United States Department of the Interior
National Park Service

OMB No. 1024-0018

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations of eligibility for individual properties or districts. See instructions in *Guidelines for Completing National Register Forms* (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, styles, materials, and areas of significance, enter only the categories and subcategories listed in the instructions. For additional space use continuation sheets (Form 10-900a). Type all entries.

1. Name of Property

historic name JOHN MACK BRIDGE

other names/site number SOUTH LAWRENCE STREET BRIDGE 173-5880-1383

2. Location

street & number NE/SE 1/4, SE 1/4, SE 1/4, NE 1/4, S. 5, T. 28S, R. 1E ☐ not for publication

city, town WICHITA ☐ vicinity

state KANSAS code KS county SEDGWICK code 173 zip code 67202

3. Classification

Ownership of Property
- ☐ private
- ☒ public-local
- ☐ public-State
- ☐ public-Federal

Category of Property
- ☐ building(s)
- ☐ district
- ☐ site
- ☒ structure
- ☐ object

Number of Resources within Property

Contributing	Noncontributing	
		buildings
		sites
1		structures
		objects
1		Total

Name of related multiple property listing:
"Rainbow Arch (Marsh Arch) Bridges of Kansas"

Number of contributing resources previously listed in the National Register 0

4. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this ☒ 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 ☒ meets ☐ does not meet the National Register criteria. ☐ See continuation sheet.

Signature of certifying official — STATE HISTORIC PRESERVATION OFFICER — Date: DECEMBER 4, 1991

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.

Signature of commenting or other official — Date

State or Federal agency and bureau

5. 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 the Keeper — Date of Action

6. Function or Use

Historic Functions (enter categories from instructions)

TRANSPORTATION : ROAD RELATED (VEHICULAR); bridge

Current Functions (enter categories from instructions)

TRANSPORTATION: ROAD RELATED (VEHICULAR); bridge

7. Description

Architectural Classification (enter categories from instructions)

OTHER: RAINBOW REINFORCED CONCRETE TIED ARCH

Materials (enter categories from instructions)

foundation
walls
roof
other CONCRETE

Describe present and historic physical appearance.

The John Mack Bridge (c. 1930-1931) spans the Big Arkansas River along lower South Broadway in Wichita, Sedgwick County, Kansas (pop. 279,835). The structure is an example of a reinforced concrete, tied arch, Rainbow Arch (Marsh Arch) bridge.

The John Mack Bridge is the largest extant bridge of its kind in the nation and is the largest Marsh Arch bridge constructed in Kansas, making it an extremely rare and important example of Marsh Arch bridge construction. The structure maintains an extremely high degree of architectural and structural integrity.

The eight span bridge has a north to south orientation, measuring 800 feet in length. The road deck measures 30 feet wide, a 5 foot wide sidewalk runs the length of the bridge on both the east and west sides.

The superstructure of the bridge is supported by massive concrete piers. The piers sit in the shallow river, there is very little debris around them.

Eight tied arches sit on the piers, connected with cast steel rocker shoes. The arches are supported by vertical hangers with each arch. Each arch is connected to its parallel member with a concrete "tie." All concrete members are incised and panelled.

Visible deterioration on the bridge includes some spalling around drain mouths underneath the deck, some craking on the hangers, and some spalling on the sidewalks.

A four-lane street meets the north and south approaches to the bridge. The four lanes merge into two lanes and are accepted by the 30 foot wide roadway. The John Mack Bridge has served the Wichita community as a two-lane bridge for sixty years.

A. G. Lichtenstein and Associates Consulting Engineers was hired by the City of Wichita to study the rehabilitation potential of the bridge in September, 1991. The firm's engineering report is expected to be completed in December, 1991.

☐ See continuation sheet

8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties:
☐ nationally ☐ statewide ☒ locally

Applicable National Register Criteria ☒ A ☐ B ☒ C ☐ D

Criteria Considerations (Exceptions) ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G

Areas of Significance (enter categories from instructions)	Period of Significance	Significant Dates
ENGINEERING	1930-1931	1930-1931
SOCIAL HISTORY	1929-1931	

Cultural Affiliation
N/A

Significant Person
N/A

Architect/Builder
MARSH, JAMES B.
TOMLINSON, EDWARD

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above.

