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A Management Plan for Historic Bridges in Virginia: Update / Scoping Phase

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Final Report VCTIR 14-R9

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<p>The <i>Management Plan for Historic Bridges in Virginia</i>, completed in 2001 (hereinafter the 2001 Management Plan), identified the management and treatment needs for 54 bridges in Virginia that were individually eligible for or listed on the National Register of Historic Places and were under state purview. The 2001 Management Plan included a recommendation that the plan be reviewed and updated approximately every 10 years. An update to the 2001 Management Plan (and periodic updates thereafter) will be required by a pending programmatic agreement regarding the management of cultural resources, including bridges, in Virginia. The signatories of this agreement will include the Virginia Department of Transportation, the Federal Highway Administration, the U.S. Army Corps of Engineers, the Tennessee Valley Authority, the Federal Emergency Management Agency, the Advisory Council on Historic Preservation, and the Virginia State Historic Preservation Officer.</p>			
<p>The current project was the scoping phase of the larger, formal update and entailed collecting information on the current status of the 54 bridges, including any major changes to the bridges since the publication of the 2001 Management Plan. Changes included major maintenance; rehabilitation work; damage; deterioration; and in a few cases, dismantling or demolition of the structure. Of the 54 bridges listed in the 2001 Management Plan, 37 underwent rehabilitation or repair; 1 was severely damaged by flooding and its remaining structure was stabilized, but treatment options are still being explored; 1 was dismantled and stored; and 3 were demolished in accordance with the recommended treatment (demolition following documentation) in the 2001 Management Plan. Although no work on the remaining 12 bridges was recorded, several had undergone rehabilitation before 2000. In the cases of bridges for which work was done, nearly all work was in accordance with the recommendations in the 2001 Management Plan.</p>			
<p>Having the updated information regarding the 54 bridges in the 2001 Management Plan in hand will facilitate the next phase of this work: the formal update of the 2001 Management Plan for these bridges. It is anticipated that the formal update will include enhanced maintenance recommendations as well as updated general management recommendations for these bridges. The current status information provided in this report will allow the update of the 2001 Management Plan to proceed in a timely, efficient fashion.</p>			
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FINAL REPORT

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In Cooperation with the U.S. Department of Transportation
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(A partnership of the Virginia Department of Transportation
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ABSTRACT

The *Management Plan for Historic Bridges in Virginia*, completed in 2001 (hereinafter the 2001 Management Plan), identified the management and treatment needs for 54 bridges in Virginia that were individually eligible for or listed on the National Register of Historic Places and were under state purview. The 2001 Management Plan included a recommendation that the plan be reviewed and updated approximately every 10 years. An update to the 2001 Management Plan (and periodic updates thereafter) will be required by a pending programmatic agreement regarding the management of cultural resources, including bridges, in Virginia. The signatories of this agreement will include the Virginia Department of Transportation, the Federal Highway Administration, the U.S. Army Corps of Engineers, the Tennessee Valley Authority, the Federal Emergency Management Agency, the Advisory Council on Historic Preservation, and the Virginia State Historic Preservation Officer.

The current project was the scoping phase of the larger, formal update and entailed collecting information on the current status of the 54 bridges, including any major changes to the bridges since the publication of the 2001 Management Plan. Changes included major maintenance; rehabilitation work; damage; deterioration; and in a few cases, dismantling or demolition of the structure. Of the 54 bridges listed in the 2001 Management Plan, 37 underwent rehabilitation or repair; 1 was severely damaged by flooding and its remaining structure was stabilized, but treatment options are still being explored; 1 was dismantled and stored; and 3 were demolished in accordance with the recommended treatment (demolition following documentation) in the 2001 Management Plan. Although no work on the remaining 12 bridges was recorded, several had undergone rehabilitation before 2000. In the cases of bridges for which work was done, nearly all work was in accordance with the recommendations in the 2001 Management Plan.

Having the updated information regarding the 54 bridges in the 2001 Management Plan in hand will facilitate the next phase of this work: the formal update of the 2001 Management Plan for these bridges. It is anticipated that the formal update will include enhanced maintenance recommendations as well as updated general management recommendations for these bridges. The current status information provided in this report will allow the update of the 2001 Management Plan to proceed in a timely, efficient fashion.

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INTRODUCTION

The *Management Plan for Historic Bridges in Virginia*, completed in 2001 (hereinafter the 2001 Management Plan) (Miller et al., 2001), identified the management and treatment needs for 54 bridges in Virginia that were individually eligible for, or listed on, the National Register of Historic Places and were under state purview. This plan was acknowledged by the historic bridge preservation and bridge engineering communities as one of the most effective such plans in the United States. When the plan was completed and implemented, it included recommendations that it be reviewed and updated approximately every 10 years.

The 2001 Management Plan was undertaken at the request of the Virginia Department of Transportation (VDOT) State Structure and Bridge Engineer to serve as a management tool for bridges under VDOT's purview that were eligible for, or listed on, the National Register of Historic Places. It was produced by the Virginia Transportation Research Council, now the Virginia Center for Transportation Innovation and Research (VCTIR), in concert with VDOT's central office and district structure and bridge engineers and the Virginia Historic Structures Task Group (the interagency group that advises on questions of historic significance and management of transportation-related structures under VDOT's purview). However, the upcoming update will involve a much more complex context: an update of the original 2001 plan (and periodic updates thereafter) will be required by a pending programmatic agreement regarding the management of cultural resources, including bridges, in Virginia. The signatories of this agreement will include VDOT, the Federal Highway Administration, the U.S. Army Corps of Engineers, the Tennessee Valley Authority, the Federal Emergency Management Agency, the Advisory Council on Historic Preservation, and the Virginia State Historic Preservation Officer.

