



Burnside Bridge

Historic Structure Report





The historic structure report presented here exists in two formats. A traditional, printed version is available for study at Antietam National Battlefield, the National Capital Regional Office of the NPS, Denver Service Center of the NPS, and at a variety of other repositories. For more widespread access, the historic structure report also exists in a web-based format through ParkNet, the website of the National Park Service. Please visit www.nps.gov for more information.

Antietam National Battlefield
Burnside Bridge
Historic Structure Report

February 2017

for

Antietam National Battlefield
Sharpsburg, MD

by

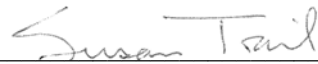
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Executive Summary

This historic structure report was produced for Antietam National Battlefield to compile historical documentation, condition assessments, and recommended treatments for the Burnside Bridge throughout its history. Use of the structure is preferred as per National Park Service policies and guidelines for Cultural Resource Management and Executive Order No. 130006: *Locating Federal Facilities on Historic Properties*. This HSR will guide future rehabilitation and repair work on the structure.

The project was conducted under a Project Agreement between the Historic Preservation Training Center (HPTC) and Antietam National Battlefield (ANTI) entitled “Prepare HSR for Burnside Bridge,” PMIS # 222121. Funding was allocated through the National Capital Regional Office (NCRO); project management was also done through NCRO. HPTC, ANTI, and NCRO are units of the National Park Service (NPS), U.S. Department of the Interior. NPS policies and guidelines were adhered to in the production and distribution of this HSR.

A historic structure report is the primary guide to treatment and use of a historic structure. It is prepared to identify and minimize the loss of character-defining features and materials and provides a basis upon which to address anticipated management objectives. This historic structure report aims to provide a current understanding of this previously undocumented historic structure and meet the following goals: provide a historical background and context for the Burnside Bridge; supply a current physical description and timeline for changes for the structure; identify character-defining features for the structure; document the condition of the structure; and provide treatment recommendations for the proposed use for the structure (see p. 92 for Burnside Bridge Prioritized Treatment List).

This HSR utilized the condition assessment and recommended treatment report entitled “Rehabilitate Burnside Bridge: Pre-Design Composition & Analysis” (December 2014) and construction drawings entitled “Rehabilitation Burnside Bridge (June 2015) completed by Peck Peck & Associates and McMullan & Associates in advance of the current rehabilitation project.

HPTC authored the remaining sections of the document. The technical evaluations provide an understanding of the historical integrity of the structure. This information is valuable for guiding sustainable development of Burnside Bridge by offering research and insight to park management. The contents are used by the park when scoping new projects. These new projects contain parameters for re-use functions and physical modifications that complement resource protection and preservation goals. This HSR informs management and directs planning and construction alternatives.

Research Conducted to Produce HSR

The following activities were conducted to gain a thorough understanding of the Burnside Bridge at Antietam National Battlefield:

- Primary and secondary historic research into the sequence of changes and evolution of construction by the NPS:
 - o Denver Service Center, Technical Information Center, Denver, CO
 - o National Capital Regional Office, Lands Database, Washington, DC
 - o Antietam National Battlefield, Sharpsburg, MD
 - o Historic American Building Survey, NPS (via Library of Congress website)
 - o National Archives and Records Administration II, College Park, MD
- Archival architectural documentation, by Historic American Building Survey
- Updated architectural documentation, by Historic American Engineering Record
- Condition assessment and recommended treatments by Peck Peck & Associates and McMullan & Associates

Condition Assessment Summary

Peck Peck & Associates and McMullan & Associates performed a structural condition assessment and analysis on the Burnside Bridge in October and November 2014. The following is a summary of the condition assessment included in their December 2014 report, entitled “Rehabilitate Burnside Bridge: Pre-Design Composition & Analysis”:

The field investigation included field measurements and survey, test pits, and corings through the piers. A structural analysis was performed and treatment recommendations developed.

The exterior surfaces of the masonry have been pointed numerous times and cracks in the piers and arches filled with mortar. Our investigation found that the parapet walls lean outward, the spandrel walls contain numerous bulges, the tie rods are in fair condition within the stone and soil fill, the arches have pockets of soil between the head joints of the barrel stones at a few locations, the interior stone masonry of the piers [have] little mortar remaining between stones, and there is little remaining mortar between the [piers'] stones at the base. Despite these issues, the arches have retained their circular shape and the cracks in the arch barrels and piers do not appear to have significantly moved since they were filled with pointing mortar.

The most immediate concern that should be addressed is bulging of the upstream (north wall) at both piers. This is likely the outside stones pulling away from the inner wythe of wall stones based on what was observed during repairs to the spandrel wall at the northwest abutment in July 2014 by the [Historic Preservation Training Center].

A structural analysis of the arches and piers was performed and determined that the arches can support the H10 load rating provided in the 2011 [Federal Highway Administration] inspection report, provided that the stones are bedded in mortar.¹

Based on the December 2014 report, HPTC believes the Burnside Bridge was in **poor** condition, from the standpoint of NPS facility management programs (FMSS) and standards (with some features in “good” and “fair” condition).

The results of these investigations at the Burnside Bridge provide a more fully-integrated narrative of developmental history of the extant structure, including changes made over the years by former owners and the NPS. They will also educate users of the structure about the integrity of the historic

¹ Peck Peck & Associates and McMullan & Associates, Inc. “Rehabilitate Burnside Bridge: Pre-Design Bridge Composition & Analysis.” December 2014.

fabric and the character-defining features so that it may be exposed, interpreted, and preserved for future generations.

Recommendations for Treatment and Use Summary

Peck Peck & Associates and McMullan & Associates provided recommended treatments in their December 2014 report, as follows:

1. Replace the deck with concrete or asphalt that slopes away from the parapets.
2. Expose, clean, encase, and supplement existing tie rods between concrete wall.
3. Install a series of tie rods at an elevation near the lower third wall height near the abutment and piers. Consider local replacement of the fill/soil stone mix with flowable fill.
4. Reconstruct the spandrel walls and parapets.
5. Grout the pier masonry in the dry.
6. Point areas of the arch barrels that have thin sections or holes in the pointing mortar.

Based on the above recommendations, the scope of work for the upcoming rehabilitation effort should be finalized during construction with the NPS prior to the start of the construction documents.

These and supplementary recommendations were included in the firms' June 2015 construction drawings (see Appendix D).

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Administrative Data

Project Identification

PMIS Number: 222121
Project Title: Prepare HSR for Burnside Bridge
Project Location: Antietam National Battlefield, Sharpsburg, MD

Name and Location Data

Preferred Structure Name: Burnside Bridge
Other Structure Name: Rohrback's Bridge; Lower Bridge
Structure Number: 070
LCS ID: 000028
Square Feet: N/A

Park: Antietam National Battlefield
Park District: Antietam NB Historic District
Structure's County: Washington
Structure's State: Maryland
NPS Region: National Capital
Cluster: Not Applicable
Administrative Unit: Antietam National Battlefield

Related Studies

Franzen, Archie W. "The Burnside Bridge, Antietam National Battlefield Site." *Historic Structures Report, Part I, Architectural Data Section*. April 1964. NPS DSC eTIC No. ANTI 302 D15.

Historic Preservation Training Center, National Park Service. "Repair and Preservation of the Burnside Bridge, Antietam National Battlefield (FY04)." *Historic Structure Record of Treatment*. January 11, 2007.

Historic Preservation Training Center, National Park Service. "Emergency Stabilization of Burnside Bridge, PMIS #211469 (FY14)." *Historic Structure Treatment Record*.

National Park Service. "Burnside Bridge Area Cultural Landscape, Antietam National Battlefield." *Cultural Landscapes Inventory*. National Park Service: 2016.

Peck Peck & Associates and McMullan & Associates. "Rehabilitate Burnside Bridge." *100% Construction Documents*. 15 sheet set. June 5, 2015.

Peck Peck & Associates and McMullan & Associates. "Rehabilitate Burnside Bridge: Pre-Design Bridge Composition & Analysis." December 2014.

Peck Peck & Associates and McMullan & Associates. "Rehabilitate Burnside Bridge: Specifications." *100% Construction Documents*. April 2015.

Scott, Gary. "Antietam National Battlefield." *National Register of Historic Places Inventory – Nomination Form*. Listed February 10, 1982.

Reed, Paula S. "Antietam National Battlefield-Additional Documentation." *National Register of Historic Places Registration Form*. Listed February 13, 2009.

Cultural Resource Data

National Register of Historic Places

Status:	Contributing structure in Antietam National Battlefield Historic District
Date:	February 10, 1982
National Historic Landmark:	No
Significance:	Criterion A: Association (Battle of Antietam, September 16-18 1862)
NR Information System No.:	66000038

Period of Significance

The Antietam National Battlefield Historic District, of which the Burnside Bridge is considered contributing, states the period of significance for the park to be September 16-18, 1862.

It should be noted that because the bridge is believed to have been built in 1832, the period of significance for the historic district occurred after the bridge's original construction.

Recommended Treatment & Use

The recommended treatment for the Burnside Bridge is preservation of the battlefield landscape with removal of non-sympathetic modern accretions and retention and restoration of character-defining features to the period of significance, September 16-18, 1862, to comply with National Park Service policies and guidelines.

The ultimate recommended use for the Burnside Bridge is continued use as an scene-setting interpretive structure for the park.

Recommendations for Cataloguing & Storage of Materials Generated by HSR

All project materials will be turned over from HPTC to the National Capital Regional Office's Museum Resource Center. Electronic files and media will be transferred via the NPS ftp network site and through archival CDs mailed to DSC. Copies of materials will also be submitted to Antietam National Battlefield and the National Capital Region Cultural Resources Office.

Abbreviations (alphabetical)

ANTI	Antietam National Battlefield
BFML	Building Feature Master List
CDF	character-defining feature
DSC	Denver Service Center
FMSS	Facility Management Software System
GMP	General Management Plan
HABS	Historic American Building Survey
HAER	Historic American Engineering Record
HPTC	Historic Preservation Training Center
HSR	Historic Structure Report
LCS	List of Classified Structures
LOC	Library of Congress
NCRO	National Capital Regional Office
NPS	National Park Service
PFMD	Park Facility Management Division
PP&A	Peck Peck & Associates and McMullan & Associates
SHPO	State Historic Preservation Office
TIC	Technical Information Center

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Part 1 | Developmental History

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Historical Background and Context

Washington County Roads and Bridges

In the early nineteenth century, the Commissioners of Washington County (also referred to as the Old Levy Court) began to propose new roads and bridges across the county. This additional infrastructure, which included a national turnpike connecting Baltimore to Hagerstown to Williamsport, would improve transportation and mail service across Washington County and to the rest of Maryland. A member of the Levy Court stated that they believed “that these bridges are necessary, that they shall be stone, and that the present is the proper time to build them.”¹ In 1817, a contract was drawn up for a new road leading from Hagerstown to the Conococheague Creek. The road was built by McKinley, Kinkead & Ramsey, of Cumberland, Maryland and the stone bridge was contracted by a prominent bridge builder, Silas Harry, from Chambersburg, Pennsylvania. The cost of the bridge was \$11,000 to \$12,000 with the work being completed in two years.² The bridge was to be two hundred ten feet long including abutments and wing walls.³

Within a contract, the Commissioners laid out the specifications of location, materials, and dimensions, as well as a payment schedule for the builder. The contract for the Wilson Bridge, built in 1818 by Silas Harry, over Conococheague Creek states (fig. 1):

...that the said Silas Harry for the consideration here after mentioned, hath agreed to build and complete in a workman like manner, a stone bridge over the Conococheague Creek on the Hagers Town turnpike road near Witmer’s Mill of the width of twenty four feet from out to out to consist of five arches of a size sufficient to answer the Creek; and with sufficient wing and curtain walls – the curtain walls to be two feet thick above the bed of the road – the distance between the abutments to be two hundred and ten feet – the bridge walls to be covered over with good pine boards or shingles, and to be painted in a complete manner with two coats of Spanish brown. The said Harry agrees to fill between the arches ready for turnpiking, and to turnpike the road across the bridge in a workman like manner. The said Silas Harry further agrees, and binds himself, well and faithfully to finish the and complete said bridge, and turnpike over it in the manner before described...⁴

Wilson Bridge became the first of many stone bridges built in Washington County, all similar in design and containing the same character-defining features as described above. The majority of these bridges were located over two county creeks: the Antietam and the Conococheague. They varied in size, from one to five arches, based on the width of the creek at that location. The design of the bridges was spandrel walls with infill, a common design during this time period. Prominent bridge builders from Pennsylvania and Maryland were associated with these bridges. Such builders included Silas Harry, John Weaver, George Weaver, W.E. Eirley, Charles Wilson, and James Lloyd.

¹ Newspapers.com, “The Honorable J. I. Merrick,” *The Torch Light and Public Advertiser*, August 24, 1824.

² Williams, T.C. *History of Washington County, Maryland: From the earliest settlements to the present time. Vol. 1.* Baltimore: Genealogical Publishing Company, 1992, p. 151.

³ Scharf, Thomas J. *History of Western Maryland: Being a History of Frederick, Montgomery, Carroll, Washington, Allegany, and Garrett Counties, Vol. II.* Baltimore: Genealogical Publishing Co. Inc., 1995, p. 997.

⁴ Washington County Land Records (WCLR), Liber CC, folio 394.

At the request of the P. & M. of the Hagers Town & Conococheague Turnpike Co. the following Art. of Agreement was recorded 24th Jan'y 1817.

Articles of Agreement made and concluded this thirty first day of December in the year one thousand eight hundred and seventeen, by and between the President and Managers of the Hagers Town and Conococheague Turnpike Company, to wit, Otho H. Williams President, Upton Sammes, Jacob Zellars, David Spheerly, John Wolgamot and John Kennedy Managers of the one part, and Silas Harry, David Fullerton and Joseph Culbertson Junr of Franklin County and Commonwealth of Pennsylvania of the other parts; Witnesseth, that the said Silas Harry for the consideration here after mentioned, hath agreed to build and complete in a workman like manner, a stone bridge over the Conococheague Creek, on the Hagers-Town turnpike road near Wetters Mill, of the width of twenty four feet from out to out, to consist of five arches of a size sufficient to answer the Creek; and with sufficient wing and curtain walls - the curtain walls to be two feet thick above the bed of the road - the distance between the abutments to be two hundred and ten feet - the Bridge walls to be covered over with good pine boards or shingles, and to be painted in a complete manner with two coats of Spanish brown - The said Harry agrees to fill between the arches ready for turnpiking, and to turnpike the road across the bridge in a workman like manner - The said Silas Harry further agrees, and binds himself, well and faithfully to finish the and complete said Bridge, and turnpike over it in the manner before described, on or before the first day of Decr: eighteen hundred and eighteen and to warrant and defend the same from accidents by fires or otherwise for the term of five years, from the time ~~the same~~ it is accepted and received from his hands by the Board of Managers - The President and Managers ^{of the said} on their part agree to pay to the said Silas for the building of the Bridge and turnpiking the road across it, as aforesaid, the sum of nine thousand one hundred dollars in manner following, Viz. three thousand dollars at the commencement of the Bridge, three thousand dollars when the centres of the Bridge are raised, and the arches started, fifteen hundred dollars when the arches are finished; and the balance of sixteen hundred dollars when the work of the bridge and road across it is finished, inspected and received by the Managers - It is understood between the parties aforesaid that the President and managers aforesaid, are to procure the privilege for the said Harry of getting the stone for the building the ^{said} Bridge, and

Figure 1. Agreement between Washington County Commissioners and Silas Harry to build Wilson Bridge (1817). Source: Washington County Land Records, Liber CC, Folio 394.

Due to a lack of primary sources concerning these builders, not much is known about them. A 1910 book by Helen Ashe Hayes entitled *The Antietam and Its Bridges: The Annals of an Historic Stream*, is the earliest-known source to mention each of the bridges and their associated builders. She states in her book that many of her sources come from Washington County Maryland Old Levy Court records.⁵ However, in 1830, the Old Levy Court transitioned to become the Commissioners of Washington County. Due to this change, documents pertaining to this body of government are very sporadic and difficult to find. The meeting minutes for Washington County Commissioners were not recorded until 1845, after the majority of the bridges were built.

Other primary sources, such as newspaper articles, were more readily available during the time of bridge construction. In Washington County, many newspaper advertisements promoting bridge proposals were posted to the local newspapers. For example, a posting for Antietam Iron Works Bridge, a bridge connecting the road from Sharpsburg, Maryland to Harpers Ferry, West Virginia, stated:

TO BRIDGE BUILDERS.

Sealed proposals will be received by the clerk of the commissioners of Washington county, at the clerk's office, in Hagerstown, until Tuesday, the 15th day of May next, for the erection of a stone bridge across Antietam Creek...of the following dimensions and description, to wit: – to be 16 feet wide in the clear – two arches, 35 feet span each – 2 do. 30 feet span each – piers, 7 feet high and 7 feet thick – wing walls, to be 25 feet back of the abutments, and to curve to suit the bank of the creek – abutments 10 feet thick and 7 feet high – curtain walls, 4 ½ feet high and 21 inches thick – abutments to be filled in such a manner as to present a grade from the centre of the bridge, of not more than three degrees, and to be paved on the MacAdam plan – the curtain walls, to be covered with ¾ inch seasoned pine boards, to be doubled and so arranged as to break the joints, and to be well painted. The whole to be completed by the 30th day of November 1832.

By order, DAVID CLAGETT, Pres't.
Board of Commissioners⁶

Similar to the bridge contracts, these advertisements laid out the design of the bridge, its necessary dimensions, and materials. The location of the bridge was also specified. The description of the location included significant landmarks, such as an existing ford or mill. Some postings mention that the new stone bridge would replace an existing wooden bridge that already stood on the site. In the advertisements, deadlines for proposal submittals and finished construction were announced.

Other valuable sources are laws and bills enacted by the government that were also posted in the newspapers. Many of these bills called for the building of bridges in various locations across Washington County. One such posting in the *Hagerstown Mail* stated, “An act authorizing the commissioners of Washington County to erect a stone bridge across the Antietam Creek, where the road from Sharpsburg to the Maple Swamp, crosses said creek.”⁷ Although not as detailed as the advertisements described above, the date and location can be discerned from this information. Due to the lack of information on the commissioners, newspaper articles help span the gap of how and when bridges were built during this time (fig. 2).

⁵ Hayes, Helen Ashe. *The Antietam and Its Bridges the Annals of an Historic Stream*. (New York: G.P. Putnam's Sons, Knickerbocker Press, 1910).

⁶ Ancestry.com, “To Bridge Builders,” *The Frederick Town Herald* (Frederick, Maryland) April 21, 1832.

⁷ Washington County Free Library, “To Bridge Builders,” *Hagerstown Mail*, June 10, 1836, [on-microfilm].

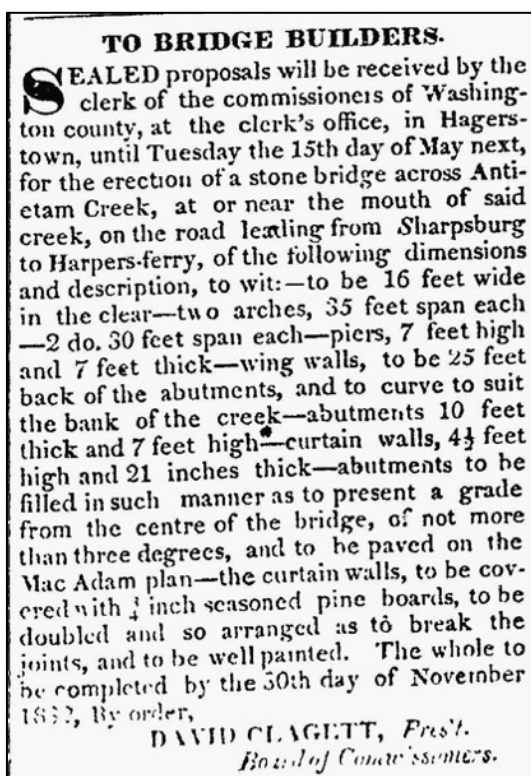


Figure 2. "To Bridge Builders" advertisement in *The Frederick Town Herald*, April 21, 1832. Source: www.ancestry.com.

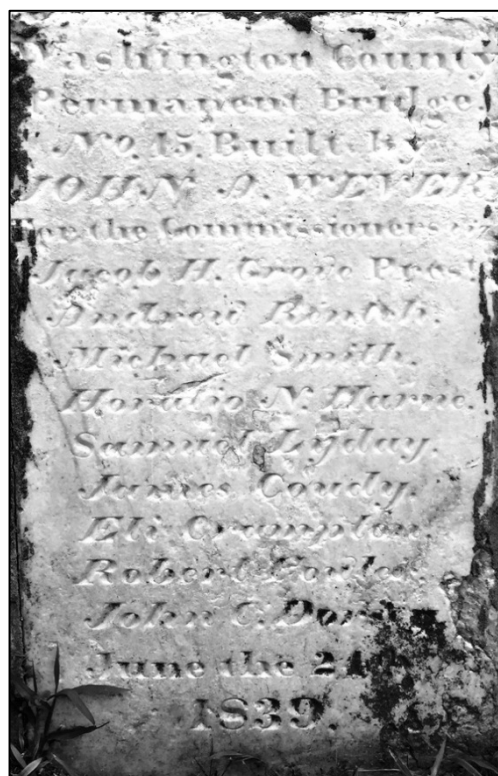


Figure 3. Stone plaque on Rose Mill Bridge (on Garis Shop Road, plaque located on the side of the bridge). Photo: HPTC, 07/12/16.

Physical evidence on the bridges can also help identify bridge construction dates and builders. A few of these bridges contain stone plaques engraved with the year of construction, name of the builder, and the names of the commissioners of the bridge. For example, Rose's Mill Bridge on Garis Shop Road near Funkstown states: "Washington County / Permanent Bridge / No. 15 Built by / JOHN A. WEAVER / For the Commissioners viz. / Jacob H. Grove, Pres't, / Andrew Rentch, / Michael Smith, / Horatio N. Harne, / Samuel Lyday, / James Condry, / Eli Crampton, / Robert Fowler, / John C. Dorsey. / June the 24th / 1839" (fig. 3). It is unknown, however, whether or not these plaques are original to the bridges or if they were added at a later date.

Bridge Builders

It is generally unknown who the builders of these Washington County bridges were as people, as there is very limited information available regarding them and their lives. The following information will discuss each known Washington County bridge builder and the resources (bridge contracts, census records, family papers, newspaper articles) related to them. The bridge builders include Silas Harry, Charles Wilson, James Lloyd, Jabez Kenney, and John Weaver.

Silas Harry

According to the Wilson Bridge contract, it states Silas Harry was from Franklin County, Pennsylvania. Census records state that he was living in Chambersburg, Franklin County,

Pennsylvania in 1820, 1830, and 1840.⁸ In the Septennial Census, Harry was listed as a mason in the years 1821, 1835, and 1842 (fig. 4).⁹ He was also listed as a “bridge builder” in a newspaper excerpt listing prominent businessmen in Chambersburg.¹⁰ The construction of bridges in Washington County, Maryland, Franklin County, Pennsylvania, and Berkeley County, West Virginia can all be attributed to Silas Harry. In Franklin County, Pennsylvania, five bridges are traced back to Silas Harry including Maclay’s Mill Road East and West bridges. According to a Historic American Engineering Record (HAER) report on the Maclay bridges, the Maclay family papers describe in great detail the work done by Silas Harry. Harry’s workforce included about twelve men. The names of the twelve men are listed in the papers along with the schedule of work. In Harry’s probate inventory, mason’s tools were recorded including two trowels, stone hammers & iron rake, picks, etc. The report also states that Silas Harry was believed to have been born in 1790 and according to a *Chambersburg Times* news article, Silas Harry died in May 1845. In the same year, a Silas Harry is listed in the Pennsylvania Wills and Probate Records. The executors of his will were Jane and Benjamin F. Harry.¹¹ Historian Allan Clarke, quoted in the HAER report, said “I did not come across much about him or his [Silas Harry] background.”¹² This has been a common trend for researchers who documented Washington County bridges and their builders.

In Washington County, besides Wilson’s bridge, Silas Harry’s name is mentioned in a second contract from February 12, 1830. This agreement called for the erection of two bridges over Antietam Creek, the first being near Samuel M. Hitt’s property and mill, and on the road leading from Hagerstown to Cavetown. This bridge is now called Hitt Bridge, but is also known as the Upper Bridge, and it was also involved in the battle of Antietam. For the second bridge, the contract states “that the said Silas Harry is to have the privilege of tearing down the old Bridge after the commencement of the ensuing spring, and to use the materials of the same in such manner as he may think proper.”¹³ This bridge, which connected Hagerstown and Cavetown, no longer exists and has most likely been replaced by a new wider bridge. Bypassing or replacement of the old stone bridges was very common in the twentieth century due to increased motor vehicular traffic in the area.

Newspaper articles also reveal that Harry was contracted to build a bridge on the road leading from Boonsboro to Sharpsburg, at Mumma’s Mill, to be completed in 1824.¹⁴

Charles Wilson

In the land records, Charles Wilson, a resident of Washington County, was contracted by Commissioners of Washington County to construct a stone bridge near Price’s fording and the mill of William Price in 1831.¹⁵ This is present-day Price’s Ford Bridge, which is no longer in use and in need of repair. A secondary source attributed the bridge to the Lloyds of Pennsylvania.¹⁶ Wilson

⁸ Ancestry.com, 1820, 1830, 1840 United States Federal Census.

