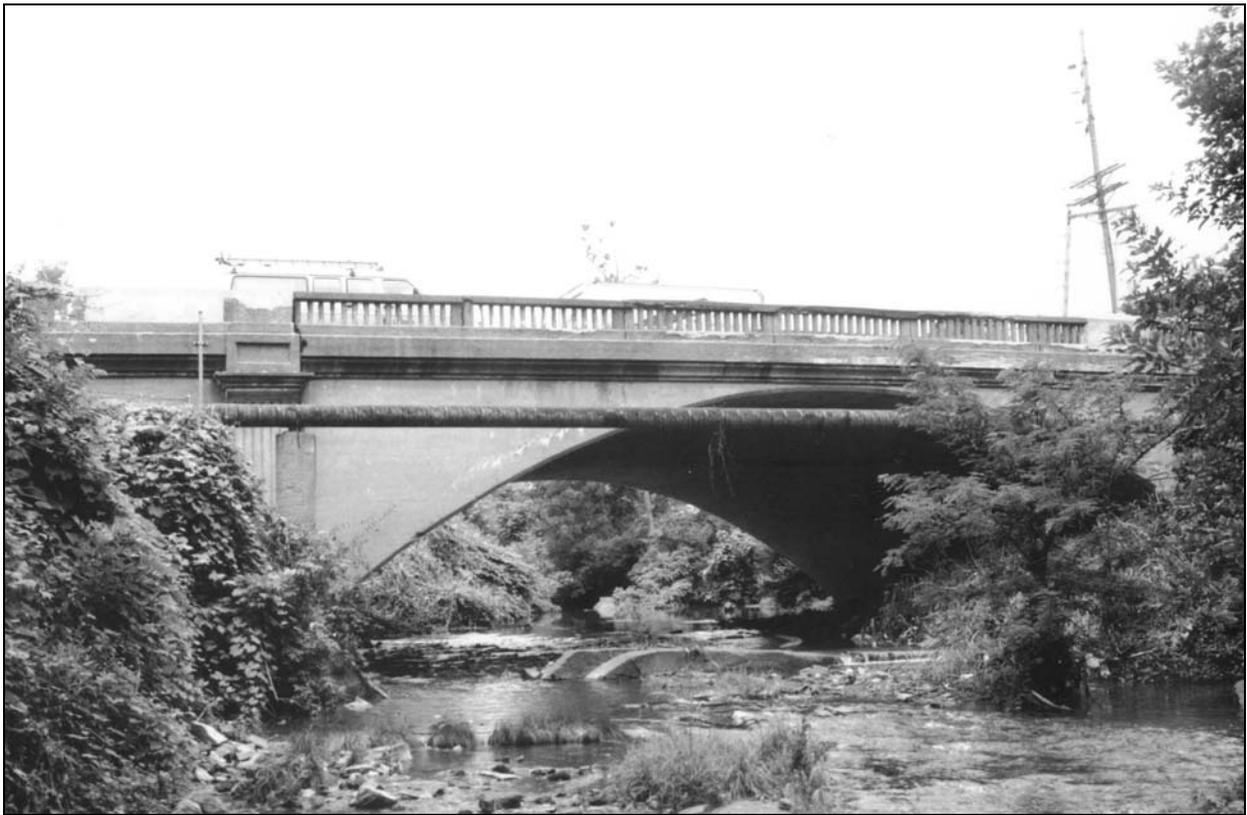


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# Documentation of the Historic Deer Creek Bridge

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Bridge No. G-681R  
St. Louis County, Route 100



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**Deer Creek Bridge**  
Bridge No. G-681R  
St. Louis County, Route 100

David C. Austin, Historian  
May 2007

## **Historical Narrative**

The Deer Creek Bridge (Bridge No. G-681R) spans Deer Creek at Missouri Route 100 west of Hanley Road in Brentwood, St. Louis County. The bridge is a single-span, reinforced concrete, continuous ribbed, filled spandrel arch structure with reinforced concrete abutments and concrete balustrade guardrails. The bridge represents an early example of filled spandrel arch construction employed by the Missouri State Highway Department, although it underwent two construction episodes. Originally built in 1925, the Deer Creek Bridge was substantially reconstructed in 1930 to widen the roadway.

Present Route 100 in St. Louis County had its beginnings in the early nineteenth century as Manchester Road, a part of the first state road between St. Louis and the Missouri capitol, Jefferson City. Known sequentially as Rue Bon Homme, Market Street Road, and finally Manchester Road, it became one of Missouri's major overland routes leading west from St. Louis.<sup>1</sup> Manchester Road crossed Deer Creek at the existing bridge site. St. Louis County erected at an undetermined date a 120' span of an unknown bridge type located about 60' south (downstream) from Bridge No. G-681R. Following the establishment of the Missouri State Highway Department in 1913 and the subsequent Centennial Road Law in 1921, a state-wide highway network began to develop in the 1920s that included cross-state highways and inter-connecting routes between county seats. The highway department designated State Route 14 as a cross-state highway linking St. Louis and Joplin, Missouri. In St. Louis County, Route 14 followed the old Manchester Road.<sup>2</sup>

In 1922-1923, the highway department prepared the plans and profile sheets for the proposed Route 14 across St. Louis County. Section 85 of Route 14 which included the Deer Creek Bridge involved the first 1.4 miles of the highway west of the St. Louis City limits. The highway department's bridge division prepared the drawings for the new bridge at Deer Creek. Those plans for Bridge No. G-681 are dated to August and November 1923. Bridge Engineer Chester D. Mann signed and submitted the bridge drawings to Chief Engineer B. H. Piepmeier

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<sup>1</sup> H. G. Hertlich, "History of Roads, Pioneer Settlers and Early Communities of St. Louis County," (special supplemental booklet), Watchman Advocate, Clayton, Missouri. State Historical Society of Missouri, Columbia.

