Historic Bridge Rehabilitation Analysis Phase 1
SR 1002 (Skinners Falls Road) over Delaware River

BMS# 63-1002-0230-0739

SHPO Review # 2013PR14303

Damascus Township, Wayne County, Pennsylvania

Town of Cochecton, Sullivan County, New York

Prepared For:

pennsylvania
DEPARTMENT OF TRANSPORTATION

PennDOT Engineering District 4-0

Prepared By:

AECOM

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1.0 Introduction

PennDOT District 4-0 is conducting this Historic Bridge Rehabilitation Analysis, Phase 1 as part of the Skinners Falls Road Bridge (SR 1002) over the Delaware River Project. This report has been prepared in accordance with PennDOT Publication 689 – Cultural Resource Handbook (March 2021) and the American Association of State Highway and Transportation Officials (AASHTO) publication, *Guidelines for Historic Bridge Rehabilitation and Replacement* (2007). This report has been prepared to determine whether the historic Skinners Falls Bridge can be rehabilitated without altering the character defining features that qualify the bridge for listing on the National Register of Historic Places (NRHP). The information in this report is based upon a bridge field view (2019), PennDOT bridge inspection records (performed by others), and a structural analysis of the bridge (2013).

Please note, as the Skinners Falls Bridge is owned and maintained by the New York (NY)-Pennsylvania (PA) Joint Interstate Bridge Commission, information for both states are provided where appropriate.

1.1 Project Location:

County:	Wayne County, PA and Sullivan County, NY
Municipality:	Damascus Township, PA and Town of Cochecton, NY
State Route / Local Road:	SR 1002 Segment 0230 / Skinners Falls Road

Location Description: The Skinners Falls Bridge carries SR 1002 over the Delaware River, connecting Wayne County, PA with Sullivan County, NY near the town of Milanville, PA. (**Figure 1)**. The area is rural with scattered residential properties along the PA side of the river and both public and private recreational facilities on the NY side at the bridge. The bridge is located within the Upper Delaware Scenic and Recreational River Unit of the National Park Service (NPS). The Upper Delaware is one of ten National Wild And Scenic River units that the NPS manages.

1.2 Bridge Information:

Owner:	NY-PA Joint Interstate Bridge Commission (primary maintenance responsibility is assigned to PennDOT Engineering District 4-0)
Year Built:	1902
Bridge Type:	Pin Connected, Modified Baltimore Through Truss
Bridge Length:	466’-6”
Number of Spans:	2
Length of Main Span:	232’-0” (c-c brgs)
Deck Width:	13’-5” between guide rails

Additional Information: Vertical clearance as established by the bridge portal on the PA side is 16'-0" and by the bridge portal on NY side, which is 15'-9". Vertical clearance is restricted by "headache" bars, which were constructed in 2016 on each end of the structure, limiting the vertical clearance to 8'-6". Although the bridge was load posted, the documented use by overweight vehicles warranted further action and the installation of headache bars provided a secondary means of restricting overweight vehicles from crossing the bridge. The bridge was closed in October 2019 due to observed structural deficiencies. Prior to its closure, the bridge was posted with a 4-ton weight limit. See Section 5.1 for a more detailed description.

1.3 Historic Significance:

Priority Level:	Exceptional; one of only three representative examples of this type of truss bridge in Pennsylvania.
NHRP Criterion:	Criterion C, Engineering Significance, as a rare, intact example of a multiple span Baltimore truss bridge of moderate length. Also a contributing element to the NRHP-listed Milanville, PA Historic District

Historic Significance:
The Skinners Falls Bridge was listed on the NRHP in 1988 under Criterion C, Engineering, as a rare example of an intact multiple span Baltimore truss of moderate length. The primary character defining features of the bridge are the two Baltimore Through Truss spans; truss configurations; pin connections; and the substructure elements consisting of the stone piers, abutments, and wingwalls. Specifically, the structural members including the top and bottom chords, as well as the vertical and diagonal members define the character of the truss configuration. Secondary character defining features include the size and scale of the structure, portals, bracing, finials, decorative railings, bridge plaques and decorative ornamentation (**Appendix A** and **Appendix B**)**.** The structure also retains its historic location over the Delaware River and its setting, which was cited in the original NRHP nomination as unique, as most Baltimore trusses are found in other regions of the state.

The Milanville, PA Historic District was listed on the NHRP in 1993 under Criterion A for its association with the area's nineteenth- and twentieth-century industrial development, and under Criterion C for its noteworthy architecture of the same era. As a result of the primary and secondary character defining features, including but not limited to the size and scale, stone substructure, portals, bracing, finials, and decorative railings, the Skinners Falls Bridge is also a contributing resource to the Milanville, PA Historic District, contributing to both Criterion A and Criterion C.

Existing Bridge History:
In 1901, the American Bridge Company was hired by the Milanville Bridge Company, formed to construct the Milanville Bridge, more commonly referred to as the "Skinners Falls Bridge". In February of 1902, during the early stages of construction, an ice flood hit the area causing damage to local homes. The combination of this storm and the neighboring bridge owners (the

Cochecton and Narrowsburg bridges) caused a delay in construction of the Skinners Falls Bridge. It is believed that the objections raised by the owners of the competing bridges played a part in limiting the width of the Skinners Falls Bridge to one lane. The bridge construction was completed in November of 1902 for $14,000.

Two years later, in March 1904, a flood caused serious damage to the Skinners Falls Bridge, carrying the NY span of the bridge downstream until it reached ground at Skinners Falls. The NY span was salvaged, brought back to the site, and was re-erected. Until the 1920s, when the bridge was purchased by the New York (NY)–Pennsylvania (PA) Joint Interstate Bridge Commission for nearly $20,000, the bridge operated as a tolled passage across the Delaware River. After ownership of the bridge changed, the bridge tolls were no longer collected. The Skinners Falls Bridge was listed on the National Register of Historic Places in 1988 under Criterion C, Engineering, as a rare example of an intact multiple span Baltimore truss of moderate length.

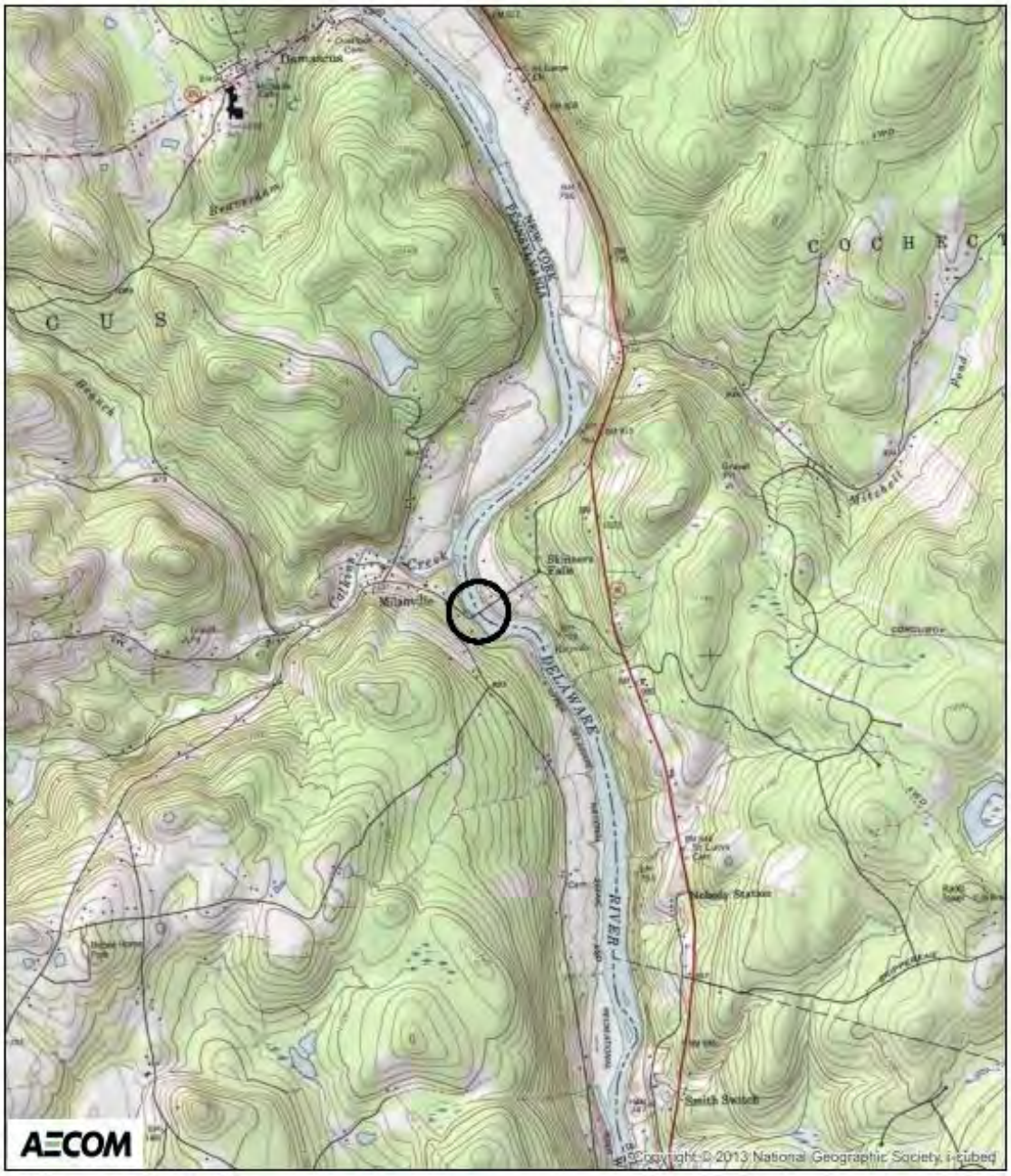
The Milanville Historic District was listed on the National Register in 1993 under Criterion A for its association with the area's nineteenth- and twentieth-century industrial development, and under Criterion C for its noteworthy architecture of the same era. The district's period of significance extends from 1815, reflecting the construction date of the earliest extant building, to ca. 1920, marking the end of the primary development period (Curtis 1992). Milanville was a center for lumbering, tanning, and wood distillation during the nineteenth century, and played a key role in the history and development of the Upper Delaware Valley. The sawmill, tannery, and acid factory associated with these important industries are no longer extant; however, the residential and commercial buildings remain as evidence of the town's vitality during the period of significance (1815 to ca. 1920). The buildings include excellent examples of rural vernacular architecture, including the Milanville School, the Milanville Store, and the former barbershop, as well as examples of Greek Revival, Queen Anne, and Eastlake style dwellings. The Milanville-Skinners Falls Bridge also contributes to the historic district, representing an intact example of a Baltimore truss bridge constructed during the district's period of significance.