⁹ Ancestry.com, Pennsylvania, Septennial Census, 1779-1863.

¹⁰ Bates, S.P. *History of Franklin County, Pennsylvania*. Chicago: Warner, Beers & Co., 1887, p. 463.

¹¹ Ancestry.com, Pennsylvania Wills and Probate Records 1683-1993.

¹² Historic American Engineering Record (HAER), Creator, Silas Harry, David Maclay, Benjamin Keyser, William Reynolds, William Heyser, Benjamin Long, et al., Elliott, Joseph E, B, photographer. *Maclay’s Mill Twin Bridge East & West, Spanning Conodoguinet Creek at Maclay’s Mill Road State Route 4018, Mowersville, Franklin County, PA*. Documentation Compiled After, 1968. Pdf. Retrieved from the Library of Congress, <https://www.loc.gov/item/pa3575/>.

¹³ WCLR, Liber LL, folio 288. (Also, look at contract in Liber LL, folio 350).

¹⁴ Newspapers.com, “Bridges,” *The Torch Light and Public Advertiser*, May 11, 1824.

¹⁵ WCLR, Liber MM, folio 638.

¹⁶ Hayes, *The Antietam and Its Bridges the Annals of an Historic Stream*.

was also contracted to build a stone bridge from the road leading from Boonsboro to Williamsport.¹⁷ This is most likely present-day Booth's Mill Bridge near Devil's Backbone County Park. Unlike the previous bridge, it is still in use today. Charles Wilson posted advertisements in the newspapers for workers. These advertisements stated, "Attention Laborers! The subscriber wishes to employ about 40 Quarriers & Laboring Men, by the year or month—to whom liberal wages and one year's employment will be given. Application may be made to him in Williams-port. Charles Wilson" (fig. 5).¹⁸

Names and Surnames	Occupations	Men	Women
Hughes Michael	Shoemaker	1	
Hunt John	Blacksmith	1	
Hutton Isaac	Shoemaker	1	
Holland Philip	Stocking Weaver	1	
Hunt Jacob	Merchant	1	
Henningsen John	Butcher	1	
Harry Silas	Mason	1	
Hick Ludwig	Butcher	1	
Hutz Charles	Merchant	1	
Hunt John	Merchant	1	
Hunt Lewis	Shoemaker	1	
Hick Jacob	Merchant	1	
Harley Rudolph	Iron Machanic	1	
Hoover George	Merchant	1	

Figure 4. Pennsylvania Septennial Census; Silas Harry is listed as a mason. Source: www.ancestry.com.

Attention Laborers!
The subscriber wishes to employ about
40 Quarriers & Laboring
Men,
by the year or month—to whom liberal wages and one year's employment will be given. Application may be made to him in Williams-Port.
CHARLES WILSON.
October 16 51-5w

Figure 5. Advertisement from Charles Wilson in *The Torch Light and Public Advertiser*, October 16, 1828. Source: www.newspapers.com.

BRIDGES.
Mr. James Lloyd, we understand, has contracted to build a stone bridge over Antietam creek, at Mr. John Shafer's mill. It is said he has already commenced the work, and expects to complete it sometime in July next.
He has also engaged to build a stone bridge over Antietam creek, at or near Mr. Frederick Zeigler's ford, on the road leading from Hagers-town through Nicholson's Gap to Gettysburg. This bridge, it is calculated, will be finished by the first of December next.
Mr. Silas Harry has contracted for the building of a stone bridge across Antietam creek, on the road leading from Boonsboro' to Sharpsburg, at Mumma's mill. We understand that this bridge also is to be completed by the first December next.
And Mr. Jabez Kenney is now engaged in the erection of a stone bridge over Beaver creek, on the road leading from Boonsborough to Williams-Port. We have not learnt at what particular time this bridge is to be finished.

Figure 6. "Bridges" newspaper article in *The Torch Light and Public Advertiser*, May 11, 1824. Source: www.newspapers.com.

¹⁷ WCLR, Liber NN, folio 733.

¹⁸ Newspapers.com, "Attention Laborers!" *The Torch Light and Public Advertiser*, October 16, 1828.

James Lloyd & Jabez Kenney

James Lloyd and his associates, from Pennsylvania, are also credited with building bridges in Washington County. In a newspaper article, he is stated as building two bridges over Antietam Creek: one at Shafer's Mill, and another near Mr. Frederick Zeigler's ford, on the road leading from Hagerstown to Gettysburg, also over Antietam Creek (fig. 6). The proposal for these two bridges stated they were to be completed in 1824. The latter bridge was built for a sum of \$2,175.¹⁹ This bridge is located near Leitersburg, MD. In the same newspaper article, another bridge builder is mentioned by the name of Jabez Kenney. He is attributed with building the bridge over Beaver Creek, now called Devil's Backbone Bridge. However, this bridge does not have the same character-defining features as other bridges in Washington County.²⁰

John Weaver

In 1832, a contract was drawn up between the Commissioners of Washington County and a builder named John Weaver (fig. 7). His name also appears as John Wever. The contract is for the bridge at the mouth of Antietam Creek and on the road leading from Sharpsburg to Harpers Ferry. This bridge is the present-day Antietam Iron Works Bridge. The contract states John Weaver hails from Washington County, Maryland.²¹ The name John Weaver is a common one, and many John Weavers were listed during the early nineteenth century in Washington and Frederick Counties in Maryland, and Franklin County in Pennsylvania (from where many bridge builders hailed). In 1840, a John Weaver was living in Cavetown, Maryland with seven total persons in his household. Cavetown was one of the many towns where bridges were built. The 1850 census is the first census in the United States to list a specific occupation as well as all of the occupants in a household. In 1850, John A. Weaver, forty-seven years old, lived in Funkstown, Maryland. His occupation was listed as a "mason" and he lived with his wife Phebe (Phoebe, Pheby) and nine children (fig. 8).²²

12	784	830	John A. Weaver	47	M	Mason		(Pa)		
13			Phoebe "	40	F			"		
14			Jac. "	18	M	Sabawee		"		
15			Geo. W. "	17	M	do			1	
16			Cath "	15	F			"		1
17			Caroline "	13	F			"		1
18			Hiram "	10	M			"		1
19			Virginia "	8	F			"		1
20			Delcy. A. "	6	F			"		1
21			Tessie "	4	F			"		
22			Lewis. C. "	2	M			"		

Figure 8. Funkstown, Maryland 1850 Census Record; John A. Weaver is listed with his wife Phebe and eight children. He is listed as a mason. Source: www.ancestry.com.

¹⁹ Bell, Herbert C. *The History of Leitersburg District: Washington County, MD*. Leitersburg, MD: Herbert C. Bell, 1898.

²⁰ Newspapers.com, "Bridges," *The Torch Light and Public Advertiser*, May 11, 1824.

²¹ WCLR, Liber NN, Folio 503.

²² Ancestry.com, 1850 United States Federal Census.

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leading from Harpburg to Harpers ferry, of the following dimensions and description to wit: to be sixteen feet wide in the clear, two arches of 35 feet span each, two dills of 30 feet span each, piers seven feet high and seven feet thick, wing walls to be 25 feet back of the abutments, and to curve to suit the bank of the creek, abutments ten feet thick and seven feet high, curtain walls 4 1/2 feet high and 21 inches thick, abutments to be fitted in such manner as to present a grade from the center of the bridge, of not more than three degrees, and to be paved on the Mac Adam plan, the curtain walls to be covered with 7/8 inch seasoned pine boards, to be doubled and so arranged as to break the joints and to be well and sufficiently painted; And in every other respect the same to be built in a good, substantial and workmanlike manner, and to be fully completed on or before the thirtieth day of November in the year eighteen hundred and thirty two. And the said John Weaver incurs the same when completed to remain firm and in good condition for the term of five years, the common wear and tear and any extraordinary act of Providence excepted. And the said Commissioners of Washington County do hereby bind themselves and their successors to pay or cause to be paid to the said John Weaver his heirs or assigns for the building and completing the bridge aforesaid, in manner aforesaid, the sum of four thousand two hundred and fifty dollars, in the manner following, to wit one third part thereof to be paid when the work is commenced, one third part when the centers are raised and the remaining third when the bridge shall be completed and approved by the said Commissioners, to the true and faithful performance of the several covenants and agreements aforesaid, the parties aforesaid do hereby respectively bind themselves and their respective heirs, executors, administrators or successors, each to the other in the sum of five thousand dollars current money, ON WITNESS whereof they hereunto subscribe their names and affix their seals this twenty third day of May in the year of our Lord eighteen hundred and thirty two...

Signed, Sealed, and delivered
in presence of,
Nathan Hastings

John Weaver (Sd)
David Blagett (Sd)
President Board Comm. Wash. Cty.

KNOW all men by these presents that we John Weaver, James W. H. Bell, Nathan H. H. Bell and Thomas Harmon of Washington County and State of Maryland, and Daniel M. Miller of Franklin County and State of Pennsylvania are held and firmly bound unto the Commissioners of Washington County in the full and just sum of five thousand dollars current money, to be paid to the said Commissioners of Washington County or their successors, to which payment well and truly to be made and done we bind ourselves and each of us, our and each of our heirs, executors and administrators, jointly and severally, firmly by these presents sealed with our seals, at date this 23^d day of May in the year eighteen hundred and

Figure 7. Agreement between Washington County Commissioners and John Weaver (Wever) to build Antietam Iron Works Bridge (1832). Source: Washington County Land Records, Liber NN, Folio 503.

According to the census, John and Phebe Weaver were both born in Pennsylvania. His eldest son, John, was also born in Pennsylvania in 1832. A year later, another son named George W. was born in Maryland. The rest of the Weaver children after George were also born in Maryland. In 1832, while John Weaver was building the Antietam Iron Works Bridge, the Weaver family moved from Pennsylvania to Maryland. It is very likely that John Weaver continued to build bridges in Washington County because the family continued living in the area; however no other contracts could be found between John Weaver and the Washington County Commissioners.

In Keedysville, just north of Sharpsburg, John Weaver is attributed to constructing a stone building at 55 South Main Street. According to Margaret Burtner Moat's *History of Keedysville*, the building was constructed in 1835 (fig. 9). There once was an arched stone date tablet above the door with the builder's name and date. This tablet was removed at a later, unknown date. The building originally functioned as the German Reformed church and school from 1835 to 1852.²³ It now serves as a house.



Figure 9. A stone house built by John Weaver in 1835 at 55 S. Main Street, Keedysville, Maryland. Photo: HPTC, 08/03/16.

In the 1860 census, John Weaver was no longer listed as living in Funkstown. However, his wife Phebe and several of their children still continued living in Funkstown, Maryland.²⁴ It is likely that John Weaver passed away between 1850 and 1860 and was buried in Funkstown Cemetery. His wife continued to live with some of her children but they moved from Maryland to Indiana,²⁵ and then to Missouri.²⁶ Her grave, as well as those of her children George, Deborah, and Susan, can be found in Missouri. George was listed several times in census records as a mason, having learned the trade from his father. A mason's mark is displayed on George's grave.²⁷

John Weaver is only mentioned a few times in historic newspapers. In a section of the newspapers called "List of Letters," he is listed several times in the 1830s for Boonsboro, Maryland where he may once have lived. This section refers to mail left behind and not claimed and that the letters would be considered dead if not claimed by a certain date.²⁸

²³ Maryland Historical Trust, Inventory of Historic Properties, WA-II-1078, 55 S. Main Street, Keedysville, MD, Paula S. Reed.

²⁴ Ancestry.com, 1860 United States Federal Census.

²⁵ Ancestry.com, 1870 United States Federal Census.

²⁶ Ancestry.com, 1880 United States Federal Census.

²⁷ Ancestry.com, findagrave.com.

²⁸ Washington County Free Library. Newspaper Archives [on micro-film], *Hagerstown Mail*, February 20, 1935, October 9, 1936, July 6, 1938, October 12, 1938, October 11, 1939.

Decline and Revival of Washington County Bridges

During the nineteenth century, Washington County had a series of storms and floods that had a major impact on the bridges. A storm in 1852 raised the levels of Antietam Creek to its highest point, damaging bridges along the creek. Bridges that were noted to have substantial damage included a bridge at Funkstown, and the stone bridge at Roxbury Mill (present-day Garis Shop Road). However, the bridge carrying the National Road across Antietam Creek was untouched.

In the 1870s, two more storms impacted the area. In 1872, the impact was mostly near Hagerstown and Funkstown. However, in 1877, “the greatest flood that had occurred in the history of Western Maryland” swept over Washington County. The rain storms began on a Thursday afternoon in November and continued for five consecutive days. The Potomac River, Conococheague Creek, and Antietam Creek rose rapidly, causing major impacts to buildings and structures along the bodies of water.²⁹ Newspaper articles from *The Herald and Torch Light* describe the impact from the torrential rain storm. The water rose twenty feet, causing the bridge on the Cavetown Turnpike and other bridges spanning across Antietam Creek to become impassible.³⁰ In the following weeks, the full impact of the storm was realized. The Roxbury Mill Bridge was damaged, and the nearby dam was swept away. The water reached up to the top of the first floor of the mill. Hitt Bridge had some but not serious damage. Years later, repairs were being conducted on the bridges. The bridge at Antietam Iron Works had been damaged so badly during the storm that the whole top of the bridge was washed away. William Brashears, a contractor and mason, was contracted to rebuild the walls.

During the twentieth century, the bridges continued to fall into disrepair. The wood coping specified in the contracts was removed from all the bridges early in the century to minimize maintenance and replaced with a more durable, but unsympathetic concrete coping. This is one of the significant changes that was made to the appearance of the bridges. Another major appearance change was the roads were resurfaced. Some bridges incorporated macadamized road surfaces in the early 1900s.³¹ In 1976, members of the county roads department attended school with National Park Service masons, carpenters, and other restoration experts to learn how to best restore the bridges. Work crews, whether county affiliated or private, began to repoint with lime mortar (instead of the harder Portland cement-based mortar). It was noted by Bob Hoke, a crew leader, that a lot of clay was used in the bridges when they were originally constructed. The combination of clay, lime, and sand makes for a fertile “soil” for vegetation to grow on the bridges, pushing the stone components apart.³² The bridges were periodically closed for several months during the 1970s in order to repair and restore them. During repair, several problems were found with all of the bridges. County Engineer Glenn Dull stated in a *Morning Herald* article: “Over the years, they were being worn away by three different forces: moisture that would get inside during freezes and thaws, pounding by floods, and pounding by modern-day loads.”³³

²⁹ Scharf, *History of Western Maryland: Being a History of Frederick, Montgomery, Carroll, Washington, Allegany, & Garrett Counties*, Vol. II.

³⁰ Newspapers.com, “Local Affairs: An Unprecedented Freshet – Great Destruction of Property,” *The Herald and Torch Light*, November 28, 1877.

³¹ Washington County Free Library, Newspaper Archives [on micro-film], *The Daily Mail*, Oct 29, 1975.

³² Washington County Free Library, Western Maryland Room, Washington County Bridges Vertical File, “Workers ready to close county bridge gaps.” Peggy Castion. May 10, 1976. *Morning Herald*. Hagerstown, Maryland.

³³ Ibid, “One bridge refurbished, another shut for repairs.” *Morning Herald*. Hagerstown, Maryland. September 8, 1979.

Some believed that the historic bridges were more trouble than they were worth. The maintenance and upkeep required for them each year was considered too much:

Stone bridges are not practical in any sense of the word in terms of modern loads and modern materials. Most are narrow and high peaked, making it difficult to see oncoming cars. All are tricky and expensive to maintain. They are old and are probably doomed to crumble into the streams they have spanned for more than a century. And they are products of stone masons long since dead, although the men did their work well, it is beginning to unravel.³⁴



Figure 10. A wall collapses at Leitersburg bridge (also referred to as Strite's Mill Bridge in 1982. Source: Washington County Free Library, Washington County Bridges vertical file.

These bridges are referred to as “stone masonry spandrel filled spans” by engineers. The fill material has soaked up all the rain water over the past one-hundred-plus years, causing the walls to bulge outward and pull away from the pavement (particularly at Rose's Mill Bridge on Garis Shop Road). Also, the forces by vehicles, trucks over the five-ton limit, and speeding cars were causing too much damage and strain to the bridges.³⁵ A stone bridge spanning over the Conococheague was demolished in the late 1970s due to damage done by Hurricane Agnes in 1972. At that time, it was considered cheaper to replace a bridge than to repair it. Wider bridges were built which allowed for two-way traffic.³⁶ Due to damage by storms and the strain from vehicular traffic, the bridges began to decay and crumble. For example, the Wilson Bridge began to crumble into the Conococheague Creek (fig. 11). Many efforts were made to save the bridge, the largest span in the county. It was

³⁴ Ibid, “Bridges fall prey to progress.” Paul Bertorelli. *Daily Mail*. April 5, 1976.

³⁵ Ibid.

³⁶ Ibid, “Bids opened for Conococheague span.” *Morning Herald*. February 8, 1972.

believed that Hurricane Agnes had a lot to do with its state. The portions which had crumbled into the water were rebuilt and the bridge is now used for pedestrians and fishermen.



Figure 11. Wilson Bridge in a state a decay, crumbling into the water. Source: Washington County Free Library, Wilson Bridge vertical file.

Despite the twentieth century mindset, many of these nineteenth-century bridges still stand today as a testament to the men who built them. However, a few of the old stone bridges have been torn down and have been replaced by new, wider bridges, to accommodate more vehicular traffic. Originally, the bridges were only used by horse-drawn carriages, so only one lane was needed. However, it was agreed that one lane was not feasible in modern society and the new bridges allowed for two-way traffic. The Orndorff Mill Bridge (also known as the Middle Bridge on Antietam Battlefield) near Sharpsburg and the Mt. Aetna Road Bridge near Hagerstown were both replaced due to this thinking. On the other hand, some bridges were saved due to their historical significance to the area. The bridges are closed to vehicular traffic to prevent further damage to them, but pedestrian traffic is still allowed that the public can utilize the bridges. Among these are Wilson Bridge, over Conococheague Creek, and Burnside Bridge (also referenced as Rohrback Bridge and the Lower Bridge on Antietam Battlefield), over Antietam Creek. Price's Bridge, spanning over the Conococheague northwest of Hagerstown, is currently in a state of disrepair. This bridge was bypassed by a new road and the bridge is near private property with limited access to the public. Most of the original damage to Price's Bridge occurred during Hurricane Agnes. Still others continue to be used for vehicular traffic, albeit with modern engineering limits applied, like Antietam Iron Works Bridge (fig. 12).



Figure 12. A present day photo of Antietam Iron Works Bridge (road leading from Sharpsburg to Harpers Ferry). John Weaver had a contract with the Washington County Commissioners for this bridge in 1832. Photo: HPTC, 06/07/16.

In the early twentieth century, Washington County surveyor Elmer E. Piper stated: “Keep these bridges in proper repair and they will last as long as any. They have stood many hard knocks and have stood them for a long time. They will stand many more hard knocks for a much longer time if they are taken care of.” With diligent upkeep and maintenance, these bridges will continue to be a part of Washington County’s landscape and history. They are a special feature in the communities they serve.

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Chronology of Development and Use

Prior to the Civil War

According to *The Antietam and its Bridges* by Helen Ashe Haye, the bridge now referred to as Burnside Bridge was built by John Weaver in 1836. However, no primary sources from the early nineteenth century confirm this date and builder. The only reference of a bridge being built over Antietam Creek in 1836 is from a newspaper posting which requested “the erection of a Stone Bridge across Antietam Creek, where the Sharpsburgh and Maple Swamp Creek Road crosses said Creek.”¹ The location of the “Sharpsburgh and Maple Swamp Creek Road” has not been confirmed and it is unknown if this refers to the location of Burnside Bridge. As a note, the name Burnside was never attributed to the bridge before the Civil War and Burnside Bridge has also been referenced as “Lower Bridge” and “Rohrback Bridge.” “Rohrback” is in reference to the farmers who lived near the bridge during the time of the battle. However, it is unknown if the Rohrbacks lived there when the bridge was constructed. An 1859 map of Washington County by Thomas Taggart displays the owners of large tracts of land. In District 1 of Sharpsburg, the land surrounding the bridge is owned by Henry B. Rohrback and Jacob H. Rohrback (fig. 13).²

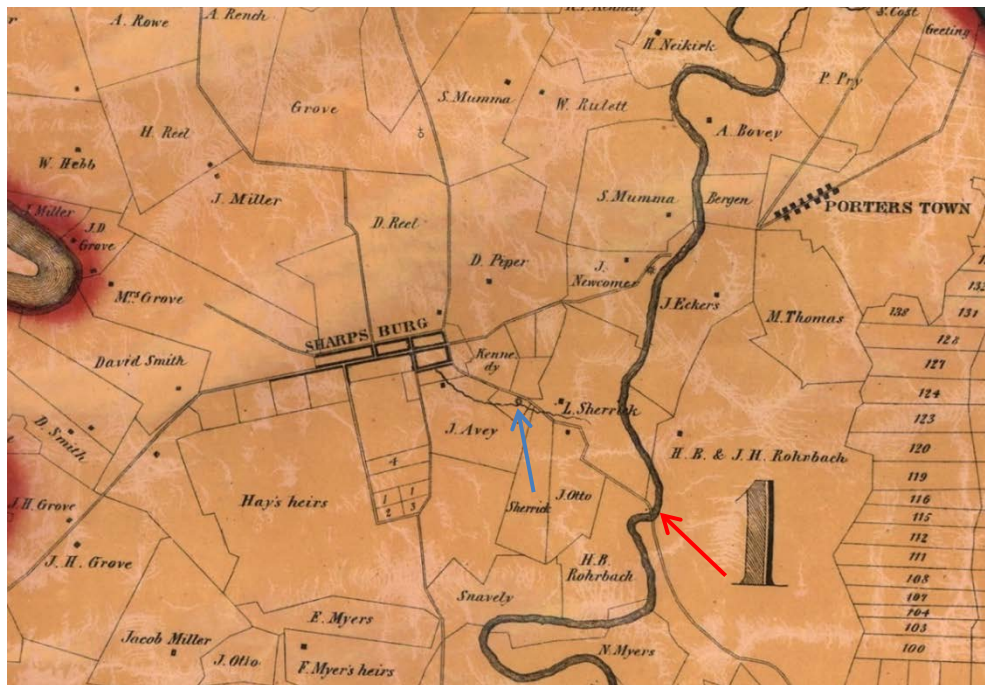


Figure 13. Sharpsburg and vicinity. Map shows land surrounding Burnside Bridge (red arrow) owned by H.B. Rohrback and J.H. Rohrback. The blue arrow denotes the location of the nearest known mill—Lumm's Mill. Source: “Partial view of a map of Washington Co., Maryland. Exhibiting the farms, election districts, towns, villages, roads, etc.” by Thomas Taggart and S.S. Downin, 1859, Library of Congress, <https://www.loc.gov/item/2002624033/>.

¹ Washington County Free Library, “To Bridge Builders,” *Hagerstown Mail* (Hagerstown, MD), June 10, 1836.

² Taggart, Thomas, and S. S. Downin. *A map of Washington Co., Maryland. Exhibiting the farms, election districts, towns, villages, roads, etc.* S.I., L.McKee and C.G. Robertson, 1859. Retrieved from the Library of Congress.

It is possible that the builder of Burnside Bridge was John Weaver; however no primary documentation has confirmed this. John Weaver did have a contract for Antietam Iron Works bridge, just further down the creek near the Potomac River. The contract dates to 1832, four years prior to Burnside Bridge's supposed construction date (refer to Historical Background and Context section for more information on John Weaver).

Many of these Washington County stone bridges were constructed near mills due to the commerce and trade associated with them. Burnside Bridge is one of the few bridges in Washington County which was not built directly beside a known mill. It is not known why a bridge would need to be built where Burnside Bridge is located today except the need for a transportation route over the Antietam Creek in the direction of Rohrersville to the east-southeast. A mill, constructed ca. 1800, was located approximately one mile west-northwest of Burnside Bridge; however it is unknown if this mill was directly associated with Burnside Bridge. At the time of the battle, the mill was owned by Solomon Lumm and historically referred to as "Lumm's Mill" or "Stone Mill" (fig. 13).³

During the mid- to late-nineteenth century, Burnside Bridge was also likely damaged as so many areas bridges were (refer to Historical Background and Context section). However, a bridge at the location of Burnside Bridge was not specifically mentioned as damaged in the newspapers of the time.

The Battle of Antietam

In 1862, the bridge became a part of one of the most historic battles of American history, the Battle of Antietam. The bridge was the setting of the third and final stage of the battle. When General Robert E. Lee redeployed his troops, 2,500 men were forced to defend the bridge from the high ground. As a note, this section uses Keven Walker and K.C. Kirkman's *A Guide to the Antietam Farmsteads Battlefield Landscapes* for its source material.

Though this force was small the ground was choice. The west bank of the creek at the bridge was nearly 100 feet high and commanded not only the bridge but also the road from Rohersville leading to it. This road ran parallel to the creek for a few hundred yards, making anyone the perfect target for the Georgians on the opposite bank. Still, with the full weight of 11,000 of the Federal Ninth Corps pressing for control of the bridge, the best Lee could hope for was a stiff resistance of his depleted divisions to buy time, time for Maj. Gen. A.P. Hill's division to arrive from Harpers Ferry.

