

PAINTERSVILLE BRIDGE
(Bridge No. 24-53)
Spanning Sacramento River at California State Highway 160
Courtland vicinity
Sacramento County
California

HAER CA-2295
HAER CA-2295

PHOTOGRAPHS
WRITTEN HISTORICAL AND DESCRIPTIVE DATA
FIELD RECORDS

HISTORIC AMERICAN ENGINEERING RECORD
PACIFIC WEST REGIONAL OFFICE
National Park Service
U.S. Department of the Interior
1111 Jackson Street, Suite 700
Oakland, CA 94607

HISTORIC AMERICAN ENGINEERING RECORD

PAINTERSVILLE BRIDGE (Bridge No. 24-53)

HAER No. CA-2295

- Location:** Spanning Sacramento River at Post Mile 20.96 of California State Highway 160, less than one mile south of Courtland, Sacramento County, California
UTM: 10-624362mE/4242133mN. UTM References were calculated using the North American Datum (NAD) 1983 series of the United States Geological Survey (U.S.G.S.), which is the California State Standard.
- Present Owner:** California Department of Transportation
1120 N St.
Sacramento, CA 95814
- Present Use:** Highway Bridge
- Significance:** The Paintersville Bridge is one of the very few unmodified examples in California of the Strauss Heel Trunnion Bascule Bridge, one of the most important patented bascules. It was also a link in the Victory Highway, a transcontinental highway, and played an integral part in transportation and agricultural history in the California Delta region.
- Report Prepared By:** Margo Nayyar, Research Associate, Tory Swim, Research Associate, and Gloria Scott, Built Environment Preservation Services Branch Chief, Cultural Studies Office, Division of Environmental Analysis, California Department of Transportation
- Project Information:** The control house on Paintersville Bridge was removed and replaced in 2007 as part of a project to correct various safety deficiencies, install state-of-the-art electrical control equipment to operate the movable spans, and to bring the bridge up to current health and safety codes for decent, safe and sanitary structures. The bridge was determined eligible for the National Register of Historic Places through consensus determination between the Federal Highway Administration and the California State Historic Preservation Officer on December 24, 1985. This documentation is intended to comply with the conditions to avoid Adverse Effect to the historic bridge, in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended.
- Date:** October 14, 2011

Part I. Historical Information

A. Physical History

1. **Date of Construction:** 1923
 2. **Engineer:** Strauss Engineering Company of Chicago
(Charles W. Deterding Jr. Sacramento County engineer)
- Builder/Contractor:** Moore Dry Dock Company of Oakland

Charles W. Deterding, Joseph Strauss, Strauss Engineering Company of Chicago

Charles W. Deterding was Sacramento County's Engineer who participated in building the Paintersville Bridge. Deterding first joined the county in 1908 as a surveyor. In 1921 Deterding became the County Engineer, just two years prior to the construction of the Paintersville, Isleton and Steamboat Slough bridges. The Strauss Bascule Bridge Company of Chicago built virtually all the bascule bridges in California prior to World War II. The proliferation of Strauss bascules can be attributed to two reasons: one, Strauss' bascule bridge design used multiple trunnions instead of a single hinge design, and two, the San Francisco office provided an opportunity for product marketing.¹ For a more detailed discussion of Mr. Deterding, Jr. and the Strauss Bascule Bridge Company, please refer to the Historic American Engineering Record Written Historical and Descriptive Data for the Isleton Bridge (Bridge No. 24-51), HAER No. CA-55.

Moore Dry Dock Company of Oakland

The Moore Dry Dock Company was an important steel bridge manufacturer in California. Founded in San Francisco in 1905 by Robert S. Moore, John Scott and Joseph A. Moore, the company began as Moore and Scott Iron Works. The business changed in 1924 from steel ship building to bridge construction because of the decline of shipbuilding following World War I. The Paintersville Bridge is one of many bridges constructed by this company, others including the Dumbarton Bridge that spans the San Francisco Bay, the Warren Truss Mad River Bridge and the Third Street Bridge in San Francisco, also a bascule.²

3. Original plans and construction:

The original plans are on file in the California Department of Transportation (Caltrans) Bridge Inspection Records Information System (BIRIS), located in Sacramento, California.

¹ Michael Chester, *Joseph Strauss; Builder of the Golden Gate Bridge*, 32,33,34,36, 40, 42; PBS, "Golden Gate Bridge," <http://www.pbs.org/wgbh/amex/goldengate/peopleevents/p_strauss.html> (accessed 13 October 2004); *Port of Los Angeles Virtual History Tour*, "Badger Avenue Bridge, People," Copyright 2001, <http://laporthistory.org/level4/Badger/badger_people.html> (accessed 13 October 2004).

² McMorris "Caltrans Historic Bridge Inventory Update," 43-7.

4. Alterations and additions:

According to the FHWA “Finding of No Adverse Effect,”³ “The bridge has a high degree of integrity, with the only notable modifications being the removal of the original concrete light posts and replacement of the original deck with an open grate steel deck.”⁴

In 1944 a safety platform was added around the navigation lights in the center leaves; and in July, the 1/8” brown linoleum in the operator’s house was added. In 1952 the road was redecked, increasing the road width to 17’-5” between wood curbs. The original timber floor was removed and replaced with Irving Type “O” open steel grating. The grating was laid in two feet by sixteen foot sections with a total of 140 sections. Furthermore, the old timber wheel guards were removed and reset, and the timber struts at piers three and four were replaced with steel struts.⁵

Several small alterations occurred to the Paintersville Bridge since its initial construction in 1923. Bridge Reports and Supplementary Bridge Reports document such alterations including the installation of fire fighting facilities in January 1936, and in March 1937 traffic signals were installed.

In 1958 air whistles were installed and in June 1965, “the entire fender systems at Pier 3 and 4 were replaced as recommended.” In 1967, “two 60 cycle AC ammeters...[were] installed on the operator’s control console...[and] a new door [was] installed on the operator’s house.” By 1968 the screen door had been removed from the main entrance.

In October 1970, “a portable chemical toilet ha[d] been placed at the east approach adjacent to the bridge.” An Incinolet Model TR4 electric toilet replaced the preexisting water closet when it was installed into the bridge operator’s house in October 1971. Signs were posted in May 1975 providing the seasonal operation hours. In April 1979, though documented in the October 26, 1979 Supplementary Bridge Report, “a timber plank sidewalk supported by steel brackets and equipped with 2” 0 steel pipe handrails ha[d] been constructed from edge of approach roadway embankment at Abutment 6, left side to the bridge operator’s house, a distance of about 118 feet. The planks are 6”x19”x20’ redwood stringers salvaged from Mokelumne River Bridge. . . .The steel channel support brackets and steel pipe handrails were salvaged from the operator house access walkway on the old San Joaquin River (Antioch) Br. No. 28-09.” Also, in 1979 “new 2” x 6” DF planks. . . [were] installed on the walkway used to service lights and upper trunnion bearings at the top of the west (Pier 3) bascule leaf.”

³ Federal Highway Administration (FHWA), “Finding of No Adverse Effect for the Rehabilitation of Isleton Bridge (#24-51), Steamboat Slough Bridge (#24-52) and Paintersville Bridge (#24-53) Sacramento County California, 03-Sac-160 KP9.5, 31.9, 33.6 (PM 5.9, 19.8, 20.9) EA.03-437200 February 2000,” (FNAE).

⁴ FHWA, “FNAE,” 3.

⁵ Caltrans Bridge Inspection Records Information System. (BIRIS) database, “Supplementary Bridge Report,” August 25 & 29, 1952, Sheet 1, available within the BIRIS database under documents for Bridge No. 24-53. Accessed June 7, 2005.

In May 1990, the:

existing guard rails were removed and replaced on the walkways leading from the deck to the gear housing on both leaves. Additionally, new steel railings, timber walkways and steel plate treads were installed at the counterweight and access platform to top most navigation lights. At the center navigation lights, a new platform and pipe railings were installed along with a gate in the traffic railing. . . .The existing timber railings at the shear lock-pin access platform was removed and replaced with a new pipe railing.

The upper catwalk floor planks were braced in September 1992 and in June 1993 concrete rails replaced the east approach rails.⁶

The control house on Paintersville Bridge was replaced in 2007 as part of a project to correct various safety deficiencies, install state-of-the-art electrical control equipment to operate the movable spans, and to bring the bridge up to current health and safety codes for decent, safe and sanitary structures. The control house was removed and a new one lifted into place. Other design features to avoid an adverse effect to the bridge ensured that the new control house is compatible in color, scale, siding, roofline, and location to the original control house, and the work was completed in a manner consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties, Rehabilitation Treatment Option. The control house is a contributing feature of the bridge.