<sup>2</sup> Missouri State Highway Commission, *Third Biennial Report of the State Highway Commission of Missouri for the Period Ending December 1, 1922* (Jefferson City: Hugh Stephens Company, Printers), 78; Missouri State Highway Commission, "Plan and Profile of Proposed State Road, St. Louis County," Route 14, Section 85, 1923. Microfiche. Design Division, Missouri Department of Transportation, Jefferson City.

who then affixed his signature for approval.<sup>3</sup> Chester Mann was the first Bridge Engineer of the Missouri State Highway Department, having assumed his duties in 1917. His Bureau of Bridges focused on the production of standardized drawings of bridges and culverts, and the designs of individual bridge structures. During 1923, the Bureau of Bridges finished a new series of culvert standards and completed designs for 405 bridges, predominantly reinforced concrete structures such as the Deer Creek Bridge. Mann left the Missouri State Highway Department at the end of 1923.<sup>4</sup> Chief Engineer B. H. Piepmeier, a Missouri native, received a civil engineering degree from the University of Missouri. He held a variety of engineering positions at the Illinois State Highway Department from 1908 until 1922, when he became Chief Engineer of the Missouri State Highway Department. Piepmeier oversaw the initial development of the state highway system and the expansion of the fledgling state highway department while administering a confusing array of state and federal transportation funds.<sup>5</sup>

Bridge No. G-681 at Deer Creek was completed in 1925, as were the adjoining sections of Route 14 that consisted of a graded earth road 30' wide covered with a 21'-wide rock aggregate driving surface. E. C. Johnson of Carrollton, Missouri, received the contract to erect the bridge for \$18,134. Other records specific to the construction project are lacking.<sup>6</sup>

The Deer Creek Bridge originally consisted of one 70', reinforced concrete, filled spandrel arch span carried on two end abutments each 30'-6" long, for a total span length of 131'. The original roadway width across the arch span was 20' and widened to 22' on the end abutments. Concrete balustrades flanked the bridge floor along the length of the structure. The highway department based the design of Bridge No. G-681 on another similar bridge, Bridge No. F-152, located in Platte County.<sup>7</sup>

The two similar end abutments each had spandrel walls enclosing the arch buttresses, and rear wing wall extensions. As finished, the rectangular footing at the east abutment measured 15'-9" x 25'-6" x 3'. The footing at the west abutment measured 16'-10" x 25'-6" x 3'. The footings were carried 6" or more into solid bedrock. Four arch buttresses within each abutment were tied into the footings with 7/8"-diameter reinforcing bars. Each buttress measured 3' wide and extended the length of the abutment, and were keyed into the footings in slots 2' wide and 6"

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<sup>3</sup> *Ibid.*; Missouri State Highway Department, "Bridge Over Branch of River Des Peres, State Road Manchester Road, About 1 mi. from Maplewood, Project No. R14-S85, St. Louis County." Bridge No. G-681 design plans [two sheets]. Microfiche. Bridge Division, Missouri Department of Transportation, Jefferson City.

<sup>4</sup> Missouri State Highway Board, *Report of the State Highway Board of Missouri for the Period Ending December 1, 1918* (Jefferson City: Hugh Stephens Company, Printers); Missouri State Highway Commission, *Annual Report of the State Highway Commission of Missouri to Governor Arthur Hyde for the Period Ending December 31, 1923* (Jefferson City: Hugh Stephens Company, Printers), 75.

<sup>5</sup> Missouri State Highway Commission, *Third Biennial Report of the State Highway Commission of Missouri for the Period Ending December 1, 1922* (Jefferson City: Hugh Stephens Company, Printers), *passim*.

<sup>6</sup> Clayton B. Fraser, "Inventory Data Sheet, Deer Creek Bridge, STLO02," Missouri Historic Bridge Inventory, 5 Vols., Missouri Department of Transportation, Project No. NBIH (6) (Loveland, Colorado: Fraserdesign, Inc., 1996).

<sup>7</sup> Missouri State Highway Department, "Bridge Over Branch of River Des Peres."

deep. The buttresses emerged from the abutment face at the arch springing line elevation of 16.08'. The surrounding spandrel walls were 6" thick and approximately 25' high from the base of the footing, built up to the 34'-elevation of the roadway crown. The face of the abutment measured 25'-6" across. The rear wing wall extensions were built on stepped footings above the arch buttress footings, over 9' higher at the east abutment and over 12' higher at the west abutment. As designed, they measured 16' long and 1'-6" thick.

The elliptical arch ring intrados was built to a theoretical radius of 50', and had a vertical thickness at the crown of 1'-4". The rise measured 16' high from the arch springing line to the crown intrados, and 18'-6" high from the finished ground line. The arch barrel, or continuous rib, measured 22'-6" across, with spandrel walls 1' thick reinforced with spandrel tie beams. Approximately 312 cubic yards of earth fill were placed on the arch barrel between the spandrel walls to support the roadway. It initially had a rock aggregate surface. Standard concrete curbs and balustrades ran along the length of the bridge, ending in square endposts. The bridge had little if any decorative embellishments. In tandem with the bridge construction, two channels of Deer Creek were reconfigured to flow as one stream underneath the center of the structure.<sup>8</sup>

Soon after the completion of the Deer Creek Bridge, in late 1925 the formal adoption of federal interstate highway routes and numbers changed Missouri Route 14 to U.S. Route 50, a coast-to-coast highway that in Missouri stretched between St. Louis and Kansas City. The highway department also used Route 50 (Manchester Road) in St. Louis County to carry traffic on U.S. Route 66. That highway was fast becoming a major cross-country route, as Chief Engineer Piepmeier had recognized by February 1926: "In my judgment this [Route 66] is one of the biggest highways in the country. There is more travel between Los Angeles and Chicago, or in that vicinity, than any other transcontinental route . . . ." As a part of the major east-west traffic corridor through St. Louis County, Route 50/66 and the Deer Creek Bridge soon became obsolete. As originally built in 1924, most of the highway had a two-lane concrete pavement only 18' wide. It as well as other major routes quickly proved inadequate as highway traffic dramatically increased through the 1920s.<sup>9</sup>

In early 1930, therefore, the highway department's Bureau of Bridges prepared detailed construction drawings for the planned widening of Bridge G-681. The reconstruction of the bridge was part of a larger project to widen U.S. Route 50 to 40' for two miles west of the St. Louis city limits. The bridge drawings are dated to March and April 1930. Bridge Engineer Norman R. Sack signed and submitted the drawings to Chief Engineer T. H. Cutler in May 1930. The actual construction of the project, likely begun sometime in 1930, was completed in 1931. (Again, no other existing files relate to the bridge reconstruction project). The reconstruction of the Deer Creek Bridge essentially involved building around the existing filled spandrel arch in order to widen the roadway to 56'. It entailed the extensions of the two abutments, the widening

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<sup>8</sup> *Ibid.*; Missouri State Highway Commission, "Plan and Profile of Proposed State Road, St. Louis County," 1923.

