CUMBERLAND CUT MIXED TRUSS
Spanning Lake Texoma/Cumberland Cut
Marshall C.L. /Ft. Washita Vicinity
Bryan County
Oklahoma

PHOTOGRAPHS

COPIES OF PLANS

AND

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
Submitted to:
Oklahoma State Historic Preservation Office
800 Nazih Zuhdi Drive
Oklahoma City, Oklahoma 73105

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Anna Eddings, Photographer, March 2010

1. GENERAL SETTING VIEW, LOOKING NORTHEAST
2. SIDE VIEW, LOOKING NORTH
3. SOUTHWEST ABUTMENT, LOOKING SOUTHWEST
4. UNDERSIDE OF K-THROUGH TRUSS, LOOKING NORTHEAST
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6. SIDE VIEW OF PARKER-THROUGH TRUSS, LOOKING NORTH
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CUMBERLAND CUT MIXED TRUSS
SEE INDEX TO PHOTOGRAPHS FOR CAPTION
PHOTO 1

CUMBERLAND CUT MIXED TRUSS
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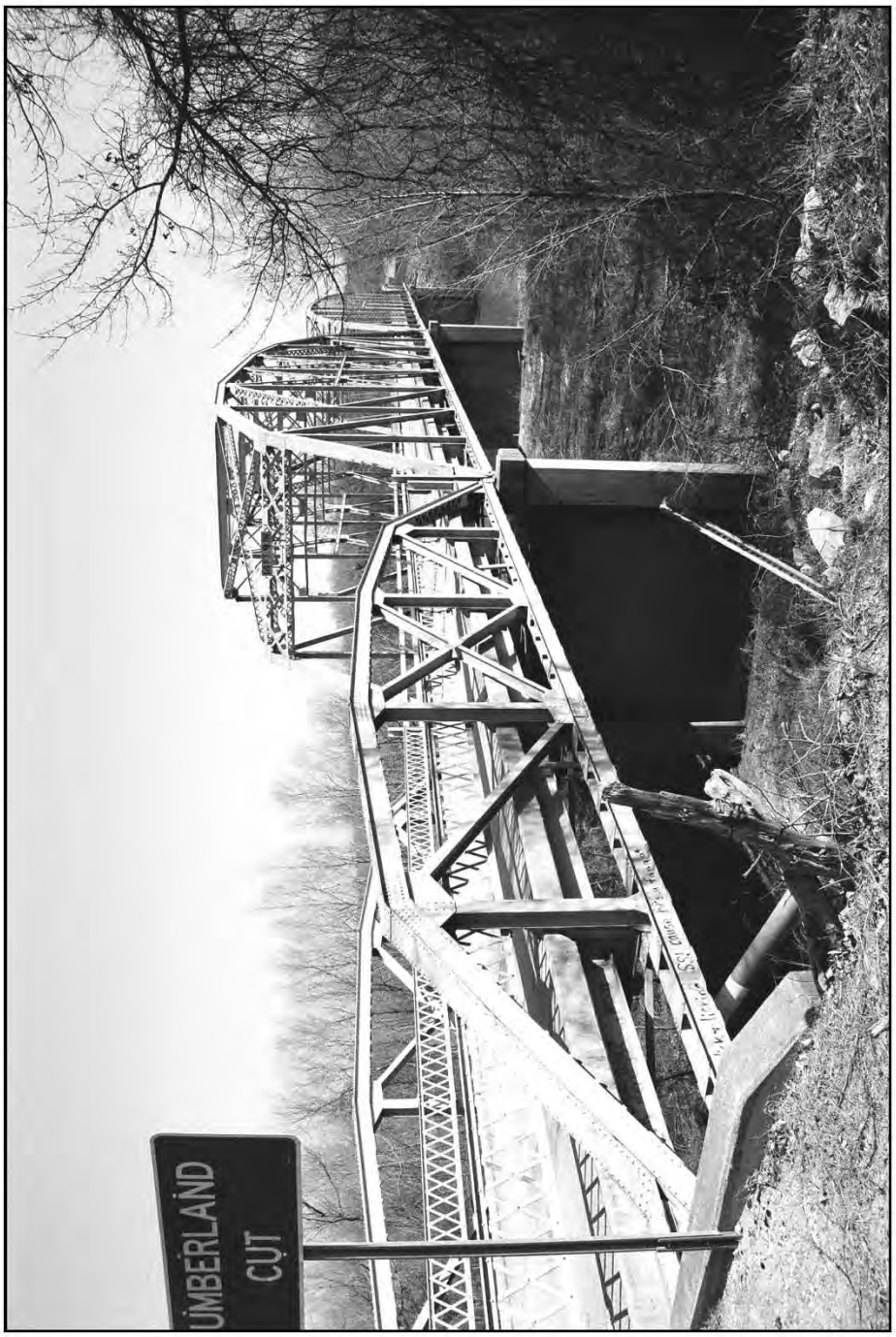
PHOTO 2



