

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

1. Name of Property

Historic name: N/A
Other name/site number: Wea Creek Bowstring Arch Truss Bridge (preferred); Bull Creek Bridge; Miller
Double Tubular Groove Fastened Bridge; 61-LT-06

2. Location On the grounds of the Kansas State Historical Society, 6425 SW 6th Avenue; approximately 200
yards west of the main museum building.

city or town Topeka not for publication
state code KS county Shawnee N/A vicinity
county code 177 zip code 66615

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1986, as amended, I hereby certify that this XX nomination request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property XX meets does not meet the National Register criteria. I recommend that this property be considered significant nationally XX statewide locally. (See continuation sheet for additional comments.)

Richard D. Parkratz
Signature of certifying official

4-09-03
Date

KANSAS STATE HISTORICAL SOCIETY

State or Federal agency and bureau

In my opinion, the property meets does not meet the National Register criteria.
(See continuation sheet for additional comments.)

Signature of commenting or other official

Date

State or Federal agency and bureau

4. National Park Service Certification

I, hereby, certify that this property is:

- entered in the National Register.
See continuation sheet
- determined eligible for the National Register.
See continuation sheet
- determined not eligible for the National Register.
- removed from the National Register.
- other, (explain:)

Signature of Keeper

Date of Action

Property Name Wea Creek Bowstring Arch Truss Bridge

County and State Shawnee, Kansas

5. Classification

Ownership of Property	Category of Property	No. of Resources within Property	
		contributing	noncontributing
<input type="checkbox"/> private	<input type="checkbox"/> building(s)		<input type="checkbox"/> buildings
<input type="checkbox"/> public-local	<input type="checkbox"/> district		<input type="checkbox"/> sites
<input checked="" type="checkbox"/> public-State	<input type="checkbox"/> site		<input type="checkbox"/> structures
<input type="checkbox"/> public-Federal	<input checked="" type="checkbox"/> structure	<u>1</u>	<input type="checkbox"/> objects
	<input type="checkbox"/> object	<u>1</u>	<u>0</u> Total

Name of related multiple property listing:
(Enter "N/A" if property is not part of a
multiple property listing.):

No. of contributing resources previously
listed in the National Register

Metal Truss Bridges in Kansas

0

6. Functions or Use

Historic Functions
(Enter categories from instructions.)

Current Functions
(Enter categories from instructions.)

TRANSPORTATION: Road-related (vehicular)

TRANSPORTATION: Road-related (vehicular)

7. Description

Architectural Classification
(Enter categories from instructions.)

Materials
(Enter categories from instructions.)

OTHER: Bowstring Truss

Foundation Concrete, Stone

Walls _____

Roof _____

Other Metal: Wrought Iron

Narrative Description (Describe the historic and current condition of the property on one or more continuation sheets.)

Property Name Wea Creek Bowstring Arch Truss Bridge

County and State Shawnee, Kansas

8. Statement of Significance

Applicable National Register Criteria (Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- A Property is associated with events that have made a significant contribution to the broad patterns of our history.
- B Property is associated with the lives of persons significant in our past.
- C Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- D Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations (Mark "x" in all the boxes that apply.)

- A owned by a religious institution or used for religious purposes.
- B removed from its original location.
- C a birthplace or a grave.
- D a cemetery.
- E a reconstructed building, object, or structure.
- F a commemorative property.
- G less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance
Enter categories from instructions.)

Period of Significance

Significant Dates

ENGINEERING

1870

1870

TRANSPORTATION

Cultural Affiliation

N/A

Significant Person

N/A

Architect/Builder

Buckeye Bridge Works (Cleveland, Ohio)

Narrative Description (Describe the historic and current condition of the property on one or more continuation sheets.)