The John Mack Bridge (c. 1930-1931) is being nominated to the National Register under criteria A and C for its historical association with the growth and development of Wichita and for its architectural significance as a reinforced concrete, tied arch, Rainbow Arch (Marsh Arch) bridge, and is to be included in the "Rainbow Arch (Marsh Arch) Bridges of Kansas" National Register thematic resources nomination. The John Mack Bridge is the largest extant bridge of its kind in the nation and is the largest Marsh Arch bridge constructed in Kansas, making it an extremely rare and important example of Marsh Arch bridge construction.

The bridge spans the Big Arkansas River along lower South Broadway in Wichita, Sedgwick County, Kansas (pop. 279,835). The eight span bridge has a north to south orientation, measuring 800 feet in length. The road deck measures 30 feet wide, a 5 foot wide sidewalk runs the length of the bridge on both the east and west sides.

The design for the Rainbow Arch or Marsh Arch bridge was patented by James Barney Marsh (1856-1936) in 1911 (U.S. Patent No. 1,035,026). Marsh writes in the patent application that, "broadly speaking the object of the present invention is, to construct an arch bridge of reinforced concrete in such manner as to permit of a limited amount of expansion and contraction both of the arches and of the floor which are, of course, the longest members of the bridge."

The original patent described the fixed arch; the tied arch is a later design but uses the same technology described in the 1911 patent. In the tied arch, the arches are connected to the top of the piers with the use of cast steel rocker shoes. One of these shoes was engineered to allow for expansion and contraction of the structure and roadway. This design lacked the massive abutment to

☒ See continuation sheet

absorb or resist horizontal thrust so a bottom chord or tie was added to the arch to fill this function.

The earliest know Marsh arch in Kansas was built in 1917, the latest in 1934. Construction of the reinforced concrete arches in Kansas reached a peak in the late 1920s and declined after 1930. "Kansas did not make extensive use of reinforced concrete spans until the introduction by James Barney Marsh of the rainbow arch, often referred to as the Marsh arch." (Jochims, Kansas Preservation, p. 2, September-October 1980)

Marsh received his Bachelor's of Mechanical Engineering from Iowa State College of Agriculture and Mechanical Arts (Ames, Iowa) in 1882. Between 1883 and 1896 he worked for the King Bridge Company in Cleveland, Ohio in sales, design, and construction. In 1889 he became the director of the King Bridge Company's general western office in Des Moines, Iowa. In 1896 Marsh formed the Marsh Bridge Company, which was reorganized as the Marsh Engineering Company in 1909.

Called the South Lawrence Street Bridge in plan specifications, the John Mack Bridge was designed by the Marsh Engineering Company of Des Moines, Iowa in August, 1929. It was outside the city limits at the time of its construction. While this part of Wichita was not annexed into the city until the early 1950s, South Lawrence Street, which later became South Broadway, was the southern outlet to Wichita and served as U. S. Highway 81 until it was rerouted. A traffic survey taken by the Kansas state highway department in 1930 showed that 4,965 motor vehicles crossed the metal truss South Lawrence Street Bridge (c. 1883) between 8 a.m. and 6 p.m. daily.

"Agitation for a new structure started after many Sedgwick county residents had pointed out that the present structure, which has been in existence for years, is inadequate for traffic in addition to being dangerous....The new bridge will follow a course almost due north and south as contrasted to the present structure which follows a diagonal route across the river. As soon as the bridge itself is completed the state highway department will construct paving from the southern extremity to a point meeting with the turn in the South Lawrence pavement due east of the Shadowland dance pavilion. This connection will serve to eliminate a dangerous curve." (Wichita Morning Eagle, 4 February 1930, p.3)

The new South Lawrence Street Bridge was named after John C. Mack (1867-1930), a newspaper publisher, senator, and member of the Kansas state highway commission from Newton. His activity as chairman of the roads committee of the Kansas House of Representatives gave him the recognition as "father" of the Kansas good roads system. He was appointed to the state highway commission as the fifth district representative by Governor Ben S. Paulen (1869-1961) in October, 1928. As the fifth district representative Mack represented Wichita on the state highway commission and is credited with the successful negotiations which resulted in the contract for the new bridge.

Under Paulen's term as governor (1925-1929) the state highway commission successfully designated a new state highway system, and in doing so regained frozen federal aid for road and bridge construction in Kansas. The Federal Aid System (FAS), which was created in 1916, mandated that all states designate state highway systems that would be maintained in part by federal funds. This mandate resulted in the establishment of the Kansas state highway commission in 1917. Since its establishment, the state highway commission struggled against the desire for local control of the road systems by the counties, jeopardizing federal aid to Kansas. The South Lawrence Street Bridge was a federal aid project that benefited from the tenacity of state highway system proponents such as Mack and Paulen.