CUMBERLAND CUT MIXED TRUSS
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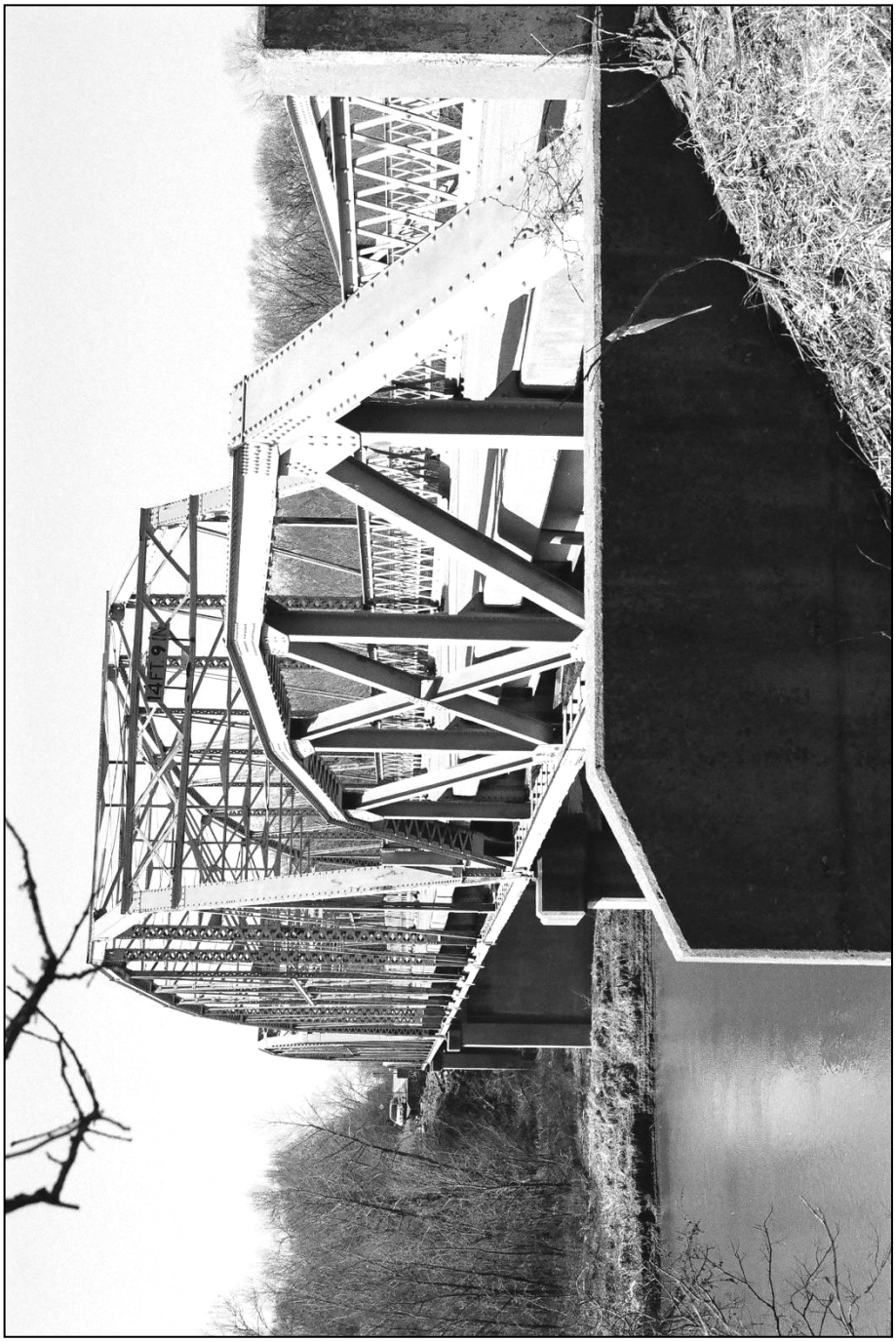
PHOTO 7



