

King Avenue Bridge
Spanning the Olentangy River
City of Columbus
Franklin Ohio
Ohio

HAER NO. OH-112

HAER
OHIO
25-COLB,
51-

PHOTOGRAPHS
WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Great Lakes System Office
Department of the Interior
1709 Jackson St.
Omaha, NE 68102

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I. INTRODUCTION

Location: Spanning the Olentangy River on King Avenue, City of Columbus,
Franklin County, Ohio.

Latitude: 39 degrees - 59' - 26" North
Longitude: 83 degrees - 01' - 28" West
UTM: easting 327180
northing 4428485

Zone 17, Southwest Columbus Quadrangle

Construction: **Design Date:** 1912-1913
Constructed: 1912-1914
Opened to Traffic: 1914
Rehabilitated: 1971

Owners: Franklin County Commissioners
(Original & Present)

Present Use: Vehicular and pedestrian bridge to be replaced by a new vehicular and pedestrian bridge. Present date of removal is Spring of 1998.

Significance: As the first concrete arch bridge constructed along the lower Olentangy River, the King Avenue Bridge served as a major cornerstone in the implementation of the 1908 "Master Plan" for the City of Columbus. The King Avenue Bridge was the first riverfront structure to feature design elements prevalent in the City Beautiful Movement of the early 20th Century. It is also an example of the work of Wilbur Watson, a noted bridge designer.

Project Information: This document was undertaken in 1997 as part of the Memorandum of Agreement between the State Historic Preservation Office and the Federal Highway Administration as a mitigative measure prior to the replacement of the bridge. This report was prepared by Jones-Stuckey, Ltd., Inc. in conjunction with the Franklin County Engineers Office.

II. HISTORY OF BRIDGE

A) History of Crossing and Site

Prior to the establishment of the Ohio State University in 1870, the area immediately northwest of downtown Columbus consisted of farms and small villages. In 1863, King Avenue became the one of the first roadways in the region to be extended west across the Olentangy River with the construction of a single-span, steel and iron truss bridge. The original truss was demolished in 1912 to make way for the present concrete bridge¹. With the new university establishing its southern boundary just north of King Avenue, the land between campus and downtown Columbus began to be developed. By the turn of the century, most of the land south of the university had been subdivided and planned for development. In addition, most of the streets parallel to King Avenue, including Third and Fifth Avenues, had been extended across the Olentangy River through the construction of simple truss bridges. These bridges allowed Columbus residents easier access to the developing suburban communities of Upper Arlington and Grandview Heights. However, the existing steel trusses could not carry the 50-ton street car loading that comprised the city's mass transit system². Although the bridges were relatively new and in good condition, popular sentiment among the county commissioners was to replace them with sturdier structures.

In 1893, the World's Columbian Exposition, a "World's Fair" -type event showcasing the best examples of culture and new innovations from around the world, was held in Chicago. After seeing examples of classical architecture used in cities across Europe, representatives from many American cities returned home from Chicago with a plan to uplift their communities from the squalor created by years of industrial expansion and uncontrolled poverty. This period of design, linked with the Progressive movement in American politics, is referred to as the "City Beautiful Movement."³ In 1908, the city of Columbus commissioned a comprehensive study on its ever-growing community. The commission, which consisted of Austin W. Lord (Chairman), Albert Kelsey, Charles N. Lowerie, H.A. MacNeil, and Charles Mulford Robinson (Secretary), was to make a report on the current state of the city and give a general direction for future development.⁴ In the spirit of the City Beautiful Movement, the Commission laid the groundwork for an aesthetically striking city that would "*contribute to the pleasure and welfare of (its) citizens.*"⁴ In their report, officially entitled the "Report of the Columbus Planning Commission", but commonly referred to as the "1908 Master Plan", the Commission focused on three discussion groups: (1) the General Survey, (2) the Park System; and (3) the State or Civic Center. Part of the General Survey section discussed the plan for future bridges in the Columbus area. Feeling that the metal truss bridge was a "*flimsy, temporary disfigurement*"⁴, the Commission made a general outline for all new bridges, requiring that they be aesthetically pleasing as well as practical. "*But, speaking generally, the conspicuousness of a bridge, seen as it is for a long distance on either shore, justifies great carefulness of design. Permanence is the first practical requirement, and nothing better gives the effect of strength than a broad*

masonry construction. Concrete is a close second in appearance, and it is so inexpensive and requires so little attention, as compared with steel, that the Commission earnestly recommends that the further bridges of Columbus be made of concrete or masonry.”⁴