B. Historical Context

The bascule bridge in Paintersville was constructed in 1923 and is reminiscent of the exciting town of Paintersville that once stood nearby, and the Delta's need for trustworthy roads and bridges for increased automotive travel and agricultural trucking.⁷ The Paintersville Bridge is one of the few unmodified examples in California of a Strauss Heel Trunnion Bascule Bridge, one of the most important patented bascules. Designed by the Strauss Engineering Company of Chicago, the contractor was Moor Dry Dock Company of Oakland. The Sacramento County Engineer at the time was Charles W. Deterding, Jr.

The Paintersville Bridge is located in the Sacramento-San Joaquin River Delta, an area that, since the late nineteenth century, has been concerned with improving transportation routes. Movable bridges answered the transportation needs of water and land traffic. They promoted the evolution of road travel without hindering water travel. Due to successful reclamation that began during the 1850s and the naturally rich soil, agriculture boomed in the Delta region. The success of agriculture, therefore, required successful transportation. Although

⁶ All information obtained from bridge reports and supplementary bridge reports are located in the Caltrans BIRIS database. Specific dates of reports quoted from are July 1944, August 1952, February 1958, June 24, 1965, December 1967, April 1966, October 1970, October 1971, May 1975, October 26, 1979, May 1990, September 1992, June 1993.

⁷ Dillon, *The Delta Country*, 68.

water and railroad transport had long been the preferred transportation method, land transportation became important as surrounding roadways were completed, improved, and trucking became more efficient. Movable bridges in the Delta region maintained a reliable flow of traffic for both water and land traffic; an important consideration as land transport became more important to the agriculture industry. The Paintersville Bridge served as an important component to the Delta's intricate water land transportation systems.

For a more detailed history of Delta history, Joseph Strauss, the Strauss Engineering Company of Chicago, Delta history, moveable bridges and bascule bridges, please refer to Historic American Engineering Record Written Historical and Descriptive Data for the Isleton Bridge (Bridge No. 24-51), HAER No. CA-55.

Transportation

Since the time of the California Gold Rush, the Delta has provided water transportation for freights and passengers to and from major cities in the San Francisco Bay Area, and farms in the San Joaquin and Sacramento Valleys. With an increase in farming in the area toward the end of the nineteenth century, the need for overland transportation proved even more necessary. Early travelers passed through the area over the most obvious routes– the high levee roads. However, good-quality roads in the Delta took forty years to transpire. The earliest roads followed old trails that followed natural levees, rivers and creeks. However, the Delta's numerous islands and tributaries limited the possibility for a direct overland route from San Francisco to Sacramento.⁸

The east bank of the Sacramento River developed as a transportation route because the west bank had recurring flooding problems. On the east bank of the Sacramento River, the Georgiana Road went from Freeport to Walnut Grove. In 1857, the Georgiana Road was designated a public road, and by 1870 it was extended southward to Sherman Island. In the early 1900s, to accommodate the new stream of automobile traffic, the County of Sacramento built three bridges between Walnut Grove and Sherman Island.⁹

Before Sacramento and Yolo counties built bridges to connect the islands and tributaries, ferries provided river crossing transportation. Since the 1850s, there have been over twenty privately-owned ferries providing service within the Delta. The ferries required a fee and posting of a bond. After 1900, ferries generally became toll free with county aid.¹⁰ Steamboating, however, diminished in the 1930s. "River freighting," writes Dillon, "gave way to trucking, and passenger traffic yielded to privately owned Model A's. As transportation changed, bridges provided improved mobility."¹¹

⁸ John Thompson, "From Waterways to Roadways in the Sacramento Delta," *California History* 59, no.2 (1980): 146-7.

⁹ Thompson, "From Waterways to Roadways," 147.

¹⁰ Thompson, "From Waterways to Roadways," 151, 145.

¹¹ Dillion, *The Delta Country*, 111.

Roadway System and Highway System

Although the early farmers and settlers of the Delta had constructed roads on top of the levee system along the banks of the Sacramento River, these roads were not designed to sustain a large amount of vehicles or heavy trucks carrying loads of produce. As a result, the concern and need for better roadways increased during the first part of the twentieth century as the automobile population expanded. The numbers of automobiles in California increased after 1908 when Henry Ford's assembly line approach to manufacturing made the Model T more affordable for the average person. As with the popularity of the automobile, trucking also became a preferred and more standard way of transporting goods.¹²

In 1909, the First State Highway Bond Act established a State Highway System. The bond appropriated \$18 million, but it was discovered that \$18 million would not be enough money to construct a state highway system. The State and counties negotiated a deal concerning the highway system's construction. The counties donated the right of way to build bridges; the State developed the highway system in between. Sacramento County was slow to initiate an active role in the Delta area because the County spent its limited resources carefully and was weary of the monetary responsibility of building and repairing levees, and building and repairing roads. Farmers also added to the delay of road improvement and maintenance because they took pride in the land reclamation and the roads they had built on top of their levees. To farmers, the roads were exemplary of the achievements of land reclamation.¹³ In 1909, the Freeport Road became the first road in the Delta to be macadamized or surfaced.¹⁴ In 1912 the Southern Pacific Railroad opened the Walnut Grove Short Line. This line extended from Sacramento, to Isleton, to Walnut Grove, and held both passengers and freight. Produce, then, was shipped back East directly from the Delta by railroad.¹⁵

History of Road and Bridge Progress

Prior to 1880, counties constructed few bridges in California. Those who traveled by automobile "negotiated" numerous ferry crossings on Highway 160 until "the first Antioch Bridge was completed to open the Victory Highway on New Year's Day of 1926."¹⁶ Prior to the 1880s,

¹² Richard F. Weingroff, "Federal Aid Road Act of 1916: Building the Foundation," *U.S. Department of Transportation, Federal Highway, Infrastructure Website*, 6 February 2004, <<http://www.fhwa.dot.gov/infrastructure/rw96a.htm>> (accessed 20 August 2004).

¹³ State of California, "Fact Sheet; Important Events in Caltrans History," *Department of Transportation*, copyrighted 2003, <<http://www.dot.ca.gov/hq/paffairs/about/chist.htm>> (accessed 23 August 2004); Norman Root, *A History of Bridge Building in California on the Lincoln Highway*, produced by California Department of Transportation, Division of Engineering Services, Education Committee, 75 min., 2000, CD-Rom. Located in the Transportation Library at Caltrans Headquarters in Sacramento. Norman Root presented the recorded lecture in Sacramento, CA; Thompson, "From Waterways to Roadways," 157.

¹⁴ Parsons Harland Bartholomew & Associates, Inc, "Historic Resources Evaluation Report Freeport Shores Pedestrian/Bicycle Trail Project Sacramento County, State 160/Freeport Boulevard," March 2004, 9.

¹⁵ Graham, *Discovering the Sacramento River Delta*, 30.

¹⁶ Hal Schell, *Cruising California's Delta* (Stockton, Calif: Schell Books, 1995), 13.

highway bridge building in California was predominantly a private endeavor. While a few counties built public bridges as early as 1855, it was not until after 1874 that the state legislature adopted a comprehensive program through which counties could establish road districts, road commissioners, and property taxes reserved for road construction.¹⁷

In 1893, a new law mandated that counties “seek the advice of its county surveyor on bridge design. This law helped professionalize the office of county surveyor and attracted trained bridge engineers.”¹⁸ By 1903 agriculture and crop processing expanded, thereby increasing traffic; and in 1906, to accommodate traffic, Sacramento County instituted the first phase of bridge construction. The County constructed three bridges in 1906, which provided a continuous road from the Brannan, Andrus and Grand Islands to Sacramento, and an easterly road from Walnut Grove to Thornton.

