-12.3/102 MASONRY & REINFORCING DETAILS CATCH BASIN NO. 2
933-12.3/103 MASONRY & REINFORCING DETAILS CATCH BASINS NOS. 4 & 6 AND DRAINAGE STRUCTURE STA. 64+87
933-12.3/104 MASONRY & REINFORCING DETAILS MANHOLE NO. 1
933-12.3/105 MASONRY & REINFORCING DETAILS MANHOLE NO. 2
933-12.3/106 MASONRY & REINFORCING DETAILS MANHOLE NO. 3
933-12.3/107 MASONRY & REINFORCING DETAILS MANHOLE NO. 4
933-12.3/108 MASONRY & REINFORCING DETAILS MANHOLE NO. 5
933-12.3/109 MASONRY & REINFORCING DETAILS MANHOLE NO. 6
933-12.3/110 DRAINAGE STRUCTURE STA. 19+11
933-12.3/111 REINFORCING DETAILS STA. 19+11
933-12.3/112 SEWER OUTLET & DRAINAGE STRUCTURE DETAILS

Ⓡ Sheets deleted

AS BUILT

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
GENERAL PLAN (UNIT I)

SHEET 1 OF 110 SHEETS SCALE 1" = 2000 FEET

U.S. ENGINEER OFFICE LOUISVILLE, KY. DEC. 2, 1940

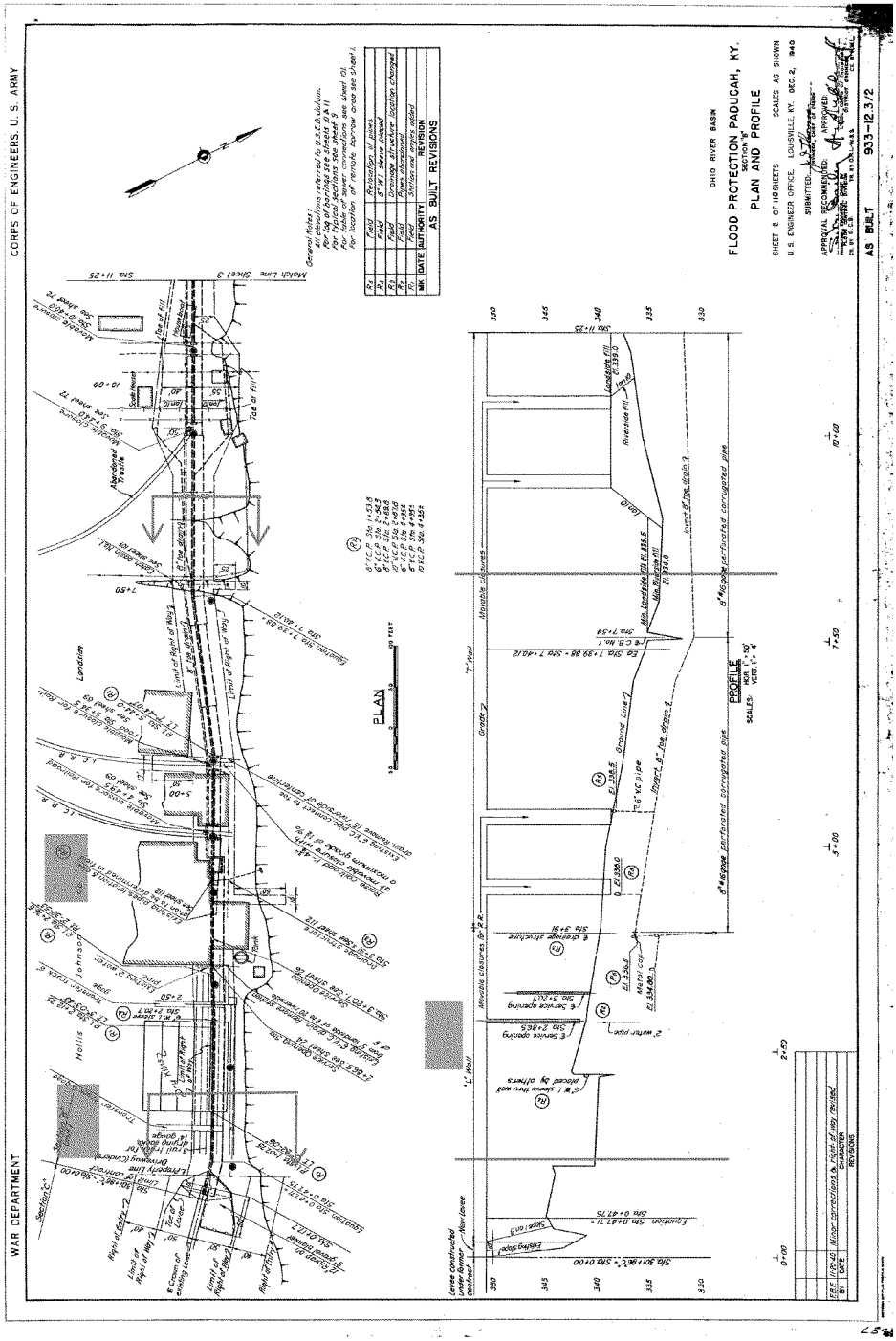
SUBMITTED:

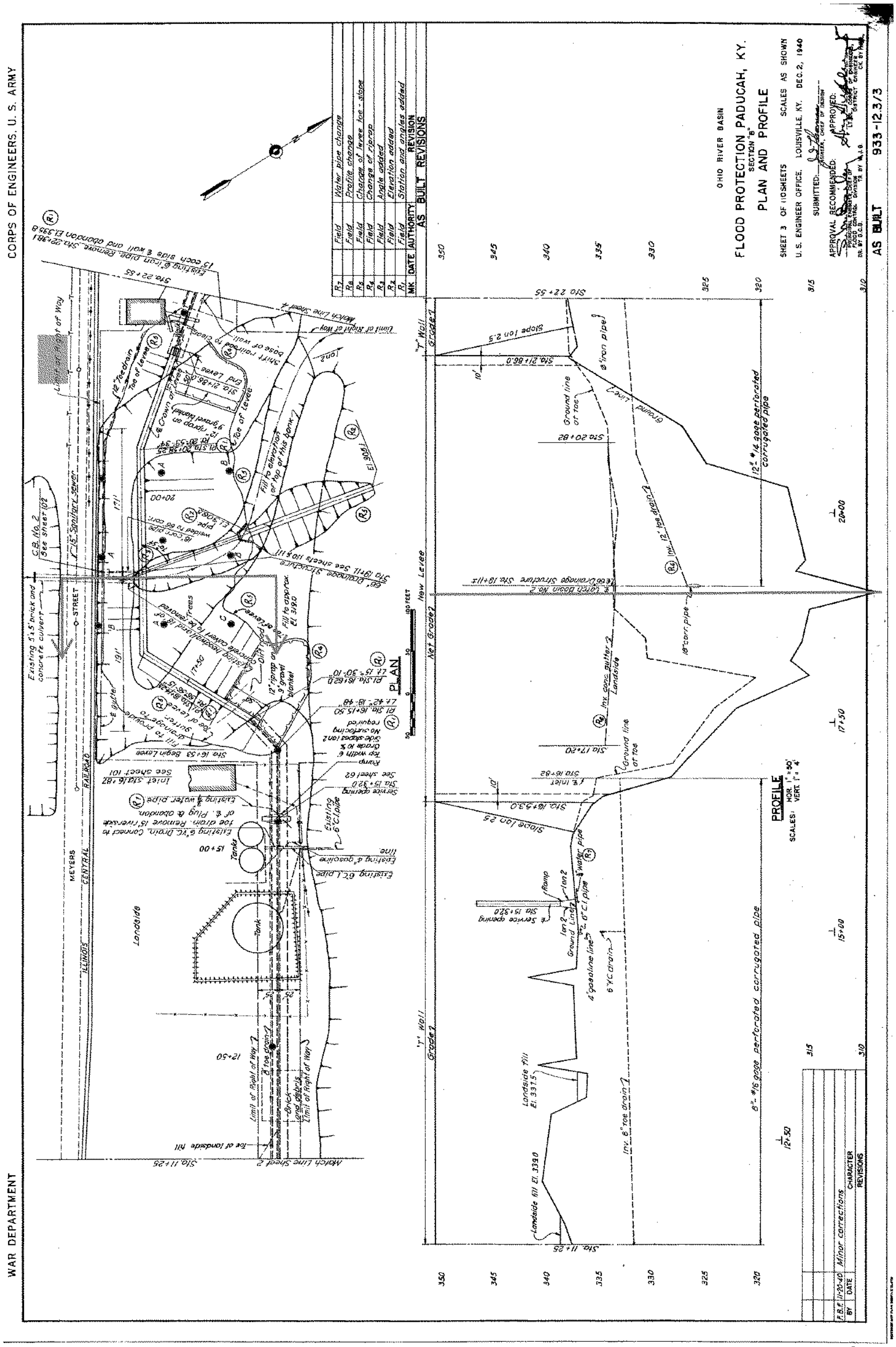
APPROVAL RECOMMENDED: APPROVED:

BY	DATE	CHARACTER REVISIONS
JJK	1-31-41	Revised as per Addendum No. 1
WCH	12-2-40	Remote borrow area added.

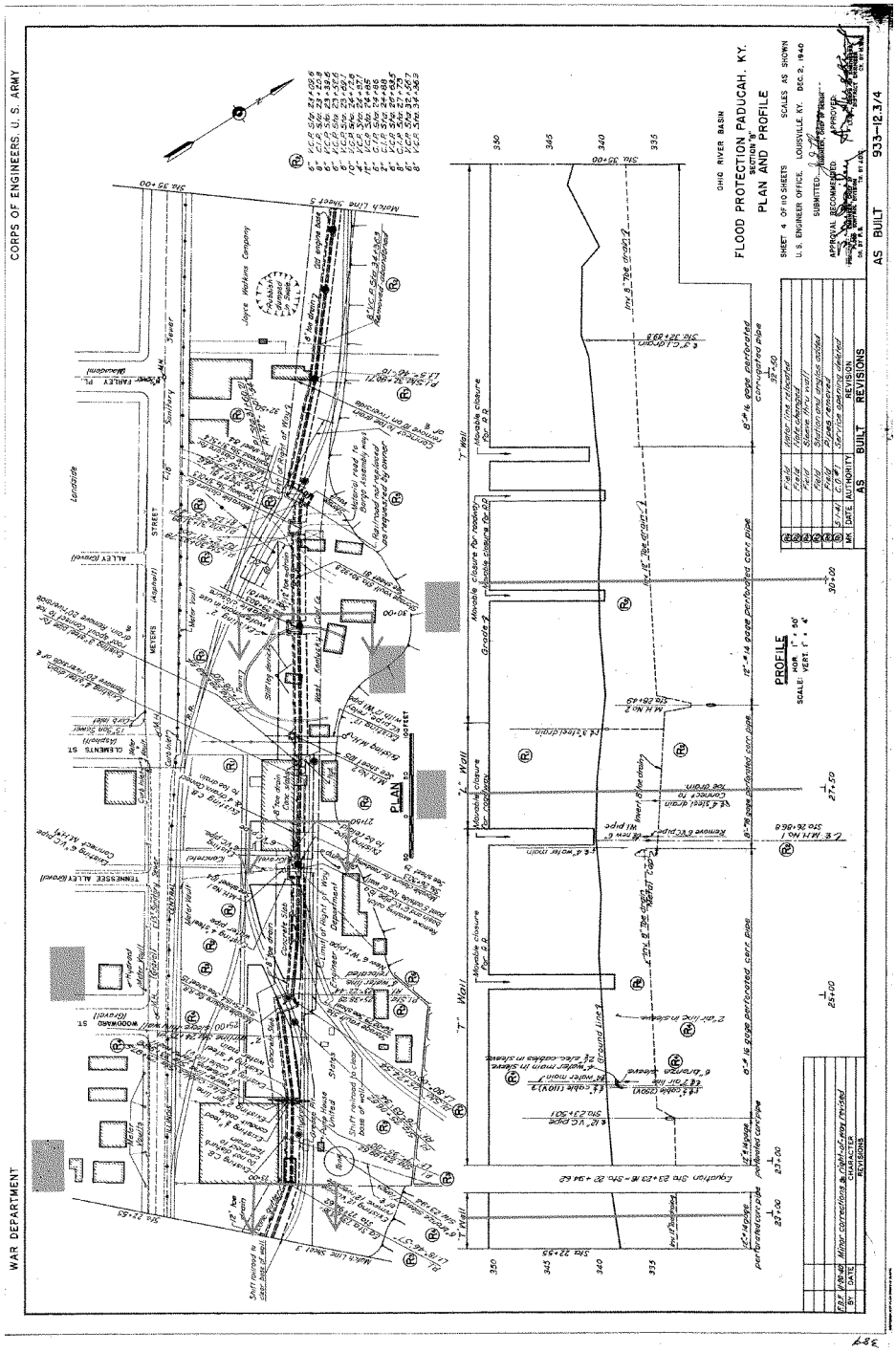
AS BUILT 933-12.3/1

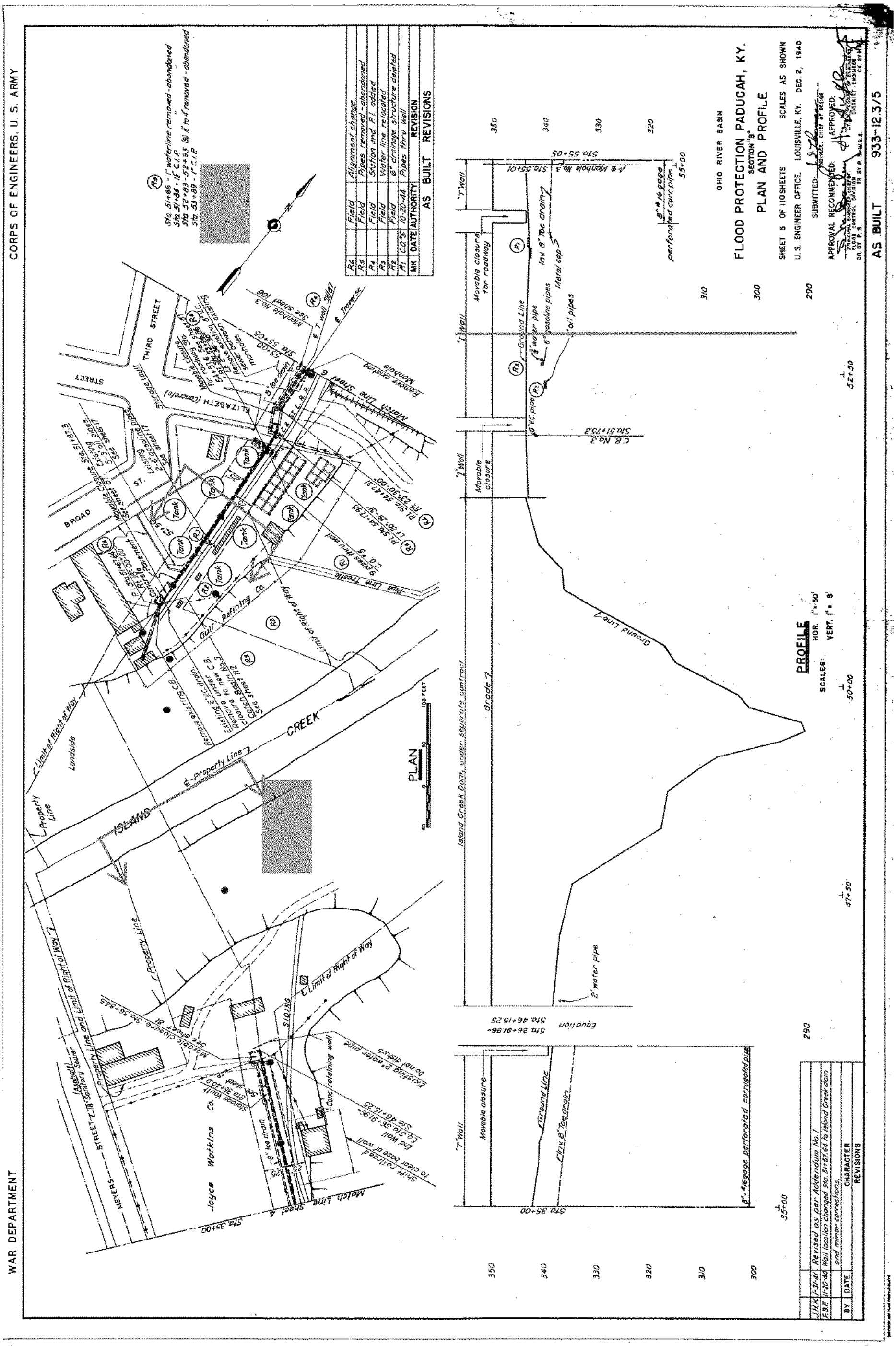
662


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "A"
PLAN AND PROFILE
SHEET 8 OF 10 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVAL RECOMMENDED
AS BUILT
933-12.3/2
AS BUILT REVISIONS
PLAN
PROFILE
Match Line Sheet 3
Match Line Sheet 1
Abandoned Trestle
Landside
Johnson
Hollis
Riverside fill
Landside fill
Levee construction under Grade - Maximum
Section C-C
Section D-D
Section E-E
Section F-F



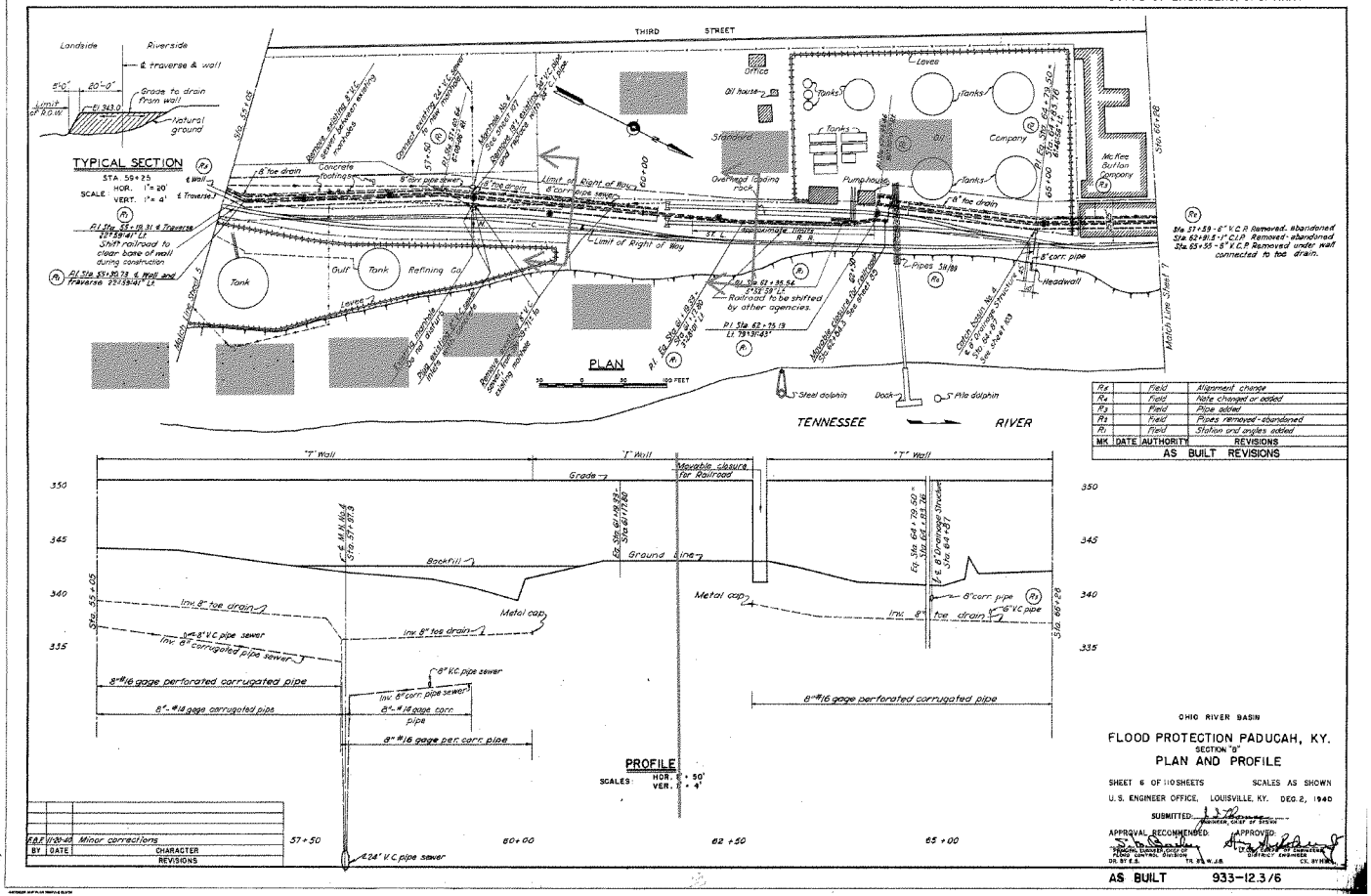
CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
PLAN AND PROFILE
SHEET 3 OF 110 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
933-12.3/3
AS BUILT REVISIONS
MK | DATE | AUTHORITY | REVISION
R1 | Field | Station and angles added
R2 | Field | Elevation added
R3 | Field | Angle added
R4 | Field | Change of riprap
R5 | Field | Change of levee toe - slope
R6 | Field | Profile change
R7 | Field | Water pipe change
PLAN
PROFILE
SCALES: HOR. 1" = 50' VERT. 1" = 4'
MEYERS STREET
ILLINOIS CENTRAL RAILROAD
Landside
New Levee
Net Grade
"T" Wall Grade
15" Sanitary sewer
C.B. No. 2 See sheet 102
Existing 5'x5' brick and concrete culvert
66" Drainage Structure Sta. 19+11 See sheets 110 & 111
Sta. 16+53 Begin Levee
Sta. 21+86.0 End Levee
Sta. 22+55
Sta. 11+25
Match Line Sheet 2
Match Line Sheet 4
Limit of Right of Way
Toe of landside fill
Fill to elevation of top of this bank
Fill to approx. El. 319.0
12" riprap on 9" gravel blanket
Existing 6" iron pipe. Remove Sta. 22+38.1 15' each side ℄ wall and abandon El. 335.8
Existing 6" V.C. Drain. Connect to toe drain. Remove 15' riverside of ℄. Plug & abandon.
Existing ¾" water pipe
Existing 4" gasoline line
Existing 6" C.I. pipe
Inlet Sta. 16+82 See sheet 101
Service opening Sta. 15+32.0 See sheet 62
Ramp Top width 6' Grade 10% Side slopes 1 on 2 No surfacing required
Tanks
Tank
Brick and debris
8" toe drain
12" Toedrain
18" corr. pipe welded to 66" corr. pipe El. 306.5
Existing headwall and 18" of concrete culvert to be removed
Trees
Slope 1 on 2.5
Ground line at toe
Ground Line
8" iron pipe
12" #14 gage perforated corrugated pipe
8" #16 gage perforated corrugated pipe
Inv. 12" toe drain
Inv. conc. gutter Landside
Inv. 8" toe drain
Landside fill El. 339.0
Landside fill El. 337.5
℄ Catch Basin No. 2
Sta. 21+86.0
Sta. 20+82
Sta. 17+20
Sta. 16+82
Sta. 16+53.0
Sta. 15+32.0
12+50
15+00
17+50
20+00
350
345
340
335
330
325
320
315
310
F.B.E. | 11-20-40 | Minor corrections
BY | DATE | CHARACTER REVISIONS
388


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
PLAN AND PROFILE
SHEET 4 OF 10 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE KY. DEC. 2, 1940
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
AS BUILT
933-12.3/4
REVISIONS
PLAN
PROFILE
HOR. 1" = 50'
VERT. 1" = 4'
Sta. 35+00
Sta. 30+00
Sta. 25+00
Sta. 23+23.18
Sta. 22+93
Sta. 21+27.30
Sta. 20+66.6
Sta. 20+61.49
Sta. 32+28.8
Sta. 32+50
Sta. 34+36.3
Joyce Watkins Company
Louisville
Tennessee
Clements St
Woodward St
Earley Pl.
Allen
Jefferson
Monroe
Madison
Harrison
Washington
Jackson
Adams
Monroe
Clay
Kentucky
Tennessee
Alley
Street
Avenue
Place
Court
Drive
Road
Boulevard
Lane
Terrace
Circle
Parkway
Highway
Bridge
Building
Warehouse
Office
Shop
Garage
Tank
Pump
Valve
Meter
Hydrant
Manhole
Catch Basin
Inlet
Outlet
Gate
Fence
Wall
Retaining Wall
Concrete
Asphalt
Gravel
Brick
Steel
Wood
Iron
Copper
Lead
Water
Gas
Sewer
Storm
Drain
Electric
Telephone
Telegraph
Cable
Conduit
Duct
Pole
Tower
Antenna
Transformer
Switch
Fuse
Meter
Light
Lamp
Signal
Sign
Post
Rail
Track
Road
Path
Walk
Curb
Gutter
Pavement
Surface
Base
Subgrade
Fill
Cut
Slope
Grade
Elevation
Station
Offset
Bearing
Distance
Angle
Curve
Tangent
Radius
Chord
Arc
Point
Line
Boundary
Property
Right of Way
Easement
Lease
Deed
Survey
Map
Plan
Profile
Section
Detail
Note
Legend
Scale
North
South
East
West
Northeast
Northwest
Southeast
Southwest
Center
Corner
Intersection
Junction
Crossing
Bridge
Tunnel
Culvert
Ditch
Channel
River
Creek
Lake
Pond
Reservoir
Dam
Levee
Floodwall
Revetment
Riprap
Gabion
Mattress
Jetty
Groin
Breakwater
Seawall
Bulkhead
Pier
Wharf
Dock
Slip
Basin
Harbor
Port
Terminal
Station
Depot
Yard
Shop
Roundhouse
Turntable
Switch
Signal
Crossing
Bridge
Tunnel
Culvert
Ditch
Channel
River
Creek
Lake
Pond
Reservoir
Dam
Levee
Floodwall
Revetment
Riprap
Gabion
Mattress
Jetty
Groin
Breakwater
Seawall
Bulkhead
Pier
Wharf
Dock
Slip
Basin
Harbor
Port
Terminal
Station
Depot
Yard
Shop
Roundhouse
Turntable
Switch
Signal
Crossing


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
PLAN AND PROFILE
SHEET 5 OF 110 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
AS BUILT
933-12.3/5
PLAN
PROFILE
ISLAND CREEK
AS BUILT REVISIONS

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



R₅		Field	Alignment change
R₄		Field	Note changed or added
R₃		Field	Pipe added
R₂		Field	Pipes removed - abandoned
R₁		Field	Station and angles added
MK	DATE	AUTHORITY	REVISIONS

AS BUILT REVISIONS

R₁ Sta 57+59 - 6" V.C.P. Removed - abandoned
Sta 62+81.5 - 1" C.I.P. Removed - abandoned
Sta 63+55 - 8" V.C.P. Removed under wall connected to toe drain.

R&R 11-30-48	Minor corrections	
BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

PLAN AND PROFILE

SHEET 6 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: ENGINEER, CHIEF OF SVSVN

APPROVAL RECOMMENDED: APPROVED:

CHIEF, FLOOD CONTROL DIVISION

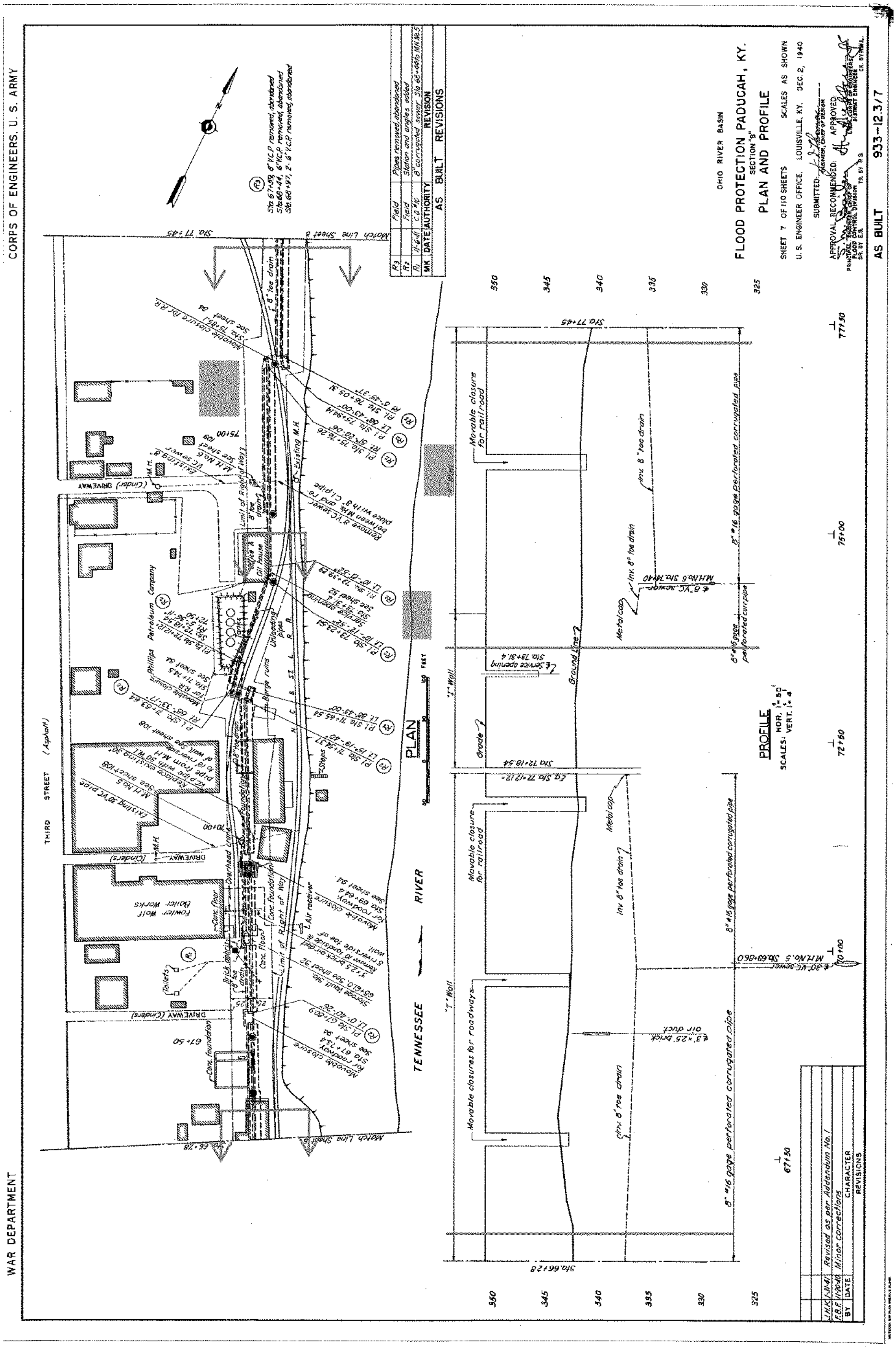
DIV. OF ENGINEERS

DISTRICT ENGINEER

DR. BY E.S. TR. BY W.J.B. CK. BY H.W.L.

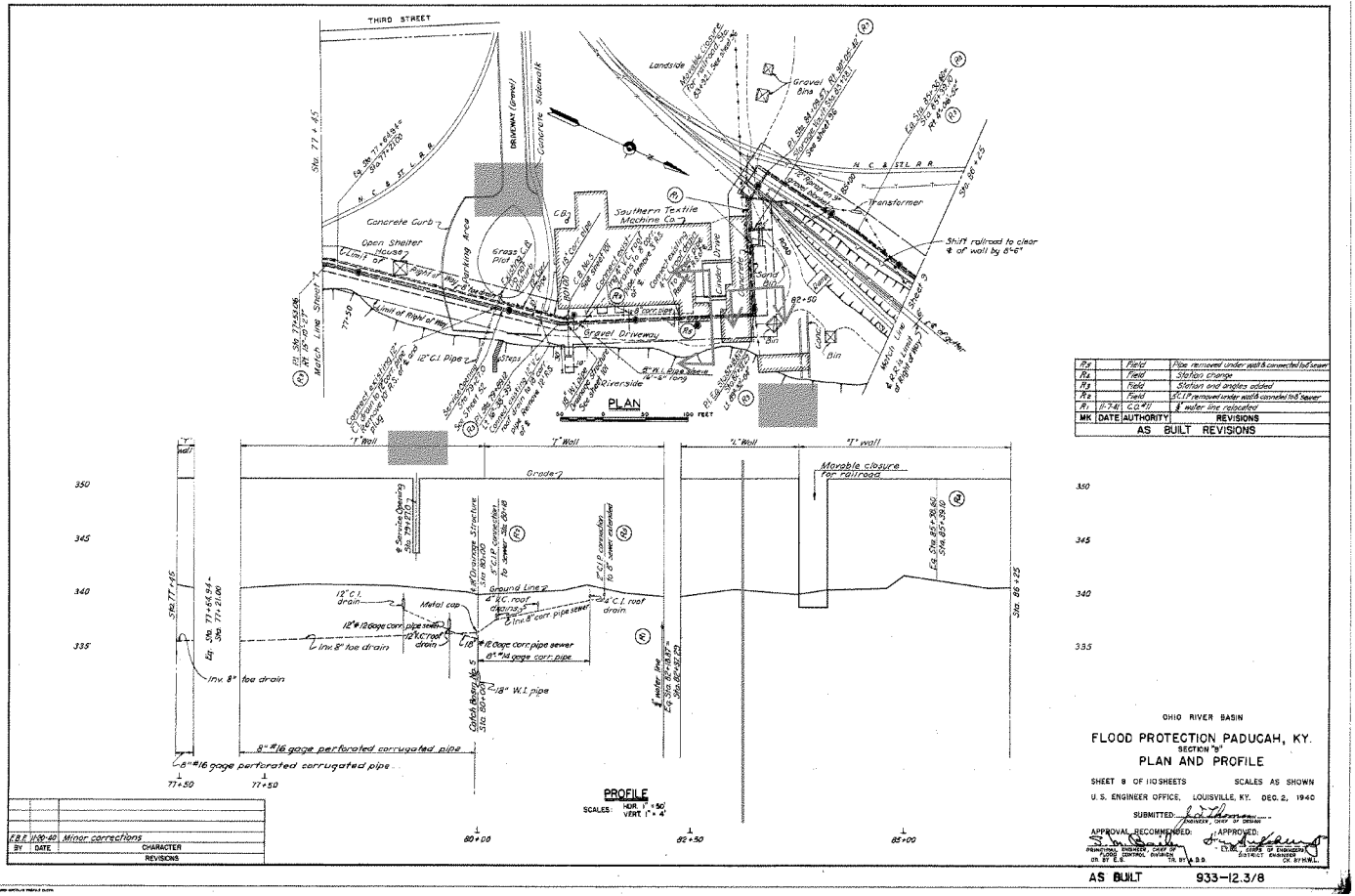
AS BUILT 933-12.3/6

669


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
THIRD STREET (Asphalt)
Fowler Wolf Boiler Works
Phillips Petroleum Company
TENNESSEE RIVER
PLAN
PROFILE
SCALES: HOR. 1" = 50' VERT. 1" = 4'
8" #16 gage perforated corrugated pipe
Ground Line
Movable closures for roadways
Movable closure for railroad
"T" Wall
Match Line Sheet 8
R3 Field Pipes removed, abandoned
R2 Field Station and angles added
R1 11-6-41 C.O. #10 8" corrugated sewer Sta 68+44 to M.H. No. 5
MK DATE AUTHORITY REVISION
AS BUILT REVISIONS
J.H.K. 1-31-41 Revised as per Addendum No. 1
F.B.F. 11-20-40 Minor corrections
BY DATE CHARACTER
REVISIONS
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
PLAN AND PROFILE
SHEET 7 OF 110 SHEETS SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
AS BUILT 933-12.3/7

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



R5		Field	Pipe removed under wall & connected to 8" sewer
R4		Field	Station change
R3		Field	Station and angles added
R2		Field	8" C.I.P removed under north & connected to 8" Sewer
R1	(1-741)	C.O. #1	4" water line relocated
MK	DATE	AUTHORITY	REVISIONS

AS BUILT REVISIONS

F.B.E. W.O. 40		Minor corrections
BY	DATE	CHARACTER
REVISIONS		

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

PLAN AND PROFILE

SHEET 8 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

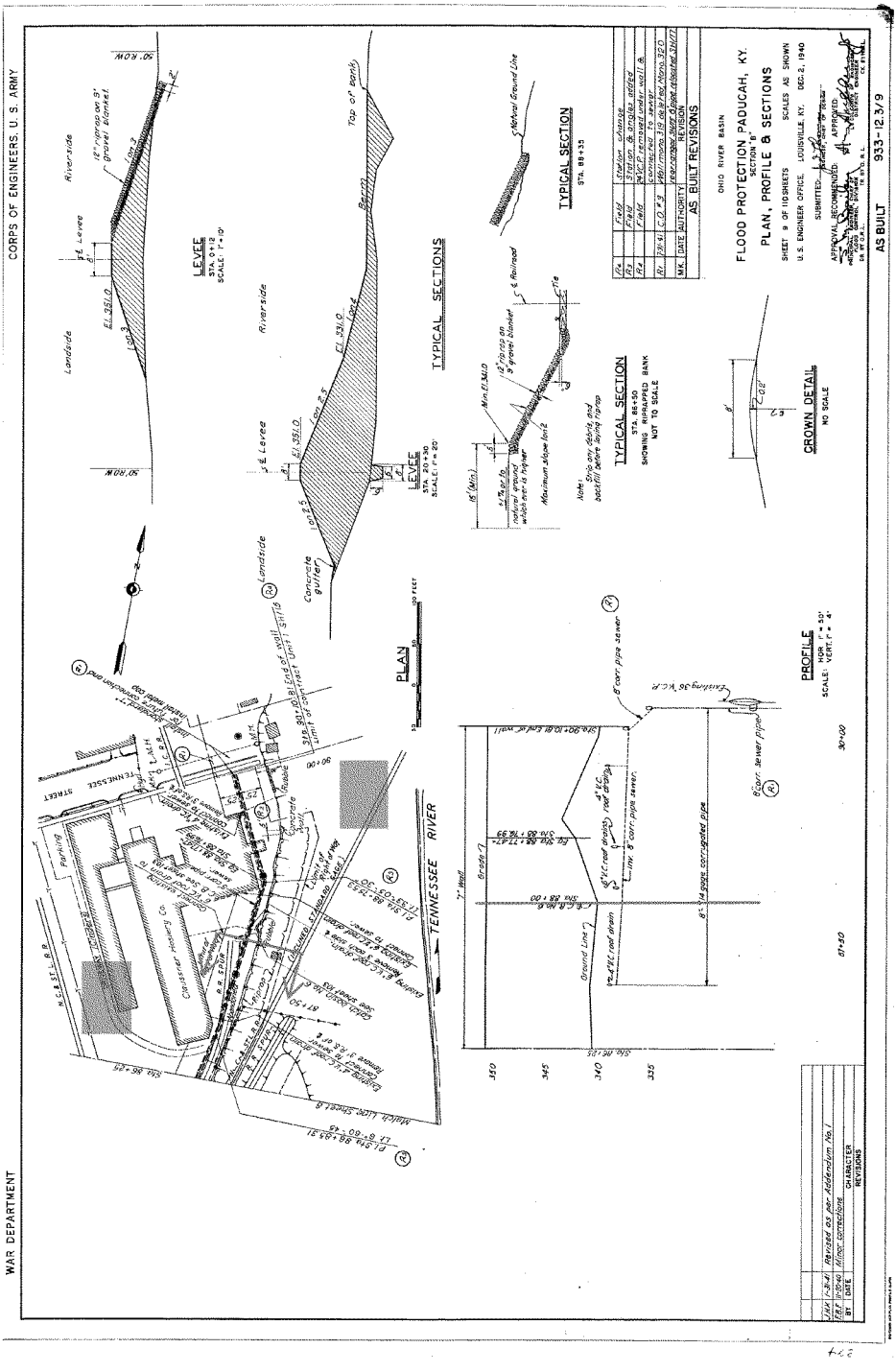
SUBMITTED: _____ ENGINEER, CHIEF OF DESIGN

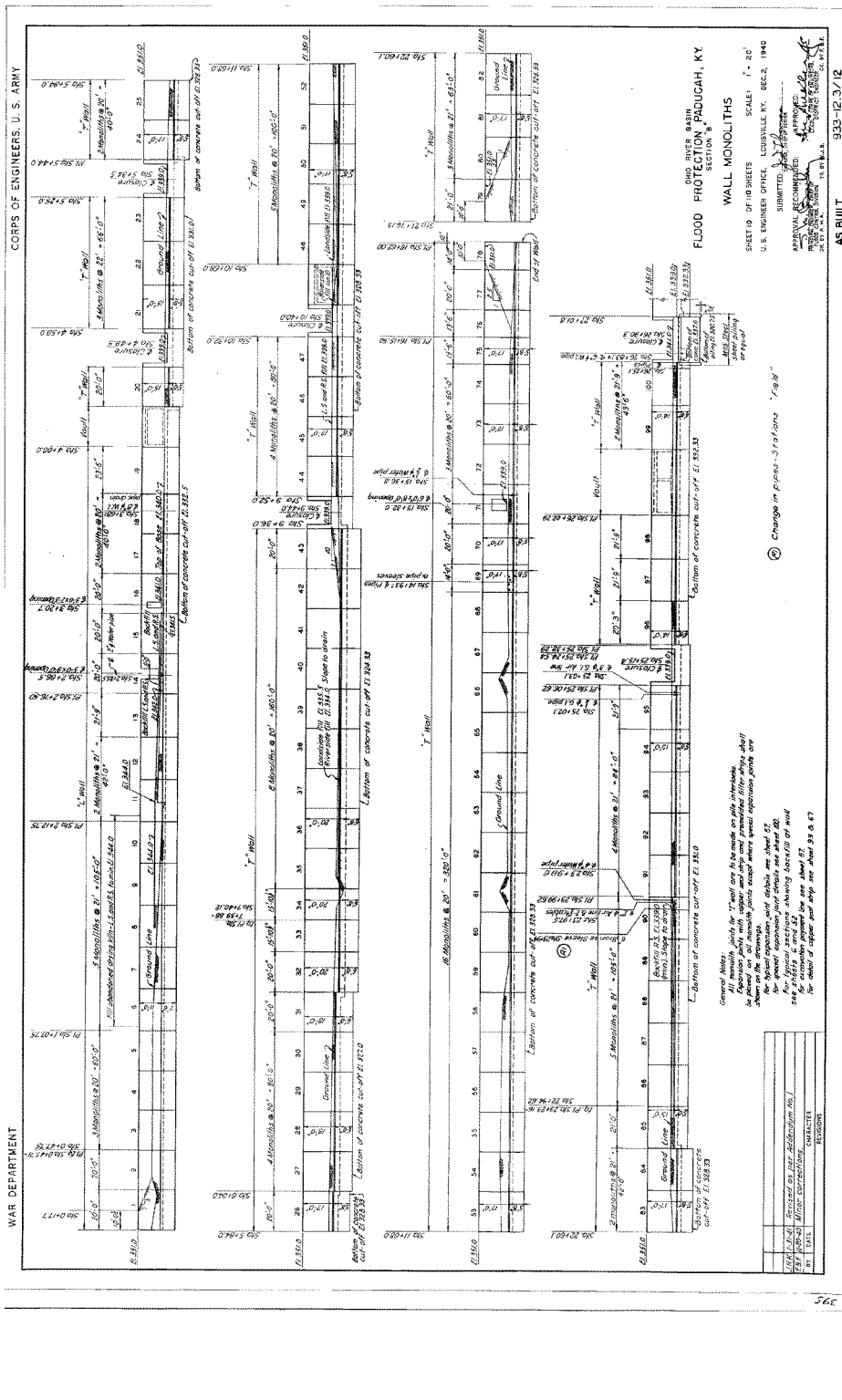
APPROVAL RECOMMENDED: _____ PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION, OR. BY E.E.

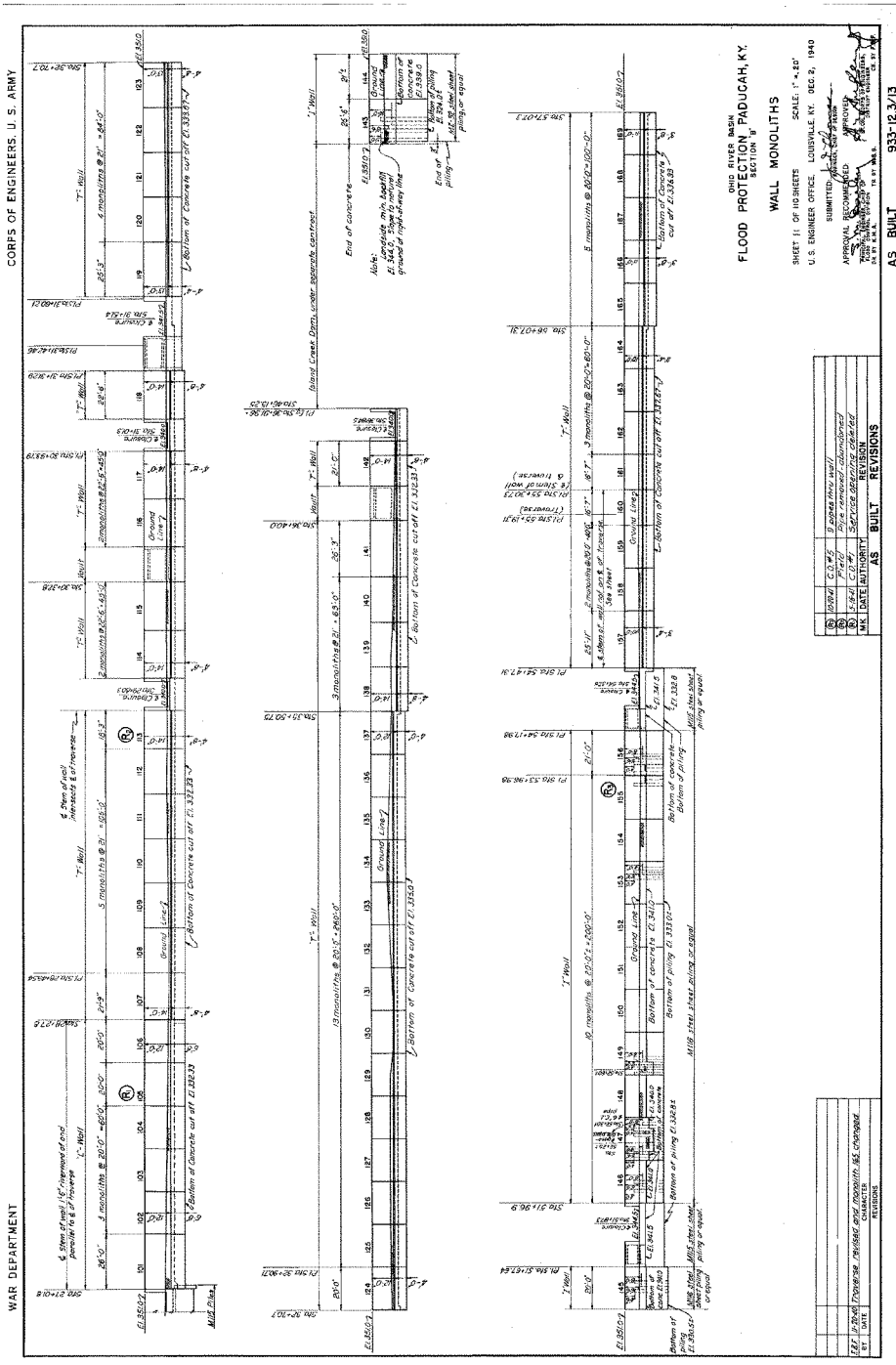
APPROVED: _____ LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER, OR. BY M.W.L.

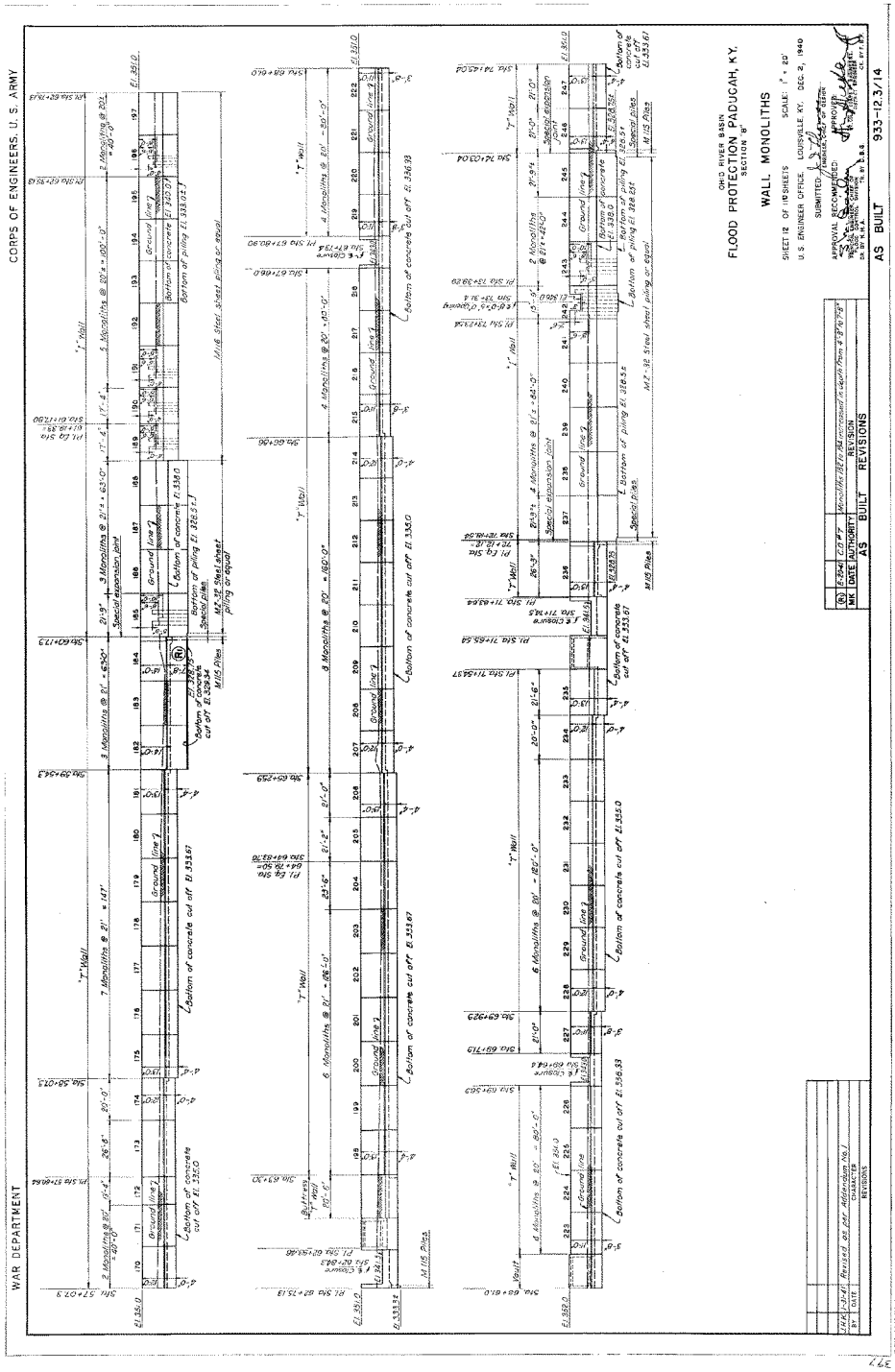
AS BUILT 933-12.3/8

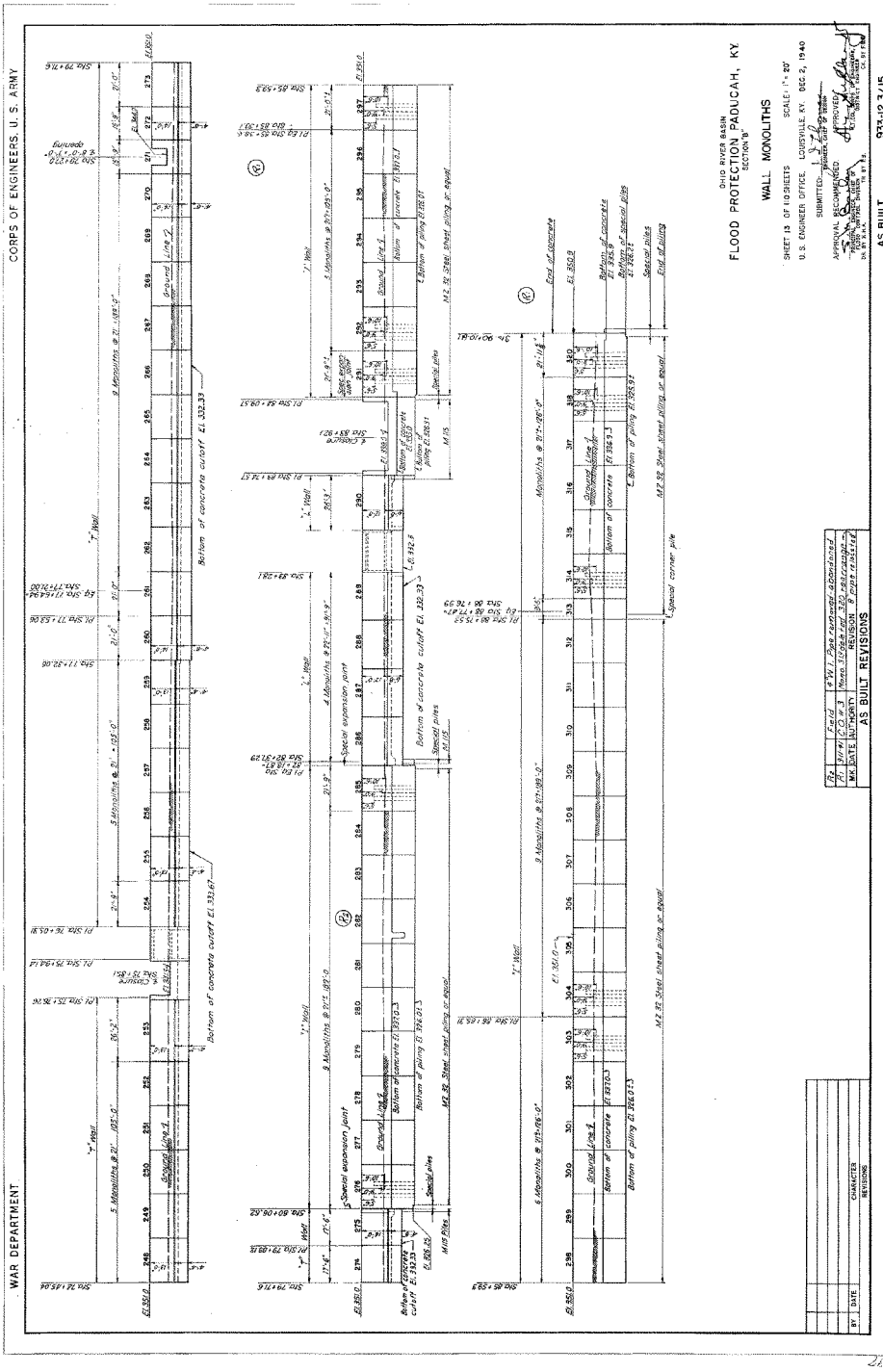
699

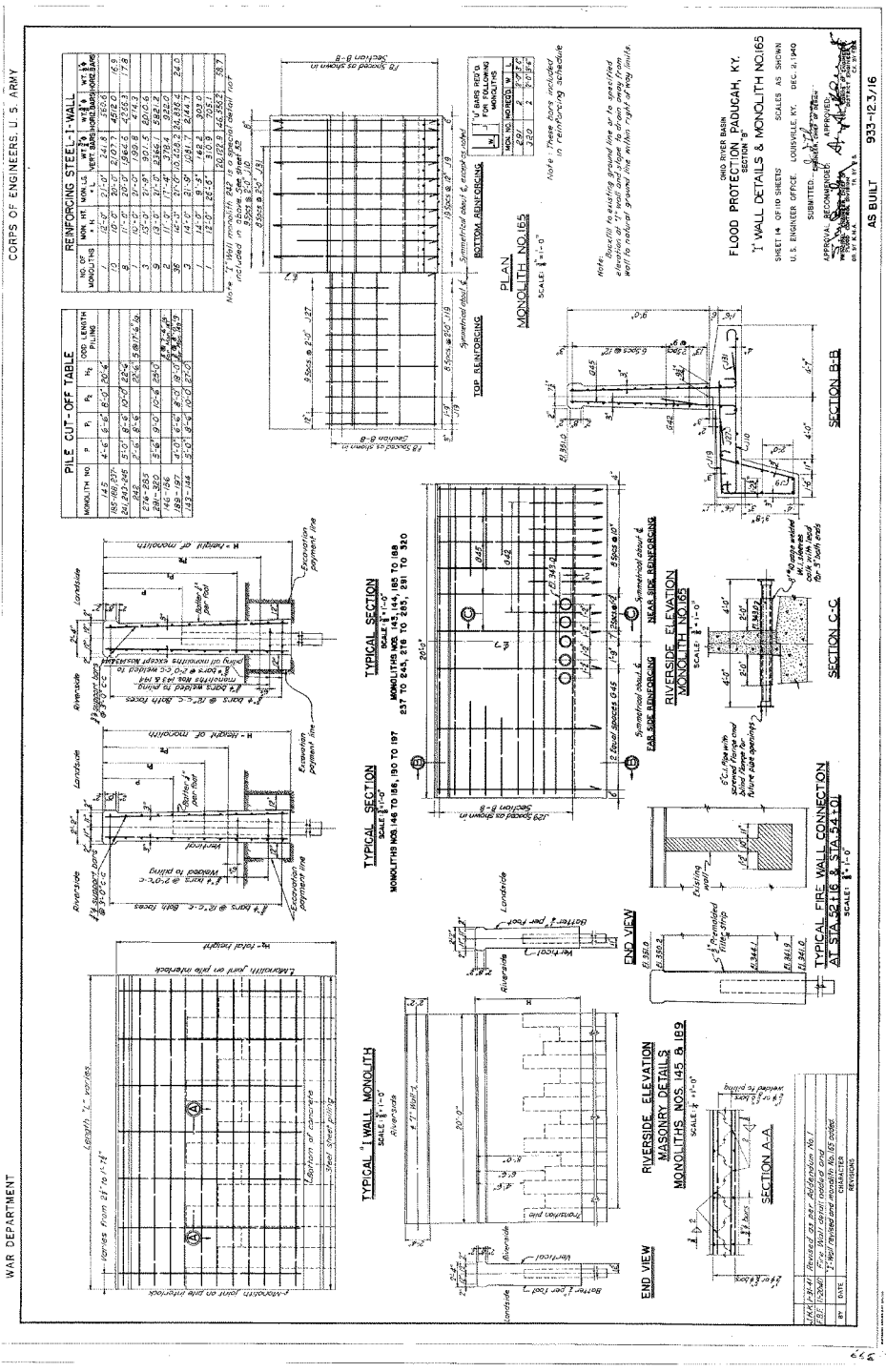

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
SECTION 8
PLAN, PROFILE & SECTIONS
OHIO RIVER BASIN
SHEET 9 OF 110 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
AS BUILT
933-12.3/9
AS BUILT REVISIONS
PLAN
LEVEE
TYPICAL SECTIONS
TYPICAL SECTION
CROWN DETAIL
PROFILE
TENNESSEE RIVER
Ohio River Basin


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION 8
WALL MONOLITHS
SHEET 10 OF 10 SHEETS
SCALE: 1" = 20'
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED:
APPROVED:
APPROVAL RECOMMENDED:
AS BUILT
933-12.3/12


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION AT PADUCAH, KY.
SECTION 16
WALL MONOLITHS
SHEET 11 OF 16 SHEETS
SCALE: 1" = 20'
U.S. ENGINEER OFFICE, LOUISVILLE KY. DEC. 9, 1940
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
AS BUILT
933-12.3/13

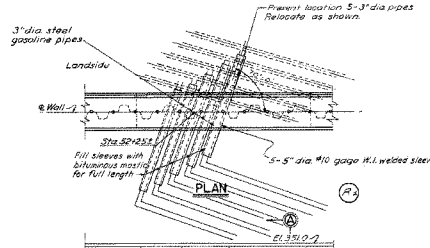

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
WALL MONOLITHS
SHEET 12 OF 18 SHEETS
SCALE: 1" = 20'
U.S. ENGINEER OFFICE, LOUISVILLE KY. DEC 2, 1940
SUBMITTED
APPROVED
APPROVAL RECOMMENDED:
AS BUILT
933-12.3/14
REVISIONS
DATE
AS BUILT
DATE AUTHORITY
Revised as per Addendum No.1
Monolithic Slabs increased in depth from 4'-6" to 5'-0"
"T" Wall
Bottom of concrete cut off El. 335.0
Bottom of piling El. 326.51
Special Piles
M/S Piles
Special expansion joint
Ground line

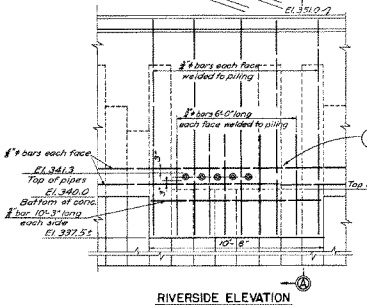

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
SECTION "B"
FLOOD PROTECTION PADUCAH, KY
WALL MONOLITHS
SHEET 13 OF 18 SHEETS
SCALE: 1" = 20'
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC 2, 1940
SUBMITTED
APPROVED
AS BUILT REVISIONS
AS BUILT
933-12.3/15


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
"I" WALL DETAILS & MONOLITH NO.165
OHIO RIVER BASIN
SECTION "B"
SCALES AS SHOWN
DEC. 31, 1940
AS BUILT
933-12.3/16
PILE CUT-OFF TABLE
REINFORCING STEEL - I-WALL
PLAN
MONOLITH NO.165
TYPICAL SECTION
TYPICAL "I" WALL MONOLITH
RIVERSIDE ELEVATION
MASONRY DETAILS
MONOLITHS NOS. 145 & 189
RIVERSIDE ELEVATION
MONOLITH NO.165
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
TYPICAL FIRE WALL CONNECTION
AT STA. 52+16 & STA. 54+01
SECTION A-A
SECTION B-B
SECTION C-C
END VIEW
TOP REINFORCING
BOTTOM REINFORCING

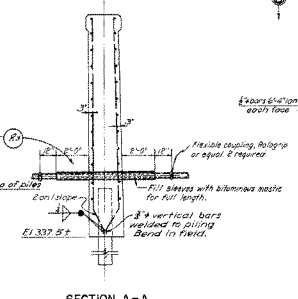
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

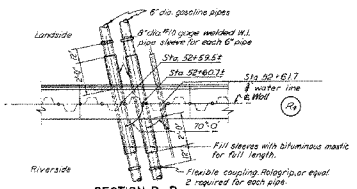




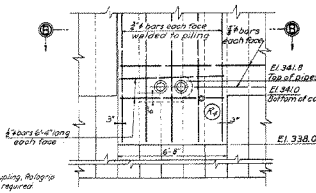
RIVERSIDE ELEVATION
STA. 52+25±
SCALE: ⅜" = 1'-0"



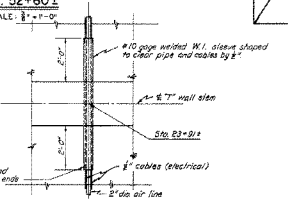
SECTION A-A
SCALE: ⅜" = 1'-0"



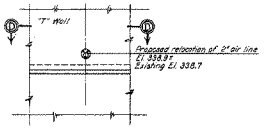
SECTION B-B



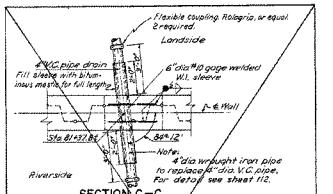
RIVERSIDE ELEVATION
STA. 52+60±
SCALE: ⅜" = 1'-0"



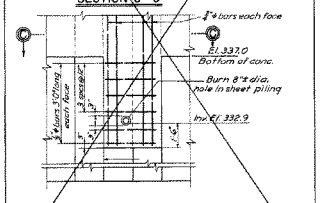
SECTION D-D



RIVERSIDE ELEVATION
STA. 23+91±
SCALE: ½" = 1'-0"



SECTION C-C



RIVERSIDE ELEVATION
STA. 81+37.8
SCALE: ⅜" = 1'-0"
DELETED

R₄		Field	¾" water pipe
R₃		Field	Pipe removed abandonded
R₂		Field	Pipes relocated
R₁		Field	Pipe removed under wall & conn to 8" sewer
MK.	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

T.B.F.	11-20-40	Reinforcing revised.
BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MISCELLANEOUS PIPES THRU WALL

SHEET 15 OF 110 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] ENGINEER, CHIEF OF DIVISION

APPROVAL RECOMMENDED: [signature] CHIEF, ENGINEERING DIVISION FLOOD CONTROL DIVISION

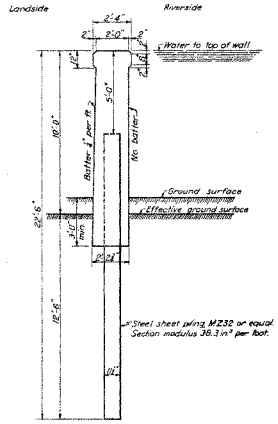
APPROVED: [signature] DISTRICT ENGINEER

DR. BY D.C.B. - CH.S. TR. BY R.W.J. CK. ST H.W.D.

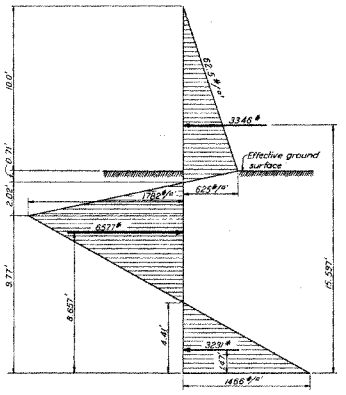
AS BUILT

933-12.3/17

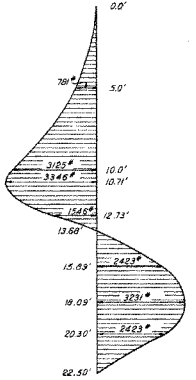
976



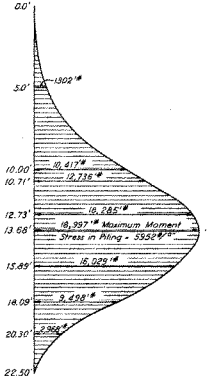
TYPICAL SECTION
SCALE: $\frac{1}{8}$" = 1'-0"



LOADING DIAGRAM
SCALE: HORIZONTAL 1" = 100#
VERTICAL $\frac{1}{8}$" = 1'-0"



SHEAR DIAGRAM
SCALE: HORIZONTAL 1" = 1800#
VERTICAL $\frac{1}{8}$" = 1'-0"



MOMENT DIAGRAM
SCALE: HORIZONTAL 1" = 5000 FT. LBS.
VERTICAL $\frac{1}{8}$" = 1'-0"

I. General Requirements.
A. Combined reinforced concrete and steel sheet piling structure designed as a cantilever and secured from sliding and overturning by penetration of steel sheet piling below ground surface.
B. Protection - (3 feet above 1937 High Water)
C. Bottom of concrete shall be a minimum of 3 feet below ground surface for protection against frost action and air circulation.
D. Structure designed for water to top of wall on riverside.

II Basic Assumptions.
A. Both landside and riverside earth assumed to be saturated.
B. Active force on the wall to consist of hydrostatic pressure only, with no additional fluid pressure from the saturated earth fluxsolution.
C. Passive resistance developed by the undisturbed saturated earth is derived from experimental observations.
D. Friction between the wall and the earth neglected.

III. Allowable Working Stress.
A. Steel sheet piling 20000 lbs. per sq. in.
B. Steel reinforcement 18000 lbs. per sq. in.
C. Concrete.
1. Ultimate compressive strength of 28 days 3000 lbs. per sq. in.
2. Compression-extreme fibre stress. 1200 lbs. per sq. in.
3. Shear 60 lbs. per sq. in.
4. Bond 150 lbs. per sq. in.

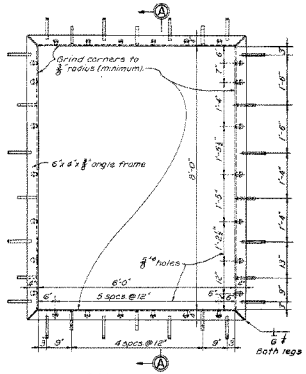
IV. Weights and Pressures.
A. Weights.
1. Water 62.5 lbs. per cu. ft.
2. Saturated earth. 125 lbs. per cu. ft.
B. Active pressures.
1. Water 62.5 lbs. per cu. ft.

T.B.F.	9-28-40	Station changed in Mk.	
BY	DATE	CHARACTER	
		REVISIONS	

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
DESIGN DATA STA. 72+50
SHEET 16 OF 110 SHEETS SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED: [signature] Engineer, Chief of Section
APPROVAL RECOMMENDED: [signature] Project Engineer
APPROVED: [signature] By Order of the Secretary of War, District Engineer
DR. BY J.H.K. TR. BY C.A.M. CK. BY E.M.S.

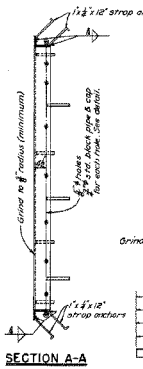
AS BUILT 933-12.3/18

677

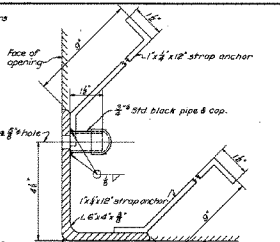


DETAIL OF BULKHEAD FRAME STA.15+32.0

MAKE: 1 MARK: BF5 WT: 383# EACH
MATERIAL: STRUCTURAL STEEL
SCALE: ½" = 1'-0"

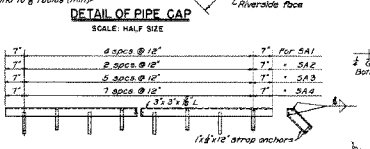


SECTION A-A



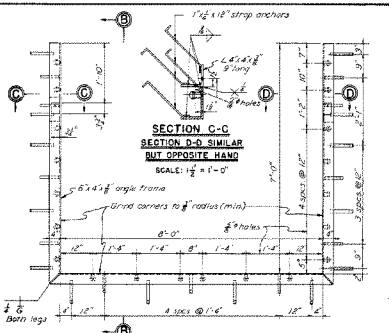
DETAIL OF PIPE CAP

SCALE: HALF SIZE



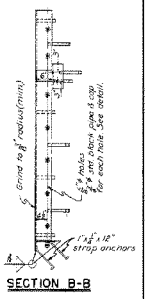
SILL ANGLE

SEE SCHEDULE
MATERIAL: STRUCTURAL STEEL
SCALE: ½" = 1'-0"

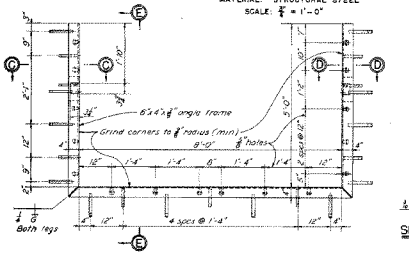


DETAIL OF BULKHEAD FRAME STA.27+96.2
& STA.79+27.0

MAKE: 2 MARK: BF4 WT: 309# EACH
MATERIAL: STRUCTURAL STEEL
SCALE: ½" = 1'-0"

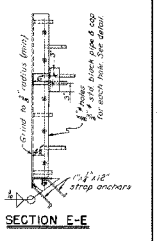


SECTION B-B

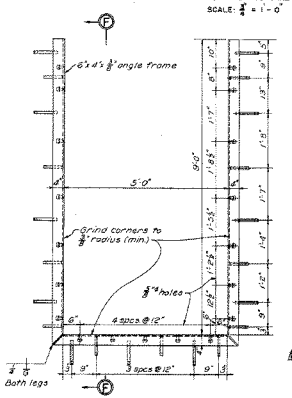


DETAIL OF BULKHEAD FRAME STA.73+31.4

MAKE: 1 MARK: BF3 WT: 255#
MATERIAL: STRUCTURAL STEEL
SCALE: ½" = 1'-0"

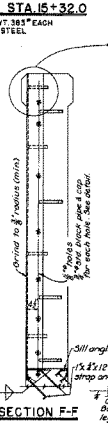


SECTION E-E

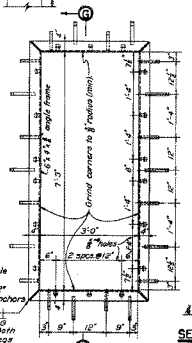


DETAIL OF BULKHEAD FRAME STA.2+86.5

MAKE: 1 MARK: BF1 WT: 311#
MATERIAL: STRUCTURAL STEEL
SCALE: ½" = 1'-0"



SECTION F-F



SECTION G-G

DETAIL OF BULKHEAD FRAME STA.3+20.7

MAKE: 1 MARK: BF2 WT: 284#
MATERIAL: STRUCTURAL STEEL
SCALE: ½" = 1'-0"

SCHEDULE OF SILL ANGLES

STATION	LENGTH	NO. REQD.	WT.	MARK
2+86.5	5'-2"	1	35.8	SA1
3+20.7	3'-2"	1	21.9	SA2
15+32.0	6'-2"	1	42.7	SA3
27+96.2	5'-2"	1	37.0	SA4
73+31.4	5'-2"	1	37.0	SA4
79+27.0	5'-2"	1	37.0	SA4

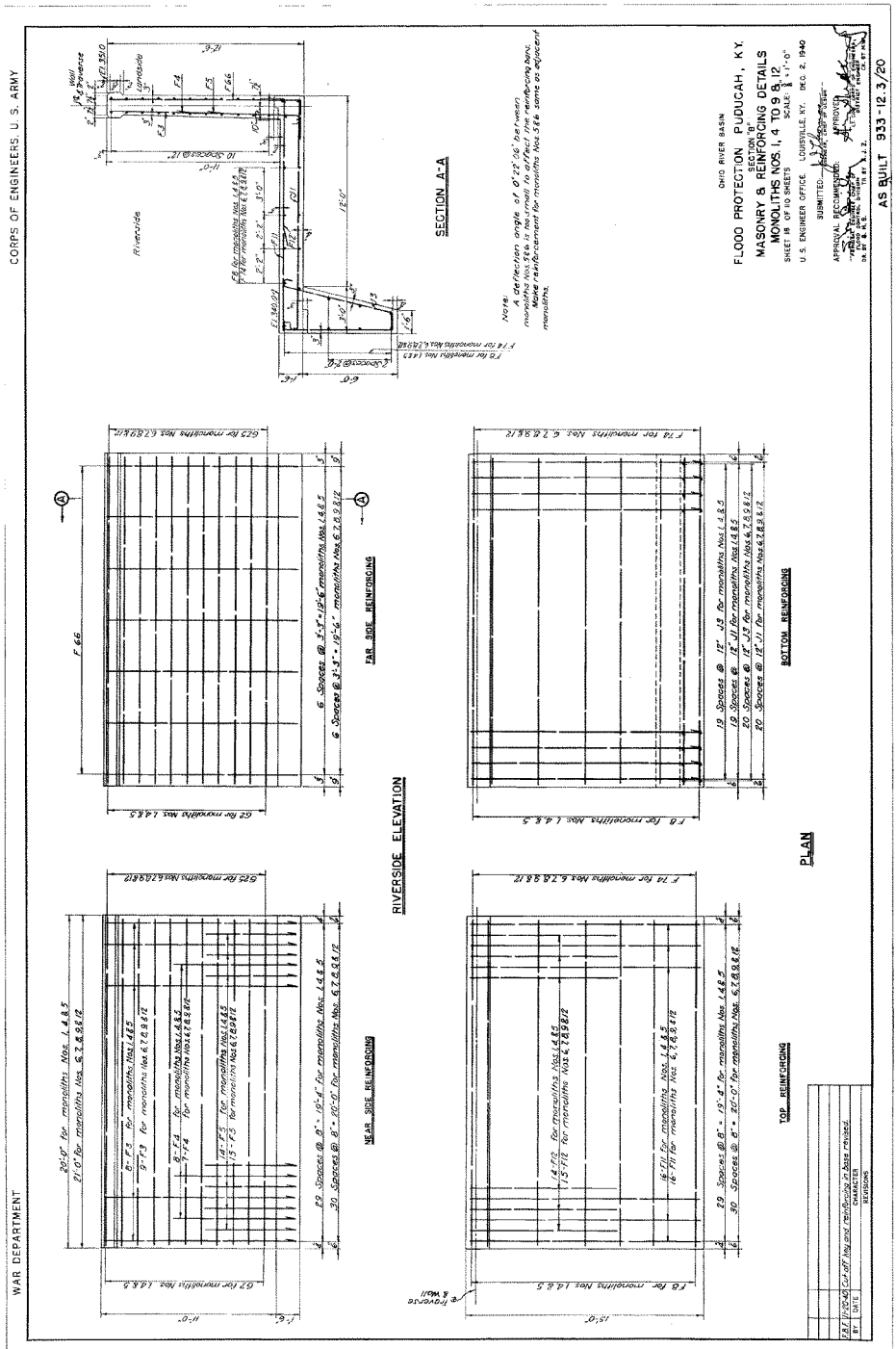
BY	DATE	CHARACTER OF REVISIONS
F.B.F.	11-20-40	Pipe cap detail revised

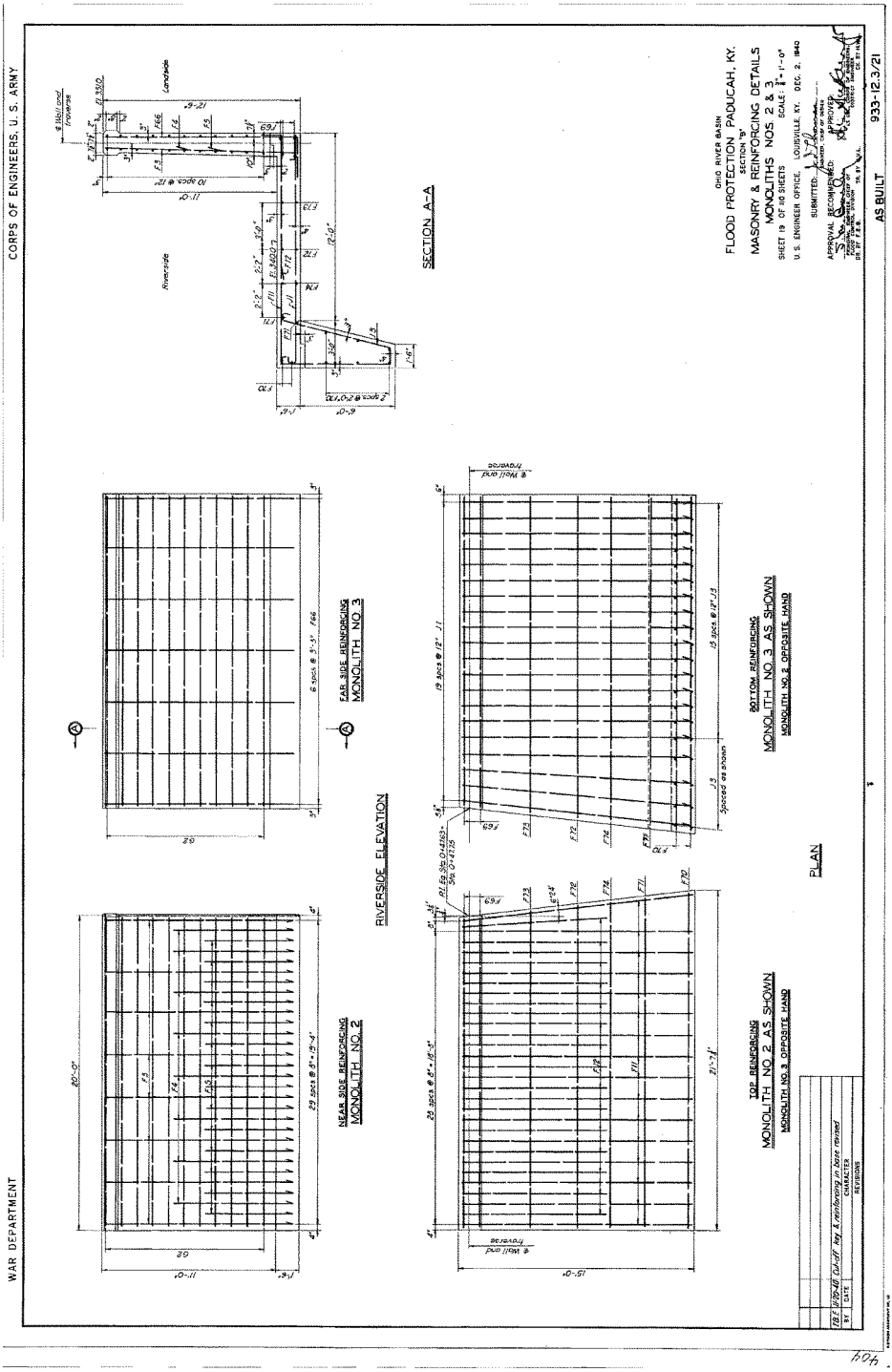
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"

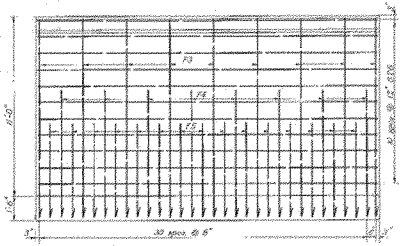
SERVICE OPENINGS

SHEET 17 OF 110 SHEETS SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED: [signature] Assistant Chief of Division
APPROVAL RECOMMENDED: [signature] Chief of Flood Control Division
APPROVED: [signature] Colonel, Corps of Engineers, District Engineer
TRACED BY: H.E.S. CHECKED BY: H.N.A. DR. BY: K.N.A. TO BY: B.S.S.-C.C.P. CK. BY: F.B.F.

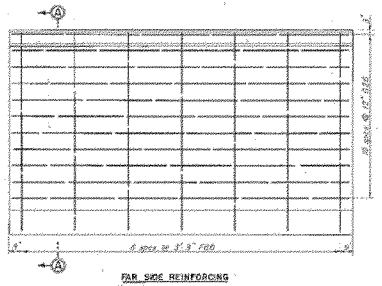
AS BUILT 933-12.3/19


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 1, 4 TO 9, 12.
SHEET 18 OF 10 SHEETS
SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
AS BUILT 933-12.3/20
SECTION A-A
RIVERSIDE ELEVATION
PLAN
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
TOP REINFORCING
BOTTOM REINFORCING
Note:
A deflection angle of 0°22'26" between monoliths Nos 5 & 6 is neutral to offset the reinforcing bars. Same reinforcement for monoliths Nos 5 & 6 same as adjacent monoliths.


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 2 & 3
SHEET 19 OF 110 SHEETS
SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVAL RECOMMENDED
AS BUILT
933-12.3/21
SECTION A-A
RIVERSIDE ELEVATION
NEAR SIDE REINFORCING MONOLITH NO. 2
FAR SIDE REINFORCING MONOLITH NO. 3
TOP REINFORCING MONOLITH NO. 2 AS SHOWN
MONOLITH NO. 3 OPPOSITE HAND
BOTTOM REINFORCING MONOLITH NO. 3 AS SHOWN
MONOLITH NO. 2 OPPOSITE HAND
PLAN
Riverside
Landside
Riverside
Landside

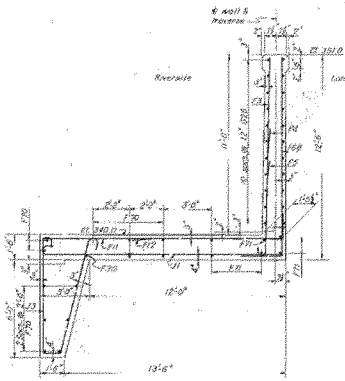


NEAR SIDE REINFORCING
MONOLITH NO. 10 AS SHOWN
MONOLITH NO. 11 OPPOSITE HAND

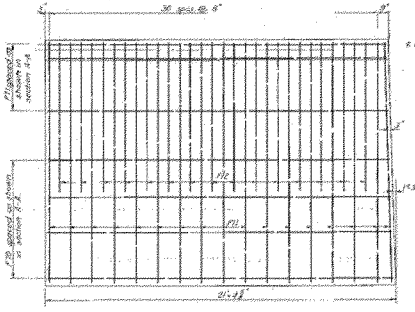


FAR SIDE REINFORCING
MONOLITH NO. 11 AS SHOWN
MONOLITH NO. 10 OPPOSITE HAND

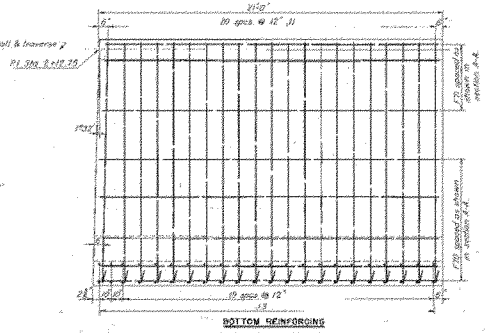
RIVERSIDE ELEVATION



SECTION A-A



TOP REINFORCING
MONOLITH NO. 10 AS SHOWN
MONOLITH NO. 11 OPPOSITE HAND



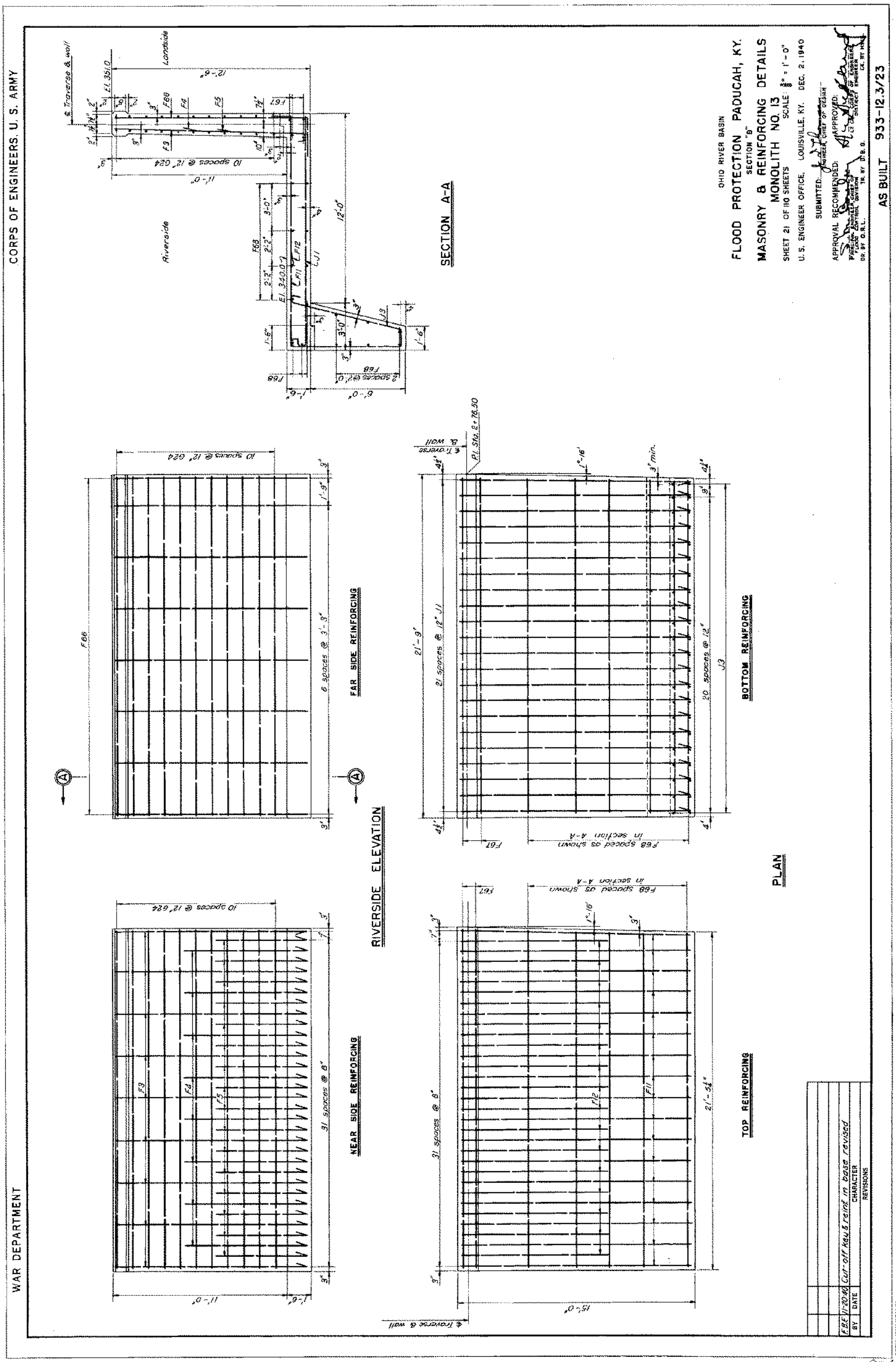
BOTTOM REINFORCING
MONOLITH NO. 11 AS SHOWN
MONOLITH NO. 10 OPPOSITE HAND

PLAN

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "S"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 10 & 11
SHEET 20 OF NO SHEETS SCALE: 1/4" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 12, 1940

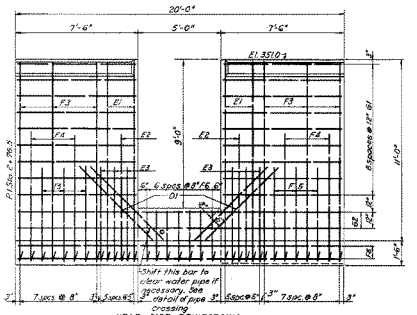
SUBMITTED:
APPROVAL RECOMMENDED: APPROVED:

AS BUILT 933-12.3/22

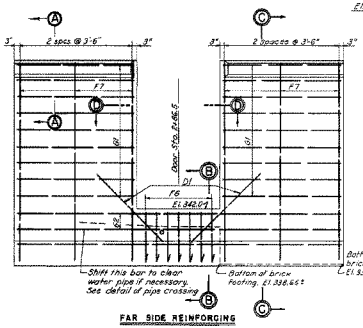

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
SECTION A-A
Riverside
Landside
RIVERSIDE ELEVATION
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
PLAN
BOTTOM REINFORCING
TOP REINFORCING
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITH NO. 13
SHEET 21 OF 110 SHEETS
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT 933-12.3/23
CHARACTER
REVISIONS
BY
DATE

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



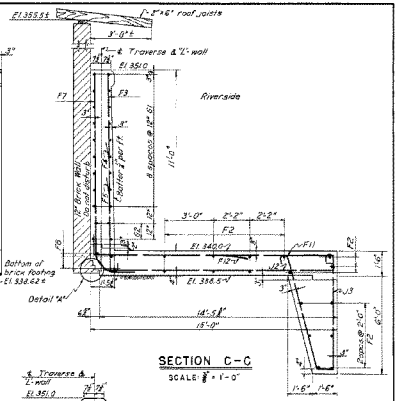
NEAR SIDE REINFORCING



FAR SIDE REINFORCING

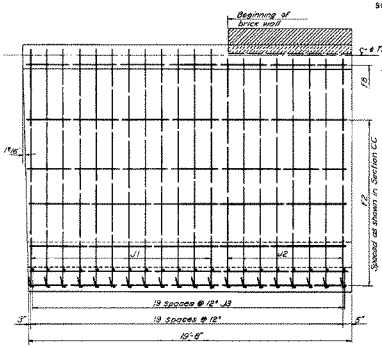
RIVERSIDE ELEVATION

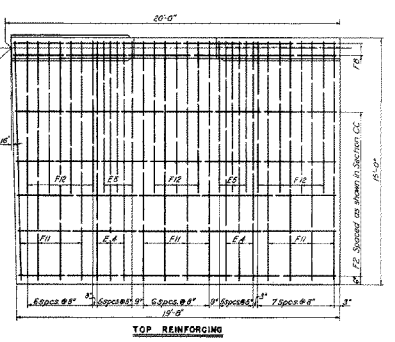
SCALE: $\frac{3}{8}$" = 1'-0"



SECTION C-C

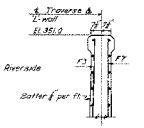
SCALE: $\frac{3}{8}$" = 1'-0"





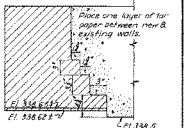
BOTTOM REINFORCING

TOP REINFORCING



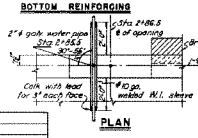
SECTION A-A

SCALE: $\frac{3}{8}$" = 1'-0"

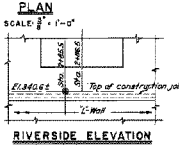


DETAIL 'A'

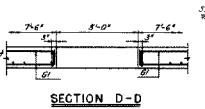
SCALE: 1$\frac{1}{2}$" = 1'-0"



PLAN

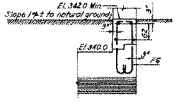


RIVERSIDE ELEVATION



SECTION D-D

SCALE: $\frac{3}{8}$" = 1'-0"



SECTION B-B

SCALE: $\frac{3}{8}$" = 1'-0"

DETAIL OF UTILITY CROSSING

SCALE: $\frac{3}{8}$" = 1'-0"

REVISIONS		
CHARACTER	DATE	BY
E.B.F. U-20-40 Cut off key & reinforcing in base revised.		

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITH NO. 14

SHEET 22 OF NO SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: _____ ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: _____ CHIEF, ENGINEERING DIVISION

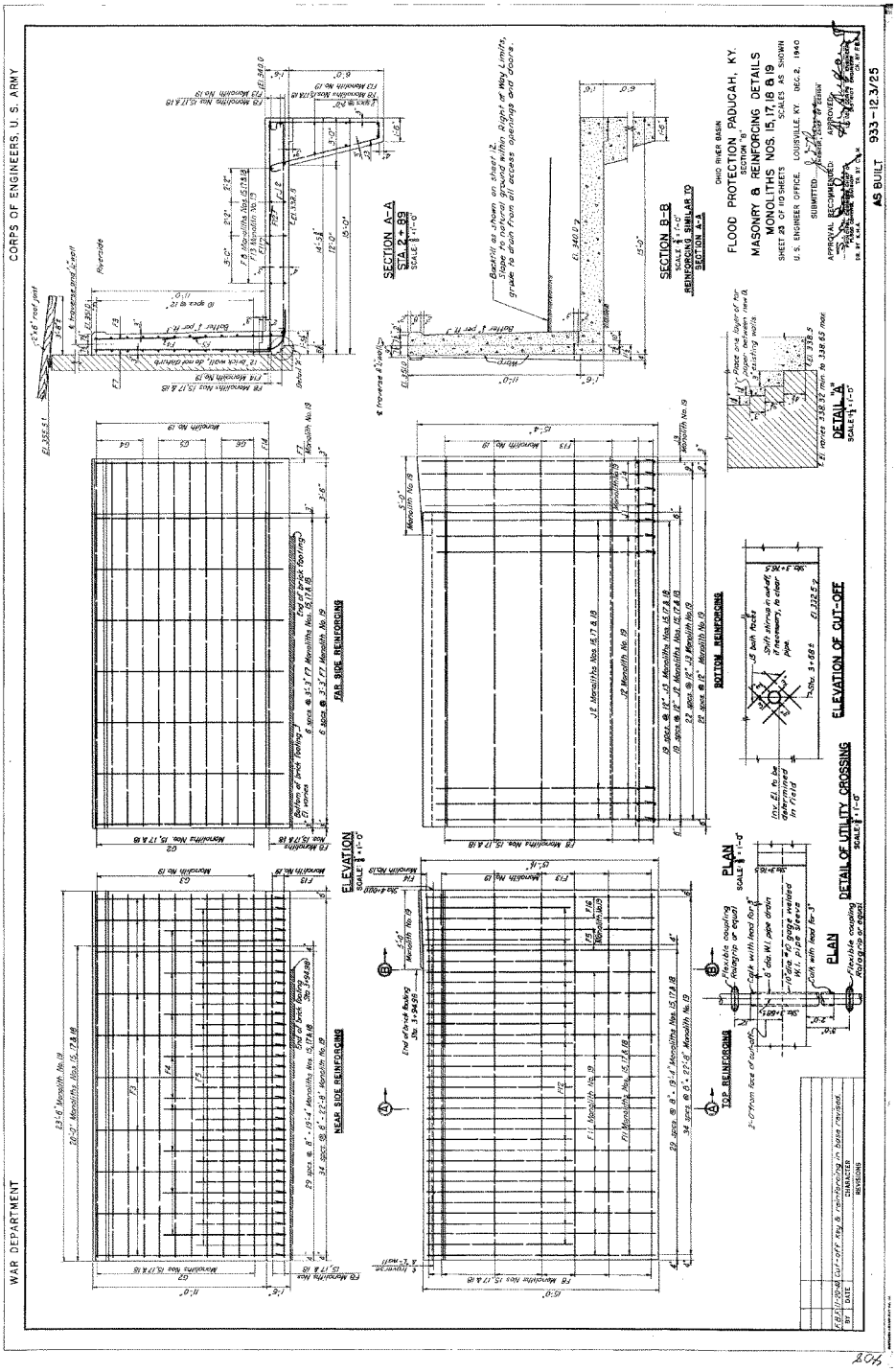
APPROVED: _____ DISTRICT ENGINEER

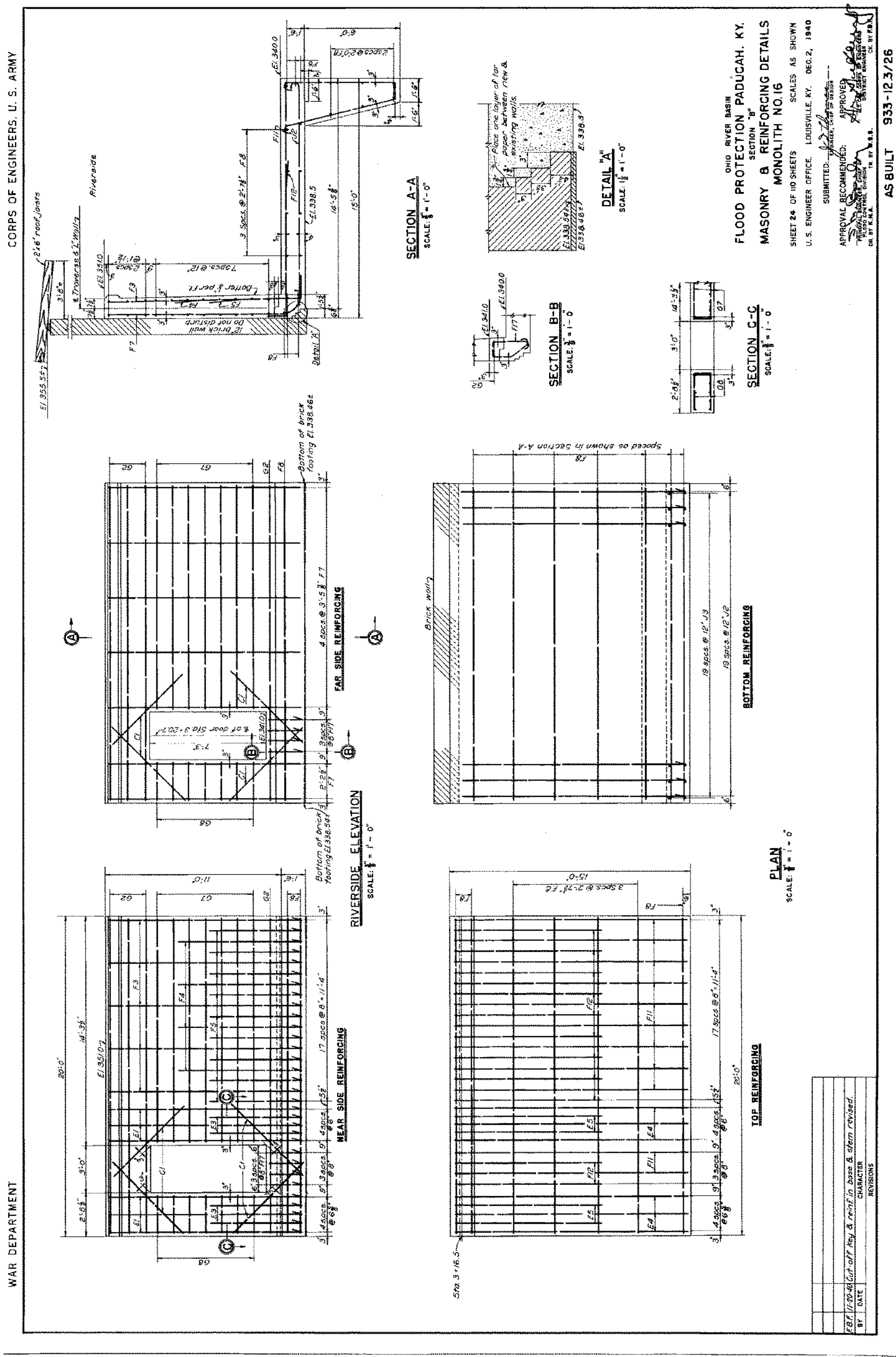
SR. BY M.H.A. — TR. BY F.E.B. — CK. BY F.B.H.

AS BUILT 933-12.3/24

683

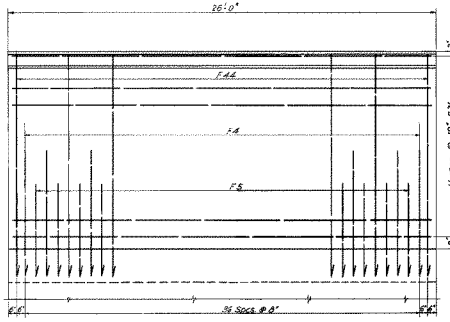
407


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION 19
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 15, 17, 18 & 19
SHEET 29 OF 110 SHEETS SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
AS BUILT 933-12.3/25
SECTION A-A
STA 2+99
SCALE 1"=1'-0"
SECTION B-B
SCALE 1"=1'-0"
REINFORCING SIMILAR TO SECTION A-A
DETAIL-A
SCALE 1"=1'-0"
ELEVATION
SCALE 1"=1'-0"
PLAN
SCALE 1"=1'-0"
DETAIL OF UTILITY CROSSING
SCALE 1"=1'-0"
ELEVATION OF CUT-OFF
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
BOTTOM REINFORCING
TOP REINFORCING
Monolith No. 19
Monolith Nos. 15, 17 & 18
Riprap
Backfill as shown on sheet 12. Slope to natural ground within Right of Way Limits, grade to drain from all excess openings of cut-off.
Flexible coupling Rockgrip or equal
Cast with lead for 3"
6" dia. W.I. pipe sleeve
Shut off valve at cut-off if necessary, to clear pipe
Inv. El. to be determined in field
Flexible coupling Rockgrip or equal
Cast with lead for 3"
6" dia. W.I. pipe sleeve
Concrete cut-off Mg. & reinforcing in Sect. revised
REVISIONS
BY DATE

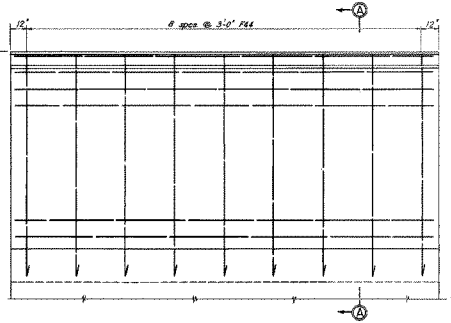

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
SECTION A-A
SECTION B-B
SECTION C-C
DETAIL "A"
RIVERSIDE ELEVATION
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
BOTTOM REINFORCING
TOP REINFORCING
PLAN
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITH NO. 16
SHEET 24 OF 110 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
AS BUILT
933-12.3/26

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



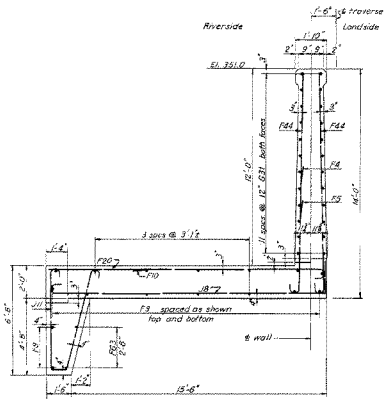
NEAR SIDE REINFORCING



FAR SIDE REINFORCING

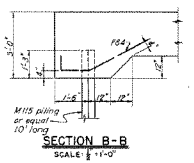
RIVERSIDE ELEVATION

SCALE: $\frac{1}{8}$" = 1'-0"



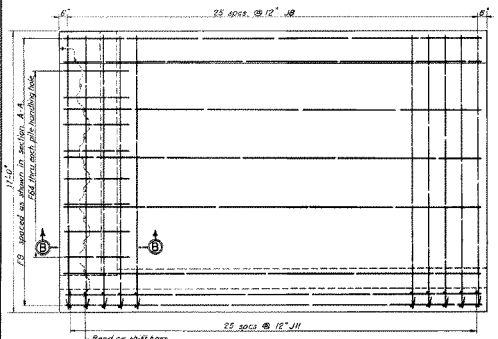
SECTION A-A

SCALE $\frac{1}{8}$" = 1'-0"

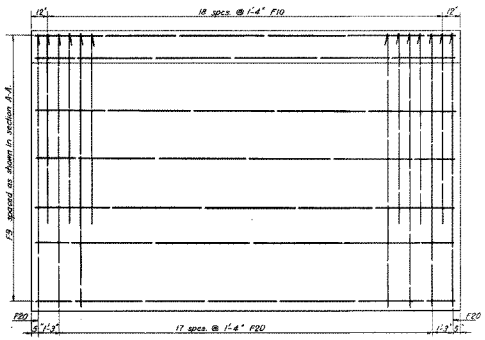


SECTION B-B

SCALE: $\frac{1}{8}$" = 1'-0"



BOTTOM REINFORCING



TOP REINFORCING

PLAN

SCALE: $\frac{1}{8}$" = 1'-0"

BY	DATE	CHARACTER
F.B.F.	11/26/40	Cut-off key and reinforcing in base revised.
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITH NO. 101

SHEET 25 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: APPROVED:

DIVISION ENGINEER, CHIEF OF ENGINEERS DIVISION, OHIO RIVER DIVISION

DISTRICT ENGINEER, LOUISVILLE DISTRICT

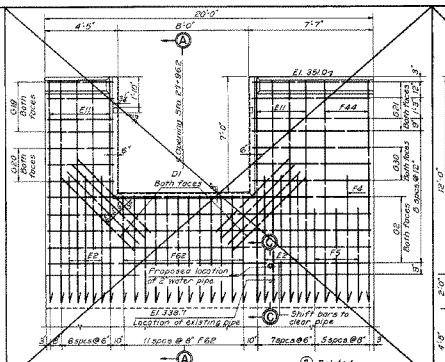
DR. BY G.H.S. TR. BY C.A.M. CK. BY H.M.H.

AS BUILT 933-12.3/27

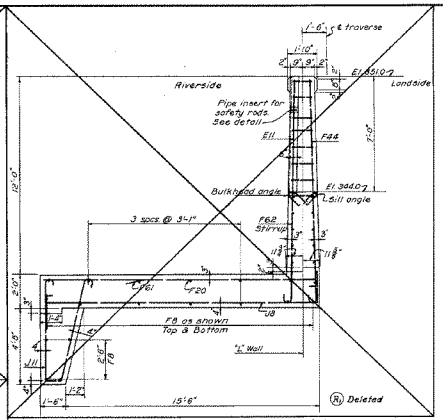
686

WAR DEPARTMENT

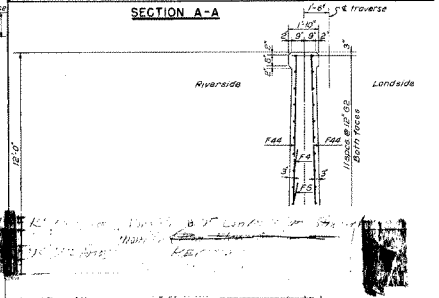
CORPS OF ENGINEERS, U. S. ARMY



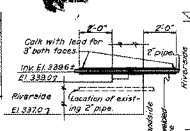
PLAN
MONOLITH NO. 105 Deleted



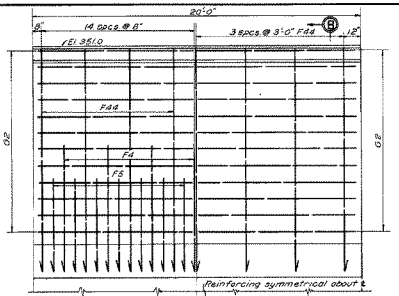
SECTION A-A



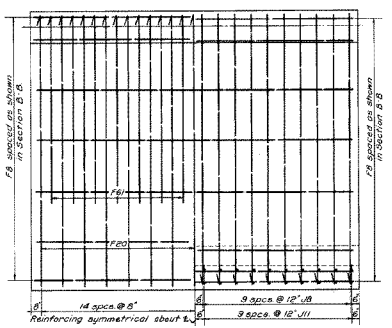
SECTION B-B



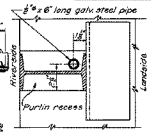
SECTION C-C



RIVERSIDE ELEVATION Ⓑ



PLAN
MONOLITHS NOS. 102, 103, 104 & 105 Ⓡ



DETAIL OF PIPE INSERT
MARK: PI MAKE 2 WT. 0.43 EACH
MATERIAL: GALVANIZED STEEL
SCALE: NONE

Note: For bulkhead and sill angle for this opening see sheet 13

BY	DATE	CHARACTER
V.B.F.	V-20-40	Cut-off key & reinforcing in base revised.

REVISIONS

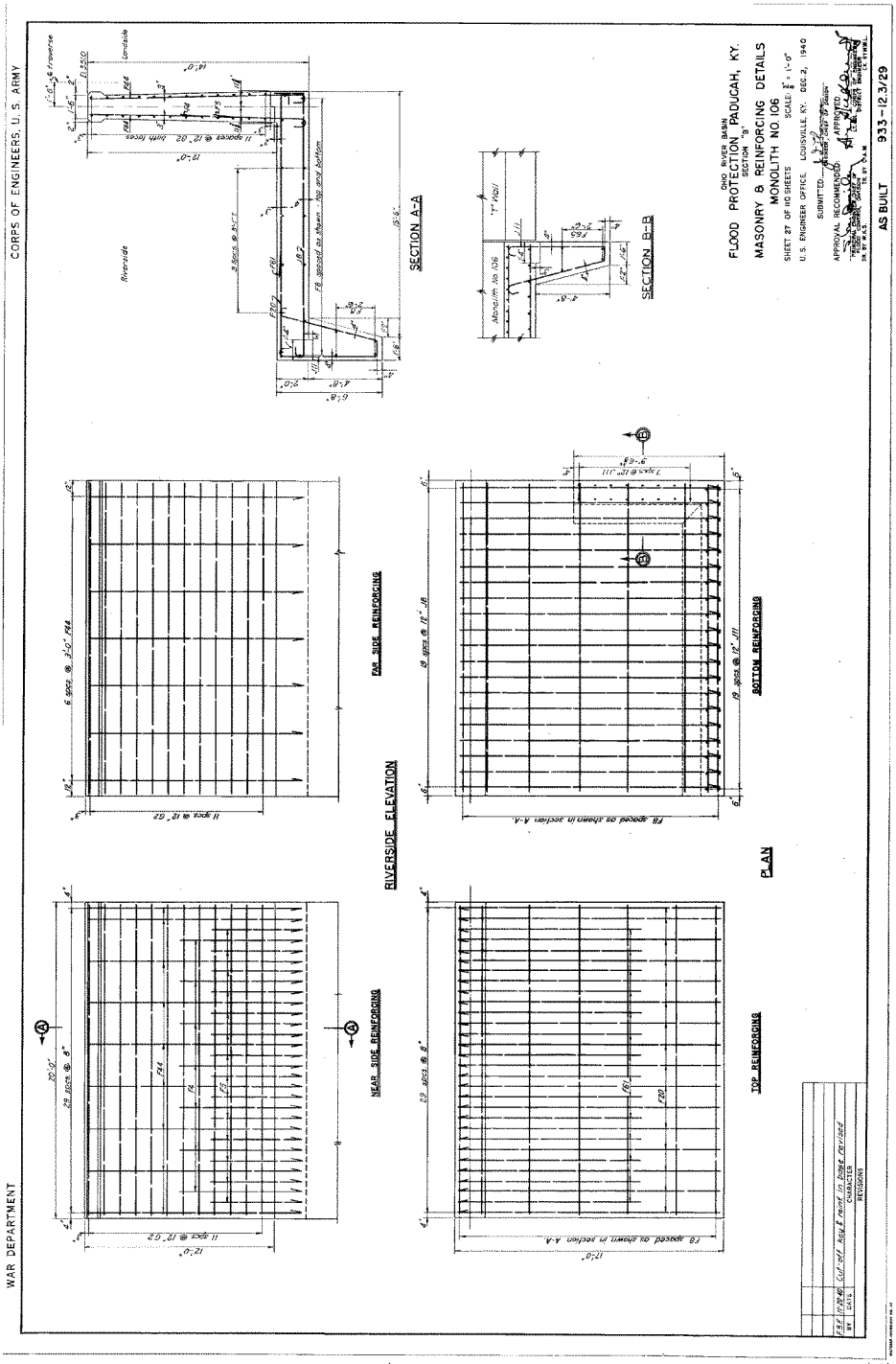
MK	DATE	AUTHORITY	REVISION
R1	5-1-41	CO #1	Monolith No. 105 converted into standard monolith

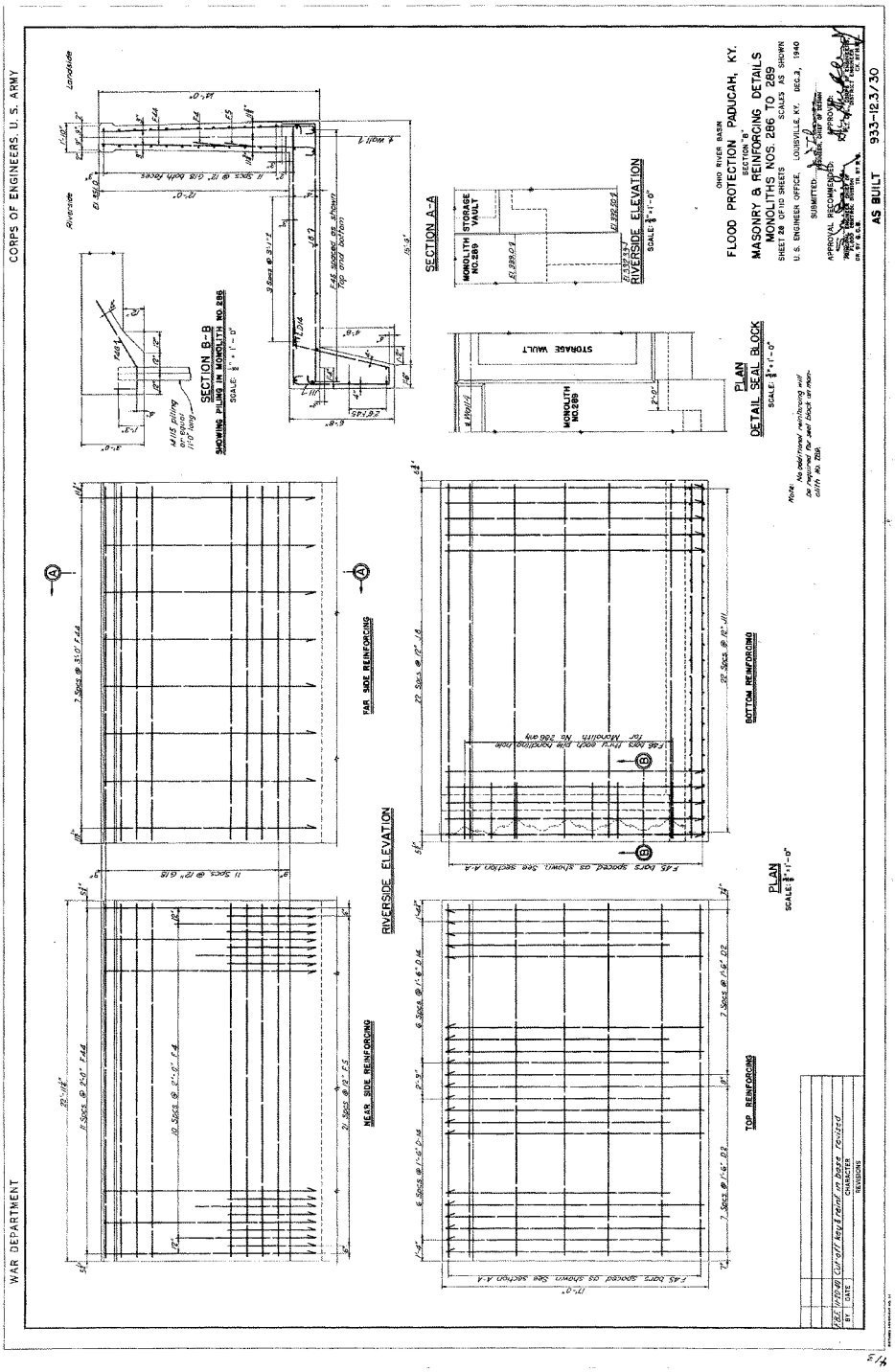
AS BUILT REVISIONS

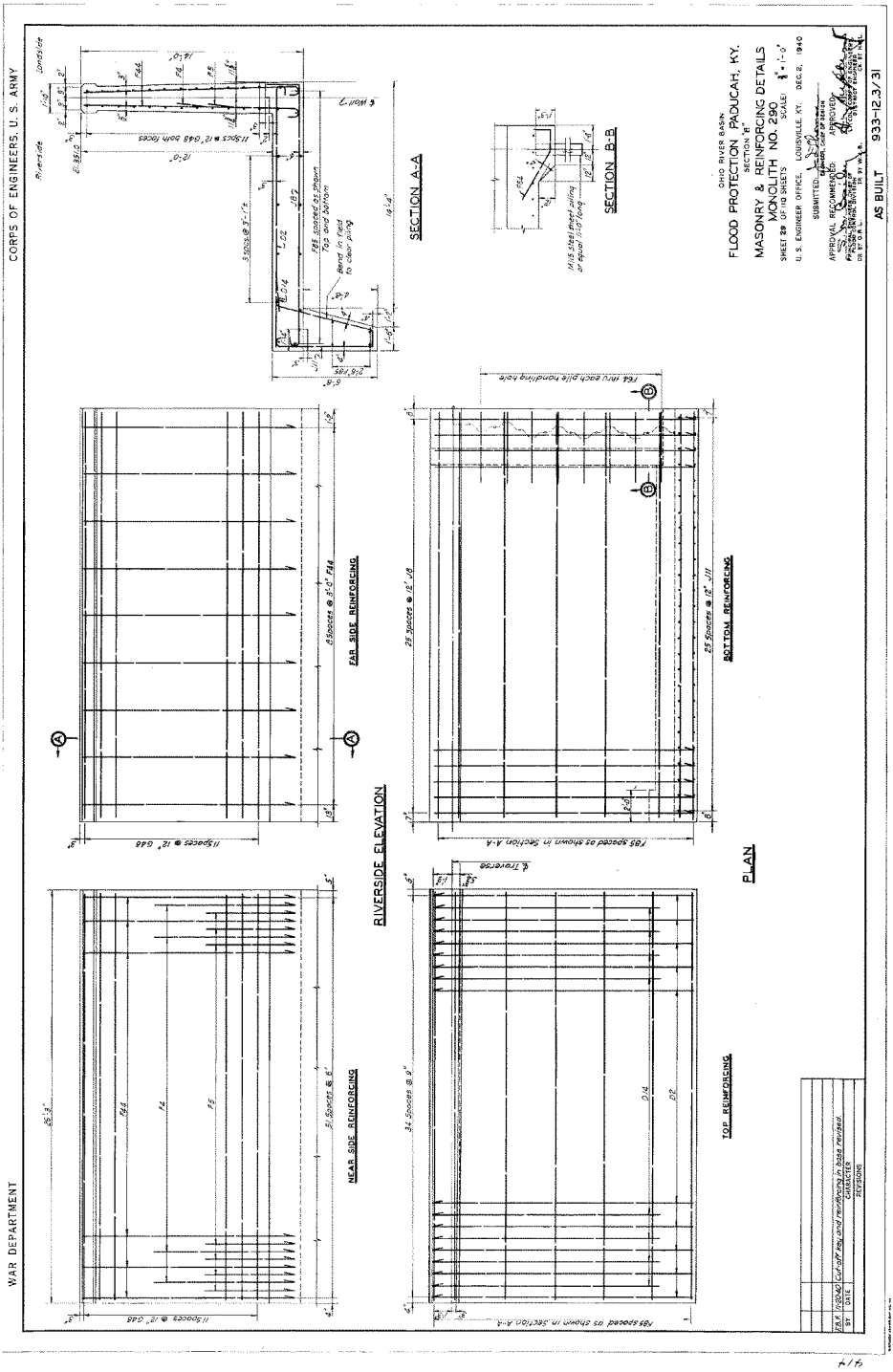
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 102 TO 105
SHEET 26 OF 110 SHEETS SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED: [signature] DISTRICT ENGINEER
APPROVED: [signature] CHIEF OF ENGINEERS
APPROVAL RECOMMENDED: [signature] CHIEF, PLANNING BRANCH, CHIEF OF PLANNING & DESIGN DIV.
DR. BY K.M.A. TR. BY W.G.S. CK. BY F.B.D.

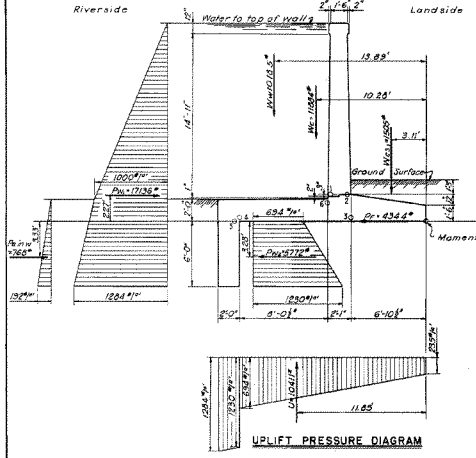
AS BUILT 933-12.3/28

687

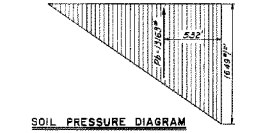

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
SECTION "B"
FLOOD PROTECTION PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MONOLITH NO. 106
SHEET 27 OF 110 SHEETS
SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
933-12.3/29
SECTION A-A
SECTION B-B
RIVERSIDE ELEVATION
PLAN
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
BOTTOM REINFORCING
TOP REINFORCING
Riverside
Landside
Monolith No. 106
"T" Wall
REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
SECTION "B"
FLOOD PROTECTION, PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 286 TO 289
SHEET 28 OF 110 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 3, 1940
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
AS BUILT
933-12.3/30
SECTION B-B
SHOWING PILING IN MONOLITH NO. 286
SECTION A-A
RIVERSIDE ELEVATION
PLAN
DETAIL SEAL BLOCK
RIVERSIDE ELEVATION
PLAN
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
TOP REINFORCING
BOTTOM REINFORCING
STORAGE VAULT
MONOLITH NO.286
MONOLITH STORAGE VAULT NO.289
Note: No additional reinforcing will be required for each block of monolith No. 286.


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITH NO. 290
SHEET 29 OF 110 SHEETS
SCALE: 1" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT 933-12.3/31
SECTION A-A
SECTION B-B
RIVERSIDE ELEVATION
PLAN
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
BOTTOM REINFORCING
TOP REINFORCING
Riverside
Landside
6 Travelers
Key
Bond in Field to clear piling
Top and Bottom
Set Sockets as shown
Fill with sheet piling or equal 40 lb. long
Fill with concrete
Fill with sand
Fill with gravel
Fill with clay
Fill with silt
Fill with loam
Fill with peat
Fill with humus
Fill with topsoil
Fill with subsoil
Fill with bedrock
Fill with boulders
Fill with cobbles
Fill with pebbles
Fill with gravel
Fill with sand
Fill with silt
Fill with clay
Fill with loam
Fill with peat
Fill with humus
Fill with topsoil
Fill with subsoil
Fill with bedrock
Fill with boulders
Fill with cobbles
Fill with pebbles



UPLIFT PRESSURE DIAGRAM



SOIL PRESSURE DIAGRAM

CASE I

SCALES: DIMENSIONS 1/4" = 1'-0"
FORCES 1" = 600#

Nomenclature

Ww = Total weight of water acting on base.
Wc = Total weight of concrete.
Ws1, Ws2 = Total weight of saturated earth acting on base.
U = Total hydrostatic uplift on base.
Pw, Pw, Pw = Total horizontal pressure of water acting on structure.
Pe in w = Total horizontal pressure of earth in water acting on structure
Pp = Total passive resistance developed by soil.
Pf = Horizontal resistance developed by friction on base.
Pb = Total soil reaction on base.

Allowable Working Stresses

A. Steel Reinforcing — 18,000 lbs per sq. in.
B. Concrete
1. Ultimate compressive strength at 28 days — 3,000 lbs per sq in
2. Compression - extreme fibre stress — 1,200 " " "
3. Shear — 60 " " "
4. Bond — 150 " " "

Weights and Pressures

A. Weights
1. Concrete — 150 lbs per cu ft.
2. Water — 62.5 " " "
3. Saturated earth — 125 " " "
4. Earth in water (net) — 62.5 " " "
B. Active Pressures We tan²(45° - ½φ)
1. Water — 62.5 lbs per sq. ft.
2. Saturated earth - angle of repose 26°-34' — 86 " " "
3. Earth in water (net) — 24 " " "

I General Requirements:-

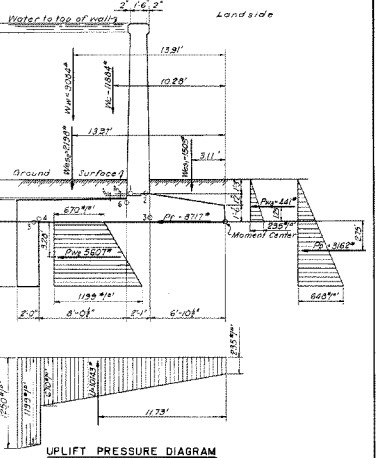
A. Cantilever type flood wall with concrete cutoff at heel, founded on soil or rock where failure by scour or undermining is improbable.
B. Protection - 3ft above 1937 High Water.
C. Structure designed for water to top of wall on riverside.
D. Bottom of concrete base shall be placed at least 3ft. below ground surface for protection against frost action.
E. Stability.
1. Resultant of forces acting on structure to fall within middle third of base when considering active forces only.
2. Factor of safety against overturning of structure to be not less than 1.25 when considering all forces, including passive resistance.

II Basic Assumption

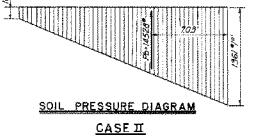
A. Active forces on wall to consist of hydrostatic pressure and the equivalent fluid pressure of the saturated earth.
B. Uplift derived from seepage pressure gradient.
C. Passive resistance of soil equal to difference between net active horizontal forces and frictional resistance developed between concrete base and soil, with passive resistance assumed to vary from zero at landside ground surface to a maximum at elevation of bottom of cutoff.
D. Coefficient of friction of concrete base on foundation assumed to vary between the limits of 0.33 to 0.60 for various types of soil. 0.33 used with Case I and 0.60 with Case II in order to produce most severe conditions.
E. Maximum wind pressure not to exceed 30#/ft² of stem.

III Design Conditions

A. Case I - Governs design at points 3, 4, & 5
1. Water to top of wall on riverside.
2. Riverside earth saturated to elevation of top of base
3. Landside earth saturated to ground level
4. Coefficient of friction of base on foundation - 0.33
B. Case II - Governs design at points 1 & 6
1. Water to top of wall on riverside.
2. No scour
3. Landside and riverside earth saturated to ground level.
4. Coefficient of friction of base on foundation - 0.60
C. Case III - (Not shown) Governs design at point 2.
1. Normal river stage. No water against wall
2. Maximum wind pressure acting on stem from landside.



UPLIFT PRESSURE DIAGRAM



SOIL PRESSURE DIAGRAM

CASE II

SCALES: DIMENSIONS 1/4" = 1'-0"
FORCES 1" = 600#

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

DESIGN DATA

18 FT. "T" WALL

SHEET 30 OF 110 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

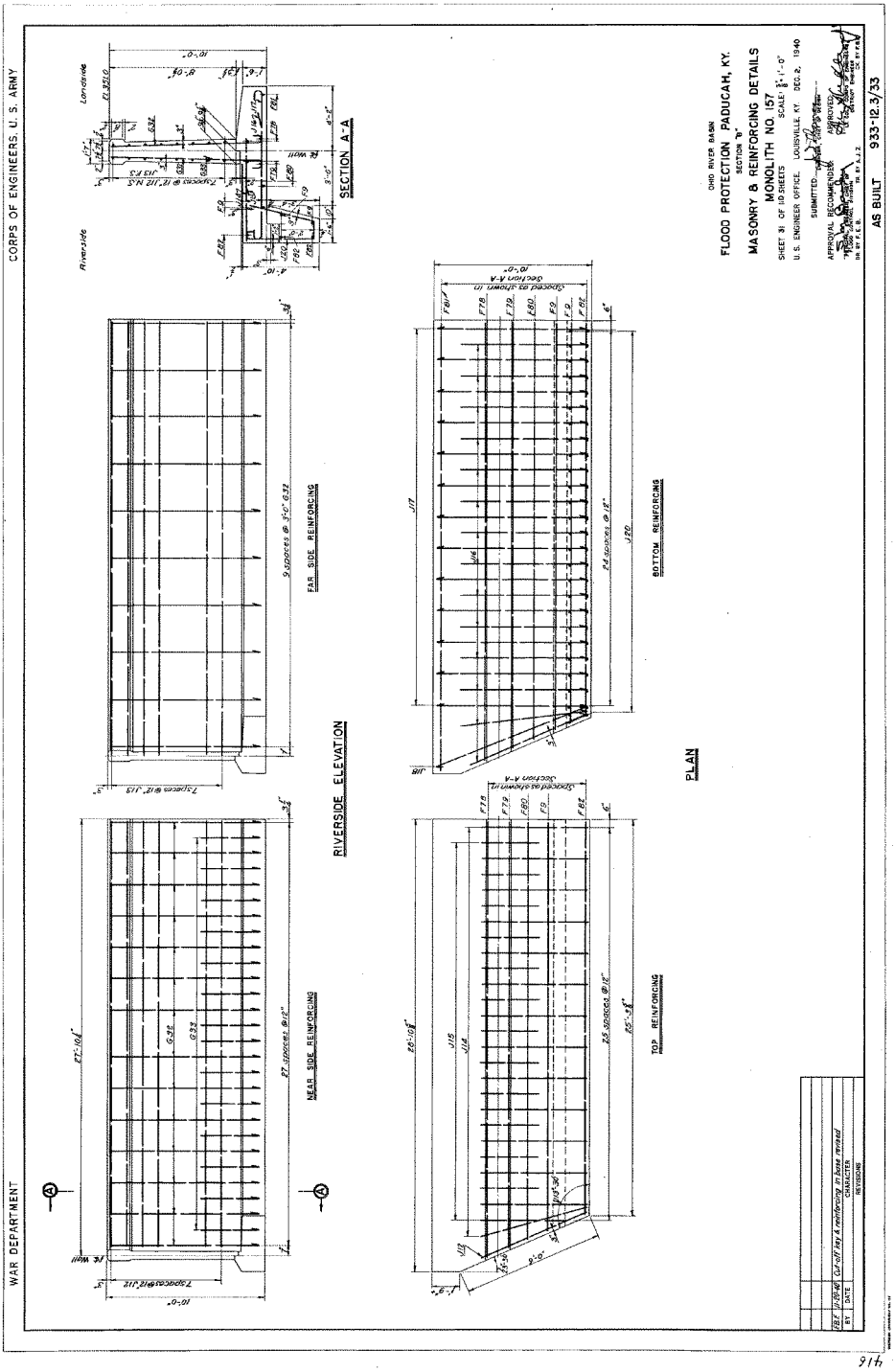
APPROVAL RECOMMENDED: [signature] CHIEF, DESIGN BRANCH, ENGINEERING DIVISION, PLANS CONTROL DIVISION — CK. BY M.J.

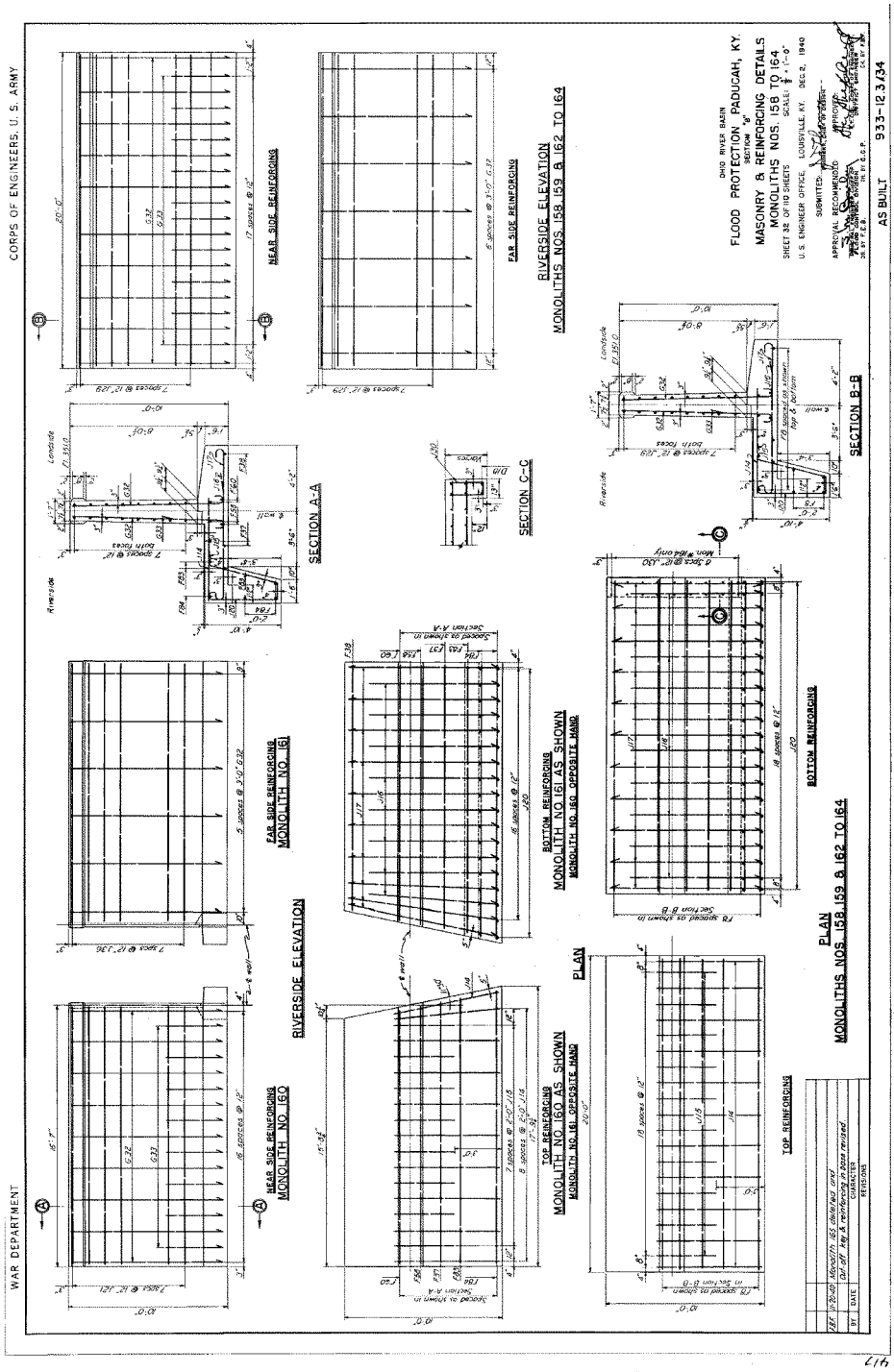
APPROVED: [signature] CHIEF, ENGINEERING DIVISION — CK. BY E.M.B.

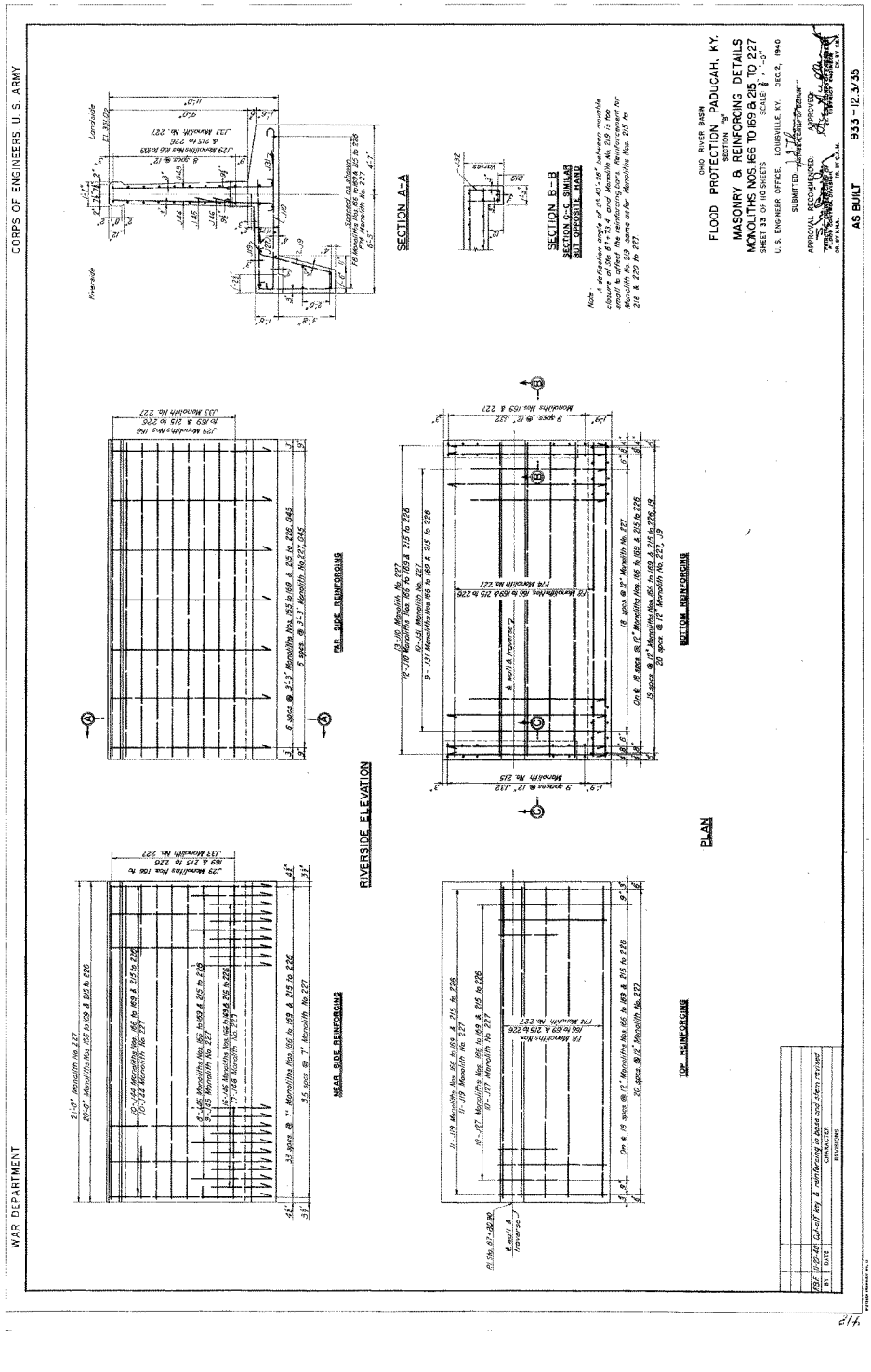
BY	DATE	CHARACTER REVISIONS

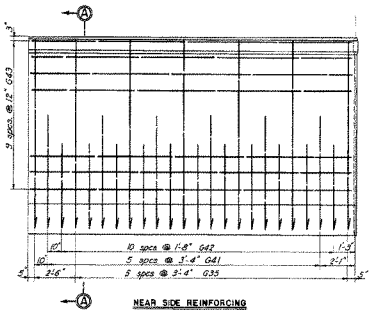
AS BUILT 933-12.3/32

691

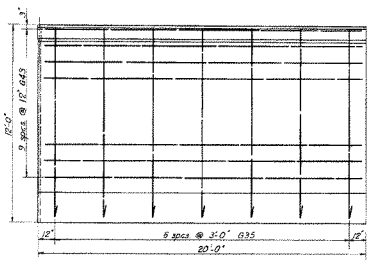

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITH NO. 157
SHEET 31 OF 103 SHEETS
SCALE 3/8" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
AS BUILT
933-12.3/33
SECTION A-A
RIVERSIDE ELEVATION
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
PLAN
TOP REINFORCING
BOTTOM REINFORCING
Riverside
Landside
Spacers @ 12" 118 N.S.
7 spaces @ 12" 118
9 spaces @ 3'-0" 6.32
27 spaces @12"
15 spaces @12"
14 spaces @ 12"
Spacers as shown in Section A-A
Section A-A
10'-0"
22'-10½"
26'-10½"
12" wall
4'-8"
4'-0"
3'-0"
2'-3"
9'-0"
6.32
U17
U18
U19
U20
F78
F79
F80
F81
F82
F9
F8
Cut off top & reinforcing at base revised
REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 158 TO 164
SECTION A-A
SECTION C-C
SECTION B-B
RIVERSIDE ELEVATION
MONOLITHS NOS. 158, 159 & 162 TO 164
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
RIVERSIDE ELEVATION
MONOLITH NO. 161
NEAR SIDE REINFORCING
MONOLITH NO. 160
BOTTOM REINFORCING
MONOLITH NO. 161 AS SHOWN
MONOLITH NO. 160 OPPOSITE HAND
TOP REINFORCING
MONOLITH NO. 160 AS SHOWN
MONOLITH NO. 161 OPPOSITE HAND
PLAN
MONOLITHS NOS. 158, 159 & 162 TO 164
AS BUILT
933-123/34


WAR DEPARTMENT
CORPS OF ENGINEERS U. S. ARMY
RIVERSIDE ELEVATION
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
PLAN
TOP REINFORCING
BOTTOM REINFORCING
SECTION A-A
SECTION B-B
SECTION C-C SHOWING BUT OPPOSITE HAND
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 166 TO 169 & 215 TO 227
SHEET 33 OF 110 SHEETS
SCALE 1/8" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
933 - 12.3/35

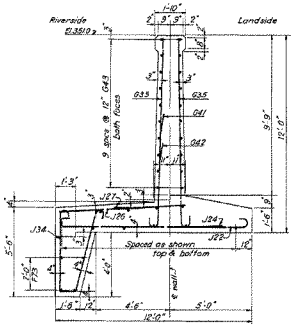


NEAR SIDE REINFORCING

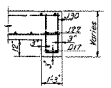


FAR SIDE REINFORCING

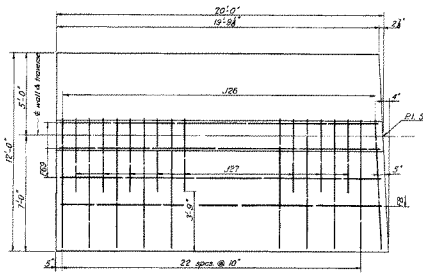
RIVERSIDE ELEVATION



SECTION A-A

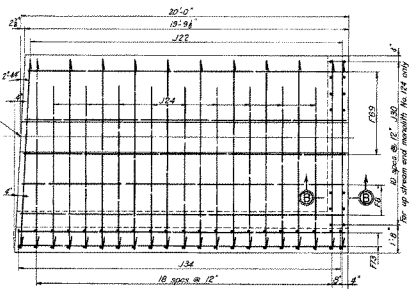


SECTION B-B



TOP REINFORCING

MONOLITH NO. 124 AS SHOWN
MONOLITH NO. 125 OPPOSITE HAND



BOTTOM REINFORCING

MONOLITH NO. 125 AS SHOWN
MONOLITH NO. 124 OPPOSITE HAND

PLAN

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 124 & 125
SHEET 34 OF 110 SHEETS SCALE: 3/8" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED: (signature) ENGINEER, CHIEF OF DESIGN.
APPROVAL RECOMMENDED: (signature) ENGINEER, CHIEF OF DESIGN, FLOOD CONTROL DIVISION. DR. BY G.H.B.
APPROVED: (signature) CHIEF, CORPS OF ENGINEERS, DISTRICT ENGINEER. TR. BY C.S.M. CK. BY F.B.V.

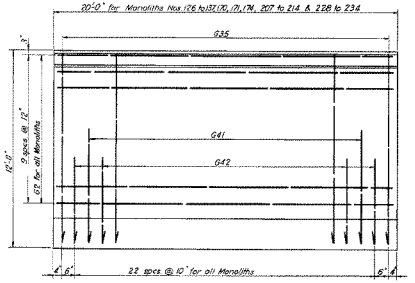
BY	DATE	CHARACTER
		REVISIONS
T.B.F.	11-20-40	Cut-off key & reinforcing in base revised

AS BUILT 933-12.3/36

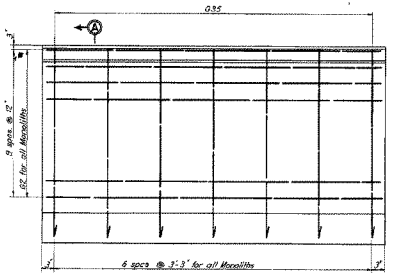
419

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

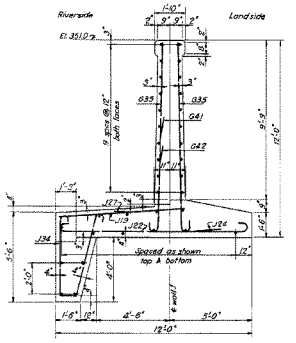


NEAR SIDE REINFORCING

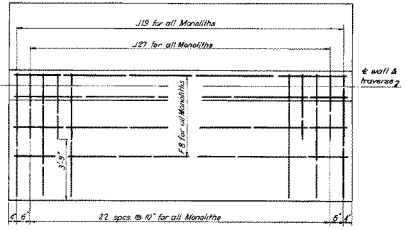


FAR SIDE REINFORCING

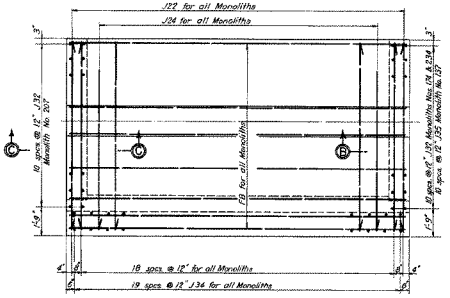
RIVERSIDE ELEVATION



SECTION A-A



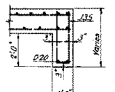
TOP REINFORCING



BOTTOM REINFORCING

PLAN

SECTION B-B
MONOLITHS NOS. 174 & 234
SECTION C-C MONOLITH NO. 207
SIMILAR BUT OPPOSITE HAND



SECTION B-B
MONOLITH NO. 137

BY	DATE	CHARACTER
		REVISIONS
J.H.K.	1-31-41	Revised as per Addendum No.1
F.B.T.	11-20-40	Cut-off key & reinforcing in base revised

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 126 TO 137, 170, 171, 174, 207 TO 214 & 228 TO 234

SHEET 35 OF 110 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [signature] LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

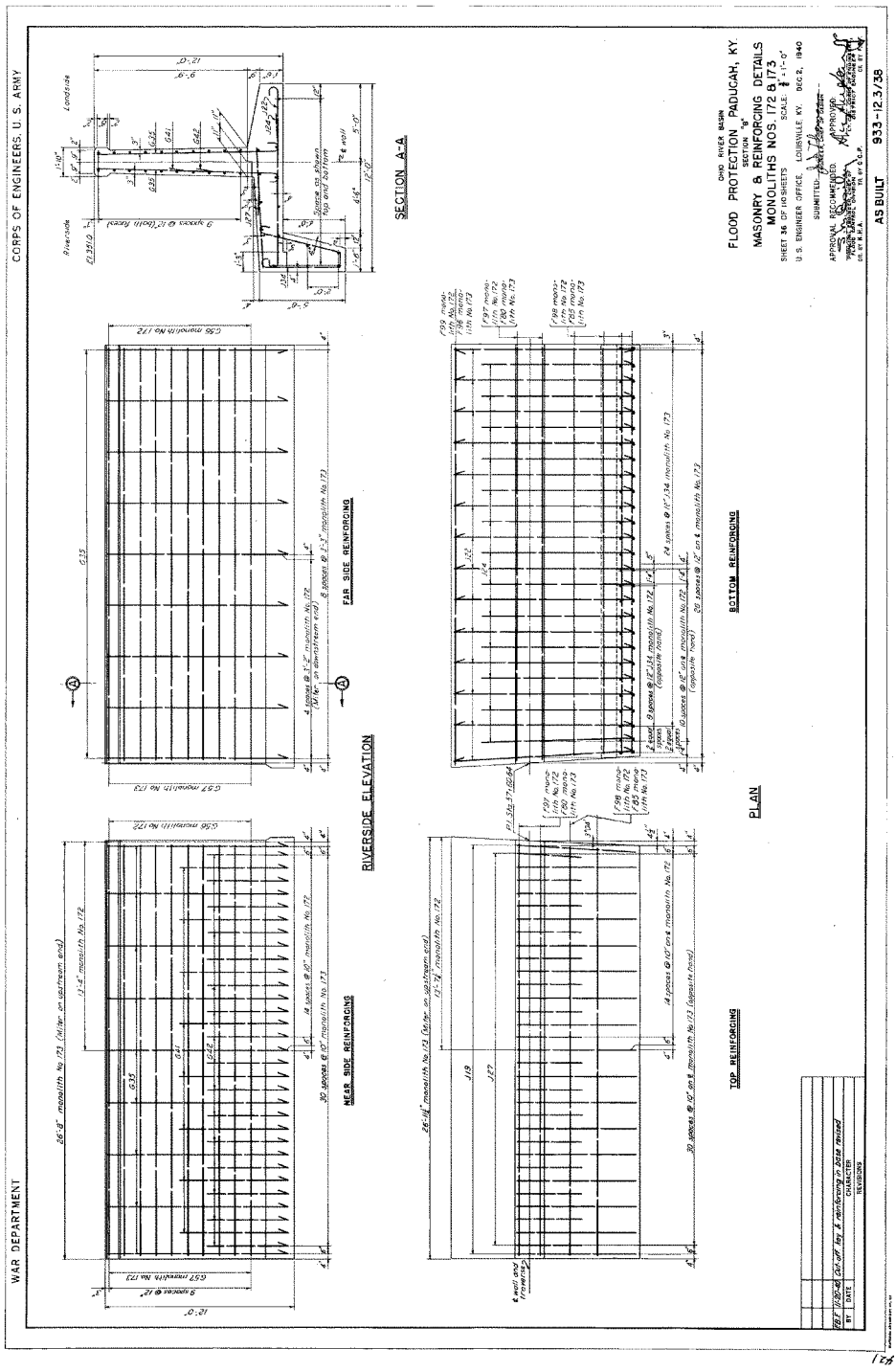
DR. BY E.W.S. CK. BY C.A.M. CK. BY K.B.

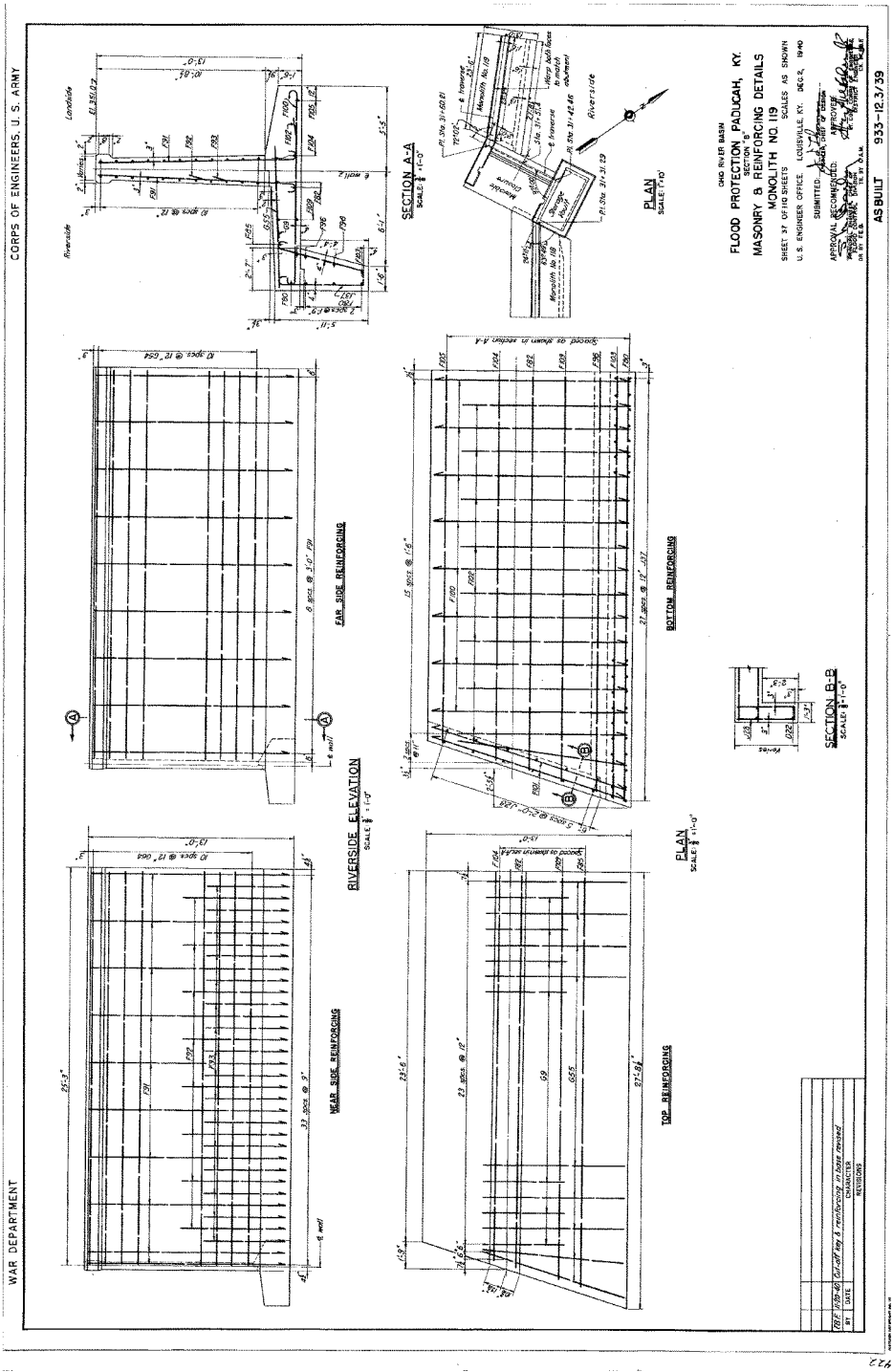
AS BUILT

933-12.3/37

K20

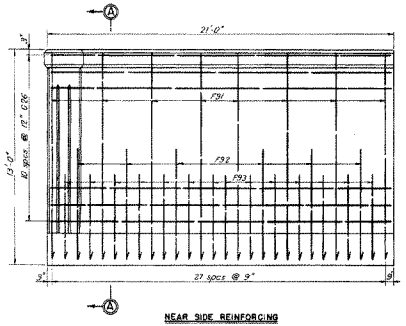
999


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 172 & 173
SHEET 36 OF 140 SHEETS
SCALE: 1/4"=1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC 2, 1940
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
933-12.3/38
SECTION A-A
RIVERSIDE ELEVATION
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
PLAN
TOP REINFORCING
BOTTOM REINFORCING

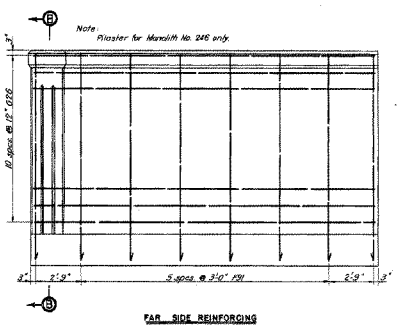

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITH NO. 119
SHEET 37 OF 110 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT 933-12.3/39
SECTION A-A
SCALE 1"=1'-0"
PLAN
SCALE 1"=10'
RIVERSIDE ELEVATION
SCALE 1"=1'-0"
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
BOTTOM REINFORCING
TOP REINFORCING
PLAN
SCALE 1"=1'-0"
SECTION B-B
SCALE 1"=1'-0"
Riverside
Landside
Monolith No. 119
Monolith No. 118
Sluice Pipe
Sluice Pipe
Riverside
Landside
6 transverse
Weep hole tubes to match adjacent
Pl. Sta. 31+60.81
Pl. Sta. 31+42.46
Pl. Sta. 31+31.29
REF. 938-46 Cutoff key & reinforcing in base revised
NO. DATE REVISIONS

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

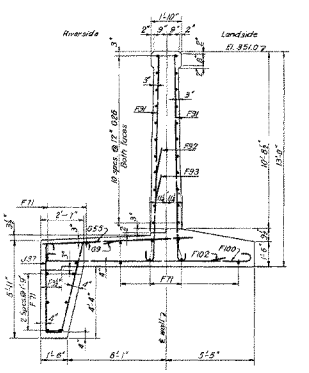


NEAR SIDE REINFORCING

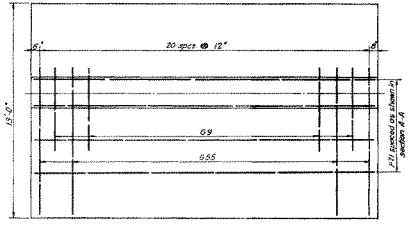


FAR SIDE REINFORCING

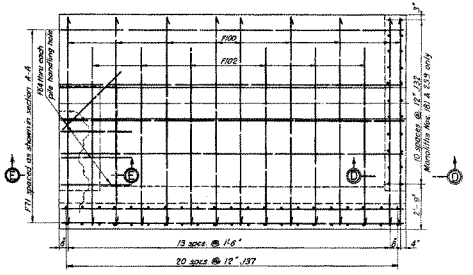
RIVERSIDE ELEVATION



SECTION A-A

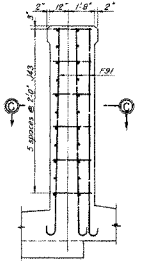


TOP REINFORCING

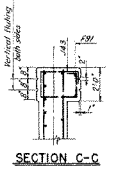


BOTTOM REINFORCING

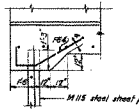
PLAN



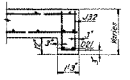
SECTION B-B
MONOLITH NO. 246 ONLY



SECTION C-C



SECTION E-E
MONOLITH NO. 246 ONLY



SECTION D-D
MONOLITHS NOS. 181 & 259 ONLY

BY	DATE	CHARACTER
FEE	11-20-40	Cut-off key & reinf. in base revised

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 120 TO 123, 175 TO 181, 198 TO 203, 206, 246 TO 252 & 255 TO 259

SHEET 38 OF 110 SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE. LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: APPROVED: CHIEF OF DIVISION

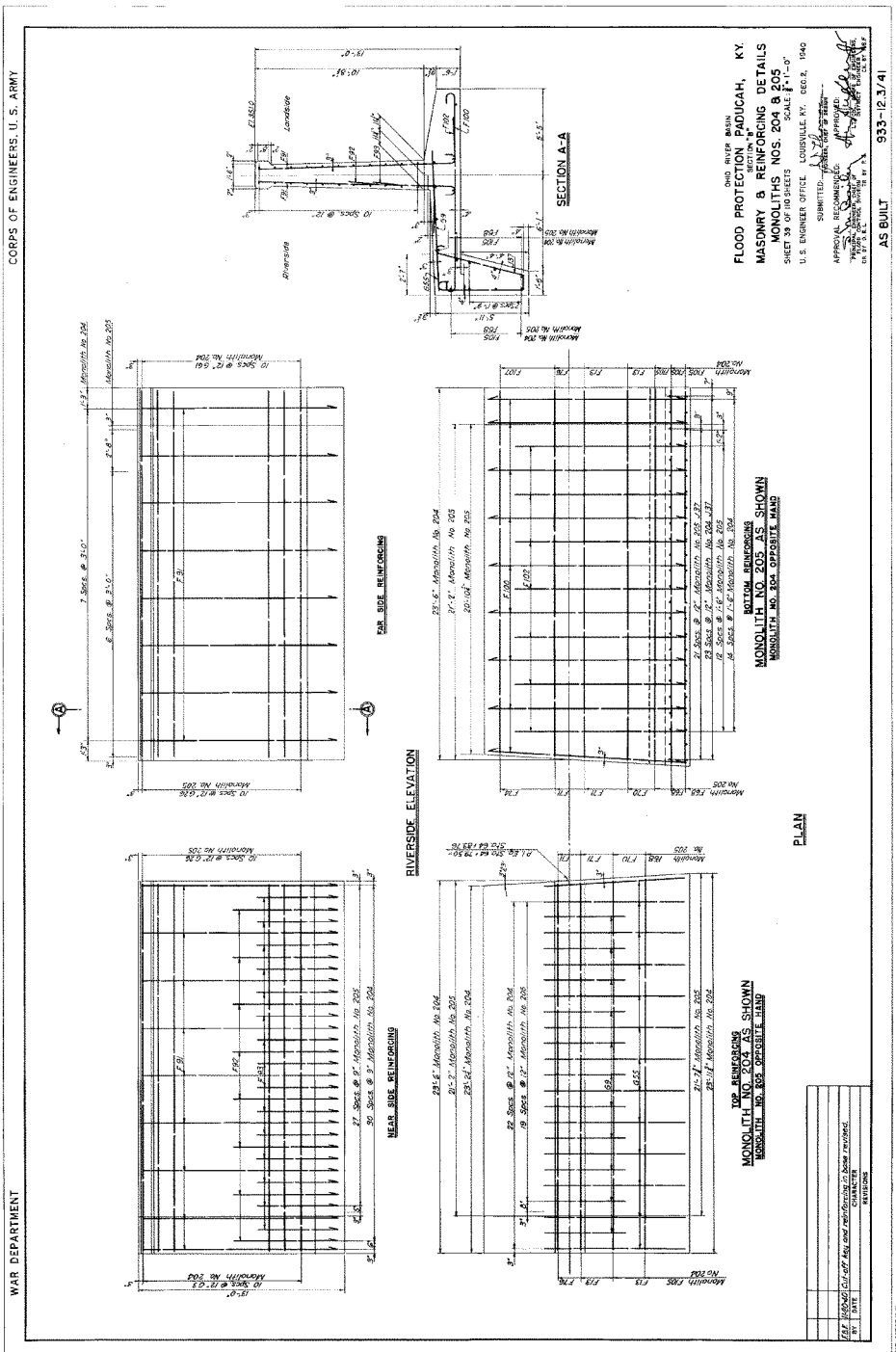
APPROVAL RECOMMENDED: APPROVED:

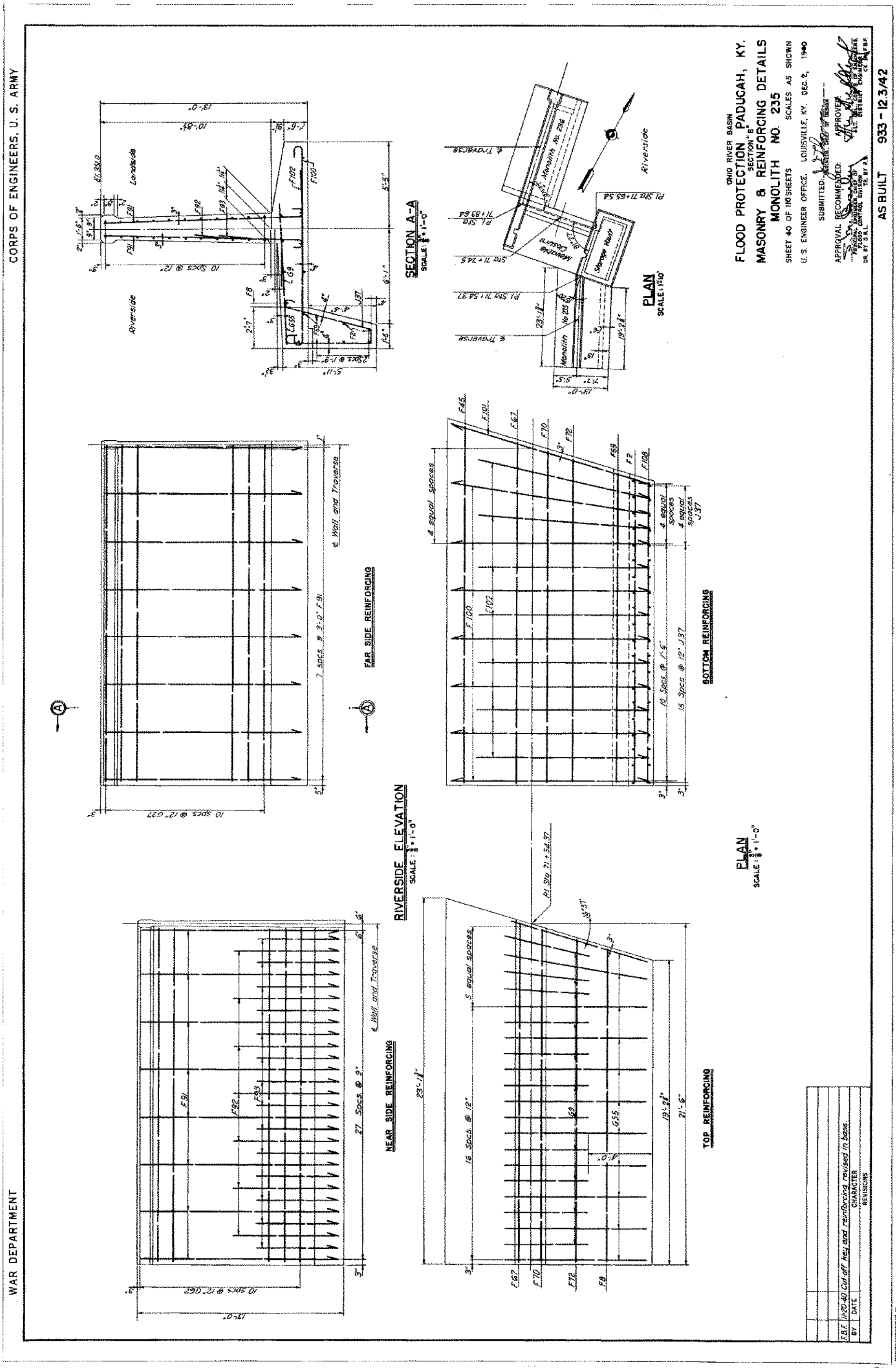
PROJECT ENGINEER OR CHIEF OF PLANS CONTROL UNIT OR BY F.E.B. TR. BY C.A.M.

DISTRICT ENGINEER OR BY F.E.B.

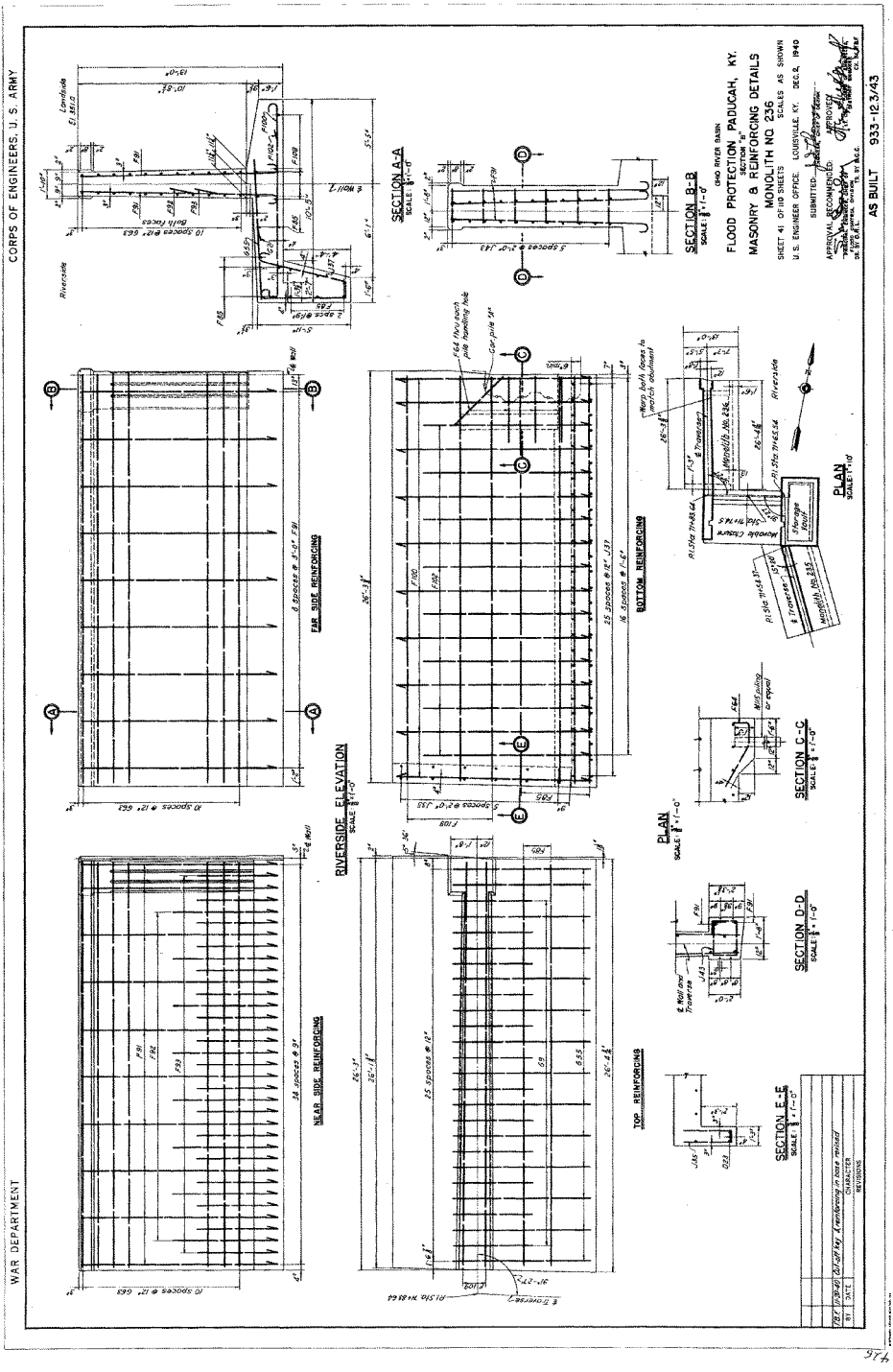
AS BUILT 933-12.3/40

669


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 204 & 205
SHEET 39 OF 110 SHEETS
SCALE: 1"=1'-0"
U.S. ENGINEER OFFICE LOUISVILLE, KY. DEC 2, 1940
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
933-12.3/41
SECTION A-A
RIVERSIDE ELEVATION
PLAN
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
BOTTOM REINFORCING
MONOLITH NO. 205 AS SHOWN
MONOLITH NO. 204 OPPOSITE HAND
TOP REINFORCING
MONOLITH NO. 204 AS SHOWN
MONOLITH NO. 205 OPPOSITE HAND
Monolith No. 204
Monolith No. 205
Riverside
Landside


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITH NO. 235
SHEET 40 OF 110 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
933 - 12.3/42
SECTION A-A
SCALE: 3/8" = 1'-0"
Landside
Riverside
El. 351.0
PLAN
SCALE: 1"=10'
Monolith No. 236
Monolith No. 235
Monolith Closure
Storage Vault
Pl. Sta. 71 + 83.64
Sta. 71 + 74.5
Pl. Sta. 71 + 54.37
Pl. Sta. 71 + 65.54
℄ Traverse
FAR SIDE REINFORCING
7 spcs. @ 3'-0" F91
10 spcs @ 12" G27
℄ Wall and Traverse
RIVERSIDE ELEVATION
SCALE: 3/8" = 1'-0"
NEAR SIDE REINFORCING
27 Spcs. @ 9"
10 spcs @ 12" G62
BOTTOM REINFORCING
10 Spcs. @ 1'-6"
15 Spcs. @ 12" J37
4 equal spaces
PLAN
SCALE: 3/8" = 1'-0"
Pl. Sta. 71 + 54.37
TOP REINFORCING
16 Spcs. @ 12"
5 equal spaces
F.B.F. 11-20-40 Cut-off key and reinforcing revised in base.
BY DATE CHARACTER
REVISIONS

4425


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MONOLITH NO. 236
SHEET 41 OF 100 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
AS BUILT 933-12.3/43
RIVERSIDE ELEVATION
SCALE 1/4"=1'-0"
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
BOTTOM REINFORCING
TOP REINFORCING
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
PLAN
SCALE 1/16"=1'-0"
Monolith No. 236
Riverside
Landside
Wall 2
Wall 1
Wall 3
Wall 4
Wall 5
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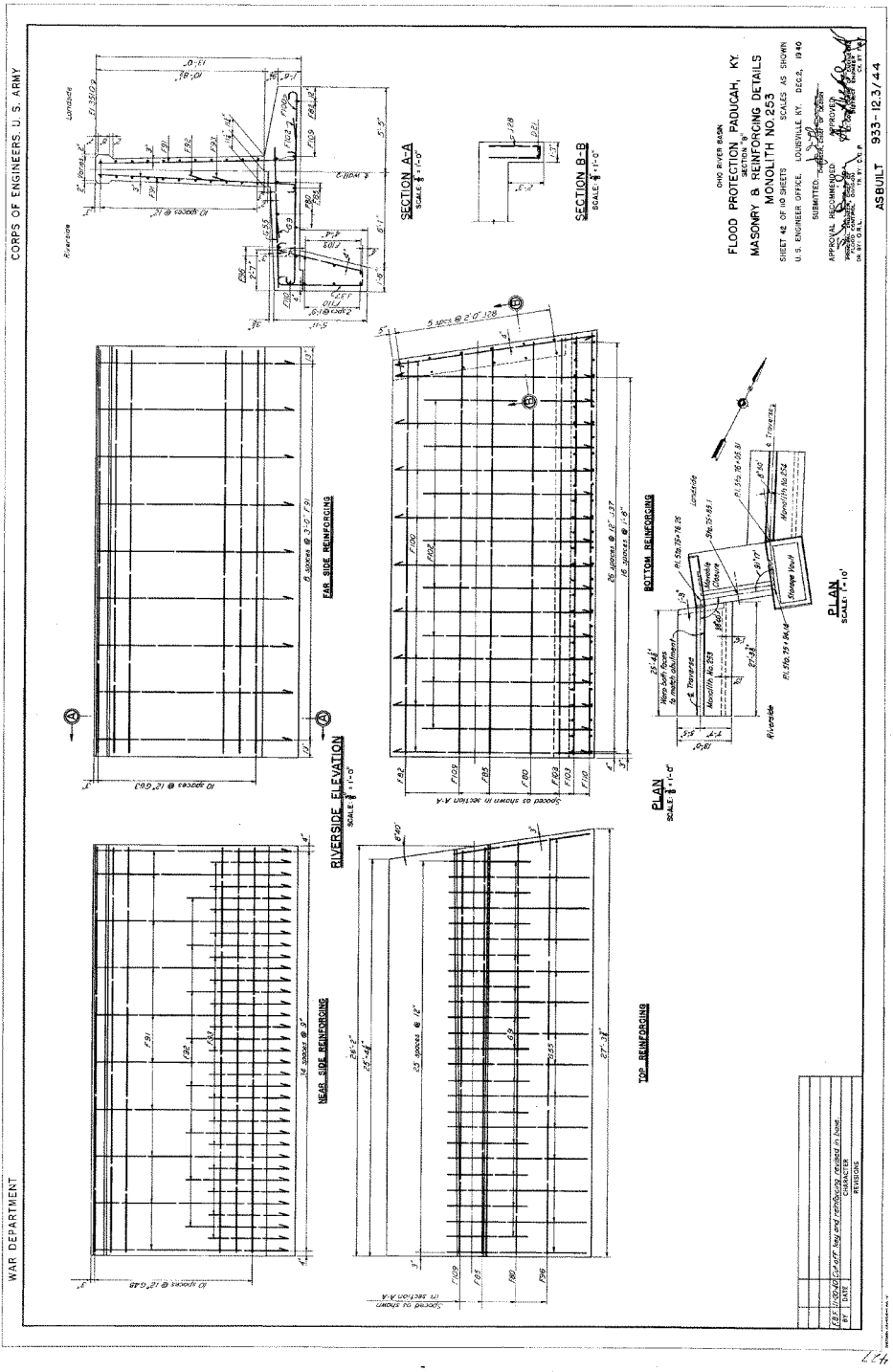
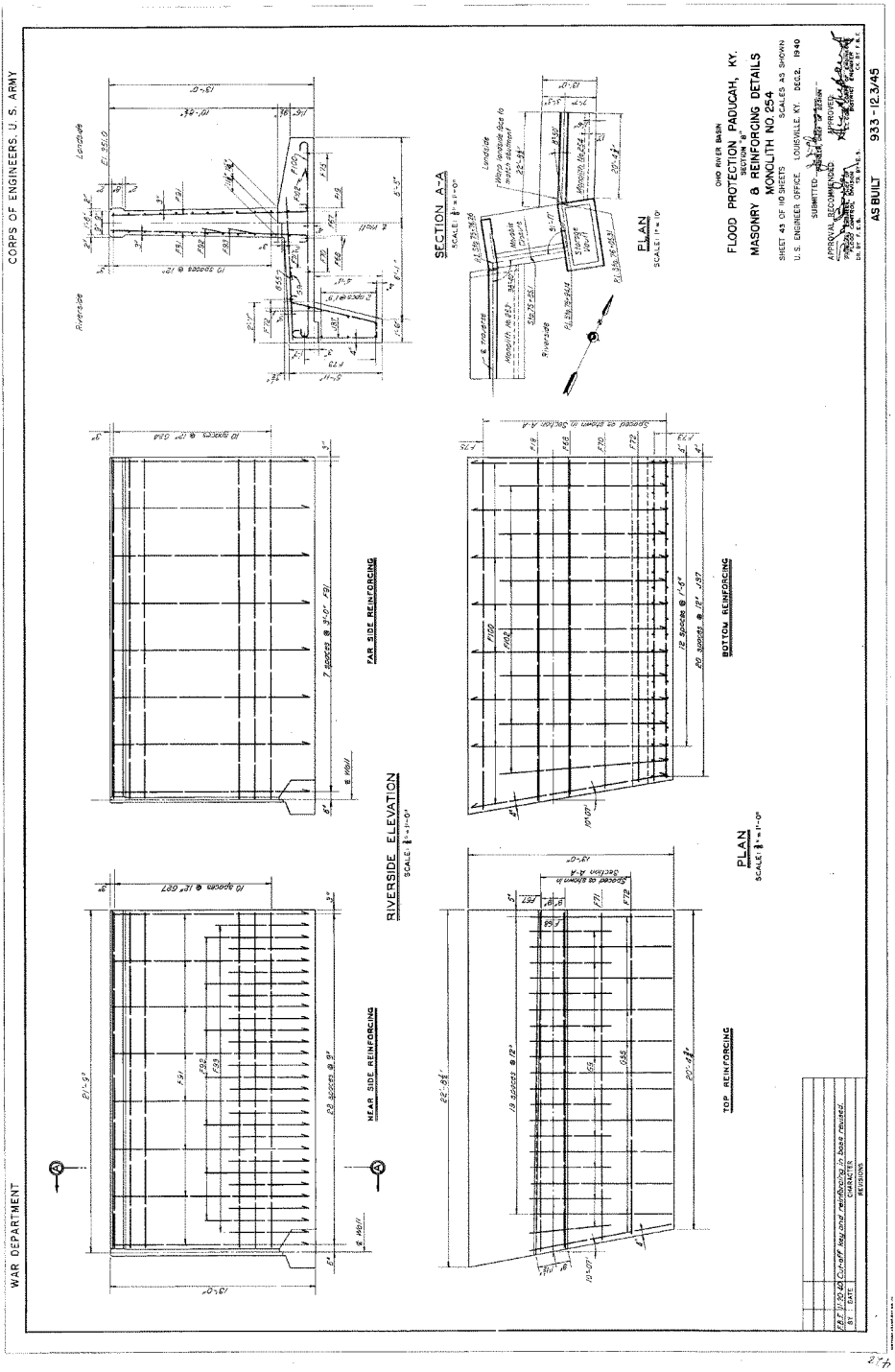
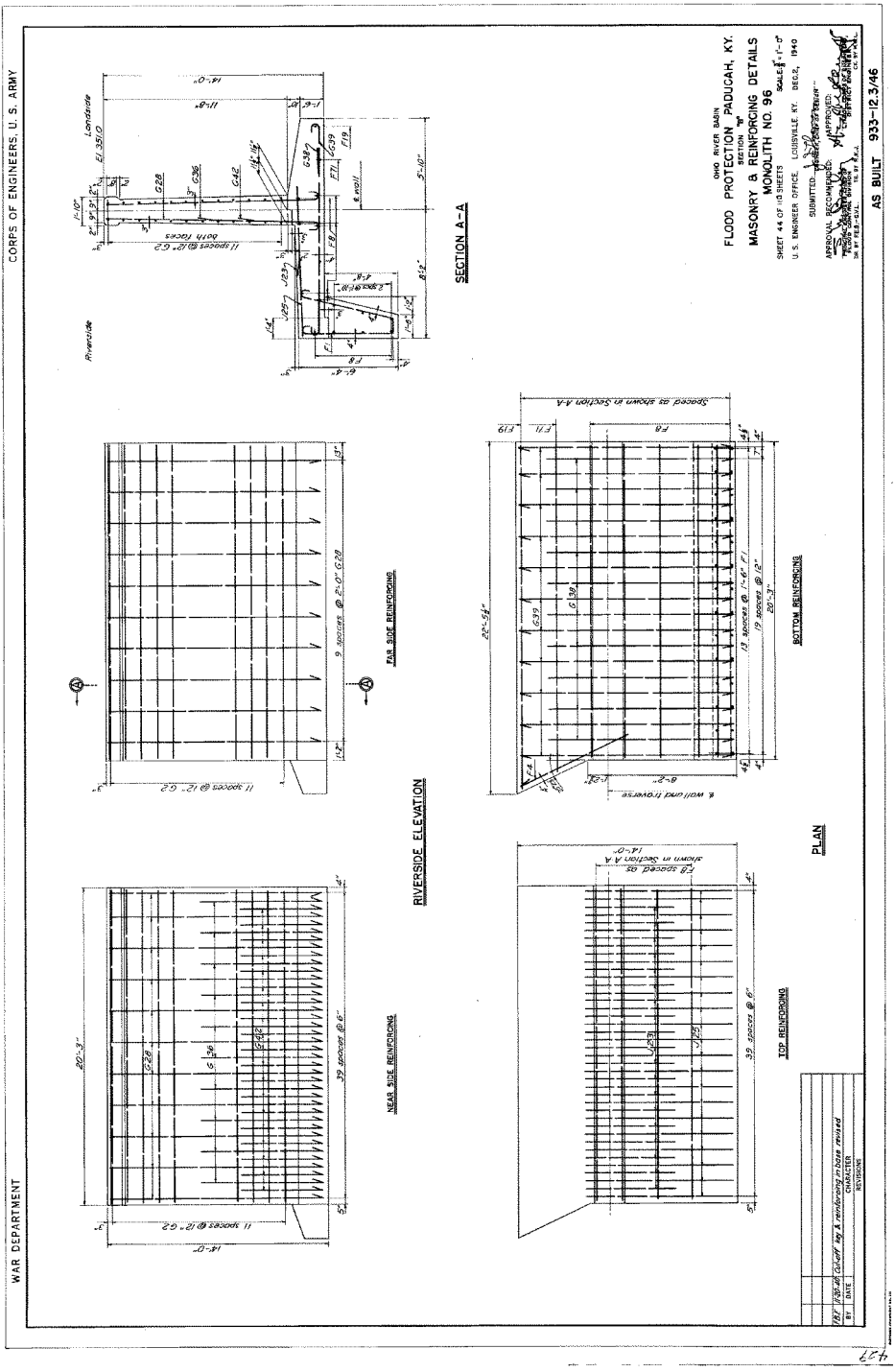
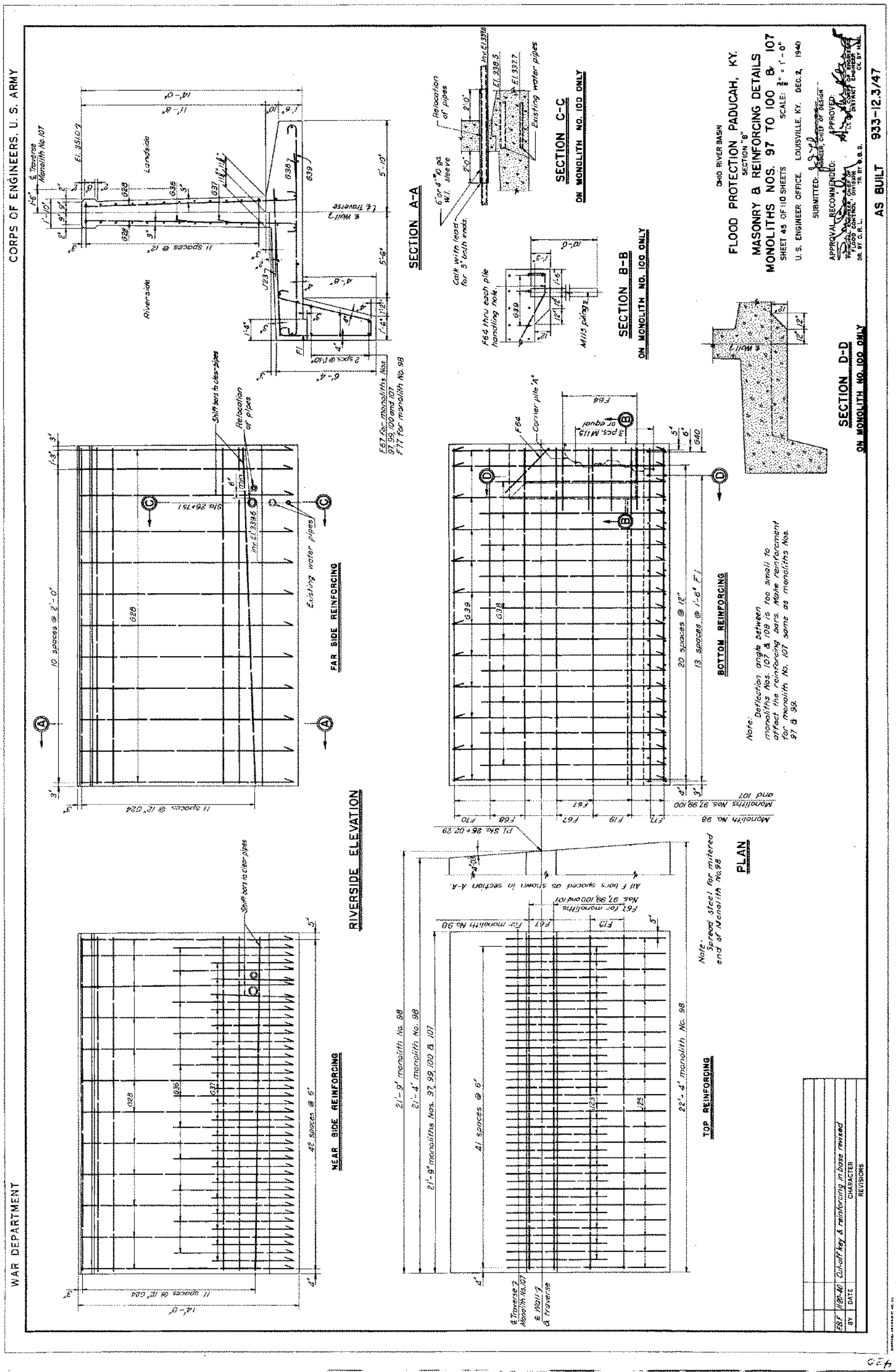
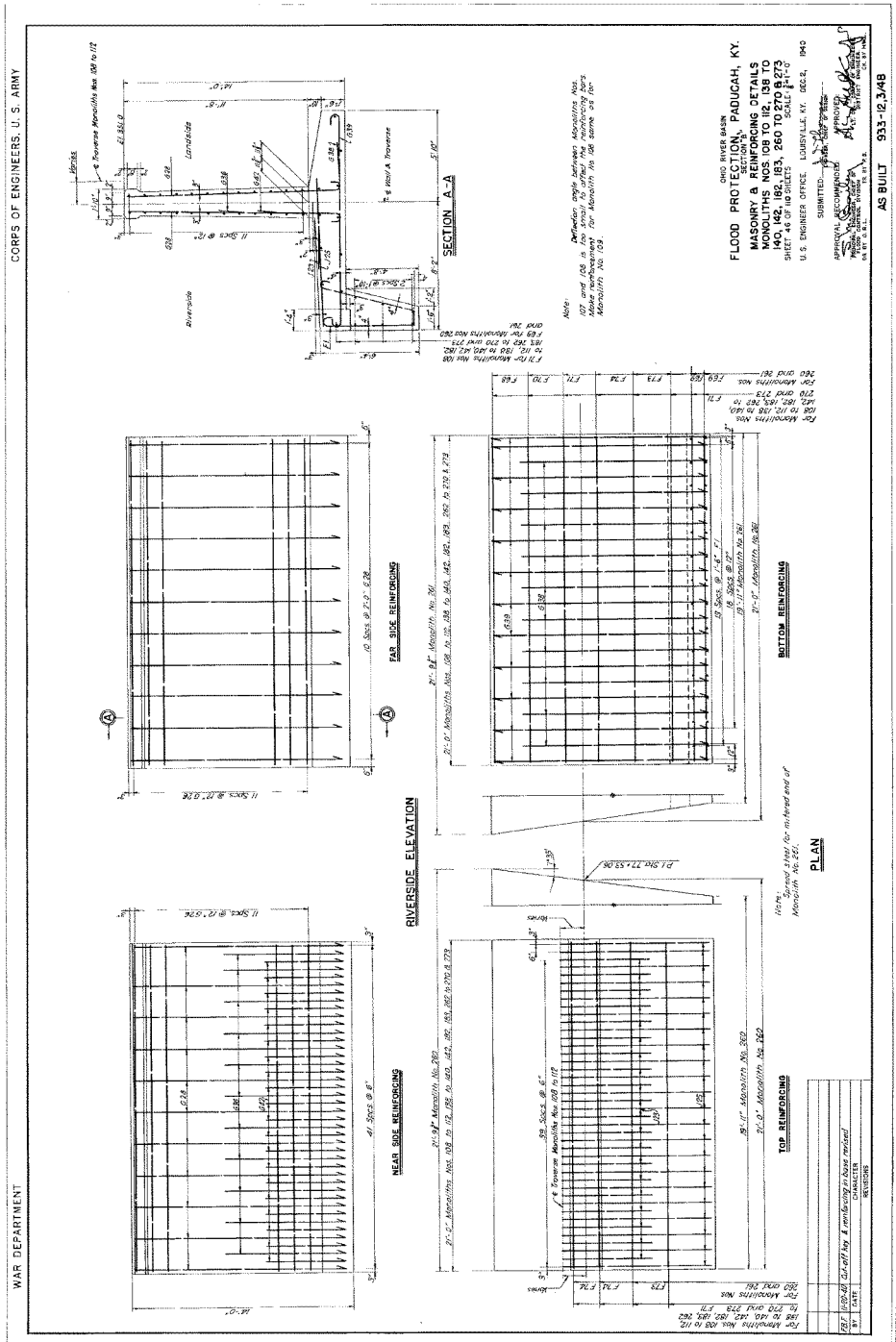
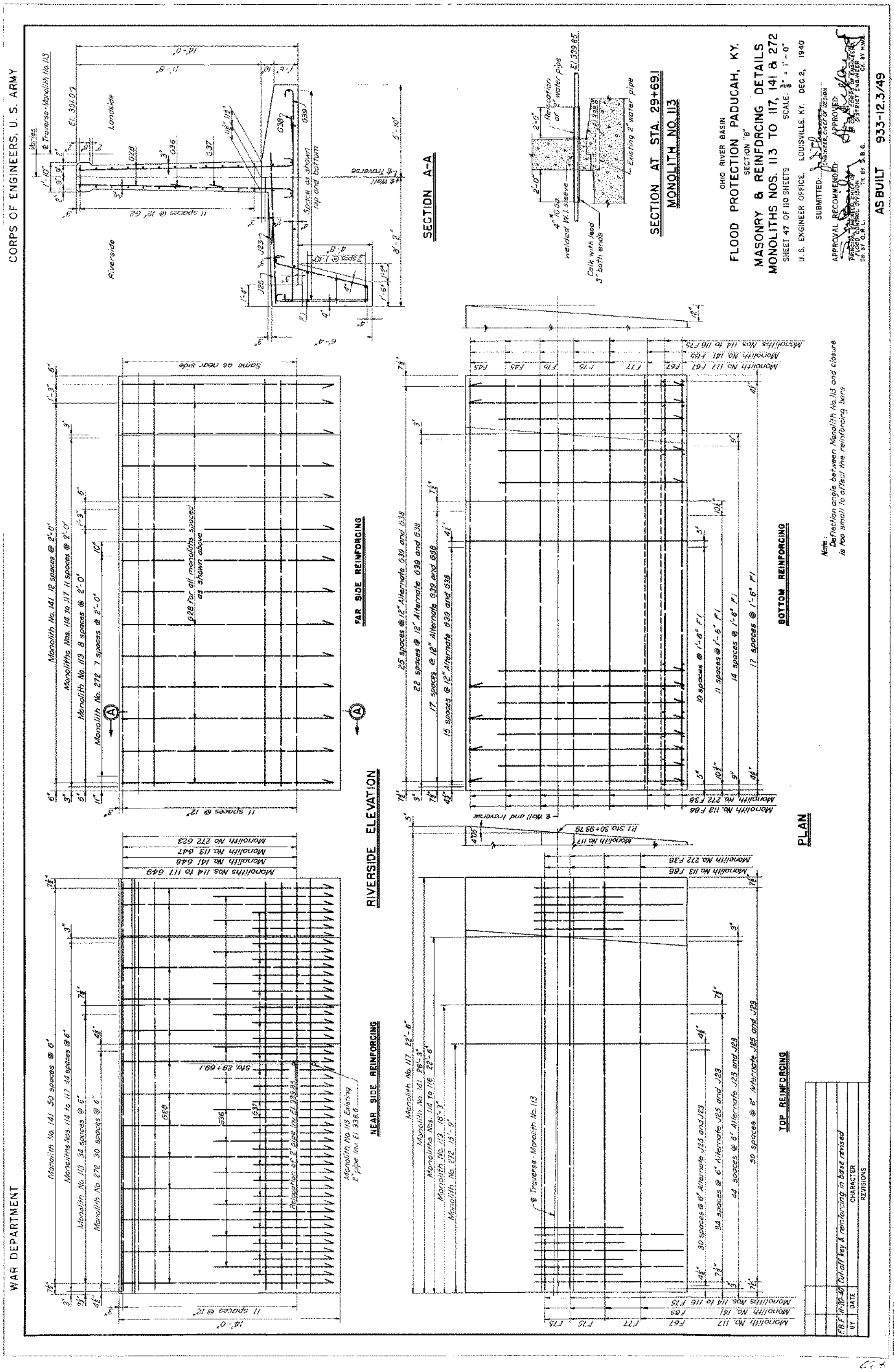

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MONOLITH NO.253
SHEET 42 OF 110 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SCALES AS SHOWN
SUBMITTED:
APPROVED:
APPROVAL RECOMMENDED:
ASBUILT 933-12.3/44
SECTION A-A
SECTION B-B
RIVERSIDE ELEVATION
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
BOTTOM REINFORCING
TOP REINFORCING
PLAN
Riverside
Landside
Monolith No.253
Monolith No.252
Sump Well
Work below this line to be placed in the dry
4 Traverses
CHARACTER
REVISIONS
BY
DATE


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITH NO. 254
SHEET 43 OF 110 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
AS BUILT
933 - 12.3/45
RIVERSIDE ELEVATION
SCALE 1/4" = 1'-0"
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
SECTION A-A
SCALE 1/4" = 1'-0"
PLAN
SCALE 1/4" = 1'-0"
TOP REINFORCING
BOTTOM REINFORCING
PLAN
SCALE 1/4" = 1'-0"
Landside
Riverside
Monolith No. 253
Monolith No. 255
Wing wall to match adjacent
Concrete as shown in Section A-A
Concrete as shown in Section B-B
F.B.F. 9/30/40 Cutoff key and reinforcing in base revised.
BY DATE REMARKS

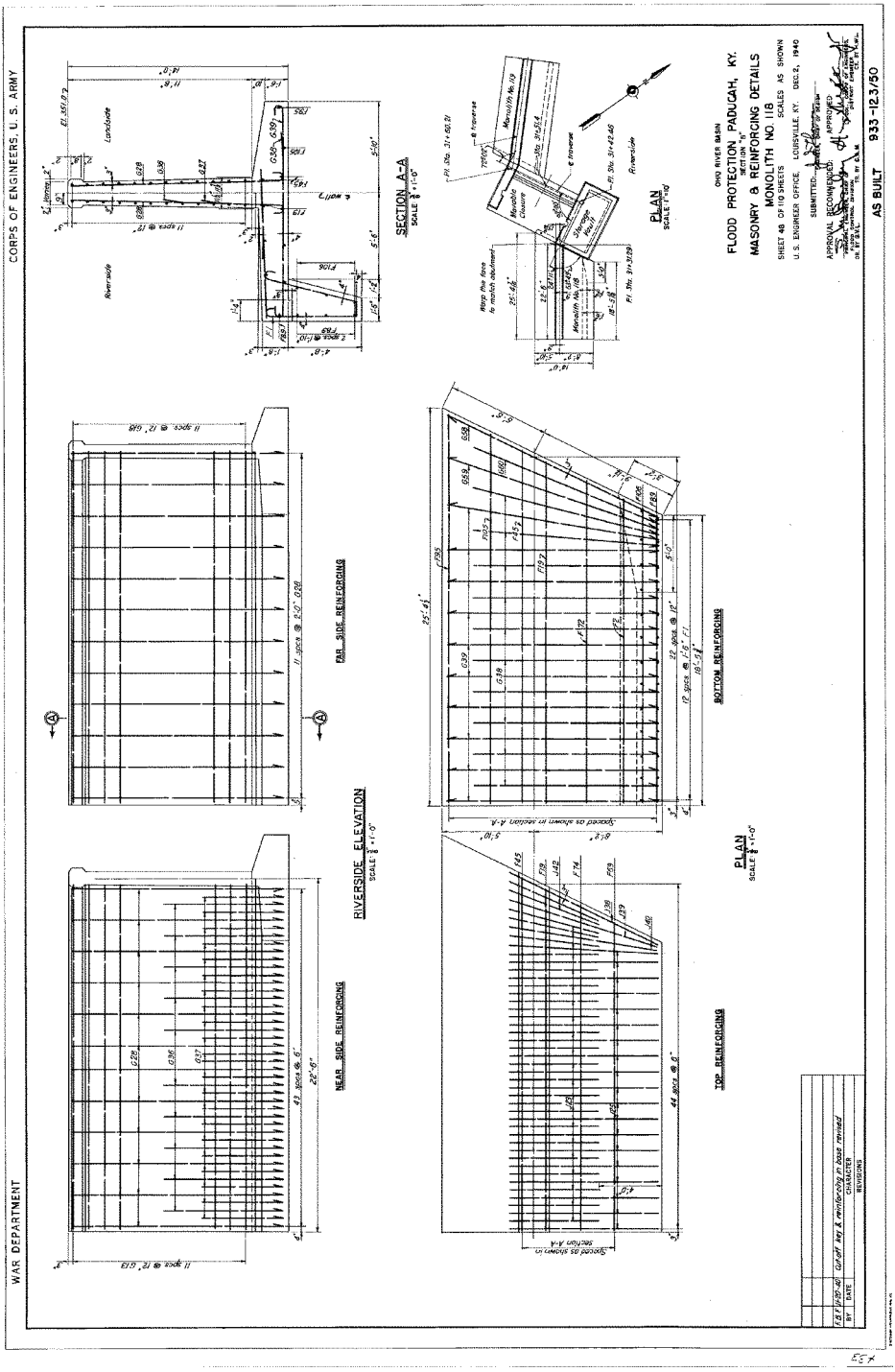

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "M"
MASONRY & REINFORCING DETAILS
MONOLITH NO. 96
SHEET 44 OF 103 SHEETS
SCALE 1"=1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC 2, 1940
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT 933-12.3/46
SECTION A-A
RIVERSIDE ELEVATION
PLAN
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
TOP REINFORCING
BOTTOM REINFORCING
Riverside
Landside
11 spaces @ 12" c2
39 spaces @ 6"
9 spaces @ 2'-0" G28
13 spaces @ 1'-6" F1
13 spaces @ 12"
6 wall and 11 towers
Spaced as shown in Section A-A
Shown in Section A-A
14'-0"
20'-3"
22'-5½"
20'-3"
137 136 Cut off leg & reinforcing steps revised
BY DATE CHARACTER
REVISIONS

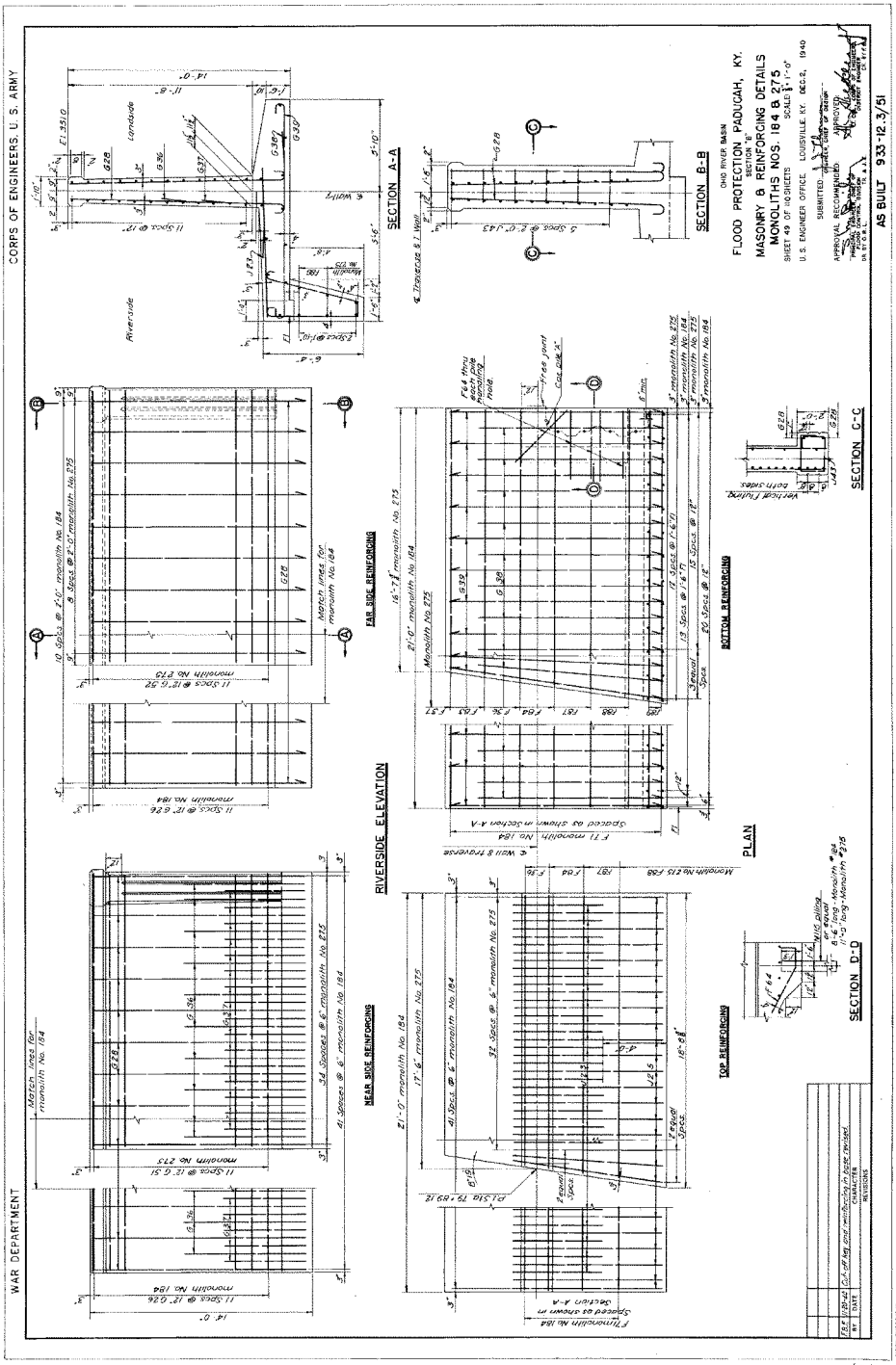

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
SECTION A-A
SECTION B-B
ON MONOLITH NO. 100 ONLY
SECTION C-C
ON MONOLITH NO. 100 ONLY
SECTION D-D
ON MONOLITH NO. 100 ONLY
FAR SIDE REINFORCING
RIVERSIDE ELEVATION
NEAR SIDE REINFORCING
BOTTOM REINFORCING
PLAN
TOP REINFORCING
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 97 TO 100 & 107
U. S. ENGINEER OFFICE. LOUISVILLE, KY. DEC. 2, 1940
AS BUILT 933-12.3/47


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS 108 TO 112, 138 TO 140, 182, 183, 260 TO 270 & 273
SHEET 4 OF 18 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC 2, 1940
SUBMITTED
APPROVED
AS BUILT 933-12,348
SECTION A-A
RIVERSIDE ELEVATION
PLAN
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
TOP REINFORCING
BOTTOM REINFORCING
Note: Deflection angle between Monoliths Nos. 107 and 108 is too small to affect the reinforcing bars. Make reinforcement for Monolith No 108 same as for Monolith No 109.
REVISIONS
DATE
BY
CHARACTER



CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
SECTION A-A
SECTION AT STA. 29+69.1
MONOLITH NO. 113
RIVERSIDE ELEVATION
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
PLAN
TOP REINFORCING
BOTTOM REINFORCING
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 113 TO 117, 141 & 272
SHEET 47 OF 110 SHEETS
U. S. ENGINEER OFFICE. LOUISVILLE, KY. DEC 2, 1940
AS BUILT
933-12.3/49


CORPS OF ENGINEERS, U.S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "A"
MASONRY & REINFORCING DETAILS
MONOLITH NO. 118
SHEET 48 OF 110 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
AS BUILT 933-12.3/50
SECTION A-A
SCALE 1/4"=1'-0"
PLAN
SCALE 1"=10'
RIVERSIDE ELEVATION
SCALE 1/4"=1'-0"
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
BOTTOM REINFORCING
TOP REINFORCING
PLAN
SCALE 1/4"=1'-0"
Riverside
Landside
Monolith No. 118
Monolith Closure
Sta. 31+54.4
Sta. 31+43.46
Riverside
Sta. 31+39.9
Sta. 31+60.51
Wrap this face to match abutment
Sloping Paving
Spaced as shown in section A-A
11 spcs. @ 12', 6.13
11 spcs. @ 2'-0", 0.88
43 spcs. @ 6", 22'-6"
12 spcs. @ 12", 18'-5"
44 spcs. @ 8", 29'-8"
25'-8"
22'-6"
18'-5"
29'-8"
5'-6"
4'-8"
14'-0"
E.B.F. 1/20/41 Grade Beg. & reinforcing in base revised
BY DATE CHARACTER
REVISIONS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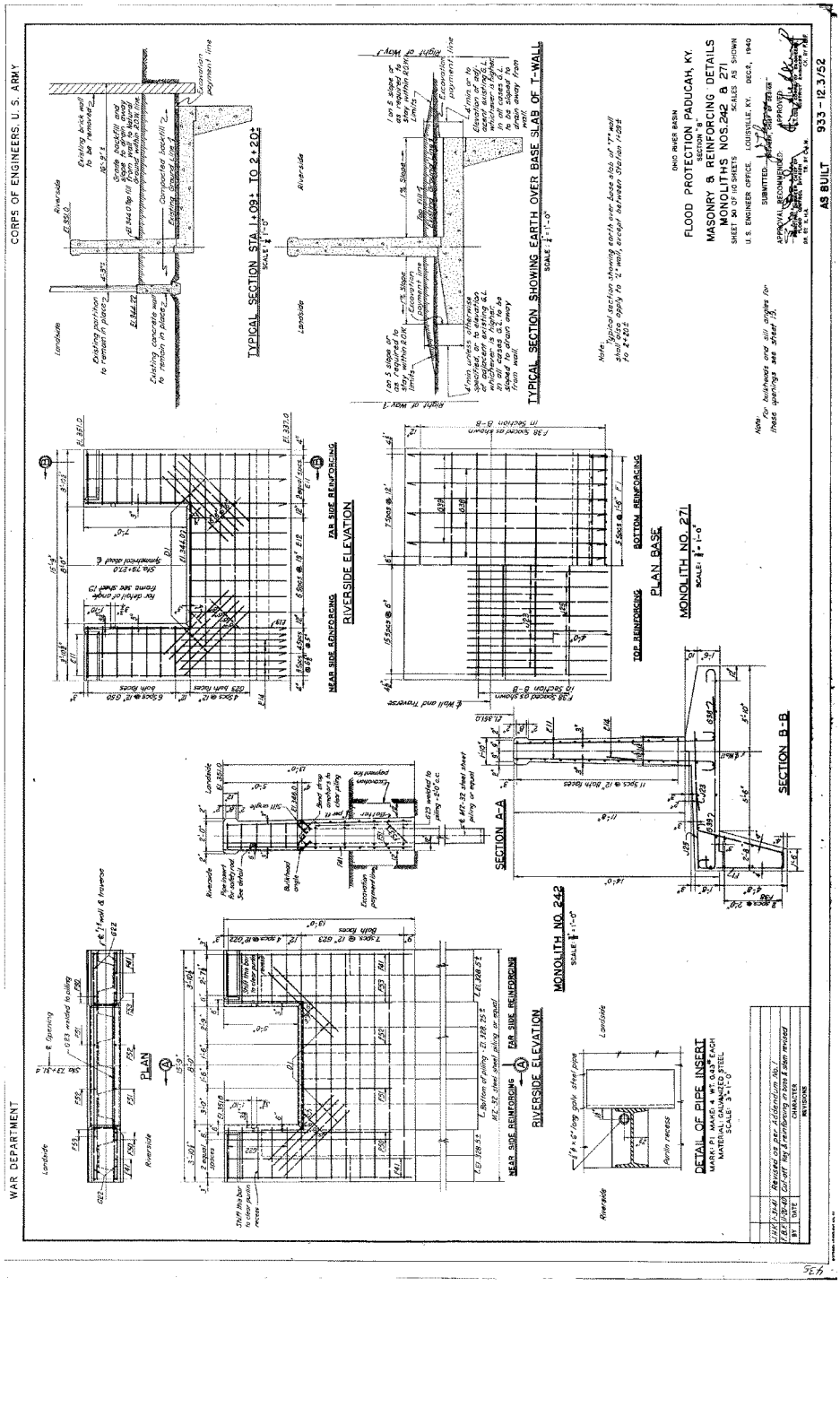
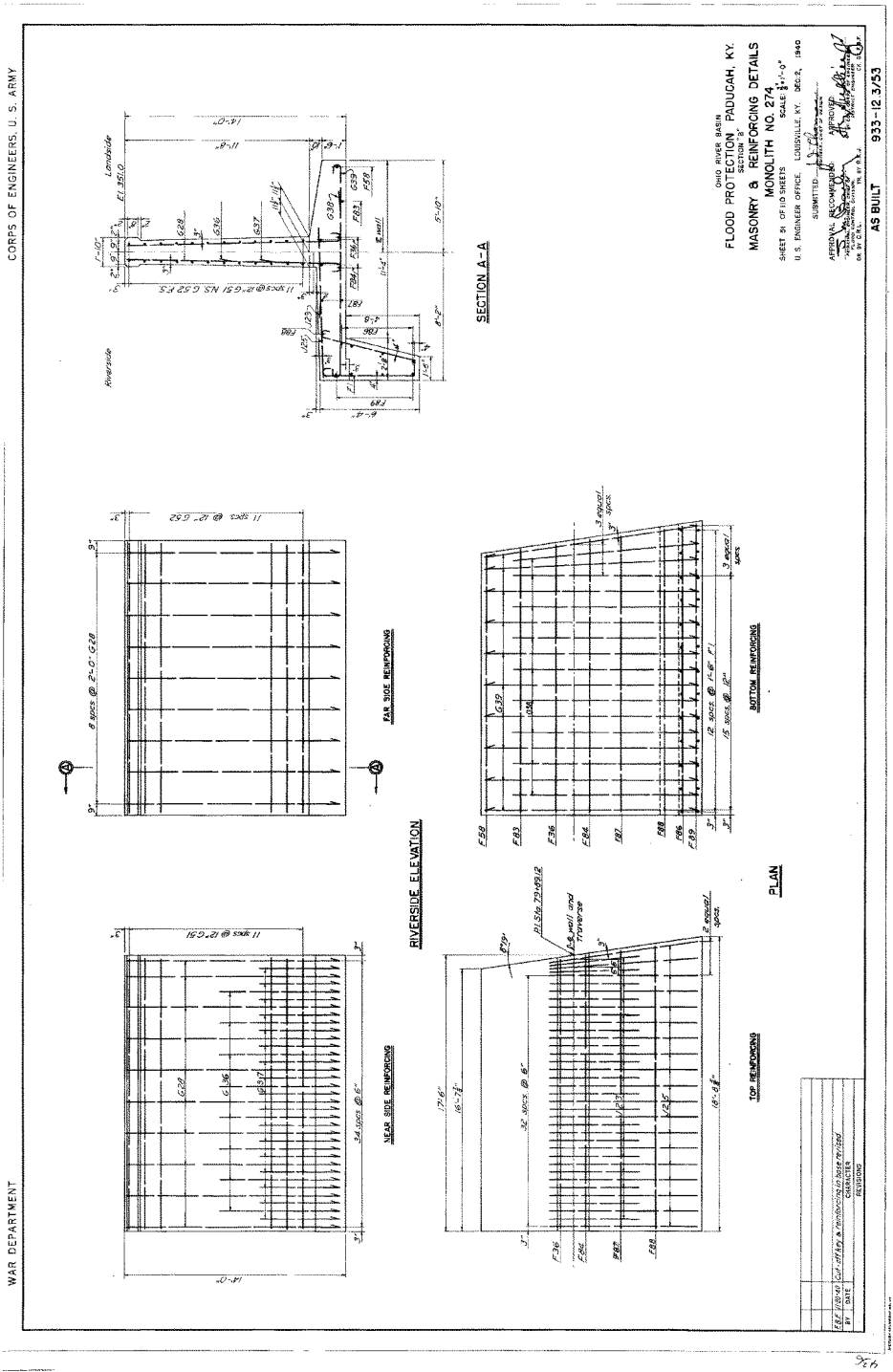
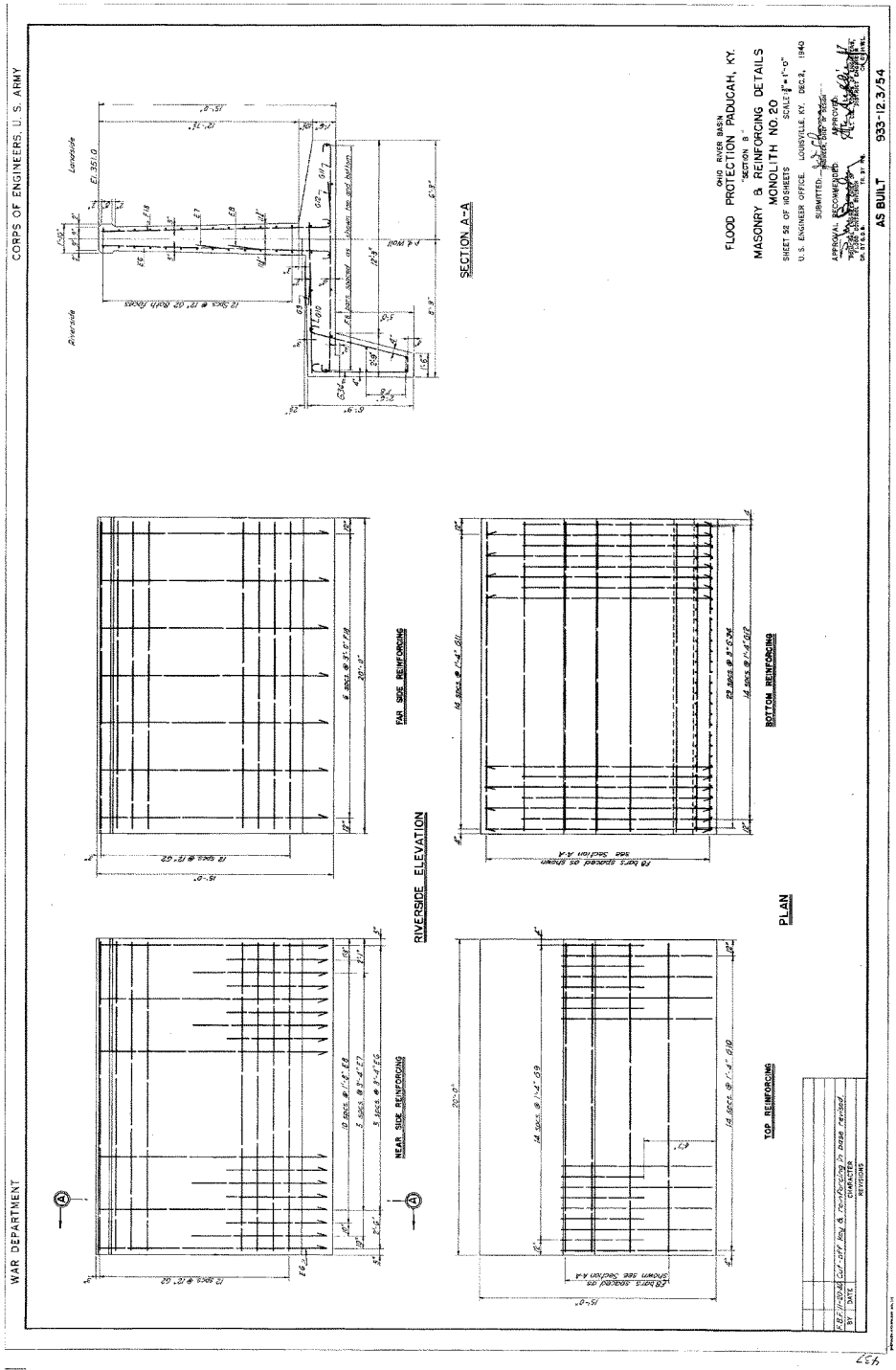
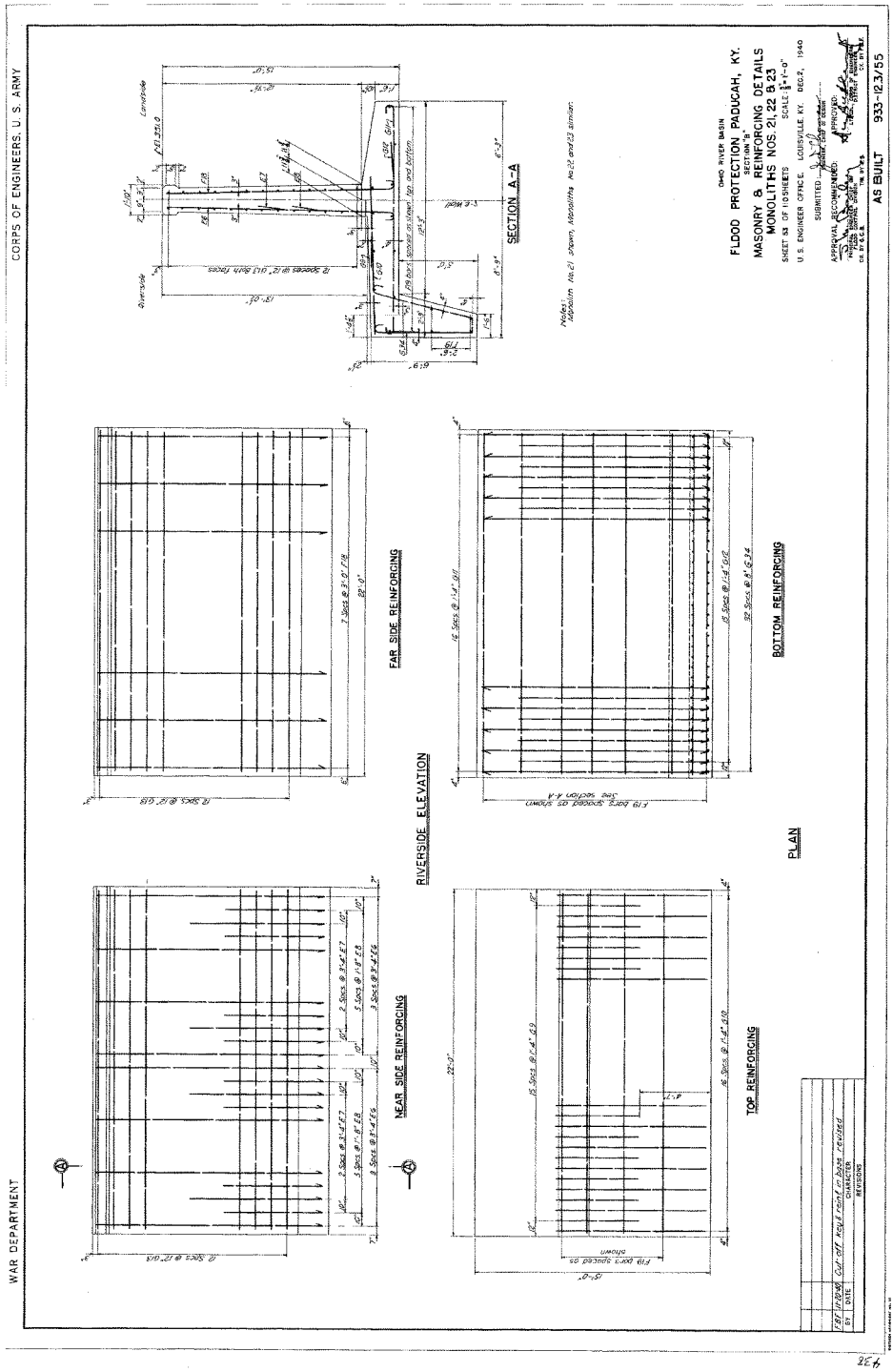
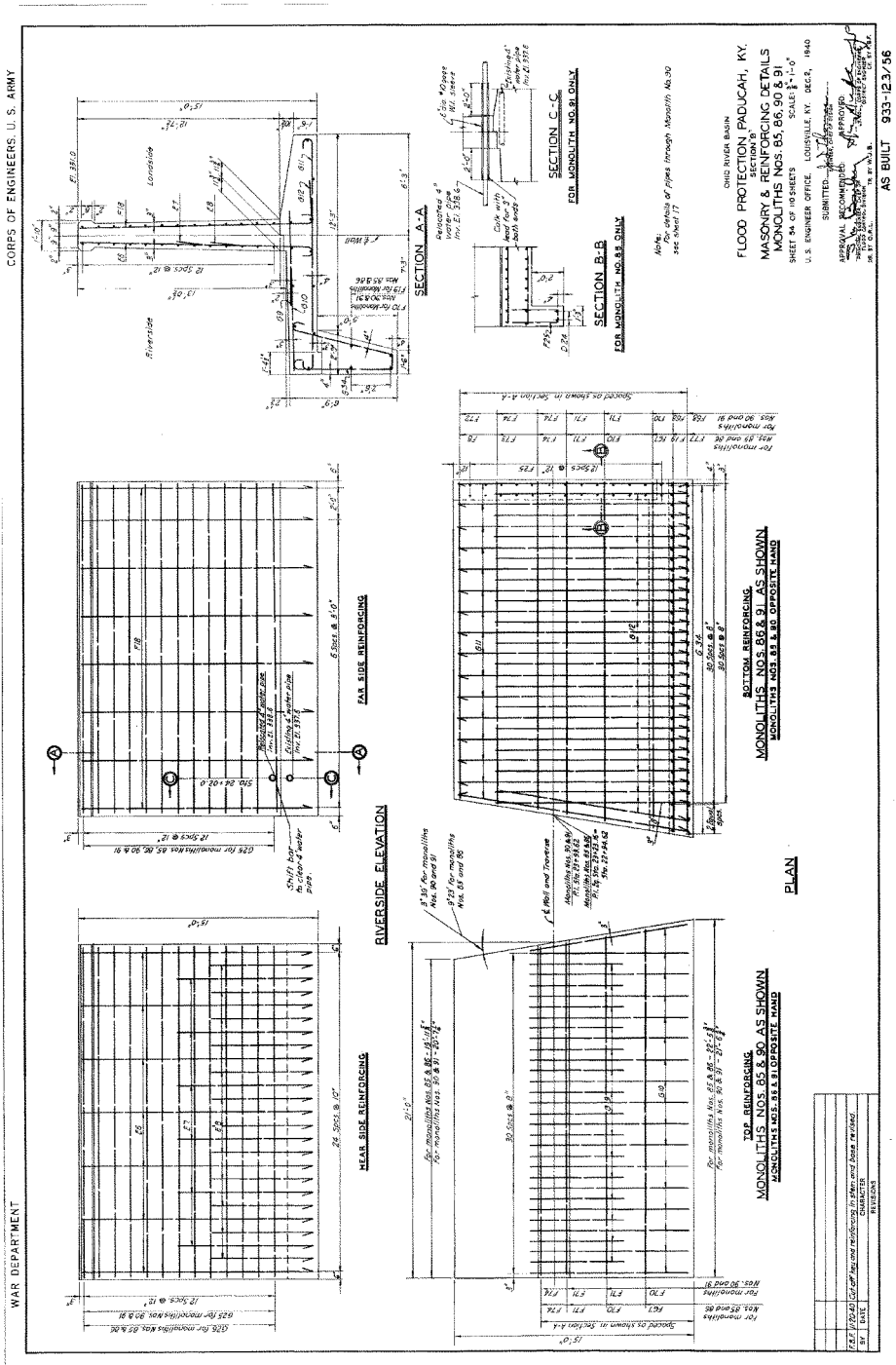
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 184 & 275
SHEET 49 OF 109 SHEETS
SCALE 1"-1'-0"
U.S. ENGINEER OFFICE LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
AS BUILT 9-33-12.3/51
RIVERSIDE ELEVATION
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
BOTTOM REINFORCING
TOP REINFORCING
PLAN
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
Riverside
Landside
Monolith No. 184
Monolith No. 275
Match lines for monolith No. 184
Match lines for monolith No. 275
Expansion Joint
Weep Holes
Vertical Tieing Bolts
Wire Rope
Section A-A
Section B-B
Section C-C
Section D-D


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 242 & 271
SHEET 30 OF 10 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC 8, 1949
SUBMITTED
APPROVED
AS BUILT 933 - 12.3/52
TYPICAL SECTION STA 1+09± TO 2+20±
TYPICAL SECTION SHOWING EARTH OVER BASE SLAB OF T-WALL
RIVERSIDE ELEVATION
PLAN BASE
MONOLITH NO. 271
SECTION A-A
SECTION B-B
PLAN
RIVERSIDE ELEVATION
MONOLITH NO. 242
DETAIL OF PIPE INSERT
Existing brick wall to be removed
Existing portion to remain in place
Existing concrete wall to remain in place
Compacted backfill
Existing ground surface
Excavation payment line
Right of Way
Landside
Riverside
Note: Typical section showing earth over footing of T-wall shall also apply to 2+20± wall, except between Station 1+09±
Note: For bulkheads and sill piles for these openings see Sheet 31
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
TOP REINFORCING
BOTTOM REINFORCING
Bulkhead angle
Sill angle
Sheet piling or repair sheet piling
Excavation payment line
Riverside flowline
Landside flowline
Perlin recess
1/4" x 6" long galv. steel pins
MATERIAL: ANGLE L W. GALVANIZED
MATERIAL GALVANIZED STEEL
SCALE: 3"=1'-0"
REVISIONS
CHARACTER
BY
DATE


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION 205
MASONRY & REINFORCING DETAILS
MONOLITH NO. 274
SCALE 1/4"-0"
SHEET 34 OF 110 SHEETS
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
AS BUILT
933-12.3/53
SECTION A-A
RIVERSIDE ELEVATION
PLAN
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
TOP REINFORCING
BOTTOM REINFORCING
Landside
Riverside
E.M. wall
E.F. wall and transverse

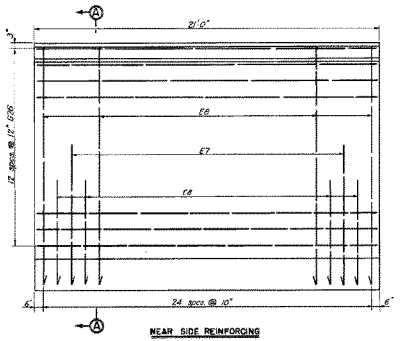

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
"SECTION B"
MASONRY & REINFORCING DETAILS
MONOLITH NO. 20
SHEET 52 OF 10 SHEETS
SCALE 1/8" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 21, 1940
SUBMITTED
APPROVED
AS BUILT
933-12.3/54
SECTION A-A
RIVERSIDE ELEVATION
FAN SIDE REINFORCING
NEAR SIDE REINFORCING
BOTTOM REINFORCING
TOP REINFORCING
PLAN
Landside
Riverside
El. 351.0
12 Slots @ 12" Bolt Floods
Place concrete on slopes, see grid bottom
Drain tile
Slope
Rip rap
Concrete
Earth
Rock
Gravel
Sand
Steel
Timber
Brick
Water
Cut-off Ring & reinforcing in base revised
REVISIONS
BY
DATE
CHARACTER


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 21, 22 & 23
SHEET 53 OF 110 SHEETS
SCALE: 1/8"-1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
933-12.3/55
SECTION A-A
RIVERSIDE ELEVATION
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
BOTTOM REINFORCING
TOP REINFORCING
PLAN
Monolith No.21 shown, Monoliths Nos.22 and 23 similar.
Cut off keyed into base revised
1 DEC 1940

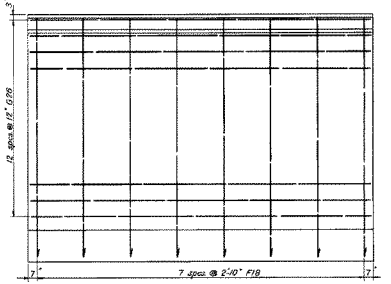

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
SECTION A-A
SECTION C-C
FOR MONOLITH NO. 91 ONLY
SECTION B-B
FOR MONOLITH NO. 85 ONLY
RIVERSIDE ELEVATION
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
PLAN
BOTTOM REINFORCING
MONOLITHS NOS. 85 & 91 AS SHOWN
MONOLITHS NOS. 86 & 90 OPPOSITE HAND
TOP REINFORCING
MONOLITHS NOS. 85 & 90 AS SHOWN
MONOLITHS NOS. 86 & 91 OPPOSITE HAND
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION 8
MASONRY & REINFORCING DETAILS
MONOLITHS Nos. 85, 86, 90 & 91
SHEET 54 OF 110 SHEETS
SCALE: 1/8" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
AS BUILT 933-123/56

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

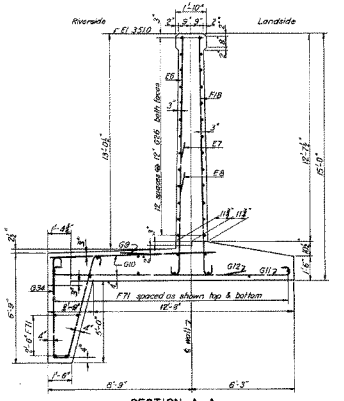


NEAR SIDE REINFORCING

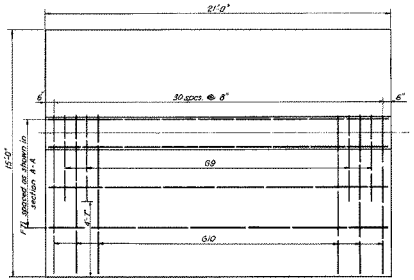


FAR SIDE REINFORCING

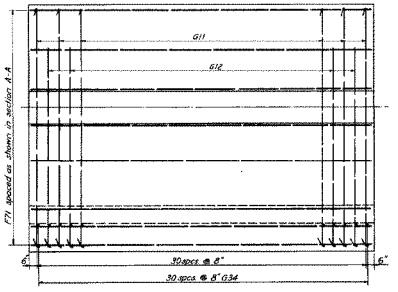
RIVERSIDE ELEVATION



SECTION A-A



TOP REINFORCING



BOTTOM REINFORCING

PLAN

15 F	11-20-48	Cut-off key & reinforcing in base reward
BY	DATE	CHARACTER
REVISIONS		

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 87 TO 89 & 92 TO 94

SHEET 55 OF 115SHEETS SCALE: 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] ENGINEER, CHIEF OF BRANCH

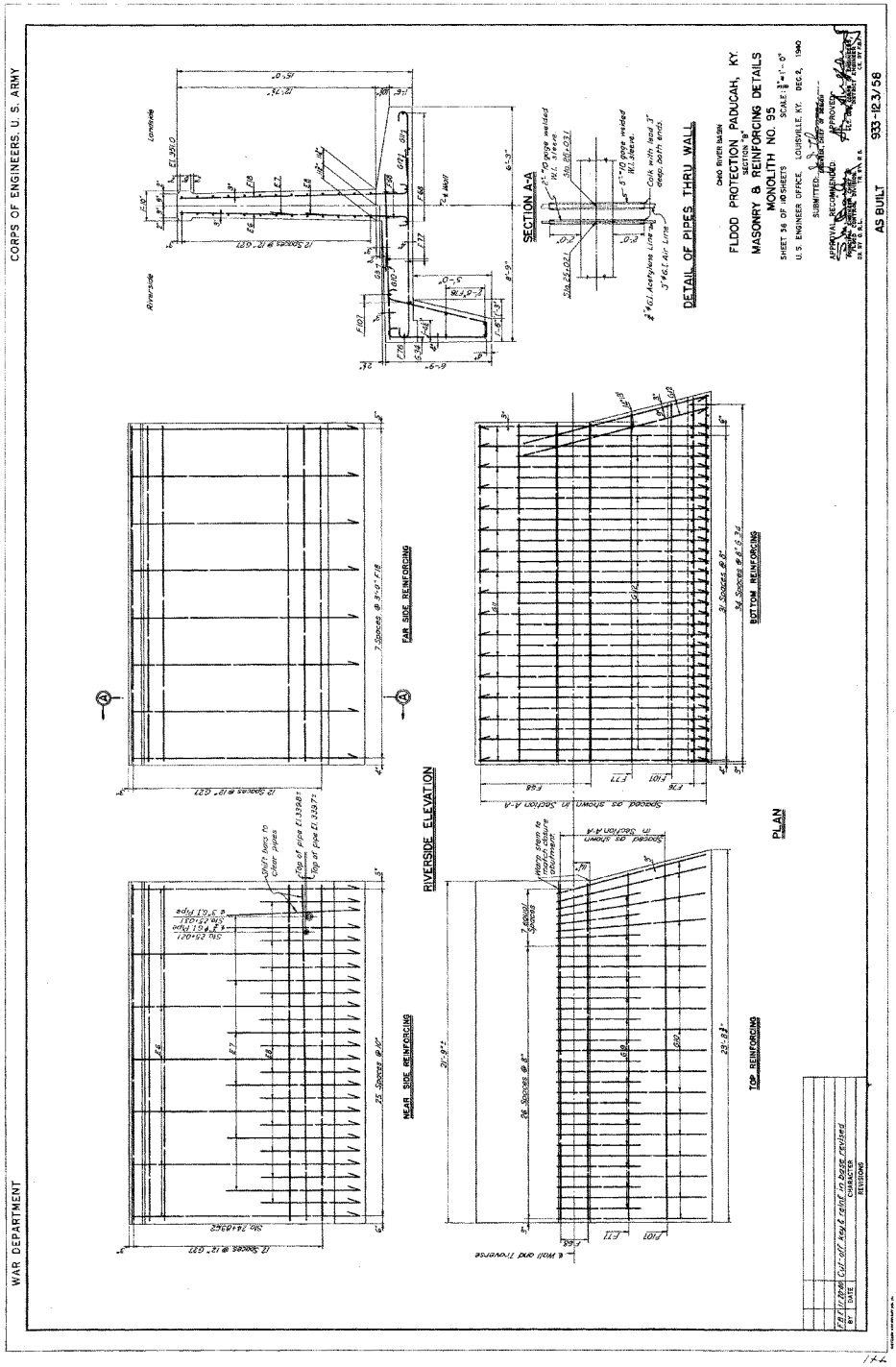
APPROVAL RECOMMENDED: [signature] CHIEF, FLOOD CONTROL DIVISION

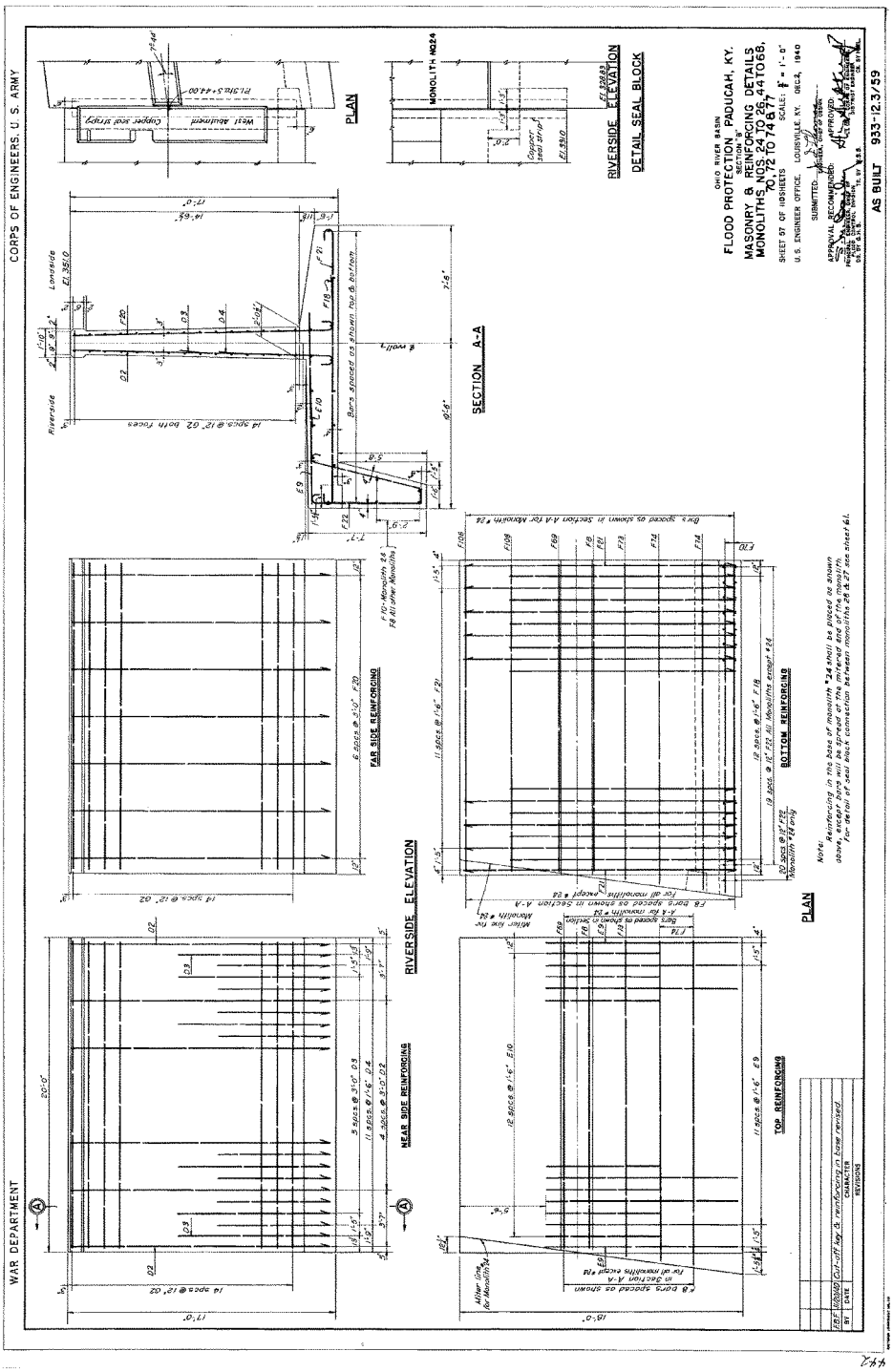
APPROVED: [signature] DISTRICT ENGINEER

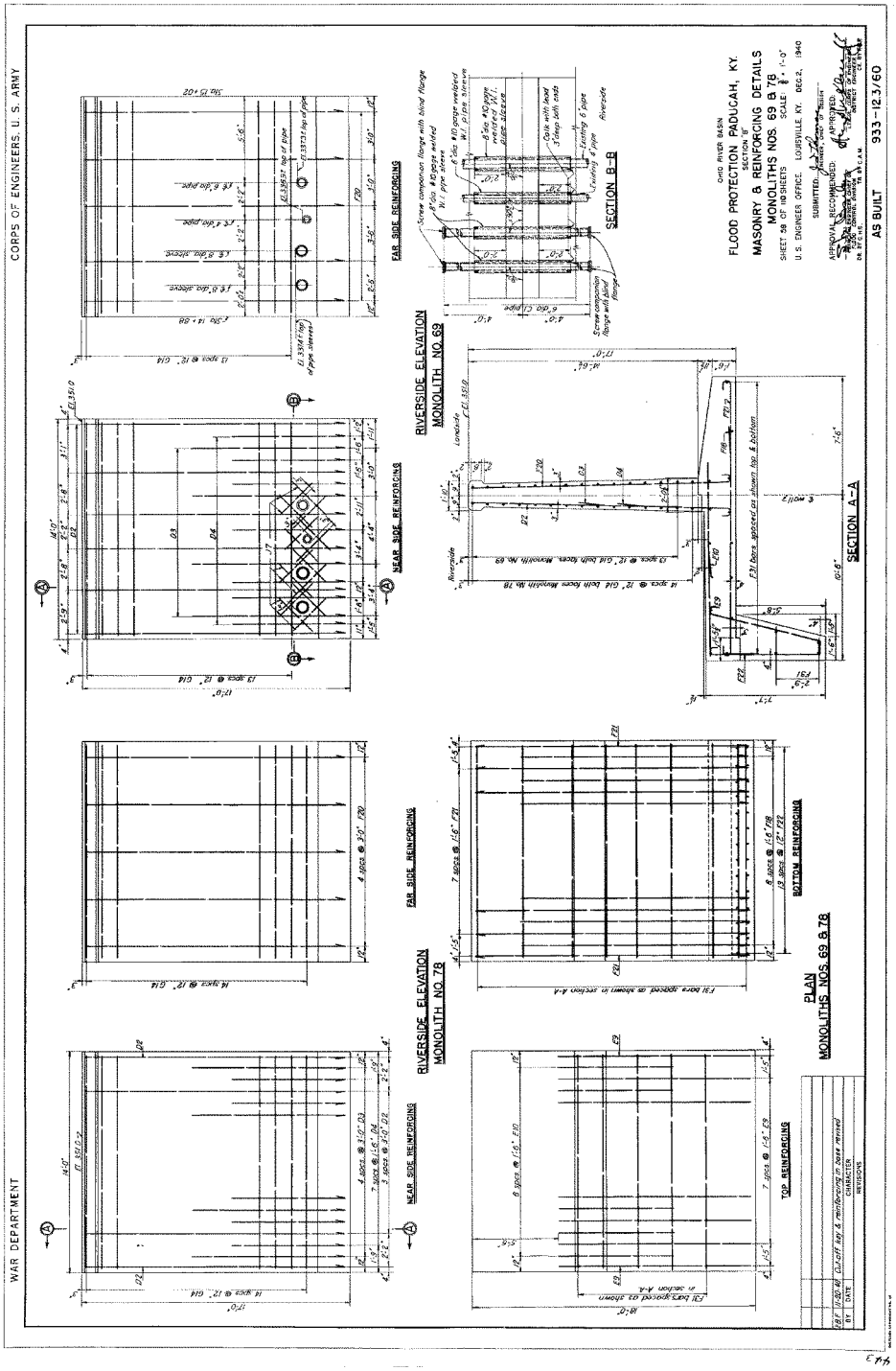
DR. BY F.E.B. TR. BY S.A.M. CK. BY F.E.B.

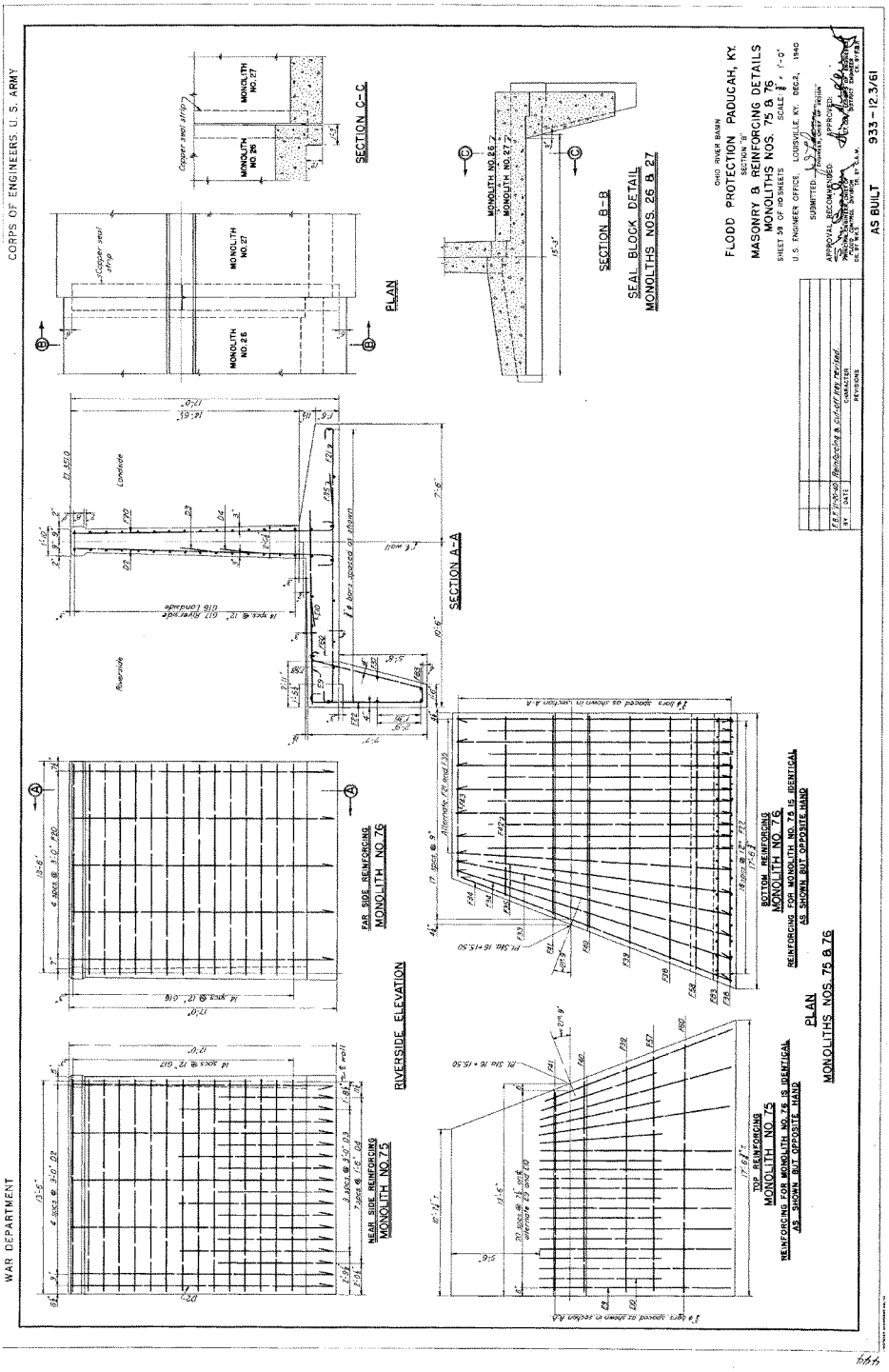
AS BUILT 933-12.3/57

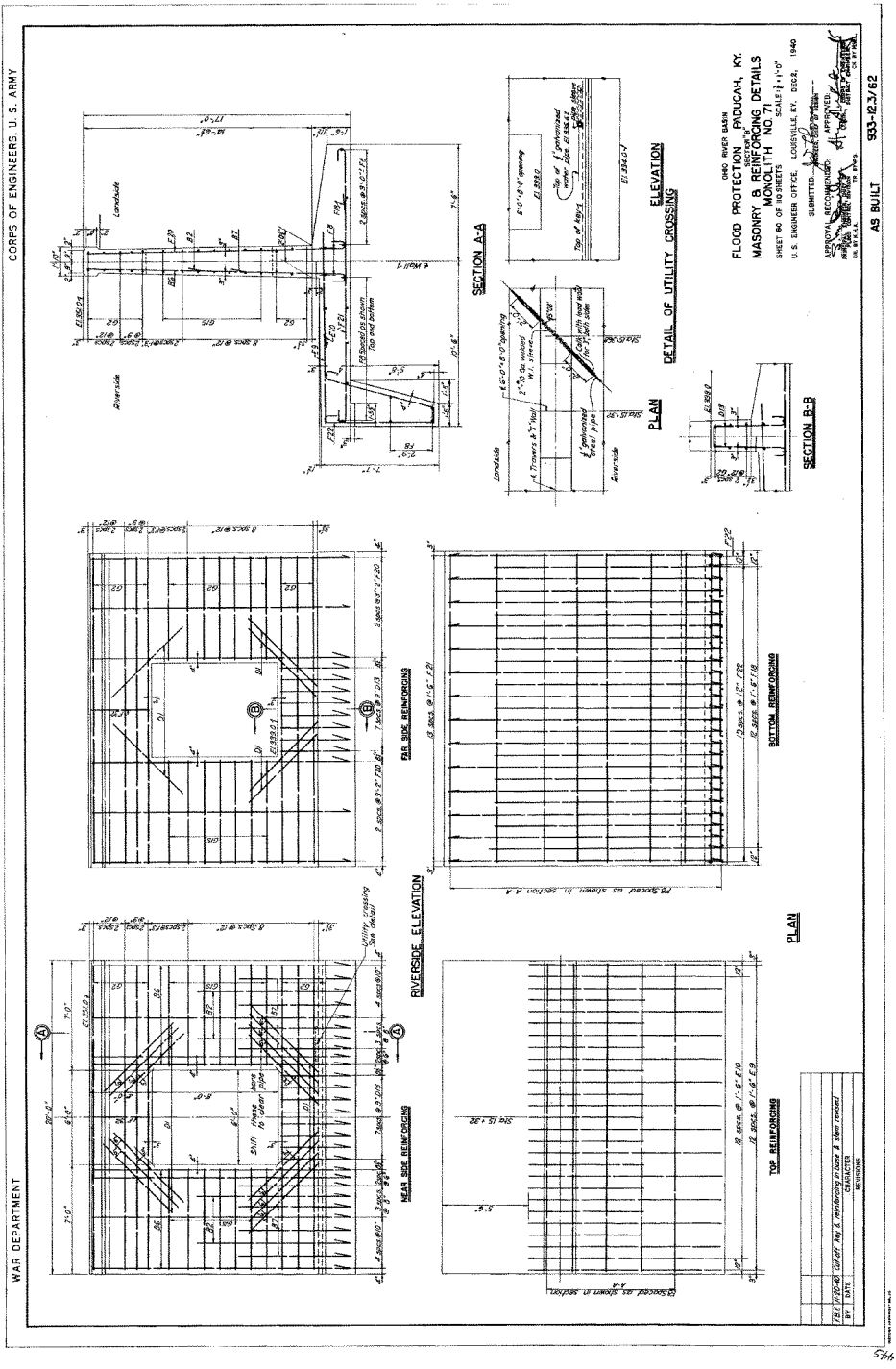
716

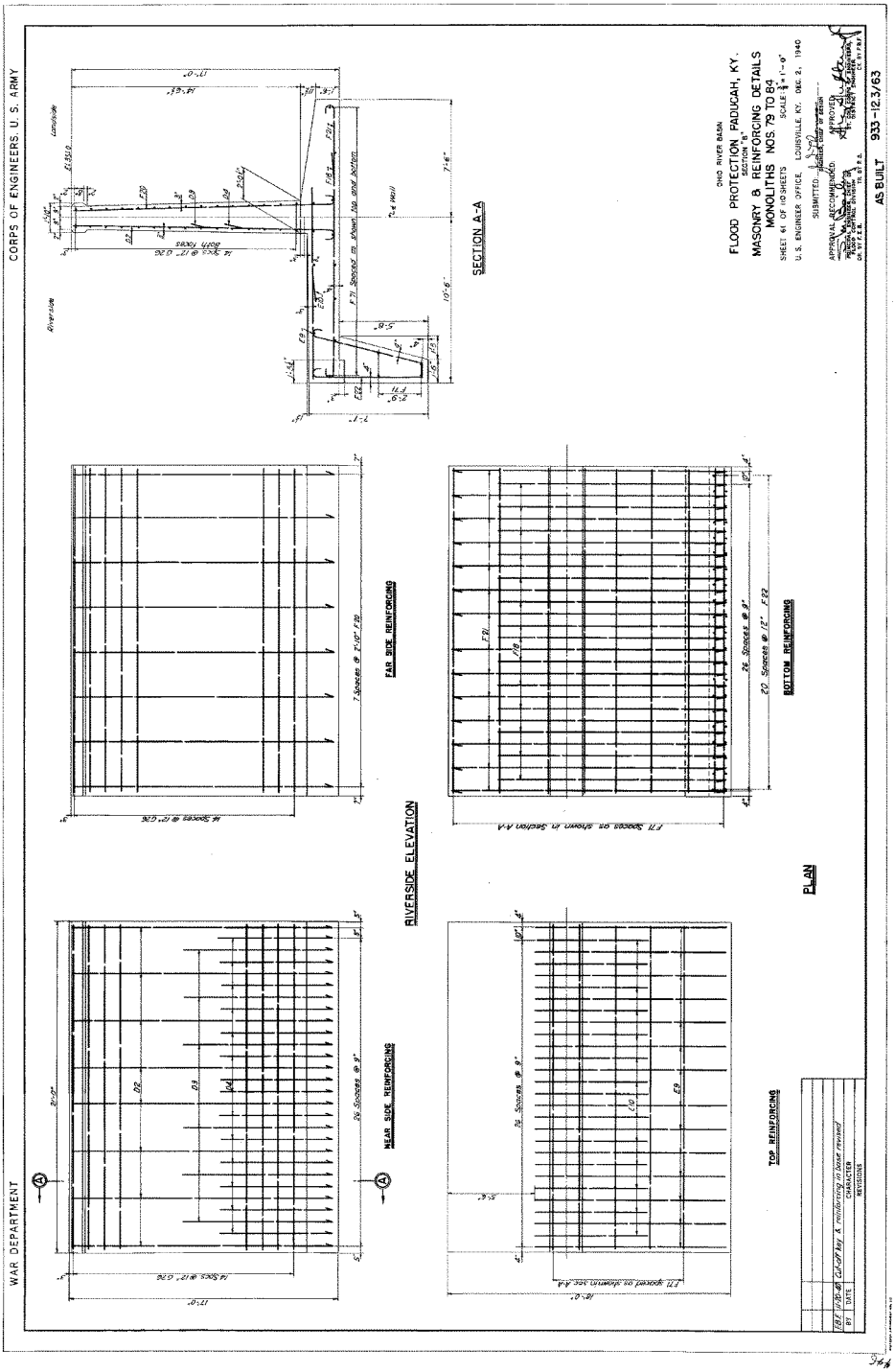

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
OHIO RIVER BASIN
MASONRY & REINFORCING DETAILS
MONOLITH NO. 95
SHEET 36 OF 40 SHEETS
SCALE: 1/8" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC 2, 1940
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
933-12.3/58
RIVERSIDE ELEVATION
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
PLAN
TOP REINFORCING
BOTTOM REINFORCING
SECTION A-A
DETAIL OF PIPES THRU WALL
Riverside
Landside
12 Spaces @ 12" C.Cs.
7 Spaces @ 3'-3" C.Cs.
24 Spaces @ 8" C.Cs.
34 Spaces @ 8" C.Cs.
Sta 24+02
Sta 24+02½
Sta 24+03
Sta 24+03½
Top of pipe El 339.81
Top of pipe El 339.71
Drift bars to clear pipes
Warp stem to conform to adjustment
Stepped as shown in Section A-A
Stepped as shown in Section A-A
4" Galv. Iron Pipe
3" Galv. Iron Pipe
5"-10 pipe welded W.I. Sleeve
Cork with lead 3" deep, both ends
3"Galv. Air Line
4"Galv. Acetylene Line
REVISIONS
CHARACTER
DATE
BY

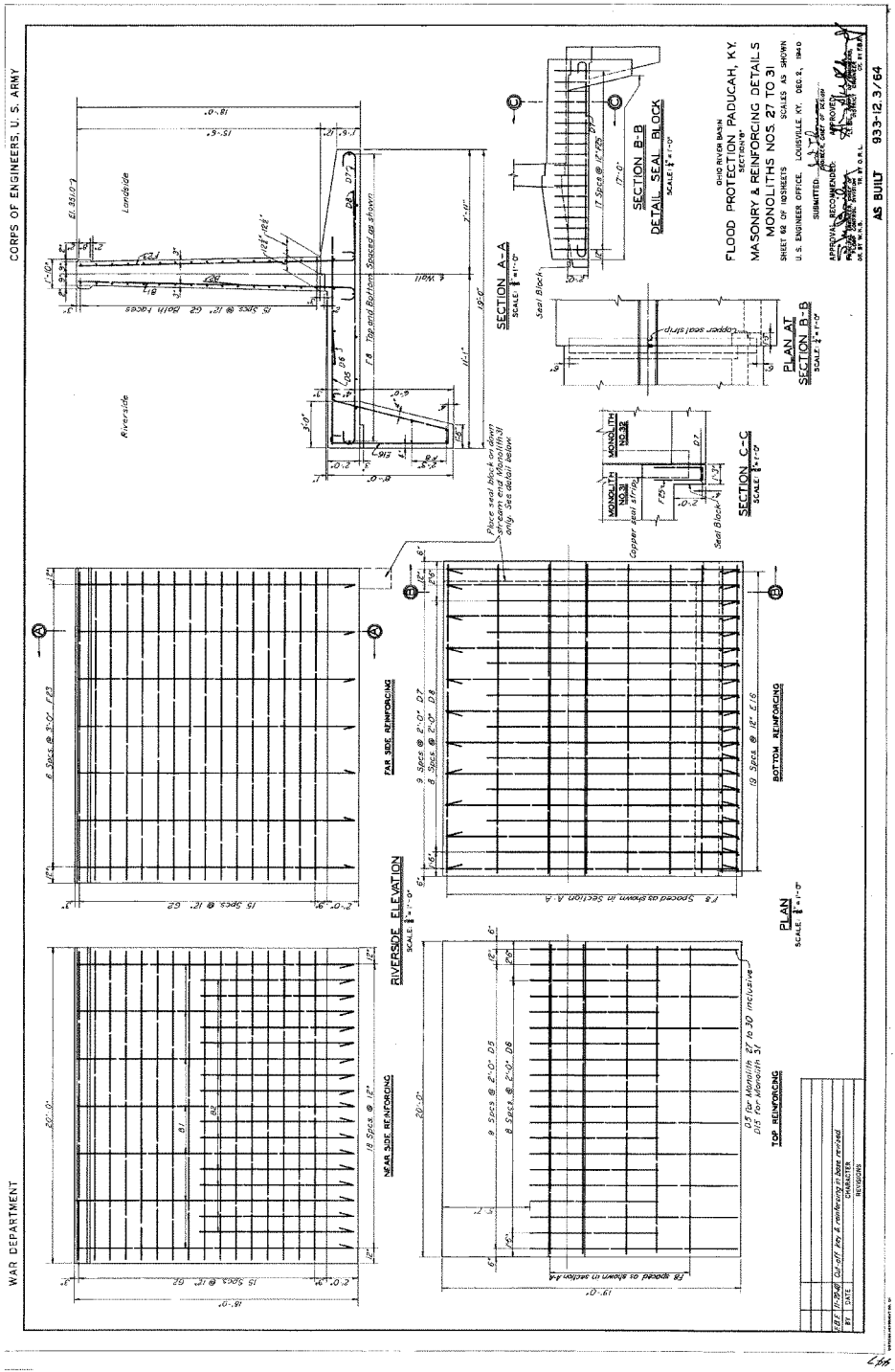

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 24 TO 26, 44 TO 68, 70, 72 TO 74 & 77
SHEET 97 OF 100 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE KY. DEC 4, 1940
SCALE: 1" = 1'-0"
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT 933-12.3/59
PLAN
RIVERSIDE ELEVATION
DETAIL SEAL BLOCK
SECTION A-A
RIVERSIDE ELEVATION
PLAN
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
BOTTOM REINFORCING
TOP REINFORCING
Note: Reinforcing in the base of monolith "24 shall be placed as shown above, except bars will be spread at the inland end of the monolith for detail of seal block connection between monoliths #6 & 27 see sheet 61.

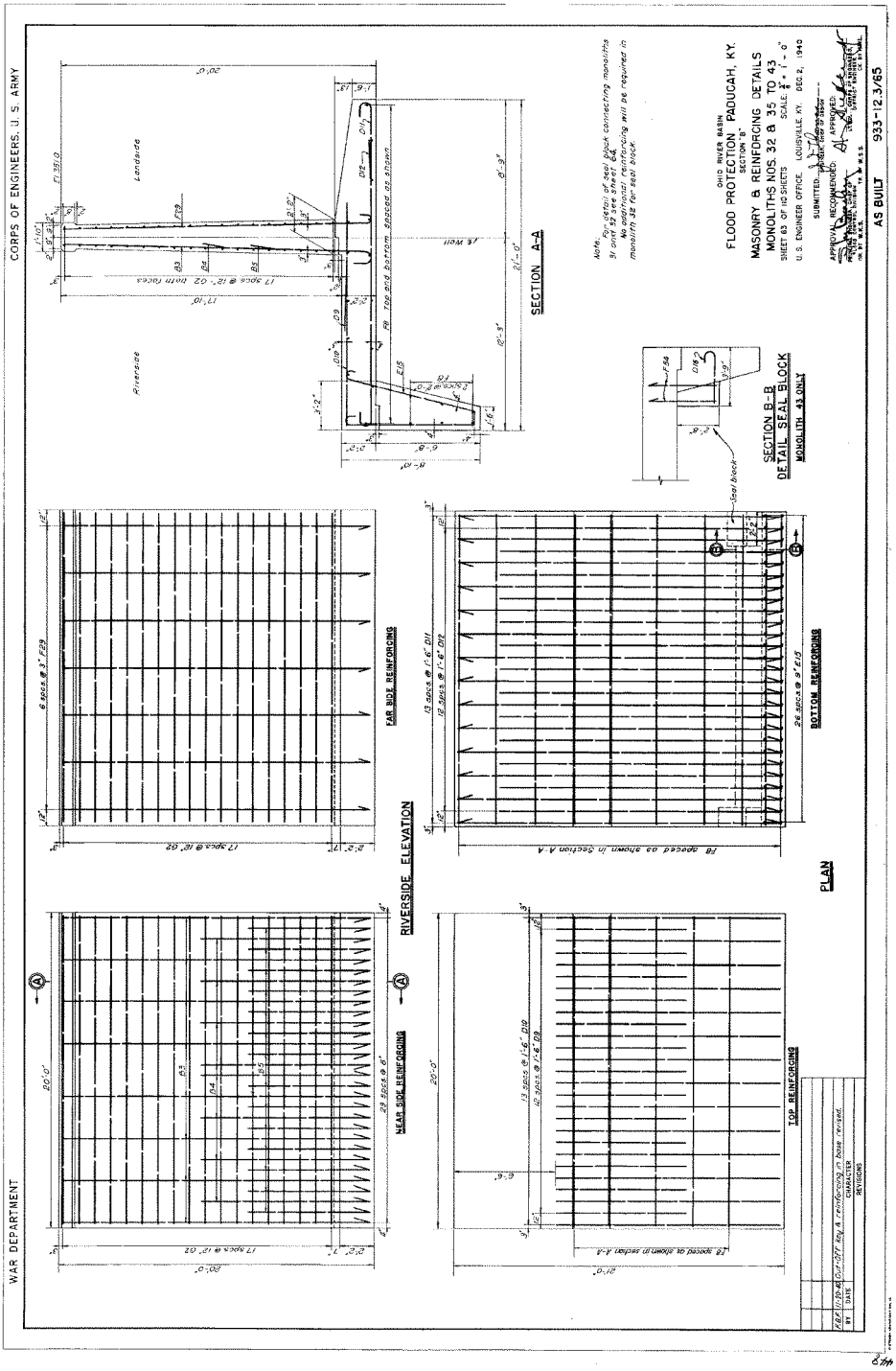

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "A"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 69 & 78
SHEET 58 OF 140 SHEETS
SCALE: 1/8" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC 2, 1940
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
933-12.3/60
PLAN
MONOLITHS NOS. 69 & 78
RIVERSIDE ELEVATION
MONOLITH NO. 78
RIVERSIDE ELEVATION
MONOLITH NO. 69
SECTION A-A
SECTION B-B
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
TOP REINFORCING
BOTTOM REINFORCING
CHARACTER
REVISIONS

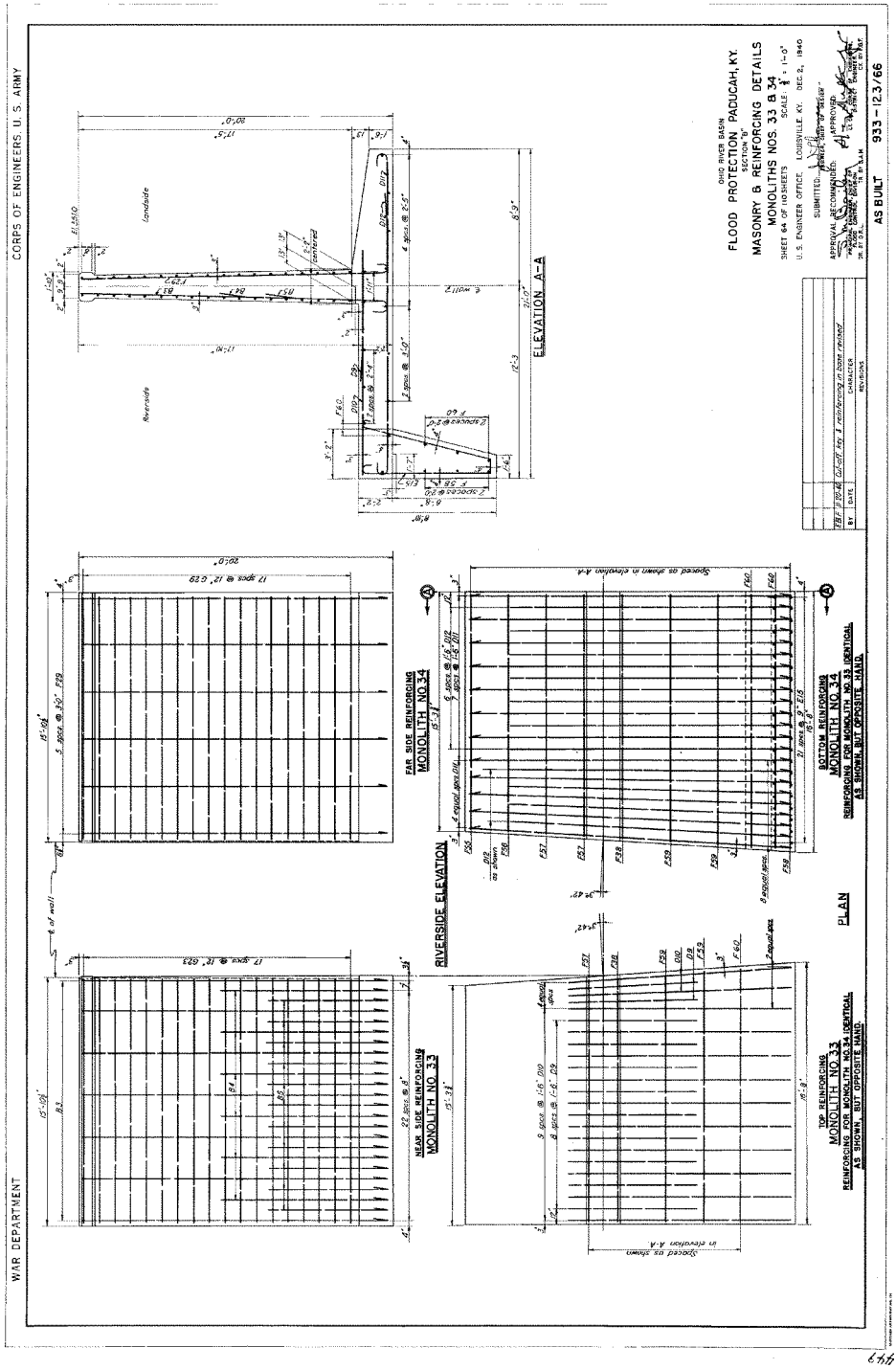

WAR DEPARTMENT
CORPS OF ENGINEERS U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 75 & 76
SHEET 39 OF 110 SHEETS
SCALE 1/8" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
933 - 12.3/61
RIVERSIDE ELEVATION
NEAR SIDE REINFORCING MONOLITH NO. 75
FAR SIDE REINFORCING MONOLITH NO. 75
TOP REINFORCING MONOLITH NO. 75
REINFORCING FOR MONOLITH NO. 76 IS IDENTICAL AS SHOWN, BUT OPPOSITE HAND
BOTTOM REINFORCING MONOLITH NO. 76
REINFORCING FOR MONOLITH NO. 75 IS IDENTICAL AS SHOWN, BUT OPPOSITE HAND
PLAN
MONOLITHS NOS. 75 & 76
SECTION A-A
SECTION B-B
SEAL BLOCK DETAIL
MONOLITHS NOS. 26 & 27
SECTION C-C
PLAN
MONUMENT NO. 26
MONUMENT NO. 27
MONUMENT NO. 25
MONUMENT NO. 85.7
MONUMENT NO. 27.7
Copper seal strip
Copper seal plug
Riverside
Landside
Alternate #3 and #6
Alternate #3 and #10

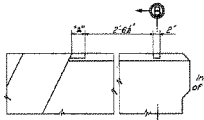

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MONOLITH NO. 71
SHEET NO OF NO SHEETS
SCALE 1/8 = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC 2, 1940
SUBMITTED
APPROVED
AS BUILT
933-12.3/62
SECTION A-B
ELEVATION
PLAN
DETAIL OF UTILITY CROSSING
SECTION B-B
RIVERSIDE ELEVATION
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
BOTTOM REINFORCING
TOP REINFORCING
PLAN
Landside
Riverside
REVISIONS
CHARACTER
DATE
BY

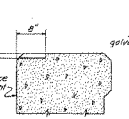

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 79 TO 84
SHEET 41 OF 110 SHEETS
SCALE 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
933-12.3/63
SECTION A-A
RIVERSIDE ELEVATION
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
BOTTOM REINFORCING
TOP REINFORCING
PLAN
REVISIONS
DATE
BY
Cut off key & reinforcing as shown revised
12-28-40

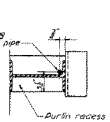

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
SECTION "B"
FLOOD PROTECTION PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 27 TO 31
SHEET 82 OF 109 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
AS BUILT
933-12.3/64
RIVERSIDE ELEVATION
SCALE 1/4"=1'-0"
PLAN
SCALE 1/4"=1'-0"
SECTION A-A
SCALE 1/4"=1'-0"
SECTION B-B
SCALE 1/4"=1'-0"
DETAIL SEAL BLOCK
SCALE 1/4"=1'-0"
PLAN AT SECTION B-B
SCALE 1/4"=1'-0"
SECTION C-C
SCALE 1/4"=1'-0"
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
TOP REINFORCING
BOTTOM REINFORCING
Landside
Riverside
Top and Bottom Spaced as shown
Place seal block as shown on earn end Monolith 31 only. See detail below
Copper seal strip
Seal Block
MONOLITH NO. 30
MONOLITH NO. 31
Cut off bars if reinforcing is less required
CHARACTER
REVISIONS
DATE
BY


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION 8
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 32 & 35 TO 43
SHEET #3 OF 110 SHEETS
SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
933-12.3/65
RIVERSIDE ELEVATION
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
PLAN
BOTTOM REINFORCING
TOP REINFORCING
SECTION A-A
SECTION B-B
DETAIL SEAL BLOCK
MONOLITH 43 ONLY
Note: For detail of keel block connecting monoliths 31 and 32 see sheet 64.
No shortinal reinforcing will be required in monolith 32 for keel block.
Landside
Riverside
Seal block
REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "A"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 33 & 34
SHEET 64 OF 110 SHEETS
SCALE 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
933 - 12.3/66
ELEVATION A-A
RIVERSIDE ELEVATION
PLAN
FAR SIDE REINFORCING
MONOLITH NO. 34
NEAR SIDE REINFORCING
MONOLITH NO. 33
BOTTOM REINFORCING
MONOLITH NO. 34
REINFORCING FOR MONOLITH NO. 33 IDENTICAL
AS SHOWN, BUT OPPOSITE HAND
TOP REINFORCING
MONOLITH NO. 33
REINFORCING FOR MONOLITH NO. 34 IDENTICAL
AS SHOWN, BUT OPPOSITE HAND
Landside
Riverside
Sloped as shown in elevation A-A
REVISIONS
DATE
BY
CHARACTER

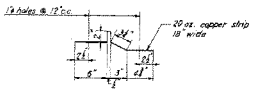


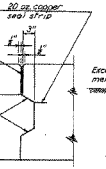


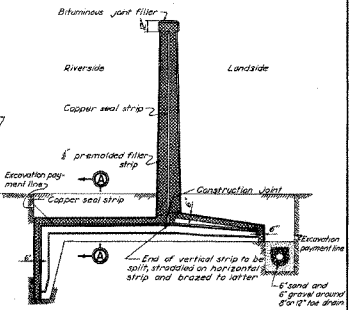


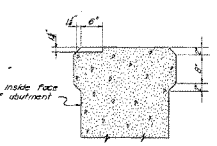
WALKWAY RECESS DETAIL
SCALE: 1" = 1'-0"

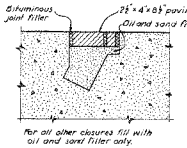
WALKWAY RECESS DIMENSIONS	
STATION	"A"
4+49.5	3½"
5+34.5	3½"
9+44.0	3½"
10+40.0	3½"
25+15.4	3½"
26+90.3	3½"
29+20.3	6"
31+01.3	6"
31+51.4	3½"
36+24.5	6"
62+84.3	3½"
71+74.5	3½"
75+85.1	3½"
83+28.1	3½"
83+92.1	3½"

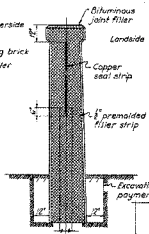


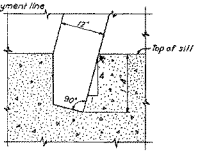


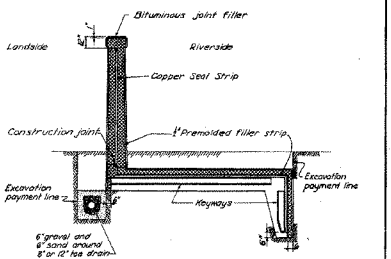




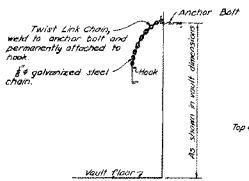


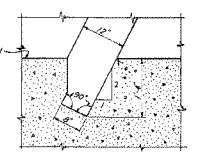


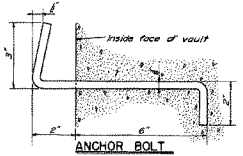


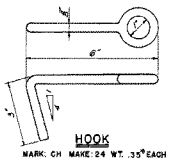


CHAIN SCHEDULE			
STATION	NO. REQD	LENGTH	APPROX. WT. LBS.
4+00.0	2	3'-0"	1.23
10+40.0	2	2'-0"	.82
28+02.3	2	1'-6"	.62
	2	2'-0"	.82
30+31.3	2	2'-0"	.82
31+51.4	2	1'-6"	.62
38+35.0	2	1'-6"	.62
62+84.3	2	1'-6"	.62
68+61.0	2	2'-0"	.82
71+74.5	2	1'-6"	.62
75+85.1	2	1'-6"	.62
83+28.1	2	3'-0"	1.23









2&F (1-20-48)	Vertical keyway in walls removed	
BY	DATE	CHARACTER
REVISIONS		

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MISCELLANEOUS DETAILS

SHEET 65 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: DISTRICT ENGINEER, CHIEF OF DIVISION

APPROVAL RECOMMENDED: APPROVED:

DIVISION ENGINEER, OHIO RIVER DIVISION

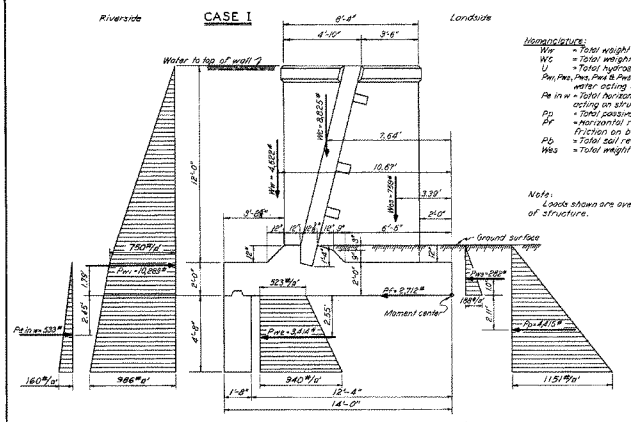
DISTRICT ENGINEER, LOUISVILLE DISTRICT

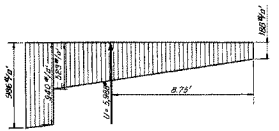
CK. BY M.M.L.

AS BUILT 933-12.3/67

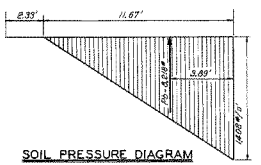
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





UPLIFT PRESSURE DIAGRAM



SOIL PRESSURE DIAGRAM

SILL SECTION - CLOSURES

STAS. 29+80.3, 31+01.3 & 36+84.5

SCALES: DIMENSIONS: 1/4" = 1'-0"
FORCES: 1" = 500 #

Nomenclature:
- Wir = Total weight of water acting on base.
- Ws = Total weight of concrete.
- U = Total hydrostatic uplift on base.
- Pwr, Pwa, Pwe, Pwd & Pwe = Total horizontal pressure of water acting on structure.
- Pe in w = Total horizontal pressure of earth in water acting on structure.
- Pp = Total passive resistance developed by soil.
- Pr = Horizontal resistance developed by friction on base.
- Pb = Total soil reaction on base.
- Wes = Total weight of saturated soil on base.

Note: Loads shown are average loads per foot of structure.

Design Conditions
Case I. Sill. Water to top of structure on riverside. Uplift on base. Soil scoured 4'-0" top of base riverside of sheeling.
Case II. Vault. Water to top of structure on riverside. Uplift on base. Soil on top of base on riverside.

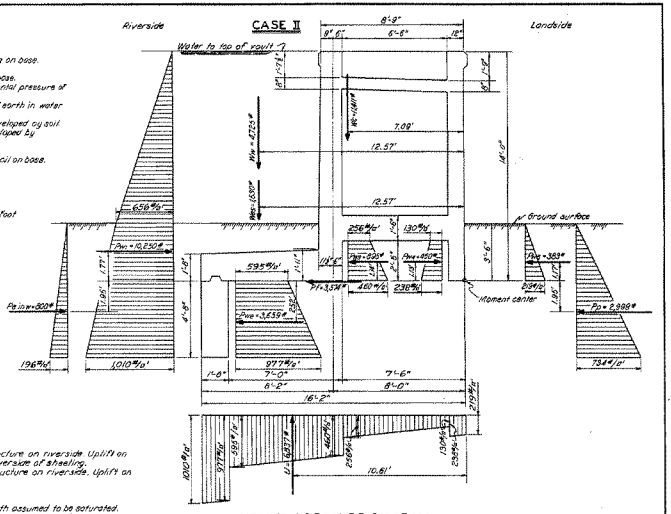
Basic Assumptions
A. Both landside and riverside earth assumed to be saturated.
B. Active forces on structure to consist of hydrostatic pressure and the equivalent fluid pressure of saturated earth.
C. The passive resistance of the soil is assumed to increase uniformly from the ground line to the bottom of the concrete at an increment not to exceed 328 #/sf per foot of depth.
D. Uplift derived from seepage pressure gradient.
E. Weight of beams and sheeting neglected.

Allowable Working Stresses

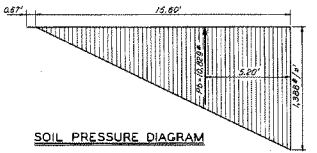
A. Steel reinforcing	18,000 #/sq in
B. Concrete	
1. Ultimate compressive strength at 28 days	3,000 #/sq in
2. Compression - extreme fibre stress	1,200 #/sq in
3. Shear	60 #/sq in
4. Bond	150 #/sq in

Weights and Pressures

A. Weights	
1. Concrete	150 # per cu ft
2. Water	62.5 # " " "
3. Saturated earth	125 # " " "
4. Earth in water (net)	62.5 # " " "
B. Active Pressures Wt. ton² (45°- Φ/2)	
1. Water	62.5 # per sq ft
2. Saturated earth - angle of repose 28°-34'	36 # " " "
3. Earth in water (net)	24 # " " "



UPLIFT PRESSURE DIAGRAM



SOIL PRESSURE DIAGRAM

VAULT SECTION

STAS. 30+32.8 & 36+40.0

SCALES: DIMENSIONS: 1/4" = 1'-0"
FORCES: 1" = 500 #

BY	DATE	CHARACTER OF REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

DESIGN DATA STAS. 29+80.3, 30+32.8, 31+01.3, 36+40.0 & 36+84.5

SHEET 86 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE. LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

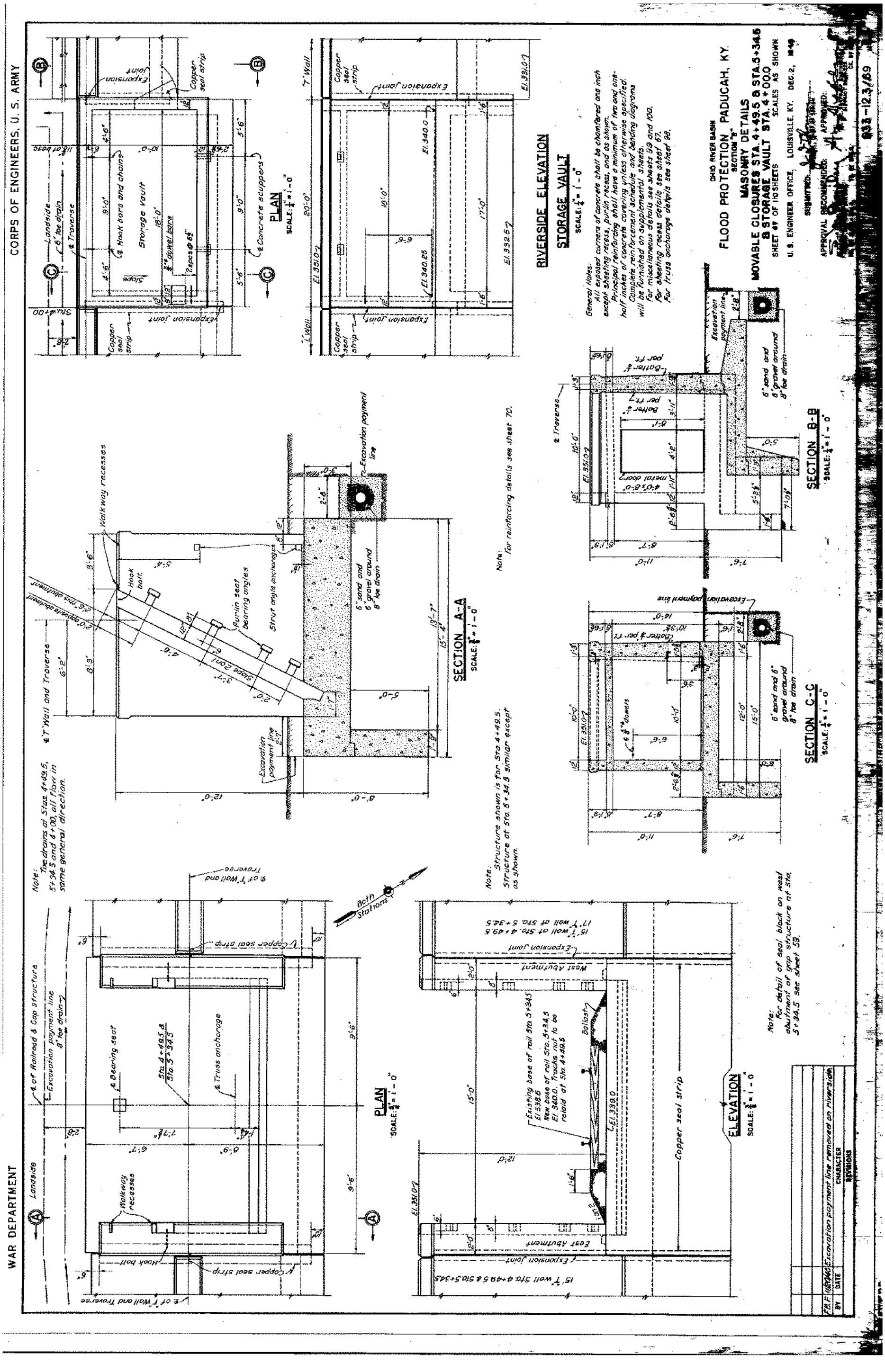
APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DESIGN
DR. BY W.A.H.

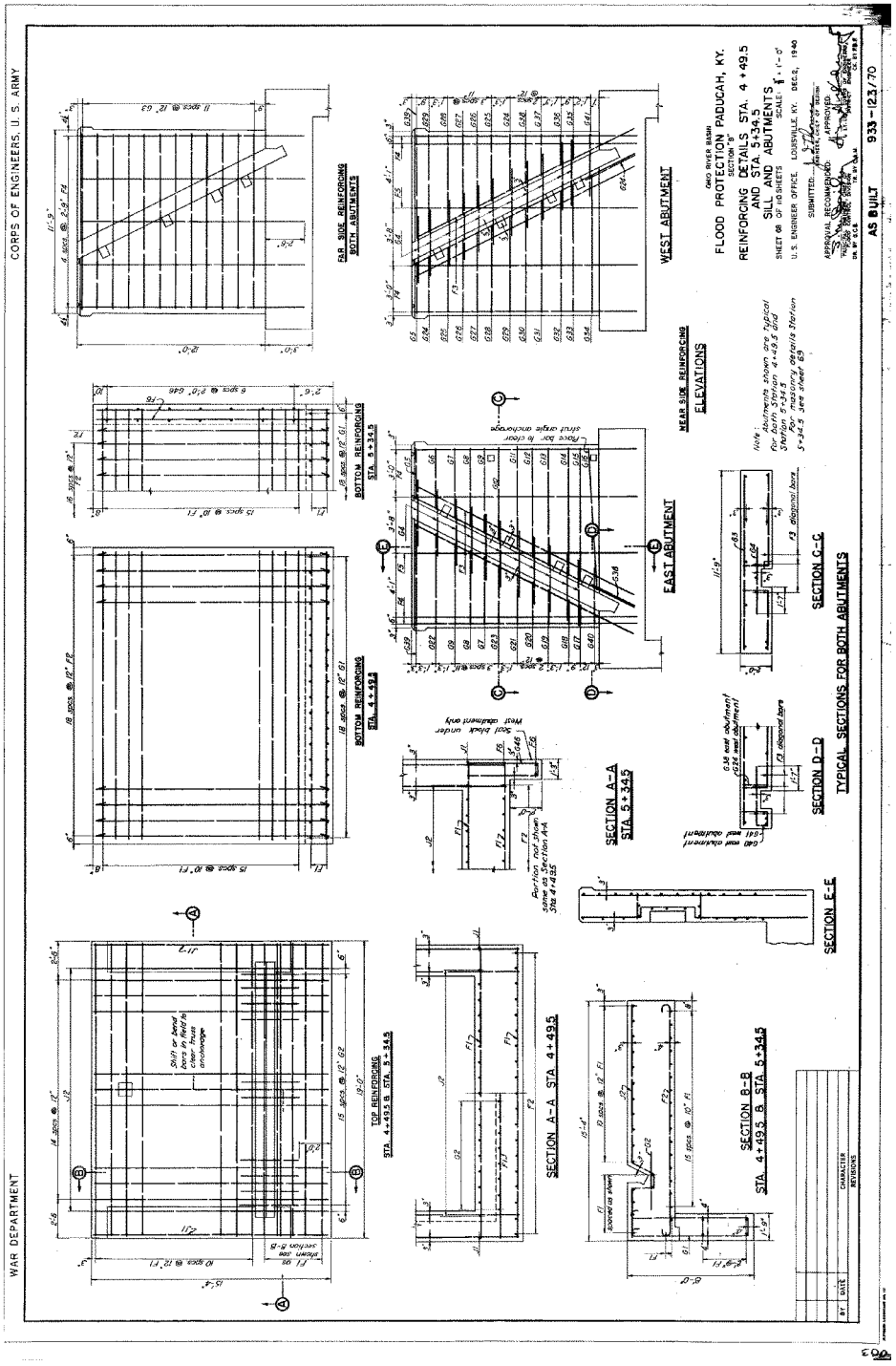
APPROVED: [signature] LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER
TR. BY E.S. CK. BY R.H.

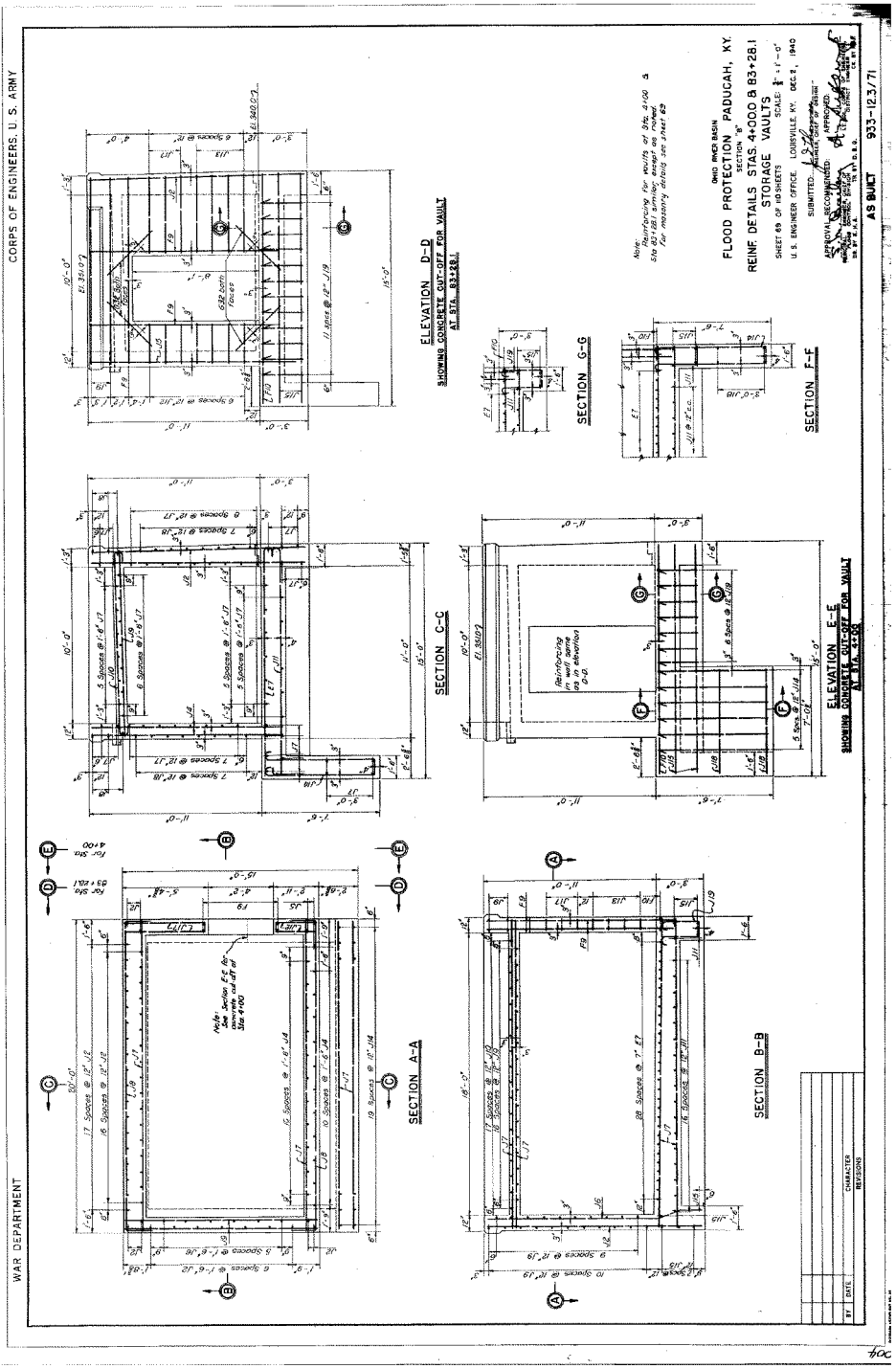
AS BUILT

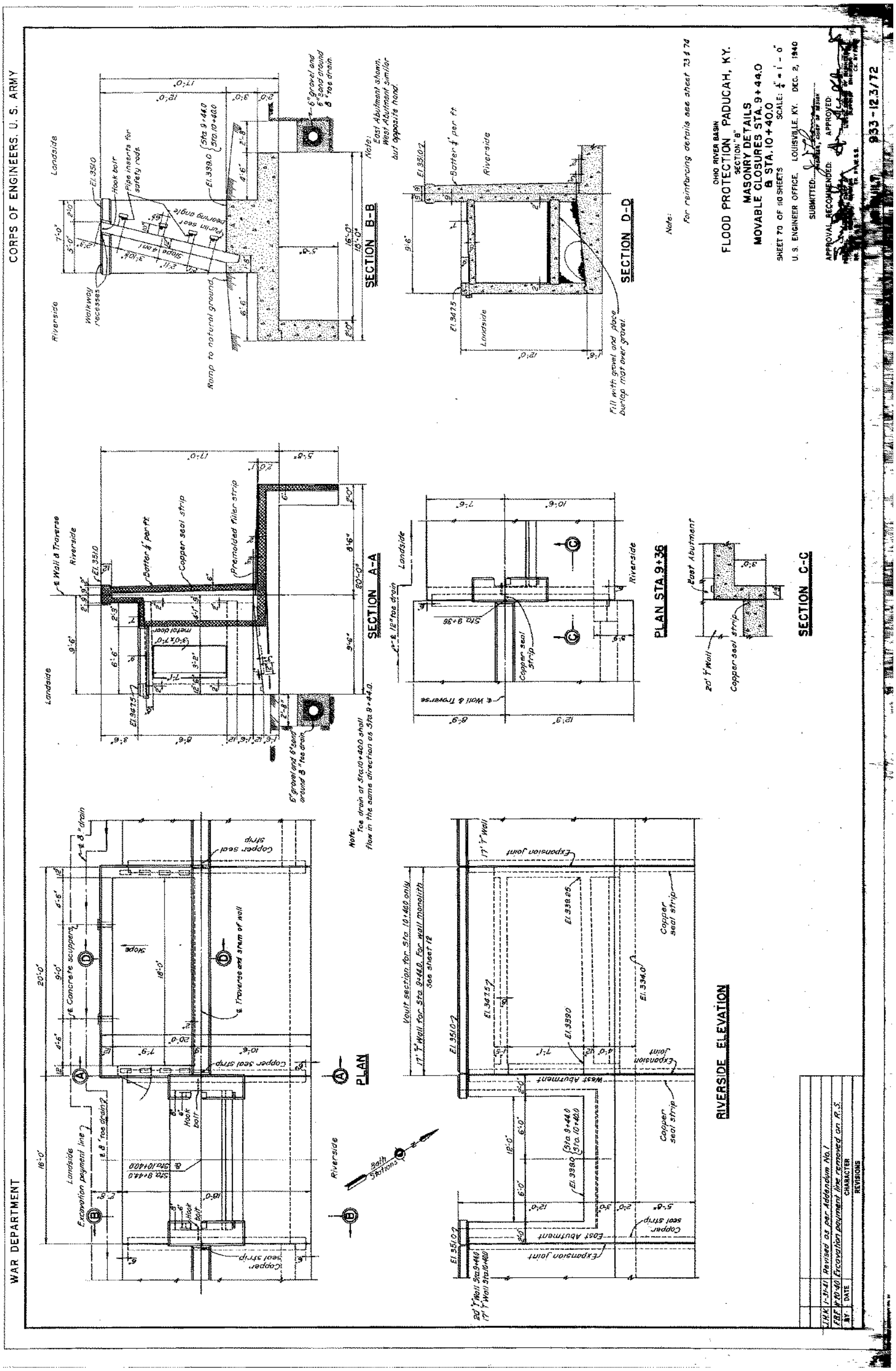
933-12.3/68

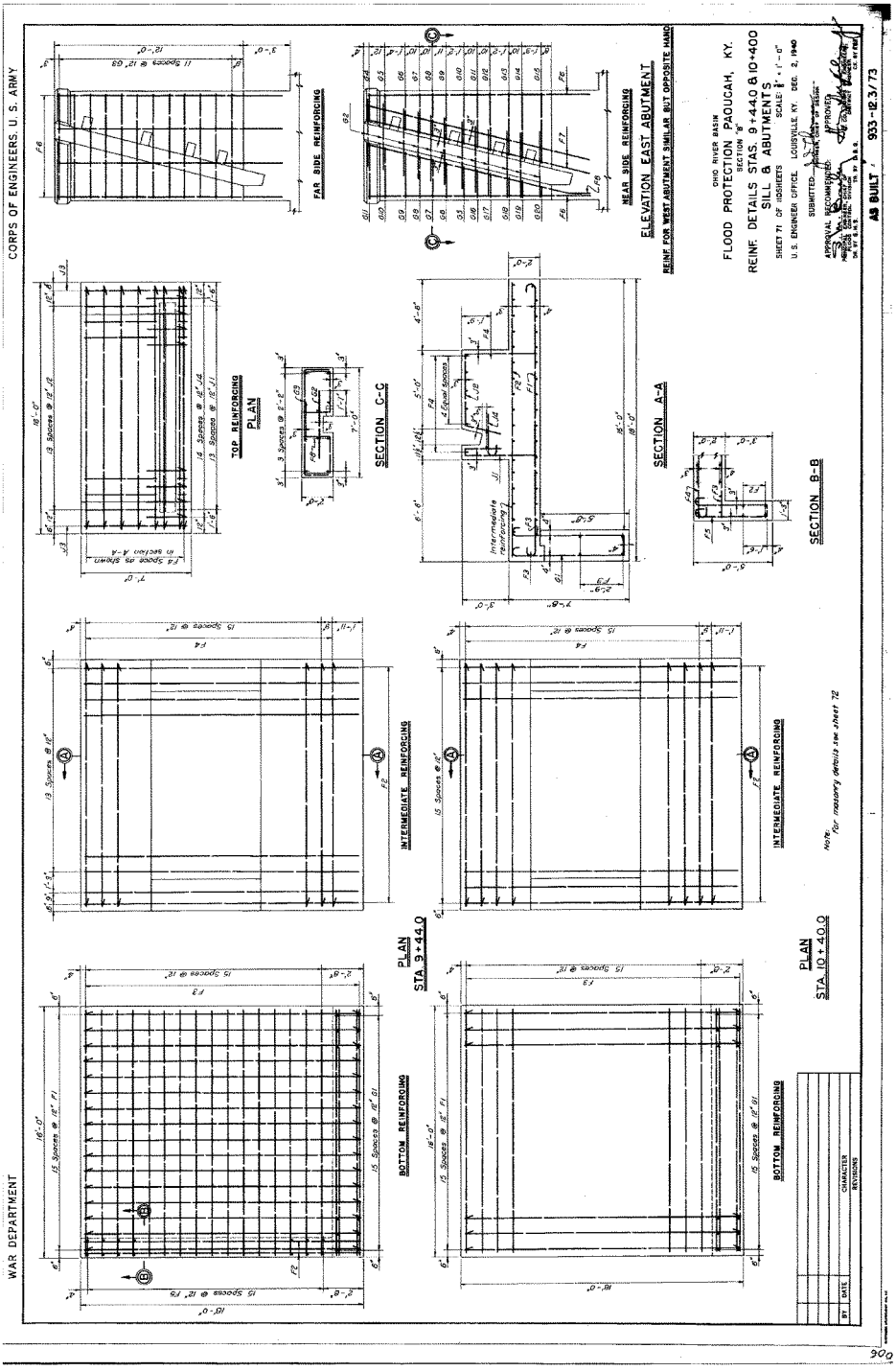
727

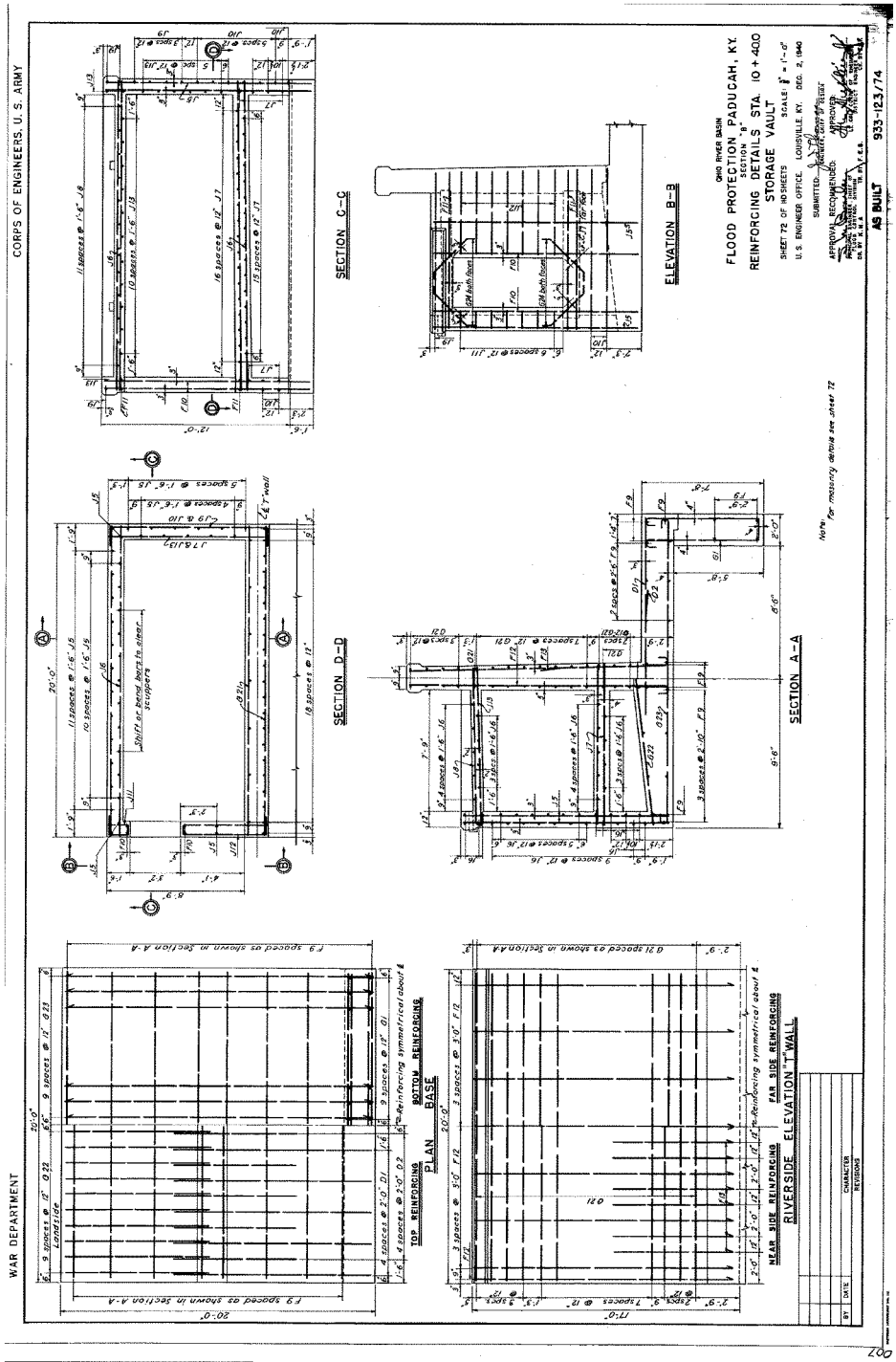

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
PLAN
ELEVATION
SECTION A-A
PLAN
RIVERSIDE ELEVATION
STORAGE VAULT
SECTION C-C
SECTION B-B
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURES STA. 4+49.5 & STA. 5+34.5
& STORAGE VAULT STA. 4+00.0
U. S. ENGINEER OFFICE, LOUISVILLE, KY.

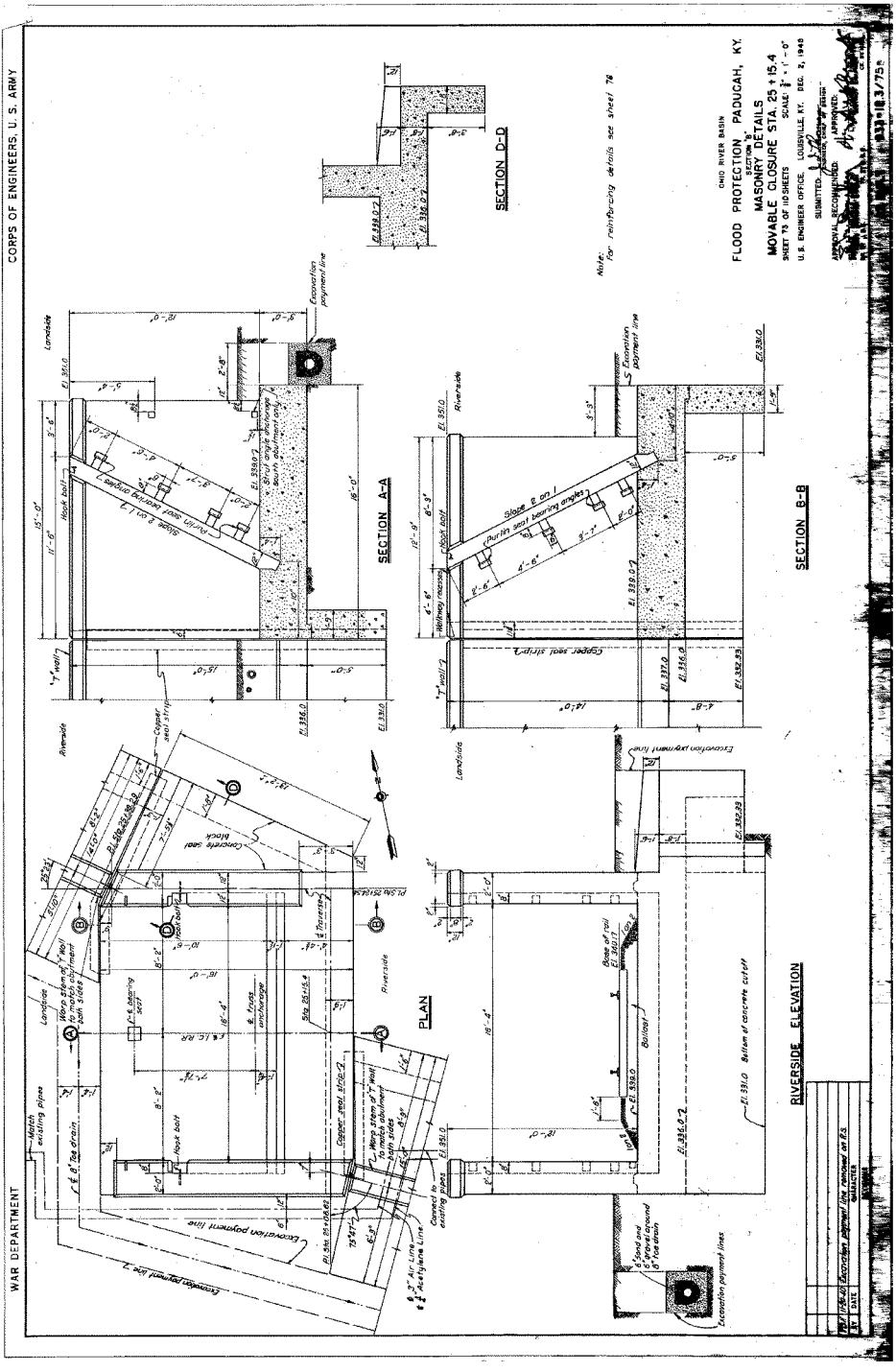

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
Ohio River Basin
REINFORCING DETAILS STA. 4+49.5 AND STA. 5+34.5
SILL AND ABUTMENTS
SHEET 68 OF 110 SHEETS
SCALE: 1" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
933-123/70
BAR SIDE REINFORCING BOTH ABUTMENTS
WEST ABUTMENT
NEAR SIDE REINFORCING ELEVATIONS
EAST ABUTMENT
BOTTOM REINFORCING STA. 5+34.5
BOTTOM REINFORCING STA. 4+49.5
TOP REINFORCING STA. 4+49.5 & STA. 5+34.5
SECTION A-A STA. 5+34.5
SECTION A-A STA. 4+49.5
SECTION B-B STA. 4+49.5 & STA. 5+34.5
SECTION C-C
SECTION D-D
SECTION E-E
TYPICAL SECTIONS FOR BOTH ABUTMENTS
Note: Abutments shown are typical for both Station 4+49.5 and Station 5+34.5 See sheet 69 for masonry details
Shift or bend bars to field to clear pipe drainage
Section B-B
Portion not shown same as Section A-A Sta 4+49.5
Wall bleak water
Wall abutment only
Strut angle anchorage
Place bar to clear
0.36 east abutment
0.24 west abutment
f3 diagonal bars
BY
DATE
CHARACTER REVISIONS

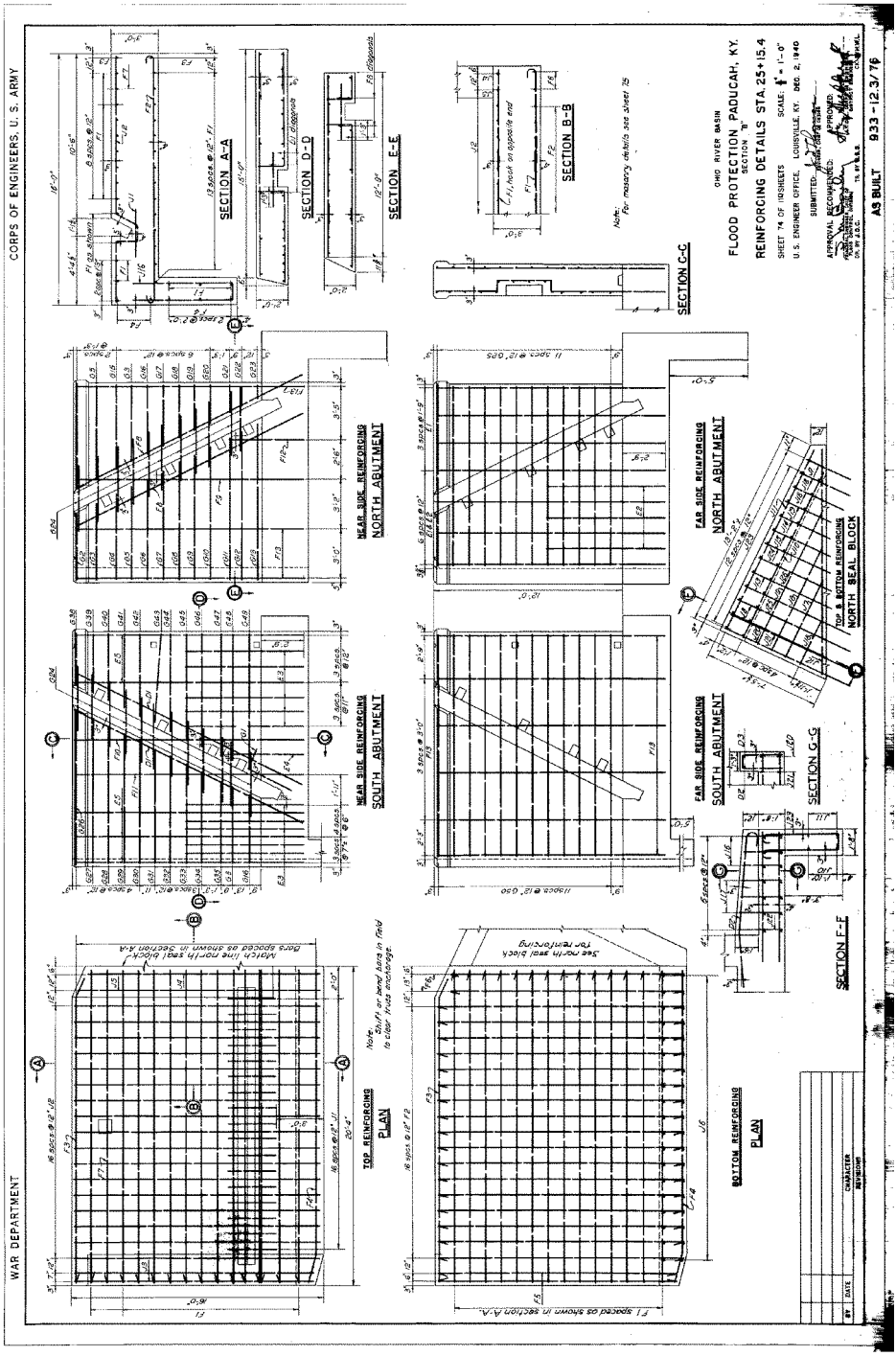

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION AT PADUCAH, KY.
REINF. DETAILS STAS. 4+000 & 83+28.1
STORAGE VAULTS
SCALE: 3/8" = 1'-0"
SHEET 69 OF 103 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY., DEC. 8, 1940
SUBMITTED
APPROVED
AS BUILT
933-12.3/71
ELEVATION D-D
SHOWING CONCRETE CUT-OFF FOR VAULT AT STA. 83+28.1
SECTION G-G
SECTION F-F
SECTION C-C
ELEVATION E-E
SECTION A-A
SECTION B-B
CHARACTER OF REVISION
BY
DATE

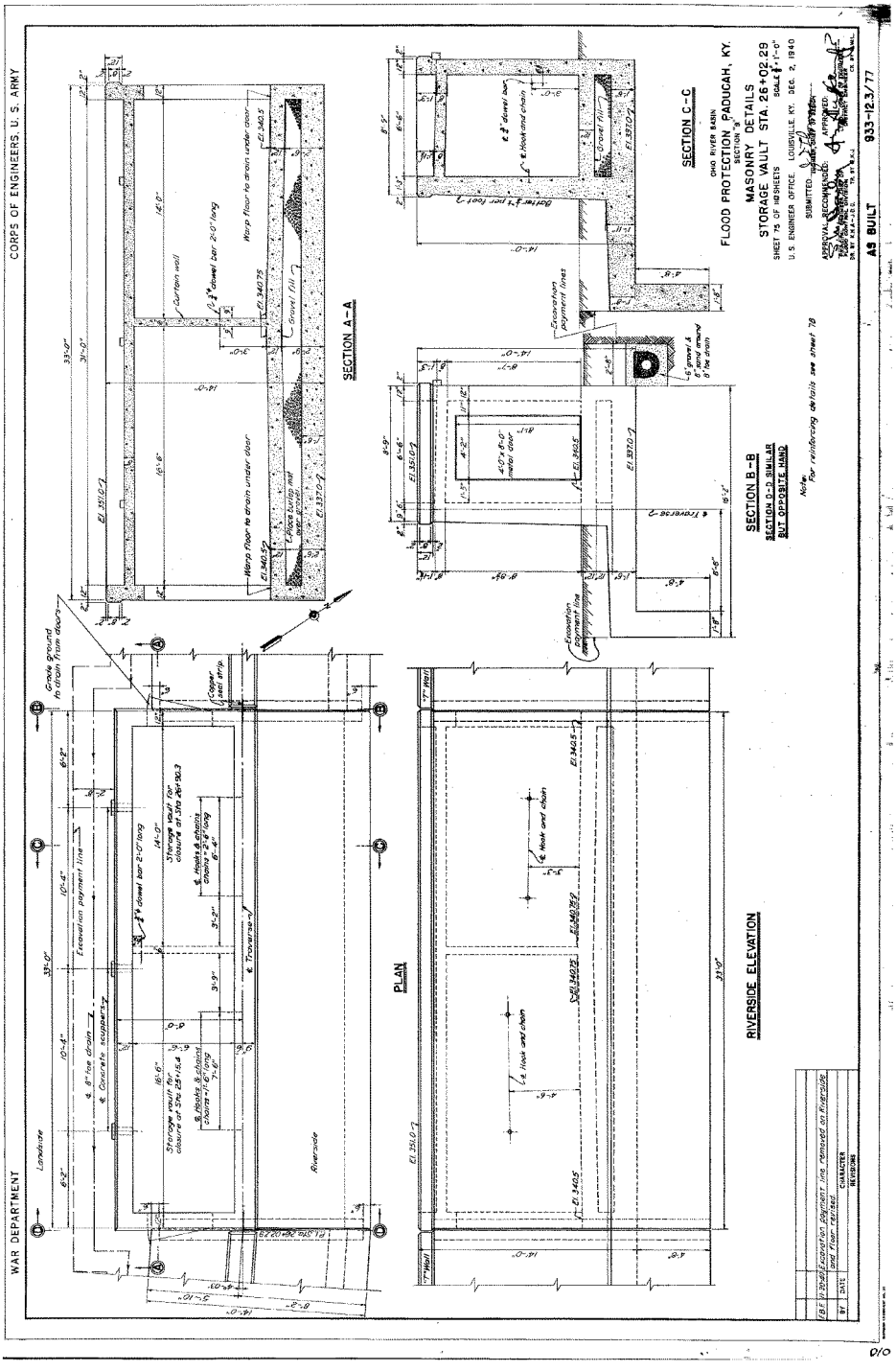

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
SECTION B-B
SECTION A-A
SECTION D-D
SECTION C-C
PLAN STA. 9+36
PLAN
RIVERSIDE ELEVATION
Note:
For reinforcing details see sheet 73 & 74
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURES STA. 9+44.0
& STA. 10+40.0
SHEET 70 OF 110 SHEETS
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
933-12.3/72

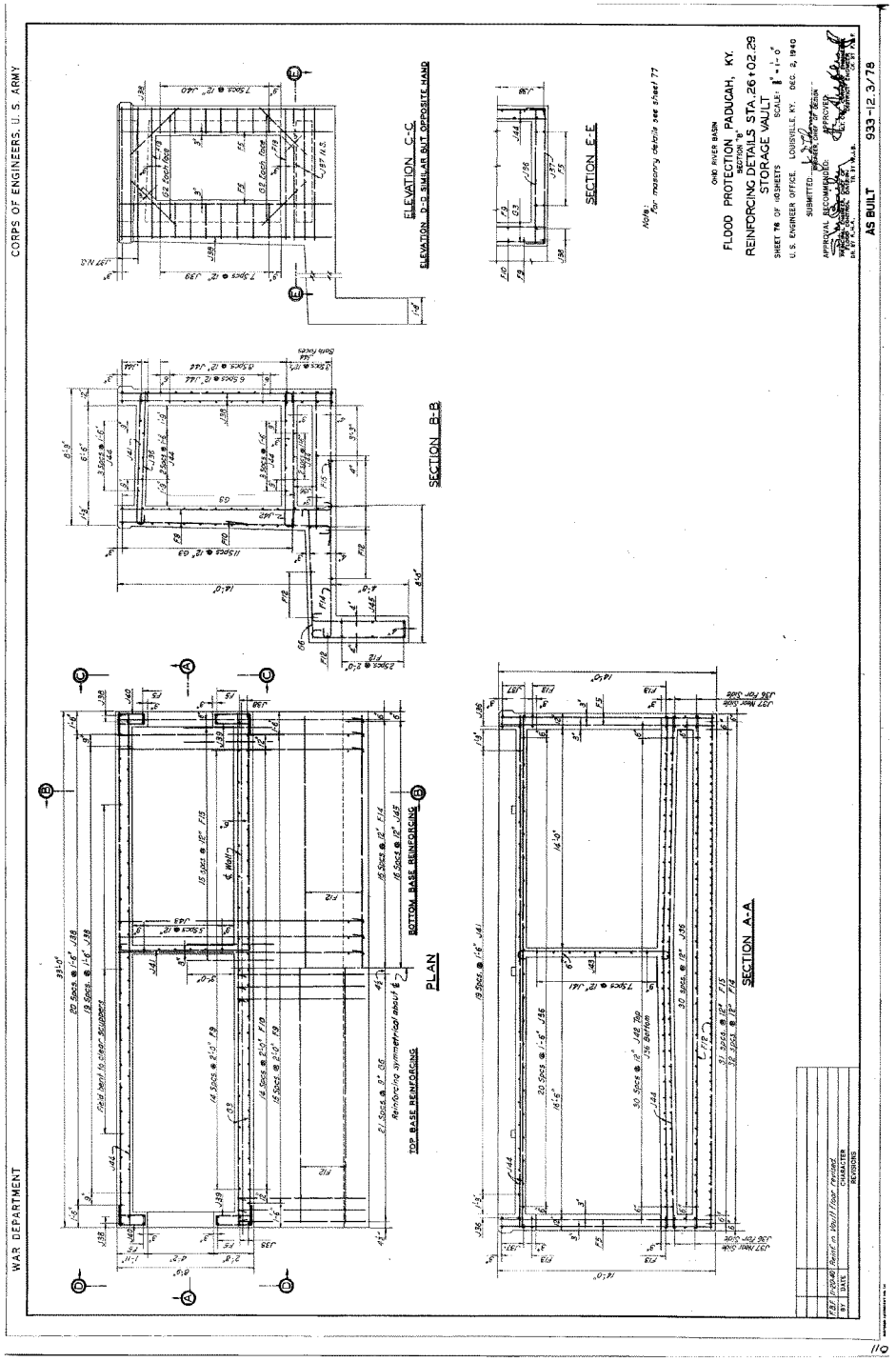

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "A"
REINF. DETAILS STAS. 9+44.0 & 10+40.0
SILL & ABUTMENTS
SHEET 71 OF 105 SHEETS
SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
AS BUILT
933-12.3/73
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
ELEVATION EAST ABUTMENT
REINF. FOR WEST ABUTMENT SIMILAR BUT OPPOSITE HAND
TOP REINFORCING
PLAN
SECTION C-C
SECTION A-A
SECTION B-B
INTERMEDIATE REINFORCING
BOTTOM REINFORCING
PLAN
STA. 9+44.0
PLAN
STA. 10+40.0
Note: For masonry details see sheet 72
BY
DATE
CHARACTER
REVISIONS

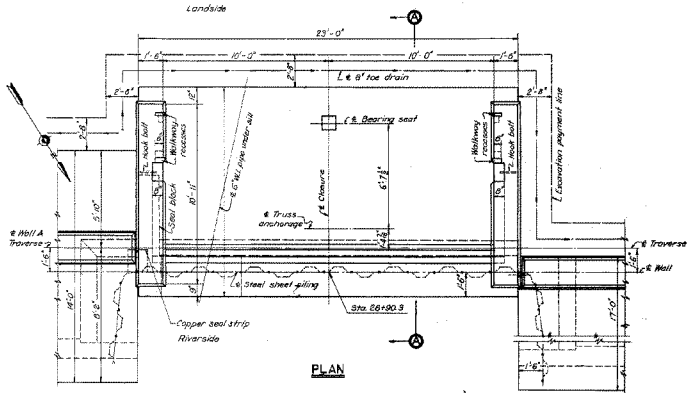

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 10+400
STORAGE VAULT
SHEET 72 OF 103 SHEETS
SCALE: 1" = 1'-0"
U.S. ENGINEER OFFICE LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
AS BUILT
933-123/74
SECTION C-C
SECTION D-D
ELEVATION B-B
SECTION A-A
Note: For masonry details see sheet 72
BOTTOM REINFORCING
PLAN
BASE
TOP REINFORCING
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
RIVERSIDE ELEVATION "T" WALL
Landside
Riverside
Re-Reinforcing symmetrical about ℄
DATE
BY
CHARACTER
REVISIONS

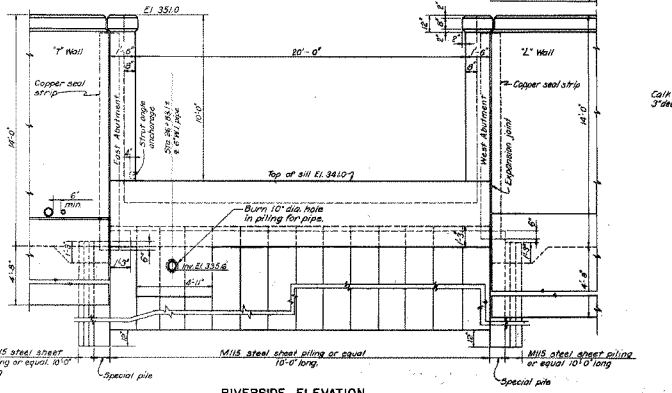

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURE STA. 25 + 15.4
SHEET 73 OF 110 SHEETS
SCALE 1/8" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
SECTION A-A
SECTION B-B
SECTION C-D
PLAN
RIVERSIDE ELEVATION
Note: for reinforcing details see sheet 78
Excavation payment line
Excavation payment lines
Copper seal strip
Concrete seal block
Hook bolt
Weephole
Ballast
Bottom of concrete cutoff
Sand and gravel backfill around 6" tile drain
Remove existing pipes
Connect to existing pipes
Riverside
Landside

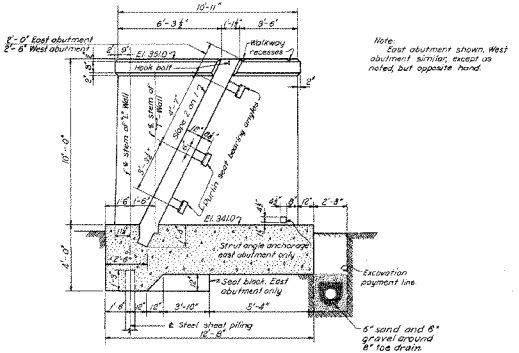

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 25+15.4
SHEET 74 OF 193 SHEETS
SCALE: 1" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED:
APPROVED:
APPROVAL RECOMMENDED:
AS BUILT 933-12.3/76
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F
SECTION G-G
NEAR SIDE REINFORCING NORTH ABUTMENT
NEAR SIDE REINFORCING SOUTH ABUTMENT
FAR SIDE REINFORCING NORTH ABUTMENT
FAR SIDE REINFORCING SOUTH ABUTMENT
TOP & BOTTOM REINFORCING NORTH SEAL BLOCK
TOP REINFORCING PLAN
BOTTOM REINFORCING PLAN
Note: For masonry details see Sheet 75
Note: Stirrups bend bars in field to clear truss anchorage.
Doors spaced as shown in section A-A
Match line north seal block
See north seal block for reinforcing
BY
DATE
CHARACTER
REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
STORAGE VAULT STA. 26+02.29
SHEET 75 OF 140 SHEETS
SCALE 1"-1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
AS BUILT
933-12.3/77
SECTION A-A
SECTION B-B
SECTION C-C
PLAN
RIVERSIDE ELEVATION
Landside
Riverside
Excavation payment line
Gravel fill
Curtain wall
Warp floor to drain under door
Grade ground to drain from doors
Concrete sculpsers
8" toe drain
Storage vault for closure at Sta 261-15.4
Storage vault for closure at Sta 261-90.3
Hooks & chains
Traverse
Copper bent strip
Expansion joint
Expansion payment lines
Hook and chain
Metal door
Gravel & sand cushion
Gravel & 8" sand cushion 8" toe drain
Note:
For reinforcing details see sheet 78
CHARACTER
REVISIONS
DATE
BY

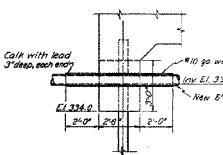

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 26+02.29
STORAGE VAULT
SHEET 76 OF 103 SHEETS
SCALE: 1" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED: Chief, Design Branch
APPROVAL RECOMMENDED: Chief, Design Branch
APPROVED: Chief, Engineering Division
AS BUILT
933-12.3/78
PLAN
BOTTOM BASE REINFORCING
TOP BASE REINFORCING
SECTION A-A
SECTION B-B
ELEVATION C-C
ELEVATION D-D SIMILAR BUT OPPOSITE HAND
SECTION E-E
Note: For masonry details see sheet 77
ISSUED: 1-10-1946 Paint in Vault Floor Revised
BY DATE CHARACTER OF REVISIONS







Note:
East abutment shown, West abutment similar, except as noted, but opposite hand.



Note
For reinforcing details see sheet 80
For detail of connection to "I" wall see sheet 47.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY DETAILS

MOVABLE CLOSURE STA. 26+90.3

SHEET 77 OF 110 SHEETS SCALE: 3/8" = 1'-0"

U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] DISTRICT ENGINEER

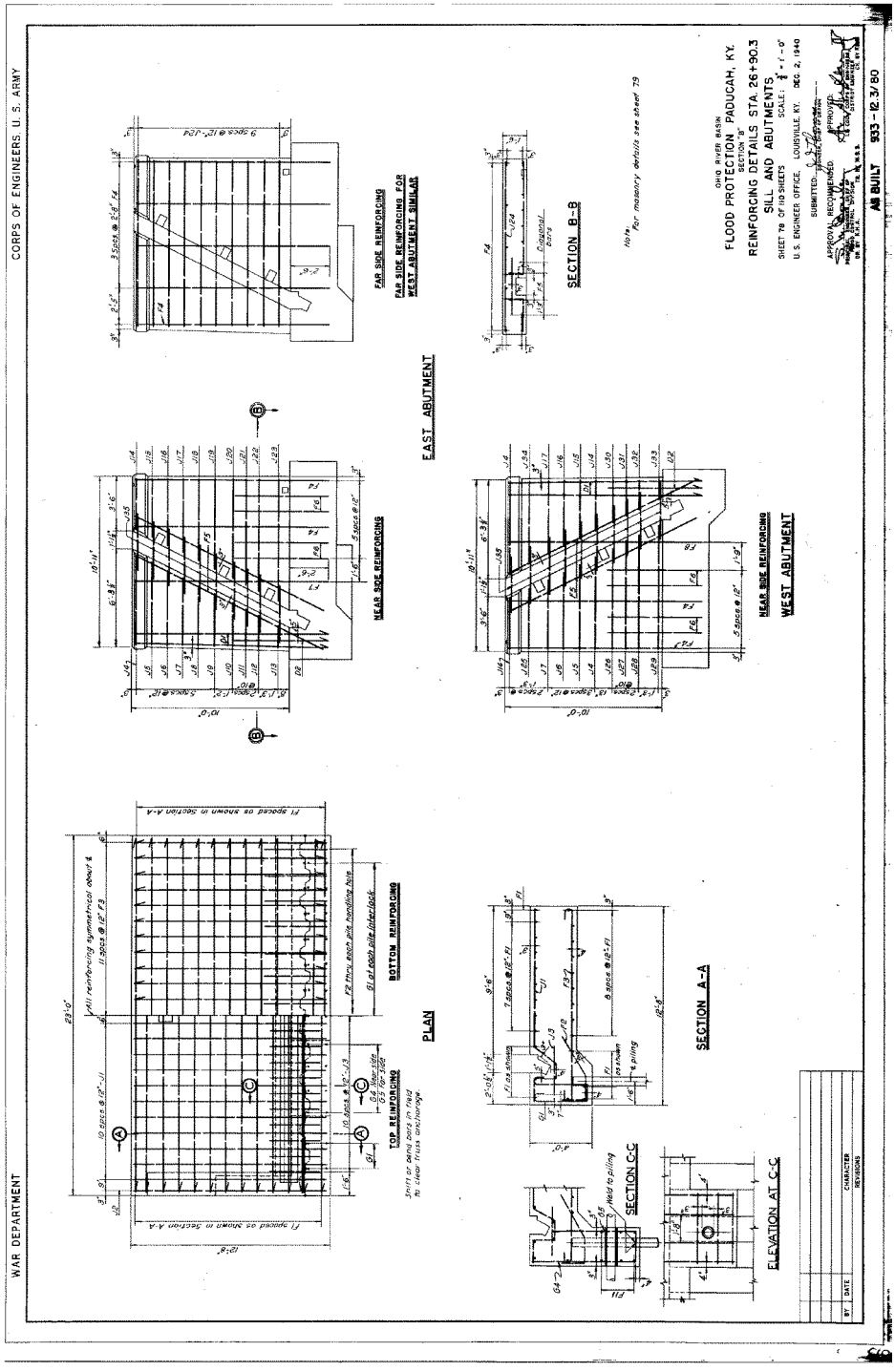
APPROVAL RECOMMENDED: [signature] CHIEF OF SECTION

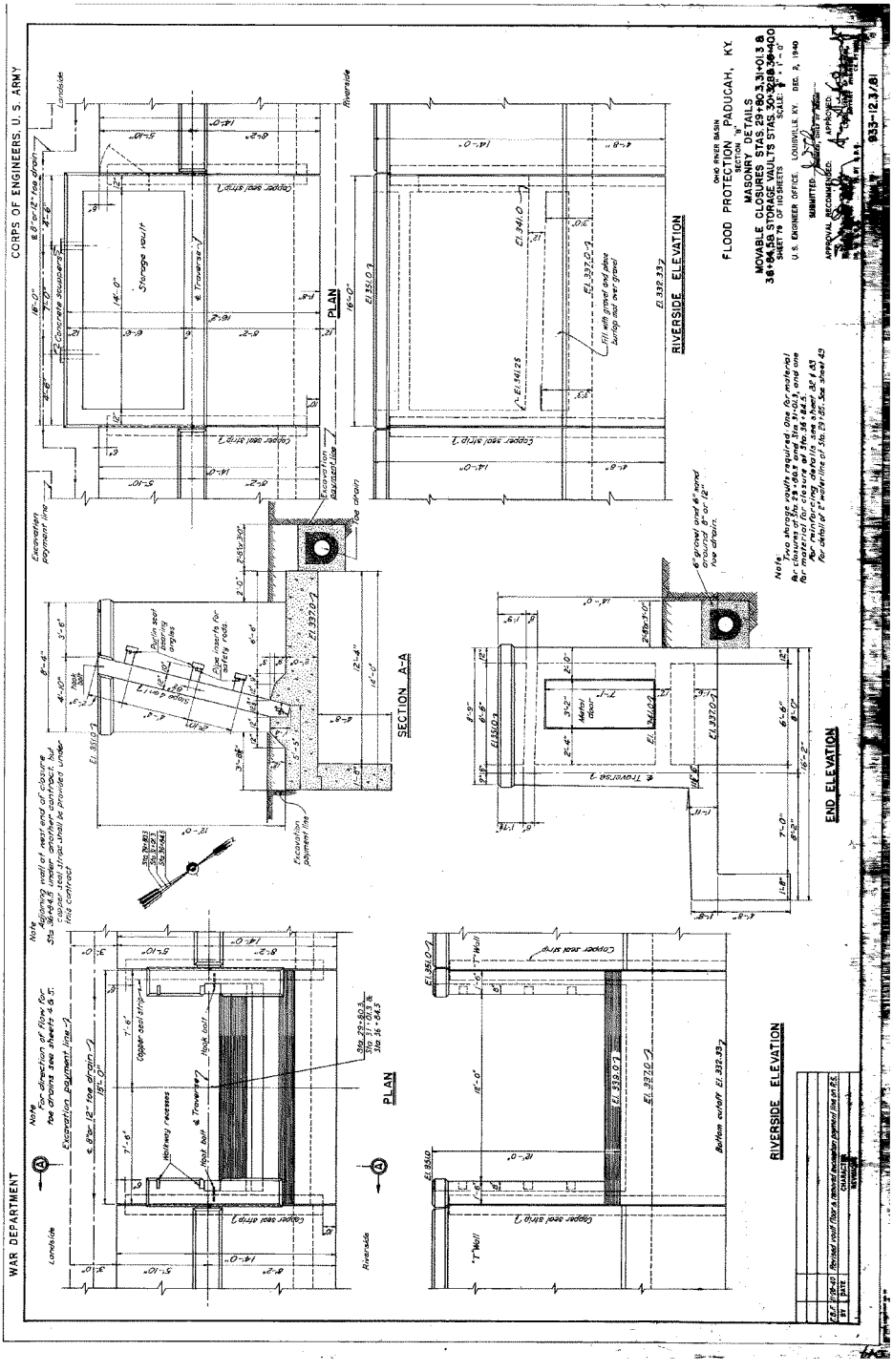
APPROVED: [signature] CHIEF OF ENGINEERS

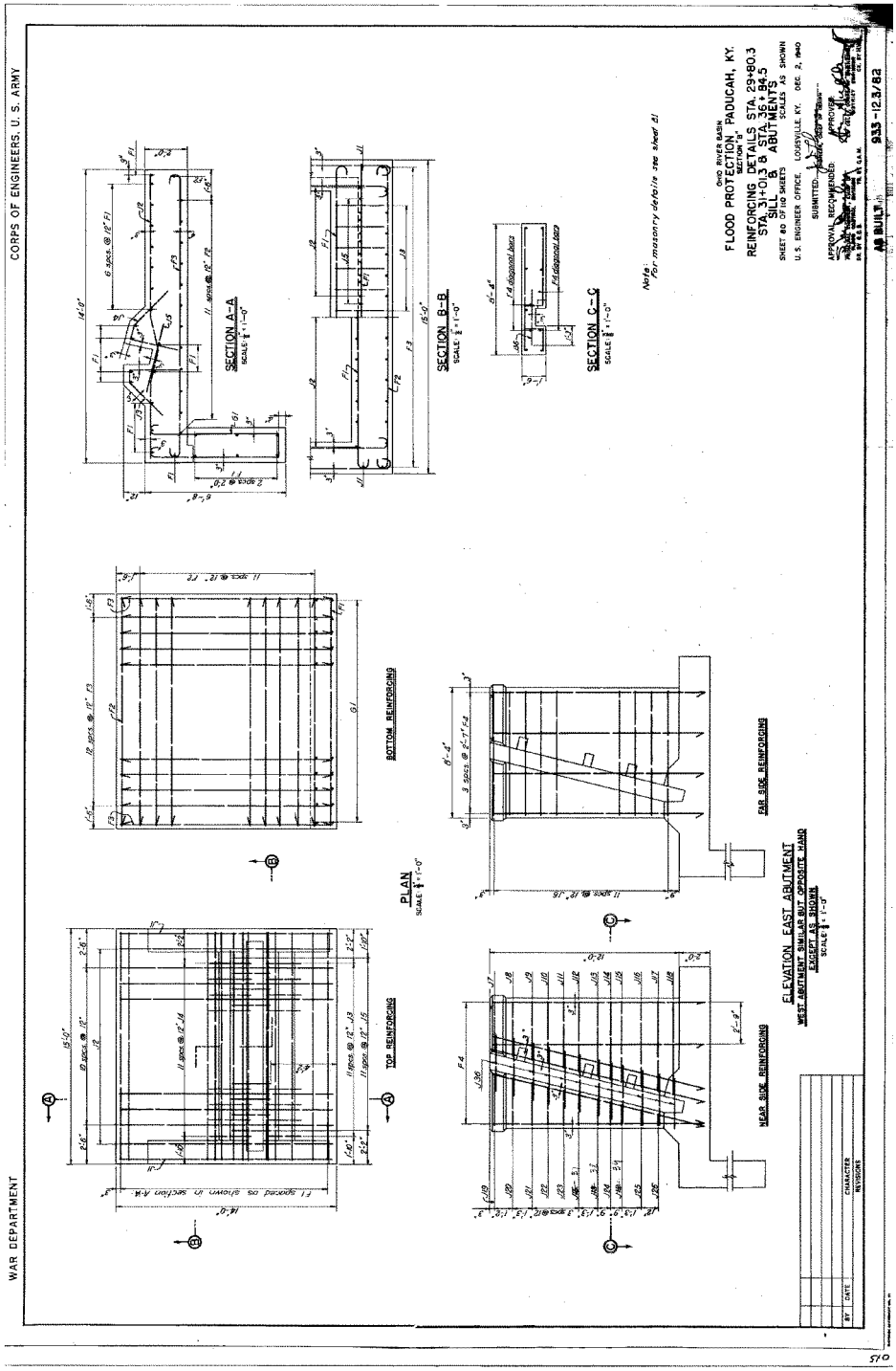
BY	DATE	CHARACTER
RBE	11-20-40	Traverse line changed and excavation payment line removed R.S.

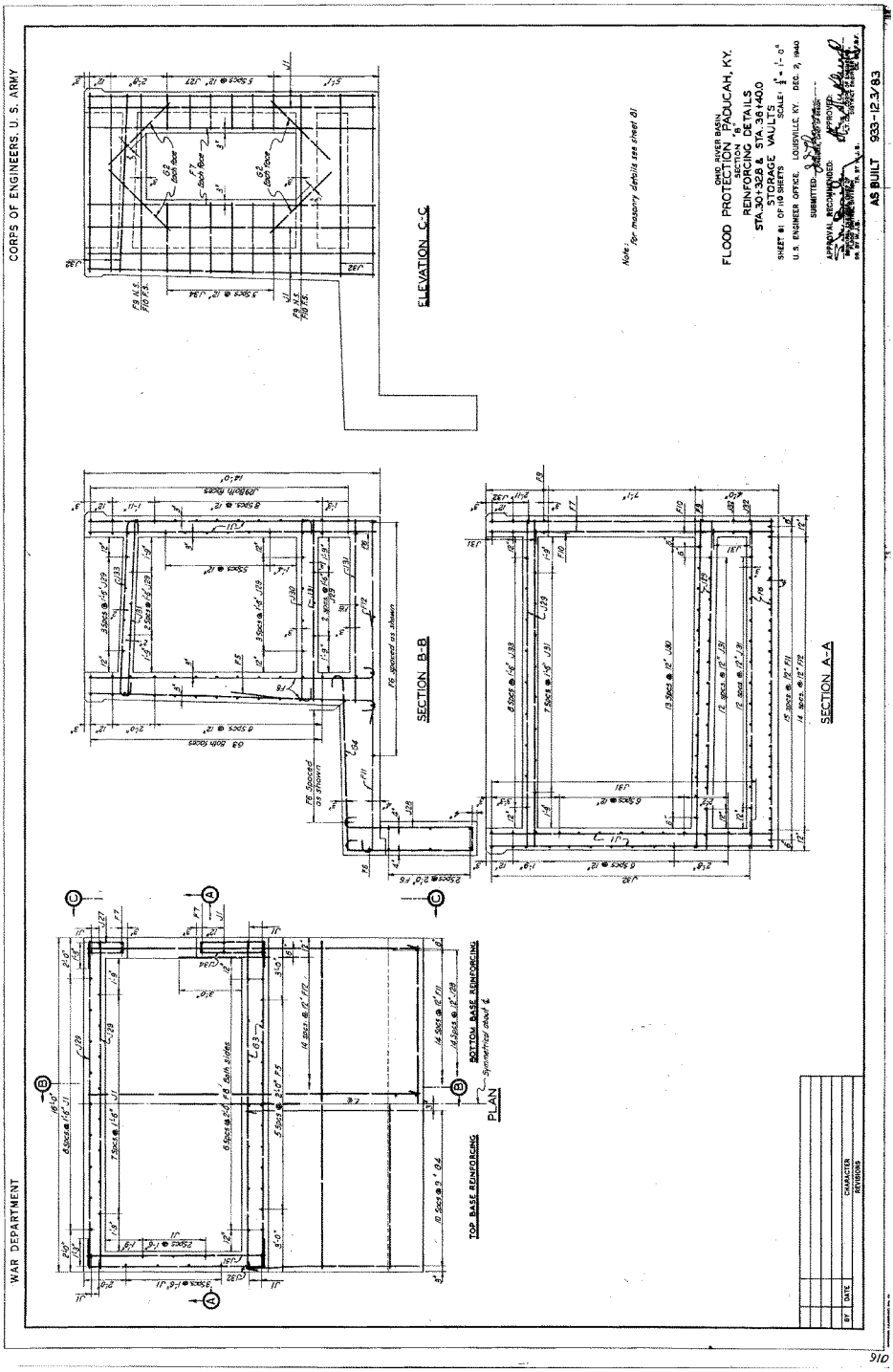
REVISIONS

633-12.3/70


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
EAST ABUTMENT
WEST ABUTMENT
PLAN
SECTION A-A
SECTION B-B
SECTION C-C
ELEVATION AT C-C
FAR SIDE REINFORCING
FAR SIDE REINFORCING FOR WEST ABUTMENT SIMILAR
NEAR SIDE REINFORCING
NEAR SIDE REINFORCING
TOP REINFORCING
BOTTOM REINFORCING
OHIO RIVER BASIN
FLOOD PROTECTION - PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 26+90.3
SILL AND ABUTMENTS
SHEET 78 OF 110 SHEETS
SCALE: 1" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
AS BUILT 933 - 12.3/80
DATE
CHARACTER
REVISIONS

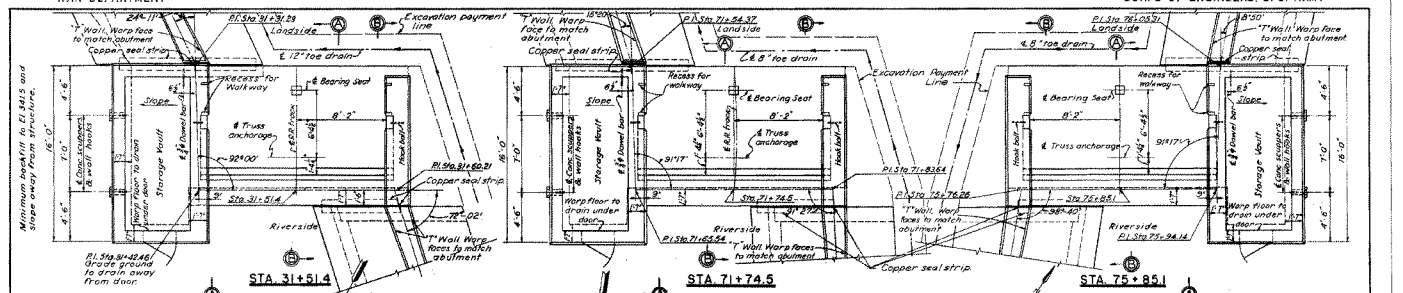

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION AT PADUCAH, KY.
MASONRY DETAILS
MOVABLE CLOSURES STAS. 29+80.3 TO 31+01.3 &
36+94.58 TO 38+28.58
STORAGE VAULTS STAS. 30+28.58 TO 34+00
SHEET 79 OF 110 SHEETS
SCALE: 1/4" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 8, 1940
SUBMITTED
APPROVED
APPROVAL RECOMMENDED:
PLAN
SECTION A-A
RIVERSIDE ELEVATION
END ELEVATION
PLAN
RIVERSIDE ELEVATION
Storage vault
Hook bolt
Copper seal strip
Excavation payment line
Top drain
Landside
Riverside
833-12.3/81

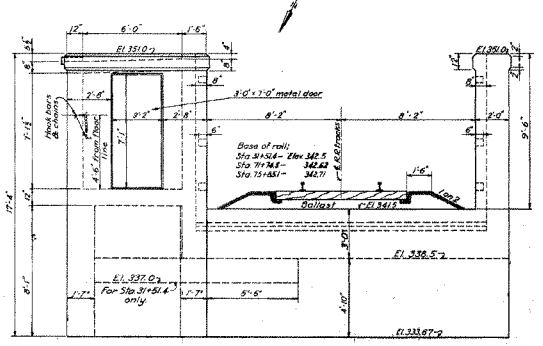

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 29+80.3
STA. 31+01.3 & STA. 36+94.5
SHEET #0 OF 140 SHEETS ABUTMENTS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
933-12.3/82
SECTION A-A
SECTION B-B
SECTION C-C
PLAN
BOTTOM REINFORCING
TOP REINFORCING
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
ELEVATION EAST ABUTMENT
WEST ABUTMENT SIMILAR BUT OPPOSITE HAND
BY DATE CHARACTER REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS
STA. 30+32.8 & STA. 38+40.0
STORAGE VAULTS
SHEET # OF 110 SHEETS
SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 9, 1940
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
AS BUILT 933-12.3/83
ELEVATION C-C
SECTION B-B
SECTION A-A
PLAN
TOP BASE REINFORCING
BOTTOM BASE REINFORCING
Note: for masonry details see sheet 61
BY
DATE
CHARACTER
REVISIONS
910

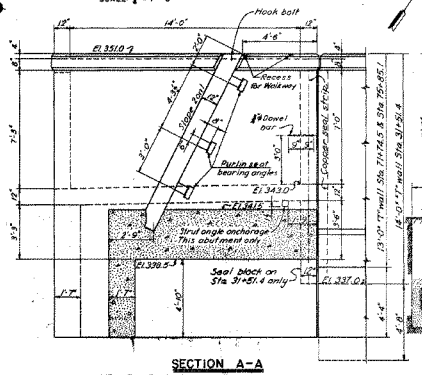
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

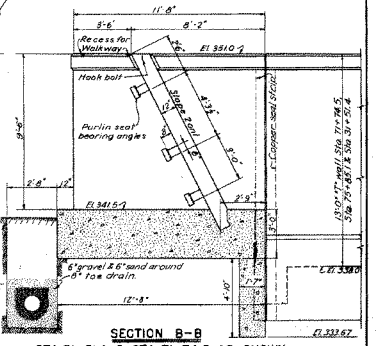




RIVERSIDE ELEVATION
STA. 31+51.4 & STA. 71+74.5 SHOWN
STA. 75+85.1 OPPOSITE HAND
SCALE: 1/4" = 1'-0"



SECTION A–A
STA. 31+51.4 & STA. 71+74.5 AS SHOWN
STA. 75+85.1 OPPOSITE HAND
SCALE: 1/4" = 1'-0"



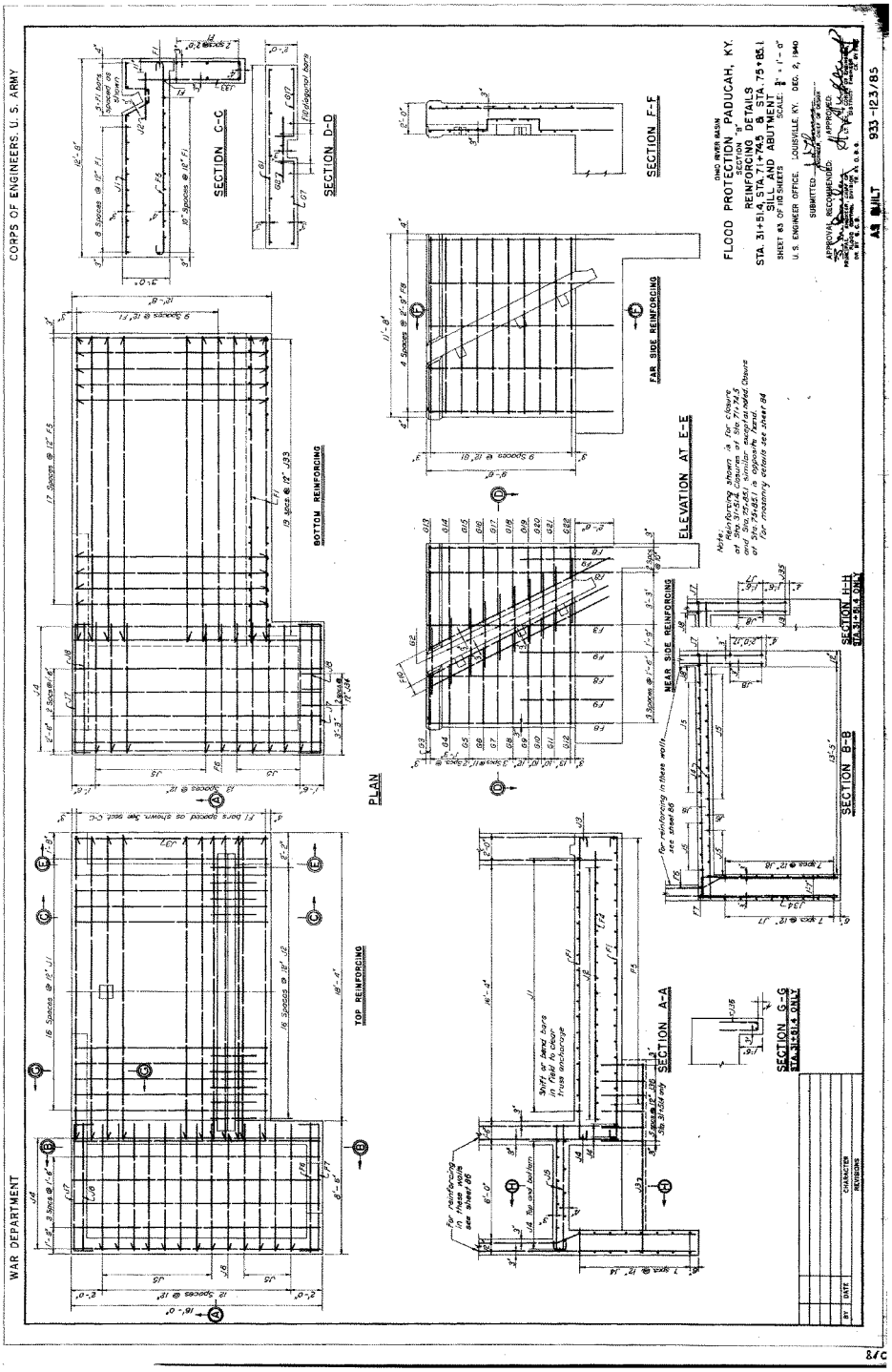
SECTION B–B
STA. 31+51.4 & STA. 71+74.5 AS SHOWN
STA. 75+85.1 OPPOSITE HAND
SCALE: 1/4" = 1'-0"

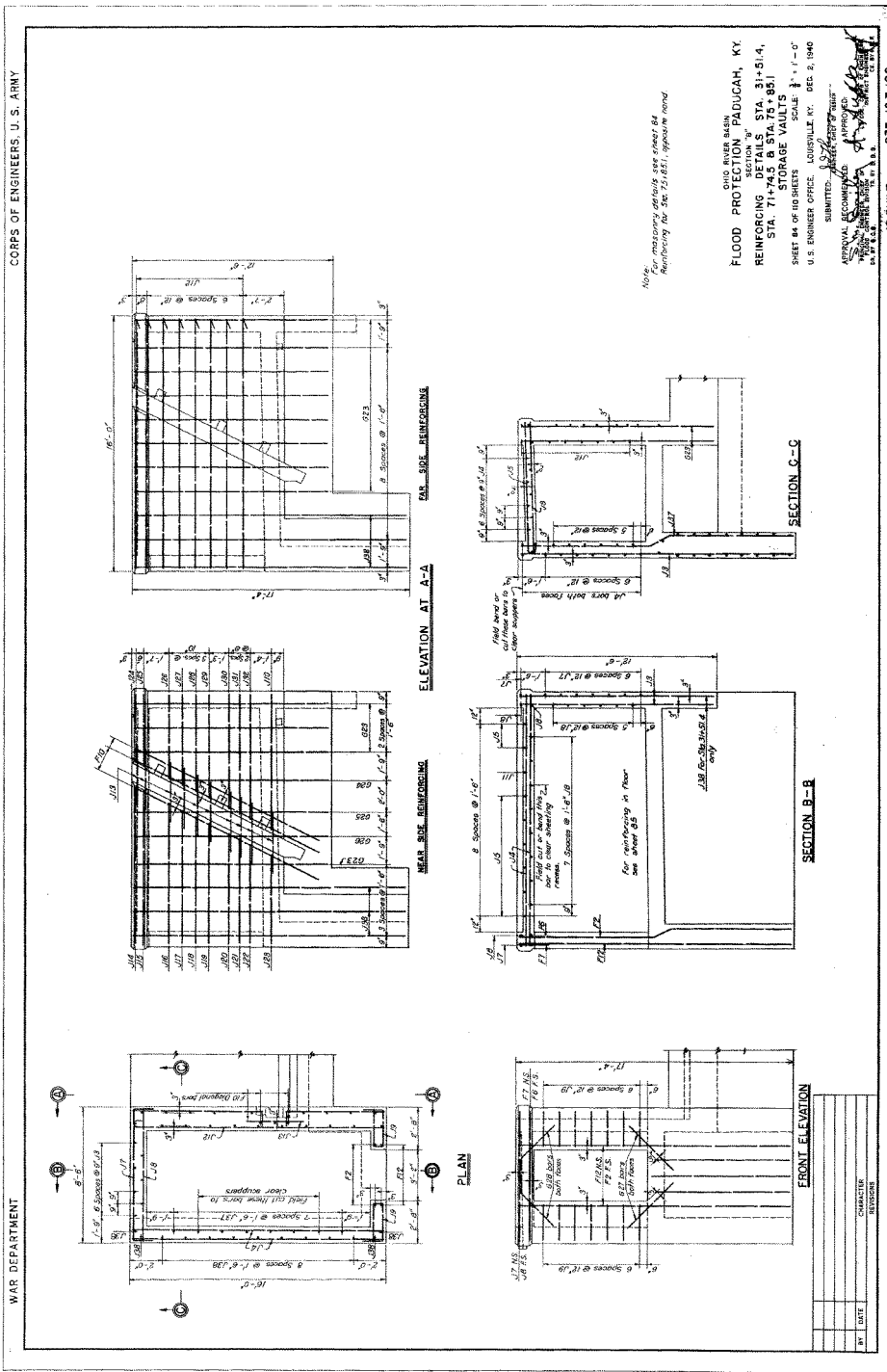
Note:
For reinforcing details see sheets 85 & 86.
For sheeting recess detail see sheet 67.

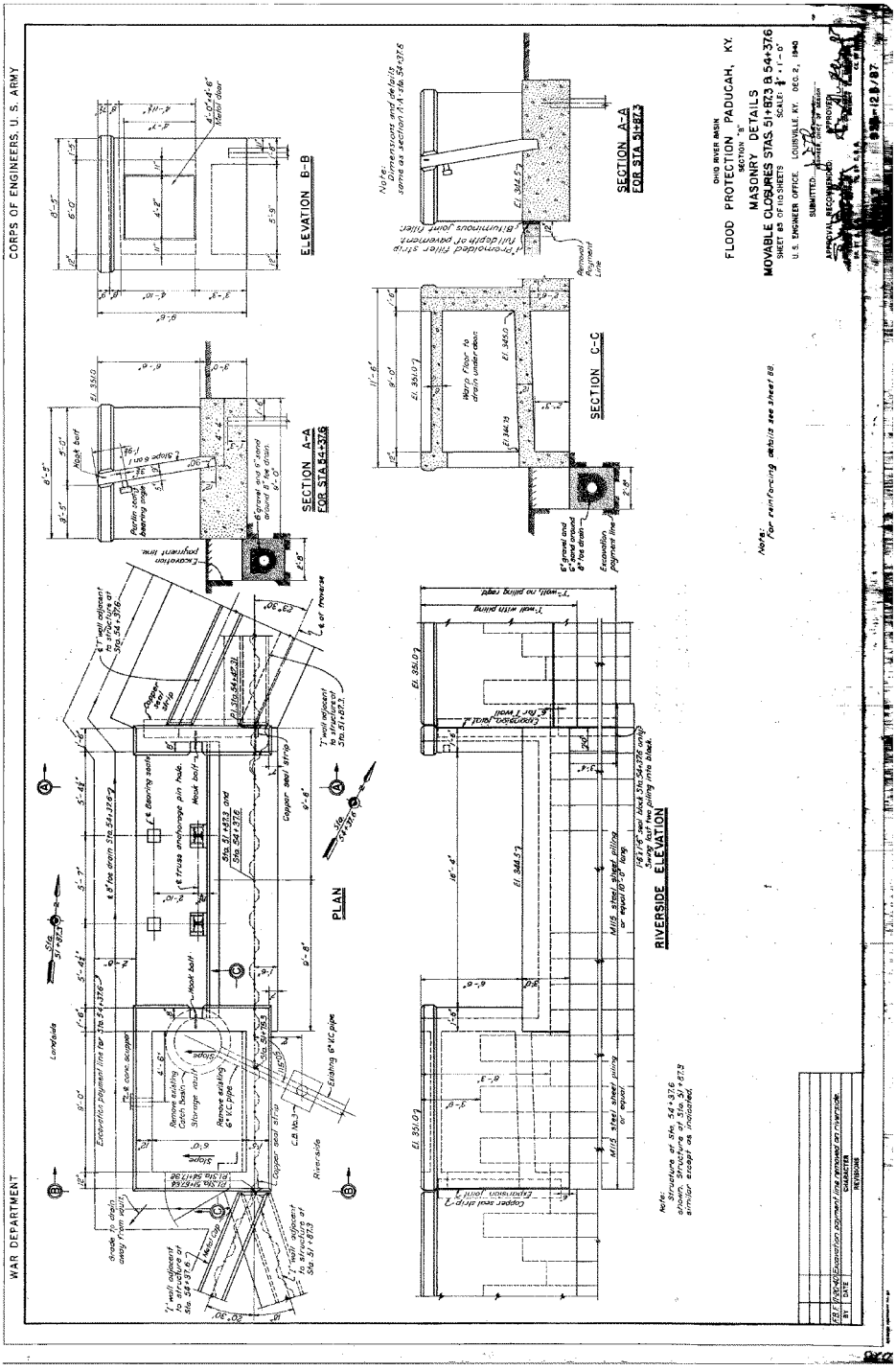
BY	DATE	CHARACTER
JNK	1-31-41	Revised as per Addendum No.1
RBF	9-20-40	Excavation payment line removed on riverside.

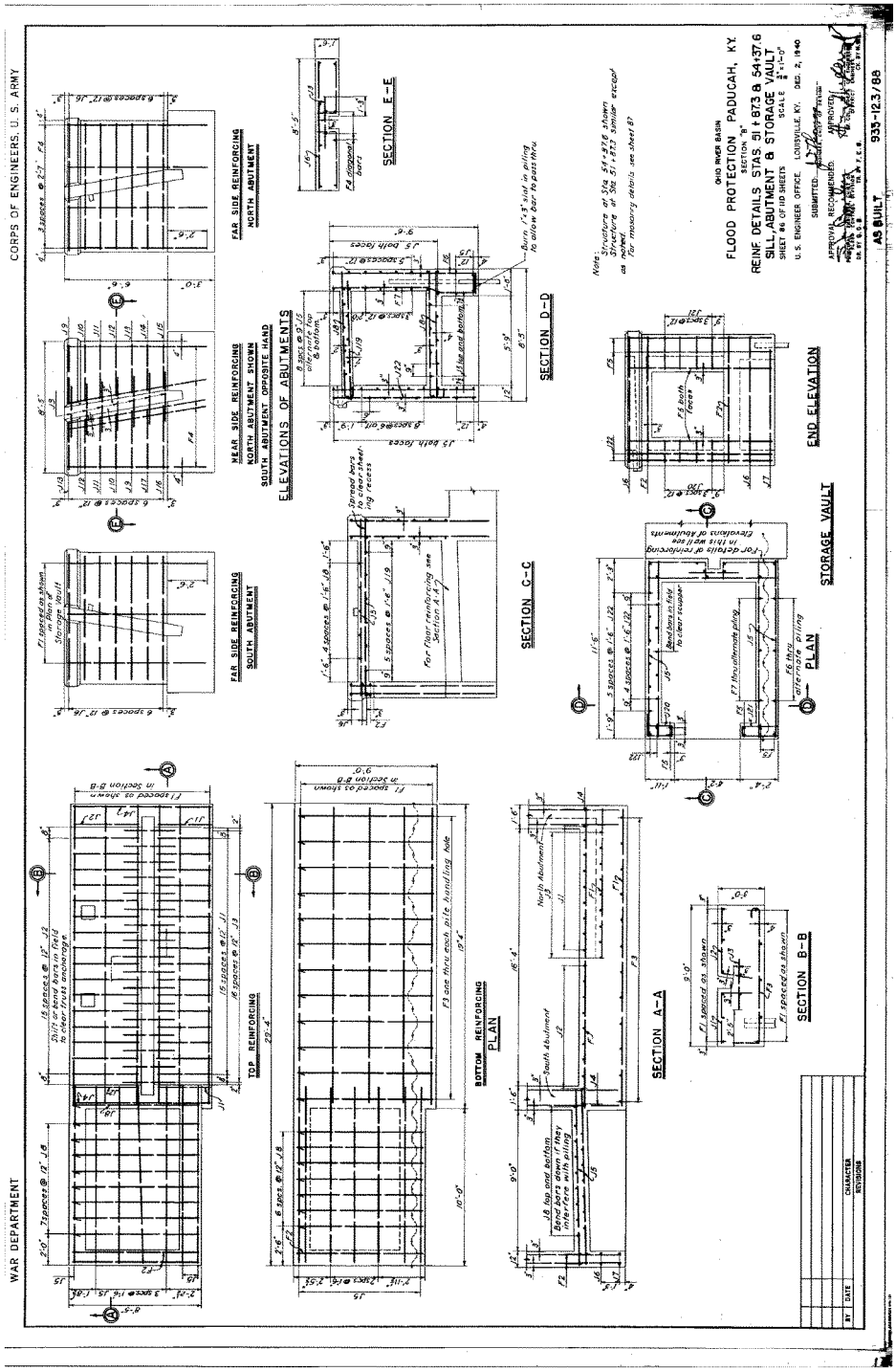
REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURES STA. 31+51.4, STA. 71+74.5 & STA. 75+85.1
SHEET 84 OF 110 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
CHIEF OF DIVISION
APPROVAL RECOMMENDED:
APPROVED:
938-123/84


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION - PADUCAH, KY.
REINFORCING DETAILS
STA. 31+51.4, STA. 71+74.5 & STA. 75+85.1
SILL AND ABUTMENT
SHEET #3 OF 110 SHEETS
SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
AS BUILT
933-123/85
PLAN
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F
SECTION G-G
SECTION H-H
ELEVATION AT E-E
BOTTOM REINFORCING
TOP REINFORCING
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
SECTION G-G STA. 31+51.4 ONLY
SECTION H-H STA. 31+51.4 ONLY
Note: Reinforcing shown is for closure at Sta. 31+51.4 only. Similar reinforcing at Sta. 75+85.1 and Sta. 74+85.1 is opposite hand. For concrete details see sheet 84
For reinforcing in these walls see sheet 66
Shift 'a' bend bars in field to clear anchor bolts
For reinforcing in these walls see sheet 66
Sta. 31+51.4 only
BY
DATE
CHARACTER
REVISIONS

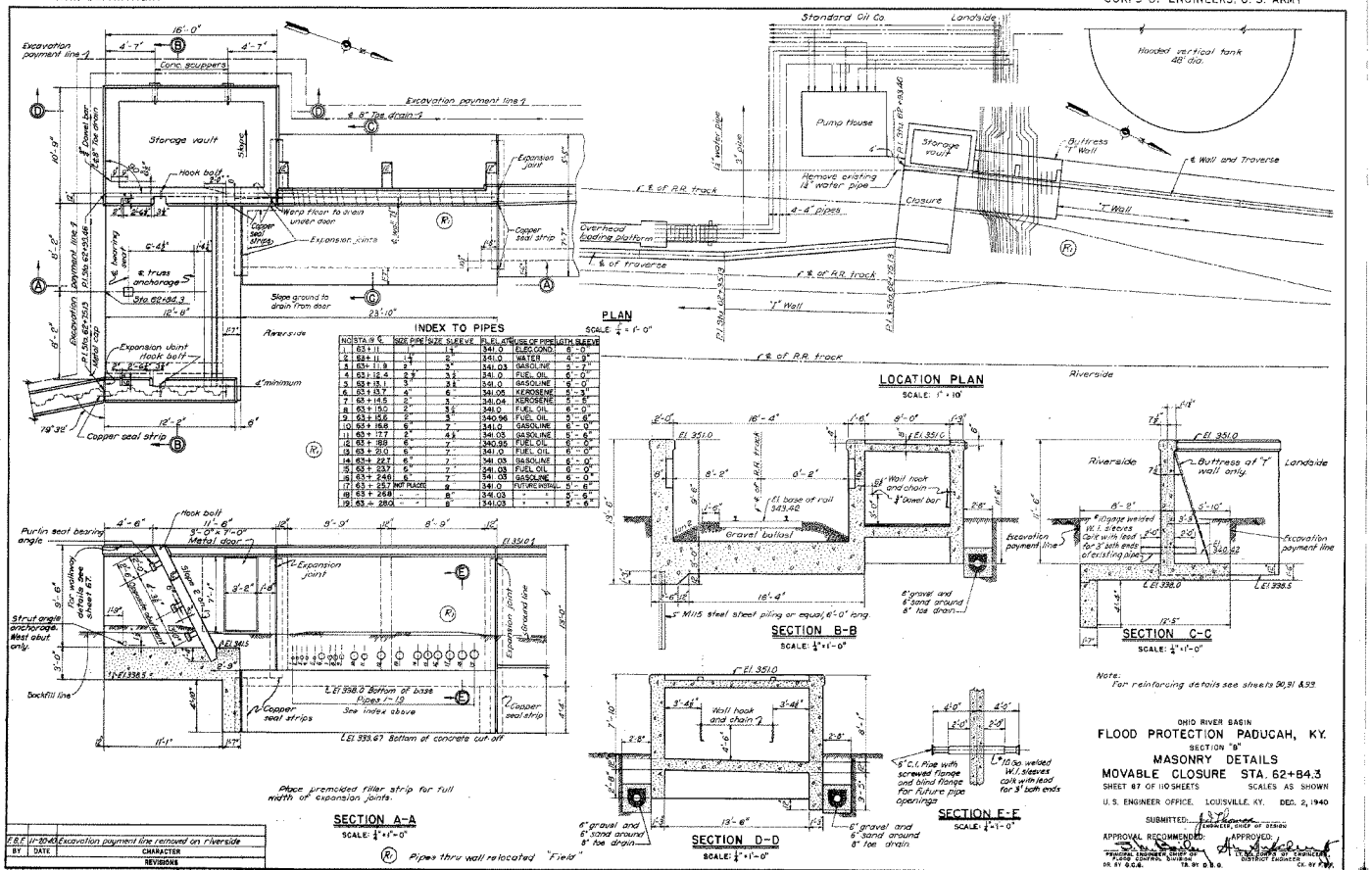

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION AT PADUCAH, KY.
SECTION 'A'
REINFORCING DETAILS STA. 31+51.4, STA. 71+74.5 & STA. 75+85.1 STORAGE VAULTS
SHEET 84 OF 110 SHEETS
SCALE: 3/8" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED:
APPROVED:
AS BUILT
933-12.3/86
Note: For masonry details see sheet 84
Reinforcing for Sta. 75+85.1 opposite hand
ELEVATION AT A-A
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
SECTION C-C
SECTION B-B
PLAN
FRONT ELEVATION
BY
DATE
CHARACTER
REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION AT PADUCAH, KY.
MASONRY DETAILS
MOVABLE CLOSURES STAS. 51+82.3 & 54+37.6
SHEET #5 OF 10 SHEETS
SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
PLAN
ELEVATION B-B
SECTION A-A FOR STA 54+37.6
SECTION A-A FOR STA 51+82.3
SECTION C-C
RIVERSIDE ELEVATION
Note: For reinforcing details see sheet 88
Note: Structure at Sta. 54+37.6 shown. Structure at Sta. 51+87.3 similar except as indicated.
Excavation payment line
Riverside
Landside


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "N"
REINF. DETAILS STAS 51+873 & 54+37.6
SILL ABUTMENT & STORAGE VAULT
SHEET #6 OF 110 SHEETS
SCALE 1"=1'-0"
U.S. ENGINEER OFFICE LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
AS BUILT
933-123/88
ELEVATIONS OF ABUTMENTS
NEAR SIDE REINFORCING
NORTH ABUTMENT SHOWN
SOUTH ABUTMENT OPPOSITE HAND
FAR SIDE REINFORCING
NORTH ABUTMENT
FAR SIDE REINFORCING
SOUTH ABUTMENT
SECTION E-E
SECTION D-D
SECTION C-C
SECTION A-A
SECTION B-B
TOP REINFORCING
PLAN
BOTTOM REINFORCING
PLAN
STORAGE VAULT
PLAN
END ELEVATION
Note: Structure at Sta 54+37.6 shown
Structure at Sta 51+873 similar except
as noted.
For masonry details see sheet 87
BY
DATE
CHARACTER
REVISIONS

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



NO	STA. @ ℄	SIZE PIPE	SIZE SLEEVE	FL. EL. at ℄	USE OF PIPE	LGTH. SLEEVE
1	63+11	1"	4"	341.0	ELEC. COND.	6'-0"
2	63+11	1/4"	2"	341.0	WATER	6'-9"
3	63+11.9	2"	5"	341.03	GASOLINE	6'-7"
4	63+12.6	2 1/2"	3 1/2"	341.0	FUEL OIL	6'-0"
5	63+13.1	3"	3 1/2"	341.0	GASOLINE	6'-0"
6	63+13.7	4"	6"	341.05	KEROSENE	6'-3"
7	63+14.5	2"	5"	341.04	KEROSENE	6'-3"
8	63+15.0	2"	5"	341.0	FUEL OIL	6'-0"
9	63+15.6	2"	5"	340.96	FUEL OIL	5'-6"
10	63+15.8	6"	7"	341.0	GASOLINE	6'-0"
11	63+17.7	2"	4 1/2"	341.03	GASOLINE	5'-6"
12	63+18.8	6"	7"	340.95	FUEL OIL	6'-0"
13	63+21.0	6"	7"	341.0	FUEL OIL	6'-0"
14	63+22.7	6"	7"	341.03	GASOLINE	6'-0"
15	63+23.7	6"	7"	341.03	FUEL OIL	6'-0"
16	63+24.6	6"	7"	341.03	GASOLINE	6'-0"
17	63+25.7	NOT PLACED	9"	341.0	FUTURE INSTALL.	5'-6"
18	63+26.8	-	8"	340.03	"	5'-6"
19	63+28.0	-	8"	341.03	"	5'-6"

BY	DATE	CHARACTER REVISIONS
F.B.F.	11-20-40	Excavation payment line removed on riverside

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY DETAILS

MOVABLE CLOSURE STA. 62+84.3

SHEET 87 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: ENGINEER, CHIEF OF DESIGN

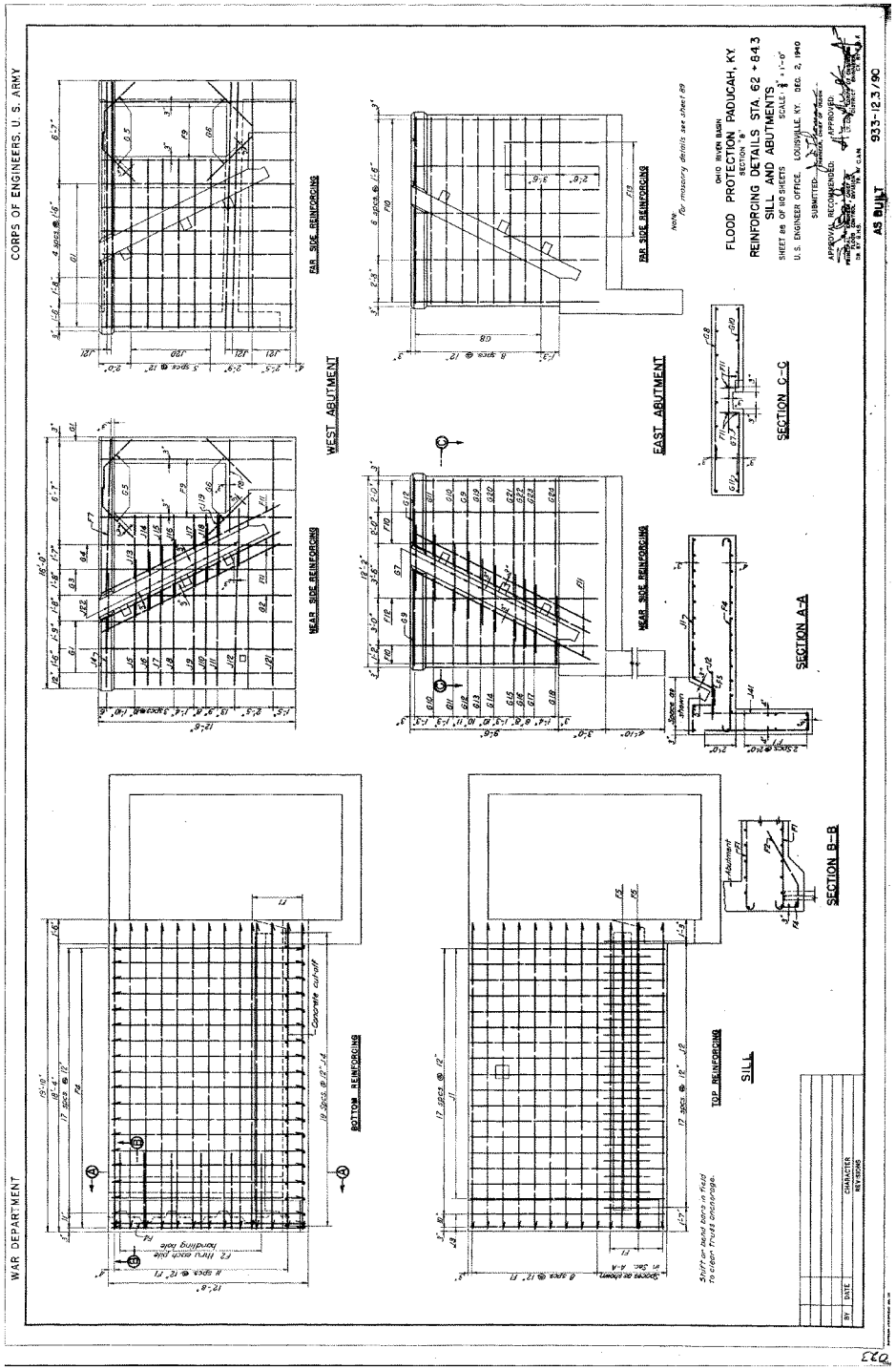
APPROVAL RECOMMENDED: APPROVED:

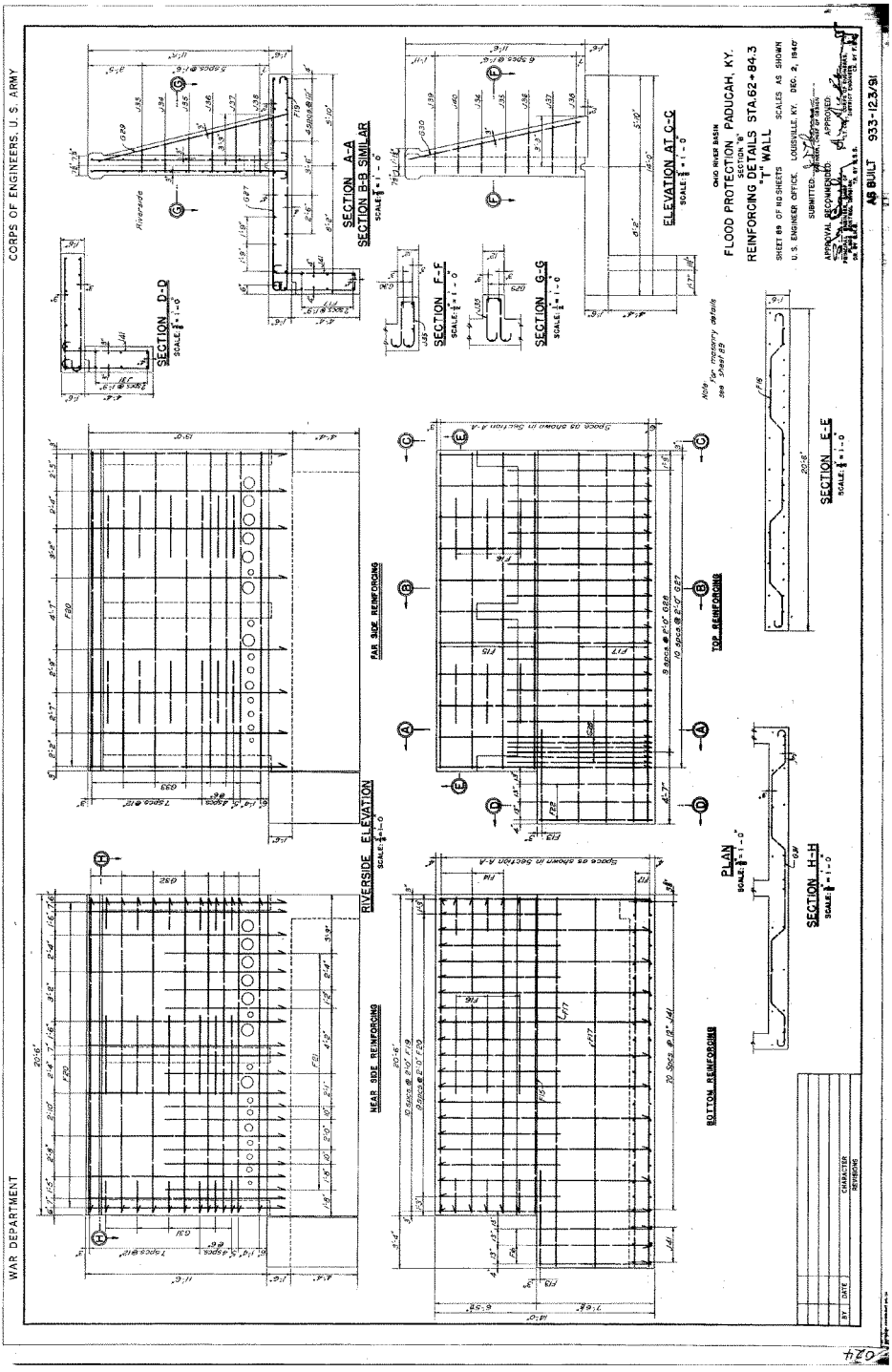
PRINCIPAL ENGINEER, CHIEF OF CENTRAL DESIGN, OFFICE OF THE CHIEF OF ENGINEERS

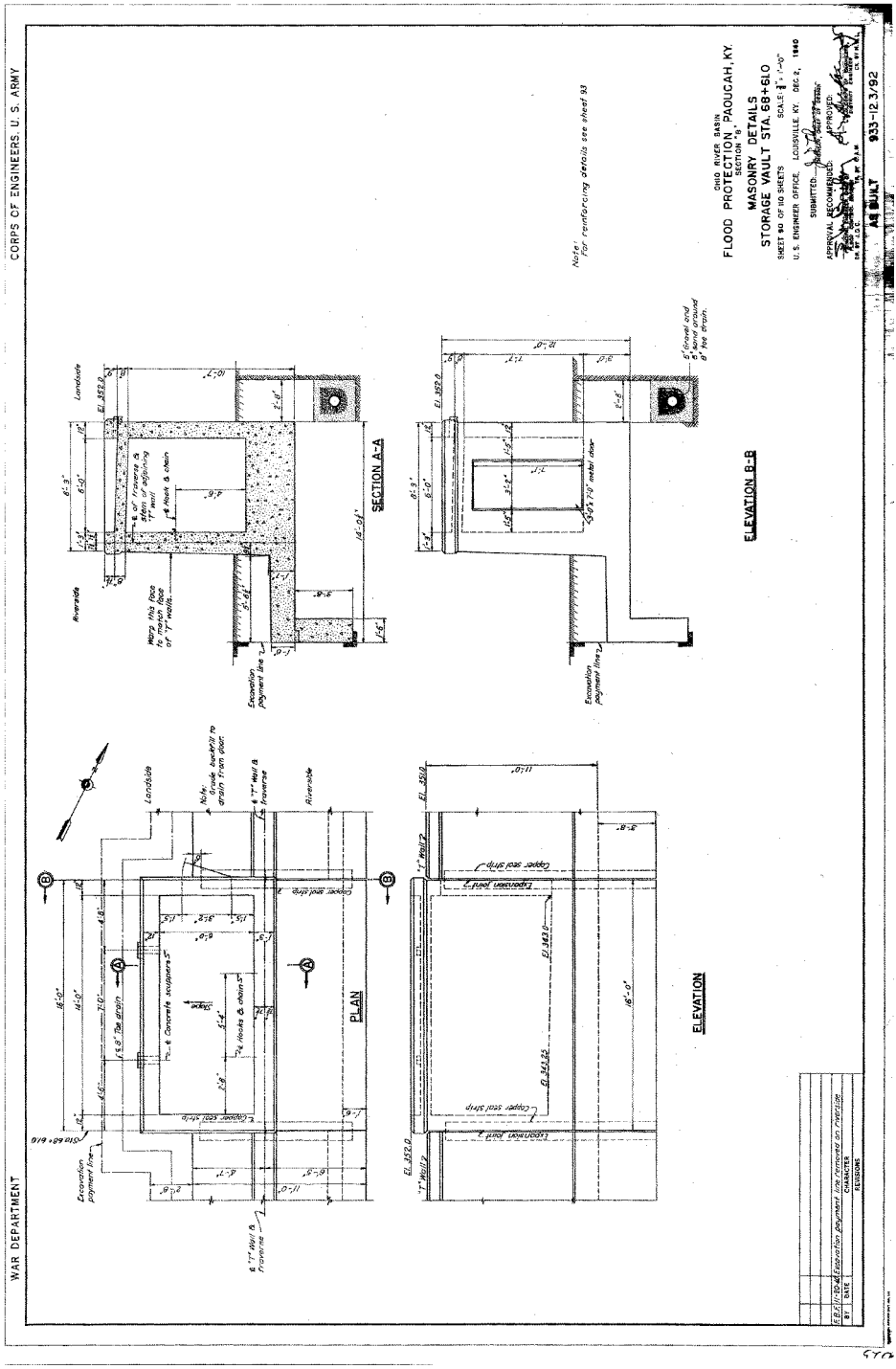
LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

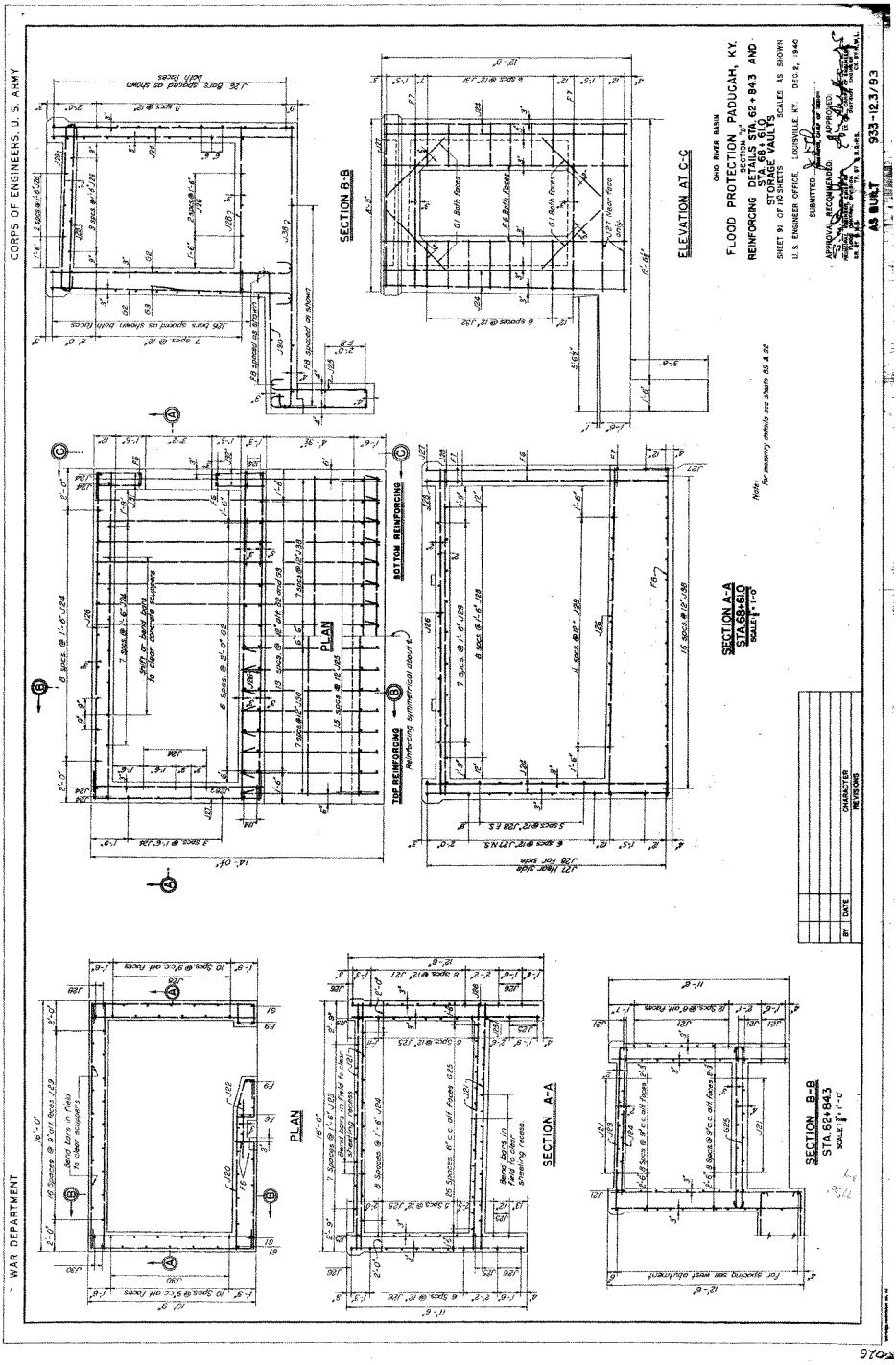
AS BUILT 933-12.3/89

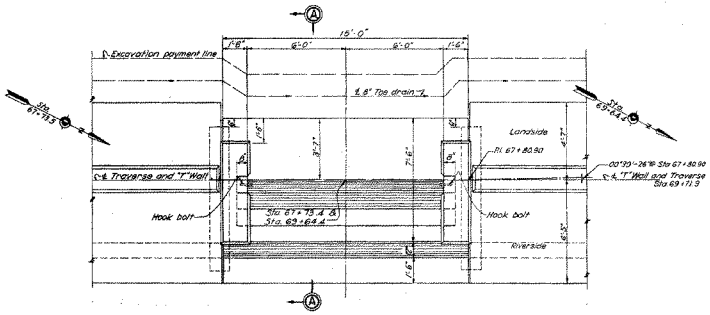
748

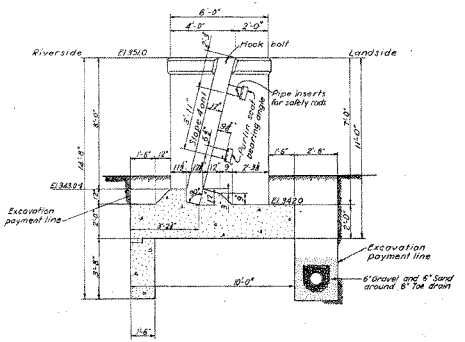

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY
SECTION "B"
REINFORCING DETAILS STA. 62 + 843
SILL AND ABUTMENTS
SHEET 88 OF 110 SHEETS
SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
AS BUILT
933-12.3/90
WEST ABUTMENT
EAST ABUTMENT
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
SECTION A-A
SECTION B-B
SECTION C-C
SILL
BOTTOM REINFORCING
TOP REINFORCING
Note
for masonry details see sheet 89
Shift on back face to fit to open trusses on barge.
CHARACTER
REVISIONS
BY
DATE

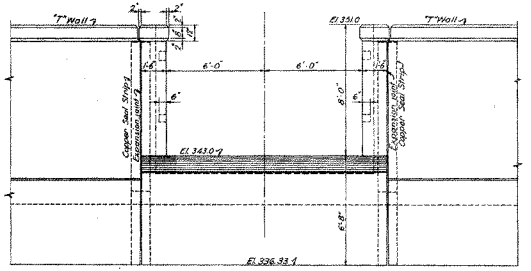

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA.62+84.3
T WALL
SHEET 89 OF NO SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
AS BUILT 933-12.3/91
SECTION A-A
SECTION B-B SIMILAR
SECTION D-D
SECTION F-F
SECTION G-G
ELEVATION AT G-G
SECTION E-E
RIVERSIDE ELEVATION
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
TOP REINFORCING
BOTTOM REINFORCING
PLAN
SECTION H-H
Riverside
BY
DATE
CHARACTER OF REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
STORAGE VAULT STA. 68+61.0
SHEET NO OF NO SHEETS
SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC 2, 1940
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
933-12.3/92
PLAN
ELEVATION
SECTION A-A
ELEVATION B-B
Landside
Riverside
Excavation payment line
Copper seal strip
Expansion joint
Note: For reinforcing details see sheet 93
CHARACTER
REVISIONS
BY
DATE


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
REINFORCING DETAILS STA. 62+84.3 AND STA. 68+61.0
STORAGE VAULTS
SHEET 91 OF 105 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC 2, 1940
SUBMITTED
APPROVED
AS BUILT
933-12.3/93
SECTION B-B
SECTION A-A
STA. 68+61.0
SCALE 1" = 1'-0"
PLAN
BOTTOM REINFORCING
TOP REINFORCING
Reinforcing symmetrical about ℄
Note: For masonry details see sheets 89 & 92
ELEVATION AT C-C
SECTION A-A
STA. 62+84.3
SECTION B-B
STA. 62+84.3
BY
DATE
CHARACTER
REVISIONS







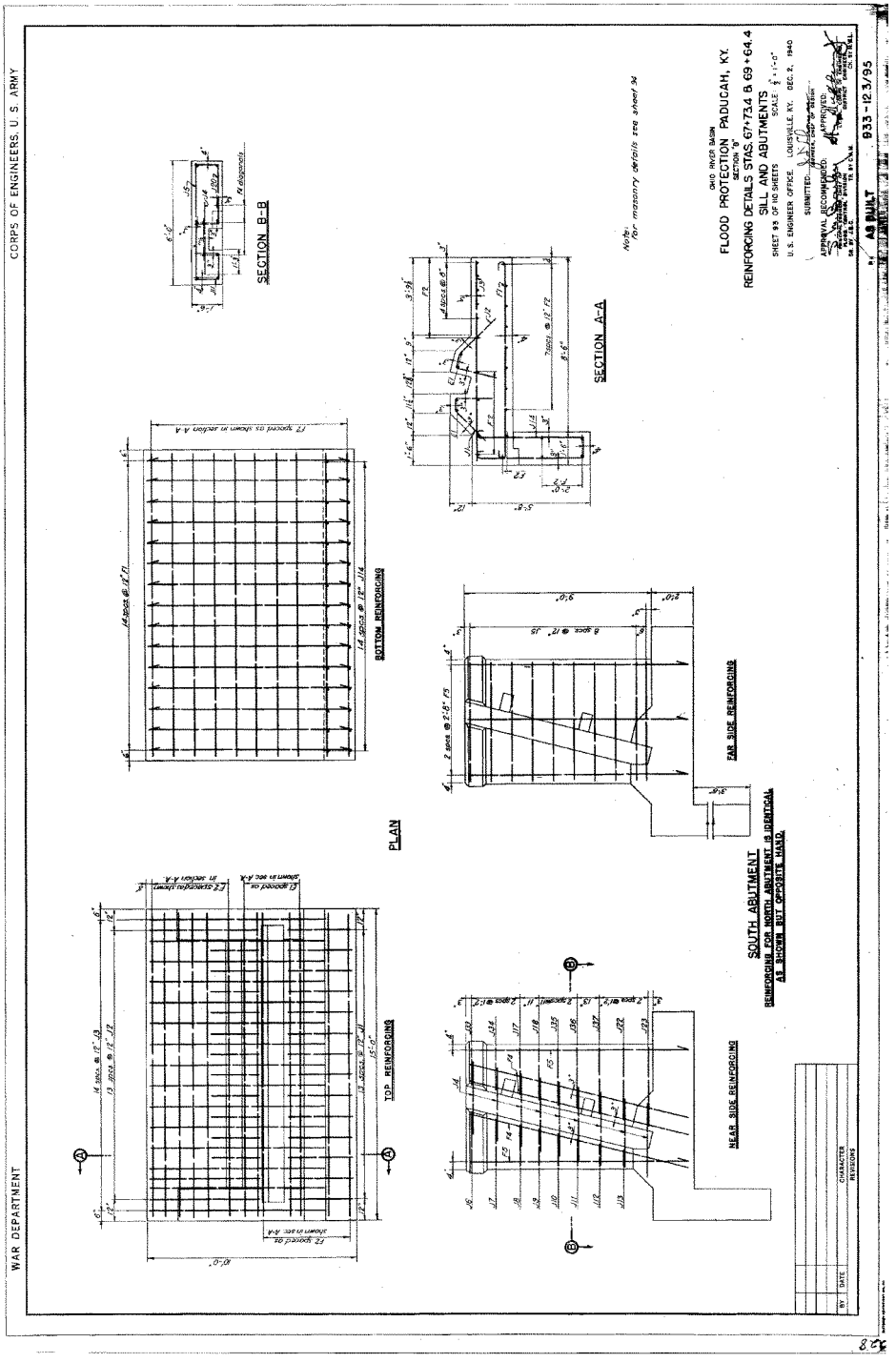
Note:
For reinforcing details see sheet 95

F.B.F.11-70-43 Excavation payment line removed on riverside.		
BY	DATE	CHARACTER
REVISIONS		

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURES STAS. 67+73 & 69+64
SHEET 92 OF 110 SHEETS SCALE: 1/8" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED: CHIEF OF DESIGN
APPROVAL RECOMMENDED: APPROVED:
AS BUILT 933-12.3/94

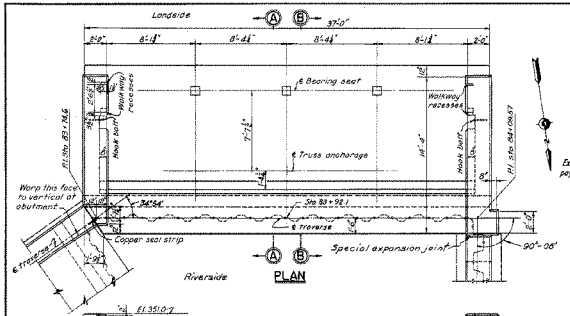
753

927

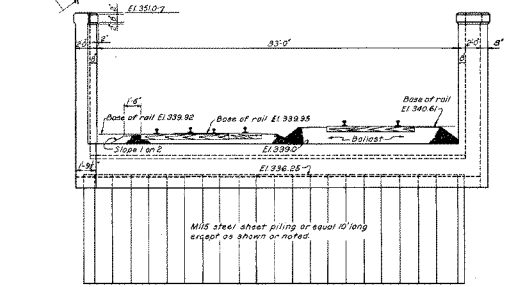

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
SECTION "A"
FLOOD PROTECTION, PADUCAH, KY.
REINFORCING DETAILS STAS. 67+73.4 & 69+64.4
SILL AND ABUTMENTS
SHEET 93 OF 110 SHEETS
SCALE 1/4"=1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
AS BUILT
933-12.3/95
SECTION B-B
SECTION A-A
PLAN
BOTTOM REINFORCING
TOP REINFORCING
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
SOUTH ABUTMENT
REINFORCING FOR NORTH ABUTMENT IS IDENTICAL AS SHOWN, BUT OPPOSITE HAND
Note: for masonry details see sheet 94
BY
DATE
CHARACTER
REVISIONS

WAR DEPARTMENT

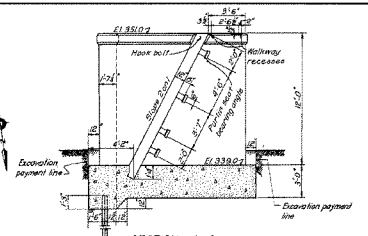
CORPS OF ENGINEERS, U. S. ARMY



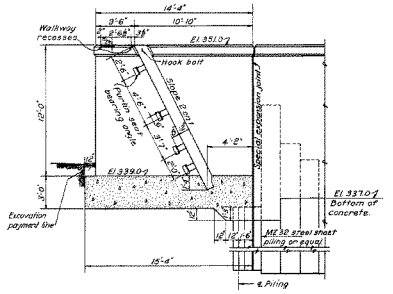
PLAN



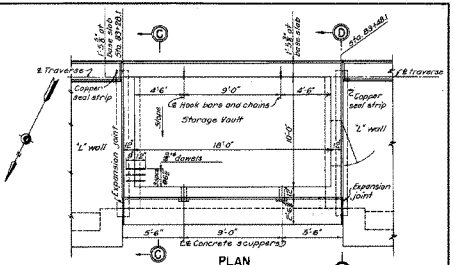
RIVERSIDE ELEVATION



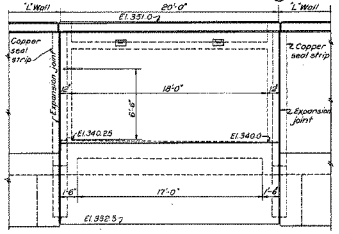
SECTION A-A



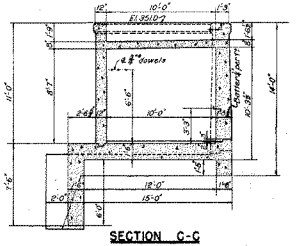
SECTION B-B



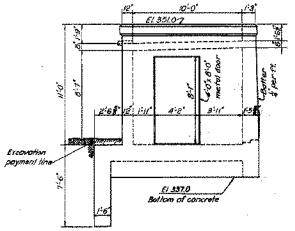
PLAN



RIVERSIDE ELEVATION
STORAGE VAULT



SECTION C-C



SECTION D-D

Note: For reinforcing details see sheet 37

BY	DATE	CHARACTER	REVISIONS
T.B.E.	1-20-40	Excavation payment line removed on riverside.	