By 1911, the concrete arch bridge was still a rare commodity in Ohio. Seen primarily as an untested, experimental engineering technique, the style had proven successful in such cases as the concrete “Y-Bridge” (1900-1902) at the confluence of the Muskingum and Licking Rivers near Zanesville.⁵ It was during this time that Franklin County Bridge Engineer Walter Braun began plans for a concrete arch bridge in Central Ohio. Due to its advanced age, heavily travelled location, and lack of load capacity, the King Avenue Bridge was seen as the most likely structure to replace. In 1912, Braun contracted the services of Wilbur Watson, a noted engineer from Cleveland, to assist him in laying the plans for the new King Avenue Bridge. Watson, who believed in the enhancement of bridge features for aesthetic purposes, brought several of his signature features, such as elliptical arches, curved wingwalls, and a strong sense of Neoclassical architecture, to the design of the bridge. By the spring of 1912, Watson and Braun had completed plans for a three-span, closed spandrel filled arch concrete bridge. On June 3 of the same year, these plans, along with a cost estimate for the new bridge, were submitted before the Franklin County Commissioners for approval.⁶ The plans were approved, and, on July 6th, construction was contracted to the firm of E. Elford and Company for the sum of \$48,799.95. The contract set two intermediate completion dates: September 1, 1913 for the concrete work and October 1, 1913 for the fill. A final construction date was not set, but was to be determined by the county engineer.⁷

As was typical at that time, several different contractors were hired for different types of work. On November 2, 1911, the firm of D.E. Sullivan and Sons was contracted to construct the approach roadway embankment and drainage.⁸ A Clintonville firm, Cooke & Cooke, was contracted on July 6, 1912 for 1700 tons of limestone rip-rap.⁹ This stone was to be placed 30 days after the approaches were completed by the Sullivan firm.

During the winter of 1913, heavy amounts of precipitation had slowed construction on the new King Avenue Bridge. Yet, despite the inclement weather and swollen state of the Olentangy River, workers managed to complete much of the approaches and roadway, in addition to a portion of the bridge's superstructure. These efforts, however, were put into severe jeopardy in March, when a prolonged period of heavy rain besieged much of the state of Ohio, including the Columbus region. The resulting flood, which ranks as one of the most destructive in history, destroyed as many as one thousand bridges across the entire state, including the Broad and Town Street Bridges over the Scioto River in downtown Columbus. Along the Olentangy River, the newly-built King Avenue extension was washed away by the raging floodwaters. While early newspaper reports stated that the "*superstructure work on the new bridge being erected over the (Olentangy) river at the King Avenue crossing was damaged considerably by the water*",¹⁰ the site remained remarkably intact. Due to this flooding, it was decided that a fourth span of 90 feet be added. During the months of April and May of 1913, construction was halted on the King Avenue Bridge while Watson revised the plans to include a fourth span. On June 9, 1913, the County Commissioners awarded E. Elford and Company the contract to finish the work on the King Avenue Bridge. Twenty-six thousand dollars (\$26,000.00) was paid to the contractor for work prior to the flood. The second contract was

for an additional cost of \$57,585.00. On November 29, 1913, the Franklin County Commissioners extended the deadline for the bridge's completion to April 1, 1914.¹¹ The bridge was dedicated and opened to traffic on October 31, 1914.

B) The Bridge

Completed in the spring of 1914, the King Avenue Bridge is a four-span, closed spandrel earth-filled arch. Designed in a collaborative effort between noted bridge designer Wilbur Watson and Franklin County Bridge Engineer Walter Braun, the bridge spans a total length of 415 feet. It consists of four elliptical, 110-ft. arches; three of which have a clear opening of 85 feet and one of 90 feet. Despite the fact that its design was altered midway through its construction in order to allow for an additional span, the bridge has a total waterway opening of 6,400 square feet. The roadway has a total width of 30 feet with a 7 foot sidewalk on each side. While the initial design does not state a maximum loading capacity or any allowable stresses, there is a streetcar track along the center line of the roadway.

Built as one of the first concrete arch bridges in the Central Ohio area, the King Avenue Bridge was constructed by the construction firm of E. Elford and Company between 1912 and 1914. The bridge was opened to traffic on October 31, 1914, amongst a gala celebration of "*red fire, Hallowe'en costumes, and speeches*".¹² Called "imposing" and "absolutely monolithic" by the local press, the bridge won praise for its simple, refined elegance and impression of lasting permanence.