The defense of the bridge fell to...around 550 men, all under the command of Gen. Robert Toombs.

The opposing Union troops were the 11,000 strong Ninth Army Corps...whose immediate commander was Gen. Ambrose Burnside...⁴

Several efforts were made to charge the bridge and happened as early as 10:00 a.m. on the morning of September 17, 1862. The first unsuccessful attempt was conducted by Colonel George Crook's brigade of the Kanawha division and 11th Connecticut Infantry regiment of Brigadier General Isaac

³ Stoner, Paula. "Stone Mill Complex." *Maryland Historical Trust Inventory Form for State Historic Sites Survey*. June 1978. Accessed at http://msa.maryland.gov/megafile/msa/stagsere/se1/se5/021000/021700/021797/pdf/msa_se5_21797.pdf.

Walker, Keven, and K.C. Kirkman. *A Guide to the Antietam Farmsteads Battlefield Landscapes*. Western Maryland Interpretative Association, Sharpsburg, MD: 2010, p. 93.

⁴ Ibid, pp. 90-91.

P. Rodman's division. Their goal was "to secure the bridge and cover the rest of the attacking column as they crossed the bridge and deployed on the other side."⁵ They took heavy fire from two hundred yards of the bridge. Some made it to the bridge but were immediately forced back. One company attempted to wade the creek but again were forced back. Further upstream, they took cover, exchanging with Confederates on the west bank of the creek.

Another attempt was made by Brigadier General Samuel Sturgis' division, the 2nd Maryland Infantry, and 6th New Hampshire Infantry of General James Nagle's brigade. They came from the northwest along Rohrersville Road to reach the bridge. The infantry was stopped by deadly enemy fire and the left flank of Federal formations was left exposed. These soldiers did not make it to the bridge like the previous attempt. They stopped just short of two hundred feet from the bridge and began to exchange fire with Toomb's Confederate troops on the opposite bank.

Finally, around noon, Sturgis was ordered to try again, and he ordered his other brigade, under Gen. Edward Ferrero, to make the assault. Two regiments were ordered to storm the bridge while the rest of brigade covered the advance. The regiments committed to the charge were the 51st Pennsylvania and 51st New York. From their position opposite the bridge, they advanced from the far side of a ridge, due west towards their target.

At 12:30 p.m. the "two 51sts" advanced [fig. 14]. It was 300 yards from the top of the hill to the bridge, and the Federals were under fire all the way. Ferrero's columns halted at the eastern approaches to the bridge and were ordered to open fire from the cover of the stone wall and rail fence along the creek.⁶



Figure 14. Painting of the Burnside Bridge by Captain James Hope who fought on the battlefield. This painting depicts the "two 51sts" charging the bridge. Source: National Park Service, Antietam National Battlefield website, <https://www.nps.gov/anti/learn/photosmultimedia/hopepaintings.htm>.

It continues to be disputed whether the 51st Pennsylvania or 51st New York crossed the bridge first. However, with both regiments they were able to successfully cross the bridge and push the Confederates back. The small group of Confederates, with little to no ammunition, were forced to retreat back to the town of Sharpsburg.

⁵ Ibid, p. 91.

⁶ Ibid, p. 91.

Toomb's men had been fighting a strong defense for nearly three hours and were feeling the pressure from not only the attempts at the bridge but also the threat of Gen. Rodman's force. His division and Col. Hugh Ewing's brigade of the Kanawha division were just about to cross the creek at Snively Ford, and Toomb's men began to pull back over the high ground to their rear toward town. As Southern fire began to taper the 51st Pennsylvania made a rush across the bridge, closely followed by the New Yorkers. As the Federals advanced more and more Confederates fell back and soon Sturgis' men were fanning out and securing the area on the west side. It was now 1 p.m. and Burnside's men were across the creek. The banners of the Ninth Corps had finally arrived on the western bank of the Antietam.⁷

After the battle concluded, Lee withdrew back over the Potomac River and headed south with his troops.

Two days after the battle, Civil War photographer Alexander Gardner took photographs of the battlefield at Antietam, including Burnside Bridge. These are the earliest known photographs of the bridge. A view from the high ground shows the wood coping heavily damaged and some debris on the roadway (fig. 15). The stone of the bridge looks relatively intact from this perspective, except the southwest corner appears to be damaged. In another photograph, a soldier is standing near the stone wall on the east bank of the creek (fig. 16). Several markers can be seen in the foreground. It is believed that pieces of the wood coping were used as temporary grave markers for soldiers. Many of these pictures depict conditions of the bridge at that time (fig. 17). Vegetation can be seen growing in some of the abutments.



Figure 15. Alexander Gardner's photograph of Burnside Bridge after the Battle of Antietam. As can be seen, the coping of the bridge was heavily damaged, as was the southwest corner. Photo: Library of Congress, <https://www.loc.gov/item/cwp2003006118/PP/>.

⁷ Ibid, p. 91.

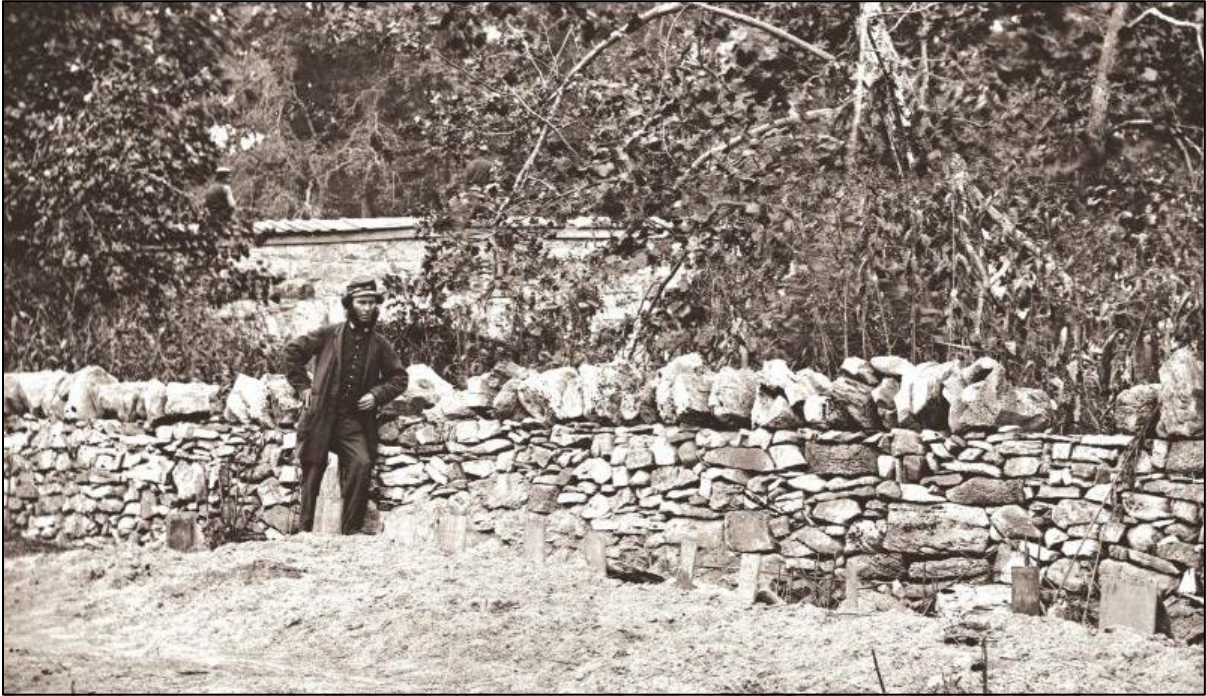


Figure 16. Alexander Gardner's photograph of a soldier along the stone wall next to Burnside Bridge. Temporary Federal grave markers can be seen in the foreground, a man sitting on the bridge can be seen in the background. Photo: Library of Congress, <https://www.loc.gov/item/cwp2003006094/PP/>.



Figure 17. Alexander Gardner's photograph of soldiers sitting on the damaged wood coping of the bridge. This photograph is looking west across the bridge to the Confederate's position on the hill. Photo: Library of Congress, <https://www.nps.gov/anti/learn/photosmultimedia/gardnerphotos.htm>.

Newspaper articles published immediately after the battle refer to the bridge as “Antietam Bridge.” No other associated name is referenced in the articles. The first mention of “Burnside Bridge,” after the commander in charge of conquering the bridge, is in a notice for public sale dated April 19, 1864 which states: “The farm in which he now resides, situated on the road leading from Sharpsburg to Pohrsville... and near the Burnside Bridge...”⁸ Then in 1865 a newspaper article mentions “Burnside’s Bridge.”⁹ From this point on the bridge became known as Burnside’s Bridge. It is unknown when the bridge name lost its possessive and became “Burnside Bridge.”

Commemoration

In the late-nineteenth and early-twentieth centuries, monuments were erected on the battlefield commemorating different regiments and people important to the battle. This included placing monuments at the four corners of Burnside Bridge.

A November 1886 *The Herald and Torch Light* article stated a committee had been formed to secure a tablet for the 51st Regiment of the Pennsylvania Volunteers. This monument was placed at the southeast corner of the bridge (fig. 18).¹⁰ The monument, which still exists, but in a separate location, is a rectangular granite block with a granite drum on top with the inscription “51st P.V.” in the middle of it. The inscription states: “51st P.V. / Erected / by the survivors of the / 51st Regt. Pa. Vols / To commemorate their / comrades



Figure 18. The monuments to the 51st Regiment of the Pennsylvania Volunteers at the southeast corner of the bridge (foreground) and 51st New York Volunteer Infantry at the northeast corner (background), ca. 1940. Photo: Antietam National Battlefield archives.

who fell in / taking this bridge in the / battle between the Federal / and Confederate forces / September 17, 1862.” The opposite side states: “51st P.V. / The 51st Regt. P.V. / was organized Sept. 1861 / by Colonel, afterwards, / Maj. Gen. John F. Hartranft, / its leader in many battles and in this charge. / Mustered out July 1865 / Engaged in 20 battles, / 18 minor combats and / numerous skirmishes. / Total death roll 314.” The soldiers killed during the battle are also listed.

In September 1890, another monument was proposed for the northeast corner to commemorate the 51st New York Volunteer Infantry. According to a *The Herald and Torch Light* article, this monument was meant to rival the 51st Pennsylvania monument due to the controversy on which regiment had tried to cross the bridge first.¹¹ Prior to the monument being installed, it was

⁸ Notation from Stephanie Gray, Chief, Museum and Library Services, Antietam National Battlefield.

⁹ Newspapers.com, “The Antietam Cemetery,” *The Herald and Torch Light*, June 14, 1885.

¹⁰ Ibid, “A Memorial Tablet at Antietam,” *The Herald and Torch Light*, November 4, 1886.

¹¹ Ibid, “Two Monuments to Be Unveiled at Antietam, Rival Monuments at Burnside’s Bridge,” *The Herald and Torch Light*, June 26, 1890.

proposed for a local Sharpsburg native, Samuel S. Stouffer, to repair Burnside Bridge due its dilapidated and dangerous state. He had recently rebuilt another stone bridge, Antietam Iron Works, over Antietam Creek.¹² The 51st New York Volunteer Infantry monument was never installed on the bridge but rather was built near the eastern entrance to the bridge. Still extant, it is a large granite monument with a bronze plaque. The plaque reads: “Fifty-first / New York Infantry / Shepard Rifles / Col. Robert B. Potter / 2d Brigade / Ferrero’s 2d Division – Sturgis’ / 9th Army Corps – Burnside’s / Army of the Potomac / Sept. 17, 1862. / In compliance with orders received from General / Burnside on the morning of September 17, the 51st / New York and the 51st Pennsylvania were selected / to carry this bridge at the point of the Bayonet. The / passage was obstinately disputed. / Casualties / 1 officer and 18 men killed / 4 officers and 64 men wounded / Total 87.”

Three other monuments were installed thereafter by survivors’ associations, and commemorated in the twentieth century. These include the 2nd Maryland Infantry, the 35th Massachusetts, and the 21st Massachusetts monuments.

The 2nd Maryland monument, a flat-topped granite block, was installed on the northeast corner of the bridge (see fig. 18). Still extant, but in a separate location, it reads “MARYLAND/ 2nd Maryland Infantry/ At 9:30 A.M. advanced /on the stone bridge / defended by Toombs’ / Brigade and two batt- / eries on the high ground / beyond. Charged to / within 100 yards of the bridge when, checked / by the severity of / the enemy’s fire, it took / shelter along the bank / of the stream and was / engaged until 1:30P.M. / The Bridge being carr- / ied, it crossed to the / hills and the battle / beyond Engaged, 187 men, / Loss 18 killed, 48 woun- / ded, 3 missing.”

The 35th Massachusetts monument was installed on the northwest corner of the bridge. The monument is a 3’-0”-tall and 2’-0”-square block with four granite “cannon balls” on top. The Ninth Army Corps insignia of an anchor crossed with a cannon is engraved on one side (fig. 19). Still extant, but in a separate location, it reads: “The Thirty-fifth Regiment of Massachusetts Volunteers / crossed this bridge with Ferrero’s / Brigade, Ninth Army Corps / at noon, Sept. 17, 1862, and / moved to the right up the hill where, at the land, two hundred and fourteen of their officers and men were killed and wounded / Gloria est Pro Patria Mori.” “Erected by Lieut. Col. Albert A. Pope, as a memorial of his dead comrades.”



Figure 19. Looking east, monuments shown are 35th Massachusetts on the left and 21st Massachusetts on the right. Witness tree seen to the left in the background. Source: Washington County Historical Society. Burnside Bridge folder, n.d.

¹² Ibid, “Good Work for the County,” *The Herald and Torch Light*, July 3, 1890.

The 21st Massachusetts monument was installed at the southwest corner of the bridge. The monument, still extant, but in a separate location, is “composed of a smooth faced granite block about one and a half feet high and two feet square” (see fig. 19).¹³ A three foot Minnie ball is on top of the block. It reads: “21st Mass. Vol. Infy. ‘2nd Brig. 2nd Div. 9th A.C.” It then lists all comrades that died near the bridge. “Erected by 21st Regt. Mass. Vol. Association.”

The four monuments continue to stand by the bridge today but are no longer installed at the corners. They were relocated at a later date during a major renovation of the bridge (ca. 1963).

In 1903, the earliest-known photographs of the bridge postdating the Civil War were taken (fig. 20). The photograph shows the Burnside Bridge with wood coping in place and the four monuments installed at each of the four corners.¹⁴ In 1913, like many other bridges in Washington County, concrete coping was installed on top of the parapet walls of the Burnside Bridge (fig. 21). This replaced the less durable wood coping, which would have needed to be maintained more often than the concrete.

Figure 20, right. A Winter 1903 view from the east bank of the creek of the bridge’s south elevation shows wood coping still intact and monuments at each of the corners. The Spong farm can be seen in the background. (Winter 1903). Photo: Antietam National Battlefield archives images.

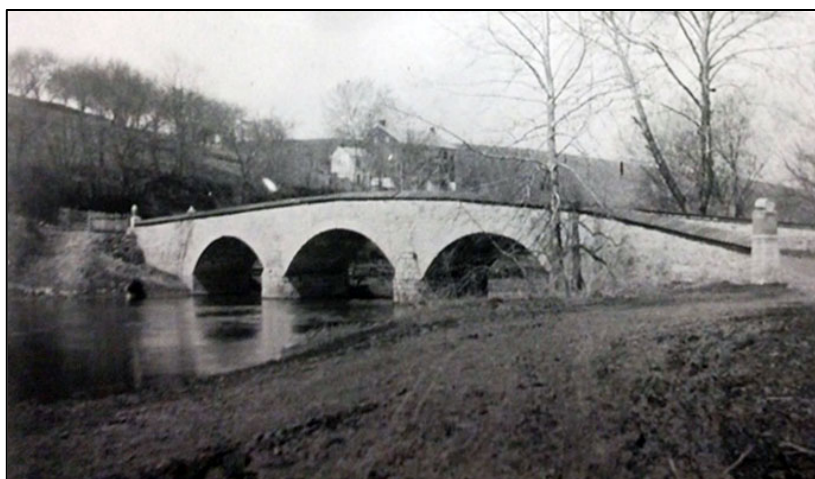


Figure 21, right. Photograph of Mrs. Fred Cross and her daughters, Dorothy and Bertha, from South Royalston, Massachusetts on June 16, 1919. The bridge now has concrete coping on top of the parapet walls. Photo: Antietam National Battlefield archives images.



¹³ Antietam National Battlefield Archives, Memorial Files, 21st Massachusetts Volunteer Infantry.

¹⁴ Antietam National Battlefield Archives. Burnside Bridge box.

National Park Service Acquires Bridge

In 1930, the 136-acre Spong Farm, adjacent to Burnside Bridge, was advertised for sale in the newspaper due to its ailing tenant, Mrs. Fannie Spong.¹⁵ In the late 1930s, the Washington County Historical Society proposed to preserve Bloody Lane and Burnside Bridge. They acquired the Spong Farm and part of the Dorsey tract, the land surrounding the bridge.¹⁶ The Historical Society conveyed this land in a donation to the United States of America to become part of Antietam National Battlefield Site. In 1946, the deed was fulfilled and 120 acres were acquired by the National Park Service (NPS). The deed did not include the bridge, just the land surrounding the bridge.

The acquisition for the bridge began just prior to the NPS acquiring the battlefield from the War Department in August 1933. A local organization—Sharpsburg Men’s Community Club—and the community of Sharpsburg suggested that the federal government take responsibility for Burnside Bridge to preserve it for future generations.¹⁷ The first deed was recorded on November 29, 1933¹⁸; however, it was never approved by the federal government.¹⁹

It could not be determined who had the authority to deed the bridge to the National Park Service. The clerk of the court said “there was no such deed and the attorney for the Commissioner states that the county having had possession of this property since 1836.” The only way to determine the owner was to find the deed for the wooden bridge that was on the site prior to Burnside Bridge. The Acting Solicitor was disappointed by the delay and stated:

It appears to me to be useless to negotiate with the Board of County Commissioners of Washington County concerning the contract to take over the portion of the highway including Burnside Bridge if the control of the road and bridge is now vested in the State Roads Commission of Maryland. The letter from the chief engineer of the Commission indicates that he would not take any action unless there was an act of Congress authorizing the Government officers to take over the bridge. Another serious legal problem has arisen. Can the Secretary of Interior accept a donation of land or an interest in land with a condition that the United States maintain the property in perpetuity for a specific public use without the express authority of Congress, – I am of the opinion that he cannot.²⁰

The bridge was not acquired by the National Park Service until the 1940s after many negotiations to define who had the authority to deed the bridge to the federal government. On December 14, 1945, it was finally announced the bridge was transferred from the county to the NPS. The formal announcement stated that an act, dated April 5, 1945, “ratified and approved the transfer of the bridge and approaches to the NPS, and the title was subsequently accepted by the Secretary of the Interior.”²¹ The deed is dated November 20, 1945 and was placed in the National Park Service records as Deed No. 54 on Antietam National Battlefield.²² Vehicular traffic over the bridge would continue.

¹⁵ Washington County Historical Society, 333.34 W, The Dorsey & Spong Farms, Burnside Bridge, 1940-43.

¹⁶ Washington County Land Records (WCLR), Liber 222, Folio 179.

¹⁷ Antietam National Battlefield Archives, National Archives files, Memorandum from H.L. Brooks, Chief, Land Division. May 14, 1934.

¹⁸ WCLR, Liber 194, Folio 396.

¹⁹ Antietam National Battlefield Archives, National Archives files, Memorandum for the Secretary, November 7, 1945.

²⁰ Ibid, Memorandum for Mr. Moskey. October 4, 1934.

²¹ Ibid, Announcement, December 14, 1945.

²² Ibid, Memorandum for the Regional Director, Region One. November 30, 1945.

Simultaneous with ownership discussions, several suggestions were made to improve the state of the bridge. In 1933, repair recommendations included “placing reinforcement over the arches, repointing all of the stone work, rebuilding the portions of the sidewalls which have failed, and paving the roadway with bituminized macadam similar to the present roadway.”²³ The proposal was presented to the Quartermaster General of the Army as the battlefield was still owned by the War Department at this time.

In 1934, a Maryland state bridge expert suggested that the bridge needed cofferdams erected in order to strengthen the piers and the macadamized road surface needed to be replaced with reinforced concrete. Another proposal was to replace the mortar with a strong mortar mix which included cement.²⁴ These projects were never completed.

In 1936, a newspaper article called for the repair and alteration of Burnside Bridge due to its dilapidated state: stones were falling out of their spans. However, the National Park Service was worried that these repairs would greatly change the appearance of the famous bridge. Superintendent John Beckenbaugh believed the bridge should no longer carry vehicles, in order to prevent further damage.²⁵

In 1940, W.H. Sheffield took photographs of Burnside Bridge and the surrounding area, showing the current conditions of the bridge at that time and the adjoining landscape (figs. 22-24).



Figure 22. Photograph taken by W.H. Sheffield in 1940. View looking southeast down Burnside Bridge road. The 51st NY memorial is located on the left. The 51st PA memorial is at the corner of the bridge. Photo: Antietam National Battlefield archives images.



Figure 23. Photograph taken by W.H. Sheffield in 1940. View looking southwest toward the bridge. Memorials can be seen on the bridge. Photo: Antietam National Battlefield archives images.

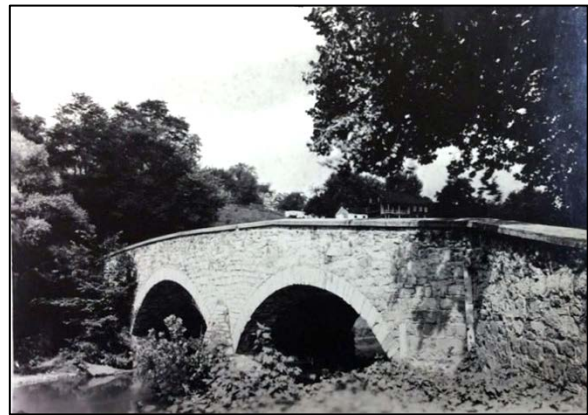


Figure 24. Photograph taken by W.H. Sheffield in 1940. View looking across to Spong farm house. Concrete coping is still in place. Photo: Antietam National Battlefield archives images.

²³ Ibid, Letter to David J. Lewis, House of Representatives. May 17, 1933.

²⁴ Ibid, Subject: Burnside Bridge. G.B. Alexander, Supt. Antietam National Battlefield. August 23, 1933.

²⁵ Ibid, Letter to the Director of National Park Service from Superintendent Beckenbaugh. September 30, 1936.

In November 1940, a large Works Progress Administration project was approved for the Burnside Bridge area (fig. 25). It included cleanup of the area; installation of rip rap to assist with stream control, demolition of the Spong farm buildings; installation of a parking area southeast of the bridge; uncovering and reconstructing the stone wall along the east side of the creek; repairing and repointing the bridge; replacing the concrete coping with wood (to bring it back to its 1862 appearance); removing the monuments from the corners and installing them on new bases near the bridge.²⁶ Most of these projects were not completed until much later.

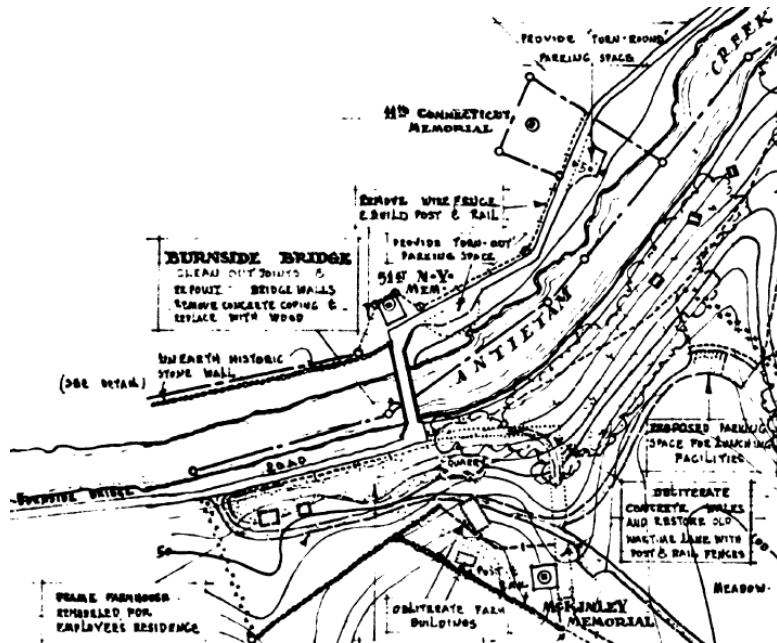


Figure 25. WPA-proposed alterations to the bridge and the area around the bridge. Drawing: NPS DSC eTIC No. ANTI 302 2010. Cropped by author. Refer to Appendix E for 11x17 pullout copy of this drawing.

Storms, Vehicles, and Repairs

Beginning in the late 1940s, the bridge was repointed every few years for continued maintenance and to upkeep a clean appearance. Portland-cement mortar was used until the 1960s. The repointing and repairing work performed in 1947 was completed by Boonsboro contractor B.L. Smith. The scope of work included “pointing and repairing of the stone work in the arches and piers” of the bridge (fig. 26).²⁷



Figure 26. Photograph from 1947 of the repointing completed by Boonsboro contractor B.L. Smith. Photo: Antietam National Battlefield archives images.