The current project is the scoping phase of the larger, formal update and entailed the collection of information on the current status of the 54 bridges, including any major changes since the publication of the 2001 Management Plan. Such changes include major maintenance; rehabilitation work; damage; deterioration; and in a few cases, dismantling or demolition of the structure. Having the updated information on these bridges in hand will help VCTIR, along with VDOT structure and bridge engineers and the Virginia Historic Structures Task Group, to begin and proceed with the next phase of this work: the formal update of the plan. It is anticipated that

the update will contain enhanced maintenance recommendations for the bridges as well as updated general management recommendations. Thus, having the current status information already collected will prevent delays in gathering this information and will allow the update of the 2001 Management Plan to proceed in a timely, efficient fashion.

PURPOSE AND SCOPE

The purpose of this project was to collect information on the current status of the 54 bridges covered in the 2001 Management Plan (Miller et al., 2001). This includes any significant changes in condition, any changes with regard to listing on the National Register, and any significant work done on these structures since the completion of the 2001 Management Plan. The information gathered formed the basis of this report, which notes the current status of these structures. These data will be used to identify the bridges to be included in and will aid in determining the final scope of the updated management plan for these bridges.

METHODS

Two tasks were carried out to achieve the project objectives.

1. *Collect information on the current status of each of the 54 bridges noted in the 2001 Management Plan (Miller et al., 2001).* VDOT district and central office structure and bridge offices were contacted via e-mail for this information. District structure and bridge engineers were queried as to the current status of the bridges in the 2001 Management Plan within their particular district. The current status included any significant changes in condition, any significant work (repairs or rehabilitation) done on these structures since the completion of the 2001 Management Plan, and any changes with regard to listing on the National Register.
2. *Identify any changes to the bridges since the publication of the 2001 Management Plan and determine whether the changes were in accordance with the recommendations for the bridges in the 2001 Management Plan.* The information on bridge status that was received from the VDOT structure and bridge offices was compared with the recommendations for the bridges in the 2001 Management Plan to identify which recommendations had been followed.

RESULTS

Current Status of Bridges

In the 10-plus years since the 2001 Management Plan (Miller et al., 2001) was completed, 37 of the 54 bridges were repaired or rehabilitated, 3 were closed to public access,

3 were demolished, 1 was badly damaged by flooding, and 1 was dismantled and stored. For 6 bridges that were previously considered eligible for the National Register, formal National Register forms were completed and the bridges were placed on the National Register. One structure previously listed on the National Register was designated a National Historic Landmark. Detailed information is provided in the Appendix.

Changes to Bridges and Whether the Changes Followed Recommendations in the 2001 Management Plan

The Appendix provides the details concerning changes to the bridges. Changes to a bridge are briefly described, and how these changes relate to / accord with the recommendations made in the 2001 Management Plan (Miller et al., 2001) regarding the bridge is noted. If no changes were made to a bridge (generally, if no bridge work was recorded since 2000), this information is also noted.

SUMMARY OF RESULTS

Based on the information gathered during this study, the current status and changes made to the 54 bridges included in the 2001 Management Plan (Miller et al., 2001) are as follows.

- Three bridges, City of Danville Structure No. 8006, Grayson County Structure No. 1007, and Page County Structure No. 1004, were demolished. In all three cases, demolition was in accordance with the recommended treatment (i.e., demolition following documentation) in the 2001 Management Plan.
- One bridge, Augusta County Structure No. 6081, was dismantled and stored. This was in accordance with the recommended treatment in the 2001 Management Plan.
- One bridge, the ca. 1823 Falling Creek Bridge at the Falling Creek Wayside in Chesterfield County, was severely damaged by flooding in 2004. It was closed to public access. The remaining structure of the bridge was stabilized, but treatment options are still being explored.
- Three bridges, the ca. 1823 Falling Creek Bridge in Chesterfield County, Allegheny County Structure No. 9008 (formerly No. 6064), and Page County Structure No. 9001 (formerly 1990), were closed to all public access.
- Six bridges, Bland County Structure No. 9000, Appomattox County Structure No. 1002, Charlotte County Structure No. 6902, Highland County Structure No. 6034, Page County Structure No. 9001 (formerly No. 1990), and Loudoun County Structure No. 6088, were placed on the National Register.

- Thirty-seven bridges underwent some degree of rehabilitation or repair. Of these, 2 were subsequently closed to public access. Nearly all work was in accordance with the recommendations for each bridge in the 2001 Management Plan.
- For the remaining 12 bridges, no work was recorded since 2000. However, several of these structures had undergone some degree of rehabilitation prior to 2000.

RECOMMENDATION

1. *The Virginia Historic Structures Task Group should use the information collected during this study to document the current status of the 54 structures listed in the 2001 Management Plan (Miller et al., 2001) and to prepare for its next update.* Having this information in hand will allow the formal update portion of the management plan to begin and proceed in a timely fashion and will avoid the delays occasioned by first having to gather this information. It is anticipated that the update will include an enhanced maintenance component, and the information collected during this study also will provide information on maintenance activities undertaken since the preparation of the previous management plan.

COSTS AND BENEFITS ASSESSMENT

The primary benefit of following the recommendation in this study would be to enable timely production of the updated Management Plan for Historic Bridges in Virginia, which will be required by the pending programmatic agreement regarding cultural resources in Virginia. No further collection of information for the 54 bridges included in the 2001 Management Plan would be necessary before the initiation of the formal update of the plan.