The second stage of bridge construction began in the Delta in 1911 with the goal to improve roads. During this period, routes to and from Sacramento were flooded most of the year. Poor road quality made trucking goods to regions west of Sacramento difficult. Companies and farmers wishing to ship products to San Francisco from Sacramento and the Delta region remained heavily dependent on steamboats and water carriers. In response to the monopoly on freight service, steamboat captains, having realized the control they held on transportation, held annual strikes to force a rise in prices. In May 1916, however, on the same day as an annual steamboat strike, the Yolo bypass opened between Sacramento and Yolo Counties providing an alternate transportation route from Sacramento to the San Francisco ports by road. With the opening of the Yolo bypass, trucking became the preferred alternative to transport goods.¹⁹

In 1916, the Goodyear Tire and Rubber Company introduced the pneumatic cord truck tire. The pneumatic tire was designed as a tire within a tire; therefore, the pneumatic tire was more resistant to puncturing and could carry substantially more weight.²⁰ With trucks equipped to transport heavy loads, the strongest inhibitor to the progression of roadway traffic and trucking was the poor road conditions. The Delta region also needed better bridges. The first part of the twentieth century would become an era of mass bridge construction within the Delta region.

¹⁷ Christopher McMorris, “Caltrans Historic Bridge Inventory Update: Metal Truss, Movable and Steel Arch Bridges, Volume 1: Report and Figures,” JRP Historical Consulting, prepared for California Department of Transportation, Environmental Program, Sacramento, as part of 2004 Bridge Survey Report. March 2004, 15.

¹⁸ McMorris, “Caltrans Historic Bridge Inventory Update,” JRP Historical Consulting, prepared for California Department of Transportation, Environmental Program, Sacramento, as part of 2004 Bridge Survey Report. March 2004, 15.

¹⁹ Norman Root, *A History of Bridge Building in California on the Lincoln Highway*, CD-rom; Thompson, “From Waterways to Roadways,” 151.

²⁰ Jack Thiessen, contributing editor, “1908-1917; Trucking Enters its Teens,” in *Heavy Duty Trucking: 100 Years of Trucking 1898-1998*, special issue of monthly publication *Heavy Duty Trucking* (Santa Ana, Calif.: Newport Publications Division, HIC CORP, March 1998), 40; Paul Dickson and William D. Hickman *Firestone: A Legend, A Century, A Celebration*. Edited by Nelson Eddy (New York: Bridgestone/Firestone Inc., 200): 75.

The Campaign for Good Roads

The general concern for road conditions extended beyond local concern and became of national interest. Locally, “until about 1914,” describes author Kathleen Graham, “the vehicular roads in the region were rudimentary. In the early days the levees were low, between 4 and 8 feet and narrow (‘shoestring levees’) and a footpath either followed the top or was on the riverside of the levee. Any road for vehicles was usually next to the levee on the land side. As the levees grew in size and the tops gradually broadened, they were increasingly used for vehicular traffic. After 1914, the levees were raised about 5 feet to approximately their height in the mid 1980s. The roadbeds were unpaved and sandy.”²¹

At a national level, the desire for good roads was strong. Carl Fisher, founder of Indianapolis Motor Speedway, began to promote the idea of a transcontinental highway in 1912. Wanting to implement a paved roadway from Times Square in New York City to Lincoln Park in San Francisco, Fisher planned to incorporate and involve towns along his highway by having them provide the necessary equipment while he, in return, would provide “free materials and a place along America’s first transcontinental highway.” Fisher also asked for cash donations. The Lincoln Highway began in 1912 and lasted until it began to be “chopped up” in 1925 as the federal government began a “system of *numbered* highways.”²²

As Fisher and other visionaries began to think of a paved road that extended across the country and put the plan into action, residents and enthusiasts of the Delta worked toward improving the roadways in the Delta area. Although a plan had been proposed by Delta supporters for the construction of six bridges and the upgrading of sixty percent of all road mileage as early as 1911, the California Highway Commission did not adapt this plan until 1916. By 1912, the California Highway Commission began to change bridge and road construction and maintenance within California:

Beginning in 1912 the California Highway Commission began to require that all structures built as part of the state highway project be designed by competent engineers and the plans, specifications, and workmanship be subject to the inspection and approval of the Highway Engineer. The commission also established the minimum width and live load guidelines for their designs and went on record in favor of the use of reinforced concrete designs when possible. . . . Reliance on the counties to furnish bridges had led to the bridge work lagging behind road construction on state highways. In response, the highway commission began requiring that all bridge design and construction on the state highway system be done under the direction of the Bridge Department beginning in 1923.²³

²¹ Graham, *Discovering the Sacramento River Delta*, 31.

²² James Lin, “A Brief History: Parts 1-4,” *Lincoln Highway Homepage*, 7 October 1998, <<http://www.ugcs.caltech.edu/~jlin/lincoln/history/part1.html>> (18 August 2004). Parts 2-4 may be accessed from this link.

²³ Thompson, “From Waterways to Roadways,” 152-53; McMorris, “Caltrans Historic Bridge Inventory Update,” 16-17.

These requirements increased the workload for the commission and created a need for the formation of a Bridge Department, which began supervising bridge construction in 1923.²⁴

The federal government also began to assist in improving roads. Proposed by the American Association of State Highway Officials (AASHO), federal government passage of the 1916 Federal Aid Road Act aided the state and counties with road improvements. Also in 1916, the state issued a second highway bond for \$15 million. The California Highway Commission implemented the adapted 1911 road improvement plan in the Delta region, covering thirty-nine miles of asphalt from Freeport to beyond Isleton and constructing several bridges: Walnut Grove (1916), Rio Vista (1919), Paintersville (1923), Isleton (1923) and Steamboat Slough (1924).²⁵ The American Toll Bridge Company had finished a bridge spanning the San Joaquin River in the Antioch vicinity in 1926, and in 1928 the Freeport Bridge became part of the Sacramento and Yolo Counties road system.²⁶ “By 1929,” argues Kathleen Graham, “all the major bridges were built and by 1930, there was an extensive network of primary and secondary paved roads.”²⁷

State Highway 160—the Victory Highway

Paintersville, Isleton and Steamboat Slough bridges are all located on the present-day State Highway 160, which at one time was known as the Victory Highway, a transcontinental route.²⁸ State Highway 160, also known as State Route 160, is one of the three main highways that run through the Delta.

The Victory Highway Association, organized in 1921, aimed to promote road improvements and follow U.S. Route 40. The Victory Highway was established after World War I as a memorial to those who served in the war. In 1923, the Secretary of Agriculture Henry C. Wallace chose the routing of the Victory Highway via Wendover, Utah, the same route that the Utah state government wished for the Lincoln Highway.²⁹ The Victory Highway gained

²⁴ McMorris, “Caltrans Historic Bridge Inventory Update,” 17.

²⁵ Weingroff, “Federal Aid Road Act of 1916,” *Infrastructure Website*; State of California, “Fact Sheet,” *Department of Transportation*; Thompson, “From Waterways to Roadways,” 153-54. Thompson’s report dates the construction of the Paintersville bridge as 1920, however, all other documents, such as BIRIS reports, state the bridge’s construction being in the year 1923.

²⁶ Thompson, “From Waterways to Roadways,” 154.

²⁷ Kathleen Graham, *Discovering the Sacramento River Delta*, 32.

²⁸ Root, *A History of Bridge Building* lecture, CD-Rom. Some rumors suggest that after the construction of the Antioch Bridge in 1926, Highway 160 became part of the Lincoln Highway.

²⁹ Thompson, “From Waterways to Roadways,” 154; Parsons Harland Bartholomew & Associates, Inc., “Revised Historical Resources Compliance Report for the Relinquishment of State 160 to the City of Sacramento, California by the California Department of Transportation, Sacramento County, Sac-160 PM 35.04/44.46; EA 03-2A4700,” April 2001, 11; Frank X. Brusca, “Victory Highway,” *U.S. Route 40; America’s Golden Highway*, copyrighted 2002, <<http://www.route40.net/history/victory.shtml>> (accessed 18 August 2004).

additional funding in 1921 after the Utah government chose the Victory Highway as a federal road and, therefore, received money from the new federal highway act.³⁰

The Victory Highway detours from Route 40 between Sacramento and San Francisco.³¹ The Delta region, for economic reasons, wanted The Victory Highway, “In an effort to obtain additional funds for transportation improvements the Victory Highway Association made several ‘reroutings’ of the Highway through Sacramento.”³² Businessmen and different business sectors in Oakland and San Francisco and of the California State Automobile Association desired a steadier flow of traffic from Salt Lake City and Ely, Nevada, and the newly formed Victory Highway Association worked to find a solution to steering more traffic towards San Francisco.³³ By 1924, the Victory Highway was well established as noticed from this 1924 commentary by Edward Tree, the editor of *Good Roads* magazine:

Approaching the Pacific end of the Victory Highway line the tourist is supplied with an entry way into San Francisco from Sacramento that follows a concrete highway down the Sacramento River levee, crosses the San Joaquin River at Antioch and follows the wonderful concrete county highway system of Contra Costa County. . .³⁴

When the Antioch Bridge was completed in 1926, in celebration of the diversion of the Victory Highway through the Delta region, the bridge was named “The Victory Bridge.”³⁵

Bridges, inevitably, made the River Road eligible for incorporation into a major highway. According to historian Frank Lortie, “Without modern, movable bridges the River Road would have never been the up-to-date motor transportation route that the Delta needed. Between Antioch and Freeport there were ultimately eight movable bridges along State Route 160. . .The bascule design seems to have been the best type of bridge for most of the Delta crossings.”³⁶ The county constructed the three movable bridges studied in this report during the early 1920s.

