CLARKE BAYOU BRIDGE HAER No. LA-28
(Bridge Recall No. 012200)
Carries U.S. Route 80 (US 80) over Clarke Bayou
Fillmore vicinity
Bossier Parish
Louisiana

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

FIELD RECORDS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street, NW
Washington, DC 20240

HISTORIC AMERICAN ENGINEERING RECORD
CLARKE BAYOU BRIDGE
(Bridge Recall No. 012200)

HAER No. LA-28

Location: Carries U.S. Route 80 (US 80) over Clarke Bayou near Fillmore, Bossier Parish, Louisiana.

The Clarke Bayou Bridge (Bridge Recall No. 012200) is located at latitude 32.567899 north, longitude -93.485655 west.[1] The coordinate represents the center of the bridge. It was obtained in 2016 by plotting its location in Google Earth. The location has no restriction on its release to the public.

Present Owner: State of Louisiana.

Present Use: Vehicular traffic.

Significance: The Clarke Bayou Bridge is a culvert consisting of a stacked, multi-cell design that demonstrates distinctive design features. This culvert exhibits a unique design where two rows of box culvert cells are stacked, one atop the other. The Clarke Bayou Bridge was determined eligible for listing in the National Register of Historic Places (National Register) in 2013 under *Criterion C: Engineering* at the state level of significance.[2]

Historian: Katherine Haun Schuring, Cultural Resource Specialist; Mead & Hunt, Inc., 2017.

Project Information: This documentation was prepared as mitigation to fulfill Stipulation IX.5 of the *Programmatic Agreement Among the Federal Highway Administration, the Louisiana Department of Transportation and Development, the Advisory Council on Historic Preservation, and the Louisiana State Historic Preservation Officer Regarding Management of Historic Bridges in Louisiana*, dated August 18, 2015, and executed September 21, 2015. The Louisiana Department of Transportation and Development (LADOTD) retained Mead & Hunt, Inc. (Mead & Hunt) to prepare this document. It was prepared by cultural resource specialist Katherine Haun Schuring of Mead & Hunt, Inc. Dietrich Floeter completed the photography.

---

[1] The bridge is also known as Structure No. 04080010316232.

[2] Mead & Hunt, Inc., *National Register Eligibility Determination Report, Pre-1971 Louisiana Highway Bridges* (prepared for the Louisiana Department of Transportation, September 2013).

Part I. Historical Information

A. Physical History:

1. Date(s) of construction: 1926; modified ca. 1948.

2. Engineer: Louisiana Highway Commission.

3. Builder/Contractor/Supplier: Girault & Le Gaurdeur, Shreveport, La.

4. Original plans and construction: Plans identified for the culvert include a standard plan and a general plan specific to the Clarke Bayou Bridge. Plans were prepared by the Louisiana Highway Commission (LHC) and are available in the General Files room at the LADOTD's Baton Rouge headquarters. The standard plan, titled "Multiple Concrete Box Culverts" (Standard plan B-2-46) is in poor condition and a date is illegible. A final tracing titled, "General Plan for Culverts at Sta. 23+00 and Sta. 123+15, Project 75A," for the culvert was prepared by the LHC and is dated November 1925. Construction was completed in 1926.

5. Alterations and additions: A second row of box culverts and concrete bi-rail was added to the structure ca. 1948. Other alterations to the Clarke Bayou Bridge include removal of two of the bottom horizontal concrete rails on the north elevation. Additionally, the southwest wingwall was replaced ca. 2012 with timber cribbing.[3] At an unknown date, guardrail was added to both sides of the east end of the culvert.

B. Historical Context:

Historical background

The Clarke Bayou Bridge was constructed as part of large federal-aid road improvement project undertaken by the LHC in the 1920s.[4] In 1923 the LHC made formal plans to complete improvements on US 80 (also historically State Road [SR] 4), a trans-continental highway that extends through the northern portion of the state and on which the subject culvert is located. This effort continued earlier LHC-initiated improvement work on the federal-aid highway, and by 1923 only a 6-mile stretch between Shreveport and Minden in Bossier and Webster Parishes was left to improve.[5] LHC engineers prepared plans for the proposed road work, including straightening and realigning the road, realigning creeks and improving

[3] *Bridge Inspection Report*, Recall No. 012200, November 16, 2012, available in Bridge Maintenance and Inspection Division, Louisiana Department of Transportation and Development, Baton Rouge, La.

[4] The Clarke Bayou is also referred to as the Clark Bayou on road development plans.

[5] Louisiana Highway Commission, *Biennial Report of the Louisiana Highway Commission of the State of Louisiana 1922-1924* (Baton Rouge, La.: Louisiana Highway Commission, 1924), n.p.; Louisiana Highway Commission, "Plan and Profile of Proposed State Highway: Minden-Shreveport Highway, La. Federal Aid Project No 75, Bossier Parish," 1923, final tracings, available on microfilm at the Louisiana Department of Transportation and Development, Baton Rouge, Louisiana.

drainage, grading, and gravelling the route.[6] At the Clarke Bayou, engineers planned for a new multi-cell culvert to replace a timber frame structure.

As part of the road realignment and drainage improvement efforts, LHC engineers planned for 28 new drainage structures, comprised of 19 box culverts and nine pipe culverts along the 6-mile stretch of highway.[7] To meet hydraulic needs at individual sites, box culverts had spans of between 2'-0" and 8'-0" and were constructed with two to 12 cells. Each cell is a monolithic, four-sided concrete structure. The LHC utilized one of two department-prepared standard plans—B-2-5b or B-2-46, plans for a double or multiple-cell culverts, respectively—for each of the culverts along the highway.[8] In addition to the standard plan, the LHC prepared a plan sheet specific to two of the largest culverts along the route.

In early 1926 contractors Girault & LeGaurdeur of Shreveport began construction on the Clarke Bayou Bridge.[9] Construction closely followed Standard Plan B-2-46, titled "Multiple Concrete Box Culverts | Flaring Wing Walls | 6 Ft to 8 Ft Spans | 3 Ft to 8 Ft Heights." The plan provided details to construct a reinforced-concrete box culvert with multiple horizontal cell openings ranging in length from 3'-0" to 8'-0" and could have up to six cells per span.[10] The LHC also prepared a specific general plan for the Clarke Bayou Bridge titled "General Plan for Culverts at Sta. 123+00 and Sta. 123+15, Project 75A," dated November 1925. This plan provided specific construction details for the culvert, including steel and concrete quantities and a detail of the expansion joints, which was required for culverts over six cells wide.[11]

In order to achieve the necessary length for the crossing, the LHC designed the Clarke Bayou Bridge with 12, 8'-0" by 8'-0" cells. The 12 cells were broken into three "clear spans" comprised of four cells per span. Clear spans were joined using a special "expansion joint" detailed on the general plan sheets. This

---

[6] Louisiana Highway Commission, "Plan and Profile of Proposed State Highway: Minden-Shreveport Highway, La. Federal Aid Project No 75, Bossier Parish."

[7] L.D. Asmus, "Final Inspection Report Louisiana 75-A Parish: Bossier," November 14, 1926, available in Bridge Inventory files, Louisiana Department of Transportation and Development.

[8] Louisiana Highway Commission, "Plan and Profile of Proposed State Highway: Minden-Shreveport Highway, La. Federal Aid Project No 75, Bossier Parish"; George LeGardeur to the Louisiana Highway Commission, "Re: Additional Plans, Federal Aid Project 75 'A,'" November 15, 1925, available in Bridge Inventory files, Louisiana Department of Transportation and Development.

[9] George LeGardeur to the Louisiana Highway Commission, "Re: Additional Plans, Federal Aid Project 75 'A.'"

[10] Louisiana Highway Commission, "Multiple Concrete Box Culverts, Flaring Wing Walls, 6 Ft to 8Ft Spans, 3 Ft to 8 Ft Heights," n.d., final tracings, available on microfilm at the Louisiana Department of Transportation and Development, Baton Rouge, Louisiana; Louisiana Highway Commission, "Plan and Profile of Proposed State Highway: Minden-Shreveport Highway, La. Federal Aid Project No 75, Bossier Parish."