ACKNOWLEDGMENTS

The updated information on the bridges in the 2001 Management Plan was provided by the staff of those VDOT district structure and bridge offices with historic bridges under their purview: Gary T. Lester (Bristol District), Dean W. Hackett (Salem District), Frank J. Lukanich III (Lynchburg District), Gary A. Martin and Thomas F. Lester (Richmond District), Teresa A. Gothard and Patrick D. Cooksey (Culpeper District), Rex L. Pearce, Park W. Thompson, Marc K. Stecker, and Robert W. Saufley, Jr. (Staunton District), and Nicholas J. Roper (Northern Virginia District). Without their cooperation, knowledge, and assistance, the collection of this information would have been much more time-consuming and difficult. Appreciation is also given to the members of the project's technical review panel: Amy A. O'Leary, G. Michael Fitch, and Michael C. Brown of VCTIR and Antony F. Opperman of VDOT's Environmental Division.

REFERENCE

Miller, A.B., Clark, K.M., and Grimes, M.C. *A Management Plan for Historic Bridges in Virginia.* VTRC 01-R11. Virginia Transportation Research Council, Charlottesville, 2001. http://www.virginiadot.org/vtrc/main/online_reports/pdf/01-r11.pdf. Accessed December 2, 2013.

APPENDIX

UPDATES TO HISTORIC BRIDGE STATUS INFORMATION SINCE 2000

[Note: The number in parentheses after the name of each VDOT district and Virginia county is the VDOT code for that district or county. The numbered recommendation(s) cited for particular bridges are keyed to the corresponding recommendations for that bridge in the 2001 Management Plan (Miller et al., 2001), which contained recommendations for each bridge. Where only “Recommended Treatment” is cited, that was the sole recommendation made for that bridge in the 2001 Management Plan.]

Bristol District (1)

Bland County (10)

Bland County No. 1021: (Concrete arch bridge); Spandrel braced arch with decorative elements, 1929, Rt. 98 crossing Crab Orchard Creek.

- The structure was repaired and maintenance was performed in 2004. Work was done to replace the deck between the sidewalks.
- This work was in partial accordance with Recommendation 1 in the 2001 Management Plan.

Bland County No. 9000: (Metal truss bridge); Pratt through truss (with Phoenix columns), ca. 1890, discontinued Rt. 61 crossing Wolf Creek.

- Work was done in 2007 to maintain the structure for non-vehicular use.
- The structure was placed on the Virginia Landmarks Register in 2010 and the National Register of Historic Places in 2011.
- Ownership was not transferred to Bland County, but otherwise this work was in partial accordance with Recommendations 1 and 2 in the 2001 Management Plan.

Grayson County (38)

Grayson County No. 1007: (Metal truss bridge); Polygonal top chord Warren truss, 1927, Rt. 94 crossing New River.

- The bridge was demolished in 2011.
- This work was in accordance with the Recommended Treatment in the 2001 Management Plan.

Wythe County (98)

Wythe County No. 6016: (Metal truss bridge); Pratt through truss (with Phoenix columns), ca. 1880s, Rt. 619 crossing Cripple Creek.

- No bridge work since 2000 has been recorded.
- The structure was rehabilitated shortly before the completion of the 2001 Management Plan.

Wythe County N/A (Southwest Turnpike Company Bridge): (Masonry arch bridge); 1850, off Rt. 11, crossing Reed Creek.

- No bridge work since 2000 has been recorded.

City of Bristol (102)

City of Bristol No. 1804: (Non-arched concrete bridge); Continuous frame, with decorative cast concrete rails and light posts; 1918, Mary St. crossing the Norfolk-Southern Railway.

- No bridge work since 2000 has been recorded.
- The posting was recently reduced to 5 tons.

Town of Marion (119)

Town of Marion No. 8003: (Metal truss bridge); Pratt through truss, 1885, E. Chilhowie St. crossing Middle Fork Holston River.

- Two major projects were initiated and completed since 2000. In 2005, the bridge underwent extensive renovations. Thompson & Litton, Inc., of Wise, Virginia, headed planning, design, and construction administration for renovations to the East Chilhowie Street Bridge. The town-led renovation was financed by a VDOT TEA-21 grant. The work included removing lead paint, reinforcing steel members with plates, and redirecting runoff to reduce corrosion. In 2011, additional work was done after the bridge was hit by a driver under the influence of alcohol in May 2009, resulting in torsion damage to the iron post that helped bear the weight of the bridge. The work was completed by Ken Construction Co. Inc., of Lebanon, Virginia, for an estimated cost of \$64,200.
- This work was in accordance with Recommendation 1 in the 2001 Management Plan.

Salem District (2)

Bedford County (9)

Bedford County No. 6087: (Metal truss bridge); Pratt deck truss, 1915 [*Note: This date is for the present steel truss only; the stone abutments date to ca. 1850 and originally supported a wooden trestle of the Virginia & Tennessee Railroad*], Rt. 666 crossing Elk Creek.

- In 2000, the bridge underwent major rehabilitation of the deck in which the timber floor was replaced with new 4 inch by 10 inch timbers and 5 inch by 6 inch wheel guards. The following year, 2001, eroded areas around Abutment B were repaired by a repair crew. In 2007, a VDOT bridge repair crew tightened loose deck timbers.
- This work was in accordance with Recommendation 1 in the 2001 Management Plan.