²⁶ United States Department of the Interior, National Park Service, Branch of Plans & Designs, Regional Office. “Layout Plan for Burnside Bridge – Spong Farm Area, Antietam National Battlefield Site.” 1 Drawing Sheet. Approved November 27, 1940. NPS DSC eTIC No. ANTI 302 2010.

Antietam National Battlefield Archives, Burnside Bridge box, New WPA Projects, 1940.

²⁷ Ibid, Invitation, Bid, and Acceptance, June 11, 1947.

In February 1942, a truck with overhanging sides knocked the 35th Massachusetts Volunteer Regiment monument from its foundation on the northwest corner. The monument had a large chip from the accident. It was suggested the chip be cemented on. The repair to the monument base and bridge's concrete coping was to be completed by NPS workers. It was also noted that "the retaining wall of the bridge has a decided outward bulge, nearly a foot in length of about 25 feet."²⁸ About a year later, the 21st Massachusetts Volunteer Infantry monument was knocked from its foundation for the second time in six months. A 1943 memo by the Assistant Regional Director stated: "The bridge was not designed for the use now being made of the structure, and the possibility of further damage is increased by the sharp turns in the alignment of the approaches, and the narrow width of the roadway between the parapet walls of the bridge." It was recommended that a by-pass be built in order to close Burnside Bridge from vehicular traffic.²⁹

A newspaper article published in 1951 suggested the bridge be closed to traffic. It stated: "Burnside Bridge, which survived some of the bloodiest fighting of the Battle of Antietam, is black and blue from the beating given it by modern traffic. . . Cars and trucks that use the bridge are threatening to jar out its keystones and might eventually ruin it altogether. It just wasn't built to handle modern traffic."³⁰ With a constant push to preserve the bridge, the elimination of vehicles crossing it was considered one way to solve this consequent problem.

In 1952, a massive storm hit the area causing "all the arches of the Burnside Bridge...[to be] filled with water." Debris accumulated on the roads leading to the bridge. "At one time during the storm the water at the lower end of the bridge was over 4 feet and a car was stranded. A considerable amount of driftwood had come down the creek and lodged against the pier." The same year, rehabilitation drawings from 1942 were re-reviewed by the park in an attempt to renew the structure; it was again proposed to replace the concrete coping with its character-defining wood coping.

In 1953, after a ten-foot square of masonry on the northeastern end of Burnside Bridge fell from the span, an engineer from Richmond immediately inspected the bridge. An article stated: "Burnside Bridge was erected 130 years ago when there was no concrete. The stones in the bridge are held together by a dry pack made of brown mud." Due to this construction detail, it was determined that the bridge could no longer withstand the weight of large and heavy trucks. Park Superintendent Doust said, "...we were cleaning away the driftwood that had become lodged under the bridge. We were working right under the span when one of the heavy trucks passed over. The rumbling was terrific and the old bridge seemed to groan and shutter."³¹ A subsequent proposal for a new bypass, which would result in closing Burnside Bridge to vehicular traffic, was again rejected.³² Instead, Burnside Bridge would be repaired, as stabilization of the bridge seemed imperative. Thirty-five-year veteran mason B.L. Smith of Boonsboro, was rehired to repair the bridge. In a letter to the Superintendent, Smith said he had completed the repair of the wing wall that had fallen down. This was achieved by removing this section and the bulging parts of the bridge down to the foundation and rebuilding using cement mortar. It was noted that the "old lime and sand mortar [had] disintegrated to the extent that [it] has no cementing or stabilizing qualities whatsoever."³³

²⁸ Ibid, Memorandum for the Superintendent, February 16, 1942.

²⁹ Ibid, Memorandum for the Superintendent. April 22, 1943.

³⁰ Ancestry.com, "New One Proposed: Traffic Results in Damage to Famed Burnside Bridge," *Morning Herald*, January 29, 1951.

³¹ Ibid, "Historic Bridge Near Sharpsburg Damaged by Pounding from Trucks," *Morning Herald*, January 19, 1953.

³² Ibid, "Continued Use Seen at Burnside Bridge," *Morning Herald*, December 3, 1953.

³³ Antietam National Battlefield Archives, Burnside Bridge box, Letter to Superintendent from B.L. Smith contractor, March 9, 1953.

Concurrently, officials from the Maryland State Road Commission objected to the permanent closure of the bridge. Instead, signs were installed near the bridge stating: “Bridge Unsafe for more than 3 tons, United States Department of Interior, National Park Service.” This limit still allowed large passenger vehicles but eliminated heavy truck and bus traffic. There was particular concern for school buses carrying children which crossed the bridge every day.³⁴

In October 1954, a storm, unrelated to Hurricane Hazel, washed away part of Burnside Bridge and caused damage to other area bridges.³⁵ A month later, a drunk driver hit the bridge causing minor damage.

In August 1955 (not 1953 as noted in the Peck Peck & Associates and McMullan & Associates 2014 “Pre-Design Bridge Composition & Analysis” report), construction drawings for the repair of the bridge were completed. As-built details and notes were added to the drawings in July 1956 (fig. 27). The drawings note the following tasks:

- Inside and outside walls to be Pointed and Grouted where designated by Contracting Officer
- Remove backfill over structure as directed and repair inside masonry (Point and Grout joints). Remove backfill from abutments along wing wall as shown. For backfill see Typical Section.
- Place 3-3” Weep holes pipes (cast iron) at bearing seats of each abutment and each side of Piers (18 Req’s)
- [Installation of] 1” Tie Bars Threaded both ends. Washers and square nuts. Tie Rods 2’-0” below pavement.
- 5” conc. slabs [above piers and abutments] sloped to weepholes.
- [Installation of] Reinf. Conc. Wall Variable Thickness. See Report.
- Prime and 60# double bituminous surface treatment between walls of bridge entire length, 25lb treatment 32’ North, 38’ South of bridge for better approach.³⁶

See figs. 28-31 for photographs of the repairs.

The construction work was summarized by the *Morning Herald* in May 1956. The contract included the removal of the road surface and dirt fill across the span; “a reinforced backing of concrete...tied together against spreading by a series of iron rods anchored into the concrete and original stone, refilling with crushed rock, replacing the road surface, and repointing the dry masonry walls.”³⁷

³⁴ Ibid, Memorandum, March 31, 1953.

³⁵ Newspapers.com, “Burnside Bridge Damaged by Flood,” *The Daily Mail*, October 16, 1954.

³⁶ United States Department of the Interior, National Park Service. Division of Design & Construction, Eastern Office. “Repairs to Burnside Bridge, Antietam Creek, Antietam National Battlefield Site.” *4 Sheet Drawing Set*. August 1, 1955. As Built, July 1956. NPS DSC eTIC No. ANTI 302 3002A.

³⁷ Ancestry.com, “Mission 66 NPS program,” *Morning Herald*, May 22, 1956.



Figure 28. The 1955-56 work, seen above, included removing the fill above the arches, placing reinforcing bars against the spandrel walls. Note the condition of the back of the spandrel wall. Photo: Peck Peck & Associates and McMullan & Associates Pre-Design Bridge Composition & Analysis report, 2014.



Figure 29. The 1955-56 work, seen above, included drilling holes through the arches for new weep holes. Note the condition of the back of the arch barrels. Photo: Peck Peck & Associates and McMullan & Associates Pre-Design Bridge Composition & Analysis report, 2014.



Figure 30. The 1955-56 work, seen above, included placing a concrete slab over the piers and the abutments a few feet above the springline and sloped to weep holes. Photo: Peck Peck & Associates and McMullan & Associates Pre-Design Bridge Composition & Analysis report, 2014.



Figure 31. The 1955-56 work, seen above, included placing concrete walls against the spandrel walls with tie bars between. Note the concrete chute placed against the backside of the arch barrel stones. The walls are located over the piers and abutments do not extend to the centerline of the span. Photo: Peck Peck & Associates and McMullan & Associates Pre-Design Bridge Composition & Analysis report, 2014.

In July 1956, further major flooding occurred along Antietam Creek; however, no damage to the bridge occurred due to the recently completed repairs.³⁸

Later that year, with the 100th anniversary of the battle fast approaching, the Washington County Historical Society proposed the bridge become a permanent memorial and protected from everyday vehicular traffic.³⁹ Concurrently, the construction of a new overlook was proposed in a new master plan of Antietam Battlefield and a bypass bridge, to be used by the many tourists who visit the site each year, was again discussed.⁴⁰

³⁸ Ancestry.com, "Burnside Bridge Restoration Saved Span from Flood Waters," *Morning Herald*, August 6, 1956.

³⁹ Antietam National Battlefield Archives, National Archives files, "Historical Society Votes to Sponsor Outstanding Centennial for Antietam," *The Daily Mail*, October 1956.

⁴⁰ Ibid, National Archives files, Report of Master Plan Conference on Antietam NBS, December 11, 1956.

Mission 66

In August 1966, the National Park Service celebrated the 50th anniversary of its formation. To commemorate this milestone, the NPS began “Mission 66” in 1956. This program continued through 1966 to improve conditions within the national parks as a “result of massive visitor boom after World War II.” During the ten years of the program, more than \$1 billion “was spent on infrastructure and other improvements.”⁴¹ Additionally, the 100th Anniversary of the Battle of Antietam occurred in September 1962. Because of these milestones, many projects on the Burnside Bridge were planned and completed during the 1960s.

Throughout 1962, plans were developed for rehabilitating the Burnside Bridge area. These plans included a new overlook terrace and parking atop the hill southwest of the bridge (fig. 32), sidewalks and stairs down to the bridge, the removal of the monuments at each of the four corner bridge piers to an area east of the bridge, and a new terrace alongside the creek northeast of the bridge (fig. 33).⁴²

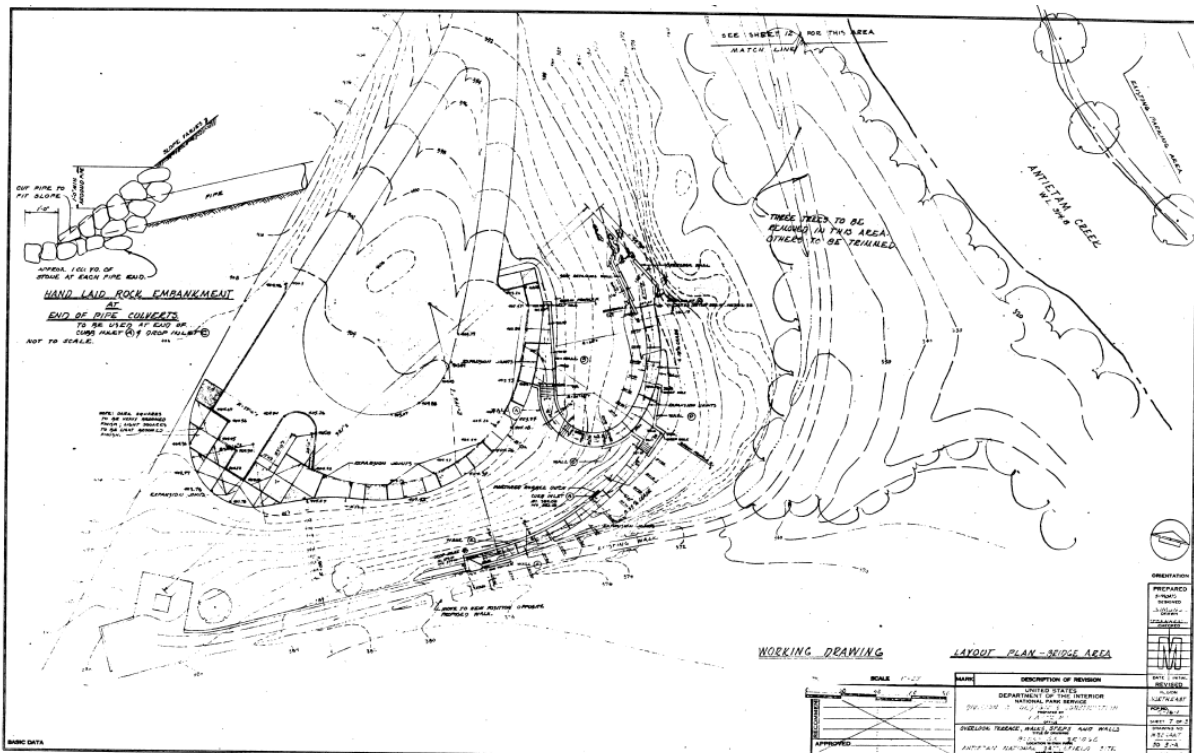


Figure 32. Redevelopment plan for the overlook terrace, walks, steps, and walls at Burnside Bridge. Drawing: NPS DSC eTIC No. ANTI 302 3031A, Sheet 7 dated October 30, 1962. Refer to Appendix E for 11x17 pullout of this drawing.

⁴¹ More information can be found at www.mission66.com/mission.html.

⁴² United States Department of the Interior, National Park Service, Division of Design & Construction, Eastern Office. “Dunkard Church Trail, Burnside Bridge Overlook, Visitor Center, Dunkard Church, Burnside Bridge, Antietam National Battlefield Park, Maryland. 12 Sheet Working Drawing Set. November 15, 1962. DSC eTIC No. ANTI 302 3031A.

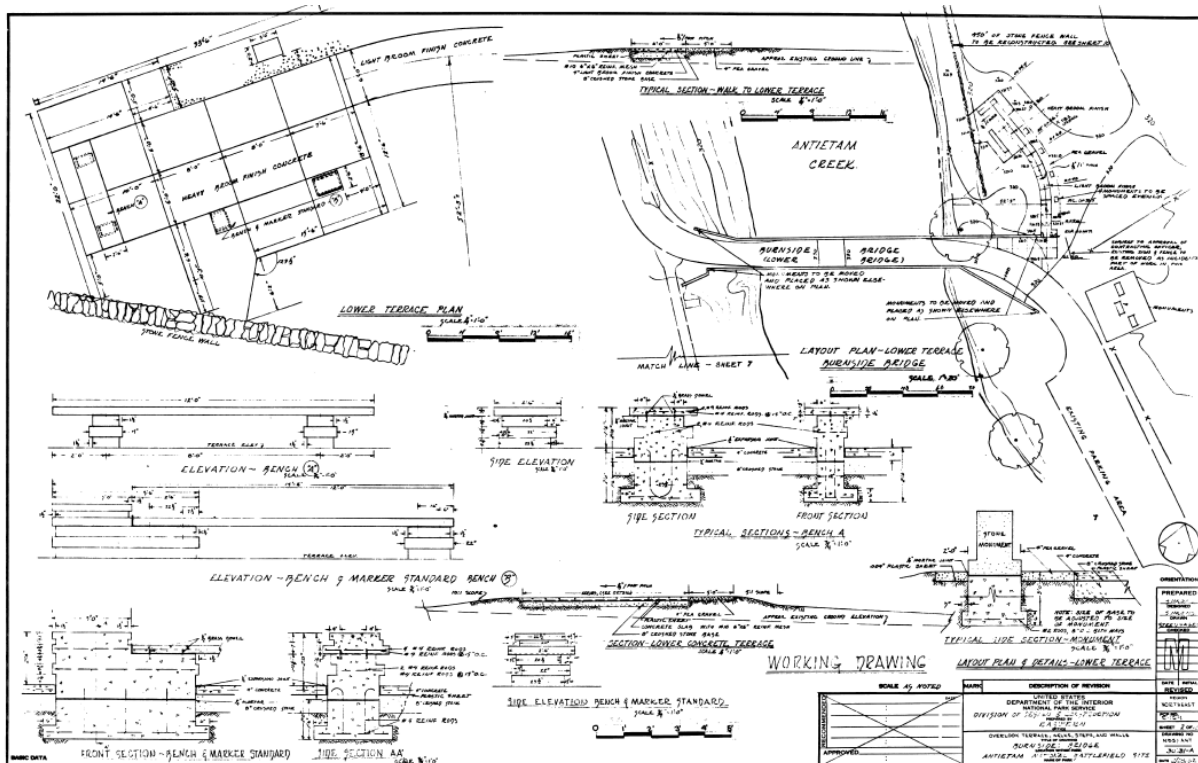


Figure 33. Redevelopment plan for the bridge and adjacent terrace. Note that the monuments were to be removed from the bridge and relocated to the east bank. Drawing: NPS DSC eTIC No. ANTI 302 3031A, Sheet 11 dated February 28, 1962. Refer to Appendix E for 11x17 pullout of this drawing.

Simultaneously three different options for a Burnside Bridge Road bypass (new road and bridge) were proposed; the third option was the most ideal due to lower costs. As a result of these plans, Burnside Bridge Road was “to be abandoned as a public right-of-way and [become] a Park road” only open to visitor foot traffic.⁴³ A preliminary drawing of the proposal can be seen in fig. 34.

Final plans were completed and various signatures attached in November and December 1964.⁴⁴ The above-mentioned items were more fully developed and included some additional changes to the area directly around Burnside Bridge, including removing the guardrails and pavement (including the parking area) along Burnside Bridge Road immediately adjacent the bridge (fig. 35).

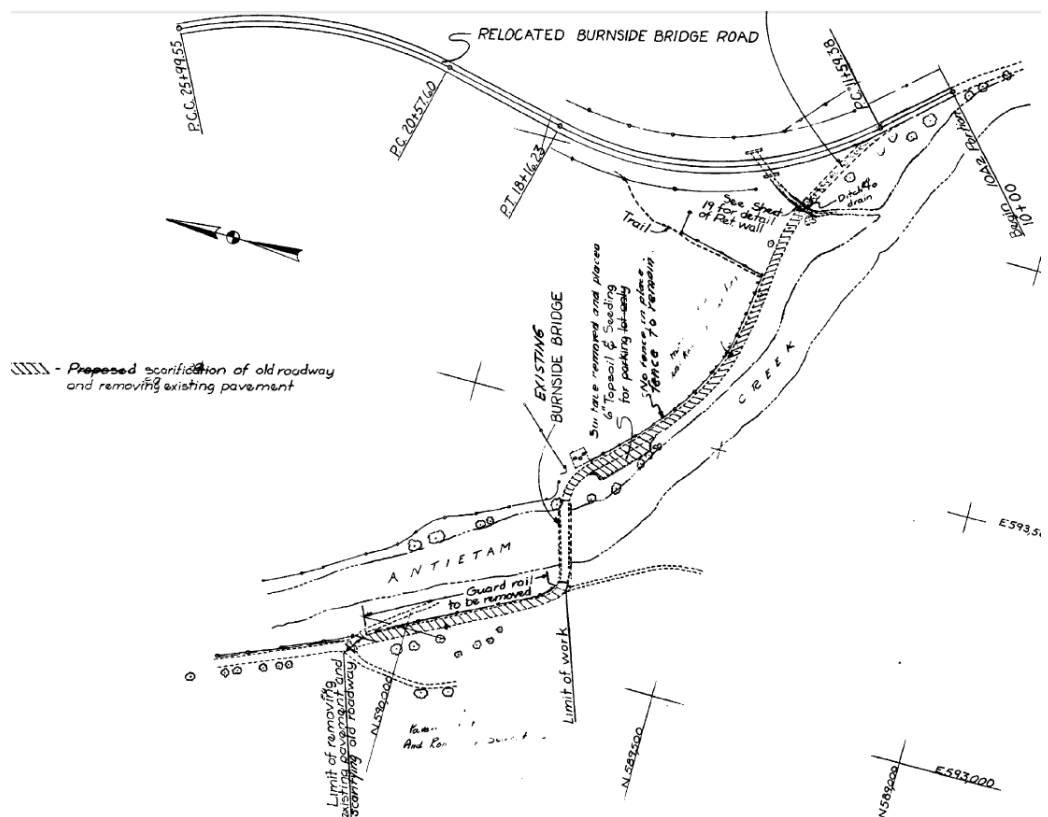
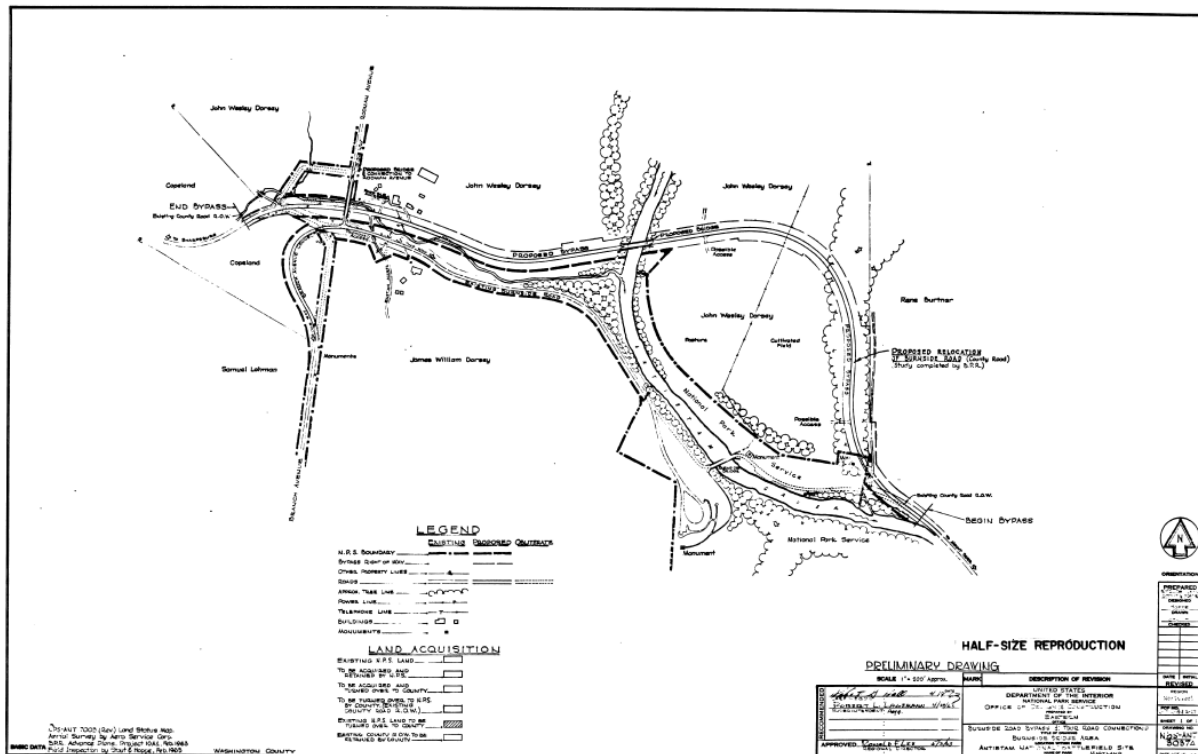
Construction began in August 1963; Frederick Kline of Frederick, Maryland was the contractor. The new approach and parking lot to the McKinley monument was completed in 1963.

In May 1964, according to the U.S. Bureau of Public Roads and a newspaper article, the bypass was sixty percent completed. Upon completion (final date unknown), the road was turned over to the Washington County Roads Department to maintain.⁴⁵

⁴³Antietam National Battlefield Archives, Burnside Bridge Box, Memorandum, January 30, 1962.

⁴⁴ United States Department of the Interior, National Park Service, Northeast Region. “Antietam Battlefield Site, Plans for Project 3A1, 7A1, 10A2 Grading, Paving, Structures, and Other Work...” *51 Sheet Drawing Set*. November/December 1964. NPS DSC eTIC No. ANTI 302 41907

⁴⁵ Ancestry.com, “By Pass on Antietam Battlefield Will Divert Traffic from Burnside Bridge.” *Morning Herald*, May 19, 1964.



Due to the commencement of construction on the bypass road and other various infrastructure improvements, documentation of the historic Burnside Bridge was completed by NPS Architect Archie W. Franzen. The resulting April 1964 Historic Structure Report (HSR) is short and provides little historic information on the bridge. It continues to reference John Weaver (Wever) as the builder of Burnside Bridge, but no bibliographical references are attached to this resource. It does provide a short description of the bridge, two sketches with rough dimensions (plan and elevation), and two photographs (fig. 36). In addition, it notes that the 1955 work to the bridge was merely “stabilizing [in] nature, to insure the load carrying capacity of the structure...” and “no restoration practices were employed.” This included the use of Portland cement to repoint the bridge and, because the bridge was being used for vehicles, the cement coping could not be replaced with more-appropriate wood coping. The HSR recommended that the mortar joints be raked and repointed “with a mortar of appropriate color and texture. Samples of mortar should be obtained from the Hitt or ‘Upper Bridge’ as this bridge was also constructed by John Wever [sic] and does not appear to have been worked over as extensively as the Burnside Bridge.” It also recommended that the wood copings be restored to the top of the parapet walls (fig. 37).⁴⁶

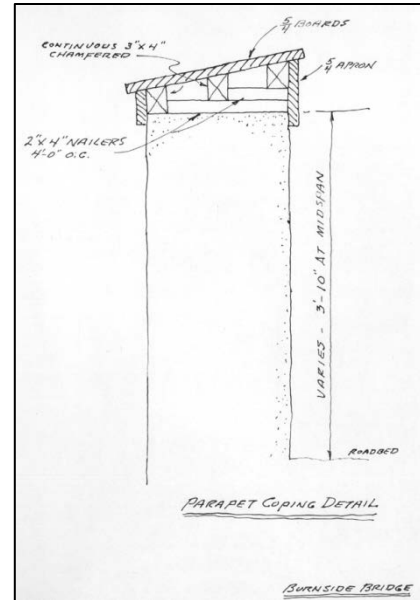


Figure 37. Sketch by Archie Franzen of a new parapet coping detail. This is for the new wood coping that will be installed. Drawing: NPS DSC eTIC No. ANTI 302 D15. Cropped by author.