On November 20, 1929 the state highway commission approved the Tomlinson Bridge and Supply Company's bid of $153,526 for the construction of a concrete arch span bridge at South Lawrence Street in Wichita. The action was described as "a virtual clean-up of the 1929 road construction program." (Wichita Morning Eagle, 21 November 1929, p.2) The Tomlinson Bridge and Supply Company of Garfield, Pawnee County bid out two other Kansas firms and two Iowa firms for the project. The company had recently completed a bridge between Hutchinson and Wichita and was currently building a bridge over the Big Arkansas at Larned.

Work on the bridge began on January 30, 1930 with the excavation of the footings; all work was supervised by the state highway department's resident engineer on the project, B. J. Berson. Eighteen months were allowed for the bridge's construction.

After the bridge's metal frame was erected, the footings, abutments and/or piers were concreted. The hangers, the arch ribs, and the

beams were concreted next. "Expansion plates were placed on the beams in preparation for receiving the floor. Finally, the intermediate ties, floor slab, wall copings and rail were poured. Once the floor centering was struck the intermediate hangers were concreted. Because the hangers had to be under full dead load when they were concreted, the floor centering was struck no less than ten days or more than twenty-one days after the rest of the concrete was placed. The handrail was the last portion of the bridge to be concreted." (Small, "Rainbow Arch (Marsh Arch) Bridges of Kansas" National Register thematic resources nomination, 1983)

Dramatically, only a month into the construction of the new South Lawrence Street Bridge, one of the middle spans of the old South Lawrence bridge collapsed. The collapsed truss bridge originally was part of a span across the Arkansas River at Douglass Avenue. Subsequently, five of these spans were moved to become the old South Lawrence Street Bridge. "The collapsed span was 100 feet in length and the state men almost set a record in driving seven lines and piles and laying a floor in three days." (Wichita Morning Eagle, 5 March 1930, p.1)

In response to the clear need for the new bridge, Edward Tomlinson attempted to finish the bridge ahead of schedule. Tomlinson was arrested in September, 1930 for working his employees more than eight hours a day. "In one of the most unusual complaints ever filed in the court, Tomlinson, who holds a contract with the state, is charged with having worked his employees more than eight hours a day. The statute applies only to contractors or sub-contractors who are working for the state." (Wichita Morning Eagle, 17 September 1930, p.5) A nominal fine of $50 was levied against Tomlinson. The construction of the bridge provided employment for a crew of twenty-two men, Tomlinson's unintentional oversight clearly was overshadowed by the economic importance of those jobs.

The Globe Construction Company of Wichita submitted the low bid of $24,306 for paving the approach to the new South Lawrence Street Bridge and for the grading and culverts on State Highway 81 to the state highway commission in October, 1930. The bridge and the paved approaches were completed in mid-July, 1931, a crew of thirty-five men accomplished this labor. Two thousand, seven hundred feet of concrete paving connected the bridge to the pavement. The total cost of the bridge, paved approach, and right-of-way acquisition was $191,000, with the cost of the bridge proper

right on target with the original bid.

"....the handsome new bridge across the Big Arkansas river on South Lawrence....is a thing of architectural beauty with its rows of arches in gleaming white concrete, replac(ing) an antiquated span across which motorists for the past year have been crawling in fear and trembling." (Wichita Morning Eagle, 26 May 1931)

The Wichita Chamber of Commerce and the South Side Improvement Association sponsored a gala celebration to mark the completion of the bridge on the evening of July 22, 1931. Five thousand people attended the ceremony and dance which followed. It was at this ceremony that the new South Lawrence Street Bridge was officially named the John Mack Bridge, in memory of the state highway commissioner that made the bridge possible. The celebrants danced on the bridge's concrete deck until midnight to the Bob and Laura Collins Orchestra. The Bob and Laura Collins Orchestra was playing at the Shadowland dance pavilion that week; the Shadowland, located near the southwest bank of the Big Arkansas River, was closed for the event. When the dance was over the bridge and the new section of the highway were opened.