Botetourt County (11)

Botetourt County No. 6100: (Metal truss bridge); Warren (with verticals) deck truss (with Phoenix columns used for compression members), 1886 (re-erected 1902), Rt. 817 crossing Craig Creek.

- In 2005, two repairs were performed. First, the approach pavement for the bridge was repaired. Second, 12 of the decaying floor timbers were replaced with new timbers. In 2007, the deteriorating timber flooring was replaced with 5 inch by 10 inch timbers. In addition, the curbs were replaced with 4 inch by 6 inch timbers.
- This work was in partial accordance with Recommendation 1 in the 2001 Management Plan.

Botetourt County No. 6386: (Metal truss bridge); Pratt through truss (with Phoenix columns), with Warren deck truss approach, 1887, Rt. 685 crossing Craig Creek.

- In 2001, modifications were made to the bridge in which the upstream railing post at L3 (adjacent to the inside low chord) was torch notched to allow the lower chord to move unrestricted. In 2002, a 1-inch wearing surface and rubber deck sealer were applied. In 2008, the wearing surface and rubber sealer (60 square feet) were repaired.
- This work was in partial accordance with Recommendation 1 in the 2001 Management Plan.

City of Roanoke (128)

City of Roanoke No. 1815: (Concrete arch bridge); Open spandrel concrete rib arch with ramp and decorative elements, 1927, Rt. 116 crossing 3rd St. and Norfolk-Southern Railway.

- In 2009, the deck received a new overlay of latex-modified concrete. Areas of delaminated and spalled concrete at the pier columns were repaired. Expansion joints were replaced, and the abandoned staircase was removed. A new sidewalk was placed on the east approach at the entrance to the old Roanoke Iron & Bridge Works shops for an estimated cost of \$200,000.
- This work was in accordance with the Recommended Treatment in the 2001 Management Plan.

City of Roanoke No. 1826: (Concrete arch bridge); Open spandrel concrete rib arch with decorative elements, 1926, Rt. 11 crossing Roanoke River and Norfolk-Southern Railway.

- In 2000, support structures were installed under the first bay of the spandrel beam along the north arch of the third span. In 2002, all spandrel columns were replaced and repairs were made to the deck soffit, spandrel beams, piers, abutments, and arches. Deck drains were installed along the north side, and the joints were replaced. In 2003, because of the deteriorating state of the bridge attributable to corrosion caused by deicing salt, a major restoration of the bridge was undertaken. The major elements of the renovation included the removal of the Roanoke Street Railway Company streetcar tracks that were originally integrated into the roadbed of the bridge. The deteriorating pavement was resurfaced completely. Further, to calm traffic, the number of lanes was reduced from four to two. This permitted the addition of a median and a bicycle lane in both directions.
- This work was in accordance with the Recommended Treatment in the 2001 Management Plan.

City of Roanoke No. 8003: (Concrete arch bridge); Closed spandrel concrete arch with decorative elements, 1926, Jefferson St. crossing Norfolk-Southern Railway.

- In 2005, pedestrian railing at the southeast corner of the bridge was repaired. In 2009, a new wearing surface was applied to the bridge. In 2010, miscellaneous spalls in substructures and cracks in arches were repaired.
- This work was in accordance with the Recommended Treatment in the 2001 Management Plan.

City of Bedford (141)

City of Bedford No. 1800: (Concrete arch bridge); Closed spandrel concrete arch, with decorative elements, 1906, Rt. 43 crossing Norfolk-Southern Railway.

- In 2000, the bridge deck underwent repair and repaving and the south approach was repaved. Spalled areas of the sidewalk were repaired in 2006. In 2009, additional spalled areas of the sidewalk were repaired.
- This work was in accordance with Recommendation 1 in the 2001 Management Plan.

Lynchburg District (3)

Appomattox County (6)

Appomattox County No. 1002: (Non-arched concrete bridge); T-beam, 1930 with 1971 widening, with decorative cast concrete rails, Rt. 24 crossing Appomattox River.

- Minor repairs were undertaken in 2002, when the railing of the bridge was repaired. In 2003, the bridge underwent a number of major repairs. A concrete apron was poured in front of both abutments. A number of spalled and delaminated areas on the substructure were repaired. Further, embankment erosion was mitigated and repaired. The wearing surface was milled from the deck, and both approaches were milled and paved. The deck surface was repaired, and the deck received a latex-modified concrete overlay. Minor additional repairs and maintenance were performed later. In 2005, plant mixture was placed on the deck. In 2007, plant mixture was placed on the deck and approaches. In 2011, the vegetation surrounding the bridge was trimmed.
- The structure was placed on the Virginia Landmarks Register and the National Register of Historic Places in 2005.
- This work was in accordance with Recommendation 1 in the 2001 Management Plan.

Charlotte County (19)

Charlotte County No. 6902: (Metal truss bridge); Camelback through truss, 1901, Rt. 620 crossing Staunton River.