Figure 36. Photograph of Burnside Bridge taken from west bank looking north towards the bridge. Photo: NPS DSC eTIC No. ANTI 302 D15.

⁴⁶ Franzen, Archie W. “The Burnside Bridge, Antietam National Battlefield.” *Historic Structure Report, Part I, Architectural Data Section*. United States Department of the Interior, National Park Service, Eastern Office, Design and Construction. April 1964. NPS DSC eTIC No. ANTI 302 D15.

Due to the bypass road and bridge and overlook project and the HSR-proposed Burnside Bridge restoration project, the bridge was indefinitely closed to vehicular traffic in 1964. The restoration completion report summarized the work:

All existing mortar was removed with hand tools; the joints cleaned and washed, and repointed. The fresh mortar duplicated in color and texture a samples of old mortar which [Supervisory Architect and contract inspector] Mr. [Archie] Franzen removed from an old bridge over the Antietam. This structure in style, age, and materials used in construction is closely akin to the Burnside Bridge.

The condition of the stonework in the Bridge made the repointing operation rather difficult. The stones, both original and replacement, differ in size; the joints varied greatly in width. In addition the removal of the concrete coping loosened the top course of stones in the Bridge walls.

When the project started, it was intended to retain an existing bulge in the south wall of the Bridge since this defect tended to emphasize the venerable character of the structure. However, the laborers in raking the joints of the bulge discovered that span was extremely weak in this sector. For this reason a change order was issued calling for the elimination of the bulge and the repair of a section of the south wall apparently damaged by an unidentified vehicle.

The carpentry work likewise presented some difficulties. Due to age, settlement, previous repair work, etc., the sidewalls had lost their graceful symmetry. The stringers which carry the new wood coping had to follow the irregular wall perfectly, The carpenters executed this involved operation in a highly creditable fashion.

All exposed wood members of the coping were finished in Pratt and Lambert's "Cattail Gray."

The project conferred two significant benefits on the Site. It resulted in the rehabilitation of the Bridge and it restored its condition to that of September 1862. The light mortar and gray wood coping combine to improve immensely the appearance of the historic landmark.

The final inspection occurred on October 12, 1964 and all work was accepted.⁴⁷

In 1966, archaeology was conducted by a graduate student Dick P. Hsu, and Charles Anthony Thompson and Clarence Joyce of Harpers Ferry Job Corps Conservation Center. They dug several test pits to reveal the original road surface along the historic Burnside Bridge Road. It was discovered that the original road surface was six inches below the present-day road. It consisted of three to four inches of grey crushed rock. A three to six-inch layer of clay was found below the original road surface. Below the clay, the archaeologists hit bedrock along the road leading to the bridge.⁴⁸

Vandalism occurred in the 1960s when the granite drum of the 51st P.V. monument was knocked down.⁴⁹

⁴⁷ Assistant Regional Director, Northeast Region. Memorandum to Director, National Park Service. "Completion Report, Rehabilitation of Burnside Bridge, Antietam National Battlefield Site." February 17, 1965. NPS DSC eTIC No. ANTI 302 D82.

⁴⁸ Antietam National Battlefield archives, Non-Technical Report.

⁴⁹ Ibid, Burnside Bridge images.

The Past 50 Years

In 1972, Hurricane Agnes struck Washington County and caused area-wide flooding. A photograph shows the water line of Antietam Creek nearly to the top of the bridge's arches (fig. 38).

Vandalism occurred to the bridge in the 1980s in a response to the presidential policies of Ronald Reagan; expletives were spray-painted on the side of the bridge.⁵⁰

In 1979, periodic bridge safety inspections by the Federal Highway Administration (FHWA) commenced; these would continue regularly through 2011. The 1979 report stated: "This bridge is generally in fair condition. There is moderate vegetation growing on piers, and moderate drift on the downstream of the bridge." The remaining life was estimated at twenty years.⁵¹

Some minor restoration work was completed in 1980. Based on photographs, NPS workers removed a portion of the southeast spandrel wall and some of the interior fill (fig. 39).⁵²

A FHWA inspection report was completed in 1983. It stated:

The bridge is deficient.



Figure 38. The creek rose during Hurricane Agnes. The bridge is partially submerged in water, as seen in this June 20, 1972 photograph. Photo: Antietam National Battlefield archives images.



Figure 39. Maintenance workers repair the outer face of the spandrel wall in 1980. Photo: Antietam National Battlefield archives images.

⁵⁰ Ibid, Burnside Bridge images.

⁵¹ U.S. Department of Transportation, Federal Highway Administration, Region 15. "Pedestrian Path over Antietam Creek, Antietam National Battlefield Site, Str. No. 3120-002T." *Bridge Safety Inspection Report*. Inspected July 18, 1979. NPS DSC eTIC No. ANTI 302 D37.

⁵² Antietam National Battlefield archives, images.

The main problems are the moderate erosion at Abutment #1 wing; the minor erosion at both breast walls; the missing stone in Abutment #2 wing; the masonry joint deterioration; and the small tree growing out of Abutment #1 breast wall.

Based on the findings of this report, we recommend that all erosion be repaired; that the missing wing stone be replaced; that the masonry joints be repointed; and that the small tree at Abutment #1 breast wall be removed.

The estimated remaining life of this structure is 17 years based on the erosion around the abutments.⁵³

Similar conditions were noted in the 1985 supplemental report and 1988 inspection report by the FHWA.⁵⁴

In an effort to repair the issues found in the various 1980s' inspection reports, the NPS contracted for repointing the bridge and recoating the roadbed in the fall of 1988; the project was completed in June 1989. A completion report from 1991 and as-built drawings (undated) explain and depict the work completed on the bridge. "The work consisted of stone masonry pier reconstruction, cleaning of stone masonry, repointing of stone masonry, placing riprap for stream bank protection, and asphaltic concrete surfacing and bituminous surface treatment of the roadbed."⁵⁵

Because of this work, the 1989 supplemental report by the FHWA administration noted the bridge to be structurally sound and the only recommendation was to repair the moderate scour on the upstream side of the piers.⁵⁶

Also during the 1980s, Historic American Building Survey (HABS) photographer Jack Boucher photographed the bridge, which shows the condition of the bridge at this time (fig. 40). Concurrently HABS documented the bridge in a three-sheet drawing set (figs. 41-42).

Throughout the 1990s, the FHWA continued their periodic inspections of the bridge (1991, 1995, and 1997). During all three inspections the bridge was noted as deficient, but only maintenance was required, including replacing riprap along the piers and abutments, to repair scour, and cleaning and repointing of masonry joints, as necessary.⁵⁷

⁵³ U.S. Department of Transportation, Federal Highway Administration, Eastern Direct Federal Division. "Pedestrian Path over Antietam Creek, Antietam National Battlefield Site, Str. No. 3120-002T." *Bridge Safety Inspection Report*. Inspected March 17, 1983. NPS DSC eTIC No. ANTI 302 D37A.

⁵⁴ U.S. Department of Transportation, Federal Highway Administration, Eastern Direct Federal Division. "Pedestrian Path over Antietam Creek, Antietam National Battlefield Site, Str. No. 3120-002T." *Bridge Safety Inspection Report*. Inspected April 30, 1986. NPS DSC eTIC No. ANTI 302 D37B.

U.S. Department of Transportation, Federal Highway Administration, Eastern Direct Federal Division. "Pedestrian Path over Antietam Creek, Antietam National Battlefield Site, Str. No. 3120-002T." *Bridge Safety Inspection Report*. Inspected March 8, 1988. NPS DSC eTIC No. ANTI 302 D37C.

⁵⁵ U.S. Department of Transportation, Federal Highway Administration, Eastern Federal Lands Highway Division, and U.S. Department of the Interior, National Park Service. "Completion Report." March 26, 1991. NPS DSC eTIC No. ANTI 302 D44. United States Department of the Interior, National Park Service. "Antietam National Battlefield, Project NPS-ANTI 900(1), Bridge Rehabilitation and Other Work on Burnside Bridge, Washington County, Maryland" *16 Sheet As Constructed Drawing Set*. Originally prepared June 1988. As-constructed drawing set date unknown. NPS DSC eTIC No. ANTI 302 41906.

⁵⁶ U.S. Department of Transportation, Federal Highway Administration, Eastern Direct Federal Division. "Pedestrian Path over Antietam Creek, Antietam National Battlefield Site, Str. No. 3120-002T." *Bridge Safety Inspection Report*. Inspected November 29, 1989. NPS DSC eTIC No. ANTI 302 D37D.

⁵⁷ U.S. Department of Transportation, Federal Highway Administration, Eastern Federal Lands Highway Division. "Pedestrian Path over Antietam Creek, Antietam National Battlefield Site, Str. No. 3120-002T." *Bridge Safety Inspection Report*. Inspected October 24, 1991. NPS DSC eTIC No. ANTI 302 D37E.

U.S. Department of Transportation, Federal Highway Administration, Eastern Federal Lands Highway Division. "Pedestrian Path over Antietam Creek, Antietam National Battlefield Site, Str. No. 3120-002T." *Bridge Safety Inspection Report, Supplemental Report*. Inspected October 3, 1995. NPS DSC eTIC No. ANTI 302 D37F.



Figure 40. 1980s Historic American Building Survey (HABS) photograph of Burnside Bridge taken by Jack Boucher. The view is from the south looking upstream. Photo: Library of Congress, <https://www.loc.gov/item/md1081/>. Refer to Appendix B for larger printout of this photograph.

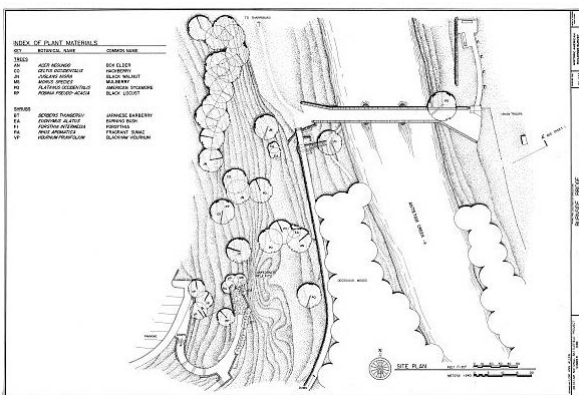


Figure 41. Sheet 2 of the HABS documentation drawings shows an overall site plan of the area around Burnside Bridge. Drawing: Library of Congress, <https://www.loc.gov/item/md1081/>. Refer to Appendix B for 11x17 pullout of this drawing.

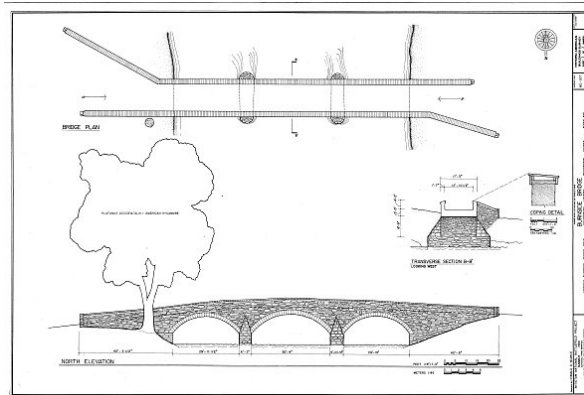


Figure 42. Sheet 3 of the HABS documentation drawings shows a plan, elevation, and section of Burnside Bridge. Drawing: Library of Congress, <https://www.loc.gov/item/md1081/>. Refer to Appendix B for 11x17 pullout of this drawing.

FHWA inspection reports throughout the 2000s describe the north spandrel wall as bulging, particularly in the area near the western abutment (also referred to as abutment #1).

The 2001 inspection report put the bridge in “fair to good condition overall” and noted issues:

Problems include minor to moderate scour along the piers and abutments; minor to moderate deterioration of the masonry mortar joints, mainly near the waterline; and some minor debris in the channel near the east abutment. Since the last inspection the bulging northwest wingwall does not appear to have changed, but a bulge in the north spandrel wall near the west abutment was noted during this inspection [fig. 43].

Although it appears that the structure is likely founded on rock, the scour should be repaired with riprap as a precautionary measure. In addition, the debris at the east abutment should be removed, and the masonry should be repointed as necessary as part of the ongoing maintenance of the structure. The condition of the northwest wingwall and north spandrel wall will continue to be monitored. With corrective action, as outlined in this report and regular maintenance, a useful life of approximately 30-35 years can be expected for this structure under current loading conditions.

The approaches are in good condition; no significant settlement or erosion is apparent.

The channel banks in the vicinity of the bridge are in satisfactory condition.”⁵⁸

In early 2001, plans were prepared for repairs to Burnside Bridge. The drawings note the following scope of work:

- Repoint joints: The most critical areas are in the lower mortar joints that are often underwater. When low water allows access, clean and repoint joints. Use pressure wash, if necessary, to remove river silt from deep underwater joints. If depth of missing mortar is greater than three inches, pump mortar into void using mechanical methods. Tool joints flat.
- Repoint joints: In areas where vegetation is growing in mortar joint, remove loose mortar, debris, and vegetation, including roots. Rake joints to a depth of $\frac{3}{4}$ inch below surface of finished joint. Press mortar firmly, completely, and uniformly into raked beds and joints. Tool joints flat.



Figure 43. Bulge (arrow) in upstream side of spandrel wall noted in 2001 FHWA inspection report. Photo: NPS DSC eTIC No. ANTI 302 D37H.

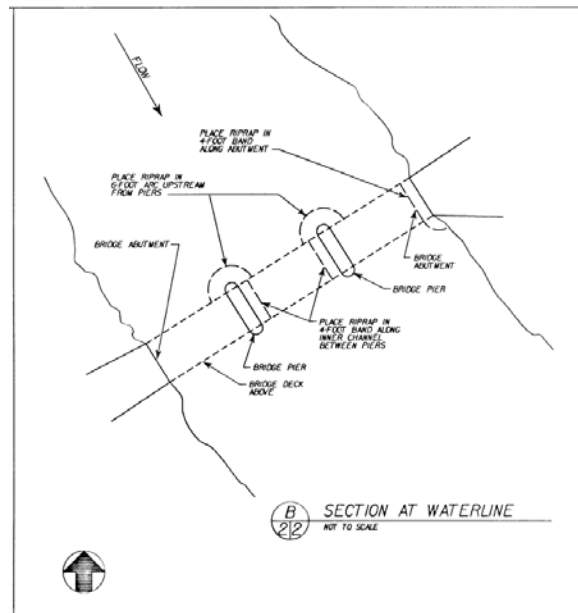


Figure 44. Areas of riprap indicated on 2001 repair drawings. Drawing: NPS DSC eTIC No. ANTI 302 80065. Cropped by author. Refer to Appendix E for 11x17 pullout of this drawing.

⁵⁸ U.S. Department of Transportation, Federal Highway Administration, Federal Lands Highway, Bridge Inspection and Management Program. “Burnside Bridge, Pedestrian Path over Antietam Creek, Antietam National Battlefield Site, Str. No. 3120-002T.” *Bridge Inspection Report, Inspection Type: Routine*. Inspected October 25, 2001. NPS DSC eTIC No. ANTI 302 D37H.

- Rip Rap: Install rip rap at base of piers and abutments. [Place riprap in 6'-0" arc upstream of piers. Place riprap in 4'-0" band along inner channel between piers. Place riprap in 4'-0" band along abutment.] Place riprap carefully to avoid stirring up sediment. Place rip rap 6 to 12" below waterline [fig. 44].⁵⁹

Later inspection reports note that this work was completed in 2002.

The 2003 FHWA inspection report demoted the bridge to fair condition. It noted that during a recent storm (Hurricane Isabel in September of the same year), the south spandrel wall at the east end of the bridge was damaged when a large tree limb fell from an adjacent tree (figs. 45-46). The top 2'-0" to 4'-0" of a 10'-0"-long section broke away, but the arch below the damaged section suffered no structural damage. The NPS installed a temporary wood barrier. It also noted that no change could be seen in the bulge in the northwest wing wall and north spandrel wall since the last inspection.⁶⁰



Figure 45. Damage to south spandrel wall (downstream) near east abutment. Photo: NPS DSC eTIC No. ANTI 302 D371.



Figure 46. The park installed a temporary wood barrier at the damaged section. Photo: NPS DSC eTIC No. ANTI 302 D371.

The storm-damaged portions were repaired by the NPS Historic Preservation Training Center (HPTC) in 2004 (figs. 47-52). Tasks included “reestablish[ing] damaged/missing masonry associated with the parapet wall, damage to the wood coping, and failing mortar joints throughout the bridge.”⁶¹

⁵⁹ United States Department of the Interior, National Park Service, National Capital Region, Maintenance and Design. “Burnside Bridge Repair, Burnside Bridge, Antietam National Battlefield.” *3 Sheet Drawing Set*. March 2001. NPS DSC eTIC No. ANTI 302 80065.

⁶⁰ U.S. Department of Transportation, Federal Highway Administration, Federal Lands Highway, Bridge Inspection and Management Program. “Burnside Bridge, Pedestrian Path over Antietam Creek, Antietam National Battlefield, Str. No. 3120-002T.” *Bridge Inspection Report, Inspection Type: Routine*. Inspected September 9, 2003. NPS DSC eTIC No. ANTI 302 D371.

⁶¹ National Park Service, Historic Preservation Training Center. “Repair and Preservation of the Burnside Bridge, Antietam National Battlefield, Sharpsburg, MD (FY04).” *Historic Structure Record of Treatment*. January 11, 2007. NPS DSC eTIC No. ANTI 302 C10.



Figure 47. A witness tree limb fell and incurred damage to the bridge during 2003's Hurricane Isabel. Photo: NPS DSC eTIC No. ANTI 302 C10.



Figure 48. Severe damage on interior face looking southeast. Photo: NPS DSC eTIC No. ANTI 302 C10.



Figure 49. Looking southwest, the damaged masonry was removed down to sound material. Photo: NPS DSC eTIC No. ANTI 302 C10.



Figure 50. The stone was relaid with historic coursing and historic construction techniques. Photo: NPS DSC eTIC No. ANTI 302 C10.



Figure 51. Scaffolding was installed on the south side of the bridge. Photo: NPS DSC eTIC No. ANTI 302 C10.



Figure 52. The completed repairs. Photo: NPS DSC eTIC No. ANTI 302 C10.

The four remaining FHWA inspection reports from 2005, 2007, 2009, 2011 note the bridge was in fair condition. Each report highlights the bulge in the north spandrel wall as a “matter of concern.” Between 2005 and 2007 the bulge appeared to have worsened (fig. 53).⁶² Furthermore, the 2011 report noted leaking water and mortar joint deterioration. It was recommended to resettle loose masonry and provide another source of drainage for the spandrel walls. The bridge received a vehicle load rating of H-10.⁶³



Figure 53. Condition of bulging northwest spandrel wall in 2005. Note the discoloration of the stone which is much darker near the bulge. Photo: 2005 Bridge Inspection Report, NPS DSC eTIC.

In January 2014, the bulge at the north spandrel wall of abutment #1 blew out and collapsed (likely due to water infiltration and mortar erosion within the wall). According to a 2014 Federal Lands Highway Emergency Inspection Report, the collapse loosened some stones on the interior side of the north parapet and opened a small hole at the base of the interior side of the parapet. “The collapsed portion of the wall had been noted in previous bridge inspection reports as bulging outward, with water leakage and mortar deterioration also present. Currently, other portions of the north spandrel wall are exhibiting similar problems and are considered to be at risk of collapse in the future.” Recommendations included installing metal flashing under the wood coping and repointing portions of the wall to deter water infiltration.⁶⁴

In June 2014, several months after the collapse, a NPS HPTC crew conducted an emergency stabilization and restored the bridge using a Maryland Heritage Areas Authorities grant. The scope of work included: installation of scaffolding in the creek (fig. 54); temporarily removing 16’-0” of wood coping (fig. 55); relaying recovered stone (80% of total) and new stone (20% of total) and pointing of spandrel and parapet walls in 1:2½ mix of Type 5 Natural Hydraulic Lime to C-144 sand from Silver Hill Aggregates, the same mix used by HPTC in 2004 (figs. 56-57); installation of stainless steel reinforcement in line with concrete support wall extant on the bridge interior; installation of three PVC weep holes beginning at bottom course of interior parapet wall and

⁶² Federal Highway Administration, Federal Lands Bridge Office, Bridge Inspection and Management Program. “Burnside Bridge, Pedestrian Path over Antietam Creek, Antietam National Battlefield, Str. No. 3120-002S.” *Bridge Inspection Report*. Inspected October 26, 2005. NPS DSC eTIC No. ANTI 302 D37K.

Federal Highway Administration, Federal Lands Bridge Office, Bridge Inspection and Management Program. “Burnside Bridge, Pedestrian Path over Antietam Creek, Antietam National Battlefield, Str. No. 3120-002S.” *Bridge Inspection Report*. Inspected November 14, 2007. NPS DSC eTIC No. ANTI 302 D37J.

Federal Highway Administration, Federal Lands Bridge Office, Bridge Inspection and Management Program. “Burnside Bridge, Pedestrian Path over Antietam Creek, Antietam National Battlefield, Str. No. 3120-002S.” *Bridge Inspection Report*. Inspected October 21, 2009. NPS DSC eTIC No. ANTI 302 D37L.

Federal Highway Administration, Federal Lands Bridge Office, Bridge Inspection and Management Program. “Burnside Bridge, Pedestrian Path over Antietam Creek, Antietam National Battlefield, Str. No. 3120-002S.” *Bridge Inspection Report*. Inspected October 25, 2011. NPS DSC eTIC No. ANTI 302 D37M.

⁶³ Peck Peck & Associates and McMullen & Associates. Rehabilitate Burnside Bridge: Pre-Design Bridge Composition and Analysis. NPS Project No. PMIS no. 211472. Contract No. P14PC00253. National Park Service: December 2014.

This rating appears to be related to the AASHTO Standard H-10 Truck which requires a clear deck width of ten feet and 20,000-pound maximum load. For more information, see

<http://www.fdot.gov/structures/StructuresManual/2007July/DesignGuidelines/SDG10PedestrianBridges.htm>.

⁶⁴ Antietam National Battlefield archives, Burnside Bridge box, FHA 2014 Bridge Inspection Report.

terminating at the exterior face of the spandrel wall; installation of a mortar wash which sloped out from the bridge and flashing atop parapet (figs. 58-59); reinstallation of wood coping.⁶⁵



Photo 54. Scaffolding was set in creek to service as a working platform. Photo: NPS DSC eTIC No. ANTI 302 127626.



Figure 55. Removing the wood coping. Photo: NPS DSC eTIC No. ANTI 302 127626.



Figure 56, left. Setting a recovered stone in place. Photo: NPS DSC eTIC No. ANTI 302 127626.



Figure 57, above. After pointing is completed. Photo: NPS DSC eTIC No. ANTI 302 127626.

⁶⁵ National Park Service, Historic Preservation Training Center. "Emergency Stabilization of Burnside Bridge, PMIS #211469 (FY14)." *Historic Structures Treatment Record*. n.d. NPS DSC eTIC No. ANTI 302 127626.



Figure 58. Installation of mortar wash atop stone parapet wall. Photo: NPS DSC eTIC No. ANTI 302 127626.



Figure 59. Installation of flashing above wood frame and below wood coping. Photo: NPS DSC eTIC No. ANTI 302 127626.

In October and November of the same year, a structural condition assessment and analysis was performed by McMullan & Associates. The scope of work included field measurements and survey, test pits, and coring through the piers. The resulting condition assessment, included in a report entitled “Rehabilitate Burnside Bridge: Pre-Design Bridge Composition and Analysis” conducted by Peck Peck & Associates and McMullan & Associates was released on December 2014, is further discussed in the Condition Assessment portion of this HSR.⁶⁶ McMullan report also included preliminary recommended treatments for the bridge, which are further discussed in the Recommended Treatments section of this HSR. The report lays out four stages for the proposed work: Field Investigation and Pre-Design Report, Schematic Design, Design Development, and Construction Documents.⁶⁷ The first phase of the project commenced in October 2015, when Antietam Creek was dammed to allow work on the piers. In April 2016, the second phase began, which includes rebuilding portions of the spandrel, parapet, and wing walls. The second phase continues at the time of this report. A separate Historic Structure Record of Treatment will be completed upon completion of the ongoing rehabilitation work.

⁶⁶ Peck Peck & Associates and McMullen & Associates. Rehabilitate Burnside Bridge: Pre-Design Bridge Composition and Analysis. NPS Project No. PMIS no. 211472. Contract No. P14PC00253. National Park Service: December 2014.

⁶⁷ Ibid.

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Architectural Description

The Historic Preservation Training Center visited the Burnside Bridge multiple times over the course of research for this HSR. This included a preliminary trip (January 2016) prior to receiving the scope of work for the project. Other site visits occurred throughout the remainder of Fiscal Year 2016. Field photographs and notes were compiled during these visits. Through these site visits, physical descriptions of features, condition assessments, and a compilation of character-defining and non-character-defining features were made. Park logistical assistance was provided by the Resource Management Division.