[11] "General Plan for Culverts at Sta. 123+00 and Sta. 123+15, Project 75A," available in Bridge Inventory files, Louisiana Department of Transportation and Development.

expansion joint (contemporarily called a keyway) connected the clear spans together and also allowed for correct vertical alignment of the structure.[12]

By June 1926 contractors completed work on the Clarke Bayou Bridge.[13] As evidenced by a historic photograph, in its finished form the culvert was comprised of a single level with 12 cells, four concrete wingwalls, concrete curbing, and a gravel deck. It did not have a railing.[14]

At approximately 108' in length, the Clarke Bayou Bridge was the largest of the 28 culverts constructed for the 6-mile road project. The second largest culvert along the route was a 10-cell culvert located just west of the Clarke Bayou Bridge. Final inspection of the culvert occurred in November 1926. The finishing work on the channel and removal of the former 74'-0"-long frame bridge over the bayou occurred in the spring of 1927.[15]

A second row of box cells, measuring 6'-0" by 8'-0", and a concrete bi-rail were added to the structure. It is likely that the improvement to the culvert occurred between 1943 and 1948 based on contracts listed in biennial reports. In 1943 the LHC let a contract on SR 4/US 10 between Bossier City and the Webster Parish line.[16] The project, which was project number SPN 932-00-04, for advanced engineering along the route was listed in the 1946-1947 biennial report as active.[17] By the publication of the 1948-1949 supplement to the biennial report, the project was listed as inactive.[18] Therefore, a ca. 1948 date has been assigned to the construction of the second row of box cells. A set of 1954 plans associated with improvement of US 10 to a divided highway confirms that the culvert was modified with a second row by this time.[19]

While it is unknown why the LHC improved the culvert, the additional cells increased the overall hydraulic capacity of the structure. An elevation diagram of the culvert found in the 1954 US 80 improvement plan

---

[12] Research did not reveal any other correspondence between the LHC and contractors or additional construction details for the culvert. Louisiana Highway Commission, "Multiple Concrete Box Culverts, Flaring Wing Walls, 6 Ft to 8Ft Spans, 3 Ft to 8 Ft Heights."

[13] L.D. Asmus, "Construction Report Louisiana 75-A Parish: Bossier," June 9, 1926, available in Bridge Inventory files, Louisiana Department of Transportation and Development.

[14] Louisiana Highway Commission, "12 8x8 Openings Station 123," August 25, 1926, available in Bridge Inventory files, Louisiana Department of Transportation and Development.

[15] L.D. Asmus, "Final Inspection Report Louisiana 75-A Parish: Bossier"; Louisiana Highway Commission, "Plan and Profile of Proposed State Highway: Minden-Shreveport Highway, La. Federal Aid Project No 75, Bossier Parish."

[16] Louisiana Highway Commission, *Twelfth Biennial Report of the Louisiana Highway Commission* (Baton Rouge, La.: Louisiana Highway Commission, 1943), 32–33.

[17] Louisiana Highway Commission, *Fourteenth Biennial Report of the Louisiana Highway Commission* (Baton Rouge, La.: Louisiana Highway Commission, 1947), 170.

[18] Louisiana Highway Commission, *Fifteenth Biennial Report of the Louisiana Highway Commission* (Baton Rouge, La.: Louisiana Highway Commission, 1949), 91.

[19] Louisiana Highway Commission, "Plans of Proposed State Highway F.I.-75(9) & F.I.-116(11) State Project No. 1-03-21 & 1-04-17 Fillmore - McIntyre Hwy. Bossier & Webster Parish," 1":2000' ([Baton Rouge, La], March 1954).

notes “Heavy Rains F.L. 192.41” pointing to the lower row of the culvert cells and “Extra Heavy Rain” to the top row of cells.[20] Therefore, the hydraulic needs for the bayou may have been a chief concern when the LHC modified the culvert.

Other alterations to the Clarke Bayou Bridge include removal of two of the bottom horizontal concrete rails on the north elevation. Additionally, the southwest wingwall was replaced ca. 2012 with timber cribbing.[21] At an unknown date, guardrail was added to both sides of the east end of the culvert.

Part II. Structural/Design Information

A. General Statement:

1. Character: The Clarke Bayou Bridge is a reinforced-concrete, multi-cell box culvert. The culvert is of unusual design with two rows of box cells vertically stacked.

2. Condition of fabric: Good.

B. Description: The Clarke Bayou Bridge carries two lanes of westbound US 80 traffic in an east-west alignment across Clarke Bayou, near the Bossier and Webster Parish lines. It has an overall length of approximately 108' and an out-to-out deck width of approximately 28', equal to the culvert’s barrel length. The deck accommodates a 24'-0" bituminous-surfaced roadway, narrow shoulders, and railings. The culvert does not have any approach spans or slabs.

Design of structure
The Clarke Bayou Bridge is a reinforced-concrete, cast-in-place, multi-cell box culvert. It is comprised of two stacked rows of 12 cells (for a total of 24 cells). Each cell has an opening 8'-0" wide (measured from the inside of the cell walls) with a 9" wall between cells. The cell is the structural unit or hydraulic opening through which water flows. In the case of the Clarke Bayou Bridge, cells have been stacked vertically in two rows to create a larger structure.

The culvert overall was cast in three distinct sections. Each section, referred to as a “clear span” on standard plans, is comprised of a block or unit that is four cells wide. The culvert was modified ca. 1948 with a second row of cells, for a total of eight cells per section. All cells in a section share common walls. To connect adjacent sections and retain correct vertical alignments, the section joints incorporate keyways (called expansion joints on plans). The interlocking keyways were formed when each section was poured and are designed to maintain the alignment of the entire culvert top or driving surface.

[20] Louisiana Highway Commission, “Plans of Proposed State Highway F.I.-75(9) & F.I.-116(11) State Project No. 1-03-21 & 1-04-17 Fillmore - McIntyre Hwy. Bossier & Webster Parish.”

[21] *Bridge Inspection Report*, Recall No. 012200.

There are four wingwalls, comprised of three cast-in-place, reinforced-concrete walls and one replacement timber wall. The wingwalls taper diagonally to the concrete floor.

Railing
The Clarke Bayou Bridge features a simple concrete railing that extends the length of the culvert on both sides. The railing is divided into three sections that correspond to the culvert clear-span sections. Each section is made up of cast 2'-6"-high concrete posts aligned directly above cell walls, connected with a pair of horizontal rails. The upper rail is cast in a "T" section; the lower rail is a rectangle. The railing was added ca. 1948 when the culvert was modified with a second row of cells. At an unknown time two of the bottom horizontal concrete rails on the north elevation were removed and guardrail was added to both sides of the east end of the culvert's railing.

C. Site Information: The Clarke Bayou Bridge carries two lanes of westbound US 80 traffic over the Clarke Bayou in Bossier Parish, Louisiana. The culvert is located approximately 1.7 miles east of the community of Fillmore and approximately 0.25 of a mile south of Interstate Highway 20. It is located in a rural area; a stand of trees is to the north and a modern concrete girder bridge that carries eastbound US 80 traffic is directly south.

Part III. Sources of Information

A. Primary Sources:

Bridge Inspection Report. Recall No. 012200, November 16, 2012. available in Bridge Maintenance and Inspection Division, Louisiana Department of Transportation and Development, Baton Rouge, La.

"General Plan for Culverts at Sta. 123+00 and Sta. 123+15, Project 75A." Baton Rouge, La: Louisiana Highway Commission, November 1925.

George LeGardeur to the Louisiana Highway Commission. "Re: Additional Plans, Federal Aid Project 75 'A,'" November 15, 1925. Available in Bridge Inventory files, Louisiana Department of Transportation and Development.