CUMBERLAND CUT MIXED TRUSS
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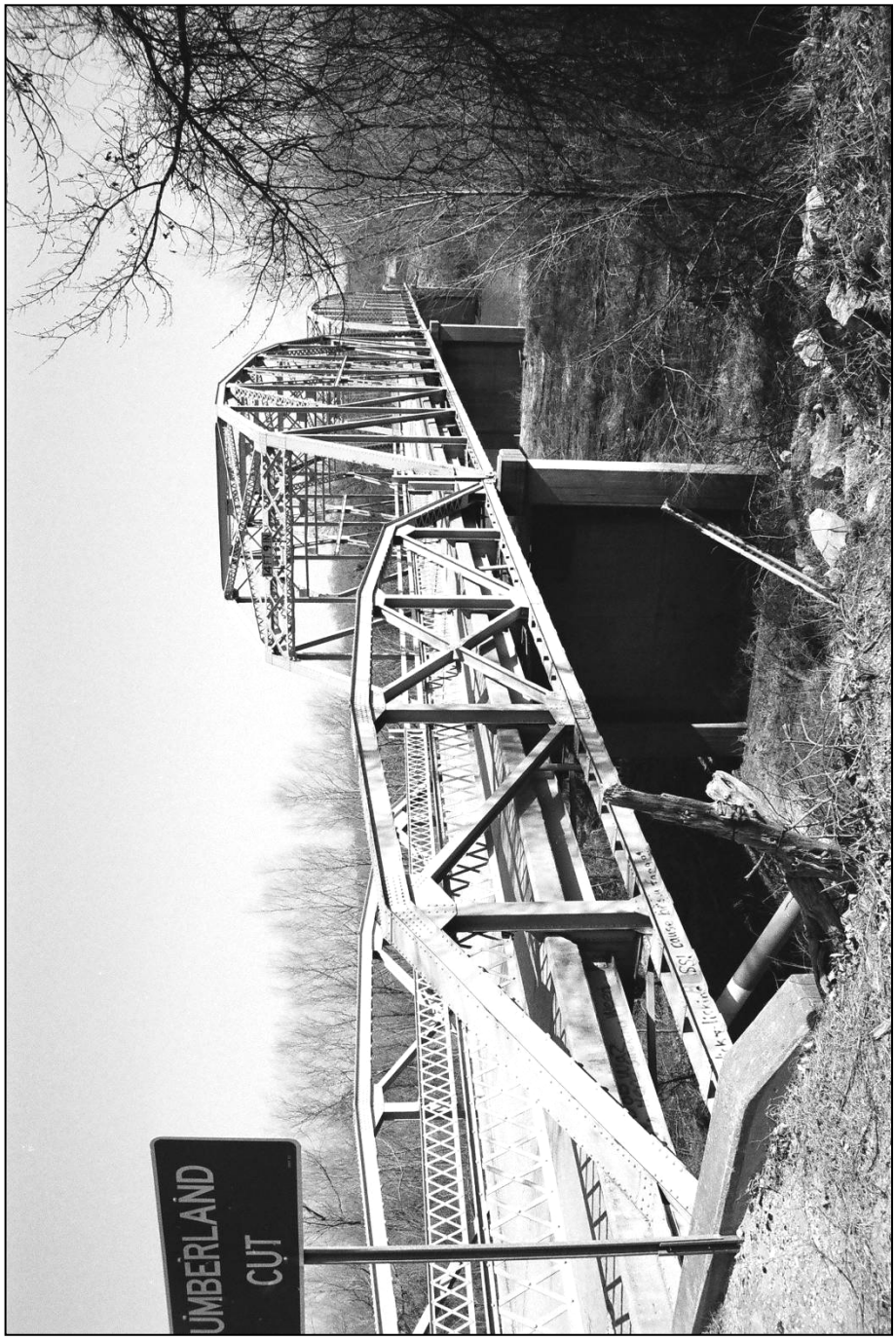

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Plans obtained from Oklahoma Department of Transportation Reproduction Services, Oklahoma City, Oklahoma, October 5, 2012.

1. Sheet 1, title page with location map
2. Sheet 2, summary of quantities, details, and erection diagram of 160 ft truss
3. Sheet 3, details and erection diagram of 210 ft truss
4. Sheet 4, details and erection diagram of two 80 ft trusses

Sheet 4,

STATE OF OKLAHOMA

DEPARTMENT OF HIGHWAYS

INDEX OF SHEETS

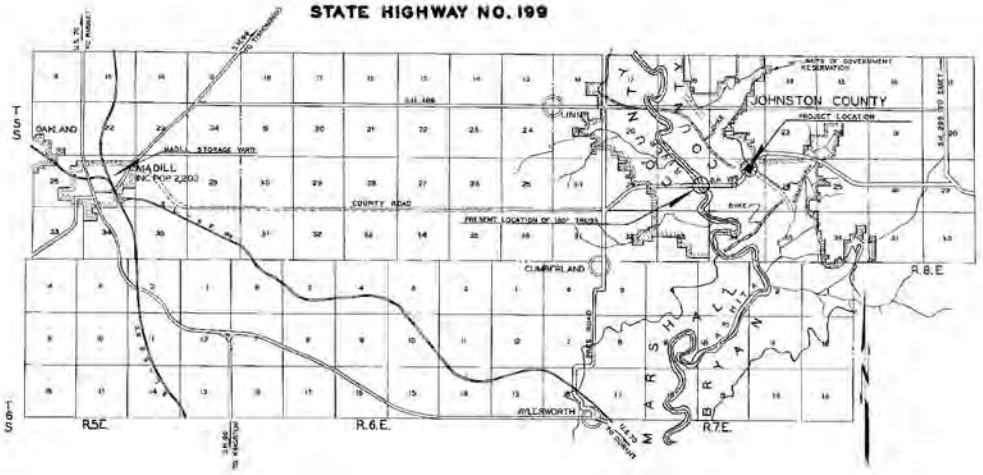
SHEET	NO. 1	TITLE PAGE
"	" 2	SUMMARY OF QUANTITIES & DETAILS & ERECTION DIAGRAM 160' TRUSS.
"	" 3	DETAILS AND ERECTION DIAGRAM 210' TRUSS.
"	" 4	DETAILS AND ERECTION DIAGRAM 2-80' TRUSSES.

PLAN AND PROFILE OF PROPOSED STATE HIGHWAY

STATE AID PROJECT NO. 926-A (2)

BRYAN COUNTY

STATE HIGHWAY NO. 199



PROJECT LENGTH_____.000FT._____.000 MI.