The character-defining features of the Milanville Historic District include its contributing buildings and structures, topography, and natural features. The district retains integrity of location, materials, design, setting, association, and feeling from the period of significance (1815 to ca. 1920). The NRHP boundary includes the historic core of the village as well as the Skinners Falls Bridge (**Appendix A).**

1.4 Phase 1 HBRA Purpose:

The purpose of the HBRA Phase 1 is to evaluate whether the bridge rehabilitation options presented in this report can be performed in compliance with the Secretary of Interior's *Standards for Rehabilitation.* This report also evaluates whether the proposed rehabilitation options would result in adverse effects under Section 106 of the National Historic Preservation Act (NRHP) to the Skinners Falls Bridge as an individually listed resource, as well as impacts as a contributing resource to the NRHP-listed Milanville Historic District. Subsequent to the

completion of the HBRA Phase 1 , Phase 2 of the HBRA will be prepared to evaluate additional, non-traditional rehabilitation options which would not meet the Secretary of Interior Standards. Phase 2 of the HBRA will also include a section on whether the Phase 1 or Phase 2 rehabilitation options meet the project purpose and need.



Skinners Falls Bridge
SR 1002-230 over the Delaware River
FIGURE 1: PROJECT LOCATION MAP

Project Location

N

0 0.25 0.5
Miles

Source:2013 National Geographic Society, i-cubed

2.0 Roadway and Site Information

2.1 Type of Service:

Type of Service:	One lane bridge on two lane roadways
Number of Lanes:	2-way traffic with narrowing approaches, 1 lane on the bridge (when open)
Approach Width(s):	24'-0" paved width (2-10 ft lanes w/ 2-ft shoulders)
Vertical Clearance:	8'-6" as controlled by the headache bars installed in 2016 15'-9" as controlled by the bridge portal on NY Side
Horizontal Clearance:	13'-5" between guide rail faces on bridge
Traffic Data:	The ADT is 0 as the bridge is currently closed. Prior to the bridge closure the most recent traffic data indicates: ADT: 379; Year: 2017 (July); Truck %: 4%
Shoulder Width:	2'-0"
Functional Classification:	Rural Local Road
Crash History:	PennDOT records indicate one crash on the approach to the bridge between January 2001 and September 2019. Crash data from the New York Department of Transportation (NYSDOT) was not readily available.

2.2 Safety Features and Deficiencies:

Guiderail is present at all four corners and guiderail was mounted on both edges of the timber deck during the 1986 rehabilitation. The original historic bridge railing is retained behind the guiderail and approximately one-third of the original bridge railing was replaced during the 1986 rehabilitation. The original railing, replacement railing, and guiderail do not meet current Manual for Assessing Safety Hardware (MASH) criteria. Approach guiderail is present at both sides of the bridges, and while adequate, does not meet current standards. Public input indicates use of the structure by pedestrian and bicyclists, but the bridge does not offer protective accommodations (i.e., sidewalks, adequate shoulder, or shared lane) for these users. Headache bars were installed at a height of 8'6" tall to limit overweight vehicles in 2016. Bridge Closed signs, Type III barricades and gravel piles were installed in October 2019, closing the bridge to all users. Continued usage from pedestrians and bicyclists has been reported via public survey data despite the closure.

When open, the bridge operated as a single lane structure with two-way traffic, yield controlled on either end of the bridge. The driver's view from the east (NY) side of the bridge heading westbound is pictured below (**Figure 2**), showing the yield condition and signage indicating that vehicles should yield to oncoming traffic. This approach has poor sight of the opposing (PA) traffic due to the bridge being situated at a higher elevation relative to the roadway approaching the bridge. The difference in elevation, along with the steepness in slope between the approach and the bridge elevations limits driver's ability to see whether vehicles, pedestrians or bicyclists are on the bridge. As noted, crash history data from NYSDOT was not readily available. PennDOT crash history data on the PA approach of the bridge did not indicate

a safety concern. However, sight distance across the bridge is substandard and problematic given the one lane available for vehicular travel.

Figure 2: New York Approach geometry with a view west of the approach on the east (New York) side of the bridge.

2.3 Summary of Performance:

The bridge was closed to traffic in October 2019 following a customer complaint and a subsequent PennDOT District Bridge Unit inspection which identified timber deck and lateral truss bracing deterioration. The bridge had previously been closed to traffic for significant periods of time in 2013 and 2015, reopening once emergency repairs had been implemented. Until 2007, the bridge had been weight posted for 9 tons. The weight posting was reduced to 7 tons in 2007 and then to 4 tons in 2013. Based on conditions noted in the 2022 inspection report, the bridge is classified as Poor under the National Bridge Inspection Standards (NBIS). This rating is controlled by the condition of the deck and superstructure, and substructure. The superstructure elements controlling the rating consist of the pin connected members, as well as the pins themselves.

2.4 Hydraulic Deficiencies:

Based upon the most recent bridge inspection, the NBIS condition rating for Channel Protection is 5 (Fair Condition). The channel flows on a good alignment through both spans. No scour exists at the abutments however, minor scour exists at the pier with the stone footing exposed at the upstream end. Placed rock (rip-rap) surrounds the pier.

The Delaware River flows in a southeasterly direction through the project area forming the boundary of PA and NY. The Delaware River 100-year floodplain, published by the Federal Emergency Management Agency (FEMA), partially encompasses the overbank areas both upstream and downstream of the Skinners Falls Bridge, inundating residential and commercial

properties and the northeastern side of Skinners Falls Road. Based on a preliminary hydraulic analysis (**Appendix C**), the existing Skinners Falls Bridge is not inundated in the FEMA 100-year storm. The northeast approach roadway is inundated in the 50-year storm.

2.5 Land Use and Any Anticipated Changes:

Based on previously performed cultural resources surveys, and as confirmed by PHMC's PA-SHARE GIS database of historic resources, no historic resources other than the Milanville Historic District and Skinners Falls Bridge were previously identified adjacent to the project location. Further, for the NY side, a review of the NY SHPO's Cultural Resource Information System (CRIS) identified no additional historic resources

Within the project area, the Delaware River is listed as a Pennsylvania Fish and Boat Commission (PFBC) Water Trail and is part of the NPS- administered Upper Delaware Scenic and Recreational River Unit. The Upper Delaware River Scenic and Recreational River was designated as a NPS unit in 1978. Also in 1978, the Upper Delaware River became a Federal Wild and Scenic River designated by the Federal Wild and Scenic River Act. The Upper Delaware is one of 10 National and Wild Scenic Rivers that the NPS manages. The Skinners Falls Bridge is an element that supports the Cultural and Scenic Outstandingly Remarkable Values of the Upper Delaware Scenic and Recreational River. Outstandingly Remarkable Values are those elements of the Upper Delaware River that are worthy of special protection under the Federal Wild and Scenic River Act.

Land Use Planning documents for both the NY side and the PA side of the river did not indicate significant current or planned growth or a designated growth area (Sullivan County 2020 Comprehensive Plan, Wayne County Economic Development Corporation, 2020). The Wayne County Comprehensive Plan Update (2010) stated that the regional economy is expected to continue to evolve from an agricultural/manufacturing to rural residential/tourism- based economy.

2.5.1 New York

Within the southeast quadrant of the project area, the New York State Department of Environmental Conservation (NYSDEC) owns and operates the Skinners Falls access area for recreational, non-motorized boaters. The access area consists of a 52-car parking lot, and a partial concrete pad for launching canoes and kayaks. Planned improvements to this area as part of the "Sullivan County Site Design for Six River Access Points" (2015) prepared by NYSDEC include upgraded and expanded parking, a permanent comfort station, and ADA accessibility. As of late 2022, these proposed improvements have not been implemented. The southeast quadrant also includes the Lothian Bed and Breakfast/Lou's Tubes providing inner tube rentals, lodging and an antique shop.

Landers Campground and River trips is located within the northeastern quadrant operating a kayaks, rafts, and inner tube rental as well as providing a campground and snack shop.

The entire project area is zoned as Hamlet District. The purpose of the Hamlet District is intended to provide for neighborhood commercial development in areas of the town which represent important meeting places and exhibit existing commercial activity but lack public sewerage facilities. A River District designation is not present within the zoning regulations for the NY Side.

2.5.2 Pennsylvania

In the northwestern quadrant to the west of the bridge, the Milton Skinner house and associated barn are present. The barn is located to the east side of SR 1002 with the house located on the west side of the road.

On the PA side, the entire project area is located within Zone RD (River District). The River District's intent is to conform with the requirements of the National Wild and Scenic Rivers Act and NPS to allow for the enjoyment of the Delaware River Valley.

The Skinners Falls bridge and areas to the west and northwest of the bridge along SR 1002 are located within the Milanville, PA NRHP-listed Historic District.