³⁰ James Lin, “A Brief History: Parts 1-4,” *Lincoln Highway Homepage*. The act provided \$75 million worth of matching funds to state highway construction in addition to requiring, unlike in 1916, that states identify “7 percent of its total mileage as ‘primary’; only these roads would be eligible for federal funds.”

³¹ Brusca, “Victory Highway,” *U.S. Route 40; America’s Golden Highway Website*. <<http://www.route40net/history/victory.shtml>>

³² Parsons Harland Bartholomew & Associates, Inc, “Revised Historical Resources Compliance Report,” April 2001, 11.

³³ Thompson, “From Waterways to Roadways,” 154.

³⁴ Parsons Harland Bartholomew & Associates, Inc, “Revised Historical Resources Compliance Report,” 9.

³⁵ Thompson, “From Waterways to Roadways,” 154.

³⁶ Frank Lortie, “Historic Architectural Survey Report for The Steamboat Slough and Threemile Slough Bridges, Bridge Numbers 24-52 and 24-121, Seismic Retrofit Projects; 3-Sac-160, PM 19.3 and 6.98, EA 3-428000,” California Department of Transportation, Sacramento, January 1996, 4.

Movable Bridges

At the turn of the twentieth century, movable bridges dotted the Delta region. In such a diverse geographic area as the Delta, the need for bridges equated to that for paved roads. To accommodate the need for an improved road system, but not affect the water carriers, the county selectively built movable bridges because of the high cost of construction and operation.³⁷ Movable bridges improved the efficiency of the road, as well as, accommodated the water vessels that had the right of way. The vast majority of movable bridges in California existed within the Sacramento-San Joaquin Delta where highway traffic and navigation often met.³⁸ Within California, nineteen of the thirty-eight movable bridges are located in Sacramento and San Joaquin counties. Twenty-five are located within the Delta region, and the rest, except two, are located in the counties between San Francisco and the inland ports.³⁹

The first movable bridge in the Delta region spanned the lower American River in 1851 at the approximate site of Sixteenth Street and the American River in the City of Sacramento. Lisle's Bridge, constructed out of timber, "was a vertical lift (sort of)," according to author Hal Schell. In 1858, the Sacramento-Yolo Bridge, a swing bridge, opened in Sacramento.⁴⁰ In 1901, a steel drawbridge was constructed across Georgiana Slough shortly before the county began their first phase of bridge construction. By the 1920s, most of the ferries that had once served the Delta roads were replaced by bridges or "earthen fills," and by 1950 only five ferries remained. Today only two ferries provide such a service.⁴¹ These are the Cache Slough Ferry (also called the Real McCoy and the Ryer Island Ferry) on State Highway 94, and the Steamboat Slough Ferry (or J-Mack Ferry) on State Highway 220. Both are near the Sacramento River and are maintained by Caltrans.

Bridges changed the economic picture of the Delta region; "by the late 1920s recreational boating and tourist traffic had increased substantially and put new demands upon the Delta

³⁷ Caltrans, *Historic Highway Bridges of California*, 111.

³⁸ Caltrans, *Historic Highway Bridges of California*, 111.

³⁹ Query of Movable Bridges from the Caltrans Bridges Database, Microsoft Access, 2002; Caltrans, *Historic Highway Bridges*, 111. There are some discrepancies between the Caltrans 1990 publication and its 2002 bridge database. According to the 1990 publication, there are 39 movable bridges found in California. Of those bridges, 27 are located in and between Sacramento, San Joaquin and Yolo Counties. The publication also notes that two movable bridges found outside of these counties, and counties associated with the San Francisco Bay Area, are a bridge in Los Angeles and Glenn County. The 2002 database lists movable bridges that still exist and have not been locked into place. It notes that there are only 38 movable bridges, 25 located in Sacramento, San Joaquin, Yolo and Solano counties. The two bridges outside of the Delta or Bay Area are noted to be located in San Diego and Los Angeles County. There are no movable bridges listed for Glenn County.

⁴⁰ Hal Schell, "Historic Drawbridges of the Delta," *California Delta Chambers & Visitors Bureau Website*, 16 January 2003, <<http://www.californiadelta.org/bridges.htm>> (accessed 27 July 2004).

⁴¹ Thompson, "From Waterways to Roadways," 149, 151-52; Wolff, *Delta Primer*, 146-7; Hal Schell, "Ferries of the Delta," *California Delta Chambers and Visitors Bureau Website*, 19 August 2004, <<http://www.californiadelta.org/ferries.htm>> (23 August 2004). While the *Delta Primer* states that there are two remaining ferries, it should be specified that Hal Schell's work claims there are five ferries that remain, but three lead to private properties.

merchants and resort owners.”⁴² The Paintersville, Isleton and Steamboat Slough bridges are each a bascule bridge, one type of movable bridge. There are three basic types of movable bridges. Two types swing and lift. Swing bridges, the earliest movable bridges, pivot on a central pier. Bascule bridges have a “movable span that pivots about a hinge, or trunnion, with the span being pulled upward and inward toward a source of power beyond the trunnion.”⁴³ More time efficient, the bascule design replaced swing bridges because the bascule spans only had to adjust the deck height to accommodate approaching vessels, whereas swing bridges had to turn entirely regardless of the size of vessel.⁴⁴

Bascule Bridge Design

Early bascule bridges did not have counterweights. The earliest type of bascule bridges consisted of “a simple span, trunnioned or hinged at one end, moving in a vertical plane about such trunnion, by virtue of an out-haul line attached to the free end and running upward and inward to the source of power.”⁴⁵ The genealogy of this design is traced to the medieval drawbridge. Although some bascule bridges existed in Europe during the first half of the nineteenth century, the twentieth-century “modern” bascule bridge was not developed until the 1920s. One of the forerunners to the bascule span of the 1920s was the Van Buren Street Bridge in Chicago, completed in 1893.⁴⁶ The Delta’s first drawbridge, Lisle’s Bridge, was a vertical lift bridge spanning part of the lower American River built in 1851.⁴⁷

The development of the bascule design occurred rapidly due to the design’s many advantages, such as, quick operation, diminished interference with the channel during operation, the duration of the opening, and pier considerations. In many of these regards, the bascule bridge was advantageous when compared to the swing bridge.⁴⁸

The bascule bridges also incorporated truss styles, the three major types of steel truss bridges in California being the “Through Truss,” “Pony Truss,” and “Deck Truss.” “For those standard configurations, engineers designed four common types, which included the ‘Pratt

⁴² Lortie, “Historic Architectural Survey Report for the Steamboat Slough and Threemile Slough bridges,” 5.

⁴³ Caltrans, *Historic Highway Bridges of California*, 111.

⁴⁴ George A. Hool, et al, *Movable and Long-Span Steel Bridges*, 2d ed, Structural Engineers’ Handbook Library (New York: McGraw-Hill Book Company, Inc, 1943), 1-2.

⁴⁵ Hool, *Movable and Long-Span Steel Bridges*, 1-2.

⁴⁶ In Frank Lortie’s report, “Historic Architectural Survey Report for The Steamboat Slough and Threemile Slough Bridges,” he specifies that “The modern bascule bridge designs were developed in Chicago in the 1890s along the Chicago River, and were the prototypes for several subsequent bascule designs that became popular nationally and internationally,” 4.