Building Feature Master List

The Building Feature Master List (BFML) is an overall outline-format checklist used for creating a physical description of the bridge. The BFML describes features using a hierarchal structure based on industry standards adopted by the federal government—the UNIFORMAT II (ASTM E1557 Standard, 2008) used by many facility management industry leaders, including the National Park Service’s Park Facility Management Division (PFMD). The BFML uses headings and sub-headings to divide architectural components, structural systems, mechanical systems, etc. into a simple organizational tool (Table 1).

Physical Description Summary

The Burnside Bridge has suffered from almost continual use and sparing maintenance attention since its construction in ca. 1832.¹ Due to its specific vehicular use, the structure has retained a majority of its physical characteristics and historic features. All insensitive alterations, e.g. concrete coping to replace original wood coping, have been restored to reflect character-defining features.

The original design and construction methodology of this structure comes across very strong and has resisted attempts at modernization by retaining most of its character-defining features. Despite alterations to the bridge, the basic character-defining materials and shape of the structure remain intact and can instruct the nature of its care. Future care of the bridge should be based on the sustainable preservation maintenance of the traditional construction materials and methodologies, not on covering them up or replacing them with inferior imitations.

A	Substructure
A10	Foundations
B	Shell
B10	Superstructure
B20	Exterior Enclosure
B30	Roof Closure
C	Interiors
C10	Interior Construction
C20	Stairs
C30	Interior Finishes
D	Services
D20	Plumbing
D30	HVAC
D40	Fire Protection Services
D50	Electrical
G	Building Sitework
G20	Site Improvements
G90	Other Site Work

Table 1. The basic UNIFORMAT II Building Feature Master List includes the above headings and subheadings.

¹ This is the assumed date of construction for the bridge because of a lack of primary resources. An exact date of construction may still be determined if primary resources can be found.

Burnside Bridge Physical Description

Location within the Park

Burnside Bridge is located southeast of the town of Sharpsburg. It is situated on Antietam National Battlefield and is located in the southern portion of the battlefield. The bridge spans over Antietam Creek, which bounds the battlefield on the east (fig. 60).

Burnside Bridge facilitated a road (now bypassed by a new road) leading from Sharpsburg to Rohersville. The bridge became a part of the battle due to its prime location: Confederates held the high ground on the west side of the creek (also known as the Georgian Overlook) and therefore closer proximity to Sharpsburg; Union troops held the lower ground on the east side of the creek and made many attempts to cross the creek. They were able to charge the bridge on their final attempt and successfully pushed the Confederates to the south (fig. 61).

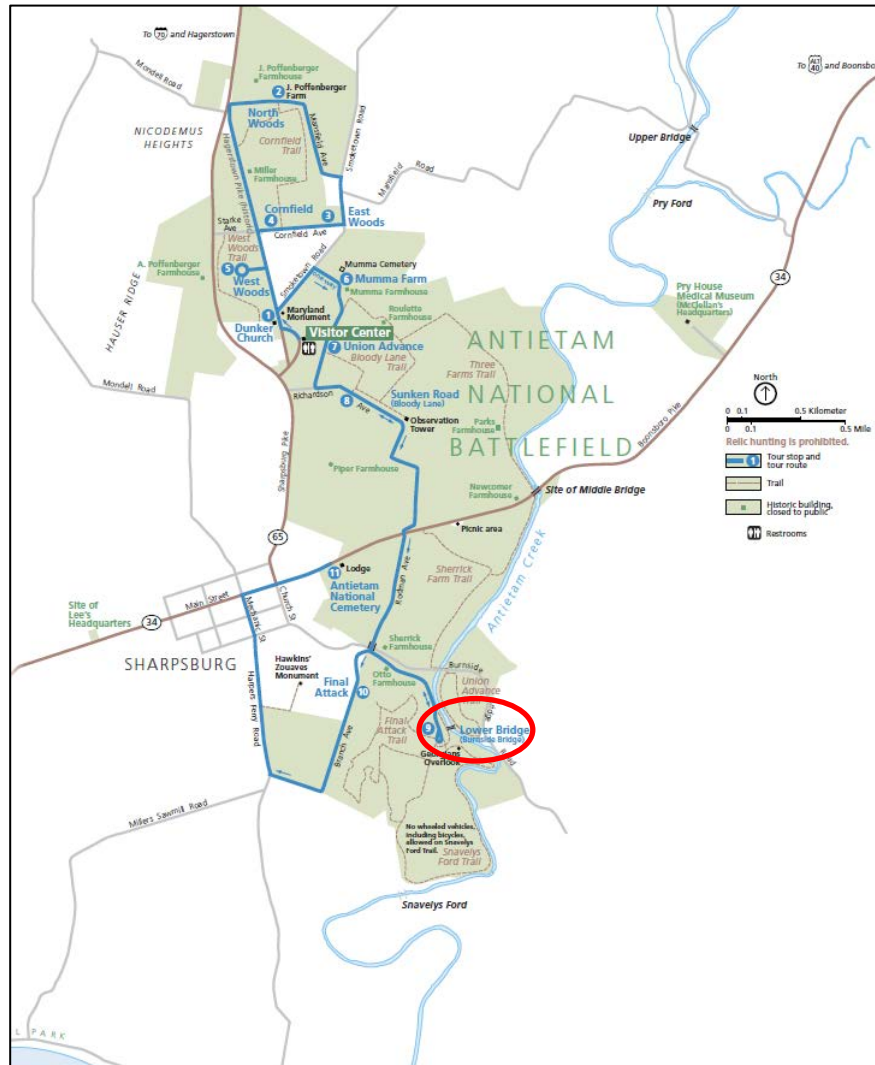


Figure 60. Map of Antietam National Battlefield, Burnside Bridge is situated between Sherrick and Otto farms, spanning over Antietam Creek. Burnside Bridge and surrounding area is highlighted by a red oval. Source: Harpers Ferry Center.



Figure 61. A sketch of “The charge across the Burnside Bridge—Antietam—1 pm Sept. 17, 1862” by artist Edwin Forbes. Source: Library of Congress, <https://www.loc.gov/item/2004661909/>.

Overall Description

Burnside Bridge is a three span stone masonry structure with spandrel walls and fill in between (figs. 62-63). The arched spans (arcs of a circle) “are supported by the abutments and two six-foot-wide piers rising from the stream bed.”² The central span is 35’-6” clear between piers. Both side spans measure 30’-0” (figs. 64-65). NPS architect Archie Franzen described in his 1964 Historic Structure Report: “the piers are deeper than the bridge width as they are rounded out past spandrel and arch faces, from the spring line of the arches down to their bases, to ease floating debris past the piers. They are terminated at the top with stone laid up to form conical caps melding with the spandrel faces.”³ All of the *voussoirs* (ring stones) in the arches are of similar size and no keystone exists.

The parapets are waist high and are capped with sloped wood coping, shedding rain and snow. The coping is composed of “boards of varying widths running transversely to the parapet length and nailed to three rows of concealed timbers running lengthwise with the parapet. An apron scantling

² Antietam National Battlefield Archives (ANTI), Burnside Bridge Box, Archie Franzen, 1964 Historic Structures Report, Burnside Bridge. n.p.

³ Ibid, n.p.

made the closure between the coping and the masonry on both sides of each parapet.”⁴ At the corners, square stone piers terminate the bridge, which are not original to the bridge; originally, the wing walls simply terminated prior to the piers. In the late nineteenth century, commemorative monuments were installed at each of the four the corners. In ca. 1963 the monuments were relocated to the east side of the bridge to be standalone monuments; it is unknown if the stone piers under the monuments were replaced at this time or a later time, as the current piers are not the historic piers.

The entrances to the bridge are splayed, and have been since the initial construction, due to the close proximity of the hill on the west side and the road running parallel to the creek on the east side. According to Franzen’s HSR, the clear width of the roadbed is 13’-4”.⁵

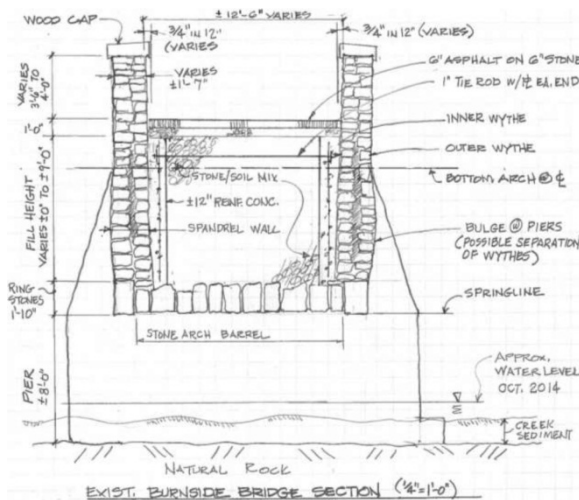


Figure 62. Sketch showing a cross section of the bridge. Photo: 2014 Pre-Design report.

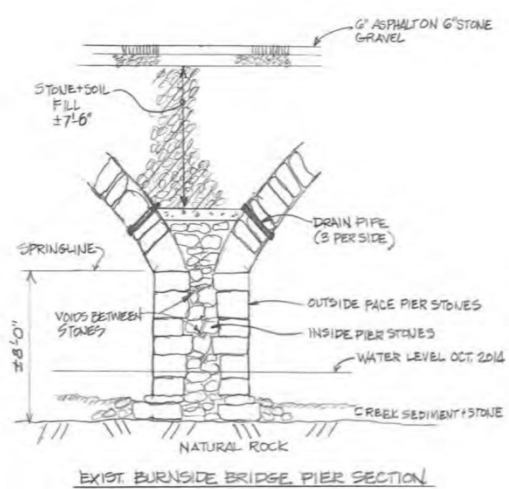


Figure 63. Sketch showing a section through one of the piers. Drawing: 2014 Pre-Design report.



Figure 64. North elevation, from west bank, during Phase I of rehabilitation. Photo: HPTC, 02/25/16.



Figure 65. South elevation, from east bank, during Phase I of rehabilitation. Photo: HPTC, 02/25/16.

⁴ Ibid, n.p.

⁵ Ibid, n.p.

Building Feature Master List Descriptions

G	SITEWORK	
G90	OTHER SITEWORK	
G9090	BRIDGE	
G909001	Abutments	

According to the McMullan & Associates assessment team (Fall 2014), “the abutments appear to be constructed in a similar manner as the piers” (see G909003 Piers for more information). Their width is unknown. A single core was drilled approximately 10’-0” behind the west abutment by the team. The core displayed the “same soil and stone fill” which exists above the arches, from just below the bridge deck down to bedrock (located approximately 15’-0” below the surface of the bridge deck).⁶

G909003	Piers
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According to the McMullan & Associates assessment team (Fall 2014), the exterior surfaces of the piers were constructed with “squared” limestone of varying size. “Coursing heights varied from [0’-10” to 1’-4”] with length of stones [2’-0” to 3’-0”]. Mortar joints on the face of the piers have been pointed with what appears to be a hard cementitious mortar. . . . The width of the face stones is not known but at the corners of the piers the width of the face stones appears to be” 1’-0”.⁷ At several arch springpoints, a ledge is located at the top of the pier. This ledge extends 0’-2” to 0’-3” beyond the bottom surface of the arch.⁸

“Cores were taken from the top surface of the bridge through the middle of each pier. The contents of the cores consisted of several fragments of limestone [fig. 66]. Only a few hard lumps were extracted from the corings with no sand or soil. There were a few fragments with a thin layer of light brown mortar on the top or bottom. The lack of mortar suggests that the original mortar has deteriorated so that it is no longer hard. Based on the cores, the interior construction of the piers is believed to be smaller flat stones with little or no mortar between them. Cores extracted from the stones varied in strength from 7,830 to 19,610 psi.”⁹



Figure 66. Material extracted from the interior of the piers. Note the material from the pier below the arch bearing indicated by the arrow. Photo: 2014 Pre-Design report.

The cores show that natural sandstone bedrock is located below the piers, approximately 20’-0” below the surface of the bridge deck. The cores into the bedrock extended 25’-0” to 29’-0”.¹⁰

⁶ Antietam National Battlefield. Peck Peck & Associates. Rehabilitate Burnside Bridge: Pre-Design Bridge Composition and Analysis. NPS Project No. PMIS no. 211472. Contract No. P14PC00253, p. 17.

⁷ Ibid, p. 16.

⁸ Ibid, p. 10.

⁹ Ibid, pp. 16-17.

¹⁰ Ibid, p. 17.

G909004	Superstructure
G909004-1	Arches

According to the McMullan & Associates assessment team (Fall 2014), the three barrel arches “are constructed of roughly squared stones laid on circular formwork with the joints bedded with mortar. The depth of the...barrel stones could not be determined and is presumed to be approximately the same or slightly smaller than the” *voussoirs*.¹¹ The limestone *voussoirs* of the arch are 1’-10” in height and vary in width from approximately 1’-0” to 1’-4”.¹²

The surface joints of the mostly limestone (and few sandstone) barrel stones “have been pointed with a fairly hard mortar. This pointing mortar was observed to vary in thickness from [0’-0¼”] to several inches thick. A rebar was used to probe between the stones in a few locations where the outside mortar was missing. At these locations, the head joints were more than [1’-0”] in depth. The head joints between stones (parallel to arch span) were observed to be irregular in shape and in some cases these are a few inches in width. The mortar in these head joints was found to be either a soft sandy mortar or a material containing clay or silt. The bed joints (perpendicular to the span) are more squared in shape and are all filled with pointing mortar.”¹³

G909004-2	Fill
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Test pits were executed at each end of the bridge behind the abutment by the McMullan & Associates assessment team in Fall 2014 (fig. 67). The pits revealed fill composed of 0’-5”- to 0’-6”- thick, irregular-shaped stone mixed with wet, cohesive soil (fig. 68). “The edges of these stones are in contact with each other with the interstitial spaces filled with soil. The soil retained its shape when rolled into a ball or a cylinder with one’s hand. This fill was placed in the 1953 rehabilitation when the original fill was removed for installation of the concrete walls.”¹⁴



Figure 67. Test pit behind the west abutment. Arrow indicates tie bar. Note exposed surface of concrete wall on the left side of the pit. Also, note the brown color of the fill material. Photo: 2014 Pre-Design report.



Figure 68. Fill material from the test pit behind the west abutment. Note the size of the stones. Photo: 2014 Pre-Design report.

¹¹ Ibid, p. 10.

¹² Ibid, p. 8.

¹³ Ibid, p. 10.

¹⁴ Ibid, p. 11.

G909004-3	Spandrel Walls & Wing Walls
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The McMullan & Associates assessment team (Fall 2014) noted that the “spandrel walls are constructed of two wythes of squared stone in random coursing. Both the wall width and parapet width were observed to vary from [1’-7” to 1’-8”].” A concrete wall was poured behind the spandrel walls historically. “No evidence was found of a mechanical tie between the spandrel wall and the concrete wall in 1956. At one location a hooked smooth ½”-diameter bar was found extending into the inner wythe but this appears to have been a tie for the formwork.”¹⁵

During an August 2014 visit, to observe repairs to the northwest spandrel being completed by HPTC, the same assessment team found a “damp lime mortar/soil mixture . . . between [the] wythes of stone.” In addition, “several feet of the outside face of the spandrel wall stone was removed to allow observation inside the wall. Many of the stones on the outside face overlap the stones on the inside face by only” 0’-2” to 0’-3” (fig. 69). No tie stones were observed which extend between the wythes (fig. 70). “In many cases, some of the space between the wythes was filled with smaller flat stone with little or no mortar. A few of the inner wythe stones were removed with little effort, exposing the concrete wall. The stone surface did not appear to be bonded to the concrete.”¹⁶

A large witness tree, which was extant during the battle of Antietam, is located at the northeast corner of the bridge.



Figure 69. Sectional view of the parapet and the spandrel wall which shows the double-wythe wall construction. Note the limited overlap of the stones of each wythe. Photo: 2014 Pre-Design report.



Figure 70. The stones below the asphalt and gravel are part of the spandrel wall. Note the smaller stone used to pin the larger stone overlaps between the wythes. Note also the lack of mortar. Photo: 2014 Pre-Design report.

¹⁵ Ibid, pp. 12-13.

¹⁶ Ibid, p. 12.

G909005	Decking
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According to the McMullan & Associates assessment team (Fall 2014), the bridge deck “is composed of an exposed aggregate finish over [0’-6”] of asphalt over [0’-6”] of gravel on the stone fill [of the superstructure]. ... The deck surface in some cases, particularly near the west end, slopes toward the parapet [fig. 71]. There is a high point of the deck at the center of the bridge at 330.8’ elevation and low points at the east and west ends, at 326.8’ and 329.6’ respectively, measured just outside of the abutment walls.”¹⁷



Figure 71. The deck abuts the parapet on each side of the bridge. The surface of the deck is fairly level between parapets. Water was observed to run against the northwest parapet wall during coring and during rain. Photo: 2014 Pre-Design report.

HPTC analysis of the roadbed slopes determined the west slope to be approximately 1:60 and the east slope to be approximately 1:10.

G909006	Parapets
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According to the McMullan & Associates assessment team (Fall 2014), the “parapets [were] constructed similarly to the spandrel wall with two wythes of stone and lime-clay mortar capped with wood... [fig. 72]. ... The variance in stonework and mortar joint color that comprises the parapet is evidence of many different repairs over time.”¹⁸

A modern wood coping is located atop the parapet. Metal flashing is located under the wood, but there is no mortar wash atop the stone of the parapet (fig. 73).



Figure 72. Construction of the parapet. Note the smaller flat stone units on the interior and the lack of mortar between the stones. There is little overlap between the two wythes of stones. Photo: 2014 Pre-Design report.



Figure 73. Construction of the wood coping over the parapet. Note the rough surface of the top of the parapet could allow water to sit and infiltrate the wall. Photo: 2014 Pre-Design report.

¹⁷ Ibid, p. 15.

¹⁸ Ibid, p. 14.

G909007	Drainage
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While the investigation team was core drilling through the piers, the water used as part of the drilling process “was observed to flow readily from” weep pipes which were placed in the 1950s to drain the fill to the exterior of the arches.¹⁹ These weep pipes were composed of metal.

¹⁹ Ibid, p. 11.

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Character-Defining Features

Each historic building is unique, with its own identity and its own distinctive character. Character refers to the visual aspects and physical features that comprise the appearance of historic buildings. Character-defining elements include the overall shape of the building, its materials, craftsmanship, decorative details, interior spaces and features, as well as the various aspects of its site and environment. Identifying and preserving a building's character-defining features is essential.

Character-defining features (CDFs) are defined in Director's Order 28, *Cultural Resources Management Guidelines*, as follows:

A prominent or distinctive aspect, quality, or characteristics of a historic property that contributes significantly to its physical character. Structures, objects, vegetation, spatial relationships, view, furnishings, decorative details, and materials may be such features.

In order to ascertain the important aspects of a building for future reference and analysis character-defining features must be recorded. These are prominent or distinctive aspects, qualities, and characteristics of a historic property that contribute significantly to its physical character as represented at the time of intervention or treatment.

The process used in this assessment for determining the character-defining features was adapted from the NPS Preservation Brief #17: "Architectural Character: Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their Character," and are in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties* and NPS Management Policies and Guidelines, specifically Director's Order 28, *Cultural Resource Management Guidelines*.

Preservation Brief #17 divides the assessment of character-defining features into three steps:

1. Identify the Overall Visual Aspects,
2. Identify the Visual Character at Close Range,
3. Identify the Visual Character of Interior Spaces, Features, and Finishes.

The purpose of Preservation Brief #17 is to help the owner or the architect identify those features or elements that give the building its visual character and that should be taken into account in order to preserve them to the maximum extent possible. The Brief states:

There are different ways of understanding old buildings. They can be seen as examples of specific building types, which are usually related to a building's function.... Buildings can be studied as examples of using specific materials.... They can also be considered as examples of an historical period, which is often related to a specific architectural style....

There are many other facets of an historic building besides its functional type, its materials, or construction or style that contribute to its historic qualities or significance. Some of these qualities are feelings conveyed by the sense of time and place or in buildings associated with events or people. A complete understanding of any property may require documentary research about its style, construction, function, its furnishings or contents; knowledge about the original builder, owners, and later occupants; and knowledge about the evolutionary history of the building. Even though buildings may be of historic, rather than architectural significance, it is their tangible elements that embody its significance for association with

specific events or persons and it is those *tangible elements* both on the exterior and interior that should be preserved.

Therefore, the approach taken in this Brief is limited to identifying those visual and tangible aspects of the historic building. While this may aid in the planning process for carrying out any ongoing or new use or restoration of the building, this approach is not a substitute for developing an understanding about the significance of an historic building and the district in which it is located.

If the various materials, features, and spaces that give a building its visual character are not recognized and preserved, then essential aspects of its character may be damaged in the process of change.

A building's character can be irreversibly damaged or changed in many ways, for example, by inappropriate repointing of the brickwork, by removal of a distinctive side porch, by changes to the window sash, by changes to the setting around the building, by changes to the major room arrangements, by the introduction of an atrium, by painting previously unpainted woodwork, etc.

In summary, the Secretary of the Interior's Standards for the Treatment of Historic Properties embody two important goals:

1. the preservation of historic materials
2. the preservation of a building's distinguishing character

By succeeding at these two goals, it is likely that a building's historic integrity will be preserved.

Extant Character-Defining Features (to be retained)

Overall Visual Aspects

Shape and Mass

- Three-span stone masonry bridge with spandrel walls and fill in between (figs. 74-75).
- Arched spans and are supported by abutments (fig. 76) and two interstitial rounded stone masonry piers anchored in the stream bed and slightly extend out past the spandrel and arch faces (fig. 77).
- Stone masonry parapets are an extension of the spandrel walls (no break or watertable) (fig. 78).
- Stone masonry wing walls at each end of the bridge. On the west bank the north wing wall is angled to accommodate vehicles entering from the road; likewise occurs to the south wing wall of the east bank (fig. 79).



Figure 74. The north elevation of the three-span Burnside Bridge from the west bank with Antietam Creek flowing underneath and through it. Photo: HPTC, 02/25/16.

- Stone masonry piers (not original, but added to accommodate Civil War commemorative monuments) at the end of each wing wall (fig. 80).



Figure 75. Fill was removed from between the spandrel walls during the currently ongoing rehabilitation project. Photo: HPTC, 01/20/16.



Figure 76, right. The west abutment wall from underneath the arch. Photo: HPTC, 10/27/15.



Figure 77. The two piers project from the face of the bridge spandrel walls and are rounded to ease water flow under the bridge. A footing is being poured around each pier during the current rehabilitation project. Photo: HPTC, 11/18/2015.



Figure 78. The parapet walls (above dotted line) are a continuation of the spandrel walls with no breaks or water tables. Photo: HPTC, 01/20/16.



Figure 79. The south wing wall on the east bank (shown here) and the north wing wall on the west bank are splayed to accommodate turning vehicles onto the bridge. Photo: HPTC, 01/20/16.

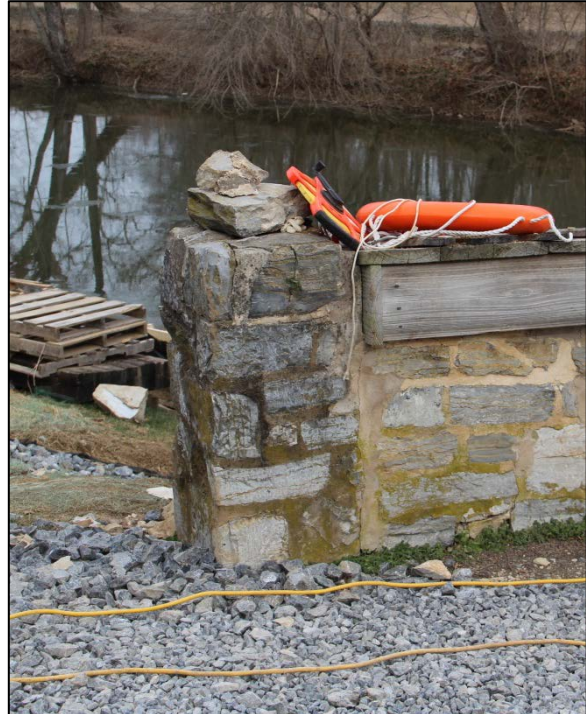


Figure 80, right. One of the stone piers at the end of a wing wall which was constructed after the Civil War for a commemorative monument, later removed. Photo: HPTC, 01/20/16.

Roof and Related Features

- There are no *Roof and Related Features* at Burnside Bridge.

Openings

- Three arched spans (arcs of a circle) allow Antietam Creek to flow under and through the bridge (see fig. 74).
- The central span is 25'-6" between the two stone masonry piers. Each side span measures 30'-0" between a stone pier and adjacent abutment walls.

Trim and Secondary Features

- Wood coping of small boards perpendicular to the length of the wall and sloped toward the creek (fig. 81).
- *Voissoirs* (arch ring stones) are pronounced; no keystones are present (fig. 82).



Figure 81. Wood coping boards run along the top of the parapets sloping toward the creek. Photo: HPTC, 01/20/16.



Figure 82. *Voussoirs* ring the arch. Photo: HPTC, 01/20/16.

Setting (fig. 83)

- Rural setting.
- Component of battlefield landscape.
- Spans over Antietam Creek.