3.0 Condition and Load Sufficiency Information

3.1 BMS Condition Code Ratings:

Deck – 4 (poor condition)
Superstructure – 4 (poor condition)
Substructure – 2 (critical condition)

The conditions above are as of the November 2022 inspection report. The bridge was closed due to excessive movement of the superstructure under live load as well as active movement and cracking of the far abutment, and remains in an overall "0-Failed Condition" structural category .

3.2 Load Rating:

The below load rating table is a summary of most recent live load ratings prepared in 2014 when the bridge was open to traffic. These ratings are based upon an allowable stress analysis methodology (AASHTO Manual for Bridge Evaluation) of the structure with consideration for PennDOT design criteria and usage of the bridge by permit vehicles. The past load ratings are not representative of the currently closed bridge and have not been revised to incorporate the ongoing deterioration as the bridge has been closed to traffic since October 2019.

Table 1: Load Rating Summary

LOAD RATING SUMMARY			
RATING VEHICLE*	**INVENTORY RATING (TONS)**	**OPERATING RATING (TONS)**	**SAFE LOAD CAPACITY RATING (TONS)**
H20	1	4	4
HS20	1	7	7
ML80	1	9	9
TK527	1	9	9
EV2	-	-	-
EV3	-	-	-
***As defined by PennDOT Publication Design Manual 15M and supplemental information. **Appendix C** contains rating vehicle information.			

3.3 Load Posting:

Although no as-built plans are available, the bridge was posted at 9-tons from its original construction until 2007, at which time the bridge posting was reduced to 7-tons. Following a 2012 in-depth inspection and 2014 load rating update, the bridge posting was further reduced to 4 tons. Subsequent inspections identified additional bridge elements requiring priority repairs which resulted in a cycle of bridge closures and emergency contracts to repair and quickly re-open the bridge at a minimum load posting of 4 tons. Most recently, the bridge was closed in October 2019 and currently remains closed to all vehicular and pedestrian traffic. Prior to the current closure, the bridge was weight posted for 4 tons. **Appendix D** contains additional load rating background.

3.4 Summary of Structural Deficiencies:

Based on the 2022 inspection report, the following structural deficiencies have been noted below. For reference, see **Figure 3** and **Figure 4** from the PennDOT Truss Maintenance Manual (2015) which have been included to assist in identifying bridge components. **Appendix B** contains representative photographs of the structural deficiencies.

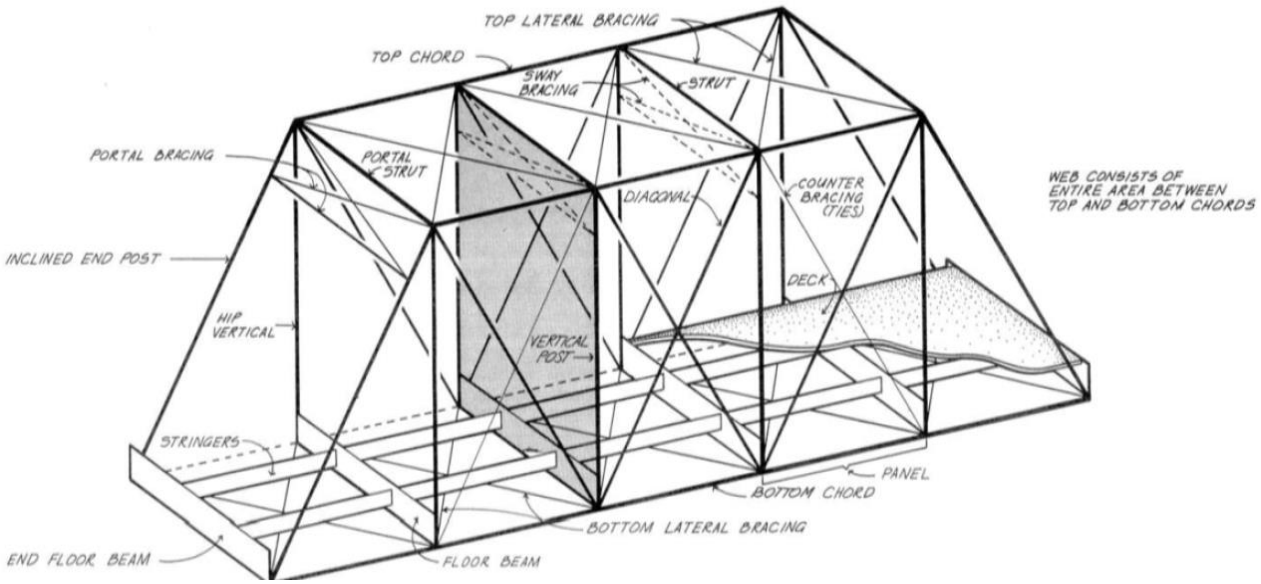


Figure 3: Basic Truss Components (from PennDOT Truss Maintenance Manual, 2015)

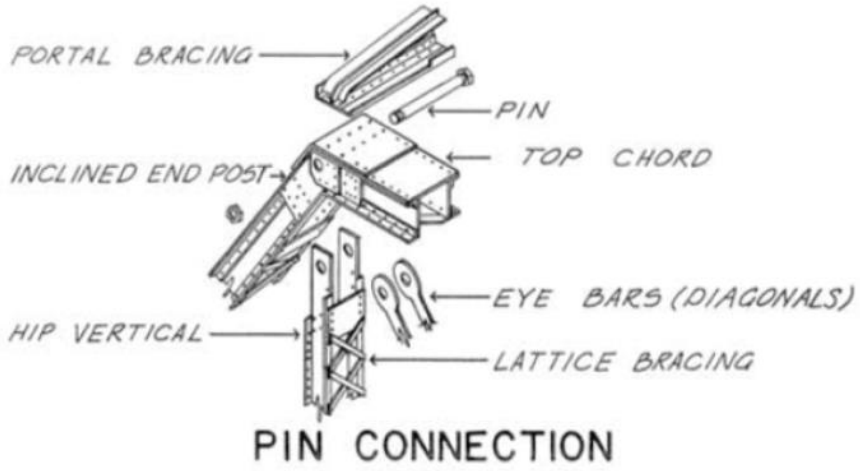


Figure 4: Structural Components (from PennDOT Truss Maintenance Manual, 2015)

Deck:

- Missing longitudinal running boards and rot of the transverse timber deck (Photos 4, 5, 33-35)
- Longitudinal running boards with missing or protruding fasteners (Photo 35)
- Underside of the timber deck exhibits checks, splits, seepage stains and localized areas of rot and active seepage throughout (Photo 19)

- Missing or deteriorated clips connecting timber to stringer top flange (Photos 19,20)
- Gaps between the stringer top flanges and deck underside (Photo 20)
- Metal plate deck joint audibly deflects under traffic (photo n/a)

Superstructure:

- Top chord members exhibit localized areas of severe rust with up to 100% section loss in Span 1 (Photo 10)
- Bent and misaligned bolts in top chord splices in Span 2 resulting in displacement of top chord channels (Photo 11)
- Collision damage to vertical and end post members at deck level and tension diagonals behind the bridge railing (Photo 12)
- End post channels exhibit localized areas of 100% section loss at pin plates (Photo 15)
- Pack rust and section loss of pinned connections at top, middle, and bottom joints (Photos 17, 18)
- Advanced section loss at pins and forged eyebar heads with up to 50% section loss noted for several members throughout structure (Photos 12, 13)
- Existing field welded and bolted repairs to lower chord forged eyebar heads (Photo 15)
- Several tension diagonals and hangers do not appear to be carrying any loads (photo n/a)
- Remaining original stringers exhibit advanced section loss of 50-100% (Photos 19, 20)
- Floorbeams exhibit advanced section loss (Photos 21-22)
- Floorbeam supports have numerous defects or had been previously retrofitted (Photo 21)
- Truss bearings at each abutment are frozen and exhibit pack rust (Photo 29)

Substructure:

- Abutment bridge seats (cap stones) are cracked or fractured at 3 of 4 locations (Photos 23-26)
- Stone masonry abutment stems with hairline to medium cracks in stones. (Photos 23-25)
- Wide mortar joints with deep voids at the top half of the near abutment (Photos 26)
- Stone masonry wingwalls are displaced with wide cracks following the mortar joints and through stones (Photo 24)
- Far abutment masonry is failing and documented to be in severe condition with wide cracks between adjacent stone masonry units with significant loss of backfill. Cracks are active due to freeze/thaw cycles and are actively monitored every 6 months (Photos 23-25).

