Sacramento River Bridge
(Tower Bridge) (M Street Bridge)
Spanning Sacramento River at California
State Highway 275
Sacramento
Sacramento County
Yolo County
California

HAER No. CA-73

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
Western Regional Office
National Park Service
U.S. Department of the Interior
San Francisco, California 94102

HISTORIC AMERICAN ENGINEERING RECORD

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(Tower Bridge) (M Street Bridge)

HAER No. CA-73

Location:	Spanning Sacramento River at California State Highway 275 Sacramento, Sacramento and Yolo counties, California
	UTM: 10.629940.4271120 - 10.630110.4271060 Quad: Sacramento West, Calif. 7.5'
Date of Construction:	1934-1936
Engineer:	Bridge Department staff, California Division of Highways
Architect:	Alfred Eichler
Builder:	George Pollock & Company
Present Owner:	California Department of Transportation District 3 P.O. Box 911 Marysville, CA 95901
Present Use:	Highway bridge
Significance:	The Sacramento River Bridge, also known as the Tower Bridge, and as the M Street Bridge, when built, was determined eligible for inclusion in the National Register of Historic Places in 1980 and listed in the Register in 1951. The bridge represents a rare use of Streamlined Moderne architectural styling in a lift bridge, making it an outstanding expression of the social and architectural climate of the period. It was also a major link in transcontinental highway U.S. 40, and has long served as the main formal gateway to California's capital city.
Report Prepared By:	James Fisher, Staff Historian John W. Snyder, Chief Architectural and Historic Studies California Department of Transportation 1120 N Street Sacramento, California 95814

PART I. HISTORICAL INFORMATION

The Tower Bridge was designed and built in 1934-36 to replace the obsolete M Street Bridge. Owned by the Sacramento Northern Railway, the M Street Bridge had been built in 1911-12 by that railroad's predecessor, the Northern Electric Railway. This earlier bridge carried the railroad's main line track, linking the San Francisco Bay Area with Chico, within its trusses. It also carried a single vehicular lane cantilevered on the outside of each truss, and was a major link in U.S. Highway 40.

By the 1930s, traffic volumes on the M Street Bridge had surpassed its limited capacity. While the bridge was structurally sound, the tremendous increase in vehicular traffic by 1934 made it apparent that a new bridge was necessary. As a first step toward this goal (and made possible by recently-passed legislation enabling the State to enter into agreements with railroad companies), the State of California, Sacramento and Yolo Counties, and the Sacramento Northern Railroad signed an agreement on March 8, 1934, whereby the railroad relinquished all rights to the old bridge in return for a franchise to operate a rail line over the new bridge until March 21, 1960, the expiration date of its existing franchise.

The earlier bridge consisted of a 400-foot center bearing through truss swing span, with 125-foot through truss approach spans. When open, the bridge provided a 162-foot clear opening on each side of the swing span for river navigation. During the 25 years the bridge was in use, Sacramento's population had increased from 45,000 to approximately 100,000, and vehicular traffic increased 700 per cent in volume and 500 per cent in speed. Complaints regarding the inadequacy of the bridge were numerous. The loudest and most persistent of these complaints emanated from the Sacramento Chamber of Commerce, which voiced concern that the nine-foot wide, cantilevered traffic lines on the old bridge were too narrow and hazardous, given the changes to volume and character of vehicular traffic since 1912. Moreover, the switching of trains on Front Street at the east end of the bridge contributed to long delays for motorists attempting to cross the bridge. On December 14, 1934, Earl Lee Kelly, Director of the California Department of Public Works, echoed the Chamber's concerns when he noted that the opening and closing of the old swing span was slow and cumbersome, and caused unreasonably long delays for both river vessels and motor vehicles. Of critical concern also was the narrowness of the navigable channel that restricted towboats, barges, and ocean-going vessels that the plied the Sacramento River.

Doubtless, when selecting the engineering design of the new bridge, the Bridge Department of the California Division of Highways (today the Division of Structures of the California Department of Transportation) strongly considered the operational deficiencies of the old swing span bridge. In order to increase the width of the

navigable channel, the State selected a vertical lift-type bridge to replace the old swing bridge. The new bridge would therefore feature a vertical lift span which could be raised or lowered at a speed of one foot per second, reducing the delays to both river and highway traffic. Moreover, the removal of the old bridge's center pier would eliminate a hazardous obstruction in the channel.

Through early 1934, design work on the new bridge proceeded under the meticulous guidance of project architect Alfred W. Eichler. Eichler was born in Shadyside, Missouri, in 1895. In 1896, his family moved to San Francisco, where Alfred eventually studied at St. Ignatius College, with later work at the Beaux Arts Institute of Design. He joined the office of the California State Architect in 1925, remaining in that employ for 38 years. He came to be in charge of a number of high-profile State projects, including the State Employment Building in Sacramento; the California Medical Facility in Vacaville; State hospital facilities in Stockton, Agnews, and Mendocino; and the Grandstand, Governor's Hall, and Administration Building at the old California State Fairgrounds in Sacramento.