- In 2005, the structure was repaired and rehabilitated as a pedestrian bridge in accordance with VDOT's *Road & Bridge Standards*. In 2009, the warning (load restriction) signs were revised at both approaches. In 2010, the bridge underwent a number of repairs and modifications, including work on the Lally columns that support the bridge. Column 1 at Pier 12 had a crack repaired (fourth segment from bottom on Span 13 side). Column 2 at Pier 13 had a crack repaired (fifth segment from bottom on Span 14 side); in addition, an angle was added to the segment over the rivet heads. Column 1 at Pier 13 had a crack repaired (fourth segment from bottom on Span 14 side). The top chord splice plates were replaced with 12 inch by 6 inch by $\frac{1}{4}$ inch plates at three locations: Span 13 Left, U1U2 near U2; Span 13 Left, U6U7 near U2; and Span 14 Left, U1U2 near U2. Steel bands ($2\frac{1}{2}$ inch by $\frac{1}{4}$ inch) were added to columns as follows: Column 1 at Pier 12, two bands at second segment from bottom; Column 1 at Pier 12, two bands at fourth segment from bottom; and Column 1 at Pier 13, three bands at third segment from bottom. A retrofit hole was drilled in Column 2 at Pier 12 in second segment from bottom to arrest the crack. Warning signs were replaced at both approaches.
- The structure was placed on the Virginia Landmarks Register in 2006 and the National Register of Historic Places in 2007.
- This work was in accordance with Recommendation 3 in the 2001 Management Plan.

Nelson County (62)

Nelson County No. 6052: (Metal truss bridge); Pratt through truss, 1882, Rt. 653 crossing Norfolk-Southern Railway.

- In 2000, posting signs were installed at both ends of the bridge. In 2002 and 2003, crews cut vegetation from around the ends of the structure. In 2007, the bridge underwent a series of modifications and repairs. The railing was tightened, and several timber floor members were replaced. In addition, new object markers and weight limit and advanced warning signs were erected. In 2008, one-lane bridge signs were erected on both approaches.
- This work was in accordance with the Recommended Treatment in the 2001 Management Plan.

Nelson County No. 6070: (Masonry arch bridge); ca. 1835, Rt. 606 crossing Owens Creek.

- In 2000, the two trees located over the upstream end of the structure were removed. In 2002, crews poured concrete aprons in both arches to repair the undermining. In 2005, vegetation was cut from around the structure. In 2007, vegetation was cut from around the inlet end and areas of embankment erosion were backfilled.
- This work was in accordance with the Recommended Treatment in the 2001 Management Plan.

City of Danville (108)

City of Danville No. 1811: (Concrete arch bridge); Open spandrel concrete arch with decorative molded balusters on railing, 1927, Rt. 29 / Main St. crossing Dan River.

- The bridge underwent an extensive rehabilitation, including replacement of some elements in kind (everything above the arches was reconstructed), and construction of a parallel span. The design phase for this project was underway at the time the 2001 Management Plan was issued, and the project was completed in 2006. In 2009, an electric junction box was installed between arches at Abutment B.
- This work was in accordance with the Recommended Treatment in the 2001 Management Plan.

City of Danville No. 8006: (Concrete arch bridge); Open spandrel concrete arch with decorative molded balusters on railing, 1928, Worsham St. crossing Dan River.

- The bridge was demolished in 2009-2010.
- This work was in accordance with Recommendation 1 in the 2001 Management Plan.

City of Lynchburg (118)

City of Lynchburg No. 1849: (Non-arched concrete bridge); Coded as a slab, 1908, Bedford Ave. crossing Norfolk-Southern Railway.

- Non-destructive testing suggests that the bridge consists of concrete-encased I-beams, a method used by various railroad companies in the early 20th century.

- In 2002, the deck was profiled and received an overlay. In 2004, the guardrail was repaired. In 2008, a revised load rating analysis of the bridge was completed. In 2012, the deck was milled and received an overlay.
- This work was in accordance with the Recommended Treatment in the 2001 Management Plan.

City of Lynchburg No. 8044: (Masonry arch bridge); 1839, 9th St. crossing old James River & Kanawha Canal.

- In 2002, a new waterline was installed in the pavement over the center of the structure. The vegetation was cut around the structure. In 2004, the sidewalks were repaired and the approaches were paved through street improvement in the area. In 2008, the sewer line was abandoned under the structure. The green-space area under the structure was cleaned of debris, and the sidewalk stones were repaired. In 2012, a storm pipe was installed under the western sidewalk. The void was filled between the new pipe and the existing culvert. A truncated dome handicap ramp was installed at the northwest corner.
- This work was in partial accordance with Recommendation 1 in the 2001 Management Plan.

Richmond District (4)

Brunswick County (12)

Brunswick County No. 6104: (Metal truss bridge); Pratt through truss, 1884, Rt. 715 crossing Meherrin River.

- In 2012, work was done to make repairs to the deck of the bridge, replacing four planks and installing new wearing surfaces.
- The posting was reduced to 3 tons.
- There has been additional deterioration of the structure since the 2012 work was done. The bridge is currently under investigation to determine future plans.
- The work done to the bridge in 2012 was in partial accordance with the Recommended Treatment in the 2001 Management Plan.

Chesterfield County (20)

Chesterfield County [NO NUMBER] (Falling Creek Bridge): (Masonry arch bridge); ca. 1823, at Falling Creek Wayside, off Rt. 1, crossing Falling Creek.

- From the 1930s until August 2004, the bridge served as a pedestrian bridge at the Falling Creek Wayside. Because of damage during Tropical Storm Gaston on August 30-31, 2004, the bridge is currently closed to all traffic and there is no public access allowed onto the bridge.
- The flooding from Gaston caused severe damage to the superstructure. The water scoured out most of the parapets, the roadbed, and the approaches. Unreinforced concrete grouting subsequently was used to stabilize the exposed upper portions of the arches to prevent the structure from collapsing. Various stabilization and repair strategies still are being discussed and studied.

Dinwiddie County (26)

Dinwiddie County No. 1005: (Concrete arch bridge); Concrete through arch, 1926, Rt. 1 crossing Stony Creek.