⁴⁷ Dana Supernowicz, “Bridge Evaluation Report for Rehabilitation of the Mokelumne River Swing Truss Bridge (29-0043) State Route 12, San Joaquin County, California 10-SJ-12 (P.M.0.01) EA 3A2300,” February 2001, in Historical Resources Compliance Report for the Rehabilitation of the Control houses on THE OLD RIVER BRIDGE (Br. No. 29-0045) Located at 10-SJ-4-0.0 THE MOKELUMNE RIVER BRIDGE (Br. No. 29-0043) Located at 10-SJ-12-0.0 San Joaquin County, California, EA 10-0C1500,” by Andrea Galvin, November 2002, 3; George A. Hool, et al, *Movable and Long-Span Bridges*, 1.

⁴⁸ George A Hool, et al, *Movable and Long-Span Bridges*, 1-8.

Truss,' 'Baltimore Truss,' 'Parker Truss,' and 'Pennsylvania Truss.'"⁴⁹ By the twentieth century the truss design had lost favor to the concrete arch for various reasons: the organization of the American Bridge Company, the growth of state and county involvement in bridge construction and the disfavor of "City Beautiful" advocates. These events contributed to the downfall of the truss design being used for "ordinary" spans. The design was used, however, for extraordinary circumstances, such as, spanning navigable water.⁵⁰

History of Paintersville

Paintersville was settled in 1852 or 1855 by Levi Painter. It is located approximately one mile downstream from Courtland. According to Kathleen Graham, "the little town's commercial life centered around its wharf, warehouse, general store, boarding house, saloon, and salmon cannery. The cannery, near the wharf on the downstream side, flourished and Painter built the boarding house to accommodate its workers."⁵¹

In 1877, the boarding house was transformed into Painter's Hall and it became used as a public dance hall. Painter later converted the hall into his own residence, and moved the building. In 1900, Paintersville still had a grocery store, clothing store, saloon, and a well driller. During the 1920s and 1930s and later, several new residences were constructed.

In 1923, a bridge was built near Paintersville "to accommodate the steady flow of fruit and produce from both sides of the Sacramento River."⁵² Commercial salmon fishing continued until it became illegal in the 1950s. Until the 1950s, Vierra's Garage sat close to the bridge as Graham describes, "Until the 1950's Vierra's Garage sat at road level near the bridge approach. Built before 1923, and perhaps as a store, it was supported on stilts which rested on concrete pads. Remnants of the old wharf were easily visible [*sic*] until the levee was improved about 1960."⁵³

Buckley's Station, a drayage business, became Paintersville's primary business after J.M. Buckley purchased a portion of Paintersville in 1918. The Buckley family purchased and moved into the boarding house which Painter had converted into a hall and then a residence, and operated a boarding house for their employees. The family operated the business until it closed in 1987.⁵⁴

⁴⁹ Supernowicz, "Bridge Evaluation Report for Rehabilitation of the Mokelumne River Swing Truss Bridge (29-0043) State Route 12 San Joaquin County, California 10-SJ-12 (P.M.0.01) EA 3A2300," 4 of Supernowicz's report.

⁵⁰ California Department of Transportation, Environmental Program, "Historic Bridge Inventory," 1986, 16-17; McMorris "Caltrans Historic Bridge Inventory Update," 15-16.

⁵¹ Kathleen Graham *Discover Paintersville, Vorden and Ryde* (Walnut Grove, Calif.: Sacramento River Delta Historical Society, 1987), 3-4. The text also states "In April 1854, he settled on land that would become known as Paintersville" (3).

⁵² "Paintersville Bridge—Sacramento River" ca. 1929. Photograph and caption available online at Sacramento History Online: <http://www.sacramentohistory.org/search.php> (accessed 8 June 2005). The Sacramento Public Library, Sacramento Room owns original photographs.

⁵³ Graham, *Discover Paintersville, Vorden and Ryde*, 4-6.

⁵⁴ Graham, *Discover Paintersville, Vorden and Ryde*, 6.

Part II. Structural/ Design Information for Paintersville Bridge

A. General Statement:

- 1. Character:** The Paintersville Bridge is one of the few unmodified examples in California of a Strauss Heel Trunnion Bascule Bridge. Designed by the Strauss Engineering Company of Chicago, Joseph Strauss's Bascule design allowed the use of concrete, a cheaper alternative to iron, to be used for the above-deck counterweights. Furthermore, the bridge's moveable spans pivots on a trunnion upward instead of swinging out. Bascules, then, are more time efficient because they adjust to the height of approaching vessels. The bascule design was only used for spanning navigable water.
- 2. Condition of fabric:** The Steamboat Slough Bridge has been in service since its construction in 1923. Its historic fabric appears to be in fair condition, with few alterations, other than repair and replacement of worn material and parts. The structural integrity of the bridge's individual components is fair, and the bridge operator's controls are worn.

B. Description:

- 1. Substructure:** The Paintersville Bridge substructure is comprised of two reinforced concrete seat abutments, and four reinforced concrete piers with curved reinforced concrete wing walls. The piers are set on timber piles. They are located 120 and 181 feet from each abutment.

There are a total of five spans. The approach spans measure 120 feet each and are of the Pratt through configuration. Three spans have the main riveted steel, rigid-connected Bascule through truss spans which measures 348 feet. The total length of the bridge is 588 feet.

There are seven, seven-pile dolphins made of treated wood. Four are located on the west end of the bridge, three on the east. A single navigation light is located at the top of each dolphin.⁵⁵

- 2. Superstructure:** The bridge carries a two-way road measuring eighteen feet wide. The total width of the bridge is approximately nineteen feet. There is a height clearance of 13.75 feet. The deck elevation is at twenty-six feet from the bottom of the piers. The deck is concrete poured over cedar blocks and stringers on the approach spans, and steel grating deck on the bascule leaves. The railing is composed of steel lattice, and there are wood plank curbs.

⁵⁵All information obtained from bridge reports and supplementary bridge reports are located in the Caltrans Bridge Inspection Records Information System (BIRIS) database. Specific dates of reports quoted from are January 1924, August 1933, January 1944 and December 1996.

The approach spans consists of a tower truss supporting the counterweight, the counterweight truss, and the mechanical equipment. The steel truss members are mostly latticed sections with riveted connections. There are two large concrete counterweights mounted in the steel frame approximately fifteen feet over the roadway at each abutment. The counterweights are approximately ten feet tall, 8.5 feet wide, and fifteen feet deep.⁵⁶

- 3. Gear houses:** There is one gear house (two total) located at each counterweight tower next to the counterweight trunnion, approximately fifteen feet above the roadway. The gear houses are triangular in design and identical. The floor of the gear houses is sloped forty-five degrees and is supported by steel framing attached to the bridge trusses. The gear houses are wood framed. The exteriors are clad in sheets of corrugated steel; there are no windows. There are two wood doors, one on the north and one on the south façades. The roof is covered in corrugated steel, and is half-gabled with open eaves and exposed rafters.

Steel staircases with steel pipe guardrails lead to the gear houses from the main deck to the gear house platform. The east gear house staircase is located on the south side of the bridge; it leads from the roadway to the south door. A second staircase leads from the north door to the counterweight platform.

The western gear house staircase is located on the north side of the bridge; it leads from the roadway to the north door. A second staircase leads from the south door to the counterweight platform.

- 4. Gates, navigation lights, etc:** On each end of the bridge there are two-color traffic lights, bells, signs, and crossing gates as protective measures for crossing road traffic.

On the east end of the bridge there is a traffic light located on the north side of the roadway. The traffic light is on a metal pole with a concrete block foundation. Behind the traffic light, attached to the pole, is a bell which dings when the crossing gate lowers and the center spans rise. Mounted below the traffic light is a sign reading "WAIT HERE," and located behind the traffic light on a metal bridge truss is a sign reading, "STOP AHEAD." The single crossing-gate arm is located on the approach spans, east of the control house, on the north side of the bridge. The crossing-gate has three yellow caution lights which blink when the gate lowers.

The same metal traffic light, bell, signs, and crossing-gate are located on the west end of the bridge, on the south side of the roadway.

There is a metal fog bell mounted on a steel truss on the north side of the bridge, on the west side of the bridge operator's control house. The bell is rigged so the bridge control operator can warn oncoming water traffic. There are also two fog horns

⁵⁶ FHWA, "FNAE," 5; Matur and Orsolini, "Seismic Retrofit of a Bascule Bridge," 517.

located on the same steel truss above the control house, outside the north door of the east gear house.

There are two blinking navigation lights at the center opening of each side of the bridge. A single navigation light is located at the top of each of the seven dolphins.