GRADE CROSSINGS _____ 9
GRADE CROSSINGS ELIMINATED _____ 0
BY SEPARATION: OVERPASS _____ 0
BY SEPARATION: UNDERPASS _____ 4
BY RELOCATION _____ 0
GRADE CROSSING REMAINING _____ 5

SCALES

PLAN 1"=100'
PROFILE (HOR. 1"=100'; VER. 1"=10'
CROSS SECTIONS 1"=5'
LAYOUT MAP 1" = 1,280

CONVENTIONAL SIGNS

- PROPOSED ROAD
- RAILROADS
- RANGE & TOWNSHIP LINES
- SECTION LINES
- QUARTER SECTION LINES
- FENCES
- BASE LINE
- RIGHT-OF-WAY LINES
- GROUND LINE
- GRADE LINE
- TRAVELLED ROADS
- CULVERTS & BRIDGES
- TELEPHONE & TELEGRAPH
- POWER LINES
- BUILDINGS
- UNLOADING POINTS
- OIL WELLS
- RIGHT OF WAY MARKERS

S.A. SPECIAL PROVISIONS GOVERN AND STATE STANDARD SPECIFICATIONS GOVERN APPROVED 1937

APPROVED
THIS _____ DAY OF _____ 1944

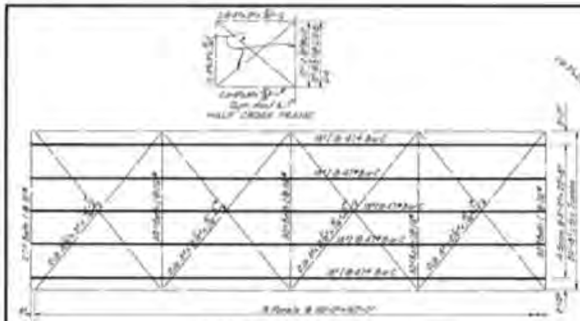
RECOMMENDED FOR APPROVAL

RECOMMENDED FOR APPROVAL

APPROVED

S.A.P. 926-A(2) Sheet No. 1

CUMBERLAND CUT MIXED TRUSS
SEE INDEX TO COPIES FOR CAPTION
SHEET 1



HALF FLOOR PLAN

HALF ELEVATION

DETAIL OF STRINGER CONNECTION

LEGEND
To be furnished by Contractor ———

Note:- New stringers and connection angles to be furnished for 160' truss. Connection angles to be punched to fit existing holes in floor beams.

Note: The Contractor will be held responsible for all old truss members. Any damage to or loss of any truss member during dismantling, hauling and stacking shall be repaired or replaced by the contractor at his own expense. Any damaged or missing truss member at the Mobile storage yard shall be furnished by the contractor and will be paid for at the unit price bid per pound for structural steel for the particular truss affected.
All structural steel shall be delivered and stacked as directed by the Resident Engineer on the west bank of channel at the new bridge site. Delivery of old trusses and structural steel does not include expansion devices for any of the trusses.

SUMMARY OF QUANTITIES

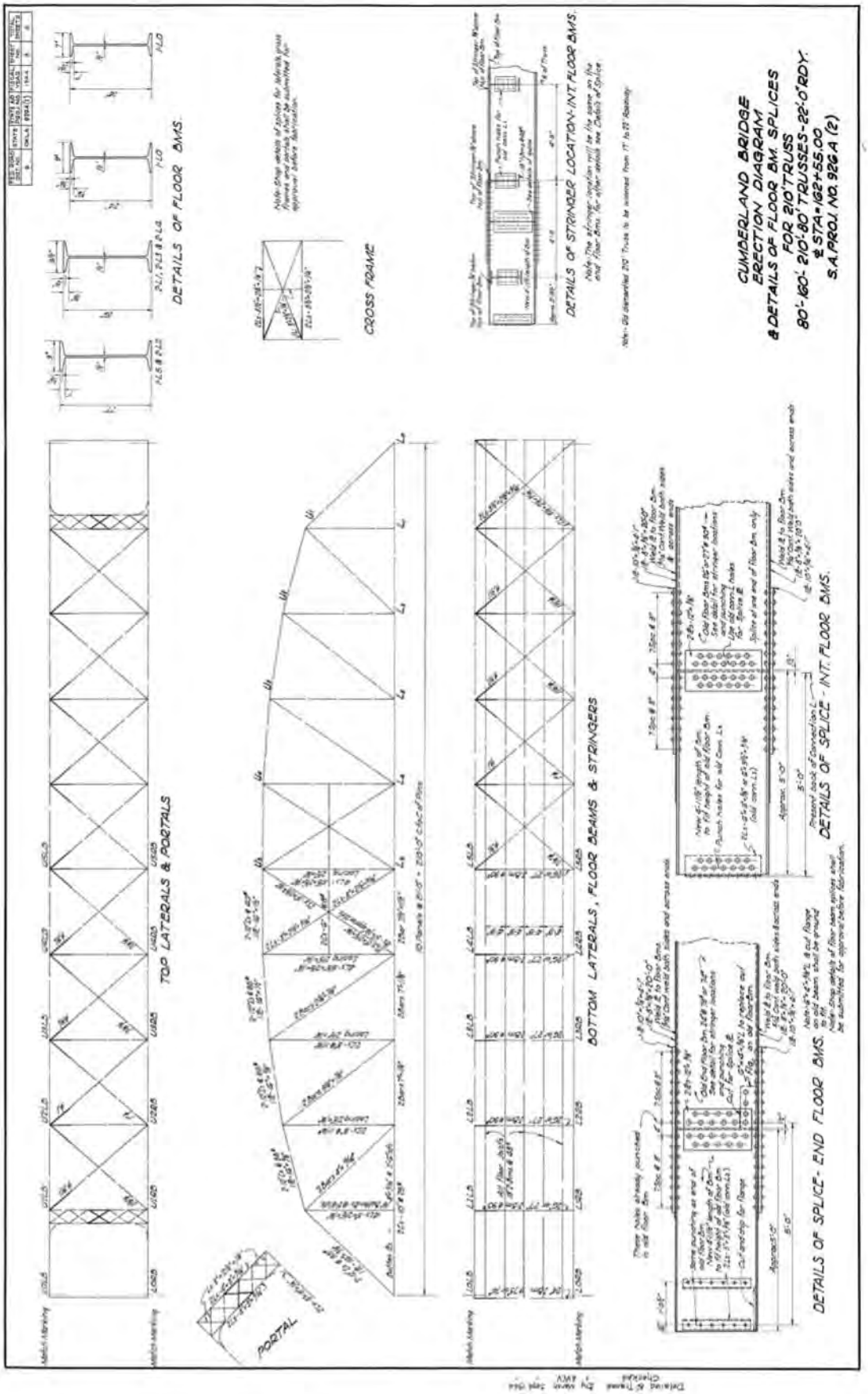
	Item No.	Item	Unit	Quantity
⊗	Special	Dismantle & Haul 160' Truss	Lump Sum	1
⊗	Special	Haul 210' Truss	Lump Sum	1
⊗	Special	Haul 2-80' Trusses	Lump Sum	1
⊗	506.06 a Sp.	Struct. Steel for 160' Truss	Lbs.	45,500
⊗	506.06 a Sp.	Struct. Steel for 210' Truss	Lbs.	24,500
⊗	506.06 a Sp.	Struct. Steel for 2-80' Trusses	Lbs.	12,500