4.0 Rehabilitation Analysis

The bridge rehabilitation analysis examines structural rehabilitation options for the Skinners Falls Bridge. As previously noted, the bridge was rehabilitated in 1974-1975 and 1986, with emergency repairs conducted in 2010, 2012, 2013 and 2016. The purpose of this analysis is to evaluate the viability of rehabilitating the existing bridge while retaining the bridge's character defining features as per the *Secretary of the Interior's Standards for Rehabilitation.*

4.1 Existing Bridge Description:

The Skinners Falls Bridge, originally constructed in 1902, is a two-span 466'-6" total length steel, pin-connected truss bridge that spans the Delaware River. The structure consists of trusses constructed in the modified Baltimore Through Truss configuration with two simple spans, each 232'-0" in length. The floor system consists of a 2"x4" timber deck with timber running boards supported by longitudinal rolled steel stringers. The stringers are supported by steel floor beams which transfer loads to the trusses at each of the lower chord panel points. The distance between the truss centerlines is 17'-3 ½", although the available lane width is reduced to 13'-5" between guide rail faces. The vertical clearance provided by the bridge structure at the PA portal is 16'-0" while the minimum vertical clearance at the NY portal is approximately 15'-9". Vertical clearance is further restricted by "headache" bars which were constructed in 2016 on each end of the structure. The headache bars, which limit the vertical clearance to 8'-6", were placed in an effort to restrict overweight vehicles (i.e., vehicles exceeding the 4-ton posting at the time of the headache bars installation) from using the bridge. The substructure units, consisting of the abutments, wingwalls and piers, are constructed of stone masonry. No pedestrian or bicycle facilities are present on the existing bridge. (**Figure 5** and **Figure 6)**

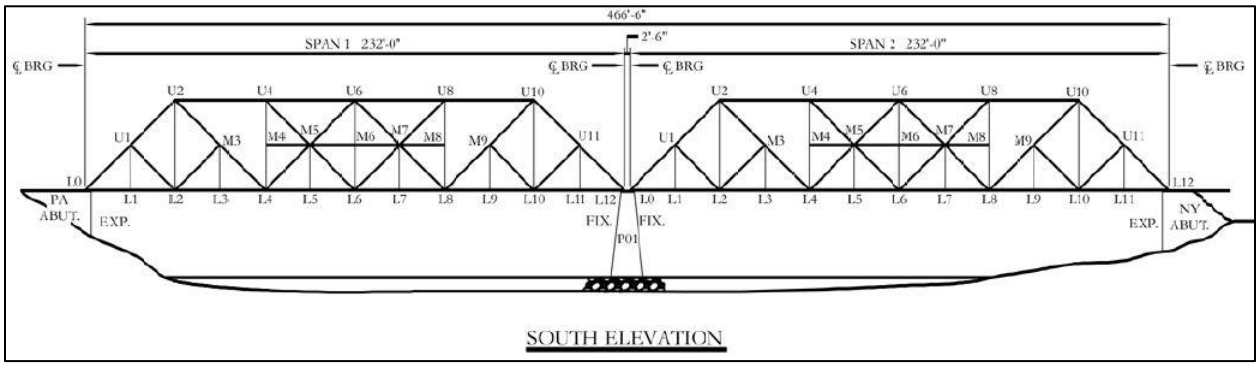


Figure 5: Elevation View of Skinners Falls Bridge

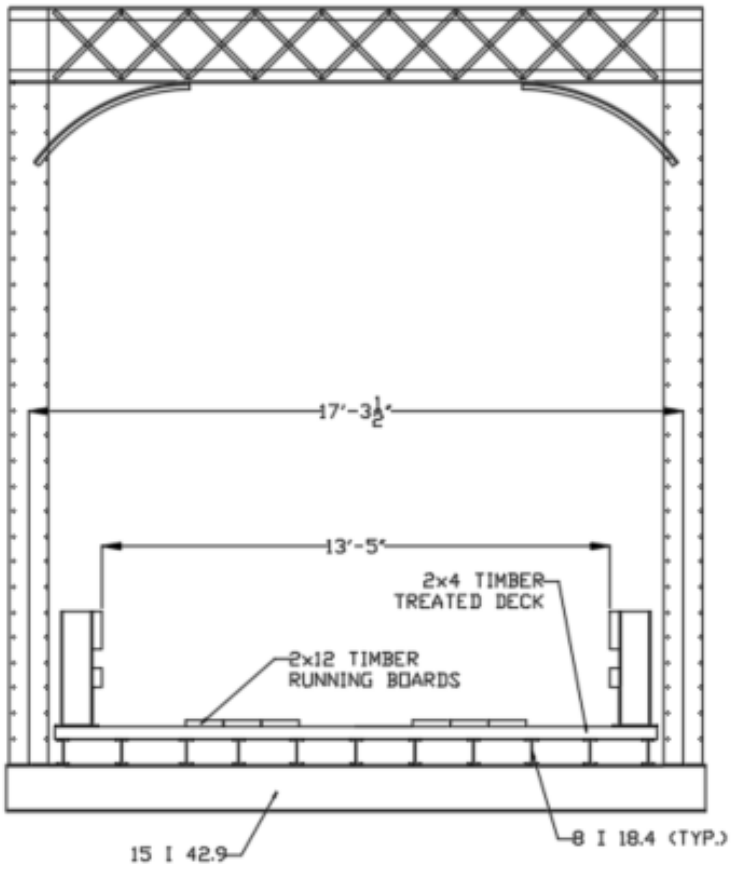


Figure 6: Existing Skinners Falls Bridge Cross Section

4.1.1 Previous Rehabilitation and Repair Projects:

The Skinners Falls Bridge was first rehabilitated with design plans developed in 1971 with construction in 1974-1975 which consisted of:

- Placing rock protection around the river pier
- Repointing of the substructure masonry
- Tightening truss turnbuckle members
- Heat shortening truss members
- Cleaning and painting structural steel with the exception of the faying surfaces of intersecting members and pin-connected joints
- Retrofitting diagonal channel member webs at connections with additional bearing plates
- Resetting of expansion bearings
- Replacing the timber deck

An additional rehabilitation was performed in 1986 which consisted of:

- Adding guide rail along both sides of the bridge deck
- Reinforcing top plates near bottom of portal end posts
- Heat-shortening truss member
- Replacing diagonal built-up member bearing plates at seven locations
- Replacing mid-height vertical members because of bridge railing weld damage
- Replacing approximately one-third of the decorative bridge railing
- Replacing ten of 264 stringers
- Strengthening floor beams
- Cleaning and painting entire structure with exception of the faying surfaces of intersecting members at pin-connected joints
- Replacing the timber deck

2010 Emergency repairs:

- Portal member repairs

2012 Emergency repairs:

- Replace deteriorated eyebar hangers with 7/8" threaded rods

Following an in-depth inspection and ratings analysis of the bridge, insufficient ratings resulted in mandatory temporary closures of the bridge and subsequent emergency repairs.

2013 Emergency repairs:

- Bracing of stringers at floor beams, abutments, and pier
- Replacing 43 of 264 stringers
- Strengthening of eight floor beams
- Repairing one floor beam connection to truss lower chord
- Cleaning and painting of members and connection at Span 1, Left Truss, PP L0

2016 Emergency repairs:

- Replacing missing pin caps
- Replacing select U-bolts at floorbeam to truss lower chord connection
- Replacing truss diagonal U8-M9
- Replacing select timber running boards
- Replacing 44 of 264 stringers
- Installation of headache bars

Refer to **Table 2** for a synopsis of aforementioned repairs from each rehabilitation contract which highlights the frequency of required repairs or member replacement specifically for the truss, floor system, and timber deck, as well as repairs to other bridge components.

Table 2: Previous Rehabilitation and Repair Summary

Year	Truss Members	Timber Deck	Floor Beams	Stringers	Substructure	Miscellaneous
1974-1975	•Tightening truss turnbuckle members •Heat shortening retrofitting diagonal channel member webs	•Replace	n/a	n/a	•Placing rock protection •Repointing masonry	•Resetting of expansion bearings •Cleaning and painting
1986	•Reinforcing top plates near bottom of portal end posts •Heat shortening •Replacing diagonal built up member bearing plates at 7 locations •Replacing mid-height vertical members •Replacing one third of decorative bridge railing	•Replace	•Strengthening of floor beams	•Replacing 10 stringers	n/a	•Adding guide rail along both sides of bridge deck •Cleaning and painting
2010	•Portal member repairs	n/a	n/a	n/a	n/a	n/a
2012	•Replace deteriorated eye bar hangers	n/a	n/a	n/a	n/a	n/a
2013	n/a	n/a	•Strengthening of floor beams •repairing one floor beam connection to truss lower chord	•Bracing of stringers at floor beams abutments and piers •Replacing 43 stringers	n/a	n/a
2016	•Replacing missing pin caps •Replacing select U-bolts •Replacing truss diagonal U8-M9	n/a	n/a	•Replace 44 stringers	n/a	•Installation of headache bars

The emergency repairs to the bridge were conducted in 2010, 2012, 2013 and 2016 to address ongoing deterioration of the structure and reopen the bridge after several short-term bridge closures. In 2019, engineering work was under way in preparation for another rehabilitation project focusing on the masonry abutment condition issues, potential deck replacement, stringer replacement, and sway/lateral bracing repairs or replacement. Following a customer

complaint and subsequent PennDOT District Bridge Unit inspection which identified extensive timber deck and lateral truss bracing deterioration, the bridge was closed to all traffic including bicyclists and pedestrians.

4.2 Testing and Inspections:

A draft Structural Assessment Report (SAR) was prepared in 2013 by AECOM included an in-depth inspection, calculate load ratings and rehabilitation recommendations. The SAR also included non-destructive testing (NDT) and materials testing of the structure. Ultrasonic testing was conducted on 12 of the 72 truss pin joints, 42 of the 160 eyebar heads and 16 of the 32 loop head rods. In-situ Brinell hardness testing was conducted on 19 truss members, with a follow-up of 17 truss members. Finally, a total of 4 materials samples were also submitted for laboratory tensile tests and Charpy V-notch testing.

Ultrasonic testing is typically used to evaluate the presence of defects, cracks, or inclusions within a structural member without directly impacting the integrity of those members. Defects, cracks, or inclusions show on the ultrasonic testing results as “indications”. The results of the ultrasonic testing found no irregularities in the eyebar and loop rod heads. Ultrasonic testing of the pins found indications on one pin in the Span 2 right truss and one pin in the Span 2 left truss. The presence of the indications and the respective location on the pins suggest there are potential flaws from the original fabrication and/or localized section loss.

The original hardness testing ranged from 113HB to 204HB, with the tensile testing resulting in 34.7 ksi to 40.1 ksi. The supplemental testing was utilized to determine the approximate average tensile strength of the steel bridge to be 64 ksi. The average tensile strength when compared with common yield strength at the time of original construction provides justification for the use of 30 ksi yield strength for rehabilitation design and analysis of associated truss members that will be retained in an “as-rehabilitated” structure. Therefore, the results of the materials testing validates the strength of the existing structural members for use in a rehabilitation design. **Appendix D** contains additional yield strength background.