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY DETAILS

MOVABLE CLOSURE STA. 83+92.1

& STORAGE VAULT STA. 83+26.1

SHEET 94 OF 110 SHEETS SCALE: 1/4" = 1'-0"

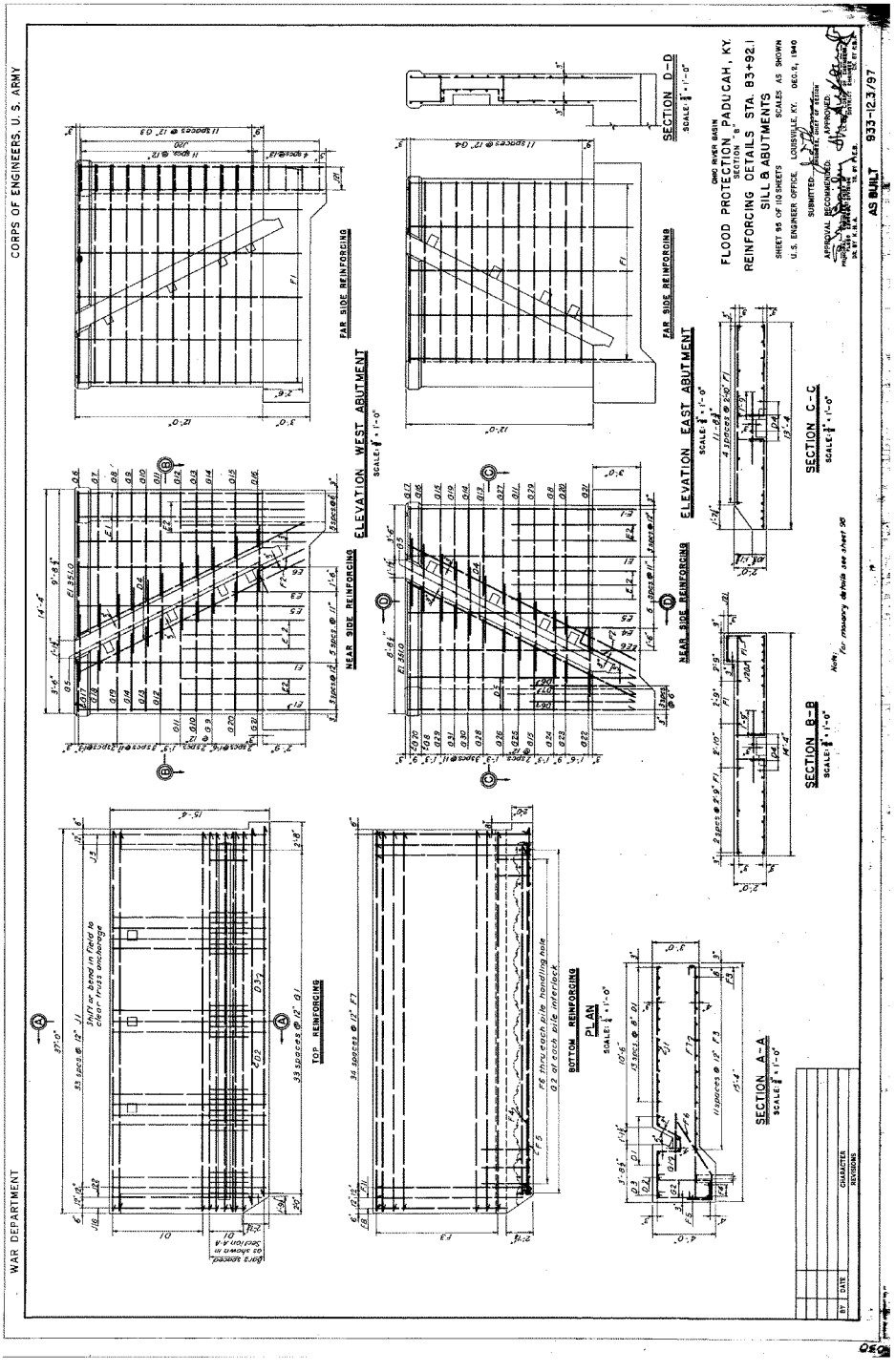
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: Chief of Design

APPROVAL RECOMMENDED: APPROVED:

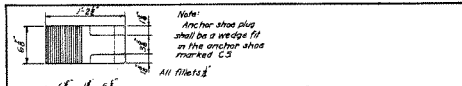
DR. BY K.R.A. TR. BY W.S.S. CK. BY F.B.

AS BUILT 933-12.3/96


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 83+92.1
SILL B ABUTMENTS
SHEET 95 OF 110 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 9, 1940
SUBMITTED
APPROVED
AS BUILT 933-12.3/97
ELEVATION WEST ABUTMENT
SCALE 1/4" = 1'-0"
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
ELEVATION EAST ABUTMENT
SCALE 1/4" = 1'-0"
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
SECTION D-D
SCALE 1/4" = 1'-0"
SECTION C-C
SCALE 1/4" = 1'-0"
SECTION B-B
SCALE 1/4" = 1'-0"
Note: for masonry details see sheet 90
TOP REINFORCING
PLAN
SCALE 1/4" = 1'-0"
BOTTOM REINFORCING
SECTION A-A
SCALE 1/4" = 1'-0"
Shift or bend in field to clear truss anchorage
Bars skewed as shown in Section A-A
16 thru each pile handling hole
@ 2 at each pile interlock
BY
DATE
CHARACTER
REVISIONS

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



Note: Anchor shoe plug shall be a wedge fit in the anchor shoe marked C3

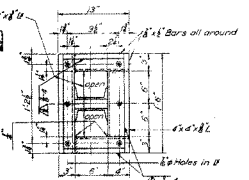
All fillets ½"

ANCHOR SHOE PLUG

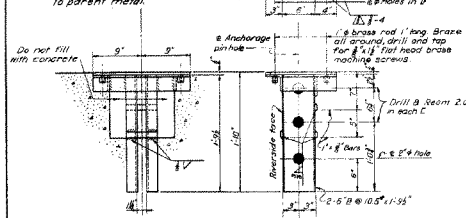
MARK 09 MAKE 11 WT 60 # EACH

MATERIAL MEDIUM CAST STEEL

SCALE: 1½" = 1'-0"



Note: Weld metal to be similar to parent metal.

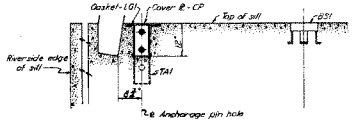


TRUSS ANCHORAGE

MARK TA1 MAKE 4

MATERIAL STRUCTURAL STEEL WT. 80 # EACH

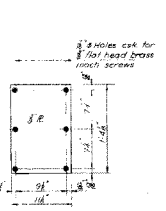
SCALE 1½" = 1'-0"



TRUSS ANCHORAGE ASSEMBLY TYPE 3

SCALE: ¾" = 1'-0"

STA. 51+87.3 & STA. 84+37.8

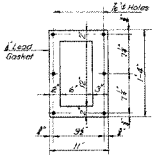


COVER PLATE

MARK CP MAKE 4 WT. 19.0 # EACH

MATERIAL - STRUCTURAL STEEL

SCALE: 1½" = 1'-0"

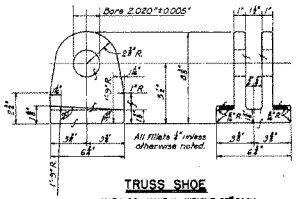


LEAD GASKET

MARK LG1 MAKE 4 WT 5.35 # EACH

MATERIAL - LEAD

SCALE: 1½" = 1'-0"

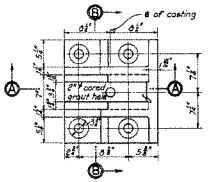


TRUSS SHOE

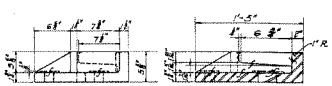
MARK 02 MAKE 11 WEIGHT 39 # EACH

MATERIAL - MEDIUM CAST STEEL

SCALE: 3" = 1'-0"



SECTION B-B



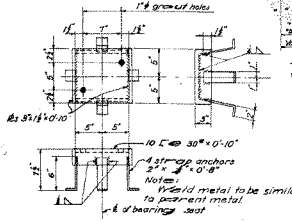
SECTION A-A

ANCHOR SHOE

MARK 05 MAKE 11 WEIGHT 242 # EACH

MATERIAL - MEDIUM CAST STEEL

SCALE: 1½" = 1'-0"

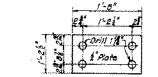


EMBEDDED BEARING SEAT

MARK B51 MAKE 13 WT. 42 # EACH

MATERIAL STRUCTURAL STEEL

SCALE 1½" = 1'-0"



ANCHOR PLATE

MARK AP1 MAKE 11 WEIGHT 39.4 # EACH

MATERIAL - STRUCTURAL STEEL

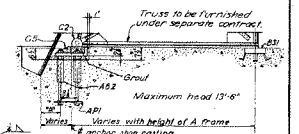
SCALE: 1" = 1'-0"

ANCHOR BOLT

MARK AB2 MAKE 44 WEIGHT 3.3 # EACH

MATERIAL - CORR. RESISTANT STEEL

SCALE: 1½" = 1'-0"



TRUSS & ANCHOR ASSEMBLY NO. 1

SCALE ¾" = 1'-0"

TABLE FOR SETTING ANCHOR SHOE

STA.	DIM. 'A'	STA.	DIM. 'A'
4+49.5	10¼"	92+84.3	10¼"
5+34.5	10¼"	71+74.5	10¼"
25+15.6	10¼"	75+45.5	10¼"
26+90.3	10¼"	63+92.1	10¼"
31+51.4	10¼"		

7-8-50	Anchor shoe plug added	
BY / DATE	CHARACTER OF REVISIONS	

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

TRUSS ANCHORAGE DETAILS

SHEET 96 OF 110 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 8, 1940

SUBMITTED: J. T. Thomas, CHIEF OF DESIGN

APPROVAL RECOMMENDED: PRINCIPAL ASSISTANT, CHIEF OF FLOOD CONTROL Division, DIV. BY C.A.W.

APPROVED: CHIEF OF ENGINEERS, DISTRICT ENGINEER, TR. BY C.A.W., CK. BY F.B.P.

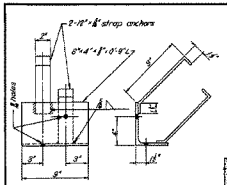
AS BUILT 933-12.3/98

031

767

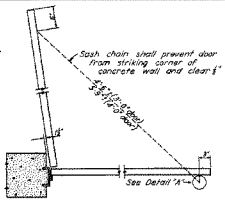
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



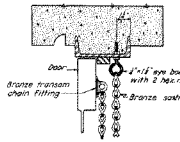
PURLIN SEAT BEARING ANGLE

MAKE 108 MARK PSA WEIGHT 13.5# EACH
MATERIAL: STRUCTURAL STEEL
SCALE: 2"= 1'-0"



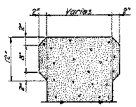
DOOR CHECK DETAIL

SCALE: 1"= 1'-0"



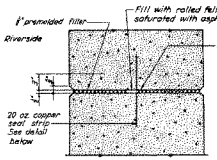
DETAIL "A"

SCALE: 3"= 1'- 0"



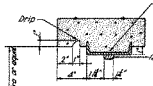
COPING DETAIL

SCALE: 1"= 1'-0"

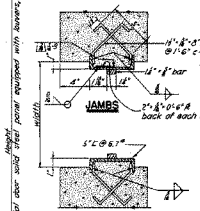


TYPICAL EXPANSION JOINT IN STEM OF WALL

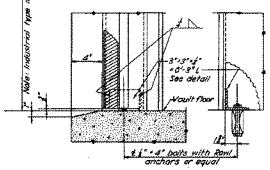
SCALE: 1½"= 1'-0"



HEAD



DOOR OPENING SCHEDULE			
STATION	NO. DOORS	HEIGHT	WIDTH
4+00.0	1	8'-1"	4'-2"
10+40.0	1	7'-1"	3'-2"
26+02.79	2	8'-1"	4'-2"
30+92.8	1	7'-1"	3'-2"
31+51.4	1	7'-1"	3'-0"
36+40.0	1	7'-1"	3'-2"
51+87.3	1	8'-3"	4'-2"
56+37.6	1	8'-1"	4'-2"
62+84.3	1	7'-1"	3'-2"
68+81.0	1	7'-1"	3'-2"
71+76.5	1	7'-1"	3'-2"
75+85.1	1	7'-1"	3'-2"
83+28.1	1	8'-1"	4'-2"

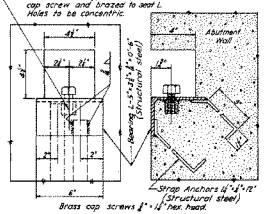


SILL

VAULT DOOR FRAME DETAILS

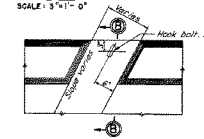
SCALE: 2"= 1'-0"

Note:
For door hasp details see sheet 100



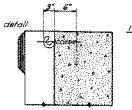
STRUT ANGLE ANCHORAGE

MAKE 10 MARK AA WEIGHT 6.80# EACH
MATERIAL AS NOTED
SCALE: 3"= 1'-0"



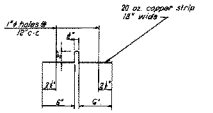
LOCATION OF HOOK BOLT

SCALE: 1"= 1'-0"



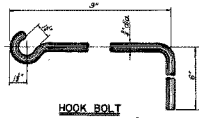
SECTION B-B

SCALE: 1"= 1'- 0"



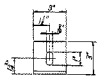
COPPER SEAL STRIP

SCALE: 1½"= 1'-0"



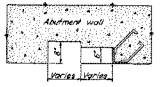
HOOK BOLT

MAKE 36 MARK HB WT. 2.65# EACH
MATERIAL: WROUGHT IRON
SCALE: 3"= 1'-0"



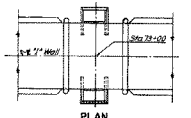
DOOR FRAME ANGLE DETAIL

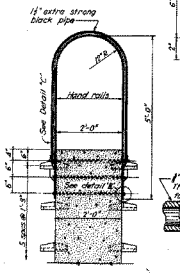
SCALE: 3"= 1'-0"



SECTION THRU PURLIN RECESS

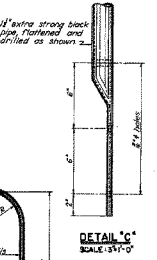
SCALE: 1½"= 1'-0"





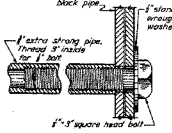
LADDER DETAIL

SCALE: ½"= 1'-0"



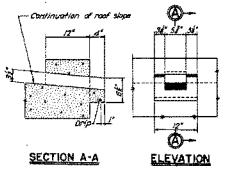
DETAIL "C"

SCALE: 3"= 1'-0"



DETAIL "B"

SCALE: FULL SIZE



CONCRETE SCUPPER

SCALE: 1"= 1'-0"

F.B.F.	1/10/45	Expansion joint revised and minor revisions.
BY	DATE	CHARACTER
REVISIONS		

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MISCELLANEOUS DETAILS

SHEET 97 OF 110 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED

APPROVAL RECOMMENDED: APPROVED:

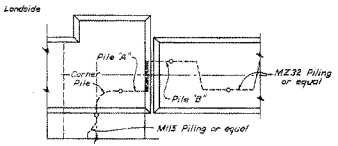
AS BUILT

933-12.3/99

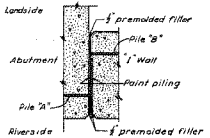
758

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

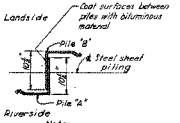


PLAN



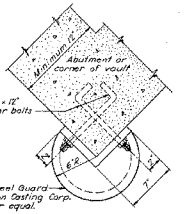
SECTION A-A

SCALE: 1" = 1'-0"

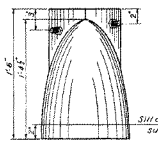


SECTION B-B

SCALE: 1" = 1'-0"

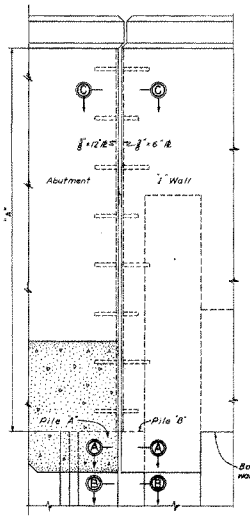


WHEEL GUARD SCHEDULE	
STATION	NO. REQUIRED
9+44.0	4
10+40.0	5
26+90.3	4
31+01.3	4
36+84.5	4
51+67.3	4
54+37.6	4
67+13.4	4
69+69.3	4
TOTAL	37



WHEEL GUARD DETAIL

SCALE: 2" = 1'-0"

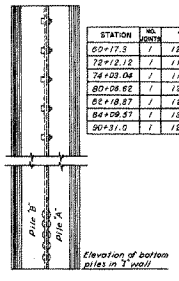


RIVERSIDE ELEVATION

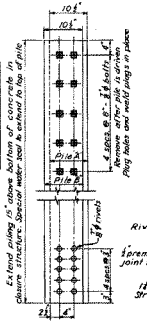
SPECIAL EXPANSION JOINT

SCALE ½" = 1'-0"

Note:
The steel sheet piling shall be cut off square and smooth after driving to form a good butt joint with special water seal.

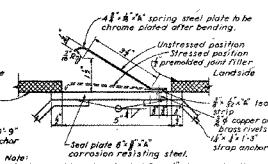


STATION	NO. JOINTS	"A"
60+17.3	1	12'-9"
72+12.12	1	11'-9"
74+03.04	1	11'-9"
80+06.62	1	12'-9"
66+18.87	1	12'-9"
84+09.57	1	13'-9"
90+31.0	1	12'-9"



DETAIL OF PILING AT SPECIAL EXPANSION JOINT

SCALE: 1" = 1'-0"

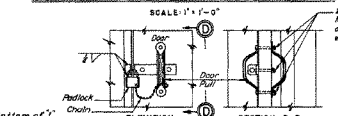


Note:
Seal assembly to be adjusted for a ½" clear joint with spring plate in position shown by dotted line before placing concrete in I" wall.

SPECIAL WATER SEAL

MATERIAL AS SHOWN

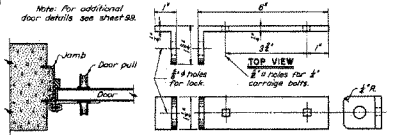
SCALE: HALF SIZE



DOOR LOCK ASSEMBLY

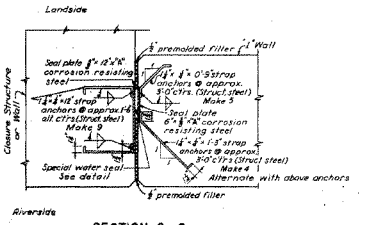
SCALE: 2" = 1'-0"

Note: For additional door details see sheet 98.



DETAIL OF WROUGHT IRON HASP

SCALE: HALF SIZE



SECTION C-C

SCALE: 1½" = 1'-0"

REVISIONS		
BY	DATE	CHARACTER
K.B.F.	11-12-40	Minor corrections & door hasp added.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MISCELLANEOUS DETAILS

SHEET 98 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [illegible] OF DIVISION

APPROVAL RECOMMENDED: APPROVED:

[illegible] DIVISION ENGINEER

DR. BY K.B.F. TR. BY K.E.B. CK. BY R.E.

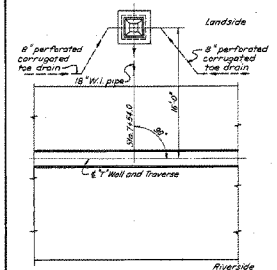
AS BUILT 933-12.3/100

23

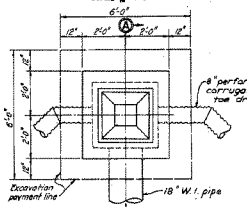
769

WAR DEPARTMENT

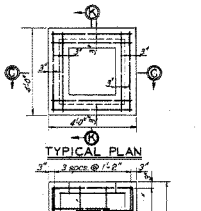
CORPS OF ENGINEERS, U. S. ARMY



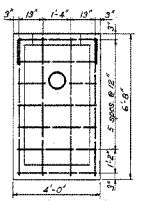
LOCATION PLAN
CATCH BASIN NO. 1
SCALE: 1/8" = 1'-0"



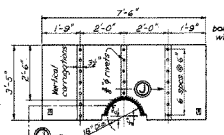
PLAN



Note:
All reinforcing ⅝" ϕ bars, cut and bend in field
Catch basin No. 1 - 232 linear feet - weight 154 #

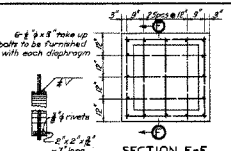


ELEVATION
SCALE: 1/2" = 1'-0"



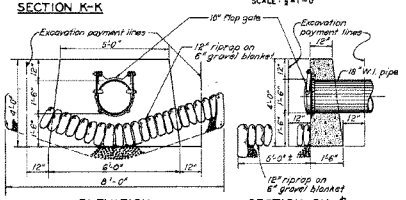
Note:
Diaphragm 14 gage galvanized corrugated sheet metal fully coated with bituminous material. One half of diaphragm shown, other half identical.

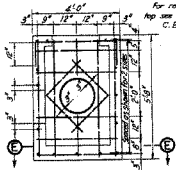
SECTION J-J

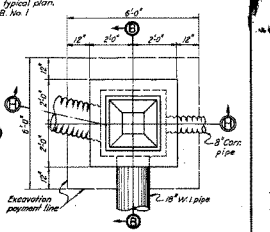


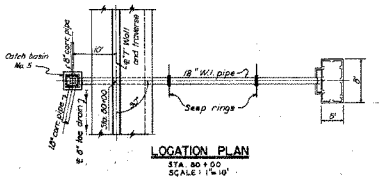
SECTION E-E

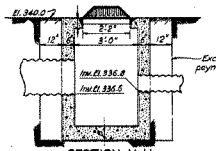
Note:
All reinforcing ⅝" ϕ bars, cut and bend in field
Catch basin No. 5 - 233 linear ft.
weight 156 #

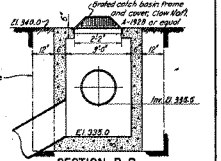




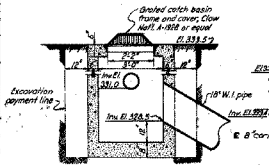




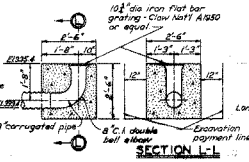




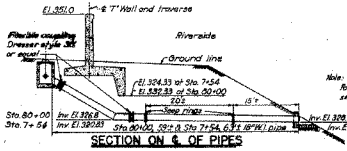
MASONRY DETAILS CATCH BASIN NO. 5
SCALE: ½" = 1'-0"



MASONRY DETAILS
CATCH BASIN NO. 1



INLET STA 16+82
SCALE: ½" = 1'-0"



DRAINAGE STRUCTURE STA. 80+00 & 7+54
SCALE: 1" = 10'

Note:
for detail of headwall Sta. 7+54 see sheet 1/2.

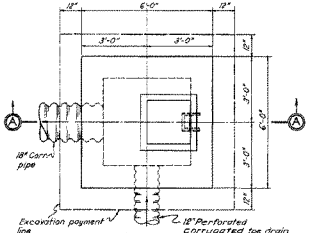
NO.	DATE	CHARACTER	DESCRIPTION
1	11-20-40	Catch basin No. 1 changed to pipe corrugatory	

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
CATCH BASINS NOS. 1 & 5
SHEET 99 OF 110 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED: [illegible] CHIEF OF DIVISION
APPROVED: [illegible] DISTRICT ENGINEER
APPROVAL RECOMMENDED: [illegible] CHIEF OF ENGINEERS
PROJECT ENGINEER
BY W.P.A.-E.S.-C.A.M.
CE BY W.P.A.-E.S.-C.A.M.
935-12.3/101

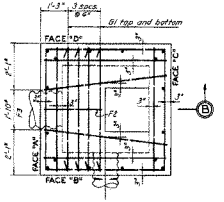
760

WAR DEPARTMENT

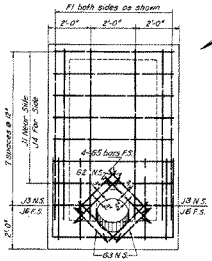
CORPS OF ENGINEERS, U. S. ARMY



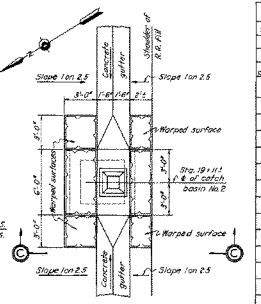
PLAN



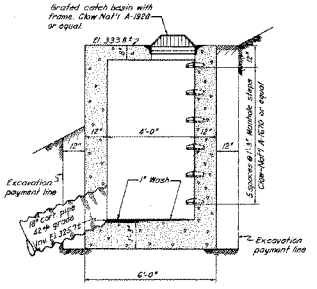
PLAN



ELEVATION FACE "A"



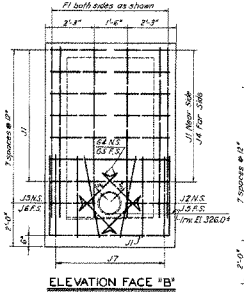
PLAN



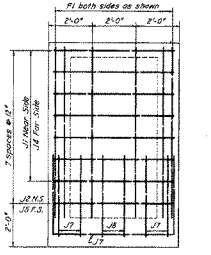
SECTION A-A

MASONRY DETAILS

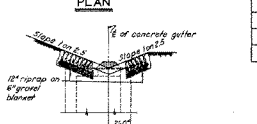
SCALE: $\frac{1}{4}$"=1'-0"



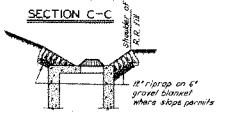
ELEVATION FACE "B"



ELEVATION FACE "C"
FACE "D" SIMILAR



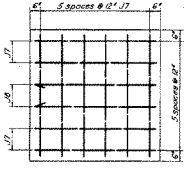
SECTION C-C



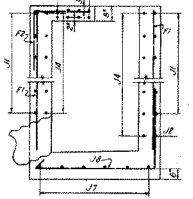
SECTION ON ℄ OF CATCH BASIN

RIPRAP DETAILS

SCALE: $\frac{1}{8}$"=1'-0"



PLAN OF BASE



SECTION B-B

REINFORCING DETAILS

SCALE: $\frac{1}{4}$"=1'-0"

REINFORCEMENT SCHEDULE

SIZE	D
#3 (#4 LESS)	6"
#5	8"
#6	10"
#7	12"
#8	16"
#9	18"
#10	20"
#11	22"

DIMENSION GIVEN IN BENDING DIAGRAM

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	16	$\frac{3}{8}$"ø	7'-0"	Straight	11.64	186.2
F2	1	"	5'-6"	2'-7" [2'-7" 4"] 4"	8.26	8.3
F3	2	"	5'-8"	Straight	8.51	17.0
G1	8	$\frac{5}{8}$"ø	7'-0"	5'-8"	7.30	58.4
G2	2	"	4'-6"	3'-3"	4.69	9.4
G3	2	"	3'-6"	2'-3"	3.65	7.3
G4	4	"	3'-10"	2'-6"	4.00	16.0
G5	8	"	2'-6"	Straight	2.61	20.9
J1	14	$\frac{3}{4}$"ø	10'-6"	[2'-6" 5'-6" 2'-6"]	7.01	98.1
J2	1	"	10'-6"	[2'-0" 5'-6" 3'-0"]	7.01	7.0
J3	2	"	3'-9"	[1'-9" 2'-0"]	2.50	5.0
J4	28	"	5'-6"	Straight	3.67	102.8
J5	1	"	8'-3"	[1'-4" 4'-7" 2'-10"]	5.54	5.5
J6	2	"	3'-0"	[1'-4" 1'-8"]	2.00	4.0
J7	10	"	12'-9"	[3'-8" 5'-5" 3'-8"]	8.52	85.2
J8	2	"	9'-9"	12' [5'-6" 3'-8"]	6.51	13.0
				TOTAL		644#

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

CATCH BASIN NO. 2

SHEET 100 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] CHIEF, DIV. OF DESIGN

APPROVAL RECOMMENDED: [signature] CHIEF, FLOOD CONTROL SECTION

APPROVED: [signature] CHIEF, DIV. OF ENGINEERING

DR. BY E.C.K. TR. BY E.C.K. CK. BY [illegible]

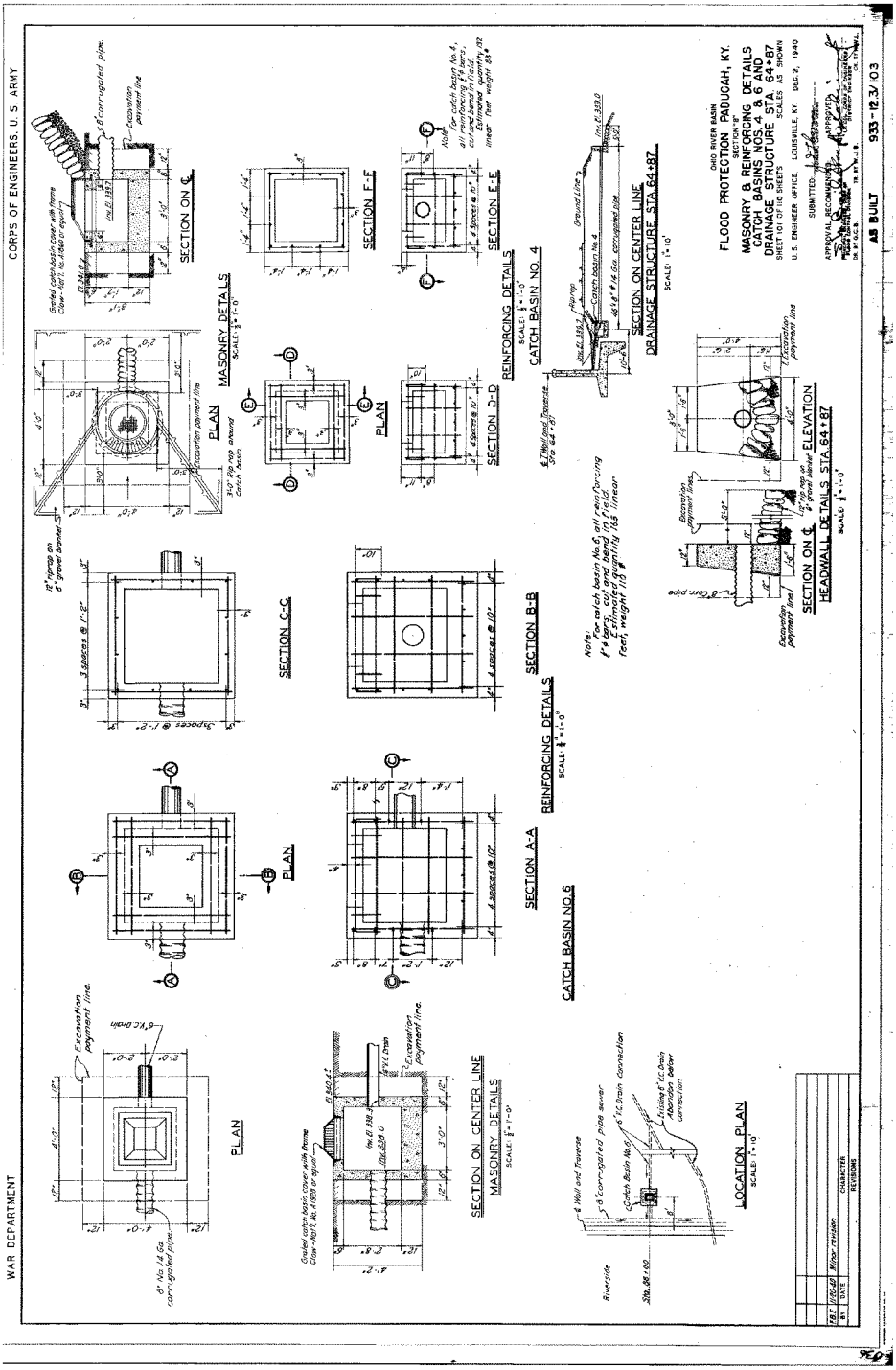
BY	DATE	CHARACTER
J.H.K.	1-31-41	Revised as per Addendum No. 1

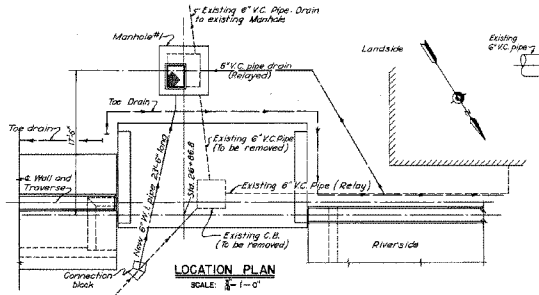
REVISIONS

AS BUILT

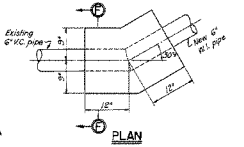
933-12.3/102

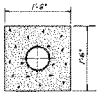
761


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
SECTION "B"
FLOOD PROTECTION PADUCAH, KY.
MASONRY & REINFORCING DETAILS
CATCH BASINS NOS. 4, 6 AND
DRAINAGE STRUCTURE STA. 64+87
SHEET NO. 1 OF 1 SHEETS
SCALE AS SHOWN
U.S. ENGINEER OFFICE LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
AS BUILT
933-12.3/103
PLAN
SECTION ON ℄
MASONRY DETAILS
SECTION C-C
SECTION F-F
SECTION E-E
REINFORCING DETAILS
CATCH BASIN NO. 4
SECTION ON CENTER LINE
DRAINAGE STRUCTURE STA. 64+87
SECTION A-A
SECTION B-B
REINFORCING DETAILS
CATCH BASIN NO. 6
SECTION ON CENTER LINE
MASONRY DETAILS
LOCATION PLAN
SECTION ON ℄
HEADWALL DETAILS STA. 64+87
Excavation payment line
6" No. 14 Ga. corrugated pipe
Grated catch basin cover with frame
Elev. 388.0
Riverside Dr.

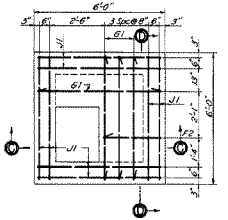


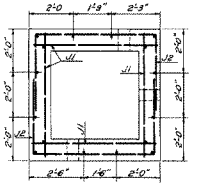
LOCATION PLAN
SCALE: 1/16" = 1'-0"

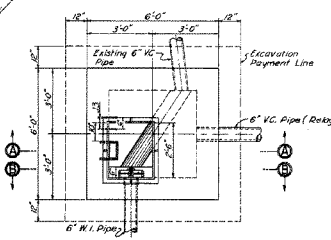




CONNECTION BLOCK
SCALE: 1" = 1'-0"





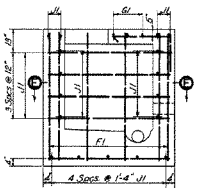


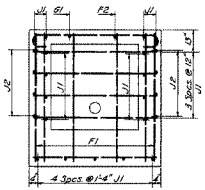
REINFORCEMENT SCHEDULE

SIZE	D
3" OR LESS	6"

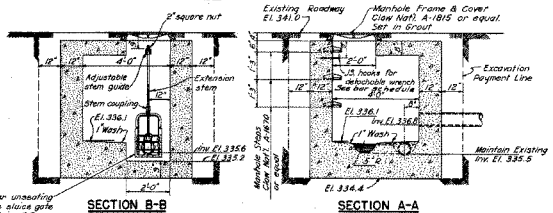
DIMENSION GIVEN IN BENDING DIAGRAM

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	16	3/4" ø	6'-0"	Straight	9.01	144.2
F2	1	"	5'-6"	2'-6" 2'-1" 1'-0"	8.26	8.3
G1	4	5/8" ø	7'-0"	5'-6"	7.30	29.2
J1	34	3/4" ø	5'-8"	Straight	3.79	128.9
J2	8	"	12'-6"	5'-6" 5'-6" 1'-4"	8.35	66.8
J3	2	"	12"	12"	0.67	1.3
				TOTAL		379#





REINFORCING DETAILS
SCALE: 1/4" = 1'-0"



MASONRY DETAILS
SCALE: 1/4" = 1'-0"

BY	DATE	CHARACTER
F.B.F.	11-20-40	Gate changed & 6" W.I. pipe revised

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MANHOLE NO. 1

SHEET 102 OF 110 SHEETS

SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: _____ CAPTAIN, CORPS OF ENGINEERS

APPROVAL RECOMMENDED: _____ DIVISION ENGINEER, OHIO RIVER DIVISION

APPROVED: _____ COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

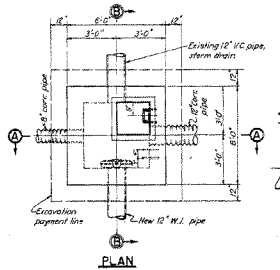
DR. BY G.H.S. TR. BY S.B.B. CK. BY F.B.F.

AS BUILT

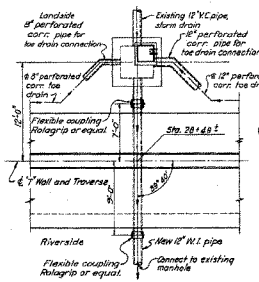
933-12.3/104

WAR DEPARTMENT

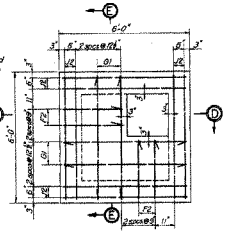
CORPS OF ENGINEERS, U. S. ARMY



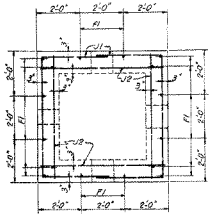
PLAN



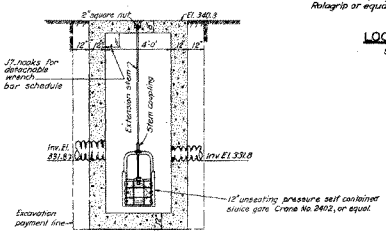
LOCATION PLAN
SCALE: 1" = 1'-0"



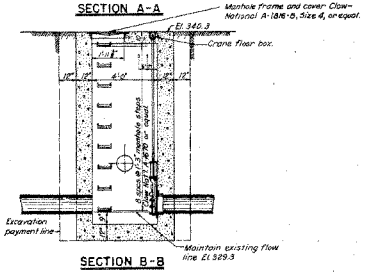
PLAN



SECTION F-F

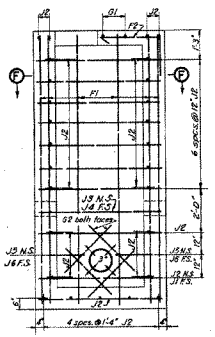


SECTION A-A

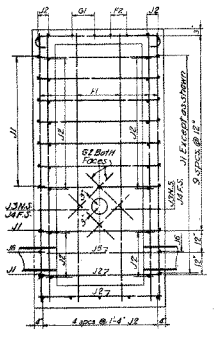


SECTION B-B

MASONRY DETAILS
SCALE: 1" = 1'-0"



SECTION D-D



SECTION E-E

REINFORCING DETAILS
SCALE: 1" = 1'-0"

REINFORCEMENT SCHEDULE

SIZE	D
1/8 thru 1"	6"

DIMENSION GIVEN IN BENDING DIAGRAM

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	16	#6	12'-3"	Straight	18.40	294.4
F2	4	"	4'-6"	1'-8" 2'-7" 1'-8"	6.75	27.0
G1	4	#9	7'-0"	3'-9"	7.30	29.2
G2	16	"	3'-0"	Straight	3.13	50.1
J1	18	#9	11'-6"	3'-0" 5'-6" 3'-0"	7.58	136.3
J2	54	"	5'-8"	Straight	3.79	204.7
J3	2	"	9'-0"	1'-8" 5'-6" 1'-8"	6.01	12.0
J4	2	"	10'-0"	2'-3" 5'-6" 2'-3"	6.68	13.4
J5	2	"	7'-9"	1'-7" 4'-7" 1'-7"	5.18	10.4
J6	2	"	9'-6"	2'-0" 5'-6" 2'-0"	6.35	12.7
J7	2	"	12"	2" 10"	0.67	1.3
					TOTAL	793#

1	8-20-41	Changed gate & location of opening
BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MANHOLE NO. 2

SHEET 103 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] Assistant Chief of Staff

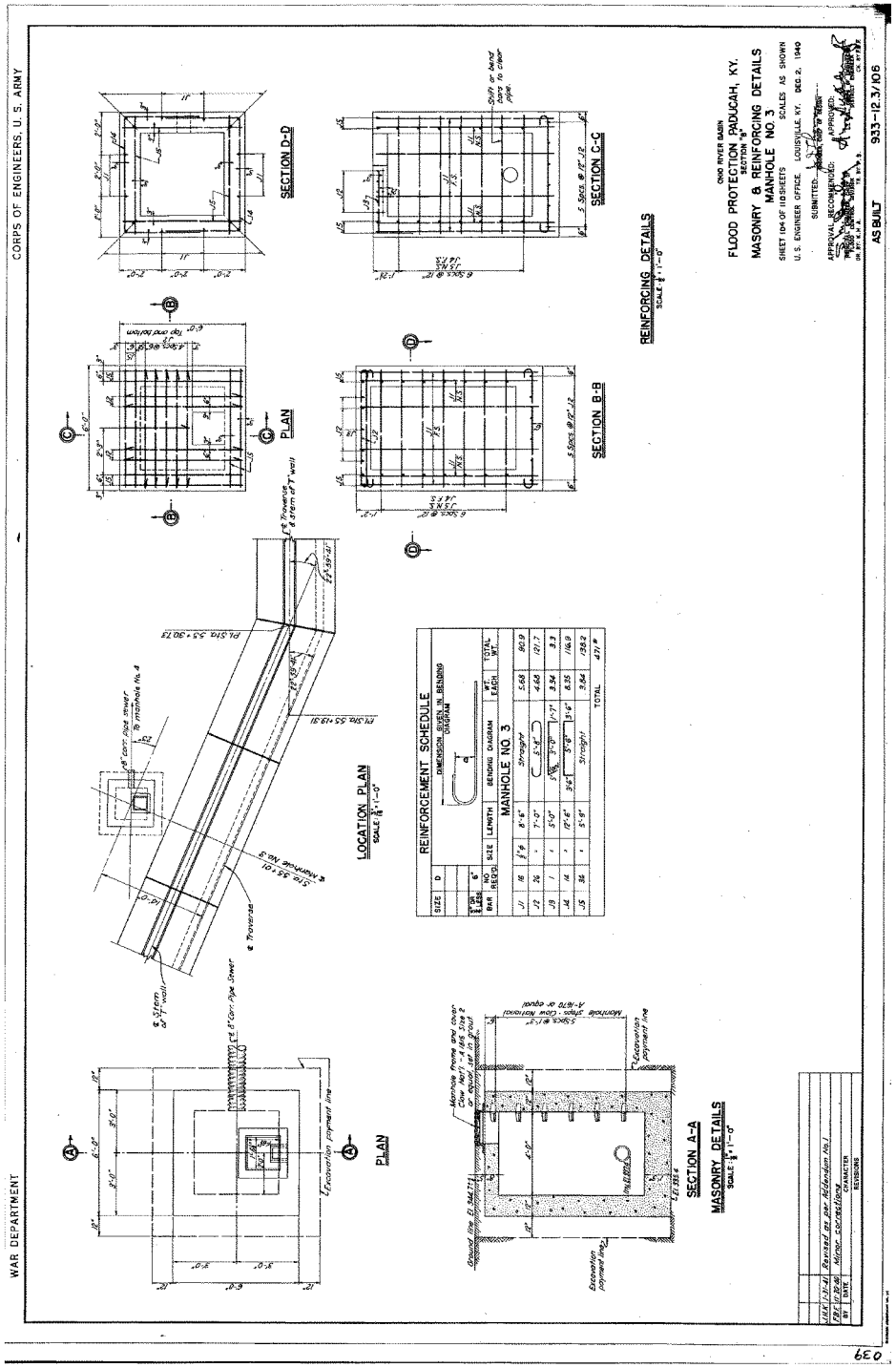
APPROVAL RECOMMENDED: [signature] Principal Engineer Chief of Engineering Division

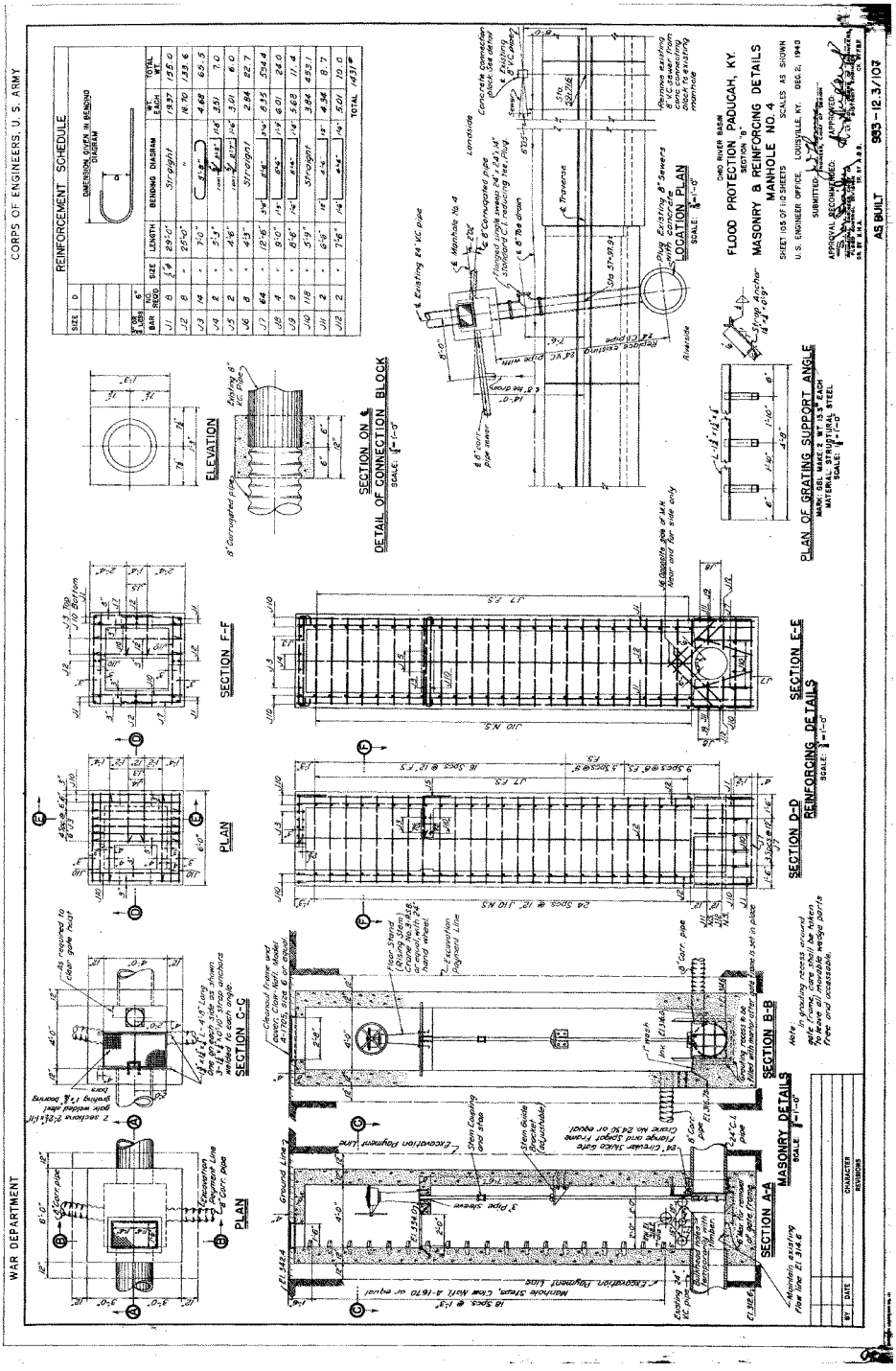
APPROVED: [signature] District Engineer

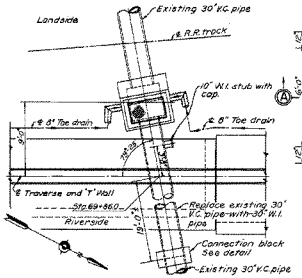
AS BUILT

933-12.3/105

764

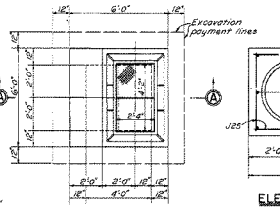

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MANHOLE NO. 3
SHEET 104 OF 110 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
933-12.3/106
SECTION D-D
SECTION C-C
SECTION B-B
PLAN
LOCATION PLAN
SCALE 1" = 1'-0"
REINFORCEMENT SCHEDULE
MANHOLE NO. 3
REINFORCING DETAILS
SCALE 1" = 1'-0"
PLAN
SECTION A-A
MASONRY DETAILS
SCALE 1" = 1'-0"
Revised as per Addendum No. 1
CHARACTER
REVISIONS
639


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
REINFORCEMENT SCHEDULE
DIMENSION, DEPTH, OR BENDING DIAGRAM
BAR NO.
SIZE
NO. REQD.
LENGTH
BENDING DIAGRAM
WT. EACH
TOTAL WT.
TOTAL 1431#
SECTION C-C
SECTION A-A
SECTION B-B
SECTION D-D
SECTION E-E
SECTION F-F
PLAN
ELEVATION
SECTION ON ℄
DETAIL OF CONNECTION BLOCK
SCALE: ½"=1'-0"
LOCATION PLAN
SCALE: 1"=1'-0"
PLAN OF GRATING SUPPORT ANGLE
MARK DEL MAKE 2 WT. 13.5# EACH
MATERIAL: STRUCTURAL STEEL
SCALE: ½"=1'-0"
MASONRY DETAILS
SCALE: ½"=1'-0"
REINFORCING DETAILS
SCALE: ½"=1'-0"
OHIO RIVER BASIN
SECTION 'B'
FLOOD PROTECTION PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MANHOLE NO. 4
SHEET 105 OF 110 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1943
SUBMITTED
APPROVAL RECOMMENDED:
APPROVED:
BY
DATE
CHARACTER OF REVISIONS
AS BUILT
963-12.3/103



LOCATION PLAN

SCALE: $\frac{1}{16}$" = 1'-0"



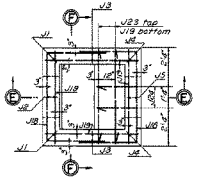
PLAN

ELEVATION

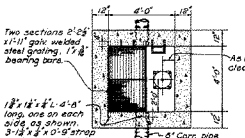
SECTION ON CENTER LINE

DETAIL OF CONNECTION BLOCK

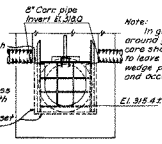
SCALE: $\frac{1}{2}$" = 1 - 0



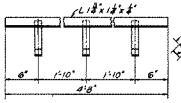
SECTION D-D



SECTION B-B



SECTION C-C

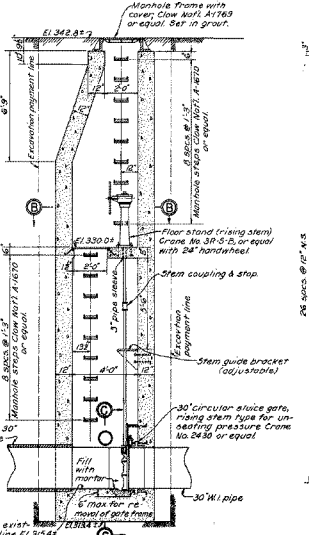


PLAN OF GRATING SUPPORT ANGLE

MARK: GSL MAKE: MARK: WT. 13.3# EACH

MATERIAL: STRUCTURAL STEEL

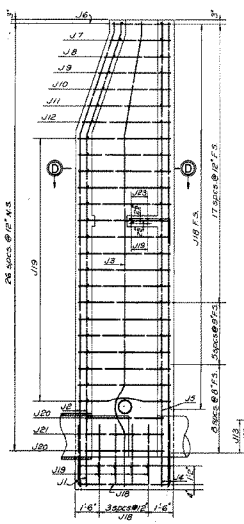
SCALE: 1½" = 1'-0"



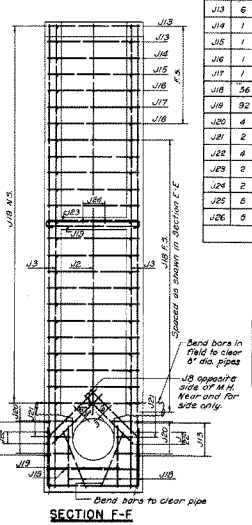
SECTION A-A

MASONRY DETAILS

SCALE: $\frac{1}{4}$" = 1'-0"



SECTION E-E



SECTION F-F

REINFORCING DETAILS

SCALE: $\frac{1}{4}$" = 1'-0"

REINFORCEMENT SCHEDULE

SIZE	D
5/4" OR LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM			WT. EACH	TOTAL WT.
J1	4	2"	28'-6"	21'-6"	R36	6"×6"×36"	18.04	76.2
J2	2	"	23'-9"	16'-8"	R36	6"×6"×36"	15.86	31.7
J3	4	"	28'-3"	21'-6"	R36	6"×6"×36"	18.87	75.5
J4	4	"	28'-3"	Straight			18.87	75.5
J5	2	"	23'-9"	"			15.86	31.7
J6	2	"	3'-6"	"			2.34	4.7
J7	2	"	3'-9"	"			2.50	5.0
J8	10	"	4'-3"	"			2.84	28.4
J9	2	"	4'-6"	"			3.01	6.0
J10	2	"	4'-9"	"			3.17	6.3
J11	2	"	5'-3"	"			3.51	7.0
J12	2	"	5'-6"	"			3.67	7.3
J13	6	"	3'-0"	1'-9"	3'-6"	1'-9"	6.01	36.1
J14	1	"	10'-0"	2'-3"	5'-6"	2'-3"	6.68	6.7
J15	1	"	10'-6"	2'-6"	5'-6"	2'-6"	7.01	7.0
J16	1	"	11'-0"	2'-9"	5'-6"	2'-9"	7.35	7.4
J17	1	"	12'-0"	3'-3"	5'-6"	3'-3"	8.02	8.0
J18	56	"	12'-6"	3'-6"	5'-6"	3'-6"	8.35	467.6
J19	92	"	5'-9"	Straight			3.84	353.3
J20	4	"	7'-0"	1'-3"	4'-6"	1'-3"	4.68	18.7
J21	2	"	6'-6"	1'-0"	4'-6"	1'-0"	4.34	8.7
J22	4	"	8'-0"	1'-3"	5'-6"	1'-3"	5.34	21.4
J23	2	"	7'-0"	3'-3"			4.68	9.4
J24	2	"	4'-6"	1'-0"	3'-6"	1'-7"	3.01	6.0
J25	6	"	3'-6"	Straight			2.34	18.7
J26	5	"	1'-6"	"			1.00	8.0
						TOTAL		1332#

BY	DATE	CHARACTER REVISIONS
F.S.F.	11-20-40	Reinforcing added to connection block and location changed

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SECTION "B"

MASONRY AND REINFORCING DETAILS

MANHOLE NO. 5

SHEET 106 OF 110 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: _____ ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: APPROVED:

_____ DIVISION ENGINEER, OHIO R. DR. BY U.S.E.D.A.

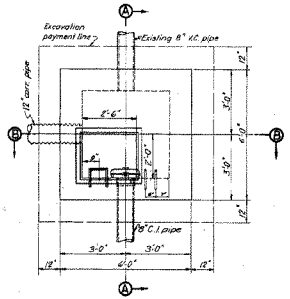
_____ DISTRICT ENGINEER, LOUISVILLE, KY. TR. BY W.B.S.

AS BUILT

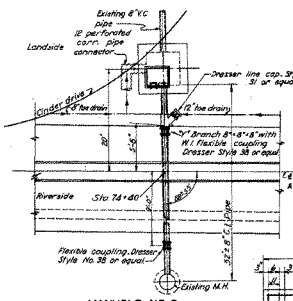
933-12.3/108

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



PLAN



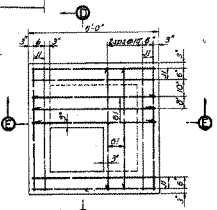
MANHOLE NO. 6
LOCATION PLAN
SCALE: 1/8" = 1'-0"

REINFORCEMENT SCHEDULE

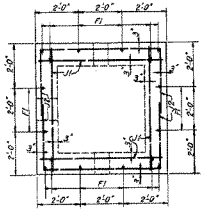
SIZE	D
5" OR LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

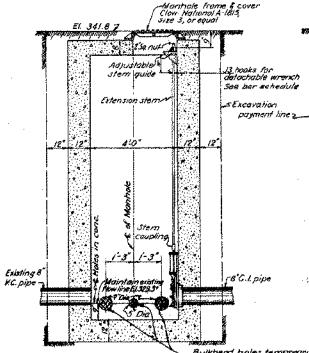
BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	16	3/4" ø	13'-6"	Straight	20.28	324.5
G1	5	5/8" ø	7'-0"	5'-8"	7.30	36.5
J1	86	1/2" ø	5'-8"	Straight	3.79	250.1
J2	24	"	11'-6"	3'-0" 3'-6" 3'-0"	7.68	184.3
J3	2	"	12"	2" 10"	0.67	1.3
					TOTAL	797 #



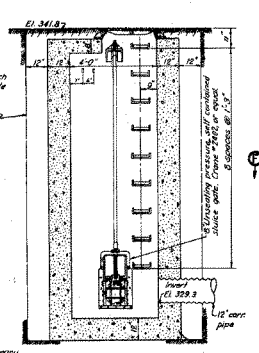
PLAN



SECTION F-F

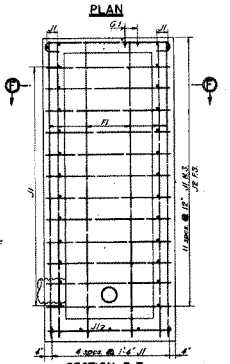


SECTION A-A

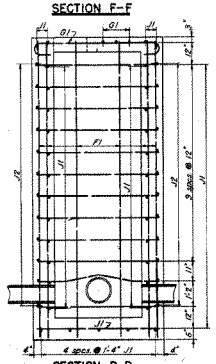


SECTION B-B

MASONRY DETAILS
SCALE: 1/2" = 1'-0"



SECTION E-E



SECTION D-D

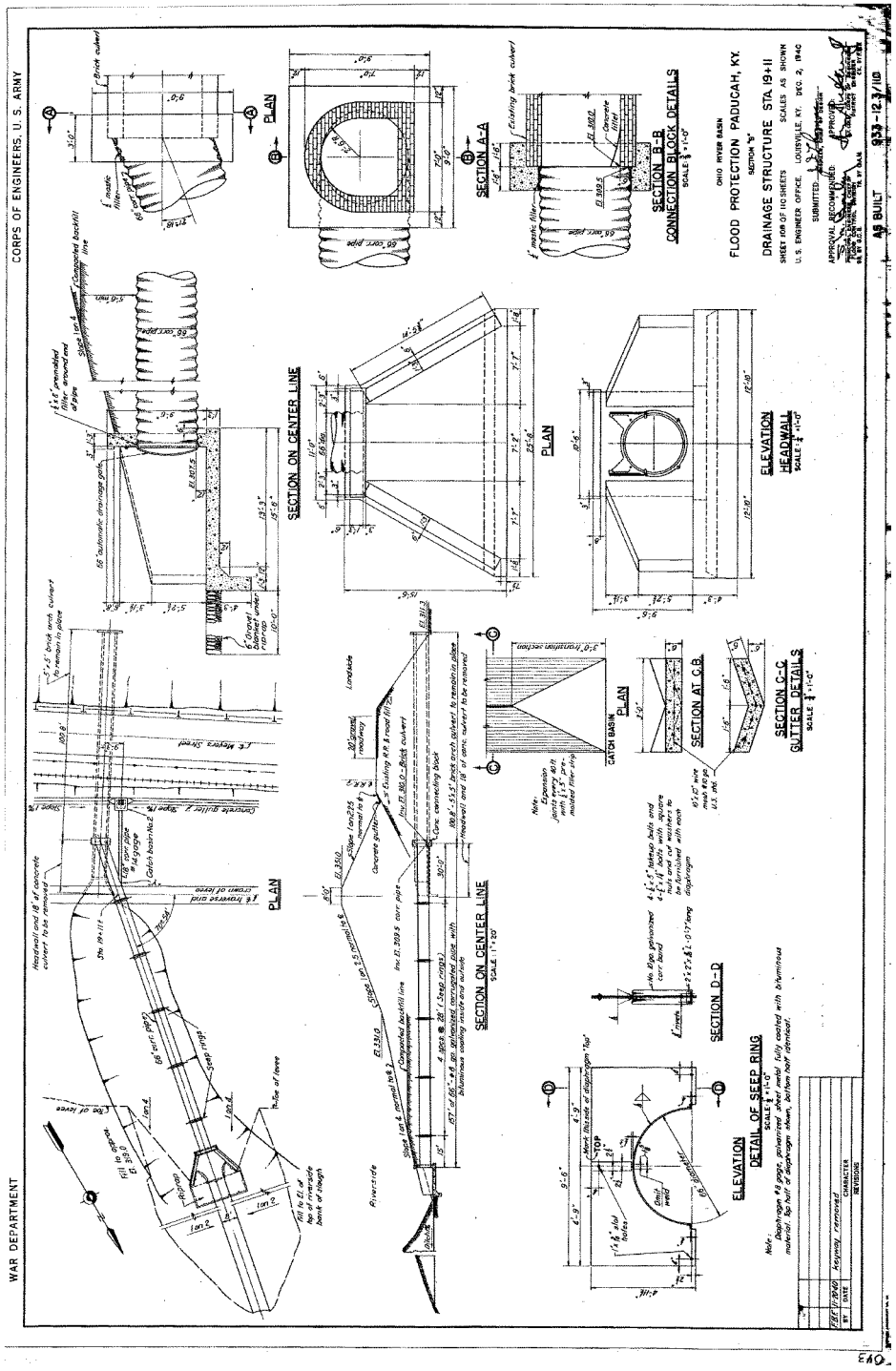
REINFORCING DETAILS
SCALE: 1/2" = 1'-0"

BY	DATE	CHARACTER OF WORKING
J.H.K.	1-31-41	Revised as per Addendum No. 1
K.B.P.	11/2040	Change gate & size of cover

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MANHOLE NO. 6
SHEET 107 OF 110 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
DR. BY A.B.D. TR. BY C.A.M. CH. BY E.M.J.

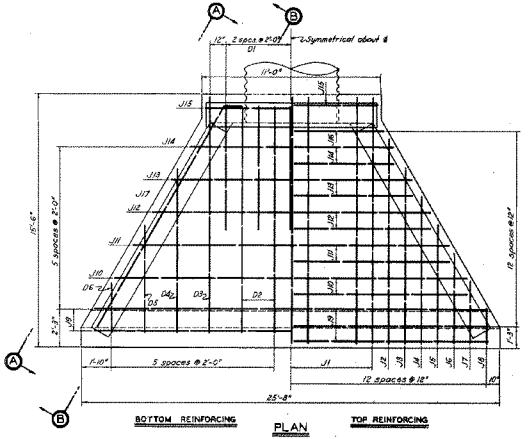
AS BUILT 933-12.3/189

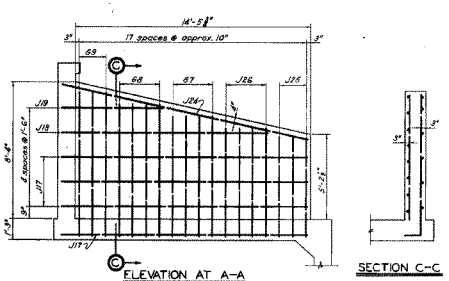
768

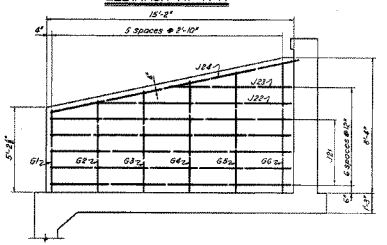

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
DRAINAGE STRUCTURE STA. 19+11
SHEET 108 OF 110 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940
SUBMITTED
APPROVED
AS BUILT
933-12.3/110
PLAN
SECTION ON CENTER LINE
SECTION A-A
SECTION B-B
CONNECTION BLOCK DETAILS
ELEVATION
HEADWALL
CATCH BASIN PLAN
SECTION C-C
GUTTER DETAILS
SECTION AT G.B.
SECTION D-D
ELEVATION
DETAIL OF SEEP RING
Note:
Depth-ogram #8 gage, galvanized sheet metal fully coated with bituminous material. Top half of depth-ogram shown, bottom half identical.
Keyway removed
CHARACTER REVISIONS
DATE
BY

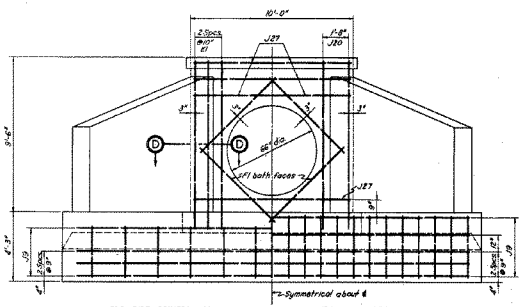
WAR DEPARTMENT

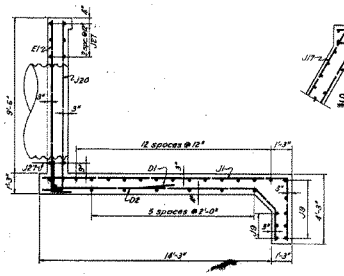
CORPS OF ENGINEERS, U. S. ARMY

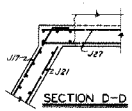












REINFORCEMENT SCHEDULE

SIZE	D
1"	6"
7/8"	7"
3/4" OR LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

BAR	NO REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT EACH	TOTAL WT
D1	5	1" ℄	9'-3"	7'-6" 1'-9"	24.70	123.5
D2	4	"	17'-0"	1'-9" 15'-2" 1'-9" 45 bars @ 1'-10" c-c	45.39	181.6
D3	2	"	16'-6"	15'-0" c-c 1'-6"	44.06	88.1
D4	2	"	12'-6"	6'-11"	33.38	66.8
D5	2	"	9'-0"	5'-6"	24.03	48.1
D6	2	"	5'-3"	1'-6" 1'-6" 31 bars @ 1'-10" c-c	14.02	28.0
E1	6	¾" ℄	11'-6"	10'-3" 1'-3"	23.51	141.1
F1	8	¾" ℄	6'-6"	Straight	9.76	78.1
G1	2	¾" ℄	9'-0"	"	5.02	10.4
G2	2	"	5'-6"	"	5.74	11.5
G3	2	"	6'-3"	"	6.52	13.0
G4	2	"	6'-9"	"	7.04	14.1
G5	2	"	7'-6"	"	7.82	15.6
G6	2	"	8'-0"	"	8.34	16.7
G7	8	"	8'-6"	7'-4" 1'-2"	8.87	71.0
G8	8	"	9'-3"	8'-1" 1'-2"	9.65	77.2
G9	6	"	10'-0"	8'-10" 1'-2"	10.43	62.6
J1	11	¾" ℄	12'-3"	11'-0" 1'-3"	12.52	137.7
J2	2	"	16'-3"	12'-6" 3'-9"	10.85	21.7
J3	2	"	14'-6"	10'-9" 3'-9"	9.69	19.4
J4	2	"	12'-9"	9'-0" 3'-9"	8.52	17.0
J5	2	"	11'-0"	7'-3" 3'-9"	7.35	14.7
J6	2	"	9'-3"	5'-6" 3'-9"	6.18	12.4
J7	2	"	7'-6"	3'-9" 3'-9"	5.01	10.0
J8	2	"	6'-0"	2'-3" 3'-9"	4.01	8.0
J9	11	"	26'-9"	Straight	16.20	178.2
J10	3	"	21'-3"	"	14.58	43.6
J11	3	"	19'-6"	"	13.03	39.1
J12	3	"	17'-3"	"	11.58	34.6
J13	3	"	14'-9"	"	9.85	29.6
J14	3	"	12'-6"	"	8.33	25.1
J15	2	"	10'-6"	"	7.01	14.0
J16	1	"	11'-3"	"	7.51	7.5
J17	8	"	16'-7"	15'-7" 12" ½ dia	11.08	88.6
J18	2	"	13'-9"	12'-9" 12" ½ dia	9.18	18.4
J19	2	"	7'-6"	6'-6" 12" ½ dia	5.01	10.0
J20	4	"	11'-6"	10'-3" 1'-3"	7.68	30.7
J21	10	"	14'-9"	Straight	9.85	98.5
J22	2	"	12'-6"	"	8.33	16.7
J23	2	"	7'-9"	"	5.18	10.4
J24	2	"	17'-6"	11'-6" 3'-0" ½ dia	11.69	46.8
J25	6	"	6'-9"	6'-1" 8"	4.51	27.1
J26	8	"	7'-3"	6'-7" 8"	4.84	38.7
J27	8	"	8'-6"	Straight	6.35	50.8
				TOTAL		2097.4

Note: For masonry details see sheet 110

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 19+11

SHEET 109 OF 110 SHEETS SCALE: ¼"=1'-0"

U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: _____ ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: _____ CHIEF, FLOOD CONTROL DIVISION, MS. RY. & C.S.

APPROVED: _____ LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER, CINCINNATI, OHIO

BY	DATE	CHARACTER REVISIONS
F.B.E.	11-20-40	Keyway removed

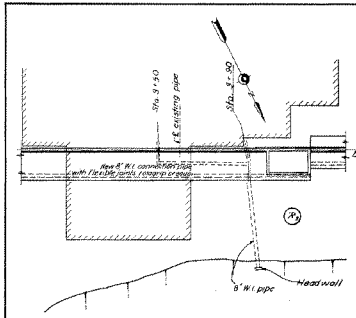
AS BUILT

933-12.3/111

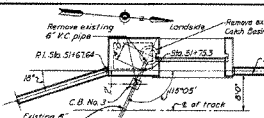
770

WAR DEPARTMENT

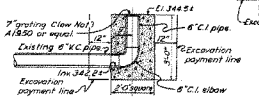
CORPS OF ENGINEERS, U. S. ARMY



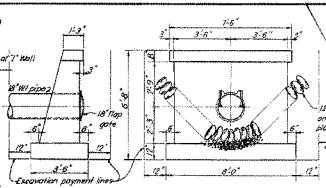
LOCATION PLAN
STA. 3+90±
SCALE: 1" = 20'



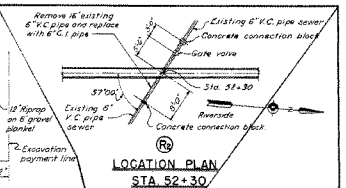
LOCATION PLAN
STA. 5I+75.3
SCALE: 1" = 10'



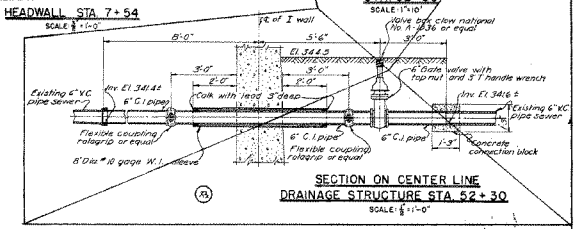
DETAIL OF
CATCH BASIN NO. 3 STA. 5I+75.3
SCALE: ½" = 1'-0"



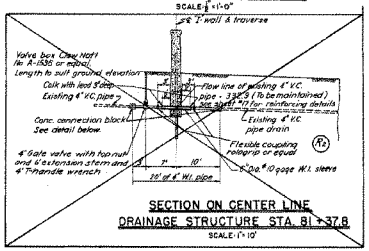
HEADWALL STA. 7+54
SCALE: ½" = 1'-0"



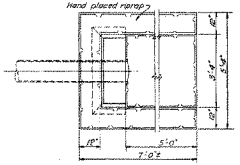
LOCATION PLAN
STA. 52+30
SCALE: 1" = 10'

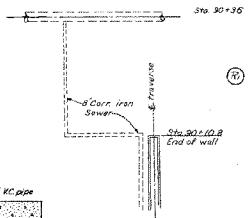


SECTION ON CENTER LINE
DRAINAGE STRUCTURE STA. 52+30
SCALE: ½" = 1'-0"



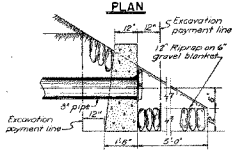
SECTION ON CENTER LINE
DRAINAGE STRUCTURE STA. 81+37.8
SCALE: 1" = 10'



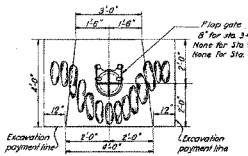


P.I.		Field	Drainage struct. loc. change
P.2		Field	Pipes deleted
P.3		Field	Relocation of 8" sewer
MK.	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

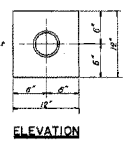


SECTION ON CENTER LINE

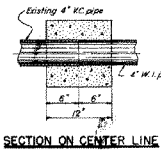


ELEVATION

HEADWALL DETAILS
SCALE: ½" = 1'-0"



ELEVATION



SECTION ON CENTER LINE
CONNECTION BLOCK
SCALE: 1½" = 1'-0"

J.N.K.	1-31-41	Revised as per Addendum No. 1
T.B.E.	11-20-40	Headwall details Sta. 7+54 added
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

SEWER OUTLET & DRAINAGE STRUCTURE DETAILS

SHEET NO. OF NO. SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 2, 1940

SUBMITTED: [signature] CHIEF OF DIVISION

APPROVAL RECOMMENDED: [signature] CHIEF ENGINEERING DIVISION

APPROVED: [signature] DISTRICT ENGINEER

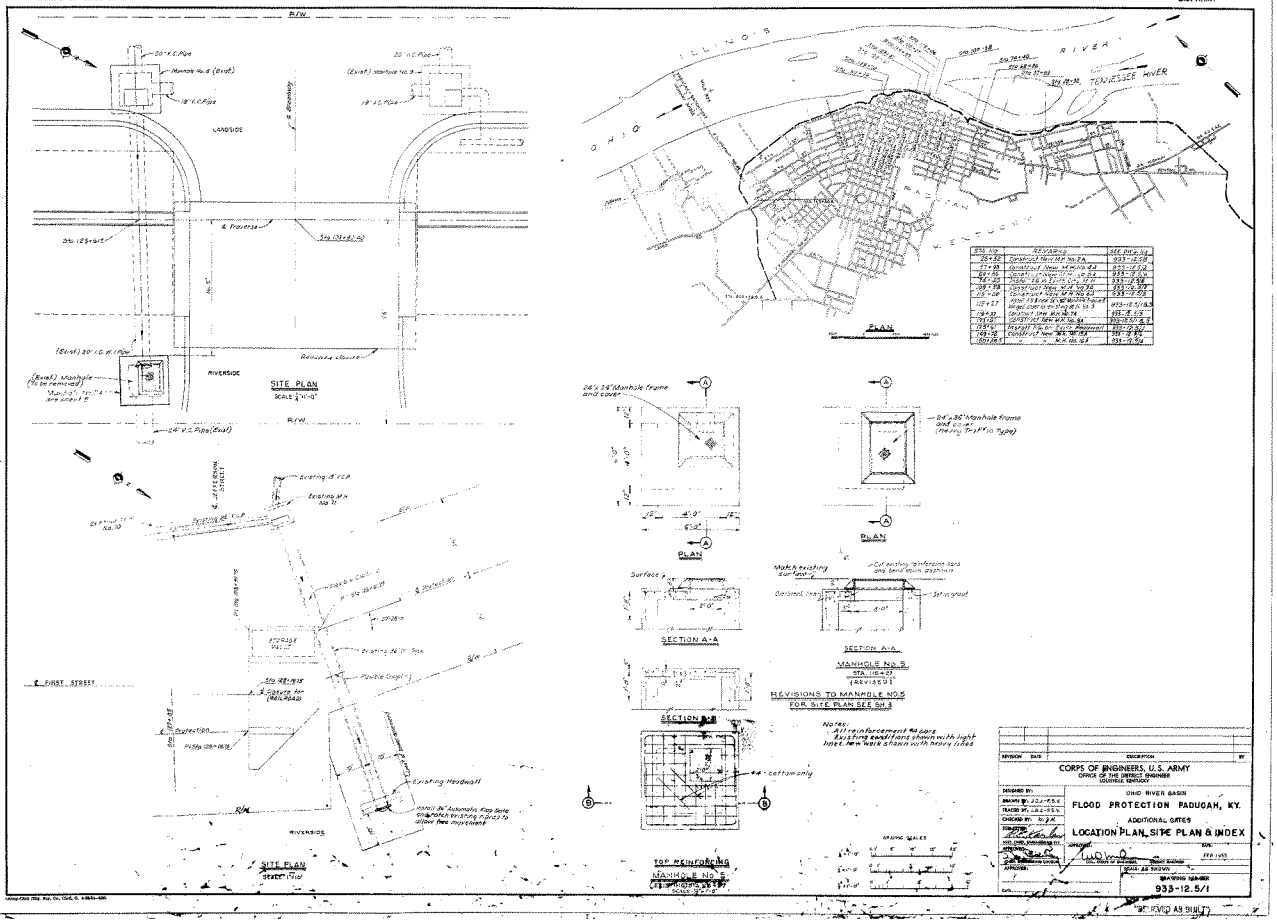
DR. BY O.H.S.-J.D.C. TR. BY C.A.M. CK. BY P.B.S.

AS BUILT 933-12.3/112

771

CORPS OF ENGINEERS

U.S. ARMY



STA. NO.	REVISIONS	SEE DWG. NO.
20+52	Construct New MH No.7A	933-12.58
77+25	Construct New MH No.8A	933-12.58
84+36	Construct New MH No.8A	933-12.58
96+25	Place Fill in Front of MH	933-12.58
109+78	Construct New MH No.9A	933-12.59
115+08	Construct New MH No.9A	933-12.59
115+27	Move 15.8 cfs of 18" Reinforced Concrete Pipe Storm Drain from MH No.9 to MH No.8	933-12.1/1.3
119+37	Construct New MH No.7A	933-12.58
119+37	Construct New MH No.8A	933-12.58
119+37	Asphalt Fill in Front of MH	933-12.59
119+78	Construct New MH No.9A	933-12.59
120+08	Construct New MH No.9A	933-12.59

Notes:
All reinforcement #6 bars.
Existing conditions shown with light lines. New work shown with heavy lines.

CORPS OF ENGINEERS, U.S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOUISVILLE, KENTUCKY

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ADDITIONAL SITES

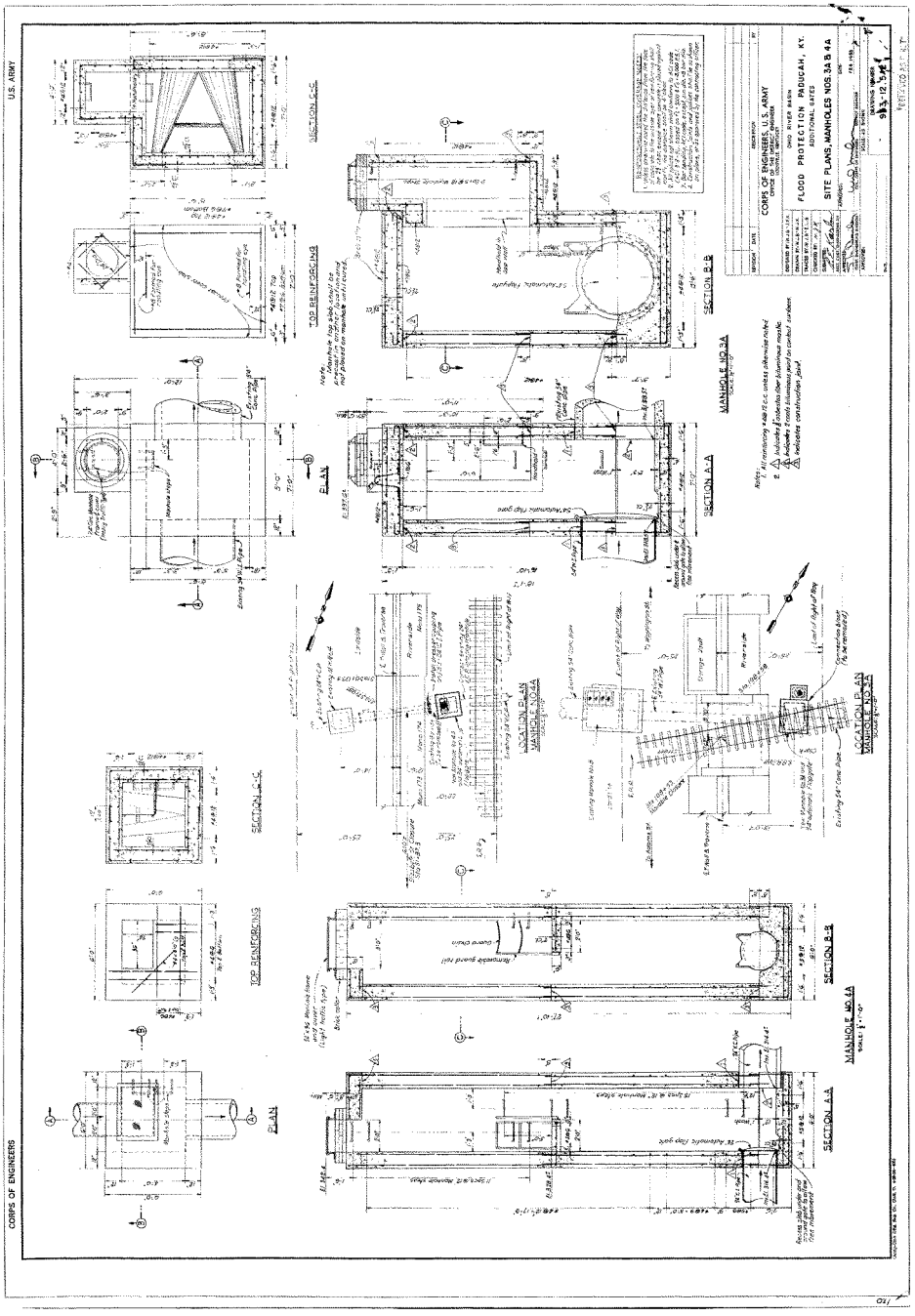
LOCATION PLAN, SITE PLAN & INDEX

DESIGNED BY:
DRAWN BY: J.D.J.-R.S.C.
TRACED BY: J.D.J.-R.S.C.
CHECKED BY: R.J.K.
SUBMITTED:
RECOMMENDED:
APPROVED:
APPROVED:
DATE:

SCALE AS SHOWN
DATE: FEB. 1958
DRAWING NUMBER
933-12.5/1

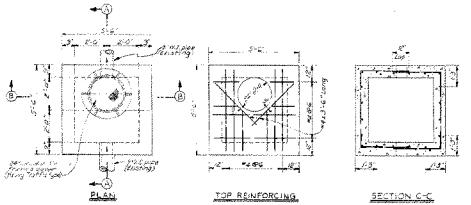
"AS BUILT"

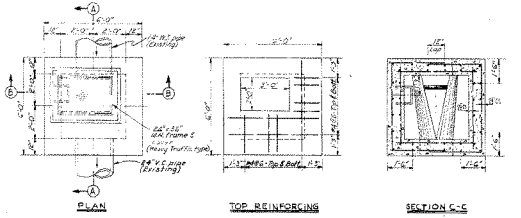
772

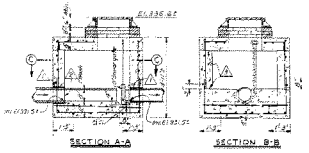

U.S. ARMY
CORPS OF ENGINEERS
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER MAIN
PADUCAH, KENTUCKY
FLOOD PROTECTION
PADUCAH, KY.
SITE PLANS, MANHOLES NOS. 3A & 4A
SECTION C-C
TOP REINFORCING
PLAN
SECTION B-B
SECTION A-A
MANHOLE NO 3A
MANHOLE NO 4A
Notes:
1. All reinforcing steel is c.c. unless otherwise noted.
2. Indicates Existing Underground Utility
Indicates Existing Above Ground Utility
Indicates construction joint

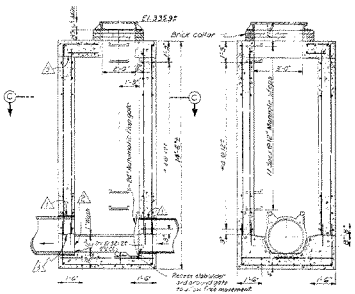
CORPS OF ENGINEERS

U.S. ARMY

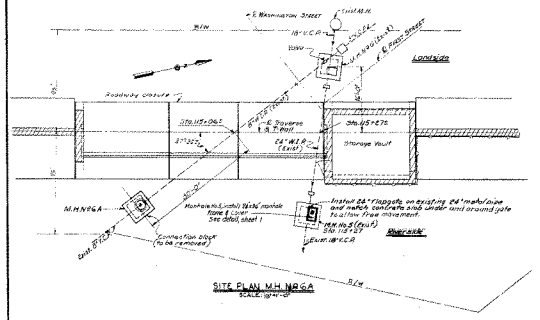


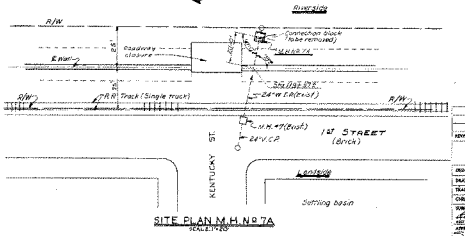






Notes:
1. For A, B, & C see sheet 2
2. For reinforcement steel curtage note, see sheet 2
3. All reinforcing #6 @12" c.c. unless otherwise noted.





GRAPHIC SCALES

1"=10'	0	5'	10'	15'	20'	
1"=5'	0	2½'	5'	7½'	10'	
1"=1'	0	5	10	15	20	25 FEET

REVISION	DATE	DESCRIPTION	BY

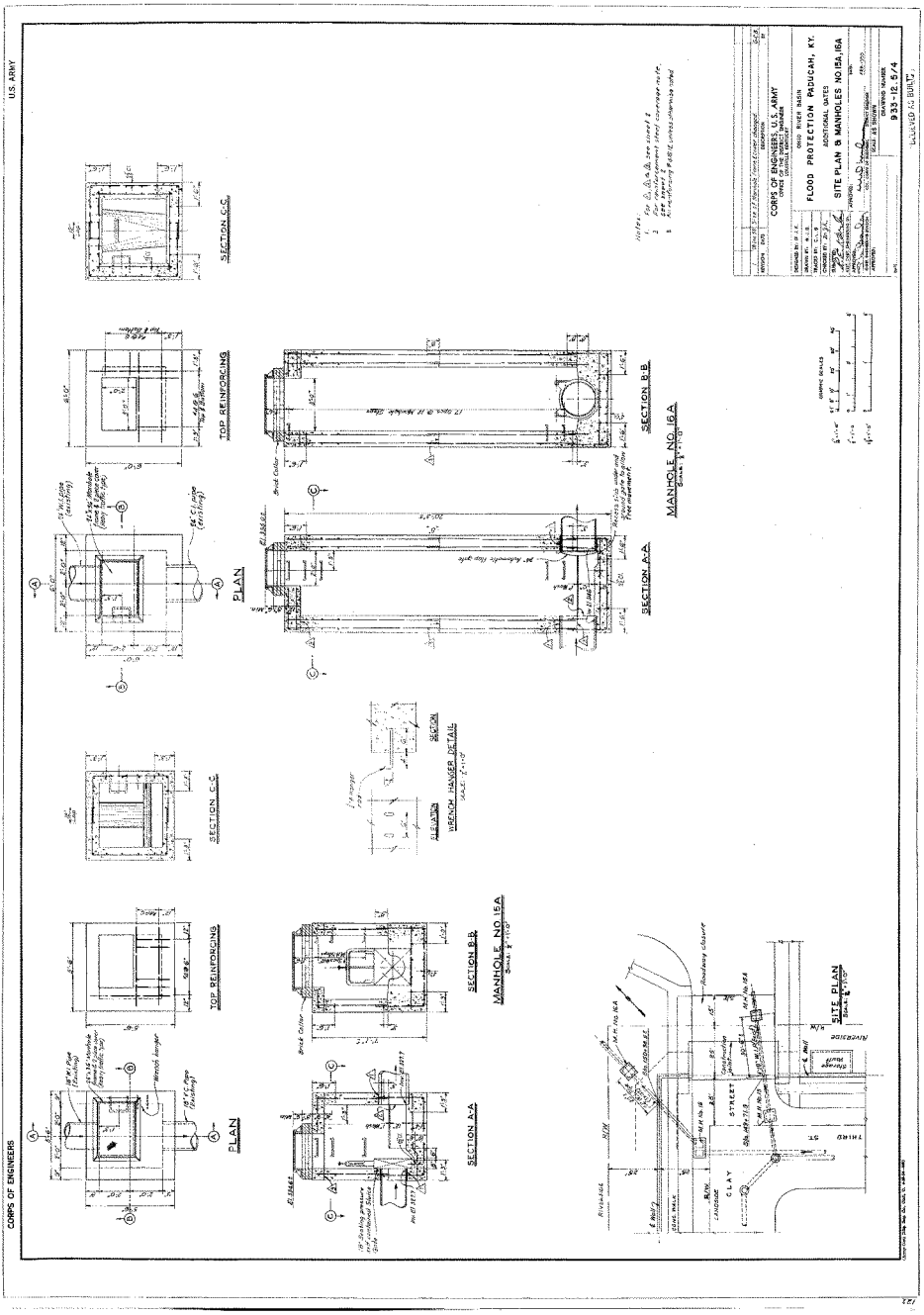
CORPS OF ENGINEERS, U.S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOUISVILLE, KENTUCKY

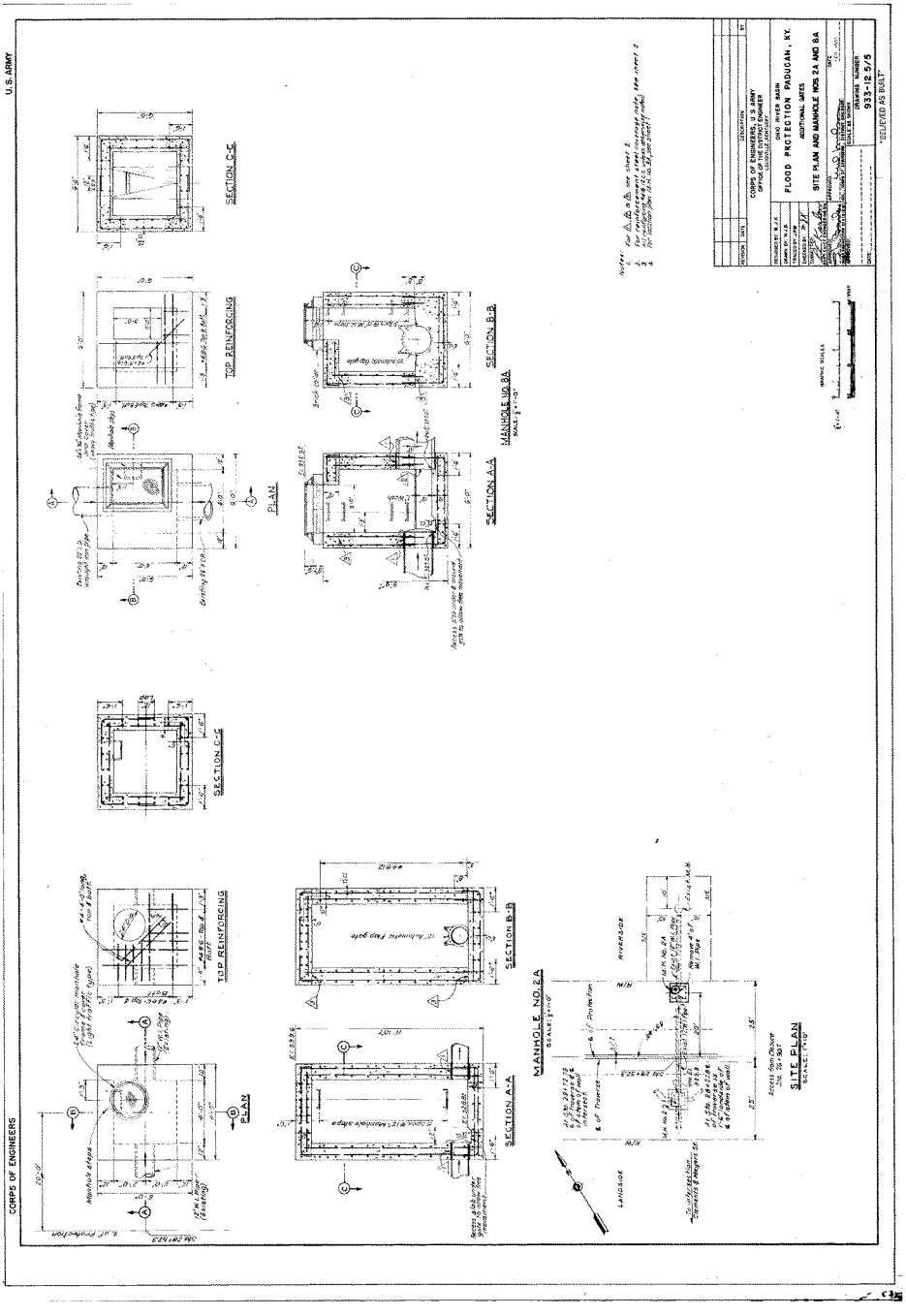
DESIGNED BY: M.J.K.
DRAWN BY: W.J.S.
TRACED BY: E.L.S.
CHECKED BY: J.K.P.
SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
APPROVED:
CHIEF, ENGINEERING DIVISION

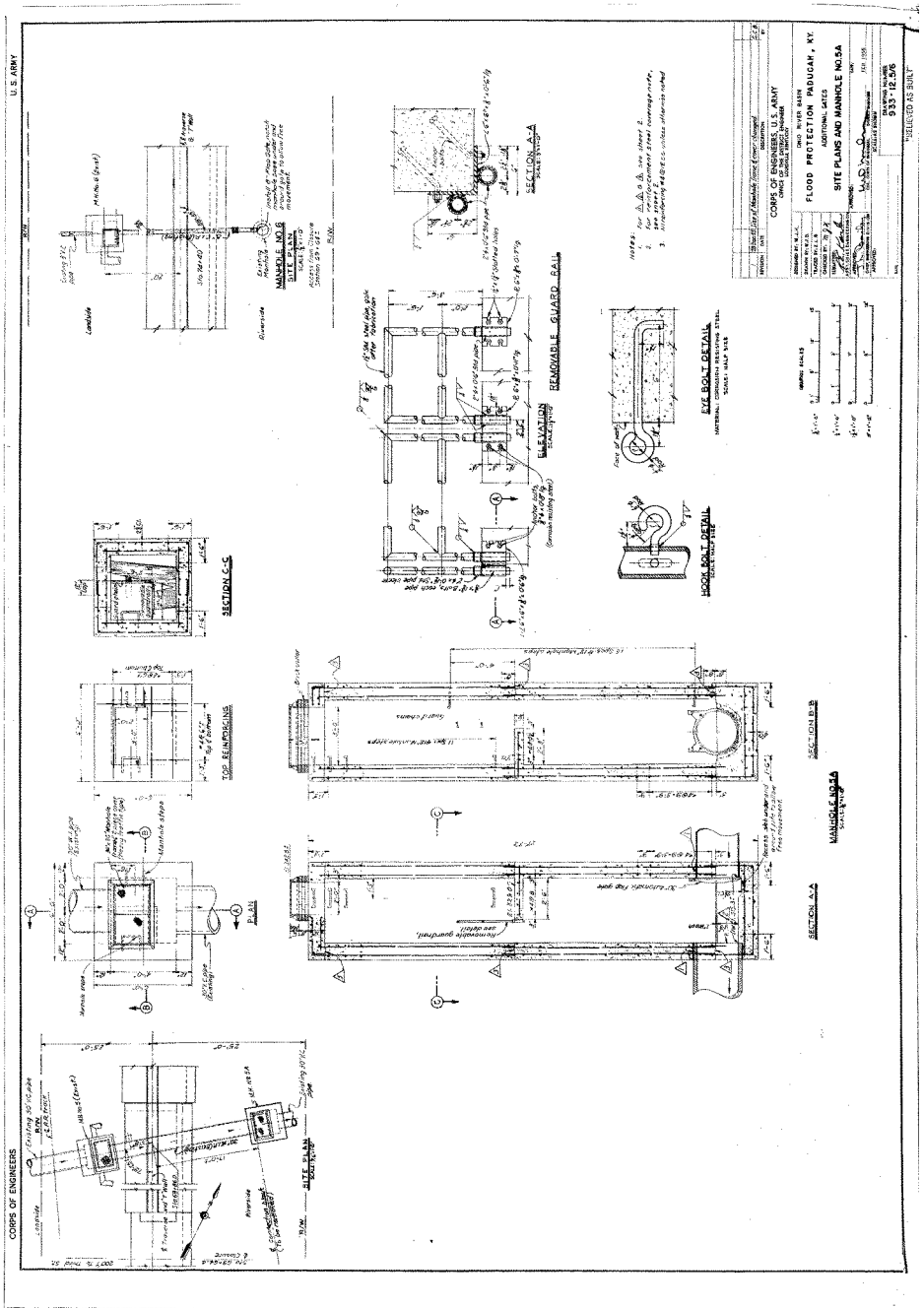
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ADDITIONAL GATES
SITE PLANS AND MANHOLES NOS. 6A, 7A

DATE: FEB 1953
SCALE AS SHOWN
DRAWING NUMBER
933-12.5/3

"REVISED AS BUILT"


CORPS OF ENGINEERS
U.S. ARMY
PLAN
TOP REINFORCING
SECTION C-C
SECTION A-A
SECTION B-B
MANHOLE NO. 15A
SECTION C-C
TOP REINFORCING
PLAN
SECTION B-B
SECTION A-A
MANHOLE NO. 16A
SECTION
ELEVATION
WEIRCH HANGER DETAIL
SITE PLAN
CLAY
STREET
THIRD ST
RIVERSIDE
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SITE PLAN & MANHOLES NO.15A, 16A
933-12, 5/4
ISSUED FOR BIDS


U.S. ARMY
CORPS OF ENGINEERS
MANHOLE NO. 2A
SCALE 1"=10'
SITE PLAN
SCALE 1"=10'
SECTION A-A
SECTION B-B
SECTION C-C
PLAN
TOP REINFORCING
MANHOLE NO. 8A
SCALE 1"=10'
SECTION A-A
SECTION B-B
SECTION C-C
PLAN
TOP REINFORCING
FLOOD PROTECTION PADUCAH, KY.
ADDITIONAL GATES
SITE PLAN AND MANHOLE NOS. 2A AND 8A
933-12.5/5
RELIEVED AS BUILT


U.S. ARMY
CORPS OF ENGINEERS
CORPS OF ENGINEERS U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SITE PLANS AND MANHOLE NO.5A
ADDITIONAL GATES
DRAWING NUMBER
933-12.5/6
"DELETED AS BUILT"
MANHOLE NO.5A
SECTION C-C
TOP REINFORCING
PLAN
SECTION A-A
SECTION B-B
ELEVATION
REMOVABLE GUARD RAIL
EYE BOLT DETAIL
HOOK BOLT DETAIL
SECTION A-A
MANHOLE NO.6
SITE PLAN
SECTION A-A

REINFORCEMENT SCHEDULE

SIZE	D
1/2"	10"
3/4"	9"
1"	8"
1 1/4"	7"
1 1/2" OR 4 LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

SHEET 933-12.3/16 MONOLITH NO. 165

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F8	14	3/4" ø	19'-9"	Straight	29.66	415.2
G42	10	3/4" ø	5'-9"	5'-1"	6.00	60.0
G45	18	"	11'-2"	10'-6"	11.65	209.7
J9	20	3/4" ø	11'-9"	5'-10" 4'-10" 10'-6"	7.85	157.0
J10	12	"	11'-10"	10'-6"	7.90	94.8
J19	11	"	7'-3"	Straight	4.84	53.2
J27	10	"	4'-0"	"	2.67	26.7
J29	20	"	19'-9"	"	13.19	263.8
J31	9	"	9'-9"	9'-1"	6.51	58.6
				TOTAL		1339*

SHEET 933-12.3/20 MONOLITHS NOS.1,4 &5

F3	8	3/4" ø	12'-8"	12'-0"	19.03	152.2
F4	8	"	8'-4"	7'-8"	12.52	100.2
F5	14	"	6'-4"	5'-8"	9.51	133.1
F8	20	"	19'-9"	Straight	29.66	593.2
F11	16	"	15'-10"	14'-7"	23.78	380.5
F12	14	"	10'-6"	9'-3"	15.77	220.8
F66	7	"	14'-6"	12'-0"	21.78	152.5
G2	22	3/4" ø	19'-9"	Straight	20.60	453.2
J1	20	3/4" ø	15'-3"	14'-7"	10.19	203.8
J3	20	"	16'-6"	15'-10"	11.02	220.4
				TOTAL 1		2810*
				TOTAL 3		2890*

MONOLITHS NOS. 6,7,8,9 &12

F3	9	3/4" ø	12'8"	12'-0"	19.03	171.3
F4	7	"	8'-4"	7'-8"	12.52	87.6
F5	15	"	6'-4"	5'-8"	9.51	142.7
F11	16	"	15'-10"	14'-7"	23.78	380.5
F12	15	"	10'-6"	9'-3"	15.77	236.6
F66	7	"	14'-6"	12'-0"	21.78	152.5
F74	20	"	20'-6"	Straight	30.79	615.8
G25	22	3/4" ø	20'-6"	"	21.38	470.4
J1	21	3/4" ø	15'-3"	14'-7"	10.19	214.0
J3	21	"	16'-6"	15'-10"	11.02	231.4
				TOTAL 1		2703*
				TOTAL 5		19514*

SHEET 933-12.3/21 MONOLITHS NOS. 2 &3

F3	8	3/4" ø	12'-8"	12'-0"	19.03	152.2
F4	8	"	8'-4"	7'-8"	12.52	100.2
F5	14	"	6'-4"	5'-8"	9.51	133.1
F11	16	"	15'-10"	14'-7"	23.78	380.5
F12	15	"	10'-6"	9'-3"	15.77	236.6

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F66	7	3/4" ø	14'-6"	12'-0"	21.78	152.5
F68	4	"	19'-6"	Straight	29.29	117.2
F70	8	"	21'-0"	"	31.54	252.3
F71	2	"	20'-9"	"	31.17	62.3
F72	2	"	20'-3"	"	30.42	60.8
F73	2	"	20'-0"	"	30.04	60.1
F74	2	"	20'-6"	"	30.79	61.6
G2	22	3/4" ø	19'-9"	"	20.60	453.2
J1	20	3/4" ø	15'-3"	14'-7"	10.19	203.8
J3	20	"	16'-6"	15'-10"	11.02	220.4
				TOTAL 1		2647*
				TOTAL 2		5294*

SHEET 933-12.3/22 MONOLITHS NOS.10 & 11

F3	9	3/4" ø	12'-8"	12'-0"	19.03	171.3
F4	8	"	8'-4"	7'-8"	12.52	100.2
F5	15	"	6'-4"	5'-8"	9.51	142.7
F11	17	"	15'-10"	14'-7"	23.78	404.3
F12	15	"	10'-6"	9'-3"	15.77	236.6
F66	7	"	14'-6"	12'-0"	21.78	152.5
F10	14	"	21'-0"	Straight	31.54	441.6
F71	6	"	20'-9"	"	31.17	187.0
G26	22	3/4" ø	20'-9"	"	21.64	476.1
J1	21	3/4" ø	15'-3"	14'-7"	10.19	214.0
J3	22	"	16'-6"	15'-10"	11.02	242.4
				TOTAL 1		2769*
				TOTAL 2		5537*

SHEET 933-12.3/23 MONOLITH NO.13

F3	9	3/4" ø	12'-8	12'-0"	19.03	171.3
F4	8	"	8'-4"	7'-8"	12.52	100.2
F5	16	"	6'-4"	5'-8"	9.51	152.2
F11	17	"	15'-10"	14'-7"	23.78	404.3
F12	16	"	10'-6"	9'-3"	15.77	252.3
F66	8	"	14'-6"	12'-0"	21.78	174.2
F67	4	"	21'-3"	Straight	32.29	129.2
F68	18	"	21'-3"	"	31.92	510.7
G24	22	3/4" ø	21'-6"	"	22.42	493.2
J1	22	3/4" ø	15'-3"	14'-7"	10.19	224.2
J3	22	"	16'-6"	15'-10"	11.02	242.4
				TOTAL		2854*

SHEET 933-12.3/24 MONOLITH NO.14

D1	6	1"ø	6'-3"	Straight	16.69	100.1
E1	4	3/4" ø	12'-10"	12'-0"	26.75	106.9
E2	2	"	8'-6"	7'-8"	17.37	34.7
E3	6	"	6'-6"	5'-8"	13.79	79.7
E4	6	"	15'-10"	14'-7"	32.36	194.2
E5	6	"	10'-6"	9'-3"	21.46	128.8
F2	16	3/4" ø	19'-3"	Straight	28.91	462.6
F3	6	"	12'-8"	12'-0"	19.03	114.2

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F4	4	3/4" ø	8'-4"	7'-8"	12.52	50.1
F5	6	"	6'-4"	5'-8"	9.51	57.1
F6	7	"	8'-7"	5'-8" 2'-11" 90°	12.88	90.2
F7	6	"	14'-0"	10'-8" 3'-4"	21.03	126.2
F8	3	"	19'-9"	Straight	29.66	89.0
F11	12	"	15'-10"	14'-7"	23.78	285.4
F12	11	"	10'-6"	9'-3"	15.77	173.5
G1	36	3/4" ø	8'-2"	7'-0"	8.52	306.7
G2	4	"	19'-9"	Straight	20.60	82.4
J1	12	3/4" ø	15'-3"	14'-7"	10.19	122.3
J2	8	"	14'-8"	14'-0"	9.80	78.4
J3	20	"	16'-6"	15'-10"	11.02	220.4
				TOTAL		2301*

SHEET 933-12.3/25 MONOLITHS NOS.15 & 18

F3	8	3/4" ø	12'-8"	12'-0"	19.03	152.2
F4	8	"	8'-4"	7'-8"	12.52	100.2
F5	14	"	6'-4"	5'-8"	9.51	133.1
F7	7	"	14'-0"	10'-8" 3'-4"	21.03	147.2
F8	19	"	19'-9"	Straight	29.66	563.5
F11	16	"	15'-10"	14'-7"	23.78	380.5
F12	14	"	10'-6"	9'-3"	15.77	220.8
G2	22	3/4" ø	19'-9"	Straight	20.60	453.2
J2	20	3/4" ø	14'-8"	14'-0"	9.80	196.0
J3	20	"	16'-6"	15'-10"	11.02	220.4
				TOTAL 1		2567*
				TOTAL 2		5134*

MONOLITH NO. 17

F3	8	3/4" ø	12'-8"	12'-0"	19.03	152.2
F4	9	"	8'-4"	7'-8"	12.52	100.2
F5	14	"	6'-4"	5'-8"	9.51	133.1
F7	7	"	14'-0"	10'-8" 3'-4"	21.03	147.2
F8	19	"	19'-9"	Straight	29.66	563.5
F11	16	"	15'-10"	14'-7"	23.78	380.5
F12	14	"	10'-6"	9'-3"	15.77	220.8
G2	22	3/4" ø	19'-9"	Straight	20.60	453.2
J2	20	3/4" ø	14'-8"	14'-0"	9.80	196.0
J3	20	"	16'-6"	15'-10"	11.02	220.4
J5	6	"	3'-4"	Straight	2.29	17.8
				TOTAL		2565*

MONOLITH NO. 19

F3	10	3/4" ø	12'-8"	12'-0"	19.03	190.3
F4	9	"	8'-4"	7'-8"	12.52	112.7
F5	16	"	6'-4"	5'-8"	9.51	152.2
F7	8	"	14'-0"	10'-8" 3'-4"	21.03	168.2
F11	15	"	15'-10"	14'-7"	23.78	356.7
F12	16	"	10'-6"	9'-3"	15.77	252.3
F18	18	"	23'-3"	Straight	34.92	628.6
F14	1	"	23'-3"	18'-5" 4'-10"	34.92	34.9

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F15	2	3/4" ø	16'-0"	14'-9"	24.09	48.1
F16	2	"	16'-2"	14'-11"	24.28	48.6
G3	11	3/4" ø	23'-3"	Straight	34.25	376.8
G4	4	"	23'-3"	18'-5" 4'-10"	34.25	97.0
G5	4	"	23'-3"	18'-5" 4'-10"	34.25	97.0
G6	3	"	23'-3"	18'-5" 4'-10"	34.25	72.8
J1	2	3/4" ø	15'-3"	14'-7"	10.19	20.4
J2	19	"	14'-8"	14'-0"	9.80	186.2
J3	24	"	16'-6"	15'-10"	11.02	264.5
J4	3	"	13'-6"	12'-10"	10.35	31.1
				TOTAL		3026*

SHEET 933-12.3/26 MONOLITH NO. 16

C1	8	1" ø	6'-3"	Straight	21.25	170.0
E1	6	3/4" ø	12'-10"	12'-0"	26.23	157.4
E3	4	"	6'-6"	5'-8"	13.29	53.2
E4	6	"	15'-10"	14'-7"	32.36	194.2
E5	4	"	10'-6"	9'-3"	21.46	85.8
F3	5	3/4" ø	12'-8"	12'-0"	19.03	95.2
F4	4	"	8'-4"	7'-8"	12.52	50.1
F5	9	"	6'-4"	5'-8"	9.51	85.6
F7	7	"	14'-0"	10'-8" 3'-4"	21.03	147.2
F8	19	"	19'-9"	Straight	29.66	563.5
F11	11	"	15'-10"	14'-7"	23.78	261.6
F12	11	"	10'-6"	9'-3"	15.77	173.5
F17	4	"	6'-10"	5'-8" 1'-2" 90°	10.26	41.0
G2	8	3/4" ø	19'-9"	Straight	20.60	164.8
G7	14	"	15'-0"	14'-0"	15.85	219.1
G8	14	"	3'-3"	2'-5"	3.56	49.8
J2	20	3/4" ø	14'-8"	14'-0"	9.80	196.0
J3	20	"	16'-6"	15'-10"	11.02	220.4
				TOTAL		2939*

SHEET 933-12.3/27 MONOLITH NO. 101

F4	11	3/4" ø	8'-4"	7'-8"	12.52	137.7
F5	18	"	6'-4"	5'-8"	9.51	171.2
F9	16	"	25'-6"	Straight	38.30	612.8
F10	19	"	12'-2"	11'-6"	18.27	347.1

* F5 in Top Reinforcing Plan should be F15, Sheet 933-12.3/25

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "a"

REINFORCEMENT SCHEDULE

SHEET 1 OF 13 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: [signature] DISTRICT ENGINEER

APPROVAL RECOMMENDED: [signature] CHIEF, FLOOD CONTROL BRANCH, DIV. ENGR. DIV. NO. 91 P.B.

APPROVED: [signature] COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER, OHIO R.V. P.B.E.

"BELIEVED AS BUILT" 933-14.1/1

778

REINFORCEMENT SCHEDULE

SIZE	D
1"	8"
$\frac{7}{8}$"	7"
$\frac{1}{2}$" OR $\frac{3}{4}$" & LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
MONOLITH NO. 101 (CONT'D.)						
F20	20	$\frac{3}{4}$"ϕ	17'-2"	16'-6"	25.78	515.6
F44	13	"	14'-2"	13'-6"	21.28	404.3
F85	2	"	23'-9"	Straight	35.67	71.3
F84	8	"	6'-0"	0.4" 5'-3"	9.01	72.1
G31	24	$\frac{3}{4}$"ϕ	25'-6"	Straight	26.60	638.4
J8	26	$\frac{3}{4}$"ϕ	19'-2"	18'-6"	12.80	332.8
J11	26	"	14'-7"	13'-11"	9.74	253.2
				TOTAL		3557 #
SHEET 933-12.3/28 MONOLITHS NOS.102,103& 104						
F4	7	$\frac{3}{4}$"ϕ	8'-4"	7'-8"	12.52	87.6
F5	14	"	6'-4"	5'-8"	9.51	133.1
F8	18	"	19'-9"	Straight	29.66	533.9
F10	15	"	17'-2"	16'-6"	25.78	386.7
F44	15	"	14'-2"	13'-6"	21.28	319.2
F61	14	"	12'-2"	11'-6"	18.27	255.8
G2	24	$\frac{3}{4}$"ϕ	19'-9"	Straight	29.60	494.4
J8	20	$\frac{3}{4}$"ϕ	19'-2"	18'-6"	12.80	256.0
J11	20	"	14'-7"	13'-11"	9.74	194.8
				TOTAL 1		3662 #
				TOTAL 3		1985 #
MONOLITH NO. 105						
D1	16	1"ϕ	6'-3"	Straight	16.69	267.0
E2	6	$\frac{3}{4}$"ϕ	8'-6"	7'-8"	17.37	104.2
E11	9	"	14'-3"	13'-5"	29.13	262.2
F4	1	$\frac{3}{4}$"ϕ	8'-4"	7'-8"	12.52	12.5
F5	3	"	6'-4"	5'-8"	9.51	28.5
F8	18	"	19'-9"	Straight	29.66	533.9
F20	15	"	17'-2"	16'-6"	25.78	386.7
F44	9	"	14'-2"	13'-6"	21.28	191.5
F61	14	"	12'-2"	11'-6"	18.27	255.8
F82	12	"	15'-7"	3.90" 14'-3.90"	23.41	280.9
G2	10	$\frac{3}{4}$"ϕ	19'-9"	Straight	29.60	296.0
G13	8	"	5'-4"	4'-7"	5.56	44.5
G20	6	"	5'-6"	4'-7"	5.74	34.4
G21	8	"	8'-6"	7'-9"	8.87	71.0
G30	6	"	8'-8"	7'-9"	9.04	54.2
J8	20	$\frac{3}{4}$"ϕ	19'-2"	18'-6"	12.80	256.0
J11	20	"	14'-7"	13'-11"	9.74	194.8
				TOTAL		3184 #
SHEET 933-12.3/29 MONOLITH NO. 106						
F4	7	$\frac{3}{4}$"ϕ	8'-4"	7'-8"	12.52	87.6
F5	14	"	6'-4"	5'-8"	9.51	133.1

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F8	18	$\frac{3}{4}$"ϕ	19'-9"	Straight	29.66	533.9
F20	18	"	17'-2"	16'-6"	25.78	472.5
F44	18	"	14'-2"	13'-6"	21.28	340.5
F61	14	"	12'-2"	11'-6"	18.27	255.8
F85	4	"	9'-3"	Straight	13.89	55.6
G2	24	$\frac{3}{4}$"ϕ	19'-9"	"	29.60	494.4
J8	20	$\frac{3}{4}$"ϕ	19'-2"	18'-6"	12.80	256.0
J11	28	"	14'-7"	13'-11"	9.74	272.7
				TOTAL		2642 #
SHEET 933-12.3/30 MONOLITH NO. 286						
D2	16	1"ϕ	17'-3"	16'-6"	46.50	744.0
D14	14	"	15'-2"	14'-3"	40.50	567.0
F4	11	$\frac{3}{4}$"ϕ	8'-4"	7'-8"	12.52	137.7
F5	22	"	6'-4"	5'-8"	9.51	209.2
F44	20	"	14'-2"	13'-6"	21.28	425.6
F85	18	"	22'-6"	Straight	33.80	608.4
F46	9	"	5'-9"	1.9" 5'-7.9"	8.64	77.8
G8	24	$\frac{3}{4}$"ϕ	22'-6"	Straight	33.47	583.3
J8	23	$\frac{3}{4}$"ϕ	19'-2"	18'-6"	12.80	294.4
J11	23	"	14'-7"	13'-11"	9.74	224.0
				TOTAL		3851 #
MONOLITHS NOS. 287, 288 & 289						
D2	16	1"ϕ	17'-5"	16'-6"	46.50	744.0
D14	14	"	15'-2"	14'-3"	40.50	567.0
F4	11	$\frac{3}{4}$"ϕ	8'-4"	7'-8"	12.52	137.7
F5	22	"	6'-4"	5'-8"	9.51	209.2
F44	20	"	14'-2"	13'-6"	21.28	425.6
F85	18	"	22'-6"	Straight	33.80	608.4
G18	24	$\frac{3}{4}$"ϕ	22'-6"	"	33.47	583.3
J8	23	$\frac{3}{4}$"ϕ	19'-2"	18'-6"	12.80	294.4
J11	23	"	14'-7"	13'-11"	9.74	224.0
				TOTAL 1		3774 #
				TOTAL 3		11,321 #
SHEET 933-12.3/31 MONOLITH NO. 290						
D2	18	1"ϕ	17'-5"	16'-6"	46.50	837.0
D14	17	"	15'-2"	14'-3"	40.50	688.5
F4	13	$\frac{3}{4}$"ϕ	8'-4"	7'-8"	12.52	162.8
F5	25	"	6'-4"	5'-8"	9.51	237.8
F44	23	"	14'-2"	13'-6"	21.28	489.4
F64	8	"	6'-0"	1.4" 5'-7.4"	9.01	72.1
F85	18	"	26'-0"	Straight	39.05	702.9
G48	24	$\frac{3}{4}$"ϕ	26'-0"	"	27.12	650.9
J8	26	$\frac{3}{4}$"ϕ	19'-2"	18'-6"	12.80	332.8
J11	26	"	14'-7"	13'-11"	9.74	253.2
				TOTAL		4427 #
SHEET 933-12.3/33 MONOLITH NO. 157						
F8	4	$\frac{3}{4}$"ϕ	25'-6"	Straight	35.30	133.2
F18	2	"	27'-9"	"	41.66	83.4

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F19	2	$\frac{3}{4}$"ϕ	27'-3"	Straight	40.93	81.9
F30	2	"	26'-3"	"	39.43	78.9
F81	1	"	28'-6"	"	42.81	42.8
F82	3	"	25'-3"	"	37.95	113.7
G32	24	$\frac{3}{4}$"ϕ	10'-3"	9'-7"	19.68	256.6
G33	14	"	6'-3"	3'-7"	4.43	62.0
J12	6	$\frac{3}{4}$"ϕ	27'-3"	Straight	18.20	145.6
J13	8	"	27'-3"	"	18.54	148.3
J14	14	"	6'-3"	"	4.51	63.1
J15	13	"	3'-3"	"	2.50	32.5
J16	14	"	8'-3"	6'-1"	5.84	81.8
J17	13	"	10'-3"	9'-5"	7.18	93.3
J18	1	"	11'-0"	10'-4"	7.35	7.4
J19	1	"	7'-3"	Straight	4.84	4.8
J20	26	"	11'-3"	10'-7"	7.51	195.3
				TOTAL		1444 #
SHEET 933-12.3/34 MONOLITHS NOS.160 &161						
F37	2	$\frac{3}{4}$"ϕ	16'-6"	Straight	24.78	49.6
F38	1	"	15'-6"	"	23.28	23.3
F58	2	"	16'-3"	"	24.41	48.8
F60	2	"	16'-0"	"	24.03	48.1
F63	3	"	16'-9"	"	25.16	75.5
F84	4	"	17'-3"	"	25.91	103.6
G32	15	$\frac{3}{4}$"ϕ	10'-3"	9'-7"	10.69	160.4
G33	8	"	4'-3"	3'-7"	4.43	35.4
J14	10	$\frac{3}{4}$"ϕ	6'-3"	Straight	4.51	45.1
J15	8	"	3'-3"	"	2.50	20.0
J16	8	"	8'-3"	6'-1"	5.84	46.7
J17	10	"	10'-3"	9'-5"	7.18	71.8
J20	18	"	11'-3"	10'-7"	7.51	135.2
J21	8	"	16'-3"	Straight	10.85	86.8
J36	8	"	16'-0"	"	10.69	85.5
				TOTAL 1		1036 #
				TOTAL 2		2072 #
MONOLITHS NOS. 158, 159, 162 & 163						
F8	14	$\frac{3}{4}$"ϕ	19'-9"	Straight	29.66	415.2
G32	17	$\frac{3}{4}$"ϕ	10'-3"	9'-7"	10.69	181.7
G33	10	"	4'-3"	3'-7"	4.43	44.3
J14	11	$\frac{3}{4}$"ϕ	6'-3"	Straight	4.51	49.6
J15	10	"	3'-3"	"	2.50	25.0
J16	10	"	8'-3"	6'-1"	5.84	58.4
J17	11	"	10'-3"	9'-5"	7.18	79.0
J20	21	"	11'-3"	10'-7"	7.51	157.7
J29	18	"	19'-9"	Straight	13.19	211.0
				TOTAL 1		1222 #
				TOTAL 4		4888 #
MONOLITH NO. 164						
D19	2	1"ϕ	11'-4"	9'-6"	30.26	60.5

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F8	14	$\frac{3}{4}$"ϕ	19'-9"	Straight	29.66	415.2
G30	17	$\frac{3}{4}$"ϕ	10'-3"	9'-7"	10.69	181.7
G33	10	"	4'-3"	3'-7"	4.43	44.3
J14	11	$\frac{3}{4}$"ϕ	6'-3"	Straight	4.51	49.6
J15	10	"	3'-3"	"	2.50	25.0
J18	10	"	8'-3"	6'-1"	5.84	58.4
J17	11	"	10'-3"	9'-5"	7.18	79.0
J20	21	"	11'-3"	10'-7"	7.51	157.7
J29	16	"	19'-9"	Straight	13.19	211.0
J30	9	$\frac{3}{4}$"ϕ	4'-11"	4'-1"	3.28	29.5
				TOTAL		1912 #
SHEET 933-12.3/35 MONOLITHS NOS. 166 TO 168 & 216 TO 226						
F8	14	$\frac{3}{4}$"ϕ	19'-9"	Straight	29.66	415.2
G45	7	$\frac{3}{4}$"ϕ	11'-2"	10'-6"	11.65	81.6
J9	20	$\frac{3}{4}$"ϕ	11'-9"	10'-6"	7.85	157.0
J10	12	"	11'-10"	10'-6"	7.90	94.8
J19	11	"	7'-3"	Straight	4.84	53.2
J27	10	"	4'-0"	"	2.67	26.7
J29	18	"	19'-9"	"	13.19	237.4
J31	9	"	9'-9"	9'-1"	6.51	58.6
J44	10	"	11'-2"	10'-6"	7.46	74.6
J45	8	"	6'-0"	5'-4"	4.01	32.1
J46	16	"	4'-9"	4'-1"	3.17	50.7
				TOTAL 1		1282 #
				TOTAL 14		17,948
MONOLITHS NOS. 169 & 215						
D19	2	1"ϕ	10'-9"	Straight	28.76	57.4
F8	14	$\frac{3}{4}$"ϕ	19'-9"	"	29.66	415.2
G45	7	$\frac{3}{4}$"ϕ	11'-2"	10'-6"	11.65	81.6
J9	20	$\frac{3}{4}$"ϕ	11'-9"	10'-6"	7.85	157.0
J10	12	"	11'-10"	10'-6"	7.90	94.8
J19	11	"	7'-3"	Straight	4.84	53.2
J27	10	"	4'-0"	"	2.67	26.7
J29	18	"	19'-9"	"	13.19	237.4
J31	9	"	9'-9"	9'-1"	6.51	58.6

* J19 marked J12 Top Reinforcing Plan, Sheet 933-12.3/33

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 2 OF 13 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: [signature] DISTRICT CHIEF OF DESIGN

APPROVED: [signature] CHIEF OF ENGINEERS

APPROVAL RECOMMENDED: [signature] DIVISION ENGINEER

"BELIEVED AS BUILT" 933-14.1/2

779

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

REINFORCEMENT SCHEDULE

SIZE	D
#	8"
3 OR 4 LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
MONOLITHS NOS. 169 & 215 (CONT'D.)						
J32	10	1" ⌀	4'-9"	1'-0"	3.17	31.7
J44	10	"	11'-2"	10'-6"	7.46	74.6
J45	6	"	6'-0"	5'-4"	4.01	32.1
J46	16	"	4'-9"	4'-1"	3.17	50.7
				TOTAL 1		1371 #
				TOTAL 2		2742 #
MONOLITH NO. 227						
D19	2	1" ⌀	10'-9"	Straight	28.70	57.4
F34	14	1" ⌀	20'-6"	"	30.79	431.1
G45	7	1" ⌀	11'-2"	10'-6"	11.95	81.6
J19	21	1" ⌀	11'-9"	11'-1"	7.85	164.9
J10	13	"	11'-10"	11'-2"	7.90	102.7
J18	11	"	7'-3"	Straight	4.84	53.2
J27	10	"	4'-0"	"	2.67	26.7
J31	10	"	9'-9"	9'-1"	6.51	65.1
J32	10	"	4'-8"	2'-0"	3.17	31.7
J33	18	"	20'-6"	Straight	13.69	246.4
J44	10	"	11'-2"	10'-6"	7.46	74.6
J45	9	"	6'-0"	5'-4"	4.01	36.1
J46	17	"	4'-9"	4'-1"	3.17	53.9
				TOTAL		1423 #
SHEET 933-12.3/36 MONOLITH NO. 124						
D17	2	1" ⌀	13'-8"	11'-6"	35.60	71.2
F8	3	1" ⌀	19'-9"	Straight	29.66	89.0
F89	6	"	19'-6"	"	29.29	175.7
F23	3	"	20'-0"	"	30.04	150.2
G35	14	1" ⌀	12'-2"	11'-6"	12.69	177.7
G41	6	"	7'-6"	6'-10"	7.82	46.9
G42	11	"	5'-9"	5'-1"	6.00	66.0
G43	20	"	19'-6"	Straight	20.34	406.8
J22	12	1" ⌀	12'-9"	11'-5"	8.52	102.2
J24	9	"	10'-9"	10'-1"	7.18	64.6
J26	13	"	7'-9"	Straight	5.18	67.3
J27	11	"	4'-0"	"	2.67	29.4
J30	11	"	5'-3"	2'-3"	3.51	38.6
J34	21	"	12'-4"	Straight	8.24	173.0
				TOTAL		1659 #
MONOLITH NO. 125						
F8	3	1" ⌀	19'-9"	Straight	29.66	89.0
F89	6	"	19'-6"	"	29.29	175.7
F23	5	"	20'-0"	"	30.04	150.2
G35	14	1" ⌀	12'-2"	11'-6"	12.69	177.7

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G41	6	1" ⌀	7'-6"	6'-10"	7.82	46.9
G42	11	"	5'-9"	5'-1"	6.00	66.0
G43	20	"	19'-6"	Straight	20.34	406.8
J22	12	1" ⌀	12'-9"	11'-5"	8.52	102.2
J24	9	"	10'-9"	10'-1"	7.18	64.6
J26	13	"	7'-9"	Straight	5.18	67.3
J27	11	"	4'-0"	"	2.67	29.4
J34	21	"	12'-4"	Straight	8.24	173.0
				TOTAL		1549 #
SHEET 933-12.3/37 MONOLITHS NOS. 126 TO 136 170 TO 171, 208 TO 214 & 228 TO 233						
F8	14	1" ⌀	19'-9"	Straight	29.66	415.2
G2	20	1" ⌀	19'-9"	"	20.60	412.0
G35	14	"	12'-2"	11'-6"	12.69	177.7
G41	6	"	7'-6"	6'-10"	7.82	46.9
G42	12	"	5'-9"	5'-1"	6.00	72.0
J19	13	1" ⌀	7'-3"	Straight	4.84	62.9
J22	12	"	12'-9"	11'-5"	8.52	102.2
J26	9	"	10'-9"	10'-1"	7.18	64.6
J27	12	"	4'-0"	Straight	2.67	32.0
J34	20	"	12'-4"	Straight	8.24	164.8
				TOTAL 1		1550 #
				TOTAL 26		40,300 #
MONOLITHS NOS. 174 & 207						
D20	2	1" ⌀	11'-6"	Straight	30.71	61.4
F8	14	1" ⌀	19'-9"	"	29.66	415.2
G2	20	1" ⌀	19'-9"	"	20.60	412.0
G35	14	"	12'-2"	11'-6"	12.69	177.7
G41	6	"	7'-6"	6'-10"	7.82	46.9
G42	12	"	5'-9"	5'-1"	6.00	72.0
J19	13	1" ⌀	7'-3"	Straight	4.84	62.9
J22	12	"	12'-9"	11'-5"	8.52	102.2
J24	9	"	10'-9"	10'-1"	7.18	64.6
J27	12	"	4'-0"	Straight	2.67	32.0
J32	11	1" ⌀	4'-9"	2'-0"	3.17	34.9
J34	20	"	12'-4"	Straight	8.24	164.8
				TOTAL 1		1646 #
				TOTAL 2		3292 #
MONOLITH NO. 137						
D20	2	1" ⌀	11'-6"	Straight	30.71	61.4
F8	14	1" ⌀	19'-9"	"	29.66	415.2
G2	20	1" ⌀	19'-9"	"	20.60	412.0
G35	14	"	12'-2"	11'-6"	12.69	177.7
G41	6	"	7'-6"	6'-10"	7.82	46.9
G42	12	"	5'-9"	5'-1"	6.00	72.0
J19	13	1" ⌀	7'-3"	Straight	4.84	62.9
J22	12	"	12'-9"	11'-5"	8.52	102.2
J24	9	"	10'-9"	10'-1"	7.18	64.6

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J27	12	1" ⌀	4'-0"	Straight	2.67	32.0
J34	20	"	12'-4"	Straight	8.24	164.8
J35	11	"	6'-9"	1'-9"	4.51	49.6
				TOTAL		1661 #
MONOLITH NO. 234						
D20	2	1" ⌀	11'-6"	Straight	30.71	61.4
F8	14	1" ⌀	19'-9"	"	29.66	415.2
G2	20	1" ⌀	19'-9"	"	20.60	412.0
G35	14	"	12'-2"	11'-6"	12.69	177.7
G41	6	"	7'-6"	6'-10"	7.82	46.9
G42	12	"	5'-9"	5'-1"	6.00	72.0
J19	13	1" ⌀	7'-3"	Straight	4.84	62.9
J22	12	"	12'-9"	11'-5"	8.52	102.2
J24	9	"	10'-9"	10'-1"	7.18	64.6
J27	12	"	4'-0"	Straight	2.67	32.0
J32	11	"	4'-9"	2'-0"	3.17	34.9
J34	20	"	12'-4"	Straight	8.24	164.8
				TOTAL		1647 #
SHEET 933-12.3/38 MONOLITH NO. 172						
F37	4	1" ⌀	15'-0"	Straight	19.33	78.1
F38	9	"	18'-9"	"	19.15	172.4
F39	1	"	19'-5"	"	19.90	19.9
G35	10	1" ⌀	12'-2"	11'-6"	12.69	126.9
G41	4	"	7'-6"	6'-10"	7.82	31.3
G42	8	"	5'-9"	5'-1"	6.00	48.0
G56	20	"	19'-0"	Straight	13.56	271.2
J19	9	1" ⌀	7'-3"	"	4.84	43.6
J22	7	"	12'-9"	11'-5"	8.52	59.6
J24	6	"	10'-9"	10'-1"	7.18	43.1
J27	8	"	4'-0"	Straight	2.67	21.4
J34	13	"	12'-4"	Straight	8.24	107.1
				TOTAL		1029 #
MONOLITH NO. 173						
F30	4	1" ⌀	26'-9"	Straight	39.43	157.7
F35	9	"	26'-0"	"	39.05	351.5
F96	1	"	26'-6"	"	39.80	39.8
G35	18	1" ⌀	12'-2"	11'-6"	12.69	228.4
G41	8	"	7'-6"	6'-10"	7.82	62.6
G42	16	"	5'-9"	5'-1"	6.00	96.0
G57	20	"	26'-9"	Straight	27.38	547.6
J19	17	1" ⌀	7'-3"	"	4.84	82.3
J22	14	"	12'-9"	11'-5"	8.52	119.3
J24	13	"	10'-9"	10'-1"	7.18	93.3
J27	18	"	4'-0"	Straight	2.67	48.7
J34	27	"	12'-4"	Straight	8.24	222.5
				TOTAL		2044 #
SHEET 933-12.3/39 MONOLITH NO. 119						
D22	2	1" ⌀	13'-0"	Straight	34.71	69.4

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F30	4	1" ⌀	26'-9"	Straight	39.43	157.7
F82	2	"	25'-0"	"	37.55	75.1
F85	1	"	26'-0"	"	39.05	39.1
F91	19	"	13'-3"	12'-7"	19.90	378.1
F92	8	"	7'-3"	6'-7"	10.89	87.1
F93	16	"	5'-9"	5'-1"	8.64	138.2
F96	3	"	26'-6"	Straight	39.80	119.4
F100	5	"	13'-9"	12'-5"	20.65	103.2
F101	2	"	14'-8"	13'-4"	21.40	42.8
F102	8	"	11'-3"	10'-7"	16.90	135.2
F103	1	"	26'-9"	Straight	40.18	40.2
F104	2	"	24'-6"	"	36.80	73.6
F105	1	"	23'-6"	"	35.30	35.3
F109	2	"	25'-9"	"	38.68	77.4
G9	12	1" ⌀	5'-3"	"	5.48	65.8
G54	11	"	24'-9"	"	25.81	283.9
G55	14	"	9'-0"	"	9.39	131.5
G64	11	"	25'-0"	"	26.08	286.9
J18	6	1" ⌀	7'-3"	1'-9"	4.84	29.0
J37	28	"	13'-2"	11'-8"	8.80	246.4
				TOTAL		2671 #
SHEET 933-12.3/40 MONOLITHS NOS. 120 TO 123, 175 TO 180, 198 TO 203, 206, 247 TO 252 & 255 TO 258						
F71	18	1" ⌀	20'-9"	Straight	31.17	498.7
F91	18	"	13'-3"	12'-7"	19.90	358.4
F92	6	"	7'-3"	6'-7"	10.89	65.3
F93	14	"	5'-9"	5'-1"	8.64	121.0
F100	9	"	13'-9"	12'-5"	20.65	185.9
F102	6	"	11'-3"	10'-7"	16.90	101.4
G9	10	1" ⌀	5'-9"	Straight	5.48	54.8
G26	22	"	20'-9"	"	21.64	476.1
G55	11	"	9'-0"	"	9.39	103.3
J37	21	1" ⌀	13'-2"	11'-8"	8.80	184.8
				TOTAL 1		2110 #
				TOTAL 27		56,962 #

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 3 OF 13 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [signature] COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

OR STAFF OR STAFF

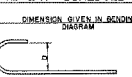
"BELIEVED AS BUILT" 933-14.1/3

780

127

REINFORCEMENT SCHEDULE

SIZE	D
1½	10"
1¾	9"
1"	8"
⅞	7"
¾ OR ¾ LESS	6"



MONOLITHS NOS. 181 & 259

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
D21	2	1"ϕ	12'-9"	Straight	34.04	68.1
F71	16	¾"ϕ	20'-9"	"	31.17	498.7
F91	16	"	13'-9"	12'-7"	19.90	318.4
F92	6	"	7'-3"	6'-7"	10.89	65.3
F93	14	"	5'-9"	5'-1"	8.64	121.0
F100	9	"	13'-9"	12'-5"	20.65	185.9
F102	6	"	11'-3"	10'-7"	16.90	101.4
G9	10	⅝"ϕ	5'-3"	Straight	5.48	54.8
G26	22	"	20'-9"	"	21.64	476.1
G55	11	"	9'-0"	"	9.39	103.3
J32	11	¾"ϕ	4'-9"	2'-0" 2'-11" 2'-11"	3.17	34.9
J37	21	"	13'-2"	2'-0" 2'-11" 8'-2"	8.80	184.8
				TOTAL 1		2219
				TOTAL 2		4425

MONOLITH NO. 246

F64	4	¾"ϕ	6'-0"	1'-6" 4'-6"	9.01	36.0
F71	16	"	20'-9"	Straight	31.17	498.7
F91	18	"	13'-3"	12'-7"	19.90	358.2
F92	6	"	7'-3"	6'-7"	10.89	65.3
F93	14	"	5'-9"	5'-1"	8.64	121.0
F100	9	"	13'-9"	12'-5"	20.65	185.8
F102	6	"	11'-3"	10'-7"	16.90	101.4
G9	10	⅝"ϕ	5'-3"	Straight	5.48	54.8
G26	22	"	20'-9"	"	21.64	476.1
G55	11	"	9'-0"	"	9.39	103.3
J32	11	¾"ϕ	4'-9"	2'-0" 2'-11" 2'-11"	3.17	34.9
J37	21	"	13'-2"	2'-0" 2'-11" 8'-2"	8.80	184.8
J48	6	"	9'-0"	2'-0" 2'-11" 4'-1"	6.01	36.1
				TOTAL		2221 *

SHEET 933-12.3/41 MONOLITH NO. 204

F13	4	¾"ϕ	23'-3"	Straight	34.92	139.7
F76	2	"	23'-0"	"	34.55	69.1
F91	17	"	13'-3"	12'-7"	19.90	338.3
F92	8	"	7'-3"	6'-7"	10.89	87.1
F93	15	"	5'-9"	5'-1"	8.64	129.6
F100	9	"	13'-9"	12'-5"	20.65	185.9
F102	7	"	11'-3"	10'-7"	16.90	118.3
F105	9	"	23'-6"	Straight	35.30	317.7
F107	1	"	22'-9"	"	34.17	34.2
G3	11	⅝"ϕ	23'-3"	"	14.25	266.8
G9	11	"	5'-3"	"	5.48	60.3
G55	13	"	9'-0"	"	9.39	122.1

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G61	11	⅝"ϕ	23'-0"	Straight	23.99	263.9
J37	24	¾"ϕ	13'-2"	2'-0" 2'-11" 8'-2"	8.80	211.2
				TOTAL		2344

MONOLITH NO. 205

F68	9	¾"ϕ	21'-3"	Straight	31.92	287.3
F70	2	"	21'-0"	"	31.54	63.1
F71	4	"	20'-9"	"	31.17	124.7
F74	1	"	20'-6"	"	30.79	30.8
F91	16	"	13'-3"	12'-7"	19.90	318.4
F92	7	"	7'-3"	6'-7"	10.89	76.2
F93	14	"	5'-9"	5'-1"	8.64	121.0
F100	8	"	13'-9"	12'-5"	20.65	165.2
F102	7	"	11'-3"	10'-7"	16.90	118.3
G9	10	⅝"ϕ	5'-3"	Straight	5.48	54.8
G26	22	"	20'-9"	"	21.64	476.1
G55	12	"	9'-0"	"	9.39	112.7
J37	22	¾"ϕ	13'-2"	2'-0" 2'-11" 8'-2"	8.80	193.6
				TOTAL		2642 *

SHEET 933-12.3/42 MONOLITH NO. 235

F2	2	¾"ϕ	18'-9"	Straight	28.91	57.8
F8	1	"	19'-9"	"	29.66	29.7
F45	1	"	22'-6"	"	33.80	33.8
F67	2	"	21'-6"	"	32.29	64.6
F69	2	"	19'-6"	"	29.29	58.6
F70	2	"	21'-0"	"	31.54	63.1
F72	2	"	20'-3"	"	30.42	60.8
F91	16	"	13'-3"	12'-7"	19.90	318.4
F92	7	"	7'-3"	6'-7"	10.89	76.2
F93	14	"	5'-9"	5'-1"	8.64	121.0
F100	7	"	13'-9"	12'-5"	20.65	144.6
F101	1	"	14'-3"	12'-11"	21.40	21.4
F102	7	"	11'-3"	10'-7"	16.90	118.3
F108	4	"	19'-0"	Straight	28.54	114.2
G9	11	⅝"ϕ	5'-3"	"	5.48	60.3
G27	11	"	21'-3"	"	22.16	243.8
G55	11	"	9'-0"	"	9.39	103.3
G62	11	"	21'-0"	"	21.90	240.9
J37	20	¾"ϕ	13'-2"	2'-0" 2'-11" 8'-2"	8.80	176.0
				TOTAL		2107 *

SHEET 933-12.3/43 MONOLITH NO. 236

D23	2	1"ϕ	12'-6"	Straight	33.36	66.8
F64	4	¾"ϕ	6'-0"	1'-6" 4'-6"	9.01	36.0
F85	11	"	26'-0"	Straight	39.05	429.6
F91	21	"	13'-3"	12'-7"	19.90	417.9
F92	8	"	7'-3"	6'-7"	10.89	87.1
F93	17	"	5'-9"	5'-1"	8.64	146.9
F100	10	"	13'-9"	12'-5"	20.65	206.5
F102	8	"	11'-3"	10'-7"	16.90	135.2

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	*BENDING DIAGRAM	WT. EACH	TOTAL WT.
F109	5	¾"ϕ	25'-9"	Straight	38.66	193.4
G9	12	⅝"ϕ	5'-3"	"	5.48	65.8
G55	14	"	9'-0"	"	9.39	131.5
G63	22	"	25'-9"	"	26.86	590.9
J35	6	¾"ϕ	6'-9"	4'-3" 2'-6"	4.51	27.1
J37	26	"	13'-2"	2'-0" 2'-11" 8'-2"	8.80	228.8
J43	6	"	9'-0"	2'-0" 2'-11" 4'-2"	6.01	36.1
				TOTAL		2800 *

SHEET 933-12.3/44 MONOLITH NO. 253

D21	2	1"ϕ	12'-9"	Straight	34.04	68.1
F80	2	¾"ϕ	26'-3"	"	39.43	78.9
F82	1	"	25'-0"	"	37.55	37.6
F85	2	"	26'-0"	"	39.05	78.1
F91	19	"	13'-3"	12'-7"	19.90	378.1
F92	8	"	7'-3"	6'-7"	10.89	87.1
F93	17	"	5'-9"	5'-1"	8.64	146.9
F96	2	"	26'-6"	Straight	39.80	79.6
F100	10	"	13'-9"	12'-5"	20.65	206.5
F102	8	"	11'-3"	10'-7"	16.90	135.2
F103	3	"	26'-9"	Straight	40.18	120.5
F109	2	"	25'-9"	"	38.66	77.4
F110	4	"	27'-0"	"	40.55	162.2
G9	13	⅝"ϕ	5'-3"	"	5.48	71.2
G48	11	"	26'-0"	"	27.12	298.3
G55	14	"	9'-0"	"	9.39	131.5
G63	11	"	25'-9"	"	26.86	295.5
J28	6	¾"ϕ	7'-3"	4'-3" 2'-6" 2'-11" 8'-2"	4.84	29.0
J37	27	"	13'-2"	2'-0" 2'-11" 8'-2"	8.80	237.6
				TOTAL		2719 *

SHEET 933-12.3/45 MONOLITH NO. 254

F19	1	¾"ϕ	21'-9"	Straight	32.67	32.7
F67	1	"	21'-6"	"	32.29	32.3
F68	2	"	21'-3"	"	31.92	63.8
F70	1	"	21'-0"	"	31.54	31.5
F71	1	"	20'-9"	"	31.17	31.2
F72	3	"	20'-3"	"	30.42	91.3
F78	6	"	20'-0"	"	30.04	180.2
F75	1	"	22'-3"	"	33.42	33.4
F91	16	"	13'-3"	12'-7"	19.90	318.4
F92	7	"	7'-3"	6'-7"	10.89	76.2
F93	14	"	5'-9"	5'-1"	8.64	121.0
F100	8	"	13'-9"	12'-5"	20.65	165.2
F102	7	"	11'-3"	10'-7"	16.90	118.3
G9	10	⅝"ϕ	5'-3"	Straight	5.48	54.8
G24	11	"	21'-6"	"	22.42	246.6
G27	11	"	21'-3"	"	22.16	243.8
G55	12	"	9'-0"	"	9.39	112.7
J37	21	¾"ϕ	13'-2"	2'-0" 2'-11" 8'-2"	8.80	184.8

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
				TOTAL		2738 *

SHEET 933-12.3/46 MONOLITH NO. 96

F1	14	¾"ϕ	14'-0"	2'-0" 2'-11" 8'-2"	21.09	294.4
F4	1	"	8'-4"	7'-8"	12.52	12.5
F8	15	"	19'-9"	Straight	29.66	444.9
F19	1	"	21'-9"	"	32.67	32.7
F71	1	"	20'-9"	"	31.17	31.2
G2	26	⅝"ϕ	19'-9"	"	20.62	494.9
G28	21	"	14'-2"	13'-6"	14.78	310.4
G36	10	"	8'-6"	7'-10"	8.87	88.7
G38	10	"	12'-6"	11'-10"	13.04	130.4
G39	11	"	14'-10"	13'-6"	15.47	170.2
G42	19	"	5'-9"	5'-1"	6.00	114.0
J23	19	¾"ϕ	5'-9"	Straight	3.84	73.0
J25	21	"	9'-6"	"	6.35	133.4
				TOTAL		2330 *

SHEET 933-12.3/47 MONOLITHS NOS. 97, 99 & 107

F1	15	¾"ϕ	14'-0"	2'-0" 2'-11" 8'-2"	21.09	315.5
F67	17	"	21'-6"	Straight	32.29	548.9
G24	24	⅝"ϕ	21'-6"	"	22.42	538.1
G28	24	"	14'-2"	13'-6"	14.78	354.7
G36	11	"	8'-6"	7'-10"	8.87	97.6
G37	20	"	6'-0"	5'-4"	6.26	125.2
G38	10	"	12'-6"	11'-10"	13.04	130.4
G39	12	"	14'-10"	13'-6"	15.47	185.6
J23	21	¾"ϕ	5'-9"	Straight	3.84	80.6
J25	22	"	9'-6"	"	6.35	139.7
				TOTAL 1		2516 *
				TOTAL 3		7549 *

MONOLITH NO. 98

F1	15	¾"ϕ	14'-0"	2'-0" 2'-11" 8'-2"	21.09	315.5
F19	6	"	21'-9"	Straight	32.67	130.7
F67	3	"	21'-6"	"	32.29	96.9
F68	2	"	21'-3"	"	31.92	63.8
F70	1	"	21'-0"	"	31.54	31.5
F71	1	"	20'-9"	"	31.17	31.2
F77	7	"	22'-0"	"	33.04	231.3

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 4 OF 13 SHEETS SCALE:

U. S. ENGINEER OFFICE, LOUISVILLE KY. 1941

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

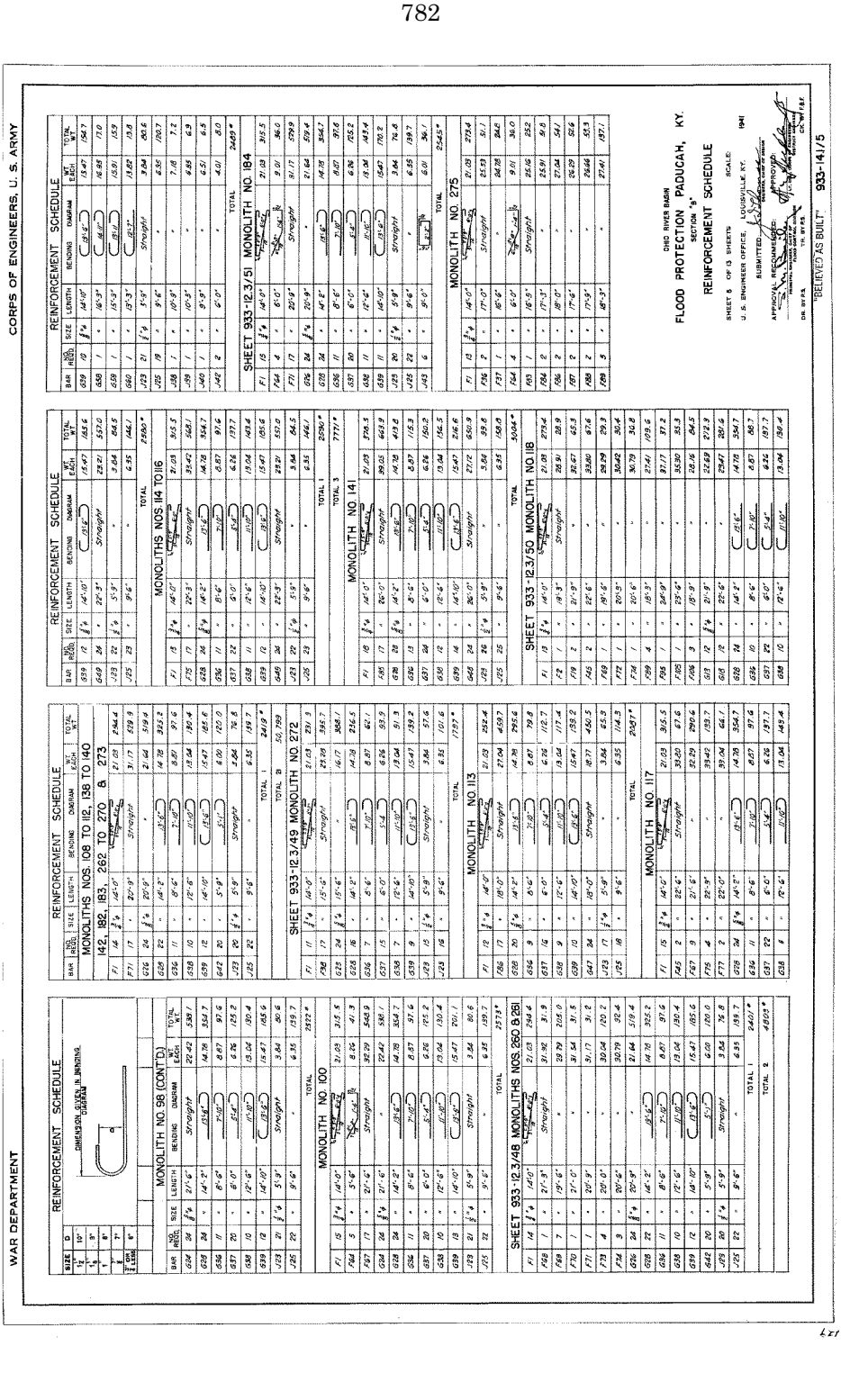
APPROVED: [signature] COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY P.S. TR. BY P.S. CK. BY F.S.E.

"BELIEVED AS BUILT," 933-14.1/4

781

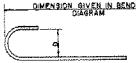
28


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
REINFORCEMENT SCHEDULE
MONOLITHS NOS. 108 TO 112, 138 TO 140
142, 182, 183, 262 TO 270 & 273
MONOLITH NO. 98 (CONT'D.)
MONOLITH NO. 100
SHEET 933-12.3/48 MONOLITHS NOS. 260 & 261
SHEET 933-12.3/49 MONOLITH NO. 272
MONOLITHS NOS. 114 TO 116
MONOLITH NO. 141
SHEET 933-12.3/50 MONOLITH NO. 118
MONOLITH NO. 113
MONOLITH NO. 117
SHEET 933-12.3/51 MONOLITH NO. 184
MONOLITH NO. 275
DIXIE RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCEMENT SCHEDULE
SHEET 5 OF 13 SHEETS
SCALE:
U.S. ENGINEER OFFICE, LOUISVILLE, KY. 1941
SUBMITTED,
APPROVED,
DIV. ENGR.
CHIEF, E&C
"RELIEVED AS BUILT"
933-141/5

REINFORCEMENT SCHEDULE

SIZE	D
1¼	10"
1⅜	9"
1	8"
⅞	7"
¾ OR ⅝ LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM



MONOLITH NO. 275 (CONT'D.)

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G28	20	⅞	14'-2"	13'-6"	14.78	295.6
G36	10	"	8'-6"	7'-10"	8.87	88.7
G37	16	"	6'-0"	5'-4"	6.26	100.2
G38	9	"	12'-6"	11'-10"	13.04	117.4
G39	10	"	14'-10"	13'-6"	15.47	154.7
G51	12	"	17'-3"	Straight	17.99	215.9
G52	12	"	17'-0"	"	17.73	212.8
J23	16	¾	5'-9"	"	3.84	61.4
J25	19	"	9'-6"	"	6.35	120.7
J43	6	"	9'-0"	2'-6"	6.01	36.1
				TOTAL		2163*

SHEET 933-12.3/52 MONOLITH NO. 271

D1	20	1⅛	6'-3"	Straight	16.69	333.8
E11	12	⅞	14'-3"	13'-6"	29.13	349.6
E12	7	"	14'-3"	13'-6"	29.13	203.9
E13	2	"	12'-1"	11'-3"	24.70	49.4
E14	8	"	5'-1"	4'-3"	16.52	132.2
F1	11	¾	14'-0"	13'-6"	21.03	231.3
F38	17	"	15'-6"	Straight	23.28	395.8
G23	10	⅞	15'-6"	"	16.17	161.7
G35	8	"	12'-4"	11'-10"	13.04	104.3
G39	8	"	14'-10"	13'-6"	15.47	123.8
G50	28	"	5'-2"	3'-6"	5.39	150.9
J23	15	¾	5'-9"	Straight	3.84	57.6
J25	16	"	9'-6"	"	6.35	101.6
				TOTAL		2396*

MONOLITH NO. 242

D1	12	1⅛	6'-3"	Straight	16.69	200.3
F41	6	⅞	12'-5"	"	19.08	114.2
F50	4	"	11'-4"	10'-10"	17.02	68.1
F51	2	"	6'-4"	5'-10"	9.51	19.0
F52	2	"	7'-8"	5'-10"	11.52	23.0
F53	4	"	12'-5"	10'-10"	19.08	76.1
G22	20	¾	5'-2"	3'-6"	5.39	107.8
G23	24	"	15'-6"	Straight	16.17	388.1
				TOTAL		997*

SHEET 933-12.3/53 MONOLITH NO. 274

F1	13	⅞	14'-0"	13'-6"	21.03	273.4
F36	2	"	17'-0"	Straight	25.53	51.1
F38	1	"	16'-3"	"	24.41	24.4
F83	1	"	16'-9"	"	25.16	25.2

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F86	2	⅞	17'-9"	Straight	25.91	51.8
F86	4	"	18'-0"	"	27.04	108.2
F87	2	"	17'-6"	"	26.29	52.6
F88	1	"	17'-9"	"	26.66	26.7
F89	4	"	18'-3"	"	27.41	109.6
G28	19	⅞	14'-2"	13'-6"	14.78	280.8
G36	8	"	8'-6"	7'-10"	8.87	71.0
G37	17	"	6'-0"	5'-4"	6.26	106.4
G38	9	"	12'-6"	11'-10"	13.04	117.4
G39	10	"	14'-10"	13'-6"	15.47	154.7
G51	12	"	17'-3"	Straight	17.99	215.9
G52	12	"	17'-0"	"	17.73	212.8
J23	18	¾	5'-9"	"	3.84	69.1
J25	19	"	9'-6"	"	6.35	120.7
				TOTAL		2072*

SHEET 933-12.3/54 MONOLITH NO. 20

E6	7	⅞	15'-4"	14'-6"	31.34	219.4
E7	6	"	9'-4"	8'-6"	19.08	114.5
E8	11	"	7'-2"	6'-4"	14.65	161.2
F8	15	¾	19'-9"	Straight	29.66	444.9
F18	7	"	15'-3"	14'-7"	22.91	160.4
G2	26	⅞	19'-9"	Straight	20.60	535.6
G9	15	"	5'-3"	"	5.48	82.2
G10	15	"	9'-6"	"	9.91	148.7
G11	15	"	15'-10"	14'-6"	16.51	247.7
G12	15	"	12'-9"	12'-1"	13.30	199.5
G34	30	"	14'-9"	13'-6"	15.38	461.4
				TOTAL		2776*

SHEET 933-12.3/55 MONOLITHS NOS. 21, 22 & 23

E6	8	⅞	15'-4"	14'-6"	31.34	250.7
E7	6	"	9'-4"	8'-6"	19.08	114.5
E8	12	"	7'-2"	6'-4"	14.65	175.8
F18	8	¾	15'-3"	14'-7"	22.91	183.3
F19	15	"	21'-9"	Straight	32.67	490.1
G9	16	⅞	5'-3"	"	5.48	87.7
G10	17	"	9'-6"	"	9.91	168.5
G11	17	"	15'-10"	14'-6"	16.51	280.7
G12	16	"	12'-9"	12'-1"	13.30	212.8
G18	26	"	21'-9"	Straight	22.69	589.9
G34	33	"	14'-9"	13'-6"	15.38	507.5
				TOTAL 1		3062*
				TOTAL 3		9165*

SHEET 933-12.3/56 MONOLITH NO. 85

D24	2	1⅛	16'-4"	14'-6"	43.61	87.2
E6	7	⅞	15'-4"	14'-6"	31.34	219.4
E7	6	"	9'-4"	8'-6"	19.08	114.5
E8	12	"	7'-2"	6'-4"	14.65	175.8
F8	1	¾	19'-9"	Straight	29.66	29.7

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F18	8	¾	15'-3"	14'-7"	22.91	183.3
F19	2	"	21'-9"	Straight	32.67	65.3
F25	19	"	6'-9"	5'-0"	10.14	192.8
F87	2	"	21'-5"	Straight	32.29	64.6
F70	2	"	21'-0"	"	31.54	63.1
F71	2	"	20'-9"	"	31.17	62.3
F73	1	"	20'-0"	"	30.04	30.0
F14	2	"	20'-6"	"	30.79	61.6
F77	3	"	22'-0"	"	33.04	99.1
G9	15	⅞	5'-3"	"	5.48	82.2
G10	17	"	9'-6"	"	9.91	168.5
G11	16	"	15'-10"	14'-6"	16.51	264.2
G12	17	"	12'-9"	12'-1"	13.30	226.1
G25	13	"	20'-6"	Straight	21.38	277.9
G26	19	"	20'-9"	"	21.64	281.3
G34	33	"	14'-9"	13'-6"	15.38	507.5
				TOTAL		3198*

MONOLITH NO. 86

E6	7	⅞	15'-4"	14'-6"	31.34	219.4
E7	6	"	9'-4"	8'-6"	19.08	114.5
E8	12	"	7'-2"	6'-4"	14.65	175.8
F8	1	¾	19'-9"	Straight	29.66	29.7
F18	8	"	15'-3"	14'-7"	22.91	183.3
F19	2	"	21'-9"	Straight	32.67	65.3
F87	2	"	21'-6"	"	32.29	64.6
F70	2	"	21'-0"	"	31.54	63.1
F71	2	"	20'-9"	"	31.17	62.3
F73	1	"	20'-0"	"	30.04	30.0
F74	2	"	20'-6"	"	30.79	61.6
F77	3	"	22'-0"	"	33.04	99.1
G9	15	⅞	5'-3"	"	5.48	82.2
G10	17	"	9'-6"	"	9.91	168.5
G11	16	"	15'-10"	14'-6"	16.51	264.2
G12	17	"	12'-9"	12'-1"	13.30	226.1
G25	13	"	20'-6"	Straight	21.38	277.9
G26	19	"	20'-9"	"	21.64	281.3
G34	33	"	14'-9"	13'-6"	15.38	507.5
				TOTAL		2976*

MONOLITHS NOS. 90 & 91

E6	7	⅞	15'-4"	14'-6"	31.34	219.4
E7	6	"	9'-4"	8'-6"	19.08	114.5
E8	12	"	7'-2"	6'-4"	14.65	175.8
F18	8	¾	15'-3"	14'-7"	22.91	183.3
F70	3	"	21'-0"	"	31.54	94.6
F71	4	"	20'-9"	"	31.17	124.7
F72	1	"	20'-3"	"	30.42	30.4
F74	3	"	20'-6"	"	30.79	92.4

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G9	15	⅞	5'-3"	Straight	5.48	82.2
G10	17	"	9'-6"	"	9.91	168.5
G11	16	"	15'-10"	14'-6"	16.51	264.2
G12	17	"	12'-9"	12'-1"	13.30	226.1
G25	26	"	20'-6"	Straight	21.38	555.9
G34	33	"	14'-9"	13'-6"	15.38	507.5
				TOTAL 1		2967*
				TOTAL 2		5934*

SHEET 933-12.3/57 MONOLITHS NOS. 87 TO 89 & 92 TO 94

E6	7	⅞	15'-4"	14'-6"	31.34	219.4
E7	6	"	9'-4"	8'-6"	19.08	114.5
E8	12	"	7'-2"	6'-4"	14.65	175.8
F18	8	¾	15'-3"	14'-7"	22.91	183.3
F71	15	"	20'-9"	Straight	31.17	467.6
G9	15	⅞	5'-3"	"	5.48	82.2
G10	16	"	9'-6"	"	9.91	158.6
G11	16	"	15'-10"	14'-6"	16.51	264.2
G12	15	"	12'-9"	12'-1"	13.30	199.5
G26	26	"	20'-9"	Straight	21.64	562.6
G34	31	"	14'-9"	13'-6"	15.38	476.8
				TOTAL 1		2905*
				TOTAL 6		17,427*

SHEET 933-12.3/58 MONOLITH NO. 95

E6	7	⅞	15'-4"	14'-6"	31.34	219.4
E7	7	"	9'-4"	8'-6"	19.08	133.6
E8	12	"	7'-2"	6'-4"	14.65	175.8
F18	8	¾	15'-3"	14'-7"	22.91	183.3
F68	6	"	21'-3"	Straight	31.92	191.5
F76	5	"	23'-0"	"	34.55	172.8
F77	2	"	22'-0"	"	33.04	66.1
F107	2	"	22'-9"	"	34.17	68.3
G9	16	⅞	5'-3"	"	5.48	87.7
G10	18	"	9'-6"	"	9.91	178.4
G11	17	"	15'-10"	14'-6"	16.51	280.7
G12	18	"	12'-9"	12'-1"	13.30	239.4

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 6 OF 13 SHEETS SCALE:

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

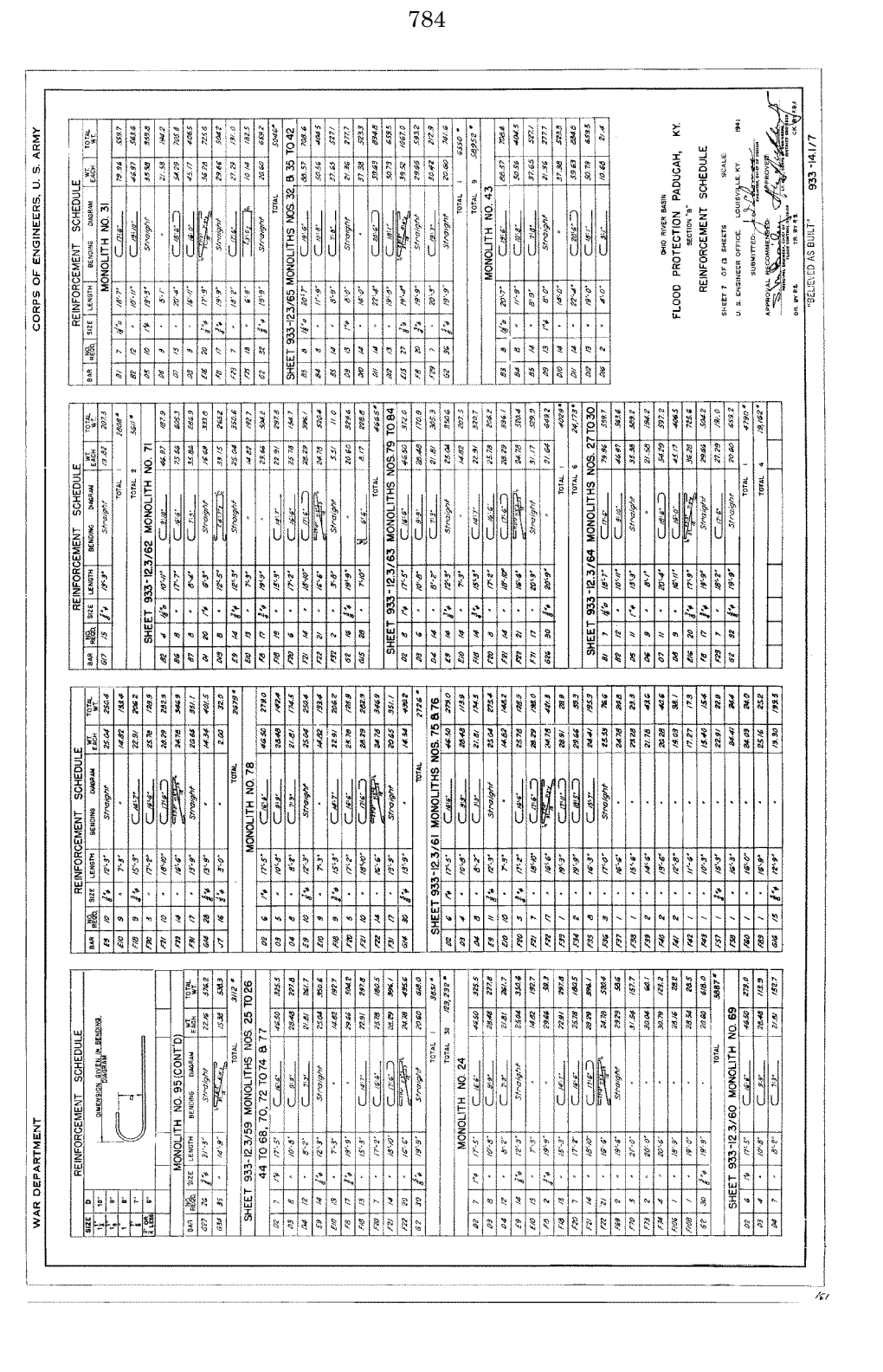
SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [signature] DISTRICT ENGINEER

DR. BY P.S. TR. BY P.S. CK. BY F.S.F.

"BELIEVED AS BUILT" 933-14.1/6


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "a"
REINFORCEMENT SCHEDULE
SHEET 7 OF 13 SHEETS
SCALE:
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
1941
SUBMITTED:
APPROVED, RECOMMENDED:
APPROVED:
DR. BY R.S.
TR. BY R.S.
CK. BY J.B.Z.
"REVISED AS BUILT"
933-141/7

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

REINFORCEMENT SCHEDULE

SIZE	D
1½	10"
1¾	9"
1	8"
⅝	7"
3/8 OR LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

MONOLITH NO. 43 (CONT'D.)

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
E15	27	¾ sq.	19'-4"	10'6" 7'5" 1'4"	39.52	1067.0
F8	20	¾ sq.	19'-9"	Straight	29.66	593.2
F29	7	"	20'-3"	19'-7"	30.42	212.9
F54	2	"	17'-4"	4'-2"	17.02	34.0
G2	36	¾ sq.	19'-9"	Straight	20.60	741.6
				TOTAL		4606#

SHEET 933-12.3/66 MONOLITHS NOS. 33 & 34

B9	7	⅝ sq.	20'-7"	19'6"	88.57	620.0
B4	6	"	17'-9"	10'4"	50.56	303.4
B5	11	"	8'-9"	7'6"	37.65	414.2
D9	11	1" ⌀	8'-0"	Straight	21.56	237.0
D10	12	"	14'-0"	"	37.38	448.6
D11	12	"	22'-4"	20'6"	58.63	715.6
D12	11	"	19'-0"	18'1"	50.73	558.0
E15	22	¾ sq.	19'-4"	10'6" 7'5" 1'4"	39.52	869.4
F29	6	"	20'-3"	19'7"	30.42	182.5
F38	2	"	15'-6"	Straight	23.28	46.6
F55	1	"	16'-9"	"	22.15	22.2
F56	1	"	15'-0"	"	22.53	22.5
F57	3	"	15'-3"	"	22.91	68.7
F58	4	"	16'-3"	"	24.41	97.6
F59	4	"	15'-9"	"	23.66	94.6
F60	5	"	16'-0"	"	24.03	120.2
G23	18	¾ sq.	15'-6"	"	16.17	291.1
G29	15	"	15'-3"	"	15.91	238.6
				TOTAL 1		5397#
				TOTAL 2		10,794#

SHEET 933-12.3/70 MOVABLE CLOSURE STA. 4+49.5

SILL

F1	39	¾ sq.	18'-4"	Straight	27.79	1083.8
F2	19	"	16'-3"	16'11"	24.41	463.8
G1	19	¾ sq.	17'-3"	17'3"	17.99	341.8
G2	16	"	3'-9"	Straight	3.91	62.6
J1	2	⅝ sq.	15'-0"	"	10.02	20.0
J2	17	"	17'-4"	5'6" 11'8"	11.58	196.9
				TOTAL		2168#

TWO ABUTMENTS

F3	8	¾ sq.	15'-9"	Straight	23.66	189.3
F4	18	"	14'-3"	"	21.40	385.2
F5	2	"	15'-7"	3'6" 4'6" 11'7"	23.41	46.8
G3	24	¾ sq.	11'-5"	Straight	11.91	285.8
G4	22	"	4'-3"	"	4.43	97.5
G5	2	"	4'-11"	3'3"	5.13	10.3
G6	1	"	5'-6"	3'10"	5.74	5.7
G7	2	"	6'-1"	4'5"	6.34	12.7
G8	2	"	6'-7"	4'11"	6.87	13.7
G9	2	"	7'-1"	5'5"	7.39	14.8
G10	1	"	7'-6"	5'10"	7.82	7.8
G11	1	"	8'-2"	6'6"	8.57	8.5
G12	1	"	8'-8"	7'0"	9.04	9.0
G13	1	"	9'-2"	7'6"	9.56	9.6
G14	1	"	9'-9"	8'1"	10.17	10.2
G15	1	"	10'-2"	8'5"	10.60	10.6
G16	1	"	10'-8"	9'0"	11.13	11.1
G17	1	"	3'-0"	1'4"	3.13	3.1
G18	1	"	3'-5"	1'9"	3.56	3.6
G19	1	"	4'-0"	2'4"	4.17	4.2
G20	1	"	4'6"	2'10"	4.69	4.7
G21	1	"	5'0"	3'4"	5.22	5.2
G22	1	"	7'-8"	6'0"	8.00	8.0
G23	1	"	5'-8"	4'0"	5.91	5.9
G24	3	"	5'9"	4'1"	5.99	18.0
G25	2	"	5'11"	4'3"	6.17	12.3
G26	2	"	6'4"	4'6"	6.61	13.2
G27	2	"	6'10"	5'0"	7.13	14.3
G28	2	"	7'3"	5'4"	7.56	15.1
G29	2	"	7'11"	5'9"	8.26	16.5
G30	1	"	8'-5"	6'0"	8.78	8.8
G31	1	"	8'11"	6'4"	9.30	9.3
G32	1	"	9'6"	7'0"	9.91	9.9
G33	1	"	9'11"	7'4"	10.34	10.3
G34	1	"	10'6"	7'10"	10.95	11.0
G35	1	"	3'3"	1'7"	3.39	3.4
G36	1	"	3'8"	2'0"	3.82	3.8
G37	1	"	4'3"	2'7"	4.43	4.4
G38	2	"	4'9"	3'1"	4.95	9.9
G39	2	"	8'-3"	6'7" 3'10"	8.60	17.2
G40	1	"	6'9"	5'1" 3'10"	7.04	7.0
G41	1	"	7'0"	5'2" 3'10"	7.30	7.3
				TOTAL		1359#

MOVABLE CLOSURE STA. 5+34.5

SILL

F1	39	¾ sq.	18'-6"	Straight	27.79	1083.8
F2	18	"	16'-3"	16'11"	24.41	439.4
J6	3	"	15'-0"	Straight	22.53	67.6
G1	19	¾ sq.	17'-3"	17'3"	17.99	341.8
G2	16	"	3'-9"	Straight	3.91	62.6
G46	7	"	9'-9"	7'4" 6'7"	10.17	71.2
J1	2	⅝ sq.	15'-0"	Straight	10.02	20.0

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J2	17	⅝ sq.	17'-4"	5'6" 11'8"	11.58	196.9
				TOTAL		2269#

TWO ABUTMENTS

F3	8	¾ sq.	15'-9"	Straight	23.66	189.3
F4	18	"	14'-3"	"	21.40	385.2
F5	2	"	15'-7"	3'6" 4'6" 11'7"	23.41	46.8
G3	24	¾ sq.	11'-5"	Straight	11.91	285.8
G4	22	"	4'-3"	"	4.43	97.5
G5	2	"	4'-11"	3'3"	5.13	10.3
G6	1	"	5'-6"	3'10"	5.74	5.7
G7	2	"	6'-1"	4'5"	6.34	12.7
G8	2	"	6'-7"	4'11"	6.87	13.7
G9	2	"	7'-1"	5'5"	7.39	14.8
G10	1	"	7'-6"	5'10"	7.82	7.8
G11	1	"	8'-2"	6'6"	8.57	8.5
G12	1	"	8'-8"	7'0"	9.04	9.0
G13	1	"	9'-2"	7'6"	9.56	9.6
G14	1	"	9'-9"	8'1"	10.17	10.2
G15	1	"	10'-2"	8'5"	10.60	10.6
G16	1	"	10'-8"	9'0"	11.13	11.1
G17	1	"	3'-0"	1'4"	3.13	3.1
G18	1	"	3'-5"	1'9"	3.56	3.6
G19	1	"	4'-0"	2'4"	4.17	4.2
G20	1	"	4'6"	2'10"	4.69	4.7
G21	1	"	5'0"	3'4"	5.22	5.2
G22	1	"	7'-8"	6'0"	8.00	8.0
G23	1	"	5'-8"	4'0"	5.91	5.9
G24	3	"	5'9"	4'1"	5.99	18.0
G25	2	"	5'11"	4'3"	6.17	12.3
G26	2	"	6'4"	4'6"	6.61	13.2
G27	2	"	6'10"	5'0"	7.13	14.3
G28	2	"	7'3"	5'4"	7.56	15.1
G29	2	"	7'11"	5'9"	8.26	16.5
G30	1	"	8'-5"	6'0"	8.78	8.8
G31	1	"	8'11"	6'4"	9.30	9.3
G32	1	"	9'-6"	7'0"	9.91	9.9
G33	1	"	9'-11"	7'4"	10.34	10.3
G34	1	"	10'-6"	7'10"	10.95	11.0
G35	1	"	3'-3"	1'7"	3.39	3.4
G36	1	"	3'-8"	2'0"	3.82	3.8
G37	1	"	4'-3"	2'7"	4.43	4.4
G38	2	"	4'-9"	3'1"	4.95	9.9
G39	2	"	8'-3"	6'7" 3'10"	8.60	17.2
G40	1	"	6'-9"	5'1" 3'10"	7.04	7.0
G41	1	"	7'-0"	5'2" 3'10"	7.30	7.3
				TOTAL		1359#

SHEET 933-12.3/71

STORAGE VAULT STA. 83+28.1

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
E7	29	¾ sq.	15'-6"	12'8"	31.66	918.7
F9	6	¾ sq.	12'-0"	Straight	18.02	108.1
F10	2	"	14'-8"	"	22.03	44.1
G32	8	¾ sq.	4'-0"	"	4.17	33.4
J2	48	⅝ sq.	13'-9"	"	9.18	440.6
J4	22	"	12'-3"	"	8.18	180.0
J5	3	"	13'-3"	"	8.85	26.6
J6	6	"	13'-9"	9'8" 4'1" 11'3"	9.18	55.1
J7	62	"	13'-3"	Straight	13.14	814.7
J8	72	"	23'-0"	19'7"	15.36	337.9
J9	42	"	12'-0"	Straight	8.02	336.8
J10	18	"	13'-1"	11'3"	8.74	157.3
J11	18	"	15'-10"	14'6"	10.58	190.4
J12	7	"	5'-3"	2'7"	3.64	26.9
J13	4	"	10'-9"	5'1"	7.15	28.7
J14	20	"	16'-2"	6'11"	10.80	216.0
J15	5	"	14'-8"	Straight	9.80	78.4
J17	3	"	10'-5"	7'4"	6.96	20.9
J19	12	"	7'-2"	2'8"	4.79	57.5
				TOTAL		4272#

STORAGE VAULT STA. 4+00

E7	29	¾ sq.	15'-6"	14'8"	31.66	918.7
F9	6	¾ sq.	12'-0"	Straight	18.02	108.1
F10	2	"	14'-8"	"	22.03	44.1
G32	8	¾ sq.	4'-0"	"	4.17	33.4
J2	48	⅝ sq.	13'-9"	"	9.18	440.6
J4	22	"	12'-3"	"	8.18	180.0
J5	3	"	13'-3"	"	8.85	26.6
J6	6	"	13'-9"	9'8" 4'1" 11'3"	9.18	55.1
J7	62	"	13'-3"	Straight	13.14	814.7
J8	72	"	23'-0"	19'7"	15.36	337.9
J9	42	"	12'-0"	Straight	8.02	336.8
J10	18	"	13'-1"	11'3"	8.74	157.3
J11	18	"	15'-10"	14'6"	10.58	190.4
J12	7	"	5'-3"	2'7"	3.64	26.9
J13	4	"	10'-9"	5'1"	7.15	28.7

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 8 OF 13 SHEETS SCALE:

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED:

APPROVAL RECOMMENDED: APPROVED:

DR. BY RS TR. BY RS. CK. BY GBF

"RELIEVED AS BUILT" 933-14.1/8

785

REINFORCEMENT SCHEDULE

SIZE	D
½"	10"
⅝"	9"
1"	8"
1¼"	7"
1" OR 1¼ LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

STORAGE VAULT STA. 4+00 (CONT'D)

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J14	26	⅝" sq.	16'-2"	6'-10½"	10.80	280.8
J15	8	"	14'-5"	Straight	9.60	76.4
J17	3	"	10'-5"	12'-11½"	6.96	20.9
J18	4	"	6'-9"	Straight	4.51	18.0
J19	7	"	7'-2"	1'-2½" 2'-5"	4.79	33.5
				TOTAL		4131 #

SHEET 933-12.3/73 MOVABLE CLOSURE STA. 9+44

SILL

F1	16	¾" sq.	19'-0"	17'-8"	28.54	456.6
F2	20	"	17'-6"	Straight	26.29	525.8
F3	22	"	15'-6"	"	23.28	512.2
F4	26	"	17'-0"	15'-8"	25.53	663.8
F5	16	"	11'-1"	1'-11½" 9'-7"	16.65	266.4
G1	16	⅝" sq.	18'-10"	17'-7"	17.56	281.0
J1	14	⅝" sq.	7'-3"	2'-0" 4'-6"	4.84	67.8
J2	14	"	11'-4"	2'-0" 8'-4"	7.57	106.0
J3	2	"	15'-6"	6'-6"	10.35	20.7
J4	15	"	3'-4"	2'-6"	2.23	33.5
				TOTAL		2934 #

MOVABLE CLOSURE STA. 10+40

SILL

F1	16	¾" sq.	19'-0"	17'-8"	28.54	456.6
F2	16	"	17'-6"	Straight	26.29	420.6
F3	22	"	15'-6"	"	23.28	512.2
F4	26	"	17'-0"	15'-8"	25.53	663.8
F5	16	⅝" sq.	16'-10"	17'-7"	17.56	281.0
J1	14	⅝" sq.	7'-3"	2'-0" 4'-6"	4.84	67.8
J2	14	"	11'-4"	2'-0" 8'-4"	7.57	106.0
J3	2	"	15'-6"	6'-6"	10.35	20.7
J4	15	"	3'-4"	2'-6"	2.23	33.5
				TOTAL		2562 #

MOVABLE CLOSURES STATIONS 9+44 & 10+40

EAST & WEST ABUTMENTS

F6	6	¾" sq.	14'-4"	Straight	21.53	129.2
F7	2	"	14'-9"	"	22.15	44.3
F8	2	"	14'-9"	135°	22.15	44.3
G2	12	⅝" sq.	6'-4"	Straight	4.52	54.2
G3	12	"	10'-0"	6'-8"	10.43	125.2
G4	1	"	5'-1"	1'-9"	5.30	5.3
G5	2	"	5'-4"	2'-0"	5.56	11.1
G6	2	"	5'-8"	2'-4"	5.91	11.8

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT EACH	TOTAL WT.
G7	2	"	5'-10"	2'-6"	6.08	12.2
G8	2	"	6'-1"	2'-9"	6.34	12.7
G9	2	"	6'-4"	2'-9"	6.61	13.2
G10	2	"	6'-7"	2'-9"	6.87	13.7
G11	2	"	6'-10"	2'-9"	7.13	14.3
G12	1	"	7'-0"	2'-9"	7.30	7.3
G13	1	"	7'-4"	2'-9"	7.65	7.7
G14	1	"	7'-6"	2'-9"	7.82	7.8
G15	1	"	7'-10"	2'-9"	8.17	8.2
G16	1	"	5'-2"	1'-10"	5.39	5.4
G17	1	"	4'-11"	1'-7"	5.13	5.1
G18	1	"	4'-8"	1'-4"	4.87	4.9
G19	1	"	4'-5"	1'-3"	4.61	4.6
G20	1	"	4'-1"	9"	4.26	4.3
				TOTAL 1		547 #
				TOTAL 4		2188 #

SHEET 933-12.3/74 STORAGE VAULT STA. 10+40

D1	10	1¼"	17'-9"	Straight	34.06	340.6
D2	10	"	7'-3"	"	20.69	206.9
F9	29	¾" sq.	19'-6"	"	29.29	673.7
F10	4	"	15'-0"	"	19.53	78.1
F11	4	"	10'-0"	"	15.06	60.1
H12	16	"	17'-2"	16'-6"	25.78	412.5
F13	12	"	8'-3"	7'-7"	12.99	148.7
G1	20	⅝" sq.	16'-10"	17'-7"	17.56	351.2
G11	30	"	19'-9"	Straight	20.60	618.0
G12	20	"	9'-6"	"	9.91	198.2
G23	20	"	20'-8"	19'5"	21.64	432.8
G24	8	"	4'-0"	3'-0"	4.17	33.4
J5	40	¾" sq.	13'-0"	Straight	8.68	347.2
J6	49	"	18'-9"	"	13.19	567.2
J7	40	"	10'-2"	"	6.79	271.6
J8	12	"	10'-8"	10'-0"	7.13	85.6
J9	7	"	12'-5"	9'-11"	8.29	58.0
J10	9	"	12'-7"	10'-1"	8.41	75.7
J11	7	"	4'-1"	2'-7"	2.73	19.1
J12	7	"	12'-7"	10'-1"	8.41	58.9
J13	20	"	10'-0"	Straight	6.66	133.6
				TOTAL		5171 #

SHEET 933-12.3/76 MOVABLE CLOSURE STA. 25+15.4

SILL

F1	32	¾" sq.	20'-6"	20'-0"	31.04	993.3
F2	17	"	17'-0"	15'-8"	25.53	434.0
F3	2	"	18'-6"	18'-0" 135°	29.29	58.6
F4	5	"	20'-0"	18'-6" 135°	30.04	150.2
F5	2	"	16'-6"	15'-2"	24.78	49.6
F6	2	"	16'-3"	14'-11"	24.41	48.8
F7	1	"	20'-10"	135° 135°	31.29	31.3

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT EACH	TOTAL WT.
J1	17	⅝" sq.	3'-0"	Straight	2.00	34.0
J2	17	"	17'-11"	135° 1'-5½" 135°	11.97	203.5
J3	2	"	15'-3"	Straight	10.19	20.4
J4	1	"	14'-9"	"	9.85	9.9
J5	1	"	17'-9"	135° 1'-5½" 135°	11.86	11.9
J6	19	"	14'-1"	1'-6"-3"	9.41	178.8
				TOTAL		2,224 #

NORTH SEAL BLOCK

B2	1	1¼"	10'-9"	135° 135°	28.70	28.7
B3	1	"	11'-4"	135° 135°	30.26	30.3
J1	2	¾" sq.	3'-0"	Straight	2.00	4.0
J7	2	"	5'-9"	"	3.84	7.7
J8	4	"	7'-9"	"	5.18	20.7
J9	2	"	9'-9"	"	6.51	13.0
J10	4	"	12'-9"	"	8.18	32.7
J11	4	"	13'-0"	"	8.68	34.7
J12	2	"	14'-6"	"	9.69	19.4
J13	2	"	7'-0"	"	4.68	9.4
J14	2	"	5'-0"	"	3.34	6.7
J15	2	"	5'-6"	"	3.67	7.3
J16	3	"	5'-3"	1'-9"	3.51	10.5
J17	3	"	5'-9"	2'-6"	3.84	11.5
J18	6	"	3'-6"	Straight	2.34	14.0
J19	2	"	4'-0"	"	2.67	5.3
J20	2	"	8'-9"	"	5.84	11.7
J21	2	"	8'-3"	"	5.51	11.0
J22	1	"	6'-3"	1'-9"	4.17	4.2
J23	12	"	12'-0"	1'-6"	8.02	96.2
J24	2	"	6'-0"	Straight	4.01	8.0
J25	2	"	7'-6"	"	5.01	10.0
J26	2	"	6'-6"	"	4.34	8.7
				TOTAL		406 #

NORTH ABUTMENT

E1	7	¾" sq.	14'-6"	Straight	29.64	207.5
E2	9	"	7'-6"	"	15.33	46.0
F8	4	¾" sq.	16'-3"	"	24.41	97.6
F9	1	"	15'-9"	12'-6" 135°	23.66	23.7
F12	1	"	4'-9"	Straight	7.13	7.1
F13	9	"	14'-6"	"	21.78	65.3
G2	1	⅝" sq.	5'-11"	4'-3"	6.17	6.2
G3	2	"	8'-7"	4'-10"	6.87	13.7
G4	1	"	7'-2"	5'-6"	7.47	7.5
G5	2	"	7'-8"	6'-0"	8.00	16.0
G6	1	"	8'-2"	6'-6"	8.52	8.5
G7	1	"	8'-8"	7'-0"	9.04	9.0
G8	1	"	9'-2"	7'-6"	9.56	9.6
G9	1	"	9'-8"	8'-0"	10.08	10.1
G10	1	"	10'-2"	8'-6"	10.60	10.6

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT EACH	TOTAL WT.
G11	1	⅝" sq.	10'-10"	9'3"	11.30	11.3
G12	1	"	11'-2"	9'6"	11.65	11.7
G13	1	"	11'-6"	10'0"	12.17	12.2
G14	1	"	8'-3"	6'7"	8.60	8.6
G15	1	"	7'-0"	5'4"	7.30	7.3
G16	1	"	6'-0"	4'4"	6.26	6.3
G17	1	"	5'-6"	3'10"	5.74	5.7
G18	1	"	5'-0"	3'4"	5.22	5.2
G19	1	"	4'-6"	2'10"	4.69	4.7
G20	1	"	4'-0"	2'4"	4.17	4.2
G21	1	"	3'-5"	1'9"	3.56	3.6
G22	1	"	3'-0"	1'4"	3.13	3.1
G23	1	"	2'-6"	10"	2.61	2.6
G24	11	"	4'-3"	Straight	4.43	48.7
G25	12	"	11'-5"	"	11.91	142.9
				TOTAL		817 #

SOUTH ABUTMENT

D1	4	1¼"	16'-3"	Straight	43.39	173.6
E3	10	¾" sq.	7'-6"	"	15.33	153.3
E4	1	"	4'-3"	"	8.69	8.7
E5	5	"	14'-7"	"	29.81	149.1
F10	1	¾" sq.	15'-9"	3'-0" 12'-6" 135°	23.66	23.7
F11	1	"	15'-9"	3'-0" 12'-6" 135°	23.66	23.7
F13	6	"	14'-6"	Straight	21.78	130.7
G1	1	⅝" sq.	8'-9"	8'3"	4.95	5.0
G3	1	"	6'-7"	4'10"	6.87	6.9
G16	1	"	6'-0"	4'4"	6.26	6.3
G24	12	"	4'-3"	Straight	4.43	53.2
G26	1	"	11'-6"	9'10"	11.99	12.0
G27	1	"	11'-0"	9'4"	11.47	11.5
G28	1	"	10'-6"	8'10"	10.95	11.0
G29	1	"	10'-0"	8'4"	10.43	10.4
G30	1	"	9'-6"	7'10"	9.91	9.9
G31	1	"	9'-1"	7'5"	9.47	9.5
G32	1	"	8'-7"	6'11"	8.95	9.0
G33	1	"	8'-1"	6'5"	8.43	8.4

* J6 Shown as J16 in Sec. A-A

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 9 OF 13 SHEETS SCALE:

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] DIVISION ENGINEER

APPROVED: [signature] CHIEF, ENGINEERING DIVISION, LOWER MISSISSIPPI VALLEY DIVISION

DR. BY P.S. TR. BY P.S. CK. BY E.B.F.

"BELIEVED AS BUILT" 933-14.1/9

786

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

REINFORCEMENT SCHEDULE

SIZE	D
#3	10"
#4	9"
#5	8"
#6	7"
#7 OR #8	6"

DIMENSION GIVEN IN BENDING DIAGRAM

SOUTH ABUTMENT (CONT'D)

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
S34	1	#6	7'-7"	5'-11"	7.91	7.9
S35	1	"	6'-11"	5'-3"	7.21	7.2
S38	1	"	6'-10	3'-2"	5.04	5.0
S39	1	"	5'-6"	3'-8"	5.56	5.6
S40	1	"	5'-10"	4'-2"	6.08	6.1
S41	1	"	6'-4"	4'-8"	6.61	6.6
S42	1	"	6'-10"	5'-2"	7.13	7.1
S43	1	"	7'-3"	5'-7"	7.56	7.6
S44	1	"	7'-9"	6'-1"	8.08	8.1
S45	1	"	8'-3	6'-7"	8.50	8.6
S46	1	"	8'-9"	7'-1"	9.13	9.1
S47	1	"	9'-5"	7'-9"	9.82	9.8
S48	1	"	9'-9"	8'-1"	10.17	10.2
S49	1	"	10'-4"	8'-6"	10.78	10.8
S50	12	"	14'-3"	Straight	14.86	178.3
				TOTAL		1104 #

SHEET 933-12.3/78 STORAGE VAULT STA. 26+02.29

F5	8	#6	15'-6"	Straight	20.28	162.2
F9	31	"	14'-2"	13'-6"	21.28	659.7
F10	15	"	7'-5"	6'-7"	11.14	167.1
F12	16	"	32'-6"	Straight	46.62	781.1
F13	8	"	8'-6"	"	12.77	102.2
F14	33	"	16'-5"	15'-9"	24.66	813.8
F15	32	"	5'-6"	Straight	8.26	264.3
G2	16	#6	4'-0"	"	6.17	98.7
G3	74	"	32'-6"	"	33.90	813.6
G6	44	"	9'-0"	8'-4"	9.39	413.2
J36	93	#7	8'-6"	Straight	5.68	528.2
J37	10	"	10'-10"	8'-4"	7.26	72.6
J38	48	"	13'-6"	Straight	9.02	442.0
J39	16	"	6'-6"	3'-3" 3'-3"	4.34	69.4
J40	19	"	5'-0"	1'-6" 2'-11"	3.34	63.4
J41	28	"	8'-9"	8'-5"	6.51	182.3
J42	31	"	10'-0"	8'-9"	6.65	207.1
J43	6	"	11'-0"	9'-6"	7.35	44.1
J44	41	"	32'-9"	Straight	21.88	897.1
J45	93	"	13'-10"	12'-9" 1'-1"	9.24	904.9
				TOTAL		7045 #

SHEET 933-12.3/80 MOVABLE CLOSURE STA. 26+90.3

SILL

F1	27	#7	28'-0"	22'8"	36.05	973.4

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F2	14	#7	6'-0"	1'-6" 3'-6"	9.01	126.1
F3	23	"	13'-8"	12'-4"	20.53	472.2
F11	6	"	4'-6"	Straight	6.76	40.6
G1	9	#6	9'-3"	3'-5"	9.45	86.9
G4	4	"	7'-9"	6'-6"	8.08	32.3
G5	4	"	6'-0"	5'-4"	6.26	25.0
J1	22	#7	14'-6"	3'-8" 10'-10" 3'-8"	9.69	213.2
J2	2	"	12'-3"	Straight	8.18	16.4
J3	21	"	3'-3"	"	2.17	45.6
				TOTAL		2032 #

EAST ABUTMENT

D1	2	1"	13'-3"	12'-4"	35.38	70.8
D2	1	"	7'-0"	6'-1"	18.69	18.7
F4	7	#7	12'-3"	Straight	18.40	128.8
F5	4	"	13'-6"	"	20.28	81.1
F6	4	"	6'-0"	"	9.01	36.0
F7	1	"	13'-8"	3'-4" 3'-8" 6'-4"	20.53	20.5
J4	1	#7	7'-0"	5'-10"	4.68	4.7
J5	1	"	6'-6"	5'-4"	4.36	4.3
J6	1	"	6'-0"	4'-10"	4.01	4.0
J7	1	"	5'-6"	4'-4"	3.67	3.7
J8	1	"	5'-0"	3'-10"	3.34	3.3
J9	1	"	4'-7"	3'-5"	3.06	3.1
J10	1	"	4'-0"	2'-10"	2.67	2.7
J11	1	"	3'-7"	2'-5"	2.39	2.4
J12	1	"	3'-3"	2'-1"	2.17	2.2
J13	1	"	2'-7"	1'-5"	1.73	1.7
J14	1	"	4'-5"	3'-3"	2.95	3.0
J15	1	"	4'-11"	3'-3"	3.28	3.3
J16	1	"	5'-5"	4'-3"	3.62	3.6
J17	1	"	5'-11"	4'-9"	3.95	4.0
J18	1	"	6'-5"	5'-3"	4.29	4.3
J19	1	"	6'-11"	5'-8"	4.62	4.6
J20	1	"	7'-6"	6'-4"	5.01	5.0
J21	1	"	7'-11"	6'-9"	5.29	5.3
J22	1	"	8'-4"	7'-2"	5.57	5.6
J23	1	"	8'-11"	7'-9"	5.96	6.0
J24	10	"	10'-6"	Straight	7.01	70.1
J25	10	"	3'-9"	Straight	2.50	25.0
				TOTAL		526 #

WEST ABUTMENT

D1	2	1"	13'-3"	12'-4"	35.38	70.8
D2	1	"	7'-0"	6'-1"	18.69	18.7
F4	7	#7	12'-3"	Straight	18.40	128.8
F5	4	"	13'-6"	"	20.28	81.1
F6	4	"	6'-0"	"	9.01	36.0
F8	1	"	13'-8"	4'-0" 3'-4" 5'-8"	20.53	36.0
J4	2	#7	7'-0"	5'-10"	4.68	9.4

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J5	1	#7	6'-8"	5'-8"	4.45	4.5
J6	1	"	6'-2"	5'-0"	4.12	4.1
J7	1	"	5'-8"	4'-6"	3.79	3.8
J14	2	"	4'-5"	3'-3"	2.95	5.9
J15	1	"	4'-10"	3'-8"	3.23	3.2
J16	1	"	5'-3"	4'-1"	3.51	3.5
J17	1	"	5'-9"	4'-7"	3.84	3.8
J24	10	"	10'-7"	Straight	7.07	70.7
J25	1	"	5'-0"	3'-10"	3.34	3.3
J26	1	"	7'-8"	6'-6"	5.12	5.1
J27	1	"	8'-1"	6'-11"	5.40	5.4
J28	1	"	8'-6"	7'-4"	5.68	5.7
J29	1	"	9'-2"	8'-0"	6.12	6.1
J30	1	"	3'-10"	2'-8"	2.56	2.6
J31	1	"	3'-5"	2'-3"	2.28	2.3
J32	1	"	3'-0"	1'-10"	2.00	2.0
J33	1	"	2'-5"	1'-3"	1.61	1.6
J34	1	"	6'-4"	5'-2"	4.23	4.2
J35	10	"	3'-9"	Straight	2.50	25.0
				TOTAL		544 #

SHEET 933-12.3/82 MOVABLE CLOSURES STATIONS 29+80.3, 31+01.3 & 36+84.5

SILL

F1	24	#7	15'-11"	14'-6"	23.78	570.7
F2	13	"	15'-10"	14'-6"	23.78	309.1
F3	15	"	14'-10"	13'-6"	22.28	334.2
G1	15	#6	14'-5"	6'-1"	15.30	229.5
J1	2	#7	13'-6"	Straight	9.01	18.0
J2	13	"	13'-9"	3'-9" 2'-11" 3'-9" 3'-4"	9.18	119.3
J3	12	"	5'-3"	4'-1" 3'-4"	3.51	42.1
J4	12	"	5'-3"	4'-1" 3'-4"	3.51	42.1
J5	12	"	2'-6"	Straight	1.67	20.0
				TOTAL 1		1665 #
				TOTAL 3		5055 #

ABUTMENTS

F4	22	#7	14'-6"	13'10"	21.78	479.2
J6	24	#7	6'-0"	Straight	5.34	128.2
J7	2	"	4'-8"	3'-2"	2.89	5.8
J8	2	"	4'-7"	3'-5"	3.06	6.1
J9	2	"	4'-11"	3'-9"	3.28	6.6
J10	2	"	5'-2"	4'-0"	3.45	6.9
J11	2	"	5'-5"	4'-3"	3.62	7.2
J12	2	"	5'-8"	4'-6"	3.79	7.6
J13	2	"	6'-0"	4'-10"	4.01	8.0
J14	2	"	6'-2"	5'-0"	4.12	8.2
J15	2	"	6'-4"	5'-2"	4.23	8.5
J16	2	"	6'-8"	5'-6"	4.45	8.9
J17	2	"	6'-11"	5'-9"	4.62	9.2

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J18	2	#7	7'-2"	6'-0"	4.79	9.6
J19	2	"	4'-6"	3'-4"	3.01	6.0
J20	2	"	4'-2"	3'-0"	2.78	5.6
J21	2	"	3'-11"	2'-9"	2.62	5.2
J22	2	"	3'-6"	2'-6"	2.45	4.9
J23	2	"	3'-5"	2'-3"	2.28	4.6
J26	2	"	2'-8"	1'-6"	1.78	3.6
J25	2	"	2'-2"	1'-0"	1.45	2.9
J26	2	"	1'-11"	9"	1.28	2.6
J36	24	"	3'-6"	Straight	2.34	56.2

For additional bars and totals see sheet No. 19

SHEET 933-12.3/83 STORAGE VAULTS STATIONS 30+32.8 & 36+40.0

F5	6	#6	7'-9"	7'-1"	11.64	69.8
F6	18	"	15'-6"	Straight	23.28	419.0
F7	4	"	13'-6"	"	20.28	81.1
F8	14	"	14'-2"	13'-6"	21.28	297.9
F9	2	"	11'-0"	8'-8"	16.52	33.0
F10	2	"	8'-0"	Straight	12.02	24.0
F11	15	"	16'-5"	15'-9"	24.66	369.9
F12	15	"	5'-6"	Straight	8.26	123.9
G2	6	#6	4'-0"	"	6.17	37.4
G3	24	"	15'-6"	"	16.17	388.1
G4	22	"	9'-0"	8'-4"	9.39	206.6
J1	34	#7	13'-6"	Straight	9.02	306.7
J27	6	"	5'-3"	4'-1" 3'-4"	3.51	21.1
J28	15	"	13'-10"	5'-9" 3'-4" 4'-7"	9.24	138.6
J29	39	"	15'-6"	Straight	10.35	403.7
J30	14	"	10'-0"	8'-4"	6.68	93.5
J31	59	"	8'-6"	Straight	5.68	901.0
J32	18	"	11'-0"	8'-8"	7.35	132.3
J33	9	"	9'-9"	8'-5"	6.51	58.6
J34	6	"	6'-5"	3'-4" 3'-1"	5.82	33.7
				TOTAL 1		3536 #
				TOTAL 2		7092 #

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 10 OF 13 SHEETS SCALE

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: ENGINEER, CHIEF OF DESIGN

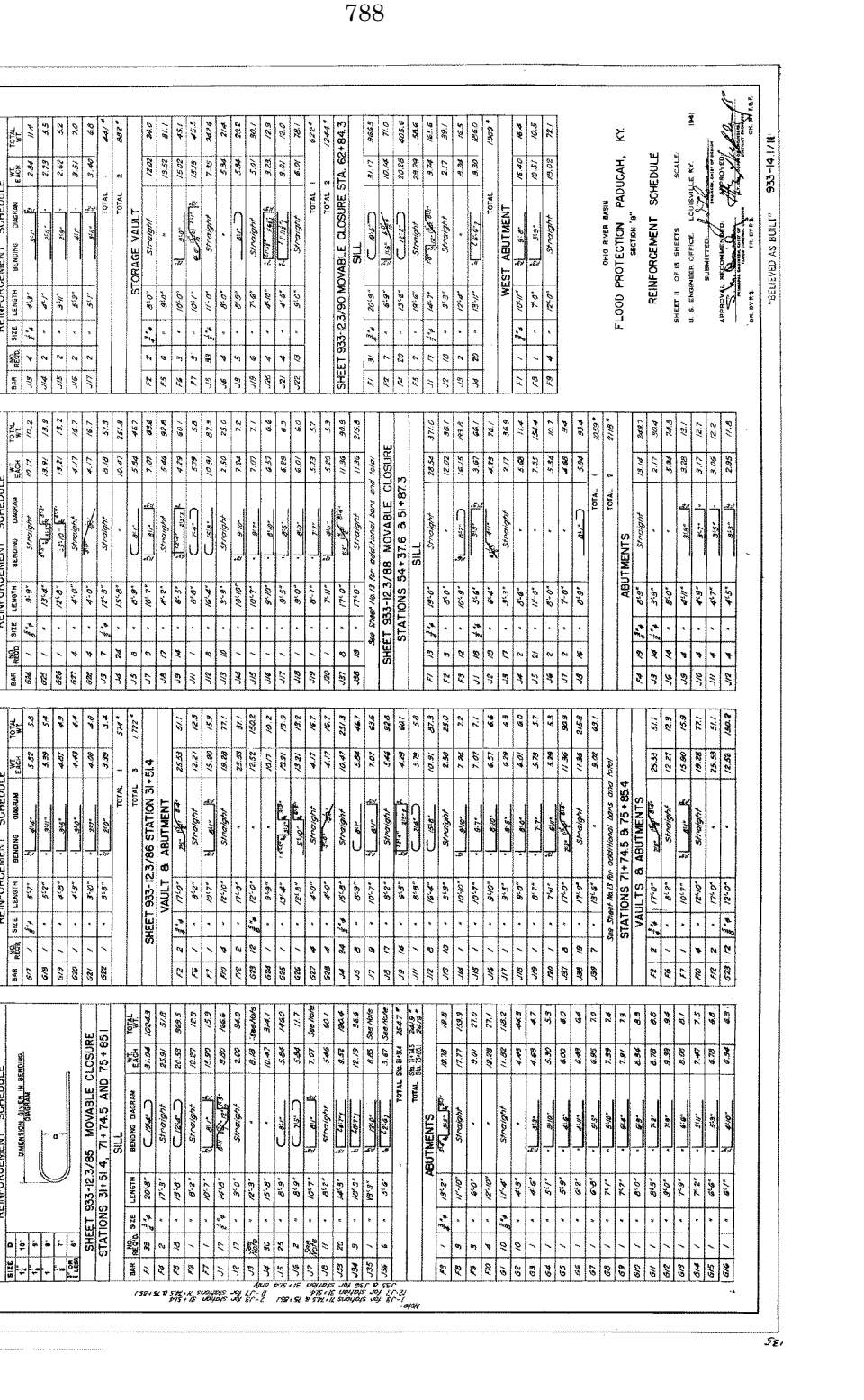
APPROVED RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DESIGN SECTION

APPROVED: LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY P.B. TR. BY P.B. CK. BY F.S.F

"BELIEVED AS BUILT."

933-14.1/10


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "M"
REINFORCEMENT SCHEDULE
SHEET II OF 13 SHEETS
SCALE
U. S. ENGINEER OFFICE LOUISVILLE, KY.
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
"BELIEVED AS BUILT"
933-14-1/11
SHEET 933-12.3/85 MOVABLE CLOSURE STATIONS 31+51.4, 71+74.5 AND 75+85.1
SILL
VAULTS & ABUTMENTS
STATIONS 71+74.5 & 75+85.4
ABUTMENTS
SHEET 933-12.3/86 STATION 31+51.4
VAULT & ABUTMENT
SHEET 933-12.3/88 MOVABLE CLOSURE
STATIONS 54+37.6 & 51+87.3
SILL
SHEET 933-12.3/90 MOVABLE CLOSURE STA. 62+84.3
SILL
STORAGE VAULT
WEST ABUTMENT
REINFORCEMENT SCHEDULE
BAR MARKS
NO. REQD.
SIZE
LENGTH
BENDING DIAGRAM
E.ACH.
TOTAL WT.
Straight
Sheet No.13 for additional bars and total
TOTAL 1
TOTAL 2
TOTAL 3

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

REINFORCEMENT SCHEDULE

SIZE	D
1-1/4"	10"
1-1/8"	9"
1"	8"
7/8"	7"
3/4" OR LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

WEST ABUTMENT (CONT'D)

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F11	4	3/4"φ	12'-9"	Straight	19.15	76.6
G1	11	5/8"φ	12'-0"	"	12.52	137.7
G2	1	"	9'-3"	"	9.65	9.7
G3	1	"	13'-6"	5'-7" 3'-5" 3'-2"	14.08	14.1
G4	1	"	13'-6"	2'-5" 3'-5" 6'-4"	14.08	14.1
G5	4	"	4'-0"	2'-8" (diagram)	4.17	16.7
G6	4	"	4'-0"	Straight	4.17	16.7
J4	1	1/2"φ	5'-5"	4'-3"	3.62	3.6
J5	1	"	6'-5"	5'-3"	4.29	4.3
J6	1	"	6'-8"	5'-6"	4.45	4.5
J7	1	"	7'-2"	6'-0"	4.79	4.8
J8	1	"	7'-8"	6'-6"	5.12	5.1
J9	1	"	8'-2"	7'-0"	5.46	5.5
J10	1	"	8'-8"	7'-6"	5.79	5.8
J11	1	"	8'-11"	7'-9"	5.96	6.0
J12	1	"	9'-8"	8'-6"	6.46	6.5
J13	1	"	5'-2"	4'-0"	3.45	3.5
J14	1	"	4'-8"	3'-6"	3.12	3.1
J15	1	"	4'-5"	3'-3"	2.95	3.0
J16	1	"	3'-11"	2'-9"	2.62	2.6
J17	1	"	3'-5"	2'-3"	2.28	2.3
J18	1	"	2'-11"	1'-9"	1.95	2.0
J19	1	"	2'-8"	1'-6"	1.78	1.8
J20	6	"	12'-7"	3'-0" (diagram)	8.41	50.5
J21	7	"	15'-9"	Straight	10.52	73.6
J22	9	"	3'-9"	"	2.50	22.5
				TOTAL		596*

EAST ABUTMENT

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F10	10	3/4"φ	11'-9"	Straight	17.65	176.5
* F11	4	"	12'-9"	"	19.15	76.6
F12	1	"	13'-1"	4'-9" 3'-5" 5'-2"	19.65	19.7
F13	3	"	6'-0"	Straight	9.01	27.0
G7	10	5/8"φ	4'-3"	"	4.43	44.3
G8	9	"	11'-10"	"	12.34	111.1
G9	2	"	7'-8"	6'-0"	8.00	16.0
G10	2	"	7'-3"	5'-5"	7.39	14.8
G11	2	"	6'-6"	4'-10"	6.78	13.6
G12	2	"	5'-11"	4'-3"	6.17	12.3
G13	1	"	5'-6"	3'-10"	5.74	5.7
G14	1	"	5'-2"	3'-6"	5.39	5.4
G15	1	"	4'-4"	2'-10"	4.63	4.7

* Bar shown as F6 on Plan.

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G16	1	5/8"φ	4'-2"	2'-6"	4.35	4.4
G17	1	"	3'-10	2'-2"	4.00	4.0
G18	1	"	3'-2"	1'-6"	3.30	3.3
G19	1	"	8'-1"	6'-5"	8.43	8.4
G20	1	"	8'-5"	6'-9"	8.78	8.8
G21	1	"	9'-1"	7'-5"	9.47	9.5
G22	1	"	9'-5"	7'-9"	9.82	9.8
G23	1	"	9'-9"	8'-1"	10.17	10.2
G24	1	"	10'-5"	8'-9"	10.86	10.9
				TOTAL		597*

SHEET 933-12.3/91 STATION 62+84.3
BUTTRESSED "T" WALL
BASE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F6	3	3/4"φ	8'-0"	7'-4"	12.02	36.1
F13'	2	"	6'-0"	Straight	9.01	18.0
F14	3	"	21'-6"	20'-2"	32.29	96.9
F15	5	"	20'-3"	Straight	30.42	152.1
F16	3	"	22'-4"	(diagram)	33.54	100.6
F17	14	"	23'-6"	Straight	35.30	494.2
F19	11	"	15'-0"	13'-8"	22.53	247.8
F20	10	"	8'-6"	7'-10"	12.77	127.7
F21	3	"	7'-3"	Straight	10.89	32.7
G27	11	5/8"φ	14'-4"	13'-8"	14.95	164.5
G28	14	"	10'-3"	9'-7"	10.69	149.7
J41	24	1/2"φ	12'-11"	5'-4"	8.63	207.1
				TOTAL		1830*

COUNTERFORTS

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G29	4	5/8"φ	12'-6"	Straight	13.04	52.2
G30	2	"	12'-9"	"	13.30	26.6
J33	2	1/2"φ	4'-9"	1'-5"	3.17	6.3
J34	3	"	5'-7"	1'-10"	3.73	11.2
J35	3	"	6'-3"	2'-2"	4.17	12.5
J36	3	"	7'-1"	2'-7"	4.73	14.2
J37	3	"	7'-7"	2'-10"	5.07	15.2
J38	3	"	8'-7"	3'-4"	5.73	17.2
J39	1	"	4'-5"	1'-3"	2.95	3.0
J40	1	"	5'-1"	1'-7"	3.40	3.4
				TOTAL		162*

STEM

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F70	20	3/4"φ	13'-2"	12'-6"	19.78	395.6
F21	9	"	8'-6"	7'-10"	12.77	114.9
G31	6	5/8"φ	22'-8"	(diagram)	23.64	141.8
G32	8	"	21'-6"	20'-2"	22.42	179.4
G33	8	"	20'-2"	Straight	21.03	168.2
				TOTAL		1000*

REINFORCEMENT SCHEDULE

SHEET 933-12.3/93 STATION 62+84.3
STORAGE VAULT (LESS W. ABUT)

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G25	27	5/8"φ	11'-9"	10'-5"	12.26	331.0
J21	41	1/2"φ	15'-9"	Straight	10.52	431.3
J23	8	"	11'-3"	10'-7"	7.51	60.1
J24	9	"	9'-0"	Straight	6.01	54.1
J25	22	"	10'-6"	"	7.01	154.2
J26	14	"	12'-10"	10'-4"	8.57	120.0
J27	7	"	15'-3"	10'-4"	10.19	71.3
J28	13	"	12'-0"	Straight	8.02	104.3
J29	17	"	11'-0"	"	7.35	125.0
J30	13	"	11'-3"	"	7.51	97.6
				TOTAL		1549*

STATION 68+61.0 STORAGE VAULT

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F6	4	3/4"φ	11'-8"	Straight	17.52	70.1
F7	4	"	8'-0"	"	12.02	48.1
F8	13	"	15'-6"	"	23.28	302.6
G1	8	5/8"φ	4'-0"	"	4.17	33.4
G2	14	"	12'-3"	11'-7"	12.78	178.9
G3	7	"	7'-6"	6'-10"	7.82	54.7
J24	32	1/2"φ	11'-6"	Straight	7.68	245.8
J25	16	"	11'-6"	(diagram)	7.68	122.9
J26	53	"	15'-9"	Straight	10.52	557.6
J27	14	"	9'-3"	8'-0"	6.18	86.5
J28	31	"	8'-0"	Straight	5.34	165.5
J29	8	"	9'-3"	7'-11"	6.18	49.4
J30	16	"	7'-3"	6'-7"	4.84	77.4
J31	7	"	6'-0"	2'-0" 2'-2"	4.01	28.1
J32	7	"	5'-3"	2'-4"	3.51	24.6
J38	16	"	14'-3"	13'-7"	9.52	152.3
				TOTAL		2198*

SHEET 933-12.3/95 MOVABLE CLOSURES
STATION 67+73.5 & 69+64.3
SILL

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
E1	4	7/8"φ	14'-6"	Straight	29.64	118.6
F1	15	3/4"φ	10'-9"	9'-5"	16.15	242.3
F2	24	"	14'-6"	Straight	21.78	522.7
J1	14	1/2"φ	4'-6"	1'-10" (diagram)	3.01	42.1
J2	14	"	5'-3"	2'-6" (diagram)	3.51	49.1
J3	15	"	9'-3"	Straight	6.18	92.7
J14	15	"	12'-6"	5'-1"	8.35	125.3
				TOTAL 1		1193*
				TOTAL 2		2386*

ABUTMENT

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F4	4	7/8"φ	10'-9"	Straight	21.97	87.9
F5	5	"	11'-3"	10'-7"	22.99	115.0
J4	9	1/2"φ	3'-6"	Straight	2.34	21.1
J5	10	"	5'-8"	"	3.79	37.9

REINFORCEMENT SCHEDULE

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J6	1	1/2"φ	4'-9"	2'-6"	3.17	3.2
J7	1	"	4'-8"	2'-5"	3.12	3.1
J8	1	"	4'-3"	2'-0"	2.84	2.8
J9	1	"	4'-0"	1'-9"	2.67	2.7
J10	1	"	3'-9"	1'-6"	2.50	2.5
J11	1	"	3'-6"	1'-3"	2.34	2.3
J12	1	"	3'-3"	12"	2.17	2.2
J13	1	"	3'-0"	9"	2.00	2.0
J17	1	"	4'-6"	2'-3"	3.01	3.0
J18	1	"	4'-9"	2'-6"	3.17	3.2
J22	1	"	5'-9"	3'-6"	3.84	3.8
J23	1	"	6'-0"	3'-9"	4.01	4.0
J33	1	"	3'-11"	1'-8"	2.62	2.6
J34	1	"	4'-2"	1'-11"	2.78	2.8
J35	1	"	4'-11"	2'-8"	3.28	3.3
J36	1	"	5'-2"	2'-11"	3.45	3.5
J37	1	"	5'-5"	3'-2"	3.62	3.6
				TOTAL 1		313*
				TOTAL 4		1252*

SHEET 933-12.3/97 MOVABLE CLOSURE
SILL & ABUTMENT STATION 83+92.1

BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
D1	20	1-1/4"φ	38'-6"	36'-8"	102.80	2056.0
D2	1	"	38'-0"	36'-2"	101.46	101.5
D3	1	"	37'-3"	35'-5"	99.46	99.5
D4	10	"	16'-3"	Straight	43.39	433.9
D5	2	"	15'-3"	14'-4"	40.72	81.4
D6	2	"	7'-9"	6'-10"	20.69	41.4
D7	1	"	9'-3"	8'-4"	24.70	24.7
E1	7	7/8"φ	14'-6"	Straight	29.64	207.5
E2	14	"	8'-0"	"	16.35	228.9
E3	1	"	4'-9"	"	9.71	9.7
E4	1	"	5'-3"	"	10.73	10.7
E5	2	"	15'-10"	(diagram)	32.36	64.7
E6	2	"	15'-10"	(diagram)	32.36	64.7
F1	11	3/4"φ	14'-3"	Straight	21.40	235.4
F2	2	"	5'-0"	3'-6"	7.51	15.0

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 12 OF 13 SHEETS SCALE:

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [signature] LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY P.S. TR. BY P.S. CK. BY F.B.E.

"BELIEVED AS BUILT" 933-14.1/12

136

REINFORCEMENT SCHEDULE

SIZE	D
#6 OR LESS	6"

DIMENSION GIVEN IN BENDING DIAGRAM

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
SILL & ABUTMENT (CONT'D.)						
I3	13	#9	38'-0"	38'8"	57.08	742.0
I4	2	"	35'-0"	35'-6"	52.57	105.1
I5	1	"	36'-6"	37'0"	54.82	54.8
I6	20	"	7'-0"	1/16" R 7'-0" 7'1"	10.51	210.2
I7	35	"	19'-3"	14'-11"	24.41	854.4
I8	1	"	13'-8"	13'9"	20.53	20.5
I11	1	"	14'-9"	14'1"	22.15	22.2
G1	34	#9	3'-9"	Straight	3.91	132.9
G2	21	"	9'-3"	5'-6" 3'-9"	9.65	202.7
G3	12	"	14'-0"	Straight	14.69	175.2
G4	12	"	11'-5"	"	11.91	142.9
G5	23	"	4'-3"	"	4.43	101.9
G6	1	"	10'-10"	9'-2"	11.30	11.3
G7	1	"	10'-3"	8'-7"	10.69	10.7
G8	3	"	9'-7"	7'-11"	10.00	30.0
G9	2	"	9'-2"	7'-6"	9.56	19.1
G10	2	"	8'-8"	7'-0"	9.04	18.1
G11	3	"	8'-3"	6'-7"	8.60	25.8
G12	2	"	7'-7"	5'-11"	7.91	15.8
G13	3	"	7'-1"	5'-5"	7.39	22.2
G14	3	"	6'-7"	4'-11"	6.87	20.6
G15	3	"	5'-10"	4'-2"	6.08	18.2
G16	2	"	5'-1"	3'-5"	5.30	10.6
G17	2	"	4'-11"	3'-3"	5.13	10.3
G18	1	"	5'-7"	3'-11"	5.82	5.8
G19	2	"	6'-2"	4'-6"	6.43	12.9
G20	3	"	9'-11"	8'-5"	10.34	31.0
G21	2	"	10'-8"	9'-0"	11.13	22.3
G22	1	"	4'-1"	2'-8"	4.26	4.3
G23	1	"	4'-10"	3'-2"	5.04	10.1
G24	1	"	5'-3"	3'-7"	5.48	5.5
G25	1	"	6'-4"	4'-8"	6.61	6.6
G26	1	"	6'-10"	5'-2"	7.13	7.1
G27	1	"	7'-9"	6'-1"	8.08	8.1
G28	1	"	7'-5"	5'-9"	7.74	7.7
G29	2	"	8'-11"	7'-3"	9.30	18.6
G30	1	"	7'-11"	6'-3"	8.26	8.3
G31	1	"	8'-5"	6'-9"	8.78	8.8
J1	34	#9	17'-4"	3/16" R 17'-4" 17'-3"	11.56	393.1
J3	1	"	15'-0"	Straight	10.02	10.0

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J16	1	#6	12'-9"	Straight	8.52	8.5
J20	16	"	4'-7"	1'-6" 3'-7"	3.06	49.0
J21	2	"	15'-6"	Straight	10.35	20.7
J22	1	"	16'-9"	2'-7" 1'-6" 4'-1" 1'-6" 2'-7"	11.19	11.2
				TOTAL		730.3 #
SHEET 933-12.3/86 STA. 31+51.4, 71+74.5 & 75+85.1						
VAULT & ABUTMENT (CONT'D. FROM SHEET II)						
J10	1	#6	9'-6"	8'-6"	6.35	6.4
J21	1	"	7'-7"	6'-7"	5.07	5.1
J22	1	"	7'-3"	6'-3"	4.84	4.8
J23	1	"	6'-7"	5'-7"	4.40	4.4
J24	1	"	5'-3"	4'-3"	3.51	3.5
J25	1	"	5'-6"	4'-6"	3.67	3.7
J26	1	"	6'-3"	5'-3"	4.17	4.2
J27	1	"	6'-8"	5'-8"	4.45	4.5
J28	1	"	7'-1"	6'-1"	4.73	4.7
J29	1	"	7'-6"	6'-6"	5.01	5.0
J30	1	"	8'-2"	7'-2"	5.46	5.5
J31	1	"	8'-6"	7'-6"	5.68	5.7
J32	1	"	8'-10"	7'-10"	5.90	5.9
				TOTAL FOR CLOSURE AT STATION 31+51.4		153.8 #
				TOTAL FOR CLOSURE AT STATION 71+74.5		159.6 #
				TOTAL FOR CLOSURE AT STATION 75+85.1		159.6 #
SHEET 933-12.3/82 MOVABLE CLOSURES STATIONS 29+80.3, 31+01.3 & 36+84.5 ABUTMENTS (CONT'D. FROM SHEET 10)						
J37	2	#6	3'-2"	2'-0"	2.12	4.2
J38	2	"	2'-11"	1'-9"	1.95	3.9
J39	2	"	2'-5"	1'-3"	1.61	3.2
				TOTAL 2		603 #
				TOTAL 3		2409 #

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCEMENT SCHEDULE

SHEET 13 OF 13 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: [signature] DIVISION, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION OR. BY P.S.

APPROVED: [signature] COL. CORPS OF ENGINEERS DISTRICT ENGINEER CK. BY T.S.B.

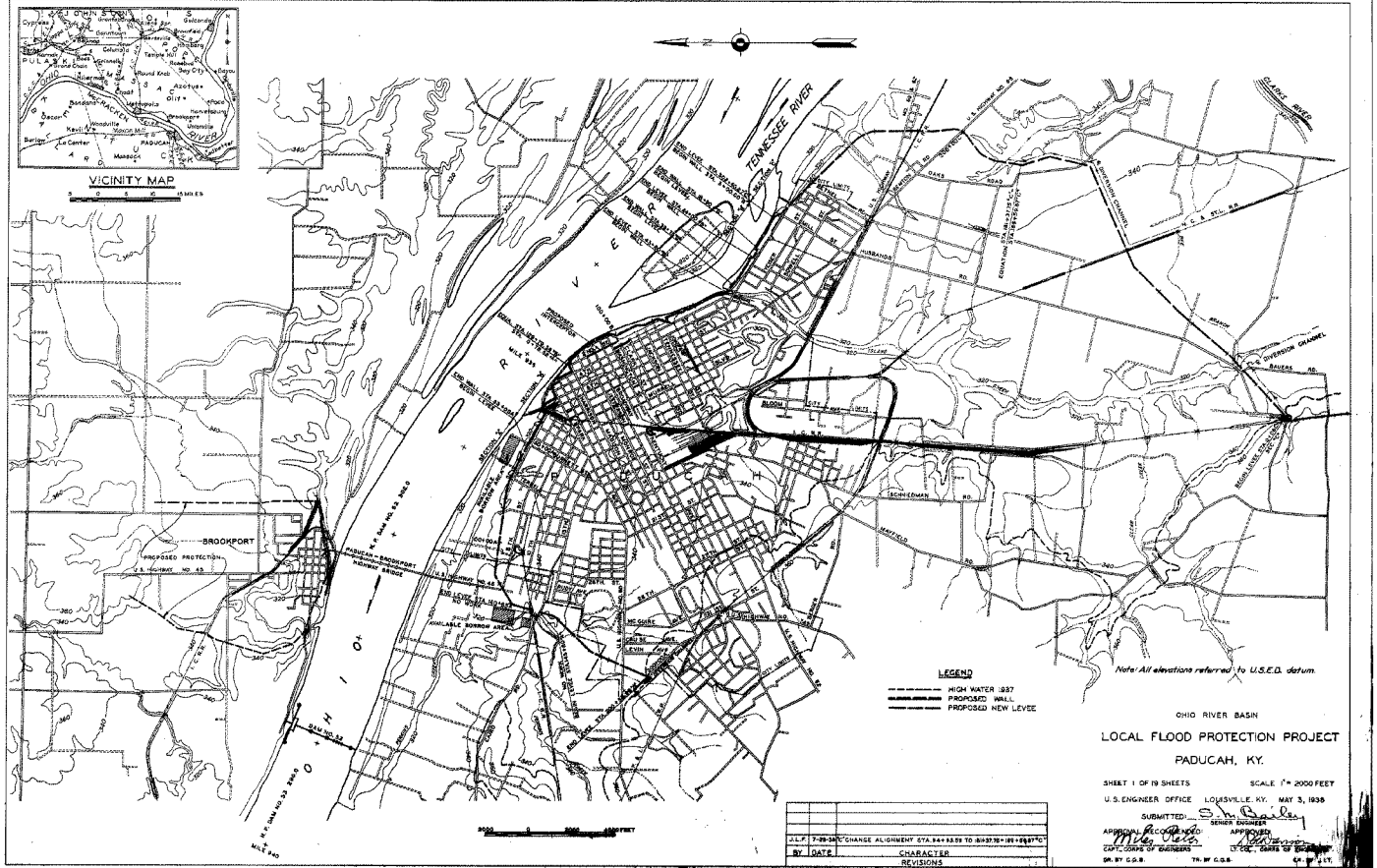
"BELIEVED AS BUILT" 933-14.1/13

790

137

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

LOCAL FLOOD PROTECTION PROJECT

PADUCAH, KY.

SHEET 1 OF 19 SHEETS SCALE 1" = 2000 FEET

U.S. ENGINEER OFFICE LOUISVILLE, KY. MAY 3, 1938

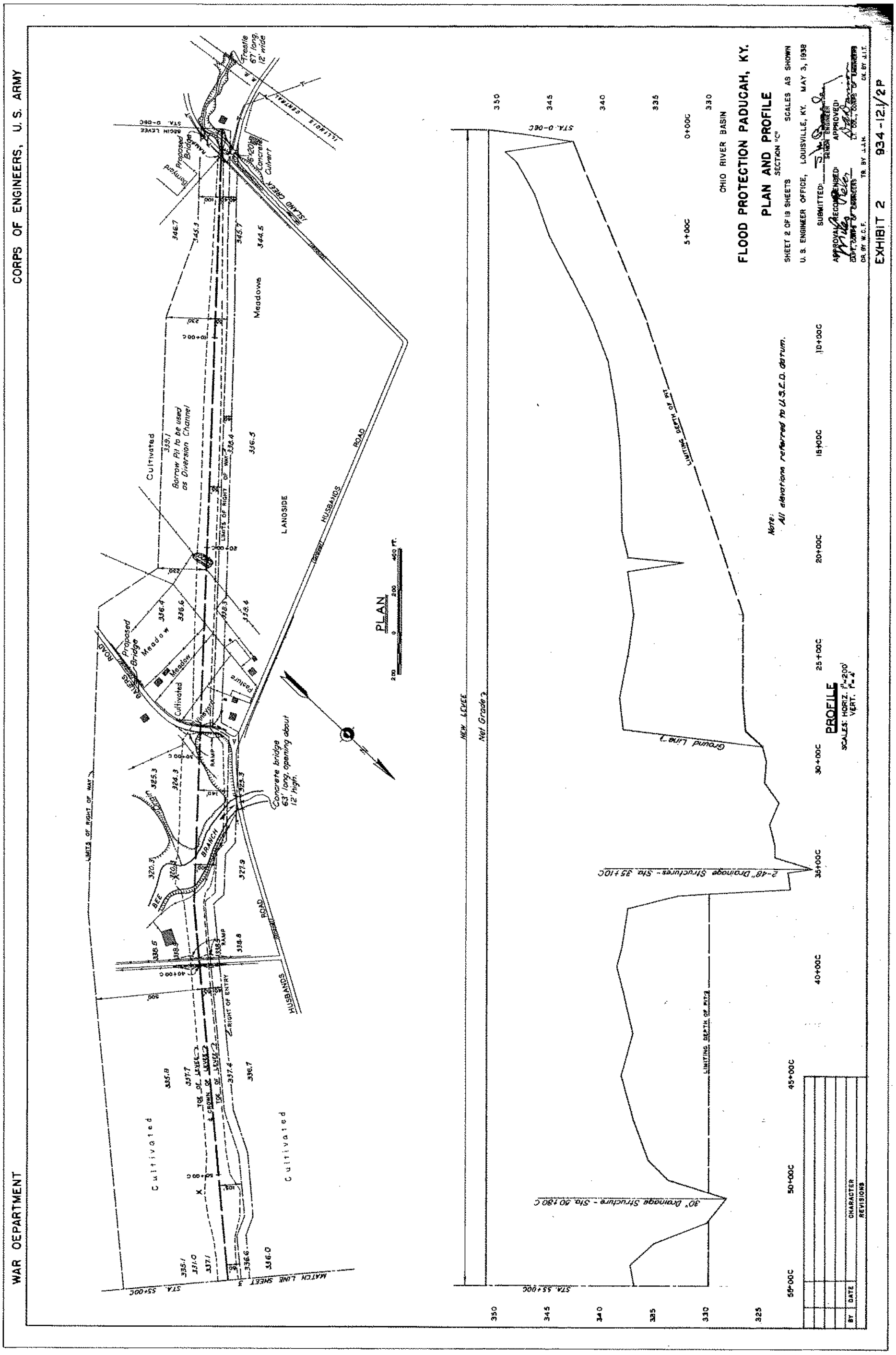
SUBMITTED: S. M. Bell
SENIOR ENGINEER

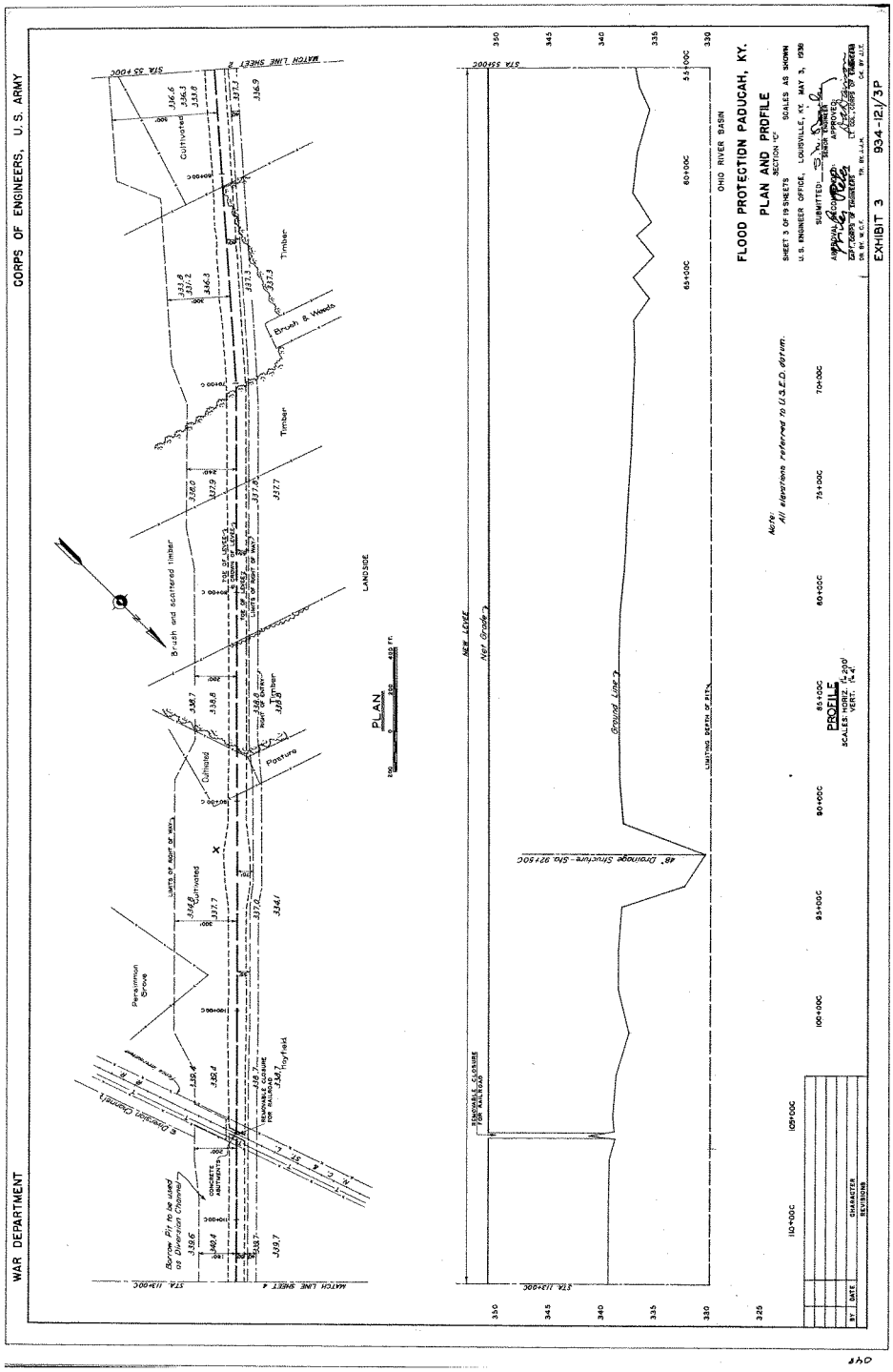
APPROVAL RECOMMENDED: Miles Otts
CAPT., CORPS OF ENGINEERS

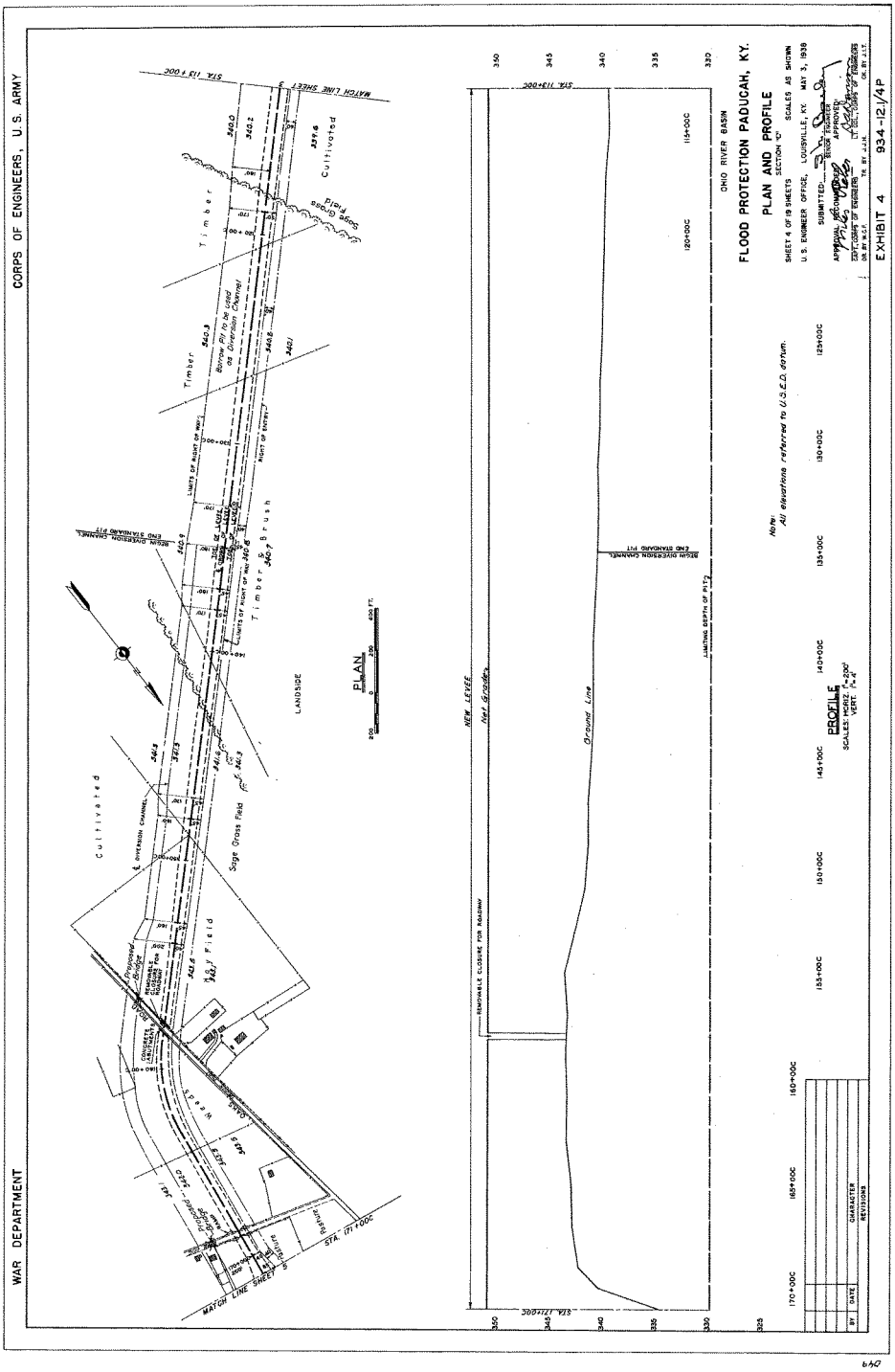
APPROVED: Julian L. Schley
LT. COL., CORPS OF ENGINEERS
DIR. OF C.O.E. TN. W.P. C.O.E.

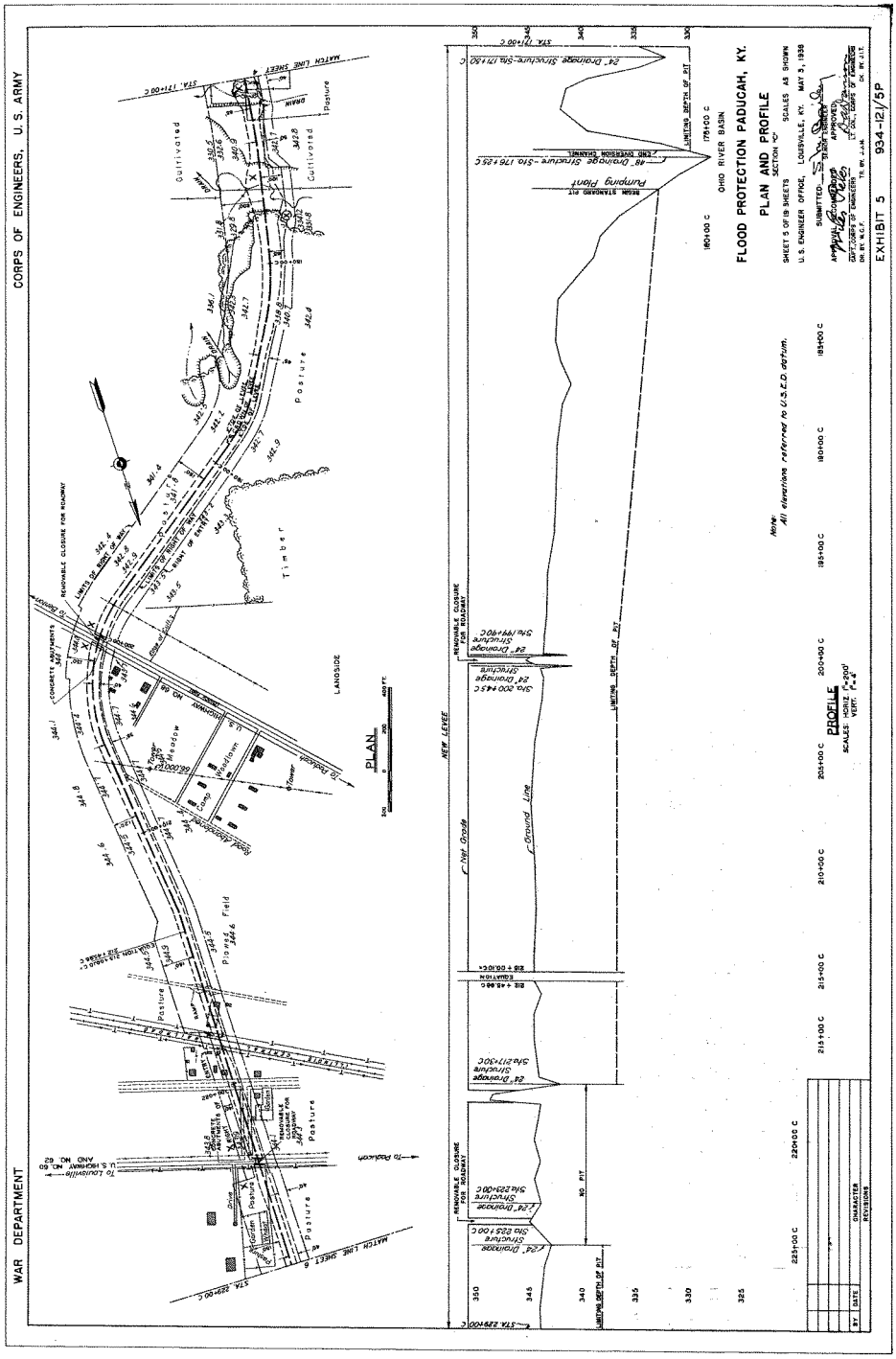
BY	DATE	CHARACTER REVISIONS
J.L.F.	7-29-38	CHANGE ALIGNMENT STA. 84+53.09 TO 89+37.76 = 189+84.67 °C

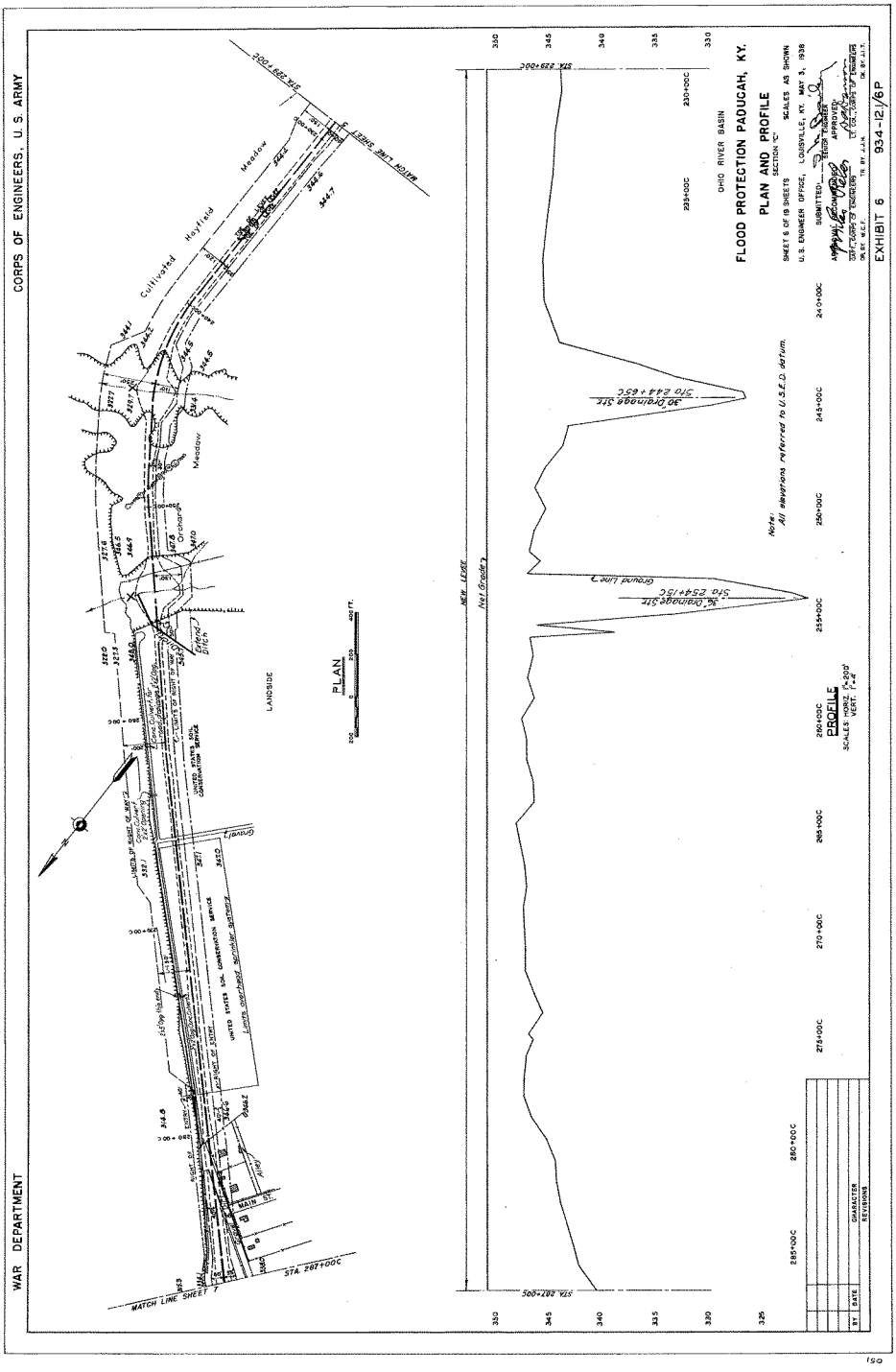
EXHIBIT 1 934-12.1/1 R

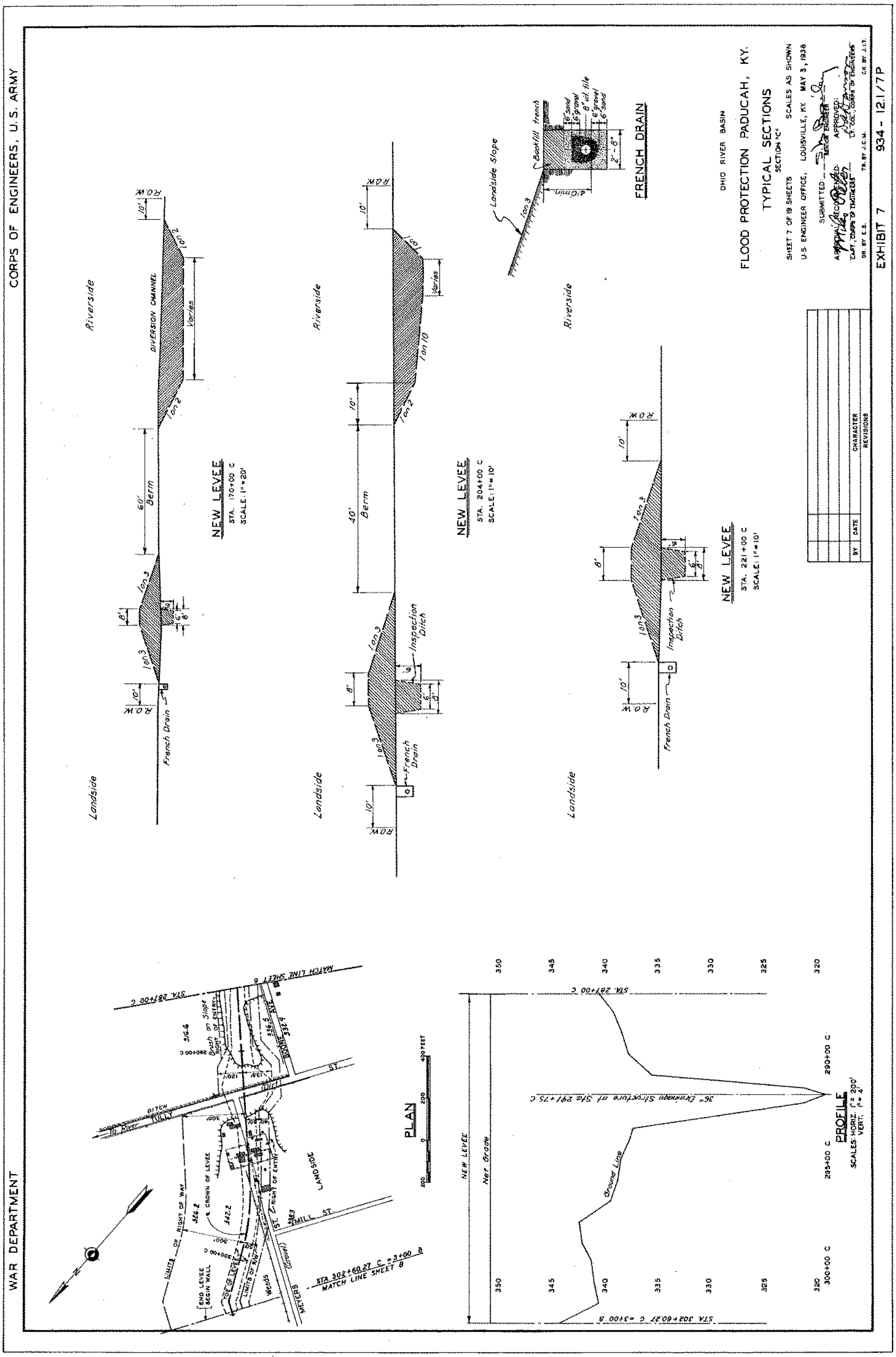

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
PLAN
PROFILE
SCALES: HORIZ. 1"=200' VERT. 1"=4'
Note: All elevations referred to U.S.C.D. datum.
Concrete bridge 63' long, opening about 12' high.
Borrow Pit to be used as Diversion Channel
Proposed Bridge
Cultivated
Meadow
Pasture
LANDSIDE
HUSBANDS ROAD
ISLAND CREEK
BEE BRANCH
New Levee
Net Grade
Ground Line
LIMITING DEPTH OF PIT
2-48" Drainage Structures - Sta. 35+10C
30" Drainage Structure - Sta. 50+80C
STA. 55+00C
MATCH LINE SHEET
Trestle 67' long, 12' wide
Concrete Culvert
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PLAN AND PROFILE
SECTION "C"
SHEET 2 OF 18 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938
SUBMITTED
RECOMMENDED
APPROVED
EXHIBIT 2
934-12.1/2P
CHARACTER
REVISIONS
BY
DATE


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
PLAN
PROFILE
FLOOD PROTECTION PADUCAH, KY.
PLAN AND PROFILE
OHIO RIVER BASIN
EXHIBIT 3
934-12.1/3P


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
PLAN
PROFILE
FLOOD PROTECTION PADUCAH, KY.
PLAN AND PROFILE
SECTION "C"
SCALES AS SHOWN
SHEET 4 OF 18 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938
SUBMITTED
APPROVED
EXHIBIT 4
934-12/4P
Note: All elevations referred to U.S.E.D. datum.
NEW LEVEE
Net Grades
Ground Line
OHIO RIVER BASIN
Cultivated
Timber
Sage Grass Field
LANDSIDE
MATCH LINE SHEET 3
MATCH LINE SHEET 5
REMOVABLE CLOSURE FOR ROADWAY
BRUSH OVERBURDEN CHANNEL END STANDING PIT
LIMITING DEPTH OF PILE

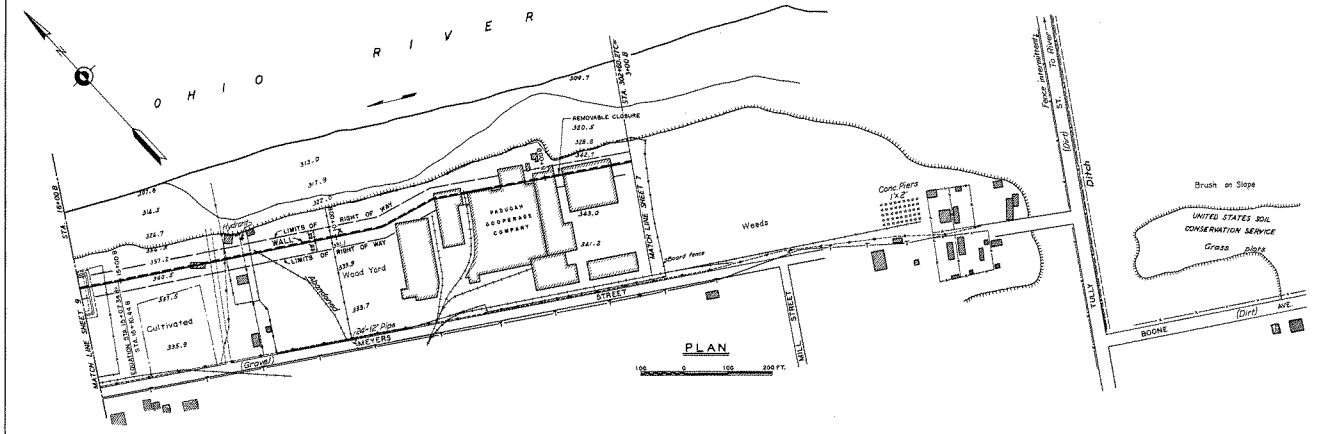

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
PLAN
PROFILE
FLOOD PROTECTION PADUCAH, KY.
PLAN AND PROFILE
EXHIBIT 5
934-121/5P

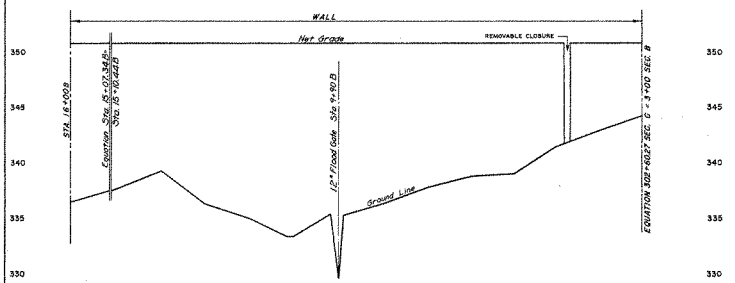

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
PLAN AND PROFILE
SECTION "C"
SCALES AS SHOWN
SHEET 6 OF 19 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938
SUBMITTED
DISTRICT ENGINEER
APPROVED
DIV. ENGR.
OHIO RIVER BASIN
EXHIBIT 6
934-12.1/6P
PLAN
PROFILE
SCALES HORIZ. 1"=200'
VERT. 1"=4'
Note: All elevations referred to U.S.E.D. datum.
MATCH LINE SHEET 7
MATCH LINE SHEET 5
LANDSIDE
Cultivated
Hayfield
Meadow
Orchard
Wild
Ditch
MAIN ST.
STA. 287+00C
STA 289+00C
STA 282+00S
30" Drainage Str. Sta 254+15C
30" Drainage Str. Sta 244+65C
Ground Line
New Levee
Net Grade
BY
DATE
CHARACTER
REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
PLAN
PROFILE
SCALES: HORIZ. 1" = 200'
VERT. 1" = 4'
NEW LEVEE
Net Grade
Ground Line
36" Drainage Structure at Sta. 291+75 C
Landside
Riverside
NEW LEVEE
STA. 170+00 C
SCALE: 1" = 20'
Berm
DIVERSION CHANNEL
Varies
French Drain
NEW LEVEE
STA. 204+00 C
SCALE: 1" = 10'
Inspection Ditch
NEW LEVEE
STA. 221+00 C
SCALE: 1" = 10'
Landside Slope
Backfill trench
FRENCH DRAIN
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
TYPICAL SECTIONS
SECTION "C"
SHEET 7 OF 19 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
CAPT., CORPS OF ENGINEERS
LT. COL., CORPS OF ENGINEERS
DR. BY E.S.
TR. BY J.C.M.
CK. BY J.I.T.
BY
DATE
CHARACTER
REVISIONS
EXHIBIT 7
934 - 12.1/7P

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





PROFILE

SCALES HORIZ. 1"=100'
VERT. 1"=4'

Note:
All elevations referred to U.S.E.D. datum

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "B"

SHEET 8 OF 19 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: SENIOR ENGINEER

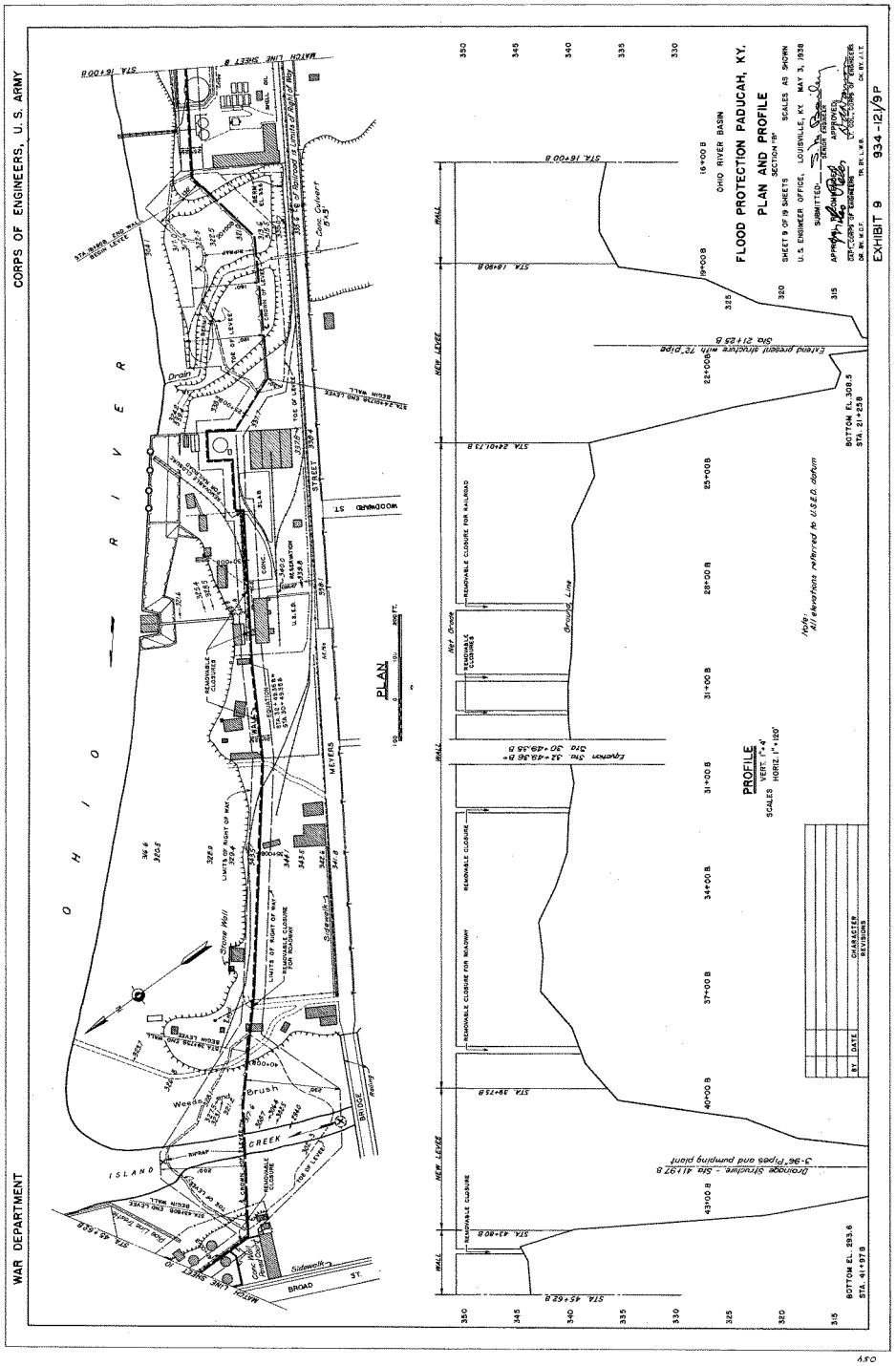
APPROVAL RECOMMENDED: APPROVED:

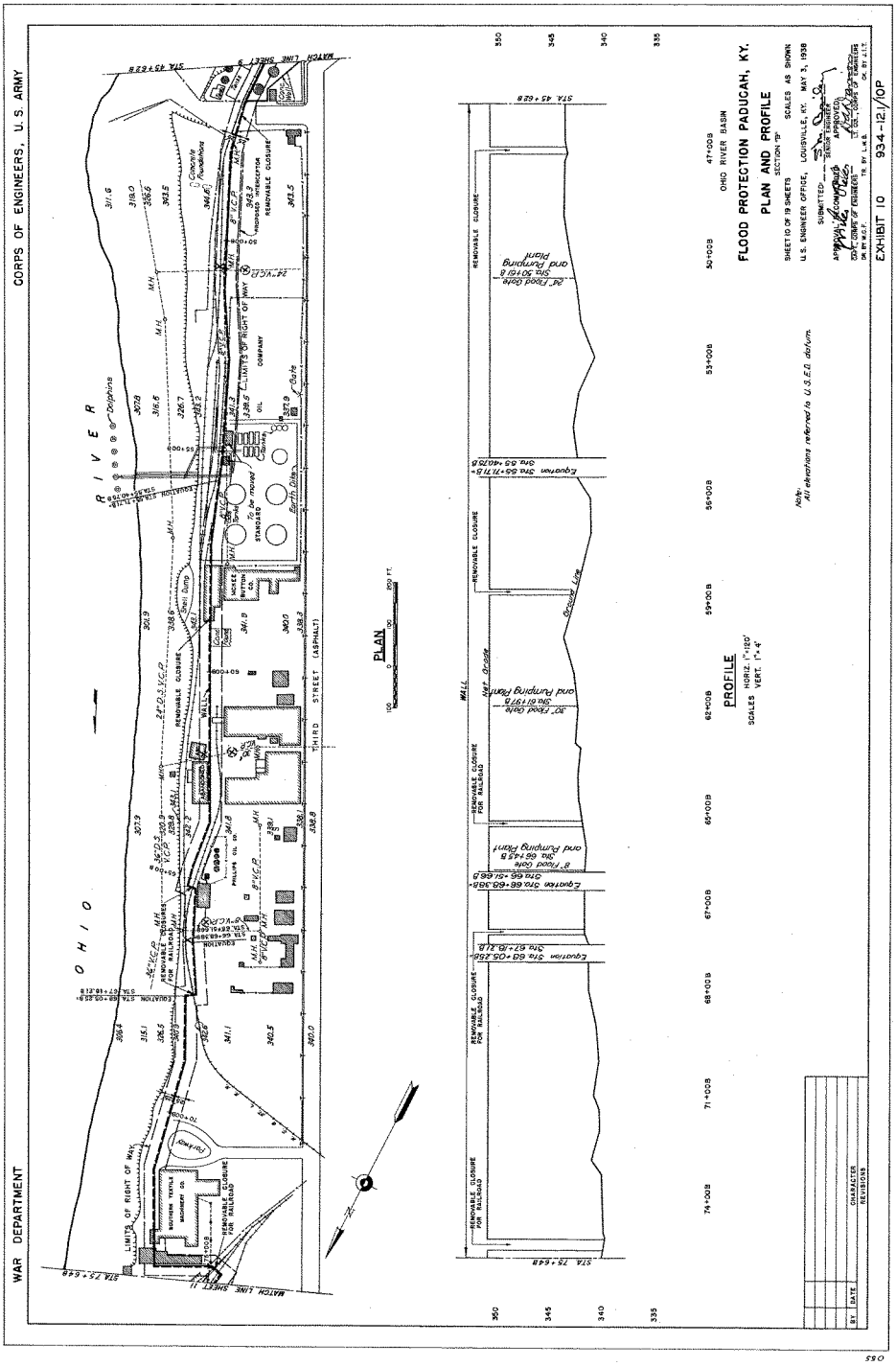
CAPT., CORPS OF ENGINEERS LT. COL., CORPS OF ENGINEERS

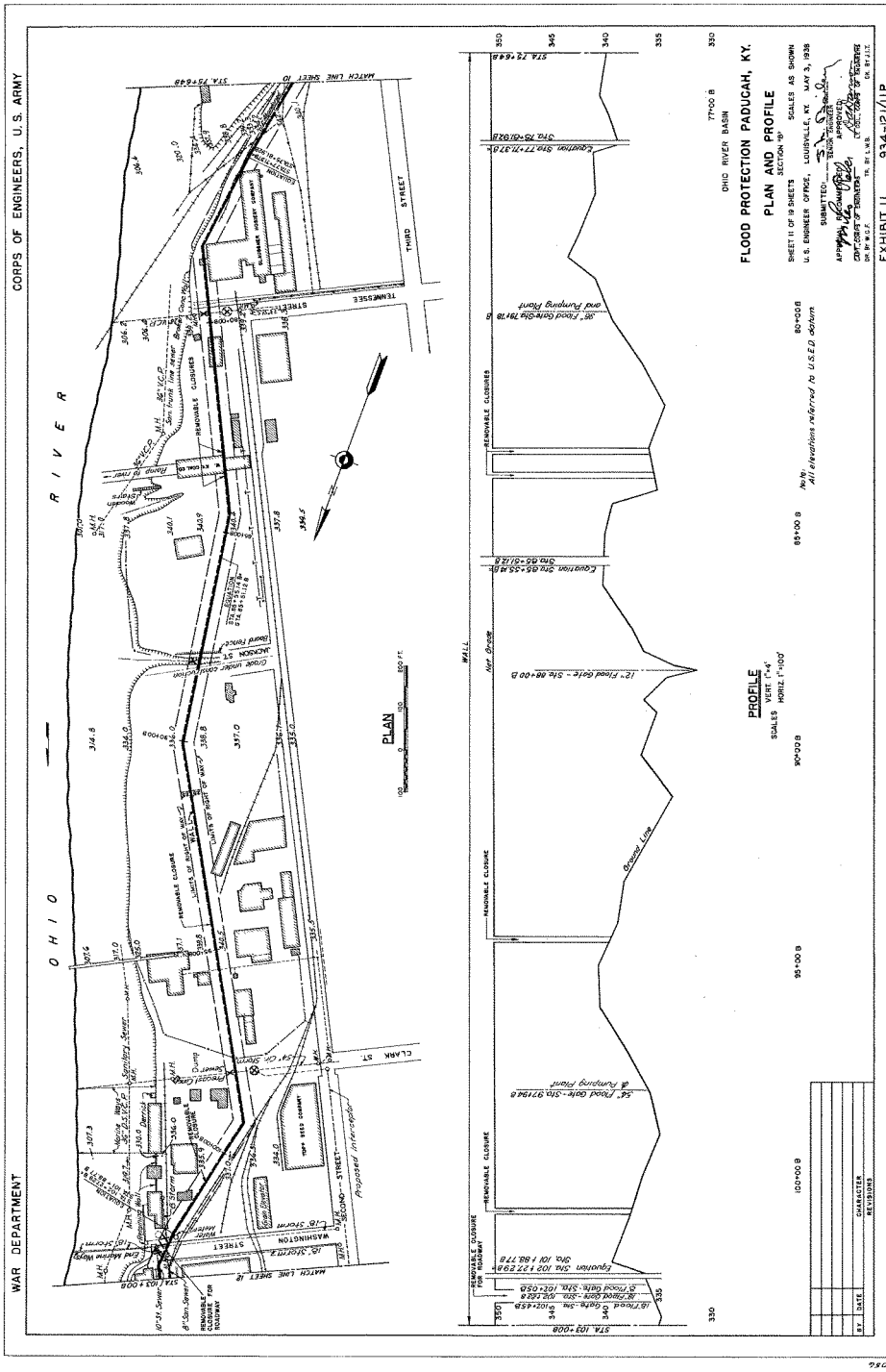
DR. BY W.C.F. TR. BY C.G.B. CK. BY J.I.T.

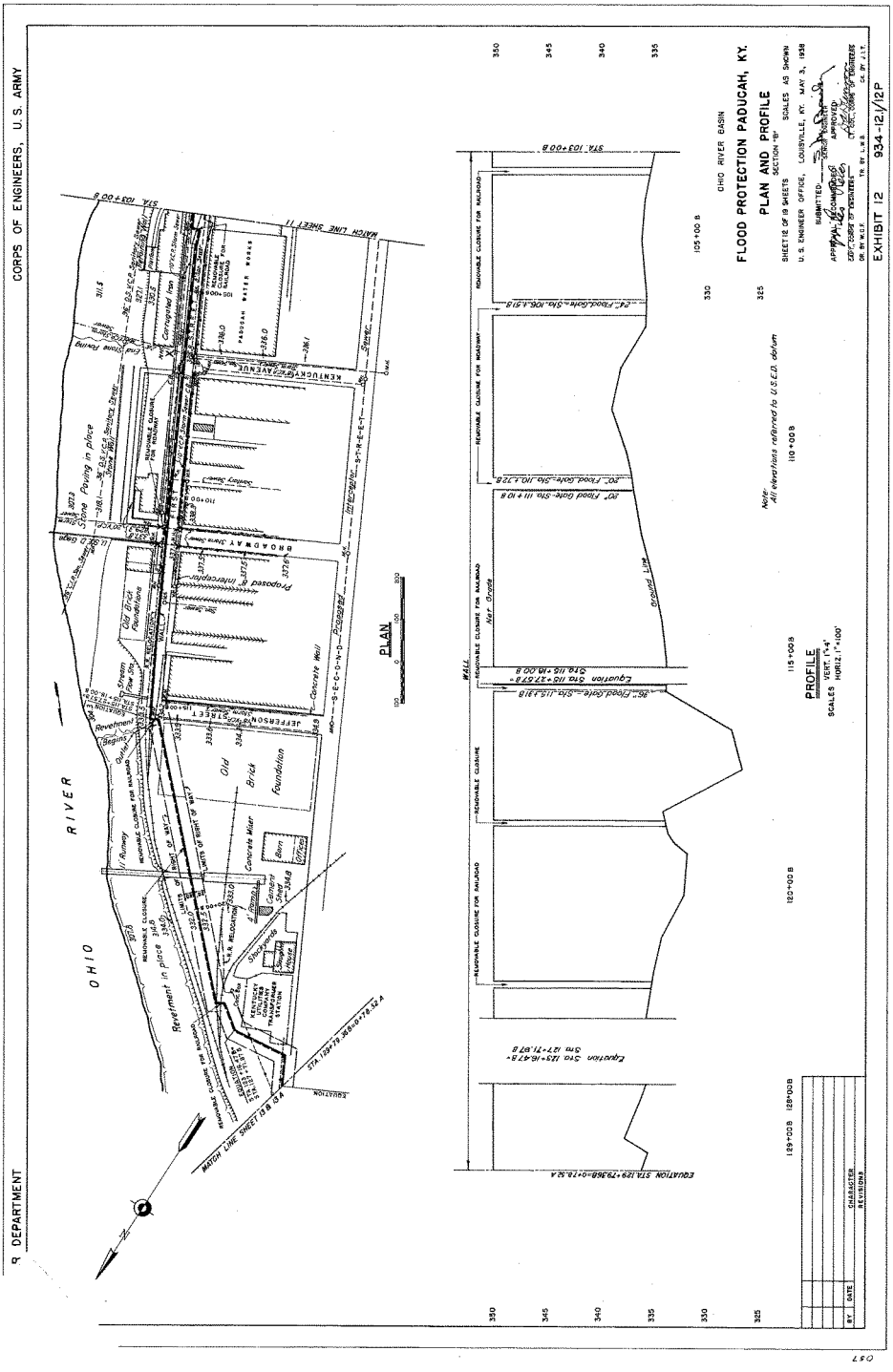
EXHIBIT 8 934-12.1/8P

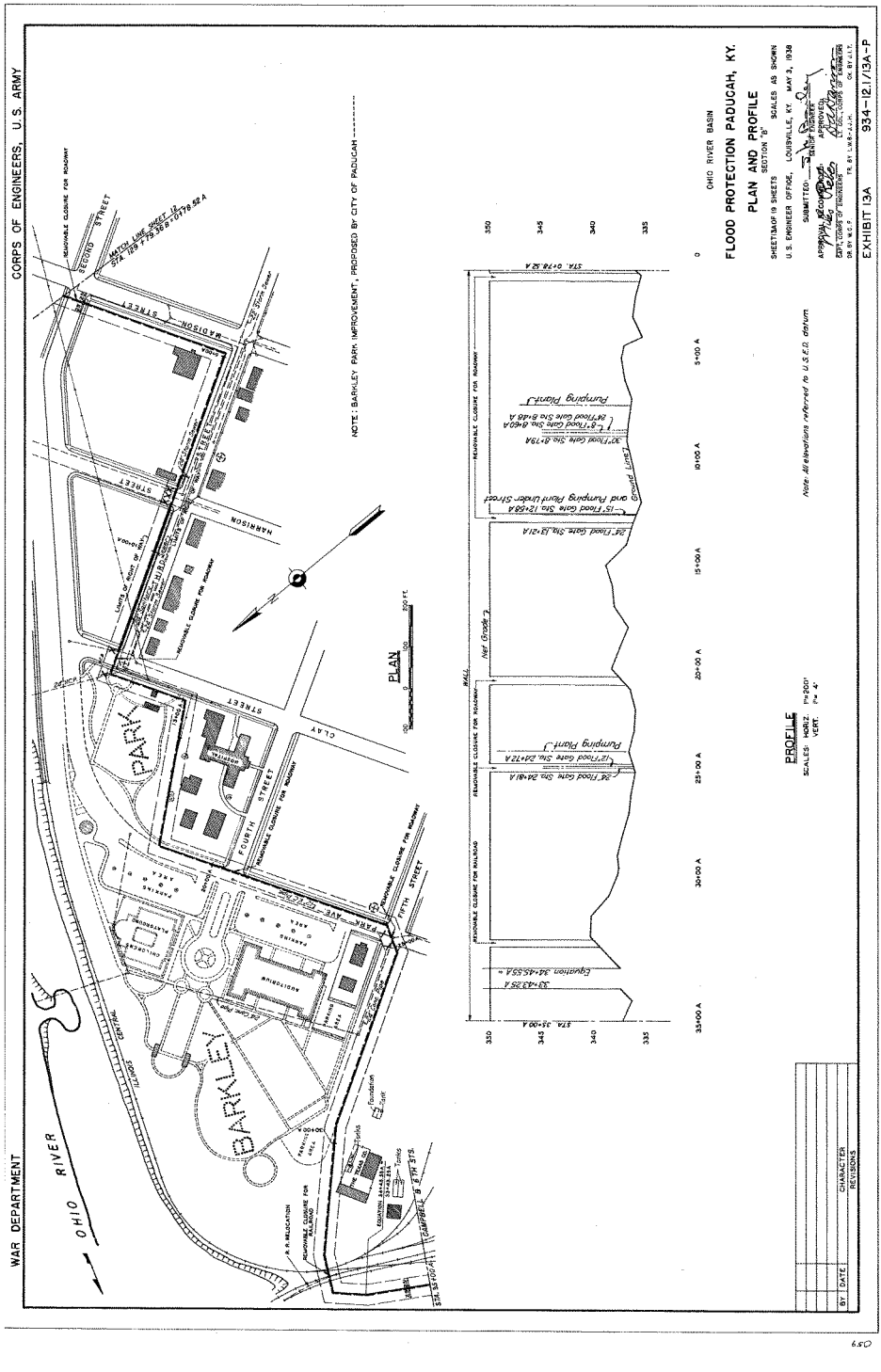
C-9

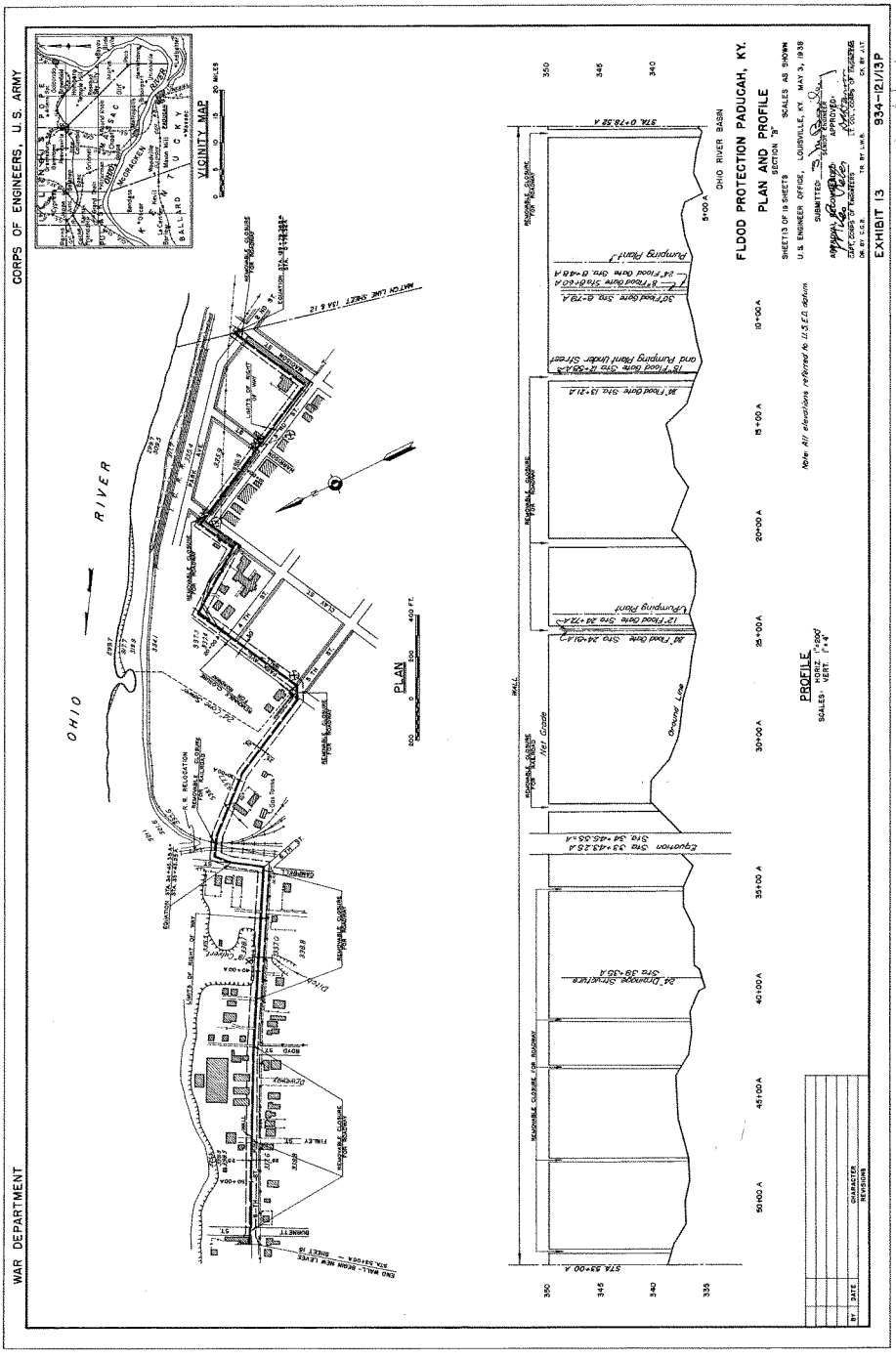

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER
PLAN
PROFILE
FLOOD PROTECTION PADUCAH, KY.
PLAN AND PROFILE
OHIO RIVER BASIN
EXHIBIT 9
934-12/9P
BROADWAY
BROAD ST.
MEYERS
WOODWARD ST
ISLAND
CREEK
NEW LEVEE
WALL
Drainage Structure - 5ft. dia. 41.37 ft.
3-36" Pipes and pumping plant
External pressure relief structure with 72" pipe
Note: All elevations referred to U.S.E.D. datum

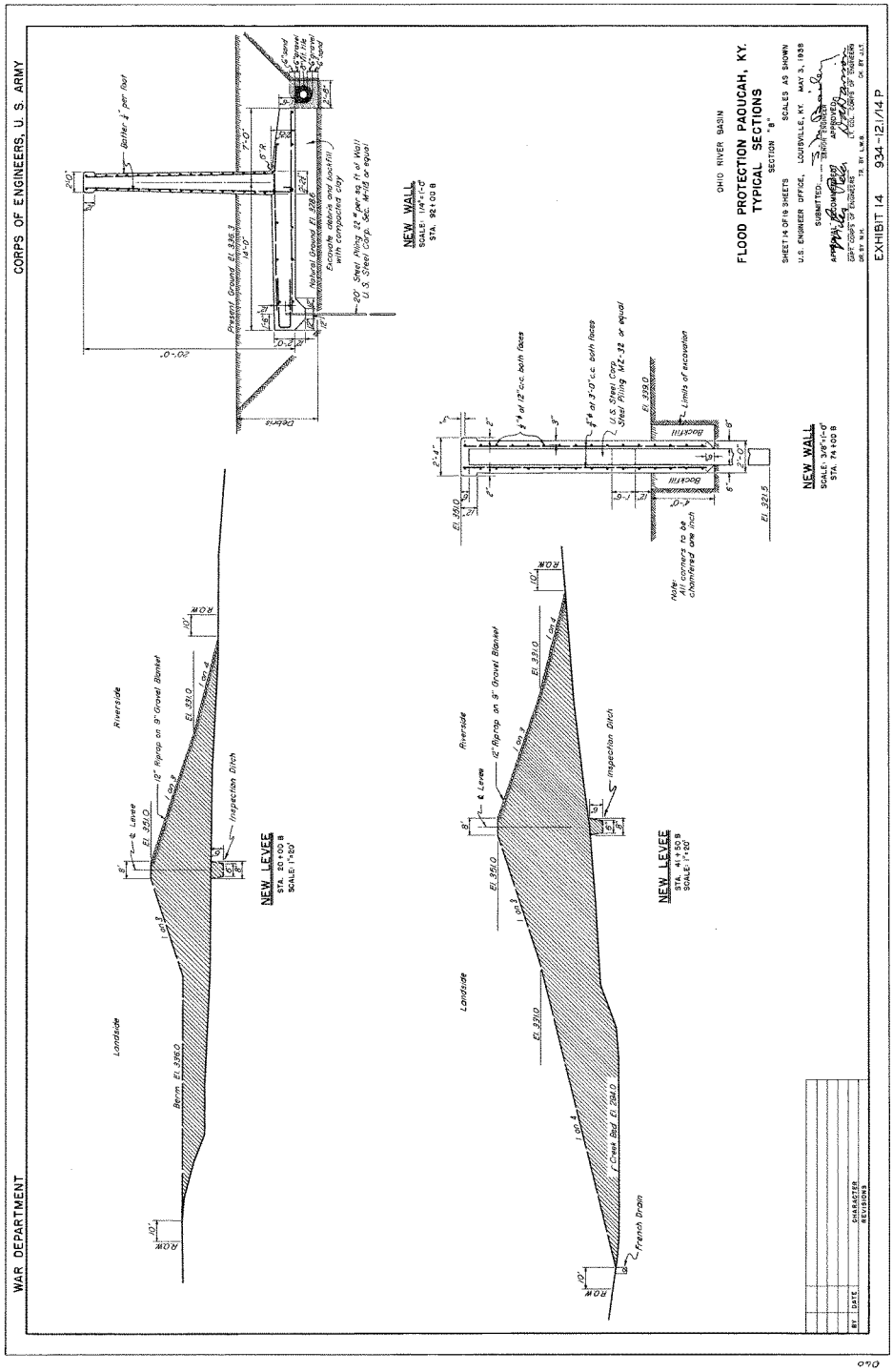

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
FLOOD PROTECTION PADUCAH, KY.
PLAN AND PROFILE
SECTION "B"
SCALES AS SHOWN
SHEET 10 OF 19 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938
SUBMITTED
APPROVED
CHIEF, CORPS OF ENGINEERS
APPROVED
DIV. ENGR.
EXHIBIT 10
934-12.1/10P
PLAN
PROFILE
SCALES HORIZ. 1"=120'
VERT. 1"=4'
Note: All elevations referred to U.S.E.D. datum.
OHIO RIVER BASIN
OHIO
RIVER
THIRD STREET (ASPHALT)
LIMITS OF RIGHT OF WAY
REMOVABLE CLOSURE
REMOVABLE CLOSURE FOR RAILROAD
MATCH LINE SHEET 9
MATCH LINE SHEET 11
30" Flood Gate and Pumping Plant
8' Flood Gate and Pumping Plant
24" Flood Gate and Pumping Plant
Equation Sta 66+63.38 = Sta 66+51.66
Equation Sta 63+71.75 = Sta 63+62.18
Equation Sta 63+05.26 = Sta 62+78.18
Equation Sta 62+78.18 = Sta 62+05.26
Equation Sta 62+05.26 = Sta 61+78.18
STA 45+62.8
STA 75+64.8
47+00B
50+00B
53+00B
56+00B
59+00B
62+00B
65+00B
67+00B
68+00B
71+00B
74+00B
Dolphins
Shell Dump
Coal Dock
Earth Dike
Gravel Line
Wall
Mat Cover
Gate
Ramp
Railroad
Southern Textile Basement Co.
Phillips Oil Co.
Standard Oil Company
Corps of Engineers
Dr. by W.G.F.
Tr. by L.A.B.
Ck. by A.L.T.
BY
DATE
CHARACTER
REVISIONS

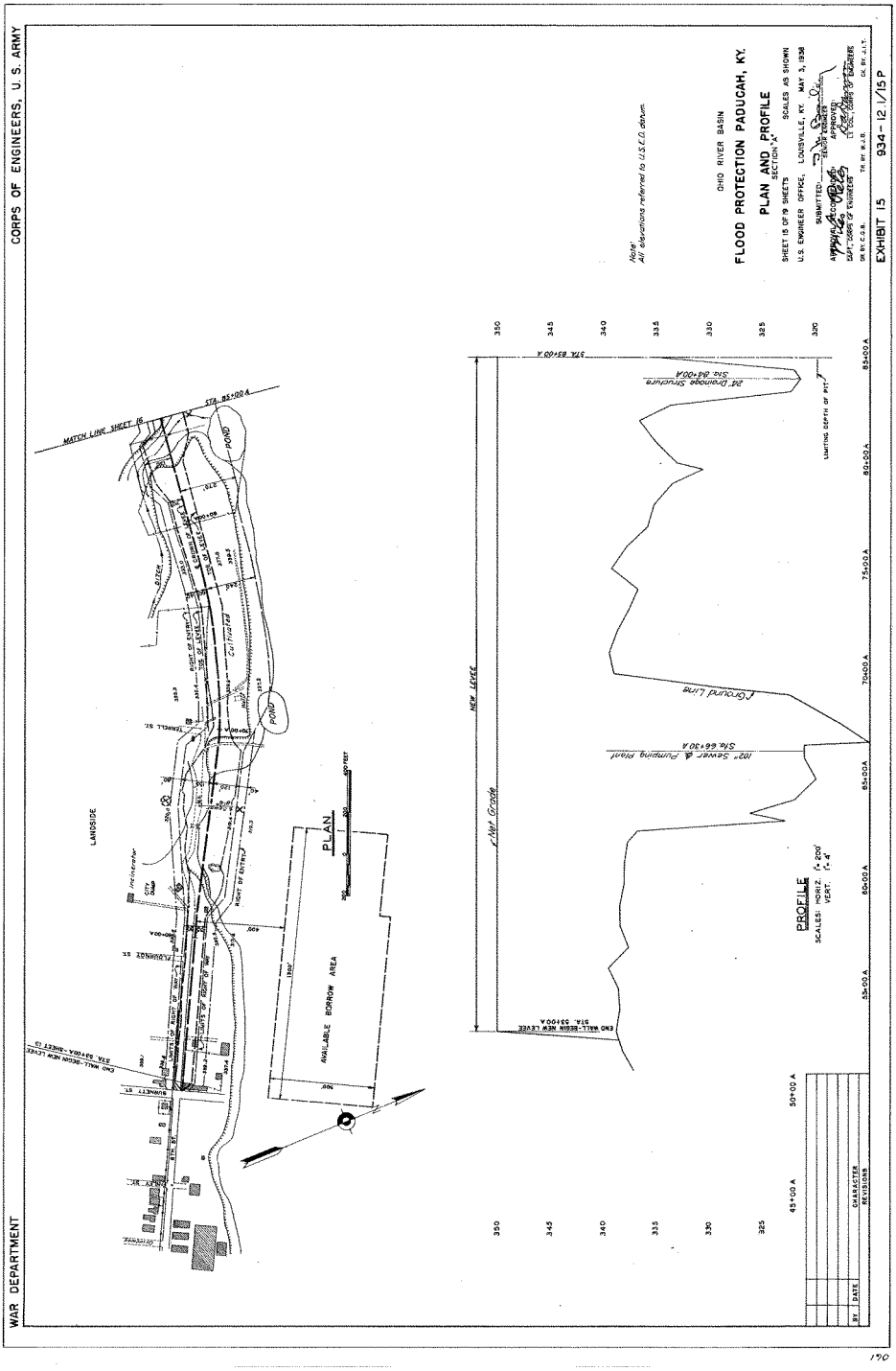

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER
PLAN
PROFILE
FLOOD PROTECTION PADUCAH, KY.
PLAN AND PROFILE
SECTION "B"
SHEET 11 OF 19 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938
SUBMITTED
RECOMMENDED
APPROVED
CHIEF OF ENGINEERS
DIV. ENGR. OHIO RIVER DIV.
DIST. ENGR. LOUISVILLE, KY.
EXHIBIT 11
934-12/11P
MATCH LINE SHEET 10
MATCH LINE SHEET 12
TENNESSEE STREET
THIRD STREET
CLARK ST.
WASHINGTON STREET
SECOND STREET
JACKSON ST.
Proposed Interceptor
Existing Wall
Proposed Wall
Ohio River Basin
Sta 102+008
Sta 75+64.8
Sta 77+71.78
Sta 80+01.28
Sta 85+55.88
Sta 88+00.8
Sta 95+00.8
Sta 100+00.8
Sta 102+45.8
Sta 101+68.78
Sta 102+72.98
Sta 97+19.68
Sta 102+05.8
Sta 101+68.78
Sta 102+72.98
Sta 97+19.68
Sta 102+05.8
Sta 102+45.8
Ground Line
Mat Grade
REMOVABLE CLOSURE
REMOVABLE CLOSURE FOR ROADWAY
REMOVABLE CLOSURE FOR RAILWAY
12" Flood Gate - Sta 88+00.8
54" Flood Gate - Sta 97+19.68
& Pumping Plant
18" Flood Gate - Sta 102+45.8
& Flood Gate - Sta 102+05.8
48" Flood Gate - Sta 101+68.78
and Pumping Plant
Equation Sta 102+72.98 = Sta 101+68.78
Equation Sta 77+71.78 = Sta 75+61.28
Equation Sta 85+55.88 = Sta 80+01.28
All elevations referred to U.S.E.D. datum
PROFILE
SCALES VERT. 1"=40'
HORIZ. 1"=100'
BY DATE CHARACTER OF REVISIONS

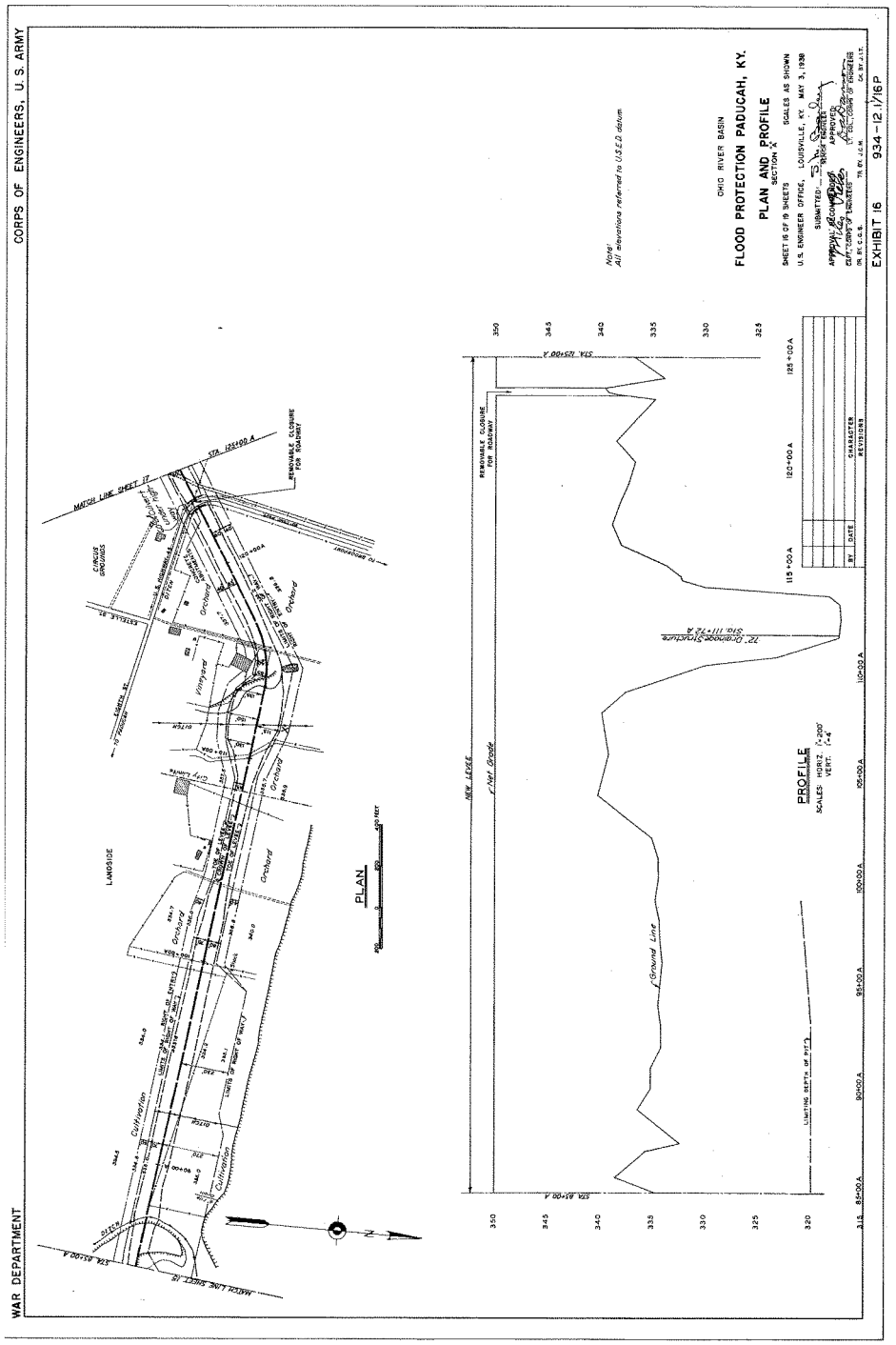

R DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
PLAN AND PROFILE
SECTION "B"
SCALES AS SHOWN
SHEET 12 OF 19 SHEETS
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938
SUBMITTED
APPROVED
EXHIBIT 12
934-12-1/12P
PLAN
PROFILE
SCALES VERT. 1"=4'
HORIZ. 1"=100'
OHIO RIVER BASIN
OHIO RIVER
KENTUCKY AVENUE
BROADWAY
JEFFERSON STREET
Old Brick Foundation
Proposed Interceptor
Concrete Wall
Concrete Mixer
Barn
Storage House
Shelter
Pumping Station
Old Brick Residence
Frame Shed
Corrugated Iron Shed
Frame Dwelling
Revetment in place
Riprap
Sewer
Gravel Drive
Fence
Gate
Telephone Booth
Fire Hydrant
Water Valve
Manhole
Catch Basin
Light Post
Telephone Pole
Guy Wire
Electric Light
Electric Power Line
Telephone Line
Gas Line
Water Line
Ground Line
Mean Grade
Equation Sta 125+16.47 B = Sta 127+71.87 B
Equation Sta 110+27.67 B = Sta 115+18.00 B
Equation Sta 129+73.68 = Sta 128+00 B
Equation Sta 129+73.68 = Sta 128+00 B + 0.52 A
Removable Closure for Railroad
Removable Closure
Note: All elevations referred to U.S.E.D. datum
EXHIBIT 12 934-12-1/12P


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER
BARKLEY PARK
NOTE: BARKLEY PARK IMPROVEMENT, PROPOSED BY CITY OF PADUCAH
PLAN
PROFILE
SCALES: HORIZ. 1"=200'
VERT. 1"= 4'
Note: All elevations referred to U.S.E.D. datum
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PLAN AND PROFILE
SHEET 16 OF 19 SHEETS
SECTION "B" SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938
SUBMITTED
APPROVED
EXHIBIT 13A
934-12.1/13A-P


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
VICINITY MAP
OHIO RIVER
PLAN
PROFILE
FLOOD PROTECTION PADUCAH, KY.
PLAN AND PROFILE
SECTION "B"
SHEET 13 OF 19 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938
SUBMITTED
APPROVED
EXHIBIT 13
934-12/13P
DH. BY C.E.B.
TR. BY L.M.B.
CK. BY J.L.T.
DATE
DESCRIPTION
REVISION
OHIO RIVER BASIN
Note: All elevations referred to U.S.E.D. datum


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
TYPICAL SECTIONS
SECTION "B"
SHEET 14 OF 18 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938
SUBMITTED
RECOMMENDED
APPROVED
DIV. ENGR.
DEPT. CORPS OF ENGINEERS
LT. COL. CORPS OF ENGINEERS
EXHIBIT 14
934-12.1/14 P
NEW LEVEE
STA. 20+00 B
SCALE 1"=20'
NEW LEVEE
STA. 45+00 B
SCALE 1"=20'
NEW WALL
SCALE 1/4"=1'-0"
STA. 92+00 B
NEW WALL
SCALE 3/8"=1'-0"
STA. 74+00 B
Riverside
Landside
Berm El. 336.0
Inspection Ditch
12" Riprop on 9" Gravel Blanket
Creek Bed El. 284.0
French Drain
Batter 1' per foot
Present Ground El. 345.3
Natural Ground El. 328.0
Excavate and backfill with compacted clay
90' Steel Piling 22# per sq. ft. w/ Wall
U. S. Steel Corp. Sec. Weld or Equal
Backfill
Limits of excavation
U.S. Steel Corp. Steel Piling WZ 32 or equal
All corners to be chamfered one inch
ROW
El. 331.0
El. 350.0
El. 321.5

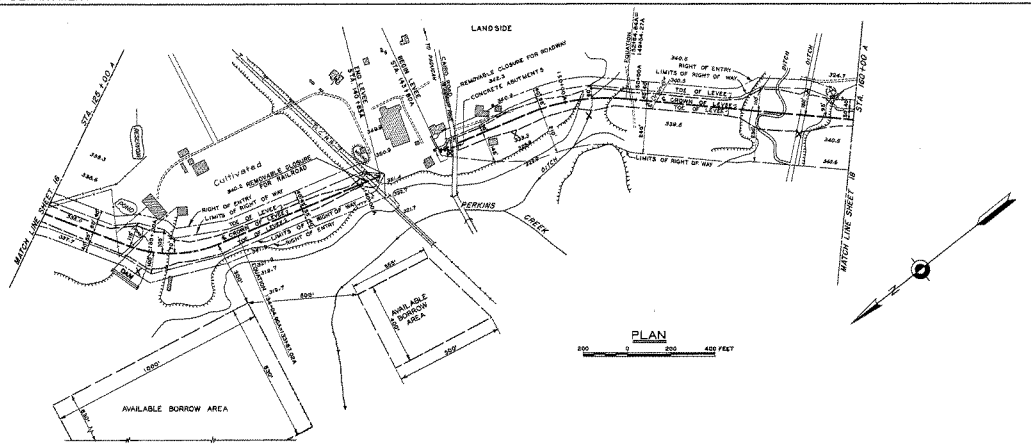

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PLAN AND PROFILE
SECTION "A"
SHEET 15 OF 19 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938
SUBMITTED:
APPROVED:
CHIEF OF ENGINEERS
SEPT. CORPS OF ENGINEERS
EXHIBIT 15
934-12.1/15P
PLAN
PROFILE
SCALES: HORIZ. 1" = 200'
VERT. 1" = 4'
MATCH LINE SHEET 16
STA. 85+00 A
POND
LANDSIDE
AVAILABLE BORROW AREA
NEW LEVEE
Ground Line
Grade
24" Drainage Structure
Sta. 84+00 A
10" Sewer & Pumping Plant
Sta. 66+30 A
LIMITING DEPTH OF PIT
Note!
All elevations referred to U.S.C.D. datum
STA. 85+00 A
STA. 84+00 A
STA. 75+00 A
STA. 66+30 A
STA. 55+00 A
STA. 45+00 A
STA. 50+00 A
END WALL-BEGIN NEW LEVEE
STA. 53+00 A
BY
DATE
CHARACTER
REVISIONS

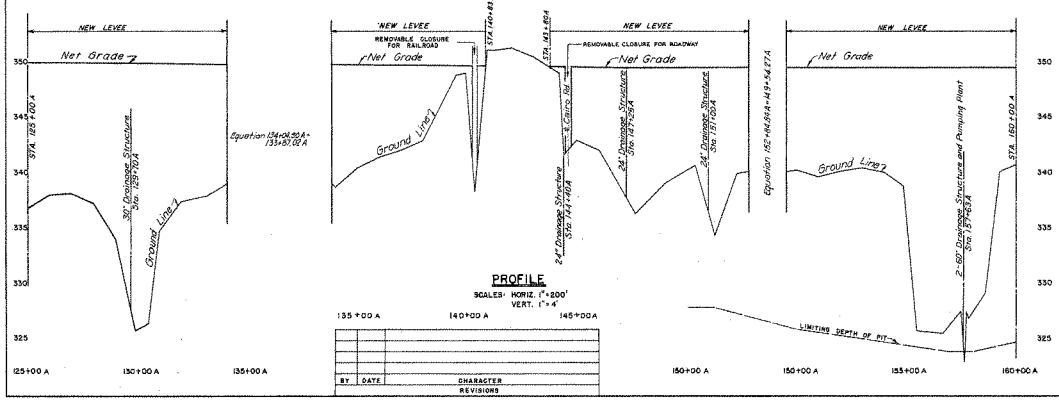

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PLAN AND PROFILE
SECTION X
SHEET 16 OF 19 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938
SUBMITTED
APPROVED
APPROVED
EXHIBIT 16
934-12.1/16P
PLAN
PROFILE
SCALES HORIZ. 1"=200'
VERT. 1"=4'
Note:
All elevations referred to U.S.E.D. datum
NEW LEVEE
Finished Grade
Ground Line
REMOVABLE CLOSURE FOR ROADWAY
72' Drainage Structure
Sta. 111+72 A
LANGSIDE
MATCH LINE SHEET 17
MATCH LINE SHEET 15
Cultivation
Orchard
Vineyard
CIRCUS GROUNDS
ESTABLE ST.
ADAMS ST.
REMOVABLE CLOSURE FOR ROADWAY
Sta. 125+00 A
Sta. 85+00 A

750

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





PROFILE

SCALES: HORIZ. 1"=200'
VERT. 1"=4'

BY	DATE	CHARACTER REVISIONS

Note!
All elevations referred to U.S.E.D. datum

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE
SECTION 'A'

SHEET 17 OF 19 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938

SUBMITTED: _____ SENIOR ENGINEER

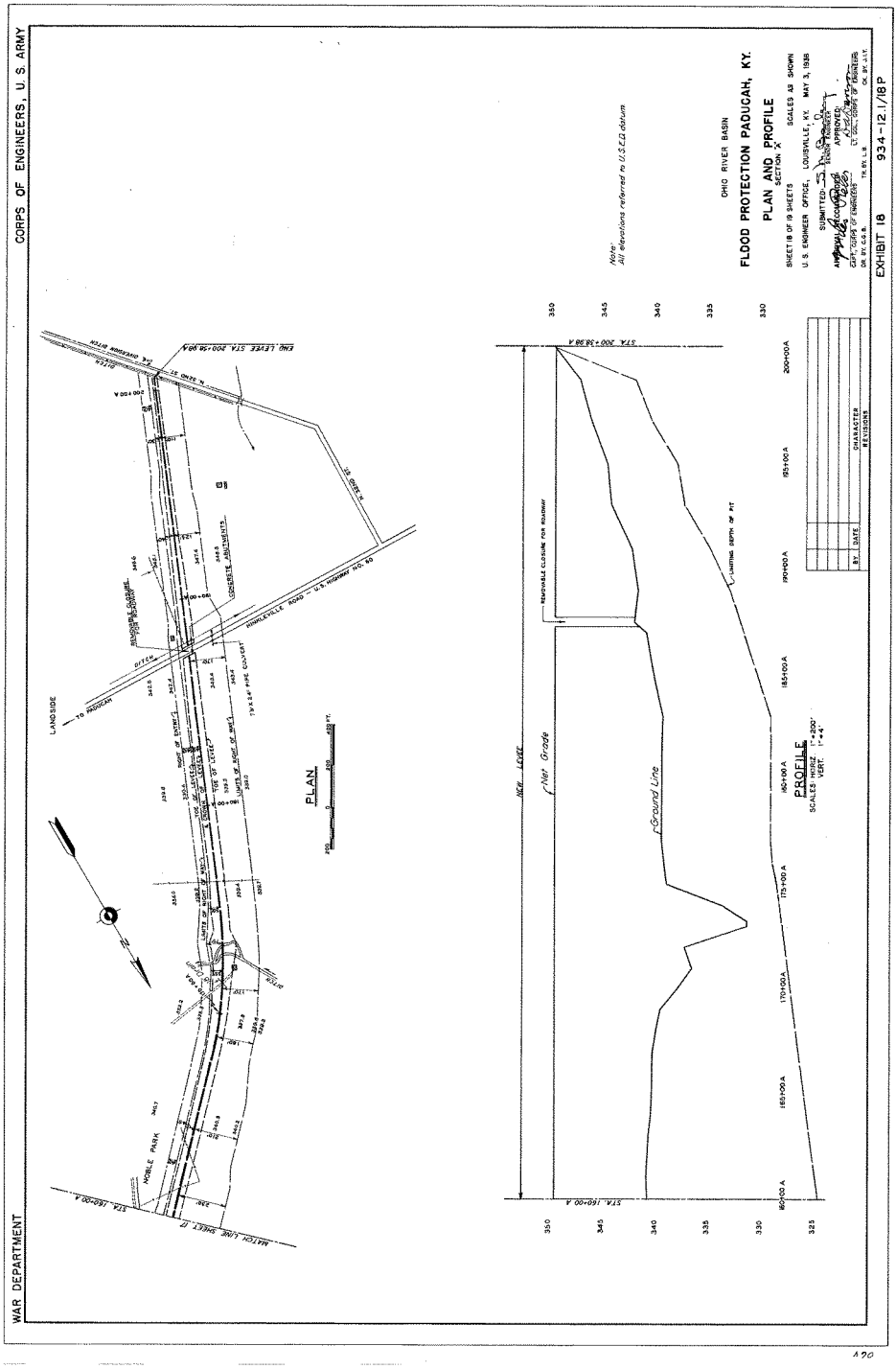
APPROVAL RECOMMENDED: _____ APPROVED: _____

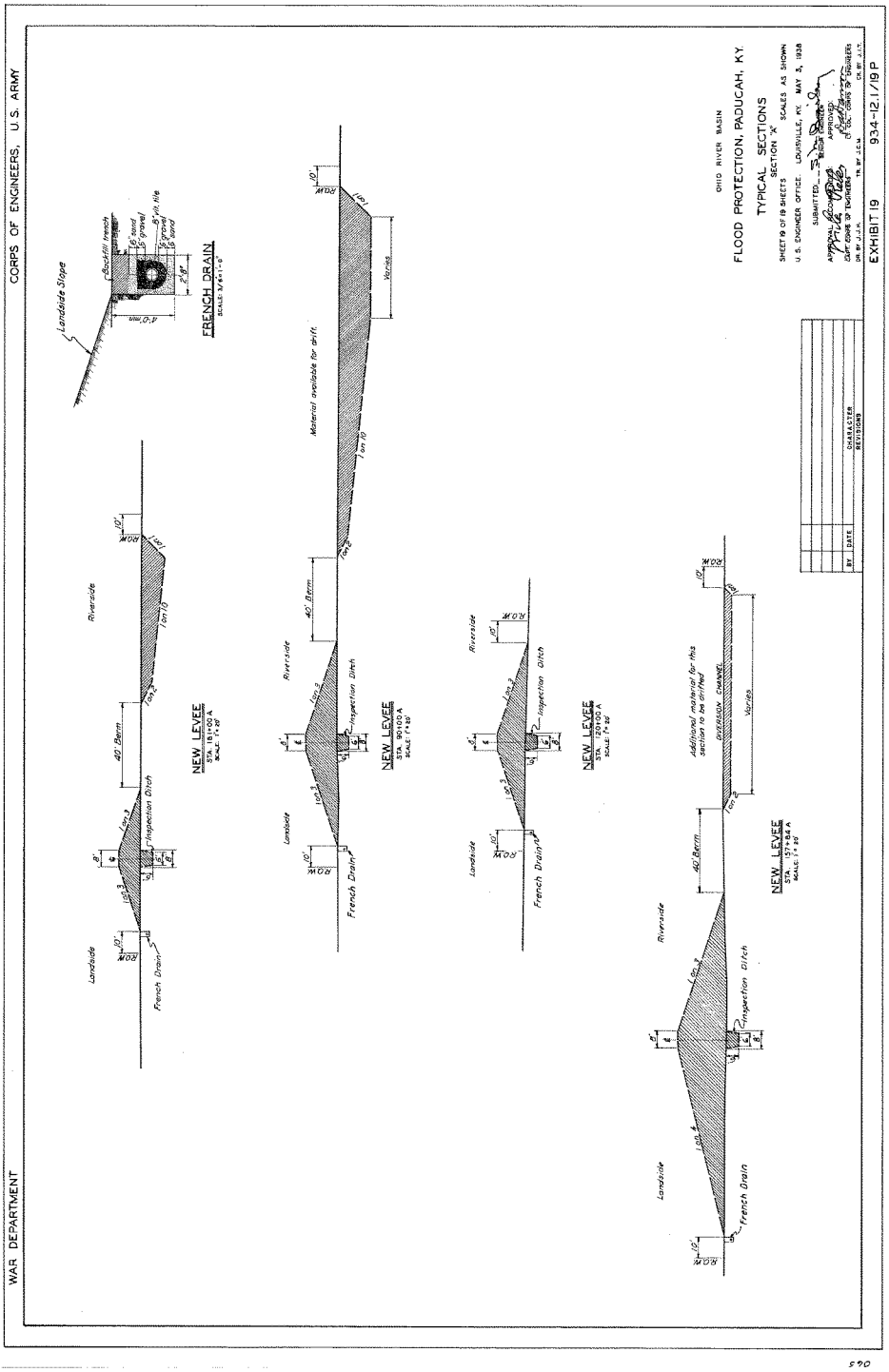
CHIEF, CORPS OF ENGINEERS LT. COL., CORPS OF ENGINEERS

DR. BY: C.Q.B. TR. BY: H.W. CK. BY: J.J.T.

EXHIBIT 17 934-12.1/17P

808


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PLAN AND PROFILE
SECTION X
SHEET 18 OF 19 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938
SUBMITTED
RECOMMENDED
APPROVED
EXHIBIT 18
934-12.1/18P
PLAN
PROFILE
Ground Line
Net Grade
NEW LEVEE
Note:
All elevations referred to U.S.C.G. datum
LANDSIDE
TO PADUCAH
CAIRO, ILLINOIS
MOBILE PARK
MATCH LINE SHEET 17
END LEVEE STA 200+56.98 A
CONCRETE APRONS
TOP OF LEVEE
TOE OF LEVEE
CENTER LINE
STA 160+00 A
STA 200+38.98 A


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
TYPICAL SECTIONS
SECTION "K"
SCALES AS SHOWN
SHEET 19 OF 19 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 3, 1938
SUBMITTED
APPROVED
CHIEF OF ENGINEERS
EXHIBIT 19
934-12-1/19 P
FRENCH DRAIN
NEW LEVEE
Landside Slope
Backfill trench
6" sand
6" gravel
6"x6" tile
Landside
Riverside
French Drain
Inspection Ditch
40' Berm
Material available for drift
Additional material for this section to be drifted
DIVERSION CHANNEL
Varies
R.O.W.
1on3
1on10
1on2
1on1

AS BUILT DRAWINGS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KENTUCKY

SECTION "A"

IN 21 SHEETS

TITLE SHEET

CONTENTS

934-12.2/1	PADUCAH, KY. GENERAL MAP	(R) 934-12.2/17.1	HIGHWAY RAMP DETAILS
		(R) 934-C1/2	" " "
934-12.2/2	PLAN AND PROFILE	(R) 934-12.2/18	DESIGN DATA STA. 122+84.7
(R) 934-12.2/3	PLAN AND PROFILE	(R) 934-12.2/19	MOVABLE CLOSURE STA. 122+84.7 MASONRY DETAILS
(R) 934-C1/1	" "	(R) 934-12.2/20	REINFORCING DETAILS STA. 122+84.7 SILL
934-12.2/4.1	PLAN AND PROFILE	(R) 934-12.2/21	REINFORCING DETAILS STA. 122+84.7 WEST ABUTMENT & VAULT
934-12.2/5	PLAN AND PROFILE		
934-12.2/6	TYPICAL SECTIONS	(R) 934-12.2/22	REINFORCING DETAILS STA. 122+84.7 E. ABUT. & E. RIVERSIDE WING WALL
934-12.2/7	DRAINAGE STRUCTURE STA. 84+00	(R) 934-12.2/23	REINFORCING DETAILS STA. 122+84.7 WEST LANDSIDE WING WALL
934-12.2/8	DRAINAGE STRUCTURE STA. 111+67		
934-12.2/9	REINFORCING DETAILS STA. 111+67	(R) 934-12.2/24	REINFORCING DETAILS STA. 122+84.7 E. LANDSIDE & W. RIVERSIDE WING WALLS
934-12.2/10	DRAINAGE STRUCTURE STA. 130+00	934-12.2/25	MOVABLE CLOSURE STA. 140+45.8 MASONRY DETAILS
934-12.2/11	DRAINAGE STRUCTURE STA. 147+25		
934-12.2/12	DRAINAGE STRUCTURE STA. 151+25	934-12.2/26	REINFORCING DETAILS STA. 140+45.8 SILL & ABUTMENT WALLS
934-12.2/13	DRAINAGE STRUCTURE STA. 157+63	934-12.2/27	REINFORCING DETAILS STA. 140+45.8 WINGWALLS & SEEPAGE CUT-OFF WALLS
934-12.2/14	REINFORCING DETAILS STA. 157+63		
(R) 934-12.2/15	BORINGS "DELETED"	934-12.2/28	REINFORCING DETAILS STA. 140+45.8 STORAGE VAULT
(R) 934-12.2/16	BORINGS "DELETED"	(R) 934-12.2/29	MISCELLANEOUS DETAILS
		(R) 934-C1/3	" "

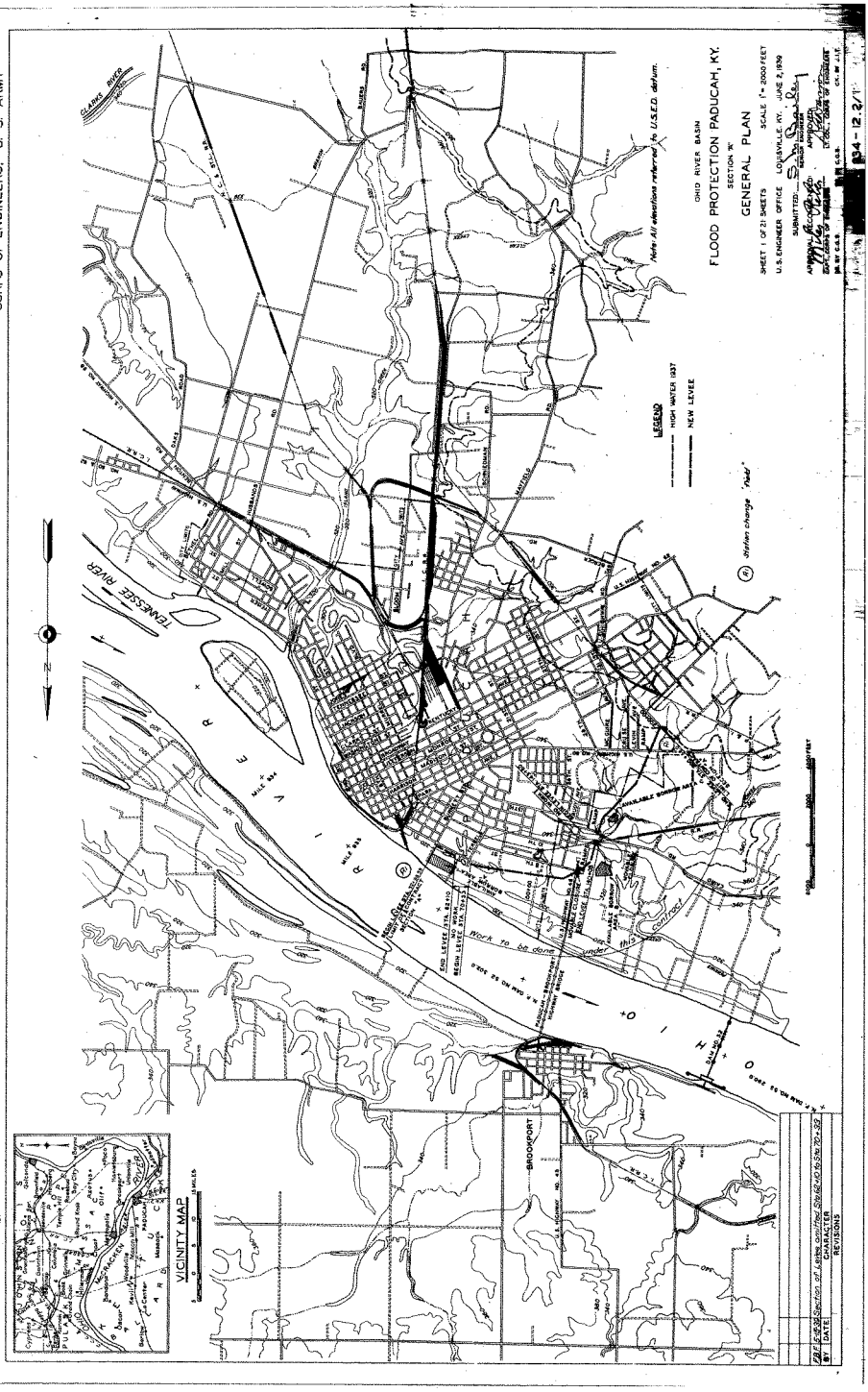
U. S. ENGINEER OFFICE, LOUISVILLE, KY.

R1	9-25-43 C.O.#1	Sheet added
R2	D.O.	Sheets deleted
R3	9-25-44 C.O.#1	sheets withdrawn, movable closure
		eliminated, ramp substituted.

MK	DATE	AUTHORITY	REVISION

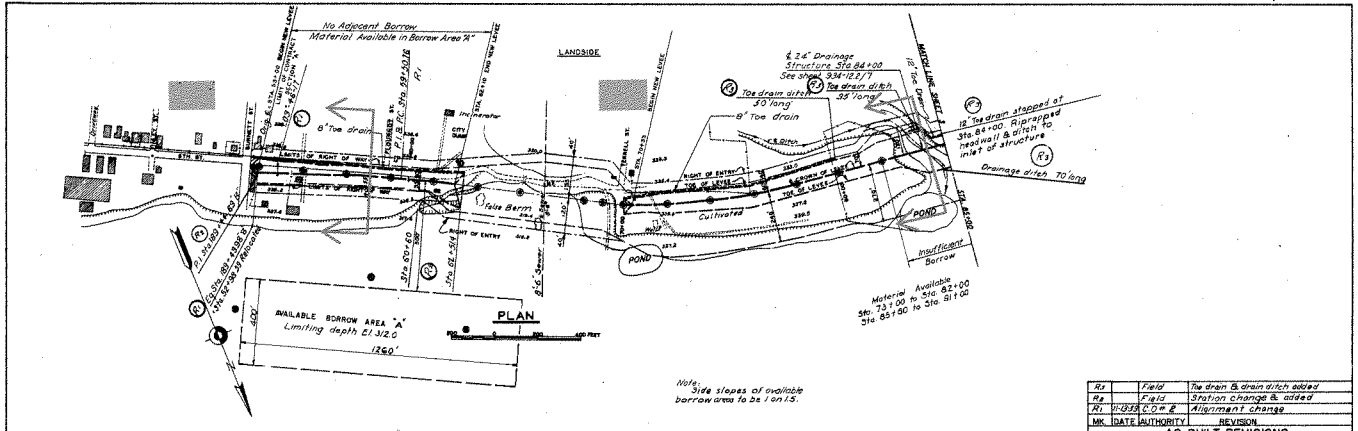
AS BUILT REVISIONS

811


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
SECTION 'K'
GENERAL PLAN
OHIO RIVER BASIN
SHEET 1 OF 21 SHEETS
SCALE 1" = 2000 FEET
U.S. ENGINEER OFFICE LOUISVILLE, KY., JUNE 5, 1939
SUBMITTED
APPROVED
APPROVED
LEGEND
HIGH WATER 1937
NEW LEVEE
Note: All elevations referred to U.S.E.D. datum.
Work to be done
VICINITY MAP
TENNESSEE RIVER
OHIO RIVER
BROOKPORT
PADUCAH
MISSISSIPPI
CLARKS RIVER
54-12.2/1

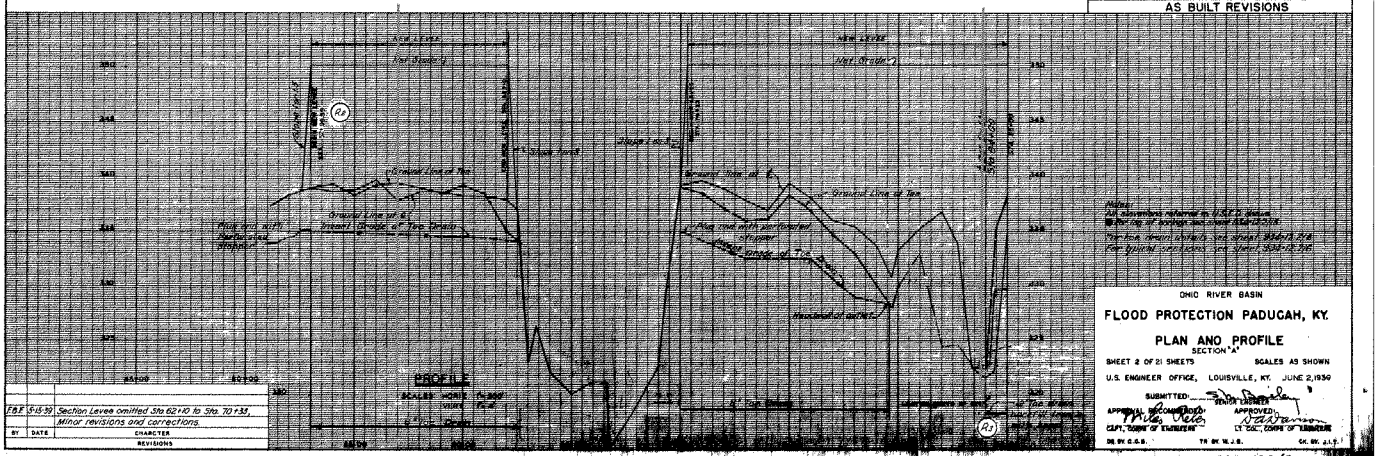
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



MK	DATE	AUTHORITY	REVISION
R3		Field	Toe drain & drain ditch added
R2		Field	Station change & added
R1	11-19-38	C.O.E. 2	Alignment change

AS BUILT REVISIONS



BY	DATE	CHARACTER REVISIONS
E.B.F.	9-15-39	Section Levees omitted Sta 62+10 to Sta. 70+35. Minor revisions and corrections.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "A"

SHEET 2 OF 21 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939

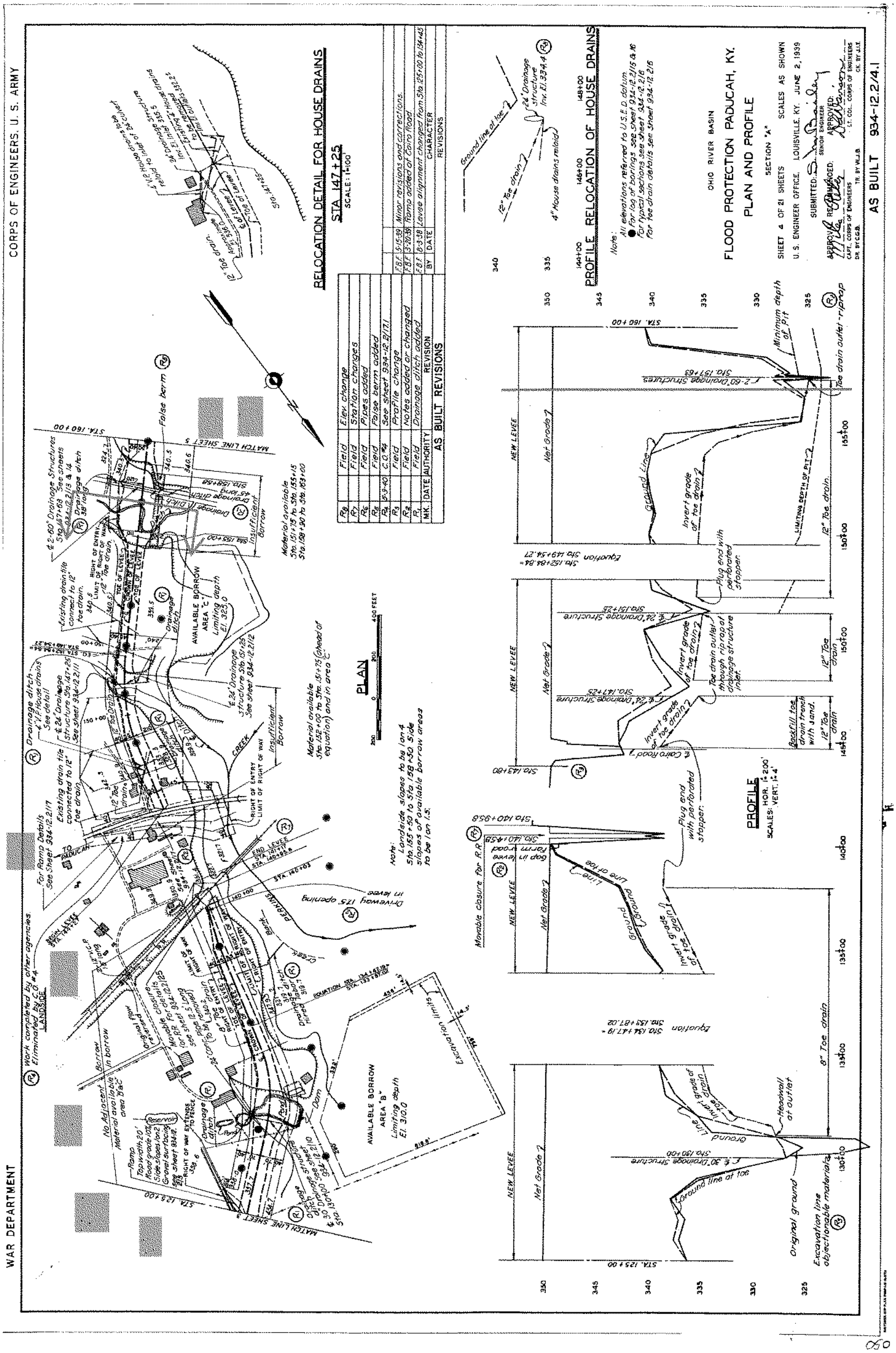
SUBMITTED: [signature] SENIOR ENGINEER

APPROVED: [signature] CAPT., CORPS OF ENGINEERS

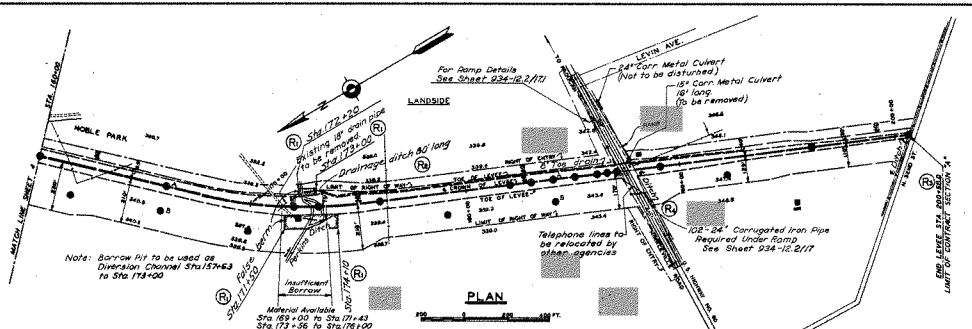
APPROVED: [signature] LT. COL., CORPS OF ENGINEERS

DIV. OF C.O.E. DIV. OF U.S.

AS BUILT 934-122/2

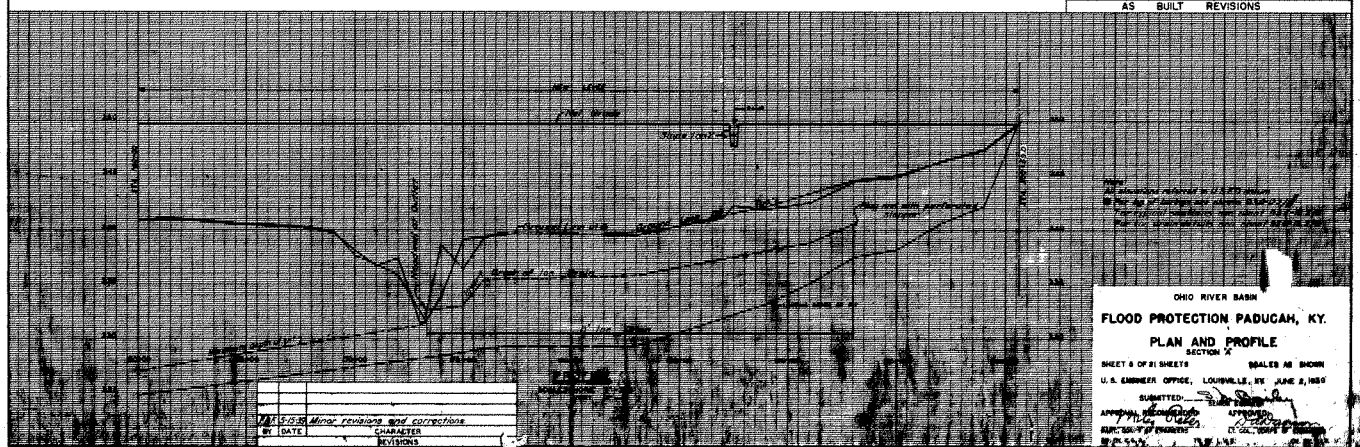

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
RELOCATION DETAIL FOR HOUSE DRAINS
STA 147+25
PLAN
PROFILE
PROFILE RELOCATION OF HOUSE DRAINS
AS BUILT REVISIONS
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PLAN AND PROFILE
SECTION "A"
AS BUILT 934-12.2/4.1

WAR DEPARTMENT — CORPS OF ENGINE[illegible], U. S. ARMY



R6		Field	Dimension changed
R5		Field	Station changed
R4		Field	Drainage ditch added
R3		Field	False berm added
NK	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS



7/27	5-15-50	Minor revisions and corrections
BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE

SECTION "A"

SHEET 6 OF 21 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1950

SUBMITTED: — ASSIST. DIVISION ENGINEER

APPROVAL RECOMMENDED: — APPROVED:

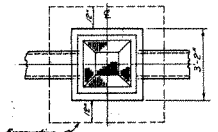
DIST. ENGR. OF ENGINEERS — CH. CIVIL WORKS OF ENGINEERS

AS BUILT

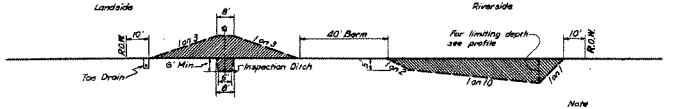
815

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY

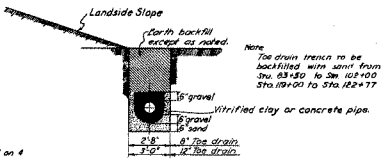


PLAN



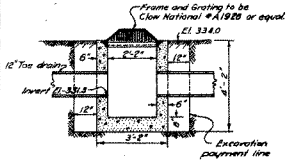
NEW LEVEE
STA. 181+00
SCALE: 1"=8'

Note
Landside slope to be 1 on 4
Sta. 110+80 to Sta. 113+00
Sta. 155+50 to Sta. 158+50



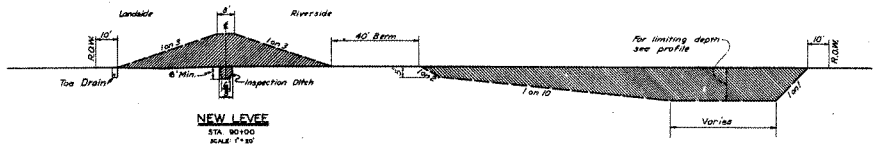
Note
Toe drain trench to be backfilled with sand from Sta. 83+80 to Sta. 102+00 Sta. 119+90 to Sta. 122+77

TOE DRAIN
SCALE: 3/8"=1'-0"

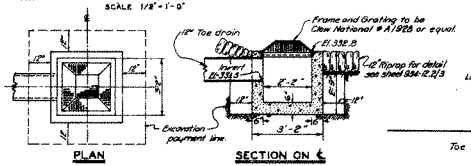


SECTION ON ℄

CATCH BASIN DETAIL STA. 122+77
SCALE 1/8"=1'-0"



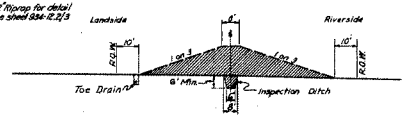
NEW LEVEE
STA. 90+00
SCALE: 1"=8'



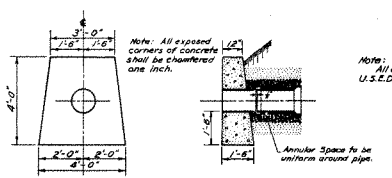
PLAN

SECTION ON ℄

CATCH BASIN DETAIL STA. 124+06
SCALE 1/2"=1'-0"



NEW LEVEE
STA. 120+00
SCALE: 1"=8'



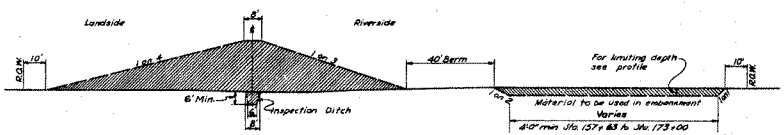
Note: All exposed corners of concrete shall be chamfered one inch.

Note: All elevations referred to U.S.E.D. datum.

FRONT ELEVATION

SECTION ON ℄

HEADWALL FOR TOE DRAIN OUTLETS
SCALE 1/2"=1'-0"



NEW LEVEE
STA. 157+84
SCALE: 1"=8'

Note:
Borrow pit to be used as diversion channel from Sta. 157+83 to Sta. 173+00 and limits excavated to not less than 100' from toe of levee, known on profile.

FEB 1938	Minor revisions and corrections
SEPT 1938	Revised and drawn to scale
BY	DATE	CHARACTER OF REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

TYPICAL SECTIONS

SECTION "A"

SHEET 6 OF 21 SHEETS

SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: [signature] Major Engineer

APPROVAL RECOMMENDED: [signature] Capt. Corps of Engineers

APPROVED: [signature] Lt. Col. Corps of Engineers

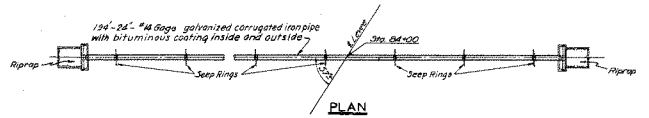
DR. BY J.J.H. TR. BY J.C.M. CK. BY J.I.T.

AS BUILT 934-122.6

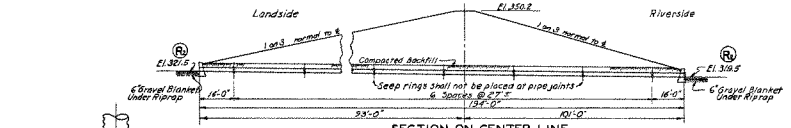
816

WAR DEPARTMENT

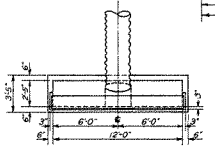
CORPS OF ENGINEERS, U.S. ARMY



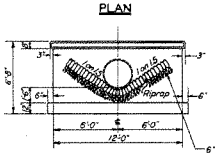
PLAN



SECTION ON CENTER LINE

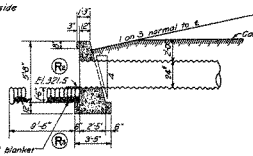


PLAN



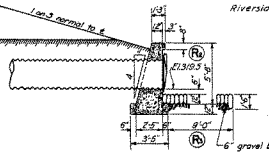
ELEVATION

SCALE: 1/4"=1'-0"



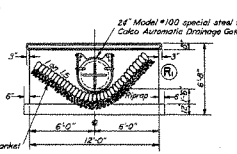
SECTION ON ℄ INLET

SCALE: 1/4"=1'-0"



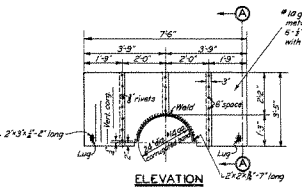
SECTION ON ℄ OUTLET

SCALE: 1/4"=1'-0"

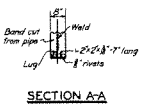


ELEVATION

SCALE: 1/4"=1'-0"



ELEVATION



SECTION A-A

Note:
One half of diaphragm shown, other half identical.

DETAIL OF SEEP RING

SCALE: 1/2"=1'-0"

General Notes:
All exposed corners of concrete shall be chamfered one inch

Slope culvert to fit bottom of ditch where suitable.

Excavation will be measured between vertical planes one foot outside required limits of foundation. Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet, before embankment is placed.
Place six inch gravel blanket under all riprap.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

DRAINAGE STRUCTURE STA. 84+00

SECTION "X"

SHEET 7 OF 21 SHEETS

SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1938

SUBMITTED: [signature] SENIOR ENGINEER

APPROVED: RECOMMENDED: [signature] CHIEF, CORPS OF ENGINEERS

APPROVED: [signature] LT. COL., CORPS OF ENGINEERS

CK. BY W.J.B. TR. BY J.J.H. CK. BY J.J.T.

AS BUILT 934-12.2/7

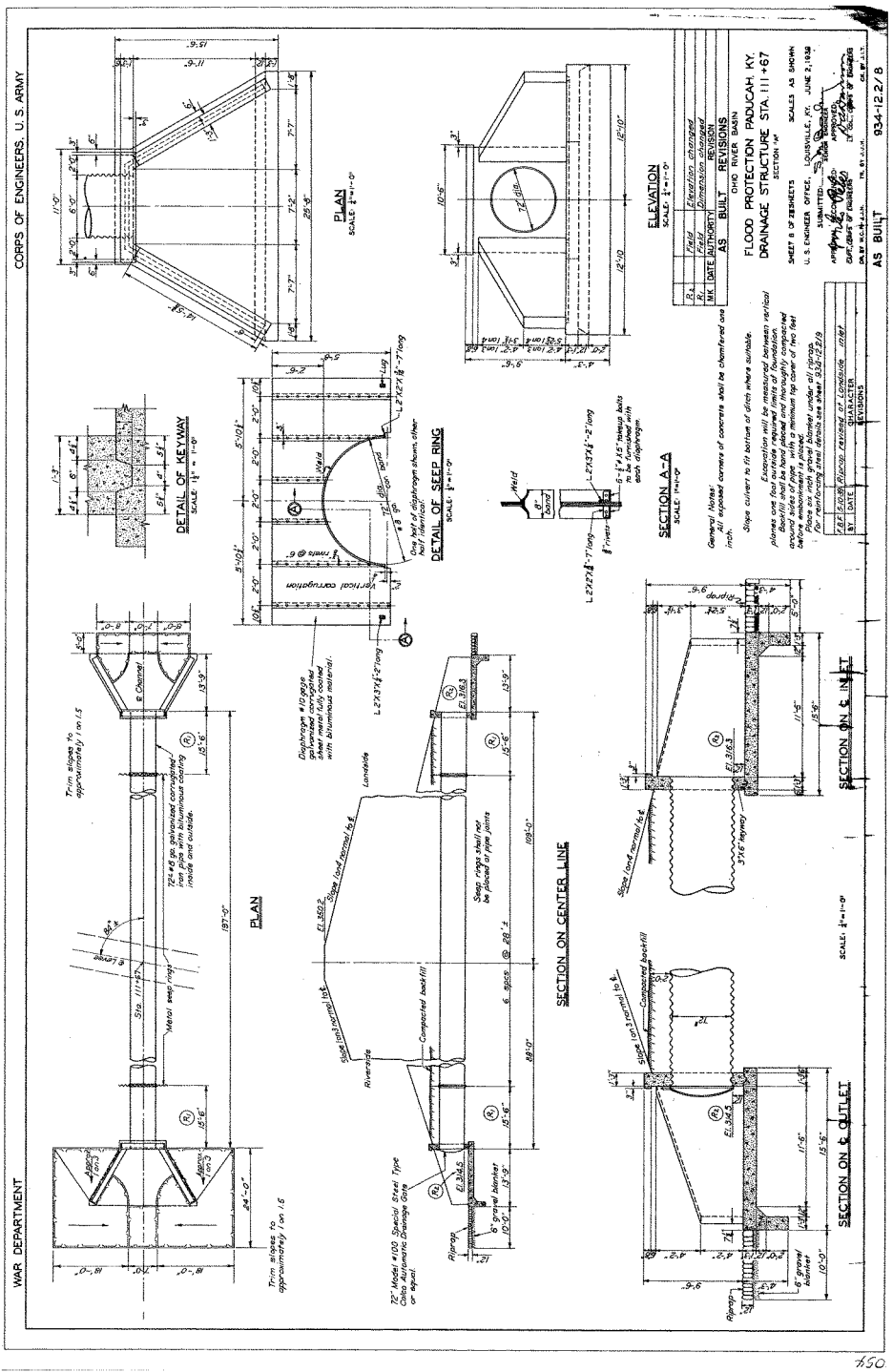
BY	DATE	CHARACTER
		REVISIONS
F.B.F.	5-10-39	Landside Levee Slopes Revised and Pipe Lengthened

MK	DATE	AUTHORITY	REVISION
(R)		Field	Dimensions changed
(R)		Field	Elevations changed
(R)		Field	Riprap changed

AS BUILT REVISIONS

353

817


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE STA. 111+67
AS BUILT
934-12.2/8
PLAN
ELEVATION
SECTION A-A
DETAIL OF KEYWAY
DETAIL OF SEEP RING
SECTION ON CENTER LINE
SECTION ON & INLET
SECTION ON & OUTLET
Trim slopes to approximately 1 on 1.5
12'-6" Model #100 Special Steel Type Corrugated Metal Automatic Drainage Gate or equal
Riprap
6" gravel blanket
Compacted backfill
Slope land normal to &
Metal seep rings
Vertical corrugation
Diaphragm #10 gage steel sheet, fully coated with bituminous material.
Seep rings shall not be placed at pipe joints
Backfill shall be hand placed and thoroughly compacted around structure to provide a minimum top cover of two feet before machine operation.
Place six inch gravel blanket under all riprap.
For reinforcing steel details see sheet S-34-12.2/9
Riprap revised at Landside inlet
AS BUILT
REVISIONS
OHIO RIVER BASIN
SCALE: 1/4"=1'-0"
SHEET 8 OF 28 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1938

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

REINFORCING DETAILS STA. 111+67

SECTION "A"

SHEET 9 OF 21 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: [illegible] — APPROVED: [illegible]

CHIEF, CORPS OF ENGINEERS — LT. COL. CORPS OF ENGINEERS

AS BUILT

934-12.2/9

PLAN
SCALE 1/4"=1'-0"

ELEVATION
SCALE 1/4"=1'-0"

SECTION B-B
(LANDSIDE)
SHOWING REINFORCING STEEL ON FILL SIDE OF WING WALL
SCALE 1/4"=1'-0"

SECTION B-B
(RIVERSIDE)
SHOWING REINFORCING STEEL ON FILL SIDE OF WING WALL

SECTION C-C
(LANDSIDE)
SHOWING REINFORCING STEEL ON CHANNEL SIDE OF WING WALL
SCALE 1/4"=1'-0"

SECTION C-C
(RIVERSIDE)
SHOWING REINFORCING STEEL ON CHANNEL SIDE OF WING WALL

SECTION E-E
SCALE 1/4"=1'-0"

SECTION D-D
SCALE 1/4"=1'-0"

General Notes:
Reinforcement schedule includes reinforcing steel for two headwalls.
Minimum distance from face of concrete to reinforcing steel shall not be less than two and one-half inches.
Landside wing walls for levee slope 1 on 3 and riverside wing walls for levee slope 1 on 3.

REINFORCEMENT SCHEDULE

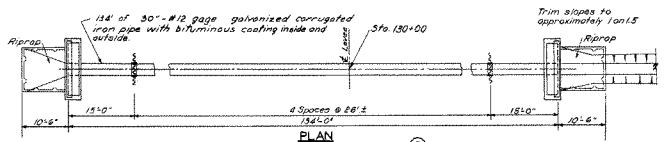
BAR	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J1	6	1"	7'-0"	1'-3"	4.98	29.9
J2	6	"	6'-3"	1'-3"	4.19	25.1
J3	2	"	5'-3"	1'-3"	3.73	7.4
J4	2	"	4'-3"	1'-3"	3.29	6.6
J5	2	"	3'-3"	Straight	2.85	5.7
J6	2	"	9'-3"	1'-3"	6.61	13.2
J7	2	"	8'-3"	1'-3"	5.85	11.7
J8	2	"	14'-3"	1'-3"	9.86	19.7
J9	2	"	16'-0"	1'-3"	11.19	22.4
J10	2	"	15'-3"	1'-3"	10.66	21.3
J11	2	"	14'-6"	1'-3"	10.06	20.1
J12	6	"	13'-6"	1'-3"	9.36	56.2
J13	6	"	12'-6"	1'-3"	8.66	52.0
J14	6	"	11'-6"	1'-3"	7.96	47.8
J15	6	"	10'-6"	1'-3"	7.26	43.6
J16	2	"	17'-6"	1'-3"	12.01	24.0
J17	2	"	16'-9"	1'-3"	11.49	23.0
J18	2	"	12'-3"	1'-3"	8.55	17.1
J19	2	"	11'-3"	1'-3"	7.85	15.7
J20	2	"	10'-3"	1'-3"	7.15	14.3
J21	2	"	9'-3"	1'-3"	6.45	12.9
J22	4	"	18'-3"	1'-3"	12.66	50.6
J23	4	"	17'-3"	1'-3"	12.03	48.1
J24	4	"	13'-3"	1'-3"	9.25	37.0
J25	2	"	12'-3"	1'-3"	8.55	17.1
J26	2	"	11'-3"	1'-3"	7.85	15.7
J27	2	"	10'-3"	1'-3"	7.15	14.3
J28	2	"	18'-3"	1'-3"	12.73	25.4
J29	2	"	17'-3"	1'-3"	12.03	24.1
J30	4	"	20'-6"	1'-3"	14.30	57.2
J31	2	"	19'-6"	1'-3"	13.60	27.2
J32	4	"	20'-3"	1'-3"	14.13	56.5
J33	20	"	20'-3"	1'-3"	14.13	282.6
J34	4	"	18'-3"	1'-3"	12.73	50.9
J35	20	"	18'-3"	1'-3"	12.73	254.6
J36	4	"	14'-3"	1'-3"	9.96	39.8
J37	4	"	9'-3"	1'-3"	6.61	26.4
J38	2	"	8'-3"	1'-3"	5.85	11.7
J39	2	"	7'-3"	1'-3"	5.14	10.3
J40	2	"	6'-3"	1'-3"	4.44	8.9
J41	4	"	9'-0"	1'-3"	6.27	25.0
J42	4	"	7'-6"	1'-3"	4.84	19.4
J43	4	"	6'-6"	1'-3"	4.14	16.6
J44	2	"	11'-7"	1'-3"	7.98	15.9
J45	16	1¼"	9'-8"	Straight	17.38	278.1
J46	16	1¼"	8'-7"	Straight	15.43	246.9
G1	4	"	7'-4"	1'-3"	5.05	20.2
G2	2	"	6'-4"	1'-3"	4.58	9.2
G3	2	"	5'-4"	1'-3"	4.01	8.0
G4	2	"	4'-4"	1'-3"	3.44	6.9
G5	2	"	3'-4"	Straight	2.88	5.8
G6	2	"	8'-7"	1'-3"	5.77	11.5
G7	2	"	7'-7"	1'-3"	5.20	10.4
G8	6	"	6'-7"	1'-3"	4.63	27.8
G9	6	"	5'-7"	1'-3"	4.06	24.4
G10	2	"	9'-3"	1'-3"	6.61	13.2
G11	6	"	8'-3"	1'-3"	5.85	35.1
G12	2	"	7'-6"	1'-3"	5.32	10.6
G13	2	"	6'-6"	1'-3"	4.61	9.2
G14	2	"	5'-6"	1'-3"	3.90	7.8
G15	2	"	5'-11"	1'-3"	4.25	8.5
G16	6	"	4'-11"	1'-3"	3.54	21.2
G17	6	"	3'-11"	Straight	2.83	17.0
G18	6	"	4'-6"	1'-3"	3.25	19.5
G19	2	"	3'-6"	1'-3"	2.54	5.1
G20	12	1¼"	9'-8"	1'-3"	17.38	208.5
G21	8	1¼"	9'-3"	1'-3"	16.62	133.0
J47	4	"	17'-9"	Straight	31.90	127.6
J48	4	"	15'-0"	1'-3"	26.94	107.8
J49	4	"	13'-3"	1'-3"	23.81	95.2
J50	4	"	11'-6"	1'-3"	20.67	82.7
J51	4	"	9'-8"	1'-3"	17.38	69.5
				TOTAL		4223#

BY	DATE	CHARACTER OF REVISIONS

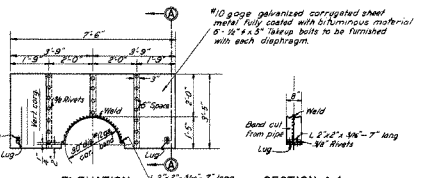
934

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



PLAN



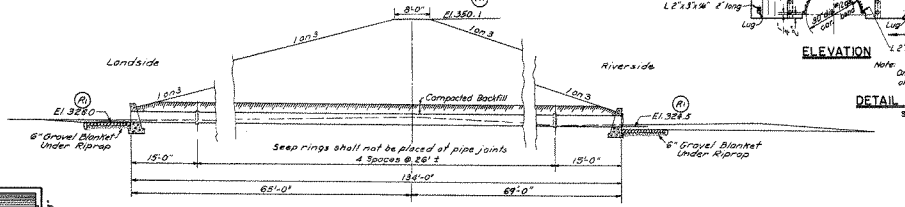
ELEVATION

SECTION A-A

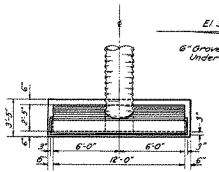
Note: One half of diaphragm shown, other half identical.

DETAIL OF SEEP RING

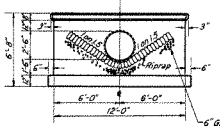
SCALE: 1/2"=1'-0"



SECTION ON CENTER LINE

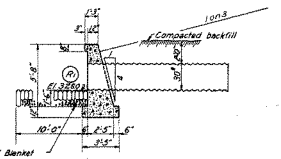


PLAN



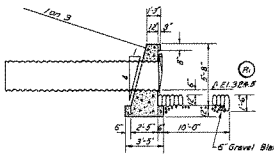
ELEVATION

SCALE: 1/4"=1'-0"



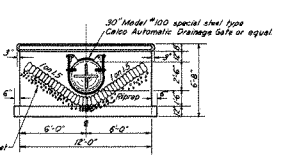
SECTION ON ℄ INLET

SCALE: 1/4"=1'-0"



SECTION ON ℄ OUTLET

SCALE: 1/4"=1'-0"



ELEVATION

SCALE: 1/4"=1'-0"

(R1) Elevation change "Field"

General Notes:
All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable.

Excavation will be measured between vertical planes one foot outside required limits of foundation. Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet, before embankment is placed. Place six inch gravel blanket under all riprap.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

DRAINAGE STRUCTURE STA. 130+00

SECTION "A"

SHEET 10 OF 21 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: SENIOR ENGINEER

APPROVED: APPROVED:

CAPT., CORPS OF ENGINEERS LT. COL., CORPS OF ENGINEERS

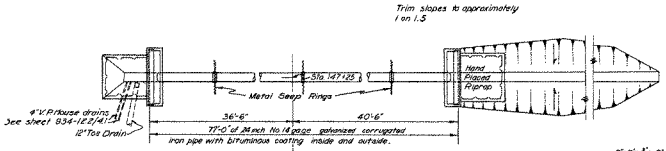
DR. BY L.W.D. TR. BY L.W.G.-W.J.B. CK. BY J.L.T.

BY	DATE	CHARACTER
		REVISIONS
F.B.T.	5-10-39	Landside Levee Slopes Revised and Pipe Lengthened

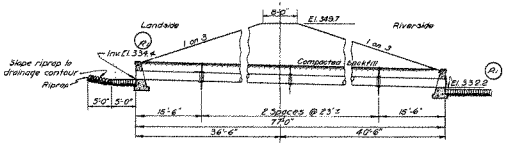
AS BUILT 934 - 12.2/10

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

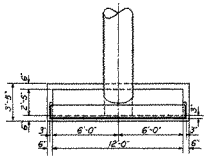


PLAN

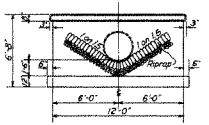


Seep rings shall not be placed at pipe joints

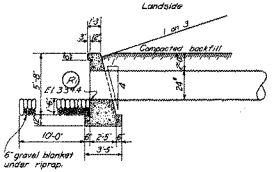
SECTION ON CENTER LINE



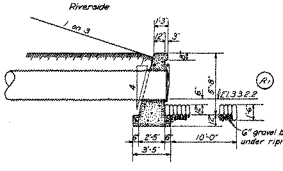
PLAN



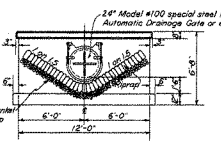
ELEVATION
Scale $\frac{1}{4}$"=1'-0"



SECTION ON ℄ INLET
Scale $\frac{1}{4}$"=1'-0"

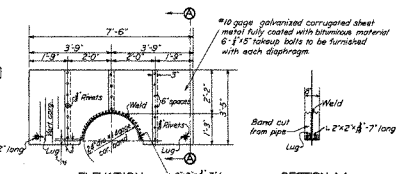


SECTION ON ℄ OUTLET
Scale $\frac{1}{4}$"=1'-0"



ELEVATION
Scale $\frac{1}{4}$"=1'-0"

(R) Elevation change "Field"



ELEVATION

SECTION A-A

Note: One half of diaphragm shown, other half identical.

DETAIL OF SEEP RING
Scale $\frac{1}{2}$"=1'-0"

General Notes:

All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable.

Excavation will be measured between vertical planes one foot outside required limits of foundation.

Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet, before embankment is placed.

Place six inch gravel blanket under all riprap.

BY	DATE	CHARACTER
		REVISIONS
TBT	5-3-39	Invert elevation Changed, riprap at landside.
		Inlet revised and pipe lengthened.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

DRAINAGE STRUCTURE STA. 147+25

SECTION "A"

SHEET 11 OF 21 SHEETS

SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: [signature] SENIOR ENGINEER

APPROVED AND RECOMMENDED: [signature] CAPT., CORPS OF ENGINEERS

APPROVED: [signature] LT. COL., CORPS OF ENGINEERS

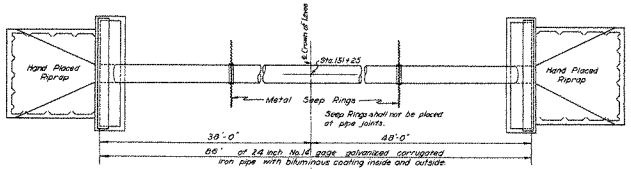
DR. BY R.S.R. TR. BY J.J.K.-A.E.L. CK. BY J.L.T.

AS BUILT 934-12.2/11

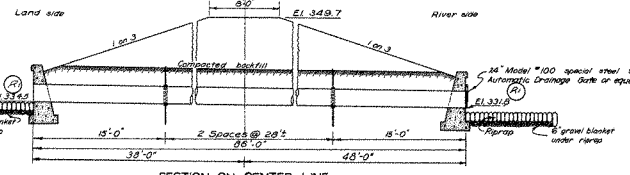
821

WAR DEPARTMENT

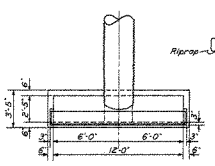
CORPS OF ENGINEERS, U. S. ARMY



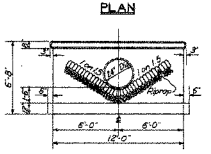
PLAN



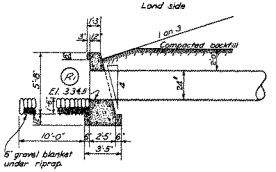
SECTION ON CENTER LINE



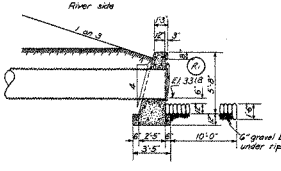
PLAN



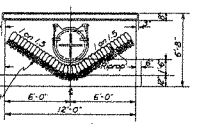
ELEVATION
Scale $\frac{1}{4}$"=1'-0"



SECTION ON ℄ INLET
Scale $\frac{1}{4}$"=1'-0"



SECTION ON ℄ OUTLET
Scale $\frac{1}{4}$"=1'-0"

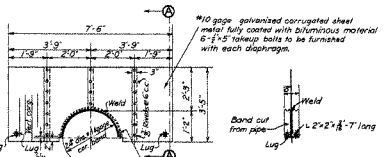


ELEVATION
Scale $\frac{1}{4}$"=1'-0"

(R) Elevation change "Field"

General Notes:
All exposed corners of concrete shall be chamfered one inch.
All riprap shall be hand placed.
Slope culvert to fit bottom of ditch where suitable.

Excavation will be measured between vertical planes one foot outside required limits of foundation.
Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet, before embankment is placed.
Place six inch gravel blanket under all riprap.



ELEVATION

SECTION A-A

Note:
One half of diaphragm shown, other half identical.

DETAIL OF SEEP RING
Scale $\frac{1}{2}$"=1'-0"

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

DRAINAGE STRUCTURE STA. 151+25

SECTION "X"

SHEET 12 OF 21 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: _____ SENIOR ENGINEER

APPROVAL RECOMMENDED: _____ CAPT. CORPS OF ENGINEERS

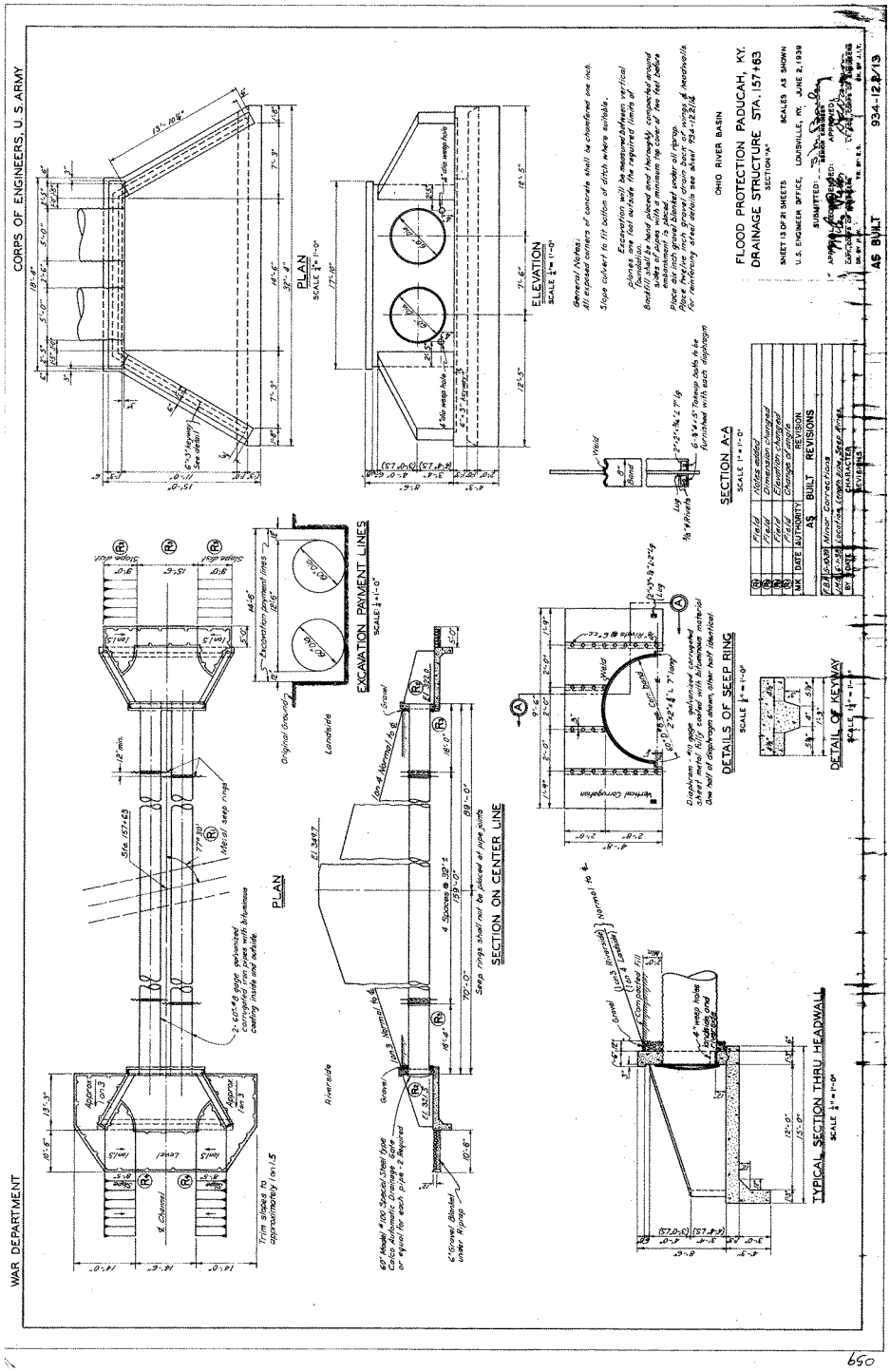
APPROVED: _____ LT. COL. CORPS OF ENGINEERS

DR. BY H.W. TR. BY J.J.H. CK. BY A.L.T.

F.B.P.	5-10-39	Minor Corrections
BY	DATE.	CHARACTER
REVISIONS		

AS BUILT 934-12.2/12

822


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE STA. 157+63
SECTION "A"
SHEET 19 OF 21 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939
AS BUILT
934-12.2/13
PLAN
ELEVATION
SECTION A-A
EXCAVATION PAYMENT LINES
SECTION ON CENTER LINE
DETAILS OF SEEP RING
DETAIL OF KEYWAY
TYPICAL SECTION THRU HEADWALL
Sta. 157+63
Riverside
Landside
Original Ground
Trim slopes to approximately 1 on 1.5
2-coat-6 gage galvanized corrugated iron pipes with bituminous coating inside and outside.
Weld all seep rings
Seep rings shall not be placed at pipe joints
4 Spaces @ 32'-0" = 128'-0"
Excavation payment lines
Gravel
Compacted Fill
Approximate Limit of Excavation
Weep holes draining into sump
Sump
Slope drain
Headwall
Keyway
Weld
Lug
Bond
Notes added
Drawing corrected
Elevation changed
Field
Changes of angle
REVISIONS
AS BUILT
Minor Corrections
Location, length, size, seep rings
Added
Revised
Traced
Checked
Approved
Submitted
Recommended for approval
Chief of Engineers
Secretary of War
Date Received in W.D.
Date Approved by W.D.

650

WAR DEPARTMENT — CORPS OF ENGINEERS, U.S. ARMY

REINFORCEMENT SCHEDULE

BAR	SIZE	NO. REQD	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
/1	1" ϕ	6	41'-9"	4'-3" 4"	171	1026
/2	"	6	5'-7"	5'-7" 4"	3.73	22.4
/3	"	6	5'-9"	5'-9" 4"	3.84	23.0
/4	"	10	6'-4"	Bundle 3"	4.23	42.3
/5	"	14	15'-5"	15'-5" 4"	10.30	144.2
/6	"	2	16'-3"	16'-3" 4"	10.85	21.7
/7	"	2	8'-3"	8'-3" 4"	5.51	11.0
/8	"	2	16'-9"	16'-9" 4"	11.19	22.4
/9	"	2	13'-5"	Straight 12"	8.95	17.9
/10	"	2	10'-6"	"	7.00	14.0
/11	"	2	6'-6"	"	4.34	8.7
/12	"	2	5'-6"	5'-6" 4" 1'-6"	3.67	7.3
/13	"	2	17'-0"	17'-0" 4" 1'-6"	11.36	22.7
/14	"	2	10'-0"	10'-0" 4" 1'-6"	6.68	13.4
/15	"	2	18'-6"	18'-6" 4" 1'-6"	12.36	24.7
/16	"	14	14'-3"	Straight 12"	9.52	133.3
/17	"	2	8'-0"	"	5.34	10.7
/18	"	6	17'-0"	"	11.33	71.8
/19	"	2	18'-8"	"	12.47	24.9
/20	"	2	21'-0"	"	14.03	28.1
/21	"	4	22'-3"	Straight	14.87	59.5
/22	"	2	23'-3"	"	15.54	31.1
/23	"	2	25'-6"	"	17.04	34.1
/24	"	2	25'-6"	"	17.04	34.1
/25	"	4	26'-4"	"	17.61	70.5
/26	"	4	26'-4"	"	17.61	70.5
/27	"	2	28'-0"	"	18.70	37.4
/28	"	4	24'-0"	"	16.03	64.1
/29	"	2	30'-0"	"	20.05	40.1
/30	"	2	31'-6"	"	21.04	42.1
/31	"	16	33'-0"	"	21.98	351.6
/32	"	34	18'-3"	4'-3" 3 1/2" 4'-3" 3 1/2" 4'-3" 3 1/2" 4'-3"	12.19	414.5
/33	"	4	16'-6"	4'-3" 3 1/2" 4'-3" 3 1/2" 4'-3"	11.05	44.1
/34	"	4	14'-6"	4'-3" 3 1/2" 4'-3" 3 1/2" 3'-0"	9.65	38.6
/35	"	4	13'-5"	4'-3" 3 1/2" 4'-3" 3 1/2" 2'-0"	8.95	35.8
/36	"	4	11'-6"	4'-3" 3 1/2" 4'-3"	7.66	30.7
/37	"	4	9'-9"	4'-3" 3 1/2" 2'-0"	6.51	26.0
/38	"	4	8'-3"	4'-3" 3 1/2"	5.54	22.2
/39	"	4	6'-3"	4'-3" 3 1/2"	4.18	16.7
/40	"	4	8'-0"	4'-3" 3 1/2"	5.34	21.4
/41	"	16	18'-10"	Straight 1 1/2"	11.30	180.8
/42	"	12	10'-4"	"	6.91	82.1
/43	1" ϕ	8	10'-4"	Straight 2"	6.55	52.4
/44	"	10	7'-2"	" 2"	7.17	71.7
/45	"	10	7'-9"	" 2"	8.08	80.8
/46	"	4	8'-2"	Straight 2"	5.45	21.8
/47	"	4	5'-0"	"	3.33	13.3
/48	"	4	5'-0"	"	5.22	20.9
/49	"	2	6'-0"	"	6.26	12.5
/50	"	4	6'-0"	" 2"	7.04	28.2
/51	"	4	5'-6"	Straight 2"	6.34	25.4
/52	"	16	8'-0"	"	12.82	1948.2
/53	"	8	12'-6"	7'-6" 1 1/4" 5'-0" 1 1/4"	13.18	1026.5
/54	"	24	17'-5"	7'-6" 1 1/4" 5'-0" 1 1/4" 4'-9" 1 1/4"	26.16	6278.8
/55	"	4	13'-4"	7'-6" 1 1/4" 5'-0" 1 1/4"	20.03	80.1
/56	"	4	10'-10"	7'-6" 1 1/4" 3'-4" 1 1/4"	16.27	65.1
/57	"	4	8'-7"	7'-6" 1 1/4" 1'-1" 1 1/4"	12.90	51.6
/58	"	20	10'-3"	4'-3" 1 1/4" 4'-3"	15.40	308.0
				TOTAL		4705

SECTION D-D

SECTION C-C
CHANNEL SIDE
REINFORCING STEEL FOR RIVERSIDE WING WALLS
SCALE 1/4" = 1'-0"

SECTION B-B
FILL SIDE

PLAN
SCALE 1/4" = 1'-0"

ELEVATION
SCALE 1/4" = 1'-0"

SECTION A-A
SCALE 1/4" = 1'-0"

SECTION B-B
FILL SIDE

SECTION C-C
CHANNEL SIDE
REINFORCING STEEL FOR LANDSIDE WING WALLS
SCALE 1/4" = 1'-0"

General Notes:
Reinforcement schedule includes reinforcing steel for two headwalls.
Provide 2" clearance from face of concrete to reinforcing steel shall not be less than two and one-half inches.
Concrete in wing walls shall be placed in 3 stages for the wing walls for these stops 1 on 3 and riverside

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS STA. 157+63
SECTION "A"

SHEET 14 OF 21 SHEETS — SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939
SUBMITTED: [signature] CHIEF, ENGINEERING DIVISION
APPROVED: [signature] CHIEF, ENGINEERING DIVISION
DISTRICT ENGINEER
DIVISION ENGINEER

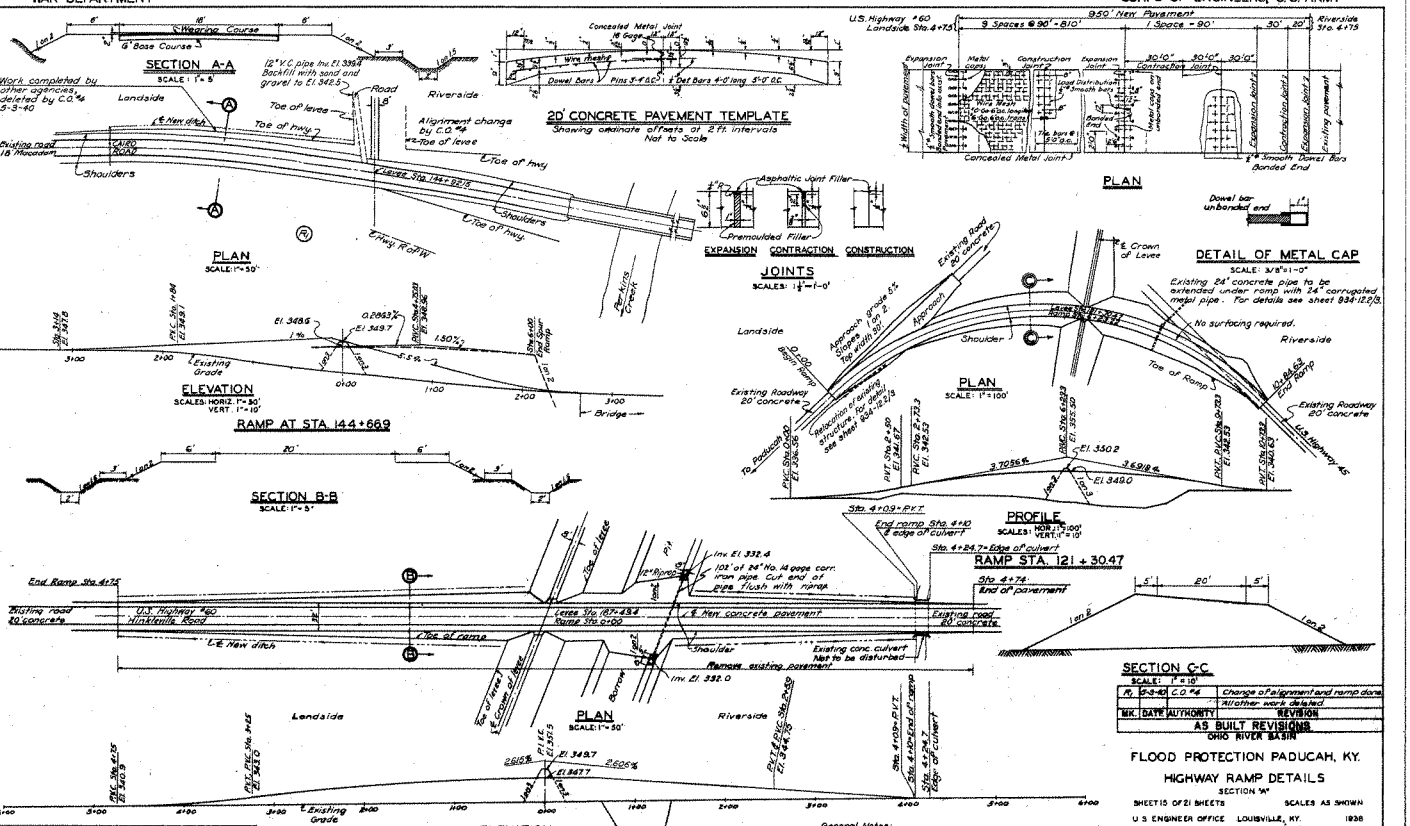
BY	DATE	CHARACTER OF REVISIONS

AS BUILT — 934-12 2/14

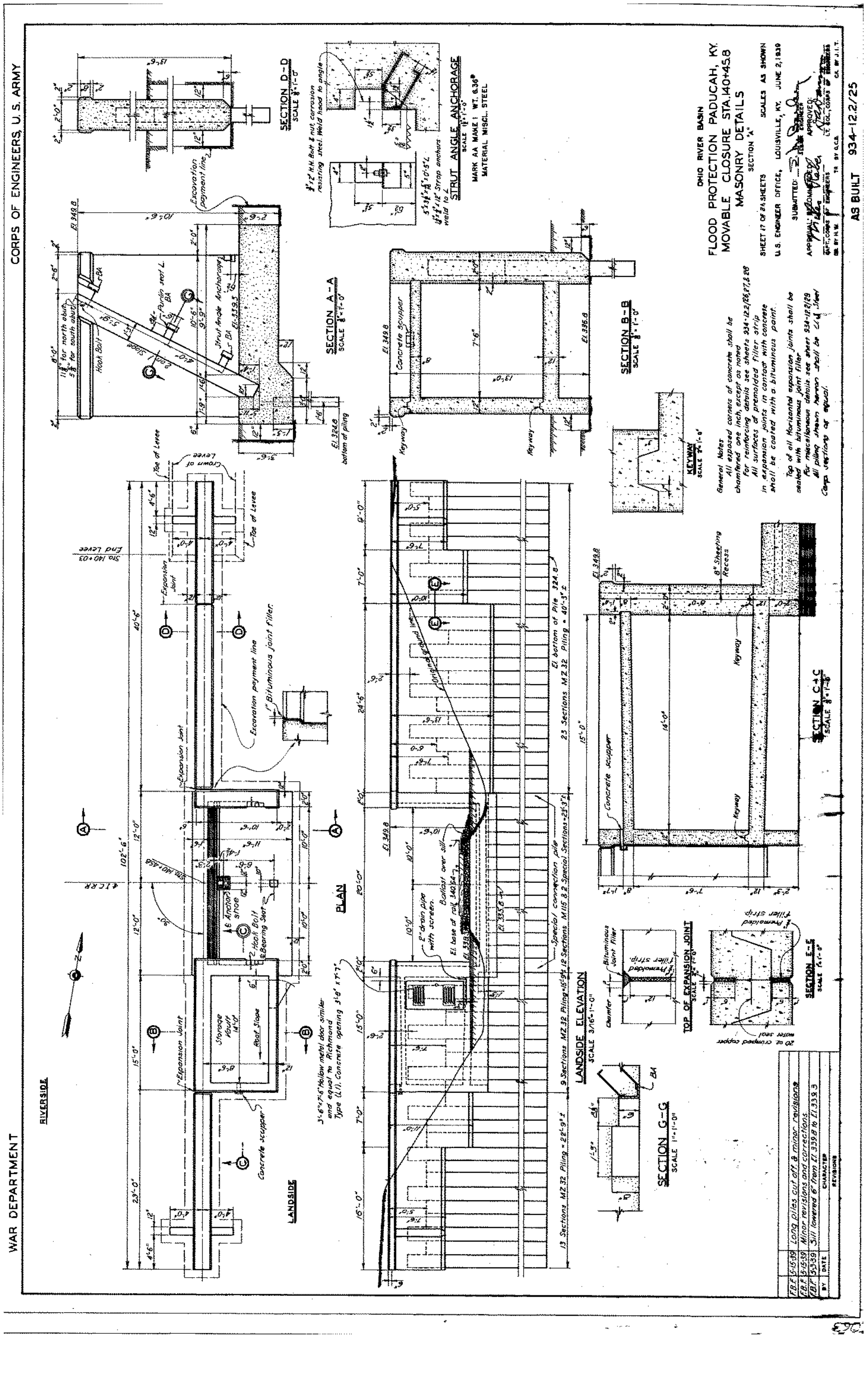
090

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY

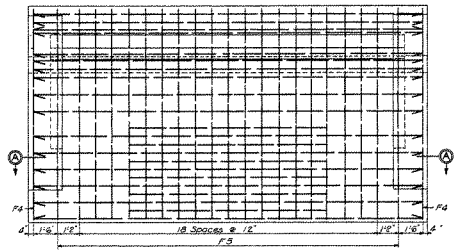


AS BUILT 934-12.2/17.1

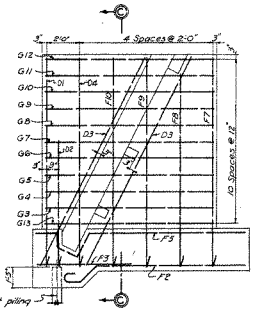

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MOVABLE CLOSURE STA.140+45.8
MASONRY DETAILS
SECTION "A"
SHEET 17 OF 24 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
CAPT., CORPS OF ENGINEERS
LT. COL., CORPS OF ENGINEERS
DR. BY H.W. TR. BY G.C.S. CK. BY J.I.T.
AS BUILT 934-12.2/25
PLAN
RIVERSIDE
LANDSIDE
LANDSIDE ELEVATION
SCALE 3/16"=1'-0"
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION G-G
SCALE 1"=1'-0"
STRUT ANGLE ANCHORAGE
MARK AA MAKE 1 WT. 6.36#
MATERIAL MISCL. STEEL
KEYWAY
TOP OF EXPANSION JOINT
Sta. 140+03 End Levee
Sta. 140+45.8
Expansion Joint
Excavation payment line
1" Bituminous joint filler
Storage Vault
Roof Slope
Concrete scupper
Hook Bolt
Purlin seat L
Strut Angle Anchorage
El. 349.8
El. 339.3
El. 335.8
El. 324.8 bottom of piling
Keyway
8" Sheeting Recess
2" drain pipe with screen.
Ballast over sill
El. base of rail 340.54
Original ground line
Special connection pile
El. bottom of Pile 324.8
13 Sections MZ 32 Piling = 22'-9" ±
9 Sections MZ 32 Piling = 15'-9" ± 12 Sections M115 & 2 Special Sections = 23'-3" ±
23 Sections MZ 32 Piling = 40'-3" ±
3'-6"x7'-6" Hollow metal door similar and equal to Richmond Type (L1). Concrete opening 3'-8" x 7'-7"
Bituminous Joint Filler
Premolded filler strip
20 oz. crimped copper water seal
General Notes
All exposed corners of concrete shall be chamfered one inch, except as noted
For reinforcing details see sheets 934-12.2/26, 27, & 28
All surfaces of premolded filler strip in expansion joints in contact with concrete shall be coated with a bituminous paint.
Top of all Horizontal expansion joints shall be sealed with bituminous joint filler
For miscellaneous details see sheet 934-12.2/29
All piling shown hereon shall be U.S. Steel Corp. sections or equal.
F.B.F. 5-15-39 Long piles cut off & minor revisions
F.B.F. 5-15-39 Minor revisions and corrections
F.B.F. 5-3-39 Sill lowered 6" from El. 339.8 to El. 339.3
BY DATE CHARACTER REVISIONS

WAR DEPARTMENT

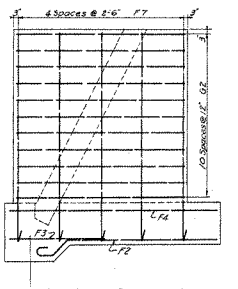
CORPS OF ENGINEERS, U. S. ARMY



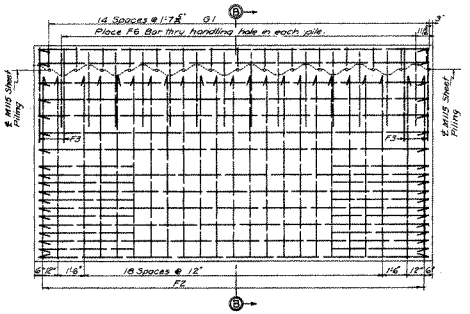
REINFORCING TOP OF SILL
SCALE: 3/8"=1'-0"



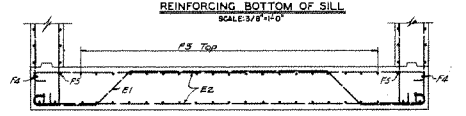
REINFORCING FRONT FACE ABUTMENT WALL
SCALE: 3/8"=1'-0"



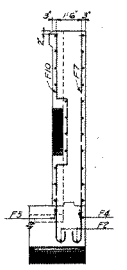
REINFORCING BACK FACE ABUTMENT WALL
SCALE: 3/8"=1'-0"



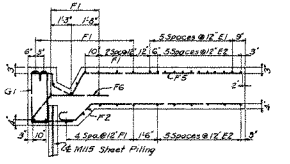
REINFORCING BOTTOM OF SILL
SCALE: 3/8"=1'-0"



SECTION A-A
SCALE: 3/8"=1'-0"



SECTION C-C
SCALE: 3/8"=1'-0"



SECTION B-B
SCALE: 3/8"=1'-0"

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	18	#6	25'-0"	23'-6"	37.55	675.9
F2	23	"	12'-1"	12" 3½" 9'-10"	18.15	417.5
F3	4	"	5'-8"	Straight	8.64	34.6
F4	2	"	12'-8"	12"	19.03	38.1
F5	21	"	13'-6"	14'-10" 9'-5" 3½"	21.78	457.4
F6	14	"	7'-10"	3½" 3'-6" 4"	11.77	164.8
F7	12	"	13'-4"	12'-8"	20.03	240.4
F8	2	"	18'-2"	11'-6"	18.27	36.5
F9	2	"	14'-2"	8'-0" 3½"	21.28	42.6
F10	2	"	14'-8"	6'-0" 3½" 8'-10"	22.03	44.1
D1	2	1"ø	19'-7"	12'-8"	36.27	72.5
D2	2	"	8'-7"	7'-8"	22.92	45.8
D3	4	"	14'-0"	Straight	37.38	149.5
G1	19	⅝"ø	6'-8"	12" 3'0"	6.69	130.4
G2	22	"	10'-8"	Straight	10.60	233.2
G3	2	"	11'-6"	1'-6" 2'-6" 6'0"	11.99	24.0
G4	2	"	11'-6"	2'-0" 2'-0" 3'-6"	11.99	24.0
G5	2	"	11'-6"	3'-6" 2'-6" 3'-0"	11.99	24.0
G6	2	"	11'-6"	3'-0" 2'-6" 3'-6"	11.99	24.0
G7	2	"	11'-6"	3'-6" 2'-6" 3'-0"	11.99	24.0
G8	2	"	11'-6"	4'-0" 2'-6" 3'-6"	11.99	24.0
G9	2	"	11'-6"	3'-6" 2'-6" 3'-0"	11.99	24.0
G10	2	"	11'-6"	3'-0" 2'-6" 3'-6"	11.99	24.0
G11	2	"	11'-6"	3'-6" 2'-6" 3'-0"	11.99	24.0
G12	2	"	11'-6"	6'-0" 2'-6" 3'-0"	11.99	24.0
E1	6	⅜"ø	27'-2"	6'-10" 12'-6" 8'-10"	55.52	333.1
E2	12	"	25'-6"	23'-6"	52.12	625.4
D4	2	1"ø	14'-3"	4'-6" 3'-0" 8'-0"	38.05	76.1
G13	2	⅝"ø	11'-6"	7'-0" 2'-6" 2'-0"	11.99	24.0
					TOTAL	4082 #

DETAIL OF HOOK

General Notes:
All reinforcing bars to be placed and secured in position before placing concrete. Reinforcing to have a minimum of two and one half inches of concrete covering unless otherwise specified.
For masonry details see sheet 934-12.2/25.
For reinforcing details see sheets 934-12.2/27 & 28

BY	DATE	CHARACTER
		REVISIONS
F.B.K.	5-3-39	Reinf. revised for lowering sill 6"

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS STA. 140+45.8
SILL & ABUTMENT WALLS
SECTION "A"

SHEET 18 OF 21 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: S. L. Bond, DENSON ENGINEER

APPROVAL RECOMMENDED: Thos. Wade, CAPT., CORPS OF ENGINEERS, DR. BY W.J.B.