- No bridge work since 2000 has been recorded.
- On October 2, 2013, the structure was struck by an over-height vehicle. Both portals sustained significant damage from broken concrete and bent main reinforcing steel. Damage was assessed, and the bridge is being monitored; repairs to the portals are planned.

Henrico County (43)

Henrico County No. 1001: (Non-arched concrete bridge); Continuous rigid frame, with decorative cast concrete rails and fascia, 1938, Rt. 1 crossing Upham Brook.

- In 2001, the utility along the upstream side was rewrapped and approximately 43 square feet of asphalt patching was placed along the wearing surface.
- This work was in partial accordance with the Recommended Treatment in the 2001 Management Plan.

City of Petersburg (123)

City of Petersburg No. 8018: (Concrete arch bridge); Concrete rigid frame, with brick veneer, 1936, Halifax Rd. and CSX Railroad crossing Defense Rd.

- No bridge work since 2000 has been recorded.

City of Richmond (127)

City of Richmond Nos. 1849/1857: (Concrete arch bridge); Concrete closed spandrel arch with decorative elements, 1911-1913, Rt. 360 crossing north and south divisions of James River at Mayo's Island.

- No bridge work since 2000 has been recorded.
- In 2011, the Virginia Center for Transportation Innovation and Research and Virginia Tech load tested the bridge for the City of Richmond.
- The bridge is currently under investigation to determine future plans.

Culpeper District (7)

Culpeper County (23)

Culpeper County No. 6906: (Metal truss bridge); Pratt through truss, 1878, Rt. 613 crossing Rappahannock River.

- No major repairs have been made to the structure. Minor repair work has been completed since 2001: several broken diagonals were replaced with cables; channel sections were retrofitted at beam ends where holes were present; damaged railing was repaired; and damaged deck timbers and stringers were replaced. In 2004, the bridge was repainted. In 2008, a driver struck the bridge, causing significant superstructure damage; repairs were made by a VDOT specialty crew experienced in maintaining and repairing vintage bridges. These repairs were completed in early 2009.
- The bridge remains posted at 3 tons. The bridge is also posted for no trucks and with a warning that only one vehicle at a time should be on the bridge.
- There has been additional deterioration of the structure since the 2009 repairs. The bridge is currently under investigation to determine future plans.
- This work was in partial accordance with the Recommended Treatment in the 2001 Management Plan.

Staunton District (8)

Alleghany County (3)

Alleghany County No. 9008 (formerly No. 6064): (Metal truss bridge); Pratt through truss, 1896, Rt. 633 crossing Cowpasture River.

- In 2011, a hole in the approach pavement was patched by a maintenance crew. A replacement structure (assigned No. 6064) was completed in the first part of 2013. As part of the cultural resource review relative to the replacement project, in an August 20, 2009 agreement between VDOT and the Virginia Department of Historic Resources, VDOT agreed that the old bridge will be retained in place. The bridge was closed to traffic and will be inspected every 2 years; scour and debris buildup issues will be addressed.
- The old bridge was renumbered as Alleghany County No. 9008, and there is no public access allowed onto the structure. This treatment essentially preserves the bridge as a landscape feature.
- Because of the size of the structure, adaptive use was not considered a feasible option by the Virginia Historic Structures Task Group in the 2001 Management Plan.

Alleghany County No. 9007 (Humpback Bridge) [Note: This structure had no number assigned at the time of the 2001 plan; it subsequently was numbered 9007]: (Covered wooden bridge); Trussed arch (“humpbacked”) covered bridge, 1857, in wayside off Rt. 60 west of Covington, crossing Dunlap Creek.

- The structure remains as a pedestrian bridge.
- Planning for repairs to the structure was completed in 2012-2013, and repairs were undertaken in the summer of 2013. The work included replacement of the roof sheeting and shingles, stabilization or replacement in kind of deteriorated framework, replacement of deteriorated weatherboards, and repointing of the mortar on the stone masonry abutment and approach walls.
- With the loss of a similar (although less arched) covered bridge in Ohio in June 2013, the structure is now the only remaining example of a trussed arch covered bridge in the United States.
- The structure was included among a nationwide group of the most historically important covered bridges in a National Historic Landmark Context Study in 2012 and was listed as a National Historic Landmark in 2012.
- This work was in accordance with Recommendation 1 in the 2001 Management Plan.

Augusta County (7)

Augusta County No. 6027: (Metal truss bridge); Pratt pony truss, 1898, Rt. 907 crossing Christian's Creek.

- In 2005, the bridge was painted. Some repairs were made in 2006. In 2012, the vertical member (U2L2) upstream was replaced and vegetation around both abutments was removed.
- This work was in accordance with Recommendation 1 in the 2001 Management Plan.

Augusta County No. 6081: (Metal truss bridge); Pratt pony leg [“bedstead”] truss, 1914, Rt. 6081 crossing Little Calfpasture River.

- In 2002, a new bridge was constructed at the site and the old bridge was dismantled and removed. The old bridge is currently in storage. There have been discussions regarding its re-erection as a pedestrian bridge, possibly at a local museum property, but no final plans have been made.
- This work was in accordance with the Recommended Treatment in the 2001 Management Plan.

Augusta County No. 6113: (Non-arched concrete bridge); Girder-and-floor beam, 1909, Rt. 722 crossing Whiskey Creek.

- In 2009, minor bridge repairs were done. Crews gunnited the girders and the deck bottom.
- This work was in partial accordance with Recommendation 1 in the 2001 Management Plan.