Biennial bridge inspections have been performed by a PennDOT consultant with special inspections as required. This report was developed with reliance on the latest report prepared for the previous inspection conducted in November 2022. These reports have noted the continued deterioration of the structure over time. Specifically, the conditions observed during the October 2019 special inspection consisted of visual “swaying” of the bridge, timber running board and deck deterioration and severe distress in the masonry abutment on the NY approach. These findings resulted in the closure of the bridge to all traffic.

4.3 Bridge Rehabilitation Alternative:

The bridge rehabilitation analysis draws from the following previously prepared reports:

- 2013 Draft Structural Assessment (AECOM)
- 2014 Draft Feasibility Study Report (AECOM)
- Biennial inspection reports (by others)

The overall rehabilitation alternative consists of a subset of three alternatives which vary in scope depending on the proposed weight limits. The three rehabilitation alternatives are: minimum rehabilitation to 4-ton weight limit, 7-ton weight limit rehabilitation, and 10-ton weight limit rehabilitation. These rehabilitation alternatives were developed to evaluate a rehabilitation of the bridge in accordance with the *Secretary of Interior's Standards for Rehabilitation.*

A conceptual level cost analysis was also developed to evaluate the initial lifecycle costs associated with each of the rehabilitation alternatives. In general, the various bridge rehabilitations can be expected to lengthen the lifespan of the existing bridge by approximately 10-25 years. Continued deterioration of retained members for the minimum rehabilitation (4-ton) and 7-ton alternatives will likely require subsequent rehabilitation activities earlier than the comprehensive 10-ton rehabilitation alternative. Citing the available bridge records, the first two major rehabilitations were conducted approximately 12 years apart with numerous emergency repairs beginning approximately 25 years after the extensive 1986 rehabilitation. Further deterioration resulted in a series of closures and significant emergency repairs beginning in 2010.

The 2016 rehabilitation resulted in a Section 106[1] finding of No Adverse Effect for the Skinners Falls Bridge and a finding of No Effect for the Milanville, PA Historic District (**Appendix A**).

4.3.1 Rehabilitation Alternative BRG 1: Minimum Rehabilitation Alternative (4-tons):

The minimum rehabilitation alternative involves performing the least extensive rehabilitation work on the existing truss, focusing on replacement of the existing floor system and timber deck. Truss members will be replaced in kind with like materials (higher yield strength modern steel) of equivalent size, shape, and connection details. As part of all rehabilitation alternatives, the activities require the complete disassembly of the bridge. The disassembly is necessary to allow the cleaning between all faying surfaces and galvanization of the members for future protection, in addition to the replacement of all pins with new shouldered pins. Additionally, the replacement shouldered pins will be of modern steel. Once the work is complete, the trusses would be reassembled (**Figure 7**). The existing timber deck, stringers, and floor beams are not the limiting bridge components which require a 4-ton posting. However, failure to address the continuing deterioration of these members while conducting the rehabilitation noted above would require frequent action similar to the emergency repairs that were performed in 2013 to maintain the integrity of the structure. By replacing the floor system and instituting an adequate maintenance plan, the structure's life can be expected to be sustained for 10-15 years.

[1] The 2016 rehabilitation of the Skinners Falls bridge involved the use of federal funding. The use of federal funds requires the agency to take the project's effects on NRHP eligible or listed properties into consideration under Section 106 of the National Historic Preservation Act of 1966, as amended.

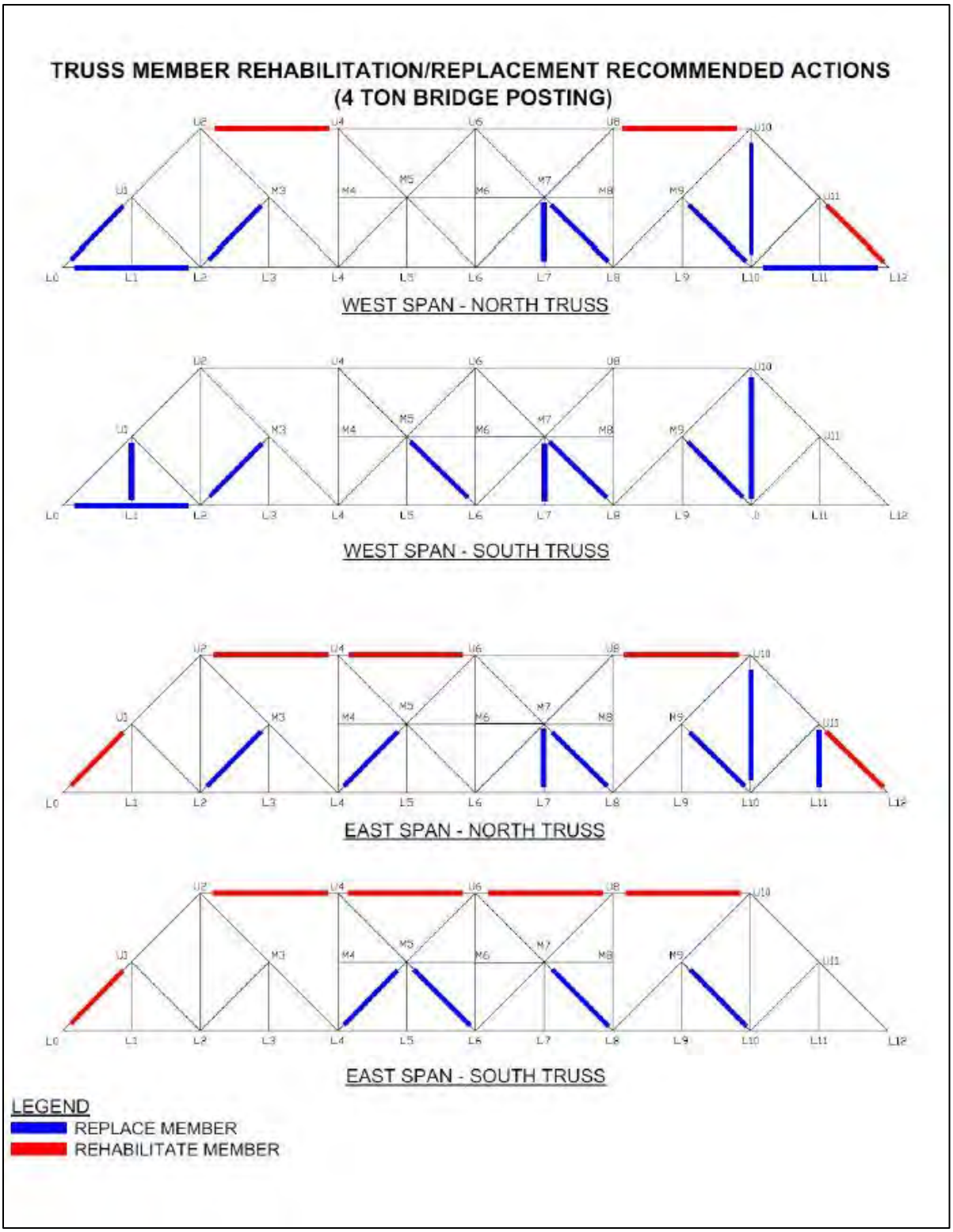


Figure 7: Minimum Rehabilitation (4-ton) Alternative

Following the emergency repairs performed in Spring 2013, all truss members had a rating of 4-tons or greater. The minimum rehabilitation alternative would include replacing approximately 15% of the truss members including portions of the bottom chord, diagonal, and vertical members and the rehabilitation of approximately 7% of the truss members consisting of top chord members and end diagonals by cleaning and strengthening of individual members. The strengthening methods were not specified in the 2014 draft Structural Feasibility Report. Various methods may be used, including adding additional plates, but will not be identifiable until the truss is disassembled during construction. Member condition needs to be evaluated in the vicinity of the pin connections once disassembled. This work would also include dismantling the truss connection-by-connection under temporary support to clean and paint members and connections and replace the existing pins with new pins. Dismantling the truss and replacing truss members would also require a temporary support system necessitating the installation of causeways within the Delaware River. As determined throughout the course of the in-depth inspection, several pins on the bridge were found to have defects including broken pin sleeves and section loss to the pins themselves. The presence of extensive pack rust and corrosion at connections throughout the structure has resulted not only in deterioration of the pins but also the concern of the pack rust causing members to be "pushed off" the pins resulting in bridge collapse.

The original pins, as illustrated in the 1986 rehabilitation plans (**Figure 8**), consisted of a single diameter steel pin, with two dust caps, which were secured to the pin with bolts. The dust caps **(Figure 9)** are the only portions of the pin that are visible on the bridge. The existing pins do not have "shoulders" as per current code, which would minimize the sliding effects of the current pins. In their current deteriorated condition, the pins are also susceptible to sliding due to bridge movements. For these reasons, pin replacement and cleaning of connections is a base recommendation for this and all other rehabilitation options. The proposed replacement shouldered pins (**Figure 10**) are anticipated to consist of a steel pin to match the same length of the existing pin. The replacement pins are anticipated to include a machined shoulder on one side, which will match the existing dust cover diameter. On the opposite side of the pin from the steel shoulder, a threaded end will be present. The combination of a shouldered nut (**Figure 10**) and the machined shoulder will minimize sliding effects. The shouldered nut will be slightly larger than the existing dust cap in order to provide retention of the bridge members and would be visible on the bridge. The proposed pin replacements will not change the overall function of the bridge as a pin-connected through truss, will replace a deteriorated bridge member, and add an added layer of protection to prevent sliding of bridge members. Therefore the pin replacements would be performed in-kind, result in a more stable preservation of the bridge, and reduce the potential of catastrophic failure due to bridge members sliding off the pins.