Property Name Wea Creek Bowstring Arch Truss Bridge

County and State Shawnee, Kansas

9. Major Bibliographical References

(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS):

- preliminary determination of individual listing (36 CFR 67) has been requested
- previously listed in the National Register
- previously determined eligible by the National Register
- designated a National Historic Landmark
- recorded by Historic American Buildings Survey # _____
- recorded by Historic American Engineering

Primary location of additional data:

- State Historic Preservation Office
 - Other State agency
 - Federal agency
 - Local government
 - University
 - Other
- Specify repository:

Record # _____

10. Geographical Data

Acreage of property 1 acre

UTM References

1	<u>1/5</u>	<u>2/5/9/6/4/0</u>	<u>4/3/2/6/4/5/0</u>	3	<u>/</u>	<u>/ / / / /</u>	<u>/ / / / /</u>
	Zone	Easting	Northing		Zone	Easting	Northing
2	<u>/</u>	<u>/ / / / /</u>	<u>/ / / / /</u>	4	<u>/</u>	<u>/ / / / /</u>	<u>/ / / / /</u>

____ See continuation sheet

Verbal Boundary Description (Describe the boundaries of the property on a continuation sheet.)

Boundary Justification (Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title Kerry Davis, Architectural Historian & Elizabeth Rosin, Partner

organization Historic Preservation Services

date August 5, 2002

street & number 323 West Eighth Street, Suite 112

telephone (816) 221-5133

city or town Kansas City

state Missouri zip code 64105

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps

A USGS map (7.5 or 15 minute series) indicating the property's location.

A sketch map for historic districts and properties having large acreage or numerous resources.

Photographs

Representative black-and-white photographs of the property.

Additional items (Check with the SHPO or FPO for any additional items.)

Property Owners (Complete this item at the request of the SHPO or FPO.)

Name Kansas State Historical Society

street & number 6425 SW 6th Avenue

telephone 785-272-8681

city or town Topeka

state KS zip code 66615

United States Department of the Interior
National Park Service

**NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET**

Section Number 7 Page 1

Wea Creek Bowstring Arch Truss Bridge
Shawnee County, Kansas

DESCRIPTION

LOCATION AND SETTING

The Wea Creek Bowstring Arch Truss Bridge is located on the grounds of the Kansas State Historical Society in northeast Kansas; on the NW ¼ of Section 32, Township 11S, Range 15E. The region is defined by rounded hills and broad, tree-lined valleys. The Wea Creek Bowstring Arch Truss Bridge carries a gravel footpath across an unnamed, intermittent tributary of the Kansas River. The footpath leads from the west edge of a parking lot through an area of reestablished prairie, past a restored 1877 schoolhouse, and north across the Wea Creek Bowstring Arch Truss Bridge.

TRUSS TYPE

The Wea Creek Bowstring Arch Truss Bridge is a single span Miller double tubular wrought iron pony truss¹ that measures 69 in length and 13 feet in width.² Stout, irregular-coursed, rough-cut limestone and concrete abutments support the "abutment shoes" of the truss that rest directly on the abutment seats.

The top chords create the wide parabolic shape distinctive to a Bowstring truss. The patented design of the top chords consists of fluted cover and bottom plates with interior grooves to receive vertical plate stock to form a square tube. The bottom chords consist of paired flat bars.

The web members include paired vertical rods that form eight equivalent panels and diagonal tie rods that intersect within the six central panels. Each rod is threaded at both ends. The lower end is inserted through a cast-iron plate below the paired bars of the bottom chord and fastened by a bolt. The upper end is inserted through the tubular top chord and secured. A bolt fastens the vertical members and a cast-iron "upset shoulder" fastens the diagonal members. The upset shoulder essentially functions as a bolt, but each is cast to accommodate a specific diagonal member and the angle at which it intersects the cover plate of the top chord. Marriage marks are visible at each upper node.

The timber deck is 13 feet wide and rises 14 feet above the creek bed on I-beam stringers. Floor beams located at the lower nodes are connected by lower lateral bracing rods.

INTEGRITY

The Wea Creek Bowstring Arch Truss Bridge is an excellent example of this bridge type and one of only about ten still existing in Kansas. In addition, it is one of the last remaining examples in the United States of the Miller double tubular patent and one of only two Miller patent bowstring truss bridges in Kansas. Although relocated in 1988, the Wea Creek Bowstring Arch Truss Bridge retains a good degree of integrity. As described in the *Multiple Property Documentation Form for Metal Truss Bridges in Kansas*, historically, moving bridges was a common practice and does not adversely affect a structure's significance, and the original workmanship, design, and feeling of the structure are readily apparent. Furthermore, the potential for preservation of the bridge is high. Serving as a footbridge on the grounds of the Kansas State Historical Society, restrictive covenants ensure the maintenance and preservation of the Wea Creek Bowstring Arch Truss Bridge.