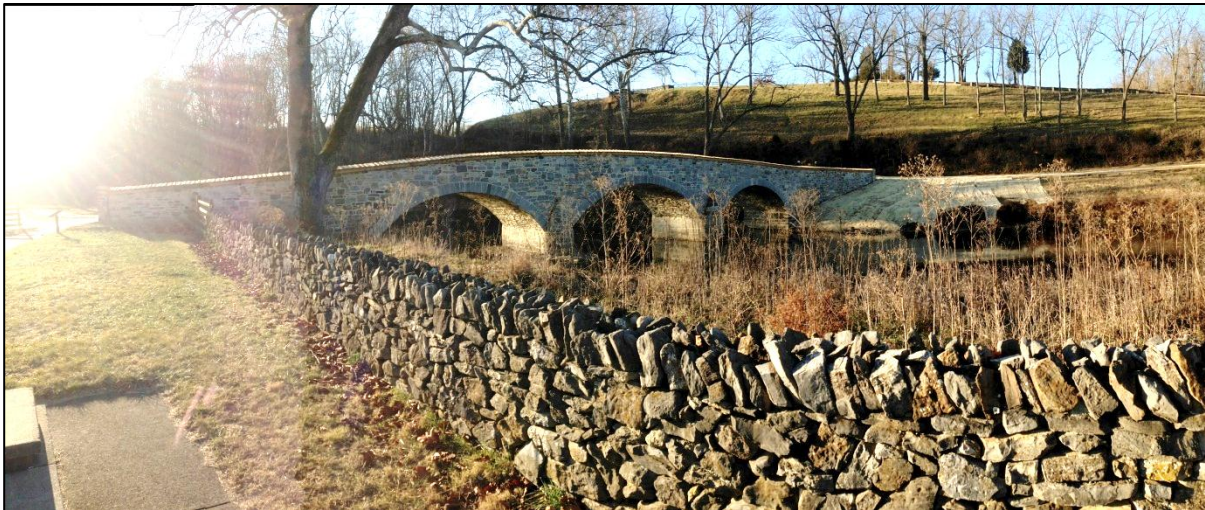


Figure 83. Burnside Bridge retains is rural setting as part of the Antietam Battlefield landscape. Photo: HPTC, 12/29/16.

Character at Close Range

Materials at Close Range

- Faced rubble stone masonry laid in some historically correct lime-based mortar (Portland cement-based mortar is not character defining) (see figs. 78-82).
- Wood coping of small boards perpendicular to the length of the wall and sloped toward the creek (see fig. 81).

Craft Details

- Faced rubble stone masonry laid in some historically correct lime-based mortar (Portland cement-based mortar is not character defining) (see figs. 78-82).
- *Voissoirs* (arch ring stones) are pronounced; no keystones are present (see fig. 82).

Interior Visual Character

There are no *Individual Spaces, Related Spaces & Sequence of Spaces, Interior Features*, or interior *Surface Materials and Finishes* at Burnside Bridge.

Condition Assessment

The conditions assessment definitions used for this HSR are based on those outlined in the NPS PFMD's Asset Management Process (AMP), the Facilities Management Software System (FMSS), and the Facility Condition Assessment Survey (FCAS) and adapted for use by HPTC. For the purpose of this report, these definitions were strictly adhered to as a way to qualitatively assess the current condition of the Burnside Bridge at Antietam National Battlefield.

Qualitative Condition Ratings

Good

- Routine maintenance should be sufficient to maintain the current condition; and/or
- A cyclic maintenance or repair/rehabilitation project is not specifically required to maintain the current condition or correct deficiencies.

Fair

- The feature generally provides an adequate level of service to operations, but
- The feature requires more than routine maintenance, and
- Cyclic maintenance or repair/rehabilitation work may be required in the future

Poor

- Feature requires immediate attention;
- Routine maintenance is need at a much higher level of effort to meet significant safety and legal requirements;
- Cyclic maintenance should be scheduled for the current year; and/or
- A special repair/rehabilitation project should be requested consistent with park requirements, priorities, and long-term management objectives.

Maintenance Deficiency Priority Ratings (10-Year Rating Period)

Minor – Short-Term/Long-Term Priority

- This rating indicates standard preventative maintenance priorities and preservation methods have not been follow; or
- There is reduced life expectancy of affected adjacent or related materials and/or systems within 5 to 10 years and beyond; or
- There is condition with a long-term impact within 5 to 10 years and beyond.

Serious – Immediate/Short-Term Priority

- This rating defines a deteriorated condition that if not corrected within 1 to 5 years will result in the failure of the feature; or
- A threat to the health and/or safety of the user may occur within 1 to 5 years if the ongoing deterioration is not corrected; or
- There is ongoing deterioration of adjacent or related materials and/or features as a result of the feature's deficiency.

Critical – Immediate Priority

- This rating defines an advanced state of deterioration which has resulted in the failure of a feature or will result in the failure of a feature if not corrected within 1 year; or
- There is accelerated deterioration of adjacent or related materials or systems as a result of the feature's deficiencies if not corrected within 1 year; or
- There is immediate threat to the health and/or safety of the user; or
- There is failure to meet a legislated requirement.

Not Rated

- The feature was not rated as it was not extant at the time of the report or is non-contributing, removed, and not planned to be replaced.

Code Compliance

Both NPS policies and federal regulations stipulate that when an historic structure is preserved and/or rehabilitated, attempts should be made to meet applicable nationally-accepted model building codes to the maximum extent feasible. Compliance with nationally-accepted codes does not automatically trigger a complete code-based upgrade. Alternative criteria exist for alterations to historic structures; these typically encourage flexibility in the literal application of the code intent.

The *Public Buildings Amendment of 1988* instructs Federal agencies to follow “to the maximum extent feasible,” as determined by the administrator or head of the agency, the “...nationally recognized model building codes and other applicable nationally recognized codes such as electrical codes, and fire and life safety codes.” The National Park Service intends to consult pertinent national, state, and local codes, and typically applies to most strident code requirements. The National Capital Regional Office (NPS) Structural Fire Safety leader will be the Authority Having Jurisdiction (AHJ) for final determination of code applications for these structures.

The National Park Service has prepared Design Standards for all construction projects, including those affecting historic structures.¹ The design standards present all codes that should be reviewed and includes the most recent copies of the following major codes and applicable laws, policies, codes, directives, standards, and NPS guidelines. The design standards present requirements for accessibility, civil, and environmental engineering, landscape architecture, architecture, including

¹ Denver Service Center. “Design Standards.” *Denver Service Center Workflows*. National Park Service, Department of the Interior. 2009. Accessed at <<http://www.nps.gov/dscw/dstandards.htm>> on March 6, 2012.

roofing and waterproofing, structural, mechanical, safety and fire protection, electrical, lighting, and sustainability disciplines.

Major codes, laws, standards, and guidelines that are part of the NPS Design Standards include:

- *Architectural Barriers Act Accessibility Standard (ABAAS)* for Federal Facilities, 2004
- *International Building Code (IBC)*, 2009
- *International Existing Building Code (IEBC)*, 2009
- *National Fire Protection Association 101 (NFPA 101)*, Life Safety Code
- *National Historic Preservation Act of 1966 (NHPA)*, amended
- *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings (36 CFR 68)*, 1995
- *The Secretary of the Interior's Standards for the Treatment of Historic Properties and the Guidelines for the Treatment of Cultural Landscapes*
- *The Secretary of the Interior's Standards and Guidelines for Archeological Documentation*
- *Uniform Code for Building Conservation*
- *Building Construction and Safety Code (NFPA 5000)*
- *National Fire Protection Association 70 (NFPA 70)*, National Electrical Code
- *Installation of Lightning Protection Systems (NFPA 780)*
- *Code for the Protection of Cultural Resource Properties (NFPA 909)*
- *Code for the Fire Protection of Historic Structures (NFPA 914)*
- *Safeguarding Construction, Alteration, and Demolition Operations (NFPA 241)*
- *Director's Order (DO) 50B, Risk Management (Manual 50B)*
- *Director's Order (DO) 58, Structural Fire Management (Manual 58)*
- 5 U.S.C § 7902 (Safety Program)
- 15 U.S.C § 2225 (Fire Prevention and Control)
- 29 U.S.C § 668 (Occupational Safety and Health)
- 40 U.S.C § 619 (Construction, Alteration, and Acquisition of Public Buildings)

Summary of Conditions

Overall Burnside Bridge meets the definition of **poor** overall condition and has an overall maintenance deficiency rating categorized as **serious**.

The features with the most serious maintenance deficiencies, taken from Table 2 below, include:

- Vertical cracks in piers (mortar joints and stone units)
- Missing mortar throughout bridge
- Lack of bedding mortar throughout bridge (found through core testing)
- Lack of mortar (bedding and pointing) below water line
- Delaminated barrel stones
- Cracks in spandrel walls above each arch
- Fill does not adhere to interior concrete walls (1953), this could cause lateral pressure
- Fill can retain water which does not easily drain away

- Wythes of spandrel, parapet, and wing walls separating and bulging, as well as leaning out over water
- Road deck is sloped to drain toward parapet walls
- Wood coping does not have metal flashing underneath

<i>Table 2. Burnside Bridge Summary of Conditions Table</i>				
UNIFORMAT II Outline Data			Condition Rating	Deficiency Rating
G	BUILDING SITEWORK			
G90	OTHER SITE WORK			
G9090	BRIDGE			
	G909001	Abutments	FAIR	MINOR
	G909003	Piers	POOR	CRITICAL
	G909004	Superstructure		
	G909004-1	Arches	POOR	CRITICAL
	G909004-2	Fill	POOR	SERIOUS
	G909004-3	Spandrel Walls & Wing Walls	POOR	CRITICAL
	G909005	Decking	FAIR	SERIOUS
	G909006	Parapets	POOR	SERIOUS
	G909007	Drainage	FAIR	SERIOUS
<i>End of Table.</i>				

Burnside Bridge Condition Assessment

Note: Additional photographs of all building features are found in the physical description section.

G	SITEWORK		
	G90	OTHER SITEWORK	
	G9090	BRIDGE	
	G909001	Abutments	

Due to the absence of distortion in the three arches, the McMullan team believed there “to be sufficient mass to resist the horizontal thrust and vertical weight [of] the arches.”¹

Condition Rating: FAIR
Deficiency Rating: MINOR

G909003	Piers
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Some vertical cracks, which had separated, were found in the stones and in the mortar joints of the piers by the McMullan & Associates assessment team (Fall 2014) (fig. 84); these were filled with mortar. The cracks typically occurred near the *voussoir* (ring stone) spring points. Additionally, “some gaps between stones below the water line [were] missing mortar. These were probed with a rebar and varied from a few inches up to [2’-6”] in depth [fig. 85].” A layer of loose stone around the base of each pier prevented the team from accessing the face stones in these locations; however, “there were no indications of stream scour or signs of significant recent movement.”²



Figure 84. West Pier. Arrows indicate cracked stone. Photo: 2014 Pre-Design report.

The “relatively strong stone strength” of the tested pier cores was thought to explain why little to no damage was caused to the surrounding limestone from the use of Portland-cement mortars to repoint the stone.³

The cores into the bedrock were recovered and indicated that the bedrock “is of a fairly good quality. The unconfined compressive strength of the...rock varied from 11,590 to 32,700 psi and the RQD values varied from 58% to 78% or ‘Fair to Good’.”⁴

¹ Antietam National Battlefield. Peck Peck & Associates. Rehabilitate Burnside Bridge: Pre-Design Bridge Composition and Analysis. NPS Project No. PMIS No. 211472. Contract No. P14PC00253, p. 17.

² Ibid, p. 16.

³ Ibid, p. 17.

⁴ Ibid, p. 17.

Because the cores from the interior of the piers lacked significant mortar, it was believed that the original interior mortar had deteriorated. The exterior faces of the piers, above the waterline, had been repointed. “With these joints in compression, mortar is expected to be found in the bed joints between these stones.” The lack of mortar in the joints below the waterline, creates a stone-on-stone bearing condition which can lead to cracking of the stones or settlement. “This can affect the resistance of the pier to unbalanced loading from the arches.”⁵



Figure 85. Probing under the East Pier with rebar that extended 2'-6" at one location. Photo: 2014 Pre-Design report.

The piers were further evaluated by the assessment team using the Modified MEXE Method.⁶ The evaluation is as follows:

From the elastic analysis, the compression unit load on the piers is approximately 20 kips per foot at the arch bearing of the center span. There is a net horizontal load on the piers at the arch springing of about 5 kips because of the unequal span lengths and because live load such as a vehicle could be applied to one span. A net eccentricity at the base of the pier is the result. Provided that the resultant is within the pier bearing area and the edges of the piers where the greatest stresses are produced are in full contact, this condition is usually adequate. The resultant is located within the pier middle one-third and a maximum compressive stress of about 117 is developed. A lack of bedding mortar between the pier stones can cause a significant increase in stresses if the bearing surfaces of the stones are not flat and result cracking or displacement of the piers or even the arches they support. Given the number of gaps between stones below the water line, this could be a concern.⁷

Condition Rating: POOR
Deficiency Rating: CRITICAL

G909004	SUPERSTRUCTURE
G909004-1	Arches

According to the McMullan & Associates assessment team (Fall 2014), a few *voussoirs* “have small pieces broken off and missing at the bottom. The outside vertical face of a few [have] delaminated and lost about an inch of material. At one location on the south side of the west arch, a [*voussoir*] appears to have slipped an inch but the arch barrel stones near the slipped [*voussoir*] have not displaced [fig. 86]. It could not be determined if the slippage occurred when the original centering (forms) were removed or not but there is no indication of recent movement. The joints between the [*voussoirs*] are tightly filled with mortar.”⁸

⁵ Ibid, p. 21.

⁶ “The method used involves separate elastic analyses of each arch span as a twopinned structure separately under dead and live loads. The ultimate live load capacity is calculated to be the load at which the maximum compressive fibre stress at any section reaches the characteristic (ultimate) compressive strength of the masonry concerned. In order to obtain the allowable live load, the ultimate capacity is then reduced by a condition factor equal to the product of a joint factor (Ft), a condition factor (Fc), and the partial safety factor for loads given in BD21. The joint and condition factors are determined by what is observed in the arch barrels.”

⁷ Ibid, p. 21.

⁸ Ibid, p. 8

The elevations of the ‘arch soffits’ at the quarter points of the arch spans “were surveyed and compared to a geometric circle. The current circular shape of the arch was confirmed for all three arches [fig. 87]. This is a good indication that the arches have not suffered significant deformations.”⁹

Some of the exposed surfaces of the barrel stones “are delaminated and have lost the outermost few inches of the depth of the stone. There are some bird nests in the resulting recesses.”¹⁰

At all three arches, minor cracks are located directly underneath the overlying spandrel walls [figs. 88-89]. The cracks “range in width from hairline up to an inch. The wider cracks have been pointed and there are no signs of recent movement.”¹¹ No recent cracking was determined in the arches. It should be noted that during flooding events, “the spaces between the stones will be filled with water and cause further erosion of the mortar. Although there are no signs of imminent distress, further loss of mortar could cause cracking and loss of arch...capacity.”¹²

The arches were evaluated by the assessment team using the Modified MEXE Method.¹³ The evaluation is as follows:

The average arch...thickness was assumed to be similar to the [*voussoir*] height of [1’-10”] and the mortar joint and condition factors assumed to be fair based on observations of solid pointing of the outside surface and the lime-soil mix found in the head joints between a few of the arch...stones as described previously. A subsequent calculation was completed using an assumed average arch...thickness of [1’-6”] for comparison. A relatively weak ultimate maximum compressive stress of 1000 psi for the masonry was assumed due to the unknown condition of the surface condition of the arch...stones. If the stones are not flat or well bedded in mortar, higher stresses can develop at the contact points between stones. The ultimate stress



Figure 86. Arrow indicates location of slippage of ringstones on the south elevation of the west arch. No slippage has occurred in the arch’s barrel. This condition may have occurred during the original construction. Photo: 2014 Pre-Design report.



Figure 87. Barrel arch construction. The arrows indicate a crack underneath the spandrel wall. Photo: 2014 Pre-Design report.

⁹ Ibid, p. 8

¹⁰ Ibid, p. 10.

¹¹ Ibid, p. 10.

¹² Ibid, p. 21.

¹³ “The method used involves separate elastic analyses of each arch span as a twopinned structure separately under dead and live loads. The ultimate live load capacity is calculated to be the load at which the maximum compressive fibre stress at any section reaches the characteristic (ultimate) compressive strength of the masonry concerned. In order to obtain the allowable live load, the ultimate capacity is then reduced by a condition factor equal to the product of a joint factor (F_j), a condition factor (F_c), and the partial safety factor for loads given in BD21. The joint and condition factors are determined by what is observed in the arch barrels.”

selected was based on “Masonry Properties for Assessing Arch Bridges”, Contractor Report 244, as sponsored by the Transport and Road Research Laboratory (TRRL) in the United Kingdom.

The arches support the weight of the roadway, parapets, fill, and live loads principally through the stones acting in compression. Eccentricity of the resultant compression forces stays within the arch stone depth until a hinge is formed. Live loads (vehicles) produce the most eccentricity given their unbalanced load effect. The arches were found to have adequate strength to support the H10 load rating that is given in the FHA report provided that the average arch barrel depth is between [1'-6" and 1'-10"] and the arch stones are well bedded in mortar. If greater loads are to be applied in the future, live load effects should be studied in more detail and based on measured arch...thicknesses and verification of the stone bedding in mortar which could be obtained by coring the arch stones.



Figure 88. Missing mortar in arch barrel. Note the thin layer of pointing mortar in front of the brown sand at the back of the recess. Photo: 2014 Pre-Design report.

The arches produce reactions at their springlines with significant horizontal and vertical components. The vertical components are resisted by bearing on the...outer face stones of the piers and abutments. Shifting of these stones could result in cracking or displacement of the arches. The horizontal components are resisted by bearing of the arches against each other through the masonry between them at the piers, and by the mass of stone and earth behind the abutments.¹⁴

Condition Rating: FAIR
Deficiency Rating: SERIOUS

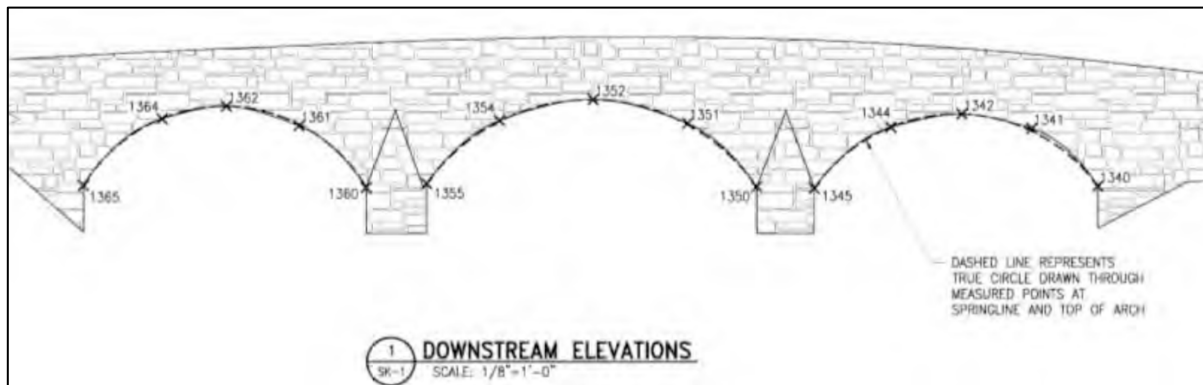


Figure 89. Elevations from survey are indicated at quarter points of the arch. The dotted lines indicate a true circle. There is good correlation between the two indicating the shape of the arches has not distorted over time. Photo: 2014 Pre-Design report.

¹⁴ Ibid, pp. 20-21.

G909004-2	Fill
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According to the McMullan & Associates assessment team, no “adhesion” or physical “connection” was located between the fill and the 1953 concrete walls located adjacent to and on the interior of the spandrel walls. “The tie rod found in the test pit on the east side of the bridge had minimal loss of section due to corrosion. However, the west test pit was noticeably wetter than the east test pit, and the tie rod in the west. Both tie rods exhibited a slight sweep in plan view, possibly the result of being pushed towards the center of the bridge during the installation of the stone fill.”¹⁵

“The stone-cohesive soil mix fill could be producing lateral pressure on the reinforced concrete behind the spandrel walls. The concrete walls are tied near the top but are not tied near the bottom third where the lateral pressures would be greatest. Judging by the amount of water that was observed flowing from the drains during coring, there are open pathways in the fill leading to the drains. With this condition, there could be loss of fines and subsequent settlement of the deck. When the soil is wet, there is a chance for freeze thaw volume changes. Since there is no way to prevent water from entering the fill during flooding events, maintaining the drains will help retain fines and allow the fill to dry out. If the fill was removed, alternative materials without soil should be considered.”¹⁶

Condition Rating: POOR
Deficiency Rating: SERIOUS

G909004-3	Spandrel Walls & Wing Walls
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The McMullan & Associates assessment team noted that the spandrel walls “bulge” outward in several locations on both the north and south elevations, typically near the piers, where the height of the fill is the greatest and where lateral pressure is the greatest. The bulge located adjacent the north side of the west pier was estimated to be 0’-6” or more out of vertical.¹⁷ In addition, the “relatively weak soil-mortar also contributes little to hold the wythes together. Water [infiltration] could be causing the wythes to separate. It is likely that movement of a similar bulge caused the wall failure in January 2014. The spandrel wall stones do not appear to be tied to or bonded to the concrete walls.”¹⁸

At both the south and north sides of the west abutment wing walls, a “leaning” similar to the “bulges” noted in the spandrel walls could be



Figure 90. Checking to see if the wing wall on the south side of the West Abutment is plumb. Note the gap between the wall and the vertical survey rod at the arrow. Photo: 2014 Pre-Design report.

¹⁵ Ibid, p. 11.

¹⁶ Ibid, pp. 21-22.

¹⁷ Ibid, p. 13.

¹⁸ Ibid, p. 22

detected (fig. 90).¹⁹

The canopy of the witness tree “overhangs the bridge and so the root structure is assumed to exist under the northeast wing wall. No signs of damage to this wall from the tree roots were observed.”²⁰

Condition Rating: POOR
Deficiency Rating: CRITICAL

G909005	Decking
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Only minor cracking of the exposed aggregate deck surface was noted by the McMullan & Associates assessment team in Fall 2014.²¹ Furthermore, despite the deck sloping “from the center towards the ends and [draining] most rainwater off the bridge, it does not slope away from the parapets and in the case of the northwest corner, is actually sloped slightly towards the parapet. This allows water to penetrate along the parapet wall into the fill and is likely contributing to hydraulic pressures, weakening, and bulging of the spandrel walls.” Evidence of water seeping through the wall was experienced firsthand by the assessment team during a rainstorm. During the August 2014 repairs work by HPTC at the northeast spandrel wall, “the soil-mortar mix between the stones was found to be moist in some locations. . . . The sustainability of the spandrel walls and parapets would be improved if the deck sloped away from the parapets.”²²

Condition Rating: FAIR
Deficiency Rating: SERIOUS

G909006	Parapets
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The assessment team checked the parapets for level vertically. The parapets were found to lean outward at both sides of the bridge with a slope of approximately 0'-0¾":1'-0" (horizontal: vertical).²³

The mortar of the parapet stones was “fairly hard and in relatively good condition.”²⁴

The wood coping atop the parapet was “not watertight because the flashing [was] penetrated by nails and [did] not extend over the edges of the stone. There [was] no sloped mortar wash or flashing on top of the wall to promote water away from the center of the parapet masonry.”²⁵

Because the parapets were constructed with few tie stones, a limited internal stone overlap, and weak mortar, the “parapets lean outward indicating that they have displaced from their original

¹⁹ Ibid, p. 13.

²⁰ Ibid, p. 13-14

²¹ Ibid, pp. 15-16.

²² Ibid, p. 22.

²³ Ibid, p.14.

²⁴ Ibid, p.14.

²⁵ Ibid, p.15.

position. Although the parapets would not likely be impacted by full AASTHO vehicle guard loading because of the narrow lane which would restrict the angle of impact, reconstructing the parapets could improve their resistance to impacts from errant vehicles.”²⁶

Condition Rating: POOR
 Deficiency Rating: SERIOUS

G909007	Drainage
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No condition assessment was supplied for the drainage system by McMullan & Associates in their December 2014 Composition & Analysis report. However, because the weep pipes were actively draining water, the team might have assumed the system was in good working order.

Condition Rating: FAIR
 Deficiency Rating: SERIOUS

²⁶ Ibid, pp. 22-23.

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Part 2 | Treatment and Use

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Requirements for Treatment and Use

The treatment and use of the Burnside Bridge must be considered within a framework of applicable laws, agreements, and policies. These mandates govern a wide range of management issues beyond the preservation, protection, and interpretation of the Antietam National Battlefield's cultural resources. They extend to issues of visitor and staff use, agricultural lease, safety, and universal accessibility, among others. Additionally, the Antietam National Battlefield Foundation Document is discussed below.