⊗ Note: See Special Provisions included in the Proposal.

Note: 160' Truss weighs approx. 64 Tons (without Stringers)
210' Truss weighs approx. 38 Tons
2-80' Trusses weighs approx. 75 Tons

CUMBERLAND BRIDGE
ERECTION DIAGRAM
& DETAILS OF STRINGER FOR 160' TRUSS
80'-160'-210'-80' TRUSSES-22' RDY.
℄ STA = 162+55.00
S.A. PROJECT NO. 926 A(2)

CUMBERLAND CUT MIXED TRUSS
SEE INDEX TO COPIES FOR CAPTION
SHEET 3



CUMBERLAND CUT MIXED TRUSS
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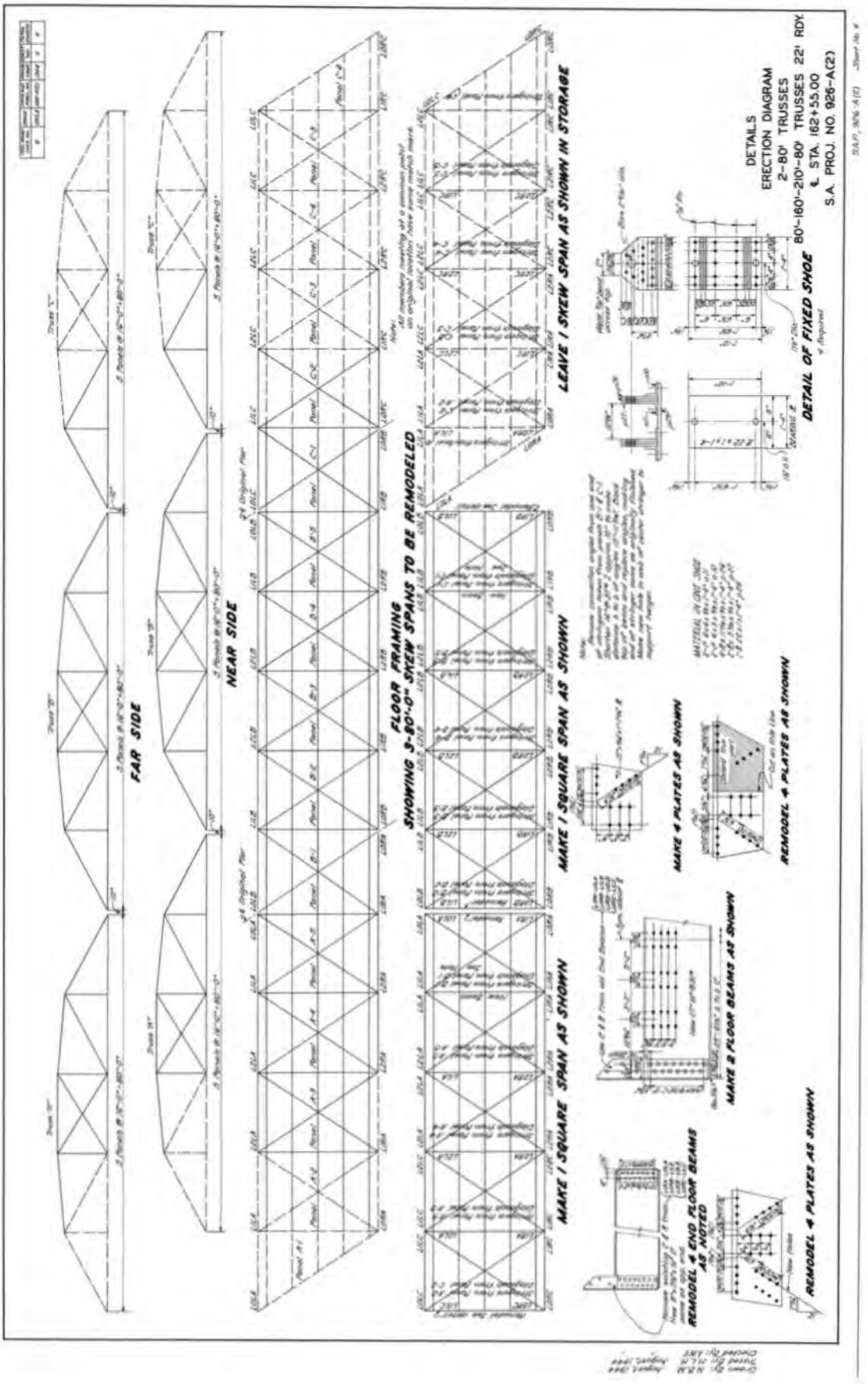
SHEET 4