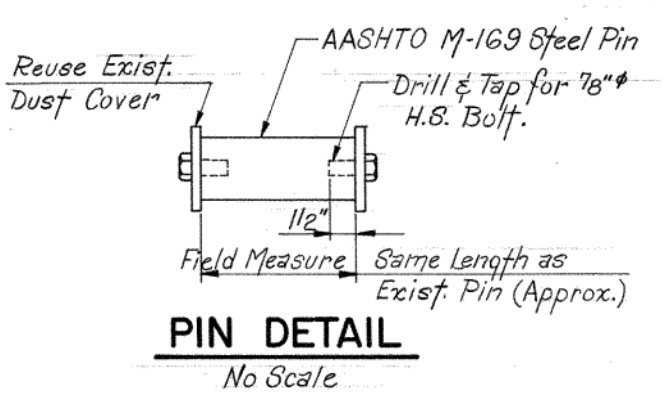


Figure 8: Existing Pin Detail, 1986 Rehabilitation Drawings

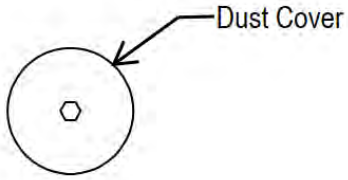


Figure 9: Existing Dust Cover

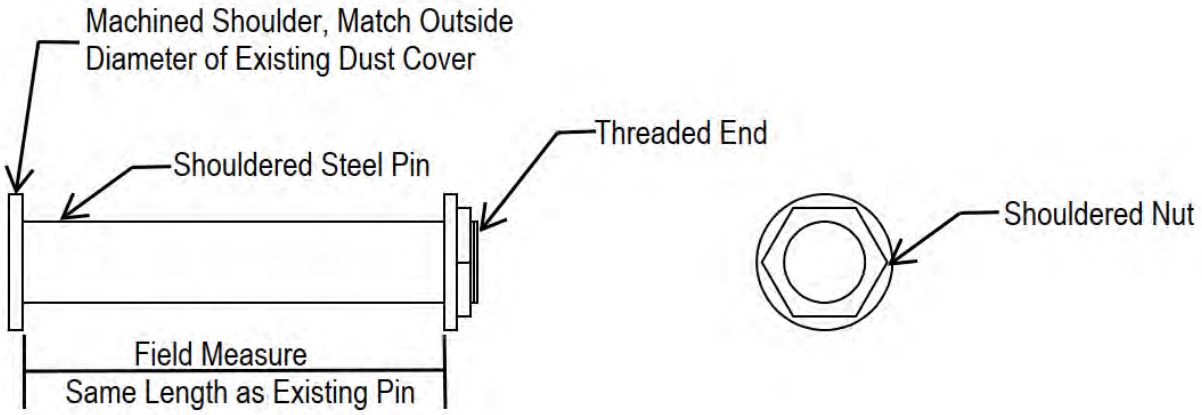


Figure 10: Proposed Shouldered Pin Detail and Shouldered Nut Detail

For this alternative, it will also be necessary to rehabilitate/replace the existing bearings that are not functioning properly and are in poor condition. As a result of the existing bearings' lack of functionality, the thermal movements of the bridge are being restricted, affecting the superstructure and substructure. Additionally, the NY abutment is in critical condition while the remaining substructure units are overall in fair condition. This rehabilitation option includes extensive repair of the NY abutment involving the installation of a new pile foundation to support the reconstructed masonry abutments and wingwalls, replacing beam seat capstones and bearing stones, reconstructing and repointing of the failed stone masonry abutment stem and wingwalls, and improvements to the existing drainage behind the stone abutment walls. These rehabilitation measures will improve the condition of the substructures for extended service life for 10-15 years.

The *Secretary of the Interior's Standards for Rehabilitation* were consulted during the development of the scope of the minimum (4-ton) rehabilitation. As noted above, the minimum rehabilitation entails replacement of the deck, truss members and pins, as well as improvements to the substructure members. All rehabilitation alternatives retain the setting and location of the bridge over the Delaware River.

Overall, the rehabilitation alternatives were designed to meet certain load ratings while maintaining the Baltimore Through Truss design. All three of the rehabilitation alternatives result in replacement or strengthening of various truss members including the top chords, verticals, end posts, diagonals, and floor system. Per the Secretary's Standards, repair or rehabilitation of members are preferrable to replacement. Replacement of the truss members would be performed in-kind with new steel members. By nature of the Baltimore Through Truss design, new replacement members would need to be of similar size and shape as the existing members. Thus, whether the members are either replaced or repaired, the overall character of the pin connected Baltimore through truss design would be retained. As a result of retaining the character of the Baltimore through truss, these activities would meet the SOI standards for retaining the historic character of the bridge. Further, these activities meet the SOI standards for preserving distinctive constructive techniques, features that characterize the bridge and associated decorative features.

Further, for the 4-ton alternative and all other alternatives, the dismantling of the truss connection by connection would need to be performed to replace the existing pins with new pins. The existing non-shouldered pins themselves must be replaced to meet load requirements retaining the original functionality of the truss as well as the nature of the pin connected members, thus preserving the overall construction technique and distinctive character of the Baltimore Through Trusses and meeting the SOI standards. However, the replacement pins will be shouldered pins to meet current standards as discussed above. The pin replacements would be performed in-kind, result in a more stable preservation of the bridge, and reduce the potential of catastrophic failure due to bridge members sliding off the pins.

Galvanizing and painting would take place as part of the rehabilitation. The painting of the structure would be of a similar color to match the color and texture of the existing paint. Therefore the galvanizing and painting meets the SOI standards to match color, texture and visual qualities of the existing features. Decorative features will be reused and repaired where possible during the reassembly of the truss. Where reuse or repair of the decorative features are not possible, replacement in-kind will be performed. As a result of retaining the decorative features, these activities would meet the SOI standards for retaining the historic character of the bridge. Further, these activities meet the SOI standards for preserving distinctive constructive techniques, features that characterize the bridge and associated decorative features.

All three alternatives require extensive reconstruction of the NY Abutment masonry stem and wingwalls and include a new pile supported foundation to support the reconstructed masonry abutments and wingwalls Repairs at both abutments require replacement of capstones and bearing stones, as well as repointing of the existing masonry and improvements to the drainage behind the wingwalls. Repointing of the masonry to be performed will match the existing masonry joints in color and texture. Repointing of the masonry does not impact the overall form and function of the stone masonry abutments and wingwalls. The installation of pile

foundations under the masonry wingwalls and abutments do not affect the form and function of the substructure units. Similarly, improvement of the drainage behind the wingwalls does not affect the form and function of the masonry wingwalls. Therefore, these activities meet the SOI standards for preservation of the historic character, as well as repairing historic features.

The timber deck was replaced in the previous rehabilitation of 1974-75 and 1986. Under all three rehabilitation alternatives, the deck is proposed to be replaced in-kind with a timber deck. Replacement in kind is necessary, as the lifespan of timber decks are limited. Thus the replacement in kind is consistent with the SOI standards to preserve the historic character of the bridge.

Due to the implementation of strategies including repair and replacement in kind **(Table 3)**, the 4-ton rehabilitation would be consistent with the Secretary's Standards. Because the 4-ton rehabilitation is consistent with the Secretary's Standards, this alternative is anticipated to result in a No Adverse Effect finding to the NHRP listed Skinners Falls Bridge. This alternative does not change the appearance, size and scale of the bridge, which is a contributing element to the Milanville, PA Historic District. Therefore, the 4-ton rehabilitation it anticipated to result in a No Adverse Effect finding for the NRHP listed Milanville, PA Historic District.

Table 3: 4-ton Rehabilitation Impacts to Character Defining Features

Character defining Feature	Repair	Replacement in-kind	Replacement
Truss members	Strengthening where feasible	Yes, with modern steel where repair is not possible	n/a
Pins	n/a	Yes, with modern shouldered pins	
Pin connections	Strengthening where feasible	Yes, with modern steel	n/a
Abutments, piers and wingwalls	Repoint masonry	Yes, abutment stem and capstone	Pile foundation under abutments and wingwalls; drainage improvements behind stone wingwalls
Decorative features	Yes, reused and repaired where possible	Yes, where repair is not possible	n/a
Bridge railing	Yes, reused and repaired where possible	Yes, where repair is not possible	n/a
Structure size	No change to the structure size		
Structure scale	No changes to the structure scale		

4.3.2 Rehabilitation Alternative BRG 2: Rehabilitation to 7-ton Weight Limit:

This alternative would be similar to minimum rehabilitation option but would also include the replacement of an additional 3%, or 18% total, of truss members (specifically portions of the bottom chord and diagonals) to an extent commensurate with bringing the entire structure to a minimum of a 7 -ton operating rating. Truss members will be replaced in kind with like materials (higher yield strength modern steel) of equivalent size, shape, and connection details. The strengthening methods were not specified in the 2014 draft Structural Feasibility Report. Various methods may be used, including adding additional plates, but will not be identifiable until the truss is disassembled during construction. Member condition needs to be evaluated in the vicinity of the pin connections once disassembled. For this alternative, it will also be necessary to rehabilitate/replace the existing bearings that are not functioning properly and are in poor condition. As a result of the existing bearings' lack of functionality, the thermal movements of the bridge are being restricted, affecting the superstructure and substructure (**Figure 11)**. This rehabilitation would restore the structure to its as-designed capacity as determined via calculation without materials testing results in the 2013 draft Structural Assessment Report. This rehabilitation would be conducted without significantly altering the appearance of the bridge. The existing engineering function of the bridge would remain, as the overall truss configurations and functions would be unchanged. The work being performed on the truss will require the use of a temporary support system to allow for the removal of members and pins.