APPROVED: R. E. Jamison, LT. COL., CORPS OF ENGINEERS, TR. BY R.O.D., CK. BY J.I.T.

AS BUILT

934-12.2/26

827

454

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS STA. 140+45.8
WING WALLS & SEEPAGE CUT-OFF WALLS

SHEET 18 OF 23 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: [signature] DISTRICT ENGINEER

APPROVED: [signature] CAPT., CORPS OF ENGINEERS

RECOMMENDED: [signature] LT. COL., CORPS OF ENGINEERS

DIV. ENGR. — 7TH M.E.C. — CH. ENGR.

AS BUILT

934-12.2/27

REINFORCEMENT SCHEDULE

BAR	NO. REQD	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J14	48	¾"	4'-3"	Field Bend	2.64	126.3
J15	16	"	5'-6"	Straight	3.67	58.7
G14	14	⅝"	22'-5"	"	13.38	327.3
G15	14	"	6'-0"	"	6.95	97.3
G16	28	"	24'-2"	"	25.21	655.5
G17	14	"	15'-7"	"	16.20	226.8
F17	16	¾"	6'-10"	"	10.26	164.2
F18	6	"	10'-4"	"	15.52	93.1
F19	18	"	12'-10"	"	19.28	347.0
F20	6	"	9'-4"	"	14.02	84.1
					TOTAL	2180#

(R)

BY	DATE	CHARACTER OF REVISIONS
EAE	5-1-38	Lengthened cut off
EAE	5-25-38	Minor revisions and corrections

BY	DATE	AUTHORITY	AS BUILT REVISIONS
MK	12-19-39	Field Bar schedule changed	

General Notes:
All reinforcing bars to be placed and secured in position before placing concrete. Clear concrete coverage shall be one and one half inches of concrete covering, unless otherwise specified.
For masonry details see sheet 934-12.2/19
For reinforcing details of dam and abutment walls see sheet 934-12.2/1
For reinforcing details of storage vault see sheet 934-12.2/21

PLAN—SOUTH WALL
SCALE 3/16"=1'-0"

ELEVATION—SOUTH WALL
SCALE 3/16"=1'-0"

PLAN—NORTH WALL
SCALE 3/16"=1'-0"

ELEVATION—NORTH WALL
SCALE 3/16"=1'-0"

SECTION A-A
SCALE 3/16"=1'-0"

SECTION B-B
SCALE 3/16"=1'-0"

590

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY

REINFORCEMENT SCHEDULE

BAR	SIZE	NO. REQD.	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J1	#8	38	12'-8"	Straight	8.46	321.5
J2	#	3	3'-10"	3'-10"	2.56	7.7
J3	#	215	11'-6"	11'-6"	11.37	2593
J4	#	7	11'-6"	11'-6"	11.85	33.6
J5	#	16	11'-6"	11'-6"	7.37	121
J6	#	7	10'-6"	10'-6"	7.01	49.1
J7	#	3	6'-2"	6'-2"	4.12	12.4
J8	#	10	9'-4"	9'-4"	6.23	62.1
J9	#	4	17'-3"	17'-3"	11.52	46.1
J10	#	4	19'-6"	19'-6"	13.03	52.1
J11	#	3	12'-6"	12'-6"	8.46	25.4
J12	#	7	10'-3"	10'-3"	6.86	48.7
F11	#	12	12'-3"	Straight 12'-3"	10.65	243.8
F12	#	2	18'-8"	Straight 18'-8"	16.02	32.0
F13	#	1	18'-8"	Straight 18'-8"	25.65	25.3
F14	#	1	17'-3"	Straight 17'-3"	23.91	23.9
F15	#	1	4' 6 1/2"	Straight 4'-6 1/2"	19.03	76.2
F16	#	6	3'-10"	3'-10"	5.78	46.1
J13	#	2.5	15'-5"	Straight 15'-5"	17.36	434.5
J14	#	16	10'-1"	10'-1"	6.74	107.9
J15	#	7	16'-5"	16'-5"	10.55	74.0
					TOTAL	2201#

(R)

Rev.	Field Bar schedule changed
MK.	DATE AUTHORITY REVISION
	AS BUILT REVISIONS

General Notes:
All reinforcing bars to be placed and secured in position before placing concrete. Minimum concrete protection shall be one half inches of concrete covering unless otherwise specified.
For masonry details see sheet 932-E-2.1A
For sheet piling section of wing walls and cofferdam cut-off walls see sheet 932-E-2.2D
For reinforcing details of sill and abutment walls see sheet 932-E-2.1B

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS STA. 140+45.8
STORAGE VAULT

SHEET 20 OF 21 SHEETS SCALES AS SHOWN
SECTION "A"

U.S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 2, 1939

SUBMITTED: [signature] DISTRICT ENGINEER
APPROVED: [signature] DIVISION ENGINEER
DEPT. CORPS OF ENGINEERS, U.S. ARMY
CHIEF OF ENGINEERS, U.S. ARMY

AS BUILT 934-12.2/28

F.B.I.	5-3-39	Sheet revised for lowering sill El.
BY	DATE	REVISIONS

SECTIONAL PLAN C-C
SCALE 3/8"=1'-0

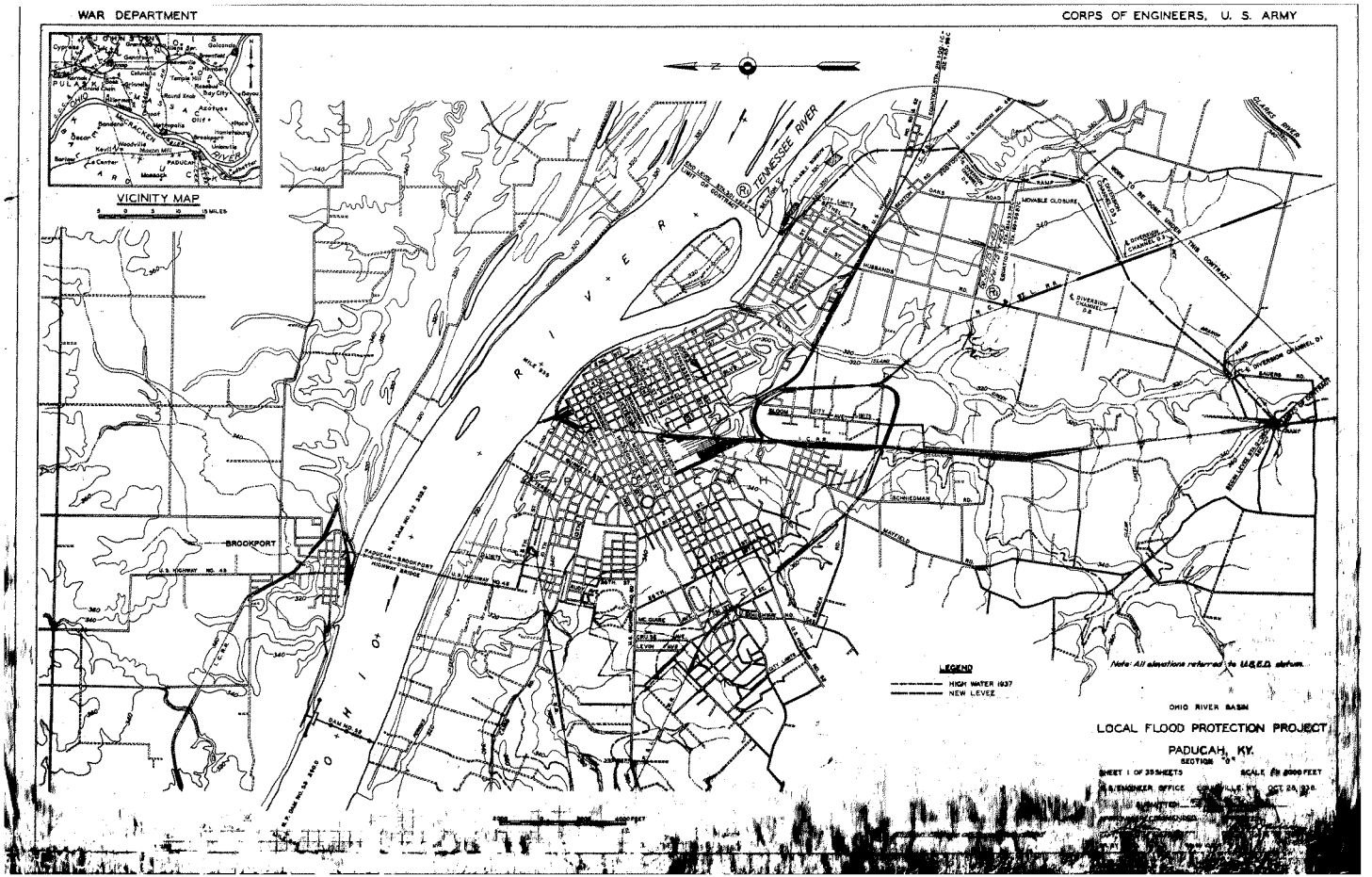
SECTION A-A
SCALE 3/8"=1'-0

SECTION B-B
SCALE 3/8"=1'-0

END ELEVATION
SCALE 3/8"=1'-0

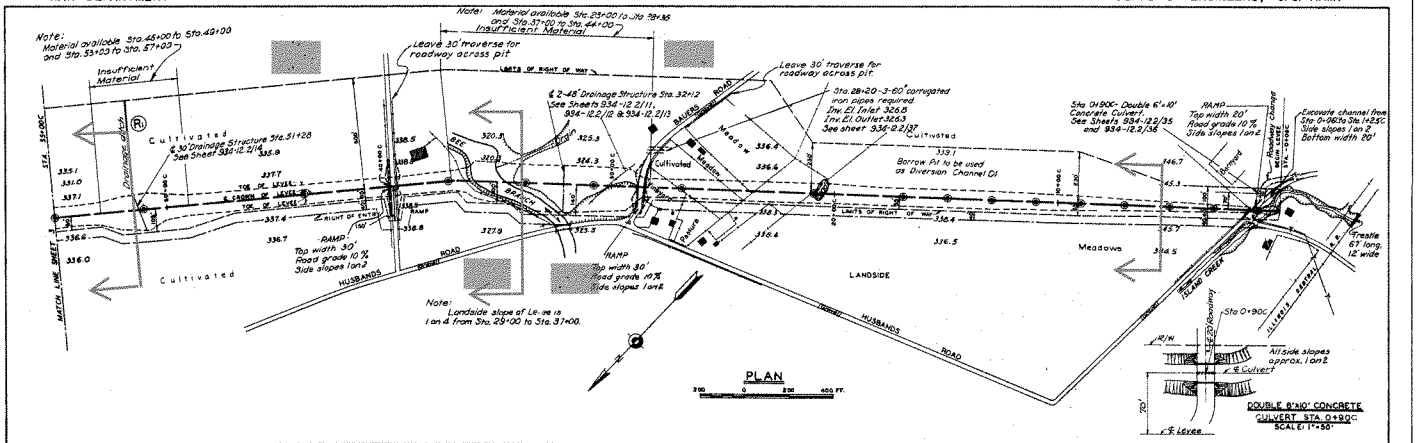
FRONT ELEVATION
SCALE 3/8"=1'-0

SECTION D-D
SCALE 3/8"=1'-0


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
VICINITY MAP
TENNESSEE RIVER
OHIO RIVER
BROOKPORT
PADUCAH
LEGEND
HIGH WATER 1937
NEW LEVEE
Note: All elevations referred to U.S.E.D. datum.
OHIO RIVER BASIN
LOCAL FLOOD PROTECTION PROJECT
PADUCAH, KY.
SECTION "D"
SHEET 1 OF 39 SHEETS
SCALE AS SHOWN FEET

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



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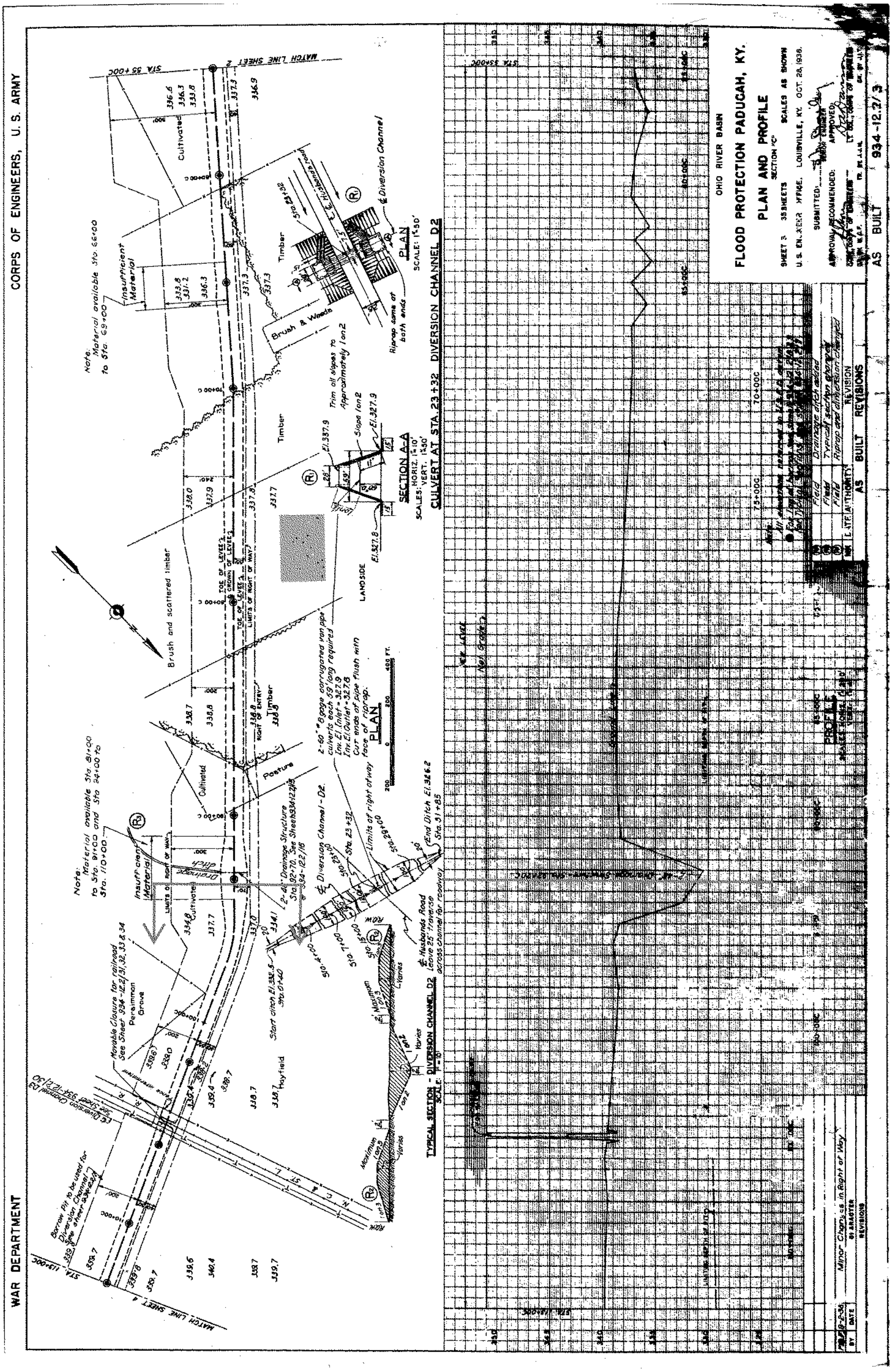
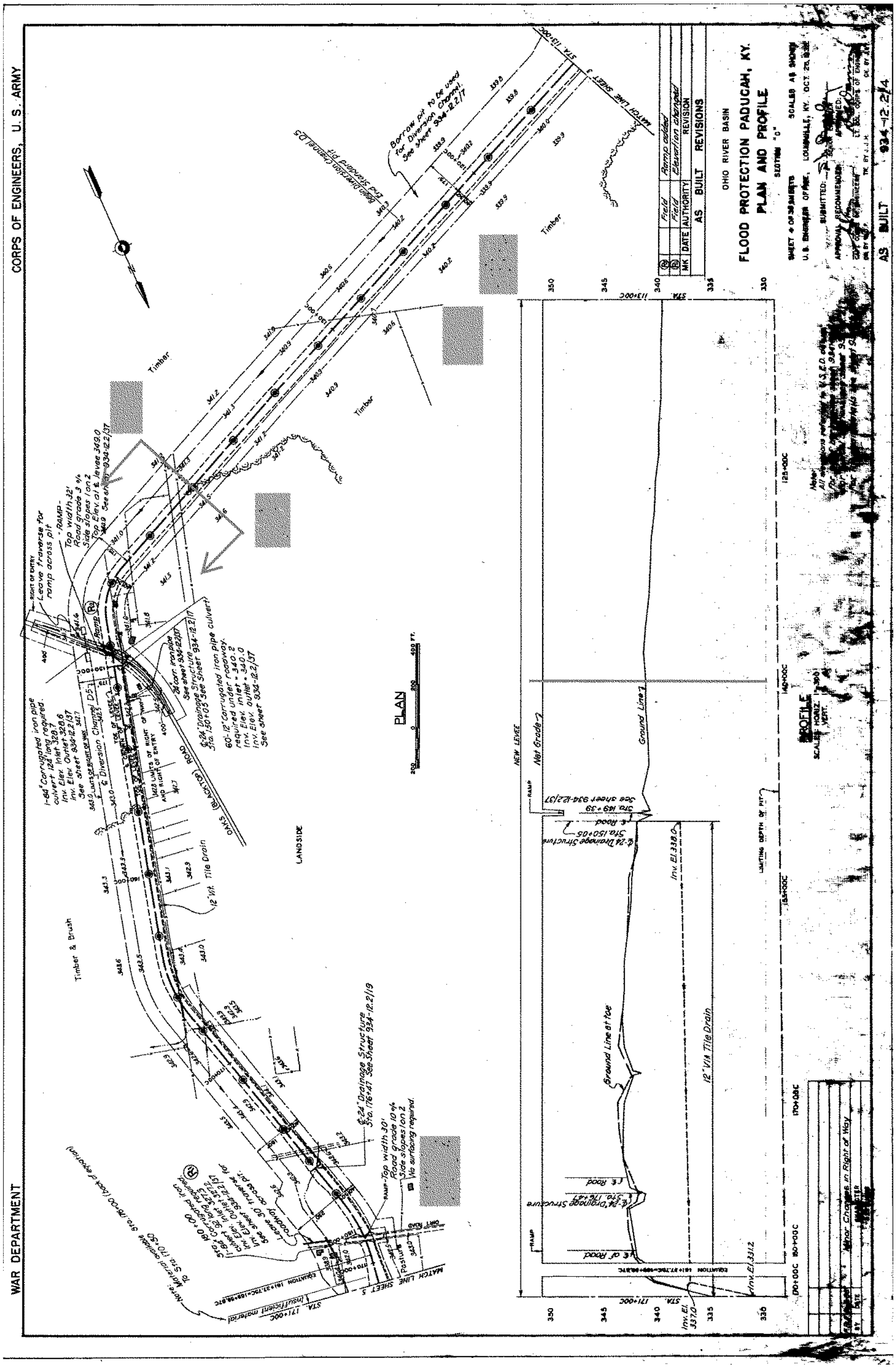
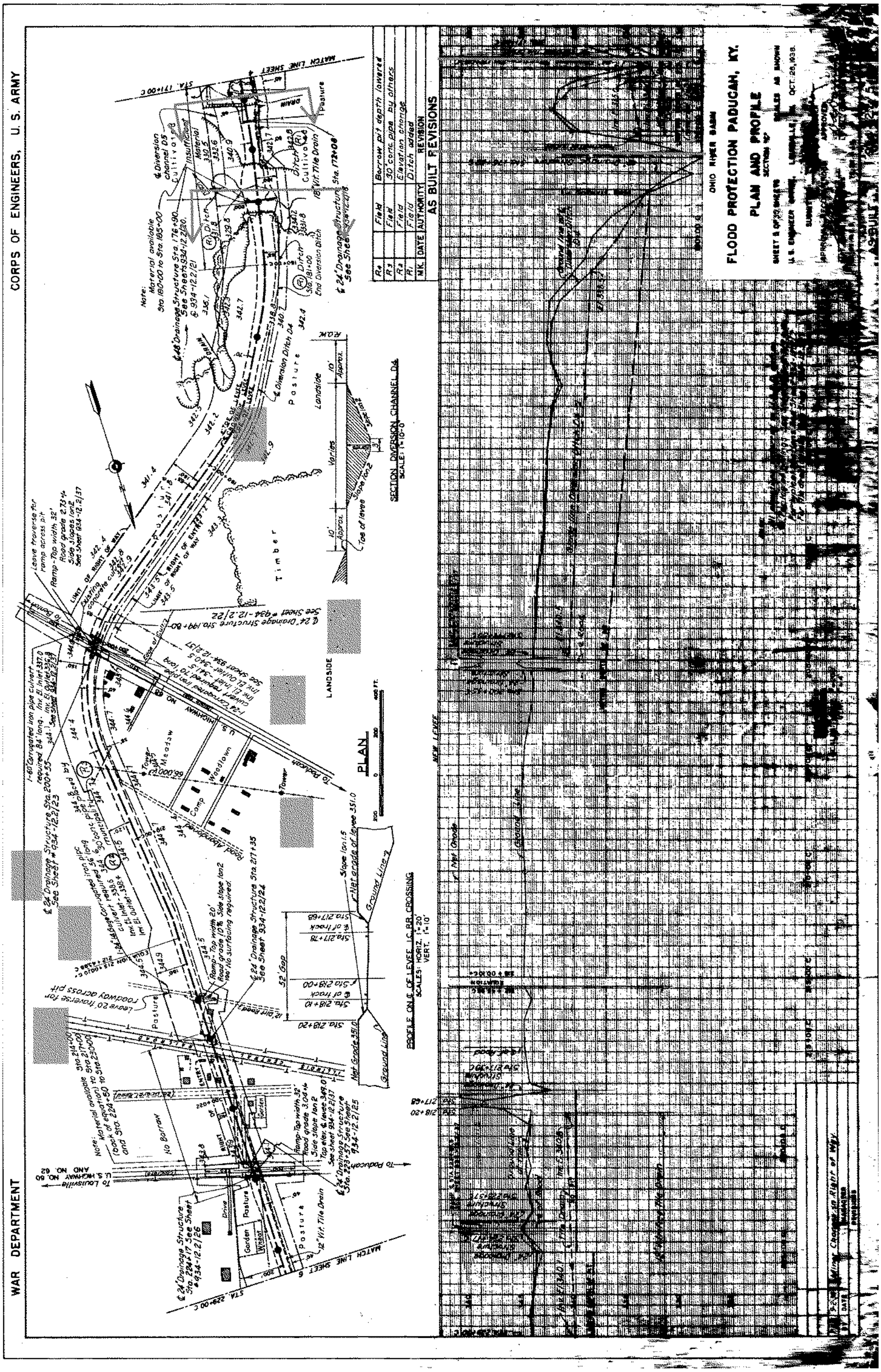
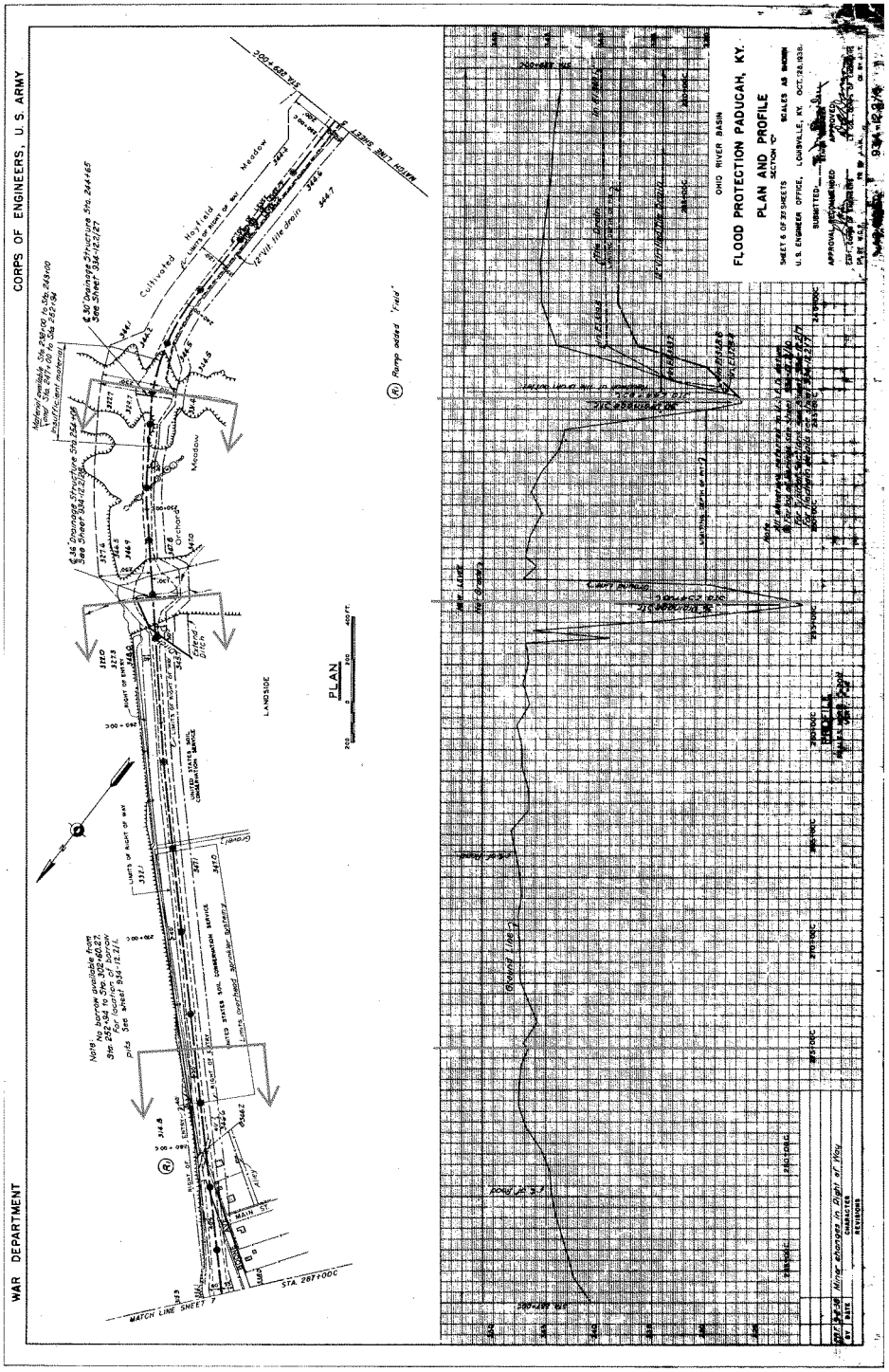
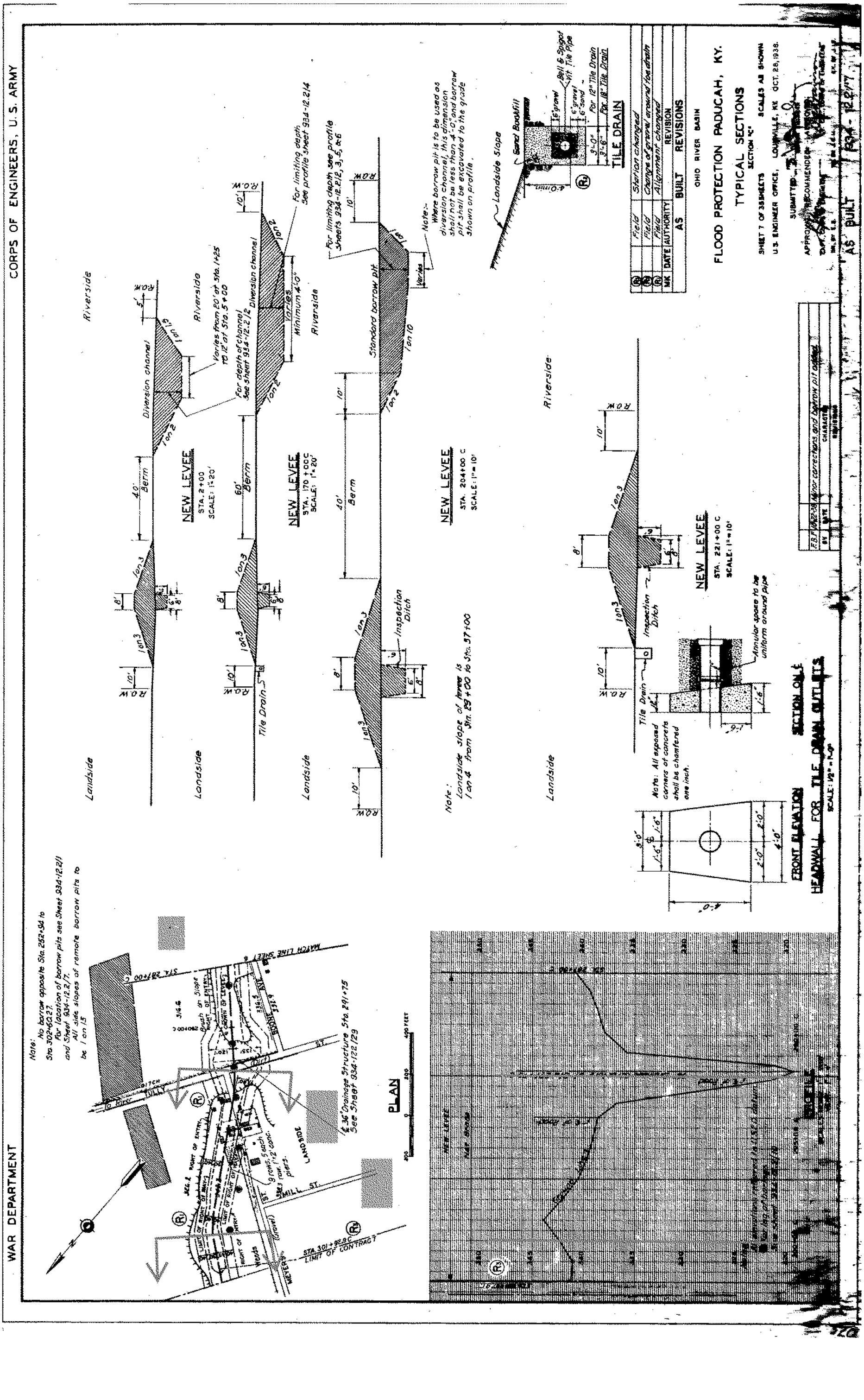

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PLAN AND PROFILE
SECTION "C"
SHEET 3 35 SHEETS SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938.
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT 934-12.2/3
PLAN
PROFILE
SECTION A-A
SCALES: HORIZ. 1"=10' VERT. 1"=50'
CULVERT AT STA. 23+32 DIVERSION CHANNEL D2
TYPICAL SECTION - DIVERSION CHANNEL D2
MATCH LINE SHEET 2
MATCH LINE SHEET 4
STA. 55+00C
STA. 115+00C
Note: Material available Sta. 66+00 to Sta. 69+00
Note: Material available Sta. 81+00 and Sta. 84+00 to Sta. 91+00 and Sta. 110+00
Insufficient Material
Cultivated
Timber
Brush & Weeds
Brush and scattered timber
Pasture
Persimmon Grove
Hayfield
LANDSIDE
TOE OF LEVEE
CROWN OF LEVEE
LIMITS OF RIGHT OF WAY
Trim all slopes to Approximately 1 on 2
Riprap same at both ends
℄ Diversion Channel
℄ Husbands Road
2-60" #8 gage corrugated iron pipe culverts each 59' long required
Inv. El. Inlet = 327.9
Inv. El. Outlet = 327.8
Cut ends of pipe flush with face of riprap.
2-48" Drainage Structure Sta. 92+70. See Sheets 934-12.2/16
Movable Closure for railroad See Sheet 934-12.2/31, 32, 33 & 34
Borrow Pit to be used for Diversion Channel - See sheet 934-12.2/1
℄ Diversion Channel D3 See Sheet 934-12.2/30
Start ditch El. 332.5 Sta. 0+40
End Ditch El. 326.2 Sta. 31+85
℄ Husbands Road Leave 25' traverse across channel for roadway
Limits of right of way
Drainage ditch
N. C. & ST. L.
ROW
Maximum 1 on 3
Varies
REVISIONS
Field Drainage ditch added
Field Typical section changed
Field Riprap and dimension changed
Minor Changes in Right of Way
AS BUILT REVISIONS


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PLAN AND PROFILE
SECTION "C"
AS BUILT REVISIONS
MK DATE AUTHORITY REVISION
Field Ramp added
Field Elevation changed
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
934-12.2/4
PLAN
PROFILE
LANDSIDE
Timber
Timber & Brush
Borrow pit to be used for Diversion Channel. See sheet 934-12.2/17
Begin Diversion Channel D5
End Standard pit
MATCH LINE SHEET 3
MATCH LINE SHEET 5
STA. 113+00C
STA. 171+00C
-RAMP- Top width 32' Road grade 3% Side slopes 1 on 2 Top Elev. at ℄ levee 349.0 See sheet 934-12.2/37
Leave traverse for ramp across pit
RIGHT OF ENTRY
1-84" Corrugated iron pipe culvert 124' long required. Inv. Elev. Inlet 328.7 Inv. Elev. Outlet 328.6 See sheet 934-12.2/37
℄ Diversion Channel D5
℄ 24" Drainage Structure Sta. 150+05 See Sheet 934-12.2/17
60'-12" Corrugated iron pipe culvert required under roadway. Inv. Elev. inlet = 340.2 Inv. Elev. outlet = 340.0 See sheet 934-12.2/37
OAKS (BLACKTOP) ROAD
12" Vit. Tile Drain
℄ 24" Drainage Structure Sta. 176+47 See Sheet 934-12.2/19
RAMP-Top width 30' Road grade 10% Side slopes 1 on 2 No surfacing required.
Leave 30' traverse for roadway across pit.
DIRT ROAD
Pasture
Insufficient material
Note: Material available to Sta. 170+50
NEW LEVEE
Net Grade
Ground Line
Ground Line at toe
Sta. 149+39 See sheet 934-12.2/37
℄ Road
℄ 24" Drainage Structure Sta. 150+05
Inv. El. 338.0
12" V.T. Tile Drain
Inv. El. 331.2
Inv. El. 337.0
LIMITING DEPTH OF PIT
RAMP
Minor Changes in Right of Way
BY DATE

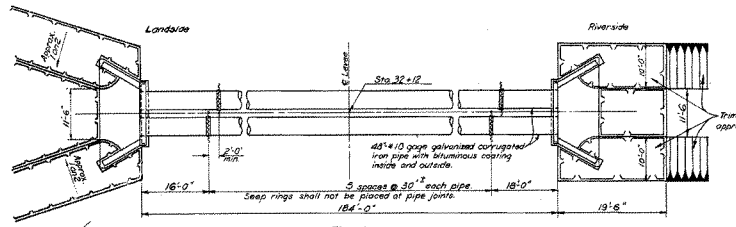

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PLAN AND PROFILE
AS BUILT REVISIONS
MK. DATE AUTHORITY REVISION
R1 Field Ditch added
R2 Field Elevation change
R3 Field 30" conc. pipe by others
R4 Field Borrow pit depth lowered
PLAN
LANDSIDE
SECTION DIVERSION CHANNEL D4
SCALE: 1"=10'-0
PROFILE ON ℄ OF LEVEE I.C. RR CROSSING
SCALES: HORIZ. 1"=20' VERT. 1"=10'
52' Gap
Net Grade 351.0
Ground Line
NEW LEVEE
Net Grade
Ground Line
Timber
Pasture
Meadow
Woodlawn
Camp
No Borrow
Garden
To Paducah
To Louisville
U.S. HIGHWAY NO. 60 AND NO. 62
MATCH LINE SHEET
MATCH LINE SHEET 6
12" Vit. Tile Drain
18" Vit. Tile Drain
℄ Diversion Ditch D4
End Diversion Ditch
Road Abandoned


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
PLAN AND PROFILE
OHIO RIVER BASIN
PLAN
LANDSIDE
MATCH LINE SHEET 7
MAIN ST.
Ground Line
Top of Wall
Base of Wall
Meadow
Cultivated
Hayfield
Ramp added "Fwd"
No R/W available here Sta 252+84 to Sta 260+27. Insufficient room for borrow pits See sheet 934-12-17.
Minor changes in Right of Way
CHARACTER
REVISIONS

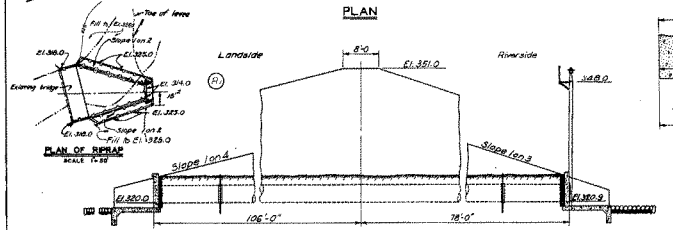

CORPS OF ENGINEERS, U.S. ARMY
WAR DEPARTMENT
Riverside
Landside
Diversion channel
1 on 1.5
1 on 2
1 on 3
R.O.W.
Varies from 20' at Sta. 1+25 to 12' at Sta. 5+00
For depth of channel See sheet 934-12.2/2
Berm
NEW LEVEE
STA. 2+00
SCALE: 1"=20'
NEW LEVEE
STA. 170+00C
SCALE: 1"=20'
Tile Drain
Varies
Minimum 4'-0"
For limiting depth See profile sheet 934-12.2/4
For limiting depth see profile Sheets 934-12.2/2, 3, 5, & 6
Standard borrow pit
1 on 10
Inspection Ditch
NEW LEVEE
STA. 204+00 C
SCALE: 1"=10'
Note: Landside slope of levee is 1 on 4 from Sta. 29+00 to Sta. 57+00
Note:- Where borrow pit is to be used as diversion channel, this dimension shall not be less than 4'-0", and borrow pit shall be excavated to the grade shown on profile.
1 on 9
NEW LEVEE
STA. 221+00 C
SCALE: 1"=10'
Landside Slope
Sand Backfill
6" gravel
6" gravel
6" sand
Bell & Spigot Vit. Tile Pipe
For 12" Tile Drain
For 18" Tile Drain
TILE DRAIN
Annular space to be uniform around pipe
Note: All exposed corners of concrete shall be chamfered one inch.
FRONT ELEVATION
SECTION ON ℄
HEADWALL FOR TILE DRAIN OUTLETS
SCALE: 1/2"=1'-0"
Field | Station changed
Field | Change of gravel around toe drain
Field | Alignment changed
MK | DATE | AUTHORITY | REVISION
AS BUILT REVISIONS
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
TYPICAL SECTIONS
SECTION "C"
SHEET 7 OF 35 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938.
SUBMITTED
RECOMMENDED
APPROVED
AS BUILT
Minor corrections and borrow pit added
CHARACTER
BY | DATE
Note: No borrow opposite Sta. 252+34 to Sta. 302+60.27. For location of borrow pits see Sheet 934-12.2/1 and Sheet 934-12.2/7. All side slopes of remote borrow pits to be 1 on 15
STA. 287+00 C
MATCH LINE SHEET
DITCH
TULLY
BOONE AVE.
ST.
MILL ST.
MEYERS
LANDSIDE
℄ 36" Drainage Structure Sta. 291+75 See Sheet 934-12.2/29
9 rows, 5 each row, 1'x2' conc. piers.
Weeds
(Gravel)
(Dirt)
RIGHT OF ENTRY
LIMIT OF RIGHT OF WAY
STA. 301+92.9C
LIMIT OF CONTRACT
PLAN
NEW LEVEE

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY

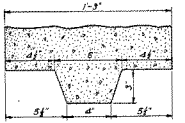


PLAN

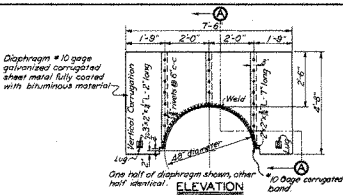


SECTION ON CENTER LINE

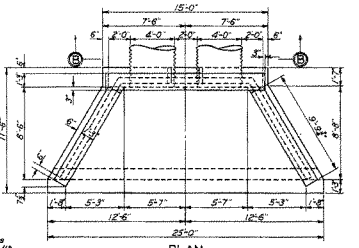
PLAN OF RIPRAP
SCALE 1"=50'



DETAIL OF KEYWAY
SCALE: 3"= 1'-0"

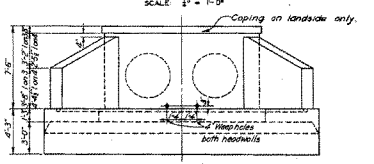


DETAIL OF SEEP RING

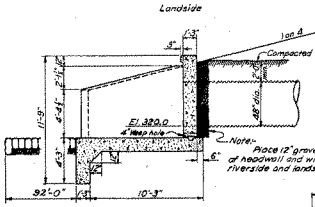


PLAN
SCALE: 1/4"= 1'-0"

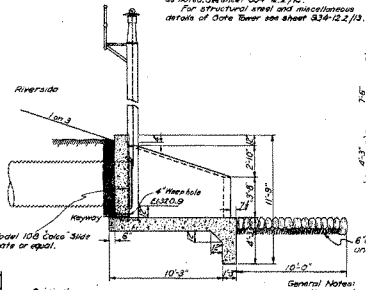
Masonry details of Riverside Headwall and Landside Headwall are identical, except as noted. See sheet 934-12.2/13.
For structural steel and miscellaneous details of Gate Tower see sheet 934-12.2/13.



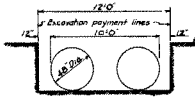
ELEVATION
SCALE: 1/4"= 1'-0"



SECTION ON ℄ OUTLET
SCALE 3/4"= 1'-0"



SECTION ON ℄ INLET
SCALE 3/4"= 1'-0"



SECTION B-B
SCALE: 1/4"=1'-0"

(A) Elevation change "Field"

General Notes:
All exposed corners of concrete shall be chamfered one inch.

Excavation, for payment, will be measured between vertical planes one foot outside required limits of foundation.
Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.
Place six inch gravel blanket under all riprap.
For reinforcing steel details see sheet 934-12.2/12
Slope culvert to fit bottom of ditch where suitable.
All riprap shall be hand placed.

BY	DATE	CHARACTER OF REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

DRAINAGE STRUCTURE DETAILS

STATION 32+12

SECTION "C"

SHEET 8 OF 38 SHEETS SCALES AS SHOWN

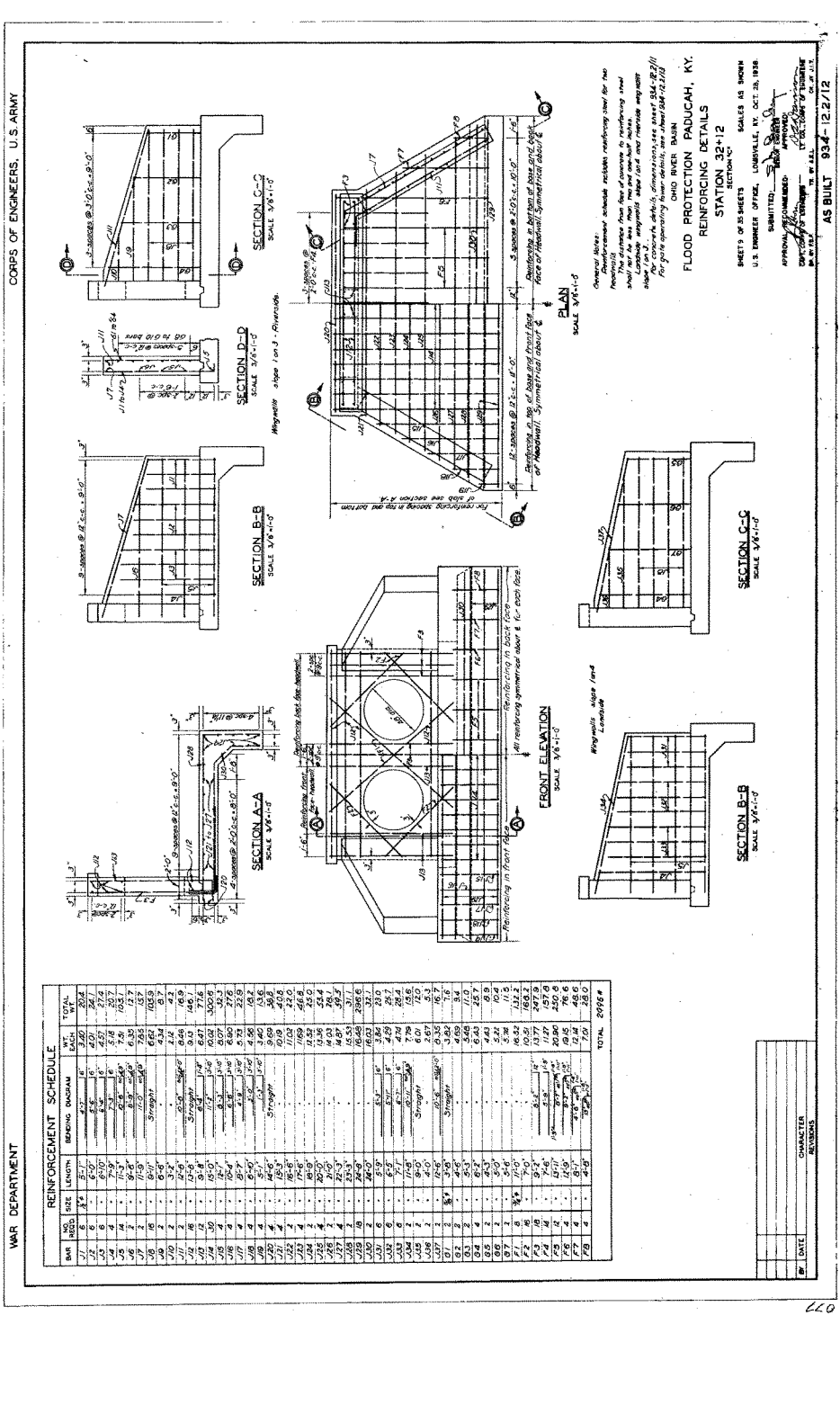
U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 26, 1938.

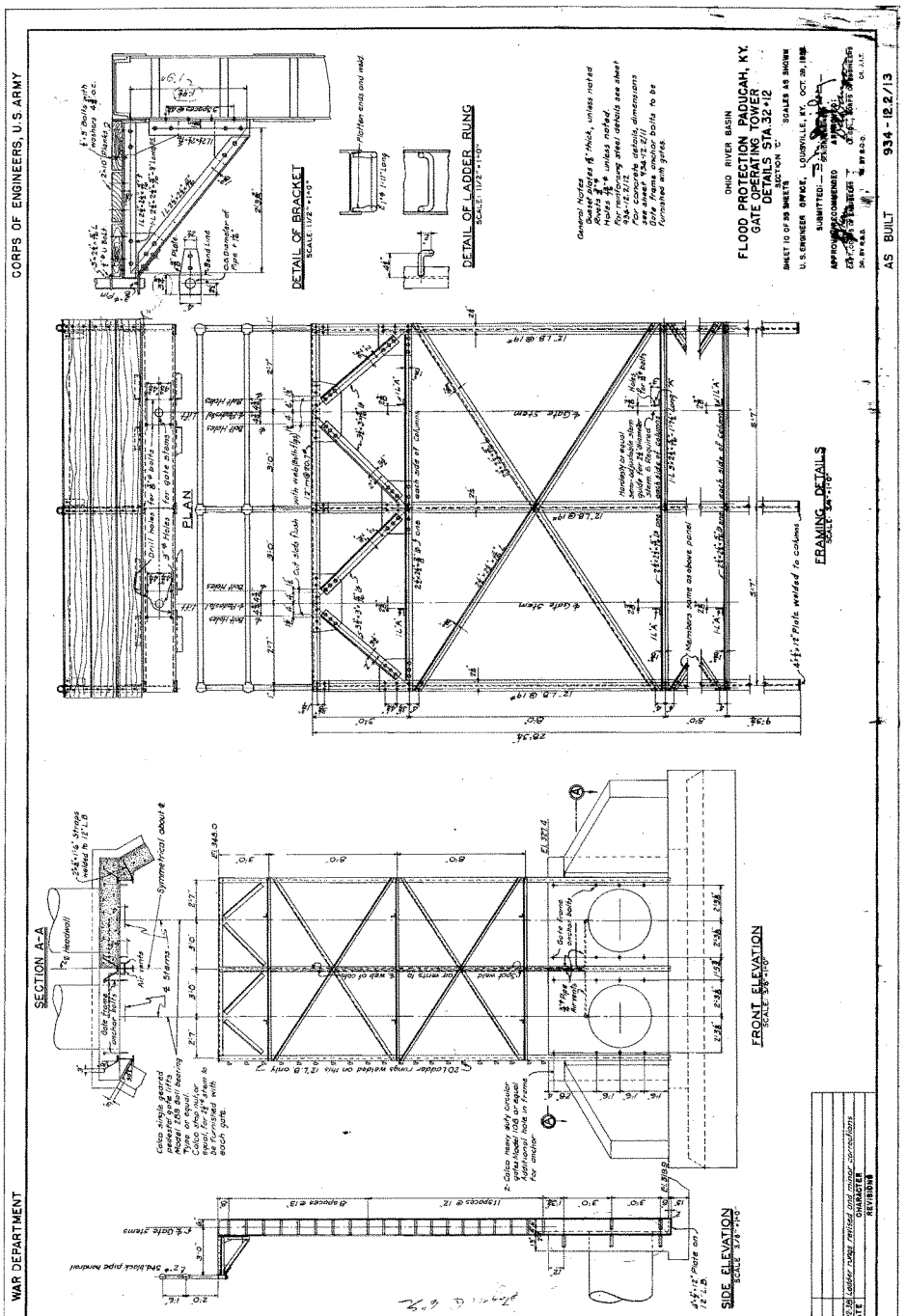
SUBMITTED

APPROVED: RECOMMENDED: Approved:

AS BUILT 934-12.2/8

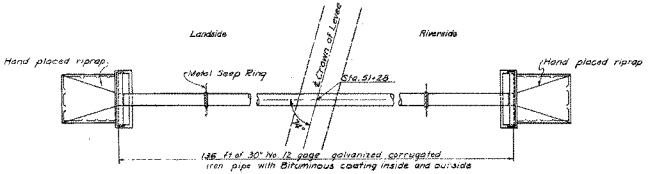
837


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
REINFORCEMENT SCHEDULE
FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS
STATION 32+12
SECTION "C"
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938
SUBMITTED
APPROVED
AS BUILT 934-12.2/12
OHIO RIVER BASIN
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
FRONT ELEVATION
PLAN
Wingwalls slope 1 on 3 - Riverside
Wingwalls slope 1 on 4 - Landside
BY
DATE
CHARACTER
REVISIONS

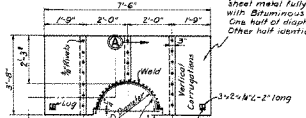

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
GATE OPERATING TOWER
DETAILS STA.32+12
SHEET 10 OF 23 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY., OCT. 30, 1939
SUBMITTED
RECOMMENDED
APPROVED
AS BUILT
934 - 12.2/13
PLAN
SECTION A-A
FRONT ELEVATION
SIDE ELEVATION
DETAIL OF BRACKET
DETAIL OF LADDER RUNG
FRAMING DETAILS
General Notes

WAR DEPARTMENT

CORPS OF ENGINEERS U.S. ARMY

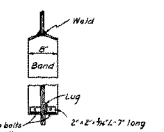


PLAN



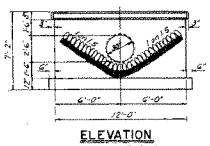
ELEVATION

SCALE: 1/2" = 1'-0"



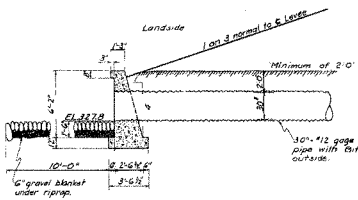
SECTION A-A

SCALE: 1" = 1'-0"



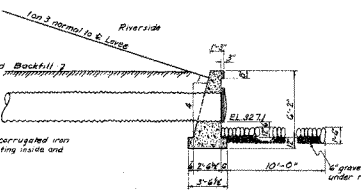
ELEVATION

SCALE: 1/4" = 1'-0"



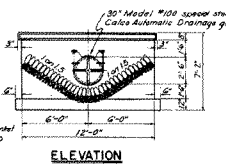
SECTION ON ℄ INLET

SCALE 1/4" = 1'-0"



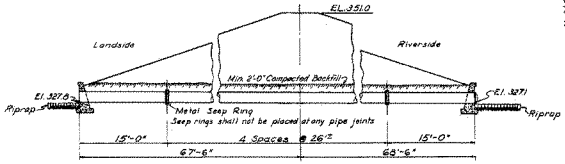
SECTION ON ℄ OUTLET

SCALE: 1/4" = 1'-0"

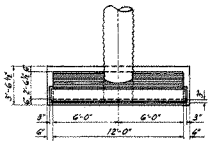


ELEVATION

SCALE: 1/4" = 1'-0"



SECTION ON CENTER LINE



PLAN

SCALE: 1/4" = 1'-0"

General Notes:

All exposed corners of concrete shall be chamfered 1 inch.

Slope culvert to fit bottom of ditch where suitable.

All riprap to be hand placed.

Excavation for payment will be measured between vertical planes one foot outside required limits of foundation.

Backfill will be hand placed and thoroughly tamped around sides of pipe, with a minimum top cover of two feet, before embankment is placed.

Place six inch gravel blanket under all riprap.

BY	DATE	CHARACTER	REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

DRAINAGE STRUCTURE DETAILS

STATION 51+28

SECTION "C"

SHEET 11 OF 39 SHEETS

SCALES AS SHOW:

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 193

SUBMITTED: _____ DISTRICT ENGINEER

APPROVAL RECOMMENDED: _____ CAPT. CORPS OF ENGINEERS

APPROVED: _____ LT. COL. CORPS OF ENGINEERS

DR. BY: G.R. TR. BY: H.W. CK. BY: J.J.T.

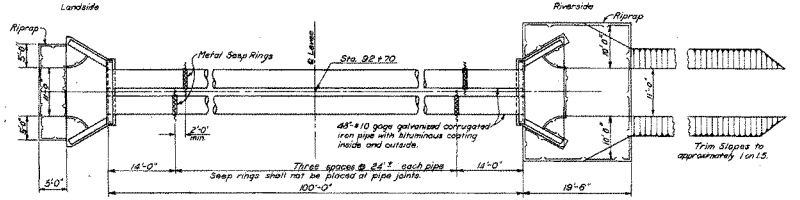
AS BUILT 934-12.2/14

079

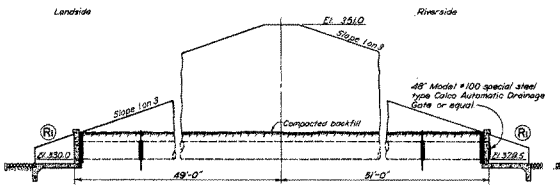
840

WAR DEPARTMENT

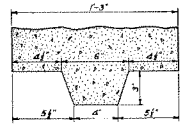
CORPS OF ENGINEERS, U. S. ARMY



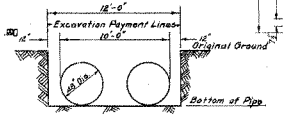
PLAN



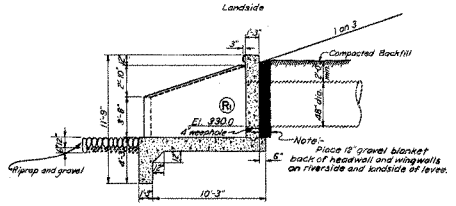
SECTION ON CENTER LINE



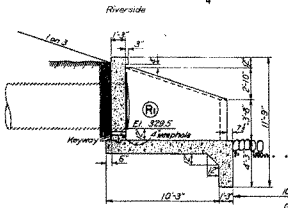
DETAIL OF KEYWAY
SCALE: 3" = 1'-0"



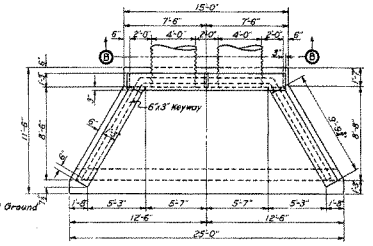
SECTION B-B
SCALE: ¼" = 1'-0"



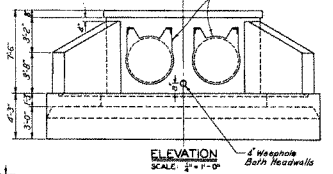
SECTION ON ℄ INLET
SCALE: ¼" = 1'-0"



SECTION ON ℄ OUTLET
SCALE: ¼" = 1'-0"

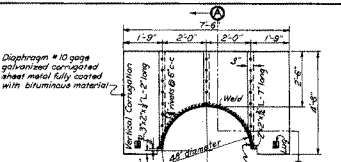


PLAN
SCALE: ¼" = 1'-0"

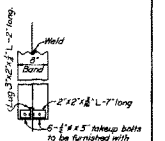


ELEVATION
SCALE: ¼" = 1'-0"

48" Model #100 special steel type Calco Automatic Drainage gate or equal.



ELEVATION
SCALE: ¾" = 1'-0"



SECTION A-A
SCALE: 1"=1'-0"

DETAIL OF SEEP RING

℄ Elevation change "field"

General Notes:
All exposed corners of concrete shall be chamfered one inch.

Excavation for payment, will be measured between vertical planes one foot outside required limits of foundation.
Backfill shall be hand placed and thoroughly compacted around sides of pipes with a minimum top cover of two feet before embankment is placed.
Place six inch gravel blanket under all riprap.
For reinforcing steel details see sheet 934-12.2/15
Slope culvert to fit bottom of ditch where suitable
All riprap shall be hand placed

BY	DATE	CHARACTER OF REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

DRAINAGE STRUCTURE STA. 92+70

SECTION "C"

SHEET 12 OF 35 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938.

SUBMITTED: _____ SENIOR ENGINEER

APPROVED: RECOMMENDED: APPROVED:

CAPT., CORPS OF ENGINEERS — LT. COL., CORPS OF ENGINEERS

DR. BY W.C.A.-J.J.M. TR. BY J.J.M. CH. BY J.L.T.

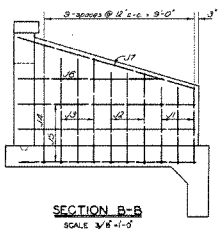
AS BUILT 934-12.2/15

841

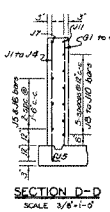
820

REINFORCEMENT SCHEDULE

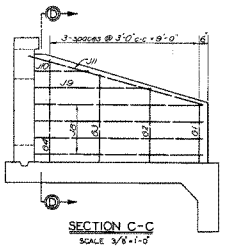
BAR	NO REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT EACH	TOTAL WT.
J1	12	5/8"	5'-7"	4'-7" 8"	3.40	40.8
J2	12	"	6'-0"	5'-6" 8"	4.01	48.1
J3	12	"	6'-10"	5'-4" 8"	4.57	54.9
J4	4	"	7'-9"	7'-3" 8"	5.18	20.7
J5	12	"	11'-3"	10'-6" 90° 9"	7.51	90.1
J6	4	"	9'-6"	8'-9" 90° 9"	6.35	25.4
J7	4	"	11'-8"	11'-0" 90° 8"	7.85	31.4
J8	16	"	9'-11"	Straight	6.62	105.9
J9	4	"	6'-8"	"	4.46	17.8
J10	4	"	3'-2"	"	2.12	8.5
J11	4	"	12'-8"	12'-0" 90° 8"	8.46	33.8
J12	16	"	13'-8"	Straight	9.13	146.1
J13	11	"	9'-8"	2'-6" 1'-4"	6.47	77.6
J14	30	"	15'-0"	15'-0" 3'-10"	10.02	300.6
J15	4	"	12'-1"	8'-3" 3'-10"	8.07	32.3
J16	4	"	10'-4"	6'-6" 3'-10"	6.90	27.6
J17	4	"	8'-7"	4'-8" 3'-10"	5.73	22.9
J18	4	"	6'-10"	3'-0" 3'-10"	4.56	18.2
J19	4	"	5'-1"	1'-3" 3'-10"	3.40	13.5
J20	4	"	14'-6"	Straight	9.69	38.8
J21	4	"	15'-3"	"	10.19	40.8
J22	1	"	16'-6"	"	11.02	22.0
J23	4	"	17'-6"	"	11.69	46.8
J24	2	"	18'-9"	"	12.52	25.0
J25	4	"	20'-0"	"	13.36	53.4
J26	2	"	21'-0"	"	14.03	28.1
J27	4	"	22'-3"	"	14.87	59.5
J28	2	"	23'-3"	"	15.53	31.1
J29	18	"	24'-8"	"	16.48	296.6
J30	2	"	24'-0"	"	16.03	32.1
G1	4	3/4"ø	3'-8"	"	3.82	15.3
G2	4	"	4'-6"	"	4.69	18.8
G3	4	"	5'-3"	"	5.48	21.9
G4	4	"	6'-2"	"	6.43	25.7
F1	8	3/4"ø	11'-0"	"	15.52	132.2
F2	16	"	7'-0"	"	10.51	168.2
F3	19	"	9'-2"	4'-2" 1'-0" 3'-0"	13.77	261.9
F4	14	"	7'-6"	3'-9" 1'-5"	11.27	157.8
F5	12	"	13'-11"	12'-3" 1'-0" 1'-8"	20.90	250.8
F6	4	"	12'-9"	11'-1" 1'-0" 1'-8"	19.15	76.6
F7	4	"	8'-1"	6'-6" 1'-5"	12.14	48.6
F8	4	"	4'-8"	3'-0" 1'-8"	7.01	28.0
					TOTAL	2982#



SECTION B-B
SCALE 3/8"-1-0

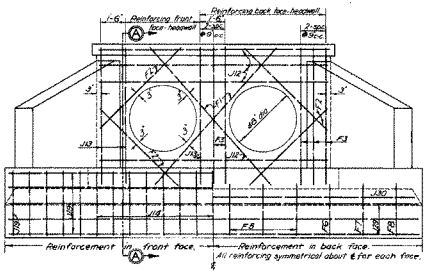


SECTION D-D
SCALE 3/8"-1-0

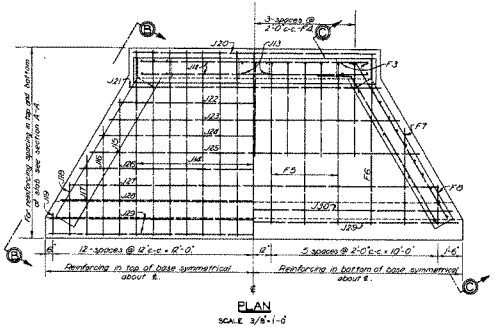


SECTION C-C
SCALE 3/8"-1-0

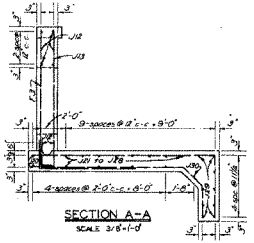
Wingwalls slope 1 on 3



FRONT ELEVATION
SCALE 3/8"-1-0



PLAN
SCALE 3/8"-1-0



SECTION A-A
SCALE 3/8"-1-0

General Notes:
Reinforcement schedule includes reinforcing steel for two headwalls.
The distance from face of concrete to reinforcing steel shall not be less than two and one half inches.
For concrete detail, dimensions, see sheet 934-12.2/15

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS
STATION 92+70
SECTION "C"

SHEET 13 OF 33 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938

SUBMITTED: _____ SENIOR ENGINEER

APPROVED: RECOMMENDED: _____ CONST. CORPS OF ENGINEERS

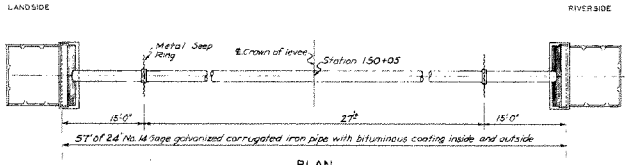
APPROVED: _____ LT. COL. CORPS OF ENGINEERS

DR. BY F.B.F. TR. BY A.E.L. CK. BY J.L.T.

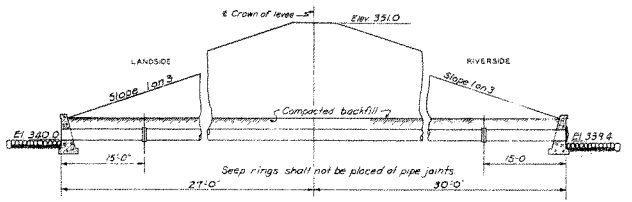
AS BUILT 934-12.2/16

BY	DATE	CHARACTER
		REVISED

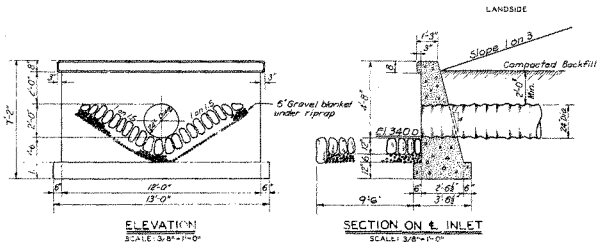
842



PLAN

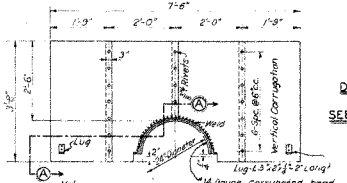


SECTION ON CENTER LINE



ELEVATION
SCALE: 3/8"=1'-0"

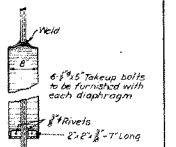
SECTION ON ℄ INLET
SCALE: 3/8"=1'-0"



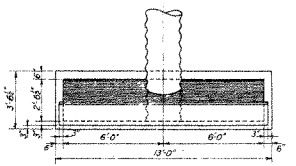
Note: Diaphragm #10 Gage galvanized corrugated sheet metal fully coated with bituminous material. One half of diaphragm shown, other half identical.

ELEVATION
SCALE: 3/4"=1'-0"

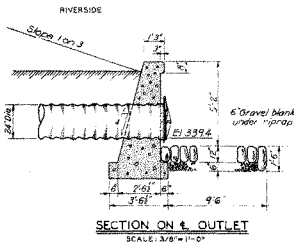
DETAIL OF SEEP RING



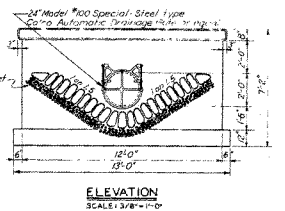
SECTION A-A
SCALE: 1"=1'-0"



PLAN
SCALE: 3/8"=1'-0"



SECTION ON ℄ OUTLET
SCALE: 3/8"=1'-0"



ELEVATION
SCALE: 3/8"=1'-0"

General Notes:
All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable.

Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.

Excavation for payment, will be measured between vertical planes one foot outside the required limits of foundation.

Place six inches of gravel blanket under all riprap.

All riprap shall be hand placed

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE STA. 150+05

SECTION "C"

SHEET 14 OF 35 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 25, 1938.

SUBMITTED: _____ SENIOR ENGINEER

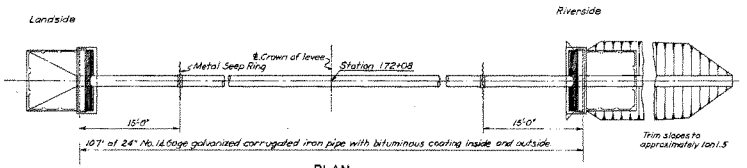
APPROVED RECOMMENDED: _____ APPROVED: _____

CAPT. CORPS OF ENGINEERS, DIV. ENGR. O.D. — LT. COL. C. PS. OF ENGINEERS, DIV. ENGR. O.D. — CH. BY A.I.T. — TR. BY A.E.L.

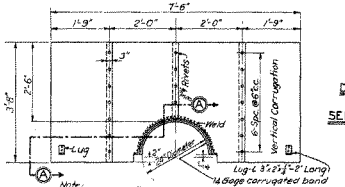
AS BUILT 934-12.2/17

DATE	CHARACTER REVISIONS

843

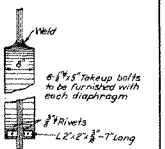


PLAN

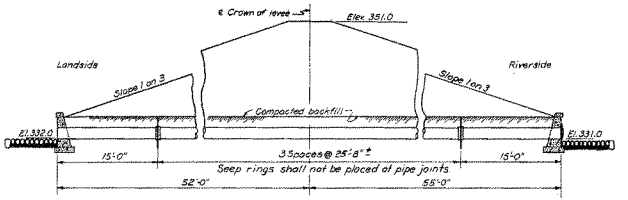


ELEVATION
SCALE: 3/4"=1'-0"

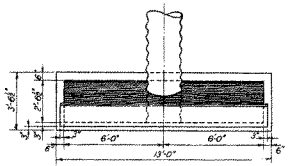
DETAIL OF SEEP RING



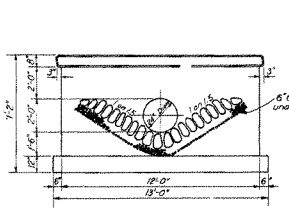
SECTION A-A
SCALE: 1"=1'-0"



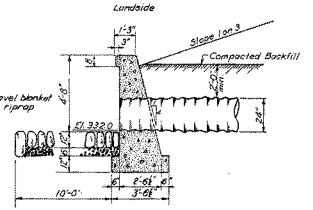
SECTION ON CENTER LINE



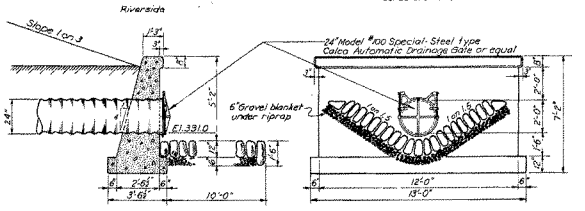
PLAN
SCALE: 3/8"=1'-0"



ELEVATION
SCALE: 3/8"=1'-0"



SECTION ON ℄ INLET
SCALE: 3/8"=1'-0"



SECTION ON ℄ OUTLET
SCALE: 3/8"=1'-0"

ELEVATION
SCALE: 3/8"=1'-0"

General Notes:
All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable.
Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.
Excavation for payment, will be measured between vertical planes one foot outside the required limits of foundation.
Place six inches of gravel blanket under all riprap.
All riprap shall be hand placed

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE STA. 172+08
SECTION "C"

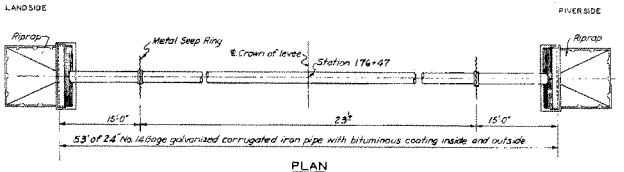
SHEET 15 OF 35 SHEETS SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 26, 1938.
SUBMITTED: [signature] Asst. to Dist. Engr.
APPROVAL RECOMMENDED: [signature] CAPT. CORPS OF ENGINEERS DR. BY E.S.-T.W.S.
APPROVED: [signature] LT. COL. CORPS OF ENGINEERS TR. BY J.J.L. CK. BY J.J.F.

BY	DATE	CHARACTER REVISIONS

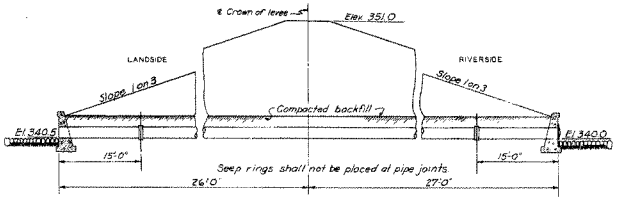
AS BUILT 934-12.2/18

083

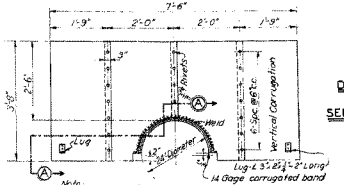
844



PLAN

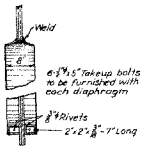


SECTION ON CENTER LINE

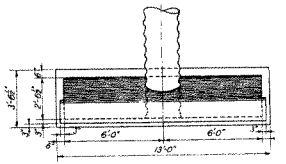


ELEVATION
SCALE: 3/4" = 1'-0"

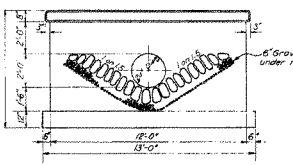
DETAIL OF SEEP RING



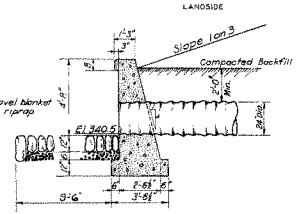
SECTION A-A
SCALE: 1" = 1'-0"



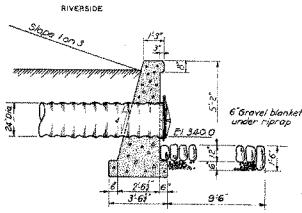
PLAN
SCALE: 3/8" = 1'-0"



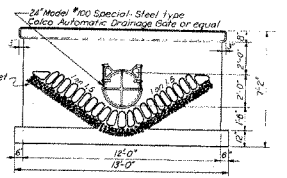
ELEVATION
SCALE: 3/8" = 1'-0"



SECTION ON ℄ INLET
SCALES: 3/8" = 1'-0"



SECTION ON ℄ OUTLET
SCALE: 3/8" = 1'-0"



ELEVATION
SCALE: 3/8" = 1'-0"

General Notes:
All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable.

Backfill shall be hand placed and thoroughly compacted around sides of pipe, with a minimum top cover of two feet before embankment is placed.

Excavation for payment will be measured between vertical planes one foot outside the required limits of foundation.

Place six inches of gravel blanket under all riprap.

All riprap shall be hand placed

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE STA. 176+47

SECTION "C"

SHEET 16 OF 36 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938

SUBMITTED: [signature] DISTRICT ENGINEER

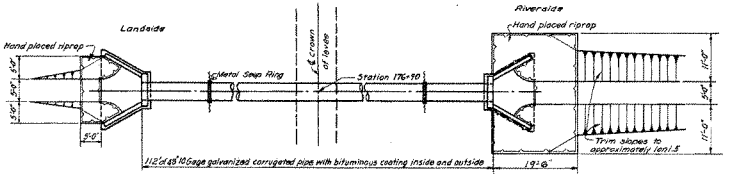
APPROVAL RECOMMENDED: [signature] CHIEF OF ENGINEERS

APPROVED: [signature] LT. COL. CORPS OF ENGINEERS

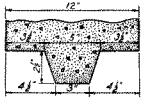
DR. BY F.B.F. - E.S. TR. BY R.O.D. CK. BY J.L.T.

AS BUILT: 934-12.2/19

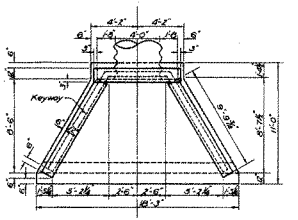
CHARACTER REVISIONS



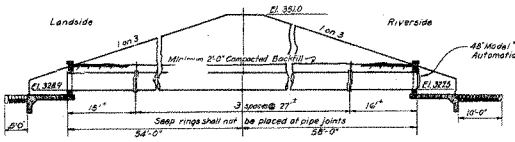
PLAN



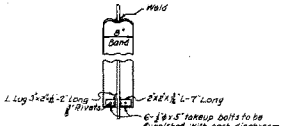
DETAIL OF KEYWAY
SCALE 3"=1'-0"



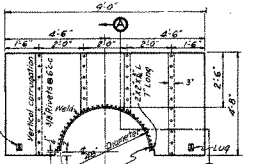
PLAN
SCALE: 1/4"=1'-0"



SECTION ON CENTER LINE



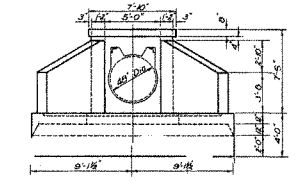
SECTION A-A
SCALE: 1"=1'-0"



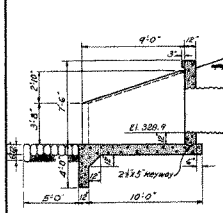
Diaphragm "10 Gage galvanized corrugated sheet metal fully coated with bituminous material. One half of diaphragm shown, other half identical

ELEVATION
SCALE: 1/2"=1'-0"

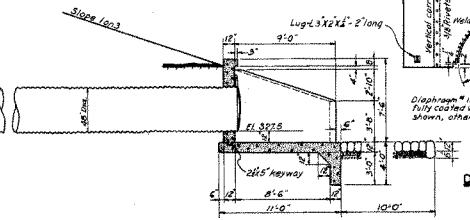
DETAIL OF SEEP RING



ELEVATION
SCALE: 1/4"=1'-0"



SECTION ON ℄ INLET
SCALE: 1/4"=1'-0"



SECTION ON ℄ OUTLET
SCALE: 1/4"=1'-0"

General Notes:
All exposed corners of concrete shall be chamfered one inch.

Slope culverts to fit bottom of ditch where suitable.

Excavation, for payment, will be measured between vertical planes one foot outside required limits of foundation.

Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.

Place six inch gravel blanket under all riprap.

For reinforcing details see sheet 934-12.2/21

All riprap shall be hand placed.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

DRAINAGE STRUCTURE STA. 176+90

SECTION "C"

SHEET 17 OF 33 SHEETS. SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938.

SUB. SENIOR ENGINEER

APPROVED: CAPT., CORPS OF ENGINEERS

APPROVED: LT. COL., CORPS OF ENGINEERS

DR. BY E.S. . BY E.S. CH. BY J.L.T.

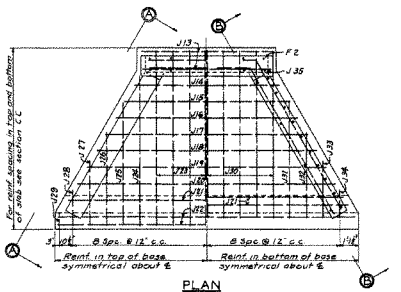
BY	DATE	CHARACTER REVISIONS

AS BUILT

934-12.2/20

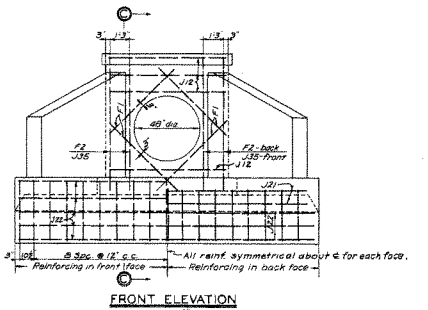
REINFORCEMENT SCHEDULE

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J1	12	#8	4'8"	4'1" 6"	3.12	37.4
J2	12	"	8'7"	5'1" 6"	3.73	44.8
J3	12	"	6'5"	5'11" 6"	4.29	51.5
J4	4	"	7'4"	6'10" 6"	4.90	19.6
J5	12	"	11'3"	10'6" 180°	7.51	90.1
J6	4	"	9'6"	8'8" 9"	6.35	25.4
J7	4	"	11'9"	11'0" 9"	7.85	31.4
J8	16	"	9'11"	Straight	6.62	105.9
J9	4	"	6'6"	"	4.34	17.4
J10	4	"	3'2"	"	2.12	8.5
J11	4	"	13'8"	12'8" 2:0	8.66	34.6
J12	16	"	7'2"	Straight	4.79	76.6
J13	8	"	8'0"	"	5.34	42.7
J16	4	"	9'0"	"	6.01	24.0
J15	4	"	10'0"	"	6.68	26.7
J16	4	"	11'0"	"	7.35	29.4
J17	4	"	12'4"	"	8.24	33.0
J18	4	"	13'4"	"	8.91	35.6
J19	4	"	14'6"	"	9.69	38.8
J20	4	"	15'8"	"	10.47	41.9
J21	6	"	16'8"	"	11.13	66.8
J22	18	"	18'0"	Straight	12.02	216.4
J23	14	"	16'6"	10'8" 3'8"	9.57	134.0
J24	4	"	12'10"	9'2" 3'8"	8.57	34.3
J25	4	"	11'2"	7'6" 3'8"	7.46	29.8
J26	4	"	9'5"	5'9" 3'8"	6.29	25.2
J27	4	"	7'8"	4'0" 3'8"	5.12	20.5
J28	4	"	5'11"	2'5" 3'8"	3.95	15.8
J29	4	"	4'5"	0'9" 3'8"	2.98	11.9
J30	18	"	12'6"	8'11" 180° 1'8" 3'8" 1'8"	8.35	150.3
J31	4	"	9'3"	7'8" 1'8" 3'8" 1'8"	6.18	24.7
J32	4	"	7'7"	6'0" 1'8" 3'8" 1'8"	5.07	20.3
J33	4	"	5'9"	3'11" 1'8" 3'8" 1'8"	3.84	15.4
J34	4	"	4'1"	2'6" 1'8"	2.73	10.9
J35	8	"	8'8"	8'1" 6"	5.79	46.3
G1	4	5/8"	3'8"	Straight	3.82	15.3
G2	4	"	4'6"	"	4.69	18.8
G3	4	"	5'3"	"	5.48	21.9
G4	4	"	6'2"	"	6.43	25.7
F1	16	5/8"	5'6"	"	8.26	132.2
F2	8	"	9'1"	8'2" 11"	13.66	109.1
					TOTAL	1960#



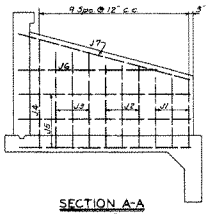
PLAN

SCALE: $\frac{1}{4}$"=1'-0"



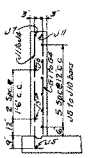
FRONT ELEVATION

SCALE: $\frac{1}{4}$"=1'-0"



SECTION A-A

SCALE: $\frac{1}{4}$"=1'-0"



SECTION D-D

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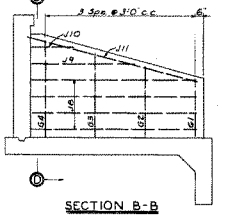
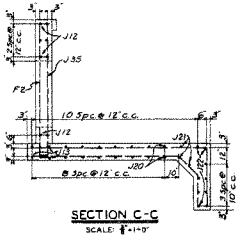


SECTION B-B

SCALE: $\frac{1}{4}$"=1'-0"



SECTION C-C

SCALE: $\frac{1}{4}$"=1'-0"

General Notes:

For concrete detail, dimensions, see sheet 934-12.2/20

Landside wing walls slope 1 on 3, riverside wing walls slope 1 on 3.

Reinforcement schedule includes reinforcing steel for two headwalls

The distance from face of concrete to reinforcing steel shall not be less than two and one half inches

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

REINFORCING DETAILS STA. 176+90

SECTION "C"

SHEETS OF 35 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938.

SUBMITTED: _____ DIVISION ENGINEER

APPROVAL RECOMMENDED: _____ APPROVED: _____

CAPT. CORPS OF ENGINEERS — LT. COL., CORPS OF ENGINEERS

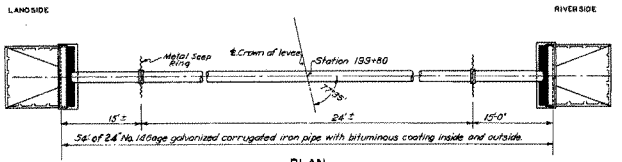
DR. BY R.O.D. — TR. BY R.O.D. — CK. BY J.L.T.

AS BUILT 934-12.2/21

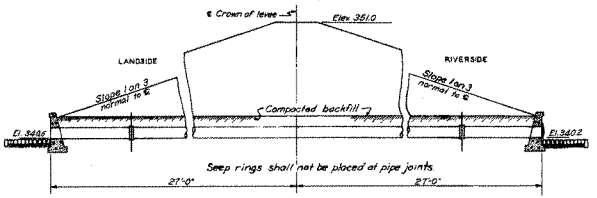
BY	DATE	CHARACTER REVISIONS

WAR DEPARTMENT

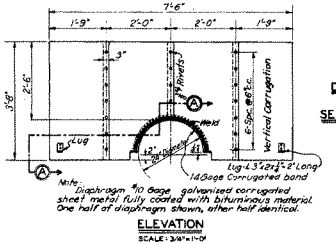
CORPS OF ENGINEERS, U. S. ARMY



PLAN



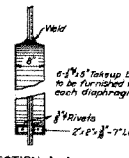
SECTION ON CENTER LINE



ELEVATION

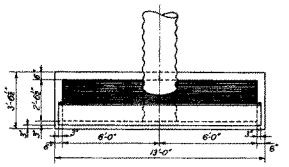
SCALE: 3/8" = 1'-0"

DETAIL OF SEEP RING



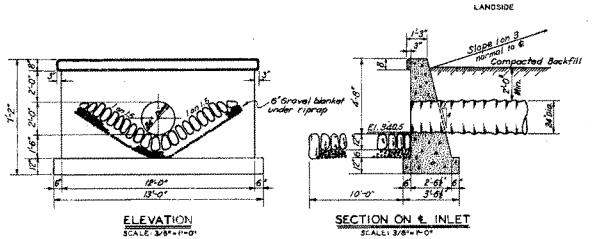
SECTION A-A

SCALE: 1" = 1'-0"



PLAN

SCALE: 3/8" = 1'-0"

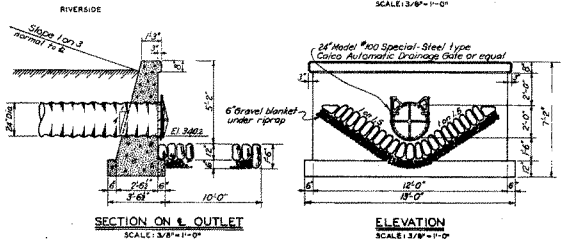


ELEVATION

SCALE: 3/8" = 1'-0"

SECTION ON ℄ INLET

SCALE: 3/8" = 1'-0"



SECTION ON ℄ OUTLET

SCALE: 3/8" = 1'-0"

ELEVATION

SCALE: 3/8" = 1'-0"

General Notes:

All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable.

Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.

Excavation, for payment, will be measured between vertical planes one foot outside the required limits of foundation.

Place six inches of gravel blanket under all riprap.

All riprap shall be hand placed

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

DRAINAGE STRUCTURE STA. 199+80

SECTION "C"

SHEET 19 OF 35 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 26, 1938.

SUBMITTED: ELMER DICKERSON

APPROVED: RECOMMENDED. APPROVED:

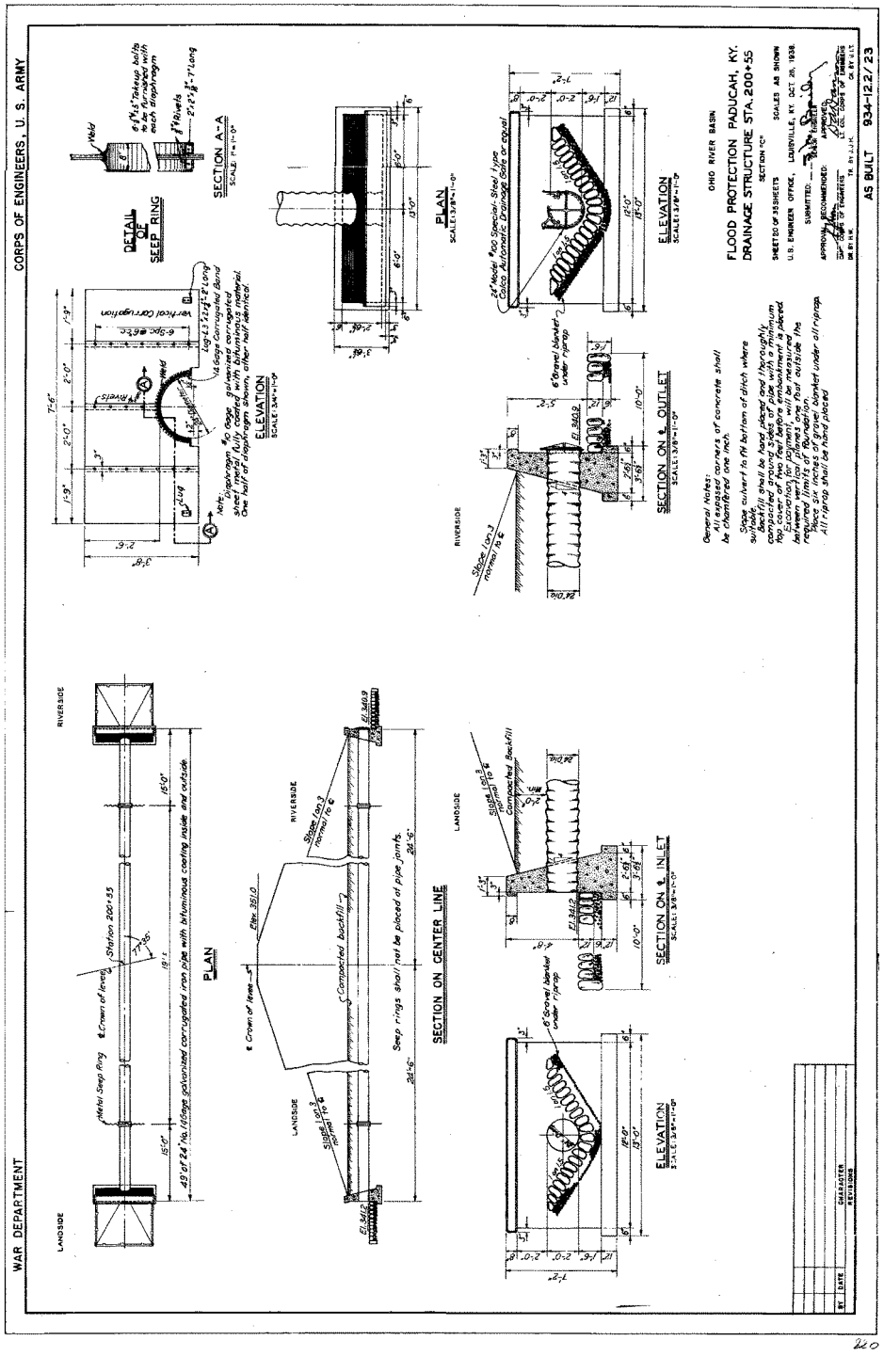
CHIEF CLERK OF ENGINEERS — LT. COL. CORPS OF ENGINEERS

DR. BY F.B.F. TR. BY J.J.H. CK. BY J.L.T.

BY	DATE	CHARACTER REVISIONS

AS BUILT 934-12.2/22

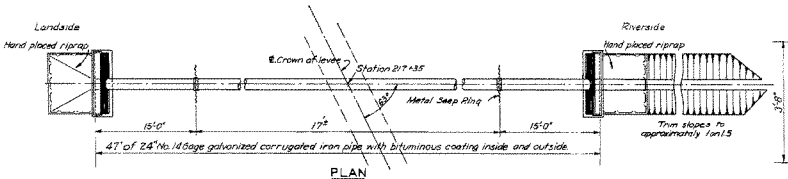
848


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE STA. 200+55
SECTION "C"
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 20, 1938.
SUBMITTED:
APPROVED:
AS BUILT
934-12.2/23
PLAN
ELEVATION
SECTION ON ℄ OUTLET
SECTION ON ℄ INLET
SECTION ON CENTER LINE
DETAIL OF SEEP RING
SECTION A-A
RIVERSIDE
LANDSIDE
Metal Seep Ring
℄ Crown of Levee
Station 200+55
Compacted Backfill
Seep rings shall not be placed at pipe joints.
6" Gravel blanket under riprap
Slope 1on 3 normal to ℄
Slope 1on 2 normal to ℄
Vertical Corrugation
Weld
Note: Diaphragm to be 10 gage galvanized corrugated sheet metal, fully coated with bituminous material. One half of diaphragm to be welded to each half of pipe.
General Notes:
All exposed corners of concrete shall be chamfered one inch.
Place six inches of gravel blanket under all riprap.
All riprap shall be hand placed.
Slope culvert to fit bottom of ditch where suitable.
Backfill shall be hard, dry soil thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed. Embankment for payment will be measured between the limits of payment, not outside the required limits of foundation.
NO. DATE DESCRIPTION BY

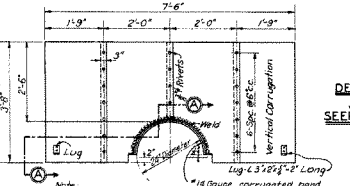
220

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



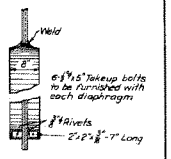
PLAN



ELEVATION

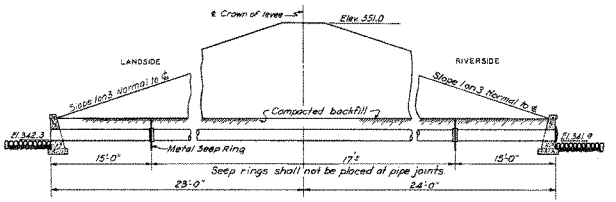
SCALE: 3/8"=1'-0"

DETAIL OF SEEP RING

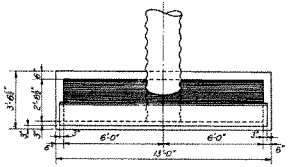


SECTION A-A

SCALE: 1"=1'-0"

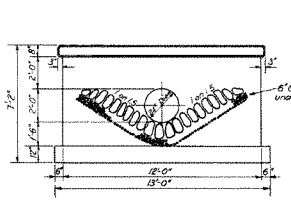


SECTION ON CENTER LINE



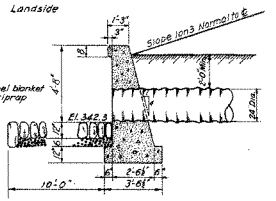
PLAN

SCALE: 3/8"=1'-0"



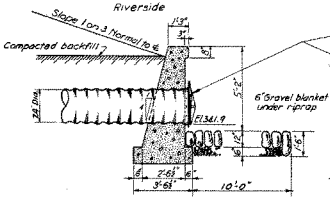
ELEVATION

SCALE: 3/8"=1'-0"



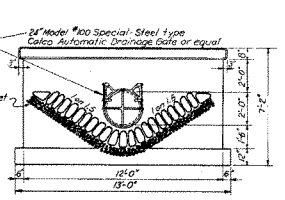
SECTION ON ℄ INLET

SCALE: 3/8"=1'-0"



SECTION ON ℄ OUTLET

SCALE: 3/8"=1'-0"



ELEVATION

SCALE: 3/8"=1'-0"

General Notes:

All exposed corners of concrete shall be chamfered one inch.

Slope culvert to fit bottom of ditch where suitable.

Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.

Excavation for payment will be measured between vertical planes one foot outside the required limits of foundation.

Place six inches of gravel blanket under all riprap.

All riprap shall be hand placed

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

DRAINAGE STRUCTURE, STA. 217+35

SECTION "C"

SHEET 21 OF 35 SHEETS

SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 26, 1938.

SUBMITTED: _____ DISTRICT ENGINEER

APPROVAL RECOMMENDED: _____ CAPT. CORPS OF ENGINEERS

APPROVED: _____ LT. COL. CORPS OF ENGINEERS

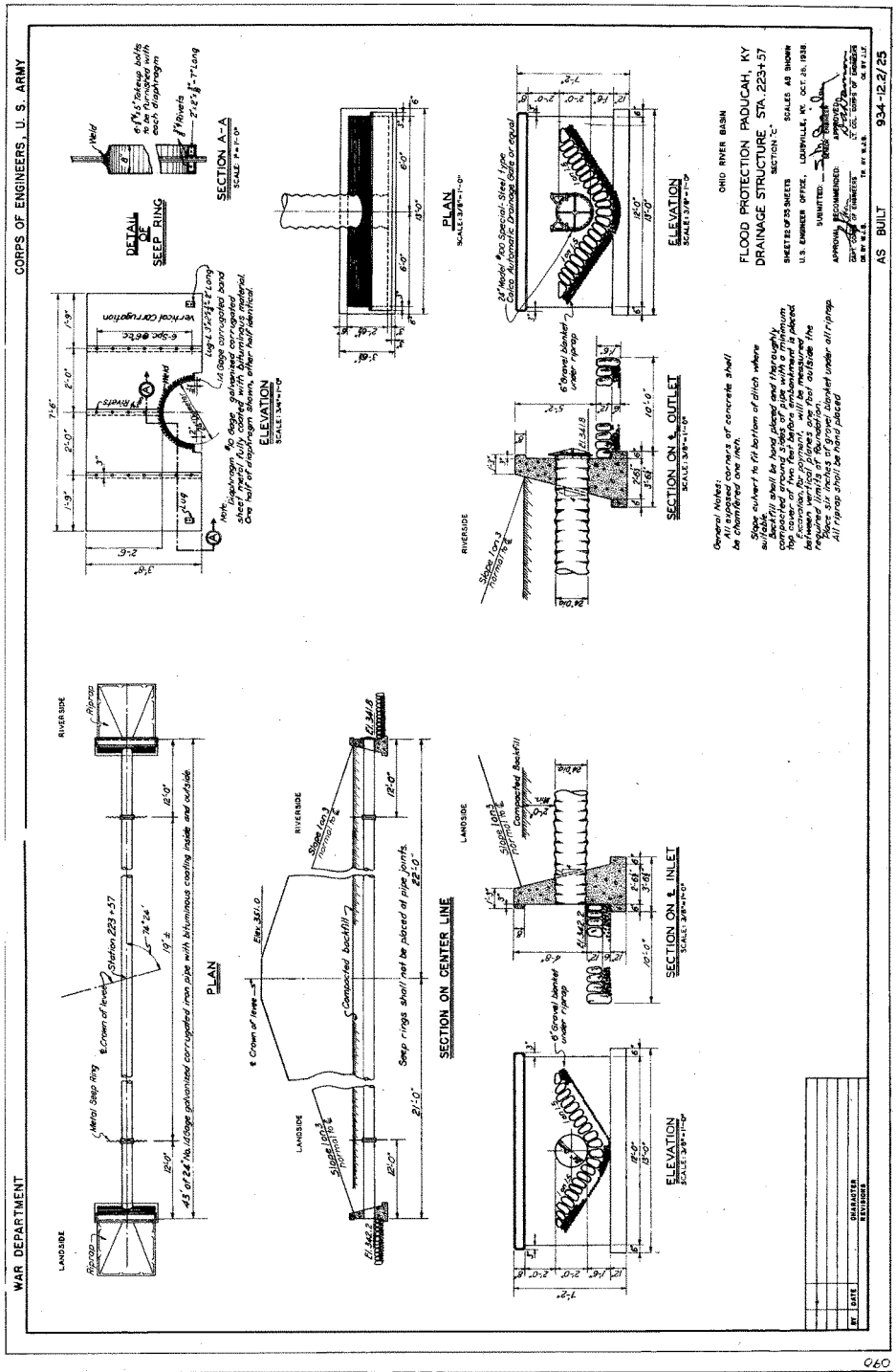
DR. BY E.A.-D.W.S. TR. BY W.J.B. CK. BY J.L.T.

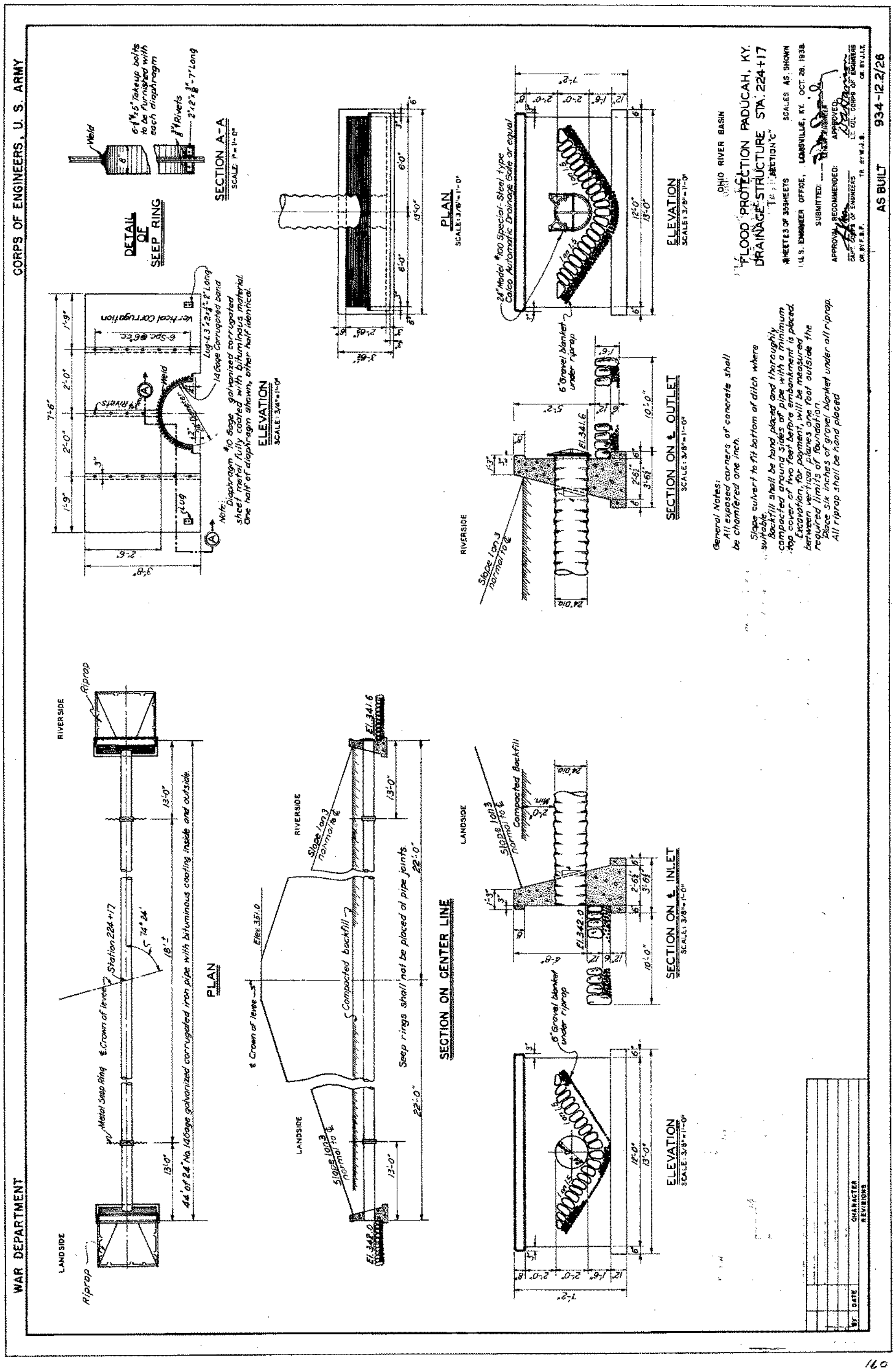
BY	DATE	CHARACTER
		REVISIONS

AS BUILT 934-12.2/24

089

850

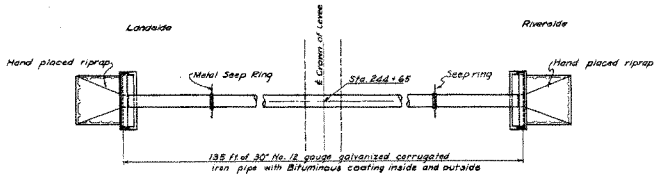

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY
DRAINAGE STRUCTURE STA. 223+57
SECTION C
SHEETS OF 35 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938
SUBMITTED: —
APPROVED RECOMMENDED:
APPROVED:
AS BUILT
934-12.2/25
PLAN
ELEVATION
SECTION A-A
DETAIL OF SEEP RING
SECTION ON ℄ OUTLET
SECTION ON ℄ INLET
SECTION ON CENTER LINE
PLAN
ELEVATION
RIVERSIDE
LANDSIDE
Metal Seep Ring
℄ Crown of levee
Station 223+57
Compacted backfill
Seep rings shall not be placed at pipe joints.
Slope 1on3
Normal to ℄
Rip-rap
6" Gravel blanket under riprap
24" Model #100 Special-Steel Type Calco Automatic Drainage Gate or equal
Vertical Corrugation
6-9/16" Corrugated Iron Pipe
Weld
Bolts
Rivets
Diaphragm
Seep ring
Concrete Collar
Flap Gate
Gate Seat
Invert
Elev. 351.0
Elev. 344.8
Elev. 342.2
Elev. 338.2
Elev. 334.8
Elev. 324.0
General Notes:
All exposed corners of concrete shall be chamfered one inch.
Slope subgrade to fit bottom of ditch where suitable.
Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.
Seep rings shall be placed at equal distances between vertical planes one foot outside the required limits of foundation.
Where six inches of gravel blanket under riprap is specified 24" corrugated iron pipe shall be used.
060


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
PLAN
SECTION ON CENTER LINE
ELEVATION
SECTION ON ℄ INLET
SECTION ON ℄ OUTLET
DETAIL OF SEEP RING
SECTION A-A
LANDSIDE
RIVERSIDE
Riprap
44'-0" of 24" No. 14 Gage galvanized corrugated iron pipe with bituminous coating inside and outside
Seep rings shall not be placed at pipe joints.
Compacted backfill
24" Model #100 Special-Steel type Calco Automatic Drainage Gate or equal
6" Gravel blanket under riprap
General Notes:
All exposed corners of concrete shall be chamfered one inch.
Slope culvert to fit bottom of ditch where suitable.
Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.
Excavation, for payment, will be measured between vertical planes one foot outside the required limits of foundation.
Place six inches of gravel blanket under all riprap.
All riprap shall be hand placed.
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE STA. 224+17
U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938.
AS BUILT
934-12.2/26

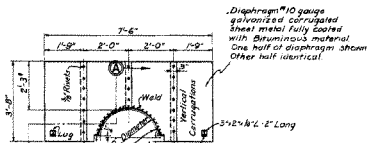
160

WAR DEPARTMENT

CORPS OF ENGINEERS U.S. ARMY

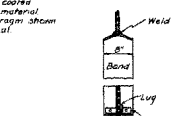


PLAN



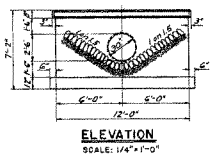
ELEVATION

SCALE: 1/2" = 1'-0"



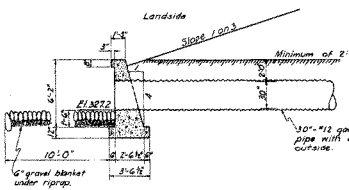
SECTION A-A

SCALE: 1" = 1'-0"



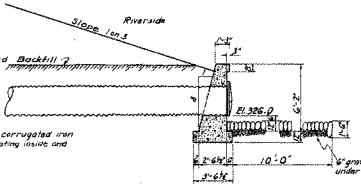
ELEVATION

SCALE: 1/4" = 1'-0"



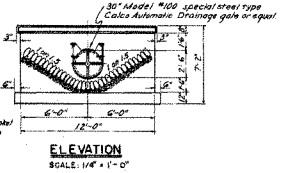
SECTION ON ℄ INLET

SCALE 1/4" = 1'-0"



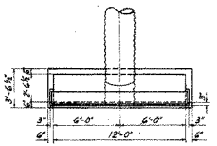
SECTION ON ℄ OUTLET

SCALE: 1/4" = 1'-0"



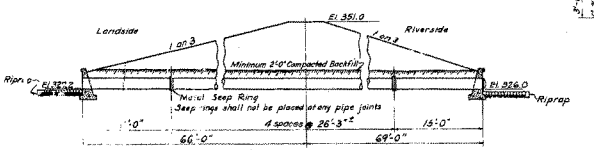
ELEVATION

SCALE: 1/4" = 1'-0"



PLAN

SCALE: 1/4"=1'-0"



SECTION ON CENTER LINE

General Notes:

All exposed corners of concrete shall be chamfered 1 inch

Slope culvert to fit ballast ditch where suitable.

All riprap shall be hand placed.

Excavation for pipework, will be measured between vertical planes one foot outside required limits of structures.

Backfill will be hand placed and thoroughly tamped or hand sides of pipe with minimum top cover of two feet, before embankment is placed.

Place six inch gravel blanket under all riprap.

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY.

DRAINAGE STRUCTURE DETAILS

STATION 244+65

SHEET 34 OF 38 SHEETS SECTION "C" SCALES AS SHOWN

U.S. RIVER WATER OFFICE, LOUISVILLE, KY. OCT 26, 1938.

SUBMITTED: [signature] DISTRICT ENGINEER

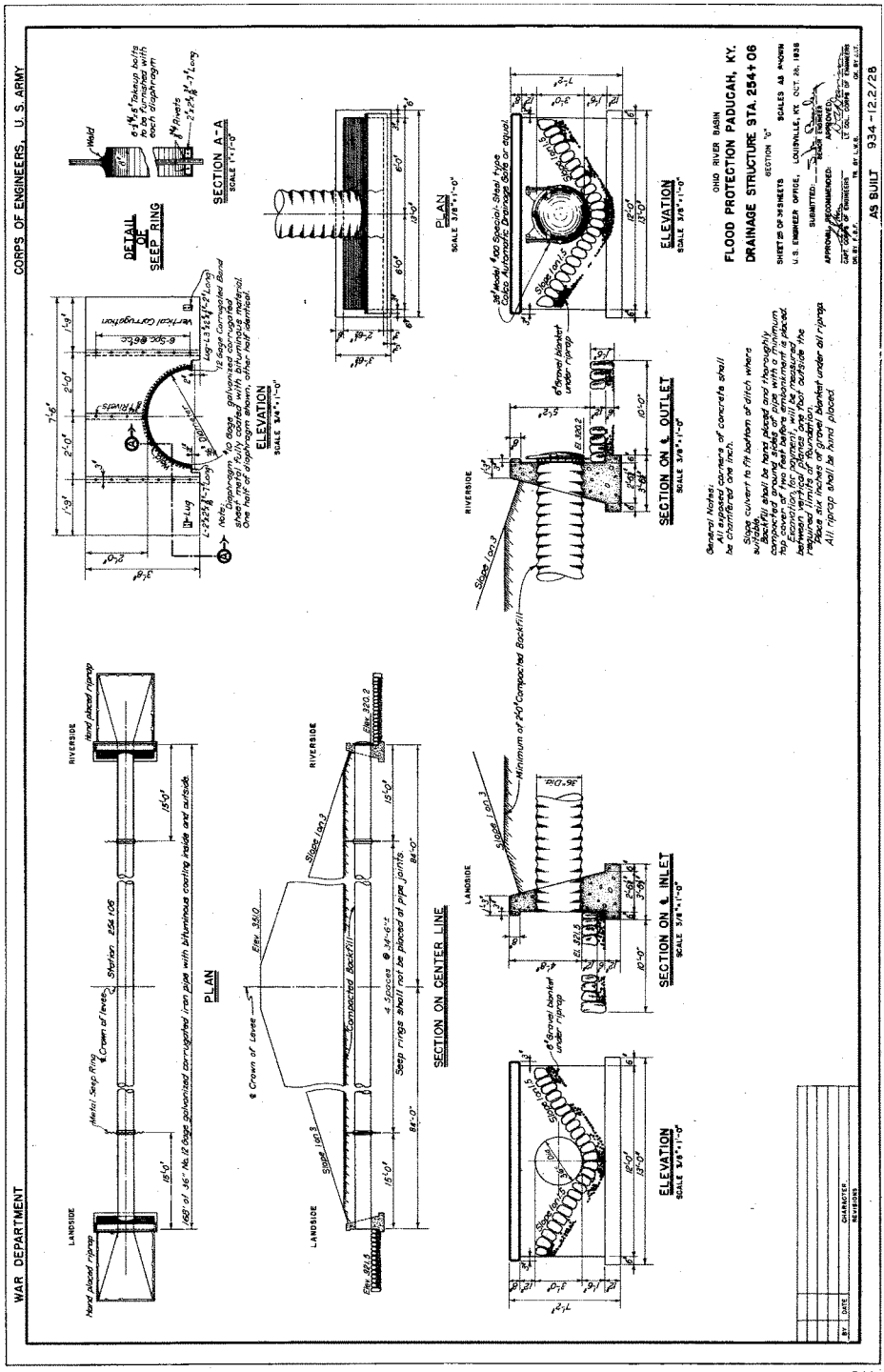
APPROVAL RECOMMENDED: [signature] CAPT. CORPS OF ENGINEERS

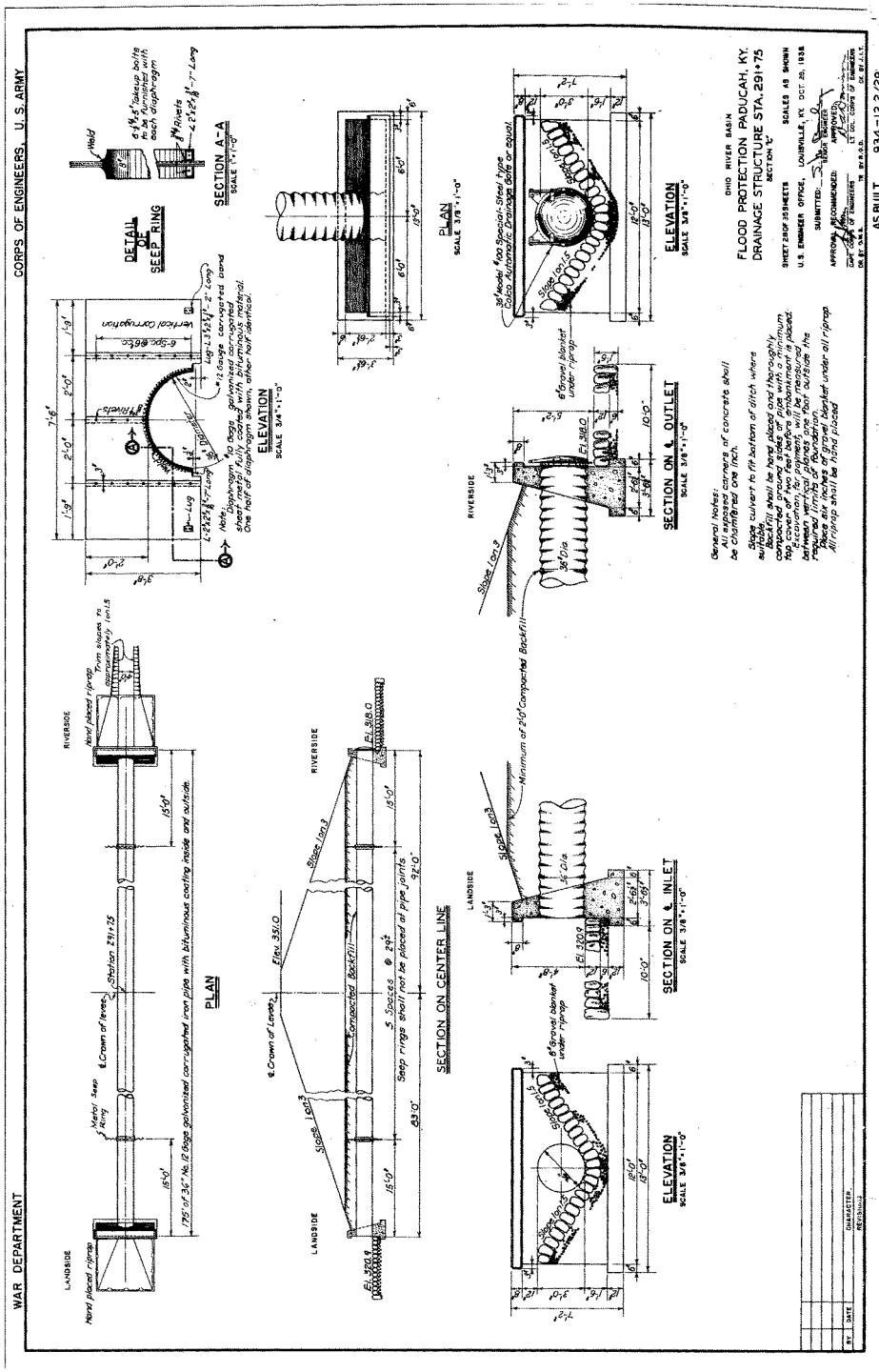
APPROVED: [signature] LT. COL. CORPS OF ENGINEERS

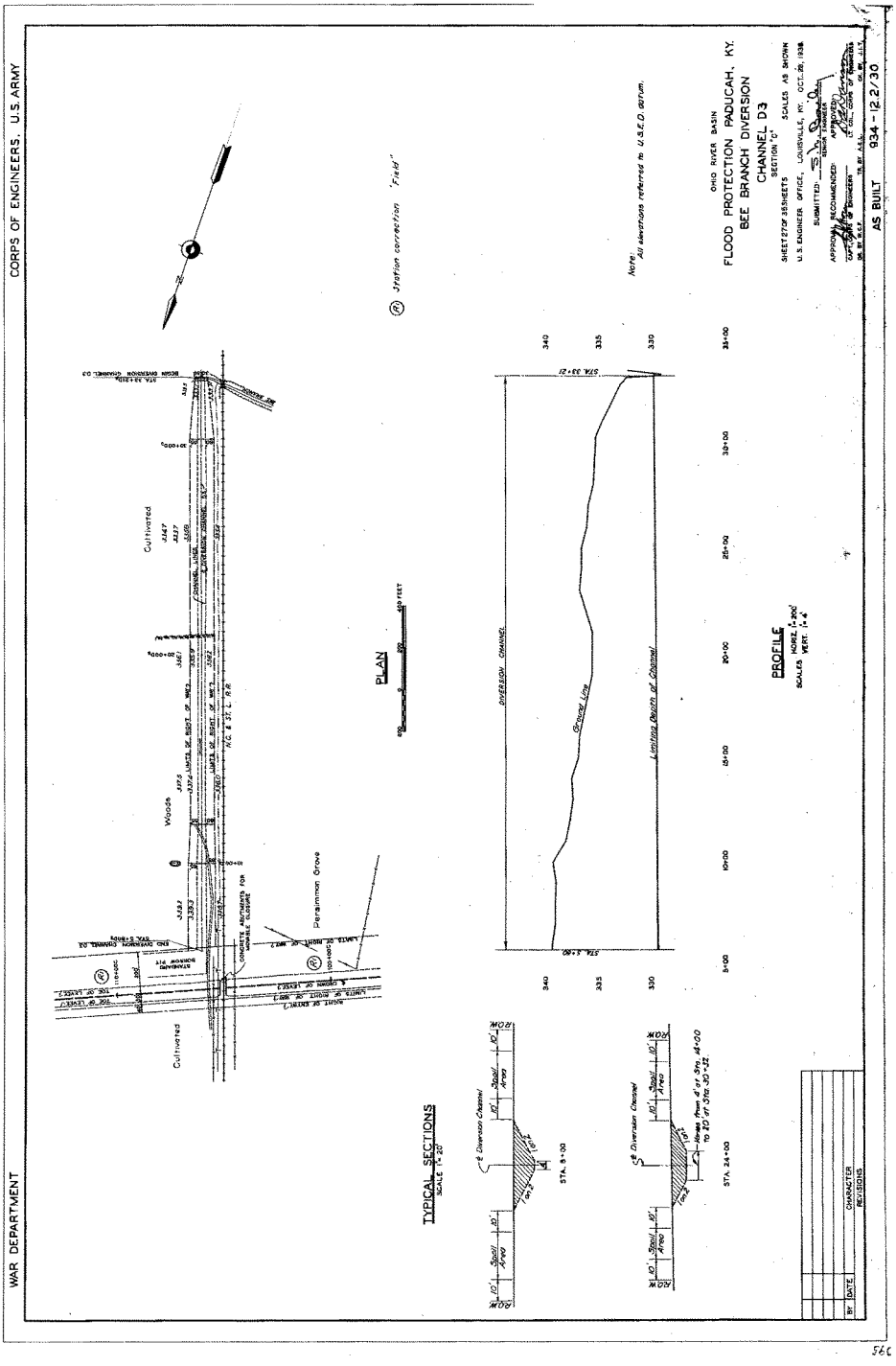
DR. BY: C.P. TR. BY: H.W. CK. BY: J.L.T.

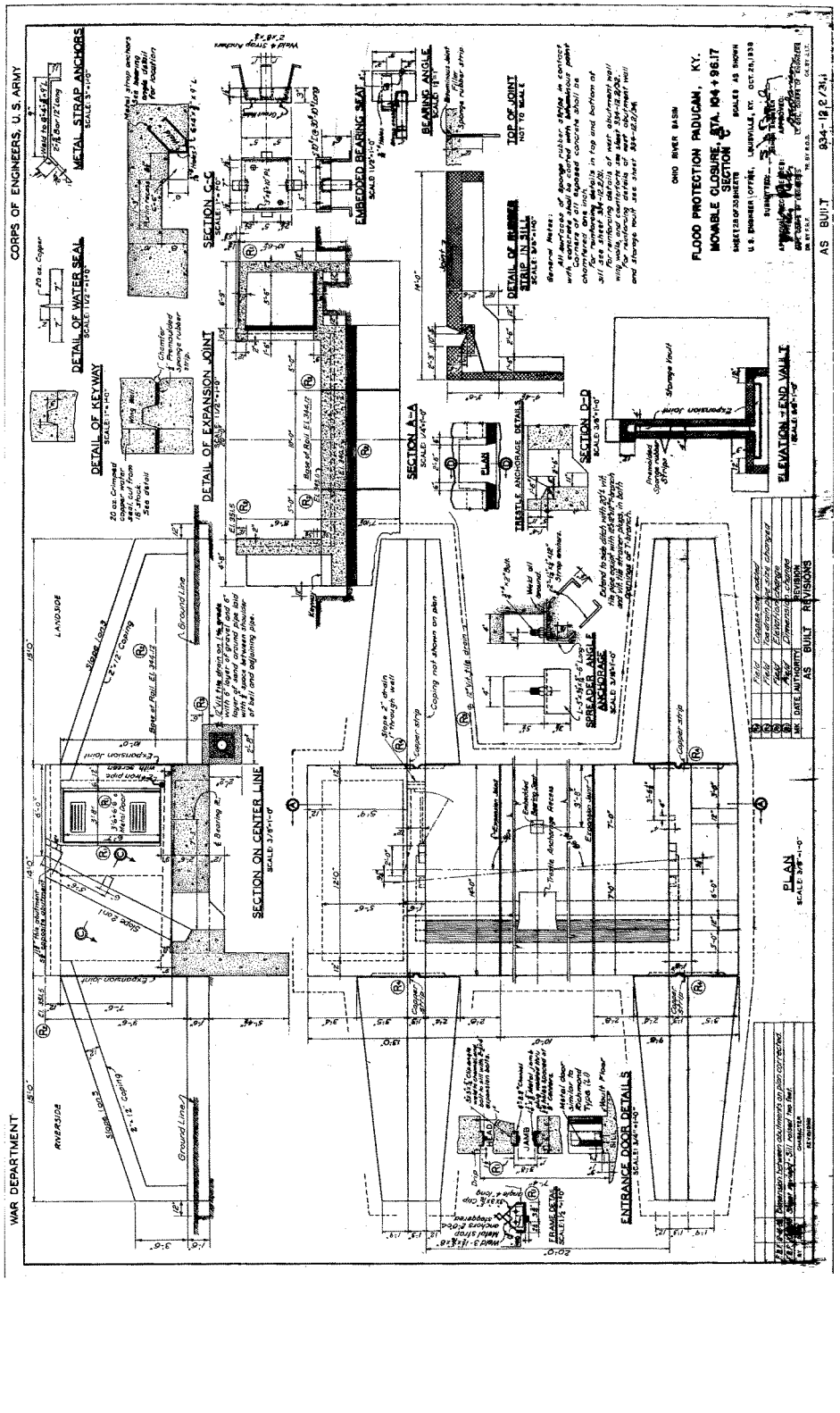
AS BUILT 934-12.2/27

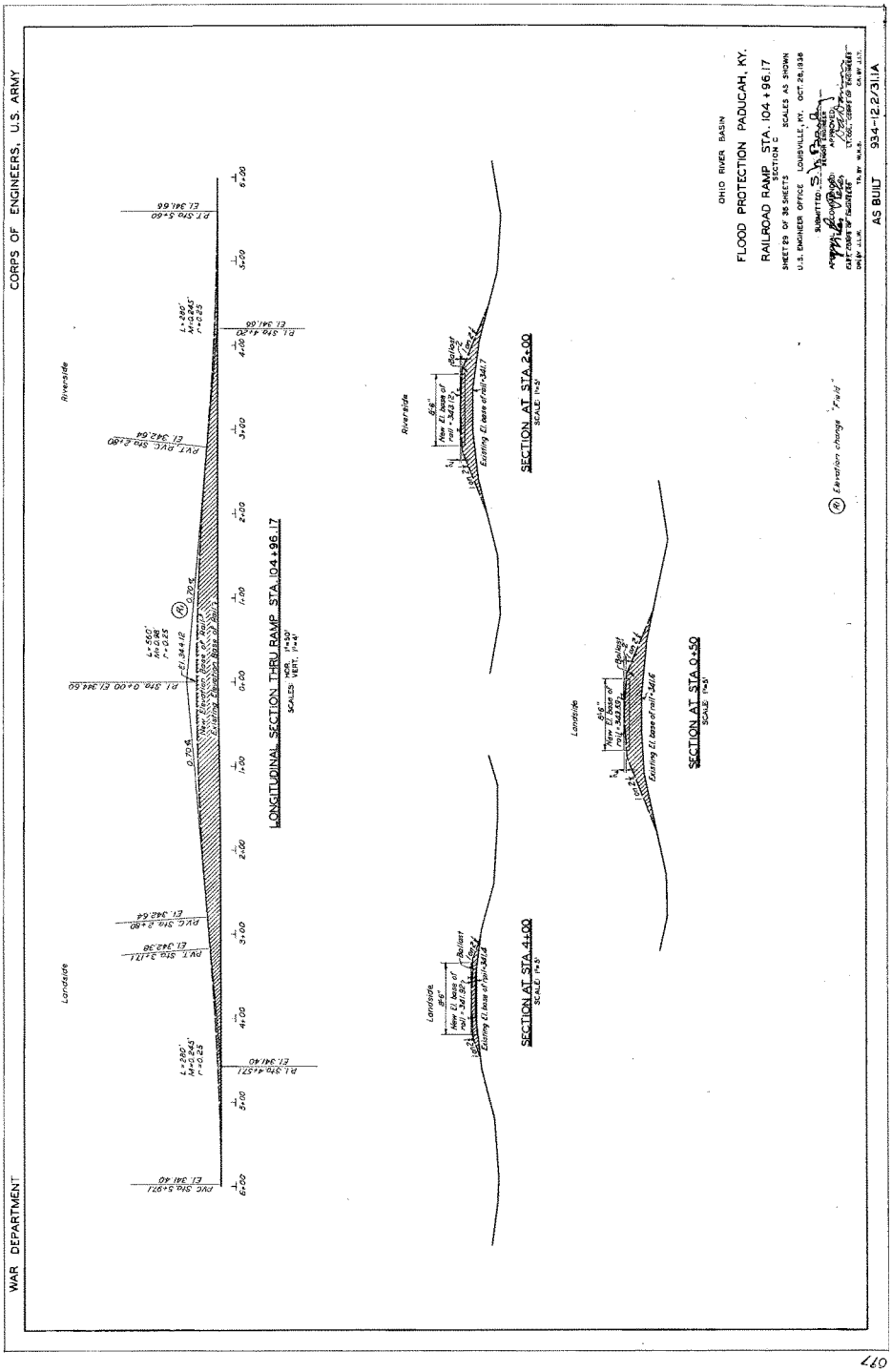
853

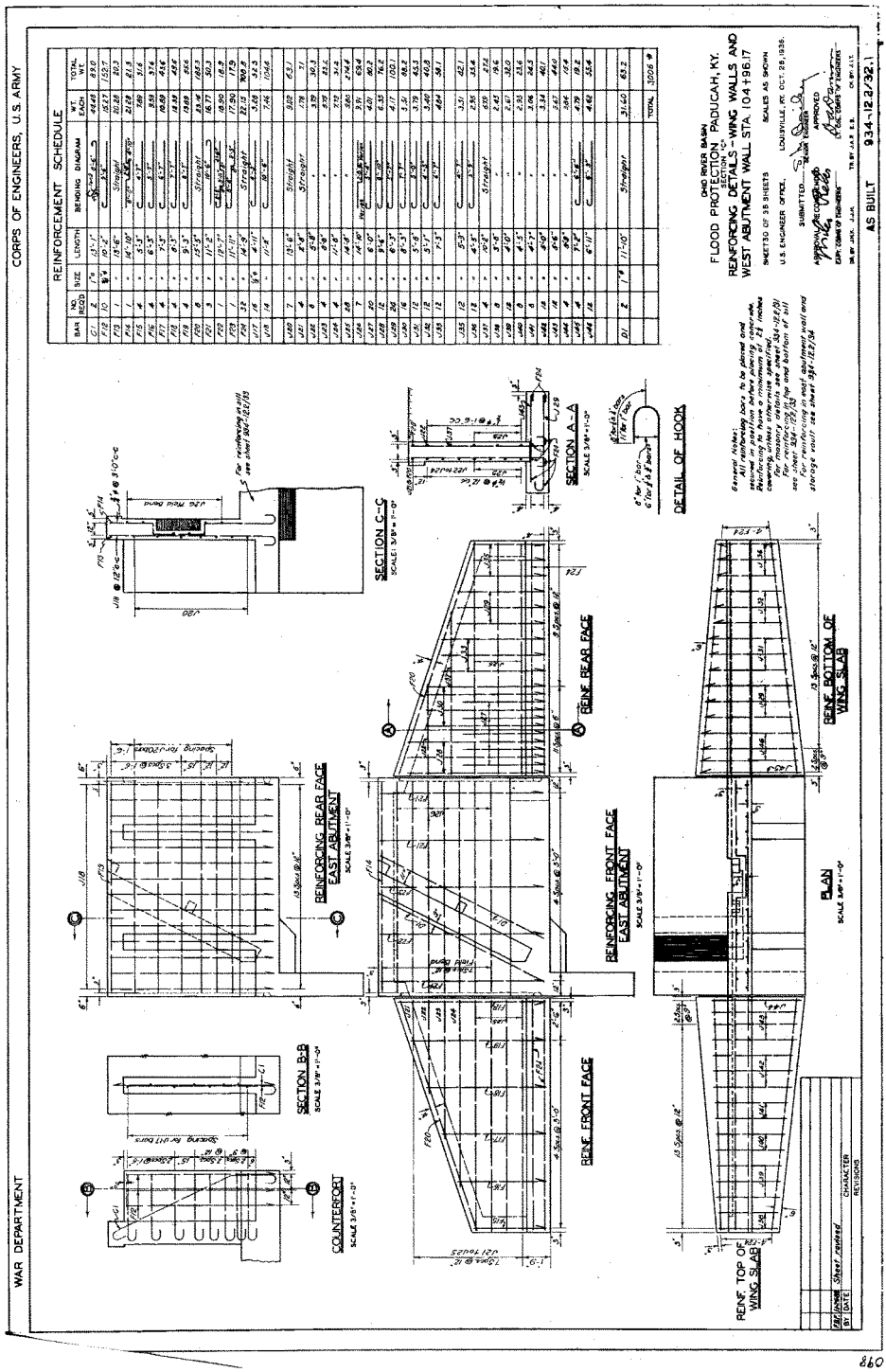

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
PLAN
SECTION ON CENTER LINE
ELEVATION
SECTION ON ℄ INLET
SECTION ON ℄ OUTLET
DETAIL OF SEEP RING
SECTION A-A
PLAN
ELEVATION
SECTION ON ℄ OUTLET
ELEVATION
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE STA. 254+06
SECTION "D"
AS BUILT 934-12.2/28


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE STA. 291+75
SECTION "C"
SHEET 2 OF 3 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. OCT 23, 1938
SUBMITTED:
APPROVED AND RECOMMENDED:
AS BUILT
934-12.2/29
PLAN
SECTION A-A
ELEVATION
DETAIL OF SEEP RING
SECTION ON CENTER LINE
SECTION ON ℄ INLET
SECTION ON ℄ OUTLET
General Notes:
All exposed corners of concrete shall be chamfered one inch.
Slope culvert to fit bottom of ditch where applicable.
Backfill shall be hand placed and thoroughly compacted around sides of pipe with a minimum top cover of two feet before embankment is placed.
Between vertical planes one foot outside the required limits of foundation.
Place six inches of gravel blanket under all riprap.
Riprap shall be hand placed.
Slope culvert to fit bottom of ditch where applicable.
Hand placed riprap
Slope 1on3
Slope 1on2
Slope 1on1.5
Compacted Backfill
Minimum of 2'0" Compacted Backfill
6" Gravel blanket under riprap
Riprap
RIVERSIDE
LANDSIDE
Crown of Levee
Station 291+75
Metal Seep Ring
Vertical Corrugation
Hinge
Weld
Lug
Diaphragm
Rivets
Bolts
Elev. 351.0
Elev. 320.9
Elev. 318.0
Elev. 300.0
Elev. 301.0
5 Spaces @ 2'6"
Seep rings shall not be placed at pipe joints
195'0" of 36" No. 12 Bage galvanized corrugated iron pipe with bituminous coating inside and outside
Approximately 10 rows
6 Spaces @ 6'0"
12 gage galvanized corrugated sheet metal fully coated with bituminous material. One half of diaphragm shown, other half identical.
Holes for 1" Rivets
4 1/4" x 4" Takeup bolts in 3rd Annulation each diaphragm
2 1/2" x 3/4" - 7 Long
2" - 2" Long
36" Model 400 Special-Steel type Colco Automatic Drainage Gate or equal.
AS BUILT
934-12.2/29

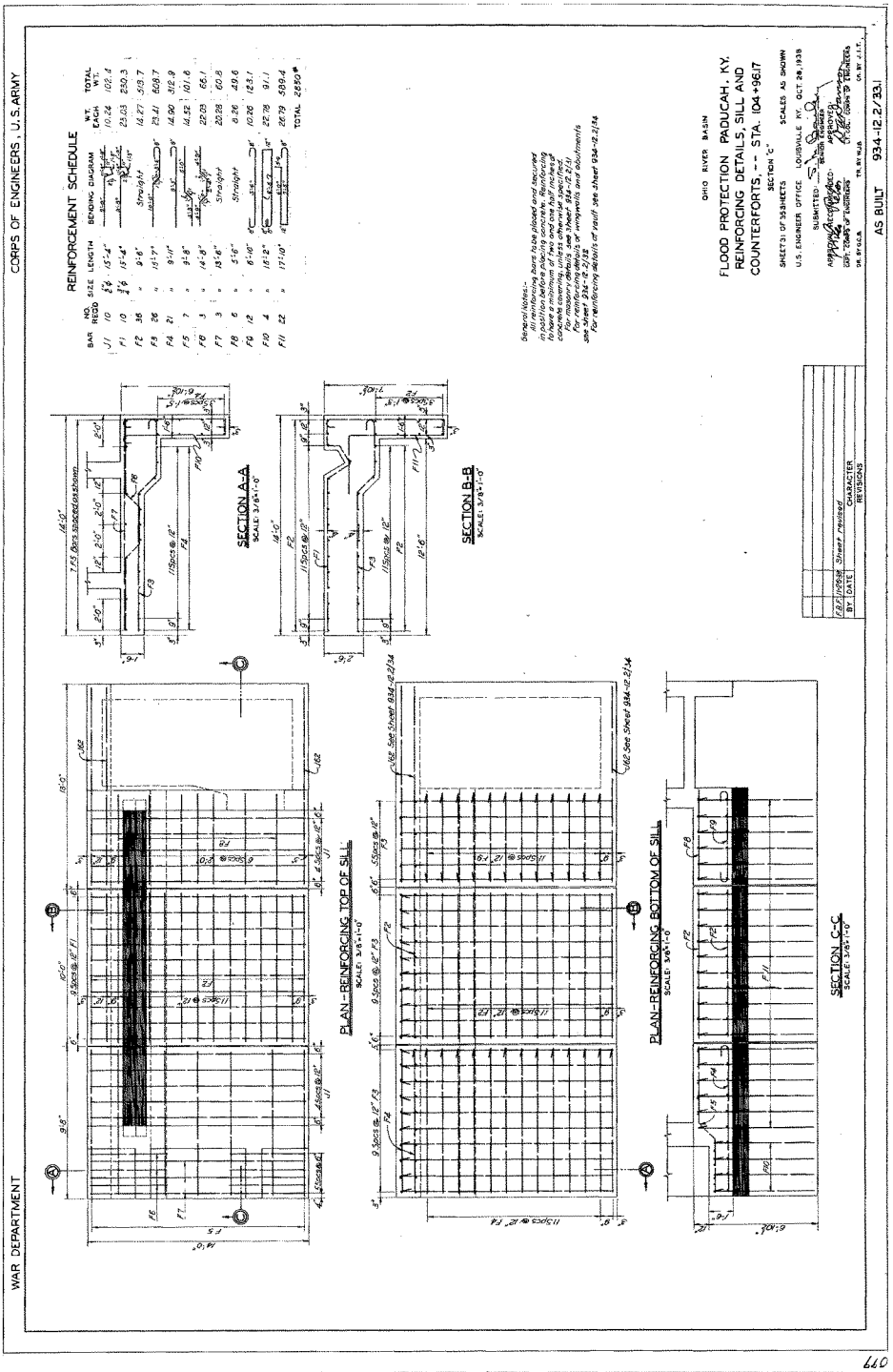

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
BEE BRANCH DIVERSION CHANNEL D3
SECTION "C"
SHEET 27 OF 33 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 20, 1938
SUBMITTED
APPROVED, RECOMMENDED:
AS BUILT
934 - 12.2/30
PLAN
PROFILE
TYPICAL SECTIONS
Diversion Channel
Ground Line
Existing Bank of Channel
Cultivated
Woods
Persimmon Grove
Note: All elevations referred to U.S.C.D. datum.


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
FLOOD PROTECTION PADUCAH, KY.
MOVABLE CLOSURE, STA. 104+96.17
SECTION C
OHIO RIVER BASIN
AS BUILT
934-18.2/24.1
PLAN
SECTION ON CENTER LINE
ELEVATION at END VAULT
ENTRANCE DOOR DETAILS
METAL STRAP ANCHORS
DETAIL OF WATER SEAL
DETAIL OF KEYWAY
DETAIL OF EXPANSION JOINT
SECTION C-C
EMBEDDED BEARING SEAT
BEARING ANGLE
TOP OF JOINT
DETAIL OF RUBBER STRIP IN SILL
SECTION A-A
TRESTLE ANCHORAGE DETAILS
SECTION D-D
SPREADER ANGLE ANCHORAGE
AS BUILT REVISIONS

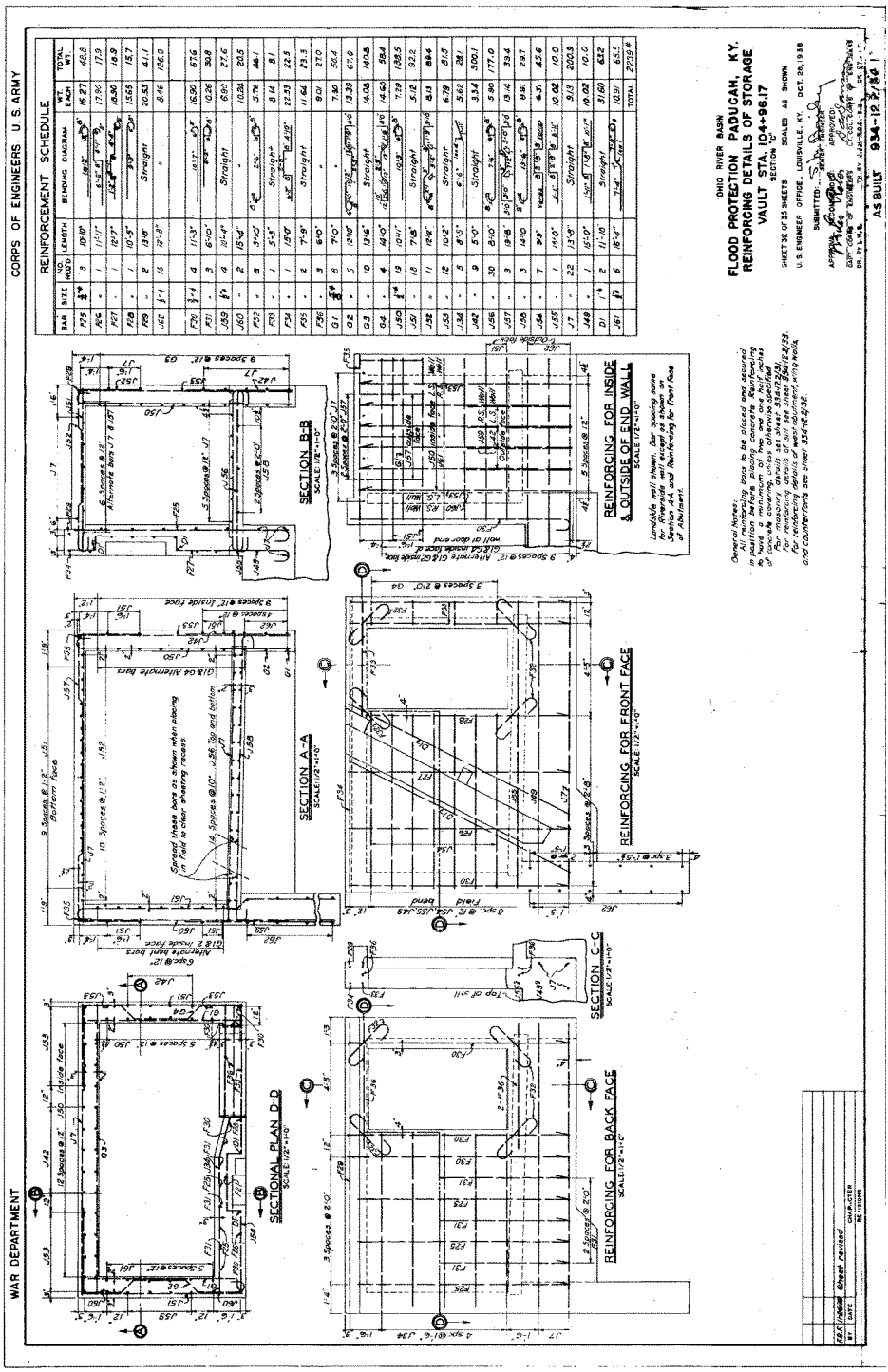

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
RAILROAD RAMP STA. 104+96.17
SECTION 12
SHEETS OF 36 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE LOUISVILLE, KY. OCT 26, 1938
SUBMITTED:
APPROVED:
CHIEF OF ENGINEERS
U.S.A.
AS BUILT
934-12.2/31.11A
LONGITUDINAL SECTION THRU RAMP STA. 104+96.17
SCALES HOR. 1"=100'
VERT. 1"=5'
SECTION AT STA. 4+00
SECTION AT STA. 2+00
SECTION AT STA. 0+50
SCALE 1"=5'
Riverside
Landside
Existing El. base of rail-341.6
Ballast
Elevation change "F"



BAR	NO. REQD	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
C1	2	1"	13'-1"	3'-4" 6'-0" 3'-4"	44.48	89.0
F18	10	¾"	10'-2"	3'-4"	15.17	151.7
F13	1	"	10'-8"	Straight	20.28	20.3
F15	1	"	10'-10"	Straight	20.62	20.6
F16	4	"	5'-3"	3'-3" 4'-3" 3'-3"	3.99	15.9
F17	4	"	7'-5"	4'-3" 4'-3"	10.69	42.8
F18	4	"	9'-3"	4'-3" 4'-3"	13.33	53.3
F19	4	"	9'-3"	4'-3" 4'-3"	13.33	53.3
F20	6	"	12'-3"	Straight	23.24	139.5
F21	3	"	11'-2"	3'-4" 4'-3" 3'-4"	16.93	50.8
F22	3	"	11'-2"	3'-4" 4'-3" 3'-4"	16.93	50.8
F23	1	"	11'-11"	3'-4" 4'-3" 3'-4"	17.90	17.9
F24	32	"	14'-3"	Straight	21.15	676.8
U11	16	¾"	4'-11"	3'-4" 3'-4"	3.68	58.9
U14	14	"	11'-4"	6'-3" 3'-4"	7.46	104.4
U66	7	"	15'-8"	Straight	3.02	63.1
U67	4	"	8'-8"	"	1.78	10.1
U23	4	"	8'-8"	"	1.78	10.1
U24	28	"	14'-8"	"	3.02	211.4
U25	28	"	14'-6"	"	3.00	210.0
U26	7	"	14'-6"	3'-3" 3'-3" 3'-3" 3'-3"	3.91	63.4
U27	20	"	6'-0"	3'-3" 3'-3"	4.61	90.3
U28	16	"	8'-3"	3'-3" 3'-3"	4.11	102.7
U29	16	"	8'-3"	3'-3" 3'-3"	4.11	102.7
U30	12	"	5'-6"	3'-3"	5.21	98.2
U31	12	"	5'-6"	3'-3"	3.79	45.5
U32	12	"	5'-1"	4'-3"	3.49	40.8
U33	12	"	7'-5"	4'-3"	4.64	38.1
U35	12	"	5'-9"	4'-3"	1.51	42.1
U36	12	"	6'-1"	3'-3"	1.51	42.1
U37	4	"	6'-3"	Straight	4.59	27.6
U38	8	"	5'-6"	"	2.41	19.6
U39	18	"	4'-10"	"	2.41	32.0
U40	8	"	4'-5"	"	2.33	23.6
U41	6	"	4'-1"	"	3.06	64.5
U42	14	"	4'-0"	"	3.34	46.1
U43	14	"	3'-6"	"	3.67	44.0
U44	14	"	3'-2"	"	4.00	44.0
U45	14	"	6'-3"	3'-3"	4.79	19.2
U46	14	"	6'-11"	3'-3"	4.46	55.4
D1	2	1"	11'-0"	Straight	31.40	63.2
					TOTAL	3006 #


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S.ARMY
REINFORCEMENT SCHEDULE
BAR MARK | NO. REQD | SIZE | LENGTH | BENDING DIAGRAM | WT. EACH | TOTAL WT.
F1 | 10 | #4 | 15'-4" | Straight | 10.24 | 102.4
F1 | 10 | #4 | 15'-4" | Straight | 25.03 | 250.3
F2 | 36 | # | 9'-6" | Straight | 14.27 | 513.7
F3 | 26 | # | 15'-7" | Straight | 23.41 | 608.7
F4 | 21 | # | 9'-11" | Straight | 14.90 | 312.9
F5 | 7 | # | 9'-8" | Straight | 14.52 | 101.6
F6 | 3 | # | 14'-8" | Straight | 22.03 | 66.1
F7 | 3 | # | 15'-6" | Straight | 23.28 | 69.8
F8 | 6 | # | 5'-6" | Straight | 8.26 | 49.6
F9 | 12 | # | 6'-10" | Straight | 10.26 | 123.1
F10 | 4 | # | 15'-2" | Straight | 22.79 | 91.1
F11 | 22 | # | 17'-10" | Straight | 26.79 | 589.4
TOTAL 2850#
Special Notes:-
All reinforcing bars to be placed and secured in position before placing concrete. Reinforcing bars shall have a minimum cover of 3" where concrete covering, unless otherwise specified.
For masonry details see sheet 934-12.2.1.1
For reinforcing details of wingwalls and abutments see sheet 934-12.2.1.2
For reinforcing details of vault see sheet 934-12.2.1.4
SECTION A-A
SCALE: 3/16"=1'-0"
SECTION B-B
SCALE: 3/16"=1'-0"
PLAN-REINFORCING TOP OF SILL
SCALE: 3/16"=1'-0"
PLAN-REINFORCING BOTTOM OF SILL
SCALE: 3/16"=1'-0"
SECTION C-C
SCALE: 3/16"=1'-0"
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS, SILL AND COUNTERFORTS, -- STA. 104+96.17
SECTION "C"
SHEET 31 OF 35 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE LOUISVILLE KY. OCT. 28, 1938
SUBMITTED:
APPROVED:
CHIEF, CORPS OF ENGINEERS
DIV. ENGINEER
OHIO RIVER DIVISION
CHIEF, CORPS OF ENGINEERS
WASHINGTON, D.C.
CHARACTER OF REVISIONS
BY | DATE
AS BUILT 934-12.2/33.1

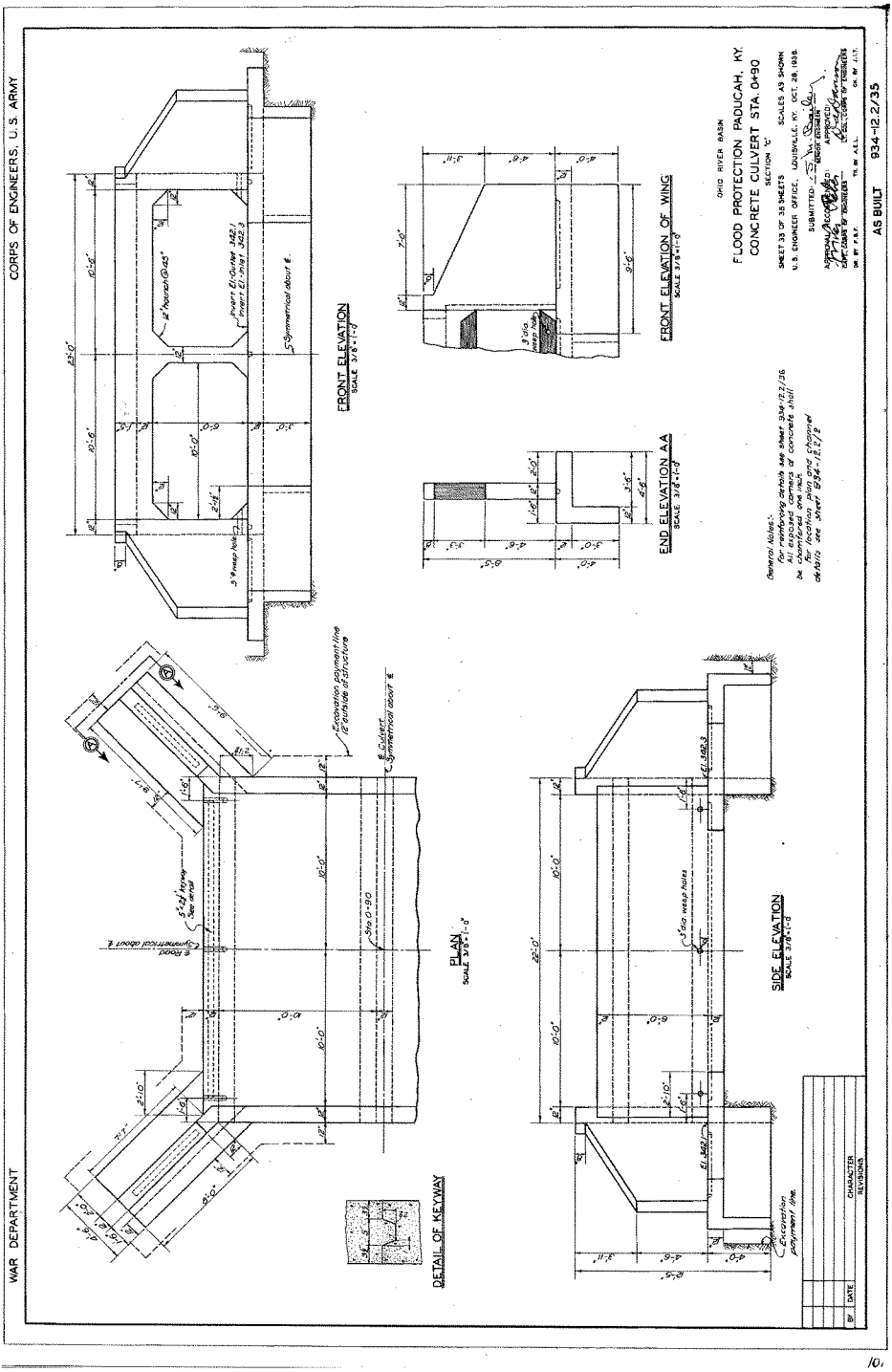
660

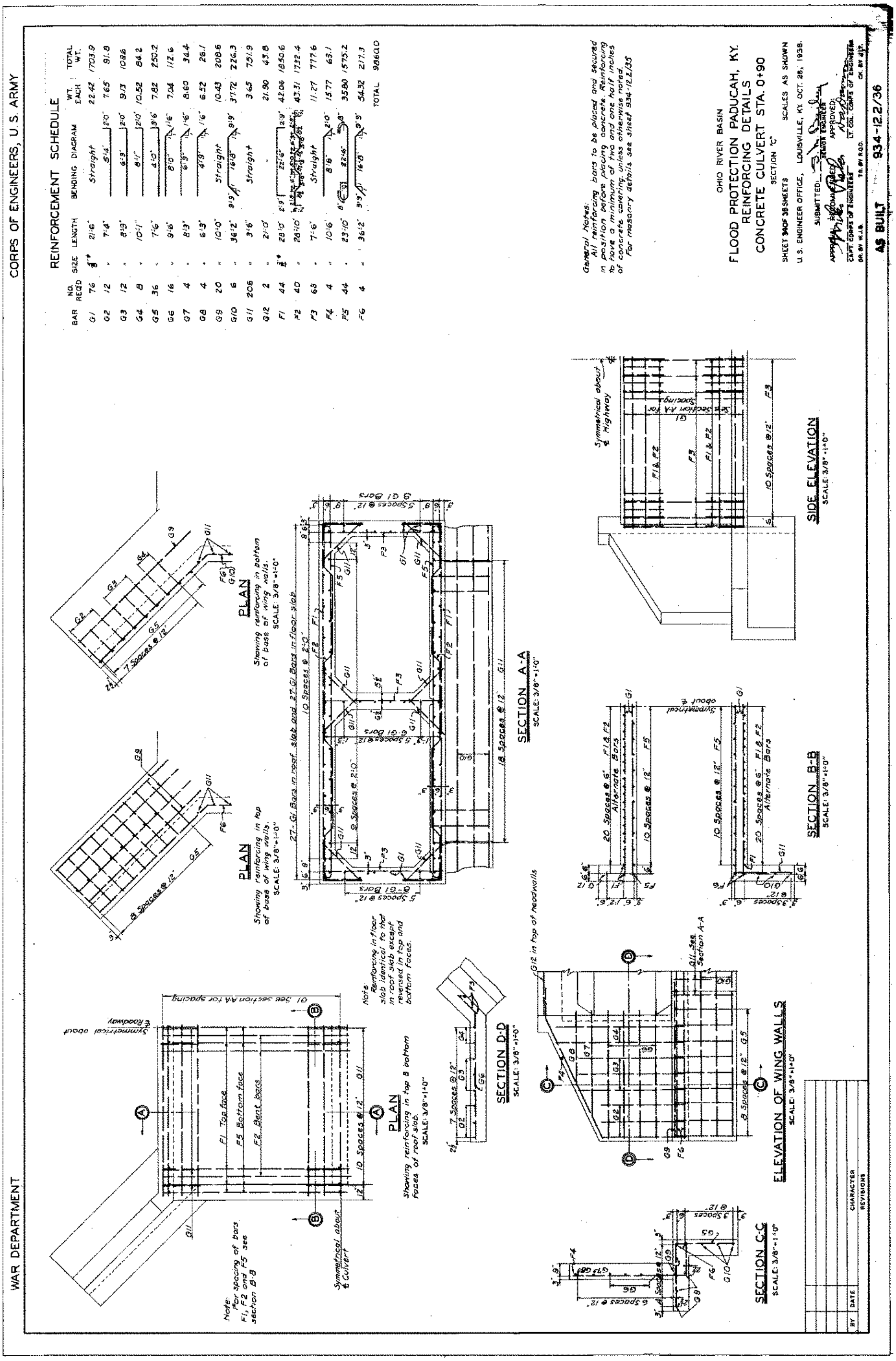


REINFORCEMENT SCHEDULE

BAR	SIZE	NO. REQ'D	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F25	3/4"	3	10'-10"	10'-2"	16.27	48.8
A/C	"	1	11'-11"	5'-5 1/2" 6'-5 1/2"	17.90	17.9
F27	"	1	12'-7"	12'-2" 3'-0"	18.90	18.9
F28	"	1	10'-3"	9'-0" 3'-0"	15.65	15.7
F29	"	2	13'-0"	Straight	26.53	41.1
J62	1 1/4	15	12'-8"	"	8.46	126.9
F26	3/4"	4	11'-3"	10'-11" 3'-0"	16.90	67.6
F31	"	3	6'-10"	6'-9" 3'-0"	10.26	30.8
J59	#9	4	10'-4"	Straight	6.90	27.6
J60	"	2	15'-4"	"	10.24	20.5
F32	"	8	3'-10"	2'-6" 2'-6"	5.74	46.1
F33	"	1	5'-3"	Straight	8.14	8.1
F34	"	1	15'0"	14'-8" 3'-0" 1'-4 1/2"	22.53	22.5
F35	"	2	7'-9"	Straight	11.64	23.3
F36	"	3	6'-0"	"	9.01	27.0
G1	#8	8	7'-0"	6'-0" 3'-0"	7.50	60.4
G2	"	5	12'-0"	6'-0" 3'-0" 3'-0"	13.33	67.0
G3	"	10	13'-6"	6'-0" 3'-0" 4'-6"	14.05	140.5
G4	"	4	14'-0"	Straight	14.40	57.6
J50	#9	19	10'-1"	10'-0" 3'-0"	7.59	138.5
J51	"	18	7'-8"	Straight	5.12	93.2
J52	"	11	12'-9"	6'-0" 3'-0" 3'-0"	8.13	89.4
J53	"	12	10'-2"	Straight	6.78	81.5
J54	"	5	8'-5"	5'-6" 3'-0"	5.62	28.1
J42	"	9	5'-0"	Straight	3.34	30.1
J56	"	30	8'-10"	8'-0" 3'-0"	5.90	177.0
J57	"	3	13'-8"	10'-0" 3'-0" 3'-0"	9.14	27.4
J55	"	3	14'-0"	11'-0" 3'-0"	9.81	29.4
J54	"	7	9'3"	Varies 6'-0" 3'-0"	6.41	45.6
J55	"	1	15'-0"	12'-6" 2'-6"	10.02	10.0
J71	"	22	13'-0"	Straight	9.13	200.9
J49	"	1	15'-0"	12'-6" 2'-6"	10.02	10.0
D1	1"	2	11'-10"	Straight	31.60	63.2
J61	#8	6	18'-4"	17'-4" 3'-0" 3'-0"	10.91	65.5
					TOTAL	2259#

BY	DATE	CHECKED	REVISIONS
F.B.F.	Sheet revised		

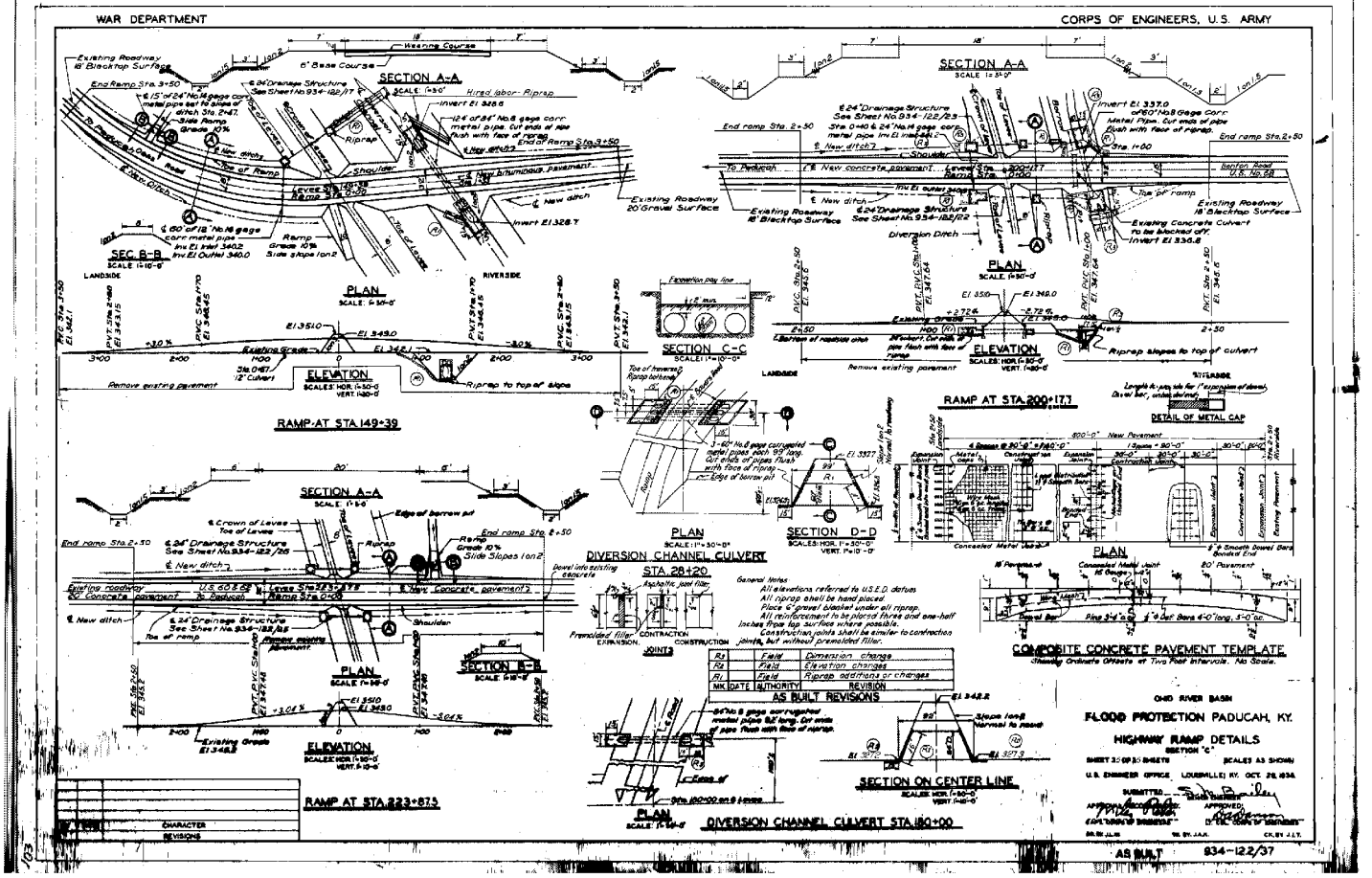

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
CONCRETE CULVERT STA. 0+90
SECTION "C"
SHEET 33 OF 38 SHEETS SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1938
SUBMITTED
APPROVED
AS BUILT 934-12.2/35
FRONT ELEVATION
SCALE 3/8"=1'-0"
FRONT ELEVATION OF WING
SCALE 3/8"=1'-0"
END ELEVATION AA
SCALE 3/8"=1'-0"
PLAN
SCALE 3/8"=1'-0"
SIDE ELEVATION
SCALE 3/8"=1'-0"
DETAIL OF KEYWAY
BY DATE CHARACTER REVISIONS



REINFORCEMENT SCHEDULE

BAR	NO. REQ'D	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
G1	76	5/8"	21'-6"	Straight	22.42	1703.9
G2	12	"	7'-4"	5'-4" 2'-0"	7.65	91.8
G3	12	"	8'-9"	6'-9" 2'-0"	9.13	1086
G4	8	"	10'-1"	8'-1" 2'-0"	10.52	84.2
G5	36	"	7'-6"	4'-0" 3'-6"	7.82	250.2
G6	16	"	9'-6"	8'-0" 1'-6"	7.04	112.6
G7	4	"	8'-3"	6'-9" 1'-6"	8.60	34.4
G8	4	"	6'-3"	4'-9" 1'-6"	6.52	26.1
G9	20	"	10'-0"	Straight	10.43	208.6
G10	6	"	36'-2"	9'-9" 16'-8" 9'-9"	37.72	226.3
G11	206	"	3'-6"	Straight	3.65	751.9
G12	2	"	21'-0"	"	21.90	43.8
F1	44	3/4"	28'-0"	2'-9" 22'-6" 2'-9"	42.06	1850.6
F2	40	"	28'-10"		43.31	1732.4
F3	69	"	7'-6"	Straight	11.27	777.6
F4	4	"	10'-6"	8'-6" 2'-0"	15.77	63.1
F5	44	"	23'-10"	8" 22'-6" 8"	35.80	1575.2
F6	4	"	36'-2"	9'-9" 16'-8" 9'-9"	54.32	217.3
					TOTAL	9860.0

ZOI


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
SECTION A-A
SCALE: 1"=5'
SEC. B-B
SCALE: 1"=10'-0"
PLAN
SCALE: 1"=50'-0"
ELEVATION
SCALES: HOR. 1"=50'-0" VERT. 1"=20'-0"
RAMP AT STA. 149+39
SECTION C-C
SCALE: 1"=10'-0"
SECTION A-A
SCALE: 1"=5'-0"
RAMP AT STA. 200+17.7
SECTION D-D
SCALES: HOR. 1"=30'-0" VERT. 1"=10'-0"
DETAIL OF METAL CAP
PLAN
SCALE: 1"=30'-0"
DIVERSION CHANNEL CULVERT STA. 28+20
SECTION A-A
SCALE: 1"=5'-0"
RAMP AT STA. 223+87.5
SECTION B-B
SCALE: 1"=5'-0"
PLAN
SCALE: 1"=50'-0"
DIVERSION CHANNEL CULVERT STA. 180+00
SECTION ON CENTER LINE
SCALES: HOR. 1"=50'-0" VERT. 1"=10'-0"
COMPOSITE CONCRETE PAVEMENT TEMPLATE
Showing Ordinate Offsets at Two Foot Intervals. No Scale.
General Notes
All elevations referred to U.S.E.D. datum
All riprap shall be hand placed
Place 6" gravel bedding under all riprap.
All reinforcement to be placed three and one-half inches from top surface where possible.
Construction joints shall be similar to contraction joints, but without premolded filler.
AS BUILT REVISIONS
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
HIGHWAY RAMP DETAILS
SECTION "C"
SHEET 3 OF 30 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1936
SUBMITTED
APPROVED
APPROVED
AS BUILT
934-122/37

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANTS NOS. 1, 2, 3, 5, 6, 7 & 12

IN 108 SHEETS

TITLE SHEET

CONTENTS

934-12.3/ 1 GENERAL PLAN PUMPING PLANTS NOS. 1,2,3,5,6,7, & 12

PUMPING PLANT NO. 1

934-12.3/ 2 GENERAL LAYOUT
934-12.3/ 3 MASONRY DETAILS PLANS & SECTIONS
934-12.3/ 4 MASONRY DETAILS ELEVATIONS
934-12.3/ 5 REINFORCING DETAILS BASE SLAB, LOADING PLATFORM & STAIRS
934-12.3/ 6 REINFORCING DETAILS ROOF SLAB & MOTOR FLOOR
934-12.3/ 7 REINFORCING DETAILS NORTH & SOUTH WALLS
934-12.3/ 8 REINFORCING DETAILS EAST, SOUTH & WEST WALLS
934-12.3/ 9 PUMPING PLANTS NOS. 1, 5, 6 & 7 WIRING DIAGRAMS
934-12.3/10 PUMPING PLANTS NOS. 1, 5 & 6 SUBSTATION
934-12.3/11 PUMPING PLANTS NOS. 1, 2, 5 & 6 MASONRY & REINFORCING DETAILS SUBSTATION PLATFORMS
934-12.3/12 PUMPING PLANTS NOS. 1, 2, 5 & 6 SUBSTATION FENCE LOCATIONS PLANS & DETAIL
934-12.3/13 LIGHTING & POWER SYSTEM
934-12.3/14 MASONRY & REINFORCING DETAILS DISCHARGE HEADWALL

PUMPING PLANT NO. 2

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934-12.3/17 MASONRY DETAILS- SECTIONS
934-12.3/18 MASONRY DETAILS- ELEVATIONS
934-12.3/19 REINFORCING DETAILS BOTTON BASE, WEIR & LOADING PLATFORM STEPS
934-12.3/20 REINFORCING DETAILS- BASE, TOP REINFORCING & PIERS
934-12.3/21 REINFORCING DETAILS- MOTOR FLOOR
934-12.3/22 REINFORCING DETAILS NORTH WALL
934-12.3/23 REINFORCING DETAILS SOUTH WALL & INTAKE CHAMBER WALL
934-12.3/24 REINFORCING DETAILS- EAST WALL
934-12.3/25 REINFORCING DETAILS- WEST WALL
934-12.3/26 REINFORCING DETAILS ROOF SLAB, INTAKE & LOADING PLATFORMS
934-12.3/27 WIRING DIAGRAM
934-12.3/28 SUBSTATION
934-12.3/29 LIGHTING & POWER SYSTEMS
934-12.3/30 MASONRY DETAILS DISCHARGE HEADWALL
934-12.3/31 REINFORCING DETAILS DISCHARGE HEADWALL

PUMPING PLANT NO. 3

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934-12.3/33 MASONRY DETAILS PLANS & ELEVATIONS
934-12.3/34 MASONRY DETAILS ELEVATIONS
934-12.3/35 REINFORCING DETAILS MOTOR FLOOR, ROOF, TRASH RACK WALKWAY & BASE SLAB
934-12.3/36 REINFORCING DETAILS NORTH, SOUTH & WEST WALLS
934-12.3/37 REINFORCING DETAILS EAST WALL, SURGE CHAMBER & WEST WALL, TRASH RACK
934-12.3/38 PUMPING PLANTS NOS. 3 & 12 WIRING DIAGRAMS
934-12.3/39 PUMPING PLANTS NOS. 3, 7 & 12 TWO-POLE TRANSFORMER SUBSTATION
934-12.3/40 LIGHTING & POWER SYSTEMS

PUMPING PLANT NO. 5

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934-12.3/42 MASONRY DETAILS PLAN & SECTIONS
934-12.3/43 MASONRY DETAILS PLAN & SECTIONS
934-12.3/44 MASONRY DETAILS ELEVATIONS
934-12.3/45 REINFORCING DETAILS SUPER AND SUB-STRUCTURE
934-12.3/46 REINFORCING DETAILS EAST WALL & SEWER OPENINGS
934-12.3/47 LIGHTING & POWER SYSTEMS
(R) 934-A1/1 MASONRY & REINFORCING DETAILS MANHOLES NOS. 12 & 13

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934-12.3/51 MASONRY DETAILS ELEVATIONS
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934-12.3/56 REINFORCING DETAILS EAST WALL
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934-12.3/58 REINFORCING DETAILS MOTOR FLOOR
934-12.3/59 REINFORCING DETAILS ROOF SLAB, PURLIN, PIER & NORTH WALL TRASH CHAMBER
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934-12.3/62 MASONRY DETAILS CLARK STREET OUTFALL HEADWALL
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934-12.3/65 MASONRY DETAILS BASE PLAN & SECTION
934-12.3/66 MASONRY DETAILS PLAN & SECTION
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934-12.3/74 LIGHTING & POWER SYSTEMS

PUMPING PLANT NO. 12

934-12.3/75 GENERAL LAYOUT
934-12.3/76 MASONRY DETAILS PLAN & SECTIONS
934-12.3/77 MASONRY DETAILS ROOF PLAN & ELEVATIONS
934-12.3/78 REINFORCING DETAILS BASE SLAB & WING WALLS
934-12.3/79 REINFORCING DETAILS SUPERSTRUCTURE WALLS
934-12.3/80 REINFORCING DETAILS SUBSTRUCTURE WALLS & LOADING PLATFORM
934-12.3/81 REINFORCING DETAILS MOTOR FLOOR & ROOF SLAB
934-12.3/82 LIGHTING & POWER SYSTEMS
934-12.3/83 MASONRY & REINFORCING DETAILS DISCHARGE HEADWALL

MISCELLANEOUS DETAILS

934-12.3/84 MISCELLANEOUS DETAILS
934-12.3/85 MISCELLANEOUS DETAILS
934-12.3/86 MISCELLANEOUS DETAILS
934-12.3/87 MISCELLANEOUS DETAILS
934-12.3/88 MISCELLANEOUS DETAILS
934-12.3/89 MASONRY & REINFORCING T-WALL MONOLITHS

MOVABLE CLOSURE & STORAGE VAULTS

934-12.3/90 MASONRY DETAILS MOVABLE CLOSURE STA. 90+36.17B
934-12.3/91 REINFORCING DETAILS STA. 90+36.17B SILL & ABUTMENTS
934-12.3/92 REINFORCING DETAILS STA. 90+ 10.00 & STORAGE VAULT
934-12.3/93 MASONRY & REINFORCING DETAILS STA. 108 + 63.17B STORAGE VAULT
934-12.3/94 MASONRY DETAILS STA. 162+01.57B STORAGE VAULT
934-12.3/95 REINFORCING DETAILS STA. 162+01.57 B STORAGE VAULT

INTERCEPTING SEWER & MANHOLES

934-12.3/96 INTERCEPTING SEWER PLAN & PROFILE
934-12.3/97 INTERCEPTING SEWER PLAN & PROFILE
934-12.3/98 INTERCEPTING SEWER PLAN & PROFILE
934-12.3/99 MASONRY & REINFORCING DETAILS MONOLITHIC CONCRETE SEWERS
934-12.3/100 INTERCEPTING SEWER MASONRY & REINFORCING DETAILS MANHOLES NOS. 1 & 2
934-12.3/101 INTERCEPTING SEWER MASONRY & REINFORCING DETAILS MANHOLES NOS. 3 & 4
934-12.3/102 INTERCEPTING SEWER MASONRY & REINFORCING DETAILS MANHOLES NOS. 5 & 6
934-12.3/103 INTERCEPTING SEWER MASONRY & REINFORCING DETAILS MANHOLES NOS. 7 & 8
934-12.3/104 INTERCEPTING SEWER MASONRY & REINFORCING DETAILS MANHOLE NO.9
934-12.3/105 INTERCEPTING SEWER MASONRY & REINFORCING DETAILS MANHOLE NO. 10
934-12.3/106 INTERCEPTING SEWER MASONRY & REINFORCING DETAILS MANHOLE NO. 11
(R) 934-A1/2 MANHOLE NO. 14
(R) 934-12.3M/16 PUMPING PLANTS NOS. 2, 3, 5, & 6 PIPING REVISIONS

No.		Add #2	Sheets added.
R.	Nov 64	Add #2	Sh. 46 superseded by Dwg No. 934-A1/1
NO.	DATE	AUTHORITY	REVISIONS

AS BUILT REVISIONS

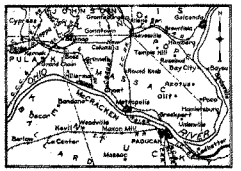
U.S. ENGINEER OFFICE, LOUISVILLE, KY.

AS BUILT

865

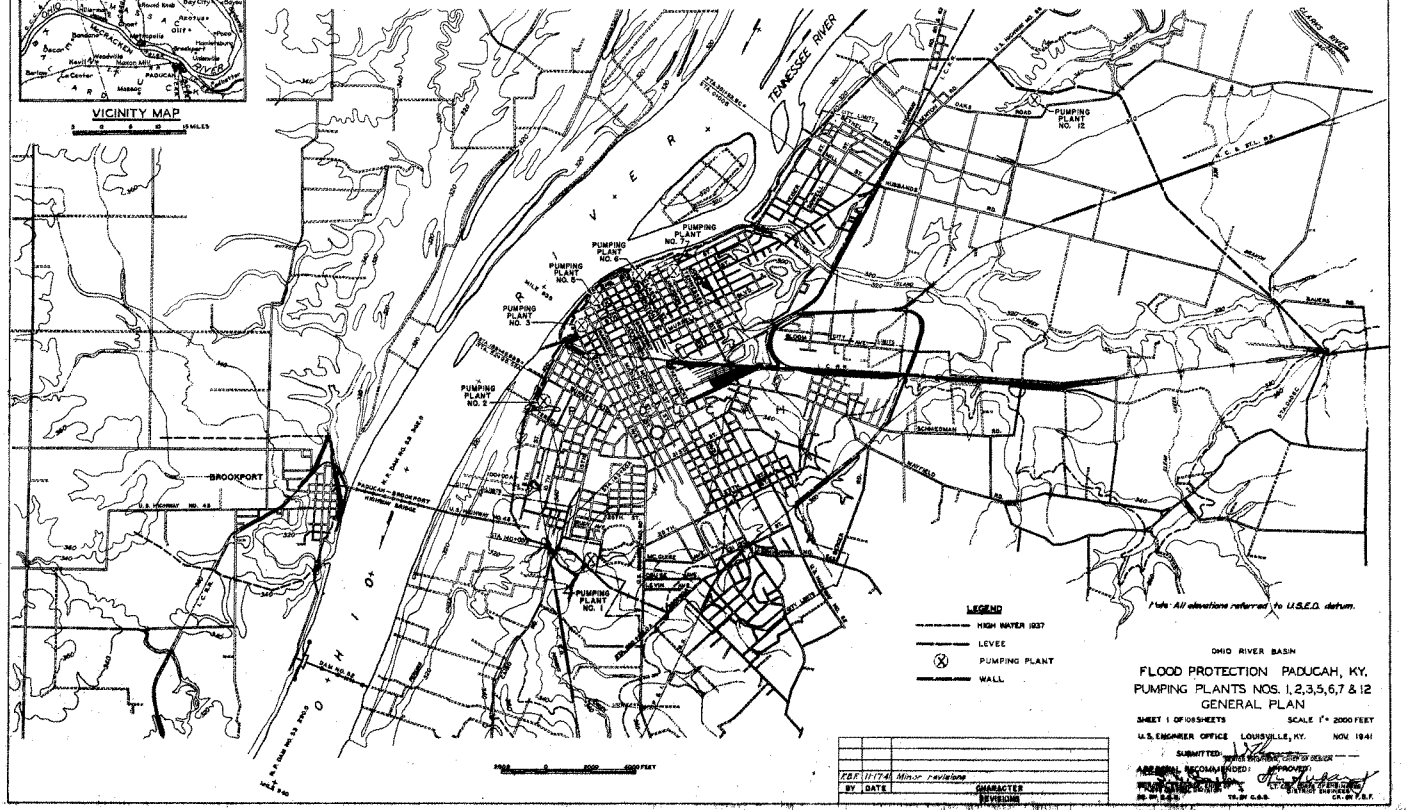
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



VICINITY MAP

0 4 8 15 MILES



LEGEND

HIGH WATER 1937

LEVEE

PUMPING PLANT

WALL

Note: All elevations referred to U.S.E.D. datum.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANTS NOS. 1, 2, 3, 5, 6, 7 & 12

GENERAL PLAN

SHEET 1 OF 108 SHEETS SCALE 1" = 2000 FEET

U.S. ENGINEER OFFICE LOUISVILLE, KY. NOV. 1941

SUBMITTED: DISTRICT ENGINEER OR DIVISION ENGINEER

APPROVED:

CHIEF OF ENGINEERS

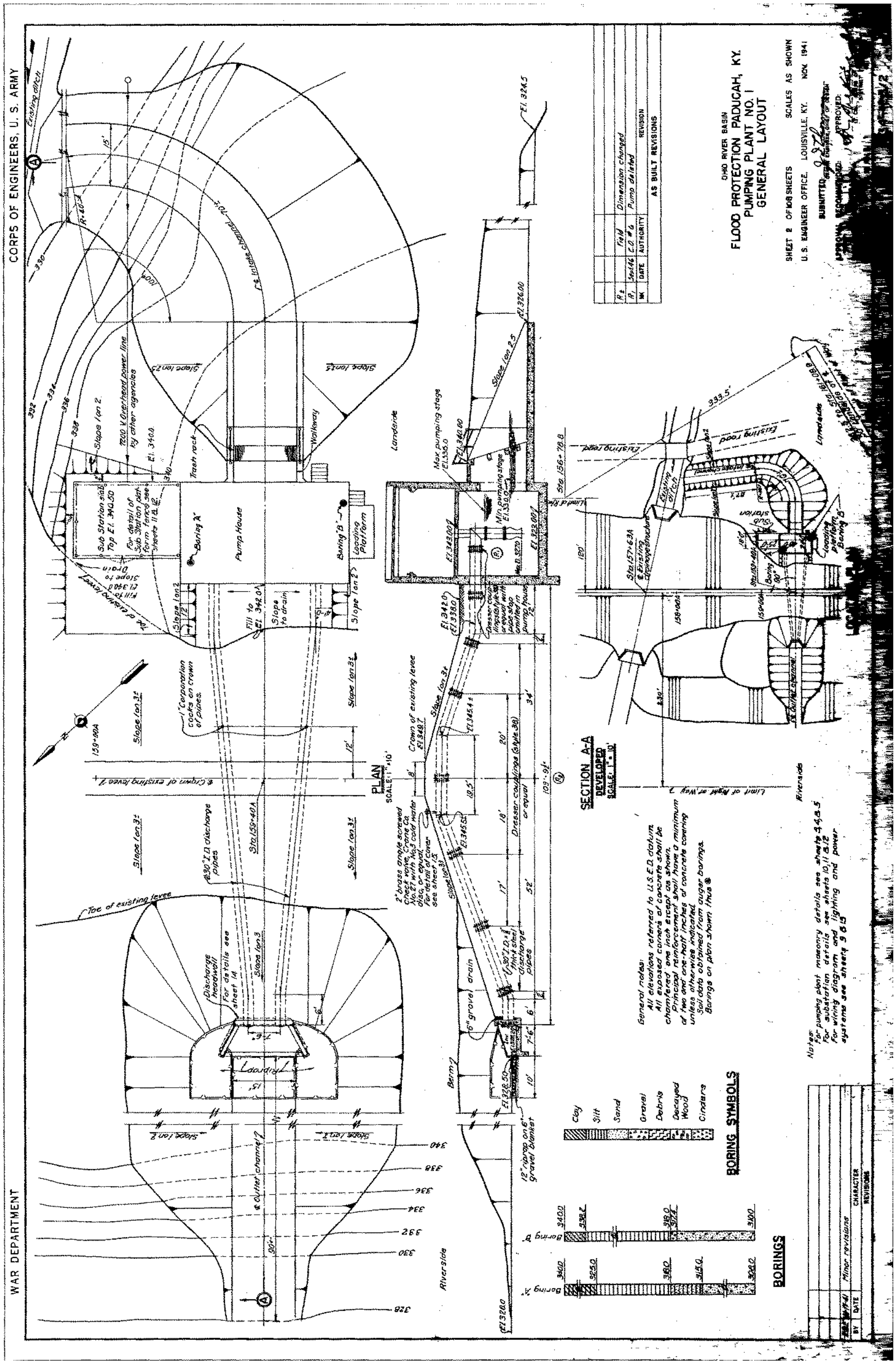
BY	DATE	CHARACTER REVISIONS
TBF	11-17-41	Minor revisions

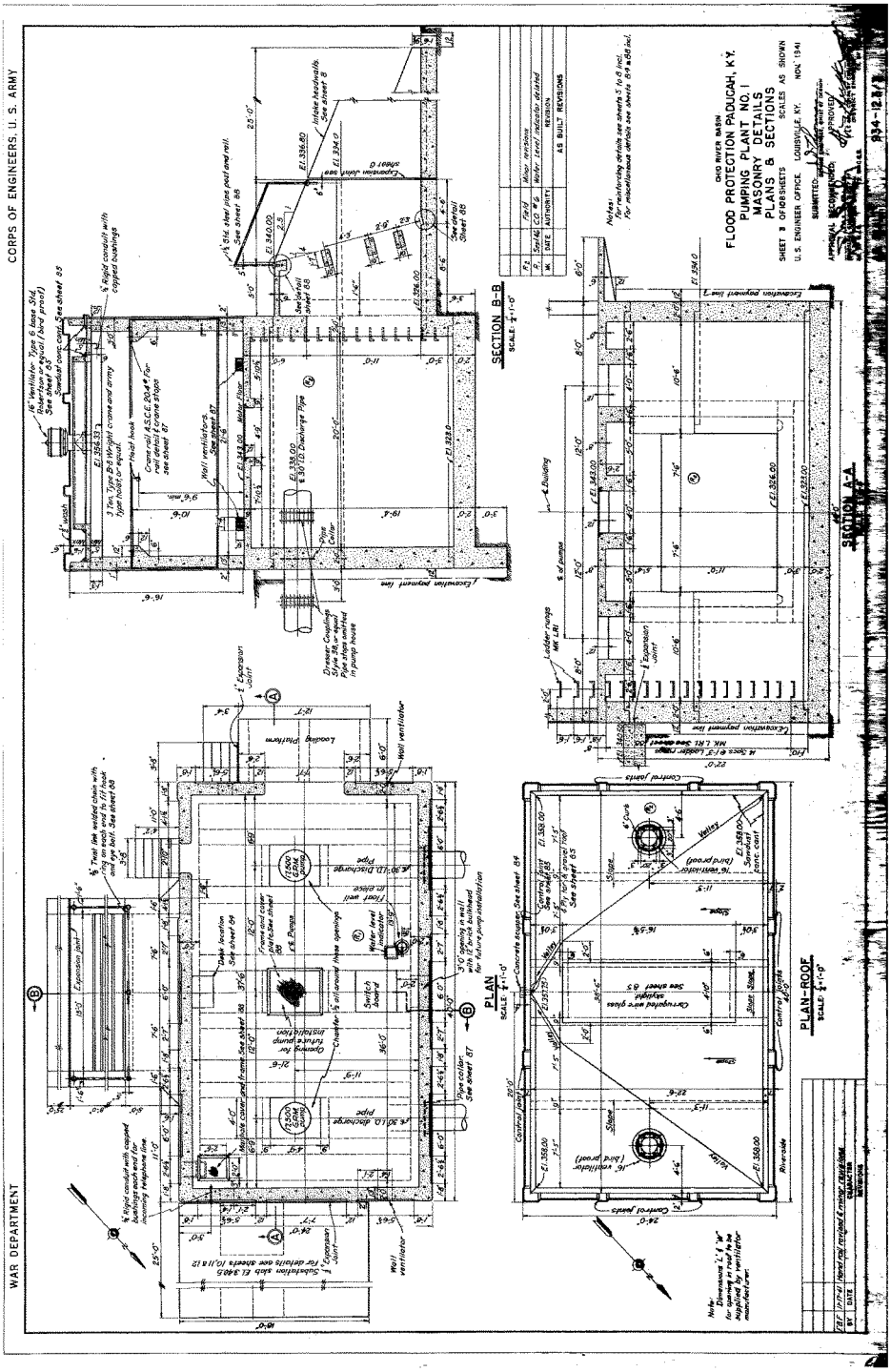
AS BUILT

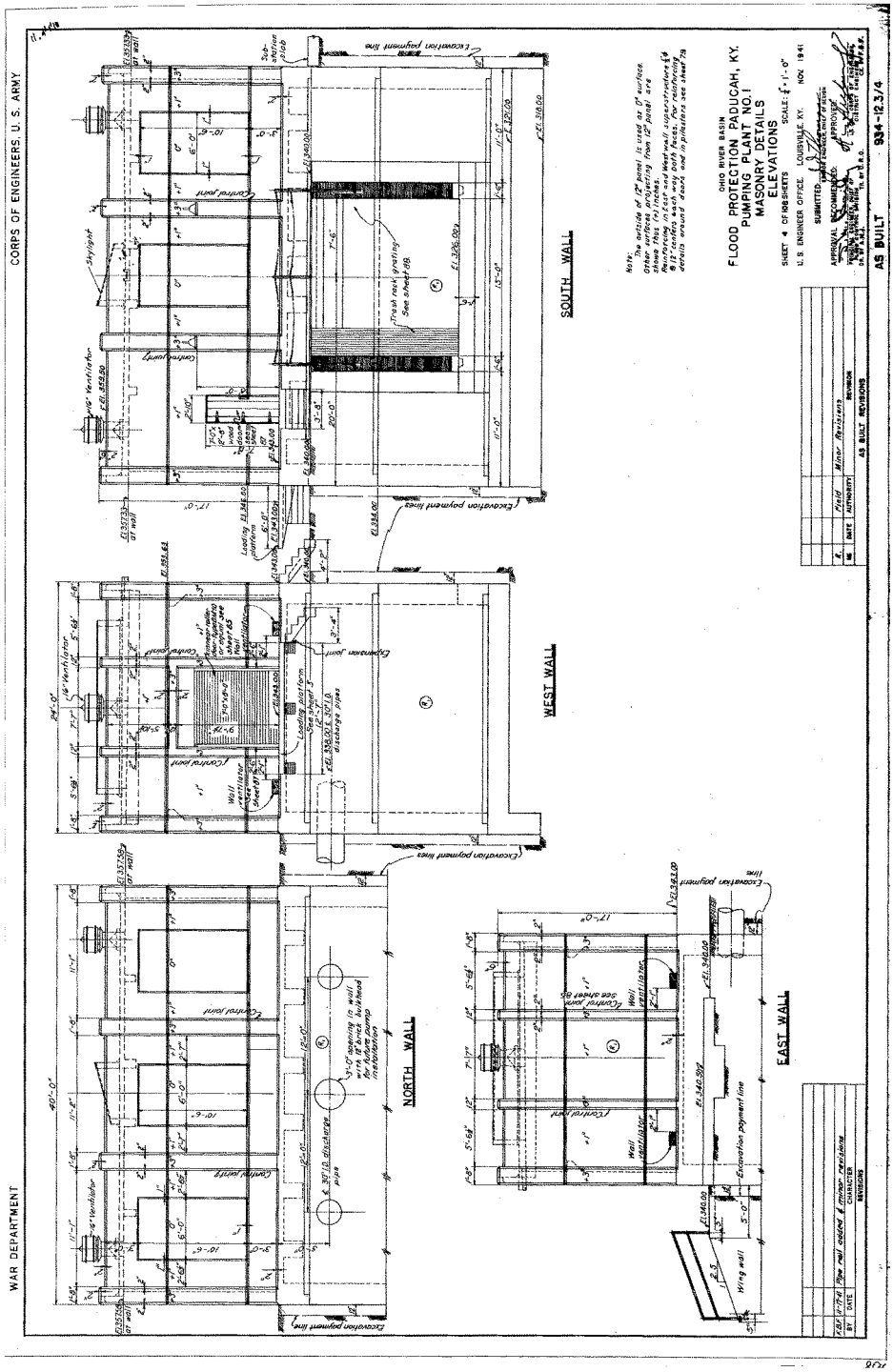
934-82.3/1

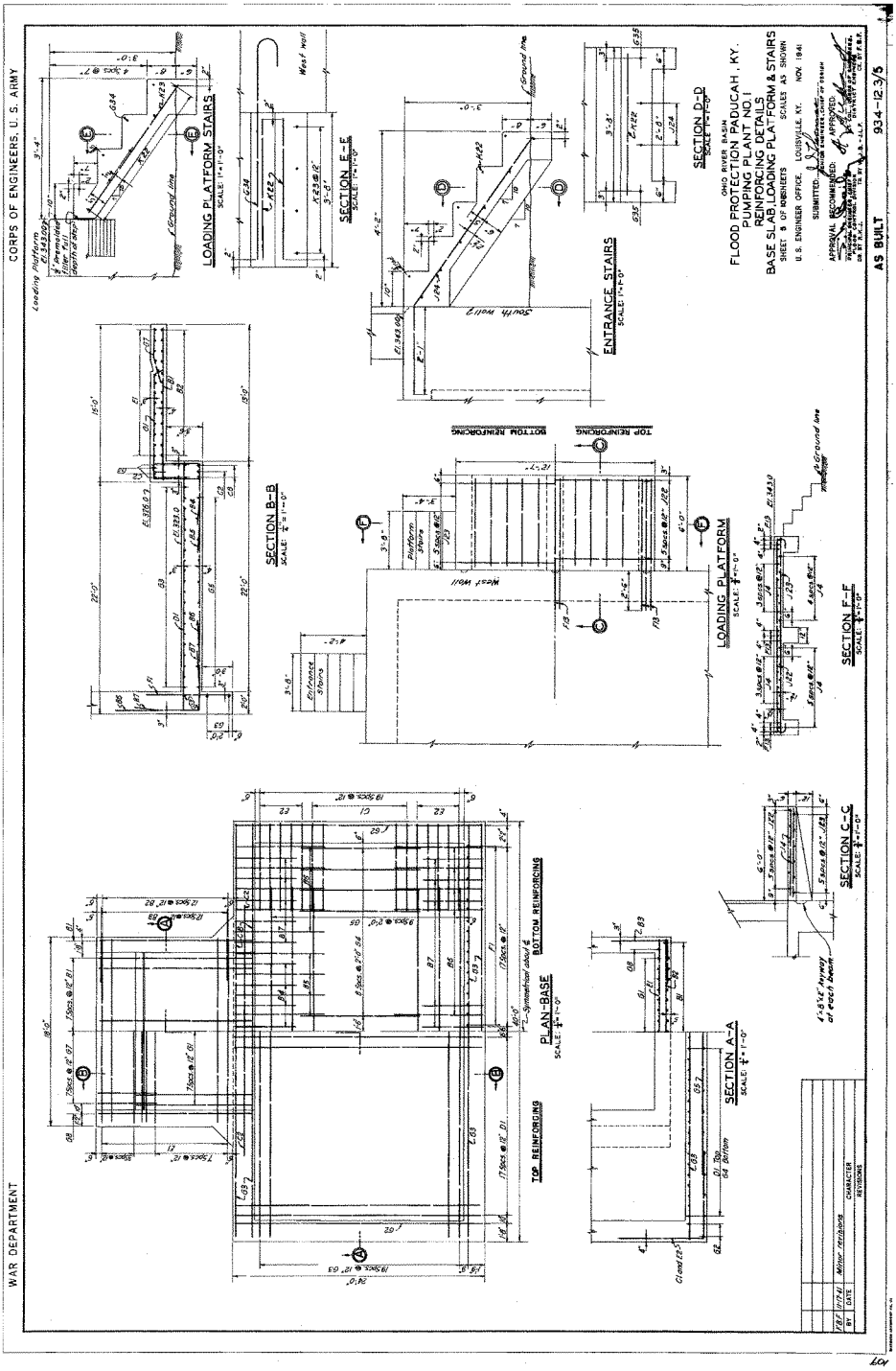
105

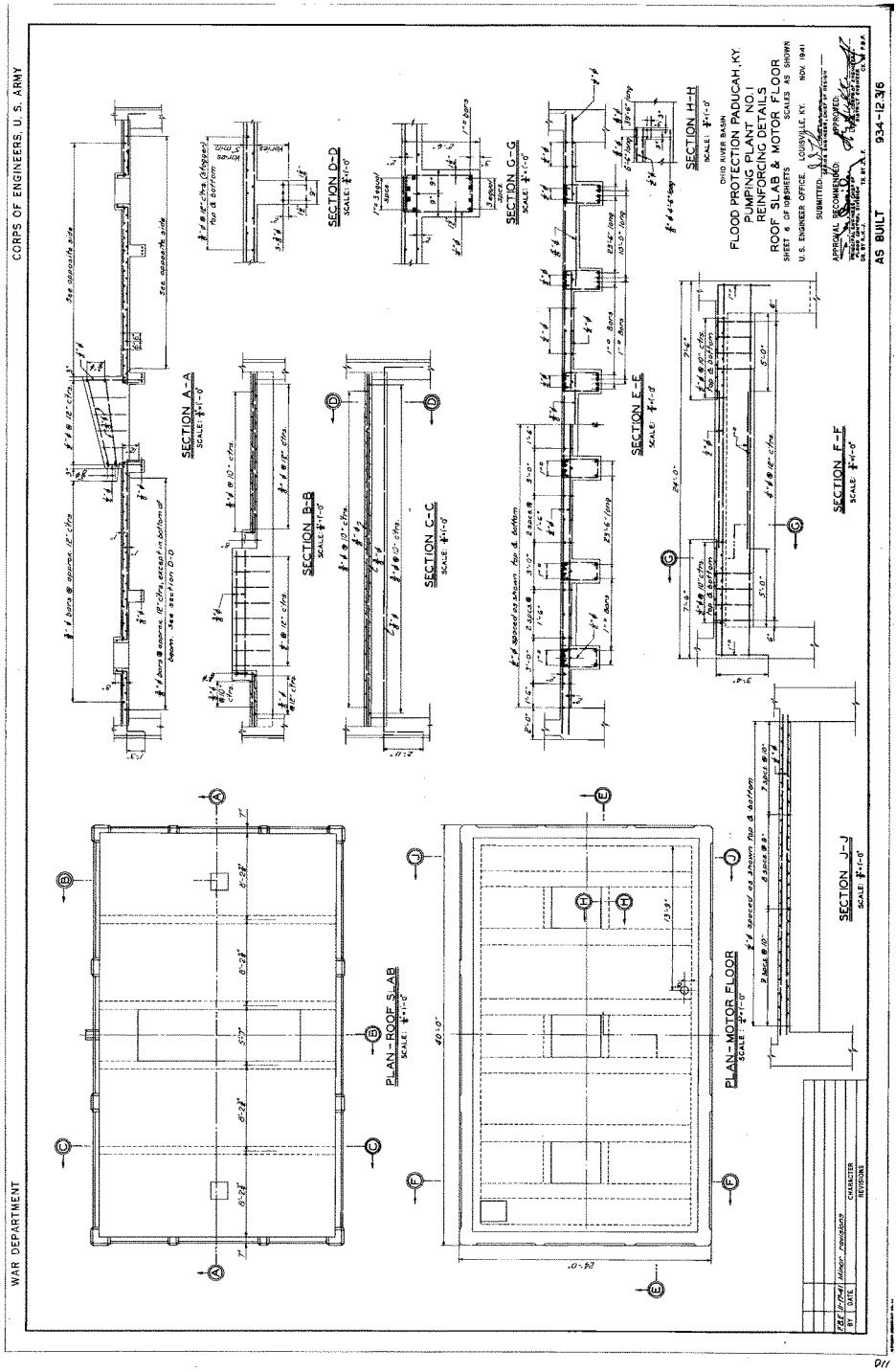
998

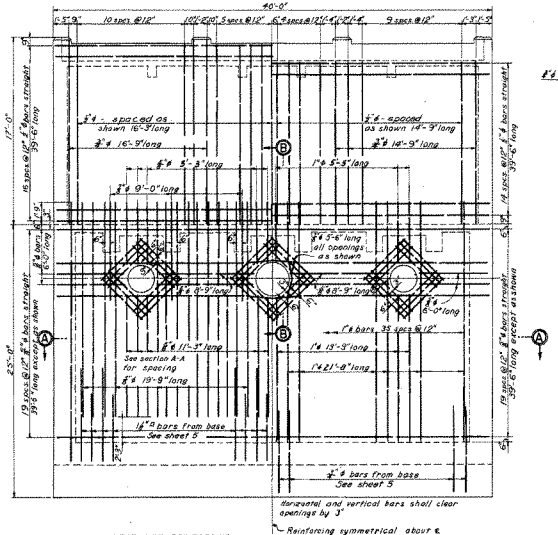

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 1
GENERAL LAYOUT
SHEET 2 OF 108 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
AS BUILT REVISIONS
PLAN
SECTION A-A
BORING SYMBOLS
BORINGS
Pump House
Loading Platform
Trash rack
Walkway
Landside
Riverside
Clay
Silt
Sand
Gravel
Debris
Decayed Wood
Cinders


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 1
MASONRY DETAILS
PLANS & SECTIONS
SHEET 9 OF 10 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED:
APPROVED:
834-12.8
SECTION B-B
SCALE 1/4"=1'-0"
SECTION A-A
SCALE 1/4"=1'-0"
PLAN
SCALE 1/4"=1'-0"
PLAN-ROOF
SCALE 1/4"=1'-0"
AS BUILT REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. I
MASONRY DETAILS
ELEVATIONS
SHEET 4 OF 108 SHEETS
SCALE: 1/4" - 1' - 0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
AS BUILT
334-12.3/4
SOUTH WALL
WEST WALL
NORTH WALL
EAST WALL
AS BUILT REVISIONS
Excavation payment line
Control joint
Wall ventilator
Skylight
Trash rack grating
Expansion joint
Loading platform
Wing wall
Note:
The outside of 12" panel is laid on 8" surface offset with inside of panel to plumb line shown thus (+) inches.
Reinforcing in east and west wall superstructure is #8 bars 12" centers unless otherwise noted.
For reinforcing in roof slabs, beams, columns and details around deck and in pilasters see sheet 75


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 1
REINFORCING DETAILS
BASE SLAB, LOADING PLATFORM & STAIRS
OHIO RIVER BASIN
SHEET 9 OF 40 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
934-123/5
LOADING PLATFORM STAIRS
SECTION E-E
SECTION D-D
ENTRANCE STAIRS
SECTION B-B
LOADING PLATFORM
SECTION F-F
SECTION C-C
PLAN-BASE
TOP REINFORCING
BOTTOM REINFORCING
SECTION A-A
CHARACTER OF REVISIONS
Minor revisions

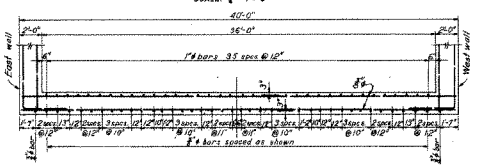

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
SECTION A-A
SCALE: 1/4"=1'-0"
SECTION B-B
SCALE: 1/4"=1'-0"
SECTION C-C
SCALE: 1/4"=1'-0"
SECTION D-D
SCALE: 1/4"=1'-0"
SECTION G-G
SCALE: 1/4"=1'-0"
SECTION E-E
SCALE: 1/4"=1'-0"
SECTION H-H
SCALE: 1/4"=1'-0"
SECTION F-F
SCALE: 1/4"=1'-0"
SECTION J-J
SCALE: 1/4"=1'-0"
PLAN - ROOF SLAB
SCALE: 1/4"=1'-0"
PLAN - MOTOR FLOOR
SCALE: 1/4"=1'-0"
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. I
REINFORCING DETAILS
ROOF SLAB & MOTOR FLOOR
SHEET 6 OF 10 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED:
APPROVED:
AS BUILT
934-12.36



NEAR SIDE REINFORCING FAR SIDE REINFORCING

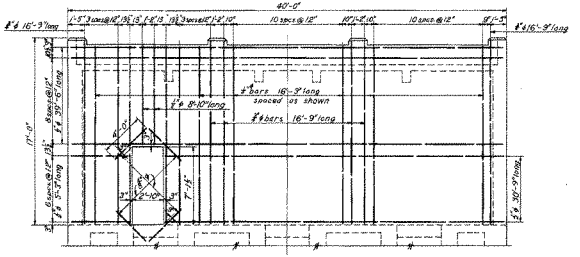
ELEVATION NORTH WALL

SCALE: 1/4" = 1'-0"

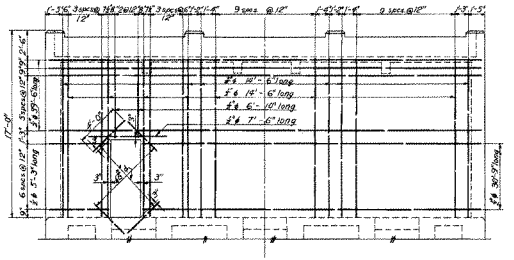


SECTION A-A

SCALE: 1/4" = 1'-0"



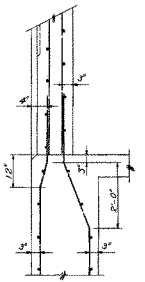
NEAR SIDE REINFORCING



FAR SIDE REINFORCING

SOUTH WALL

SCALE: 1/4" = 1'-0"



For location of Section see sheet 8.

SECTION B-B

SCALE: 1/4" = 1'-0"

Note:
For reinforcing at corners, around door openings and at pilasters see detail sheet 79.
For reinforcing in south wall sub structure see sheet 8.
For masonry details see sheets 384.

F.B.F.	11-17-41	Minor corrections
BY	DATE	CHARACTER OF REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 1
REINFORCING DETAILS
NORTH & SOUTH WALLS

SHEET 7 OF 10 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE. LOUISVILLE, KY. NOV. 1941

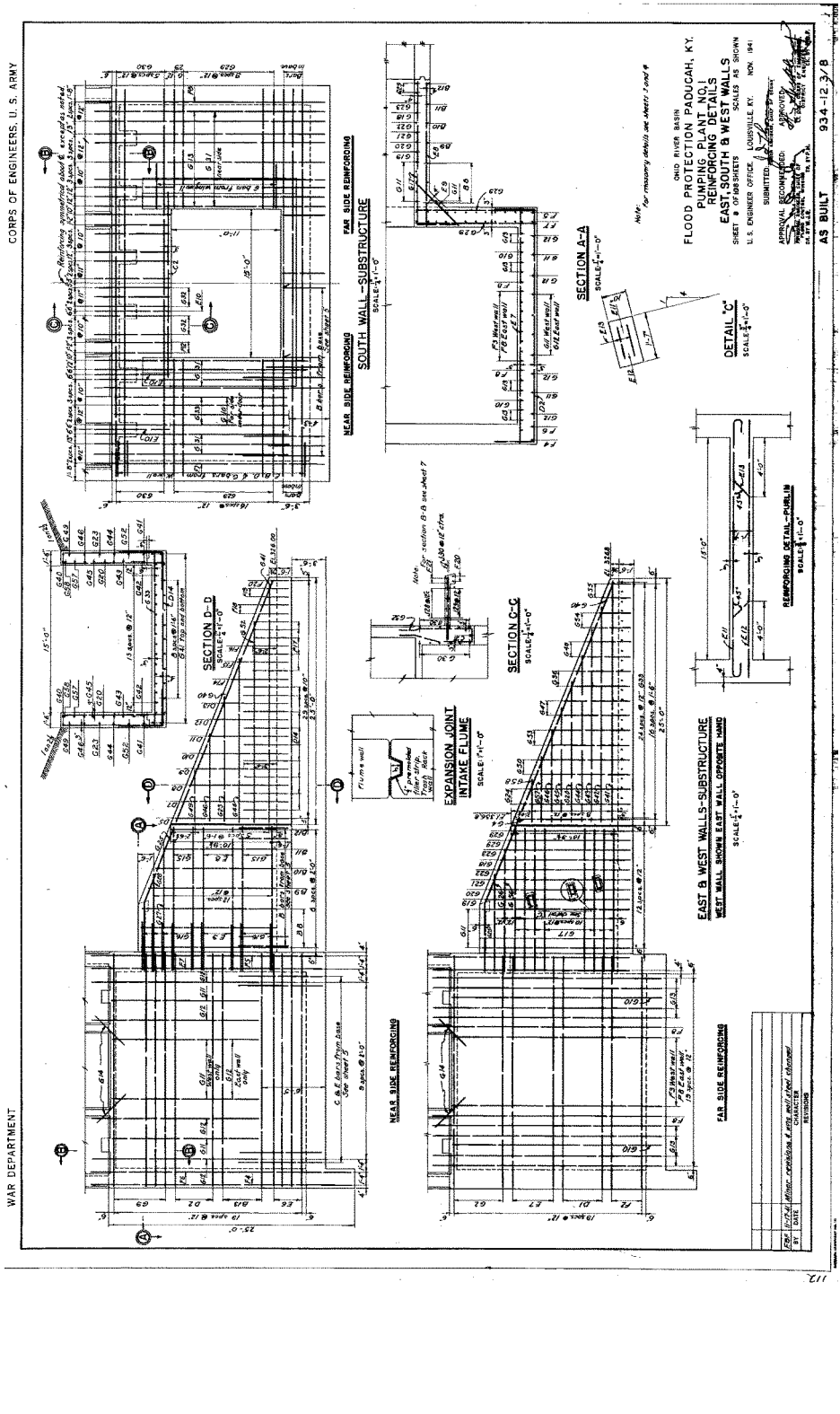
SUBMITTED: DISTRICT ENGINEER, CHIEF OF DIVISION

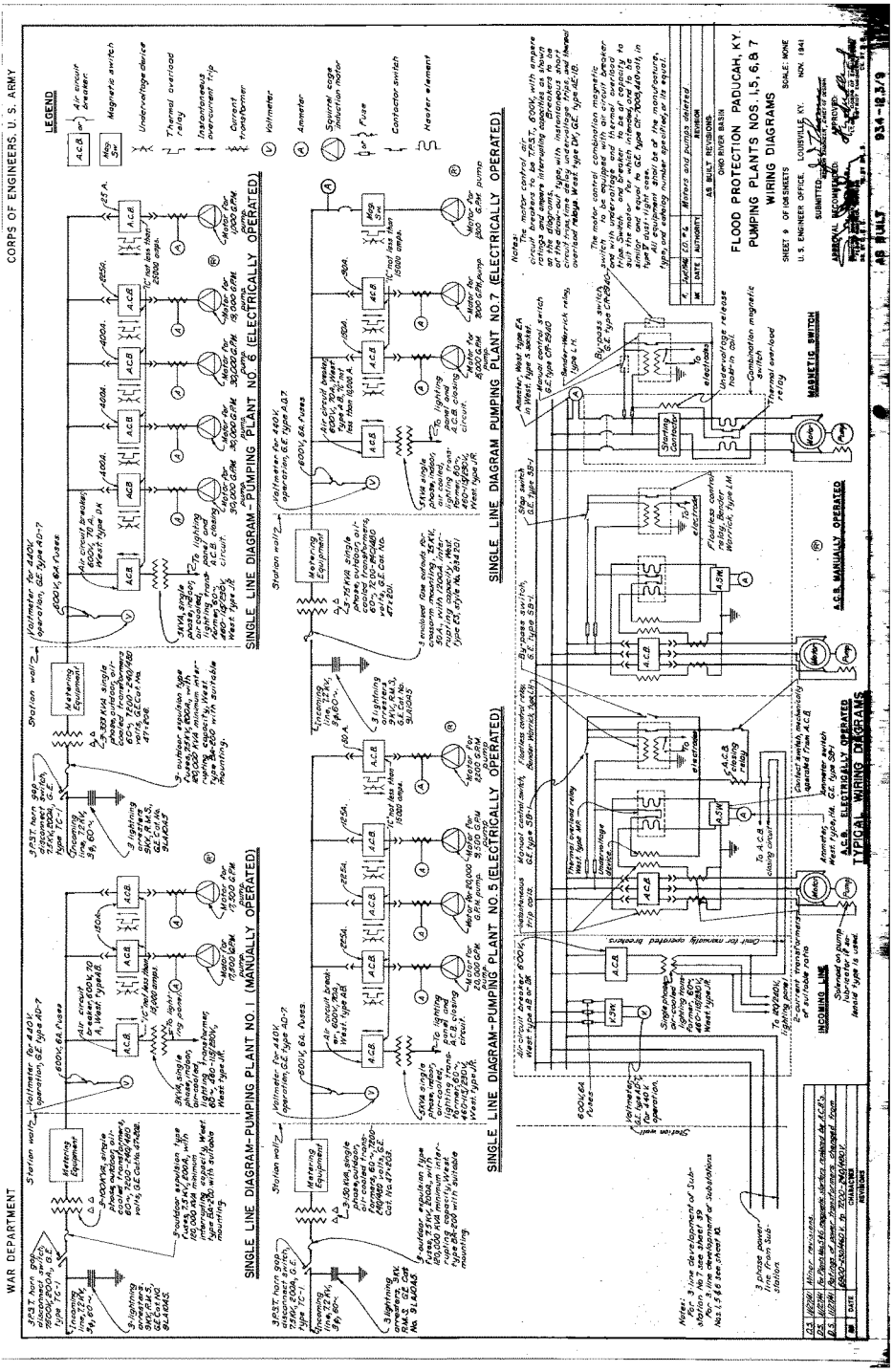
APPROVAL RECOMMENDED: APPROVED:

PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL SECTION DR. BY W.L.B. TR. BY C.P.R.G. LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER CK. BY F.B.K.

AS BUILT 934-12.3/7

872

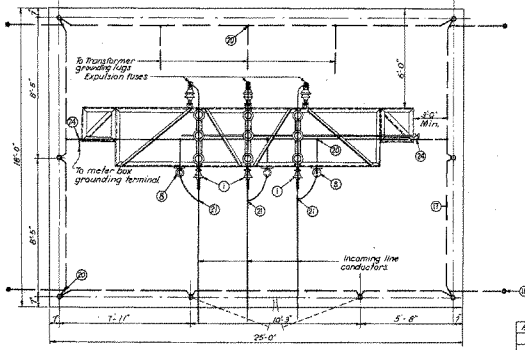

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 1
REINFORCING DETAILS
EAST SOUTH & WEST WALLS
OHIO RIVER BASIN
SCALE AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
AS BUILT
934-12.3/8
SOUTH WALL-SUBSTRUCTURE
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
SECTION A-A
SECTION C-C
SECTION D-D
DETAIL "C"
EXPANSION JOINT INTAKE FLUME
EAST & WEST WALLS-SUBSTRUCTURE
WEST WALL SHOWN EAST WALL OPPOSITE HAND
REINFORCING DETAIL-PURLIN


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
LEGEND
SINGLE LINE DIAGRAM-PUMPING PLANT NO. 1 (MANUALLY OPERATED)
SINGLE LINE DIAGRAM-PUMPING PLANT NO. 6 (ELECTRICALLY OPERATED)
SINGLE LINE DIAGRAM PUMPING PLANT NO. 5 (ELECTRICALLY OPERATED)
SINGLE LINE DIAGRAM PUMPING PLANT NO. 7 (ELECTRICALLY OPERATED)
TYPICAL WIRING DIAGRAMS
A.C.B. MANUALLY OPERATED
A.C.B. ELECTRICALLY OPERATED
MAGNETIC SWITCH
INCOMING LINE
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 1,5,6 & 7
WIRING DIAGRAMS
OHIO RIVER BASIN
AS BUILT REVISIONS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SHEET 9 OF 106 SHEETS
SCALE: NONE
AS BUILT
934-18.3/9

WAR DEPARTMENT

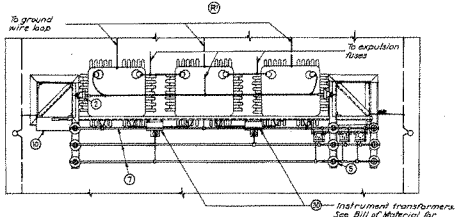
CORPS OF ENGINEERS, U. S. ARMY

Arrangement of gate and fence posts on slab is typical for Pumping Plant No.6. For gate and fence arrangement at Pumping Plants Nos.1 & 5 see sheet 12



PLAN

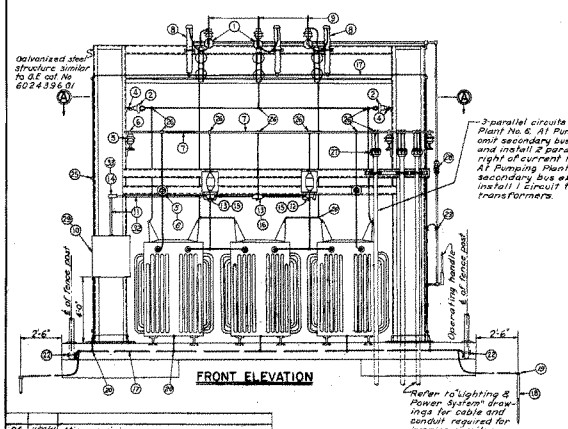
26	T connectors for 1" IPS Main to 350 MCM cable	G.E.	6009481998	3	
26	" " " " " 300 " "	G.E.	6009481991		6
26	" " " " " 500 " "	G.E.	6009421B106		18



SECTION PLAN A-A

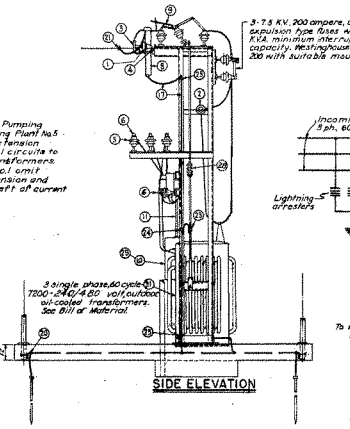
Note
Power connections from transformer secondaries to the 440 volt buses shall be as indicated in the following table.

P.P. No.	Conductors carrying line currents	Conductors carrying phase currents
1	4/0 MCM rubber insulated copper cable	#3/0 rubber insulated copper cable
5	350 " " " " "	250 MCM rubber insulated copper cable
6	1¼" IPS copper tubing (extra heavy)	1" IPS copper tubing

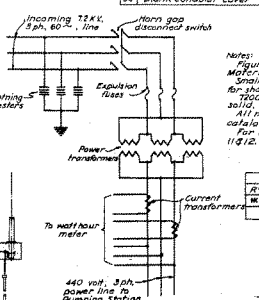


FRONT ELEVATION

Refer to "Lighting & Power System" drawings for cable and conduit required for incoming circuits.



SIDE ELEVATION



WIRING DIAGRAM

Notes:
Figures in circles refer to part numbers on the Bill of Material.
Small electrical fittings, power connectors, etc., not called for shall be furnished as required.
7200 volt buses and connections to be #2/0 bare, solid, copper conductor.
All material shall be of the manufacture, type, and catalog number specified, or its equal.
For substation slab and fence details see sheets 11 & 12.

BILL OF MATERIAL

INST. NO.	DESCRIPTION	MFR.	CATALOG NO.	QUANTITY P.P. No. 1	P.P. No. 5	P.P. No. 6
1	6" strain insulators	Locke	16383	3	3	3
2	6" strain insulators	Locke	18062	2	2	2
3	Strain clamps	Locke	20087	3	3	3
4	Hooks	Locke	2869	5	5	5
5	Insulator units	G.E.	6009410D1	8	8	11
6	Bus supports (clises to suit horizontal buses)	G.E.	6026206	6	6	9
7	Bus supports (clises to suit vertical phase conductors)	G.E.	6026208	2	2	2
	1" IPS copper tubing buses, ea. 13'-1" long			3	3	
	1¼ extra heavy IPS copper tubing buses, ea. 19'-1" long					3
8	Lightning arresters	G.E.	9LA1048	3	3	3
9	3 POST horn gap disconnect switch	G.E.	6003398701	1	1	1
10	Meter box	Superior	PSU-7750	1	1	1
11	1" rigid electrical conduit			15'	15'	15'
12	Conduit outlet Crouse-Hinds		E37	1	1	1
13	Conduit outlet "	"	C37	2	2	2
14	Conduit outlet "	"	LB37	1	1	1
15	3-hole composition cover "	"	3773	2	2	2
16	1-hole composition cover "	"	3771	1	1	1
17	#2/0 bare stranded copper cable			200'	200'	200'
18	Ground rod ¾"x8'	Copperweld		4	4	4
19	Connector for ¾" rod and #2/0 cable	Burndy	GBC6426	4	4	4
20	T connector for #2/0 cable	"	NT2626	12	12	12
21	Disconnecting clamp	G.E.	6021459G1	3	3	3
22	Connector for #2/0 cable and fence posts	Burndy	Type GD	9	9	8
23	Connector for #2/0 cable and 2" pipe	"	GO 1626	1	1	1
24	Connector for #2/0 cable to structural framework	"	GC 2626	2	2	2
25	" " " " " "	"	GB26	6 & 1	6 & 1	6 & 1
26	T connectors for 1" IPS copper tubing (clises to suit)	G.E.	6005421			6
	T connectors for 1" IPS main to cable branch (clises to suit)	"	6005421	5	5	1
	T connections for cable (sizes to suit)	"	6005422	2	2	
	T connectors for #2/0 bare solid copper conductor	"	6005422	5	5	3
27	¾" service entrance fitting Crouse-Hinds		FB63	1	2	
	4" " " " "	"	F1063			4
28	Operating rod insulator	Lapp	6993	1	1	1
29	Watthour meter	G.E.	77 x 811	1	1	1
30	Current transformer, 500/5 A.	"	99 x 812	2		
	" 800/5 A	"	84 x 514		2	
	" 1500/5 A.	"	93 x 607			5
31	Power transformer, 7200-240/480@1000 KVA.	"	47 x 202	3		
	" 7200-240/480 V, 150 KVA.	"	47 x 203		3	
	" 7200-240/480 V, 333 KVA.	"	47 x 206			3
32	#12 insulated copper wire			900'	900'	900' each
33	Blank conduit cover Crouse-Hinds		3770	1	1	1

BY	DATE	CHARACTER	Field Bill of material changed
DS	11/21/41	Minor revisions	
DS	11/21/41	Secondary bus for Plant No.5 changed to 2 circuits	
DS	11/21/41	Phase lead sizes noted	

REVISIONS

MK	DATE	AUTHORITY	REVISION
			AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 1, 5, & 6
SUBSTATION

SHEET 10 OF 108 SHEETS SCALE: ¾"=1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [signature] DISTRICT ENGINEER, CHIEF OF DESIGN

APPROVED: [signature] CHIEF OF ENGINEERS

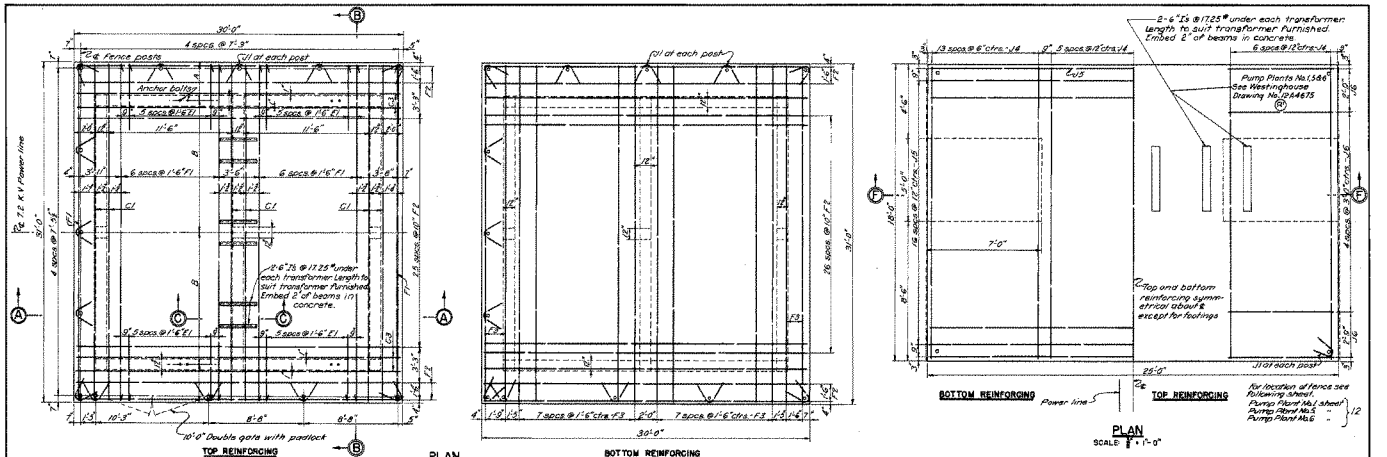
MATERIAL RECOMMENDED: [signature]

AS BUILT 9-3-43 10/3/10

875

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



TRANSFORMER SLAB PUMPING PLANTS NOS. 1, 5 & 6

SCALE: 1/2" = 1'-0"

TRANSFORMER SLAB PUMPING PLANT NO. 2

SCALES AS SHOWN

Note: Dimensions shown thus 'X and B' to be furnished by manufacturer of tower structure. See sheet 10 for location of embedded ground cable, power conduit and lightning arrester stand.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANTS NOS. 1, 2, 5 & 6

MASONRY & REINFORCING DETAILS

SUBSTATION PLATFORMS

SHEET 11 OF 16 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: Chief, Design Section

APPROVAL RECOMMENDED: Project Engineer, Chief, Design Section

APPROVED: Lytle Brown, Colonel, Corps of Engineers, District Engineer

BY	DATE	CHARACTER OF REVISIONS
F.B.E.	11-17-41	T-beams added to plants 1,5 & 6
F.B.E.	11-17-41	Minor revisions & ground line revised

BY	DATE	AUTHORITY	REVISION
		Field	Dimensions and note added.

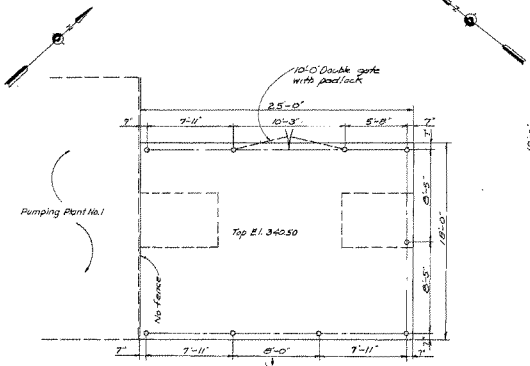
AS BUILT REVISION

AS BUILT

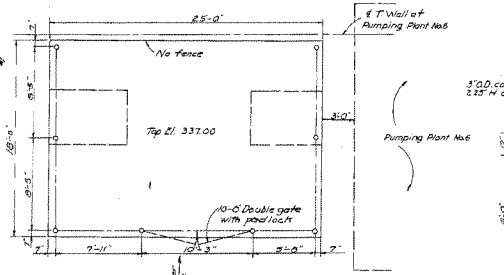
934-12.3/11

WAR DEPARTMENT

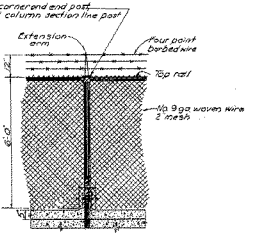
CORPS OF ENGINEERS, U. S. ARMY



PUMPING PLANT NO. 1

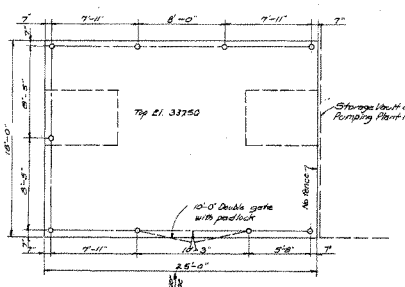


PUMPING PLANT NO. 6

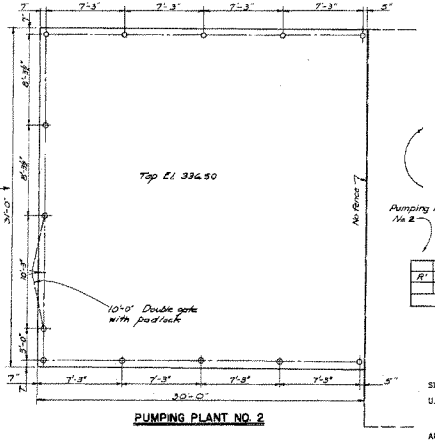


WIRE FENCE DETAIL

SCALE: $\frac{1}{2}$" = 1'-0"



PUMPING PLANT NO. 5



PUMPING PLANT NO. 2

Note:
Corner posts used in all cases, fence not connected to adjacent structures

PLANS

SCALE: $\frac{1}{2}$" = 1'-0"

BY	DATE	CHARACTER
R'	Field	Dimensions changed, gate moved

DIXIE RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANTS NOS. 1,2,5, & 6

SUBSTATION FENCE LOCATIONS

PLANS AND DETAIL

SHEET 12 OF 108 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [signature] DIVISION ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER IN CHARGE OF FLOOD CONTROL DIVISION

APPROVED: [signature] LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER

DR. BY: W.J.B. TR. BY: T.H. CK. BY: C.B.F.

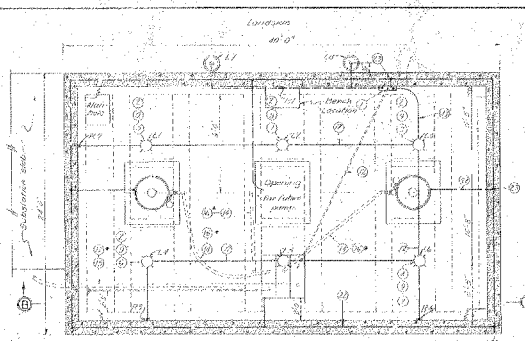
AS BUILT 934-12.3/12

877

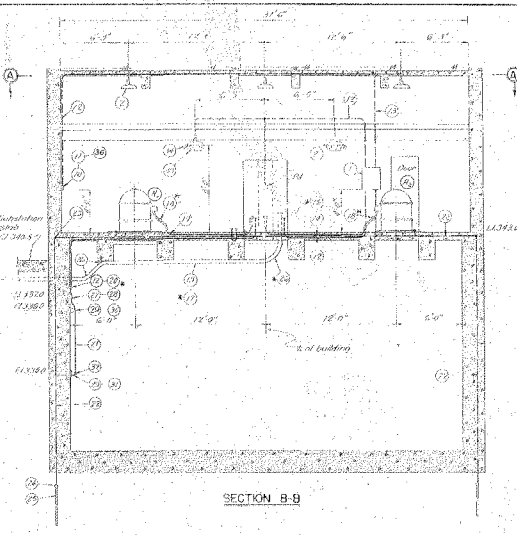
116

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



SECTION A-A



SECTION B-B

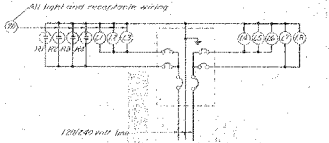
BILL OF MATERIAL

PART NO.	DESCRIPTION	SPECIFICATION NO.	QUAN.
1	4 Circuit light distribution panel (Surface type)		1
2	60 W dome reflector Lunchet	Westf. 3493-13	7
3	Conduit outlet	Crouse Hinds SK 122	1
4	" "	" SK 12	1
5	" "	" SKC 17	1
6	" "	" SKU 2	1
7	" "	" 1451	7
8	" Cover	" 1515	9
9	" "	" SK 164	4
10	" outlet	" 1751	4
11	Duplex plug receptacle		4
12	1" Rigid electrical conduit		200'
13	1" " "		781'
14	1¼" " "		154'
15	2" " "		501'
16*	#2, 7 Xerx cable, R.C.&B.W.M. with 60% rubber jacket		1635'
17*	4/0 MCM Rawhide, R.C.&B.W.M. with 60% rubber jacket		1601'
18	1" Crickson coupling		2
19	1" Standard, 90° elbow		6
20*	#12 Insulated copper wire		3401'
21	#6 A.D. bare solid wire		10'
22	#10 Bare stranded copper wire		1651'
23	T Connector for #00 stranded cable	Penn. M 11676	8
24	Connector for #00 stranded cable to 2" rod	" 845428	4
25	Ground rod, 8' x 5/8" x 5/8" forge	Copper Weld	2
26	Special lamp recess 90° elbow, 2¾" x 4¾" reamed		7
27	Conduit outlet	Crouse Hinds AX 1	1
28	" cover	" 1211	1
29	3 bolt circle type insulator	Locke 13761	3
30	Bus support fitting bolt to channel 4 bars solid wire	Locke 2653	1
31	" " " 6 dia. studrods	" 2033	1
32	Duplex electrode (see part No. 9) sheet		1
33	Wire guard for reflector	Westf. 351497	7
34	Pinplock	" 351494	6
35	3/8" Standard radius 45° elbow	C.O. No. 1	2
36	Wall recess plate		4

(K) * Denotes asterisks deleted.

LEGEND

Embedded conduit
Exposed conduit
Concealed conduit
Ground wire



WIRING DIAGRAM
LIGHTING CIRCUIT

Notes:
Figures in circles refer to part numbers as bill of material.
All material shall be of the manufacture, type and catalog number specified or its equal. All conduit to have openings for pump furnished.
All fittings, conduits, etc. not listed shall be furnished as required.
All conduit in floor shall be placed as near the center of same as possible.
All wall bells shall be furnished and installed in all rooms.

NO.	DATE	AUTHORITY	REVISIONS
1			Future sump opening noted
			AS BUILT REVISIONS

NO.	DATE	AUTHORITY	REVISIONS
4	Feb 37	C.O. # 7	Materials deleted or changed
5	Sept 40	C.O. # 6	Motors deleted.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 1
LIGHTING & POWER SYSTEM

SHEET 13 OF 13 SHEETS SCALE: ¼" = 1'-0"

U. S. ENGINEER OFFICE LOUISVILLE, KY. NOV. 1941

SUBMITTED

APPROVAL RECOMMENDED:

APPROVED:

AS BUILT

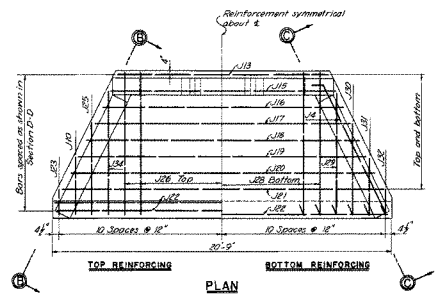
934 13

878

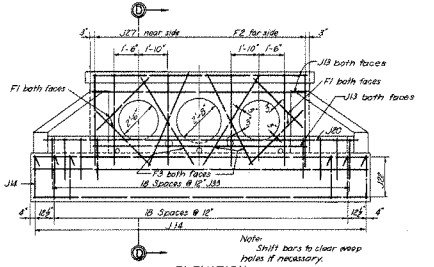
117

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

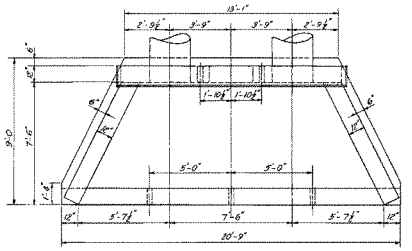


PLAN

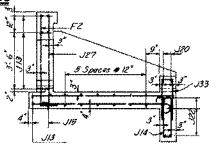


ELEVATION

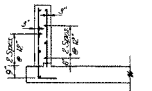
REINFORCING DETAILS



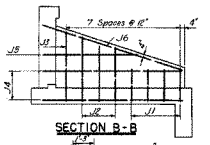
PLAN



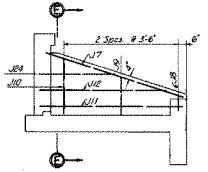
SECTION D-D



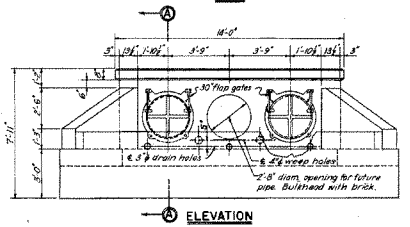
SECTION E-E



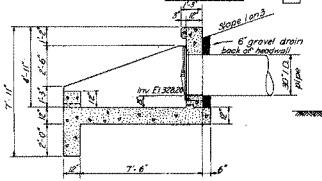
SECTION B-B



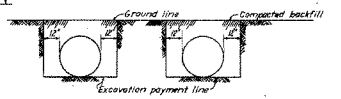
SECTION C-C



ELEVATION



SECTION A-A



EXCAVATION PAYMENT LINES

MASONRY DETAILS

REINFORCEMENT SCHEDULE

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM (DIMENSION GIVEN IN BENDING DIAGRAM a)	WT. EACH	TOTAL WT.
F1	8	5/8 sq.	4'-6"	Straight	6.76	54.1
F2	6	"	6'-6"	5'-0" | 12"	9.76	58.6
F3	8	"	6'-3"	Straight	9.39	75.1
J1	8	5/8 sq.	2'-10"	1'-10" | 12"	1.69	13.1
J2	6	"	4'-1"	3'-1" | 12"	2.73	16.4
J3	2	"	5'-0"	4'-0" | 12"	3.34	6.7
J4	4	"	9'-3"	8'-6" | 5/8 sq.	6.18	24.7
J5	2	"	6'-6"	5'-9" | 5/8 sq.	4.34	8.7
J6	2	"	9'-6"	8'-9" | 5/8 sq.	6.35	12.7
J7	2	"	11'-0"	9'-0" | 5/8 sq.	7.35	14.7
J8	2	"	1'-3"	Straight	0.83	1.7
J9	2	"	2'-3"	"	1.50	3.0
J10	4	"	3'-6"	"	2.34	9.4
J11	2	"	8'-9"	"	5.84	11.7
J12	2	"	8'-0"	"	5.34	10.7
J13	8	"	13'-0"	"	8.65	69.2
J14	21	"	6'-10"	6"	4.56	95.8
J15	2	"	14'-0"	Straight	9.33	18.7
J16	2	"	15'-0"	"	10.02	20.0
J17	2	"	16'-0"	"	10.69	21.4
J18	2	"	17'-0"	"	11.36	22.7
J19	2	"	18'-0"	"	12.02	24.0
J20	4	"	19'-0"	"	12.69	50.8
J21	2	"	20'-0"	"	13.36	26.7
J22	9	"	20'-3"	"	13.55	67.7
J23	2	"	1'-6"	"	1.00	2.0
J24	2	"	4'-10"	"	3.23	6.5
J25	2	"	5'-6"	"	3.67	7.3
J26	13	"	8'-6"	"	5.68	73.8
J27	6	"	6'-0"	5'-6" | 6"	4.01	24.1
J28	18	"	9'-2"	8'-6"	6.12	79.6
J29	2	"	8'-3"	7'-7"	5.51	11.0
J30	2	"	6'-3"	5'-7"	4.17	8.3
J31	2	"	4'-6"	3'-7"	2.84	5.7
J32	2	"	2'-3"	1'-7"	1.50	3.0
J33	19	"	5'-6"	4'-6" | 6"	3.67	69.7
J34	2	"	7'-6"	Straight	5.01	10.0
				TOTAL		1042#

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 1
MASONRY & REINFORCING DETAILS
DISCHARGE HEADWALL

SHEET 14 OF 108 SHEETS SCALE: 1/2" = 1'-0"

U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [signature] DIVISION ENGINEER, CHIEF OF BRANCH

APPROVAL RECOMMENDED: [signature] CHIEF OF DESIGN

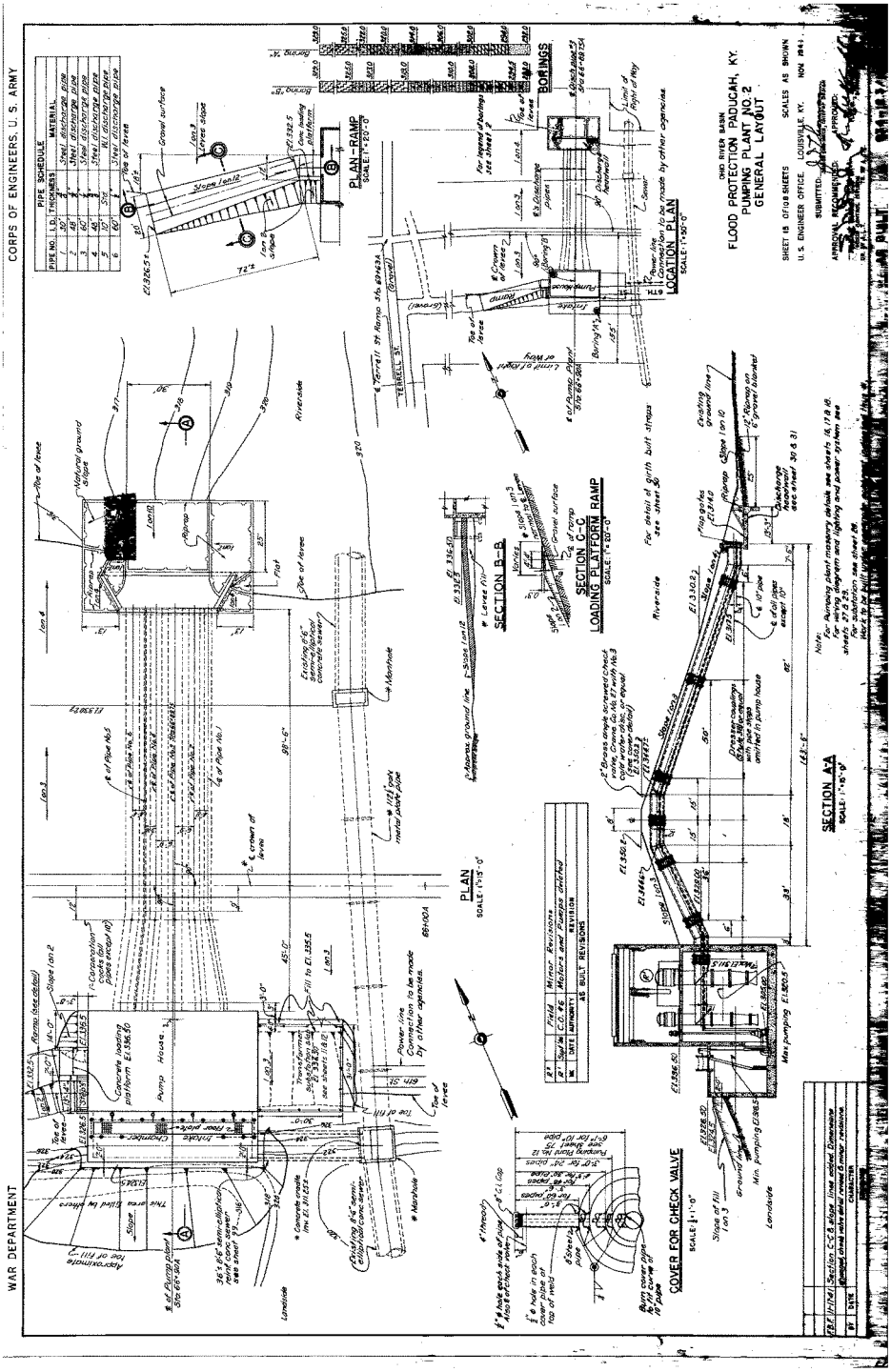
APPROVED: [signature] DISTRICT ENGINEER

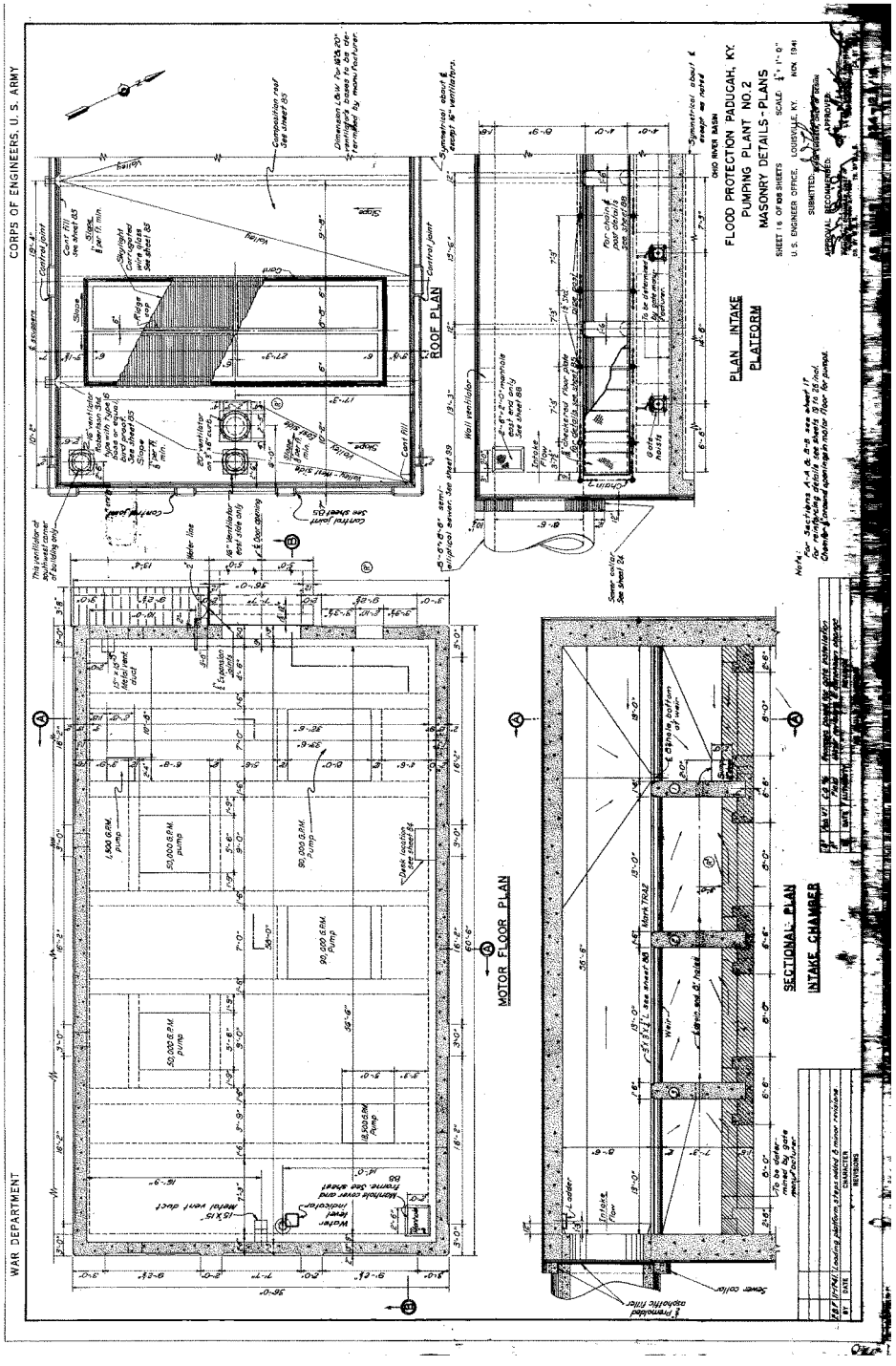
DR. BY C.R.C. TR. BY F.B.E. CK. BY C.E.P.

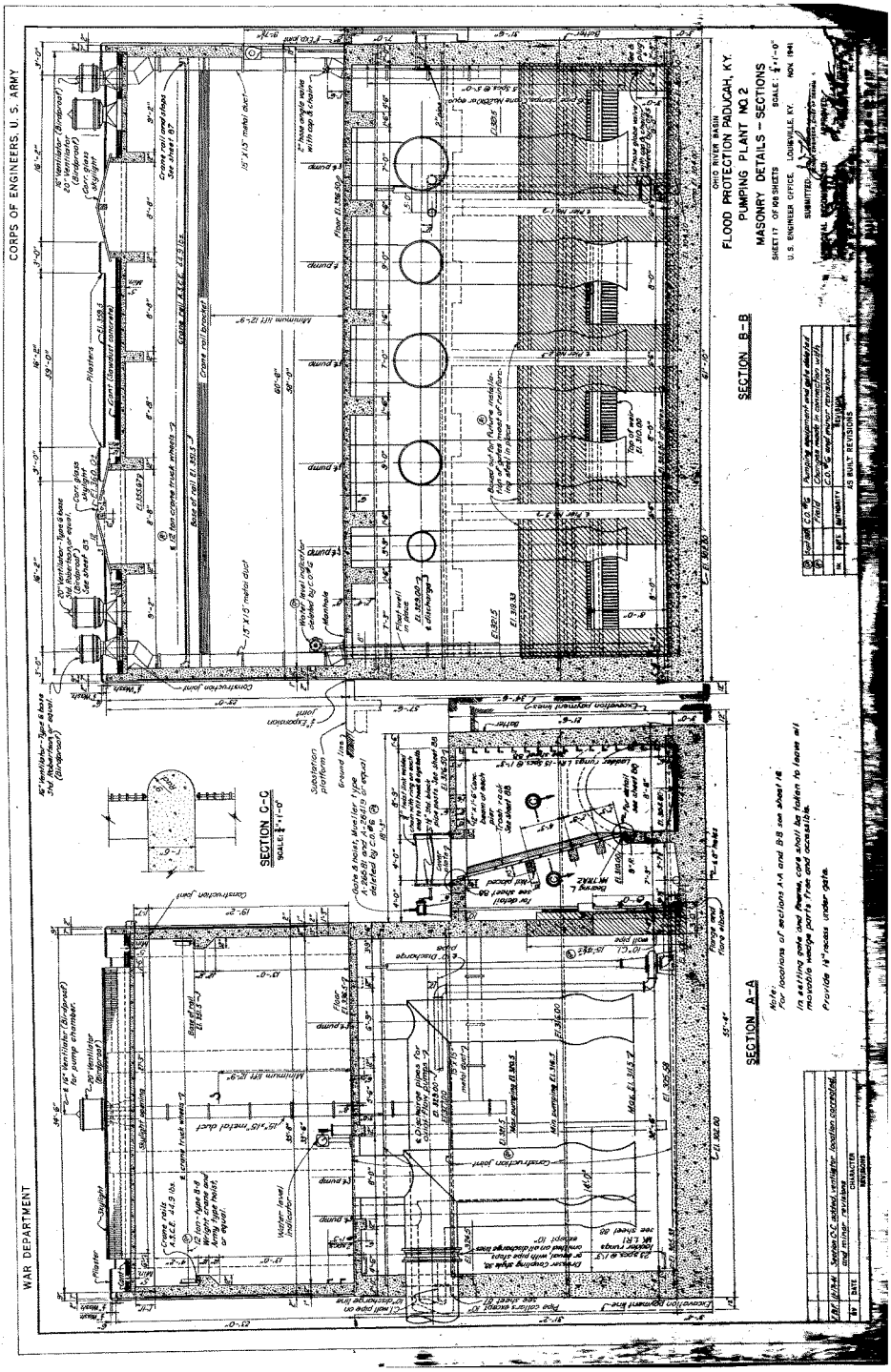
AS BUILT 334-12.3(14)

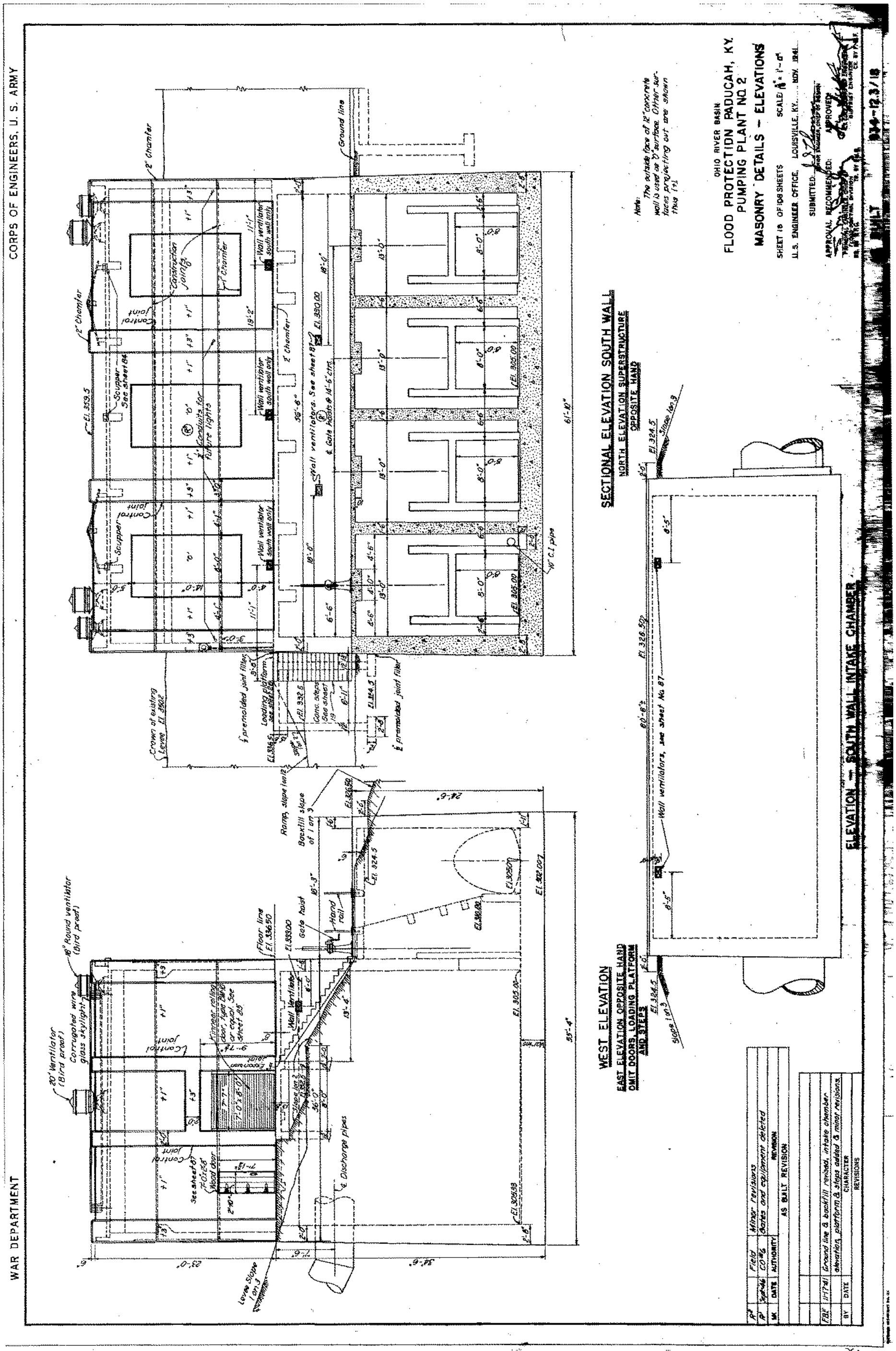
BY	DATE	CHARACTER REVISIONS
F.B.E.	1-12-46	Minor revisions.

879

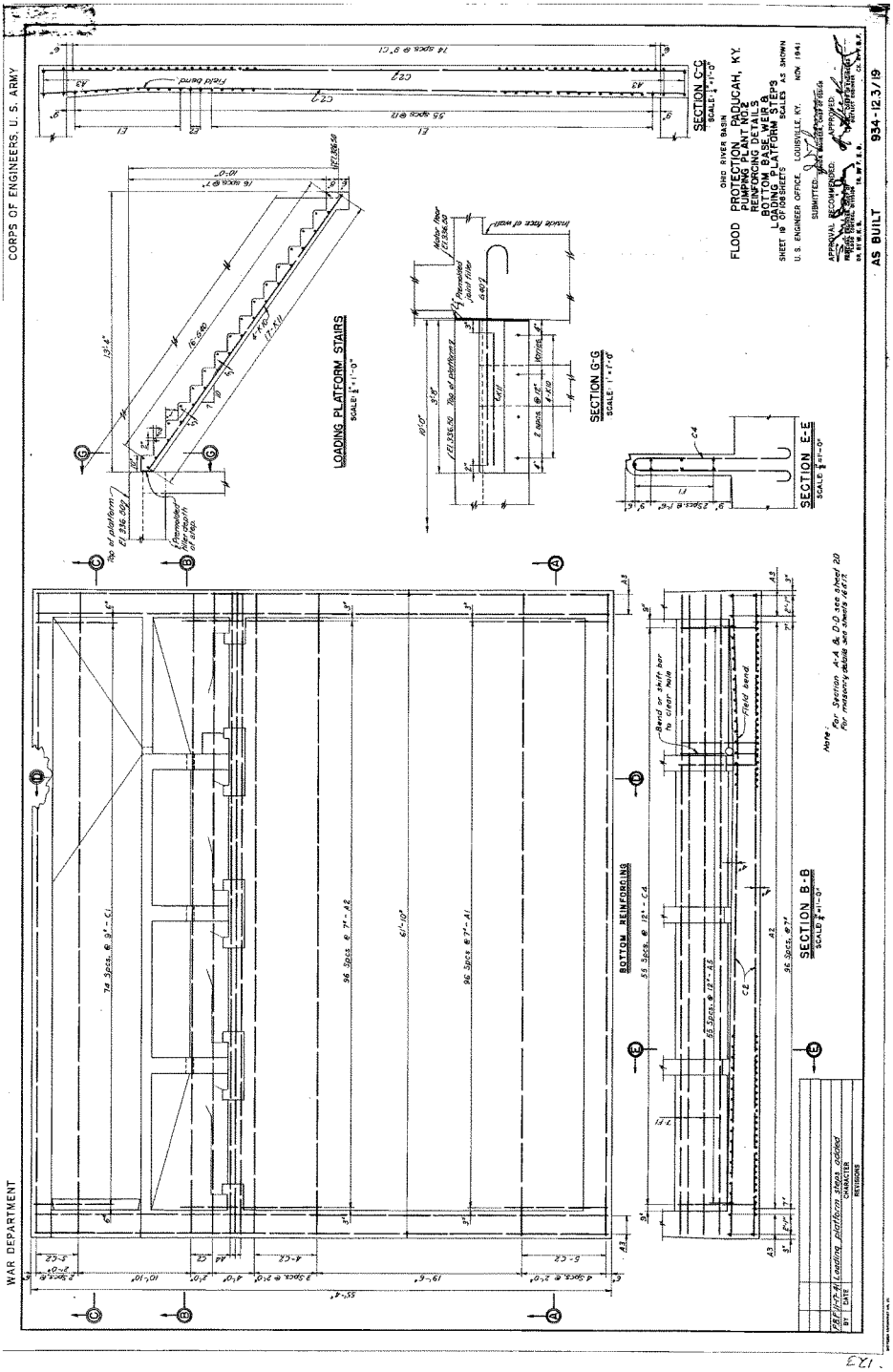

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
GENERAL LAYOUT
PLAN
SECTION A-A
SECTION B-B
SECTION C-C
LOADING PLATFORM RAMP
PLAN-RAMP
LOCATION PLAN
BORINGS
COVER FOR CHECK VALVE
SCALES AS SHOWN
SHEET 18 OF 18 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY.
NOV 1941
SUBMITTED
APPROVED
RECOMMENDED
APPROVED

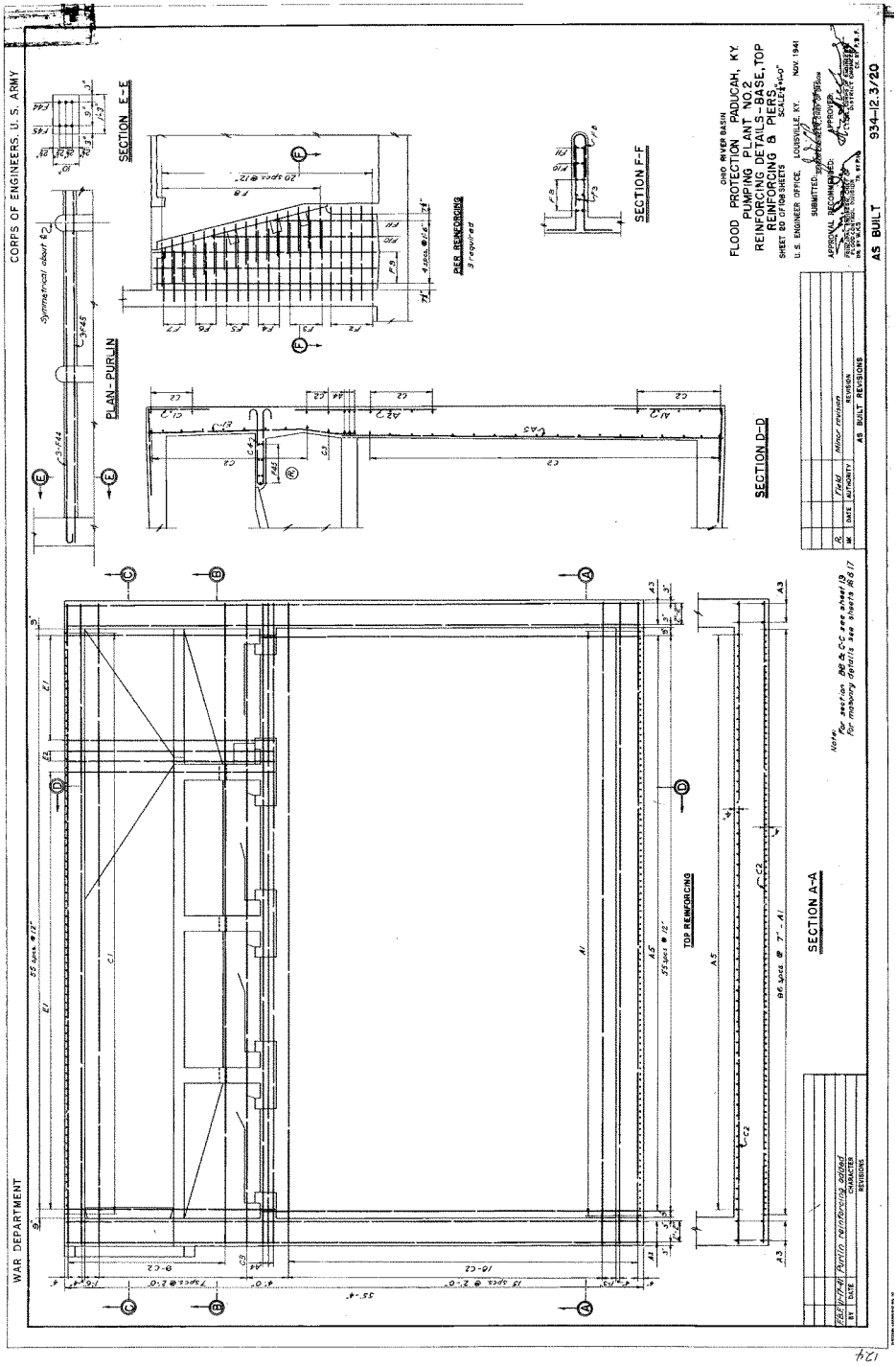

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
MASONRY DETAILS - PLANS
ROOF PLAN
MOTOR FLOOR PLAN
SECTIONAL PLAN
INTAKE CHAMBER
PLAN INTAKE
PLATFORM
SCALE: 1/4" = 1'-0"
SHEET 16 OF 103 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY.
SUBMITTED:
APPROVED:
NOV. 1941

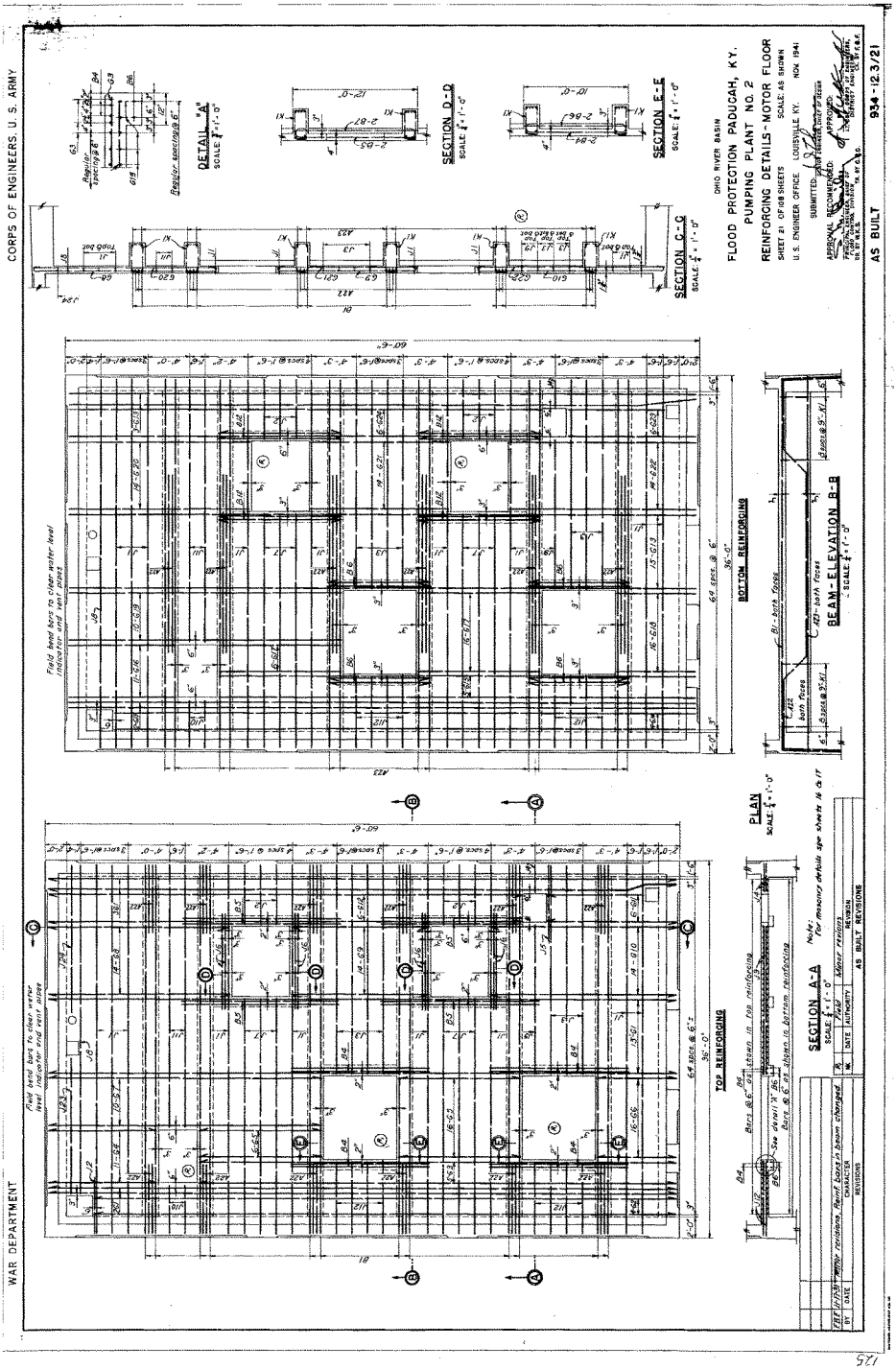

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
MASONRY DETAILS – SECTIONS
SHEET 17 OF 98 SHEETS
SCALE: 1/4"-1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
SECTION B–B
SECTION C–C
SCALE 1/4"=1'-0"
SECTION A–A
Note:
For locations of sections A-A and B-B see sheet 16.
In setting gate and frame, care shall be taken to leave all movable wedge parts free and accessible.
Provide 1/4" recess under gate.
AS BUILT REVISIONS
NO. REF. AUTHORITY DATE CHARACTER OF REVISION
1 Sht 68 C.O. 46 Pumping equipment and gate shelter changed to suit manufacturer's data
2 C.O. 46 and Amdt. Increase
3 Sht 68 C.O. 46 Section C-C added, ventilator location corrected.
BY DATE CHARACTER OF REVISION
REVISIONS

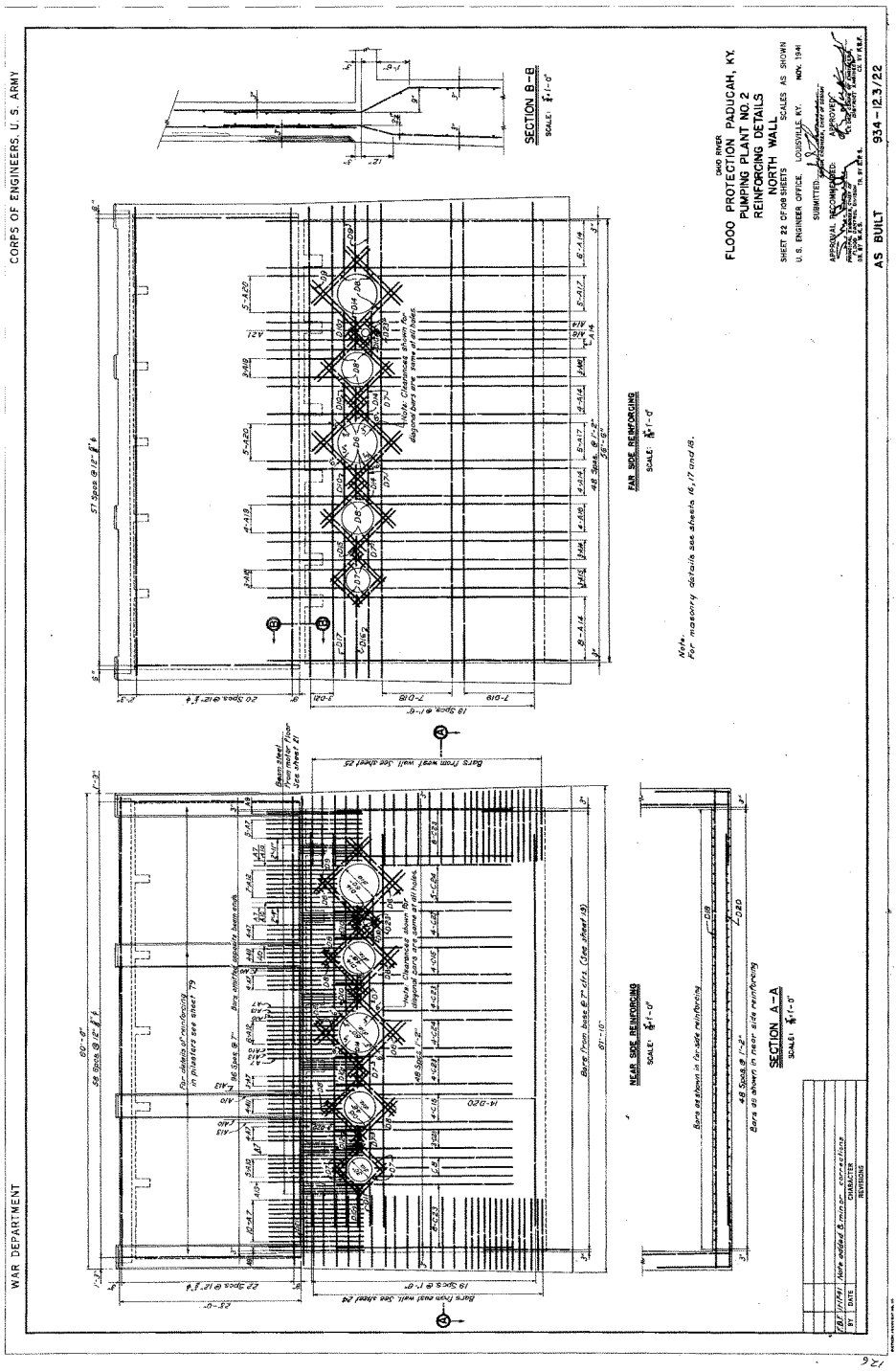

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO 2
MASONRY DETAILS – ELEVATIONS
SHEET 18 OF 108 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
934-12.3/18
Note: The outside face of 12" concrete wall is used as 'O' surface. Other surfaces projecting out are shown thus (+1)
SECTIONAL ELEVATION SOUTH WALL
NORTH ELEVATION SUPERSTRUCTURE OPPOSITE HAND
WEST ELEVATION
EAST ELEVATION OPPOSITE HAND OMIT DOORS, LOADING PLATFORM AND STEPS
ELEVATION – SOUTH WALL INTAKE CHAMBER
Wall ventilators, see sheet No 87
El. 326.50
El. 324.5
Slope 1 on 3
Minor revisions
Gates and equipment deleted
AS BUILT REVISION
Ground line & backfill revised, intake chamber elevation, platform & steps added & minor revisions.
REVISIONS

122


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION, PADUCAH, KY.
PUMPING PLANT NO. 2
REINFORCING DETAILS
BOTTOM SLAB &
LOADING PLATFORM STEPS
SHEET 19 OF 108 SHEETS
SCALES AS SHOWN
NOV 1941
U.S. ENGINEER OFFICE, LOUISVILLE, KY.
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
934-12.3/19
LOADING PLATFORM STAIRS
SCALE 1"=1'-0"
SECTION C-C
SECTION G-G
SECTION E-E
SECTION B-B
BOTTOM REINFORCING
Note: For Section A-A & D-D see sheet 20
For retaining walls see sheets 6 & 7.
Bend or shift bar to clear hole
Field bend
Top of platform El 336.50
Intermediate step-depth of steps
Inside face of wall
Top of platform
Construction joint
Expansion joint filler
Field bend
74 Spcs. @ 8'-C1
96 Spcs. @ 7'-A2
96 Spcs. @ 7'-A1
61'-10"
55 Spcs. @ 12'-C4
65 Spcs. @ 12'-A3
4 Spcs. @ 2'-0"
3 Spcs. @ 2'-0"
4 Spcs. @ 2'-0"
19'-6"
55'-4"
10'-10"
Patch at loading platform steps added
BY DATE REVISIONS

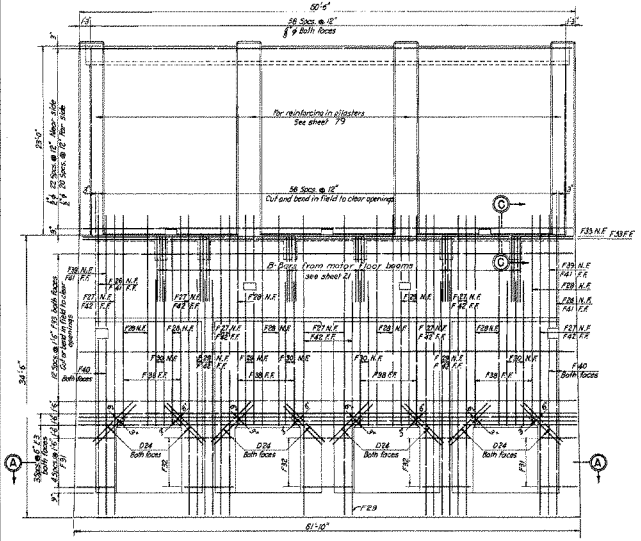

CORPS OF ENGINEERS, U.S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO.2
REINFORCING DETAILS AT BASE, TOP
REINFORCING & PIERS
SHEET 80 OF 108 SHEETS
SCALE 1/4"=1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
AS BUILT
934-12.3/20
SECTION A-A
SECTION D-D
SECTION E-E
SECTION F-F
PLAN-PURLIN
PIER REINFORCING
TOP REINFORCING
Symmetrical about ℄
AS BUILT REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
REINFORCING DETAILS - MOTOR FLOOR
SHEET 21 OF 108 SHEETS
SCALE: AS SHOWN
U.S. ENGINEER OFFICE LOUISVILLE KY. NOV. 1941
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
934-12.3/21
DETAIL "A"
SECTION D-D
SECTION E-E
SECTION C-C
PLAN
SECTION A-A
BEAM-ELEVATION B-B
TOP REINFORCING
BOTTOM REINFORCING
Field bend bars to clear water level indicator and vent pipes
Note: For masonry details see sheets 16 & 17
Motor revisions
AS BUILT REVISIONS
Beam B-B changed.
REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
REINFORCING DETAILS
NORTH WALL
SHEET 22 OF 108 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
APPROVED AND RECOMMENDED
AS BUILT
934-12.3/22
SECTION A-A
SCALE: 1/4"-1'-0"
SECTION B-B
SCALE: 1/4"-1'-0"
NEAR SIDE REINFORCING
SCALE: 1/4"-1'-0"
FAR SIDE REINFORCING
SCALE: 1/4"-1'-0"
Note: Clearances shown for diagonal bars are same at all holes.
For details of reinforcing in pilasters see sheet 79
Bars from east wall see sheet 24
Bars from west wall see sheet 23
Bars as shown in far side reinforcing
Bars as shown in near side reinforcing
For masonry details see sheets 16, 17 and 18.
REVISIONS
CHARACTER
DATE
BY

WAR DEPARTMENT

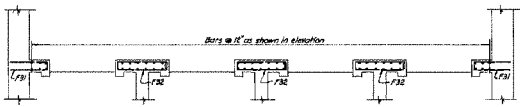
CORPS OF ENGINEERS, U. S. ARMY



SOUTH WALL

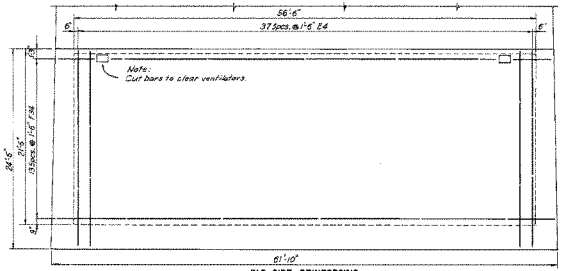
SCALE: 1/8" = 1'-0"

Note:
N.F. designates near side.
F.F. designates far side.



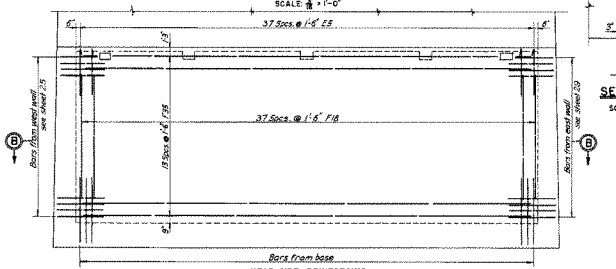
SECTION A-A

SCALE: 1/8" = 1'-0"



FAR SIDE REINFORCING

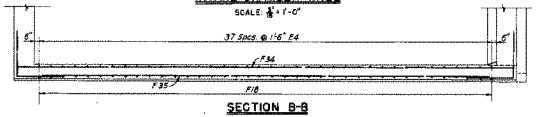
SCALE: 1/8" = 1'-0"



NEAR SIDE REINFORCING

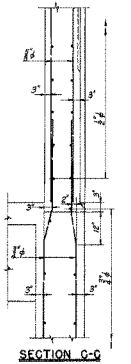
INTAKE CHAMBER WALL

SCALE: 1/8" = 1'-0"



SECTION B-B

SCALE: 1/8" = 1'-0"



SECTION C-C

SCALE: 1" = 1'-0"

Note:
For masonry details, see sheets 16, 17 & 18.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 2

REINFORCING DETAILS

SOUTH WALL & INTAKE CHAMBER WALL.

SHEET 28 OF 108 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [signature] CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER CHIEF OF FLOOD CONTROL DIVISION OK BY: W.E.S

APPROVED: [signature] LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER OK BY: F.B.F.

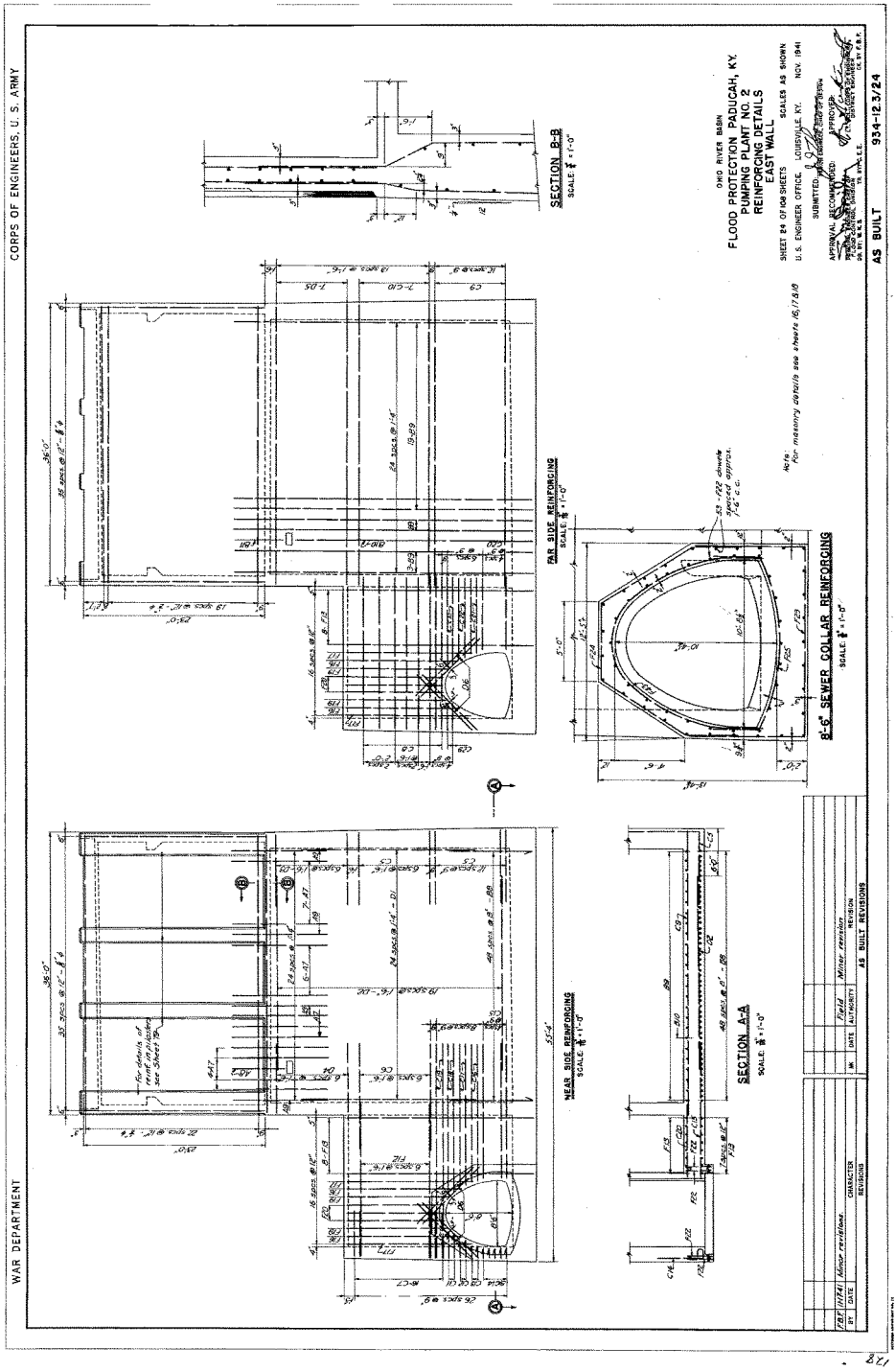
BY	DATE	CHARACTER REVISIONS
F.B.F.	11-17-41	Minor revisions.

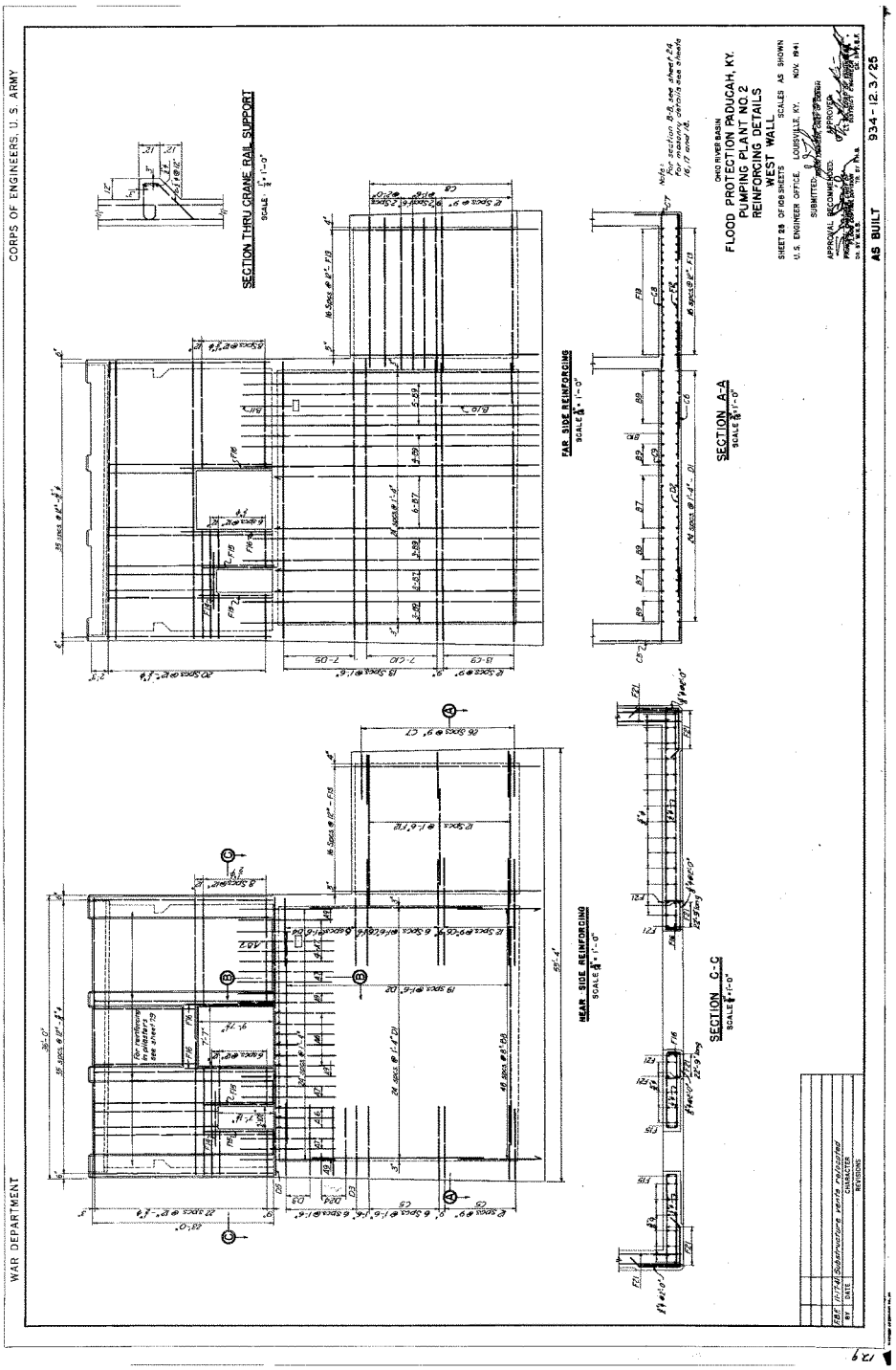
AS BUILT

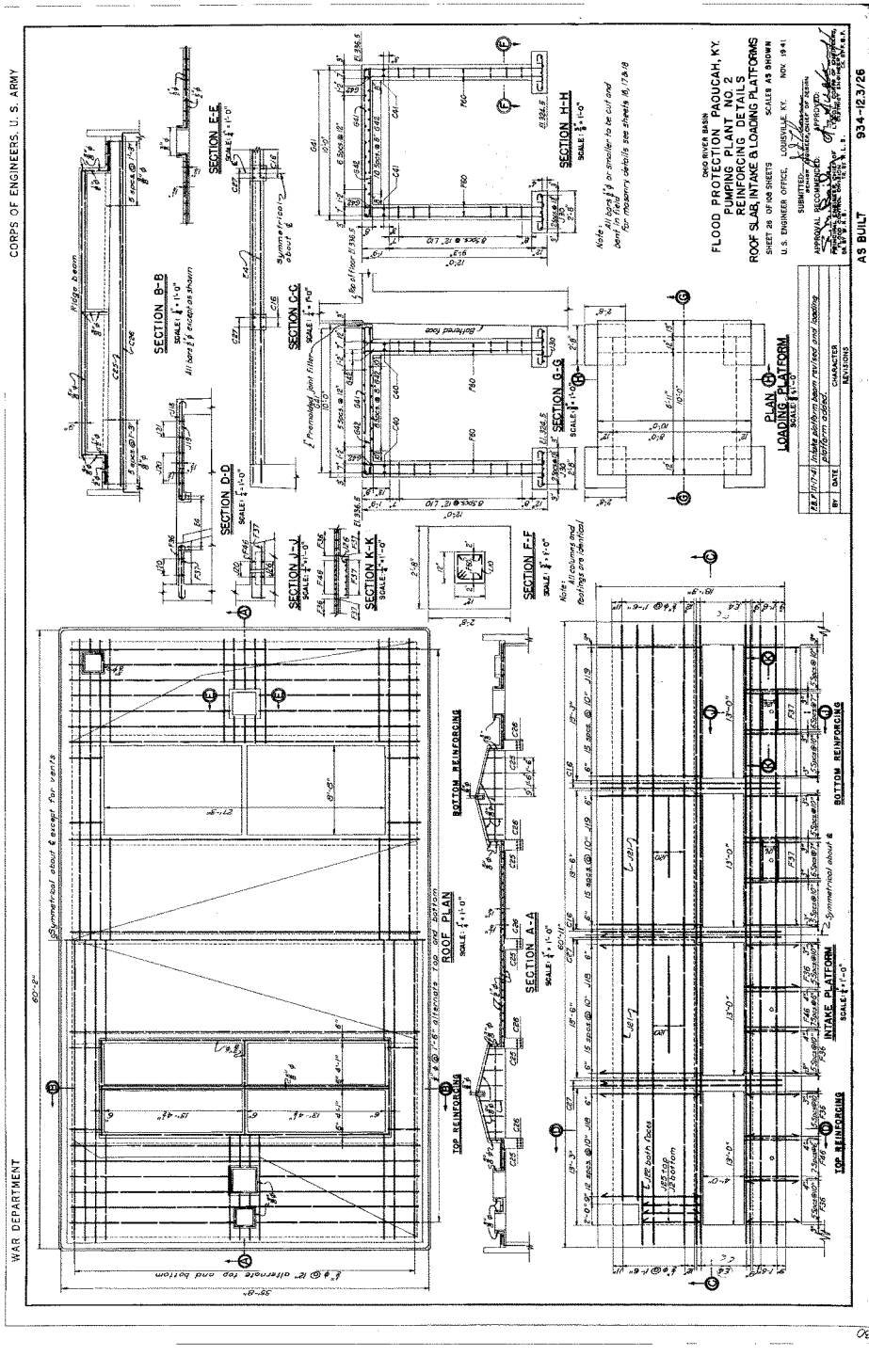
934-123/23

888

12.7

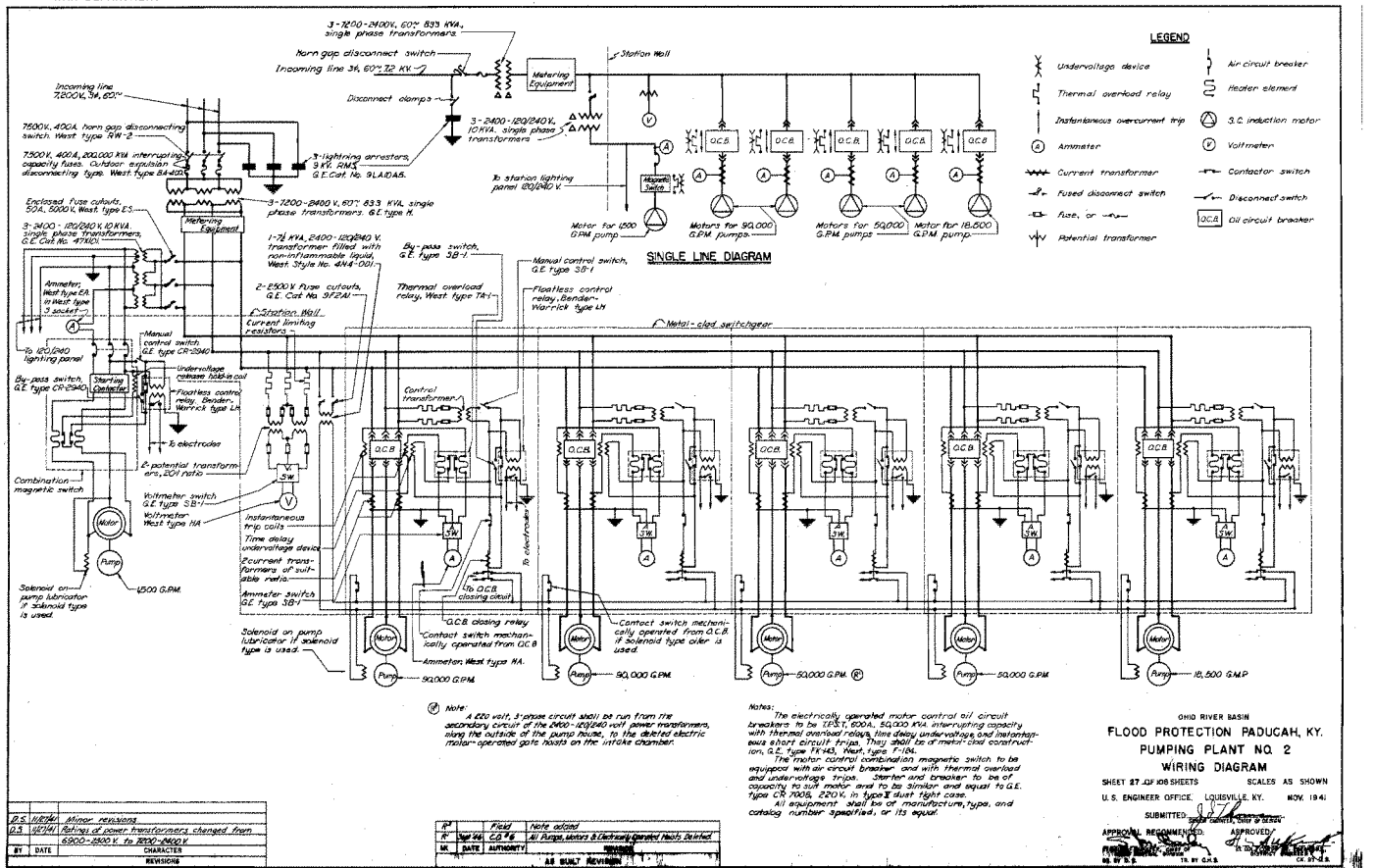

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
REINFORCING DETAILS
EAST WALL
SHEET 24 OF 108 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED:
APPROVED:
AS BUILT
934-12.3/24
SECTION B-B
SCALE 3/4" = 1'-0"
FAR SIDE REINFORCING
SCALE 3/4" = 1'-0"
8'-6" SEWER COLLAR REINFORCING
SCALE 3/4" = 1'-0"
NEAR SIDE REINFORCING
SCALE 3/4" = 1'-0"
SECTION A-A
SCALE 3/4" = 1'-0"
Note: For masonry details see sheets 16, 17 & 18
For details of roof openings see Sheet 19
FEB 1944 Minor revisions
BY DATE CHARACTER OF REVISIONS
JMK DATE AUTHORITY
Field Minor revision
#3 BUILT REVISIONS


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
SECTION THRU CRANE RAIL SUPPORT
SCALE 1/2" = 1'-0"
FAR SIDE REINFORCING
SCALE 1/8" = 1'-0"
NEAR SIDE REINFORCING
SCALE 1/8" = 1'-0"
SECTION A-A
SCALE 1/8" = 1'-0"
SECTION C-C
SCALE 1/8" = 1'-0"
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
REINFORCING DETAILS
WEST WALL
SHEET 28 OF 108 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY.
SCALES AS SHOWN
NOV. 1941
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
PROJECTING ENGINEER
CHIEF OF ENGINEERS
DIVISION ENGINEER
AS BUILT
934 - 12.3/25
REVISIONS
NO. DATE
Subscribe vers. reinforcing
12-31-41


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
REINFORCING DETAILS
ROOF SLAB, INTAKE & LOADING PLATFORMS
SHEET 28 OF 108 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV 1941
SUBMITTED:
APPROVED:
AS BUILT
934-12.3/26
ROOF PLAN
SECTION A-A
INTAKE PLATFORM
LOADING PLATFORM
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F
SECTION G-G
SECTION H-H
SECTION J-J
SECTION K-K
TOP REINFORCING
BOTTOM REINFORCING

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



(R) Note: A 220 volt, 3-phase circuit shall be run from the secondary circuit of the 2400-120/240 volt power transformers, along the outside of the pump house, to the deleted electric motor-operated gate hoists on the intake chamber.

Notes: The electrically operated motor control oil circuit breakers to be 15 KV., 600 A., 50,000 KVA. interrupting capacity with thermal overload relays, time delay undervoltage, and instantaneous short circuit trips. They shall be of metal-clad construction, G.E. type FK-143, West. type F-184.

The motor control combination magnetic switch to be equipped with air circuit breaker and with thermal overload and undervoltage trips. Starter and breaker to be of capacity to suit motor and to be similar and equal to G.E. Type CR 7003, 220 V., in type 2 dust tight case.

All equipment shall be of manufacture, type, and catalog number specified, or its equal.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 2

WIRING DIAGRAM

SHEET 27 OF 108 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED:

APPROVAL RECOMMENDED: APPROVED:

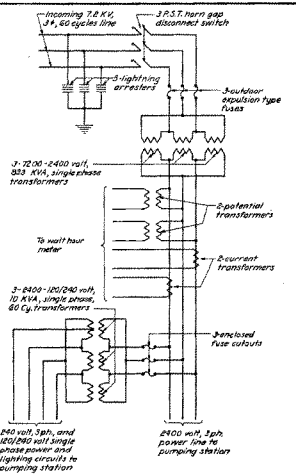
BY	DATE	REVISIONS
D.S.	11/27/41	Minor revisions
D.S.	12/1/41	Ratings of power transformers changed from 6900-2400 V. to 7200-2400 V.

BY	DATE	AUTHORITY	Field Note added
W.	Sept 26, 42	C.O. 9 &	All Pumps, Motors & Electrically Operated Heads Deleted

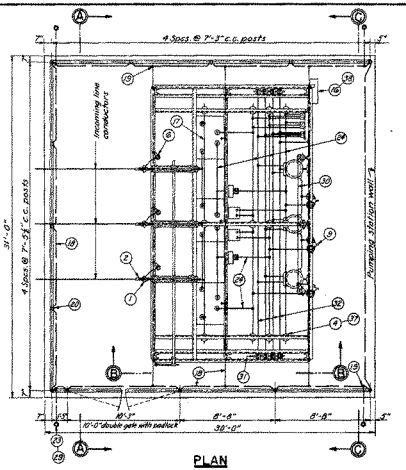
AS BUILT REVISIONS

AS BUILT

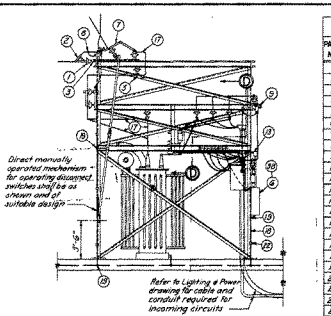
934-12.3/27



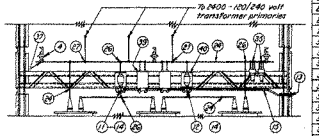
WIRING DIAGRAM



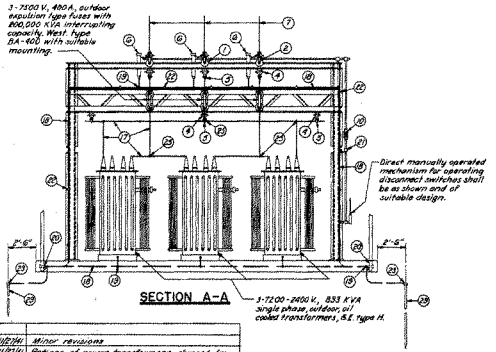
PLAN



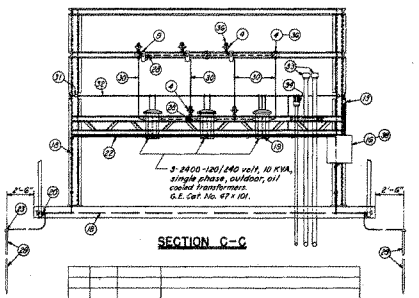
SECTION B-B



SECTION D-D



SECTION A-A



SECTION C-C

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUANTITY
1	6" strain insulators	Locke	16383	3
2	Strain clamps	Locke	12926	3
3	Hooks	Locke	2563	3
4	Insulator units	G.E.	600839(P)	23
5	Bus supports	G.E.	6026206(I)	6
6	Lightning arresters	G.E.	SLA10A5	3
7	3 P.S.T. horn gap disconnect switch, 7100 V, 400A	West.	Type RW-2	1
8	Disconnecting clamp	G.E.	602A5962	3
9	Enclosed fuse cutouts, 5000 V, 30 A.	West.	Type ES	3
10	Operating rod insulator	Lapp	6383	1
11	Condulet outlet	Crouse-Hinds	LB7	1
12	Condulet outlet	Crouse-Hinds	LB7	3
13	Condulet outlet	Crouse-Hinds	LB7	2
14	2-hole composition cover	Crouse-Hinds	3772	4
15	1" rigid electrical conduit			30'±
16	Meter box	Superior	PSU-2730	1
17	½" Std. iron pipe size copper tubing			100'±
18	#10 bare stranded copper cable			350'±
19	"T" connector for #2/0 stranded cable	Burndy	HT2626	21/2
20	Connector for #1/0 cable and fence posts	Burndy	Type GT	12
21	Connector for #2/0 cable and 1¼" pipe	Burndy	GD1824	1
22	Connector for #2/0 cable to structural framework	Burndy	GB26	838
23	Connector for #2/0 cable to ½" ground rod	Burndy	GRE426	4
24	1" Std. iron pipe size copper tubing			110'±
25	"T" connector for 1" iron pipe size copper tubing	G.E.	600342(G)	5
26	"T" connector for 1" iron pipe size copper tubing	G.E.	600342(B)	6
27	"T" connector for 1" iron pipe size tubing to #2/0 solid wire	G.E.	600342(G)	3
28	"T" connector for #2/0 bare copper wire	G.E.	600342(D)	3
29	Ground rod, ¾" x 8'	Cooperweld		4
30	#2/0 hard drawn bare copper wire			70'±
31	Secondary rack	Joslyn	J1170	2
32	#6 AWG bare solid copper wire			125'±
33	3" service entrance fitting	Crouse-Hinds	F963	3
34	1" service entrance fitting	Crouse-Hinds	F394	1
35	"T" connector for 1" iron pipe size tubing to 350 MCM cable	G.E.	600342(B)	9
36	Bus supports	G.E.	6026206(I)	8
37	Bus supports	G.E.	6026206(B)	9
38	Watthour meter	G.E.	77 I 305	1
39	Potential transformer	G.E.	70 V 182	2
40	Current transformer, 1000/5A	G.E.	94 X 518	2

(R)

Notes:
Figures in circles refer to part numbers on the bill of material.
All material shall be of the manufacture, type and catalog number specified, or its equal.
Small fittings, electric power connectors, wire, etc., not called for, shall be furnished as required.
(R) A 220 volt, 3 phase circuit shall be run from the secondary circuit of the 2400 - 120/240 volt power transformer, along the outside of the pumphouse to the electric motor-operated gate hoists on the intake chamber. The circuit shall be provided with suitable outlets for connections to the hoists motors.

BY	DATE	CHARACTER
D.S.	11/27/41	Minor revisions
D.S.	11/27/41	Ratings of power transformers changed from 6900-2300 V. to 7200-2400 V.

REVISIONS

MK	DATE	AUTHORITY	REVISION
A		Field	Bill of material changed, note added

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 2

SUBSTATION

SHEET 28 OF 108 SHEETS SCALE: ¼"-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [signature] DIVISION ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF SOILS SECTION, DESIGN DR. 91 C.E.D.

APPROVED: [signature] LT. COLONEL, CORPS OF ENGINEERS DISTRICT ENGINEER

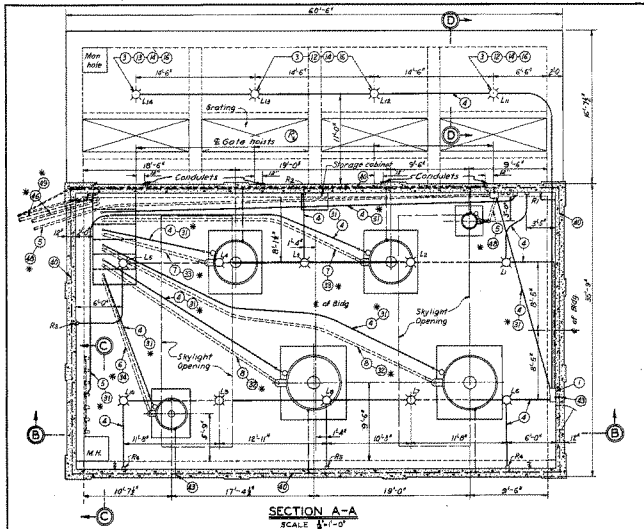
TR. BY H.M.L. CK. BY D.S.

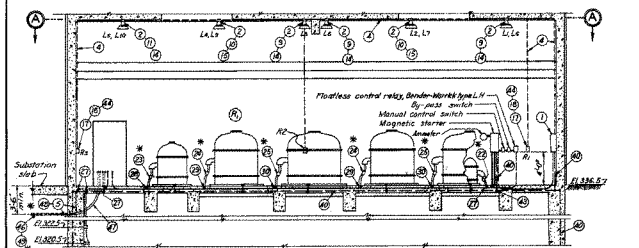
AS BUILT 934-12.3/28

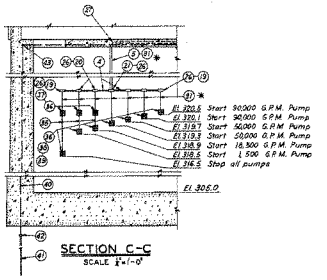
893

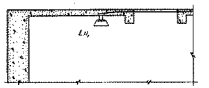
WAR DEPARTMENT

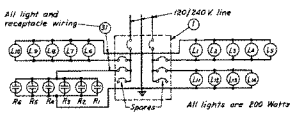
CORPS OF ENGINEERS, U. S. ARMY











WIRING DIAGRAM, LIGHTING CIRCUITS

LEGEND

Embedded Conduit
Exposed Conduit
Ground Wire

Notes:

Figures in circles refer to Part Nos. in Bill of Material

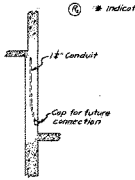
All material shall be of the manufacture, type, and catalog number specified or its equal.

All conduit to clear opening for pump removal.

Small fittings, conduiets, etc., not listed shall be furnished as required.

All conduit in floor shall be placed as near the center of same as possible.

200 watt bulbs shall be furnished and installed in all lights



BILL OF MATERIAL

PART NO.	DESCRIPTION	MFR.	CAT. & CO. NO.	QUANTITY
1	Line distribution panel (surface type) 125/250 V. 6 circuit			1
2	R.L.M. dome reflector and socket	West.	349 S 78	10
3	Vaporite conduilet with reflector and socket	Crouse-Hinds	VMDA1959	4
4	3/4" rigid electrical conduit			700'±
5	1" " " "			105'±
6	1¼" " " "			23'±
7	1½" " " "			62'±
8	2" " " "			85'±
9	Conduilet outlet	Crouse-Hinds	SKT 12	4
10	" " "	" "	GT67	4
11	" " "	" "	SKL 12	2
12	" " "	" "	SKC-12	3
13	" " "	" "	SK-12	1
14	Conduilet cover	" "	SK-84	10
15	" "	" "	H-816	4
16	Cover gasket	" "	Gask 208	4
17	Conduilet outlet	" "	FS1	6
18	Duplex plug receptacle			6
19	Conduilet outlet	Crouse-Hinds	E17	2
20	" " "	" "	C17	4
21	" " "	" "	TB187	1
22*	1" Erickson coupling			1
23*	¾" " "			1
24*	1¼" " "			2
25*	2" " "			2
26	Conduilet cover	Crouse-Hinds	1771	7
27	1" Standard 90° elbow			4
28	1¼" " " "			2
29	1½" " " "			4
30	2" " " "			4
31*	#12 AWG insulated copper wire			1820'±
32*	#3C, 1 cond. cable, RC, 3000 V. ins with 60% rubber jacket			260'±
33*	#2, 1 " " " " " " "			195'±
34*	#6, 1 " " " " " " "			75'±
35	#6, H.D. bare copper wire			10'±
36	3" bolt circle type insulators	Lapp	13761	10
37	Bus support fitting, drill to clamp #6 bare solid wire	Locke	9863	3
38	Bus support fitting, drill to clamp ¾" electrode	"	9853	1
39	Electrode (See Part No. 25 sheet)			1
40	#2/0 bare copper stranded cable			410'±
41	¾"x 8' copperweld ground rod			4
42	Connector for #2/0 ground cable to ¾" x rod	Burndy	GA 6426	4
43	"H" connector for #2/0 ground cable	"	HT 3826	13
44	Duplex surface plates			6
45				
46	3½" rigid electrical conduit			85'±
47	Special long radius 90° elbow, 3½" x 42" radius	G.E.		6
48*	#3, 4 W.G. 1 cond. cable, RC 6001 V. ins with 60% rubber jacket			235'±
49*	350 MCM, 1 cond. cable, RC, 3000 V. ins with 60% rubber jacket			170'±
27A	Spec. long rad. 90° Elbow 1" x 12" rad.			4
	8 Weatherproof 200 W. R.L.M. lights with guard & chain. Connect lights to spare circuits in lighting distribution on panel.			

(R) * Indicates items deleted

D.S.	6/8/41	Ammeter added to magnetic starters	
BY	DATE	CHARACTER	REVISIONS

R3	Feb 47	C.O. #7	Materials deleted & minor changes
R2	Sept 46	C.O. #6	Pumps & motors deleted
BK	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 2

LIGHTING & POWER SYSTEMS

SHEET #9 OF 108 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE LOUISVILLE, KY. NOV. 1941

SUBMITTED: [signature] DIVISION ENGINEER, CHIEF OF DESIGN

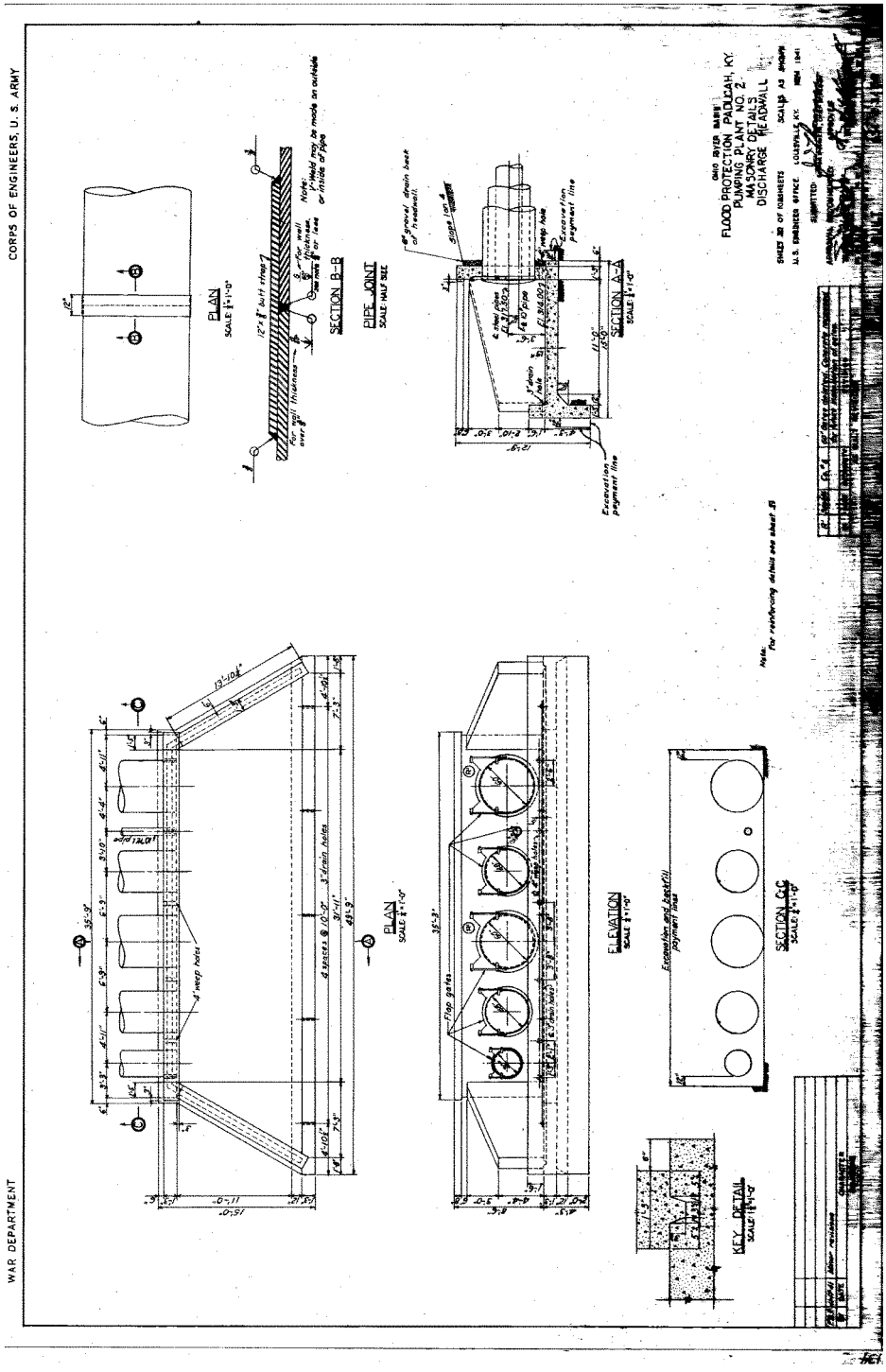
APPROVAL RECOMMENDED: [signature] CHIEF, DESIGN BRANCH, CHIEF, GENERAL CONSTRUCTION SECTION, LOUISVILLE DISTRICT

APPROVED: [signature] CHIEF, CORPS OF ENGINEERS, U.S. ARMY, PRESIDENT, MISSISSIPPI RIVER COMMISSION

TR. BY U.S.E. TR. BY U.S.E. CK. BY U.S.E.

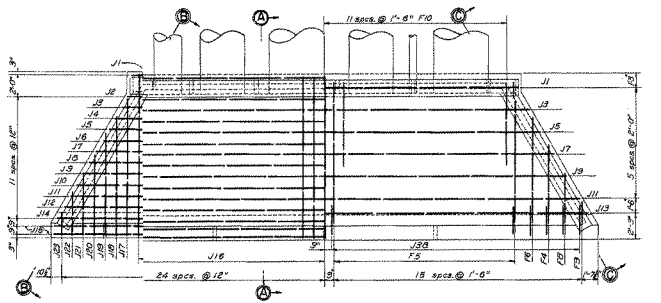
AS BUILT 934-12.3/29

894


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
MAIN STORM DRAIN
DISCHARGE HEADWALL
PLAN
SCALE 1"=1'-0"
SECTION B-B
PIPE JOINT
SCALE HALF SIZE
SECTION A-A
PLAN
ELEVATION
SECTION C-C
KEY DETAIL
Excavation and backfill payment lines
Excavation payment line
Note: For reinforcing details see sheet 3

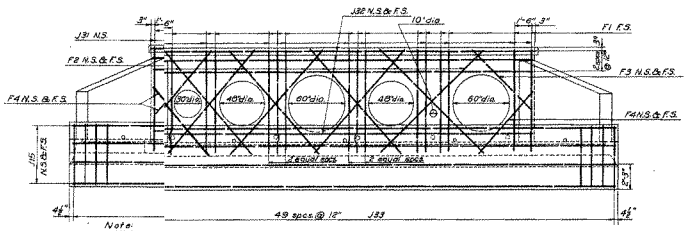
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



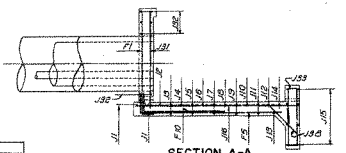
TOP REINFORCING BOTTOM REINFORCING

PLAN



Note:
All bars next to pipes are to clear pipes by 3".

ELEVATION



SECTION A-A

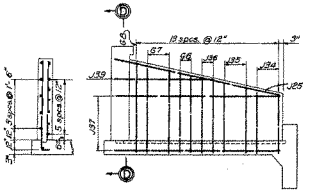
REINFORCEMENT SCHEDULE

SIZE	D
9" OR 6 LEGS	6"

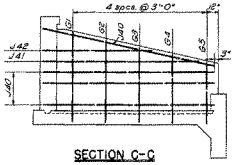
DIMENSION GIVEN IN BENDING DIAGRAM

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
F1	16	#9	10'-3"	2'-3" @ 12"	15.40	246.4
F2	16	"	18'-3"	Straight	18.40	294.4
F3	2	"	8'-0"	"	12.02	24.0
F4	6	"	7'-6"	"	11.27	90.2
F5	24	"	14'-3"	8'-0" @ 9"	22.15	531.6
F6	2	"	10'-0"	Straight	15.02	30.0
F9	2	"	5'-0"	"	7.51	15.0
F9	2	"	2'-6"	"	3.76	7.5
F10	23	"	9'-3"	7'-6" @ 9"	13.89	319.5
G1	2	#8	8'-0"	Straight	8.34	16.7
G2	2	"	7'-3"	"	7.56	15.1
G3	2	"	6'-6"	"	6.78	13.6
G4	2	"	6'-0"	"	6.26	12.5
G5	2	"	5'-3"	"	5.48	11.0
G6	4	"	7'-3"	6'-3" 7"	7.56	30.2
G7	6	"	7'-9"	7'-2" 7"	8.09	48.5
G8	2	"	8'-6"	7'-11" 9"	8.87	17.7
J1	2	#9	35'-3"	Straight	23.55	47.1
J2	1	"	36'-0"	"	24.05	24.1
J3	2	"	37'-0"	"	24.72	49.4
J4	1	"	38'-3"	"	25.55	25.6
J5	2	"	39'-3"	"	26.22	52.4
J6	1	"	40'-6"	"	27.05	27.1
J7	2	"	41'-6"	"	27.72	55.4
J8	1	"	42'-9"	"	28.56	28.6

BAR	NO. REQ'D.	SIZE	LENGTH	BENDING DIAGRAM	WT. EACH	TOTAL WT.
J9	2	#9	44'-0"	Straight	29.39	58.8
J10	1	"	45'-3"	"	30.23	30.2
J11	2	"	46'-6"	"	31.06	62.1
J12	1	"	47'-6"	"	31.73	31.7
J13	1	"	48'0"	"	32.06	32.1
J14	1	"	48'-9"	"	32.56	32.6
J15	8	"	49'-3"	"	32.90	263.2
J16	35	"	41'-6"	"	9.69	339.2
J17	2	"	12'-3"	"	8.18	16.4
J18	2	"	10'-8"	"	7.18	14.4
J19	2	"	9'-0"	"	6.01	12.0
J20	2	"	7'-3"	"	4.84	9.7
J21	2	"	5'-9"	"	3.84	7.7
J22	2	"	4'-0"	"	2.67	5.3
J23	2	"	2'-3"	"	1.50	3.0
J25	2	"	16'-3"	16'-3" 4½"	10.85	21.7
J31	11	"	9'-3"	Straight	6.18	68.0
J32	8	"	34'-3"	"	22.88	183.0
J33	50	"	13'-0"	9" 5'-6" 9"	8.68	434.0
J34	6	"	5'-6"	5'-0" 6"	3.67	22.0
J35	6	"	6'-3"	5'-9" 6"	4.17	25.0
J36	4	"	6'-9"	6'-3" 6"	4.51	18.0
J37	8	"	16'-0"	8'-0" 4½"	10.69	85.5
J38	32	"	3'-6"	Straight	2.34	74.9
J39	2	"	9'-0"	8'-0" 4½"	6.01	12.0
J40	10	"	15'-6"	Straight	10.35	103.5
J41	2	"	14'-0"	"	9.35	18.7
J42	2	"	9'-9"	"	6.49	12.4
				TOTAL		4,031 lbs



SECTION D-D SECTION B-B



SECTION C-C

General notes:
For masonry details see sheet 30.
Bend bars in field to clear weep holes.
N.S. indicates near side.
F.S. indicates far side.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
REINFORCING DETAILS
DISCHARGE HEADWALL

SHEET 31 OF 135 SHEETS SCALE: ¼" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: _____ DIVISION ENGINEER, OHIO RIVER DIVISION

APPROVAL RECOMMENDED: _____ APPROVED: _____

CHIEF, ENGINEERING DIVISION, OHIO RIVER DIVISION

DR. BY A.L.F. TR. BY R.L.S. CK. BY M.A.K.

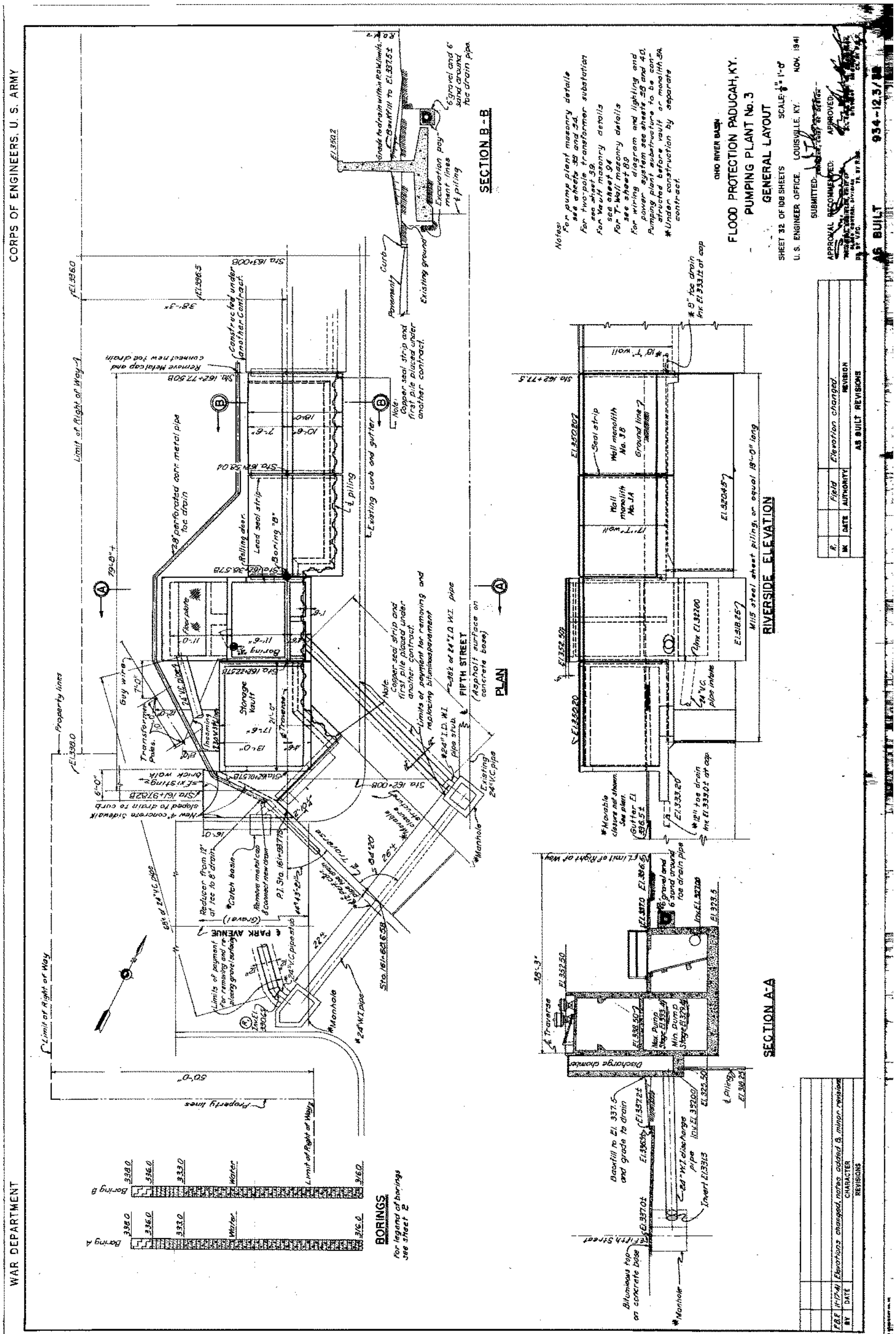
BY	DATE	CHARACTER OF REVISIONS

AS BUILT

934-12.3/31

135

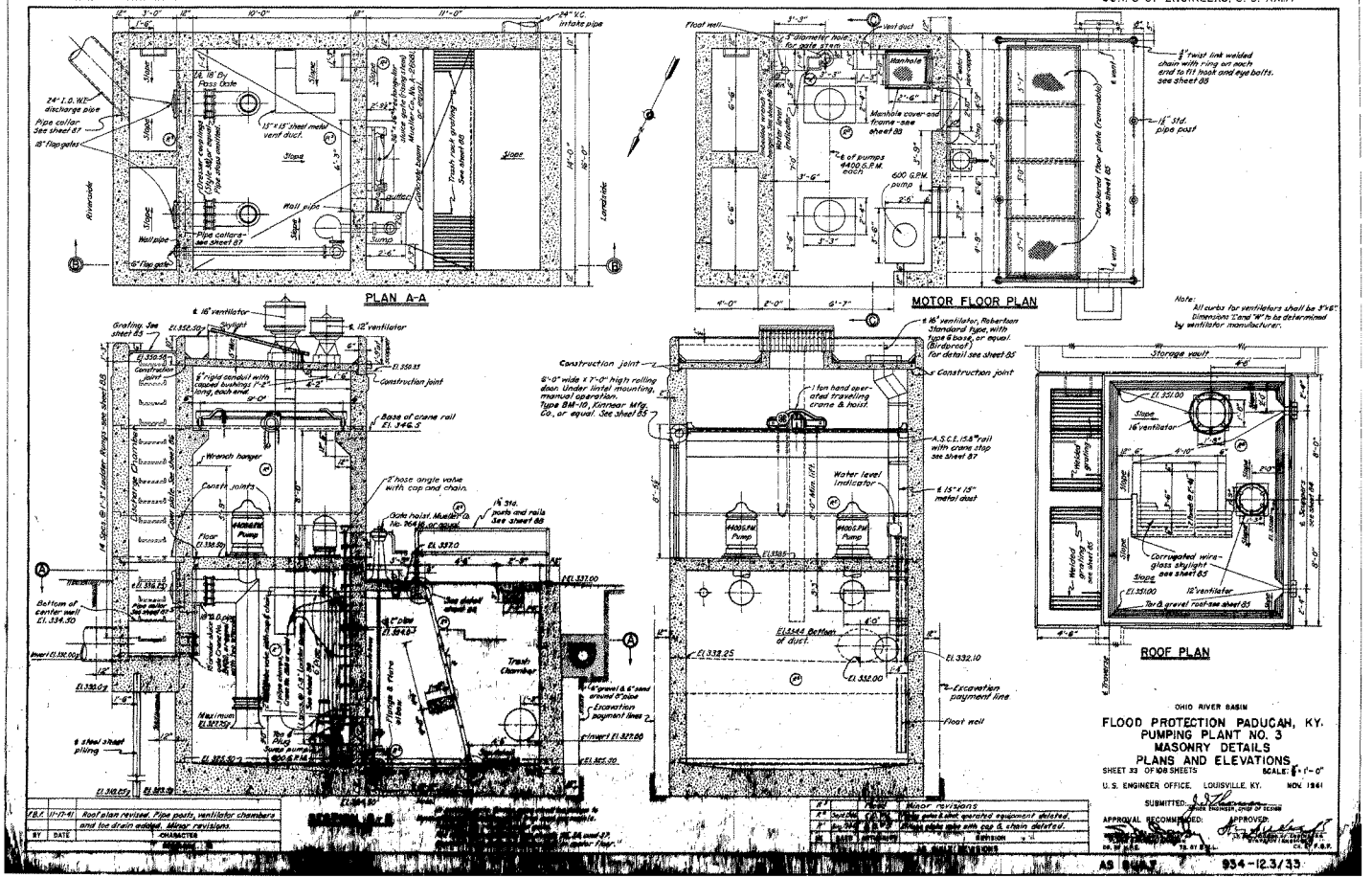
968



CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
SECTION B-B
PLAN
RIVERSIDE ELEVATION
SECTION A-A
BORINGS
For legend of borings see sheet 2
Boring A
Boring B
FIFTH STREET
PARK AVENUE
Storage Vault
Transformer Poles
Guy wire
Property lines
Limit of Right of Way
Discharge chamber
Notes:
For pump plant masonry details see sheets 33 and 34.
For two-pole transformer substation see sheet 39.
For Vault masonry details see sheet 94
For T-Wall masonry details see sheet 83
For wiring diagram and lighting and power system see sheets 38 and 40.
Pumping plant substructure to be constructed before vault or monolith 3A.
*Under construction by separate contract.
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT No. 3
GENERAL LAYOUT
SHEET 32 OF 108 SHEETS
SCALE: 1/8" = 1'-0"
U. S. ENGINEER OFFICE. LOUISVILLE, KY. NOV. 1941
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
934-12.3/
Field Elevation changed.
AS BUILT REVISIONS
Elevations changed, notes added & minor revisions
CHARACTER REVISIONS

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 3
MASONRY DETAILS
PLANS AND ELEVATIONS

SHEET 33 OF 108 SHEETS SCALE: 1/4" = 1'-0"

U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: _____ DIVISION ENGINEER, OHIO RIVER DIVISION

APPROVAL RECOMMENDED: _____ DISTRICT ENGINEER

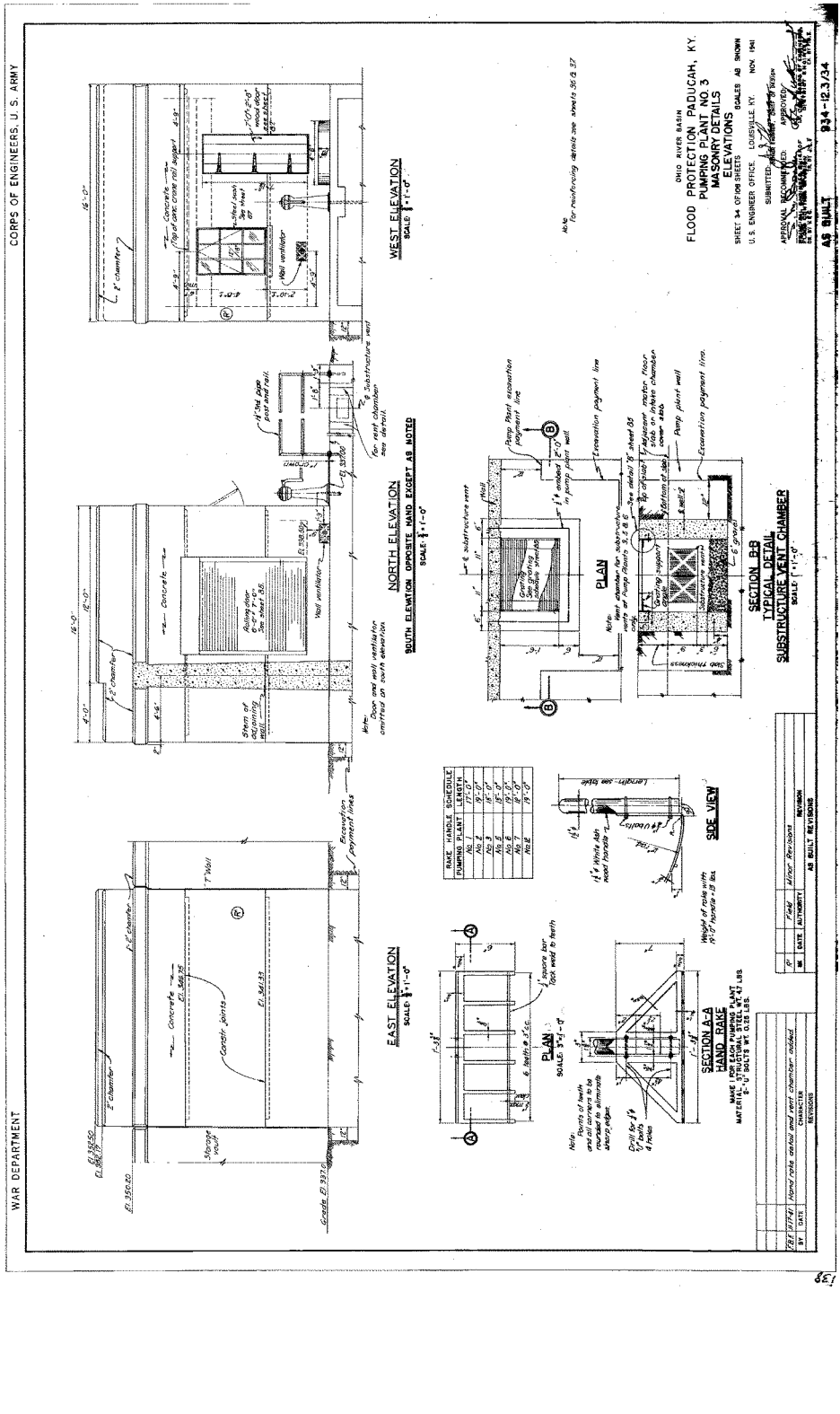
APPROVED: _____ CHIEF OF ENGINEERS

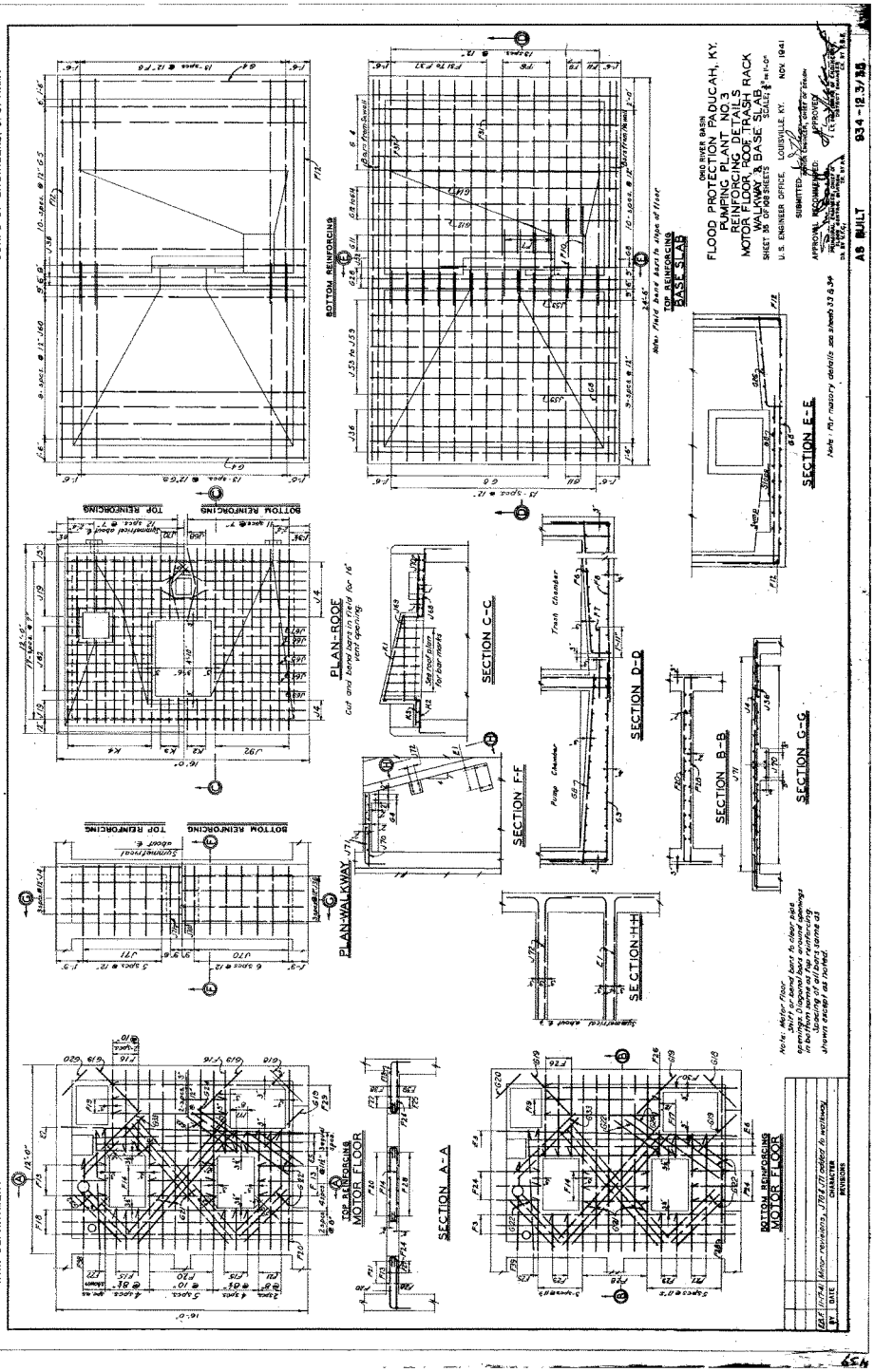
BY	DATE	CHARACTER
F.B.T.	11-17-41	Roof plan revised. Pipe posts, ventilator chambers and toe drain added. Minor revisions.

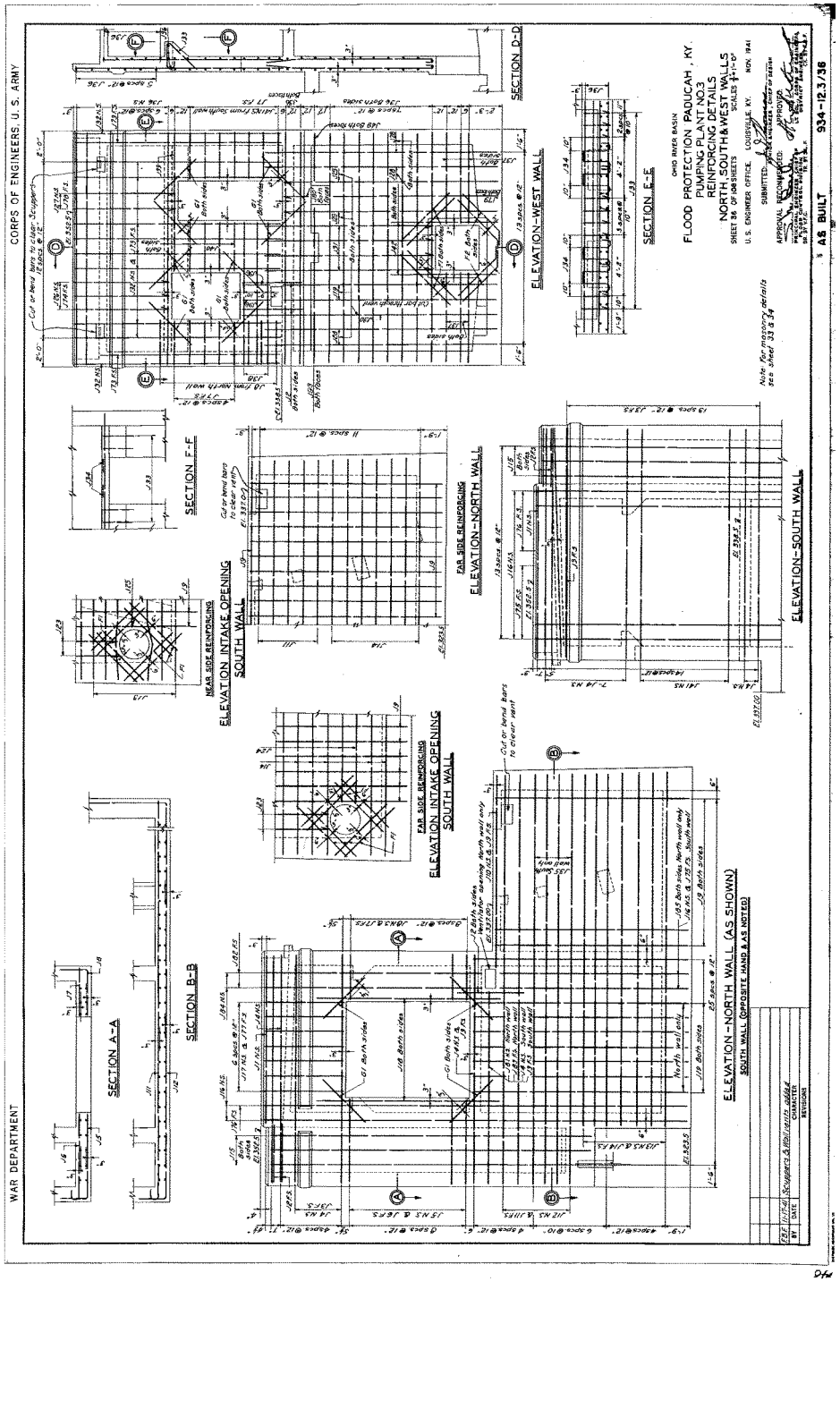
2"	April 1942	Minor revisions
3"	Sept. 1942	Flap gates & steel operated equipment deleted.
4"	Jan. 1943	Sluice slide gates with cap & chain deleted.

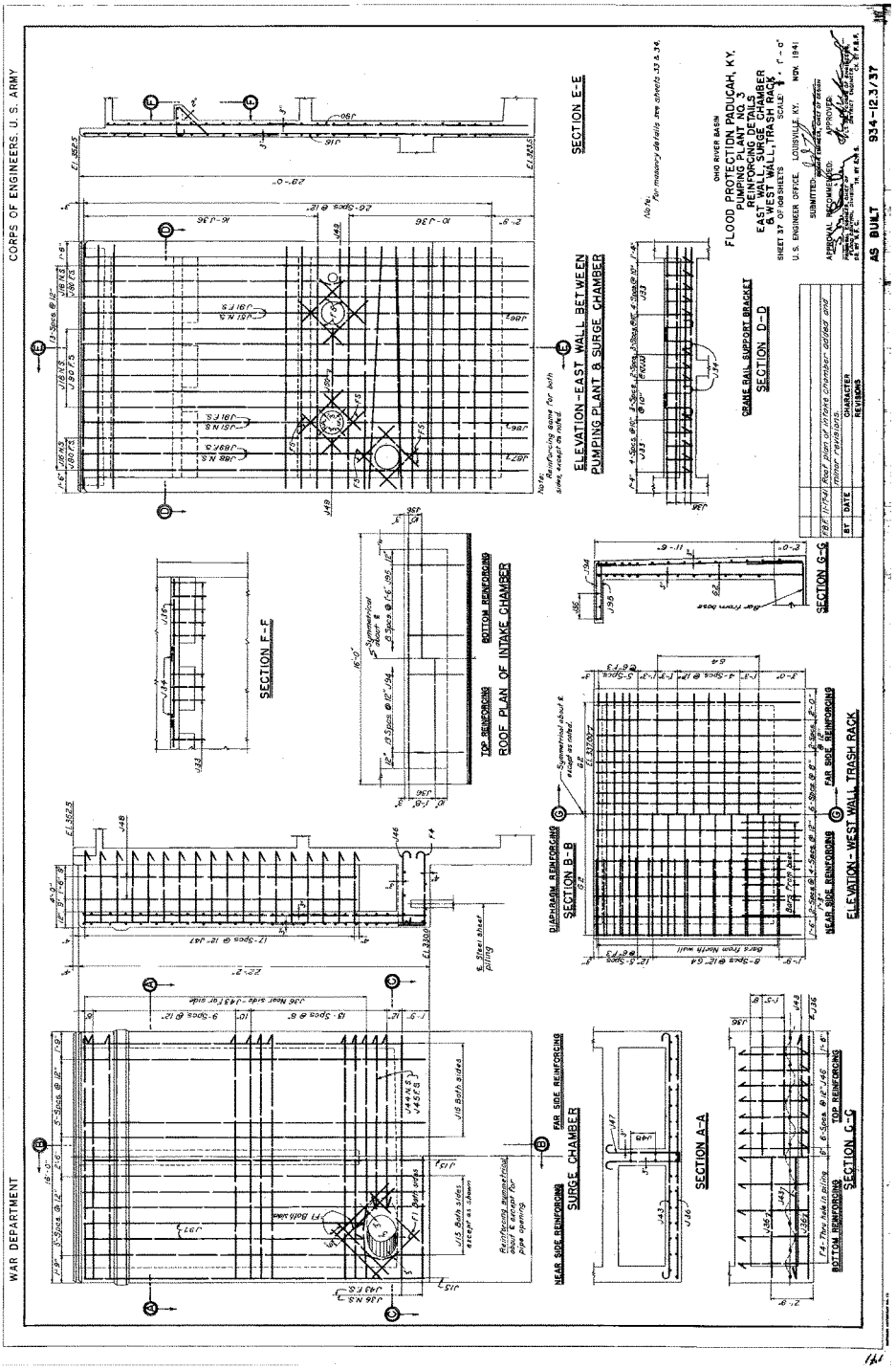
AS BUILT

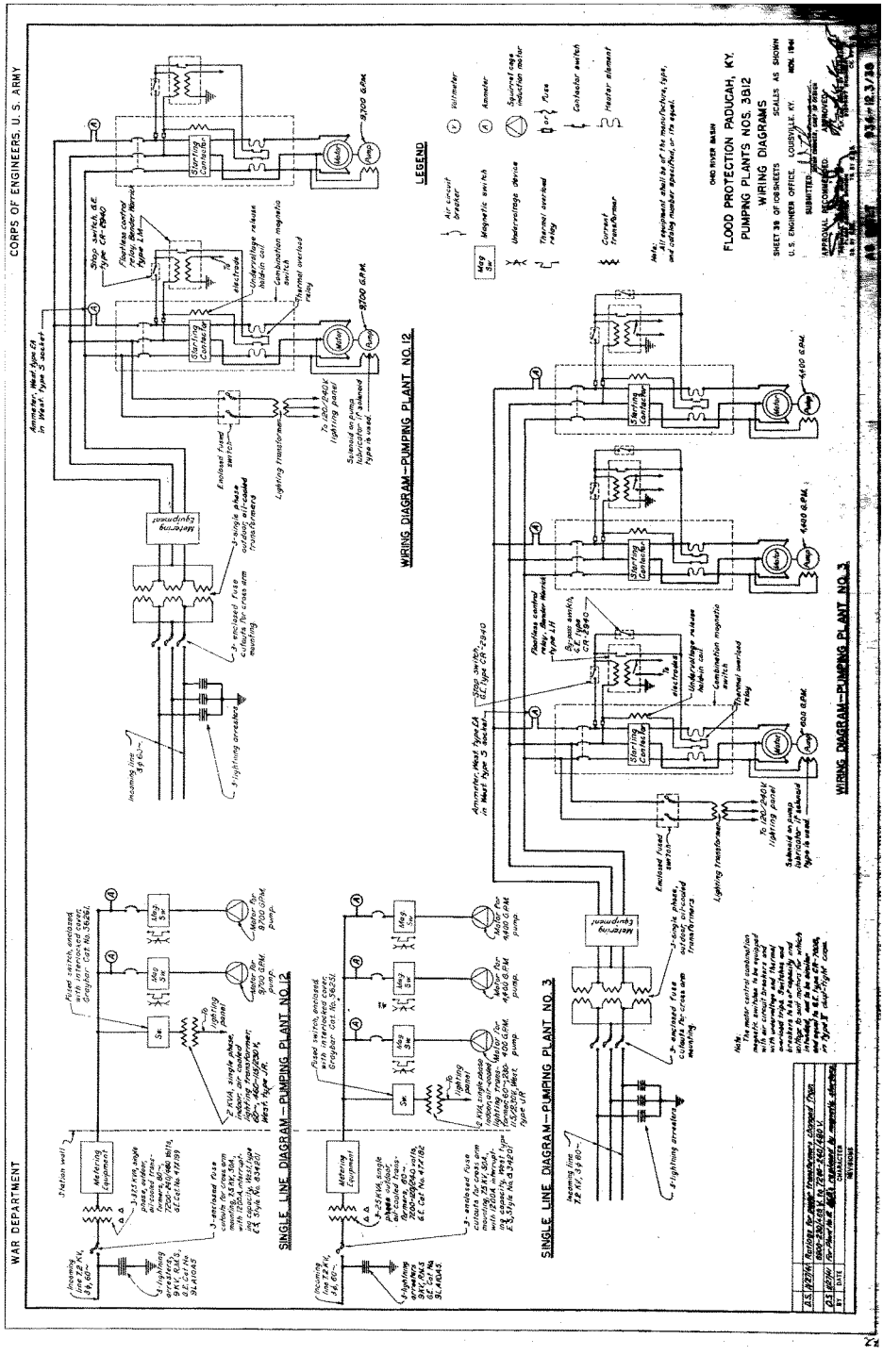
934-12.3/33


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
EAST ELEVATION
SCALE 1/4"=1'-0"
NORTH ELEVATION
SOUTH ELEVATION OPPOSITE HAND EXCEPT AS NOTED
SCALE 1/4"=1'-0"
WEST ELEVATION
SCALE 1/4"=1'-0"
PLAN
SCALE 1/4"=1'-0"
SECTION B-B
TYPICAL DETAIL
SUBSTRUCTURE VENT CHAMBER
SCALE 1"=1'-0"
SECTION A-A
HAND RAKE
SIDE VIEW
RAKE HANDLE SCHEDULE
PUMPING PLANT LENGTH
No. 1 17'-0"
No. 2 19'-0"
No. 3 11'-0"
No. 4 13'-0"
No. 5 15'-0"
No. 6 17'-0"
No. 7 11'-0"
No. 8 13'-0"
Excavation payment lines
Pump Plant excavation payment line
Excavation payment line
Pump plant wall
Substructure vent
Gutter support
Gutter
Sump
Adjacent motor floor slab on intake chamber cover slab
Wall ventilator
Roof and wall ventilators omitted on south elevation
Note: For reinforcing details see sheets 36 & 37
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 3
MASONRY DETAILS
ELEVATIONS
SHEET 34 OF 108 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
AS BUILT
834-12.3/34


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 3
REINFORCING DETAILS
MOTOR FLOOR, TRASH RACK
WALKWAY & BASE SLAB
SHEET 35 OF 40 SHEETS
SCALE 3/8" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV 1941
SUBMITTED
APPROVAL RECOMMENDED
AS BUILT
934 - 12.3/35
PLAN-ROOF
PLAN-WALKWAY
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F
SECTION G-G
SECTION H-H
BOTTOM REINFORCING
TOP REINFORCING
MOTOR FLOOR
BASE SLAB

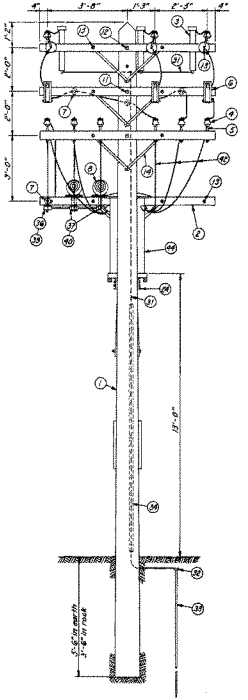

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO.3
REINFORCING DETAILS
NORTH, SOUTH & WEST WALLS
SHEET 14 OF 17 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED:
APPROVED:
APPROVAL RECOMMENDED:
AS BUILT
934-12.3/36
ELEVATION-WEST WALL
ELEVATION-SOUTH WALL
ELEVATION-NORTH WALL (AS SHOWN)
SOUTH WALL (OPPOSITE HAND & AS NOTED)
ELEVATION-NORTH WALL
ELEVATION INTAKE OPENING SOUTH WALL
SECTION A-A
SECTION B-B
SECTION D-D
SECTION E-E
SECTION F-F


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION, PADUCAH, KY.
PUMPING PLANT DETAILS
REINFORCING DETAILS
EAST WALL, SURGE CHAMBER
& WEST WALL, TRASH RACK
SHEET 37 OF 108 SHEETS
SCALE 1" = 1'-0"
OHIO RIVER BASIN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
AS BUILT
934-12.3/37
SECTION E-E
ELEVATION-EAST WALL BETWEEN PUMPING PLANT & SURGE CHAMBER
SECTION D-D
CRANE RAIL SUPPORT BRACKET
SECTION F-F
ROOF PLAN OF INTAKE CHAMBER
SECTION G-G
SECTION B-B
DIAPHRAGM & REINFORCING
ELEVATION-WEST WALL TRASH RACK
SECTION A-A
SURGE CHAMBER
SECTION C-C

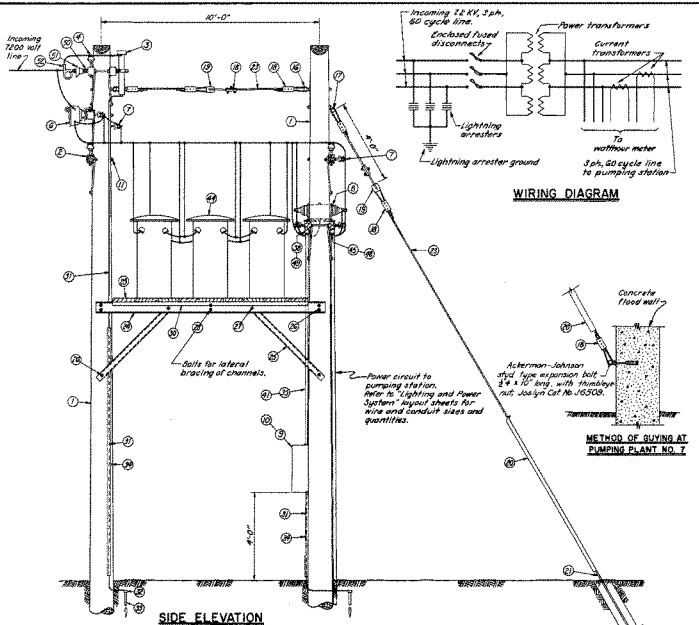

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
SINGLE LINE DIAGRAM—PUMPING PLANT NO. 12
SINGLE LINE DIAGRAM—PUMPING PLANT NO. 3
WIRING DIAGRAM—PUMPING PLANT NO. 12
WIRING DIAGRAM—PUMPING PLANT NO. 3
LEGEND
OHIO RIVER MAIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 3&12
WIRING DIAGRAMS
SHEET 39 OF 108 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY.
NOV. 1944
SUBMITTED
APPROVED
Station wall
Metering Equipment
Lighting arresters
Enclosed fuse cutouts for cross arm mounting
Lighting transformers
Enclosed fuse switch
To constant lighting panel
Submarine pump lubricator if solenoid type is used
Ammeter, West type GA in West type S socket
Stop switch, G.E. type CR-2940
Floatless control relay, Bender-Herrick type L.H.
Electrodes
Undervoltage release holding coil
Combination magnetic switch
Thermal overload relay
Starting Controller
Motor
Pump
8700 G.P.M.
4400 G.P.M.
4600 G.P.M.
Air Circuit Breaker
Voltmeter
Magnetic switch
Ammeter
Underrolltage device
Squirrel cage induction motor
Thermal overload relay
Fuse
Contactor switch
Current Transformer
Heater element
Meg Sw
Sw
Note: All equipment shall be of the manufacture, type, and catalog number specified, or its equal.

WAR DEPARTMENT

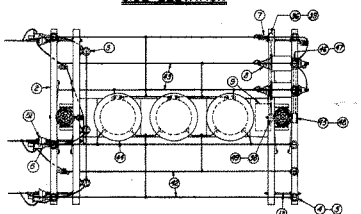
CORPS OF ENGINEERS, U. S. ARMY



END ELEVATION



SIDE ELEVATION



PLAN

WIRING DIAGRAM

METHOD OF GUYING AT PUMPING PLANT NO. 7

Notes

All material shall be of the manufacture, type, & catalog number specified, or its equal.

Solderless connectors shall be used for making splices and taps to buss.

Figures in circles refer to part numbers on the bill of material.

Small parts, fittings, etc., not called for shall be furnished as required.

All bolts and lag screws to be furnished with a full complement of washers in accordance with best practice.

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUANTITY REQD. PP NO. 3	PP NO. 7	PP NO. 12
1	Wood pole, 30', class 1			2	2	2
2	Crossarm, Douglas fir, 3¼"x4½"x8'-0"			7	7	7
3	Lightning arrester	G.E.	9LA40A5	3	3	3
4	Pin type insulator	Joslyn	L401	18	18	18
5	Steel pin for insulator	Joslyn	J210A	18	18	18
6	Enclosed fused cutout	West.	934201	3	3	3
7	Primary lead wire holder	Hubbard	1960	6	6	6
8	Current transformer, 200/5A.	G.E.	94x508	2		
	Current transformer, 300/5A.	G.E.	94x510		2	
	Current transformer, 100/5A.	G.E.	94x507			2
9	Watt hour meter	G.E.	77X405	1		
	Watt hour meter	G.E.	77X311		1	1
10	Meter enclosure	Superior	P311-1326	1	1	1
11	Machine bolt, galvanized, ⅝"x16"	Joslyn	J6816	3	3	3
12	Machine bolt, galvanized, ⅝"x20"	Joslyn	J6820	2	2	2
13	Double arming bolt, ⅝"x20"	Joslyn	J6870	5	5	5
14	Crossarm brace	Joslyn	J7158	14	14	14
15	Carriage bolt, ⅝"x5"	Joslyn	J6635	14	14	14
16	Thimble eye bolt, shoulder type, 12"	Joslyn	J6812	2	2	2
17	Thimble eye bolt, shoulder type, 8", 45° angle	Joslyn	J6012	1	1	1
18	Guy wire clamp, 3 bolt	Joslyn	J1121	6	6	6
19	Guy strain insulator	Joslyn	L1284	2	2	2
20	Guy guard	Joslyn	J1818	1	1	1
21	Anchor rod, thimbleeye, ¾"x8'	Joslyn	J7428	1		1
22	Guy anchor, exp., 2 way, 6' Rod & rod	Eversteel	636	1		1
23	Guy wire, ⅜", Siemens-Martin double galv.			40'	40'	40'
24	Channel iron, galv, 6"x2"x8"-6"@8.2#/ft.			2	2	2
25	Channel iron, galv, 5"x1⅝"x4'-6"@5.0#/ft.			4	4	4
26	Machine bolt, galvanized, ⅝"x14"	Joslyn	J6814	6	6	6
27	Machine bolt, galvanized, ⅝"x18"	Joslyn	J6818	4	4	4
28	Double arming bolt, ⅝"x16"	Joslyn	J6826	2	2	2
29	Treated yellow pine boards, 2"x12"x13'			9	9	9
30	Treated yellow pine strips, 2"x2"x4'-5"			4	4	4
31	Ground wire, #2 bare copper			45'	45'	45'
32	Ground wire clamp	Joslyn	J6495	2	2	2
33	Copperweld ground rod, ¾"x8'			2	2	2
34	Wood moulding	Joslyn	Size #1	20'	20'	20'
35	1" rigid electrical conduit			15'	15'	15'
36	Conduilet outlet	Crouse-Hinds	LL37	1	1	1
37	Conduilet outlet	Crouse-Hinds	C37	2	2	2
38	Conduilet outlet	Crouse-Hinds	LL37	1	1	1
39	1-hole composition cover	Crouse-Hinds	3771	1	1	1
40	3-hole composition cover	Crouse-Hinds	3773	2	2	2
41	No. 12 insulated copper wire			110'	110'	110'
42	No. 6 solid H.D. triple braid W.P. wire			90'	90'	90'
43	No. 1 solid H.D. triple braid W.P. wire			55'		
	No. 6 solid H.D. triple braid W.P. wire				55'	
	No. 1 solid H.D. triple braid W.P. wire					55'
44	Power transformer, 7200-2400/4160 Y 5 KVA	G.E.	47X186	3		
	Power transformer, 7200-2400/4160 Y, 75 KVA	G.E.	47X201		3	
	Power transformer, 7200-2400/4160 Y, 225 KVA	G.E.	47X189			3
45	Conduilet outlet	Crouse-Hinds	LL37	1		1
	Conduilet outlet	Crouse-Hinds	LR37		1	
46	Conduilet outlet	Crouse-Hinds	E57	1		1
	Conduilet outlet	Crouse-Hinds	E47	1	1	
47	3-hole composition cover	Crouse-Hinds	3773			1
	3-hole composition cover	Crouse-Hinds	3773	1	1	
48	Blank composition cover	Crouse-Hinds	3770			1
	Blank composition cover	Crouse-Hinds	3770	1	1	
49	Blank composition cover	Crouse-Hinds	3770	1	1	

BILL OF MATERIAL (CON'TD.)

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUANTITY REQD. PP NO. 3	PP NO. 7	PP NO. 12
50	Drop forged eyenut	Joslyn	J1098	3	3	3
51	6" strain insulator	Locke	L6583	3	3	3
52	Strain clamp	"	20087	3	3	3

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 3, 7 & 12
TWO-POLE TRANSFORMER SUBSTATION

SHEET 39 OF 108 SHEETS

SCALE: ½"=1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: Francis Shanklin, Chief of Design

APPROVAL RECOMMENDED: Jesse L. Gilbert, Chief of Design, Design Section, Design Branch, Engineering Division

APPROVED: Lucius D. Clay, Brig. Gen., U.S.A., District Engineer

DR. BY O.E.E. TR. BY R.M.S. TR. BY D.S.

AS BUILT

934-12.3/39

R'		Field	Bill of Materials change
NR	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

D5	11/8/41	Minor revisions
D3	11/8/41	Dead ending of incoming line changed.
BY	DATE	CHARACTER

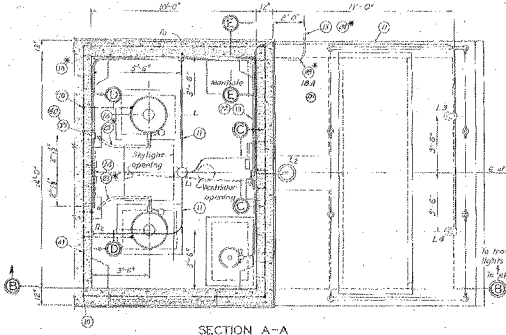
REVISIONS

143

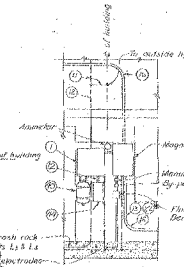
904

WAR DEPARTMENT

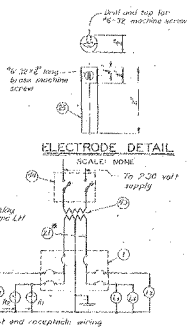
CORPS OF ENGINEERS, U. S. ARMY



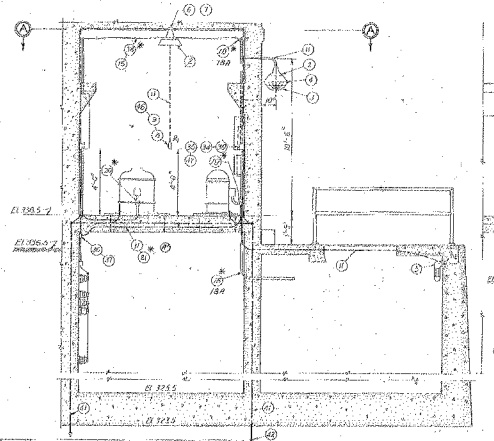
SECTION A-A
SCALE: $\frac{1}{8}$"=1'-0"



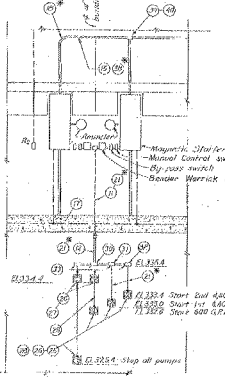
SECTION C-C
SCALE: $\frac{3}{8}$"=1'-0"



WIRING DIAGRAM
LIGHTING CIRCUIT



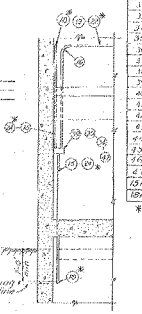
SECTION B-B
SCALE: $\frac{3}{8}$"=1'-0"



SECTION D-D
SCALE: $\frac{3}{8}$"=1'-0"

LEGEND

Embedded conduit
Exposed conduit
Ground wire



SECTION E-E
SCALE: $\frac{1}{4}$"=1'-0"

Note:
Figures in circles refer to part numbers in Bill of Material.
All material shall be of the manufacture, type and catalog number specified, or its equal.
Small fittings, conduits, etc., not listed shall be furnished as required.
All conduit in floor shall be placed as near the center of same as possible and shall clear openings for pump removal.
200 watt bulbs shall be furnished and installed in all lights.

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFR.	CATALOG NO.	QUAN-TITY
1	4' steel light distributor panel (surface type)			1
2	40 LB. dome reflector and socket	Wheel	M9573	2
3	Wire guard	"	35A491	1
4	Wire guard padlock	"	35H156	1
5	Vaporite light	Crouse-Hinds	VMG105	3
6	Conduit outlet	"	SAC12	1
7	Conduit cover	"	SB64	1
8	Conduit outlet	"	TS1	2
9	Duplex plug receptacle			2
10	Connectors for #2/0 stranded cable	Burndy	NTC-270	12
11	¾" rigid electrical conduit			165
12	¾" " "			44
13	1" " "			30
14	1¼" " "			17
15	1½" " "			30
16	1" standard 90° elbow			4
17	1¼" " "			4
18*	1½" " "			6
19*	1" Erickson coupling			1
20*	1½" Erickson coupling			2
21*	#10 AWG weather proof copper wire			2400
22*	#4/0 cond cable, RC-600V, un with 60% rubber jacket			60
23*	#6/1 cond cable, RC-600V, un with 60% rubber jacket			540
24*	#2/1 cond cable, RC-600V un with 30% rubber jacket			100
25	Brass electrode, ¾"x 8'-0" long (See detail)			4
26	3" bolt circle type insulator	Lapp	1761	6
27	Bus support fitting, Drill to clamp ¾" bus and mount	Locke	9651	1
28	Bus support fitting, Drill to clamp ¾" electrode	"	"	4
29	#6 AWG hard drawn copper wire			140
30	Conduit outlet	Crouse-Hinds	TB197	1
31	" "	"	C-78	1
32	" "	"	C-77	7
33	Conduit outlet cover	"	1771	4
34	Conduit hub plate	"	HS492	1
35	" " "	"	HS493	1
36	Conduit	"	TB11	1
37	Conduit cover	"	3170	1
38	#2 travel cable, RC-600V un with 60% rubber jacket			100
39	Junction box	Crouse-Hinds	HSM1	1
40	Conduit outlet cover	"	5120	1
41	#2/0 bare stranded copper cable			150
42	Connector for #2/0 stranded cable to ¾" ground rod	Burndy	GA5626	4
43	Ground rod, ¾"x8'	Copperweld		4
44	Enclosed fused switch 3 pole, cover interlocked	Graybar	36251	1
45	Transformer 2.30-230/115 volts, 0.5 KVA, dry type	Wagner	9H103	1
46	Wall surface plate			6
47	Junction box plate	Crouse-Hinds	HSM40	2
184	2½" rigid electrical conduit			50
184	2½" long rad 90° elbow 24"x24" rad			3

* Indicates items deleted (M)

M	DATE	AUTHORITY	REVISION
			AS BUILT REVISIONS

M	DATE	CHARACTER
U.S.	10/41	Perimeters added to magnetic starters
U.S.	10/41	Minor revisions

CHARACTER OF REVISIONS

M	DATE	C.O.#	Bill of materials changed in accord with change order

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 3

LIGHTING & POWER SYSTEMS

SHEET 40 OF 108 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: (Signature) (Title) CHIEF, CONSTRUCTION DIVISION

APPROVAL RECOMMENDED: APPROVED:

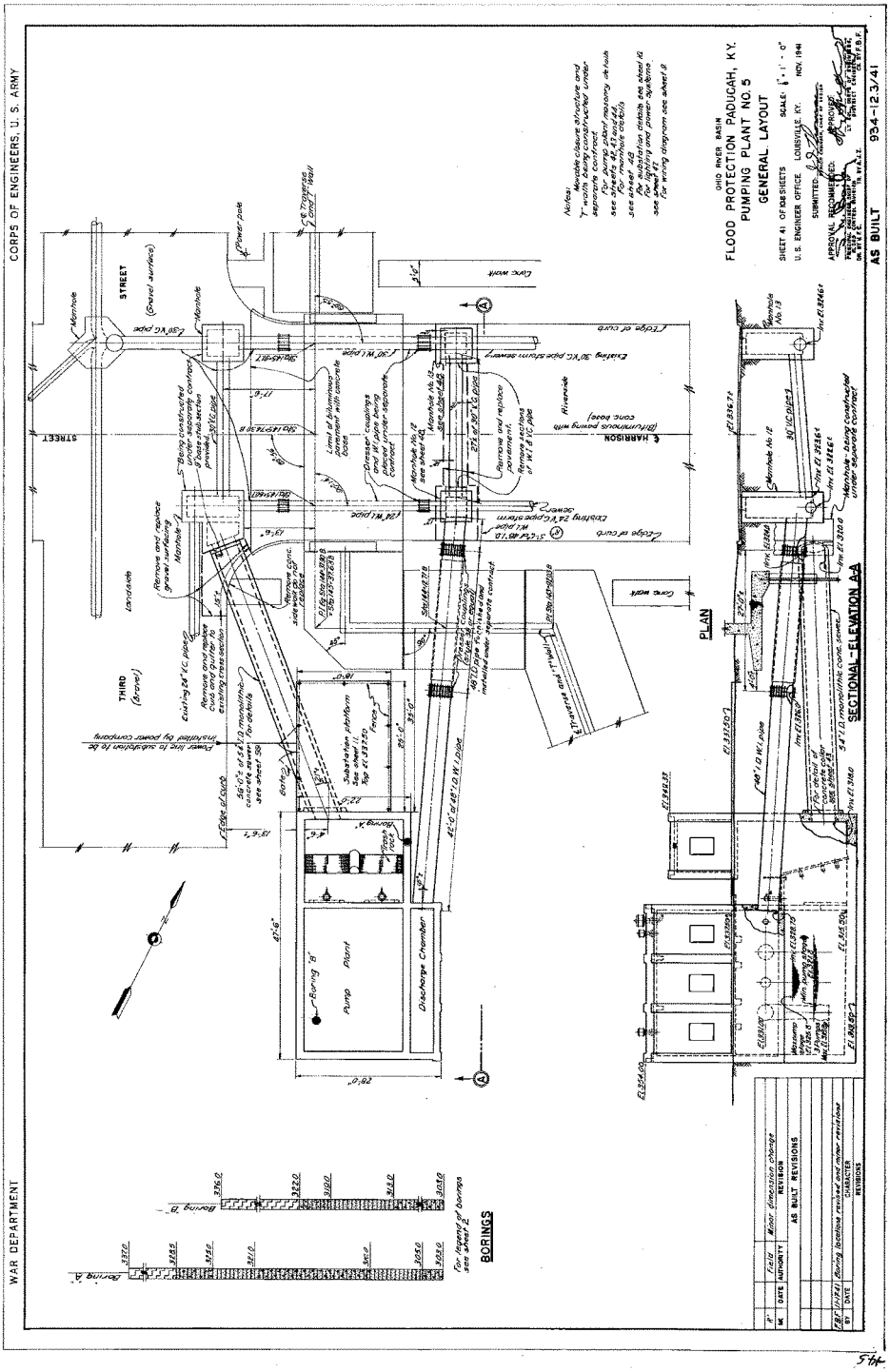
(Signature) (Title) PRINCIPAL ASST. ENGINEER IN CHARGE OF CONSTRUCTION, PUMPING STATIONS

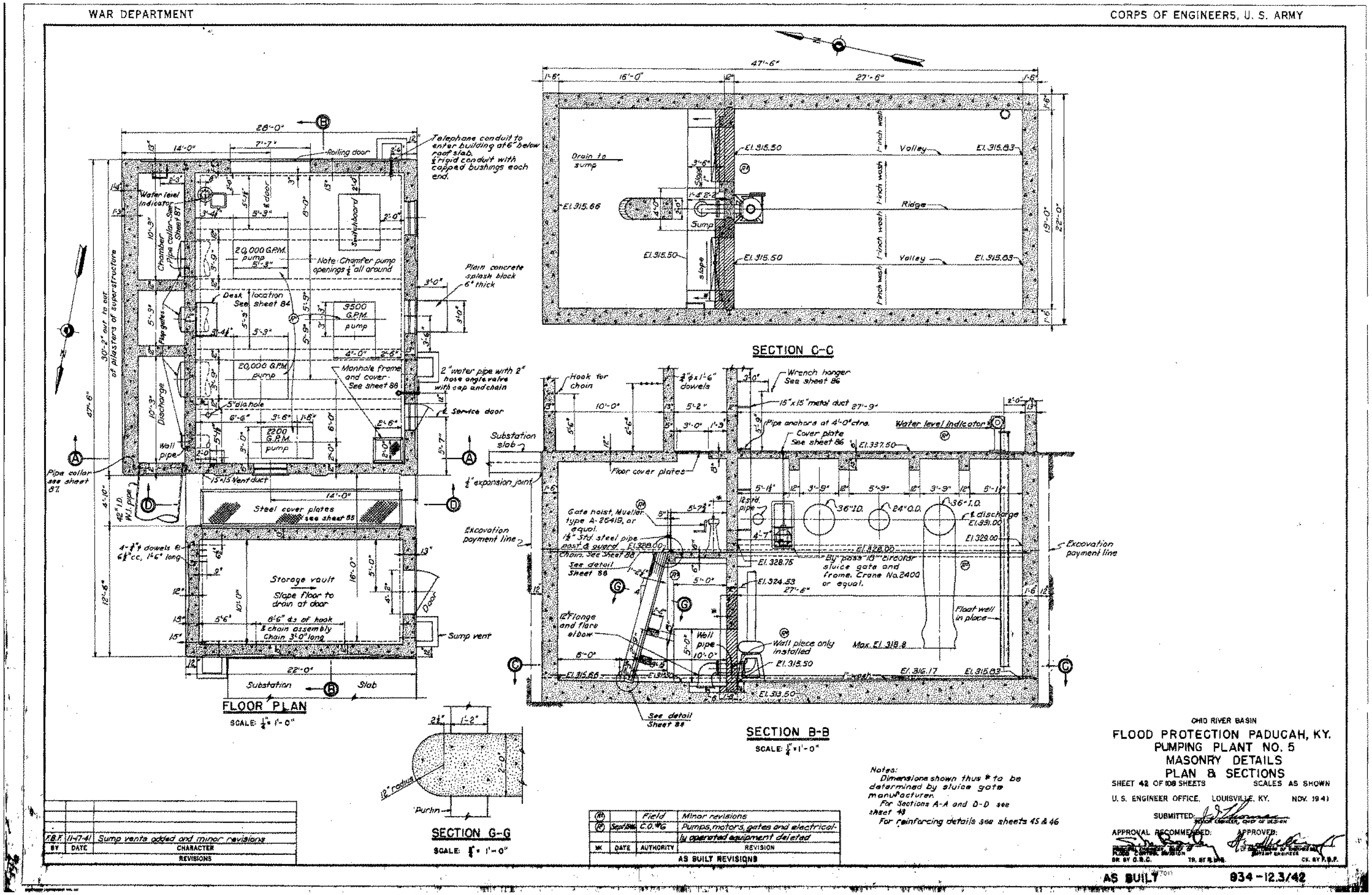
(Signature) (Title) CH. CIVIL DIVISION OF ENGINEERING DIVISION OF CONSTRUCTION

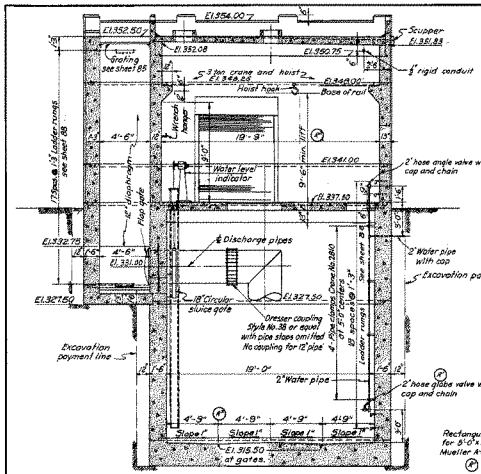
EA. BY U.S. EA. BY M.C.B. EA. BY U.S.

AS BUILT 934-12.3/40

905

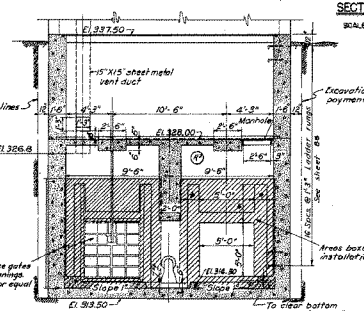

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 5
GENERAL LAYOUT
SHEET 41 OF 108 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY.
SCALE: 1" = 1' - 0"
NOV. 1941
SUBMITTED:
APPROVED, RECOMMENDED:
AS BUILT
934-(2.3/41
PLAN
SECTIONAL-ELEVATION A-A
BORINGS
STREET
THIRD
HARRISON
Pumping Plant
Burning 'B'
Pump
Discharge Chamber
Substation platform
Manhole No. 12
Manhole No. 13
Riverside
Notes:
Manhole shown thus and 7'-width being constructed under separate contract
see sheet 46 for brick masonry details for manhole details
see sheet 45 for substation details see sheet 10 for lighting and power systems
see sheet 47 for wiring diagram see sheet 8
Boring A
Boring B
For legend & borings see sheet 2
No. DATE AUTHORITY REVISION
Field Minor dimension change
AS BUILT REVISIONS
BY DATE CHARACTER REVISIONS
Rating sections revised and minor revisions

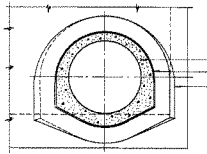

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOR PLAN
SCALE: 1/4" = 1'-0"
SECTION C-C
SECTION B-B
SCALE: 1/4" = 1'-0"
SECTION G-G
SCALE: 1/2" = 1'-0"
Storage vault
Slope floor to drain at door
Steel cover plates see sheet 85
Substation
Slab
Telephone conduit to enter building at 6" below roof slab.
Plain concrete splash block 6" thick
2" water pipe with 2" hose angle valve with cap and chain
Manhole frame and cover. See sheet 86
Note: Chamfer pump openings 1/2" all around
Switchboard
20,000 G.P.M. pump
9500 G.P.M. pump
2200 G.P.M. pump
Desk location See sheet 84
Water level indicator
Discharge Chamber
Flap gates
Wall pipe
Pipe collar see sheet 87
Rolling door
Service door
Sump vent
Excavation payment line
Floor cover plates
Hook for chain
Wrench hanger See sheet 86
Water level indicator
Float well in place
Max. El. 318.8
Wall piece only installed
By-pass 18" circular sluice gate and frame. Crane No. 2400 or equal.
Gate hoist, Mueller type A-25419, or equal.
See detail Sheet 88
Drain to sump
Sump
Valley
Ridge
Notes:
Dimensions shown thus * to be determined by sluice gate manufacturer.
For Sections A-A and D-D see sheet 43
For reinforcing details see sheets 45 & 46
Sump vents added and minor revisions
REVISIONS
AS BUILT REVISIONS
Minor revisions
Pumps, motors, gates and electrical-ly operated equipment deleted
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 5
MASONRY DETAILS
PLAN & SECTIONS
SHEET 42 OF 108 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
NOV. 1941
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
934-12.3/42



SECTION A-A

SCALE: 1/4" = 1'-0"

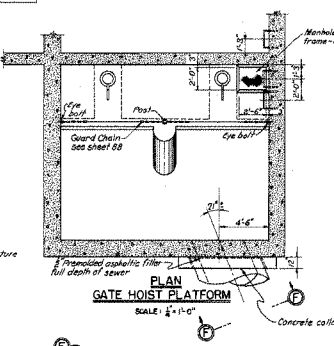




SECTION F-F

SCALE: 1/4" = 1'-0"

Dimensions shown thus (*) to be determined by gate manufacturer.