By mid-1934, the contract for constructing the new bridge had been let to the construction firm of George Pollock & Company, whose low bid totaled $907, 365, approximately $81,000 above the State's original estimate. The company's owner, George G. Pollock, had worked on State projects in the past and was a well-known member of Sacramento's fledgling construction industry. Born in Charleston, Indiana in 1885, Pollock came to Sacramento in 1909 as an engineer for the Western Bridge and Construction Company. In 1918, he formed his own construction firm. Due to his later efforts during World War II, when he founded the Pollock Stockton Shipbuilding Company to build and repair naval auxiliary vessels, Pollock became one of the largest engineering construction contractors in Northern California. After World War II, Pollock engaged in the rehabilitation and repair of numerous naval installations in the Philippines, Guam and the Hawaiian Islands. As a sidelight, Pollock had major interests in the raising of registered Hereford cattle, at one time owning more that 2,000 head. He is credited with having been responsible for building up this breed in California.

Construction work on the new structure began on July 20, 1934, with completion of the new main piers the first effort. When this portion of the work was completed, efforts began in September 1934 for the construction of a shoofly (railroad parlance for a detour) bridge to handle railroad traffic across the river during the period between the removal of the old bridge and the completion of the new structure; highway traffic was detoured over the I Street Bridge a short distance upstream. The shoofly bridge consisted of steel plate deck girder spans, with a timber Howe truss lift span supported by timber lift towers, all on timber pile bents. The shoofly lift span provided half the normal navigation channel, and the girder spans were placed so

that the old bridge's swing span would pass over the top of them when it was opened. The shoofly bridge was completed and opened to railroad traffic on February 4, 1935.

With the shoofly bridge open, construction forces began the removal of the old bridge, completing this task by March 11, 1935. At the same time, falsework had been placed for the erection of the new bridge. Steel erection work for the new bridge began on March 15, 1935. On June 25, 1935, workers began erecting the lift span, building it in the raised position to allow passage of river traffic; by September 17, 1935 they were able to lower it to its closed position. Work then began on the deck, and the first train rolled across the bridge on November 7, 1935. Shortly thereafter, the contractor's forces completed the railings and the concrete pylons at each end of the bridge which carried the span wires supporting the railroad's trolley wire. On December 15, 1935, a grand dedication was held, and the State formally accepted the bridge on January 11, 1936.

At the time of its completion, the Tower Bridge carried the transcontinental traffic of U.S. Highway 40, as well as traffic between San Francisco and Portland, Oregon. It also served as the formal gateway to the State capitol, with the west front of the capitol building directly east of the bridge down M Street (today Capitol Mall). Given such an important site, an aesthetically pleasing design for the new bridge had clearly been in order, and the Bridge Department of the California Division of Highways, working closely with the Office of the State Architect, found a suitable answer. The designers--and chiefly project architect Alfred Eichler--accomplished this by sheathing the trussed lift span towers in bolted and riveted quarter-inch plate steel, creating a streamlined effect. Even the cross-bracing of the towers was so treated, a feature which would appear later on the towers of the suspension spans of the San Francisco-Oakland Bay Bridge. The streamlined verticality of the towers (from which the bridge quite naturally takes its historic name) was echoed in the concrete pylons supporting trolley span wires at each end of the bridge. It was this striking architectural treatment that caused the bridge to receive both local and international recognition almost immediately. For years the crossing of the Tower Bridge--indeed, even the view approaching it--told millions of travelers that they were entering the State capital. Architecturally, the design team had provided a restrained Streamlined Moderne structure. Even the finish was given careful consideration: in a period when most steel bridges were painted black, a special work order was written, with the consent of the U.S. Bureau of Public Roads, to allow the bridge to be painted with aluminum paint, its silver color entirely in keeping with the architectonic qualities of the bridge. Even the concrete pylons were originally finished in light blue "Bondex" cement paint which, when dry, was very similar to the aluminum color of the bridge proper when reflecting a clear blue sky.

Relative to engineering, the Tower Bridge was not unique in general overall terms. The vertical lift bridge as a type dated to the 19th century, with a few examples dating as early as the 1870s; however the first large modern vertical lift bridge was built in Chicago in 1893-94. The Tower Bridge is a span-drive type bridge, a type developed by the early years of the 20th century. In this type bridge, the operating machinery is located in the operator's cabin on the lift span (the other type of vertical lift bridge is the tower drive, requiring two sets of operating machinery located in supporting towers). In engineering detail, however, the Tower Bridge offers some significant developments. Unlike most lift bridges, the front and back legs of the towers are parallel, rather than having the outside legs angled, or "battered" (though one initial design variation would have utilized this more traditional approach). This allowed the unique Streamlined Moderne verticality of the design, achieved through the sheathing of the towers. In addition, the deck of the bridge was formed of a special lightweight concrete developed for use on the San Francisco-Oakland Bay Bridge; this lightweight deck utilized welded steel reinforcement to form Warren trusses. The Columbia Steel Company at Pittsburg, California supplied the steel for the deck to Western Pipe and Steel Company of San Francisco; they in turn fabricated the deck trusses for both the Tower Bridge and for the Bay Bridge at the same time. The company electrically welded the units prior to shipment, the prefabrication allowing rapid and easy placement at the job site. Other noteworthy engineering features included such purely aesthetic design features as the sheathing of the bracing in the towers to screen the counterweights when the lift span is in the closed position, and the necessity of hinging the overhead trolley wire, since the counterweights descended to a position below the wire level when the lift span was opened.