- 5. Approaches:** On the east end of the bridge there are decorative concrete approaches on the south and north side of the roadway. The approaches are approximately three feet tall with concrete curbs and large concrete blocks where the east bridge spans begins.

On the west end of the bridge there are two large, decorative concrete blocks on the north and south sides of the roadway (four total). There is a concrete curb and metal pipe railing between the two concrete blocks.

6. Original Control House Exterior⁵⁷

- a. Overall:** The bridge operator's control house is a one-story rectangular structure.
- b. Foundation:** The control house is cantilevered over the Sacramento River on the north side of the bridge. It is supported by three steel brackets across its width, and three galvanized iron soffits across its length bracing the house to the brackets. There is a galvanized iron water table. The house is level with the bridge's main deck.
- c. Walls:** The control house is clad with corrugated steel siding.
- d. Structural system, framing:** The control house is wood framed. The roof has a common hipped rafter system.
- e. Walkways:** A wood plank walkway extends from the east bank of the river, along the north side of the bridge, to the control house. The walkway runs along the roadway, along the south side of the control house and leads to the control house's main entrance. A metal pipe railing runs along both sides of the walkway until it reaches the main deck and the control house.
- f. Doors:** There is a set of wood double doors on the east end of the south façade. The double doors each have one single-pane, fixed-sash window. The windows are protected by metal security bars. The doors also have plywood bolted to the bottom half of the door, below the windows. The wood door located on the west end of the south façade has a small, square, single-pane, fixed-sash window at the top. There is a metal-framed and metal mesh security screen door in front of the wood door. All the doors have simple wood board casing.

⁵⁷ The original control house was replaced in 2007, and its description here is the major reason in the FHWA FNAE that this documentation was written.

- g. Windows:** On the north façade of the control house there are five multi-paned, double-hung windows. The east window on the north façade is smaller than the other four. It has four-over-four lights; the others have six-over-six lights. The windows have wood board casing and decorative wood sills.

There are two windows on the south façade. One window is located next to the west door; it is a single-pane, fixed-sash window. The second window is located in the middle of the control house; it is a single-pane, fixed-sash window. Both windows have metal security bars mounted on the interior of the control house, and have simple wood board casing.

The east façade has no windows. The west façade has two, six-over-six light, double-hung windows, with simple wood casing and decorative sills.

- h. Roof:** The control house has a simple hipped roof sheathed in corrugated steel. The roof has moderate eaves overhang and boxed eaves with metal fascia and metal sheet soffits.

The gutter system is made of galvanized iron; it runs along the roof line and has galvanized iron drainage pipes.

7. Original Control House Interior

- a. Flooring:** There are wood floors covered by linoleum throughout the control house. In some areas, the wood floors are exposed. The bathroom has linoleum flooring.
- b. Wall and ceiling finish:** The control house is clad with horizontal beveled wood siding. There are simple vertical wood corner finishing boards, and simple wood crown molding. There are plain wood base boards throughout the interior. The interior is painted.
- c. Decorative features:** There is a wood shelving unit on an interior east wall. Interior doors have coffered wood paneling.
- d. Heating and air:** A window mounted air conditioner is located in a window on the west façade.
- e. Plumbing:** There is an incinerator toilet and ceramic sink.

C. Mechanicals/Operation: The Heel Trunnion Bascule operates “with concrete counterweights to distribute loads throughout the opening process and to reduce the motor power necessary to lift the bridge and with four trunnions to ensure that the

counterweight and lift spans are balanced at all points while the bridges are being lifted.”⁵⁸

In the May 1923, blueprints the bridge’s motor was noted to be a three-phase, alternating-current (AC) motor with 15 horse power. The motor has 850 rotations per minute (RPM) and has normal running torque of 90 inches and normal starting torque at 180 inches. There are four counterweight trunnions and heel trunnions, and there are solenoid brakes. The bridge gearing is triple pinion-and-spur reduction before final rack-and-pinion.⁵⁹

The bridge operator’s control house contains electric control panels and other equipment necessary to operate the movable span. Inside, the control house has bridge controls along the south wall. Against the west wall is a Westinghouse control panel dated 1940. The air compressor and engine generator are located in the eastern half of the control house.⁶⁰

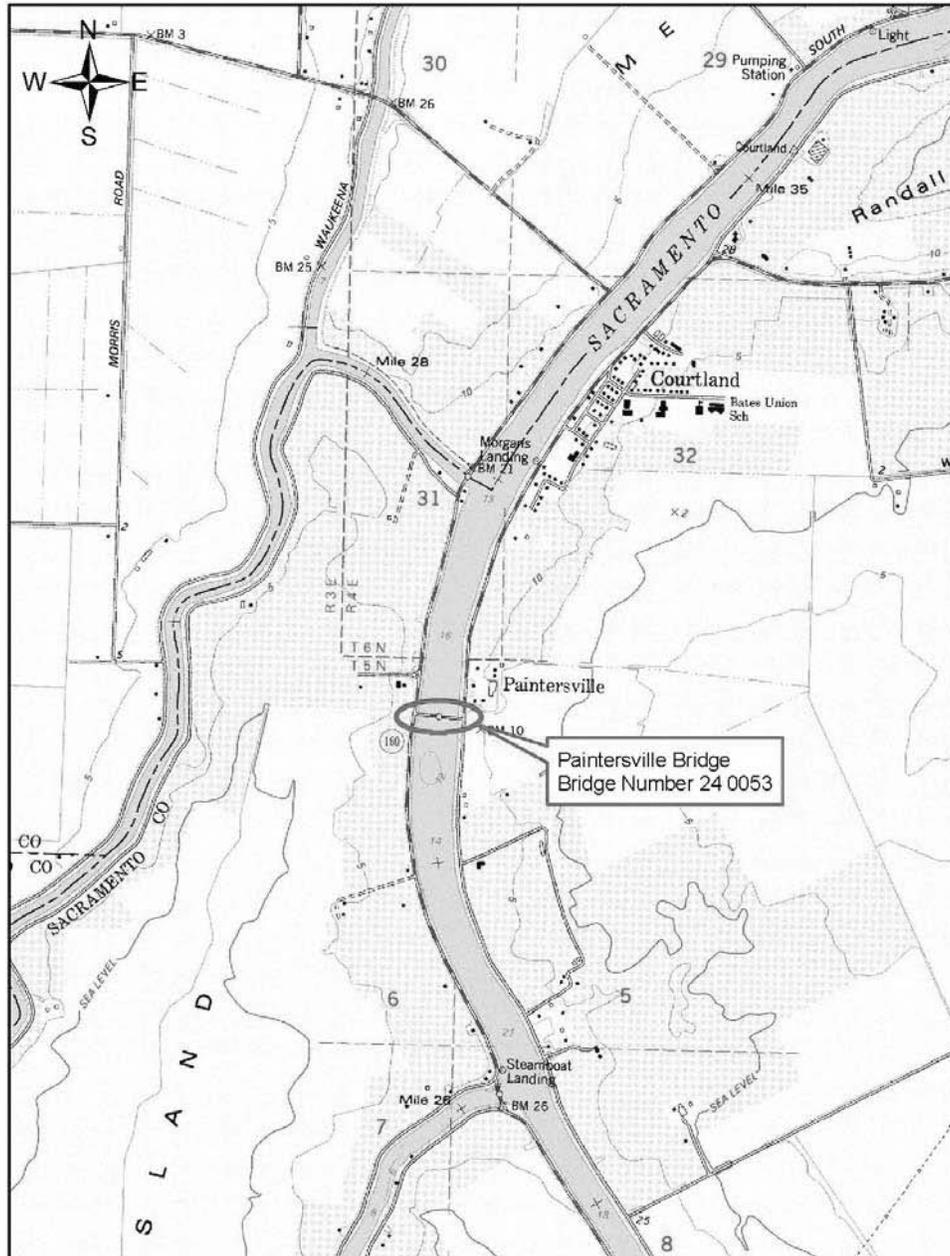
D. Site Information: The Paintersville Bridge spans the Sacramento River at Postmile 20.96 on State Highway 160; the road is on top of the levees on either side of the river. The Paintersville Bridge carries two lanes of traffic in opposing directions as a component of California State Highway 160. The bridge is surrounded by flat farm fields and sparsely scattered single family houses and farm structures.