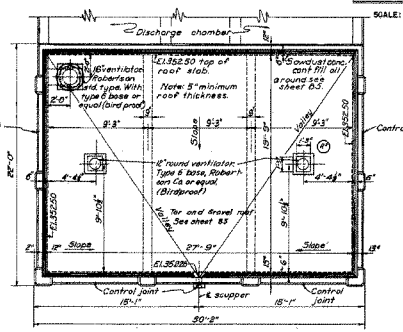
PLAN

GATE HOIST PLATFORM

SCALE: 1/4" = 1'-0"

SECTION D-D

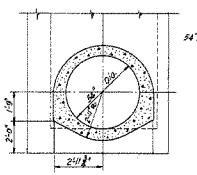
SCALE: 1/4" = 1'-0"



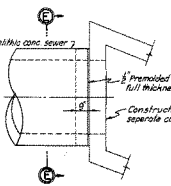
ROOF PLAN

SCALE: 1/4" = 1'-0"

Note: all curbs for ventilators shall be 3"x 6" Dimensions "L & W" to be determined by ventilator manufacturer.



SECTION E-E



PLAN

Note: for reinforcing details see sheets 45 and 46 for location of sections A-A and D-D see sheet 42.

CONNECTION TO EXISTING MANHOLE FOR 54" MONOLITHIC CONC. INTAKE

SCALE: 1/4" = 1'-0"

BY	DATE	CHARACTER
		REVISIONS
FBF	11-1941	Discharge pipe, Sections E-E & F-F added
		ladder rungs shown & minor revisions.

No	DATE	AUTHORITY	REVISION
A*		Field	Changes made in connection with C.O.#5 & minor revisions
N	10/1/43	C.O.#5	2" hose globe valve with cap, chain, gates & details deleted

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 5

MASONRY DETAILS

PLAN AND SECTIONS

SHEET 43 OF 108 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED:

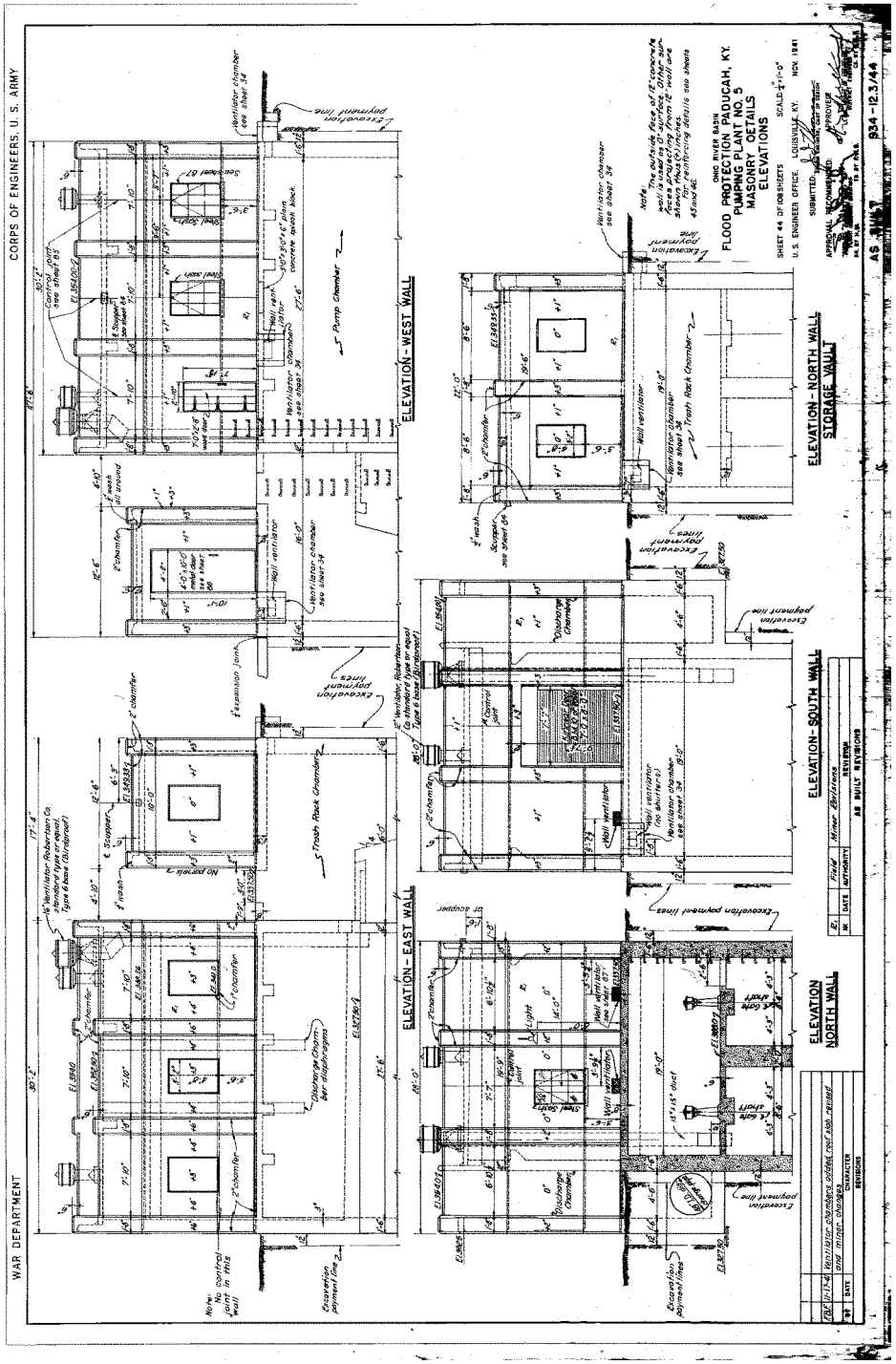
APPROVAL RECOMMENDED:

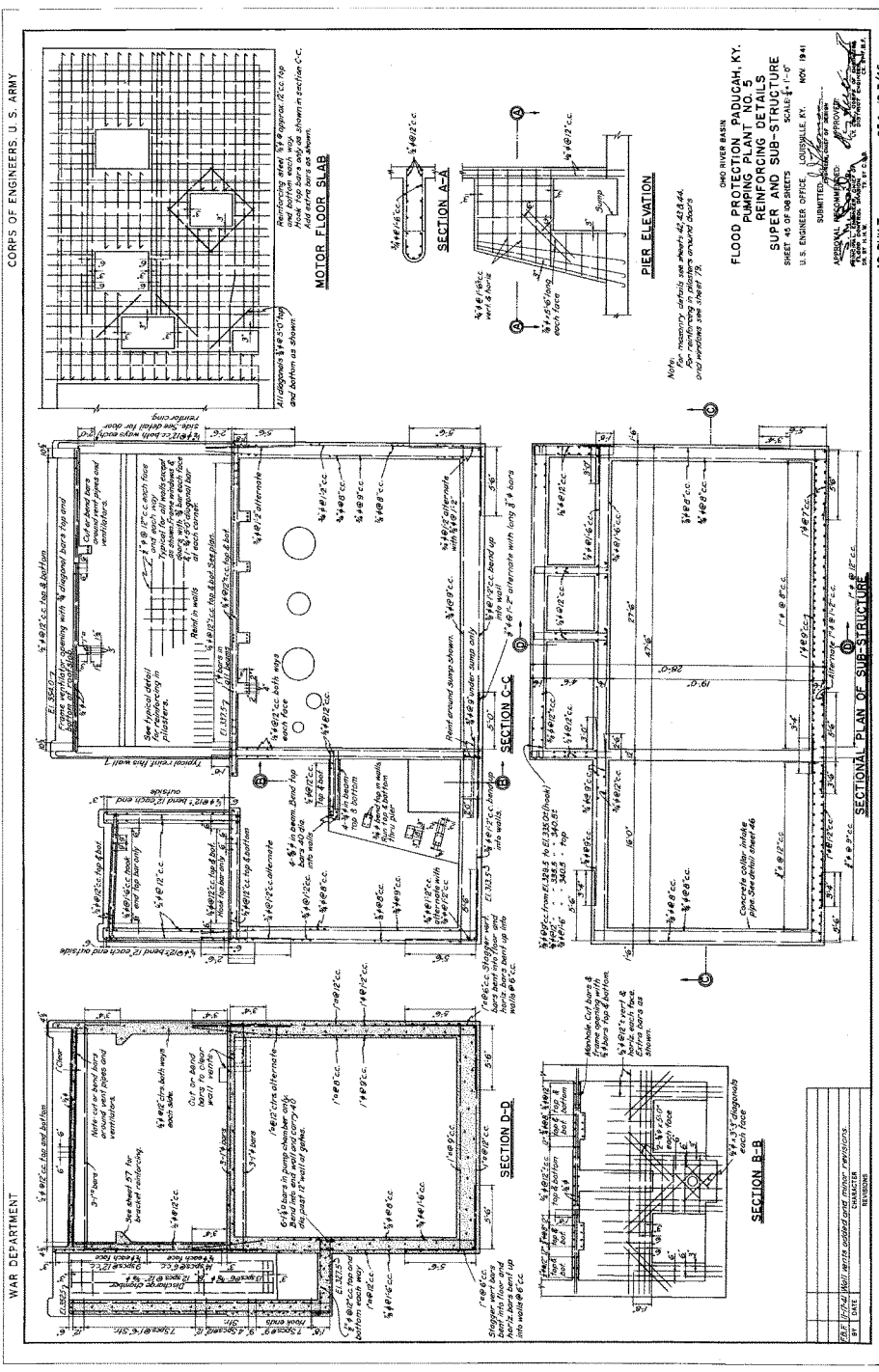
APPROVED:

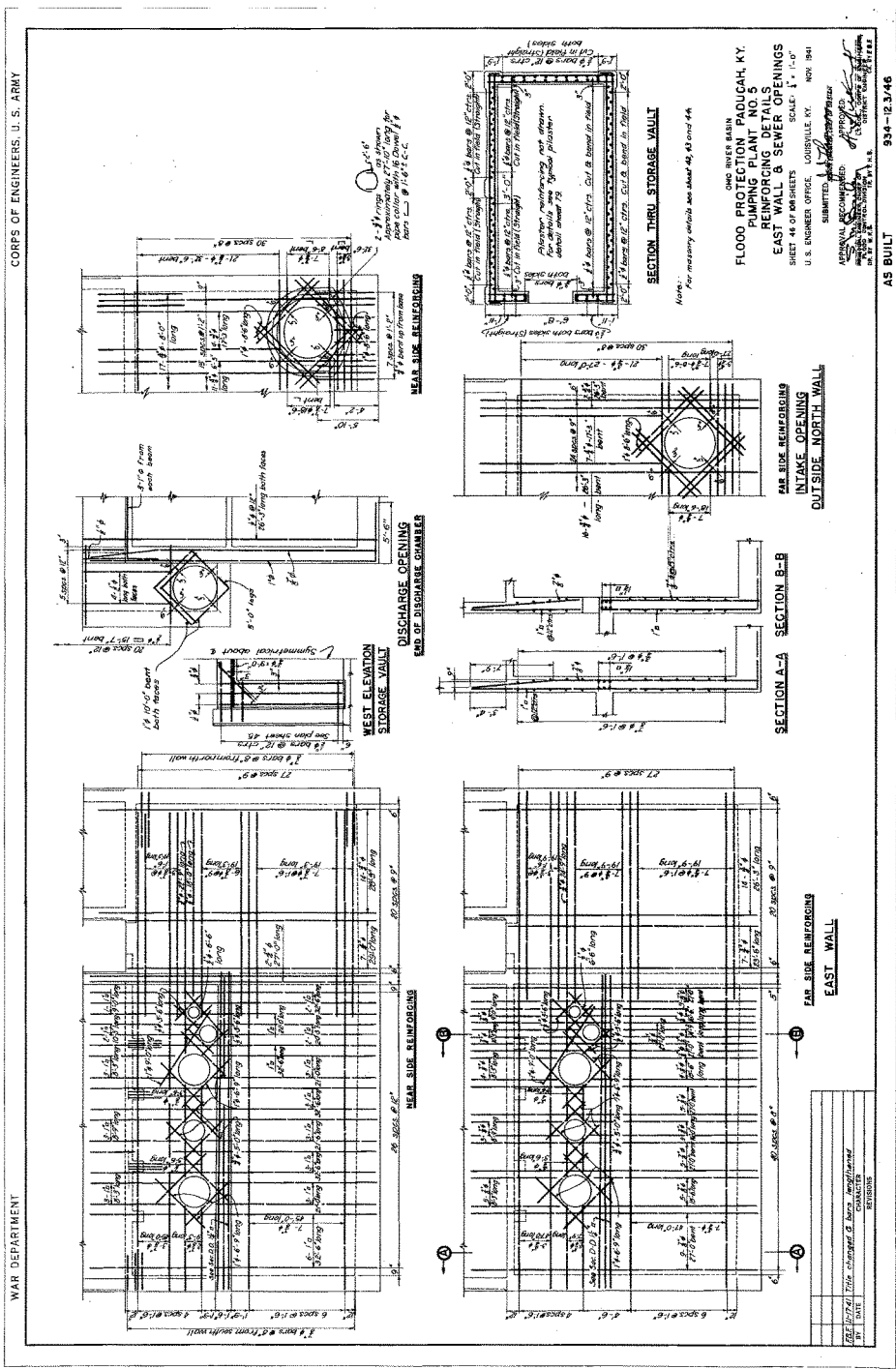
AS BUILT

934-12.3/43

806

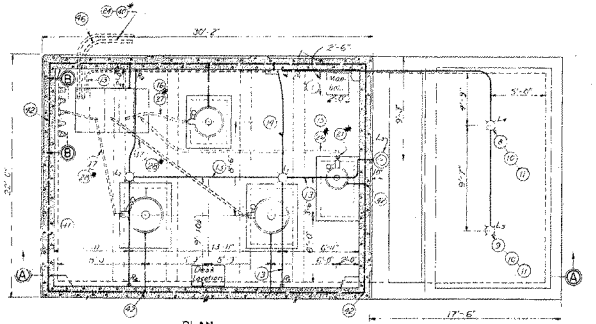

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
ELEVATION - WEST WALL
ELEVATION - EAST WALL
ELEVATION - SOUTH WALL
ELEVATION - NORTH WALL
STORAGE VAULT
ELEVATION NORTH WALL
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 5
MASONRY DETAILS
ELEVATIONS
SHEET 44 OF 108 SHEETS
SCALE 1/4"=1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
AS BUILT
934-12.3/44
Pump Chamber
Trash Rack Chamber
Discharge Chamber
Ventilator chamber see sheet 34
Excavation payment lines
Excavation payment line
Note: control joint No. 1 in this wall
Excavation payment line 2
AS BUILT REVISIONS
Minor deviations


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIS
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 5
REINFORCING DETAILS
SUPER AND SUB-STRUCTURE
SHEET 45 OF 108 SHEETS
SCALE $\frac{1}{4}$"-1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED:
APPROVED:
RECOMMENDED:
AS BUILT
934-12.3/45
MOTOR FLOOR SLAB
SECTION A-A
PIER ELEVATION
SECTIONAL PLAN OF SUB-STRUCTURE
SECTION B-B
SECTION C-C
SECTION D-D


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
PUMPING PLANT NO. 5
REINFORCING DETAILS
EAST WALL & SEWER OPENINGS
SHEET 46 OF 108 SHEETS
SCALE: 1" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
APPROVED AND RECOMMENDED:
AS BUILT
934-12.3/46
EAST WALL
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
SECTION A-A
SECTION B-B
SECTION THRU STORAGE VAULT
FAR SIDE REINFORCING
INTAKE OPENING
OUTSIDE NORTH WALL
WEST ELEVATION
STORAGE VAULT
DISCHARGE OPENING
END OF DISCHARGE CHAMBER
NEAR SIDE REINFORCING
REVISIONS
DATE
BY
CHARACTER

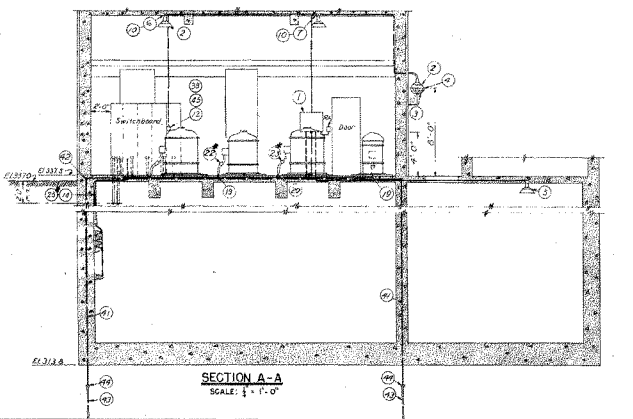
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



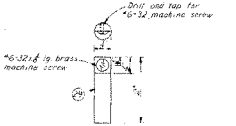
PLAN

SCALE: $\frac{1}{4}$" = 1'-0"



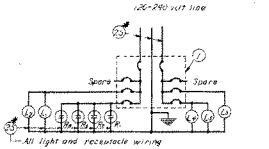
SECTION A-A

SCALE: $\frac{1}{4}$" = 1'-0"



ELECTRODE DETAIL

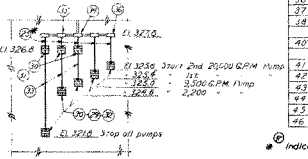
SCALE. NONE



WIRING DIAGRAM
LIGHTING CIRCUIT

Concealed conduit
Exposed conduit
Ground wire

LEGEND



SECTION B-B

SCALE: $\frac{1}{4}$" = 1'-0"

Notes:

Figures in circles refer to part numbers in bill of material.

All material shall be of the manufacture, type, and catalog number specified, or its equal.

Small fittings, conduits, etc. not listed shall be furnished as required.

All conduit in floor shall be placed as near the center of same as possible and shall clear openings for pump removal.

200 watt bulbs shall be furnished and installed in all lights.

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CAT. NO.	QUAN.
1	6 circuit light distribution panel(surface type)			1
2	RLM dome reflector and socket	West	349571	3
3	Wire guard	"	351497	1
4	Wire guard padlock	"	321488	1
5	Vaportite conduit with reflector and socket	Crouse-Hinds	VNDA1359	2
6	Conduulet outlet	"	SKT12	1
7	" "	"	SKV12	1
8	" "	"	SKC12	1
9	" "	"	SK12	1
10	" cover	"	SK84	4
11	" gasket	"	Gask206	2
12	Duplex plug receptacle			4
13	$\frac{1}{2}$" rigid electrical conduit			1600'
14	2" " "			35'
15	1" " "			25'
16	$\frac{3}{4}$" " "			15'
17	2½" " "			400'
18	1" standard 90° elbow			8
19	$\frac{1}{2}$" " "			2
20	2" " "			4
21	1" Erickson coupling			1
22	1½" " "			1
23	2" " "			2
24	$\frac{3}{8}$" rigid electrical conduit			140'
25	#12 insulated copper wire			500'
26	#6 1 cond. cable, R.C. 600V. ins. with 60% rubber jacket			80'
27	#4 1 cond. cable, R.C. 600V. ins. with " " " "			40'
28	#10 1cond. cable, R.C. 600V. ins. with " " " "			120'
29	Brass electrode, $\frac{3}{8}$" x 2" lg. (See detail)			5
30	3 bolt circle type insulator	Lapp	13761	8
31	Bus support fitting. Drill to clamp #6 bare solid wire	Locke	9853	3
32	Bus support fitting Drill to clamp $\frac{3}{8}$" electrode	"	"	3
33	#6 hard drawn copper wire			15'
34	Conduulet outlet	Crouse-Hinds	TB-127	1
35	" "	" "	C-17	2
36	" "	" "	E-17	2
37	Conduulet outlet covers	" "	1771	3
38	Wall surface plate			4
40	#6 M.C.M. 1 cond. cable R.C. 600V. ins. with 60% rubber jacket			440'
41	#2/0 bare stranded copper cable			200'
42	"T" connectors for #2/0 stranded cable	Burndy	N72686	10
43	Ground rod $\frac{3}{4}$" x 8'	Copperweld		4
44	Connector for #2/0 stranded cable to $\frac{3}{4}$" ground rod	Burndy	GAG4226	4
45	Conduulet outlet	Crouse-Hinds	FS1	4
46	Special long radius 90° elbow, $\frac{3}{4}$" x 36" radius	GE		8

© Indicates item deleted.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 5

LIGHTING & POWER SYSTEMS

SHEET 47 OF 108 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE. LOUISVILLE, KY. NOV. 1941

SUBMITTED: Walter Engineer, Corps of Engineers

APPROVAL RECOMMENDED: APPROVED:

Chief, Engineering Division, Office of the District Engineer

For the Chief of Engineers, U. S. Army

BY	DATE	REVISIONS CHARACTER
GS	12/7/41	Minor revisions.
GS	12/7/41	Magnetic starter replaced by motor control M.C.B.

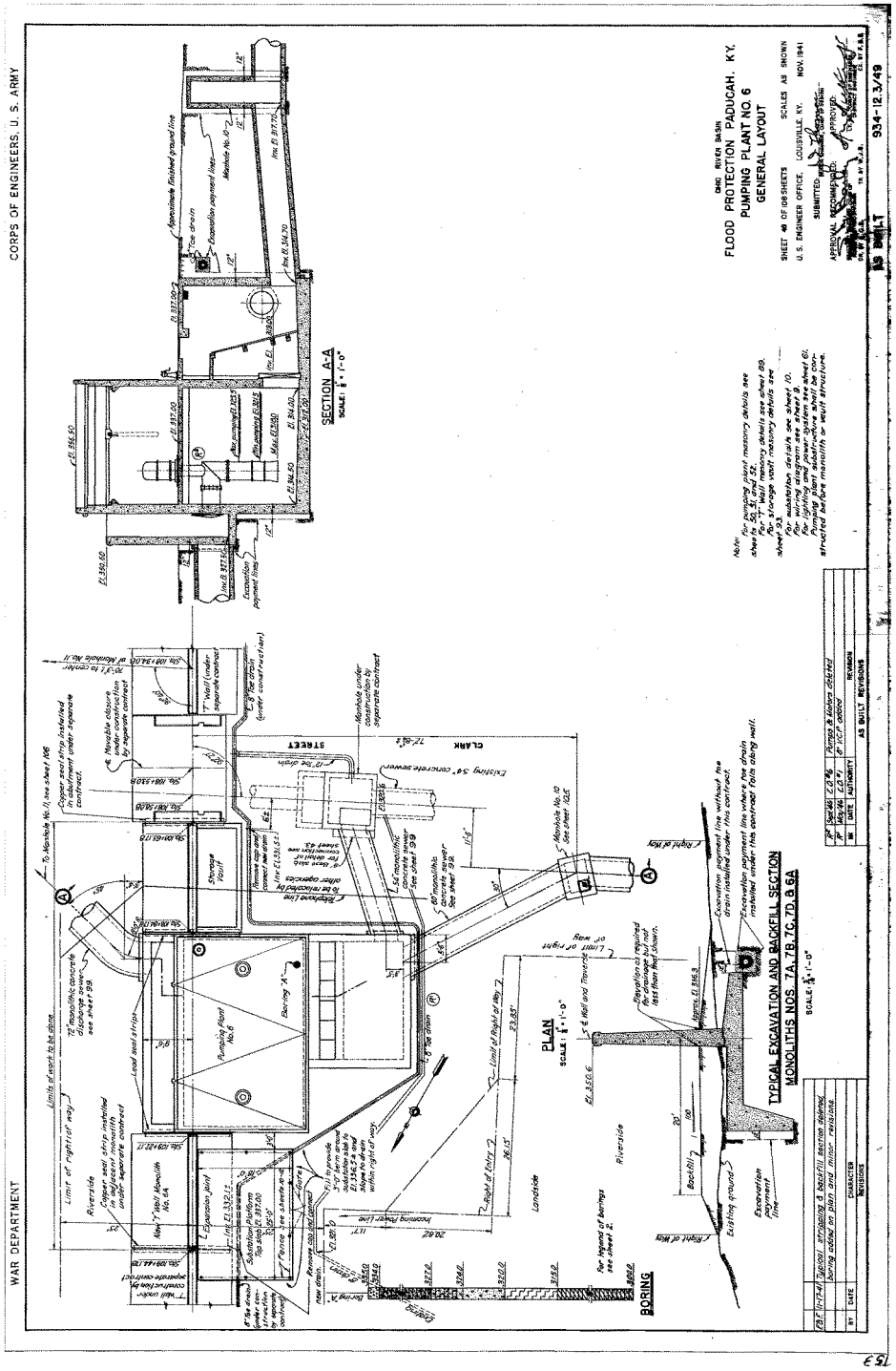
BY	DATE	AUTHORITY	AS BUILT REVISIONS
JK	Jan 1942	C.O. 47	Materials deleted or changed

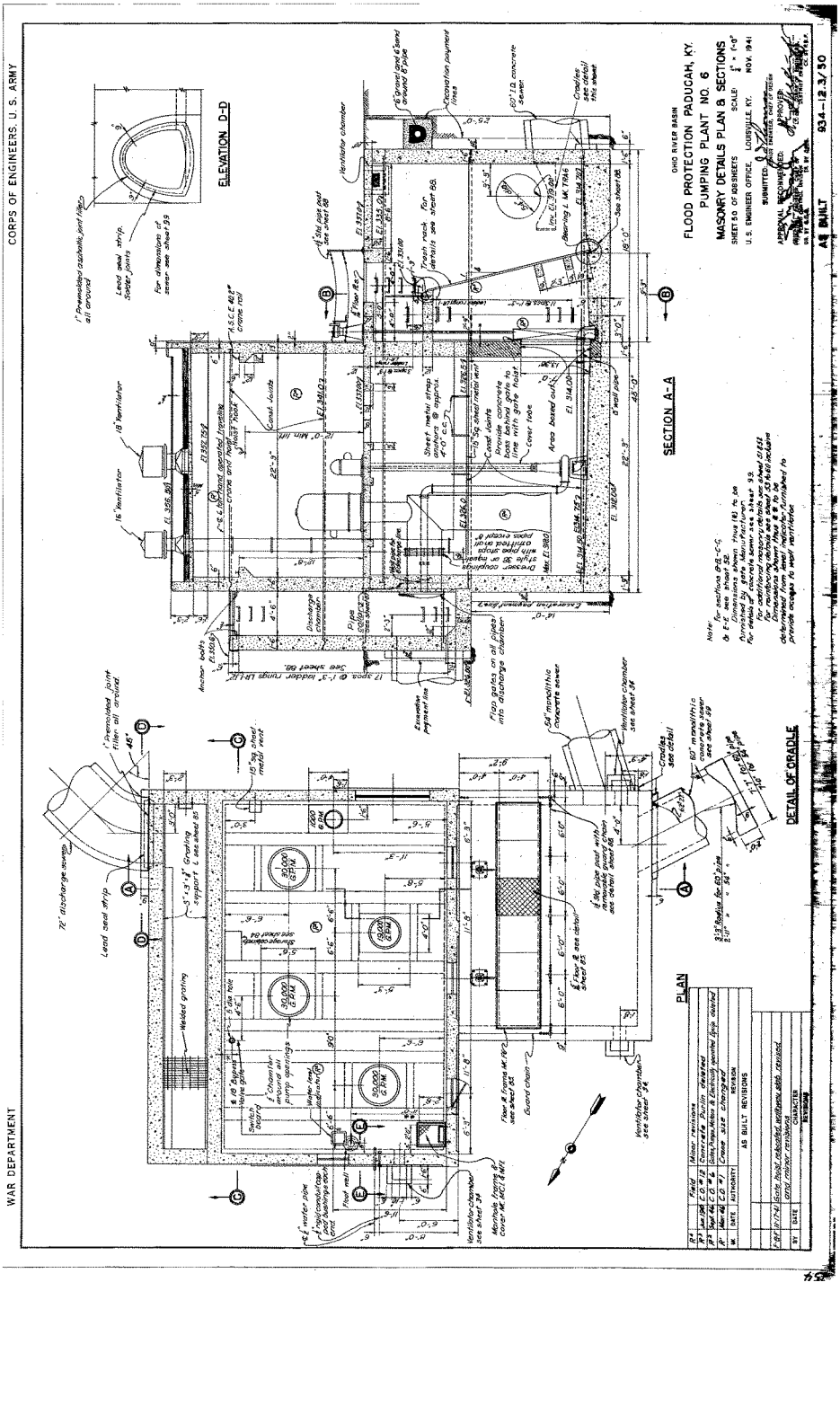
AS BUILT

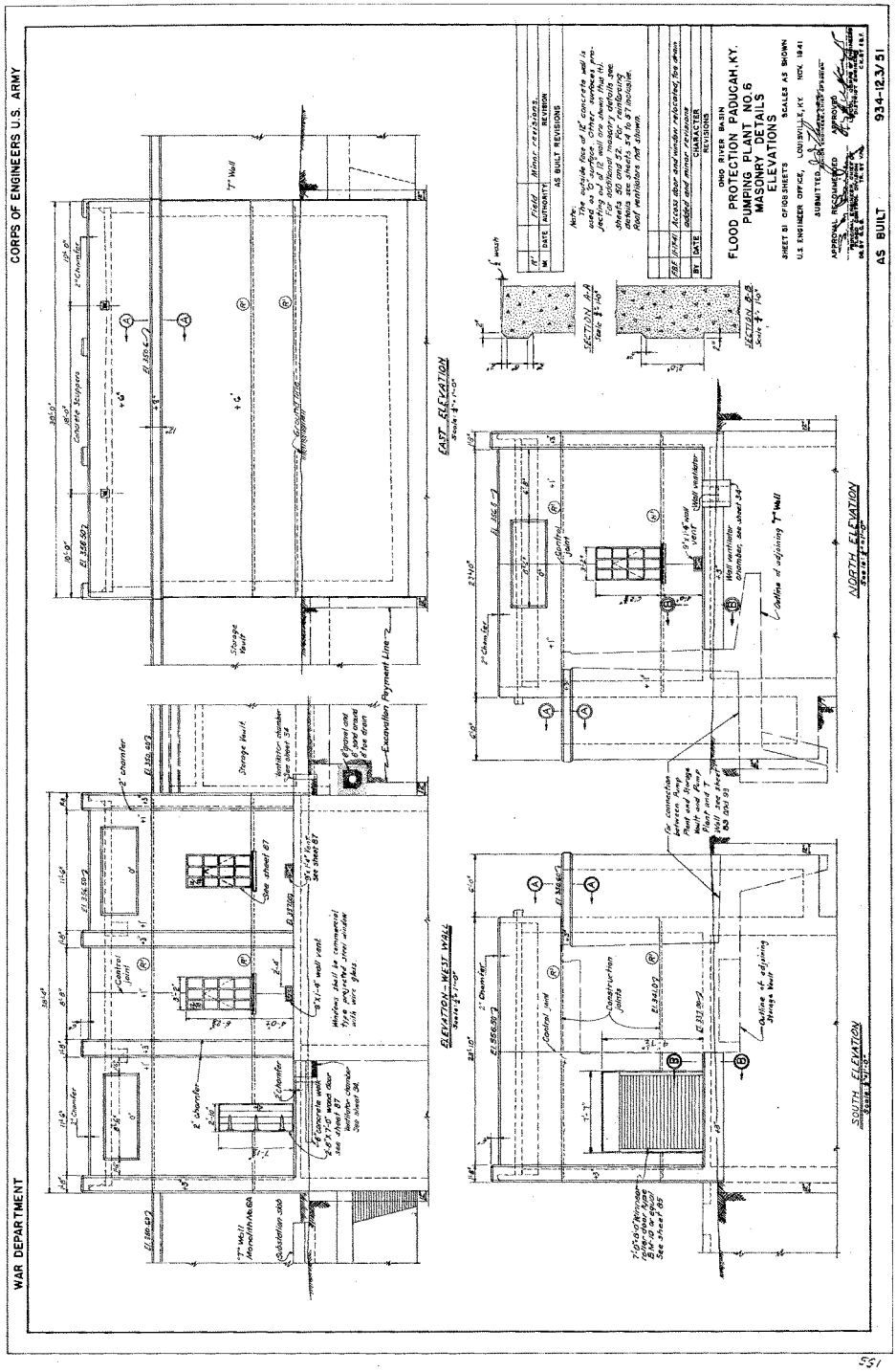
934-12.

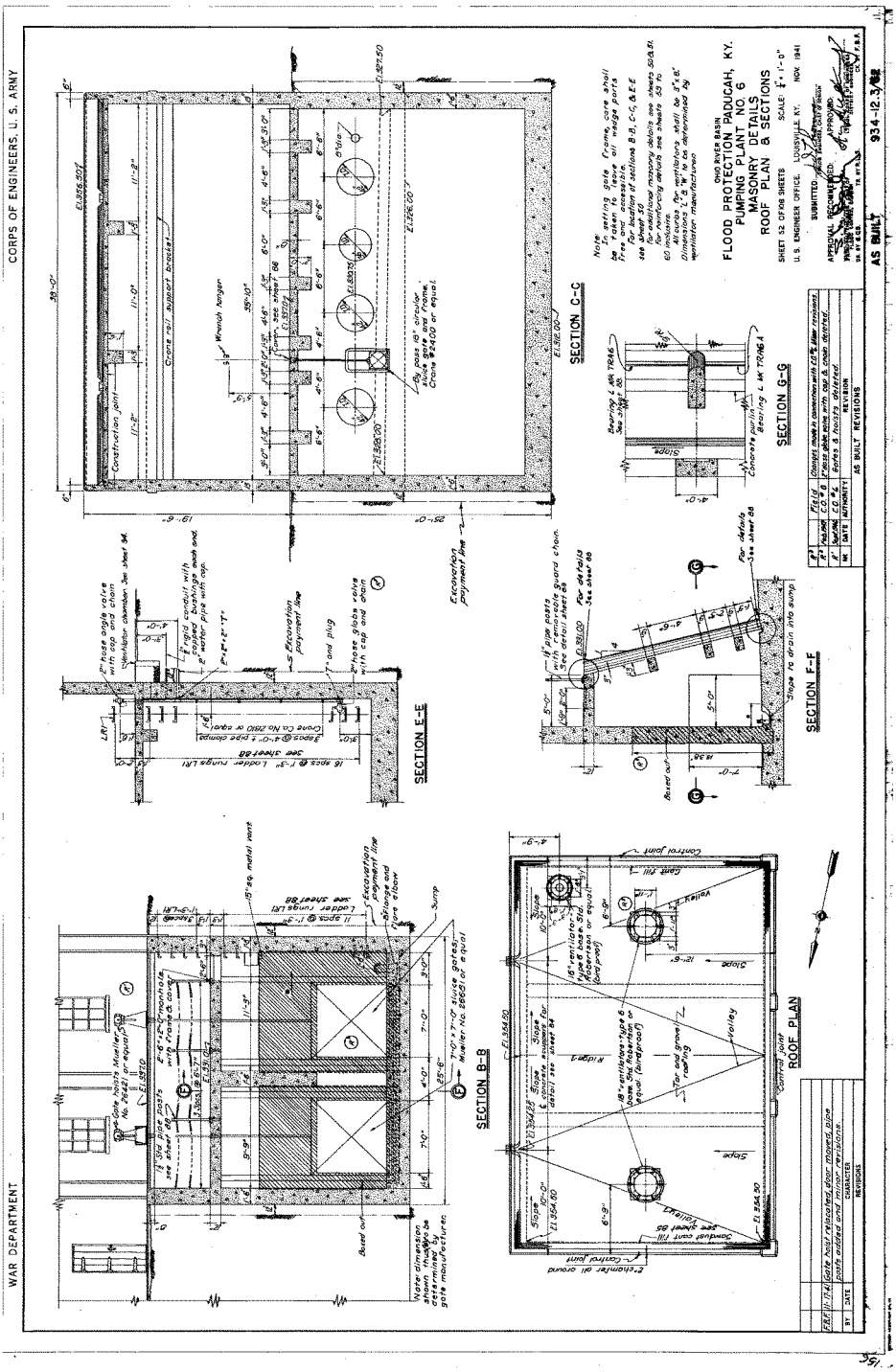
151

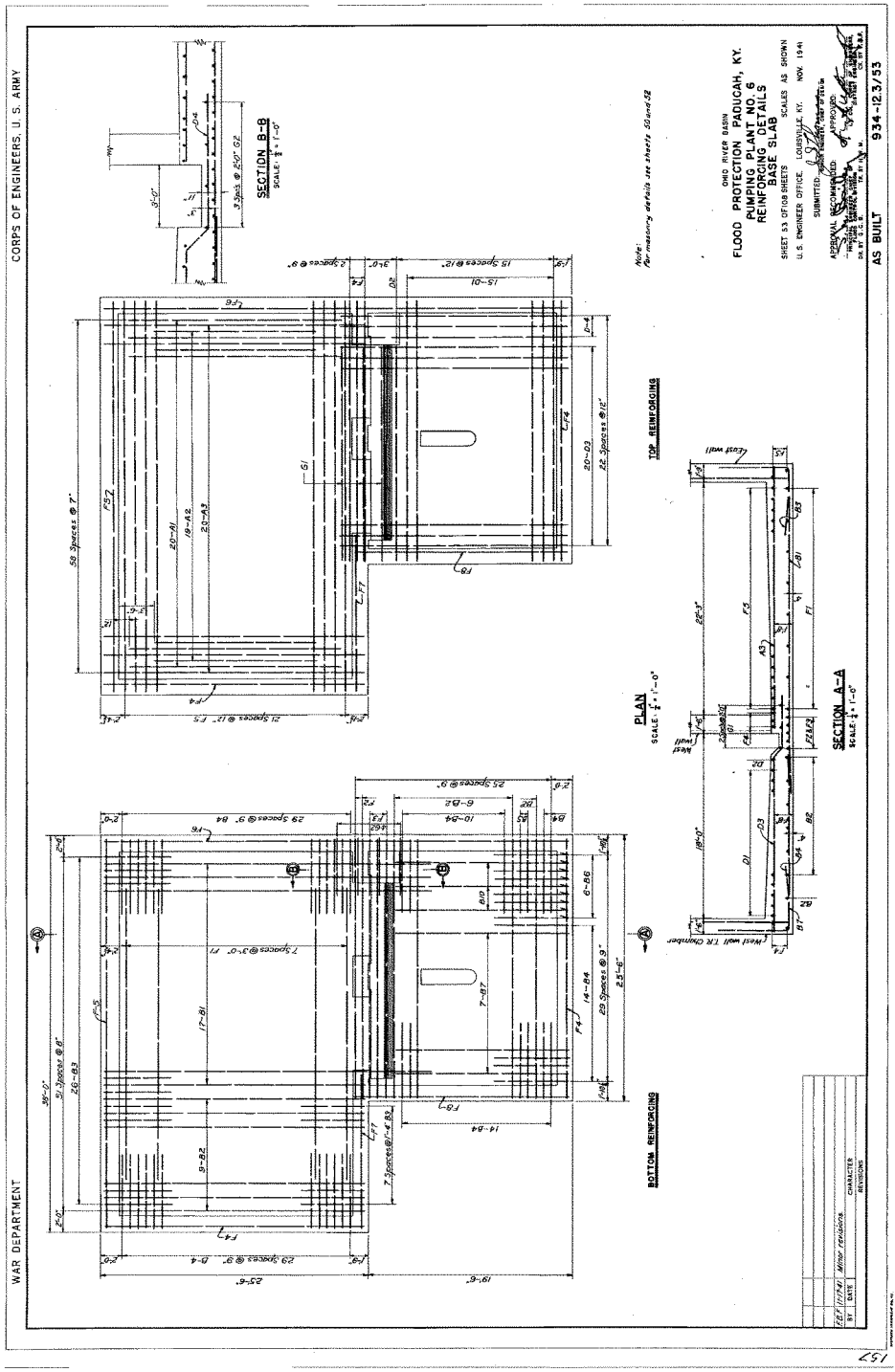
912

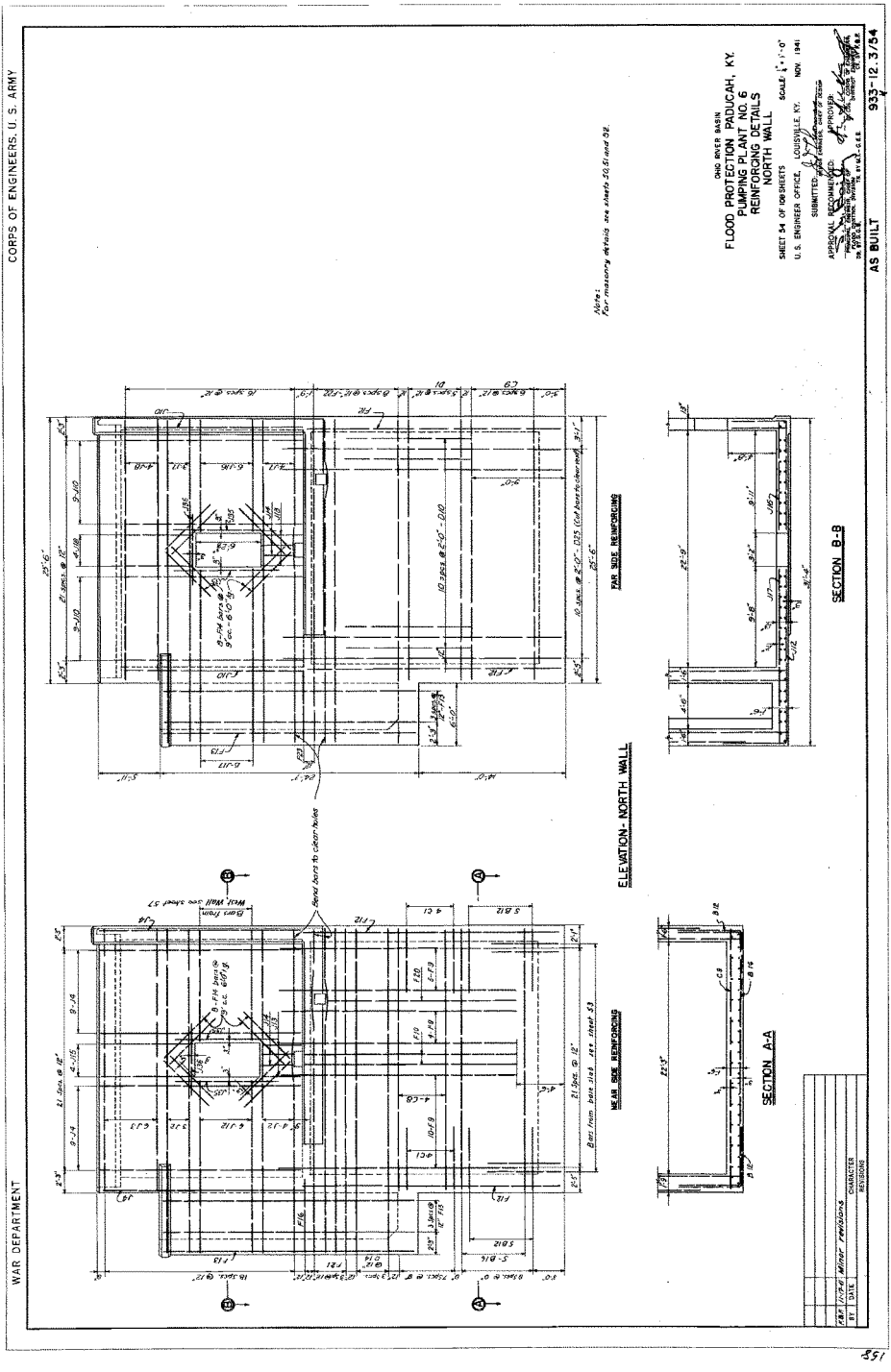

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER DIVN
FLOOD PROTECTION, PADUCAH, KY.
PUMPING PLANT NO. 6
GENERAL LAYOUT
SHEET 48 OF 108 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
AS BUILT
934-12.3/49
SECTION A-A
SCALE 1/8" = 1'-0"
PLAN
SCALE 1/8" = 1'-0"
TYPICAL EXCAVATION AND BACKFILL SECTION
MONOLITHS NOS. 7A, 7B, 7C, 7D, & 6A
SCALE 1/8" = 1'-0"
BORING
Riverside
Landside
Pumping Plant No. 6
STREET
CLARK
Existing ground
Excavation payment line
Limit of right of way
Limit of excavation
Boring A
Boring B
Boring C
Boring D
Boring E
Boring F
Boring G
Boring H
Boring I
Boring J
Boring K
Boring L
Boring M
Boring N
Boring O
Boring P
Boring Q
Boring R
Boring S
Boring T
Boring U
Boring V
Boring W
Boring X
Boring Y
Boring Z

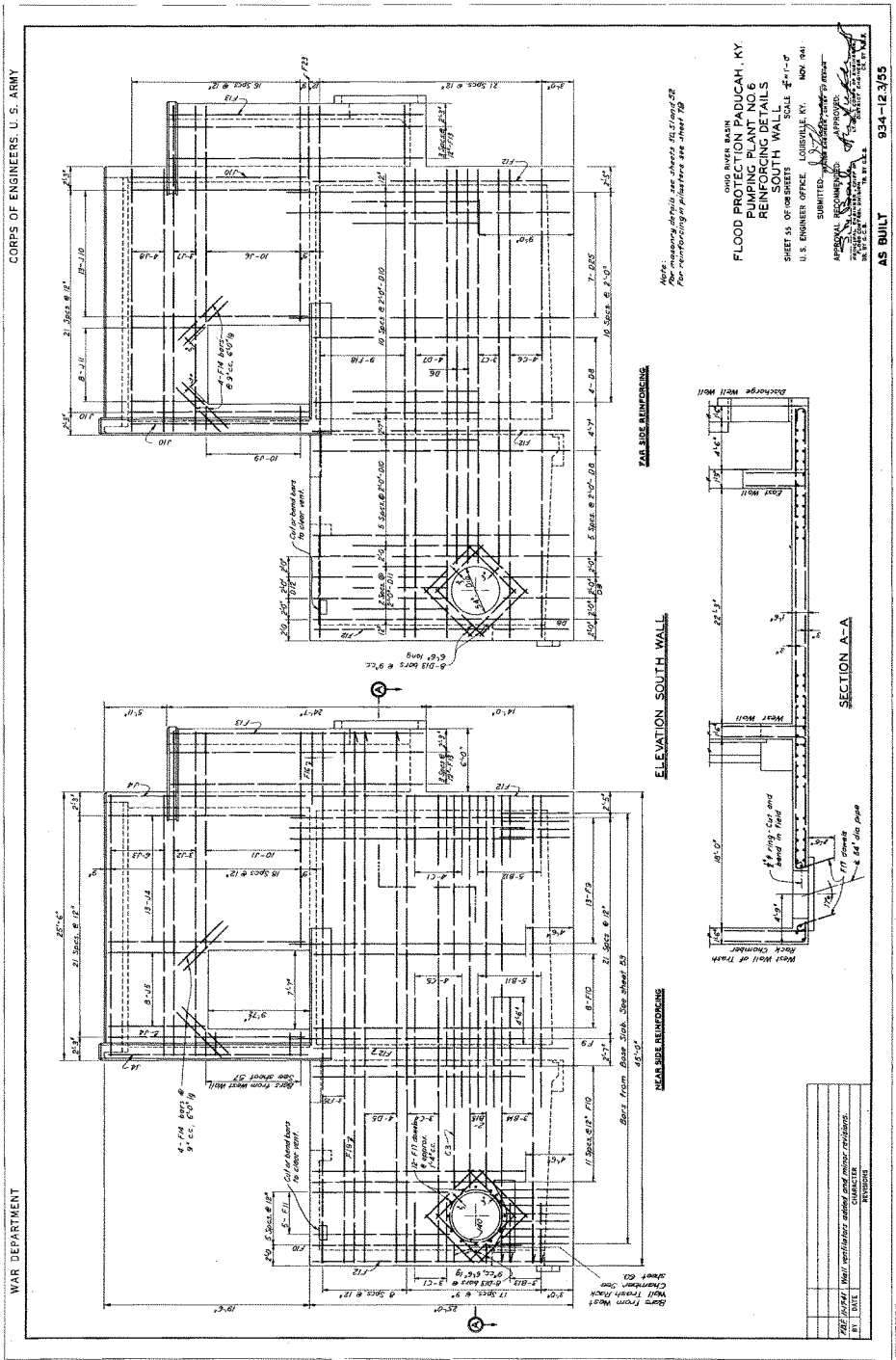

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
MASONRY DETAILS PLAN & SECTIONS
SHEET 90 OF 408 SHEETS
SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED:
APPROVED:
AS BUILT
934-12.3/30
ELEVATION D-D
SECTION A-A
PLAN
DETAIL OF CRADLE

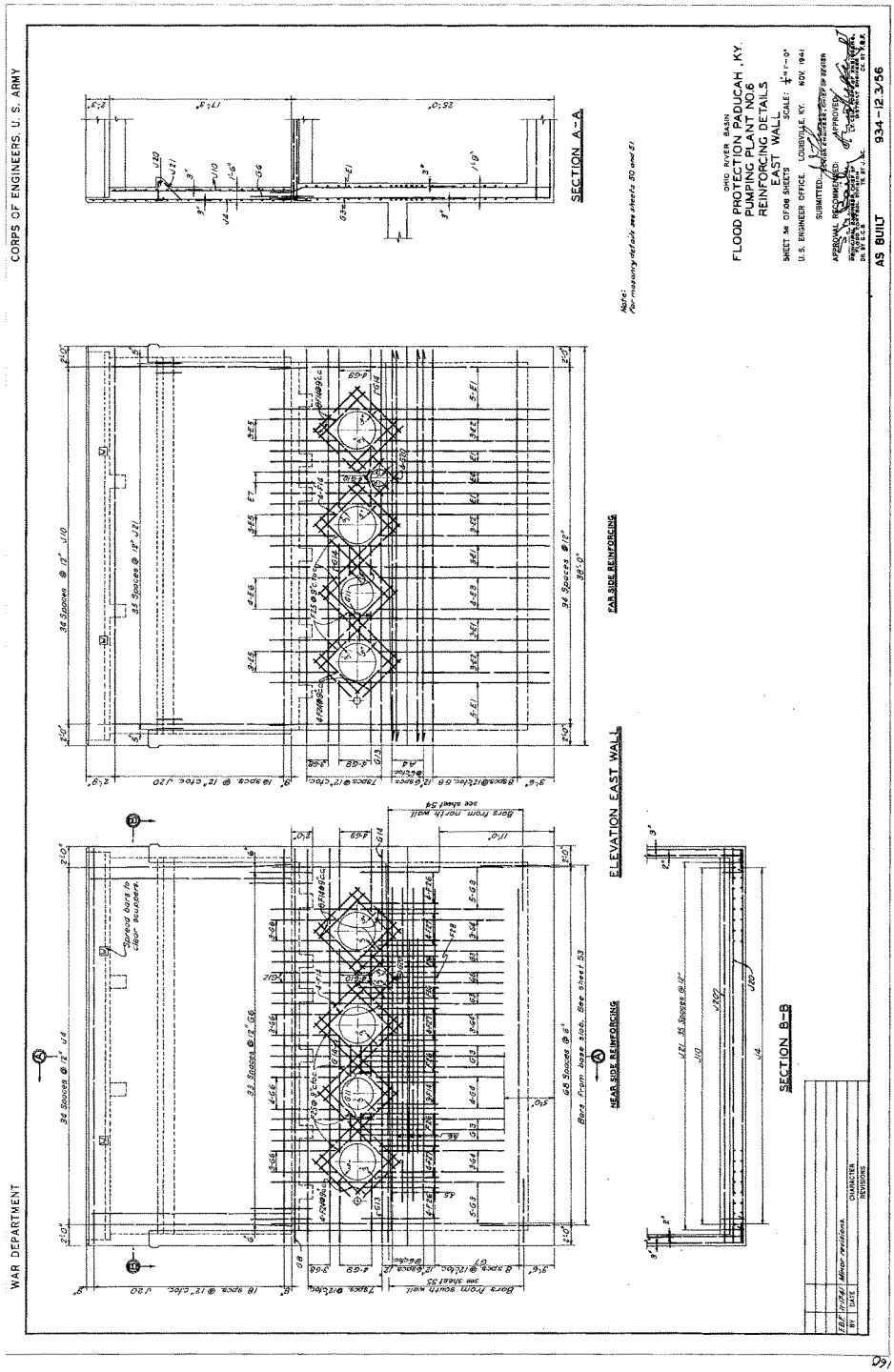

WAR DEPARTMENT
CORPS OF ENGINEERS U.S. ARMY
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
MACHINERY DETAILS
ELEVATIONS
OHIO RIVER BASIN
AS BUILT
934-12.3/51
EAST ELEVATION
ELEVATION-WEST WALL
NORTH ELEVATION
SOUTH ELEVATION
SECTION A-A
SECTION B-B
SECTION C-C
T Wall
Storage Vault
Excavation Payment Line
Control Joint
Construction Joints
Sump
Ventilator chamber
Well ventilator
Outline of adjoining Storage Vault
Outline of adjoining T Wall
Access door and window relocated, fire drain added and minor revisions
Field Minor revisions
AS BUILT REVISIONS
SCALES AS SHOWN
LOUISVILLE, KY. HDK 1941
SUBMITTED
APPROVED
APPROVAL RECOMMENDED

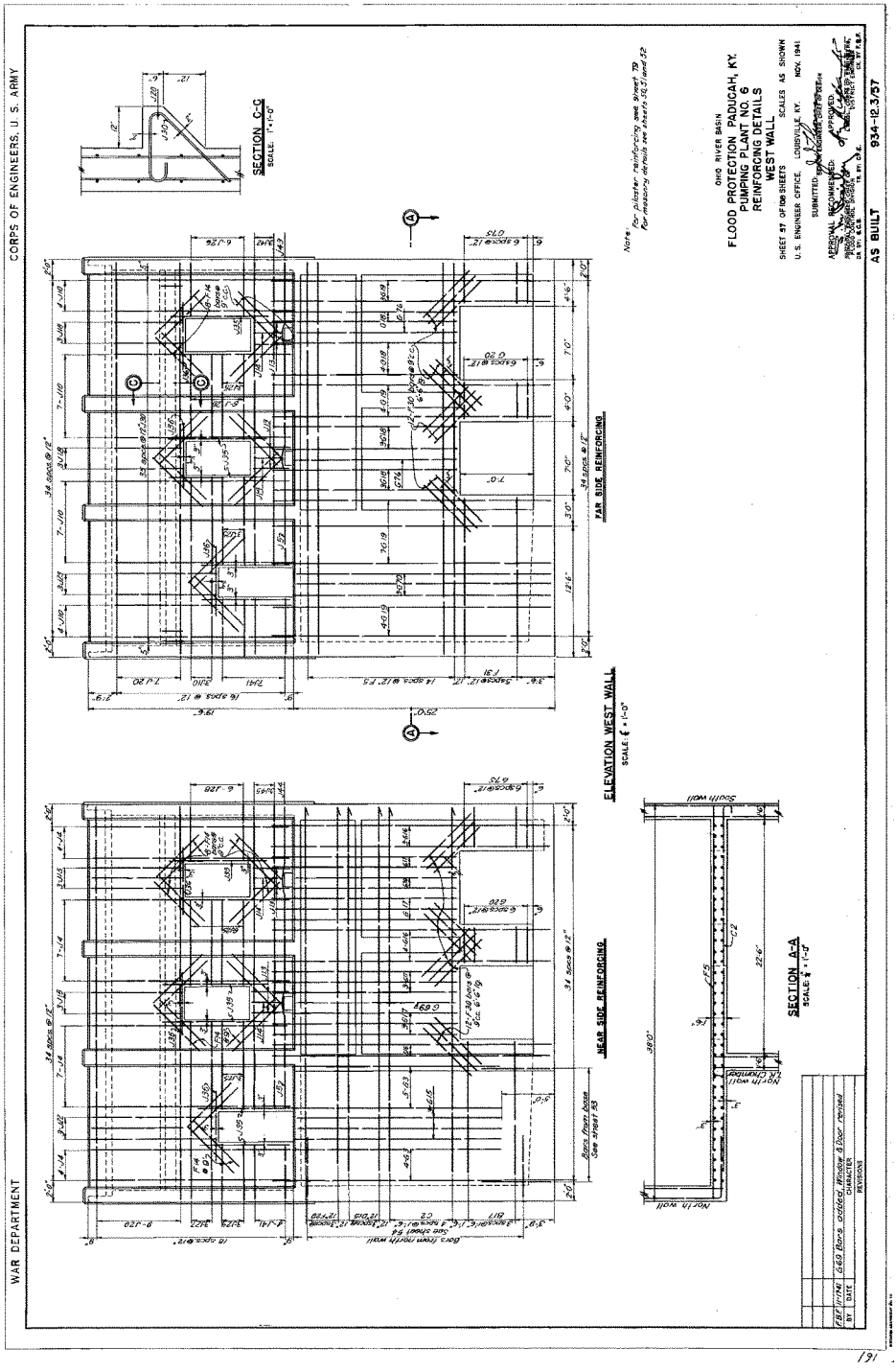

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION, PADUCAH, KY.
PUMPING PLANT NO. 6
MASONRY DETAILS
ROOF PLAN & SECTIONS
SHEET 12 OF 28 SHEETS
SCALE 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
AS BUILT
934-12.3
SECTION E-E
SECTION C-C
SECTION G-G
SECTION F-F
SECTION B-B
ROOF PLAN
Note
Excavation payment line
Control joint
Crane rail support bracket
Wrench hangar
Ridge
Valley
Slope
Sump
Buried out
Concrete pulling bearing
Bearing
Ladder rungs
Pipe sleeve
Gate hoist relocated, door moved, pipe posts added and minor revisions.
REVISIONS

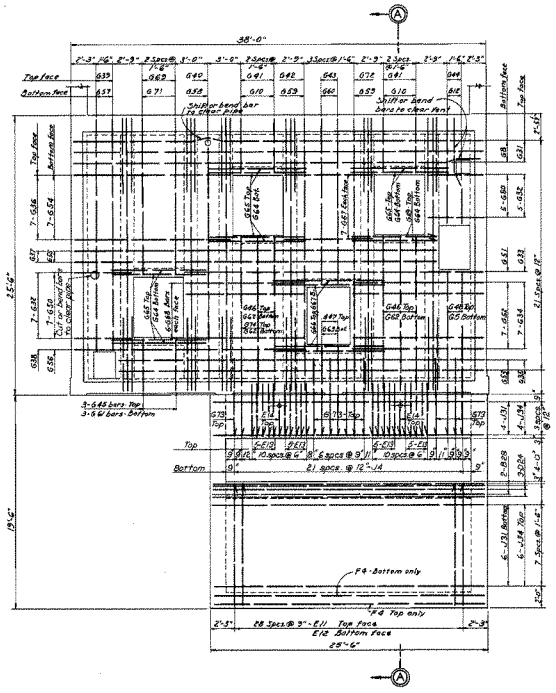

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
REINFORCING DETAILS
BASE SLAB
SHEET 53 OF 108 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
AS BUILT
934-12.3/53
SECTION B-B
SCALE 1/4" = 1'-0"
PLAN
SCALE 1/4" = 1'-0"
TOP REINFORCING
BOTTOM REINFORCING
SECTION A-A
SCALE 1/4" = 1'-0"
Note:
For masonry details see sheets 50 and 52
REVISIONS
DATE
BY
CHARACTER
MINOR REVISIONS
157


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
PUMPING PLANT NO. 6
REINFORCING DETAILS
NORTH WALL
SHEET 54 OF 108 SHEETS
SCALE 1/4" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
AS BUILT
933-12.3/54
ELEVATION - NORTH WALL
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
SECTION B-B
SECTION A-A
Bend bars to clear holes
Note:
For masonry details see sheets 50, 51 and 52.
CHARACTER OF REVISIONS
551


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY
PUMPING PLANT NO. 6
REINFORCING DETAILS
SOUTH WALL
SHEET 55 OF 108 SHEETS
SCALE 1/4"-1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV 1941
SUBMITTED
APPROVED:
APPROVAL RECOMMENDED:
AS BUILT
934-12.3/55
ELEVATION SOUTH WALL
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
SECTION A-A
Discharge Wall
Floor Wall
West Wall
West Wall of Trash Rack Chamber
Bars From West Wall See Sheet 53
Bars From West Trash Rack Chamber See Sheet 63
Bars from Base Slab See Sheet 53
Here:
For masonry details see sheets 56, 57 and 58
For reinforcing of pilasters see sheet 78
REVISIONS
DATE
BY
CHARACTER
651

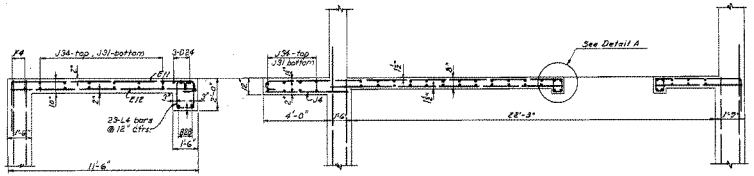

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO.6
REINFORCING DETAILS
EAST WALL
SHEET 34 OF 108 SHEETS
SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED:
APPROVED:
AS BUILT
934 - 12.3/56
ELEVATION EAST WALL
FAN SIDE REINFORCING
NEAR SIDE REINFORCING
SECTION A-A
SECTION B-B
Note: For masonry details see sheets 50 and 51
Bars from north wall see sheet 34
Bars from south wall see sheet 35
Bars from base slab. See sheet 53
Dowel bars by Union Builders
CHARACTER
REVISIONS
DATE
BY


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
REINFORCING DETAILS
WEST WALL
SHEET 57 OF 106 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
RECOMMENDED
APPROVED
AS BUILT
934-12.3/57
SECTION C-C
SCALE 1"=1'-0"
ELEVATION WEST WALL
SCALE 1/4"=1'-0"
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
SECTION A-A
SCALE 1/4"=1'-0"
South wall
North wall
N.E. Chamber
Note
For pilaster reinforcing see sheet 79
For masonry details see sheets 29, 31 and 32



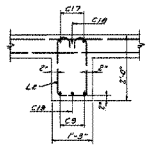
PLAN

SCALE: $\frac{1}{4}$" = 1'-0"



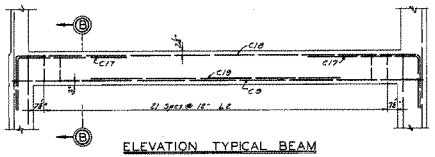
SECTION A-A

SCALE: $\frac{1}{4}$" = 1'-0"



SECTION B-B

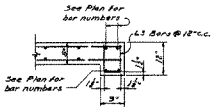
SCALE: $\frac{1}{4}$" = 1'-0"



ELEVATION TYPICAL BEAM

6 REQUIRED

SCALE: $\frac{1}{4}$" = 1'-0"



DETAIL A

SCALE: $\frac{1}{4}$" = 1'-0"

Note
For masonry details see sheets 30 and 52

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
REINFORCING DETAILS
MOTOR FLOOR

SHEET 58 OF 108 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [signature] CHIEF OF SECTION

APPROVAL RECOMMENDED: [signature] CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [signature] DISTRICT ENGINEER

DR. BY: G.C.B. TR. BY: V.F.C. CK. BY: W.K.S.

BY	DATE	CHARACTER
KAF	11-17-41	Bars in walkway revised and minor revisions

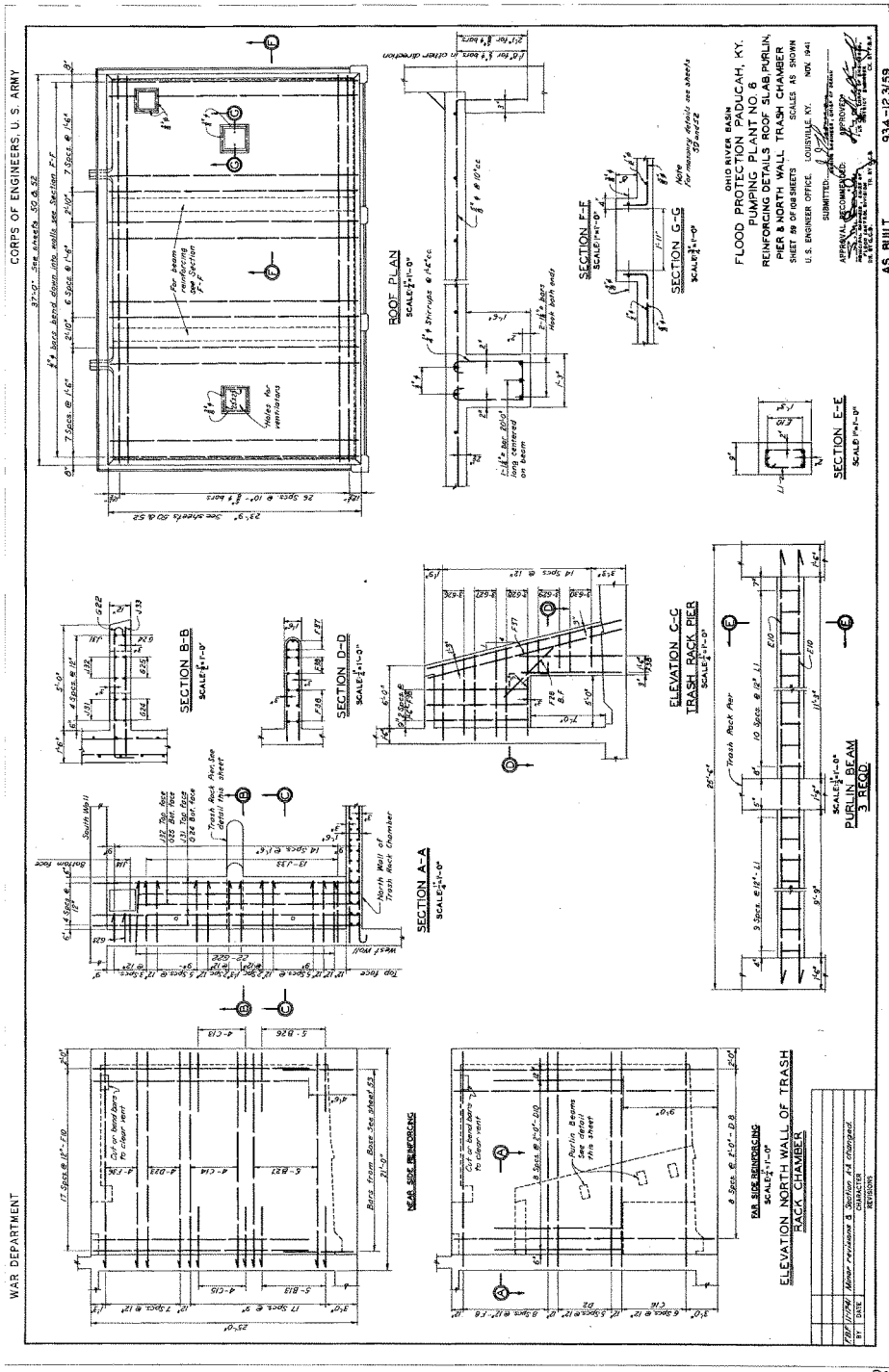
REVISIONS

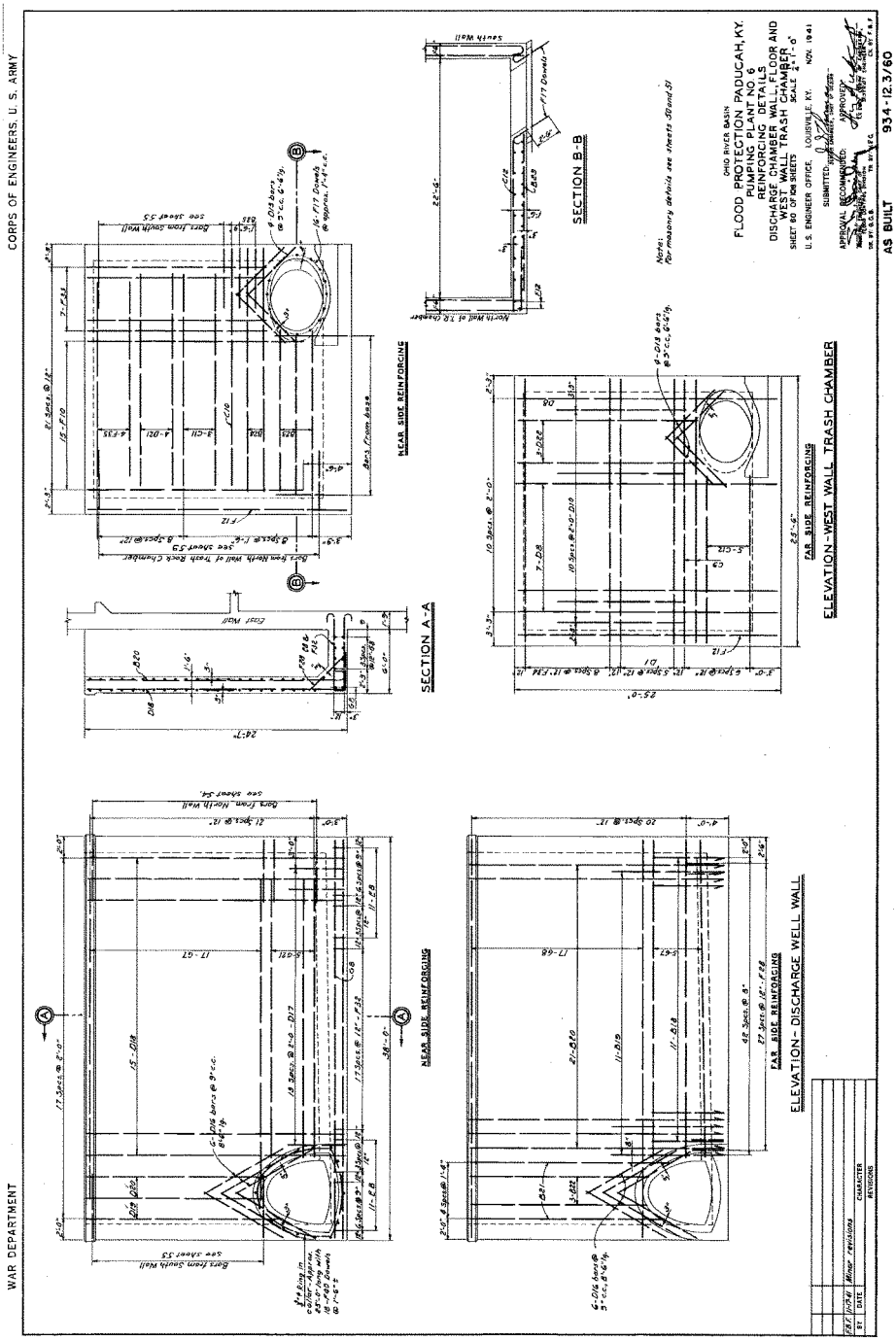
AS BUILT

934-12.3/58

922

162


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
REINFORCING DETAILS ROOF SLAB, PURLIN, PIER & NORTH WALL TRASH CHAMBER
SHEET 89 OF 108 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
AS BUILT
934-12.3/59
ROOF PLAN
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F
SECTION G-G
ELEVATION G-C TRASH RACK PIER
PURLIN BEAM 3 REQD
ELEVATION NORTH WALL OF TRASH RACK CHAMBER
REAR SIDE REINFORCING
RAM SIDE REINFORCING
REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
PUMPING PLANT NO. 6
REINFORCING DETAILS
DISCHARGE CHAMBER WALL, FLOOR AND WEST WALL TRASH CHAMBER
SHEET 60 OF 130 SHEETS
SCALE 1"=1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
AS BUILT
934-12.3/60
SECTION A-A
SECTION B-B
ELEVATION-WEST WALL TRASH CHAMBER
ELEVATION-DISCHARGE WELL WALL
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
Note: For masonry details see sheets 59 and 57
South wall
North Wall of T.R. Chamber
Coast Wall
Data from North wall of Trash Rack Chamber
Data from South Wall
Data From North Wall
see sheet 53
see sheet 54
see sheet 57a
24'-7"
25'-0"
22'-6"
17'-6"
17'-11"
17'-6 7/8"
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17'-6 1/4"
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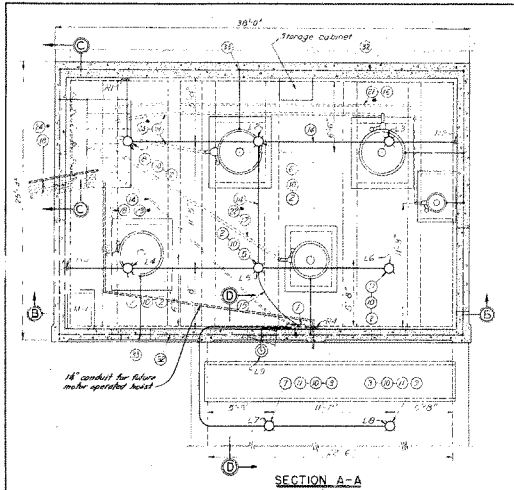
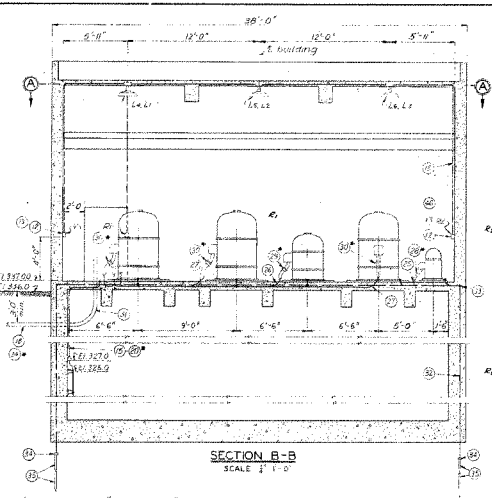
WAR DEPARTMENT

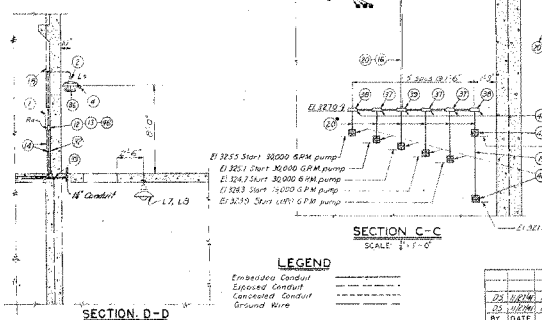
CORPS OF ENGINEERS, U. S. ARMY



SECTION A-A
SCALE 1/4" = 1'-0"

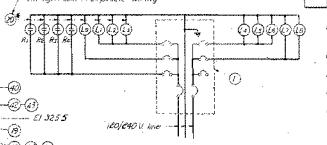


SECTION B-B
SCALE 1/4" = 1'-0"



SECTION C-C
SCALE 1/4" = 1'-0"

SECTION D-D
SCALE 1/4" = 1'-0"



WIRING DIAGRAM
LIGHTING CIRCUIT

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFR.	CATALOG NO.	QUAN.
1	4 circuit light distribution panel (surface type)			1
2	R.L.M. dome reflector and socket	West	740573	7
3	Incandescent conduit with reflector and socket	Crouse-Hinds	VP1041054	2
4	Padlock	Yale	3514842	1
5	Conduit outlet	Crouse-Hinds	SK A 22	1
6	"	"	SK 12	1
7	"	"	SK 12	3
8	"	"	SK 12	1
8	"	"	SK 12	2
10	Condulet cover	"	SK B4	8
11	Gasket	"	Gask BDB	2
12	Condulet outlet	"	FD 1	4
13	Duplex plug receptacle			4
14	½" rigid electrical conduit			240'
15	¾" " " "			20'
16	1" " " "			1'-0"
17	2" " " "			30'
R2 18	3" " " "			60'
19	#6 hard drawn bare solid wire			350'
20A	#12 A.W.G. insulated copper wire			650'
21A	#8 3 cond. cable, #1,600M cir. mils with 60% rubber jacket			50'
22A	#10 " " " " " " "			60'
23A	400 M.C.M. cond. cable, #1,600M cir. mils with 60% rubber jacket			100'
24A	650 " " " " " " "			340'
25	1" standard 90° elbow			4
26	2" " "			2
27	3" " "			6
28A	1" Erickson coupling			1
29A	2" " "			1
30A	3" " "			3
R6 31	Special long radius 90° elbow, 4'-6" radius	G.E.		8
32	#00 bare stranded copper wire			240'
33	T connector for #00 stranded cable	Burndy	HTD426	4
34	Connector for #00 stranded cable to 1" rod		KA 64A	4
35	Ground rod, 1" x 8'-0" long	Copperweld		4
36	Wire guard for reflector	West	3514907	7
37	Condulet outlet	Crouse-Hinds	C 17	1
38	" "	"	C 17	1
39	" "	"	18637	1
40	Condulet cover	"	771	6
41	" "	"	1170	1
42	3" bolt circle type insulator	Lapp	1971	7
43	Bus support fitting (nut to clamp ¾ bare solid wire	Locke	9853	1
44	" " " " ¾" dia electrode	"	9858	6
45	Brass electrode (See Part No. 35 sheet 4.)			6
46	Wall surface plate			4
R5 18A	4" rigid electrical conduit			130'

Notes:
Figures in circles refer to Part numbers on Bill of Material.
All material shall be of the manufacture, type and catalog number specified, or its equal.
All conduit in floor shall be placed as near the center of same as possible and shall clear opening for pump removal. Small fittings, condulets, etc., not listed shall be furnished as required.
200 watt bulbs shall be furnished and installed in all lights.
* Indicated items Deleted.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
LIGHTING & POWER SYSTEMS

SHEET 61 OF 108 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE KY. NOV. 1941

SUBMITTED: [signature] DIVISION ENGINEER, CHIEF OF DESIGN

APPROVED RECOMMENDED: [signature] CHIEF, FLOOD CONTROL DIVISION

APPROVED: [signature] OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

Rev.	Fields	Bill of Material Changed & Minor Revisions.
R	Feb. 27, C.O. No. 7	Materials Deleted
M	DATE AUTHORITY	REVISION
	AS BUILT REVISIONS	

D3	11-27-42	Magnetic starter replaced by motor control #4-B
D2	10-1-42	Minor revisions
BY	DATE	CHARACTER REVISIONS

LEGEND

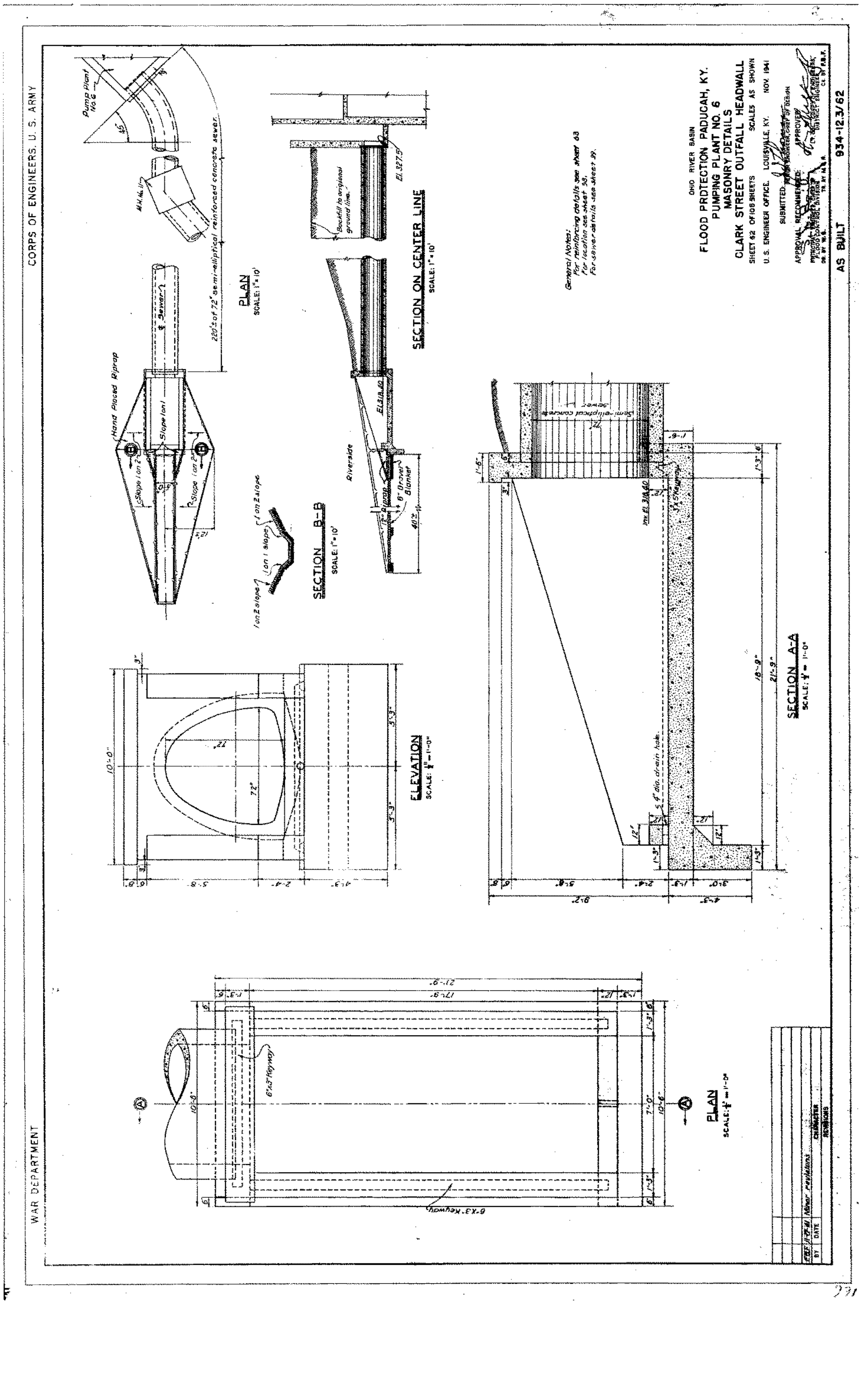
Embedded Conduit
Exposed Conduit
Concealed Conduit
Ground Wire

AS BUILT

934-12.3/61

925

165

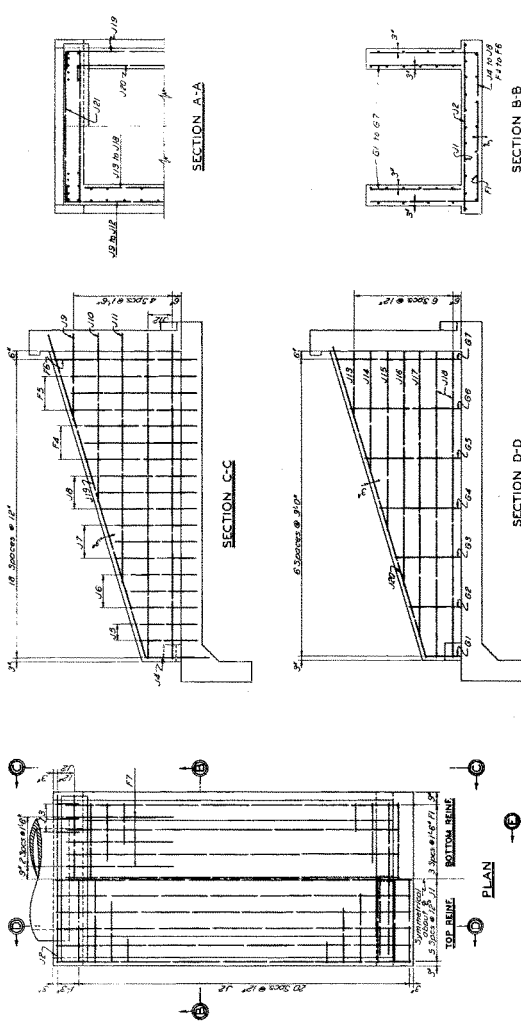

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
PLAN
SCALE: 1" = 10'
SECTION ON CENTER LINE
SCALE: 1" = 10'
SECTION B-B
SCALE: 1" = 10'
Riverside
Hand Placed Riprap
220'± of 72" semi-elliptical reinforced concrete sewer
Pump Plant No. 6
El. 327.5
El. 318.60
6" Gravel Blanket
Backfill to original ground line
General Notes:
For reinforcing details see sheet 63
For location see sheet 58.
For sewer details see sheet 59.
ELEVATION
SCALE: 1/4" = 1'-0"
SECTION A-A
SCALE: 1/4" = 1'-0"
4" dia. drain hole
6"x3" Keyway
72" Semi-elliptical concrete sewer
PLAN
SCALE: 1/4" = 1'-0"
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
MASONRY DETAILS
CLARK STREET OUTFALL HEADWALL
SHEET 62 OF 108 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV 1941
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
934-12.3/62
AS BUILT
Minor revisions
BY
DATE
CHARACTER
REVISIONS

WAR DEPARTMENT — CORPS OF ENGINEERS, U. S. ARMY

REINFORCEMENT SCHEDULE

MARK	NO. REQD.	SIZE	LENGTH	BENDING DIAGRAM (DIMENSION GIVEN IN BENDING DIAGRAM)	WT. EACH	TOTAL WT.
F1	7	3/4" sq.	24'-0"	24'-0" Straight	36.42	254.9
F2	4	"	11'-2"	11'-2" Straight	16.77	67.1
F3	4	3/4" sq.	4'-3"	4'-3" Straight	6.38	25.5
F4	3	"	22'-6"	6'-0" 9'-0" 7'-6"	34.05	102.2
F5	3	"	24'-0"	7'-6" 9'-0" 7'-6"	36.00	110.4
F6	1	"	26'-4"	8'-6" 9'-0" 8'-6"	39.53	39.6
F7	6	"	21'-3"	11'-0" 10'-3"	12.79	76.8
G1	2	3/4" sq.	2'-3"	2'-3" Straight	2.35	4.7
G2	2	"	3'-2"	"	3.30	6.6
G3	2	"	4'-1"	"	4.26	8.5
G4	2	"	5'-0"	"	5.22	10.4
G5	2	"	5'-11"	"	6.17	12.3
G6	2	"	6'-10"	"	7.13	14.3
G7	2	"	7'-9"	"	8.08	16.2
J1	11	3/4" sq.	25'-3"	5'-10" 14'-5" Straight	14.81	162.9
J2	21	"	10'-6"	10'-6" Straight	6.79	142.5
J3	6	"	11'-6"	11'-6" Straight	7.08	42.5
J4	1	"	16'-10"	3'-6" 13'-4"	11.24	11.2
J5	2	"	16'-0"	3'-6" 12'-6"	10.69	21.4
J6	3	"	17'-3"	4'-1" 13'-2"	11.47	34.4
J7	3	"	19'-0"	5'-10" 13'-2"	12.69	38.1
J8	3	"	20'-10"	5'-10" 15'-0"	13.38	41.8
J9	2	"	6'-3"	6'-3" Straight	4.12	8.2
J10	2	"	11'-0"	11'-0" Straight	7.35	14.7
J11	2	"	16'-0"	16'-0" Straight	10.69	21.4
J12	4	"	20'-1"	12'-6" 7'-7"	13.75	55.0
J13	2	"	6'-0"	6'-0" Straight	2.67	5.3
J14	2	"	7'-4"	"	4.90	9.8
J15	2	"	10'-10"	"	7.26	14.5
J16	2	"	14'-3"	"	9.52	19.0
J17	2	"	17'-3"	"	11.52	23.0
J18	4	"	18'-1"	"	12.41	49.6
J19	2	"	21'-10"	12'-6" 9'-4"	14.36	28.7
J20	2	"	20'-10"	12'-6" 8'-4"	13.61	27.2
J21	8	"	9'-0"	9'-0" Straight	6.12	49.0
J22	6	3/4" sq.	2'-3"	"	1.50	9.0
J23	1	"	19'-8"	See elevation	13.14	13.1
				Total		1683

MARK	DATE	REVISIONS
		CHARACTER



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
REINFORCING DETAILS
CLARK STREET OUTFALL HEADWALL

SHEET 48 OF 108 SHEETS — SCALE: 1/2"=1'-0"

U.S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

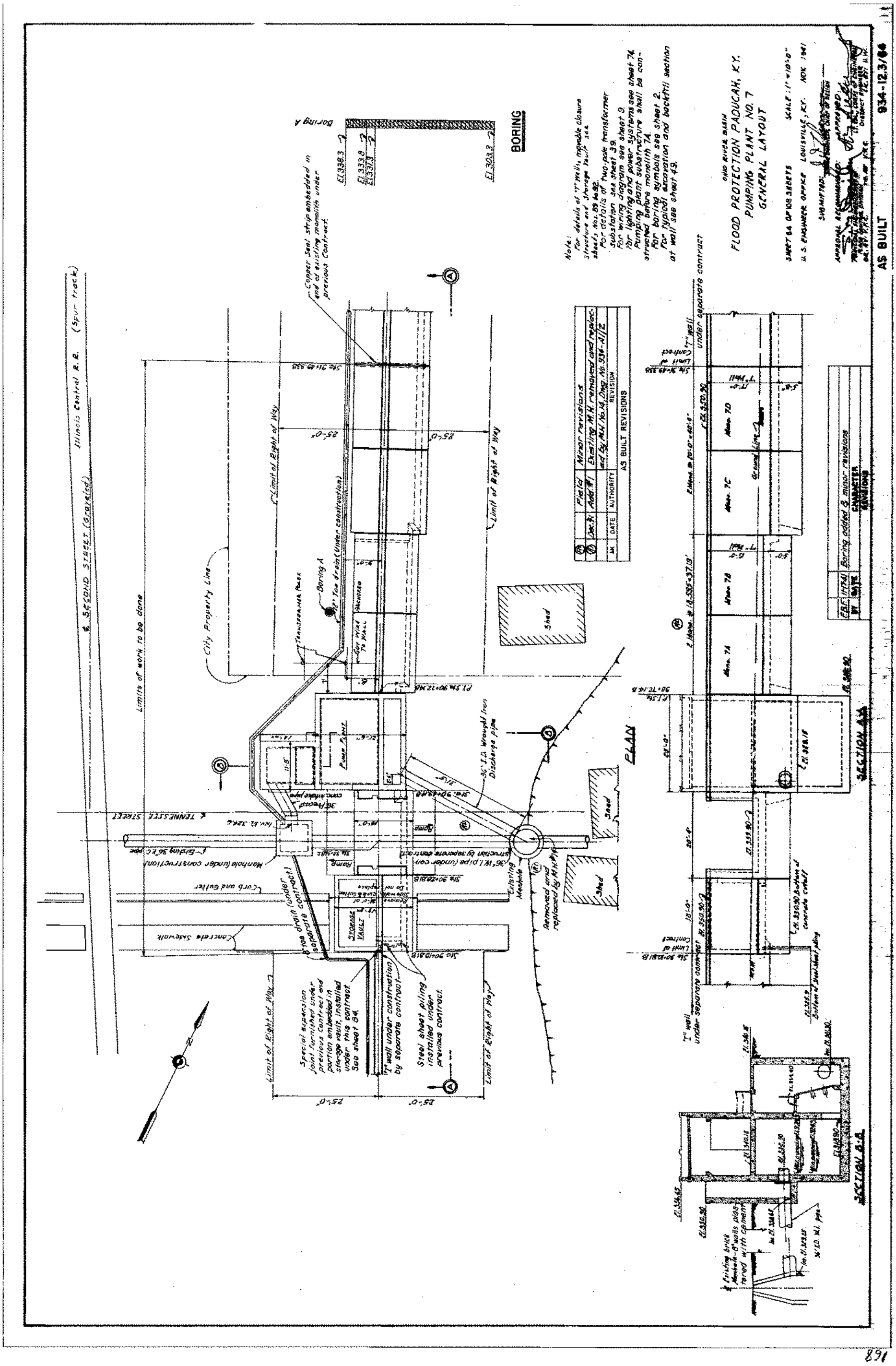
SUBMITTED: [illegible] — APPROVED: [illegible]

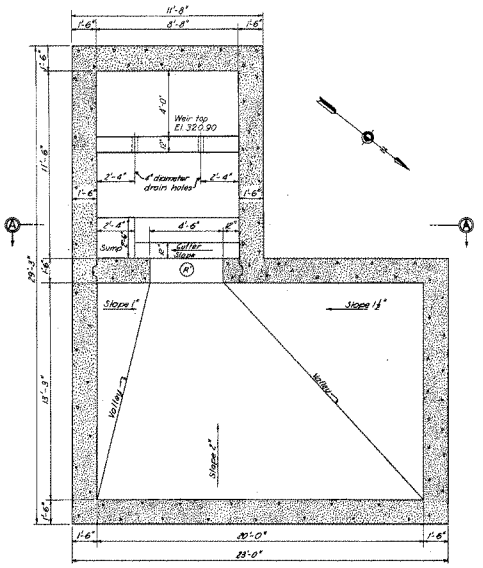
APPROVAL RECOMMENDED: [illegible]

AS BUILT — 934-123/63

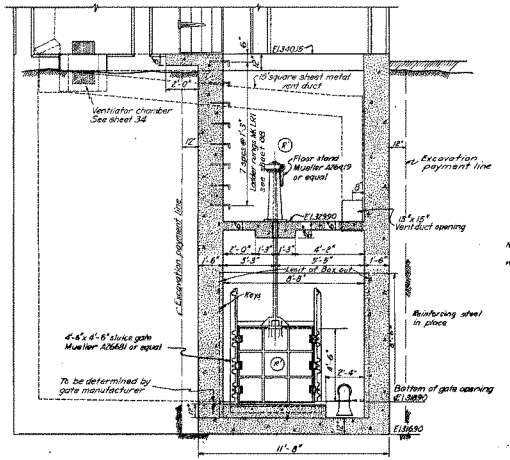
General Notes:
For masonry details see sheet 42

L91


OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 7
GENERAL LAYOUT
AS BUILT
934-12.3/84
PLAN
SECTION A-A
SECTION B-B
BORING
AS BUILT REVISIONS
Limits of work to be done
City Property Line
Limit of Right of Way
Illinois Central R.R. (Spur track)
℄ SECOND STREET (Graveled)
℄ TENNESSEE STREET
Concrete Sidewalk
Curb and Gutter
Storage Vault
Pump Room
Ramp
Shed
Existing Manhole
Removed and replaced by M.H.#1
36" I.D. Wrought Iron Discharge pipe
Boring A
Boring added & minor revisions



PLAN BASE



SECTION A-A

Note:
In setting gate frame, care shall be taken to leave all wedge parts free and accessible.
Provide 18"recess under gate.
For additional masonry details see sheets 66, 67 & 68
For reinforcing details see sheets 69 to 73 inclusive

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 7
MASONRY DETAILS
BASE PLAN & SECTION

SHEET 65 OF 108 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV 1941

SUBMITTED: UNION ENGINEER, CHIEF OF DESIGN

APPROVED: APPROVED:

FRED'K MACHEN, DISTRICT ENGINEER

LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY M.E.D. TR. BY Mrs. B. CK. BY F.B.K.

AS BUILT 934-12.3/65

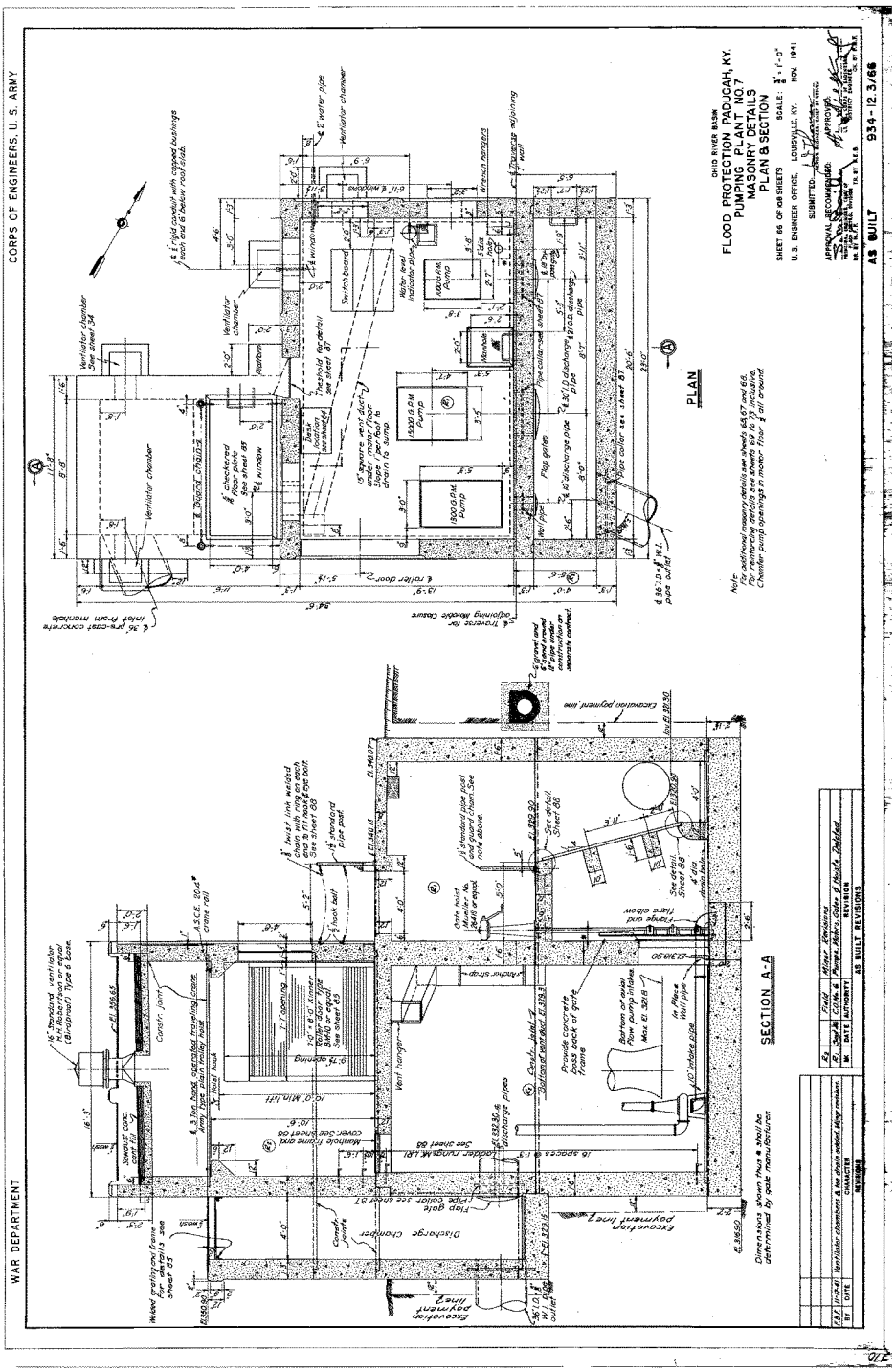
BY	DATE	CHARACTER REVISIONS
F.B.K.	11-17-41	Sump vent added, pump sump changed and minor revisions.

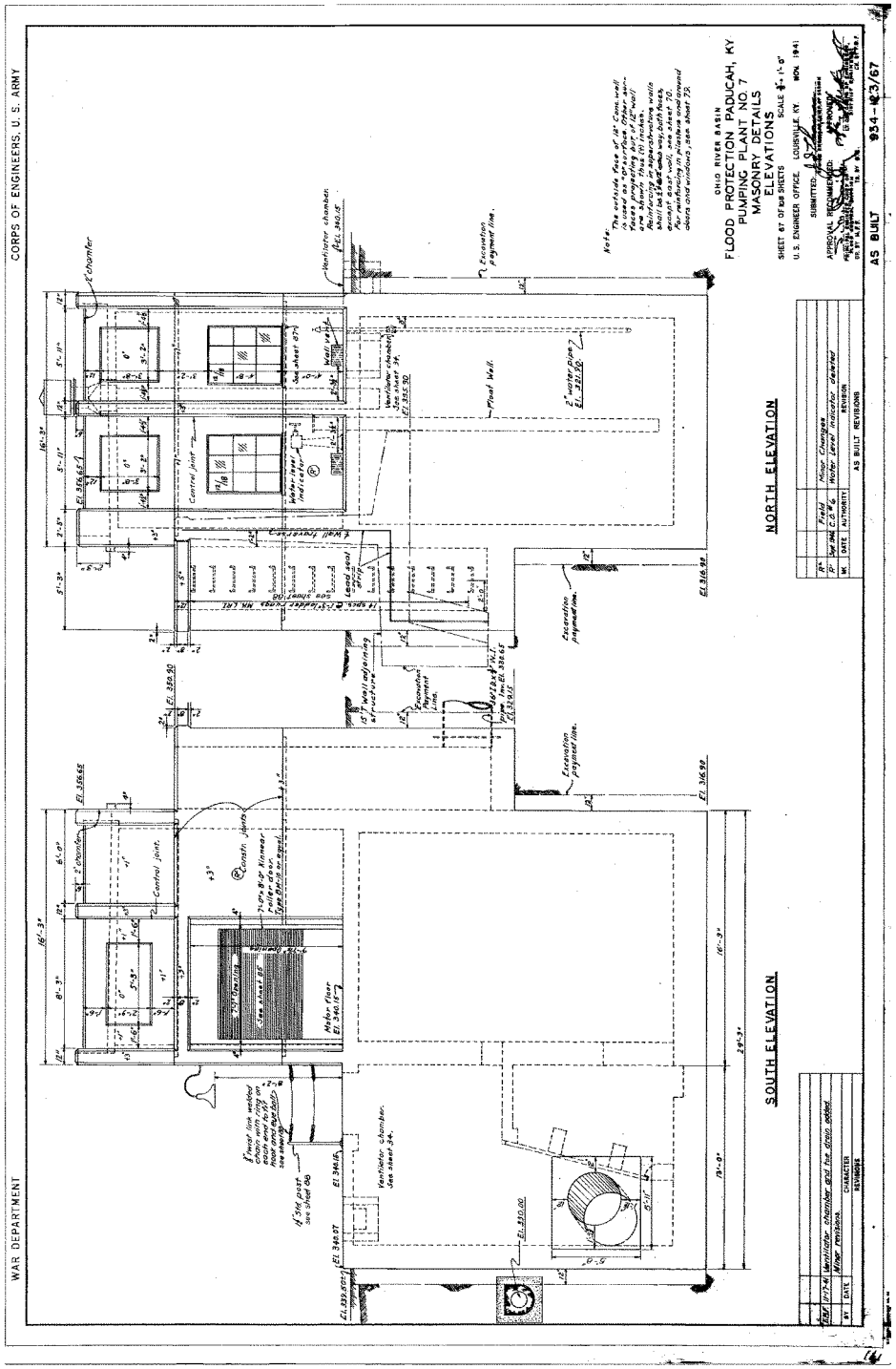
BY	DATE	AUTHORITY	REVISION
BK	8" Sept 1945	C.O. 6 &	Gates & hoists deleted. Opening boxed.

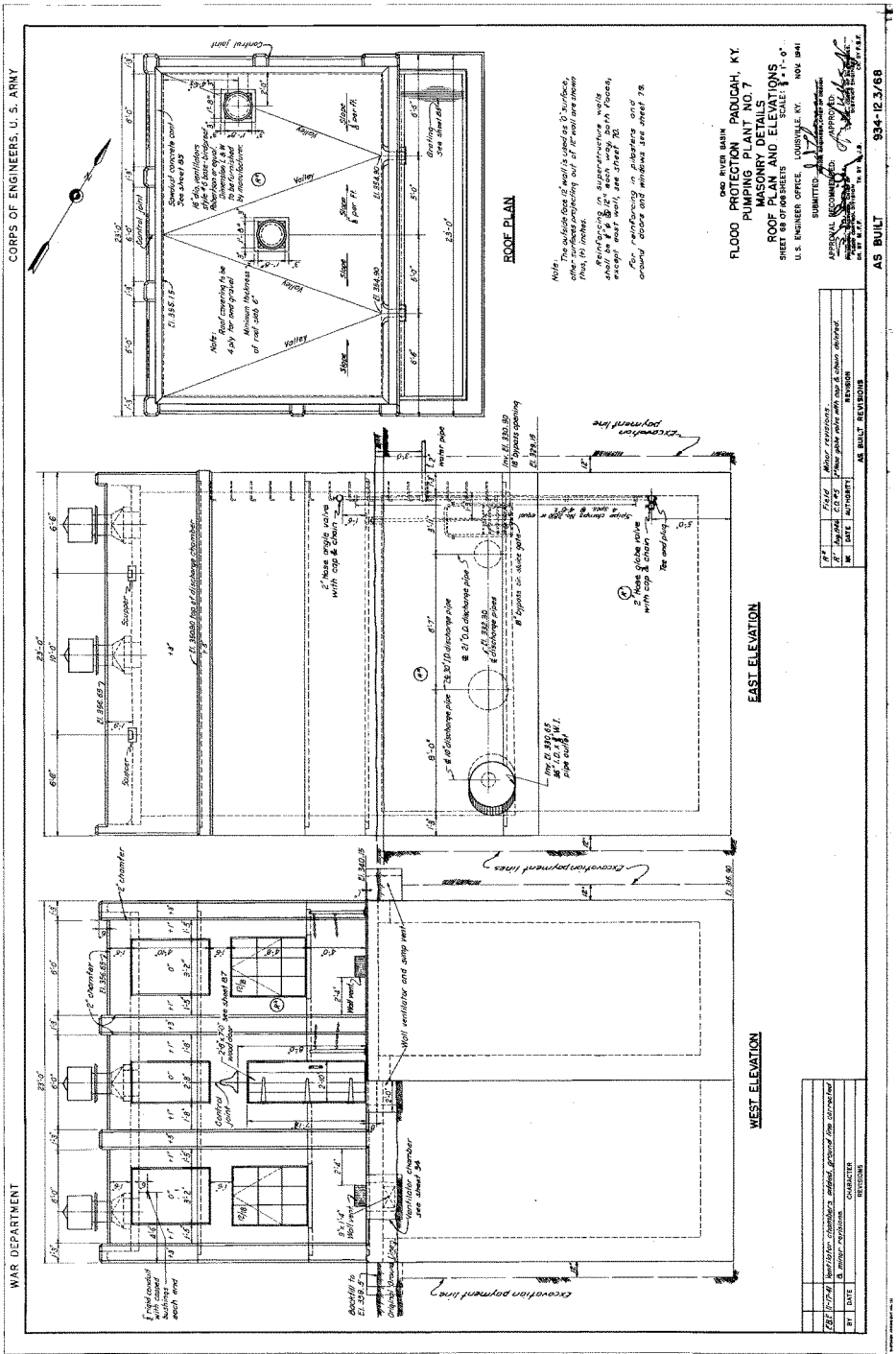
AS BUILT REVISIONS

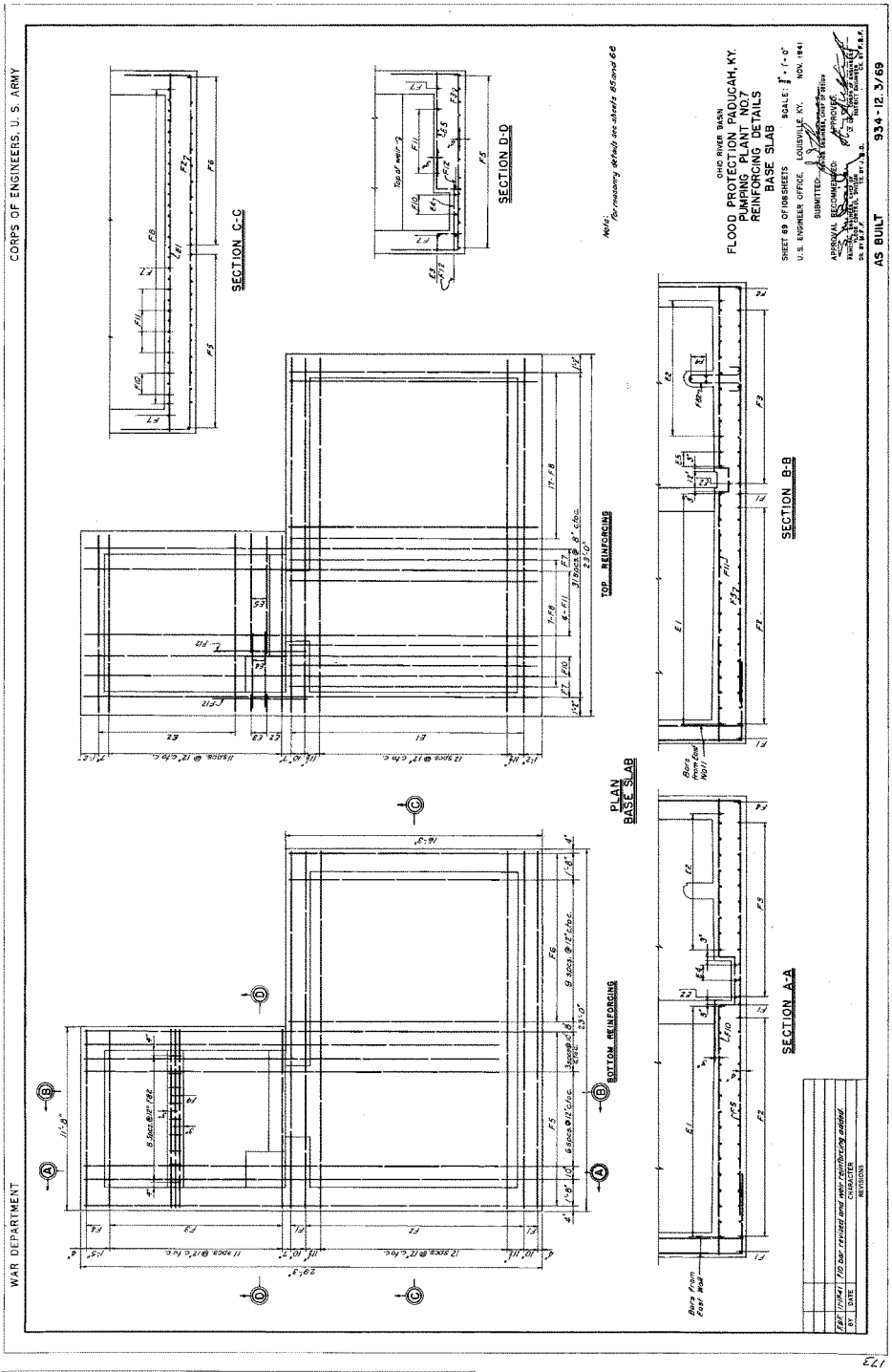
169

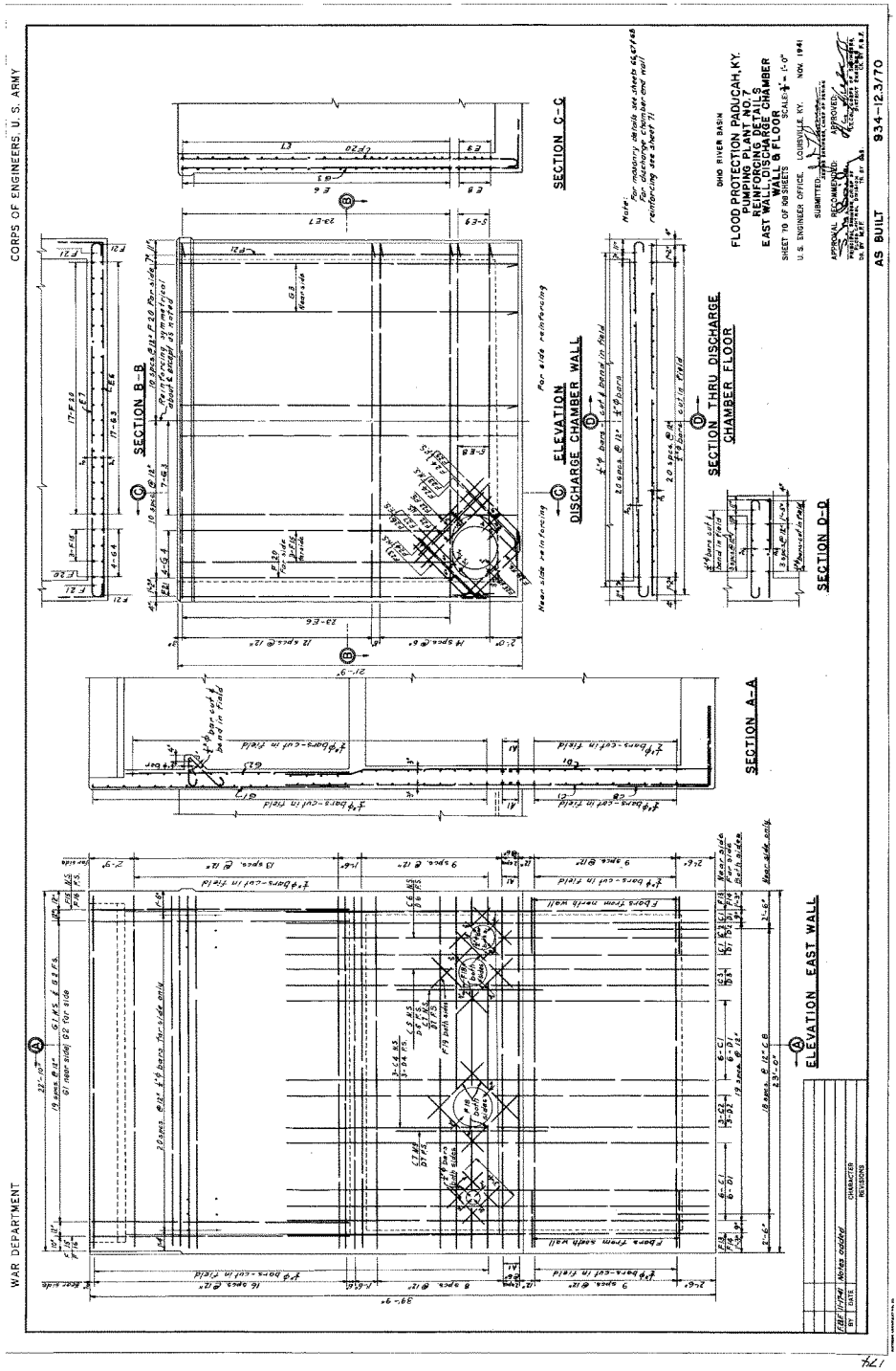
929

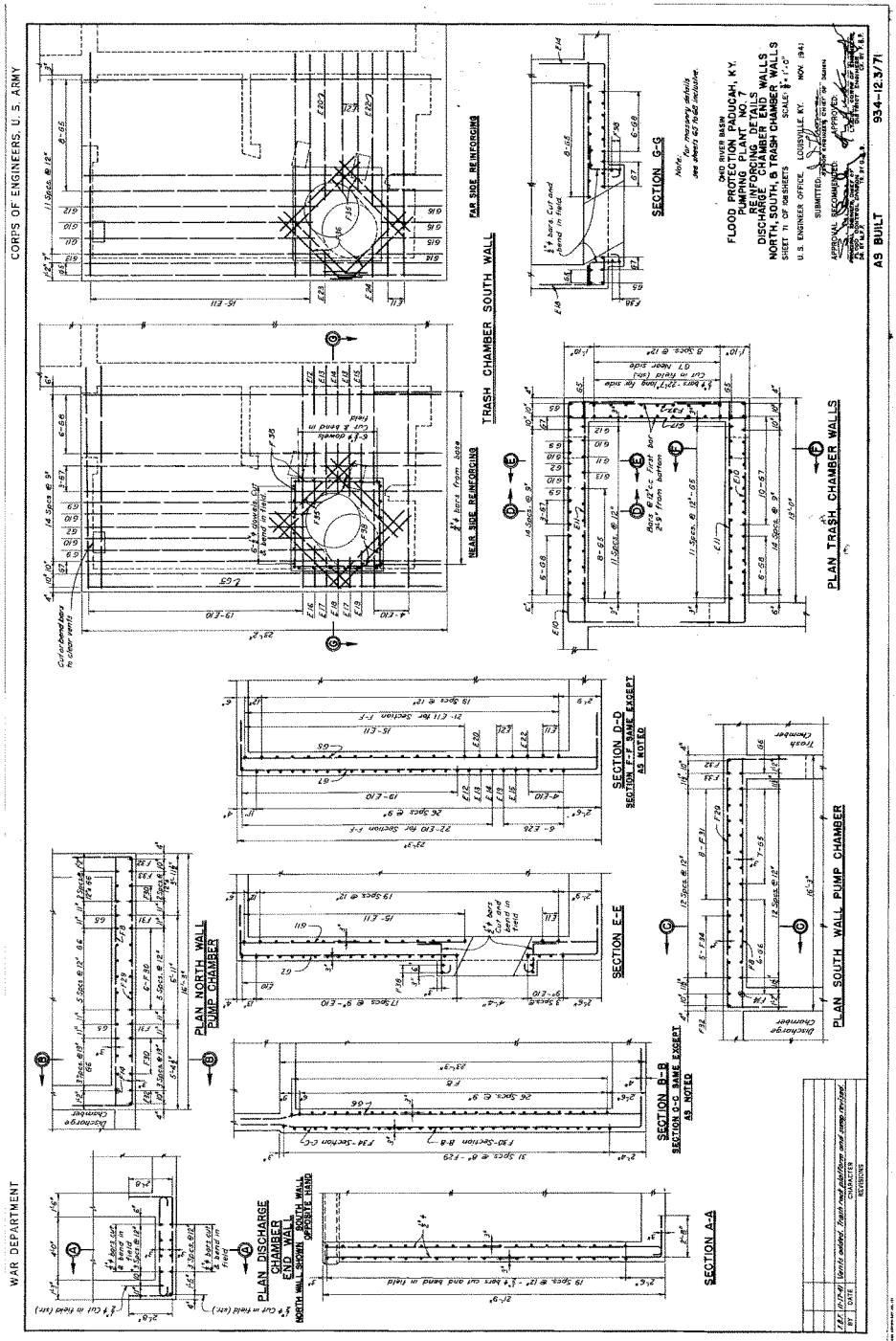

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
PUMPING PLANT NO.7
MASONRY DETAILS
PLAN & SECTION
SHEET 66 OF 68 SHEETS
SCALE: 3/8" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
APPROVAL RECOMMENDED:
AS BUILT
934-12.3/66
PLAN
SECTION A-A
AS BUILT REVISIONS
Note:
For additional masonry details see sheets 65,67 and 68.
For pump and motor details see sheet 64.
Chamfer pump openings in motor floor 3/4" all around.
Dimensions shown thus ● should be determined by gate manufacturer.

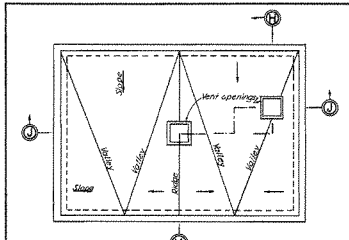

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY
PUMPING PLANT NO. 7
MASONRY DETAILS
ELEVATIONS
SCALE 1/4"-1'-0"
SHEET 67 OF 868 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MON 1941
SUBMITTED:
APPROVAL RECOMMENDED:
AS BUILT
934-E-3/67
NORTH ELEVATION
SOUTH ELEVATION
Minor Changes
Water Level Indicator deleted
AS BUILT REVISIONS
Ventilator chamber and fire pump gallery
Minor revisions.
Excavation payment line.
Proof Wall.
2" water pipe El. 351.10
Lead seal strip
Control joint
Wall Ventilator
Ventilator chamber See sheet 34.
Motor floor El. 340.18
Excavation payment line.
El. 316.98
El. 326.65
El. 330.90
El. 340.07
El. 339.00
El. 310.00
Note:


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 7
MASONRY DETAILS
ROOF PLAN AND ELEVATIONS
SHEET 68 OF 68 SHEETS
SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED:
AS BUILT
934-12.3/68
ROOF PLAN
EAST ELEVATION
WEST ELEVATION
AS BUILT REVISIONS
Ventilator chambers, added, ground line corrected
& minor revisions
Minor revisions.
Yellow pilot rate with roof & sheet deleted


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO.7
REINFORCING DETAILS
BASE SLAB
SHEET 69 OF 108 SHEETS
SCALE: 1/8" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE KY. NOV. 1941
SUBMITTED
APPROVED
AS BUILT
934-12.3/69
PLAN
BASE SLAB
TOP REINFORCING
BOTTOM REINFORCING
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
Note: For masonry details see sheets 65 and 66
Bars from East Wall
Bars from Sout Wall
REF (Ltr.) NO bar revised and vert. reinforcing added
BY DATE CHANGES REMARKS

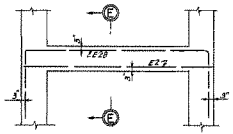

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 7
FLOOD PROTECTION UNIT 5
EAST WALL-DISCHARGE CHAMBER
WALL & FLOOR
SHEET 70 OF 108 SHEETS
SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED:
AS BUILT
934-12.3/70
SECTION B-B
SECTION C-C
SECTION A-A
SECTION D-D
ELEVATION DISCHARGE CHAMBER WALL
SECTION THRU DISCHARGE CHAMBER FLOOR
ELEVATION EAST WALL


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 7
REINFORCING DETAILS
DISCHARGE CHAMBER END WALLS
NORTH, SOUTH & TRASH CHAMBER WALLS
SHEET 11 OF DESIGN SCALE 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
AS BUILT
934-12.3/71
TRASH CHAMBER SOUTH WALL
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
SECTION G-G
PLAN TRASH CHAMBER WALLS
SECTION D-D
SECTION F-F SAME EXCEPT AS NOTED
SECTION E-E
SECTION B-B
SECTION C-C SAME EXCEPT AS NOTED
PLAN SOUTH WALL PUMP CHAMBER
PLAN NORTH WALL PUMP CHAMBER
PLAN DISCHARGE CHAMBER END WALL
NORTH WALL SHOWN SOUTH WALL OPPOSITE HAND
SECTION A-A



ROOF PLAN
SCALE 1/4"-1'-0"

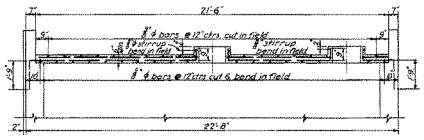
SECTION A-A



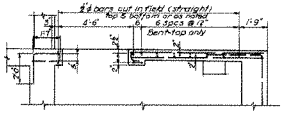
SECTION THRU PURLIN

SECTION B-B

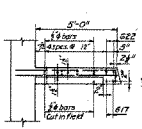
SECTION E-E



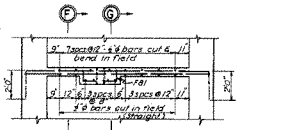
SECTION J-J



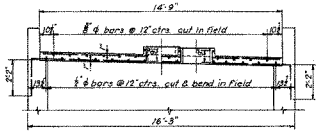
SECTION C-C



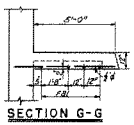
SECTION F-F



SECTION THRU TRASH CHAMBER WALKWAY

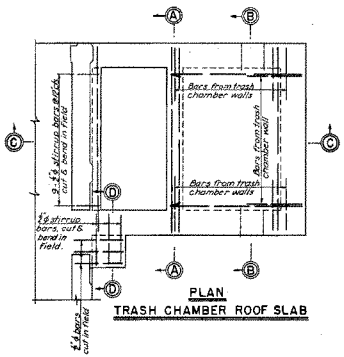


SECTION H-H

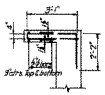


SECTION G-G

Note: For masonry details, see sheets 67, 68 and 68



PLAN
TRASH CHAMBER ROOF SLAB



SECTION D-D

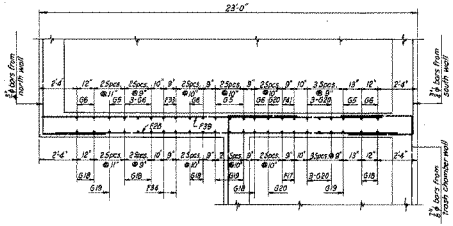
CST 1/17-41	Walkway slab and ventilator opening revised	
BY	DATE	CHARACTER
REVISIONS		

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 7
REINFORCING DETAILS
ROOF SLAB, TRASH CHAMBER ROOF SLAB, TRASH CHAMBER WALKWAY & PURLINS
SHEET 72 OF 108 SHEETS SCALE 1/4"-1'-0" EXCEPT AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVAL RECOMMENDED APPROVED
DIVISION ENGINEER DISTRICT ENGINEER
FILED IN CORPS OF ENGINEERS FILE NO. 72 FLOOD CONTROL DIVISION
DR. BY M.R.R. TR. BY F.E.B. CH. BY F.E.B.

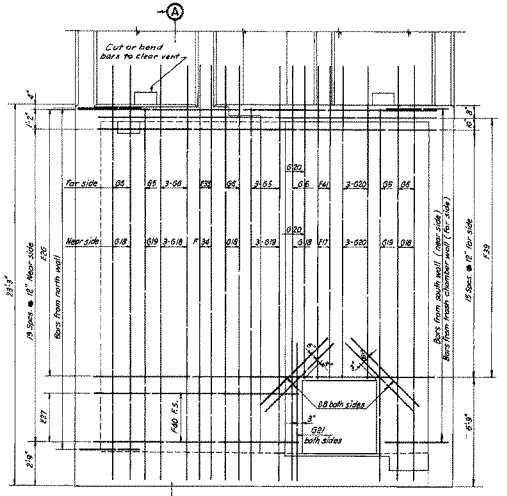
AS BUILT 934-12.3/72

176

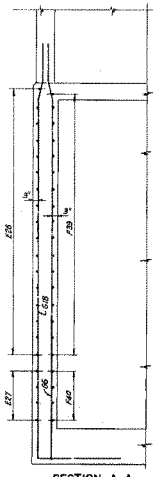
936



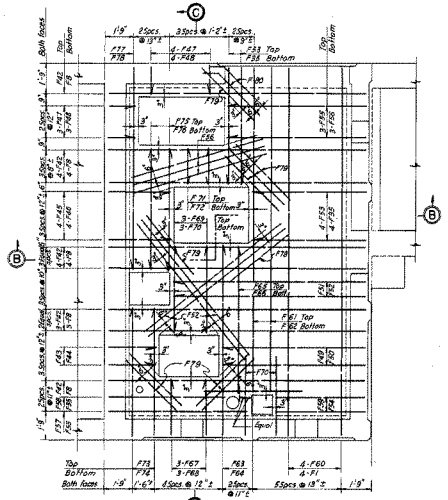
PLAN
WEST WALL PUMP CHAMBER



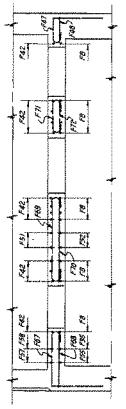
ELEVATION
WEST WALL



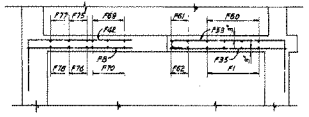
SECTION A-A



PLAN - MOTOR FLOOR



SECTION C-C



SECTION B-B

Note:
For masonry details see sheets 65, 66 and 68

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 7
REINFORCING DETAILS
WEST WALL & MOTOR FLOOR

SHEET 73 OF 108 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV 1941

SUBMITTED: JOHN CASSIDY, Chief of Design

APPROVAL RECOMMENDED: APPROVED:

PRINCIPAL ENGINEER, CHIEF OF DESIGN, OHIO RIVER DIVISION
DR. BY M.P.T. TR. BY W.J.B. CK. BY F.B.K.

CHIEF, CORPS OF ENGINEERS, DISTRICT ENGINEER

BY	DATE	CHARACTER OF REVISIONS
FBK	1/1741	Vent added and minor revisions.

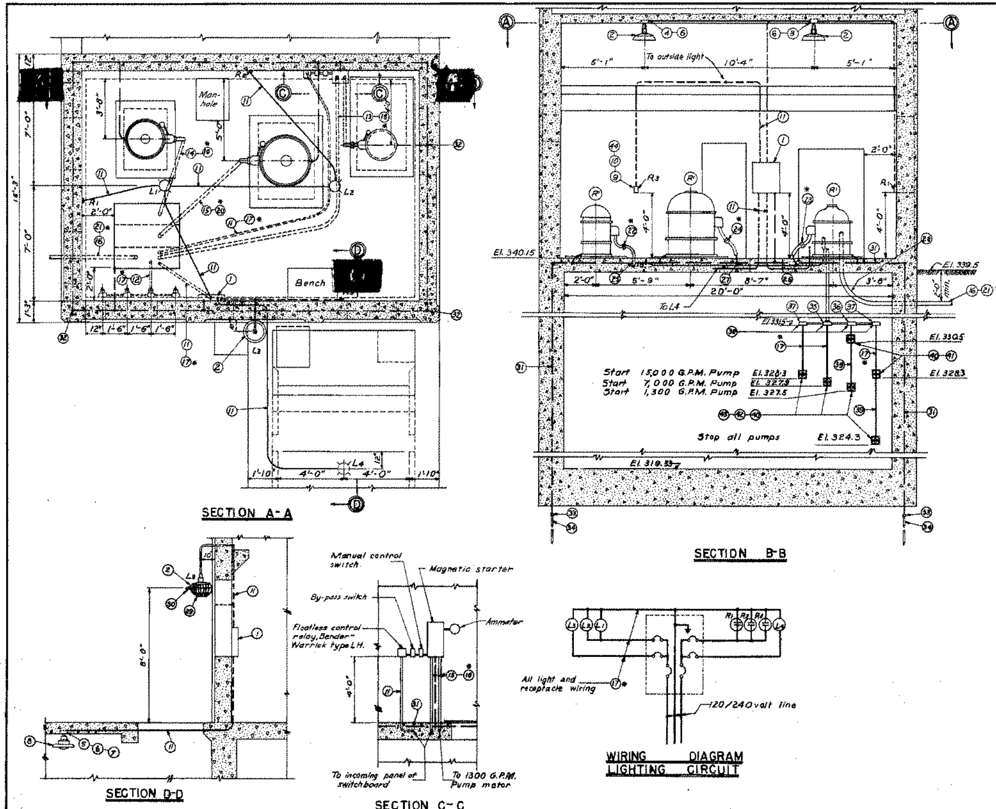
AS BUILT 934-12.3/73

937

122

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUANTITY
1	4 circuit light distribution panel (surface type)			1
2	R.L.M. dome reflector and socket	West.	349573	3
3	Condulet outlet	Crouse-Hinds	SKT 12	1
4	" "	" "	SKL 12	1
5	" "	" "	SK 12	1
6	Condulet cover	" "	SK 84	3
7	Condulet gasket	" "	Gask 208	1
8	Vaportite condulet with reflector and socket	" "	VHDA 1959	1
9	Condulet outlet	" "	FS1	3
10	Duplex plug receptacle			3
11	½" Rigid electrical conduit			155'±
12	¾" " " "			20'±
13	1" " " "			40'±
14	1¼" " " "			15'±
15	1½" " " "			15'±
16	3" " " "			40'±
17*	#12 A.W.G. insulated copper wire			380'±
18*	#8 A.W.G. 1cond. cable R.C. 600V. ins. with 60% rubber jacket			120'±
19*	#6 A.W.G. 1 " " " " " " " " " "			40'±
20*	#2 A.W.G. 1 " " " " " " " " " "			45'±
21*	#3/0 A.W.G. " " " " " " " "			120'±
22*	1" Erickson coupling			1
23*	1¼" " "			1
24*	1½" " "			1
25	1" Std. 90° Elbow			4
26	1¼" " " "			2
27	1½" " " "			2
(R²) 28	Special long radius 90° elbow, 3"φ x 36" rad.	G.E.		2
29	Wire guard for reflector	West	351497	1
30	Padlock	"	351484	1
31	#2/0 bare stranded copper cable			200'±
32	"T" connector for #2/0 copper cable	Burndy	NT 2626	10
33	Connector for #2/0 str. cable to ¾" grnd. rod	"	GA 6426	4
34	Ground rod ¾"φ, 8' long	Copperweld		4
35	Condulet outlet	Crouse-Hinds	TB 127	1
36	" "	" "	C 17	1
37	" "	" "	E 17	2
38	Condulet cover	" "	1771	4
39	#6 A.W.G. hard drawn copper wire			10'±
40	3" bolt circle type insulators	Lapp	13761	6
41	Bus support fitting. Drill to clamp #6 bare solid wire	Locke	9853	2
42	" " " " " " ½"φ electrode	"	"	4
43	Brass electrode (See part No. 25, sheet 40)			4
44	Wall surface plate			3

Notes:-

Figures in circles refer to part Nos. in Bill of Material.

All material shall be of the manufacture, type and catalog number specified or its equal.

All conduits to clear openings for pump removal.

Small fittings, conduits, etc., not listed, shall be furnished as required.

All conduits in floor shall be placed as near the center of same as possible.

200 watt bulbs shall be furnished and installed in all lights.

(R¹) * Indicates items deleted.

BY	DATE	CHARACTER
DS	11/27/41	Ammeter added to magnetic starter

REVISIONS

MK	DATE	AUTHORITY	REVISION
R²	Feb. 1947	C.O. #7	Materials deleted or changed.
R¹	Sept. 1946	C.O. #6	Pumps and motors deleted.

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 7

LIGHTING & POWER SYSTEMS

SHEET 74 OF 108 SHEETS SCALE ¼" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: SENIOR ENGINEER, CHIEF OF DESIGN

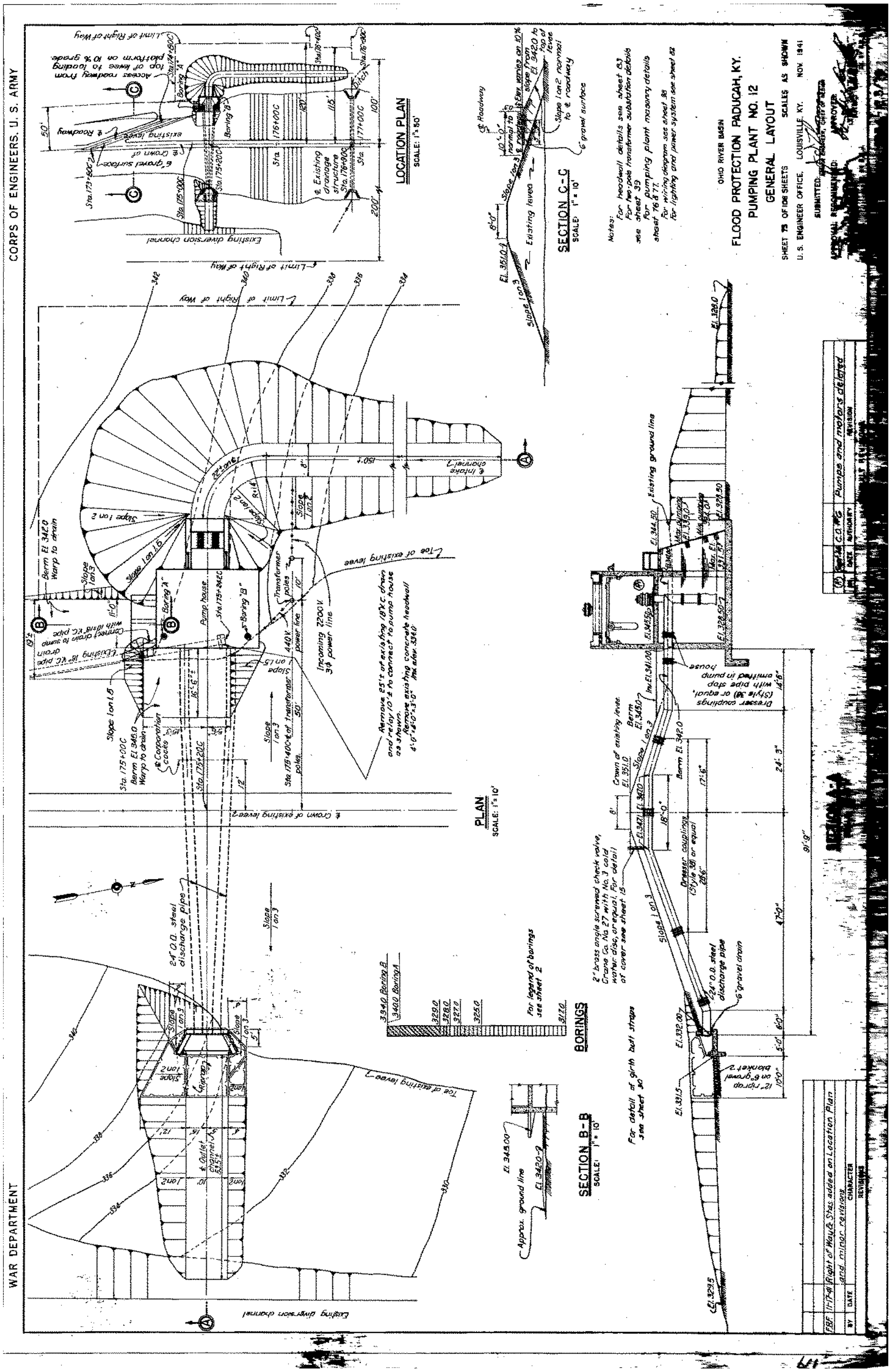
APPROVAL RECOMMENDED: PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

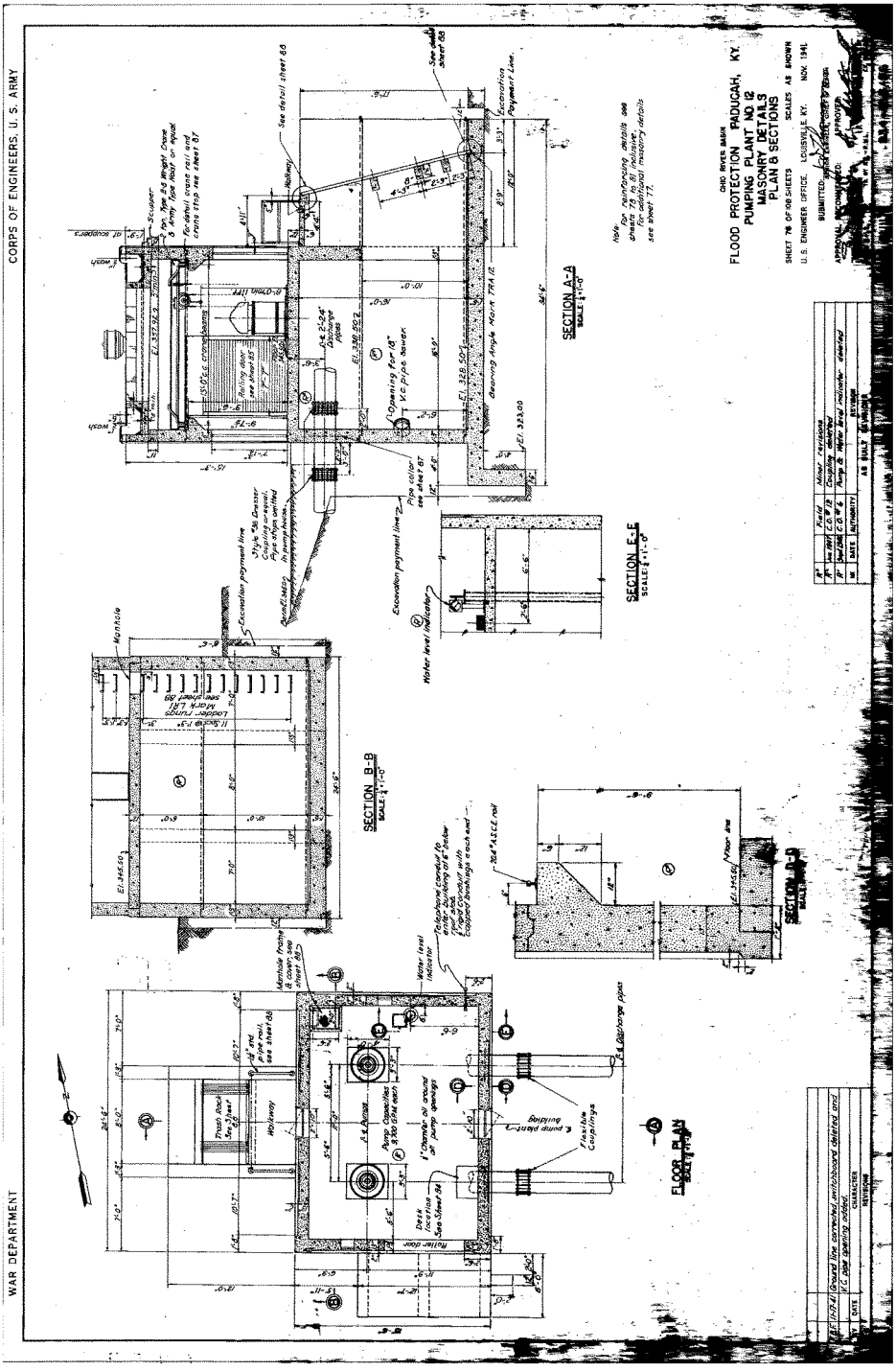
APPROVED: LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER

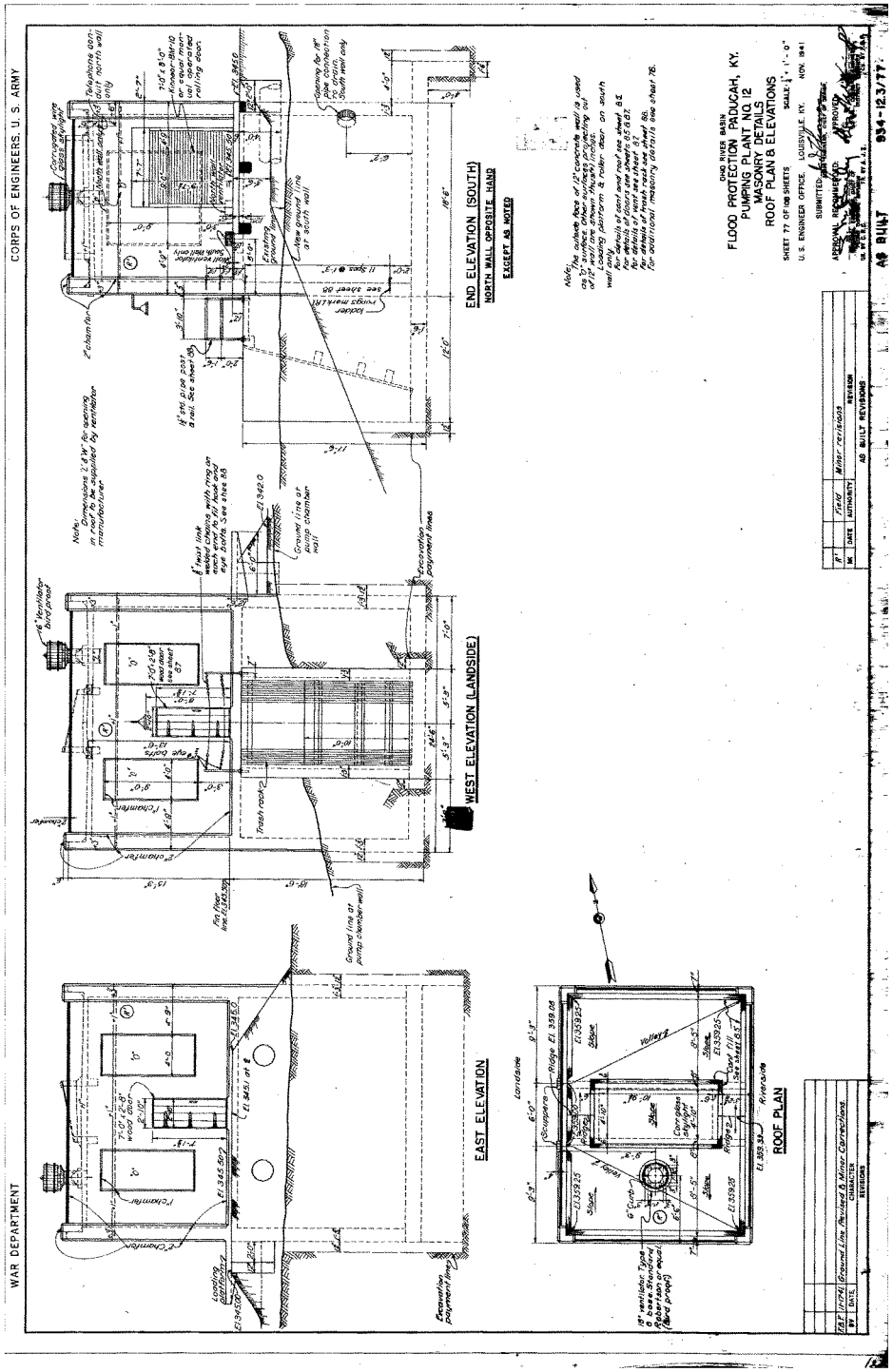
DR. BY A.L.T. TR. BY M.E. CK. BY G.B.

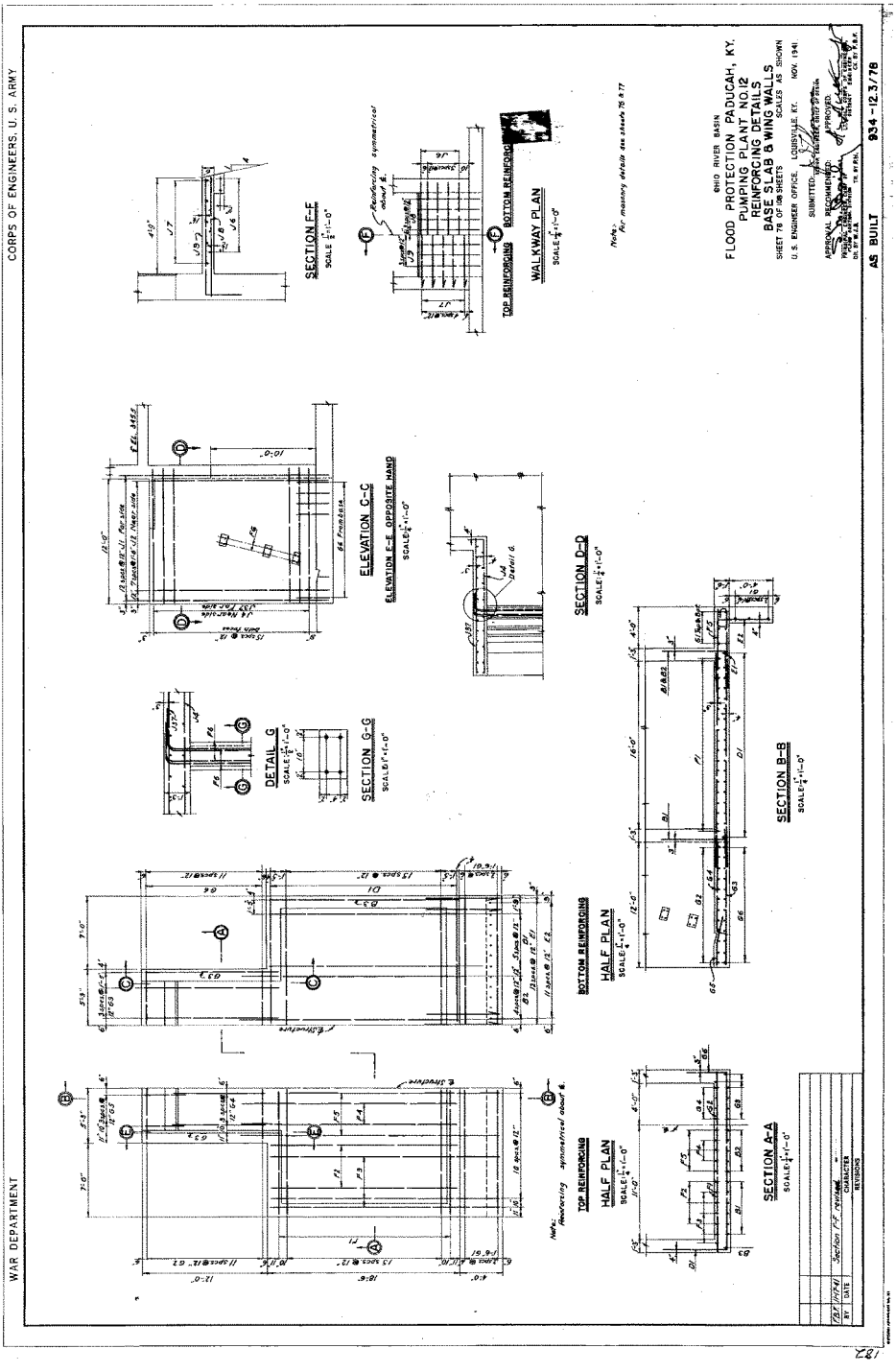
AS BUILT 934-12.3/74

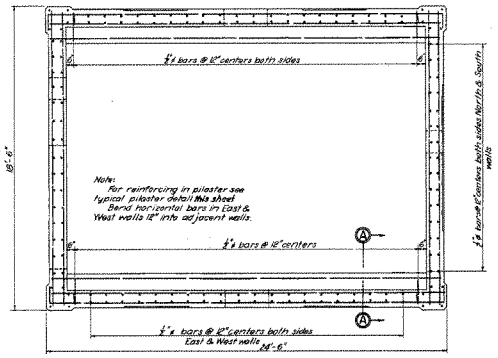
178


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
LOCATION PLAN
SCALE: 1" = 50'
Access roadway from top of levee to loading platform on 10% grade.
Limit of Right of Way
Existing diversion channel
℄ Existing drainage structure Sta. 176+90C
Ditch
℄ Roadway
6" gravel surface
℄ Crown of existing levee
Boring "A"
Boring "B"
PLAN
SCALE: 1" = 10'
Berm El 342.0 Warp to drain
Slope 1 on 2
Slope 1 on 1.6
Slope 1 on 3
Pump house
Transformer poles
Incoming 2200V. 3φ power line
440V. power line
Toe of existing levee
Existing 18" V.C. pipe drain
Connect drain to sump with 10x18" V.C. pipe
Slope 1 on 1.5
Sta. 175+00C Berm El 346.0 Warp to drain
℄ Corporation cocks
Sta. 175+20C
Sta. 175+40C ℄ of transformer poles
Remove 25'± of existing 18" V.C. drain and relay 10'± to connect to pump house as shown. Remove existing concrete headwall 4'0"x4'0"x3'0" Inv. elev. 334.0
℄ Crown of existing levee
24" O.D. steel discharge pipe
℄ Intake channel
℄ Outlet channel
Riprap
BORINGS
For legend of borings see sheet 2
SECTION B-B
SCALE: 1" = 10'
Approx. ground line
El. 345.00
El. 342.0
For detail of girth butt straps see sheet 30
SECTION C-C
SCALE: 1" = 10'
Existing levee
Slope 1 on 3
Slope 1 on 2 normal to ℄ roadway
6" gravel surface
Notes:
For headwall details see sheet 83.
For two-pole transformer substation details see sheet 39
For pumping plant masonry details sheet 76 & 77.
For wiring diagram see sheet 98
for lighting and power system see sheet 52
2" brass angle screwed check valve, Crane Co. No. 27 with No. 3 cold water disc, or equal. For detail of cover see sheet 15
Crown of existing levee El. 351.0
Berm El. 342.0
Dresser couplings (Style 38) or equal
Dresser couplings (Style 38) or equal, with pipe stop omitted in pump house
Existing ground line
6" gravel drain
12" riprap on 6" gravel blanket
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 12
GENERAL LAYOUT
SHEET 75 OF 108 SHEETS SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED:
RECOMMENDED:
APPROVED:
Pumps and motors deleted
REVISION
Right of Way & Stas. added on Location Plan and minor revisions
BY DATE CHARACTER REVISIONS

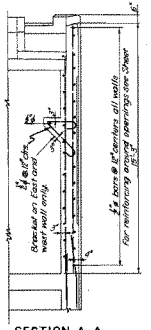

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 12
MASONRY DETAILS
PLAN & SECTIONS
SHEET 76 OF 108 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE KY. NOV. 1941.
SUBMITTED
APPROVED
FLOOR PLAN
SECTION A-A
SECTION B-B
SECTION C-D
SECTION E-F
Manhole
Ladder Irons
Water level indicator
Pipe collar
Excavation payment line
Opening for 18" V.C. Pipe Sewer
Discharge pipes
Trash Rack
Walkway
Roller door
Dark location
Pump Capacities
Building
Flexible Couplings
Hoist
Sump
Ground line
Concrete
Brick
Steel
Timber
Rock
Earth
Fill


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 12
MASONRY DETAILS
ROOF PLAN & ELEVATIONS
SHEET 77 OF 100 SHEETS
SCALE: 1/4" - 0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
934-12.3/77
END ELEVATION (SOUTH)
NORTH WALL OPPOSITE HAND
EXCEPT AS NOTED
WEST ELEVATION (LANDSIDE)
EAST ELEVATION
ROOF PLAN
Note: Dimensions 1'-4 W for opening in roof to be supplied by ventilator manufacturer
Note: The surface face of 12" concrete wall is used as 12" surface when working or placing out of 12" surface when working or placing out
Loading platform & roller door on south wall
For details of vent and roof see sheet 85
For details of doors see sheets 65 & 82
For details of steel see sheet 86
For details of trash rack see sheet 86
For additional masonry details see sheet 76
Ground line at pump chamber wall
Excavation payment lines
Trash rack
Chamber
Ladder
Fence to 9'-0" above concrete to drain. South wall only
Telephone conduit north wall only
Corrugated pipe conduit
Column footing
Ridge El 359.04
Valley
Slope
Riverside
Landside
Occupancy
Loading platform
Roof 2
Roof 1
6" Curb
Skylight
6" ventilator Type 4 see Standard Plans Ventilators Roof (Bird proof)
Mitor revisions
Field
AUTHORITY
REVISION
AS BUILT REVISIONS
DATE
BY
Ground line Revised & Minor Corrections
CHARACTER
REVISION

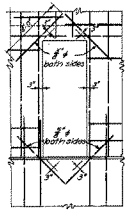

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO.12
REINFORCING DETAILS
BASE SLAB & WING WALLS
SHEET 78 OF 104 SHEETS DRAWING AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
AS BUILT
934-12.3/78
SECTION E-E
SECTION F-F
SECTION G-G
ELEVATION G-C
ELEVATION E-E OPPOSITE HAND
DETAIL G
SECTION D-D
SECTION B-B
SECTION A-A
WALKWAY PLAN
HALF PLAN
TOP REINFORCING
BOTTOM REINFORCING
Note: Reinforcing symmetrical about ℄.
Note: For masonry details see sheets 76 & 77



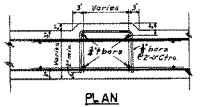
PLAN BELOW ROOF



SECTION A-A

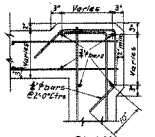


TYPICAL REINFORCING AT ACCESS DOOR OPENING



PLAN

TYPICAL WALL PILASTER DETAIL



PLAN

TYPICAL CORNER PILASTER DETAIL

SCALE: 1"=1'-0"

REINFORCEMENT BAR SCHEDULE

PUMPING PLANT NUMBER	PILASTER BARS								WINDOW SILL BARS			
	3/4" ϕ BARS					TOTAL WEIGHT	3/4" ϕ BARS	TOTAL WEIGHT	NUMBER OF WINDOWS	WALL THICKNESS	3/4" ϕ BARS UNDER WINDOWS	TOTAL WEIGHT
1	(24'-0") ⑩ 1'-3"	(20'-0") ⑨ 1'-3"	(24'-0") ⑩ 1'-3"	(10'-0") ④ 1'-3"	(3'-0") ① 1'-3"	114.3	(23'-0") ⑫ 14'-2" (36'-0") ⑧ 14'-5"	198.1	None	13"		
2	(20'-0") ⑩ 1'-3"	(18'-0") ⑨ 1'-3"	(12'-0") ⑥ 1'-3"	(20'-0") ⑩ 1'-3"	(4'-4") ② 1'-3" (20'-0") ⑩ 1'-3"	256.3	(62'-0") ⑫ 33'-3" (48'-0") ⑧ 26'-8"	1682.2	None	13"		
3	No pilasters								1	13"	(6'-8") ④ 1'-3" (3'-3") ① 1'-3"	2.98
5	(24'-0") ⑩ 1'-3"	(20'-0") ⑨ 1'-3"	(8'-0") ③ 1'-3"	(11'-3") ⑤ 1'-3"		178.2	(162'-3") ⑫ 14'-2" (144'-0") ⑧ 26'-8"	1584.9	3	14"-12" 24"-15"	(16'-8") ④ 15" (5'-3") ② 1'-3"	9.15
6	(22'-0") ⑩ 1'-3"	(22'-6") ⑩ 1'-3"	(8'-0") ③ 1'-3"	(6'-4") ② 1'-3"		43.6	(198'-6") ⑫ 18'-0" (216'-0") ⑧ 19'-6"	3247	3	13"	(15'-0") ⑭ 18" (5'-3") ② 1'-3"	5.31
7	(26'-6") ⑩ 1'-3"	(20'-0") ⑨ 1'-3"	(8'-0") ③ 1'-3"	(2'-0") ① 1'-3"		40.7	(162'-0") ⑫ 18'-0" (114'-0") ⑧ 19'-6"	931.8	2	1'-0"	(11'-4") ⑥ 1'-3" (8'-6") ② 1'-3"	6.71
12	(12'-0") ⑩ 1'-3"	(10'-0") ⑨ 1'-3"				43.3	(108'-0") ⑫ 17'-6" (120'-0") ⑧ 18'-5"	440.6	2	13"	(10'-0") ⑥ 18" (5'-3") ② 1'-3"	6.20

Note:
Figures shown within circles thus ⑩ are number of bars required. Figures shown in parenthesis are total linear feet.

Note:
For diagonal reinforcing bar details around windows see sheet 57
For diagonal reinforcing bar details around rolling doors see sheet 36

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 12
REINFORCING DETAILS
SUPERSTRUCTURE WALLS
SHEET 79 OF 108 SHEETS SCALE: 1/2" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: DESIGN ENGINEER, CHIEF OF DESIGN

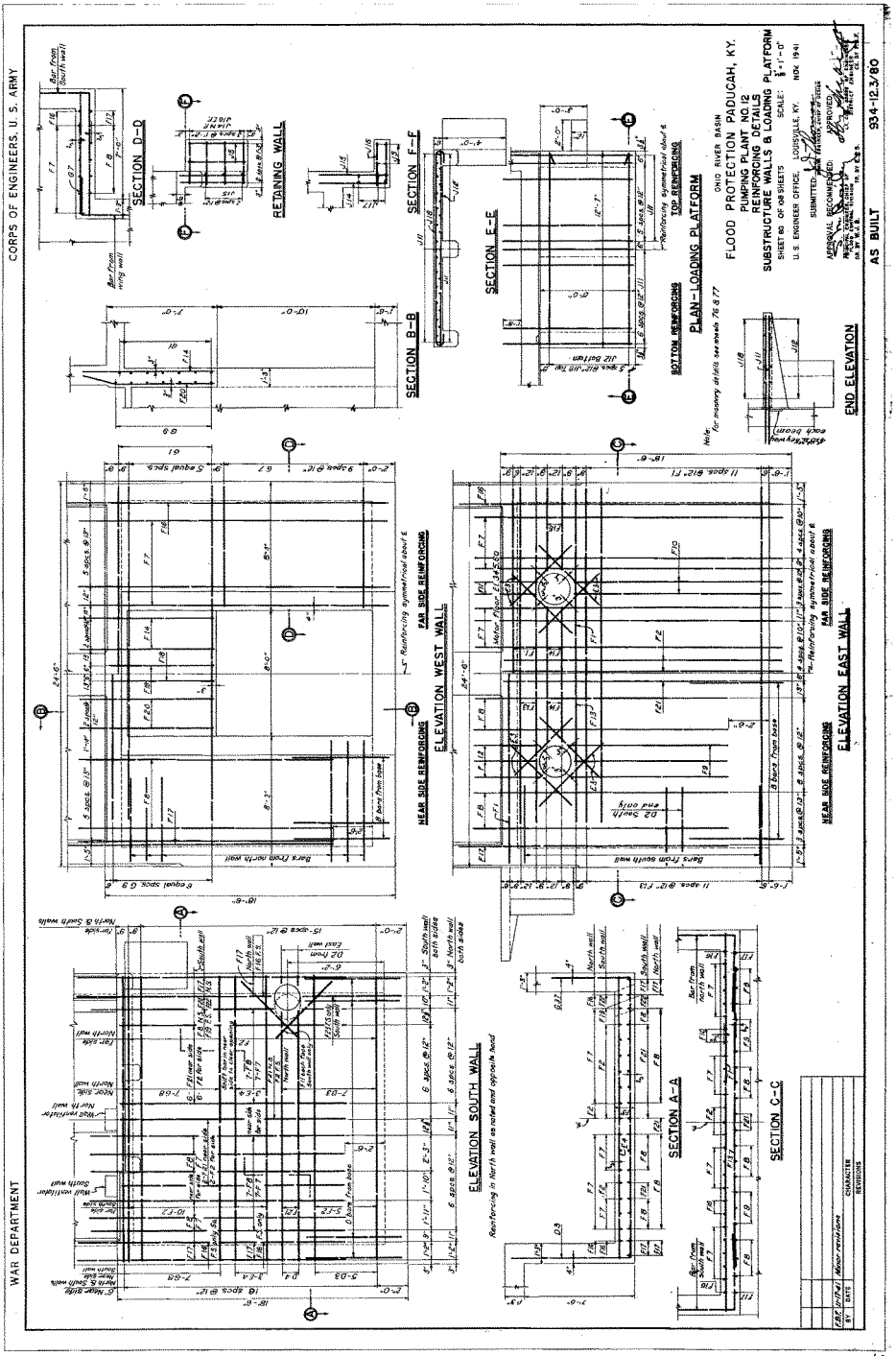
APPROVAL RECOMMENDED: APPROVED:
CHIEF, ENGINEERING DIVISION, FLOOD CONTROL DIVISION
DR. BY E.F.C. TR. BY R.V.S.
CHIEF OF ENGINEERS DISTRICT ENGINEER
CH. BY F.B.F.

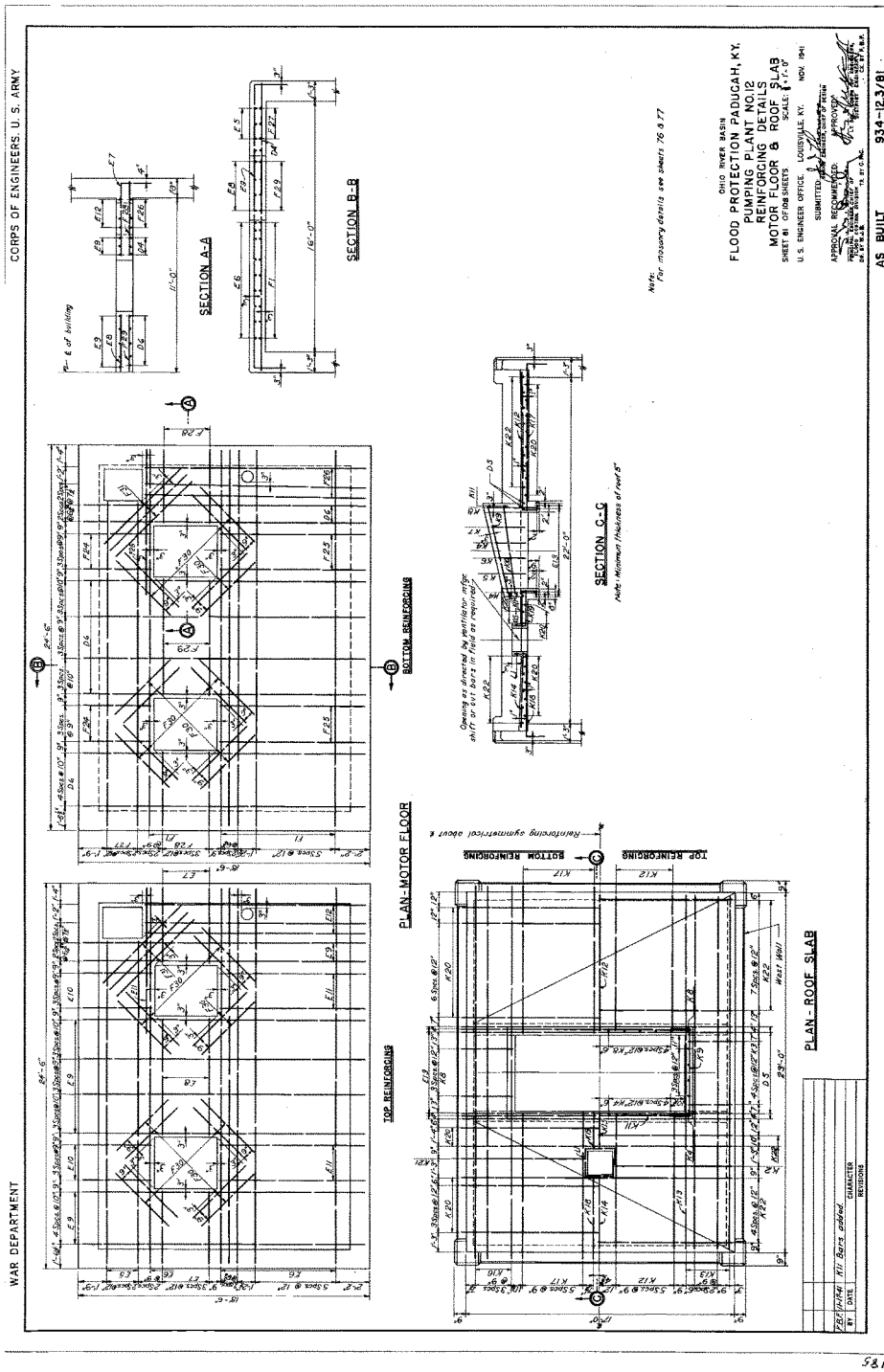
BY	DATE	CHARACTER OF REVISIONS
F.B.F.	11-17-41	Notes added and minor revisions

AS BUILT 934-12.3/79

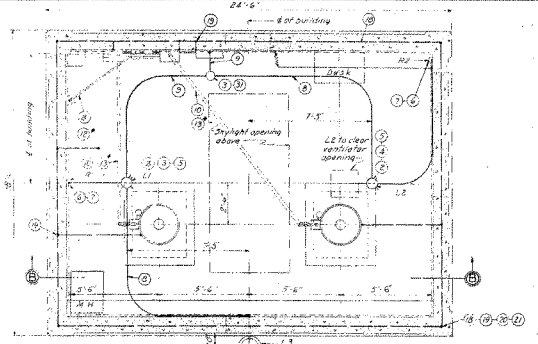
183

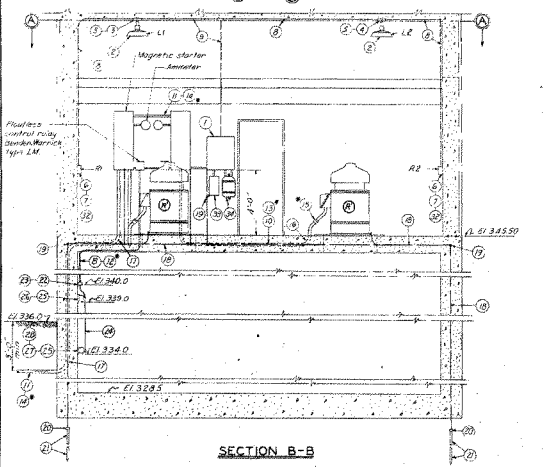
943

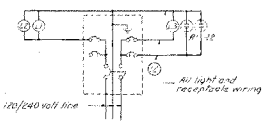

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
FLOOD PROTECTION PADUCAH, KY.
OHIO RIVER BASIN
PUMPING PLANT NO. 12
REINFORCING DETAILS & LOADING PLATFORM
SUBSTRUCTURE, WALLS & LOADING PLATFORM
SHEET 60 OF 68 SHEETS
SCALE: 1/4"=1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
RECOMMENDED:
APPROVED:
AS BUILT
934-12.3/80
SECTION D-D
RETAINING WALL
SECTION F-F
SECTION B-B
SECTION E-E
PLAN-LOADING PLATFORM
BOTTOM REINFORCING
TOP REINFORCING
END ELEVATION
ELEVATION WEST WALL
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
ELEVATION EAST WALL
ELEVATION SOUTH WALL
SECTION A-A
SECTION C-C


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO.12
REINFORCING DETAILS
MOTOR FLOOR & ROOF SLAB
SHEET 61 OF 104 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SCALE 1/4"=1'-0"
SUBMITTED
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
934-12.3/81
PLAN-MOTOR FLOOR
PLAN-ROOF SLAB
SECTION A-A
SECTION B-B
SECTION C-C
TOP REINFORCING
BOTTOM REINFORCING
Note: For masonry details see sheets 76 & 77
Note: Minimum thickness of roof 8"
Opening as directed by ventilator mfgr. shift or cut bars in field as required.
Reinforcing symmetrical about ℄
CHARACTER
REVISIONS
DATE
BY

581







WIRING DIAGRAM OF LIGHTING CIRCUIT

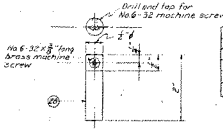
BILL OF MATERIAL

PART NO.	DESCRIPTION	MFG'R	CATALOG NO.	QUAN TITY
1	2-Circuit light distribution panel (surface type)			
2	R.L.M. dome reflector and gasket	Wesp	13513	1
3	Condulet outlet	Crouse-Hinds	FSF1E	2
4	"		DFL12	1
5	" cover		JA84	2
6	" outlet		FS-1	2
7	Duplex plug receptacle			6
8	¾" rigid electrical conduit			150'
9	¾" " "			10'
10	½" " "			190'
11	½" " "			410'
12	#12 AWG insulated copper wire			3200'
13	#6 AWG, triplex cable, #6 solid ins with 85% rubber, jacket			450'
14	#2 " " " 60% fiber, jacket			1230'
15	½" Ericson coupling			2
16	½" 3/4" 90° elbow			2
17	½" bare, long rod, 90° Elbow, ½" x 10' rod			1
18	# 2/0 bare stranded copper cable			150'
19	"T" connector for # 2/0 stranded cable	Burndy	YT2CE	10
20	Connector for # 2/0 stranded cable to ½" ground rod	"	GA6AE	3
21	Ground rod, ½" x 8'	Copperweld		4
22	Condulet outlet	Crouse-Hinds	A-7	1
23	" cover	"	1771	1
24	#6 AWG, hard drawn copper wire			450'
25	3" post circle type insulator	Lapp	13161	6
26	Bus - support fitting, drill to clamp #6 bare solid wire	Ilsco	9053	6
27	" " electrode			1
28	Truss electrode, 8' 8 x 8 x ¼" long (see detail)			1
29	Wire guard for reflector	West	351491	1
30	Padlock		351434	1
31	Condulet cover	Crouse-Hinds	JA8013	1
32	Wall surface plate			2
33	Enclosed fused switch, 2 pole, open interlocked	Graybar	58761	1
34	Transformer, 460-115/230 V., 2 KVA, dry type	West	511415	1

(A) * Items deleted

Note:
Figures in circles refer to part numbers on bill of material.
All material shall be of the manufacture, type, and catalog number specified, or its equal.
All conduits to clear openings for pump removal.
Small fittings, conduits, etc., not listed, shall be furnished as required.
All conduit in floor shall be placed as near the center of same as possible.
200 watt bulbs shall be furnished and installed in all lights.

LEGEND
Embedded conduit
Exposed conduit
Concealed conduit
Ground wire



ELECTRODE DETAIL
SCALE: NONE

BY	DATE	AUTHORITY	REVISION
A*	Feb 37	C.O.#7	Materials deleted or changed
R*	Sept 38	C.O.#6	Pumps deleted
			AS BUILT REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO.12
LIGHTING & POWER SYSTEMS
SHEET 82 OF 100 SHEETS SCALES: ¼"=1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED: [signature] DIVISION ENGINEER, CHIEF OF DESIGN
APPROVAL RECOMMENDED: [signature] CHIEF, FLOOD CONTROL DIVISION
APPROVED: [signature] COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

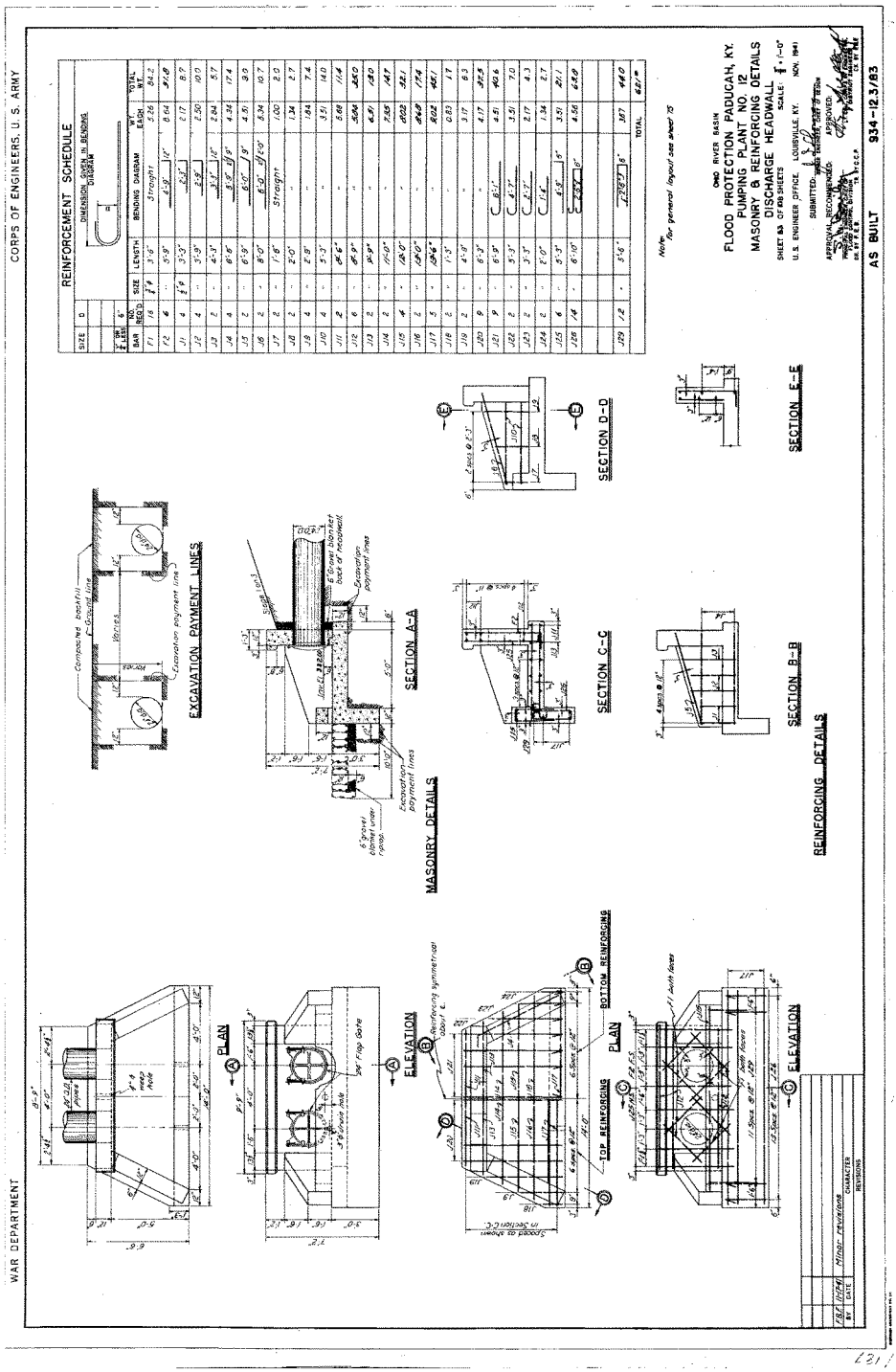
BY	DATE	CHARACTER	REVISIONS
		05 watt/hr AC8 motor starters replaced by magnetic starters	

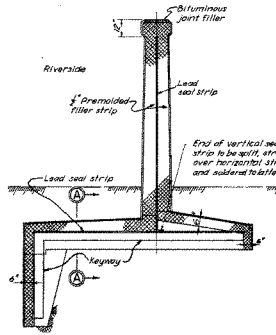
AS BUILT

934-12.3/82

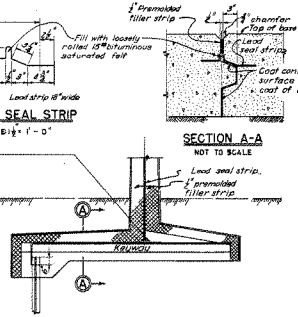
946

96

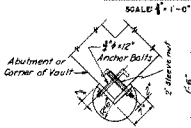

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
REINFORCEMENT SCHEDULE
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 12
MASONRY & REINFORCING DETAILS
DISCHARGE HEADWALL
AS BUILT
934-12.3/83
EXCAVATION PAYMENT LINES
MASONRY DETAILS
REINFORCING DETAILS
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
PLAN
ELEVATION
TOP REINFORCING
BOTTOM REINFORCING



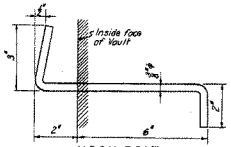
TYPICAL T-WALL EXPANSION JOINT
FOR CONCRETE CUT-OFF
SCALE: 1" = 1'-0"



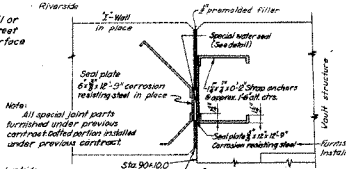
TYPICAL T-WALL EXPANSION JOINT
FOR STEEL SHEET PILING CUT-OFF



WHEEL GUARD DETAILS
SCALE: 1½" = 1'-0"



HOOK BOLT
MARK HB2 MAKE S WT. 0.38# EACH
MATERIAL - WROUGHT IRON
SCALE: 6" = 1'-0"



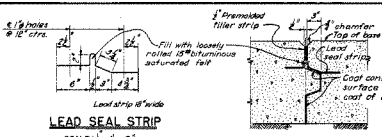
Note: All special joint parts furnished under previous contract & offed portion installed under previous contract.

Furnished under separate contract. Installed under this contract.

SPECIAL EXPANSION JOINT
SCALE: 1½" = 1'-0"
Furnished under separate contract

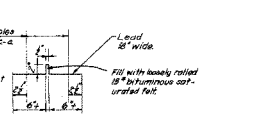
WATER SEAL STRIP SCHEDULE	
STATION	REMARKS
90+18.00	Lead seal strips- Furnish under this contract
90+48.33	" " " " " " "
90+71.33	" " " " " " "
90+90.25	" " " " " " "
91+09.33	" " " " " " "
91+27.83	" " " " " " "
91+69.83	Copper seal strips - Furnished under separate contract
106+63.17	" " " " " " "
108+84.17	Lead seal strips- Furnish under this contract
109+18.17	" " " " " " "
109+44.17	Copper seal strips- Furnished under separate contract
161+97.92	" " " " " " "
162+20.57	Lead seal strips- Furnish under this contract
162+38.57	" " " " " " "
162+58.06	" " " " " " "
162+77.90	Copper seal strips- Furnished under separate contract

BY	DATE	CHARACTER
		REVISIONS
F.B.F.	11-17-41	Toe drains deleted and minor revisions.

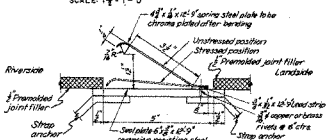


LEAD SEAL STRIP
SCALE: 1½" = 1'-0"

SECTION A-A
NOT TO SCALE

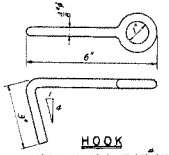


LEAD SEAL STRIP
SCALE: 1½" = 1'-0"

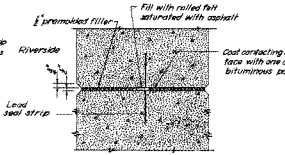


Note: Seal assembly to be adjusted for 3" clear joint with spring plate in position shown by dotted line before placing concrete in closure.

SPECIAL WATER SEAL
MATERIAL - AS SHOWN
SCALE: HALF SIZE
Furnished and installed under separate contract.

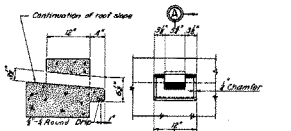


HOOK
MARK H MAKE 4 WT. 0.35 EACH
MATERIAL - WROUGHT IRON
SCALE: 6" = 1'-0"



TYPICAL EXPANSION JOINT IN STEM OF WALL
SCALE: 1½" = 1'-0"

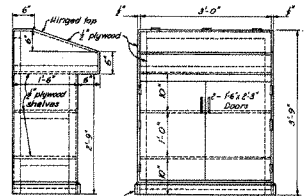
HOOK BOLT SCHEDULE		
STATION	NO. REQ'D.	REMARKS
90+10.00	2	Furnished under separate contract *
108+63.75	2	Furnish under this contract
Pumping Plant	2	" " " "
162+01.575	2	" " " "



SECTION A-A
CONCRETE SCUPPER
ELEVATION
SCALE: 1" = 1'-0"

WHEEL GUARD SCHEDULE		
STATION	NO. REQD.	REMARKS
90+35.75	4	Upgrade furnished under previous contract *
90+35.75	1	Guard furnished under this contract *
106+53.00	1	Furnished under this contract

* Installed under this contract



Cabinet framing to be made of 2"x4" yellow pine or fir

¾"x4" moulding

One cabinet for each pump plant except No. 3.

STORAGE CABINET AND DESK
SCALE: ½" = 1'-0"
8 REQUIRED

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.

MISCELLANEOUS DETAILS

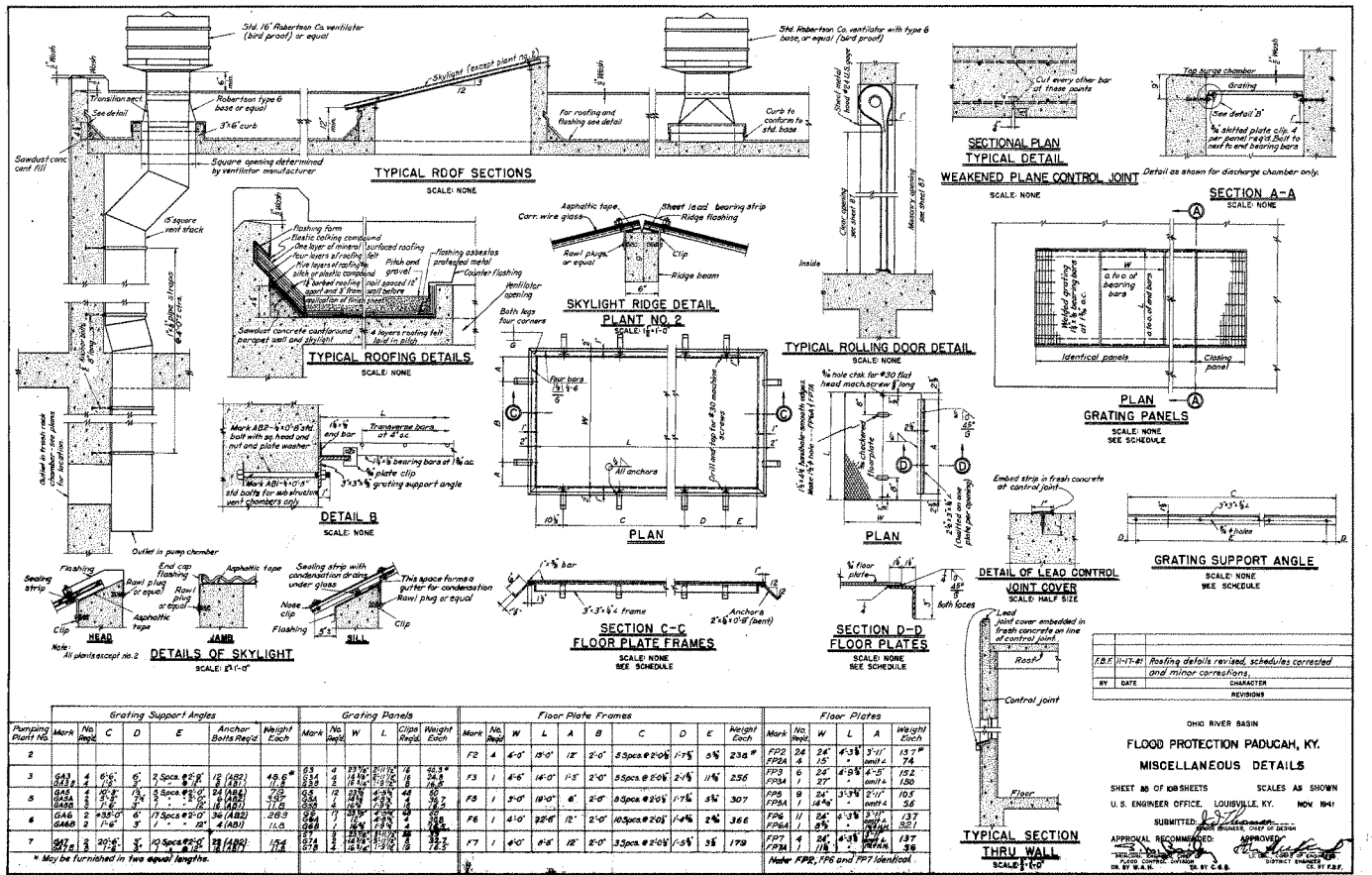
SHEET 84 OF 108 SHEETS SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV 1941
SUBMITTED: [signature] DENVER SHELHORN, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] FRANCIS B. FOSTER, CHIEF OF FLOOD CONTROL DIVISION
APPROVED: [signature] THOMAS M. ROBINS, COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER
DR. BY F.N.B. TR. BY R.M.B. CK. BY F.B.F.

AS BUILT 934-12.3/84

948

188



Grating Support Angles

Pumping Plant No.	Mark	No. Reqd.	C	D	E	Anchor Bolts Reqd.	Weight Each
2							
3	GA3	4	6'-6"	6"	2 Spcs. @ 3'-8"	(2) (AB2)	49.6*
	GA3 B	4	1'-8"		1 " @ 1'-8"	8 (AB1)	11.8
5	GA5	4	10'-2"	7½	5 Spcs. @ 2'-0"	24 (AB2)	79
	GA5A	2	3'-2"	3"	3 " @ 1'-0"	6 (AB2)	4.90
	GA5B	2	11.6"	3"	1 " @ 12"	8 (AB1)	11.8
6	GA6	2	#35'-0"	6"	17 Spcs. @ 2'-0"	36 (AB2)	28.3
	GA6B	2	1'-6"	3"	1 " @ 12"	4 (AB1)	11.8
7	GA7	3	20'-6"	5"	10 Spcs. @ 2'-0"	72 (AB2)	154
	GA7B	3	1'-2"		1 " @ 2'-0"	12 (AB1)	17.8

* May be furnished in two equal lengths.

Grating Panels

Mark	No. Reqd.	W	L	Clips Reqd.	Weight Each
G3	4	33⅛"	2'-11⅞"	16	40.5 #
G3A	2	16⅛"	2'-11⅞"	8	24.6
G3B	2	16⅛"	1'-9⅞"	8	16.5
G4	1	33⅛"	4'-3⅜"	16	60.5 #
G4A	1	16⅛"	4'-3⅜"	8	36.7
G4B	1	16⅛"	2'-11⅞"	8	24.6
G5	1	33⅛"	5'-7⅜"	16	80.5 #
G5A	1	16⅛"	5'-7⅜"	8	48.8
G5B	1	16⅛"	3'-11⅞"	8	32.7

Floor Plate Frames

Mark	No. Reqd.	W	L	A	B	C	D	E	Weight Each
F2	4	4'-0"	13'-0"	12"	2'-0"	5 Spcs. @ 2'-0½"	1'-7⅝"	5⅜"	238.*
F3	1	4'-6"	14'-0"	1'-5"	2'-0"	5 Spcs. @ 2'-0½"	2'-1⅝"	11⅝"	256
F5	1	5'-0"	19'-0"	6"	2'-0"	8 Spcs. @ 2'-0½"	1'-7⅝"	5⅜"	307
F6	1	4'-0"	22'-6"	12"	2'-0"	10 Spcs. @ 2'-0½"	1'-4⅝"	2⅝"	366
F7	1	4'-0"	6'-6"	12"	2'-0"	3 Spcs. @ 2'-0½"	1'-5⅜"	3⅝"	179

Floor Plates

Mark	No. Reqd.	W	L	A	Weight Each
FP2	24	24"	4'-3⅜"	3'-11"	13.7*
FP2A	4	15"	"	omit	7.4
FP3	6	24"	4'-9⅜"	4'-5"	15.2
FP3A	1	27"	"	omit	8.50
FP5	9	24"	5'-3⅜"	5'-11"	10.5
FP5A	1	14⅝"	"	omit	5.6
FP6	11	24"	6'-3⅜"	5'-11"	13.7
FP6A	1	8⅝"	"	omit	3.21
FP7	4	24"	6'-3⅜"	5'-11"	13.7
FP7A	1	11⅜"	"	omit	5.6

Note: FP2, FP6 and FP7 identical.

BY	DATE	REVISIONS
F.B.K.	11-17-41	Roofing details revised, schedules corrected and minor corrections.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

MISCELLANEOUS DETAILS

SHEET 85 OF 108 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV 1941

SUBMITTED: [signature] DIVISION ENGINEER, CHIEF OF DESIGN

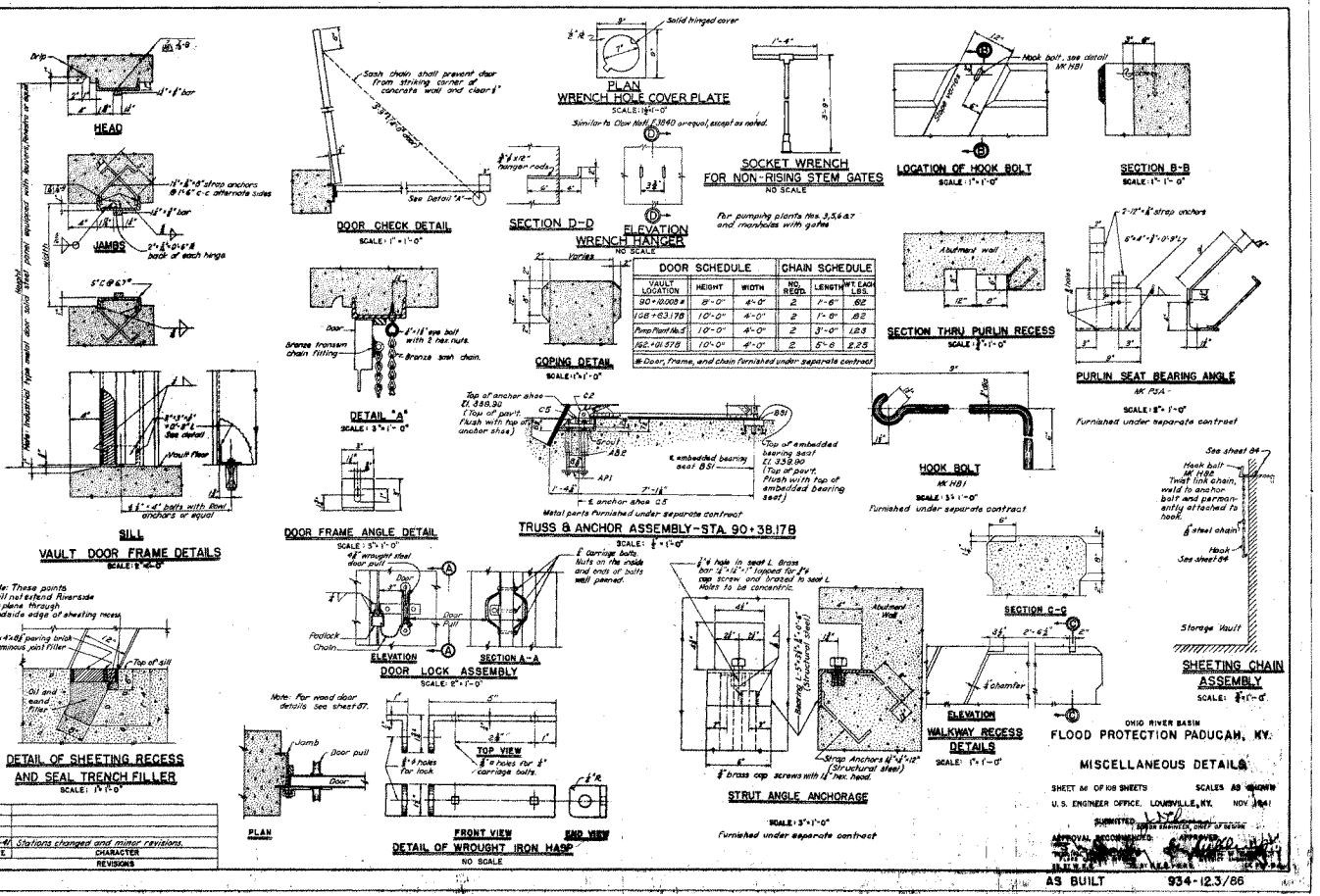
APPROVED: [signature] DISTRICT ENGINEER

APPROVED: [signature] CHIEF OF ENGINEERS

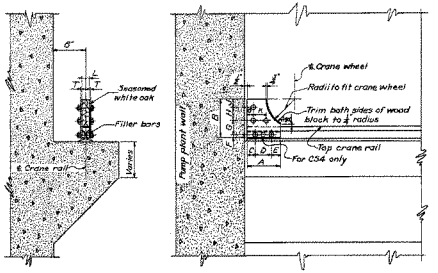
DR. BY W.A.H. CH. BY C.A.S. CK. BY F.B.K.

934-12.3/85

949


HEAD
JAMBS
SILL
VAULT DOOR FRAME DETAILS
DETAIL OF SHEETING RECESS AND SEAL TRENCH FILLER
DOOR CHECK DETAIL
SECTION D-D
PLAN
WRENCH HOLE COVER PLATE
ELEVATION
WRENCH HANGER
SOCKET WRENCH FOR NON-RISING STEM GATES
DOOR SCHEDULE
CHAIN SCHEDULE
COPING DETAIL
DETAIL "A"
DOOR FRAME ANGLE DETAIL
DOOR LOCK ASSEMBLY
TRUSS & ANCHOR ASSEMBLY-STA. 90+38.178
LOCATION OF HOOK BOLT
SECTION B-B
SECTION THRU PURLIN RECESS
PURLIN SEAT BEARING ANGLE
HOOK BOLT
SHEETING CHAIN ASSEMBLY
ELEVATION WALKWAY RECESS DETAILS
SECTION C-C
STRUT ANGLE ANCHORAGE
DETAIL OF WROUGHT IRON HASP
PLAN
FRONT VIEW
END VIEW
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MISCELLANEOUS DETAILS
SHEET 66 OF 108 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY.
NOV. 1941
AS BUILT
934-12.3/86

950

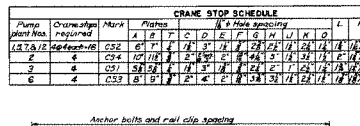


CRANE STOP DETAILS

MATERIAL: STRUCTURAL STEEL EXCEPT AS SHOWN

SCALE: NONE

CRANE STOP SCHEDULE																		
Pump plant Nos.	Crane stops required	Mark	Plates		¾ Hole spacing										L	Filler bars	Seasoned white oak bolts-hex. heads and nuts, filler blocks, nuts with lock washers
			A	B	T	C	D	E	F	G	H	J	K	O			
1,2,7,8,12	4 of each 18	CS2	6"	1'-1"	¾	12"	3"	¾	8"	2'-2"	¾	24"	¾	¾	¾	¾ x 6" x 0'-6"	¾ x 2½"
4	6	CS4	10"	1'-8"	¾	2'-8"	5"	¾	14"	3"	¾	32"	¾	¾	1"	¾ x 10" x 0'-10"	¾ x 2" x 0'-10"	¾ x 3½"
3	6	CS1	5"	1'-5"	¾	1'-8"	3"	¾	8"	2'-2"	1"	24"	¾	¾	1"	¾ x 8" x 0'-8"	¾ x 4" x 0'-5"	¾ x 2½"
5	6	CS3	8"	1'-11"	¾	2'-0"	4"	1"	10"	3"	¾	32"	¾	¾	1"	¾ x 10" x 0'-8"	¾ x 6" x 0'-8"	¾ x 3½"



CRANE RAIL & ANCHORS

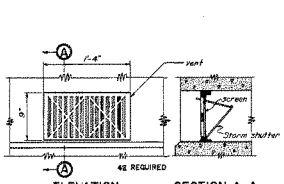
MATERIAL: STRUCTURAL STEEL

SCALE: NONE

CRANE RAIL AND ANCHOR SCHEDULE												
Pumping plant Nos.	Crane rails required	A.S.C.E. crane rail section	Mark	L *	A	B **	C	D	E	F	Rail clip No.	Bolts Mark and No.
1	2	20.4#	CR1	37'-3"	1¾	3"	26-6	¼	9"	18.5 pcs @ 2'-0	76	76-A82
2	2	44.9#	CR2	57'-11"	2"	3½"	36-6	¼	1'-3"	37 pcs @ 1'-6	152	152-A83
3	2	135#	CR3	15'-11"	1¾	3	13-0	¼	12"	8.5 pcs @ 2'-0	28	28-A81
5	2	20.4#	CR4	27'-8"	1¾	3	26-11	¼	10"	13.5 pcs @ 2'-0	56	56-A82
6	2	40.2#	CR5	38'-9"	2"	4	36-11	¼	1'-4"	27.5 pcs @ 1'-6	92	92-A82
7	2	20.4#	CR6	20'-5"	¼	3	19-3	¼	1'-3"	8.5 pcs @ 2'-0	40	40-A82
12	2	20.4#	CR7	21'-1"	¼	3	19-8	¼	12"	10.5 pcs @ 2'-0	44	44-A82

** All rails have 2 holes each end except CR2 which has 3 holes each end.

* Rails longer than 30'-0" may be furnished with std. splices.

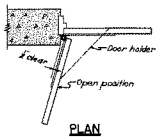


ELEVATION SECTION A-A

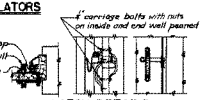
TYPICAL DETAIL WALL VENTILATORS

SCALE: 1½" = 1'-0"

Note: Omit shutters on substructure ventilators

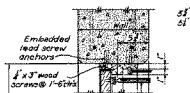


PLAN DOOR HOLDER

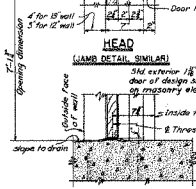


LATCH DETAILS (FOR 2'-8" x 7'-0" DOOR)

SCALE: 1" = 1'-0"

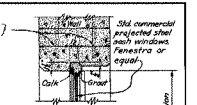


HEAD (JAMB DETAIL SIMILAR)

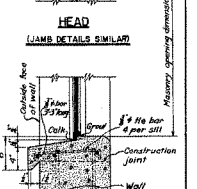


SILL ACCESS DOOR FRAME DETAILS

SCALE: 1½" = 1'-0"



HEAD (JAMB DETAILS SIMILAR)



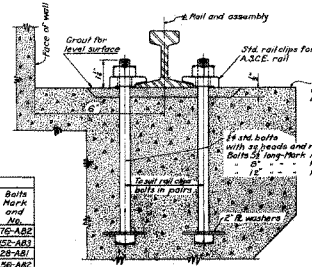
SILL TYPICAL WINDOW DETAILS

SCALE: 1½" = 1'-0"

WINDOW AND DOOR SCHEDULE †							
Pumping plant No.	WINDOWS			ACCESS DOORS		ROLLING DOORS ††	
	No. req'd	Masonry opening dimensions	Type, Fenestra or equal	No. req'd	Masonry opening dimensions	No. req'd	Masonry opening dimensions, clear opening clear
1	—	—	—	1	2'-6" x 7'-1½"	1	7'-7" x 9'-7½" 7'-0" x 8'-0"
2	—	—	—	1	"	1	"
3	1	3'-2" x 4'-8"	331/61	1	"	1	6'-7" x 8'-3½" 6'-0" x 7'-9"
5	3	"	"	1	"	1	7'-7" x 9'-7½" 7'-0" x 8'-0"
6	3	3'-6" x 6'-2½"	341/61	1	"	1	" "
7	4	3'-2" x 4'-9"	331/61	1	"	1	" "
12	—	—	—	2	"	1	" "

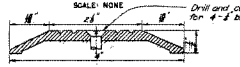
† Storage vault doors not included in this schedule.

†† Rolling doors to be under-listed mounted, manually operated, Kinnear Mfg. Co. BM10 or equal. Coil to be housed in No. 24 U.S. gage sheet metal hood.



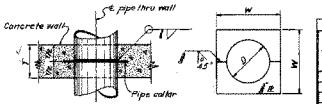
RAIL ANCHORAGE DETAIL

SCALE: NONE



THRESHOLD FOR WOOD ACCESS DOORS

SCALE: FULL SIZE



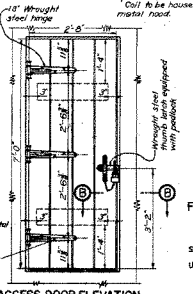
PLAN PIPE COLLAR ELEVATION

MATERIAL: STRUCTURAL STEEL

SCALE: NONE

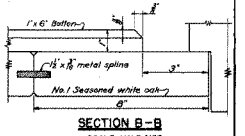
PIPE COLLAR SCHEDULE				
Pumping plant No.	No. required	W	D	Wt. each
1	2	3'-6"	2'-7"	107#
2	2	6'-2"	5'-11"	258#
	2	3'-1"	4'-7"	195#
	1	3'-6"	2'-7"	107#
3	2	2'-6"	1'-6½"	68#
	* 1 Elliptical hole	3'-0"	2'-4½"	89#
		3'-12"	2'-4½"	
5	2	6'-0"	3'-1"	131#
	1	3'-0"	2'-6½"	94#
	1	2'-0"	1'-1"	47½#
	1	3'-0"	4'-1½"	181#
6	3	4'-0"	3'-1"	131#
	1	4'-0"	3'-1"	131#
7	1	5'-6"	5'-3"	157#
	* 1 Elliptical hole	4'-5"	3'-9"	76#
		4'-5"	3'-2"	30#
12	2	3'-0"	2'-0½"	89#

* Dimension W is vertical and h. horizontal



ACCESS DOOR ELEVATION

SCALE: ½" = 1'-0"



SECTION B-B

SCALE: HALF SIZE

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

MISCELLANEOUS DETAILS

SHEET 87 OF 108 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [signature] DISTRICT ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] CHIEF, FLOOD CONTROL BRANCH

APPROVED: [signature] COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY W.A.H. CK. BY P.M. CK. BY F.B.F.

AS BUILT 934-12.3/87

BY	DATE	CHARACTER
F.B.F.	11-17-41	Threshold detail added, crane rail & pipe collar schedules corrected and minor revisions.

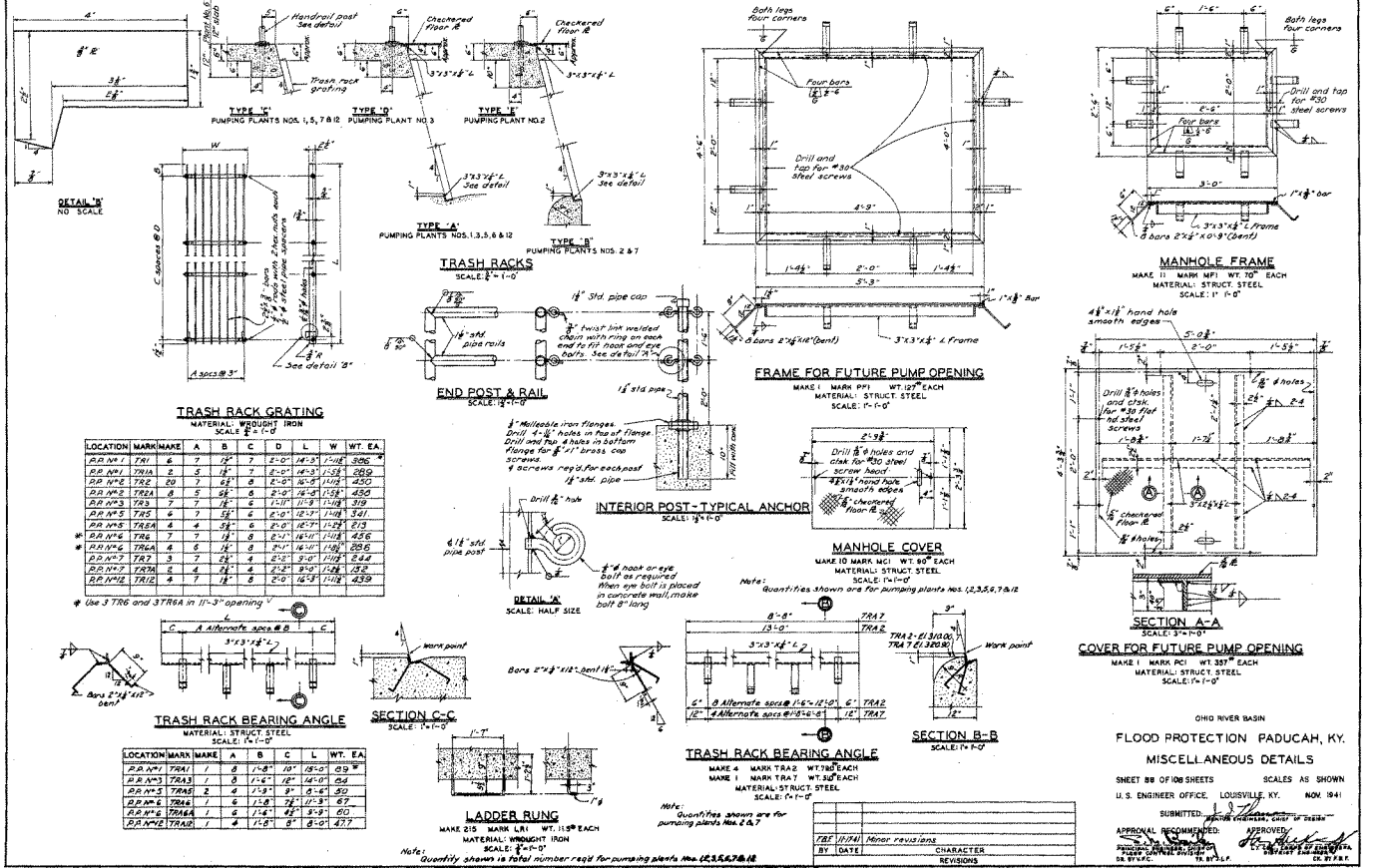
REVISIONS

791

951

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



LOCATION	MARK	MAKE	A	B	C	D	L	W	WT. EA.	
P.P. N° 1	TR1	6	7	12"	7	2'-0"	14'-3"	1'-11"	306	
P.P. N°1	TR1A	2	3	12"	7	2'-0"	14'-3"	1'-5½"	269	
P.P. N°2	TR2	20	7	6¾"	8	2'-0"	16'-6"	1'-11"	450	
P.P. N°2	TR2A	8	5	5¾"	6	2'-0"	16'-3"	1'-5½"	430	
P.P. N°3	TR3	7	7	12"	6	1'-11"	11'-9"	1'-11"	319	
P.P. N°5	TR5	6	7	5¾"	6	2'-0"	12'-3"	1'-11"	321	
P.P. N°5	TR5A	4	4	5¾"	6	2'-0"	12'-7"	1'-1½"	213	
* P.P. N°6	TR6	7	7	12"	8	2'-1"	16'-11"	1'-11"	456	
* P.P. N°6	TR6A	4	6	12"	8	2'-1"	16'-11"	1'-11"	286	
P.P. N°7	TR7	3	7	12"	4	2'-2"	9'-0"	1'-11"	244	
P.P. N°7	TR7A	2	4	12"	4	2'-2"	8'-10"	1'-1½"	153	
P.P. N°12	TR12	4	7	12"	8	2'-0"	16'-3"	1'-11"	439	

* Use 3 TR6 and 3 TR6A in 11'-3" opening

LOCATION	MARK	MAKE	A	B	C	L	WT. EA.
P.P. N°1	TRA1	1	8	1'-8"	10"	18'-0"	89#
P.P. N°3	TRA3	1	8	1'-6"	12"	14'-0"	84
P.P. N°5	TRA5	2	6	1'-9"	9"	15'-6"	80
P.P. N°6	TRA6	1	6	1'-8"	7½"	11'-3"	67
P.P. N°6	TRA6A	1	6	1'-6"	8½"	8'-9"	60
P.P. N°12	TRA12	1	8	1'-8"	8"	8'-0"	47.7

Note: Quantity shown is total number reqd. for pumping plants Nos. 1, 2, 3, 5, 6, 7 & 12

Note: Quantities shown are for pumping plants Nos. 2 & 7

TBF	11-1941	Minor revisions
BY	DATE	CHARACTER
REVISIONS		

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

MISCELLANEOUS DETAILS

SHEET 88 OF 108 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: _____ DISTRICT ENGINEER, CHIEF OF DESIGN

APPROVED: _____ LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

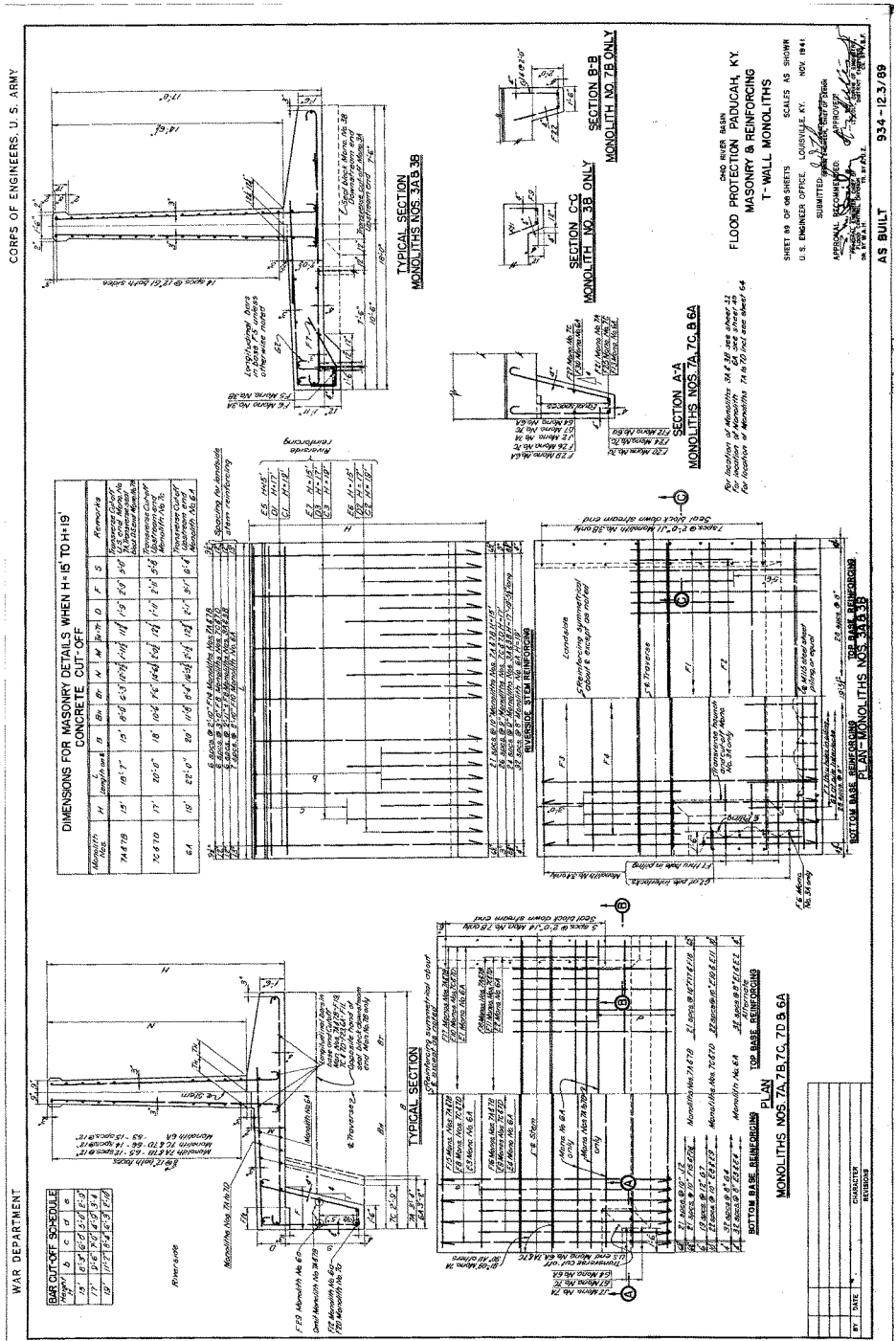
APPROVAL RECOMMENDED: _____ PRINCIPAL ASSISTANT ENGINEER, PLANS CONTROL SECTION

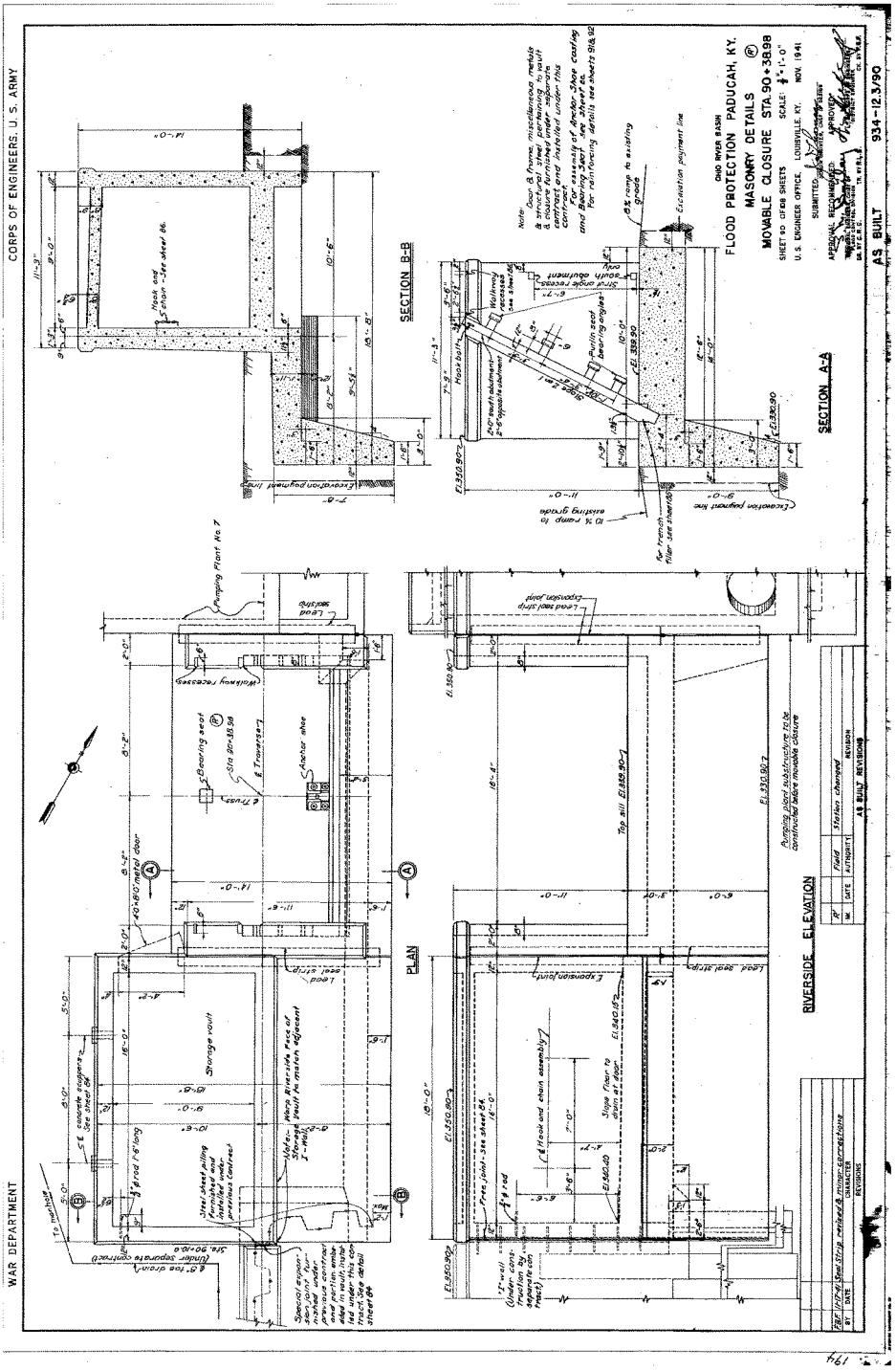
AS BUILT

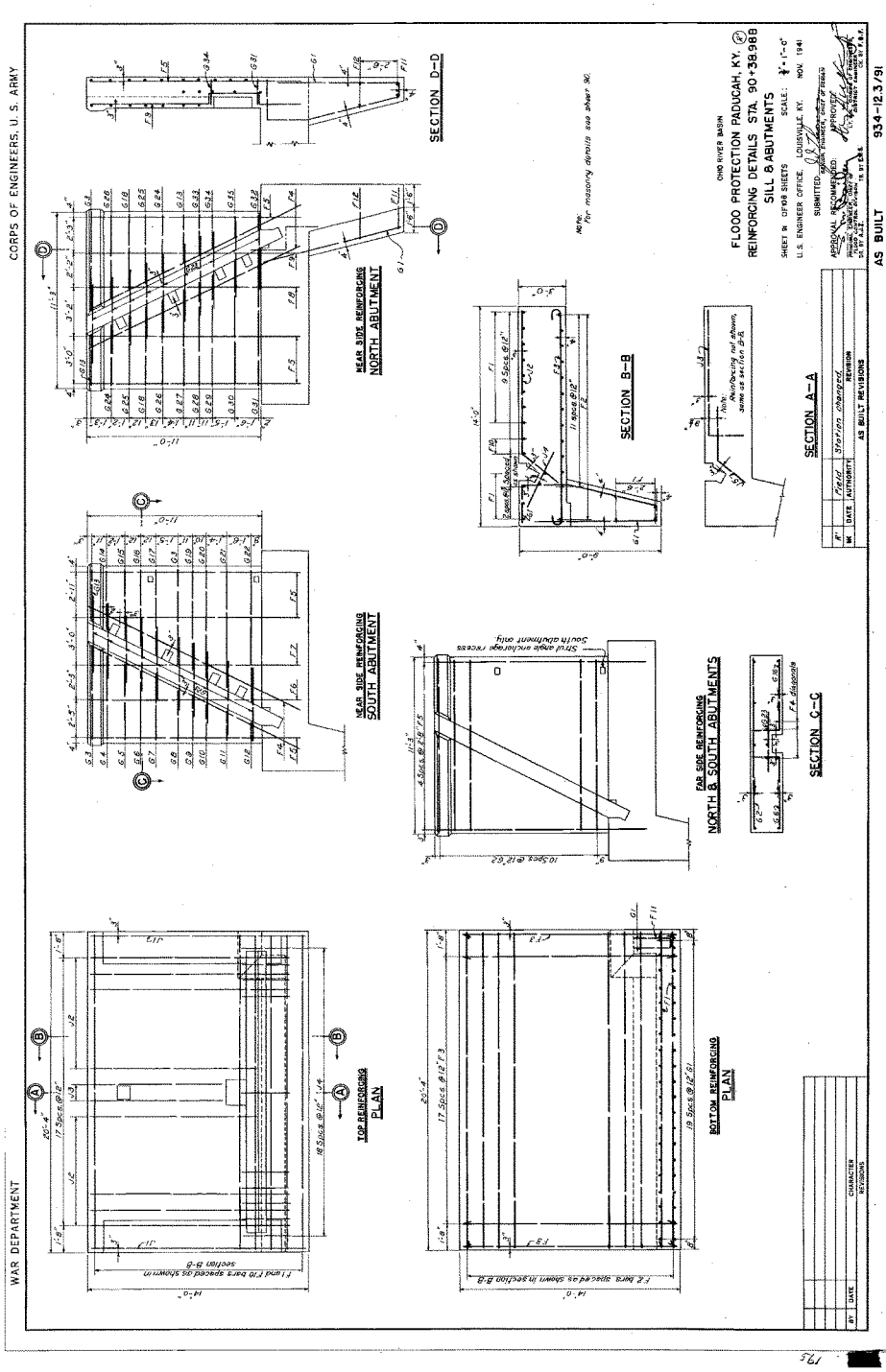
934-12.3/88

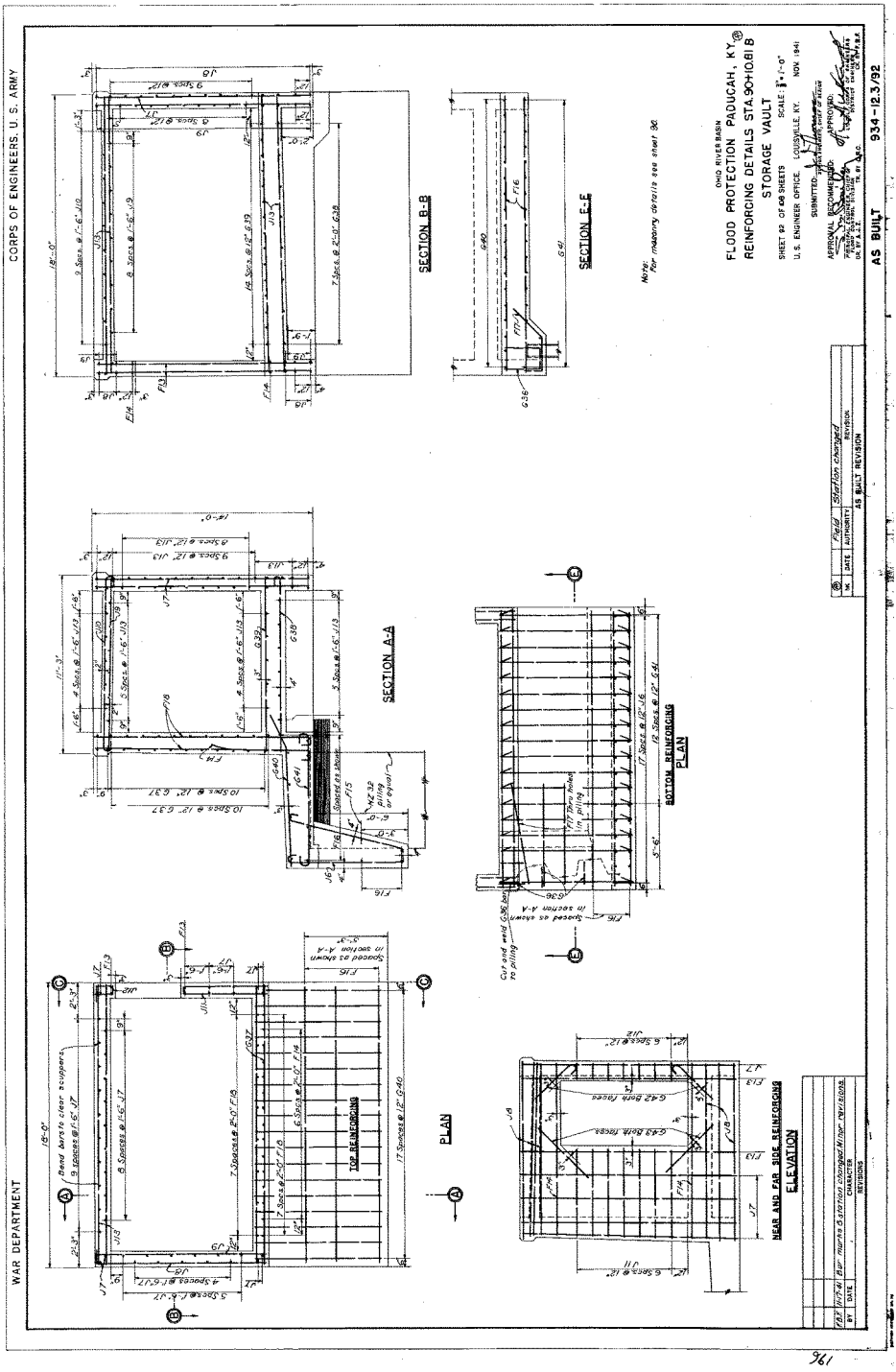
952

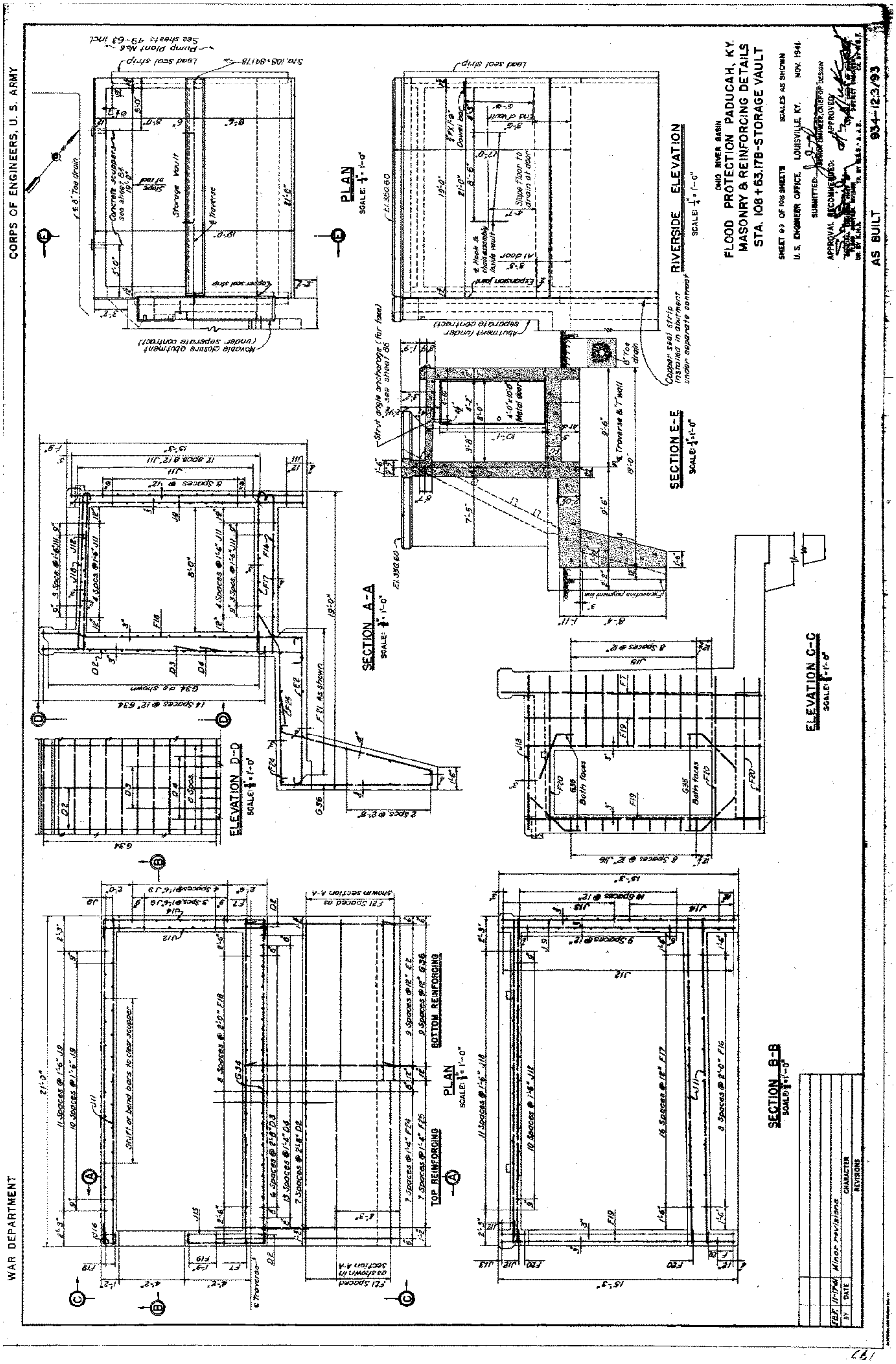
199

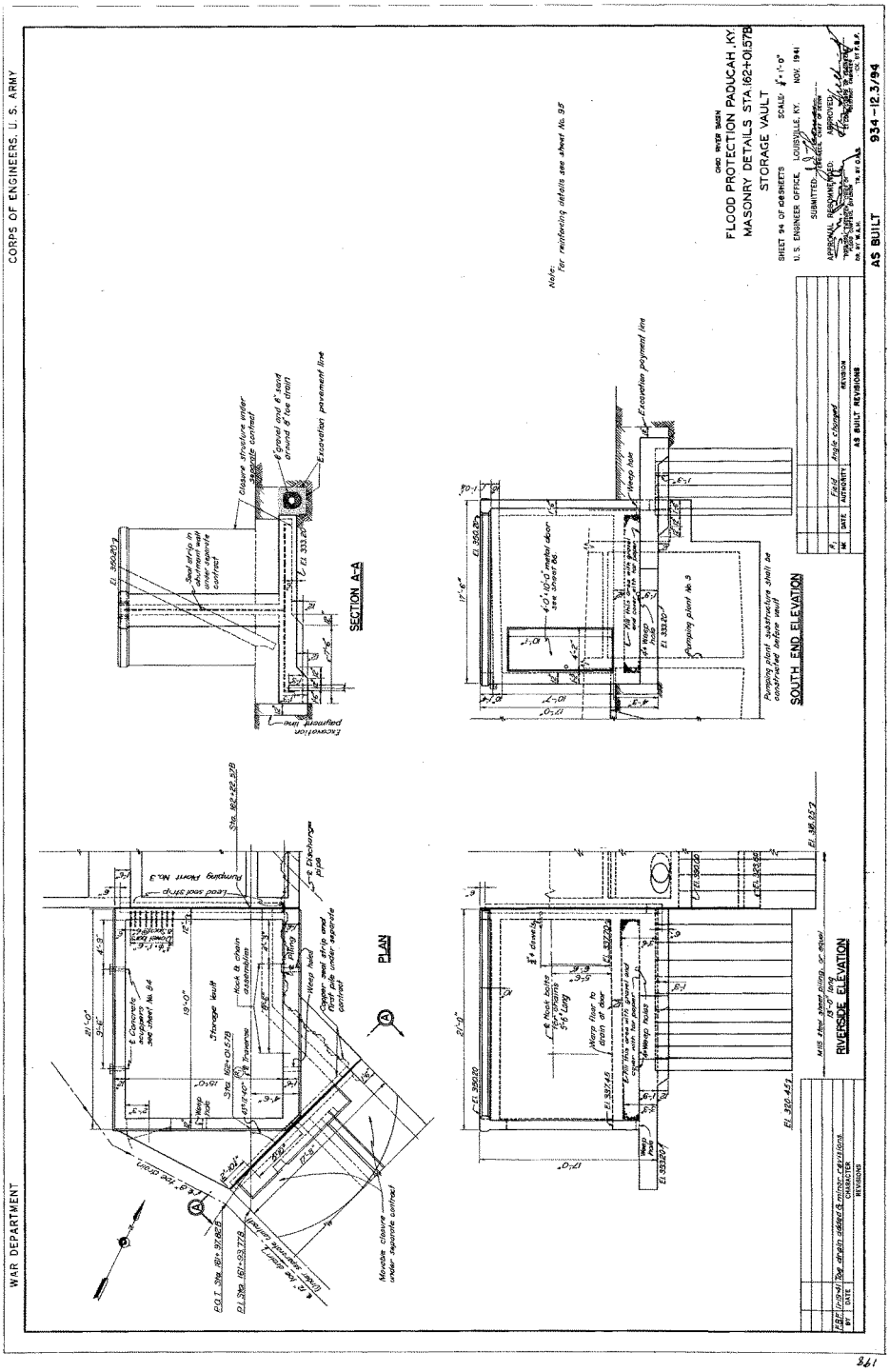

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MASONRY & REINFORCING
T-WALL MONOLITHS
SHEET 89 OF 98 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY.
NOV 1941
AS BUILT
934-12.3/89
DIMENSIONS FOR MASONRY DETAILS WHEN H=15' TO H=19'
CONCRETE CUT-OFF
BAR CUT-OFF SCHEDULE
TYPICAL SECTION
MONOLITHS NOS. 3A & 3B
SECTION B-B
MONOLITH NO. 7B ONLY
SECTION C-C
MONOLITH NO. 3B ONLY
SECTION A-A
MONOLITHS NOS. 7A, 7C, & 6A
TYPICAL SECTION
PLAN
MONOLITHS NOS. 7A, 7B, 7C, 7D & 6A
BOTTOM BASE REINFORCING
TOP BASE REINFORCING
PLAN-MONOLITHS NOS. 3A & 3B
BOTTOM BASE REINFORCING
TOP BASE REINFORCING

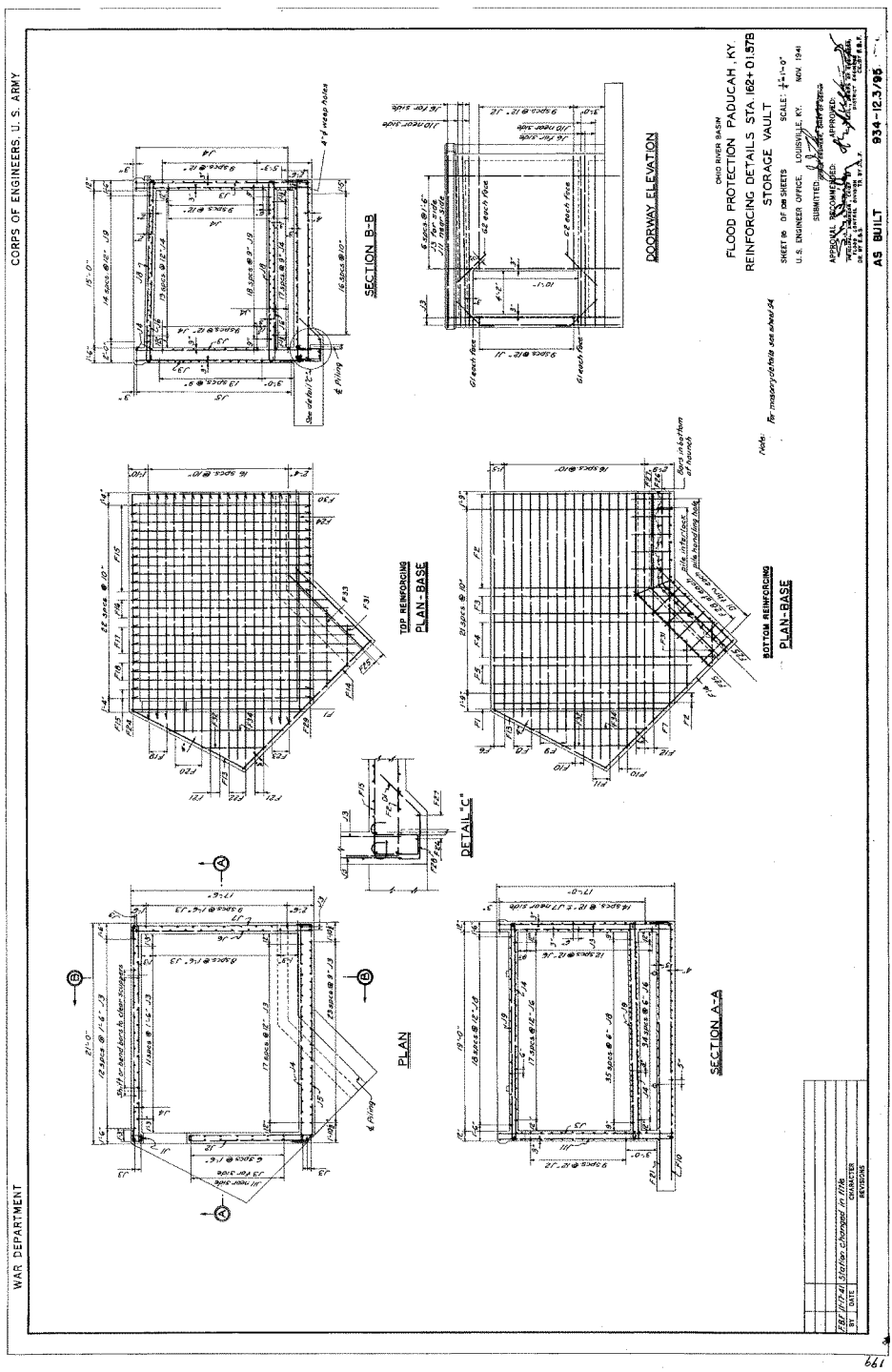

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MASONRY DETAILS
MOVABLE CLOSURE STA. 90+38.98
SHEET 90 OF 98 SHEETS
SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
AS BUILT
934-12.3/90
PLAN
RIVERSIDE ELEVATION
SECTION A-A
SECTION B-B

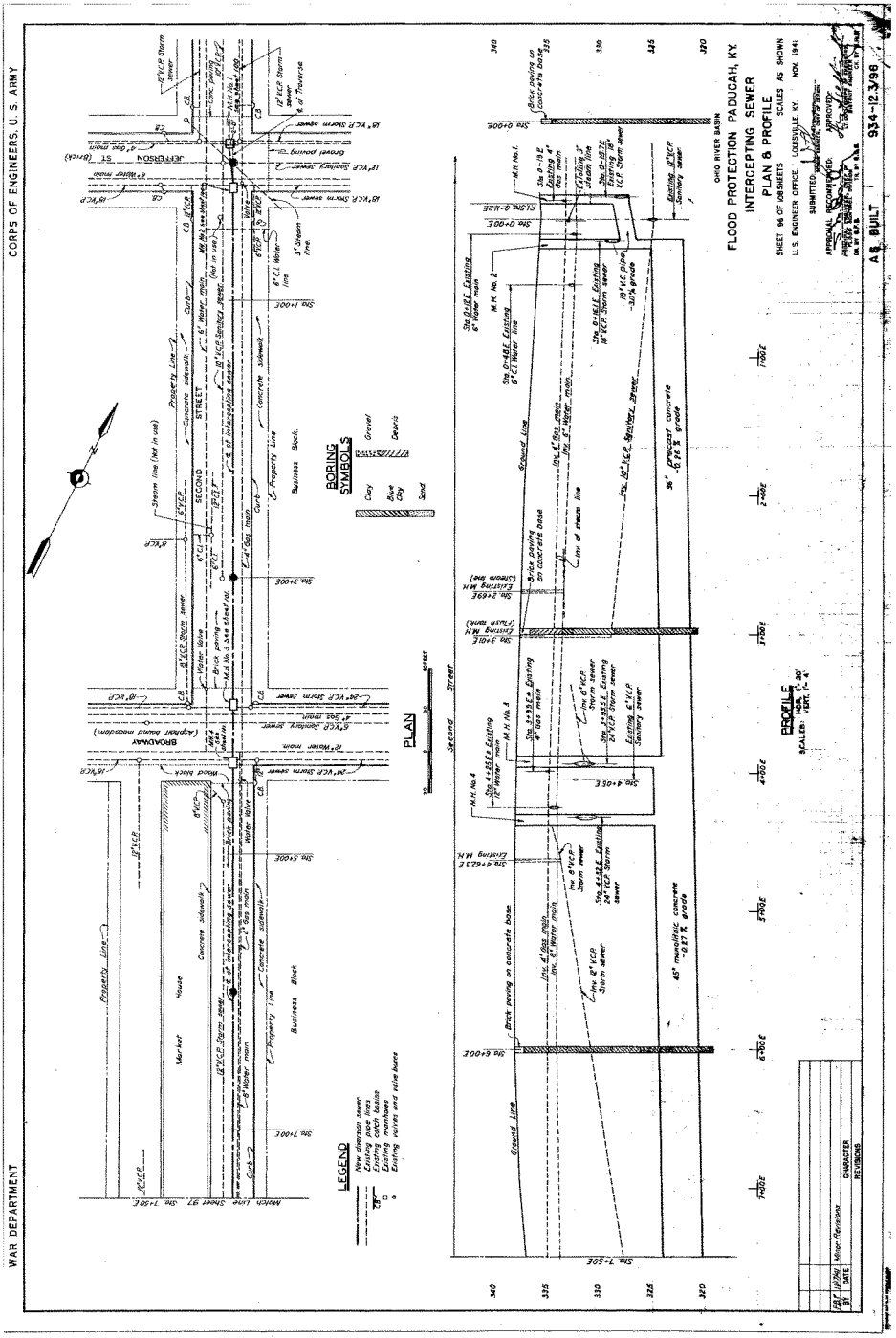

CORPS OF ENGINEERS, U.S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS STA. 90+38.98
SILL & ABUTMENTS
SCALE: 3/4"-1'-0"
SHEET 14 OF 108 SHEETS
U.S. ENGINEER OFFICE LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
AS BUILT
934-12.3/91
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
NEAR SIDE REINFORCING NORTH ABUTMENT
NEAR SIDE REINFORCING SOUTH ABUTMENT
FAR SIDE REINFORCING NORTH & SOUTH ABUTMENTS
TOP REINFORCING PLAN
BOTTOM REINFORCING PLAN
Note: For masonry details see sheet 90.
AS BUILT REVISIONS

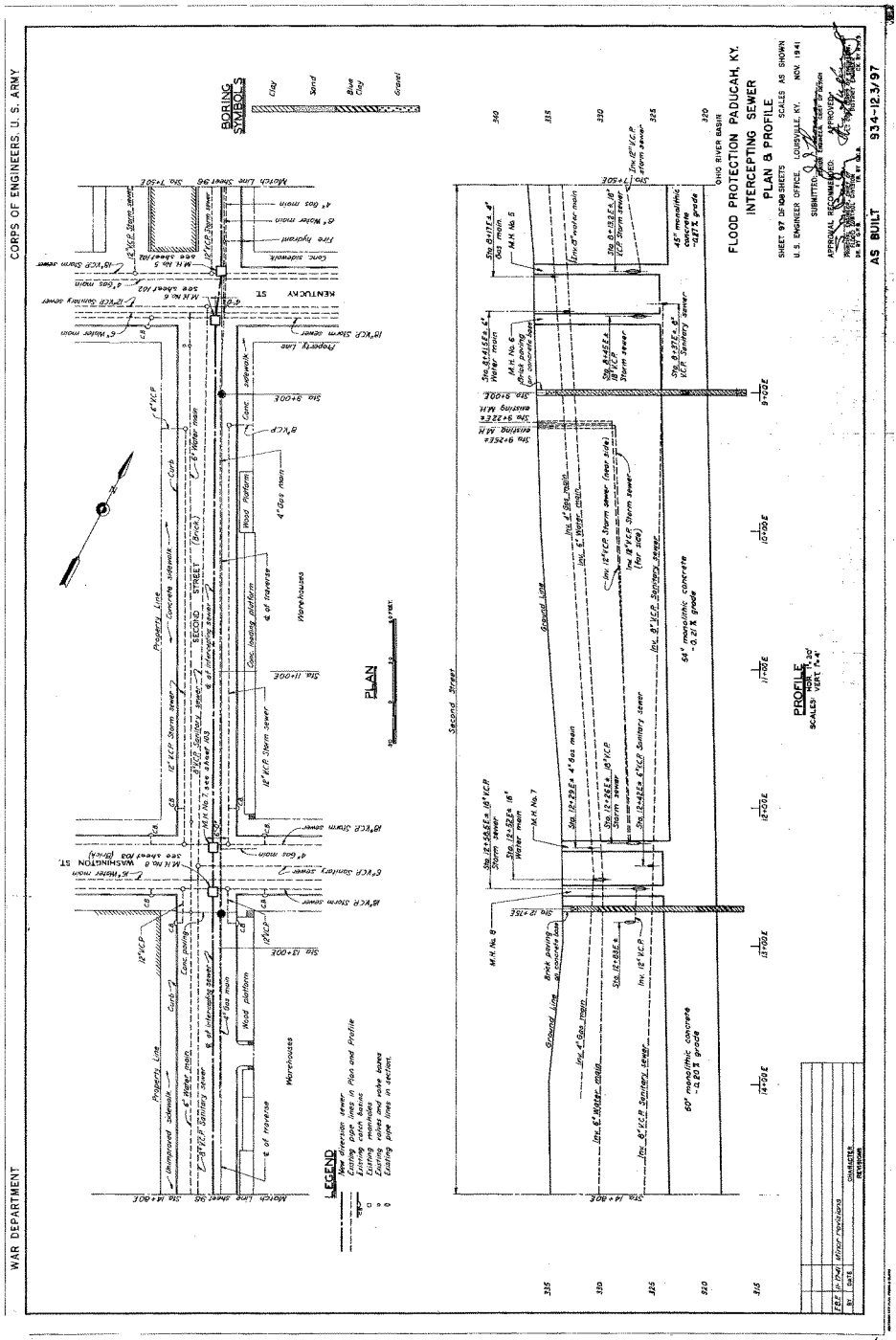

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS STA.90+08.18
STORAGE VAULT
SHEET 82 OF 68 SHEETS
SCALE: 3/4"=1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
AS BUILT
934-12.3/92
SECTION B-B
SECTION E-E
SECTION A-A
PLAN
BOTTOM REINFORCING PLAN
TOP REINFORCING
NEAR AND FAR SIDE REINFORCING ELEVATION
Note: For masonry details see sheet 36
Bend bars to clear supports
Shaded as shown in section A-A
Cut and weld to piling
Field Station changed
AS BUILT REVISION
961

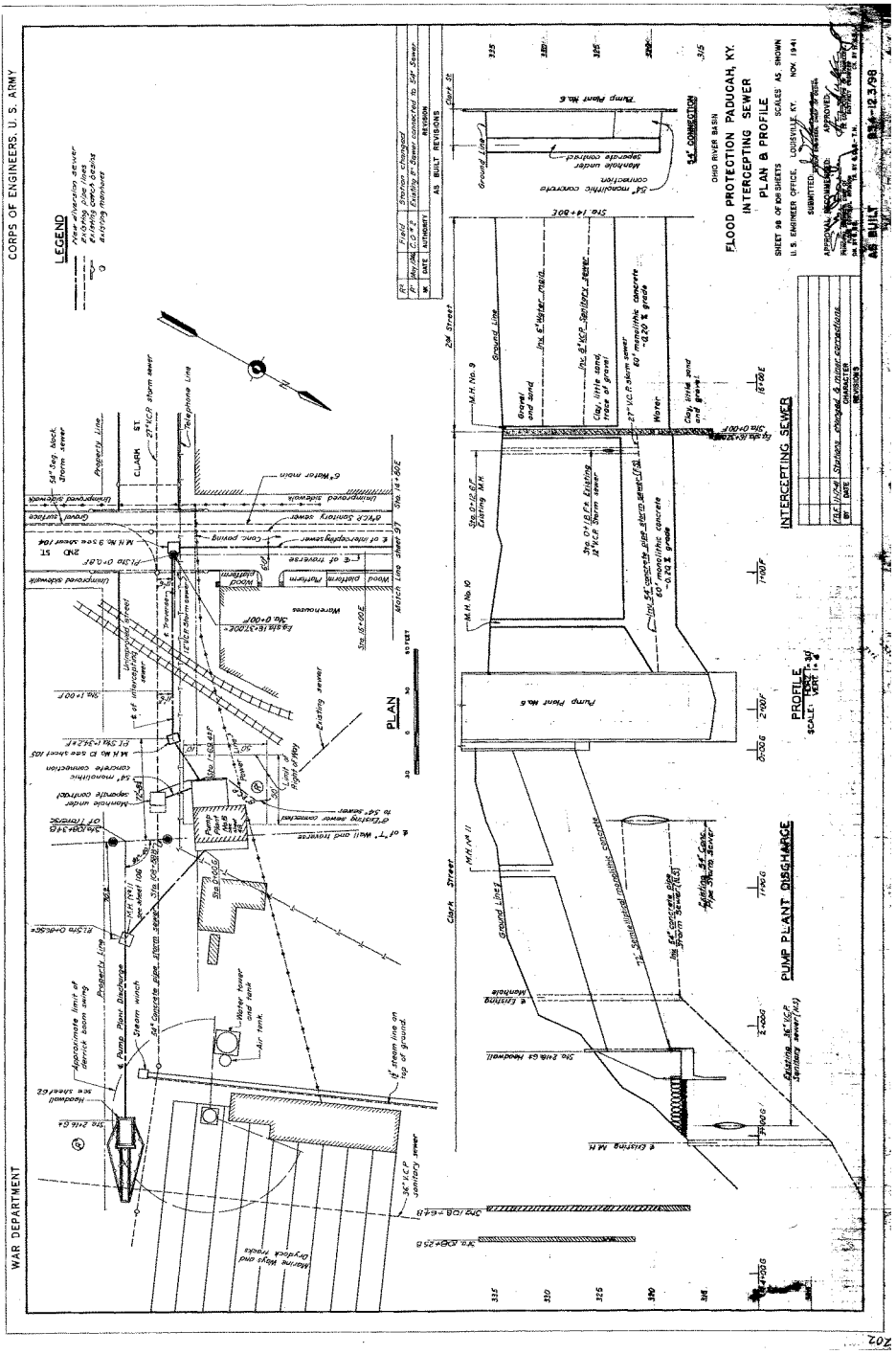

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MASONRY & REINFORCING DETAILS
STA. 108+63,178-STORAGE VAULT
SHEET 93 OF 108 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
AS BUILT
934-12.3/93
PLAN
RIVERSIDE ELEVATION
SECTION E-E
SECTION A-A
ELEVATION D-D
ELEVATION C-C
SECTION B-B
TOP REINFORCING
BOTTOM REINFORCING
Storage Vault
Minor revisions

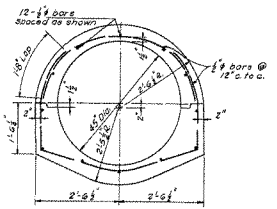

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MASONRY DETAILS STA 162+01.578
STORAGE VAULT
SHEET 94 OF 108 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SCALE: 1/4"=1'-0"
SUBMITTED: Chief, Engineering Division
APPROVAL RECOMMENDED: Chief, Engineering Division
APPROVED: Division Engineer
AS BUILT
934-12.3/94
PLAN
SECTION A-A
SOUTH END ELEVATION
RIVERSIDE ELEVATION
Storage Vault
Pumping plant No. 3
Lead sand strip
Excavation payment line
Closure structure under separate contract
Monolith closure under separate contract
Weep hole
Weep holes
Pumping plant substructure shall be constructed before vault
Note: For reinforcing details see sheet No. 85
AS BUILT REVISIONS
Field Authority
Field Check
Drain added & minor revisions
CHARACTER OF REVISIONS


CORPS OF ENGINEERS, U.S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS STA. 162+01.57B
STORAGE VAULT
SCALE: 1/4"=1'-0"
SHEET 78 OF 138 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED:
APPROVED:
APPROVAL RECOMMENDED:
AS BUILT
934-12.3/95
SECTION B-B
DOORWAY ELEVATION
TOP REINFORCING PLAN-BASE
BOTTOM REINFORCING PLAN-BASE
DETAIL "C"
PLAN
SECTION A-A
Note: For masonry details see sheet 24
BY DATE CHARACTER OF REVISIONS
FEB 1974 Station changed in title


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
INTERCEPTING SEWER
PLAN & PROFILE
SHEET 96 OF 108 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
AS BUILT
934-12.3/96
PLAN
PROFILE
LEGEND
BORING SYMBOLS
Clay
Gravel
Blue Clay
Debris
Sand
Second Street
Ground Line
OHIO RIVER BASIN
BROADWAY
JEFFERSON ST
STREET
Property Line
Business Block
Concrete sidewalk
Brick paving on concrete base
Inv. of stream line
Existing MH
Existing Sanitary sewer
Existing Storm sewer
Existing Water main
Existing gas main
Existing steam line
Existing telephone conduit
Existing valves and valve boxes
New diversion sewer
Existing pipe lines
Existing manholes
Match Line Sheet 97


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
INTERCEPTING SEWER
PLAN & PROFILE
SCALES AS SHOWN
NOV. 1941
AS BUILT
934-12.3/97
PLAN
PROFILE
LEGEND
BORING SYMBOLS
Clay
Sand
Blue Clay
Gravel
SECOND STREET
KENTUCKY ST
WASHINGTON ST.
Second Street
Ground Line
Property Line
Concrete sidewalk
Wood platform
Warehouses
Brick paving
OHIO RIVER BASIN

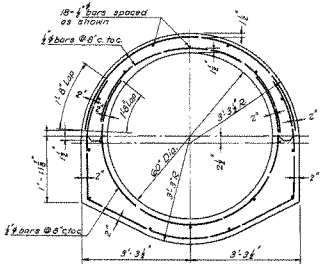

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
LEGEND
FLOOD PROTECTION PADUCAH, KY.
INTERCEPTING SEWER
PLAN & PROFILE
SCALES AS SHOWN
NOV. 1941
AS BUILT
PLAN
PROFILE
INTERCEPTING SEWER
PUMP PLANT DISCHARGE
Clark Street
2nd Street
Pump Plant No. 6
OHIO RIVER BASIN



TYPICAL SECTION

45" REINFORCED CONCRETE SEWER

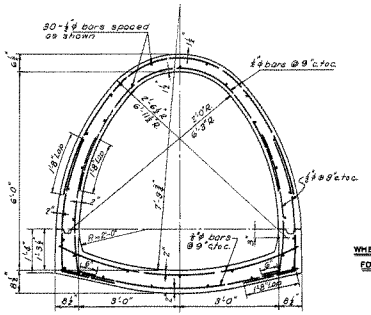
403' LINEAR FT. SEWER REQ'D.
12,165 LIN. FT. @ 40 = 1.83 STEEL REQ'D
SCALE: ½" = 1'-0"



TYPICAL SECTION

60" REINFORCED CONCRETE SEWER

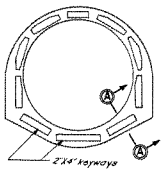
558' LINEAR FT. SEWER REQ'D.
43,307 LIN. FT. @ 1.00 = 43,307 LBS. STEEL REQ'D.
SCALE: ½" = 1'-0"



TYPICAL SECTION

72" SEMI-ELLIPTICAL SEWER

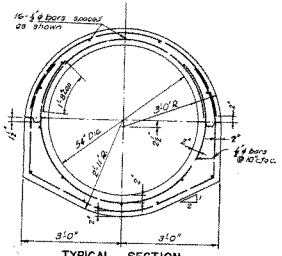
207' LINEAR FT. SEWER REQ'D.
⅞ @ 17,784 LIN. FT. @ 1.00 = 17,784 LBS. STEEL REQ'D.
⅝ @ 4901 LIN. FT. @ 1.78 = 8,723 LBS. STEEL REQ'D.
SCALE: ½" = 1'-0"



TYPICAL VERTICAL CONSTRUCTION JOINT

WHERE WATER TIGHT CONSTRUCTION IS NOT REQUIRED FOR 45", 54", 60" OR 72" MONOLITHS CONCRETE SEWER

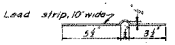
SECTION A-A



TYPICAL SECTION

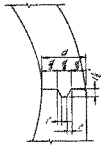
54" REINFORCED CONCRETE SEWER

479' LINEAR FT. SEWER REQ'D.
30,217 LIN. FT. @ 1.84 = 55,599 LBS. STEEL REQ'D.
SCALE: ½" = 1'-0"



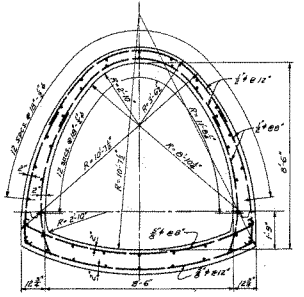
LEAD SEAL STRIP

SCALE: 3" = 1'-0"



TYPICAL HORIZONTAL CONSTRUCTION JOINT

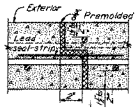
SCALE: 1½" = 1'-0"



TYPICAL SECTION 6'-6"

SEMI-ELLIPTICAL CONCRETE SEWER

361' LINEAR FT. SEWER REQ'D.
⅞ @ 3,765 LIN. FT. @ 2.26 = 8,511 LBS. STEEL REQ'D.
⅝ @ 1,087 LIN. FT. @ 1.35 = 1,468 LBS. STEEL REQ'D.
SCALE: ½" = 1'-0"



TYPICAL VERTICAL CONSTRUCTION JOINT

FOR WATER TIGHT CONSTRUCTION

SCALE: 3" = 1'-0"

BY	DATE	CHARACTER
TBF	11-17-41	Title changed, reinforcing quantities and weights added.

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

MASONRY AND REINFORCING DETAILS MONOLITHIC CONCRETE SEWERS

SHEET 99 OF 106 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: _____ Assistant Chief of Design

APPROVAL RECOMMENDED: _____ Flood Control Division

APPROVED: _____ District Engineer

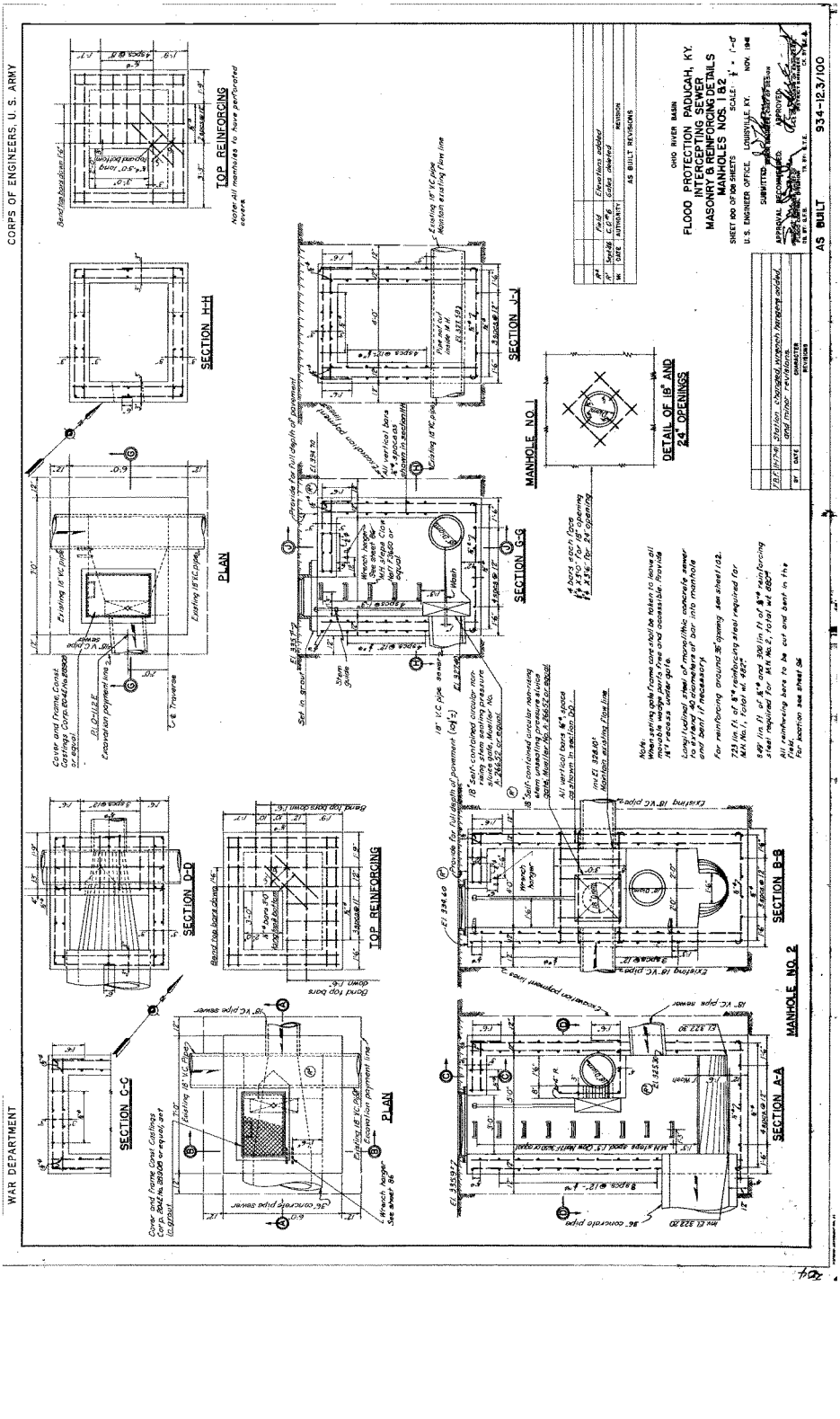
DR. BY: G.T.B. TR. BY: J.E.C. CH. BY: J.A.

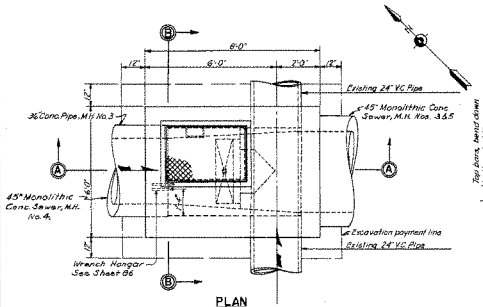
AS BUILT

934-12.3/99

207

963

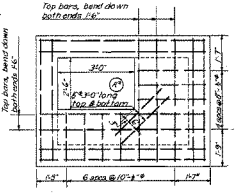

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
FLOOD PROTECTION PADUCAH, KY.
INTERCEPTING SEWER
MASONRY & REINFORCING DETAILS
MANHOLES NOS. 1 & 2
OHIO RIVER BASIN
AS BUILT
934-12.3/100
MANHOLE NO. 1
MANHOLE NO. 2
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION G-G
SECTION H-H
SECTION J-J
PLAN
TOP REINFORCING
DETAIL OF 16" AND 24" OPENINGS



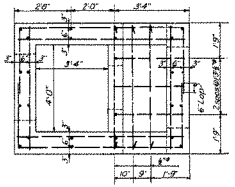
PLAN

MANHOLE NO. 3

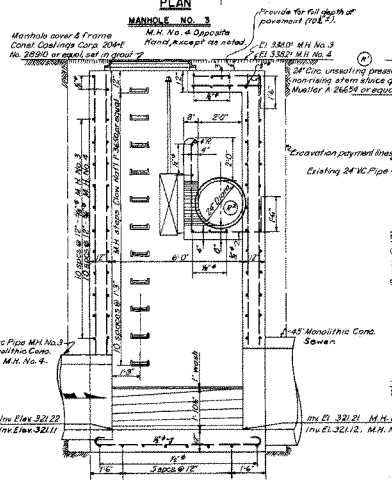
M.H. No. 4 Opposite Hand, except as noted



TOP REINFORCING



SECTION C-C



SECTION A-A

MANHOLE NO. 3

MANHOLE NO. 4 OPPOSITE HAND

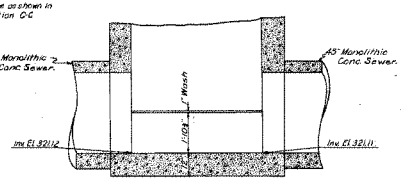
EXCEPT AS NOTED

SECTION B-B

MANHOLE NO. 3

MANHOLE NO. 4 OPPOSITE HAND

EXCEPT AS NOTED



PART SECTION A-A

MANHOLE NO. 4

For additional details see M.H. No. 3, Section A-A.

A*		Field	Minor revisions, Elevation added.
A'	Sept. 1941	C.O. P.E.	Gate deleted.
NO.	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

F.B.P.	11-17-41	Inv. Elevations added and minor revisions
BY	DATE	CHARACTER

REVISIONS

Note:
When setting gate frame care shall be taken to leave all movable wedge parts free and accessible.
Estimated quantity reinforcing for one M.H. only
#4 402 Lbs. Ft = 268 Lbs. #5 1105 Lbs. Ft = 1159 Lbs.
Longitudinal steel of monolithic concrete sewer to extend 40 diameters of bar into manhole and bent if necessary.
For reinforcing around 24" openings see sheet 100.
For reinforcing around 36" and 45" openings see sheet 102.
For location see sheet No. 96

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY
INTERCEPTING SEWER
MASONRY & REINFORCING DETAILS
MANHOLES NOS. 3 & 4

SHEET 101 OF 108 SHEETS SCALE: 1/4" = 1'-0"

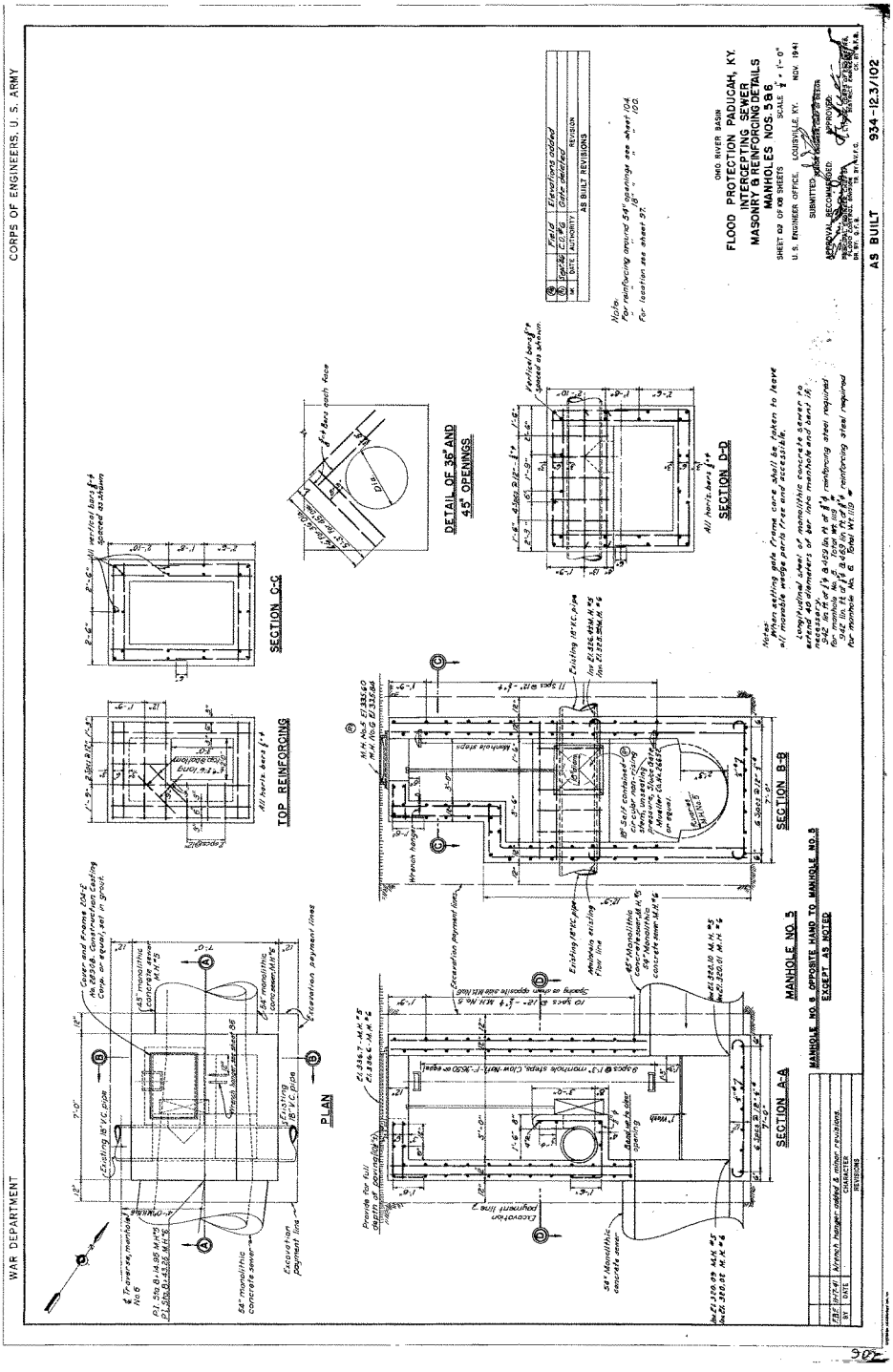
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

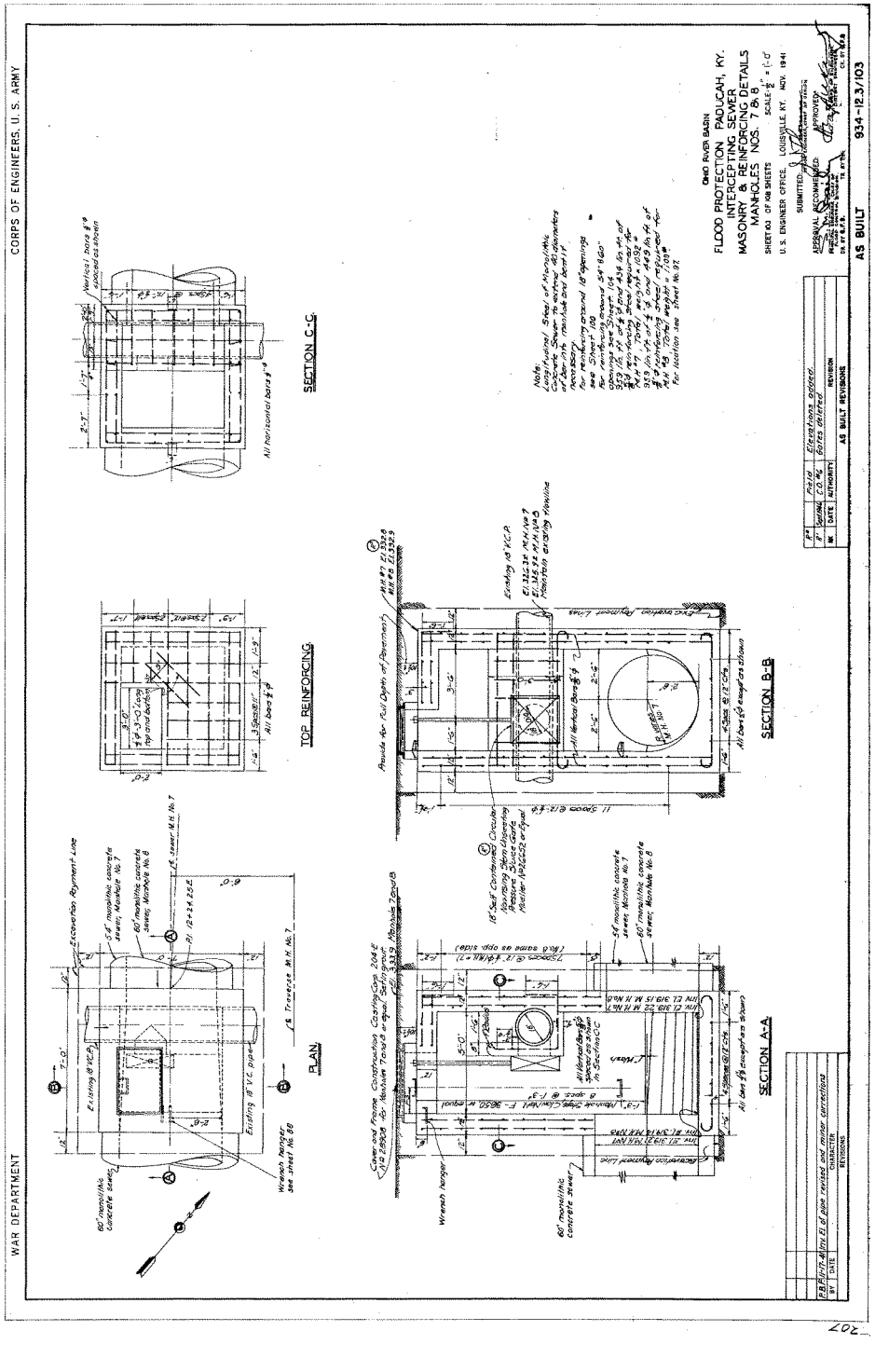
SUBMITTED: [signature] Asst. Engineer, Chief of Design

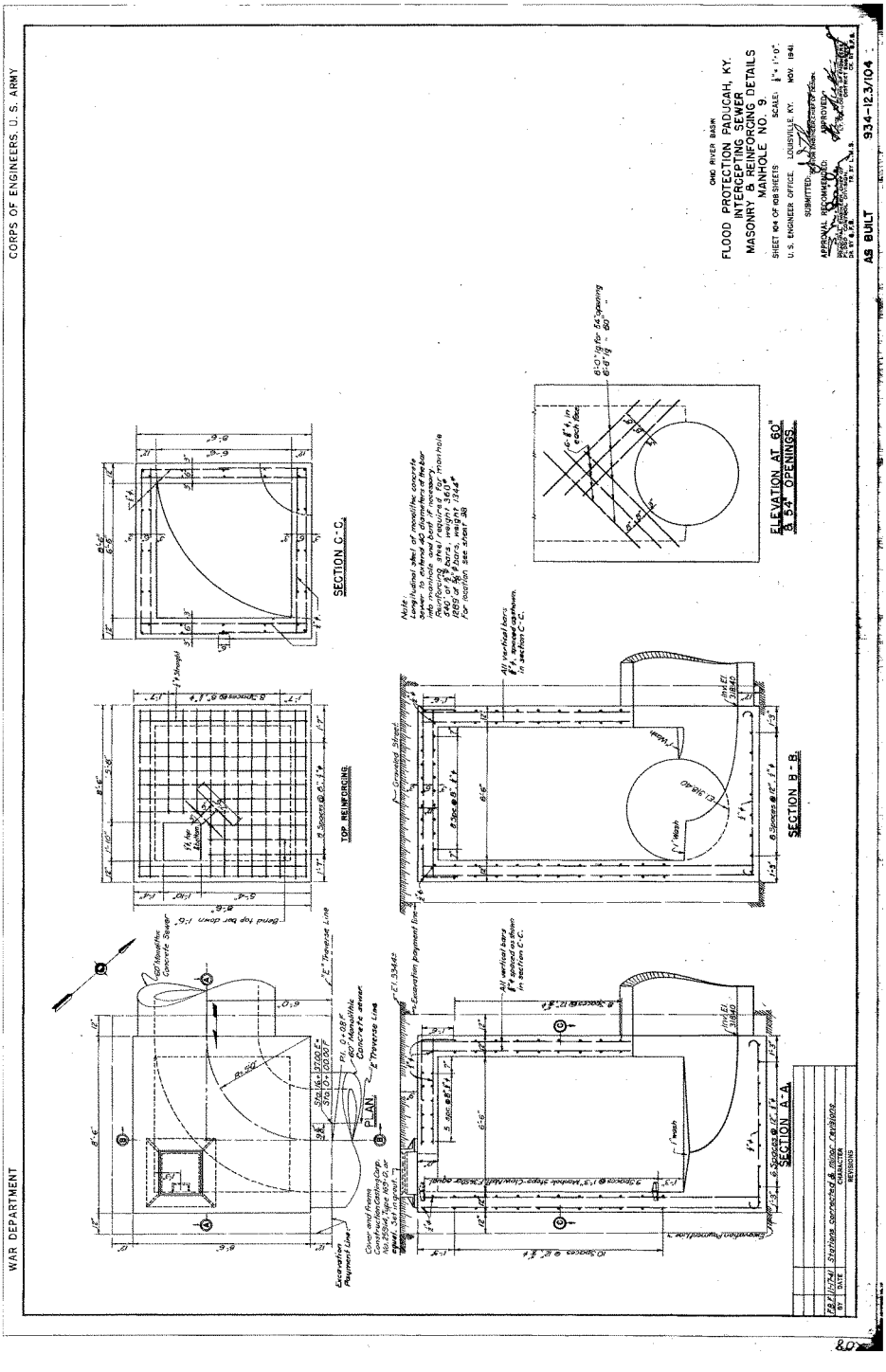
APPROVAL RECOMMENDED: [signature] Engineering Assistant to Chief of Design

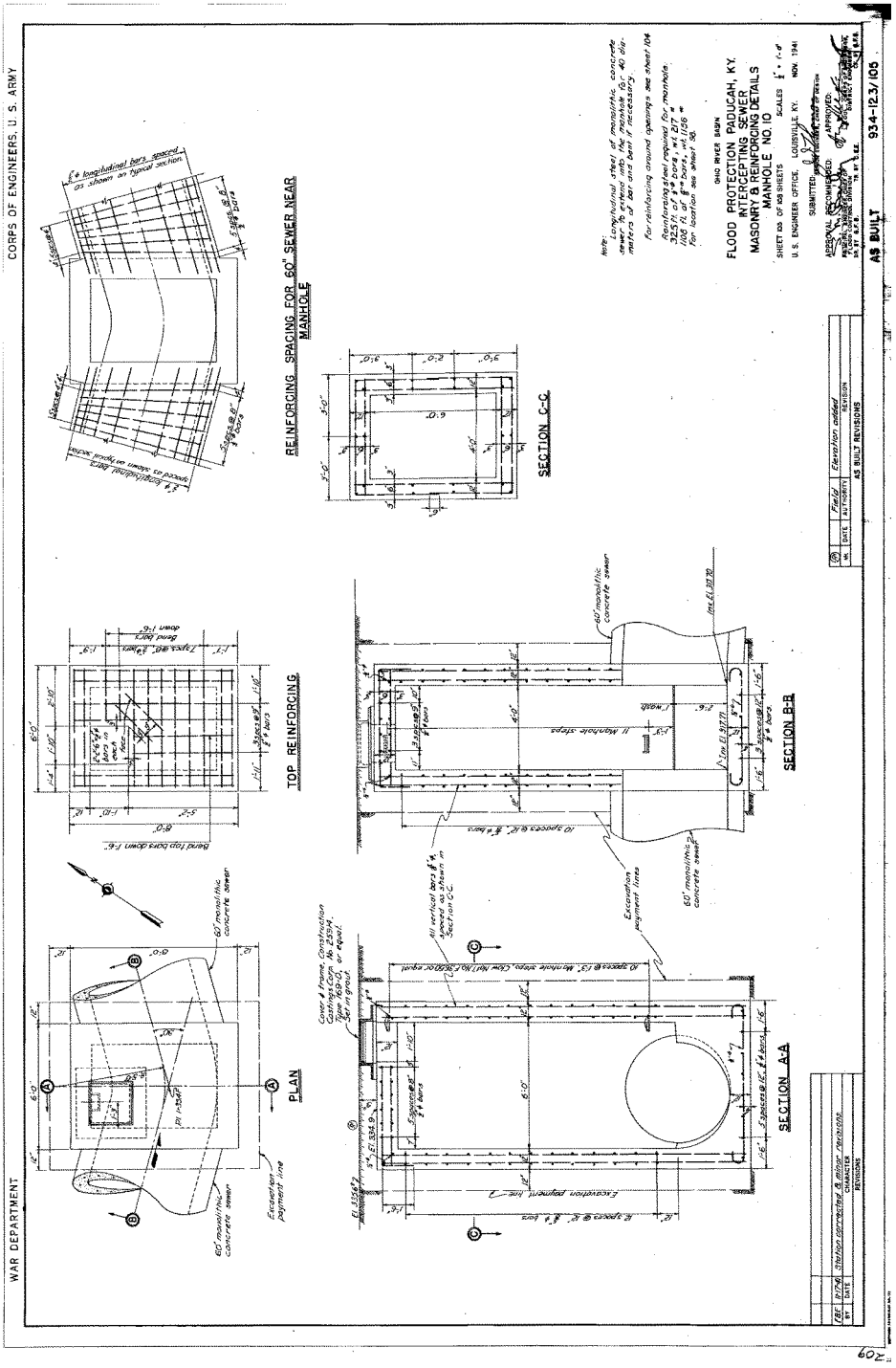
APPROVED: [signature] Lt. Colonel, Corps of Engineers, District Engineer

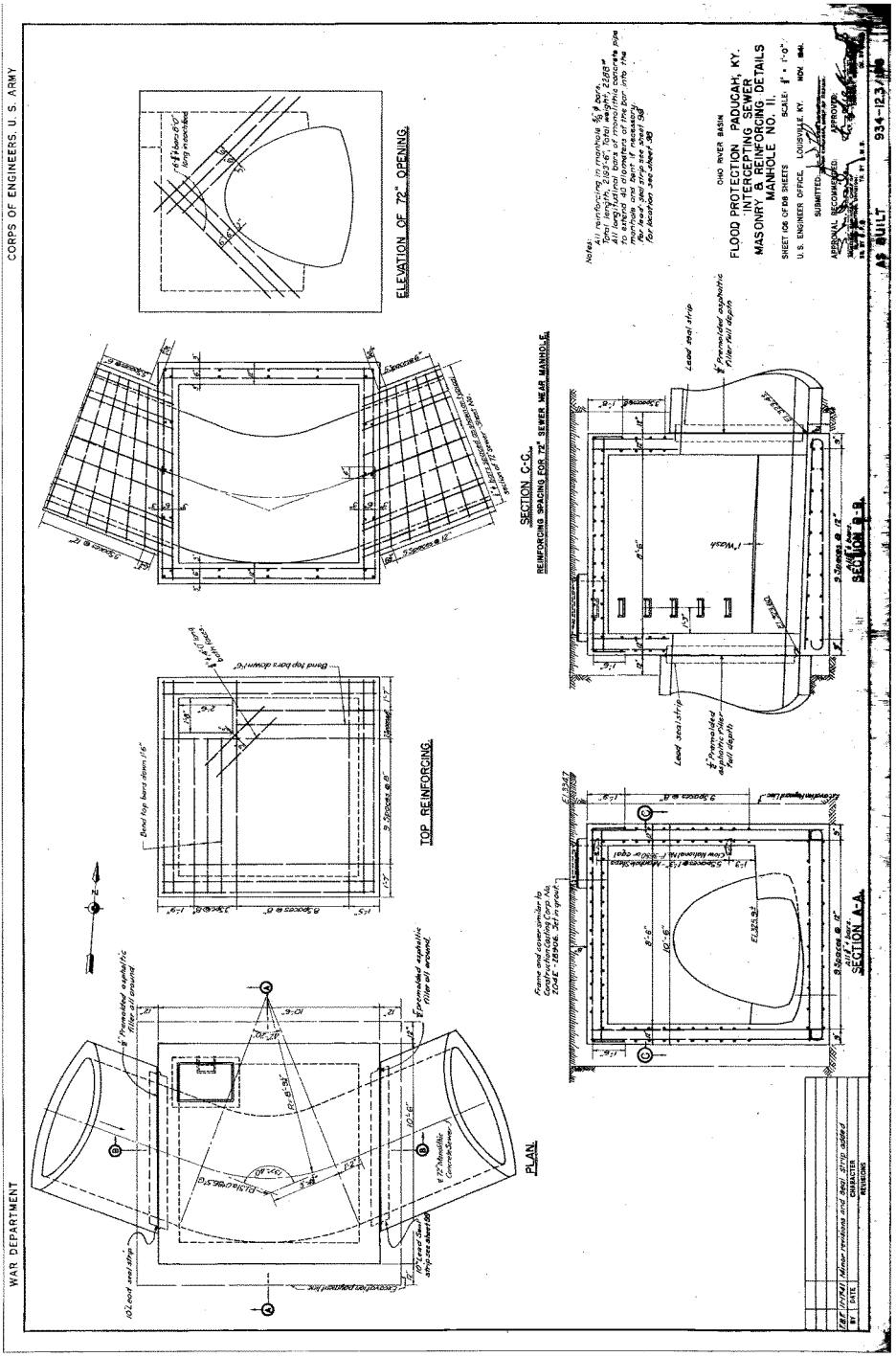
AS BUILT 934-12.3/101


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
PLAN
SECTION C-C
TOP REINFORCING
DETAIL OF 36" AND 45° OPENINGS
SECTION D-D
SECTION A-A
MANHOLE NO. 5
SECTION B-B
MANHOLE NO. 6 OPPOSITE HAND TO MANHOLE NO. 5 EXCEPT AS NOTED
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
INTERCEPTING SEWER
MASONRY & REINFORCING DETAILS
MANHOLES NOS. 5 & 6
SHEET 62 OF 68 SHEETS
SCALE 1/2" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
934-12.3/102


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
PLAN
SECTION A-A
SECTION B-B
SECTION C-C
TOP REINFORCING
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
INTERCEPTING SEWER
MASONRY & REINFORCING DETAILS
MANHOLES NOS. 7 & 8
SCALE-1/2" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
AS BUILT
934-12.3/103

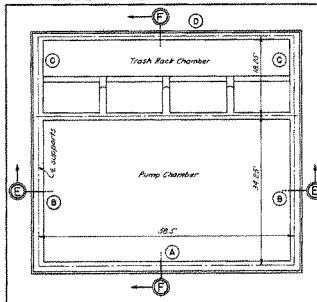

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
INTERCEPTING SEWER
MASONRY & REINFORCING DETAILS
MANHOLE NO. 9.
SHEET 104 OF 108 SHEETS
SCALE: 1" = 1'-0"
U.S. ENGINEER OFFICE LOUISVILLE, KY. NOV. 1941
SUBMITTED:
APPROVED:
AS BUILT
934-12.3/104
PLAN
SECTION A-A
SECTION B-B
SECTION C-C
TOP REINFORCING
ELEVATION AT 60" & 54" OPENINGS
Note
Invert shall slope from manhole to sewer as shown.


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
PLAN
TOP REINFORCING
REINFORCING SPACING FOR 60" SEWER NEAR MANHOLE
SECTION A-A
SECTION B-B
SECTION C-C
60" monolithic concrete sewer
Excavation payment line
Bend top bars down 1'-6"
All vertical bars #4 spaced as shown in Section C-C
Cover 4 front, Construction Joints 18" apart, Set in grout
Inv. El. 302.78
Inv. El. 297.78
Manhole steps
FLOOD PROTECTION PADUCAH, KY.
INTERCEPTING SEWER
MASONRY & REINFORCING DETAILS
MANHOLE NO. 10
OHIO RIVER BASIN
SCALES 1" = 1'-0"
SHEET NO. OF 103 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
AS BUILT
934-12.3/105

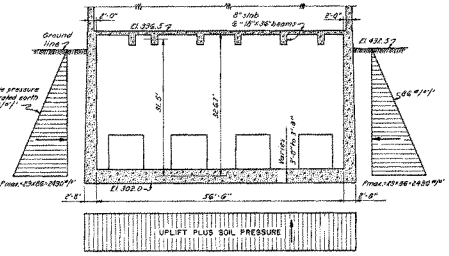

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
INTERCEPTING SEWER
MASONRY & REINFORCING DETAILS
MANHOLE NO. 11.
SHEET 106 OF 108 SHEETS
SCALE: 1" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV 1941.
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
934-12.3/106
PLAN
SECTION A-A.
SECTION B-B.
SECTION C-C.
REINFORCING SPACING FOR 72" SEWER NEAR MANHOLE
TOP REINFORCING.
ELEVATION OF 72" OPENING.
Notes:
All reinforcing in manhole is ¾" bars.
All longitudinal bars of manhole concrete pipe to extend 40 diameters of the bar into the manhole concrete. See detail sheet 38
For lead seal strip see sheet 38
For location see sheet 36
Bend top bars down 1'6"
Lead seal strip
¾" Premolded asphaltic filler full depth
¾" Premolded asphaltic filler all around
Frame and cover similar to Construction Catalog Corp No. 1004E - 18906. Set in grout.
Except as noted
BY | DATE | CHARACTER OF REVISIONS

WAR DEPARTMENT

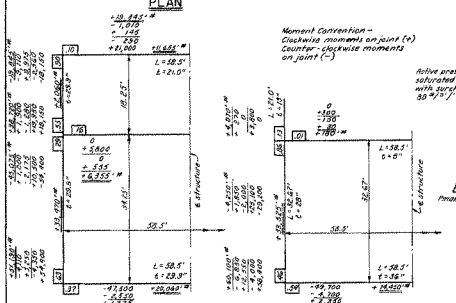
CORPS OF ENGINEERS, U. S. ARMY



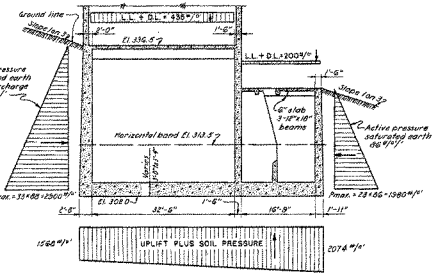
PLAN



SECTION E-E

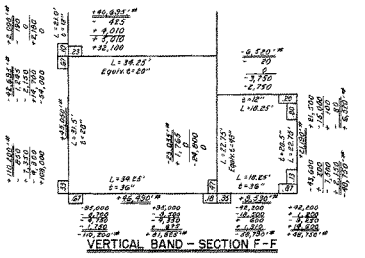


HORIZONTAL BAND – EL. 313.5



SECTION F-F

VERTICAL BAND – SECTION E-E



VERTICAL BAND – SECTION F-F

DESIGN OF MEMBERS

Panel	Type Slab	m	Section	Average Pressure	– M Coeff.	– M Unadjusted	Design Moments and Reinforcing Steel				
							Steel in E.F.	As Req'd	As Used	Adjusted – M or + M/m'	As Req'd	As Used
A	4 edges Cont.	.54	Vert. –M top	1140 #/s.f.	.054	54,000	41,625	1.51	2.68	——	——	——
			Vert. –M bottom		.075	108,000	110,200	2.85	2.68	——	——	——
			Vert. +M center		——	——	——	——	——	45,050	1.23	1.34
			Hor. –M ends		.033	47,500	51,150	1.43	1.33	——	——	——
			Hor. +M center		——	——	——	——	——	20,080	.53	0.53
B	1 edge Discont.	.56	Vert. –M top	1245 #/s.f.	.022	23,200	4,250	0.14	1.17	——	——	——
			Vert. –M bottom		.064	58,400	60,100	1.50	1.50	——	——	——
			Vert. +M center		——	——	——	——	——	33,525	0.90	0.95
			Hor. –M ends		.041	54,400	51,150	1.51	1.33	——	——	——
			Hor. +M center		——	——	——	——	——	33,970	0.92	1.33
Base of Pump Chamber	4 edges Cont.	.90	–M short span	1740 #/s.f.	.063	95,000	78,700	2.29	2.68	——	——	——
			+M short span		——	——	61,882	1.88	2.68	46,430	1.01	1.56
			–M long span		.033	49,700	60,100	1.36	1.50	——	——	——
			+M long span		——	——	——	——	——	19,950	0.32	0.50

Weights and Pressures

A. Weights
1. Concrete — 150 lbs. per cu. ft.
2. Water — 62.5 lbs. per cu. ft.

B. Active pressures
1. Water — 62.5 lbs. per sq. ft.
2. Saturated earth – angle of repose = 28°-34' – no surcharge — 88 lbs. per sq. ft.
3. Saturated earth – angle of repose = 28°-34' – 1 on 3 slope surcharge — 95 lbs. per sq. ft.

Allowable Working Stresses

A. Steel reinforcing — 18,000 lbs. per sq. in.

B. Concrete
1. Ultimate compressive strength at 28 days — 3,000 lbs. per sq. in.
2. Compression – extreme fibre stress — 1,000 lbs. per sq. in.
3. Shear – beams without web reinforcement, but with end anchorage of longitudinal steel — 90 lbs. per sq. in.
4. Bond – end anchorage provided — 225 lbs. per sq. in.

Loading Assumptions

Loads on substructure walls taken as full active pressure of saturated soil to ground line. Pump sump assumed dry.
Friction on wall and base assumed to equal only unbalanced horizontal forces on opposite sides of pump plant.

Roof:
Designed for 30 #/s.f. live load plus any concentrations due to skylight beams or similar framing. Slab designed as continuous normal to beams and as flange of "T" beams parallel to beams. "T" beams designed for simple supports.

Walls:
1. Designed for 20 #/s.f. wind load normal to surface.
2. Designed for eccentric vertical load equal to one half crane, plus hoist, plus 125% of maximum live load vertical reaction in conjunction with horizontal thrust acting in either direction at base of rail, equal to 10% of trolley weight with full load.

Floor:
Slab designed as continuous, for a concentrated load equal to weight of heaviest probable piece of equipment plus 100% impact, or a uniform load of 250 #/s.f., whichever is greater. Beams designed as rectangular beams for both full and partial fixity and supporting concentrated loads equal to the weight of pump, motor and maximum hydraulic thrust, all plus 25% for impact, or for dead load, including pump and motor, plus uniform live load of 150 #/s.f. on area of floor not occupied by pumps, whichever is greater.

Base:
Designed as a rectangular slab having full continuity with side walls.

Walls:
Designed as slabs under various degrees of edge restraint and poured monolithically with adjacent walls, base and floor.

Crane:
Capacity based on weight of heaviest manufactured motor or pump of capacity specified.

Trash Rack:
Designed for full stoppage with water at maximum pumping stage on outside of racks.

Floor Plates:
Floor plates over trash chambers are designed for a maximum deflection of 1/350 of the span with a live load of 150 #/s.f. Floor plates on motor floor are designed for a concentrated load of 1/2 motor weight.

Method of Procedure

The 1940 Joint Code has been used as a basis of design throughout, except as noted otherwise. Reference is also made to Timoshenko's "Theory of Plates and Shells." The substructure has been considered as a group of slabs poured monolithically with each other and restrained at their periphery. A horizontal section through the pump sump, as well as a vertical section thru each principal axis of the plant has been analyzed as a continuous frame, using the end moment coefficients, corresponding to the degree of restraint assumed existing at the edges of the slab, for the unbalanced moments. These moments have then been adjusted according to the principles of moment distribution. Total loads on panels are considered as equivalent uniform loads.

The same sections are also analyzed as elastic frames using beam coefficients and actual loads. This second analysis serves as a double check on the distribution of shear and moment but is not used for steel selection except for the short span of rectangular panels whose ratio of length to width is 1.5 or greater.

The analysis of slabs whose ratio of length to width is less than 1.5 is checked by using beam analysis in two directions, with actual total load "W", the load distribution in each direction being determined by the equation $W_{short\ span} = \frac{L^4}{L^4 + L^4}(W_{total})$, where L/S is the ratio of long to short span.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 2

DESIGN DATA

SHEET 1 OF 1 SHEET — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. OCTOBER, 1941

SUBMITTED: [signature]
CHIEF OF DESIGN

SCALES: DIMENSIONS 1" = 10'
FORCES 1" = 2000#

APPROVAL RECOMMENDED: [signature]
CHIEF ENGINEERS DIVISION

APPROVED: [signature]
COLONEL, CORPS OF ENGINEERS
DISTRICT ENGINEER

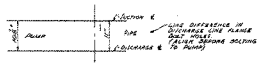
DR. BY W.A.H. TR. BY H.M.L. CK. BY F.B.F.

934-12.3/A

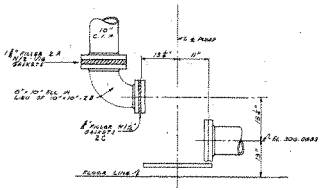
REVISED AS BUILT

971

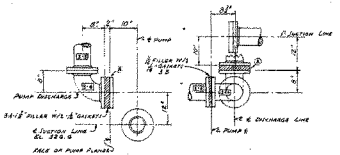
382



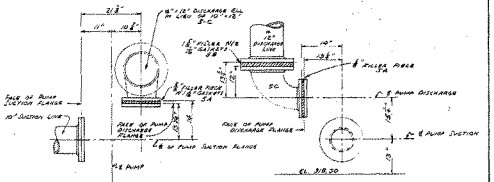
PLAN



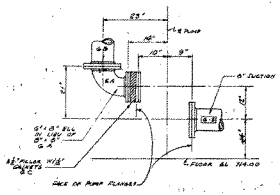
ELEVATION
PLANT Nº 2



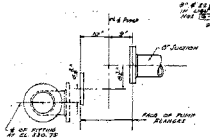
ELEVATION PLAN
PLANT Nº 3



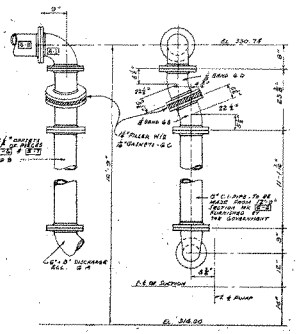
PLAN ELEVATION
PLANT Nº 5



ELEVATION



PLAN



ELEVATION

PLANT Nº 6

NOTES

1. ALL CLOSING DISCS TO BE CLOW-NATIONAL P-1768.
2. CONTRACTOR TO FURNISH REQUIRED FITTINGS, OFFSETS, PIPE CLOSURES, SPECIAL LENGTH BOLTS & ADDITIONAL GASKETS TO COMPLETE PIPING AS SHOWN.
3. THIS DRAWING TO BE USED IN CONJUNCTION WITH AMERICAN CAST IRON PIPE CO. DRWG. NO. 3088-1 "PUMPING PLANTS, CAST IRON PIPE & FITTINGS" DATED 7-11-42, AS REVISED 9-25-42.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KENTUCKY

PUMPING PLANTS NOS. 2, 3, 5 & 6

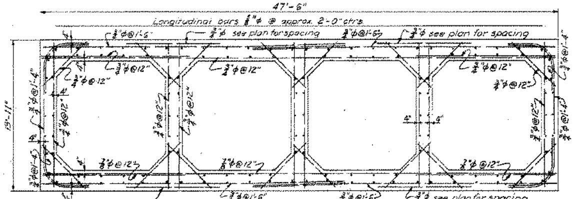
PIPING REVISIONS

SHEET 1 OF 1 SHEETS SCALE: 1/2" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAR. 1944

WAR DEPARTMENT

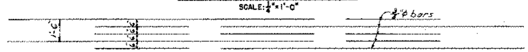
CORPS OF ENGINEERS, U. S.



Note:
Reinforcing as shown is for section at 36.5' from ℄ of dam.

REINFORCING STEEL DETAILS

SCALE: ¼" = 1'-0"



PLAN-TYPICAL BAR SPACING

Case No.	Point	Max. Shear	- Moment	+ Moment
I	1	21,100#	36,560#	
	2			18,690'#
	3	24,300# / 23,300#	58,400'# / 56,600'#	
	4			11,650'#
	5	22,700#	53,100#	
	6	19,340#		
	7			6,750'#
	8	14,550#		
	9	22,660#	39,060#	
	10			20,740'#
	11	26,840# / 25,100#	63,000'# / 61,000'#	
	12			12,200'#
	13	24,400#	57,000'#	
II	1	18,220#	24,600'#	
	2			19,100'#
	3	23,780# / 20,900#	36,600'# / 35,100'#	
	4			10,700'#
	5	20,100	44,700'#	
	6	7,765#		
	7			4,000'#
	8	9,220		
	9	20,850#	25,600'#	
	10			30,400'#
	11	23,330# / 21,220#	41,200'# / 41,300'#	
	12			15,200'#
	13	23,180#	54,600'#	

Note:
Maximum computed shears and moments shown are [illegible] intersection of ℄ of members.
Moments adjusted to edge of slabs for reinforcing steel.
Shears adjusted to edge of slab & end of haunches for maximum design stresses.

Design Conditions.
Case I: Earth dam 50 % saturated and water in multiple box culvert at El. 306.0.
Case II: Earth dam dry and water in multiple box culvert at normal pool El. 302.0
Case III. Earth dam fully saturated and water to El. 330.0 on Island Creek side. This case not shown.
Case IV: Water to El. 306.0 with one barrel of culvert unwatered. This case not shown.

Allowable Working Stress.

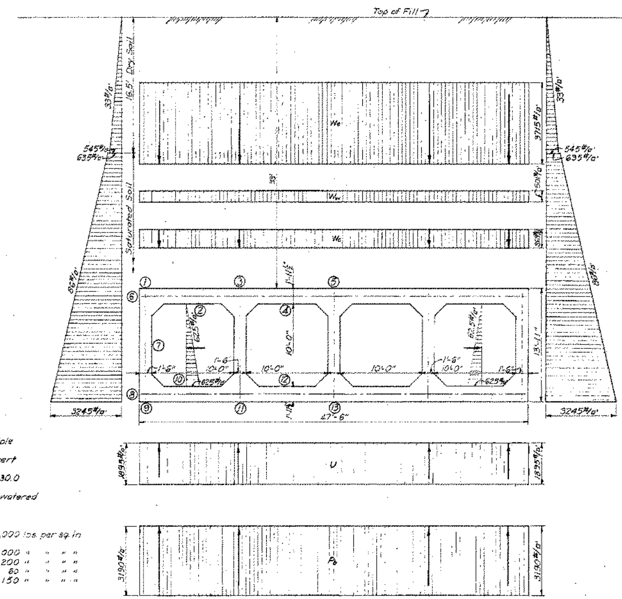
A. Steel Reinforcing	18,000 lbs. per sq. in
B. Concrete	
1. Ultimate compressive strength at 28 days	3000 " " " "
2. Compression - extreme fiber stress	1200 " " " "
3. Shear (without end anchorage of steel)	60 " " " "
4. Bond (deformed bars)	150 " " " "

Weights and Pressures

A. Weights	
1. Concrete	150 lbs. per cu. ft.
2. Water	62.5 " " " "
3. Saturated Earth	125 " " " "
4. Earth in Water (net)	62.5 " " " "
B. Active Pressures	
1. Water	62.5 lbs. per sq. ft.
2. Saturated Earth-angle of repose 26°-34'	86 " " " "
3. Dry Earth	33 " " " "
4. Earth in Water (net)	24 " " " "

Nomenclature
We Weight of dry and saturated soil on culvert in lbs. per sq. ft.
Ww Weight of water in culverts in lbs. per sq. ft. uniformly distributed over entire width.
Wc Weight of concrete culvert in lbs. per sq. ft. uniformly distributed over entire width.
U Uplift - lbs. per sq. ft.
Pb Soil pressure on base - lbs. per sq. ft.

Method of Analysis.
1. Properties of members and fixed end moment coefficients determined by methods and tables in Portland Cement Association Publication No. ST-41.
2. Final fixed end moments determined by method of moment distribution.
3. All span lengths taken as center to center of members.



LOADING DIAGRAM - CASE I

SCALES: DIMENSIONS ⅛" = 1'-0"; FORCES 1" = 2000#

Note.
Section shown is taken at 36.5' from ℄ of dam.

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 11
& ISLAND CREEK DAM
MULTIPLE BOX CULVERT
DESIGN DATA

SHEET OF SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JULY 1, 1942

SUBMITTED: [signature]

APPROVAL RECOMMENDED: [signature] APPROVED: [signature]

DR. BY R.K.J. TR. BY R.K.J. CK. BY H.W.

934-12.4/A

BELIEVED AS BUILT

389

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

IN 34 SHEETS

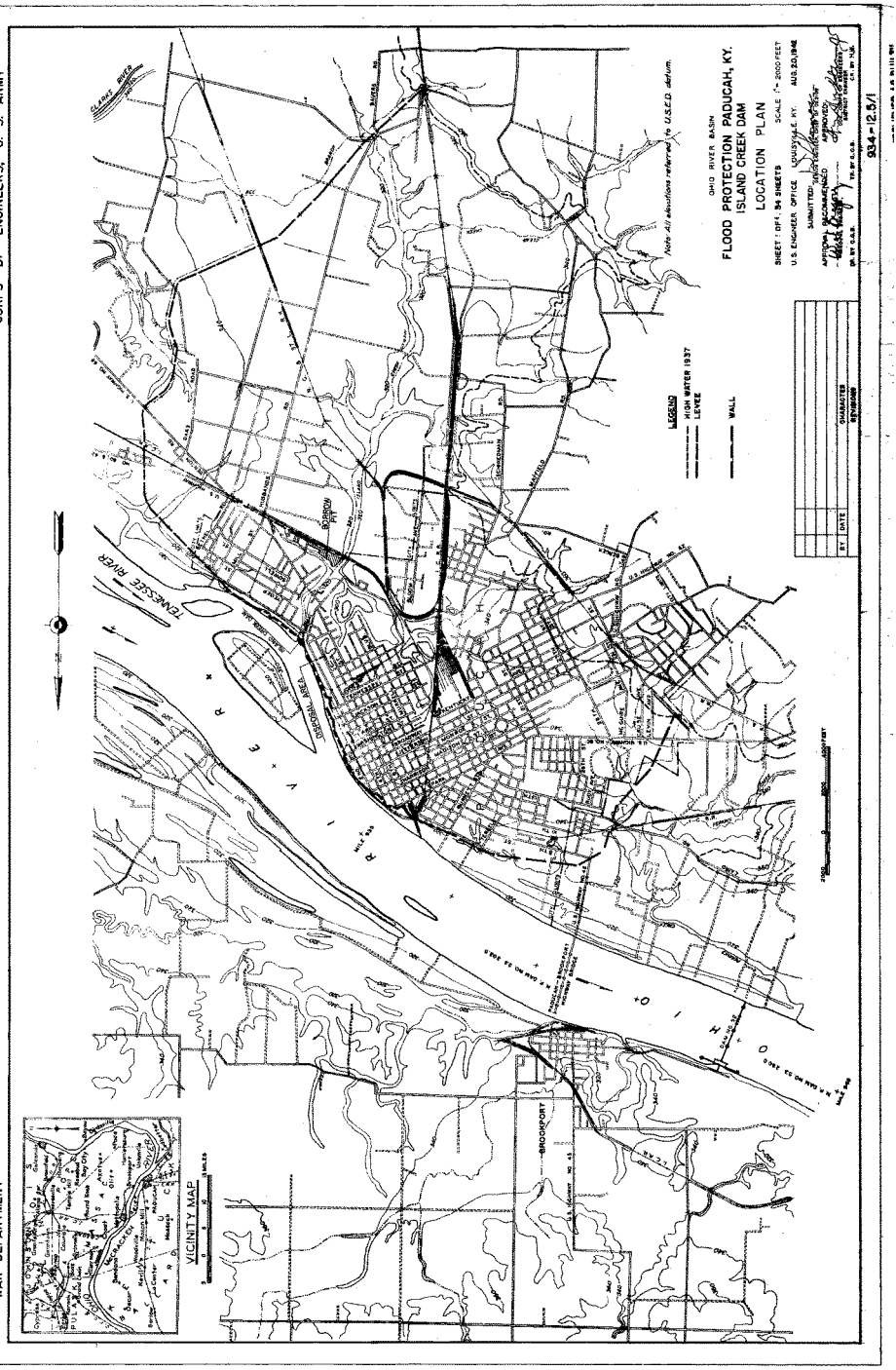
CONTENTS

934-12.5/1 LOCATION PLAN
934-12.5/2 PLAN & PROFILE
934-12.5/3 GENERAL LAYOUT
934-12.5/4 SECTION & ELEVATION
934-12.5/5 BORINGS
934-12.5/6 MASONRY DETAILS PLAN & SECTION
934-12.5/7 MASONRY DETAILS PLAN & SECTION
934-12.5/8 MASONRY DETAILS ROOF PLAN & ELEVATIONS
934-12.5/9 REINFORCING DETAILS LANDSIDE & RIVERSIDE SUPERSTRUCTURE WALLS
934-12.5/10 REINFORCING DETAILS SUPERSTRUCTURE END WALLS & ROOF SLAB
934-12.5/11 REINFORCING DETAILS MOTOR FLOOR
934-12.5/12 REINFORCING DETAILS PUMPING PLANT BASE
934-12.5/13 REINFORCING DETAILS PUMPING PLANT BASE
934-12.5/14 REINFORCING DETAILS LANDSIDE & RIVERSIDE SUBSTRUCTURE WALLS
934-12.5/15 REINFORCING DETAILS DISCHARGE CHAMBER WALL
934-12.5/16 REINFORCING DETAILS EAST, WEST AND INTERMEDIATE WALLS
934-12.5/17 MASONRY DETAILS STILLING BASIN PLAN
934-12.5/18 MASONRY DETAILS STILLING BASIN SECTIONS & DETAILS
934-12.5/19 REINFORCING DETAILS STILLING BASIN SLAB, PIERS & BAFFLES
934-12.5/20 REINFORCING DETAILS STILLING BASIN WALL NO.7
934-12.5/21 REINFORCING DETAILS STILLING BASIN WALLS NOS.8 TO 14 INCLUSIVE
934-12.5/22 MASONRY & REINFORCING DETAILS MONOLITH NO.1
934-12.5/23 MASONRY & REINFORCING DETAILS MONOLITHS NOS.2,3,4,5 & 6
934-12.5/24 MASONRY DETAILS LANDSIDE HEADWALL
934-12.5/25 REINFORCING DETAILS LANDSIDE HEADWALL
934-12.5/26 MASONRY DETAILS MULTIPLE BOX CULVERT
934-12.5/27 REINFORCING DETAILS MULTIPLE BOX CULVERT
934-12.5/28 REINFORCING DETAILS MULTIPLE BOX CULVERT
934-12.5/29 MISCELLANEOUS DETAILS
934-12.5/30 MISCELLANEOUS DETAILS
934-12.5/31 MISCELLANEOUS DETAILS
934-12.5/32 LIGHTING & POWER SYSTEMS
934-12.5/33 HYDROGRAPHS
934-12.5/34 BORROW PIT LOCATION & BORINGS

U.S.ENGINEER OFFICE, LOUISVILLE, KY.

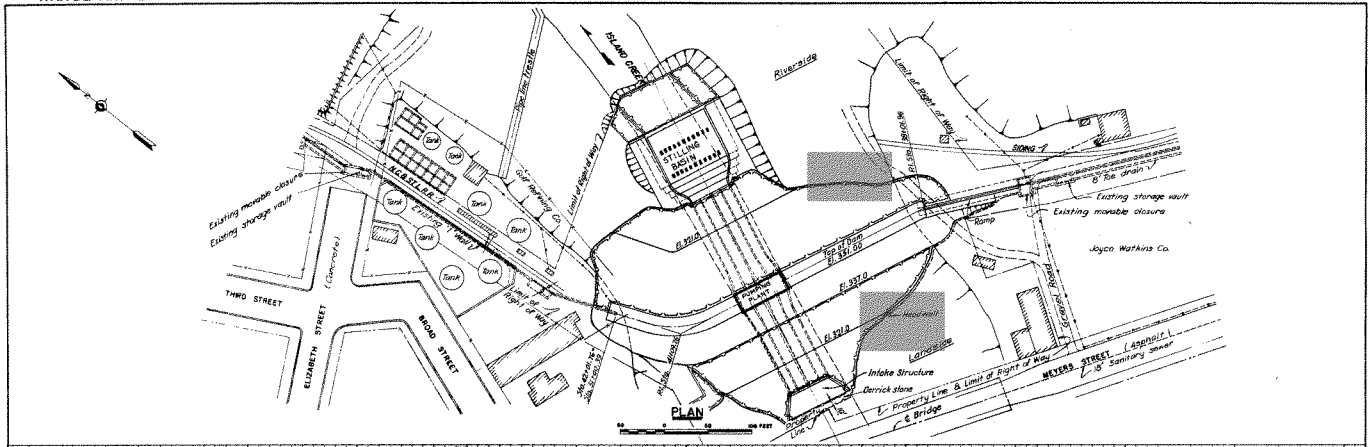
934-12.5/0

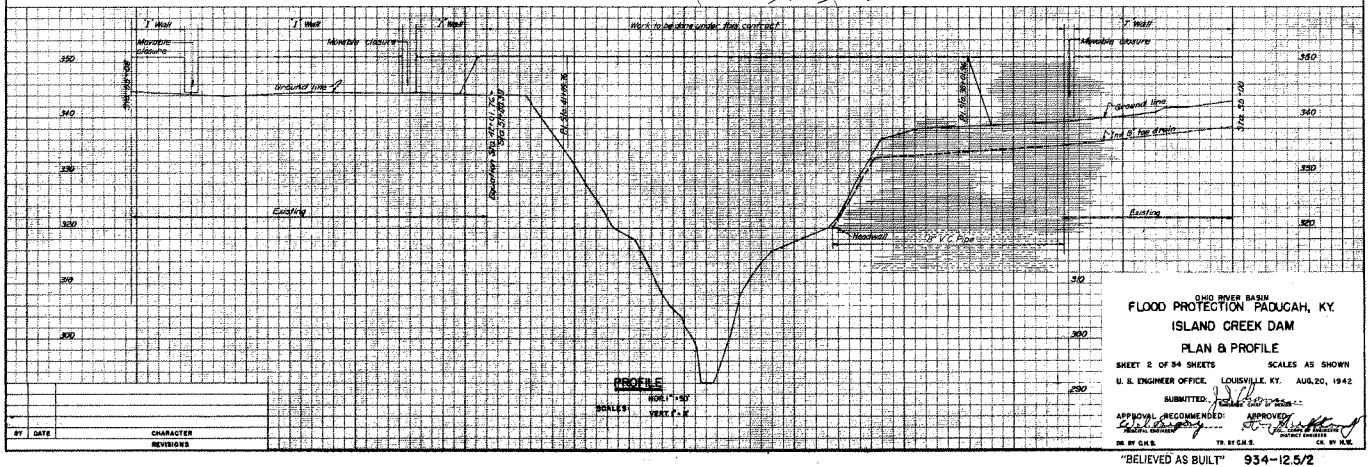
"RELIEVED AS BUILT"


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
LOCATION PLAN
SHEET 1 OF 1 SHEETS
SCALE 1" = 2000 FEET
U.S. ENGINEER OFFICE LOUISVILLE, KY. AUG. 20, 1942
SUBMITTED
APPROVED, RECOMMENDED FOR APPROVAL
934-12.5/1
LEGEND
HIGH WATER 1937
LEVEE
WALL
Note: All elevations referred to U.S.E.D. datum.
VICINITY MAP
TENNESSEE RIVER
OHIO RIVER
BROOKPORT
DOWNTOWN AREA
BY
DATE
CHANGES
REVISIONS

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

PLAN & PROFILE

SHEET 2 OF 34 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED:

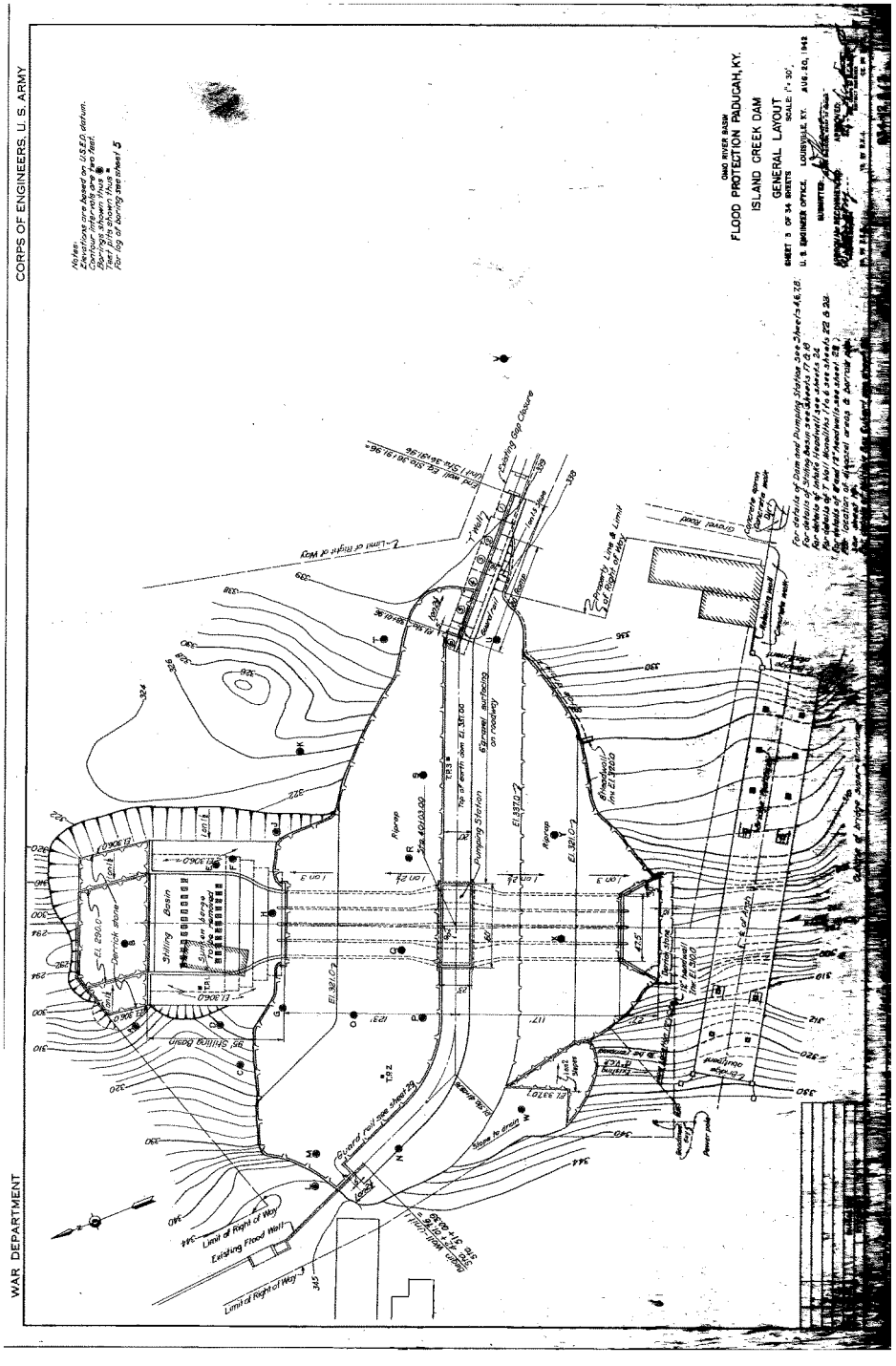
APPROVAL RECOMMENDED: APPROVED:

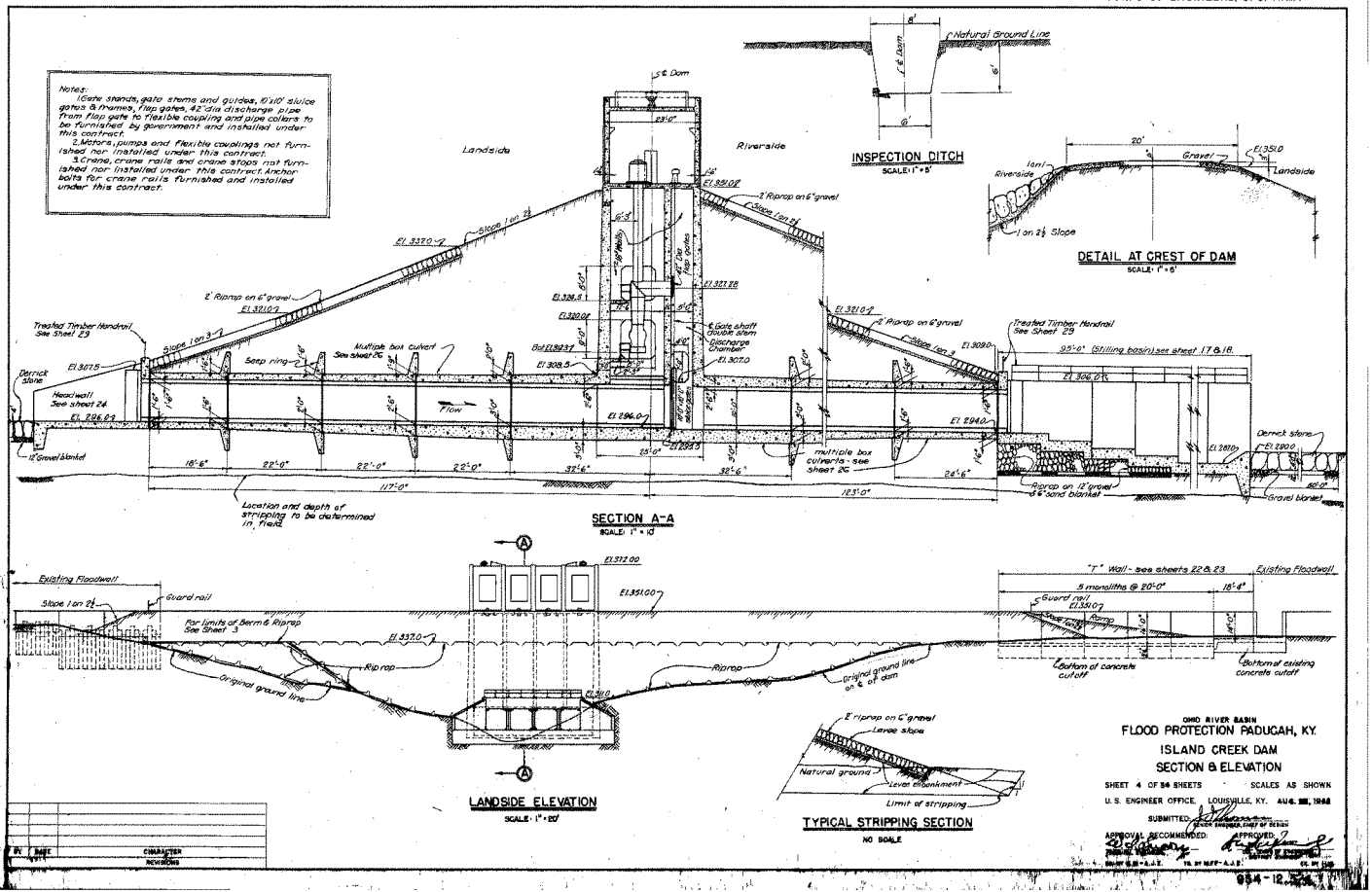
DR. BY G.H.S. TR. BY G.H.S. CK. BY H.W.

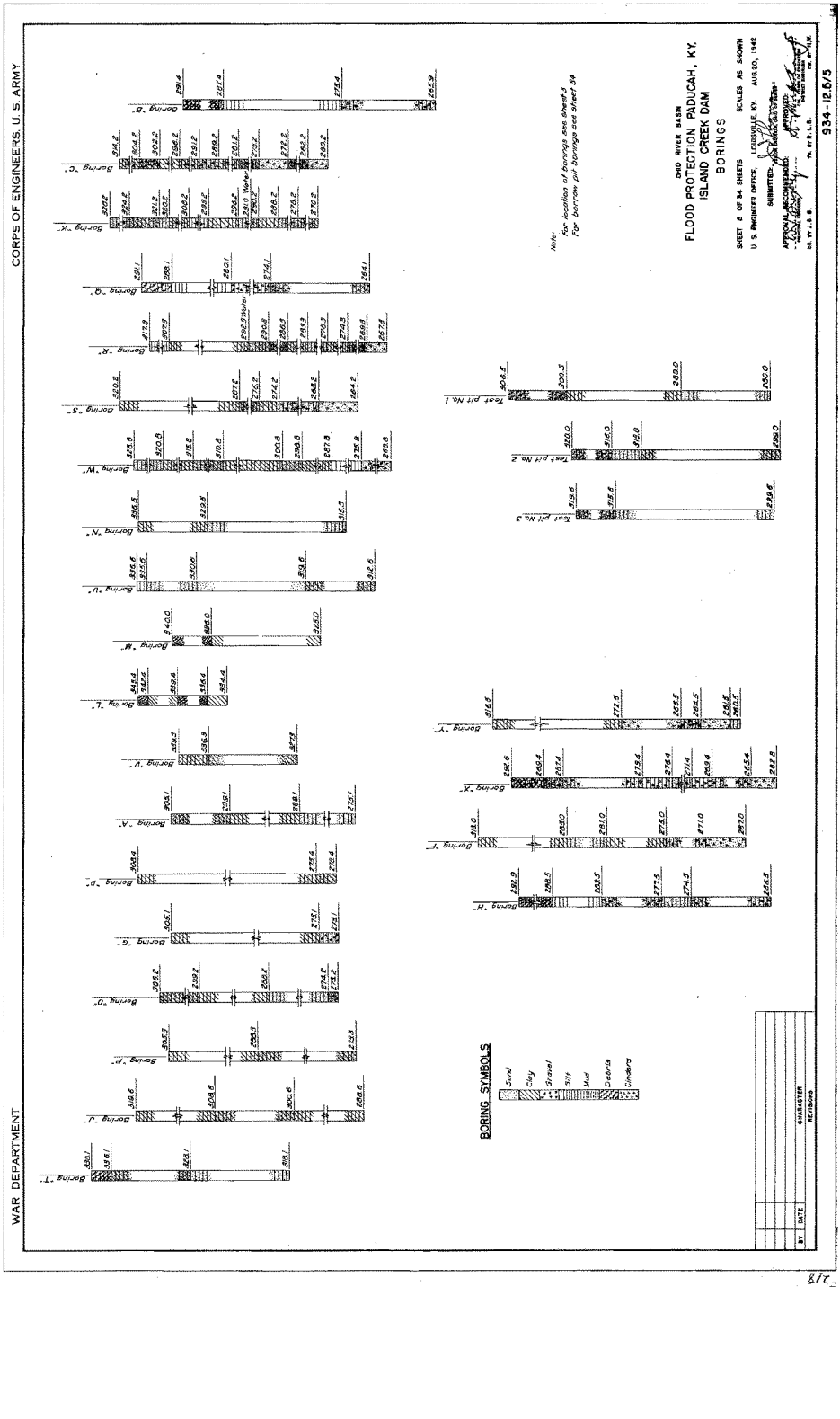
BY	DATE	CHARACTER OF REVISIONS

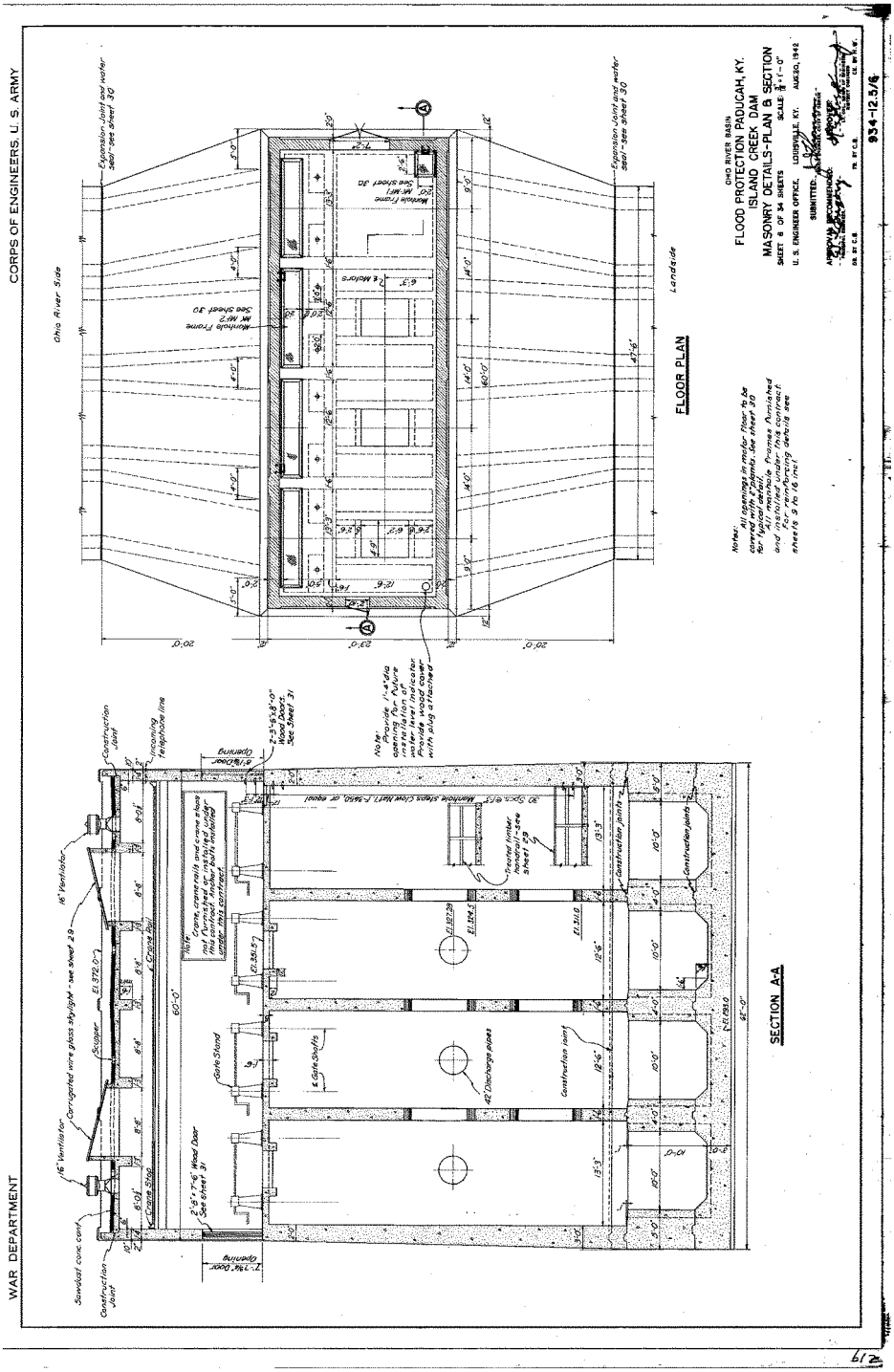
"BELIEVED AS BUILT" 934-12.5/2

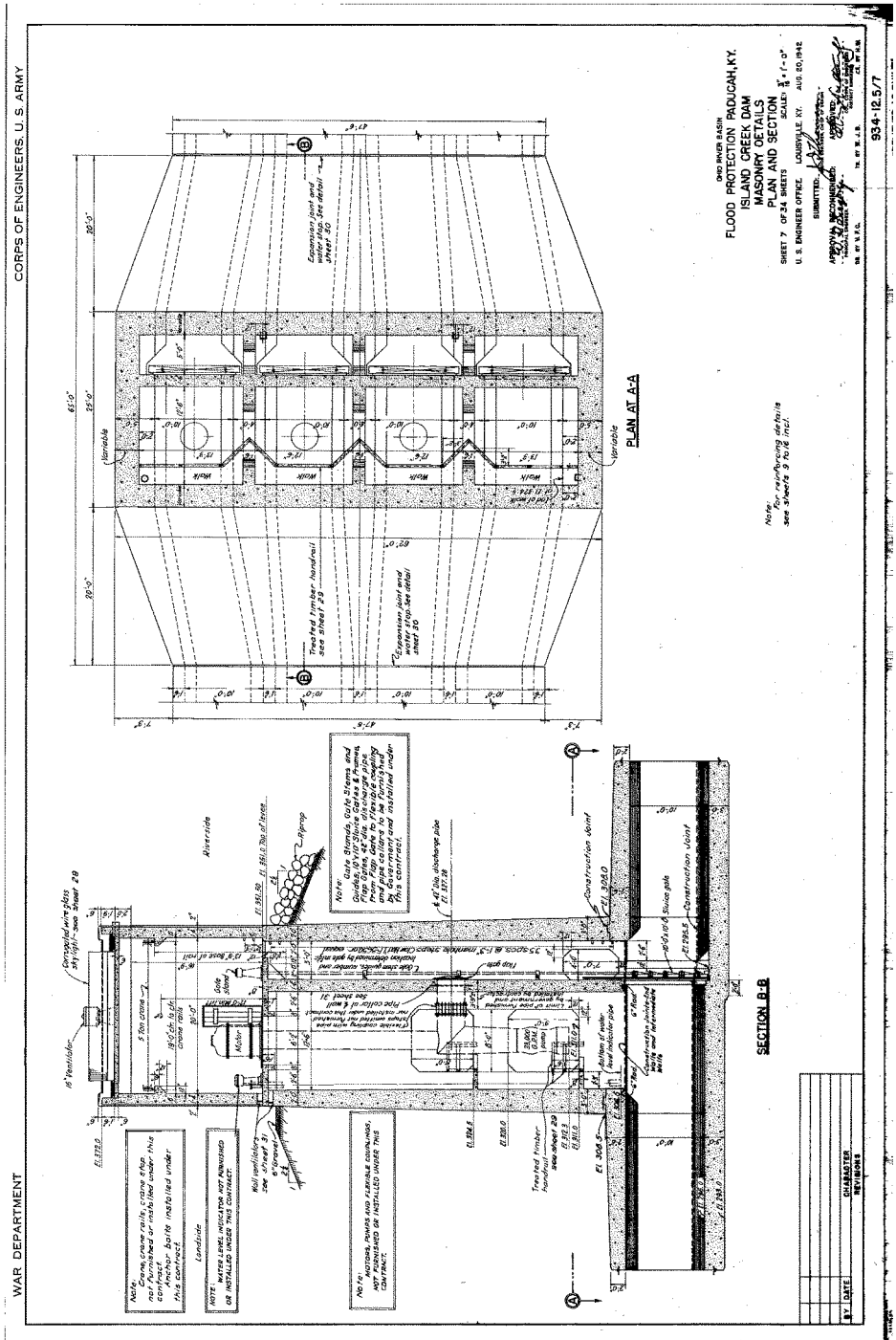
215

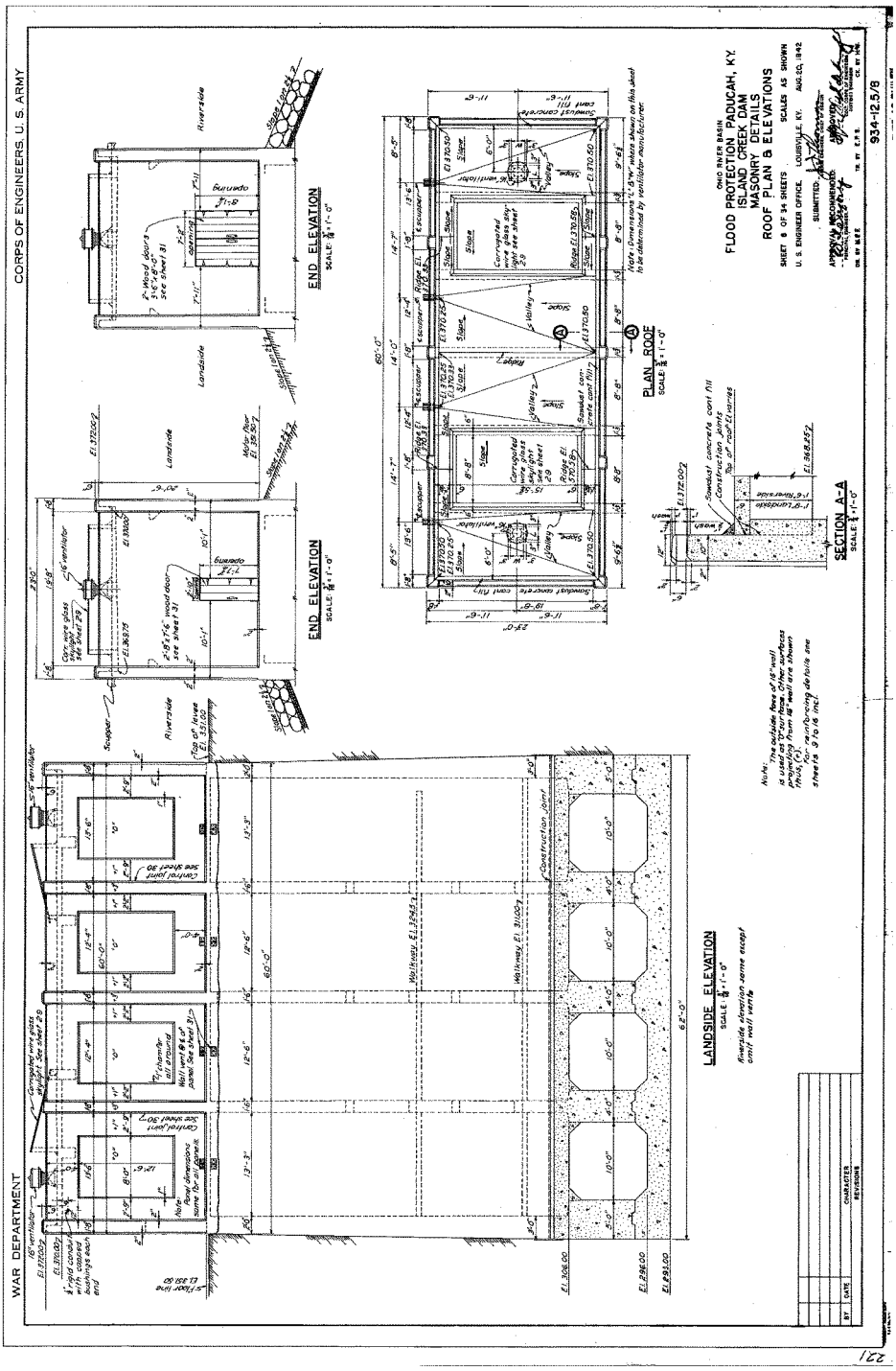

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
GENERAL LAYOUT
SHEET 5 OF 34 SHEETS
SCALE: 1" = 50'
U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942
SUBMITTED
RECOMMENDED
APPROVED
Notes:
Elevations are based on U.S.E.D. datum.
Contour intervals are 2 ft.
Existing contours thus
Test pits shown thus
For log of boring see sheet 5
Limit of Right of Way
Existing Flood Wall
Stilling Basin
Pumping Station
Gravel surfacing on roadway
Closing Gap Closure
Concrete apron
Concrete wall
Gravel road
Property Line & Limit of Right of Way
Limit of Right of Way
Existing Flood Wall
Limit of Right of Way

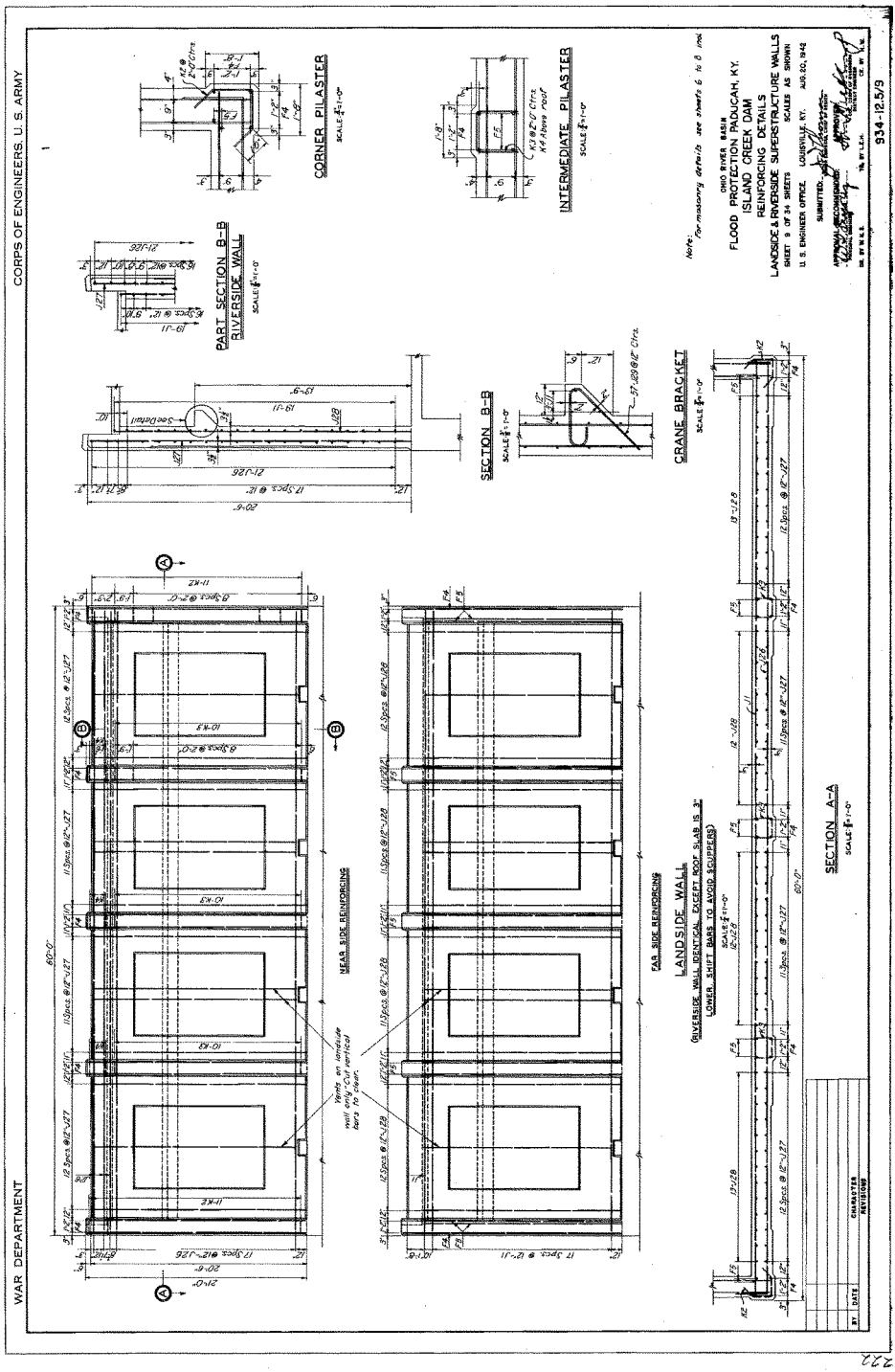

Notes:
1.Gate stands, gate stems and guides, 10'x10' sluice gates & thimbles, flap gates, 42"dia discharge pipe from flap gate to flexible coupling and pipe collars to be furnished by government and installed under this contract.
2.Motors, pumps and flexible coupling not furnished nor installed under this contract.
3.Crane, crane rails and crane stops not furnished nor installed under this contract. Anchor bolts for crane rails furnished and installed under this contract.
Natural Ground Line
INSPECTION DITCH
SCALE: 1" = 5'
Landside
Riverside
DETAIL AT CREST OF DAM
SCALE: 1" = 5'
SECTION A-A
SCALE: 1" = 10'
Location and depth of stripping to be determined in field
LANDSIDE ELEVATION
SCALE: 1" = 20'
TYPICAL STRIPPING SECTION
NO SCALE
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
SECTION & ELEVATION
SHEET 4 OF 34 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY.
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
954-12-4.1

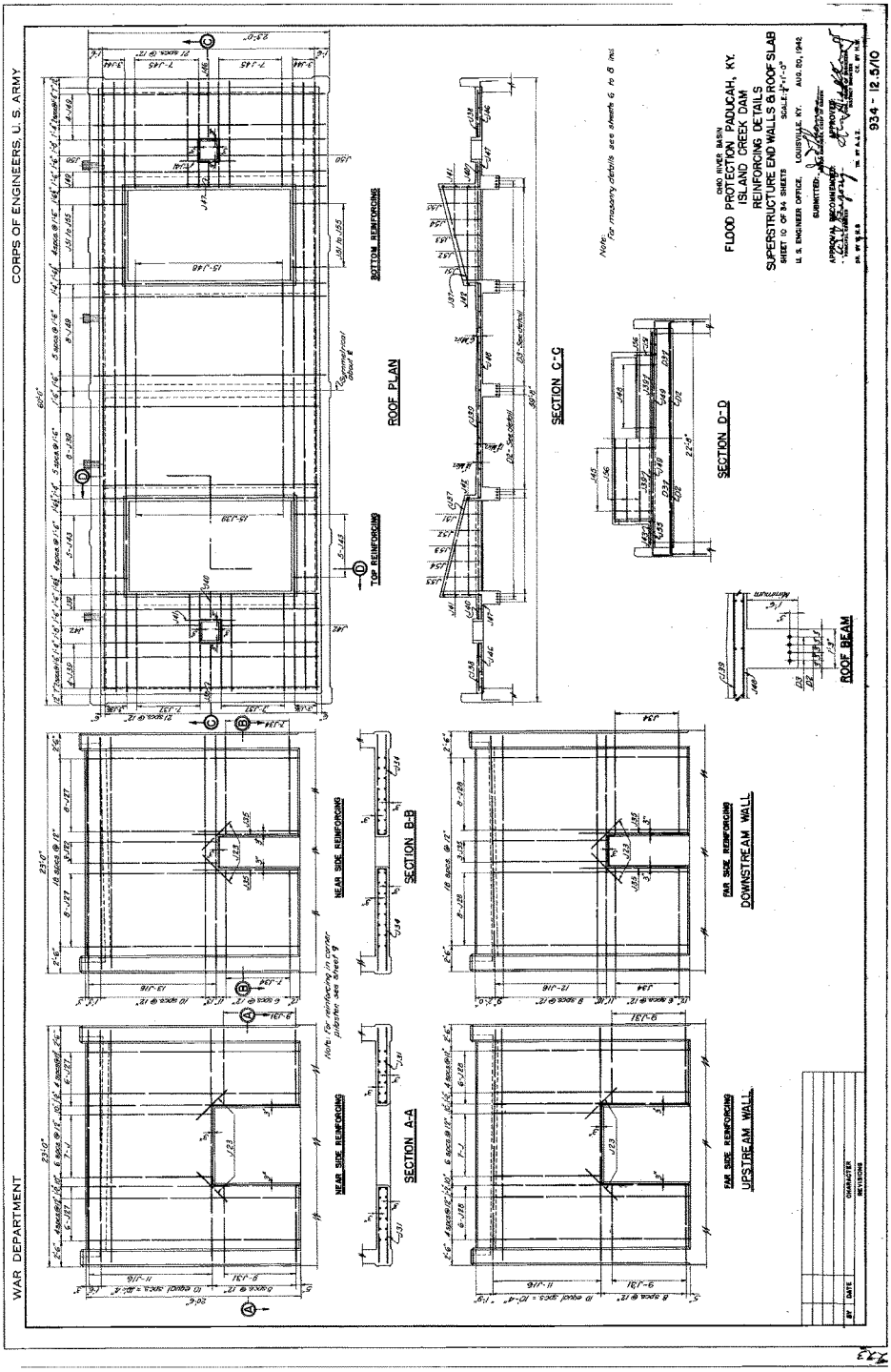

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
BORINGS
SHEET 6 OF 34 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. AUG 20, 1942
SUBMITTED:
APPROVED:
934-12.6/5
BORING SYMBOLS
Sand
Clay
Gravel
Silt
Mud
Debris
Shale
Note: For location of borings see sheet 3
For borrow pit borings see sheet 34
Test pit No. 1
Test pit No. 2
Test pit No. 3
Boring "B"
Boring "C"
Boring "K"
Boring "Q"
Boring "R"
Boring "S"
Boring "W"
Boring "N"
Boring "U"
Boring "M"
Boring "L"
Boring "V"
Boring "A"
Boring "O"
Boring "G"
Boring "D"
Boring "F"
Boring "J"
Boring "T"
Boring "Y"
Boring "X"
Boring "I"
Boring "H"


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
MASONRY DETAILS-PLAN & SECTION
SHEET 6 OF 34 SHEETS
SCALE 1/4"-1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG 20, 1942
SUBMITTED
RECOMMENDED
APPROVED
934-12.5/6
FLOOR PLAN
SECTION A-A
Ohio River Side
Landside
Expansion Joint and water seal - See sheet 30
Manhole Frame M.H. #1 See sheet 30
Manhole Frame M.H. #2 See sheet 30
6 Motors
Note: All openings in motor floor to be covered with gratings - See sheet 28 for typical details. All manhole frames furnished and installed by this contract. For reinforcing details see sheets 9 to 16 incl.
Note: Provide 1"x1" slotted opening for future water level indicator. Provide wood cover with plug attached
Note: Crane, crane rails and crane stops not shown. Furnished and installed under this contract. Anchor bolts furnished under this contract.
Trashrack Timber Monorail - See sheet 29
Construction Joint
Sawcast conc cont
Construction Joint
16" Ventilator
Corrugated wire glass skylight - See sheet 29
Scupper
Crane Stop
Gate Stand
4 Gate Shafts
42" Discharge pipes
Construction Joint
Construction Joints
Trashrack Timber Monorail - See sheet 29
Operating Platform
Incoming telephone line
2'-3"x5'-11" Wood Doors See Sheet 31
8'x10'-0" Wood Door See Sheet 31
2'-8"x7'-6" Wood Door See Sheet 31
Operating Platform
Manhole Steps (Cast Metal) Pattern or equal
EL 372.0
EL 351.5
EL 327.29
EL 304.5
EL 311.0
EL 286.0
60'-0"
92'-0"


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
ISLAND CREEK DAM
MASONRY DETAILS
PLAN AND SECTION
SHEET 7 OF 24 SHEETS
SCALE: 3/4" = 1'-0"
U.S. ENGINEER OFFICE LOUISVILLE, KY. AUG 20, 1942
SUBMITTED:
APPROVED RECOMMENDED:
934-12.5/7
PLAN AT A-A
SECTION B-B
Riprap
Riverside
Landside
Construction Joint
Expansion joint and water stop. See detail sheet 30
Treated timber handrail see sheet 29
Note: For reinforcing details see sheets 9 to 16 incl.
Note: Gate Stands, Gate Stems and Guide Pipes for 4'-0" dia. Flap Gates, 42" dia discharge pipe and 48" dia. pipe to be furnished by Government and installed under this contract.
Note: Cranes, crane rails, crane stop not furnished or installed under this contract. Bolts installed under this contract.
NOTE: WATER LEVEL INDICATOR NOT FURNISHED OR INSTALLED UNDER THIS CONTRACT.
NOTE: MOTORS, POWER AND FLEXIBLE COUPLINGS NOT FURNISHED OR INSTALLED UNDER THIS CONTRACT.
NO. DATE CHARACTER REVISIONS

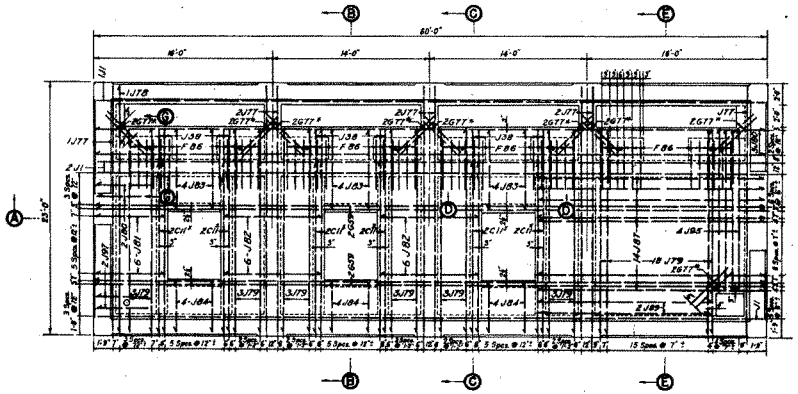

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
MISCELLANEOUS DETAILS
ROOF PLAN & ELEVATIONS
SHEET 8 OF 34 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. CO., 1942
SUBMITTED
APPROVED RECOMMENDED
934-12.5/8
LANDSIDE ELEVATION
SCALE 1/8" = 1'-0"
END ELEVATION
SCALE 1/8" = 1'-0"
PLAN - ROOF
SCALE 1/8" = 1'-0"
SECTION A-A
SCALE 1" = 1'-0"
Riverside
Landside
Corrugated wire glass skylight See Sheet 29
Sawcut concrete cont fill
Construction Joint
Walkway El. 312.67
Walkway El. 310.67
El. 306.00
El. 296.00
El. 293.00
62'-0"
60'-0"


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
CORNER PILASTER
SCALE 1"=1'-0"
INTERMEDIATE PILASTER
SCALE 1"=1'-0"
PART SECTION B-B
RIVERSIDE WALL
SCALE 1"=1'-0"
SECTION B-B
SCALE 1"=1'-0"
CRANE BRACKET
SCALE 1"=1'-0"
Note: For masonry details see sheets 6 to 8 incl.
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
LANDSIDE & RIVERSIDE SUPERSTRUCTURE WALLS
SHEET 9 OF 34 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942
SUBMITTED
APPROVED RECOMMENDED
APPROVED
934-12.5/9
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
LANDSIDE WALL
(RIVERSIDE WALL IDENTICAL EXCEPT ROOF SLAB IS 3" LOWER, SHIFT BARS TO AVOID SCUPPERS)
SECTION A-A
SCALE 1"=1'-0"


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
SUPERSTRUCTURE END WALLS & ROOF SLAB
SHEET 10 OF 94 SHEETS
SCALE: 1/4"=1'-0"
L. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942
SUBMITTED:
APPROVED:
934 - 12.5/10
ROOF PLAN
BOTTOM REINFORCING
TOP REINFORCING
SECTION C-C
SECTION D-D
SECTION A-A
SECTION B-B
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
UPSTREAM WALL
DOWNSTREAM WALL
ROOF BEAM
Note: For masonry details see sheets 6 to 8 incl.
Note: For reinforcing in corner junction see sheet 9
BY
DATE
CHARACTER REVISIONS

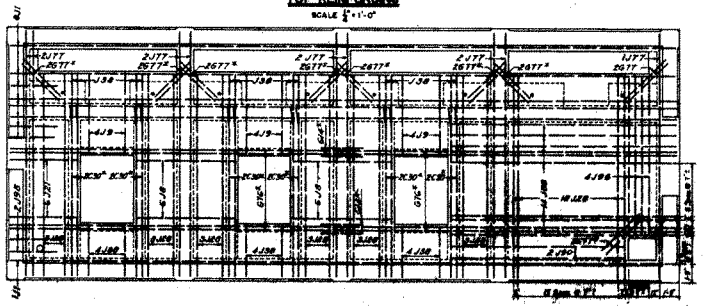
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



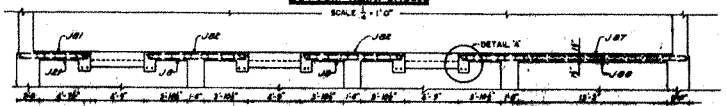
TOP REINFORCING

SCALE $\frac{1}{4}$" = 1'-0"



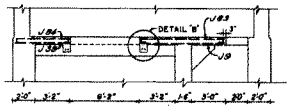
BOTTOM REINFORCING

SCALE $\frac{1}{4}$" = 1'-0"



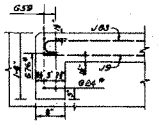
SECTION A-A

SCALE $\frac{1}{4}$" = 1'-0"



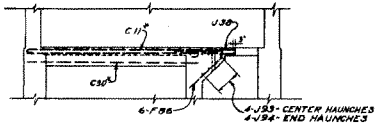
SECTION B-B

SCALE $\frac{1}{4}$" = 1'-0"



DETAIL 'B'

SCALE 1 = 1'-0"

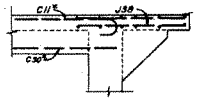


SECTION C-C

SCALE $\frac{1}{4}$" = 1'-0"

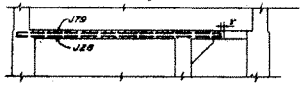
SECTION D-D

SCALE $\frac{1}{4}$" = 1'-0"



SECTION G-G

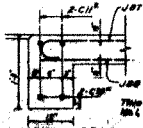
SCALE $\frac{1}{4}$" = 1'-0"



SECTION E-E

SCALE $\frac{1}{4}$" = 1'-0"

BY	DATE	CHARACTER REVISIONS



Notes:
For temporary closure see sheet No. 7.48
Work to be performed by government & inspected by contractor.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

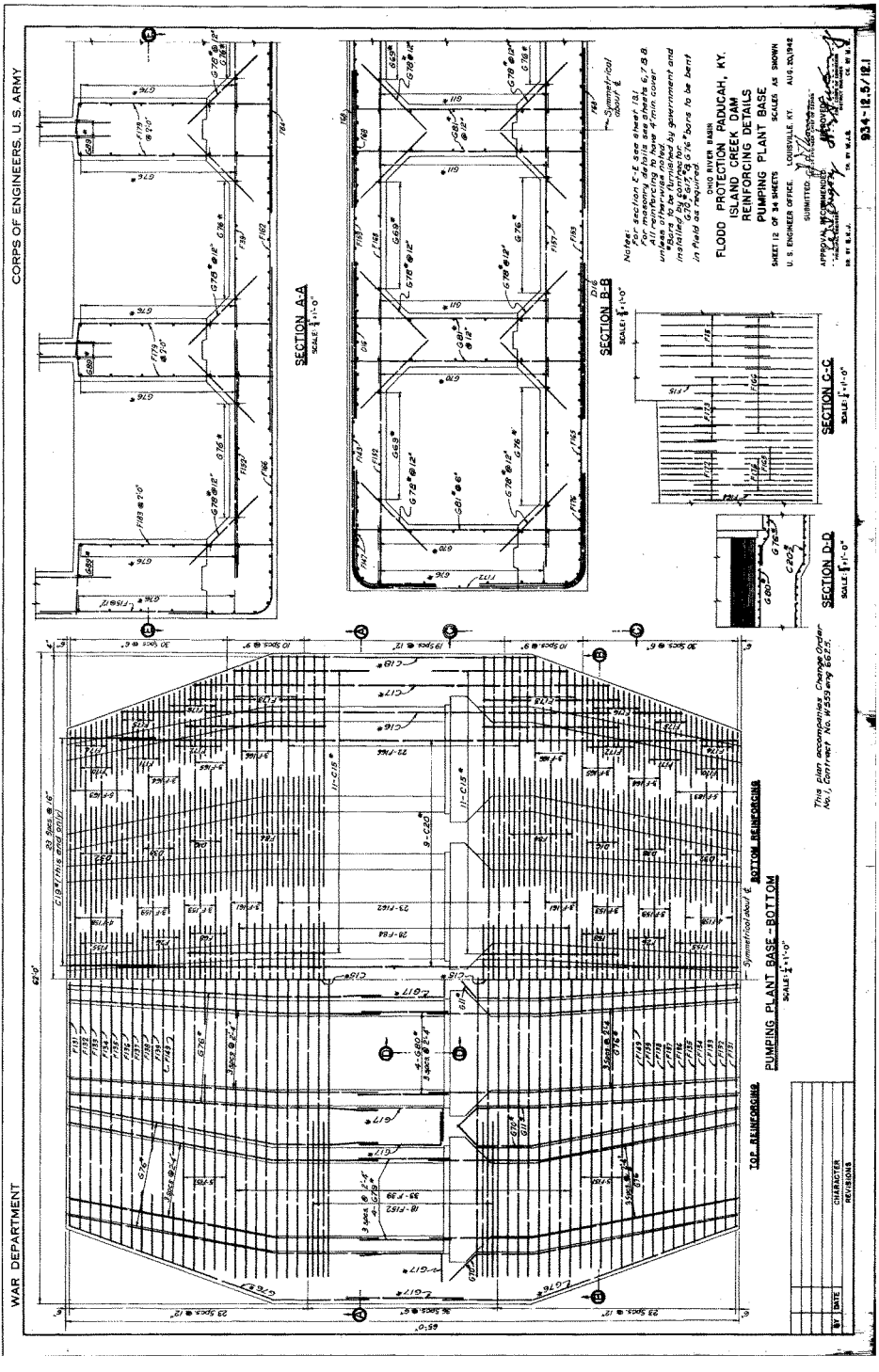
REINFORCING DETAILS

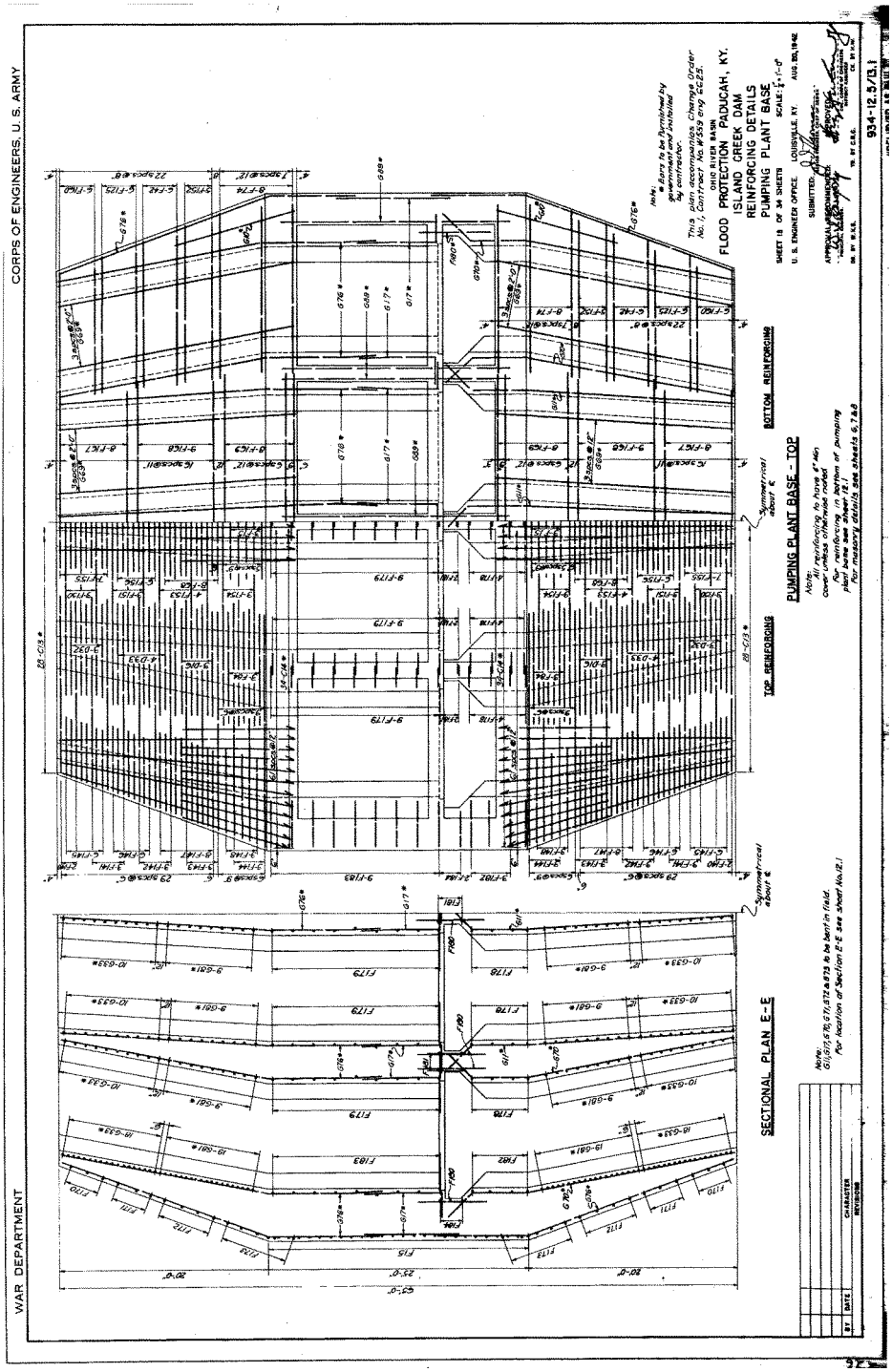
MOTOR FLOOR

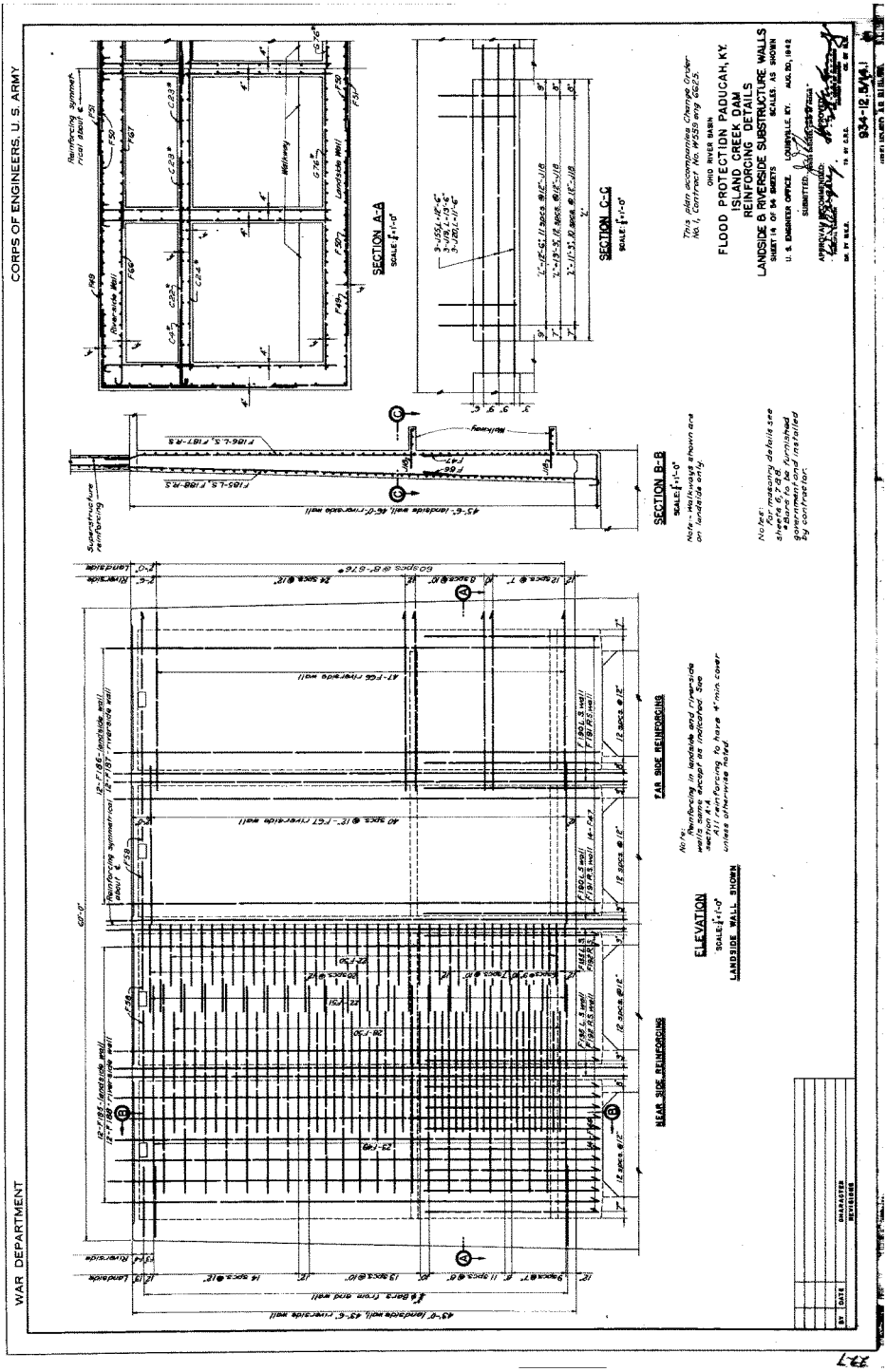
SHEET 11 OF 94 SHEETS SCALES AS SHOWN

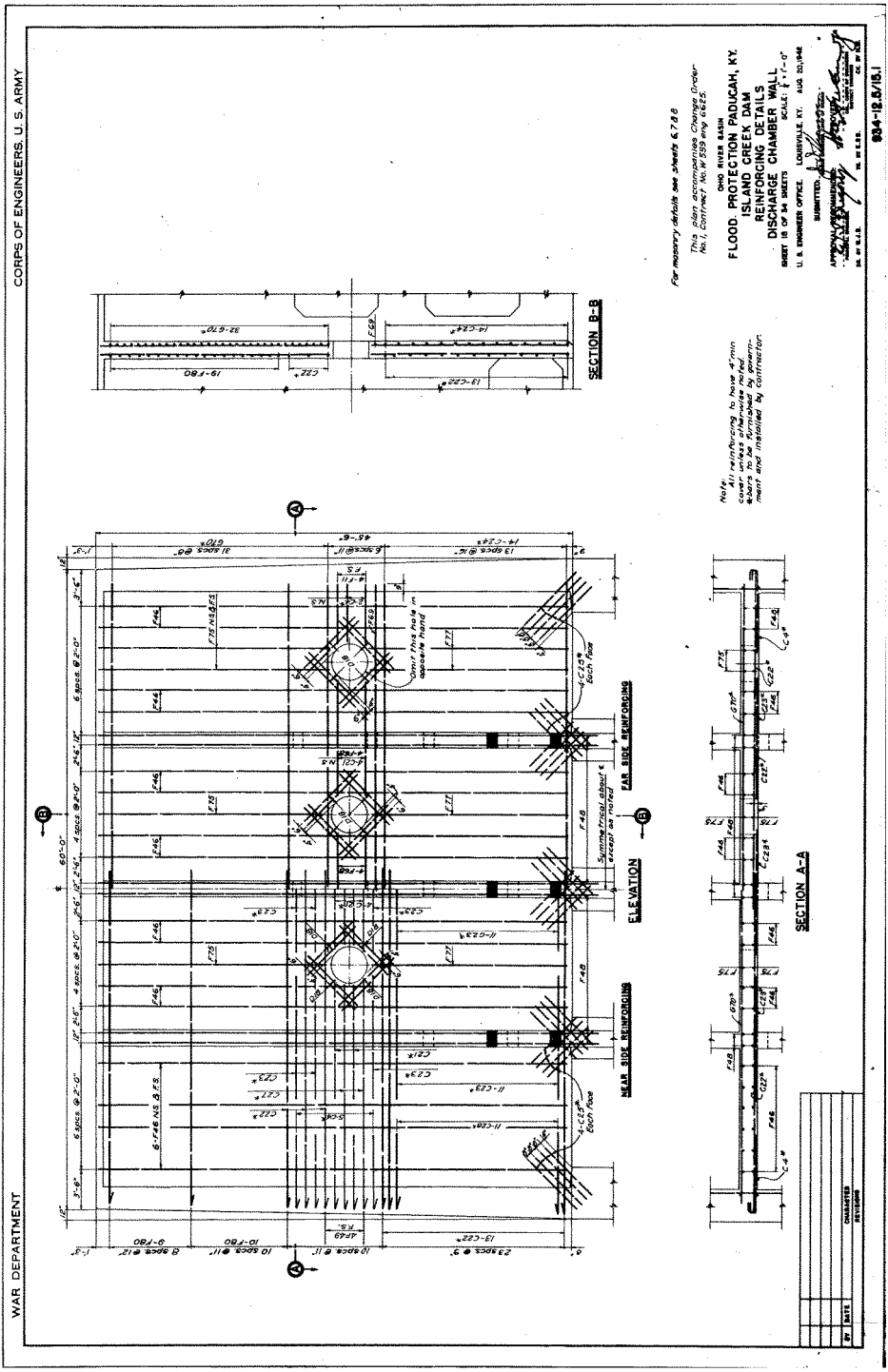
U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

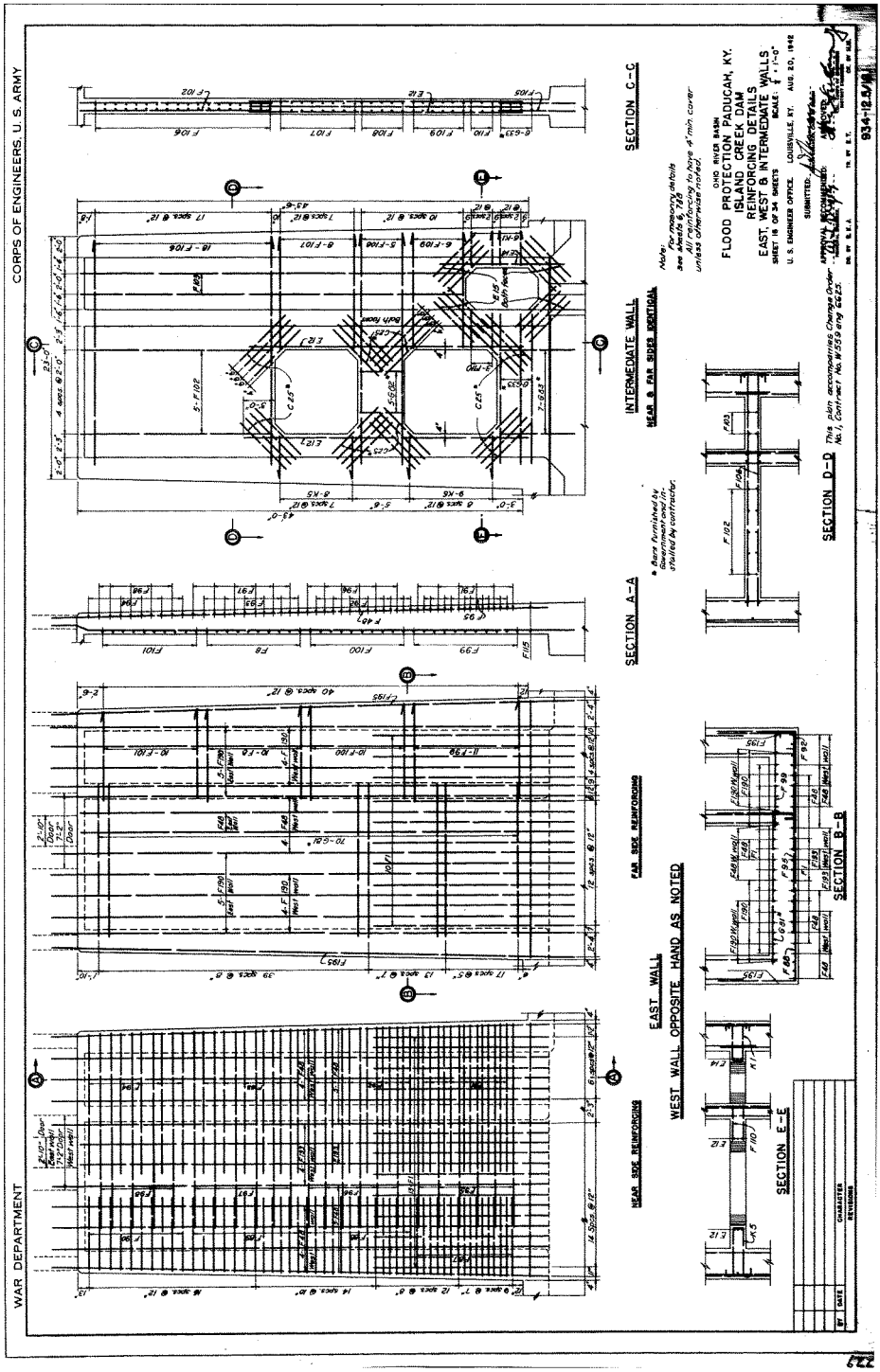
985

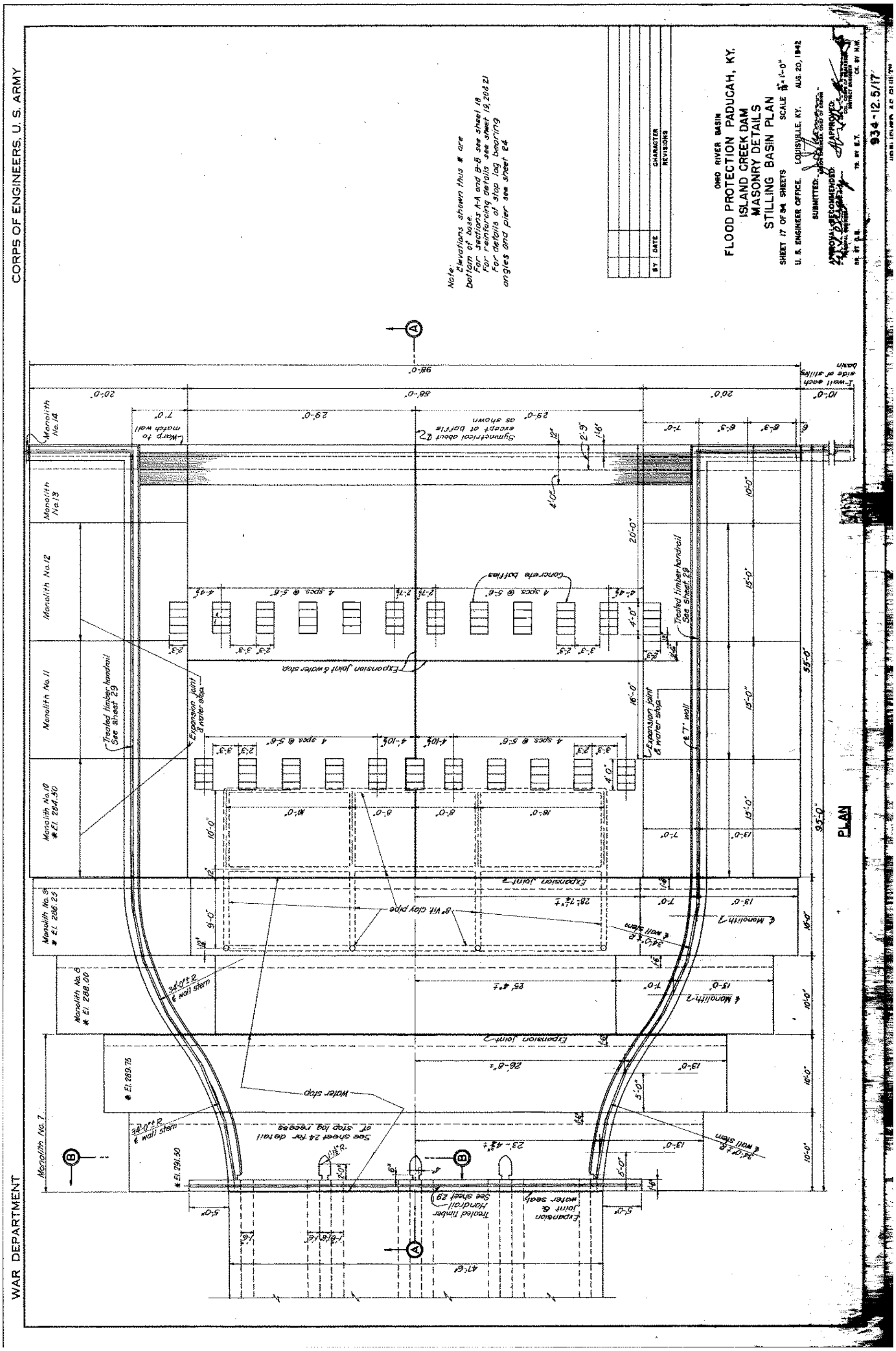

CORPS OF ENGINEERS, U.S. ARMY
WAR DEPARTMENT
SECTION A-A
SCALE 1/4"-1'-0"
SECTION B-B
SCALE 1/4"-1'-0"
SECTION C-C
SCALE 1/4"-1'-0"
SECTION D-D
SCALE 1/4"-1'-0"
PUMPING PLANT BASE - BOTTOM
SCALE 1/4"-1'-0"
TOP REINFORCING
BOTTOM REINFORCING
Symmetrical about ℄
Notes: Section F-F see sheet 18.
For masonry details see sheets 6, 7 & 8.
All reinforcing to have 4"min. cover unless otherwise noted.
*Bars to be furnished by government and installed by contractor.
**Bars 5/8" ø 6"c & 5/8" ø bars to be bent in field as required
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
PUMPING PLANT BASE
SHEET 12 OF 34 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE LOUISVILLE, KY. AUG. 20, 1942
SUBMITTED
APPROVED
934-18.5/18.1
This plan accompanies Change Order No. 1, Contract No. W 559 eng 6625.
BY DATE CHARACTER REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
PUMPING PLANT BASE
OHIO RIVER BASIN
SCALE: 1"=1'-0"
SHEET 18 OF 34 SHEETS
U. S. ENGINEER OFFICE LOUISVILLE, KY. AUG. 20, 1942
SUBMITTED
APPROVED RECOMMENDED
934-12.5/13.1
PUMPING PLANT BASE - TOP
BOTTOM REINFORCING
TOP REINFORCING
SECTIONAL PLAN E-E
Symmetrical about ℄
Note: All reinforcing to have 4" min. cover unless otherwise noted
Note: Elevations of pumping plant bench marks are 421.1
For mastery details see sheets 6,7 & 8
Note: Bars to be furnished by government and installed by contractor.
This plan accompanies Change Order No. 1, Contract dated May 8, 1942.
For location of Section E-E see sheet No. 12.1
Note: G1, G15, G16, G17, G18 & G19 to be bent in field.
CHARACTER OF REVISIONS
BY DATE

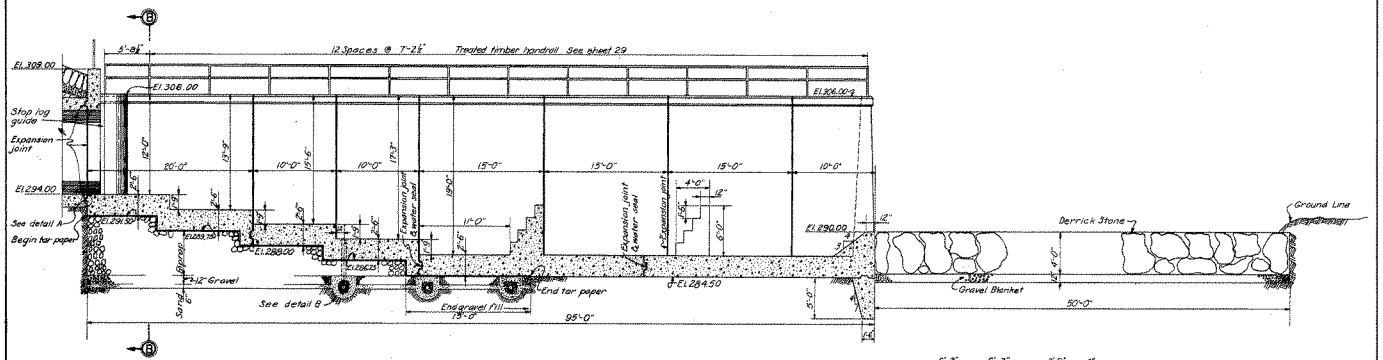

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
LANDSIDE & RIVERSIDE SUBSTRUCTURE WALLS
OHIO RIVER BASIN
934-12.5/44.1
ELEVATION
SCALE 1"=1'-0"
LANDSIDE WALL SHOWN
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
SECTION A-A
SECTION B-B
SECTION C-C
Note: Reinforcing in landside and riverside walls same except as indicated. See sections A, B, C.
All reinforcing to have 4" min cover unless otherwise noted.
Note - Walkway shown on landside only
Note! For masonry details see sheets 6, 7 & 8. Masonry to be furnished & placed by contractor.
This plan accompanies Change Order No 1, Contract No. W-358 eng 6625.
Walkway
Reinforcing symmetrical about ℄
Riverside wall
Landside wall
Superstructure reinforcing
Expansion joint
Weep holes
Drainage pipe
Waterstop
Construction joint
Footing
Pile
Concrete
Rock
Earth
Gravel
Sand
Steel
Timber
Masonry
Water
Backfill
Fill
Excavation
Section
Elevation
Plan
Detail
Scale
Date
Drawn
Traced
Checked
Approved
Submitted
Recommended
Revisions
By
Date


CORPS OF ENGINEERS, U.S. ARMY
WAR DEPARTMENT
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
DISCHARGE CHAMBER WALL
OHIO RIVER BASIN
SECTION B-B
SECTION A-A
ELEVATION
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
For masonry details see sheets 6, 7 & 8
This plan accompanies Change Order No. 1 Contract No. W 1559 eng 6625.
Note: All reinforcing to have 4" min cover unless otherwise shown on this sheet. Supports to be furnished and installed by contractor.
SUBMITTED
APPROVED FOR THE CHIEF OF ENGINEERS
DATE
934-18.8/15.1


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
EAST, WEST & INTERMEDIATE WALLS
OHIO RIVER BASIN
SHEET 18 OF 34 SHEETS
SCALE: 1" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1946
SUBMITTED:
APPROVED RECOMMENDED:
934+12.5/18
EAST WALL
WEST WALL OPPOSITE HAND AS NOTED
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
INTERMEDIATE WALL
NEAR & FAR SIDES IDENTICAL
Note:
For masonry details
see Sheets 6, 7&8
All concrete to have 4" min. cover
unless otherwise noted.
* Bars furnished by
Intermediate wall
stalled by contractor.
This plan accompanies Change Order
No. 1, Contract No. W-359-eng-6825.
BY DATE CHARACTER OF REVISIONS

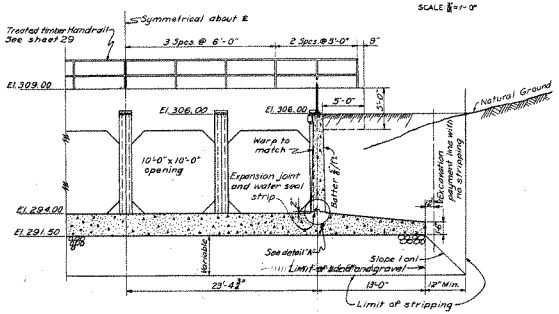


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
Note:
Elevations shown thus * are bottom of base.
For sections A-A and B-B see sheet 18.
For reinforcing details see sheet 19, 20 & 21.
For details of stop log bearing angles and pier see sheet 24.
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
MASONRY DETAILS
STILLING BASIN PLAN
SHEET 17 OF 34 SHEETS
U. S. ENGINEER OFFICE. LOUISVILLE, KY. AUG. 20, 1942
934-12.5/17
PLAN
Concrete baffles
Expansion joint & water stop
Treated timber handrail See sheet 29
8" Vit. clay pipe
Water stop



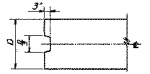
SECTION A-A

SCALE ⅛"=1'-0"



SECTION B-B

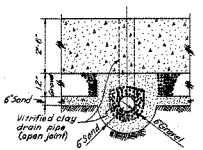
SCALE ⅛"=1'-0"



DETAIL 'A'
TYPICAL KEYWAY

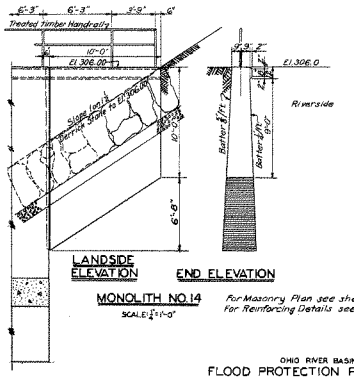
HORIZONTAL & VERTICAL JOINTS

NO SCALE



DETAIL 'B'

SCALE ½"=1'-0"



LANDSIDE ELEVATION

END ELEVATION

MONOLITH NO. 14

SCALE ⅛"=1'-0"

For Masonry Plan see sheet 17
For Reinforcing Details see sheets 19, 20 & 21

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

MASONRY DETAILS

STILLING BASIN-SECTIONS & DETAILS

SHEET 18 OF 34 SHEETS

SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED:

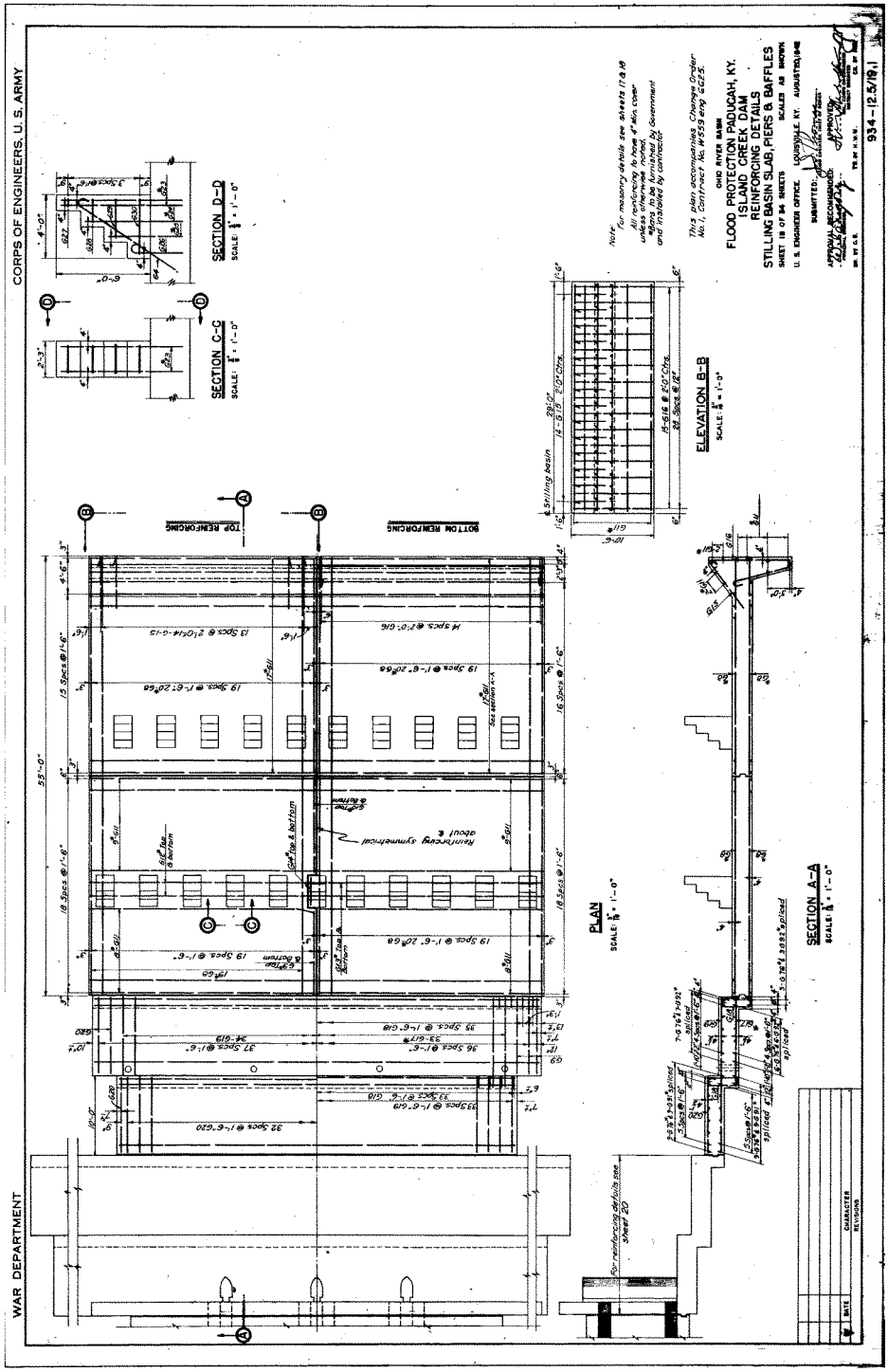
APPROVED RECOMMENDED:

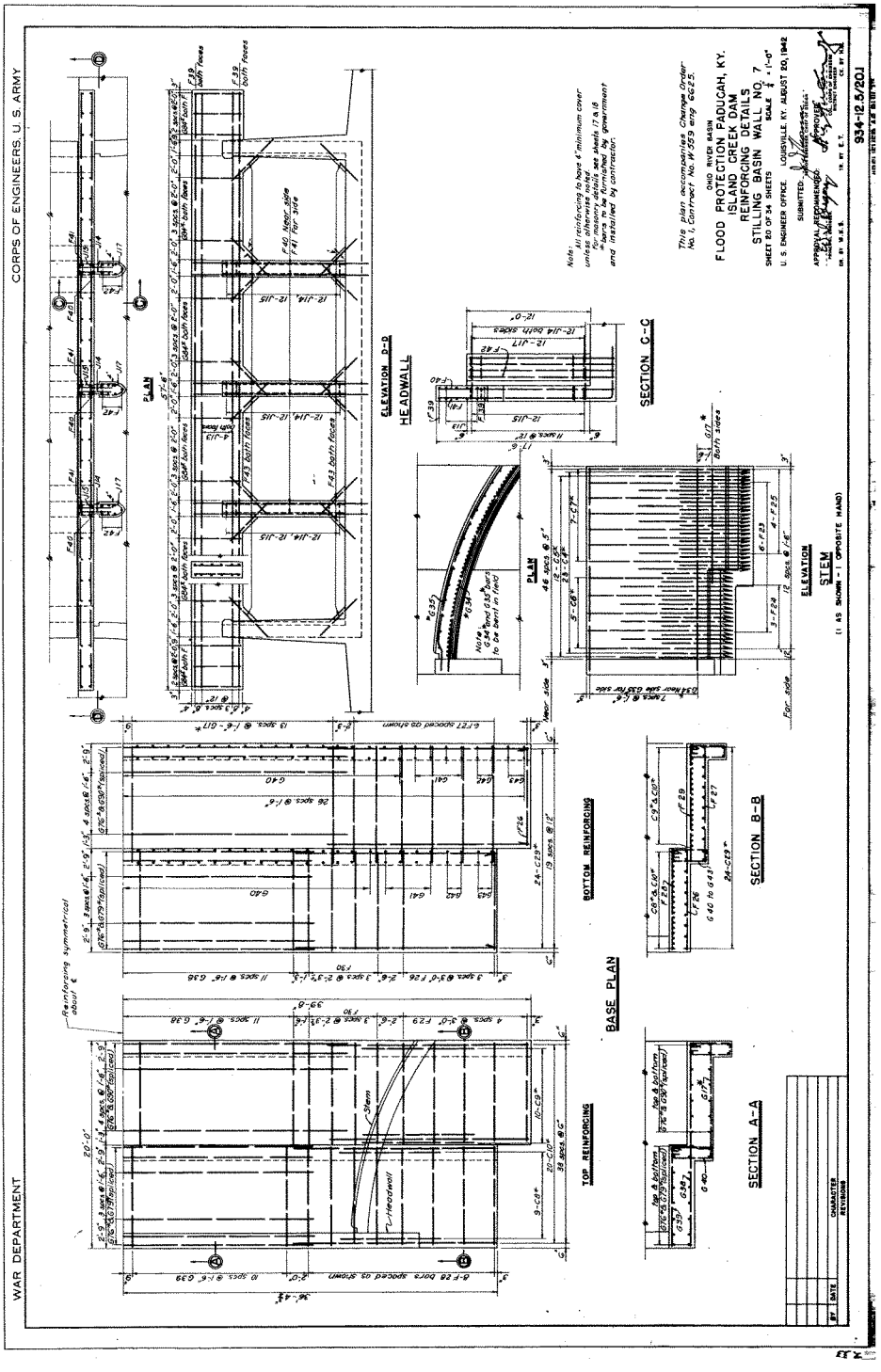
APPROVED

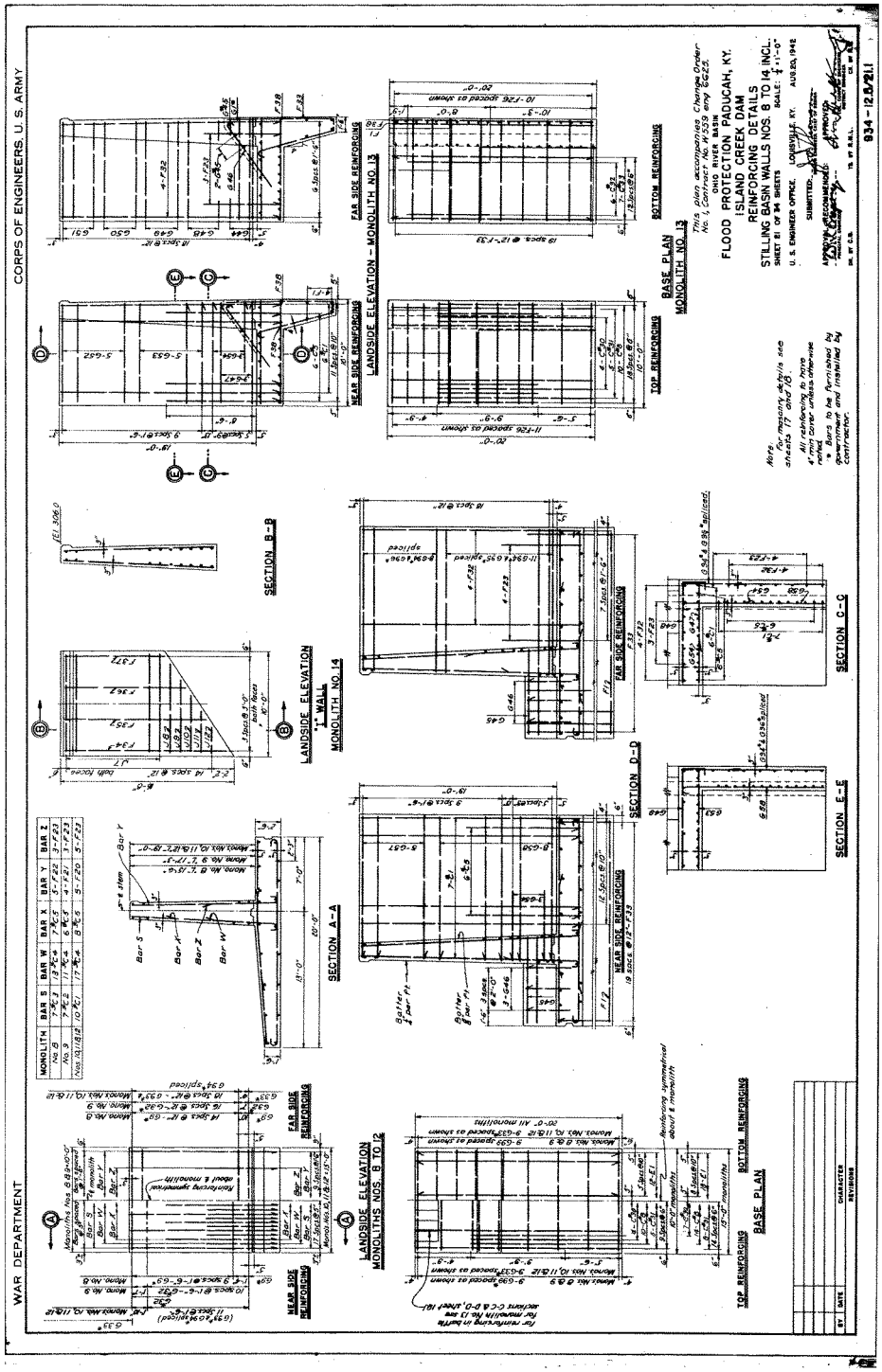
DR. BY C.B. TR. BY L.E.K. CK. BY H.M.