L.D. Asmus. "Construction Report Louisiana 75-A Parish: Bossier," June 9, 1926. Available in Bridge Inventory files, Louisiana Department of Transportation and Development.

———. "Final Inspection Report Louisiana 75-A Parish: Bossier," November 14, 1926. Available in Bridge Inventory files, Louisiana Department of Transportation and Development.

Louisiana Highway Commission. "12 8x8 Openings Station 123," August 25, 1926. Available in Bridge Inventory files, Louisiana Department of Transportation and Development.

———. *Biennial Report of the Louisiana Highway Commission of the State of Louisiana 1922-1924*. Baton Rouge, La.: Louisiana Highway Commission, 1924.

———. *Fifteenth Biennial Report of the Louisiana Highway Commission*. Baton Rouge, La.: Louisiana Highway Commission, 1949.

———. *Fourteenth Biennial Report of the Louisiana Highway Commission*. Baton Rouge, La.: Louisiana Highway Commission, 1947.

———. "Multiple Concrete Box Culverts, Flaring Wing Walls, 6 Ft to 8Ft Spans, 3 Ft to 8 Ft Heights," n.d. Final tracings, available on microfilm at the Louisiana Department of Transportation and Development, Baton Rouge, Louisiana.

———. "Plan and Profile of Proposed State Highway: Minden-Shreveport Highway, La. Federal Aid Project No 75, Bossier Parish," 1923. Final tracings, available on microfilm at the Louisiana Department of Transportation and Development, Baton Rouge, Louisiana.

———. "Plans of Proposed State Highway F.I.-75(9) & F.I.-116(11) State Project No. 1-03-21 & 1-04-17 Fillmore - McIntyre Hwy. Bossier & Webster Parish." 1":2000'. [Baton Rouge, La], March 1954.

———. *Twelfth Biennial Report of the Louisiana Highway Commission*. Baton Rouge, La.: Louisiana Highway Commission, 1943.

B. Secondary Sources:

Mead & Hunt, Inc. *Historic Context for Louisiana Bridges*. Prepared for the Louisiana Department of Transportation and Development, December 2013.

———. *National Register Eligibility Determination Report, Pre-1971 Louisiana Highway Bridges*. Prepared for the Louisiana Department of Transportation and Development, September 2013.

HISTORIC AMERICAN ENGINEERING RECORD

INDEX TO PHOTOGRAPHS

CLARKE BAYOU BRIDGE **HAER No. LA-28**
(Bridge Recall No. 012200)
Carries U.S. Route 80 (US 80) over Clarke Bayou
Fillmore vicinity
Bossier Parish
Louisiana

INDEX TO BLACK AND WHITE PHOTOGRAPHS

Dietrich G. Floeter, photographer, February and March 2016
Scale Device 8 Feet Long

LA-28-1 North elevation, from northeast

LA-28-2 South elevation, from southeast

LA-28-3 Approach, from east

LA-28-4 Approach from west

LA-28-5 Bridge deck, from east

LA-28-6 View from bridge to north

LA-28-7 View from bridge to south

LA-28-8 Detail view of southwest abutment, from south

LA-28-9 Detail view of southeast abutment, from southwest

LA-28-10 Detail view of north side, from northwest

LA-28-11 Detail view showing proximity to new highway bridge, from west

LA-28-12 Detail view of south side, from southwest

LA-28-13 Detail view of south side with 8-foot scale device, from south

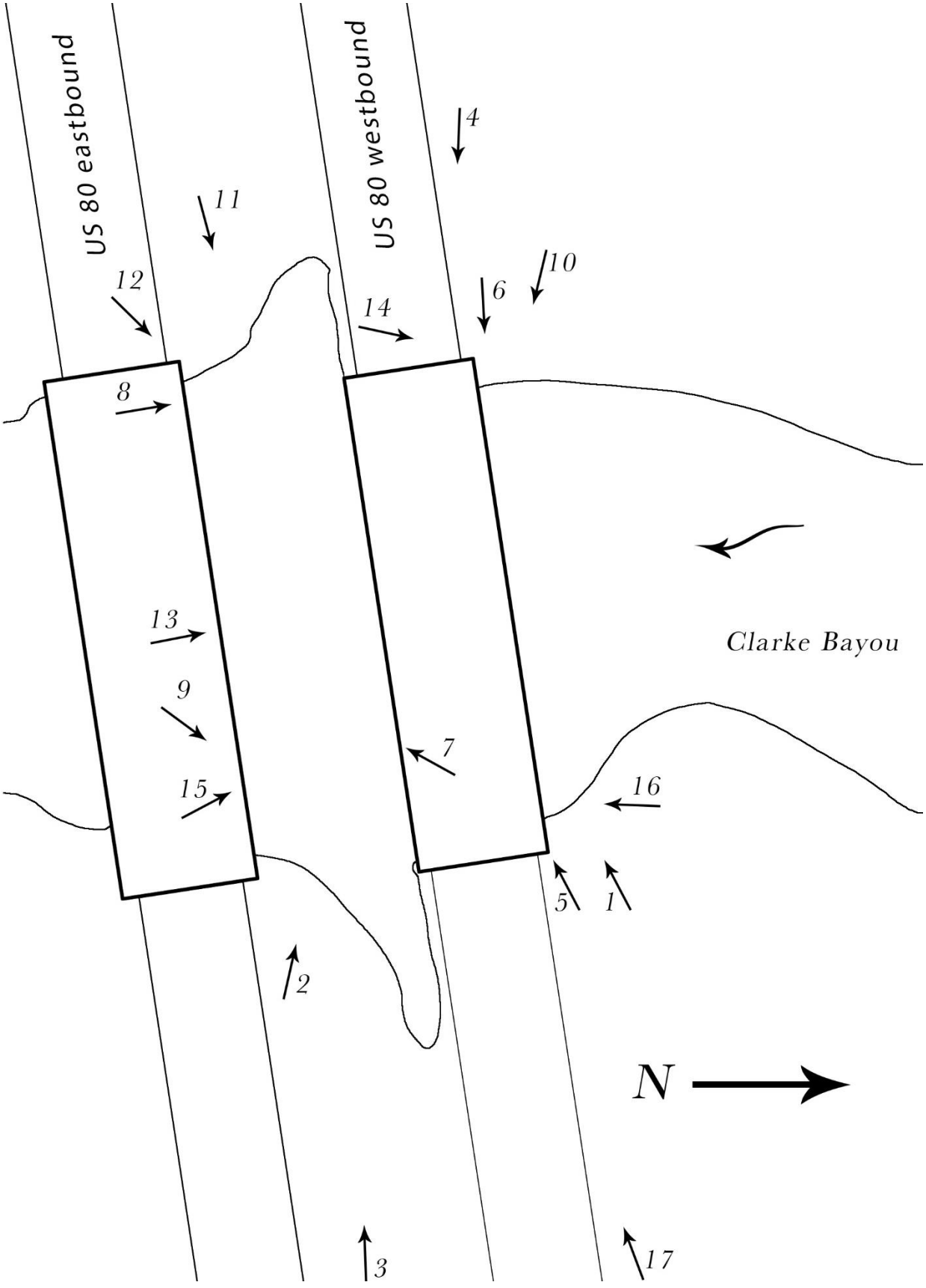
LA-28-14 Detail inner view of railing, from south