Prevalent throughout the Midwestern United States, including the State of Ohio, the bridges of designer Wilbur J. Watson are renowned for their ability to be aesthetically pleasing without the use of extraneous ornamentation. With its lack of sculpture, relief carvings, or other decorative effects, the King Avenue Bridge is a fine example of Watson's neoclassical approach to bridge design. As Watson himself said in his 1927 book, *Bridge Architecture*, the aesthetics of this bridge lie purely in its slight enhancement of traditional elements. *"This bridge may be considered typical of its kind, although greater pains have been taken to obtain pleasing lines than usual in this class of structure. The essential features may be described as the usual of perfect ellipses for the interdosal curves, curved cutwaters for the pier, curved retaining walls at the abutments and a carefully executed parapet. Another feature of the bridge is the light color, almost white, obtained by the use of selected aggregates (white limestone) for the concrete. No attempt to imitate cut stone masonry has been made."*¹³ This precise attention to detail that Watson put into the King Avenue Bridge made it the model to which all further concrete bridges in Columbus would be compared.

In 1951, the Olentangy River became regulated with the construction of the Delaware Dam. The late 1960's saw another major change to the lower Olentangy region with the construction of State Route 315, a major north-south expressway along the west bank of the Olentangy River. From 1967-1969, two freeway overpasses were constructed over the western ends of several area bridges, including the King Avenue Bridge.

C) The Designer: Wilbur J. Watson

One of the premier bridge designers in the Midwest, Wilbur Watson was noted for creating practical, permanent structures with a subtle, elegant sense of aesthetic beauty. Based

out of Cleveland, Watson founded his own consulting firm, "The Watson Engineering Company" in 1907. He remained in practice with the firm until his death in 1937.

Renowned for his artful, detailed enhancement of traditional bridge elements, Watson was considered an expert in the field of bridge design and aesthetics. During his lifetime, he authored several journal articles and four books on bridge history and design. Watson's four books were *Specifications for Concrete Arch Bridges* (1905), *Bridge Architecture* (1927), *Decades of Bridges: 1926-36*, and *Bridges in History and Legend* (both published in 1937). In addition to co-designing the King Avenue Bridge with Franklin County Bridge Engineer Walter Braun, Watson designed the West Third Avenue Bridge- completed in 1919- and the Lane Avenue Bridge; both of which are located in the Columbus area over the Olentangy River.

D) The Builder: E. Elford and Company

The construction firm of E. Elford and Company is the predecessor to the Elford Construction Company. Today, like the Elford firm of yesteryear, the Elford Construction Company focuses primarily on the building construction trade. In an interview with the *Ohio State Journal* in 1923, Mr. E. Elford stated that his company had built the McCracken Power Building and other buildings at the Ohio State University. His firm also built four bridges over the Olentangy River: King Avenue, Lane Avenue, Weisheimer (Henderson Road), and Worthington (State Route 161).¹⁴ Both the Weisheimer and Worthington Bridges were rebuilt with the construction of State Route 315 in the early 1980's. In 1935, Elford Construction built an open spandrel rib arch bridge at the point where U.S. Route 33 and State Route 161 crosses the Scioto River in Dublin, Ohio.

D) Location Map



LOCATION MAP
KING AVE. BRIDGE o/OLENTANGY RIVER
FRA-CR68-01.85

III. DECLINE AND RECENT HISTORY

A) Alterations and Repairs

- Oct. 1957 Resurfaced deck with 2" thick t-35 hot mix.
- Sep. 1961 Capped North walk by removing existing concrete except curb and replacing to grade (4" +/-).
- Oct. 1962 Applied linseed oil anti-spalling to face of curb and sidewalk, 2 coats, 35 gal total.
- Mar. 1966 Two utility 21" dia. manhole lids replaced.
- 1967 Columbus & Southern Electric (C&SOE) installed electrical conduits, replaced North sidewalk.
- Late 1960's Overpass bridges for the Olentangy Freeway constructed over the western portion of the approach roadway.
- 1983 Resurfaced deck with 2" of ODOT item 404.

B) Recent Inspections and Testing

Mar. 1968 Whole structure was reported as crumbling. Some of the underneath reinforcing steel was exposed.

Jul. 1982 Condition Survey. Jones-Stuckey, Ltd. Inc. completed a condition survey for the King Avenue Bridge over the Olentangy River.

Condition: An on-site inspection was made on the bridge, the river, and a boat viewing all exposed portions of the bridge and reporting apparent conditions graphically.

While the bridge overall was rated in fair condition, the extensive cracking (both D and longitudinal) raised questions on the arch's integrity.¹⁵ It was recommended that further testing be completed before a decision to widen and rehabilitate.

Nov. 1985 Preliminary Engineering Report, Dalton-Dalton-Newport:

"Dalton-Dalton-Newport was retained by Franklin County to perform an in-depth inspection, analysis, and evaluation of the King Avenue Bridge over the Olentangy River, Bridge No. CLI-68-01.85, with the purpose of investigating the condition of the structure and assessing its potential for rehabilitation and restoration or replacement."¹⁶

Inspection: An in-depth, hands-on inspection of the bridge was performed by sounding the concrete surface. The concrete was found to be in poor condition, exhibiting severe surface deterioration in localized areas and in distinct patterns throughout the bridge.