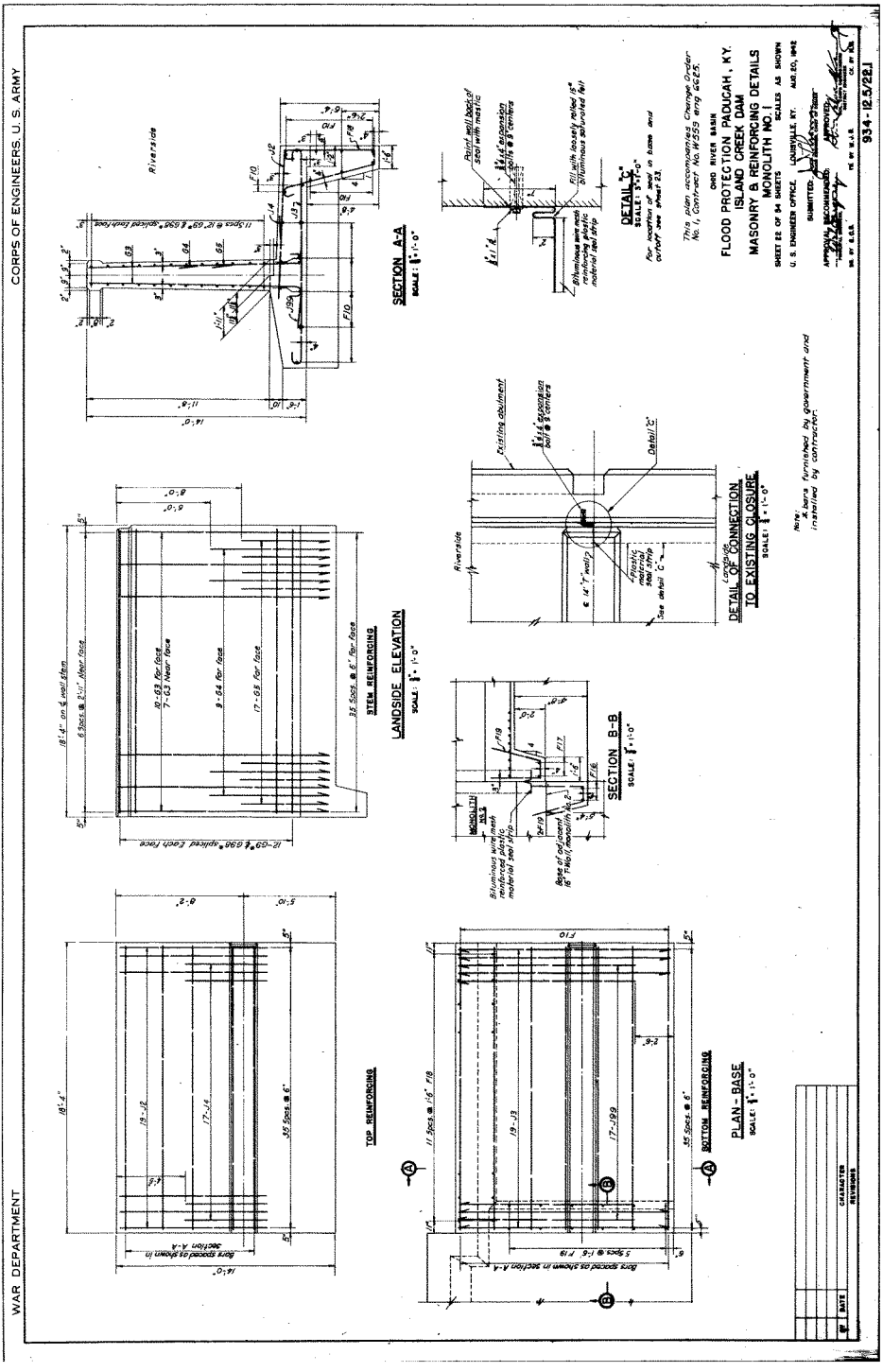
BY	DATE	CHARACTER REVISION

934-12.5/18


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
STILLING BASIN SLAB, PIERS & BAFFLES
OHIO RIVER BASIN
SECTION D–D
SECTION C–C
ELEVATION B–B
PLAN
SECTION A–A
TOP REINFORCING
BOTTOM REINFORCING
934–12.5/19.1

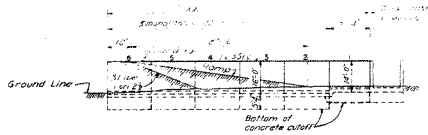

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
STILLING BASIN WALL NO. 7
OHIO RIVER BASIN
934-12.5/201
PLAN
ELEVATION D-D
HEADWALL
SECTION C-C
ELEVATION
STEM
(1 AS SHOWN - 1 OPPOSITE HAND)
BASE PLAN
BOTTOM REINFORCING
TOP REINFORCING
SECTION A-A
SECTION B-B


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
STILLING BASIN WALLS NOS. 8 TO 14, INCL.
OHIO RIVER BASIN
934-12.8/21.1
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
LANDSIDE ELEVATION "L" WALL MONOLITH NO. 14
LANDSIDE ELEVATION MONOLITHS NOS. 8 TO 12
LANDSIDE ELEVATION - MONOLITH NO. 13
BASE PLAN MONOLITH NO. 13
BASE PLAN
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
TOP REINFORCING
BOTTOM REINFORCING


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
MASONRY & REINFORCING DETAILS
MONOLITH NO. 1
OHIO RIVER BASIN
SCALES AS SHOWN
934-12.5/22.1
SECTION A-A
SCALE: 1"=1'-0"
LANDSIDE ELEVATION
SCALE: 1"=1'-0"
SECTION B-B
SCALE: 1"=1'-0"
PLAN-BASE
SCALE: 1"=1'-0"
DETAIL OF CONNECTION TO EXISTING CLOSURE
SCALE: 1"=1'-0"
DETAIL 'C'
SCALE: 1"=1'-0"
TOP REINFORCING
STEM REINFORCING
BOTTOM REINFORCING
Riverside
Landside
Existing abutment
Note: X bars furnished by government and installed by contractor.

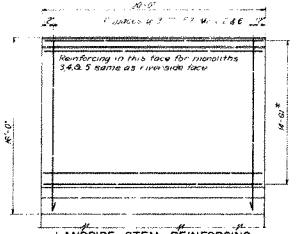
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



LANDSIDE ELEVATION - UPSTREAM "T" WALL - MONOLITHS

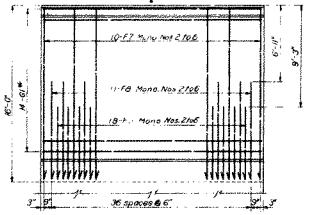
SCALE 1" = 20'



LANDSIDE STEM REINFORCING

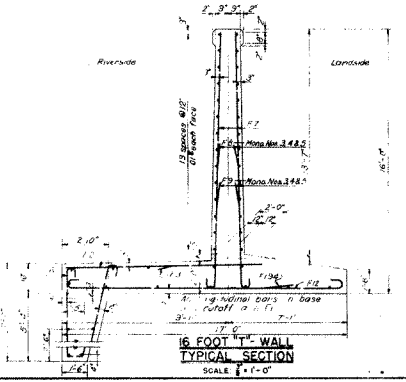
MONOLITHS NOS. 2 & 6

SCALE 1/4" = 1'-0"



RIVERSIDE STEM REINFORCING

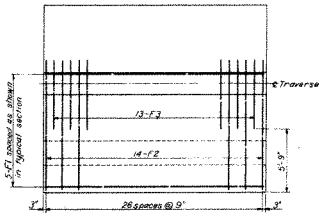
SCALE 1/4" = 1'-0"



16 FOOT "T" WALL

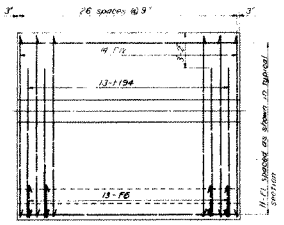
TYPICAL SECTION

SCALE 1/4" = 1'-0"



PLAN - BASE - TOP REINFORCING

SCALE: 1/4" = 1'-0"



PLAN - BASE - BOTTOM REINFORCING

SCALE: 1/4" = 1'-0"

16 FOOT "T" WALL

MONOLITHS NOS. 2,3,4,5 & 6

Note:
Place seal block at riverside edge of base between monoliths 1 and 2, for details see sheet 12
*bars furnished by government and installed by contractor.

This plan accompanies Change Order No. 1, Contract No. W 539 eng 6625.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 2,3,4,5 & 6

SHEET 23 OF 34 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED: Assistant Engineer

APPROVAL RECOMMENDED: Chief of Engineering

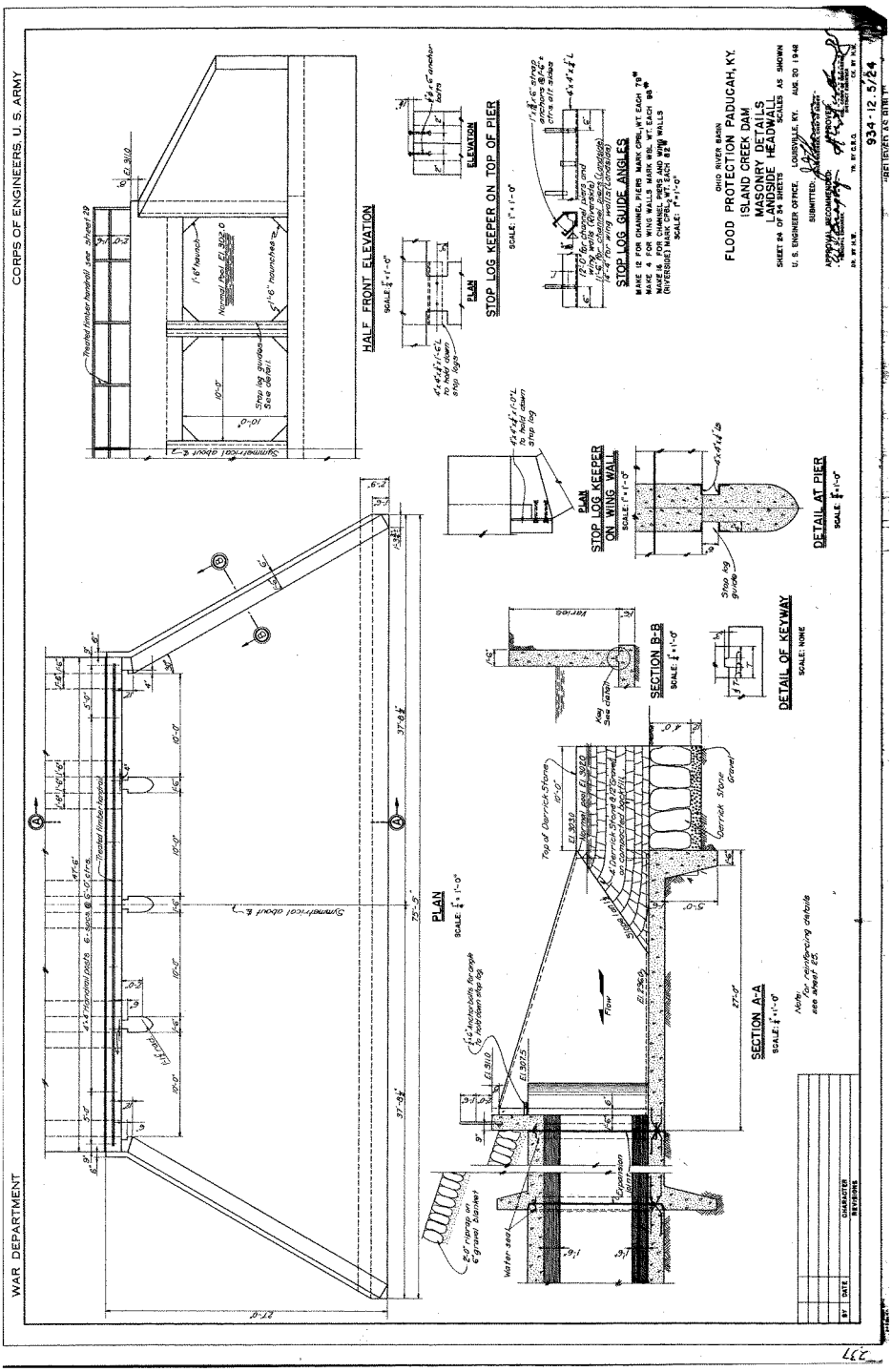
APPROVED: Col. Corps of Engineers, District Engineer

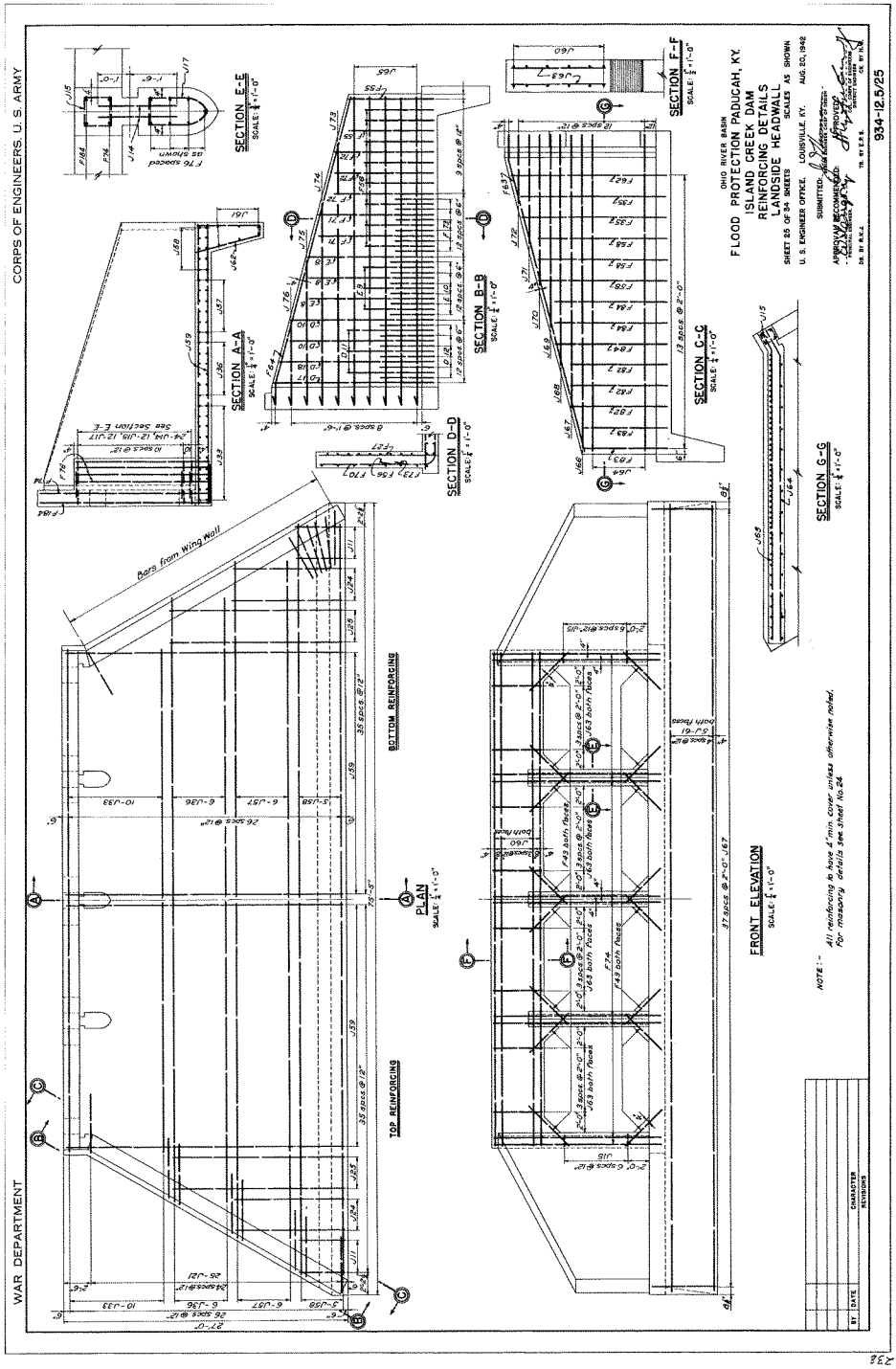
DR. BY W.K.B. TR. BY O.B.C. CK. BY H.W.

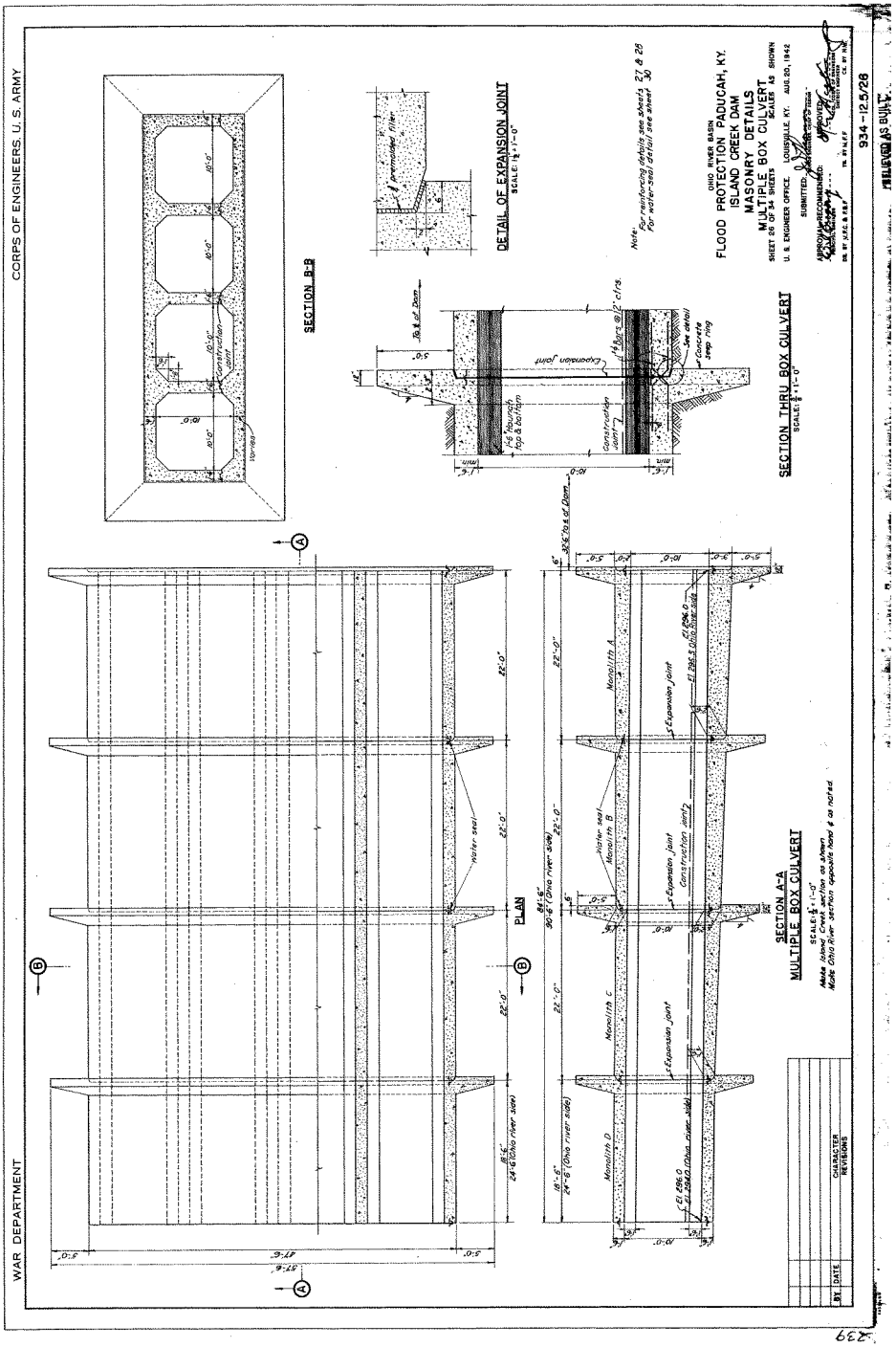
934 - 12.5/23.1

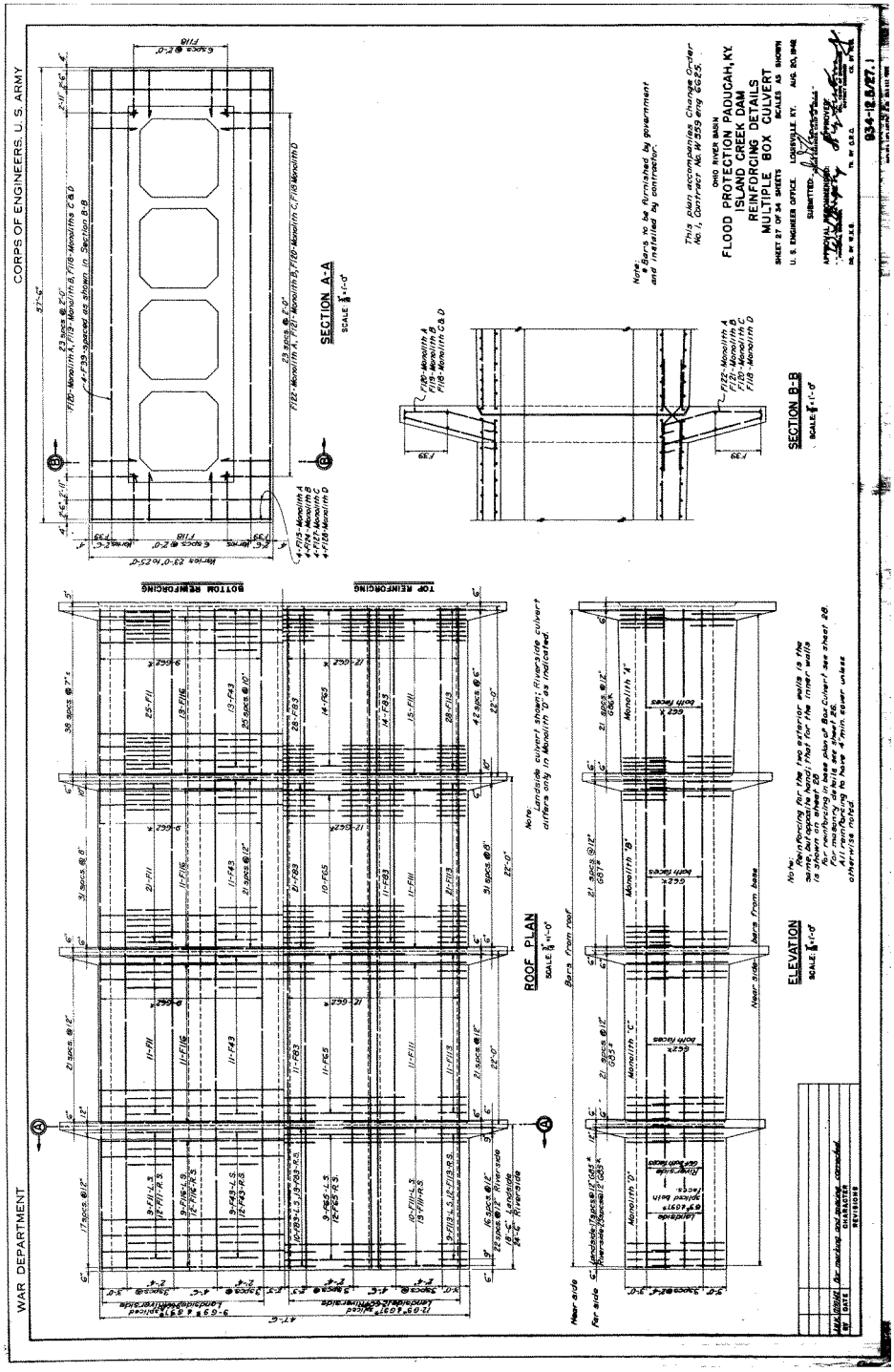
BY	DATE	CHARACTER OF REVISIONS

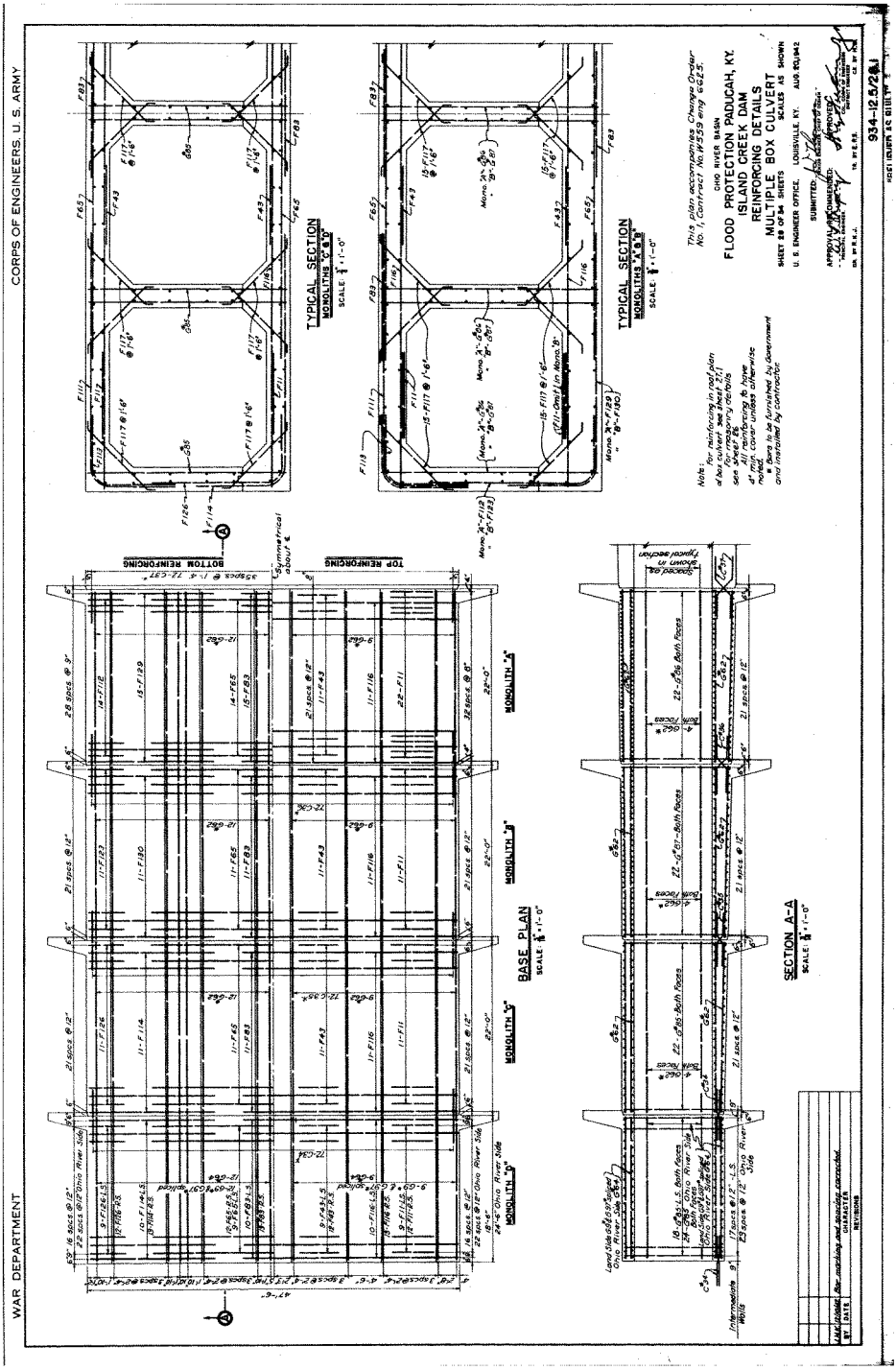
997


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
MASONRY DETAILS
LANDSIDE HEADWALL
SHEET 84 OF 84 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20 1948
SCALES AS SHOWN
SUBMITTED
APPROVED RECOMMENDED
APPROVED
934-12.5/24
HALF FRONT ELEVATION
PLAN
ELEVATION
STOP LOG KEEPER ON TOP OF PIER
STOP LOG GUIDE ANGLES
PLAN
STOP LOG KEEPER ON WING WALL
DETAIL AT PIER
SECTION B-B
DETAIL OF KEYWAY
SECTION A-A
PLAN
Normal Pool El. 306.0
Stop log grooves See detail
Trashrack detail E-3
Trashrack detail see sheet 29
Top of Derrick Stone
Normal pool El. 306.0
Derrick Stone
Ground
Flow
Expansion joint
Water seal
Key See detail
Trashracks
Stop log grooves
Note: For reinforcing details see sheet 85
BY
DATE
CHARACTER OF REVISIONS


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
LANDSIDE HEADWALL
SHEET 25 OF 34 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942
SUBMITTED:
APPROVED AND RECOMMENDED:
APPROVED:
934-12.5/25
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F
SECTION G-G
PLAN
FRONT ELEVATION
BOTTOM REINFORCING
TOP REINFORCING
Bars from Wing Wall
See Section E-E
NOTE:- All reinforcing to have 4" min. cover unless otherwise noted. For masonry details see Sheet No. 24
BY DATE CHARACTER REVISIONS

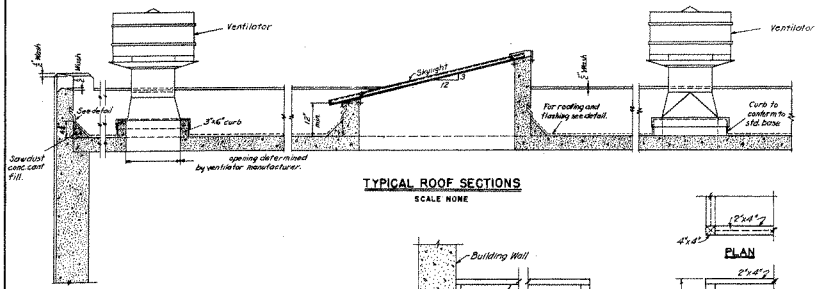

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
MASONRY DETAILS
MULTIPLE BOX CULVERT
SHEET 86 OF 94 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942
SUBMITTED
APPROVED AND RECOMMENDED
934-12.5/28
AS BUILT
SECTION B-B
DETAIL OF EXPANSION JOINT
SCALE 1"=1'-0"
SECTION THRU BOX CULVERT
SCALE 1"=1'-0"
PLAN
SECTION A-A
MULTIPLE BOX CULVERT
SCALE 1/8"=1'-0"
Make Island Creek section as shown
Make Ohio River section typical except as noted
Monolith A
Monolith B
Monolith C
Monolith D
Expansion joint
Construction joint
Water seal
Cl 296.0
El 286.5 Ohio River side
El 296.0 Ohio River side
Cl 286.0
El 276.5 Ohio River side
Note: For reinforcing details see sheets 27 & 28
For water-seal detail see sheet 30
DATE
BY
CHECKED
REVISIONS


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
MULTIPLE BOX CULVERT
OHIO RIVER BASIN
SECTION A-A
SECTION B-B
ROOF PLAN
ELEVATION
Note: Landside culvert shown; Riverside culvert differs only in Monolith 'D' as indicated.
Bars from roof
Bars from base
Near side
Far side
This plan accompanies Change Order No 1, Contract No W 359 eng 6625.
Note: # Bars to be furnished by government and installed by contractor.
BOTTOM REINFORCING
TOP REINFORCING
934-1-B.1/27.1


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
BASE PLAN
SCALE 1/4"=1'-0"
SECTION A-A
SCALE 1/4"=1'-0"
TYPICAL SECTION
MONOLITHS "A" & "B"
SCALE 1/4"=1'-0"
TYPICAL SECTION
MONOLITHS "C" & "D"
SCALE 1/4"=1'-0"
MONOLITH "A"
MONOLITH "B"
MONOLITH "C"
MONOLITH "D"
BOTTOM REINFORCING
TOP REINFORCING
Symmetrical about ℄
Ohio River Side
Land Side
Intermediate Walls
This plan accompanies Change Order No. 1, Contract No. 9-eng-6425.
OHIO RIVER DAM
Note: For reinforcing in roof slab of box culvert see Sheet 21
For reinforcing in cheek walls see Sheet 22
All reinforcing is shown as it would appear in plan unless otherwise noted.
All reinforcing steel to be furnished by Government and installed by contractor.
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
MULTIPLE BOX CULVERT
SHEET 8 OF 8 SHEETS
U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942
SUBMITTED:
APPROVED:
APPROVED AND RECOMMENDED:
934-12.5/26.1
SHEET ISSUED AS BUILT

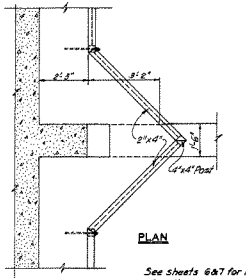
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



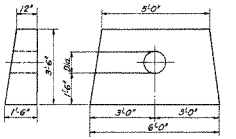
TYPICAL ROOF SECTIONS

SCALE NONE



PLAN

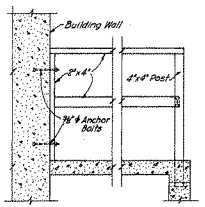
See sheets 6&7 for location of walkways.

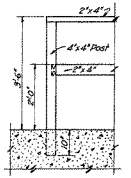


HEADWALL DETAIL FOR 8" AND 12" PIPE

NO SCALE

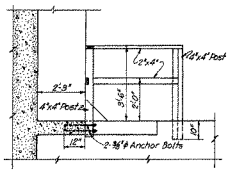
PLAN





END POST & RAIL

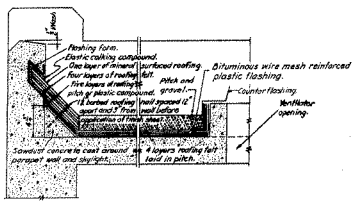
SCALE: ¾"=1'-0"



ELEVATION

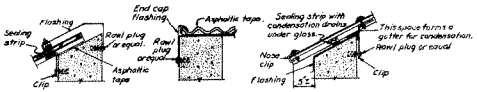
WALKWAY HANDRAIL AT INTERMEDIATE WALLS

SCALE: ½"=1'-0"



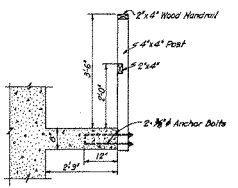
TYPICAL ROOFING DETAILS

SCALE: NONE



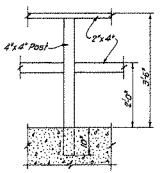
DETAILS OF SKYLIGHT

SCALE: 2" = 1'-0"



WALKWAY HANDRAIL

SCALE: ½"=1'-0"



INTER POST TYPICAL ANCHOR

SCALE: ¾"=1'-0"

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
MISCELLANEOUS DETAILS

SHEET 29 OF 34 SHEETS SCALES: AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942.

SUBMITTED:

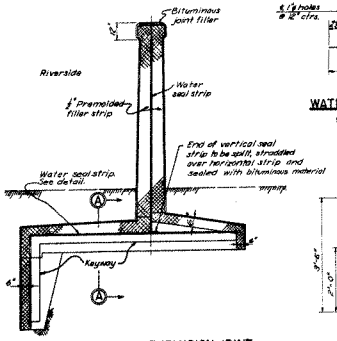
APPROVAL RECOMMENDED: APPROVED:

DR. BY: C.N.B.- W.J.B. TR. BY: M. A. F. CK. BY: E.E.

934-12.5/29

"BELIEVED AS BUILT"

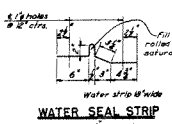
1003



TYPICAL T-WALL EXPANSION JOINT

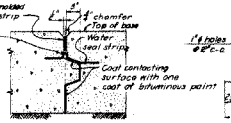
FOR CONCRETE CUT-OFF

SCALE: ½" = 1'-0"



WATER SEAL STRIP

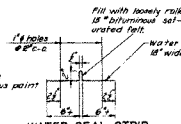
SCALE: 1½" = 1'-0"



SECTION A-A

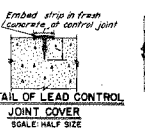
NOT TO SCALE

Note: Bituminous wire mesh reinforced plastic material



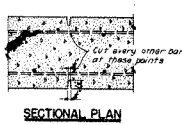
WATER SEAL STRIP

SCALE: 1½" = 1'-0"



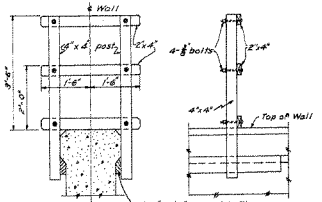
DETAIL OF LEAD CONTROL JOINT COVER

SCALE: HALF SIZE



SECTIONAL PLAN TYPICAL DETAIL WEAKENED PLANE CONTROL JOINT

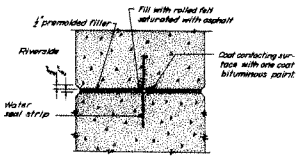
SCALE: NONE



Note: Guard rail at Sta. 37+96.96 to be as shown. To install guard rail at Sta. 51+05.00 holes must be drilled in existing concrete and 4"x4" posts grouted in place.

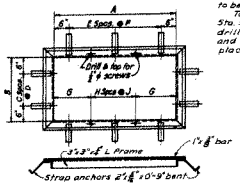
GUARD RAIL

SCALE: ¾" = 1'-0"



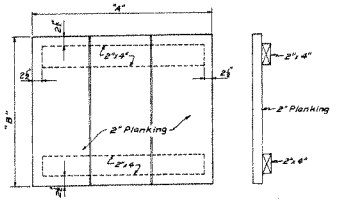
TYPICAL EXPANSION JOINT IN STEM OF WALL

SCALE: 1½" = 1'-0"



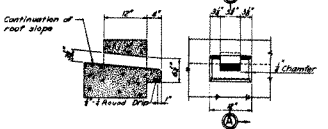
MANHOLE FRAME

NO SCALE



MANHOLE COVER

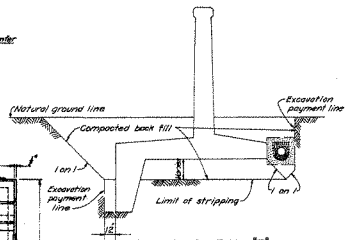
SCALE: 1½" = 1'-0"



SECTION A-A ELEVATION

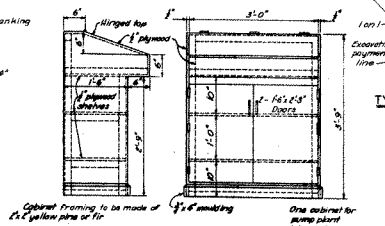
CONCRETE SCUPPER

SCALE: 1" = 1'-0"



TYPICAL STRIPPING SECTION "T" WALL

SCALE: ¼" = 1'-0"



STORAGE CABINET AND DESK

SCALE: 1" = 1'-0"

1 REQUIRED

MANHOLE FRAMES

A	B	C	D	E	F	G	H	V	No. Straps/Hinges	No. Bars	Make	Mark	Wt. each
2'-0"	2'-6"	1	1'-6"	1	12"	12"	-	-	8	2	1	MF1	73.5
12'-6"	2'-0"	1	12"	8	1'-0"	10½"	5	2'-8"	22	12	4	MFE	218.9

MANHOLE COVERS

Manhole Size	A	"B"	Make
2'-0"x 2'-6"	2'-10"	2'-6"	1
2'-10"-12"-6"	2'-4"	3'-1"	16
3'-9"x 6'-8"	3'-1"	6'-8"	4

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

MISCELLANEOUS DETAILS

SHEET 30 OF 34 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED: [signature] CHIEF ENGINEER, CHIEF OF DIVISION

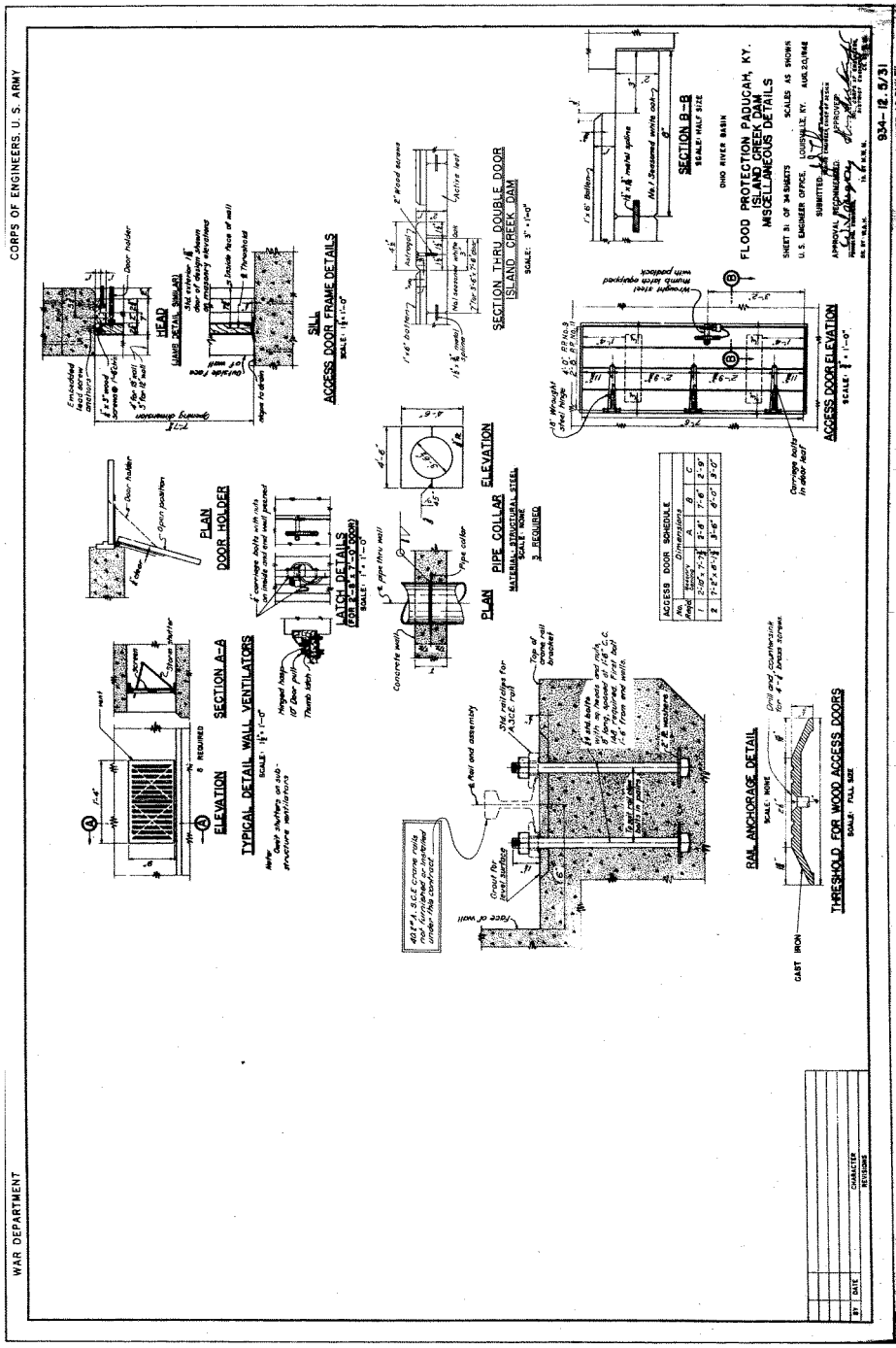
APPROVED: [signature] DISTRICT ENGINEER

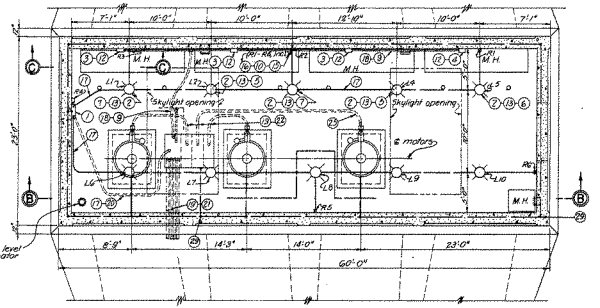
DR. BY E.H.S. TR. BY E.H.S. CK. BY F.S.F.

934-12/6/30

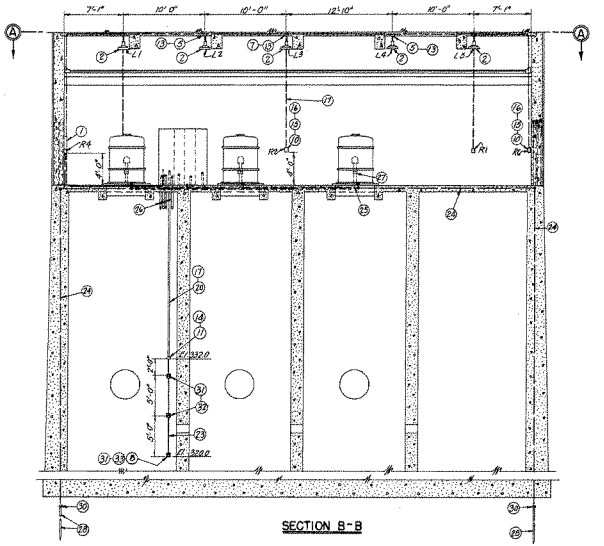
"AS BUILT"

1004

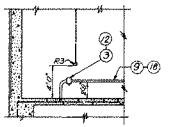

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
MISCELLANEOUS DETAILS
SHEET 31 OF 34 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1948
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
934-12.5/31
"RELIEVED AS BUILT"
TYPICAL DETAIL WALL VENTILATORS
SCALE: 1½"=1'-0"
ELEVATION
SECTION A-A
REQUIRED
PLAN
DOOR HOLDER
HATCH DETAILS
FOR 2'-6"x3'-0" DOOR
SCALE: 1"=1'-0"
HEAD
SILL
ACCESS DOOR FRAME DETAILS
SCALE: 1½"=1'-0"
PLAN
PIPE COLLAR
ELEVATION
MATERIAL: STRUCTURAL STEEL
SCALE: NONE
3 REQUIRED
SECTION THRU DOUBLE DOOR
ISLAND CREEK DAM
SCALE: 3"=1'-0"
ACCESS DOOR SCHEDULE
ACCESS DOOR ELEVATION
SCALE: ½"=1'-0"
SECTION B-B
SCALE: HALF SIZE
OHIO RIVER BASIN
RAIL ANCHORAGE DETAIL
SCALE: NONE
THRESHOLD FOR WOOD ACCESS DOORS
SCALE: FULL SIZE
CAST IRON
BY
DATE
CHECKED
REVISIONS



SECTIONAL PLAN A-A



SECTION B-B

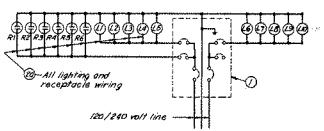


SECTION C-C

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUANTITY
1 *	4 circuit lighting panel (surface type)			1 *
2 *	R.L.M. dome reflector and socket	West	349573	10 *
3 *	Conduilet outlet	Crouse-Hinds	FDCT3	3 *
4 *	" "	" "	FDL3	1 *
5	" "	" "	SKC12	6
6	" "	" "	SKL12	1
7	" "	" "	SKT12	3
8 &	5/8" electrode, for detail see sheet 26			1 *
9 *	#8-1 cond cable VC, 600 V.ins. with W.P. braid			240' ±
10 *	Conduilet outlet	Crouse-Hinds	FS141	6 *
11 *	" "	" "	8147	1 *
12 *	" Cover	" "	05100	4 *
13 *	" Cover	" "	SKB4	10 *
14 *	" "	" "	1771	1 *
15 *	Duplex plug receptacle			6 *
16 *	Wall surface plate			6 *
17	1/2 electrical metallic tubing (E.M.T.)			170'±
18	1" rigid electrical conduit			15'±
19	3/4" rigid electrical conduit			90'±
20 M	#12 type SN insulated copper wire			700'± *
21 *	300 MCM 3-cond. cable, VC, 600 Vins. with lead jacket			680'± *
22 *	750 " " " " " " W.P. braid			240'± *
23 *	#6 H.D. bare solid copper wire			15'± *
24 *	#2/0 bare stranded copper cable			450'±
25	3/4" standard 90° elbow			7 *
26	Special long radius elbow 3/4" x 36" radius	G.E.		4
27 *	3/4" Erickson coupling			3 *
28	Copper weld ground rod 3/4" x 8'-0" long			4
29	"T" connector for #2/0 stranded cable	Burndy	NT2626	8
30	Connector for #2/0 stranded cable to 3/4" rod	"	GA6436	8
31 *	3" bolt circle type insulator	Lapp	13761	3 *
32 *	Bus support fitting. Drill to clamp #6 solid wire	Locke	9859	2 *
33 *	Bus support fitting. Drill to clamp 3/4" conduit	"	9853	1 *
34				
35				

* These materials not to be furnished or installed under this contract.



WIRING DIAGRAM - LIGHTING CIRCUIT

Embedded conduit
Exposed conduit
Concealed conduit
Ground wire

LEGEND

Notes:
Figures in circles refer to part numbers on Bill of Material.
All material shall be of the manufacture, type & catalog number specified, or its equal.
All conduit in floor shall be placed as near the center of same as possible & shall clear opening for pump removal.
Small fittings, conduilets, E.M.T. couplings and adapters, etc., not listed shall be furnished as required.
200 watt bulbs shall be furnished and installed in all lights, under separate contract.

BY	DATE	CHARACTER REVISIONS

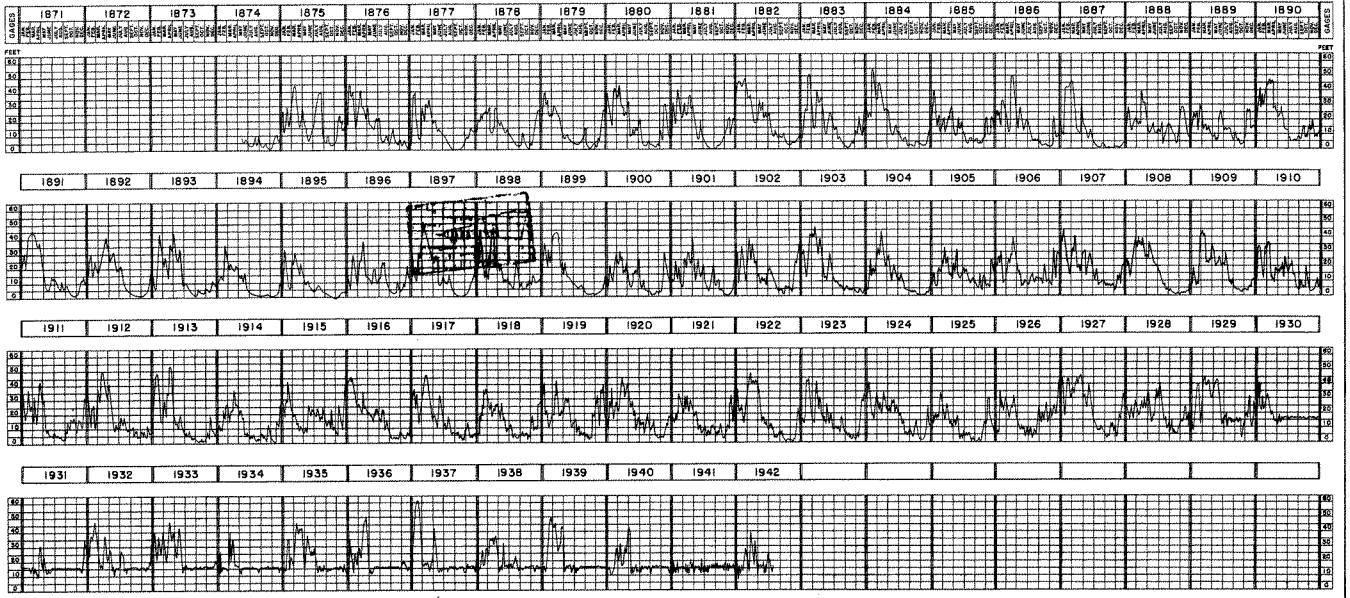
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
LIGHTING & POWER SYSTEMS
SHEET 32 OF 34 SHEETS SCALE 3/8" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942
SUBMITTED: [signature] DIVISION ENGINEER
APPROVED RECOMMENDED: [signature] PRINCIPAL ASSISTANT
APPROVED: [signature] COL. CORPS OF ENGINEERS DISTRICT ENGINEER
DR. BY A.J.Z. TR. BY A.J.Z. CK. BY D.S.

934-12.5/32

1006

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

HYDROGRAPHS

SHEET 33 OF 34 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. AUG. 20, 1942

SUBMITTED: [illegible] Chief of Section

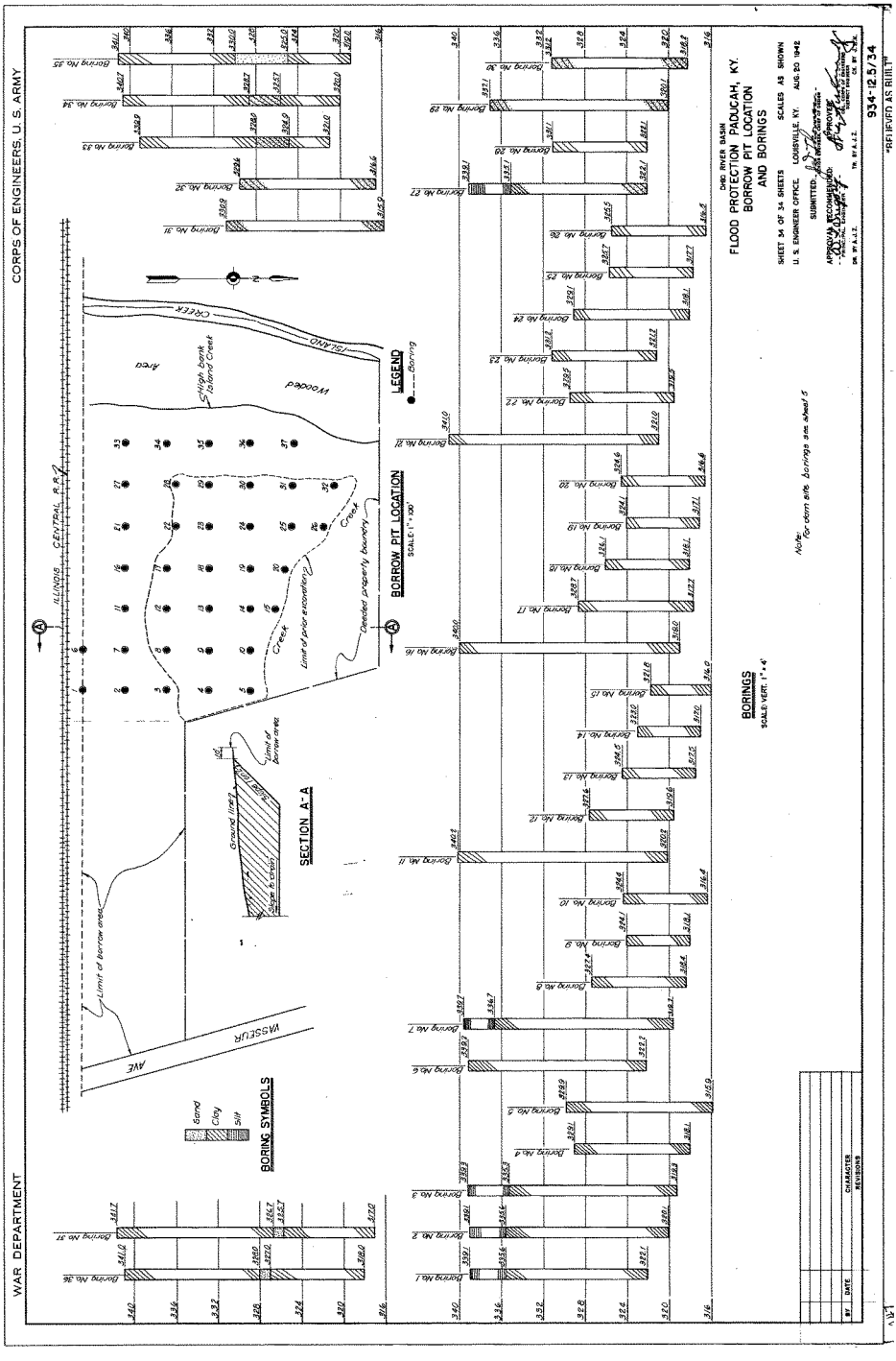
APPROVED: [illegible] Chief of Engineers

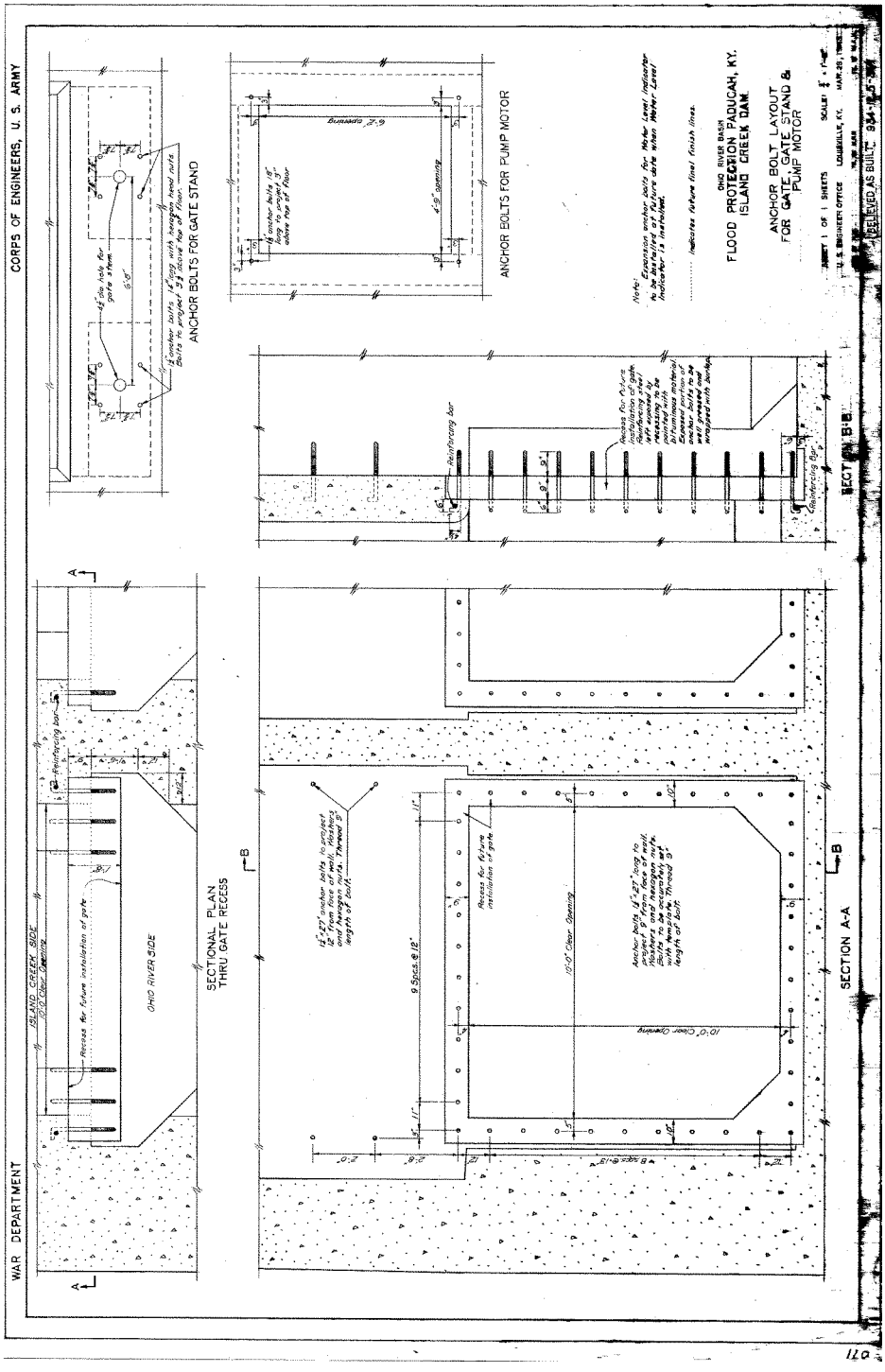
Note:
Zero Gage = El. 286.26 (U.S.E.D. datum).
Dam No. 52 placed in operation Oct. 27, 1928,
for location see sheet 934-12.5/1

DR. BY R.M.L. CH. BY [illegible] TR. BY R.M.L. CH. BY [illegible]

934-12.5/33

1007


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
ILLINOIS CENTRAL R.R.
Limit of borrow area
Ground line
Old surface
Limit of borrow area
SECTION A-A
BORROW PIT LOCATION
SCALE 1" = 100'
Limit of prior excavation
Creek
Deeded property boundary
Creek
High bank Island Creek
Island
Island Creek
Wooded
Area
LEGEND
Boring
BORING SYMBOLS
Sand
Clay
Silt
BORINGS
SCALE VERT. 1" = 4'
Note
For dam site borings see sheet 5
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
BORROW PIT LOCATION
AND BORINGS
SHEET 34 OF 34 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE: LOUISVILLE, KY. AUG 20 1942
SUBMITTED:
APPROVED:
APPROVED AND RECOMMENDED:
934-12.5/34
CHARACTER
REVISIONS
BY
DATE

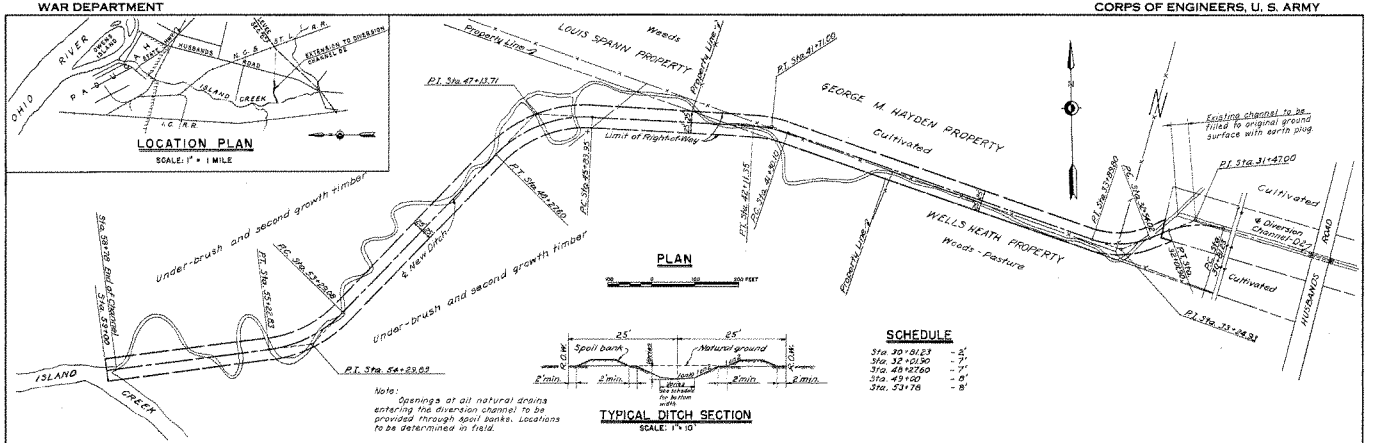

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM.
ANCHOR BOLT LAYOUT
FOR GATE, GATE STAND &
PUMP MOTOR
SHEET 1 OF 1 SHEETS
SCALE: 1" = 1'-0"
U. S. ENGINEER OFFICE
LOUISVILLE, KY.
MAR. 25, 1940
REVISED AS BUILT
SECTIONAL PLAN
THRU GATE RECESS
ISLAND CREEK SIDE
OHIO RIVER SIDE
Recess for future installation of gate
Reinforcing bar
10'-0" Clear Opening
9 Spcs. @ 12"
SECTION A-A
SECTION B-B
ANCHOR BOLTS FOR GATE STAND
ANCHOR BOLTS FOR PUMP MOTOR
4'-9" opening
Reinforcing Bar
Recess for future installation of gate
Note: Expansion anchor bolts for Water Level Indicator to be installed at future date when Water Level Indicator is installed.
Indicates future final finish lines.

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

LOCATION PLAN

SCALE: 1" = 1 MILE



PLAN

SCALE: 0 50 100 200 FEET

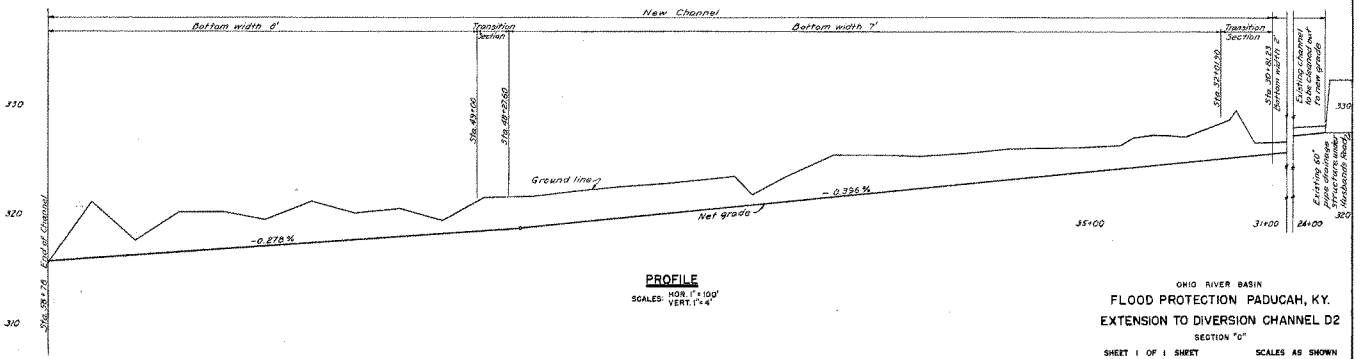
TYPICAL DITCH SECTION

SCALE: 1" = 10'

Note: Openings at all natural drains entering the diversion channel to be provided through spoil banks. Locations to be determined in field.

SCHEDULE

Sta. 30+81.23	- 2'
Sta. 32+01.90	- 7'
Sta. 48+27.60	- 1'
Sta. 49+00	- 0'
Sta. 53+78	- 8'



PROFILE

SCALES: HOR. 1" = 100'
VERT. 1" = 4'

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

EXTENSION TO DIVERSION CHANNEL D2

SECTION "C"

SHEET 1 OF 1 SHEET SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1943

SUBMITTED: [signature] Lieut. Colonel, C.E.

APPROVED AND RECOMMENDED: [signature] Lieut. Colonel, C.E. District Engineer

APPROVED: [signature] Lieut. Colonel, C.E. Chief of Engineers

DR. BY M.A.F. TR. BY M.A.F. CK. BY A.B.A.

"BELIEVED AS BUILT" 934-12.6/1

1010

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KENTUCKY

PUMPING PLANTS NOS. 4, 8, 9 & 10

INDEX

PUMPING PLANT NO. 4 SHEET 934-12.7/2

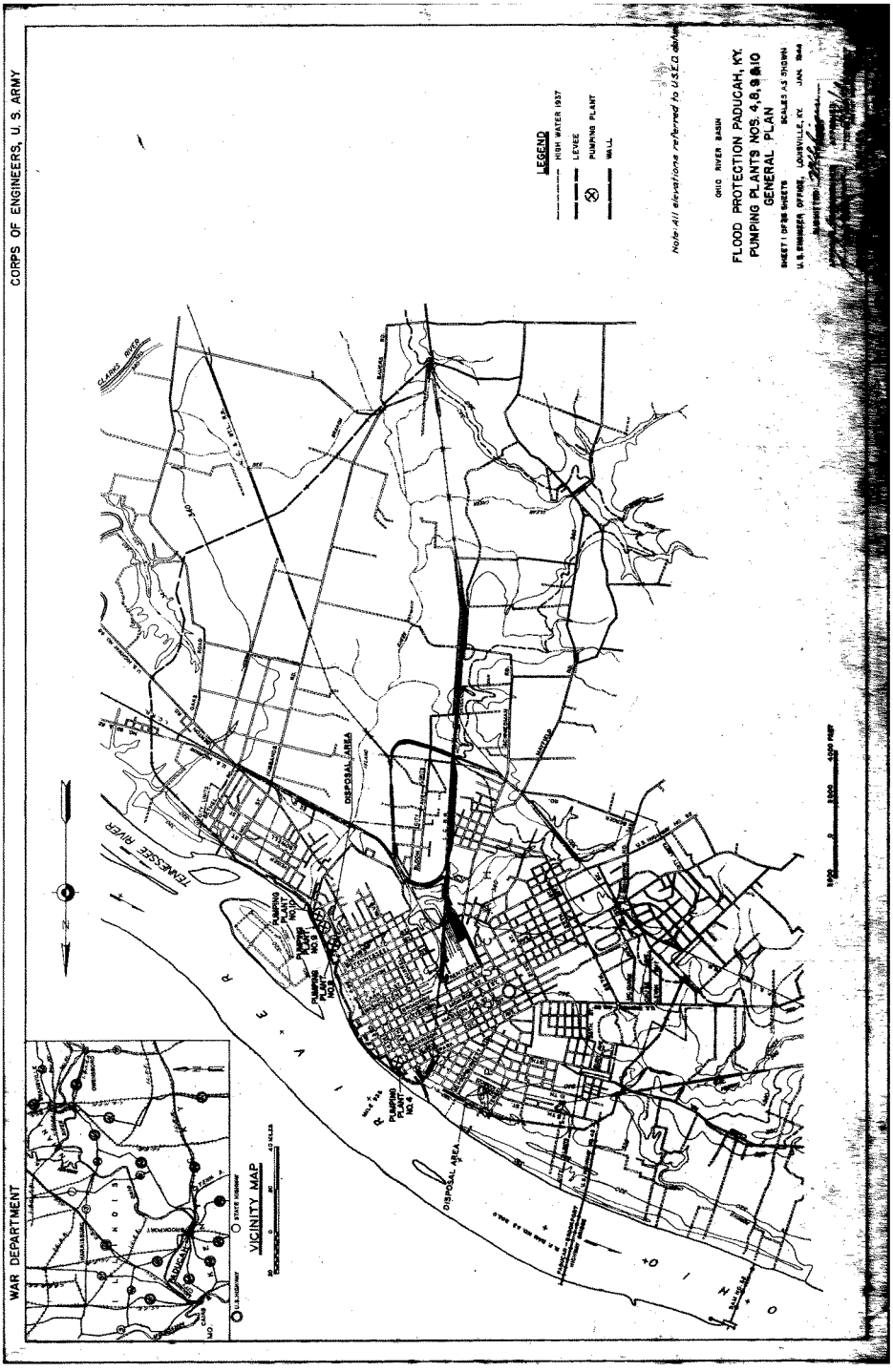
PUMPING PLANT NO. 8 SHEET 934-12.7/13

PUMPING PLANT NO. 9 SHEET 934-12.7/14

PUMPING PLANT NO. 10 SHEET 934-12.7/25

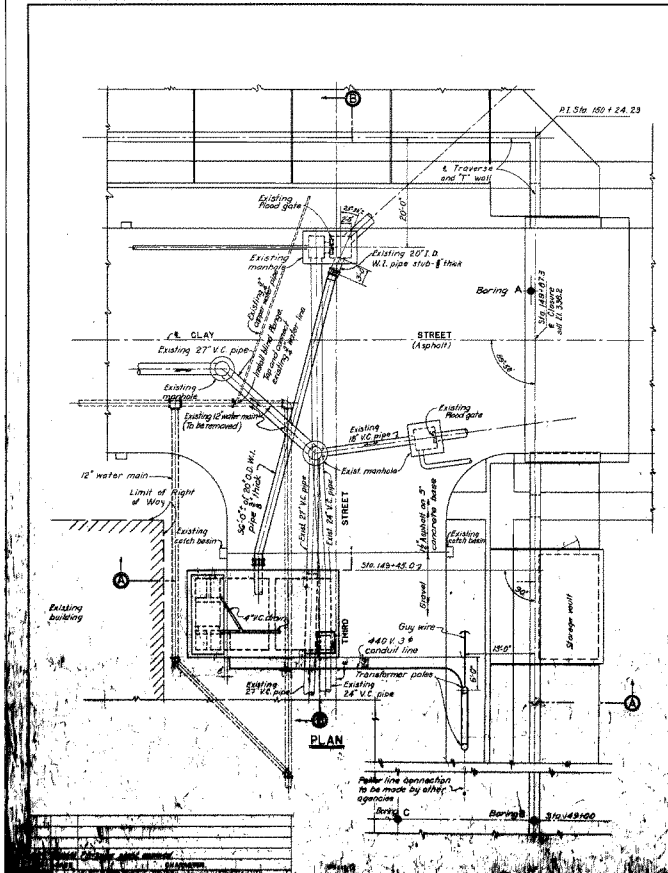
U. S. ENGINEER OFFICE, LOUISVILLE, KY.

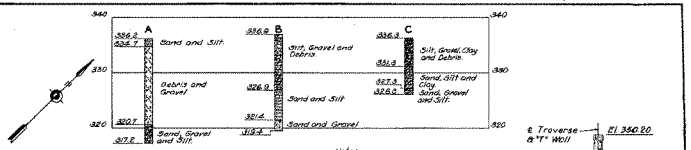
"DELIVERED AS BUILT"
934 12.7/6


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 4, 8, 9 & 10
GENERAL PLAN
SHEET 1 OF 28 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944
LEGEND
HIGH WATER 1937
LEVEE
PUMPING PLANT
WALL
Note: All elevations referred to U.S.E.D. datum
VICINITY MAP
TENNESSEE RIVER
OHIO RIVER
CLARKS RIVER
DISPOSAL AREA
PUMPING PLANT NO. 4
PUMPING PLANT NO. 8
PUMPING PLANT NO. 9
PUMPING PLANT NO. 10
PADUCAH
ILLINOIS
KENTUCKY
MISSOURI

WAR DEPARTMENT

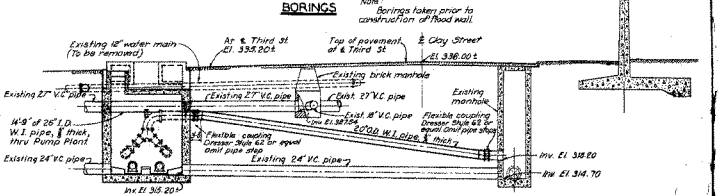
CORPS OF ENGINEERS, U. S. ARMY



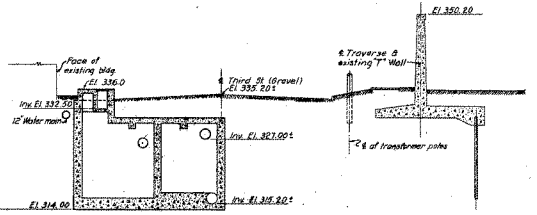


BORINGS

Note: Borings taken prior to construction of flood wall.



SECTION B-B



SECTION A-A

General Notes:

1. Reinforcing coverage - The distance from the surface of the nearest bar to the face of the concrete shall be 2½" for Formed surfaces and 3" for unformed surfaces unless otherwise indicated.
2. Indicated construction joints may be revised subject to approval of contracting Officer.

INDEX - PUMPING PLANT NO. 4

DRWG. NO.	TITLE
934-12.7/1	GENERAL PLAN PUMPING PLANTS 4, 8, 9 & 10.
934-12.7/2	GENERAL LAYOUT.
934-12.7/3	MASONRY DETAILS - PLAN AND SECTIONS.
934-12.7/4	" " " "
934-12.7/5	REINFORCING DETAILS - BASE SLAB.
934-12.7/6	" " " WALL AND PLATFORM.
934-12.7/7	" " " NORTH AND SOUTH WALLS.
934-12.7/8	" " " WALLS.
934-12.7/9	" " " ROOF SLAB.
934-12.7/10	WIRING DIAGRAMS PLANT NOS. 4 AND 9.
934-12.7/11	LIGHTING AND POWER LAYOUT.
934-12.7/12	TWIN REACTOR AND TRANSFORMER SUB-STATION - PLANTS NOS. 4 & 9.
934-12.7/13	GATE HOUSE DETAILS.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 4

GENERAL LAYOUT

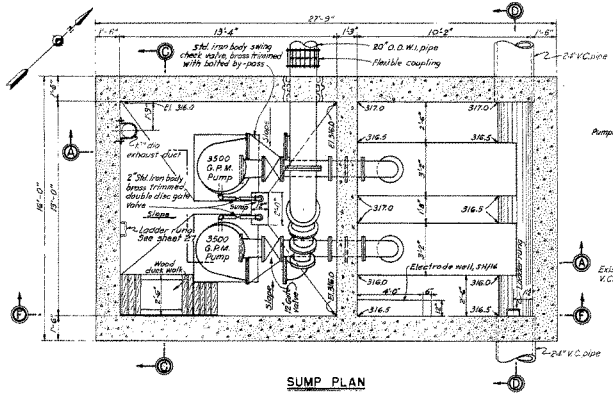
SHEET 2 OF 10 SHEETS SCALE: 1" = 10'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JUNE 1944

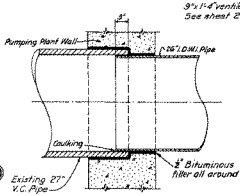
1013

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

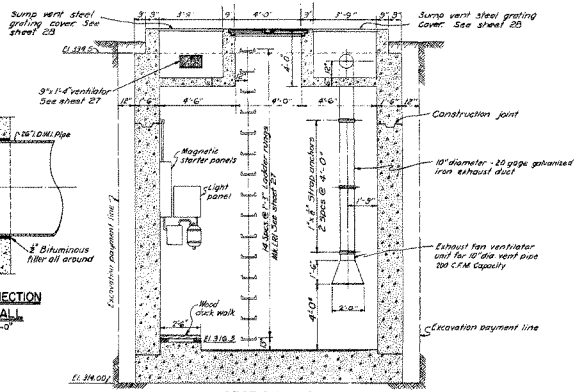


SUMP PLAN

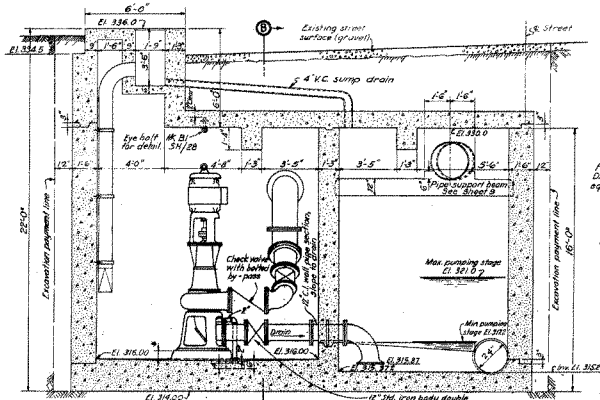


PIPE CONNECTION THRU WALL

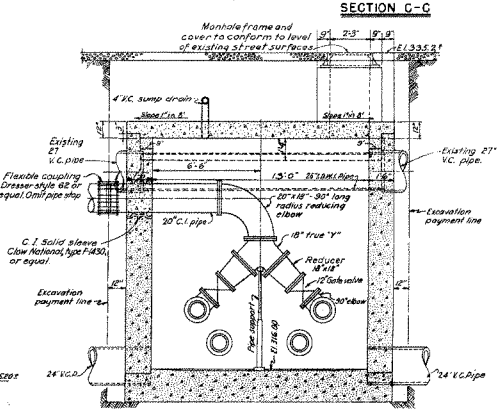
SCALE: 1"=1'-0"



SECTION C-C



SECTION A-A



SECTION B-B

Note:
For sections C-D, E-E, F-F and plan see sheet 6
for reinforcing details see sheet 6, 7, 8 and 9
* Dimensions shall be determined by the Pump Manufacturer.

BY	DATE	CHARACTER REVISIONS
K.W.	11/24/43	Electrode well added, partition wall and pumps relocated

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 4

MASONRY DETAILS

PLAN AND SECTIONS

SHEET 3 OF 28 SHEETS SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944

SUBMITTED: R. R. Phillippe, ENGINEER

APPROVED: RECOMMENDED: APPROVED:

R. R. Phillippe, DIVISION ENGINEER

Lt. Col. C.E., DISTRICT ENGINEER

OF DIV. E.T. TA. BY E.C. OF DIST. H.M.

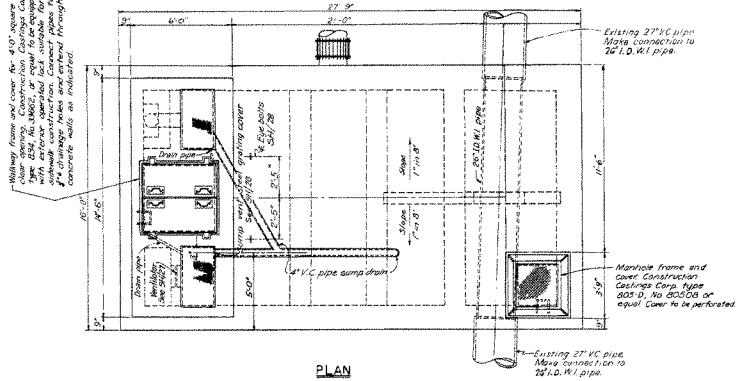
824.1-51 934-12.7/3

1014

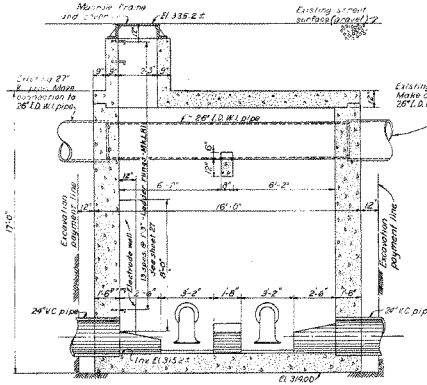
157

WAR DEPARTMENT

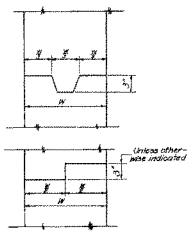
CORPS OF ENGINEERS, U. S. ARMY



PLAN

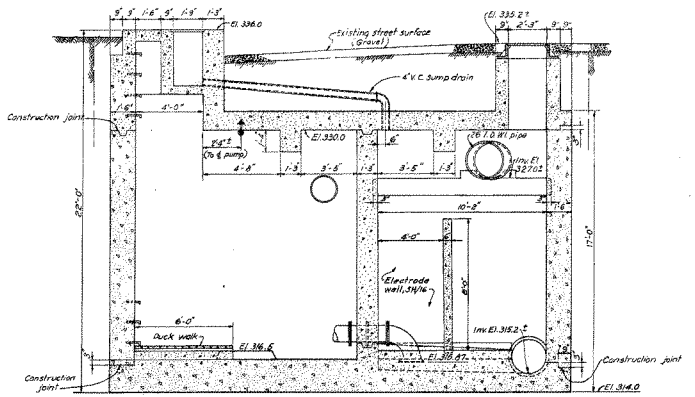


SECTION D-D



TYPICAL CONSTRUCTION JOINTS

SCALE: NONE



SECTION F-F

Notes:
For location of Section D-D and F-F see sheet 9.
For reinforcing details see sheets 5, 6, 7, 8 and 9
All exposed corners of concrete shall be chamfered one inch.
For pipe connection thru wall see sheet 3

BY	DATE	CHARACTER
KH	5/9/44	Partition wall relocated, electrode wall added.

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 4
MASONRY DETAILS
PLAN & SECTIONS

SHEET 4 OF 28 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944

SUBMITTED: [signature] Chief

APPROVED RECOMMENDED: [signature] Senior Engineer

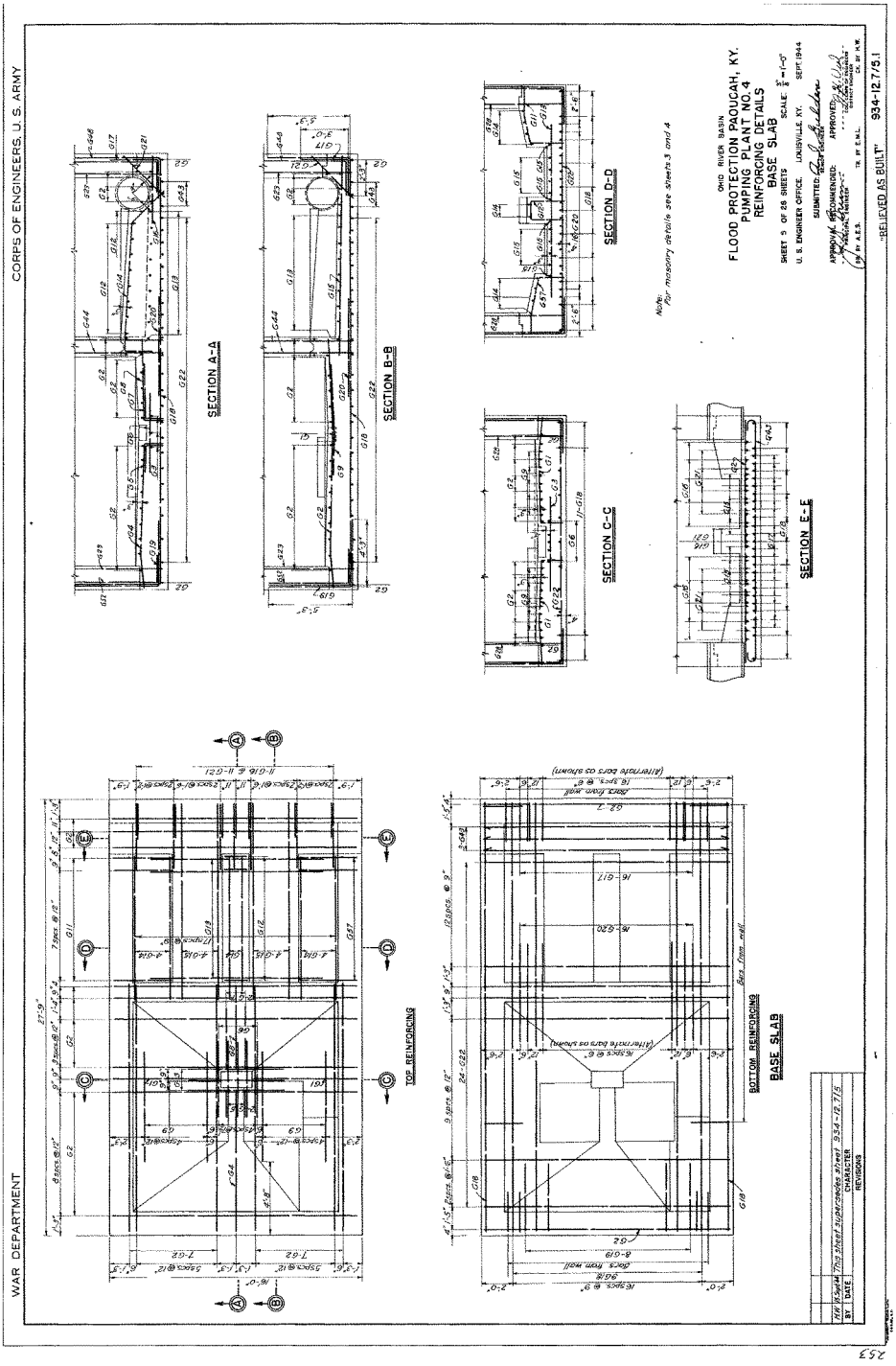
APPROVED: [signature] Lt. Col., Corps of Engineers, District Engineer

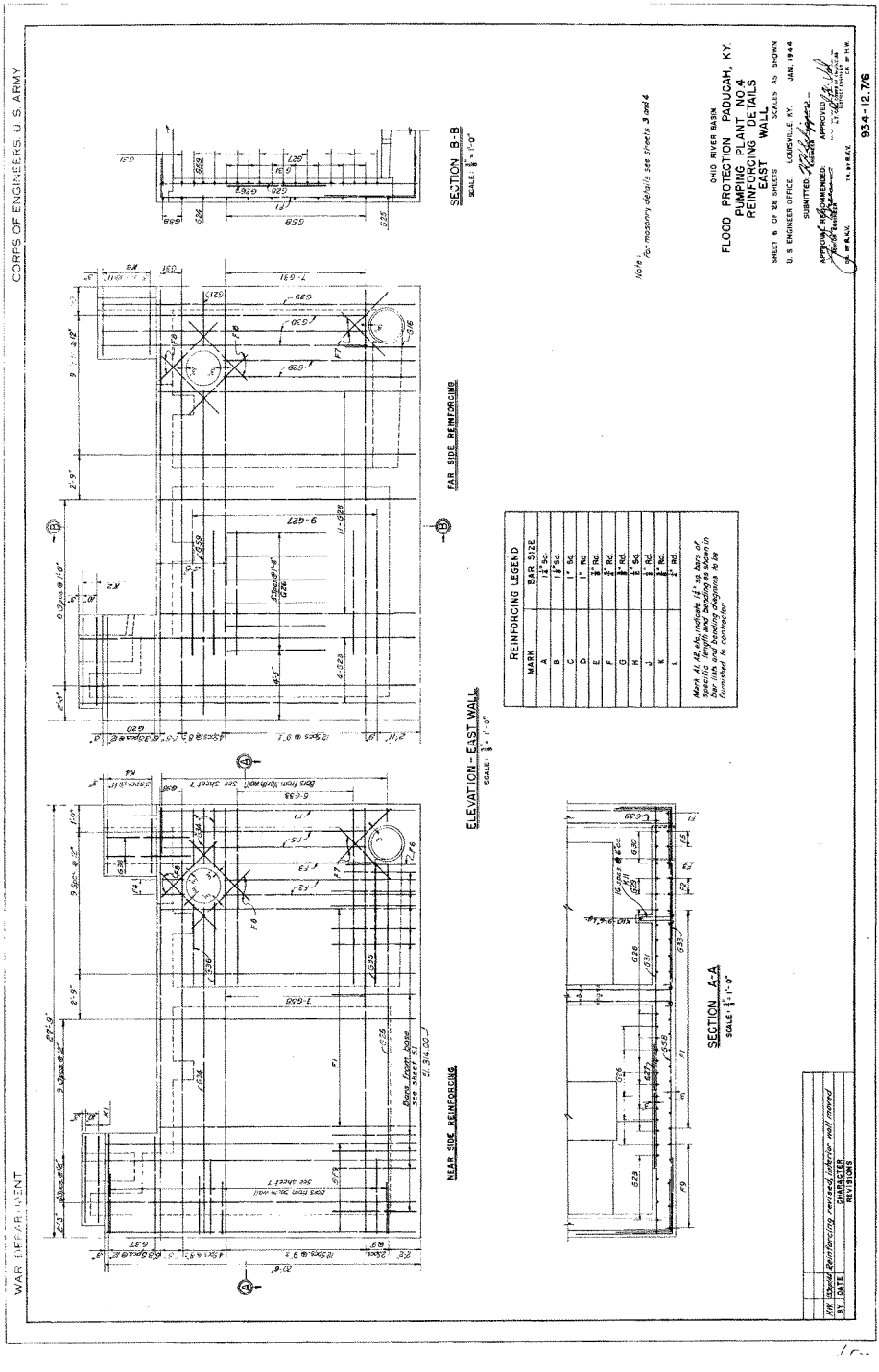
DR. BY E.T. TR. BY E.T. CH. BY H.K.

"BELIEVED AS BUILT"

934-12.7/4

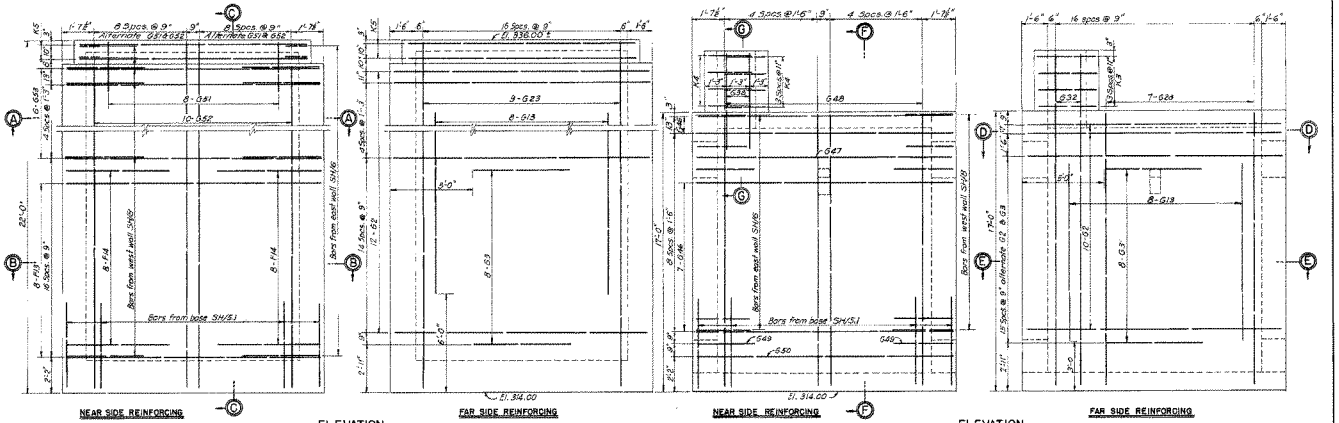
1015


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 4
REINFORCING DETAILS
BASE SLAB
SHEET 9 OF 26 SHEETS
SCALE: 3/8"=1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. SEPT. 1944
SUBMITTED:
APPROVED:
APPROVED, RECOMMENDED:
"RELIEVED AS BUILT"
934-12.7/5.1
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
TOP REINFORCING
BOTTOM REINFORCING
BASE SLAB
Note: For masonry details see sheets 3 and 4
(Alternate bars as shown)
bars from wall
REVISIONS
This sheet superseds sheet 934-12.7/5
No.
DATE


CORPS OF ENGINEERS, U.S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO.4
REINFORCING DETAILS
EAST WALL
SHEET 6 OF 28 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE LOUISVILLE, KY. JAN. 1944
SUBMITTED
APPROVED
934-12.7/6
"BELIEVED AS BUILT"
REINFORCING LEGEND
MARK
BAR SIZE
SECTION B-B
SCALE: 1/4" = 1'-0"
FAR SIDE REINFORCING
ELEVATION - EAST WALL
SCALE: 1/4" = 1'-0"
NEAR SIDE REINFORCING
SECTION A-A
SCALE: 1/4" = 1'-0"
Note: for masonry details see sheets 3 and 4
REVISIONS
BY
DATE
CHARACTER

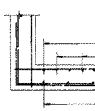
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

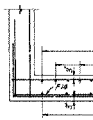


ELEVATION SOUTH WALL

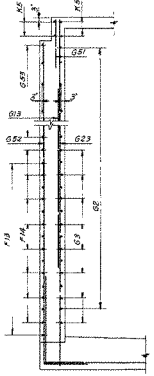
ELEVATION NORTH WALL



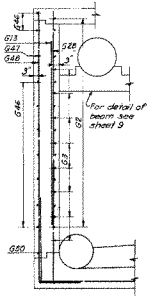
SECTION A-A



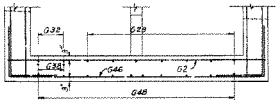
SECTION B-B



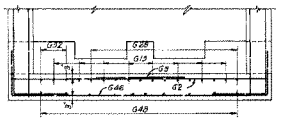
SECTION G-G
SOUTH WALL



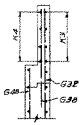
SECTION F-F
NORTH WALL



SECTION D-D



SECTION E-E



SECTION G-G

Note:
For masonry details see sheets 3 & 4

H.W.	5/29/44	Reinforcing marks changed
BY	DATE	CHARACTER
REVISIONS		

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 4
REINFORCING DETAILS
NORTH & SOUTH WALLS

SHEET 7 OF 28 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944

SUBMITTED: [signature] Engineer

APPROVAL RECOMMENDED: [signature] CHIEF ENGINEER

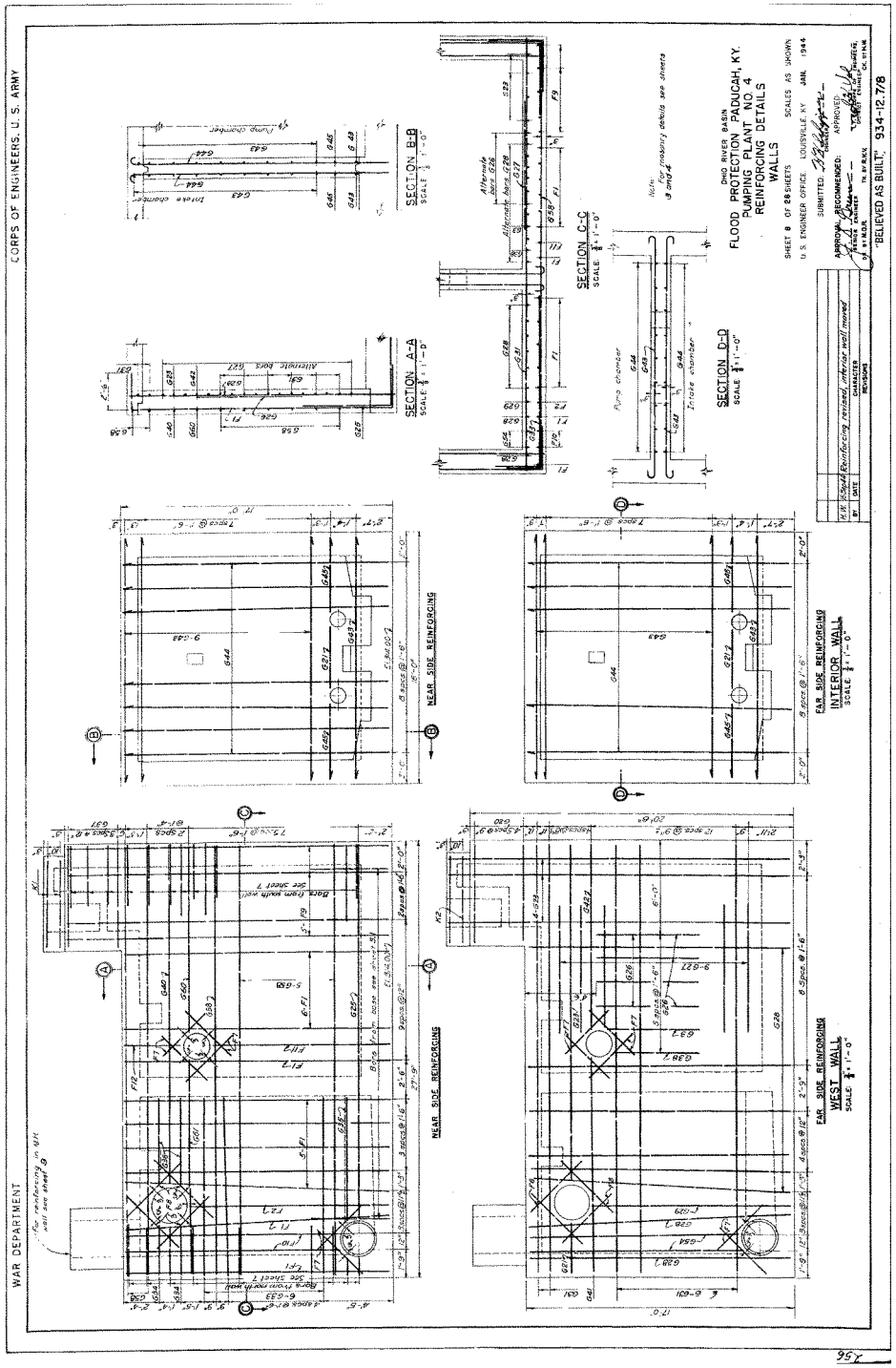
APPROVED: [signature] DISTRICT ENGINEER

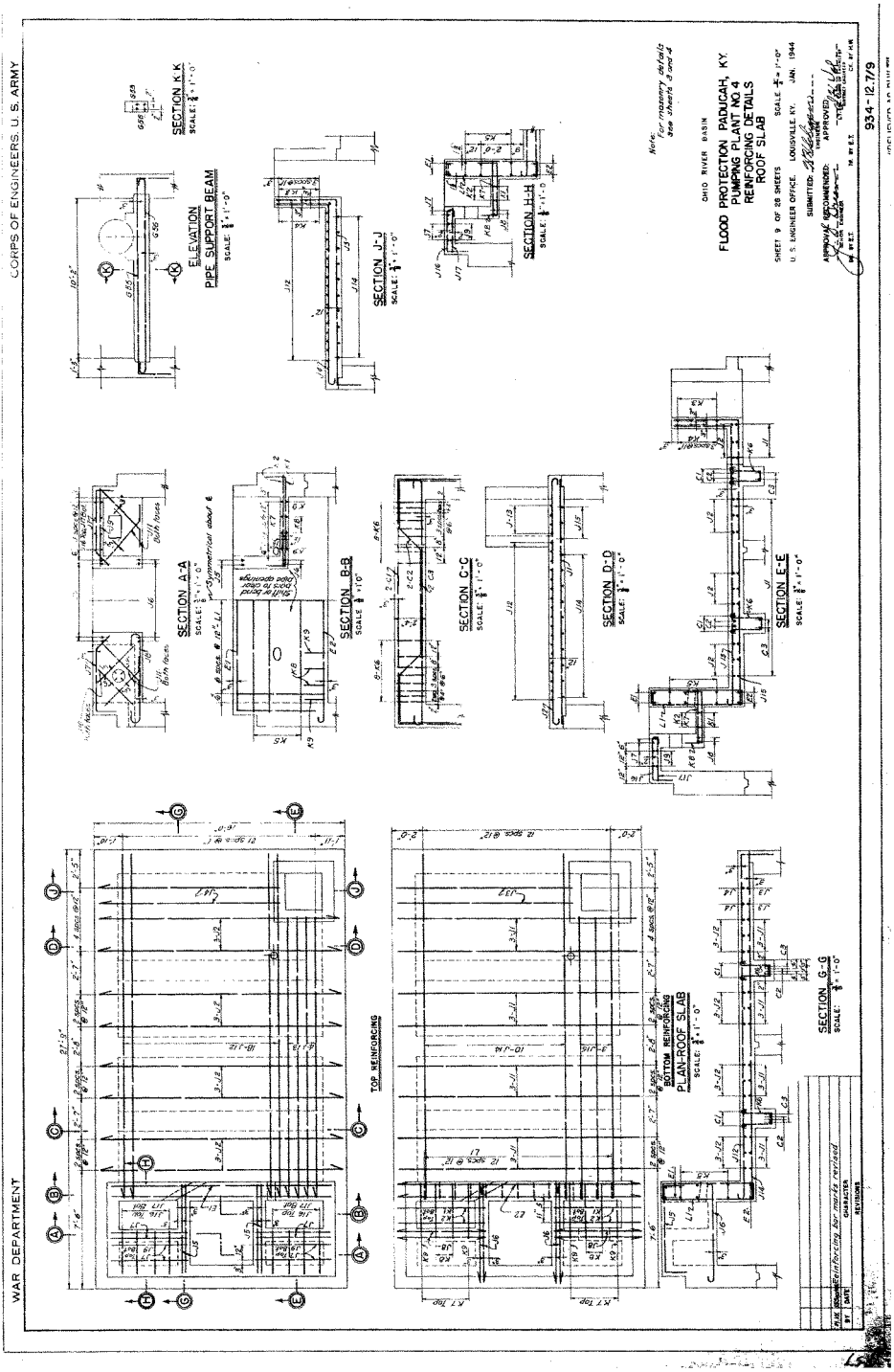
DR. BY W.A.B. TR. BY W.J.B. CK. BY H.W.

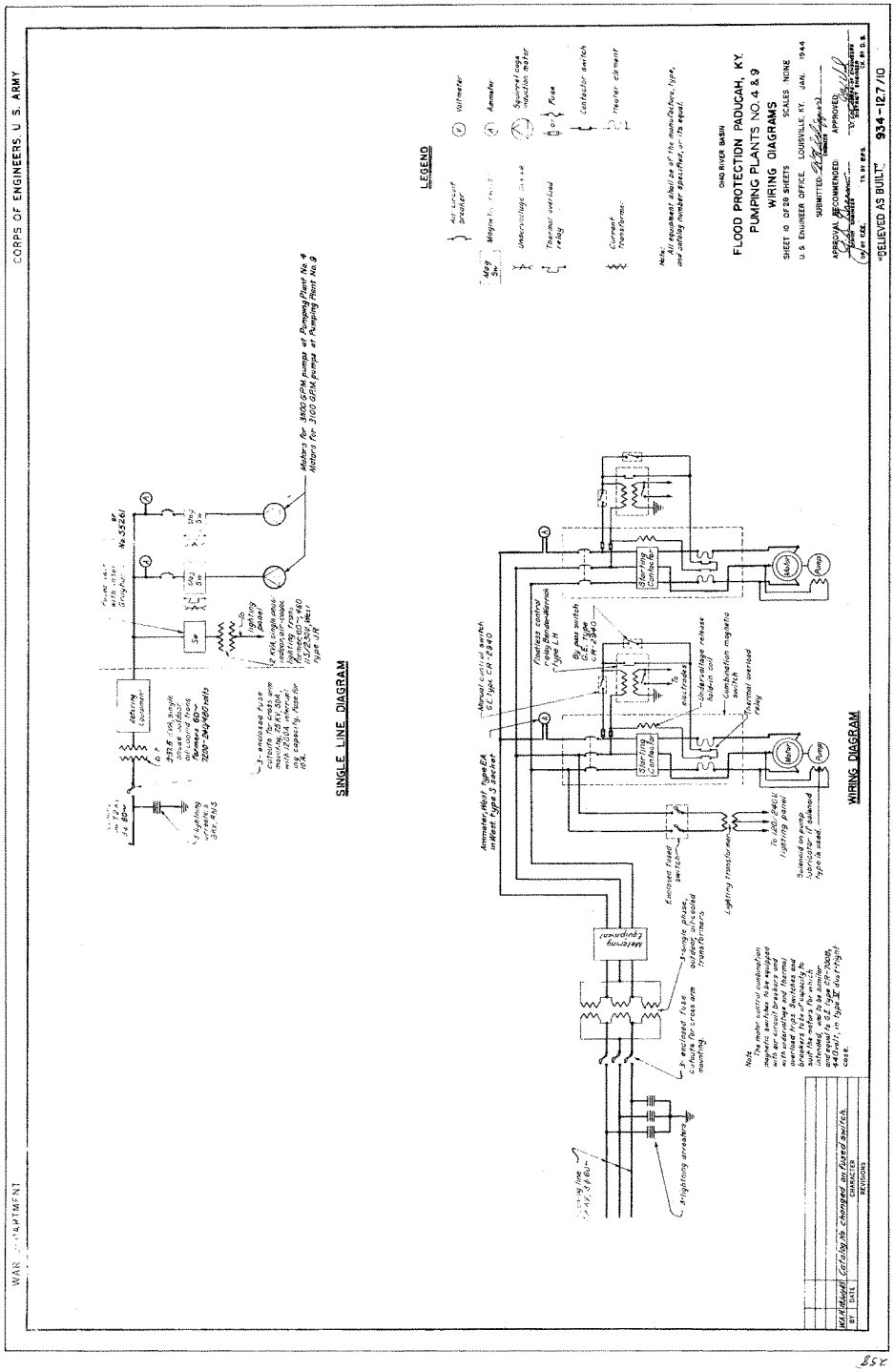
"BELIEVED AS BUILT" 934-12.7/7

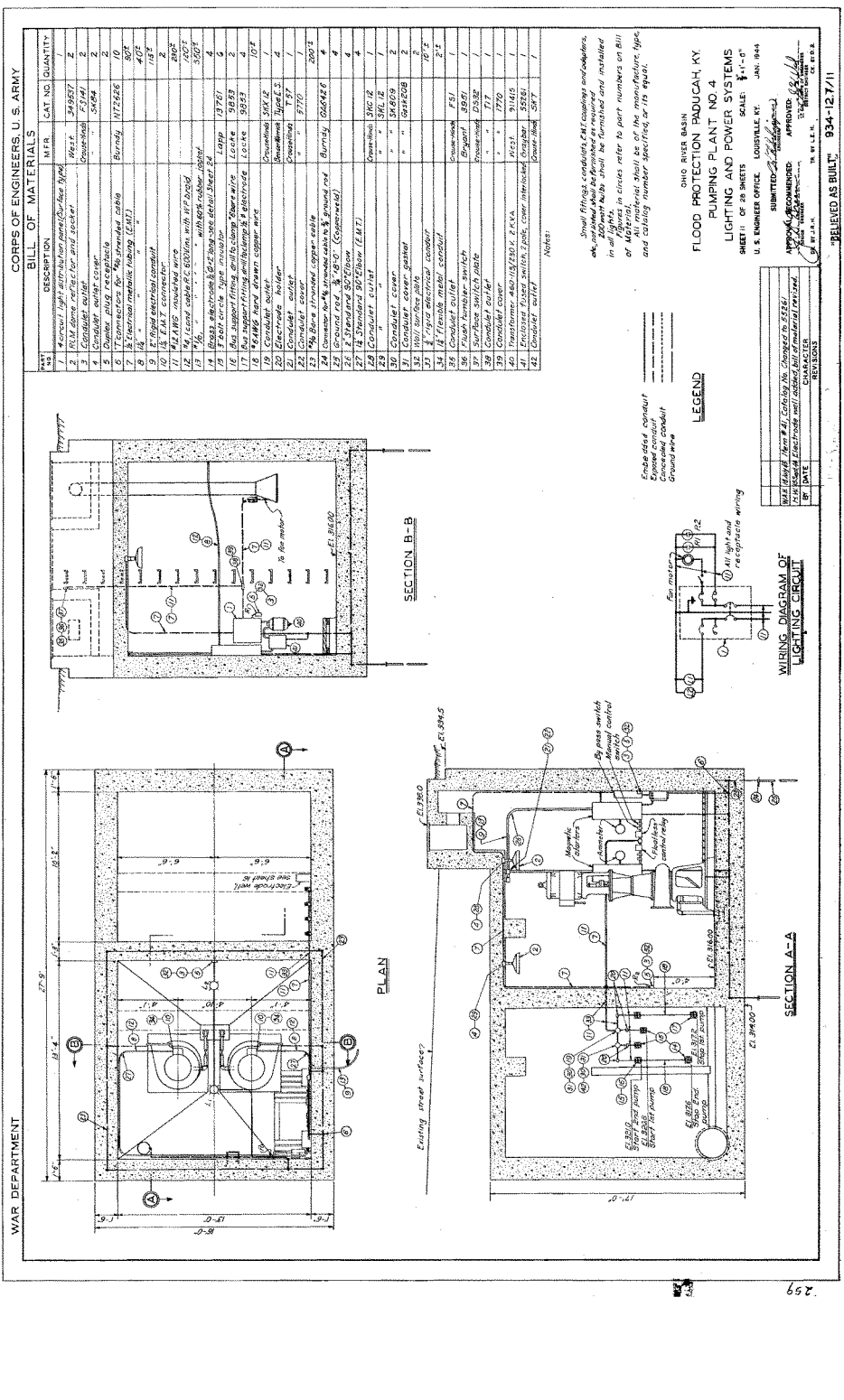
255

1018


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 4
REINFORCING DETAILS
WALLS
OHIO RIVER BASIN
SHEET 8 OF 28 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944
SUBMITTED
RECOMMENDED:
APPROVED:
APPROVED:
"BELIEVED AS BUILT," 934-12.7/8
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
INTERIOR WALL
WEST WALL
Pump chamber
Intake chamber
Alternate bars
Note: For masonry details see sheets 3 and 4
Bars from south wall See sheet 7
For reinforcing in W.W. wall see sheet 9
Alternate Bars 628
Alternate Bars 627


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 4
REINFORCING DETAILS
ROOF SLAB
SHEET 9 OF 28 SHEETS
SCALE 1"=1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944
SUBMITTED:
APPROVED:
934-12.7/9
ELEVATION
PIPE SUPPORT BEAM
SECTION K-K
SECTION J-J
SECTION H-H
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION G-G
PLAN-ROOF SLAB
TOP REINFORCING
BOTTOM REINFORCING


CORPS OF ENGINEERS, U. S. ARMY
SINGLE LINE DIAGRAM
WIRING DIAGRAM
LEGEND
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NO. 4 & 9
WIRING DIAGRAMS
SCALES NONE
"DELIEVED AS BUILT"
934-12.7/10

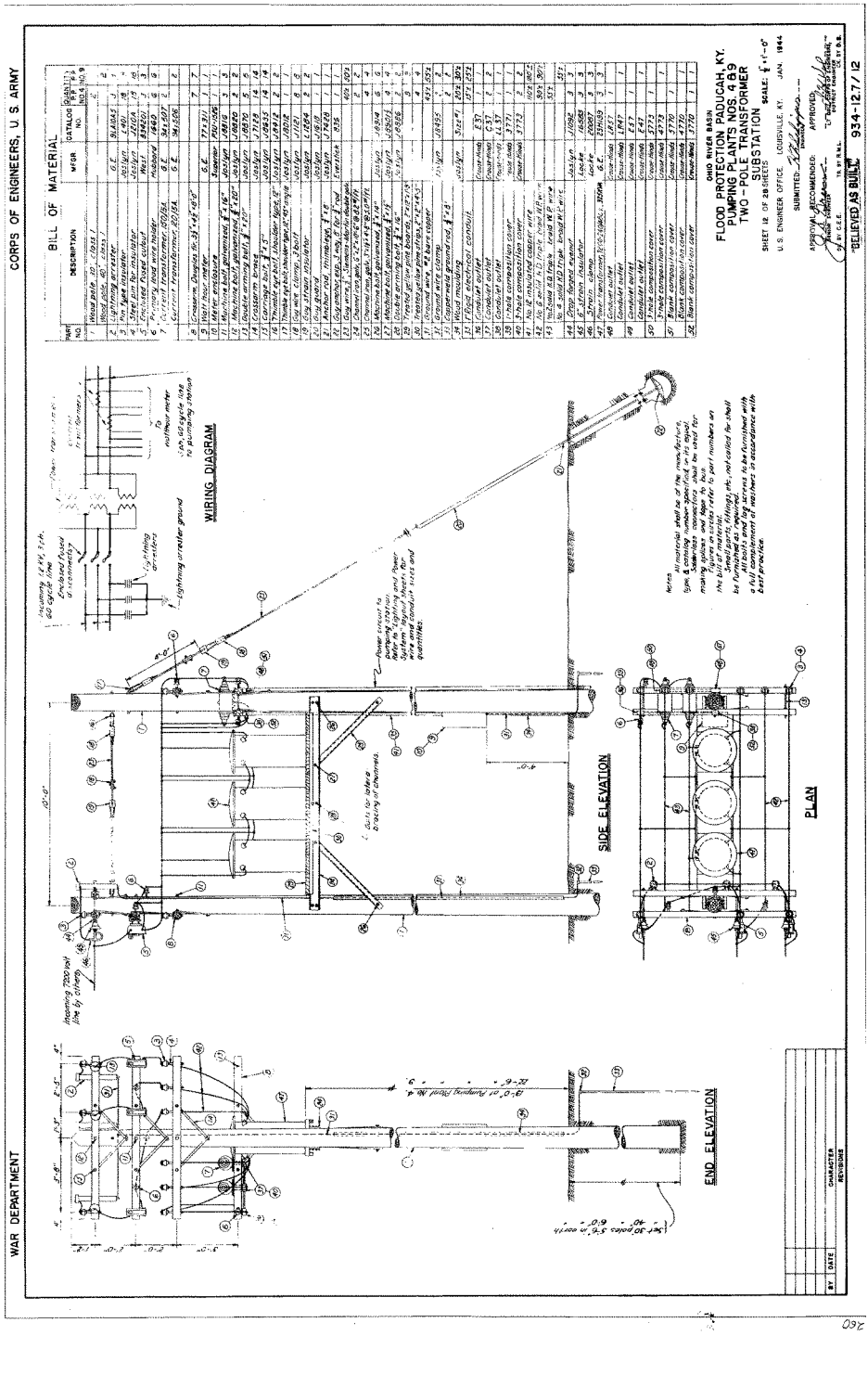


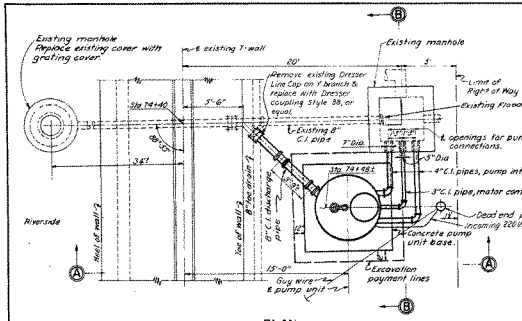
PART NO.	DESCRIPTION	M.F.R.	CAT. NO.	QUANTITY
1	4 circuit light distribution panel (Surface type)	West.	349537	1
2	20 M.P. dome reflector and socket	"	349537	2
3	Conduit outlet	Crouse-Hinds	FS141	2
4	Conduit outlet cover	"	SK84	2
5	Duplex plug receptacle	Burndy	W72626	2
6	1" Connectors for #8 stranded cable			90#
7	1" Electrical metallic tubing (E.M.T.)			402'
8	1" " " " "			402'
9	1" Rigid electrical conduit			113'
10	1" E.M.T. connector			2
11	#12 AWG insulated wire			280'
12	#4 Lead cable P.C. 600 Vm with jute braid			203'
13	#6 " " " with 60% rubber isolat.			362'
14	Brass electrode 8'x5/8" long - see detail Sheet 24			4
15	3 point circle type insulator	Lapp	13761	6
16	Bus support fitting, drilled clamp 10 wire	Locke	9853	2
17	Bus support fitting, drilled clamp 4 wire	Locke	9855	2
18	#6 Bare solid tinned copper wire	Cruciblend	SWG 12	10#
19	Conduit outlet	Crouse-Hinds	SWG 12	1
20	Electrode holder	Smeathlink	Type E-5	4
21	Conduit outlet	Crouse-Hinds	T 57	1
22	Conduit cover	"	5770	1
23	#6 Bare stranded copper cable			280'
24	Connector for #6 stranded cable to 3/8" ground rod	Burndy	GBG4126	4
25	Ground rod - 3/8" x 8'-0" (Copperweld)			4
26	2" Standard 90° Elbow			4
27	2" Standard 90° Elbow (E.M.T.)	Crouse-Hinds	SWG 12	1
28	Conduit outlet	"	SWG 12	1
29	" "	"	SK84	4
30	Conduit cover	"	SK8609	2
31	Conduit cover - gasket	"	Gask2208	2
32	Wall surface plate			2
33	1" Rigid electrical conduit			10'-5"
34	1" Flexible metal conduit			2'-5"
35	Conduit outlet	Crouse-Hinds	FS1	1
36	Flush tumbler switch	Bryant	3951	1
37	Surface switch plate	Crouse-Hinds	DS32	1
38	Conduit outlet	" "	T17	1
39	Conduit cover	" "	1770	1
40	Transformer 480/115/230 V. 2 KVA.	West.	911415	1
41	Enclosed flush switch, 2 pole, cover interlocked	Brayton	35281	1
42	Conduit outlet	Crouse-Hinds	SK7	1

Notes:

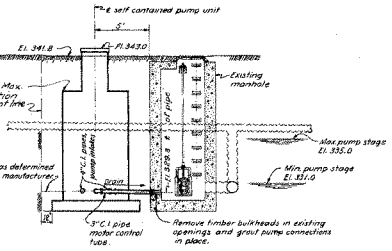
BY	DATE	REVISIONS CHARACTER
W.H.A.		Wall Mounted Panel #40, Catalog No. changed to 35281.
W.H.A.		Sheet #4 Electrode well added, bill of material revised.

APPROVED RECOMMENDED: [illegible] Chief Engineer
APPROVED: [illegible] Colonel, Corps of Engineers, District Engineer
W. H. A. W. H. L. H.
12 APR 44

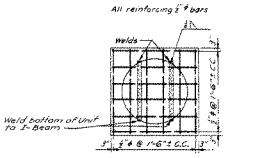

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
BILL OF MATERIAL
WIRING DIAGRAM
SIDE ELEVATION
PLAN
END ELEVATION
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 4 & 9
TWO - POLE TRANSFORMER
SUBSTATION
SHEET 12 OF 28 SHEETS
SCALE: 1"=1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944
SUBMITTED
APPROVAL RECOMMENDED:
APPROVED:
"AS BUILT"
934-12.7/12



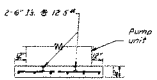
PLAN
SCALE: $\frac{1}{4}$" = 1'-0"



SECTION B-B
SCALE: $\frac{1}{4}$" = 1'-0"

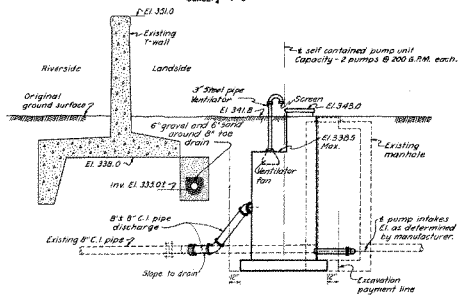


PLAN

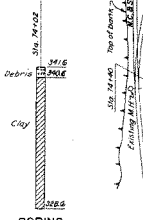


ELEVATION

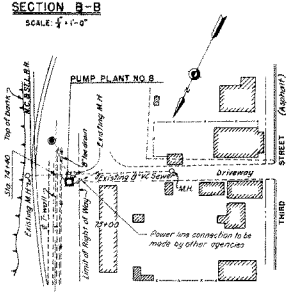
DETAIL OF BASE UNDER PUMP UNIT
SCALE: $\frac{1}{4}$" = 1'-0"



SECTION A-A
SCALE: $\frac{1}{4}$" = 1'-0"

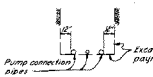


BORING
SCALES: HOR. NONE
VERT. 1" = 4'-0"
Note: Boring shown on plan, thus, ⊛

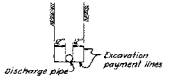


LOCATION PLAN
SCALE: 1" = 80'

Note: Grade backfill to drain away from floodwall and pumping plant.



SECTION THRU PUMP INTAKE PIPES
SCALE: $\frac{1}{4}$" = 1'-0"



SECTION THRU PUMP DISCHARGE PIPE
SCALE: $\frac{1}{4}$" = 1'-0"

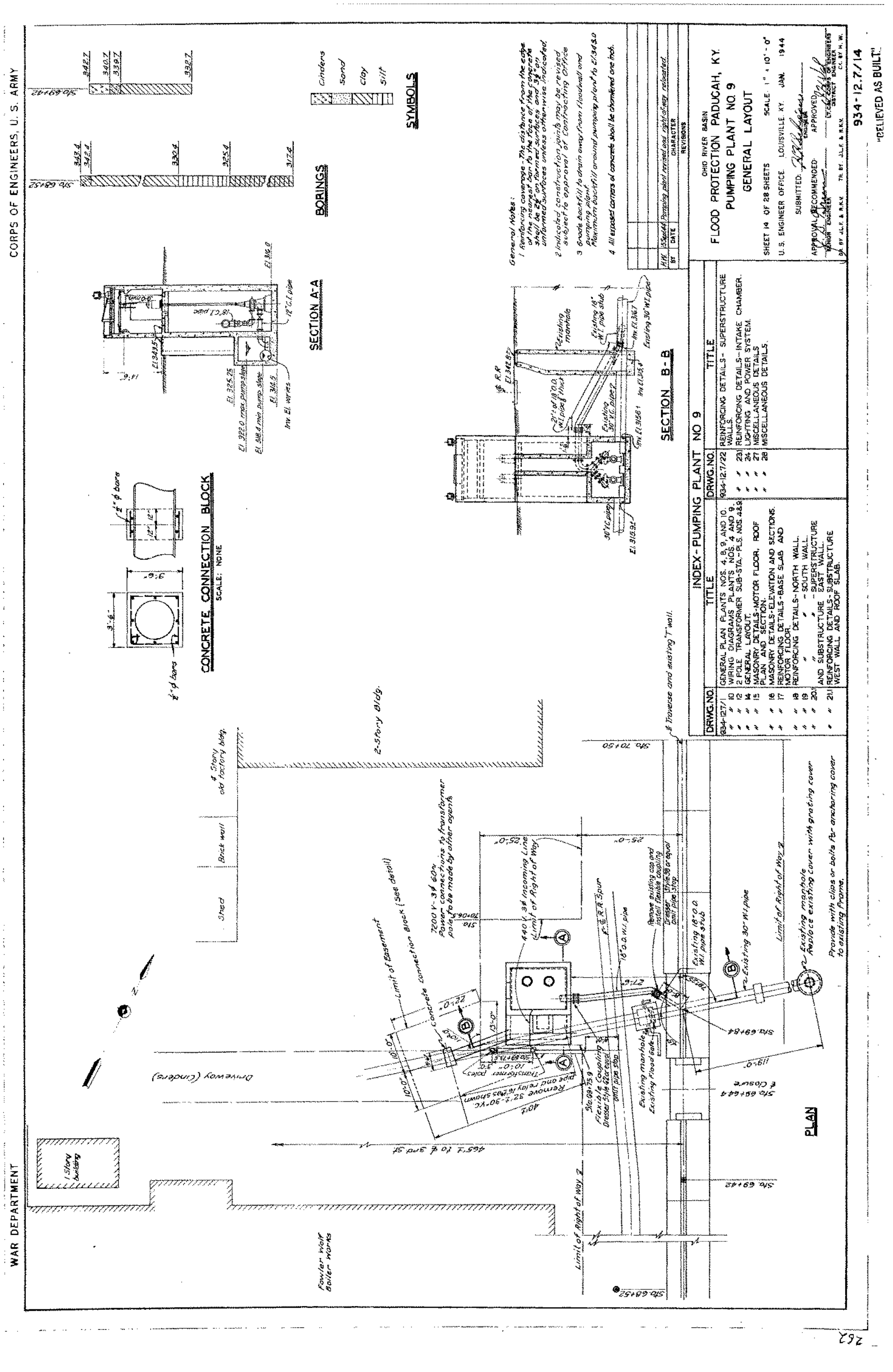
BY	DATE	CHARACTER REVISIONS

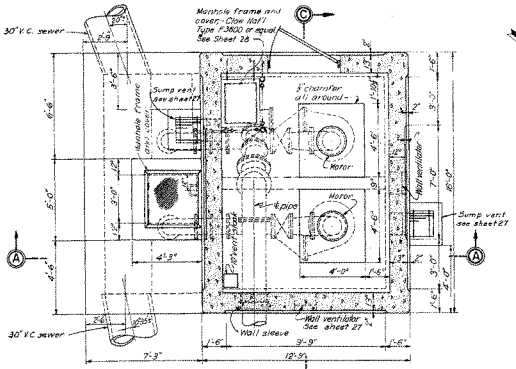
INDEX - PUMPING PLANT NO. 8	
DRWG. NO.	TITLE
934-12.7/13	MASONRY AND REINFORCING DETAILS.
934-12.7/29	POLE STRUCTURES.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 8
MASONRY & REINFORCING DETAILS
SHEET 13 OF 28 SHEETS SCALES AS SHOWN
U. S. ENGINEER OFFICE LOUISVILLE, KY. JAN. 1944
SUBMITTED: _____ DIVISION ENGINEER
APPROVED AND RECOMMENDED: _____ CHIEF ENGINEER
APPROVED: _____ CHIEF OF ENGINEERS DISTRICT ENGINEER
BY: J.L.F. TR. BY J.L.F. CY. BY R.W.

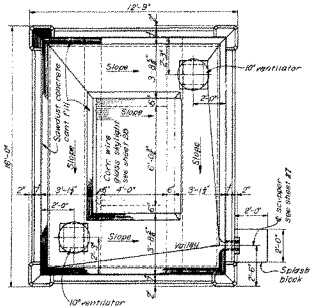
824.1-51 934-12.7/13
"RELIEVED AS BUILT"

1024

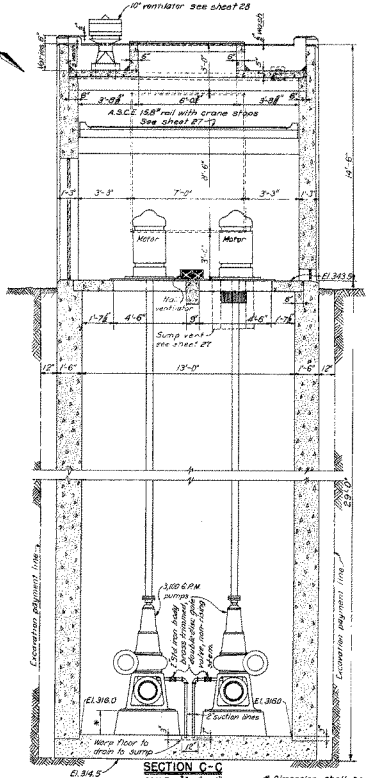

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
BORINGS
Sta. 68+52
Sta. 69+42
SYMBOLS
Cinders
Sand
Clay
Silt
SECTION A-A
SECTION B-B
CONCRETE CONNECTION BLOCK
SCALE: NONE
PLAN
General Notes:
1 Reinforcing coverage - The distance from the edge of the nearest bar to the face of the concrete shall be 2½" on formed surfaces and 3½" on unformed surfaces unless otherwise indicated.
2 Indicated construction joints may be revised subject to approval of Contracting Office
3 Grade backfill to drain away from floodwall and pumping plant. Maximum backfill around pumping plant to El 343.0
4 All exposed corners of concrete shall be chamfered one inch.
15Sept44 Pumping plant revised and right-of-way relocated.
DATE
CHARACTER
REVISIONS
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO 9
GENERAL LAYOUT
SHEET 14 OF 28 SHEETS
SCALE 1" = 10'-0"
U.S. ENGINEER OFFICE. LOUISVILLE KY. JAN. 1944
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
934-12.7/14
"BELIEVED AS BUILT"
INDEX - PUMPING PLANT NO 9
DRWG. NO. | TITLE
934-12.7/1 GENERAL PLAN PLANTS NOS. 4, 8, 9, AND 10.
10 WIRING DIAGRAMS PLANTS NOS. 4 AND 9.
12 2 POLE TRANSFORMER SUB-STA. - PLS. NOS. 4 & 9.
14 GENERAL LAYOUT.
15 MASONRY DETAILS - MOTOR FLOOR, ROOF PLAN AND SECTION.
16 MASONRY DETAILS - ELEVATION AND SECTIONS.
17 REINFORCING DETAILS - BASE SLAB AND MOTOR FLOOR.
18 REINFORCING DETAILS - NORTH WALL.
19 " " - SOUTH WALL.
20 " " - SUPERSTRUCTURE AND SUBSTRUCTURE EAST WALL.
21 REINFORCING DETAILS - SUBSTRUCTURE WEST WALL AND ROOF SLAB.
934-12.7/22 REINFORCING DETAILS - SUPERSTRUCTURE WALLS.
23 REINFORCING DETAILS - INTAKE CHAMBER.
24 LIGHTING AND POWER SYSTEM.
27 MISCELLANEOUS DETAILS
28 MISCELLANEOUS DETAILS.
Driveway (Cinders)
1 Story building
Fowler Wolf Boiler Works
Shed
Brick wall
4 Story old factory bldg.
2-Story Bldg.
Limit of Easement
Concrete connection block (See detail)
7200 V - 3ϕ 60~ Power connections to transformer pole to be made by other agents
440 V. 3ϕ Incoming Line
Limit of Right of Way
Existing manhole
Existing Flood Gate
Existing 30" W.I. pipe
Existing 18" O.D. W.I. pipe stub
Existing manhole Replace existing cover with grating cover
Provide with clips or bolts for anchoring cover to existing frame.
℄ Traverse and existing 'T' wall.
℄ Closure
Sta. 69+84
Sta. 69+64.4
Sta. 70+50
262



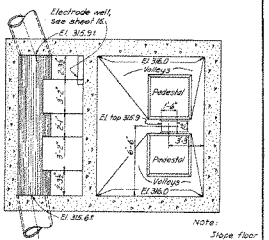
MOTOR FLOOR PLAN
SCALE- $\frac{3}{8}$" = 1'-0"



ROOF PLAN
SCALE $\frac{3}{8}$" = 1'-0"



* Dimension shall be determined by pump manufacturer



PLAN-SUMP FLOOR
SCALE- $\frac{3}{8}$" = 1'-0"

Note:
Slope floor to drain to sump.

Note:
For reinforcing details see sheets 17 to 28 incl.
For Section A-A see sheet 16.

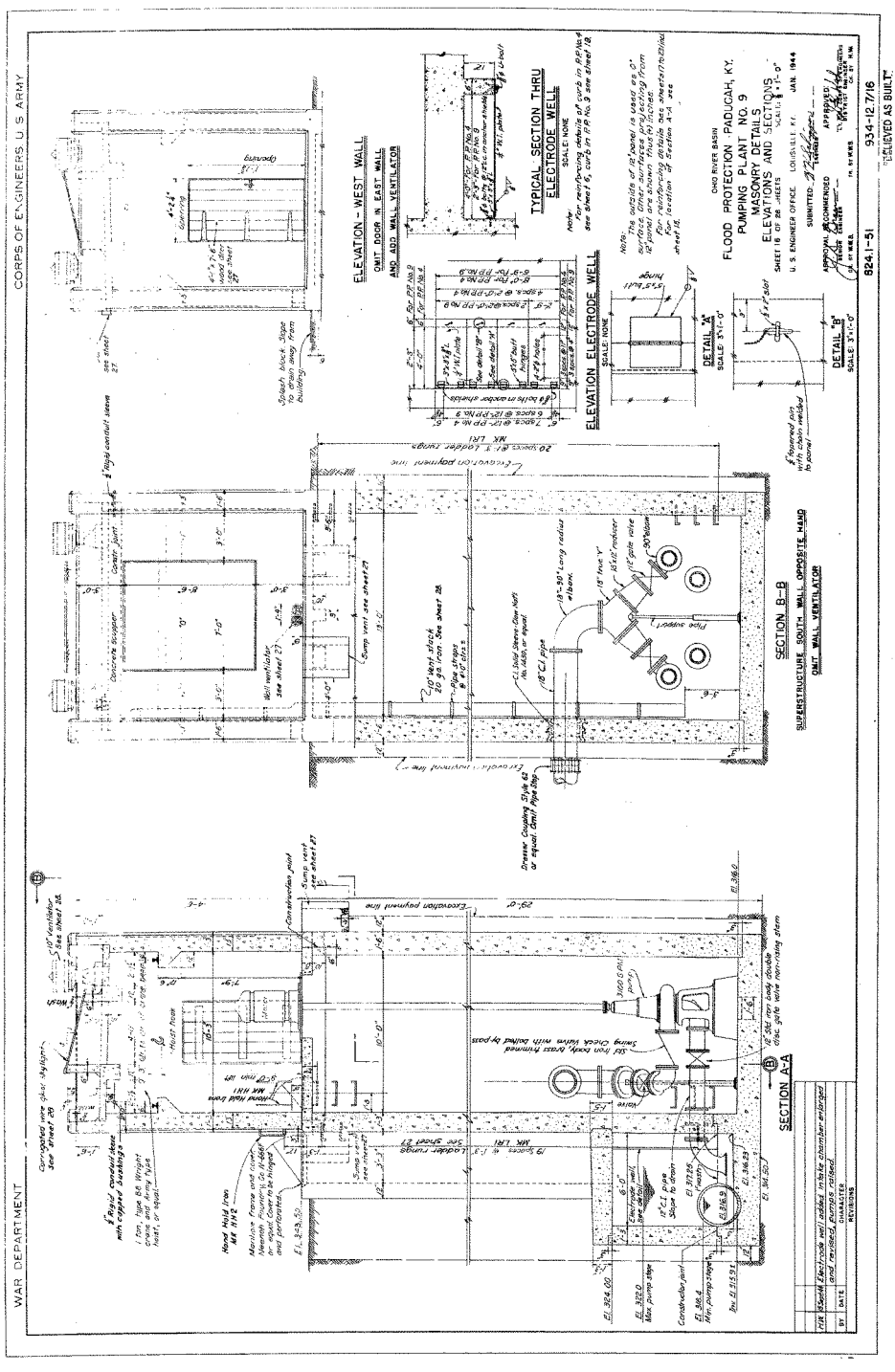
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 9
MASONRY DETAILS
MOTOR FLOOR, ROOF PLAN & SECTION
SHEET 15 OF 28 SHEETS SCALES AS SHOWN
U. S. ENGINEER OFFICE LOUISVILLE, KY. JAN. 1944
SUBMITTED: [signature] ENGINEER
APPROVAL RECOMMENDED: [signature] SENIOR ENGINEER
APPROVED: [signature] LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER
DR. BY R.K.V. TR. BY R.K.V. CK. BY H.W.

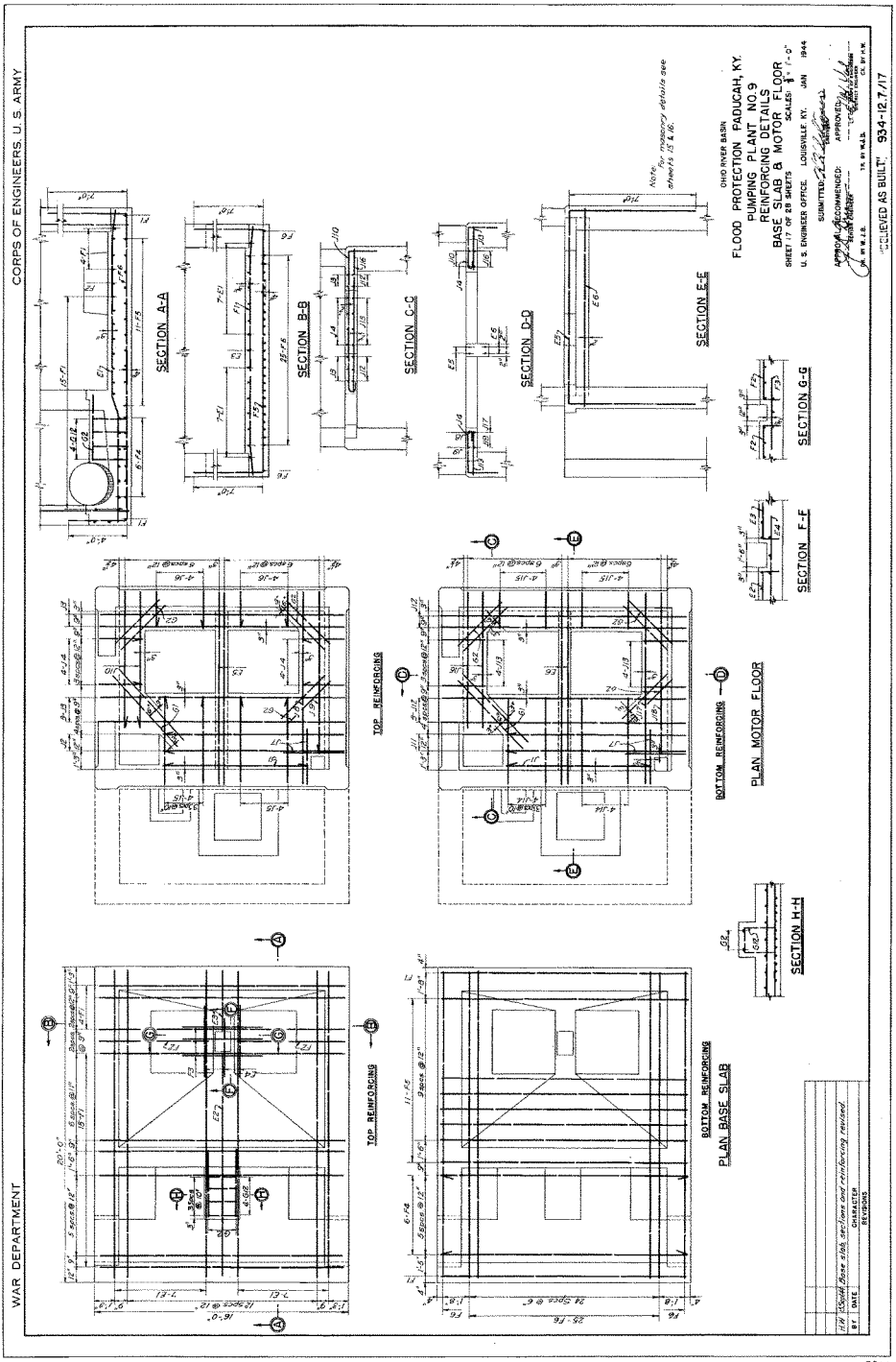
H.W.	7/25/44	Intake chamber enlarged and revised, pumps raised, electrode well added.
BY	DATE	CHARACTER OF REVISIONS

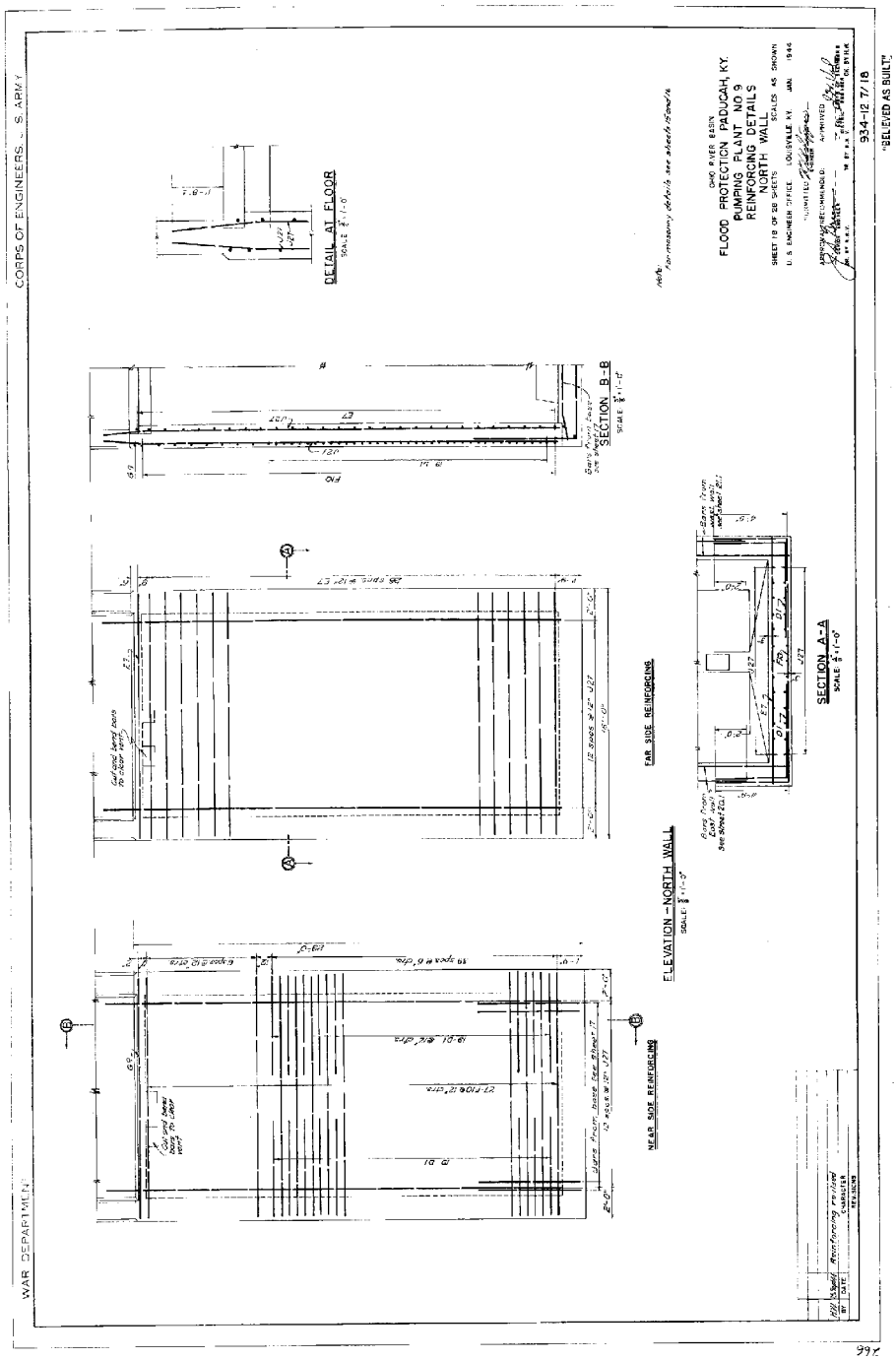
824.1-51 934-12.7/15

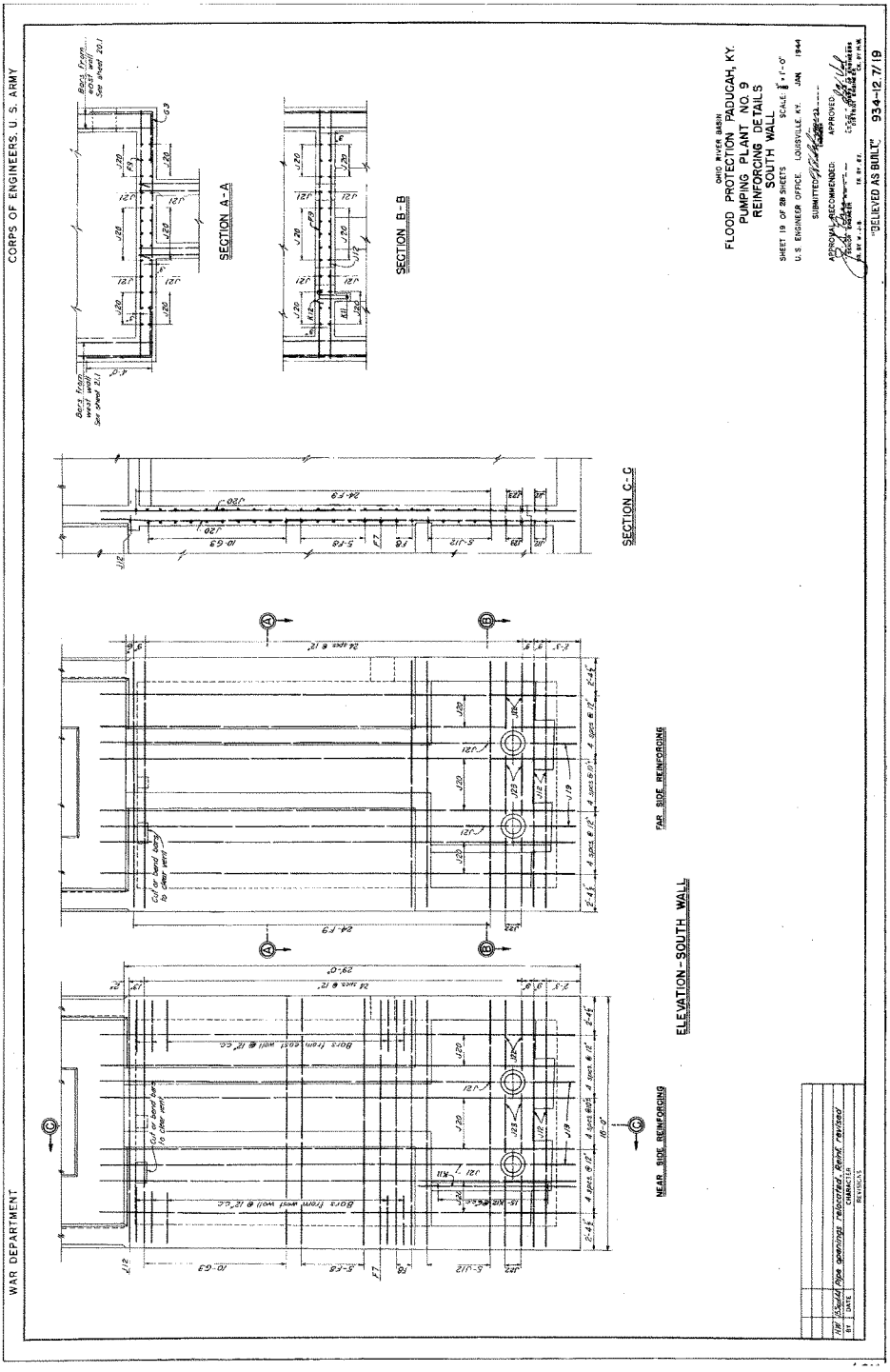
"DELIEVED AS BUILT" [signature] [illegible]

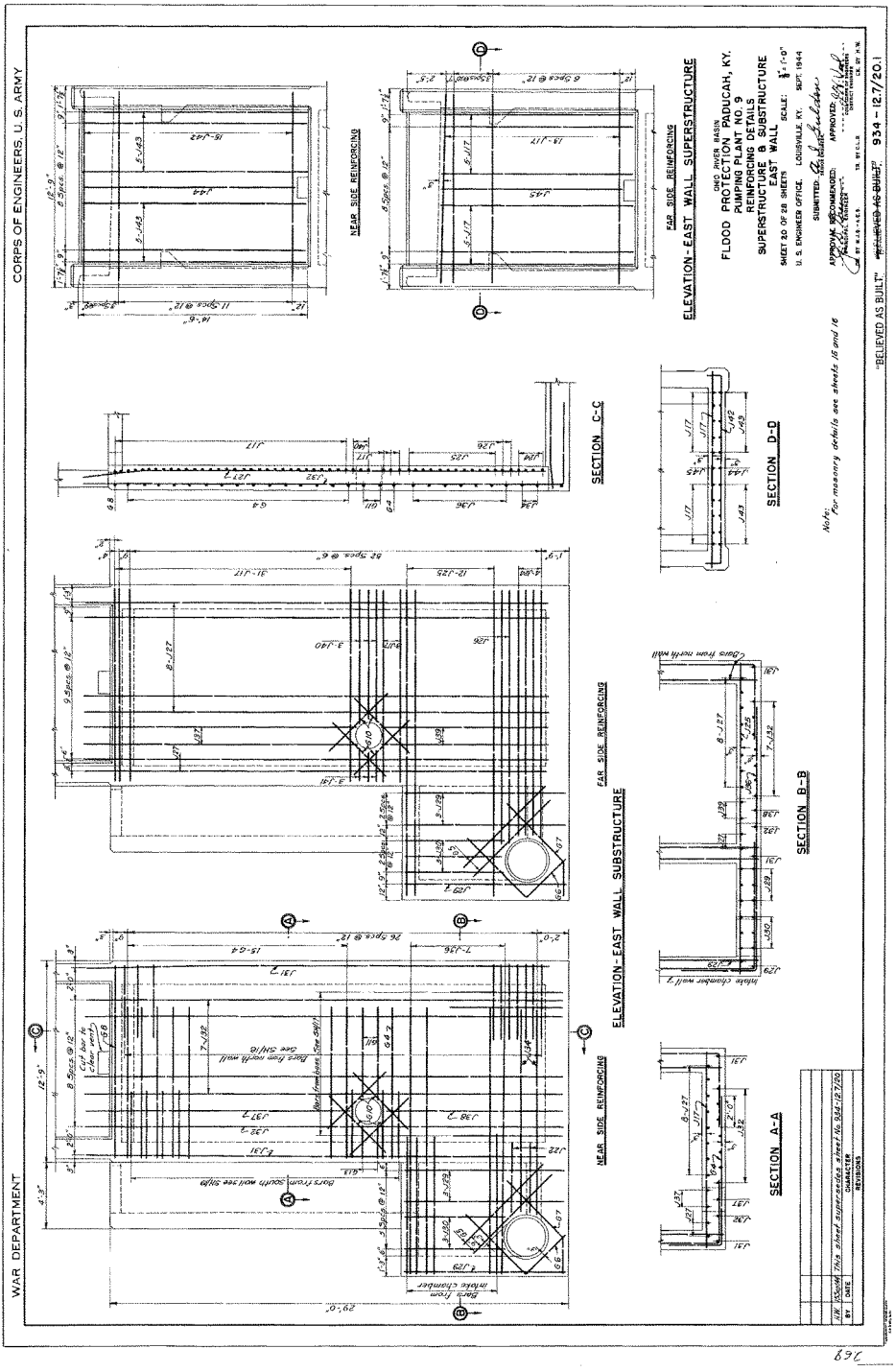
1026


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
FLOOD PROTECTION - PADUCAH, KY.
PUMPING PLANT NO. 9
MASONRY DETAILS
ELEVATIONS AND SECTIONS
OHIO RIVER BASIN
SHEET 10 OF 28 SHEETS
U.S. ENGINEER OFFICE LOUISVILLE, KY. JAN. 1944
824.1-51
934-12.7/16
RELIEVED AS BUILT
ELEVATION - WEST WALL
OMIT DOOR IN EAST WALL AND ADD WALL VENTILATOR
TYPICAL SECTION THRU ELECTRODE WELL
SCALE: NONE
ELEVATION ELECTRODE WELL
SCALE: NONE
DETAIL "A"
SCALE 3"=1'-0"
DETAIL "B"
SCALE 3"=1'-0"
SECTION B-B
SUPERSTRUCTURE SOUTH WALL OPPOSITE HEAD
OMIT WALL VENTILATOR
SECTION A-A
Head Wall Iron MK HW1
Trash Rack Iron MK TR1
Loader Irons MK LR1
Concrete pour
Construction joint
Sump vent see sheet 27
Well ventilator see sheet 27
Corrugated vent skylight see sheet 26
Rigid conduit sleeve with capped bushings
Splash block Slope to drain away from building
Gutter
Downspout
Concrete Equipment Pad
Pipe support
Pipe straps
Drawer Coupling Style 62 or equal. Omit Pipe Step
Sump Pump
Discharge Line
Suction Line
Elevation pavement line
Excavation pavement line
Backfill
Gravel
Sand
Concrete
Reinforcing steel
Pipe
Steel
Wood
Earth
Rock
Water
Elevation
Section
Plan
Detail
Scale
Date
Drawn
Traced
Checked
Approved
Submitted
Recommended
Approved
Contract No.
Drawing No.
Sheet No.
Revisions
By
Date
Remarks
Should Electrode well added in Valve chamber enlarged and revised pumps raised.

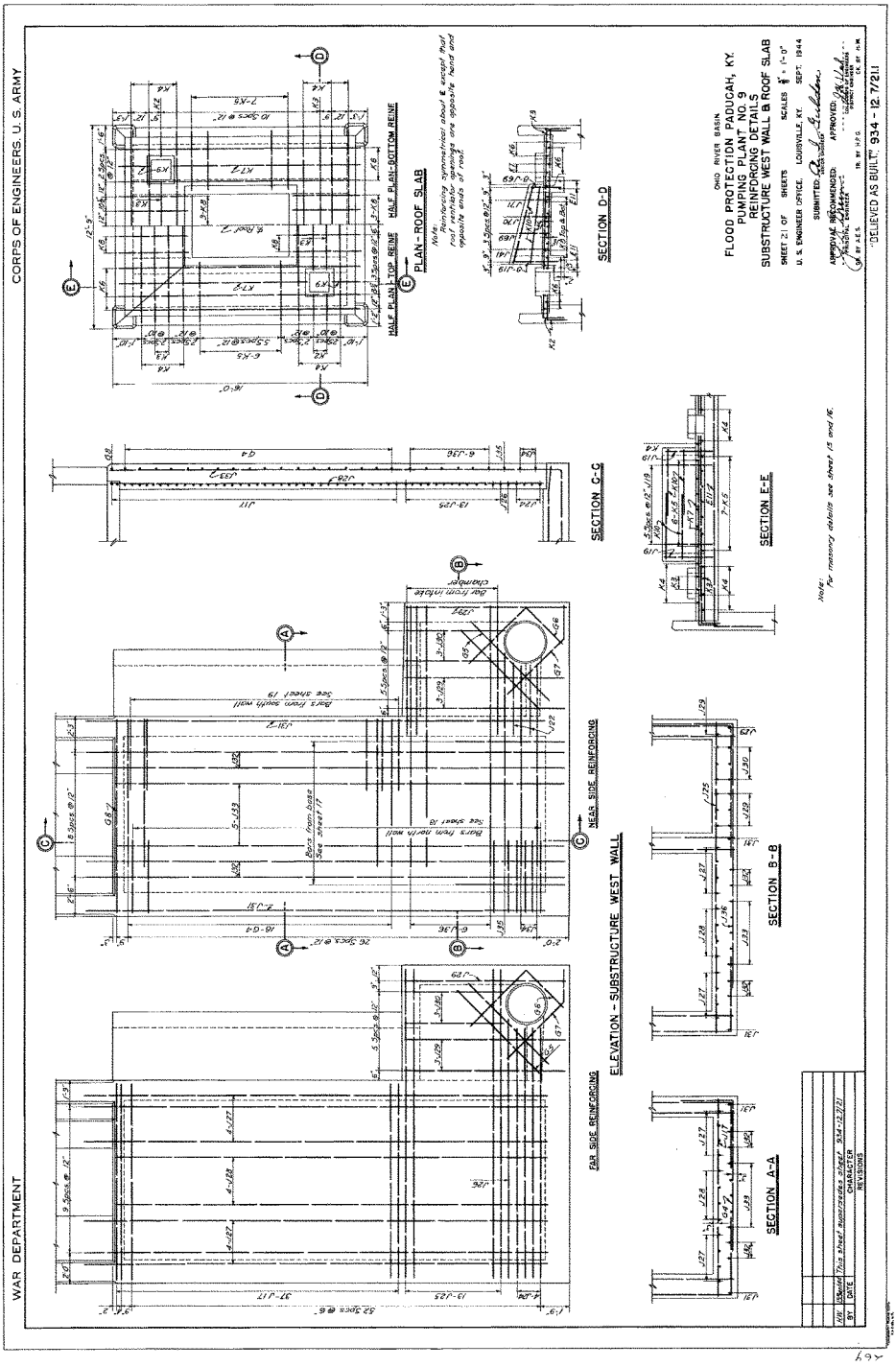

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 9
REINFORCING DETAILS
BASE SLAB & MOTOR FLOOR
SHEET 17 OF 28 SHEETS
SCALES: 1/4" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN 1944
SUBMITTED:
APPROVED:
APPROVED AND RECOMMENDED:
"AS BUILT" 934-12.7/17
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F
SECTION G-G
SECTION H-H
PLAN MOTOR FLOOR
PLAN BASE SLAB
TOP REINFORCING
BOTTOM REINFORCING
Note: For misc. details see sheets 15 & 16.
Revised base slab sections and reinforcing revised.
CHARACTER OF REVISIONS
DATE
BY

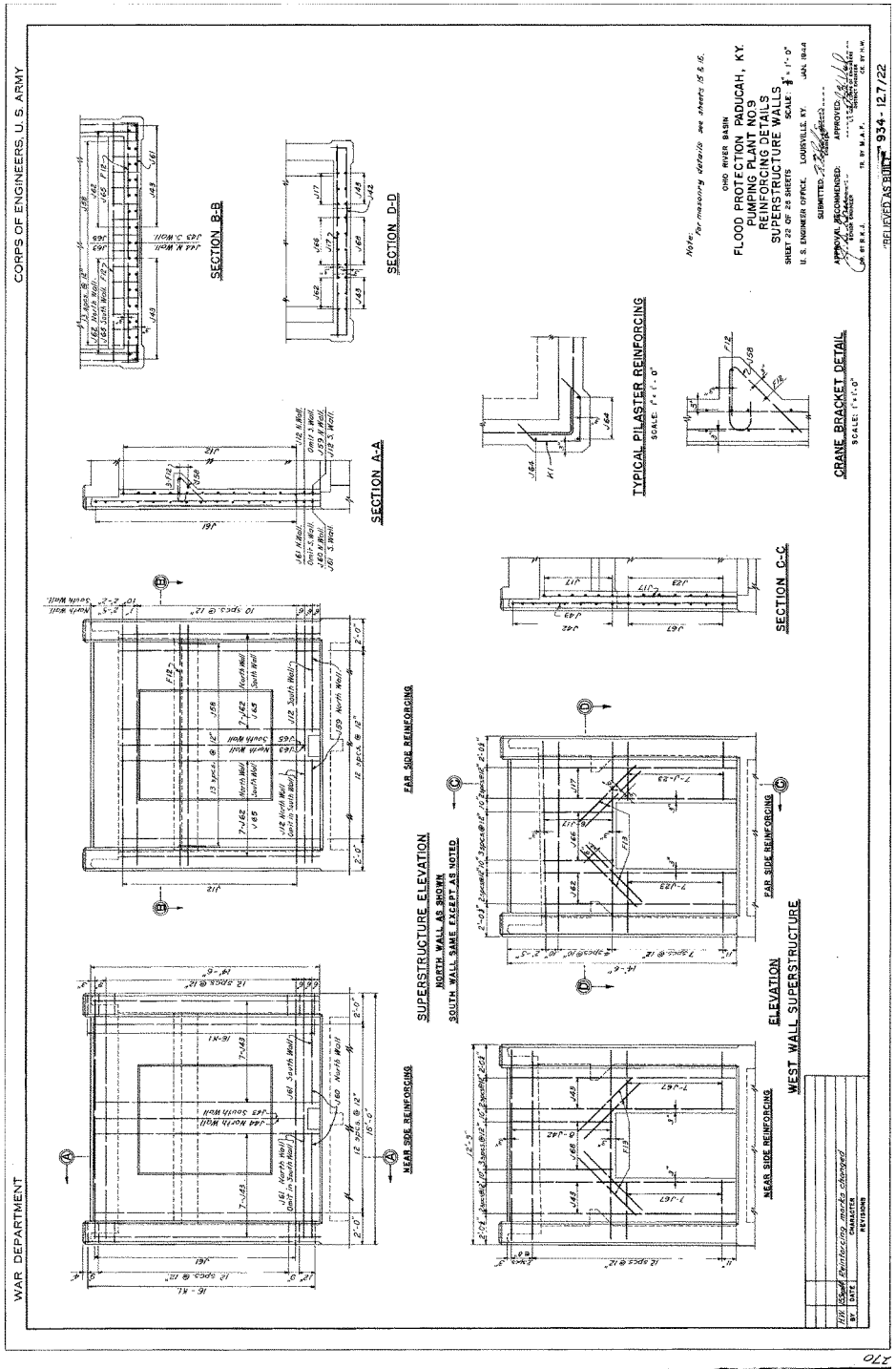

WAR DEPARTMENT
CORPS OF ENGINEERS - U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO 9
REINFORCING DETAILS
NORTH WALL
SHEET 18 OF 28 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE LOUISVILLE KY. JAN. 1946
934-12 7/18
"BELEVED AS BUILT"
DETAIL AT FLOOR
SECTION B-B
SECTION A-A
ELEVATION - NORTH WALL
FAR SIDE REINFORCING
NEAR SIDE REINFORCING

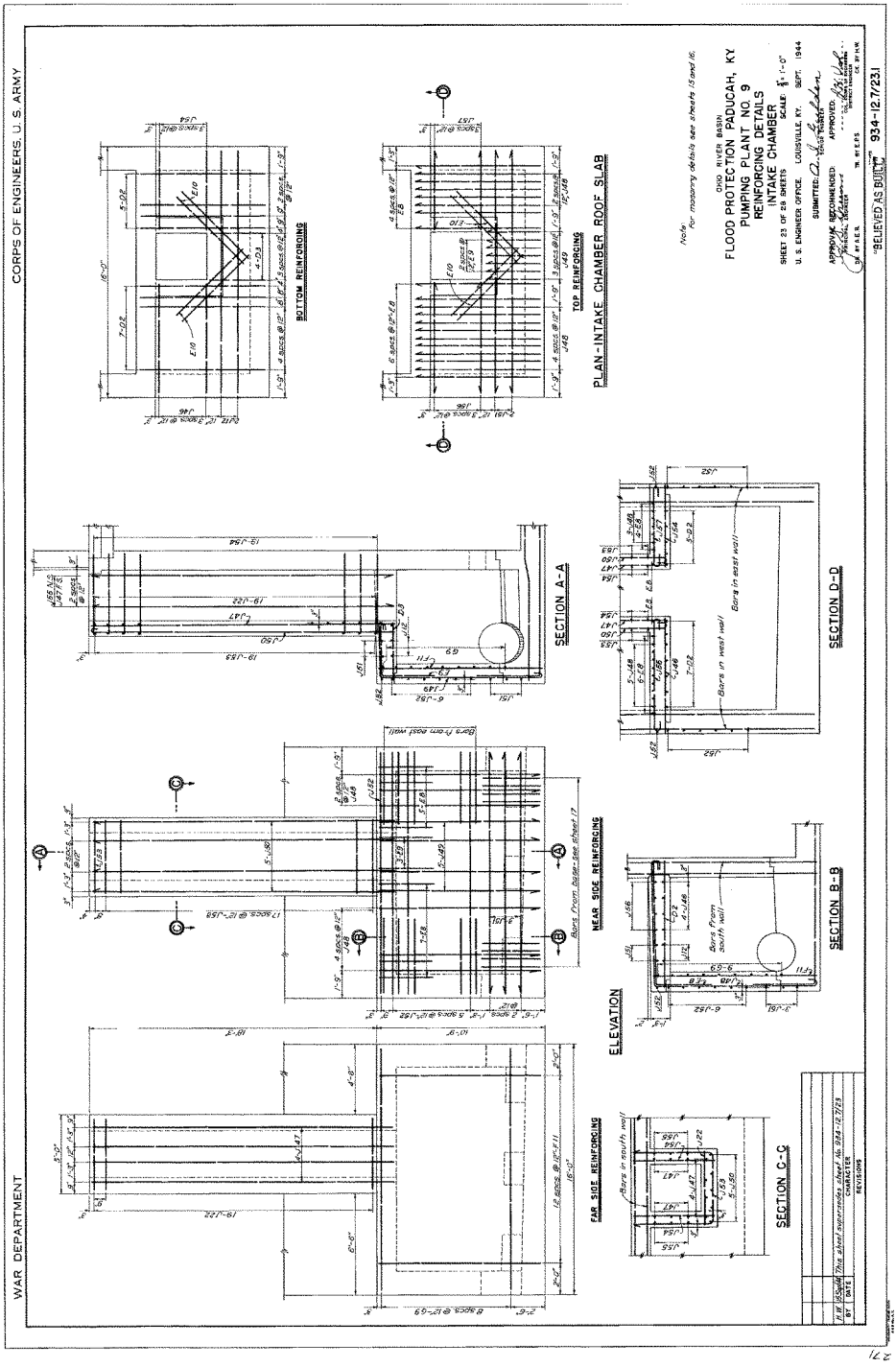

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 9
REINFORCING DETAILS
SOUTH WALL
SHEET 19 OF 28 SHEETS
SCALE 1/8" = 1'-0"
U.S. ENGINEER OFFICE LOUISVILLE, KY. JAN. 1944
SUBMITTED:
APPROVED:
APPROVED AND RECOMMENDED:
"DELIVERED AS BUILT" 934-12.7/19
SECTION A-A
SECTION B-B
SECTION C-C
ELEVATION-SOUTH WALL
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
Bars from west wall See sheet 20.1
Bars from west wall See sheet 20.1
Bars from west wall @ 12" CC
Cut or bend bars to clear vent
24 spcs @ 12"
4 spcs @ 12"
4 spcs @ 6"
4 spcs @ 6"
4 spcs @ 12"
4 spcs @ 12"
4 spcs @ 6"
4 spcs @ 6"
4 spcs @ 12"
4 spcs @ 12"
24-F9
29'-0"
15'-0"
10-G3
5-F8
5-U12
24-F9
10-G3
5-F8
5-U12
F7
F8
U20
U28
U19
U18
U12
R11
No. 1 Install pipe openings relocated. Reinf. revised
BY DATE CHARACTER OF REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 9
REINFORCING DETAILS
SUPERSTRUCTURE & SUBSTRUCTURE
EAST WALL
SCALE: 1/4"-0"
SHEET NO 20 OF 28 SHEETS
SEPT. 1944
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
"BELIEVED AS BUILT"
934 - 12.7/20.1
ELEVATION - EAST WALL SUPERSTRUCTURE
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
ELEVATION - EAST WALL SUBSTRUCTURE
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
Note: For masonry details see sheets 18 and 19
Bars from north wall
Bars from south wall Sta 9+10
Inlets from inhale chamber
Inhale chamber wall
Bars from north wall See Sht/16
Bars from south wall Sta 9+10
Bars from inhale chamber
Bars from north wall
Inhale chamber wall
Bars from south wall Sta 9+10
Bars from inhale chamber

896

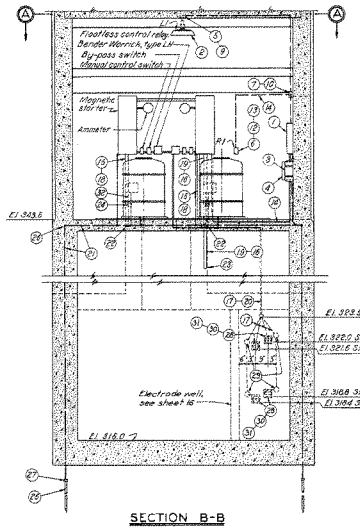

CORPS OF ENGINEERS, U.S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 9
REINFORCING DETAILS
SUBSTRUCTURE WEST WALL & ROOF SLAB
SHEET 21 OF SHEETS
SCALES 1" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. SEPT. 1944
SUBMITTED:
APPROVED:
APPROVED AND RECOMMENDED:
DELIVERED AS BUILT" 934 - 12.7/21.1
PLAN-ROOF SLAB
HALF PLAN-BOTTOM REINF.
HALF PLAN-TOP REINF.
SECTION C-C
SECTION D-D
SECTION E-E
SECTION A-A
SECTION B-B
ELEVATION - SUBSTRUCTURE WEST WALL
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
Note: Reinforcing symmetrical about E except that roof reinforcing openings are opposite hand and opposite ends of roof.
Note: For masonry details see sheet 15 and 16.
REVISIONS
NO. DATE
1 3/45 Revised this sheet incorporates sheets 934-12.7/21


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
SECTION B-B
SECTION D-D
SECTION A-A
SECTION C-C
TYPICAL PILASTER REINFORCING
SCALE: 1" = 1'-0"
CRANE BRACKET DETAIL
SCALE: 1" = 1'-0"
SUPERSTRUCTURE ELEVATION
NORTH WALL AS SHOWN
SOUTH WALL SAME EXCEPT AS NOTED
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
ELEVATION
WEST WALL SUPERSTRUCTURE
Note: For masonry details see sheets 15 & 16.
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO.9
REINFORCING DETAILS
SUPERSTRUCTURE WALLS
SHEET 22 OF 28 SHEETS
SCALE: 1" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944
SUBMITTED:
APPROVED:
RECOMMENDED:
DELIVERED AS BUILT 934-12.7/22
No. Revised Reinforcing marks changed
BY DATE REMARKS
270


CORPS OF ENGINEERS, U.S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY
PUMPING PLANT NO. 9
REINFORCING DETAILS
INTAKE CHAMBER
SHEET 23 OF 28 SHEETS
SCALE: 1/8"-1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. SEPT. 1944
SUBMITTED:
APPROVED:
APPROVED AS BUILT
934-12.7/231
Note:
For masonry details see sheets 15 and 16.
PLAN-INTAKE CHAMBER ROOF SLAB
BOTTOM REINFORCING
TOP REINFORCING
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
ELEVATION
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
Bars from east wall
Bars from south wall
Bars in south wall
Bars in west wall
Bars from base-see sheet 17

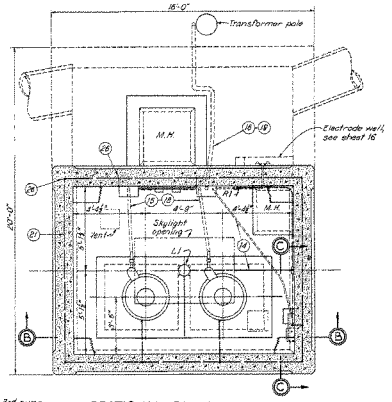
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



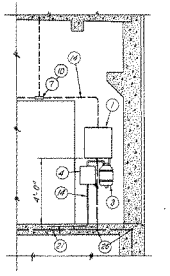
SECTION B-B

SCALE: $\frac{1}{2}$" = 1'-0"



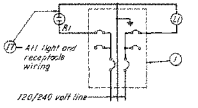
SECTIONAL PLAN A-A

SCALE: $\frac{1}{8}$" = 1'-0"

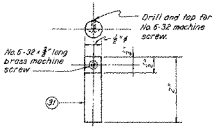


SECTION C-C

SCALE: $\frac{1}{2}$" = 1'-0"



WIRING DIAGRAM - LIGHTING CIRCUIT



ELECTRODE DETAIL

SCALE: $\frac{1}{2}$" = 1"

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUANTITY
1	4 circuit light distribution panel (surface type)			1
2	R.L.M. dome reflector and socket	West	349573	1
3	Transformer 460-115/230 V, 2KVA, dry type	West	5141.5	1
4	Enclosed fused switch, 2 pole, cover interlocked	Brayton	5686	1
5	Condulet outlet	Crouse-Hinds	FS147	1
6	Condulet outlet	Crouse-Hinds	FS141	1
7	Condulet outlet	" "	T11147	1
8	Condulet cover	" "	H516	1
10	Condulet cover	" "	T770	1
12	Duplex plug receptacle			1
13	Wall surface plate			1
14	¾" Electrical metallic tubing (E.M.T.)			60'±
15	1½" Rigid electrical conduit			30'±
16	1½" rigid electrical conduit			45'±
17	#12 insulated copper wire			340'±
18	#6, 1-cond cable, R.C. 600 V ins. with W.P. braid			90'±
19	#2 B. 1-cond cable, R.C. 600 V ins. with 60% rubber jacket			135'±
20	¾" Rigid electrical conduit			30'±
21	#2/0 bare 7-strand copper cable			170'±
22	1½" standard 90° elbow (E.M.T.)			4
23	1½" standard 90° elbow			2
24	1½" Connector			2
26	Copper weld ground rod, ¾" ø - 8'-0" long			4
27	"T" connector for #2/0 stranded cable	Burndy	NTP626	10
27	Connector for #2/0 stranded cable to ¾" rod	"	GA6426	4
28	3" bell circle type insulator	Lapp	13761	4
29	Wireholder	Joslyn	J1955	4
30	Bus support fitting Drill to clamp ⅝" ø electrode	Locke	9833	4
31	Brass electrode (see detail)			4
32	1½" Flexible metal conduit			2'±

Notes.

Figures in circles refer to part numbers on bill of material.

All material shall be of the manufacture, type, and catalog number specified, or its equal.

All conduit to clear openings for pump removal.

Small fittings, conduits, E.M.T. couplings and adapters, etc. not listed shall be furnished as required.

All conduit in floor shall be placed as near the center of same as possible.

200 watt bulbs shall be furnished and installed in all lights.

LEGEND

Embedded Conduit ——————

Exposed Conduit — — — — —

Concealed Conduit — — — — —

Ground Wire ——————

BY	DATE	CHARACTER
H.W.	8/30/44	Electrode well added, sectional plan revised.

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 9

LIGHTING AND POWER SYSTEMS

SHEET 24 OF 28 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944

SUBMITTED: [signature] DISTRICT ENGINEER

APPROVAL RECOMMENDED: [signature] CHIEF, DIVISION

APPROVED: [signature] LT. COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY C.E.E. TR. BY E.S. CK. BY D.S.

"BELIEVED AS BUILT"

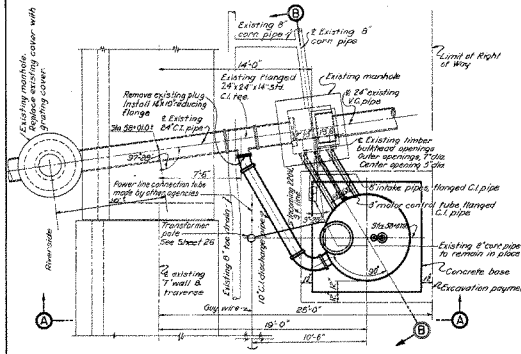
934-12.7/24

1035

277

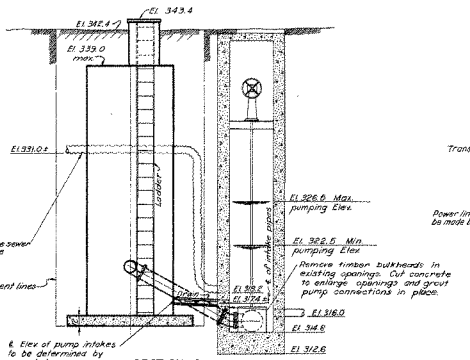
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



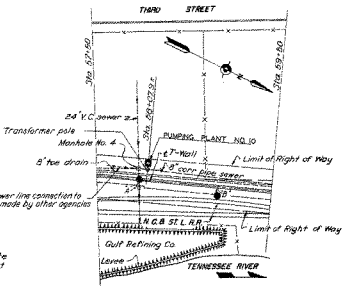
PLAN

SCALE: $\frac{1}{4}$" = 1'-0"



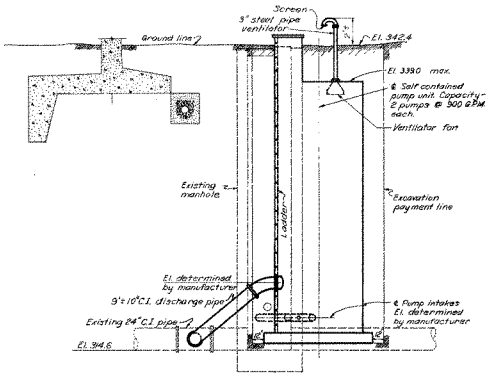
SECTION B-B

SCALE: $\frac{1}{4}$" = 1'-0"



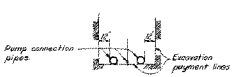
LOCATION PLAN

SCALE: 1" = 50'



SECTION A-A

SCALE: $\frac{1}{4}$" = 1'-0"

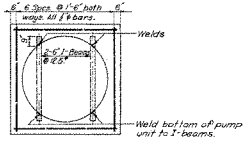


SECTION THRU PUMP INTAKE PIPES

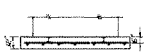
SCALE $\frac{1}{4}$" = 1'-0"

SECTION THRU PUMP DISCHARGE PIPE

SCALE: $\frac{1}{4}$" = 1'-0"



PLAN

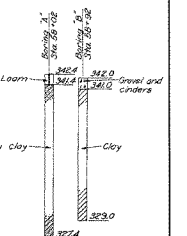


ELEVATION

SCALE: $\frac{1}{4}$" = 1'-0"

Note: All reinforcing ⅝" bars.

DETAIL OF BASE UNDER PUMP UNIT



BORINGS

SCALES: HOR. NONE VERT. 1" = 4'-0"

Note: Borings shown on plan thus ● Grade backfill to drain away from floodwall and pump plant.

BY	DATE	CHARACTER REVISIONS

INDEX PUMPING PLANT NO. 10	
DRWG. NO.	TITLE
934-12.7/1	GENERAL PLAN
934-12.7/25	MASONRY DETAILS - PLAN AND SECTIONS
934-12.7/26	POLE STRUCTURES

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 10

MASONRY & REINFORCING DETAILS

SHEET 25 OF 68 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944

SUBMITTED: [signature] DRAFTSMAN.

APPROVED RECOMMENDED: [signature] ENGINEER

APPROVED: [signature] COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

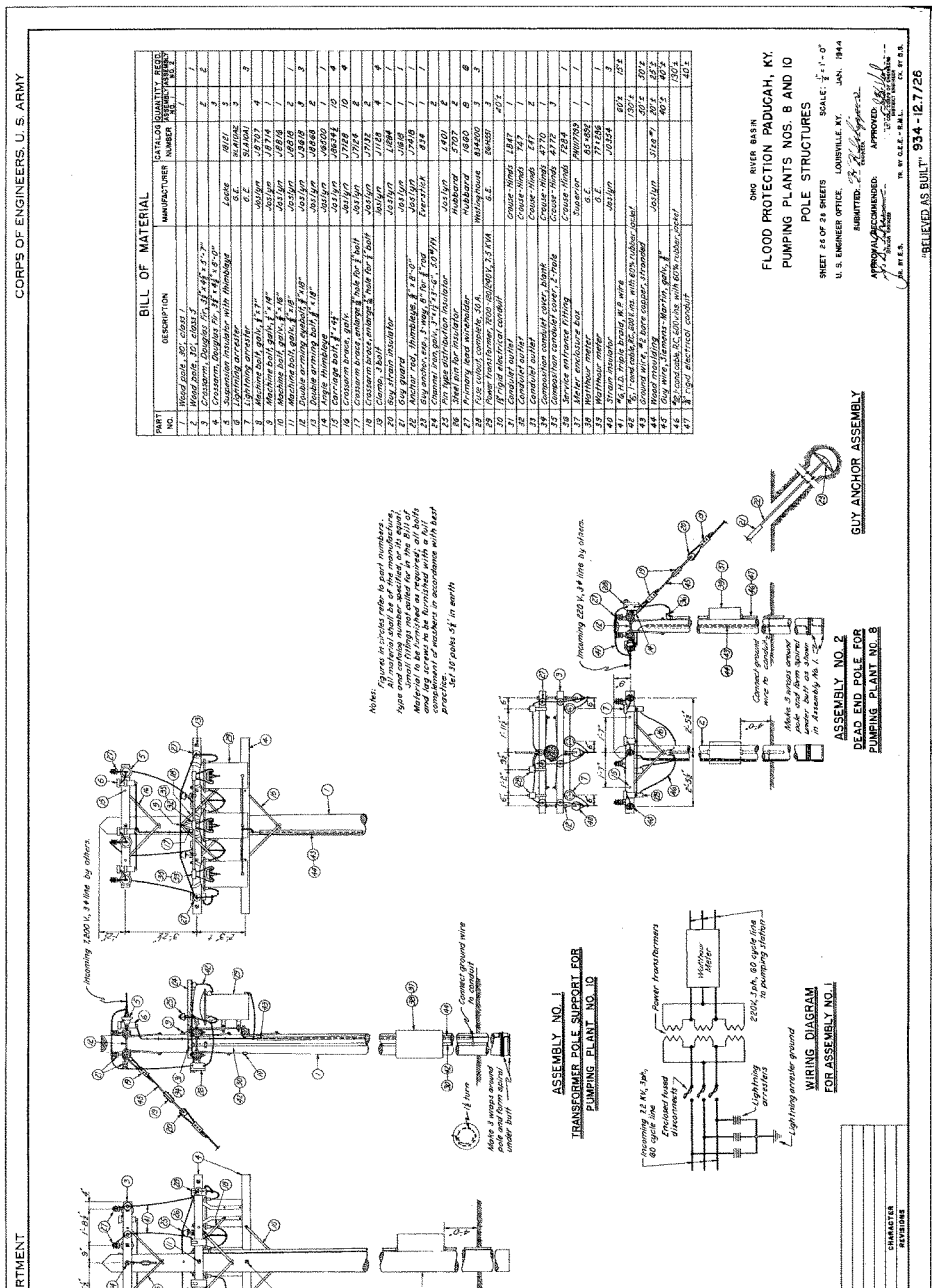
DR. BY R.K.J. TR. BY C.H.S. CK. BY H.M.

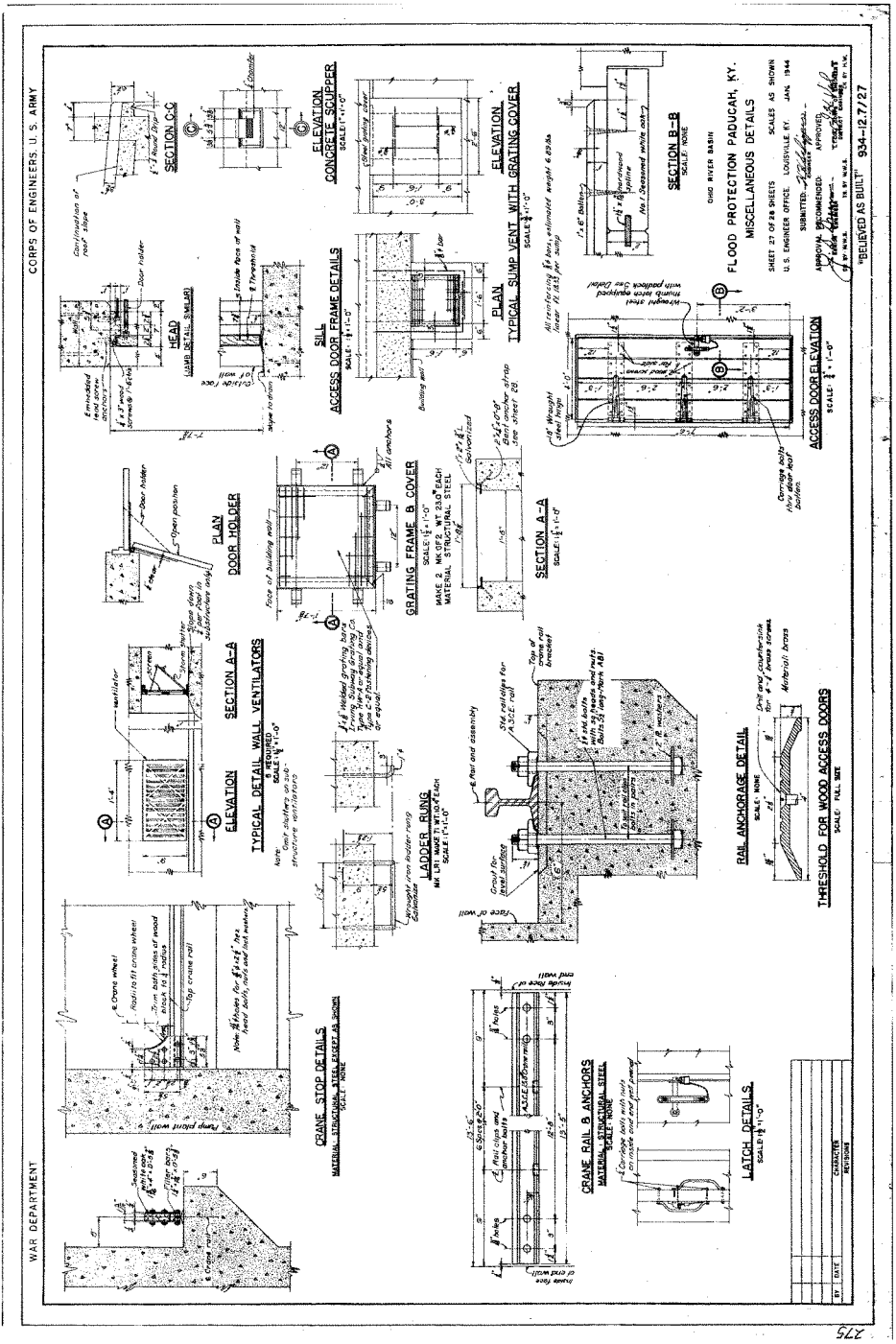
824.1-51

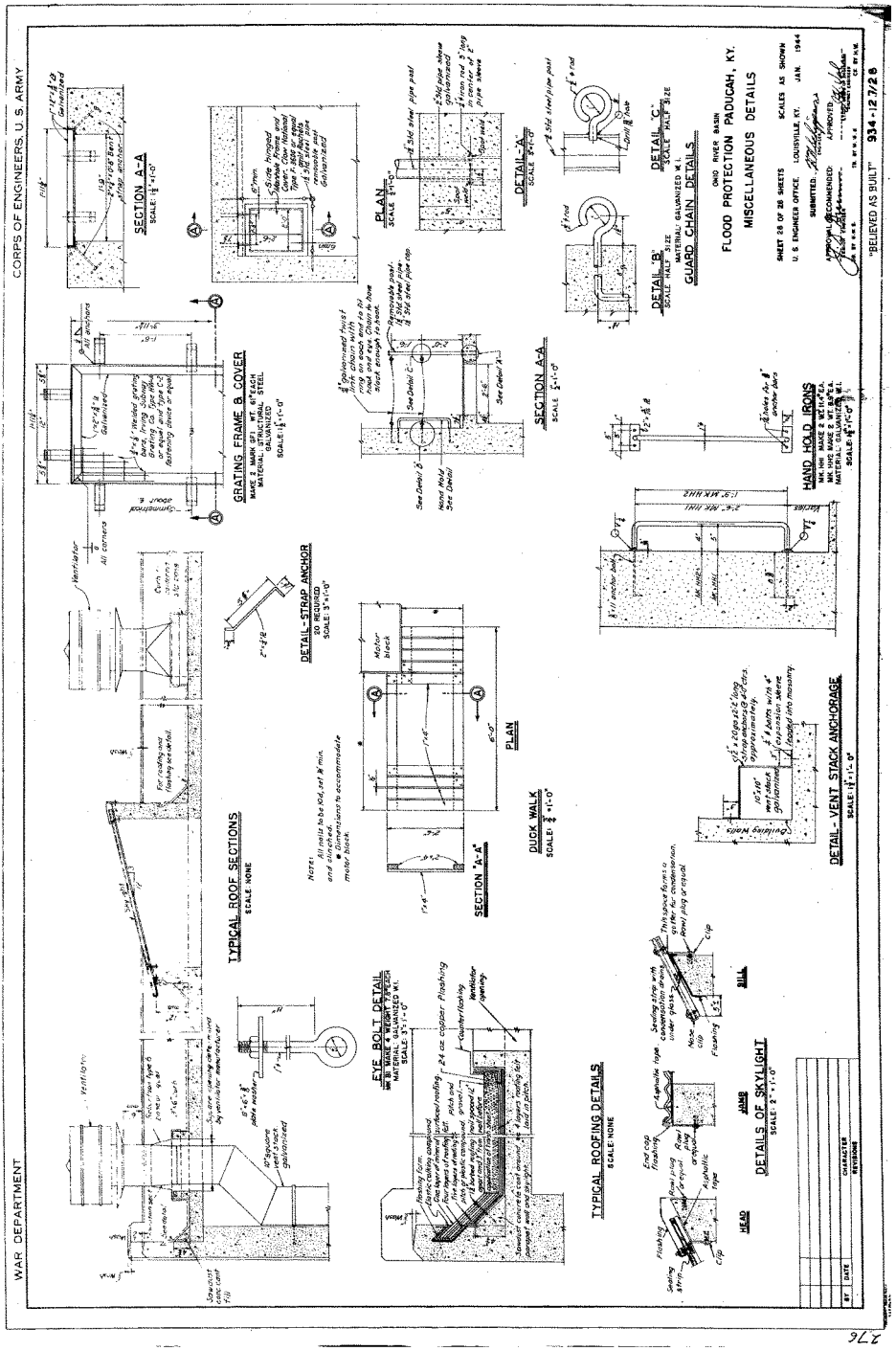
934-12.7/25

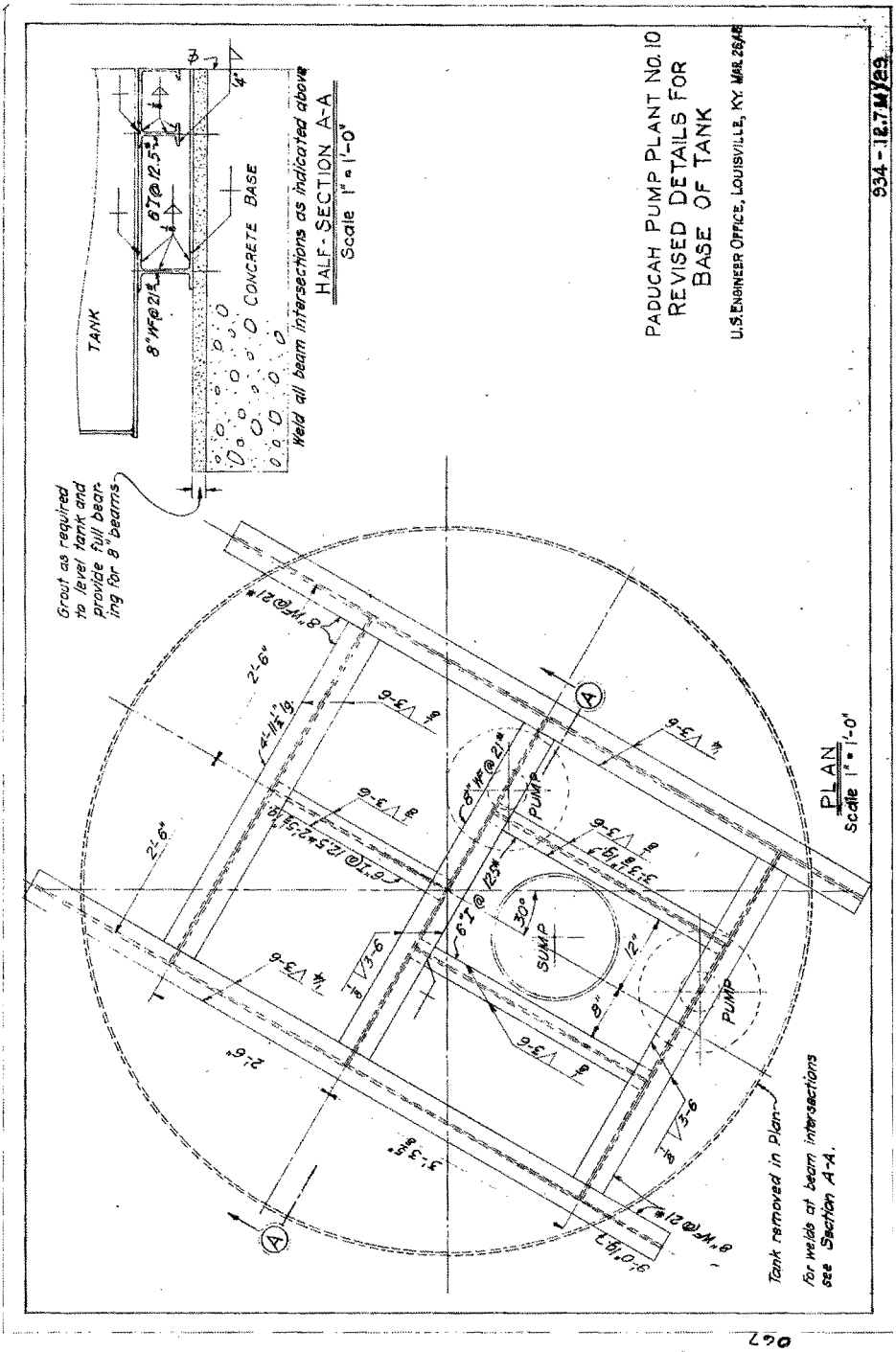
1036

273


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
BILL OF MATERIAL
DESCRIPTION
MANUFACTURER
CATALOG NUMBER
QUANTITY REQD
ASSEMBLY NO. 1
TRANSFORMER POLE SUPPORT FOR PUMPING PLANT NO. 10
ASSEMBLY NO. 2
DEAD END POLE FOR PUMPING PLANT NO. 8
GUY ANCHOR ASSEMBLY
WIRING DIAGRAM FOR ASSEMBLY NO. 1
Notes: Figures in circles refer to part numbers. All material shall be of the manufacture, type and catalog number listed in the Bill of Material. Small fittings not called for in the Bill of Material to be furnished as required, to suit conditions. Bolts shall be furnished with a full complement of washers in accordance with best practice.
Set 10 poles 5'-0" in earth
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 8 AND 10
POLE STRUCTURES
SHEET 26 OF 28 SHEETS
SCALE: 1/2" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944
SUBMITTED:
APPROVED:
APPROVED AND RECOMMENDED:
TH. W. O.E.E. - B.R.
"BELIEVED AS BUILT" 934 - 12.7/26


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
MISCELLANEOUS DETAILS
SHEET 27 OF 28 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE KY. JAN. 1944
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
"BELIEVED AS BUILT" 934-12.7/27
SECTION C-C
ELEVATION
CONCRETE SCUPPER
HEAD
(JAMB DETAIL SIMILAR)
SILL
ACCESS DOOR FRAME DETAILS
PLAN
TYPICAL SUMP VENT WITH GRATING COVER
ELEVATION
DOOR HOLDER
PLAN
SECTION A-A
TYPICAL DETAIL WALL VENTILATORS
GRATING FRAME B COVER
SECTION A-A
LADDER RUNG
ACCESS DOOR ELEVATION
SECTION B-B
CRANE STOP DETAILS
RAIL ANCHORAGE DETAIL
THRESHOLD FOR WOOD ACCESS DOORS
CRANE RAIL B ANCHORS
LATCH DETAILS
BY
DATE
CHARACTER
REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
MISCELLANEOUS DETAILS
OHIO RIVER BASIN
SHEET 28 OF 28 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. JAN. 1944
SUBMITTED
APPROVED AND RECOMMENDED:
APPROVED:
"RELIEVED AS BUILT" 934-12 7/28
SECTION A-A
GRATING FRAME & COVER
PLAN
DETAIL-A
DETAIL-B
DETAIL-C
GUARD CHAIN DETAILS
TYPICAL ROOF SECTIONS
DETAIL-STRAP ANCHOR
EYE BOLT DETAIL
DUCK WALK
HAND HOLD IRONS
TYPICAL ROOFING DETAILS
DETAIL - VENT STACK ANCHORAGE
DETAILS OF SKYLIGHT
HEAD
JAMB
SILL


PADUCAH PUMP PLANT NO. 10
REVISED DETAILS FOR
BASE OF TANK
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAR. 26/48
934-12.7 M/29
HALF-SECTION A-A
Scale 1" = 1'-0"
TANK
CONCRETE BASE
Weld all beam intersections as indicated above
Grout as required to level tank and provide full bearing for 8" beams
PLAN
Scale 1" = 1'-0"
PUMP
SUMP
Tank removed in Plan for weld at beam intersections see Section A-A.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KENTUCKY

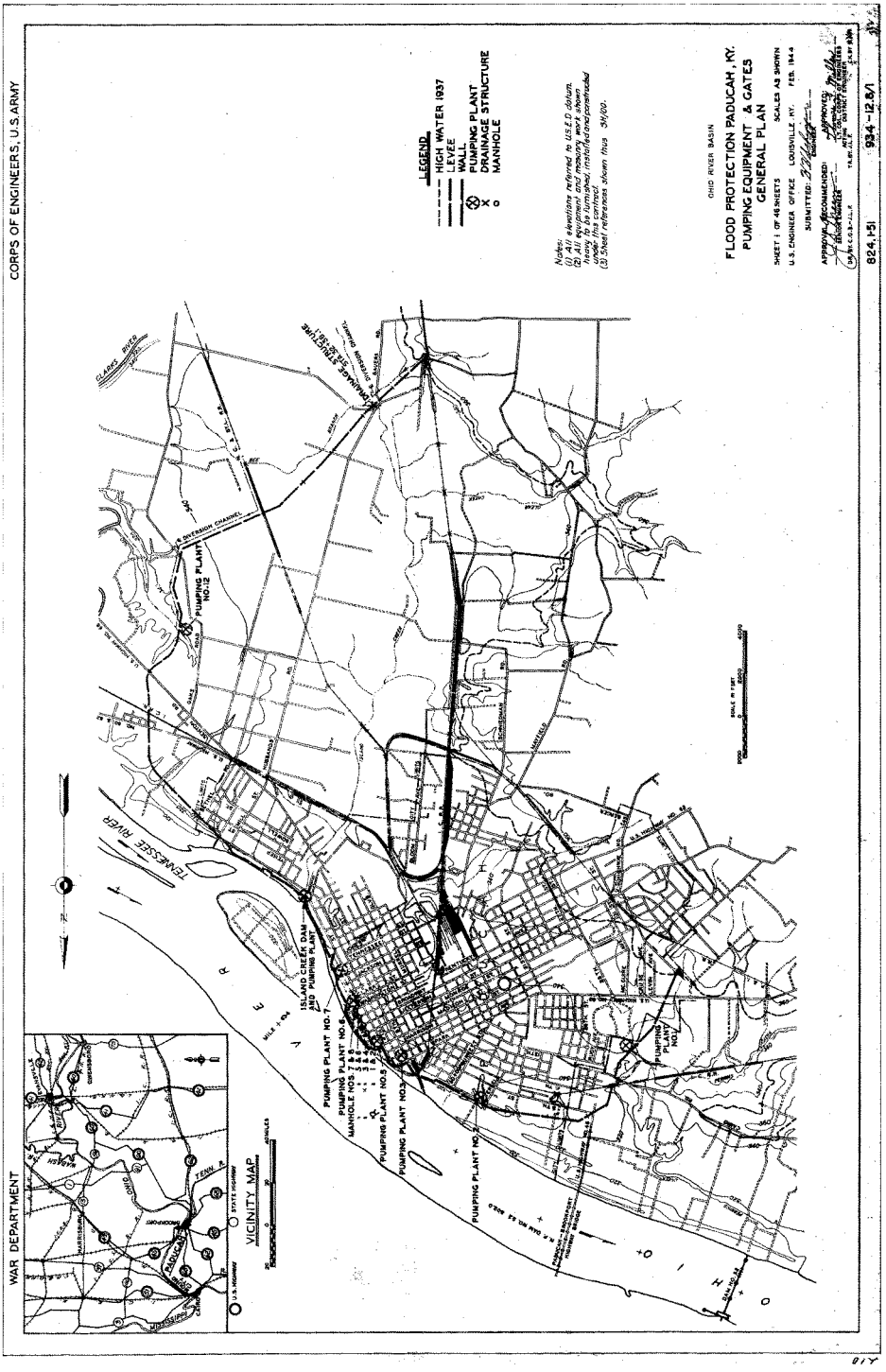
PUMPING EQUIPMENT AND GATES

INDEX

GENERAL PLAN	SHEET 934-12.8/1
PUMPING PLANT NO. 1	" " - " 2
PUMPING PLANT NO. 2	" " - " 4
PUMPING PLANT NO. 3	" " - " 7
PUMPING PLANT NO. 5	" " - " 9
PUMPING PLANT NO. 6	" " - " 12
PUMPING PLANT NO. 7	" " - " 15
PUMPING PLANT NO. 12	" " - " 18
INTERCEPTER SEWER MANHOLES	" " - " 21
ISLAND CREEK DAM PUMPING PLANT	" " - " 23
DRAINAGE STRUCTURE STA. 32+38.1	" " - " 30

U. S. ENGINEER OFFICE, LOUISVILLE, KY.

"DELIEVED AS BUILT"


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S.ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING EQUIPMENT & GATES
GENERAL PLAN
SHEET 1 OF 46 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE LOUISVILLE, KY. FEB. 1944
SUBMITTED:
APPROVED:
824.1-51
934-12.8/1
LEGEND
HIGH WATER 1937
LEVEE
WALL
PUMPING PLANT
DRAINAGE STRUCTURE
MANHOLE
Notes:
(1) All elevations referred to U.S.E.D. datum.
(2) All equipment and masonry work shown hereon, except that installed or proposed under this contract.
(3) Sheet references shown thus 34/60.
VICINITY MAP
TENNESSEE RIVER
OHIO RIVER
CLARKS RIVER
PADUCAH
PUMPING PLANT NO.1
PUMPING PLANT NO.2
PUMPING PLANT NO.3
PUMPING PLANT NO.4
PUMPING PLANT NO.5
PUMPING PLANT NO.6
PUMPING PLANT NO.7
PUMPING PLANT NO.8
ISLAND CREEK DAM AND PUMPING PLANT
MANHOLE NOS. 1 & 2
MANHOLE NOS. 3 & 4
MANHOLE NOS. 5 & 6
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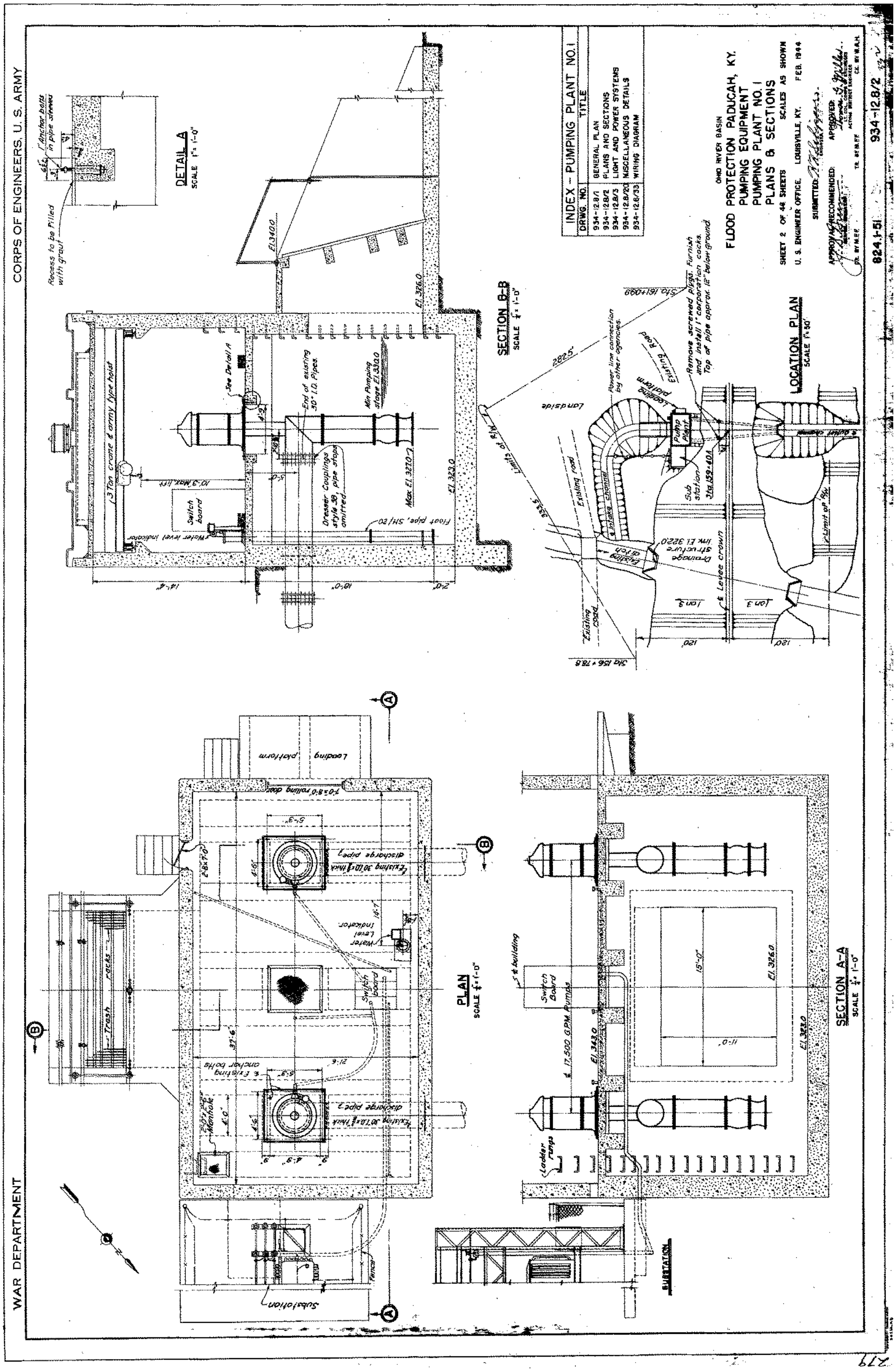
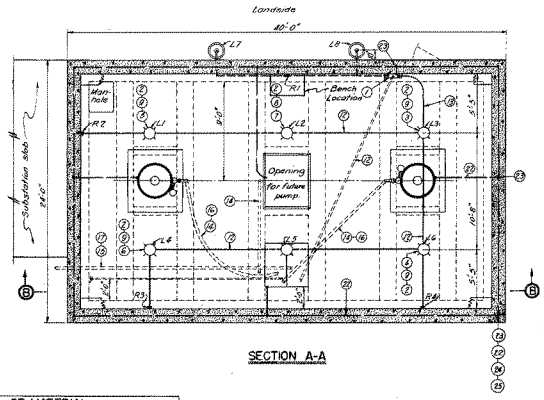
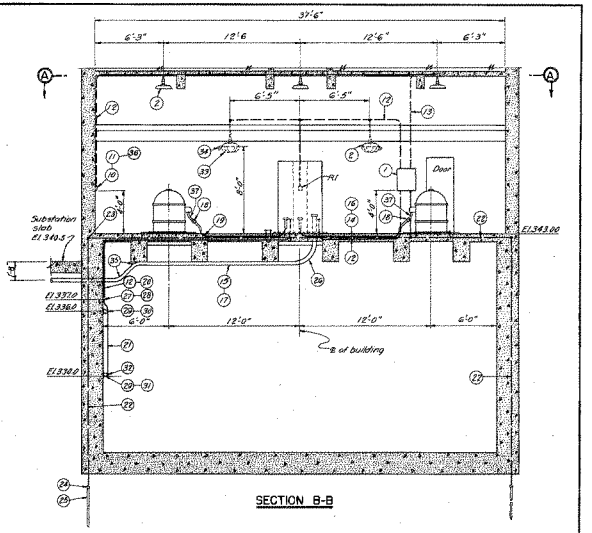

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
DETAIL A
SCALE 1"=1'-0"
Recess to be filled with grout
1" Anchor bolts in pipe sleeves
SECTION B-B
SCALE 1/4"=1'-0"
3 Ton crane & army type hoist
10'-3" Max. lift
Switch board
Water level indicator
See Detail A
End of existing 30" I.D. Pipes
Min Pumping stage El.330.0
Max El. 327.0
Dresser Couplings style 38, pipe stops omitted
Float pipe, SH/20
El. 340.0
El. 326.0
El. 323.0
PLAN
SCALE 1/4"=1'-0"
Trash racks
Loading platform
7'-0"x8'-0" rolling door
Existing 30"I.D.x3/8" thick discharge pipe
Water Level indicator
Switch board
2'-0"x2'-0" Manhole
& Existing anchor bolts
Substation
Fence
SECTION A-A
SCALE 1/4"=1'-0"
& building
Switch Board
& 17,500 GPM Pumps
El. 343.0
El. 326.0
El. 323.0
Ladder rungs
SUBSTATION
LOCATION PLAN
SCALE 1"=50'
Landside
Limits of R/W
Power line connection by other agencies.
Loading platform
Existing Road
Existing road
Pump Plant
Sub station Sta.159+40A
Remove screwed plugs. Furnish and install 1" corporation cocks. Top of pipe approx. 12" below ground.
Sta. 161+099
Sta. 156+78.8
Drainage structure Inv. El. 322.0
Existing ditch
& Intake channel
& Levee crown
Limit of R/W
INDEX – PUMPING PLANT NO.1
DRWG. NO. TITLE
934-12.8/1 GENERAL PLAN
934-12.8/2 PLANS AND SECTIONS
934-12.8/3 LIGHT AND POWER SYSTEMS
934-12.8/20 MISCELLANEOUS DETAILS
934-12.8/33 WIRING DIAGRAM
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING EQUIPMENT
PUMPING PLANT NO. 1
PLANS & SECTIONS
SHEET 2 OF 44 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
FEB. 1944
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
934-12.8/2
824.1-51



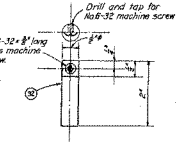


BILL OF MATERIAL

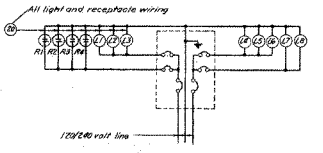
PART NO.	DESCRIPTION	MFGR.	CATLOG NO.	QUAN.	
1	4 Circuit light distribution panel (Surface type)			1	
2	R.L.M. dome reflector & socket	West	349573	7	
3	Conduilet outlet	Crouse Hinds	GHT22	1	
4	" "	"	SKT12	1	
5	" "	"	SKC12	1	
6	" "	"	SKL12	1	
7	" "	"	GI-51	2	
8	" Cover	"	H515	2	
9	" "	"	SK56	4	
10	" outlet	"	F31	4	
11	Duplex plug receptacle			4	
12	1" Rigid electrical conduit			1065	
13	1¼" " " "			70'	
14	1½" " " "			135'	
15	2" " " "			50'	
16	#6 Cond. cable, Type SNW			1351'	*
17	#600 MCM, Cond. cable, Type RH, with 60% rubber jacket			1501'	*
18	1" coupling			2	*
19	1" Standard 90° elbow			6	
20	#12 Insulated copper wire			5401	*
21	#6 H.D. bare solid wire			10'	
22	#2/0 Bare stranded copper wire			2655	
23	"T" connector for #2/0 stranded cable	Burndy	HT2626	8	
24	Connector for #2/0 stranded cable to ¾" rod	"	GA6626	4	
25	Ground rod, ¾" ø x 8'-0" long	Copper Weld		4	
26	Special long radius 90° elbow, 2½" x 42" radius			2	
27	Conduilet outlet	Crouse Hinds	A17	1	
28	" Cover	"	1771	1	
29	3" bolt circle type insulator	Lapp	13761	2	
30	Bus support fitting. Drill to clamp #6 bare solid wire	Locke	9853	1	
31	" " ¾ dia. electrode	"	9853	1	
32	Brass electrode (See Detail)			1	
33	Wire guard for reflector	West	351407	2	
34	Pigtail	"	351484	2	
35	3" Standard radius 45° elbow			2	
36	Wall surface plate			4	
37A	Flexible metal conduit 1½" x 1'-6" lg.			2	*

LEGEND

Embedded conduit ———
Exposed conduit — — — —
Concealed conduit - - - - -
Ground wire ———



ELECTRODE DETAIL
SCALE: NONE



WIRING DIAGRAM
LIGHTING CIRCUIT

Notes:
Figures in circles refer to part numbers on bill of material.
All material shall be of the manufacture, type, and catalog number specified or its equal.
Small fittings, conduilets, EMT couplings and adapters etc. not listed shall be furnished as required.
* Indicates materials to be furnished and installed under this contract. Other materials listed and shown were installed under previous contract and are of the type and catalog number specified or equal.
Install 200 watt bulbs to be furnished by Gov't. in all lighting fixtures.
Existing motor lead conduits are capped approximately 8' above floor.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 1
PUMPING EQUIPMENT
LIGHTING AND POWER SYSTEM

SHEET 3 OF 48 SHEETS SCALE: ¼" = 1'-0"

U.S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [signature] Engineer

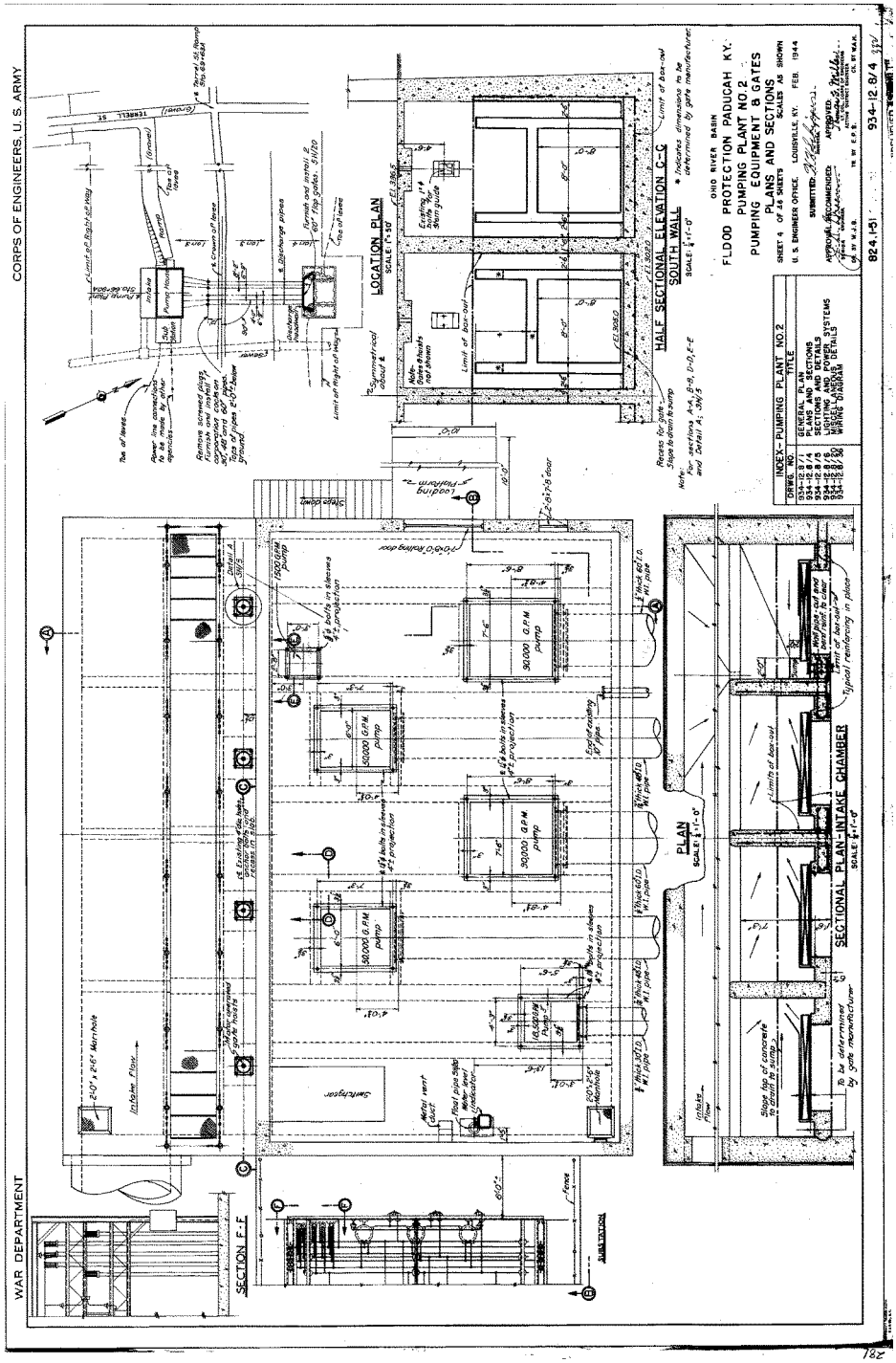
APPROVAL RECOMMENDED: [signature] Chief, Engineering Division

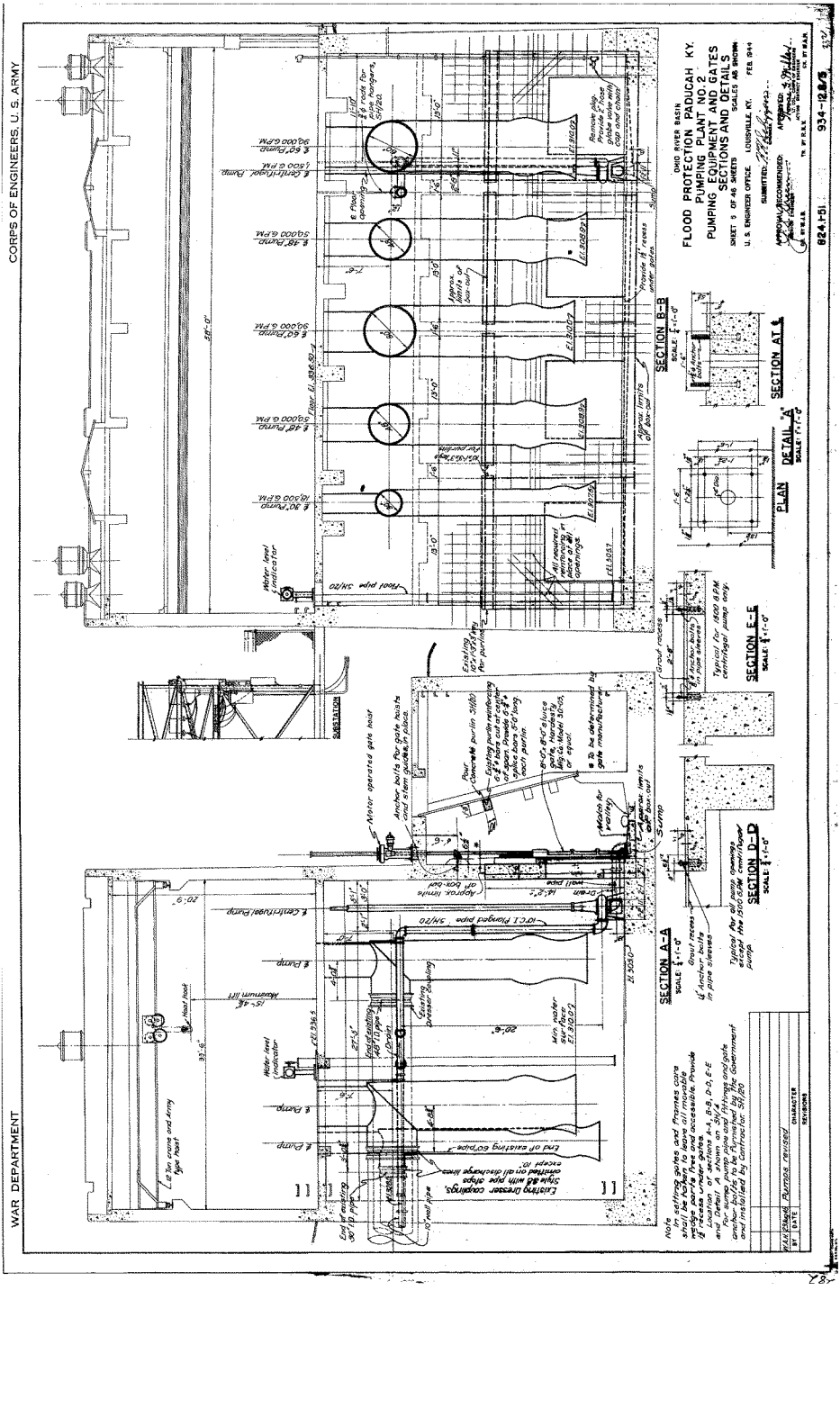
APPROVED: [signature] Acting District Engineer

CK. BY G.E.E. TR. BY A.J.Z. CK. BY E.S.

824.1-51 824-12.8/3

BY	DATE	CHARACTER OF REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
FLOOD PROTECTION PADUCAH KY.
PUMPING PLANT NO.2
PUMPING EQUIPMENT & GATES
PLANS AND SECTIONS
OHIO RIVER BASIN
SCALES AS SHOWN
SHEET 4 OF 44 SHEETS
U.S. ENGINEERS OFFICE, LOUISVILLE, KY. FEB. 1944
INDEX - PUMPING PLANT NO.2
DRWG. NO. TITLE
934-12.8/4 GENERAL PLANS AND SECTIONS
934-12.8/5 SECTIONS AND DETAILS
934-12.8/6 LOCATION AND DETAILS
934-12.8/35 MISCELLANEOUS SYSTEMS
934-12.8/36 WIRING DIAGRAM
LOCATION PLAN
SCALE 1"-50'
HALF SECTIONAL ELEVATION G-G
SOUTH WALL
SCALE 1/4"-1'-0"
SECTIONAL PLAN-INTAKE CHAMBER
SCALE 1/4"-1'-0"
PLAN
SCALE 1/4"-1'-0"
SECTION F-F
934-12.8/4
182


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH KY.
PUMPING PLANT NO. 2
PUMPING EQUIPMENT AND GATES
SECTIONS AND DETAILS
SHEET 5 OF 40 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE LOUISVILLE, KY. FEB. 1944
SUBMITTED
APPROVED
RECOMMENDED
APPROVED
824-151 934-12.8/5
PLAN
DETAIL A
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION A1
SECTION A2
SECTION A3
SECTION A4
SECTION A5
SECTION A6
SECTION A7
SECTION A8
SECTION A9
SECTION A10
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SECTION A93
SECTION A94
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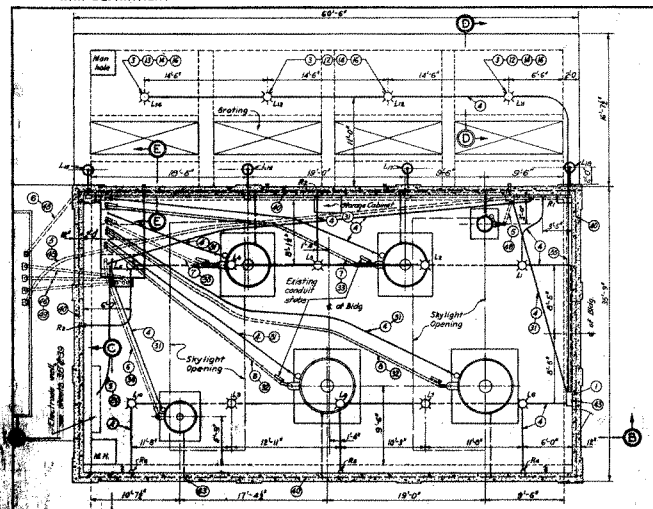
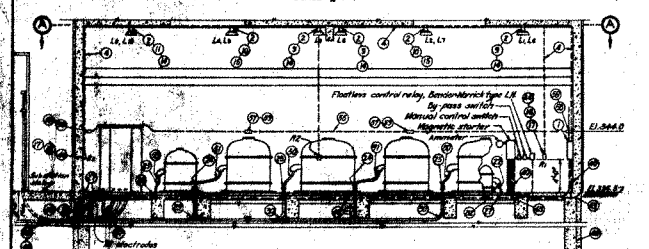
SECTION A98
SECTION A99
SECTION A100

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



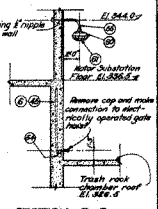
SECTION A-A
SCALE 1/4"-1'-0"



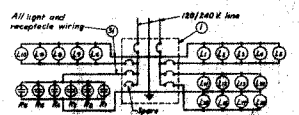
SECTION B-B
SCALE 1/4"-1'-0"

SECTION C-C
SCALE 1/4"-1'-0"

SECTION D-D
SCALE 1/4"-1'-0"



SECTION E-E
SCALE 1/4"-1'-0"



WIRING DIAGRAM, LIGHTING CIRCUITS

LEGEND

Embedded Conduit
Exposed Conduit
Ground Wire

Notes:

Figures in circles refer to Part No. in Bill of Material

All material shall be of the manufacture, type, and catalog number specified or its equal.

Small fittings, condulets E.M.T. couplings and adapters etc. not listed above shall be furnished as required.

W. indicates material precisely installed.

Install 200 watt lamps, to be furnished by Gov't, in all inside, outside and sump lighting fixtures.

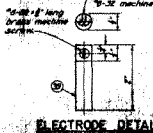
Existing motor lead conduits are capped approximately 6" above floor.

Eight existing conduit stubs as conduit runs which are to be abandoned between switchgear and motors shall be cut off level with floor and plugged with concrete.

For existing conduit and electrode layout, see sheet 3.E.

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFR.	CATALOG NO.	QUANTITY
1*	Line distribution panel (surface type) 125/250 V. 6 circuit			1
2*	R.L.M. dome reflector and socket	West.	349 S13	10
3*	Vaportite condulet with reflector and socket	Crouse-Hinds	YH0A1959	4
4*	2" rigid electrical conduit			700'±
5*	1" " " "			105'±
6*	¾" " " "			120'±
7	2" " " "			55'±
8	2½" " " "			85'±
9*	Condulet outlet	Crouse-Hinds	5KT 18	4
10*	" "	" "	6 IST	4
11*	" "	" "	5 KL 12	2
12*	" "	" "	5 KC-18	1
13*	" "	" "	5 K-14	1
14*	Condulet cover	" "	5K-64	10
15*	" "	" "	11-818	4
16*	Cover gasket	" "	Gask 70B	4
17*	Condulet outlet	" "	FS1	6
18*	Duplex plug receptacle			6
19	" "			1
20	¾" Rigid electrical conduit			30'±
21	Wire holder			89
22	1" Coupling			1
23	¾" "			1
24	2" "			1
25	2½" "			1
26				
27*	1" Standard 90° elbow			2
28*	¾" " " "			4
29	2" " " "			4
30	2½" " " "			4
31	#12 AWG insulated copper wire			2630'±
32	#10 cond cable, Type YC-30			210'±
33	#10/3 " " "			240'±
34	#6 " " " "			30'±
35				
36	3" bolt circle type insulators	Lapp	1816	12
37				
38	Bus support fitting, drill to clamp 3/4" electrode	"	9B2	4
39	Electrode (See Detail)			4
40*	#2/0 bare copper stranded cable			100'±
41*	¾"x 8' copperweld ground rod			4
42*	Connector for #2/0 ground cable to ¾" rod	Burndy	GA2/0	4
43*	"T" connector for #2/0 ground cable	"	HT	14
44*	Duplex surface plates			8
45	#4 cond. cable, RH. with 60% rubber jacket			300'±
46*	¾" rigid electrical conduit			300'±
47*	Special lens radius 30" about 30° x 42" radius	G.E.		4
48	#4 AWG, 1 cond. cable, Type SHW			150'±
49	350 MCM, 1 cond. cable, Type YC-90			150'±
50	Flexible metal conduit 2½"x 2'-6" ea.			2
51	" " 2"x 2'-0" "			2
52	" " 1"x 1'-0" "			2
53	" " ¾"x 2'-0" "			1
54*	Condulet	Crouse-Hinds	BT-4	4
55	¾" Rigid electrical conduit			110'±
56	Condulet	Crouse-Hinds	LB-7	1
57	"	" "	T-7	2
58	"	" "	LB-8	1
59	Condulet cover	" "	TBT	3
60	R.L.M. dome reflector and socket	West.	349 S13	4
61	Wire guard for reflector	"	4614 S7	4



ELECTRODE DETAIL
SCALE: NONE

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 2

PUMPING EQUIPMENT AND GATES

LIGHTING & POWER SYSTEM

SHEET 6 OF 26 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [signature]

APPROVED: [signature]

APPROVAL RECOMMENDED: [signature]

[signature] ACTING DIVISION ENGINEER

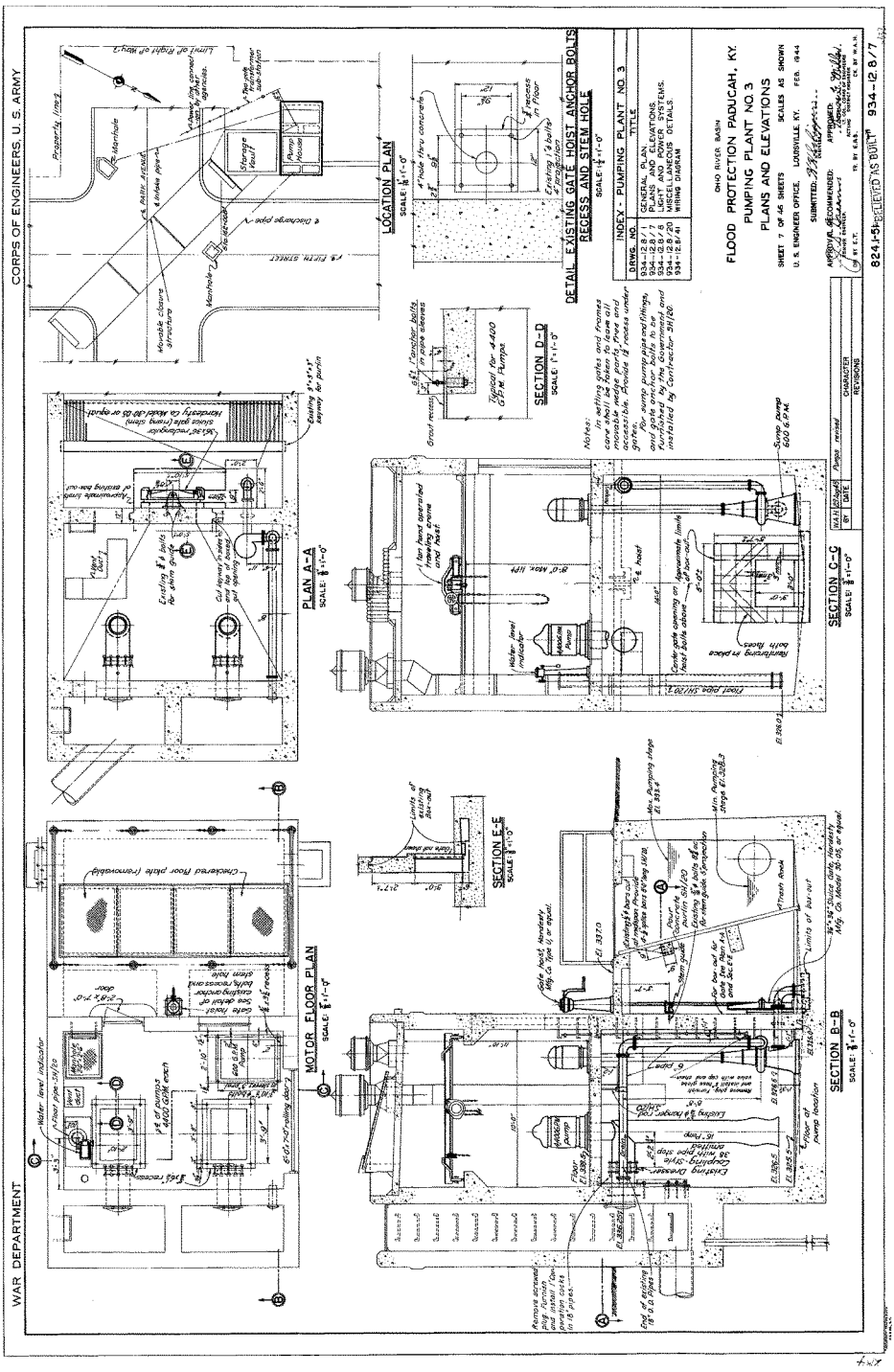
DATE: [illegible] TRACED BY: B.K.V.

824.1(6)

954-12.8/6

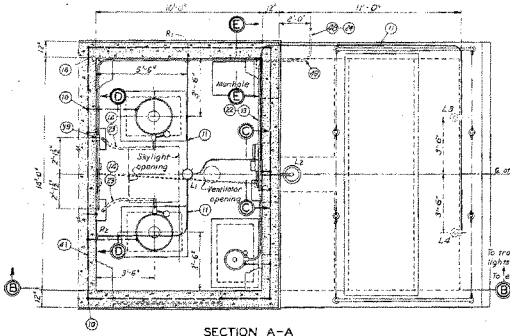
DATE | CHARACTER OF REVISIONS | BY

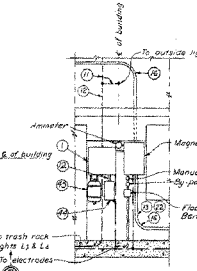
1047

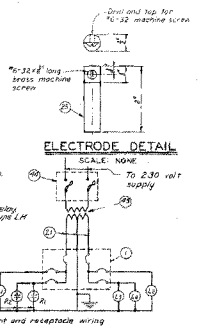

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 3
PLANS AND ELEVATIONS
SHEET 7 OF 46 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944
SCALES AS SHOWN
INDEX - PUMPING PLANT NO. 3
DRWG. NO. TITLE
934-12.8/1 GENERAL PLAN
934-12.8/7 PLANS AND ELEVATIONS
934-12.8/15 MISCELLANEOUS ITEMS.
934-12.8/20 MISCELLANEOUS DETAILS
934-12.8/41 WIRING DIAGRAM
LOCATION PLAN
MOTOR FLOOR PLAN
PLAN A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
DETAIL EXISTING GATE HOIST ANCHOR BOLTS RECESS AND STEM HOLE
824+5 REVISED AS BUILT 934-12.8/7

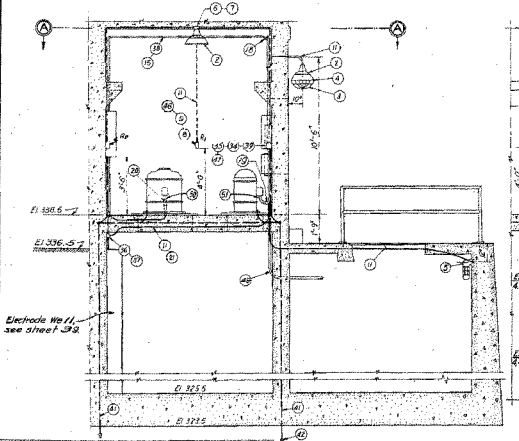
WAR DEPARTMENT

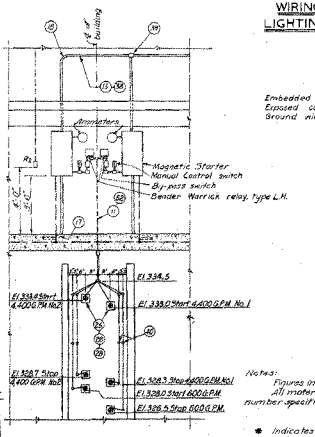
CORPS OF ENGINEERS, U. S. ARMY

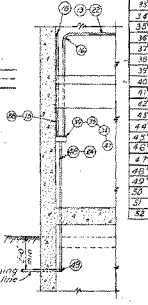












LEGEND

Embedded conduit
Exposed conduit
Ground wire

Notes:

Figures in circles refer to part numbers in Bill of Material. All material shall be of the manufacture, type and catalog number specified, or it's equal.

* Indicates material previously installed.

For existing electrode layout see sheet 40.

Install 200 watt bulbs, to be furnished by the Government, in all lighting fixtures.

Existing motor lead conduits for the two large motors are capped approximately 8" above the floor. The motor lead conduit for the small motor is capped approximately 5' from the wall.

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFR.	CATALOG NO.	QUAN-TITY
1	4 circuit light distribution panel (Surface Type)			1
2	R.L.M. lamp reflector and socket	West.	349373	2
3	Wire guard	"	351497	1
4	Wire guard padlock	"	351484	1
5	Vaportite light	Crouse-Hinds	VMP165	2
6	Conduulet outlet	"	SKC 12	1
7	Conduulet cover	"	SK 84	1
8	Conduulet outlet	"	FS 1	2
9	Duplex plug receptacle	Bryant	#5262-I	2
10	connectors for #2/0 stranded cable	Burndy	HTEE26	12
11	4" rigid electrical conduit			16'
12	3" " " "			1'
13	1" " " "			30'
14	1/2" " " "			17'
15	1/2" " " "			30'
16	1" standard 30° elbow			4
17	4" " " "			4
18	1" " " "			8
19	1" Coupling			4
20	1/2" Coupling			2
21	#12 R.W.P. insulated copper wire			1700'
22	#6, 1 cond. cable, Type R.H. with 60% rubber jacket			600
23	#6, 1 cond. cable, Type R.H. with 60% rubber jacket			945
24	#2/8 Round cable, Type R.H. with 60% rubber jacket			1200
25	Brass electrode, 3/4" x 8' long (See detail)			6
26	3" bolt circle type insulator	Westl.	4917736	6
27				
28	Bus support fitting. Drill to clamp 3/4" electrode	Locke	9853	6
29				
30				
31				
32				
33	Conduit hub plate	"	85107	1
34	" " "	"	85283	1
35	Conduulet	"	T211	1
36	Conduulet cover	"	2770	1
37	#2/0, 1 cond. cable, Type SNW			1125
38	Junction box	Crouse-Hinds	757	1
39	Wire holder	Joslyn	J 1900	12
40	#2,0 bare stranded copper cable			150'
41	Connector for #2/0 stranded cable to 3/4" ground rod	Burndy	GR6426	4
42	Ground rod, 3/4" x 8'	Copperweld		4
43	Enclosed fused switch, 2 pole, cover interlocked	Erteabar	56251	1
44	Transformer, 230-2301115 volts, 2KVA, dry type	West.	911415	1
45	Wall surface plate	Bryant	7491	2
46	Junction box plate	Crouse-Hinds	RSMPO	2
47	2" rigid electrical conduit			50'
48	Special long radius 90° elbow 2" x 1.26' rad.			3
49	Flexible metal conduit 1/2" x 24" long			2
50	" " " 1" x 1'-6" long			1
51				
52	#12 Type RNW copper wire			100'

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING EQUIPMENT & GATES
PUMPING PLANT NO. 3
LIGHTING & POWER SYSTEMS

SHEET 8 OF 48 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [signature] ENGINEER

APPROVAL RECOMMENDED: [signature] DIVISION ENGINEER

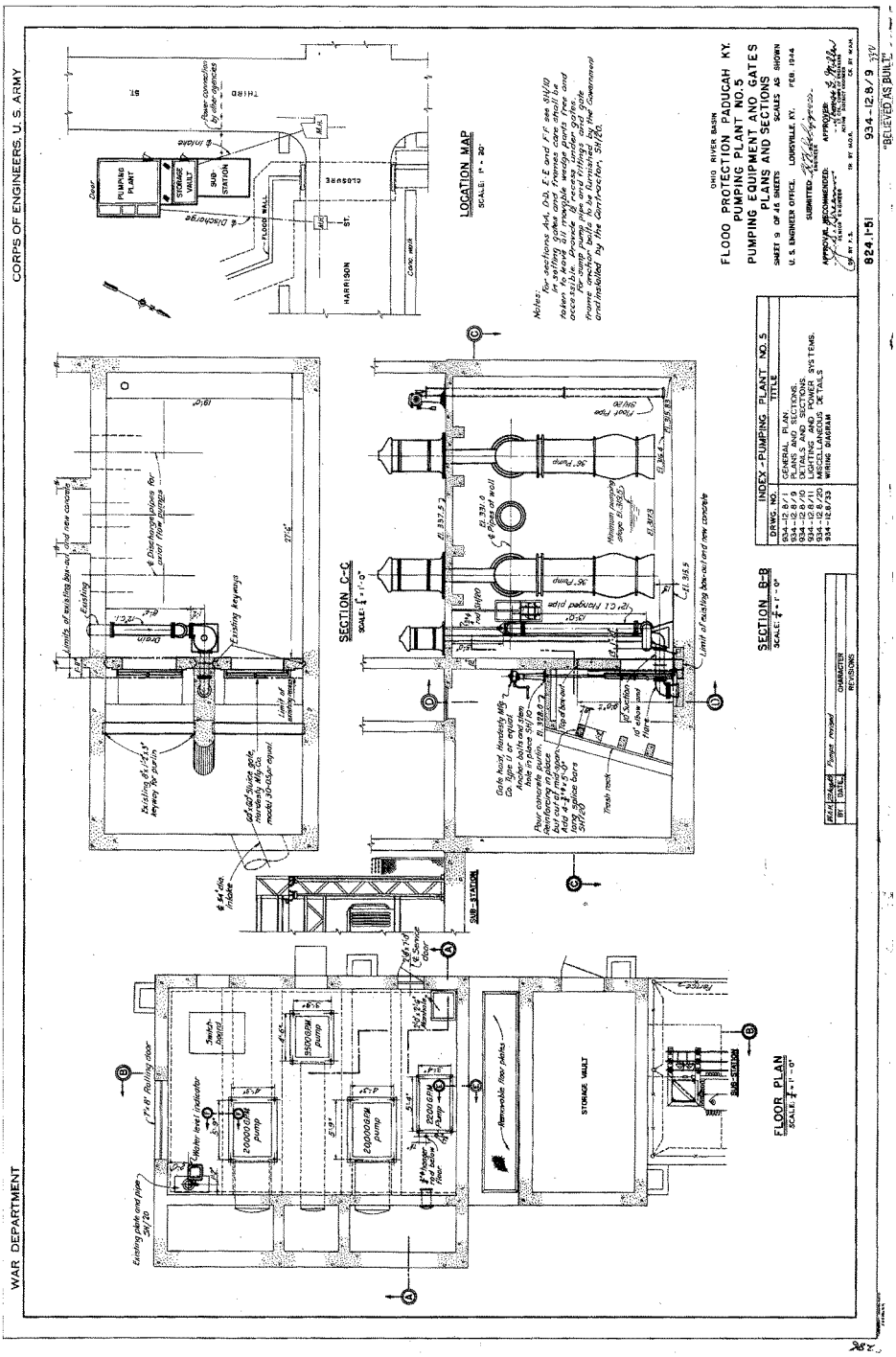
APPROVED: [signature] ACTING DISTRICT ENGINEER

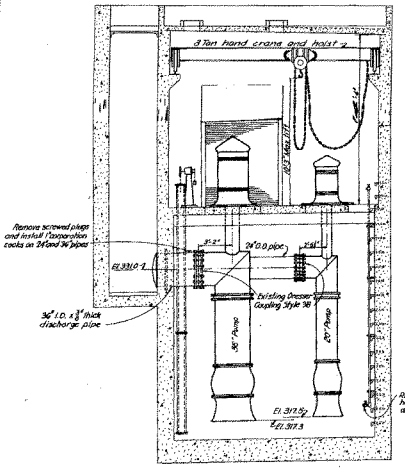
BY | DATE | CHARACTER REVISIONS

"DELIVERED AS BUILT" 824.1-51

934-12.8/8

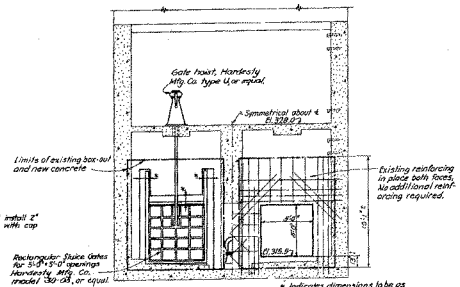
1049


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH KY.
PUMPING PLANT NO. 5
PUMPING EQUIPMENT AND GATES
PLANS AND SECTIONS
SHEET 9 OF 45 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944
SUBMITTED: APPROVED:
APPROVAL RECOMMENDED:
934-12.8/9
824-1-51
"BELIEVED AS BUILT"
INDEX - PUMPING PLANT NO. 5
DRWG. NO. TITLE
934-12.8/1 GENERAL PLAN
934-12.8/2 ELEVATIONS AND SECTIONS
934-12.8/10 DETAILS AND SECTIONS
934-12.8/11 LIGHTING AND POWER SYSTEMS
934-12.8/32 FLOOD WALLS AND DIKE
934-12.8/33 WIRING DIAGRAM
LOCATION MAP
SCALE: 1" = 20'
FLOOR PLAN
SCALE: 1/4" = 1'-0"
SECTION C-C
SCALE: 1/4" = 1'-0"
SECTION B-B
SCALE: 1/4" = 1'-0"
STORAGE VAULT
SUB-STATION
FLOOD WALL
HARRISON ST.
THIRD ST.
CLOSURE
PUMPING PLANT
STORAGE VAULT
SUB-STATION
Door
Power connection by other agencies
6" Discharge
6" Intake
Note: for sections AA, DD, EE and FF see SH.10
Flood wall and pumping plant shall be taken to along 3" rectangle wedge cast in concrete. Provide 3" recess in under gates. Frame anchor bolts to be furnished by the Government and installed by the Contractor, SH.10.
Limits of existing box and dike new concrete
Existing
Drain
Existing keyway
Limit of existing road
Existing 24"x24" keyway for purlin
24"x24" timber gate, removable, mate 30"x30" opening
6" Air line
Existing gate and pipe Sty.20
7'-0" Rolling door
Switch board
Water level indicator
1500 GPM pump
2000 GPM pump
2200 GPM pump
8" Motor operated valve
Removable floor plates
Limit of existing box-culvert and new concrete
Floor pipe
Sump
El. 331.0 Floor of wall
36" Pump
Manhole opening under each unit
El. 325.5
12'-0" Finished pipe
12"x12" rod sump
El. 315.5
Gate hoist Kendrick MFG Co. Type U or equal
Anchor bolts and stem free in place Sty.10
Pour concrete around reinforcing in place
Cut out 4" mud sill, and 4" x 4" mud sill, long yellow bars Sty.20
Trash rack
Section of drive unit
Floor
Sump
Existing 24"x24" keyway for purlin
Existing
Existing keyway
Limit of existing road
Drain
Limit of existing box-culvert and new concrete
Existing gate and pipe Sty.20
7'-0" Rolling door
Switch board
Water level indicator
1500 GPM pump
2000 GPM pump
2200 GPM pump
8" Motor operated valve
Removable floor plates
STORAGE VAULT
SUB-STATION
Sump
Floor pipe
Sump
El. 331.0 Floor of wall
36" Pump
Manhole opening under each unit
El. 325.5
12'-0" Finished pipe
12"x12" rod sump
El. 315.5
Gate hoist Kendrick MFG Co. Type U or equal
Anchor bolts and stem free in place Sty.10
Pour concrete around reinforcing in place
Cut out 4" mud sill, and 4" x 4" mud sill, long yellow bars Sty.20
Trash rack
Section of drive unit
Floor
Sump
Limit of existing box-culvert and new concrete
6" Air line
SUB-STATION
7'-0" Rolling door
6" Intake
Door
Power connection by other agencies
6" Discharge
PUMPING PLANT
STORAGE VAULT
SUB-STATION
CLOSURE
FLOOD WALL
HARRISON ST.
THIRD ST.
Note: for sections AA, DD, EE and FF see SH.10
Flood wall and pumping plant shall be taken to along 3" rectangle wedge cast in concrete. Provide 3" recess in under gates. Frame anchor bolts to be furnished by the Government and installed by the Contractor, SH.10.



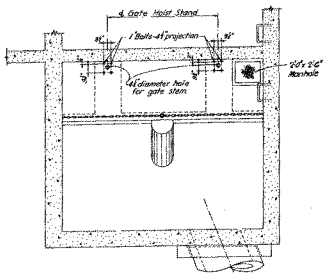
SECTION A-A

SCALE: 1/4"=1'-0"



SECTION D-D

SCALE: 1/4"=1'-0"

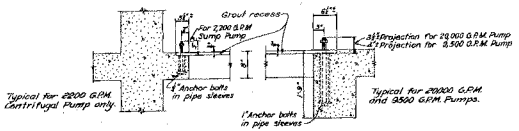


PLAN

GATE HOIST PLATFORM

SCALE: 1/4"=1'-0"

Note:
For location of sections A-A, D-D, E-E and F-F, see 9N/9.



SECTION E-E

SECTION F-F

SCALE: 1"=1'-0"

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY.

PUMPING PLANT NO.5

PUMPING EQUIPMENT AND GATES

DETAILS AND SECTIONS

SHEET 10 OF 46 SHEETS

SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: _____ DESIGNER

APPROVED & RECOMMENDED: _____ DIVISION ENGINEER

APPROVED: _____ ACTING DISTRICT ENGINEER

DR. BY P.S. CK. BY W.A.H.

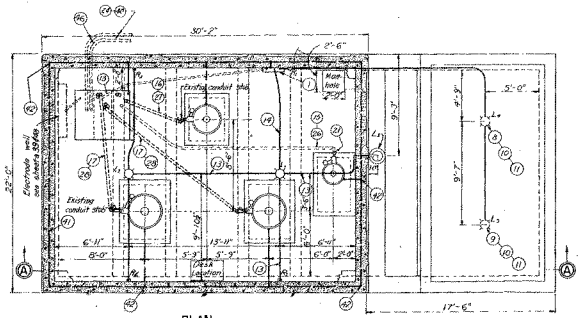
BY	DATE	CHARACTER OF REVISIONS
W.L.H.	12 Aug 48	Pumps revised

824.1-51

934-12.8/10

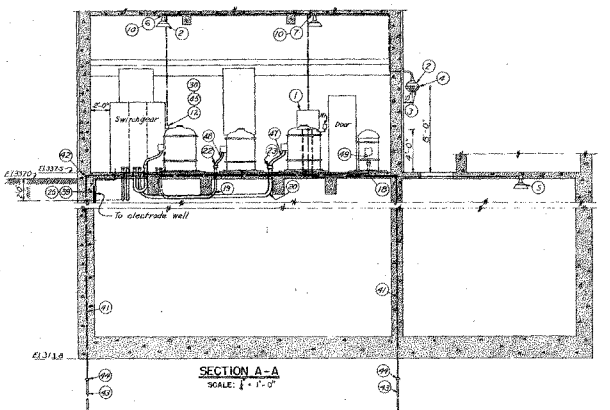
"BELIEVED AS BUILT"

1051



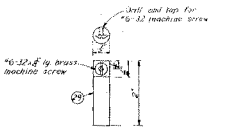
PLAN

SCALE: $\frac{1}{4}$" = 1'-0"



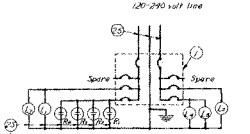
SECTION A-A

SCALE: $\frac{1}{4}$" = 1'-0"



ELECTRODE DETAIL

SCALE: NONE



WIRING DIAGRAM
LIGHTING CIRCUIT

Concealed conduit
Embedded conduit
Exposed conduit
Ground wire

LEGEND

Notes:

Figures in circles refer to part numbers in bill of material.

All material shall be of the manufacture, type, and catalog number specified, or its equal.

Small fittings, conduits, couplings and adapters etc not listed shall be furnished as required.

* Indicates material previously installed.

Old existing conduit stubs on conduit runs which are to be abandoned between switchgear and gates shall be cut off level with floor and plugged with concrete.

Install 200 watt bulbs, furnished by the Government, in all lighting fixtures.

Existing motor lead conduits are capped approximately 6" above floor.

For existing layout, see sheet #2.

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CAT. NO.	QUAN.
1*	6 circuit light distribution panel (surface type)			1
2*	10" M.H. dome reflector and socket	West.	349577	3
3*	Wire guard	"	351491	1
4*	Wire guard padlock	"	331484	1
5*	Vaporite conduit with reflector and socket	Crouse-Hinds	VHA1939	2
6*	Condulet outlet	" "	SK112	1
7*	" "	" "	SKE12	1
8*	" "	" "	SKC12	1
9*	" "	" "	SK12	1
10*	" cover	" "	SK89	4
11*	" gasket	" "	Gask 20E	2
12*	Duplex plug receptacle	Bryant	5262 BR	4
13*	¾" rigid electrical conduit			150'
14*	3" " "			20'
15*	1" " "			25'
16	2" " "			15'
17	¾" " "			40'
18*	1" standard 90° elbow			2
19	2" " "			2
20	3" " "			4
21	1" Coupling			
22	2" "			
23	3" "			
24*	¾" rigid electrical conduit			40'
25	#12 insulated copper wire			140'
26	*#5 conductor, Type R.H. with 60% rubber jacket			80'
27	*#8 conductor, Type R.H. with " "			40'
28	*350 M.C.M. 1 cond. cable Type R.H. with 60% rubber jacket			120'
29	Brass electrode, ¾" x 8'-0" (See detail 3)			12
30	1" bolt circle type insulator	West	45736	18
31				
32	Bus support fitting Drill to clamp ¾" electrode			12
33				
34				
35				
36				
37				
38*	Wall surface plate	Bryant	HV31	4
39	1¼" Rigid electrical conduit			16'
40	*500 M.C.M. 1 cond. cable, Type R.H. with 60% rubber jacket			440'
41*	*2/0 bare stranded copper cable			240'
42*	"T" connectors for #2/0 stranded cable	Burndy	HTP626	10
43*	Ground rod ¾" x 8'	Copperweld		4
44*	Connector for #2/0 stranded cable to ¾" ground rod	Burndy	GA6426	4
45*	Condulet outlet	Crouse-Hinds	FS1	4
46*	Special long radius 90° elbow, 3" x 36" radius		R.E.	6
47	Flexible metal conduit, 3" x 8'-6" lg.			2
48	" " " 2" x 1'-6" lg. ±			1
49	" " " 1" x 1'-6" lg. ±			1
50	Wireholders	Joslyn	J1860	25

BY	DATE	CHARACTER OF REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 5
PUMPING EQUIPMENT AND GATES
LIGHTING & POWER SYSTEMS

SHEET 11 OF 48 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. — FEB. 1944

SUBMITTED: [signature] ENGINEER

APPROVAL RECOMMENDED: [signature] CHIEF, ENGINEERING DIV.

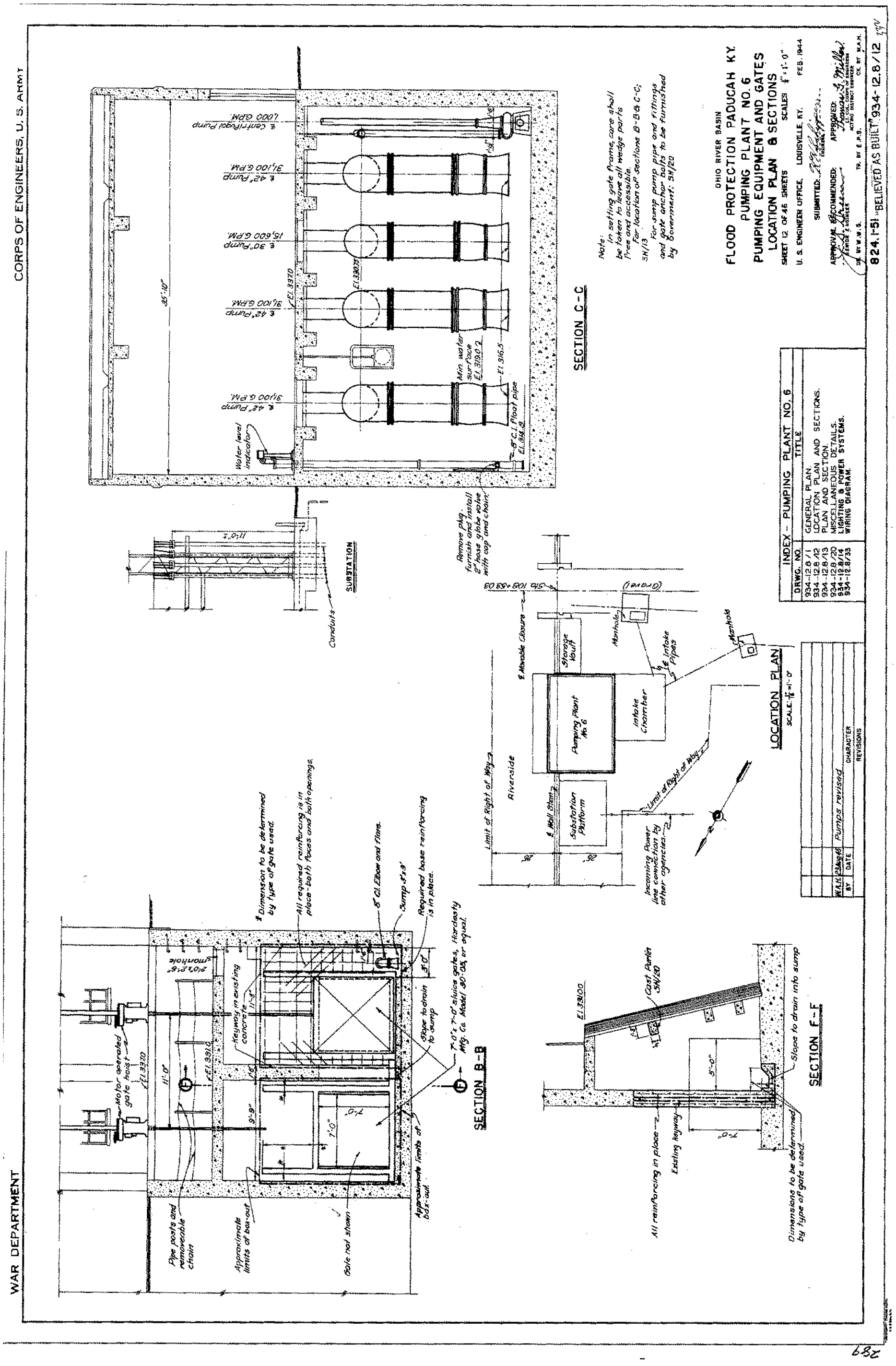
APPROVED: [signature] COL. CORPS OF ENGINEERS, ACTING DISTRICT ENGINEER

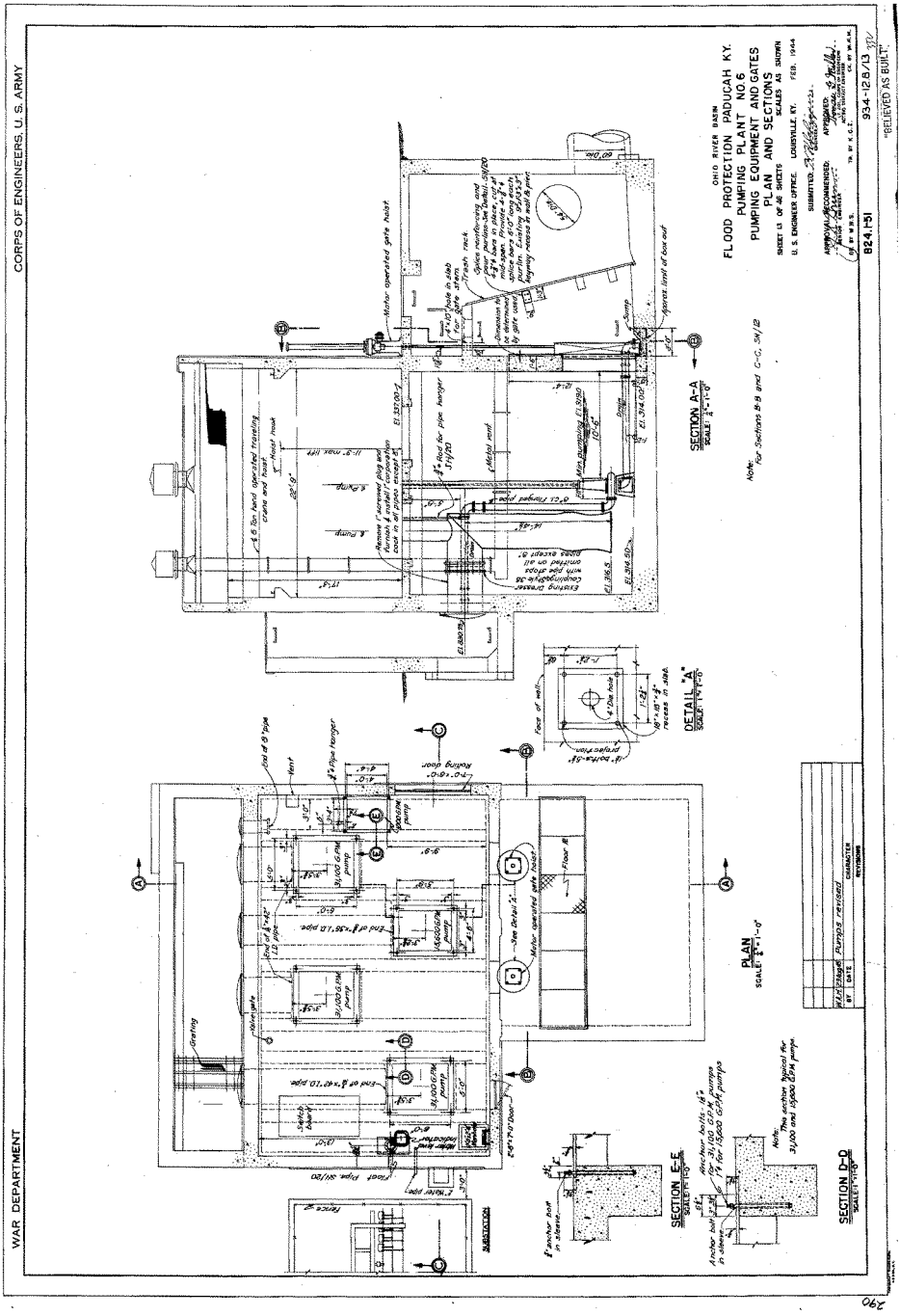
DA, OFF. O.D. — DA, OFF. C.E.R.C. — DA, OFF. O.D.

824.151 — 934-12.8/11

"RECEIVED" MICROFILMED

1052


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH KY.
PUMPING PLANT NO. 6
PUMPING EQUIPMENT AND GATES
LOCATION PLAN & SECTIONS
SHEET 12 OF 46 SHEETS
SCALES ¼" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944
824.1-51 "BELIEVED AS BUILT" 934-12.8/12
SECTION C-C
SECTION B-B
SECTION F-F
LOCATION PLAN
SUBSTATION
INDEX - PUMPING PLANT NO. 6
DRWG. NO. | TITLE
934-12.8/1 GENERAL PLAN.
934-12.8/12 LOCATION PLAN AND SECTIONS.
934-12.8/13 PLAN AND SECTION.
934-12.8/20 MISCELLANEOUS DETAILS.
934-12.8/14 LIGHTING & POWER SYSTEMS.
934-12.8/33 WIRING DIAGRAM.
Pumps revised
CHARACTER
REVISIONS
Note: In setting gate frame, care shall be taken to leave all wedge parts free and accessible.
For location of sections B-B & C-C; SH/13
For sump pump pipe and fittings and gate anchor bolts to be furnished by Government: SH/20
℄ 42" Pump 31,100 G.P.M.
℄ 30" Pump 15,600 G.P.M.
℄ Centrifugal Pump 1,000 G.P.M.
Water level indicator
Min. water surface El. 319.0 ±
Pumping Plant No. 6
Intake Chamber
Storage Vault
Substation Platform
Riverside
Limit of Right of Way
Incoming Power line connection by other agencies
Motor operated gate hoist
Pipe posts and removable chain
Approximate limits of box-out
Gate not shown
7'-0" x 7'-0" sluice gates, Hardesty Mfg. Co. Model 30-08, or equal.
Dimension to be determined by type of gate used.
All required reinforcing is in place - both faces and both openings.
Required base reinforcing is in place.
Slope to drain to sump
Keyway in existing concrete
Cast Purlin SH/20
Slope to drain into sump
All reinforcing in place
Existing keyway
Dimensions to be determined by type of gate used.
Remove plug, furnish and install 2" hose globe valve with cap and chain.
Conduits


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH KY.
PUMPING PLANT NO.6
PUMPING EQUIPMENT AND GATES
PLAN AND SECTIONS
SCALES AS SHOWN
SHEET 13 OF 48 SHEETS
U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944
SUBMITTED
APPROVED RECOMMENDED
APPROVED
B24.1-51
934-12 B/13
"BELIEVED AS BUILT"
PLAN
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
DETAIL "A"
SUBSTATION
Note: For Sections B-B and C-C, SH/12
Note: This anchor typical for 31/00 and 15/800 G.P.M. pumps.
Anchor bolts, 4" for 31/00 G.P.M. pumps 5" for 15/800 G.P.M. pumps
Motor operated gate hoist
Motor operated traveling crane and hoist
Existing Power Centipoise 36 motor driven on all pipes except 9"
Remove 1" screwed plug and furnish & install corporation cock in at this point
Floor pipe 36/20
Trash rack
Grating
Sump
Pump
Floor #1
Floor #2
Roof
Fence
Ladder
Door
Vent
Hoist
Hook
Pipe hanger
Rod for pipe hanger
Metal end
Face of wall
Top of slab
Invert
Spare
Floor drain
Sluice gate
Valve
Elbow
Tee
Cap
Plug
Reducer
Flange
Coupling
Nipple
Union
Bushing
Gate valve
Check valve
Butterfly valve
Strainer
Meter
Gauge
Thermometer
Pressure gauge
Vacuum gauge
Water meter
Flow meter
Level
Switch
Relay
Transformer
Motor
Generator
Exciter
Rheostat
Ammeter
Voltmeter
Wattmeter
Frequency meter
Power factor meter
Synchroscope
Oscillograph
Recorder
Indicator
Alarm
Signal
Control
Protection
Grounding
Lightning arrester
Circuit breaker
Disconnect switch
Fuse
Capacitor
Reactor
Resistor
Inductor
Potentiometer
Rectifier
Inverter
Converter
Battery
Charger
Meter
Instrument
Panel
Switchboard
Cubicle
Bus
Feeder
Line
Cable
Conduit
Duct
Manhole
Handhole
Pole
Tower
Guy
Insulator
Arrester
Ground
Neutral
Phase
Delta
Wye
Single-line
Three-line
Schematic
Wiring
Connection
Terminal
Block
Strip
Jack
Plug
Receptacle
Lamp
Light
Fixture
Switch
Push button
Key
Lock
Bell
Horn
Siren
Telephone
Intercom
Radio
Antenna
Microphone
Speaker
Headset
Telegraph
Teletype
Facsimile
Television
Camera
Monitor
Screen
Projector
Film
Slide
Chart
Graph
Table
Diagram
Map
Plan
Elevation
Section
Detail
Scale
Dimension
Tolerance
Fit
Finish
Material
Weight
Volume
Area
Length
Width
Height
Depth
Thickness
Diameter
Radius
Angle
Slope
Grade
Elevation
Datum
Benchmark
Survey
Station
Offset
Bearing
Azimuth
Declination
Latitude
Longitude
Coordinate
Grid
Zone
Meridian
Parallel
Equator
Pole
Hemisphere
Continent
Ocean
River
Lake
Island
Peninsula
Bay
Gulf
Strait
Channel
Harbor
Port
Dock
Pier
Wharf
Quay
Jetty
Breakwater
Seawall
Revetment
Levee
Dike
Dam
Spillway
Gate
Lock
Canal
Tunnel
Bridge
Culvert
Ford
Ferry
Road
Railroad
Airport
Runway
Taxiway
Apron
Hangar
Terminal
Control tower
Navigation light
Buoy
Beacon
Lighthouse
Fog signal
Radar
Sonar
Loran
Decca
Omega
Satellite
Weather
Meteorology
Hydrology
Geology
Seismology
Oceanography
Astronomy
Navigation
Surveying
Photogrammetry
Cartography
Geodesy
Gravimetry
Magnetometry
Seismometry
Tide
Current
Wave
Swell
Surf
Beach
Dune
Cliff
Reef
Shoal
Bar
Delta
Estuary
Marsh
Swamp
Forest
Grassland
Desert
Tundra
Glacier
Iceberg
Snow
Ice
Rain
Hail
Sleet
Fog
Mist
Cloud
Wind
Storm
Hurricane
Typhoon
Tornado
Earthquake
Volcano
Tsunami
Landslide
Avalanche
Flood
Drought
Fire
Pollution
Erosion
Sedimentation
Deposition
Weathering
Metamorphism
Igneous
Sedimentary
Metamorphic
Rock
Mineral
Ore
Coal
Oil
Gas
Water
Soil
Clay
Sand
Gravel
Silt
Loam
Peat
Humus
Topsoil
Subsoil
Bedrock
Aquifer
Groundwater
Spring
Well
Reservoir
Pond
Lake
River
Stream
Creek
Brook
Ditch
Canal
Pipeline
Tank
Silo
Barn
House
Building
Factory
Mill
Mine
Quarry
Pit
Dump
Landfill
Incinerator
Sewage
Treatment
Plant
Station
Substation
Power
Transmission
Distribution
Generation
Turbine
Boiler
Condenser
Cooling tower
Fuel
Combustion
Engine
Motor
Pump
Compressor
Fan
Blower
Valve
Pipe
Fitting
Flange
Gasket
Bolt
Nut
Washer
Screw
Rivet
Weld
Solder
Braze
Glue
Adhesive
Paint
Coating
Insulation
Refractory
Gasket
Seal
Packing
Lubrication
Bearing
Shaft
Coupling
Gear
Belt
Chain
Sprocket
Pulley
Clutch
Brake
Flywheel
Governor
Speed
Torque
Power
Energy
Work
Force
Pressure
Temperature
Flow
Velocity
Acceleration
Mass
Density
Viscosity
Heat
Light
Sound
Electricity
Magnetism
Gravity
Time
Frequency
Wavelength
Amplitude
Phase
Resonance
Vibration
Noise
Signal
Data
Information
Communication
Transmission
Reception
Modulation
Demodulation
Amplification
Attenuation
Distortion
Noise
Interference
Shielding
Grounding
Bonding
Safety
Hazard
Risk
Accident
Injury
Fatality
Emergency
Rescue
First aid
Fire
Explosion
Toxic
Radiation
Contamination
Decontamination
Disposal
Recycling
Reuse
Conservation
Efficiency
Economy
Cost
Budget
Estimate
Contract
Specification
Drawing
Report
Record
Archive
Library
Training
Education
Research
Development
Design
Construction
Operation
Maintenance
Repair
Replacement
Inspection
Testing
Commissioning
Acceptance
Warranty
Guarantee
Liability
Insurance
Bond
Claim
Dispute
Arbitration
Litigation
Settlement
Agreement
Partnership
Corporation
Government
Agency
Department
Bureau
Office
Division
Section
Unit
Team
Group
Committee
Board
Council
Commission
Authority
Jurisdiction
Regulation
Law
Code
Standard
Guideline
Procedure
Policy
Plan
Program
Project
Task
Activity
Event
Milestone
Deadline
Schedule
Calendar
Clock
Watch
Timer
Counter
Meter
Gauge
Instrument
Sensor
Transducer
Actuator
Controller
Regulator
Governor
Feedback
Loop
System
Subsystem
Component
Part
Assembly
Module
Unit
Device
Machine
Tool
Equipment
Facility
Infrastructure
Network
Grid
Matrix
Array
Vector
Tensor
Scalar
Variable
Constant
Parameter
Function
Equation
Model
Simulation
Analysis
Calculation
Measurement
Observation
Experiment
Hypothesis
Theory
Law
Principle
Concept
Idea
Invention
Innovation
Discovery
Publication
Patent
Trademark
Copyright
Intellectual property
Knowledge
Wisdom
Skill
Expertise
Profession
Occupation
Career
Employment
Labor
Management
Leadership
Organization
Culture
Ethics
Values
Mission
Vision
Strategy
Goal
Objective
Target
Performance
Quality
Reliability
Availability
Maintainability
Safety
Security
Sustainability
Resilience
Adaptability
Flexibility
Scalability
Interoperability
Compatibility
Standardization
Modularity
Redundancy
Diversity
Complexity
Simplicity
Elegance
Beauty
Art
Science
Engineering
Technology
Progress
Change
Evolution
Revolution
Future
Past
Present
History
Memory
Learning
Adaptation
Survival
Extinction
Life
Death
Birth
Growth
Decay
Cycle
Rhythm
Pattern
Order
Chaos
Entropy
Information
Meaning
Purpose
Value
Worth
Quality
Quantity
Number
Word
Language
Writing
Reading
Speaking
Listening
Thinking
Feeling
Perception
Consciousness
Mind
Body
Soul
Spirit
God
Universe
Existence
Nothingness
Infinity
Eternity
Time
Space
Matter
Energy
Force
Field
Wave
Particle
Quantum
Relativity
Gravity
Electromagnetism
Strong force
Weak force
Unified theory
Theory of everything
Big bang
Expansion
Contraction
Oscillation
Steady state
Multiverse
Parallel universe
Alternate reality
Simulation
Virtual reality
Artificial intelligence
Machine learning
Neural network
Deep learning
Natural language processing
Computer vision
Robotics
Automation
Industry 4.0
Internet of things
Big data
Cloud computing
Edge computing
Blockchain
Cryptocurrency
Digital twin
Augmented reality
Mixed reality
Wearable technology
Smart city
Smart grid
Smart home
Smart factory
Smart manufacturing
Additive manufacturing
3D printing
Nanotechnology
Biotechnology
Genetic engineering
Synthetic biology
Bioinformatics
Computational biology
Systems biology
Neuroscience
Cognitive science
Psychology
Sociology
Anthropology
Economics
Finance
Accounting
Marketing
Sales
Customer service
Human resources
Legal
Compliance
Risk management
Quality assurance
Project management
Program management
Portfolio management
Change management
Configuration management
Release management
Deployment
Operations
Support
Maintenance
Upgrade
Migration
Integration
Testing
Validation
Verification
Certification
Accreditation
Audit
Review
Assessment
Evaluation
Improvement
Optimization
Automation
Digitization
Transformation
Disruption
Innovation
Entrepreneurship
Startup
Venture capital
Angel investor
Crowdfunding
Initial public offering
Merger
Acquisition
Divestiture
Bankruptcy
Liquidation
Restructuring
Turnaround
Growth
Expansion
Diversification
Specialization
Globalization
Localization
Outsourcing
Offshoring
Nearshoring
Reshoring
Supply chain
Logistics
Transportation
Warehousing
Inventory
Procurement
Purchasing
Vendor
Supplier
Customer
Market
Competition
Strategy
Tactics
Operations
Finance
Accounting
Marketing
Sales
Customer service
Human resources
Legal
Compliance
Risk management
Quality assurance
Project management
Program management
Portfolio management
Change management
Configuration management
Release management
Deployment
Operations
Support
Maintenance
Upgrade
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Validation
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Accreditation
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Review
Assessment
Evaluation
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Venture capital
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Initial public offering
Merger
Acquisition
Divestiture
Bankruptcy
Liquidation
Restructuring
Turnaround
Growth
Expansion
Diversification
Specialization
Globalization
Localization
Outsourcing
Offshoring
Nearshoring
Reshoring
Supply chain
Logistics
Transportation
Warehousing
Inventory
Procurement
Purchasing
Vendor
Supplier
Customer
Market
Competition
Strategy
Tactics
Operations
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Program management
Portfolio management
Change management
Configuration management
Release management
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Upgrade
Migration
Integration
Testing
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Verification
Certification
Accreditation
Audit
Review
Assessment
Evaluation
Improvement
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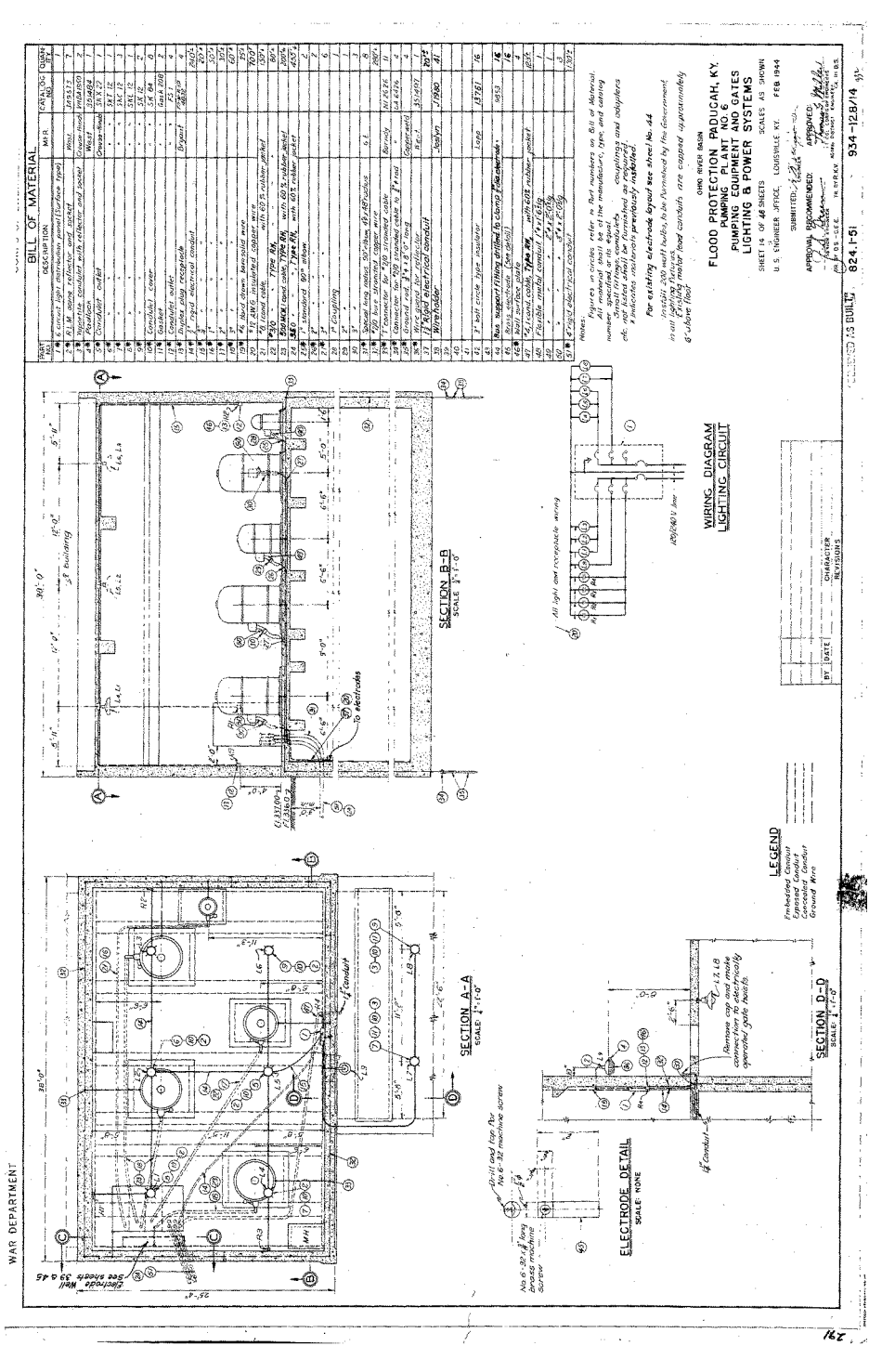
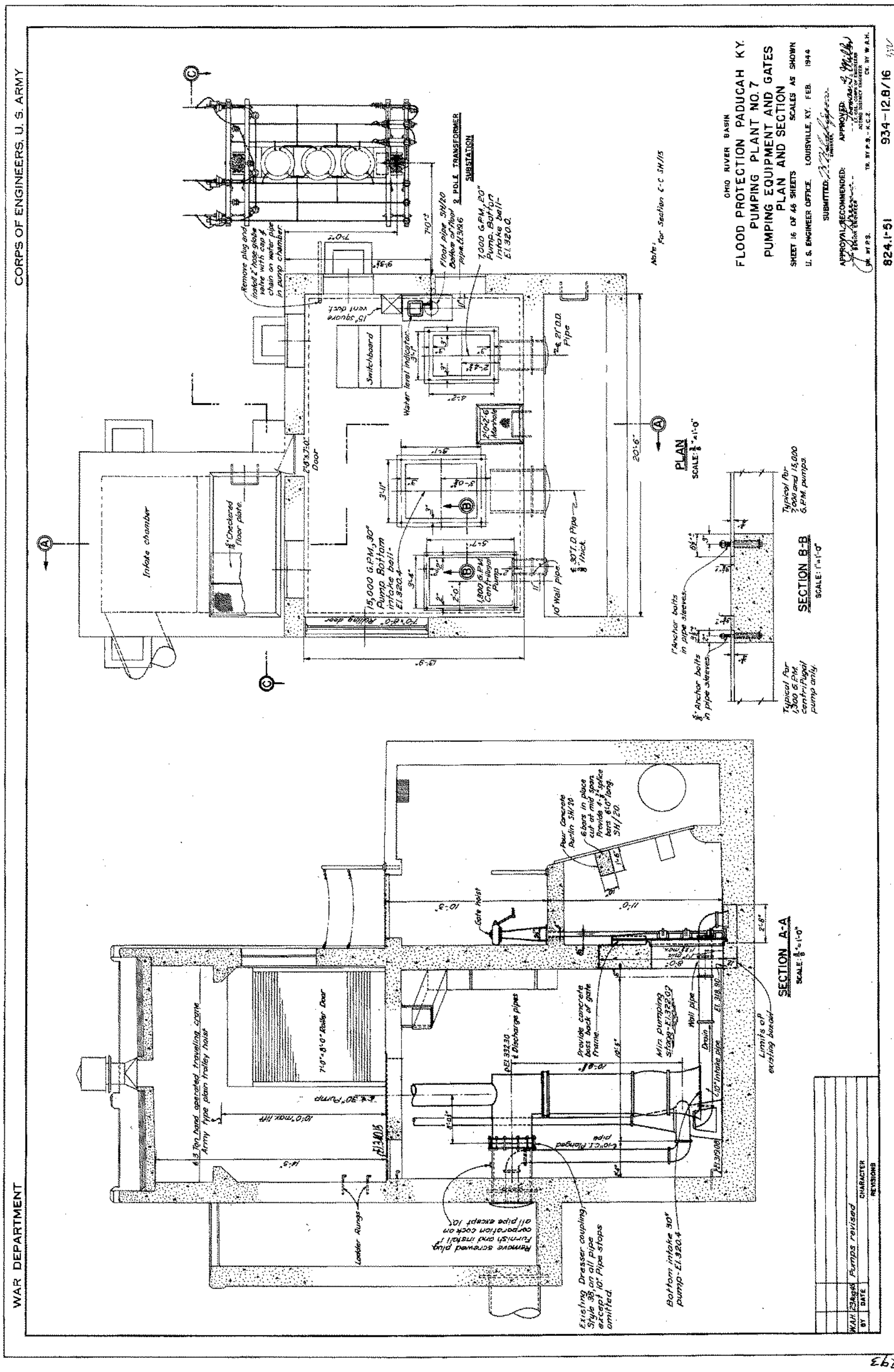
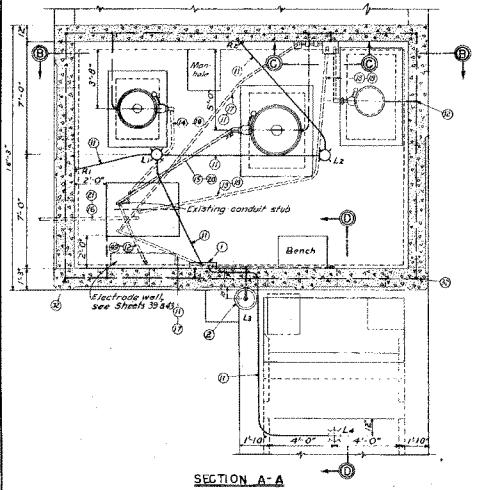
Angel investor
Crowdfunding
Initial public offering
Merger
Acquisition
Divestiture
Bankruptcy
Liquidation
Restructuring
Turnaround
Growth
Expansion
Diversification
Specialization
Globalization
Localization
Outsourcing
Offshoring
Nearshoring
Reshoring
Supply chain
Logistics
Transportation
Warehousing
Inventory
Procurement
Purchasing
Vendor
Supplier
Customer
Market
Competition
Strategy
Tactics

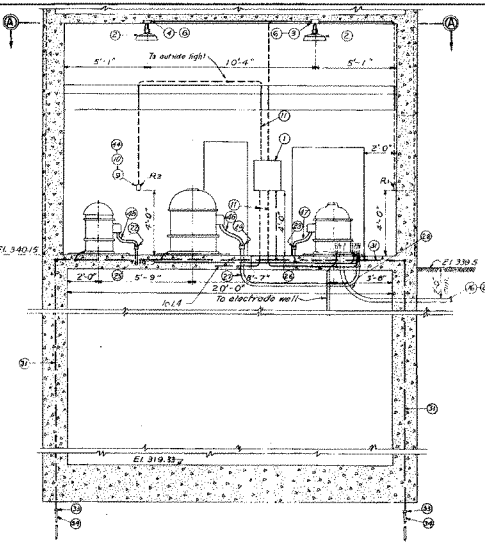

WAR DEPARTMENT
BILL OF MATERIAL
FLOOD PROTECTION PADUCAH, KY.
PUMPING EQUIPMENT AND GATES
LIGHTING & POWER SYSTEMS
934-128/14
824.1-51
SECTION A-A
SECTION B-B
SECTION D-D
ELECTRODE DETAIL
WIRING DIAGRAM
LIGHTING CIRCUIT
LEGEND
Remove cap and make connection to normally operated gate hoists.
To electrodes
Existing 200 watt bulbs, to be furnished by the Government, in wire guards.
Existing motor lead conduits are capped approximately 6' above floor.
OHIO RIVER BASIN

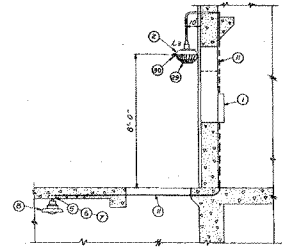

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH KY.
PUMPING PLANT NO. 7
PUMPING EQUIPMENT AND GATES
PLAN AND SECTION
PLAN
SECTION A-A
SECTION B-B
Intake chamber
Switchboard
934-12.8/16
824.1-51
"BELIEVED AS BUILT"

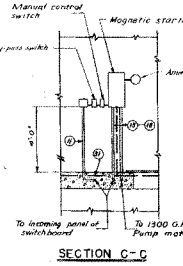
WAR DEPARTMENT

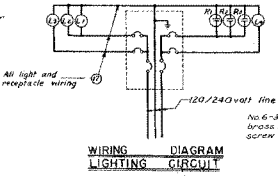
CORPS OF ENGINEERS, U. S. ARMY

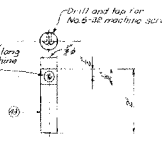












LEGEND

Embedded Conduit ———

Exposed Conduit - - - -

Ground Wire ———

Concealed Conduit - - - -

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUAN
1*	4 circuit light distribution panel (surface type)			1
2*	R.L.M. dome reflector and socket	West.	349573	3
3*	Condulet outlet	Crouse-Hinds	SKT 12	1
4*	" "	"	SKL 12	1
5*	" "	"	SK 12	1
6*	Condulet cover	"	SK 59	3
7*	Condulet gasket	"	Gask 208	1
8*	Vaportite conduit with reflector and socket	"	#NDA 1933	1
9*	Condulet outlet	"	FS1	3
10*	Duplex plug receptacle	Bryant	5252-B (SI)	3
11*	½" Rigid electrical conduit			155'
12*	¾" " "			215'
13*	1" " "			40'
14*	1¼" " "			15'
15*	2" " "			15'
16*	3" " "			40'
17	#2 A.W.G. insulated copper wire			310'
18	#8 A.W.G. tons cable, Type RH, with 60% rubber jacket			120'
19	#4 A.W.G. " " " " " "			40'
20	#6 A.W. " " " " " "			45'
21	#300 M.C.M. " " " " "			120'
22	1" counting			1
23	1¼" "			1
24	2" "			1
25*	1" Str. 90° Elbow			4
26*	1½" " "			2
27	2" " "			2
28*	Special long radius 90° elbow, 3"ϕ x 36" rad.	G.E.		2
29*	Wire guard for reflector	West.	351497	1
30*	Padlock	"	351489	
31*	#2/0 bare stranded copper cable			200'
32*	T connector for #2/0 copper cable	Burndy	NT 6626	10
33*	Connector for #2/0 str. cable to ¾" grnd. rod	"	GA 6626	4
34	Ground rod ¾"ϕ, 8' long	Copperweld		4
35				
36				
37				
38				
39				
40	3 bolt circle type insulators	West.	491736	
41	Bus support fitting (nut to clamp ⅝" bare solid wire	Lacke	3853	
42	" " " " " ⅝" electrode	"	"	1
43	Brass electrode (See Detail)			
44*	Wall surface plate	Bryant	HY-31	3
45	Flexible metal conduit ¾"x12'0" lg.			1
46	" " 2"x12'6" lg.			1
47	" " ¾"x2'0" lg.			1
48	Wireholder	Joslyn	JJ980	17
49	#12 insulated copper wire, Type SNW			175'

Notes:

Figures in circles refer to part No. in Bill of Material.

All material shall be of the manufacture, type and catalog number specified or its equal.

Conduit fittings, conduilets E.M.T. couplings and adapters etc. not listed shall be furnished as required.

Two existing conduit stubs on conduit run which is to be abandoned between switchgear and motor shall be cut off level with floor and plugged with concrete.

* Indicates material previously installed

Install 200 watt bulbs, to be furnished by the Government, in all lighting fixtures.

Existing motor lead conduits are capped approximately 6" above floor.

For existing conduit and electrode layout see sheet 46

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 7

PUMPING EQUIPMENT & GATES

LIGHTING & POWER SYSTEMS

SHEET 17 OF 46 SHEETS SCALE ⅛" = 1'-0"

U.S. ENGINEER OFFICE. LOUISVILLE, KY. FEB. 1944

SUBMITTED: [signature]

APPROVED RECOMMENDED: [signature] DESIGN ENGINEER

APPROVED: [signature] CHIEF, DIST. ENGINEERS, OHIO RIVER DIVISION, DISTRICT ENGINEER

DR. BY A.L.T. TR. BY M.L. CK. BY D.S.

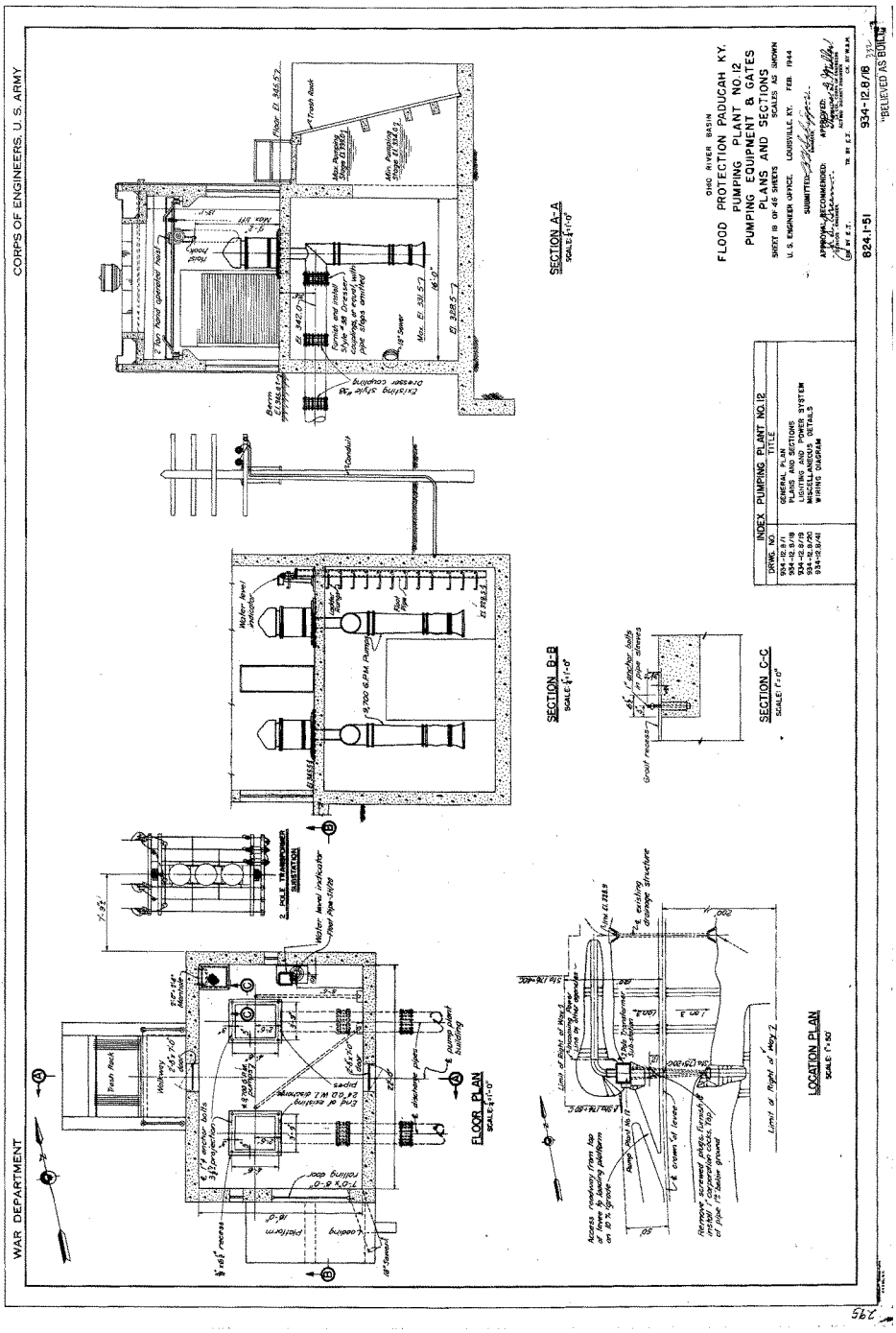
824.1-51

934-12.8/17

"BELIEVED AS BUILT"

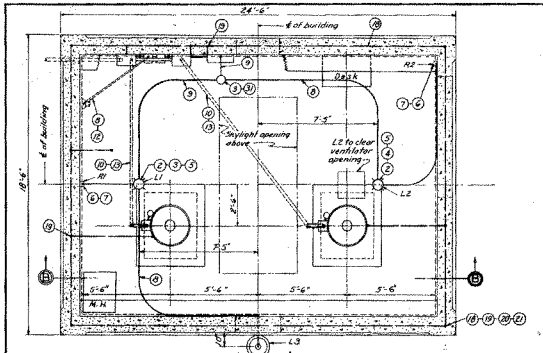
BY	DATE	CHARACTER OF REVISIONS

1057

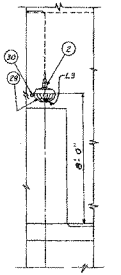

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH KY.
PUMPING PLANT NO.12
PUMPING EQUIPMENT & GATES
PLANS AND SECTIONS
SHEET 19 OF 46 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944
SUBMITTED
APPROVED RECOMMENDED
INDEX PUMPING PLANT NO.12
DRWG. NO. TITLE
934-12.8/8 GENERAL PLAN
934-12.8/9 PLANS AND SECTIONS
934-12.8/10 LIGHTING AND POWER SYSTEM
934-12.8/11 MISCELLANEOUS DETAILS
934-12.8/40 WIRING DIAGRAM
824.1-51
934-12.8/8
REVISED AS BUILT
FLOOR PLAN
SECTION A-A
SECTION B-B
SECTION C-C
LOCATION PLAN

WAR DEPARTMENT

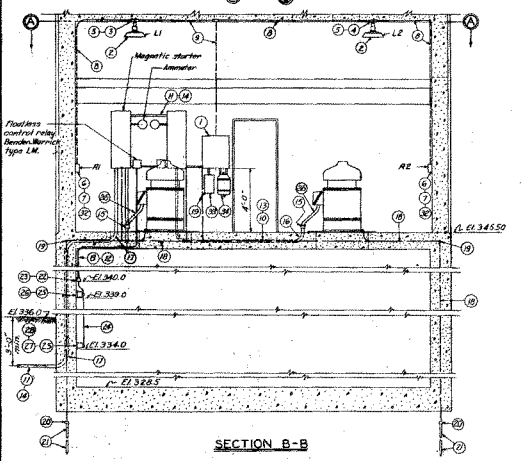
CORPS OF ENGINEERS, U. S. ARMY



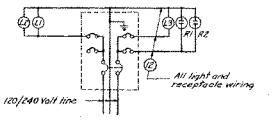
SECTION A-A



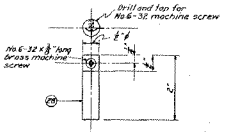
SECTION C-C



SECTION B-B



WIRING DIAGRAM OF LIGHTING CIRCUIT



ELECTRODE DETAIL

SCALE: NONE

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUANTITY
1	4-Circuit light distribution panel (surface type)			1
2	ALM dome reflector and socket	West	349513	3
3	Condulet outlet	Crouse-Hinds	XKT 22	2
4	" "	" "	XKL 16	1
5	" cover	" "	XKB8	2
6	" outlet	" "	FS-1	2
7	Duplex plug receptacle			2
8	¾" rigid electrical conduit			100ft
9	½" " "			30ft
10	¾" " "			40ft
11	¼" " "			40ft
12A	#12 AWG insulated copper wire			300ft*
13A	#9 AWG, 1-cond cable, Type RH, with 60% rubber jacket			125ft*
13B	#14 " " " Type SNW			12.5ft*
15A	¼" Coupling			2
16	¼" Std. 90° elbow			4
17	¼" " " "			4
18	#5/0 bare stranded copper cable			190ft
19	"T" connector for #5/0 stranded cable	Burndy	NT2626	10
20	Connector for #5/0 stranded cable to ¾" ground rod	"	GA6426	4
21	Ground rod, ¾"x8'	Copperweld		4
22	Condulet outlet	Crouse-Hinds	A17	1
23	" cover	" "	1771	1
24	#6 AWG, hard drawn copper wire			6*
25	3" bolt circle type insulator	Loop	13761	2
26	Bus support fitting, Drill to clamp #6 bare solid wire	Locke	9853	1
27	" " " ¾" ø electrode	"		1
28	Brass electrode, ¾" ø x 8' long (See detail)			1
29	Wire guard for reflector	West	351497	1
30	Padlock	"	351484	1
31	Condulet cover	Crouse-Hinds	XK809	1
32	Wall surface plate			2
33	Enclosed Fused switch, 2 pole, cover interlocked	Croyton	66761	1
34	Transformer, 460-115/230 V, 2 KVA, dry type	West	911418	1
35	Flexible metal conduit ½"ø x 2'-0" lg			2"

Note:
Figures in circles refer to part numbers on bill of material.
All material shall be of the manufacture, type, and catalog number specified, or its equal.
Small fittings, conduits, couplings and adapters, etc. not listed shall be furnished as required.
* Indicates materials to be furnished and installed under this contract. Other materials listed and shown were installed under previous contract and are of the type and catalog number specified or equal.
Install 200 watt bulbs, Furnished by the Government, in all lighting fixtures.
Existing motor lead conduits are capped approximately 4' above floor.

LEGEND

Embedded conduit
Exposed conduit
Concealed conduit
Ground wire

BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO.12

PUMPING EQUIPMENT AND GATES

LIGHTING & POWER SYSTEMS

SHEET 19 OF 46 SHEETS SCALE: ¼" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [illegible] CHIEF, ENGINEERING DIVISION

APPROVED: RECOMMENDED: [illegible] CHIEF, ENGINEERING DIVISION

APPROVED: [illegible] ACTING DISTRICT ENGINEER

DR. BY C.E.E. TR. BY J.L.F. CK. BY D.S.

824.1-51

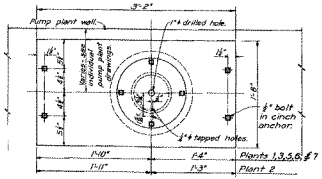
934-12.8/19

"BELIEVED AS BUILT."

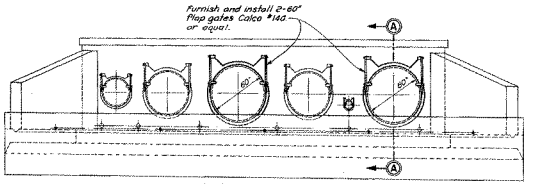
1059

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



PLAN

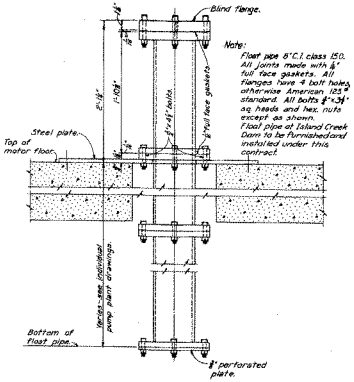


ELEVATION OF EXISTING HEADWALL

SCALE: ¼"=1'-0"

ANCHOR BOLTS AND C.I. PIPE AND FITTINGS TO BE FURNISHED BY THE GOVERNMENT AND INSTALLED BY THE CONTRACTOR.		
PUMPING PLANT	ANCHOR BOLTS FOR SLUICE GATES, GALVANIZED BOLTS WITH 2 GALVANIZED SQ. HD. NUTS EACH.	SUMP PUMP PIPE CLASS 150 FITTINGS CLASS 125, C.I. FLANGED, AMER. STD FLANGES FACED & DRILLED, AMER. STD 125 # GASKETS ⅛" FULL FACE, BOLTS-SQ. HD. & HEX. NUTS.
2.	48 @ ¾"-4 x 12" long 40 @ ¾"-4 x 15" long	10" pipe and fittings. * 13-10"x16" gaskets. 157-¾"+1-3½" bolts.
3.	4 @ ¾"-4 x 12" long 6 @ ¾"-4 x 18" long	6" pipe and fittings. * 9-6"x11" gaskets. 73-¾"+1-3¼" bolts.
5.	16 @ ¾"-4 x 16" long 16 @ ¾"-4 x 18" long	10" & 12" pipe and fittings. * 4-10"x15" gaskets. 4-10"x18" gaskets. 97-¾"+1-3½" bolts.
6.	16 @ ¾"-4 x 16" long 8 @ ¾"-4 x 16" long 16 @ ⅞"-4 x 16" long	8" pipe and fittings. * 10-8"x13½" gaskets. 81-¾"+1-3½" bolts.
7.	8 @ ¾"-4 x 12" long 8 @ ¾"-4 x 18" long	10" pipe and fittings * 8-10"x16" gaskets. 97-¾"+1-3¼" bolts.

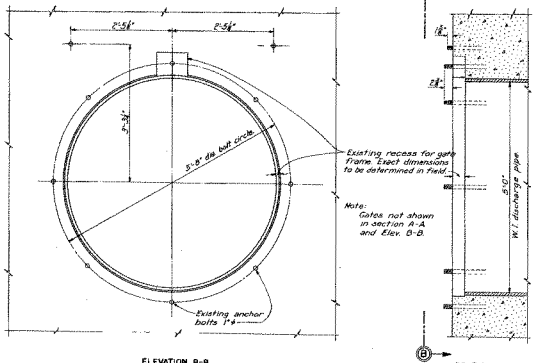
* For pipe sections and fittings see individual pumping plant plans.



ELEVATION

EXISTING FLOAT PIPE DETAIL

SCALE: 1½"=1'-0"



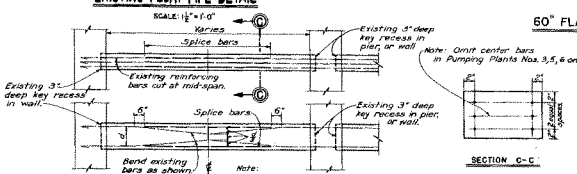
ELEVATION B-B

SCALE: 1"=1'-0"

SECTION A-A

SCALE: 1"=1'-0"

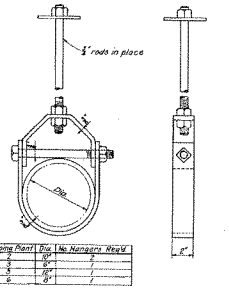
60" FLAP GATES, DISCHARGE HEADWALL, PUMP PLANT NO. 2



TYPICAL PURLIN DETAILS

NO SCALE

SECTION C-C



Pumping Plant	Dia.	No. Hangers Req'd
2	10"	2
3	6"	1
5	10"	1
6	8"	1

Hangers to be furnished by the Government and installed by Contractor

PIPE HANGER

SCALE: NONE

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY.

PUMPING EQUIPMENT & GATES

MISCELLANEOUS DETAILS

SHEET 20 OF 46 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [signature] 6-22-

APPROVED RECOMMENDED: [signature] DISTRICT ENGINEER

APPROVED: [signature] COL. CORPS OF ENGINEERS ACTING DISTRICT ENGINEER

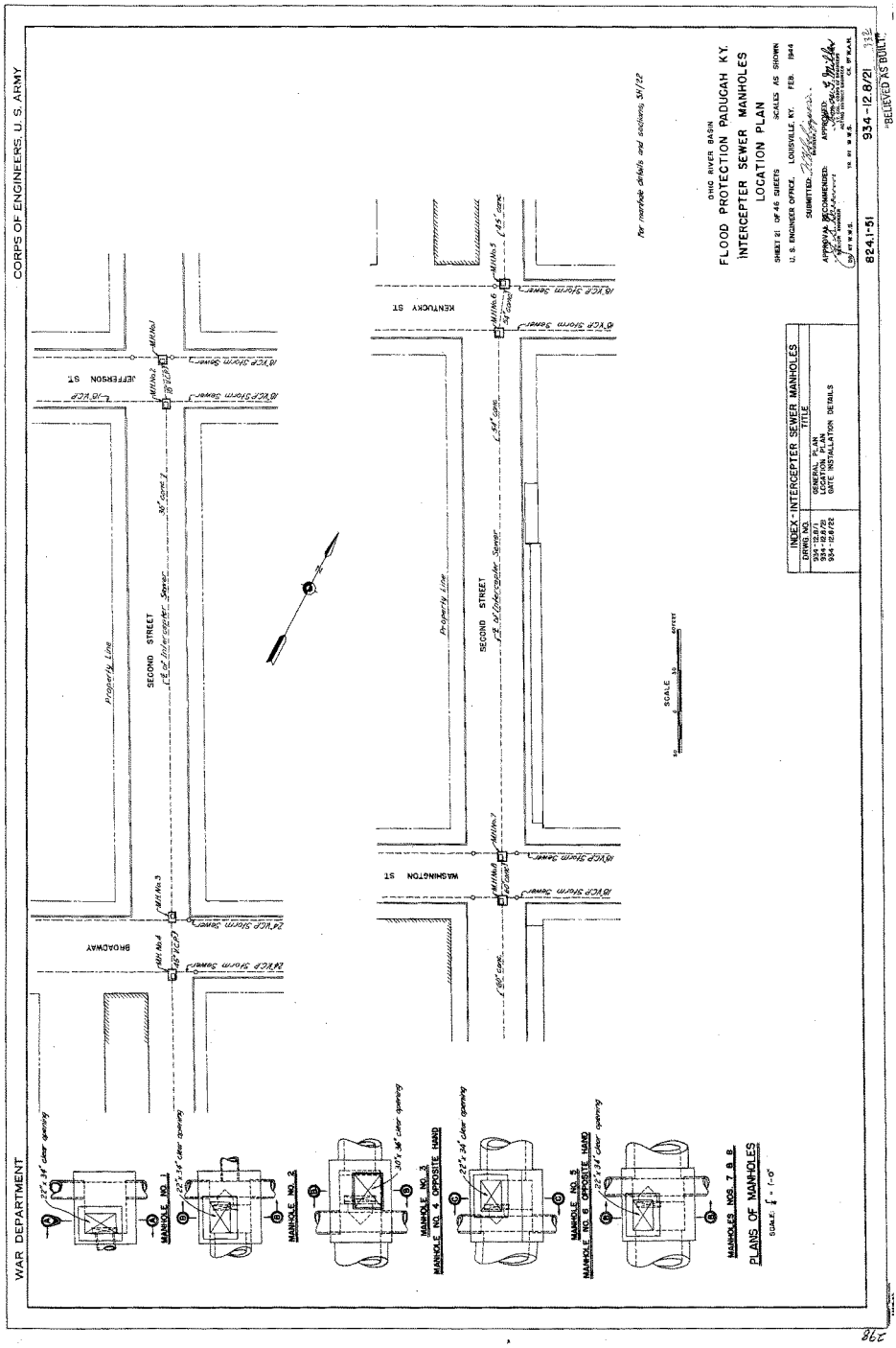
DR. BY E.T. TR. BY H.C.Z. CH. BY WAH.

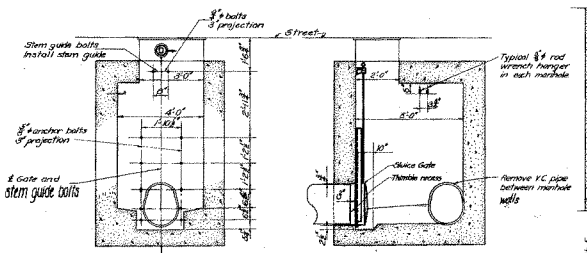
824.1-51 934-12.8/20

"BELIEVED AS BUILT"

1060

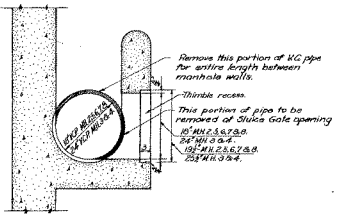
297


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH KY.
INTERCEPTER SEWER MANHOLES
LOCATION PLAN
SHEET 21 OF 46 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944
SUBMITTED
APPROVED RECOMMENDED:
APPROVED:
824.1-51
934-12.8/21
"BELIEVED AS BUILT"
INDEX - INTERCEPTER SEWER MANHOLES
DRWG. NO. TITLE
934-12.8/1 GENERAL PLAN
934-12.8/2 LOCATION PLAN
934-12.8/22 GATE INSTALLATION DETAILS
BROADWAY
JEFFERSON ST
SECOND STREET
WASHINGTON ST
KENTUCKY ST
Property Line
Manhole No. 1
Manhole No. 2
Manhole No. 3
Manhole No. 4
Manhole No. 5
Manhole No. 6
Manhole No. 7
Manhole No. 8
MANHOLE NO. 1
MANHOLE NO. 2
MANHOLE NO. 3
MANHOLE NO. 4 OPPOSITE HAND
MANHOLE NO. 5
MANHOLE NO. 6 OPPOSITE HAND
MANHOLES NOS. 7 & 8
PLANS OF MANHOLES
SCALE 1" = 1'-0"
SCALE
For manhole details and sections SH/22

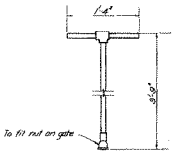


SECTION A-A

SECTION D-D

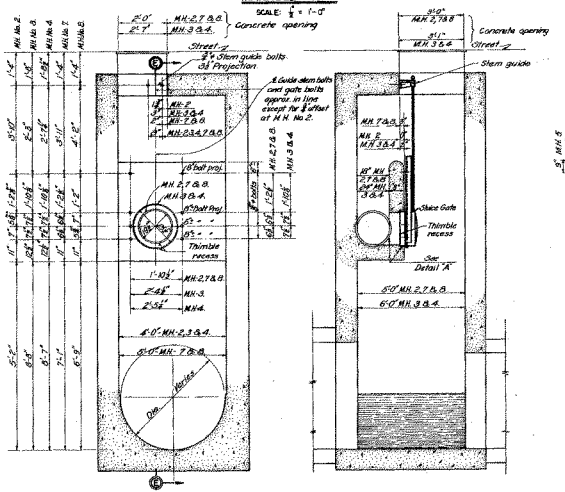


DETAIL "A"
SCALE: 1" = 1'-0"



SOCKET WRENCH
FOR NON-RISING STEM GATES
8 REQ'D.
MATERIAL: MALLEABLE OR WROUGHT IRON
SCALE: NONE

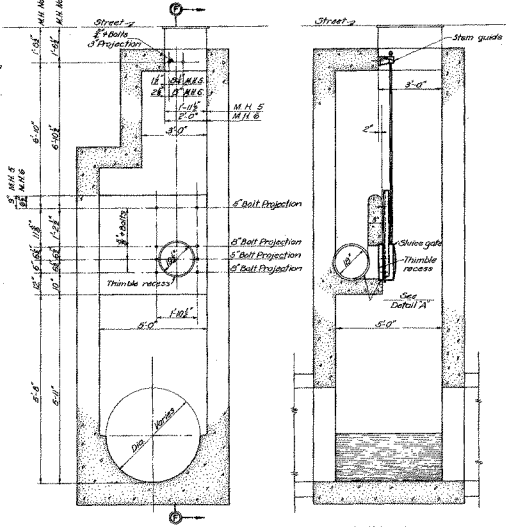
MANHOLE NO. 1
SCALE: ½" = 1'-0"



SECTION B-B

SECTION E-E

MANHOLES NOS. 2,3,4,7 & 8
SCALE: NONE



SECTION C-C

SECTION F-F

MANHOLES NOS. 5 & 6
SCALE: NONE

General Notes:
All anchor bolts are in 12" ø sleeves 9" deep.
Bolt spacing dimensions given are approximate only and may vary 2" from as shown.
Exact dimensions shall be determined in field by contractor before ordering gates and guides.
Furnish 3 sluice 6'-0" sluice gates, one each in Manholes Nos. 1, 2, 5, 6, 7 & 8 and 2-24" sluice gates, one each in Manholes Nos. 3 and 4. Gates to be self contained, circular, unsealing pressure, Hardesty Mfg. Co., Model 50-10C, or equal, complete with stem guide and operating wrench. Operating nuts on all gates shall be of uniform size.
For location of manholes and sections, Sht 12.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY
INTERCEPTER SEWER MANHOLES
GATE INSTALLATION DETAILS

SHEET 22 OF 46 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [signature]
DRAFTSMAN

APPROVAL RECOMMENDED: [signature]
DISTRICT ENGINEER

APPROVED: [signature]
COL. CORPS OF ENGINEERS
ACTING DISTRICT ENGINEER

TR. BY R.K.V. CK. BY W.A.H.

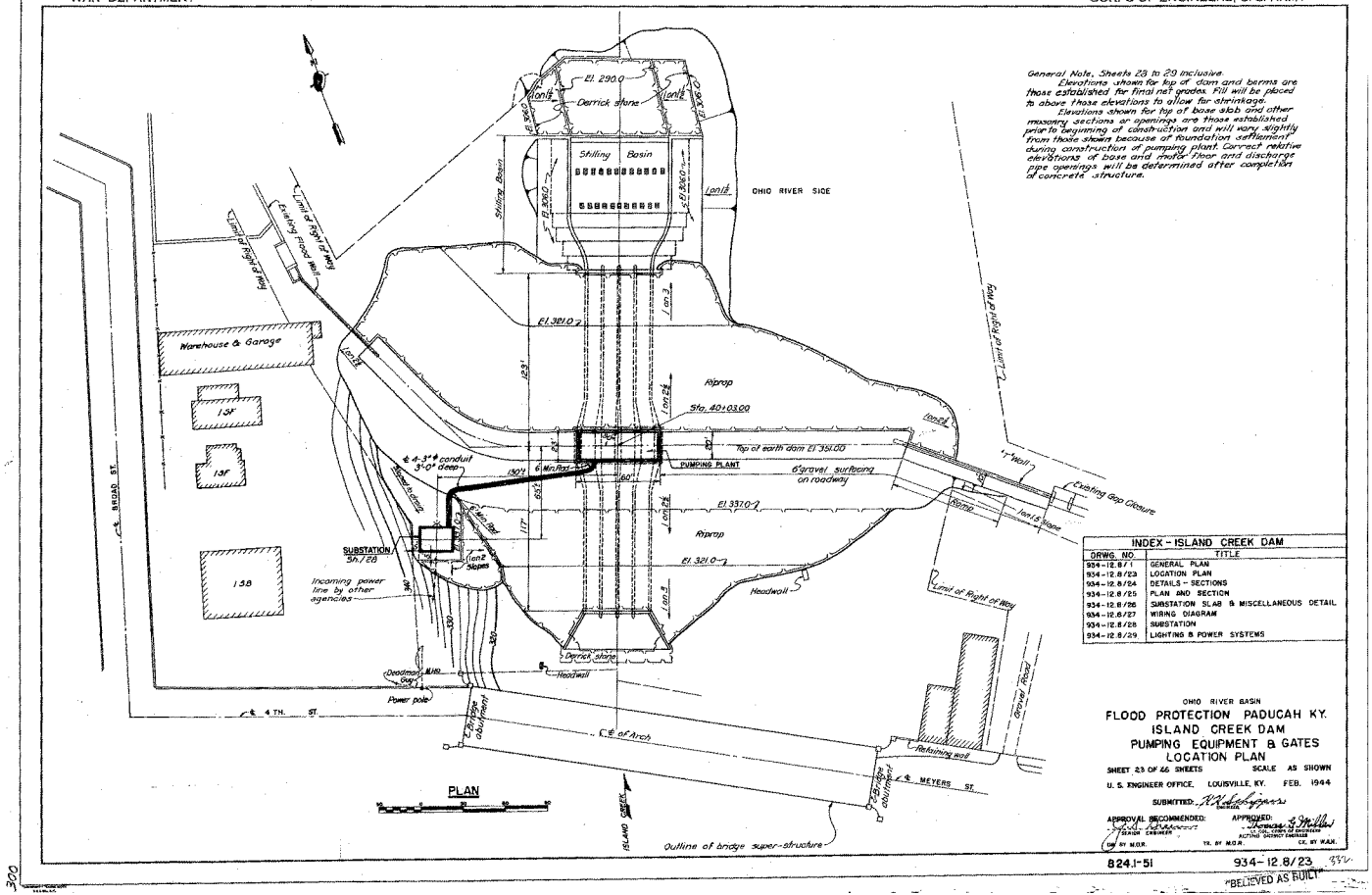
824.1-51 934-12.8/22

"BELIEVED AS BUILT"

1062

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



General Note, Sheets 28 to 29 inclusive

Elevations shown for top of dam and berms are those established for final net grades. Fill will be placed to above those elevations to allow for shrinkage.

Elevations shown for top of base slab and other masonry sections or openings are those established prior to beginning of construction and will vary slightly from those shown because of foundation settlement during construction of pumping plant. Correct relative elevations of base and motor floor and discharge pipe openings will be determined after completion of concrete structure.

INDEX - ISLAND CREEK DAM

DRWG. NO.	TITLE
934-12.8/1	GENERAL PLAN
934-12.8/23	LOCATION PLAN
934-12.8/24	DETAILS - SECTIONS
934-12.8/25	PLAN AND SECTION
934-12.8/26	SUBSTATION SLAB & MISCELLANEOUS DETAIL
934-12.8/27	WIRING DIAGRAM
934-12.8/28	SUBSTATION
934-12.8/29	LIGHTING & POWER SYSTEMS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY.

ISLAND CREEK DAM

PUMPING EQUIPMENT & GATES

LOCATION PLAN

SHEET 23 OF 66 SHEETS SCALE AS SHOWN

U. S. ENGINEER OFFICE. LOUISVILLE, KY. FEB. 1944

SUBMITTED: [signature]

APPROVAL RECOMMENDED: [signature] DIVISION ENGINEER

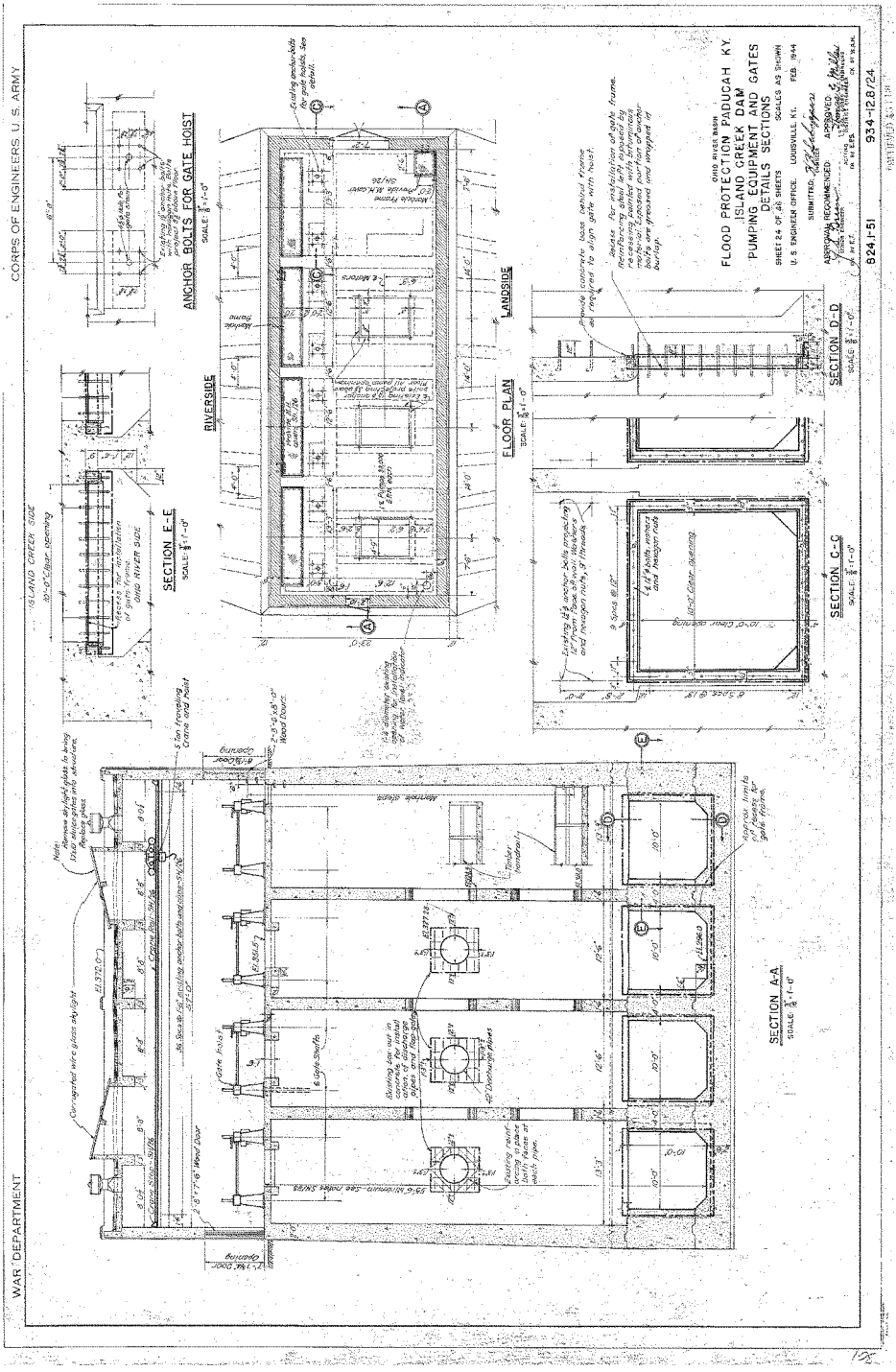
APPROVED: [signature] COLONEL, CORPS OF ENGINEERS ACTING DISTRICT ENGINEER

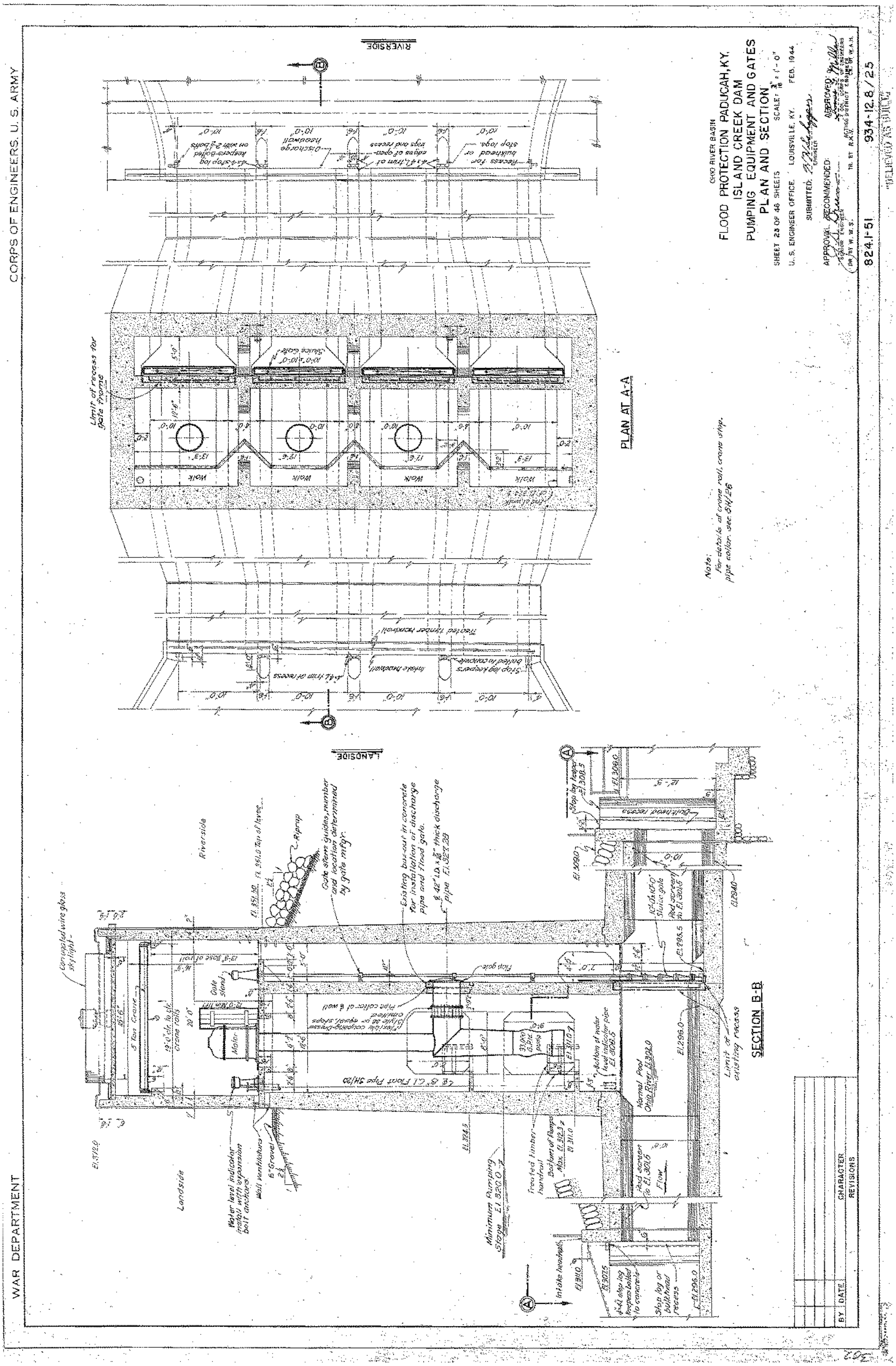
DR. BY M.O.R. TR. BY M.O.R. CK. BY W.A.M.

824.1-51 934-12.8/23

"BELIEVED AS BUILT"

1063

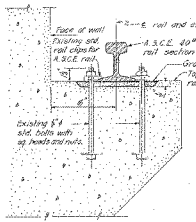

WAR DEPARTMENT
CORPS OF ENGINEERS U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH KY.
ISLAND CREEK DAM
PUMPING EQUIPMENT AND GATES
DETAILS SECTIONS
SCALES AS SHOWN
SHEET 24 OF 48 SHEETS
U. S. ENGINEER OFFICE, LOUISVILLE, KY., FEB. 1944
SUBMITTED
APPROVED
934-12.8/24
824.1-51
ANCHOR BOLTS FOR GATE HOIST
SECTION E-E
SECTION A-A
SECTION C-C
SECTION D-D
FLOOR PLAN
RIVERSIDE
LANDSIDE
ISLAND CREEK SIDE



WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
SECTION B-B
PLAN AT A-A
LANDSIDE
RIVERSIDE
Landside
Riverside
Corrugated wire glass skylight
5 Ton Crane
19'-0" ctr. to ctr. crane rails
Motor
Gate stand
Water level indicator install with expansion bolt anchors
Wall ventilators
6" Gravel
Riprap
El. 351.0 Top of levee
Gate stem guides, number and location determined by gate mfg'r.
Existing box-out in concrete for installation of discharge pipe and flood gate.
Minimum Pumping Stage El. 320.0
Treated timber handrail
Intake headwall
Normal Pool Ohio River El. 302.0
Flow
Rod screen
Sluice gate
Flap gate
Limit of existing recess
Stop log or bulkhead recess
Bulkhead recess
Limit of recess for gate frame
Walk
Stop log keepers bolted to concrete
Discharge headwall
Recess for bulkhead or stop logs.
Note: For details of crane rail, crane stop, pipe collar, see SH/26
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
PUMPING EQUIPMENT AND GATES
PLAN AND SECTION
SHEET 23 OF 46 SHEETS
U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
BY DATE CHARACTER
REVISIONS
824.1-51
934-12.8/25
"BELIEVED AS BUILT"

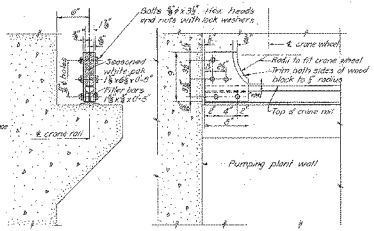
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



RAIL ANCHORAGE DETAIL

SCALE: 3"=1'-0"

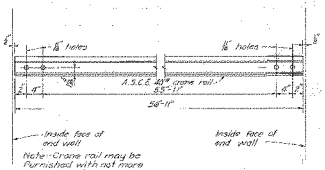


CRANE STOP DETAILS

MATERIAL: STRUCTURAL STEEL, EXCEPT AS SHOWN

MK. CS1 = MAKE 6

SCALE: 1½"=1'-0"

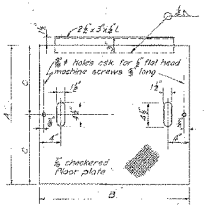


CRANE RAIL DETAIL

MATERIAL: STRUCTURAL STEEL

MK. CR1 = MAKE 2

SCALE: 1½"=1'-0"

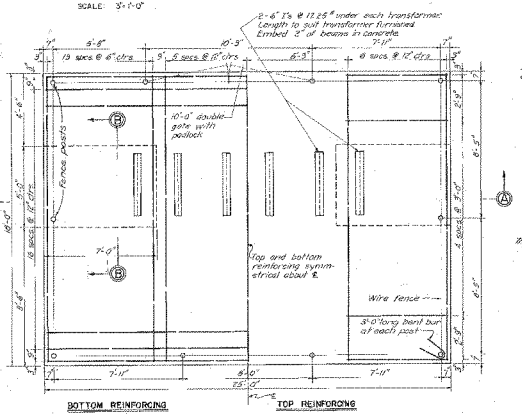


MANHOLE COVER

SCALE: NONE

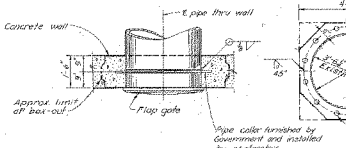
MANHOLE COVERS

Manhole Size	A	B	C	Angle Spacing	Hand holes	Make	Mark	Wt. each
2'-0"x2'-0"	1'-8"	2'-2"	1⅛	none	2	1	MC1	135#
2'-0"x3'-0"	2'-8"	3'-2"	1⅛	none	2	4	MC2	194#
2'-0"x10'-0"	2'-8"	10'-2"	1⅛	1'-10"	2	20	MC3	1102#



PLAN-TRANSFORMER SLAB

SCALE: ⅜"=1'-0"



PLAN ELEVATION

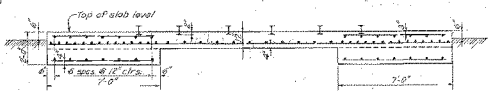
PIPE COLLAR

MATERIAL: STRUCTURAL STEEL

MAKE 8

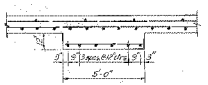
SCALE: ½"=1'-0"

Note: Square pipe collars will be furnished to the contractor who shall cut the corners and increase the inside dia. as indicated and drill or punch the 3" holes as shown.



SECTION A-A

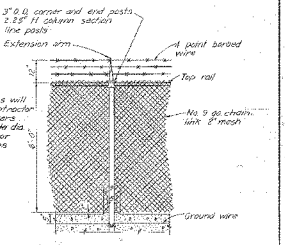
SCALE: ⅜"=1'-0"



SECTION B-B

SCALE: ⅜"=1'-0"

Note: 1655 linear feet of ⅝"ϕ steel reinforcing bars requires total weight of 1,105# Cut and bend bars in field.



WIRE FENCE DETAIL

SCALE: ½"=1'-0"

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY

ISLAND CREEK DAM

PUMPING EQUIPMENT AND GATES

SUBSTATION SLAB & MISCELLANEOUS DETAIL

SHEET 28 OF 48 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [illegible] Engineer

APPROVAL RECOMMENDED: [illegible] SENIOR ENGINEER

APPROVED: [illegible] Lt. Col., Corps of Engineers, Acting District Engineer

DR. BY E.T. TR. BY E.P.S. CK. BY W.A.U.

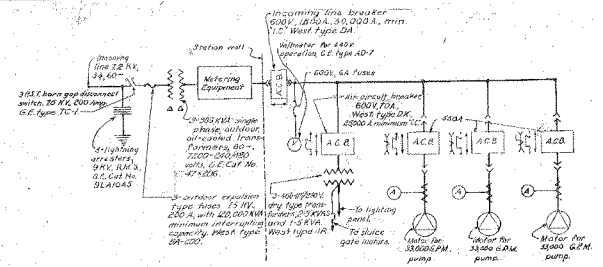
824.1-51 934-12.8/26

"BELIEVED AS BUILT"

1066

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY

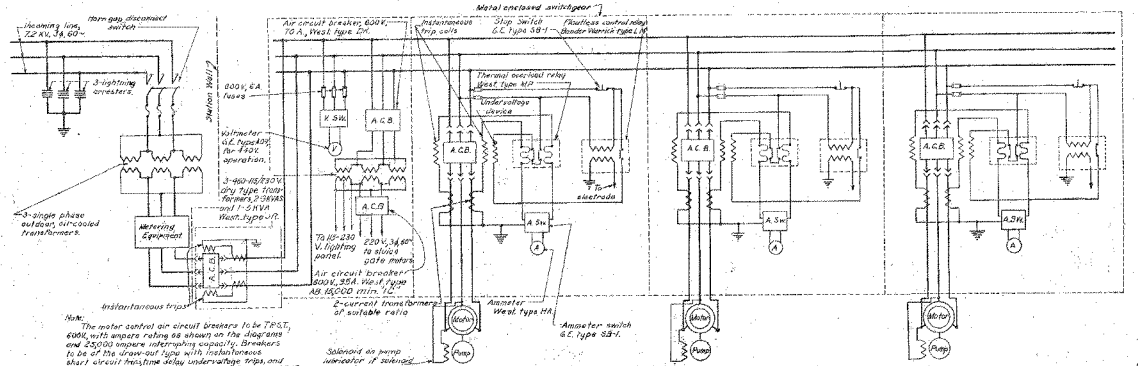


SINGLE LINE DIAGRAM

LEGEND

- A.C.B. or Air circuit breaker
- Heater element
- Undervoltage device
- Thermal overload relay
- Instantaneous overcurrent trip
- Current transformer
- V Voltmeter
- A Ammeter
- Squirrel cage induction motor
- or Fuse
- Contactor switch

Note: All equipment shall be of the manufacture, type, and catalog number specified, or its equal.



Note:
The motor control air circuit breakers to be T.P.S.T., 600V, with ampere rating as shown on the diagrams and 25,000 ampere interrupting capacity. Breakers to be of the draw-out type with instantaneous short circuit trip, time delay undervoltage trips, and thermal overload relays. West type DK, G.E. type AE-18.
Switchgear will be furnished by the government & shall be installed under this contract.
The incoming line air circuit breaker shall be T.P.S.T., 600V, 1800A., 50,000A. interrupting capacity. Breakers to be of the draw-out type with instantaneous short circuit trips, West type DA.

BY	DATE	CHARACTER OF REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
PUMPING EQUIPMENT AND GATES
WIRING DIAGRAM

SHEET 27 OF 46 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1942

SUBMITTED: [signature] ENGINEER

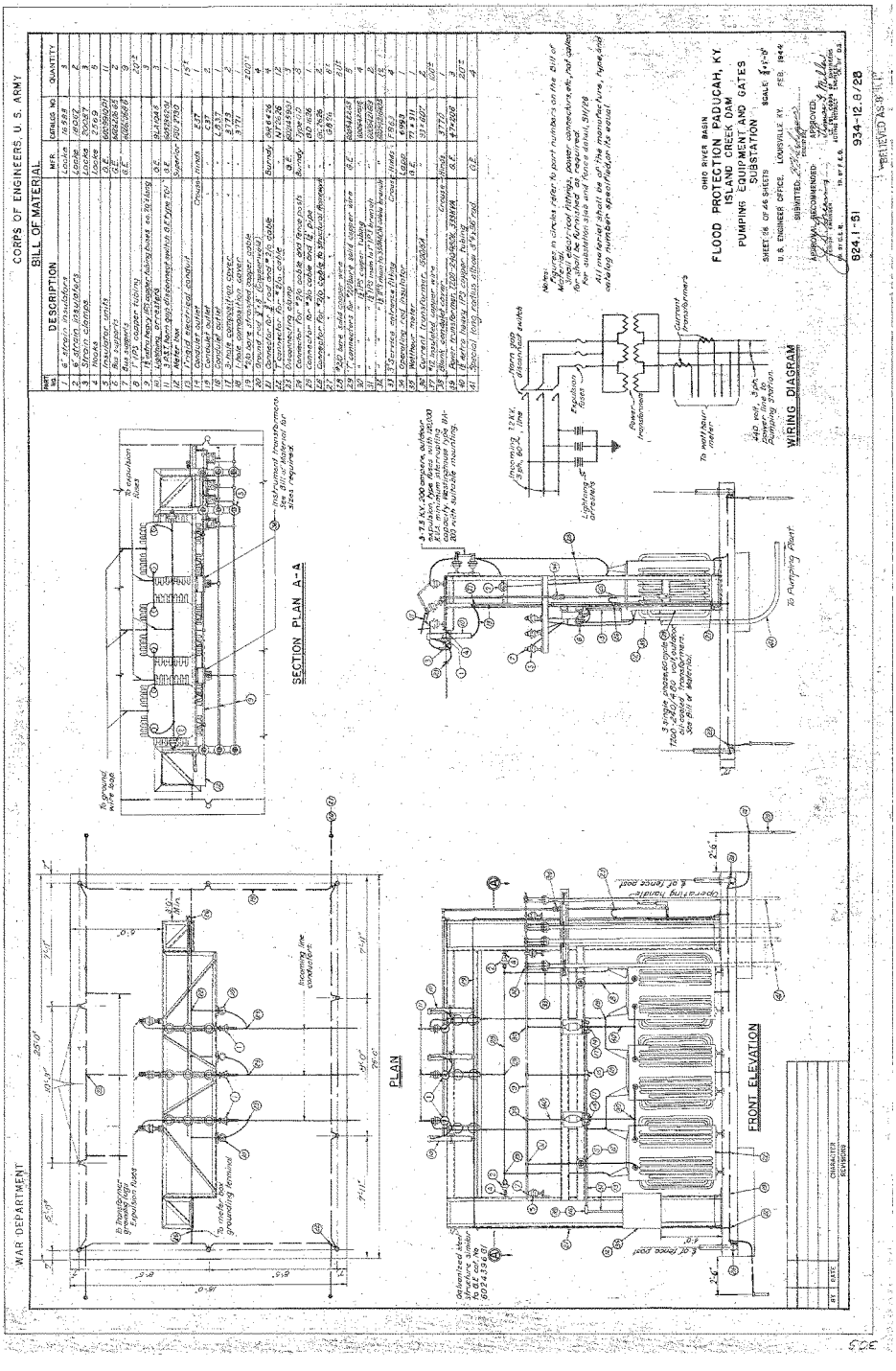
APPROVAL RECOMMENDED: [signature] DIVISION ENGINEER

APPROVED: Thomas J. Miller LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER

DA BY O.C.E. FR. BY N.E.S. CK. BY D.S.

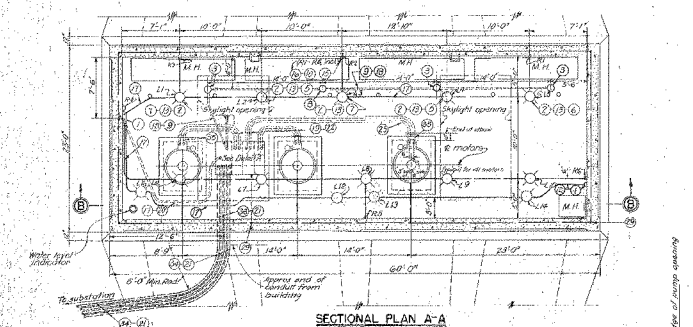
824.1-51 934-12.8/27

10697

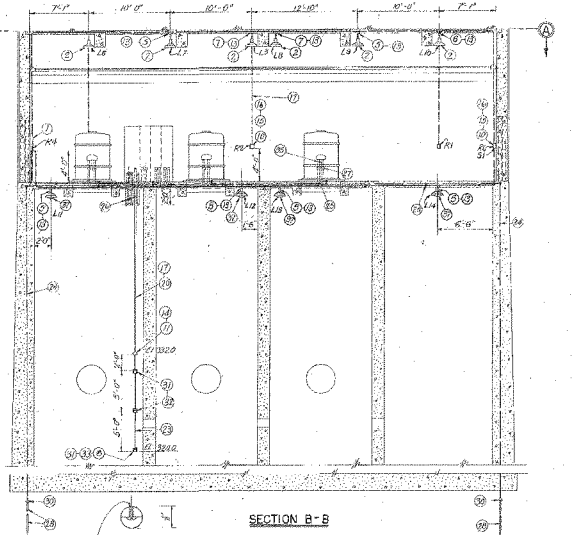

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
BILL OF MATERIAL
DESCRIPTION
MFR.
CATALOG NO.
QUANTITY
FLOOD PROTECTION PADUCAH, KY
ISLAND CREEK DAM
PUMPING EQUIPMENT AND GATES
SUBSTATION
OHIO RIVER BASIN
SCALE 1/4"=1'-0"
SHEET 26 OF 46 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE KY. FEB. 1944
SUBMITTED
RECOMMENDED
APPROVED
934-1-51
934-12.8/28
PLAN
FRONT ELEVATION
SECTION PLAN A-A
WIRING DIAGRAM
RECEIVED AS-BUILT

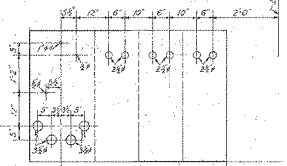
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

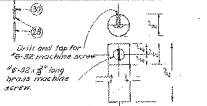


SECTIONAL PLAN A-B

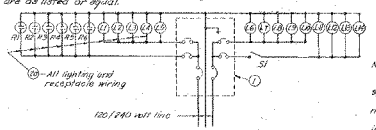




DETAIL "A"
SCALE 3/4" = 1'-0"



ELECTRODE DETAIL
SCALE: FULL SIZE



WIRING DIAGRAM - LIGHTING CIRCUIT

BILL OF MATERIAL

MARK NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUANTITY
1	* 4 circuit lighting panel (surface type)			1 *
2	* RL Majestic reflector and socket	Mosk.	340573	10 *
3	Floor Box	G.E.	SR-2206	4
4	* Surface Switch Plate			1 *
5	Condulet Outlet	Crouse-Hinds	SK C12	10
6	" "	" "	SK L12	1
7	" "	" "	SKT12	3
8	* Electrode (See detail)			6 *
9	* #8 Lead cable Type RH with W.P. braid			180'*
10	* Condulet outlet	Crouse-Hinds	FS141	6 *
11	" "	" "	A141	1 *
12	* Flush Tumbler Switch	Bryant	3951	1 *
13	* Condulet Cover	Crouse-Hinds	DK84	16 *
14	* " "	" "	1711	1 *
15	* Duplex plug receptacle			6 *
16	* Wall surface plate			6 *
17	* 1/2 electrical metallic tubing (EMT)			380'*
18	1" rigid electrical conduit			50'±
19	1 1/2" rigid electrical conduit			130'±
20	* #12 Hypl insulated copper wire			1140'*
21	* 350MCM, 1 cond. cable, Type R.H. with 60% rubber jacket			2150'±
22	* 4/0 " " " " " " "			430'*
23	* #6 H.D. bare solid copper wire			15'*
24	#2/0 bare stranded copper cable			450'±
25	2" galvanized 90° elbow			22
26	Special long radius elbow 3" dia. radius	G.E.		4
27	M) E.M.T. coupling			5 *
28	Copperweld ground rod 3/4" x 8'-0" long			6
29	T" connector for #2/0 stranded cable	Burndy	NT 2626	9
30	Connector for #2/0 stranded cable to 3/4" rod	"	GA4424	6
31	3" bolt circle type insulator	Lapp	13761	3 *
32	Bus support fitting Drill to clamp #6 solid wire	Locke	9863	2 *
33	* Bus support fitting, drill to clamp 3/4" conduit	"	9858	1 *
34	2" rigid electrical conduit			630'±
35	* Flexible metal conduit 3/4" I.D.			6 *
36	3/4" rigid electrical conduit			60'±
37	* Vaportight Socket & Reflector	Crouse-Hinds	VRDM309	4 *

* These materials to be furnished and installed under this contract. Other items listed and shown installed under previous contract. Items previously installed are as listed or equal.

Notes:
Figures in circles refer to part numbers on Bill of Material.
All material shall be of the manufacture, type & catalog number specified, or its equal.
Small fittings, conduits, E.M.T. couplings and adapters, etc. not listed, shall be furnished as required.
* 500 watt lamps shall be furnished by government and installed in all lights by Contractor.
The switchgear will be furnished by the Government and shall be installed under this contract.

LEGEND

Embedded conduit
Exposed conduit
Concealed conduit
Ground wire

BY	DATE	CHARACTER OF REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY
ISLAND CREEK DAM
PUMPING EQUIPMENT AND GATES
LIGHTING AND POWER SYSTEM

SHEET 29 OF 46 SHEETS SCALE 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [signature] DISTRICT ENGINEER

APPROVAL RECOMMENDED: [signature] DIVISION ENGINEER

APPROVED: [signature] ACTING DISTRICT ENGINEER

DR. BY A.J.Z. TR. BY A.J.Z. CK. BY G.S.

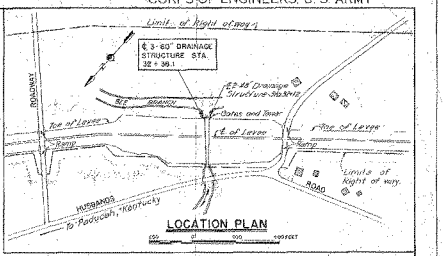
824.1-51 934-12.8/29

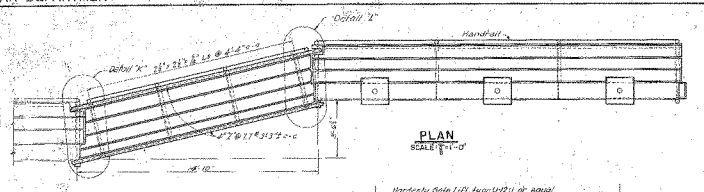
"REVISED AS BUILT"

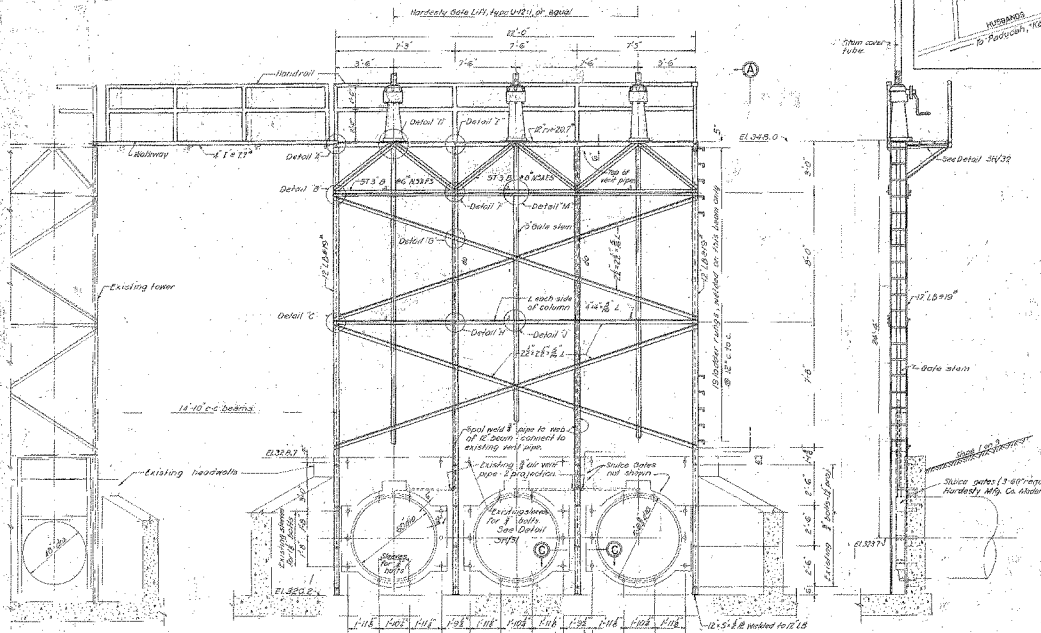
1069

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY







Notes.

1. The contractor shall furnish and install, 3-60" model 50-10 c Hardesty sluice gates or equal using the existing anchor bolt sleeves for anchoring, together with gate stems, hoists and stem guides mounted on angles as indicated. See detail J and M-3H/31
2. For details A thru J incl and M see 3H/31
3. For section C-C see 3H/30
4. For details K and L see 3H/32
5. Details of hoist anchorage to be approved by constructing officer.

INDEX - DRAINAGE STRUCTURE STA. 32+38.1

DRWG. NO.	TITLE
934-12.8/1	GENERAL PLAN
934-12.8/30	GATES AND TOWER
934-12.8/31	TOWER AND WALKWAY DETAILS
934-12.8/32	WALKWAY DETAILS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY.

DRAINAGE STRUCTURE STA. 32+38.1

GATES AND TOWER

SHEET 30 OF 48 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE. LOUISVILLE, KY. FEB. 1944

SUBMITTED: [signature] ENGINEER

APPROVAL RECOMMENDED: [signature] CHIEF, ENGINEERING DIV.

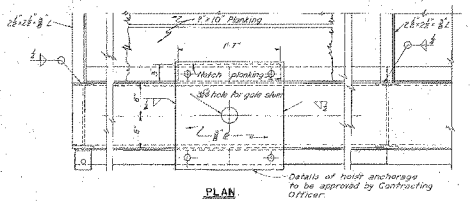
APPROVED: [signature] Thomas M. Miller LT. COL., CORPS OF ENGINEERS, ACTING DISTRICT ENGINEER

DR. BY W.N.S. TR. BY W.N.S. CK. BY W.A.R.

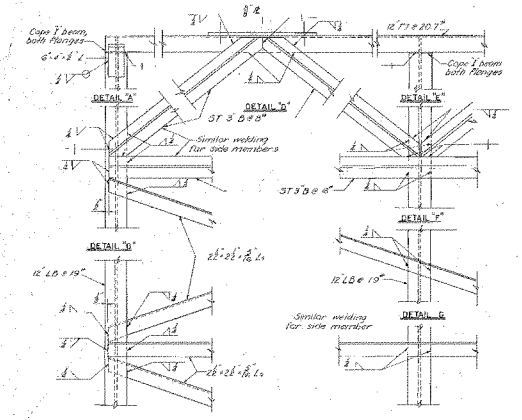
824.1-51 934-12.8/30

"DELIVERED AS BUILT"

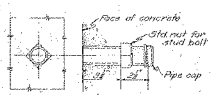
1070



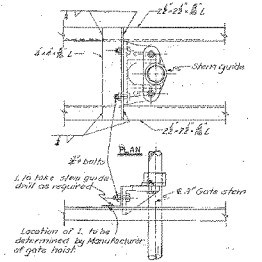
PLAN



WELDING DETAILS
SCALE: 1/2" = 1'-0"

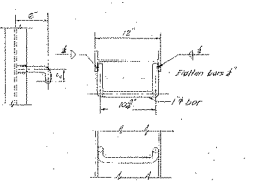


EXISTING ANCHOR BOLT SLEEVE
SCALE: NONE

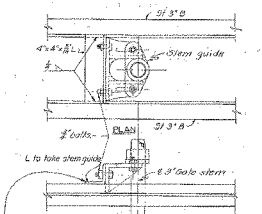


ELEVATION

DETAIL "J"

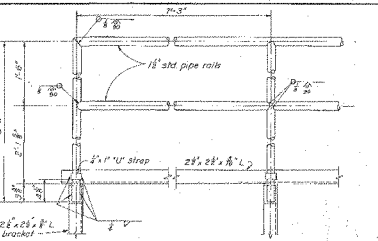


DETAIL OF LADDER RUNG

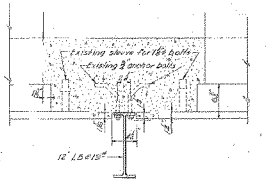


ELEVATION

DETAIL "M"



HAND RAIL DETAIL
SCALE: 1" = 1'-0"



SECTION C-C
SCALE: 1 1/2" = 1'-0"

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
DRAINAGE STRUCTURE STA. 32+38.1
TOWER AND WALKWAY DETAILS

SHEET 31 OF 48 SHEETS SCALE: 1/2" = 1'-0"

U. S. ENGINEER OFFICE. LOUISVILLE, KY. FEB. 1944

SUBMITTED: [signature]
DISTRICT ENGINEER

APPROVAL RECOMMENDED: [signature]
DIVISION ENGINEER
CHIEF OF WORKS, U.S.

APPROVED: [signature]
CHIEF OF ENGINEERS
ACTING DISTRICT ENGINEER
TR. BY NOW, U.S.

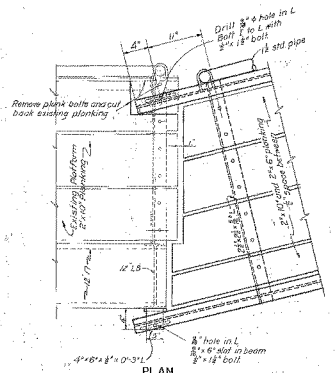
824.1-51 934-12.8/31

"REVISED AS BUILT"

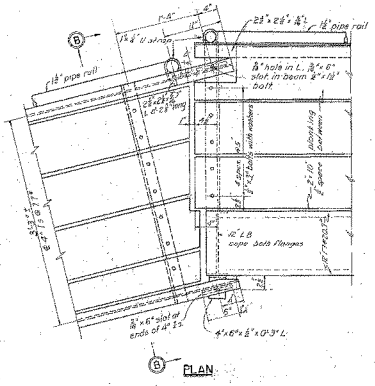
1071

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

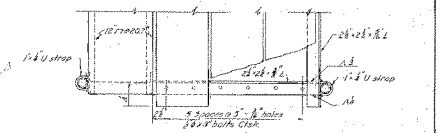


PLAN

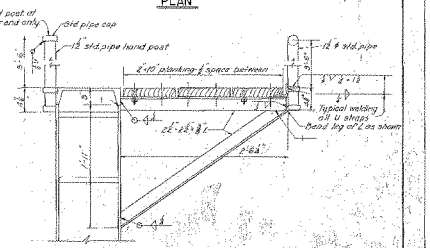


PLAN

Note:
All ⅞" x 1¾" anchor bolts for walkway to have lock washers.



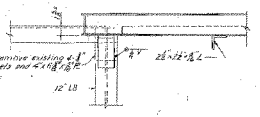
PLAN



ELEVATION

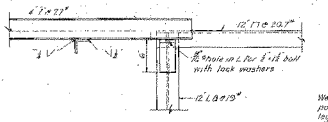
TYPICAL BRACKET DETAIL

LADDER END OF TOWER SHOWN



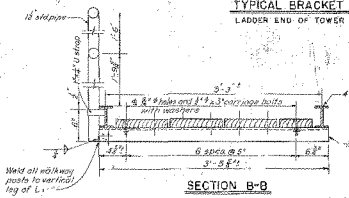
ELEVATION

DETAIL "K"



ELEVATION

DETAIL "L"



SECTION B-B

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY.

DRAINAGE STRUCTURE STA. 32+38.1

WALKWAY DETAILS

SHEET 32 OF 46 SHEETS SCALE: 1½" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [signature] ENGINEER

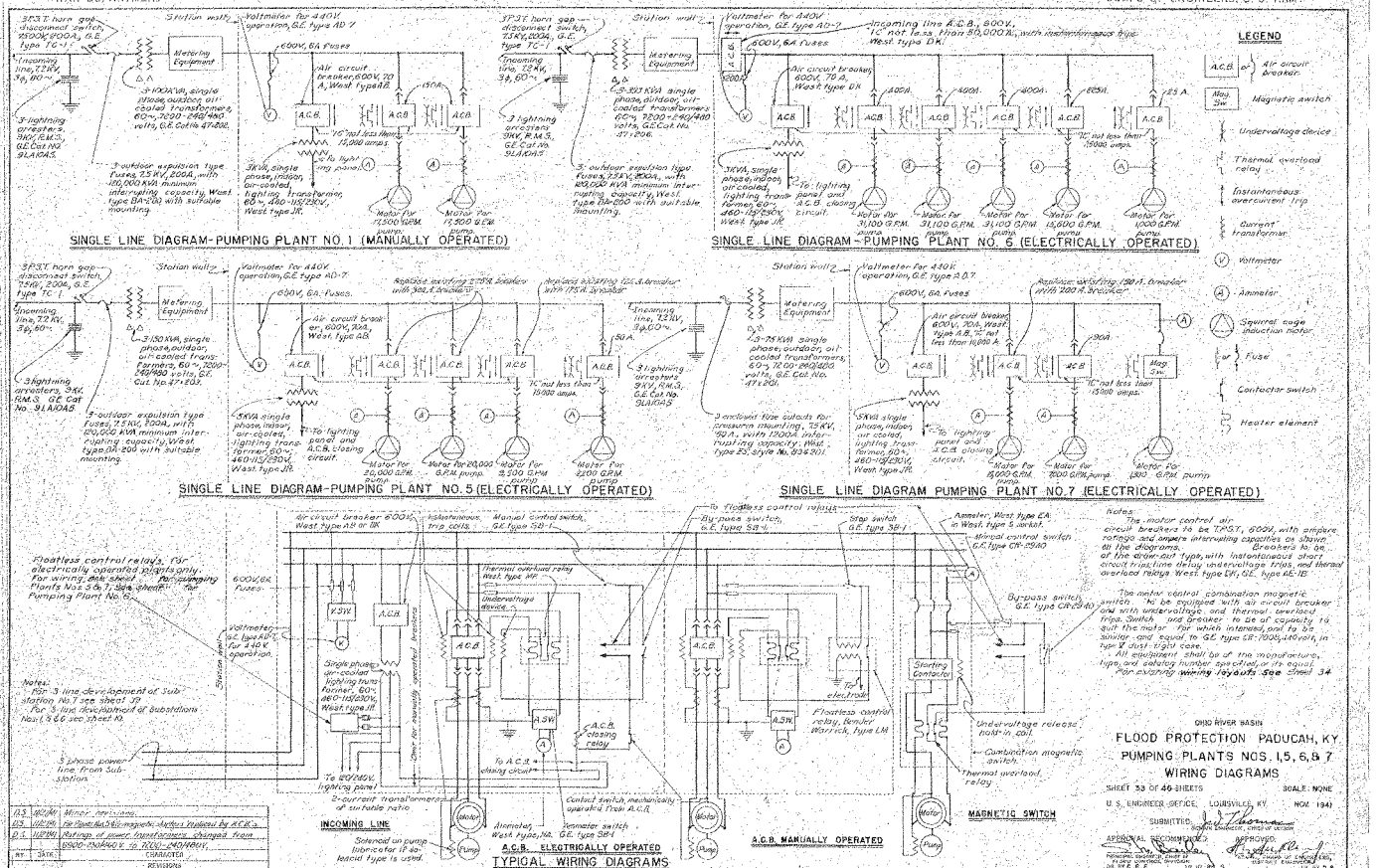
APPROVAL RECOMMENDED: [signature] CHIEF, ENGINEER DIV. OF W.M.S.

APPROVED: [signature] ACTING DIV. ENGR. DIVISION OF PROGRESS ACTING DISTRICT ENGINEER TA. DIV. W.M.S. DIV. OF W.M.R.

824.1-51 934-12.8/32

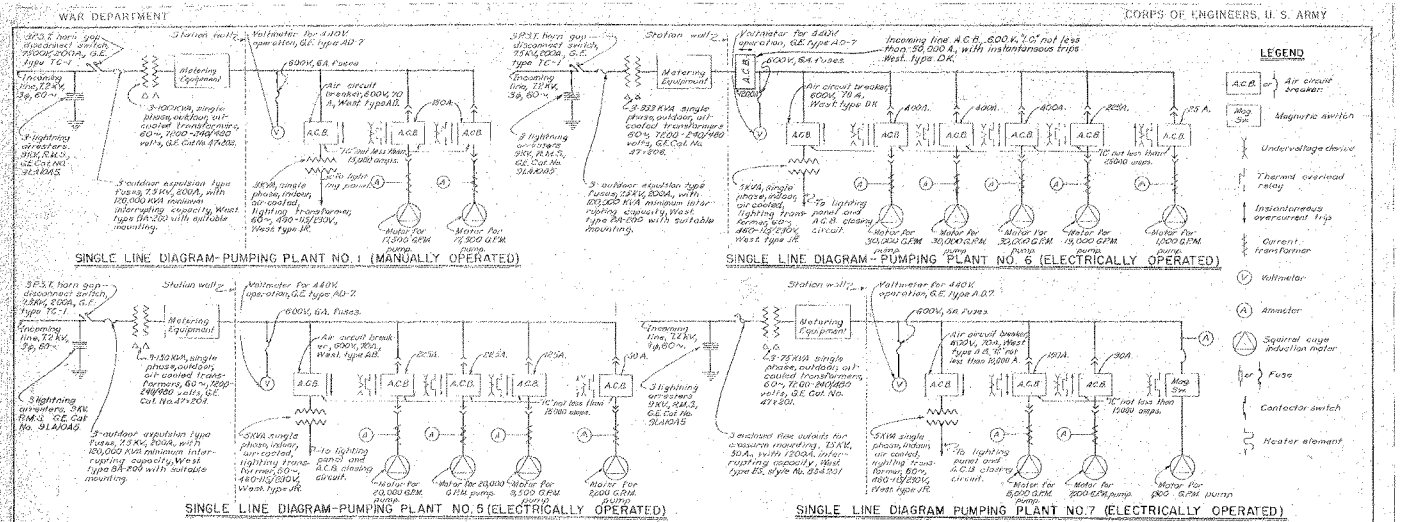
"REVISED AS BUILT"

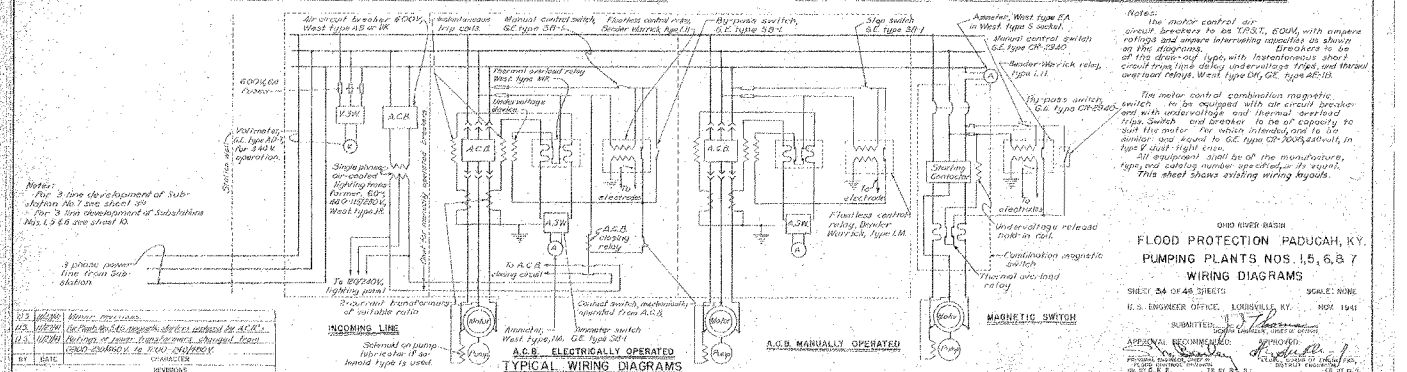
1072


SINGLE LINE DIAGRAM-PUMPING PLANT NO. 1 (MANUALLY OPERATED)
SINGLE LINE DIAGRAM-PUMPING PLANT NO. 6 (ELECTRICALLY OPERATED)
SINGLE LINE DIAGRAM-PUMPING PLANT NO. 5 (ELECTRICALLY OPERATED)
SINGLE LINE DIAGRAM PUMPING PLANT NO. 7 (ELECTRICALLY OPERATED)
LEGEND
Air circuit breaker
Magnetic switch
Undervoltage device
Thermal overload relay
Instantaneous overcurrent trip
Current transformer
Voltmeter
Ammeter
Squirrel cage induction motor
Fuse
Contactor switch
Heater element
Floatless control relays for electrically operated plants only.
Notes:
The motor control air circuit breakers to be T.P.S.T., 600V, with ampere ratings and ampere interrupting capacities as shown on the diagrams. Breakers to be of the draw-out type, with instantaneous short circuit trip, time delay undervoltage trips, and thermal overload relays. West type EH, GE. type AE-16
The motor control combination magnetic switch to be equipped with air circuit breaker and with undervoltage and thermal overload trips. Switch and breaker to be of capacity to suit the motor for which intended, and to be similar and equal to GE type CR-1005-L16 volt, in type 1 dust-tight case.
All equipment shall be of the manufacture, type, and catalog number specified, or its equal.
For existing wiring layouts see sheet 34
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 1,5, 6, & 7
WIRING DIAGRAMS
SHEET 33 OF 46 SHEETS
SCALE: NONE
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941
SUBMITTED
APPROVED
824.1-51
934-12. 8/33

1073

WAR DEPARTMENT — CORPS OF ENGINEERS, U. S. ARMY





Notes:

For 3 line development of Substation No. 7 see sheet 89.
For 3 line development of Substations Nos. 1, 5 & 6 see sheet 10.

The motor control air circuit breakers to be TYP.S., 600V, with ampere ratings and ampere interrupting capacities as shown on the diagrams. Breakers to be of the draw-out type, with instantaneous short circuit trips, time delay undervoltage trips, and thermal overload relays, West type DH, G.E. type AE-16.

The motor control combination magnetic switch to be equipped with air circuit breaker and with undervoltage and thermal overload trips. Switch and breaker to be of capacity to suit the motor for which intended, and to be similar and equal to G.E. type CR-2940 switch, in type V dust-tight enclosure.

All equipment shall be of the manufacture, type and catalog number specified, or its equal.

This sheet shows existing wiring layouts.

BY	DATE	CHARACTER
R.S.	10/1941	Minor revisions.
R.S.	10/1941	Re Plan No. 1 to separate sheet re contact for A.C.B.'s
R.S.	10/1941	Ratings of power transformers changed from 2500 KVA each to 3000 KVA each

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANTS NOS. 1, 5, 6 & 7

WIRING DIAGRAMS

SHEET 34 OF 48 SHEETS — SCALE: NONE

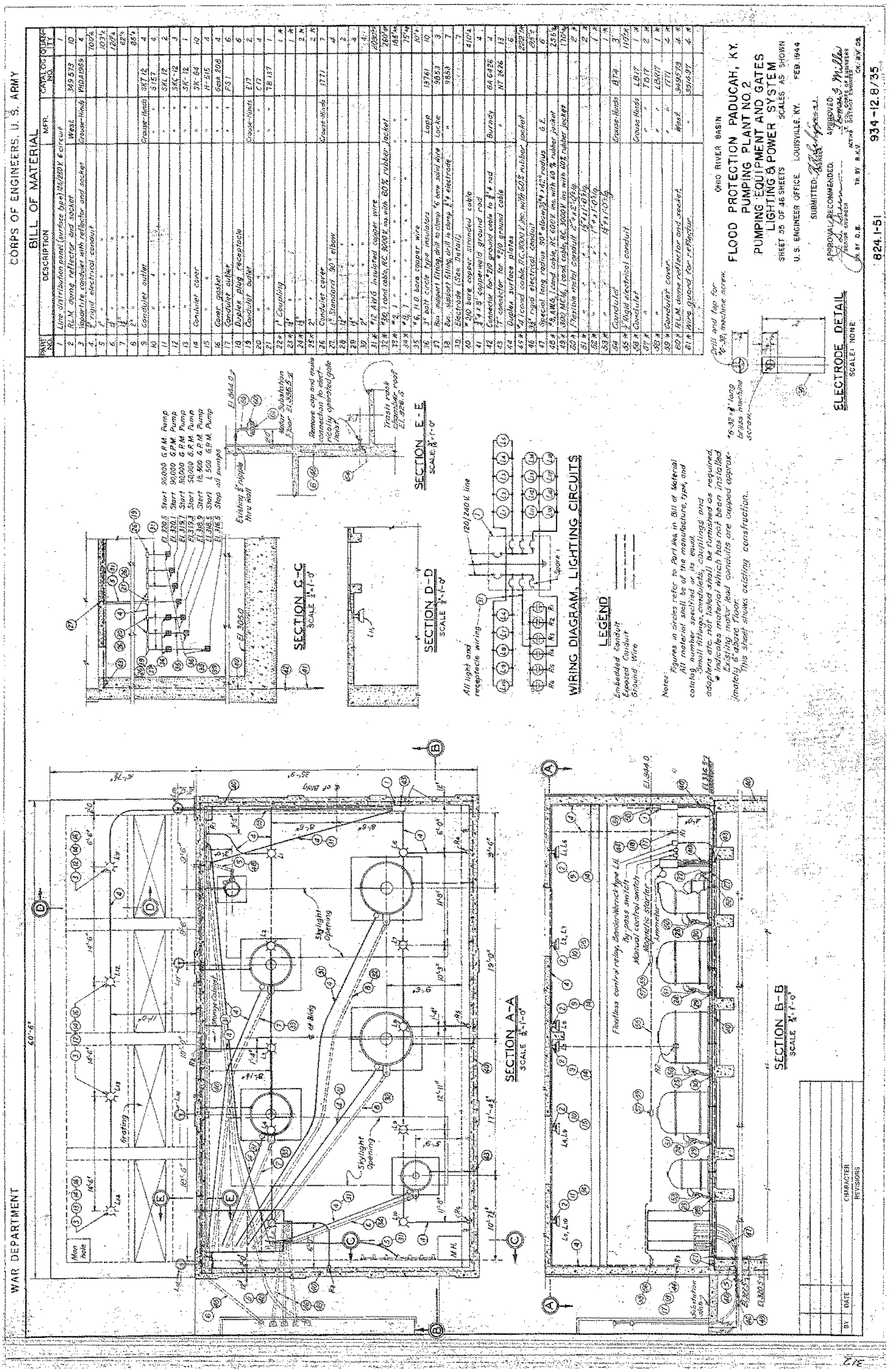
U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

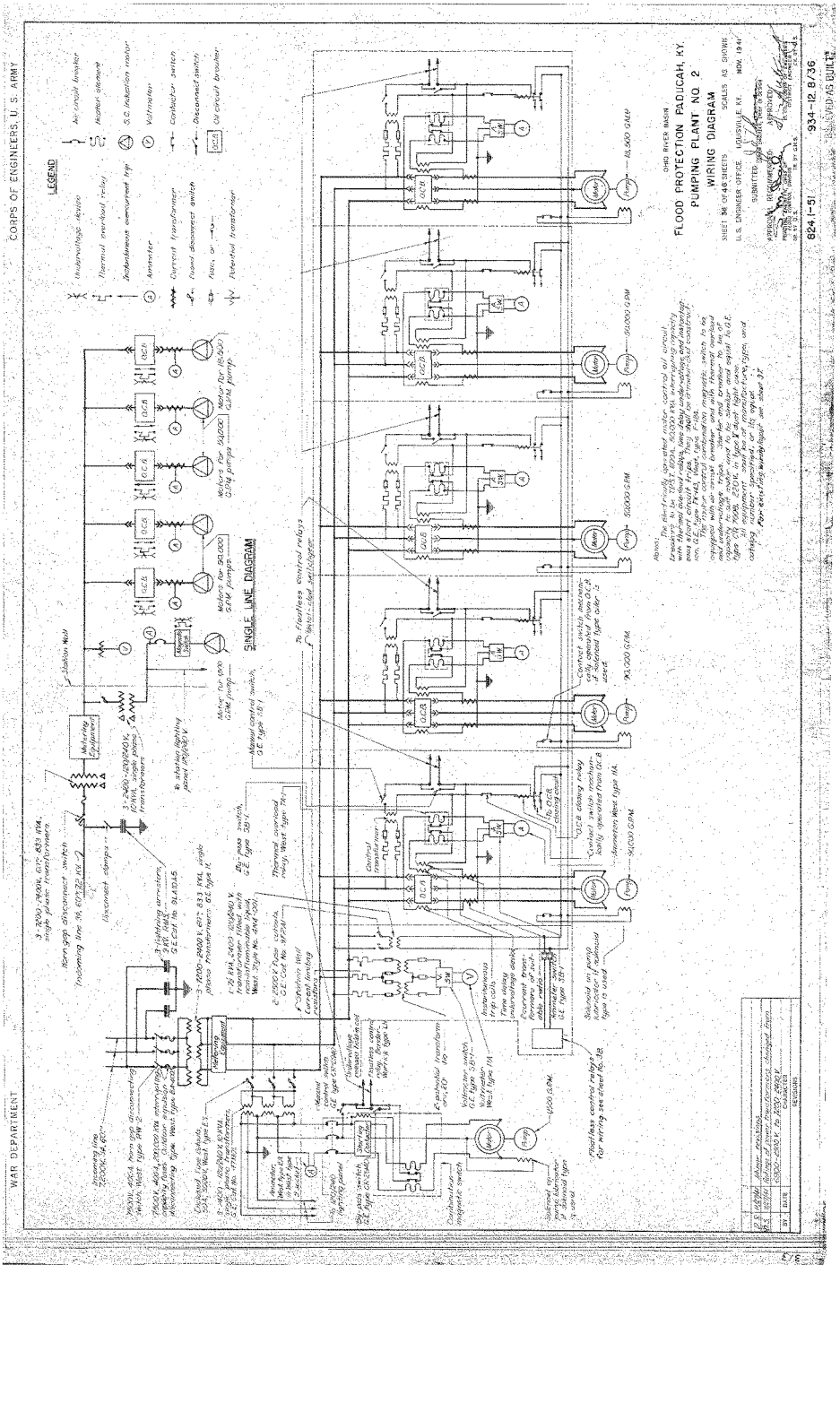
SUBMITTED: [signature] — SENIOR ENGINEER, DISTRICT OFFICE

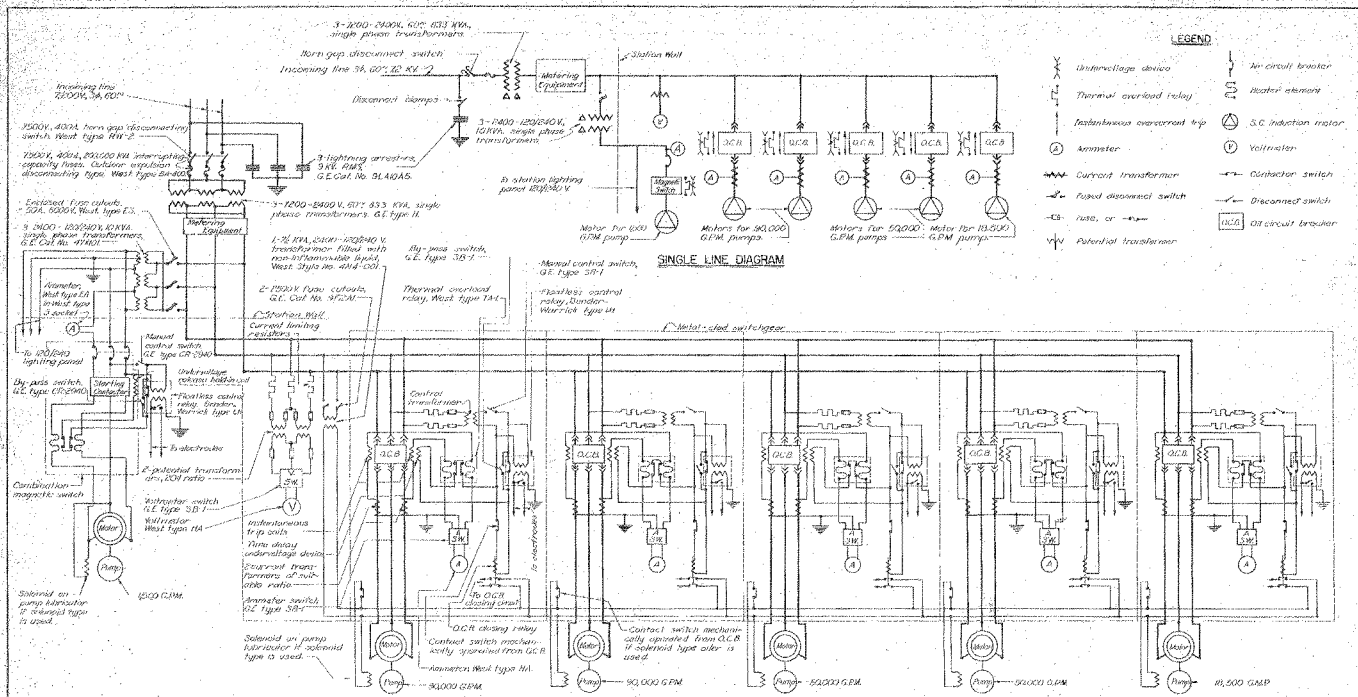
APPROVED: [signature] — CHIEF OF ENGINEERS, U. S. ARMY

824.1-51 — 934-12.8/34

DELIVERED AS BUILT


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
BILL OF MATERIAL
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
WIRING DIAGRAM, LIGHTING CIRCUITS
LEGEND
ELECTRODE DETAIL
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
PUMPING EQUIPMENT AND GATES
LIGHTING & POWER SYSTEM
SHEET 35 OF 46 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE. LOUISVILLE, KY. FEB. 1944
824.1-51
934-12.8/35


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
LEGEND
SINGLE LINE DIAGRAM
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
WIRING DIAGRAM
824-1-51
934-12.8/36



Notes:

The electrically operated motor control oil circuit breakers to be G.E.T. 600A., 50,000 KVA. interrupting capacity with thermal overload relays, time delay undervoltage and instantaneous short circuit trips. They shall be of metal clad construction, G.E. type FK-42, West. type F 104.

The motor control combination magnetic switch to be equipped with air circuit breaker unit with thermal overload and undervoltage trips. Starter and breaker to be of capacity to suit motor and to be similar and equal to G.E. type CR 7003, 220V. in type X dust tight case.

All equipment shall be of manufacture, types, and catalog number specified, or its equal.