Augusta County No. 6147: (Metal truss bridge); Pratt through truss, 1909, Rt. 775 crossing Middle River.

- In 2002, the bridge was painted. In 2012, crews tightened a loose rail at the Abutment B end post. The bridge is currently under repair.
- This work was in partial accordance with Recommendation 1 in the 2001 Management Plan.

Augusta County No. 6149: (Metal truss bridge); Camelback through truss, 1915, Rt. 778 crossing Middle River.

- In 2005, the bridge was painted. In 2012, crews tightened a loose rail at the Abutment B end post.
- This work was in partial accordance with Recommendation 1 in the 2001 Management Plan.

Augusta County No. 6165: (Concrete arch bridge); Spandrel braced arch, 1932, Rt. 835 crossing Jennings Branch.

- No bridge work since 2000 has been recorded.

Augusta County No. 6553: (Non-arched concrete bridge); Deck girder, 1925, Rt. 1205 crossing South River.

- In 2010, crews repaired potholes in the deck top upstream.
- This work was in partial accordance with the Recommended Treatment in the 2001 Management Plan.

Augusta County No. 6729: (Metal truss bridge); Pratt through truss, 1907, Rt. 769 crossing Middle River.

- No bridge work since 2000 has been recorded.
- The bridge remains closed to vehicular traffic.

Augusta County (Valley Railroad Bridge) [Note: This structure had no number assigned at the time of the 2001 Management Plan; it subsequently was numbered No. 6997]: (Masonry arch bridge); 1874, crossing Folly Mills Creek just west of I-81, south of Staunton.

- No bridge work since 2000 has been recorded.
- The structure remains as a landscape feature within the I-81 right of way and remains closed to all traffic. There is no public access allowed onto the bridge.

Frederick County (39)

Frederick County No. 6903: (Concrete arch bridge); Concrete closed spandrel arch bridge, 1917, Rt. 672 crossing Opequon Creek.

- In 2012, crews removed dirt and debris that had built up along the curbs.
- This work was in partial accordance with Recommendation 1 in the 2001 Management Plan.

Highland County (45)

Highland County No. 6034: (Metal truss bridge); Lane Patent pony truss, 1896, Rt. 645 crossing Crab Run.

- No bridge work since 2000 has been recorded. The structure, closed to vehicular traffic since 1994, remains as a pedestrian and bicycle bridge.
- The structure was placed on the Virginia Landmarks Register and the National Register of Historic Places in 2009.

Page County (69)

Page County No. 1004: (Metal truss bridge); Pratt deck arch truss, 1936, Rt. 340 crossing Jeremiah's Run.

- In 2007, areas of deterioration were repaired by VDOT's on-call contractor. Minor strengthening work was done to reinforce the deteriorating areas. The bridge subsequently was demolished.
- The demolition work was in accordance with Recommendation 4 in the 2001 Management Plan.

Page County No. 9001 (formerly No. 1990): (Metal truss bridge); Pratt deck arch truss, 1938, Rt. 340 crossing Overall Creek.

- Areas of deterioration were repaired by VDOT's on-call contractor in 2007. In 2008, a new bridge was constructed to replace the existing bridge, bypassing the original bridge. Minor strengthening work was done to reinforce the deteriorating areas. The deck was removed to expose the metal arch truss; the structure is now preserved as a landscape feature and historical exhibit and is closed to all public access. Interpretive signage covering various elements of local history and one of the concrete end posts with its date plate were erected near the old bridge. The old bridge was renumbered as Page County No. 9001. The truss portion of the bridge was painted in 2013 (as part of the commitment required by the amended 2010 Memorandum of Agreement).

- Preservation of the structure was required under several memoranda of agreement related to the constriction of the new bridge. The original agreement, among VDOT, the Federal Highway Administration, and the Virginia Department of Historic Resources, was finalized in 2004 and was amended in 2010. For a period of 15 years, VDOT will inspect the truss and the supporting piers of the structure every 4 years and will perform the minimum repairs to keep the truss and piers stable.
- The structure was placed on the Virginia Landmarks Register and the National Register of Historic Places in 2008. A continuation sheet with additional documentation was added in 2013.
- Because of the site-specific nature and deteriorated condition of the structure, adaptive use was not considered a feasible option by the Virginia Historic Structures Task Group in the 2001 Management Plan. Conversion to a landscape feature and historical exhibit was not among the recommended options for the bridge in the 2001 Management Plan.

Rockbridge County (81)

Rockbridge County No. 1012: (Concrete arch bridge); Rigid frame with stone veneer, 1940, Rt. 39 crossing Laurel Run.

- No bridge work since 2000 has been recorded.

Rockbridge County No. 6145: (Metal truss bridge); Pratt through truss, 1890, Rt. 746 crossing Calfpasture River.

- The bridge underwent extensive rehabilitation in 2001 and 2002. The planning phase for this project was underway at the time the 2001 Management Plan was issued, and the project was completed in mid-2002. The project included major work on the deteriorated superstructure and substructure and work on the deck. The bridge underwent reconstruction in which it was disassembled and reconstructed with major repairs being made. Lead paint was removed; the metal was galvanized to comply with modern standards; and deteriorated or outdated parts (particularly the eye bars and elements with a high percentage of section loss) were replaced.
- This work was in accordance with the Recommended Treatment in the 2001 Management Plan.

Rockingham County (82)

Rockingham County No. 6154: (Metal truss bridge); Thacher through truss, 1898, Rt. 1421 crossing Linville Creek.