¹ A pony truss is also referred to as a low truss.

² Unless otherwise noted, the information herein is taken from Dale Nimz, *Miller Double Tubular Groove Fastened Wrought Iron Bridge, National Register of Historic Places Registration Form*, (Topeka: Kansas State Historical Society, c.1998). This draft nomination was never submitted to the National Park Service.

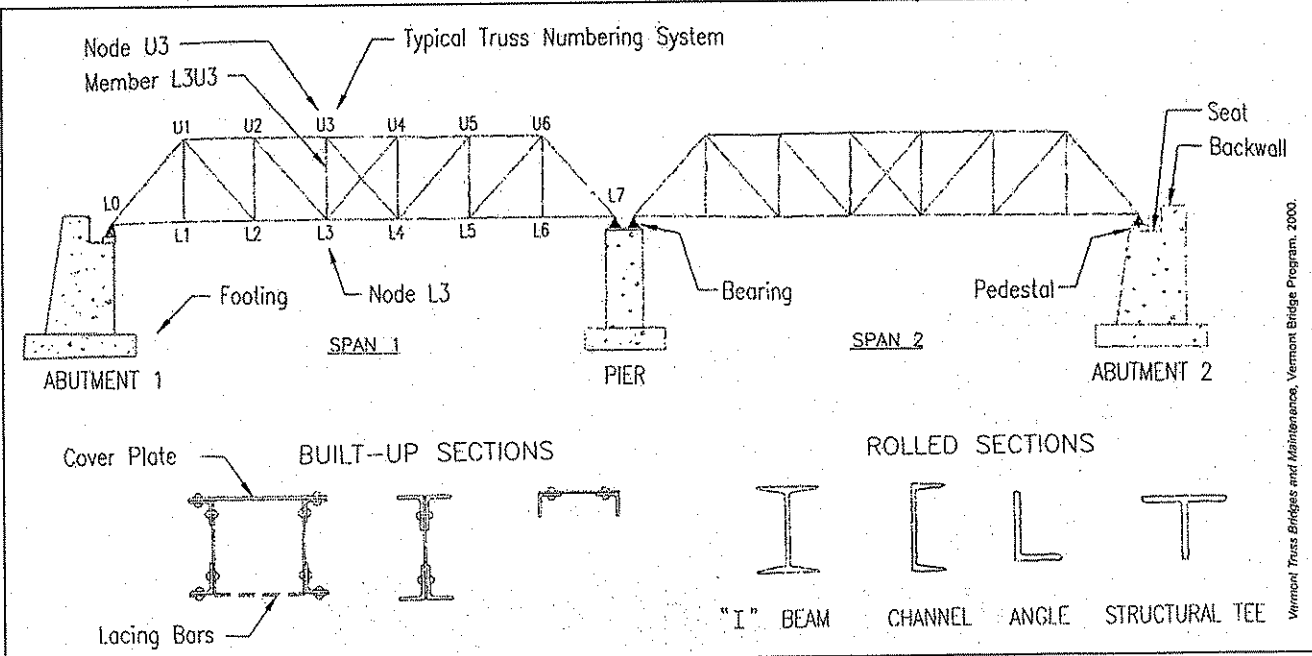
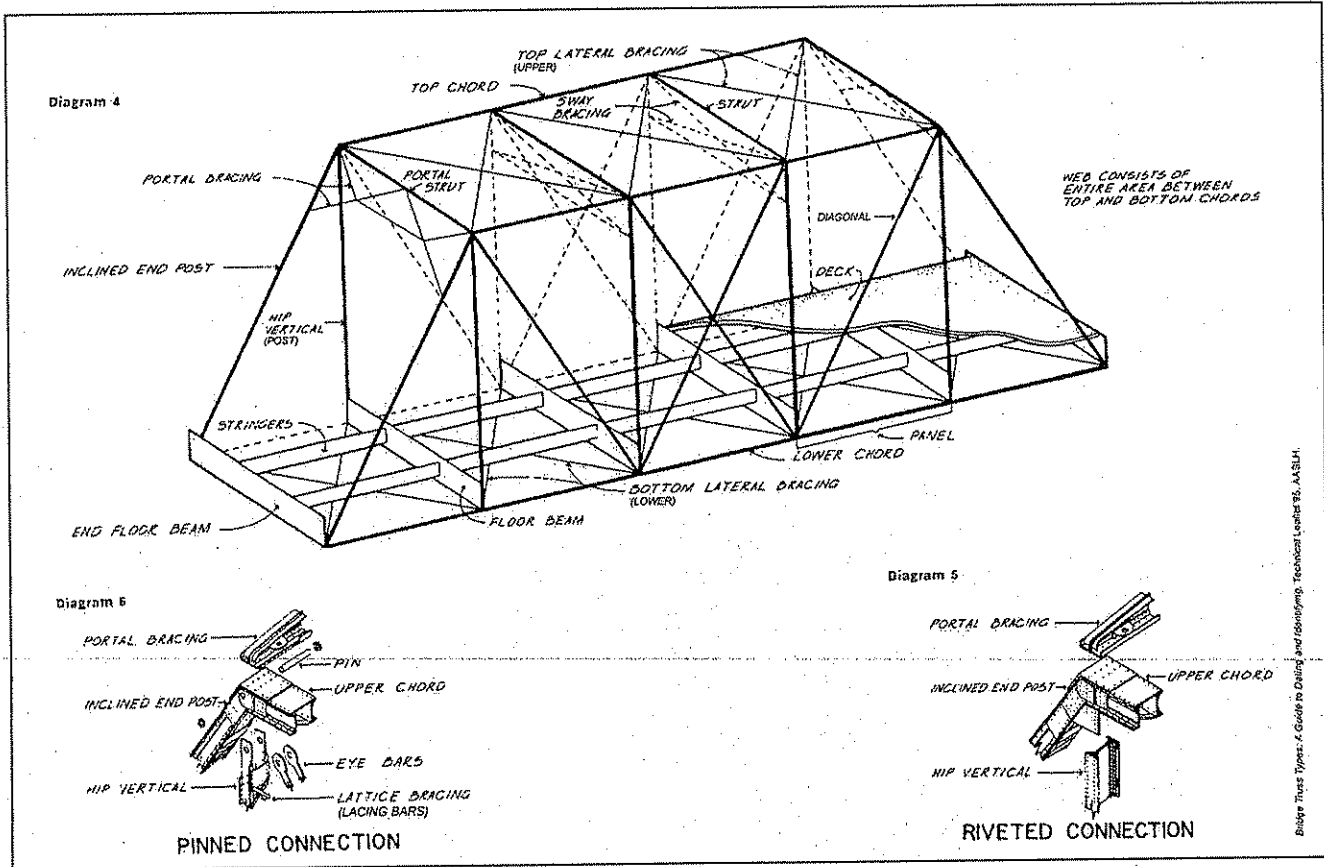
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Wea Creek Bowstring Arch Truss Bridge
Shawnee County, Kansas