Analysis: A structural analysis on the existing arch barrel was not performed, once

the extent of the damage was known. The economic analysis showed that the bridge could not be rehabilitated and widened.

Recommendations: The evaluation of the structure included a combined assessment of visual and tactile observations and lab results of samples taken from the site. Based on this evaluation, it was recommended that the King Avenue Bridge over the Olentangy River be replaced. Furthermore, it was suggested that replacement studies be initiated as soon as practical so that the bridge can be economically replaced before it becomes structurally unsafe.

Cost: The cost estimate for the bridge replacement was 2.1 million dollars and for bridge rehabilitation was 2.0 million dollars.

Mar. 1995 Visual Inspection Report, Eriksson Engineering Limited:

“Eriksson Engineering was retained by the Franklin County Engineers Office to update the Preliminary Engineering Report done by Dalton-Dalton-Newport in 1985.”¹⁷

Inspection: A visual and sounding inspection was completed to find the extent of concrete deterioration since 1985. The damaged concrete was found to have gotten worse. Most deteriorated areas in 1985 had grown in size.

Recommendations: it was recommended that, due to the advanced state of deterioration, it would require an extensive rehabilitation effort to extend the life of the structure. It was recommended that the structure be replaced.

FOOTNOTES

1. Columbus Dispatch , November 1, 1914, p. 8
2. Site Plan from 1917 Plan for West Third Avenue Bridge; Lists 50-ton street car loading.
3. "The Concrete Arch Supplement to the Ohio Historic Bridge Inventory, Evaluation, and Preservation Plan", Chapter Two.
4. "Report of the Columbus Plan Commission for Columbus, Ohio", February 1908.
5. "The Concrete Arch Supplement to the Ohio Historic Bridge Inventory, Evaluation, and Preservation Plan", Chapter Two.
6. County Contract, June 3, 1912.
7. County Contract, July 6, 1912.
8. County Contract, November 2, 1911.
9. County Contract, July 6, 1912
10. Columbus Evening Dispatch, March 25, 1913, p. 5.
11. County Contract, November 29, 1913.
12. Columbus Dispatch , November 1, 1914, p. 8.
13. "Bridge Architecture", p. 225.
14. The Ohio State Journal, March 22, 1914, p. 16.
15. Jones-Stuckey, Ltd., Inc, "King Avenue Bridge over The Olentangy River - A Condition Study", Columbus, Ohio, July, 1982.
16. Dalton-Dalton-Newport, "Preliminary Engineering Report, King Avenue Bridge over The Olentangy River", Columbus, Ohio, November, 1985.
17. Eriksson Engineering Limited, "Visual Inspection Report, Bridge No. -68-01.85, King Avenue over Olentangy River", Columbus, Ohio, March, 1995.

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Watson, Wilbur J., Bridge Architecture, William Hellburn Inc., New York, 1927.

The Ohio Department of Transportation, the Federal Highway Administration, The Concrete Arch Supplement To The Ohio Historic Bridge Inventory, Evaluation and Preservation Plan Columbus, Ohio, 1994.

Report of the Plan Commission for Columbus, Ohio, February, 1908.

The Columbus Evening Dispatch, 25 March 1913, 01 November 1914.

The Ohio State Journal, 22 March 1923.

The Columbus Citizen-Journal, 04 June 1947.

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Jones-Stuckey, Ltd., Inc., Condition Survey, King Avenue Bridge over the Olentangy River Columbus, Ohio, July, 1982.

Sherman, Mark, Historic American Engineering Record, The Broad Street Bridge, Franklin County Engineer's Office, HAER No. OH-618, Columbus, Ohio, 1988.

Franklin County, Ohio, County Engineers Bridge File Inventory, Microfilm Plans of Existing Bridge: Condition - Fair, Commissioners Journal Book 19-20, Bridge Inventory Card, County Board of Commissioners (CBC) Engineers Estimate Book #8, Commissioners Contract Book #8.

Report and Recommendations, Bridge Number CL1-68-01.85, King Avenue over Olentangy River, Dalton-Dalton-Newport, Columbus, Ohio, November 22, 1985.

Visual Inspection Report, Bridge No.-68-01.85, King Avenue over Olentangy River, Eriksson Engineering Limited, Columbus, Ohio, March 1995.

ADDENDUM TO:
KING AVENUE BRIDGE
Spanning Olentangy River
Columbus
Franklin County
Ohio

HAER OH-112
HAER OHIO,25-COLB,51-

FIELD RECORDS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001