<sup>9</sup> James R. Powell, "The Birthplace of Route US 66," *Show Me Route 66* 22 (1) (Spring 1997), 19; Jay Nies and Tim Walsh, "The Original," *Show Me Route 66* 8 (4) (Winter 1996), 11; State Highway Planning Survey, Special Report on Missouri State Highway Needs (Jefferson City: Midland Printing Company), 12.

of the arch barrel, the addition of two 5'-wide outer sidewalks, new concrete balustrades, and the inclusion of decorative, fluted pilasters framing the arch span.<sup>10</sup>

Each of the two extended abutments added another four arch buttresses to the north (upstream) side of the span. The reconstruction also extended the abutments to the south to widen the roadway and accommodate a sidewalk on that side. Altogether, the faces of the extended abutments measured 66'-6" across compared to the earlier 25'-6" width. The new construction featured 4'-wide fluted pilasters with flared crowns, placed on the sides of the abutments to border the arch span. The pilaster element had become a common decorative embellishment to the highway department's concrete arch bridges. The arch barrel was extended from a width of 22'-6" to 66', but otherwise carried the same lines as the original arch. The arch span remained 70' long, and retained the same rise of 16' as the original bridge. The bridge required an estimated 2,180 cubic yards of fill placed over the arch barrel and within the abutments to serve as the base for the concrete roadway pavement. The overall bridge length remained at 131'. Curbed sidewalks 5' wide were built 7" above the roadway. Concrete balustrades consisted of posts placed at each end of the abutments, with evenly spaced balusters between subposts, and beveled handrails. Overall, the bridge exhibited a balanced, symmetrical appearance in the side elevations. Because of the modifications to the original design, the bridge number for the Deer Creek Bridge became G-681R.<sup>11</sup>

As built in its original form, the Deer Creek Bridge with its 70' span was a modest example of a continuous ribbed, filled spandrel arch bridge built by the Missouri State Highway Department. In its later reconstruction, however, the bridge rivaled others of its type in the width of its arch barrel of 66'. In 1919, the department's Bureau of Bridges under Chester Mann prepared standard plans for concrete arch bridges that featured elliptical arch profiles. Many of the filled spandrel arch bridges that followed were single spans of 60' or less, and appeared in both urban and rural settings. Among the earliest examples were a group of three single-span structures, each 40' long, constructed along Route 21 in Iron County in 1922. Other filled spandrel arch bridges were longer, multiple-span structures. In 1922, the bridge bureau completed a design for a three-span bridge in Saline County featuring a central span of 90' flanked by two 60' spans. Several other larger examples followed in 1923. The Current River Bridge on Route 19 in Shannon County had three 130' spans and two 60' end spans, for a total length of 602'. The 130' span length exceeded Missouri's other filled spandrel arch structures. A filled spandrel arch bridge on Route 5 in Ozark County begun in 1925 had three 80' spans. Completed in 1926, the Meramec River Bridge in Crawford County, also on Route 19, surpassed all others in total length at 640', with five 110' spans and two 35' end abutments. At about that time, the use of filled spandrel arch bridges fell out of favor, particularly those with multiple spans. One late example dated to 1934 was comparatively short with three 37' spans. In 1925,

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<sup>10</sup> Missouri State Highway Department, "Bridge Over Deer Creek, State Road From Gray Summit to St. Louis, About 1.75 Miles N.W. of Maplewood, Project No. U.S. 50-S83, St. Louis County." Bridge No. G-681-R design plans [five sheets], 1930. Microfiche. Bridge Division, Missouri Department of Transportation, Jefferson City; Missouri State Highway Commission, "Plan and Profile of Proposed State Road, Federal Aid Project, St. Louis County," Route 50, Section 83, 1929. Microfiche. Design Division, Missouri Department of Transportation, Jefferson City.

<sup>11</sup> Missouri State Highway Department, "Bridge Over Deer Creek," 1930.

the Missouri State Highway Department began designing multiple-ribbed, open spandrel arch bridges because of their more economical use of reinforced concrete. The 1930-1931 reconfiguration of the Deer Creek Bridge represents a relatively late example of filled spandrel arch construction. Likely it was the most cost-effective approach to add on to the fairly new, existing bridge, rather than to remove it altogether and erect a totally different span.<sup>12</sup>

The Deer Creek Bridge carried both Route 50 and Route 66 traffic until 1933, when the highway department completed a new southern route for Route 66 between St. Louis and Gray Summit, Franklin County.<sup>13</sup> For the next twenty years the Deer Creek Bridge remained a part of U.S. Route 50. In April 1953, representatives of the Missouri Highway 50 Association met with the Missouri State Highway Commission. The Highway 50 Association encouraged the Commission to develop roadside parks and other improvements along the route, but then inquired about the possible rerouting of Route 50 between St. Louis and Gray Summit. According to the Association, many travelers using Route 50 complained of its crooked and hilly course through St. Louis County. The Highway Commission instructed Chief Engineer Rex M. Whitton to study the feasibility of relocating Route 50 within the St. Louis area. Whitton reported back to the Commission in February 1954, and citing an internal department study recommended that Route 50 follow Route 66 from the MacArthur Bridge at the Mississippi River to Gray Summit. Whitton noted that Route 66 was a more modern highway compared to Route 50, and that Route 66 would be expanded to four lanes in the near future. He also observed that Route 66 was about two miles shorter and ten to twenty minutes faster than Route 50. The Commission concurred with Whitton's recommendation. He would first seek consent from the American Association of State Highway Officials before formally relocating that stretch of U.S. Route 50.<sup>14</sup>

Following the relocation of Route 50, in October 1954 Chief Engineer Whitton recommended to the Highway Commission to extend State Route 100 from Gray Summit "over old Route 50" through Manchester and St. Louis to the MacArthur Bridge. Route 100 was a secondary state highway running easterly from Hermann through Washington to Route 66 near Gray Summit.<sup>15</sup> The Deer Creek Bridge has since been a part of Route 100 and remains essentially unaltered from its completion in 1931, other than the installation of a raised concrete center median. Proposed modifications to the bridge planned for 2007 will remove the concrete median, sidewalks and balustrades and install new curbs and three-beam guardrails to provide for an additional left-turn lane.