TRUSS TERMINOLOGY



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Wea Creek Bowstring Arch Truss Bridge
Shawnee County, Kansas

STATEMENT OF SIGNIFICANCE

The Wea Creek Bowstring Arch Truss Bridge is significant under National Register Criterion C in the areas of Engineering and Transportation. As defined by the *Multiple Property Documentation Form for Metal Truss Bridges in Kansas*, it is an excellent example of the Bowstring truss bridge type. Built in 1870, the Wea Creek Bowstring Arch Truss Bridge is a rare survivor of this once common bridge truss type. It is one of the last remaining examples in the United States of the Miller double tubular patent and one of only two in Kansas. In addition, it may have been the first application of the patent west of the Mississippi River. Its wrought iron construction illustrates the standard use of this material during the period of significance. As no consistent historic name identifies this bridge, the preferred name "Wea Creek Bowstring Arch Truss Bridge" has been assigned. This describes the historic location, design, and function of the structure.

ELABORATION

The need for all-weather crossings of rivers and streams corresponded to the growth of the market economy across Kansas during the late nineteenth and early twentieth centuries. Bridges provided farmers easy access to markets and could make the difference between growth and stagnation for the many small, young communities across the state.¹ Proximity to a bridge often secured a town's economic stability, and it contributed to a local sense of modernity.

Prior to the 1930s, the railroad was the primary means of long-distance travel and there was little need for roads to extend more than a few dozen miles. With little stimulus for improving roads that would cross multiple jurisdictions, road construction and maintenance remained local concerns. County commissioners often carried the burden of selecting bridge locations, over which much contention was common.

The range of choices for bridge designs and companies was vast. Many of the larger bridge companies sold metal truss bridges through mail order catalogues. County commissioners could simply specify the span, clearance needs, and truss type (if there was a preference), then choose the lowest bidder from the numerous competing companies that had salesmen in the field.

By the late nineteenth century, fabrication of iron and steel was widespread. The speed of construction and the relatively low cost of metal truss bridge parts ensured their popularity over labor-intensive masonry bridges and short-lived timber bridges. The wrought iron construction of the Wea Creek Bowstring Arch Truss Bridge is typical of bridges built during its period of significance. Toward the end of the nineteenth century, the quality, quantity, and cost of steel improved to such a degree that it virtually replaced wrought iron for bridge construction by 1910.²

Most metal trusses were constructed of built-up members composed of mass-produced, standard-shaped channel, plate, and angle stock purchased from one or more of the numerous steel companies nationwide. The bridge

¹ Larry Jochims, *Metal Truss Bridges in Kansas 1861-1939, National Register of Historic Places Multiple Property Documentation Form*, (Topeka: Kansas State Historical Society, 1989), E.

² Ibid, F.

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Wea Creek Bowstring Arch Truss Bridge
Shawnee County, Kansas

companies preassembled trusses in their factories then simply shipped them to the bridge site for installation. Installation involved grading approaches, constructing abutments and piers, erecting preassembled floor and truss members, and placing deck material.

Before 1900, generally all panel point connections – the locations at which structural bridge elements intersect – were made with the use of a pin. This technique was so widespread that it became one of the distinctive features of American bridge construction in the nineteenth century.³ However, subsequent advancements in pneumatic riveting techniques greatly improved rivet installation quality, enabling more reliable panel point connections. With the increased portability of this construction technology, the more rigid riveting technique rapidly surpassed pin-connected bridge construction during the first years of the twentieth century. The bolt-fastened structure of the Wea Creek Bowstring Arch Truss Bridge is an example of a typical construction technique used prior to the widespread standardization of the pin-connected technique.

In addition, the contemporary development of economic cement production promoted the widespread combination of steel and concrete in bridge construction. It was not uncommon for older metal truss bridges to receive new reinforced concrete decks or poured concrete reinforcements for older stone abutments. By the 1920s, reinforced concrete was the standard material for abutments, piers, and decks of steel truss bridges.

The Wea Creek Bowstring Arch Truss Bridge is a classic example of this truss design. Patented by Squire Whipple in 1840, the bowstring arch truss is essentially an arch bridge in which the deck is supported by the top chords, thus placing all vertical members in tension.⁴ The bottom chords resist the horizontal thrust of the arch. The diagonal members serve as bracing. The bowstring arch truss became a very common truss type during the late nineteenth century and spawned numerous variations, including the Miller double tubular patent illustrated by the Wea Creek Bowstring Arch Truss Bridge.

The bowstring arch truss bridge type is the oldest truss type found in Kansas.⁵ During the 1870s, it was the most popular bridge type and often represented the first public improvement expenditure made in many counties across the state. In 1998, approximately twelve bowstring arch truss bridges, including the Wea Creek Bowstring Arch Truss Bridge, existed throughout the state of Kansas.⁶

STRUCTURE HISTORY

Buckeye Bridge Works of Cleveland, Ohio, a prolific metal truss bridge builder in the Midwest, constructed the Wea Creek Bowstring Arch Truss Bridge in 1870 as part of a triple-span bridge across Bull Creek at the Osawatomie, crossing after the previous bridge was lost to floodwaters on July 11, 1869.⁷ Local citizens

³ Ibid, F.