National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) mandates that federal agencies, like the National Park Service, take into account the effects of their actions on properties listed or eligible for listing on the National Register of Historic Places and gives the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment.¹ The Burnside Bridge is listed as a contributing structure in the Antietam National Battlefield Historic District and any undertakings (expenditure of federal funds) will be reviewed in accordance to NPS policy and federal historic preservation laws including the service-wide *Programmatic Agreement Among the National Park Service (U.S. Department of the Interior), the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers for Compliance with Section 106 of the National Historic Preservation Act* (2008).²

Section 110 of the NHPA clarifies the broad historic preservation responsibilities of Federal agencies with the intention of ensuring that historic preservation is fully integrated into the ongoing programs of all Federal agencies by identifying, protecting, and avoiding unnecessary damage to historic properties. Additionally, each agency is required to use historic properties available to it and when managing these properties, must consider preservation of their historic, archaeological, architectural, and cultural values.³

Executive Order No. 11593

Executive Order No. 11593: Protection and Enhancement of the Cultural Environment (1971) mandates that “the Federal Government shall provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the Nation.”⁴ Responsibilities of federal agencies include:

- Nominating “...to the Secretary of the Interior all sites, buildings, districts, and objects under their jurisdiction of the control that appear to qualify for listing on the National Register of Historic Places.”

¹ The NHPA of 1966 was last amended in 2006. A downloadable copy is located at (<http://www.achp.gov/nhpa.html>).

² A copy of this agreement can be found on the NPS's website at (<http://www.nps.gov/policy/106agreement.pdf>).

³ More information on Section 110 can be found on the NPS's website at (http://www.nps.gov/hps/fapa_110.htm).

⁴ A copy of this E.O. can be found on the NPS's website at (http://www.nps.gov/history/history/online_books/anps/anps_7b.htm).

- Exert caution “...during the interim period until inventories and evaluation...are completed to assure that any federally owned property that might qualify for nomination is not inadvertently transferred, sold, demolished, or substantially altered.”
- “Initiate measures to assure that where as a result of Federal action or assistance a property listed on the National register of Historic Places is to be substantially altered or demolished, timely steps be taken to make or have made records, including measured drawings, photographs, and maps, of the property, and that copy of such records then be deposited in the Library of Congress as part of the Historic American Buildings Survey or Historic American Engineering Record for future use and reference.”
- “Initiate measures and procedures to provide for the maintenance, through preservation, rehabilitation, or restoration, of federally owned and registered sites professional standards prescribed by the Secretary of the Interior.”

Executive Order No. 13006

Executive Order No. 13006: Locating Federal Facilities on Historic Properties (1996) mandates that “the Federal Government shall utilize and maintain, wherever operationally appropriate and economically prudent, historic properties and districts...” Furthermore, “any rehabilitation or construction that is undertaken pursuant to this order must be architecturally compatible with the character of the surrounding historic district or properties.”⁵

Secretary of the Interior’s Standards

Treatment to the Burnside Bridge is to be guided by *The Secretary of the Interior’s Standards for Historic Preservation Projects*.⁶ Descriptions of the four standards are as follows:

- **Preservation:** “the act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.”
- **Rehabilitation:** “the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values.”
- **Restoration:** “the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.”

⁵ A copy of this agreement is located on the ACHP’s website at (<http://www.achp.gov/EO13006.html>).

⁶ Weeks, Kay D. and Anne E. Grimmer. “The Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings.” United States Department of the Interior, National Park Service, Cultural Resource Stewardship and Partnerships, Heritage Preservation Services, Washington, DC, 1995.

- **Reconstruction:** “the act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.”

Because the Burnside Bridge is intact, reconstruction is not a treatment consideration.

DO-28

DO-28 Cultural Resource Management Guideline is intended to guide the National Park Service through successful cultural resource management through three steps⁷:

- **Research:** “identify, evaluate, document, register, and establish other basic information about cultural resources;”
- **Planning:** “ensure that this information is well integrated into management processes for making decisions and setting priorities;” and
- **Stewardship:** “planning decisions are carried out and resources are preserved, protected, and interpreted to the public.”⁸

Through the development of this HSR, the research and planning (for treatment and use) of the Burnside Bridge is addressed. The general preservation philosophy integrated into this HSR is best represented by the following:

“Better to preserve than to repair, better repair than restore, better restore than [re]construct. It is ordinarily better to retain genuine old work of several periods, rather than arbitrarily to ‘restore’ the whole, by new work, to its aspect at a single period.”⁹

Decisions for the future stewardship of the Burnside Bridge are under the purview of Antietam National Battlefield. As part of NPS-28 “stewardship focuses on five major activities:

- Control of treatment and use,
- Monitoring conditions of deterioration and structural failure,
- Protecting from human and environmental threats,
- Retaining or delegating responsibility for structures, and
- Developing the skills, knowledge, and attitudes needed to support the program.”¹⁰

A Call to Action

In 2011, National Park Service Director Jon Jarvis put forth his vision for NPS employees and partners “to commit to actions that advance the service toward a shared vision for 2016 and our second century.”¹¹

Action Item #25, “What’s Old is New,” addresses preservation actions: “Modernize historic preservation methods and technologies, show how historic structures can be made sustainable, and

⁷ A copy of NPS-28 can be found at http://www.nps.gov/history/history/online_books/nps28/28contents.htm.

⁸ NPS-28, p. 1.

⁹ The Advisory Board on National Parks, Historic Sites, Buildings, and Monuments policy statement (1936). NPS-28, p. 2 .

¹⁰ NPS-28, p. 127.

¹¹ More information on A Call to Action is located on the NPS website at (<http://www.nps.gov/calltoaction/>).

support efforts to rebuild the economic vitality of rural and urban communities by updating the *Secretary of the Interior's Standards and Guidelines for the Treatment of Historic Properties* in consultation with historic preservation partners.”

Additionally, creativity and flexibility are encouraged when applying these Actions and should not hinder the day-to-day operations of the NPS.

Antietam National Battlefield Foundation Document

A foundation document “serves as a standalone document that provides underlying information for management and planning decisions for a national park unit.”¹²

During the process, the purpose of each park is identified. The purpose of Antietam National Battlefield “is to preserve, protect, interpret, and restore for the benefit of the public the resources associated with the Battle of Antietam and its legacy.”¹³ The purpose statement leaves the treatment of historic structures open for interpretation – restore vs. preserve.

Fundamental Resources and Values were established for the park. These include a multitude of features/attributes which should be considered during planning and management considerations. The fundamental resource and value identified which most pertains to the Burnside Bridge, is the 1862 Battlefield Landscape. “The cultural landscape and its many contributing features are primarily significant because of the Civil War battle fought here. The park preserves these features and others related to the 1862 vernacular agricultural landscape.”¹⁴

The document further analyzes the fundamental resources and values individually, including the 1862 Battlefield Landscape, and how they relate to Current Conditions and Trends, Threats and Opportunities, Related Resources and Values, Identified Data Needs, Identified Planning Needs, Laws and Policies that Apply to the FRV and Policy-level Guidance. Within in these categories, items which most pertain to historic structures include:

- the battlefield landscape currently has a high level of integrity
- the battlefield has become increasingly accessible to the public
- losing rural and agricultural character due to changing land use pattern
- historic structures adaptive reuse plan¹⁵

The document also identified major issues which are associated with planning needs. One was Ongoing Preservation Maintenance.

With 537 structures, features, monuments, and markers documented in the NPS List of Classified Structures database, preservation and preventative maintenance presents a daily challenge for park staff. Preserving the historical integrity of the battlefield landscape and commemorative landscape are ongoing processes that require the close integration of maintenance, natural resource, and cultural resource staff.¹⁶

¹² National Park Service. “Foundation Document: Antietam National Battlefield, Maryland.” September 2013, p. 3.

¹³ Ibid, p. 6. It should be noted that the purpose statement was changed for the final document to include the work “restore.”

¹⁴ Ibid, p. 9.

¹⁵ Ibid, pp.12-15.

¹⁶ Ibid, p. 33.

It is with this last statement the ultimate preference of treatment to historic structures is presented. Preservation of the battlefield landscape is the preferred treatment.

International Building Code

According to The Public Buildings Amendments of 1988, any building constructed or altered by a Federal agency must, “to the maximum extent feasible, be in compliance with one of the nationally recognized model building codes and with other applicable nationally recognized codes.” The International Building Code (IBC) is one of the allowable recognized model building codes.¹⁷

Treatments of the buildings and site are to be guided by the International Building Code (IBC).¹⁸ Threats to public life, safety, and welfare are to be addressed; however, because the Burnside Bridge is historic, alternatives to full legislative and code compliance are recommended where compliance would needlessly compromise the integrity of the historic building with the removal of character-defining features or infringement upon the National Register characteristics of the site and/or structures.

Accessibility

An accessibility assessment was not included in the scope of work for this project and therefore recommended accessibility treatments will not be provided. Modifications may be proposed in the future; the most appropriate response will take into account scoping and technical design requirements of the Architectural Barrier Act Accessibility Standards and skillful application of preservation principles to preserve the historic character and historical integrity of this property.¹⁹ Refer to NPS Preservation Brief #32: “Making Historic Properties Accessible” for more information.²⁰

It should be noted that the Architectural Barriers Act Accessibility Guidelines (ABAAG) require a maximum slope of 1:20 for walking surfaces (the bridge is not considered a ramp because there are no intermediate landings). The west slope is compliant to this with a slope of approximately 1:60; the east slope is not compliant with a slope of approximately 1:10. However ABAAG does state alterations to a “Qualified Historic Building or Facility” can be excepted “where the State Historic Preservation Officer or Advisory Council on Historic Preservation determines that compliance with the requirements for accessible routes, entrances, or toilet facilities would threaten or destroy the historic significance of the building or facility” (F202.5 Alterations to Qualified Historic Buildings and Facilities).²¹

¹⁷ The General Services Administration had more information on this amendment and other accepted building codes at (<http://www.gsa.gov/portal/content/101288>).

¹⁸ IBC is overseen by the International Code Council. More information is located at <http://www.iccsafe.org/CS/Pages/default.aspx>.

¹⁹ The Architectural Barrier Act Accessibility Standards are under the authorization of the United States Access Board. More information can be found through Access Board’s website (<http://www.access-board.gov/aba/>).

²⁰ Jester, Thomas C. and Sharon C. Park. “Making Historic Properties Accessible.” Preservation Brief 32. Washington, DC, September 1993. Accessible at (<http://www.nps.gov/hps/tps/briefs/brief32.htm>).

²¹ United States Access Board. “Americans with Disabilities Act and Architectural Barriers Act Accessibility Guidelines.” July 23, 2004. p. 87.

Preferred Ultimate Treatment and Use

The Burnside Bridge has been used as a bridge since its construction in ca. 1826. Though no longer used for vehicular traffic, the bridge is used as an cultural landscape for Antietam National Battlefield to interpret the afternoon portion of the Battle of Antietam on September 17, 1862.

Because a funded and active rehabilitation project is occurring at the bridge currently, the ultimate treatment and use recommendations provided are for future guidance and do not provide a construction or architectural program. The Recommended Treatments by Feature provided in this report were completed in advance of the current rehabilitation project. The identification of resource impacts were fully assessed prior to finalizing the construction/architectural program.

Considering the applicable laws, agreements, and policies discussed above, the Preferred Ultimate Treatment for Burnside Bridge is preservation of the structure with removal of non-sympathetic modern accretions and retention and restoration of character-defining features important to the historic design and construction of the bridge during the Battle of Antietam, September 16-18, 1862.

Also, considering the applicable laws, agreements, and policies discussed above, the Preferred Ultimate Use Burnside Bridge is to continue its use as scene-setting and and interpretive structure.

Alternatives for Treatment and Use

There are no identified alternatives for treatment and use at this time for Burnside Bridge

Recommended Treatments by Feature

The following recommended treatments are intended to repair, maintain, and preserve with the least degree of intervention Burnside Bridge and its character-defining features while elevating its Facility Condition Index Rankings to **GOOD**. These treatments include limited replacement in-kind as defined by *The Secretary of the Interior's Standards for the Treatment of Historic Properties*.

The Burnside Bridge retains a high level of historic integrity for the vernacular, rural battlefield landscape. Preservation of the battlefield landscape, with the removal of non-sympathetic modern accretions and retention and restoration of character-defining features important to the historic design and construction of the bridge during the Battle of Antietam, September 16-18, 1862, is the recommended ultimate treatment. Continued use as a scene-setting and interpretive structure is the recommended ultimate use.

Any rehabilitation of the bridge must conform to the guidance and mandates put forth by the National Historic Preservation Act (Section 106, Section 110, and ACHP), Executive Order No. 13006, the *Secretary of the Interior's Standards for Historic Preservation Projects*, NPS-28 *Cultural Resource Management Guideline*, the International Building Code, and the Architectural Barrier Act Accessibility Standards.

Burnside Bridge was found to be in **poor** condition with **serious** maintenance deficiencies. There are, of course, certain features in fair condition with minor or critical deficiencies. There were no features in good condition.

The following recommended treatments are placed in priority order of the building features starting with the highest level of maintenance deficiency (Table 3). The list starts with ratings of POOR and CRITICAL and continues through to FAIR and MINOR and presents a path to obtaining a good condition and lessening of the maintenance burden.

The hierarchal list divides the recommended treatments into three basic groupings based on the overall condition ratings of POOR and FAIR (there were no features in good condition). Within these groupings each feature is ordered by its maintenance deficiency rating of CRITICAL, SERIOUS, or POOR.

The assessment of the Burnside Bridge by Peck Peck & Associates and McMullan & Associates in 2014 determined that several critical features were found to be in a state of moderate deterioration (rated POOR by HPTC); this indicates these features may need to be repaired or replaced. This type of maintenance activity (repairing) is recognized within the definition of preservation maintenance. Other recently improved features were noted with moderate- to low- levels of deterioration (rated FAIR) and should be repaired and maintained using traditional preservation techniques rather than replaced. No features were found to be in good condition (rated GOOD).

Because a rehabilitation project is currently ongoing at Burnside Bridge, the treatment recommendations provided are a summary of those recommendations provided by Peck Peck &

Associates and McMullan & Associates in December 2014. Additionally, the identification of resource impacts will not be completed by HPTC as Section 106 compliance has already been completed for the project.

Table 3. Burnside Bridge Prioritized Treatment List						
Major Group Element	Group Element	Individual Element	Specific Element	Sub-Element	Condition Rating	Deficiency Rating
POOR						
G BUILDING SITEWORK	G90 OTHER SITE WORK	G9090 BRIDGE	G909003 Piers		POOR	CRITICAL
G BUILDING SITEWORK	G90 OTHER SITE WORK	G9090 BRIDGE	G909004 Superstructure	G909004-1 Arches	POOR	CRITICAL
G BUILDING SITEWORK	G90 OTHER SITE WORK	G9090 BRIDGE	G909004 Superstructure	G909004-3 Spandrel Walls & Wing Walls	POOR	CRITICAL
G BUILDING SITEWORK	G90 OTHER SITE WORK	G9090 BRIDGE	G909004 Superstructure	G909004-2 Fill	POOR	SERIOUS
G BUILDING SITEWORK	G90 OTHER SITE WORK	G9090 BRIDGE	G909006 Parapets		POOR	SERIOUS
FAIR						
G BUILDING SITEWORK	G90 OTHER SITE WORK	G9090 BRIDGE	G909005 Decking		FAIR	SERIOUS
G BUILDING SITEWORK	G90 OTHER SITE WORK	G9090 BRIDGE	G909007 Drainage		FAIR	MINOR
G BUILDING SITEWORK	G90 OTHER SITE WORK	G9090 BRIDGE	G90901 Abutments		FAIR	MINOR
GOOD						
No elements were rated to be in good condition.						
End of Table.						

Burnside Bridge Recommended Treatments

Note: In June 2015, construction documents by Peck Peck & Associates and McMullen & Associates entitled “Rehabilitate Burnside Bridge” were approved. These drawings include further recommendations for rehabilitation. Refer to Appendix D for 11 x 17 drawings.

G909003	Piers	POOR	CRITICAL
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The McMullan & Associates assessment team (Fall 2014) supplied the following recommendation treatments for the piers:

Consolidation of the piers by grouting is recommended for enhanced sustainability. The purpose of grouting will be to fill the spaces between stones. This can best be achieved by doing the work in the dry through the use of cofferdams. Cofferdams could be placed around the abutment and the piers allowing stream flow through two spans during construction. According to the USGS water monitoring station located just downstream of the bridge, mid to late summer typically has lower stream heights than other times of the year and it would be an obvious benefit to have work in the water done during this period.

The small rocks placed as rip rap and sediment around the piers need to be temporarily removed. Then any gaps between the stones can be pointed. A low concrete wall could be anchored to rock and formed around the pier to help contain grout and enhance resistance to scour although the pointing itself may be adequate. Prior to grouting, water could be pumped into the ports to aid in removing small fines that could reduce grout bonding. Grout can then be placed from the bottom up in lifts using several low pressure hand pumps simultaneously. Grout ports would be located in mortar joints. When grout flows from ports left in the mortar joints near the top of the lift, the grouting would be stopped for that lift. Then the ports could be pointed.

Grout pour height should be measured to ensure that the interior of the pier is filled up to the masonry between the arch bearings but not above the concrete slab. This could be accomplished by coring from the top or through mortar joints on the side.

Although immediate repair of the piers is not required, if the piers are not grouted, they are more likely to be damaged by weathering in the future. There is likely to be continued loss of fines during flood events which could lead to larger forces in the pier stones and cracking or displacement of the support for the arches.²²

G909004-1	Arches	POOR	CRITICAL
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The McMullan & Associates assessment team (Fall 2014) supplied the following recommendation treatments for the arches:

Replacing deteriorated or missing mortar on the arch...soffit is recommended. Thin sections of mortar should be located by sounding with a hammer and be replaced where found. Where areas of soil are found behind the mortar, the soil should be removed and the recess filled with grout using hand pumps. The type of mortar selected should be compatible with the existing stone and mortar. Hard Portland cement mortars are not recommended given the availability of hydraulic lime mortars. The majority of this work appears to be in the lower [10'-0"] of the [arches] near the springline.

²² Antietam National Battlefield. Peck Peck & Associates. Rehabilitate Burnside Bridge: Pre-Design Bridge Composition and Analysis. NPS Project No. PMIS No. 211472. Contract No. P14PC00253, pp. 24-25.

During flood events there is expected to be a loss of material through open joints and the arches should be inspected shortly after the event. If no repair work is performed on the arches in the near future, the number of recesses and missing mortar joints is expected to increase over time to the point where repairs will be required.²³

G909004-3	Spandrel Walls & Wing Walls	POOR	CRITICAL
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The McMullan & Associates assessment team (Fall 2014) supplied the following recommendation treatments for the spandrel and wing walls:

The greatest durability can be achieved by reconstructing the spandrel walls with a good mortar to replace the existing soil/mortar mix and with ties or header stones to bond the wythes together. This would also address the bulges in the walls. The limestone strength is such that a strong and durable hydraulic lime mortar, such as NHL 5 could be used. Reconstruction of the spandrels would also include the parapets that they support. Reconstruction would allow placement of ties in the mortar joints that are anchored to the concrete wall with small drilled anchors.

Repairing the walls by installing ties in the mortar joints between the wythes is not likely to be as effective as reconstruction. The anchorage of ties into the adjacent wythe or into the fill may not be effective unless the material receiving the anchorage is exposed so that the anchorage can be located. Also ties placed into the face mortar joints are not as effective as if they were placed in the outside stones, but this would have an aesthetic impact. If the walls are not reconstructed or repaired, further bulging and partial collapse of portions of the wall are likely.

Limited fill excavation would allow access to the existing tie rods or the introduction of new ones. Where existing tie rods are bent significantly or deteriorated, they could be replaced. Existing tie rods could be cleaned, painted and encased in concrete fill for increased sustainability. New tie rods could be placed by drilling and epoxy anchoring into the concrete with sleeve nut splices between the walls.

Excavation to about 6 feet would allow placement of additional tie rods near the lower third of the wall. These could be drilled and anchored with epoxy into the concrete walls from the inside and then the fill replaced. To allow equipment access for this excavation, it may be advantageous to cut some of the existing rods and then replace them with new rods. This would allow partial replacement of the existing fill with cementitious material as described above.²⁴

G909004-2	Fill	POOR	SERIOUS
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The McMullan & Associates assessment team (Fall 2014) supplied the following recommendation treatments for the arches:

Replacement of the stone fill with lean concrete would remove the soil between the stones and should also be considered. The current soil when wet could increase lateral pressure on the spandrel walls. Also during flood events this material could find its way into gaps between the arch stones or flow through the drains. By removing the existing fill and replacing with some form of cementitious material, we can reduce infiltration concerns and eliminate lateral pressure concerns. A rough estimate of the quantity of this material is about 200 cubic yards. The excavation of the fill should be done with light weight equipment or by hand. ... Suitable materials could be lean concrete, pre-placed aggregate with grout fill, or flowable fill. Maintaining the tie rods in place during excavation needs to be considered.²⁵

²³ Ibid, p. 23.

²⁴ Ibid, pp. 23-24.

²⁵ Ibid, p. 23.

G909006	Parapets	POOR	SERIOUS
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The McMullan & Associates assessment team (Fall 2014) supplied the following recommendation treatments for the parapets:

“Reconstruction would improve resistance to water penetration, restore plumbness, and allow the bulges in the spandrel wall to be addressed by reconstruction. A sloped mortar wash under the cap [, atop the stone portion of the parapets,] would further improve watertightnes [sic].”²⁶

G909005	Decking	FAIR	SERIOUS
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The McMullan & Associates assessment team (Fall 2014) supplied the following recommendation treatments for the decking:

Constructing a surface that promotes water run-off away from the spandrel walls is recommended. This could be achieved by creating a small slope against the parapet.

Replacement of the existing asphalt with a reinforced concrete slab is recommended although not required. This will improve distribution of vehicle loading and allow construction of a sloped surface adjacent to the parapets. By replacing the deck, the existing tie rods can be accessed and possibly allow placement of additional rods.

A compressible filler will need to be placed on top of the existing concrete walls to prevent direct bearing of the concrete slab and transmission of concentrated loads to the arch barrels.

It is possible to replace the existing asphalt with a new asphalt surface and construct a sloped portion adjacent to the parapets. Asphalt would not have the same load distribution characteristics as the concrete slab but has the advantage of not needing a compressible filler placed on top of the concrete wall since the material wont span like reinforced concrete.

We would anticipate placement of the concrete or asphalt directly against the parapet stone.

Although some form of sealant could be applied to further waterproof the joint, these typically have limited lifespan and require maintenance. We expect that concrete or asphalt placed tight to the wall will be adequate for most circumstances.²⁷

G909007	Drainage	FAIR	MINOR
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No recommended treatments were supplied for the drainage system by McMullan & Associates in their December 2014 Composition & Analysis report.

G909001	Abutments	FAIR	MINOR
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No recommended treatments were supplied by McMullan & Associates in their December 2014 Composition & Analysis report.

²⁶ Ibid, p. 23.

²⁷ Ibid, p. 25.

Appendix A

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Appendix A: Bibliography

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Appendix B

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Appendix B: 1980s HABS Documentation

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Appendix C

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Appendix C: 2016 HAER Documentation

In March 2016, prior to the start of the rehabilitation project, the Historic American Engineering Record (HAER) undertook emergency digital scanning of Burnside Bridge to document it prior to any changes being made.

In order to complete high-definition laser scanning, HAER used a Leica ScanStation 2 due to its versatility. According to HAER's website, this particularly scanner "suits the needs of the programs because of its long range, relatively quick speed, and ability to produce full-dome scans. It also fits easily into the workflow of most projects, which range from architectural monuments and industrial complexes to engineering structures and landscapes."

On most of their documentation projects, HAER "supplements the laser scans with hand-measuring, and after the scanning process, uses software to migrate the point clouds into AutoCAD to produce two- (and sometimes three-) dimensional drawings to its standards" in order to interpret the structure and make it "understandable to the general public." Measured drawings are easier to understand than scanning images, and ensure long-term 'storage' of the information. Storage of digital records is still being explored and perfected by the Library of Congress. Additionally, scanned data does not meet the Secretary of the Interior's Standards and Guidelines for Architectural and Engineering Documentation, which requires documentation be "reproducible and durable long-term, and that it is clearly and concisely produced."

However, in order to record Burnside Bridge in a timely and cost-effective manner, due to the impending rehabilitation project, laser scanning was chosen for several reasons: it is extremely accurate; it can record difficult structures and locations; it saves time in the field; and scanning has an exactness that has been previously unachievable. The accuracy "of the point cloud the point cloud can reveal the slightest deflection in a wall or, depending on the resolution setting, variations such as cracks and other deficiencies, making it a useful monitoring tool for conservation."

The resulting point-cloud images (from the scanner) and eleven photographic panoramas of the HAER scanning data show the condition of Burnside Bridge in March 2016. All of these files are included on the CD, but only representative samples are printed, to conserve paper. The panoramas are also included in an online exhibit: <https://www.nps.gov/hdp/exhibits/burnside/index.html>.

For more information, refer to the website of Heritage Documentation Programs (<https://www.nps.gov/hdp/>), under which HAER falls. Quoted information above was found at the following website: <https://www.nps.gov/hdp/standards/laser.htm>.

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Appendix D

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Appendix D: 2015 Rehabilitation Drawings

Peck Peck & Associates and McMullan & Associates. "Rehabilitate Burnside Bridge." *100% Construction Documents*. 15 sheet set. June 5, 2015.

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Appendix E

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Appendix E: Archival Drawings

The following drawings are referenced in the HSR and are listed in chronological order.

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Note: This set was not printed to conserve paper.

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As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. Administration.