This sheet shows existing wiring layout

BY	DATE	CHARACTER OF REVISIONS
G.S. HOLM		Motor revisions
G.S. HOLM		Ratings of power transformers changed from 6000-2300 V. to 7200-2400 V.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 2

WIRING DIAGRAM

SHEET 37 OF 46 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1941

SUBMITTED: [signature] DISTRICT ENGINEER OR AGENT

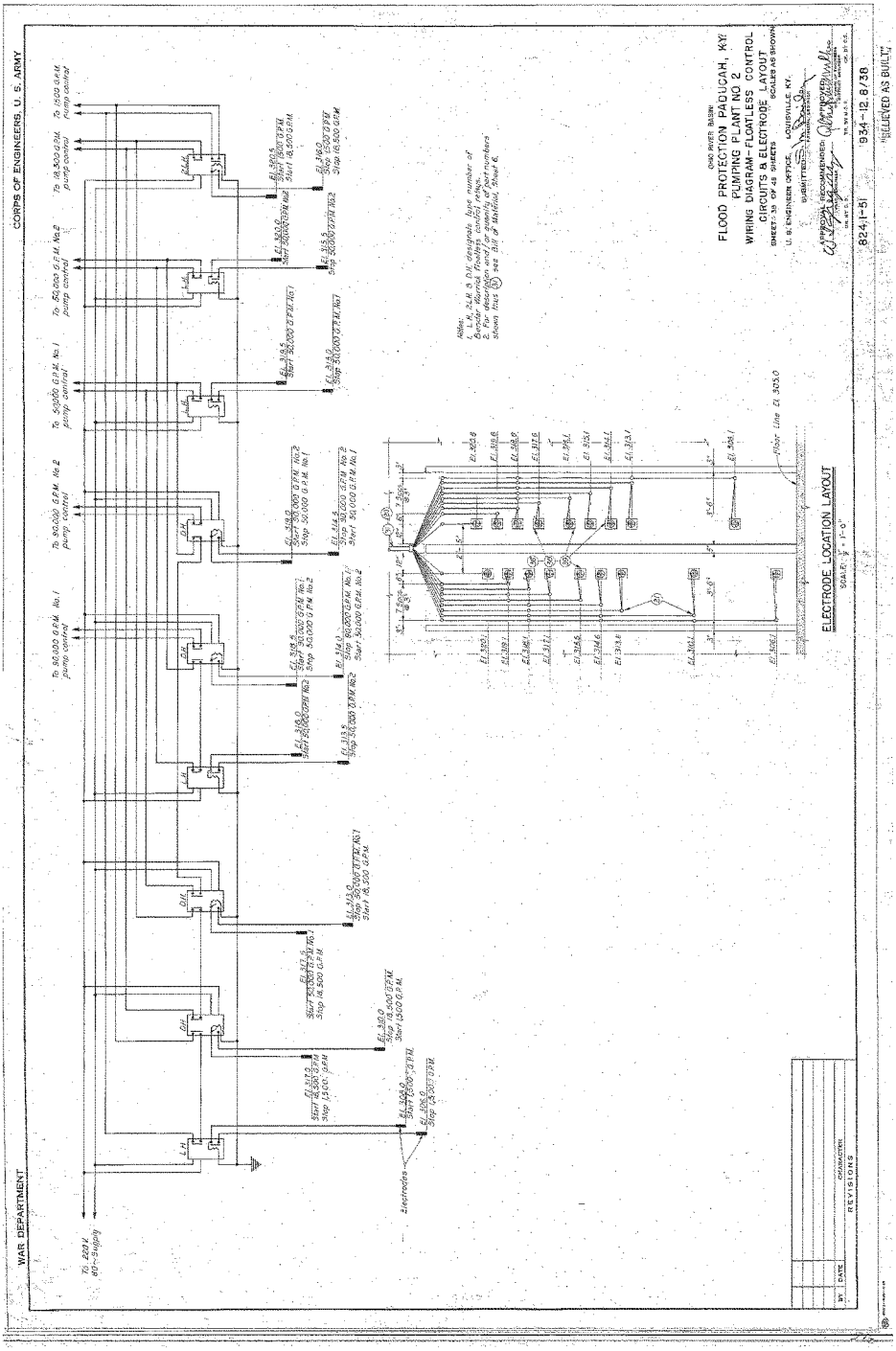
APPROVAL RECOMMENDED: [signature] CHIEF, FLOOD CONTROL BRANCH

APPROVED: [signature] BY DIRECTION OF THE CHIEF OF ENGINEERS, ASSISTANT CHIEF OF ENGINEERS

824.1-51

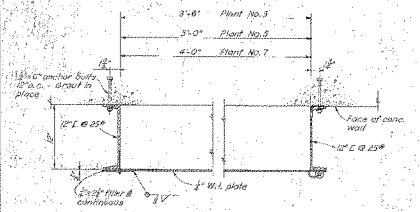
934-12.8/37

"REVISED AS BUILT"


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO 2
WIRING DIAGRAM-FLOATLESS CONTROL
CIRCUITS & ELECTRODE LAYOUT
SHEET 38 OF 48 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
SUBMITTED:
RECOMMENDED:
APPROVED:
824-1-81
934-12.8/38
"RELIEVED AS BUILT"
ELECTRODE LOCATION LAYOUT
SCALE: 3/8" = 1'-0"
Floor Line El 303.0
Electrodes
To 90,000 G.P.M. No.1 pump control
To 90,000 G.P.M. No.2 pump control
To 50,000 G.P.M. No.1 pump control
To 50,000 G.P.M. No.2 pump control
To 18,500 G.P.M. pump control
To 600 H.P. 60~ Bldg.
NO. DATE REVISIONS CHARACTER

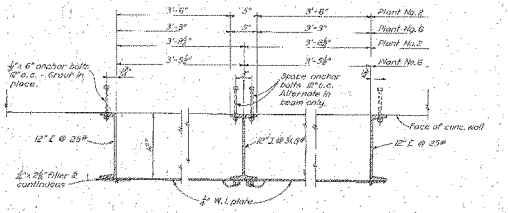
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



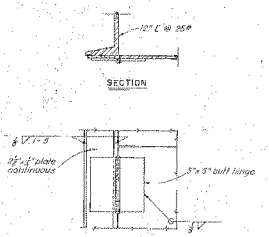
SECTION A-A

SCALE: 1½"=1'-0"



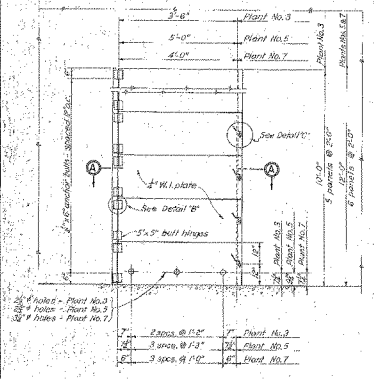
SECTION D-D

SCALE: 1½"=1'-0"



DETAIL "B"

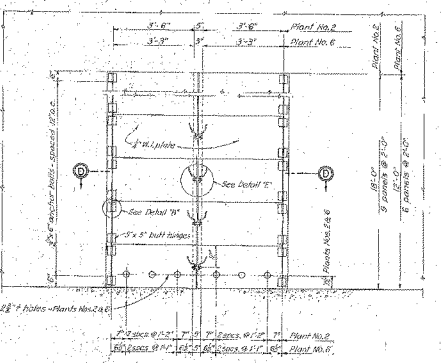
SCALE: 3"=1'-0"



ELEVATION

ELECTRODE WELLS
FOR PUMPING PLANTS NOS. 3,5&7

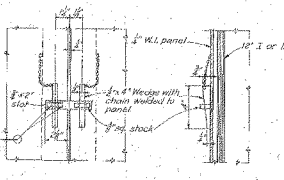
SCALE: ½"=1'-0"



ELEVATION

ELECTRODE WELLS
FOR PUMPING PLANTS NOS. 2&6

SCALE: ½"=1'-0"



DETAIL "E"
DETAIL "C" SIMILAR

SCALE: 3"=1'-0"

BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANTS NOS. 2,3,5,6&7

ELECTRODE WELLS, SECTIONS & DETAILS

SHEET 39 OF 46 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1945

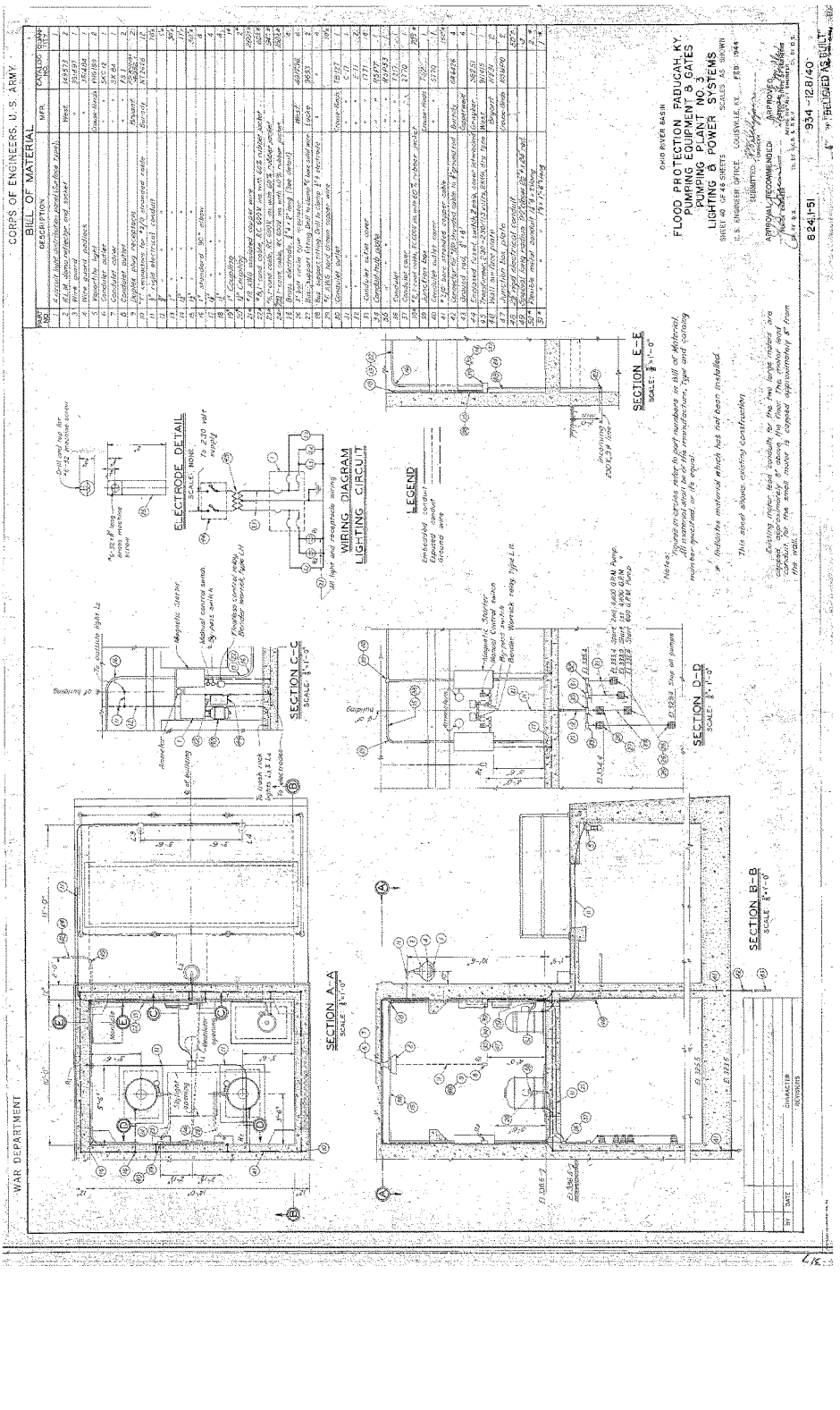
SUBMITTED: [signature]

APPROVAL RECOMMENDED: [signature] APPROVED: [signature]

824'1-51 934-12.8/39

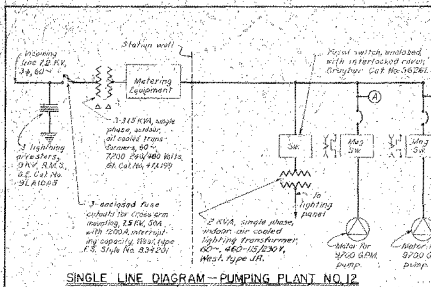
REVISED AS BUILT

1079

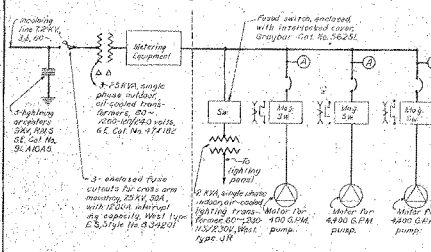

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
BILL OF MATERIAL
DESCRIPTION
MFR.
CATALOG OR SPEC. NO.
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
PUMPING EQUIPMENT & GATES
PUMPING PLANT NO. 3
LIGHTING & POWER SYSTEMS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY., FEB. 1944
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
824-1-51
934-(2.8)40
AS BUILT
ELECTRODE DETAIL
SCALE: NONE
WIRING DIAGRAM
LIGHTING CIRCUIT
LEGEND
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F

WAR DEPARTMENT

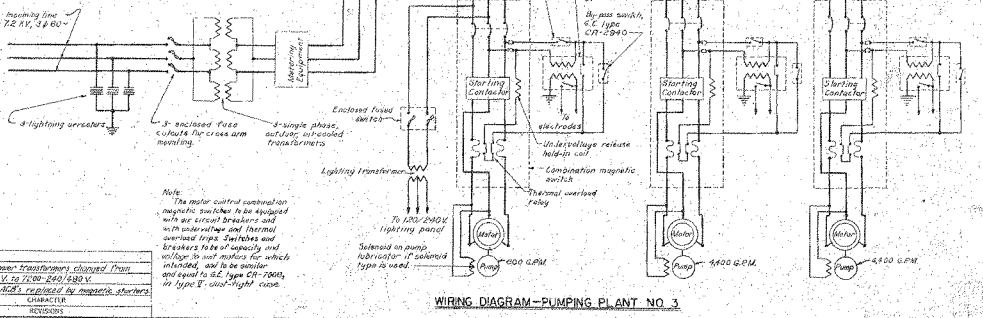
CORPS OF ENGINEERS, U. S. ARMY



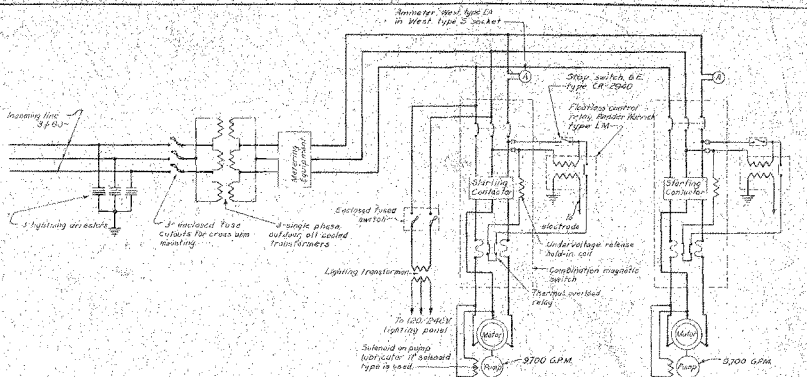
SINGLE LINE DIAGRAM — PUMPING PLANT NO. 12



SINGLE LINE DIAGRAM — PUMPING PLANT NO. 3



WIRING DIAGRAM — PUMPING PLANT NO. 3



WIRING DIAGRAM — PUMPING PLANT NO. 12

LEGEND

Air circuit breaker	Voltmeter
Mag Sw — Magnetic switch	Ammeter
Undervoltage device	Squirrel cage induction motor
Thermal overload relay	Fuse
Current transformer	Contactor switch
	Heater element

Note:
All equipment shall be of the manufacture, type, and catalog number specified, or its equal.

Note:
The motor control combination magnetic switches to be equipped with air circuit breakers and with undervoltage and thermal overload trips. Switches and breakers to be of capacity and voltage to suit motors for which intended, and to be similar and equal to G.E. type CR-7006, in type B - dust-tight case.

BY	DATE	CHARACTER
P.S.	9/27/41	Ratings for power transformers changed from 6600-230/460 V. to 7200-240/480 V.
O.S.	10/2/41	For Plant No. 12 and 3 added, equipped for magnetic starters.

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANTS NOS. 3 & 12

WIRING DIAGRAMS

SHEET 41 OF 46 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — NOV. 1941

SUBMITTED: JOHN TROMLER, CHIEF OF DESIGN

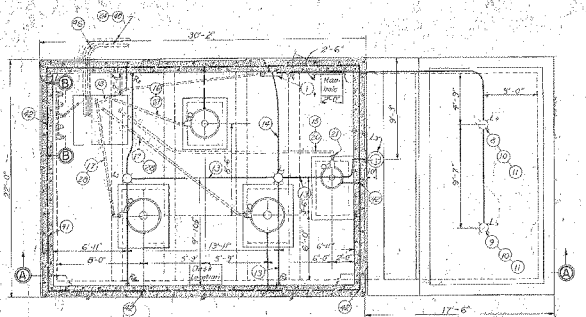
APPROVAL RECOMMENDED: — APPROVED:

ARMOND BRUNER, CHIEF OF FLOOD CONTROL DIVISION — JOHN TROMLER, CHIEF OF DESIGN — DISTRICT ENGINEER

"APPROVED AS BUILT" — 824.1-51 — 934

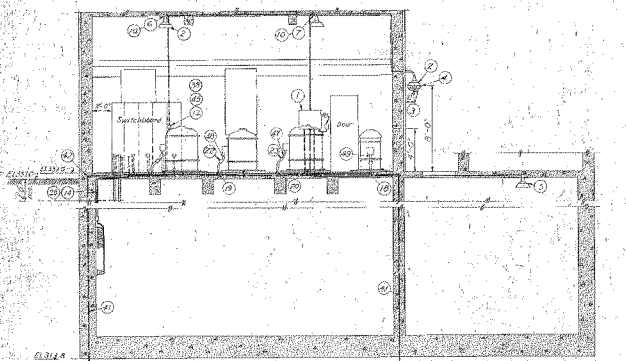
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



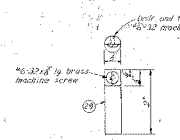
PLAN

SCALE: $\frac{1}{4}$" = 1'-0"



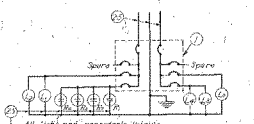
SECTION A-A

SCALE: $\frac{1}{4}$" = 1'-0"



ELECTRODE DETAIL

SCALE: NONE



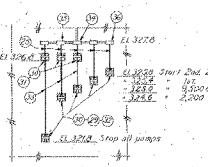
All light and receptacle wiring

WIRING DIAGRAM

LIGHTING CIRCUIT

Concealed conduit
Embedded conduit
Exposed conduit
Ground wire

LEGEND



SECTION B-B

SCALE: $\frac{1}{4}$" = 1'-0"

Notes:

Figures in circles refer to part numbers in bill of material.

All material shall be of the manufacture, type, and catalog number specified, or its equal.

Small fittings, conduits, couplings and adapters, etc., not listed shall be furnished as required.

* indicates material which has not been installed.

Existing motor lead conduits are capped approximately 6" above floor.

This sheet shows existing construction.

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CAT. NO.	QUAN.	
1	6 circuit light distribution panel (surface type)			1	
2	RLM dome reflector and socket	West.	349373	3	
3	Wire guard	"	351497	1	
4	Wire guard padlock	"	351499	1	
5	Vaporlite conduit with reflector and socket	Crouse-Hinds	DMD139	2	
6	Conduit outlet	" "	SKT12	1	
7	" "	" "	SKX12	1	
8	" "	" "	SKC12	1	
9	" "	" "	SM12	1	
10	" cover	" "	SM84	2	
11	" gasket	" "	Gask208	2	
12	Duplex plug receptacle	Bryant	1762 (Ivory) 5462W	8	
13	$\frac{3}{4}$" rigid electrical conduit			150'	
14	2" " " "			45'	
15	1" " " "			25'	
16	1¼" " " "			15'	
17	1½" " " "			370'	
18	1" standard 90° elbow			5	
19	1½" " " "			2	
20	2" " " "			4	
21	1" Coupling			1	
22	1½" "			2	
23	2" "			2	
24	3/4" rigid electrical conduit			140'	
25	#10 insulated copper wire			560'	
26	#8 1 cond. cable, R.C.600V. ins. with 60% rubber jacket			80'	
27	#6 1 cond. cable, R.C.600V. ins. with " " " "			40'	
28	#10 1 cond. cable, R.C.600V. ins with " " " "			120'	
29	Bypass electrode, 2" x 2" (see detail 3)			3	
30	1" bolt circle type insulator	West.	40676	6	
31	Bus support fitting, Drill to clamp #6 bare solid wire	Locke	3663	9	
32	Bus support fitting Drill to clamp 3/4" electrode	"	"	6	
33	#6 hard drawn copper wire			75'	
34	Conduit outlet	Crouse-Hinds	TB-127	1	
35	" "	" "	C-17	2	
36	" "	" "	E-17	2	
37	Conduit outlet covers	" "	17F1	3	
38	Wall anchors, plain	Bryant	1493	2	
39					
40	#10 M.C.M. 1 cond. cable, R.C. 600V. ins. with 60% rubber jacket			840'	
41	#2/0 bare stranded copper cable			2401	
42	"T" connectors for #2/0 stranded cable	Burndy	H72646	10	
43	Ground rod, 3/4" x 8'	Copperweld		4	
44	Connector for #2/0 stranded cable to 3/4" grooved rod	Burndy	GAE426	4	
45	Conduit outlet	Crouse-Hinds	FS1	4	
46	Special long radius 90° elbow, 3/4" 130 radius		GE	8	
47	Flexible conduit cord 3/4" x 1'-6" lg.			2	
48	" " " 1" x 1'-6" lg.			1	
49	" " " 1½" x 1'-6" lg.			1	

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 5

PUMPING EQUIPMENT AND GATES

LIGHTING & POWER SYSTEMS

SHEET 48 OF 48 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: W. F. Kuchmann, ENGINEER

APPROVAL RECOMMENDED: John Friese, DIVISION ENGINEER

APPROVED: James E. Miller, CHIEF OF ENGINEERS, U.S. ARMY

BY DIR. O.E. TR BY E.R.O.

824.751 934-12.8/42

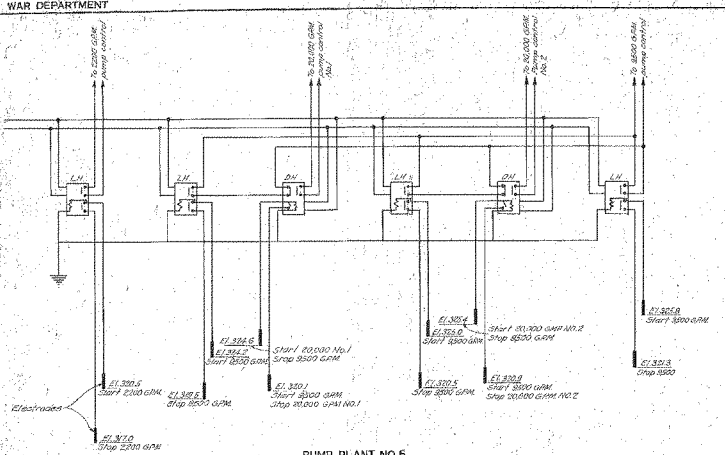
"REVISED AS BUILT"

BY	DATE	CHARACTER REVISION

1082

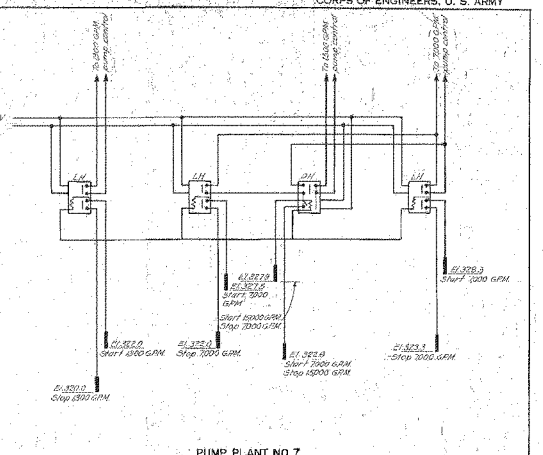
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



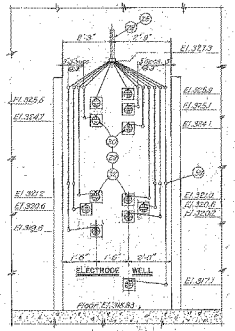
PUMP PLANT NO.5

SCALE: NONE



PUMP PLANT NO.7

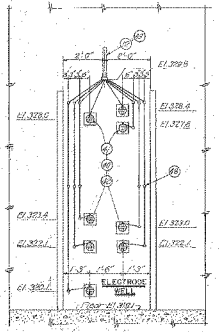
SCALE: NONE



ELECTRODE LOCATION LAYOUT

PUMPING PLANT NO.5

SCALE: $\frac{1}{2}$"=1'-0"



ELECTRODE LOCATION LAYOUT

PUMPING PLANT NO.7

SCALE: $\frac{1}{2}$"=1'-0"

Notes:
L.H. and D.H. designate type No. of Bender Warrick floatless control relays.
For description and/or quantity of part Nos. shown thus (5) see 5th of Material, sheet No.11 for pumping plant No. 5, and sheet No.17 for pumping plant No.7.

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANTS NOS. 5 & 7

WIRING DIAGRAM-FLOATLESS CONTROL CIRCUITS & ELECTRODE LAYOUT

SHEETS 43 OF 46 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY.

SUBMITTED: [signature] Chief, Design Section

APPROVAL RECOMMENDED: [signature] Engineer Officer

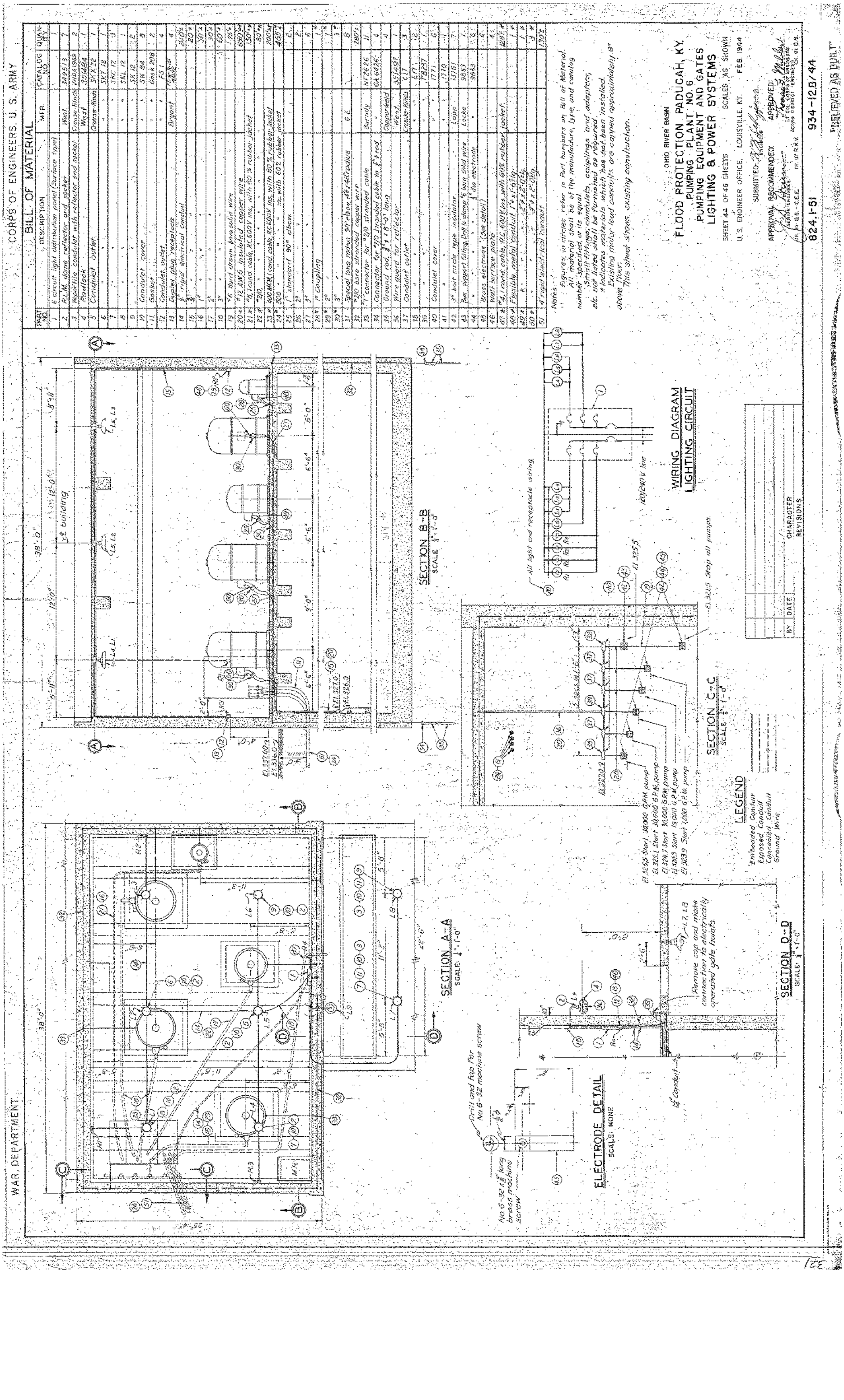
APPROVED: [signature] Lieut. Colonel, Corps of Engineers, District Engineer

TR. BY K.E. CK. BY H.A.M. CK. BY D.S.

824.1-51 934-12.8/43

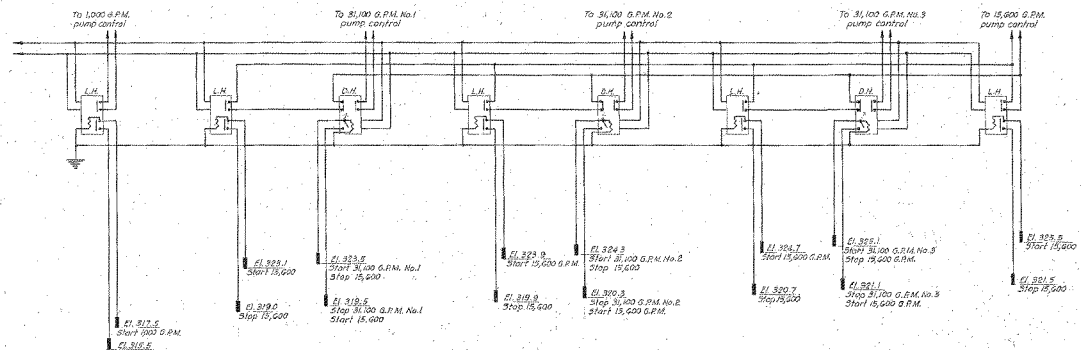
"REVISED AS BUILT"

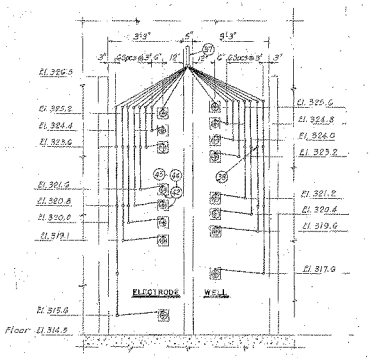
1083


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
BILL OF MATERIAL
PART NO. | DESCRIPTION | MFR. | CATALOG NO. | QUANTITY
1 | 6 circuit light distribution panel (Surface type) | | | 1
2 | R.L.M. dome reflector and socket | West. | 3A9513 | 7
3 | Vaporlite condulet with reflector and socket | Crouse-Hinds | VNDA1959 | 2
4 | Padlock | West | 351484 | 1
5 | Condulet outlet | Crouse-Hinds | SKX 12 | 1
6 | " | " | SKT 12 | 1
7 | " | " | SKC 12 | 3
8 | " | " | SKL 12 | 1
9 | " | " | SK 12 | 2
10 | Condulet cover | " | SK 84 | 8
11 | Gasket | " | Gask 208 | 2
12 | Condulet outlet | " | FS 1 | 4
13 | Duplex plug receptacle | Bryant | | 4
14 | 3/4" rigid electrical conduit | | | 240'
15 | 3/4" | | | 20'
16 | 1" | | | 30'
17 | 2" | | | 30'
18 | 3" | | | 60'
19 | #6 hard drawn bare solid wire | | | 125'
20* | #12 AWG insulated copper wire | | | 650'
21* | #8 1 cond. cable, RC 600V ins. with 60% rubber jacket | | | 150'
22* | #2/0 | | | 80'
23* | 400 MCM 1 cond. cable, RC 600V ins. with 60% rubber jacket | | | 200'
24* | 500 " ins. with 60% rubber jacket | | | 405'
25 | 1" standard 90° elbow | | | 2
26 | 2" | | | 2
27 | 3" | | | 6
28* | 1" Coupling | | | 1
29* | 2" | | | 1
30* | 3" | | | 3
31 | Special long radius 90° elbow | G.E. | | 8
32 | #2/0 bare stranded copper wire | | | 280'
33 | "T" connector for #2/0 stranded cable | Burndy | NT2626 | 11
34 | Connector for #2/0 stranded cable to 3/4" rod | " | GA 6426 | 4
35 | Ground rod, 3/4" x 8'-0" long | Copperweld | | 4
36 | Wire guard for reflector | West. | 351497 | 1
37 | Condulet outlet | Crouse-Hinds | C17 | 3
38 | " | " | E17 | 12
39 | " | " | T8237 | 1
40 | Condulet cover | " | 1771 | 6
41 | " | " | 1770 | 1
42 | 3" bolt circle type insulator | Lapp | 13161 | 7
43 | Bus support fitting, Drill to clamp 1/8 bare solid wire | Locke | 9853 | 1
44 | " 1/4 dia electrode | " | 9853 | 6
45 | Brass electrode (See detail) | | | 6
46 | Wall surface plate | | | 4
47* | #4 1 cond. cable, RC 600V ins. with 60% rubber jacket | | | 1257'
48* | Flexible metal conduit 1 1/4" x 1'-6" lg. | | | 1
49* | 2" x 2'-0" lg. | | | 1
50* | 3" x 2'-0" lg. | | | 3
51 | 4" rigid electrical conduit | | | 130'
Notes:
Figures in circles refer to Part numbers on Bill of Material.
All material shall be of the manufacture, type, and catalog number specified, or its equal.
Small fittings, conduits, couplings and adapters, etc. not listed shall be furnished as required.
* Indicates materials which has not been installed.
Existing motor lead conduits are capped approximately 6" above floor.
This sheet shows existing construction.
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
PUMPING EQUIPMENT AND GATES
LIGHTING & POWER SYSTEMS
SHEET 44 OF 46 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY.
FEB. 1944
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
824.1-51
934-128/44
"BELIEVED AS BUILT"
SECTION B-B
SCALE 1/4" = 1'-0"
SECTION A-A
SCALE 1/4" = 1'-0"
SECTION C-C
SCALE 1/4" = 1'-0"
SECTION D-D
SCALE 1/4" = 1'-0"
ELECTRODE DETAIL
SCALE: NONE
WIRING DIAGRAM
LIGHTING CIRCUIT
All light and receptacle wiring
120/240 V line
LEGEND
Embedded Conduit
Exposed Conduit
Concealed Conduit
Ground Wire
El. 326.5 Start 30,000 G.P.M. pump
El. 325.1 Start 30,000 G.P.M. pump
El. 324.7 Start 30,000 G.P.M. pump
El. 324.3 Start 15,000 G.P.M. pump
El. 323.9 Start 1,000 G.P.M. pump
El. 321.5 Stop all pumps
El. 325.5
El. 322.0
El. 337.00
El. 336.0
El. 327.0
El. 326.0
℄ building
Remove cap and make connection to electrically operated gate hoists
Drill and tap for No. 6-32 machine screw
No. 6-32 x 3/8" long brass machine screw
1 1/4" Conduit
BY | DATE | CHARACTER
REVISIONS
39'-0"
38'-0"
25'-4"
22'-6"

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





ELECTRODE LOCATION LAYOUT

SCALE: $\frac{1}{2}$" = 1'-0"

Note: L.H. and D.H. designate type No of Bender Warrick Floatless control relays. For description and/or quantity of part nos. shown thus (57) see bill of material. Sheet No. 14.

BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 6

WIRING DIAGRAM - FLOATLESS CONTROL CIRCUITS & ELECTRODE LAYOUT

SHEET 43 OF 45 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY.

SUBMITTED: [signature]

APPROVAL RECOMMENDED: [signature]

APPROVED: [signature]

824.1-51

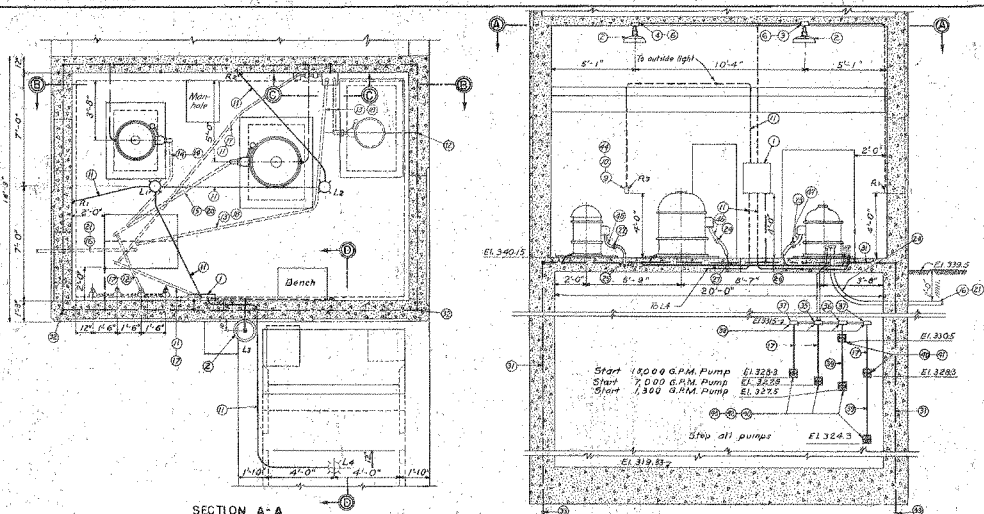
934-12.6/45

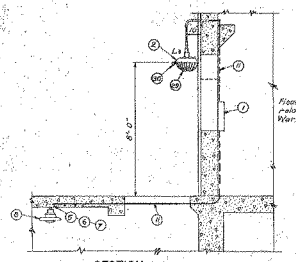
"BELIEVED AS BUILT"

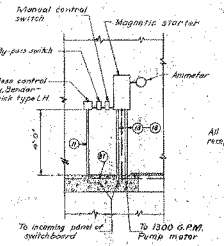
1085

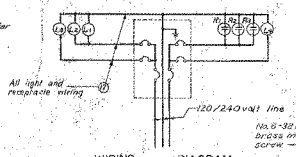
WAR DEPARTMENT

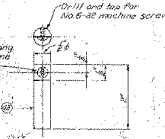
CORPS OF ENGINEERS, U. S. ARMY











LEGEND

Embedded Conduit ———

Exposed Conduit - - - - -

Ground Wire — — — —

Concealed Conduit ———

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUAN.
1	4 circuit light distribution panel (surface type)			1
2	R.L.M. dome reflector and socket	West.	349373	3
3	Condulet outlet	Crouse-Hinds	SMT 12	1
4	" "	" "	SM 12	1
5	" "	" "	SM 12	1
6	Condulet cover	" "	SM 84	3
7	Condulet gasket	" "	Gask 208	1
8	Vaportite conduit with reflector and socket	" "	VMA 1959	1
9	Condulet outlet	" "	FS1	1
10	Duplex plug receptacle	Bryant	5262-2 Ml 5662	3
11	½" Rigid electrical conduit			155'±
12	¾" " " "			20'±
13	1" " " "			40'±
14	1¼" " " "			15'±
15	1½" " " "			15'±
16	2" " " "			40'±
17*	#12 A.W.G. insulated copper wire			3800'±
18*	#8 A.W.G. lamp cable RC 2001 lbs. with 60% rubber jacket			120'±
19*	#6 A.W.G. " " " " " " " "			40'±
20*	#2 A.W.G. " " " " " " " "			45'±
21*	#250 MCM " " " " " " " "			120'±
22*	¾" Coupling			1 #
23*	1¼" "			1 #
24*	1½" "			1 #
25	¾" Std. 90° Elbow			4
26	1" " " "			2
27	1½" " " "			2
28	Special long radius 90° elbow, 3" ϕ x 36" rad.	G.E.		2
29	Wire guard for reflector	West	351497	1
30	Padlock	"	351484	1
31*	#2/0 bare stranded copper cable			200'±
32	"T" connector for #2/0 copper cable	Burndy	NT 2606	10
33	Connector for #2/0 str. cable to ⅝" grnd. rod	"	GA 6626	4
34	Ground rod ⅝" ϕ, 8' long	Copperweld		4
35	Condulet outlet	Crouse-Hinds	FS 167	1
36	" " " "	" "	C 17	1
37	" " " "	" "	C 17	2
38	Condulet cover	" "	1771	4
39	#6 A.W.G. hard drawn copper wire			10'±
40	Shelf circuit type insulators	West	491736	6
41	Bus support fitting (bill to clamp ⅝ bare neutral	Lapp	9453	2
42	" " " " " ⅝ ϕ electrode	"	"	4
43	Brass electrode (See Detail)			4
44	Wall surface plate	Bryant	HY-31	3
45*	Flexible metal conduit ¾" x 15'-0"			1 #
46*	" " " 1¼" x 21'-6"			1 #
47*	" " " 1½" x 20'-0"			1 #

Notes:
Figures in circles refer to part No. in Bill of Material.
All material shall be of the manufacture, type and catalog number specified or its equal.
Small fittings, condulets, couplings, and adapters, etc., not listed shall be furnished as required.
* Indicates material which has not been installed
Existing motor lead conduits are exposed approximately 6" above floor.
This sheet shows existing construction.

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO.7

PUMPING EQUIPMENT & GATES

LIGHTING & POWER SYSTEMS

SHEET 46 OF 46 SHEETS SCALE ⅛" = 1'-0"

U.S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1944

SUBMITTED: [signature]

APPROVED RECOMMENDED: [signature] DIVISION ENGINEER

APPROVED: [signature] Lt. Col., Corps of Engineers, District Engineer

CH. BY A.L.T. TR. BY H.I. CK. BY D.S.

824.1-51

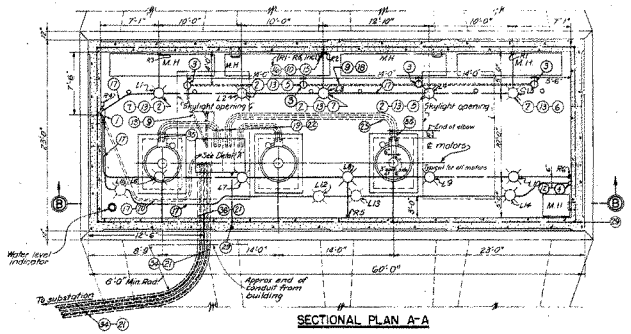
934-12.8/46

"BELIEVED AS BUILT"

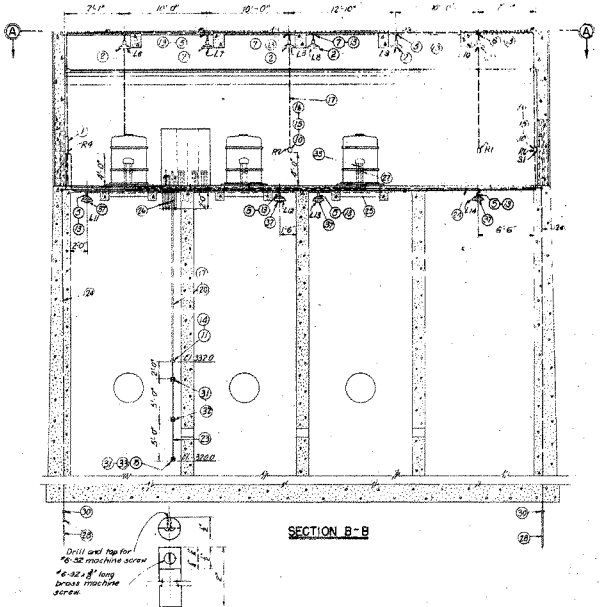
1086

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

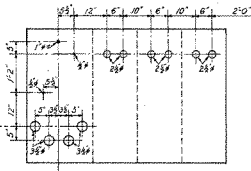


SECTIONAL PLAN A-A

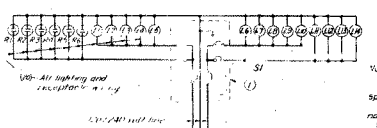


SECTION B-B

ELECTRODE DETAIL
SCALE FULL SIZE



DETAIL "A"
SCALE 3/4" = 1'-0"



WIRING DIAGRAM - LIGHTING CIRCUIT

LEGEND

BILL OF MATERIAL

PART NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUANTITY
1	4 circuit lighting panel (surface type)			1
2	R.L.M. dome reflector and socket	Hess	349573	10
3	Floor Box	G.E.	SP-9308	4
4	Surface Switch Plate			1
5	Conduilet Outlet	Crouse-Hinds	SKC12	10
6	" "	" "	SKL12	1
7	" "	" "	SKT12	3
8	5/8" electrode. (See detail)			1
9	#8 stranded cable VC, 600 volts with W.P. braid			180'±
10	Conduilet outlet	Crouse-Hinds	FS161	6
11	" "	" "	B161	1
12	Flush Tumbler Switch	Bryant	3951	16
13	Conduilet Cover	Crouse-Hinds	SKB4	16
14	" "	" "	1771	1
15	Duplex plug receptacle			6
16	Wall surface plate			6
17	1" electrical metallic tubing (E.M.T.)			380'±
18	1" rigid electrical conduit			60'±
19	2 1/2" Rigid electrical conduit			130'±
20	#12 type insulated copper wire			1140'±
21	500 MCM / cond. cable, DC, 600 Volts with 60% rubber jacket			240'±
22	#250 " " " "			420'±
23	#6 H.D. barn toilet copper wire			
24	#4 7 wire stranded copper cable			
25	1" x 1" Standard "T"			26
26	1" special long radius elbow 12" R. (about)	G.E.		4
27	1" E.M.T. coupling			15
28	Copperweld ground rod 3/4" x 10' long			4
29	1" Connector for #8 stranded cable	Burndy	NT1426	9
30	Connector for #8 stranded cable to 3/4" rod	"	GB6476	3
31	3/4" Split bolt wire type insulator	Ilsco	IJ761	15
32	Flex support fitting (not for use on #6 solid wire	Locke	9803	9
33	Flex support fitting (with locknut) for use on #6 solid wire	"	9803	1
34	2 Rigid electrical conduit			about 4
35	1 Heather conduit conduit 1" E.M.T. (1/2)			15
36	3/4" Rigid electrical conduit			65'±
37	Vapor proof Socket & Reflector	Crouse-Hinds		1

Notes:
Figures in circles refer to part numbers on Bill of Material.
All material shall be of the manufacture, type & catalog number specified, or its equal.
Small fittings, conduilets, E.M.T. couplings and adapters, etc. not listed shall be furnished as required.
200 watt lamps shall be furnished by government and installed in all lights by Contractor.
This drawing is for information of the switch gear manufacturer & indicates the space available for the switchgear.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
PUMPING EQUIPMENT AND GATES
LIGHTING AND POWER SYSTEM

SHEET 1 OF 2 SHEETS — SCALE 3/8" = 1'-0"

U. S. ENGINEER OFFICE LOUISVILLE, KY. AUG. 1945

SUBMITTED... PRINCIPAL ENGINEER

APPROVAL RECOMMENDED: ASST. CHIEF, ENGINEERING DIVISION

APPROVED: COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

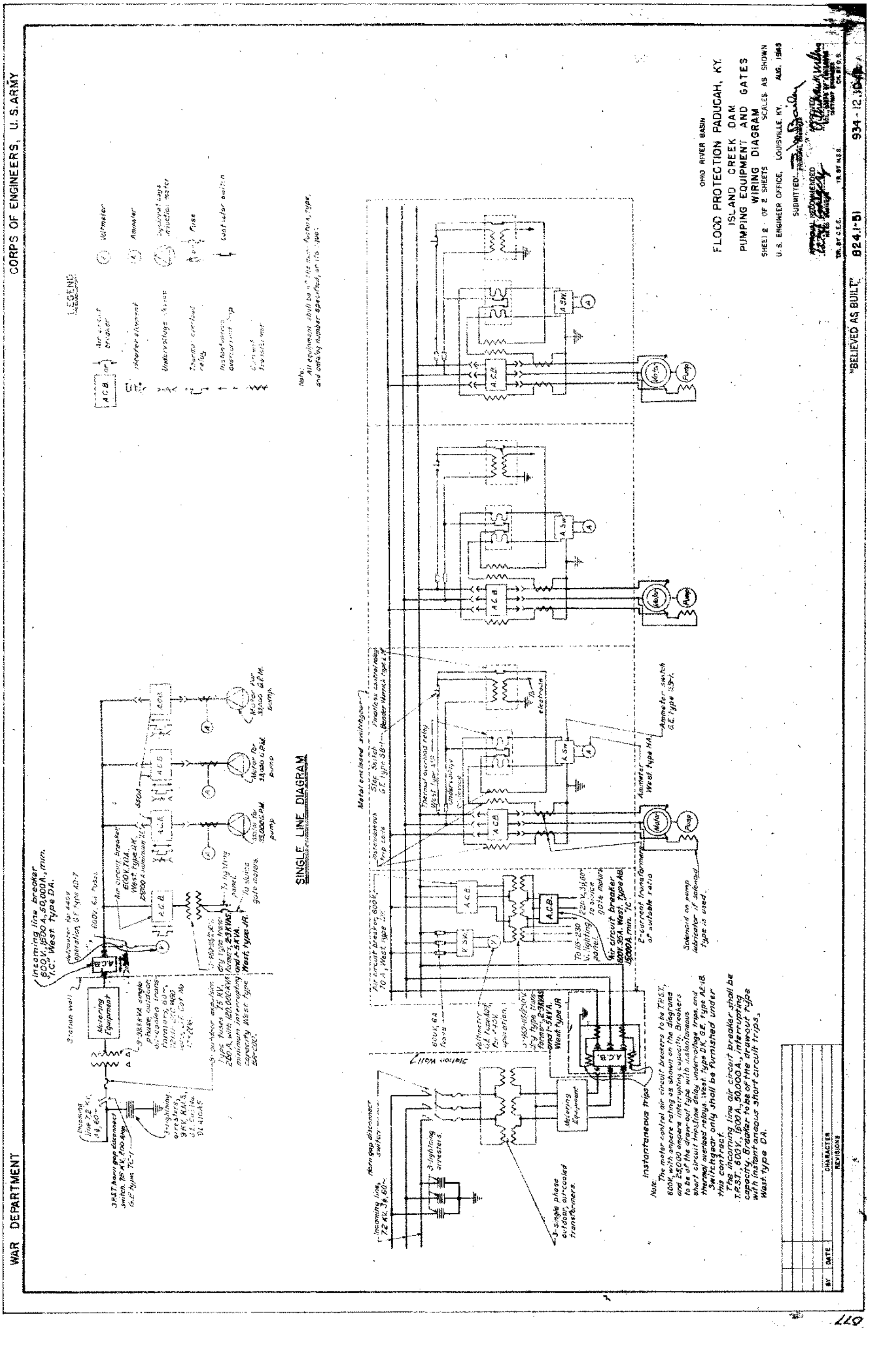
BY A.L.F. — TR/BY A.L.F.

BY	DATE	CHARACTER REVISIONS

"BELIEVED AS BUILT"

321.(0.01)

1087



WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
LEGEND
SINGLE LINE DIAGRAM
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
PUMPING EQUIPMENT AND GATES
WIRING DIAGRAM
SHEET 2 OF 2 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE KY.
AUG. 1943
SUBMITTED
RECOMMENDED
"BELIEVED AS BUILT."
824.1-51
934-12.304
CHARACTER
REVISIONS
BY
DATE

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH AREA

MOVABLE CLOSURE PARTS

SUPPLY CONTRACT

824.1-51

INDEX

PADUCAH AREA

(BROOKPORT & HARRISBURG, ILL.)

934-12.11/ 1.1 STRUCTURAL DETAILS

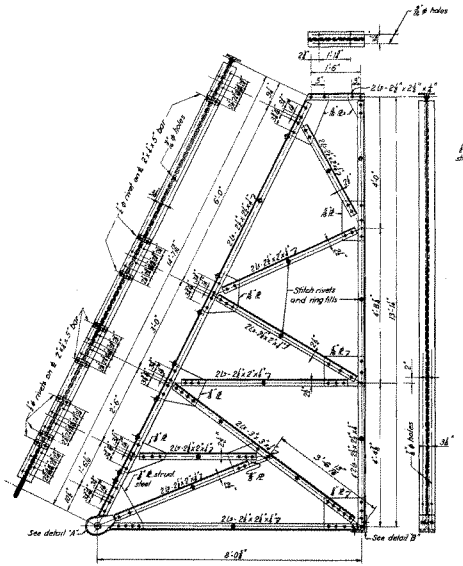
934-12.11/ 2.1 STRUCTURAL DETAILS & PINS

934-12.11/ 3.1 STRUCTURAL DETAILS

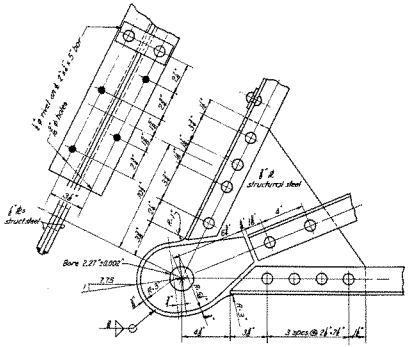
934-12.11/ 4.1 STRUCTURAL DETAILS

U. S. ENGINEER OFFICE, LOUISVILLE, KY.

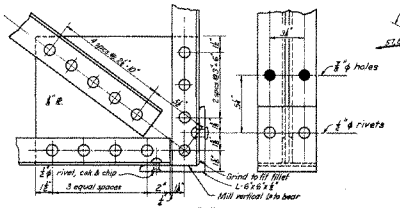
"BELIEVED AS BUILT"



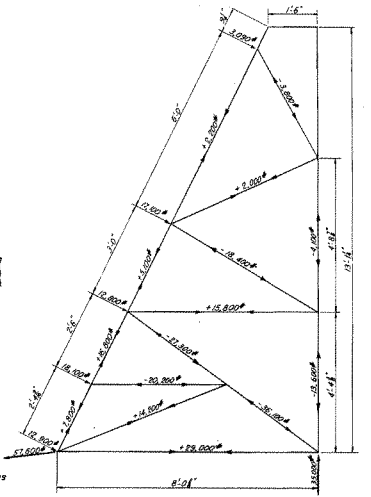
TRUSS
HARRISBURG STA. 23+73.8
MATERIAL: NO. AL 14-TALUMINUM, EXCEPT AS NOTED
MARK: CTI NO. REQ'D: 2
WEIGHT:
STRUCTURAL STEEL 34 LBS.
ALUMINUM 240 LBS.
SCALE: $\frac{3}{4}$" = 1'-0"



DETAIL "A"
PIN JOINT
SCALE: 3½"=1'-0"



DETAIL "B"
HEEL SEAT
SCALE: 3"=1'-0"



STRESS DIAGRAM
SCALE: $\frac{3}{16}$" = 1'-0"

General Notes, Aluminum Alloy Trusses.

All holes to be drilled, or sub-punched ¼" less than nominal size and reamed to finished diameter.

Rivet holes to be not more than ⅛" greater diameter than nominal size of rivet.

Standard gages to be used on all angles except as otherwise indicated.

Minimum rivet pitch for ⅞ rivets to be 2½" except as otherwise indicated.

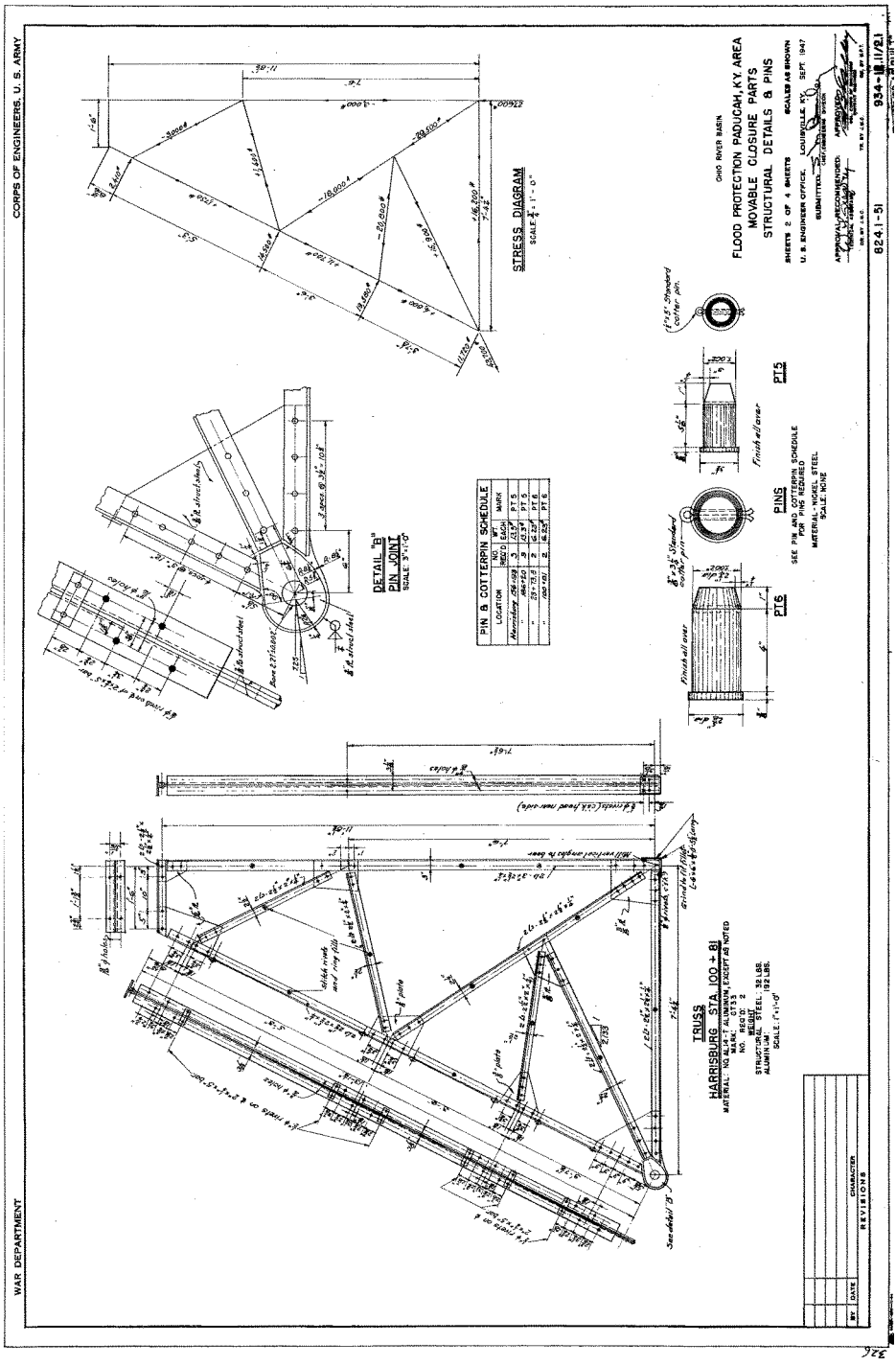
Minimum distance from the center of a rivet to a sheared edge to be 2 rivet diameters unless otherwise indicated.

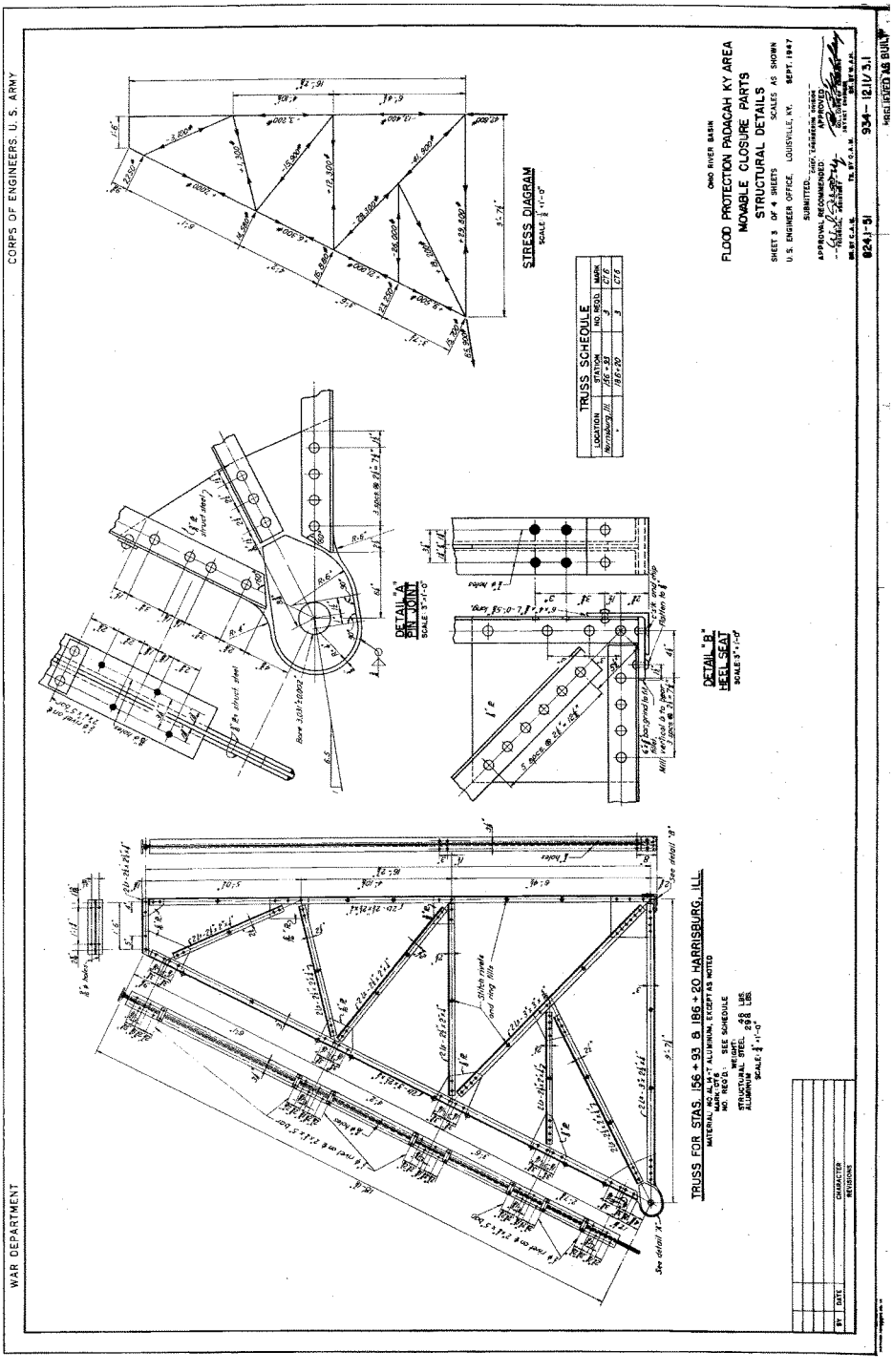
All rivets to be ¼" annealed steel, driven cold with cone point head except as otherwise indicated.

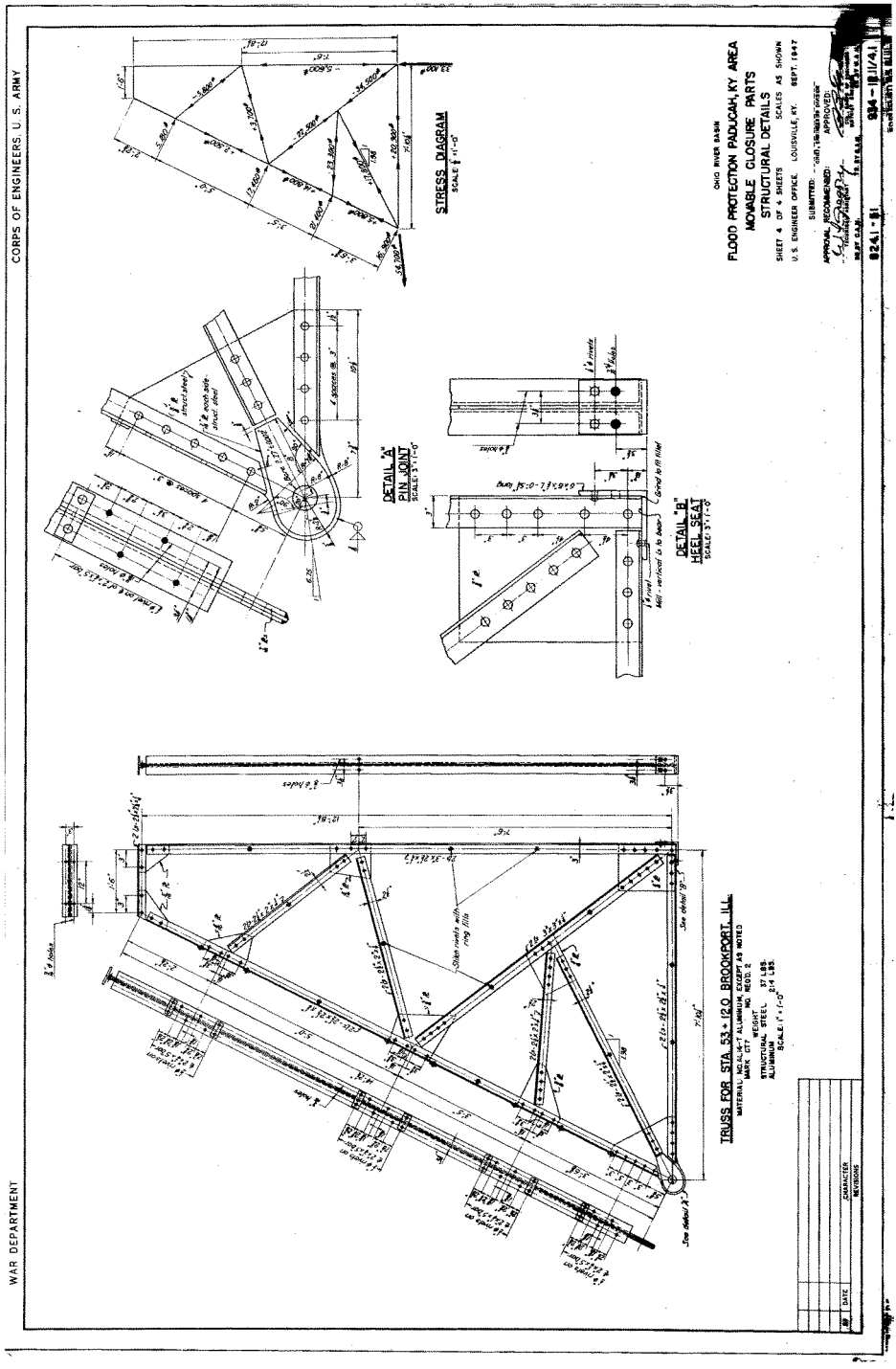
⅞ rivets to be AL 53-T Aluminum alloy, driven cold, and with cone-point heads unless otherwise indicated.

NO.	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY. AREA
MOVABLE CLOSURE PARTS
STRUCTURAL DETAILS
SHEET 1 OF 4 SHEETS SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. SEPT. 1947
SUBMITTED, CHIEF, ENGINEERING DIVISION
APPROVAL RECOMMENDED: APPROVED:
Chief, Engineering Division
Chief of Engineers
Major General, U.S.A.
Acting
034-12.1/1

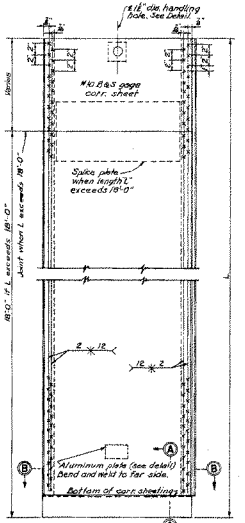

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY. AREA
MOVABLE CLOSURE PARTS
STRUCTURAL DETAILS & PINS
SHEETS 2 OF 4 SHEETS
SCALED AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. SEPT. 1947
SUBMITTED
APPROVED
824.1-51
934-18 11/21
STRESS DIAGRAM
SCALE 1/4" = 1'-0"
DETAIL "B"
PIN JOINT
SCALE 3"=1'-0"
PIN & COTTERPIN SCHEDULE
LOCATION
NO. REQ'D
DIA.
MARK
PT 5
PT 6
PINS
SEE PIN AND COTTERPIN SCHEDULE FOR PINS REQUIRED
MATERIAL: HEAT TREATED STEEL
SCALE: NONE
TRUSS
HARRISBURG STA. 100 + 81
MATERIAL: NO. 6061-T ALUMINUM, EXCEPT AS NOTED
NO. REQ'D: 2
WEIGHT
STRUCTURAL STEEL: 32,185
ALUMIN. (all): 192,385
SCALE: 1"=1'-0"
BY
DATE
CHARACTER
REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH KY AREA
MOVABLE CLOSURE PARTS
STRUCTURAL DETAILS
SHEET 3 OF 4 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. SEPT. 1947
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
934-121/3.1
824-91
STRESS DIAGRAM
SCALE 1"=1'-0"
TRUSS SCHEDULE
LOCATION
STATION
NO. REQD.
MARK
Northbound
156+93
3
C7F
186+20
3
C7F
DETAIL "A"
PIN JOINT
SCALE 3"=1'-0"
DETAIL "B"
HEEL SEAT
SCALE 3"=1'-0"
TRUSS FOR STAS. 156+93 & 186+20 HARRISBURG, ILL.
MATERIAL: NO. 24-S-T ALUMINUM, EXCEPT AS NOTED
MARK: C7F
NO. REQ'D.: 6
SEE SCHEDULE
WEIGHT:
STRUCTURAL STEEL: 288 LBS.
ALUMINUM: 288 LBS.
SCALE: 3/4"=1'-0"
BY
DATE
CHARACTER
REVISIONS
AS BUILT

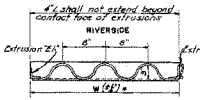

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY AREA
MOVABLE CLOSURE PARTS
STRUCTURAL DETAILS
SHEET 4 OF 4 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. SEPT. 1947
SUBMITTED: "ORIGINAL SIGNED"
APPROVED: "ORIGINAL SIGNED"
MAP CASE
824-11/4.1
STRESS DIAGRAM
SCALE 1"=1'-0"
DETAIL "A"
PIN JOINT
SCALE 3"=1'-0"
DETAIL "B"
HEEL SEAT
SCALE 3"=1'-0"
TRUSS FOR STA 53+ I.P.O. BROOKPORT ILL.
MATERIAL NO. AL-6-T ALUMINUM, EXCEPT AS NOTED
MARK CIT WEIGHT
NO. REQ'D. 2
STRUCTURAL STEEL 37 LBS.
ALUMINUM 234 LBS.
SCALE 1"=1'-0"
NO.
DATE
CHARACTER
REVISIONS

WAR DEPARTMENT

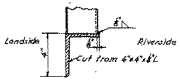
CORPS OF ENGINEERS, U. S. ARMY



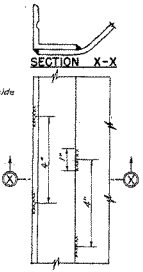
SHEETING PANEL
LANDSIDE ELEVATION
SCALE: NONE
MATERIAL: AL 61-T ALUMINUM ALLOY



SECTION B-B
SCALE: 1½"=1'-0"

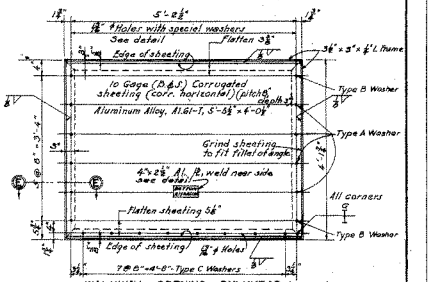


SECTION A-A
SCALE: 3"=1'-0"

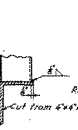


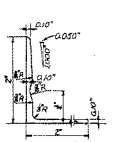
SECTION X-X

ELEVATION
ALTERNATE DETAIL FOR
WELDING EXTRUSIONS TO PANEL
SCALE: NONE

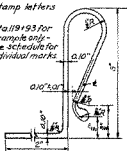


WALKWAY OPENING BULKHEAD
FOR OPENINGS AT STAS. 107 + 80.7 & 108+ 55.3
EVANSVILLE HOWELL SECTION
MAKE 2 - MARK EB1 - WT. 79 LBS. EA.
MATERIAL: ALUMINUM ALLOY AL 61-T
SCALE: 1"=1'-0"

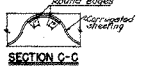




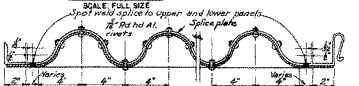
EXTRUSION "E1"
SCALE: FULL SIZE
Round edges



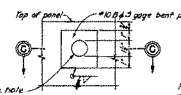
EXTRUSION "E2"
SCALE: FULL SIZE



SECTION C-C

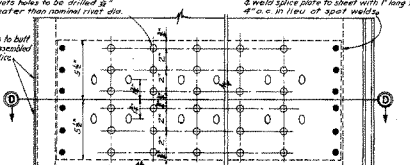


SECTION D-D



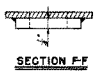
R.S.ELEVATION
HANDLING HOLE DETAIL
SCALE: 3"=1'-0"

Note: When fillet welds are used to join extrusion to sheet, make distance from edge of splice to edge of extrusion ½", & weld splice plate to sheet with 1" long fillets 4" o.c. in lieu of spot welds.

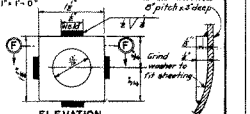


LANDSIDE ELEVATION
SPLICE IN SHEETING PANELS
SCALE: 3" = 1'-0"

SECTION E-E



SECTION F-F
TYPE C



ELEVATION

SECTION F-F
TYPE B

SECTION F-F
TYPE A

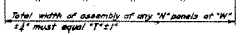
Note:
The corrugated sheeting has a nominal pitch of 3" & depth of 3/8". A ¼" tolerance in pitch is allowable.

SPECIAL WASHERS FOR
WALKWAY OPENINGS
SCALE: NONE

SHEETING SCHEDULE

LOCATION	STATION	WIDTH "W"	LENGTH "L"	NO. REQ'D	"Y"	TOTAL WT.	MARK
Brockport, Ill.	53+17.0	5'-2½"	18'-1"	7	3½"±	1940	C.S. 23
"	81+00.5	4'-6½"	11'-1"	3	18½"±	595	" " 18
"	59+49.2	4'-6½"	11'-1"	5	18½"±	595	" " 16
"	92+68.3	5'-3½"	12'-10"	5	21½"±	719	" " 32
"	97+18.6	5'-3½"	11'-1"	5	21½"±	682	" " 31
"	110+58.00	5'-2½"	13'-10"	7	3½"±	1160	" " 21
"	114+38.54	5'-2½"	13'-10"	7	3½"±	1160	" " 21
"	195+30.7	5'-3½"	11'-1"	5	21½"±	682	" " 31
Golconda, Ill.	10+61.0	5'-2½"	13'-4"	7	3½"±	1060	" " 20
"	19+34.5	4'-6½"	12'-4"	3	18½"±	336	" " 17
"	21+05.6	5'-2½"	11'-1"	7	3½"±	959	" " 19
Harrisburg, Ill.	23+73.8	5'-2½"	16'-10"	7	3½"±	1400	" " 24
"	100+81	5'-2½"	14'-1"	7	3½"±	1220	" " 22
"	156+80	5'-2½"	20'-1"	7	3½"±	1730	" " 25
"	166+20	5'-2½"	20'-4"	7	3½"±	1751	" " 26

● Width tolerance for panel = ±¼". Edge of panel to be not more than ½" out of parallel. Schedule contains "N"+1 panels for each closure.



Total width of assembly at any "N" panels at "W", ±2" must equal "T"±2".

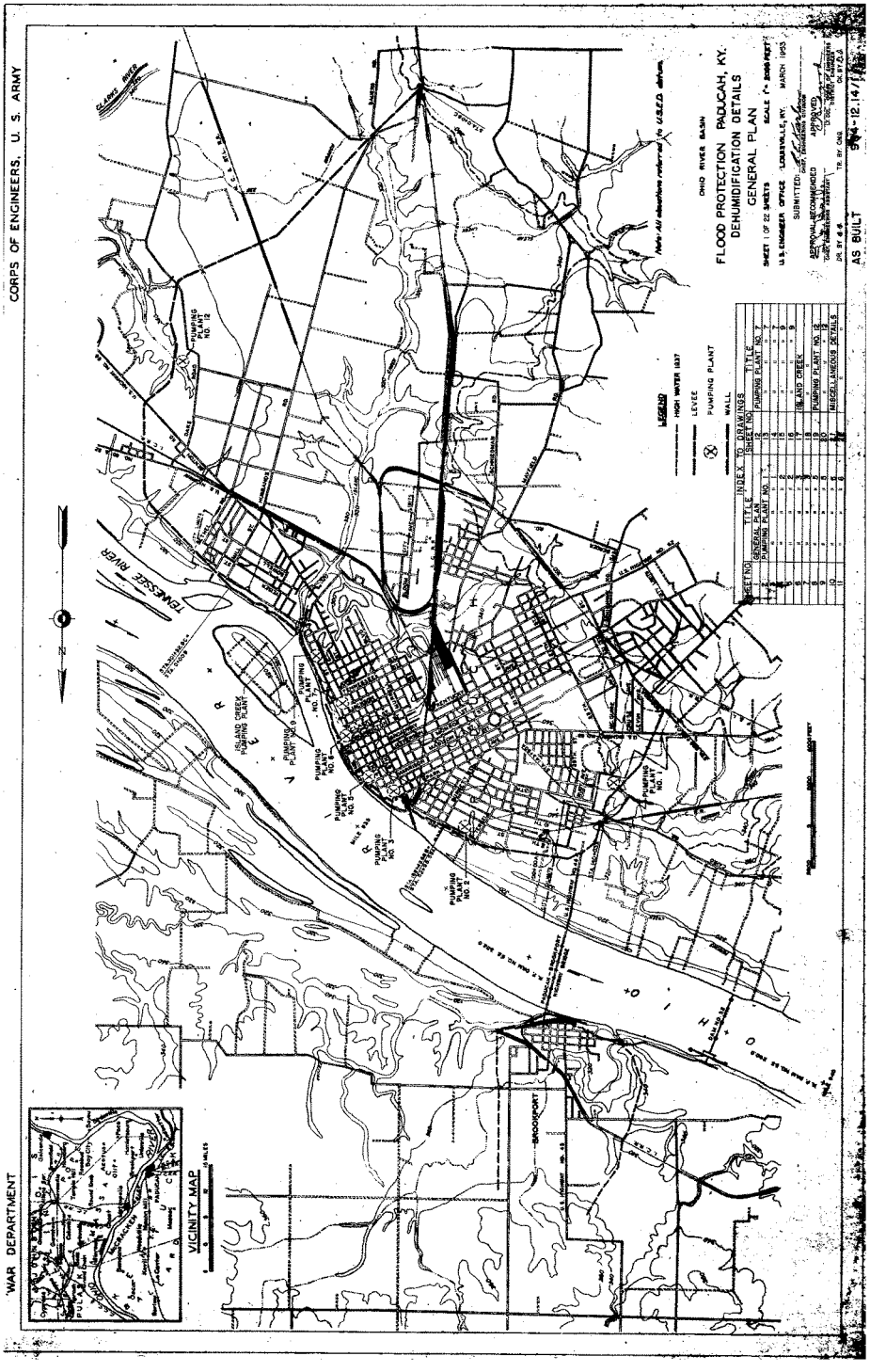
BY	DATE	CHARACTER
		REVISIONS

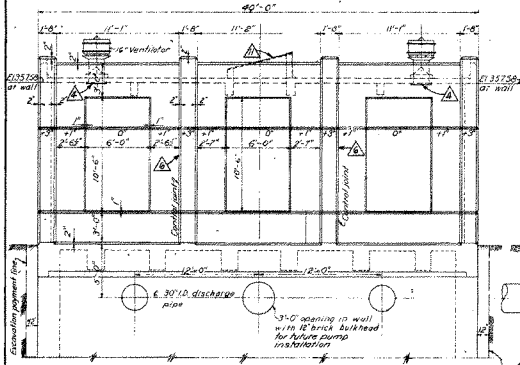
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY. AREA
MOVABLE CLOSURE PARTS
SHEETING PANELS AND
WALKWAY OPENING BULKHEADS
SHEETS 1 OF 1 SHEETS — SCALES AS SHOWN
CORPS OF ENGINEERS — LOUISVILLE, KY. — SEPT 1947
SUBMITTED: CHIEF, ENGINEERING DIVISION
APPROVAL RECOMMENDED: — APPROVED:
DIVISION ENGINEER — DIV. ENGR.

884.1-51

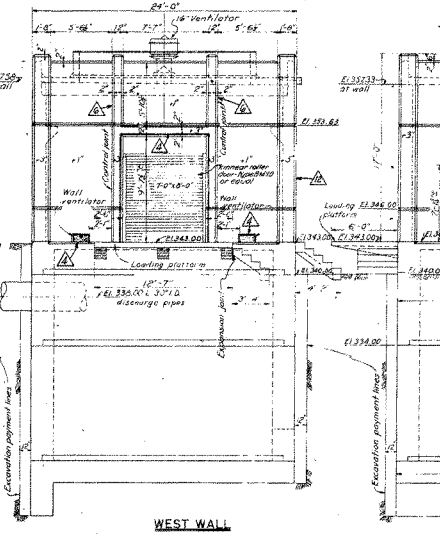
884-1R/1

WHEN SHEETS AS BUILT

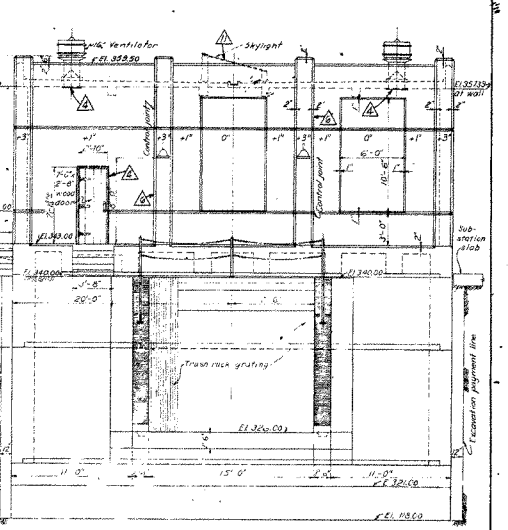

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
DEHUMIDIFICATION DETAILS
GENERAL PLAN
OHIO RIVER BASIN
SHEET 1 OF 22 SHEETS
SCALE 1" = 2000 FEET
U.S. ENGINEER OFFICE LOUISVILLE, KY. MARCH 1943
SUBMITTED
APPROVED
AS BUILT
VICINITY MAP
INDEX TO DRAWINGS
SHEET NO.
TITLE
GENERAL PLAN NO. 1
PUMPING PLANT NO. 7
PUMPING PLANT NO. 12
LEGEND
HIGH WATER 1937
LEVEE
PUMPING PLANT
WALL
TENNESSEE RIVER
OHIO RIVER
ISLAND CREEK PUMPING PLANT
PUMPING PLANT NO. 1
PUMPING PLANT NO. 2
PUMPING PLANT NO. 3
PUMPING PLANT NO. 4
PUMPING PLANT NO. 5
PUMPING PLANT NO. 6
PUMPING PLANT NO. 7
PUMPING PLANT NO. 12
BROOKPORT



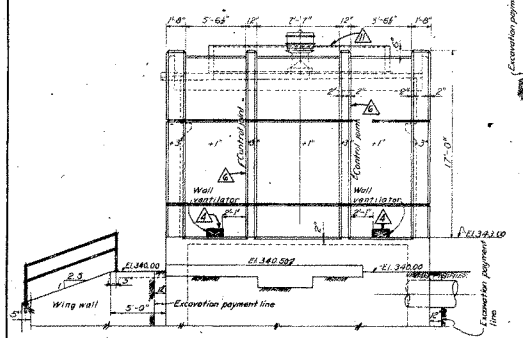
NORTH WALL



WEST WALL



SOUTH WALL



EAST WALL

ITEMS OF WORK UNDER DEHUMIDIFICATION CONTRACT

1. Furnish and install dehumidification unit Desomatic Model SOR-B-AE, 110V 60~ or equal. Provide suitable supports with 1'-6" clearance above floor.
2. Furnish and install reactivation air lines thru wall ventilator. Provide vapor-tight connection at cover plate.
3. Paint all concrete surfaces in superstructure, including floor, with a vapor barrier plastic.
4. Cover all door and ventilators openings in plant superstructure as shown by details on sheets E1 & E2. Dimensions of openings shall be verified in field prior to fabrication.
5. Seal all incoming line conduits, including electrical conduit not shown on plans.
6. Caulk all control joints.
7. Seal pipe wall for water level indicator.
8. Install gasket under cover, around edges and between sections, modify hinges Also See Detail A, B & C, Sheet E1.
9. Caulk ventilator duct openings at sump and roof and seal duct joints.
10. Caulk opening around valve stem. Provide rubber gasket under cover and offset to box.
11. Caulk and seal skylight glass and frame so as to be vapor-tight.
12. Seal cracks in exterior of superstructure concrete walls, including parapet and paint with one coat of waterproof paint.
13. Permanently secure ventilating sash in windows in closed position and caulk windows so as to be vapor-tight.

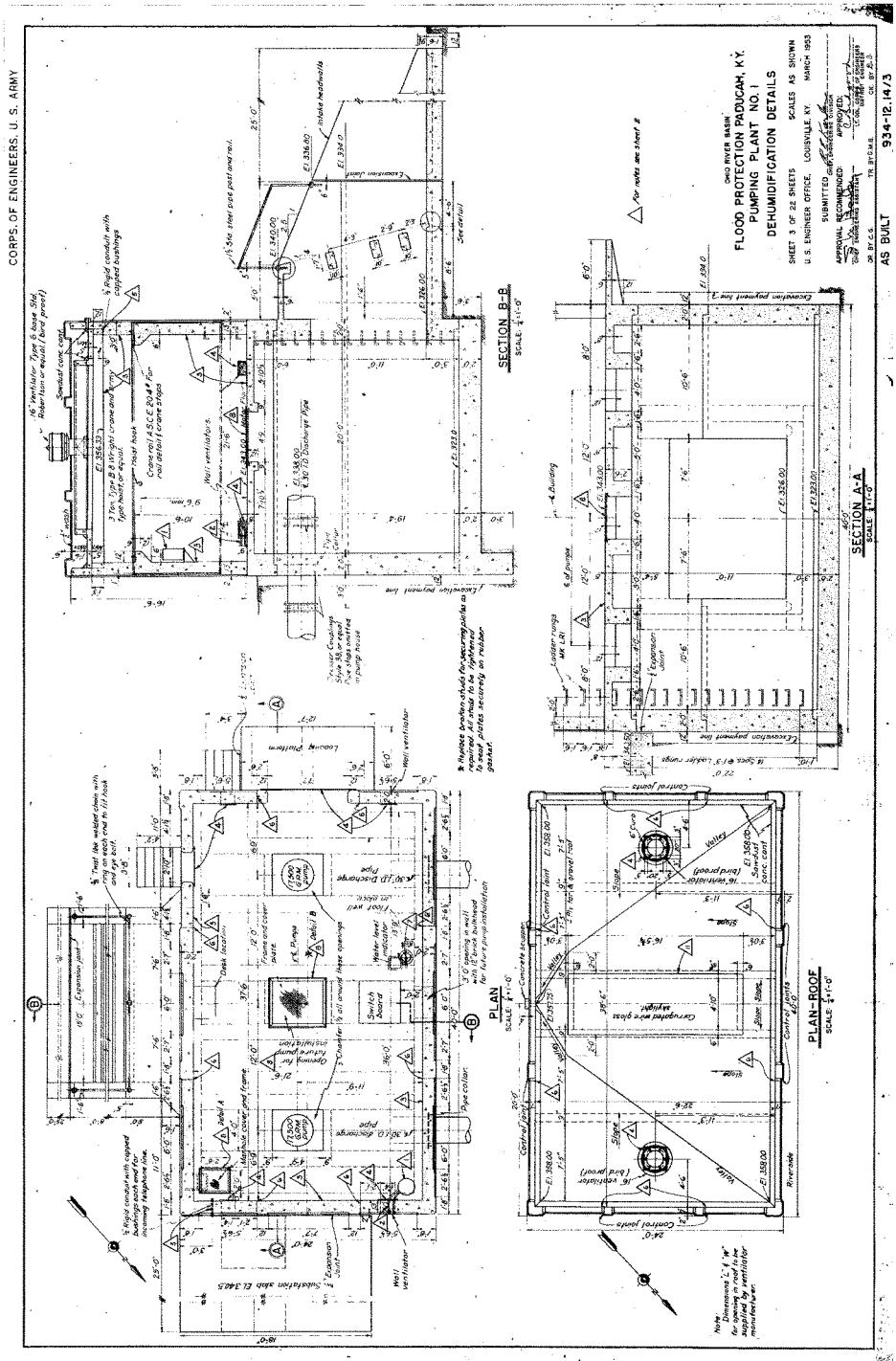
Notes:
1. See C.O. Nos. 1 and 2, "As Built" corrections.
2. Duplex receptacles installed within 6'-0" of unit where required.

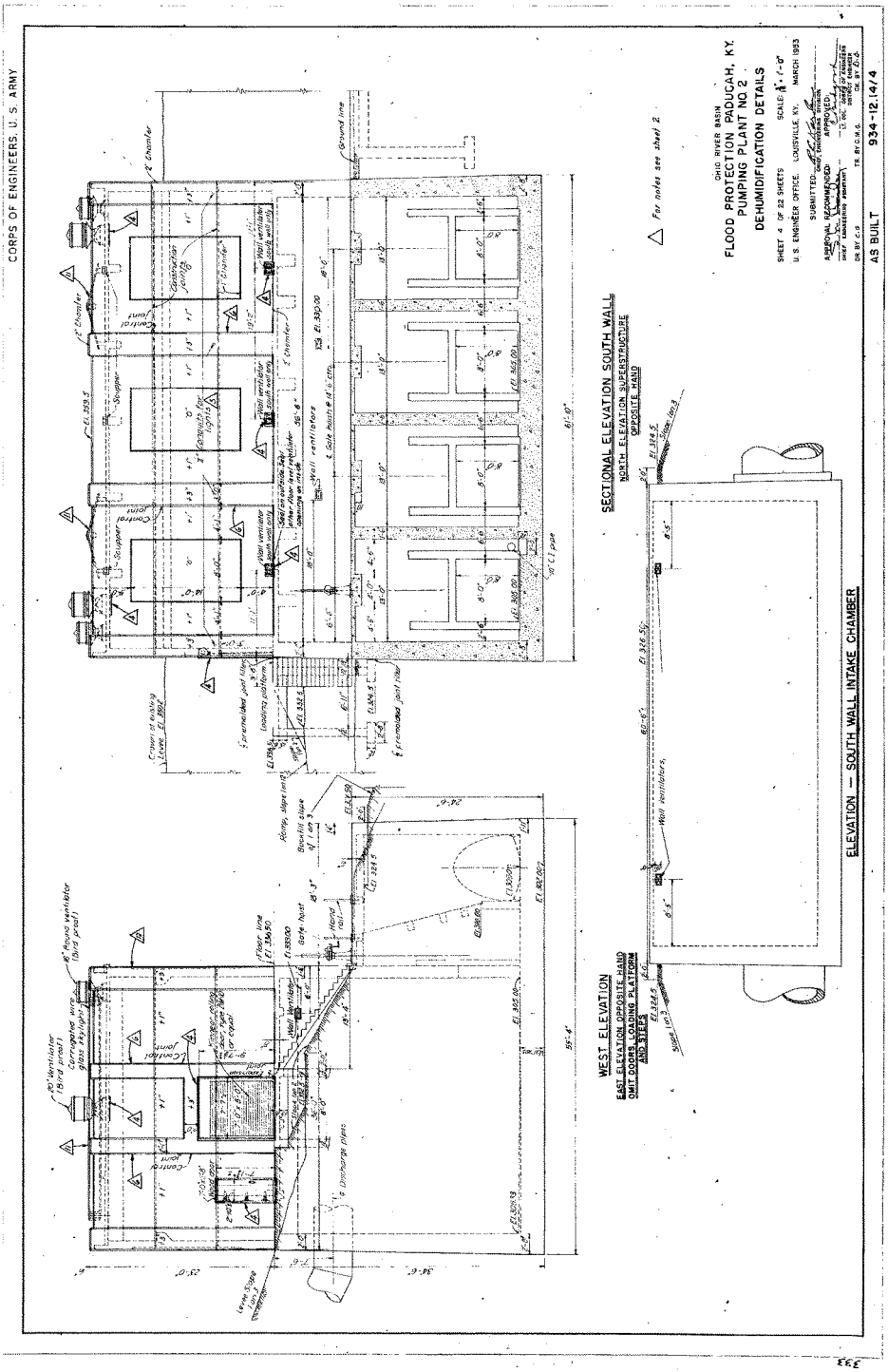
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO.1
DEHUMIDIFICATION DETAILS

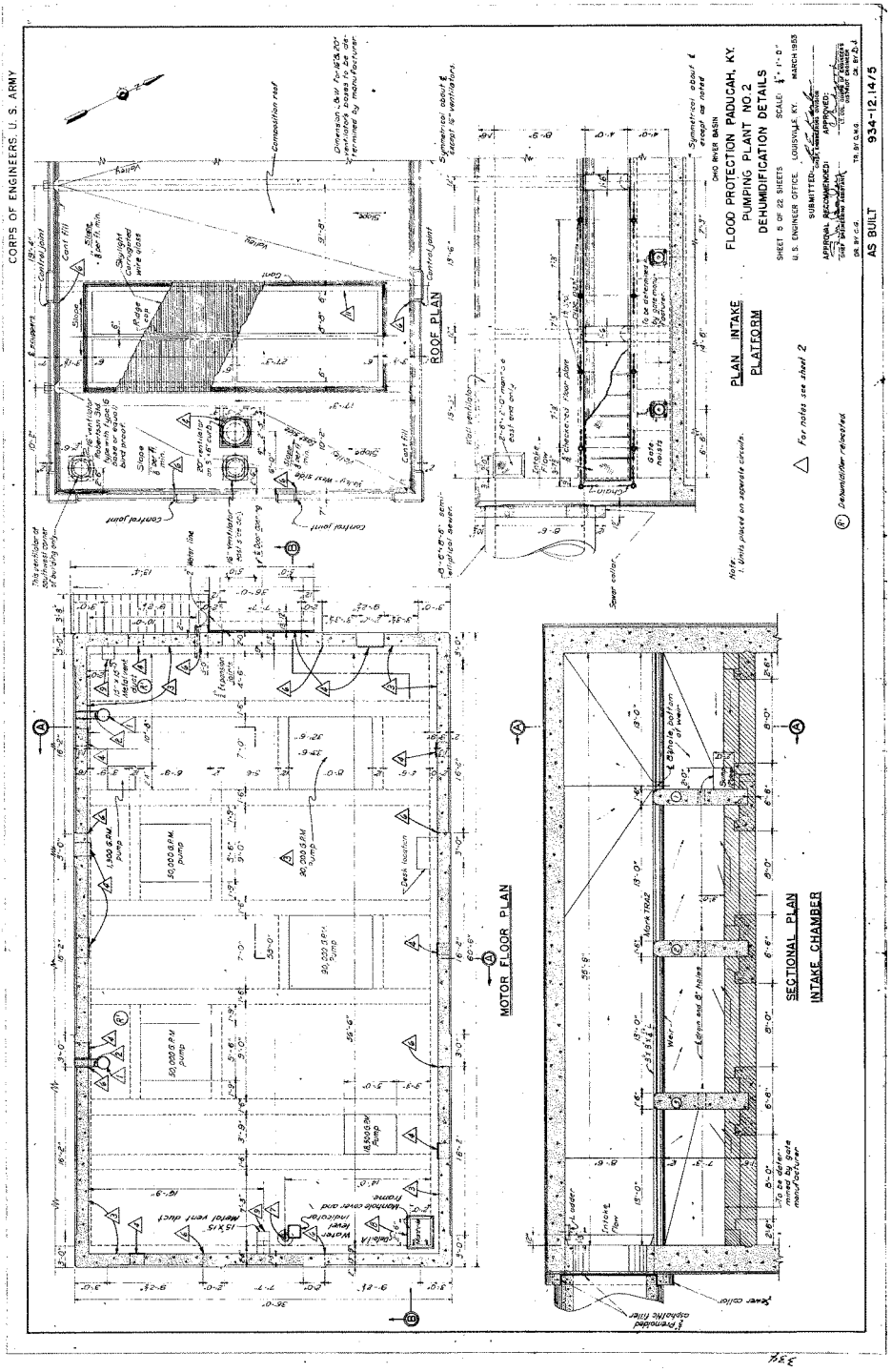
SHEET 2 OF 22 SHEETS SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953
SUBMITTED: _____ CHIEF, ENGINEERING DIVISION
APPROVAL RECOMMENDED: _____ CHIEF ENGINEERING DIVISION
APPROVED: _____ LT. COL., CORPS OF ENGINEERS DISTRICT ENGINEER
DR. BY C.G. TR. BY O.M.G. CK. BY D.D.

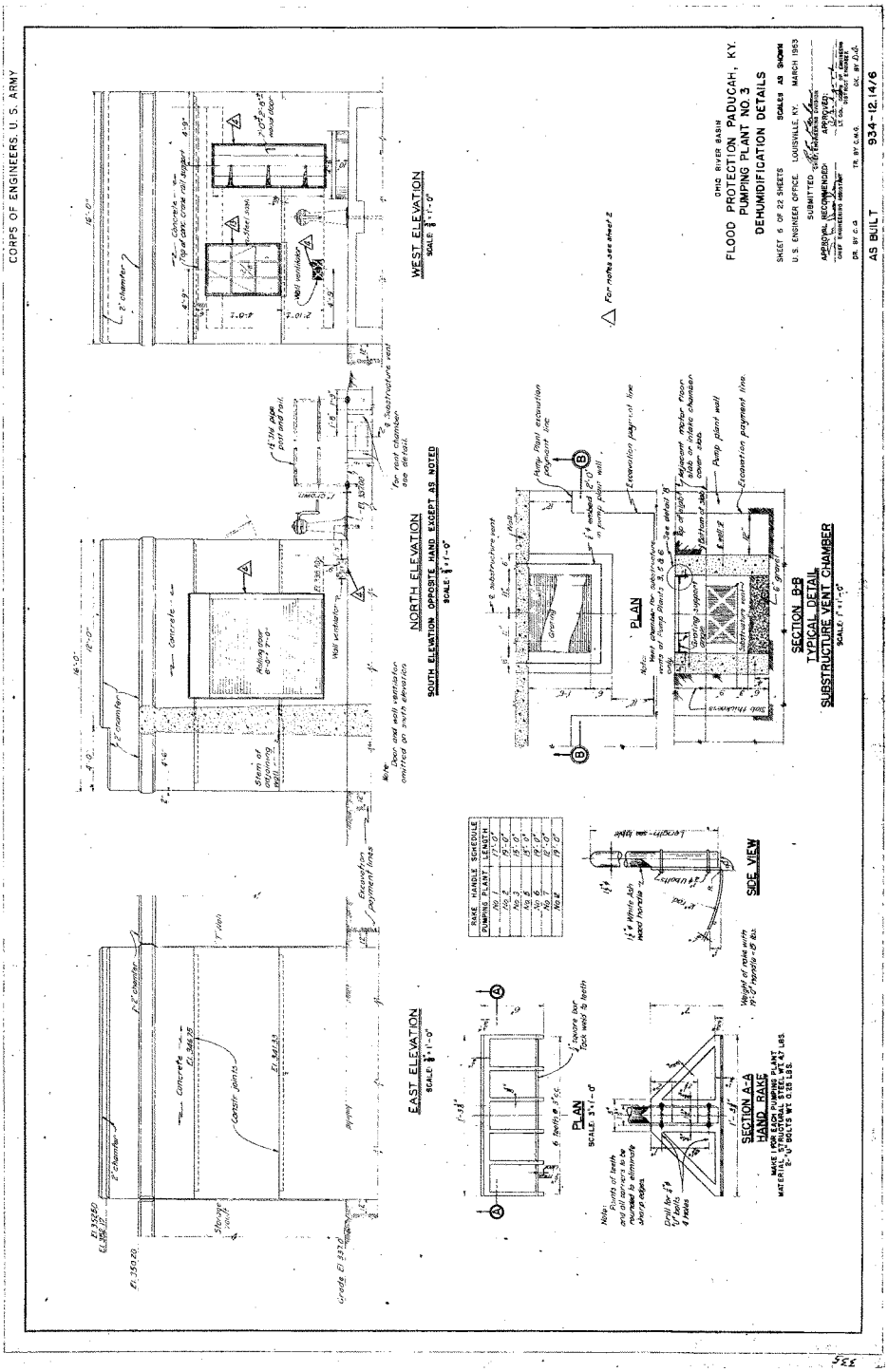
AS BUILT 934-12.14/2

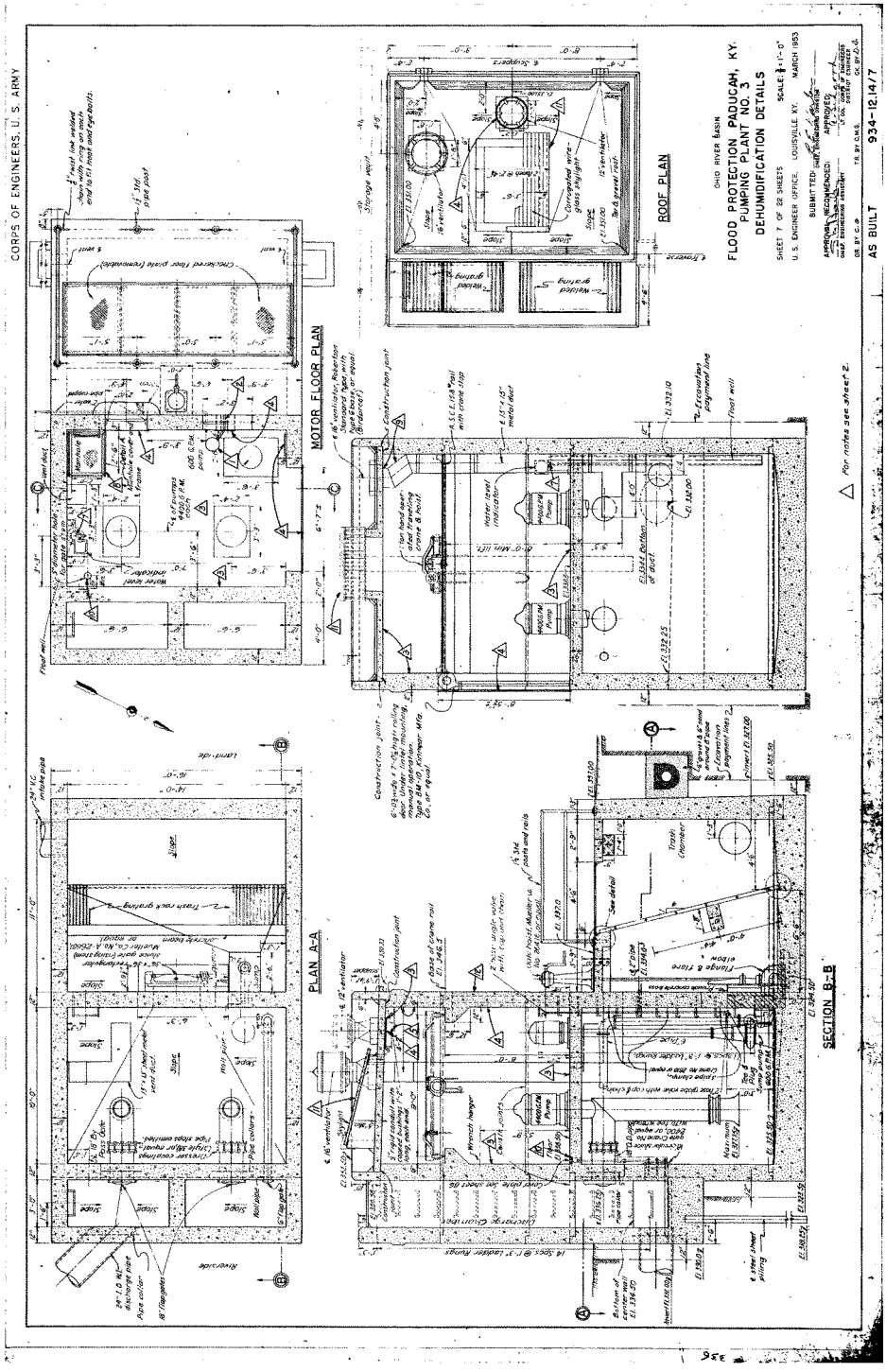
1096

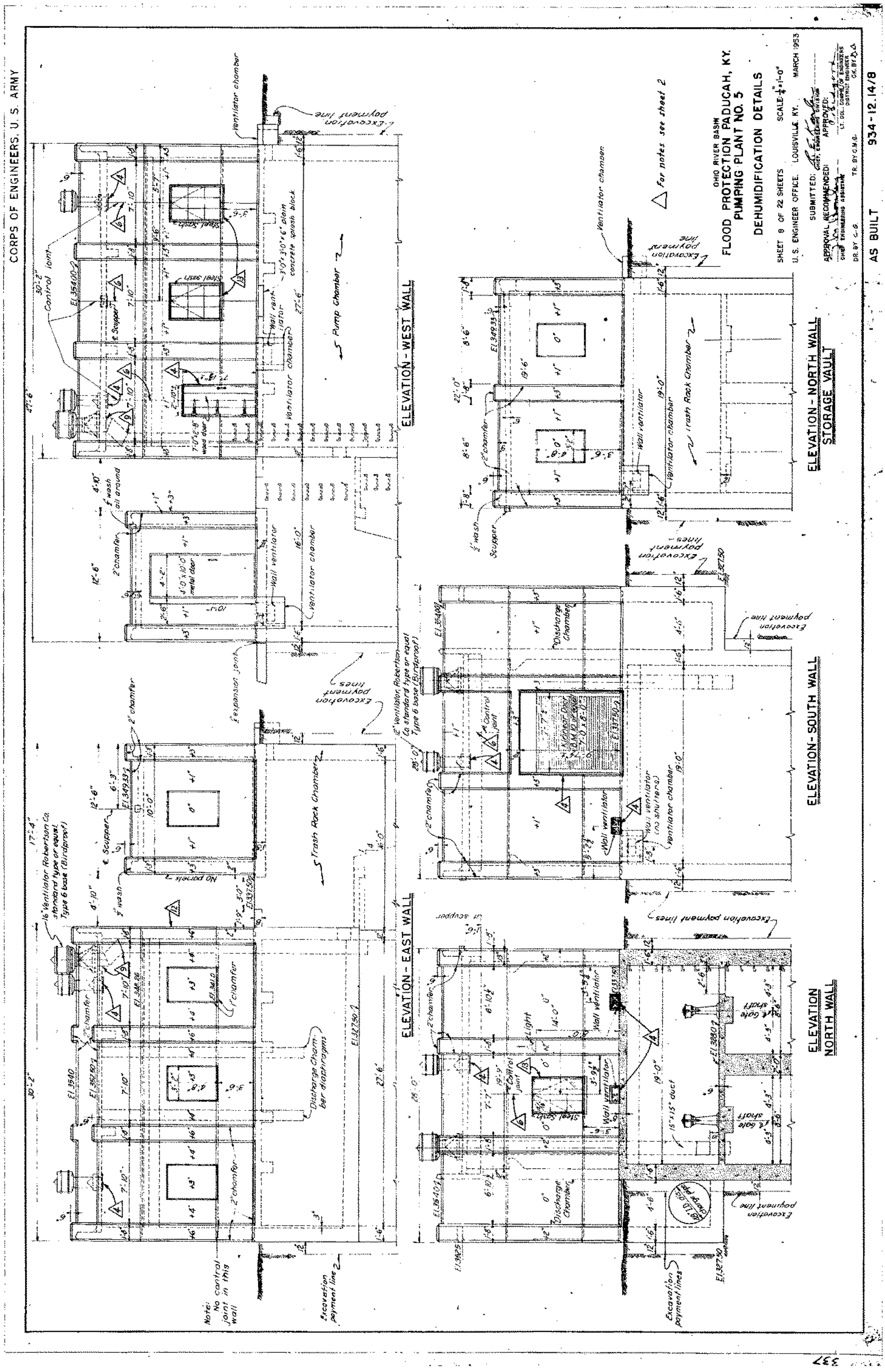

CORPS. OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 1
DEHUMIDIFICATION DETAILS
SHEET 3 OF 22 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953
SUBMITTED
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
934-12.14/3
SECTION B-B
SCALE 1/4"=1'-0"
SECTION A-A
SCALE 1/4"=1'-0"
PLAN
SCALE 1/4"=1'-0"
PLAN-ROOF
SCALE 1/4"=1'-0"

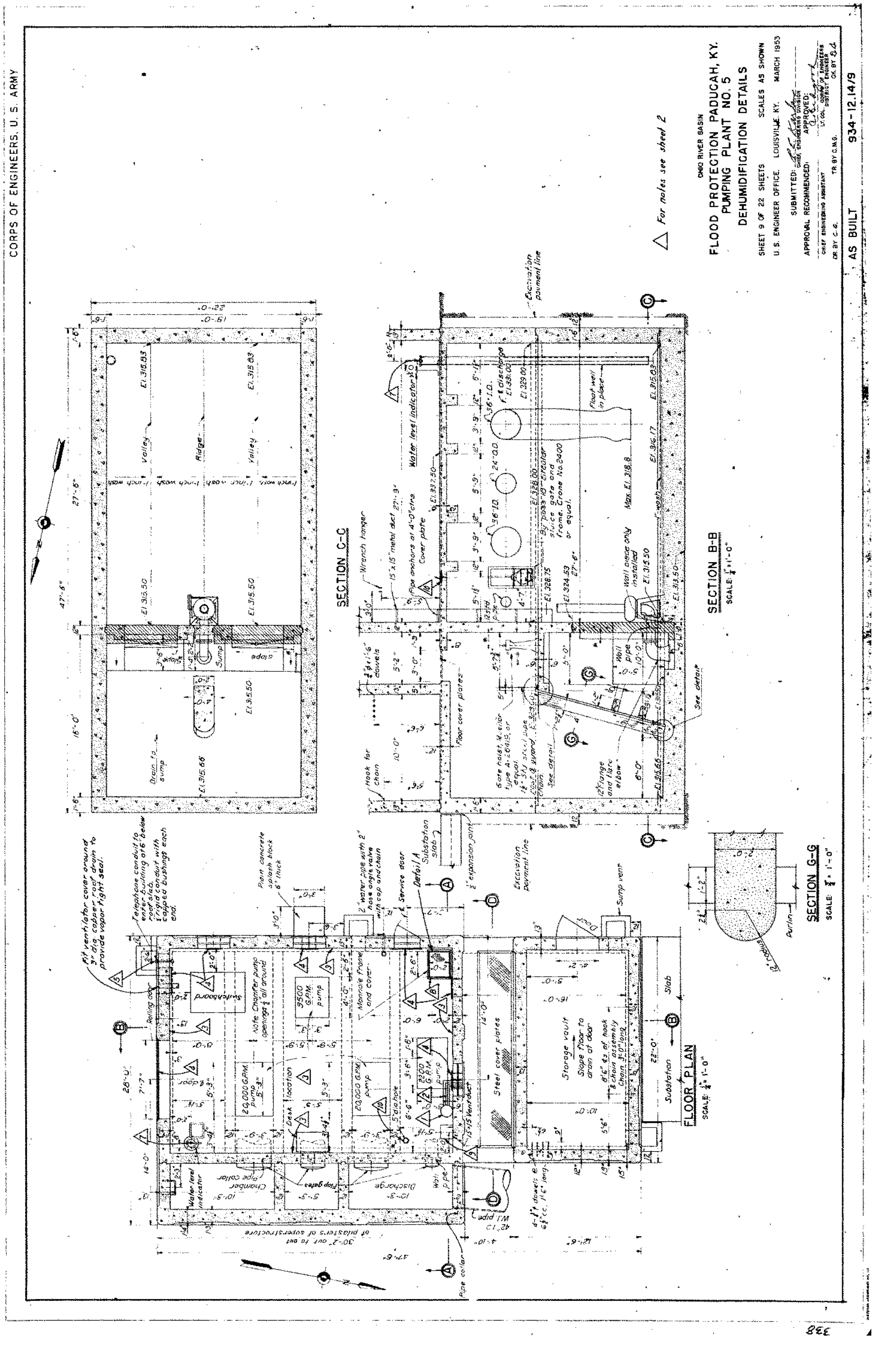

CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
DEHUMIDIFICATION DETAILS
SHEET 4 OF 22 SHEETS
SCALE: 1/8" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953
SUBMITTED:
APPROVED:
AS BUILT
934-12.14/4
ELEVATION — SOUTH WALL INTAKE CHAMBER
WEST ELEVATION
EAST ELEVATION OPPOSITE HAND
OMIT DOORS LOADING PLATFORM AND STEPS
SECTIONAL ELEVATION SOUTH WALL
NORTH ELEVATION SUPERSTRUCTURE OPPOSITE HAND
△ For notes see sheet 2

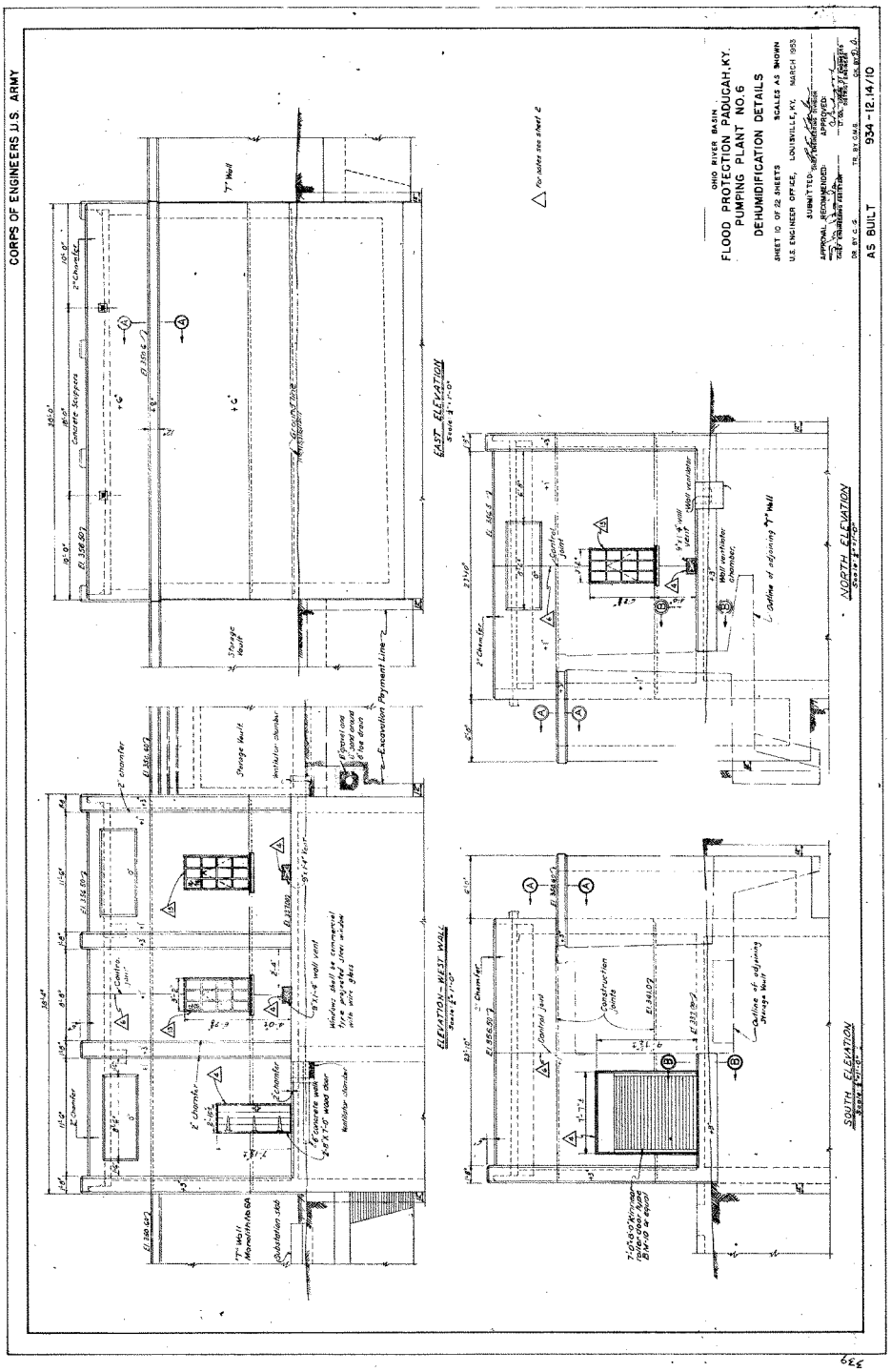

CORPS OF ENGINEERS, U. S. ARMY
ROOF PLAN
MOTOR FLOOR PLAN
SECTIONAL PLAN
INTAKE CHAMBER
PLAN INTAKE
PLATFORM
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 2
DEHUMIDIFICATION DETAILS
SHEET 5 OF 22 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY.
SCALE: 1/4" = 1'-0"
MARCH 1938
SUBMITTED:
APPROVED:
AS BUILT
934-12.14/5

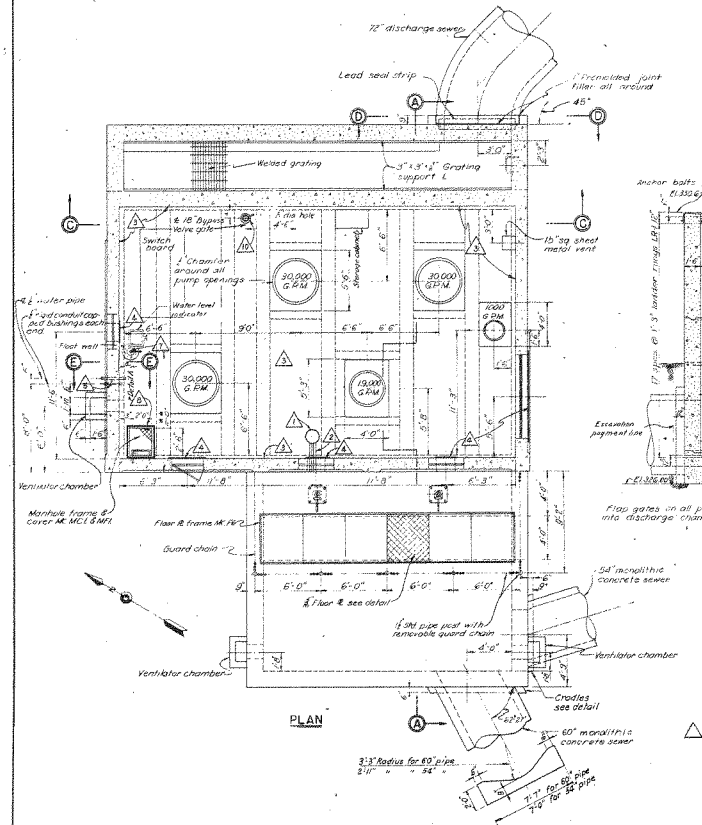

CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 3
DEHUMIDIFICATION DETAILS
SHEET 6 OF 22 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953
SUBMITTED
APPROVAL RECOMMENDED
APPROVED:
AS BUILT
934-12.14/6
EAST ELEVATION
SCALE 1/4"=1'-0"
NORTH ELEVATION
SOUTH ELEVATION OPPOSITE HAND EXCEPT AS NOTED
SCALE 1/4"=1'-0"
WEST ELEVATION
SCALE 1/4"=1'-0"
PLAN
SCALE 3/4"=1'-0"
SECTION A-A
HAND RAKE
SIDE VIEW
PLAN
SECTION B-B
TYPICAL DETAIL
SUBSTRUCTURE VENT CHAMBER
SCALE 1"=1'-0"
RAKE HANDLE SCHEDULE
PUMPING PLANT
LENGTH
No. 1
15'-0"
No. 2
15'-0"
No. 3
15'-0"
No. 4
15'-0"
No. 5
15'-0"
No. 6
15'-0"
No. 7
15'-0"
No. 8
15'-0"
For notes see sheet 2


CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 3
DEHUMIDIFICATION DETAILS
SHEET 7 OF 22 SHEETS
SCALE: 1/4" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953
SUBMITTED:
APPROVED:
AS BUILT
934-12.14/7
MOTOR FLOOR PLAN
ROOF PLAN
PLAN A-A
SECTION B-B


CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 5
DEHUMIDIFICATION DETAILS
SHEET 8 OF 22 SHEETS
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953
ELEVATION - WEST WALL
ELEVATION - EAST WALL
ELEVATION - NORTH WALL
STORAGE VAULT
ELEVATION - SOUTH WALL
ELEVATION
NORTH WALL
Pump Chamber
Trash Rack Chamber
Discharge Chamber
Ventilator chamber
For notes see sheet 2
AS BUILT
934-12.14/8


CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 5
DEHUMIDIFICATION DETAILS
SHEET 9 OF 22 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE. LOUISVILLE, KY.
MARCH 1953
For notes see sheet 2
AS BUILT
934-12.14/9
SECTION C-C
SECTION B-B
SECTION G-G
FLOOR PLAN
Storage vault
Steel cover plates
Substation
Switchboard
20,000 G.P.M. pump
9500 G.P.M. pump
Desk location
Discharge Chamber
Water level indicator
Float well in place


CORPS OF ENGINEERS U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
DEHUMIDIFICATION DETAILS
SHEET 10 OF 22 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953
SUBMITTED:
APPROVED:
AS BUILT
934-12.14/10
EAST ELEVATION
NORTH ELEVATION
SOUTH ELEVATION
ELEVATION-WEST WALL
Excavation Payment Line
Outline of adjoining "T" Wall
Outline of adjoining Sluice Wall
Control joint
Construction joints
Sluice Vault
Ventilator chamber
Concrete Scupper
"T" Wall
Monolith No 6A
Substation Slab



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 6
DEHUMIDIFICATION DETAILS

SHEET 11 OF 22 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953

SUBMITTED: Chief, Engineering Division

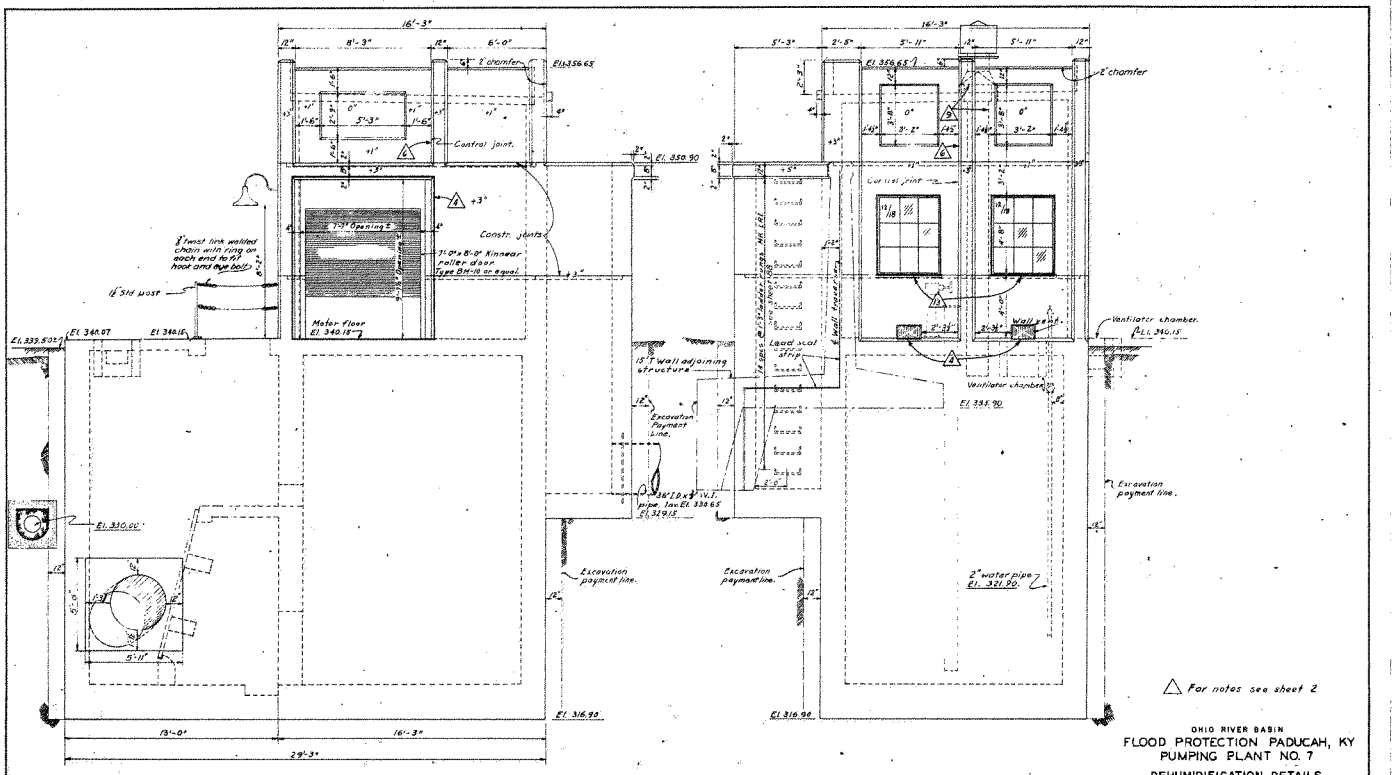
APPROVED: Lt. Col., Corps of Engineers, District Engineer

APPROVAL RECOMMENDED: Chief, Engineering Division

DR. BY C.S. TR. BY R.L.M. CK. BY D.A.

AS BUILT 934-12.14/11

1105



△ For notes see sheet 2

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY
PUMPING PLANT NO. 7

DEHUMIDIFICATION DETAILS

SHEET 12 OF 22 SHEETS SCALE ¼" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953

SUBMITTED: CHIEF, ENGINEERING DIVISION

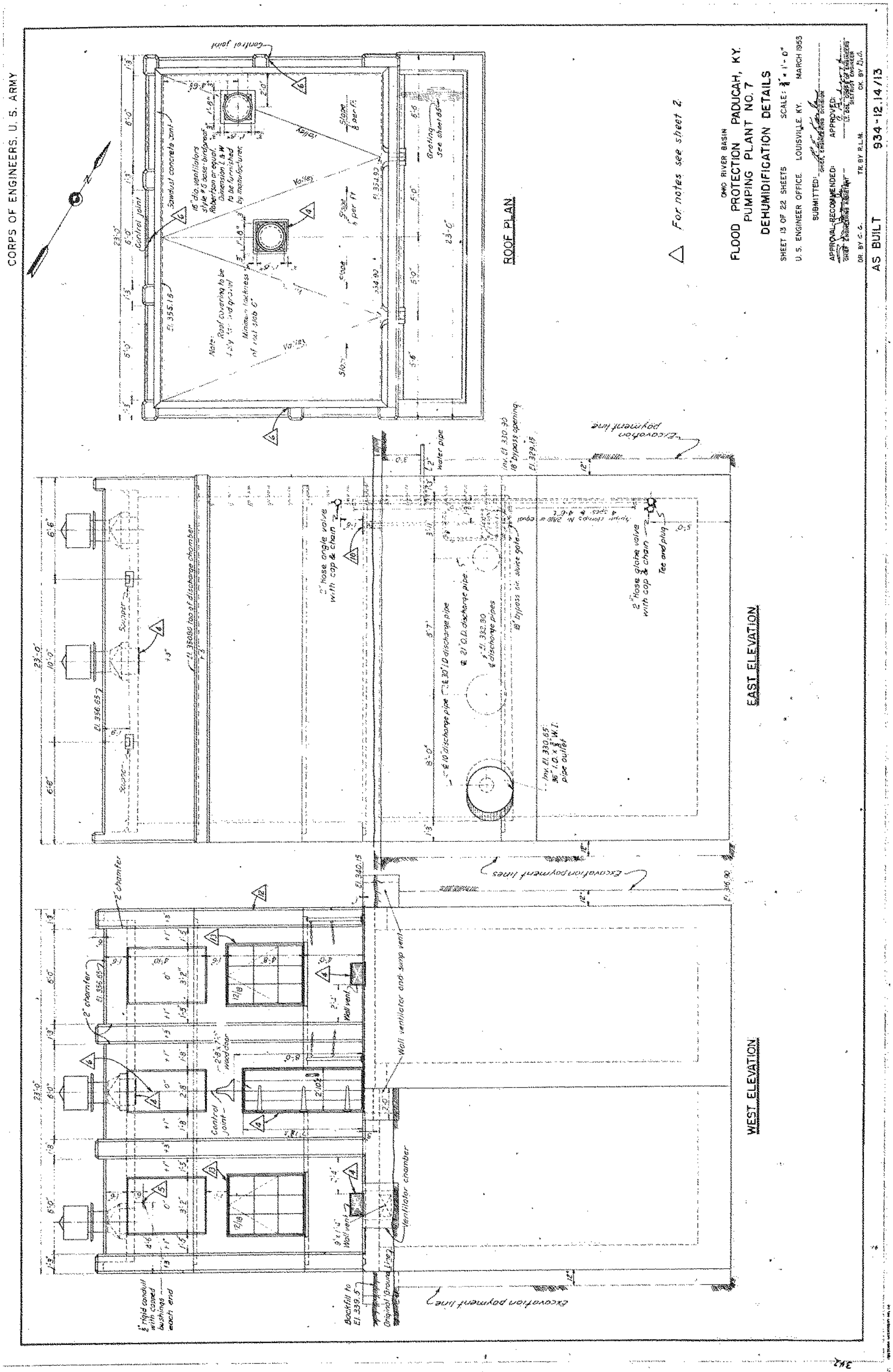
APPROVAL RECOMMENDED: CHIEF ENGINEERING ASSISTANT

APPROVED: LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER

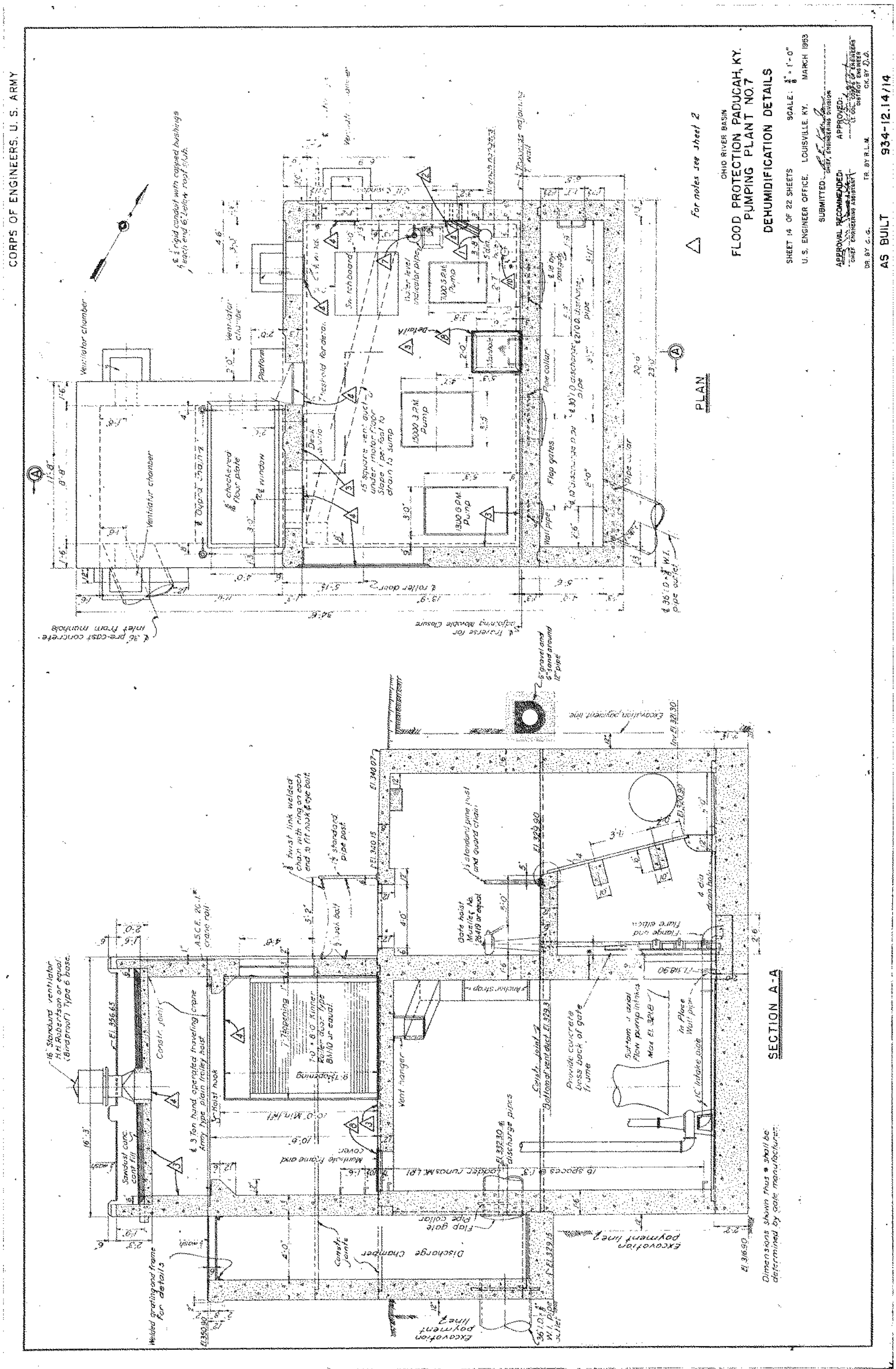
DR. BY C. G. TR. BY S. L. M. CK. BY O. J. C.

AS BUILT 934-12.14/12

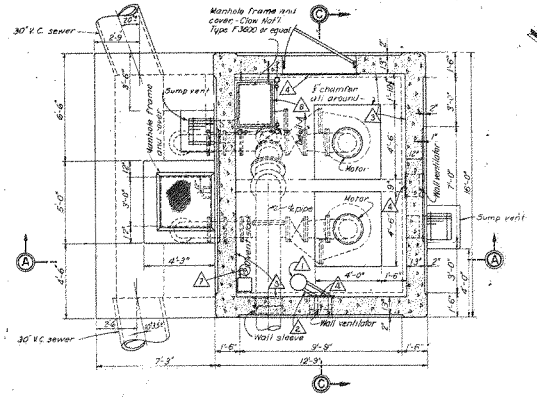
1106



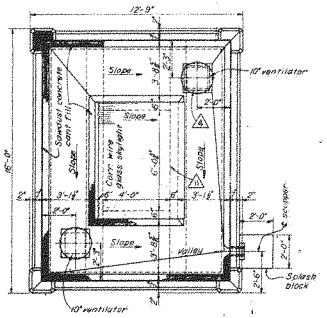
CORPS OF ENGINEERS, U. S. ARMY
ROOF PLAN
EAST ELEVATION
WEST ELEVATION
For notes see sheet 2.
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 7
DEHUMIDIFICATION DETAILS
SHEET 13 OF 22 SHEETS
SCALE: ¼" = 1'-0"
U. S. ENGINEER OFFICE. LOUISVILLE, KY.
MARCH 1953
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
DR. BY C. C.
TR. BY R.L.M.
CK. BY D.J.
AS BUILT
934-12.14/13


CORPS OF ENGINEERS, U. S. ARMY
SECTION A-A
PLAN
For notes see sheet 2
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 7
DEHUMIDIFICATION DETAILS
SHEET 14 OF 22 SHEETS
SCALE: 3/8" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
MARCH 1953
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
934-12.14/14
Dimensions shown thus * shall be determined by gate manufacturer.

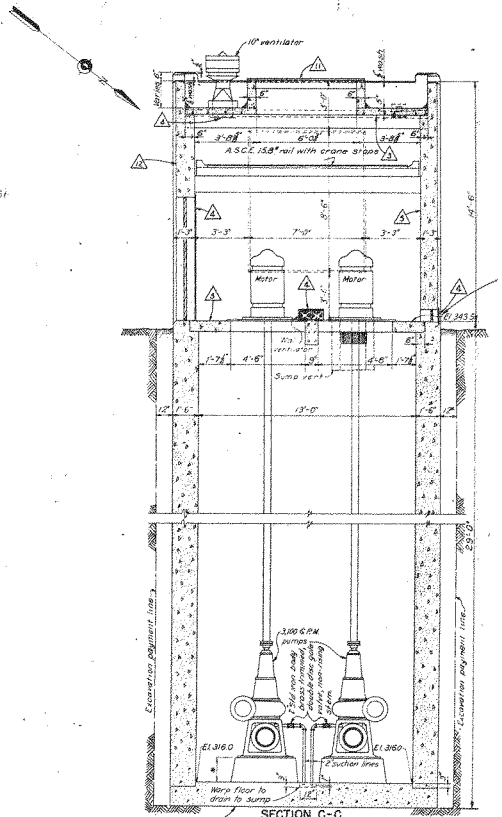
CORPS OF ENGINEERS, U. S. ARMY



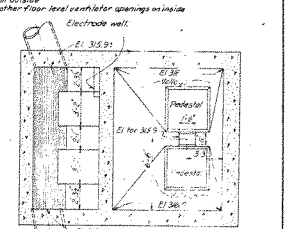
MOTOR FLOOR PLAN
SCALE- 3/8" = 1'-0"



ROOF PLAN
SCALE 3/8" = 1'-0"



SECTION C-C
SCALE: 3/8" = 1'-0"



PLAN-SUMP FLOOR
SCALE- 1" = 1'-0"

△ For notes see sheet 2

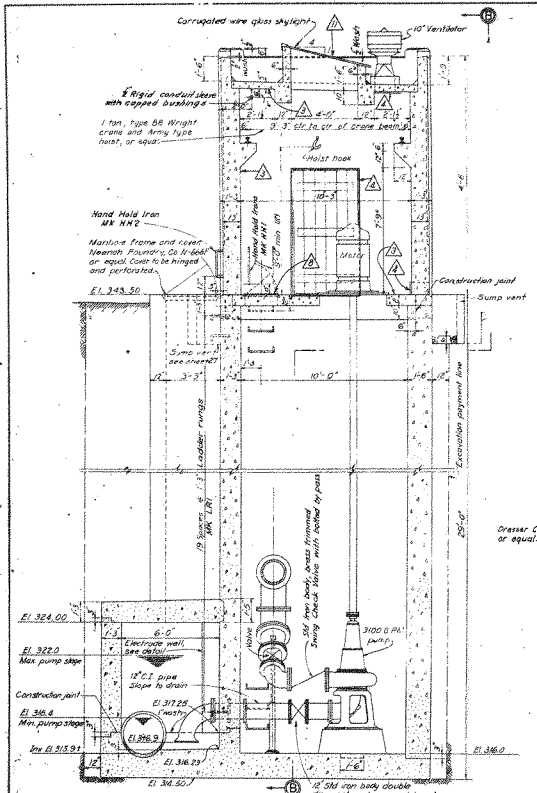
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY
PUMPING PLANT NO. 9
DEHUMIDIFICATION DETAILS

SHEET 15 OF 22 SHEETS — SCALES AS SHOWN
U. S. ENGINEER OFFICE. LOUISVILLE, KY. MARCH 1953
SUBMITTED: _____ CHIEF, ENGINEERING DIVISION
APPROVAL RECOMMENDED: _____ CHIEF ENGINEERING ASSISTANT
APPROVED: _____ Lt. Col. CORPS OF ENGINEERS DISTRICT ENGINEER
DR. BY C. S. TR. BY R.L.M. CK. BY J. O.

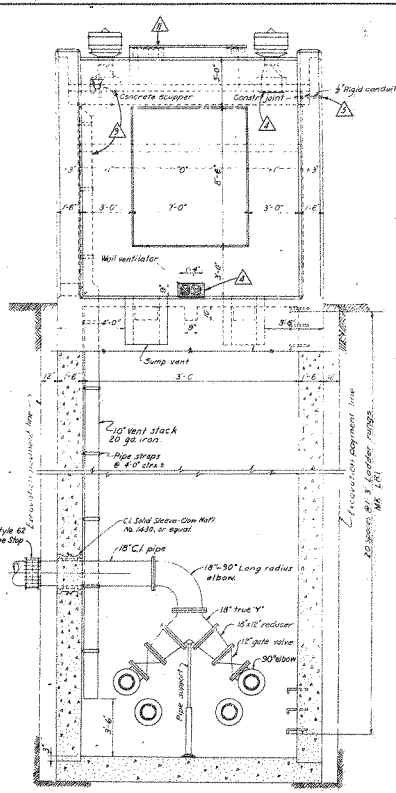
AS BUILT

934-12.14/15

11109

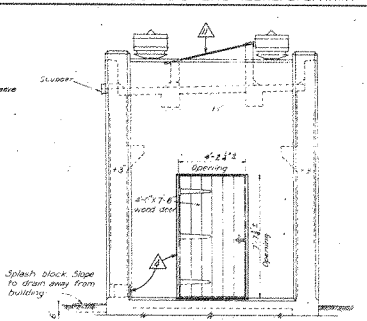


SECTION A-A



SECTION B-B

SUPERSTRUCTURE SOUTH WALL OPPOSITE HAND
OMIT WALL VENTILATOR



ELEVATION - WEST WALL

OMIT DOOR IN EAST WALL
AND ADD WALL VENTILATOR

△ For notes see sheet 2

OHIO RIVER BASIN

FLOOD PROTECTION - PADUCAH, KY.
PUMPING PLANT NO. 9
DEHUMIDIFICATION DETAILS

SHEET 16 OF 22 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953

SUBMITTED: _____
CHIEF, ENGINEERING DIVISION

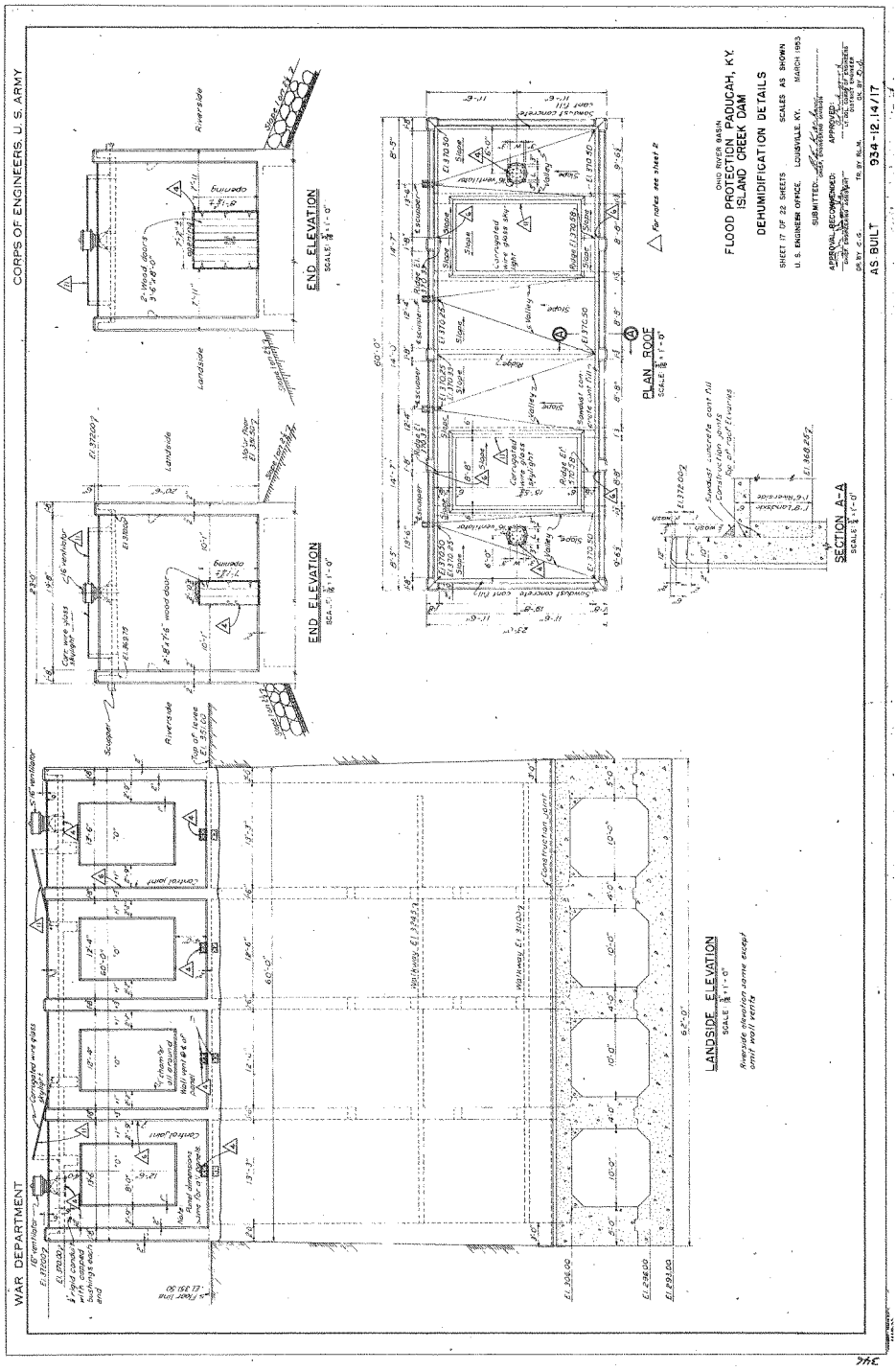
APPROVED: RECOMMENDED: _____
CHIEF ENGINEERING ASSISTANT

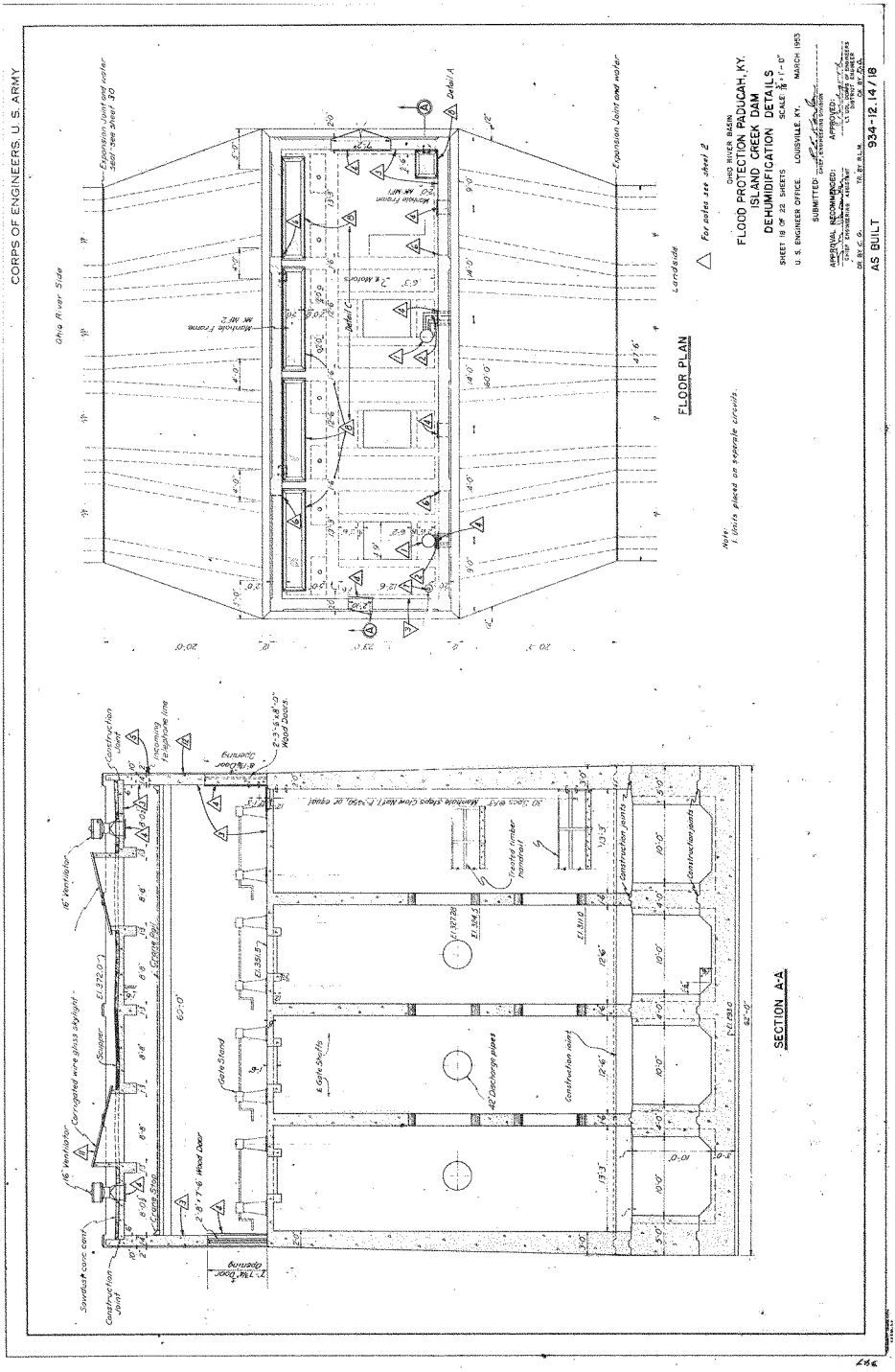
APPROVED: _____
LT. COL., CORPS OF ENGINEERS
DISTRICT ENGINEER

DR. BY C. S. TR. BY R.L.N. CK. BY C.G.

AS BUILT 934-12.14/16

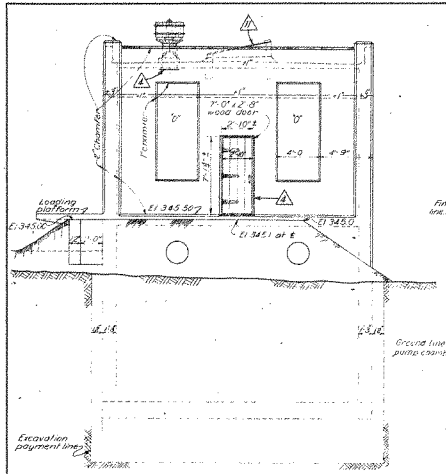
1110


CORPS OF ENGINEERS, U.S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
DEHUMIDIFICATION DETAILS
SHEET 17 OF 22 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE: LOUISVILLE, KY. MARCH 1953
SUBMITTED:
APPROVED:
AS BUILT
934-12.14/17
END ELEVATION
SCALE 1/4" = 1'-0"
LANDSIDE ELEVATION
SCALE 1/4" = 1'-0"
Riverside elevation same except omit wall vents
PLAN ROOF
SCALE 1/4" = 1'-0"
SECTION A-A
SCALE 1/4" = 1'-0"
For notes see sheet 2

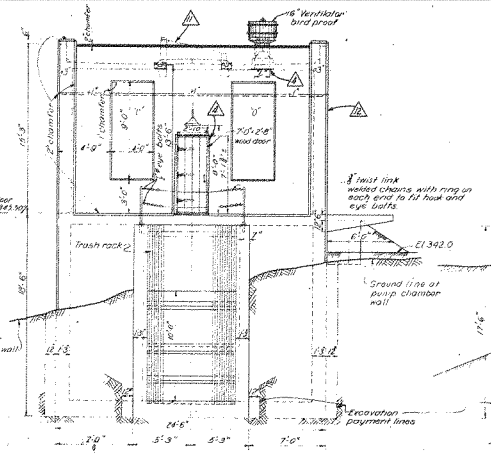

CORPS OF ENGINEERS, U.S. ARMY
Ohio River Side
Landside
Expansion Joint and water Stop see sheet 16
Expansion Joint and water
Manhole Frame MK No. 2
Detail A
Detail C
2 Motors
FLOOR PLAN
For notes see sheet 2
Note: 1 Units placed on separate circuits.
SECTION A-A
Sawdust core cont.
Construction Joint
16" Ventilator
Corrugated wire glass skylight
Scuppers
Concrete Slab
Gate Stand
2'-8" x 7'-6" Wood Door
Incoming Telephone line
Manhole Steps (Use Alt.) P-350 or equal
Trusted timber handrail
Construction joints
42 Discharge pipes
6 Gate Shafts
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
DEHUMIDIFICATION DETAILS
SHEET 18 OF 22 SHEETS
SCALE 1/8"=1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
DIV. ENGINEER
DIV. ENGINEER
CHIEF, ENGINEERING DIVISION
CHIEF, CONSTRUCTION BRANCH
CHIEF, ENGINEERING DIVISION
DR. BY C. G.
TR. BY R.L.M.
AS BUILT
934-12.14/18

WAR DEPARTMENT

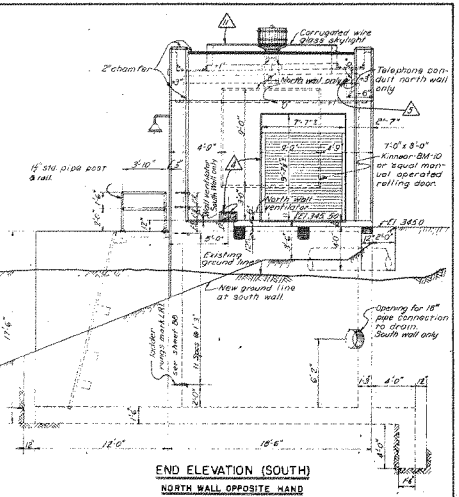
CORPS OF ENGINEERS, U. S. ARMY



EAST ELEVATION



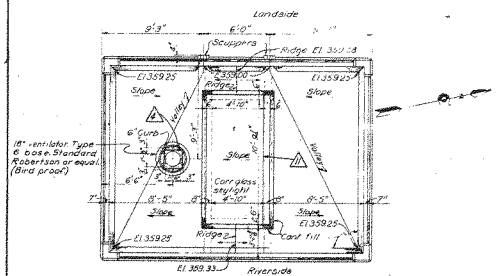
WEST ELEVATION (LANDSIDE)



END ELEVATION (SOUTH)

NORTH WALL OPPOSITE HAND

EXCEPT AS NOTED



ROOF PLAN

△ For notes see sheet 2

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANT NO. 12

DEHUMIDIFICATION DETAILS

SHEET 15 OF 22 SHEETS SCALE: 1/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953

SUBMITTED: CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: CHIEF, ENGINEERING SUBSTANCE

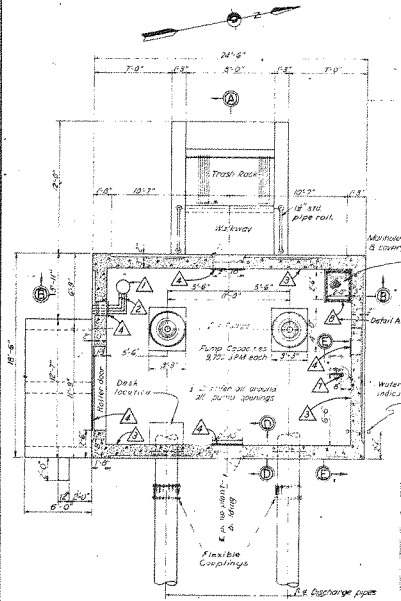
APPROVED: LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER

DR BY C.G. TR BY R.L.M. CK BY D.J.D.

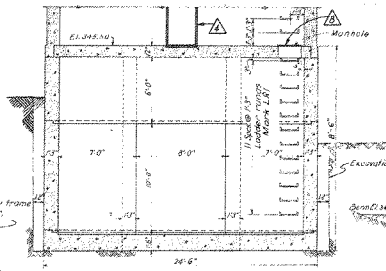
AS BUILT 934-12.14/19

1113

CORPS OF ENGINEERS, U. S. ARMY

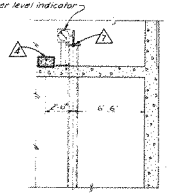


FLOOR PLAN
SCALE: 1/4"=1'-0"

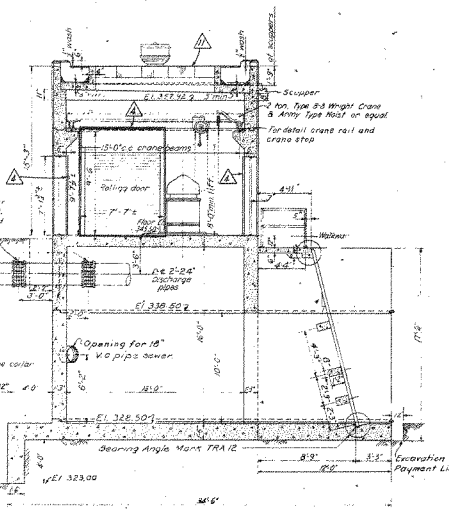


SECTION B-B
SCALE: 1/4"=1'-0"

SECTION D-D
SCALE: 1"=1'-0"



SECTION E-E
SCALE: 1/4"=1'-0"



SECTION A-A
SCALE: 1/4"=1'-0"

△ For notes see sheet 2

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 12
DEHUMIDIFICATION DETAILS

SHEET 20 OF 22 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MARCH 1953

SUBMITTED: _____ CHIEF, ENGINEERING DIVISION

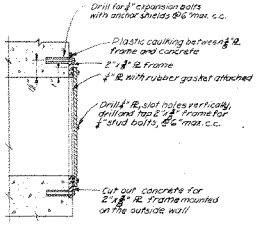
APPROVAL RECOMMENDED: _____ CHIEF, ENGINEERING ASSISTANT

APPROVED: _____ LT. COL. CORPS OF ENGINEERS DISTRICT ENGINEER

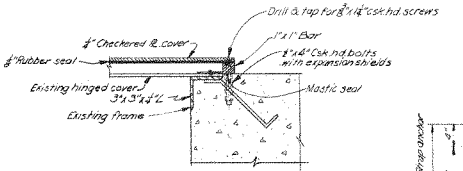
DR. BY D.G. TR. BY R.L.M. CK. BY D.J.

AS BUILT

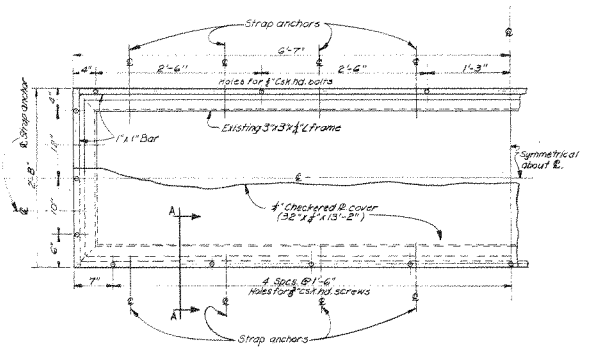
934-12.14/20

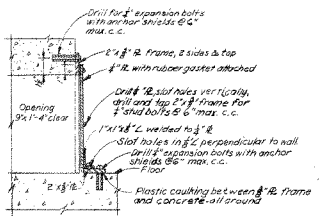


OUTSIDE WALL VENTILATOR COVER ℓ
SCALE: 3"=1'-0"

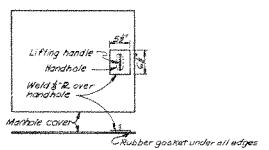


SECTION A-A
SCALE: 3"=1'-0"

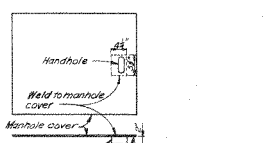




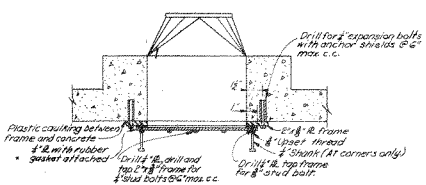
INSIDE WALL VENTILATOR COVER ℓ
SCALE: 3"=1'-0"



MANHOLE COVER
DETAIL "A"



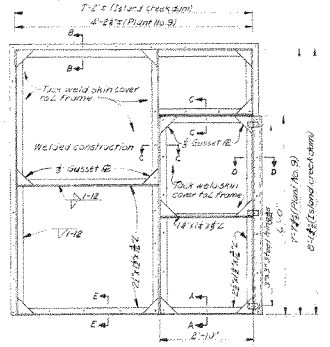
MANHOLE COVER
DETAIL "B"



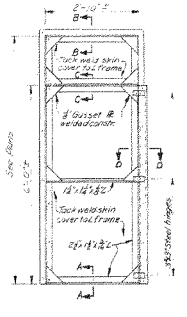
VENTILATOR COVER ℓ
SCALE: NONE

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS
MISCELLANEOUS
DEHUMIDIFICATION DETAILS
SHEET 21 OF 22 SHEETS SCALE: AS SHOWN
U. S. ENGINEER OFFICE LOUISVILLE, KY. MARCH 1953
SUBMITTED: _____ CHIEF, ENGINEERING DIVISION
APPROVAL RECOMMENDED: _____ CHIEF, ENGINEERING ASSISTANT
APPROVED: _____ LT. COL., CORPS OF ENGINEERS, DISTRICT ENGINEER
DR. BY C.G. TR. BY E.L.B. CK. BY D.L.
AS BUILT 934-12.14/21

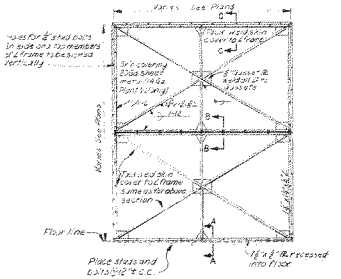
1115



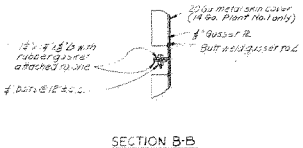
WOOD DOOR COVER
SCALE: ¾"=1'-0"



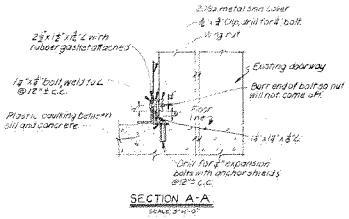
WOOD DOOR COVER
SCALE: ¾"=1'-0"



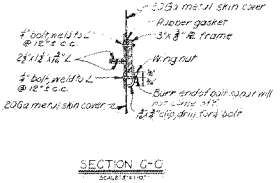
ROLLER DOOR COVER
SCALE: ¾"=1'-0"



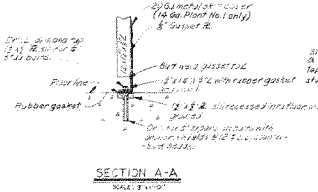
SECTION B-B
SCALE: 3"=1'-0"



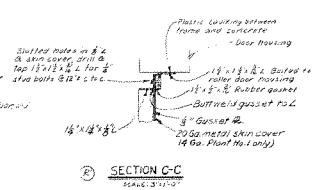
SECTION A-A
SCALE: 3"=1'-0"



SECTION C-C
SCALE: 3"=1'-0"

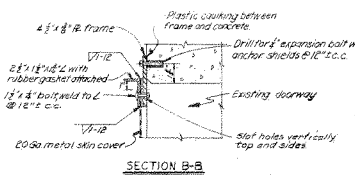


SECTION A-A
SCALE: 3"=1'-0"



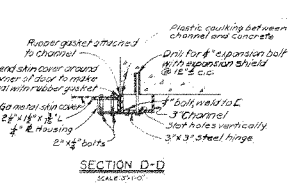
Ⓡ SECTION C-C
SCALE: 3"=1'-0"

Ⓡ Section C-C revised.

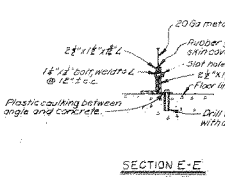


SECTION B-B
SCALE: 3"=1'-0"

Note:
Covers to be placed over doors on inside of plants.



SECTION D-D
SCALE: 3"=1'-0"



SECTION E-E
SCALE: 3"=1'-0"

Note:
Cover to be placed over doors on inside of plants.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS
MISCELLANEOUS
DEHUMIDIFICATION DETAILS
SHEET 22 OF 22 SHEETS SCALE: AS SHOWN
U. S. ENGINEER OFFICE LOUISVILLE, KY. MARCH 1953
SUBMITTED: _____ CHIEF, ENGINEERING DIVISION
APPROVAL RECOMMENDED: _____ CHIEF ENGINEERING ASSISTANT
APPROVED: _____ LT. COL., CORPS OF ENGINEERS DISTRICT ENGINEER
DR. BY G.G. TR. BY E.L.B. CK. BY T.J.

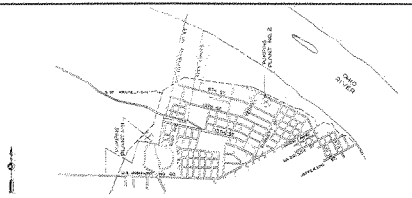
AS BUILT 934-12.14/22

1116

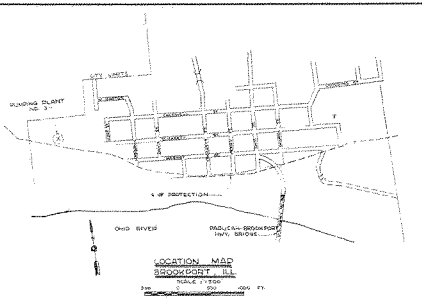
51

CORPS OF ENGINEERS

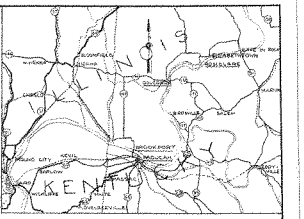
U.S. ARMY



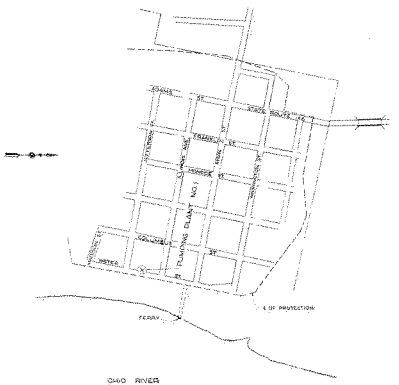
LOCATION MAP
PADUCAH, KY.
SCALE: 1"=1000'



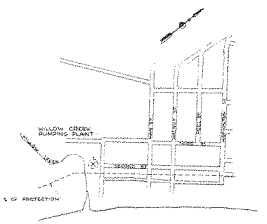
LOCATION MAP
BROOKPORT, ILL.
SCALE: 1"=500'



VICINITY MAP
SCALE: 1:500,000



LOCATION MAP
GOLCONDA, ILL.
SCALE: 1"=500'



LOCATION MAP
ROSICLARE, ILL.
SCALE: 1"=400'

DRAWING NO.	PADUCAH, KY
	INDEX TO DRAWINGS
934-12.15/1	GENERAL PLAN
2	PUMPING PLANT NO. 1 & 2
	GOLCONDA & ROSICLARE, ILL.
903-13.4/1	PUMPING PLANT NO. 1 GOLCONDA, ILL.
	WILLOW CREEK PUMPING PLANT ROSICLARE, ILL.
	BROOKPORT
935-4.5/1	PUMPING PLANT NO. 3
2	" "

GENERAL NOTE:
1. SCREEN VALVES TO BE INSTALLED TO PERMIT AIR TO BE SUPPLIED FROM DISCHARGE PIPE AND PREVENT ENTRANCE OF AIR INTO TWE PIPE.

REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS, U.S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOUISVILLE KENTUCKY

DESIGNED BY: OHIO RIVER BASIN
DRAWN BY: G.H.C.
TRACED BY: G.H.C.
CHECKED BY:
SUBMITTED:
RECOMMENDED:
APPROVED:
DATE:

FLOOD PROTECTION PADUCAH, KY. AREA
INSTALLATION OF AIR VENTS & VACUUM PRIMERS
GENERAL PLANS

APPROVED: SIGNATURE DATE: 16 SEPT. 1958
CHIEF, ENGINEERING DIVISION
COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

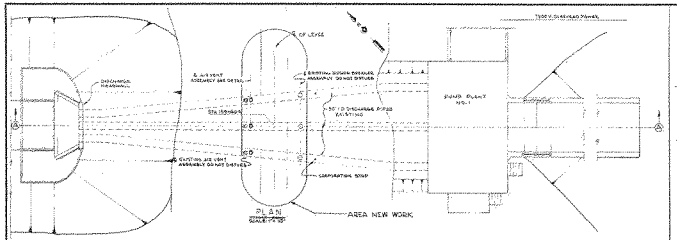
SCALE: AS SHOWN
DRAWING NUMBER
934-12.15/1

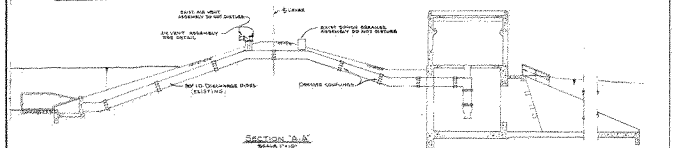
RECORD DRAWING "AS BUILT"

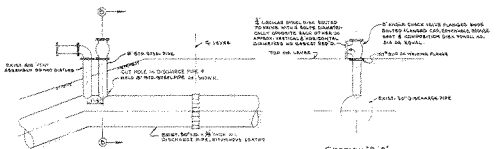
1117

CORPS OF ENGINEERS

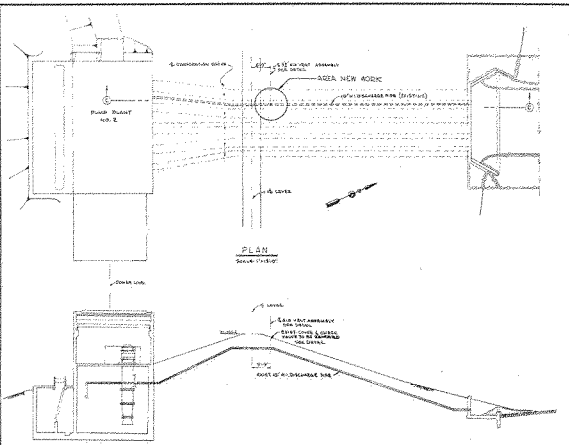
U. S. ARMY

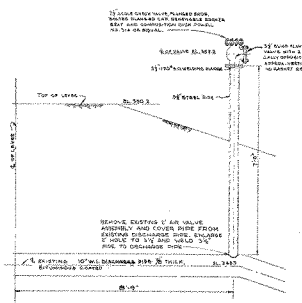




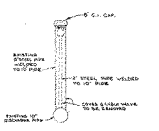


PUMPING PLANT No. 1





PUMPING PLANT No. 2.



NOTE:
SEE GENERAL NOTE 1, SH. 934-12-15/1

DRAWING SCALES	
1"=10'	0 5 10 20 30
1"=20'	0 10 20 40 60
1"=30'	0 15 30 60 90
1"=50'	0 25 50 100 150

REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS, U.S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOUISVILLE, KENTUCKY

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANTS NO. 1 & NO. 2
INSTALLATION OF AIR VENTS

DESIGNED BY:
DRAWN BY: J.P.M.
TRACED BY: J.P.M.
CHECKED BY:
QUANTITIES BY:
SPEC. SECT. SUPERVISOR
APPROVED:
CHIEF, ENGINEERING DIVISION

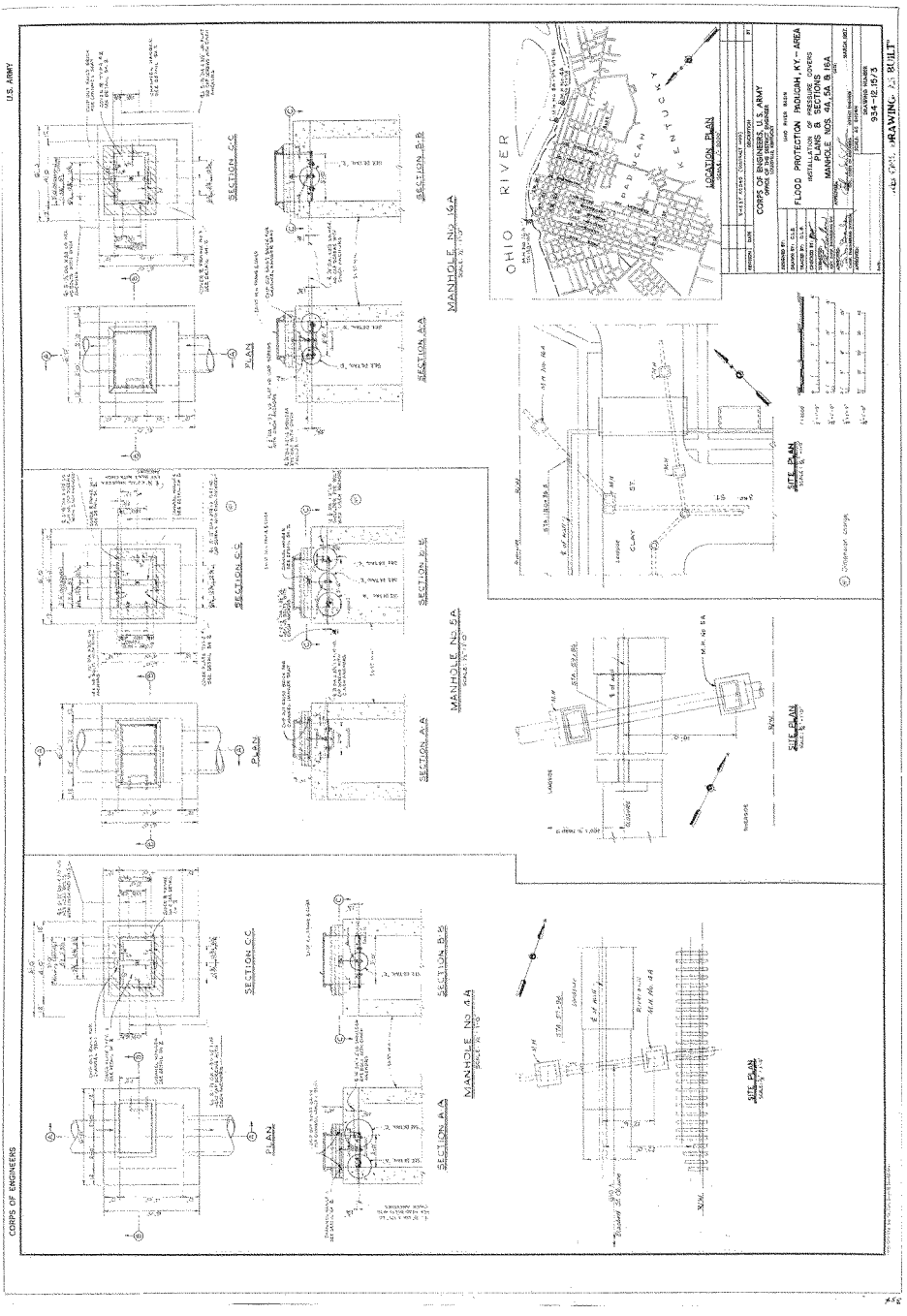
APPROVED:
CHIEF, DIV. OF ENGINEERING

SCALE: AS SHOWN
DATE: 15 SEPT. 1958

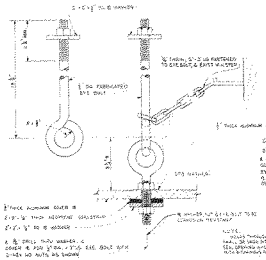
DRAWING NUMBER
934-12-15/2

RECORD DRAWING "AS BUILT"

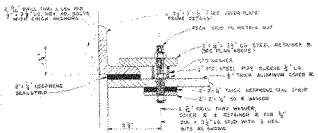
1118


U.S. ARMY
CORPS OF ENGINEERS
OHIO RIVER
KENTUCKY
BIG SANDY
LOCATION PLAN
CORPS OF ENGINEERS, U.S. ARMY
HUNTINGTON DISTRICT
OHIO RIVER BASIN
FLOOD PROTECTION PROGRAM, KY - AREA
INSTALLATION OF SEEPAGE COVERS
MANHOLE NOS. 4A, 5A, & 16A
SCALE AS SHOWN
954-12-1613
AS BUILT DRAWING
MANHOLE No. 4A
MANHOLE No. 5A
MANHOLE No. 16A
SECTION A-A
SECTION B-B
SECTION C-C
PLAN
SITE PLAN

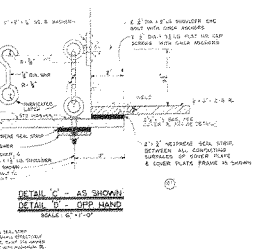
PLAN - RETAINER PLATE



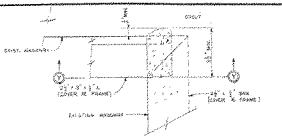
DETAIL E
SCALE: 1" = 1'-0"



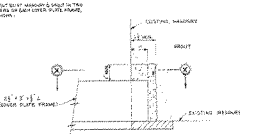
DETAIL 'A' AS SHOWN
DETAIL 'B' - OPP HAND
SCALE: 1" = 1'-0"



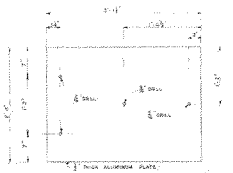
DETAIL 'C' AS SHOWN
DETAIL 'D' - OPP HAND
SCALE: 6" = 1'-0"



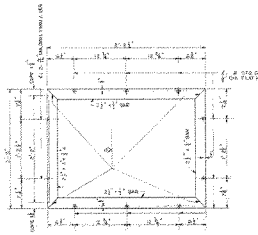
SECTIONAL PLAN X-X



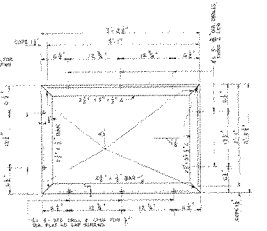
SECTION Y-Y
TYPICAL GROUTING DETAIL
SCALE: 1" = 1'-0"



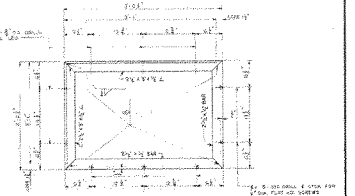
COVER PLATE - TYPE 1
MATERIAL: ALUM. NO REQ'D. 1
SCALE: 1" = 1'-0"



PLAN - FRAME NO. 1
MATL.: STRUCT STEEL - NO REQ'D 1



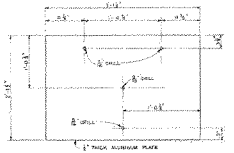
PLAN - FRAME NO. 2
MATL.: STRUCT STEEL - NO REQ'D 1



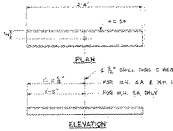
PLAN - FRAME NO. 3
MAT'L.: STRUCT STEEL - NO REQ'D. 1

COVER PLATE FRAME DETAILS
SCALE: 1" = 1'-0"

(2) TACKING 1/8" CHANNEL PLATE WELDED, CONTRACT MOD. NO. 3



COVER PLATE - TYPE 2
MATERIAL: ALUM. NO REQ'D. 2
SCALE: 1" = 1'-0"



CHANNEL HANGER DETAIL
MATL.: STRUCT. STEEL - NO REQ'D. 2 AS SHOWN
SCALE: 1" = 1'-0"

REVISION	DATE	DESCRIPTION	BY
		SHEET ADDED (CONTRACT MOD)	

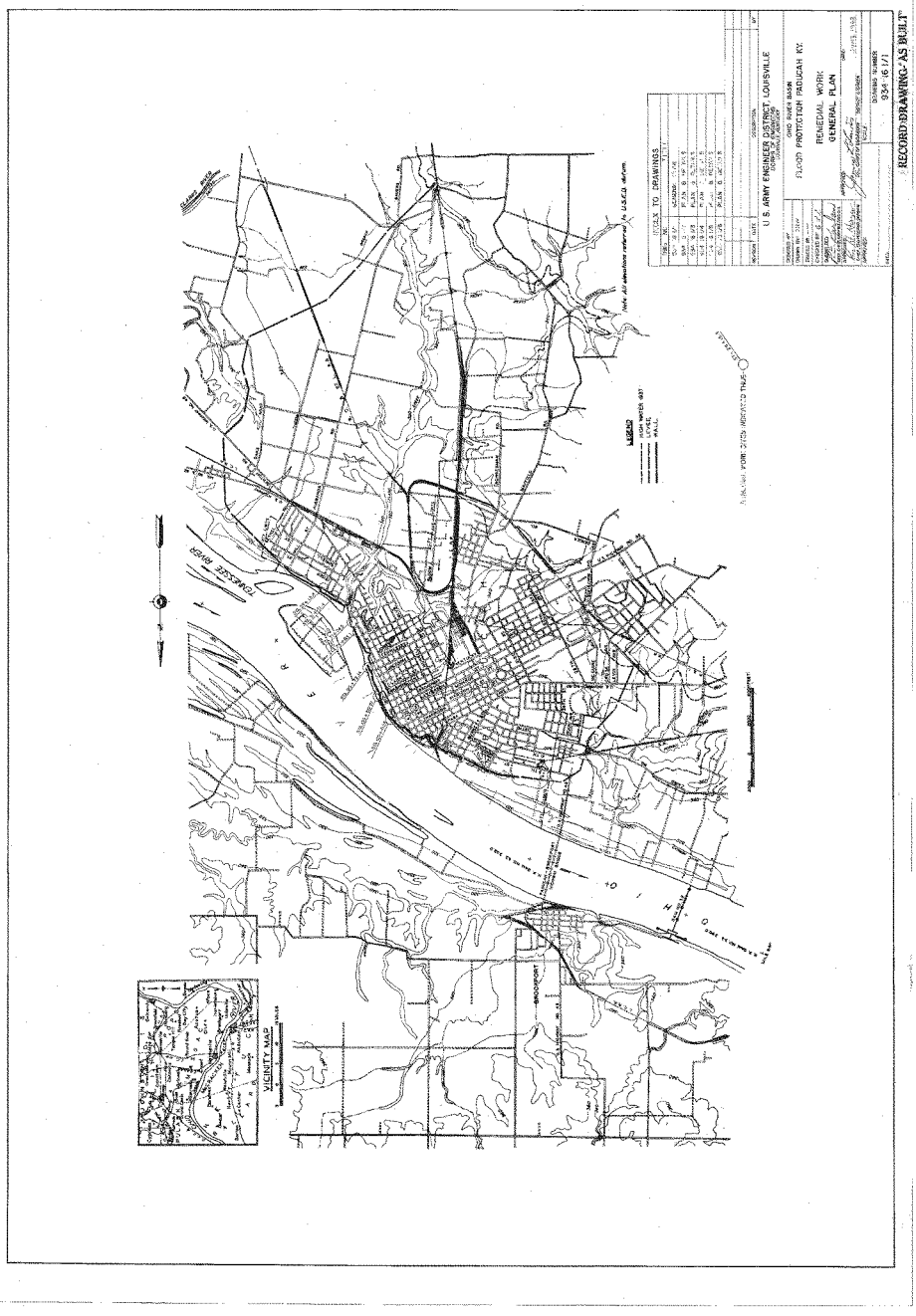
CORPS OF ENGINEERS, U.S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOUISVILLE, KENTUCKY

DESIGNED BY:	OHIO RIVER BASIN
DRAWN BY: P.C.L.	FLOOD PROTECTION PADUCAH, KY - AREA
TRACED BY: L.A.	INSTALLATION OF PRESSURE COVERS
CHECKED BY:	COVER PLATES & DETAILS
SUBMITTED: CHIEF, CIVIL DESIGN BRANCH	APPROVED: DATE: MARCH, 1957
APPROVED: CHIEF, ENGINEERING DIVISION	FOR CORPS OF ENGINEERS
AMENDED:	SCALE: AS SHOWN
DATE:	DRAWING NUMBER 934-12.15/4

USGPO SCALES
0 1" 2"
1/4"=1'-0"

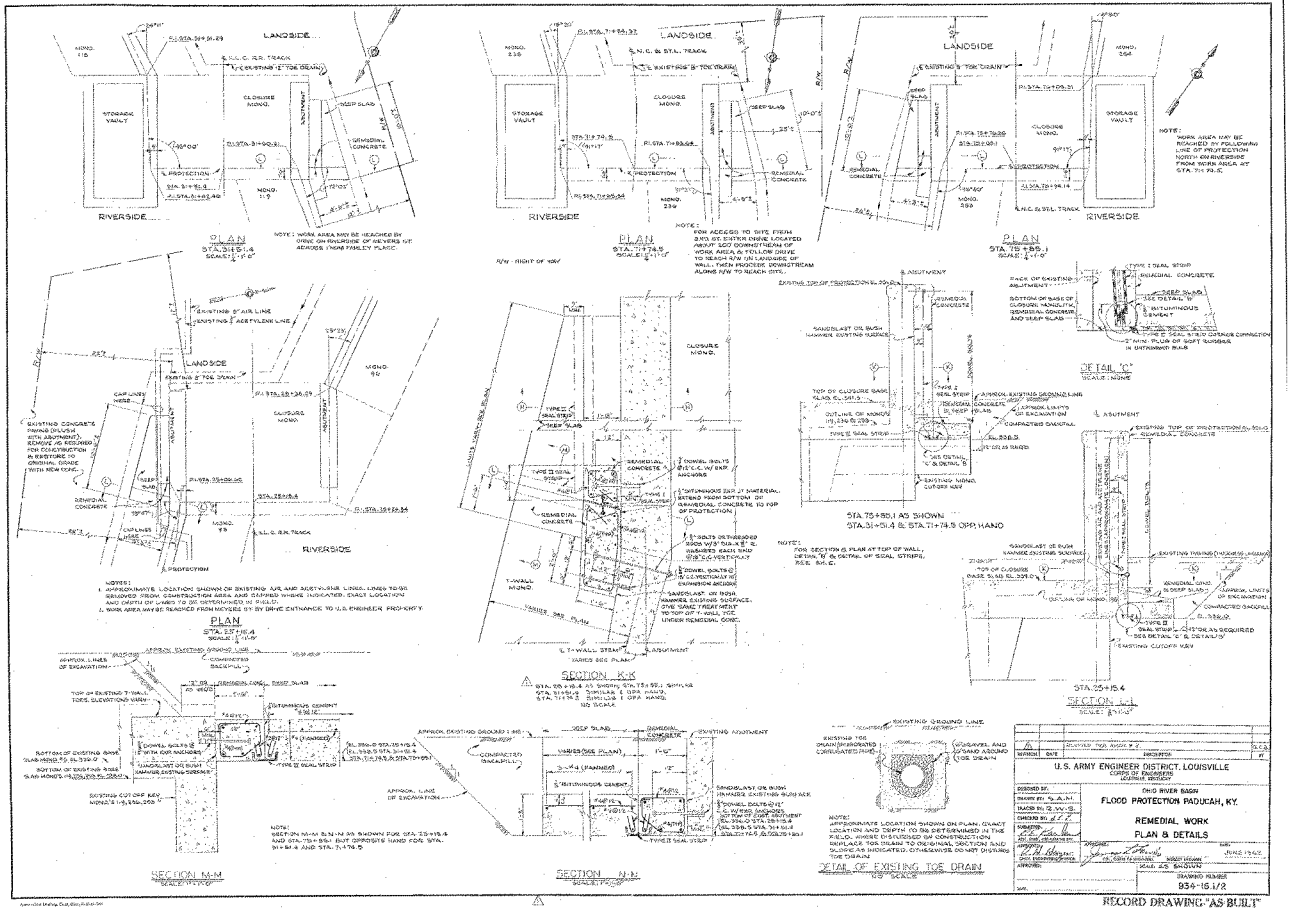
RECORD DRAWING "AS BUILT"

1120


RECORD DRAWING - AS BUILT
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY
FLOOD PROTECTION PADUCAH KY.
REMEDIAL WORK
GENERAL PLAN
INDEX TO DRAWINGS
VICINITY MAP
LEGEND
OHIO RIVER
TENNESSEE
KENTUCKY
METROPOLIS
PADUCAH
BARKLEY CANAL
OHIO RIVER FLOOD PROTECTION PROJECT

CORPS OF ENGINEERS,

U.S. ARMY



NO.	DATE	DESCRIPTION	BY
		REVISED PER ADDN'L W.S.	C.L.G.
		REVISED PER ADDN'L W.S.	F.T.

U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

DESIGNED BY: OHIO RIVER BASIN
DRAWN BY: H. A. M.
TRACED BY: R. W.-S.
CHECKED BY: J. F.
QUANTITIES BY:
APPROVED: [signature] DATE: JUNE 1962
APPROVED: [signature] DATE: JUNE 1962
SCALE AS SHOWN

FLOOD PROTECTION PADUCAH, KY.

REMEDIAL WORK

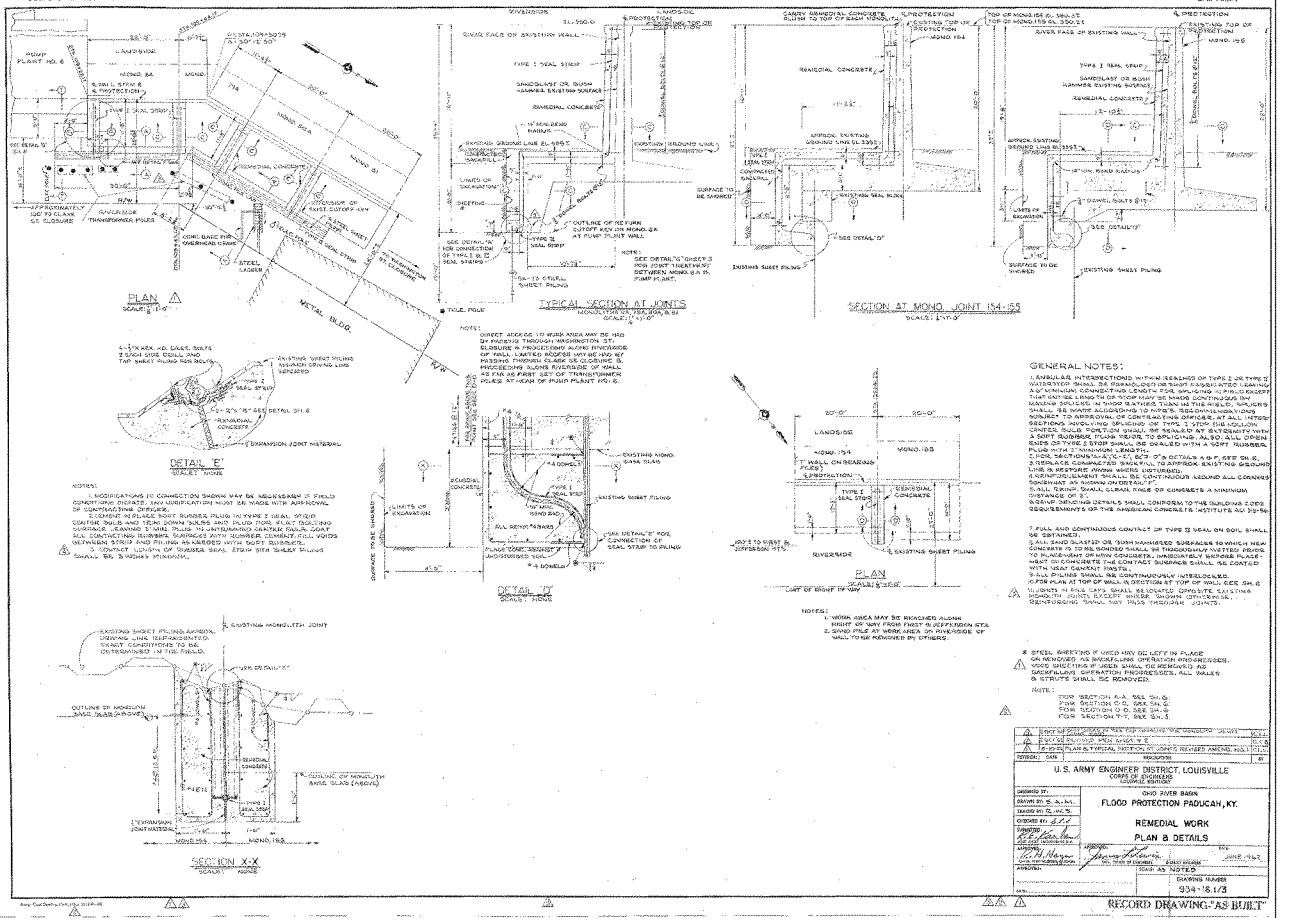
PLAN & DETAILS

DRAWING NUMBER
934-15-1/2

RECORD DRAWING "AS BUILT"

1122

CORPS OF ENGINEERS. U.S. ARMY



U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

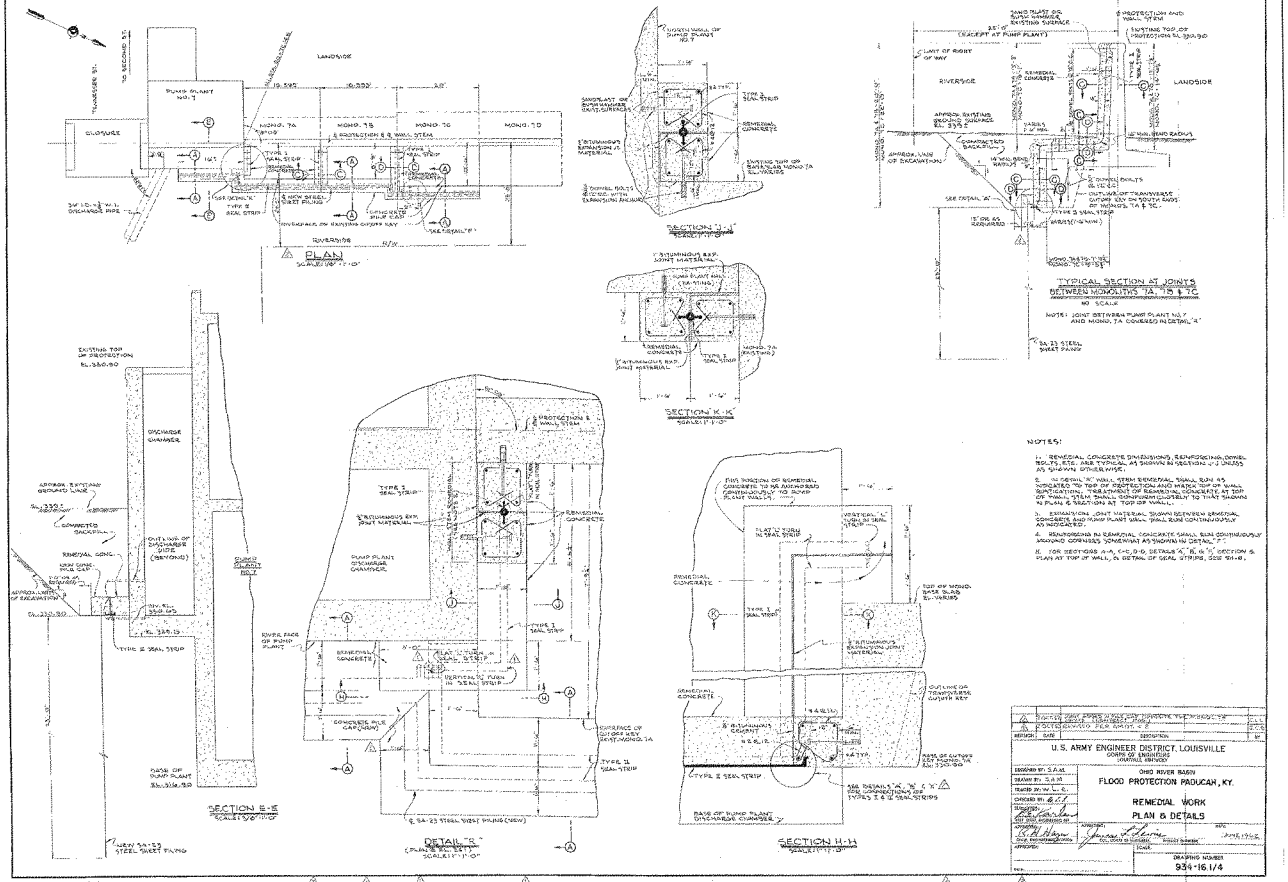
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
REMEDIAL WORK
PLAN & DETAILS

DESIGNED BY: ...
DRAWN BY: E. A. H.
TRACED BY: C. W. S.
CHECKED BY: J. F. F.
DIRECTOR OF CIVIL WORKS: ...
CHIEF, ENGINEERING DIVISION: ...
APPROVED: ...
DATE: JUNE 1962
APPROVED: ... CHIEF, ENGINEERING DIVISION
DATE: ...

SCALE AS NOTED
DRAWING NUMBER
934-16-173

1123

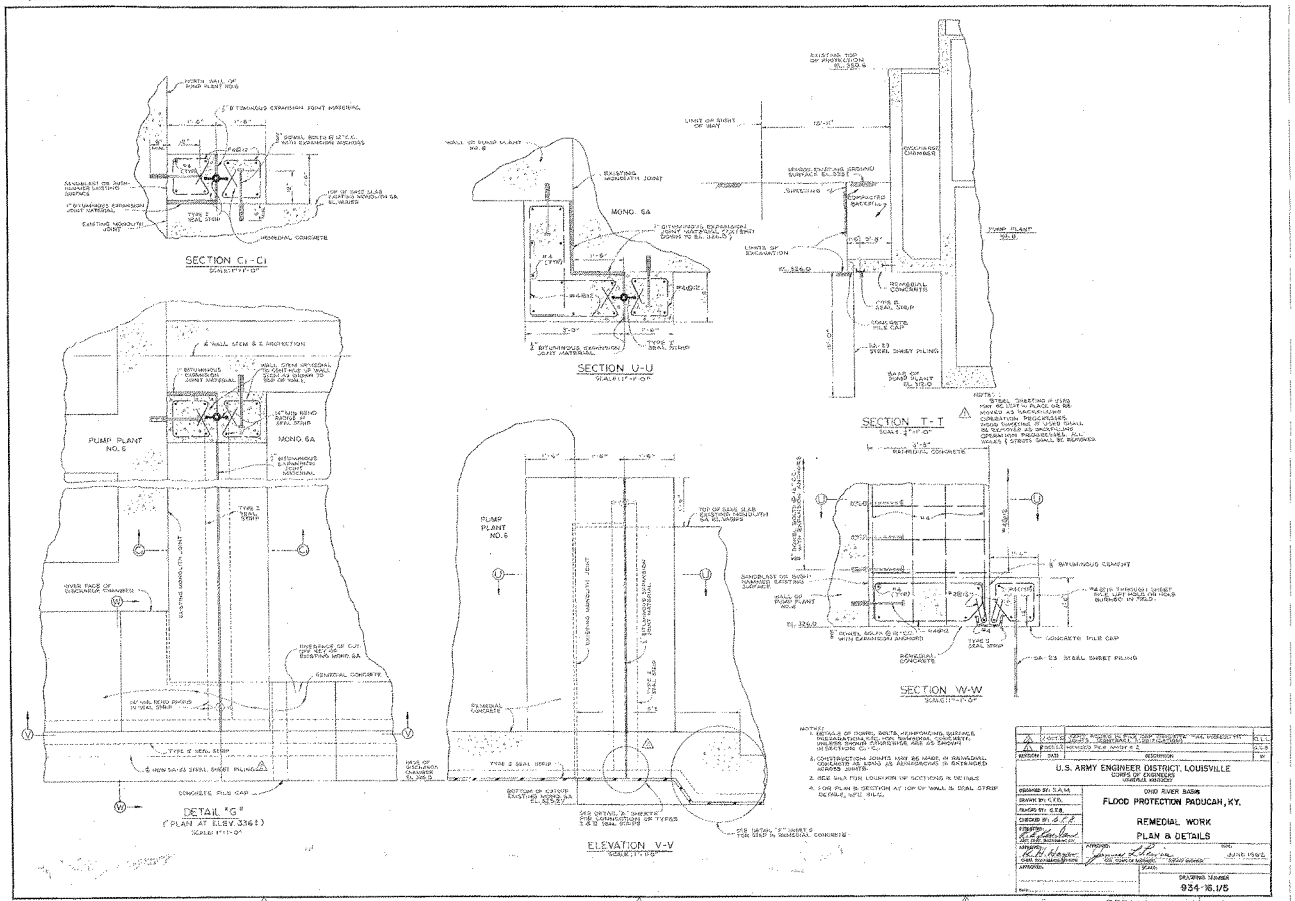
CORPS OF ENGINEERS, U.S. ARMY



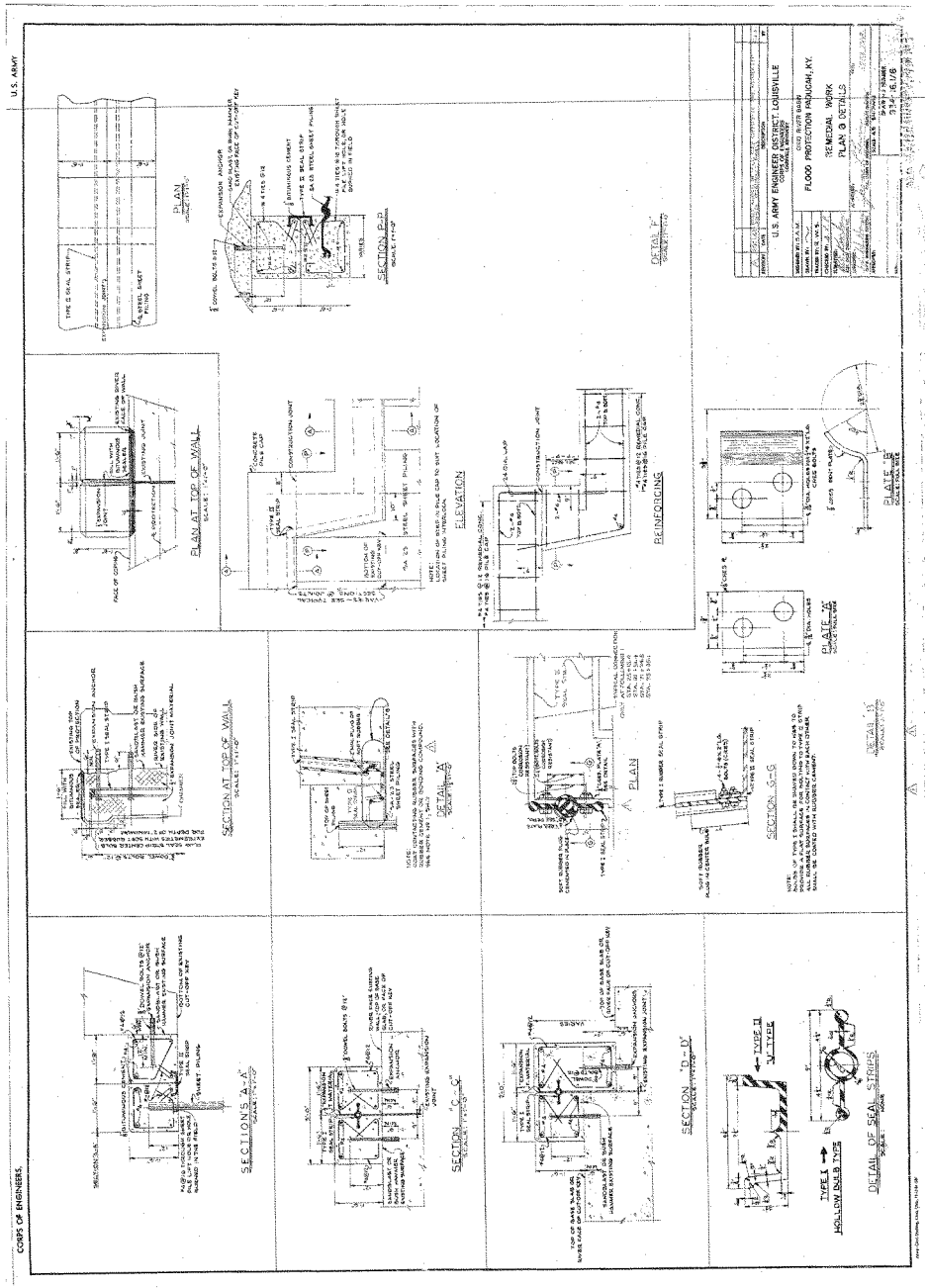
RECORD DRAWING "AS BUILT"

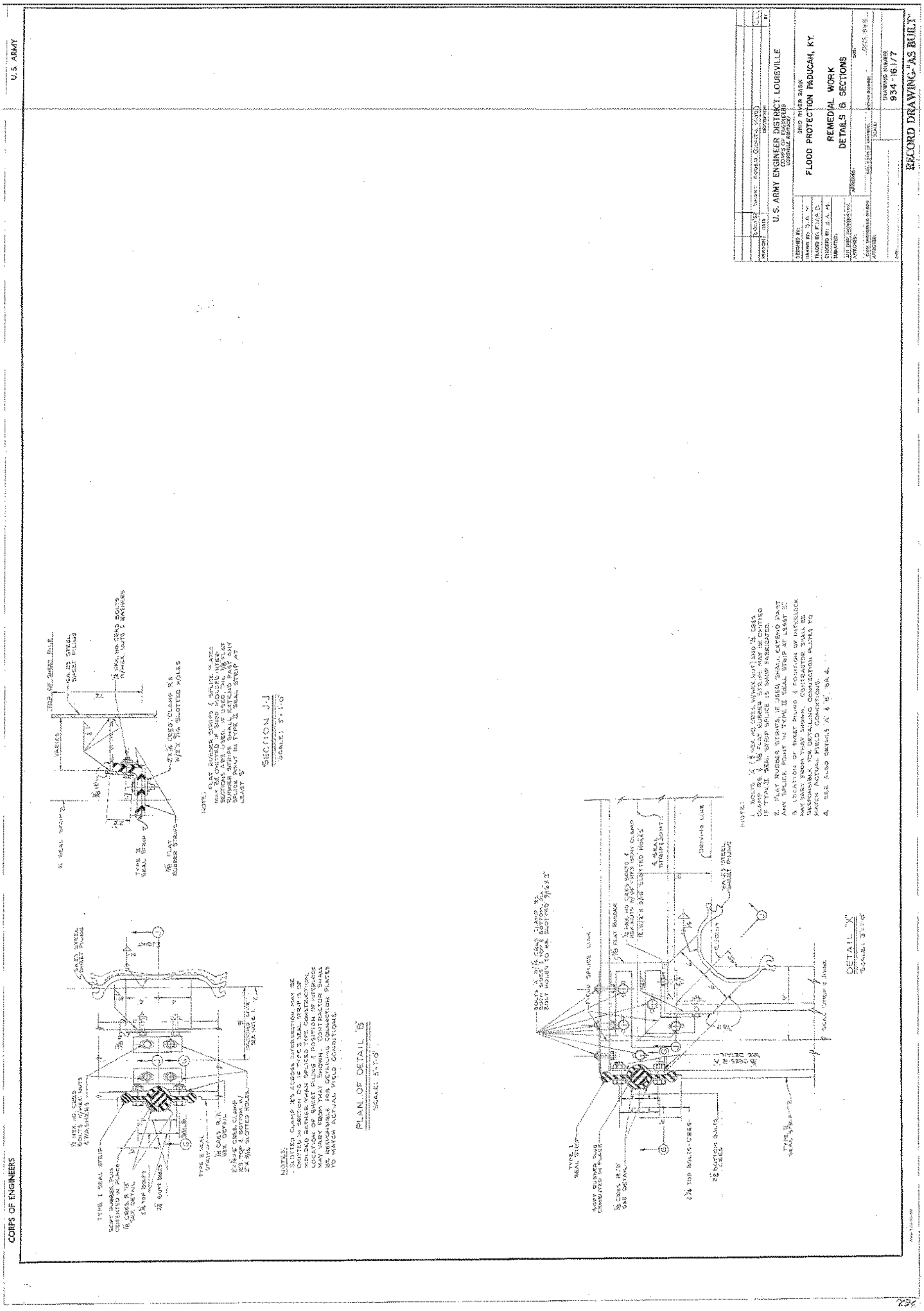
1124

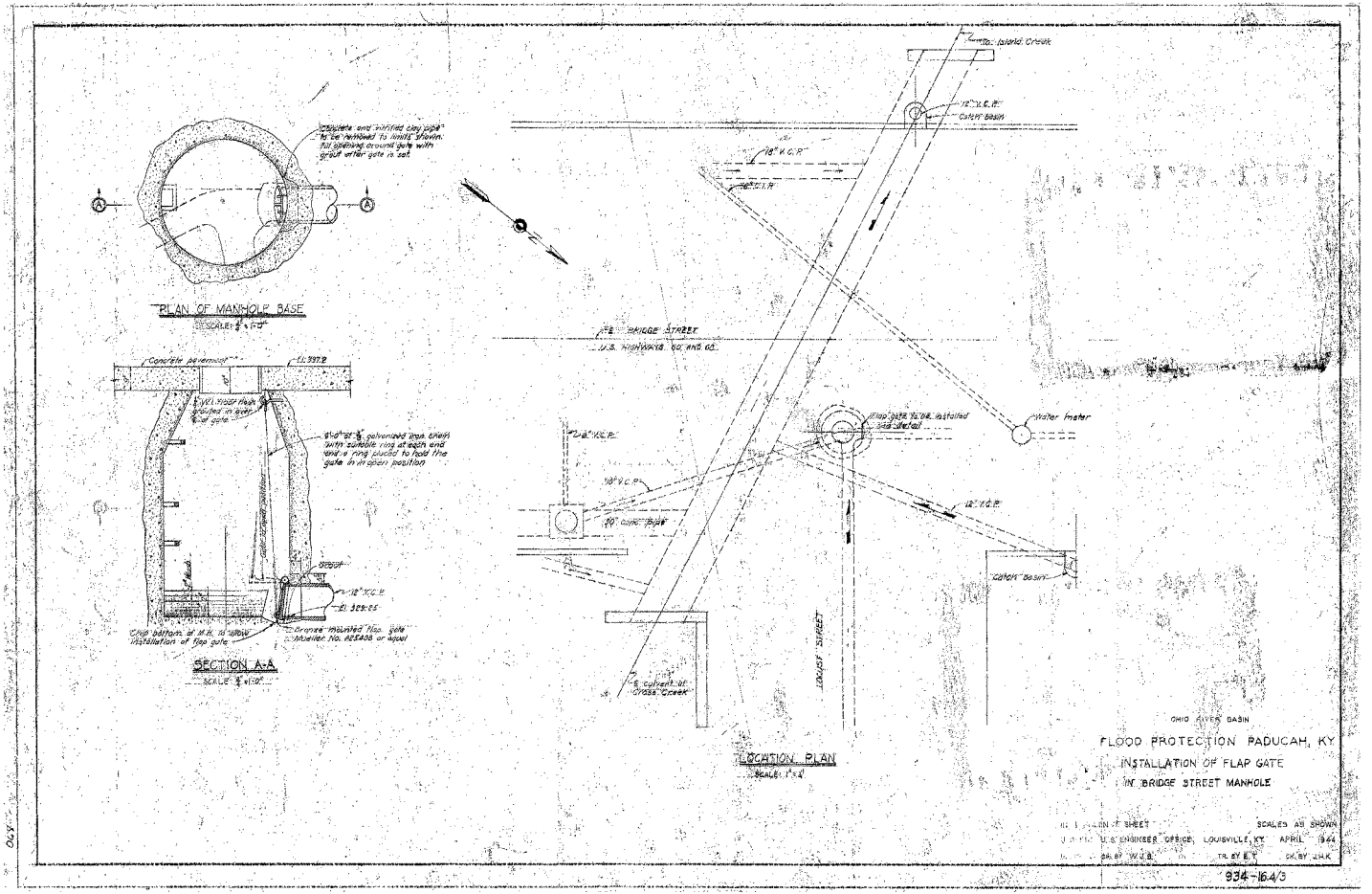
CORPS OF ENGINEERS. U.S. ARMY



1125


U.S. ARMY
CORPS OF ENGINEERS
U.S. ARMY ENGINEER DISTRICT LOUISVILLE
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
REMEDIAL WORK
PLAN & DETAILS
SECTIONS A-A'
SECTION AT TOP OF WALL
PLAN AT TOP OF WALL
SECTION B-B'
ELEVATION
DETAIL A
PLAN
REINFORCING
DETAIL F
SECTION C-C'
SECTION D-D'
SECTION E-E'
PLATE A
PLATE B
DETAIL G
TYPE II
TYPE I
DETAIL OF SEAL STRIPS


CORPS OF ENGINEERS
U.S. ARMY
PLAN OF DETAIL "B"
SECTION J-J
DETAIL "X"
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
REMEDIAL WORK
DETAILS & SECTIONS
934-16.1/7
RECORD DRAWING-"AS BUILT"



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY

INSTALLATION OF FLAP GATE IN BRIDGE STREET MANHOLE

SCALES AS SHOWN

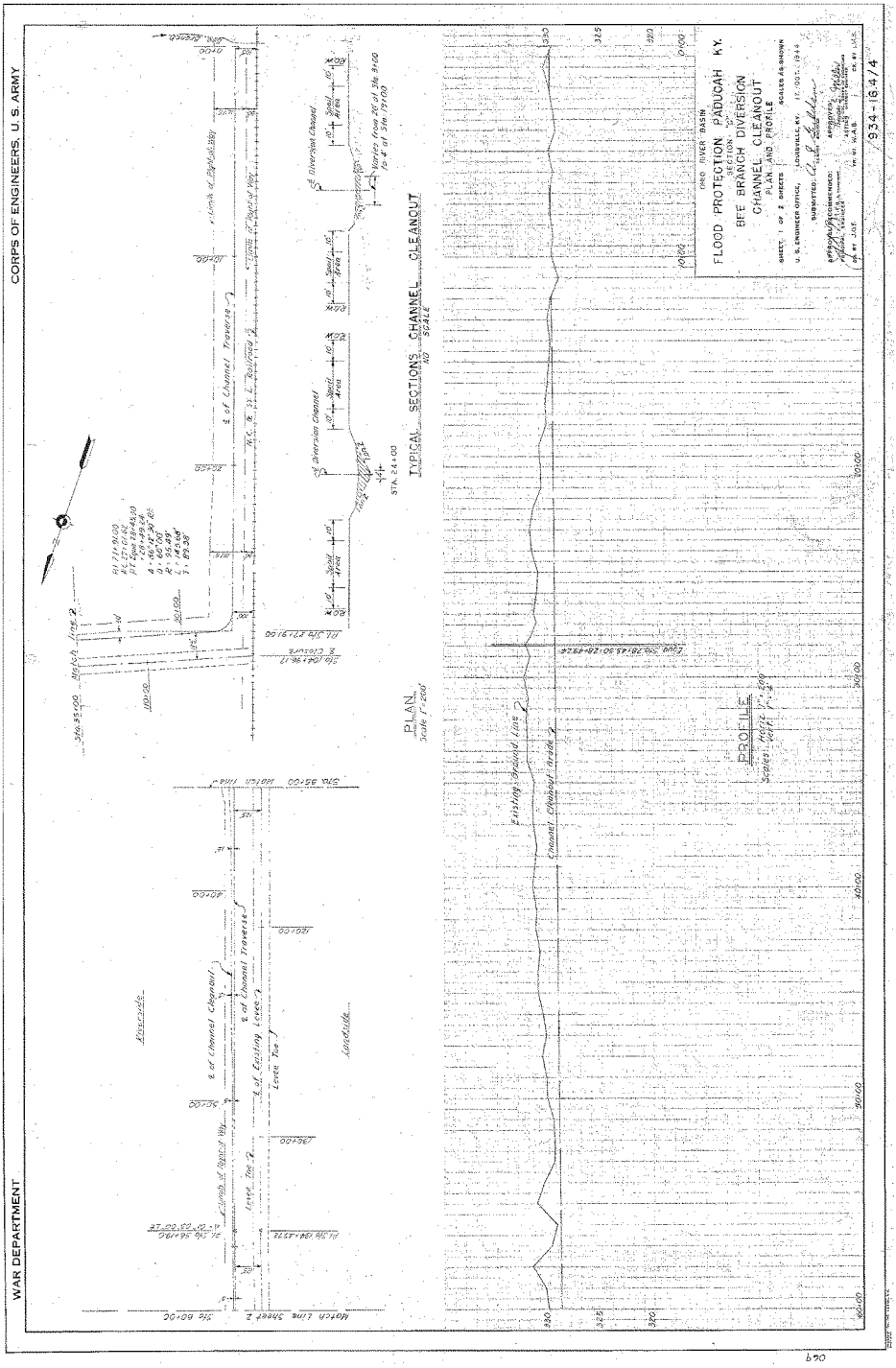
U.S. ENGINEER OFFICE, LOUISVILLE, KY. APRIL 1944

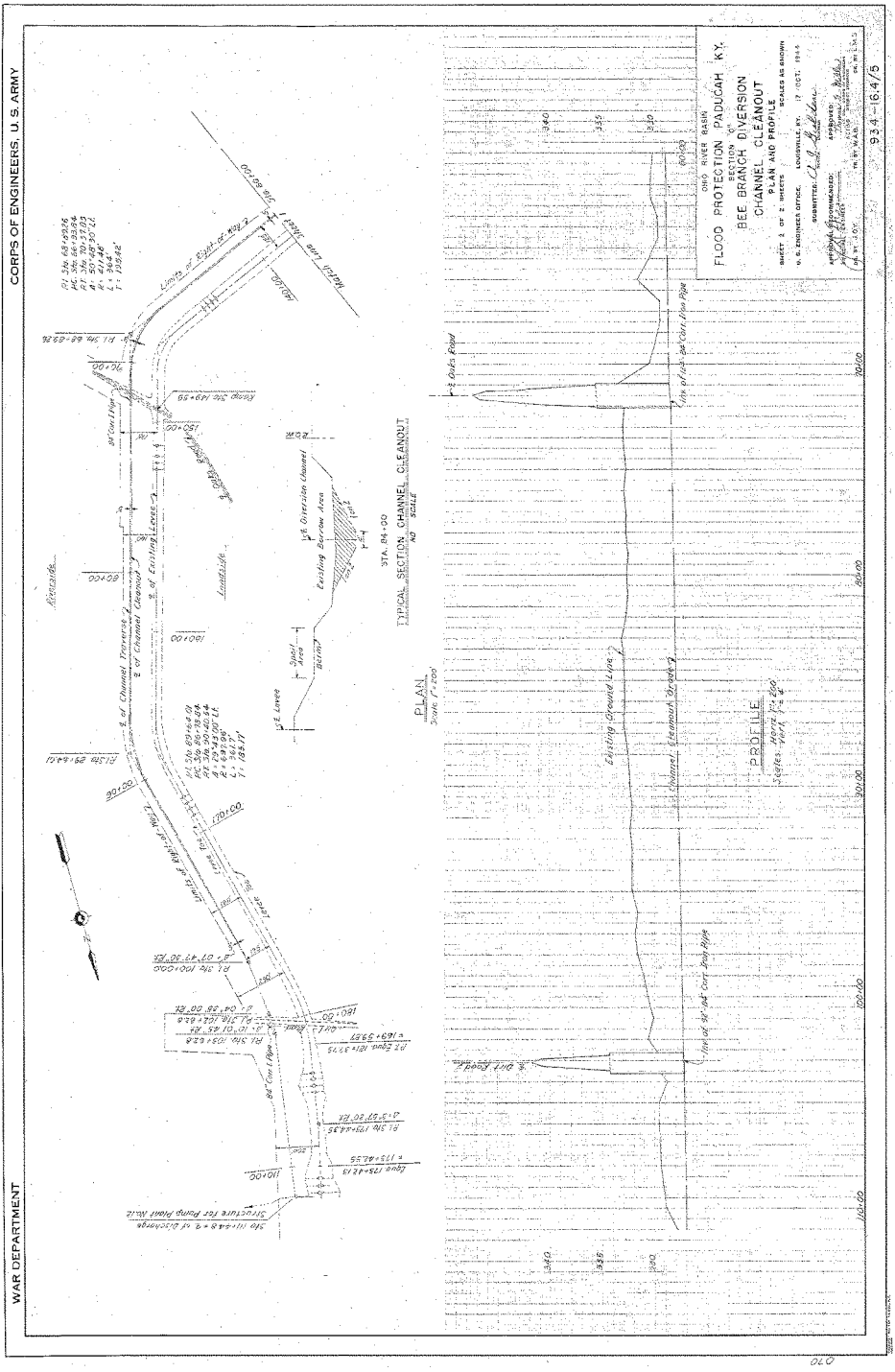
DR. BY W.L.B. TR. BY E.T. CK. BY J.H.K.

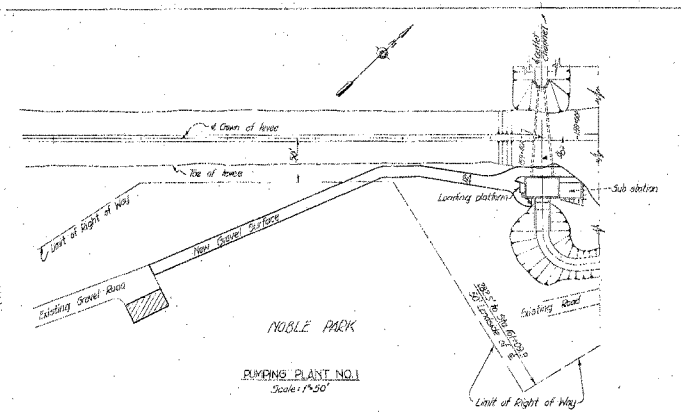
934-16.4/3

OLY

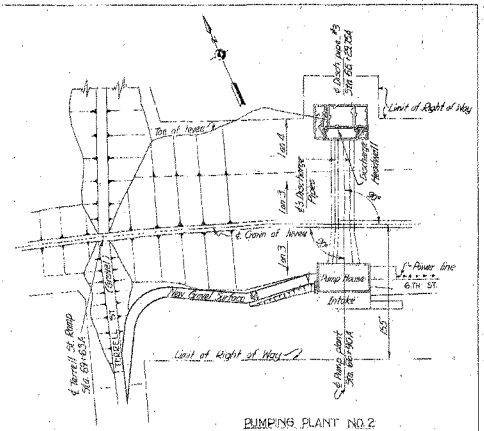
1128


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
PLAN
Scale 1" = 200'
TYPICAL SECTIONS CHANNEL CLEANOUT
NO SCALE
PROFILE
Scales: Horiz. 1" = 200'
Vert. 1" = 20'
Existing Ground Line
Channel Cleanout Grade
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH KY.
SECTION "C"
BFE BRANCH DIVERSION
CHANNEL CLEANOUT
PLAN AND PROFILE
SHEET 1 OF 2 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. 17 OCT. 1944
SUBMITTED
APPROVED
934-16.4/4

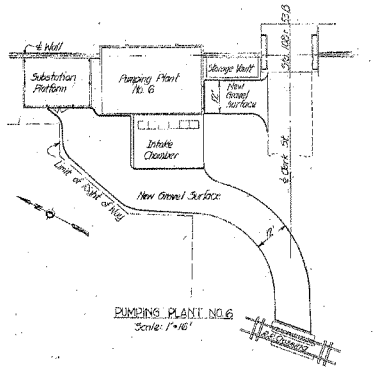

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
FLOOD PROTECTION PADUCAH KY.
SECTION "A"
BEE BRANCH DIVERSION
CHANNEL CLEANOUT
PLAN AND PROFILE
SHEET 2 OF 2 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. 17 OCT. 1945
SUBMITTED:
APPROVED:
APPROVED & RECOMMENDED:
934-16.4/5
OHIO RIVER BASIN
PLAN
PROFILE
TYPICAL SECTION CHANNEL CLEANOUT
STA. 84+00
NO SCALE
Existing Ground Line
Channel Grade
Dirt Road
Levee
Floodside
Landside
Limits of Right of Way
Structure for Pump Plant No.1



PUMPING PLANT NO.1
Scale: 1"=50'



PUMPING PLANT NO.2
Scale: 1"=50'



TYPICAL CROSS SECTION
ACCESS DRIVE
No scale

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 1, 2 & 6
ACCESS DRIVES

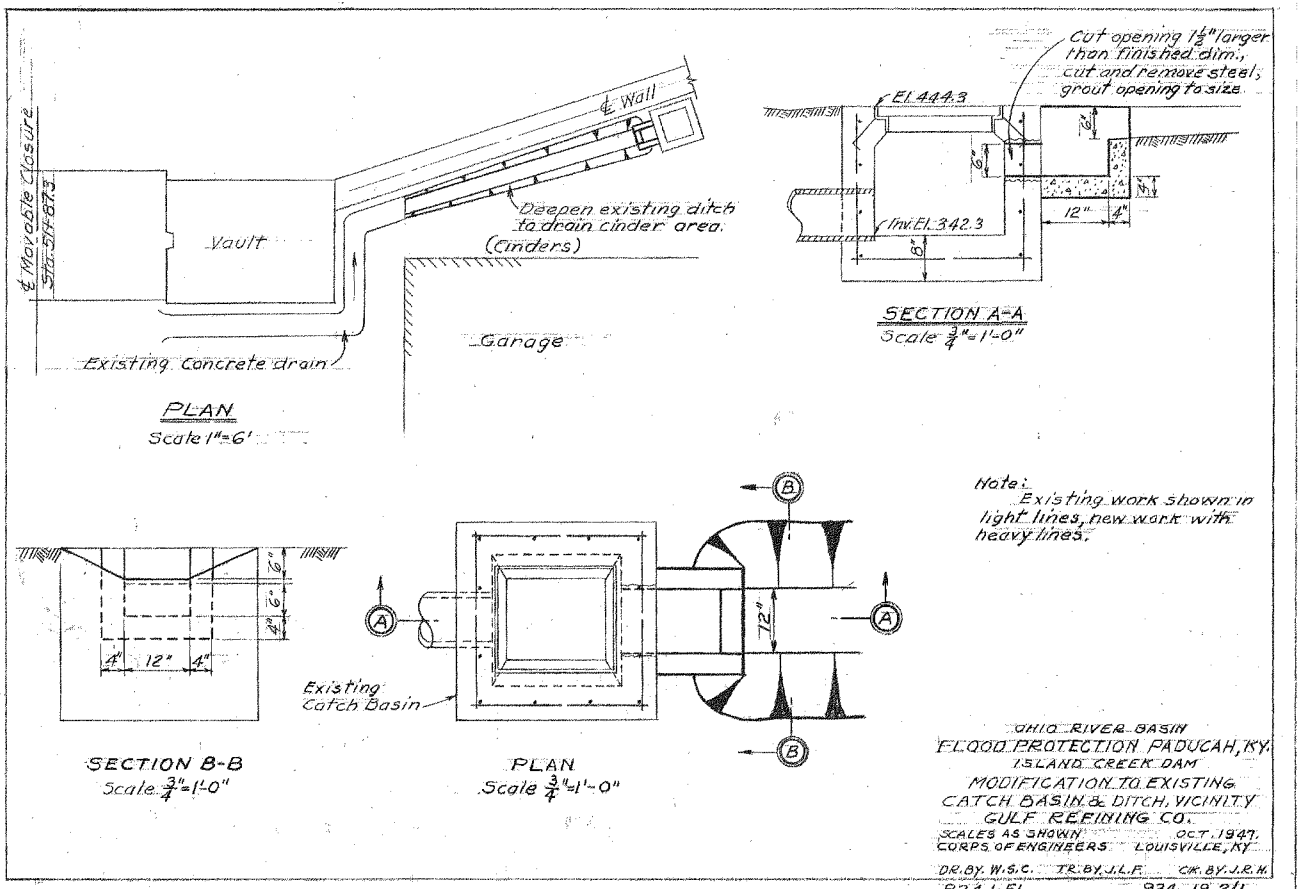
SHEET 1 OF 1 SHEETS SCALES AS SHOWN
LOUISVILLE DISTRICT CORPS OF ENGINEERS WAR DEPARTMENT
LOUISVILLE, KY. APRIL 1948

SUBMITTED
APPROVAL RECOMMENDED APPROVED
CHIEF, ENGINEERING DIVISION
CHIEF OF ENGINEERS
"TECHNICAL SERVICES"

824.1-511 934-18.1

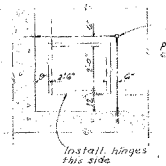
"BELIEVED AS BUILT"

1131

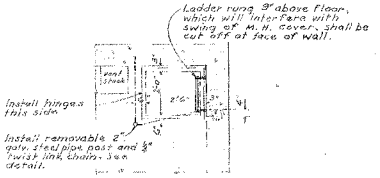

℄ Movable Closure
Sta. 5+87.5
℄ Wall
Vault
Deepen existing ditch to drain cinder area. (Cinders)
Existing Concrete drain
Garage
PLAN
Scale 1"=6'
Cut opening 1½" larger than finished dim., cut and remove steel, grout opening to size.
El. 444.3
Inv. El. 342.3
12"
4"
SECTION A-A
Scale ¾"=1'-0"
Note: Existing work shown in light lines, new work with heavy lines.
4"
12"
4"
SECTION B-B
Scale ¾"=1'-0"
72"
Existing Catch Basin
PLAN
Scale ¾"=1'-0"
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
MODIFICATION TO EXISTING CATCH BASIN & DITCH, VICINITY
GULF REFINING CO.
SCALES AS SHOWN OCT. 1947.
CORPS OF ENGINEERS LOUISVILLE, KY.
DR. BY W.S.C. TR. BY J.L.F. CK. BY J.R.H.
824.1-51 934-18.2/1

071

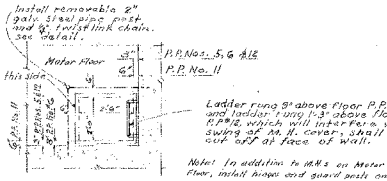
1132



PLAN
PLANTS NOS. 1 & 2



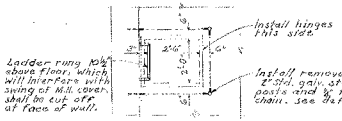
PLAN
PLANT NO. 3



Note: In addition to M.H.'s on Motor Floor, install hinge and guard posts and chains on Trash Rotky Platforms P.P. 5 & 6.

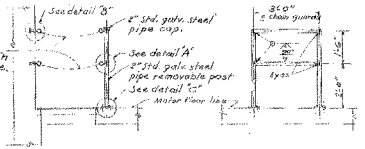
PLAN
PLANTS NOS. 5, 6, 11 & 12 (6 MANHOLES 4 in motor floor, 2 on trash rack platform)

Note: Install hinges on 24 covers over gate wells of Pump Plant No. 11. Covers shall be hinged out and to swing to wall except that covers at ladder shall be hinged on side.

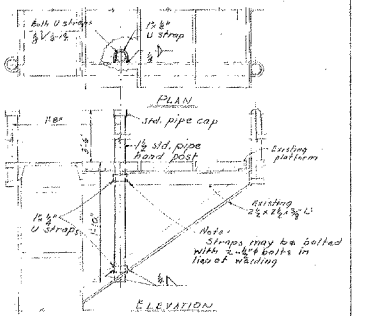


PLAN
PLANT NO. 7

Hinges for manhole covers: 2-3"x4" strap heavy cast-in Pin Butts each cover. Hinges shall be welded to frame and cover or installed with 3-⅝" bolts or flat screws each leaf.

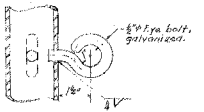


TYPICAL GUARD POST DETAILS
FOR CHAIN OR RAIL

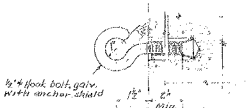


DRAINAGE STRUCTURE STA. 37+38.1
TYPICAL BRACKET SHOWING
NEW HAND POST DETAIL
SCALE: 1½"=1'-0"

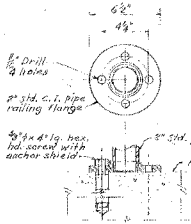
GUARD CHAIN DETAILS AT MOTOR FLOOR MANHOLES
SCALE: ½"=1'-0"



DETAIL "A"
SCALE: HALF SIZE



DETAIL "B"
SCALE: HALF SIZE

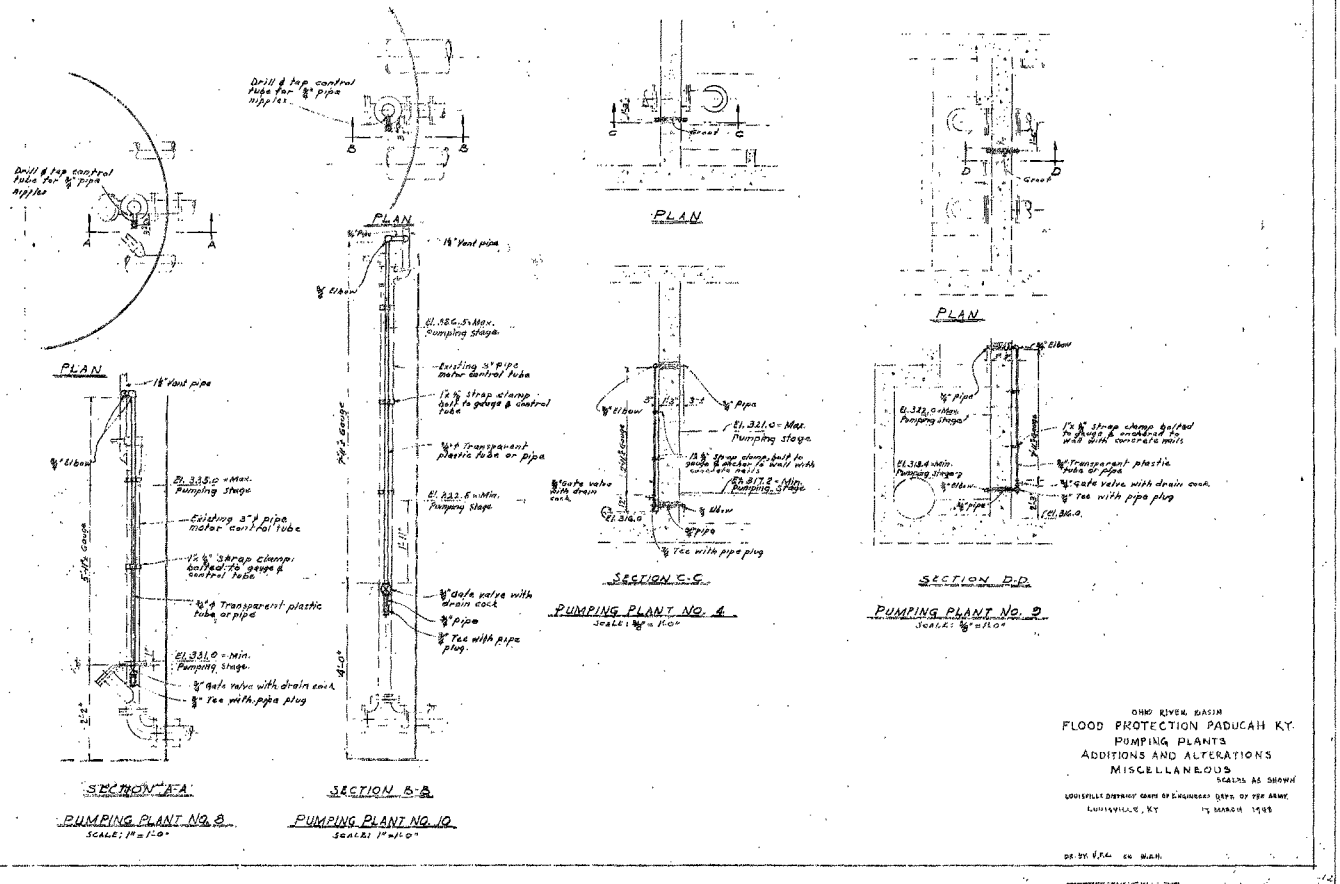


DETAIL "C"
SCALE: 3"=1'-0"

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS
ADDITIONS & REVISIONS
MISCELLANEOUS
SCALES AS SHOWN
LOUISVILLE DISTRICT CORPS OF ENGINEERS DEPT. OF THE ARMY
LOUISVILLE, KY. 16 MARCH 1949

DELIVERED AS BUILT 924-18.5/1

1133



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH KY.

PUMPING PLANTS

ADDITIONS AND ALTERATIONS

MISCELLANEOUS

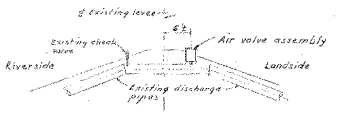
SCALES AS SHOWN

LOUISVILLE DISTRICT CORPS OF ENGINEERS DEPT. OF THE ARMY

LOUISVILLE, KY 15 MARCH 1948

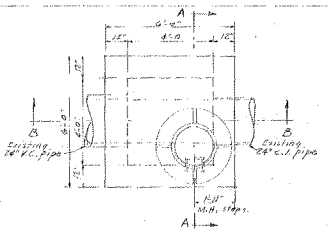
DR. BY V.F.K. CK. W.E.H.

"BELIEVED AS BUILT" 934-18.8/2

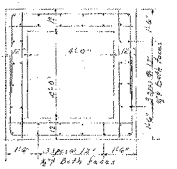


TYPICAL SECTION

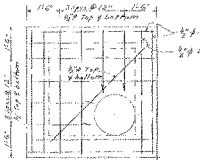
PUMPING PLANTS NOS. 1, 2 & 12



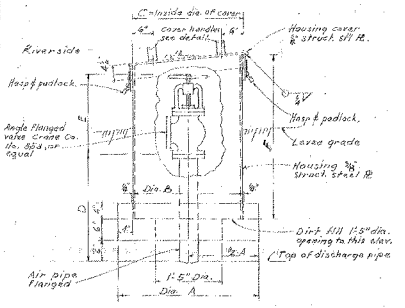
PLAN



SECTION C-C



TOP REINFORCING

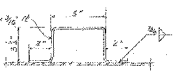


ELEVATION

SCALE: NONE

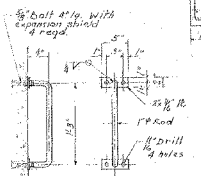
AIR VALVE ASSEMBLY

SCHEDULE - AIR VALVE ASSEMBLY										
PLANT NO.	AIR PIPE SIZE	No. RODS	DIMENSIONS A	B	C	D	E	F	SIZE OF DISCHARGE PIPE
1	4"	2	2'-6"	2'-2"	3'-0"	1'-6"	2'-3"		30" I.D.
2	4"	2	"	"	"	"	"		" "
3	4"	2	"	"	"	"	"		48" I.D.
12	6"	3	3'-6"	3'-0"	4'-0"	1'-9"	2'-6"	3'-2"	60" I.D.
	4"	2	2'-6"	2'-2"	3'-0"	1'-6"	2'-3"		84" O.D.



COVER HANDLE DETAIL

SCALE: 3"=1'-0"



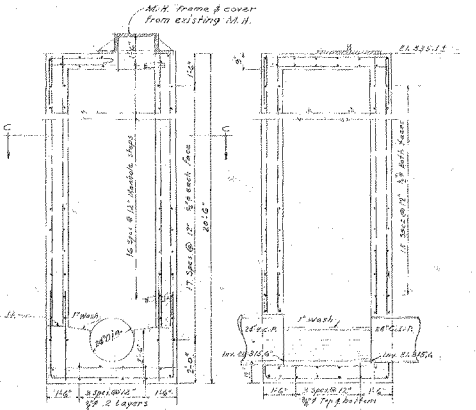
HAND HOLD IRON

MAKE ONE FOR MANHOLE NO. 7A

MAKE ONE FOR PUMPING PLANT NO. 4

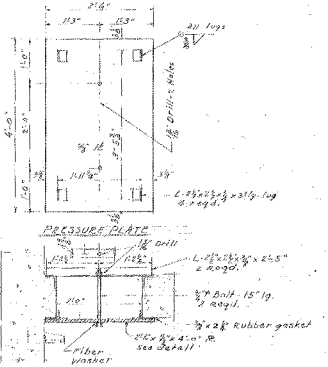
MATL. - STRUCT. ST'L REC.

SCALE: 1"=1'-0"



MANHOLE UNDER MYERS ST. BRIDGE JOINT TO PUMPING PLANT NO. 10

SCALE: 1/4"=1'-0"



PRESSURE CHAMBER COVER FOR MANHOLE 1C - 8C

SCALE: 1"=1'-0"

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PUMPING PLANTS

ADDITIONS AND ALTERATIONS

MISCELLANEOUS

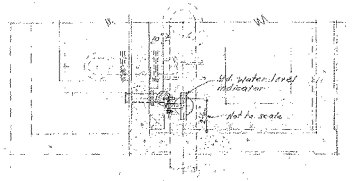
SCALES AS SHOWN

LOUISVILLE DISTRICT CORPS OF ENGINEERS, DEPT OF THE ARMY

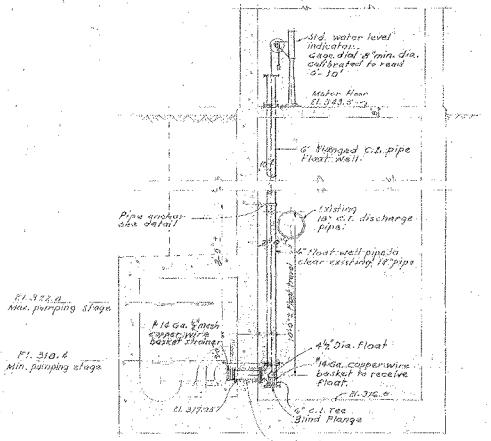
LOUISVILLE, KY. 17 MARCH 1948

DELIVERED AS BUILT 934-18-3/3

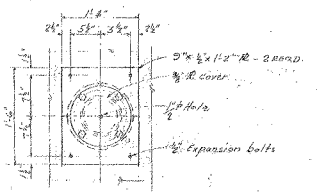
1135



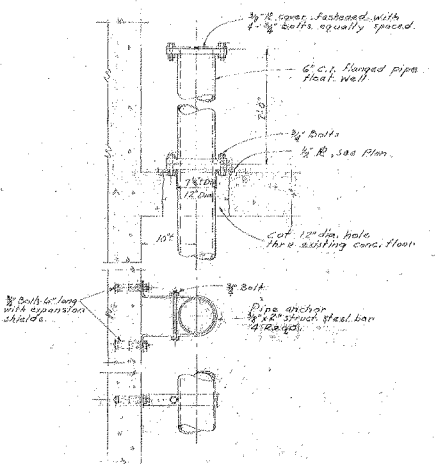
PLAN
SCALE: 3/8"=1'-0"



SECTION A-A
SCALE: 3/8"=1'-0"



PLAN



FLOAT WELL DETAIL
SCALE: 1½"=1'-0"

Details on this drawing supersede details for W.L. Indicator for P.P. 9 on Proj. 934-18.3/4

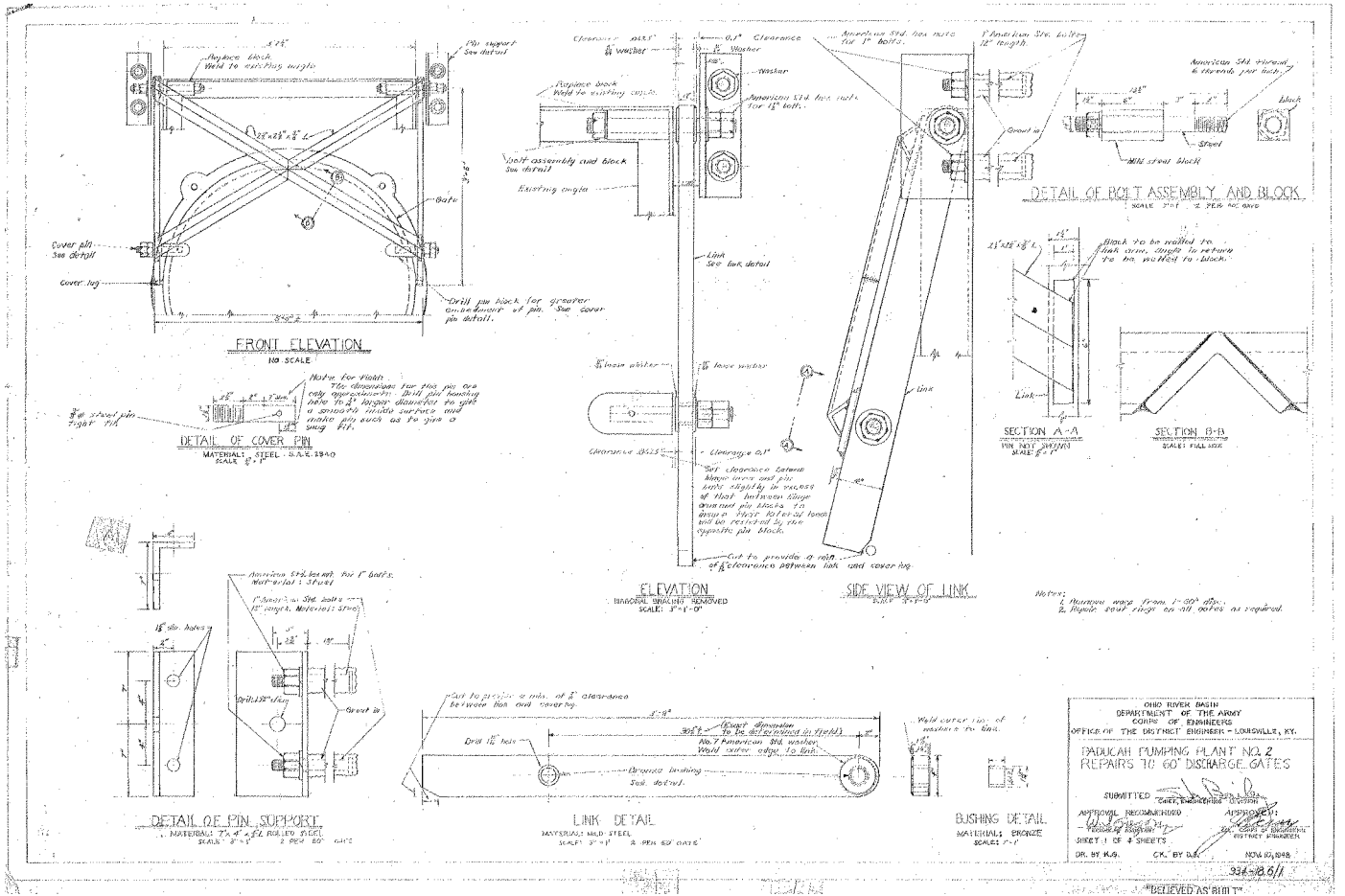
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANT NO. 9
ADDITIONS AND ALTERATIONS
MISCELLANEOUS
SCALES AS SHOWN
LOUISVILLE DISTRICT CORPS OF ENGINEERS, DEPT. OF THE ARMY
LOUISVILLE, KY. 9 APRIL 1948

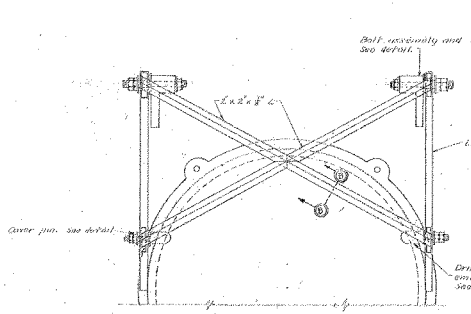
DR. BY: V.P.C. CK. BY:

934-18.3/4

"RELIEVED AS BUILT"

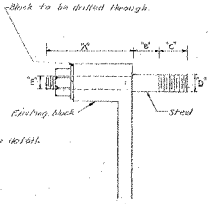
1136


FRONT ELEVATION
NO SCALE
DETAIL OF COVER PIN
MATERIAL: STEEL - S.A.E. 1040
SCALE 3" = 1'
ELEVATION
(BRACING REMOVED)
SCALE: 3"=1'-0"
SIDE VIEW OF LINK
SCALE 3"=1'-0"
DETAIL OF BOLT ASSEMBLY AND BLOCK
SCALE 3"=1'
2 PER 60' GATE
SECTION A-A
(PIN NOT SHOWN)
SCALE 3" = 1'
SECTION B-B
SCALE FULL SIZE
DETAIL OF PIN SUPPORT
MATERIAL: 7"x 4" x 5/8" ROLLED STEEL
SCALE 3"=1'
2 PER 60' GATE
LINK DETAIL
MATERIAL: MILD STEEL
SCALE 3"=1'
2 PER 60' GATE
BUSHING DETAIL
MATERIAL: BRONZE
SCALE 3"=1'
Notes:
1. Maximum warp from 1-30" dia.
2. Provide seal rings on all gates as required.
OHIO RIVER BASIN
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
OFFICE OF THE DISTRICT ENGINEER - LOUISVILLE, KY.
PADUCAH PUMPING PLANT NO. 2
REPAIRS TO 60' DISCHARGE GATES
SUBMITTED
CHIEF, ENGINEERING DIVISION
APPROVAL RECOMMENDED
CHIEF OF DIVISION
APPROVED:
COL. CORPS OF ENGINEERS
DISTRICT ENGINEER
SHEET 1 OF 4 SHEETS
DR. BY K.S.
CK. BY D.R.
NOV 10, 1948
934-B.6/1
"BELIEVED AS BUILT"



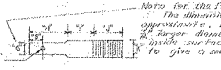
FRONT ELEVATION

NO SCALE



DETAIL OF BOLT ASSEMBLY AND BLOCK

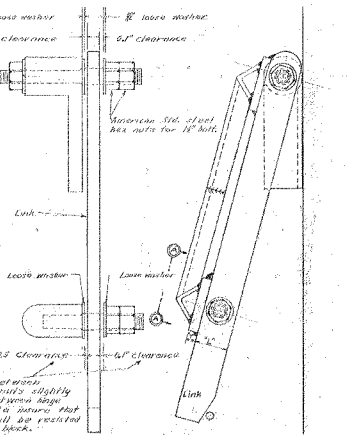
SCALE: 1/2" = 1'



DETAIL OF COVER PIN

MATERIAL: STEEL - SAE 2340

SCALE: 1/2" = 1'



FRONT ELEVATION

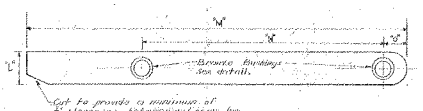
DIAGONAL BRACING REMOVED

SCALE: 1/2" = 1'

SIDE ELEVATION

SCALE: 1/2" = 1'

DIMENSION	40° GATE	30° GATE
A	Determine in field	Determine in field
B	1/8"	1/8"
C	1/4"	1/4"
D	1/2"	1/2"
E	1/2"	1/2"
F	1/2"	1/2"
G	1/2" ±	1/2" ±
H	1/2" ±	1/2" ±
I	1/2"	1/2"
J	1/2"	1/2"
K	1/2"	1/2"
L	1/2"	1/2"
M	24"	22"
N	Determine in field	Determine in field
O	Determine in field	Determine in field
P	1/2"	1/2"
Q	1/2"	1/2"
R	1/2"	1/2"
S	Determine in field	Determine in field
T	1/2"	1/2"



LINK DETAIL

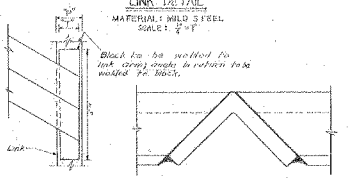
MATERIAL: MILD STEEL

SCALE: 1/2" = 1'

BUSHING DETAIL

MATERIAL: BRONZE

SCALE: 1/2" = 1'



SECTION A-A

PIN NOT SHOWN

SCALE: 1/2" = 1'

SECTION B-B

SCALE - FULL SIZE

Notes:

1. Repair seat rings on all gates as required.

BY	DATE	REVISIONS

OHIO RIVER BASIN
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
OFFICE OF THE DISTRICT ENGINEER - LOUISVILLE, KY.

PADUCAH PUMPING PLANT NO. 2
REPAIRS TO 30° & 40° DISCHARGE GATES

SUBMITTED: CHIEF, ENGINEERING BRANCH

APPROVAL RECOMMENDED: CHIEF, OPERATIONS BRANCH

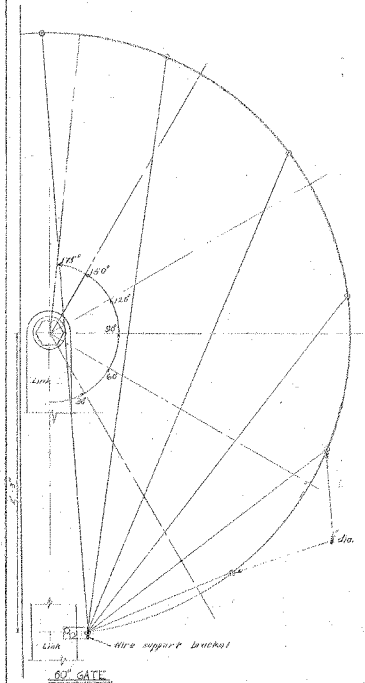
APPROVED: COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

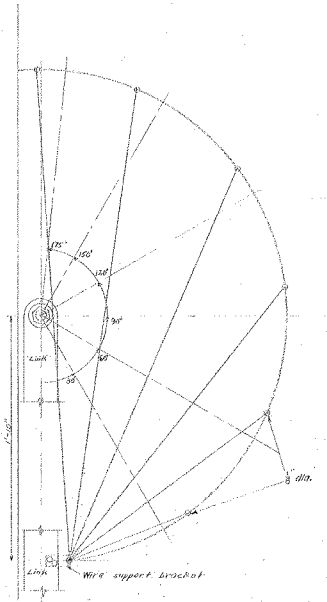
SHEET 2 OF 4 SHEETS

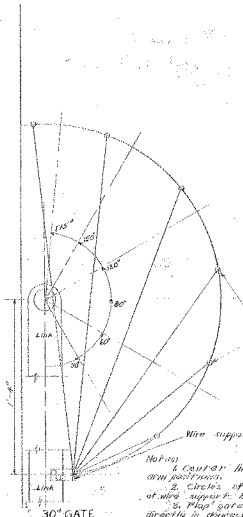
DR. BY K.G. CK. BY D.S.C. NOV. 10, 1948

BELIEVED AS BUILT 334-126/2

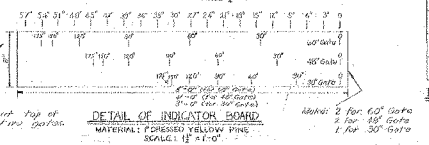
AO-3







Notes:
1. Center lines indicate gate arm positions.
2. Circles of 1" dia. indicate position of wire support brackets.
3. Plug gates positions are read directly to degrees on indicator board.
4. Indicator background to be painted white with black figures and markings.
5. Letters and markings to be 1½" in height.



GATE POSITION	0°	30°	60°	90°	120°	150°	175°
WIRE MOVEMENT 60° GATE	0"	14¼"	27½"	39⅜"	47"	52⅝"	54½"
WIRE MOVEMENT 48° GATE	0"	11⅜"	22½"	31⅛"	38⅛"	43"	44½"
WIRE MOVEMENT 30° GATE	0"	8½"	16"	22⅝"	27⅞"	30⅞"	31½"

INDICATOR BOARD CALIBRATION DATA

CRAIG RIVER BASIN
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
OFFICE OF THE DISTRICT ENGINEER-LOUISVILLE, KY.

PADUCAH PUMPING PLANT NO. 2.
CALIBRATION OF INDICATOR BOARD

SUBMITTED: CHIEF, ENGINEERING DIVISION
APPROVAL RECOMMENDED: TECHNICAL ASSISTANT
APPROVED: ACTING DISTRICT ENGINEER

SHEET 3 OF 4 SHEETS.

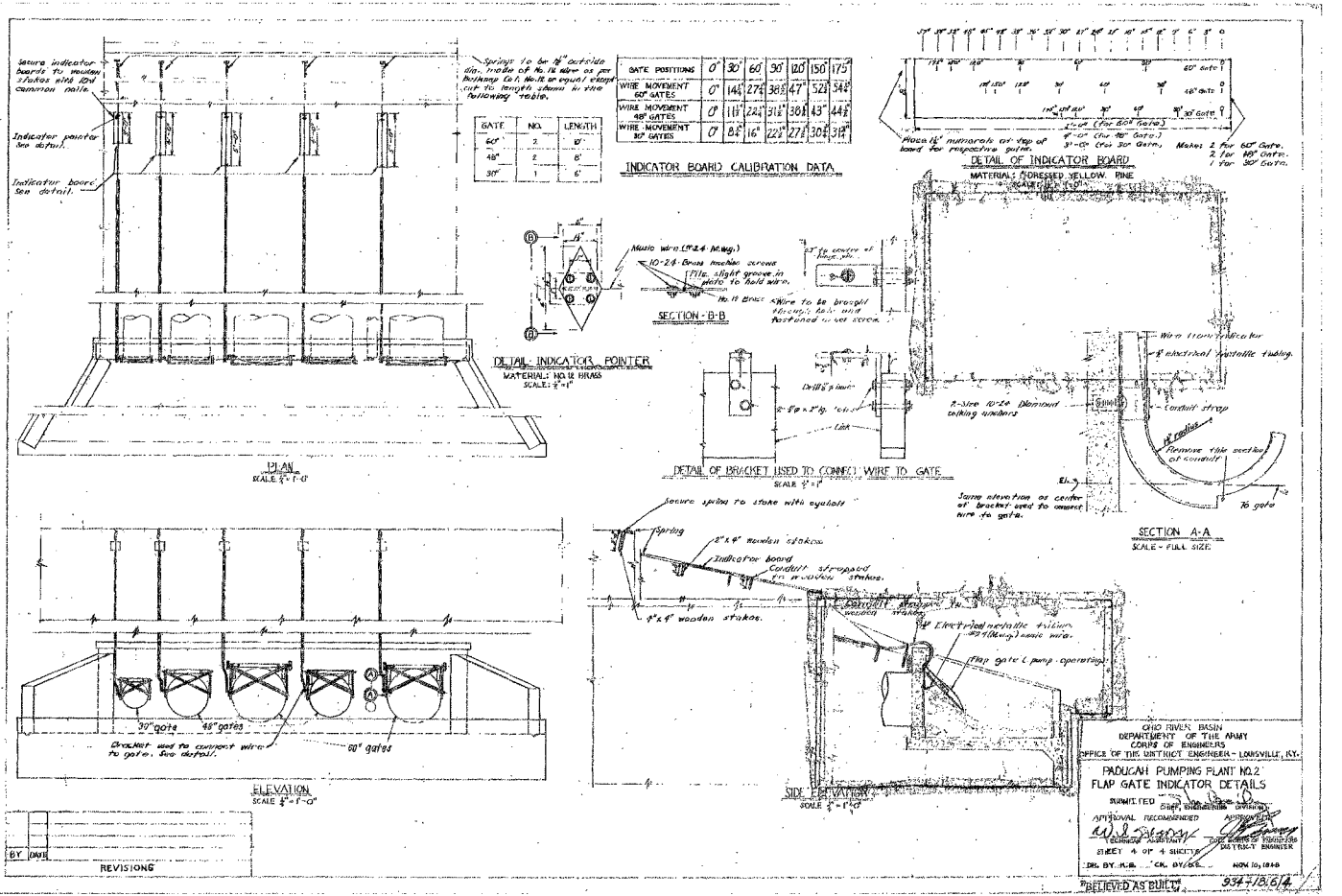
DR: BY R.S. CK: BY C.S. NOV. 10, 1943.

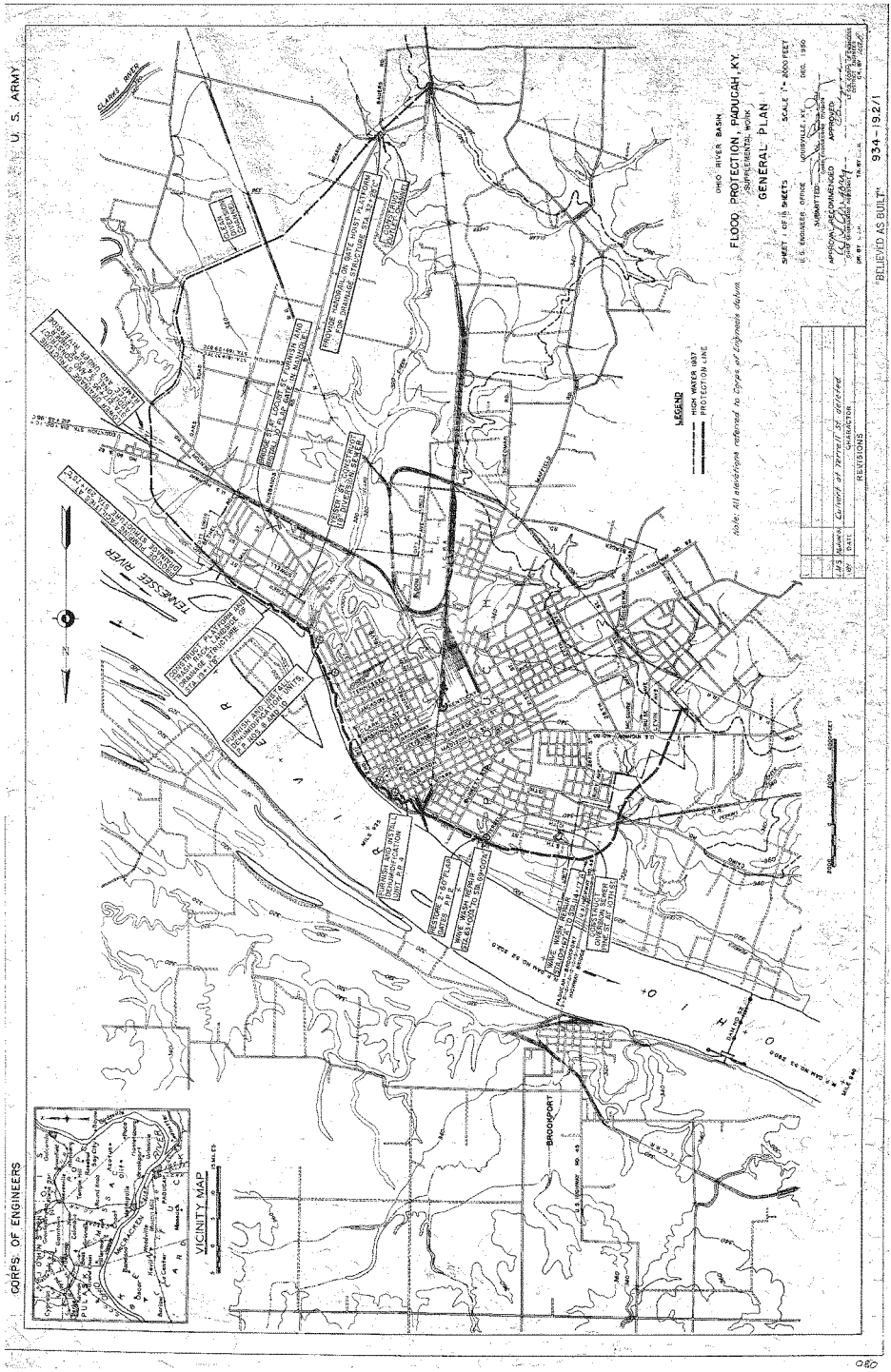
"BELIEVED AS BUILT" 934-18.6/3

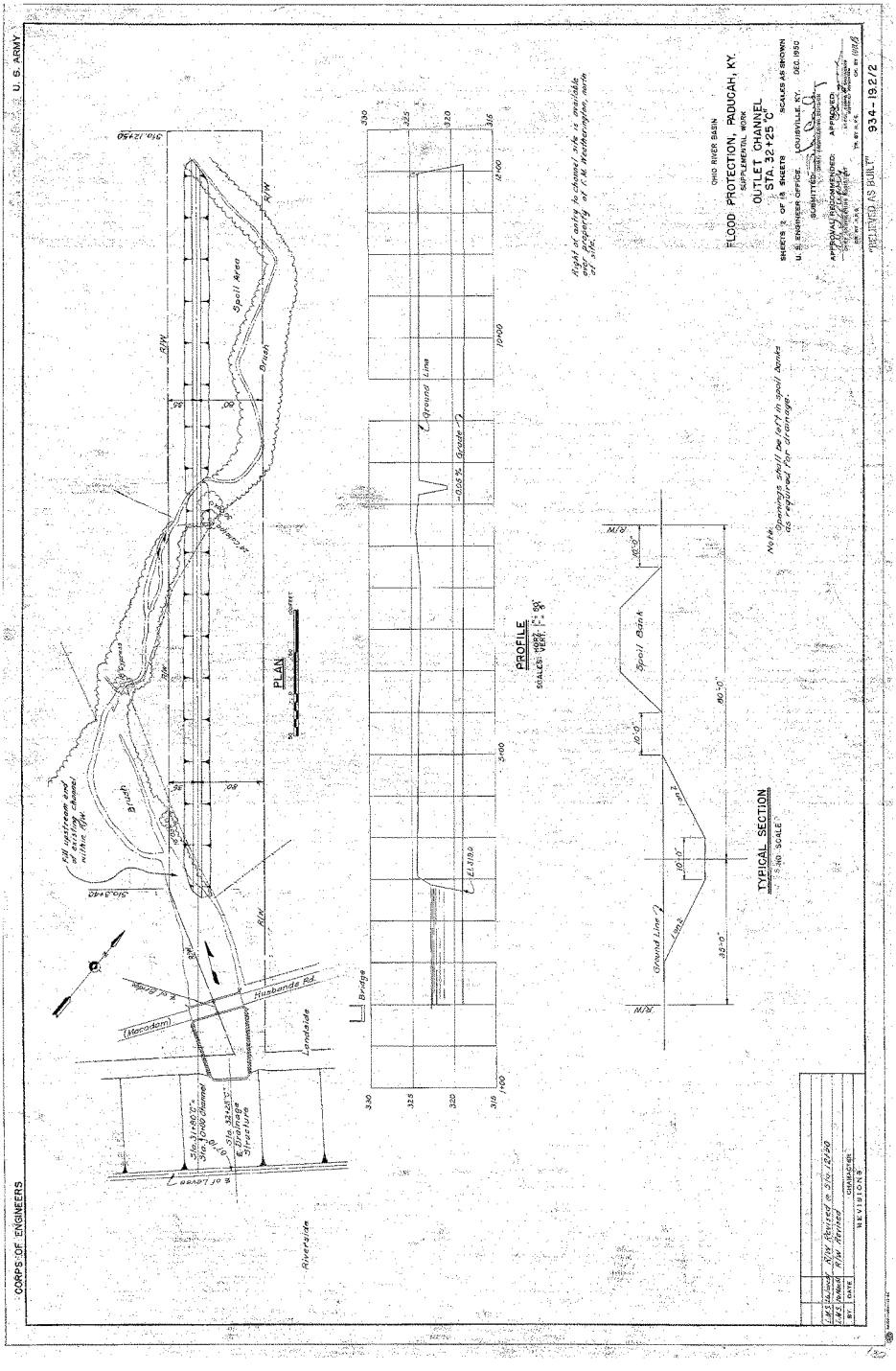
BY	DATE	REVISIONS

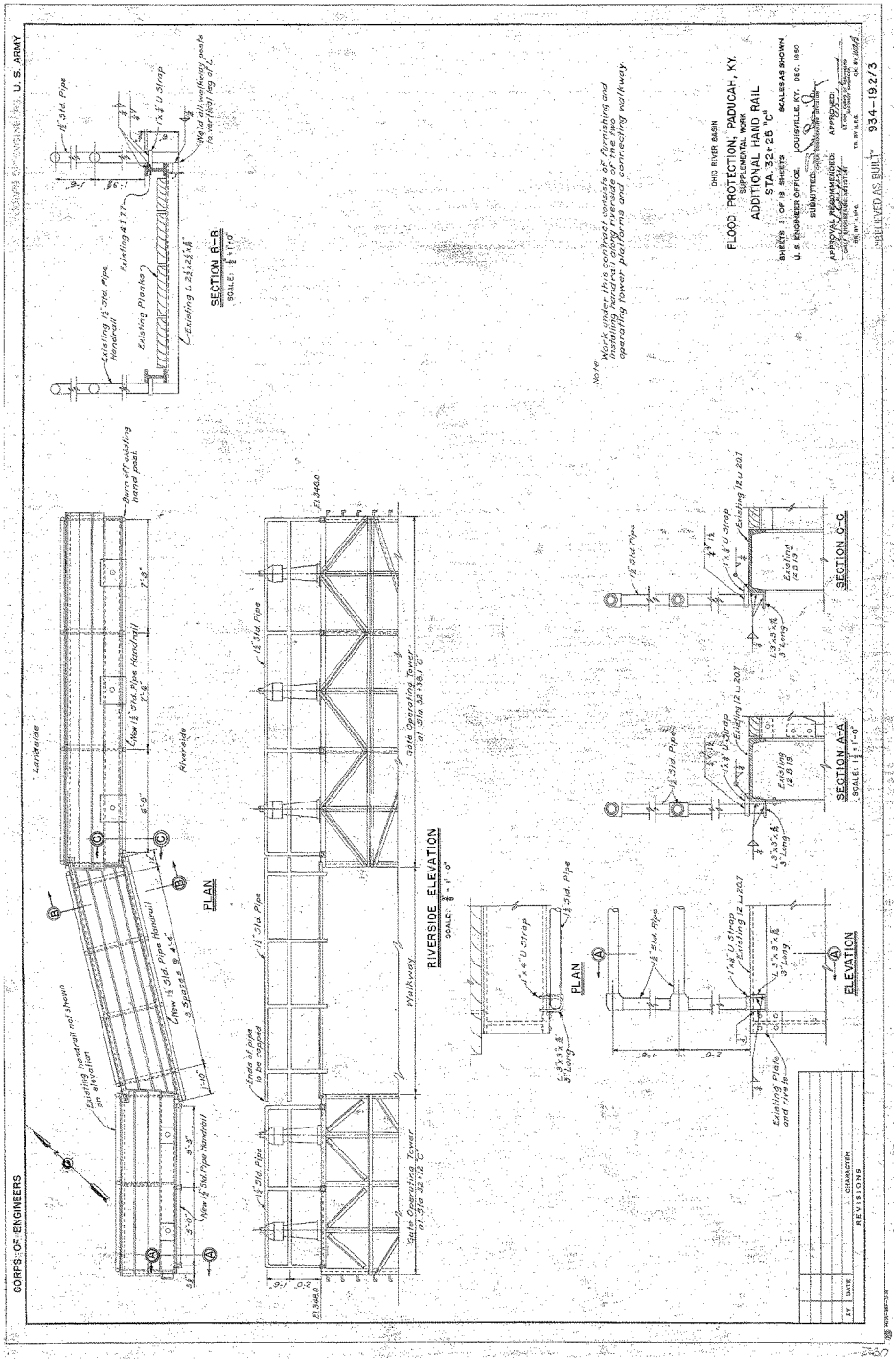
1139

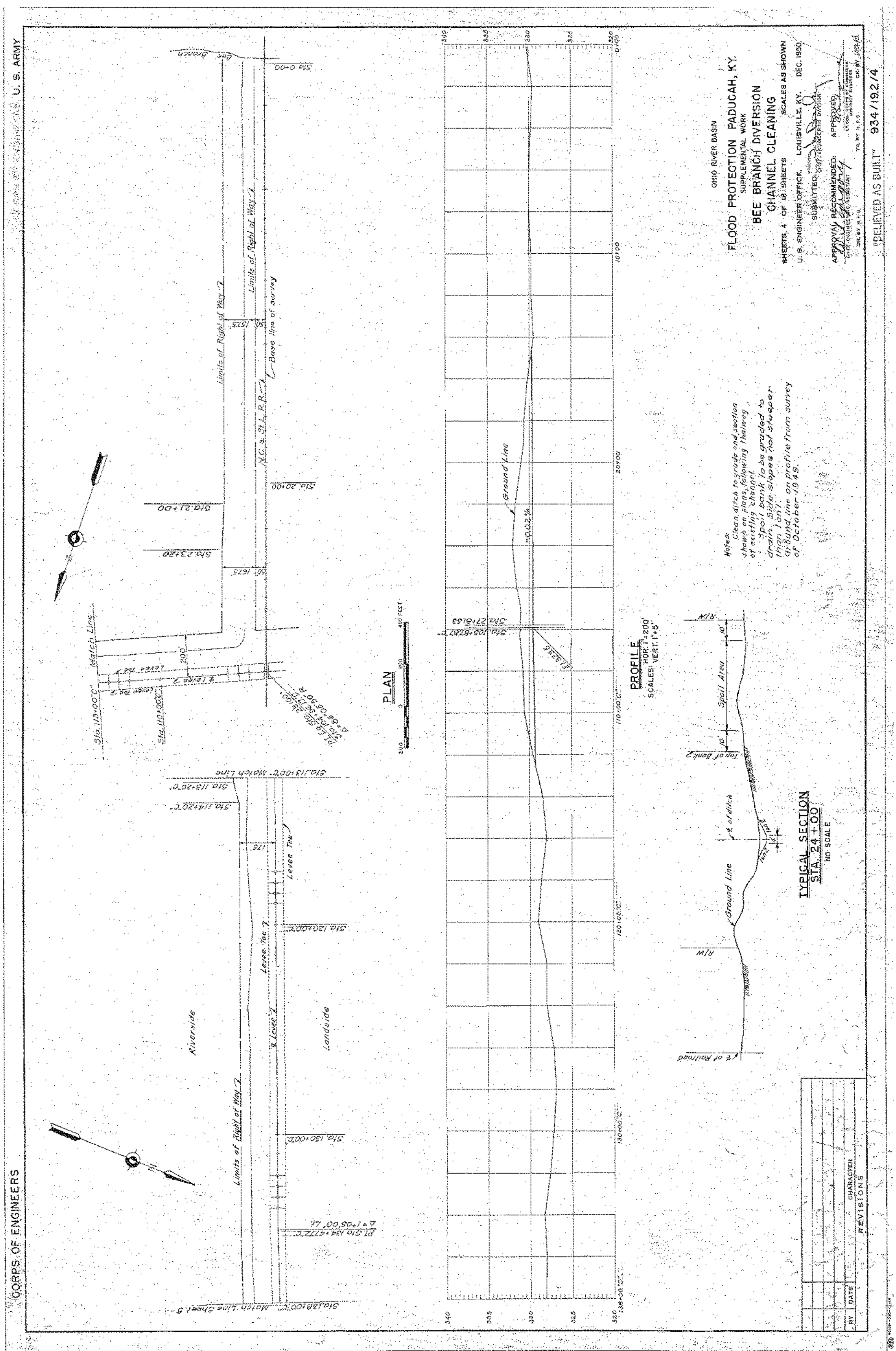
1139


Secure indicator boards to mutton stakes with 10d common nails.
Indicator pointer See detail.
Indicator board See detail.
PLAN
SCALE 1/4" = 1'-0"
Springs to be 1/4" outside dia. made of No. 12 wire or 3/8" Belknap Co. No. 12 wire or equal, stock cut to length shown in the following table.
GATE NO. LENGTH
60" 2 9'
48" 2 8'
30" 1 6'
GATE POSITIONS 0° 30' 60' 90' 120' 150' 175°
WIRE MOVEMENT 60" GATES 0" 14 1/2" 27 1/2" 36 1/2" 47" 52 1/2" 54 1/2"
WIRE MOVEMENT 48" GATES 0" 11 1/2" 22 1/2" 31 1/2" 38 1/2" 43" 44 1/2"
WIRE MOVEMENT 30" GATES 0" 8 1/2" 16" 22 1/2" 27 1/2" 30 1/2" 31 1/2"
INDICATOR BOARD CALIBRATION DATA
Place 1/4" numerals at top of board for respective gates.
Make: 2 for 60" Gate.
2 for 48" Gate.
1 for 30" Gate.
DETAIL OF INDICATOR BOARD
MATERIAL: DRESSED YELLOW PINE
SCALE 1" = 1'-0"
DETAIL INDICATOR POINTER
MATERIAL: NO. 12 BRASS
SCALE: 3" = 1"
Music wire (No. 24 Mw.g.)
10-24 Brass machine screws (File slight groove in plate to hold wire.)
No. 11 Brace
SECTION - B-B
Wire to be brought through to and fastened to set screw.
Drill 5/8" hole
2-5/8" x 2" lg. Iron
Link
DETAIL OF BRACKET USED TO CONNECT WIRE TO GATE
SCALE 3" = 1"
Wire from indicator
4" electrical metallic tubing.
Conduit strap
8-Size 10-24 Diamond tapping washers
Remove this section of conduit
To gate
Same elevation as center of bracket used to connect wire to gate.
SECTION A-A
SCALE - FULL SIZE
ELEVATION
SCALE 1/4" = 1'-0"
30" gate
48" gates
Bracket used to connect wire to gate. See detail.
60" gates
Secure spiral to stake with eyelet
Spring
2" x 4" wooden stakes
Indicator board
Conduit strapped to wooden stakes.
4" x 4" wooden stakes.
Conduit strapped to wooden stakes
4" Electrical metallic tubing
#9 (Mw.g.) music wire.
Flap gate (pump operating)
SIDE ELEVATION
SCALE 1/4" = 1'-0"
BY DATE
REVISIONS
OHIO RIVER BASIN
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
OFFICE OF THE DISTRICT ENGINEER - LOUISVILLE, KY.
PADUCAH PUMPING PLANT NO. 2
FLAP GATE INDICATOR DETAILS
SUBMITTED
CHIEF, ENGINEERING DIVISION
APPROVAL RECOMMENDED
CHIEF, CONSTRUCTION DIVISION
APPROVED
DISTRICT ENGINEER
SHEET 4 OF 4 SHEETS
DRL BY M.B. CK. BY G.C. NOV 10, 1948
"BELIEVED AS BUILT"
934-1/8.6/4


CORPS OF ENGINEERS
U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SUPPLEMENTAL WORK
GENERAL PLAN
SHEET 1 OF 18 SHEETS
SCALE 1" = 2000 FEET
DEC. 1980
U.S. ENGINEER OFFICE LOUISVILLE, KY.
SUBMITTED
APPROVED
APPROVED
"BELIEVED AS BUILT" 934-19.2/1
LEGEND
HIGH WATER 1937
PROTECTION LINE
Note: All elevations referred to Cairo, ill. datum
VICINITY MAP
TENNESSEE RIVER
OHIO RIVER
BROOKPORT
REVISIONS

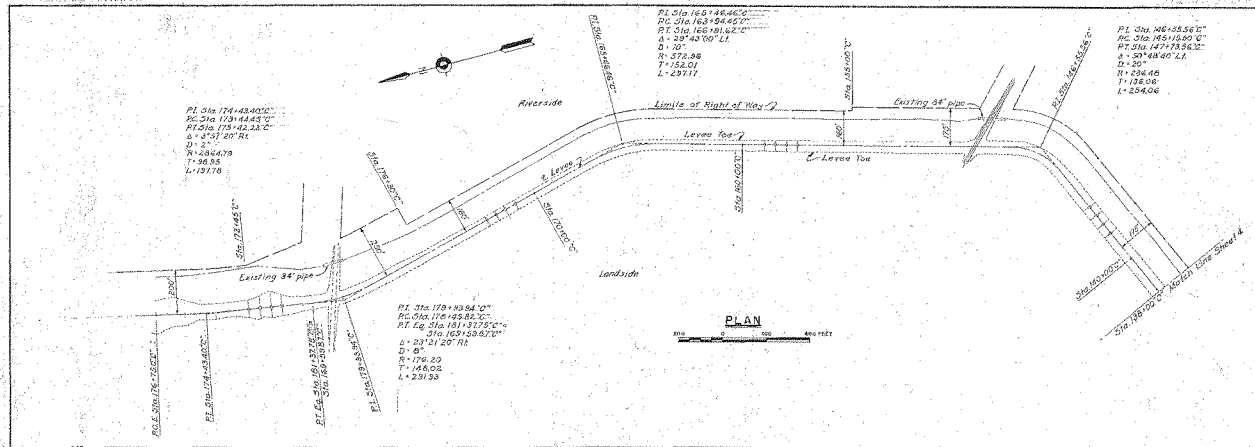

CORPS OF ENGINEERS
U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SUPPLEMENTAL WORK
OUTLET CHANNEL
STA. 32+25 C
SHEET 9 OF 16 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 1950
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
"REVISED AS BUILT"
934-19.2/2
PLAN
PROFILE
SCALES HOR. 1" = 100'
VERT. 1" = 10'
TYPICAL SECTION
NO SCALE
Spoil Area
Brush
Husbands Rd.
(Macadam)
Landside
Riverside
Bridge
Ground Line
Spoil Bank
Note: Openings shall be left in spoil banks as required for drainage.
Right of entry to channel site is available over property of F.M. Westherington, owner.
REVISIONS
BY
DATE

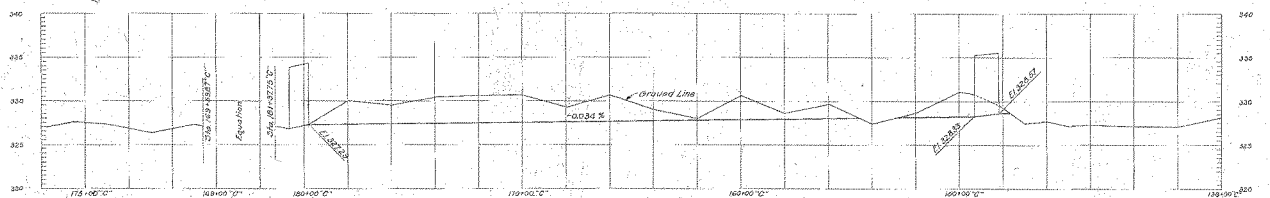

CORPS OF ENGINEERS
U. S. ARMY
Landside
Riverside
Existing handrail not shown at elevation
New 1½" Std. Pipe Handrail
Burn off existing hand post
Weld all walking posts to vertical leg of L
Existing 1½" Std. Pipe Handrail
Existing Planks
Existing L 3½x3½x⅜
Existing 4 x 2 I
1½" Std. Pipe
4"x⅜" U Strap
PLAN
SECTION B–B
SCALE: 1½" = 1'-0"
Note
Work under this contract consists of furnishing and installing handrail on existing and operating tower platforms and connecting walkway
Gate Operating Tower at Sta 32+26
Gate Operating Tower at Sta 32+26 ℄
Walkway
Trees to be removed
El 346.0
RIVERSIDE ELEVATION
SCALE: ⅛" = 1'-0"
1½" Std. Pipe
4"x⅜" U Strap
Existing 12 I 20.7
Existing 12 B 27
Existing 12 B 31
Existing 12 I 20.7
Existing Plate and Angles
SECTION A–A
SCALE: 1½" = 1'-0"
SECTION C–C
ELEVATION
PLAN
DATE
CHARACTER
REVISIONS
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SUPPLEMENTAL WORK
ADDITIONAL HAND RAIL
STA. 32+26 ℄
SHEETS 1 OF 19 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 1960
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
AS BUILT
934-19.2/3


CORPS OF ENGINEERS
U. S. ARMY
PLAN
PROFILE
SCALES: HOR. 1"=200' VERT. 1"=5'
TYPICAL SECTION
STA. 24+00
NO SCALE
Notes:
Clean ditch to grade and section shown on plans, following thalweg of existing channel.
Spoil bank to be graded to drain. Side slopes not steeper than 1 on 1.
Ground line on profile from survey of October 1949.
Riverside
Landside
Ground Line
Spoil Area
REVISIONS
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SUPPLEMENTAL WORK
BEE BRANCH DIVERSION
CHANNEL CLEANING
SHEETS 4 OF 18 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 1950
934/192/4

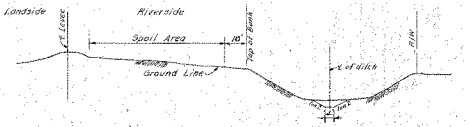
CORPS OF ENGINEERS

U. S. ARMY





PROFILE
SCALES: HOR. 1"=200'
VERT. 1"= 5'



TYPICAL SECTION
STA. 170+00"C"
NO SCALE

Note:
See note sheet 4.
Ground line on profile from survey of October 1949.

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.
SUPPLEMENTAL WORK

BEE BRANCH DIVERSION
CHANNEL CLEANING

SHEETS 5 OF 18 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 1950

SUBMITTED: [signature] CHIEF, ENGINEERING DIVISION

APPROVED: [signature] CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: [signature] CHIEF, ENGINEERING DIVISION

DR. BY W.P.S. TR. BY W.P.S. CK. BY W.A.B.

"BELIEVED AS BUILT"

934-19.2/5

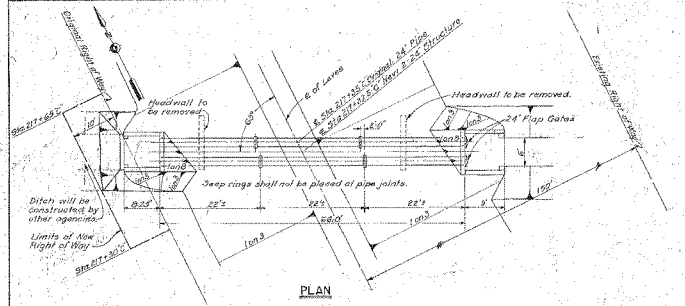
BY	DATE	CHARACTER

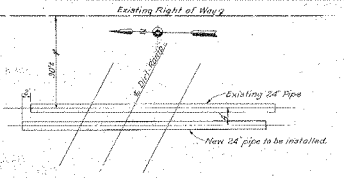
REVISIONS

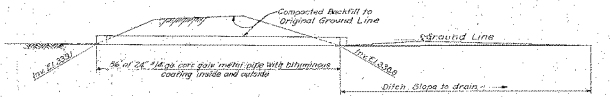
1145

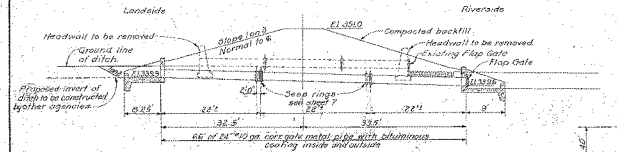
CORPS OF ENGINEERS

U. S. ARMY

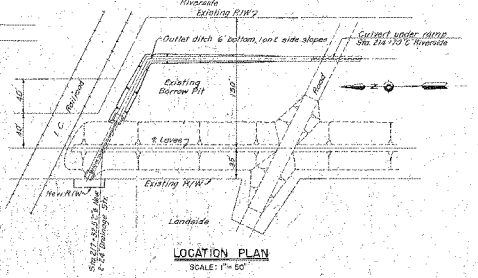


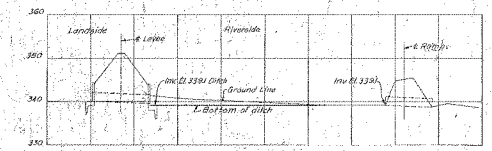






Notes:
1. For details of headwalls, see sheet 7.
2. Existing pipe, Flap gate, and seep rings may be reused providing they are in good condition or repaired as approved by the Contracting Officer or his authorized representative.





OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SUPPLEMENTAL WORK

DRAINAGE STRUCTURE STA. 217+32.5 "C"
CULVERT STA. 214+70 "C"

SHEETS 6 OF 18 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 1950

SUBMITTED: CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: CHIEF, REAL ESTATE DIVISION

APPROVED: COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

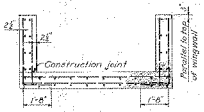
BY	DATE	CHARACTER
		REVISIONS

"RELIEVED AS BUILT" 934-192/6

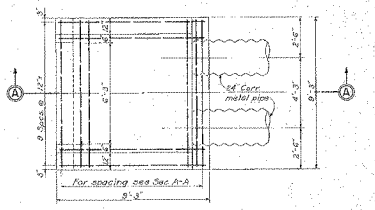
1146

CORPS OF ENGINEERS

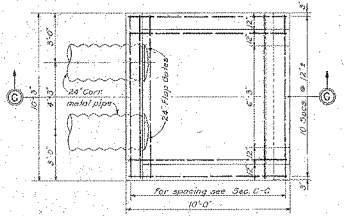
U. S. ARMY



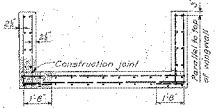
SECTION B-B
SCALE: $\frac{3}{8}$" = 1'-0"



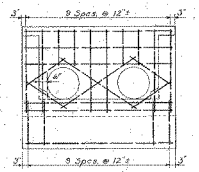
PLAN
SCALE: $\frac{3}{8}$" = 1'-0"



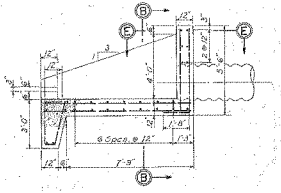
PLAN
SCALE: $\frac{3}{8}$" = 1'-0"



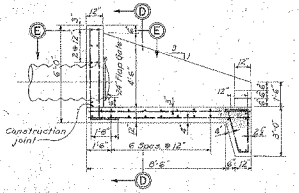
SECTION D-D
SCALE: $\frac{3}{8}$" = 1'-0"



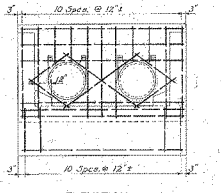
ELEVATION
SCALE: $\frac{3}{8}$" = 1'-0"



SECTION A-A
SCALE: $\frac{3}{8}$" = 1'-0"



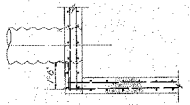
SECTION C-C
SCALE: $\frac{3}{8}$" = 1'-0"



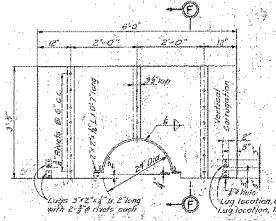
ELEVATION
SCALE: $\frac{3}{8}$" = 1'-0"

24" INLET HEADWALL

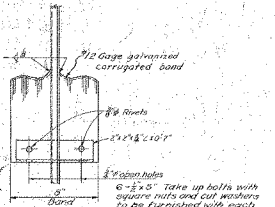
24" OUTLET HEADWALL



SECTION E-E
SCALE: $\frac{3}{8}$" = 1'-0"



ELEVATION
SCALE: $\frac{3}{8}$" = 1'-0"



SECTION F-F
SCALE: 3" = 1'-0"

⅞" open holes
6-1"x 6" Take up bolts with square nuts and cut washers to be furnished with each diaphragm.

Note:
All reinforcing ½" ϕ @ 12" c.c. unless otherwise noted.

Note:
Diaphragm 14 gal. corrugated metal fully coated with bituminous material. Top half diaphragm shown, bottom half identical, except as noted.

DETAIL OF SEEP RINGS

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SUPPLEMENTAL WORK

DRAINAGE STRUCTURE DETAILS

STA. 217+32.5 "C"

SHEET 7 OF 18 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 1950

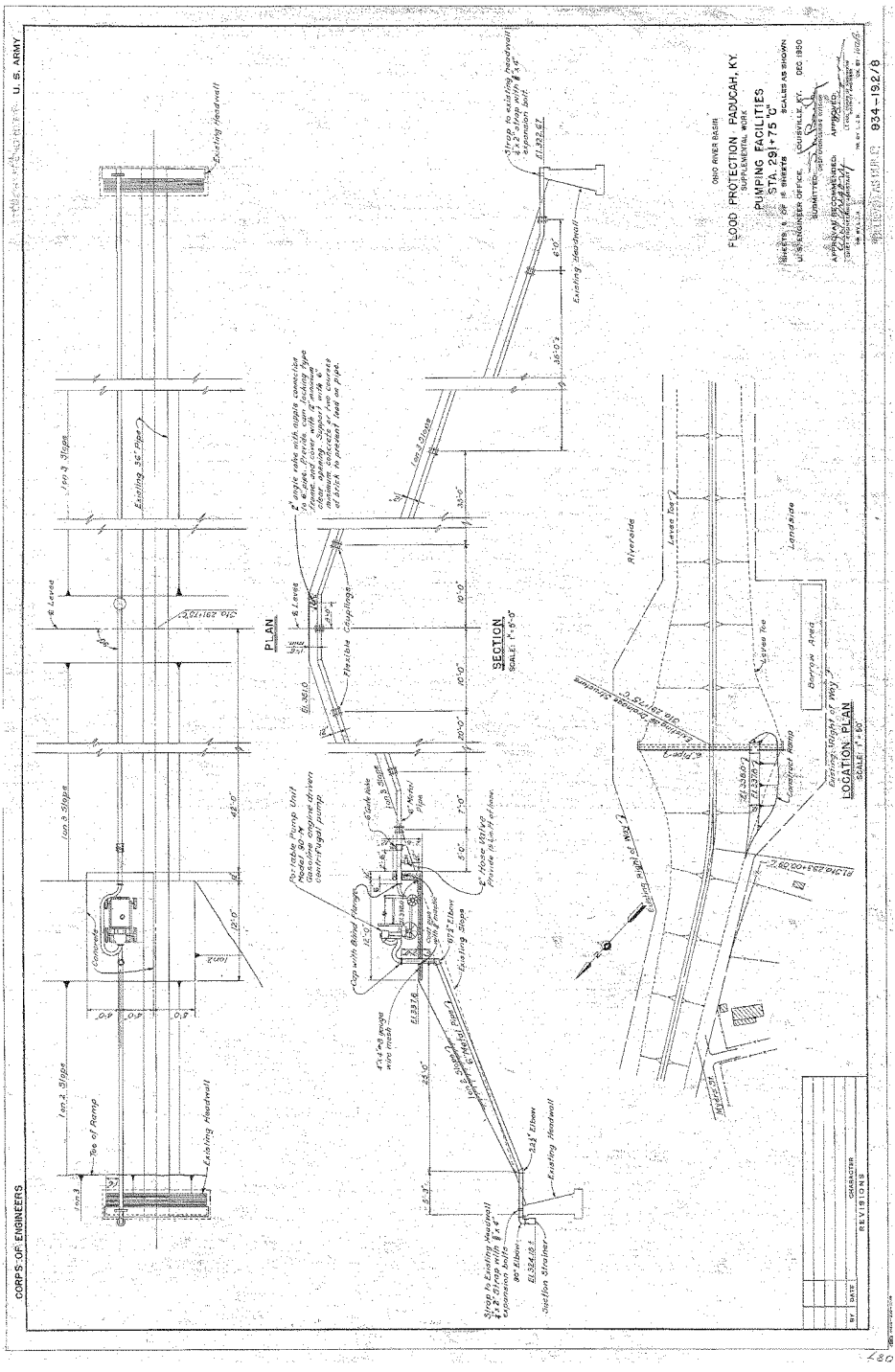
SUBMITTED: CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: CHIEF, ENGINEERING ASSISTANT — APPROVED: CHIEF, ENGINEERING DIVISION OR ASSISTANT

DR. W. T. — TR. W. L.F. — CK. W. H.G.

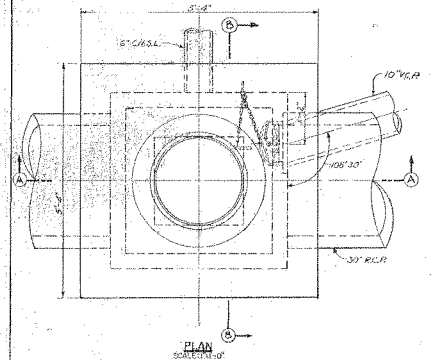
RELIEVED AS BUILT 934-19.2/7

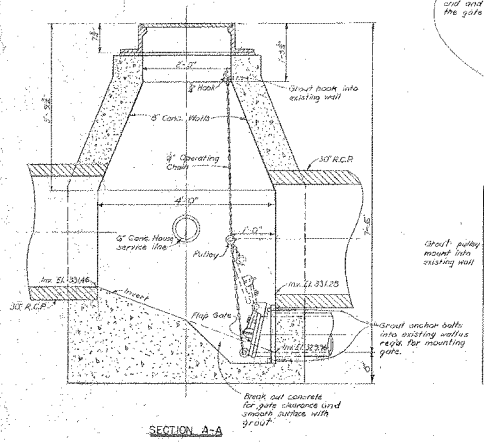
11147

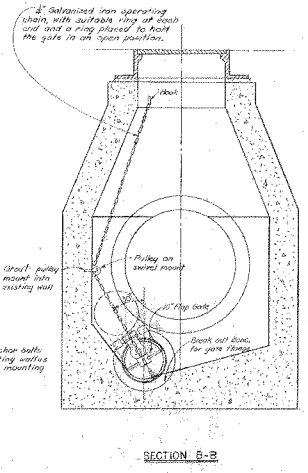

CORPS OF ENGINEERS
U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SUPPLEMENTAL WORK
PUMPING FACILITIES
STA. 291+75 "O"
SHEET 1 OF 18 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. DEC 1950
SUBMITTED
APPROVED RECOMMENDED
APPROVED
834-19.2/8
PLAN
SECTION
SCALE: 1"=5'-0"
LOCATION PLAN
SCALE: 1" = 50'
Existing Headwall
Toe of Ramp
Existing 36" Pipe
Riverside
Landside
Levee Toe
Borrow Area
Existing Right of Way
Construction Ramp
Flexible Couplings
Portable Pump Unit
Suction Strainer
Existing Slope
BY
DATE
REVISIONS
CHARACTER

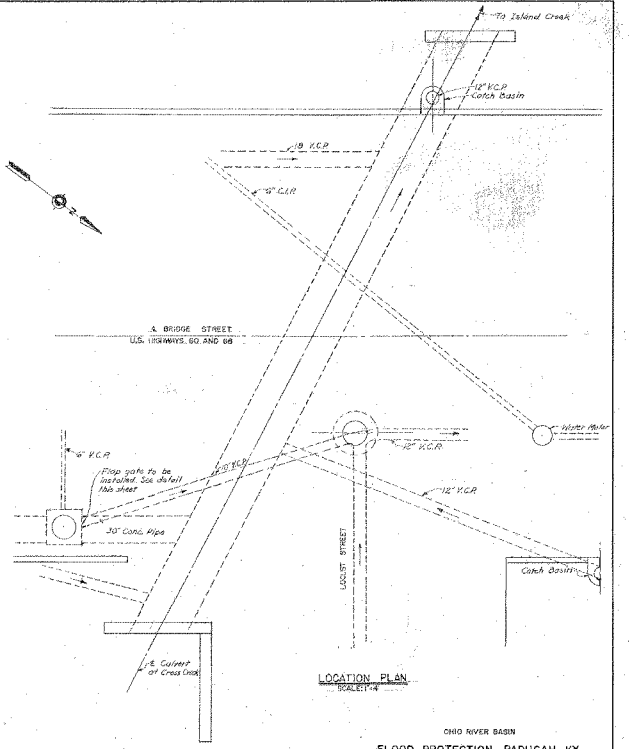
CORPS OF ENGINEERS

U. S. ARMY









OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SUPPLEMENTAL WORK

INSTALLATION OF FLAP GATE

BRIDGE ST. AT LOCUST ST.

SHEETS 9 OF 18 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE LOUISVILLE, KY. FEB 1952

SUBMITTED _____ CHIEF ENGINEERING DIVISION

APPROVAL RECOMMENDED _____ CHIEF ENGINEERING ASSISTANT

APPROVED _____ U.S. CORPS OF ENGINEERS DISTRICT ENGINEER

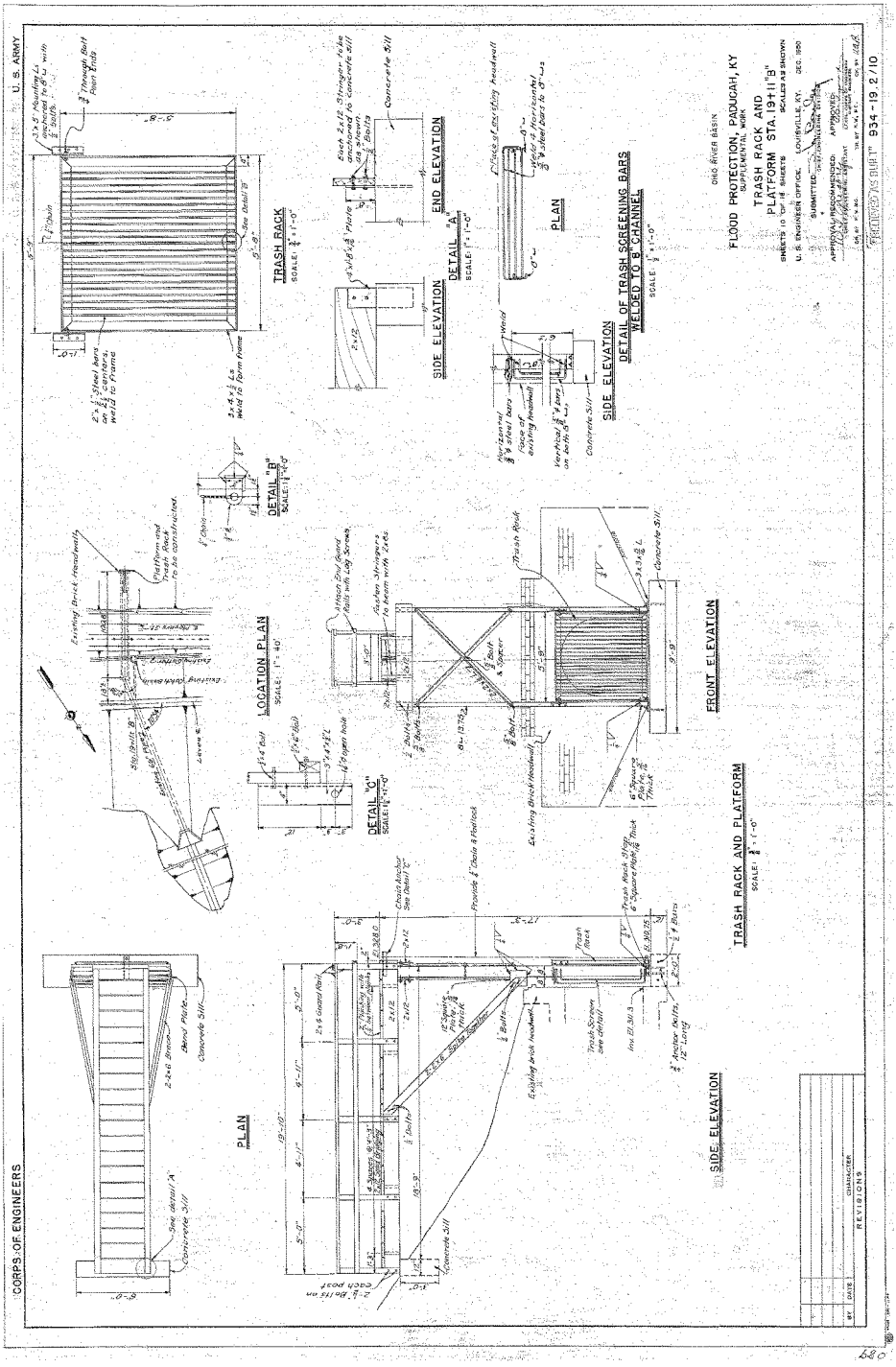
DR. BY DWN. TR. BY A.S. CK. BY

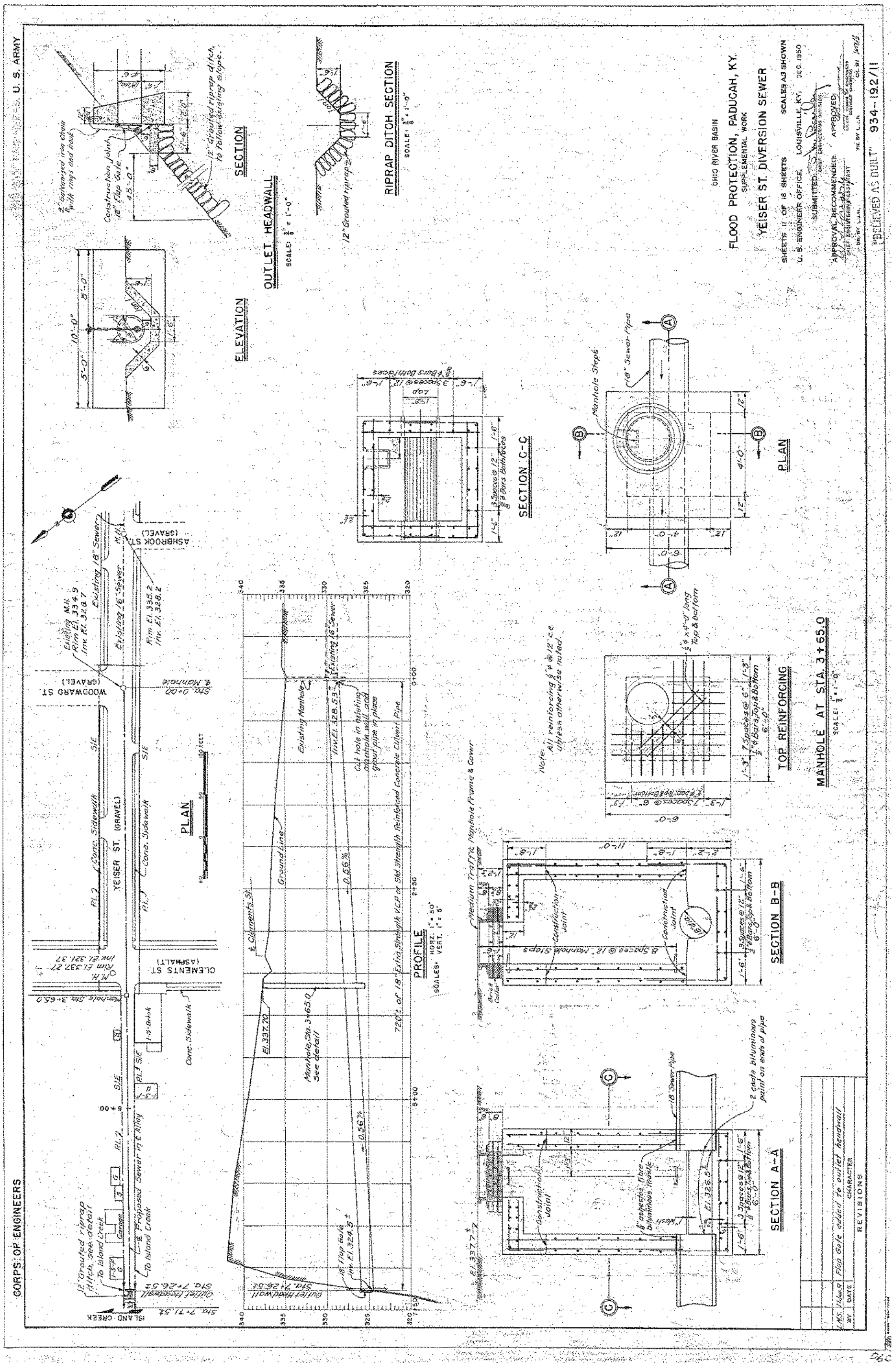
(CONTRACT MOD. THIS DWG. SUPERSEDES 934-192/9 DATED DEC. 1950)

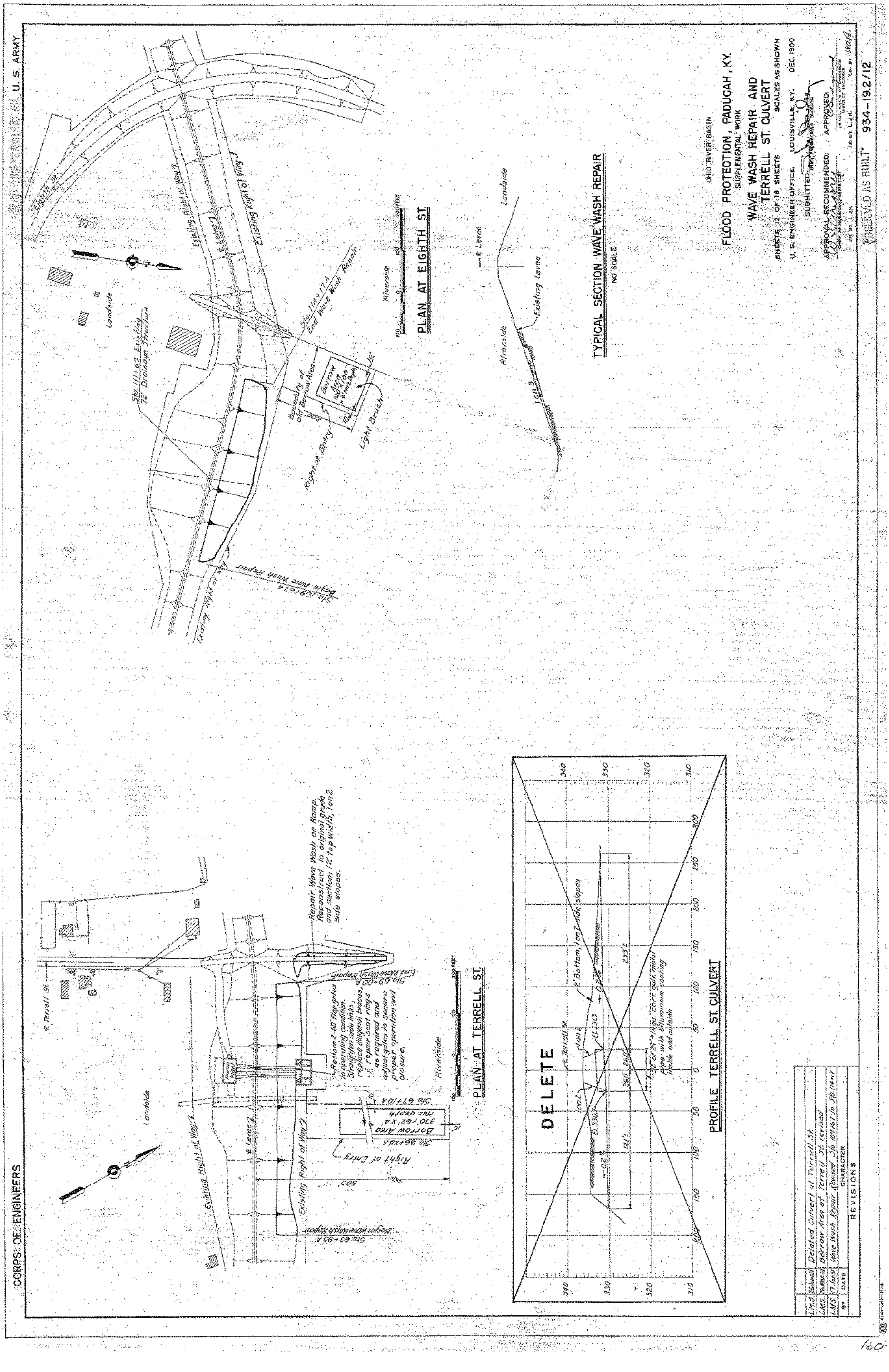
REVISED AS BUILT 934-192/9.1

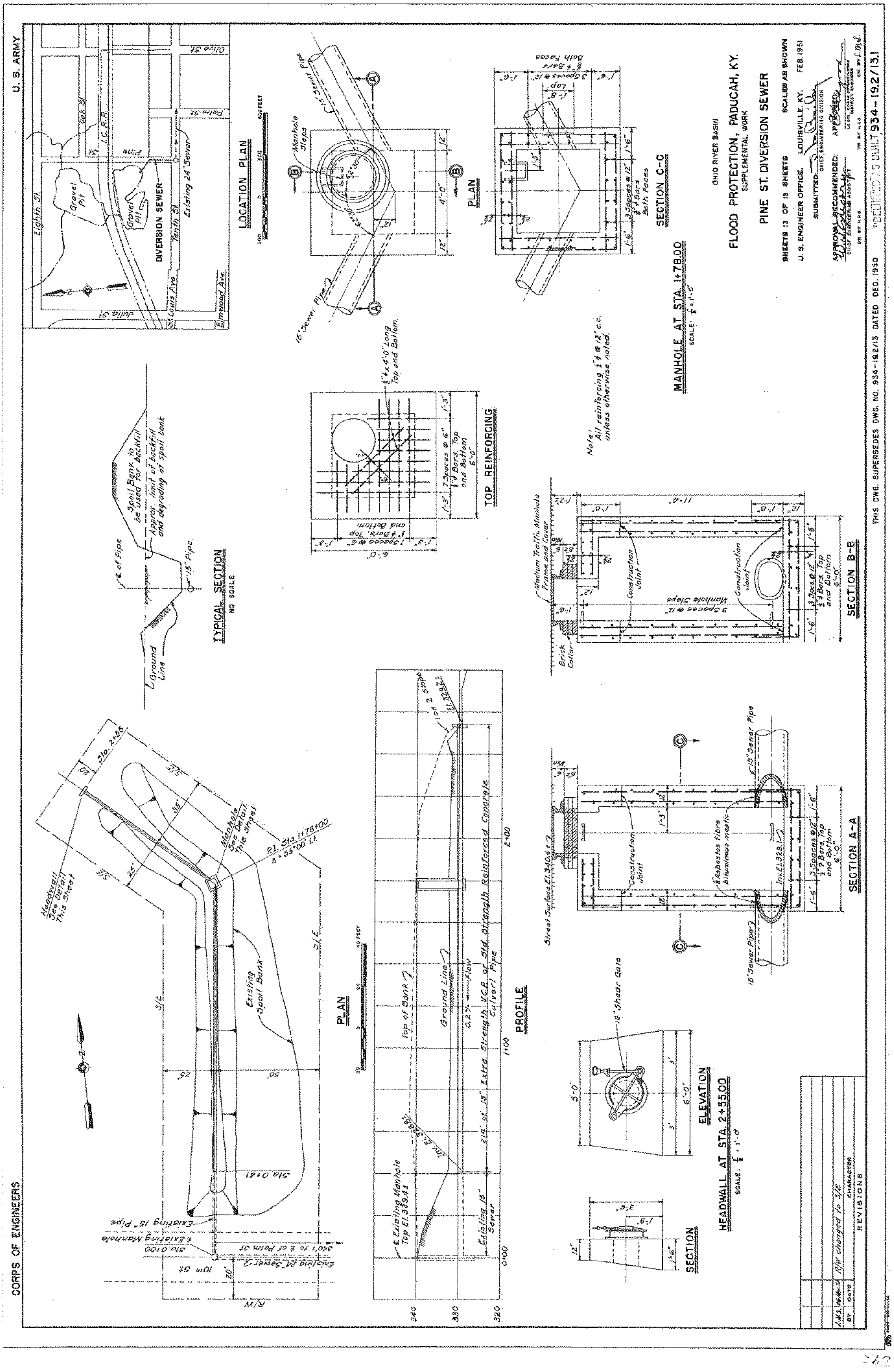
280

1149


CORPS OF ENGINEERS
U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY
SUPPLEMENTAL WORK
TRASH RACK AND PLATFORM STA. 19+11"B"
SHEETS 10 TO 14 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 1950
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
CHIEF, ENGINEERING DIVISION
CHIEF, OPERATIONS DIVISION
DRAWING NO. 934-19-2/10
TRASH RACK
SCALE: 1/4" = 1'-0"
PLAN
SIDE ELEVATION
END ELEVATION
DETAIL "A"
DETAIL "B"
DETAIL "C"
LOCATION PLAN
TRASH RACK AND PLATFORM
FRONT ELEVATION
DETAIL OF TRASH SCREENING BARS WELDED TO 8" CHANNEL
REVISIONS
BY
DATE
CHARACTER

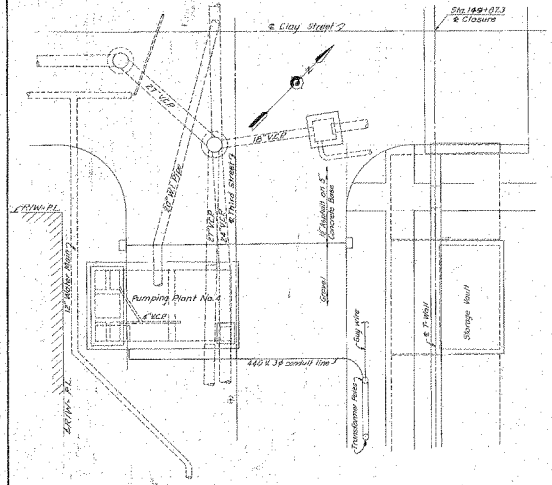

CORPS OF ENGINEERS
U. S. ARMY
PLAN
PROFILE
SECTION A-A
SECTION B-B
TOP REINFORCING
MANHOLE AT STA. 3+65.0
SECTION C-C
ELEVATION
OUTLET HEADWALL
SECTION
RIPRAP DITCH SECTION
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SUPPLEMENTAL WORK
YEISER ST. DIVERSION SEWER
REVISIONS
"BELIEVED AS BUILT"
934-192/11


CORPS OF ENGINEERS
U. S. ARMY
PLAN AT EIGHTH ST
TYPICAL SECTION WAVE WASH REPAIR
NO SCALE
PLAN AT TERRELL ST
PROFILE TERRELL ST. CULVERT
DELETE
REVISIONS
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SUPPLEMENTAL WORK
WAVE WASH REPAIR AND
TERRELL ST. CULVERT
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC 1950
934-19.2/12


U. S. ARMY
CORPS OF ENGINEERS
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SUPPLEMENTAL WORK
PINE ST. DIVERSION SEWER
SHEETS 13 OF 18 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. FEB. 1951
THIS DWG. SUPERSEDES DWG. NO. 934-19.2/13 DATED DEC. 1950
LOCATION PLAN
DIVERSION SEWER
TYPICAL SECTION
NO SCALE
PLAN
PROFILE
TOP REINFORCING
SECTION C-C
MANHOLE AT STA. 1+78.00
SECTION B-B
SECTION A-A
ELEVATION
HEADWALL AT STA. 2+55.00
SECTION
REVISIONS

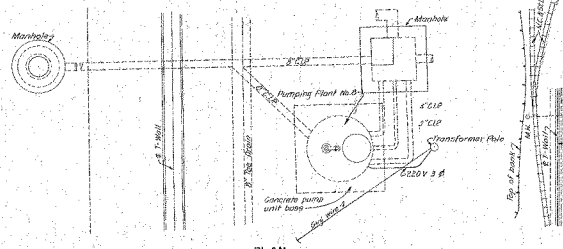
CORPS OF ENGINEERS

U. S. ARMY



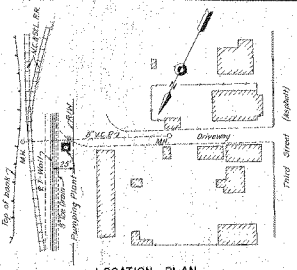
PUMPING PLANT NO. 4

SCALE: 1/8" = 1'-0"



PLAN

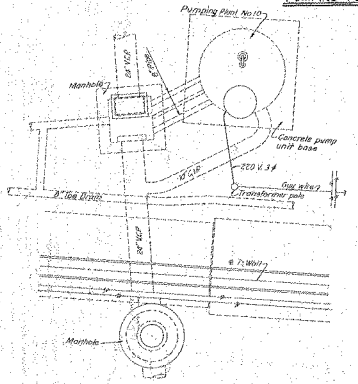
SCALE: 1/8" = 1'-0"



LOCATION PLAN

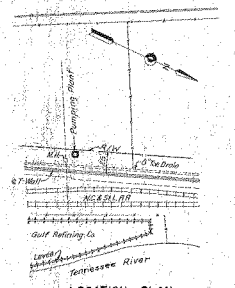
SCALE: 1" = 50'

PUMPING PLANT NO. 8



PLAN

SCALE: 1/8" = 1'-0"



LOCATION PLAN

SCALE: 1" = 50'

PUMPING PLANT NO. 10

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SUPPLEMENTAL WORK

DEHUMIDIFICATION EQUIPMENT

LOCATION PLANS

SHEET 9 OF 18 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 1950

SUBMITTED: _____ CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED: _____ CHIEF, ENGINEERING DIVISION

APPROVED: _____ LEVEE, CHIEF OF ENGINEERS

BY	DATE	CHARACTER

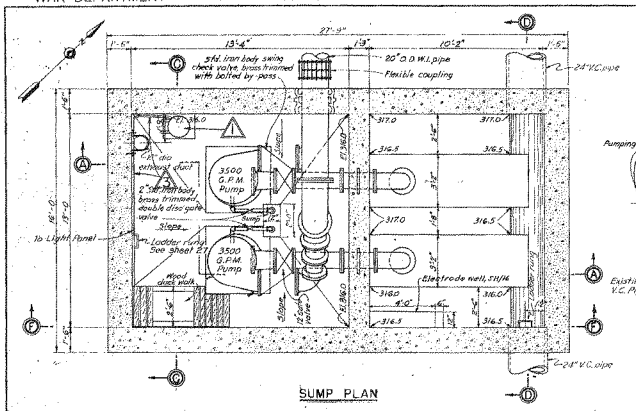
REVISIONS

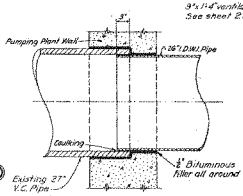
RECEIVED AS BUILT 934-19.2/14

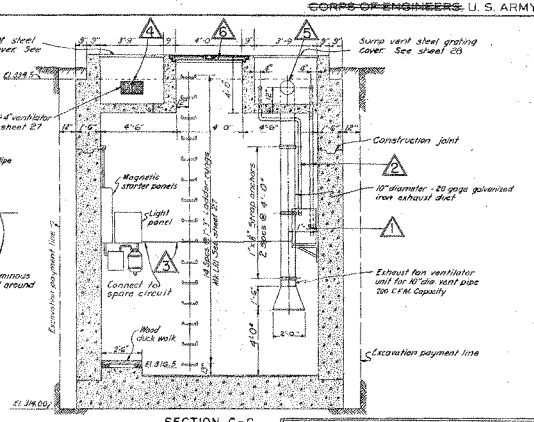
1154

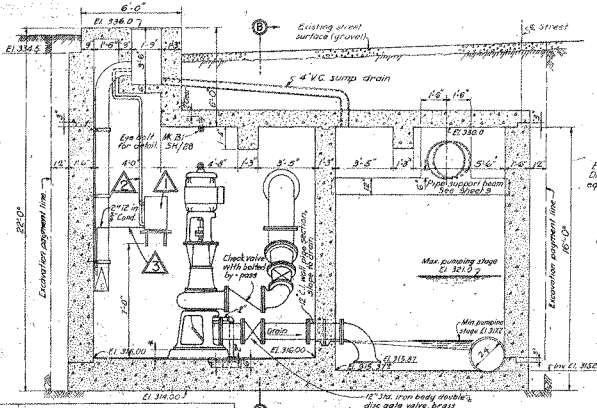
~~WAR DEPARTMENT~~ CORPS OF ENGINEERS

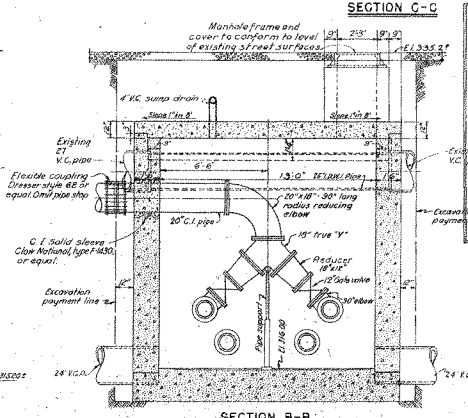
~~CORPS OF ENGINEERS~~ U. S. ARMY











ITEMS OF WORK UNDER SUPPLEMENTAL WORK CONTRACT

1. Furnish and install dehumidification unit, Dasomatic Model SOR-8, 110 V, 60c, or equal.
2. Furnish and install mechanical air lines.
3. Furnish and install wiring to dehumidification unit.
4. Furnish and install cover for ventilation intake opening. See Detail 4. Dwg. 934-19.2/16
5. Furnish and install cover for ventilation exhaust opening. See Detail 5. Dwg. 934-19.2/16
6. Provide soft neoprene gaskets for 4'-0"x 4'-0" access opening. See Detail 6. Dwg. 934-19.2/16

Note: For Sections D-D, EE, FF and Plan, see Drawing 934-19.2/16

These drawings, except for title and notes regarding dehumidification, reproduced from original drawings for pumping plant construction contract. Exact location of mechanical and electrical equipment may vary slightly from position shown. Exact location to be determined in field.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SUPPLEMENTAL WORK

PUMPING PLANT NO. 4

MASONRY DETAILS

PLAN AND SECTIONS

SHEET 15 OF 101 SHEETS SCALE: ¼"=1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 1950

SUBMITTED: CHIEF, ENGINEERING DIVISION

APPROVED: CHIEF, ENGINEERING DIVISION

APPROVED: CHIEF OF ENGINEERS

DISTRICT ENGINEER, LT. COL. C.E.

04 ft 8.5 TH-BY C.T.

BY	DATE	CHARACTER REVISIONS
		Min. top of finished well added, partition wall and panels relocated.

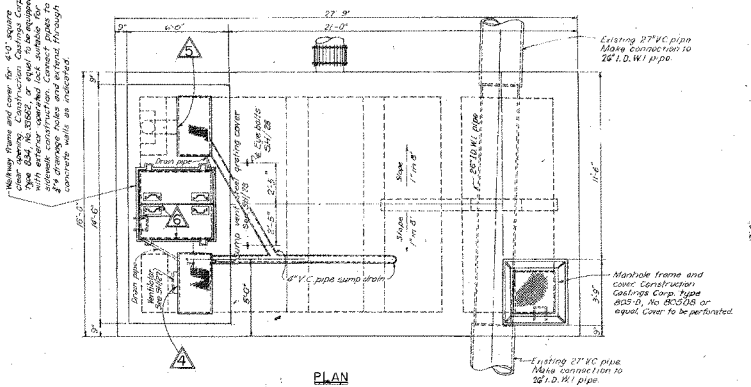
"DELIVERED AS BUILT" 934-19.2/15 ~~934-2.7/3~~

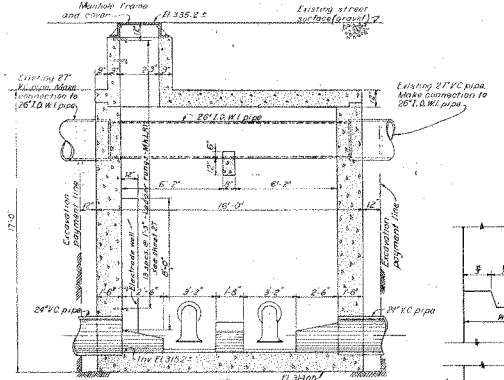
1155

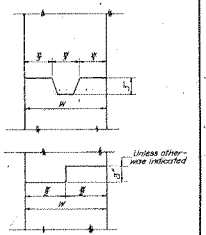
940

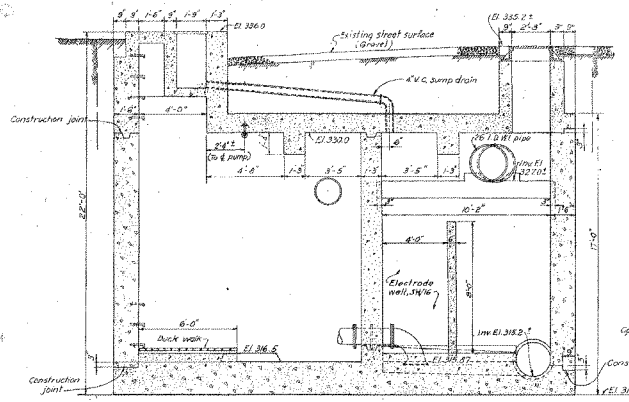
WAR DEPARTMENT CORPS OF ENGINEERS

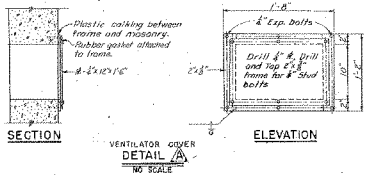
CORPS OF ENGINEERS U. S. ARMY

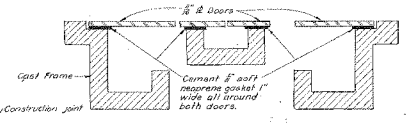












Notes: For location of Section D-D and F-F, see sheet
For items of work under Supplemental Work Contract, see notes, sheet 934-19.2/15
For location of Section D-D and F-F, see sheet 934-19.2/15

OHIO RIVER BASIN

FLOOD PROTECTION AT PADUCAH, KY.

SUPPLEMENTAL WORK

PUMPING PLANT NO. 4

MASONRY DETAILS

PLAN & SECTIONS

SHEET 16 OF 18 SHEETS SCALE: 1" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. DEC. 1950

SUBMITTED:

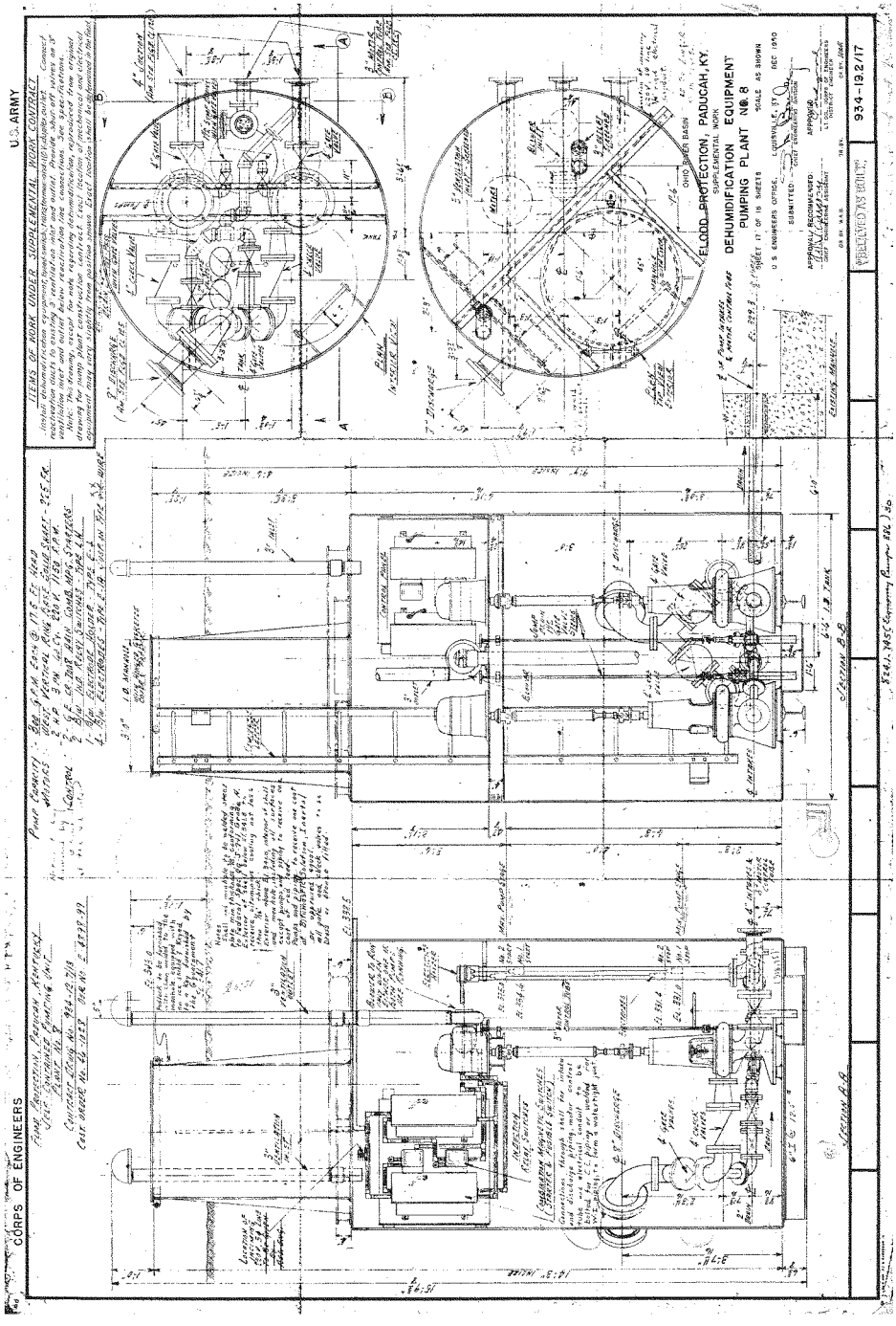
APPROVAL RECOMMENDED

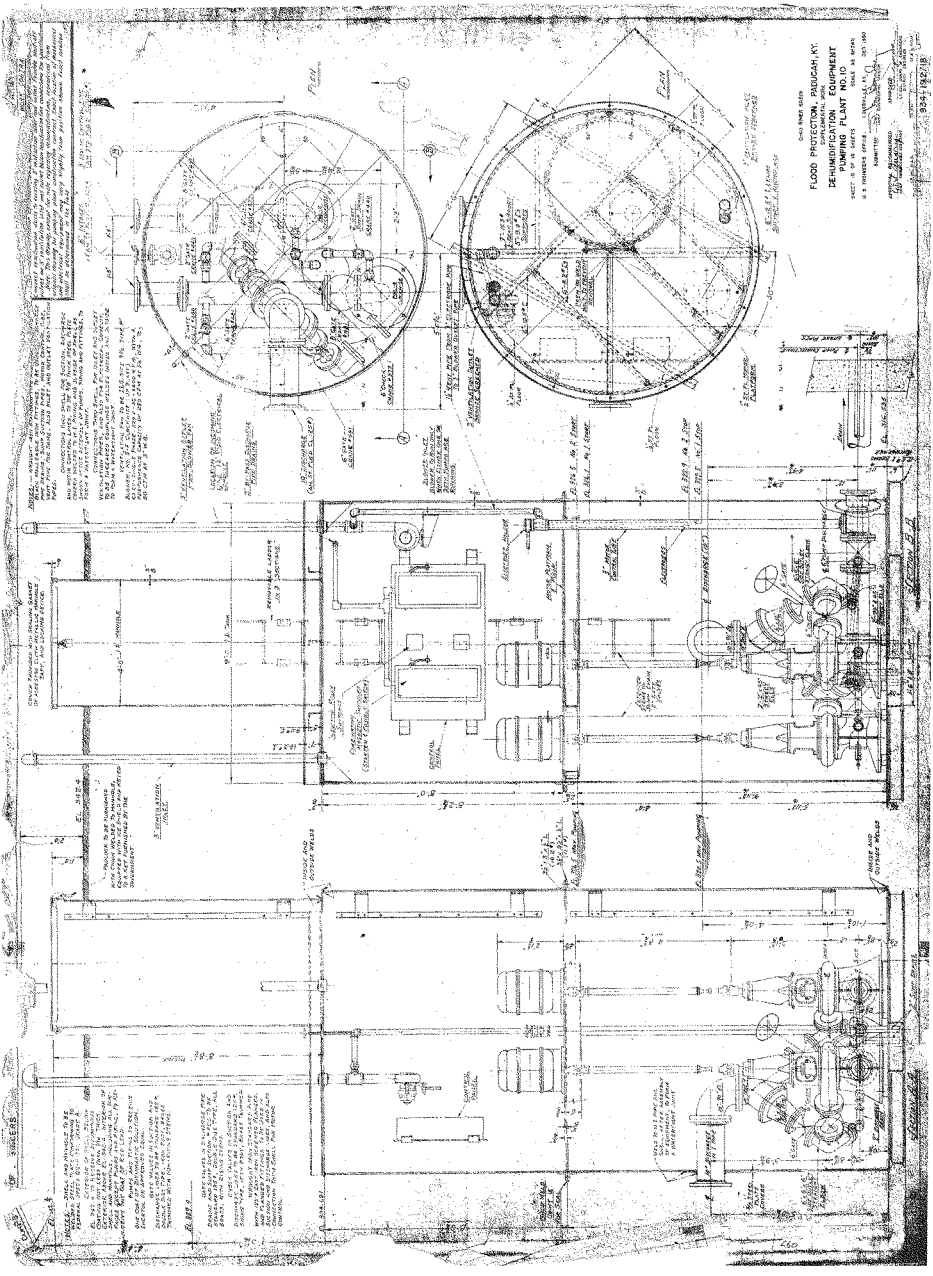
APPROVED

BY DATE CHARACTER REVISIONS

PRINTED AS BUILT 934-19.2/16 934-12.7/4

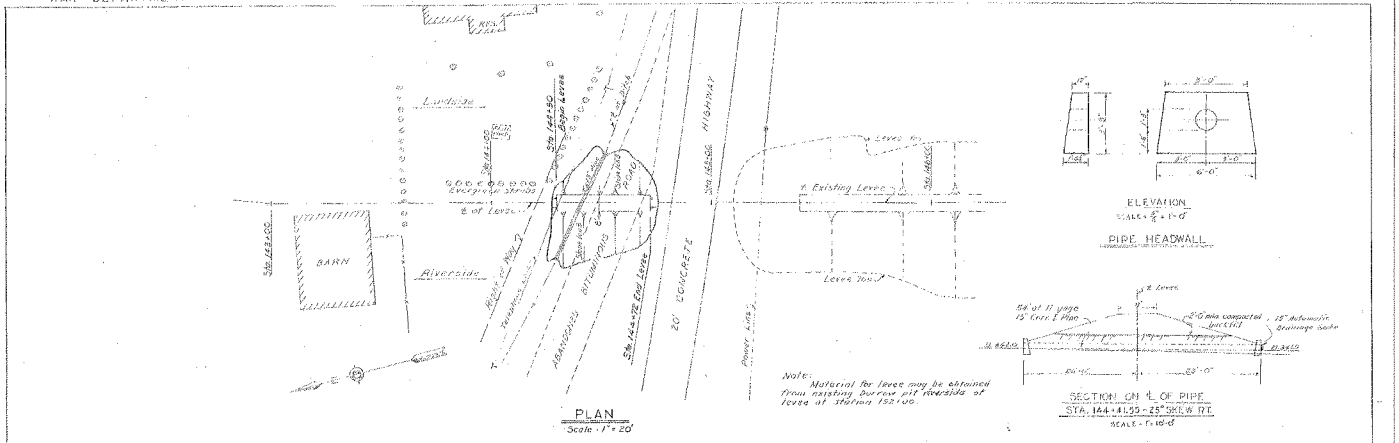
1156

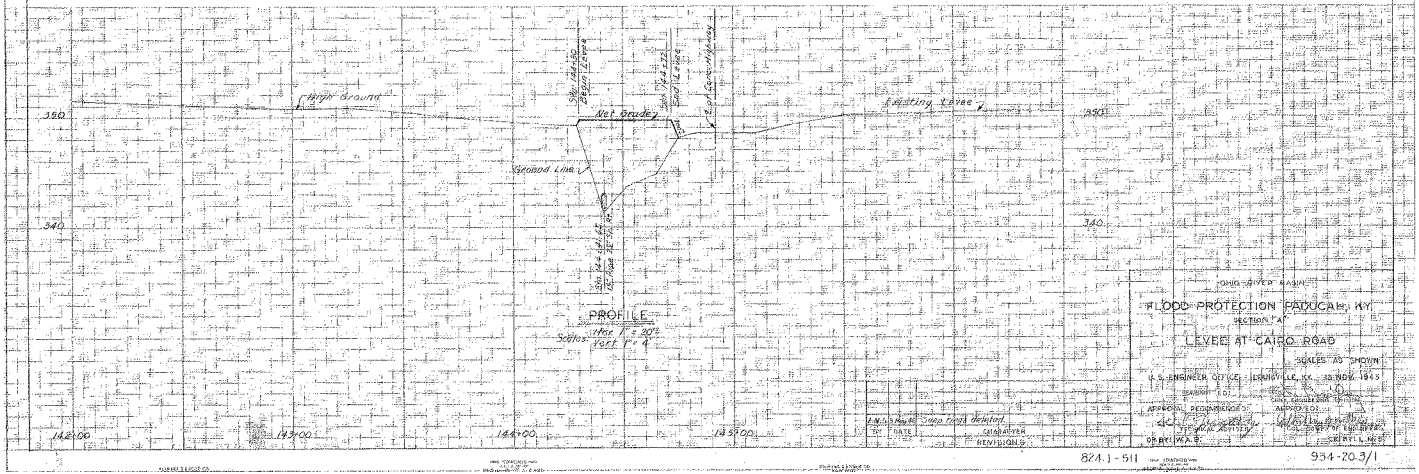

U.S. ARMY
CORPS OF ENGINEERS
ITEMS OF WORK UNDER SUPPLEMENTAL WORK CONTRACT
FLOOD PROTECTION, PADUCAH, KY.
SUPPLEMENTAL WORK
DEHUMIDIFICATION PUMPING EQUIPMENT PLANT NO. 8
SCALE AS SHOWN
934-19.2/17


FLOOD PROTECTION, PADUCAH, KY.
DEHUMIDIFICATION EQUIPMENT
PUMPING PLANT
934-1(82)18

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "A"

LEVEE AT CAIRO ROAD

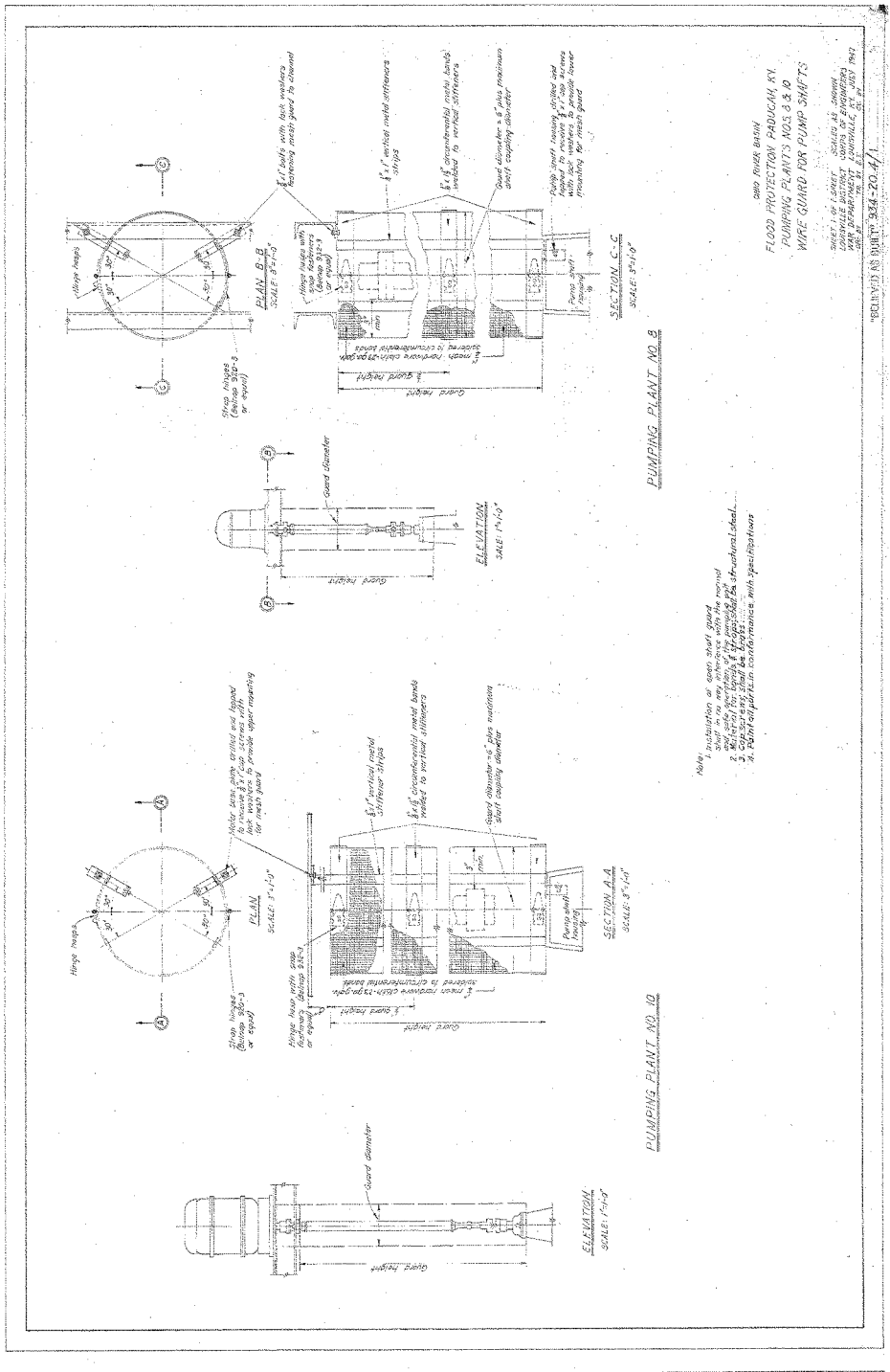
SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 30 NOV. 1945

824.1-511

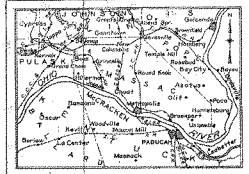
934-20.3/1

1159


OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
PUMPING PLANTS NOS. 8 & 10
WIRE GUARD FOR PUMP SHAFTS
SHEET 1 OF 1 SHEET SCALES AS SHOWN
LOUISVILLE DISTRICT CORPS OF ENGINEERS
WAR DEPARTMENT LOUISVILLE, KY. JULY 1942
APPROVED BY DIR. OF CIVIL WORKS
DRAWING NO. 8WR-354-20.4/1
PUMPING PLANT NO. 8
PUMPING PLANT NO. 10
PLAN
ELEVATION
SECTION A-A
SECTION C-C
PLAN B-B
Hinge loops
Strap hinges (Belmar 316-3 or equal)
Hinge leaves with loose pins (Belmar 312-3 or equal)
Hinge head with stop (Belmar 316-2 or equal)
Water pipe guide bracket and tapped to receive 3/4" eye bolt and lock washers to provide upper mounting for mesh guard
3/4" vertical metal stiffeners
3/16" circumferential metal bands welded to vertical stiffeners
Guard diameter = 6" plus maximum shaft coupling diameter
Pump shaft coupling
Guard height
Guard diameter
Hinge leaves
Strap hinges (Belmar 316-3 or equal)
Hinge head with stop (Belmar 316-2 or equal)
Pump shaft coupling
Note:
1. Installation of mesh shaft guard shall in no way interfere with the normal operation of the pump shaft.
2. Material for bands & stiffeners to be structural steel.
3. Construction shall be in accordance with specifications.
4. Paint in accordance with specifications.

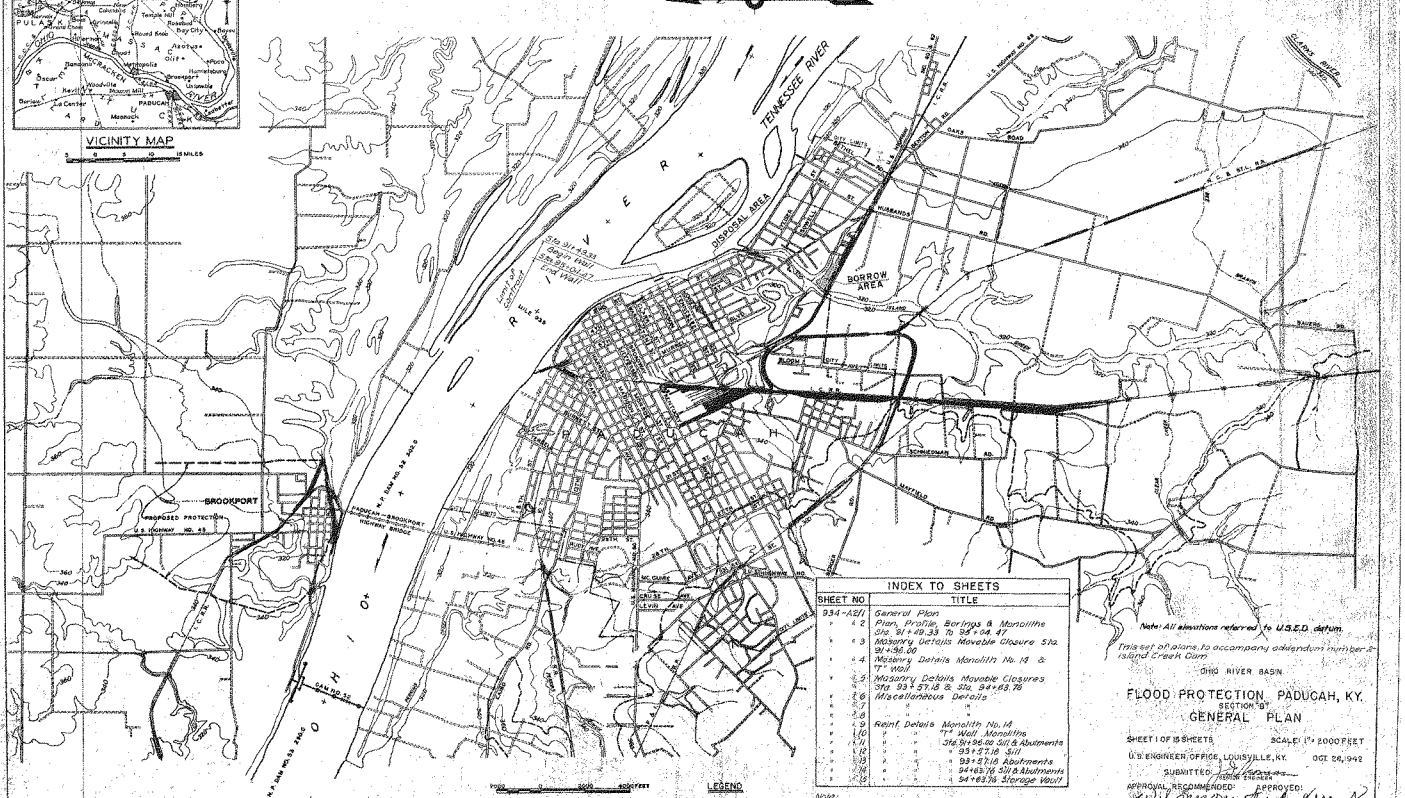
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



VICINITY MAP

5 0 5 10 15 MILES



INDEX TO SHEETS	
SHEET NO	TITLE
934-A2/1	General Plan
" 2	Plan, Profile, Borings & Monoliths Sta. 91+49.33 to 94+04.47
" 3	Masonry Details Movable Closure Sta. 91+96.00
" 4	Masonry Details Monolith No. 14 & "T" Wall
" 5	Masonry Details Movable Closures Sta. 93+57.18 & Sta. 94+63.76
" 6	Miscellaneous Details
" 7	" "
" 8	" "
" 9	Reinf. Details Monolith No. 14
" 10	" " "T" Wall Monolithe
" 11	" " Sta. 94+96.00 Sill & Abutments
" 12	" " " 93+27.18 Sill
" 13	" " " 93+27.18 Abutments
" 14	" " 94+63.76 Sill & Abutments
" 15	" " " 94+63.76 Storage Vault

Note: Sheets 934-A2/9 to 934-A2/15 inclusive will be furnished as supplementar sheets

Note: All elevations referred to U.S.E.D. datum.

This set of plans to accompany addendum number 2 Island Creek Dam

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
GENERAL PLAN

SHEET 1 OF 15 SHEETS SCALE: 1" = 2000 FEET

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT 26, 1942

SUBMITTED: (SIGNATURE AND TITLE OF ENGINEER)

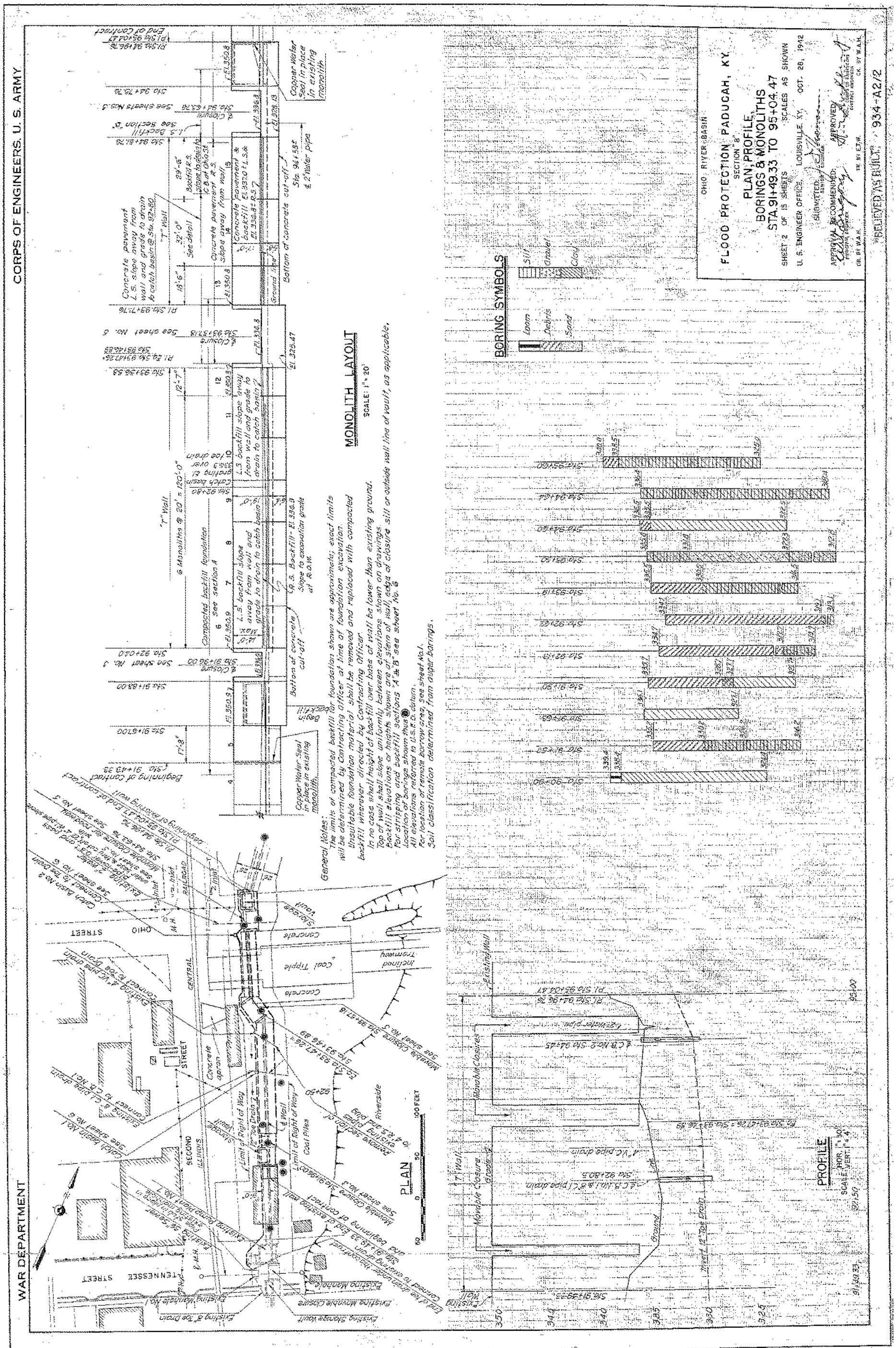
APPROVAL RECOMMENDED: APPROVED:

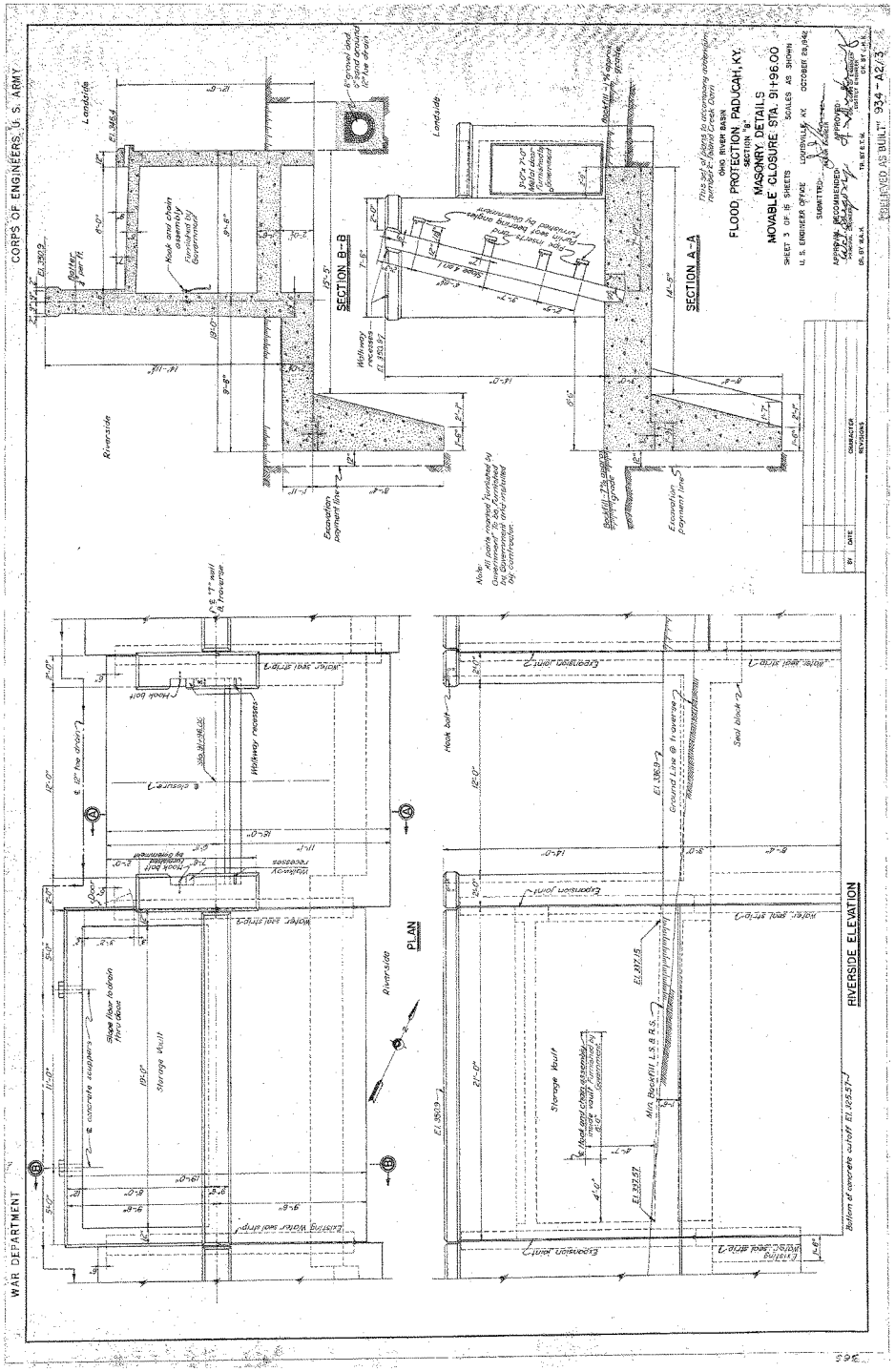
(SIGNATURE AND TITLE OF ENGINEER) (SIGNATURE AND TITLE OF ENGINEER)

DR. BY O.A.B. TR. BY E.P.S. CK. BY J.M.K.

934-A2/1

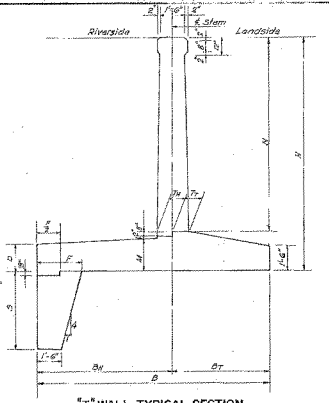
1161


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
PLAN, PROFILE, BORINGS & MONOLITHS
STA. 91+49.33 TO 95+04.47
SHEET 2 OF 15 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE KY. OCT. 28, 1942
MONOLITH LAYOUT
BORING SYMBOLS
PLAN
PROFILE
934-A2/2


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION, PADUCAH, KY.
OHIO RIVER BASIN
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURE STA. 91+96.00
SECTION B-B
SECTION A-A
PLAN
RIVERSIDE ELEVATION
Riverside
Landside
Storage Vault
Sump
Hook bolt
Weepholes
Expansion joint
Construction joint
Seal block
Existing Water Stop
Bottom of concrete cutoff EL 325.57
REVISED AS BUILT 9-24-43 A2/3

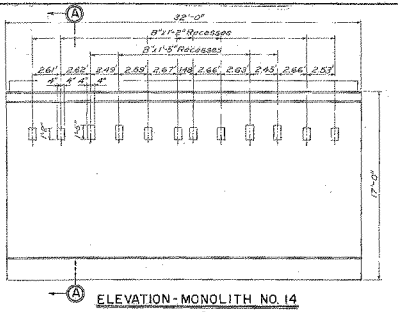
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



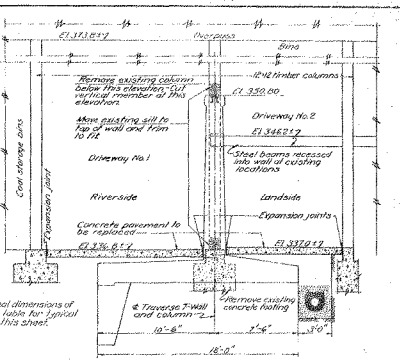
"T" WALL TYPICAL SECTION

NO SCALE



ELEVATION - MONOLITH NO. 14

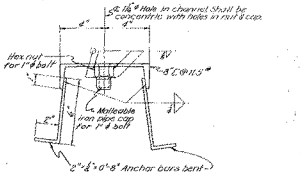
SCALE: $\frac{1}{4}$" = 1'-0"



SECTION A-A

SCALE: $\frac{1}{4}$" = 1'-0"

Note: For additional dimensions of 17'-0" T-Wall see table for typical wall section on this sheet.



DETAIL "B"

SCALE: 3" = 1'-0"

DIMENSIONS FOR MASONRY DETAILS									
With concrete total H L = 20'-0" except as noted	H	B	Bh	Bt	N	M	Th-Tr	D	F	S
5-11.5 incl, 13-18'-6", 15-19'-6"	17'-0"	18'-0"	10'-6"	7'-6"	14'-6"	3'-0"	12"	1'-11"	2'-11"	0'-0"
6-11 incl, 12-12'-7" long	13'-0"	20'-0"	11'-8"	8'-4"	16'-6"	2'-9"	12"	2'-1"	3'-1"	1'-4"

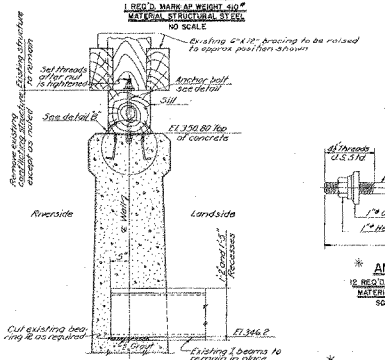
L = Length of monolith

* ANCHOR PLATE

1 REQ'D. MARK AP WEIGHT 410#

MATERIAL STRUCTURAL STEEL

NO SCALE

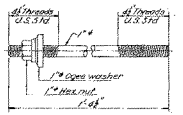


SECTION THRU WALL

SHOWING SILL ANCHORAGE AND BEAM RECESSES

REINFORCING BARS NOT SHOWN

SCALE: 1" = 1'-0"



* ANCHOR BOLT

12 REQ'D. MARK AB-1 WT. 6.65# EACH

MATERIAL STRUCTURAL STEEL

SCALE: 3" = 1'-0"

* To be furnished by Government and installed by contractor.

This set of plans to accompany addendum number 2 - Island Creek Dam

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY DETAILS

MONOLITH NO. 14 & "T" WALL

SHEET 4 OF 15 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE LOUISVILLE, KY. OCT. 28, 1942

SUBMITTED: [signature] MINOR ENGINEER

APPROVAL RECOMMENDED: [signature] ASSISTANT ENGINEER

APPROVED: [signature] CHIEF, CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY K.H.A TR. BY C.V. CK. BY JHR

"RELIEVED AS BUILT"

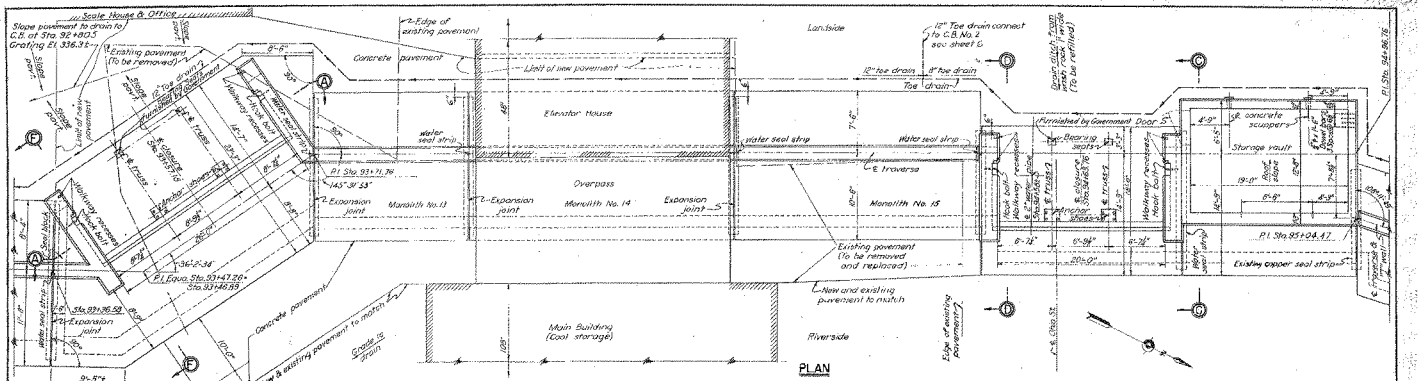
934-A2/4

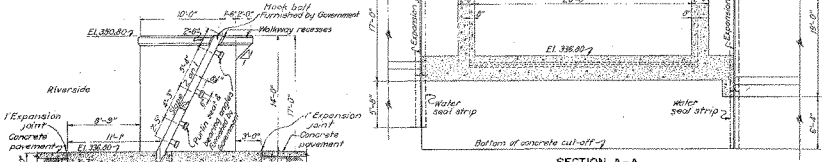
BY	DATE	CHARACTER
		REVISIONS

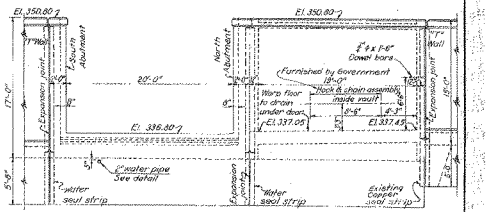
1164

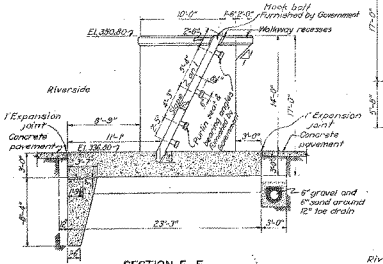
WAR DEPARTMENT

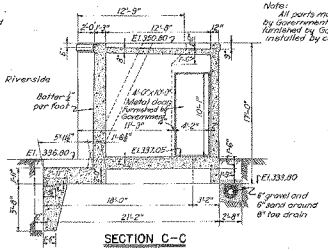
CORPS OF ENGINEERS, U. S. ARMY

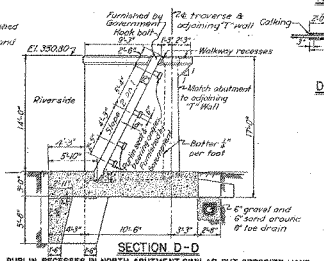


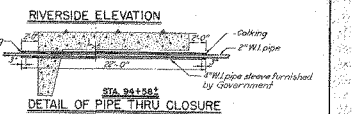












This set of plans to accompany addendum number 2 - Island Creek Dam

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY DETAILS

MOVABLE CLOSURES STA. 93+57.18 & STA. 94+63.76

SHEET 5 OF 15 SHEETS SCALE: 3/8" = 1'-0"

U. S. ENGINEER OFFICE LOUISVILLE, KY. OCT. 28, 1942

SUBMITTED: DIVISION ENGINEER

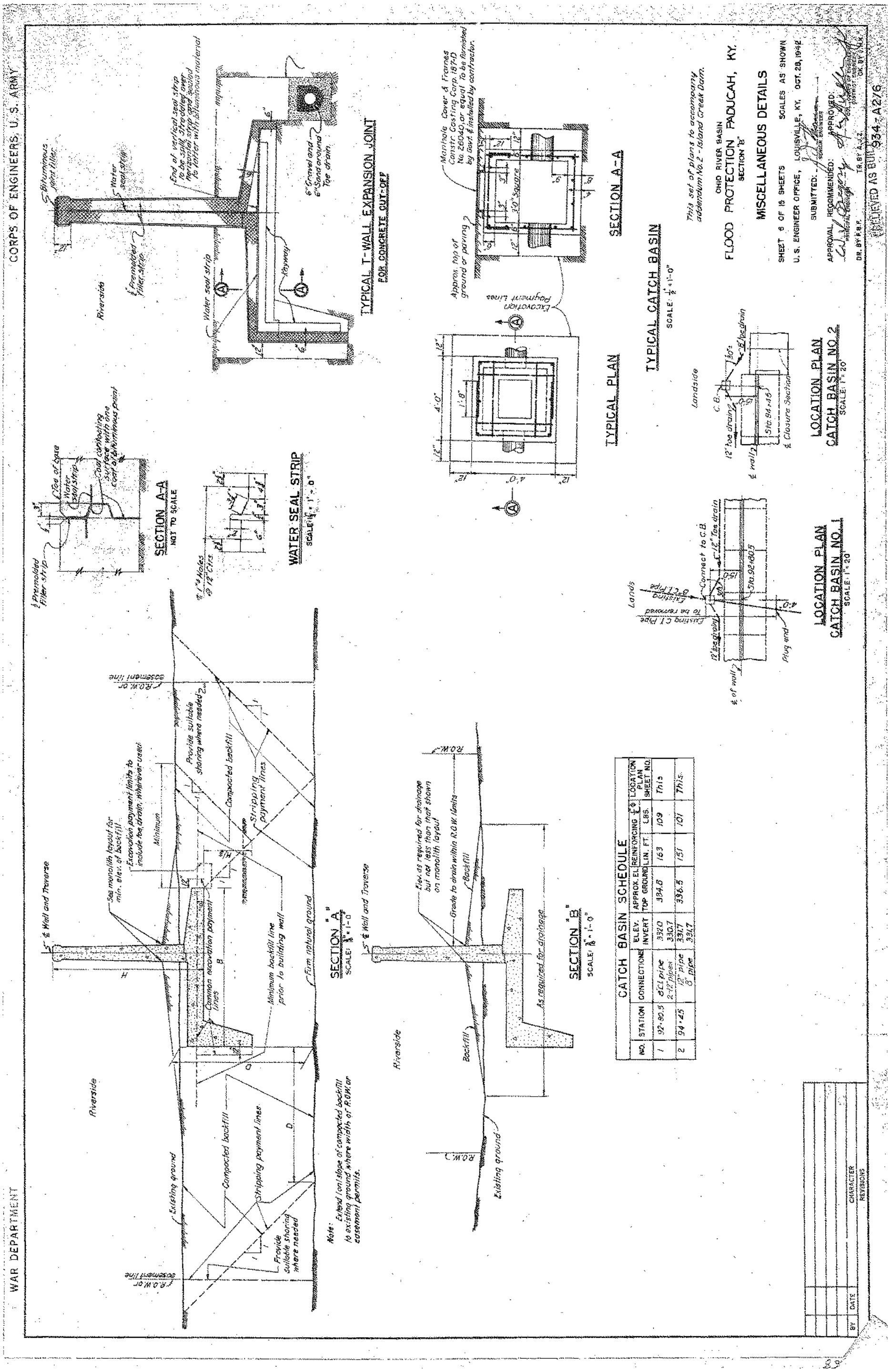
APPROVED: RECOMMENDED: DISTRICT ENGINEER

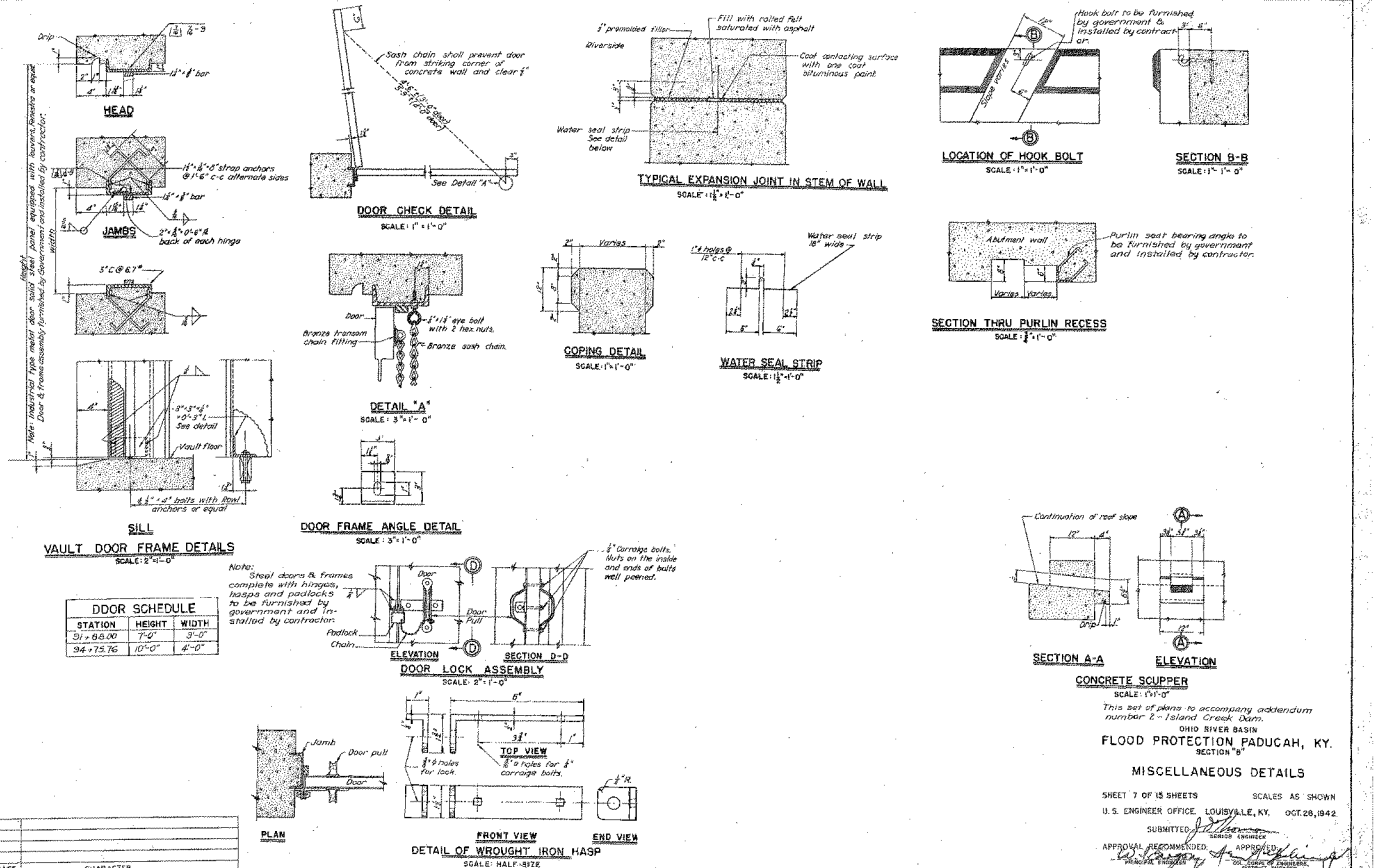
DR. BY E.H.S. TR. BY E.T.W. CHIEF, ENGINEERING DIVISION, CORPS OF ENGINEERS, U.S. ARMY DISTRICT ENGINEER BY J.M.K.

BY	DATE	CHARACTER OF REVISIONS

"BELIEVED AS BUILT" 354-A2/5

1165


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
TYPICAL T-WALL EXPANSION JOINT
FOR CONCRETE CUT-OFF
SECTION A-A
NOT TO SCALE
WATER SEAL STRIP
TYPICAL PLAN
SECTION A-A
TYPICAL CATCH BASIN
SECTION "A"
SECTION "B"
CATCH BASIN SCHEDULE
LOCATION PLAN
CATCH BASIN NO. 1
LOCATION PLAN
CATCH BASIN NO. 2
This set of plans to accompany addendum No. 2 - Island Creek Dam.
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MISCELLANEOUS DETAILS
SHEET 6 OF 15 SHEETS SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1942
934-A2/6



This set of plans to accompany addendum number 2 - Island Creek Dam.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MISCELLANEOUS DETAILS

SHEET 7 OF 15 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1942.

SUBMITTED: SENIOR ENGINEER

APPROVAL RECOMMENDED: APPROVED:

DIVISION ENGINEER DISTRICT ENGINEER

DR. BY W. K. S. TR. BY C.R.G. CK. BY J.H.K.

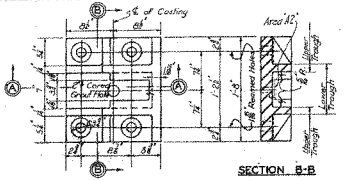
BY | DATE | CHARACTER OF REVISIONS

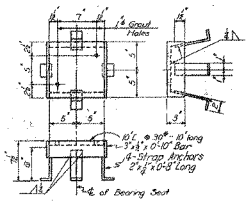
"REVISED AS BUILT" 934-A2/7

11167

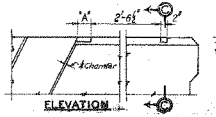
WAR DEPARTMENT

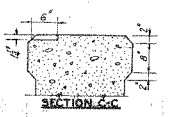
CORPS OF ENGINEERS, U.S. ARMY



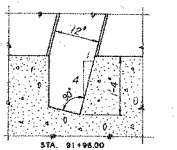


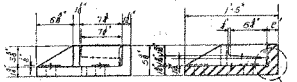
EMBEDDED BEARING SEAT
SCALE 1½" = 1'-0"





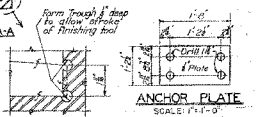
WALKWAY RECESS DIMENSIONS	
STATION	"A"
91+96.00	6"
93+57.18	3½"
94+63.76	3½"



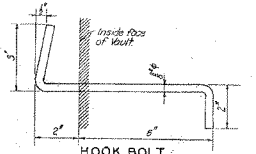


ANCHOR SHOE
SCALE 1½"=1'-0"

Note: Anchor shoes & truss shoes not included in this contract. Details are shown only for locating anchor bolts.

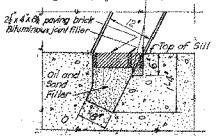


Note: Embedded Bearing Seats & Anchor Plates to be furnished by government & installed by contractor.



Note: These points shall not extend Riverside of a plane through landside edge of sheeting recess.

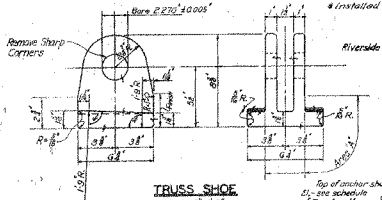
DETAIL OF SHEETING RECESS
SCALE: 1"= 1'-0"

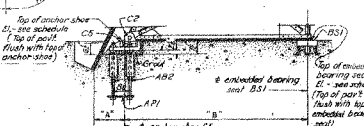


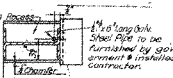
ANCHORAGE SCHEDULE				
STATION	NUMBER BOLTS	A	B	ELEV TOP OF E.B. SEAT & TOP OF ANCHOR PLATE
93+57.18	2	1'-4½"	6'-3"	936.80
94+63.76	2	1'-4½"	6'-3"	936.80

DETAIL OF SHEETING RECESS AND SEAL TRENCH FILLER
SCALE: 1"=1'-0"
STA. 93+57.18 & 94+63.76

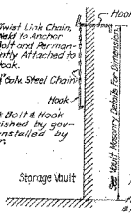
CHAIN SCHEDULE			
STATION	NO. REQ'D	LENGTH	APPROX. WT.-LBS.
91+67.00	2	1'-8"	62
94+76.76	2	6'-0"	246







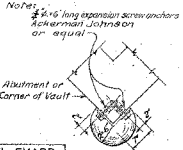
DETAIL OF PIPE INSERT
MARK P1 8 REQ'D. WT. 9.45 EACH
MATERIAL - GALVANIZED STEEL
SCALE: 1½"= 1'-0"

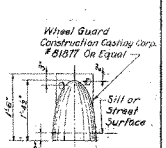


Note: Chain, Hook Bolt & Hook to be furnished by government & installed by contractor.

SHEETING CHAIN ASSEMBLY
SCALE: ¾"= 1'-0"

Note: Wheelguard to be furnished by government & installed by Contractor. Anchor bolts to be furnished and installed by contractor.





WHEEL GUARD SCHEDULE	
STATION	NO. REQ'D
91+96.00	4
93+57.18	4
94+63.76	4

WHEEL GUARD DETAILS
SCALE: 1" = 1'-0"

Note: This set of plans to accompany addendum number 2, Island Creek Dam.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"

MISCELLANEOUS DETAILS

SHEET 8 OF 5 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. OCT. 28, 1942

SUBMITTED _____ DIVISION ENGINEER

APPROVAL RECOMMENDED: _____ PRINCIPAL ENGINEER

APPROVED: _____ CHIEF OF ENGINEERS DISTRICT ENGINEER

DR. BY W.L.B. TR. BY H.W.S. CK. BY J.H.K.

BY	DATE	CHARACTER REVISIONS

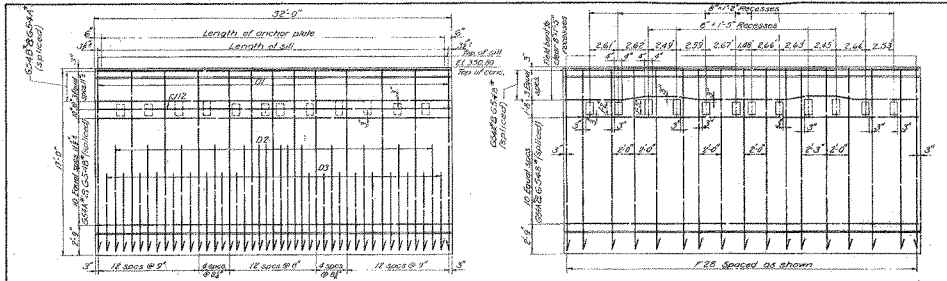
"BELIEVED AS BUILT" 934-A2/8

1168

378

WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY

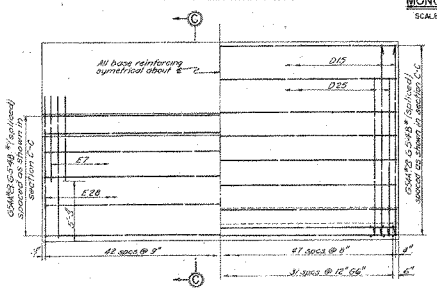


RIVERSIDE STEM REINFORCING

MONOLITH NO. 14

SCALE: 1/4" = 1'-0"

LANDSIDE STEM REINFORCING

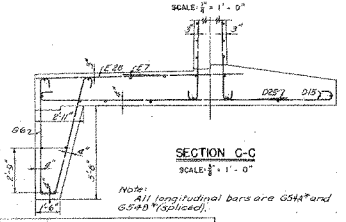


TOP REINFORCING

PLAN

BOTTOM REINFORCING

SCALE: 1/8" = 1'-0"



SECTION C-C

SCALE: 1/8" = 1'-0"

Note:
All longitudinal bars are G54A" and G54B"(spliced).

Notes:
For masonry details see sheet 4 Addendum No.2
N = Bars to be furnished by government and installed by contractor.

BY	DATE	CHARACTER OF REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "A"

REINFORCING DETAILS

MONOLITH NO.14

SHEET 9 OF 15 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE LOUISVILLE, KY. NOV. 1942

SUBMITTED: [signature]

APPROVAL RECOMMENDED: [signature] PASTRY ENGR.

APPROVED: [signature] CH. CORPS OF ENGINEERS, DISTRICT ENGINEER

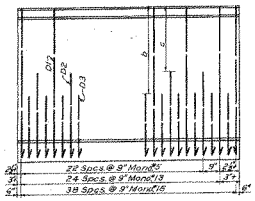
DR. BY K.H.A. TR. BY A.J.Z. CK. BY J.H.K.

"RETRIEVED AS BUILT" 934-A2/9

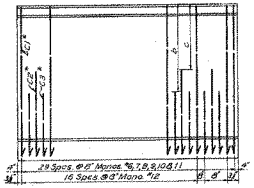
1169

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



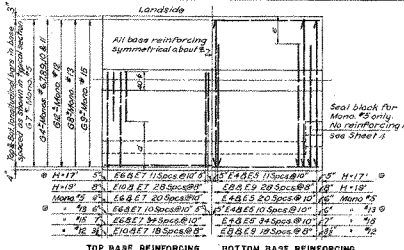
H=17'



H=19'

RIVERSIDE STEM REINFORCING

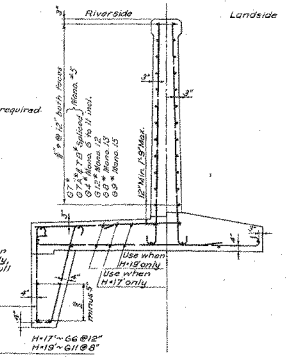
NO SCALE



H=17' & H=19'

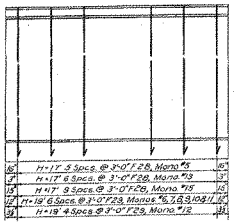
NO SCALE

* Number of spaces given for half monolith only, all others given for full monolith length.