⁴ T. Allan Comp and Donald Jackson, *Bridge Truss Types: A guide to dating and identifying*. (Nashville, Tennessee: American Association for State and Local History, Technical Leaflet 95), 8.

⁵ Jochims, E.

⁶ Nimz, 6.

⁷ Little else is known of the company except that there are a handful of surviving examples of their work in Nebraska and Michigan.

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Wea Creek Bowstring Arch Truss Bridge
Shawnee County, Kansas

pressured the Miami County Commissioners for a replacement and, after much deliberation, the Commissioners agreed upon the construction of a new iron bridge on the remaining piers. The Commissioners voted to advertise for bids to construct a triple-span iron truss bridge of the "Miller Tubular Iron Bridge Pattern." Each span was to be 69 feet in length and 13 feet in width, and the cost was not to exceed twenty-eight dollars per lineal foot.

Upon completion on July 9, 1870, *The Miami Republican* reported that the Miller double tubular patent bridge was the "best bridge in existence" and that "Messrs. Sprague and Pratt, of Atchison, Kansas are sole contractors for these bridges for all the states and territories west of the Mississippi."

Mahlon Miller (1831- 1909) patented the Miller double tubular groove fastened bridge design. As early as 1861, Miller appeared in the Cleveland City Directory as a boilermaker and bridge builder. By 1871, Miller had formed a partnership with William Jamieson and was a principal in the firm of Miller and Jamieson.

According to Miami County press, the bridge was a pioneering effort for Miller, who was present for the erection of the bridge. With a high profile in Kansas during the 1870s and early 1880s, Miller's firm received numerous contracts.

C. C. Pratt came to Kansas in 1868 as a representative of the King Iron and Bridge Company of Cleveland, Ohio. His connections in real estate and the insurance business lead him to Dr. A. N. Sprague, a real estate and freighting businessman, as well as physician. In addition to their partnership as contractors of Miller patent bridges, the 1870 Atchison City Directory listed them as partners in a real estate firm.

In 1902, the Miami County Commissioners ordered the disassembly of the bridge and the relocation of each of the three spans to different sites within Miami County. T. M. Hobson received the contract. One span was relocated to cross Middle Creek at Bryan pond in Mound Township; one span was relocated to cross Middle Creek at Davis pond in Sugar Creek Township; and one span was relocated to cross Wea Creek at Whitaker Crossing between Wea and Tenmile Townships.

On November 19, 1988, the Wea Creek Bowstring Arch Truss Bridge was relocated to the grounds of the Kansas State Historical Society in Topeka.

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Wea Creek Bowstring Arch Truss Bridge
Shawnee County, Kansas

BIBLIOGRAPHY

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- Delaware Historic Bridges, Survey and Evaluation*. Historic Architecture and Engineering Series, No. 89. Dover: Delaware Department of Transportation, Division of Highways, 1991.
- Historic Bridge Inventory*. Kansas Department of Transportation, c.1985 [no date].
- Historic Highway Bridges in Pennsylvania*. Harrisburg: Pennsylvania Department of Transportation and Pennsylvania Historical and Museum Commission, 1986.
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- Nimz, Dale E. *Activity III Review Initial Assessment Metal Truss Bridges*. Topeka: Kansas State Historical Society, 1998.
- Nimz, Dale E. *Miller Double Tubular Groove Fastened Wrought Iron Bridge, National Register of Historic Places* [draft nomination]. Topeka: Kansas State Historical Society, c.1998 [no date].
- The Second Ohio Historic Bridge Inventory: Evaluation and Preservation Plan*. Columbus: Ohio Department of Transportation, 1990.
- Vermont Truss Bridges and Maintenance*. Vermont Bridge Program, 2000.
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Wea Creek Bowstring Arch Truss Bridge
Shawnee County, Kansas

GEOGRAPHICAL DATA

Verbal Boundary Description:

Located on the NW $\frac{1}{4}$ of Section 32, Township 11S, Range 15E, the Wea Creek Bowstring Arch Truss Bridge encompasses an area measuring approximately 69 feet by 12 feet. The northwest corner of this area corresponds to the northwest corner of the bridge.

Boundary Justification:

The boundary includes the truss, deck, abutments, and associated approaches that represent the significant features associated with the bridge structure.