⁵⁸ Chester, *Joseph Strauss*, 32,33,34,36, 40,42; PBS, “Golden Gate Bridge,” <http://www.pbs.org/wgbh/amex/goldengate/peopleevents/p_strauss.html>;and *Port of Los Angeles Virtual History Tour*, “Badger Avenue Bridge, People,” <http://laporthistory.org/level4/Badger/badger_people.html>

⁵⁹ All information obtained from bridge reports and supplementary bridge reports are located in the Caltrans Bridge Inspection Records Information System (BIRIS) database. Specific dates of reports quoted from are May 1923.

⁶⁰ FHWA, “FNAE,” 3.

PAINTERSVILLE BRIDGE
(Bridge No. 24-53)
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(Page 19)



Courtland, CA, U.S.G.S. 7.5' Quadrangle
Scale 1:24,000

PART III: SOURCES CONSULTED

A. Primary Sources

- Anonymous. *The Complete Official Road Guide of The Lincoln Highway*. 1916.
Available at the California Department of Transportation HQ library. (Sacramento: Phleaiades Press, First printing June 1984).
- Archival folder on Isleton Bridge located in the Transportation Library and History Center at the California Department of Transportation, Headquarters in Sacramento. Consists of a floor plan ca. 1999 of the existing control house floor plan and the new control house floor plan, historic photographs, map of freeway/highway system surrounding Sacramento (therefore including Hwy 160); "Final Construction Report of Repairs to the Deck of the Bascule Bridges over the Sacramento River at Isleton and across Steamboat Slough in the County of Sacramento on Road III-Sac-11-D, E Contract 414WLC2" as submitted to the State Highway Engineer on November 9, 1942.
- California Department of Public Works, Division of Highways. *Fifteenth Biennial Report to the Governor of California by the Director of Public Works*. Sacramento: California State Printing Office, 1946.
- "County Incurs No Indebtedness over 20 Years; Annual Cuts in Tax Rate Have been effected since 1933." *The Sacramento Bee*, April 24, 1937.
- "Deterding, First County Executive, is Dead at 89." *The Sacramento Bee* January 20, 1975.
- "Deterding is Selected by Supervisors as Manager." *The Sacramento Bee*, June 12, 1933.
"Deterding Ends Eighth Year with County." *The Sacramento Union*, June 8, 1941.
- The Isleton May Festival Committee, compilers. *The Isleton May Festival: May 3rd & 4th, 1975*. Isleton, Calif.: The Committee, 1975.

B. Secondary Sources

- Bohakel, Charles A. *The Historic Delta Country; A Guidebook to State Highway 160, the Bayou of the West*. Antioch, Calif.: by the author, 1979. California Department of Transportation. *Historic Highway Bridges of California*. 1990.
- Chester, Michael. *Joseph Strauss, Builder of the Golden Gate Bridge*. New York: G.P. Putnam's Sons, 1965.
- Crawford, Bruce. *Isleton*. Charleston, SC: Arcadia Pub., 2003.
- Dickson, Paul and William D. Hickman. *Firestone: A Legend, a Century, a Celebration*. Edited by Nelson Eddy. New York: Bridgestone/Firestone Inc., 2000.
- Dillon, Richard. *Delta Country*. Novato, CA: Presidio Press, 1982.

- Graham, Kathleen. *Discover Paintersville, Vorden and Ryde*. Walnut Grove, Calif.: Sacramento River Delta Historical Society, 1987.
- _____. *Discovering Courtland*. Rev. ed, 1987. Walnut Grove, Calif.: The Sacramento River Delta Historical Society, 1985.
- _____. *Discovering the Sacramento River Delta*. Rev. ed, 1985. Walnut Grove, Calif.: Sacramento River Delta Historical Society, 1982.
- Hool, George A., et al. *Movable and Long-Span Steel Bridges*, 2d ed. Structural Engineers' Handbook Library. New York: McGraw-Hill Book Company, Inc., 1943.
- Hoover, Mildred Brook; Rensch, Hero Eugene; Rensch, Ethel Grace; William N. Abeloe. *Historic Spots in California* (fourth edition revised by Douglas E. Kyle). First published in 1932, 1933, 1937, 1948, and 1968. Stanford, CA: Stanford University Press, 1990.
- Jackson, Donald C. *Great American Bridges and Dams*. With a foreword by David McCullough. Great American Places Series. Washington, D.C.: The Preservation Press, 1988.
- Leung, Peter C.Y. *One day, one dollar: Locke, California, and the Chinese farming experience in the Sacramento delta*. Edited by L. Eve Armentrout Ma. *El Cerrito, Calif.: Chinese/Chinese American History Project, c.1984*.
- Reed, Walter G. *History of Sacramento County, California With Biographical Sketches*. Los Angeles, CA: Historic Record Company, 1923.
- Sacramento City Directories, 1909-1966.
- Schell, Hal. *Hal Schell's Guide to Cruising California's Delta: The Delta Dawdler's Dream Tour of This Fabulous*. Stockton, Calif: Schell Books, 1995.
- _____. *Dawdling on the Delta; The Complete Cruising Guide for California's Fabulous 1,000-Mile Delta*. Stockton, Calif: Schell Books, 1979.
- Tinkham, George H. *History of San Joaquin County California With A Biographical Review of the Leading Men and Women of the County Who Have Been Identified With its Growth and Development from the Early Days to the Present* (Historic Record Company: Lost Angeles, California, 1923).
- Wolff, Jane. *Delta Primer; A Field Guide to the California Delta*. With a preface by Kevin Starr. San Francisco: William Stout Publishers, 2003.

Reports

- Astaneh-Asl, Abolhassan and James Roberts, organizers and editors. "Seismic Design, Evaluation and Retrofit of Steel Bridges; Proceedings of the Second US Seminar held at the Hyatt Regency, San Francisco, November 20-21, 1996." Available in a folder "Steamboat Slough Bridge," in the Transportation Library and History Center at the California Department of Transportation, Headquarters, Sacramento.

- California Department of Transportation, Environmental Program. *Historic Bridge Inventory*, 1986.
- Federal Highway Administration. "Finding of No Adverse Effect for the Rehabilitation of Isleton Bridge (#24-51), Steamboat Slough Bridge (#24-52) and Paintersville Bridge (#24-53) Sacramento County California, 03-Sac-160 KP9.5, 31.9, 33.6 (PM 5.9, 19.8, 20.9) EA.03-437200," February 2000.
- Lortie, Frank. "Historic Architectural Survey Report for The Steamboat Slough and Threemile Slough Bridges, Bridge Numbers 24-52 and 24-121, Seismic Retrofit Projects; 3-Sac-160, PM 19.3 and 6.98, EA 3-428000." California Department of Transportation, Sacramento, January 1996.
- McMorris, Christopher. "Caltrans Historic Bridge Inventory Update: Metal Truss, Movable and Steel Arch Bridges, Volume 1: Report and Figures." JRP Historical Consulting. Prepared for California Department of Transportation, Environmental Program in Sacramento. March 2004.
- Parsons Harland Bartholomew & Associates, Inc. "Revised Historical Resources Compliance Report for the Relinquishment of State 160 to the City of Sacramento, California by the California Department of Transportation, Sacramento County, Sac-160 PM 35.04/44.46; EA 03-2A4700." April 2001.
- _____. "Historic Resources Evaluation Report Freeport Shores Pedestrian/Bicycle Trail Project Sacramento County, State 160/Freeport Boulevard." March 2004.
- Snyder, John W. "Photographs: Written Historical and Descriptive Data, Middle Fork Stanislaus River Bridge," HAER NO. CA-72, California Department of Transportation, October 21, 1992.
- State of California Business and Transportation Agency and Department of Transportation. "Route 160." State Highway Routes: Selected Information. April 1994. Found within the Cultural Studies Office Library in the Division of Environmental Analysis at the California Department of Transportation Headquarters, Sacramento.
- State of California, Department of Transportation. "Historic Property Survey Report for the Control House Replacement on Three Bridges In Sacramento County, 03-Sac-160, KP 9.5, 31.9, 33.6, 03-437200." September 1999.
- Supernowicz, Dana. "Bridge Evaluation Report for Rehabilitation of The Mokelumne River Swing Truss Bridge (29-0043) State Route 12, San Joaquin County, California 10-SJ-12 (P.M. 0.01) EA 3A2300," February 2001, in "Historical Resources Compliance Report for the Rehabilitation of the Control Houses on THE OLD RIVER BRIDGE (Br. No. 29-0045) Located at 10-SJ-4-0.0 THE MOKELUMNE RIVER BRIDGE (Br. No. 29-0043) Located at 10-SJ-12-0.0 San Joaquin County, California, EA 10-0C1500," by Andrea Galvin, November 2002.