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<sup>12</sup> David C. Austin, "Meramec River Bridge Spanning the Meramec River at Missouri State Route 19, Steelville vicinity, Crawford County, Missouri, HAER No. MO-109," Historic American Engineering Record, National Park Service, Washington, D.C., 1999, 7-8.

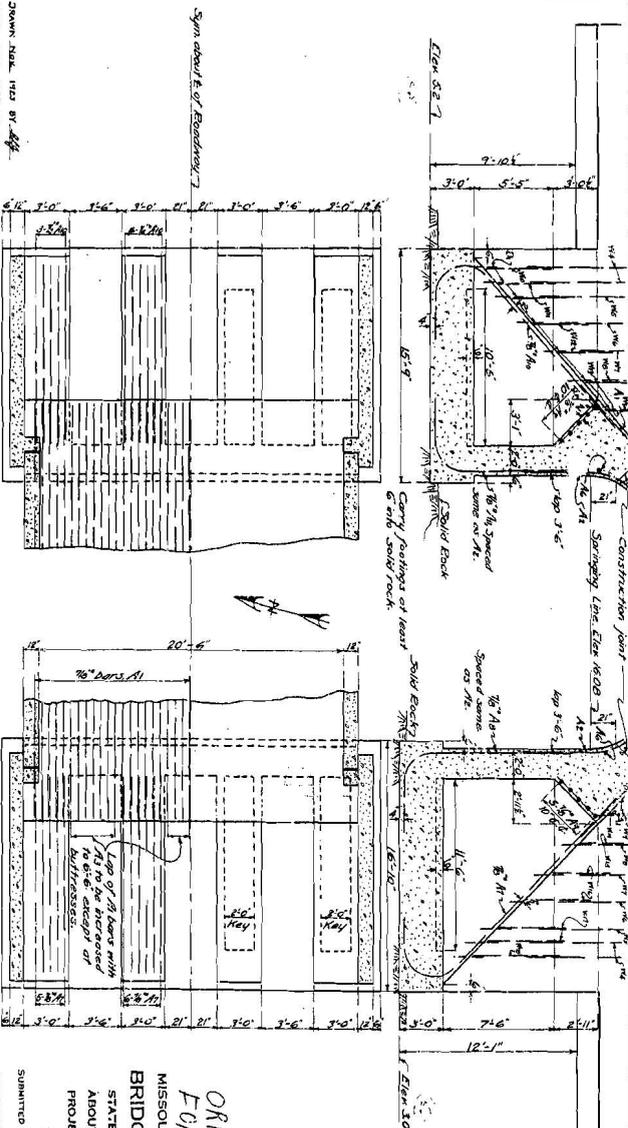
<sup>13</sup> Nies and Walsh, "The Original," 11.

<sup>14</sup> "Delegation Requesting Revision of U.S. Route 50 Marking in St. Louis and Franklin Counties," April 14, 1953; "Change of U.S. Route 50 Marking," February 8, 1954, in Minutes of Proceedings of Missouri State Highway Commission, 1919-present, Secretary's Office, Missouri State Highway Commission, Jefferson City, Missouri.

<sup>15</sup> "Approval of Route Marking Changes," October 12, 1954, Minutes of Proceedings, 4.



Drawn from 1923 by *W. H. ...*  
 CORR. NOV. 1923 BY *J. L. ...*



MISSOURI STATE HIGHWAY DEPARTMENT  
 BRIDGE OVER BRANCH OF RIVER DES PERES  
 STATE ROAD MANCHESTER ROAD  
 ABOUT 1.1 M. E. FROM MAPLEWOOD  
 PROJECT NO. R14-S65 STA. 31+05  
 ST. LOUIS COUNTY

ORIGINAL PLANS  
 FOR REFERENCE ONLY

De-lect from Estimated quantities shown on sheet G6681; 2400 LAMP Poles, 2400 concrete. All of above quantities in this amount.

NO.	DESCRIPTION	QUANTITY	UNIT	EST. PRICE	TOTAL
1	Concrete	11.3	cu. yd.	6.80	76.84
2	Reinforcing Steel	178.5	lbs.	202.00	35,757.00
3	Iron	206.00	lbs.	202.00	41,612.00
4	Steel	600	lbs.	202.00	121,200.00
5	Wood	570.15	cu. ft.	5.00	2,850.75
6	Paint	1.0	gal.	1.00	1.00
7	Other	1.0	unit	1.00	1.00
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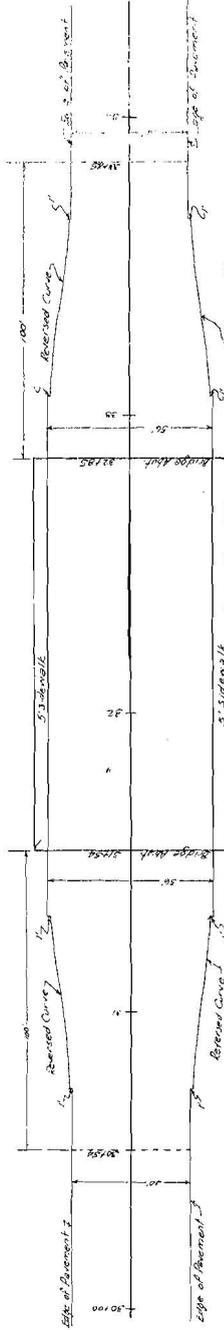
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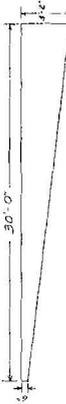
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BY	J. W. [unclear]	NO.	50183