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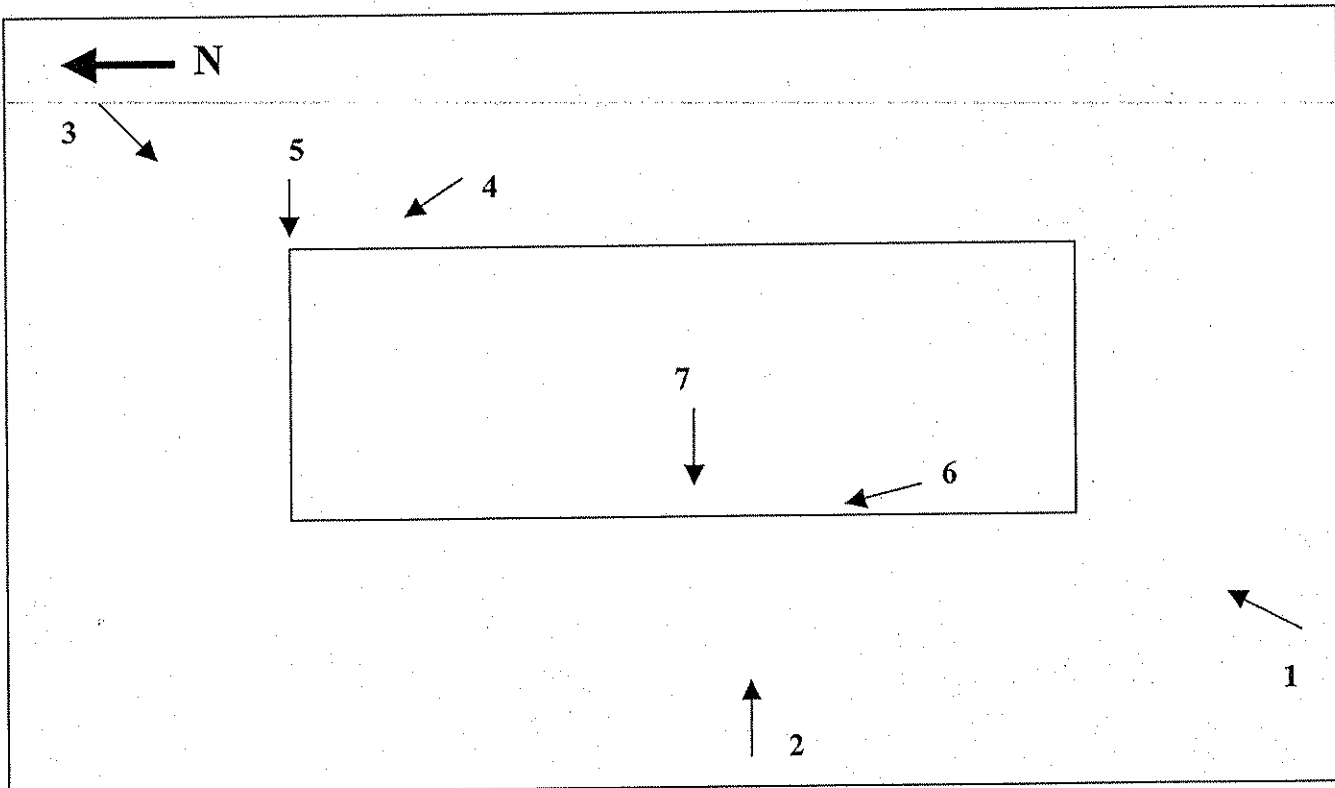
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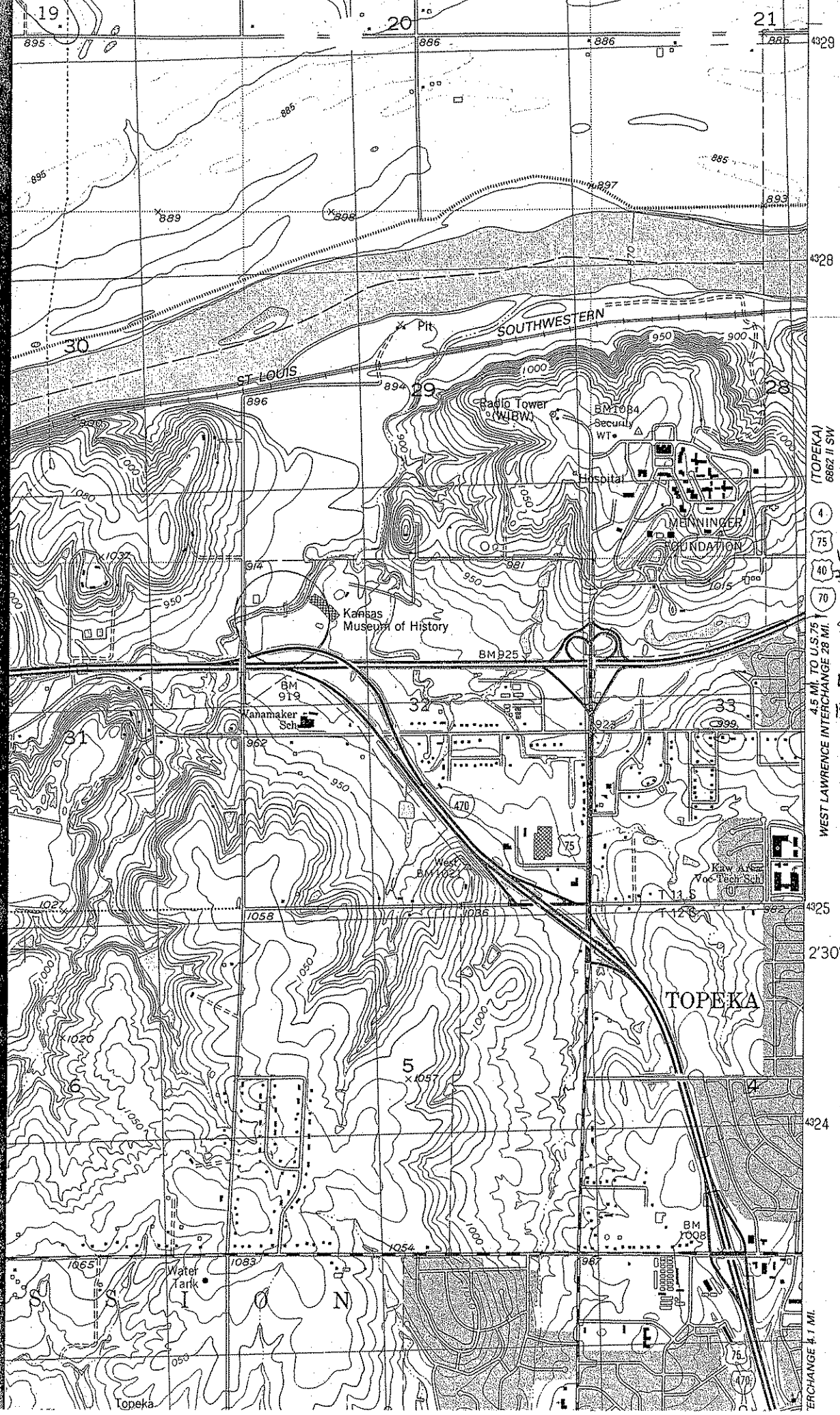
Wea Creek Bowstring Arch Truss Bridge
Shawnee County, Kansas

PHOTO LOG

Photographer: Kerry Davis
Date of Photographs: February 2002
Location of Original Negative: Kansas State Historical Society, Topeka, Kansas

Photograph Number	Camera View
1.	View NE, bridge truss and deck
2.	View E, bridge truss and stream banks
3.	View SW, bridge truss and deck
4.	View NW, north abutment and bridge understructure
5.	View W, bearing detail
6.	View NW, upper chord detail
7.	View W, upper chord, node detail





(TOPEKA)
 6862 II SW
 4
 75
 40
 70
 4.5 MI. TO U.S. 75
 WEST LAWRENCE INTERCHANGE 28 MI.

WEA CREEK
 BANSTRING ARCH
 TRUSS BRIDGE
 SHAWNEE CO., KANSAS

UTM REFERENCE:
 15/259 W40/4326 450

INTERCHANGE 4.1 MI.