- A major project was completed in 2013. This project renovated the Thacher truss and repurposed it as a bridge for pedestrian and bicycle use only, with a replacement bridge nearby. A \$2.9 million contract was awarded to Plecker Construction Co. of Staunton, Virginia, in 2012. This facilitated construction of a new bridge and preserved the existing bridge as a shared bicycle and pedestrian path.
- The structure was transferred to the town of Broadway.
- This work was in accordance with Recommendation 1 in the 2001 Management Plan.

Shenandoah County (85)

Shenandoah County No. 6078: (Covered wooden bridge); Burr arch truss, built 1894, Rt. 720 crossing North Fork of Shenandoah River.

- In 2011, electrical upgrades and maintenance repairs were done on the bridge. In 2012, vehicular damage to the Abutment A portal was repaired.
- The bridge was long thought to have been built ca. 1893, but recent research supported a date of 1894. In 2008, a continuation page containing additional historical research (including correcting the date in the original 1975 National Register nomination to 1894) was added to the Virginia Landmarks Register and National Register forms.
- This work was in accordance with Recommendation 1 in the 2001 Management Plan.

City of Covington (107)

City of Covington No. 8002: (Metal truss bridge); Pratt through truss (with Phoenix columns), ca. 1885 / ca. 1900, Hawthorne St. crossing CSX Railroad.

- In 2006, the bridge underwent a major rehabilitation. Corrosion and other infrastructure damage had rendered the bridge unsafe for vehicular and pedestrian traffic. Fairfield-Echols LLC of Fishersville, Virginia, was awarded a \$1,238,921.87 contract in January 2006 to renovate the bridge. Upon closing of the bridge for repair, the bridge had a 7 ton load rating; the new maximum load will be 20 tons. The rehabilitated bridge included a fiber-reinforced polymer deck for vehicular traffic, the first of its kind in Virginia. This allowed for the expanded load rating and for a longer expected lifetime. In 2011, the damaged approach guardrail terminal at the south end of Abutment A was replaced.
- This work was in accordance with Recommendation 1 in the 2001 Management Plan.

Northern Virginia District (9)

Arlington County (0)

Arlington County No. 5020: (Non-arched concrete bridge); Rigid frame, with decorative stone veneer, 1945, Memorial Ave., crossing Rt. 110, adjoining Arlington National Cemetery.

- No bridge work since 2000 has been recorded.

Loudoun County (53)

Loudoun County No. 1025: (Masonry arch bridge); ca. 1810-1824, Rt. 50 crossing Little River.

- In 2001, the bridge underwent extensive rehabilitation after an inspection in July 2000 showed that a portion of the bridge's wing wall and buttress required reconstruction because of severe deterioration of the mortar between the stones. Engineers used a proprietary strengthening method (grouted anchors) to repair the bridge to functionality. Martins Construction Corp., of Falls Church, Virginia, completed the work at a cost of \$1.1 million.
- The structure was placed on the Virginia Landmarks Register in 2007; nomination to the National Register of Historic Places is still pending.
- This work was in accordance with the Recommended Treatment in the 2001 Management Plan.

Loudoun County No. 6051: (Metal truss bridge); Pratt through truss, date uncertain (probably ca. 1889), Rt. 673 crossing N. Fork Catoctin Creek.

- In 2003, the bridge underwent an extensive rehabilitation. The rehabilitation was performed by DLB Inc. of Hillsdale, Virginia, and cost \$1,128,237. It included work on the superstructure including metallization; a timber deck replacement with an asphalt overlay; adjustments to the stringers; masonry repointing; modification of the surrounding drainage; and adjustment of the rails. Environmental protection and health and safety work (the aforementioned metallization occurred after the bridge was stripped of lead paint); jacking of the existing structure; and modification of the grading were also part of the rehabilitation.
- This work was in accordance with the Recommended Treatment in the 2001 Management Plan.

Loudoun County No. 6088: (Masonry arch bridge); ca. 1829, Rt. 734 crossing Beaverdam Creek.

- After prolonged discussions between VDOT and Loudoun County, the bridge underwent a major rehabilitation in 2007. This included extensive work on the superstructure and substructure. The spandrel walls were dismantled and rebuilt by hand by the use of stone masonry techniques compatible with 19th century practices. A reinforced concrete slab floating on gravel base material was added to distribute loads more evenly to the arch, thereby improving its strength and durability. An internal reinforced concrete saddle was added. Underdrains were installed to help collect drainage material and prevent it from saturating the base material, leaking, and causing freeze-thaw damage to the masonry walls. The objective of the project was

- to increase the durability and longevity of the bridge rather than to increase its capacity, which remained posted at 6 tons.
- The structure's posting at 6 tons is in accordance with the provisions of a 2001 Memorandum of Agreement between Loudoun County and VDOT. The bridge is owned by the Commonwealth of Virginia, but Loudoun County assumed responsibility for maintenance funding in a 2001 Memorandum of Agreement between Loudoun County and VDOT.
 - The structure was placed on the Virginia Landmarks Register in 2010 and the National Register of Historic Places in 2011.
 - This work was in accordance with Recommendation 2 in the 2001 Management Plan.

Prince William County (76)

Prince William County No. 6023: (Metal truss bridge); Pratt through truss, 1882, Rt. 646 crossing Norfolk-Southern Railway.

- No major bridge work since 2000 has been recorded.
- There have been two repairs to the flooring since 2007.
- The structure is posted at 6 tons.
- A major rehabilitation, probably including the construction of a parallel span, is in the planning stage.