DETAIL OF WIDENING AT BRIDGE AT STA 31+85

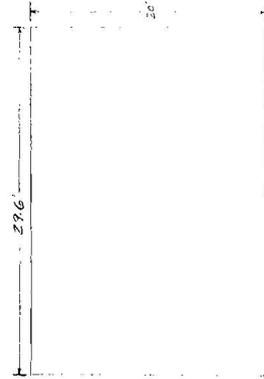


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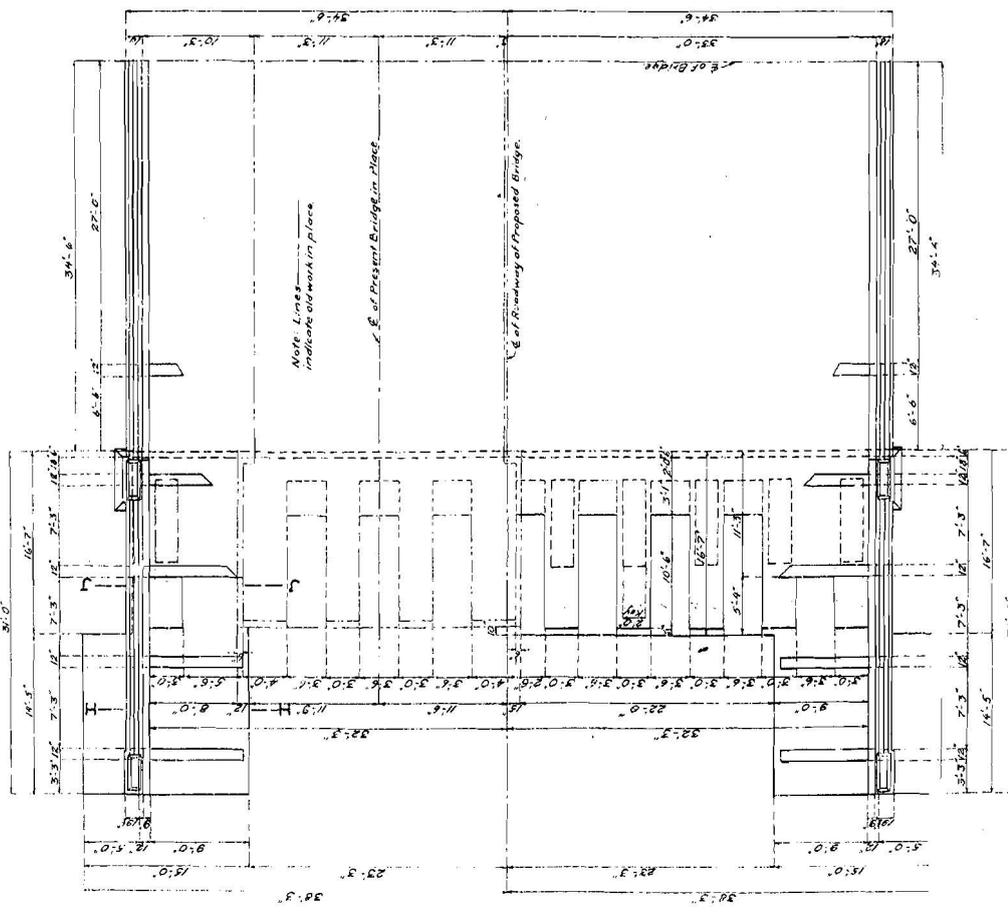
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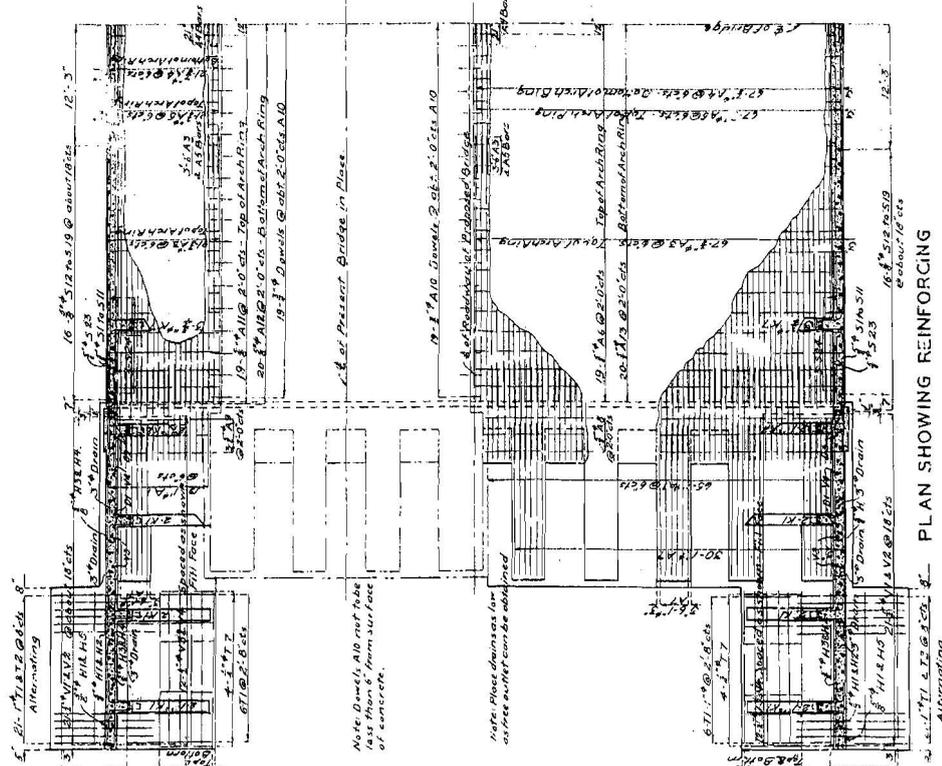
MISSOURI STATE HIGHWAY DEPARTMENT

PROJ. ROAD DIST. NO.	STATE	DATE	SCALE	SHEET	TOTAL SHEETS
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PLAN SHOWING DIMENSIONS

DETAILS OF ABUTMENT NO. 1



PLAN SHOWING REINFORCING

BRIDGE OVER DEER CREEK  
 STATE ROAD FROM GRAY SUMMIT TO ST. LOUIS  
 ABOUT 1.75 MILES N.W. OF MAPLEWOOD  
 PROJECT NO. U.S. 50-593 STA. 31+85  
 COUNTY ST. LOUIS

Drawn March 1930 by R. A. B.  
 Revised March 1936 by H. L. U.  
 Checked April 1936 by H. L. U.