"T" WALL TYPICAL SECTION

NO SCALE

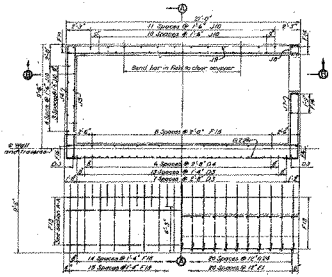


H=17 & H=19'

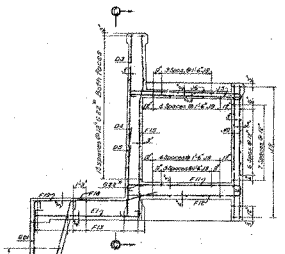
LANDSIDE STEM REINFORCING

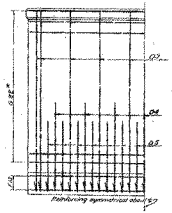
NO SCALE

REINFORCING STEEL CUT-OFF DIMENSIONS				
H	a	b	d	e
17'	9'6"	7'0"	6'9"	3'-4"
19'	11'2"	8'-4"	6'9"	2'10"

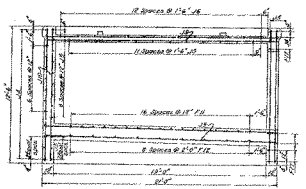


PLAN





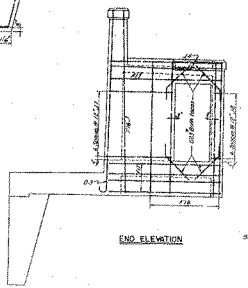
HALF SECTION C-C



STORAGE VAULT

ST. 91+96.00

SCALE: 1/4"=1'-0"



Notes:
For masonry details see sheets 3 & 4, Addendum No. 2
* Bars to be furnished by Government and installed by contractor.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS

"T" WALL MONOLITHS

SHEET 10 OF 15 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE. LOUISVILLE, KY. NOV. 1942

SUBMITTED:

APPROVAL RECOMMENDED: APPROVED:

DIVISION ENGINEER

DIVISION ENGINEER

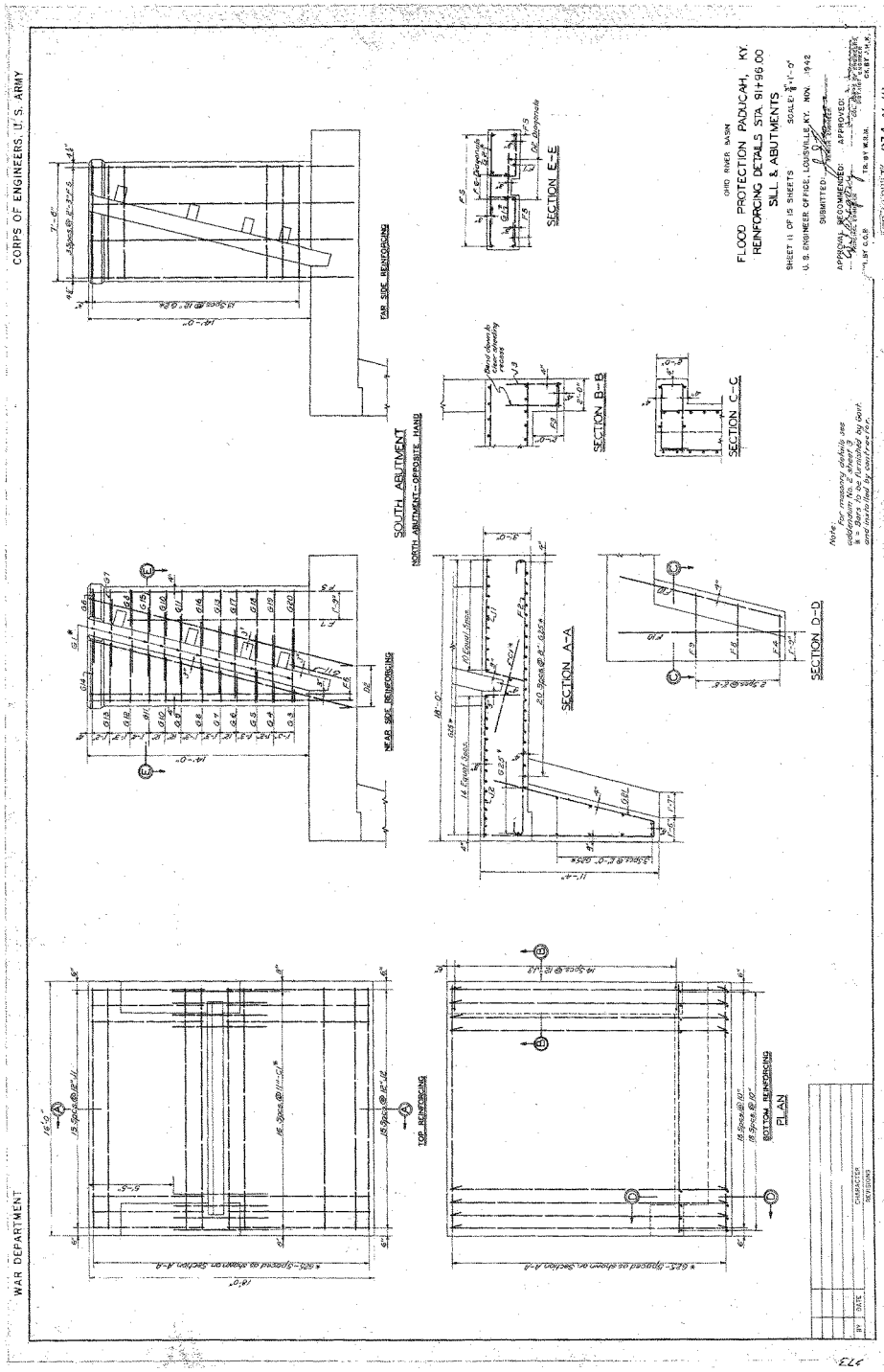
COL. CORPS OF ENGINEERS DISTRICT ENGINEER

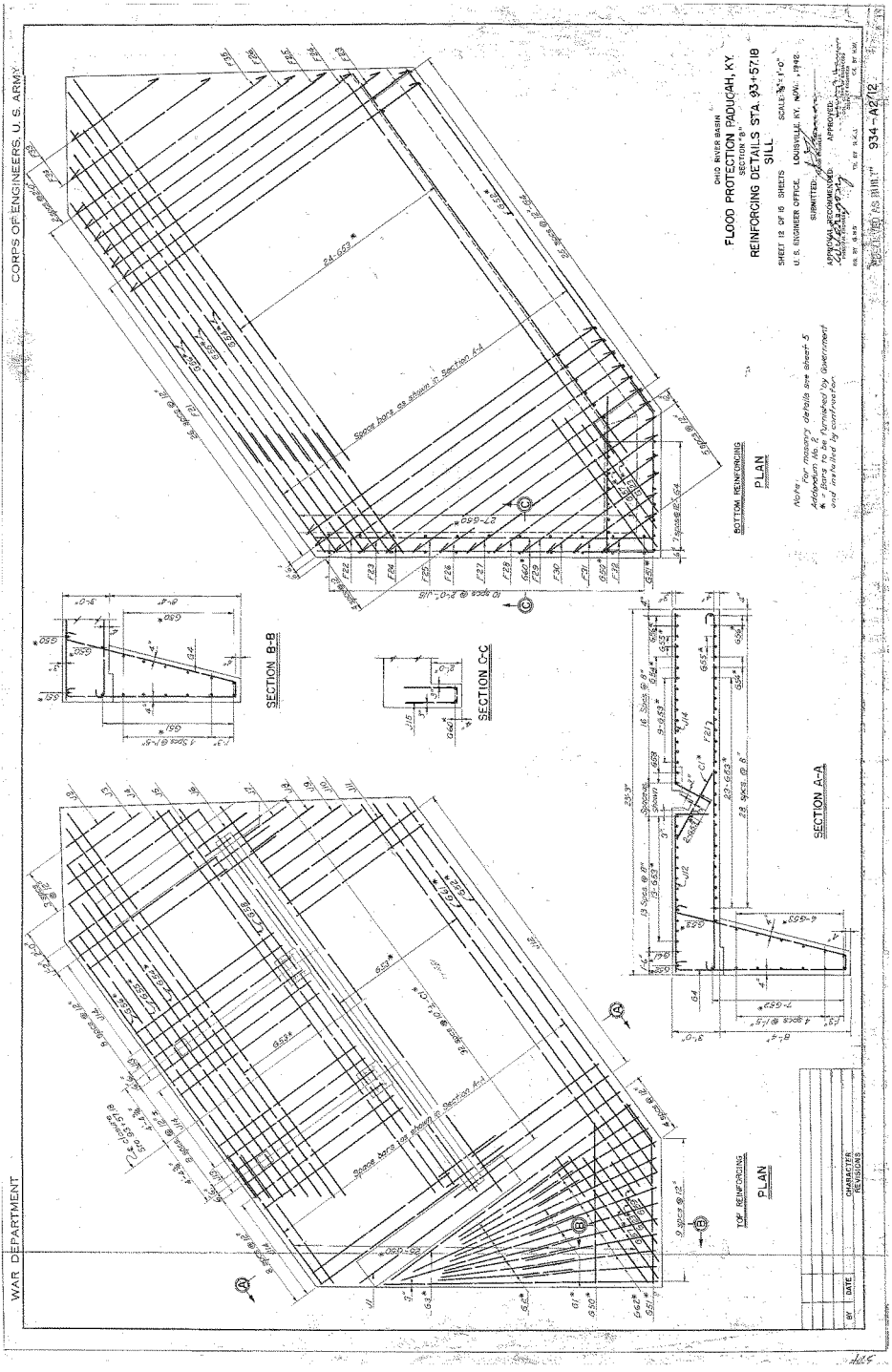
DR. BY K.H.A. TR. BY E.F.S. CK. BY J.H.K.

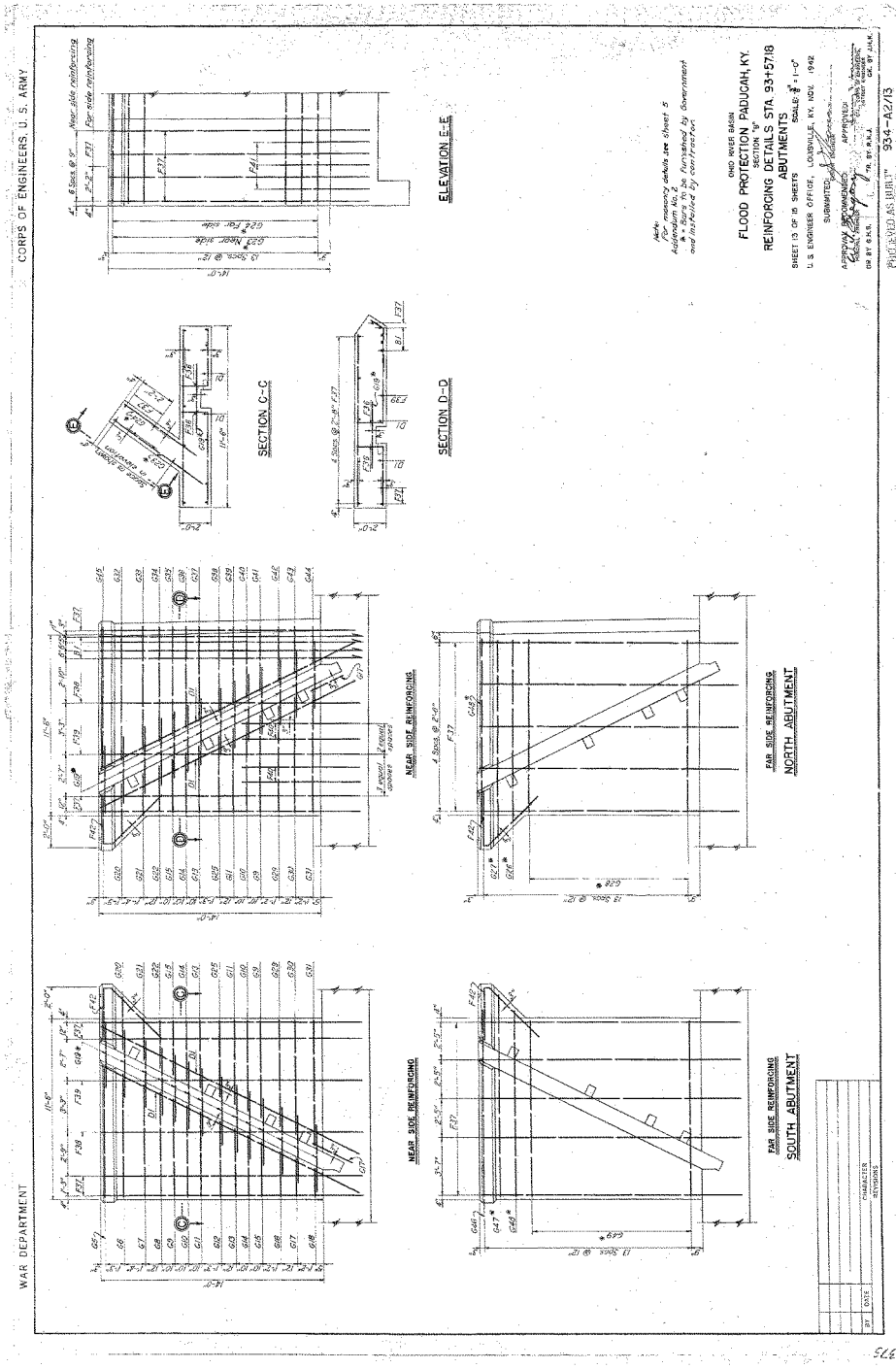
"BELIEVED AS BUILT" 934-A2/10

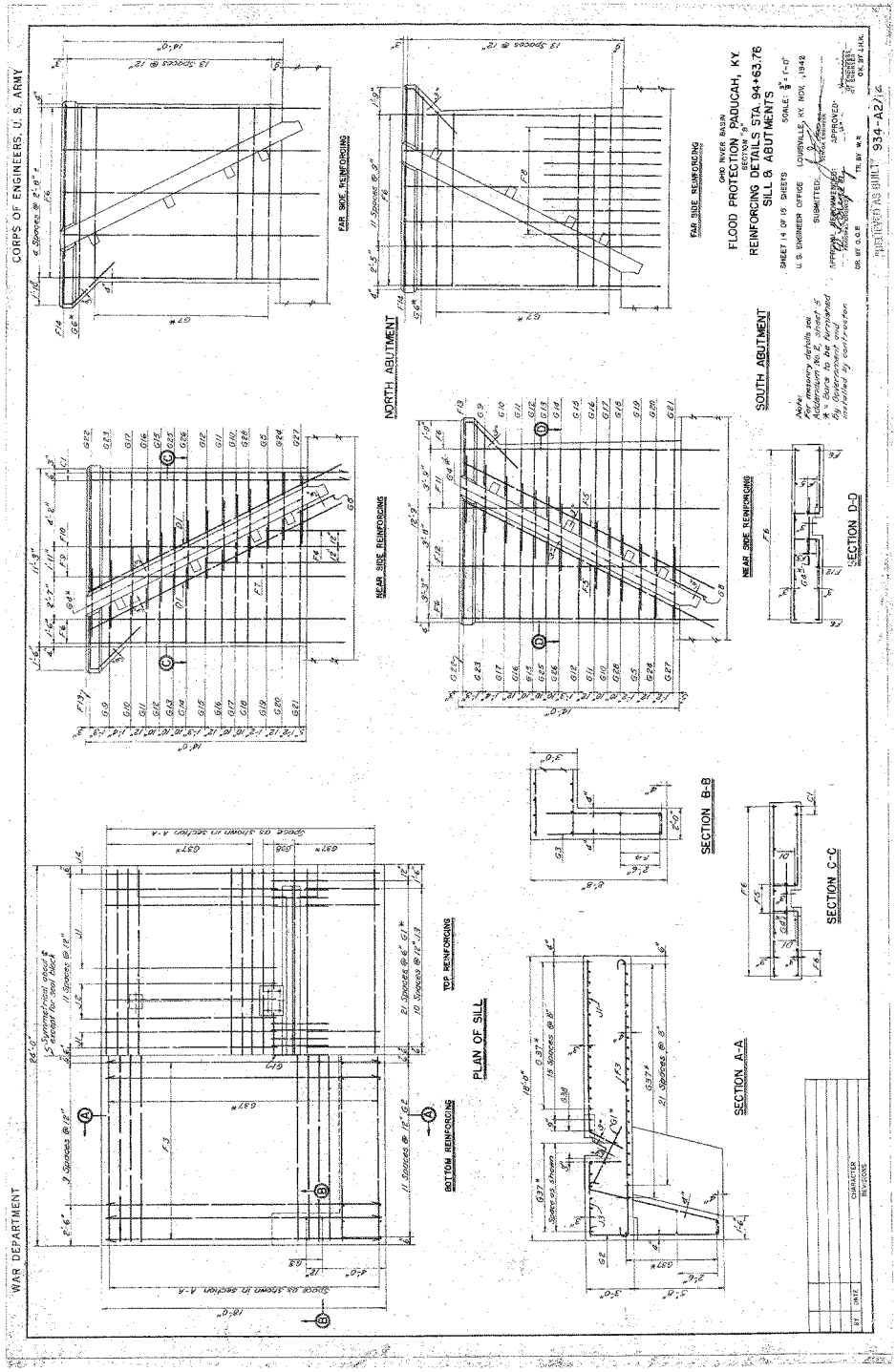
1170

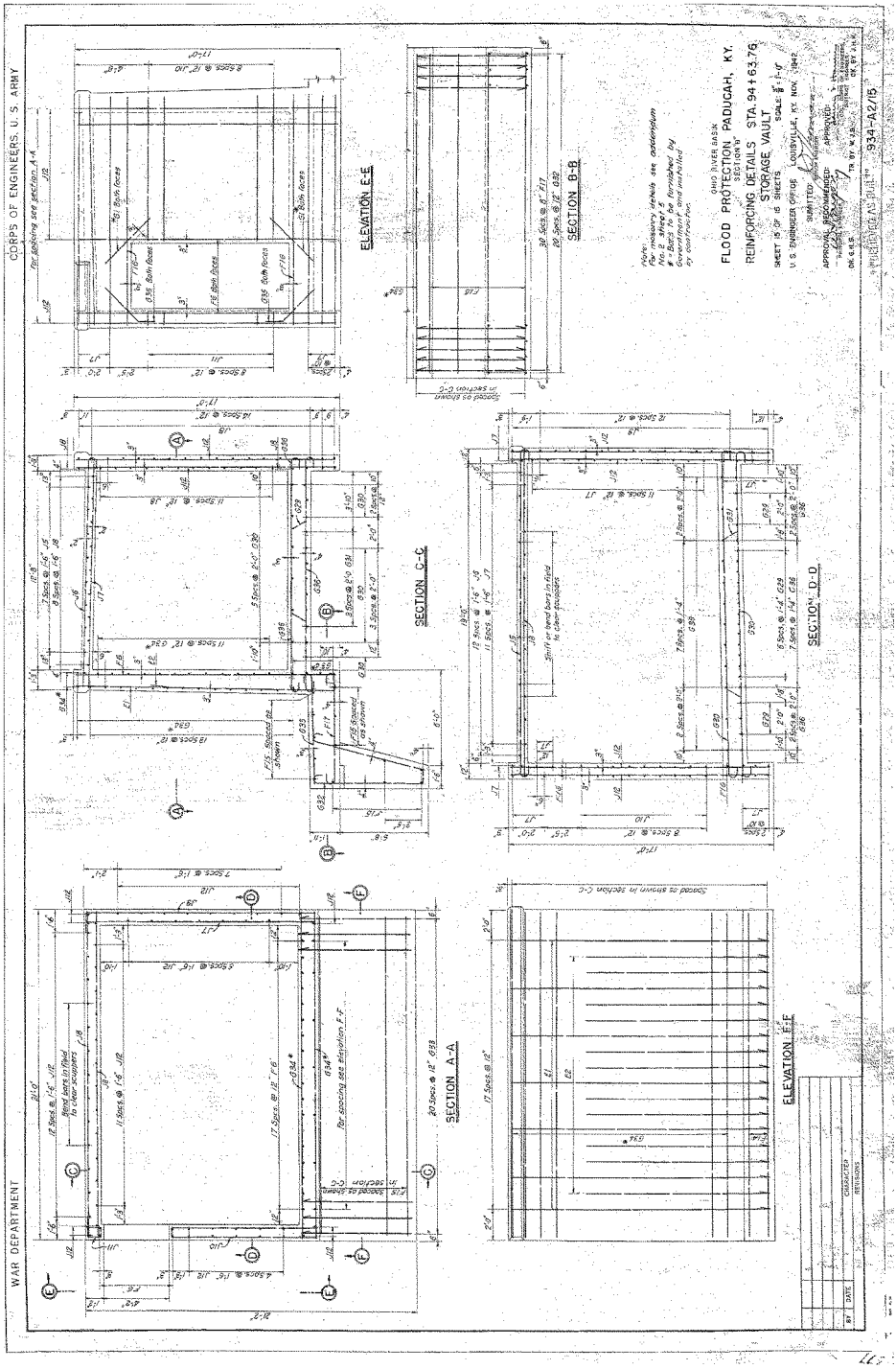
372


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS STA. 91+96.00
SILL & ABUTMENTS
SHEET 11 OF 15 SHEETS
SCALE: 1/4"=1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1942
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
CHIEF OF ENGINEERS
BY DIRECTION OF THE SECRETARY OF WAR
DATE
CHARACTER
REVISIONS
BY
SOUTH ABUTMENT
NORTH ABUTMENT—OPPOSITE HAND
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
TOP REINFORCING
BOTTOM REINFORCING
PLAN
Note
For masonry details see
addendum No. 2 sheet 3
= Bars to be furnished by Govt.
and installed by contractor.
AS BUILT
934-A-L/11


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 93+57.18
SILL
SHEET 12 OF 16 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1942.
SCALE: 3/4" = 1'-0"
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
934-A2(12)
BOTTOM REINFORCING PLAN
TOP REINFORCING PLAN
SECTION A-A
SECTION B-B
SECTION C-C
Note: For masonry details see sheet 5
Addendum No. 2
* Bars to be furnished by Government and installed by contractor.
BY
DATE
CHARACTER REVISIONS

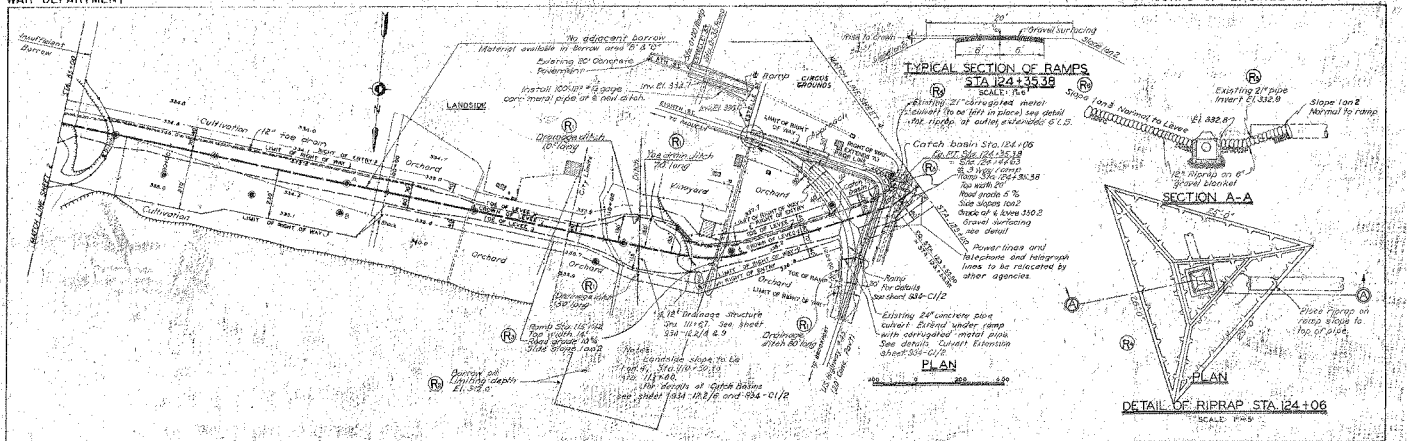

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION - PADUCAH, KY.
REINFORCING DETAILS STA. 93+57/8
ABUTMENTS
SHEET 13 OF 19 SHEETS
SCALE: 3/4" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. NOV. 1942
SUBMITTED
APPROVED
RECOMMENDED
DR. BY E.N.R.
CH. BY E.N.R.
DE. BY J.A.M.
REVISIONS
BY
DATE
CHARACTER OF REVISIONS
PUBLISHED AS BUILT
934-A2/13
SECTION C-C
SECTION D-D
ELEVATION E-E
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
SOUTH ABUTMENT
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
NORTH ABUTMENT
Near side reinforcing
Far side reinforcing
15 Spcs @ 12"
Adjustments details see Sheet 5
* Bars to be furnished by Government and installed by contractor
Expansion joint
1" preformed expansion joint filler
4 Spcs @ 2'-0" = 8'-0"
15 Spcs @ 12"

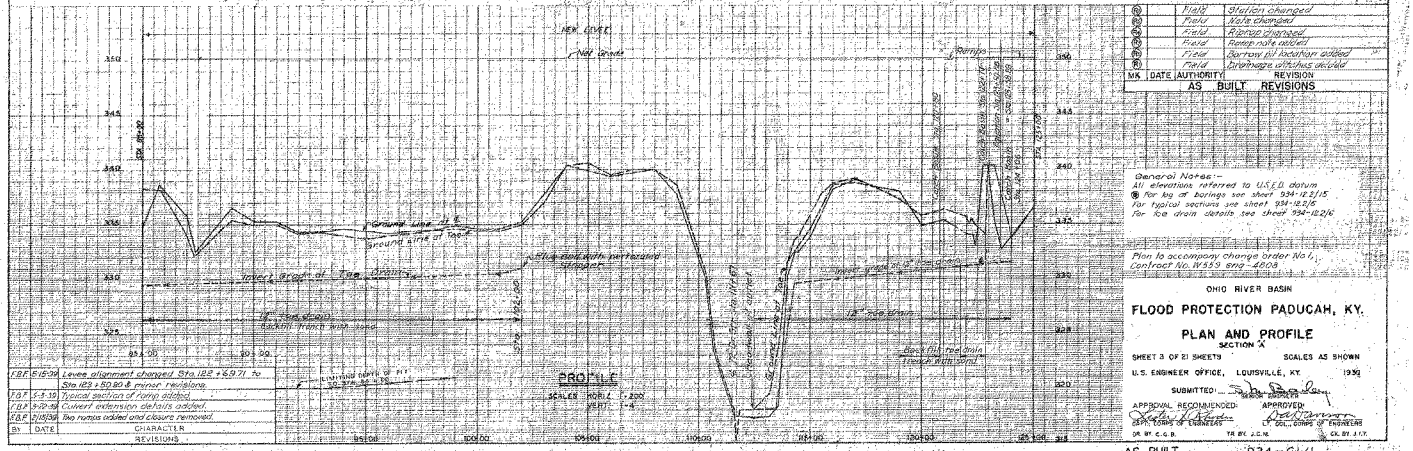

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "A"
REINFORCING DETAILS STA. 94+63.76
SILL & ABUTMENTS
SHEET 14 OF 15 SHEETS
SCALE: 3/8" = 1'-0"
U. S. ENGINEER OFFICE LOUISVILLE, KY. NOV., 1942
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
DIV. ENGR.
DIVISION ENGINEER
OR BY O.C.E.
CHIEF OF ENGINEERS
TRACED BY
CHECKED BY
PREPARED AS BUILT
934-A2/12
NORTH ABUTMENT
SOUTH ABUTMENT
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
SECTION D-D
SECTION B-B
SECTION C-C
SECTION A-A
PLAN OF SILL
TOP REINFORCING
BOTTOM REINFORCING
Note:
For necessary details see Addendum No. 2, sheet 5
* = Bars to be furnished by Government and placed by contractor
CHARACTER REVISIONS
BY
DATE


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION No
REINFORCING DETAILS STA. 94+63.76
STORAGE VAULT
SHEET 15 OF 16 SHEETS
SCALE 1/2"=1'-0"
U.S. ENGINEER OFFICE LOUISVILLE, KY. NOV. 1942.
SUBMITTED
APPROVED RECOMMENDED
APPROVED
934-A2/15
ELEVATION E-E
SECTION B-B
SECTION C-C
SECTION D-D
SECTION A-A
ELEVATION F-F
CHARACTER
REVISIONS
BY
DATE

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





F.B.F.	5-15-39	Levee alignment changed Sta 122+69.71 to Sta 123+50.82 & minor revisions	
F.B.F.	5-3-39	Typical section of ramp altered	
F.B.F.	9-21-38	Culvert extension details added	
F.B.F.	7-15-39	Two ramps added and closure removed	
BY	DATE	CHARACTER OF REVISIONS	

⑥		Plate	Station changed
⑤		Field	Axis changed
④		Field	Riprap changed
③		Field	Ramp note added
②		Field	Borrow pit location added
①		Field	Drainage structure deleted
NO.	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

General Notes:
All elevations referred to U.S.E.D. datum
For log of borings see sheet 934-12.1/5
For typical sections see sheet 934-12.1/6
For ice drain details see sheet 934-12.2/6

Plan to accompany change order No 1, Contract No. W559 eng-4808

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

PLAN AND PROFILE SECTION X

SHEET 3 OF 21 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. 1939

SUBMITTED: [signature] DISTRICT ENGINEER

APPROVAL RECOMMENDED: [signature] CAPT. CORPS OF ENGINEERS DR. BY C. G. B.

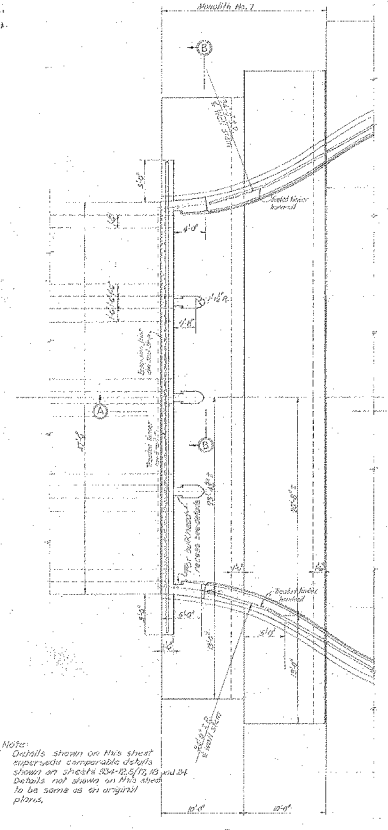
APPROVED: [signature] LT. COL., CORPS OF ENGINEERS TR. BY J. C. H. CK. BY J. F. Y.

AS BUILT 934-C1/1

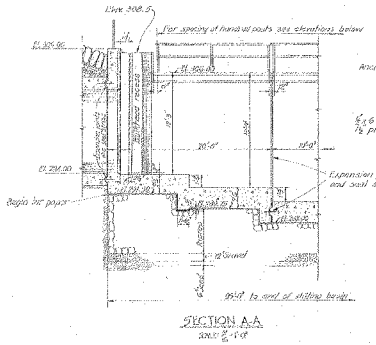
1176

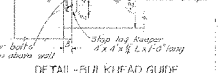
WAR DEPARTMENT

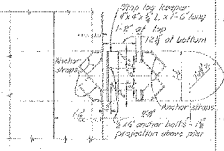
CORPS OF ENGINEERS U.S. ARMY

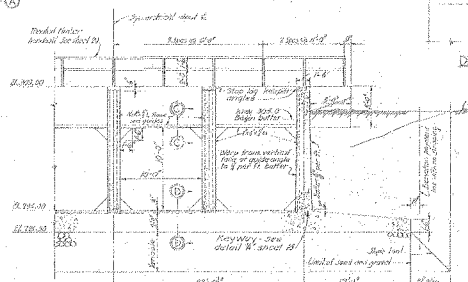


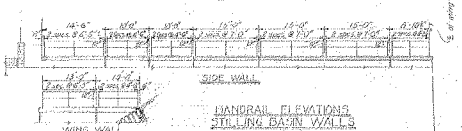
Note:
Details shown on this sheet supersede comparable details shown on sheets 804-B-5/75, 13 and 14. Details not shown on this sheet to be same as on original plans.

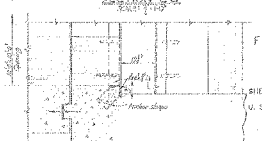


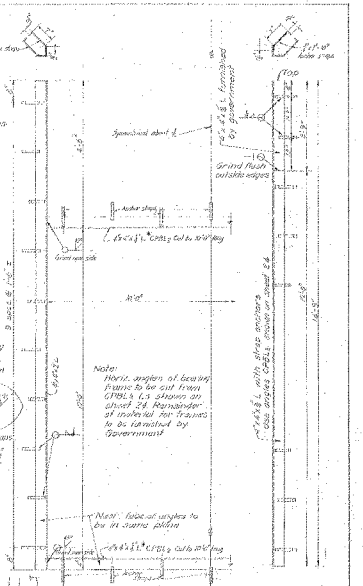












BEARING FRAME	GUIDE ANGLE
MARK 4	MARK B
WT. EACH	WT. EACH
MATERIAL - STRUCT. STEEL	

BULKHEAD GUIDE ANGLES
SCALE 1"=1'-0"

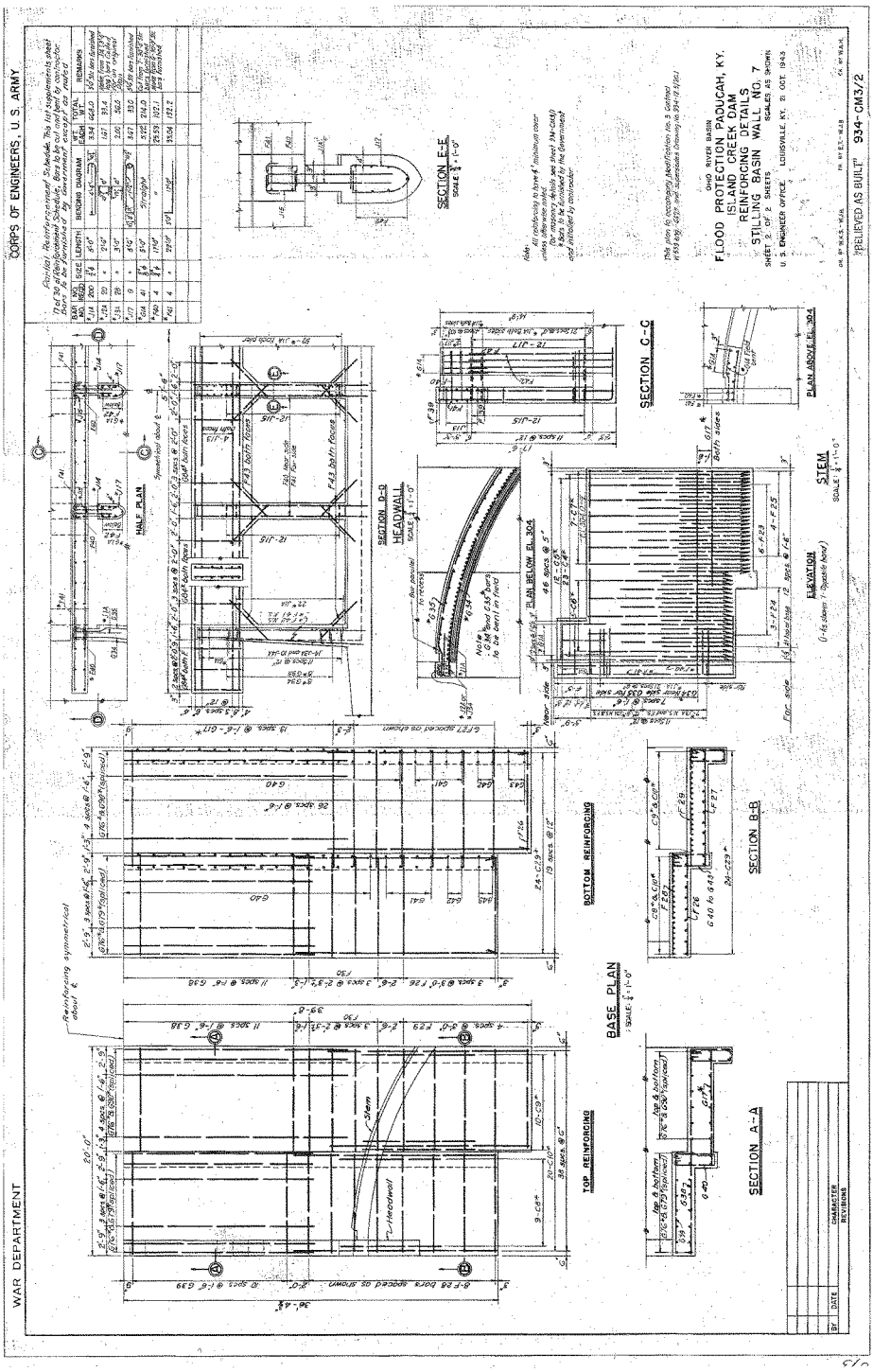
This plan to accompany Modification No. 3 Contract W 939 eng-6625

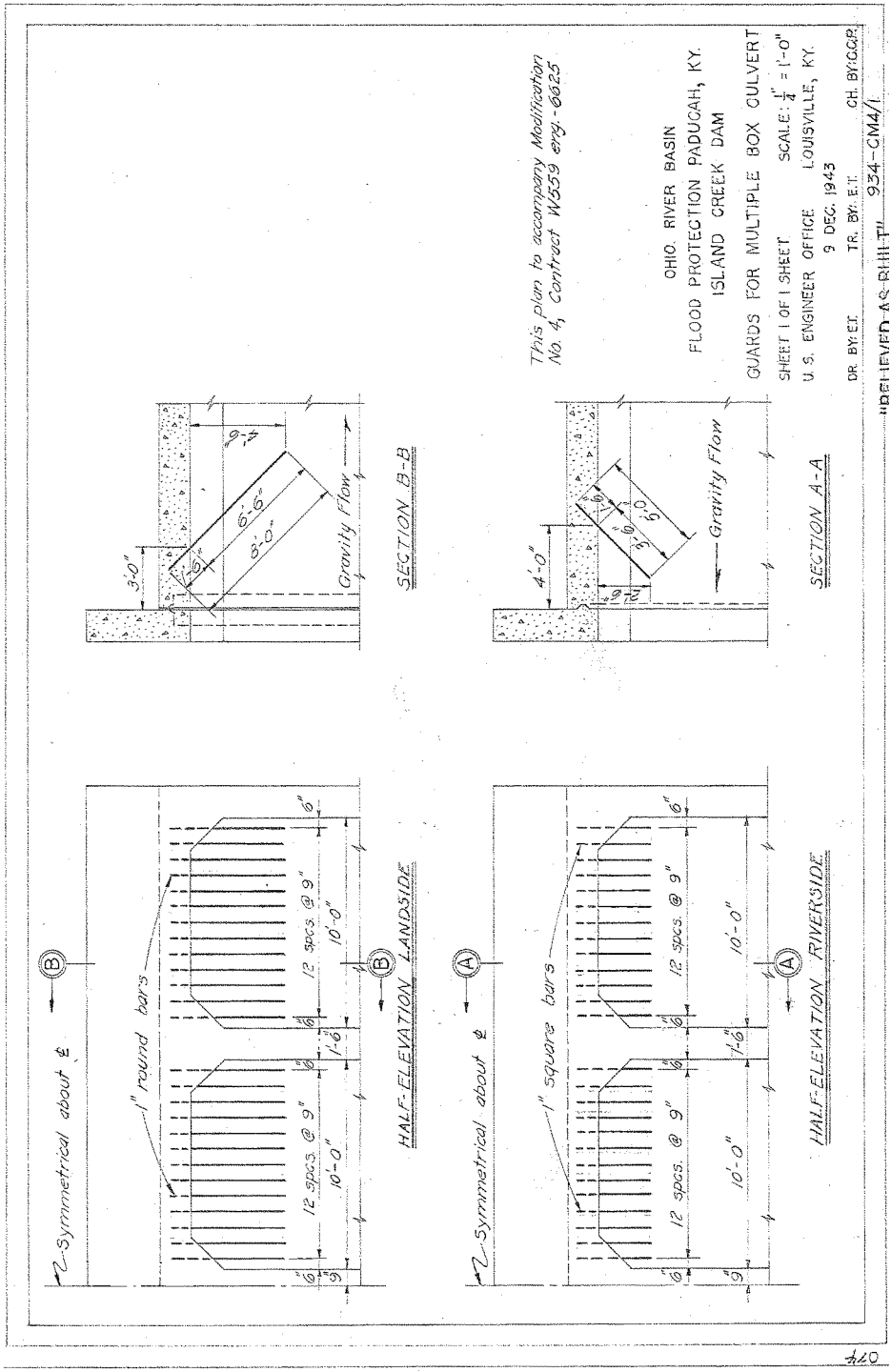
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
MASONRY AND
HANDRAIL DETAILS
SHEET 1 OF 2 SHEETS..... SCALES AS SHOWN
U. S. ENGINEER OFFICE LOUISVILLE, KY. 21 DEC. 1943

DR. BY WCB-EE TR. BY EE-WJH CK. BY WHS

"BELIEVED AS BUILT" 934-CM3/1

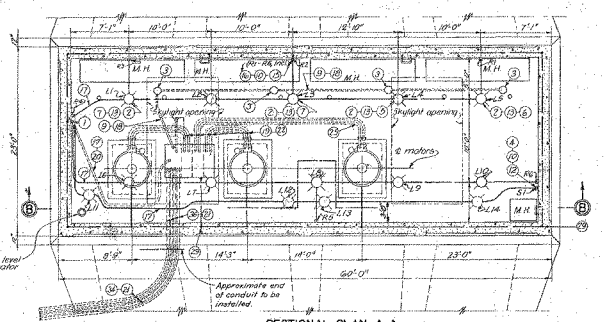
11177


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
REINFORCING DETAILS
STILLING BASIN WALL NO. 7
OHIO RIVER BASIN
SHEET 2 OF 2 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. 28 OCT. 1943
AS BUILT 934-CM3.2
HALF PLAN
SECTION D-D
HEADWALL
SECTION E-E
SECTION C-C
PLAN BELOW EL. 304
PLAN ABOVE EL. 304
ELEVATION
STEM
BASE PLAN
TOP REINFORCING
BOTTOM REINFORCING
SECTION A-A
SECTION B-B

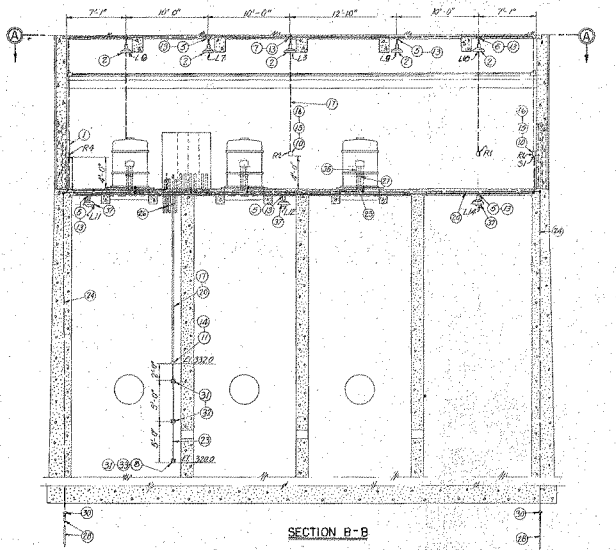

℄ Symmetrical about ℄
1" round bars
12 spcs. @ 9"
10'-0"
1'-6"
HALF ELEVATION LANDSIDE
SECTION B-B
3'-0"
6'-6"
8'-0"
Gravity Flow
℄ Symmetrical about ℄
1" square bars
HALF ELEVATION RIVERSIDE
SECTION A-A
4'-0"
This plan to accompany Modification
No 4, Contract W-559 eng. 6625
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
ISLAND CREEK DAM
GUARDS FOR MULTIPLE BOX CULVERT
SHEET 1 OF 1 SHEET
SCALE: 1" = 1'-0"
U.S. ENGINEER OFFICE LOUISVILLE, KY.
9 DEC. 1943
DR. BY: E.T. TR. BY: E.T. CH. BY: G.P.
934-CM4/1

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



SECTIONAL PLAN A-A

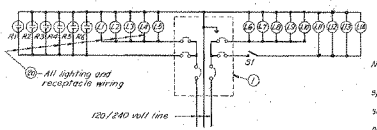


SECTION B-B

BILL OF MATERIAL

KEY NO.	DESCRIPTION	MFGR.	CATALOG NO.	QUANTITY
1	4 circuit lighting panel (surface type)			1 *
2	R.L.M. dome reflector and socket	Wheat	390573	10 *
3	4" Floor Box	G.E.	SR-8300	4
4	Surface Switch Plate			1 *
5	Conduulet Outlet	Crouse-Hinds	5K C12	10
6	" "	" "	5K L12	1
7	" "	" "	5K T12	3
8	1" Electrunk			1 *
9	#8 T-cond cable 12,600 cm. with W.P. braid			190' *
10	Conduulet outlet	Crouse-Hinds	FS 181	7 *
11	" "	" "	A147	1 *
12	Flush Tumbler Switch	Bryant	3951	1 *
13	Conduulet Cover	Crouse-Hinds	SK84	1ot *
14	" "	" "	1771	1 *
15	Duplex plug receptacle			6 *
16	Wall surface plate			6 *
17	1" electrical metallic tubing (E.M.T.)			380' *
18	1" rigid electrical conduit			60' *
19	2" Rigid electrical conduit			130' *
20	#12 Type SN insulated copper wire			1140' *
21	#2 AWG "cond cable, 6,600 lbs. with #2 rubber jacket			2160' *
22	#2 " " " " " W.P. braid			4320' *
23	#6 H.D. bare solid copper wire			13' *
24	#10 bare stranded cooper cable			450' *
25	2" standard 90° elbow			24
26	Special long radius elbow 2" x 36" radius	G.E.		4
27	2" E.M.T. coupling			6 *
28	Copperweld ground rod 3/4" x 8'-0" long			4
29	"T" connector for #10 stranded cable	Burndy	NT 2626	9
30	Connector for #10 stranded cable, 3/8" bolt	"	GA643A	6
31	3" Bell circle type insulator	Lapp	13767	9 *
32	Bus support fitting Drill to clamp #6 solid wire	Locke	9853	2 *
33	Bus support fitting, Drill to clamp 3/4" bus bar	"	9853	4 *
34	3" Rigid electrical conduit			630' *
35	Flexible metal conduit 2.5" x 20' lg.			6 *
36	3/4" Rigid electrical conduit			80' *
37	Vaporite Socket & Reflector	Crouse-Hinds	VPDN/323	4 *

* These materials not to be furnished or installed under this contract.



WIRING DIAGRAM - LIGHTING CIRCUIT

Embedded conduit
Exposed conduit
Concealed conduit
Ground wire

LEGEND

Notes:
Figures in circles refer to part numbers on Bill of Material.
All material shall be of the manufacture, type & catalog number specified, or its equal.
All conduit in floor shall be placed as near the center of same as possible & shall clear opening for pump removal.
Small fittings, conduits, E.M.T. couplings and adapters, etc, not listed shall be furnished as required.
300 watt bulbs shall be furnished and installed in all lights. Under separate contract.

Plan to accompany, Modification No. 7, Contract No. W-358 eng-6625

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

ISLAND CREEK DAM

LIGHTING AND POWER SYSTEM

SHEET 1 OF SHEET 1 SCALE 1/8" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY.

BY	DATE	CHARACTER REVISIONS

DR. BY A.J.Z. TR. BY A.J.Z. CK. BY D.S.

"BELIEVED AS BUILT"

934-CM 7/1

1180

AS BUILT

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B" UNIT 2

IN 124 SHEETS

TITLE SHEET

U. S. ENGINEER OFFICE, LOUISVILLE, KY.

MK.	DATE	AUTHORITY	REVISION
			AS BUILT REVISIONS
(R)		C.O.	Sheet added
(R)		C.O.	Sheet deleted
(R)	10-5-62	C.O. 79	Deletion of portion of wall Station 90+75.3 - 92+04.47

CONTENTS

935-12.2/1 GENERAL PLAN
935-12.2/2 PLAN AND PROFILE
935-12.2/3 PLAN AND PROFILE
935-12.2/4 PLAN AND PROFILE
935-12.2/5 PLAN AND PROFILE
935-12.2/6 PLAN AND PROFILE
935-12.2/7 PLAN AND PROFILE
935-12.2/8 PLAN AND PROFILE
935-12.2/9 PLAN AND PROFILE
935-12.2/10 PLAN AND PROFILE
935-12.2/11 PLAN AND PROFILE
935-12.2/12 ILLINOIS CENTRAL RAILROAD REVISIONS
935-12.2/13 ILLINOIS CENTRAL RAILROAD REVISIONS
935-12.2/14 STREET & RAILROAD REVISIONS, FIRST STREET VICINITY
(R) 935-12.2/15 BORINGS (DELETED)
(R) 935-12.2/16 BORINGS "
935-12.2/17 BORINGS & TYPICAL SECTION
935-12.2/18 WALL MONOLITHS
935-12.2/19 WALL MONOLITHS
935-12.2/20 WALL MONOLITHS
935-12.2/21 WALL MONOLITHS
935-12.2/22 STRIPPING AND BACKFILL
935-12.2/23 MASONRY & REINFORCING DETAILS MONOLITH NO. 14
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935-12.2/25 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 80 & 167
935-12.2/26 MASONRY & REINFORCING DETAILS MONOLITHS NOS. 115, 131, 132 AND BULKHEAD AND FRAME DETAILS
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935-12.2/35 MASONRY & REINFORCING DETAILS "I" WALL MONOLITHS
935-12.2/36 MASONRY & REINFORCING DETAILS "I" WALL MONOLITHS
935-12.2/37 MASONRY & REINFORCING DETAILS "I" WALL MONOLITHS
935-12.2/38 MISCELLANEOUS PIPES THRU WALL AND DETAILS
935-12.2/39 MISCELLANEOUS PIPES THRU WALL AND DETAILS
935-12.2/40 GENERAL PLAN WASHINGTON & FIRST ST.
935-12.2/41 GENERAL PLAN KENTUCKY & FIRST ST.
935-12.2/42 GENERAL PLAN BROADWAY & FIRST ST.
935-12.2/43 GENERAL PLAN MADISON & SECOND STREETS
935-12.2/44 GENERAL PLAN THIRD & HARRISON STS.
935-12.2/45 GENERAL PLAN CLAY & THIRD STREETS
935-12.2/46 GENERAL PLAN FOURTH & FIFTH STREETS AT PARK AVE.
935-12.2/47 TUNNEL STA. 117+20± & U.S.G.S. GAGING STATION
935-12.2/48 MASONRY DETAILS MOVABLE CLOSURES STA. 90+41.17 & STA. 103+83.50
935-12.2/49 REINFORCING DETAILS STA. 90+41.17 & STA. 103+83.50 SILL & ABUTMENTS
935-12.2/50 REINF. DETAILS STAS. 90+51.33, 103+73.67 & 106+21.50 STORAGE VAULT
(R) 935-12.2/51 MASONRY DETAILS MOVABLE CLOSURE STA. 91+96.00
935-12.2/52 REINFORCING DETAILS STA. 91+96.00 SILL & ABUTMENTS
935-12.2/53 REINFORCING DETAILS STA. 91+96.00 STORAGE VAULT
935-12.2/54 MASONRY DETAILS MOVABLE CLOSURES STA. 93+57.18 & STA. 94+63.76
935-12.2/55 REINFORCING DETAILS STA. 93+57.18 SILL
935-12.2/56 REINFORCING DETAILS STA. 93+57.18 ABUTMENTS
935-12.2/57 REINFORCING DETAILS STA. 94+63.76 SILL & ABUTMENTS
(R) 935-12.2/58 REINFORCING DETAILS STA. 94+63.76 STORAGE VAULT
935-12.2/59 MASONRY DETAILS MOVABLE CLOSURES STA. 98+88.50 & STA. 108+53.00
935-12.2/60 REINFORCING DETAILS STA. 98+88.50 & STA. 108+53.00 SILL & SOUTH ABUTMENT
935-12.2/61 REINFORCING DETAILS STA. 98+88.50 & STA. 108+53.00 NORTH ABUTMENT & STORAGE VAULT
935-12.2/62 MASONRY DETAILS MOVABLE CLOSURE STA. 108+10.00
935-12.2/63 REINFORCING DETAILS STA. 108+10.00 SILL & ABUTMENTS
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935-12.2/70 MASONRY DETAILS MOVABLE CLOSURE STA. 128+19.75
935-12.2/71 REINFORCING DETAILS STA. 128+19.75 SILL AND EAST ABUTMENT
935-12.2/72 MASONRY DETAILS MOVABLE CLOSURE STA. 132+40.50
935-12.2/73 REINFORCING DETAILS STA. 132+40.50 SILL & ABUTMENTS
935-12.2/74 REINFORCING DETAILS STA. 132+40.50 STORAGE VAULT
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935-12.2/77 REINFORCING DETAILS STA. 128+19.75 AND STA. 135+22.75 STORAGE VAULT AND WEST ABUTMENT
935-12.2/78 MASONRY DETAILS MOVABLE CLOSURE STA. 145+74.30
935-12.2/79 REINFORCING DETAILS STA. 145+74.30 SILL & ABUTMENTS
935-12.2/80 MASONRY DETAILS MOVABLE CLOSURE STA. 158+23.25
935-12.2/81 MASONRY DETAILS MOVABLE CLOSURE STA. 149+87.30
935-12.2/82 REINFORCING DETAILS STA. 149+87.30 & STA. 158+23.25 SILL & ABUTMENTS
935-12.2/83 REINFORCING DETAILS STA. 149+27.80 & STA. 157+65.25 STORAGE VAULT & WALKWAY PLANKING SCHEDULE
935-12.2/84 MASONRY DETAILS MOVABLE CLOSURE STA. 157+26.10
935-12.2/85 REINFORCING DETAILS STA. 157+26.10 SILL & ABUTMENTS
935-12.2/86 REINFORCING DETAILS STA. 156+86.80 STORAGE VAULT
935-12.2/87 MASONRY DETAILS MOVABLE CLOSURE STA. 161+53.15
935-12.2/88 REINFORCING DETAILS STA. 161+53.15 SILL AND ABUTMENTS
935-12.2/89 MASONRY DETAILS MOVABLE CLOSURE STA. 168+48.50
935-12.2/90 REINFORCING DETAILS STA. 168+48.50 SILL & ABUTMENTS
935-12.2/91 REINFORCING DETAILS STA 168+48.50 STORAGE VAULT
935-12.2/92 MASONRY DETAILS MOVABLE CLOSURE STA. 170+04.36
935-12.2/93 REINFORCING DETAILS STA. 170+04.36 SILL AND EAST ABUTMENT
935-12.2/94 REINFORCING DETAILS STA. 170+04.36 STORAGE VAULT & MONOLITH NO. 340
935-12.2/95 MISCELLANEOUS DETAILS
935-12.2/96 MISCELLANEOUS DETAILS
935-12.2/97 MISCELLANEOUS DETAILS
935-12.2/98 STRUCTURAL DETAILS
935-12.2/99 STRUCTURAL DETAILS
935-12.2/100 STRUCTURAL DETAILS
935-12.2/101 STRUCTURAL DETAILS
935-12.2/102 STRUCTURAL DETAILS
935-12.2/103 STRUCTURAL DETAILS
935-12.2/104 STRUCTURAL DETAILS
935-12.2/105 STRUCTURAL DETAILS
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935-12.2/109 MISCELLANEOUS STRUCTURAL DETAILS
935-12.2/110 MASONRY & REINFORCING DETAILS CATCH BASINS AND MISCELLANEOUS DETAILS
935-12.2/111 LOCATION PLANS MANHOLES NOS. 2,7,11 & 12 AND HEADWALL DETAILS STA. 128+61
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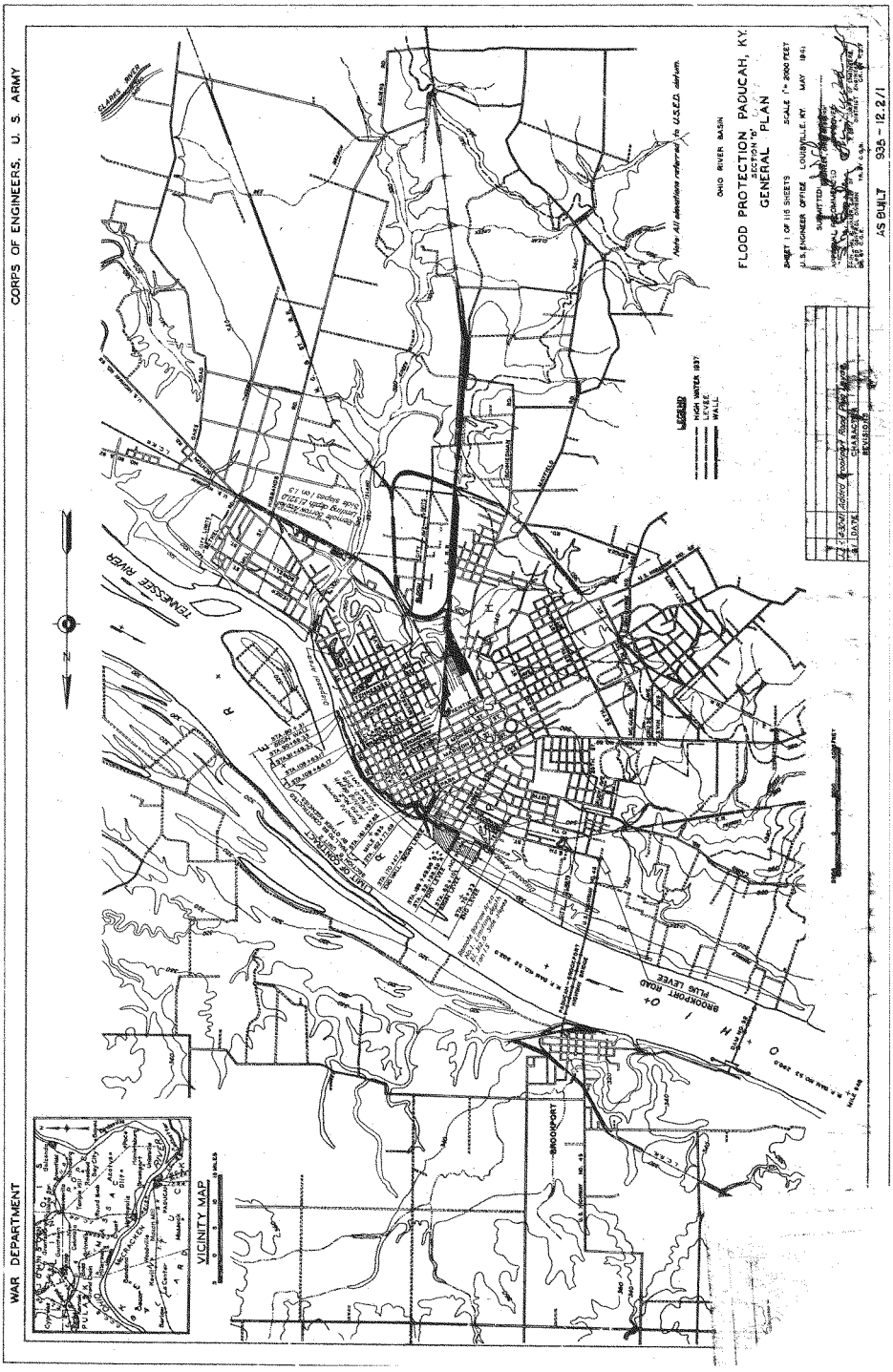
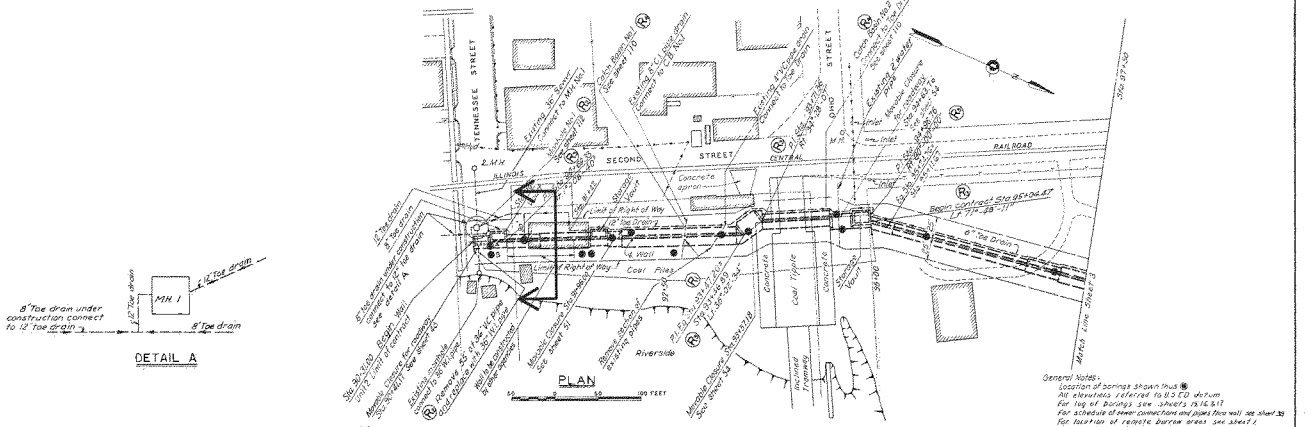
935-12.2/113 MASONRY & REINFORCING DETAILS MANHOLES NOS. 2,6,12 & 15
935-12.2/114 MASONRY DETAILS MANHOLE NO. 3
935-12.2/115 REINFORCING DETAILS MANHOLE NO. 3
935-12.2/116 MASONRY AND REINFORCING DETAILS MANHOLES NOS. 4,5,9,10,17,18,19,21 AND 22
935-12.2/117 MASONRY & REINFORCING DETAILS MANHOLES NOS. 6 & 16
935-12.2/118 MASONRY & REINFORCING DETAILS MANHOLES NOS. 7 & 11
935-12.2/119 MASONRY & REINFORCING DETAILS MANHOLES NOS. 13 & 14
935-12.2/120 MASONRY & REINFORCING DETAILS MANHOLE NO. 20
935-12.2/121 SEWER STA. 66+27
935-12.2/122 MASONRY & REINFORCING DETAILS MANHOLE NO. 23
935-12.2/123 MASONRY & REINFORCING DETAILS MANHOLE NO. 24
935-12.2/124 DRAINAGE STRUCTURE STA. 175+40
(R) 935- 06/1 REINFORCING DETAILS MONOLITHS NOS. 79A & 84A

AS BUILT


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
GENERAL PLAN
OHIO RIVER BASIN
SCALE 1" = 2000 FEET
SHEET 1 OF 115 SHEETS
U.S. ENGINEER OFFICE LOUISVILLE, KY. MAY 1944
SUBMITTED
RECOMMENDED
APPROVED
AS BUILT 935 - 12.2/1
LEGEND
HIGH WATER 1937
LEVEE
WALL
VICINITY MAP
TENNESSEE RIVER
OHIO RIVER
BROOKPORT
BROOKPORT ROAD
PLUG LEVEE

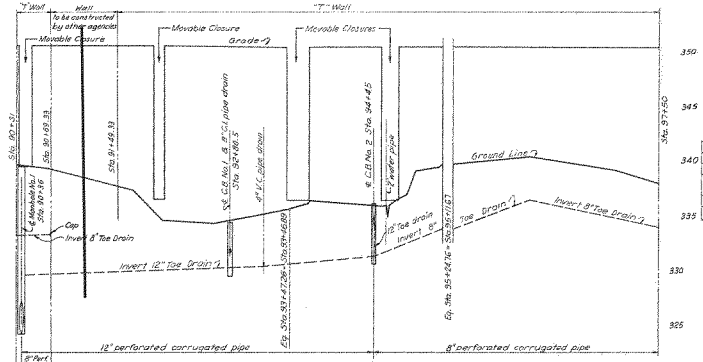
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



DETAIL A

General Notes:
Location of borings shown thus ⊕
All elevations referred to U.S.C.D. datum
For log of borings see sheets 13,16,&17
For schedule of sewer connections and pipes thru wall see sheet 39
For location of remote borrow areas see sheet 1



PROFILE

SCALE: HOR 1" = 50'
VERT 1" = 4'

90+00 92+50 95+00 97+50

MK.	DATE	AUTHORITY	REVISION
(R)	16-5-42	C.O. #9	Catch basin deleted
(R)		Field	Station and angles added
(R)		Field	Placed under 8" I conf. pipe
(R)	6-5-42	C.O. #9	Deletion of portion of wall Station 90+75.3 - 95+04.47

AS BUILT REVISIONS

BY	DATE	CHARACTER
WKS	4-30-41	Catch Basins Nos. 1 & 2 revised & minor corrections.

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

PLAN AND PROFILE

SHEET 2 OF 115 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. May 1941

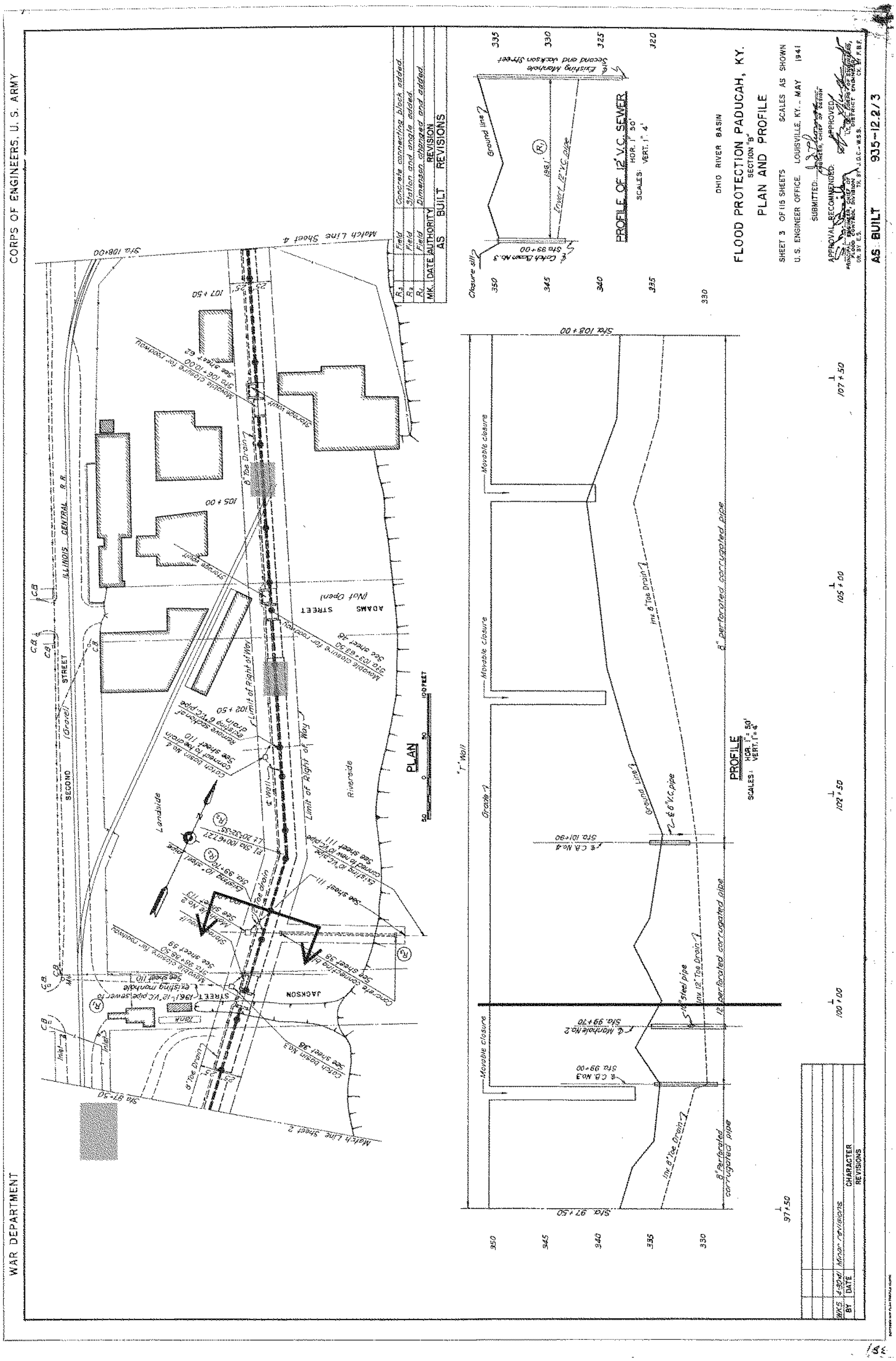
SUBMITTED: [signature] CHIEF, DIST. OF SPLAN

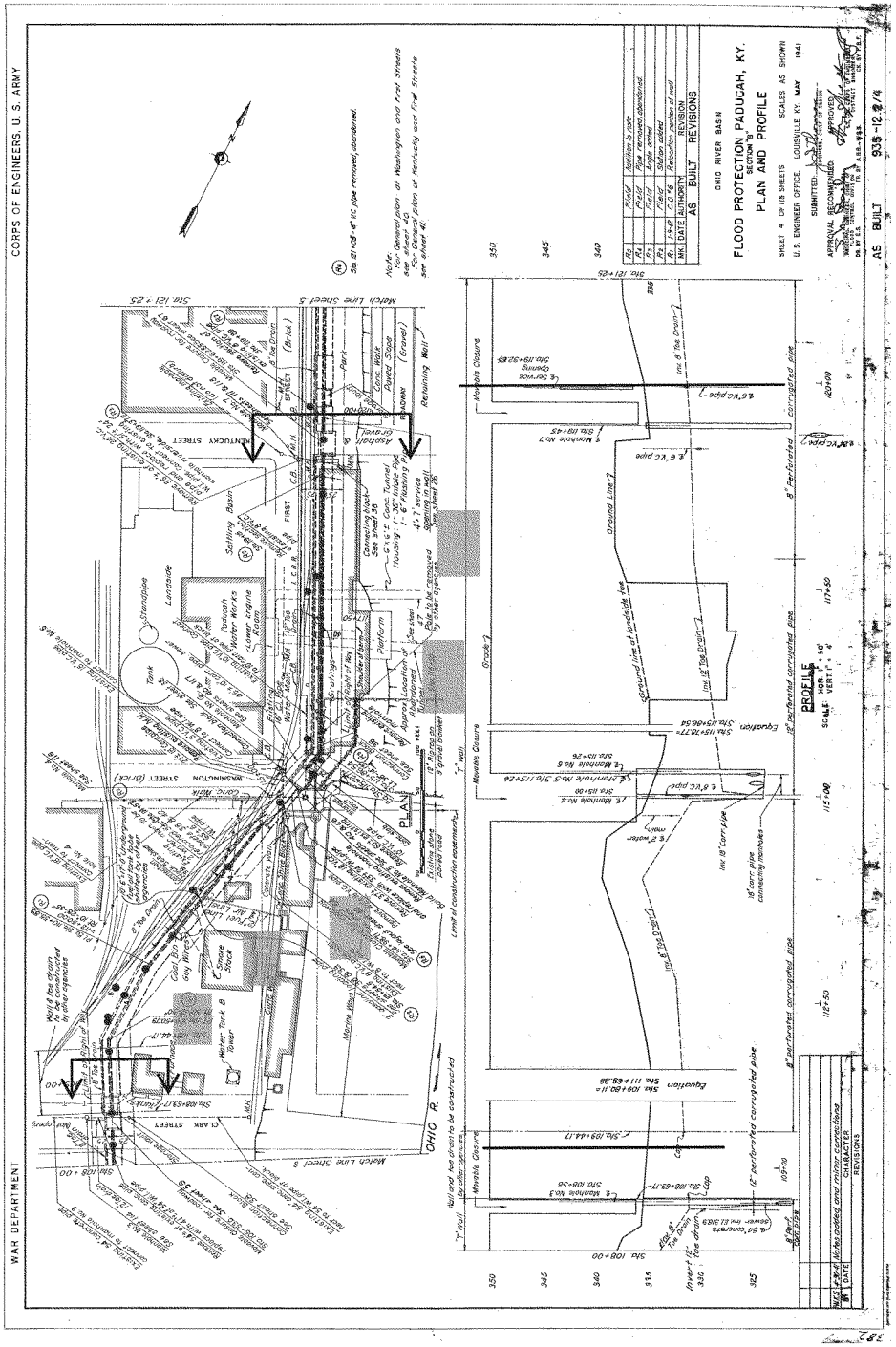
APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF PLANNING & CONTROL DIVISION OR BY E.S.

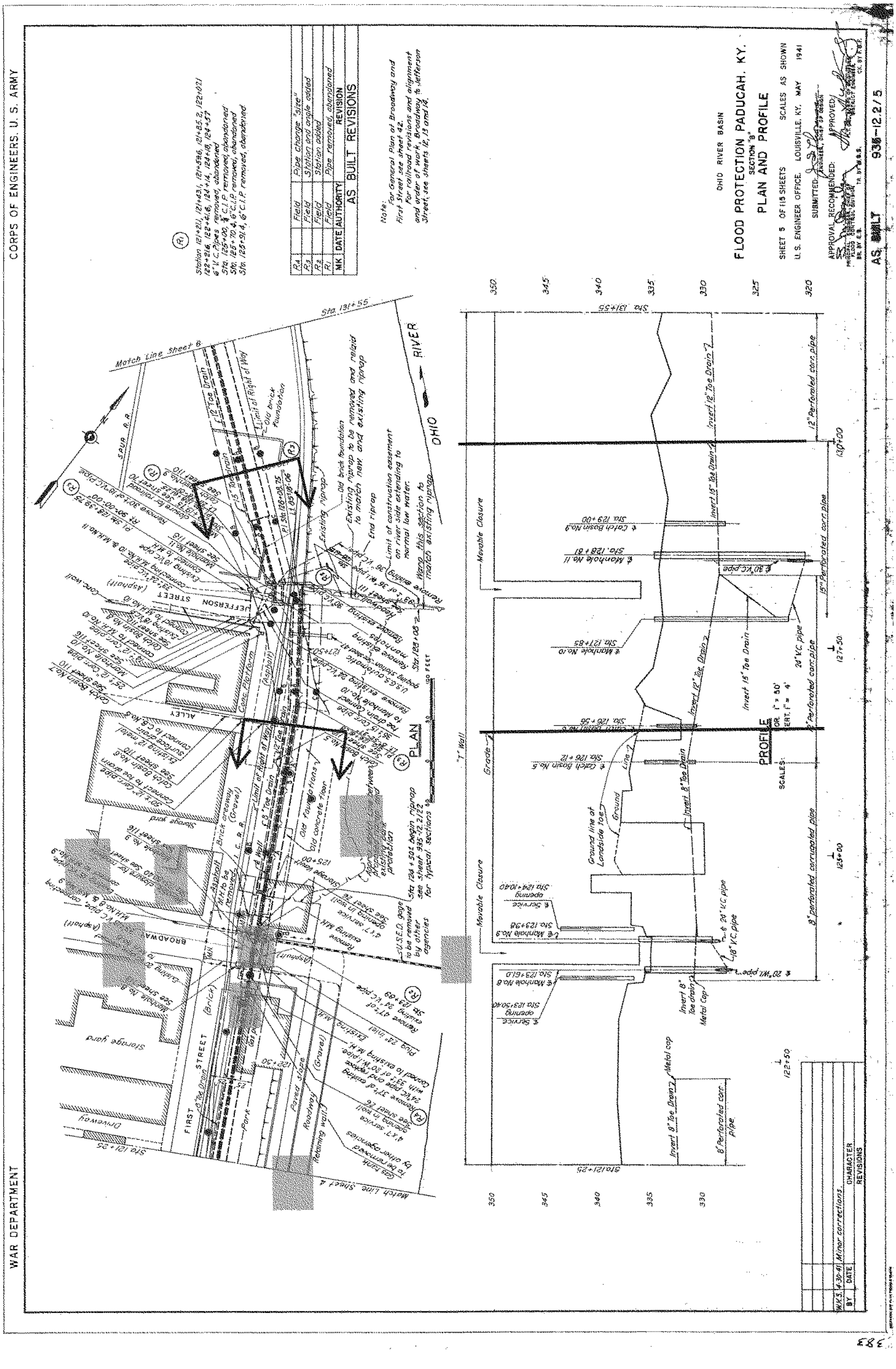
APPROVED: [signature] DIVISION ENGINEER, OHIO RIVER DIVISION OR BY R.B.R.

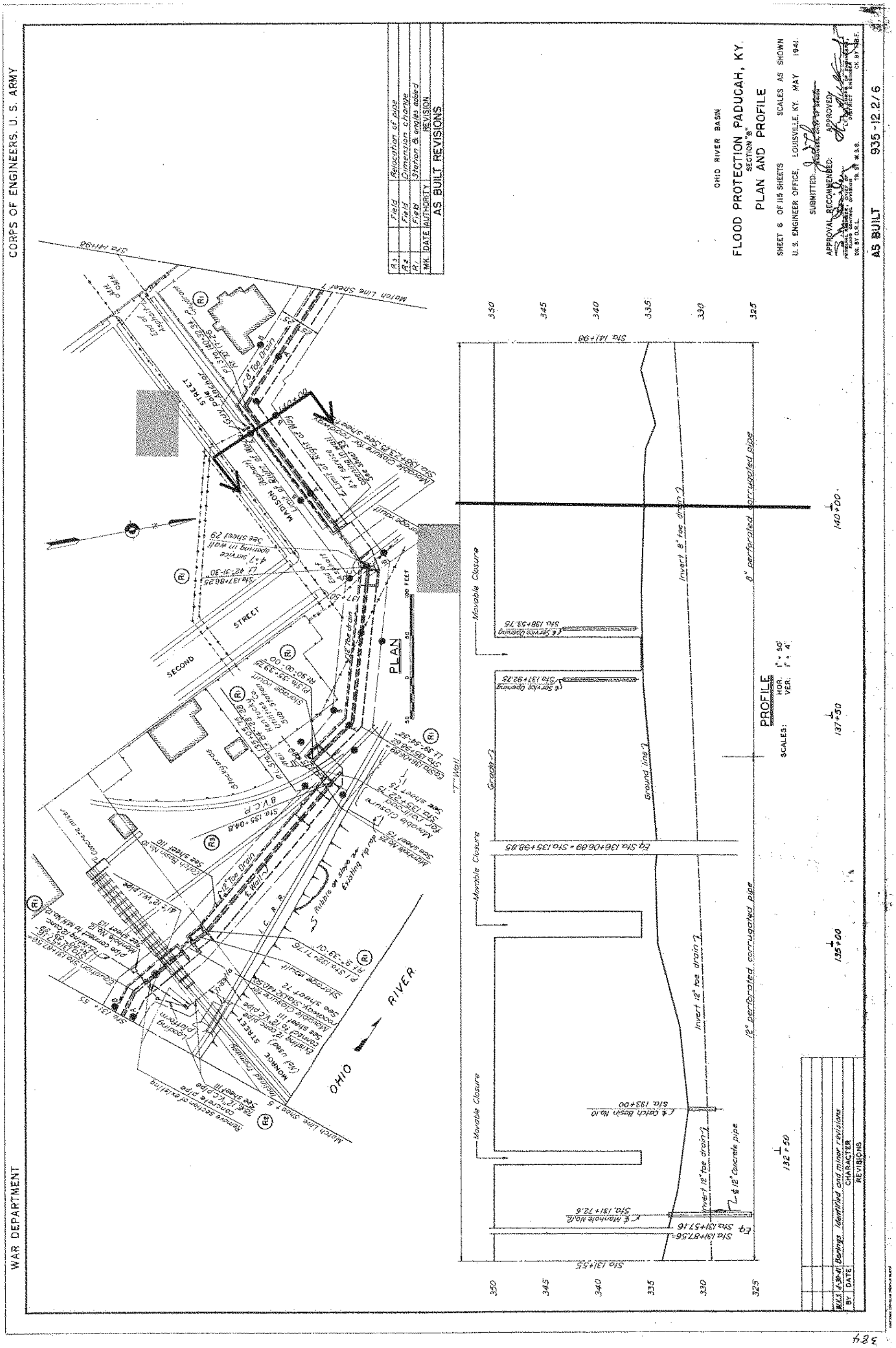
AS BUILT 935-12.2/2

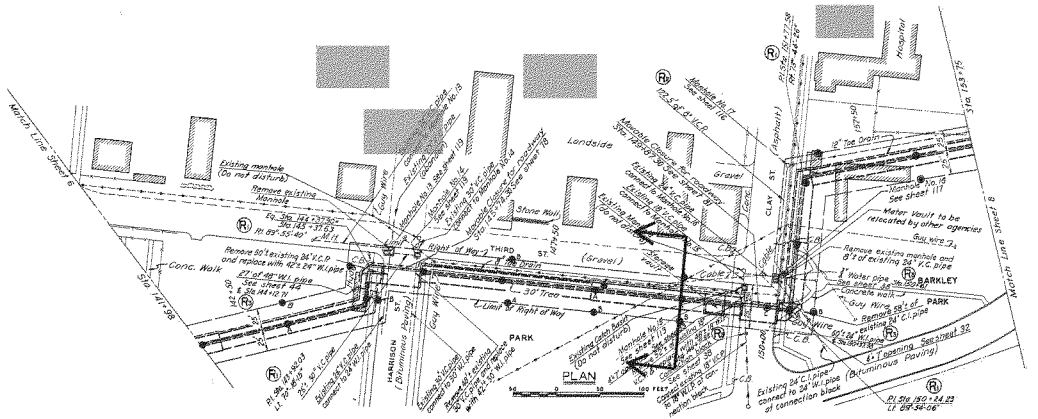
1183

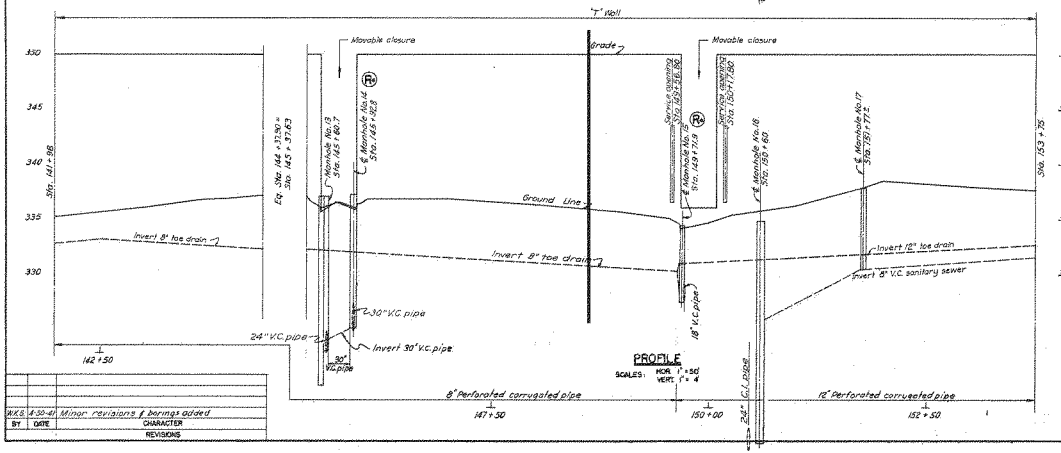

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
PLAN AND PROFILE
PLAN
PROFILE
PROFILE OF 12" V.C. SEWER
AS BUILT REVISIONS
AS BUILT 935-12.2/3


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
PLAN AND PROFILE
OHIO RIVER BASIN
AS BUILT REVISIONS
PLAN
PROFILE
OHIO R.
AS BUILT
938-12.8/4


CORPS OF ENGINEERS. U. S. ARMY
WAR DEPARTMENT
Station 121+21.1, 121+43.1, 121+53.6, 121+85.2, 122+07.1
122+21.6, 122+41.6, 124+14, 124+18, 124+57
6" V.C. Pipes removed, abandoned
Sta. 125+00, 8" C.I.P removed, abandoned
Sta. 125+70.4, 6" C.I.P removed, abandoned
Sta. 125+91.4, 6" C.I.P. removed, abandoned
R4 Field Pipe change "size"
R3 Field Station and angle added
R2 Field Station added
R1 Field Pipe removed, abandoned
MK DATE AUTHORITY REVISION
AS BUILT REVISIONS
Note:
For General Plan at Broadway and First Street see sheet 42.
For railroad revisions and alignment and order of work, Broadway to Jefferson Street, see sheets 12, 13 and 14.
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
PLAN AND PROFILE
SHEET 5 OF 115 SHEETS SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
935-12.2/5
Match Line Sheet 6
Sta. 131+55
OHIO RIVER
SPUR R.R.
12" Toe Drain
Limit of Right of Way
Old brick foundation
Existing riprap to be removed and relaid to match new and existing riprap
End riprap
Limit of construction easement on river side extending to normal low water.
Warp this section to match existing riprap
JEFFERSON STREET
ALLEY
Conc. Platform
(Asphalt)
Storage yard
BROADWAY
FIRST STREET
(Brick)
Driveway
Paved slope
Roadway
(Gravel)
Retaining wall
Sta. 121+25
Match Line Sheet 4
PLAN
Sta 124+50± begin riprap see sheet 935-12.2/22 for typical sections
U.S.E.D. gage to be removed by other agencies
Gas tank to be removed by other agencies
"T" Wall
Movable Closure
Grade Line
Ground line at Landside toe
Ground
Invert 12" Toe Drain
Invert 15" Toe Drain
Invert 8" Toe Drain
Metal cap
12" Perforated corr. pipe
15" Perforated corr. pipe
8" perforated corrugated pipe
24" V.C. pipe
18" V.C. pipe
20" W.I. pipe
30" V.C. pipe
℄ Manhole No. 11 Sta. 128+81
℄ Catch Basin No. 9 Sta. 129+00
℄ Manhole No. 10 Sta. 127+85
℄ Catch Basin No. 5 Sta. 126+12
℄ Manhole No. 9 Sta. 123+98
℄ Manhole No. 8 Sta. 123+61.0
℄ Service opening Sta. 124+10.40
℄ Service opening Sta. 123+50.40
PROFILE
SCALES: HOR. 1" = 50' VERT. 1" = 4'
130+00
127+50
125+00
122+50
350
345
340
335
330
325
320
W.K.S. 4-30-41 Minor corrections.
BY DATE CHARACTER REVISIONS
383


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
AS BUILT REVISIONS
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
PLAN AND PROFILE
SHEET 6 OF 115 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941.
AS BUILT
935-12.2/6
PLAN
PROFILE
OHIO RIVER
SECOND STREET
MADISON STREET
MONROE STREET
384





R4		Field	Pipes etc. removed
R3		Field	Station changed
R2		Field	Station added
R1		Field	Dimension changed
R		Field	Station and angle added
MK.	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

W.K.S.	4-30-41	Minor revisions & borings added
BY	DATE	CHARACTER

REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

PLAN AND PROFILE

SHEET 7 OF 113 SHEETS SCALES AS SHOWN

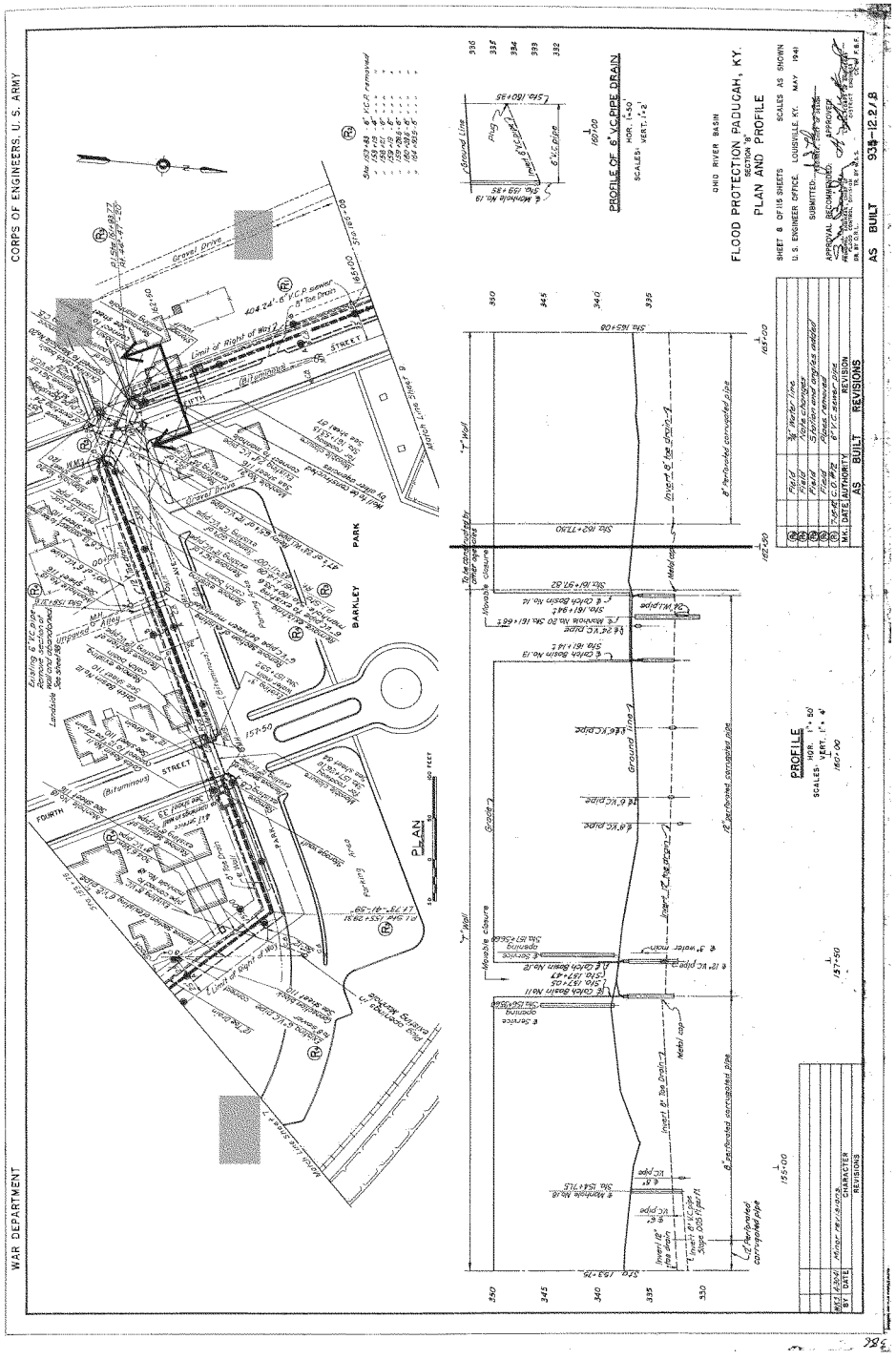
U. S. ENGINEER OFFICE. LOUISVILLE, KY. MAY 1941

SUBMITTED: [illegible]

APPROVAL RECOMMENDED: APPROVED:

[illegible]

AS BUILT 935-12.2/7


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
PLAN AND PROFILE
OHIO RIVER BASIN
SHEET 8 OF 115 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
939-12.2/8
PLAN
PROFILE
PROFILE OF 6' V.C. PIPE DRAIN
BARKLEY PARK
FOURTH STREET
Gravel Drive
Limit of Right of Way
Sta 163+08
Sta 160+35
Sta 153+78
Sta 151+50
Sta 150+00
Sta 148+50
Sta 147+00
Sta 145+50
Sta 144+00
Sta 142+50
Sta 141+00
Sta 139+50
Sta 138+00
Sta 136+50
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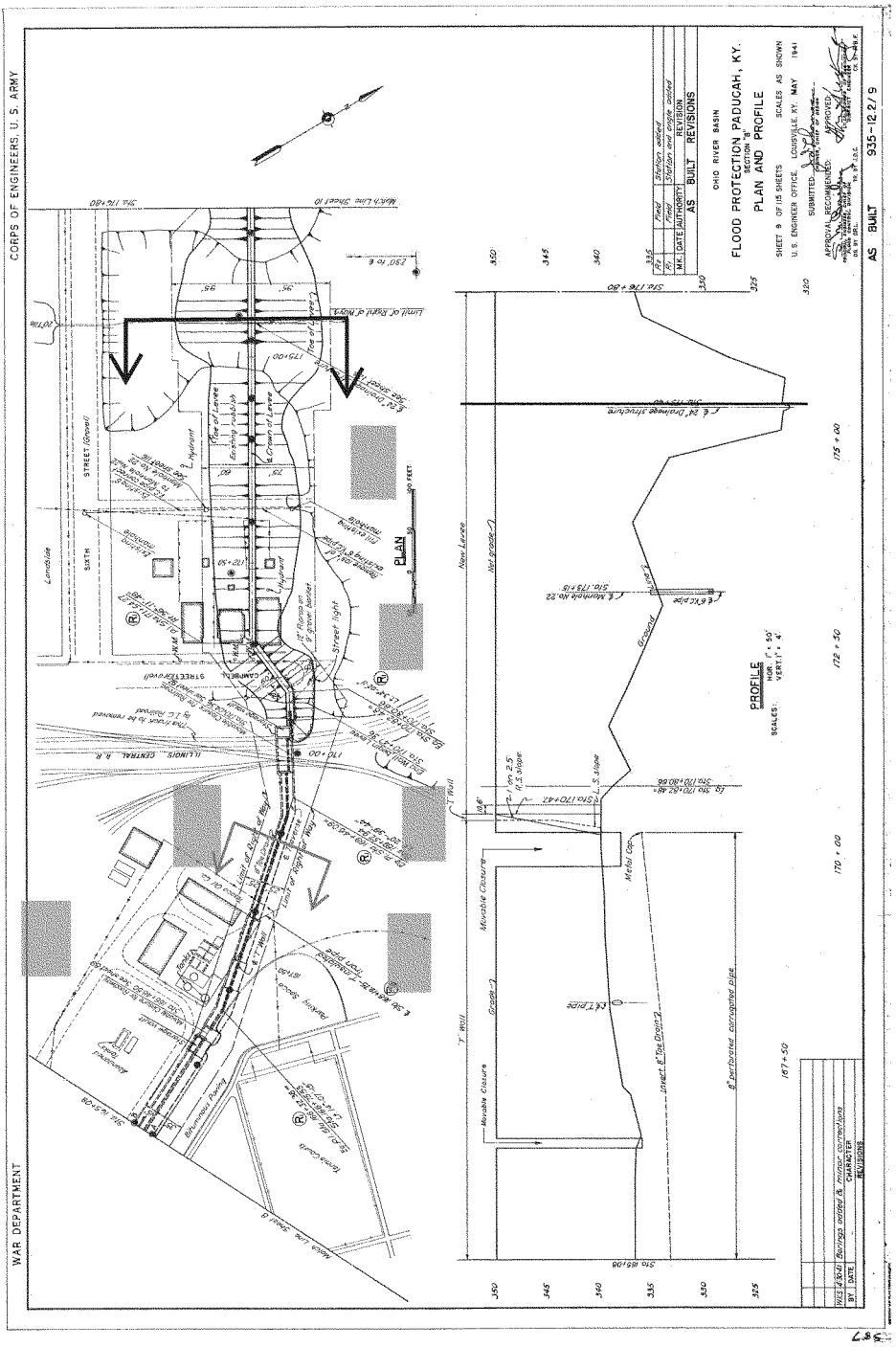
AS BUILT REVISIONS
MK. DATE AUTHORITY REVISION
BY DATE CHARACTER REVISIONS


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
PLAN AND PROFILE
OHIO RIVER BASIN
AS BUILT REVISIONS
AS BUILT
935-12.2/9
PLAN
PROFILE
SCALES: HOR. 1" = 50'
VERT. 1" = 4'
SHEET 9 OF 15 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED:
APPROVED:
APPROVAL RECOMMENDED:
Sta. 176+80
Sta. 175+00
Sta. 172+30
Sta. 170+00
Sta. 167+50
Sta. 165+08
Sta. 170+42
Sta. 170+80.66
Sta. 170+62.48
Sta. 173.9 I.E.
Sta. 173.8 I.E.
New Levee
Net grade
Ground
Levee
Sixth
Street (Gravel)
Illinois Central R.R.
Street light
Hydrant
Gate
Metal Cap
Movable Closure
Grade
Invert of Toe Drain
T. Wall
L.S. slope
R.S. slope
Elev. 359.5
Elev. 359.0
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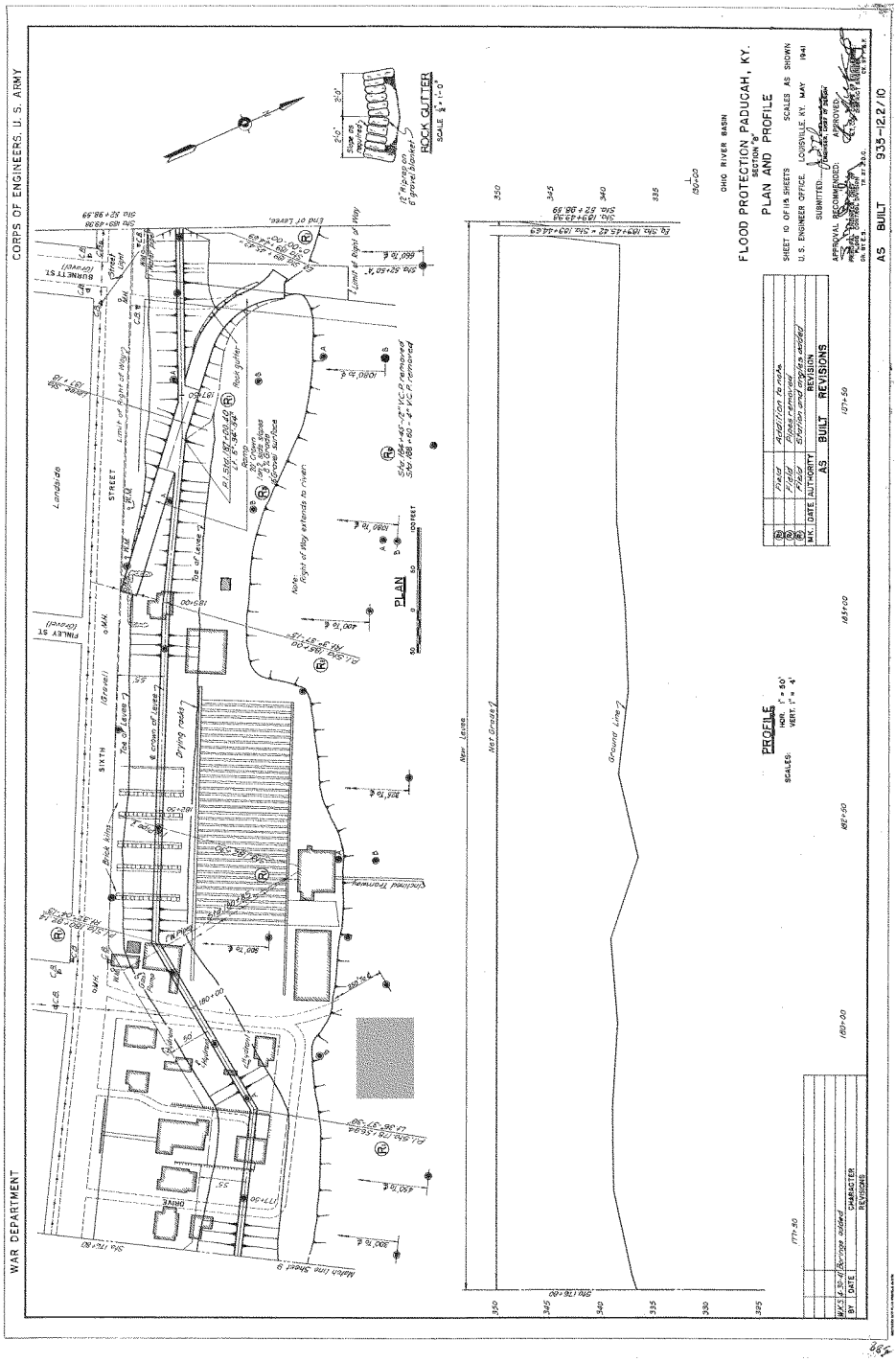
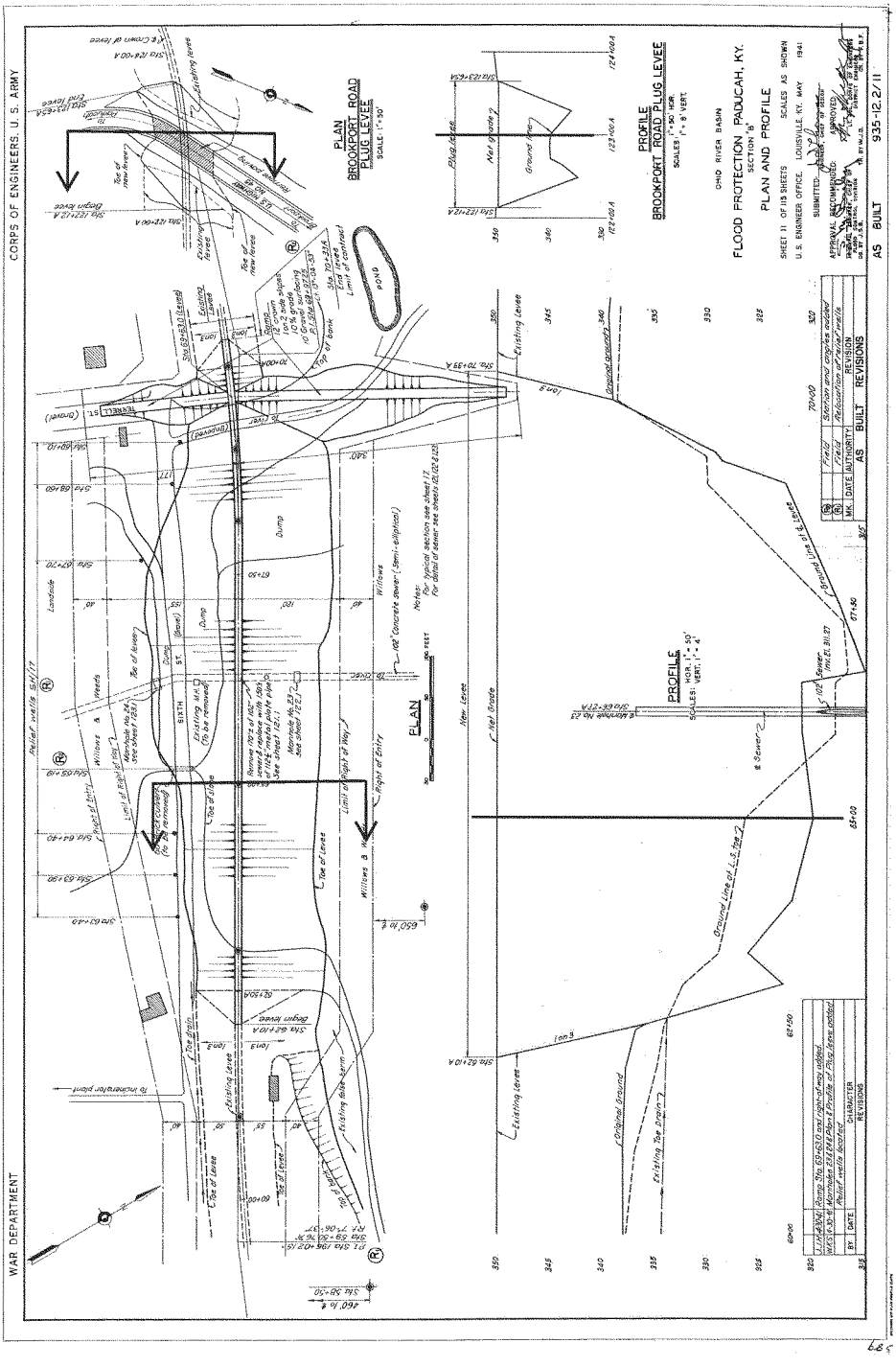
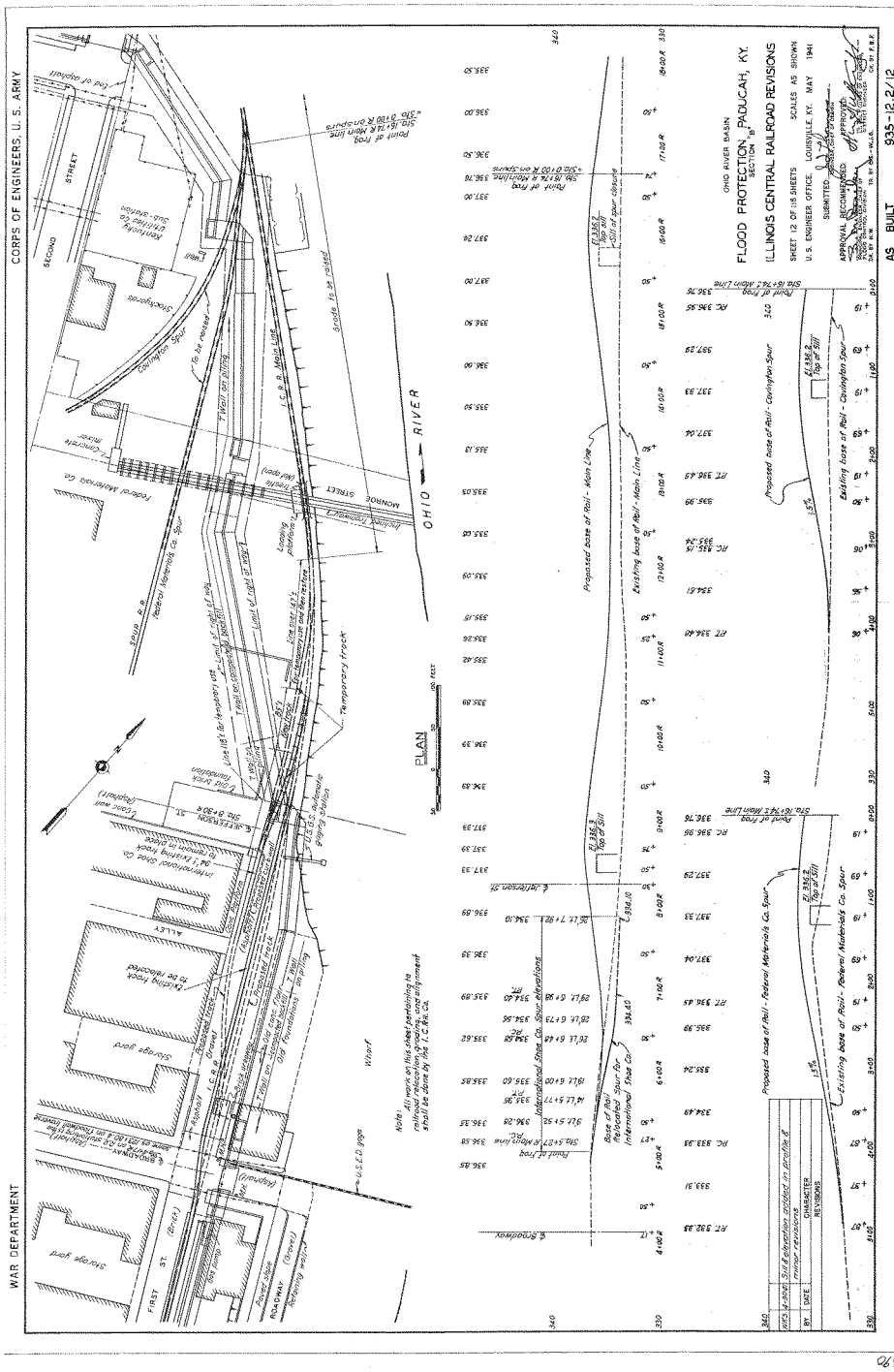
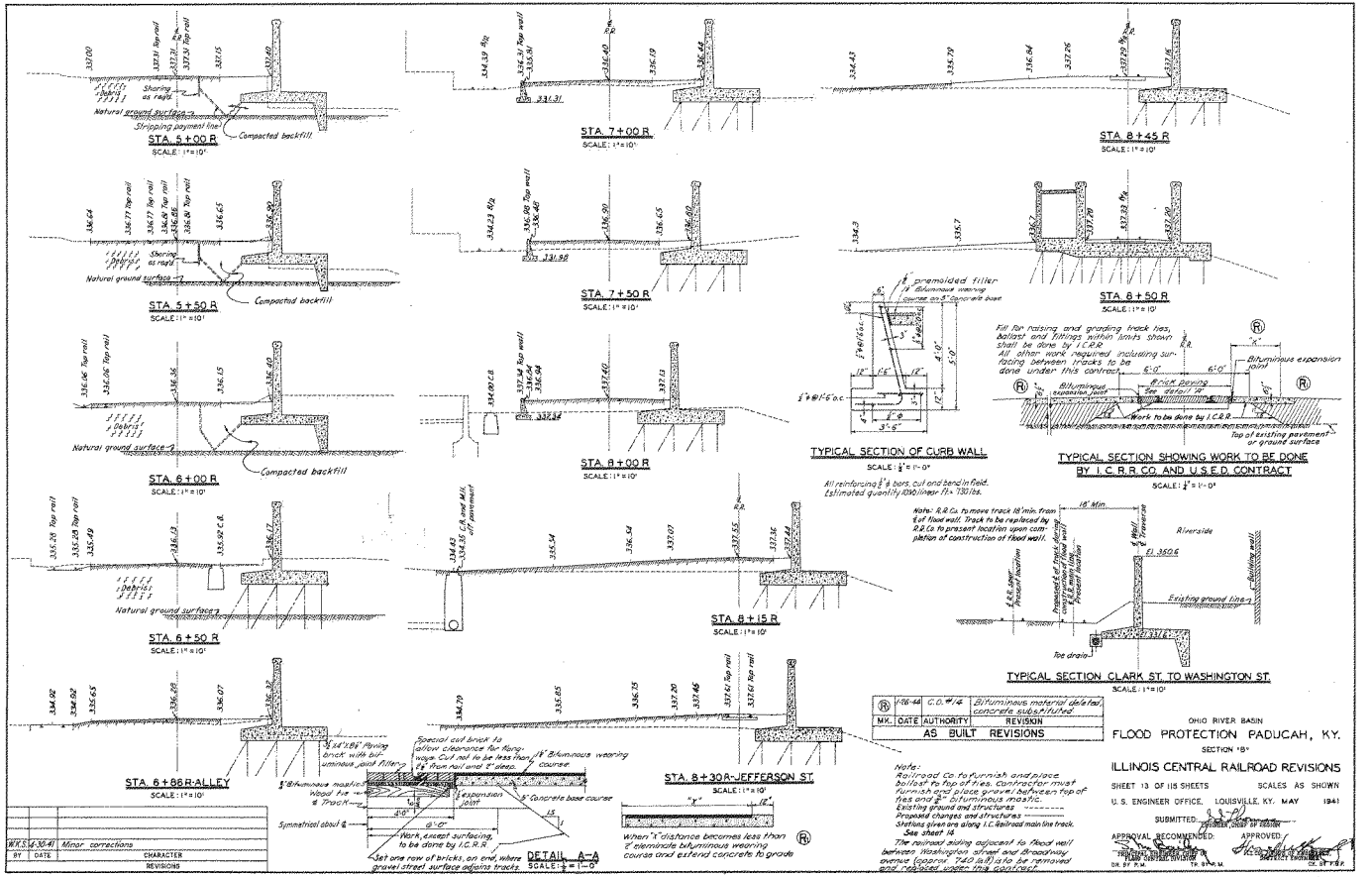
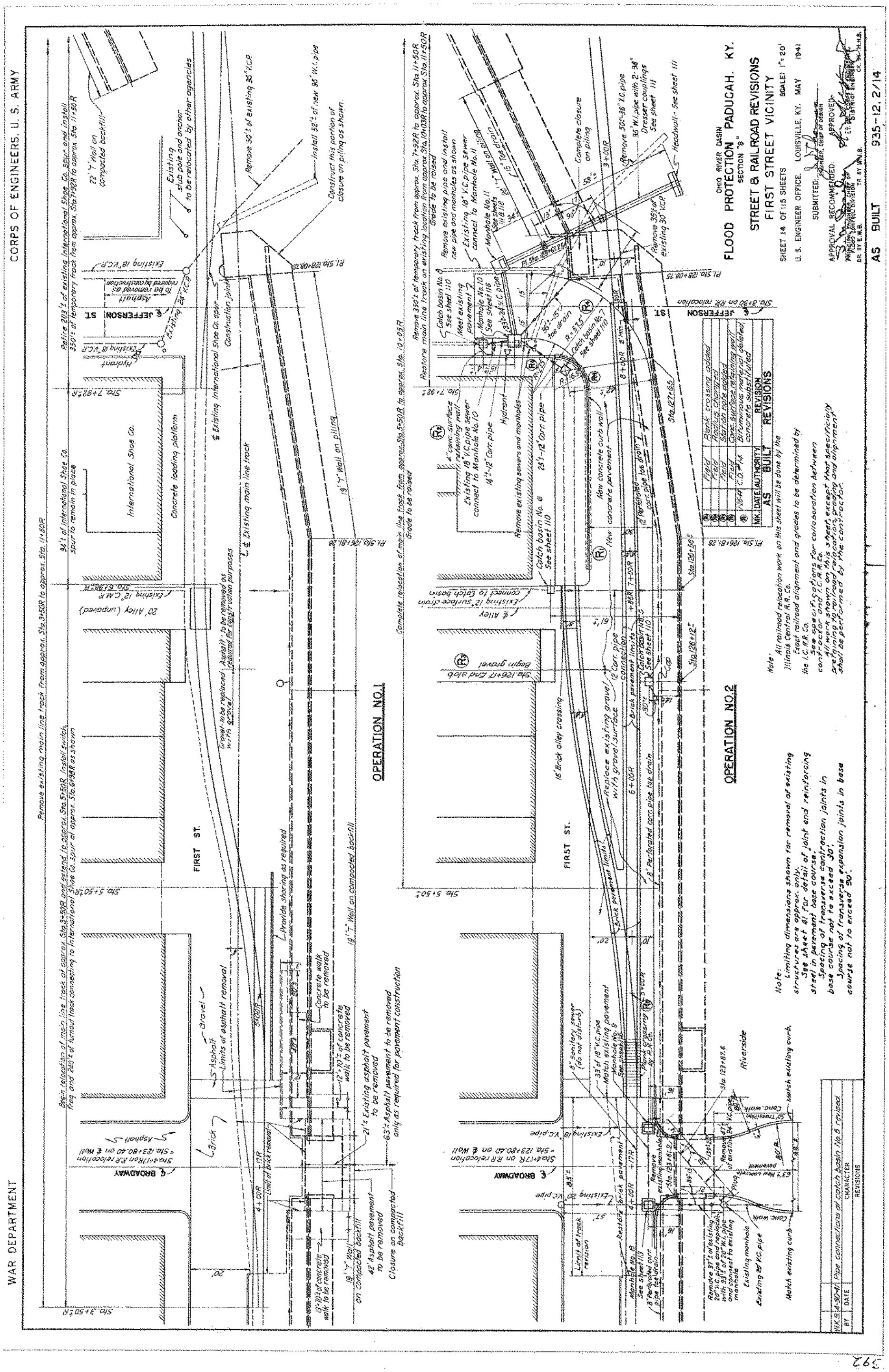
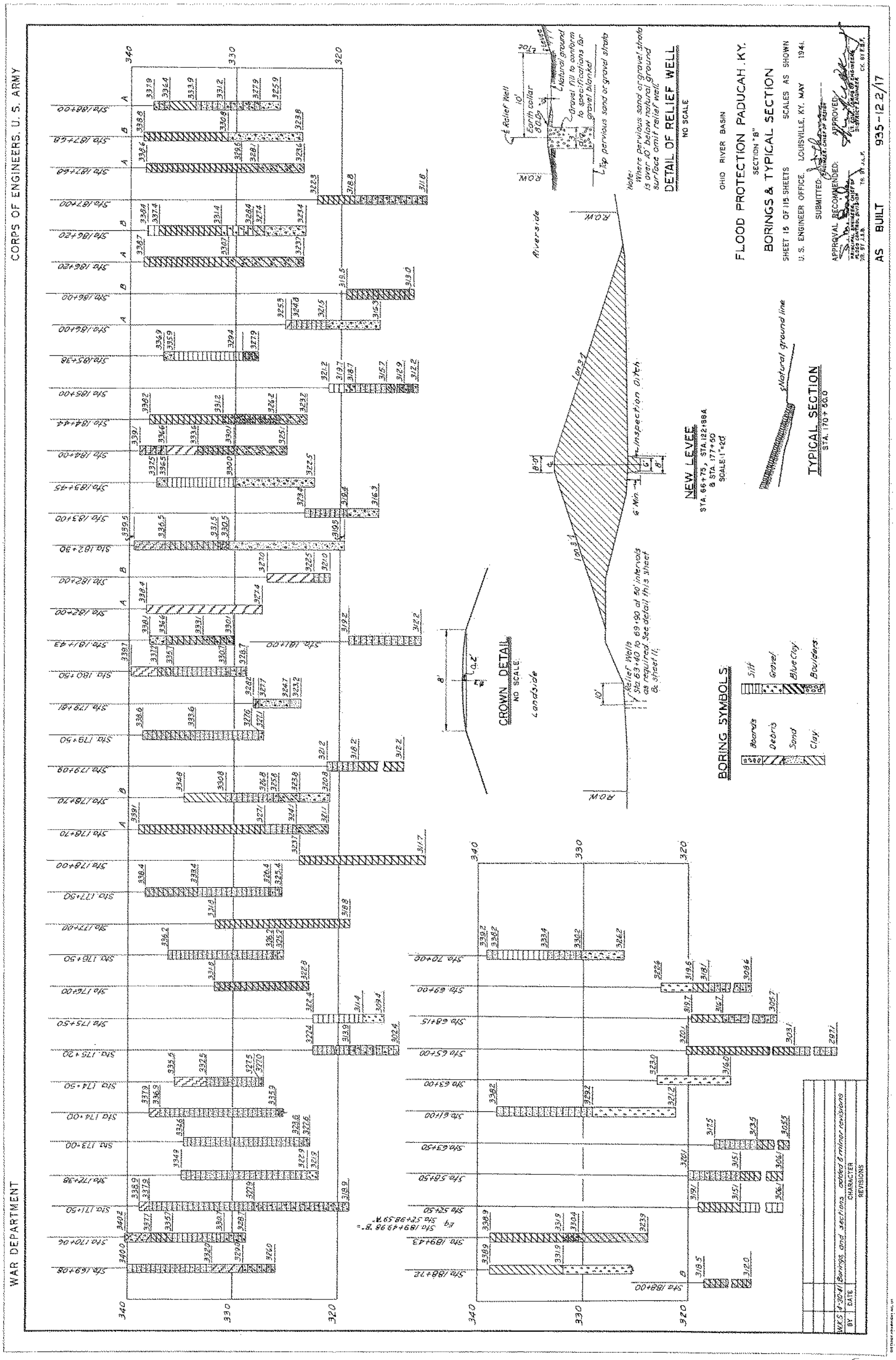

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
PLAN AND PROFILE
OHIO RIVER BASIN
SHEET 10 OF 14 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
APPROVAL RECOMMENDED:
PLAN
PROFILE
SCALES: HOR. 1" = 50'
VERT. 1" = 4'
ROCK GUTTER
SCALE 1/2" = 1'-0"
AS BUILT REVISIONS
AS BUILT
935-12.2/10

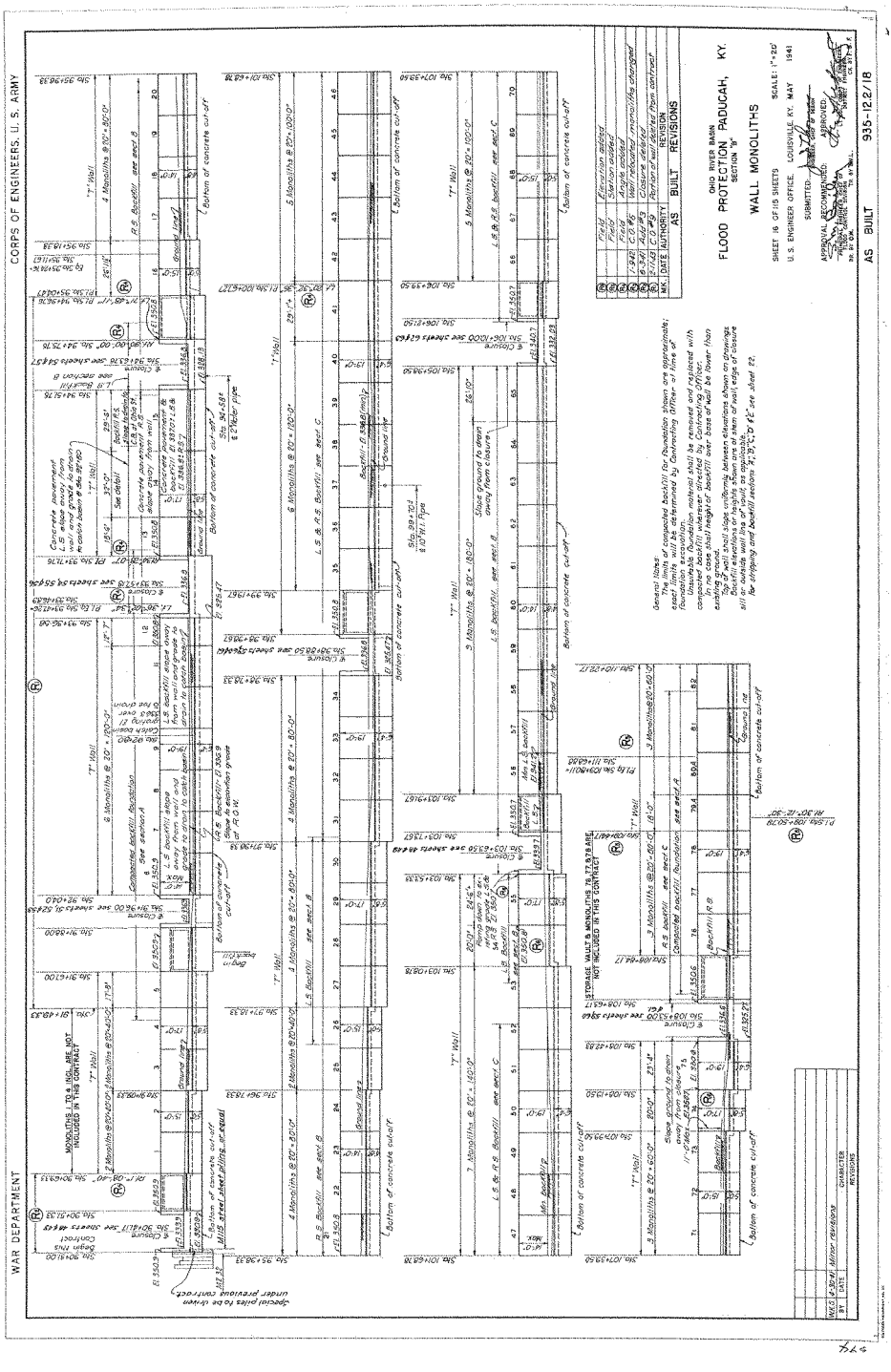

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
PLAN
BROOKPORT ROAD PLUG LEVEE
SCALE: 1" = 50'
PROFILE
BROOKPORT ROAD PLUG LEVEE
SCALES: 1" = 50' HOR.
1" = 8' VERT.
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
PLAN AND PROFILE
SHEET 11 OF 115 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
AS BUILT
935-12.2/11
PROFILE
SCALES: HOR. 1" = 50'
VERT. 1" = 4'
PLAN
SCALE: 1" = 50 FEET
REVISIONS
AS BUILT


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION
ILLINOIS CENTRAL RAILROAD REVISIONS
SHEET 12 OF 115 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
AS BUILT
935-12.2/12
PLAN
OHIO RIVER
MONROE STREET
SECOND STREET
FIRST ST.
ALLEY
BROADWAY
ROADWAY
Existing base of Rail - Main Line
Proposed base of Rail - Main Line
Existing base of Rail - Covington Spur
Proposed base of Rail - Covington Spur
Existing base of Rail - Federal Materials Co. Spur
Proposed base of Rail - Federal Materials Co. Spur
Point of Frog Sta. 18+74.2 Main Line
Point of Frog Sta. 0+00 R on Spurs
Top of Sill
Wharf
Temporary track
Existing track to be relocated
Proposed track
Existing track to be removed
Storage yard
Stockyards
Coal Chute
Coal Unloader
Engine house
Water tank
Sand house
Coaling station
Cinder pit
Turntable
Freight house
Passenger station
Telegraph office
Signal tower
Switch tower
Underground Shaft Co. Spur
Federal Materials Co. Spur
Covington Spur
Main Line
Note: All work on this sheet pertaining to railroad relocation to be in accordance with agreement dated as above by the I.C.R.R. Co.


STA. 5+00 R
SCALE: 1"=10'
Sharing as req'd.
Natural ground surface
Stripping payment line
Compacted backfill
STA. 7+00 R
SCALE: 1"=10'
STA. 8+45 R
SCALE: 1"=10'
STA. 5+50 R
SCALE: 1"=10'
STA. 7+50 R
SCALE: 1"=10'
STA. 8+50 R
SCALE: 1"=10'
STA. 6+00 R
SCALE: 1"=10'
STA. 8+00 R
SCALE: 1"=10'
TYPICAL SECTION OF CURB WALL
SCALE: 1/2"=1'-0"
All reinforcing 3/4" bars, cut and bend in field. Estimated quantity 1330 linear ft. = 1201 lbs.
premolded filler
Bituminous wearing course on 6" concrete base
Fill for raising and grading track ties, ballast and fittings within limits shown shall be done by I.C.R.R. All other work required inclusive surfacing between tracks to be done under this contract.
Bituminous expansion joint
Brick paving See detail 'A'
Work to be done by I.C.R.R.
Top of existing pavement or ground surface
TYPICAL SECTION SHOWING WORK TO BE DONE BY I. C. R. R. CO. AND U.S.E.D. CONTRACT
SCALE: 1/2"=1'-0"
STA. 6+50 R
SCALE: 1"=10'
STA. 8+15 R
SCALE: 1"=10'
Note: R.R.Co. to move track 18' min. from toe of flood wall. Track to be replaced by R.R.Co. to present location upon completion of construction of flood wall.
18' Min.
Riverside
El. 350.6
Existing ground line
Bulkhead wall
Toe drain
TYPICAL SECTION CLARK ST. TO WASHINGTON ST.
SCALE: 1"=10'
STA. 6+86 R-ALLEY
SCALE: 1"=10'
3/4"x1 3/8" Flaring bracket with bituminous joint filler
5" Bituminous mastic
Wood tie @ Track
Symmetrical about ℄
Special cut brick to allow clearance for flange. Cut not to be less than 1 1/2" from rail and 2" deep.
6" Bituminous wearing course
5" Concrete base course
Expansion joint
Work, except surfacing, to be done by I.C.R.R.
Set one row of bricks, on end, where gravel street surface adjoins tracks.
DETAIL A-A
SCALE: 1/2"=1'-0"
STA. 8+30 R-JEFFERSON ST
SCALE: 1"=10'
When "x" distance becomes less than 2' eliminate bituminous wearing course and extend concrete to grade
R 7-26-44 C.O. #14 Bituminous material deleted, concrete substituted.
MK. DATE AUTHORITY REVISION
AS BUILT REVISIONS
Note: Railroad Co. to furnish and place ballast to top of ties. Contractor must furnish and place gravel between top of ties and 6" bituminous mastic. Existing ground and structures ------- Proposed changes and structures ——— Stations given are along I.C. Railroad main line track. See sheet 14
The railroad siding adjacent to flood wall between Washington street and Broadway avenue (approx. 740 lin.ft) is to be removed and replaced under this contract.
W.K.S.J. 10-41 Minor corrections
BY DATE CHARACTER REVISIONS
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
ILLINOIS CENTRAL RAILROAD REVISIONS
SHEET 13 OF 115 SHEETS SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED:
APPROVED:
AS BUILT
935-12.2/13

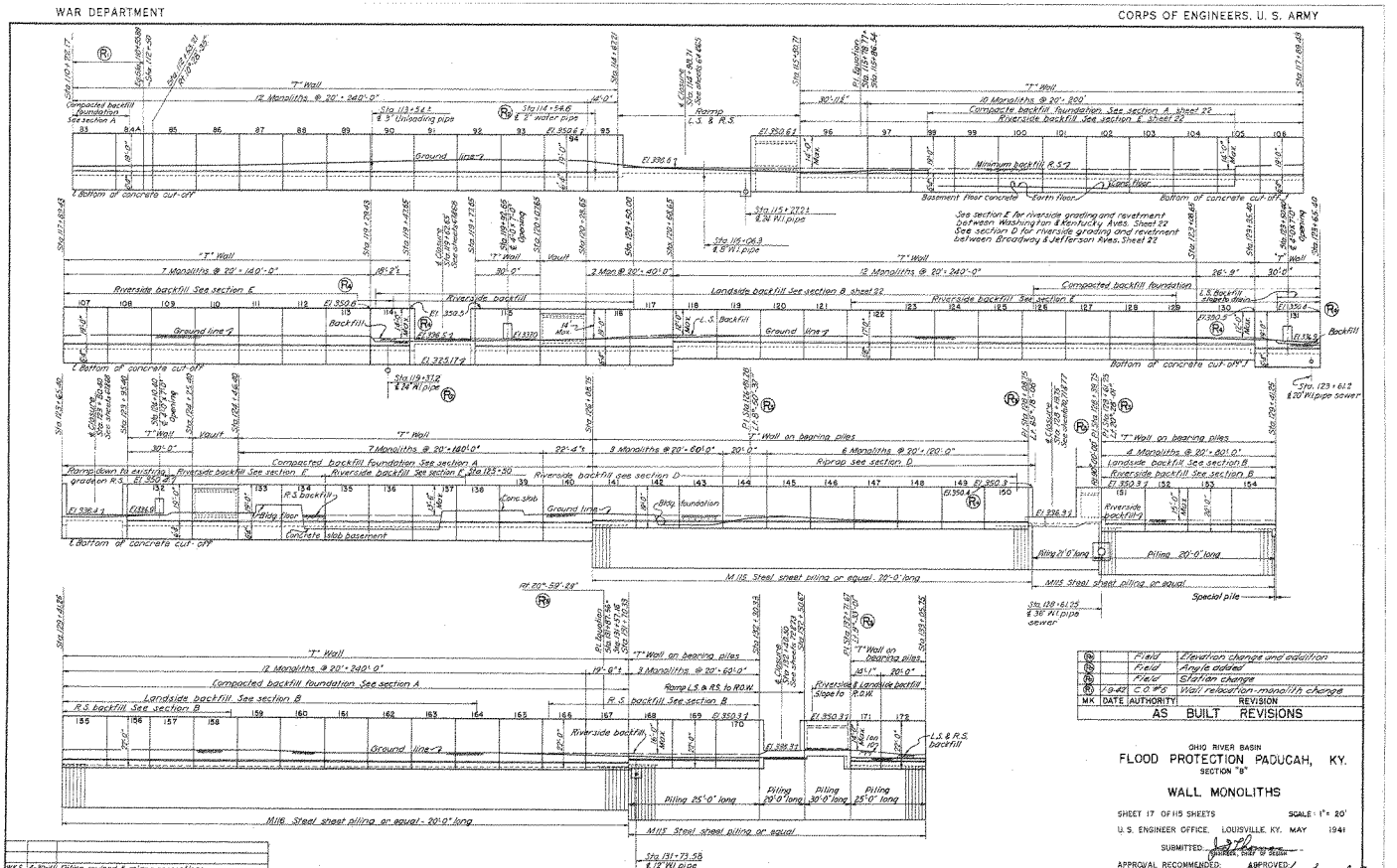

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
STREET & RAILROAD REVISIONS
FIRST STREET VICINITY
SHEET 14 OF 115 SHEETS
SCALE: 1" = 20'
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
AS BUILT
935-12.2/14
OPERATION NO.1
OPERATION NO.2
FIRST ST.
JEFFERSON ST.
BROADWAY
International Shoe Co.
Concrete loading platform
Riverside
REVISIONS
AS BUILT REVISIONS
Note:
All railroad relocation work on this sheet will be done by the Illinois Central R.R. Co.
Exact railroad alignment and grades to be determined by the I.C. R.R. Co.
See specifications for collaboration between contractor and I.C.R.R. Co.
All work shown on this sheet except that specifically pertaining to railroad relocation, grading and alignment shall be performed by the contractor.
Note:
Limiting dimensions shown for removal of existing structures are approx. only.
See sheet 41 for detail of joint and reinforcing steel in pavement base course.
Spacing of transverse contraction joints in base course not to exceed 30'.
Spacing of transverse expansion joints in base course not to exceed 90'.
592


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
DETAIL OF RELIEF WELL
NO SCALE
CROWN DETAIL
NO SCALE
Landside
Riverside
NEW LEVEE
TYPICAL SECTION
STA. 170 + 36.0
Natural ground line
Inspection Ditch
BORING SYMBOLS
Boards
Debris
Sand
Clay
Silt
Gravel
Blue Clay
Boulders
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
BORINGS & TYPICAL SECTION
SHEET 15 OF 115 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941.
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
935-12.2/17
REVISIONS


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
WALL MONOLITHS
SHEET 16 OF 115 SHEETS
SCALE: 1"=20'
U.S. ENGINEER OFFICE, LOUISVILLE KY. MAY 1941
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
935-12.2/18
AS BUILT REVISIONS
MK. DATE AUTHORITY
MONOLITHS 1 TO 6 INCL. ARE NOT INCLUDED IN THIS CONTRACT
STORAGE VAULT & MONOLITHS 76, 77, 78 & 79 ARE NOT INCLUDED IN THIS CONTRACT
General Notes:
Special plate to be given under previous contract

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



(R)		Field	Elevation change and addition
(R)		Field	Angle added
(R)		Field	Station change
(R)	1-9-42	C.O. #5	Wall relocation - monolith change
MK	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

MKS	6-30-41	Piling revised & minor corrections
BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

WALL MONOLITHS

SHEET 17 OF 115 SHEETS SCALE: 1" = 20'

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: _____ DISTRICT ENGINEER, CHIEF OF SECTION

APPROVAL RECOMMENDED: _____ PRINCIPAL ENGINEER, CHIEF OF PLANNING & CONTROL DIVISION

APPROVED: _____ LT. COL. CORPS OF ENGINEERS, DISTRICT ENGINEER

DR. BY G.W. TR. BY A.G. CK. BY F.B.F.

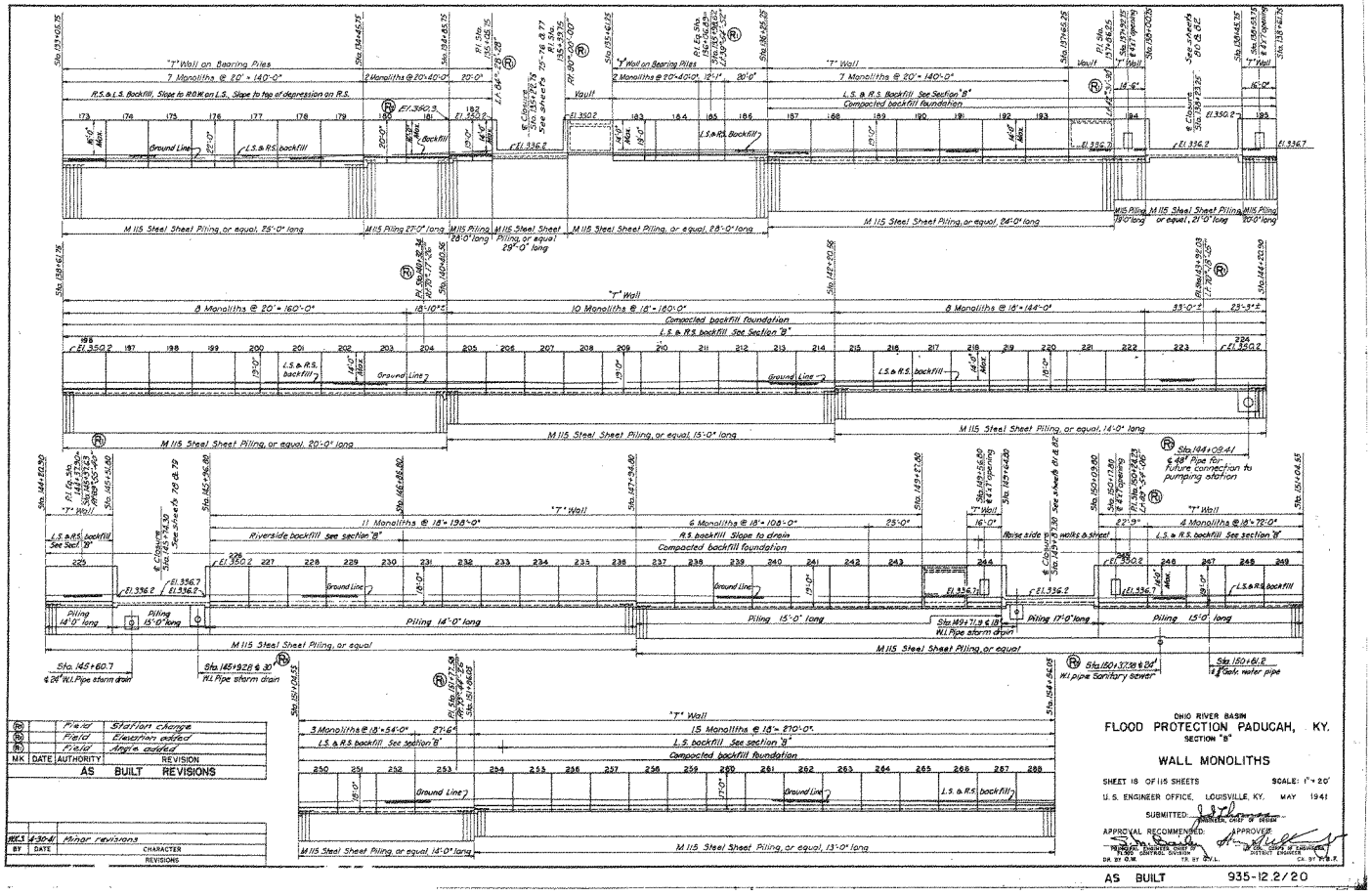
AS BUILT 935-122/19

395

1198

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



(R)		Field	Station change
(R)		Field	Elevation added
(R)		Field	Angle added
MK	DATE	AUTHORITY	REVISION

AS BUILT REVISIONS

WKS	4-30-41	Minor revisions
BY	DATE	CHARACTER REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

WALL MONOLITHS

SHEET 18 OF 115 SHEETS SCALE: 1" = 20'

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: _____ Assistant Chief of Section

APPROVAL RECOMMENDED: _____ Chief of Section

APPROVED: _____ Col. Corps of Engineers, District Engineer

PROJECT STRUCTURE DWG. NO. 75 BY DR. BY O.M. FLOOD CONTROL DIVISION

PROJECT STRUCTURE DWG. NO. 75 BY DV.L. CA. BY W.S.F.

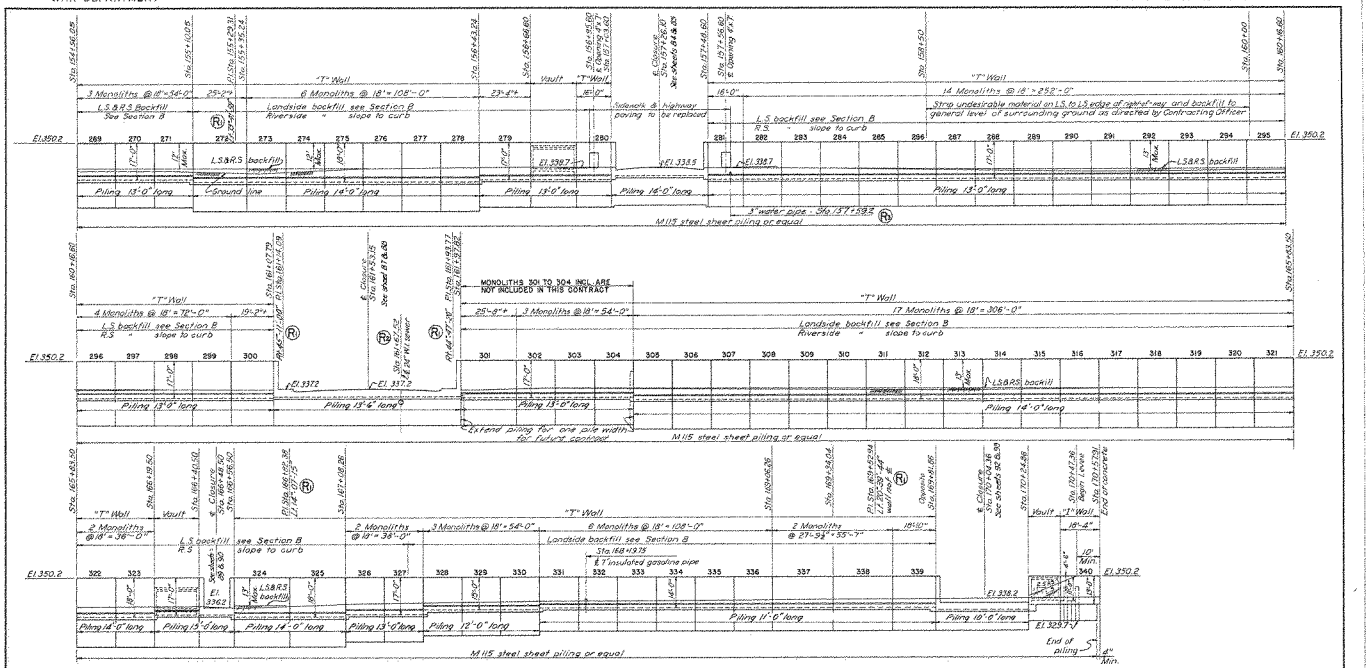
AS BUILT 935-12.2/20

396

1199

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



W.K.S.	4-30-41	24" sewer added
BY	DATE	CHARACTER
REVISIONS		

(R)	Field	Pipe added
(R)	Field	Station change
(R)	Field	Angles added
MK	DATE	AUTHORITY
AS BUILT REVISIONS		

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

WALL MONOLITHS

SHEET 19 OF 115 SHEETS

SCALE: 1" = 20'

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED:

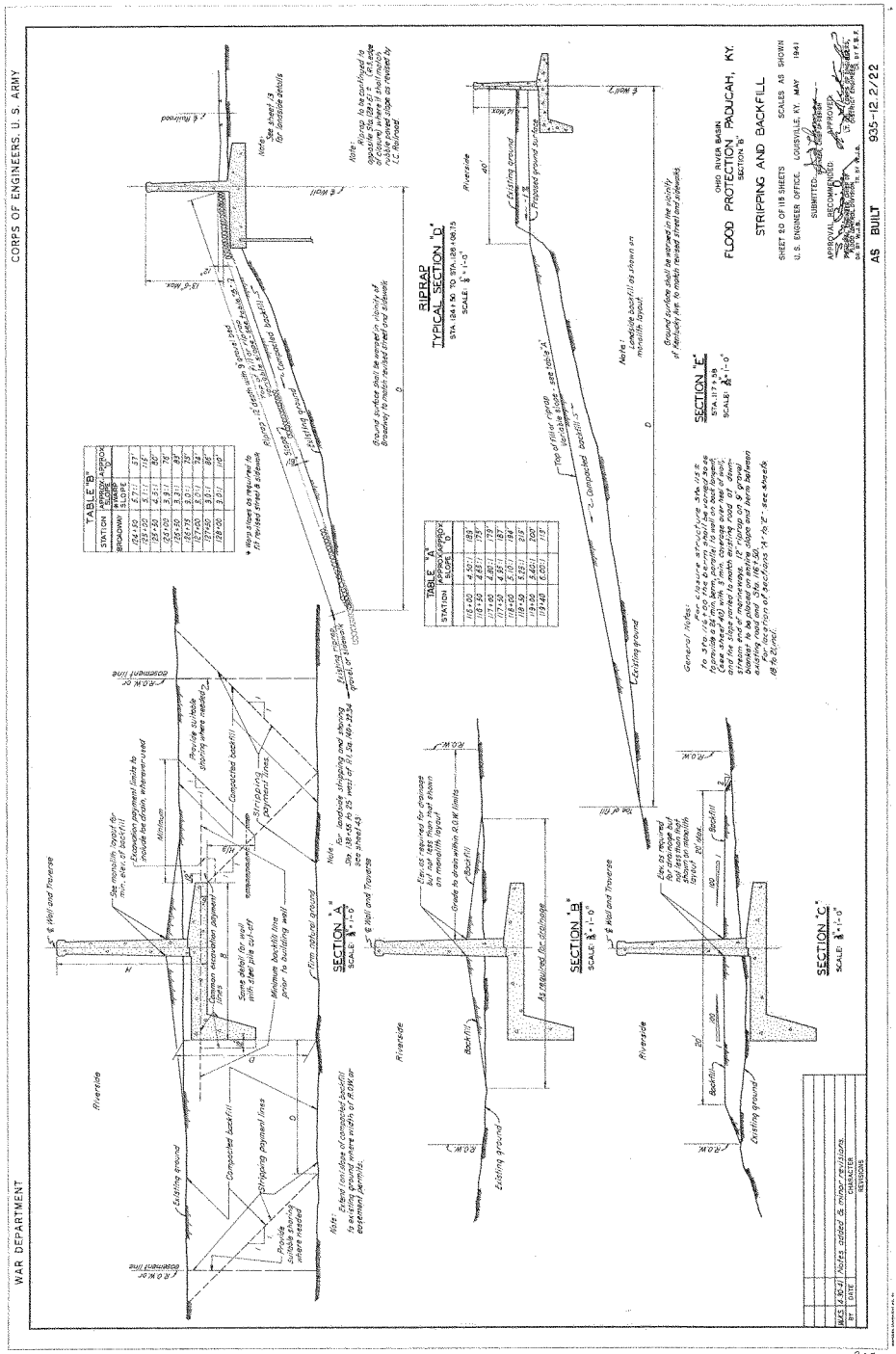
APPROVAL RECOMMENDED:

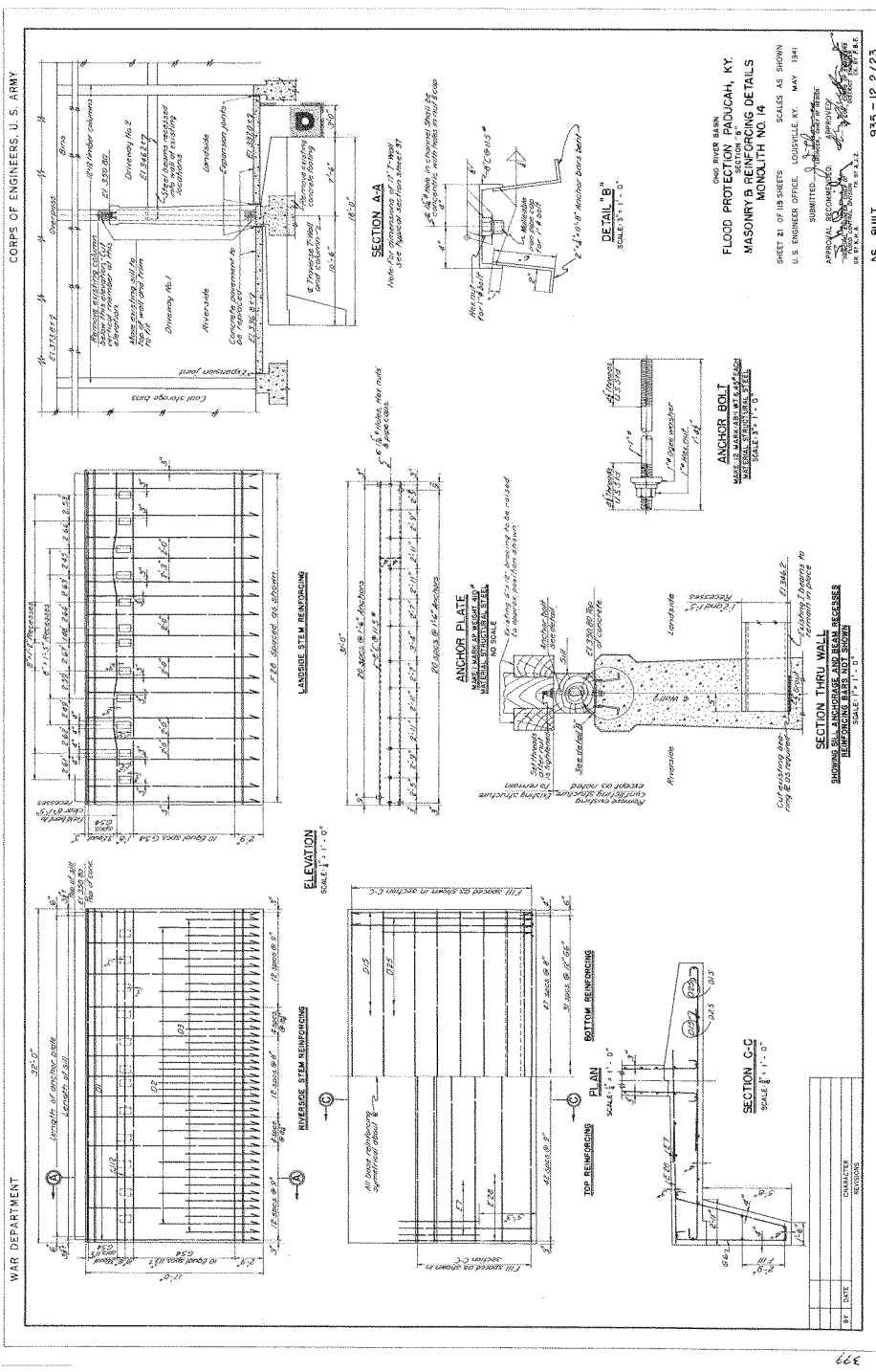
APPROVED:

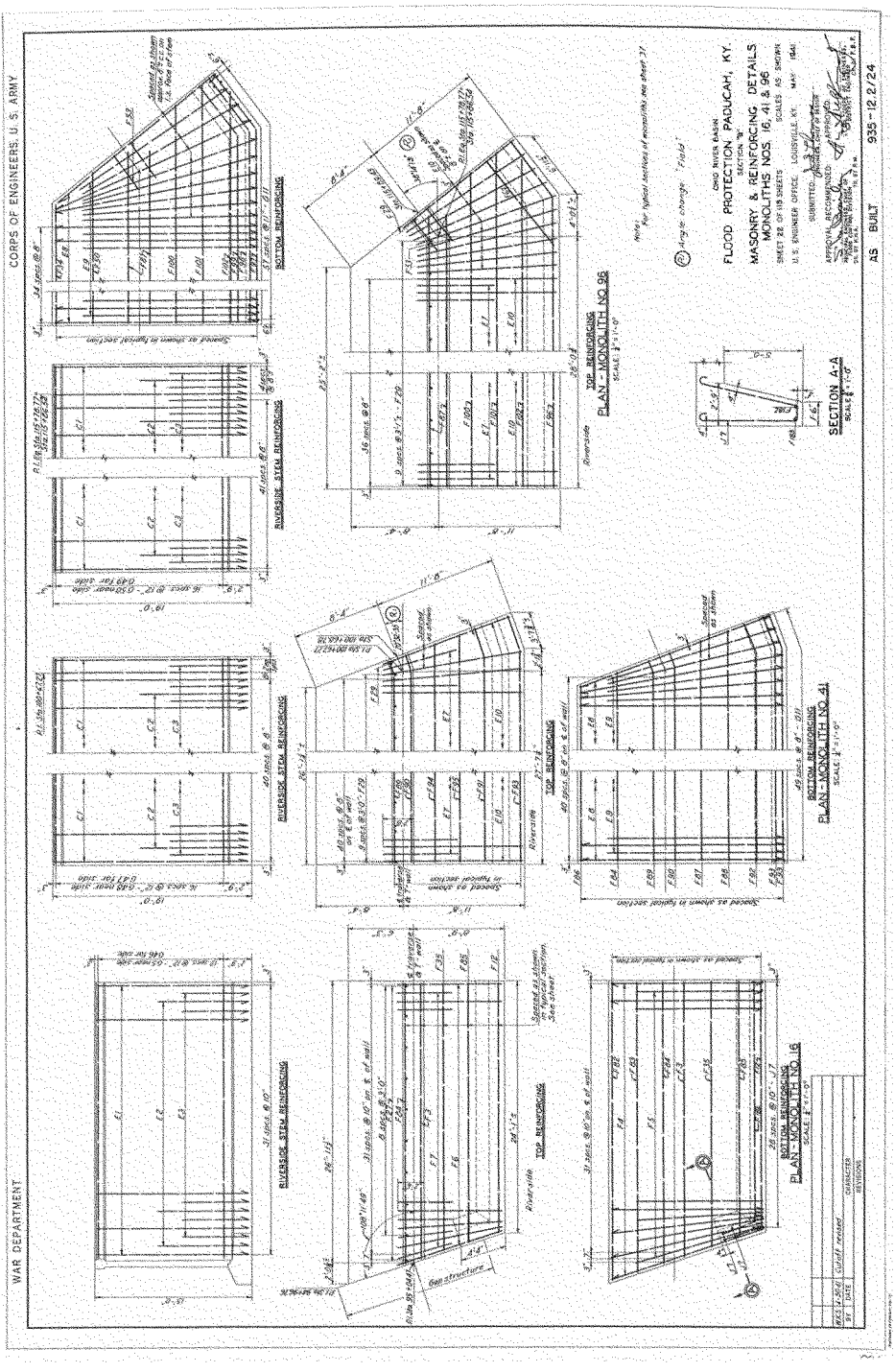
DR. BY O.M. TR. BY K.K.J. CK. BY F.B.F.

AS BUILT 935-12.2/21

1200

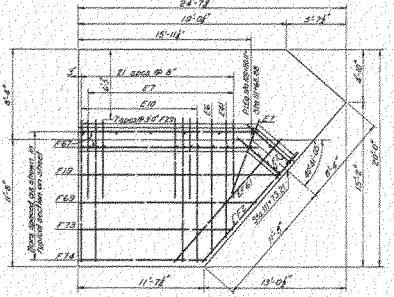

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
SECTION "A"
SCALE 1/4"-1'-0"
SECTION "B"
SCALE 1/4"-1'-0"
SECTION "C"
SCALE 1/4"-1'-0"
SECTION "E"
STA. 317+98
SCALE 1/4"-1'-0"
RIPRAP
TYPICAL SECTION "D"
STA. 184+50 TO STA. 188+15
SCALE 1/4"-1'-0"
TABLE "A"
TABLE "B"
FLOOD PROTECTION PADUCAH, KY.
OHIO RIVER BASIN
SECTION "B"
STRIPPING AND BACKFILL
SHEET 20 OF 118 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
AS BUILT
935-12.2/22


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION NO. 15
MASONRY & REINFORCING DETAILS
MONOLITH NO. 14
SHEET 21 OF 118 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
935 - 12.2/23
ELEVATION
SCALE 1/4" = 1'-0"
LANDSIDE STEM REINFORCING
RIVERSIDE STEM REINFORCING
PLAN
SCALE 1/4" = 1'-0"
TOP REINFORCING
BOTTOM REINFORCING
SECTION G-G
SCALE 1/4" = 1'-0"
SECTION A-A
SCALE 1/4" = 1'-0"
DETAIL "B"
SCALE 3" = 1'-0"
ANCHOR PLATE
SCALE 3" = 1'-0"
ANCHOR BOLT
SCALE 3" = 1'-0"
SECTION THRU WALL
SCALE 1" = 1'-0"
BY
DATE
CHARACTER
REVISIONS

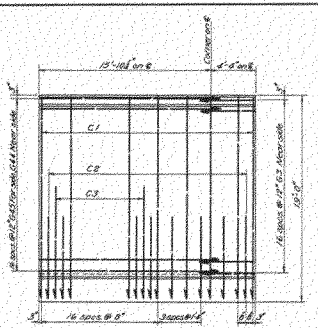

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 16, 41 & 96
SHEET 28 OF 119 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
AS BUILT
935-12.2/24
RIVERSIDE STEM REINFORCING
BOTTOM REINFORCING
TOP REINFORCING
PLAN - MONOLITH NO. 16
PLAN - MONOLITH NO. 41
PLAN - MONOLITH NO. 96
SECTION A-A
Riverside
Riverview
Special as shown in typical section
See Sheet
Note: For typical sections of monoliths see sheet 31.
(A) Angle change "Point"

WAR DEPARTMENT

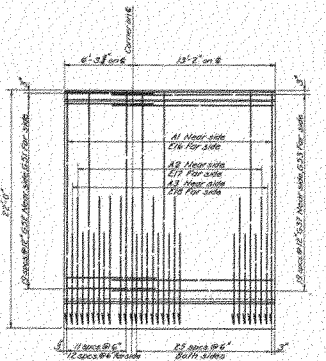
CORPS OF ENGINEERS, U. S. ARMY



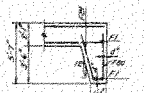
TOP REINFORCING
MONOLITH NO. 80



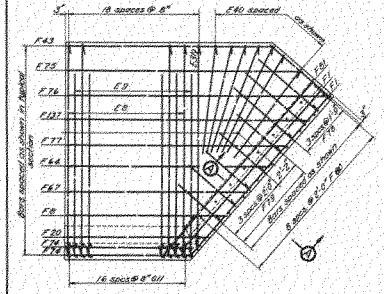
RIVERSIDE STEM REINFORCING
MONOLITH NO. 80



RIVERSIDE & LANDSIDE STEM REINFORCING
MONOLITH NO. 167

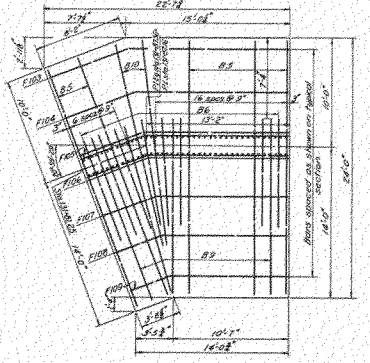


SECTION A-A

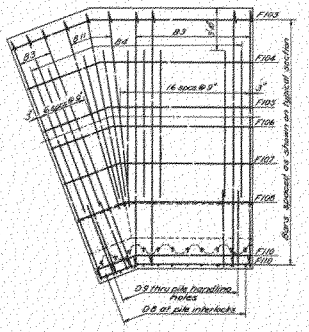


BOTTOM REINFORCING
MONOLITH NO. 80

PLAN MONOLITH NO. 80



TOP REINFORCING
MONOLITH NO. 167



BOTTOM REINFORCING
MONOLITH NO. 167

PLAN MONOLITH NO. 167

Note
For typical section of Monolith "80 see sheet 31-H-12
For typical section of Monolith "167 see sheet 31-H-22

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITH NOS. 80 & 167

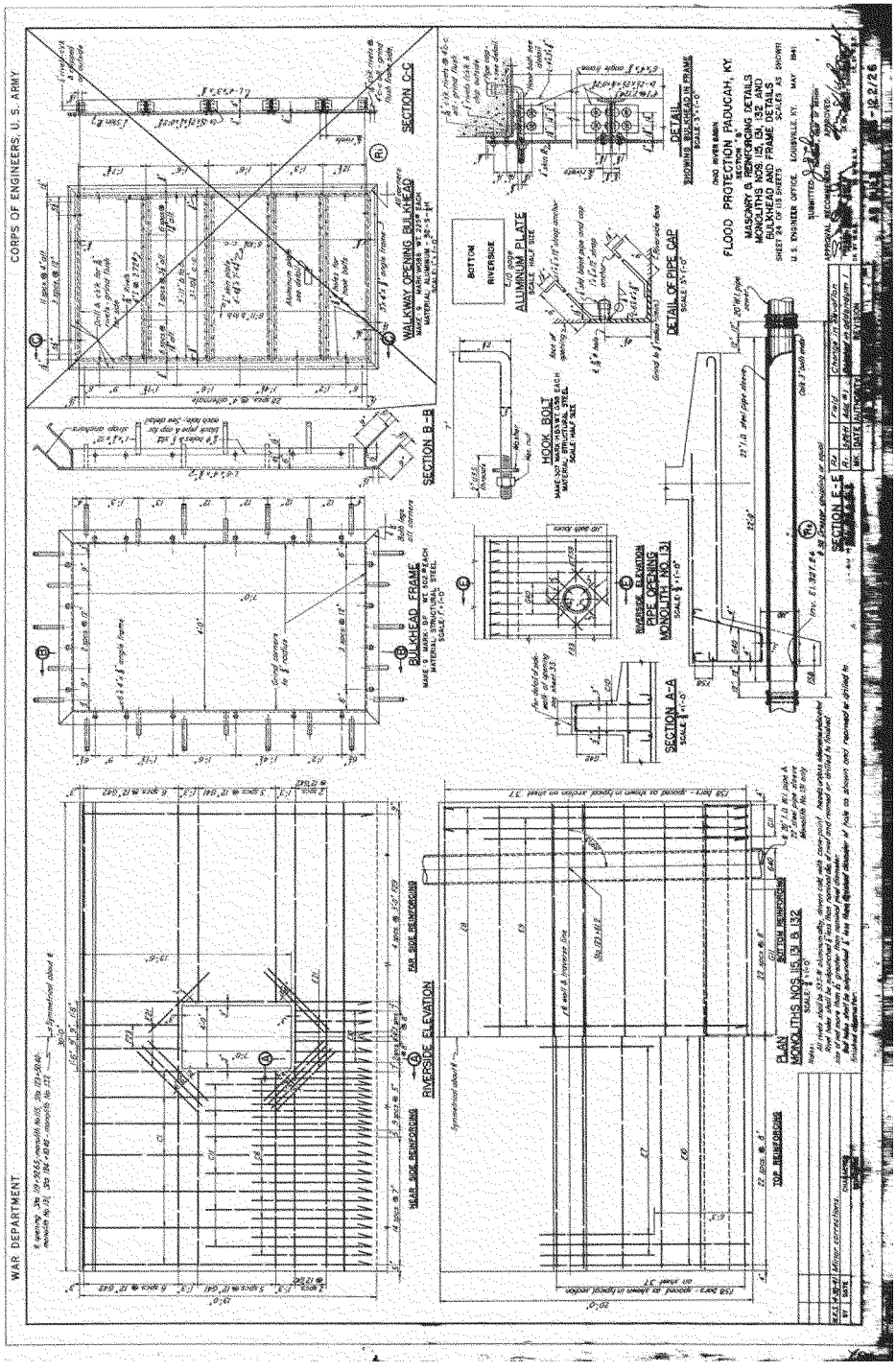
SHEET 23 OF 115 SHEETS SCALE: 1" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED: Thomas Carroll Stone
APPROVED: [illegible]
APPROVAL RECOMMENDED: [illegible]

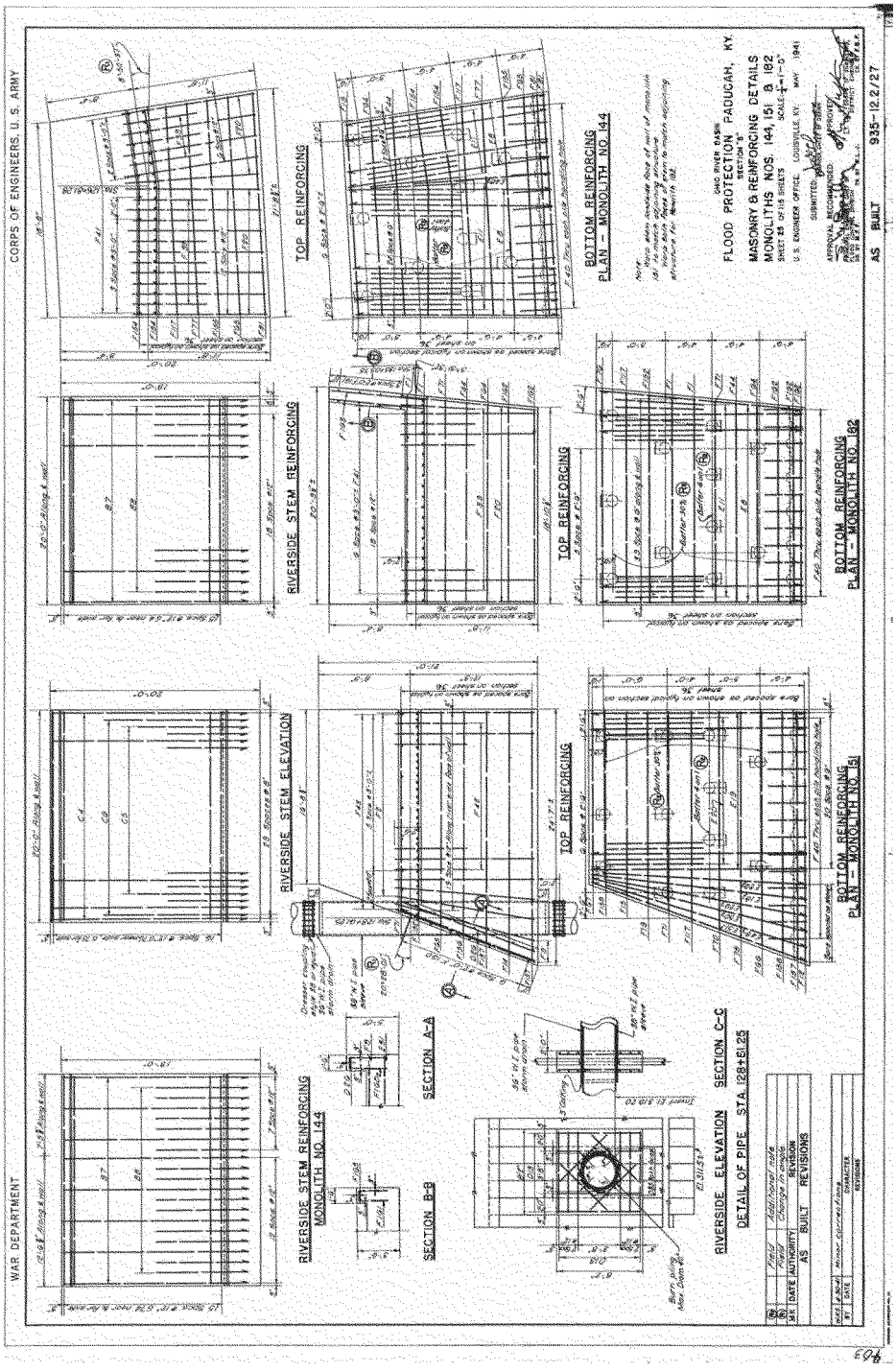
BY	DATE	CHARACTER OF REVISIONS
W.K.S.	6-30-41	Piling revised & minor corrections

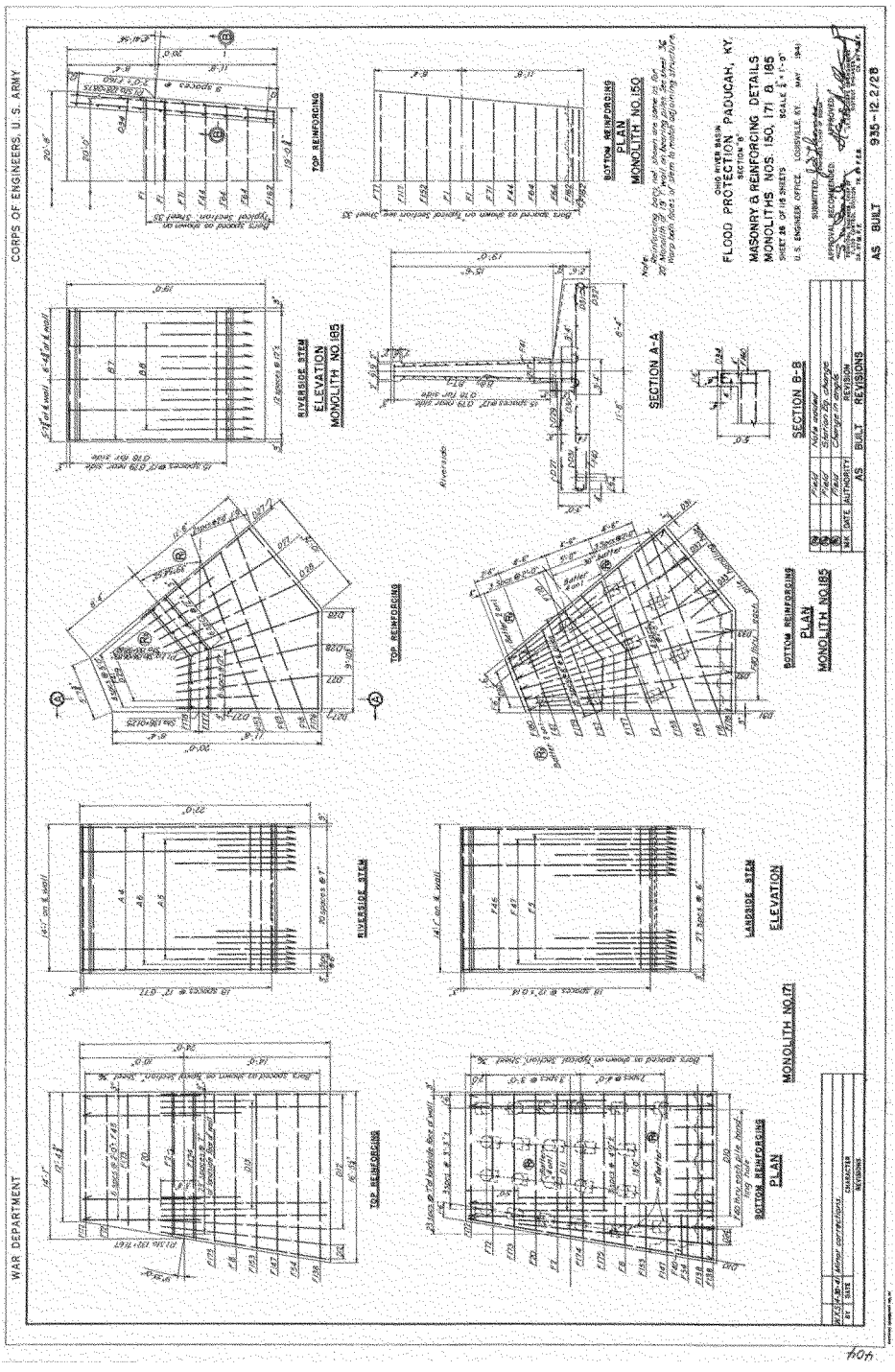
AS BUILT

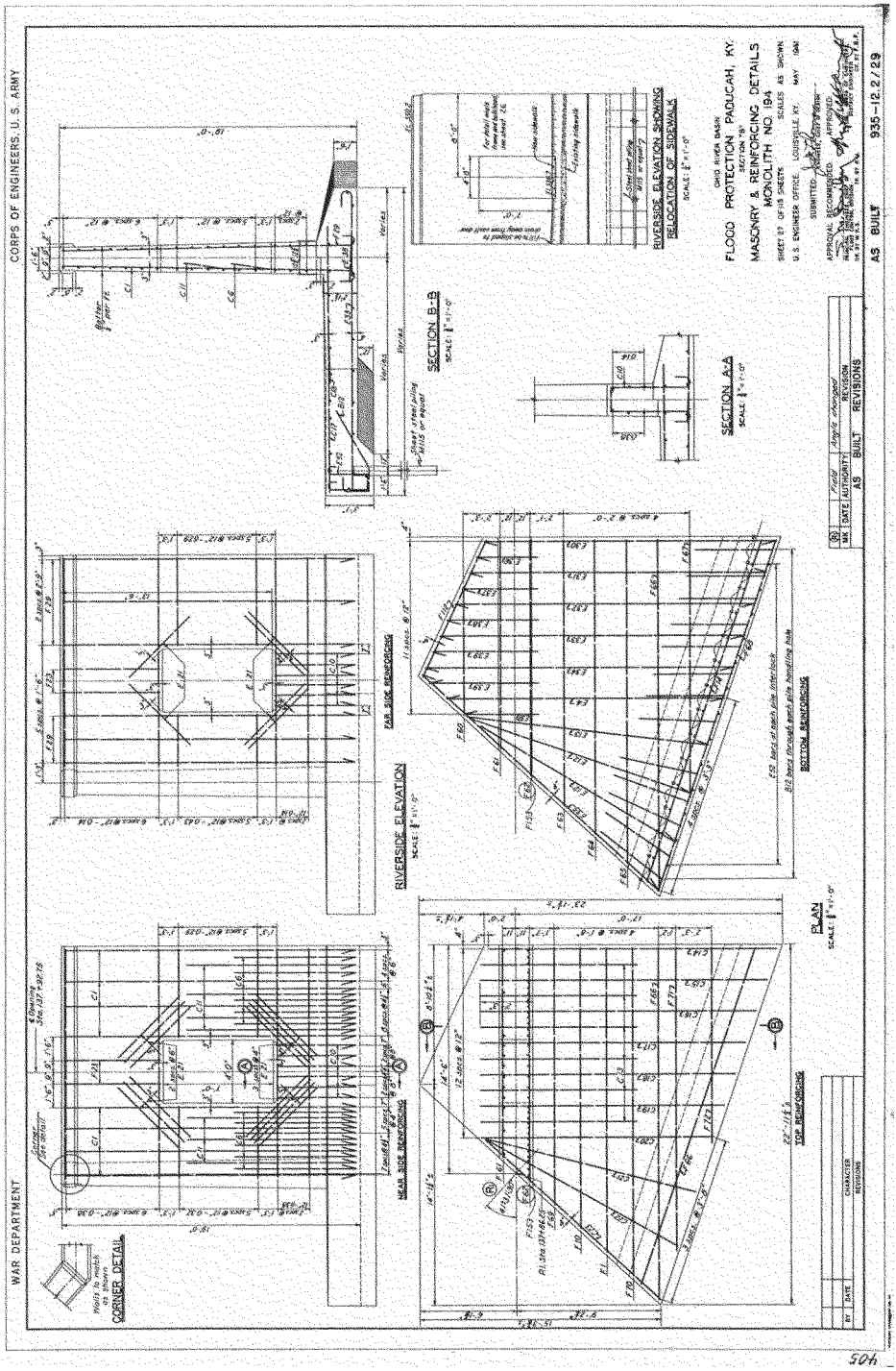
935-12.2/26

1204


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
FLOOD PROTECTION PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 31, 32 AND 33
BULKHEAD AND FRAME DETAILS
SHEET 24 OF 115 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SECTION C-C
SECTION B-B
SECTION A-A
SECTION E-E
RIVERSIDE ELEVATION
PLAN
MONOLITHS NOS. 31, 32 & 33
BULKHEAD FRAME
WALKWAY OPENING BULKHEAD
HOOK BOLT
ALUMINUM PLATE
DETAIL OF PIPE CAP
DETAIL
BOTTOM
RIVERSIDE


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 144, 151 & 182
SHEET 28 OF 78 SHEETS
SCALE 1/4"=1'-0
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
935-12.2/27
RIVERSIDE STEM REINFORCING
MONOLITH NO. 144
RIVERSIDE STEM ELEVATION
TOP REINFORCING
BOTTOM REINFORCING
PLAN – MONOLITH NO. 144
RIVERSIDE STEM REINFORCING
RIVERSIDE STEM ELEVATION
TOP REINFORCING
BOTTOM REINFORCING
PLAN – MONOLITH NO. 182
RIVERSIDE STEM REINFORCING
RIVERSIDE STEM ELEVATION
TOP REINFORCING
BOTTOM REINFORCING
PLAN – MONOLITH NO. 151
SECTION A-A
SECTION B-B
RIVERSIDE ELEVATION SECTION C-C
DETAIL OF PIPE STA. 128+61.25
AS BUILT REVISIONS
DATE AUTHORITY REVISION

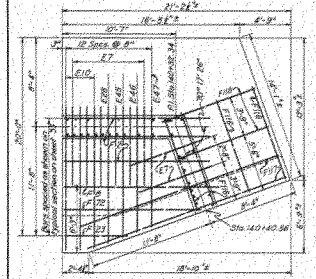

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 150, 171 & 185
SHEET 28 OF 115 SHEETS
SCALE 1" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
AS BUILT
935-12-2/28
AS BUILT REVISIONS
TOP REINFORCING
BOTTOM REINFORCING
PLAN
MONOLITH NO.150
SECTION A-A
SECTION B-B
RIVERSIDE STEM
ELEVATION
MONOLITH NO.185
LANDSIDE STEM
ELEVATION
MONOLITH NO.171


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
CORNER DETAIL
RIVERSIDE ELEVATION
SCALE 1"=1'-0"
SECTION B-B
SCALE 1"=1'-0"
SECTION A-A
SCALE 1"=1'-0"
RIVERSIDE ELEVATION SHOWING RELOCATION OF SIDEWALK
SCALE 1"=1'-0"
PLAN
SCALE 1"=1'-0"
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
BOTTOM REINFORCING
TOP REINFORCING
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MONOLITH NO. 194
SHEET 27 OF 115 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1944
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
AS BUILT
935-12.2/29
BY | DATE | CHARACTER REVISIONS
BY | DATE | AUTHORITY | REVISION
AS BUILT REVISIONS
504

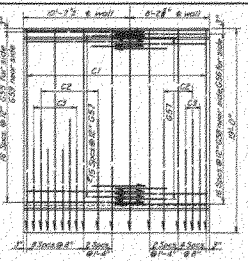
EM 33-600

WAR DEPARTMENT

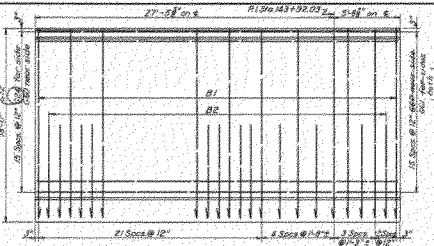
CORPS OF ENGINEERS, U. S. ARMY



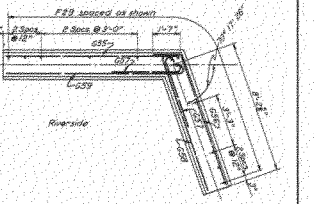
TOP REINFORCING
MONOLITH NO. 204



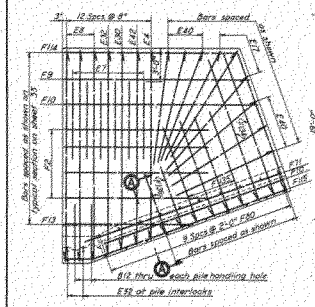
RIVERSIDE STEM REINFORCING
MONOLITH NO. 204
SCALE: 1/4" = 1'-0"



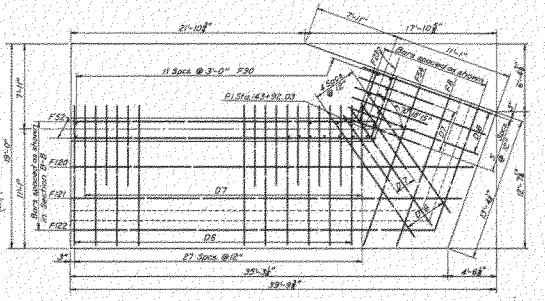
RIVERSIDE STEM REINFORCING
MONOLITH NO. 223
SCALE: 1/4" = 1'-0"



CORNER REINFORCEMENT OF STEM
MONOLITH NO. 204
SCALE: 1/4" = 1'-0"

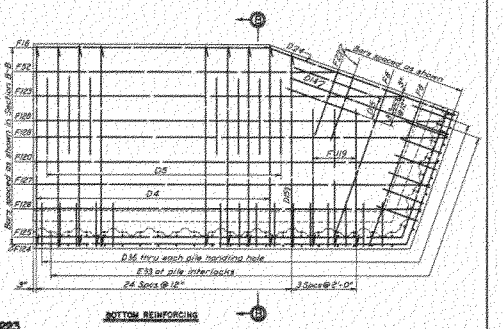


BOTTOM REINFORCING
PLAN-MONOLITH NO. 204
SCALE: 1/4" = 1'-0"

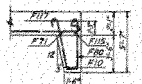


TOP REINFORCING

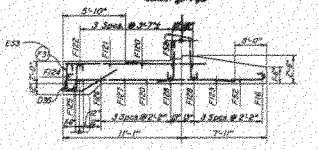
PLAN-MONOLITH NO. 223
SCALE: 1/4" = 1'-0"



BOTTOM REINFORCING



SECTION A-A
SCALE: 1/4" = 1'-0"



SECTION B-B
SCALE: 1/4" = 1'-0"

BY	DATE	CHARACTER OF REVISIONS
W.K.S. & W.M.F.	30-41	Minor correction.

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 204 & 223

SHEET 28 OF 115 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY, 1941

SUBMITTED: Assistant Chief of Design

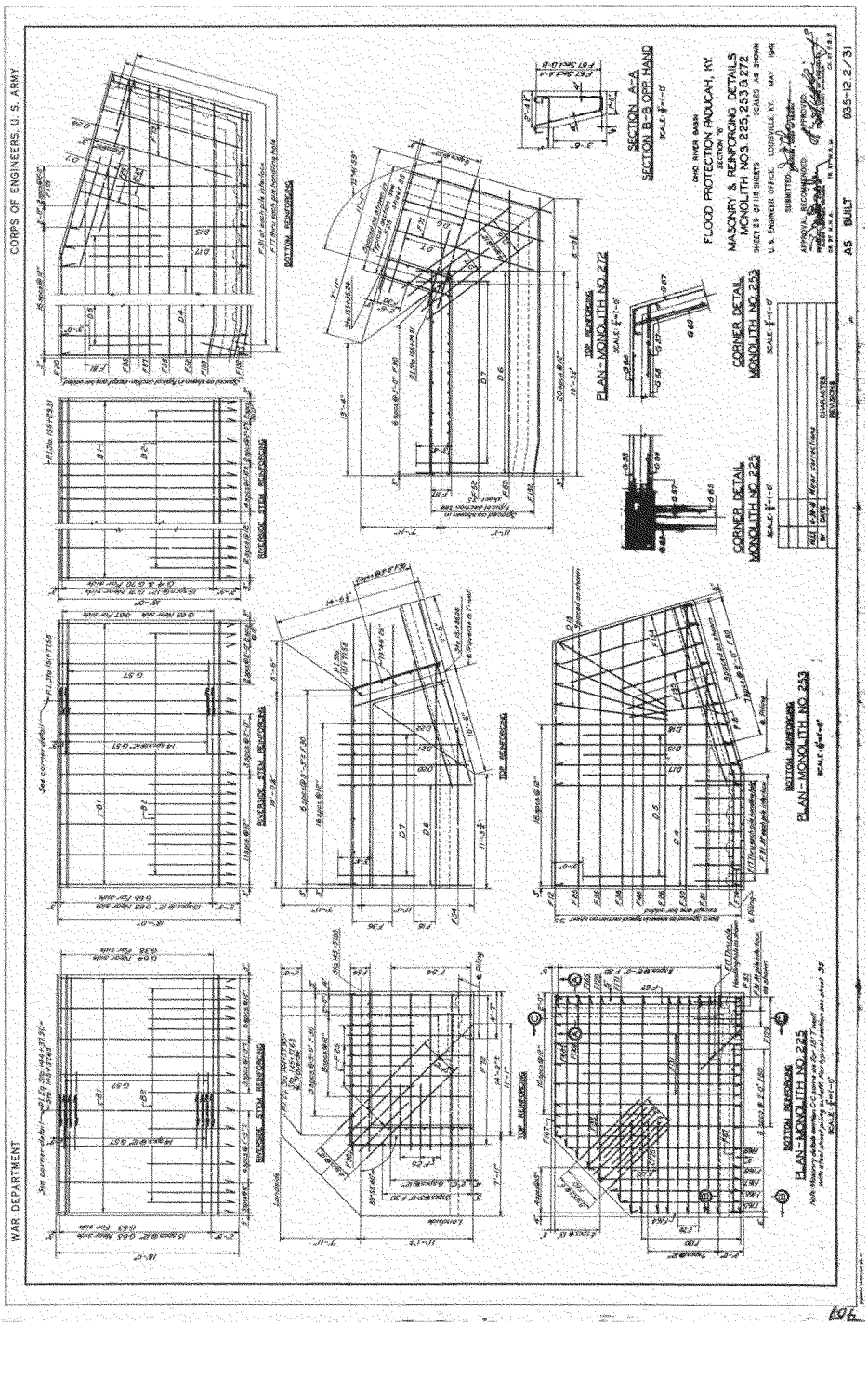
APPROVAL RECOMMENDED: Chief, Planning Division

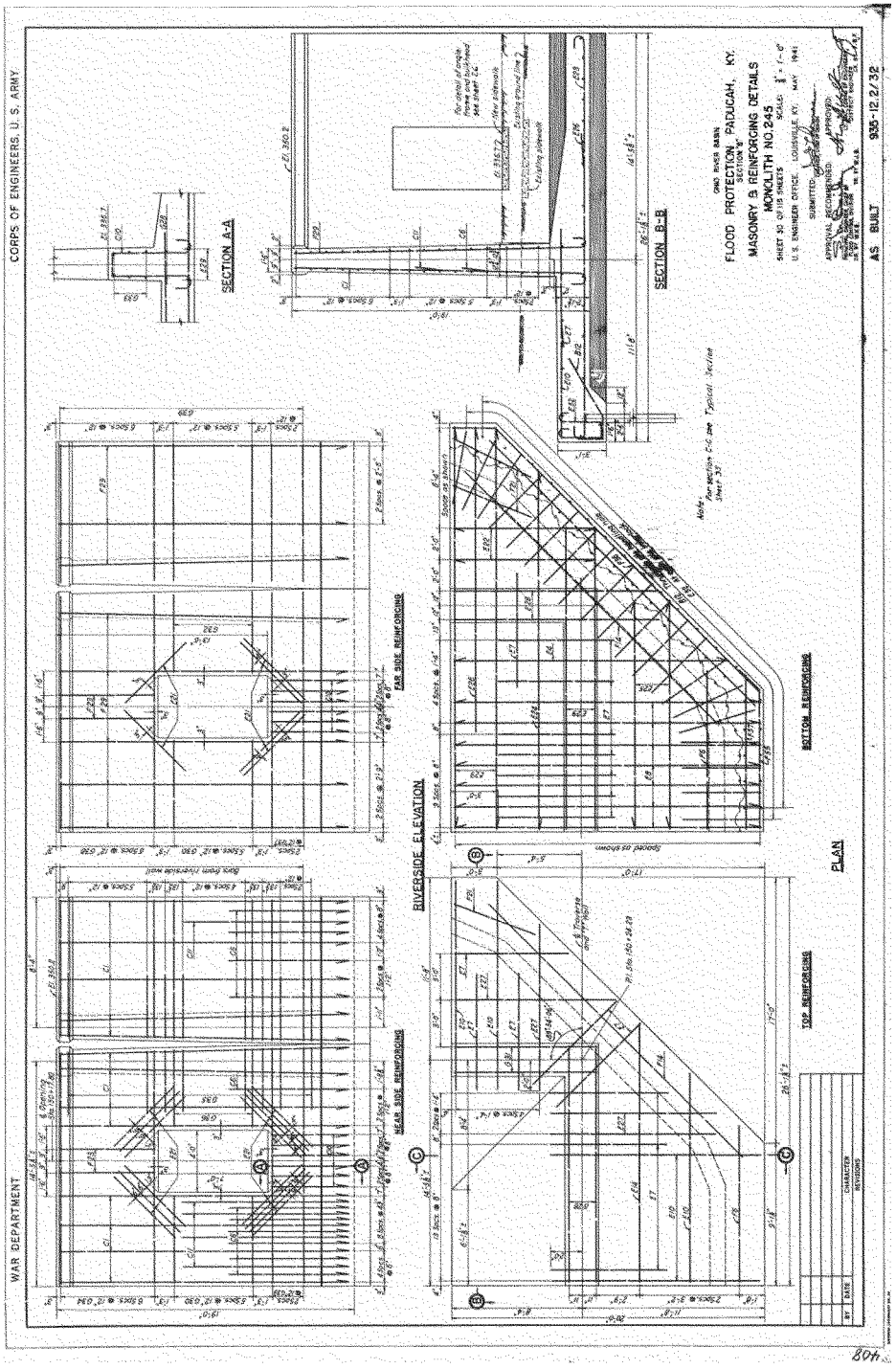
APPROVED: District Engineer

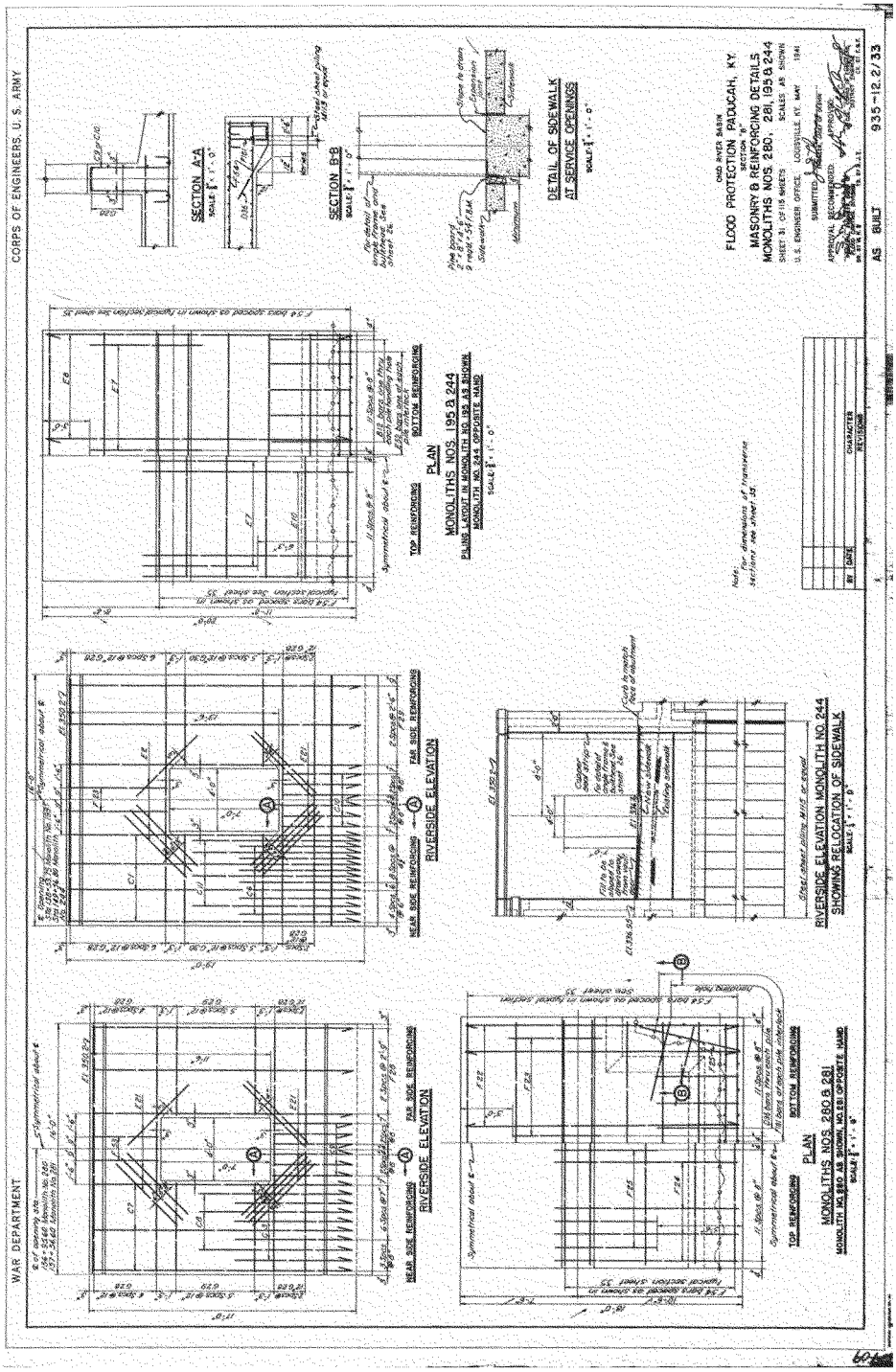
AS BUILT

935-12.2/30

12096

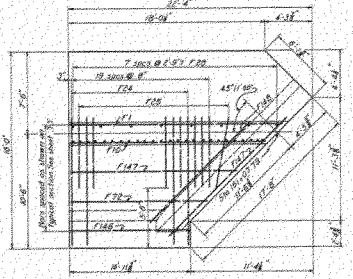

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
FLOOD PROTECTION PADUCAH, KY.
SECTION 'B'
OHIO RIVER BASIN
MASONRY & REINFORCING DETAILS
MONOLITH NOS. 225, 253 & 272
SHEET 19 OF 19 SHEETS SCALES AS SHOWN
U.S. ENGINEER OFFICE LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
AS BUILT
935-12.2/31
PLAN - MONOLITH NO. 272
PLAN - MONOLITH NO. 253
PLAN - MONOLITH NO. 225
SECTION A-A
SECTION B-B
CORNER DETAIL MONOLITH NO. 253
CORNER DETAIL MONOLITH NO. 225
BOTTOM REINFORCING
TOP REINFORCING
RIVERSIDE STEM REINFORCING
LANDSIDE STEM REINFORCING


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MONOLITH NO. 245
SHEET 30 OF 115 SHEETS
SCALE: 1" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
935-12.2/32
SECTION A-A
SECTION B-B
RIVERSIDE ELEVATION
PLAN
REAR SIDE REINFORCING
FAR SIDE REINFORCING
BOTTOM REINFORCING
TOP REINFORCING
Typical Section
CHARACTER OF REVISIONS
DATE
BY

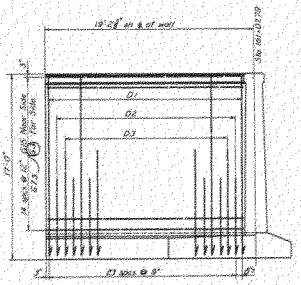

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MONOLITHS NOS. 280, 281, 195 & 244
SHEET 31 OF 115 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
935-12.2/33
SECTION A-A
SECTION B-B
DETAIL OF SIDEWALK AT SERVICE OPENINGS
PLAN
MONOLITHS NOS. 195 & 244
PLANS LAYOUT IN MONOLITH NO. 195 AS SHOWN
MONOLITH NO. 244 OPPOSITE HAND
RIVERSIDE ELEVATION
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
TOP REINFORCING
BOTTOM REINFORCING
PLAN
MONOLITHS NOS. 280 & 281
MONOLITH NO. 280 AS SHOWN, NO. 281 OPPOSITE HAND
RIVERSIDE ELEVATION-MONOLITH NO. 244
SHOWING RELOCATION OF SIDEWALK
BY
DATE
CHARACTER
REVISIONS

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



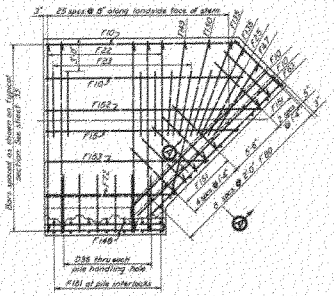
TOP REINFORCING



RIVERSIDE STEM REINFORCING

MONOLITH NO. 300

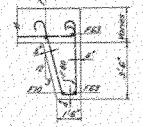
SCALE: $\frac{1}{8}$" = 1'-0"



BOTTOM REINFORCING

PLAN - MONOLITH NO. 300

SCALE: $\frac{1}{8}$" = 1'-0"



SECTION A-A

SCALE: $\frac{1}{8}$" = 1'-0"

W.E.S. 4-30-41	Monolith No. 301 deleted
BY DATE	CHARACTER OF REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MONOLITHS NOS. 300 & 301

SHEET 32 OF 116 SHEETS SCALES AS SHOWN.

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [signature] ASSISTANT CHIEF OF BRANCH

APPROVAL RECOMMENDED: [signature] DIVISION ENGINEER

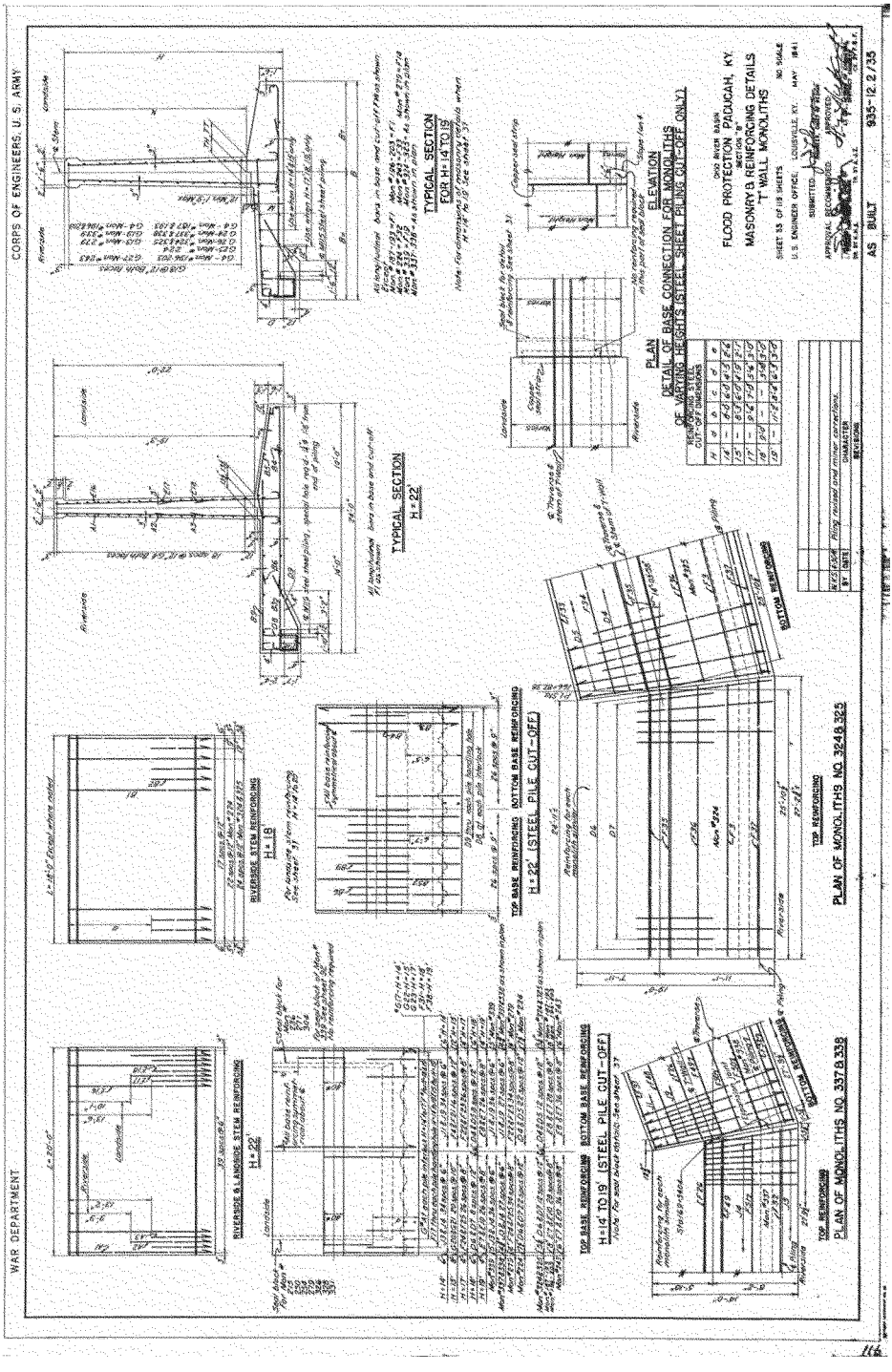
APPROVED: [signature] COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

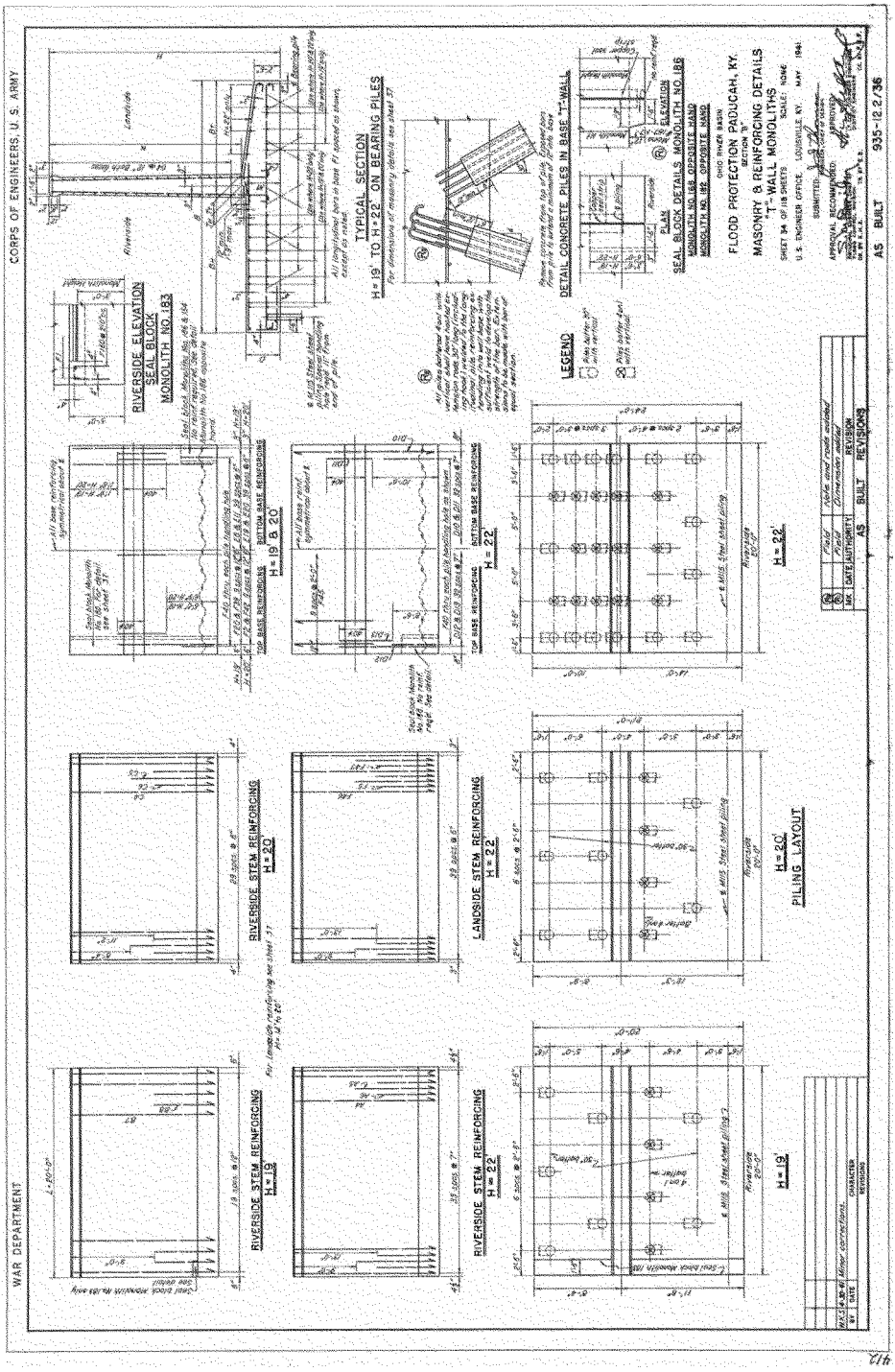
DR. BY: M.F.F. TR. BY: O.A.K. CK. BY: F.B.F.

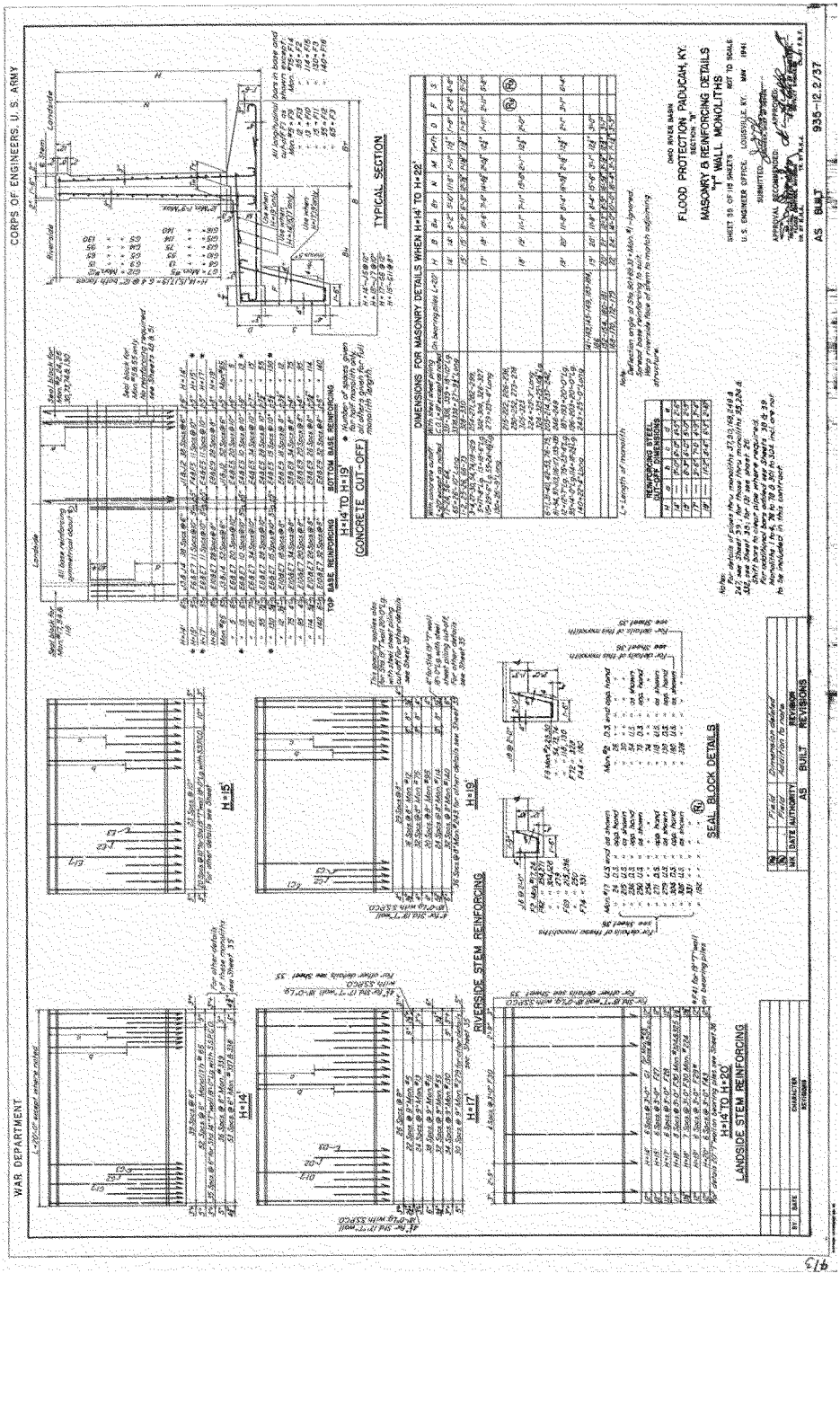
AS BUILT

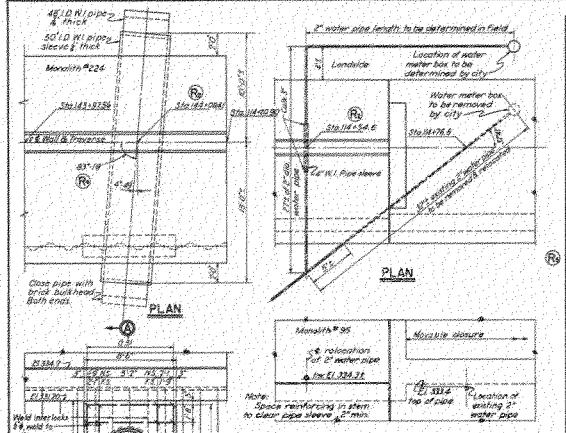
935-12.2/34

1213

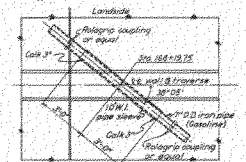

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
MASONRY & REINFORCING DETAILS
"T" WALL MONOLITHS
PLAN OF MONOLITHS NO 337 & 339
PLAN OF MONOLITHS NO 324 & 325
TYPICAL SECTION H=22'
TYPICAL SECTION FOR H=14 TO 19
PLAN DETAIL OF BASE CONNECTION FOR MONOLITHS OF VARYING HEIGHTS (STEEL SHEET PILING CUT-OFF ONLY)
ELEVATION
AS BUILT
935-12.2/35

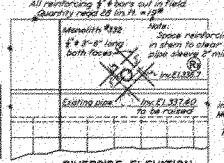

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
RIVERSIDE ELEVATION
SEAL BLOCK
MONOLITH NO. 183
TYPICAL SECTION
H = 19' TO H = 22' ON BEARING PILES
For dimensions of masonry details see sheet 37
DETAIL CONCRETE PILES IN BASE "T" WALL
LEGEND
Piles battered 3on1 with vertical
Piles battered 4on1 with vertical
SEAL BLOCK DETAILS MONOLITH NO. 186
MONOLITH NO. 185 OPPOSITE MAND
MONOLITH NO. 187 OPPOSITE MAND
PLAN
ELEVATION
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MASONRY & REINFORCING DETAILS
"T" WALL MONOLITHS
SHEET 34 OF 118 SHEETS
SCALE: NONE
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
AS BUILT
935-12.2/36
RIVERSIDE STEM REINFORCING
H = 19
RIVERSIDE STEM REINFORCING
H = 20
RIVERSIDE STEM REINFORCING
H = 22
LANDSIDE STEM REINFORCING
H = 22
H = 19'
H = 20'
H = 22'
PILING LAYOUT
REVISIONS
AS BUILT

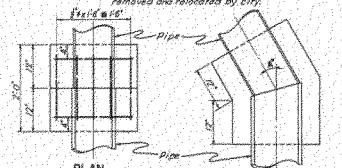

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
SECTION "A"
MASONRY & REINFORCING DETAILS
"A" WALL MONOLITHS
OHIO RIVER MAIN
SHEET 35 OF 115 SHEETS
SCALE
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
AS BUILT
935-12.2/37
DIMENSIONS FOR MASONRY DETAILS WHEN H=14 TO H=22
REINFORCING STEEL
SEAL BLOCK DETAILS
RIVERSIDE STEM REINFORCING
LANDSIDE STEM REINFORCING
TYPICAL SECTION
BASE REINFORCING
(CONCRETE CUT-OFF)
H=14 TO H=19
H=14
H=15
H=16
H=17
H=18
H=20
REVISIONS
AS BUILT

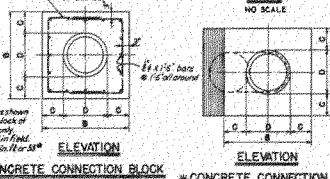


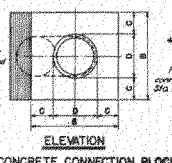
RIVERSIDE ELEVATION
STA. 1+14+57
SCALE: ¼"=1'-0"











* Angle to be determined in field.

For concrete connection block at Sta. 1+41+3 see sheet 110

SCHEDULE OF SEWER CONNECTIONS AND PIPES THRU WALL

STATION	DESCRIPTION	OLD ELEV.	NEW ELEV.	REMARKS
90+36.0	36" V.C. Pipe	F.L. 324.6	Same	Remove 35'-1" Replace with 48.5' W.I. & 2 seep rings. See typical section sheet 38
92+19.4	8" C.I. Pipe	Top 334.4		Connect to Catch Basin No. 1. Remove 4'-3" of wall & plug.
93+17.1	6" V.C. Pipe	Top 331.1		Connect to roof drain. Remove 4'-8" of wall and plug.
94+58.1	2" Water Pipe	Top 334.1	F.L. 333.81	Lower to El. 333.31 to pass thru outlet of gas analyzer with 22' of 4" W.I. pipe sleeve. See sheet 56.
160+39	6" V.C. Pipe	F.L.		Remove 27.7' Plug opening in manhole.
99+70	10" V.C. Pipe	F.L. 332.05	F.L. 328.31	Replace with approx. 36' of 10" W.I. pipe from MH No. 2 with 25' of 12" pipe sleeve. See sheet 39
102+01	6" V.C. Pipe	F.L. 332.6		Remove 15½' Not found
108+58.0	54" Cor. Conc. Pipe	F.L. 318.9	Same	Remove 5.4'. Replace 47.8' of 54" W.I. pipe and 2 seep rings. See typical section sheet 39
113+54	8" Gasoline Unloading Pipe	Top 331.51	Raised	Pass thru stem with 6' of 8" W.I. pipe sleeve
113+55	Underground Tank			To be shifted by other interests
114+76.6	2" Water Pipe	Top 338.8	F.L. 334.31	Relocate pipe to Sta. 1+14+34.6 using 6' of 4" W.I. pipe sleeve. See this sheet & sheet 40
114+82.61	Water Meter Box			To be removed & relocated by city
115+08.8	8" V.C. Pipe	F.L. 331.5	Same	Replace 66.4' with 8" W.I. & 31' of 10" W.I. pipe sleeve. Remove existing M.H. See sheet 40
115+08.5	18" V.C. Pipe	F.L. 324.4		Remove 49.5' See sheet 40
115+27.2	18" V.C. Pipe	F.L. 326.0	Same	Remove 36.0' Replace with 12' W.I. pipe and 8' of 36" W.I. pipe sleeve. See sheet 40 and 66.
116+25	Manhole	Bottom 317.5		Remove and backfill.
119+20.0	6" V.C. Pipe	F.L. 330.15		Remove 6' landside and plug. Not found
119+37.6	24" V.C. pipe	F.L. 318.31	Same	Remove 36'. Replace with 0.55' 24" W.I. pipe & 2 seep rings. See sheet 38.
119+96.8	8" V.C. Pipe	F.L. 331.71		Remove and plug at M.H.
123+18	Water Meter Box			To be relocated by City
123+29	Underground Tank	Top 336.9 Bottom 333.0	Remove	Tank 3.5' x 3.5' x 3.5'

STATION	DESCRIPTION	OLD ELEV.	NEW ELEV.	REMARKS
123+61.3	24" V.C. Pipe	F.L. 326.6	F.L. 326.6	Remove 57'. Replace with 33' of 20" W.I. pipe & 22' of 24" W.I. pipe sleeve. Connect to existing 24"
123+87.6	24" V.C. Pipe	F.L. 328.7		Remove 41'. See sheet 42.
126+61.35	36" V.C. Pipe	F.L. 319.2	Same	Remove & replace with 33.2' of 36" W.I. pipe & 22' of 58" W.I. pipe sleeve. at Sta. 1+26.65. See sheet 111.
131+13.4	12" Conc. Pipe	F.L. 325.0	Same	Remove 172.6'& replace with 48.6'12" W.I. pipe & 108.5' 12" W.C. pipe lining 76' of 14" W.I. pipe sleeve. See sheet 111.
144+08.41	48" I.D. W.I. Pipe	F.L. 324.0		Place 21'-6" of 60" W.I. pipe with 23' of 60" W.I. pipe sleeve for future connection to Pump House. See this sheet
145+60.7	24" V.C. Pipe	F.L. 322.81	F.L. 322.81	Remove 32', replace with 43' of 24" W.I. pipe and 21' of 36" W.I. pipe sleeve. See sheets 39 and 44
145+92.8	30" V.C. Pipe	F.L. 325.0	F.L. 324.81	Remove 48.1', replace with 42' of 30" W.I. pipe & 21' of 42" W.I. pipe sleeve. See sheets 39 & 44
148+71.92	15" V.C. Pipe	F.L. 327.8	Same	Remove 48.6' replace with 18' W.I. pipe & 31' of 30" W.I. pipe sleeve. See sheet 45
150+45.5	24" C.I. Pipe	F.L. 324.2	F.L. 323.95	Remove 74'. replace with 60.6' of 24" W.I. pipe and 2 cont. seep rings of 36" I.D. (80-38.5. See sheets 39 & 45
150+61.2	¾" Water Pipe	Top 333.6	¾" 339.6	Raise & pass thru stem with 6' of 4" W.I. pipe sleeve. See sheet 39. Water meter vault to be handled by City.
154+46.0	6" V.C. Pipe	F.L. 332.6		Remove 59.6' & plug. R.S.
154+82.0	8" V.C. Pipe	Top 335.6		Remove 42.8' & divert Flow to M.H.
157+04.0	18" V.C. Pipe	F.L. 334.5		Remove 18' See sheet 46
157+55.0	10" V.C. Pipe	F.L. 335.4		Remove 22.8' See sheet 46
157+59.2	3" Water Pipe	Top 338.4		Pipe & fire hydrant to be handled by City
159+29.0	6" V.C. Pipe			Remove 26.1'
159+37.0	6" V.C. Pipe	F.L. 333.1		Remove 49.1' & plug at M.H.
For pipes at 5+& Park Sts.				See sheet 46
168+19.75	T.O.D. Iron Pipe	Top 337.98	F.L. 337.71	Raise to pass thru stem using 6' of 10" W.I. pipe sleeve. See this sheet.
173+15.0	6" V.C. Pipe	F.L. 329.3		Remove under levee
115+54	10" V.C. Pipe			Remove 64.7' See sheet 46
031+48	8" V.C. Pipe	N.B.O.	Same	Remove 68'. Replace with 33.5'-8" W.I. pipe from M.H. #23 with 8" of 8" W.I. pipe sleeve. See sheet 121

CONCRETE CONNECTION BLOCKS

MANHOLE	STATION	PIPES	Ⓡ	B	C	D
No. 2	99+70	10" V.C.P. 10" W.I.	——	2'-0"	6"	12"
No. 3	108+58	54" W.I. 54" Conc.	——	7'-2"	12"	62±
No. 6	115+26.5	8" V.C.P. 8" W.I.	——	1'-10"	5"	10"±
No. 8 *	115+66	10" V.C.P. 10" Conc.	**	2'-0"	6"	12"±
No. 7	118+45	24" V.C.P. 24" W.I.	——	3'-8"	8"	20"±
No. 12 *	131+72.6	12" V.C.P. 12" W.I.	1 (8212" 1 (8038"	2'-2"	6"	14"±
No. 15	149+71.8	18" V.C.P. 18" W.I.	——	2'-9"	6"	21"±
No. 16	150+60	24" V.C.P. 24" W.I.	——	3'-4"	6"	28"±
No. 25	135+00.	8" V.C.P. 8" W.I.	1 at 45, 2 straight	1'-10"	6"	10"±
No. 13	143+60.7	24" C.I. 24" W.I.	NOT placed	3'-4"	6"	28"±
No. 14	145+92.8	30" C.I. 30" W.I.	Not placed	3'-11"	6"	35"±

* ** Ⓡ

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MISCELLANEOUS PIPES THRU WALL AND DETAILS

SHEET 39 OF 115 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941.

SUBMITTED

APPROVAL RECOMMENDED: Lt. Col. M.R.E. — APPROVED: Col. C.E. — Div. Engr. O.R.D.

AS BUILT 935-12.2/38

NO.	DATE	CHARACTER
3	6-8-42	Revised concrete connection block manhole No. 3

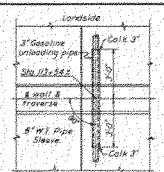
REVISIONS

NO.	DATE	AUTHORITY	REVISION
1	11-6-41	Field	Change in section and under-it.
2	11-6-41	Field	Change in plan, elevation & remarks
3	11-6-41	Field	Angle added
4	11-6-41	Field	Addition shown
5	11-6-41	Field	Station change
6	11-6-41	Drawing C.O. #2	Deleted

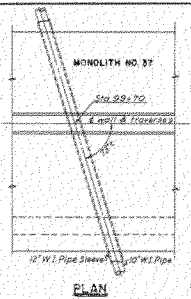
AS BUILT REVISIONS

WAR DEPARTMENT

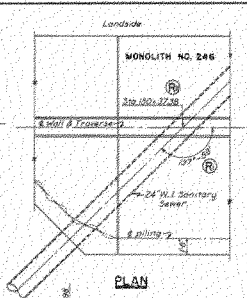
CORPS OF ENGINEERS, U. S. ARMY



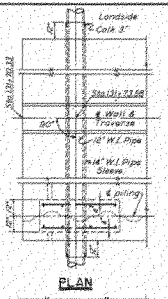
RIVERSIDE ELEVATION
STA. 113+54±
SCALE: 1/4" = 1'-0"



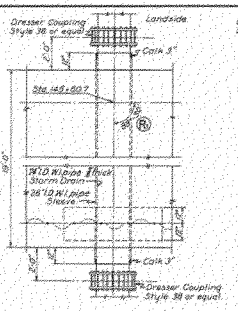
RIVERSIDE ELEVATION
STA. 99+70
SCALE: 1/4" = 1'-0"



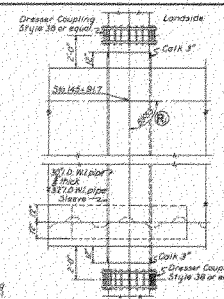
RIVERSIDE ELEVATION
STA. 150+37.38 Rt
SCALE: 1/4" = 1'-0"



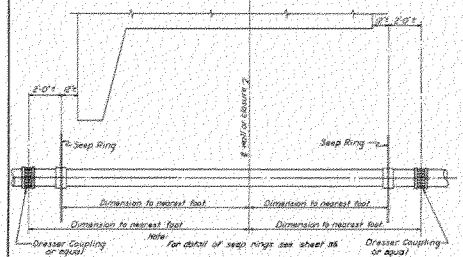
RIVERSIDE ELEVATION
STA. 131+73.58
SCALE: 1/4" = 1'-0"

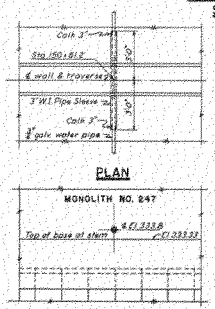


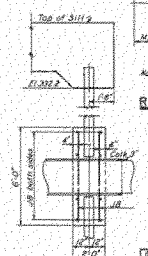
RIVERSIDE ELEVATION
STA. 146+60.7
SCALE: 1/4" = 1'-0"



RIVERSIDE ELEVATION
STA. 145+92.8 Rt
SCALE: 1/4" = 1'-0"







BY	DATE	CHARACTER REVISIONS

(3)	Field	Reinforcing cut to fit seal block
(2)	Field	Station change
(1)	Field	Angle change
NO.	DATE	AUTHORITY REVISION

AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MISCELLANEOUS PIPES THRU WALL AND DETAILS

SHEET 37 OF 115 SHEETS SCALES AS SHOWN

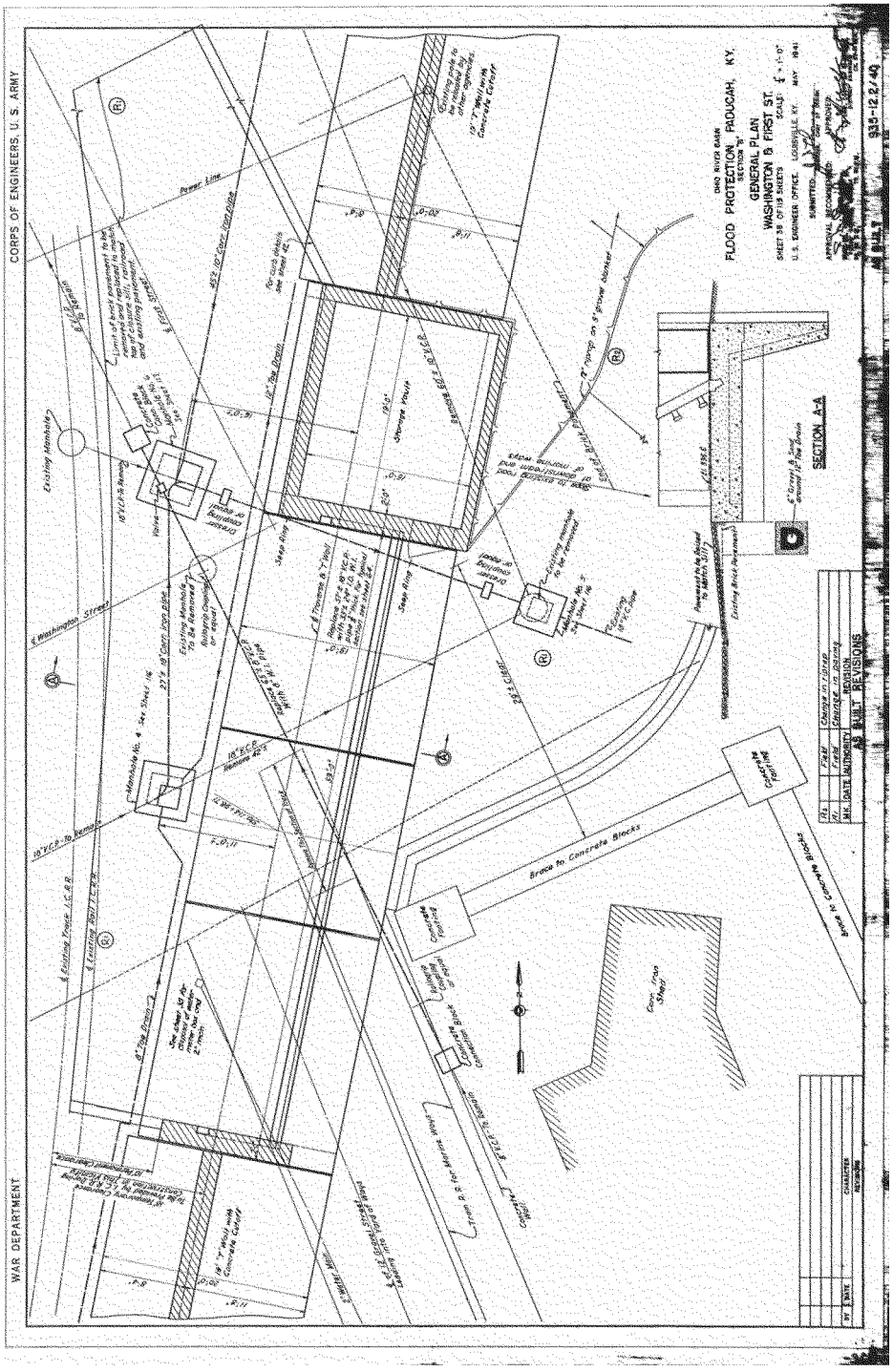
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: (Engineer, Asst or Design)

APPROVAL RECOMMENDED: (Principal Engineer, Asst or Chief Design Section, Dr. 911, F.E.D.)

APPROVED: (Lt. Col., Corps of Engineers, District Engineer, Dr. 911, F.E.D., Dr. 911C, O.P.)

AS BUILT 935-12.2/39


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
GENERAL PLAN
WASHINGTON & FIRST ST.
SHEET 38 OF 138 SHEETS
SCALE: 1" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
AS BUILT
935-12.2/40
SECTION A-A
AS BUILT REVISIONS
Washington Street
Power Line
Existing Manhole
Sharps Valve
Sharps Valve House
Sharps River
Brace to Concrete Blocks
Concrete Floor
Existing Brick Retainment
Existing Manhole No. 3
Existing 10"VCP
Existing 8"VCP
Existing Manhole No. 4
Existing Manhole No. 5
Existing Manhole No. 6
Existing Manhole No. 7
Existing Manhole No. 8
Existing Manhole No. 9
Existing Manhole No. 10
Existing Manhole No. 11
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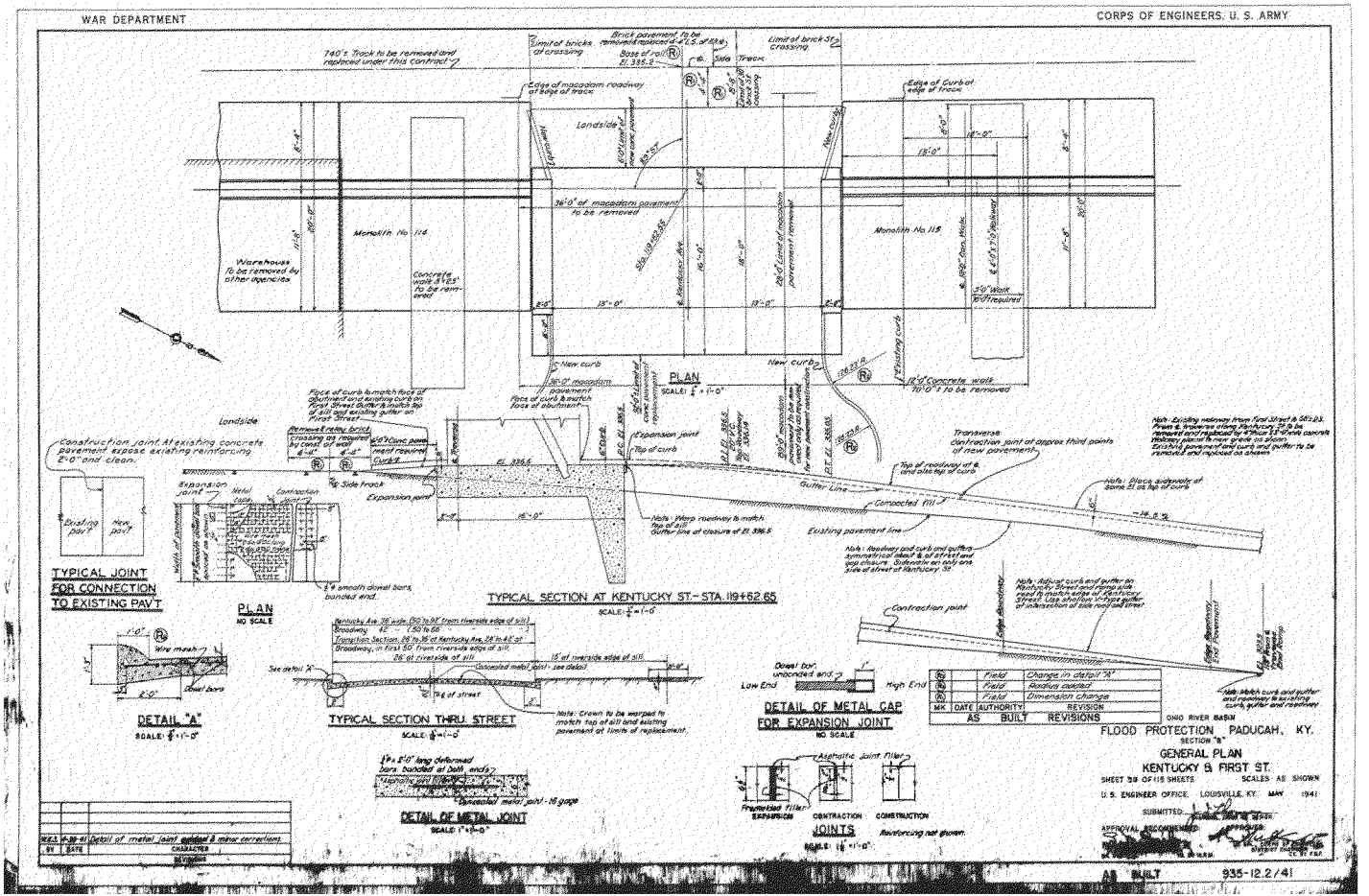
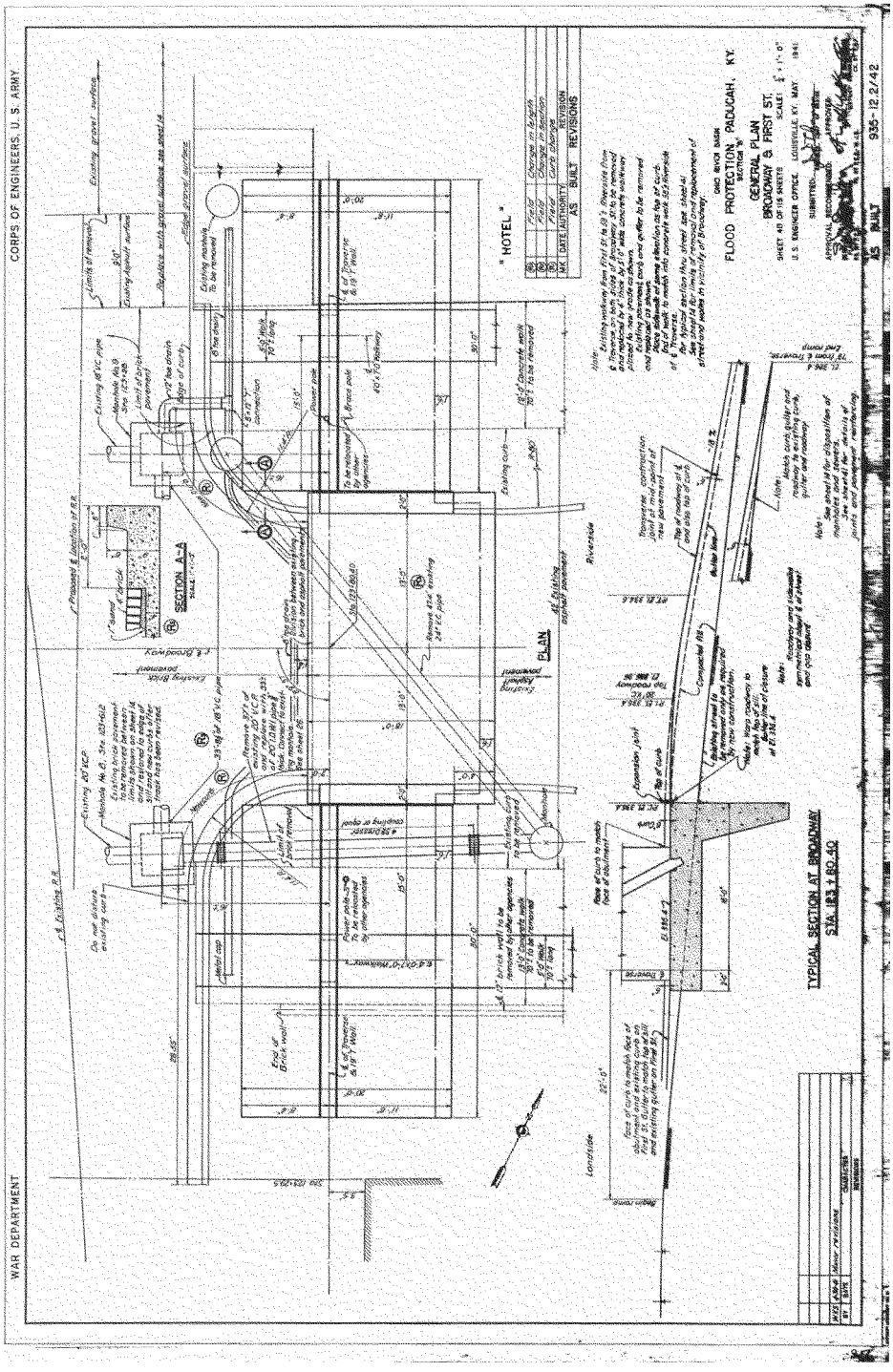
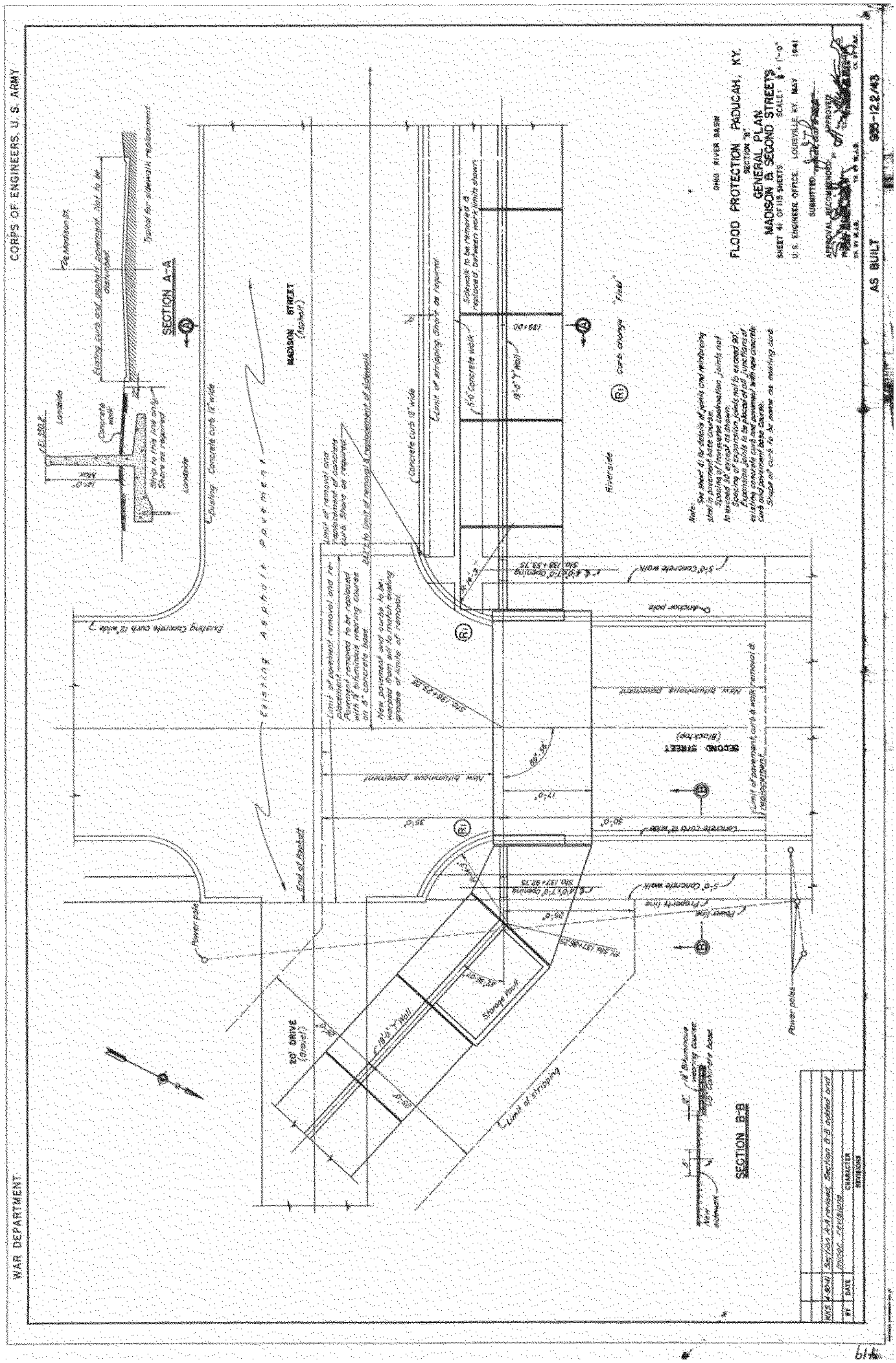
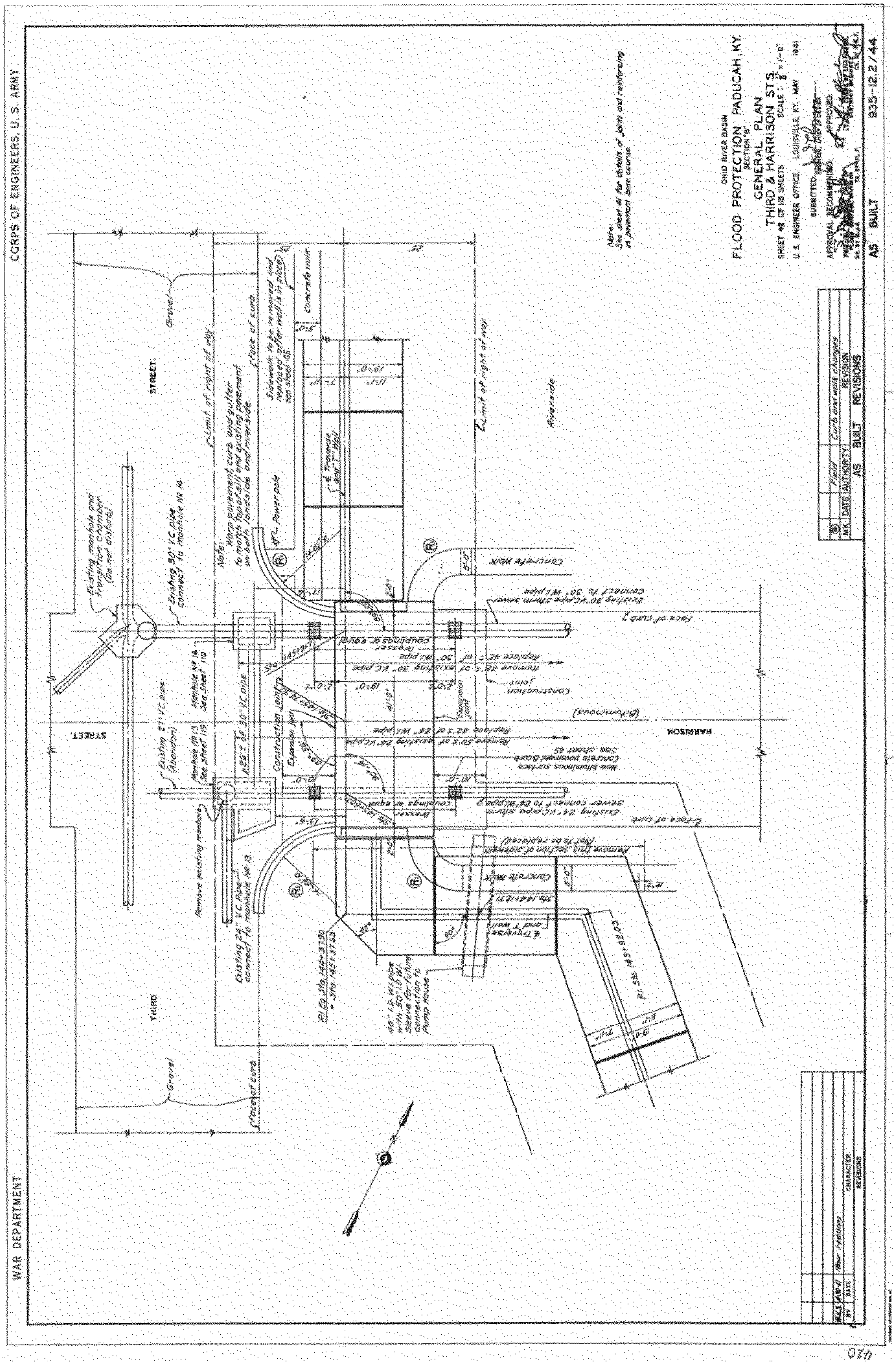
Existing Manhole No. 98
Existing Manhole No. 99
Existing Manhole No. 100

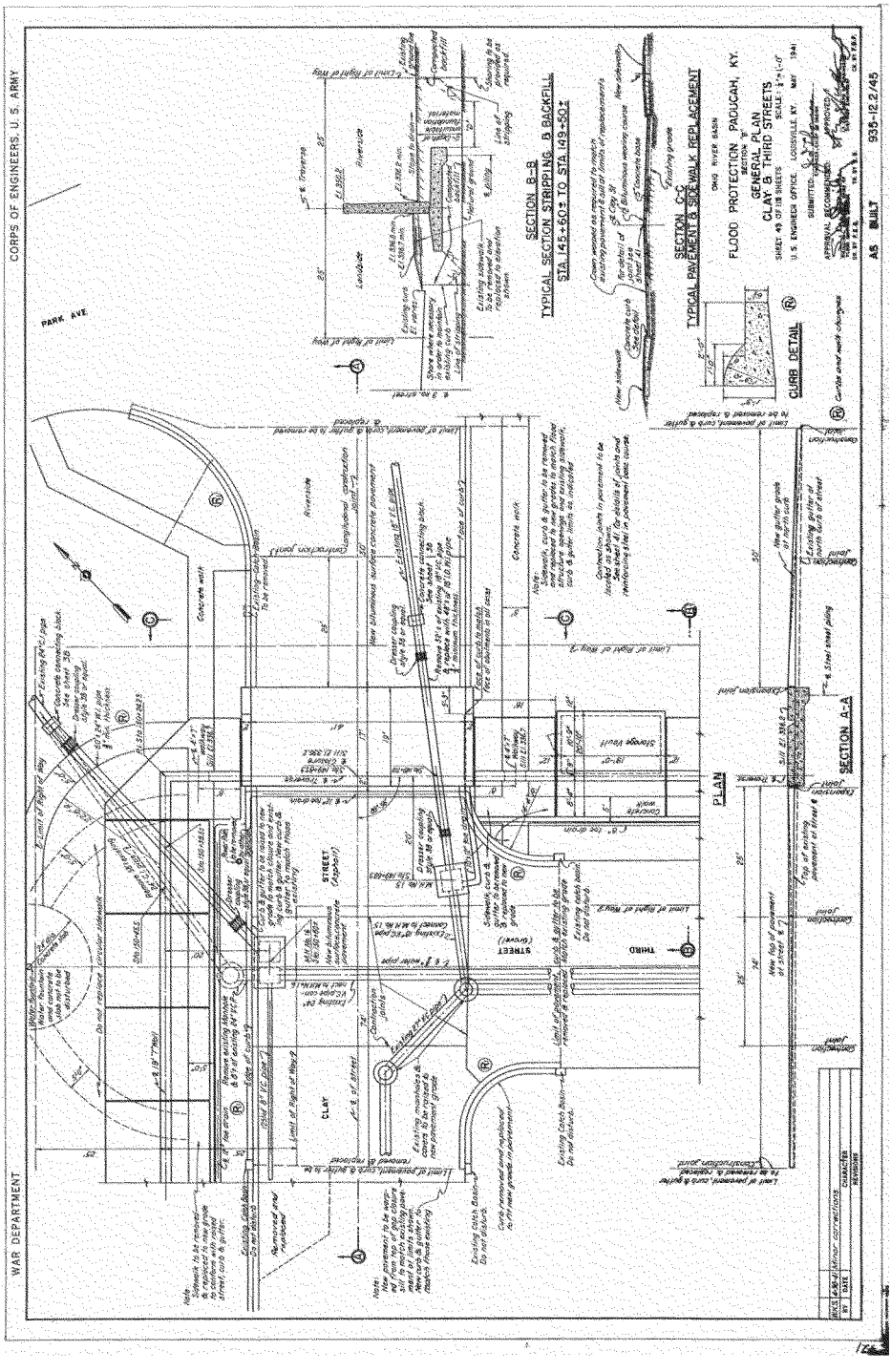

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
PLAN
SCALE: 1" = 1'-0"
TYPICAL SECTION AT KENTUCKY ST. - STA. 119+62.65
SCALE: 1/4" = 1'-0"
TYPICAL JOINT FOR CONNECTION TO EXISTING PAV'T
PLAN
NO SCALE
DETAIL "A"
SCALE: 1" = 1'-0"
TYPICAL SECTION THRU STREET
SCALE: 1/4" = 1'-0"
DETAIL OF METAL CAP FOR EXPANSION JOINT
NO SCALE
DETAIL OF METAL JOINT
SCALE: 1" = 1'-0"
JOINTS
SCALE: 1 1/2" = 1'-0"
Reinforcing not shown.
Asphaltic Joint Filler
Preformed Filler
EXPANSION
CONTRACTION
CONSTRUCTION
Monolith No 114
Monolith No 115
Warehouse To be removed by other agencies
Concrete wall 3'-2.5" to be removed
740'± Track to be removed and replaced under this contract
Limit of bricks At crossing
Brick pavement to be removed replaced at U.S. at grade
Base of rail El. 395.9
Limit of brick St. Crossing
Side Track
Edge of macadam roadway at edge of track
Edge of Curb at edge of track
Landside
New curb
New curb line
36'-0" of macadam pavement to be removed
Side 119+62.65
Monolith
26'-0" Limit of macadam pavement removed
New curb
5'-9" Walk to be required
12'-9" Concrete walk 70'-0"± to be removed
Face of curb to match face of abutment and existing curb on First Street. Build a mitre 3in of silt and existing gutter on First Street
Landside
Remove & relay brick crossing as required by cond. of wall
6" Conc. pavement required
Curb 'A'
Side track
Expansion joint
Top of curb
E.G. El. 396.6
El. 396.5
Note: Warp roadway to match Top of sill Gutter line at closure of El. 396.5
Transverse contraction joint at approx. third points of new pavement.
Top of roadway at & and edge of curb
Gutter Line
Connected fill
Existing pavement line
Note: Roadway and curb and gutter to symmetrical about & of street and approximately as shown. Submit for only one side of street of Kentucky St.
Note: Existing roadway from First Street & 58'±0.S. Front & Traverse along Kentucky 20.9 be removed and replaced by 6"min 3 P.S.I. Conc. Walkway placed to new grade as shown. Existing curb and gutter to be removed and replaced as shown.
Note: Place subgrade at same El as top of curb
Contraction joint
Edge Roadway
Edge Roadway 1st Pavement
Note: Adjust curb and gutter on Kentucky Street and ramp side road to match edge of Sanitary Street. Use shallow V-type gutter at intersection of side road and street.
Note: Match curb and gutter and roadway to existing curb, gutter and roadway.
Existing pav't
New pav't
Expansion joint
Metal Joint
Contraction Joint
Middle of Roadway
Pavement in Sections
Wire mesh
Dowel bars
Kentucky Ave. 36' wide (50' to 58' from riverside edge of sill)
Broadway 42' (50' to 58')
Transition Section, 38' to 36' at Kentucky Ave. 24' to 44' at Broadway, in first 50' from riverside edge of sill.
36' at riverside of sill
15' at riverside edge of sill
Cancelled metal joint - see detail
See detail "A"
7% of street
Note: Crown to be warped to match top of sill and existing pavement at limits of replacement.
Dowel bar, unbonded end
Low End
High End
1/2" x 2'-0" long deformed bars bonded at both ends
Asphaltic Joint Filler
Cancelled metal joint - 16 gage
Preformed Filler
EXPANSION
CONTRACTION
CONSTRUCTION
Reinforcing not shown.
Sq. Field Change in detail "A"
Sq. Field Roadway deleted
R Field Dimension change
MK DATE AUTHORITY REVISION
AS BUILT REVISIONS
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "A"
GENERAL PLAN
KENTUCKY & FIRST ST.
SHEET 39 OF 115 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED:
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
935-12.2/41

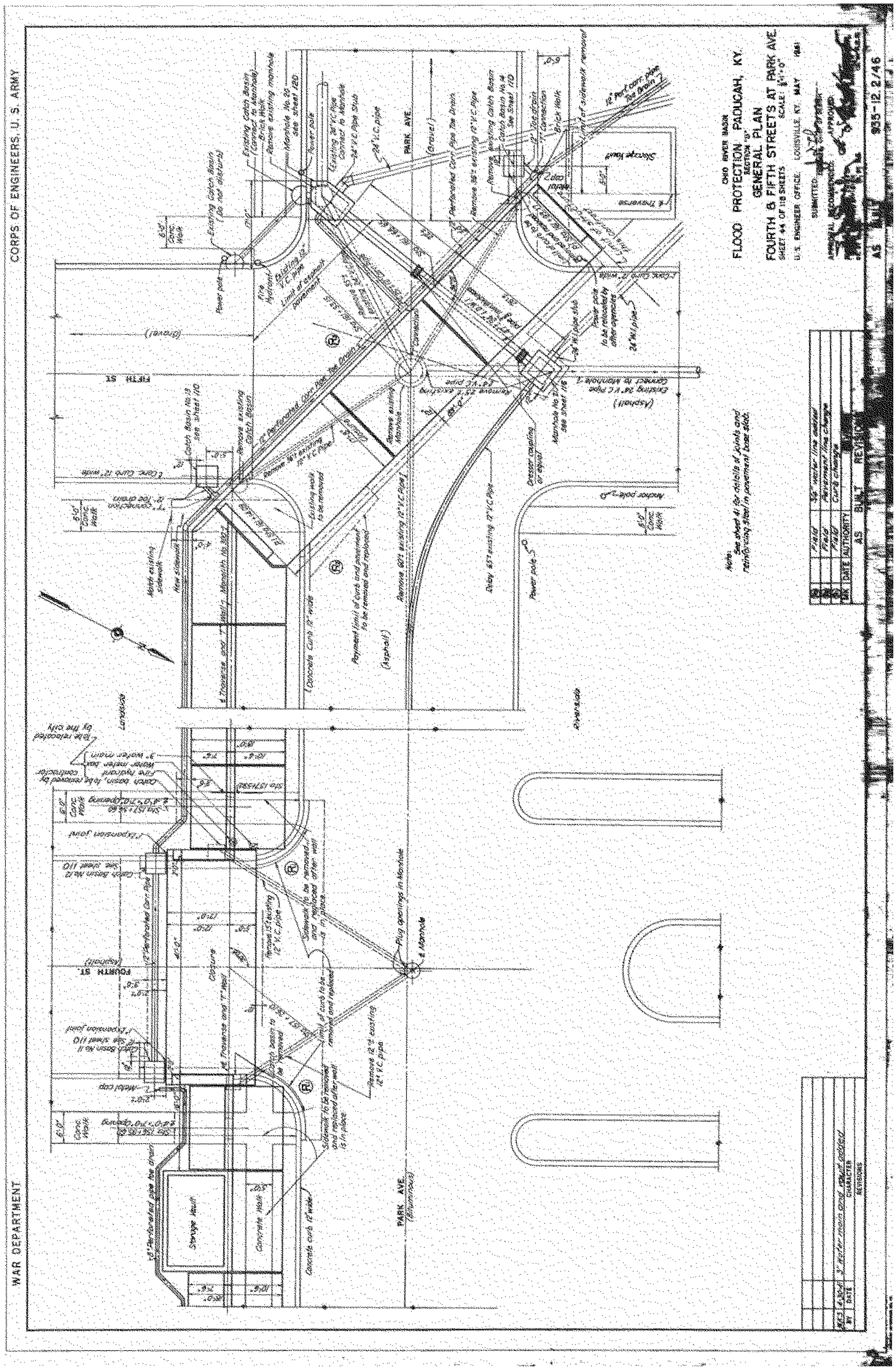

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION, PADUCAH, KY.
GENERAL PLAN
BROADWAY & FIRST ST.
AS BUILT
935-12.2/42
TYPICAL SECTION AT BROADWAY
STA. 183+80.40
SECTION A-A
PLAN
" HOTEL "
Riverside
Landside

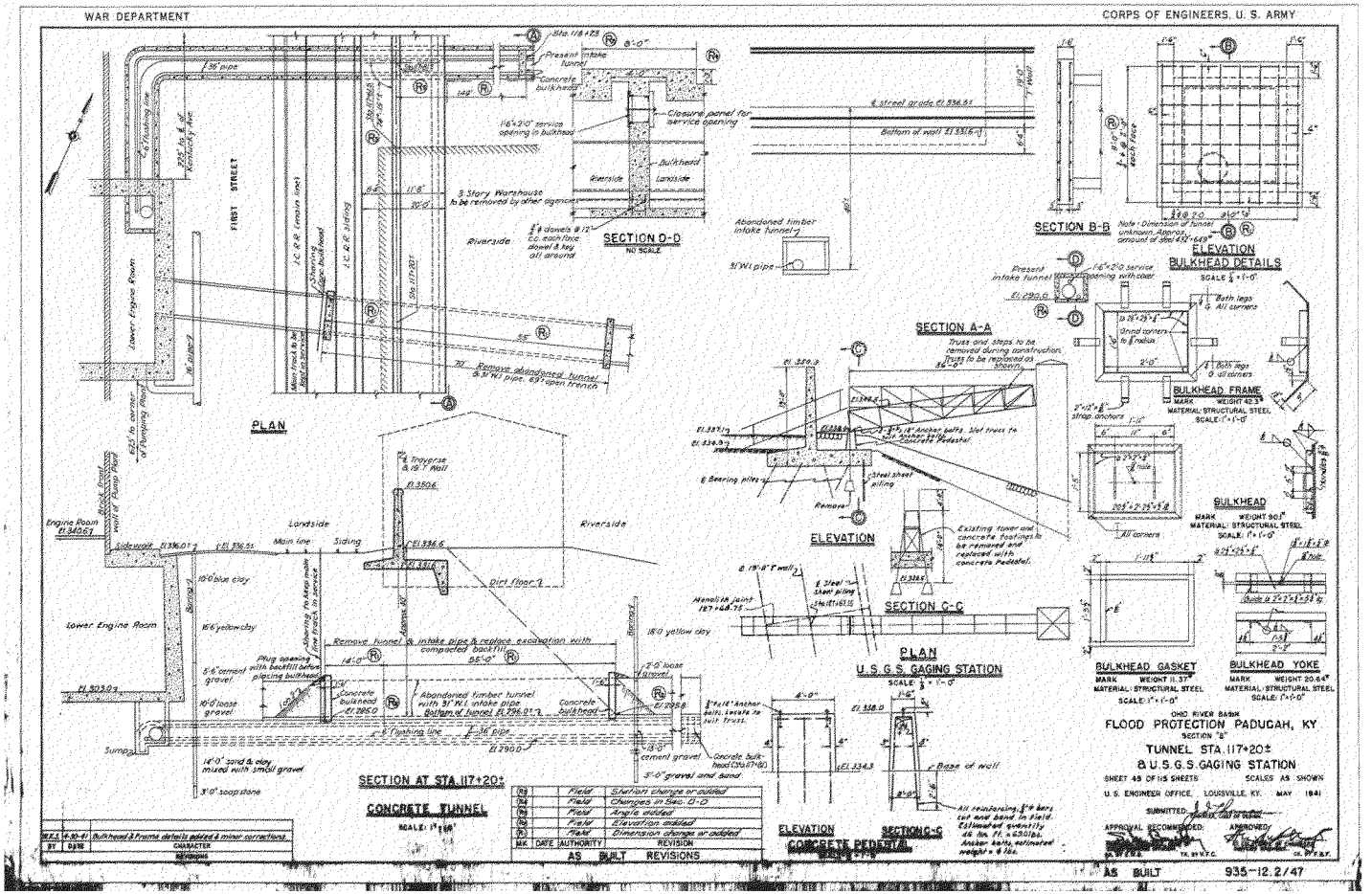


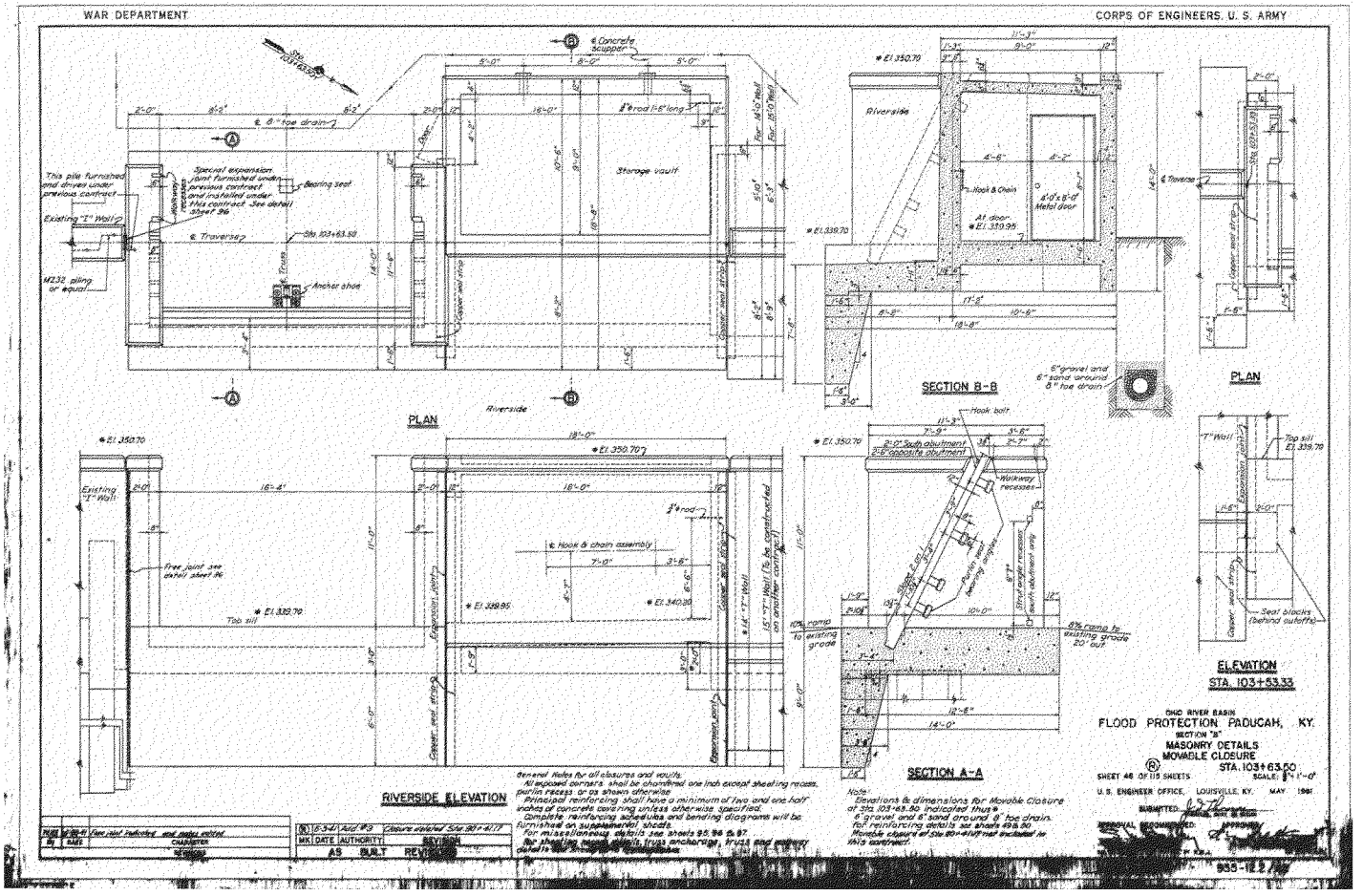
WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
GENERAL PLAN
MADISON & SECOND STREETS
AS BUILT
SECTION A-A
SECTION B-B
MADISON STREET
(Asphalt)
SECOND STREET
(Blacktop)
20' DRIVE
(Gravel)
Storage Vault
Existing Asphalt pavement
Limit of stripping
Power poles
Anchor pole
Landside
Riverside


CORPS OF ENGINEERS, U.S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "8"
GENERAL PLAN
THIRD & HARRISON STS.
SHEET 42 OF 113 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
935-12.2/44
AS BUILT REVISIONS
STREET
THIRD
HARRISON
Riverside
Concrete walk
Limit of right of way
Face of curb
Gravel
Power pole
Construction joint
Expansion joint

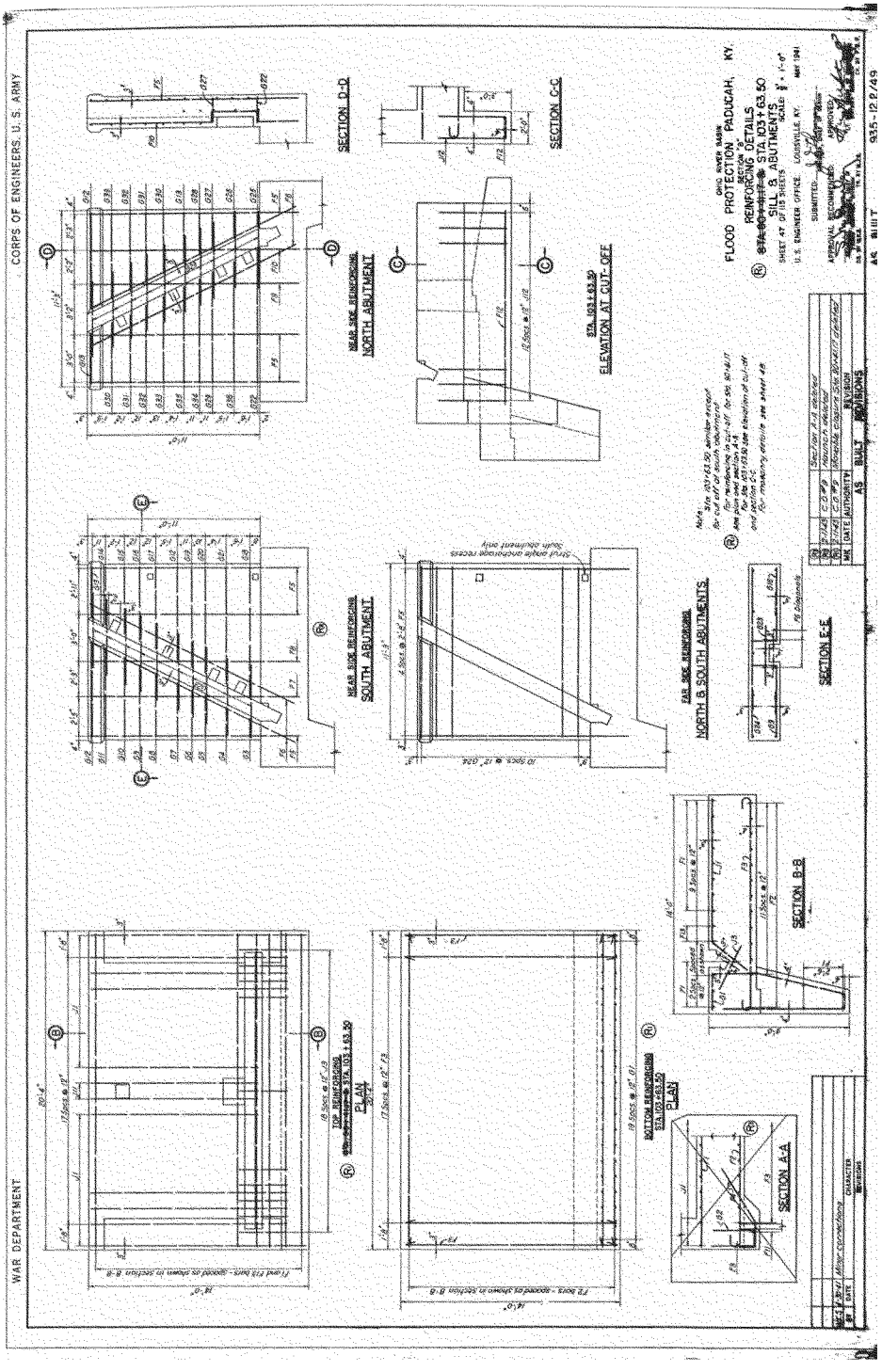

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
PARK AVE
CLAY
THIRD
STREET
PLAN
SECTION A-A
SECTION B-B
TYPICAL SECTION STRIPPING & BACKFILL
STA. 145+60± TO STA. 149+50±
SECTION C-C
TYPICAL PAVEMENT & SIDE WALK REPLACEMENT
CURB DETAIL
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
GENERAL PLAN
CLAY & THIRD STREETS
SHEET 49 OF 138 SHEETS
SCALE 1" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
AS BUILT
935-12.2/45

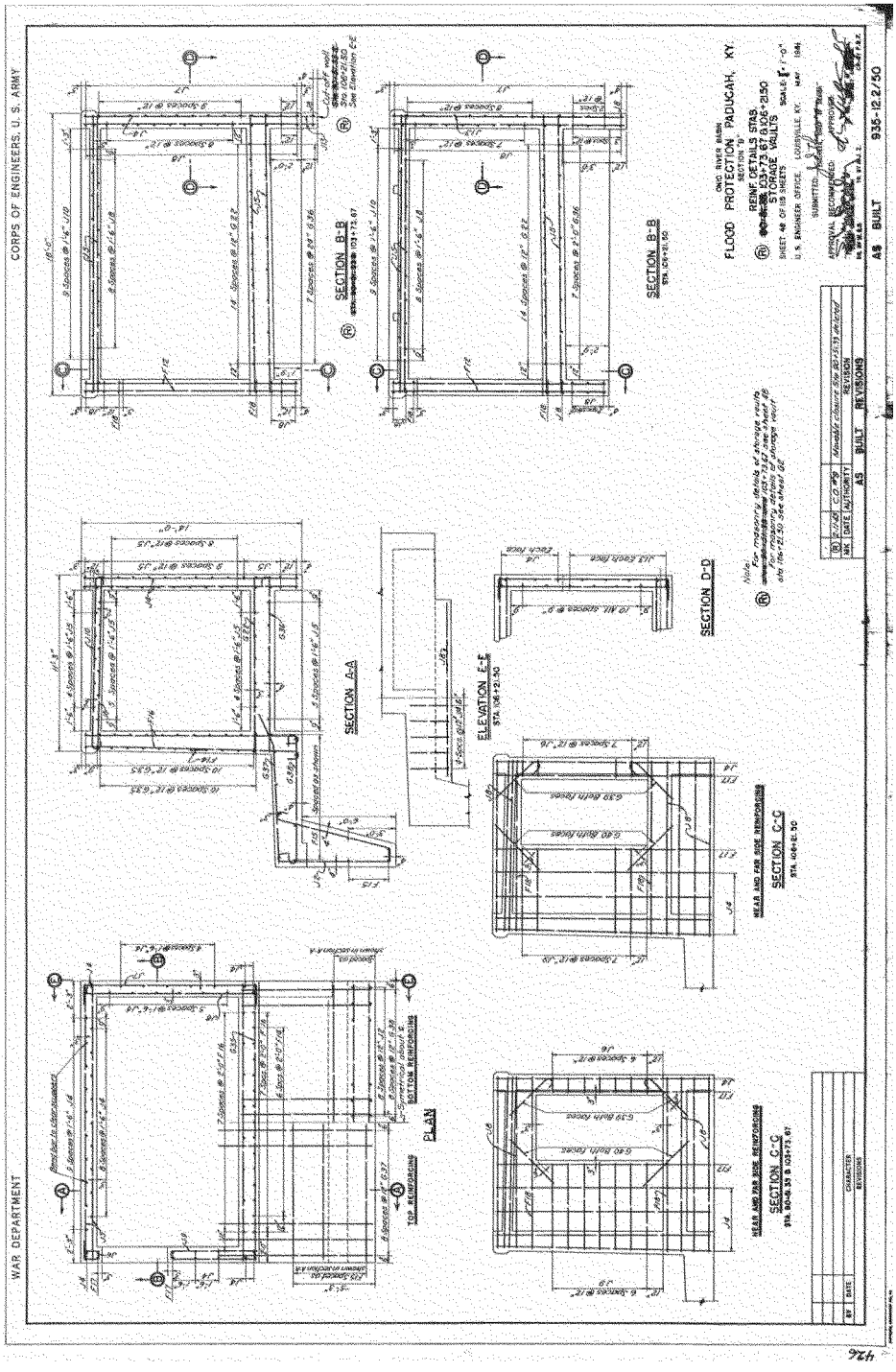

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
GENERAL PLAN
FOURTH & FIFTH STREETS AT PARK AVE.
SHEET 44 OF 118 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY.
935-12.2/46
FIFTH ST
FOURTH ST.
PARK AVE.
Storage Vault
Landside
Riverside
Closure
Concrete Walk
Concrete curb 12" wide
Plug openings in Manhole
Power pole
AS BUILT
REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
PLAN
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
ELEVATION
BULKHEAD DETAILS
BULKHEAD FRAME
BULKHEAD
BULKHEAD GASKET
BULKHEAD YOKE
PLAN
U.S.G.S. GAGING STATION
SECTION AT STA 117+20±
CONCRETE TUNNEL
ELEVATION
CONCRETE PEDESTAL
SECTION C-C
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY
SECTION "B"
TUNNEL STA. 117+20±
& U.S.G.S. GAGING STATION
SHEET 48 OF 115 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
935-12.2/47
AS BUILT REVISIONS
BY DATE CHARACTER OF REVISIONS
BY DATE AUTHORITY REVISION


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
PLAN
RIVERSIDE ELEVATION
SECTION B-B
SECTION A-A
PLAN
ELEVATION
STA. 103+53.33
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURE
STA. 103+63.00
SHEET 46 OF 115 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1951
SUBMITTED:
RECOMMENDED:
APPROVED:
935-112.2/46

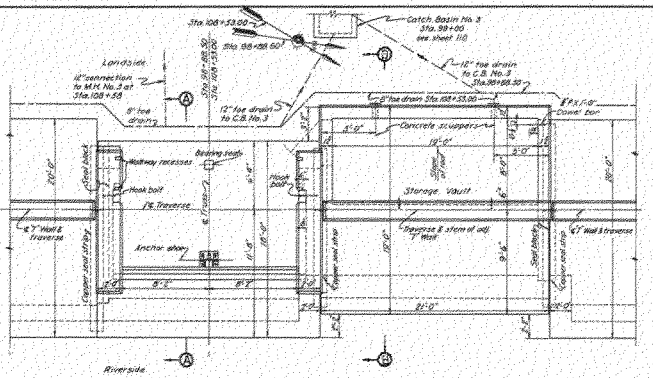
1227


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
REINFORCING DETAILS
SILL B, ABUTMENTS
SCALE 1/8" = 1'-0"
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
NEAR SIDE REINFORCING
NORTH ABUTMENT
SOUTH ABUTMENT
NORTH & SOUTH ABUTMENTS
ELEVATION AT CUT-OFF
AS BUILT REVISIONS
935-12/149

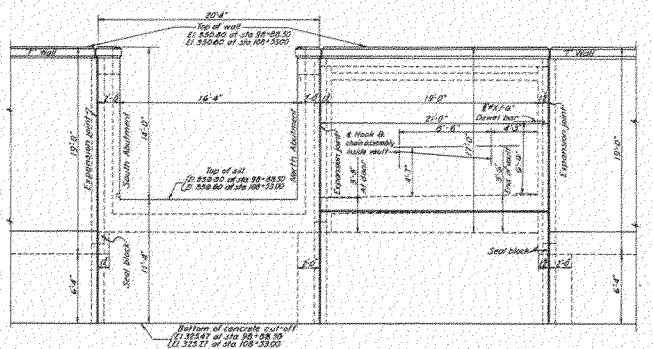

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINF. DETAILS STAS. 103+73.61 & 106+21.50
STORAGE VAULTS
SCALE 1/4" = 1'-0"
SHEET 48 OF 153 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1944
SUBMITTED
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
935-12.2/50
SECTION B-B
SECTION A-A
ELEVATION E-E
SECTION D-D
SECTION C-C
PLAN
TOP REINFORCING
BOTTOM REINFORCING
HEAD AND PAR SIDE REINFORCING
REVISIONS
AS BUILT

WAR DEPARTMENT

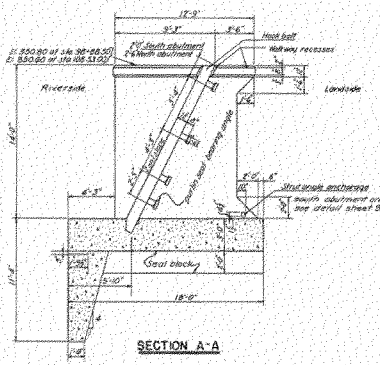
CORPS OF ENGINEERS, U. S. ARMY



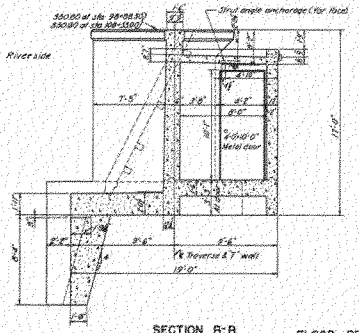
PLAN



RIVERSIDE ELEVATION



SECTION A-A



SECTION B-B

Note:
For reinforcing details see Sheets 60 and 61
Storage vault for Sta. 106+33.00 is not to be included in this contract

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SECTION "B"

MASONRY DETAILS

MOVABLE CLOSURES

STA. 98+88.50 STA. 108+53.00

SHEET 49 OF 115 SHEETS

SCALE: 1/4" = 1'-0"

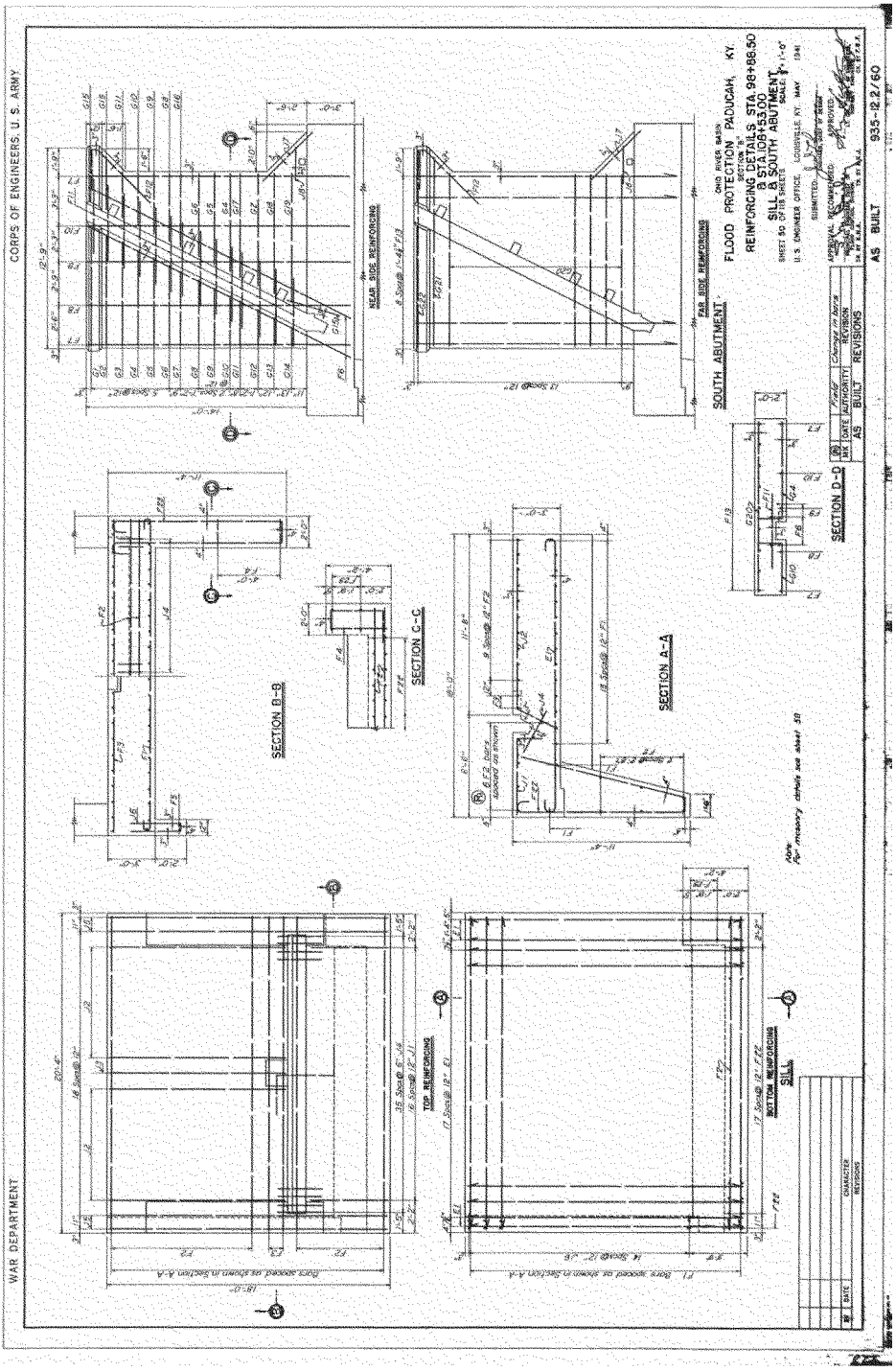
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED:

APPROVED:

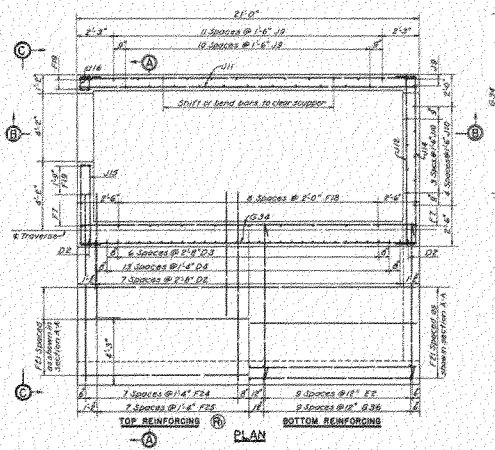
BY	DATE	CHARACTER OF REVISIONS
W.R.S.	4-30-41	Catch Basin No. 3 and connecting toe drains added.

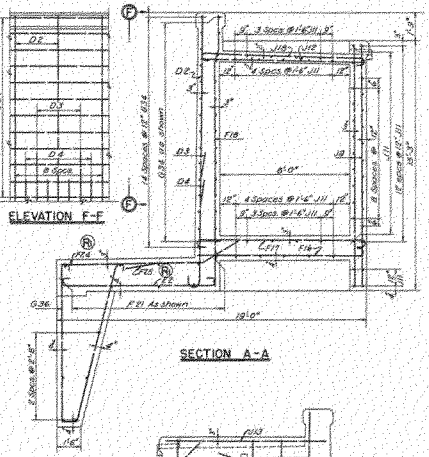
935-12.2/59

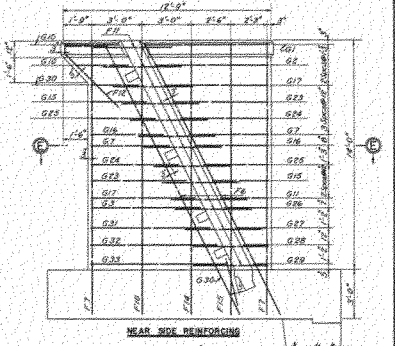

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER MAIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 98+86.50
& STA. 106+53.00
SILL AT SOUTH ABUTMENT
SHEET SO OF 56 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1960
SUBMITTED
APPROVED
AS BUILT
935-12.2/60
SOUTH ABUTMENT
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
TOP REINFORCING
BOTTOM REINFORCING
SILL
REVISIONS
AS BUILT
Note
For masonry details see sheet 58

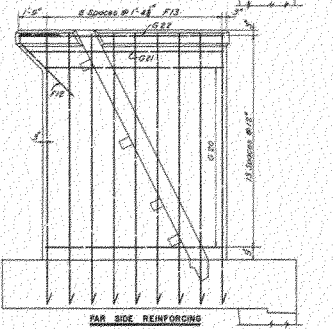
WAR DEPARTMENT

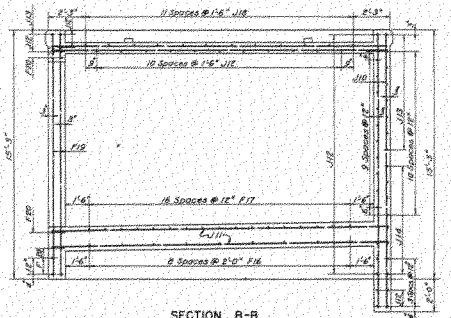
CORPS OF ENGINEERS, U. S. ARMY



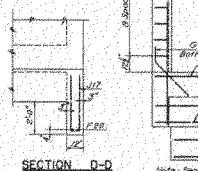


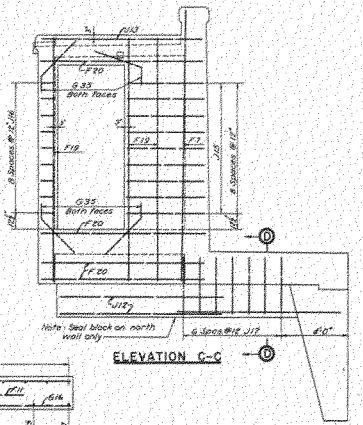


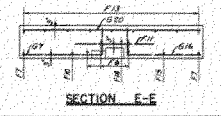




Note: For masonry details See sheet 89
Reinforcing details for storage vault at Sta 108+53.00 not to be included in this contract







BY	DATE	CHARACTER REVISIONS

NO	DATE	AUTHORITY	Field Change in bars REVISION
			AS BUILT REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 98+88.50 & STA. 108+53.00

NORTH ABUTMENT & STORAGE VAULT

SHEET 51 OF 115 SHEETS SCALE: 1/4" = 1'-0"

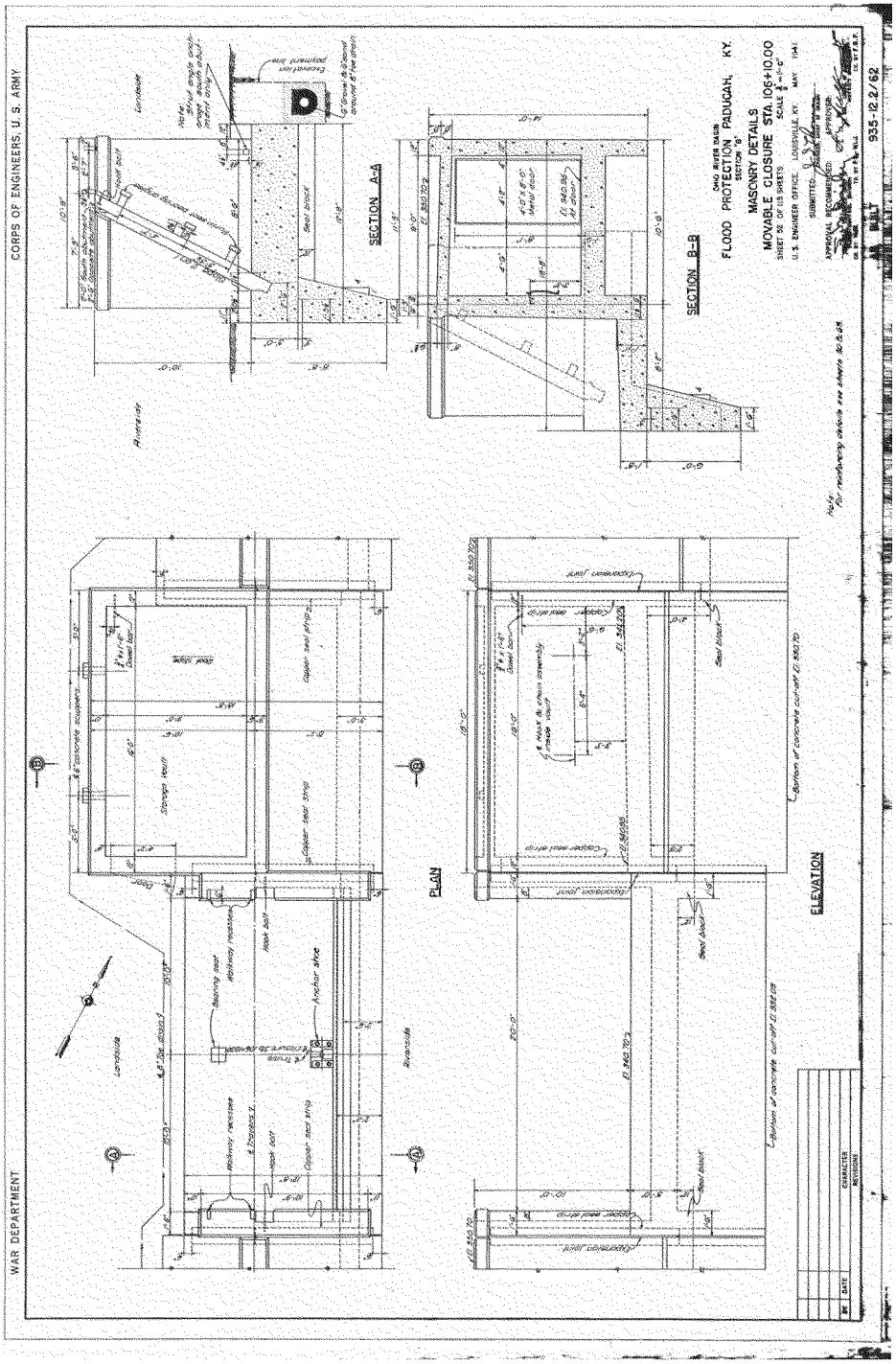
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

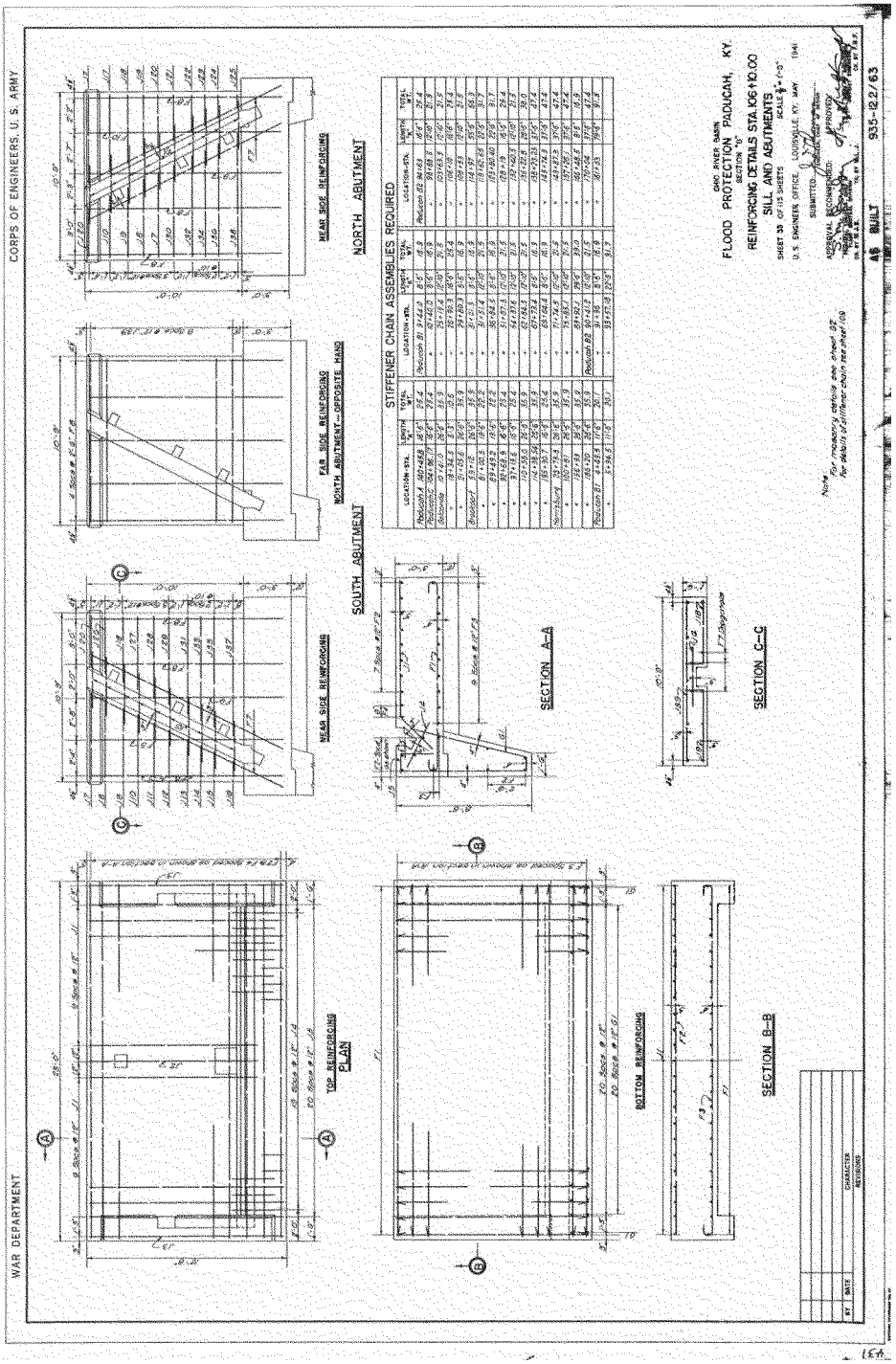
SUBMITTED:

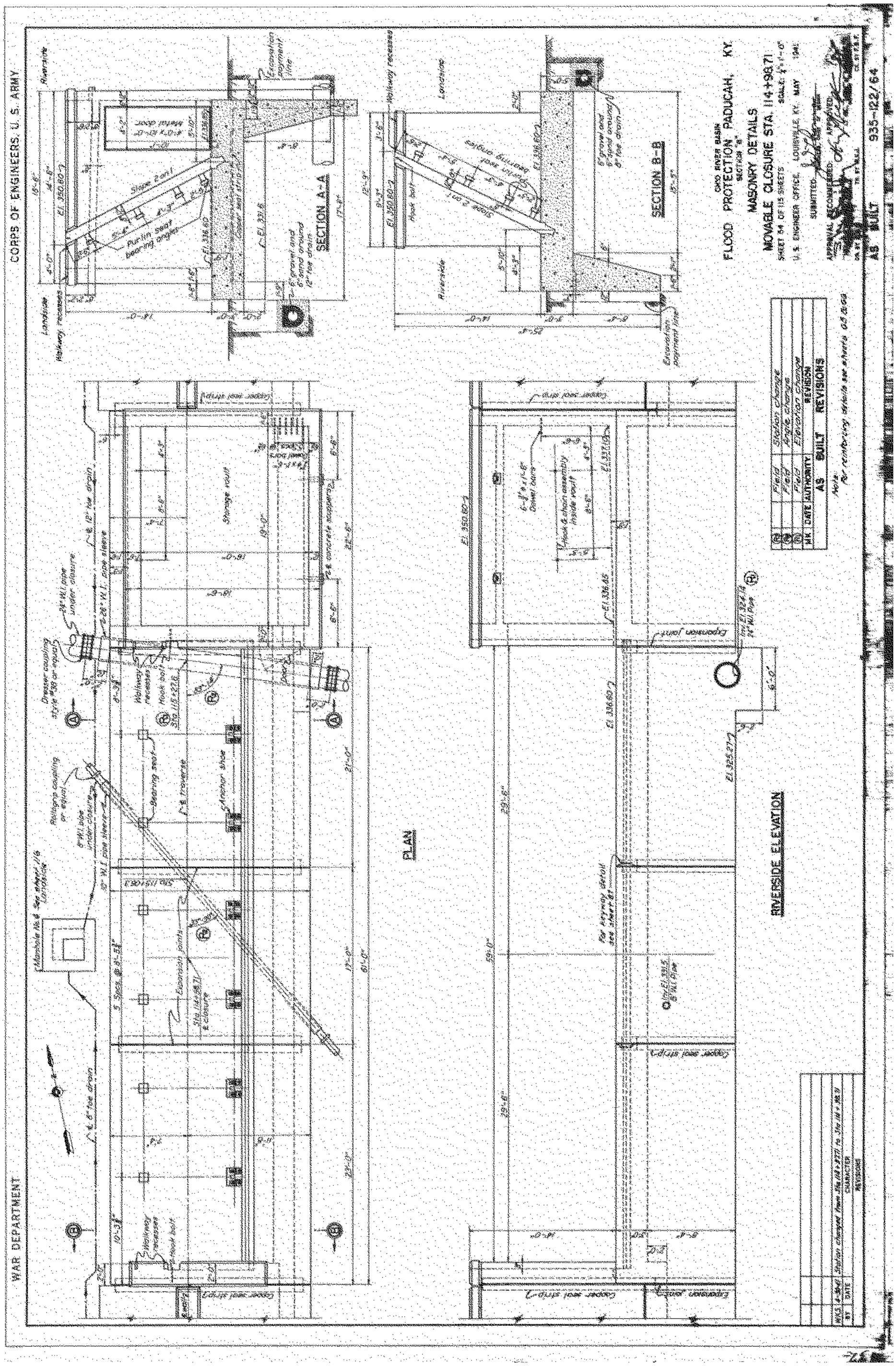
APPROVAL RECOMMENDED: APPROVED:

DR. BY R.H.S. TR. BY M.S.B. - A.J.Z. CK. BY W.B.F.

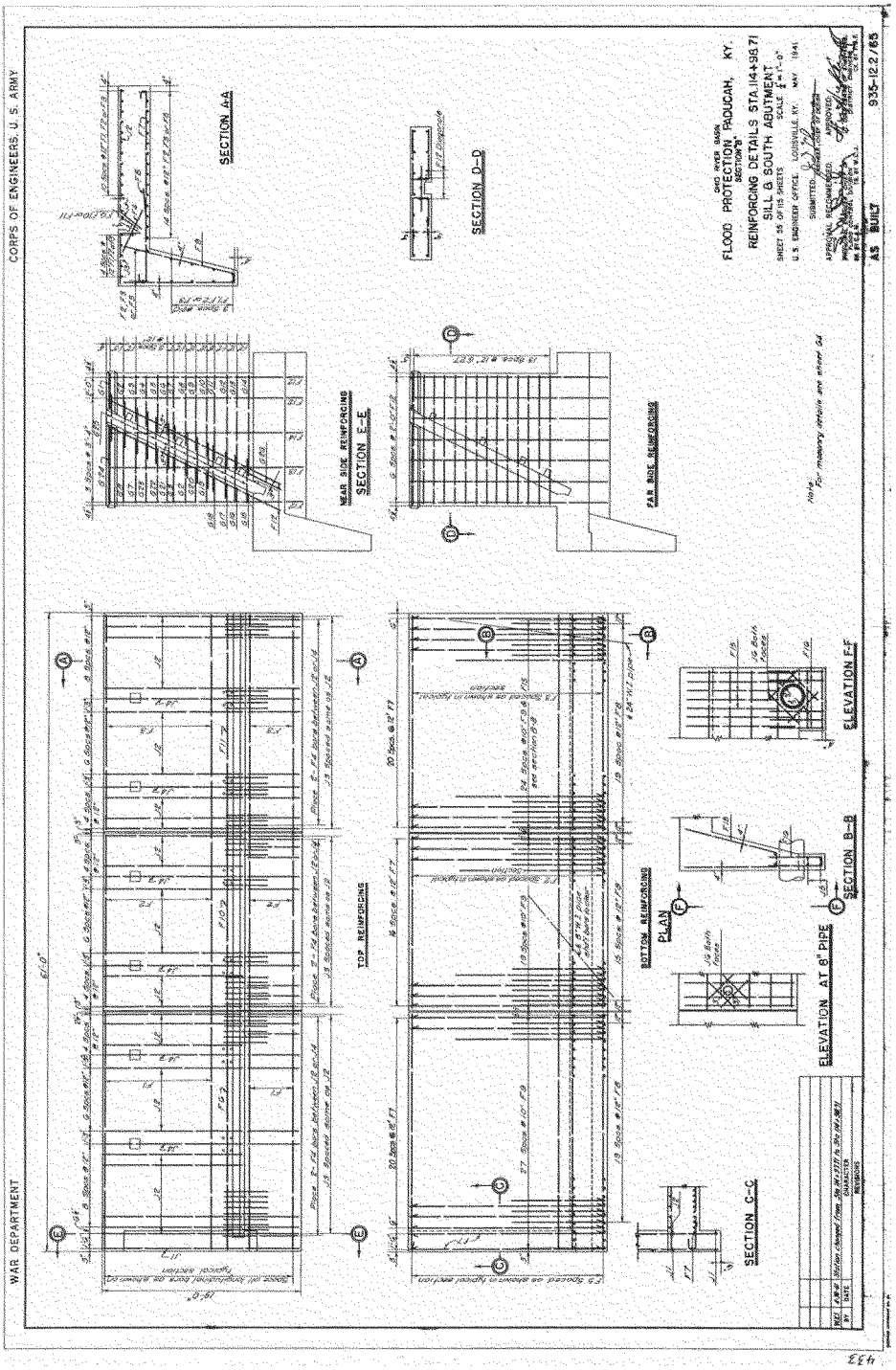
AS BUILT 935-12.2/61

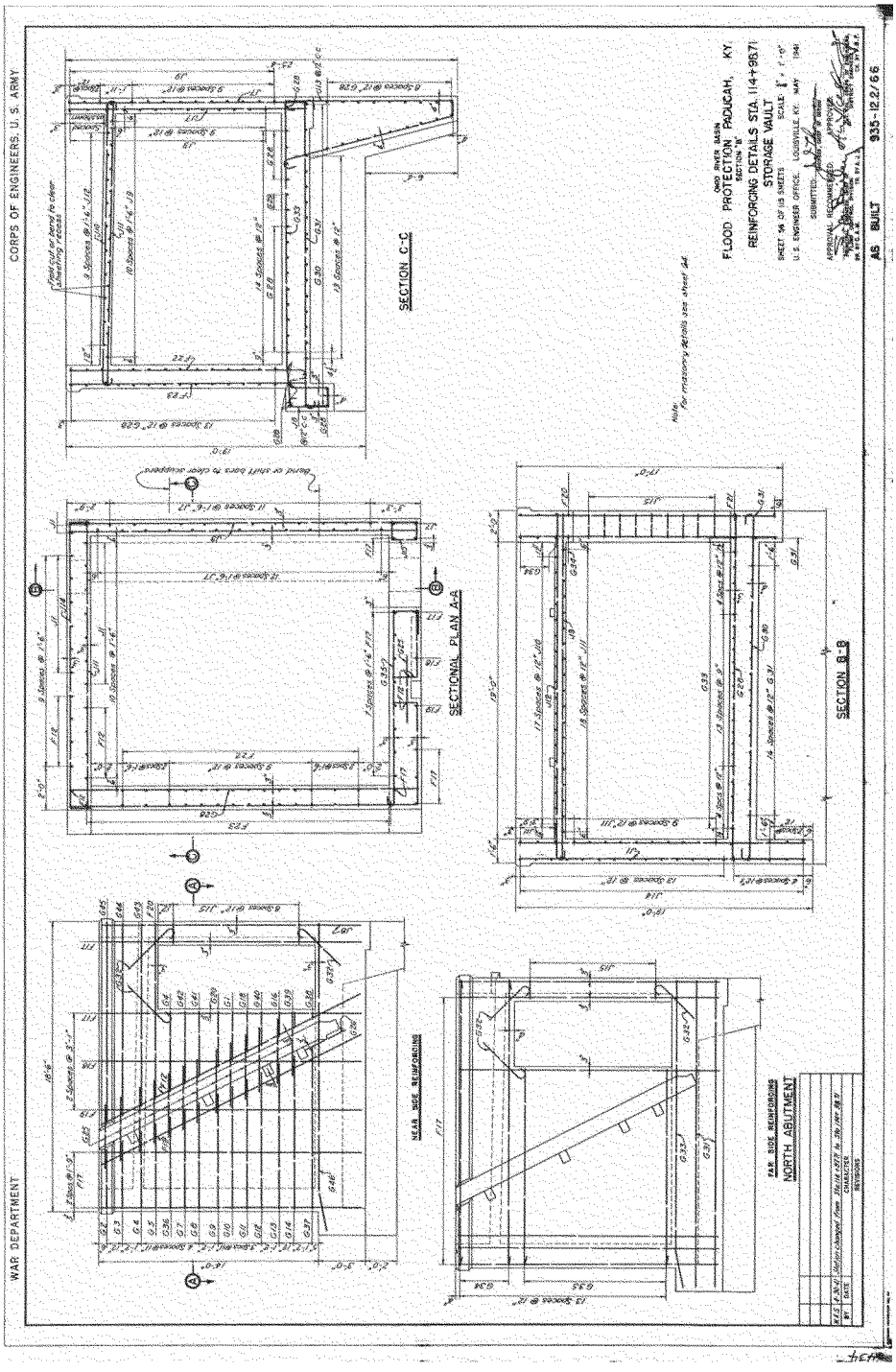

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURE STA. 106+10.00
SHEET 52 OF 118 SHEETS
SCALE 1"=1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED:
APPROVED:
APPROVAL RECOMMENDED:
935-12.2/62
SECTION A-A
SECTION B-B
PLAN
ELEVATION
Riverside
Landside
Stoney Haul
Copper seal strip
Bearing seat
Anchor shoe
Hook bolt
Walkway recesses
Steel block
Roof concrete
Bottom of concrete current El. 352.70
Note: For machinery details see sheets 3C & 4B

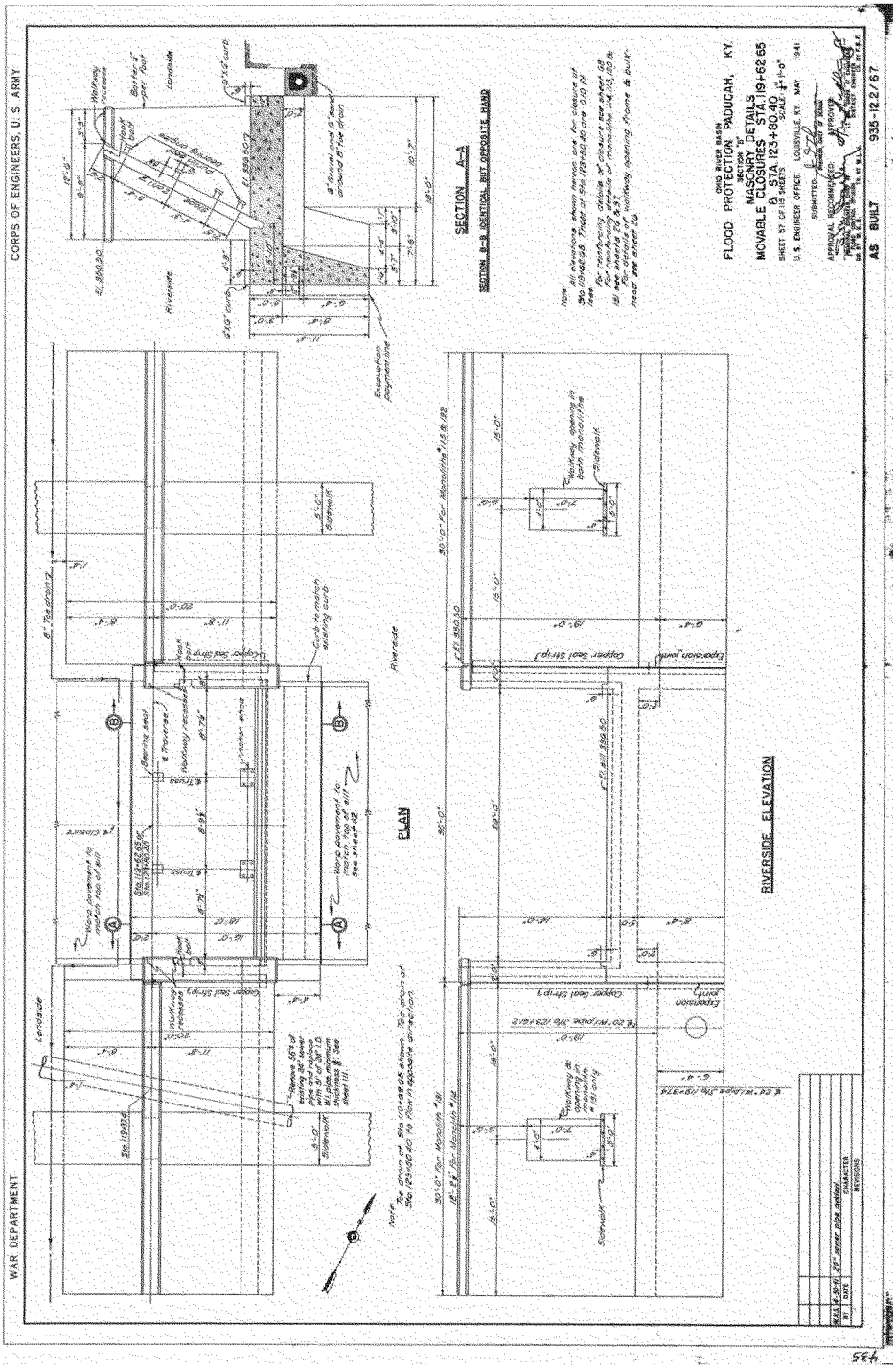

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
TOP REINFORCING PLAN
BOTTOM REINFORCING
SECTION A–A
SECTION B–B
SECTION C–C
SOUTH ABUTMENT
NORTH ABUTMENT
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
NORTH ABUTMENT—OPPOSITE HAND
STIFFENER CHAIN ASSEMBLIES REQUIRED
OHIO RIVER SMITH
FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS STA. K66+20.00
SILL AND ABUTMENTS
SHEET 33 OF 115 SHEETS
SCALE 1"=1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
AS BUILT
935-12-2/63



WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
SECTION A-A
SECTION B-B
PLAN
RIVERSIDE ELEVATION
Landside
Riverside
Walkway recesses
Metal door
Slope 2 on 1
Purlin seat bearing angles
Hook bolt
Storage vault
Dresser coupling style #38 or equal
24" W.I. pipe under closure
Bearing seat
Anchor shoe
Expansion joints
Copper seal strip
Expansion joint
For keyway detail see sheet 63
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURE STA. 114+98.71
SHEET 54 OF 115 SHEETS
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
935-122/64
Field Station change
Field Angle change
Field Elevation change
MK DATE AUTHORITY REVISION
AS BUILT REVISIONS
Note:
For reinforcing details see sheets 65 to 68
CHARACTER
REVISIONS
BY DATE

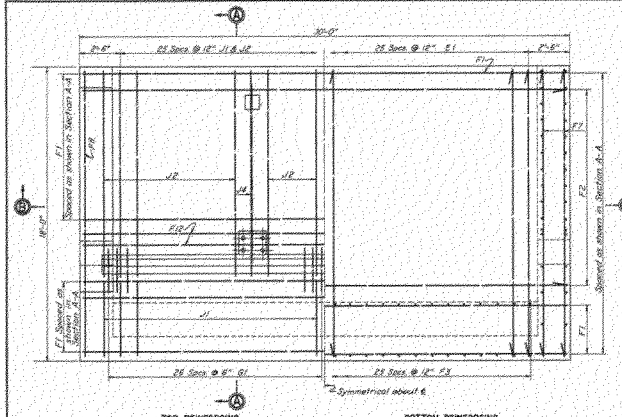

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
REINFORCING DETAILS STA.1+96.71
SILL & SOUTH ABUTMENT
SCALE 1" = 1'-0"
SHEET 55 OF 115 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
AS BUILT
935-12.2/65
SECTION A-A
SECTION D-D
NEAR SIDE REINFORCING
SECTION E-E
FAR SIDE REINFORCING
TOP REINFORCING
BOTTOM REINFORCING
PLAN
ELEVATION AT 6' PIPE
SECTION B-B
ELEVATION F-F
SECTION G-C


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 114+96.71
STORAGE VAULT
SHEET 14 OF 115 SHEETS
SCALE 1" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED:
APPROVED:
AS BUILT
935-12.2/66
SECTION C-C
SECTIONAL PLAN A-B
SECTION B-B
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
NORTH ABUTMENT
Note: For masonry details see sheet 44
Hand cut or bend to clear existing conduit
Bond or shift bars to clear obstruction


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
MASONRY DETAILS
MOVABLE CLOSURES STA. 119+62.65
& STA. 123+80.40
SCALE 1/4"=1'-0"
SHEET 57 OF 18 SHEETS
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVAL RECOMMENDED:
APPROVED
AS BUILT
935-12.2/67
PLAN
RIVERSIDE ELEVATION
SECTION A-B
SECTION B-B IDENTICAL, BUT OPPOSITE HAND
Riverside
Landside
Sta 119+62.65
Sta 123+80.40
Excavation Payment line
Copper seal Strip
Expansion joint
Sidewalk
Curb to match existing curb
Work pavement to match top of wall
Anchor eyes
Bearing seat
Walkway recesses
Walkway opening in open monolithic
Remove 56'± of existing bar lower grids 31' of 36"10. W. pipe railing & bars shown on sheet 111.
Excavation line
Backfill
Existing bar grids
Bollard
Buttress pier head
Concrete
Rip-rap
Elevations
Note
All elevations shown hereon are for closure at Sta 123+80.40. Those at Sta 119+62.65 are 2.0 ft. higher.
For monolithic details at closure bar sheet 68
For monolithic details at monolithic 114, 115, 80 & 81 see sheets 72 & 73
For details of walkway, bearing, frame & bulkhead see sheet 69

WAR DEPARTMENT

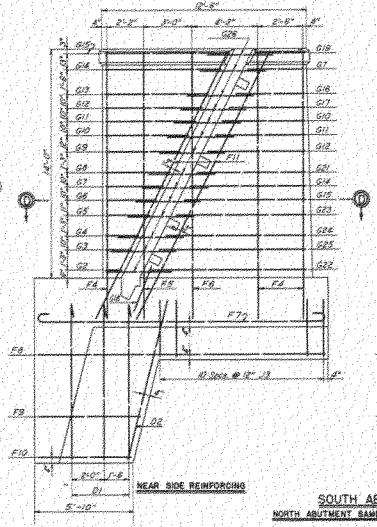
CORPS OF ENGINEERS, U. S. ARMY

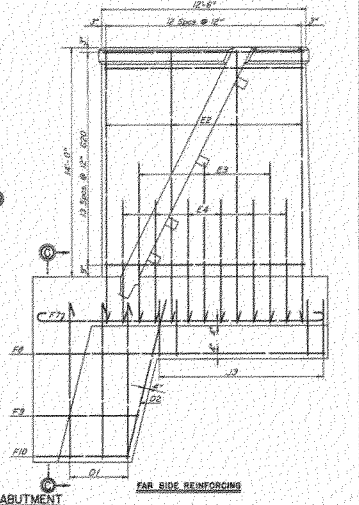


TOP REINFORCING

BOTTOM REINFORCING

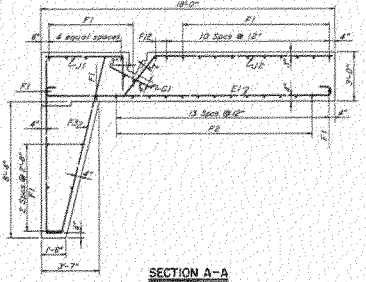
PLAN

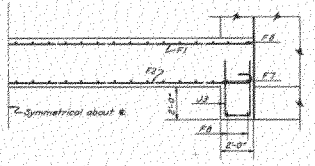


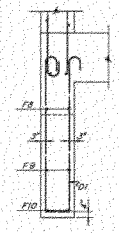


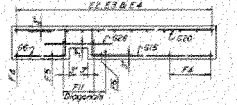
SOUTH ABUTMENT

NORTH ABUTMENT SAME BUT OPPOSITE HAND









Note: For masonry details see sheet G7.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS

STA. 119+62.65 & STA.123+80.40

SILL & ABUTMENTS

SHEET 59 OF 115 SHEETS SCALE: 3/8"=1'-0"

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

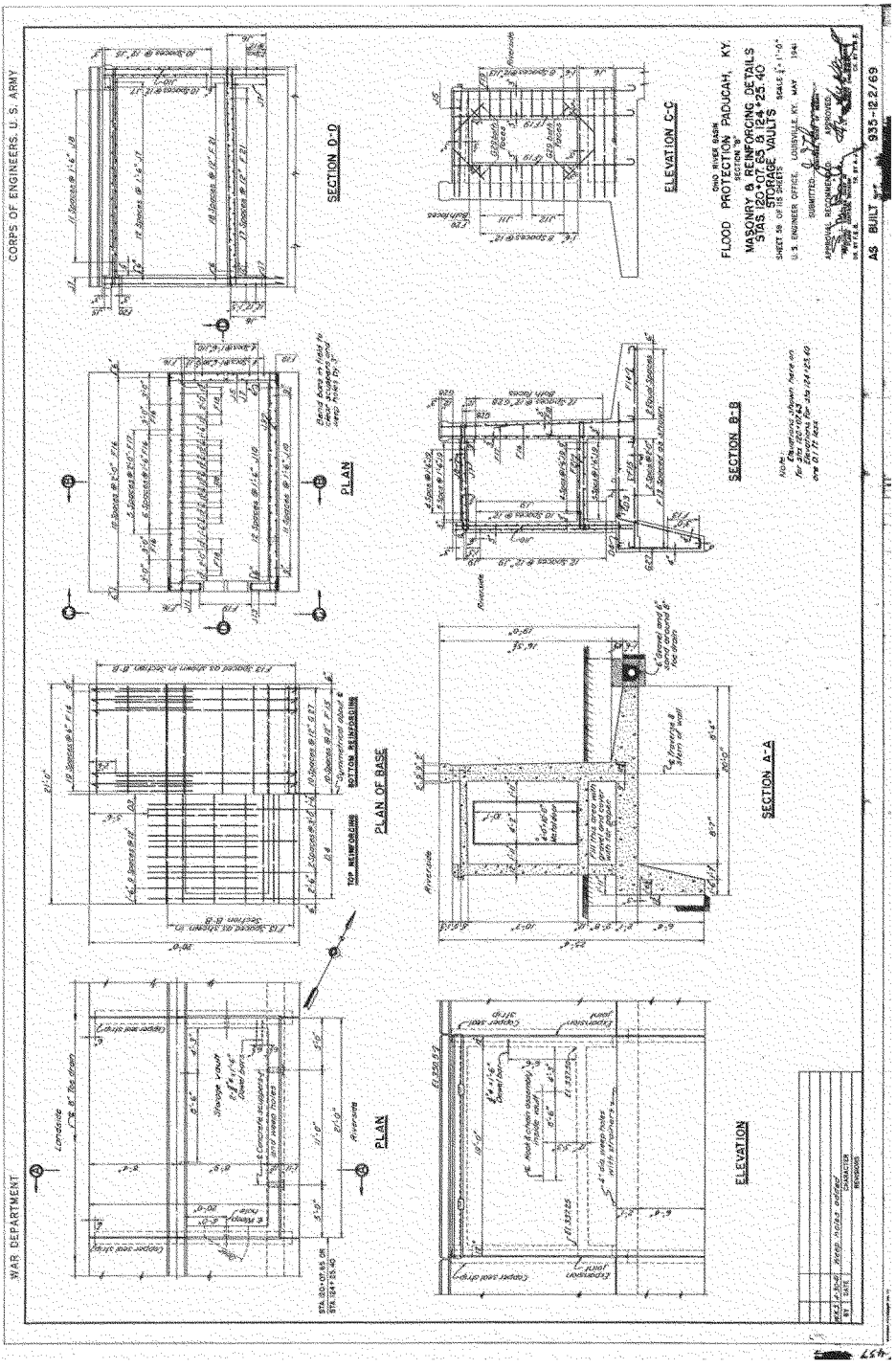
SUBMITTED:

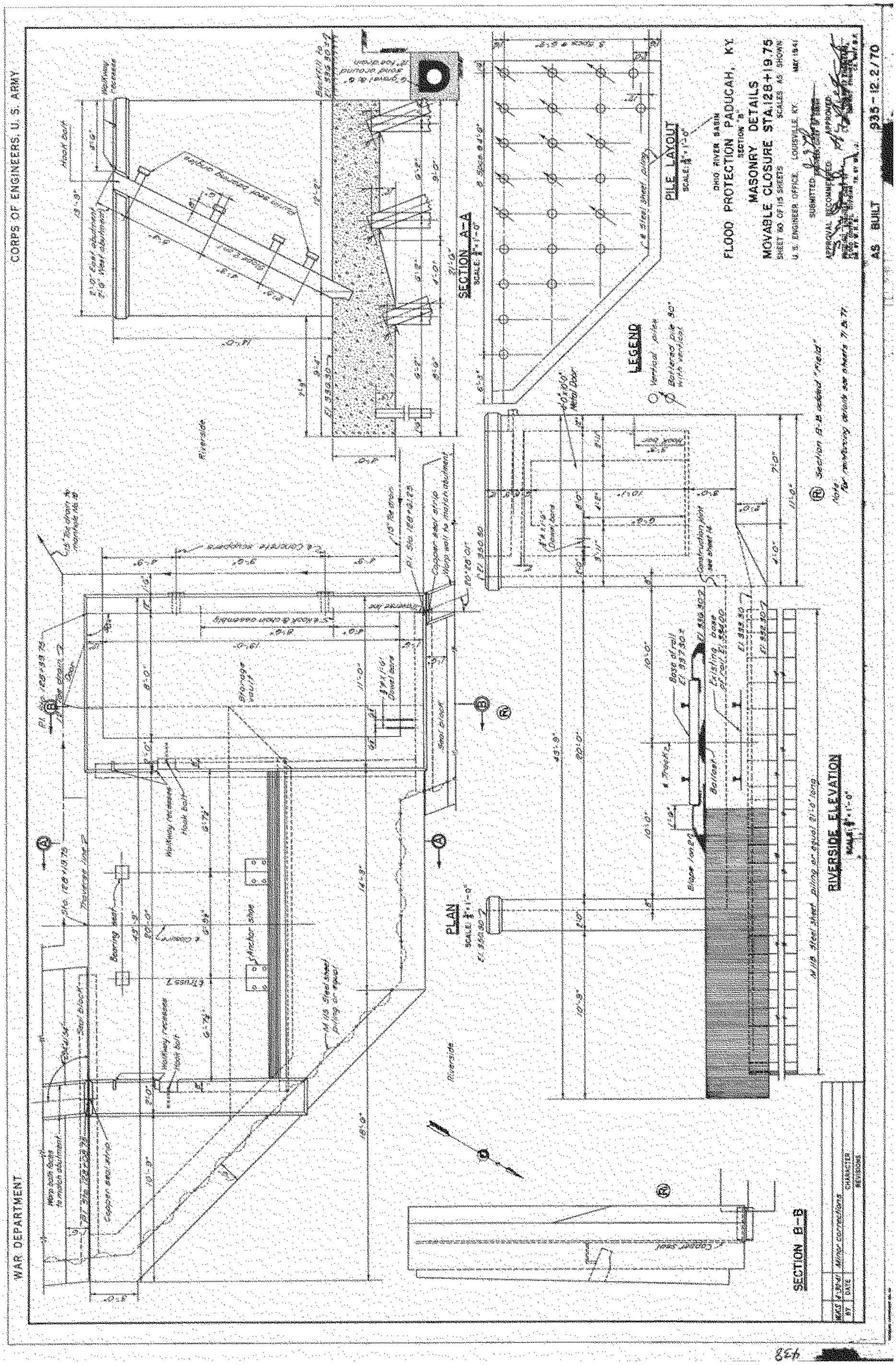
APPROVAL RECOMMENDED:

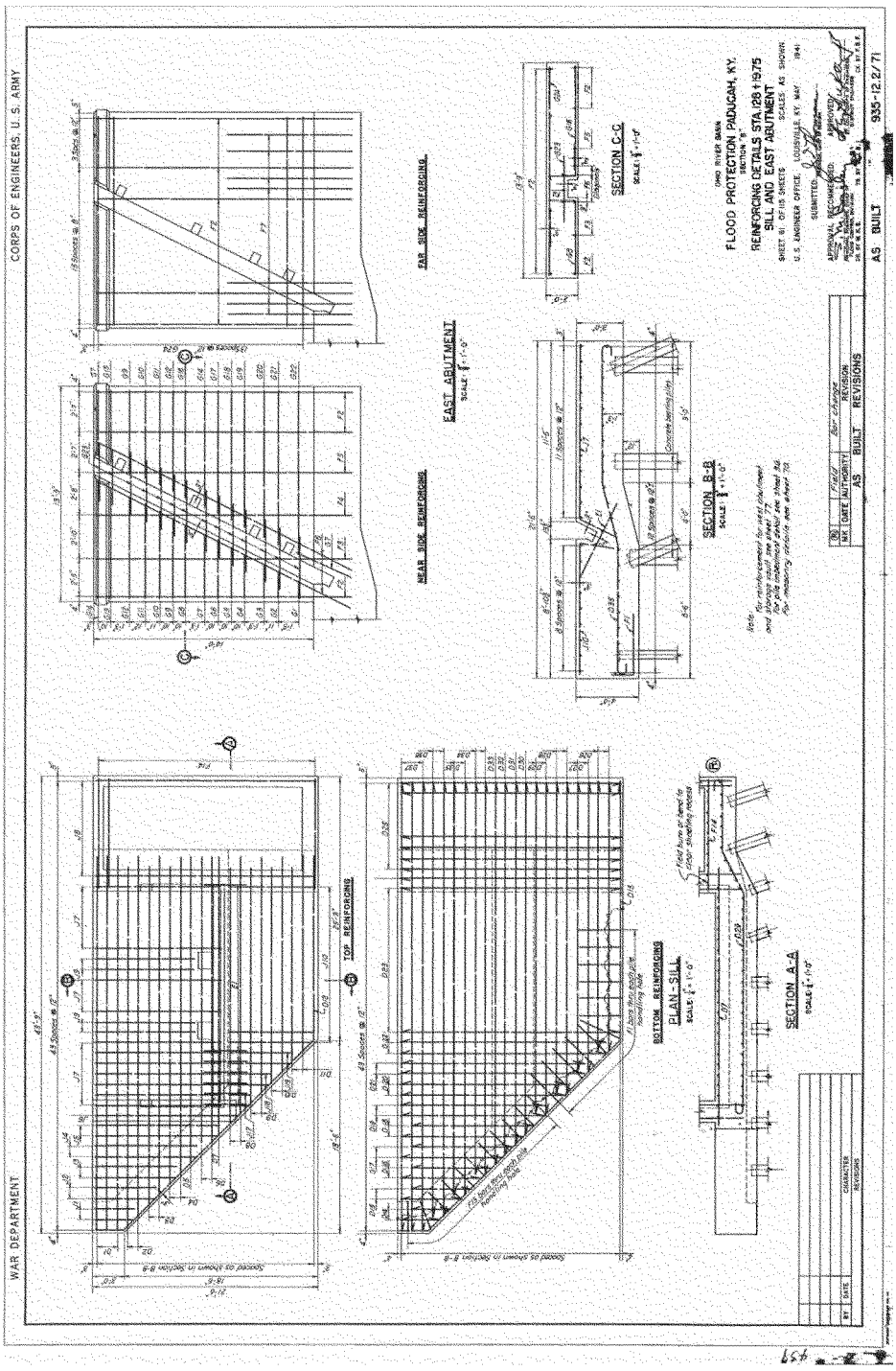
APPROVED:

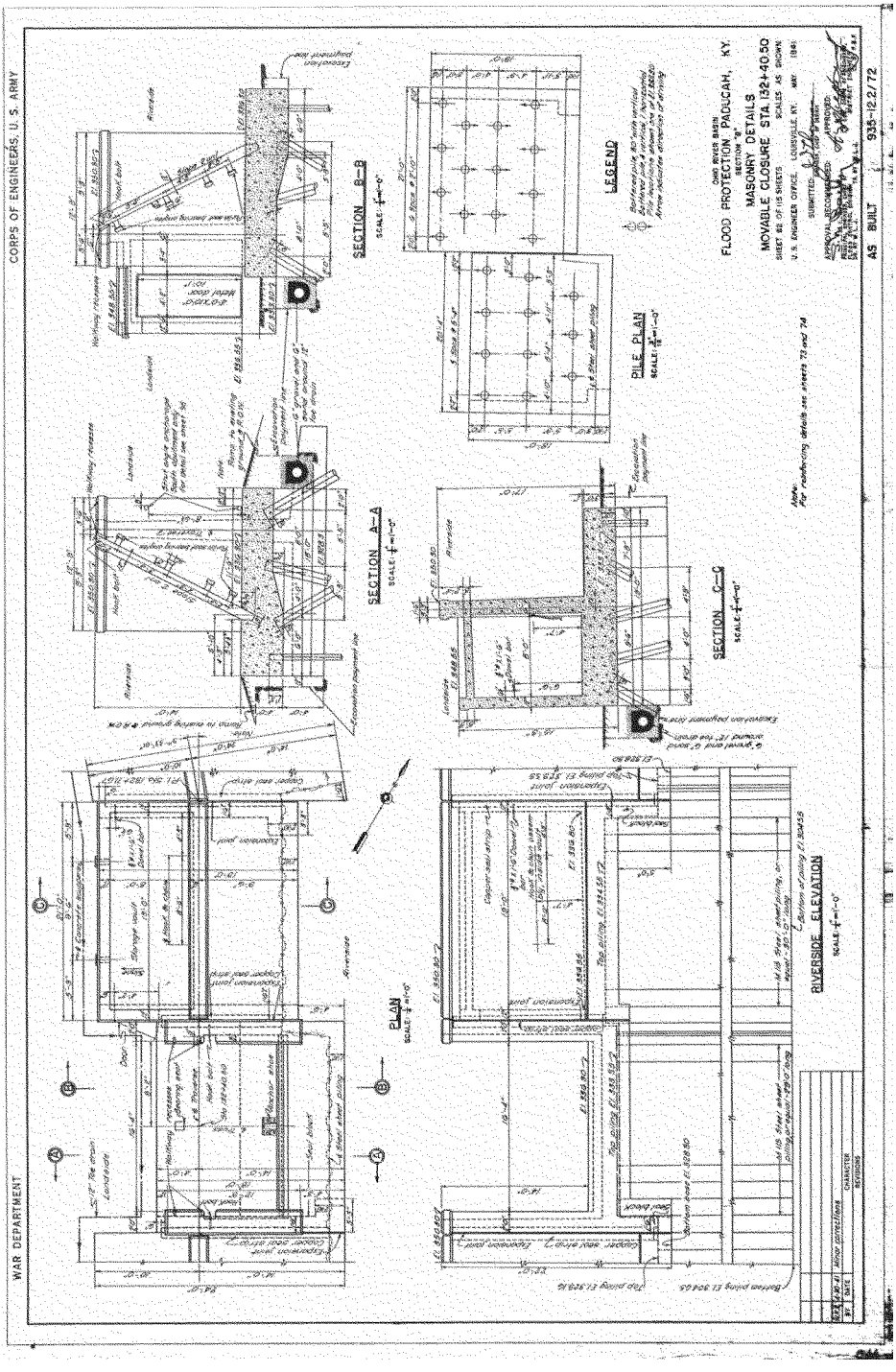
BY	DATE	CHARACTER REVISIONS

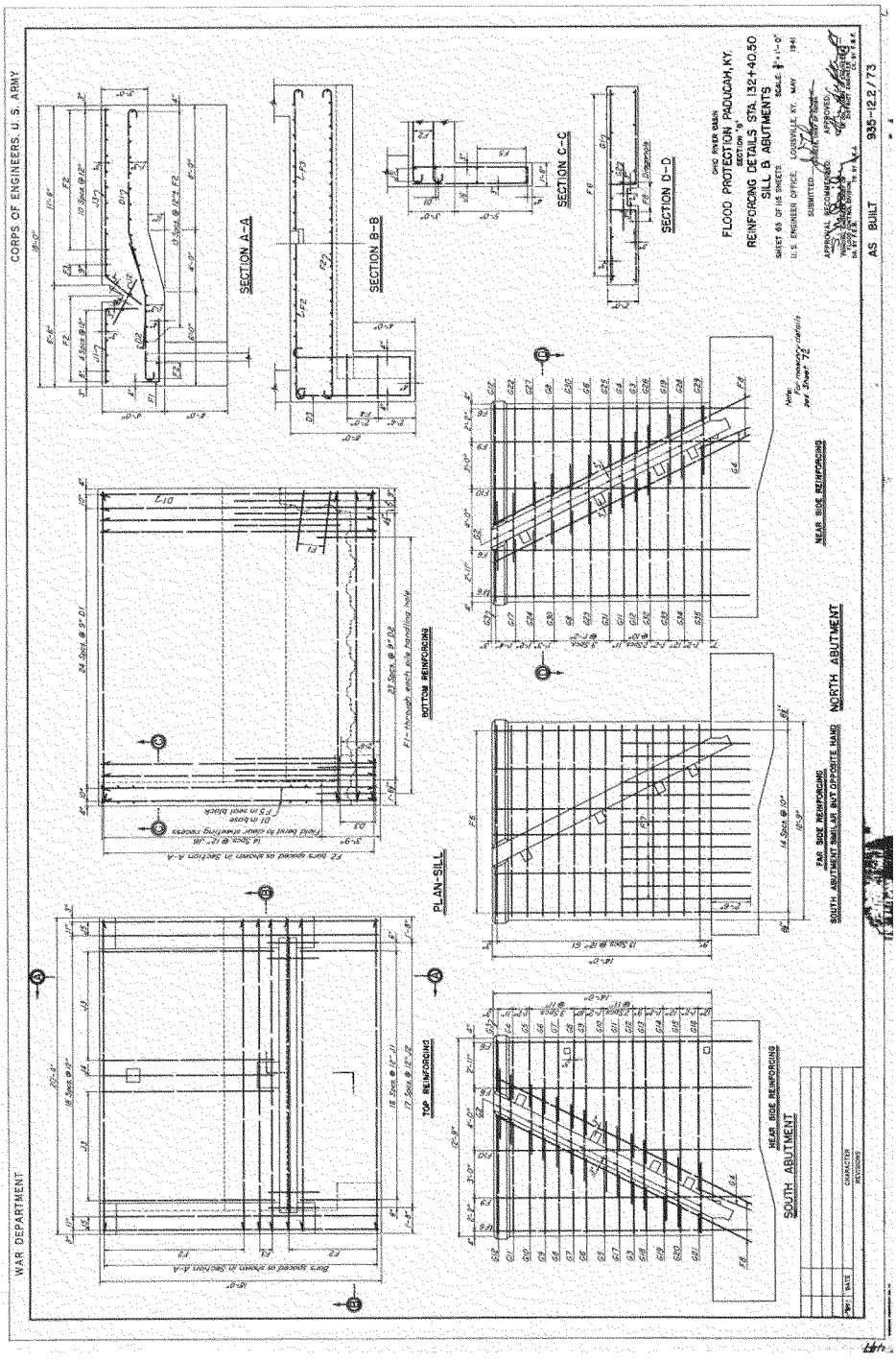
AS BUILT 935-12.2/68

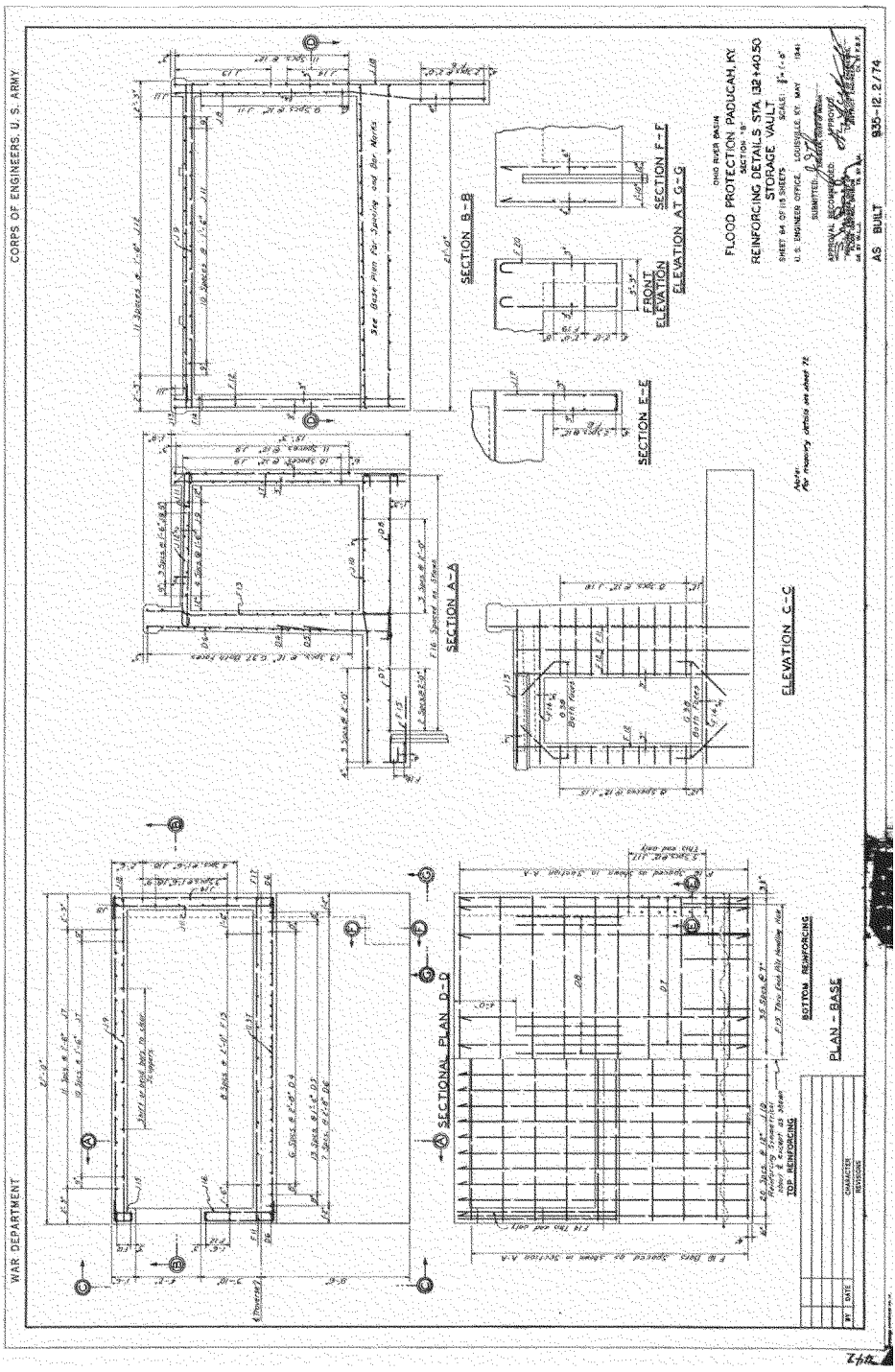

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION AT PADUCAH, KY.
SECTION 13
MASONRY & REINFORCING DETAILS
STAS. 120+07.65 & 124+25.40
STORAGE VAULTS
SHEET 59 OF 115 SHEETS
SCALE 1/2" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1944
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
AS BUILT
935-12.2/69
SECTION D-D
PLAN
SECTION B-B
ELEVATION C-C
PLAN OF BASE
SECTION A-A
PLAN
ELEVATION

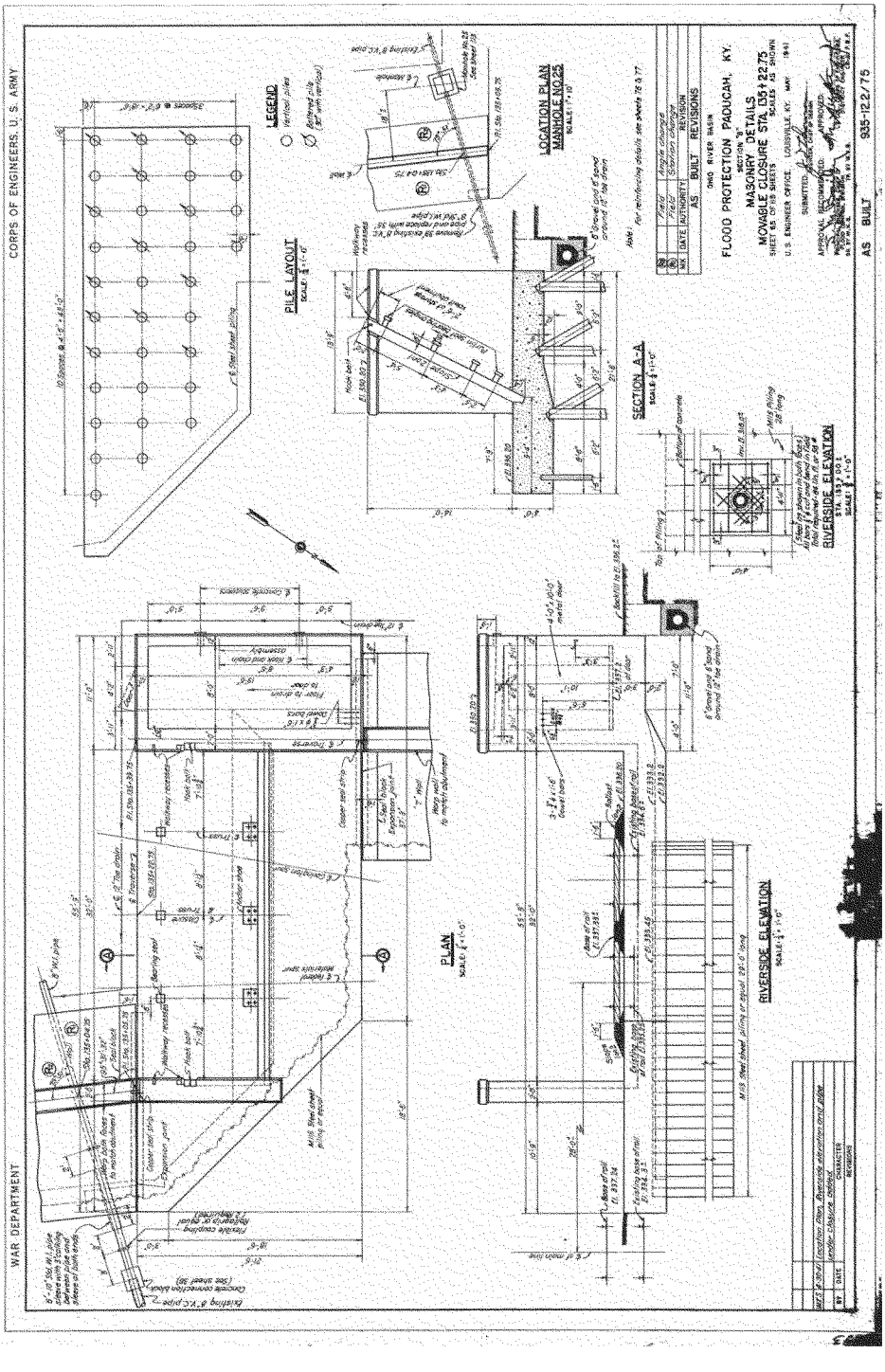

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
SECTION A-A
PLAN
RIVERSIDE ELEVATION
PILE LAYOUT
LEGEND
SECTION B-B
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MASONRY DETAILS
MOVABLE CLOSURE STA.128+19.75
AS BUILT
335-12.2/70

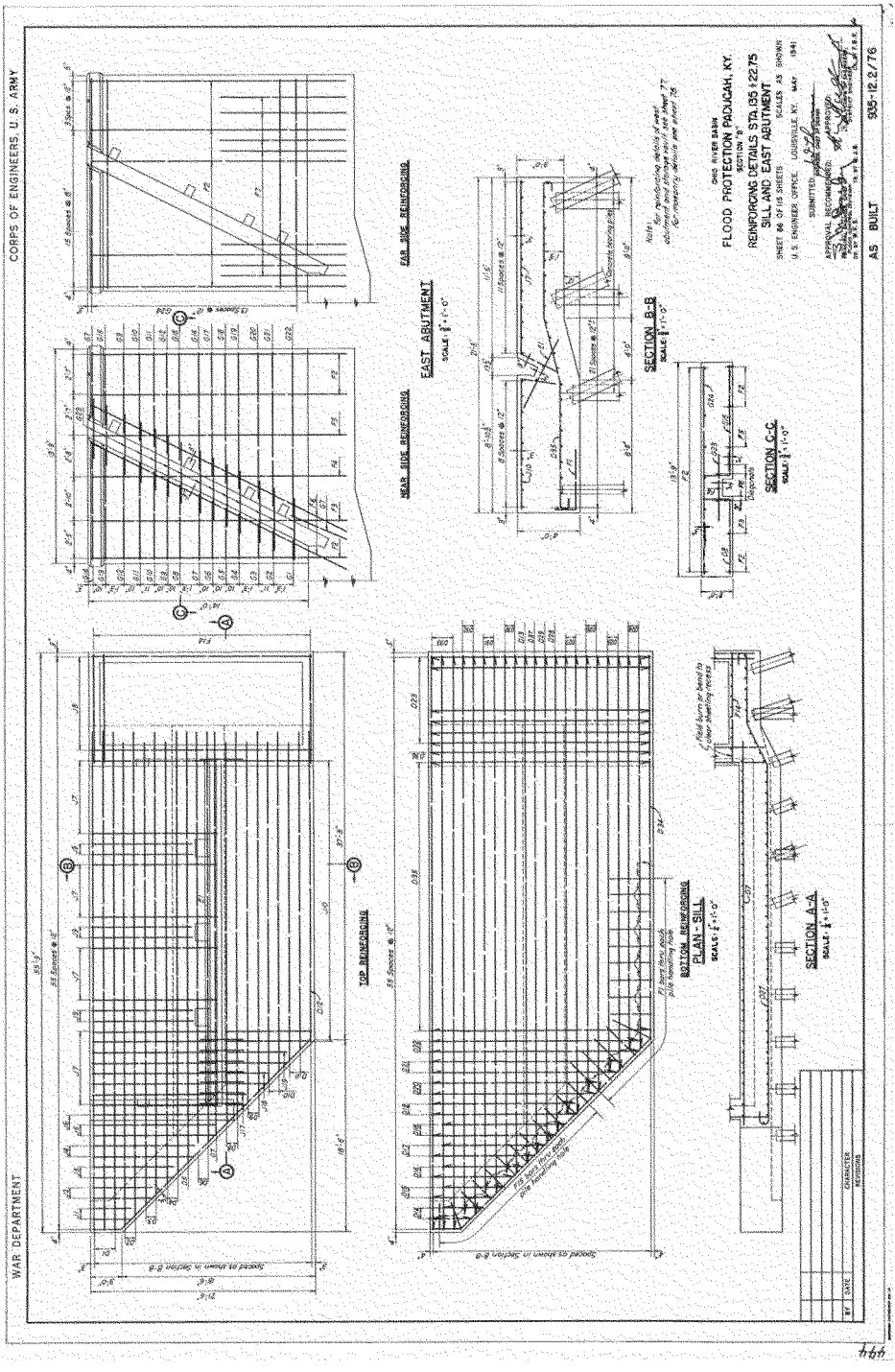

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
REINFORCING DETAILS STA.128+1975
SILL AND EAST ABUTMENT
AS BUILT
935-12.2/71
EAST ABUTMENT
FAR SIDE REINFORCING
NEAR SIDE REINFORCING
TOP REINFORCING
BOTTOM REINFORCING
PLAN - SILL
SECTION A-A
SECTION B-B
SECTION C-C

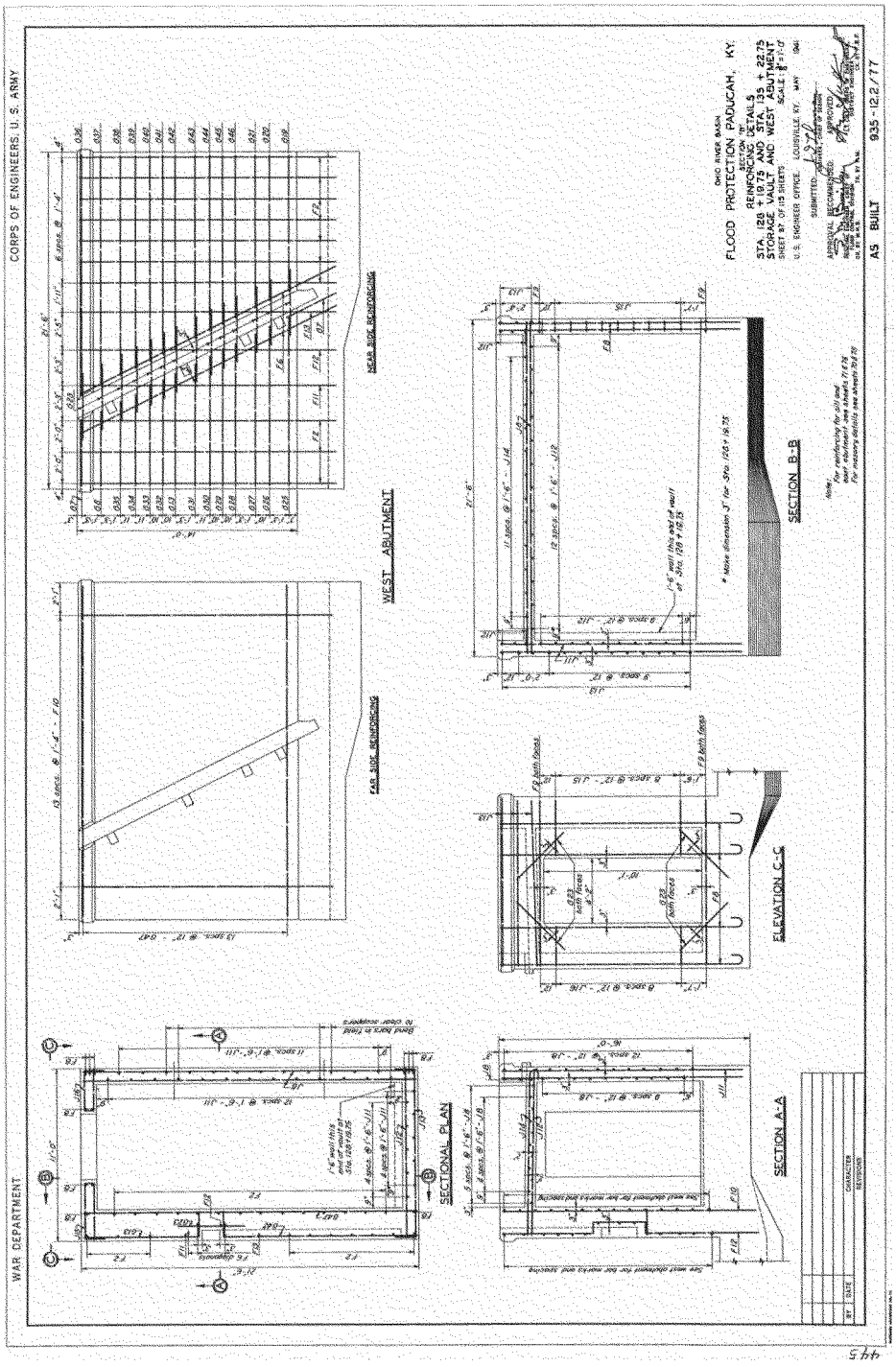

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURE STA. 1324+40.50
SHEET 82 OF 115 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED:
RECOMMENDED:
APPROVED:
AS BUILT
935-12.2/72
PLAN
SCALE 1"=10'
SECTION B—B
SECTION A—A
SECTION C—C
PILE PLAN
SCALE 1/4"=1'-0"
LEGEND
RIVERSIDE ELEVATION
SCALE 1"=10'

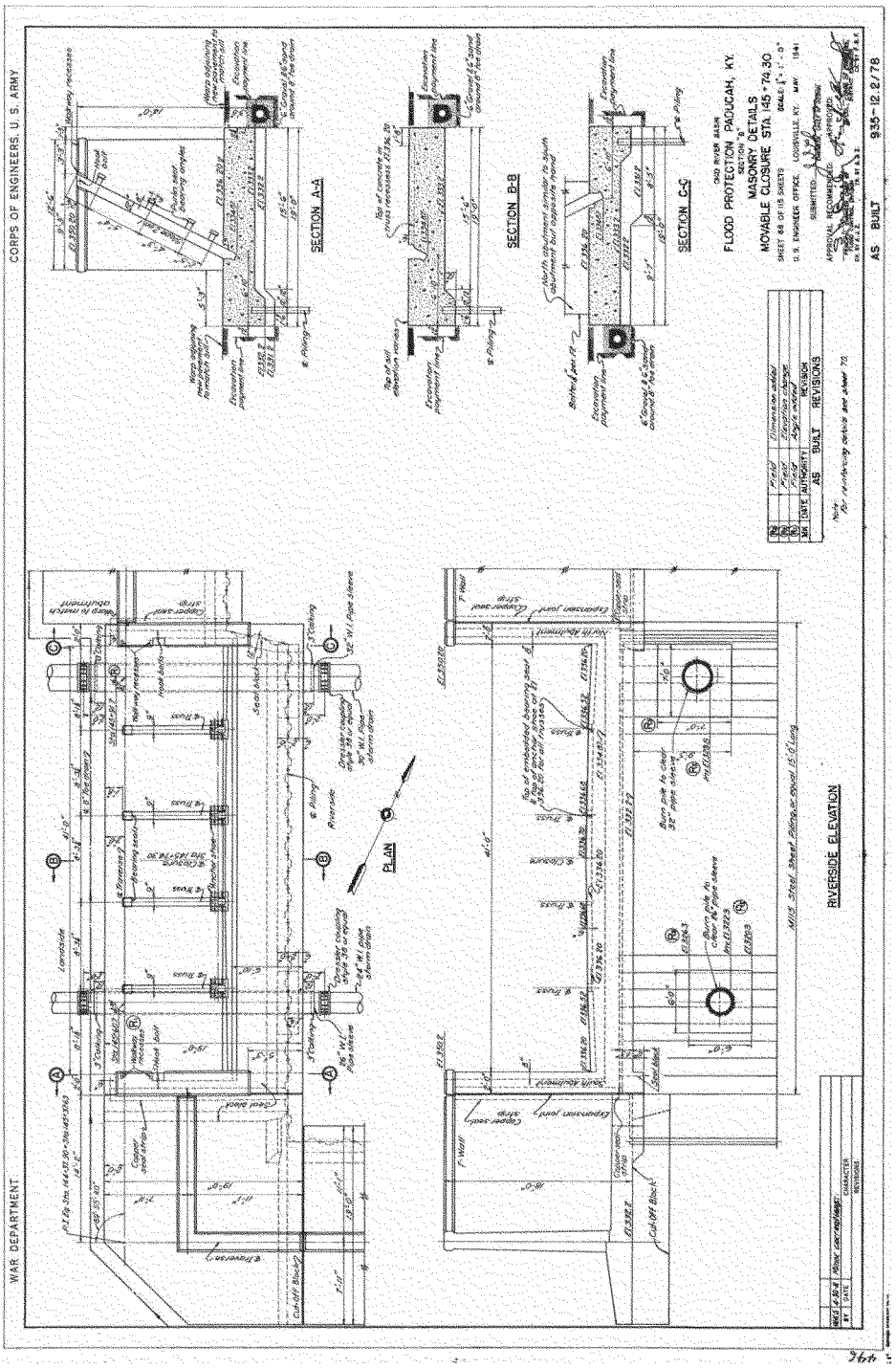

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 132+40.50
SILL & ABUTMENTS
SHEET 69 OF 115 SHEETS
SCALE 1" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY., MAY 1941
SUBMITTED
APPROVED
AS BUILT
935-12.2/73
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
PLAN-SILL
BOTTOM REINFORCING
TOP REINFORCING
FAR SIDE REINFORCING
SOUTH ABUTMENT SIMILAR BUT OPPOSITE HAND
NEAR SIDE REINFORCING
NORTH ABUTMENT
NEAR SIDE REINFORCING
SOUTH ABUTMENT

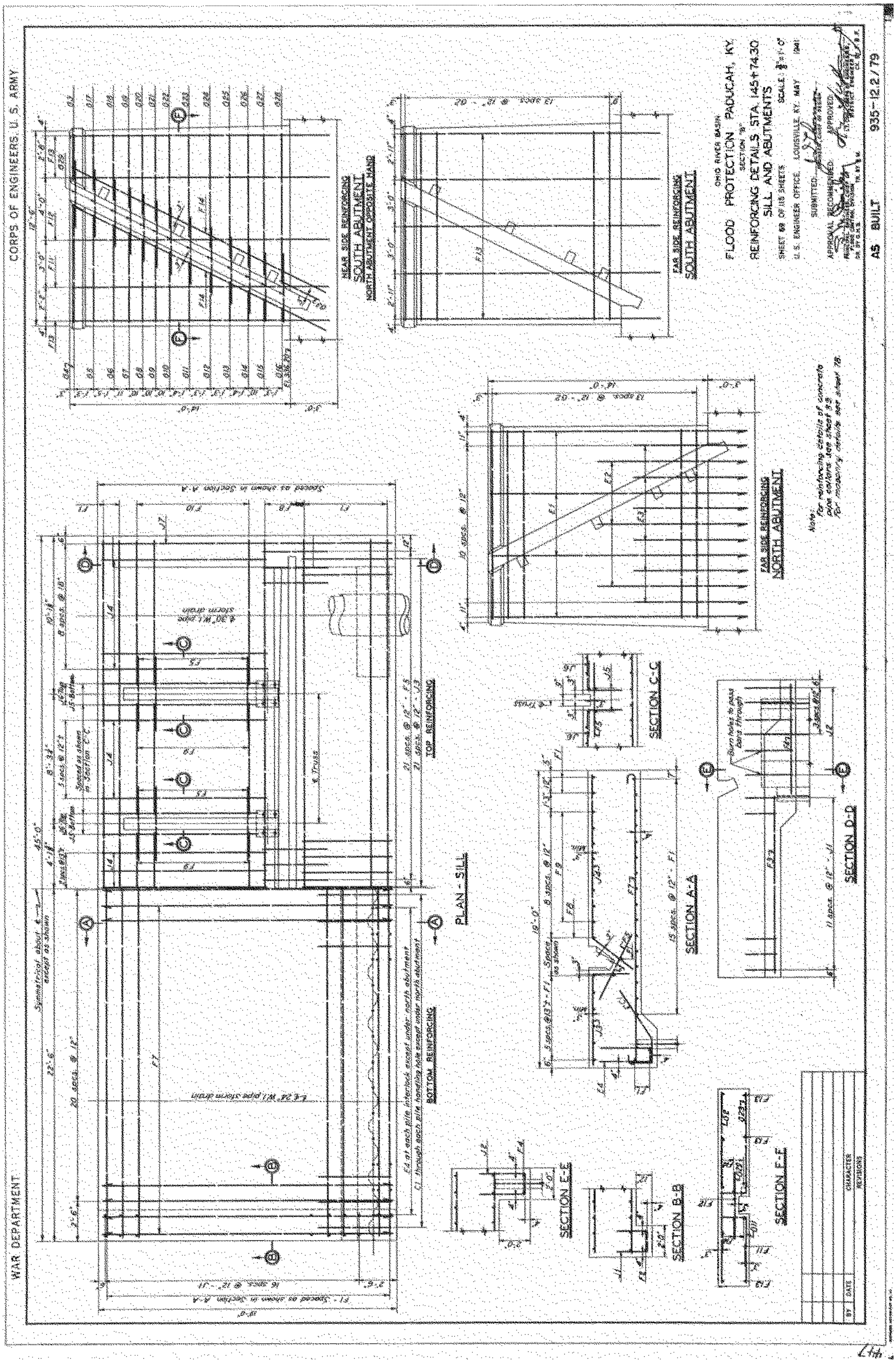

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 132+40.50
STORAGE VAULT
SHEET 84 OF 115 SHEETS
SCALES: 1"=1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED:
APPROVED:
APPROVAL RECOMMENDED:
AS BUILT
935-12.2/74
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F
FRONT ELEVATION
ELEVATION AT G-G
PLAN - BASE
BOTTOM REINFORCING
TOP REINFORCING
BY
DATE
CHARACTER REVISIONS

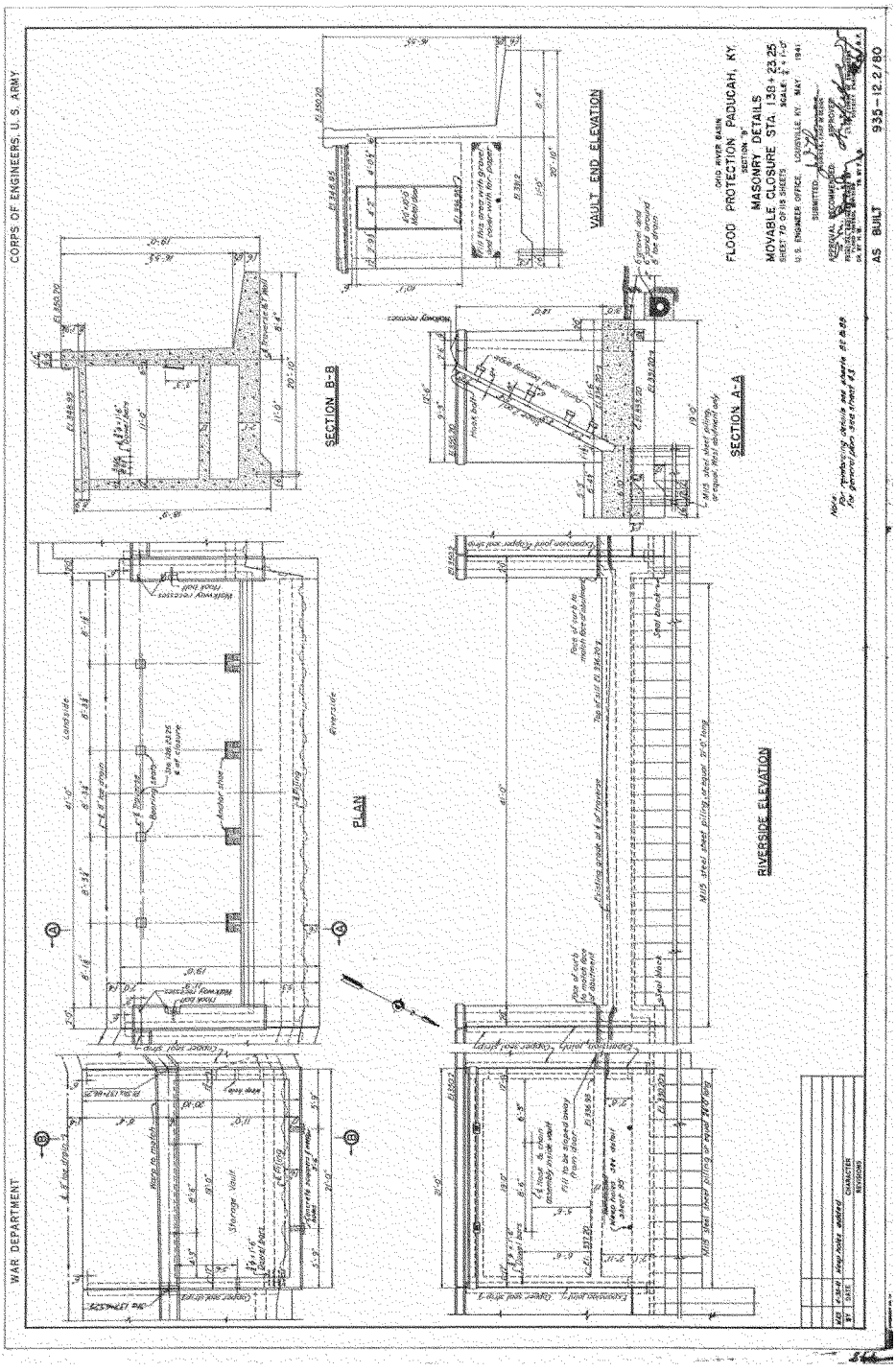

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURE STA. 136+22.75
OHIO RIVER BASIN
AS BUILT
935-12-2/75
LEGEND
PILE LAYOUT
LOCATION PLAN MANHOLE NO.25
SECTION A-A
PLAN
RIVERSIDE ELEVATION
RIVERSIDE ELEVATION

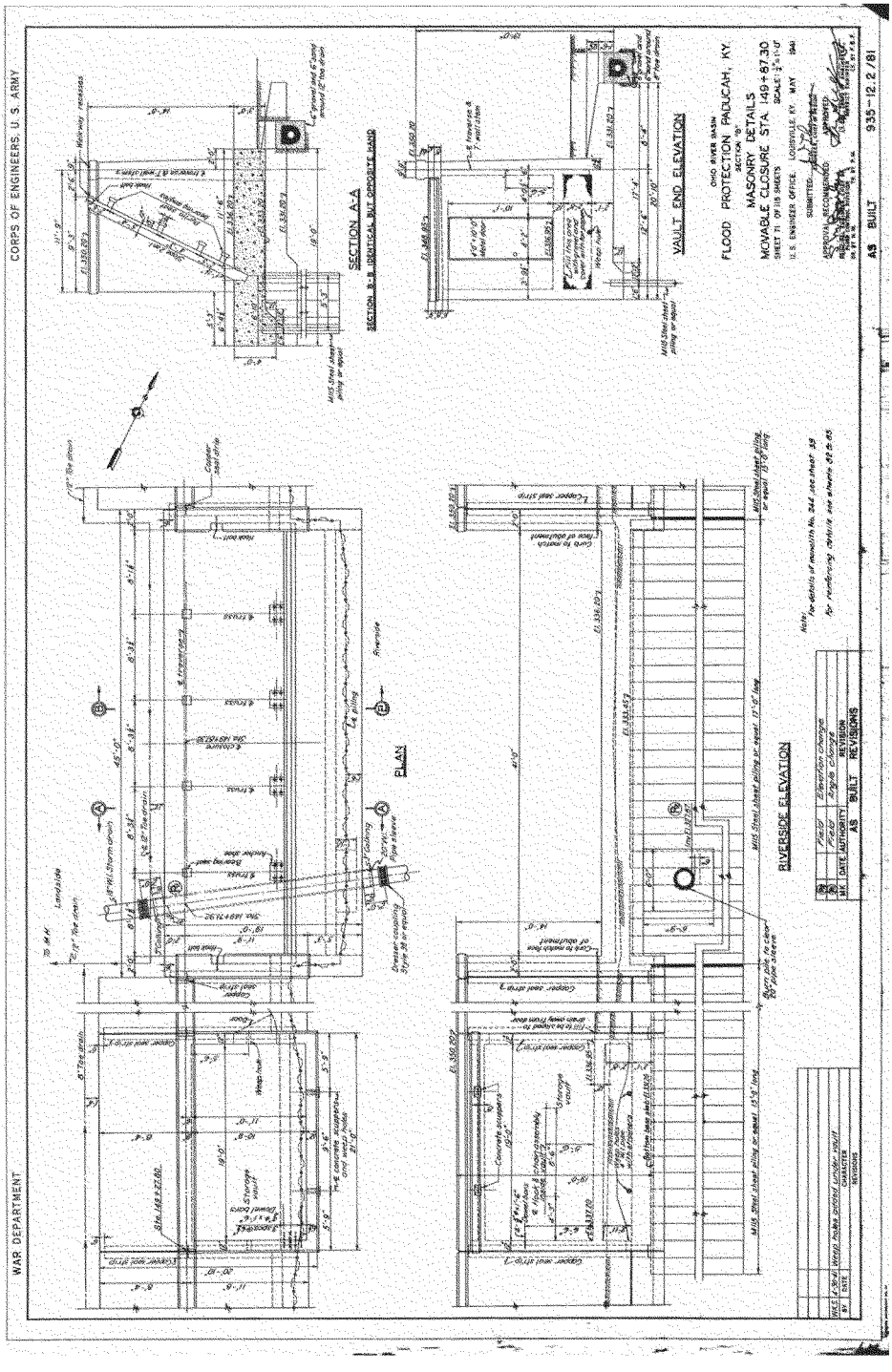

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA.135 to 22+75
SILL AND EAST ABUTMENT
SHEET 66 OF 115 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVAL RECOMMENDED:
APPROVED:
AS BUILT
905-12.2/76
EAST ABUTMENT
SCALE 1/4"-1'-0"
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
SECTION B-B
SCALE 1/4"-1'-0"
SECTION C-C
SCALE 1/4"-1'-0"
SECTION A-A
SCALE 1/4"-1'-0"
PLAN - SILL
SCALE 1/4"-1'-0"
BOTTOM REINFORCING
TOP REINFORCING
Note:
for reinforcing details of panel
adjacent and flanking wall see sheet 77
for reinforcing details see sheet 76
Hold bars or bend to
clear sheeting rocker
Fit bent bars over
pile handling hole
Fit bent bars over
pile handling hole
Spaced as shown in Section B-B
Spaced as shown in Section B-B
BY
DATE
CHARACTER
REVISIONS

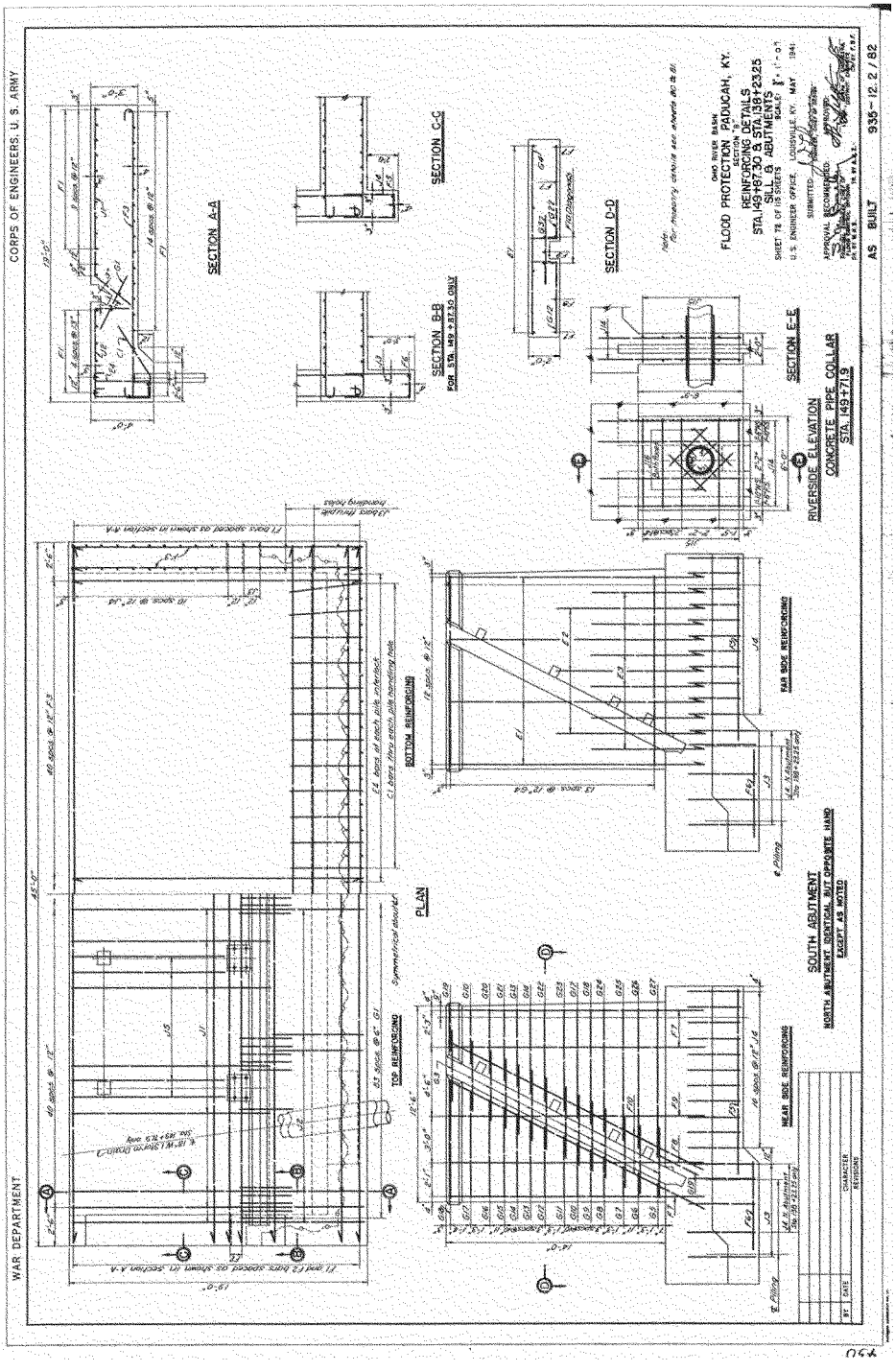

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
REINFORCING DETAILS
STA. 128 + 10.79 AND STA. 135 + 22.75
STORAGE VAULT AND WEST ABUTMENT
SHEET NO. 1 OF 1 SHEETS SCALE 1" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
AS BUILT
935 - 12.2 / 77
WEST ABUTMENT
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
SECTION B-B
ELEVATION C-C
SECTIONAL PLAN
SECTION A-A

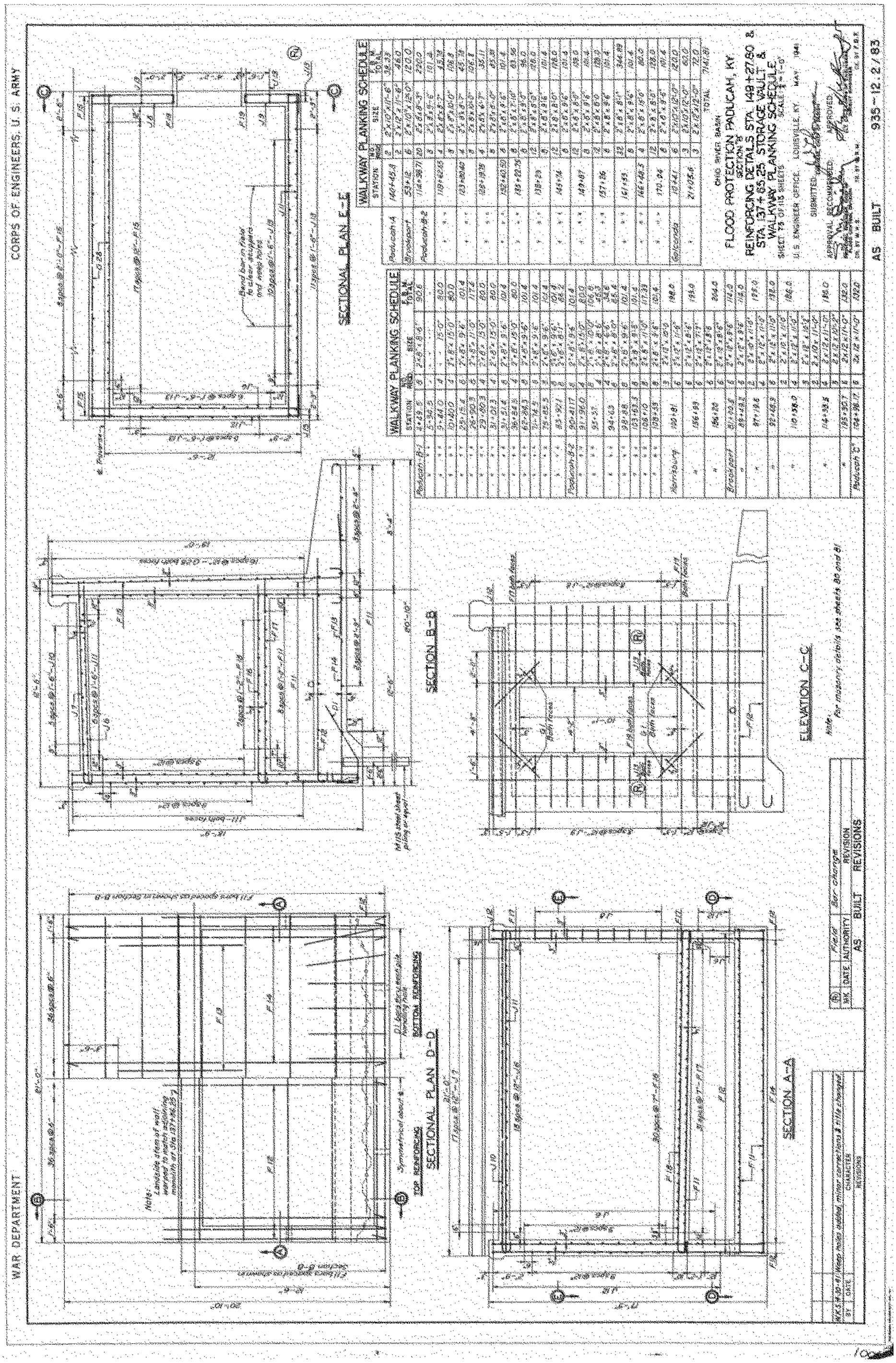

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURE STA. 145+74.30
SHEET 68 OF 115 SHEETS
SCALE 1" = 1'-0"
U.S. ENGINEERS OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
AS BUILT
9-35-12-2/78
SECTION A-A
SECTION B-B
SECTION C-C
PLAN
RIVERSIDE ELEVATION
AS BUILT REVISIONS


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
NEAR SIDE REINFORCING
SOUTH ABUTMENT
NORTH ABUTMENT OPPOSITE HAND
FAR SIDE REINFORCING
SOUTH ABUTMENT
FAR SIDE REINFORCING
NORTH ABUTMENT
PLAN - SILL
TOP REINFORCING
BOTTOM REINFORCING
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 145+74.30
SILL AND ABUTMENTS
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
AS BUILT
935-12.2/79
CHARACTER
REVISIONS


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURE STA. 136+23.25
SHEET 70 OF 118 SHEETS
SCALE: 1/4" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
RECOMMENDED
APPROVED
AS BUILT
935—12.2/80
SECTION B-B
SECTION A-A
VAULT END ELEVATION
PLAN
RIVERSIDE ELEVATION

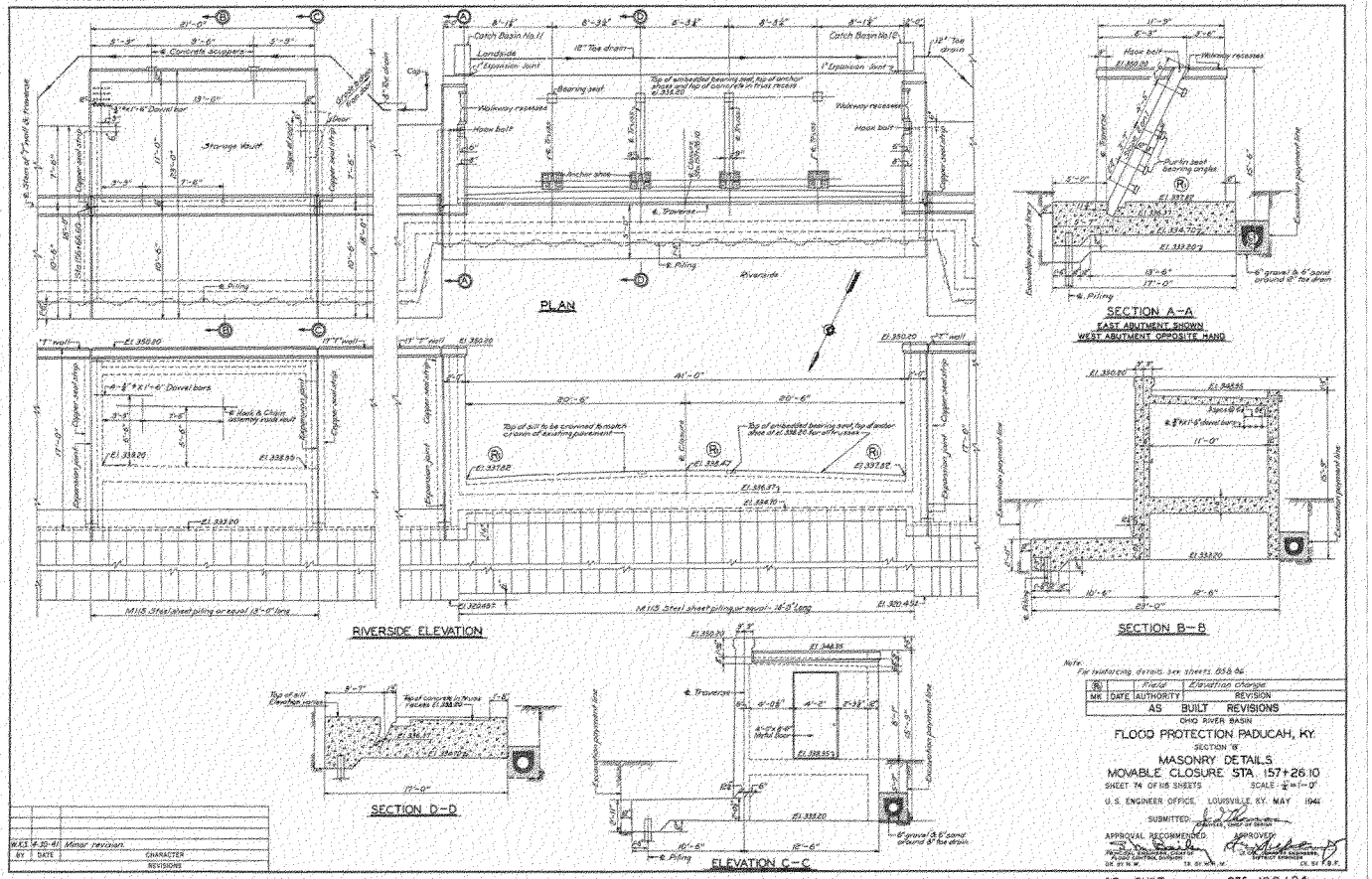

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MASONRY DETAILS
MOVABLE CLOSURE STA. 149+87.30
SHEET 71 OF 115 SHEETS
SCALE 3/4"=1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1944
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
935-12.2/81
SECTION A-A
SECTION B-B IDENTICAL BUT OPPOSITE HAND
VAULT END ELEVATION
PLAN
RIVERSIDE ELEVATION
DATE AUTHORITY REVISION
AS BUILT REVISIONS


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS
STA. 149+67.30 & STA. 138+23.25
SILL & ABUTMENTS
SCALE 1" = 0'-1"
SHEET 72 OF 115 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVAL RECOMMENDED
AS BUILT
935 - 12.2 / 82
SECTION A-A
SECTION B-B
FOR STA. 149+37.50 ONLY
SECTION C-C
SECTION D-D
SECTION E-E
RIVERSIDE ELEVATION
CONCRETE PIPE COLLAR
STA. 149+71.9
PLAN
TOP REINFORCING
BOTTOM REINFORCING
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
SOUTH ABUTMENT
NORTH ABUTMENT SIMILAR, BUT OPPOSITE HAND
EXCEPT AS NOTED


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
SECTIONAL PLAN D-D
TOP REINFORCING
BOTTOM REINFORCING
Note: Landside stem of wall warped to match adjoining monolith at Sta 137+86.25
SECTION B-B
SECTIONAL PLAN E-E
SECTION A-A
ELEVATION C-C
Note: For masonry details see sheets 80 and 81
WALKWAY PLANKING SCHEDULE
WALKWAY PLANKING SCHEDULE
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 149+27.80 &
STA. 137+85.25 STORAGE VAULT &
WALKWAY PLANKING SCHEDULE
SHEET 75 OF 115 SHEETS
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT REVISIONS
AS BUILT
935-12.2/83

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



R	Field	Elevation Change
MK	DATE AUTHORITY	REVISION
AS	BUILT	REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY DETAILS

MOVABLE CLOSURE STA. 157+26.10

SHEET 74 OF 115 SHEETS SCALE: 1/4" = 1'-0"

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1942

SUBMITTED:

APPROVAL RECOMMENDED:

APPROVED:

W.K.S. 4-30-41. Minor revision.

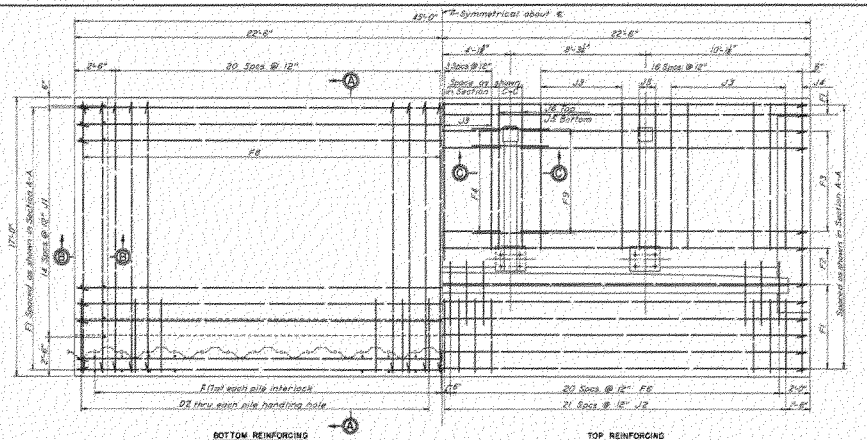
BY	DATE	CHARACTER REVISIONS

AS BUILT 935-122/84

1255

WAR DEPARTMENT

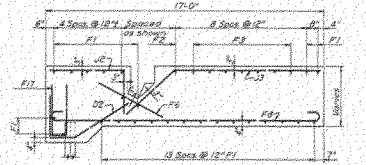
CORPS OF ENGINEERS, U. S. ARMY



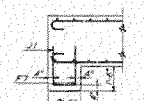
BOTTOM REINFORCING

TOP REINFORCING

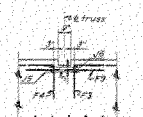
PLAN SILL



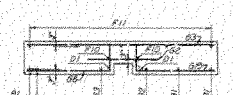
SECTION A-A



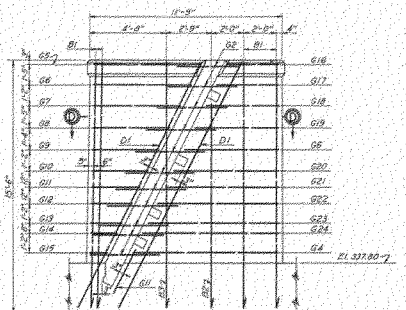
SECTION B-B



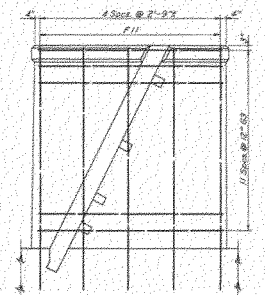
SECTION C-C



SECTION D-D



NEAR SIDE REINFORCING



FAR SIDE REINFORCING

EAST ABUTMENT

WEST ABUTMENT SIMILAR BUT OPPOSITE HAND

Note:
For masonry details see sheet 84.

BY	DATE	CHARACTER OF REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 157+26.10

SILL & ABUTMENTS

SHEET 75 OF 115 SHEETS SCALE: ½"=1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941.

SUBMITTED: [illegible] CHIEF OF DIVISION

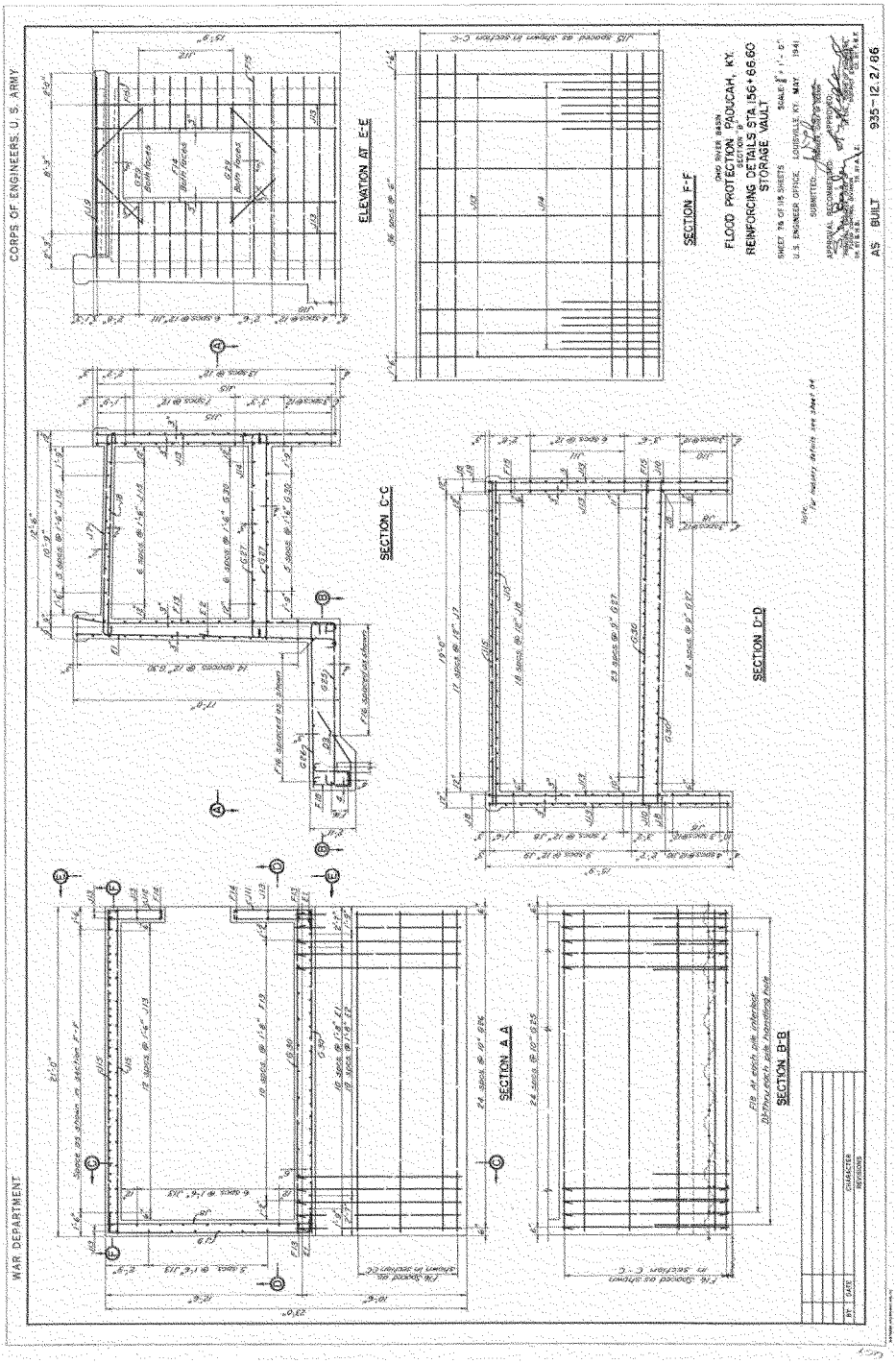
APPROVED: [illegible] CHIEF OF ENGINEERS

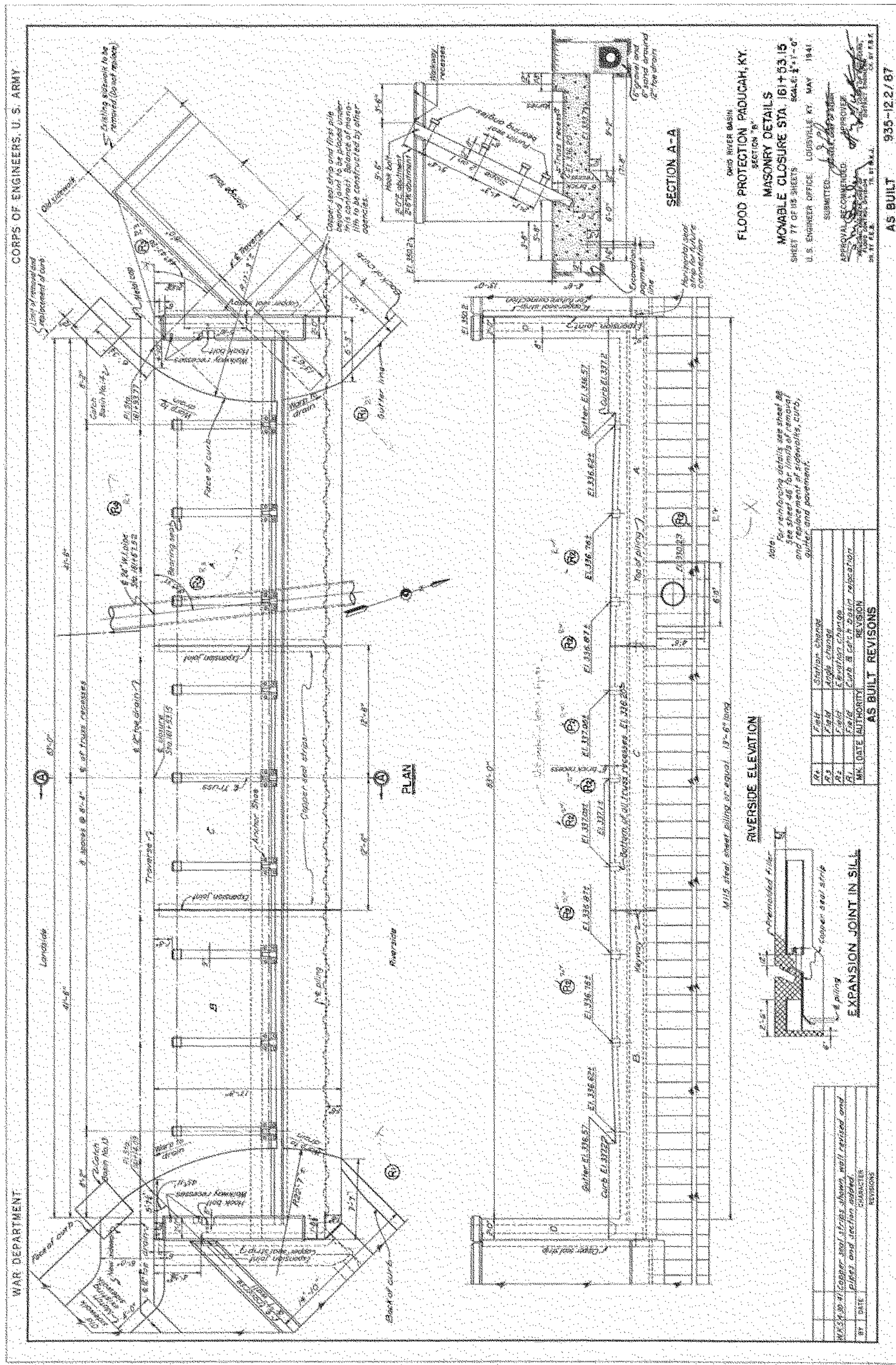
APPROVAL RECOMMENDED: [illegible] CHIEF, ENGINEERING DIVISION FLOOD CONTROL DIVISION

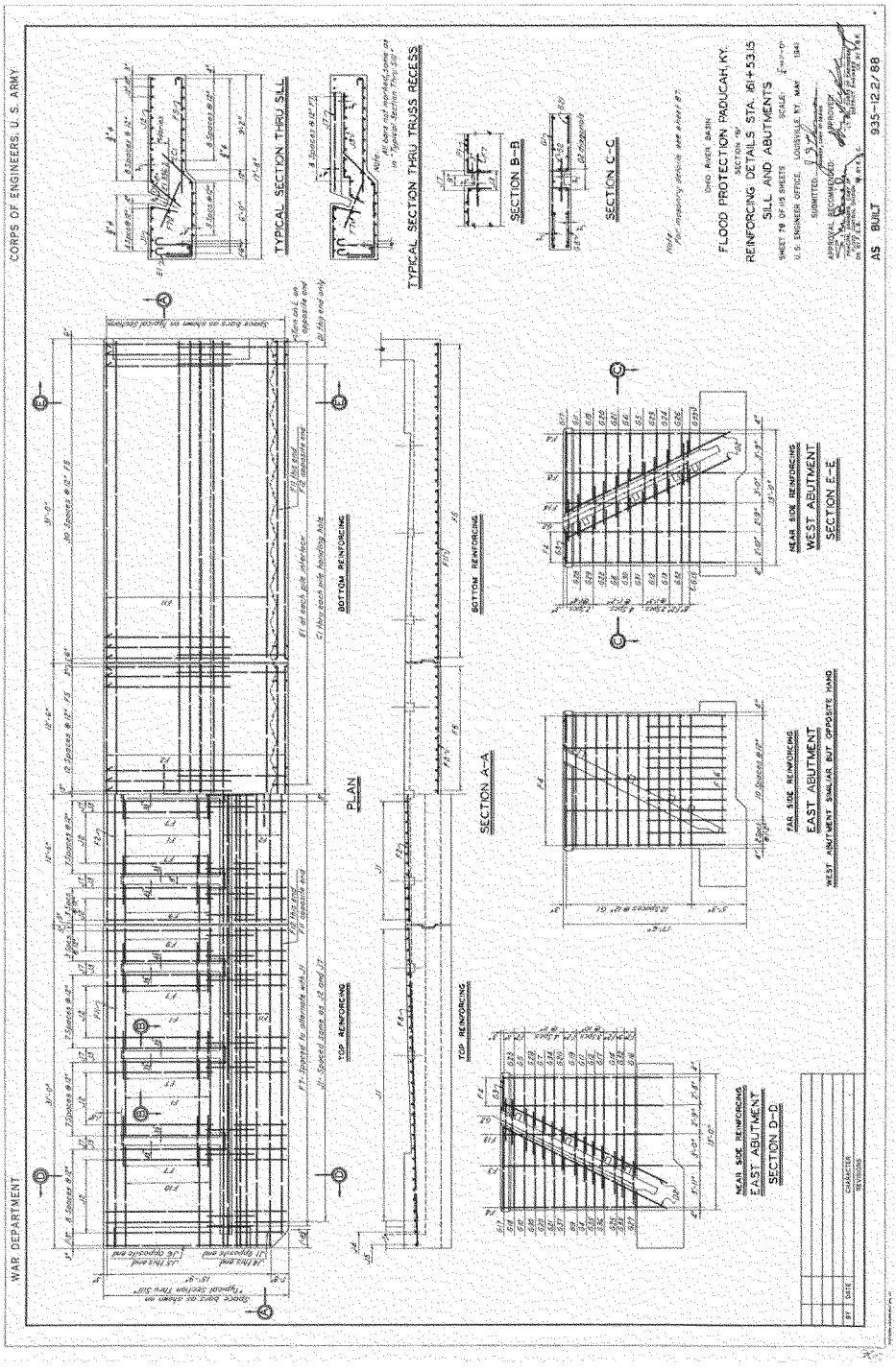
DR. BY D.R.S. TR. BY W.K.J. CK. BY F.B.F.