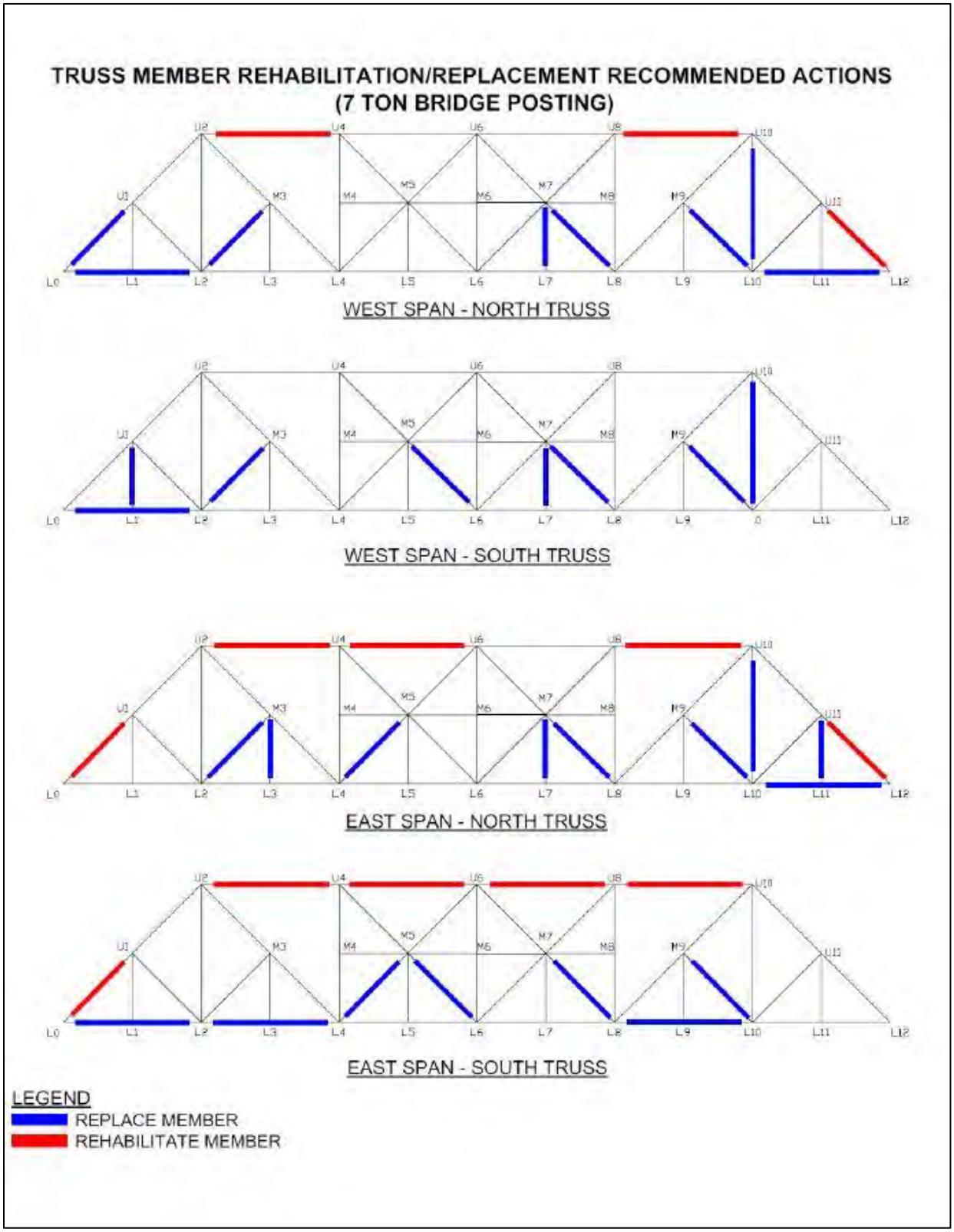


Figure 11: 7-ton Rehabilitation Alternative

The *Secretary of the Interior's Standards for Rehabilitation* were consulted during the development of the scope of the 7-ton rehabilitation. As noted above, the 7-ton rehabilitation entails replacement of the deck, truss members and pins, as well as substructure members. Additional truss members would need to be replaced as compared to the minimum (4-ton) rehabilitation. All rehabilitation alternatives retain the setting and location of the bridge over the Delaware River.

Overall, the rehabilitation alternatives were designed to meet certain load ratings while maintaining the Baltimore Through Truss design. All three of the rehabilitation alternatives result in replacement or strengthening of various truss members including the top chords, verticals, end posts, diagonals, and floor system. As the load rating increases, the number of members which needed to be replaced or rehabilitated increases. Per the Secretary's Standards, repair or rehabilitation of members are preferrable to replacement. Replacement of the truss members would be performed in-kind with new steel members. By nature of the Baltimore Through Truss design, new replacement members would need to be of similar size and shape as the existing members. Thus, whether the members are either replaced or repaired, the overall character of the pin connected Baltimore through truss design would be retained. As a result of retaining the character of the Baltimore through truss, these activities would meet the SOI standards for retaining the historic character of the bridge. Further, these activities meet the SOI standards for preserving distinctive constructive techniques, features that characterize the bridge and associated decorative features.

Further, for the 7-ton alternative and all other alternatives, the dismantling of the truss connection by connection would need to be performed to replace the existing pins with new pins. The existing non-shouldered pins themselves must be replaced to meet load requirements retaining the original functionality of the truss as well as the nature of the pin connected members, thus preserving the overall construction technique and distinctive character of the Baltimore Through Trusses and meeting the SOI standards. However, the replacement pins will be shouldered pins to meet current standards as discussed above. The pin replacements would be performed in-kind, result in a more stable preservation of the bridge, and reduce the potential of catastrophic failure due to bridge members sliding off the pins.

Galvanizing and painting would take place as part of the rehabilitation. The painting of the structure would be of a similar color to match the color and texture of the existing paint. Therefore the galvanizing and painting meets the SOI standards to match color, texture and visual qualities of the existing features. Decorative features will be reused and repaired where possible during the reassembly of the truss. Where reuse or repair of the decorative features are not possible, replacement in-kind will be performed. As a result of retaining the decorative features, these activities would meet the SOI standards for retaining the historic character of the bridge. Further, these activities meet the SOI standards for preserving distinctive constructive techniques, features that characterize the bridge and associated decorative features

All three alternatives require extensive reconstruction of the NY Abutment masonry stem and wingwalls and include a new pile supported foundation to support the reconstructed masonry abutments and wingwalls. Repairs at both abutments require replacement of capstones and bearing stones, as well as repointing of the existing masonry and improvements to the drainage behind the wingwalls. Repointing of the masonry to be performed will match the existing masonry joints in color and texture. Repointing of the masonry does not impact the overall form and function of the stone masonry abutments and wingwalls. The installation of pile foundations under the masonry wingwalls and abutments do not affect the form and function of the substructure units. Similarly, improvement of the drainage behind the wingwalls does not affect the form and function of the masonry wingwalls. Therefore, these activities meet the SOI standards for preservation of the historic character, as well as repairing historic features.

The timber deck was replaced in the previous rehabilitation of 1974-75 and 1986. Under all three rehabilitation alternatives, the deck is proposed to be replaced in-kind with a timber deck. Replacement in kind is necessary, as the lifespan of timber decks are limited. Thus the replacement in kind is consistent with the SOI standards to preserve the historic character of the bridge.

Due to the implementation of strategies including repair and replacement in kind **(Table 4)**, the 7-ton rehabilitation would be consistent with the Secretary's Standards. Because the 7-ton rehabilitation is consistent with the Secretary's Standards, this alternative is anticipated to result in a No Adverse Effect finding to the NHRP listed Skinners Falls Bridge. This alternative does not change the appearance, size and scale of the bridge, which is a contributing element to the Milanville, PA Historic District. Therefore, the 7-ton rehabilitation is anticipated to result in a No Adverse Effect finding for the NRHP listed Milanville PA Historic District.

Table 4: 7-ton Rehabilitation Impacts to Character Defining Features

Character defining Feature	Repair	Replacement in-kind	Replacement
Truss members	Strengthening where feasible	Yes, with modern steel where repair is not possible	n/a
Pins	n/a	Yes, replacement with modern shouldered pins	
Pin connections	Strengthening where feasible	Yes, with modern steel	n/a
Abutments, piers and wingwalls	Repoint masonry	Yes, Abutment stem and capstone	Pile foundation under abutments and wingwalls; drainage improvements behind stone wingwalls
Decorative features	Yes, reused and repaired where possible	Yes, where repair is not possible	n/a
Bridge railing	Yes, reused and repaired where possible	Yes, where repair is not possible	n/a
Structure size	No change to the structure size		
Structure scale	No changes to the structure scale		

4.3.3 Rehabilitation Alternative BRG 3: Rehabilitate to 10- ton Weight Limit

This alternative would consist of repairing the bridge to a 10-ton operating rating, which would yield a higher structural capacity than the as-designed 1901 Skinners Falls Bridge. The 2013 draft Structural Assessment and 2014 draft Feasibility Study contained information substantiating a 10-ton rehabilitation alternative. Similar to the other rehabilitation alternatives, the 10-ton option would also include the replacement of all bridge pins, the entire floor system with new members of adequate capacity, and the timber deck system to ensure the extended service life of the structure. The 10-ton rehabilitation would include replacement, retrofit, and/or repair work to approximately 35% of remaining truss members (**Figure 12**). **Appendix C** also provides a comprehensive breakdown of structural members to be repaired, retrofitted or replaced under this alternative. A temporary bridge support structure, similar to the one proposed for the other alternatives, would be required for truss disassembly to permit replacement of members; cleaning, galvanizing, and painting; and reassembly of both truss spans.