The bridge's Moderne styling, with its streamlining and machine imagery, was inextricably linked with symbolism of the future. This monumental, twin-towered structure is strongly reminiscent of earlier Wellsian images of the gleaming, streamlined, towered city of the future. The application of the futuristic imagery which pervaded 1930s design transformed an otherwise utilitarian structure into an outstanding expression of the social and architectural climate of the period. Dedication fanfare in 1935 hailed the bridge as a major link in U.S. Highway 40, and it carried the rail traffic of the Sacramento Northern Railway as well. Shortly after its completion, the Tower Bridge was judged the nation's "...most beautiful lift bridge." Serving as the main gateway to Sacramento for thirty years, it remains a key element in the urban landscape.

The Tower Bridge has seen few alterations since its completion and dedication. In 1963, after the Sacramento Northern Railway's franchise had expired, the rails were removed from the median of the bridge and the deck was restriped for additional traffic lanes; the trolley wires had been removed years earlier when the railroad

dieselized. In 1976, as a city bicentennial project, the bridge was repainted in an ochre color selected to match that of the dome of the State Capitol building located ten blocks away at the opposite end of Capitol Mall (the subsequent restoration of the Capitol resulted in the dome now being sheathed in unpainted copper).

PART II. ARCHITECTURAL INFORMATION

The Sacramento River Bridge, also known as the Tower Bridge, Bridge No. 22-21, located on California State Highway 275 at its crossing of the Sacramento River in Sacramento and Yolo Counties, consists of a steel through truss vertical lift span, and steel through truss and reinforced concrete and steel plate deck girder approach spans. The bridge rests on reinforced concrete piers, reinforced concrete seat abutment, and reinforced concrete cantilever and gravity wall abutments. The piers and abutments are founded on reinforced concrete piles, untreated Douglas fir piles, and treated Douglas fir piles. Piers 6 and 7 are founded on concrete footing blocks in addition to the aforementioned piles. The bridge's eight spans total 738 feet in length, 54 feet in width, and carry four traffic lanes between steel channel railings, crossing the Sacramento River with no skew.

As built, the bridge carried the single track main line of the Sacramento Northern Railway on its centerline, flanked by single traffic lanes, and sidewalks. In mid-1963 the railroad tracks, median, and railroad switching and locking mechanisms were removed as the railroad's franchise had expired and it had obtained trackage rights to use the Southern Pacific Railroad's nearby tracks over the I Street Bridge. Earlier alterations had consisted of removal of the Sacramento Northern's overhead trolley wire and supporting span wires when the railroad switched from electric locomotives to diesel locomotives. These alterations, however, caused little change in the physical appearance of the bridge. The bridge was repainted from silver to ochre in 1976, and the concrete pylons long ago lost their original blue paint, and are now simply the weathered gray of exposed concrete.

PART III. SOURCES OF INFORMATION

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PART IV. PROJECT INFORMATION

In 1985, the California Department of Transportation proposed to undertake safety-related equipment replacement and modifications on the Tower Bridge. This work was to remove safety hazards for bridge operators, and to bring the structure up to the current standards of the California Occupational Safety and Health Agency (CAL/OSHA). The proposed work was as follows:

A. Place wire mesh guards on control tower lighting fixtures;

B. Replace oil-filled step down transformers with dry type transformers;

C. Replace the reversing starter for the bridge drive motors, the gasoline-powered standby generator, and the standby drive engine with diesel units;

D. Replace high voltage open knife type switches with oil switches;

E. Replace high voltage service cable;

F. Install guards for rotating machinery in the control house;

G. Extend grease lines from rotating machinery in both lift towers;

H. Improve existing hand rails and provide additional hand rails;

I. Add landings to main tower ladders;

J. Install safety devices on ladders;

K. Add protective rails on main tower lift sheaves;

L. Provide slip-resistant treads on all stairs;

M. Provide a written emergency medical services plan;

N. Correct all walkways which have depressions, obstructions, or debris accumulation;

O. Extend ladders 42 inches above parapets and landings;

P. Replace electrical cords and cables with fixed wiring.

Because no Federal funds or approvals were involved, the provisions of Section 106 of the National Historic Preservation Act of 1966 (as amended) did not apply. However, for State-funded

projects, Section 5024.5 of the California Public Resources Code requires State agencies to consult with the State Historic Preservation Officer prior to undertaking any alterations to agency-owned structures listed in the National Register of Historic Places, and to develop measures to eliminate or mitigate any adverse effects. Accordingly, Caltrans committed to undertake documentation of the Tower Bridge to the standards of the Historic American Engineering Record, said documentation to consist of large-format archival photos and written historical information, and to furnish copies to the Historic American Engineering Record, the State Historic Preservation Officer, the California State Library, the Bancroft Library, the Sacramento History Center, and the Yolo County Historical Society.

ADDENDUM TO:
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