The John Mack Bridge has served the Wichita community for sixty years. The structure maintains an extremely high degree of architectural and structural integrity and is eligible for the National Register. Strong community support for its preservation and continued active use has been demonstrated by the Save the John Mack Bridge Committee petition which gathered over six thousand signatures in May and June, 1991. Since that time the City of Wichita has hired A. G. Lichtenstein and Associates Consulting Engineers to study the bridge for its rehabilitation potential. The firm's engineering report is expected to be completed in December, 1991. The John Mack Bridge continues to serve the Wichita community as a two-lane bridge.

9. Major Bibliographical References

SEE CONTINUATION SHEET.

[XX] See continuation sheet

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 Record # _____

Primary location of additional data:

- [XX] State historic preservation office
- [ ] Other State agency
- [ ] Federal agency
- [ ] Local government
- [ ] University
- [ ] Other

Specify repository: KANSAS STATE HISTORICAL SOCIETY

10. Geographical Data

Acreage of property LESS THAN ONE ACRE

UTM References

	Zone	Easting	Northing
A	14	646860	4167490
B			
C			
D			

[ ] See continuation sheet

Verbal Boundary Description

THE NOMINATED PROPERTY IS LOCATED ON THE NE/SE 1/4, SE 1/4, SE 1/4, NE 1/4, S. 5, T. 28S, R. 1E IN WICHITA, SEDGWICK COUNTY, KANSAS ON A TRACT MEASURING 800 FEET FROM NORTH TO SOUTH AND 40 FEET FROM EAST TO WEST WHOSE NORTHEAST CORNER IS REPRESENTED BY THE NORTHEAST CORNER OF THE BRIDGE. BEGINNING AT THE NORTHEAST CORNER OF THE BRIDGE THE BOUNDARY PROCEEDS 800 FEET SOUTH, 40 FEET WEST, 800 FEET NORTH, AND 40 FEET EAST TO THE POINT OF BEGINNING.

[ ] See continuation sheet

Boundary Justification

THE BOUNDARY INCLUDES ONLY THAT AREA THAT IS HISTORICALLY ASSOCIATED WITH THE NOMINATED PROPERTY.

[ ] See continuation sheet

11. Form Prepared By

name/title MARTHA HAGEDORN-KRASS, ARCHITECTURAL HISTORIAN

organization KANSAS STATE HISTORICAL SOCIETY date DECEMBER 4, 1991

street & number 120 W. 10th telephone 913-296-5264

city or town TOPEKA state KANSAS zip code 66612

Des Moines Tribune; 26 June 1936.

Jochims, Larry. "Rainbow Arch Bridges Add Variety to Kansas Highways," Kansas Preservation, V. 2, N. 6, September-October, 1980.