LA-28-15 Detail outer of railing, from south

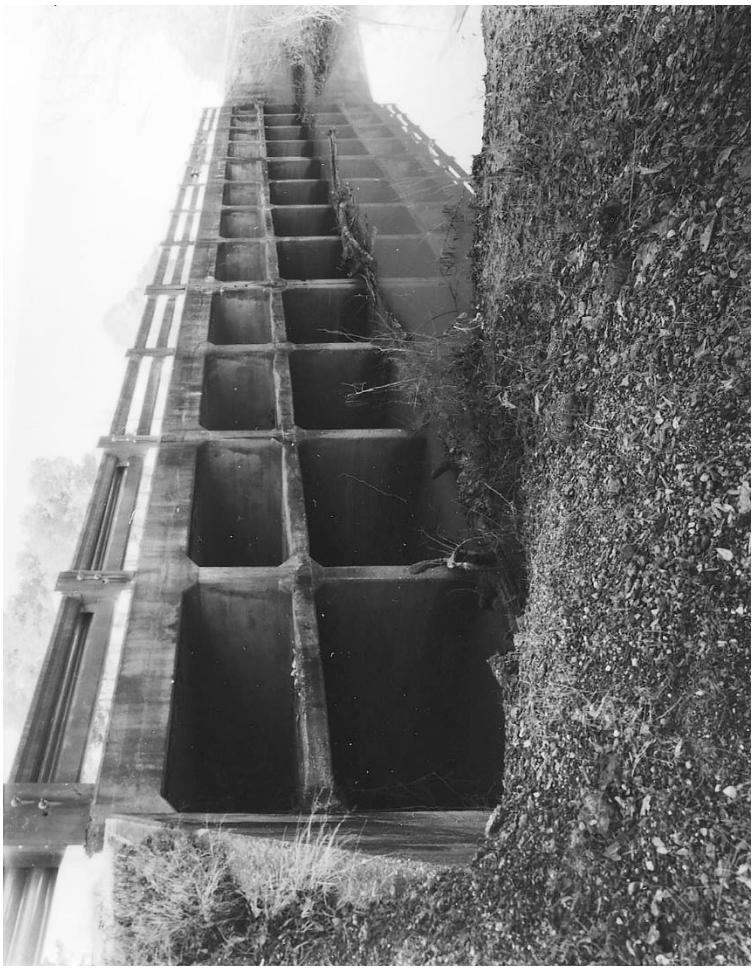
LA-28-16 Detail view of barrel, from northeast

LA-28-17 Overview, from east

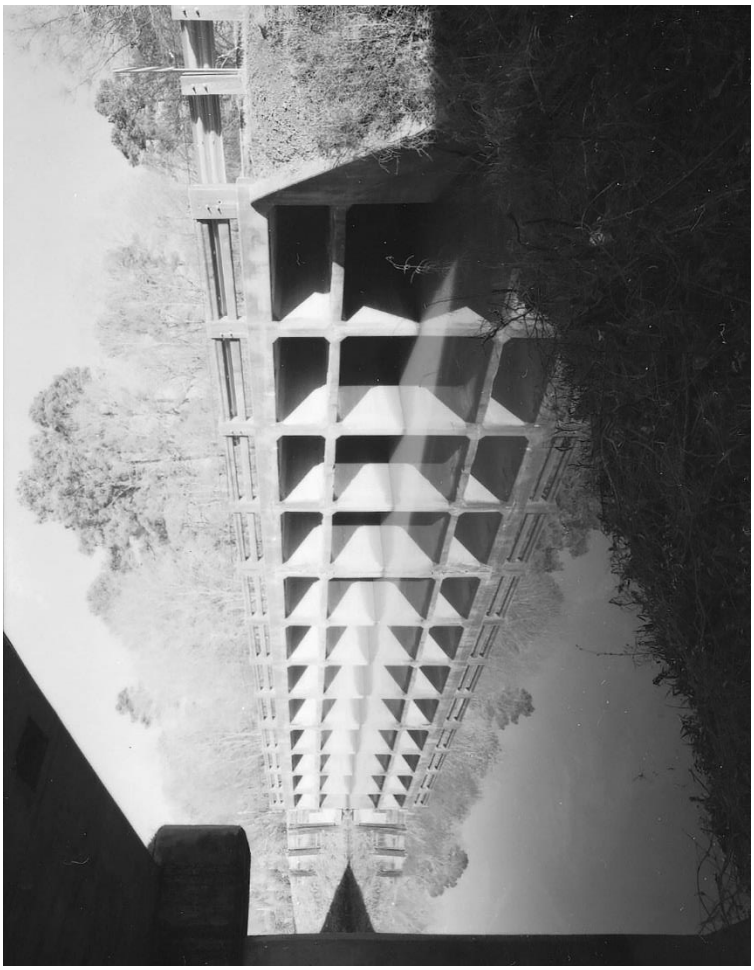
CLARKE BAYOU BRIDGE
HAER No. LA-28
INDEX TO PHOTOGRAPHS



HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-28-1



HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-28-2



HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-28-3

HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-28-4

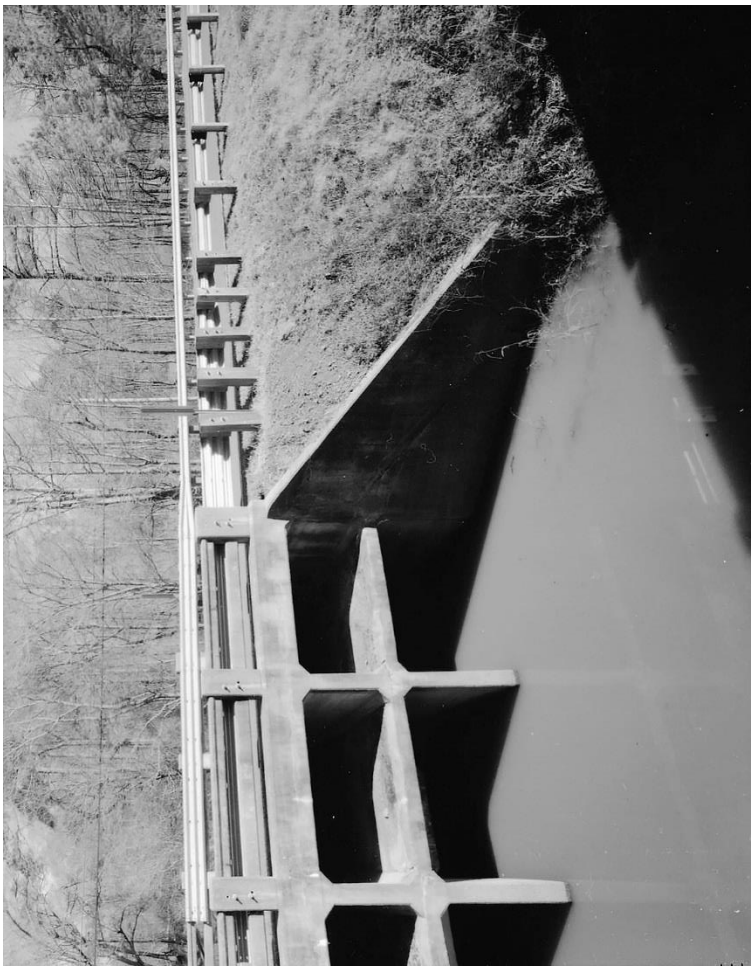
HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-28-5

HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-28-6

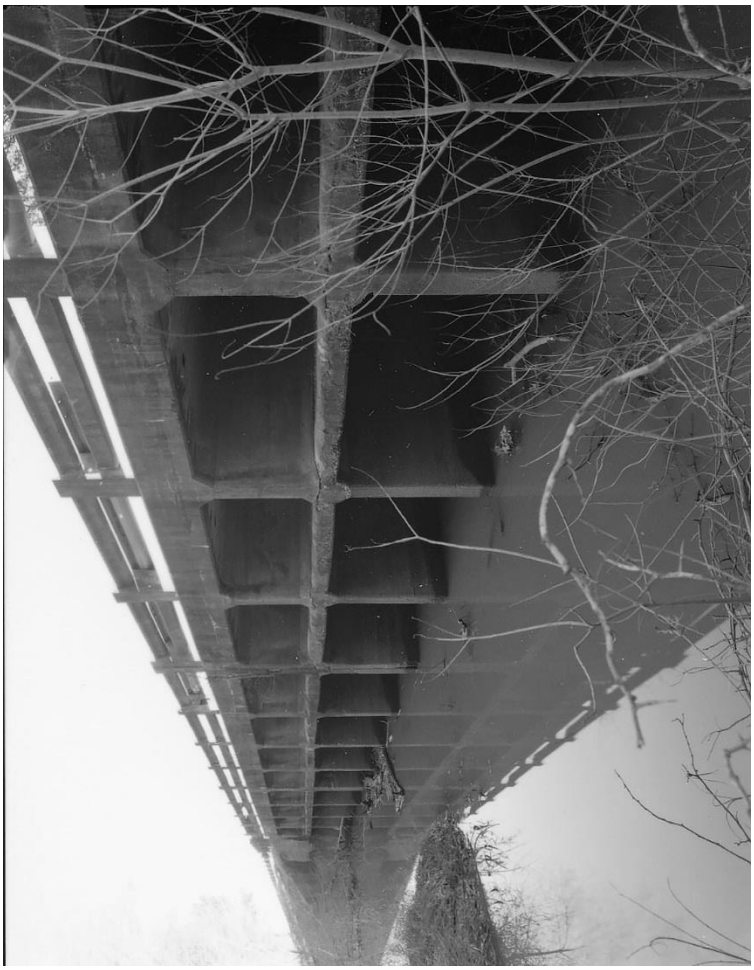
HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-28-7

HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-28-8

HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-28-9



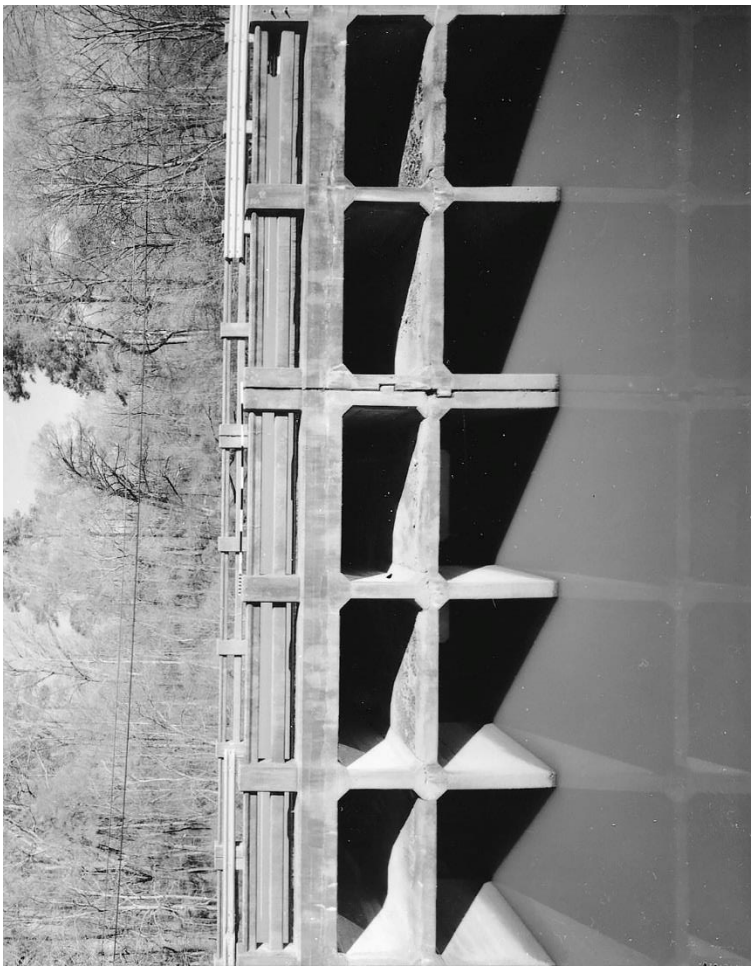
HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-28-10



HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-28-11

HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-28-12

HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-28-13



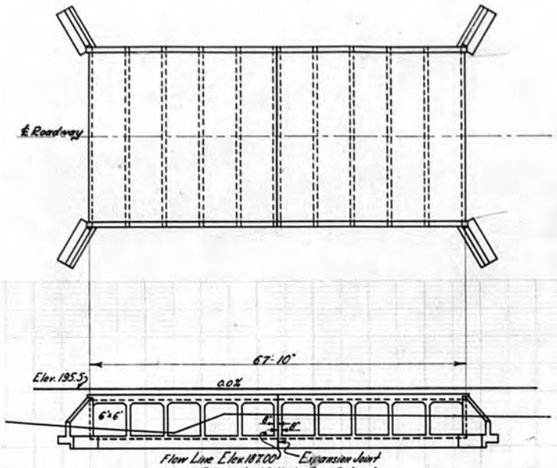
HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-28-14

HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-28-15

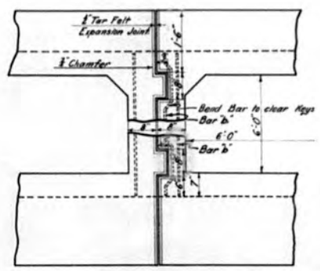
HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-28-16

HISTORIC AMERICAN ENGINEERING RECORD
See Index to Photographs for Caption
HAER NO. LA-28-17

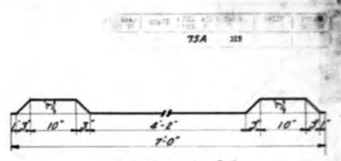
25



Concrete Multiple Box Culvert
10-6'6"x5'3" Openings
Sta. 23+00
Quantities: Concrete - 189.16 Cu. Yds.
Steel - 14106 Pounds.

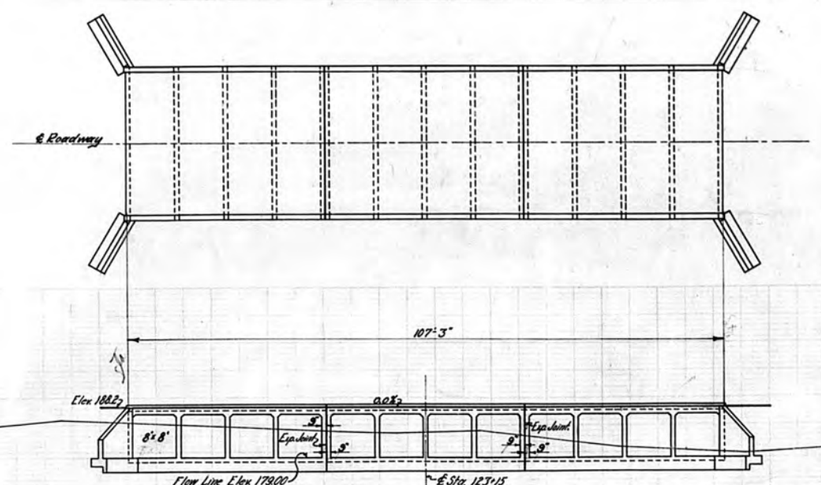


Detail of Expansion Joints
On Concrete Culvert. Sta. 23+00
Scale 3/4"=1'0"



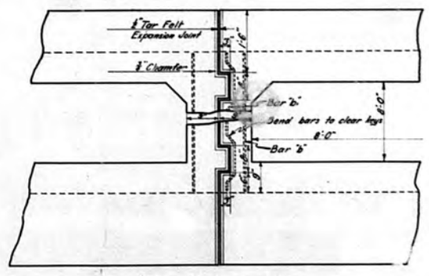
Detail of Bar "b"

23 24

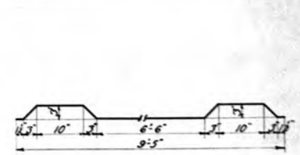


Concrete Multiple Box Culvert
12-8'8"x8'8" Openings
Sta. 123+15

Quantities: Concrete - 317.89 Cu. Yds.
Steel - 32838 Pounds.