Sheet No. 2 of 5

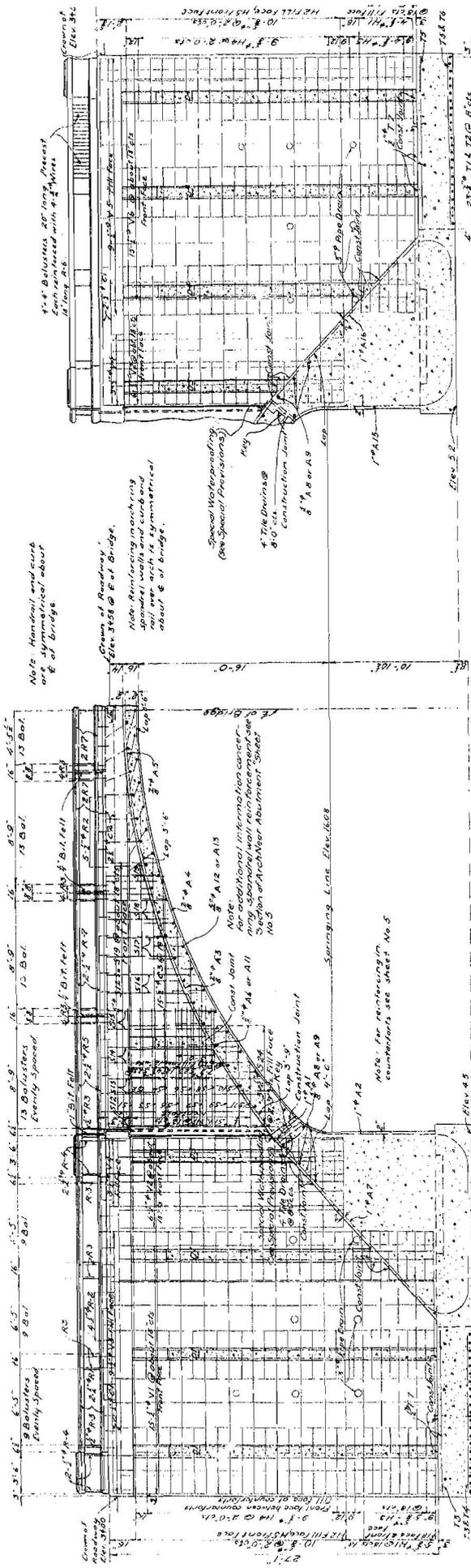
C 684R

1691



DES. NO.	DATE	BY	CHKD.	TOTAL SHEETS	TOTAL
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100	1/25/35	H. E. W.	H. E. W.	15	15

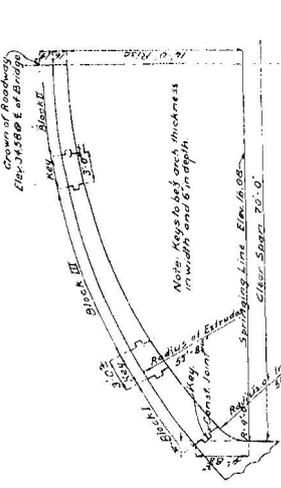
MISSOURI STATE HIGHWAY DEPARTMENT



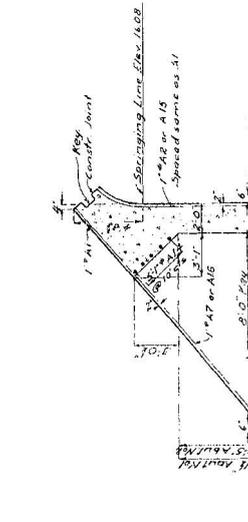
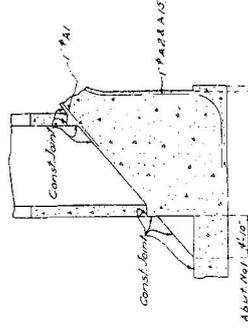
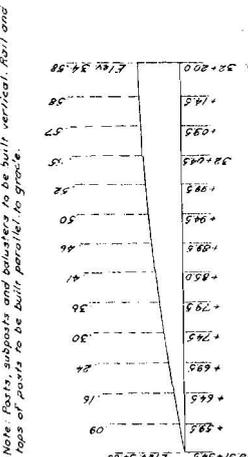
ABUTMENT NO. 2

PART SECTION A - A SHOWING REINFORCING

ABUTMENT NO. 1



SKETCH SHOWING ELEVATION AT C OF ROADWAY



BRIDGE OVER DEER CREEK  
 STATE ROAD FROM GRAY SUMMIT TO ST. LOUIS  
 ABOUT 1.75 MILES N.W. OF MAPLEWOOD  
 PROJECT NO. U.S. 50-583 STA. 3+495  
 ST. LOUIS COUNTY  
 DESIGNED BY: H. E. WILSON  
 CHECKED BY: J. W. BROWN

SECTION B-B  
 SHOWING REINFORCING  
 IN ABUTMENTS

Drawn March 1930 by P. A. B.  
 Traced April 1930 by H. F. U.  
 Checked April 1930 by J. W. B.