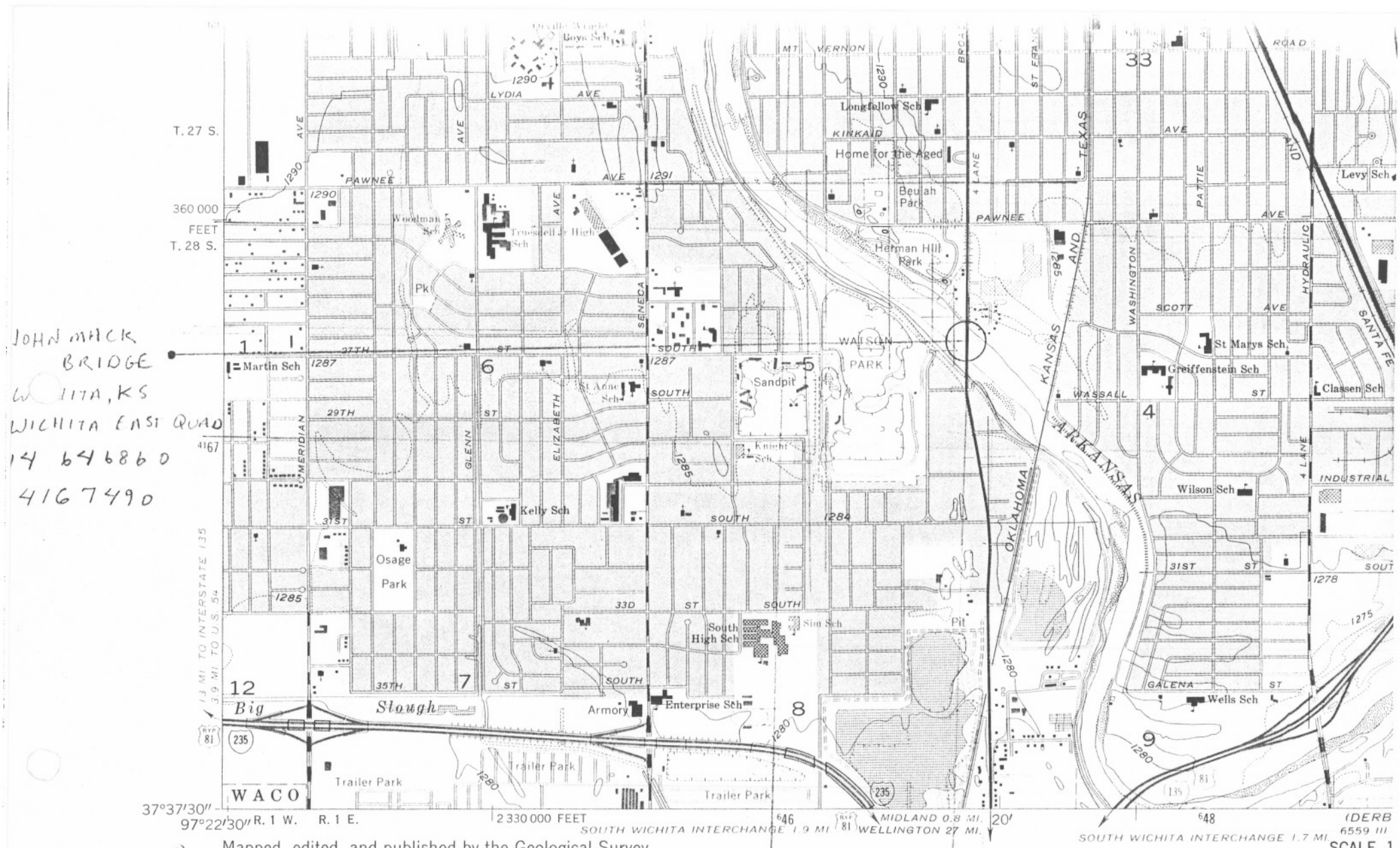
Rowland, Mary. "Kansas and the Highways, 1917-1930," Kansas History: A Journal of the Central Plains, V. 5, N. 1, Spring, 1982.

Schirmer, Sherry Lamb and Dr. Theodore A. Wilson. Milestones: A History of the Kansas Highway Commission and the Department of Transportation. (Topeka, 1986).

Small, Nora Pat. "Rainbow Arch (Marsh Arch) Bridges of Kansas," (National Register thematic resources nomination, 1983).

United States Patent Office. United States Patent No. 1,035,026. James B. Marsh, of Des Moines, Iowa. Reinforced Arch-Bridge.

Wichita Morning-Eagle; 8 November 1929, 21 November 1929, 30 January 1930, 4 February 1930, 31 August 1930, 17 September 1930, 18 September 1930, 28 September 1930, 25 October 1930, 23 January 1931, 24 May 1931, 26 May 1931, 18 July 1931, 19 July 1931, 22 July 1931, 23 July 1931, 22 December 1934.



JOHN MACK
BRIDGE
WICHITA, KS
WICHITA EAST QUAD
14 646860
4167490

(BAYNEVILLE)
6559 III SW

Mapped, edited, and published by the Geological Survey
in cooperation with State of Kansas agencies

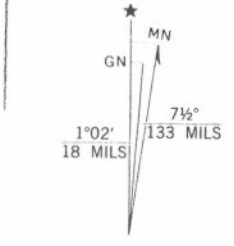
Control by USGS and USC&GS

Culture and drainage in part compiled from aerial photographs taken 1954. Topography by planetable surveys 1940–1941
Revised 1961 in cooperation with the City of Wichita

Polyconic projection. 1927 North American datum
10,000-foot grid based on Kansas coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks,
zone 14, snown in blue

Red tint indicates areas in which only landmark buildings are shown

To place on the predicted North American Datum 1983



UTM GRID AND 1982 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

SCALE 1

1 0 1/2 1
1000 0 1000 2000 300
1 .5 0

CONTOUR INTE
DOTTED LINES REPRESE
NATIONAL GEODETIC VE

THIS MAP COMPLIES WITH NATIO
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER
AND STATE GEOLOGICAL SURV
A FOLDER DESCRIBING TOPOGRAPHIC MAPS