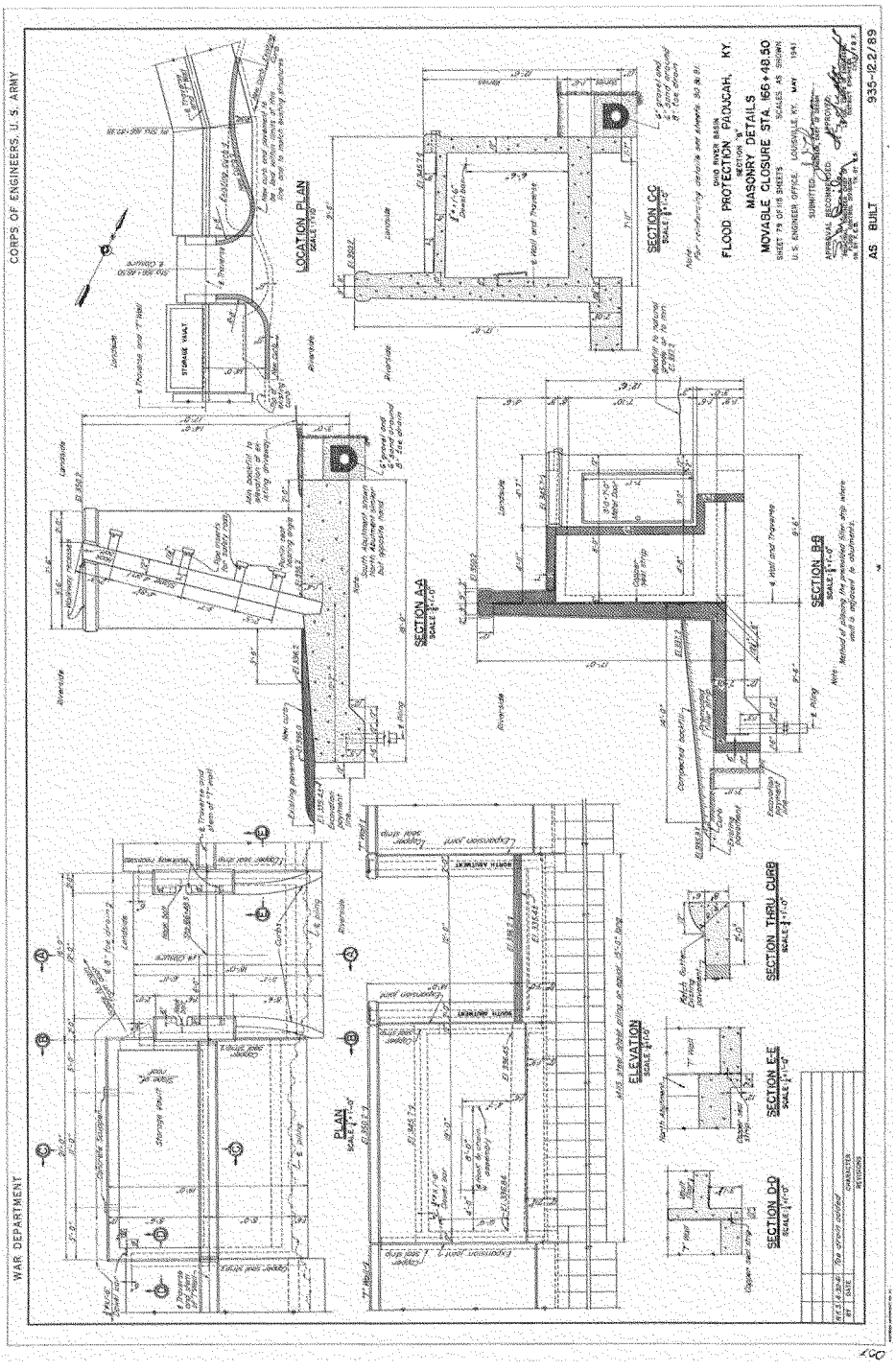
AS BUILT 935 - 12.2 / 85

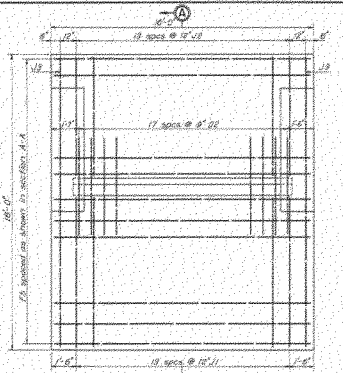
1256


CORPS OF ENGINEERS, U.S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 156+66.60
STORAGE VAULT
SCALE 1/8" = 1'-0"
SHEET 78 OF 115 SHEETS
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED:
APPROVED:
AS BUILT
935-12.2/66
ELEVATION AT E-E
SECTION C-C
SECTION D-D
SECTION F-F
SECTION A-A
SECTION B-B
BY
DATE
CHARACTER
REVISIONS

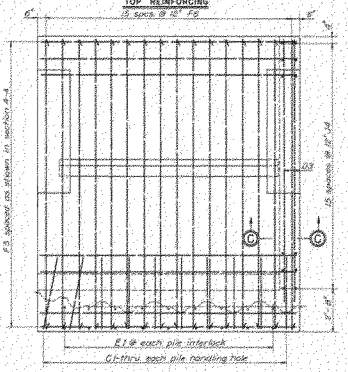

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
PLAN
SECTION A-A
RIVERSIDE ELEVATION
EXPANSION JOINT IN SILL
Landside
Riverside
Copper seal strips
Expansion joint
Anchor Shoe
Face of curb
Back of curb
Gutter line
Note: For reinforcing details see sheet 88
See sheet 46 for limits of removal
and replacement of sidewalks, curb,
gutter, and pavement.
M115 steel sheet piling or equal. 13'-6" long
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY DETAILS
MOVABLE CLOSURE STA. 161+53.15
U. S. ENGINEER OFFICE. LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
935-12.2/87
R4 Field Station change
R3 Field Angle change
R2 Field Elevation change
R1 Field Curb & catch basin relocation
MK. DATE AUTHORITY REVISION
AS BUILT REVISONS
REVISIONS


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION 49
REINFORCING DETAILS STA. 161+53.15
SILL AND ABUTMENTS
SHEET 79 OF 115 SHEETS
SCALE: 1"=1'-0"
U.S. ENGINEER OFFICE - LOUISVILLE, KY. MAY 1941
SUBMITTED:
APPROVED:
AS BUILT
935-12.2/88
PLAN
TOP REINFORCING
BOTTOM REINFORCING
SECTION A-A
TYPICAL SECTION THRU SILL
TYPICAL SECTION THRU TRUSS RECESS
SECTION B-B
SECTION C-C
SECTION E-E
NEAR SIDE REINFORCING
WEST ABUTMENT
FAR SIDE REINFORCING
EAST ABUTMENT
WEST ABUTMENT SIMILAR BUT OPPOSITE HAND
NEAR SIDE REINFORCING
EAST ABUTMENT
SECTION D-D
BY
DATE
CHARACTER
REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
OHIO RIVER BASIN
SECTION "A"
FLOOD PROTECTION PADUCAH, KY.
MASONRY DETAILS
MOVABLE CLOSURE STA. 166+48.50
SHEET 79 OF 115 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
AS BUILT
935-12.2/89
LOCATION PLAN
SCALE 1"=50'
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION THRU CURB
PLAN
ELEVATION
STORAGE VAULT
NORTH ABUTMENT
Riverside
Landside

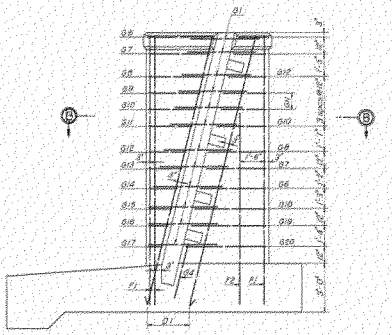


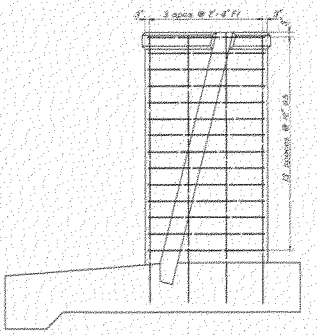
TOP REINFORCING



BOTTOM REINFORCING

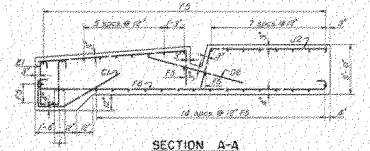
PLAN - SILL



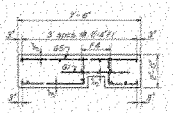


SOUTH ABUTMENT

NORTH ABUTMENT IDENTICAL BUT OPPOSITE HAND



SECTION A-A



SECTION B-B

SECTION C-C

Note
For masonry details see sheet 89.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

REINFORCING DETAILS STA. 166+48.50

SILL & ABUTMENTS

SHEET NO. OF 115 SHEETS SCALE: 3/4" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

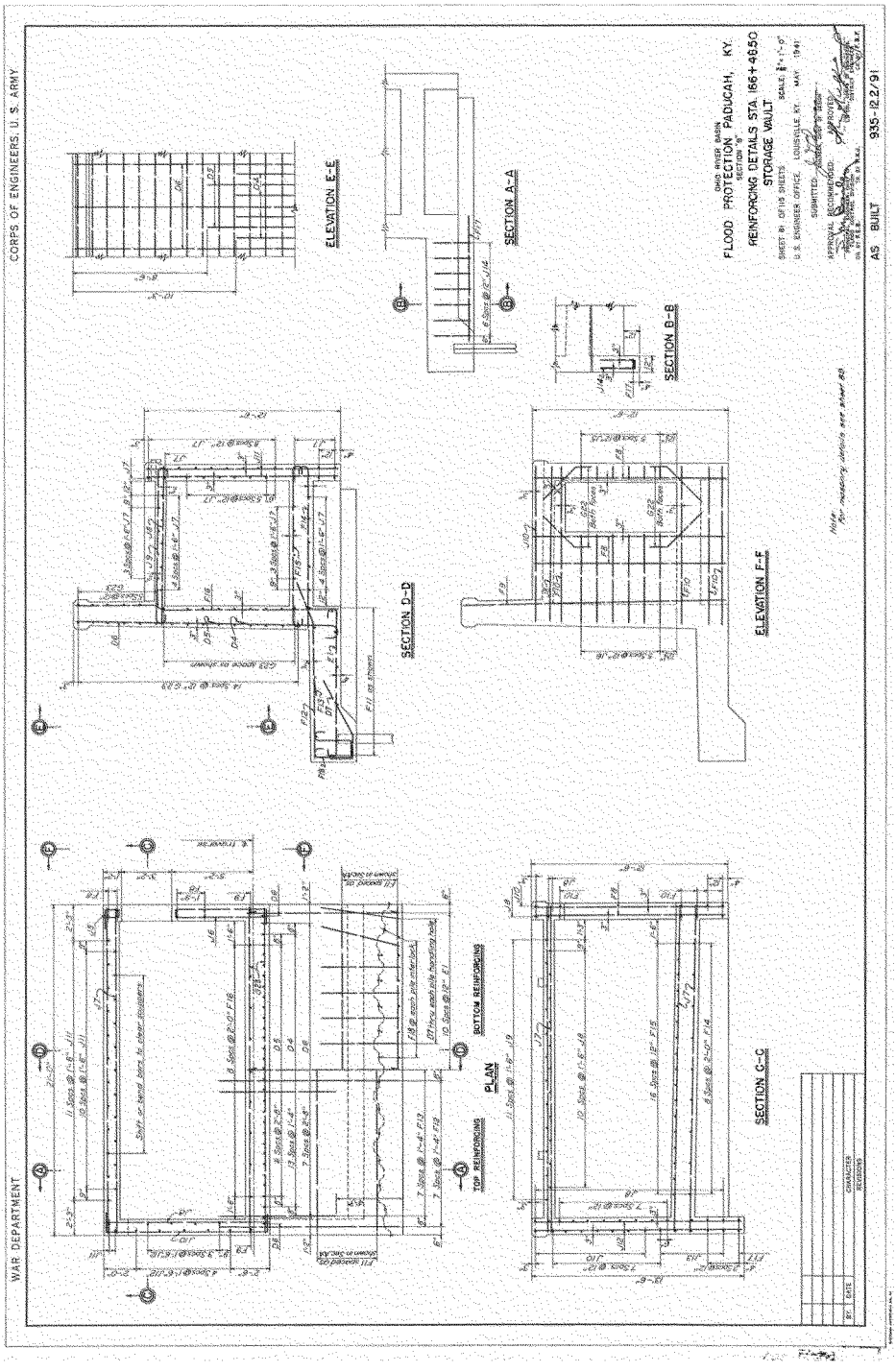
SUBMITTED:

APPROVAL RECOMMENDED: APPROVED:

BY	DATE	CHARACTER REVISIONS

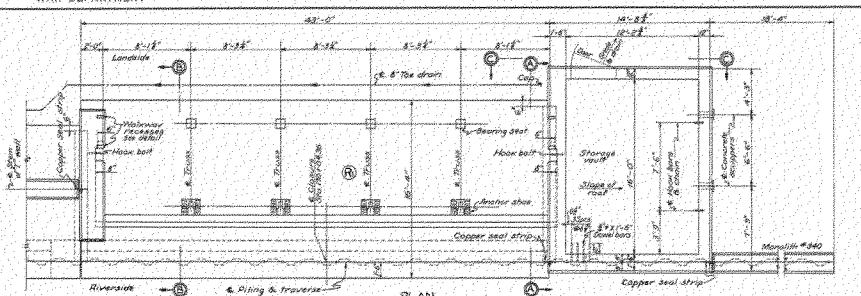
AS BUILT 935-12.2/90

1261


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS STA. 166+46.50
STORAGE VAULT
SCALE: 1/4"=1'-0"
MAY 1941
SUBMITTED
APPROVED
AS BUILT
935-12.2/91
ELEVATION E-E
SECTION A-A
SECTION B-B
SECTION D-D
ELEVATION F-F
SECTION C-C
PLAN
TOP REINFORCING
BOTTOM REINFORCING

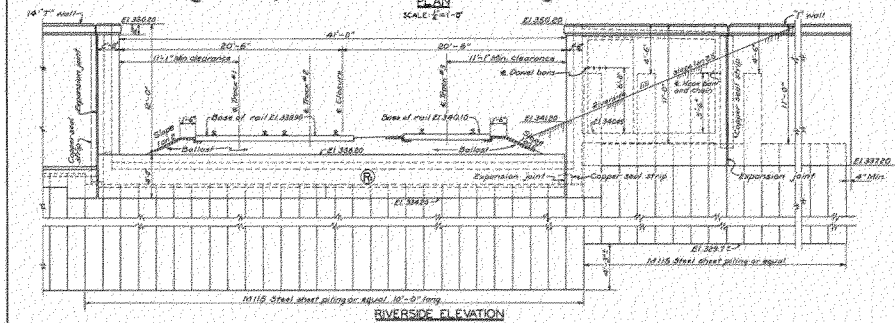
WAR DEPARTMENT

CORPS OF ENGINEERS, U.S. ARMY



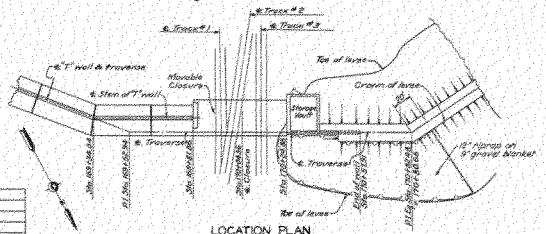
PLAN

SCALE: 1/8"=1'-0"



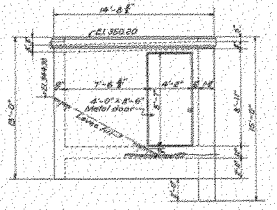
RIVERSIDE ELEVATION

SCALE: 1/8"=1'-0"



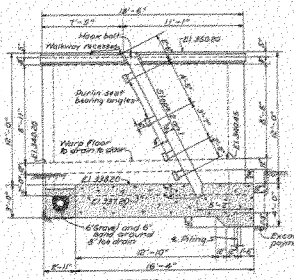
LOCATION PLAN

SCALE: 1"=20'



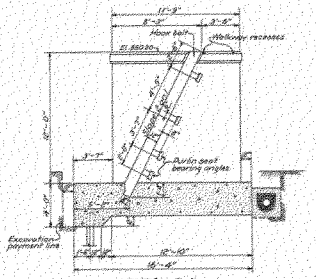
ELEVATION AT C-C

SCALE: 1/4"=1'-0"



SECTION A-A

SCALE: 1/8"=1'-0"



SECTION B-B

SCALE: 1/8"=1'-0"

BY	DATE	CHARACTER REVISIONS

MK	DATE	AUTHORITY	Field Construction joint deleted REVISION
		AS BUILT	REVISIONS

Note.
For reinforcing details see sheets 88 & 84.

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY DETAILS

MOVABLE CLOSURE STA. 170+04.36

SHEET 82 OF 115 SHEETS SCALES AS SHOWN

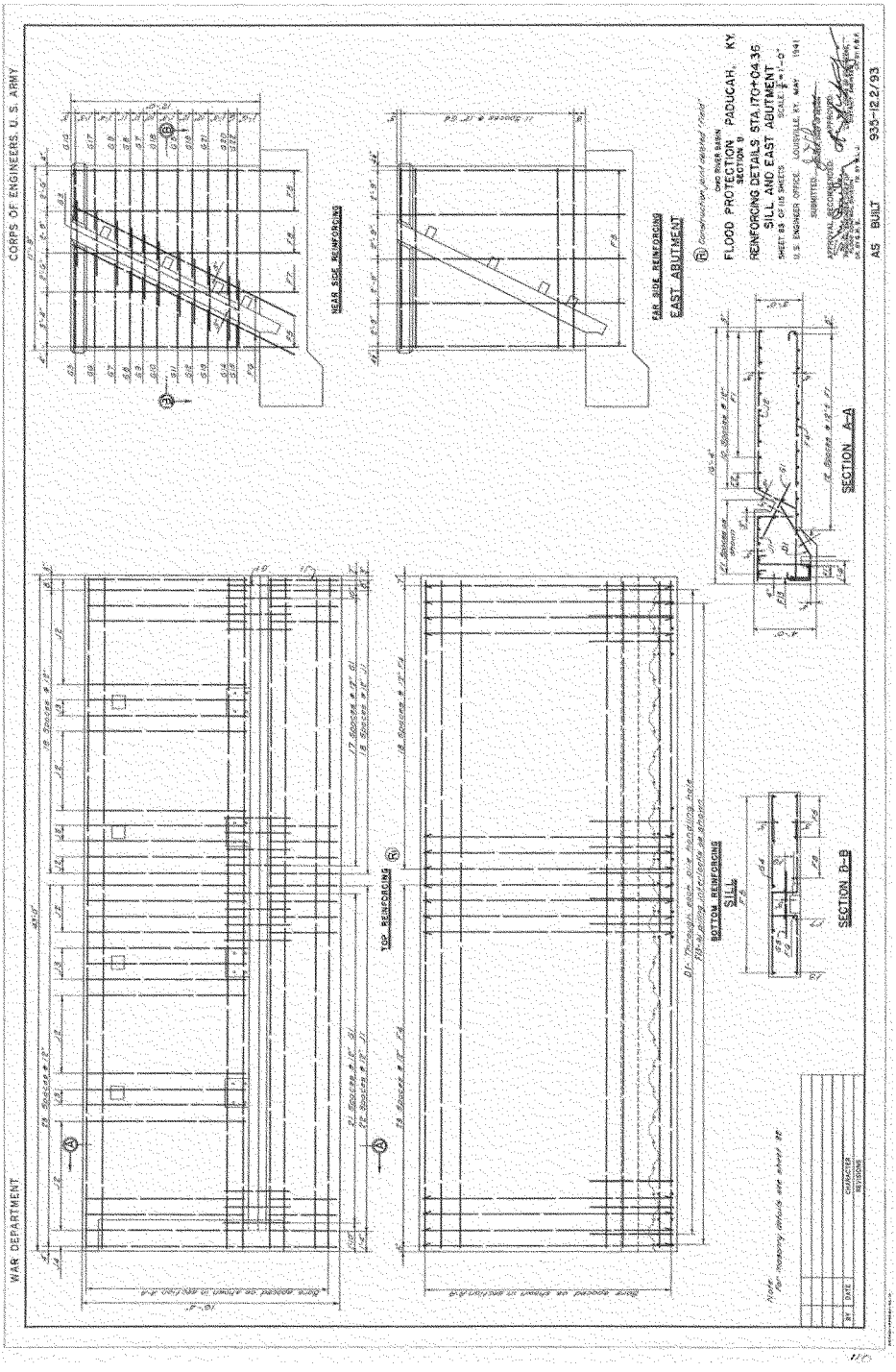
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

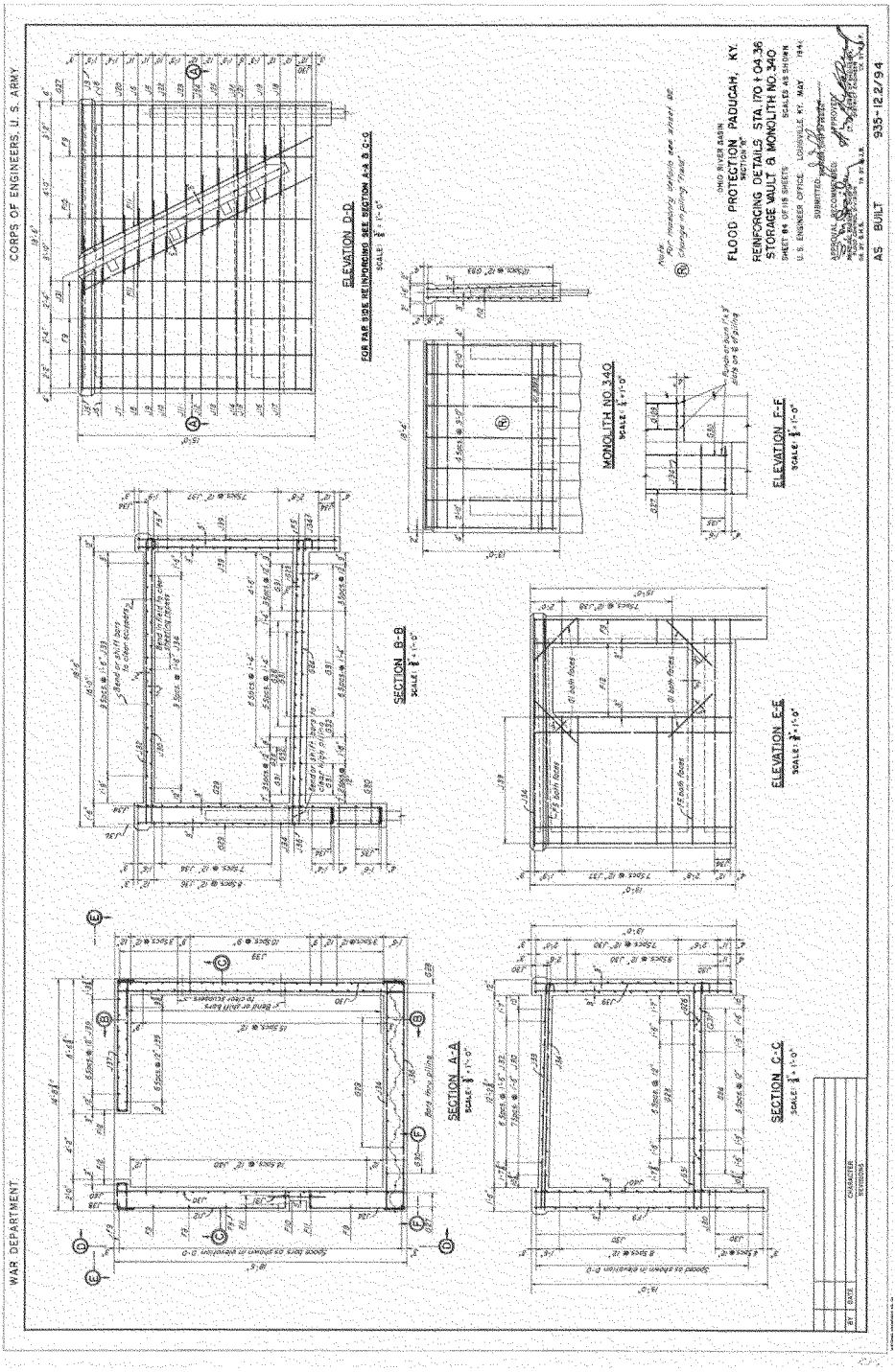
SUBMITTED: [illegible] DISTRICT ENGINEER

APPROVED: [illegible] DIVISION ENGINEER

DR. BY G.H.S. TR. BY W.A.M. CK. BY E.W.P.

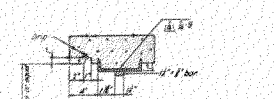
AS BUILT 935-12.2/92

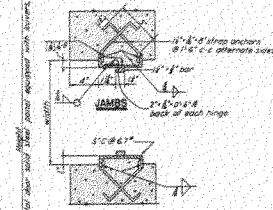

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION
SECTION B
REINFORCING DETAILS STA.170+04.36
SILL AND EAST ABUTMENT
AS BUILT
935-12.2/93
NEAR SIDE REINFORCING
FAR SIDE REINFORCING
EAST ABUTMENT
TOP REINFORCING
BOTTOM REINFORCING
SILL
SECTION A-A
SECTION B-B

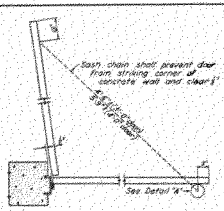

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
REINFORCING DETAILS STA. 170+04.36
STORAGE VAULT & MONOLITH NO. 340
AS BUILT
935-12.2/94
ELEVATION D-D
FOR FAR SIDE REINFORCING SEE SECTION A-A, B-B, C-C
SECTION A-A
SECTION B-B
SECTION C-C
MONOLITH NO. 340
ELEVATION E-E
ELEVATION F-F

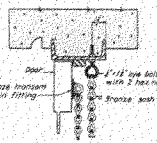
WAR DEPARTMENT

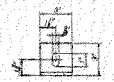
CORPS OF ENGINEERS, U.S. ARMY

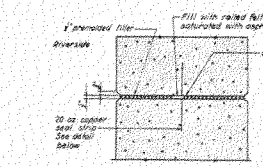


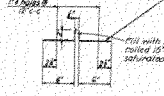


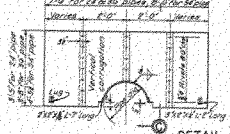


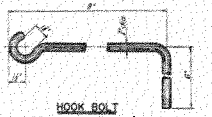


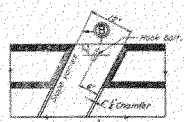


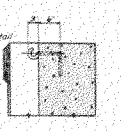


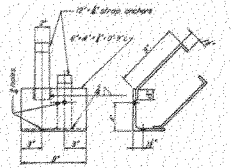


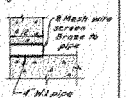


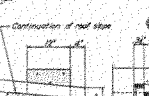


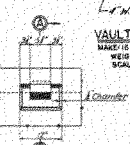


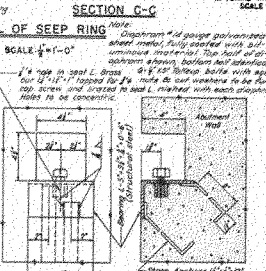


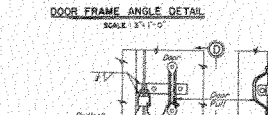


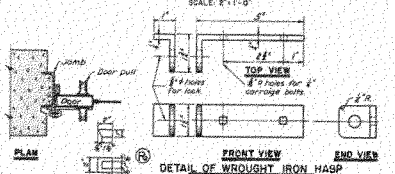












DOOR SCHEDULE			
STATION	HEIGHT	WIDTH	
90+51.35	8'-0"	4'-0"	
91+97.00	7'-0"	3'-0"	
94+75.79	10'-0"	4'-0"	
98+38.97	10'-0"	4'-0"	
103+78.97	8'-0"	4'-0"	
109+81.50	8'-0"	4'-0"	
116+28.81	10'-0"	4'-0"	
120+07.98	10'-0"	4'-0"	
124+23.40	10'-0"	4'-0"	
128+98.75	10'-0"	4'-0"	
132+00.97	10'-0"	4'-0"	
136+48.28	10'-0"	4'-0"	
137+25.10	10'-0"	4'-0"	
143+67.80	10'-0"	4'-0"	
150+99.50	8'-0"	4'-0"	
162+19.80	7'-0"	3'-0"	
170+25.80	8'-0"	4'-0"	

	Field	Lock recess
R	7-1-43	C.O. #3 Deleted
MK	DATE	AUTHORITY REVISION

AS BUILT REVISIONS

WKS	4-1041	vault drain detail added & hasp revised.
BY	DATE	CHARACTER OF REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MISCELLANEOUS DETAILS

Note: Metal parts for vault at sta 104+53 Paducah 9-2 included in number of parts required.

SHEET 85 OF 115 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [illegible] DISTRICT ENGINEER

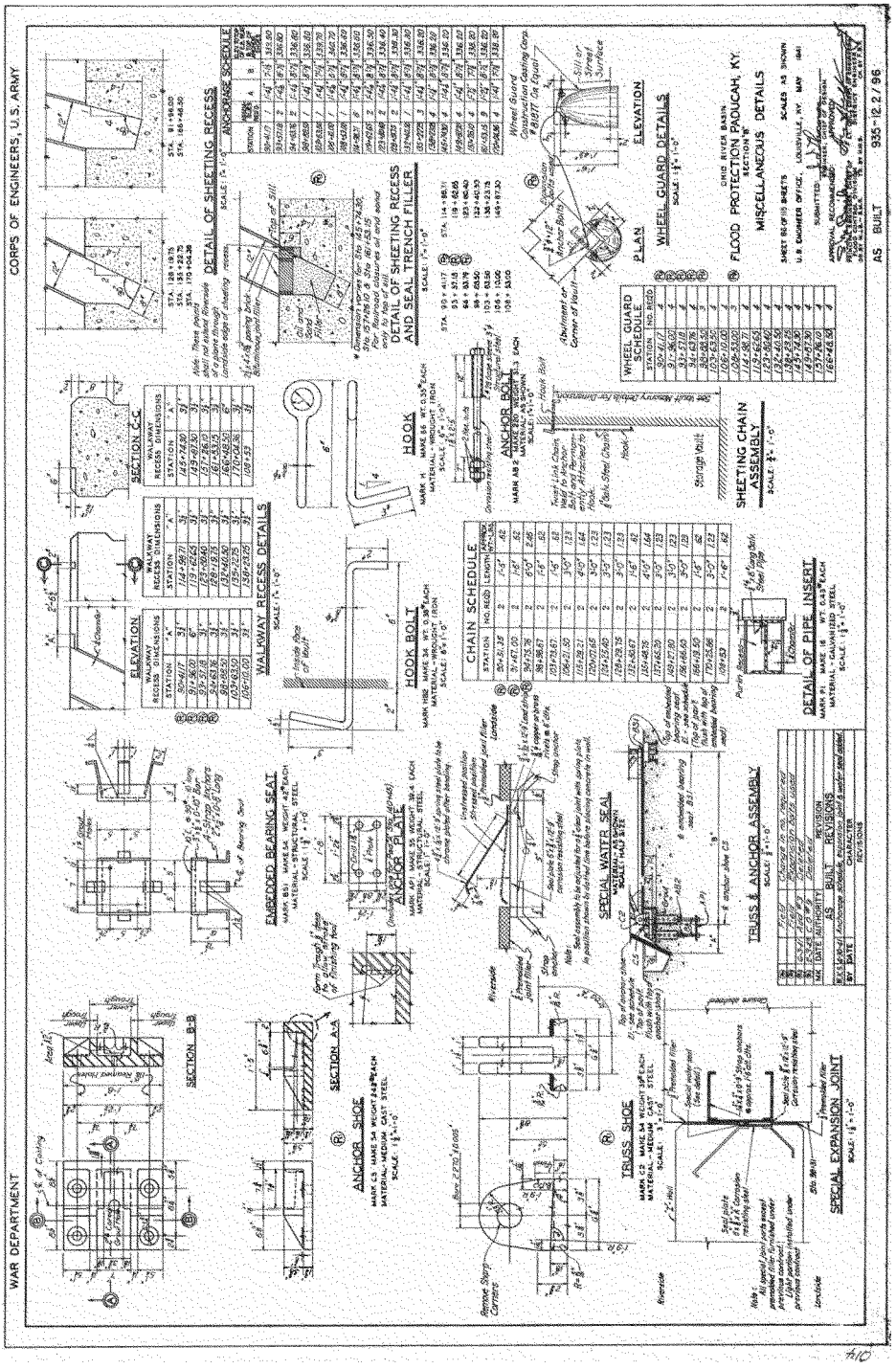
APPROVED RECOMMENDED: [illegible] DIVISION ENGINEER

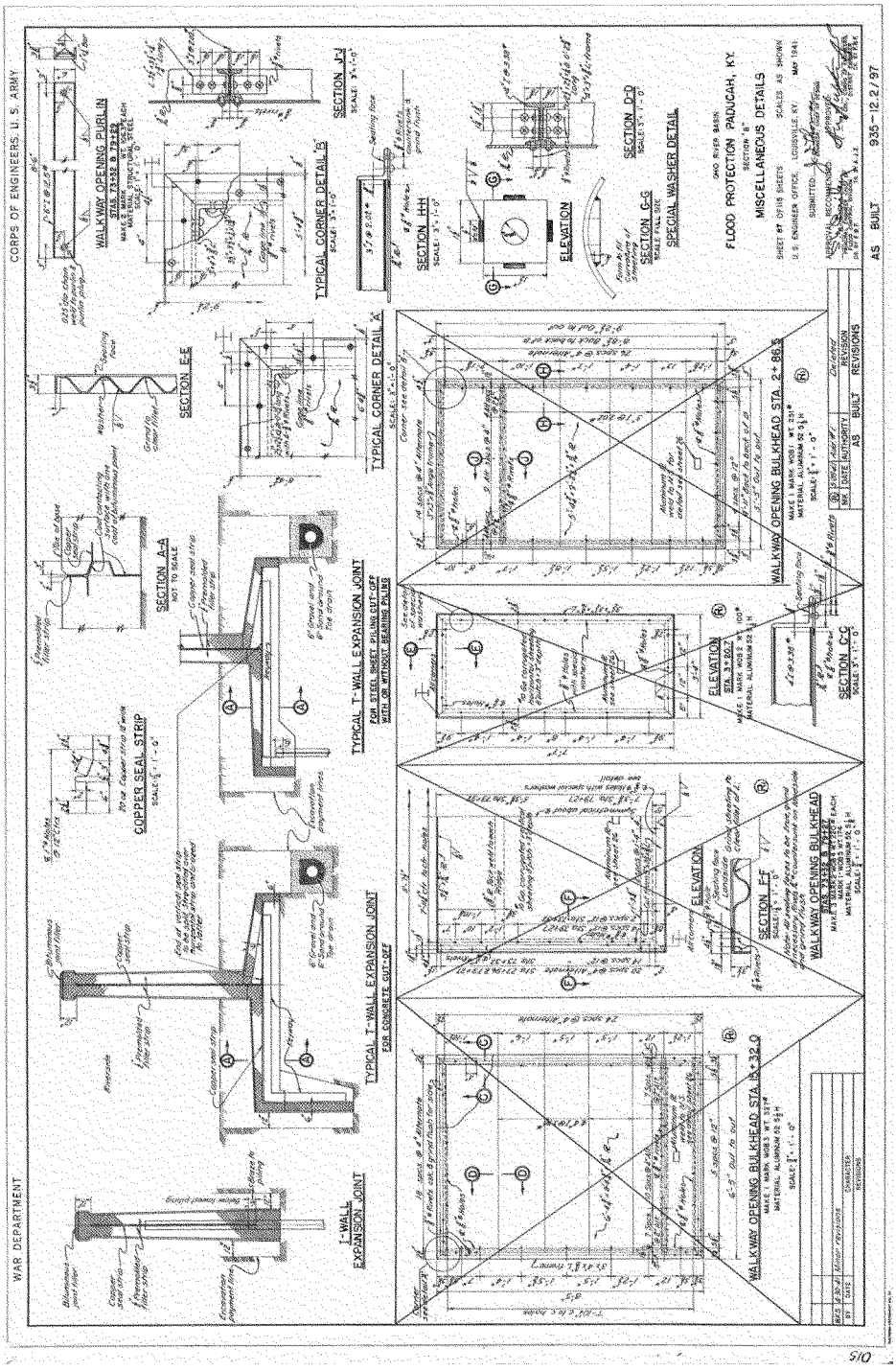
APPROVED: [illegible] CHIEF OF ENGINEERS

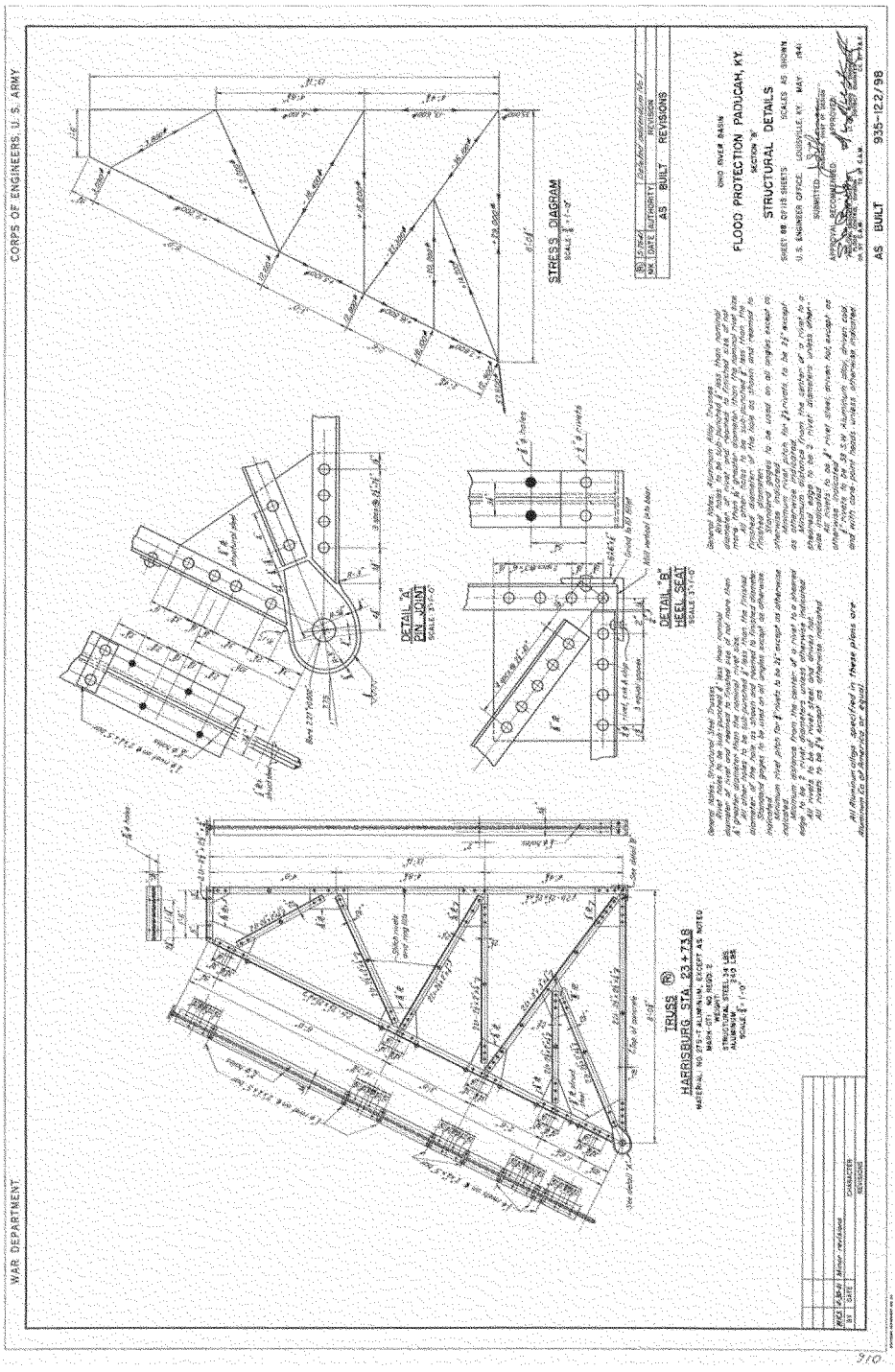
AS BUILT

935-12.2/95

1266

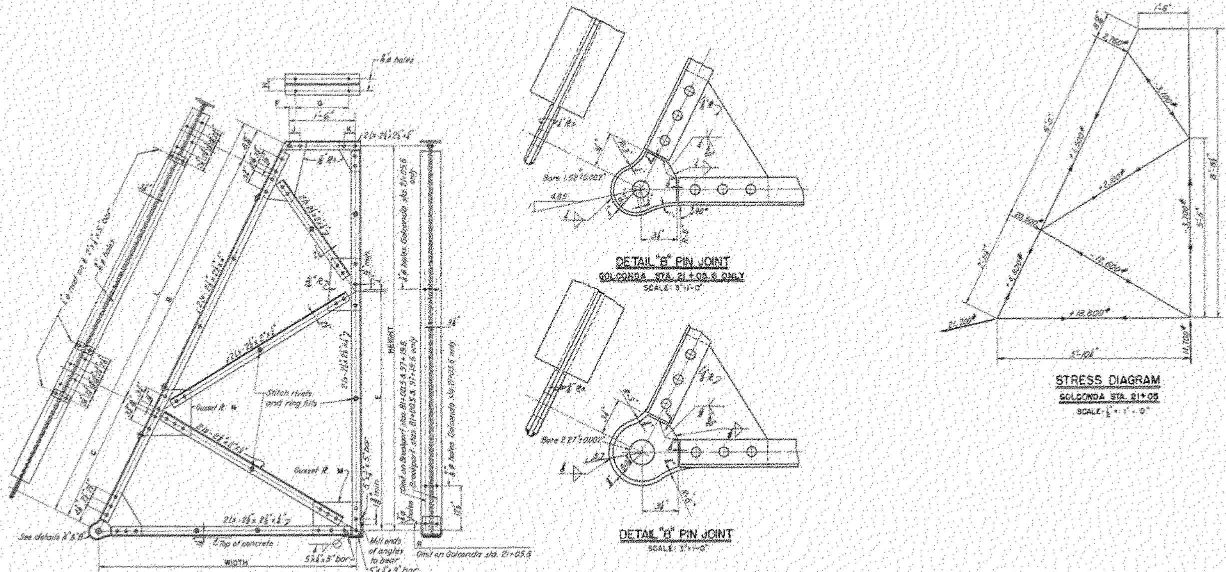

WAR DEPARTMENT
CORPS OF ENGINEERS, U.S. ARMY
FLOOD PROTECTION PADUCAH, KY.
OHIO RIVER BASIN
SECTION 'B'
MISCELLANEOUS DETAILS
AS BUILT
935-12.2/96
DETAIL OF SHEETING RECESS
WALKWAY RECESS DETAILS
HOOK BOLT
HOOK
ANCHOR BOLT
DETAIL OF SHEETING RECESS AND SEAL TRENCH FILLER
CHAIN SCHEDULE
ANCHORAGE SCHEDULE
EMBEDDED BEARING SEAT
ANCHOR PLATE
ANCHOR SHOE
TRUSS SHOE
SPECIAL WATER SEAL
TRUSS & ANCHOR ASSEMBLY
DETAIL OF PIPE INSERT
SPECIAL EXPANSION JOINT
SECTION A-A
SECTION B-B
SECTION C-C
WHEEL GUARD DETAILS
PLAN
ELEVATION
WHEEL GUARD SCHEDULE
SHEETING CHAIN ASSEMBLY
SHEET REVISIONS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
AS BUILT REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
MISCELLANEOUS DETAILS
AS BUILT
935-12.2/97


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
STRUCTURAL DETAILS
SCALES AS SHOWN
AS BUILT
935-12-2/98
TRUSS Ⓑ
HARRISBURG STA. 23+71.8
STRESS DIAGRAM
DETAIL "A" PIN JOINT
DETAIL "B" HEEL SEAT

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



TRUSS

MATERIAL: STRUCTURAL STEEL
WEIGHT: SEE SCHEDULE
MARK: SEE SCHEDULE
NO. REQ'D: SEE SCHEDULE
SCALE: 1"=1'-0"

TRUSS SCHEDULE																	
													GUSSET PLATES				
LOCATION	NO. REQ'D	HEIGHT	WIDTH	L	B	C	E	F	G	H	J	K	M	N	R	MARK	WEIGHT
Paducah "C" sta. 104+91.6	1	8'-2¾"	5'-7½"	9'-2¾"	5'-8"	2'-11⅛"	4'-11"	2"	1'-2"	3¼"	4"	4"	⅜"	⅜"	2¼"	CT 2	348
Brookport sta. 81+00.5	1	8'-2¾"	5'-7½"	9'-2¾"	5'-8"	2'-3⅝"	4'-11"	2"	1'-2"	3¼"	4"	4"	⅜"	⅜"	1⅜"	CT 3	348
" " 85+49.2	1	8'-2¾"	5'-7½"	9'-2¾"	5'-8"	2'-3⅝"	4'-11"	2"	1'-2"	3¼"	4"	4"	⅜"	⅜"	1⅜"	CT 3	348
" " 97+19.8	1	8'-2¾"	5'-7½"	9'-2¾"	5'-8"	2'-3⅝"	4'-11"	2"	1'-2"	3¼"	4"	4"	⅜"	⅜"	1⅜"	CT 4	348
" " 195+30.7	1	8'-2¾"	5'-7½"	9'-2¾"	5'-8"	2'-3⅝"	4'-11"	2"	1'-2"	3¼"	4"	4"	⅜"	⅜"	1⅜"	CT 4	348
Golconda sta. 21+05.6	2	8'-8¾"	5'-10¼"	9'-8⅝"	6'-0"	3'-0⅞"	5'-5"	1½"	12"	3"	3"	3"	⅜"	⅜"	omit	CT 5	363

BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

STRUCTURAL DETAILS

SHEET 89 OF 115 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

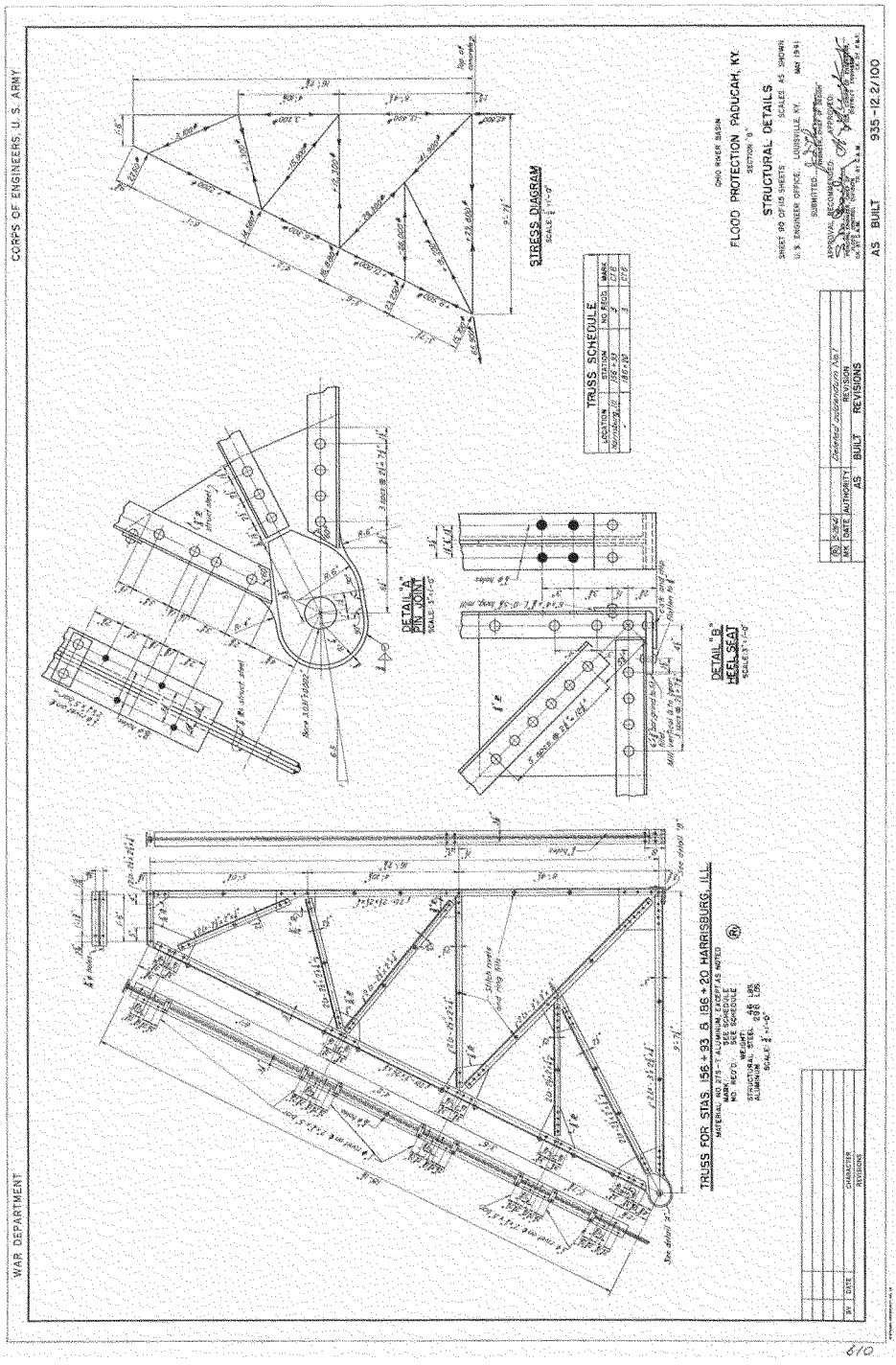
SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

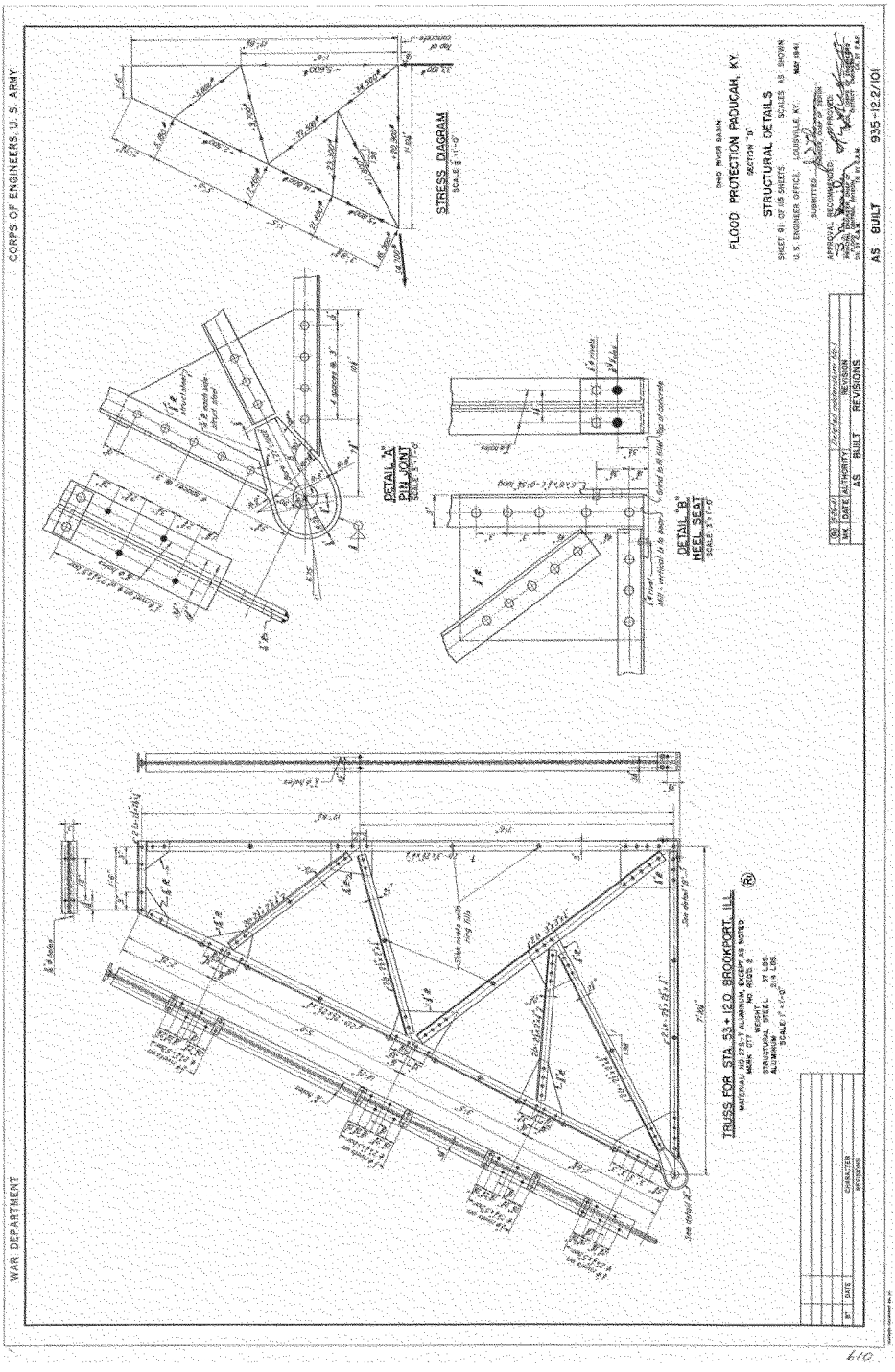
APPROVAL RECOMMENDED: [signature] PRINCIPAL ENGINEER, CHIEF OF FLOOD CONTROL DIVISION

APPROVED: [signature] DISTRICT ENGINEER

AS BUILT 935-12.2/99

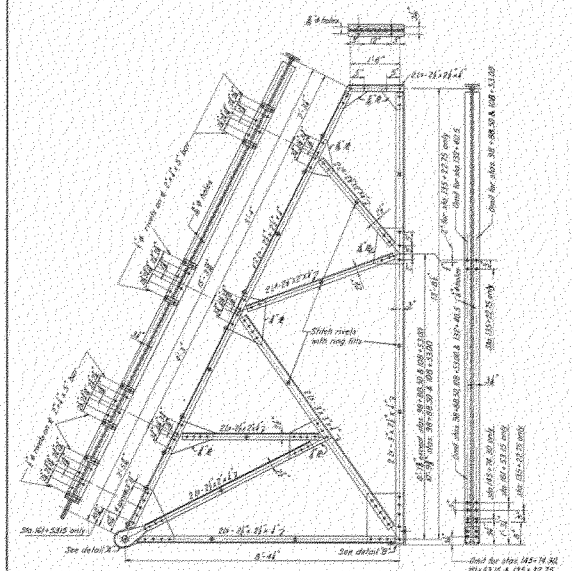
017


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
STRUCTURAL DETAILS
SHEET 90 OF 115 SHEETS
SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY.
MAY 1941
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
AS BUILT
935-12.2/100
TRUSS FOR STAS. 156+33 & 186+20, HARRISBURG, ILL.
STRESS DIAGRAM
TRUSS SCHEDULE
DETAIL "A" PIN JOINT
DETAIL "B" HEEL SEAT
610


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "D"
STRUCTURAL DETAILS
SHEET 81 OF 115 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
AS BUILT
935-12.2/101
TRUSS FOR STA. 53+12.0 BROOKPORT, ILL.
STRESS DIAGRAM
SCALE 1" = 1'-0"
DETAIL "A" PIN JOINT
DETAIL "B" HEEL SEAT
REVISIONS
AS BUILT

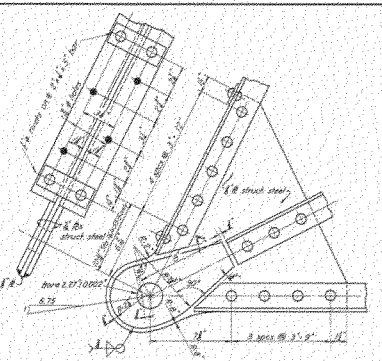
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

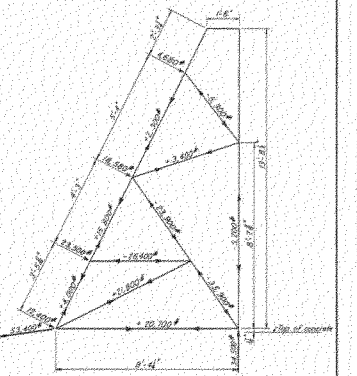


TRUSS (R)

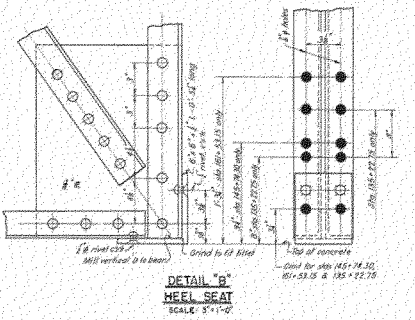
MATERIAL: NO. 378-T ALUMINUM, EXCEPT AS NOTED
MARK: SEE SCHEDULE
NO. REQ'D: SEE SCHEDULE
WEIGHT:
STRUCTURAL STEEL 38 LBS.
ALUMINUM 527 LBS.
SCALE: $\frac{3}{4}$" = 1'-0"



DETAIL "A"
PIN JOINT
SCALE: 3" = 1'-0"



STRESS DIAGRAM
STA. 93+57.18
SCALE: $\frac{1}{8}$" = 1'-0"



DETAIL "B"
HEEL SEAT
SCALE: 3" = 1'-0"

TRUSS SCHEDULE

LOCATION	STATION	NO. REQ'D.	MARK
Paducah "B-2"	93+57.18	2	CT.8
"	94+63.76	2	CT.9
"	98+88.20	1	CT.10
"	108+55.00	1	CT.11
"	114+98.71	6	CT.12
"	119+62.65	2	CT.13
"	123+60.40	2	CT.14
"	128+19.75	2	CT.15
"	132+40.30	1	CT.16
"	135+22.75	3	CT.17
"	138+23.05	4	CT.18
"	145+74.30	4	CT.19
"	149+87.80	4	CT.20
"	161+33.18	9	CT.21

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

STRUCTURAL DETAILS

SHEET 92 OF 115 SHEETS SCALES: AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY., MAY 1941

SUBMITTED: _____ ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: _____ APPROVED: _____

PHYSICAL ENGINEER, CHIEF OF DIVISION, OHIO RIVER DIVISION

DISTRICT ENGINEER

BY	DATE	CHARACTER
WKS	4-30-41	Minor revisions

REVISIONS

BY	DATE	AUTHORITY	REVISION
(R)	5-26-41		Deleted addendum No.1

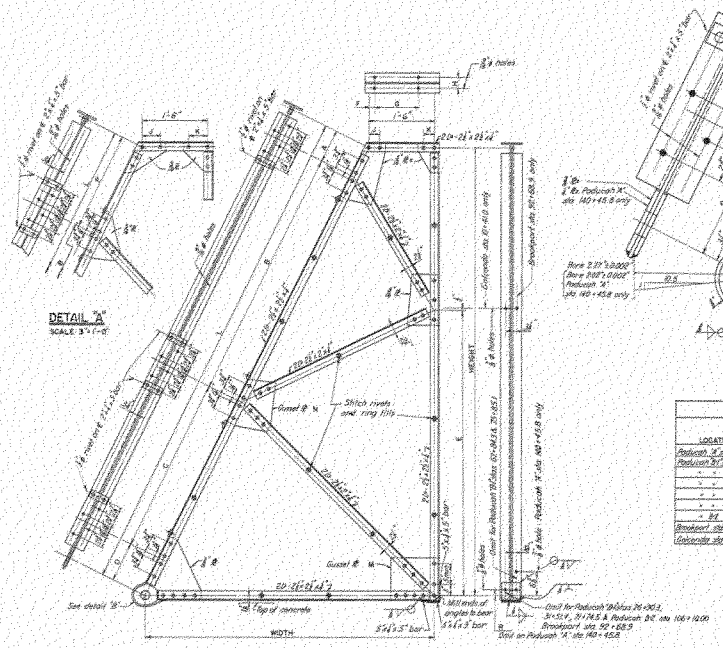
AS BUILT REVISIONS

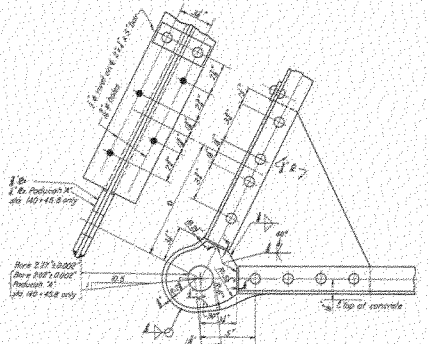
AS BUILT

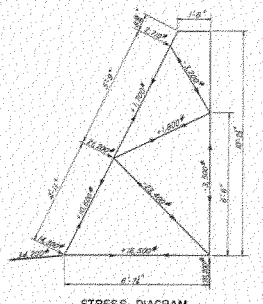
935-12.2/102

1273

020







TRUSS SCHEDULE

LOCATION	NO. REQ'D	HEIGHT	WIDTH	L	A	B	C	D	E	F	G	H	J	K	GUSSET PLATES M	GUSSET PLATES N	DETAIL "A" P	R	MARK	WEIGHT
Paducah "A" Sta 140+45.8	1	10'-2⅜	6'-1⅞	11'-4⅜	58°	5'-9"	4'-0"	11"	6'-6"	⅞	12"	3"	3"	3"	1	1	——	2	CT 88	419
Paducah "B" Sta 24+30.3	1	9'-8¾	6'-1⅞	10'-10⅜	58°	5'-7"	3'-8½"	10¾"	5'-10"	⅞	12"	3"	3"	3"	1	1	6'-3⅜	2	CT 89	407
" " " 51+51.4	1	9'-3⅛	5'-11"	10'-3⅜	58°	5'-3"	3'-4½"	9¾"	5'-3"	⅞	12"	3"	3"	3"	1	1	5'-9⅜	2	CT 90	390
" " " 82+44.2	1	9'-3⅛	5'-11"	10'-3⅜	58°	5'-3"	3'-4½"	9¾"	4'-6"	⅞	12"	3½"	3"	3"	1	1	5'-9⅜	2	CT 91	390
" " " 111+74.5	1	9'-3⅛	5'-11"	10'-3⅜	58°	5'-3"	3'-4½"	9¾"	4'-6"	⅞	12"	3½"	3"	3"	1	1	5'-9⅜	2	CT 92	390
" " " 137+85.1	1	9'-3⅛	5'-11"	10'-3⅜	58°	5'-3"	3'-4½"	9¾"	4'-6"	⅞	12"	3½"	3"	3"	1	1	5'-9⅜	2	CT 93	390
" B " 106+19.00	1	9'-8¾	6'-1⅞	10'-10⅜	58°	5'-7"	3'-8½"	10¾"	5'-10"	⅞	12"	3½"	3"	3"	1	1	6'-3⅜	2	CT 94	407
Brookport Sta 152+68.9	1	9'-8¾	6'-1⅞	10'-10⅜	58°	5'-10"	3'-11½"	10¾"	5'-10"	1"	12"	3½"	3"	3"	1	1	6'-3⅜	2	CT 95	407
Carbondale Sta 101+61.0	2	9'-3⅛	6'-1⅞	10'-4⅜	58°	5'-6"	3'-5"	1⅛"	5'-9"	⅞	12"	3"	3"	3"	2	2	——	2	CT 96	392

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

STRUCTURAL DETAILS

SHEET 93 OF 115 SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [signature] CHIEF, SHOP OF DESIGN

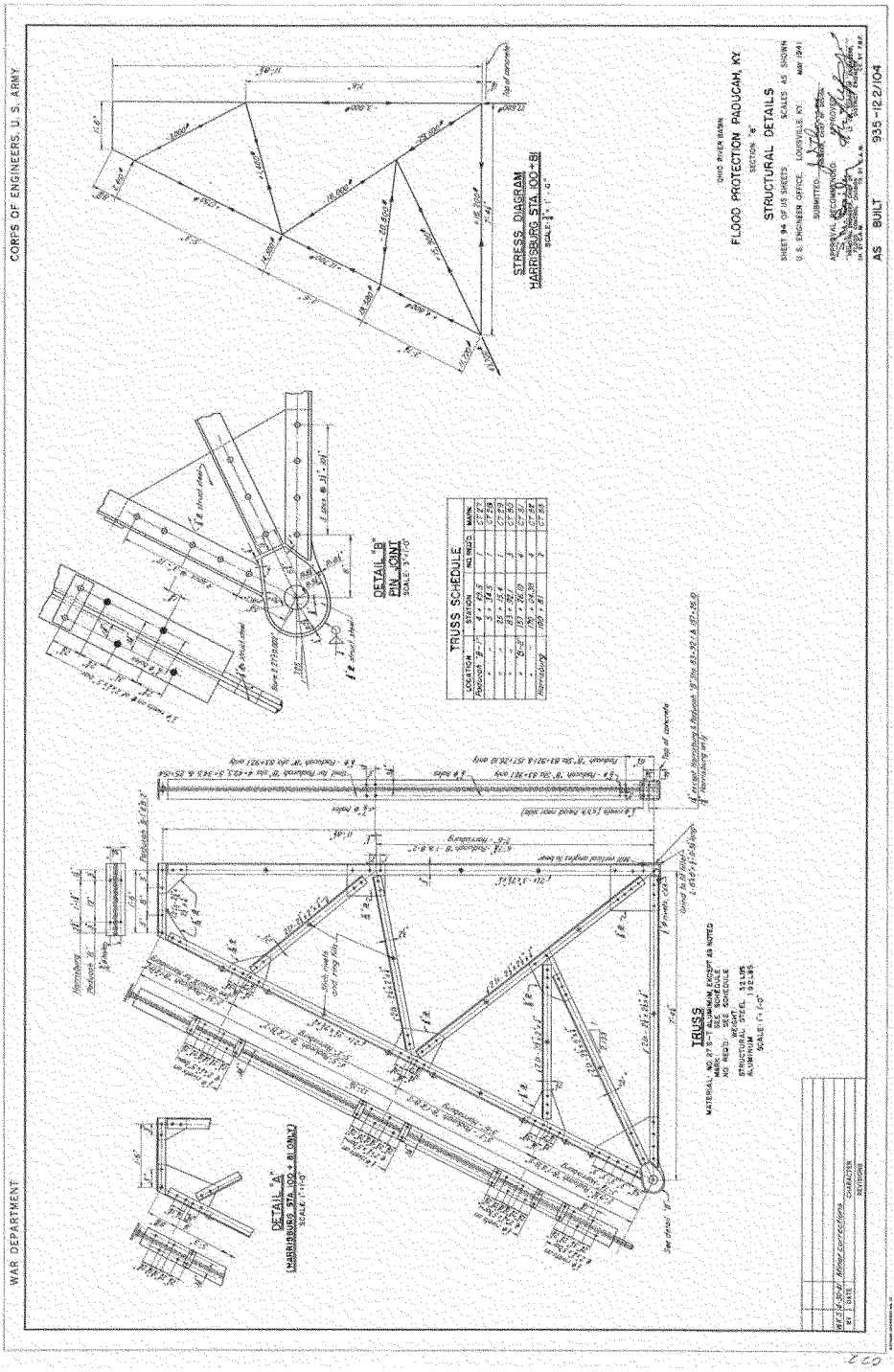
APPROVAL RECOMMENDED: [signature] CHIEF, SHOP OF DESIGN

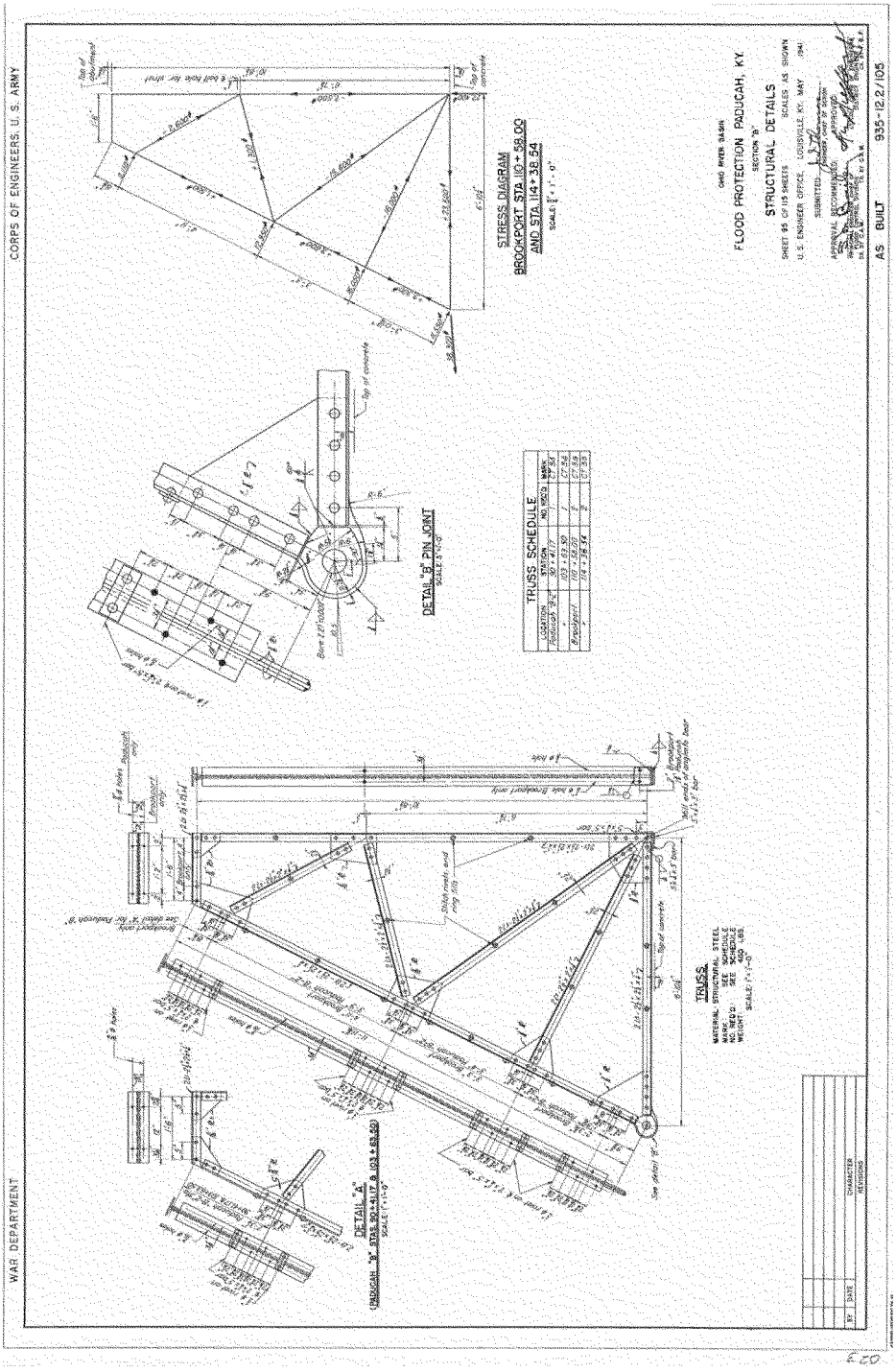
APPROVED: [signature] COLONEL, CORPS OF ENGINEERS DISTRICT ENGINEER

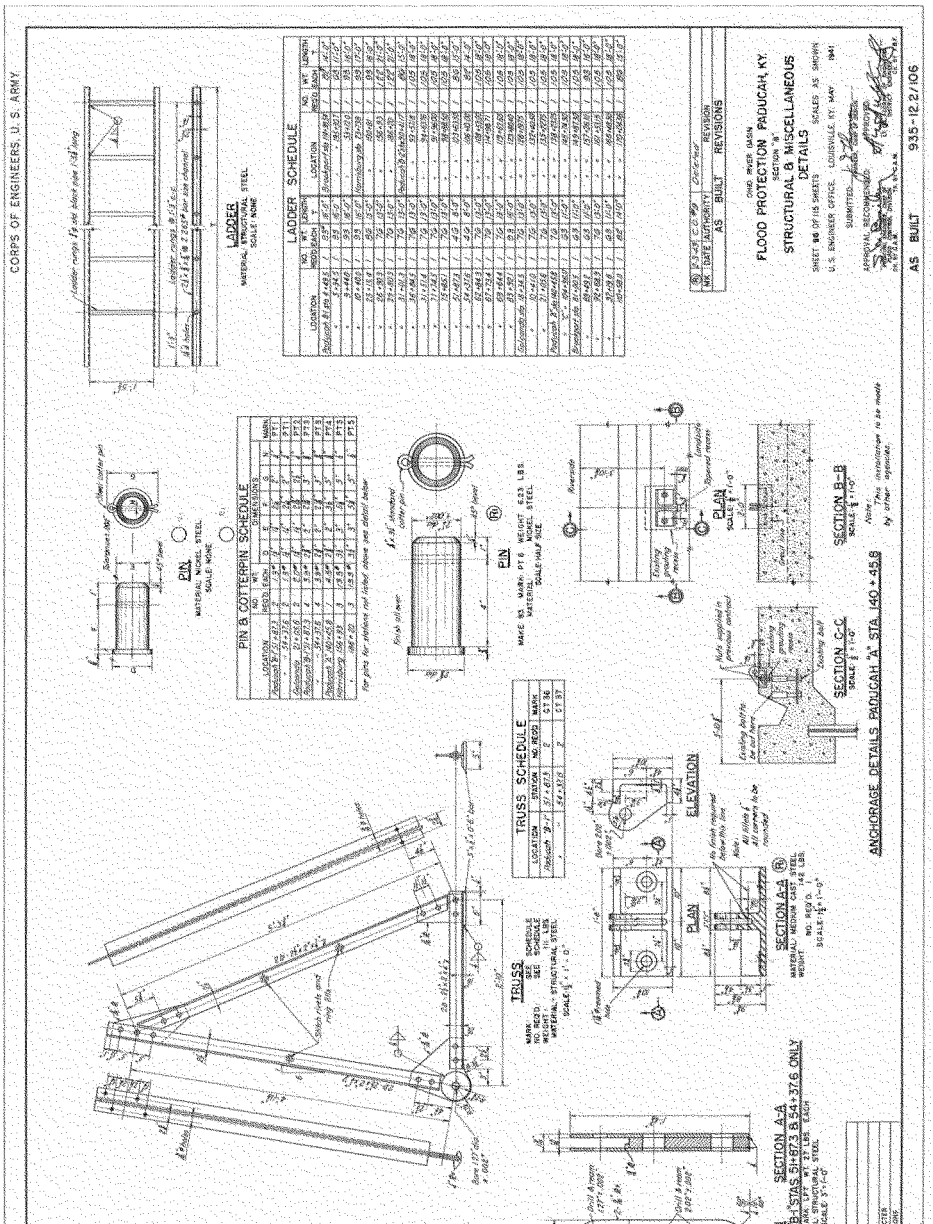
BY	DATE	CHARACTER OF REVISIONS

AS BUILT 935-12.2/103

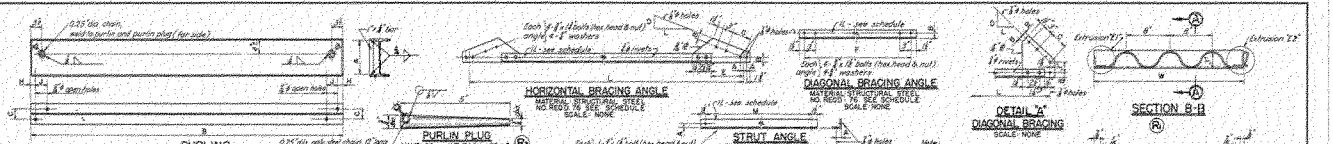
1274


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY
SECTION "B"
STRUCTURAL DETAILS
SHEET #4 OF 115 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED:
APPROVED:
APPROVAL RECOMMENDED:
AS BUILT
935-12.2/104
TRUSS SCHEDULE
LOCATION
STATION
NO. REQ'D.
MARK
DETAIL "A"
HARRISBURG STA. 100+81 (CONV.)
DETAIL "B"
PIN JOINT
STRESS DIAGRAM
HARRISBURG STA. 100+81
TRUSS
MATERIAL: NO. 17 S-T ALUMINUM, EXCEPT AS NOTED
MARK
NO. REQ'D.
SIZE AND SHAPE
WEIGHT
STRUCTURAL STEEL 32,195
ALUMINUM 102,185
REVISIONS
DATE
BY
CHARACTER


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER, BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
STRUCTURAL DETAILS
SCALES AS SHOWN
AS BUILT
935-12.2/105
STRESS DIAGRAM
BROOKPORT STA. 110+58.00
AND STA. 114+38.54
SCALE 1" = 1'-0"
TRUSS SCHEDULE
DETAIL "B" PIN JOINT
SCALE 3"=1'-0"
DETAIL "A"
DIAGRAM "A" STAS. 110+58.00 & 113+83.50
SCALE 1"=1'-0"
TRUSS
SCALE 1"=1'-0"


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
FLOOD PROTECTION PADUCAH, KY.
SECTION "A"
STRUCTURAL & MISCELLANEOUS
DETAILS
AS BUILT
935-12-2106
ANCHORAGE DETAILS PADUCAH "A" STA. 140+45.8
LINK PLATE PADUCAH-B STAS. 51+67.3 & 54+37.6 ONLY
LADDER SCHEDULE
PIN & COTTERPIN SCHEDULE
TRUSS SCHEDULE
LADDER
PIN
TRUSS
SECTION A-A
SECTION B-B
SECTION C-C
ELEVATION
PLAN

WAR DEPARTMENT — CORPS OF ENGINEERS, U. S. ARMY



PURLIN SCHEDULE

LOCATION	STATION	SECTION	NO. REQD.	DIMENSIONS A	B	C	J	H	BOLTS & NUTS	WASHERS	EACH	WT.	REMARKS	MARK
Paducah "B"	108+13.50	8"WF@ 17#	8	7'-11"	23"	3/4"	1"	20	20	151	Omit purlin plugs	TP1
"	119+98.71	5"WF@ 17#	28	7'-11"	23"	3/4"	1"	108	108	154	" " "	TP2
"	123+61.65	8"WF@ 18#	12	7'-11"	23"	3/4"	1"	36	36	177	" " "	TP3
"	125+69.40	8"WF@ 18#	12	7'-11"	23"	3/4"	1"	36	36	177	" " "	TP3
"	128+12.15	8"WF@ 17#	12	7'-11"	23"	3/4"	1"	36	36	153	" " "	TP4
"	132+46.90	8"WF@ 17#	8	8'-0"	23"	3/4"	1"	20	20	151	" " "	TP1
"	135+22.75	6"WF@ 17#	16	7'-8"	23"	3/4"	1"	54	54	147	" " "	TP5
"	138+21.24	6"WF@ 17#	20	7'-8"	23"	3/4"	1"	72	72	130	" " "	TP6
"	141+74.30	8"WF@ 17#	20	7'-8"	23"	3/4"	1"	72	72	150	" " "	TP2
"	143+67.30	8"WF@ 17#	20	7'-8"	23"	3/4"	1"	72	72	150	" " "	TP6
"	157+86.40	8"WF@ 17#	20	7'-8"	23"	3/4"	1"	72	72	150	" " "	TP6
"	161+53.15	6"WF@ 17#	40	7'-8"	23"	3/4"	1"	162	162	151	" " "	TP7
"	166+49.50	12"WF@ 28#	4	7'-8"	23"	3/4"	1"	12	12	223	" " "	TP8
"	170+44.36	8"WF@ 17#	28	8'-9½"	23"	3/4"	1"	72	72	150	Omit purlin plugs	TP6
Paducah "C"	184+96.17	8"WF@ 21#	4	7'-10.8"	23"	3/4"	1"	12	12	223	" " "	TP9
Brookport	53+12.9	8"WF@ 21#	12	7'-10.8"	23"	3/4"	1"	36	36	224	" " "	TP10
"	81+40.8	6"WF@ 17#	4	7'-9.2"	23"	3/4"	1"	12	12	157	" " "	TP11
"	82+49.2	6"WF@ 17#	4	7'-9.2"	23"	3/4"	1"	12	12	157	" " "	TP11
"	92+69.9	8"WF@ 24#	6	7'-10.8"	23"	3/4"	1"	16	16	225	" " "	TP9
"	97+15.8	8"WF@ 21#	4	7'-10.8"	23"	3/4"	1"	12	12	225	" " "	TP9
"	110+58.98	8"WF@ 28#	12	7'-10.8"	23"	3/4"	1"	36	36	203	" " "	TP10
"	114+88.96	8"WF@ 28#	12	7'-10.8"	23"	3/4"	1"	36	36	203	" " "	TP10
"	120+30.7	8"WF@ 21#	4	7'-10.8"	23"	3/4"	1"	12	12	225	" " "	TP10
Sciotoville	10+41.0	8"WF@ 28#	9	7'-10.8"	23"	3/4"	1"	28	28	203	" " "	TP12
"	18+34.5	6"WF@ 15#	8	7'-8.0"	---- Omit ----			None	None	168	Purlin plugs	TP13
"	21+05.6	6"WF@ 17#	6	7'-10.8"	23"	3/4"	1"	20	20	226	Omit purlin plugs	TP10
Harrisburg	53+13.8	8"WF@ 21#	12	10'-0.8"	23"	3/4"	1"	48	48	225	" " "	TP14
"	100+81	8"WF@ 17#	12	10'-10"	23"	3/4"	3/4"	36	36	207	" " "	TP15
"	155+93	8"WF@ 17#	20	7'-8.0"	23"	3/4"	1"	72	72	136	" " "	TP16
"	186+20	8"WF@ 17#	20	8'-0.8"	23"	3/4"	1"	72	72	138	" " "	TP16
Paducah "A"	460+65.8	8"WF@ 24#	6	7'-10.8"	23"	3/4"	1"	16	16	225	" " "	TP9
Paducah "B"	6+49.5	8"WF@ 15#	8	8'-5"	23"	3/4"	1"	20	20	140	" " "	TP17
"	5+34.5	8"WF@ 17#	8	8'-5"	23"	3/4"	1"	20	20	180	" " "	TP17
"	9+44.0	10"WF@ 21#	4	3/4"	12'-10"	---- Omit ----		None	None	296	Purlin plugs	TP18
"	10+90.0	10"WF@ 29#	4	3/4"	12'-10"	---- Omit ----		None	None	296	" " "	TP18
"	23+15.5	8"WF@ 17#	8	7'-11"	23"	3/4"	1"	20	20	151	Omit purlin plugs	TP1
"	28+90.3	8"WF@ 18#	6	7'-10.8"	23"	3/4"	1"	16	16	204	" " "	TP19
"	79+80.3	14"WF@ 23#	3	3/4"	12'-10"	---- Omit ----		None	None	296	Purlin plugs	TP18
"	31+01.3	10"WF@ 29#	3	3/4"	12'-10"	---- Omit ----		None	None	296	" " "	TP18
"	31+51.4	8"WF@ 17#	6	7'-11"	23"	3/4"	1"	16	16	151	Omit purlin plugs	TP1
"	36+84.5	10"WF@ 33#	3	3/4"	12'-10"	---- Omit ----		None	None	296	Purlin plugs	TP18
"	51+87.3	5"WF@ 10#	3	3/4"	6'-0"	1"	1"	12	12	61	Omit purlin plugs	TP20
"	54+31.6	5"WF@ 10#	3	3/4"	6'-0"	1"	1"	12	12	61	" " "	TP20
"	60+84.3	8"WF@ 17#	3	7'-11"	23"	3/4"	1"	16	16	151	" " "	TP1
"	67+73.4	10"WF@ 29#	2	3/4"	12'-10"	---- Omit ----		None	None	271	Purlin plugs	TP21
"	69+54.6	12"WF@ 31#	2	3/4"	12'-10"	---- Omit ----		None	None	271	" " "	TP21
"	71+74.5	8"WF@ 17#	6	7'-11"	23"	3/4"	1"	16	16	151	Omit purlin plugs	TP1
"	75+85.5	8"WF@ 17#	6	7'-10.8"	23"	3/4"	1"	16	16	151	" " "	TP1
"	83+92.1	8"WF@ 17#	18	7'-10.8"	23"	3/4"	1"	54	54	151	" " "	TP22
Paducah "B"	90+41.11	8"WF@ 17#	8	8'-10"	23"	3/4"	1"	20	20	151	" " "	TP1
"	91+36.01	10"WF@ 33#	4	3/4"	12'-10"	---- Omit ----		None	None	322	Purlin plugs	TP18
"	93+97.18	8"WF@ 17#	12	7'-9.2"	23"	3/4"	1"	36	36	177	Omit purlin plugs	TP3
"	98+43.36	8"WF@ 17#	12	7'-9.2"	23"	3/4"	1"	36	36	177	" " "	TP3
"	98+88.80	8"WF@ 17#	8	8'-0"	23"	3/4"	1"	20	20	151	" " "	TP1
"	103+43.5	8"WF@ 17#	8	7'-11"	23"	3/4"	1"	20	20	151	" " "	TP1
"	108+18.0	8"WF@ 18#	6	10'-8.2"	23"	3/4"	1"	16	16	204	" " "	TP19

SHEETING SCHEDULE

MARK	WIDTH OF PANEL W	LENGTH OF PANEL	NO. REQD	TOTAL WT.	MARK
TP2	3'-0"	17'-4"	13	1080	CS2
TP3	3'-0"	17'-4"	10	1278	CS3
TP3	3'-0"	17'-8"	10	1278	CS3
TP4	3'-0"	17'-4"	8	1027	CS3
TP1	2'-4"	17'-6"	1	873	CS1
TP5	3'-0"	17'-6"	12	1884	CS3
TP6	6'-5"	17'-4"	9	1847	CS4
TP20	6'-3"	17'-4"	3	1847	CS4
TP6	6'-3"	17'-6"	3	1851	CS4
TP6	5'-3"	17'-4"	1	821	CS5
TP7	5'-3"	16'-10"	17	3990	CS6
TP8	8'-8"	15'-0"	4	945	CS7
TP6	5'-3"	15'-1"	1	1419	CS8
TP9	5'-3"	11'-1"	5	1370	CS9
TP10	5'-3"	16'-11"	7	1305	CS10
TP11	4'-6"	11'-1"	5	983	CS11
TP11	4'-6"	11'-1"	5	983	CS11
TP9	5'-3"	12'-10"	5	1370	CS12
TP9	5'-3"	11'-1"	5	970	CS9
TP10	5'-3"	15'-10"	7	1460	CS13
TP10	5'-3"	15'-10"	7	1460	CS13
TP9	5'-3"	11'-1"	5	970	CS9
TP12	5'-3"	12'-4"	7	1206	CS14
TP13	3'-0"	18'-4"	4	908	CS15
TP10	5'-3"	11'-1"	7	928	CS16
TP14	5'-3"	11'-1"	7	928	CS16
TP15	5'-3"	14'-7"	7	1204	CS18
TP16	5'-3"	20'-1"	7	1680	CS19
TP16	5'-3"	20'-4"	7	1969	CS20
TP9	5'-3"	13'-4"	5	1196	CS21
TP17	3'-3"	15'-1"	6	1098	CS22
TP17	3'-3"	15'-1"	6	1098	CS22
TP18	4'-4"	13'-10"	4	1394	CS23
TP18	4'-4"	13'-10"	4	1394	CS23
TP1	2'-4"	15'-1"	5	1362	CS24
TP19	3'-0"	12'-10"	8	760	CS25
TP18	4'-4"	12'-10"	4	925	CS26
TP18	4'-4"	12'-10"	4	925	CS26
TP1	2'-4"	15'-1"	5	1362	CS24
TP18	4'-4"	12'-10"	4	925	CS26
TP20	4'-4"	3'-10"	5	418	CS28
TP20	4'-4"	3'-10"	5	418	CS28
TP1	2'-4"	15'-1"	5	1362	CS24
TP21	4'-4"	9'-4"	4	388	CS29
TP21	4'-4"	9'-4"	4	388	CS29
TP1	2'-4"	12'-4"	5	1206	CS27
TP1	2'-4"	12'-4"	5	1206	CS27
TP22	3'-8"	13'-1"	12	1297	CS30
TP1	2'-4"	15'-10"	5	1426	CS31
TP19	3'-0"	12'-10"	8	766	CS26

BRACING ANGLE SCHEDULE

MARK	DIAGONAL BRACING ANGLE SIZE OF ANGLE	F	WT. EACH	NO. REQD.	MARK	HORIZONTAL BRACING ANGLE SIZE OF ANGLE	L	A	B	C	D	E	WT. EACH	NO. REQD.	MARK
TP21	4"x4"x½"	0'-9"	52	6	ABD1	3½"x3½"x½"	8'-3"	8"	8"	7½"	8½"	4"	52	6	ABH1
TP22	4"x4"x½"	0'-9"	52	6	ABD2	3½"x3½"x½"	8'-3"	8"	8"	7½"	8½"	4"	52	6	ABH2
TP23	4"x4"x½"	0'-9"	57	2	ABD3	3½"x3½"x½"	8'-9"	8"	8"	7½"	8½"	4"	54	2	ABH3
TP24	4"x4"x½"	0'-9"	48	2	ABD3	3½"x3½"x½"	8'-3"	8"	8"	7½"	8½"	4"	46	2	ABH3
TP1	4"x4"x½"	0'-9"	47	4	ABD4	3½"x3½"x½"	7'-10"	8"	8"	7½"	8½"	4"	51	4	ABH4
TP25	4"x4"x½"	0'-9"	53	4	ABD5	3½"x3½"x½"	8'-3"	8"	8"	7½"	8½"	4"	51	6	ABH5
TP26	4"x4"x½"	0'-9"	52	4	ABD5	3½"x3½"x½"	8'-3"	8"	8"	7½"	8½"	4"	51	6	ABH5
TP6	4"x4"x½"	0'-9"	53	4	ABD5	3½"x3½"x½"	8'-3"	8"	8"	7½"	8½"	4"	51	6	ABH5
TP6	4"x4"x½"	0'-9"	46	4	ABD7	3½"x3½"x½"	8'-3"	8"	8"	7½"	8½"	4"	51	6	ABH7
TP27	4"x4"x½"	0'-9"	51	10	ABD8	3½"x3½"x½"	8'-4"	8"	8"	7½"	7½"	4"	51	10	ABH8
TP28	4"x4"x½"	0'-9"	63	2	ABD11	3½"x3½"x½"	10'-3"	8"	8"	7½"	8½"	4"	67	2	ABH11
TP29	4"x4"x½"	0'-9"	63	2	ABD12	3½"x3½"x½"	10'-3"	8"	8"	7½"	8½"	4"	66	2	ABH12
TP30	4"x4"x½"	0'-9"	63	2	ABD13	3½"x3½"x½"	10'-3"	8"	8"	7½"	8½"	4"	67	2	ABH13
TP31	4"x4"x½"	0'-9"	67	2	ABD14	3½"x3½"x½"	10'-3"	8"	8"	7½"	8½"	4"	67	2	ABH14
TP32	4"x4"x½"	0'-9"	67	2	ABD15	3½"x3½"x½"	10'-3"	8"	8"	7½"	8½"	4"	67	2	ABH15
TP33	4"x4"x½"	0'-9"	66	2	ABD16	3½"x3½"x½"	10'-3"	8"	8"	7½"	8½"	4"	66	2	ABH16
TP34	4"x4"x½"	0'-9"	63	2	ABD17	3½"x3½"x½"	10'-3"	8"	8"	7½"	8½"	4"	67	2	ABH17
TP35	4"x4"x½"	0'-9"	63	2	ABD18	3½"x3½"x½"	10'-3"	8"	8"	7½"	8½"	4"	67	2	ABH18
TP36	4"x4"x½"	0'-9"	63	2	ABD19	3½"x3½"x½"	10'-3"	8"	8"	7½"	8½"	4"	67	2	ABH19
TP37	4"x4"x½"	0'-9"	63	2	ABD20	3½"x3½"x½"	10'-3"	8"	8"	7½"	8½"	4"	67	2	ABH20
TP38	4"x4"x½"	0'-9"	63	2	ABD21	3½"x3½"x½"	10'-3"	8"	8"	7½"	8½"	4"	67	2	ABH21
TP39	4"x4"x½"	0'-9"	63	2	ABD22	3½"x3½"x½"	10'-3"	8"	8"	7½"	8½"	4"	67	2	ABH22
TP40	4"x4"x½"	0'-9"	63	2	ABD23	3½"x3½"x½"	10'-3"	8"	8"	7½"	8½"	4"	67	2	ABH23

STRUT ANGLE SCHEDULE

SIZE OF ANGLE	M	A EACH	WT. EACH	NO. REQ'D	MARK
3½"x3½"	8'-2½"	8"	41	2	AS1
3½"x3½"	8'-2½"	8"	41	2	AS2
3½"x3½"	9'-0"	7"	59	1	AS2
3½"x3½"	8'-6½"	7"	43	1	AS3
3½"x3½"	8'-6½"	7"	43	1	AS4
3½"x3½"	9'-0"	7"	60	2	AS5
3½"x3½"	10'-0"	7"	60	1	AS5
3½"x3½"	10'-0"	7"	60	1	AS6
3½"x3½"	10'-0"	7"	60	1	AS6
3½"x3½"	9'-0"	7"	59	1	AS7
3½"x3½"	7'-6"	7"	38	2	AS8
3½"x3½"	7'-6"	7"	38	2	AS8
3½"x3½"	8'-2½"	8"	41	2	AS9
3½"x3½"	10'-0"	7"	60	1	AS5
3½"x3½"	8'-2½"	8"	41	1	AS9
3½"x3½"	5'-6"	6"	23	1	AS10
3½"x3½"	5'-6"	6"	23	1	AS10
3½"x3½"	8'-2½"	8"	41	1	AS11
3½"x3½"	8'-2½"	8"	41	1	AS9
3½"x3½"	8'-2½"	8"	41	1	AS11
3½"x3½"	8'-2½"	8"	41	2	AS9
3½"x3½"	8'-2½"	8"	41	1	AS9
3½"x3½"	8'-2½"	8"	41	2	AS1
3½"x3½"	8'-2½"	8"	41	2	AS9
3½"x3½"	8'-2½"	8"	41	1	AS9
3½"x3½"	10'-0"	7"	60	1	AS5

* Use detail "A"

Sheeting schedule deleted
Sec. A-A & B-B, Elevation extrusion "E1" "E2" deleted

MK	DATE	AUTHORITY	REVISION
(R) 6-26-41	Add #1		
(R) 9-29-41	Add #1		

AS BUILT REVISIONS

W.K.S. 6-30-41 Minor revisions

BY	DATE	CHARACTER
		REVISIONS

* Opposite hand of that shown.
** 1 as shown - 1 opposite hand.
*** Holes to be ¾" dia. & washers to be 1".

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MISCELLANEOUS STRUCTURAL DETAILS
SHEET 27 OF 115 SHEETS — SCALES: AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [illegible] Engineer Officer in Charge

APPROVED RECOMMENDED: [illegible] Chief, Flood Control Division

APPROVED: [illegible] Colonel, Corps of Engineers, District Engineer

DR. BY C.A.M. — TR. BY C.A.M. — CK. BY F.G.E.

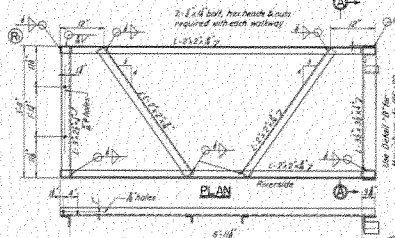
AS BUILT 935-12.2/107

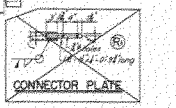
1278

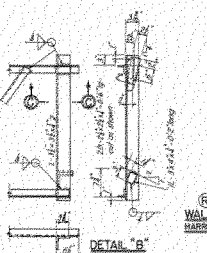
035

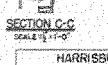
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY









HARRISBURG WALKWAY SCHEDULE

STATION	CENTER PORTION NO. REQ'D	CENTER PORTION WT. EACH	CENTER PORTION MARK	END PORTION NO. REQ'D	END PORTION WT. EACH	END PORTION MARK	REMARKS
150+81	1	94*	WE1	2	1007	WE1	Use shown, * opposite hand with connector bar details reversed
156+93	1	89	WE3	2	86	WE1	Use "Detail B", * as shown, ** opposite hand with connector bar details reversed
186+20	2	82	WE2	2	86	WE1	
(R) 23+73	1		WE3	2		WE1	

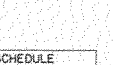
WALKWAY END PORTION DETAILS

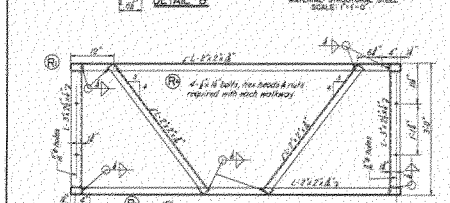
HARRISBURG STAS. 100+81, 156+93 & 186+20

NO. REQ'D. SEE HARRISBURG SCHEDULE

MATERIAL: STRUCTURAL STEEL

SCALE: 1" = 1'-0"





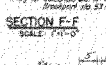
WALKWAY CENTER PORTION DETAILS

HARRISBURG STAS. 100+81, 156+93, 186+20 & 23+73

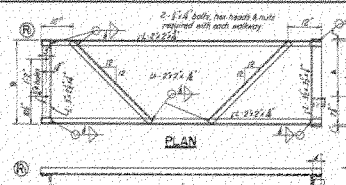
NO. REQ'D. SEE HARRISBURG SCHEDULE

MATERIAL: STRUCTURAL STEEL

SCALE: 1" = 1'-0"

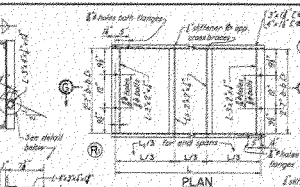


BY	DATE	CHARACTER	INITIAL AUTHORITY	REVISIONS
				AS BUILT REVISIONS
				Change in amount required
				Station added
				Dimension change
				Connector plate deleted

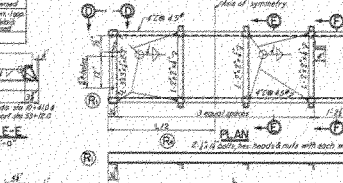


WALKWAY SCHEDULE "A"

LOCATION	STATION	NO. REQ'D. EACH	WT. EACH	A	B	L	MARK	REMARKS
Brookport	81+20.5	1	1	8'5"	2'-6"	3'-0"	8'-6"	WE2	*
"	81+00.5	1	93	2'-6"	3'-0"	8'-6"	WE7	**
"	85+49.5	1	93	2'-6"	3'-0"	8'-6"	WE6	*
"	89+89.5	1	93	2'-6"	3'-0"	8'-6"	WE6	**
"	97+19.5	1	98	2'-6"	2'-6"	8'-6"	WE6	*
"	97+19.5	1	98	2'-6"	2'-6"	8'-6"	WE7	**
"	92+58.9	1	101	2'-6"	3'-0"	8'-6"	WE8	*
"	92+58.9	1	101	2'-6"	3'-0"	8'-6"	WE9	**
"	107+58.61	1	98	2'-6"	2'-6"	8'-6"	WE10	*
"	110+58.61	1	98	2'-6"	2'-6"	8'-6"	WE11	**
"	114+38.54	1	98	2'-6"	2'-6"	8'-6"	WE12	*
"	114+38.54	1	98	2'-6"	2'-6"	8'-6"	WE13	**
"	139+90.7	1	101	2'-6"	3'-0"	8'-6"	WE14	*
"	135+30.7	1	101	2'-6"	3'-0"	8'-6"	WE15	**
Paducah "C"	104+96.17	1	101	2'-6"	3'-0"	8'-6"	WE16	*
"	104+96.17	1	101	2'-6"	3'-0"	8'-6"	WE17	**



* As shown
** Opposite hand with connector plate details reversed
*** Opposite hand



WALKWAY SCHEDULE "B"

LOCATION	STATION	L	NO. REQ'D. EACH	WT. EACH MARK	REMARKS
Paducah "A"	140+49.8	11'-0"	1	1.8#	WE18	As shown
"	140+49.8	11'-0"	1	1.8#	WE19	Opp hand with connector B on R.H. channel
Brookport	53+03.2	10'-0"	1	1.8#	WE20	As shown
"	53+12.8	10'-0"	1	1.8#	WE21	Opp. hand with connector B reversed
"	53+12.8	10'-0"	1	1.4#	WE22	* See note below
Golconda	10+41.0	10'-0"	1	1.8#	WE23	As shown
"	10+41.0	10'-0"	1	1.8#	WE24	Opposite hand
"	10+41.0	10'-0"	1	1.4#	WE25	* See note below
"	21+05.6	10'-0"	1	1.8#	WE26	As shown
"	21+05.6	10'-0"	1	1.8#	WE27	* Opposite hand
"	21+05.6	10'-0"	1	1.4#	WE28	See note below

* Make right half opposite hand of left half shown, but with connector B on riverside channel at both ends.

STANDARD WALKWAY SCHEDULE

LOCATION PADUCAH "B"	L	BETWEEN TRUSSES NO. REQ'D. EACH	BETWEEN TRUSSES WT. EACH	BETWEEN TRUSSES MARK	END PORTION NO. REQ'D. EACH	END PORTION MARK	LOCATION PADUCAH "B"	L	BETWEEN TRUSSES NO. REQ'D. EACH	BETWEEN TRUSSES MARK	END PORTION NO. REQ'D. EACH	END PORTION MARK
101+63.5					2	WE33	9+44.5				2	WE29
101+15.0					2	WE30	10+40.0				2	WE39
100+53.0					2	WE29	25+15.4				2	WE29
104+98.7	9'-0"	1	115#	WE1	2	WE33	28+90.3				2	WE30
109+62.63	8'-6"	1	110	WE2	2	WE33	29+60.3				2	WE39
113+80.61	8'-6"	1	110	WE3	2	WE33	31+01.3				2	WE29
118+19.16	8'-6"	1	99	WE3	2	WE34	31+51.4				2	WE29
122+40.66					2	WE29	36+84.5				2	WE39
133+22.75	7'-0"	2	110	WE4	2	WE35	62+84.3				2	WE29
138+23.06	6'-6"	3	111	WE5	2	WE36	71+74.3				2	WE29
145+74.30	6'-0"	3	111	WE6	2	WE36	75+85.5				2	WE29
149+87.30	6'-0"	3	111	WE5	2	WE36	83+92.1	8'-6"	2	WE1	2	WE29
157+76.10	6'-0"	3	111	WE5	2	WE36	90+41.7				2	WE29
161+53.10	6'-0"	8	112	WE6	2	WE29	91+86.8				2	WE29
168+46.50					2	WE37*	93+57.91	6'-0"	1	WE2	2	WE40
170+04.36	6'-0"	3	111	WE5	2	WE38	94+83.76	6'-6"	1	WE3	2	WE34
6+43.5					2	WE38	98+88.16				2	WE29
9+34.5					2	WE38						

* Use abutment end details at both ends.

Note:

Sta. 6+43.5 to Sta. 83+92.1 incl. Paducah "B-1"
Sta. 90+41.7 to Sta. 170+04.36 incl. Paducah "B-2"
For walkway planking schedule see sheet 83

OHIO RIVER BASIN

FLOOD PROTECTION, PADUCAH, KY.

SECTION "A"

MISCELLANEOUS STRUCTURAL DETAILS

SHEET 98 OF 115 SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED:

APPROVAL RECOMMENDED:

APPROVED:

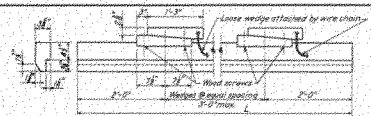
AS BUILT 935-12.2/108

1279

320

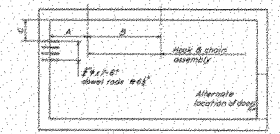
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



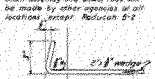
SEALING TIMBER ST 10

MATERIAL: NO. 1 COM. WHITE OAK S4S



LOCATION OF HOOK & CHAIN ASSEMBLY AND DOWEL RODS

Note: Installation of hook and chain assembly and dowel rods will be made by other agencies at all locations except Paducah 5-2.

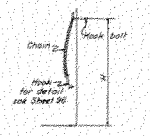


HOOK BOLT

MARK: 30 MARK: HBA WT. 7.8 LB EACH

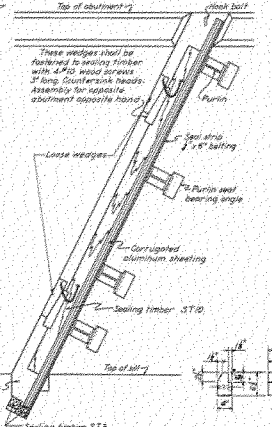
MATERIAL: WROUGHT IRON

SCALE: 3"=1'-0"



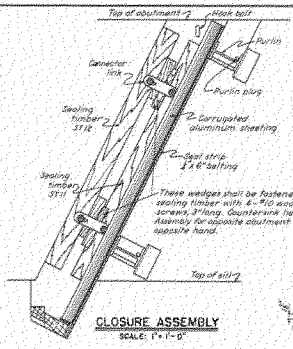
HOOK & CHAIN ASSEMBLY

SCALE: NONE



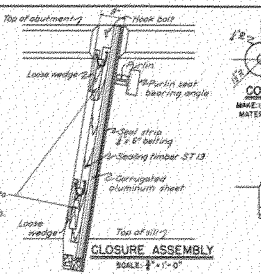
CLOSURE ASSEMBLY

SCALE: 1"=1'-0"



CLOSURE ASSEMBLY

SCALE: 1"=1'-0"



CLOSURE ASSEMBLY

SCALE: 1"=1'-0"

MARK: CC MARK CL WT. 1.85 EACH

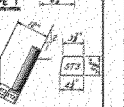
MATERIAL: STRUCTURAL STEEL

SCALE: 3"=1'-0"

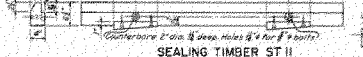
TYPE 1

MATERIAL: NO. 1 COM. WHITE OAK S4S

SCALE: 1"=1'-0"



TYPE 2

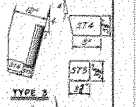


MATERIAL: NO. 1 COM. WHITE OAK S4S

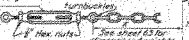
SCALE: 1"=1'-0"

MATERIAL: NO. 1 COM. WHITE OAK S4S

SCALE: 1"=1'-0"

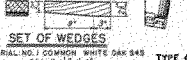


TYPE 3



STIFFENER CHAIN

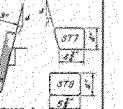
SCALE: NONE



SET OF WEDGES

MATERIAL: NO. 1 COMMON WHITE OAK S4S

SCALE: 1½"=1'-0"



TYPE 4

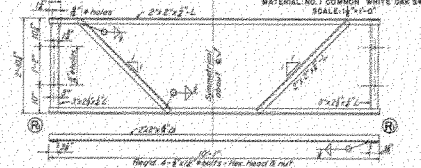
TYPE 5

SEAL TRENCH TIMBERS

CHAMFER CORNERS ½"

MATERIAL: NO. 1 COM. WHITE OAK S4S

SCALES: ¾"=1'-0" & 1½"=1'-0"



CENTER PORTION OF WALKWAY

MAKE: R MARK WCS WT. 938 LB EACH

MATERIAL: STRUCTURAL STEEL

BROOKPORT, ILL. STA. 110+38 & 114+38

SCALE: ¾"=1'-0"

LOCATION	SEAL STRIPS	SEALING TIMBERS				SEAL TRENCH TIMBERS				LOCATION	SEAL STRIPS	SEALING TIMBERS				SEAL TRENCH TIMBERS				HOOK & CHAIN ASSEMBLY					DOWEL RODS		
	NO. EACH	LGTH EACH	NO.	LGTH	MARK	NO. EACH	TYPE	LGTH	MARK		NO. EACH	LGTH EACH	NO.	LGTH	MARK	NO. EACH	TYPE	LGTH	MARK	LGTH NO.	L	H	A	B	NO.	C	H
Paducah 823 to 824	2	40'-0"	2	111'-0"	ST 10	6	2	2	9'-0"	Paducah 813 to 814	2	12'-0"	2	114'-0"	ST 13	6	3	2	6'-6"								
" " 3+96	2	18'-0"	2	114'-0"	" "	8	3	2	6'-6"	" " 3+60	2	18'-0"	2	91'-6"	" "	8	3	2	5'-0"								
" " 83+57	2	17'-8"	2	116'-0"	" "	8	3	2	9'-0"	" " 36+86	2	13'-0"	2	110'-0"	" "	6	3	2	6'-6"								
" " 84+03	2	17'-8"	2	118'-0"	" "	8	3	2	7'-0"	" " 37+07	2	21'-6"	2	51'-6"	ST 13	4	4	2	5'-0"								
" " 38+40	2	17'-8"	2	114'-0"	" "	8	2	2	8'-6"	" " 84+37	2	18'-0"	2	91'-6"	" "	8	2	2	6'-6"								
" " 103+65	2	14'-0"	2	116'-0"	" "	6	2	2	8'-6"	" " 42+84	2	12'-6"	2	91'-6"	ST 10	6	2	2	6'-6"								
" " 106+40	2	13'-0"	2	109'-0"	" "	6	2	3	7'-0"	" " 67+73	2	24'-6"	2	89'-0"	" "	8	3	2	6'-6"								
" " 109+53	2	17'-8"	2	116'-0"	" "	8	2	2	8'-6"	" " 69+64	2	21'-6"	2	91'-6"	" "	6	3	2	6'-6"								
" " 114+38	2	17'-8"	2	114'-0"	" "	8	2	2	7'-6"	" " 71+74	2	17'-8"	2	114'-0"	" "	8	2	2	8'-6"								
" " 119+40	2	17'-8"	2	114'-0"	" "	8	2	2	9'-0"	" " 78+85	2	12'-8"	2	91'-6"	" "	8	2	2	8'-6"								
" " 123+80	2	17'-8"	2	114'-0"	" "	8	2	2	9'-0"	" " 81+30	2	15'-0"	2	110'-0"	" "	6	2	3	11'-4"								
" " 129+19	2	17'-8"	2	114'-0"	" "	8	2	2	7'-0"	Paducah 835 to 840	2	131'-6"	2	261'-6"	ST 11	6	1	3	7'-0"	3	5'-0"	3'-6"	1'-9"	6'-9"	3	1'-2"	6'-6"
" " 130+40	2	17'-8"	2	116'-0"	" "	8	2	2	8'-9"	Paducah 5 to 6	2	17'-0"	2	91'-6"	" "	8	1	3	7'-0"	3	5'-0"	3'-6"	1'-9"	5'-6"	3	1'-4"	8'-0"
" " 133+22	2	17'-8"	2	114'-0"	" "	8	2	2	11'-0"	Harrisburg 26 to 31	2	17'-0"	2	91'-6"	" "	8	1	3	10'-4"	2	5'-0"	3'-6"	1'-9"	6'-9"	4	1'-11"	7'-0"
" " 139+21	2	17'-8"	2	114'-0"	" "	8	2	2	7'-0"	63+98	2	24'-6"	2	91'-6"	" "	8	1	3	10'-4"	2	5'-0"	3'-6"	1'-9"	7'-0"	4	1'-11"	8'-6"
" " 145+76	2	17'-8"	2	114'-0"	" "	8	2	2	8'-6"	7+93	2	20'-0"	4	91'-6"	" "	8	1	3	10'-4"	2	5'-0"	3'-6"	1'-9"	10'-0"	5	1'-11"	7'-0"
" " 149+97	2	17'-8"	2	116'-0"	" "	8	2	2	7'-0"	86+20	2	20'-6"	4	91'-6"	" "	8	1	3	10'-4"	2	5'-0"	3'-6"	1'-9"	10'-0"	5	1'-11"	7'-0"
" " 151+26	2	17'-8"	2	120'-0"	" "	8	2	2	6'-0"	Brookport 13 to 17	2	111'-0"	2	91'-6"	" "	6	1	2	9'-0"	2	5'-0"	3'-6"	1'-9"	5'-6"	3	1'-4"	8'-0"
" " 161+33	2	17'-8"	2	114'-0"	" "	8	2	2	9'-0"	89+49	2	13'-0"	2	91'-6"	" "	8	1	3	5'-0"	2	5'-0"	3'-6"	1'-9"	4'-0"	3	1'-4"	8'-0"
" " 166+48	2	18'-0"	2	114'-0"	" "	8	2	2	8'-6"	92+68	2	13'-0"	2	91'-6"	" "	8	1	3	7'-0"	2	5'-0"	3'-6"	1'-9"	6'-6"	3	1'-4"	6'-6"
" " 170+04	2	18'-0"	2	120'-0"	" "	8	2	2	8'-0"	97+28	2	21'-6"	2	91'-6"	" "	8	1	3	7'-0"	2	5'-0"	3'-6"	1'-9"	9'-6"	3	1'-4"	8'-0"
Paducah 83 to 4+49	2	18'-0"	2	120'-0"	" "	8	2	2	8'-0"	100+58	2	18'-0"	2	91'-6"	" "	8	1	3	10'-4"	2	5'-0"	3'-6"	1'-9"	7'-0"	4	1'-11"	6'-6"
" " 5+34	2	18'-0"	2	120'-0"	" "	8	2	2	8'-0"	114+38	2	18'-0"	2	91'-6"	" "	8	1	3	10'-4"	2	5'-0"	3'-6"	1'-9"	7'-0"	4	1'-11"	6'-6"
" " 7+46	2	18'-0"	2	120'-0"	" "	8	2	2	6'-6"	103+30	2	17'-0"	2	91'-6"	" "	8	1	3	7'-0"	2	5'-0"	3'-6"	1'-9"	5'-6"	3	1'-4"	8'-0"
" " 10+40	2	18'-0"	2	120'-0"	" "	8	3	2	6'-6"	93+12	2	13'-0"	2	91'-6"	" "	8	1	3	10'-4"	2	5'-0"	3'-6"	1'-9"	8'-0"	4	1'-11"	7'-0"
" " 23+15	2	18'-0"	2	120'-0"	" "	8	3	2	8'-6"	Kaloonda 5 to 10+41	2	12'-6"	2	91'-6"	" "	8	1	3	10'-4"	2	5'-0"	3'-6"	1'-9"	8'-0"	4	1'-11"	8'-3"
" " 26+40	2	18'-0"	2	120'-0"	" "	8	3	2	7'-0"	18+36	2	12'-6"	2	91'-6"	" "	8	1	3	9'-0"	—	—	—	—	—	—	—	—
" " 29+60	2	18'-0"	2	114'-0"	" "	8	3	2	6'-6"	31+08	2	11'-0"	2	91'-6"	ST 12	6	1	3	10'-4"	2	5'-0"	3'-6"	1'-9"	5'-0"	3	1'-4"	8'-0"

Note: Wedge sets marked thus ▪ include 1 connector link.

BY	DATE	CHARACTER REVISIONS

MK	DATE	AUTHORITY	REVISION
			Connector plate deleted
AS BUILT REVISIONS			

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MISCELLANEOUS STRUCTURAL DETAILS

SHEET 99 OF 115 SHEETS SCALES: AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: (Signature) DISTRICT ENGR. OR DIVISION ENGR.

APPROVAL RECOMMENDED: (Signature) CHIEF, ENGINEERING DIVISION OR DIVISION ENGINEER

APPROVED: (Signature) DISTRICT ENGINEER OR DIVISION ENGINEER

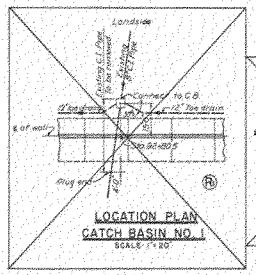
AS BUILT 935-12.2/109

1280

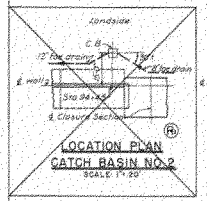
027

WAR DEPARTMENT

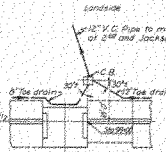
CORPS OF ENGINEERS, U. S. ARMY



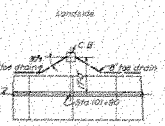
LOCATION PLAN
CATCH BASIN NO. 1
SCALE: 1" = 20'



LOCATION PLAN
CATCH BASIN NO. 2
SCALE: 1" = 20'



LOCATION PLAN
CATCH BASIN NO. 3
SCALE: 1" = 20'

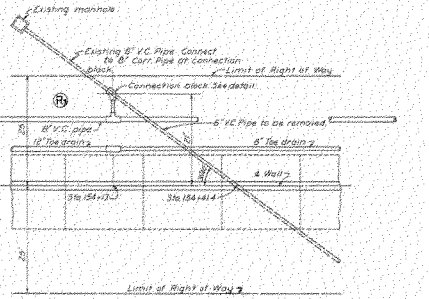


LOCATION PLAN
CATCH BASIN NO. 4
SCALE: 1" = 20'

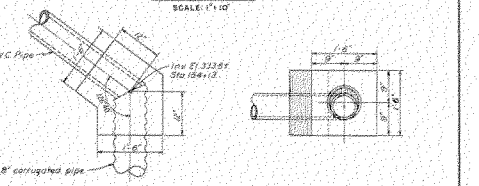
CATCH BASIN SCHEDULE

	NO.	TYPE	STATION	CONNECTIONS	ELEV. INVERT	APPROX. EL. TOP GROUND	REINFORCING ℔ LIN. FT.	REINFORCING ℔ LBS.	LOCATION PLAN SHEET NO.
Ⓡ	1	A	92+80.5	8Cl pipe 2-12 Corr pipe	332.0 330.7	334.8	163	108	This
Ⓡ	2	A	94+45	12 Corr pipe 8 Corr pipe	331.7 331.7	336.5	151	101	This
Rx	3	A	99+00	12 Corr pipe 6 Corr pipe 12 V.C. pipe	330.0 330.0 329.9	335.33	197	128	This
	4	C	101+90	12 Corr pipe 8 Corr pipe	331.0 331.0	335.3	148	99	This
	5	A	126+12	12 Corr pipe 6 Corr pipe	331.9 331.9	335.9	163	109	14
	6	A	126+56	12 Corr pipe 12 Corr pipe	332.7 331.8	335.0	130	93	14
	7	A	127+68.5	12 Corr pipe	332.2	334.0	136	92	14
Rx	8	A	127+83	12 Corr pipe	331.2	333.8	139	93	14
	9	C	129+00	15 Corr pipe 18 Corr pipe	329.0 329.0	334.0	163	102	This
Rx	10	C	133+00	2-24 Corr Pipes	330.0	332.5	119	80	This
	11	B	137+05	12" Corr Pipe	334.0	337.8 *	142	95	46
	12	B	137+47	12" Corr Pipe	333.5	337.6 *	186	111	46
	13	B	161+14	12" Corr Pipe	334.0	336.5 *	122	82	46
Rx	14	B	161+94	12" Corr Pipe	334.0	336.2 *	122	82	46

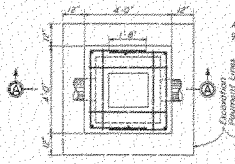
* Bottom of curb



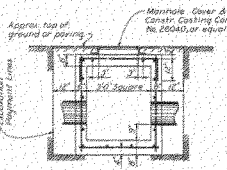
LOCATION PLAN
SCALE: 1" = 10'



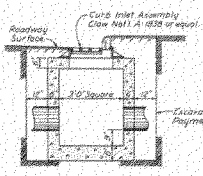
CONCRETE CONNECTION BLOCK
SCALE: 1" = 1'-0"



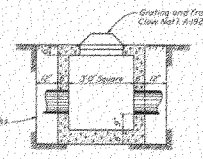
TYPICAL PLAN



SECTION A-A
TYPE "A"



SECTION A-A
TYPE "B"



SECTION A-A
TYPE "C"

TYPICAL CATCH BASINS
SCALE: 1/2" = 1'-0"

Notes:
All reinforcing bars 1/2" ϕ @ spaces 12" c.c. Cut and bend in field.
Reinforcing and masonry details similar in all types.

Rx	Field	Pipe added to plan
Rx	Field	Change in elevation "top ground"
Ⓡ	2/10	C.O. #9 Deleted

MK	DATE	AUTHORITY	REVISION
		AS BUILT	REVISIONS

BY	DATE	CHARACTER REVISIONS
WKS	4-30-41	Catch basins relocated & schedule revised

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS
CATCH BASINS AND
MISCELLANEOUS DETAILS

SHEET 100 OF 115 SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. — MAY 1941

SUBMITTED: [signature] CHIEF ENGINEER, CHIEF OF DESIGN

APPROVAL RECOMMENDED: [signature] CHIEF, FLOOD CONTROL DIVISION

APPROVED: [signature] DIVISION ENGINEER

DR. BY: E.C.B. — TR. BY: D.C.P. — CK. BY: [illegible]

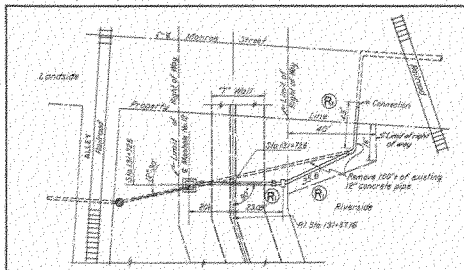
AS BUILT

935-12.2/110

1281

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

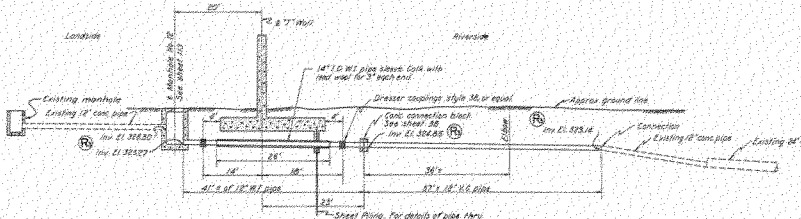


PLAN

SCALE: 1" = 20'

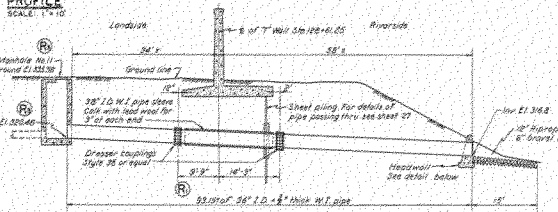
PLAN AND PROFILE

MANHOLE NO. 12



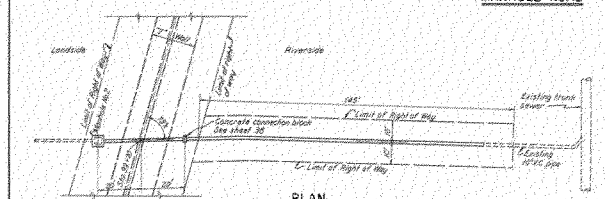
PROFILE

SCALE: 1" = 10'



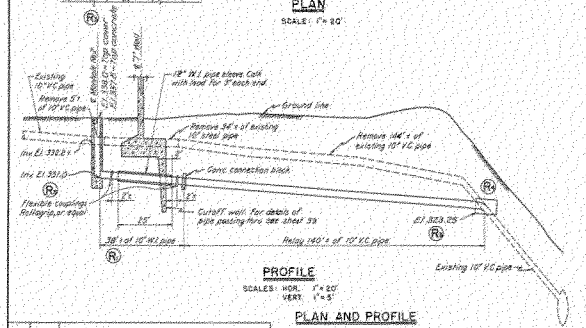
PROFILE - MANHOLE NO. 11

SCALE: 1" = 10'



PLAN

SCALE: 1" = 20'

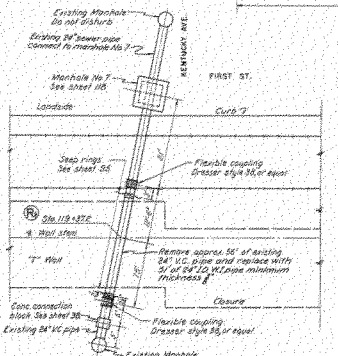


PROFILE

SCALES: HOR. 1" = 20'
VERT. 1" = 5'

PLAN AND PROFILE

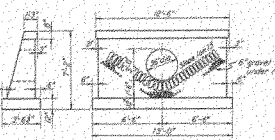
MANHOLE NO. 2



LOCATION PLAN

MANHOLE NO. 7

SCALE: 1" = 10'



HEADWALL STA 128+61

SCALE: 1/2" = 1'-0"

MK	4-30-41		Minor Corrections
BY	DATE	CHARACTER	
REVISIONS			

(R)	Field	Concrete block added
(R)	Field	Change in elevation and addition
(R)	Field	Station change
(R)	Field	Change in dimension and addition
MK DATE	AUTHORITY	REVISION
AS BUILT REVISIONS		

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

LOCATION PLANS

MANHOLES NOS. 2, 7, 11 & 12 AND

HEADWALL DETAILS STA. 128+61

SHEET 101 OF 115 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. — MAY 1941

SUBMITTED: [signature] DIVISION ENGINEER

APPROVAL RECOMMENDED: [signature] CHIEF, ENGINEERING DIVISION

APPROVED: [signature] DIVISION ENGINEER

DR. BY G.C.S. TR. BY E.S. CK. BY F.B.F.

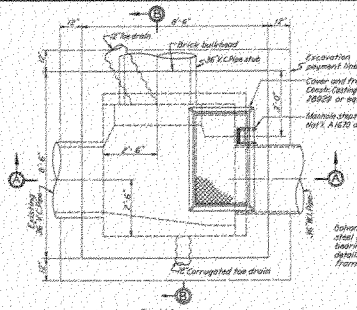
AS BUILT

935-12.2/111

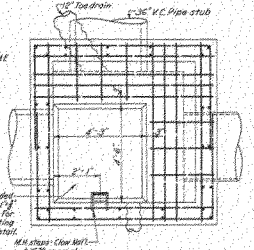
1282

WAR DEPARTMENT

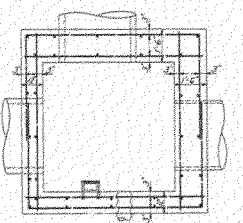
CORPS OF ENGINEERS, U. S. ARMY



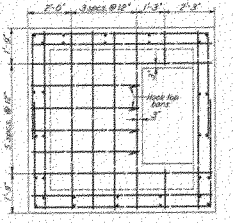
PLAN



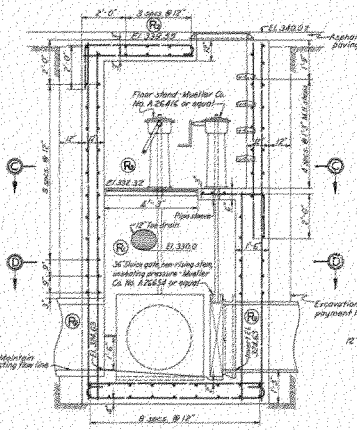
SECTION C-C



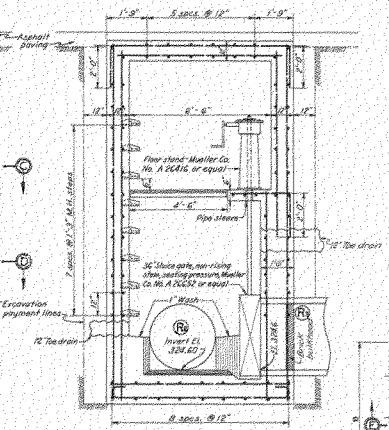
SECTION D-D



REINFORCING STEEL - TOP



SECTION A-A

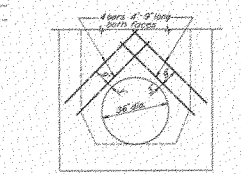


SECTION B-B

Note:
In setting gate frames care shall be taken to have all movable wedge parts free and accessible. Provide 1⅝" recess under gate.
All reinforcing shall be ⅝" ϕ, cut and bent in the field. Estimated quantity: 2149 linear ft. = 2235 #

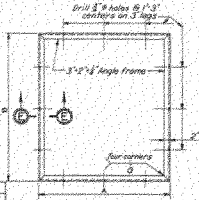
WKS 4-3041	Floor stand added and minor corrections.		
BY	DATE	CHARACTER	
REVISIONS			

(B)	Field	Bulkhead not placed
(D)	Field	Elevation change and addition
(E)	Initial C.O. #	Deleted
MK	DATE AUTHORITY	REVISION
AS BUILT REVISIONS		



ELEVATION AT 36" HOLES

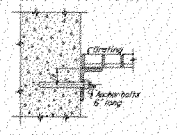
MANHOLE NO. 1
SCALE: ½" = 1'-0"



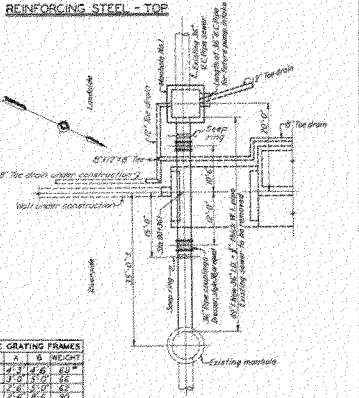
GRATING FRAME
NO SCALE

TABLE OF MANHOLE GRATING FRAMES				
MANHOLE NO.	MARK	A	B	WEIGHT
1	MG1	4'-3"	1'-6"	108 #
2	MG2	3'-0"	2'-0"	95
11	MG3	2'-6"	3'-0"	82
12	MG4	2'-6"	2'-6"	70
14	MG5	2'-6"	2'-0"	58
16	MG6	2'-0"	2'-0"	47

For grating support details for manhole No. 3 see sheet 114



SECTION E-E
SCALE: 3"=1'-0"



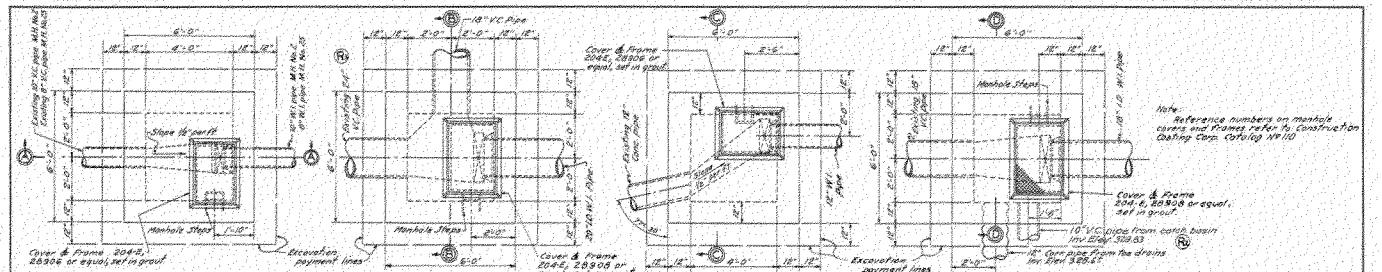
LOCATION PLAN
SCALE: 1"=10'-0"

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MANHOLE NO. 1
SHEET 102 OF 115 SHEETS SCALE: ½"=1'-0" EXCEPT AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED: [signature] Assistant, Chief of Section
APPROVED: [signature] Chief, Engineering Division
APPROVED: [signature] District Engineer
AS BUILT 935-12.2/112

1283

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

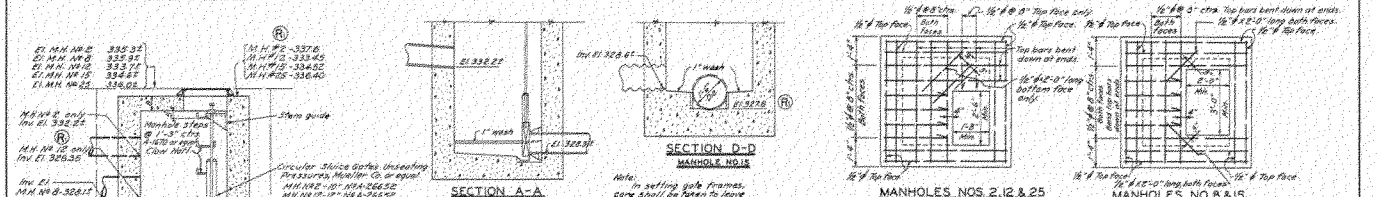


MANHOLES NOS. 2 & 25
STA. 98+70 & STA. 135+00

MANHOLE NO.8
STA. 123+81

MANHOLE NO.12
STA. 131+72.5

MANHOLE NO.15
STA. 149+83.3



TYPICAL SECTION
ALL MANHOLES

SECTION A-A
MANHOLE NO. 2

SECTION B-B
MANHOLE NO. 8

SECTION C-C
MANHOLE NO.12

SECTION D-D
MANHOLE NO.15

ELEVATION OF 18" & 20" PIPE OPENINGS

MANHOLES NOS. 2,12 & 25

MANHOLES NO.8 & 15

PLAN

TYPICAL HORIZONTAL SECTION

TYPICAL VERTICAL SECTION

SECTION A-A
MANHOLE NO. 23

REINFORCING ESTIMATED QUANTITIES

MANHOLE NUMBER	#5 BARS LINEAR FEET	WT. #
2	475	420
8	652	575
12	696	615
15	825	730
25	1271	850

Note: All reinforcing shall be cut and bent in the field.
For Location Plan of Manholes Nos. 2 & 12 see sheet 111.
For Location Plan of Manhole No. 25 see sheet 112.

Note: Reference numbers on manhole covers and frames refer to Construction Casting Corp. Catalog No 110

Note: In setting gate frames, care shall be taken to leave all movable wedge parts free and accessible. Provide 1½" recess under gates.

Note: Cut bend or shift bars to clear pipe openings.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MANHOLES NOS. 2, 8, 12, 15 & 25
SHEET 109 OF 115 SHEETS SCALE: ½" = 1'-0"
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVAL RECOMMENDED: APPROVED:
Div. Engr. O. R. B. Dist. Engr. Dist. Engr.
Dr. by C. B. Tr. by T. L. P. Ck. by H. N. S.

BY	DATE	CHARACTER	REVISIONS
		MK 5-14-41 Section A-A and notes added.	
(6)		Field	Change in size of pipe
(5)		Field	Pipe added
(4)		Field	Elevation change and addition
MK	DATE	AUTHORITY	REVISION

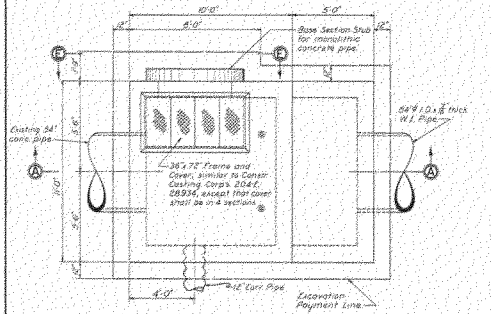
AS BUILT AS BUILT

935-12.2/113

1284

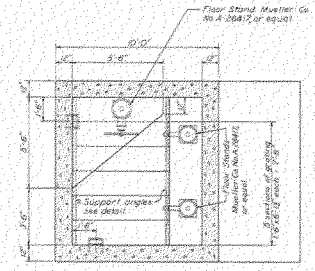
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



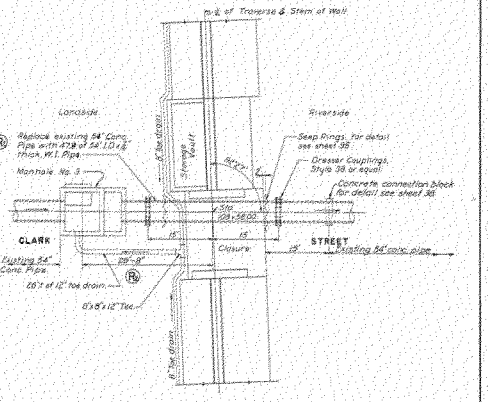
PLAN

SCALE: 1/4" = 1'-0"



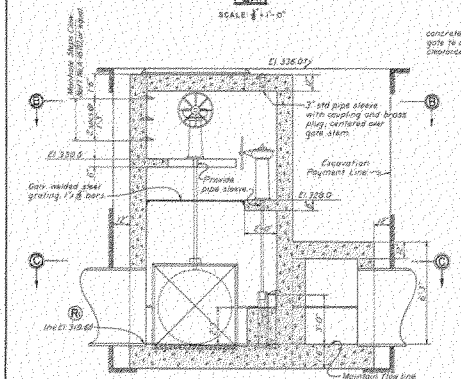
SECTION B-B

SCALE: 1/4" = 1'-0"



LOCATION PLAN

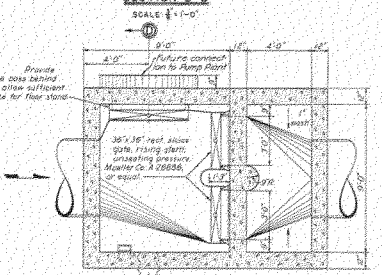
SCALE: 1" = 10'



SECTION A-A

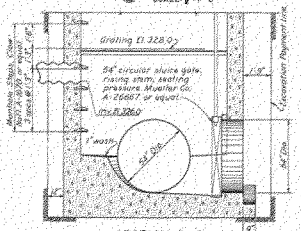
SCALE: 1/4" = 1'-0"

Note:
In setting gate frames, care shall be taken to leave all mortable wedge parts free and accessible. Provide 1" ± recess under gate.



SECTION C-C

SCALE: 1/4" = 1'-0"



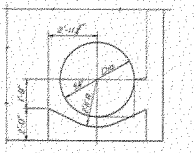
SECTION D-D

SCALE: 1/4" = 1'-0"

Note: For method of fastening to wall see details of standard grating frame, Sheet 112.

GRATING SUPPORT ANGLE

MAKE 1 AS SHOWN - 1 OPPOSITE HAND. MARK: GSA
WEIGHT: 37# EACH. MATERIAL: STRUCTURAL STEEL
SCALE: 1/4" = 1'-0"



ELEVATION E-E

SCALE: 1/4" = 1'-0"

R	Field	Dimension change
R	Plate	Elevation change
MK | DATE | AUTHORITY		REVISION
AS BUILT REVISIONS		

MKS 4-30-41	Minor corrections	
BY | DATE	CHARACTER	
	REVISIONS	

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY DETAILS

MANHOLE NO. 5

SHEET 104 OF 115 SHEETS SCALES: AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

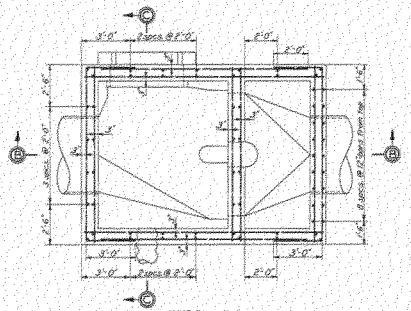
SUBMITTED: [signature] CHIEF, ENGINEERING DIVISION

APPROVED: [signature] CHIEF OF ENGINEERS

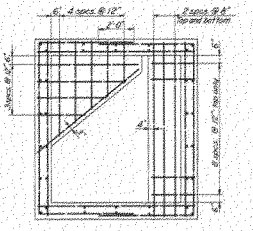
APPROVAL RECOMMENDED: [signature] CHIEF, PLANNING, CONTROL, AND REPORTS BRANCH, PLANNING CONTROL, AND REPORTS DIV. DR. BY: D.C.B. TR. BY: D.C.P. CK. BY: H.M.S.

AS BUILT 935-12.2/114

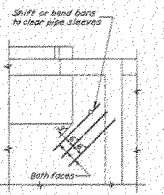
1285



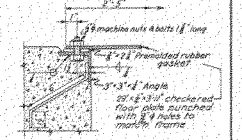
SECTION A-A



SECTION D-D

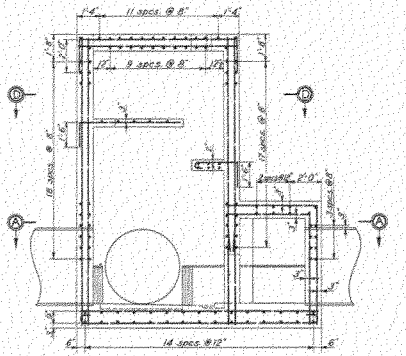


PLAN AT MANHOLE COVER OPENING

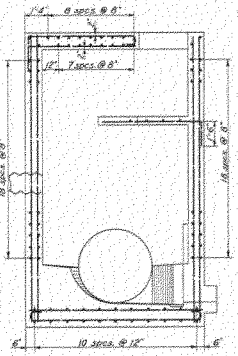


SECTION E-E
SCALE: 3"=1'-0"

Note:
All reinforcing 5/8" ø bars cut and bent in the field.
Estimated quantity 3950 linear feet = 4120#.

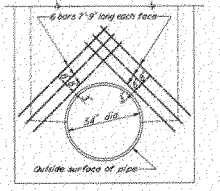


SECTION B-B

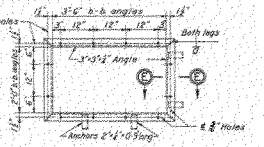


SECTION C-C

MANHOLE NO. 3
SCALE: 1/2"=1'-0"



ELEVATION 54" OPENINGS



FRAME
SCALE: 1/2"=1'-0"

PRESSURE CHAMBER FRAME AND COVER
MAKE 1 - MANHOLE NO. 16 - MK. P.C. - WEIGHT 1150#
MATERIAL - STRUCTURAL STEEL

WKS 4-30-41	Elevation 12" corr pipe corrected	
BY	DATE	CHARACTER
		REVISIONS

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
REINFORCING DETAILS
MANHOLE NO. 3

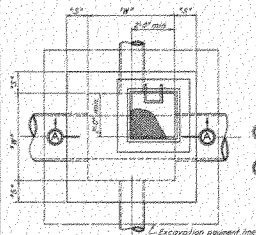
SHEET 105 OF 115 SHEETS SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY., MAY 1941
SUBMITTED: [signature] CHIEF OF DESIGN
APPROVED: [signature] DISTRICT ENGINEER

AS BUILT 935-12.2/115

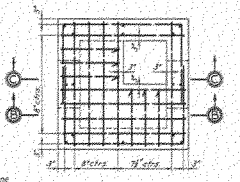
1286

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

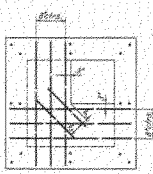


PLAN

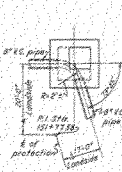


TOP REINFORCING - ROOF

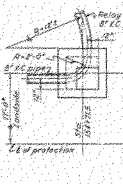
PLAN



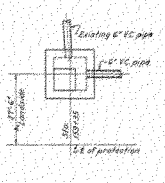
BOTTOM REINFORCING - ROOF



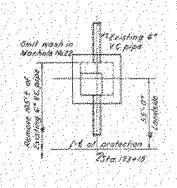
MANHOLE NO. 17



MANHOLE NO. 18



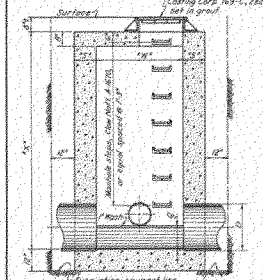
MANHOLE NO. 19



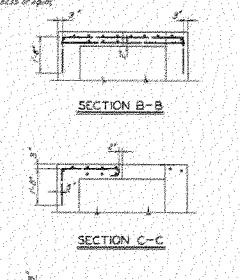
MANHOLE NO. 22

LOCATION PLANS

SCALE: 1" = 1'-0"



SECTION A-A

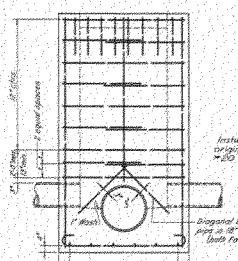


SECTION B-B

SECTION C-C

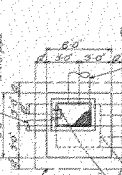
FAR SIDE REINFORCING

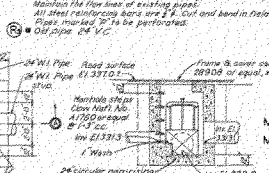
TYPICAL ELEVATION



NEAR SIDE REINFORCING

TYPICAL ELEVATION





TOP REINFORCING

PLAN

SCALE: 1" = 1'-0"

SECTION A-A

REINFORCING DETAILS

SCALE: 1" = 1'-0"

MANHOLE NUMBER	STATION	DIMENSIONS W	S	X	PIPE CONNECTIONS QUAN.	SIZE	KIND	INV. ELEV.	APPROX. GROUND ELEVATION OR TOP OF MANHOLE	NUMBER OF STEPS REQUIRED	QUANTITY OF STEEL REINFORCING FEET	LBS.	FOR LOCATION PLAN SEE
4	115+00	5'-0"	3"	10'-3"	1	18"	V.C. - Existing	323.3	336.0	8	665	445	Sheet 10
					1	18"	Conc. - New	325.1					
					1	12"	Conc. - New (D)	326.0					
					1	8"	Conc. - New (D)	330.0					
5	115+26	4'-0"	3"	10'-4"	1	18"	V.C. - Existing	324.0	336.4	7	660	390	Sheet 10
					1	24"	M.I. - New	324.0					
9	123+98	4'-0"	3"	6'-4"	2	* 18"	V.C. - New & Exist	323.66	336.5	4	620	415	Sheet 12
10	127+65	4'-0"	3"	10'-0"	1	12"	Conc. - New (D)	330.2	335.0	6	930	625	Sheet 14
					1	6"	V.C. - New	330.85					
					1	18"	V.C. Existing	323.3					
					1	18	Conc. New (D)	322.33					
					2	18	Conc. - New	323.33					
11	131+72	3'-0"	3"	8'-3½"	2	8"	V.C. - New	330.6	336.0	3	445	300	This sheet
18	154+10.3	3'-0"	3"	6'-1"	1	8"	V.C. - Relayed	331.4	339.0	4	475	320	This sheet
					1	8"	V.C. - New	331.6					
19	159+35	3'-0"	3"	21'-4"	1	6"	V.C. - Existing	338.1	339.2	3	373	185	This sheet
					1	6"	V.C. - New	338.1					
21	161+66	4'-0"	3"	6'-2"	1	24"	V.C. - Existing	330.8	337.9	4	610	410	Sheet 16
					1	24"	M.I. - New	330.8					
					1	12"	V.C. - Relayed	330.11					
					1	24"	M.I. - Stub - New	330.98					
22	173+15	3'-0"	3"	15'-8"	1	6"	V.C. - Existing	328.4	336.5	4	430	290	This sheet

Notes: Refer to table for dimensions indicated by the letters "W", "S", and "X"
Manhole No. 5 flow line of existing pipes.
All steel reinforcing bars are ½" ϕ cut and bend in field.
Pipes marked "P" to be perforated.
* Old pipe 24" V.C.

Install 24" gate originally for manhole #20 by C.O. #5

MASONRY DETAILS

Scale: 1" = 1'-0"

R4	12-17-41	C.O. # 3 — Cargill added
R+	Field	Addition to note
R+	Field	Elevation change ground & top of MH
R3	Field	Change pipe connections
R2	Field	Invert elevation change
R1	12-17-41	C.O. # 5 — See Sheet 12A
MK.	DATE	AUTHORITY — REVISION

AS BUILT REVISIONS

W.K.S.	4-30-41	Minor corrections
BY	DATE	CHARACTER OF REVISIONS

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

OHIO RIVER BASIN

MASONRY AND REINFORCING DETAILS

MANHOLES NOS. 4, 5, 9, 10, 17, 18, 19, 21, & 22

SHEET 106 OF 115 SHEETS — SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: [signature] Engineer, Corps of Engineers

APPROVAL RECOMMENDED: [signature] Chief, Engineering Division

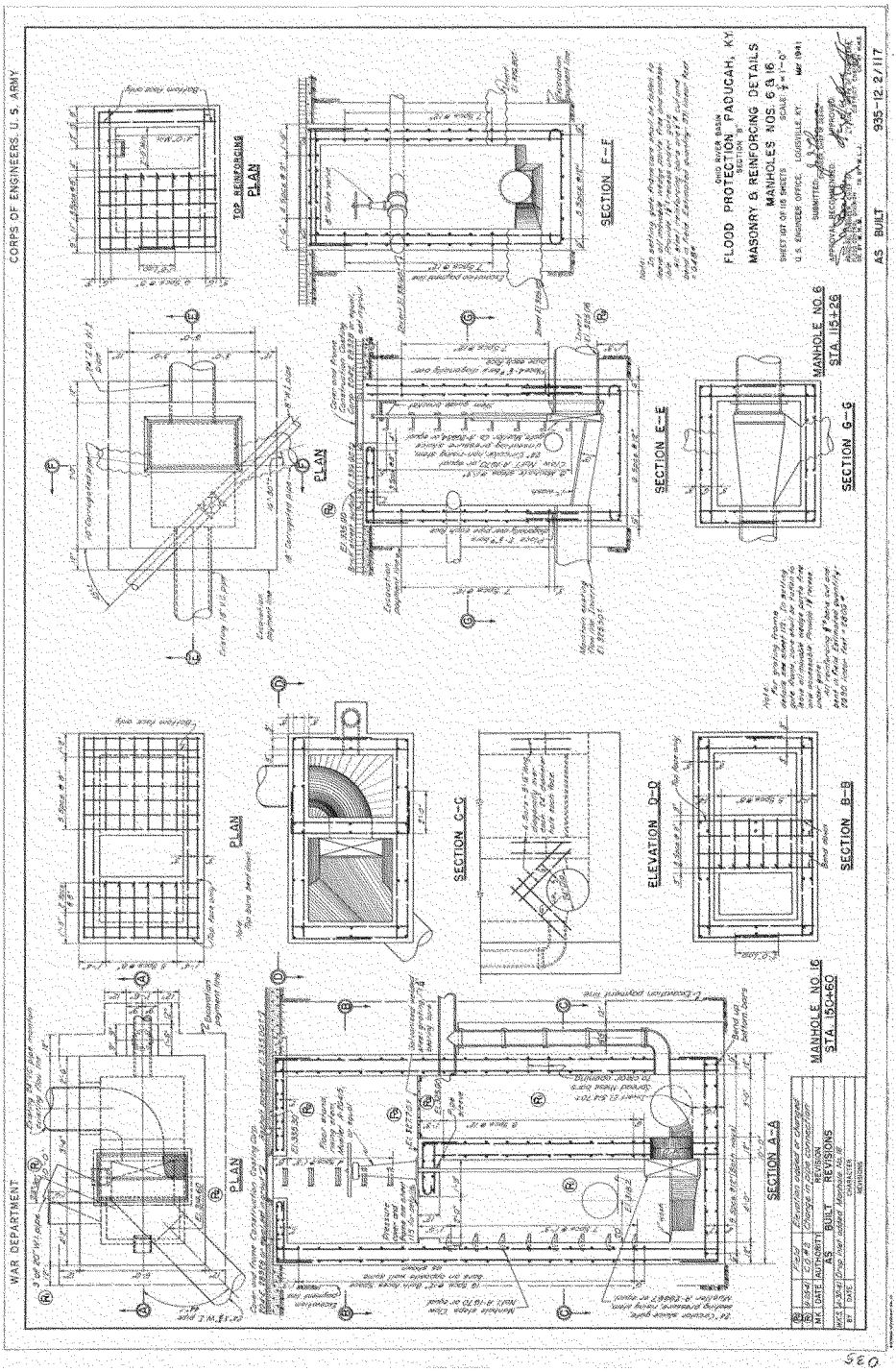
APPROVED: [signature] Colonel, Corps of Engineers, District Engineer

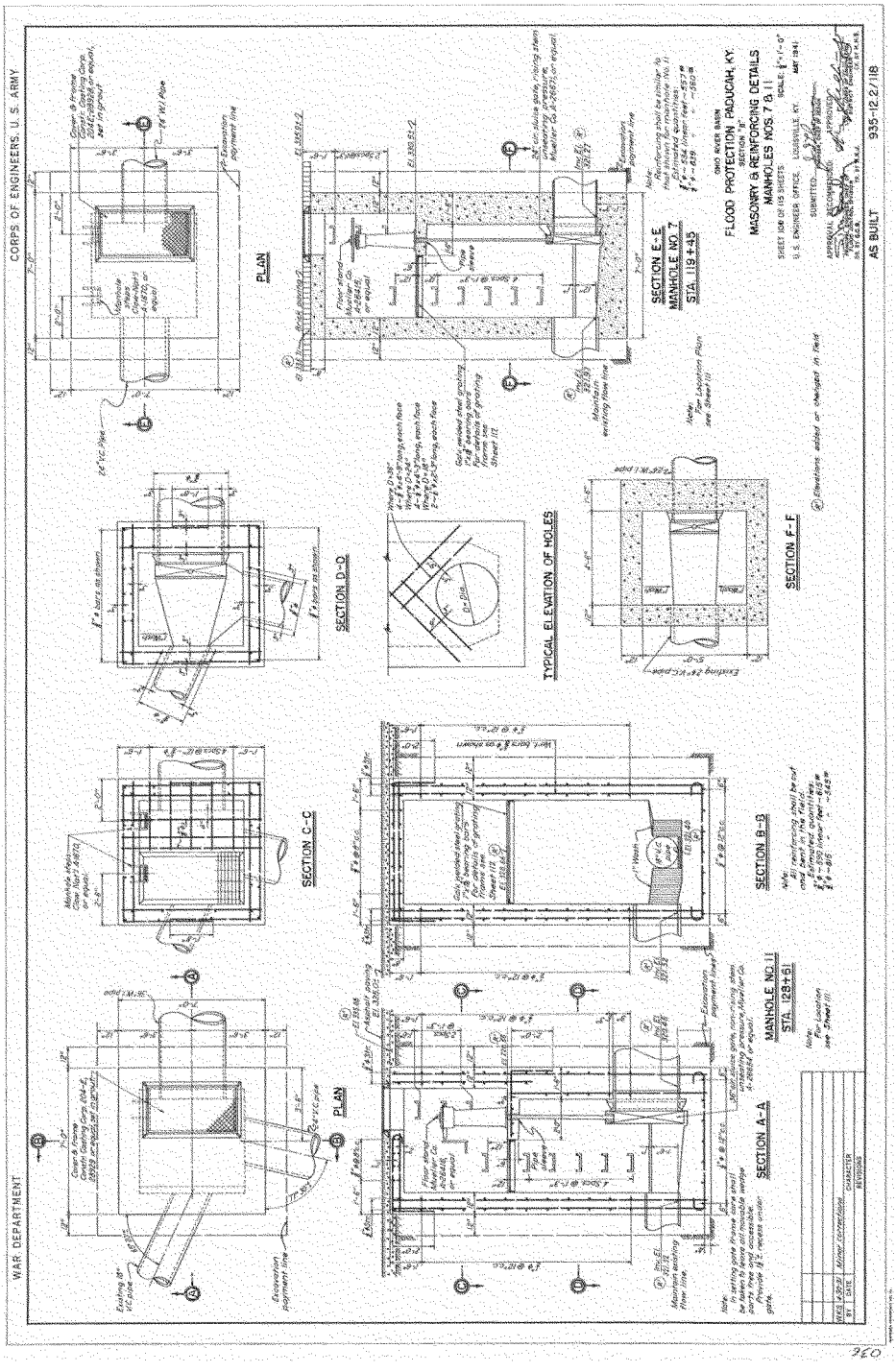
Tr. 21 E.C.E.

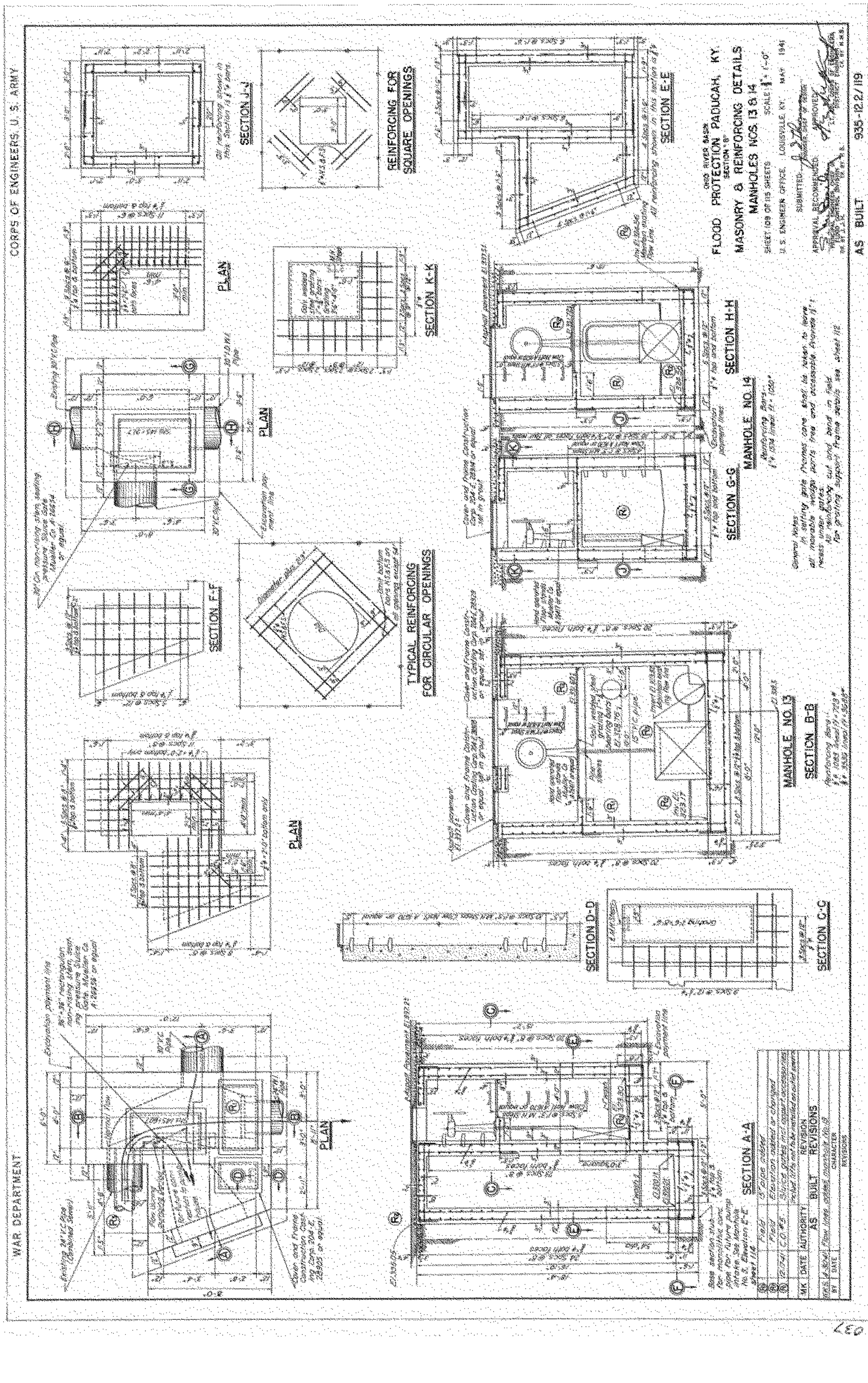
AS BUILT 935-12.2/116

1287

0396

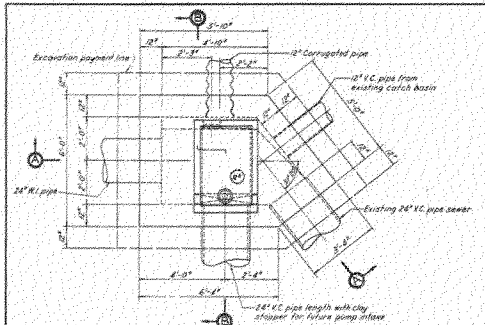

WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION AT PADUCAH, KY.
SECTION
MASONRY & REINFORCING DETAILS
MANHOLES NOS. 6 & 16
SHEET 107 OF 115 SHEETS
SCALE 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY.
MAY 1941
SUBMITTED
APPROVED
AS BUILT
935-12.2/117
PLAN
TOP REINFORCING PLAN
SECTION A-A
SECTION B-B
SECTION C-C
ELEVATION D-D
SECTION E-E
SECTION F-F
SECTION G-G
MANHOLE NO. 16
STA. 150+60
MANHOLE NO. 6
STA. 115+26
REVISIONS
AS BUILT
Change in Type Construction
Change Inlet Added Manhole No. 16

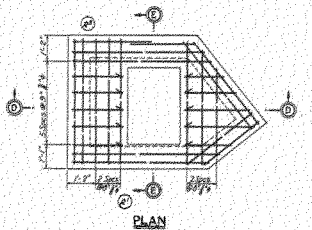

CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
PLAN
SECTION C-C
SECTION D-D
TYPICAL ELEVATION OF HOLES
SECTION E-E
MANHOLE NO. 7
STA. 119+45
SECTION F-F
PLAN
SECTION A-A
MANHOLE NO. 11
STA. 123+61
SECTION B-B
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION "A"
MASONRY & REINFORCING DETAILS
MANHOLES NOS. 7 & 11
SHEET 108 OF 115 SHEETS
SCALE: 1/4" = 1'-0"
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
AS BUILT
935-12.2/118


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
SECTION J-J
REINFORCING FOR SQUARE OPENINGS
SECTION E-E
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
MASONRY & REINFORCING DETAILS
MANHOLES NOS 13 & 14
SHEET 109 OF 115 SHEETS
U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
AS BUILT
935-12.2/119
PLAN
SECTION K-K
PLAN
SECTION F-F
TYPICAL REINFORCING FOR CIRCULAR OPENINGS
SECTION G-G
SECTION H-H
MANHOLE NO. 14
PLAN
MANHOLE NO. 13
SECTION B-B
SECTION D-D
SECTION C-C
PLAN
SECTION A-A
MK DATE AUTHORITY REVISION
AS BUILT REVISIONS

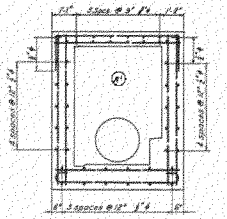
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY

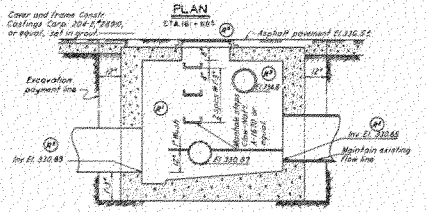




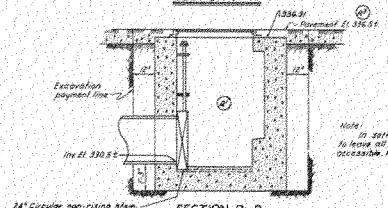
PLAN



SECTION E-E



SECTION A-A

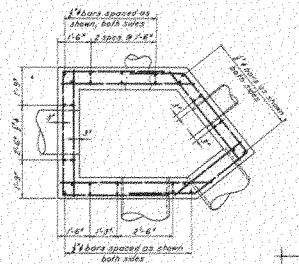


SECTION B-B

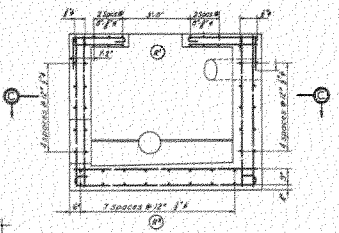
24" Circular, non-rising stem, sluicing pressure sluice gate Modified Co. No. A-26652 or equal

MASONRY DETAILS

Note: In setting gate frame, care shall be taken to leave all wooden wedge pieces free and accessible. Provide 1½" recess under gates.

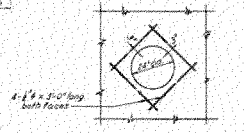


SECTION C-C



SECTION D-D

Note: All reinforcing cut and bent in the field. Estimated quantities: ⅝" ø - Weight 1214# Lin. Ft. 770 ¾" ø - Weight 682# Lin. Ft. 721



REINFORCING AROUND 24" DIA. HOLES

REINFORCING DETAILS

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

MASONRY & REINFORCING DETAILS

MANHOLE NO. 20

SHEET 110 OF 118 SHEETS SCALE ½" = 1'-0"

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941

SUBMITTED: J. F. Johnson, Division, Chief of Design

APPROVAL RECOMMENDED: H. L. Smith, Chief, Planning, Engineering, Design Branch, Flood Control Division

APPROVED: H. J. Sullivan, Jr., Colonel, Corps of Engineers, District Engineer

DR. BY E. C. C. TR. BY E. C. C. CK. BY H. L. S.

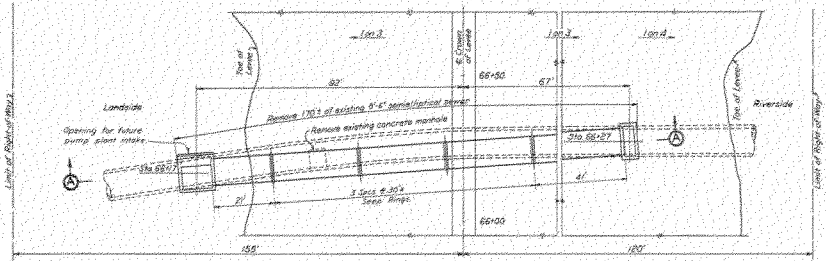
AS BUILT 935-12.2/120.1

W.K.S.	4-30-41	Minor revisions	
BY	DATE	CHARACTER OF REVISIONS	

(4)		Field	Elevation added or changed
(5)		Field	Change in Plan and Sections
(6)	10-11-41	C.O. No. 3	Sluice gate and appurtenant accessories; incl. lifts (on 36"ø Lower drains) placed in MASONRY
MK	DATE	AUTHORITY	AS BUILT REVISIONS

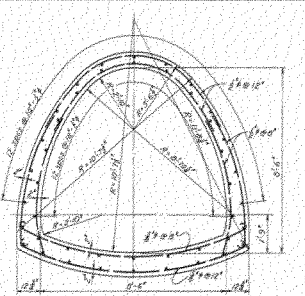
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



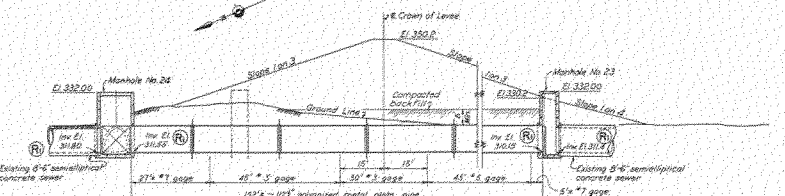
PLAN

SCALE: 1"=15'



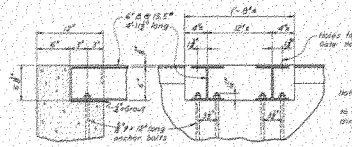
TYPICAL SECTION EXISTING 8'-6" SEMI-ELLIPTICAL CONCRETE SEWER

SCALE: 1/4"=1'-0"



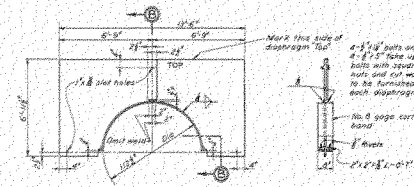
SECTION A-A

SCALE: 1"=15'



SUPPORT DETAIL FOR GATE HOIST BEAMS

SCALE: 1/2"=1'-0"



ELEVATION

SECTION B-B

DETAIL OF SEEP RING

SCALE: NONE

Note:
Diaphragm "B gage galvanized sheet metal. Top half of diaphragm shown, bottom half identical. Four complete seep rings required.

W.O. 5-1-41	This sheet supersedes sheet No. 935-12.2/121	
BY	DATE	CHARACTER
		REVISIONS

(R)		Field	Elevation change
MK	DATE	AUTHORITY	REVISION
AS BUILT REVISIONS			

OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION B

SEWER STA. 66+27

SHEET 111 OF 115 SHEETS SCALES AS SHOWN.

U. S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941.

SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN

APPROVED: [signature] DIVISION ENGINEER

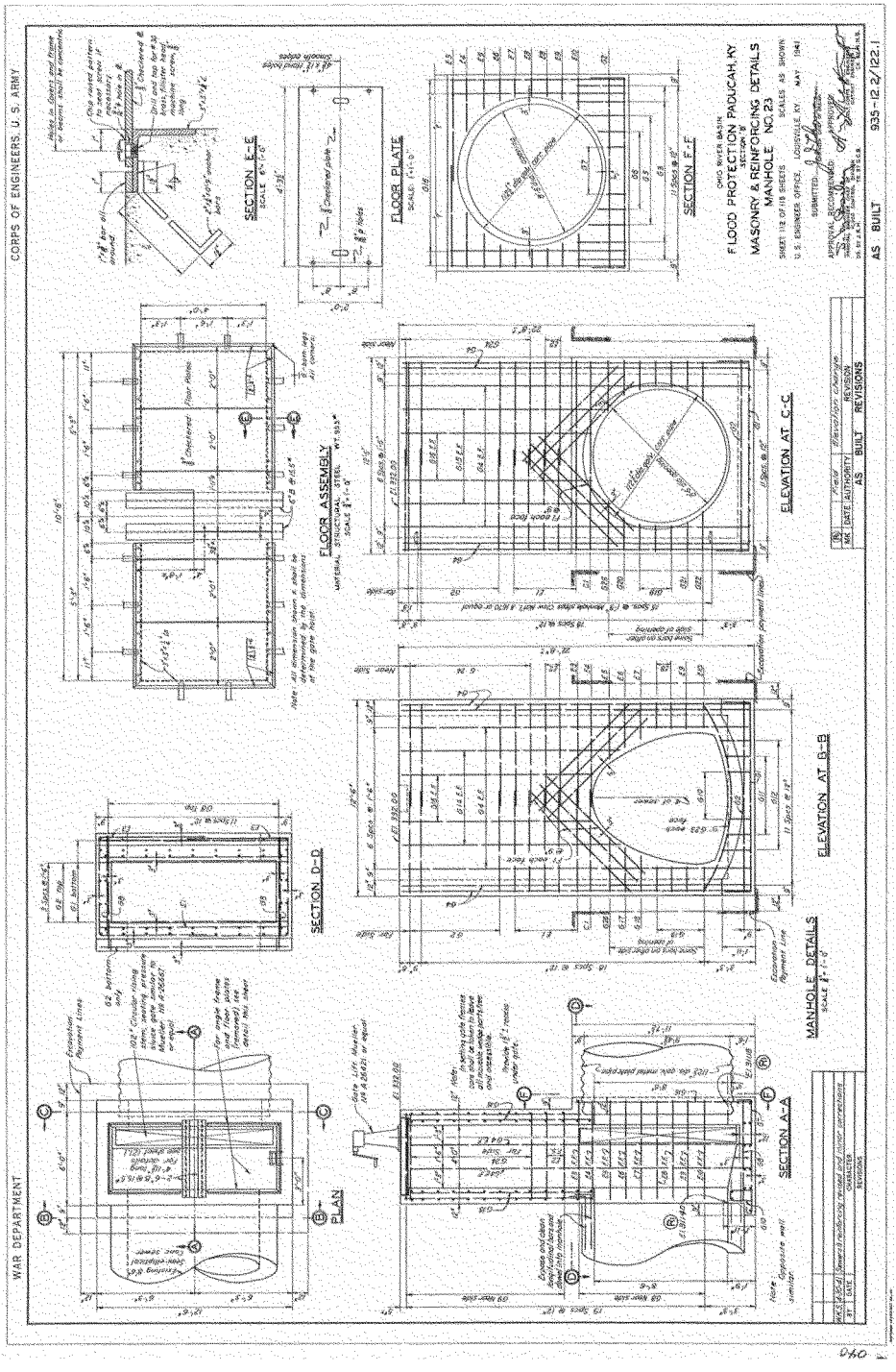
APPROVAL RECOMMENDED: [signature] CHIEF, ENGINEERING DIVISION, FLOOD CONTROL DIVISION, OR. ST. L.M.R.

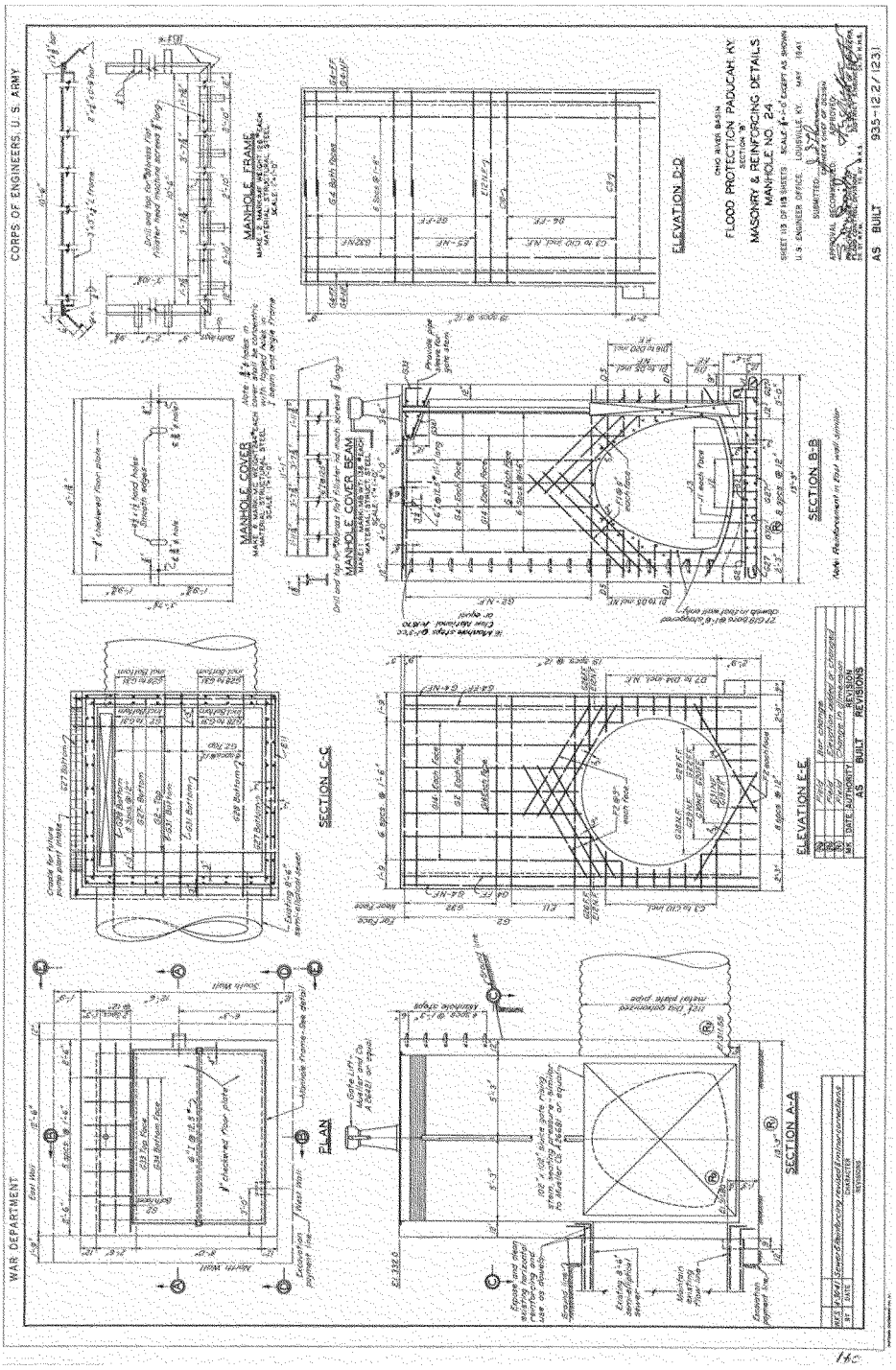
[signature] CHIEF, CONSTRUCTION DIVISION, FLOOD CONTROL DIVISION, TE. ST. P.O.M.

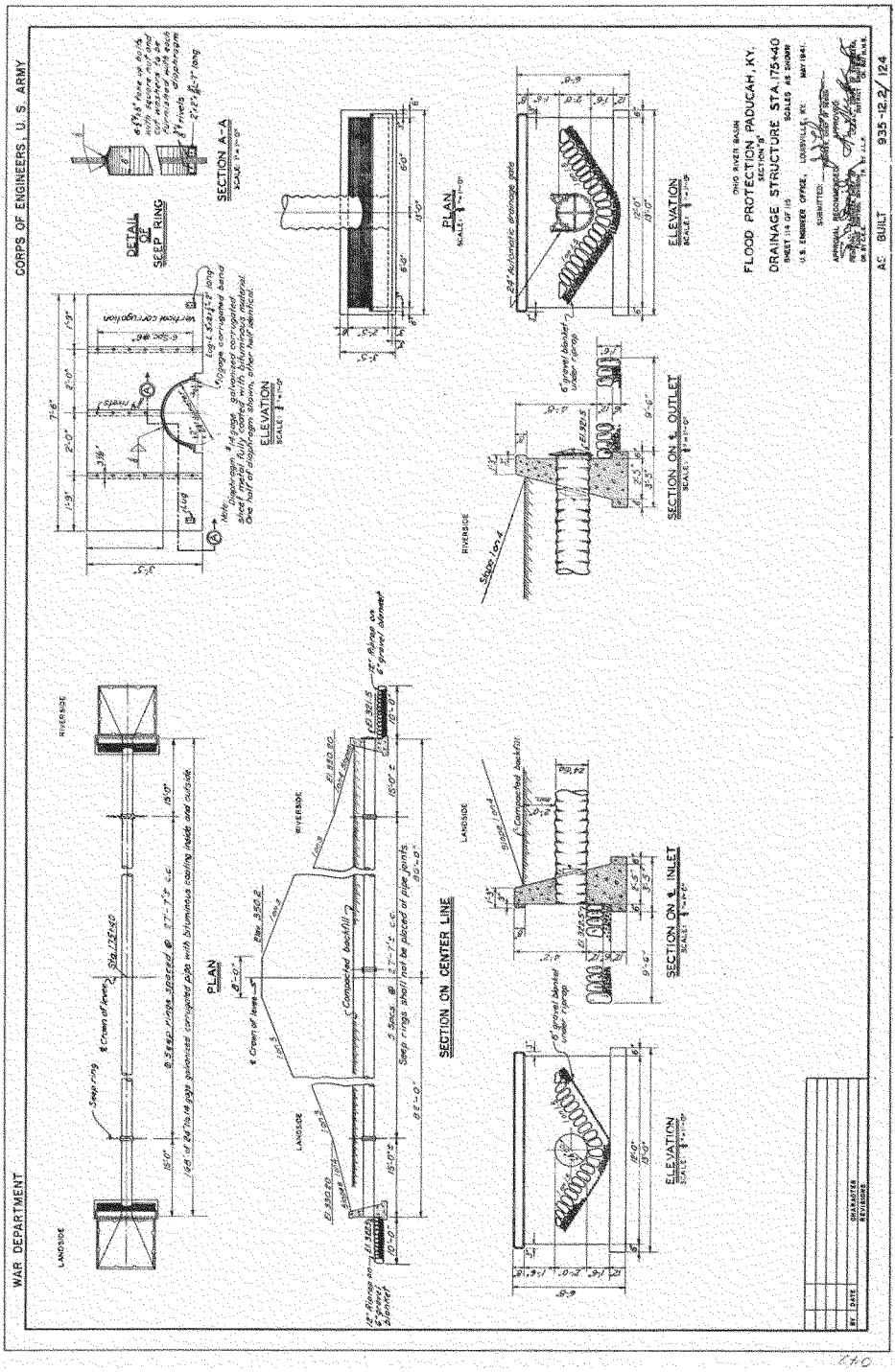
[signature] CHIEF, CONSTRUCTION DIVISION, FLOOD CONTROL DIVISION, OR. ST. O.M.R.

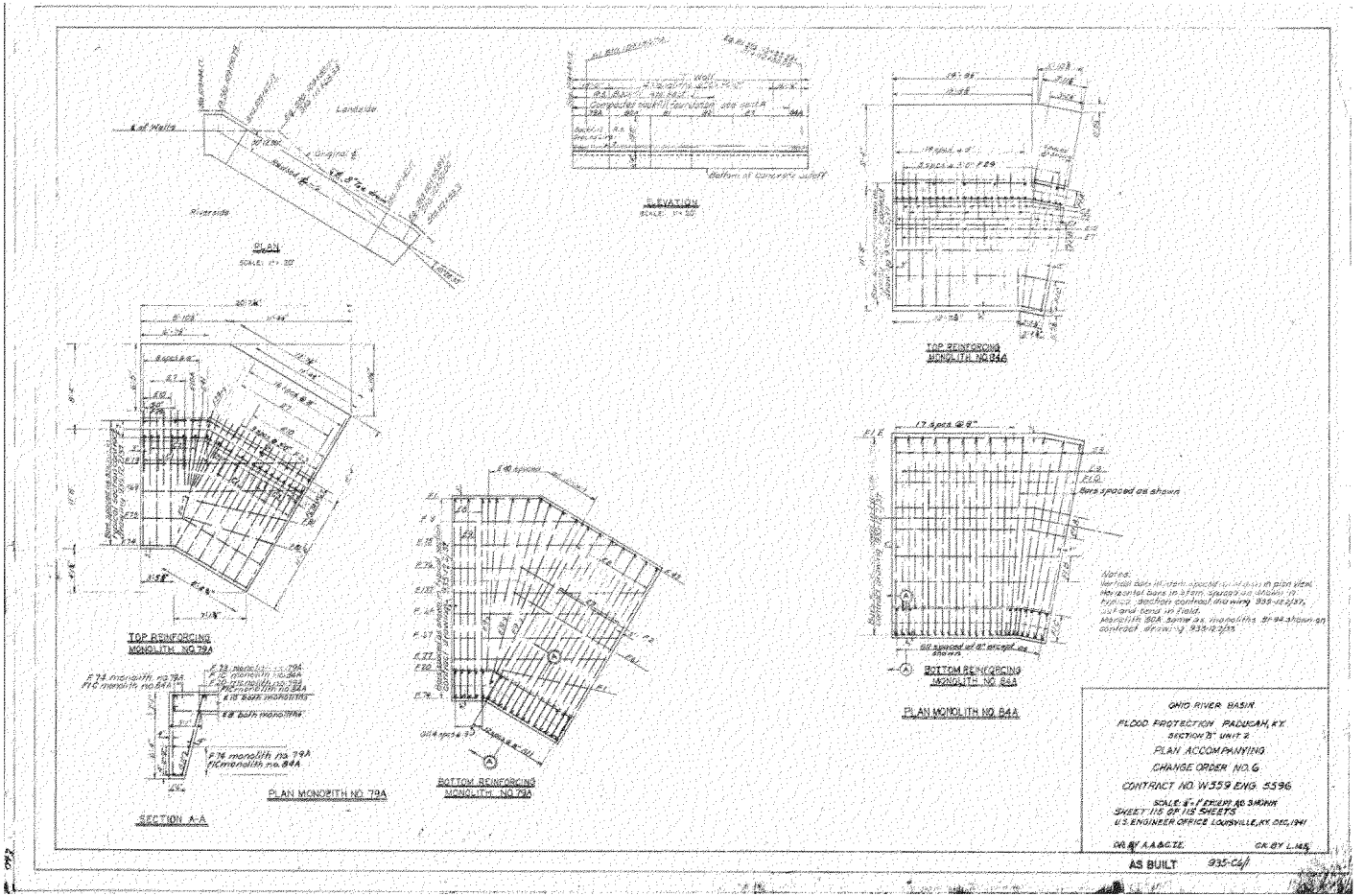
AS BUILT 935-12.2/121.1

1292


CORPS OF ENGINEERS, U. S. ARMY
WAR DEPARTMENT
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY
SECTION 'A'
MASONRY & REINFORCING DETAILS
MANHOLE NO. 23
SHEET 118 OF 118 SHEETS
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941
SUBMITTED
APPROVED
APPROVAL RECOMMENDED
AS BUILT
935-12.2/122.1
PLAN
SECTION A-A
SECTION B-B
SECTION C-D
SECTION E-E
SECTION F-F
FLOOR ASSEMBLY
FLOOR PLATE
ELEVATION AT C-C
MANHOLE DETAILS
REVISIONS
AS BUILT


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
MASONRY & REINFORCING DETAILS
MANHOLE NO. 24
AS BUILT
935-12.2/123.1
PLAN
SECTION A-A
SECTION B-B
SECTION C-C
ELEVATION D-D
ELEVATION E-E
MANHOLE FRAME
MANHOLE COVER
MANHOLE COVER BEAM
AS BUILT REVISIONS


WAR DEPARTMENT
CORPS OF ENGINEERS, U. S. ARMY
OHIO RIVER BASIN
FLOOD PROTECTION, PADUCAH, KY.
SECTION 'B'
DRAINAGE STRUCTURE STA. 175+40
SHEET 114 OF 115
SCALES AS SHOWN
U.S. ENGINEER OFFICE, LOUISVILLE, KY. MAY 1941.
SUBMITTED:
APPROVED:
AS BUILT
935-12.2/124
PLAN
SECTION ON CENTER LINE
ELEVATION
SECTION A-A
DETAIL OF SEEP RING
SECTION ON ℄ INLET
SECTION ON ℄ OUTLET
RIVERSIDE
LANDSIDE
Seep ring
℄ Crown of levee
Compacted backfill
Seep rings shall not be placed at pipe joints.
24" Automatic drainage gate
6" gravel blanket under riprap
Slope 1on4
Slope 1on2
Concrete backfill
Note: Diaphragm, 4 at each seep ring, of corrugated sheet metal fully coated with bituminous material. One half of diaphragm shown, other half identical.



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B" UNIT 2

PLAN ACCOMPANYING

CHANGE ORDER NO. 6

CONTRACT NO. W-559 ENG. 5596

SCALE: 8" = 1' EXCEPT AS SHOWN

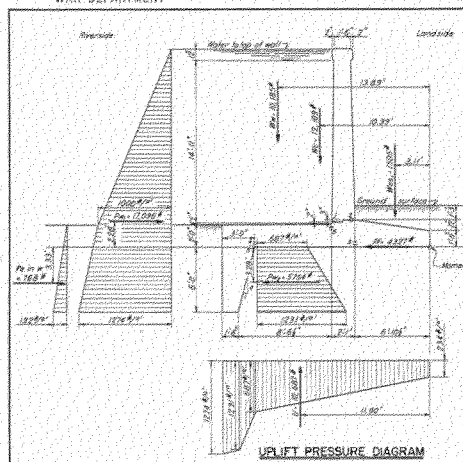
SHEET 116 OF 115 SHEETS

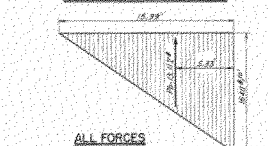
U.S. ENGINEER OFFICE LOUISVILLE, KY. DEC. 1941

DR. BY A.A.B.&C.T.E. CK. BY L.H.S.

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY





Nomenclature:

- W_w = Total weight of water acting on base.
- W_c = Total weight of concrete.
- W_{s1}, W_{s2} = Total weight of saturated earth acting on base.
- U = Total hydrostatic uplift on base.
- P_{w1}, P_{w2}, P_{w3} = Total horizontal pressure of water acting on structure.
- P_h in w = Total horizontal pressure of earth in water acting on structure.
- P_p = Total passive resistance developed by soil.
- P_f = Horizontal resistance developed by friction on base.
- P_b = Total soil reaction on base.

I. General Requirements

A. Cantilever type flood wall with concrete cutoff at heel, founded on soil or rock where failure by scour or undermining is improbable.
B. Protection - 3ft. above 1937 high water.
C. Structure designed for water to top of wall on riverside.
D. Bottom of concrete base shall be placed at least 3ft. below ground surface for protection against frost action.
E. Stability
1. Resultant of forces acting on structure to fall within middle third of base when considering active forces only.
2. Factor of safety against overturning of structure to be not less than 1.25 when considering all forces, including passive resistance.

II Basic Assumption

A. Active forces on wall to consist of hydrostatic pressure and the equivalent fluid pressure of the saturated earth.
B. Uplift derived from seepage pressure gradient.
C. Passive resistance of soil equal to difference between net active horizontal forces and frictional resistance developed between concrete base and soil, with passive resistance assumed to vary from zero at landside ground surface to a maximum at elevation at bottom of cutoff.
D. Coefficient of friction of concrete base on foundation assumed to vary between the limits of 0.33 to 0.60 for various types of soil. 0.33 used with Case I and 0.60 with Case II in order to produce most severe conditions.
E. Maximum wind pressure not to exceed 30 #/ft² of stem.

III. Design conditions

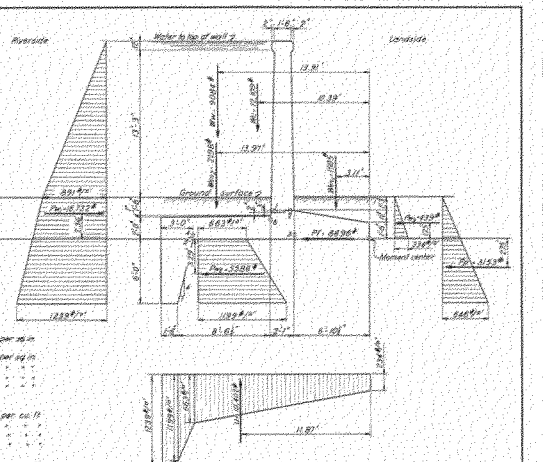
A. Case I - Governs design at points 3, 4 & 5
1. Water to top of wall on riverside.
2. Riverside earth scoured to elevation at top of base.
3. Landside earth saturated to ground level.
4. Coefficient of friction of base on foundation = 0.33
B. Case II - Governs design at points 1 & 6
1. Water to top of wall on riverside
2. No scour
3. Landside and riverside earth saturated to ground level.
4. Coefficient of friction of base on foundation = 0.60
C. Case III - (Not shown) Governs design at point 2.
1. Normal river stage. No water against wall.
2. Maximum wind pressure acting on stem from landside.

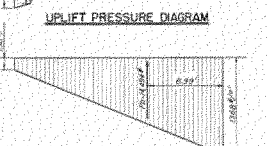
Allowable Working Stresses

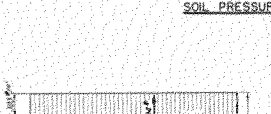
A. Steel reinforcing	18,000 lbs. per sq. in.
B. Concrete	
1. Ultimate compressive strength at 28 days	3,000 lbs. per sq. in.
2. Compression - extreme fibre stress	1,200 " " " "
3. Shear	60 " " " "
4. Bond	150 " " " "

Weights and Pressures

A. Weights	
1. Concrete	150 lbs. per cu. ft.
2. Water	62.5 " " " "
3. Saturated earth	125 " " " "
4. Earth in water (net)	62.5 " " " "
B. Active Pressures $W_e \tan^2 (45° - \phi/2)$	
1. Water	62.5 lbs. per sq. ft.
2. Saturated earth - angle of repose 28° - 34°	86 " " " "
3. Earth in water (net)	74 " " " "







OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

DESIGN DATA

18 FT. "T" WALL

SHEET OF SHEETS SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1946

SUBMITTED:

APPROVAL RECOMMENDED:

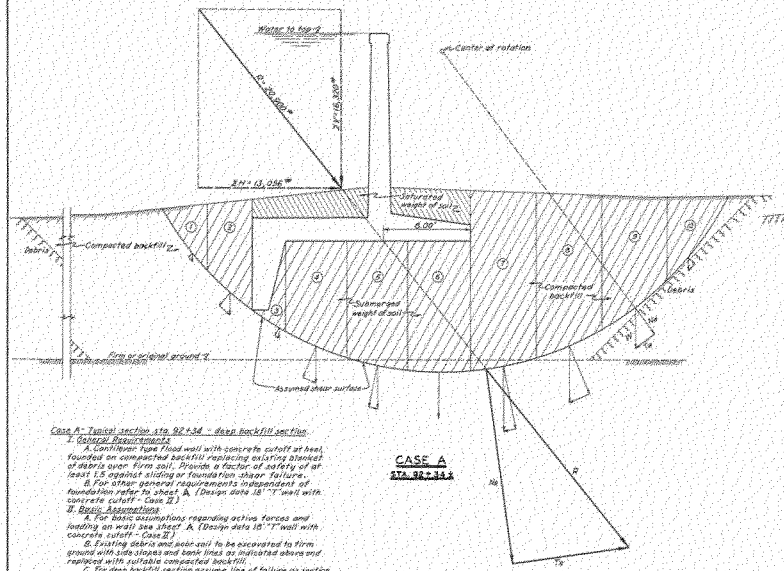
APPROVED:

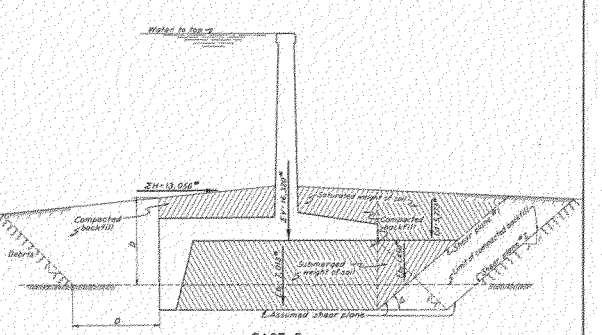
BY	DATE	CHARACTER OF REVISIONS

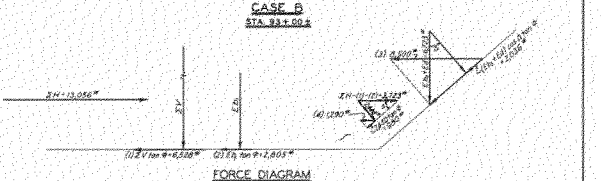
935-12.2/A

"REVISED AS BUILT"

1297







Case A - Typical section sta. 92+34 - deep backfill section.

I. General Requirements

A. Cantilever type flood wall with concrete cutoff at heel, founded on compacted backfill replacing existing stratum of debris over firm soil. Provide a factor of safety of at least 1.5 against sliding or foundation shear failure.

B. For other general requirements independent of foundation refer to sheet A (Design data 18' "T" wall with concrete cutoff - Case II.)

II. Basic Assumptions

A. For basic assumptions regarding active forces and loading on wall see sheet A (Design data 18' "T" wall with concrete cutoff - Case II.)

B. Existing debris and sub-soil to be excavated to firm ground with side slopes and bank lines as indicated above and replaced with suitable compacted backfill.

C. For deep backfill section assume line of failure as section of circular arc with wall and section of foundation rotating about center of arc. Resultants of active forces on wall and foundation segments are resolved into normal and tangential forces at intersection with shear arc.

D. Factor of safety against sliding $= \frac{\Sigma N \tan \Phi + c \Sigma L}{\Sigma T}$. For analysis use minimum tan Φ = 0.4 and c = 0 (debris and backfill).

Case B - Typical section sta. 93+00 ± shallow backfill section.

I. General Requirements - Same as Case A.

II. Basic Assumptions

A. Same as Case A.

B. Same as Case A.

C. For shallow backfill section assume line of failure as shown.

D. Factor of safety against shear failure $= \frac{(\text{Horizontal})}{\Sigma T}$. For analysis use minimum tan Φ = 0.4 and c = 0.

SEGMENT	W	H	l*	N	T
1	4.2	3.8	795	500	600
2	4.9	8.3	2,075	1,510	1,350
3	1.8	8.3	932	800	500
4	5.8	9.6	3,360	3,100	1,300
5	5.6	11.4	3,990	3,990	800
6	5.7	12.5	4,275	4,275	150
7	6.0	14.0	6,000	5,650	-1,100
8	6.8	13.9	5,210	4,800	-2,000
9	6.0	10.15	3,805	3,650	-2,300
10	5.6	3.75	1,315	800	- 900
		Σ = 20,300#/'		18,000	12,600
			Σ =	46,620	9,150

$\left[\text{Factor of safety against sliding (for tan } \Phi = 0.4, c = 0)\right] = \frac{46,620 \times 0.4 + 0}{9150} = 2.04$

Nomenclature

Q = Resultant of all active forces acting on wall.
ΣH = Summation of all active horizontal forces acting on wall.
ΣV = Summation of all active vertical forces acting on wall.
T_s = Tangential component of R at failure surface.
N_s = Normal component of R at failure surface.
W = Weight of earth segment.
Tw = Tangential component of W at failure surface.
Nw = Normal component of W at failure surface.
Eh, Ev, and Eq = Weight of earth segments.
(1), (2), (3) and (4) = Horizontal forces shown in Force Diagram.
c = Total cohesion along failure surface.
Φ = Angle of internal friction for both soil and debris.

Allowable Working Stresses and Weights and Pressures

See sheet (Design data 18' "T" wall with concrete cutoff Case II).

SCALES: DIMENSIONS 1/4" = 1'-0"
FORCES 1" = 4000#.

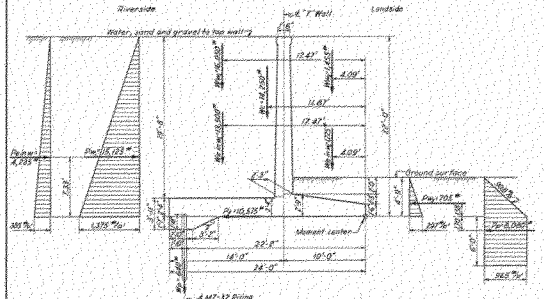
Note: Computations shown for shear plane #1 only.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
DESIGN DATA
18' "T" WALL ON COMPACTED BACKFILL
SHEET OF SHEETS SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941
SUBMITTED: [signature] ENGINEER, CHIEF OF DESIGN
APPROVAL RECOMMENDED: [signature] PROJECT ENGINEER, FLOOD CONTROL DIVISION
APPROVED: [signature] DISTRICT ENGINEER
DR. BY W.A.H. TR. BY K.B. CK. BY H.N.

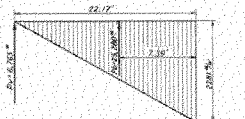
BY	DATE	CHARACTER
		REVISIONS

935-12.2/B

CASE III



UPLIFT PRESSURE DIAGRAM



SOIL PRESSURE DIAGRAM

SCALES: DIMENSIONS 1/4" = 1'-0"
FORCES 1" = 10000#

Nomenclature

$W_w, W_{w'}$ = Total weight of water acting on base
W_c = " Total weight of concrete
W_s = " Total weight of steel sheet piling
W_s in e, W_s in e' = Total weight of sand & gravel in water
$W_s, W_{s'}$ = " Total weight of dry sand & gravel
U = " Total hydrostatic uplift
$P_w, P_{w'}$ = Total horizontal pressure of water
P_e in e' = " Total horizontal pressure of sand & gravel in water
$P_s, P_{s'}$ = " Total horizontal pressure of dry sand & gravel
P_b = " Total soil reaction on base
P_p = " Total passive resistance developed by soil
P_f = " Horizontal resistance developed by friction on base
P_t = " Tension or bearing developed by steel sheet piling

Allowable Working Stresses

A. Steel sheet piling	20000 # per sq. in.
B. Steel reinforcing	18 000 " " " "
C. Concrete	
1. Ultimate compressive strength at 28 days	3000 " " " "
2. Compression - extreme fibre stress	1 200 " " " "
3. Shear	100 " " " "
4. Bond	150 " " " "

Weights and Pressures

A. Weights	
1. Concrete	150 # per cu. ft.
2. Water	62.5 " " "
3. Dry sand & gravel	100 " " "
4. Sand & gravel in water (est.)	52.5 " " "
5. Sand & gravel and water	115 " " "
B. Active pressures $W_s \tan^2(45° - \phi/2)$	
1. Water	62.5 # per sq. ft.
2. Dry sand & gravel - angle of repose 30°-08'	33 " " "
3. Sand & gravel in water - angle of repose 30°00'	30 " " "
4. Sand & gravel in water (est.)	17.5 " " "

Design Conditions

Case I Water to top of wall on riverside. Soil scoured off top of base on riverside. Landside earth assumed to be saturated. Uplift on base.

Case II Water to top of wall on riverside. Both riverside and landside earth assumed to be saturated. No scour on riverside. Uplift on base.

Case III Water and sand and gravel to top of wall on riverside and to ground line on landside. Uplift on base.

Case IV Dry sand and gravel to top of wall on landside and to ground line on riverside. No uplift on base.

CASES III & IV

General Requirements

A. Cantilever type flood wall with steel sheet piling cutoff at heel, founded on pervious soil or compacted backfill over pervious soil, and designed to resist flood water to top of wall. In addition the wall must be able to restrain sand & gravel stock piled against wall to top of stem on landside, riverside, or both, either alone or in combination with maximum flood water.

B. Protection - 3 ft. above 1937 high Water.

C. Bottom of concrete base shall be at a minimum of three feet below the ground surface for protection against frost action.

Basic Assumptions

A. Active forces on structure to consist of hydrostatic pressure and the equivalent fluid pressure of sand and gravel, for the given cases.

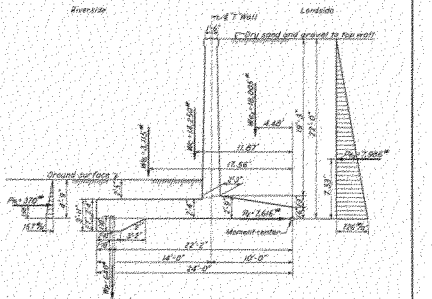
B. Uplift derived from seepage pressure gradient (haunch neglected).

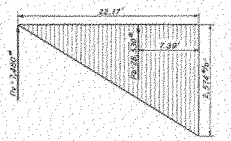
C. Coefficient of friction = 0.33

D. The passive resistance of the soil is assumed to increase uniformly from zero at the ground line to a maximum at the bottom of concrete and then to act uniformly on haunch and piling to a depth of one-fourth the base width. No passive resistance developed in Case III.

E. Steel sheet piling develops sufficient tension or bearing to make the soil pressure vary from zero at piling to maximum at toe.

CASE IV





SOIL PRESSURE DIAGRAM

SCALES: DIMENSIONS 1/4" = 1'-0"
FORCES 1" = 10000#

NO UPLIFT - CASE IV

OHIO RIVER BASIN.

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

DESIGN DATA - 22' "T" WALL
STA. 129+41.25 TO STA. 131+70.33

SHEET OF SHEETS SCALES AS SHOWN

U.S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: [signature] DIVISION, CHIEF OF SECTION

APPROVAL RECOMMENDED: [signature] CHIEF, FLOOD CONTROL SECTION

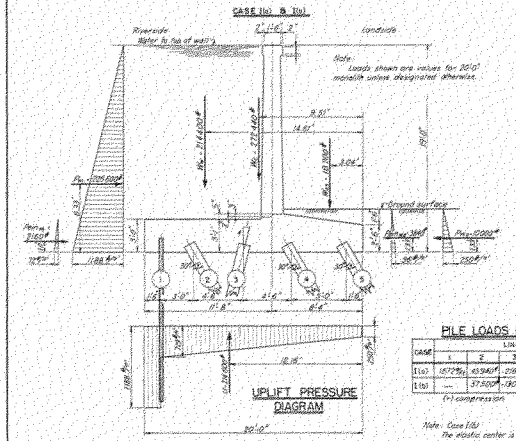
APPROVED: [signature] DISTRICT ENGINEER

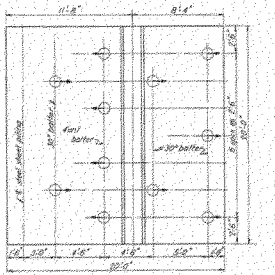
BY	DATE	CHARACTER OF REVISIONS

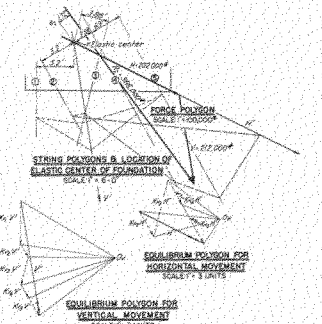
935-12.2/C

RECEIVED AS BUILT

12/99







DETERMINATION OF PILE LOADS CASE I(a) FOR 20'-0" MONOLITH

Line	$K_1 \cap n$	r	r^2	nr^2	K_1	K_H	$\frac{Mr}{\Sigma nr^2}$ & $n \cdot \beta$	$K_1 \cdot V$	$K_H \cdot H$	P	p
1	6	5.2'	27.0	162.0	.171	.00	-.1769#	-15660#	19100#		13340# / $6'_{0}$	1672# / l'_{0}
2	3	5.2'	27.0	54.0	.114	.40	-.1618#	-15200#	16300#	60800#	91980#	15940#
3	4	3.86'	14.9	59.6	.148	.30	.3541#	32960#	37600#	-61600#	-86440#	21610#
4	3	2.58	6.64	19.9	.114	.40	.3770#	35400#	38300#	60800#	114640#	37330#
5	3	6.9	47.6	142.8	.166	.30	.0196#	1830#	3950#	121200#	190750#	63580#

$\Sigma nr^2 = 431.7$ (+) = compression (-) = tension

Nomenclature:-
- K = Relative stiffness of each line of piles.
- n = Number of piles in each line.
- r = Perpendicular distance from elastic center to line of piles.
- K_V = Proportion of total load (V) induced in each line of piles due to a unit vertical movement.
- K_H = Proportion of total load (H) induced in each line due to a unit horizontal movement.
- e = Perpendicular distance of reaction from elastic center.
- M = Moment due to rotation of reaction about elastic center.
- R = Load per pile caused by rotation about elastic center.
- P = Load per line of piles.
- p = Load per pile.

PILE LOADS PER PILE

CASE	LINE 1	2	3	4	5
I(a)	16775# / $6'_{0}$	6594# / $3'_{0}$	21610# / $6'_{0}$	37330# / $6'_{0}$	63580# / $6'_{0}$
I(b)	----	37300# / $3'_{0}$	43900# / $6'_{0}$	57500# / $6'_{0}$	81000# / $6'_{0}$

(+) compression (-) tension

Note: Case I(b)
The elastic center is determined by point of intersection of resultant for dead load only and resultant for live load condition, lines buttered at 30° to vertical are located so that the center of gravity of these piles passes thru the elastic center. Therefore there is zero eccentricity and pile loads are equal.

Nomenclature:-
- W_W = Total weight of water acting on base
- W_C = Total weight of concrete
- W_{ES} = Total weight of saturated earth acting on base
- U = Total hydrostatic uplift acting on base
- P_W, P_{EW} = Total horizontal pressure of water acting on structure
- P_E, P_{EE} = Total horizontal pressure of earth in water acting on structure

Allowable Working Stresses:
- A. Steel sheet piling — 20,000 lbs per sq in.
- B. Steel reinforcing — 18,000 " " "
- C. Concrete
  - 1. Ultimate compressive strength at 28 days — 3000 " " "
  - 2. Compression - extreme fibre stress — 1350 " " "
  - 3. Shear — 60 " " "
  - 4. Bond — 150 " " "

Weights and Pressures
- A. Weights
  - 1. Concrete — 150 lbs per cu ft
  - 2. Water — 62.5 " " "
  - 3. Dry sand & gravel — 100 " " "
  - 4. Sand & gravel in water (net) — 92.5 " " "
  - 5. Sand, gravel & water — 115 " " "
  - 6. Dry earth — 100 " " "
  - 7. Saturated earth — 125 " " "
  - 8. Earth in water (net) — 92.5 " " "

Design Conditions:
Case I(a) & I(b). Water to top of wall on riverside. Soil scoured off top of base on riverside. Landside earth assumed to be saturated. Uplift on base.
Case II(a) & II(b) Water to top of wall on riverside. Both riverside and landside earth assumed to be saturated. No scour on riverside. Uplift on base.
Case III(a) & III(b). Water, sand and gravel to top of wall on riverside and to ground line on landside. Uplift on base.
Case IV(a) & IV(b). Dry sand and gravel to top of wall on landside and to ground line on riverside. No uplift on base.
Case V(a) & V(b). Dry sand to top of wall both riverside and landside. No uplift on base.
Case VI(a) & VI(b) Dead load of structure with a minimum of 4'-0" dry earth both landside and riverside over bottom of base. No uplift.

Basic assumptions:
- A. Active forces on structure to consist of hydrostatic pressure and the equivalent fluid pressure of sand and gravel, for the given cases.
- B. Uplift derived from seepage pressure gradient.
- C. Base of "T" wall considered rigid.
- D. For all design cases marked (a) steel sheet piling considered to take a proportionate amount of load depending on its relative stiffness to that of the concrete pile.
- E. For all design conditions marked (b), sheet piling ignored as a load bearing member.
- F. Bearing piles considered pinned at base and at some point below the base which has the same vertical distance below the base for all piles.

Weights and Pressures (cont)
- B. Equivalent Fluid Pressures
  - Active Pressure = $Wt\ tan^2(45° - \phi/2)$
  - 1. Water — 62.5 lbs per sq ft
  - 2. Dry sand & gravel - angle of repose 30°tan° — 33 " " "
  - 3. Sand & gravel in water - angle of repose 30°tan° — 80 " " "
  - 4. Sand & gravel in water (net) — 17.5 " " "
  - 5. Dry earth — 33 " " "
  - 6. Saturated earth - angle of repose 26°34' — 86 " " "
  - 7. Earth in water (net) — 24 " " "

Note:- Design cases III (a), III(b), IV(a), IV(b), V(a) & V(b) used for 23'-0" special "T" wall on bearing piles only.

OHIO RIVER BASIN
FLOOD PROTECTION PADUCAH, KY.
SECTION "B"
DESIGN DATA
19' "T" WALL ON BEARING PILES
SHEET OF SHEETS SCALES AS SHOWN
U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941
SUBMITTED:
APPROVAL RECOMMENDED: APPROVED:
DIVISION ENGINEER, CHIEF OF DESIGN
CHIEF, PLANS & SPECS. BRANCH, PLANS DIVISION
DR. BY: A.M.J. TR. BY: C.J.M. CK. BY: H.M.
DISTRICT ENGINEER
CHIEF OF ENGINEERS
CK. BY: H.M.

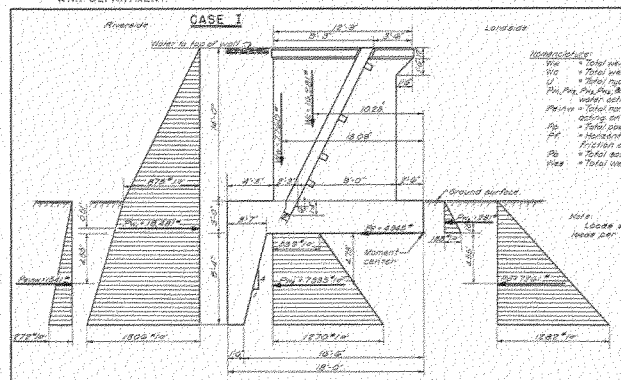
BY	DATE	CHARACTER OF REVISIONS

935-12.2/0
"AS BUILT"

1300

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



Nomenclature:
- Ww = Total weight of water acting on base
- Wc = Total weight of concrete
- U = Total hydrostatic uplift on base
- Ph1, Ph2, Ph3 & Ph4 = Total horizontal pressure of water acting on structure
- Pe/Pw = Total horizontal pressure of earth, in water acting on structure
- Pp = Total passive resistance developed by soil
- Pf = Horizontal resistance developed by friction on base
- Pa = Total soil reaction on base
- Vss = Total weight of saturated soil on base

Note: Loads shown are average loads per foot of structure

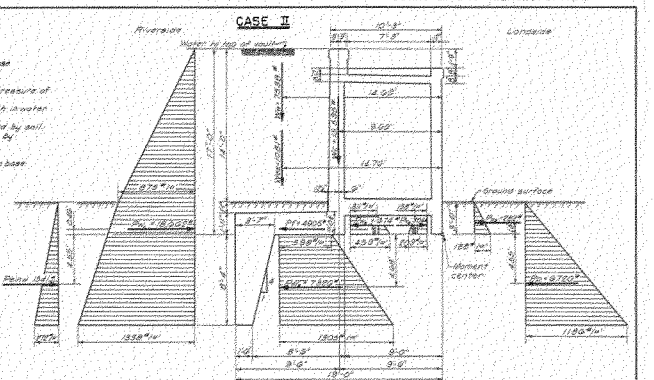
Design Conditions:
Case I. Sill. Water to top of structure on riverside. Uplift on base.
Case II. Vault. Water to top of structure on riverside. Uplift on base. Soil on top of base on riverside.

Basic Assumptions:
A. Both landside and riverside earth assumed to be saturated.
B. Active forces on structure to consist of hydrostatic pressure and the equivalent fluid pressure of saturated earth.
C. The passive resistance of the soil is assumed to increase uniformly from the ground line to the bottom of the concrete at an increment not to exceed 250 #/ft per foot of depth.
D. Uplift derived from seepage pressure gradient.
E. Weight of beams and sheeting neglected.

Allowable Working Stresses:
A. Steel reinforcing — 18,000# per sq. in.
B. Concrete:
1. Ultimate compressive strength at 28 days — 3,000# " " "
2. Compression - extreme fibre stress — 1,200# " " "
3. Shear — 80# " " "
4. Bond — 150# " " "

Weights and Pressures:
A. Weights:
1. Concrete — 150 # per cu. ft.
2. Water — 62.5# " " "
3. Saturated earth — 105 # " " "
4. Earth in water (net) — 62.5# " " "
B. Active Pressures (Rankine's formula):
1. Water — 62.5# per sq. ft.
2. Saturated earth - angle of repose (30°-34°) — 84 # " " "
3. Earth in water (net) — 54 # " " "

SCALES: DIMENSIONS 1/4"=1'-0"; FORCES 1"=500#



OHIO RIVER BASIN

FLOOD PROTECTION PADUCAH, KY.

SECTION "B"

DESIGN DATA STAS. 98+86.50, 108+53.00, 99+09.17 & 108+73.67

SHEET ___ OF ___ SHEETS — SCALES AS SHOWN

U. S. ENGINEER OFFICE, LOUISVILLE, KY. 1941

SUBMITTED: _____ DIVISION ENGINEER

APPROVAL RECOMMENDED: _____ CHIEF, ENGINEERING DIVISION, FLOOD CONTROL BRANCH, OR RY. B.R.B.

APPROVED: _____ BRIGADIER GENERAL, U.S. ARMY, DIVISION ENGINEER, OR RY. B.R.B.

935-12.2/E

"BELIEVED AS BUILT"

BY	DATE	CHARACTER OF REVISIONS

387

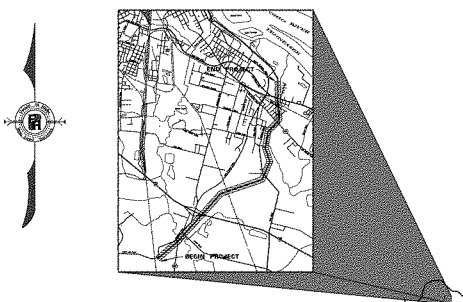
1301

OHIO RIVER SHORELINE, PADUCAH, KENTUCKY LFPP RECONSTRUCTION FEASIBILITY REPORT VOLUME 4 APPENDIX C

SECTION 5
SECTION A AND C RIGHT-OF-WAY DRAWINGS

April 2011
Final Submittal

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C" FROM CLARKLINE ROAD TO WEST OF TULLY STREET PADUCAH, McCRACKEN COUNTY, KENTUCKY

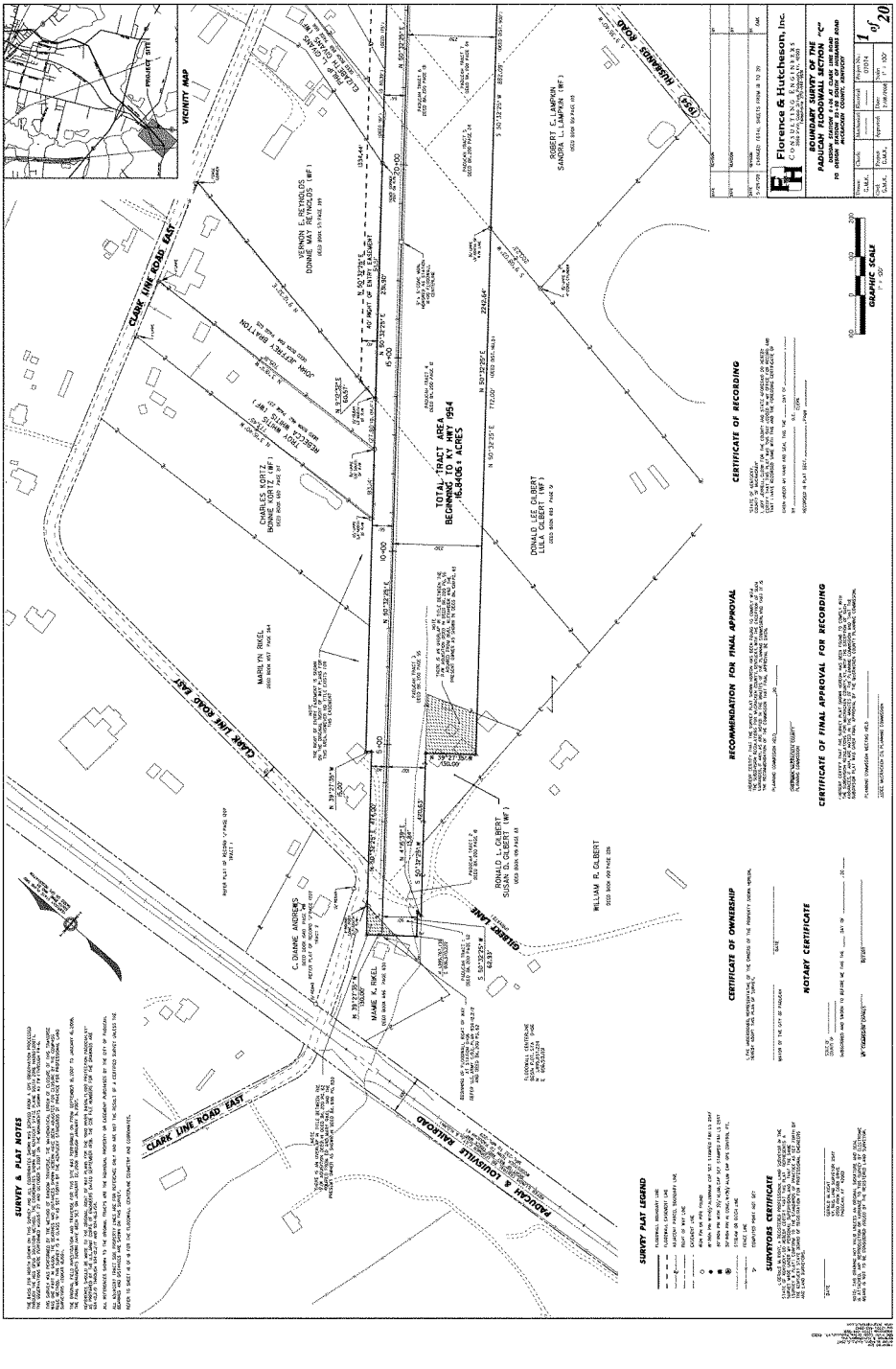


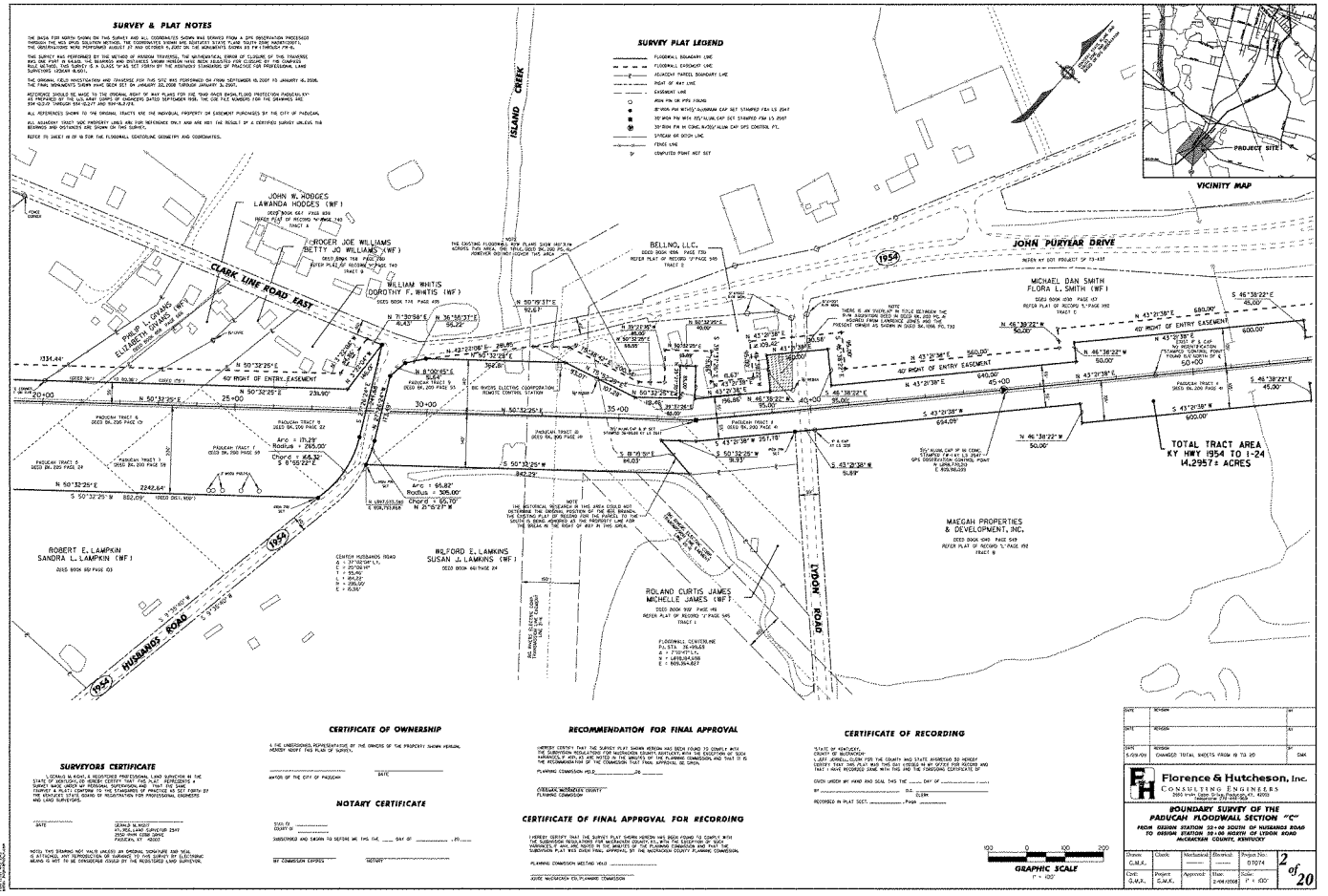
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
KENTUCKY SURVEY DIVISION

Project 07074
REVISED ISSUE
WITH COMPLETE ALIGNMENT
MAY 29, 2009

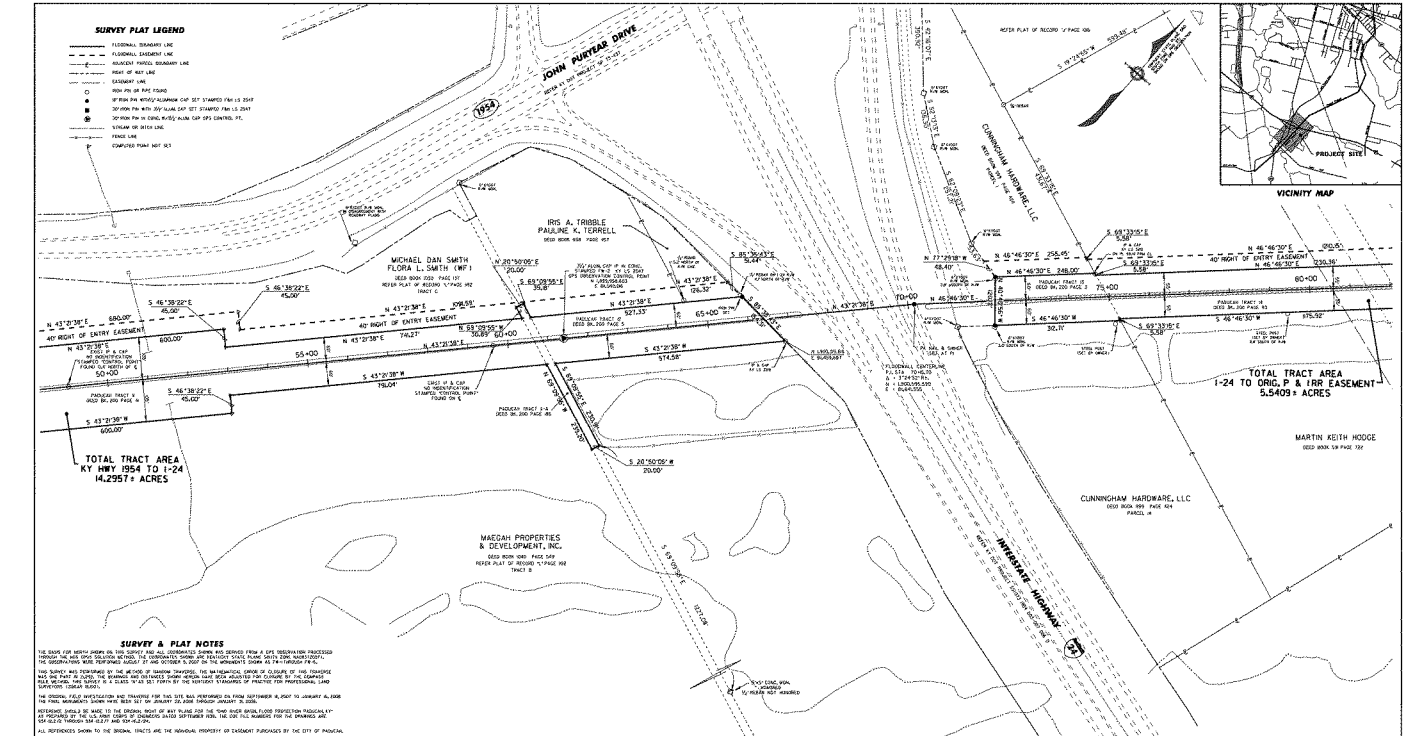
REPLACES SIGNED ISSUE OF APRIL 14, 2009

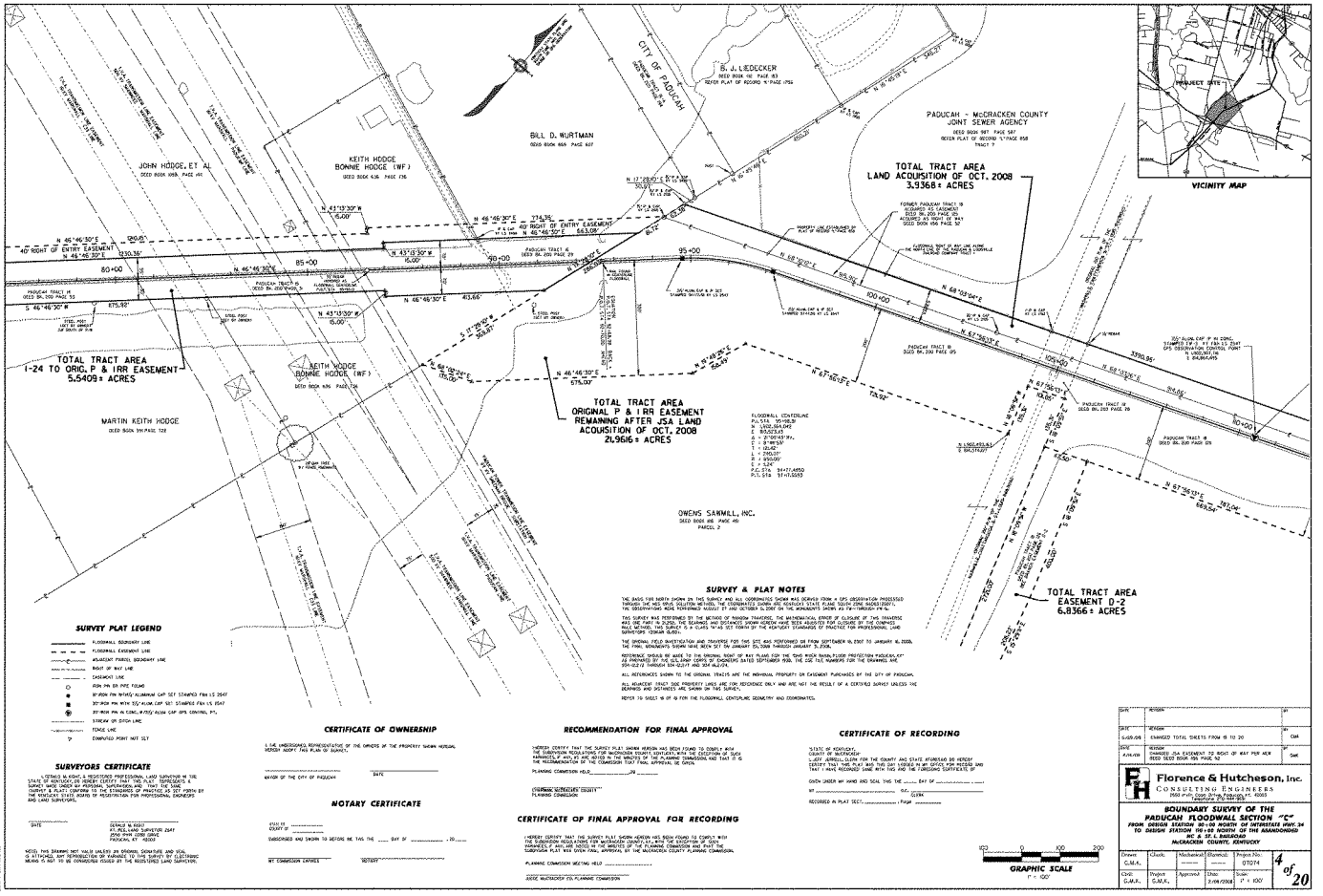
1303


SURVEY & PLAT NOTES
VICINITY MAP
PROJECT SITE
CLARK LINE ROAD EAST
HUBBARDS ROAD (45')
PUDUCH & LOUISVILLE RAILROAD
GILBERT LANE
TOTAL TRACT AREA
BEGINNING TO KY. HWY 1954
16.4766± ACRES
CHARLES KORTZ
BONNIE KORTZ (WF)
MARVIN RIKEL
NAME K. RIKEL
C. DIANNE ANDREWS
RONALD L. GILBERT
SUSAN G. GILBERT (WF)
DONALD LEE GILBERT
LULA GILBERT (WF)
WILLIAM R. GILBERT
STEPHEN N. REYNOLDS
DONNIE R. REYNOLDS (WF)
ROBERT C. LAMPKIN
SANDRA L. LAMPKIN (WF)
SURVEY PLAT LEGEND
CERTIFICATE OF OWNERSHIP
RECOMMENDATION FOR FINAL APPROVAL
CERTIFICATE OF RECORDING
CERTIFICATE OF FINAL APPROVAL FOR RECORDING
NOTARY CERTIFICATE
SURVEYOR'S CERTIFICATE
GRAPHIC SCALE
BOUNDARY SURVEY OF THE
RONALD L. GILBERT PROPERTY
Florence & Hutcheson, Inc.
1 of 20


SURVEY & PLAT NOTES
SURVEY PLAT LEGEND
VICINITY MAP
PROJECT SITE
CLARK LINE ROAD EAST
JOHN PURYEAR DRIVE
LYDON ROAD
HUSBANDS ROAD
ISLAND CREEK
JOHN M. HODGES
LAWANDA HODGES (WF)
(ROGER JOE WILLIAMS
BETTY JO WILLIAMS (WF)
WILLIAM WHITIS
(DOROTHY F. WHITIS (WF)
BELLNO, LLC.
MICHAEL DAN SMITH
FLORA L. SMITH (WF)
ROBERT E. LAMPKIN
SANDRA L. LAMPKIN (WF)
WILFORD E. LAMKINS
SUSAN J. LAMKINS (WF)
ROLAND CURTIS JAMES
MICHELLE JAMES (WF)
MAEGAH PROPERTIES
& DEVELOPMENT, INC.
TOTAL TRACT AREA
KY HWY 1954 TO I-24
14.2957± ACRES
CERTIFICATE OF OWNERSHIP
SURVEYORS CERTIFICATE
NOTARY CERTIFICATE
RECOMMENDATION FOR FINAL APPROVAL
CERTIFICATE OF FINAL APPROVAL FOR RECORDING
CERTIFICATE OF RECORDING
GRAPHIC SCALE
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
BOUNDARY SURVEY OF THE
PADUCAH FLOODWALL SECTION "C"
FROM ESSION STATION 32+00 SOUTH OF HUSBANDS ROAD
TO ESSION STATION 59+00 SOUTH OF LYDON ROAD
McCRACKEN COUNTY, KENTUCKY
2 of 20

1305


SURVEY PLAT LEGEND
FLOODWALL BOUNDARY LINE
FLOODWALL EASEMENT LINE
ADJACENT PARCEL BOUNDARY LINE
RIGHT OF WAY LINE
EASEMENT LINE
IRON PIN OR PIPE FOUND
18" IRON PIN W/YELLOW ALUMINUM CAP SET STAMPED PLS LS 3547
30" IRON PIN WITH 3½" ALUM CAP SET STAMPED PLS LS 3547
30" IRON PIN IN CONC W/3½" ALUM CAP GPS CONTROL PT.
UTILITY OR DITCH LINE
FENCE LINE
COMPUTED POINT NOT SET
JOHN PURYEAR DRIVE
REFER TO DWG SHEET 'B' FOR DETAILS
1954
IRIS A. TRIBBLE
PAULINE K. TERRELL
DEED BOOK 608 PAGE 457
MICHAEL DAN SMITH
FLORA L. SMITH (WF)
DEED BOOK 2010 PAGE 197
REFER PLAT OF RECORD 'L' PAGE 982 TRACT C
40' RIGHT OF ENTRY EASEMENT
TOTAL TRACT AREA
KY HWY 1954 TO I-24
14.2957± ACRES
MAEGAH PROPERTIES
& DEVELOPMENT, INC.
DEED BOOK 1080 PAGE 569
REFER PLAT OF RECORD 'L' PAGE 998 TRACT B
PADUCAH TRACT N
DEED BK. 200 PAGE 85
PADUCAH TRACT N-1
DEED BK. 200 PAGE 85
PADUCAH TRACT M
DEED BK. 200 PAGE 5
PADUCAH TRACT M
DEED BK. 200 PAGE 93
PADUCAH TRACT M
DEED BK. 200 PAGE 93
CUNNINGHAM HARDWARE, LLC
DEED BOOK 1001 PAGE 469
PARCEL M
CUNNINGHAM HARDWARE, LLC
MARTIN KEITH HODGE
DEED BOOK 128 PAGE 722
TOTAL TRACT AREA
I-24 TO ORIG. P & IRR EASEMENT
5.5409± ACRES
INTERSTATE HIGHWAY
24
PROJECT SITE
VICINITY MAP
SURVEY & PLAT NOTES
THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PROCESSED THROUGH THE KRS RTK SOLUTION METHOD. THE COORDINATES SHOWN ARE FEET/GRID STATE PLANE SOUTH ZONE NAD83(2011). THE OBSERVATIONS WERE PERFORMED AUGUST 27 AND OCTOBER 5, 2020 ON THE MONUMENTS SHOWN AS PA-1 THROUGH PA-6.
THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE. THE MATHEMATICAL ERROR OF CLOSURE OF THE TRAVERSE WAS LESS THAN 1 FOOT IN 10,000. THE BEARINGS AND DISTANCES SHOWN HEREON HAVE BEEN ADJUSTED FOR CLOSURE BY THE COMPASS RULE METHOD. THE ACCURACY OF THIS SURVEY IS AS SET FORTH BY THE KENTUCKY STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (SURVEY PLAT).
THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FROM SEPTEMBER 4, 2007 TO JANUARY 16, 2008. THE FINAL MONUMENTS SHOWN HERE WERE SET ON JANUARY 20, 2008 THROUGH JANUARY 31, 2008.
REFERENCE SHALL BE MADE TO THE ORIGINAL RIGHT OF WAY PLANS FOR THE "OHIO RIVER BRIDGE, FLOOD PROTECTION PROJECT, AS PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS, DATED SEPTEMBER 1939. THE CORPS FILE NUMBERS FOR THE SPEARHEAD ARE 934-612-2 THROUGH 934-612-7 AND 934-412-294.
ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE INDIVIDUAL PROPERTY OR EASEMENT PURCHASES BY THE CITY OF PADUCAH.
ALL ADJACENT TRACT DATA PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.
REFER TO SHEET B OF B FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.
CERTIFICATE OF OWNERSHIP
I, THE UNDERSIGNED, REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.
DATE
MAYOR OF THE CITY OF PADUCAH
SURVEYORS CERTIFICATE
I, GERALD W. RIGHT, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, DO HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY MADE UNDER MY PERSONAL SUPERVISION, AND THAT THE ERROR OF CLOSURE AND ACCURACY OF THIS SURVEY MEETS OR EXCEEDS THE STANDARDS SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.
DATE
GERALD W. RIGHT
KENTUCKY LICENSED SURVEYOR 3547
2600 IRON CORE DRIVE
PADUCAH, KY 42003
NOTE: THIS DRAWING NOT VALID UNLESS AN ORIGINAL SIGNATURE AND SEAL IS AFFIXED. ANY REPRODUCTION OF THIS DRAWING IN PAPER OR ELECTRONIC MEANS IS NOT TO BE CONSIDERED SIGNED BY THE REGISTERED LAND SURVEYOR.
NOTARY CERTIFICATE
STATE OF _____
COUNTY OF _____
SUBSCRIBED AND SWORN TO BEFORE ME THIS THE ___ DAY OF _____, 20___
MY COMMISSION EXPIRES _____ NOTARY
RECOMMENDATION FOR FINAL APPROVAL
HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KENTUCKY, WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, AS ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION, AND THAT IT IS THE RECOMMENDATION OF THE COMMISSION THAT FINAL APPROVAL BE GIVEN.
PLANNING COMMISSION HELD _____, 20____
GRAPHICS MANAGER/COUNTY PLANNING COMMISSION
CERTIFICATE OF FINAL APPROVAL FOR RECORDING
I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KENTUCKY, AND THAT IT HAS BEEN GIVEN FINAL APPROVAL AS INDICATED IN THE MINUTES OF THE PLANNING COMMISSION AND THAT THE SUBDIVISION PLAT WAS GIVEN FINAL APPROVAL BY THE MCCRACKEN COUNTY PLANNING COMMISSION.
PLANNING COMMISSION MEETING HELD _____
MCCRACKEN CO. PLANNING COMMISSION
CERTIFICATE OF RECORDING
STATE OF KENTUCKY,
COUNTY OF MCCRACKEN
I, JEFF JERRELL, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THE FOREGOING PLAT WAS LODGED FOR RECORD ON THE _____ DAY OF _____, AND THAT I HAVE RECORDED SAME WITH THIS AND THE FOREGOING CERTIFICATE OF
GIVEN UNDER MY HAND AND SEAL THIS THE _____ DAY OF _____
BY _____ D.C.
CLERK
RECORDED IN PLAT SEC. _____, Page _____
GRAPHIC SCALE
1" = 100'
DATE REVISION BY
DATE REVISION BY
DATE REVISION BY
8/29/08 CHANGED TOTAL SHEETS FROM 18 TO 20 GWK
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
2900 Irvin Cobb Drive, Paducah, KY 42001
Telephone 270-443-3943
BOUNDARY SURVEY OF THE
PADUCAH FLOODWALL SECTION "C"
FROM DESIGN STATION 50+00 NORTH OF LYDON ROAD
TO DESIGN STATION 80+00 NORTH OF INTERSTATE HWY. 24
McCRACKEN COUNTY, KENTUCKY
Drawn: G.M.S. Check: Authorized: Standard: Project No.: 07074
Field: G.M.S. Project: Approved: Date: 5/08/2008 Scale: 1" = 100'
3 of 20
Plotted By: GARY KIRK
Plotted On: 8/29/2008 10:49:04 AM
File Name: P:\Projects\07074 Paducah Floodwall\Survey\Plat\07074 Boundary Survey.dwg
Layout: Sheet 3



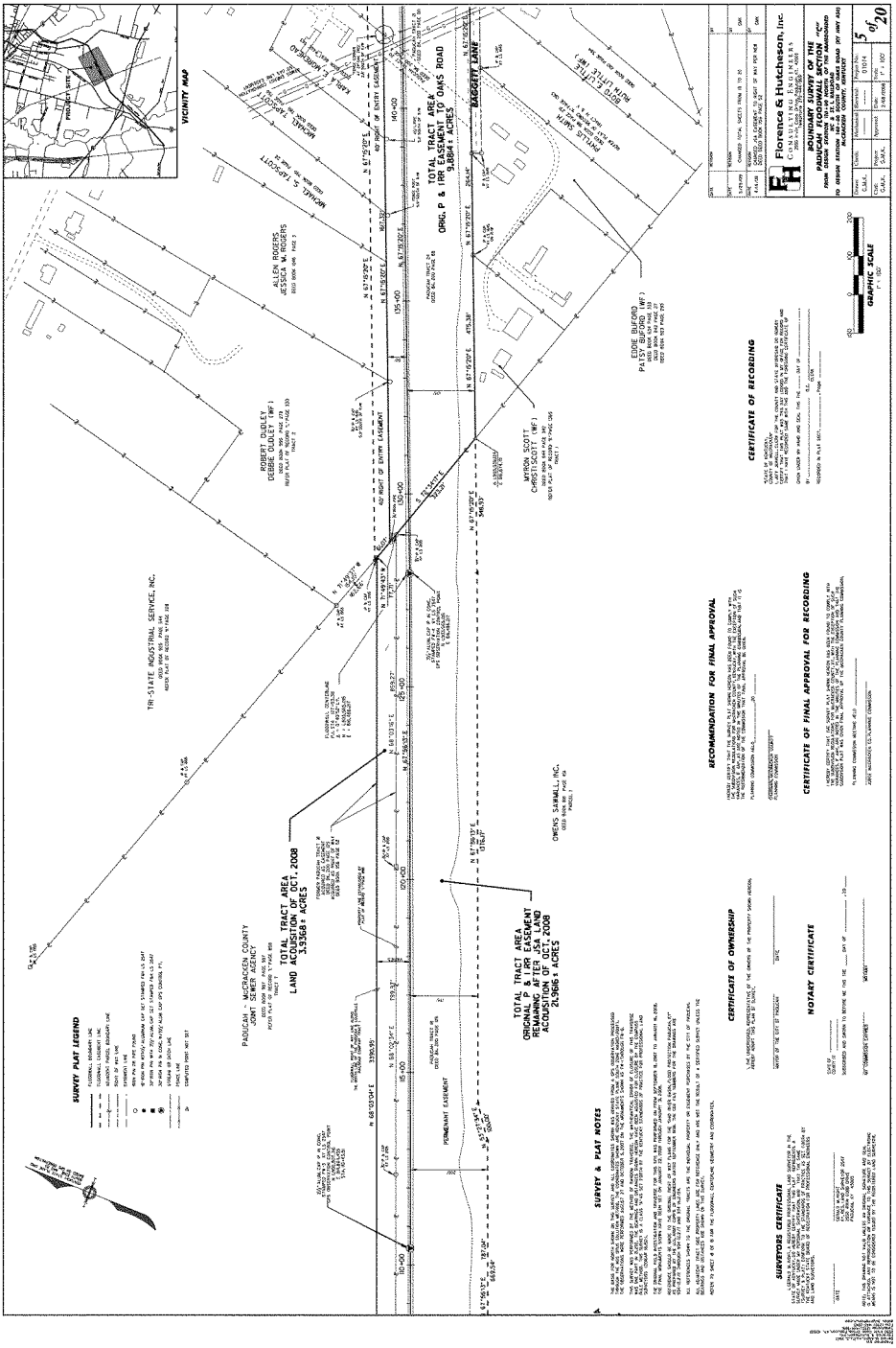
BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"
FROM STATION 121+00 NORTH OF INTERSTATE WAY 24
TO STATION 190+00 NORTH OF THE ABANDONED
AT. & SF. RAILROAD
McCRACKEN COUNTY, KENTUCKY

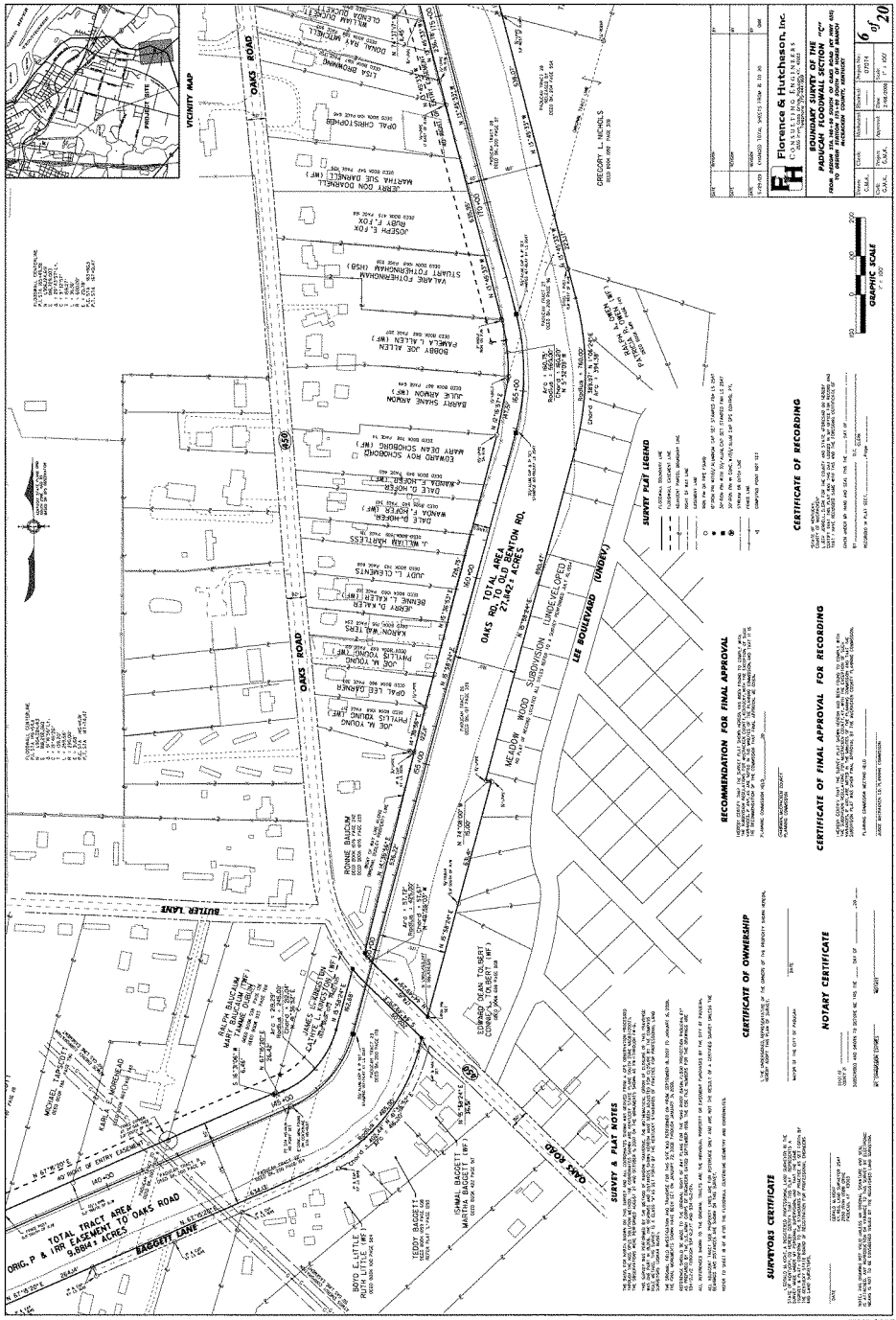
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
1900 Fifth Third Center, Paducah, KY 42001
Telephone 270 444-8506

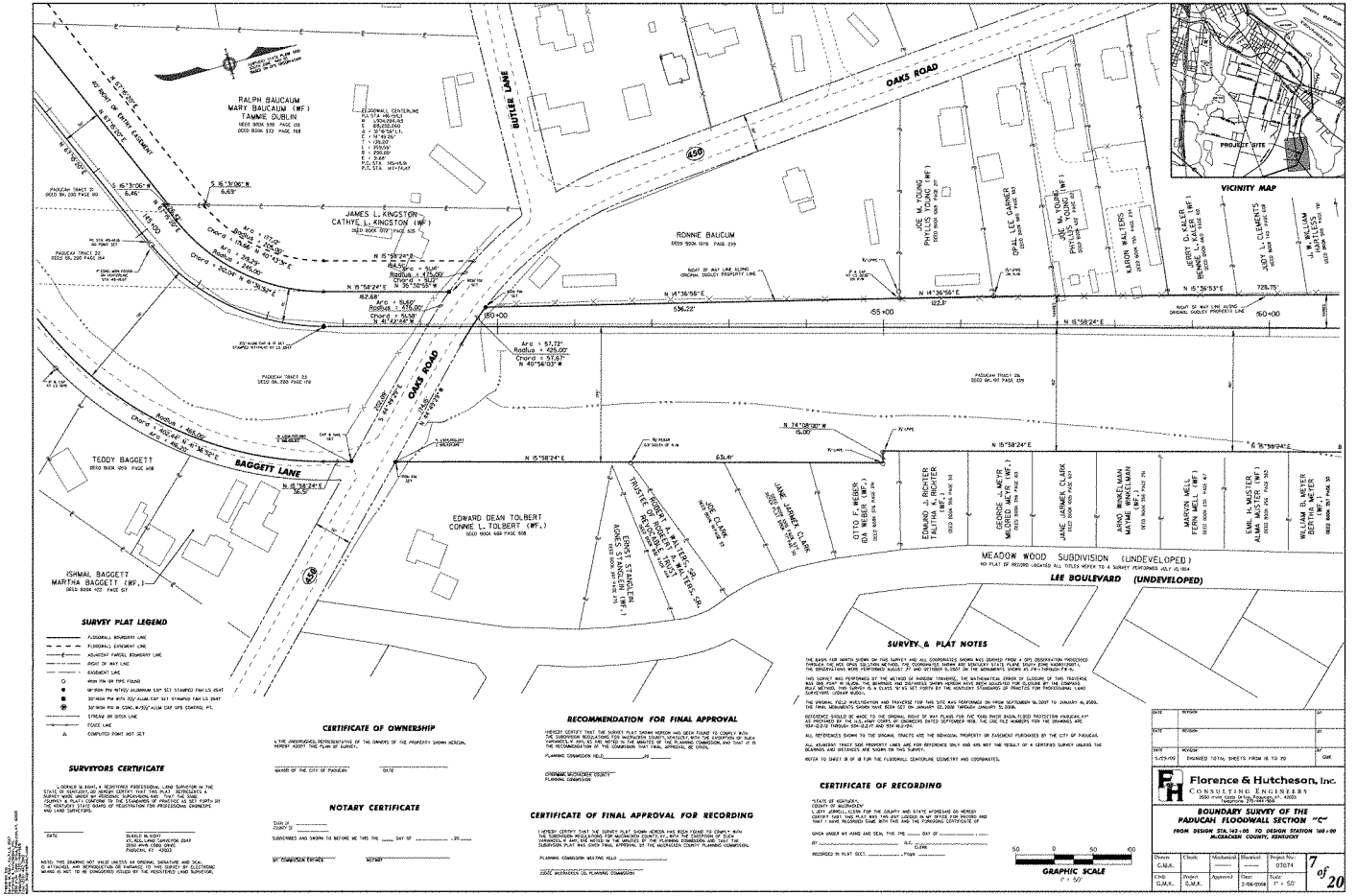
Drawn: G.M.K. | Check: | Mechanical: | Electrical: | Project No.: 07074
Civil: G.M.K. | Project: | Approved: | Date: 7/09/2008 | Scale: 1" = 100'

Sheet 4 of 20

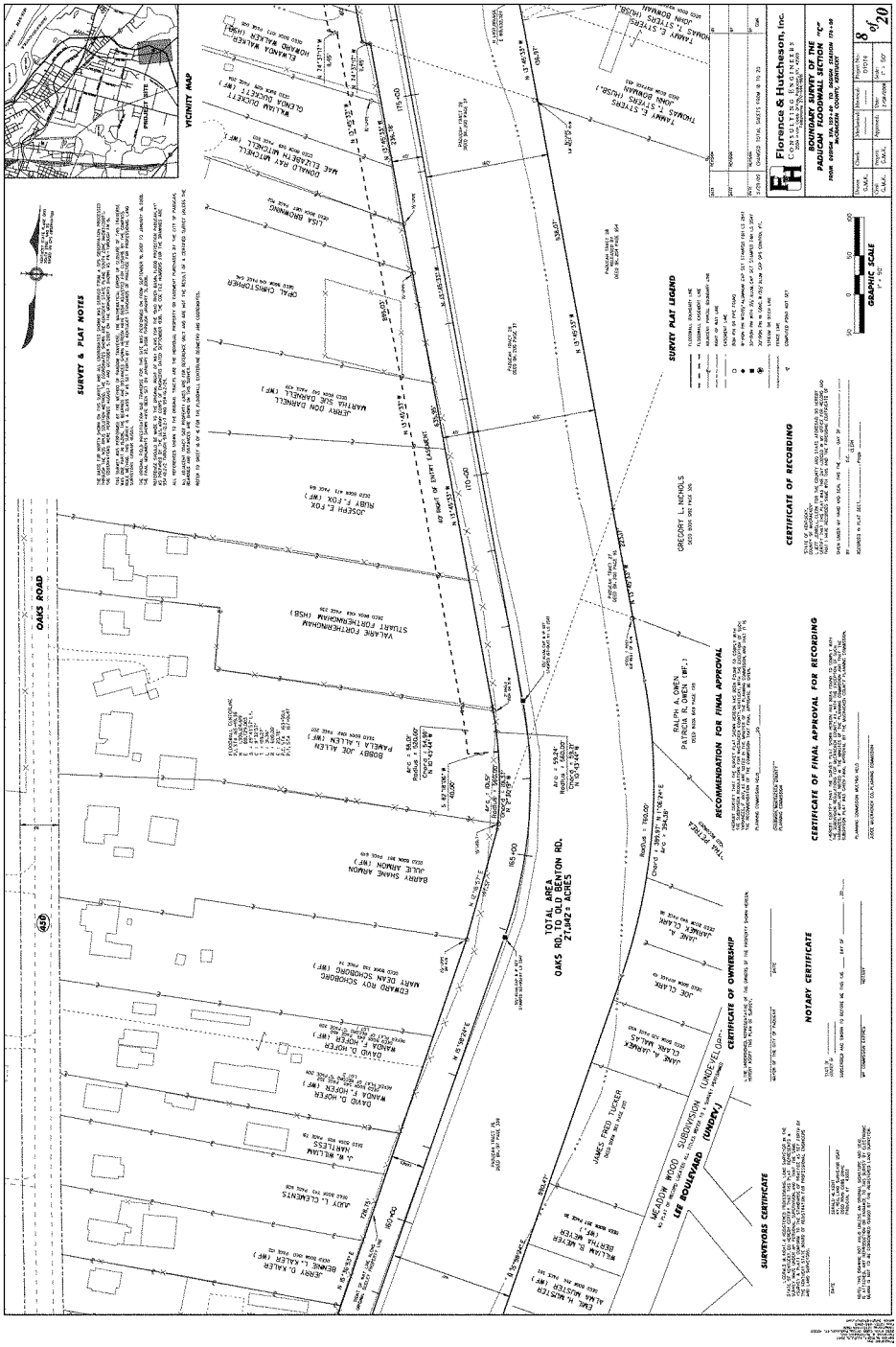
1307

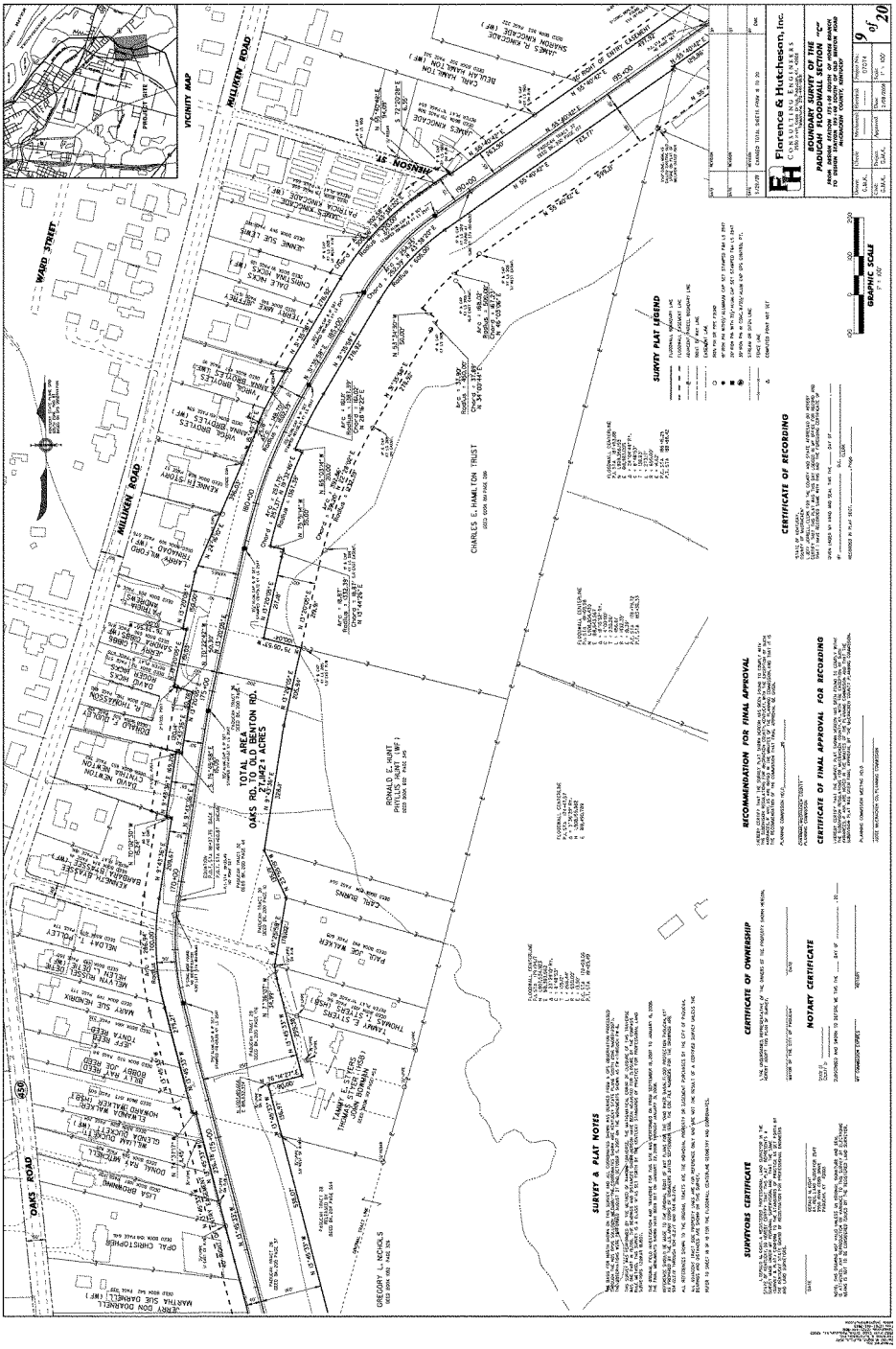

SURVEY PLAT LEGEND
VICINITY MAP
PROJECT SITE
TOTAL TRACT AREA
LAND ACQUISITION OF OCT. 2008
3.9368± ACRES
TOTAL TRACT AREA
ORIGINAL R/W EASEMENT
REMAINING AFTER LAND
ACQUISITION OF OCT. 2008
21.7986± ACRES
TOTAL TRACT AREA
ORG. P & IRR EASEMENT TO OAKS ROAD
9.8884± ACRES
PERMANENT EASEMENT
TEMPORARY EASEMENT
BAGGETT LANE
OAKS ROAD
TR-STATE INDUSTRIAL SERVICE, INC.
ROBERT DUDLEY
DEBBIE LOU F. (WF)
ALLEN ROGERS
JESSICA MORRIS
MYRON SCOTT
CHRISTI SCOTT (WF)
EDDIE BUFORD
PATSY BUFORD (WF)
OMNIS SAWMILL, INC.
PADUCAH - MCCRACKEN COUNTY
JOINT SEWER AGENCY
SURVEY & PLAT NOTES
CERTIFICATE OF OWNERSHIP
SURVEYORS CERTIFICATE
NOTARY CERTIFICATE
RECOMMENDATION FOR FINAL APPROVAL
CERTIFICATE OF FINAL APPROVAL FOR RECORDING
CERTIFICATE OF RECORDING
GRAPHIC SCALE
1" = 100'
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
BOUNDARY SURVEY PLAT
PADUCAH REGIONAL GATEWAY PARK
FROM SEDDIE STATION TAYLOR HOMES TO THE RAILROAD
TO SEDDIE STATION OAKS ROAD
PADUCAH, MCCRACKEN COUNTY, KENTUCKY
5 of 20

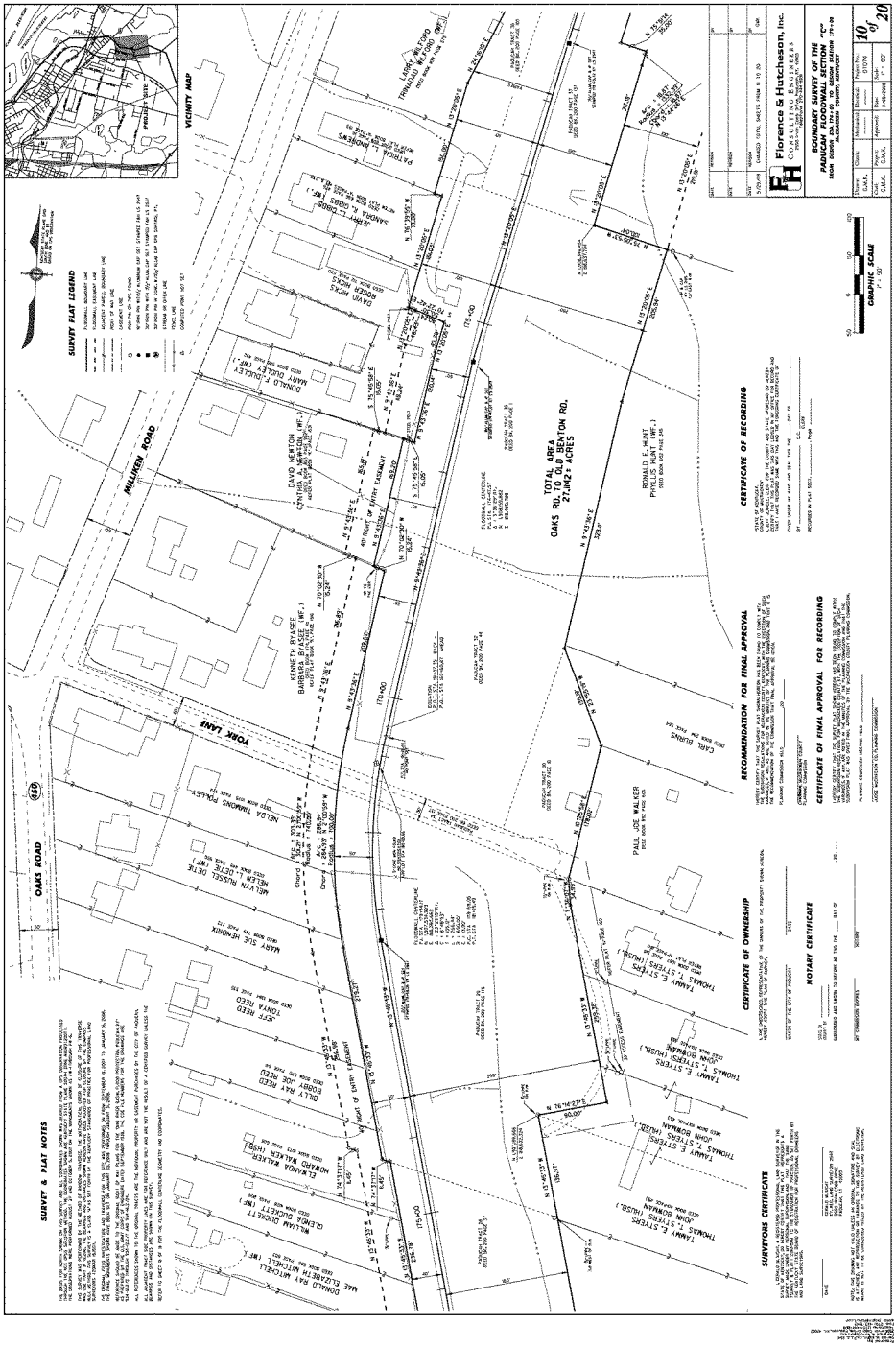

VICINITY MAP
PROJECT SITE
OAKS ROAD
BUTLER LANE
BARKLEY LANE
LEE BOULEVARD (UNDER)
TOTAL TRACT AREA
9.8884 ACRES
ORIG. P & IRR EASEMENT TO OAKS ROAD
TOTAL AREA
OAKS RD. TO OLD BENTON RD.
2.4462 ACRES
MEADOW WOOD SUBDIVISION
UNDEVELOPED
SURVEY PLAT LEGEND
SURVEY & PLAT NOTES
CERTIFICATE OF OWNERSHIP
SURVEYORS CERTIFICATE
NOTARY CERTIFICATE
RECOMMENDATION FOR FINAL APPROVAL
CERTIFICATE OF FINAL APPROVAL FOR RECORDING
CERTIFICATE OF RECORDING
BOUNDARY SURVEY OF THE
PADUCAH FLOODWALL SECTION "QC"
FROM STATION 35+40.00 OUSO (OLD USO) (47.00') AND
STATION 36+00.00 OUSO (OLD USO) (47.00')
McCRACKEN COUNTY, KENTUCKY
Florence & Hutchason, Inc.
CONSULTING ENGINEERS
GRAPHIC SCALE
6 of 20


OAKS ROAD
BUTLER LANE
BAGGETT LANE
LEE BOULEVARD (UNDEVELOPED)
MEADOW WOOD SUBDIVISION (UNDEVELOPED)
NO PLAT OF RECORD CREATED ALL TOLLS WORK TO A SURVEY PERFORMED JULY 15, 1954
RALPH BAUCAUM
MARY BAUCAUM (WF.)
TAMMIE DUBLIN
DEED BOOK 339 PAGE 128
DEED BOOK 323 PAGE 158
JAMES L. KINGSTON
CATHYE L. KINGSTON (WF.)
DEED BOOK 309 PAGE 505
RONNIE BAUCUM
DEED BOOK 309 PAGE 299
TEDDY BAGGETT
DEED BOOK 289 PAGE 408
ISHMAL BAGGETT
MARTHA BAGGETT (WF.)
DEED BOOK 402 PAGE 97
EDWARD DEAN TOLBERT
CONNIE L. TOLBERT (WF.)
DEED BOOK 489 PAGE 608
TRUSTEE ROBERT A. WATTERSON
REVOCABLE TRUST
DEED BOOK 387 PAGE 257
ERNEST STANDLEY (WF.)
AGNES STANDLEY
DEED BOOK 289 PAGE 447
JOE CLARK
DEED BOOK 289 PAGE 30
JANE JARMER CLARK
DEED BOOK 289 PAGE 30
OTTO F. WEBER
IDA WEBER (WF.)
DEED BOOK 276 PAGE 29
EDWARD J. RICHTER
MARTHA A. RICHTER (WF.)
DEED BOOK 289 PAGE 30
GEORGE J. MEYER
MILDRED MEYER (WF.)
DEED BOOK 289 PAGE 451
JANE JARMER CLARK
DEED BOOK 289 PAGE 451
ARNO WINKELMAN
MAYME WINKELMAN
DEED BOOK 289 PAGE 751
MARVIN MELL
FERN MELL (WF.)
DEED BOOK 289 PAGE 447
EMIL H. MEISTER
AMELIA MEISTER
DEED BOOK 289 PAGE 343
WILLIAM G. MEYER
BERTHA MEYER (WF.)
DEED BOOK 289 PAGE 30
JERRY D. KALER
BONNIE L. KALER (WF.)
DEED BOOK 289 PAGE 65
JODY L. CLEMENTS
DEED BOOK 289 PAGE 608
J. W. WILLIAM HARTLESS
DEED BOOK 289 PAGE 751
JOE M. YOUNG
PHYLLIS YOUNG (WF.)
DEED BOOK 468 PAGE 287
OPAL LEE GARNER
DEED BOOK 289 PAGE 743
KARON WALTERS
DEED BOOK 289 PAGE 294
PADUCAH TRACT 21
DEED BK. 289 PAGE 154
PADUCAH TRACT 23
DEED BK. 289 PAGE 176
PADUCAH TRACT 28
DEED BK. 187 PAGE 339
PROJECT SITE
VICINITY MAP
SURVEY PLAT LEGEND
FLOODWALL BOUNDARY LINE
FLOODWALL EASEMENT LINE
ADJACENT PARCEL BOUNDARY LINE
RIGHT OF WAY LINE
EASEMENT LINE
IRON PIN OR PIPE FOUND
WITNESS PIN WITH/OUT ALUMINUM CAP SET STAMPED PAH LS 3547
30"IRON PIN WITH 2" ALUM. CAP SET STAMPED PAH LS 3547
30"IRON PIN IN CONC. W/3½" ALUM CAP GPS CONTROL PT.
STREAM OR DITCH LINE
FENCE LINE
COMPUTED POINT NOT SET
SURVEYORS CERTIFICATE
I, GEORGE M. EAVES, II, REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF KENTUCKY, DO HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY MADE UNDER MY SUPERVISION AND THAT THE SURVEY MEETS OR EXCEEDS A SURVEY PLAT CONFORMS TO THE STANDARDS OF PRACTICE AS SET FORTH BY THE KENTUCKY STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.
DATE
GEORGE M. EAVES II
KY. REG. LAND SURVEYOR 3547
3550 IRVIN CORY DRIVE
PADUCAH, KY 42003
NOTE: THIS DRAWING NOT VALID UNLESS IN ORIGINAL SIGNATURE AND SEAL. © ATTACHED AND REPRODUCTION OR VARIANCE TO THIS SURVEY BY ELECTRONIC MEANS IS NOT TO BE CONSIDERED VALID BY THE REGISTERED LAND SURVEYOR.
CERTIFICATE OF OWNERSHIP
I, THE UNDERSIGNED, REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.
MAYOR OF THE CITY OF PADUCAH
DATE
NOTARY CERTIFICATE
STATE OF _____
COUNTY OF _____
SUBSCRIBED AND SWORN TO BEFORE ME THIS _____ DAY OF _____, 20____.
MY COMMISSION EXPIRES _____ NOTARY
RECOMMENDATION FOR FINAL APPROVAL
I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KY., WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, AS ARE NOTED IN THE MINUTES OF THE PLANNING COMMISSION, AND THAT I AM RECOMMENDING THAT THE SAME BE GIVEN FINAL APPROVAL BY THE COMMISSION AND THAT IT IS THE RECOMMENDATION OF THE COMMISSION THAT FINAL APPROVAL BE GIVEN.
PLANNING COMMISSION HELD _____, 20____
CHAIRMAN, MCCRACKEN COUNTY PLANNING COMMISSION
CERTIFICATE OF FINAL APPROVAL FOR RECORDING
I HEREBY CERTIFY THAT THE SURVEY PLAT SHOWN HEREON HAS BEEN FOUND TO COMPLY WITH THE SUBDIVISION REGULATIONS FOR MCCRACKEN COUNTY, KY., WITH THE EXCEPTION OF SUCH VARIANCES, IF ANY, AND WAS NOTED IN THE MINUTES OF THE PLANNING COMMISSION AND THAT THE SUBDIVISION PLAT WAS GIVEN FINAL APPROVAL BY THE MCCRACKEN COUNTY PLANNING COMMISSION.
PLANNING COMMISSION MEETING HELD _____, 20____
JUDGE-MCCRACKEN CO. PLANNING COMMISSION
SURVEY & PLAT NOTES
THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PROCESSED THROUGH THE HCE OPUS SOLUTION METHOD. THE COORDINATES SHOWN ARE KENTUCKY STATE PLANE SOUTH ZONE NORTH(GRID). THE OBSERVATIONS WERE PERFORMED AUGUST 27 AND OCTOBER 5,2007 ON THE MONUMENTS SHOWN AS PA-1 THROUGH PA-4.
THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE. THE MATHEMATICAL ERROR OF CLOSURE OF THIS TRAVERSE WAS 1 FOOT IN 10,000 FEET. ANGLES AND DISTANCES SHOWN HEREON WERE BOTH ADJUSTED FOR CLOSURE BY THE COMPASS RULE METHOD. THE SURVEY IS A CLASS 'A' AS SET FORTH BY THE KENTUCKY STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS. (CADAR GUIDE).
THE ORIGINAL FIELD DESCRIPTION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FROM SEPTEMBER 18, 2007 TO JANUARY 16, 2008. THE FINAL MONUMENTS SHOWN HAVE BEEN SET ON JANUARY 22, 2008 THROUGH JANUARY 31, 2008.
REFERENCE SHOULD BE MADE TO THE ORIGINAL RIGHT OF WAY PLANS FOR THE OAKS ROAD FROM DESIGN FLOOD PROTECTION PADUCAH,KY STA. 143+00 TO STA. 160+00 DATED SEPTEMBER 1958, THE LEE BLVD PLANS FOR THE DRAINAGE AND SEA-52-2 THROUGH SEA-52-27 AND SEA-52-29.
ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE DESIGNAL PROPERTY OR EASEMENT PURCHASES BY THE CITY OF PADUCAH.
ALL ADJACENT TRACT SIDE PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.
REFER TO SHEET 18 OF 18 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.
CERTIFICATE OF RECORDING
STATE OF KENTUCKY,
COUNTY OF MCCRACKEN
I, JEFF LARRELL, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THE FOREGOING PLAT WAS PRESENTED TO THE COUNTY CLERK AND THAT I HAVE RECORDED SAME WITH THE SAME AND THE FOREGOING CERTIFICATE OF
GIVEN UNDER MY HAND AND SEAL THIS THE _____ DAY OF _____, 20____.
BY _____, D.C. CLERK
RECORDED IN PLAT BOOK _____, PAGE _____
50 0 50 100
GRAPHIC SCALE
1" = 50'
DATE REVISION BY
DATE REVISION BY
DATE REVISION BY
5/09/08 ENGINEER TOTAL SHEETS FROM 18 TO 20 GME
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
3550 IRVIN CORY DR. PADUCAH, KY. 42003
PHONE (270) 443-3900 FAX (270) 443-3901
BOUNDARY SURVEY OF THE
PADUCAH FLOODWALL SECTION "C"
FROM DESIGN STA.143+00 TO DESIGN STATION 160+00
McCRACKEN COUNTY, KENTUCKY
Drawn: G.M.K. Check: G.M.K. Checked: Approved: Project No.: 07074 Date: 2-06-2008 Scale: 1" = 50'
7 of 20

1310


SURVEY & PLAT NOTES
VICINITY MAP
SURVEY PLAT LEGEND
GRAPHIC SCALE
1" = 50'
OAKS ROAD
LEE BOULEVARD (UNPAVED)
TOTAL AREA OF SUBDIVISION
OAKS RD. TO LEE BLVD.
21.042 ACRES
MEADOW WOOD SUBDIVISION (UNRECORDED)
SURVEYORS CERTIFICATE
NOTARY CERTIFICATE
CERTIFICATE OF OWNERSHIP
CERTIFICATE OF FINAL APPROVAL FOR RECORDING
RECOMMENDATION FOR FINAL APPROVAL
CERTIFICATE OF RECORDING
Florence & Hutcheson, Inc.
BOUNDARY SURVEY OF THE
PADUCAH FLOODWALL SECTION "QC"
FROM CROSS STA. 151+00 TO CROSS STATION 154+00
McCRACKEN COUNTY, KENTUCKY


VICINITY MAP
WARD STREET
HILLKIRK ROAD
OAKS ROAD
JOHNSON ST
OAKS RD. TO OLD BENTON RD.
TOTAL AREA
21.1421 ACRES
SURVEY PLAT LEGEND
SURVEY & PLAT NOTES
SURVEYORS CERTIFICATE
CERTIFICATE OF OWNERSHIP
NOTARY CERTIFICATE
RECOMMENDATION FOR FINAL APPROVAL
CERTIFICATE OF FINAL APPROVAL FOR RECORDING
CERTIFICATE OF RECORDING
BOUNDARY SURVEY OF THE
PADUCAH INTERNATIONAL COMMERCE PARK
GRAPHIC SCALE
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
9 of 20


VICINITY MAP
SURVEY PLAT LEGEND
SURVEY & PLAT NOTES
SURVEYORS CERTIFICATE
CERTIFICATE OF OWNERSHIP
NOTARY CERTIFICATE
RECOMMENDATION FOR FINAL APPROVAL
CERTIFICATE OF FINAL APPROVAL FOR RECORDING
CERTIFICATE OF RECORDING
TOTAL AREA
OAKS RD. TO DAVID NORTON RD.
27.1042± ACRES
OAKS ROAD
YORK LANE
MILLIKEN ROAD
DAVID NORTON
CYNTHIA A. NORTON, LIFE
DB. 1078 PG. 1
DONALD F. DUDLEY (LIFE)
MARY DUDLEY (LIFE)
DEED BOOK 1005 PAGE 161
DONALD RAY MITCHELL (LIFE)
MAE ELIZABETH MITCHELL (LIFE)
DEED BOOK 1005 PAGE 163
WILLIAM DUCKETT (LIFE)
GLENDA DUCKETT (LIFE)
DEED BOOK 1005 PAGE 165
CLARENCE WALKER (LIFE)
HOWARD WALKER (LIFE)
DEED BOOK 1005 PAGE 167
BILLY RAY REED
BOBBY JOE REED
DEED BOOK 1005 PAGE 169
JEFF REED
TONYA REED
DEED BOOK 1005 PAGE 171
MARY SUE HENDRIX
DEED BOOK 1005 PAGE 173
MELVIN MUSSELWHITE (LIFE)
MELBA MUSSELWHITE (LIFE)
DEED BOOK 1005 PAGE 175
NELDA TIMMONS PADGETT
DEED BOOK 1005 PAGE 177
KENNETH RYKER (LIFE)
BARBARA RYKER (LIFE)
DEED BOOK 1005 PAGE 179
DAVID NORTON
CYNTHIA A. NORTON, LIFE
DB. 1078 PG. 1
DONALD F. DUDLEY (LIFE)
MARY DUDLEY (LIFE)
DEED BOOK 1005 PAGE 161
DAVID NORTON
ROOSEVELT NORTON
DEED BOOK 1005 PAGE 181
SAMORA L. OGDEN
DEED BOOK 1005 PAGE 183
PATRICIA L. HENDRIX
DEED BOOK 1005 PAGE 185
THOMAS LOWE, JR. & SYLVIA
DEED BOOK 1005 PAGE 187
RONALD E. HUNT
PATRICIA S. HUNT (LIFE)
DEED BOOK 1005 PAGE 189
CARL BURNS
DEED BOOK 1005 PAGE 191
PAUL JOE WALKER
DEED BOOK 1005 PAGE 193
THOMAS E. STYERS
JOHN BOWMAN
DEED BOOK 1005 PAGE 195
THOMAS E. STYERS
JOHN BOWMAN
DEED BOOK 1005 PAGE 197
THOMAS E. STYERS
JOHN BOWMAN
DEED BOOK 1005 PAGE 199
THOMAS E. STYERS
JOHN BOWMAN
DEED BOOK 1005 PAGE 201
THOMAS E. STYERS
JOHN BOWMAN
DEED BOOK 1005 PAGE 203
THOMAS E. STYERS
JOHN BOWMAN
DEED BOOK 1005 PAGE 205
THOMAS E. STYERS
JOHN BOWMAN
DEED BOOK 1005 PAGE 207
THOMAS E. STYERS
JOHN BOWMAN
DEED BOOK 1005 PAGE 209
GRAPHIC SCALE
Florence & Hutcheson, Inc.
BOUNDARY SURVEY OF THE
PADUCAH FLOODWALL SECTION "C"
FROM 0000+00, 250.76± RT. TO 0004+ 00.00± RT.
Florence & Hutcheson, Inc.
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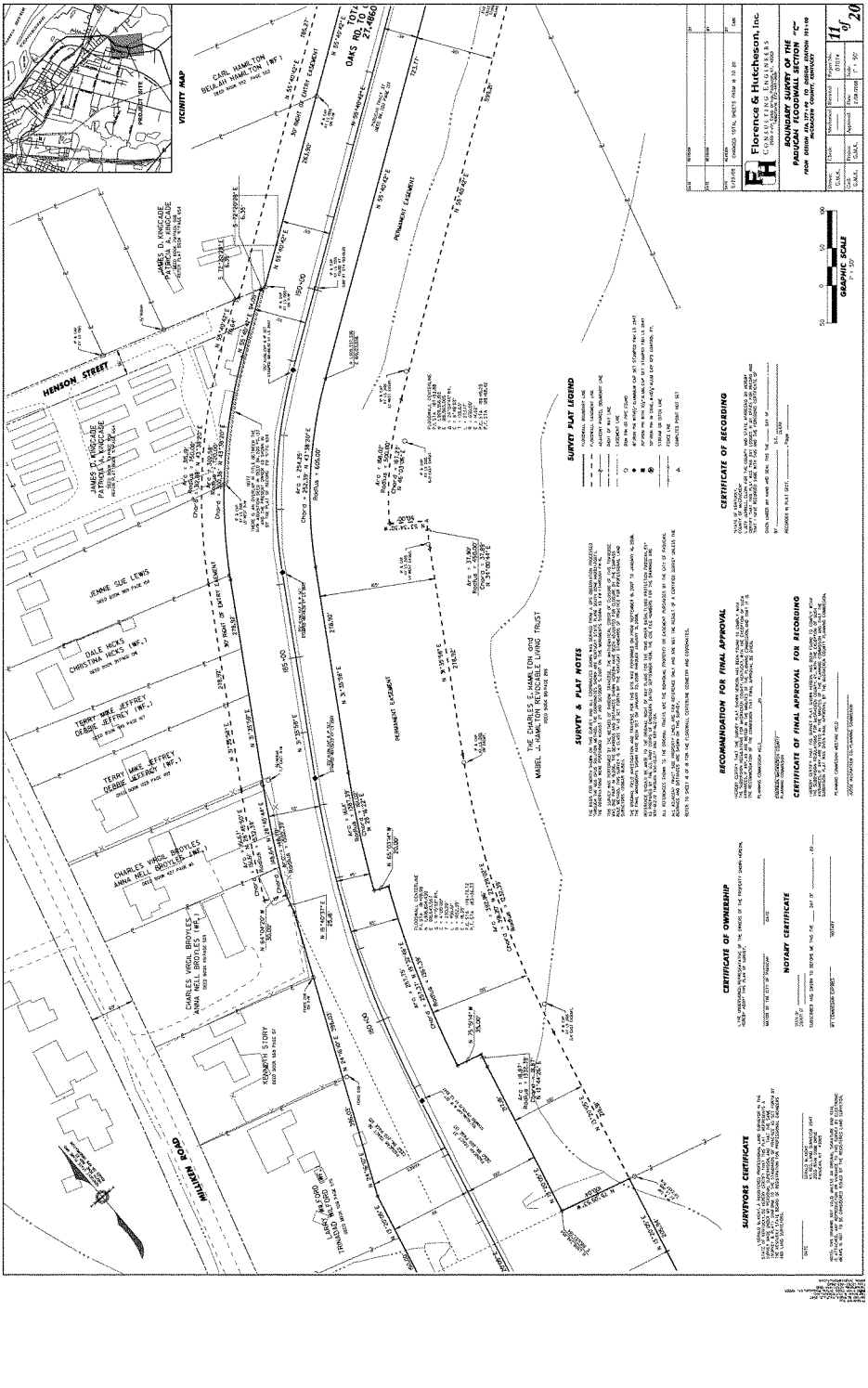
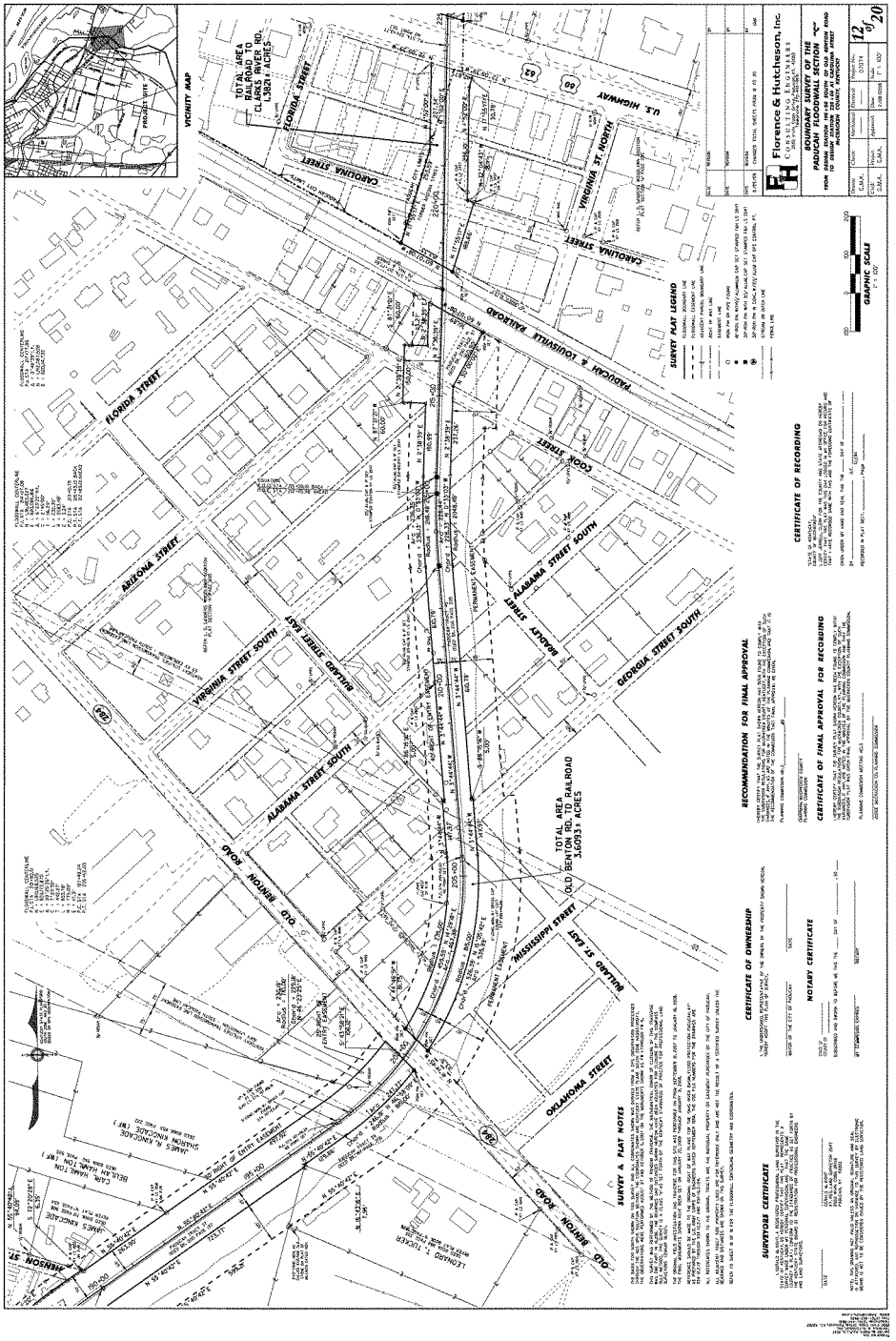
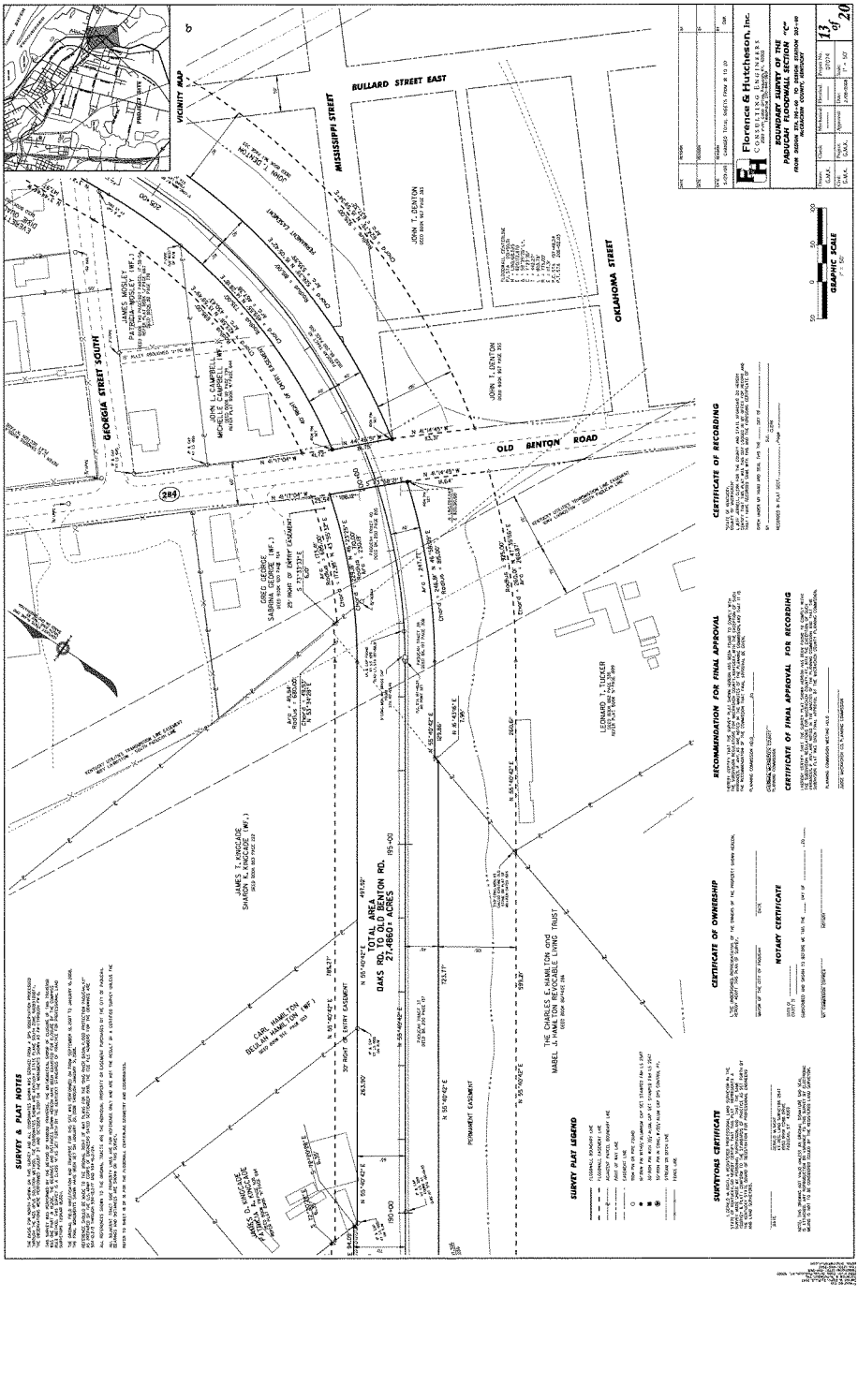
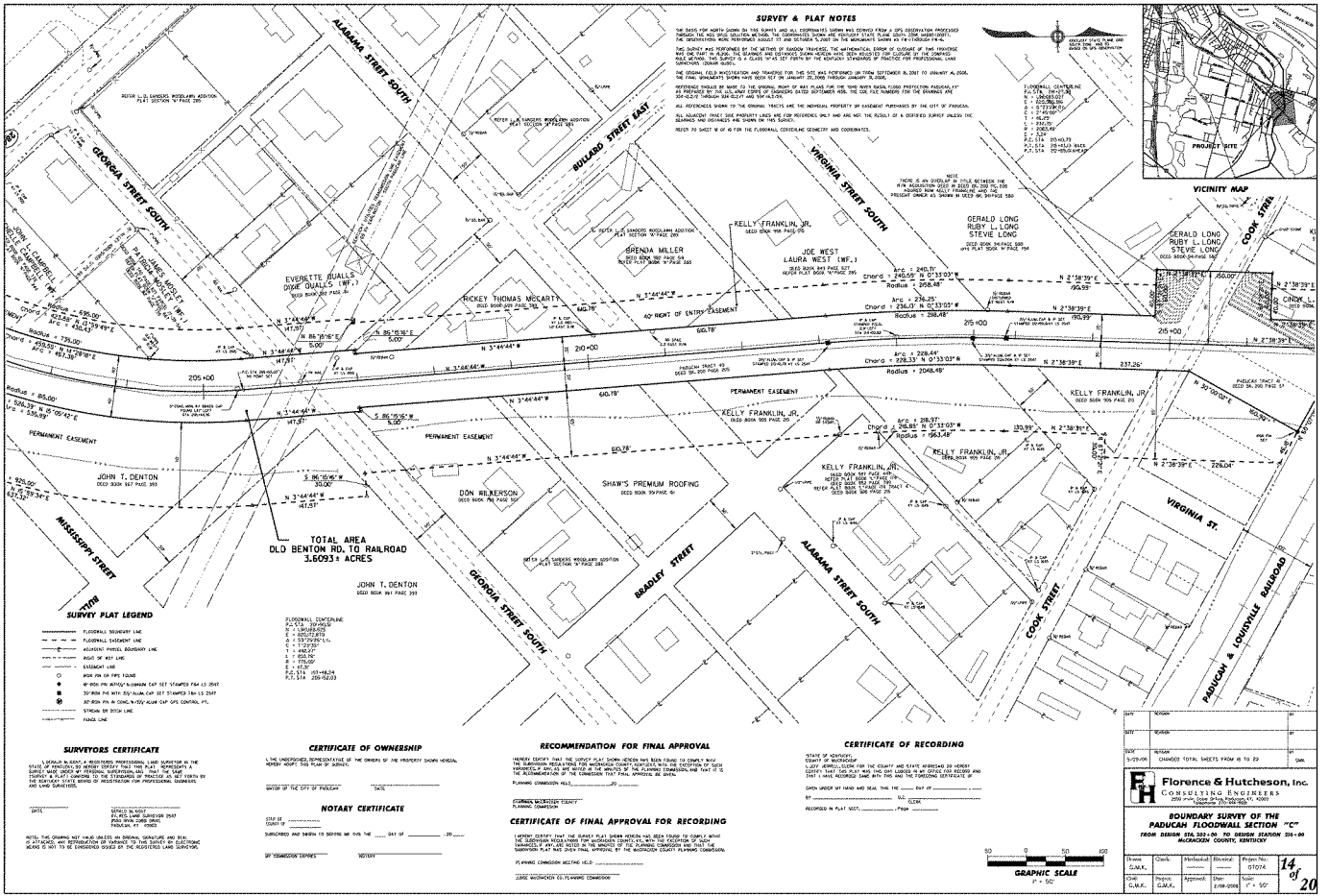

VICINITY MAP
HENSON STREET
MILLIKEN ROAD
JAMES D. KINCAID
PATRICIA A. KINCAID
DEED BOOK 459 PAGE 424
JERNNE SUE LEWIS
DEED BOOK 469 PAGE 424
DALE HICKS
CHRISTINA HICKS (WF.)
DEED BOOK 317 PAGE 174
TERRY MIKE JEFFREY
DEBBIE (JEFFREY) JEFFREY (WF.)
DEED BOOK 369 PAGE 601
CHARLES VIRGIL BROYLES
ANNA HELL BROYLES (WF.)
DEED BOOK 457 PAGE 46
KENNETH E. STORY
DEED BOOK 424 PAGE 47
LARRY W. LOYD
DEED BOOK 424 PAGE 47
BELINDA CARL HAMILTON (WF.)
DEED BOOK 193 PAGE 100
OAKS RD. TO T.O.L. 2.4860
PERMANENT EASEMENT
30' RIGHT OF WAY EASEMENT
THE CHARLES E. HAMILTON and MABEL J. HAMILTON REVOCABLE LIVING TRUST
DEED BOOK 469 PAGE 424
SURVEY & PLAT NOTES
SURVEY PLAT LEGEND
CERTIFICATE OF OWNERSHIP
SURVEYORS CERTIFICATE
RECOMMENDATION FOR FINAL APPROVAL
CERTIFICATE OF RECORDING
NOTARY CERTIFICATE
CERTIFICATE OF FINAL APPROVAL FOR RECORDING
GRAPHIC SCALE
1" = 50'
BOUNDARY SURVEY OF THE
PROPERTY OF CHARLES E. HAMILTON and "CC"
FROM DEED#: 469, PG: 424 TO DEED#: 193 PG: 100
MCCRACKEN COUNTY, KENTUCKY
Florence & Huteson, Inc.
CONSULTING ENGINEERS
2969 Fern Valley Road, Louisville, Kentucky 40213
(502) 968-2244 FAX (502) 968-1966
Drawn: D.M.K.
Checked: G.M.K.
Approved: G.M.K.
Scale: 1" = 50'
Project No.: 07014
Date: 7/24/08
Sheet: 11 of 20


VICINITY MAP
PROJECT SITE
TOTAL AREA RELEASED TO CLARKS RIVER RD. 1.3624± ACRES
TOTAL AREA RELEASED TO OLD BENTON RD. 3.6093± ACRES
FLORIDA STREET
CAROLINA STREET
U.S. HIGHWAY 60
NORTH 4TH STREET
VIRGINIA STREET
PADUCAH & LOUISVILLE RAILROAD
COOK STREET
ARIZONA STREET
VIRGINIA STREET SOUTH
BUILARD STREET EAST
ALABAMA STREET SOUTH
MAPLE STREET
GEORGIA STREET SOUTH
MISSISSIPPI STREET
BUILARD ST. EAST
OKLAHOMA STREET
OLD BENTON ROAD
RENSON ST.
SURVEY PLAT LEGEND
SURVEY A PLAT NOTES
SURVEYORS CERTIFICATE
CERTIFICATE OF OWNERSHIP
NOTARY CERTIFICATE
RECOMMENDATION FOR FINAL APPROVAL
CERTIFICATE OF FINAL APPROVAL FOR RECORDING
CERTIFICATE OF RECORDING
GRAPHIC SCALE
1" = 100'
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
BOUNDARY SURVEY OF THE
PADUCAH FLOODWALL SECTION "C"
FROM BEING SITUATED ON OLD BENTON ROAD TO CLARKS RIVER ROAD IN THE CITY OF PADUCAH
MCCRACKEN COUNTY, KENTUCKY
12 of 20


SURVEY & PLAT NOTES
SURVEYOR'S CERTIFICATE
CERTIFICATE OF OWNERSHIP
SURVEY PLAT LEGEND
NOTARY CERTIFICATE
RECOMMENDATION FOR FINAL APPROVAL
CERTIFICATE OF FINAL APPROVAL FOR RECORDING
CERTIFICATE OF RECORDING
VICINITY MAP
PROJECT SITE
TOTAL AREA TO BE DEDICATED AS OAKS RD. (S-01) 21.4860± ACRES
OLD BENTON ROAD
BULLARD STREET EAST
MISSISSIPPI STREET
GEORGIA STREET SOUTH
OKLAHOMA STREET
JAMES D. KINGCADE SHARON K. KINGCADE (INF.)
CARL HAMILTON BELAH HAMILTON (INF.)
THE CHARLES E. HAMILTON and MABEL J. HAMILTON REVOCABLE LIVING TRUST
JOHN T. DENTON
LEONARD T. TUCKER
JOHN C. CAMPBELL
JAMES MOSLEY
GREG GEORGE SABRINA GEORGE (INF.)
PERMANENT EASEMENT
30' RIGHT OF ENTRY EASEMENT
GRAPHIC SCALE
Florence & Hutchison, Inc.
CONSULTING ENGINEERS
FINAL SUBDIVISION PLAT OF THE "OC" PHASE ONE, FINAL PLAT
FROM SIERRA TRL PAV-08 TO SIERRA STATION 393+00
MCCRACKEN COUNTY, KENTUCKY
13 of 20


SURVEY & PLAT NOTES
SURVEY PLAT LEGEND
SURVEYORS CERTIFICATE
CERTIFICATE OF OWNERSHIP
NOTARY CERTIFICATE
RECOMMENDATION FOR FINAL APPROVAL
CERTIFICATE OF FINAL APPROVAL FOR RECORDING
CERTIFICATE OF RECORDING
VICINITY MAP
PROJECT SITE
GRAPHIC SCALE
1" = 50'
TOTAL AREA
OLD BENTON RD. TO RAILROAD
3.6093± ACRES
GEORGIA STREET SOUTH
ALABAMA STREET SOUTH
BULLARD STREET EAST
VIRGINIA STREET SOUTH
MISSISSIPPI STREET
BRADLEY STREET
COOK STREET
VIRGINIA ST.
PADUCAH & LOUISVILLE RAILROAD
PERMANENT EASEMENT
40' RIGHT OF ENTRY EASEMENT
JOHN T. DENTON
DON WILKERSON
SHAW'S PREMIUM ROOFING
KELLY FRANKLIN, JR.
GERALD LONG
RUBY L. LONG
STEVE LONG
BRENDA MILLER
JOE WEST
LAURA WEST (WF.)
RICKEY THOMAS MCCARTY
EVERETTE QUALLS
DIXIE QUALLS (WF.)
JOHN L. CAMPBELL
LEE E. CAMPBELL (WF.)
PAUL JAMES MOSLEY
MARY MOSLEY (WF.)
205+00
210+00
215+00
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
BOUNDARY SURVEY OF THE
PADUCAH FLOODWALL SECTION "C"
FROM DESIGN STA. 202+00 TO DESIGN STATION 216+00
McCRACKEN COUNTY, KENTUCKY
Drawn: G.M.K.
Check: G.M.K.
Approved:
Date: 6-08-2006
Scale: 1" = 50'
14 of 20

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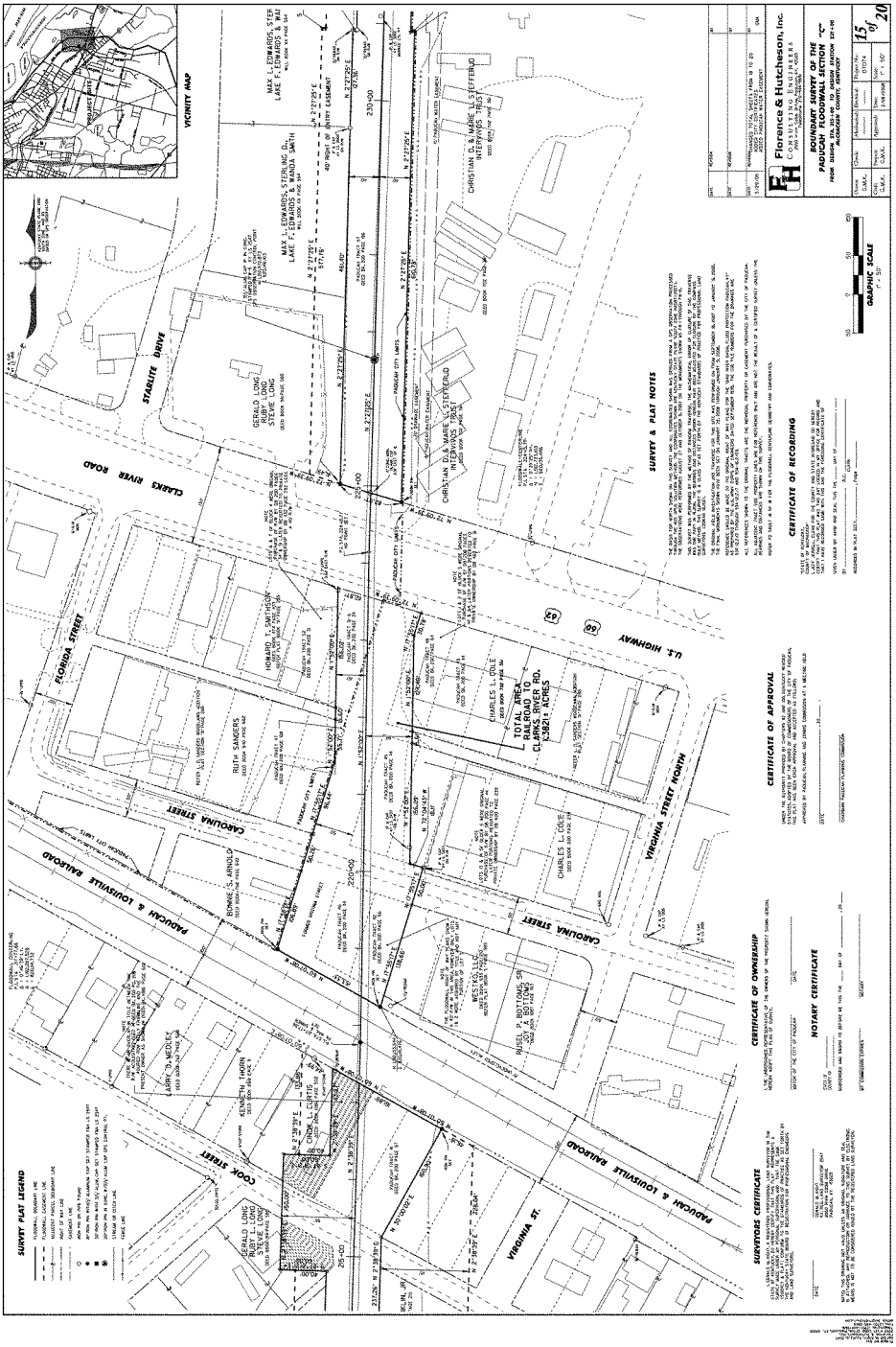
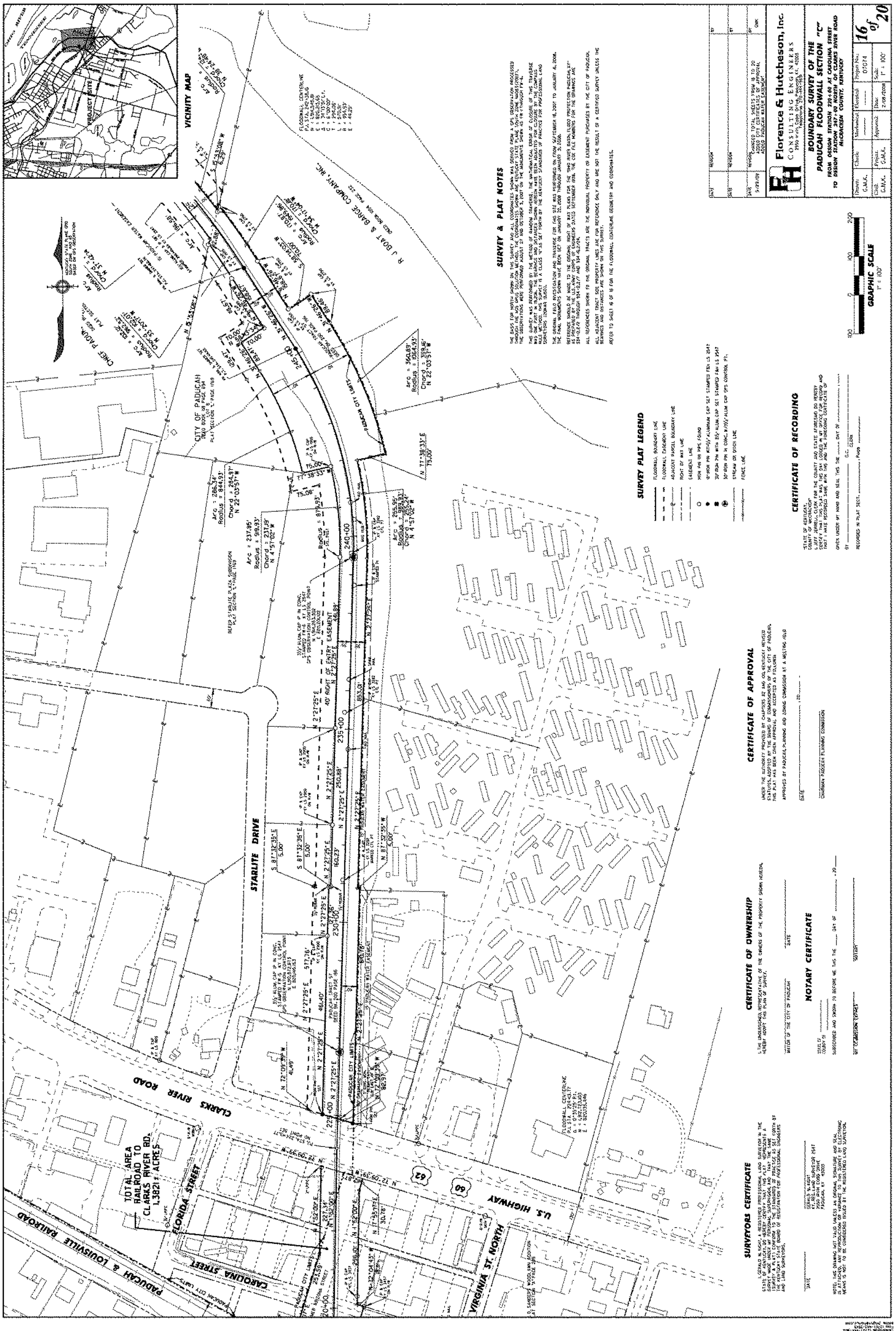
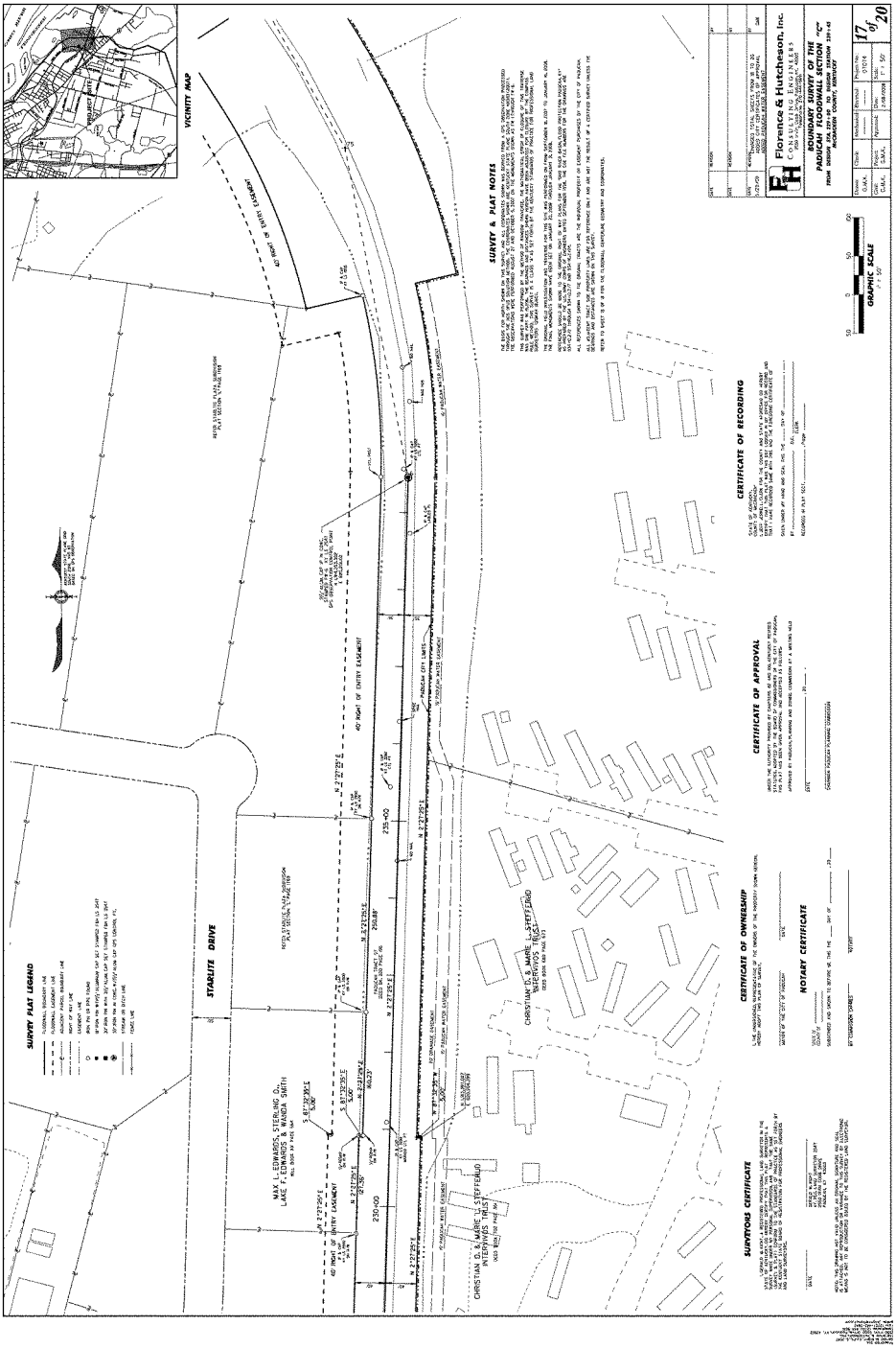
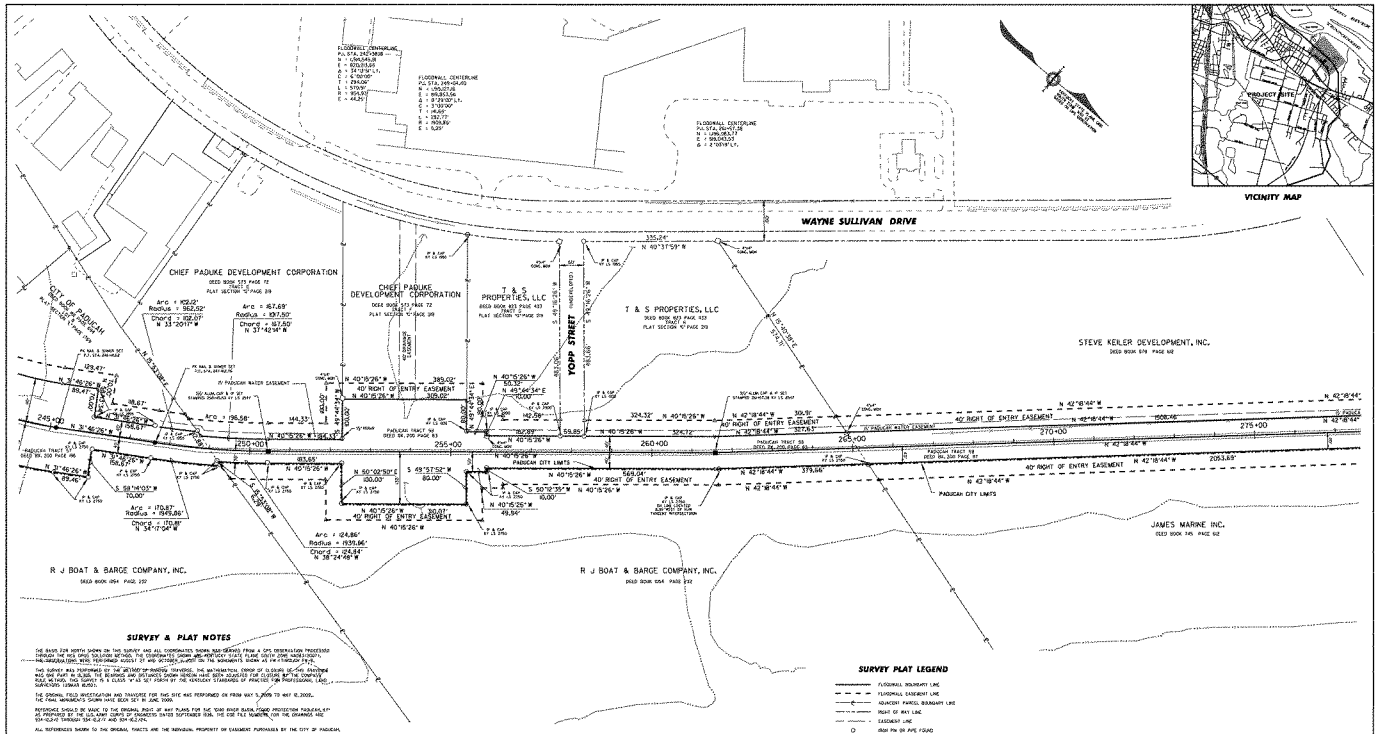

SURVEY PLAT LEGEND
SURVEY & PLAT NOTES
CERTIFICATE OF RECORDING
CERTIFICATE OF APPROVAL
CERTIFICATE OF OWNERSHIP
SURVEYORS CERTIFICATE
NOTARY CERTIFICATE
VICINITY MAP
GRAPHIC SCALE
1" = 50'
TOTAL AREA
PARCEL "C"
CLARKS RIVER RD.
3.3211 ACRES
CLARKS RIVER ROAD
STARLITE DRIVE
FLORIDA STREET
CAROLINA STREET
VIRGINIA STREET NORTH
VIRGINIA ST.
COOK STREET
U.S. HIGHWAY 62
PADUCAH & LOUISVILLE RAILROAD
MAX L. EDWARDS, STER
LAKE F. EDWARDS & WAN
GERALD LONG
RUBY L. LONG
CHRISTIAN D. & MARIE LS STEFFERUD
INTERVIVOS TRUST
HOWARD T. SMITHSON
RUTH SANDERS
CHARLES L. COLE
BONNIE S. ARNOLD
KENNETH THORN
LARRY D. MEDLOCK
CRAIG L. CURTIS
RUSSEL P. BOTTOMS SR
RUSSEL P. BOTTOMS JR
RUNN, JR.
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
BOUNDARY SURVEY OF THE
PROPERTY OF PARCEL "C"
AS SURVEYED FOR
MCCRACKEN COUNTY, KENTUCKY
15 of 20


PADUCAH & LOUISVILLE RAILROAD
TOTAL AREA
RAILROAD TO
CLARKS RIVER RD.
1.3821± ACRES
FLORIDA STREET
CAROLINA STREET
CLARKS RIVER ROAD
STARLITE DRIVE
VIRGINIA ST. NORTH
U.S. HIGHWAY
62
60
40' RIGHT OF ENTRY EASEMENT
CITY OF PADUCAH
R J BOAT & BARGE COMPANY, INC.
CHIEF PADUCAH
VICINITY MAP
PROJECT SITE
SURVEY & PLAT NOTES
SURVEY PLAT LEGEND
SURVEYORS CERTIFICATE
CERTIFICATE OF OWNERSHIP
NOTARY CERTIFICATE
CERTIFICATE OF APPROVAL
CERTIFICATE OF RECORDING
GRAPHIC SCALE
1" = 100'
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
BOUNDARY SURVEY OF THE
PADUCAH FLOODWALL SECTION "C"
FROM DESIGN STATION 220+00 AT CAROLINA STREET
TO DESIGN STATION 247+00 NORTH OF CLARKS RIVER ROAD
McCRACKEN COUNTY, KENTUCKY
16 of 20


SURVEY PLAT LEGEND
VICINITY MAP
STARLITE DRIVE
40' RIGHT OF ENTRY EASEMENT
MAX L. EDWARDS & STERLING G. LANE C. EDWARDS & MARIA SMITH
CHRISTIAN D. & MARIE J. STEFFAND
SURVEY & PLAT NOTES
CERTIFICATE OF OWNERSHIP
CERTIFICATE OF APPROVAL
CERTIFICATE OF RECORDING
SURVEYORS CERTIFICATE
NOTARY CERTIFICATE
GRAPHIC SCALE
1" = 50'
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
BOUNDARY SURVEY OF THE
LAKE C. EDWARDS SUBDIVISION
PARCEL "A" AND PARCEL "C"
FROM DEEDS 474, 223 & 45 TO DEEDS 3390 & 3391
MADISON COUNTY, MISSOURI
17 of 20



SURVEY & PLAT NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS OBTAINED FROM A GPS OBSERVATION PROCESSED THROUGH THE NGS OPUS SOLUTION METHOD. THE COORDINATES SHOWN ARE KENTUCKY STATE PLANE SOUTH ZONE NAD83(2011), THE ORTHOMETRIC DATUM WAS NAVD88(GEOID12A). ALL DISTANCES SHOWN ARE GROUND DISTANCES.

THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE. THE MATHEMATICAL ERROR OF CLOSURE (E-CLO) EXCEEDED THE MINIMUM ACCURACY REQUIREMENTS OF THE BOUNDARY SURVEY AS ADJUSTED FOR CLOSURE BY THE COMPUTER RULE AS PER THE 2010 KENTUCKY MINIMUM STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (URBAN MODE).

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FROM MAY 5, 2009 TO MAY 12, 2009.

ALL FINAL MONUMENTS SHOWN HAVE BEEN SET IN JUNE, 2009.

REFERENCE SHOULD BE MADE TO THE ORIGINAL PLAT OF WAY PLANS FOR THE TOAD RIVER BANK/FLOOD PROTECTION PROJECT, 67" FLOODWALL, PADUCAH, KENTUCKY. THE PLANS WERE DATED SEPTEMBER 1966. THE CSX TILE NUMBERS ON THE DRAWING ARE SHEETS 1324-02-01 THROUGH 1324-02-17 AND 1324-42-20A.

ALL REFERENCES SHOWN TO THE ORIGINAL TRACTS ARE THE INDIVIDUAL PROPERTY OR EASEMENT PURCHASES BY THE CITY OF PADUCAH.

ALL ADJACENT TRACT 56B PROPERTY LINES ARE FOR REFERENCE ONLY AND ARE NOT THE RESULT OF A CERTIFIED SURVEY UNLESS THE BEARINGS AND DISTANCES ARE SHOWN ON THIS SURVEY.

REFER TO SHEET 20 OF 20 FOR THE FLOODWALL CENTERLINE GEOMETRY AND COORDINATES.

SURVEYORS CERTIFICATE

I, CERTIFY TO HOUK & BOUCHING PROFESSIONAL LAND SURVEYORS IN THE STATE OF KENTUCKY, DO HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY MADE UNDER MY PERSONAL SUPERVISION, AND THAT THE SAME CORRECTLY & PLATS CONFORM TO THE STANDARDS OF PRACTICE AS SET FORTH BY THE KENTUCKY BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS.

DATE

GEORGE W. HOUK
LS 7468 - KENTUCKY
2368 PARK CORNERS
PADUCAH, KY 42003

NOTE: THIS DRAWING NOT VALID UNLESS AN ORIGINAL SIGNATURE AND SEAL IS ATTACHED. ANY REPRODUCTION OR ALTERATION TO THIS SURVEY BY ELECTRONIC MEANS IS NOT TO BE CONSIDERED SEALED BY THE REGISTERED LAND SURVEYOR.

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED, REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAH — DATE

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS THE ____ DAY OF _____, 20____

MY COMMISSION EXPIRES — NOTARY

CERTIFICATE OF APPROVAL

UNDER THE AUTHORITY PROVIDED BY CHAPTERS 82 AND 100 KENTUCKY REVISED STATUTES, ADOPTED BY THE BOARD OF COMMISSIONERS OF THE CITY OF PADUCAH, THIS PLAT HAS BEEN GIVEN APPROVAL AND ACCEPTED AS FOLLOWS:

APPROVED BY PADUCAH PLANNING AND ZONING COMMISSION AT A MEETING HELD

DATE

CHAIRMAN PADUCAH PLANNING COMMISSION

SURVEY PLAT LEGEND

- FLOODWALL BOUNDARY LINE
- FLOODWALL EASEMENT LINE
- ADJACENT PARCEL BOUNDARY LINE
- RIGHT OF WAY LINE
- EASEMENT LINE
- ○ IRON PIN OR PIPE FOUND
- ● 18"ØIRON PIN WITH 2½" ALUM. CAP SET STAMPED LS 2547
- ⊕ 30" IRON PIN & CONC. 8"x12" ALUM. CAP GPS CONTROL PT.
- WATER LINE OR FLOW LINE
- FENCE LINE

CERTIFICATE OF RECORDING

STATE OF KENTUCKY,
COUNTY OF McCRACKEN

I, JEFF JERRELL, CLERK FOR THE COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THE FOREGOING PLAT WAS LODGED FOR RECORD AT THE TIME AND DATE HAVE RECORDED SAME WITH THE CERTIFICATE THEREON ENDORSED.

GIVEN UNDER MY HAND AND SEAL THIS THE _____ DAY OF _____, _____.

BY _____ D.C.
CLERK

RECORDED IN PLAT BOOK _____, PAGE _____

DATE	REVISION	BY
DATE	REVISION	BY
DATE	REVISION	BY

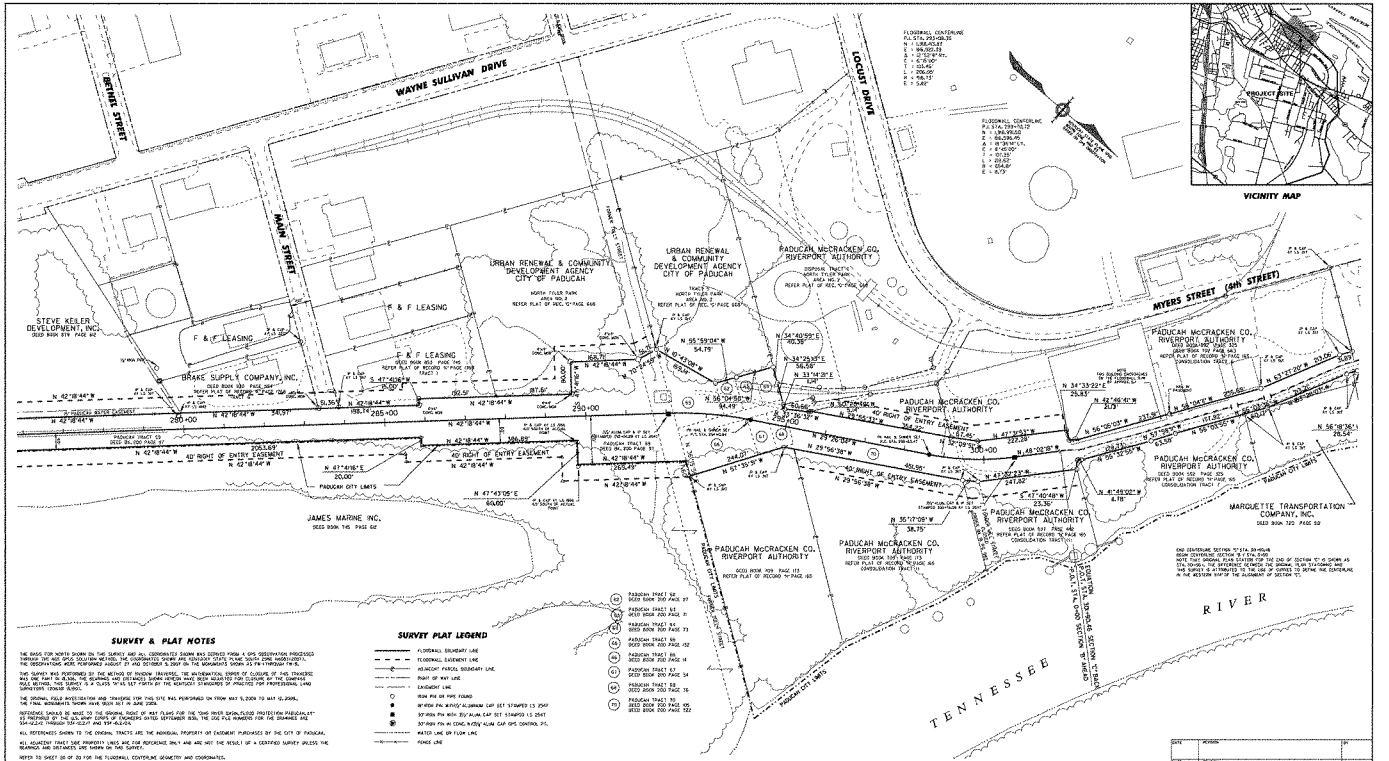
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
2368 PARK CORNERS
PADUCAH, KENTUCKY 42003
PHONE (270) 444-5836

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"
FROM STATION 247+08 TO STATION 275+00
McCRACKEN COUNTY, KENTUCKY

Drawn:	Check:	Mechanical	Electrical	Project No.:	
G.M.H.				070174	
Dist:	Project:	Approved:	Date:	Scale:	
G.M.H.	G.M.H.		5-05-2009	1" = 100'	

18 of 20

1321


WAYNE SULLIVAN DRIVE
LOCUST DRIVE
BETHEL STREET
MAIN STREET
MYERS STREET (6TH STREET)
STEVE KEILER DEVELOPMENT, INC.
DEED BOOK 879 PAGE 66
F & F LEASING
BRAKE SUPPLY COMPANY, INC.
DEED BOOK 930 PAGE 586
URBAN RENEWAL & COMMUNITY DEVELOPMENT AGENCY CITY OF PADUCAH
PADUCAH McCRACKEN CO. RIVERPORT AUTHORITY
JAMES MARINE INC.
DEED BOOK 745 PAGE 612
MARQUETTE TRANSPORTATION COMPANY, INC.
DEED BOOK 720 PAGE 512
TENNESSEE RIVER
PROJECT SITE
VICINITY MAP
SURVEY & PLAT NOTES
SURVEY PLAT LEGEND
SURVEYORS CERTIFICATE
CERTIFICATE OF OWNERSHIP
CERTIFICATE OF APPROVAL
CERTIFICATE OF RECORDING
NOTARY CERTIFICATE
GRAPHIC SCALE
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
BOUNDARY SURVEY OF THE
PADUCAH FLOODWALL SECTION "C"
FROM DESIGN STATION 273+00
TO DESIGN STATION 307+90.60 END OF SECTION "C"
McCRACKEN COUNTY, KENTUCKY
19 of 20

1322

Floodwall Section C Centerline

(EAST (X) NORTH (Y))

P.O.T. 0+06.0000 N 50°12'25.00"E 896913.0310 1895837.2242

P.O.T. 18+00.0000 N 50°32'25.00"E 907898.1274 1896977.3751

P.O.T. 28+60.6886 N 50°32'25.00"E 916817.0860 1897654.4855

P.I. 36+98.6939 N 43°21'38.15"E 8093344.6270 1898854.6983

P.I. = 36+98.6939
Delta = 7°10'46.85"Left

P.O.T. 45+26.4362 N 43°21'38.15"E 809918.0396 1898770.5906

P.O.T. 64+39.5702 N 45°21'38.15"E 810410.0869 1899986.6070

P.I. 70+15.6894 N 46°46'29.68"E 8954.6555 1900595.5904

P.I. = 70+15.6894
Delta = 3°24'55.51"Right

P.O.T. 86+55.1287 N 46°46'29.68"E 812836.1565 1901718.3799

P.O.T. 92+68.9786 N 46°46'29.68"E 813283.4498 1902138.7849

Eq.Bk. 92+68.9790 ----- EQUATION -----
Eq.Ah. 92+70.0000 ----- EQUATION -----

813283.4501 1902138.7852

P.O.T. 95+98.9066 813521.4331 1902364.0465

P.C. 94+77.4950 N 45°46'29.68"E 813414.8376 1902280.8948
P.T. 97+57.5593 N 61°56'12.59"E 813675.6424 1902409.6506

M.O.C. 95+97.5231
Rad Pt

813526.1783 1902354.5716
813675.8009 1902607.2455

P.I. = 95+98.9066
Delta = 2°09'42.9" Right
D = 8°48'5.09"
T = 20.4286
L = 40.8572
R = 650.0000
E = 1.2435

P.O.T. 110+43.3180 N 61°56'12.59"E 814864.4950 1902907.7180

P.O.T. 127+93.3751 N 61°56'29.22"E 816466.2170 1903565.0050

P.I. = 127+93.3751
Delta = 0°40'52.37"Left

P.I. 146+54.6041 816292.2595 1904284.4435

P.C. 145+14.5086 N 61°15'25.25"E 816171.8831 1904230.9956
P.T. 147+74.4725 N 15°58'24.02"E 816240.6662 1904418.2388

M.O.C. 146+44.6891
Rad Pt

816178.1705 1904305.4165
817361.1631 1904958.2693

P.I. = 146+54.6041
Delta = 51°16'35.29"Left
D = 19°45'31.20"
T = 353.4008
L = 704.9028
R = 290.0000
E = 214.1782

P.I. 155+45.3815 818729.0034 1906924.6993

P.C. 153+90.97 N 15°58'24.02"E 818585.1740 1905971.4998
P.T. 161+24.4708 N 13°45'33.36"W 818426.222 1906729.1486

M.O.C. 155+45.7192
Rad Pt

818705.7259 1906925.0207
8808.3401 1906316.6629

P.I. = 155+45.3815
Delta = 29°43'57.58"Left
D = 9°34'57.47"
T = 259.2699
L = 516.9516
R = 598.0000
E = 56.1793

P.I. 179+94.1713 818383.6825 1907534.8233

P.C. 178+59.0540 N 13°45'33.36"W 818405.7892 1907403.6834
P.T. 181+25.4946 N 9°43'36.29"E 818406.4904 1907668.0983

M.O.C. 179+92.2141
Rad Pt

818317.3490 1907134.4127
819247.1485 1907558.2814

P.I. = 179+94.1713
Delta = 23°29'06.05"Right
D = 6°48'53.99"
T = 213.91
L = 417.1188
R = 850.0000
E = 13.1899

P.O.T. 184+37.7590 N 9°43'36.29"E 818438.5610 1907680.1780

Floodwall Section C Centerline (after Overlap Equation)

(EAST (X) NORTH (Y))

P.O.T. 159+60.870 N 9°43'36.29"E 818408.5610 1907680.1780

P.I. 174+47.5721 N 13°20'05.11"E 818490.7887 1908159.8825

P.I. = 174+47.5721
Delta = 3°16'29.62"Right

P.I. 181+09.9791 818543.5669 1908604.4304

P.C. 178+73.7817 N 13°20'05.11"E 818530.4594 1908560.3780
P.T. 183+36.1339 N 3°35'57.78"E 818546.2260 1909003.3036

M.O.C. 181+08.0259
Rad Pt

818600.5605 1908797.4028
819564.2350 1908250.0092

P.I. = 181+09.9791
Delta = 18°05'52.47" Right
D = 4°05'00.00"
T = 290.2634
L = 577.6443
R = 432.3993
E = 18.3896

P.I. 187+53.8844 818583.3052 1909354.1927

P.C. 186+15.2549 N 3°35'57.78"E 818563.3465 1909238.374
P.T. 189+88.4611 N 55°40'41.73"E 818591.4971 1909434.5174

M.O.C. 187+55.8380
Rad Pt

818737.5848 1909146.4041
819463.3827 1908897.0325

P.I. = 187+53.8844
Delta = 24°54'43.87" Right
D = 8°48'5.09"
T = 118.4035
L = 213.8662
R = 650.0000
E = 10.888

P.I. 201+90.5975 819217.8700 1910468.5259

P.C. 197+49.2422 N 55°40'41.75"E 818807.6099 1910293.484
P.T. 206+62.0269 N 3°44'43.85"W 819043.9790 1910619.8457

M.O.C. 203+60.148
Rad Pt

819066.1390 1910378.8192
819263.2189 1910653.2893

P.I. = 201+90.5975
Delta = 58°25'25.60" Left
D = 19°23'34.9"
T = 442.6454
L = 803.7839
R = 295.5000
E = 67.3516

P.I. 214+27.0764 820086.8163 1911483.0270

P.C. 213+45.7820 N 3°44'43.85"W 820094.432 1911366.3810
P.T. 216+43.0297 N 2°38'38.56"E 820092.89 1911695.975

M.O.C. 214+26.9559
Rad Pt

820080.0592 1911493.0582
822173.4459 1911803.0846

P.I. = 214+27.0764
Delta = 6°15'23.29" Right
D = 2°45'00.00"
T = 156.3944
L = 312.3416
R = 2081.4829
E = 5.243

P.O.T. 219+42.4804 N 2°38'38.56"E 820104.5965 1911868.2615

FLOODWALL CENTERLINE RECTIFICATION TO ORIGINAL PROJECT

EQUATION THREE TANGENTS
THE FIRST TANGENT (BEGINNING 164+77.9) OF ORIGINAL CENTERLINE STATION @ 426.1145 POINT WAS HELD FOR THE BASIS OF THE SOUTHERN SECTION 124 ROTATION.

THE FIRST TANGENT WAS A BEST FIT LINE THROUGH THE ABOVE MENTIONED MONUMENT AND A SERIES OF 21 CENTERLINE OF LEVEE TOPOGRAPHY POINTS.

THE SECOND TANGENT WAS ESTABLISHED DURING THE CONTROL MONUMENTATION PHASE FOR CONTROL MONUMENTS 3AND 5.

THE FIRST POINT ON THE INTERSECTION OF THE ABOVE TWO TANGENTS, THE RESULTING STATION OF THE PI= 83+69.98 THE PLAN POSITION SCALED AT 2FT=1IN.

THE THIRD TANGENT WAS ESTABLISHED BY HONORING THE FOUND 4"REBAR (6FT) AHD 4 WAS OVER THE CENTERLINE OF A CROSS DRIVE.

THE SECOND POSITIONSHIP WAS THE INTERSECTION OF THE SECOND AND THIRD TANGENTS.

THE ENDING STATION AT THE END FOUND (6FT) BY HOLDING THE 21SE MONUMENT AS THE BASIS RESULTED IN 83+69.98. THE PLAN POSITION SCALED AT 2FT=1IN. ORIGINAL WAS 30+76. THIS RESULTED IN A POSITIVE CHANGE OF 1FOOT IN SOME DISTANCE AND THE ORIGINAL BEST SUPPLY.

ANOTHER OVERLAP LOCATION WAS THE BRIDGE LOCATED 70'RIGHT OF STATION 61+90. THE RESULTING STATION FOR THIS WAS 0+99.81.

Notes

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PROCESSED THROUGH THE NGS OPUS SOLUTION METHOD. THE COORDINATES SHOWN ARE KENTUCKY STATE PLANE SOUTH ZONE NAD83(2007). THE OBSERVATIONS WERE PERFORMED AUGUST 31 AND SEPTEMBER 6, 2007 ON THE MONUMENTS SHOWN AS PM 1 THROUGH PM 15.

THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE. THREE INDIVIDUAL TRAVERSES WERE PERFORMED. THE FIRST TRAVERSE BEGAN AT PM 1 AND CLOSED ON PM 2 WITH A RATIO OF 1:10,000. THE SECOND TRAVERSE BEGAN AT PM 3 AND CLOSED ON PM 4 WITH A RATIO OF 1:10,000. THE THIRD TRAVERSE CLOSED FROM AND FOR PART A RATIO. THE BEARINGS AND DISTANCES SHOWN HEREON WERE ADJUSTED FOR CLOSURE BY THE COMPASS RULE METHOD. THIS SURVEY IS A CLASS "A" AS SET FORTH BY THE MINIMUM STANDARDS OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS (KRS#322.030).

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FROM SEPTEMBER 18, 2007 TO JANUARY 16, 2008 THE FINAL MONUMENTS SHOWN HAVE BEEN SET ON JANUARY 16, 2008 THROUGH JANUARY 18, 2008

REFERENCE SHOULD BE MADE TO THE ORIGINAL PAGE OF MAP PLANS FOR THE OHIO RIVER MAIN FLOOD PROTECTION PADUCAH, KY AS PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1956. THE COE FILE NUMBERS FOR THE DRAWINGS ARE 954-102-D THROUGH 954-102-F7 AND 954-102-F9.

Floodwall Section C Centerline (after Second Overlap Equation)

(EAST (X), NORTH (Y))

P.O.T. 232+89.000 N 2°38'38.54"E 820092.81 1911689.975

P.I. 241+77.8607 N 1°51'53.99"E 820141.1322 1912087.5278

P.I. = 241+77.8607
Delta = 0°46'38.56" Left

P.I. 224+03.7732 N 2°27'24.72"E 820035.4462 1912723.1028

P.I. = 224+03.7732
Delta = 0°35'24.3" Right

P.O.T. 226+63.7732 N 2°27'24.72"E 820048.1830 1912912.8730

P.I. 242+38.1548 820201.6524 1914545.8074

P.C. 239+44.0994 N 2°27'24.72"E 820201.0471 1914251.0023
P.T. 245+44.601 N 3°46'26.25"W 820206.8822 1914795.7934

M.O.C. 242+28.3558
Rad Pt

820170.8431 1914514.8097
819416.3952 1914292.9575

P.I. = 242+38.1548
Delta = 34°09'0.74" Left
D = 6°30'00.00"
T = 194.0554
L = 370.1927
R = 954.9297
E = 44.2486

P.I. 249+04.3966 819853.5639 1915627.8629

P.C. 247+82.7509 N 3°46'26.08"W 819828.901 1915035.7983
P.T. 250+45.5247 N 40°15'25.54"W 819762.0298 1915235.2933

M.O.C. 249+04.1378
Rad Pt

818849.335 1915214.0777
818304.3562 1914108.0725

P.I. = 249+04.3966
Delta = 81°28'53.71" Left
D = 8°00'00.00"
T = 716.4457
L = 787.7738
R = 716.8593
E = 5.2454

P.I. 261+57.3733 819043.5324 1916083.7692

P.I. = 261+57.3733
Delta = 2°03'16.7" Left

P.I. 293+08.3149 816922.3900 1918443.8673

P.C. 292+04.8825 N 42°18'46.36"W 816982.0358 1918337.9608
P.T. 294+10.5093 N 29°26'05.64"W 816873.5473 1918513.9178

M.O.C. 293+07.9059
Rad Pt

816927.4057 1918417.2775
817693.9410 1918954.4768

P.I. = 293+08.3149
Delta = 13°43'11.27" Right
D = 8°00'00.00"
T = 101.4593
L = 206.0468
R = 716.7325
E = 7.0716

P.I. 299+70.7129 816596.4547 1919895.4980

P.C. 298+63.4694 N 29°26'03.84"W 816549.8061 1919838.0898
P.T. 302+19.2774 N 46°02'18.20"W 816396.7025 1919582.1209

M.O.C. 299+69.7589
Rad Pt

816589.8486 1919886.0382
816218.8150 1919576.2792

P.I. = 299+70.7129
Delta = 16°36'16.36" Left
D = 8°48'05.09"
T = 117.2207
L = 232.6329
R = 650.0000
E = 10.4254

P.O.T. 302+05.2558 N 46°02'18.20"W 816420.6464 1919415.5834

CERTIFICATE OF OWNERSHIP

I, THE UNDERSIGNED, REPRESENTATIVE OF THE OWNERS OF THE PROPERTY SHOWN HEREON, HEREBY ADOPT THIS PLAN OF SURVEY.

MAYOR OF THE CITY OF PADUCAH DATE

NOTARY CERTIFICATE

STATE OF _____
COUNTY OF _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS THE ____ DAY OF _____, 20____

MY COMMISSION EXPIRES _____ NOTARY

CERTIFICATE OF APPROVAL

UNDER THE AUTHORITY VESTED IN ITS UNDER KRS 100 AND ALL AMENDMENTS THERETO AND THE SUBDIVISION REGULATIONS OF THE CITY OF PADUCAH, THIS PLAT HAS BEEN GIVEN APPROVAL AND ACCEPTED AS FOLLOWS:

APPROVED BY PADUCAH PLANNING AND ZONING COMMISSION AT A MEETING HELD

DATE _____, 20____ .

CHAIRMAN PADUCAH PLANNING COMMISSION

CERTIFICATE OF RECORDING

STATE OF KENTUCKY
COUNTY OF MCCRACKEN

I, _____, CLERK OF SAID COUNTY AND STATE AFORESAID DO HEREBY CERTIFY THAT THIS PLAT WAS THIS DAY LODGED IN MY OFFICE FOR RECORD AND THAT I HAVE RECORDED SAME WITH THIS AND THE FOREGOING CERTIFICATE OF

GIVEN UNDER MY HAND AND SEAL THIS THE _____ DAY OF _____, _____.

BY _____, D.C. CLERK

RECORDED IN PLAT BOOK _____, PAGE _____

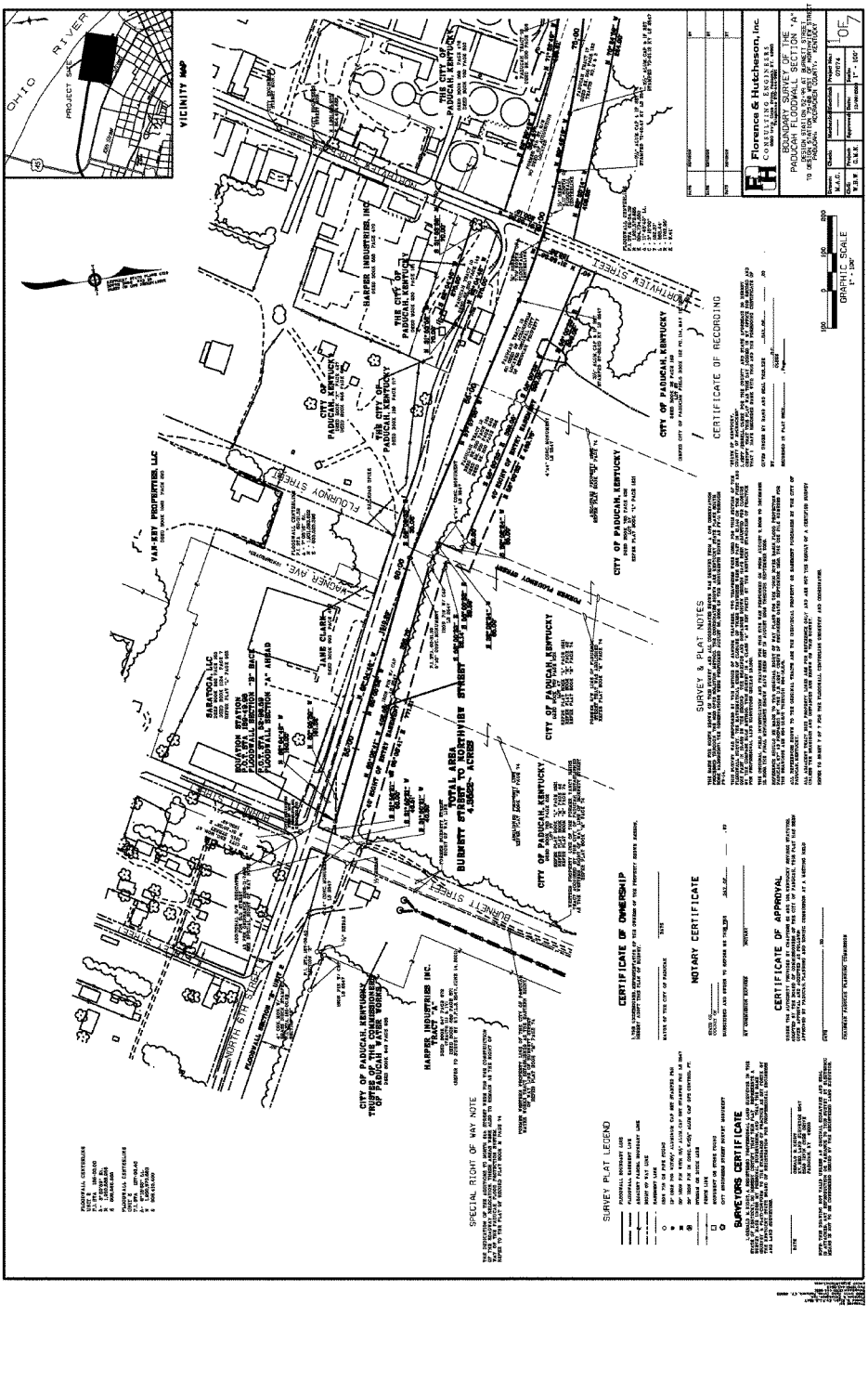
DATE	REVISIONS	BY
DATE	REVISIONS	BY
DATE	REVISIONS	BY
5-09-08	ADDED STATE PLANE DATA FROM STA. 239 TO 302 REVISED SHEET NUMBERS	D.M.K.

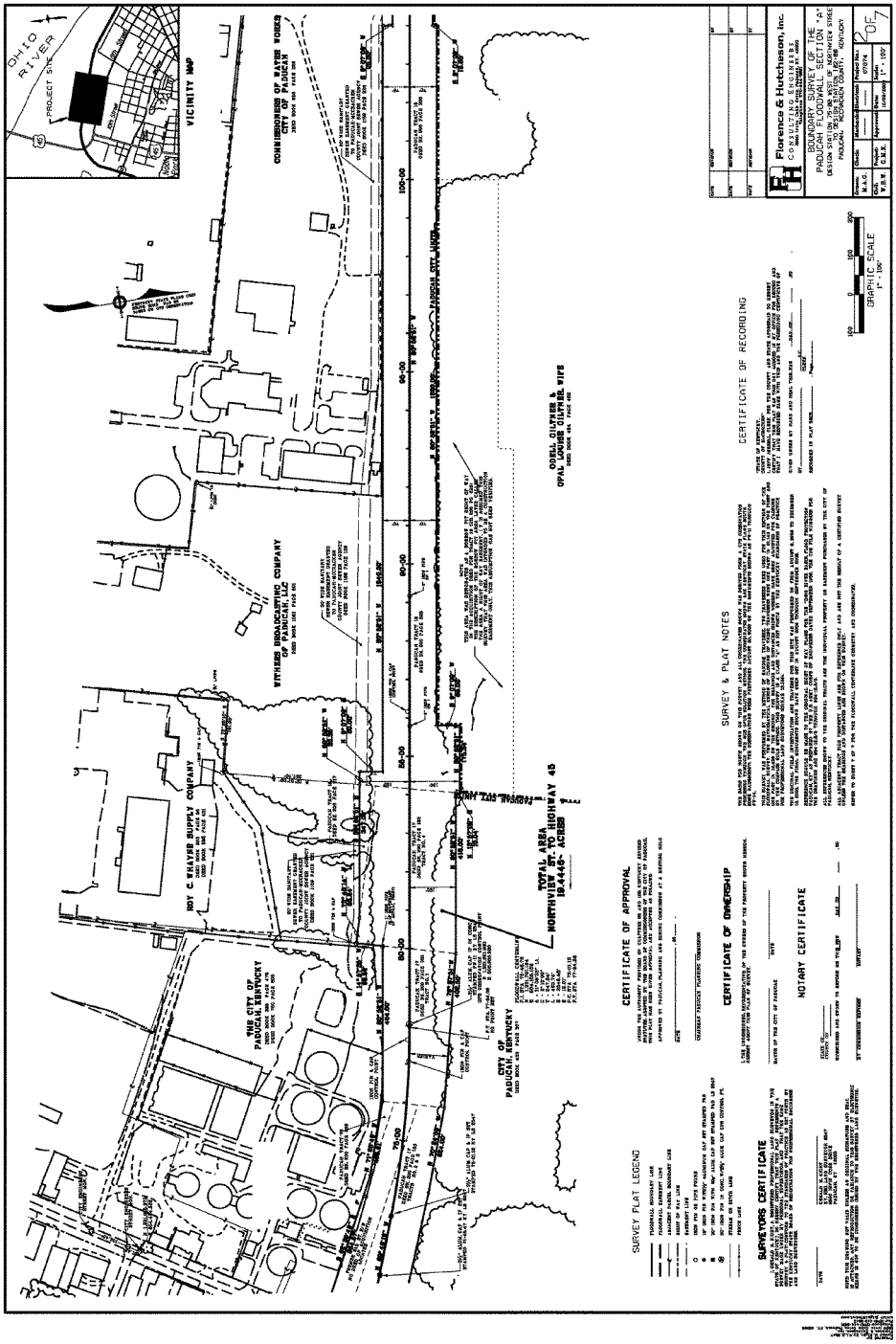
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
2500 HIGH POINT DRIVE, PADUCAH, KY. 42001
PADUCAH 270-554-4815

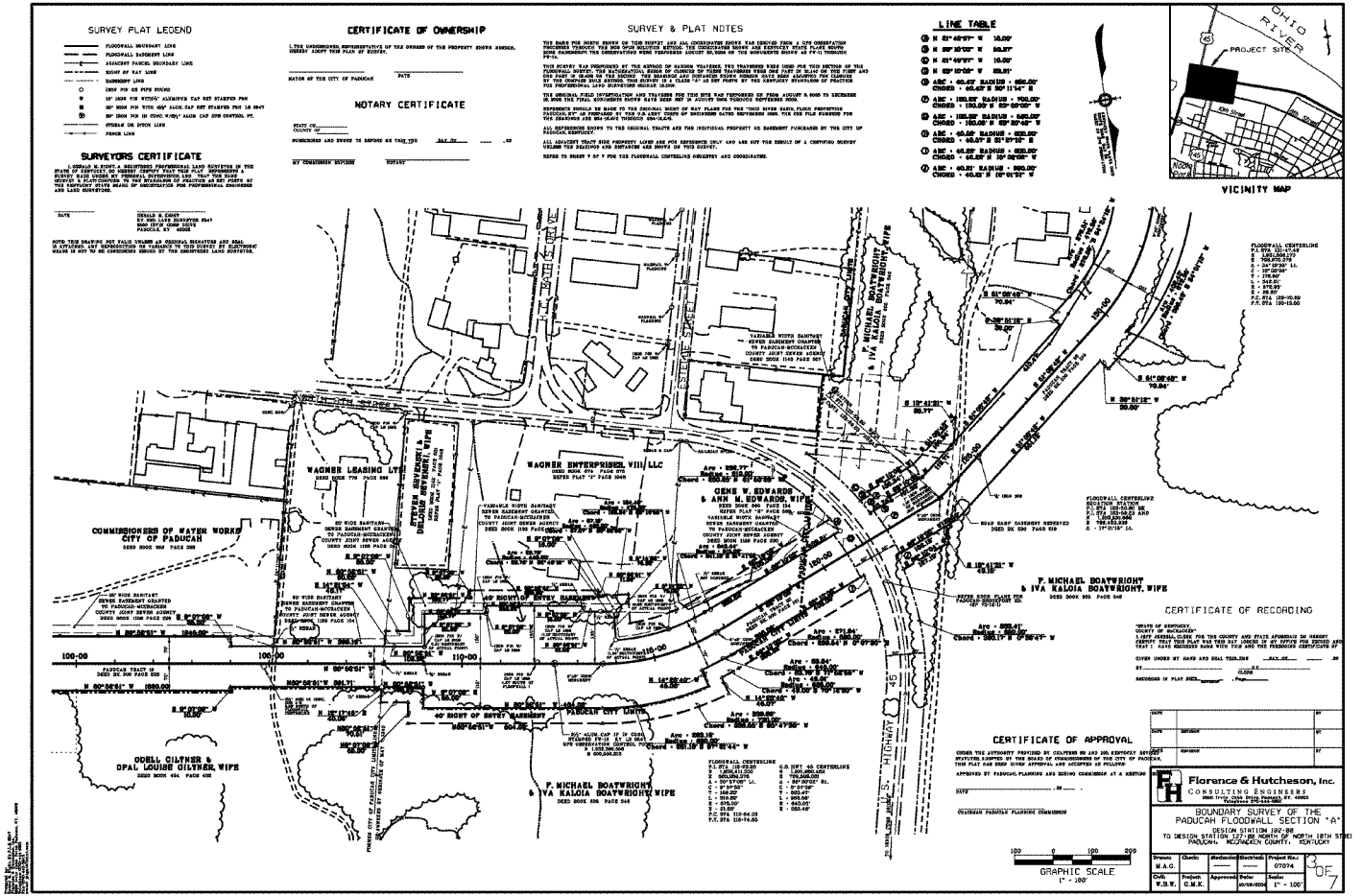
BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "C"
FLOODWALL CENTERLINE GEOMETRY

Drawn: D.M.K.	Check:	Mechanical:	Electrical:	Project No.: 07074	20 of 20
Date: D.M.K.	Project Engineer: D.M.K.	Approved:	Date: 5-09-2008	Scale: N/A	

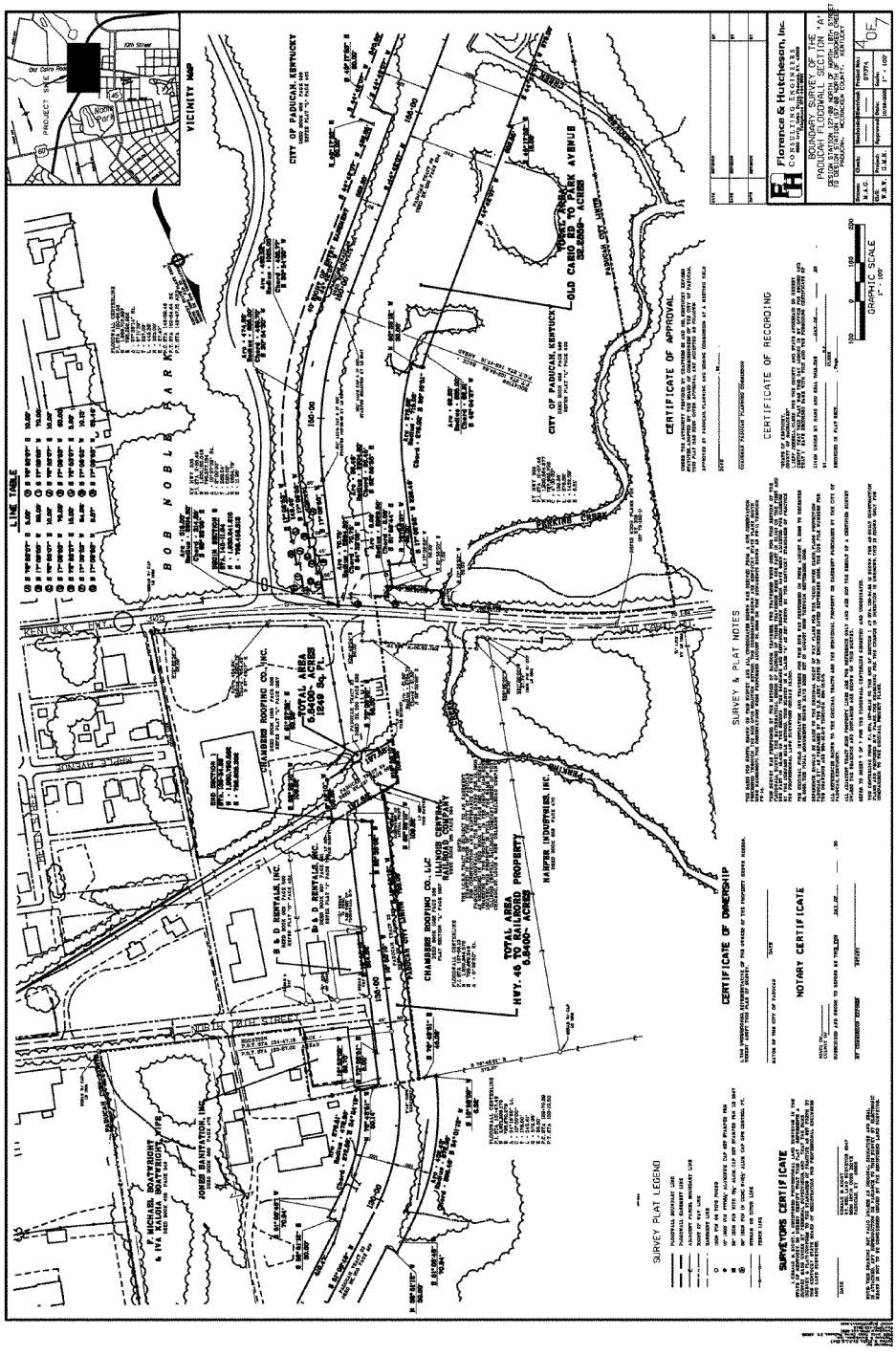
1323

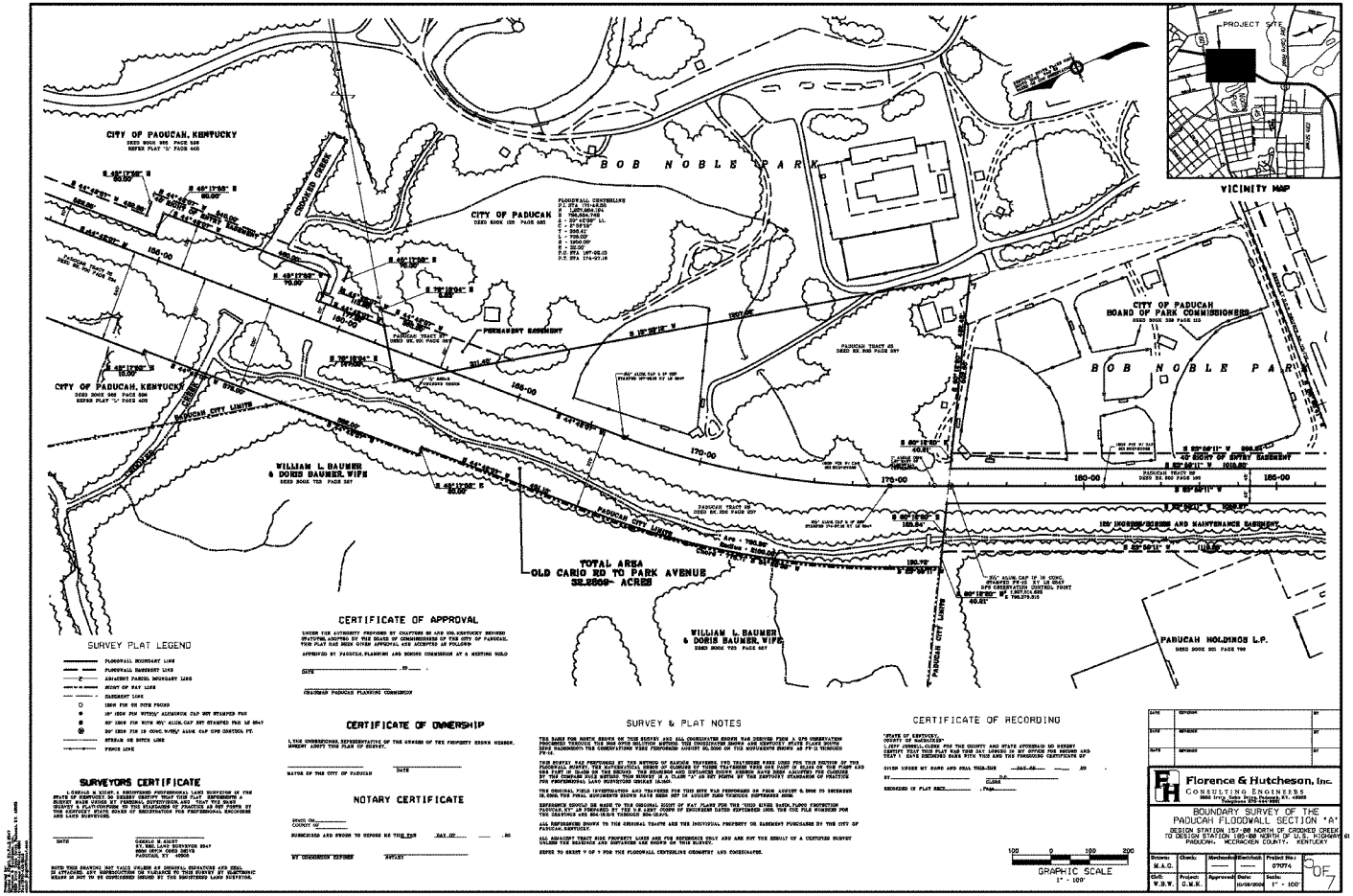

OHIO RIVER
PROJECT SITE
VICINITY MAP
SURVEY PLAT LEGEND
SURVEY & PLAT NOTES
CERTIFICATE OF OWNERSHIP
NOTARY CERTIFICATE
CERTIFICATE OF APPROVAL
SURVEYORS CERTIFICATE
CERTIFICATE OF RECORDING
SPECIAL RIGHT OF WAY NOTE
TOTAL AREA
BURNETT STREET TO NORTHSIDE STREET
4.0000 ACRES
BOARDWALK
FLOURNOY STREET
JACKSON STREET
NORTH 6TH STREET
NORTHSIDE STREET
BOARDWALK SURVEY
PADUCAH FLOODWALL SECTION "A"
DESIGN STATION 29+40 AT BURNETT STREET
TO DESIGN STATION 34+00 AT NORTHSIDE STREET
PADUCAH, MCCRACKEN COUNTY, KENTUCKY
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
GRAPHIC SCALE
1" = 100'
SHEET 1 OF 7


VICINITY MAP
OHIO RIVER
PROJECT SITE
SURVEY PLAT LEGEND
SURVEY & PLAT NOTES
CERTIFICATE OF APPROVAL
CERTIFICATE OF OWNERSHIP
CERTIFICATE OF RECORDING
SURVEYORS CERTIFICATE
NOTARY CERTIFICATE
THE CITY OF PADUCAN, KENTUCKY
ROY C. THAYER SUPPLY COMPANY
WITHERS BROADCASTING COMPANY OF PADUCAH, LLC
COMMONWEALTH OF KENTUCKY CITY OF PADUCAN
ODEAL GILPHER & OPAL LOUISE GILPHER WIFE
TOTAL AREA NORTHVIEW ST. TO HIGHWAY 45 19.4446+ ACRES
PADUCAH CITY LIMITS
GRAPHIC SCALE
1" = 100'
Florence & Hutchason, Inc.
CONSULTING ENGINEERS
BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "A"
DESIGN STATION 75+00 TO 105+00 ALONG NORTHVIEW STREET
MCCRACKEN COUNTY, KENTUCKY
07

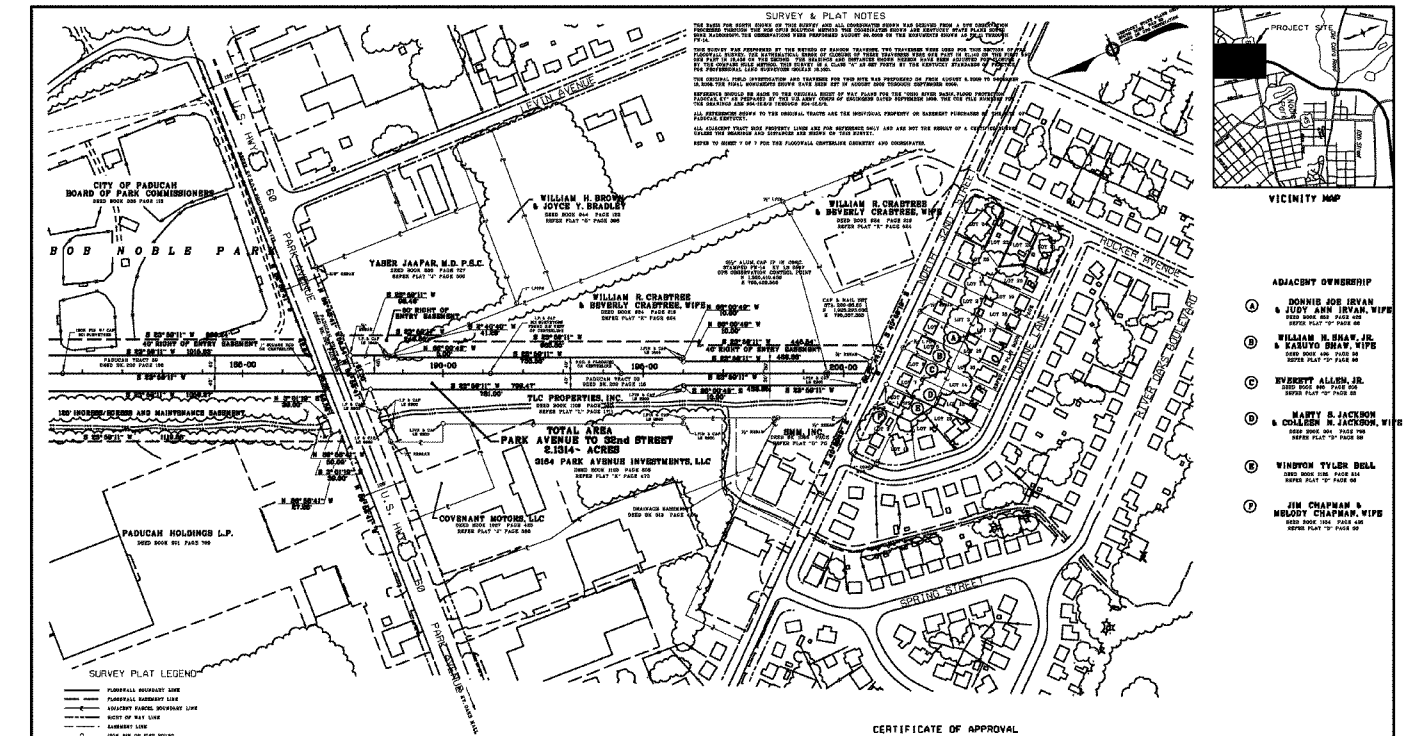

SURVEY PLAT LEGEND
CERTIFICATE OF OWNERSHIP
SURVEY & PLAT NOTES
LINE TABLE
VICINITY MAP
SURVEYORS CERTIFICATE
NOTARY CERTIFICATE
CERTIFICATE OF RECORDING
CERTIFICATE OF APPROVAL
COMMISSIONERS OF WATER WORKS CITY OF PADUCAH
WAGNER LEASING LTD
WAGNER ENTERPRISES, VIII, LLC
GENE W. EDWARDS & ANN M. EDWARDS, WIFE
F. MICHAEL BOATWRIGHT & IVA KALOIA BOATWRIGHT, WIFE
ODELL GILTNER & OPAL LOUISE GILTNER, WIFE
PROJECT SITE
OHIO RIVER
BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "A"
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
GRAPHIC SCALE

1326


VICINITY MAP
LINE TABLE
SURVEY PLAT LEGEND
SURVEY & PLAT NOTES
CERTIFICATE OF OWNERSHIP
CERTIFICATE OF APPROVAL
CERTIFICATE OF RECORDING
SURVEYORS CERTIFICATE
NOTARY CERTIFICATE
BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "A"
GRAPHIC SCALE
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
BOB NOBLE PARKWAY
KENTUCKY AVENUE
JONES SANITATION, INC.
CHAMBERS ROOFING CO., LLC
HARPER HUNTSMAN, INC.
OLD CAIRO ROAD
CITY OF PADUCAH, KENTUCKY


CITY OF PADUCAH, KENTUCKY
DEED BOOK 886 PAGE 526
REFER PLAT "D" PAGE 400
CROOKED CREEK
BOB NOBLE PARK
CITY OF PADUCAH
DEED BOOK 120 PAGE 585
PERMANENT EASEMENT
CITY OF PADUCAH
BOARD OF PARK COMMISSIONERS
DEED BOOK 339 PAGE 113
CITY OF PADUCAH, KENTUCKY
DEED BOOK 886 PAGE 526
REFER PLAT "D" PAGE 400
PADUCAH CITY LIMITS
WILLIAM L. BAUMER
& DORIS BAUMER, WIFE
DEED BOOK 703 PAGE 567
TOTAL AREA
OLD CAIRO RD TO PARK AVENUE
32.2606± ACRES
WILLIAM L. BAUMER
& DORIS BAUMER, WIFE
DEED BOOK 703 PAGE 567
PADUCAH HOLDINGS L.P.
DEED BOOK 201 PAGE 799
100' INGRESS/EGRESS AND MAINTENANCE EASEMENT
60' ROW OF ENTRY EASEMENT
PROJECT SITE
VICINITY MAP
SURVEY PLAT LEGEND
SURVEYORS CERTIFICATE
CERTIFICATE OF APPROVAL
CERTIFICATE OF OWNERSHIP
NOTARY CERTIFICATE
SURVEY & PLAT NOTES
CERTIFICATE OF RECORDING
GRAPHIC SCALE
1" = 100'
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
BOUNDARY SURVEY OF THE
PADUCAH FLOODWALL SECTION "A"
DESIGN STATION 157+88 NORTH OF CROOKED CREEK
TO DESIGN STATION 180+88 NORTH OF U.S. HIGHWAY 60
PADUCAH, MCCRACKEN COUNTY, KENTUCKY
Drawn: M.A.C.
Check:
Rechecked:
Electrical:
Project No.: 07074
Civil: W.B.W.
Project: C.M.K.
Approved:
Date: 10/29/2008
Scale: 1" = 100'
6 OF 7

1328


SURVEY & PLAT NOTES
PROJECT SITE
VICINITY MAP
ADJACENT OWNERSHIP
A DONNIE JOE IRVAN & JUDY ANN IRVAN, WIFE
B WILLIAM H. SHAW, JR. & KASUYO SHAW, WIFE
C EVERETT ALLEN, JR.
D MARTY S. JACKSON & COLLEEN M. JACKSON, WIFE
E WINSTON TYLER BELL
F JIM CHAPMAN & MELODY CHAPMAN, WIFE
CITY OF PADUCAH BOARD OF PARK COMMISSIONERS
BOB NOBLE PARK
WILLIAM H. BROWN & JOYCE Y. BRADLEY
WILLIAM R. CRABTREE & BEVERLY CRABTREE, WIFE
YASER JAAFAR, M.D. P.S.C.
TLC PROPERTIES, INC.
SMW, INC.
COVENANT MOTORS, LLC
PADUCAH HOLDINGS L.P.
TOTAL AREA
PARK AVENUE TO 32nd STREET
2.1314± ACRES
3164 PARK AVENUE INVESTMENTS, LLC
LEVIN AVENUE
ROCKER AVENUE
SPRING STREET
PARK AVENUE
BLUFF ROAD
RIVER ROAD SUBURBAN
U.S. HWY. 60
SURVEY PLAT LEGEND
SURVEYORS CERTIFICATE
CERTIFICATE OF OWNERSHIP
NOTARY CERTIFICATE
RECOMMENDATION FOR FINAL APPROVAL
CERTIFICATE OF FINAL APPROVAL/RECORDING
CERTIFICATE OF APPROVAL
CERTIFICATE OF RECORDING
GRAPHIC SCALE
1" = 100'
Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION 'A'
DESIGN STATION 108+00 NORTH OF U.S. HIGHWAY 60 TO DESIGN STATION 208+52 NORTH OF 32ND STREET
McCRACKEN COUNTY, KENTUCKY
Project No.: 07074
Sheet: 6 OF 7

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FLOODWALL SECTION A CENTERLINE BURNETT STREET TO SOUTH OF OLD CAIRO ROAD

	EAST (X)	NORTH (Y)
P.O.T.	62+82.7003	N 65° 06' 51.60" W 806195.2394 1930776.8435
P.I.	60+31.5900	N 57° 57' 35.60" W 806183.3956 1931083.5821

P.I. - 60+31.5900
Delta = 7° 09' 16.00" Right

P.I.	59+54.3930	804754.8795 1931578.6952
P.C.	57+82.0252	N 57° 57' 35.60" W 804659.2686 1931481.9369
P.T.	71+45.4561	N 69° 46' 18.63" W 804583.5698 1932841.7405
M.O.C.	69+63.7488	804730.5358 1931570.2368
Rad Pt		805841.0041 1933087.5853

P.I. - 59+54.3930
Delta = 11° 48' 43.99" Left
C = 3° 15' 00.00"
T = 152.3673
L = 303.4430
R = 1756.9471
E = 9.4074

P.I.	75+48.7849	804186.1387 1932761.1936
P.C.	73+01.1181	N 69° 46' 18.63" W 804417.5095 1932695.3581
P.T.	77+34.3251	N 80° 52' 21.32" W 803940.8829 1932805.4280
M.O.C.	75+47.9988	804182.0956 1932759.5800
Rad Pt		805837.0436 1932206.1878

P.I. - 75+48.7825
Delta = 11° 09' 32.69" Left
C = 2° 15' 00.00"
T = 247.2446
L = 489.7370
R = 2546.4791
E = 12.0134

P.O.T.	76+04.8624	N 80° 52' 51.32" W 803939.9660 1932621.9936
P.I.	115+23.2288	800256.3749 1932411.3237
P.C.	113+54.0235	N 80° 52' 51.32" W 800416.8620 1932368.0867
P.T.	118+74.6464	S 68° 10' 00.15" W 800111.0027 1932352.1243
M.O.C.	115+19.3381	800254.4327 1932418.3660
Rad Pt		802251.7700 1932339.6309

P.I. - 115+23.2288
Delta = 50° 37' 05.53" Left
C = 9° 33' 23.14"
T = 156.1956
L = 310.8196
R = 579.0000
E = 21.5328

P.O.T.	116+74.7477	S 88° 10' 03.15" W 800111.4857 1932358.9853
P.I.	123+50.8000	S 51° 26' 47.80" W 799483.9261 1932106.6467

P.I. - 123+50.8000
Delta = 17° 01' 15.35" Left

Eq.Bk.	123+50.8001	----- EQUATION ----- 799483.9260 1932106.6466
Eq.Ah.	123+59.2323	----- EQUATION -----

P.I.	131+47.4295	798971.0769 1931668.1703
P.C.	129+72.8618	S 51° 08' 47.80" W 799007.6043 1931718.9547
P.T.	133+15.4981	S 15° 52' 33.52" W 798915.7632 1931437.1875
M.O.C.	131+42.1950	798992.1234 1931591.2907
Rad Pt		799267.5375 1931270.7617

P.I. - 131+47.4295
Delta = 34° 15' 52.80" Left
C = 10° 00' 00.00"
T = 176.2992
L = 342.8564
R = 572.9579
E = 26.5979

Eq.Bk.	134+47.1900	----- EQUATION ----- 798779.9500 1931509.2549
Eq.Ah.	133+97.0000	----- EQUATION -----
P.I.	137+66.1341	S 22° 33' 02.48" W 798859.2468 1930944.5775

P.I. - 10137+66.1341
Delta = 5° 29' 52.20" Right

P.O.T.	139+34.8796	S 22° 33' 02.48" W 798805.3080 1930796.5823

FLOODWALL SECTION A CENTERLINE OLD CARIO ROAD TO NORTH 32ND STREET

	EAST (X)	NORTH (Y)
P.O.T.	145+11.0691	S 17° 06' 55.10" W 798494.4834 1930841.2181
P.I.	150+66.5585	798292.9818 1929710.2973
P.C.	149+39.4650	S 17° 06' 52.13" W 798359.5119 1929927.3328
P.T.	152+84.8406	S 44° 42' 06.52" W 798133.2414 1929548.3859
M.O.C.	150+62.1525	798299.4144 1929724.4086
Rad Pt		797475.7704 1930196.5477

P.I. - 150+66.5585
Delta = 57° 30' 13.72" Right
C = 5° 11' 30.80"
T = 327.9939
L = 445.2730
R = 935.0000
E = 27.4662

Eq.Bk.	152+84.8400	----- EQUATION ----- 798133.2414 1929548.3859
Eq.Ah.	149+47.1500	----- EQUATION -----
P.I.	171+45.5342	796364.7475 1927924.1944
P.C.	167+92.1262	S 44° 42' 06.52" W 796235.4301 1928237.5193
P.T.	174+97.1592	S 23° 56' 10.92" W 796439.9519 1927658.5669
M.O.C.	171+44.6432	796311.4191 1927965.9703
Rad Pt		795231.4837 1928663.5639

P.I. - 171+45.5342
Delta = 90° 45' 56.84" Left
C = 5° 26' 17.99"
T = 358.4560
L = 705.0321
R = 1050.0000
E = 58.3030

P.O.T.	250+52.5742	S 23° 56' 10.92" W 795400.9945 1928323.7299

U.S. HIGHWAY 45 (8TH STREET)

	EAST (X)	NORTH (Y)
P.O.T.	100+00.0000	N 75° 09' 58.11" W 800385.2832 1931745.7458
P.I.	109+18.7899	799809.0356 1931980.4816
P.C.	108+80.1533	N 75° 09' 58.11" W 800011.0801 1931830.8008
P.T.	112+81.5800	N 15° 50' 02.18" E 799852.3248 1932587.2436
M.O.C.	127+87.5194	799728.8164 1932110.7281
Rad Pt		800975.7310 1932408.4710

P.I. - 109+18.7899
Delta = 89° 20' 57.26" Right
C = 6° 57' 06.95"
T = 823.6236
L = 893.7352
R = 840.0000
E = 257.3958

P.O.T.	120+23.9492	N 13° 50' 59.16" E 799939.6168 1933795.7453

KENTUCKY HWY. 305 - OLD CAIRO ROAD

	EAST (X)	NORTH (Y)
P.O.T.	0+00.0000	N 72° 53' 37.95" W 799646.4188 1930099.5845
P.I.	2+82.4096	799577.1942 1930185.0477
P.C.	0+93.0494	N 72° 53' 37.95" W 799887.1164 1930108.6544
P.T.	5+43.3731	N 61° 55' 00.17" W 799345.2181 1930356.4669
M.O.C.	2+81.7658	799581.2359 1930196.6852
Rad Pt		799994.4308 1929235.9997

P.I. - 2+82.4096
Delta = 23° 27' 37.78" Right
C = 2° 00' 00.00"
T = 282.2412
L = 563.0267
R = 2864.7890
E = 11.6777

P.I.	10+87.4568	797986.7017 1930564.5773
P.C.	9+47.3757	N 61° 55' 00.17" W 797928.1155 1930443.5823
P.T.	12+28.4596	N 73° 54' 19.48" W 797731.8765 1930506.4072
M.O.C.	10+87.0177	797963.0934 1930556.3621
Rad Pt		797314.8103 1929235.7758

P.I. - 10+87.4568
Delta = 11° 09' 29" Left
C = 4° 00' 00.00"
T = 158.9541
L = 279.3940
R = 1432.3945
E = 8.6142

P.O.T.	16+11.9774	N 73° 54' 19.48" W 797383.4478 1932717.5419

NOTES

THE BASIS FOR NORTH SHOWN ON THIS SURVEY AND ALL COORDINATES SHOWN WAS DERIVED FROM A GPS OBSERVATION PERFORMED THROUGH THE KGS CORS STATION ARTHUR. THE COORDINATES SHOWN ARE KENTUCKY STATE PLANE SOUTH ZONE (1983/2007). THE OBSERVATIONS WERE PERFORMED AUGUST 6 AND 7, 2008 ON THE REFLECTIVE SURVEY AS FB-08 THROUGH FB-014

THIS SURVEY WAS PERFORMED BY THE METHOD OF RANDOM TRAVERSE TWO INDIVIDUAL TRAVERSES WERE PERFORMED THE ANGULAR AND LINEAR MISCLOSURE OF EACH OF THESE TRAVERSES FOR THE ENTIRE ROAD AND ONE PART IN EXCESS OF THE REQUIREMENTS FOR A CLASS "A" SURVEY AS SET FORTH BY THE KENTUCKY BOARD OF SURVEYORS. THIS SURVEY IS A CLASS "A" AS SET FORTH BY THE KENTUCKY BOARDOF SURVEYORS FOR PROFESSIONAL LAND SURVEYORS DATED 10/2001.

THE ORIGINAL FIELD INVESTIGATION AND TRAVERSE FOR THIS SITE WAS PERFORMED ON FROM AUGUST 31, 2009 TO OCTOBER 26, 2009 THE FINAL MONUMENTS SHOWN HAVE BEEN SET ON ------, 2009 THROUGH ------, 2009

REFERENCE SHOULD BE MADE TO THE ORIGINAL SHEET OF WAY PLANS FOR THE "OHIO RIVER BANKS FLOOD PROTECTION PROJECTS AT" AS PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS DATED SEPTEMBER 1968. THE CES FILE NUMBERS FOR THE DRAWINGS ARE 634-ELE/ENTRANCE 634-ELE/S

DATE	REVISION	BY
DATE	REVISION	BY
DATE	REVISION	BY

Florence & Hutcheson, Inc.
CONSULTING ENGINEERS
2500 York Road, Suite Twenty KY. 40205
Telephone (502) 451-8560

BOUNDARY SURVEY OF THE PADUCAH FLOODWALL SECTION "A"
FLOODWALL CENTERLINE GEOMETRY

Drawn	Check	Mechanical	Electrical	Project No.
M.A.C.				07074
Chk.	Project	Approved	Date	Scale
W.B.F.	D.M.K.		10/26/2009	N/A

OE 7

1330