CUMBERLAND CUT MIXED TRUSS
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Bryan County
Oklahoma

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD

CUMBERLAND CUT MIXED TRUSS

Location: Spanning Lake Texoma/Cumberland Cut, at Road S.H. 199, in the Marshall County line/Fort Washita vicinity, Bryan County, Oklahoma.
UTM: 14/E 725704 /N 3775611
Quad: Little City

Legal Location: Section 27, T5S, R7E

Present Owner: Oklahoma Department of Transportation
ODOT Structure Number 0718 0099 X

Present Use: Vehicular Bridge

Significance: The Cumberland Cut Mixed Truss Bridge is located on State Highway (SH) 199 and crosses the Cumberland Cut channel located on the Washita River arm of Lake Texoma. The bridge, constructed 1950–1951, has a combination of two Camelback (C-back) pony trusses flanking a Parker-through truss and K-through truss. The Parker-through truss portion of the bridge combines pinned and riveted connections, while the K-through truss and C-back pony trusses exhibit only riveted connections. Additional notable features include the identification of two steelmaker marks (Illinois-S-USA and Bethlehem USA) and two side railing types (lattice and double bar). As an unaltered bridge featuring several contrasting elements, the Cumberland Cut Mixed Truss Bridge is a unique example of its type.

Project Information: Historic American Engineering Record (HAER) Level II equivalent documentation was performed in March 2010 and May 2012. Tanya McDougall, Architectural Historian, conducted an on-site visit and compiled the historical information in May 2012. Photo documentation was conducted in March 2010, by Anna Eddings, an Architectural Historian with the Oklahoma Department of Transportation. Photographs for this report have been digitally reproduced following National Park Service (NPS) standards for digital images. This HAER recordation serves as mitigation for the removal of the structure from vehicular traffic.

List of Preparers:

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Architectural Historian
Geo-Marine Inc.
Plano, Texas

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Photographer	Anna Eddings Architectural Historian ODOT Cultural Resources Program Norman, Oklahoma

PART I. HISTORICAL INFORMATION

A. Physical History:

1. **Date of Construction:** 1950–951

2. **Architect/Engineer:** Not Known

3. **Builder/Contractor/Supplier:** Guy H. James, General Contractor

4. **Original Plans:** Obtained from the ODOT Reproductive Services, Oklahoma City, Oklahoma.

5. **Alterations and Additions:** The bridge has remained unaltered.

B. Historical Context:

1. Introduction

The Cumberland Cut Mixed Truss Bridge, constructed 1950–1951, is located on State Highway (SH) 199 in northwest Bryan County, Oklahoma. The bridge spans the Cumberland Cut channel on the north end of what is now known as Lake Texoma. Early development of the area began in 1842 with the establishment of Fort Washita by General Zachery Taylor. At that time, the area encompassed by what is now Bryan County was within Indian Territory and part of the Choctaw Nation. Fort Washita, located northeast of the bridge site, was occupied by U.S. troops through 1861, at which time it was abandoned and reoccupied during the Civil War by the Confederate Army. After the war, the land and fort buildings were turned over to the Chickasaw Nation and later owned by the Colberts, a prominent Chickasaw family (Oklahoma

Historical Society 2012).[1] During the late 1800s, the area was sparsely populated, and the road now known as SH 199 did not exist. The nearest road in the location was a north–south route leading to Fort Washita located east of the bridge site (Bureau of Land Management 1899).

In 1907, Oklahoma was admitted to the Union as the forty-sixth state, and Bryan County was created, with Durant chosen as the county seat (Milligan 2012). Drained by the Red River in the south and its major tributary, the Washita River, in the north, Bryan County developed as an agricultural area through the early part of the twentieth century (Huffman et al. 1978:10). Although known for having fertile soil, the area suffered from frequent flooding. Between 1843 and 1949, seven major floods in southern Oklahoma led to millions of dollars in property damage and loss of life (*Ada Evening News* 26 June 1949). By 1933, political leaders in Oklahoma, Texas, Arkansas, and Louisiana were supporting a comprehensive flood control plan. The plan included the construction of a dam along the Red River (Denison Dam), creation of a large reservoir (Lake Texoma), and the production of hydro-electric power (*Miami Daily News-Record* 19 July 1933).