170



**Deer Creek Bridge**  
Bridge No. G-681R  
St. Louis County, Route 100

Randall Dawdy, Photographer

**Index to Photographs:**

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4. Bridge No. G-681R. Northwest pilaster. View to south.
5. Bridge No. G-681R. North profile. View to southwest.
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17. Bridge No. G-681R. Sub-arch. View to northwest.
18. Bridge No. G-681R. South profile. View to north.

Photograph 1



Photograph 2



Photograph 3



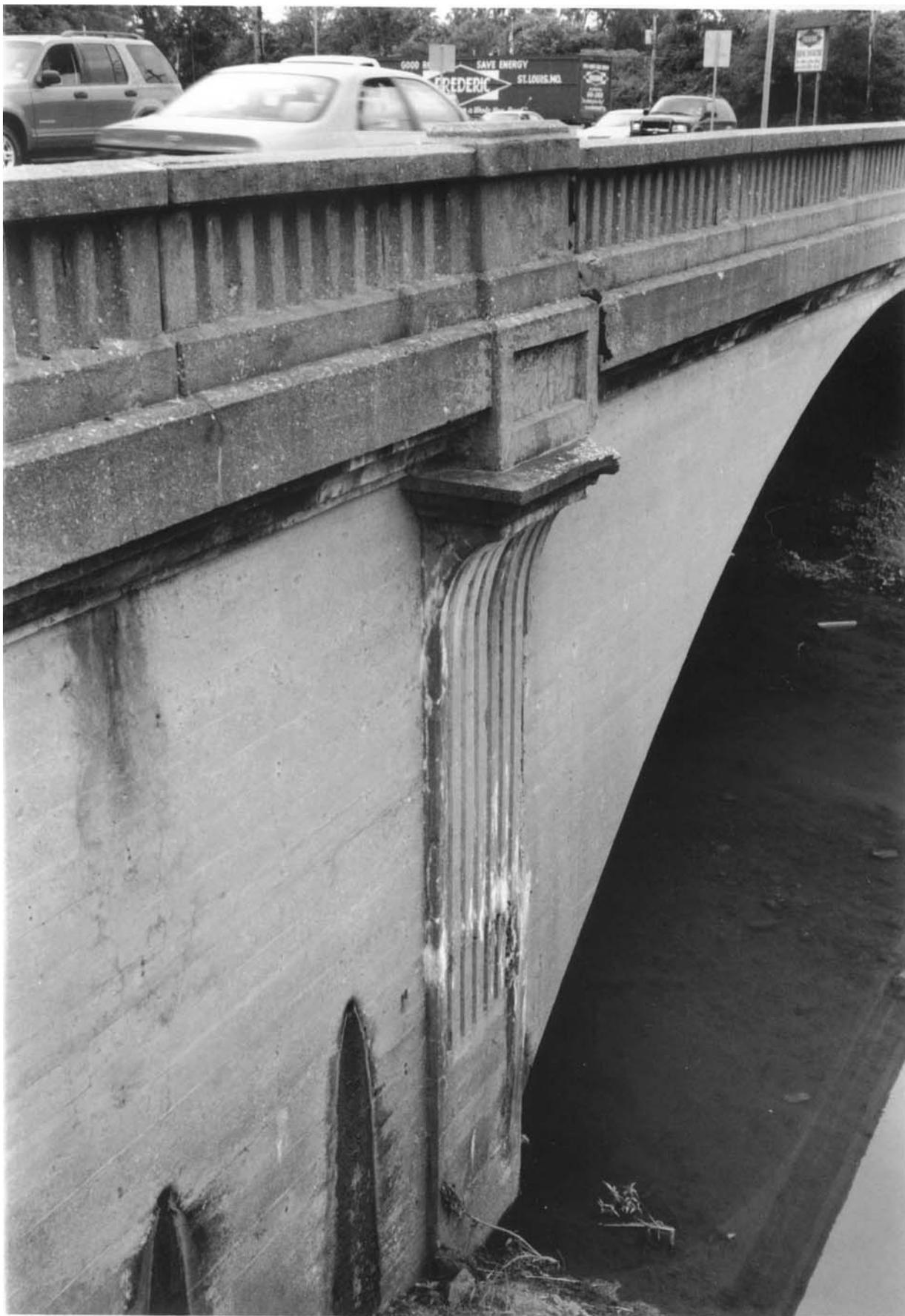
Photograph 4



Photograph 5



Photograph 6



Photograph 7



Photograph 8



Photograph 9



Photograph 10

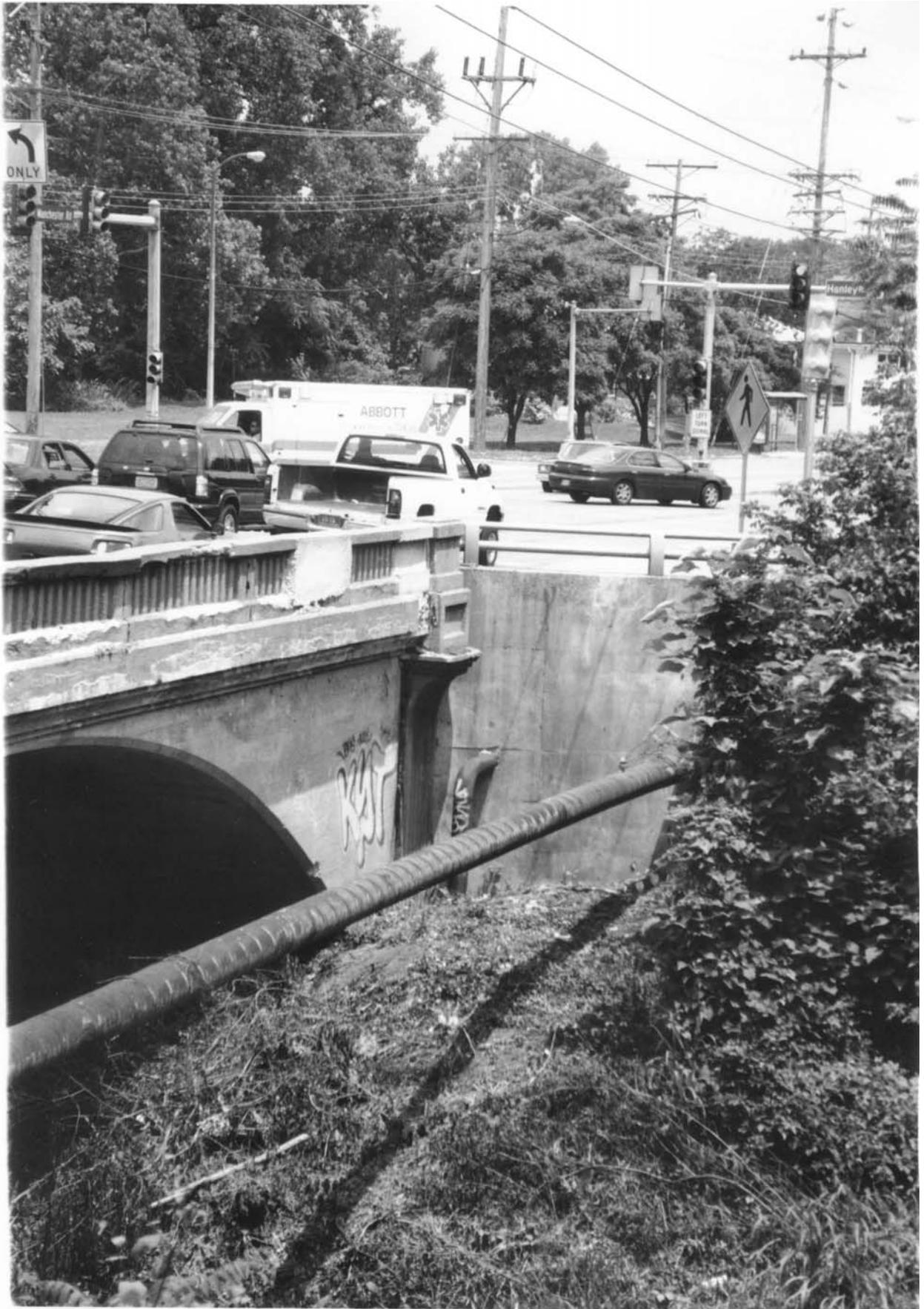


Photograph 11



Photograph 12



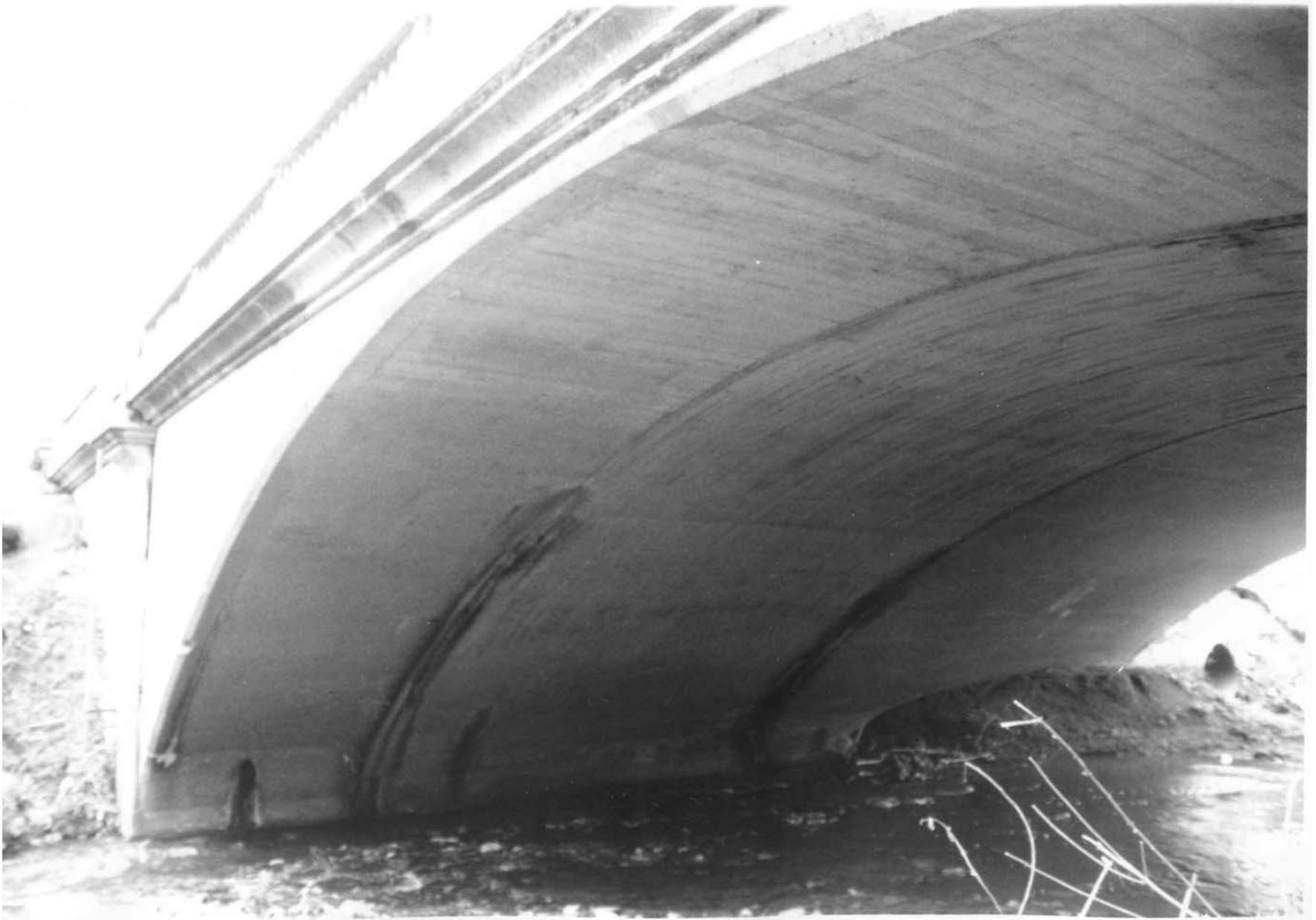








Photograph 17



Photograph 18