Detail of Expansion Joints
On Concrete Culverts Sta. 123+15
Scale: 3/4"=1'0"

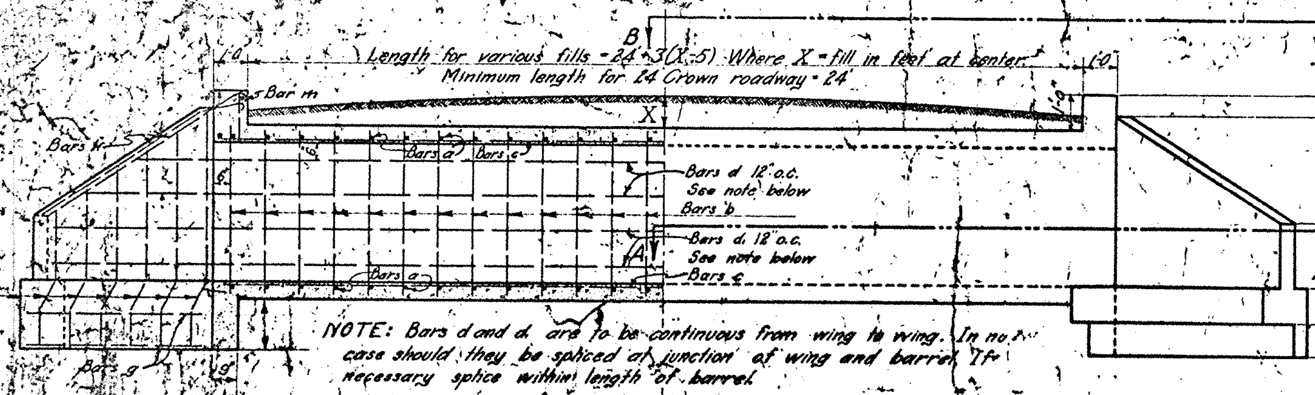


Detail of Bar "b"

GENERAL PLAN FOR CULVERTS
AT
Sta. 23+00 and Sta. 123+15
PROJECT 75A
LOUISIANA HIGHWAY COMMISSION
BATON ROUGE, LA.
Scale: 1"=10'-0" except as noted. Nov. 25, 1925.

8-10-26

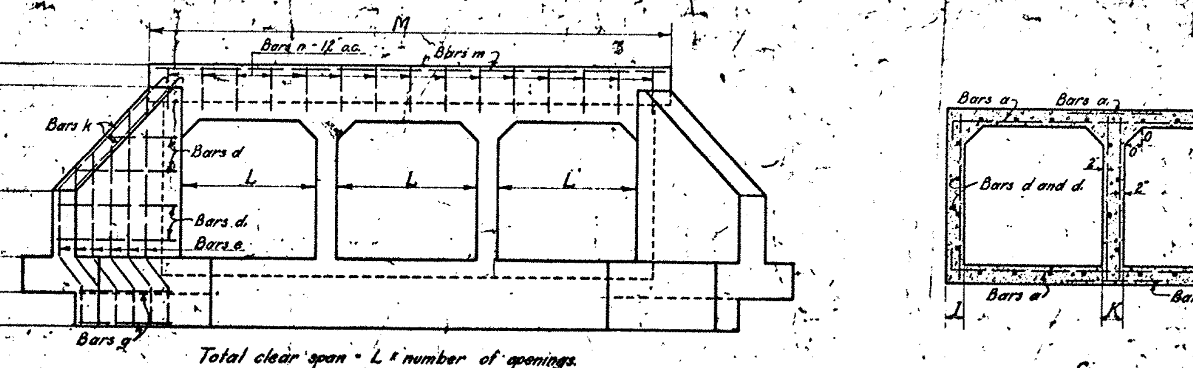
FINAL TRACINGS



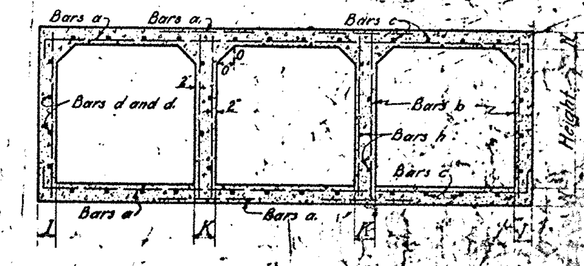
NOTE: Bars d and d₁ are to be continuous from wing to wing. In no case should they be spliced at junction of wing and barrel. If necessary splice within length of barrel.