From the early stages of planning, the project faced local opposition, arguing that the dam and reservoir would cause Oklahoma to lose millions of acres of fertile agricultural land. However, by 1936, federal funding to survey the proposed dam site on the Red River near Denison was approved, and two years later Congress passed the Flood Control Act of 1938, authorizing the use of $54,000,000 in estimated costs to construct Denison Dam and the reservoir now known as Lake Texoma (*Ada Evening News* 25 February 1936; Seventy-fifth Congress 1938:5).

Planning and construction of the Denison Dam was under the direction of the U.S. Army Corps of Engineers (USACE), Tulsa District, and was well underway by 1940. That same year, however, construction of the dam was disrupted by the discovery of the Cumberland Oilfield in the northern section of the project area (*Ada Evening News* 19 March 1940). The discovery well, the Pure Oil Company 1 Little 100, was drilled west of the Cumberland Cut bridge location in an area slated for flooding by the waters of the Washita River (Huffman et al. 1978:73). Soon after, the USACE developed alternative plans, which included the construction of dikes and rechanneling the Washita River (*Ada Evening News* 12 April 1943). By 1941, several more oil wells had been drilled, and a gravel road (SH 199) was constructed through the Cumberland Oilfield from Madill in Marshall County, east to SH 299 in Bryan County. The road was built with a bridge crossing the Washita River, but at that time the Cumberland Cut channel had not yet been constructed; thus, there was not yet a need for a bridge in that location (Oklahoma State Highway Commission 1940–1942:41).

In 1944, Denison Dam was completed, and Lake Texoma officially opened with the Cumberland Oilfield remaining unharmed (Flippen 2012). Soon after, the lake and surrounding area quickly became a haven for recreational activities, increasing the need

[1] The area now encompassed by Bryan County, Oklahoma, was part of the Choctaw and Chickasaw nations from 1831 through 1855, at which time it became part of the Chickasaw Nation. The area remained part of the Chickasaw Nation until Oklahoma statehood in 1907, when Bryan County was officially established (Morris et al. 1986:23).

for additional routes and road improvements. Due to the U.S. involvement in World War II (1941–1945), however, road projects were stopped and delayed. During those years, funding for road projects was severely reduced, dropping from $12,143,282 in 1941 to $7,417,961 in 1944. Road construction projects were also impacted by the shortage of steel for bridges. With such resources going toward the war effort, many projects were put on hold, including the nearly 1-mile-long US Highway 70 Bridge that was to cross Lake Texoma (Oklahoma State Highway Commission 1942–1944:15). After the war, the Oklahoma Highway Commission initiated a strong road improvement program, and it was during that period that the Cumberland Cut Mixed Truss Bridge was constructed.

2. Development of the Bryan County, Cumberland Cut Mixed Truss Bridge

After World War II, the Oklahoma State Highway Commission initiated the Post-war Highway Construction Program and invested $57,500,000 in improving Oklahoma's roadways (Oklahoma State Highway Commission 1944–1946:13). As part of this initiative, improvements were made to SH 199 between 1944 and 1946, which included re-graveling the road and dismantling the old Washita River Bridge (Oklahoma State Highway Maps 1944–1950; Oklahoma State Highway Commission 1944–1946:219). In 1949, the Oklahoma State Highway Commission approved SH 199 for additional improvements, including the construction of the Cumberland Cut Mixed Truss Bridge northeast of the old Washita River (Oklahoma State Highway Commission 1949–1950:24). The contractor for the bridge was Guy H. James from Oklahoma City (King 1993).[2]

When completed in 1951, the Cumberland Cut Mixed Truss Bridge consisted of two C-back pony trusses flanking one Parker-through truss and one K-through truss. The use of the three truss types was due to the bridge being constructed from previously used trusses. According to the original plans the K-through truss was acquired from the old Washita River Bridge dismantled between 1944 and 1946, and the C-back trusses and Parker-through truss were previously used trusses held at the State's Madill storage yard (see Sheets 1 through 4).

Although the three truss types exhibited on this bridge are complementary to one another, they are distinctly different. The C-back truss, commonly used after World War I, is a type of Pratt truss (diagonal members angled inward) and looks very similar to the Parker truss (modified Pratt truss using inclined members to create an arched top chord). The primary difference between the C-back truss and Parker truss (also popular after World War I) is that the C-back uses exactly five inclined members to create the top chord, whereas the Parker truss does not use a defined number. The third truss type, K-truss, features vertical members with two small inclined members forming a K-shape within the truss panels. The K-truss was popular from 1930 through the early 1950s (King 1993).

In addition to the design differences the trusses also feature different connections. The Parker-through truss exhibits riveted and pinned connections, whereas the remaining

[2] Guy H. James, Oklahoma City contractor, is also noted for his work on the 1938–1939, U.S. Highway 77 Bridge over the Canadian River in McClain and Cleveland counties, Oklahoma (Gabbert 2003:14).

trusses exhibit only riveted connections.[3] Although the riveted C-back trusses exhibited here were commonly constructed with either type of through truss found on the Cumberland Cut Bridge, it was not common for a bridge to be constructed with both a Parker and K truss. This bridge also displays the mark of two steelmakers, which is due to the bridge being constructed from previously used trusses. A stamp reading "Illinois-S-USA" can be found on the C-back pony trusses and Parker-through truss, while "Bethlehem USA" is found on the K-though truss. Finally, the railing found on the K-through truss, two horizontal rails, is different from the lattice railing found on the remaining three spans. Either railing was commonly used during the bridge's construction, but again it is uncommon to see them used in conjunction. Thus, as an unaltered structure the Cumberland Cut Mixed Truss Bridge is a unique example of its type and period of construction.