Articles

Adams, Kenneth C. "Chapter Thirteen: Start of Highway System." *California Highways and Public Works Centennial Edition, September 9, 1850 – September 9, 1950* (9 September 1950): 77-79.

Arreola, Daniel D. "The Chinese Role in the Making of the Early Cultural Landscape of the Sacramento-San Joaquin Delta." *The California Geographer* 35 (1995): 3-14.

"The Story of US 40 and US 50." *California Highways and Public Works* 35, no. 5-6 (May/June 1956): 38.

Mitchell, Martin D. "Land and Water Policies in the Sacramento-San Joaquin Delta." *Geographical Review* 84, no. 4 (Oct. 1994): 411-423.

Thompson, John. "From Waterways to Roadways in the Sacramento Delta." *California History* 59, no. 2 (1980): 144-169.

Special Edition Magazines and/or Bicentennial Projects

Heavy Duty Trucking: 100 Years of Trucking 1898-1998. Special Issue of *Heavy Duty Trucking*, published monthly. Santa Ana, Calif.: Newport Publications Division, HIC Corp., March 1998.

The History and Heritage Committee, Sacramento Section, American Society of Civil Engineers. *Historic Civil Engineering Landmarks of Sacramento and Northeastern California*. A Bicentennial Project. N.P.: November 1976.

Electronic Sources

American Bridge Company. "History." *American Bridge*. 27 August 2003 ("History" last updated 9 January 2003), <<http://www.americanbridge.net/company/history.php>> (24 August 2003).

Bridgehunter.com. "Twin Cities Road Bridge," <<http://bridgehunter.com/ca/sacramento/24C0053/>> (Accessed 9 August 2011).

Brusca, Frank X. "Victory Highway." *U.S. Route 40; America's Golden Highway*. Copyrighted 2002. <<http://www.route40.net/history/victory.shtml>> (18 August 2004).

_____. "Victory Highway-Hobbs Guide." *U.S. Route 40; America's Golden Highway*. Copyrighted 2002. <<http://www.route40.net/library/maps/hobbs/hobbs-00.shtml>> (18 August 2004). Pages 1, 2, and 3 (introduction, notes about Victory Highway, and San Francisco to Sacramento) were accessed and viewed from this page.

_____. "Lincoln Highway." *U.S. Route 40; America's Golden Highway*. Copyrighted 2002. <<http://www.route40.net/history/lincoln.shtml>> (18 August 2004).

- CalFed Bay-Delta Program. "Regional Highlights; The Delta." *California Bay-Delta Authority Website*. Copyrighted 2001.
<http://calwater.ca.gov/Regions/DeltaRegion_RPI.shtml> (5 August 2004).
- California Department of Transportation. "Fact Sheet; Important Events in Caltrans History." *Department of Transportation*. Copyrighted 2003.
<<http://www.dot.ca.gov/hq/paffairs/about/cthist.htm>> (23 August 2004).
- _____. Query of Movable Bridges from California Department of Transportation Bridges Database. Microsoft Access. 2002.
- California Department of Water Resources, Division of Planning and Local Assistance. "Introduction." *Sacramento-San Joaquin Delta Atlas Website*. 8 August 1995.
<http://rubicon.water.ca.gov/delta_atlas.fdr/intro.html> (11 August 2004).
- _____. "Time Line of Delta Events." *Sacramento-San Joaquin Delta Atlas*, 8 August 1995. <http://rubicon.water.ca.gov/delta_atlas.fdr/timeline.html> (11 August 2004).
- _____. "The Delta and its Service Area." *Sacramento-San Joaquin Delta Atlas*. 8 August 1995. <http://rubicon.water.ca.gov/delta_atlas.fdr/dservarea.html> (11 August 2004).
- City of Isleton Chamber of Commerce. "Isleton's History." *City of Isleton Chamber of Commerce Website*. 19 August 2004. <<http://www.isletoncoc.org/history.htm>> (07 September 2004).
- "City Beautiful Movement." *TheFreeDictionary.Com*.
<http://encyclopedia.thefreedictionary.com/City%20Beautiful%20movement>
(accessed 13 August 2004).
- "Connecticut's historic Highway Bridges." available at <http://www.past-inc.org/historic-bridges/Design-right.html> (accessed 16 June 2005). Web presentation based on the book, *Connecticut's Historic Highway Bridges* written by Bruce Clouette and Matthew Roth.
- Discovery Museum of Sacramento. "History—Places." *Sacramento Discovery Museum Website*. N.D. <http://www.thediscovery.org/history/his_pla.html> (11 August 2004).
- Lin, James. "A Brief History: Parts 1-4." *Lincoln Highway Homepage*. 7 October 1998,
<<http://www.ugcs.caltech.edu/~jlin/lincoln/history/part1.html>> (18 August 2004).
Parts 2, 3 and 4 may be accessed from this link.
- Lincoln Highway Association. "Information About the Lincoln Highway." Copyrighted 1999-2004. <<http://www.lincolnhighwayassoc.org/info/>> (18 August 2004).
- _____. "The Lincoln Highway in California." Copyrighted 1999-2004.
<<http://www.lincolnhighwayassoc.org/info/ca/>> (18 August 2004).
- Nejedly, John A. "The Sacramento-San Joaquin Delta 'Islands.'" *California Water Crisis Website*. Copyrighted 2002.
<http://californiawatercrisis.org/the_history_of_the_delta.htm> (11 August 2004).

- Online Highways. "Sacramento River." *Sacramento River, California (Rivers)*.
Copyrighted 2004. <<http://www.caohwy.com/s/sactoriv.htm>> (28 July 2004).
- PBS, "Golden Gate Bridge, People & Events: Joseph Strauss (1870-1938)." *American Experience*. Created 16 April 2004.
<http://www.pbs.org/wgbh/amex/goldengate/peopleevents/p_strauss.html> (accessed 13 October 2004).
- Port of Los Angeles Virtual History Tour. "Badger Avenue Bridge, the people."
Copyrighted 2001. <http://laporthistory.org/level4/Badger/badger_people.html>
(accessed 13 October 2004).
- SacDelta.com. "History of the Delta." Copyrighted 1997-2002.
<<http://www.sacdelta.com/hist.html>> (23 August 2004).
- Schell, Hal. "California Delta history." *California Delta Chambers & Visitors Bureau Website*. 31 July 2004. <http://www.californiadelta.org/history.htm> (11 August 2004).
- Schell, Hal. "Ferries of the Delta." *California Delta Chambers & Visitors Bureau Website*. 19 August 2004. <<http://www.californiadelta.org/ferries.htm>> (23 August 2004). All material adapted from Hal Schell's copyrighted book *Cruising California's Delta*.
- Schell, Hal. "Historic Drawbridges of the Delta." *California Delta Chambers & Visitors Bureau Website*. 16 January 2003. <<http://www.californiadelta.org/bridges.htm>> (27 July 2004).
- Schell, Hal. "Steamboats." *California Delta Chambers & Visitors Bureau Website*. 2 September 2004. <<http://www.californiadelta.org/steambts.htm>> (8 September 2004). All material adapted from Hal Schell's copyrighted book *Cruising California's Delta*.
- Schell, Hal. "Towns & Cities of the California Delta." *California Delta Chambers & Visitors Bureau Website*. 24 August 2002.
<<http://www.californiadelta.org/cities.htm>> (5 August 2004).
- Stanek, David. "Routes 141 to 160." *California Highway Routes*. 4 January 2001.
<<http://www.geocities.com/dstanek.geo/cahwys/r141-160.html>> (18 August 2004).
- US Highway 40; The Lincoln Highway*. N.D.
<<http://www.gbcnet.com/ushighways/US40/index.html>> (18 August 2004).
- Weingroff, Richard F. "Federal Aid Road Act of 1916: Building the Foundation." *U.S. Department of Transportation, Federal Highway, Infrastructure Website*. 6 February 2004. <<http://www.fhwa.dot.gov/infrastructure/rw96a.htm>> (20 August 2004).

Video Recordings

- Root, Norman. *A History of Bridge Building in California on the Lincoln Hwy*. Produced by California Department of Transportation. Division of Engineering Services. Education Committee. 75 min. 2000. CD-Rom. Located in the California Department

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of Transportation Library at Headquarters in Sacramento. Recording of lecture given in Sacramento, CA.