HALF SECTION ON ℄

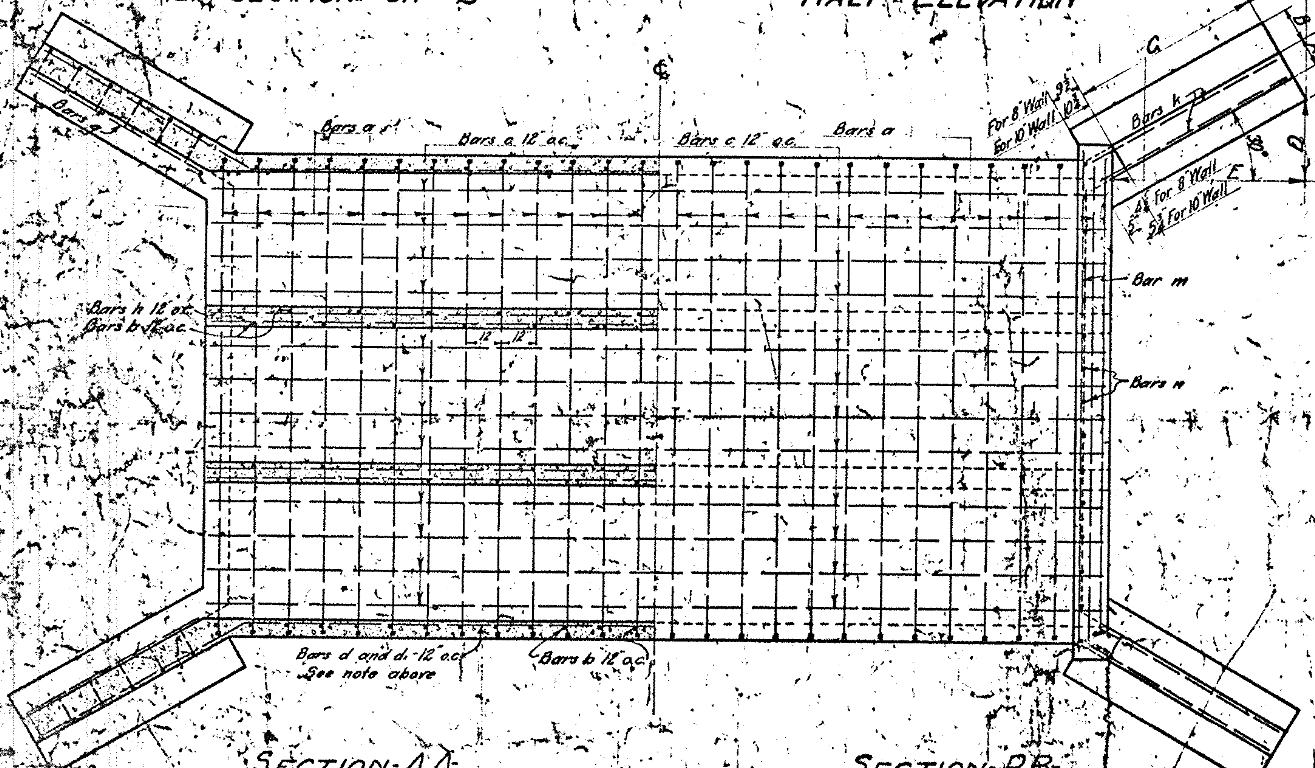
HALF ELEVATION



END ELEVATION

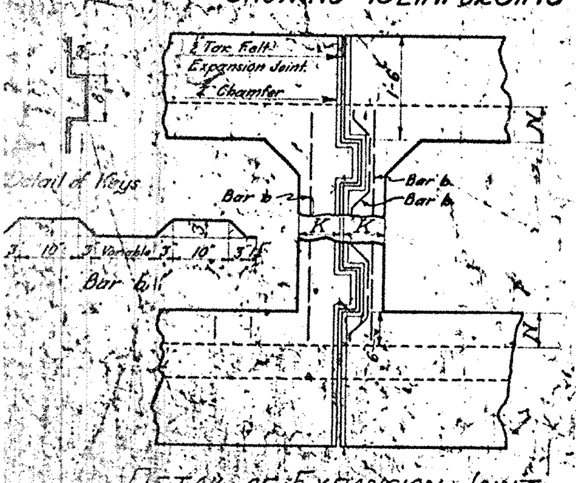


SECTION OF BARREL

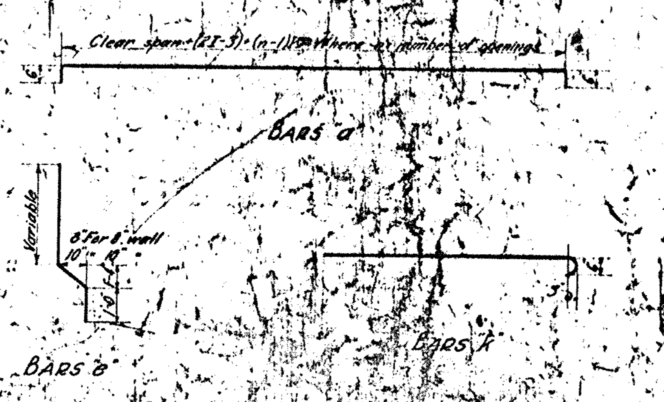


SECTION-AA SHOWING REINFORCING

SECTION-BB SHOWING REINFORCING



DETAIL OF EXPANSION JOINT
Scale: 1" = 1'-0"
To be used in large culverts when so directed by Engineer



REINFORCEMENT FOR 24' CULVERT

BARREL REINFORCEMENT ALL ½" □ BARS — WING AND CURB REINFORCEMENT ALL ½" □ BARS

Clear Height	Total Clear Span	Bars a No.	Bars a Length	Bars a Spacing Ins.	Bars a₁ No.	Bars a₁ Length	Bars b No.	Bars b Length	Bars c No.	Bars c Length	Bars d Short Bar	Bars d Variation	Bars d Long Bar	Bars d No. of each Length	Bars d₁ No.	Bars d₁ Length	Bars h No.	Bars h Length	Bars m No.	Bars m Length	Bars n No.	Bars n Length	Bars e Short Bar	Bars e Variation	Bars e Long Bar	Bars e No. of each Length	Bars g No.	Bars g Length	Bars k No.	Bars k Length
3	6	70	8'-3"	9"	70	2'-0"	78	3'-9"	12	25'-9"	31'-3"	3'-6"	34'-9"	2	2	34'-10"	3	25'-9"	2	7'-9"	16	1'-3"	3'-8"	7"	6'-0"	4	4	4'-9"	8	[illegible]
	9	70	11'-9"	9"	140	2'-0"	104	3'-9"	18	25'-9"	31'-3"	3'-6"	34'-9"	2	2	34'-10"	6	25'-9"	2	11'-3"	24	1'-3"	3'-8"	7"	6'-0"	4	4	4'-9"	8	6'-0"
	12	70	15'-3"	9"	210	2'-0"	130	3'-9"	24	25'-9"	31'-3"	3'-6"	34'-9"	2	2	34'-10"	9	25'-9"	2	14'-9"	30	1'-3"	3'-8"	7"	6'-0"	4	4	4'-9"	8	6'-0"
	15	70	18'-9"	9"	280	2'-0"	156	3'-9"	30	25'-9"	31'-3"	3'-6"	34'-9"	2	2	34'-10"	12	25'-9"	2	18'-3"	38	1'-3"	3'-8"	7"	6'-0"	4	4	4'-9"	8	6'-0"
	18	70	22'-3"	9"	350	2'-0"	182	3'-9"	36	25'-9"	31'-3"	3'-6"	34'-9"	2	2	34'-10"	15	25'-9"	2	21'-9"	44	1'-3"	3'-8"	7"	6'-0"	4	4	4'-9"	8	6'-0"
4	8	70	10'-4"	9"	70	2'-9"	78	4'-9"	16	25'-9"	31'-3"	3'-6"	34'-9"	2	4	37'-0"	4	25'-9"	2	10'-3"	22	1'-3"	4'-3"	7"	7'-2"	4	4	5'-10"	8	7'-5"
	12	70	14'-11"	9"	140	2'-9"	104	4'-9"	24	25'-9"	31'-3"	3'-6"	34'-9"	2	4	37'-0"	8	25'-9"	2	14'-10"	30	1'-3"	4'-3"	7"	7'-2"	4	4	5'-10"	8	7'-5"
	16	70	19'-6"	9"	210	2'-9"	130	4'-9"	32	25'-9"	31'-3"	3'-6"	34'-9"	2	4	37'-0"	12	25'-9"	2	19'-5"	40	1'-3"	4'-3"	7"	7'-2"	4	4	5'-10"	8	7'-5"
	20	70	24'-4"	9"	280	2'-9"	156	4'-9"	40	25'-9"	31'-3"	3'-6"	34'-9"	2	4	37'-0"	16	25'-9"	2	24'-0"	50	1'-3"	4'-3"	7"	7'-2"	4	4	5'-10"	8	[illegible]
	24	70	28'-8"	9"	350	2'-9"	182	4'-9"	48	25'-9"	31'-3"	3'-6"	34'-9"	2	4	37'-0"	20	25'-9"	2	28'-7"	58	1'-3"	4'-3"	7"	7'-2"	4	4	5'-10"	8	[illegible]
5	10	78	12'-7"	8"	76	3'-3"	78	5'-9"	20	25'-9"	31'-3"	3'-6"	38'-3"	2	4	39'-8"	5	25'-9"	2	12'-4"	26	1'-3"	4'-9"	7"	8'-3"	4	4	7'-0"	8	[illegible]
	15	78	18'-3"	8"	152	3'-3"	104	5'-9"	30	25'-9"	31'-3"	3'-6"	38'-3"	2	4	39'-8"	10	25'-9"	2	18'-0"	38	1'-3"	4'-9"	7"	8'-3"	4	4	7'-0"	8	[illegible]
	20	78	23'-11"	8"	228	3'-3"	130	5'-9"	40	25'-9"	31'-3"	3'-6"	38'-3"	2	4	39'-8"	15	25'-9"	2	23'-8"	48	1'-3"	4'-9"	7"	8'-3"	4	4	7'-0"	8	[illegible]
	25	78	29'-7"	8"	304	3'-3"	156	5'-9"	50	25'-9"	31'-3"	3'-6"	38'-3"	2	4	39'-8"	20	25'-9"	2	29'-4"	60	1'-3"	4'-9"	7"	8'-3"	4	4	7'-0"	8	[illegible]
	30	78	35'-3"	8"	380	3'-3"	182	5'-9"	60	25'-9"	31'-3"	3'-6"	38'-3"	2	4	39'-8"	25	25'-9"	2	35'-0"	70	1'-3"	4'-9"	7"	8'-3"	4	4	7'-0"	8	[illegible]
6	12	88	14'-7"	7"	86	3'-9"	78	6'-11"	24	25'-9"	31'-6"	3'-6"	38'-6"	2	6	41'-6"	6	25'-9"	2	14'-4"	30	1'-4"	5'-3"	7"	9'-4"	4	4	8'-0"	8	[illegible]
	18	88	21'-3"	7"	172	3'-9"	104	6'-11"	36	25'-9"	31'-6"	3'-6"	38'-6"	2	6	41'-6"	12	25'-9"	2	21'-0"	44	1'-4"	5'-3"	7"	9'-4"	4	4	8'-0"	[illegible]	[illegible]
	24	88	27'-11"	7"	258	3'-9"	130	6'-11"	48	25'-9"	31'-6"	3'-6"	38'-6"	2	6	41'-6"	18	25'-9"	2	27'-8"	56	1'-4"	5'-3"	7"	9'-4"	4	4	8'-0"	[illegible]	[illegible]
	30	88	34'-7"	7"	344	3'-9"	156	6'-11"	60	25'-9"	31'-6"	3'-6"	38'-6"	2	6	41'-6"	24	25'-9"	2	34'-4"	70	1'-4"	5'-3"	7"	9'-4"	4	4	8'-0"	[illegible]	[illegible]
	36	88	41'-3"	7"	430	3'-9"	182	6'-11"	72	25'-9"	31'-6"	3'-6"	38'-6"	2	6	41'-6"	36	25'-9"	2	41'-0"	84	1'-4"	5'-3"	7"	9'-4"	4	4	8'-0"	[illegible]	[illegible]
8	16	122	19'-0"	5"	120	5'-0"	78	9'-3"	32	25'-9"	32'-0"	3'-6"	46'-0"	2	6	46'-8"	8	25'-9"	2	18'-5"	38	1'-6"	6'-3"	7"	11'-6"	4	4	10'-6"	[illegible]	[illegible]
	24	122	27'-9"	5"	240	5'-0"	104	9'-3"	48	25'-9"	32'-0"	3'-6"	46'-0"	2	6	46'-8"	16	25'-9"	2	27'-2"	56	1'-6"	6'-3"	7"	11'-6"	4	4	10'-6"	8	[illegible]
	32	122	36'-6"	5"	360	5'-0"	130	9'-3"	64	25'-9"	32'-0"	3'-6"	46'-0"	2	6	46'-8"	24	25'-9"	2	35'-11"	74	1'-6"	6'-3"	7"	11'-6"	4	4	10'-6"	8	[illegible]
	40	122	45'-3"	5"	480	5'-0"	156	9'-3"	80	25'-9"	32'-0"	3'-6"	46'-0"	2	6	46'-8"	32	25'-9"	2	44'-8"	90	1'-6"	6'-3"	7"	11'-6"	4	4	10'-6"	8	13'-0"
	48	122	54'-0"	5"	600	5'-0"	182	9'-3"	96	25'-9"	32'-0"	3'-6"	46'-0"	2	6	46'-8"	40	25'-9"	2	53'-5"	108	1'-6"	6'-3"	7"	11'-6"	4	4	10'-6"	8	13'-0"