PART II. STRUCTURAL/DESIGN INFORMATION

A. General Description: The Cumberland Cut Mixed Truss Bridge carries SH 199 over the Cumberland channel, located on the Washita River arm of Lake Texoma in Bryan County, Oklahoma. The structure runs northeast–southwest to accommodate the northwest-to-southeast drainage of the Cumberland channel. The Cumberland Cut Mixed Truss Bridge is a combination of two C-back pony trusses flanking a Parker-through truss and K-through truss. The bridge has a concrete slab deck that measures approximately 23 feet (ft) in width and accommodates two lanes of traffic. The deck is supported by five stringers and multiple floor beams. The structure as a whole consists of four spans and has a total length of 538 ft, with the longest span measuring 210 ft. All three truss designs found on this bridge are common types and frequently found in rural areas; however, the combined use of these trusses is unique.

The C-back pony trusses, located at each end of the structure, are simple spans (individual spans) consisting of two parallel truss walls. The top chord of each wall is made up of five inclined built-up members with V-lacing, riveted together to create an arch. The use of five inclined members for the top chord is a defining characteristic of this design, distinguishing it from the Parker truss design. The truss walls are each five panels wide and have four vertical and four diagonal I-beams. Two of the diagonal members cross at the center panel forming an X. All of the members of these trusses are riveted together with gusset plates located at each connection.

The Parker-through truss, located on the bridge's northeast center span, has 10 inclined built-up members with V-lacing creating the design's defining characteristic of an arched top chord.[4] The walls for this truss have 10 panels, nine vertical built-up members with V-lacing, and 10 diagonals. The diagonals in the two center panels cross to form an X and consist of angles connected with stay plates. The remaining diagonals consist of paired

[3] After World War I, pinned trusses were used less frequently, and riveted connected trusses became standard for bridge construction. Riveted connections were used until 1960, when bolt connections became popular (Solomon 2007:52).

[4] The Parker truss design, a modified Pratt truss, is defined by the arched top chord created by inclined diagonal members, but does not use a specific number of members to create the arch, such as the C-back truss (diagonal members angled inward).

rods angled inward and attached to the top and bottom chords using pin connections. All of the other members on the truss wall are riveted together with gusset plates located at the connection. The web connecting the truss walls at the top chord consists of eight panels with lateral bracing and nine struts with lateral bracing. The lateral bracing throughout the web is made up of rods with pin connections and angles with riveted connections.

Southwest of the Parker-through truss is the K-through truss. This truss has similar features found on the adjacent Parker truss, but does not use any rods or pin connections. The walls of the K-through truss have eight panels and seven vertical built-up members. The two center panels exhibit diagonals that cross and form an X. These diagonals are made up of angles connected with stay plates. The panels flanking the two center panels have two small diagonal members that form an inward facing K-shape and provide the truss with its character-defining feature. The web connecting the truss walls at the top chord consists of six panels with lateral bracing and seven struts with lateral bracing. The lateral bracing throughout the web is made up of angles connected with stay plates. All of the members of this truss are riveted together with gusset plates located at each connection.

The bridge substructure consists of five square concrete piers with solid web walls. The piers are positioned at the end of each span. The concrete piers are uniform and appear to be original to the structure. Located at each end of the bridge are concrete abutments with straight wing walls and clipped corners.

1. **Character:** The bridge structure is a two-lane simple-span bridge with two C-back pony trusses flanking a Parker-through truss and a K-through truss. The Parker-through truss exhibits riveted and pinned connections, but the remaining trusses only exhibit riveted connections. The use of multiple types of trusses, coupled with contrasting elements—such as the use of pin connections on only one truss, different steelmaker marks, and two railing types—is a result of the bridge being constructed from previously used trusses. Overall, the Cumberland Cut Mixed Truss Bridge is indicative of a bridge constructed in a rural area on a secondary road. Furthermore, the three truss types have each retained their character-defining features.

2. **Condition of Fabric:** The Cumberland Cut Mixed Truss is an unaltered structure and retains its character and integrity. The structure is in good condition and shows little evidence of deterioration.

B. **Site Information:** The area immediately surrounding the Cumberland Cut Mixed Truss Bridge is undeveloped. Native vegetation lines the banks of the Cumberland Cut channel. The nearest buildings and structures to the bridge are the buildings associated with Fort Washita located approximately .5 miles northeast, and oil-related structures located approximately .24 miles southwest.

PART III. SOURCES OF INFORMATION

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CUMBERLAND CUT MIXED TRUSS BRIDGE
Spanning Cumberland Cut
Marshall C.L. /Ft. Washita Vicinity
Bryan County
Oklahoma

LOCATION MAP

CUMBERLAND CUT MIXED TRUSS BRIDGE
BRYAN COUNTY, OKLAHOMA
LOCATION MAP