DIMENSIONS AND QUANTITIES FOR 24' CULVERT

Dimensions of single Opening (Ft.)	Number of Openings	Total Clear Span (Ft.)	Area (Sq. Ft.)	X (Ft.)	Barrel I (In.)	Barrel N (In.)	Barrel K (In.)	Barrel O (In.)	M (Ft. In.)	A (In.)	B (Ft. In.)	C (Ft. In.)	D (Ft. In.)	F (Ft. In.)	E (Ft. In.)	H (Ft. In.)	h (Ft. In.)	Per Lin. Ft. Barrel Steel (Lbs.)	Per Lin. Ft. Barrel Concr. (C.Y.)	Total Quantities Steel (Lbs.)	Total Quantities Concr. (C.Y.)
3×3	2	6	18	3	6	6	6	4	8-0	8	9	4-5	1-9	1-0	4-7	4-0	1-6	50.6	.453	1528	16.28
	3	9	27	3	6	6	6	4	11-6	8	9	4-5	1-9	1-0	4-7	4-0	1-6	73.9	.642	2167	21.75
	4	12	36	3	6	6	6	4	15-0	8	9	4-5	1-9	1-0	4-7	4-0	1-6	97.2	.831	2806	27.22
	5	15	45	3	6	6	6	4	18-6	8	9	4-5	1-9	1-0	4-7	4-0	1-6	120.5	1.020	3445	32.69
	6	18	54	3	6	6	6	4	22-0	8	9	4-5	1-9	1-0	4-7	4-0	1-6	143.8	1.210	4084	38.16
4×4	2	8	32	3	6	6	7	6	10-6	10	1-0	5-6	2-4	1-0	5-6½	5-0	1-10	65.5	.607	1997	22.91
	3	12	48	3	6	6	7	6	15-1	10	1-0	5-6	2-4	1-0	5-6½	5-0	1-10	96.4	.872	2817	30.52
	4	16	64	3	6	6	7	6	19-8	10	1-0	5-6	2-4	1-0	5-6½	5-0	1-10	127.3	1.137	3639	38.13
	5	20	80	3	6	6	7	6	24-3	10	1-0	5-6	2-4	1-0	5-6½	5-0	1-10	158.2	1.401	4461	45.74
	6	24	96	3	6	6	7	6	28-10	10	1-0	5-6	2-4	1-0	5-6½	5-0	1-10	189.1	1.666	5281	53.35
5×5	2	10	50	3	7	6	8	6	18-7	10	1-3	6-8	2-11	1-3	6-7	6-0	2-3	64.8	.796	2571	31.00
	3	15	75	3	7	6	8	6	18-3	10	1-3	6-8	2-11	1-3	6-7	6-0	2-3	115.2	1.139	3706	40.90
	4	20	100	3	7	6	8	6	23-11	10	1-3	6-8	2-11	1-3	6-7	6-0	2-3	165.6	[illegible]	[illegible]	50.80
	5	25	125	3	7	6	8	6	29-7	10	1-3	6-8	2-11	1-3	6-7	6-0	2-3	206.0	1.826	[illegible]	60.70
	6	30	150	3	7	6	8	6	35-3	10	1-3	6-8	2-11	1-3	6-7	6-0	2-3	246.4	2.169	7110	70.60
6×6	2	12	72	3	7	7	8	6	14-7	10	1-6	7-9	3-5½	1-3	7-6	7-1	2-7	106.3	1.016	3191	[illegible]
	3	18	108	3	7	7	8	6	21-3	10	1-6	7-9	3-5½	1-3	7-6	7-1	2-7	158.3	1.456	4525	[illegible]
	4	24	144	3	7	7	8	6	27-11	10	1-6	7-9	3-5½	1-3	7-6	7-1	2-7	210.3	1.896	5859	[illegible]
	5	30	180	3	7	7	8	6	34-7	10	1-6	7-9	3-5½	1-3	[illegible]	7-1	2-7	262.3	2.336	7195	77.70
	6	36	216	3	7	7	8	6	41-3	10	1-6	7-9	3-5½	1-3	[illegible]	7-1	2-7	314.3	2.776	[illegible]	[illegible]
8×8	2	16	128	3	9	9	9	6	18-5	10	1-9	10-2	4-8	1-6	9-7	9-3	3-5	169.1	[illegible]	[illegible]	[illegible]
	3	24	192	3	9	9	9	6	27-3	10	1-9	10-2	4-8	1-6	9-7	9-3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	4	32	256	3	9	9	9	6	36-2	10	1-9	10-2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	5	40	320	[illegible]	9	9	9	6	44-11	10	1-9	10-2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	6	48	384	3	9	9	9	6	53-8	10	1-9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

GENERAL NOTES & DESIGN DATA

General Specifications:- La. State Highway Commission Spec[illegible]
Concrete: All class "A", 1:6 mix.
Steel:- All ½" □ deformed bars.
All exposed corners to be chamfered ¾ in.
All exposed surfaces to be given a smooth finish.
Design Loads:-
Concentrated load = 15 ton typical truck with 30% impact allowance distributed as specified in general specifica[illegible]
Entire weight of all fill above culvert assumed as [illegible]
All dimensions relating to bars are to centers of bars.
Bars at splices are to be lapped 2'-0".
Reinforcing bars should be wired at intersections and [illegible] secured against displacement during placing of conc[illegible]
Expansion joint to be used only when number of [illegible] are in excess of number provided in table of quantities [illegible] special instructions will be given by Bridge Engineer.

MULTIPLE
CONCRETE BOX CULVERTS
FLARING WING WALLS
6 FT. TO 8 FT. SPANS
3 FT. TO 8 FT. HEIGHTS
[illegible] HIGHWAY [illegible]

8-2-46