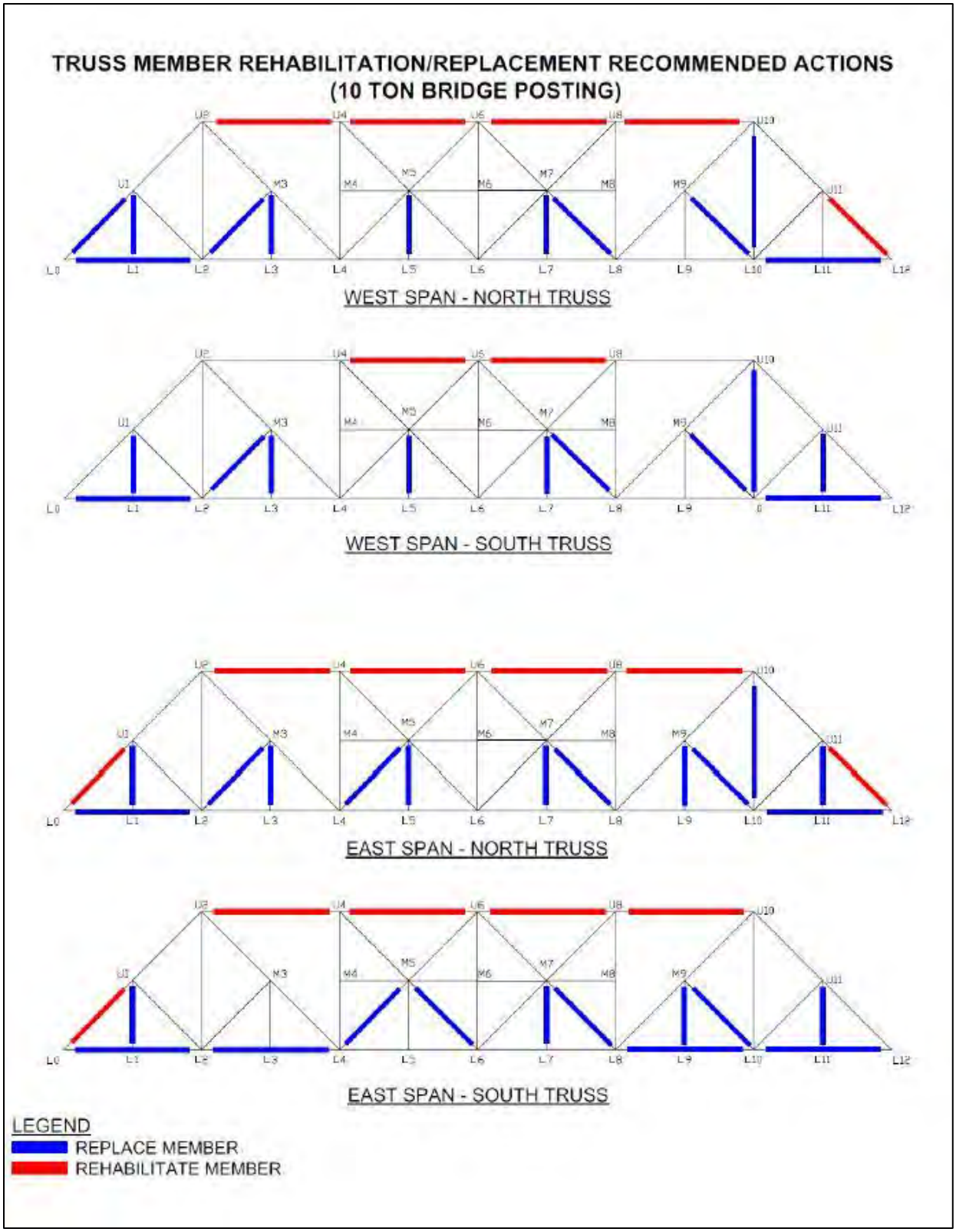


Figure 12: 10-ton Rehabilitation Alternative

For this alternative, it will also be necessary to rehabilitate/replace the existing bearings that are not functioning properly and are in poor condition. As a result of the existing bearings' lack of functionality, the thermal movements of the bridge are being restricted, affecting the superstructure and substructure. Additionally, the NY abutment is in critical condition while the remaining substructure units are overall in fair condition. This rehabilitation option includes extensive repair of the NY abutment involving the installation of a new pile foundation to support the reconstructed masonry abutments and wingwalls, replacing beam seat capstones and bearing stones, reconstructing and repointing of the failed stone masonry abutment stem and wingwalls, and improvements to the existing drainage behind the stone abutment wall.

The *Secretary of the Interior's Standards for Rehabilitation* were consulted during the development of the scope of the 10-ton rehabilitation. As noted above, the 10-ton rehabilitation entails replacement of the deck, truss members and pins, as well as substructure members. Additional truss members would need to be replaced as compared to the minimum (4-ton) and 7-ton rehabilitations. All rehabilitation alternatives retain the setting and location of the bridge over the Delaware River.

Overall, the rehabilitation alternatives were designed to meet certain load ratings while maintaining the Baltimore Through Truss design. All three of the rehabilitation alternatives result in replacement or strengthening of various truss members including the top chords, verticals, end posts, diagonals, and floor system. As the load rating increases, the number of members which needed to be replaced or rehabilitated increases. Per the Secretary's Standards, repair or rehabilitation of members are preferrable to replacement. Replacement of the truss members would be performed in-kind with new steel members. By nature of the Baltimore Through Truss design, new replacement members would need to be of similar size and shape as the existing members. Thus, whether the members are either replaced or repaired, the overall character of the pin connected Baltimore through truss design would be retained. As a result of retaining the character of the Baltimore through truss, these activities would meet the SOI standards for retaining the historic character of the bridge. Further, these activities meet the SOI standards for preserving distinctive constructive techniques, features that characterize the bridge and associated decorative features.

Further, for the 10-ton alternative and all other alternatives, the dismantling of the truss connection by connection would need to be performed to replace the existing pins with new pins. The existing non-shouldered pins themselves must be replaced to meet load requirements retaining the original functionality of the truss as well as the nature of the pin connected members, thus preserving the overall construction technique and distinctive character of the Baltimore Through Trusses and meeting the SOI standards. However, the replacement pins will be shouldered pins to meet current standards as discussed above. The pin replacements would be performed in-kind, result in a more stable preservation of the bridge, and reduce the potential of catastrophic failure due to bridge members sliding off the pins.

Galvanizing and painting would take place as part of the rehabilitation. The painting of the structure would be of a similar color to match the color and texture of the existing paint. Therefore the galvanizing and painting meets the SOI standards to match color, texture and visual qualities of the existing features. Decorative features will be reused and repaired where possible during the reassembly of the truss. Where reuse or repair of the decorative features are not possible, replacement in-kind will be performed. As a result of retaining the decorative features, these activities would meet the SOI standards for retaining the historic character of the bridge. Further, these activities meet the SOI standards for preserving distinctive constructive techniques, features that characterize the bridge and associated decorative features

All three alternatives require extensive reconstruction of the NY Abutment masonry stem and wingwalls and include a new pile supported foundation to support the reconstructed masonry abutments and wingwalls. Repairs at both abutments require replacement of capstones and bearing stones, as well as repointing of the existing masonry and improvements to the drainage behind the wingwalls. Repointing of the masonry to be performed will match the existing masonry joints in color and texture. Repointing of the masonry does not impact the overall form and function of the stone masonry abutments and wingwalls. The installation of pile foundations under the masonry wingwalls and abutments do not affect the form and function of the substructure units. Similarly, improvement of the drainage behind the wingwalls does not affect the form and function of the masonry wingwalls. Therefore, these activities meet the SOI standards for preservation of the historic character, as well as repairing historic features.

The timber deck was replaced in the previous rehabilitation of 1974-75 and 1986. Under all three rehabilitation alternatives, the deck is proposed to be replaced in-kind with a timber deck. Replacement in kind is necessary, as the lifespan of timber decks are limited. Thus the replacement in kind is consistent with the SOI standards to preserve the historic character of the bridge.

Due to the implementation of strategies including repair and replacement in kind, **(Table 5)**, the 10-ton rehabilitation would be consistent with the Secretary's Standards. Because the 10-ton rehabilitation is consistent with the Secretary's Standards, this alternative is anticipated to result in a No Adverse Effect finding to the NHRP listed Skinners Falls Bridge. This alternative does not change the appearance, size and scale of the bridge, which is a contributing element to the Milanville, PA Historic District. Therefore, the 10-ton rehabilitation is anticipated to result in a No Adverse Effect finding for the NRHP listed Milanville, PA Historic District.

Table 5: 10-ton Rehabilitation Impacts to Character Defining Features

Character defining Feature	Repair	Replacement in-kind	Replacement
Truss members	Strengthening where feasible	Yes, with modern steel where repair is not possible	n/a
Pins	n/a	Yes, replacement with modern shouldered pins	
Pin connections	Strengthening where feasible	Yes, with modern steel	n/a
Abutments, piers and wingwalls	Repoint masonry	Yes, Abutment stem and capstone	Pile foundation under abutments and wingwalls; drainage improvements behind stone wingwalls
Decorative features	Yes, reused and repaired where possible	Yes, where repair is not possible	n/a
Bridge railing	Yes, reused and repaired where possible	Yes, where repair is not possible	n/a
Structure size	No change to the structure size		
Structure scale	No changes to the structure scale		

5.0 Conclusion

Overall, the task of rehabilitating the Skinners Falls Bridge to a 10-ton weight limit does not include significantly more work than the minimum rehabilitation option. Since all rehabilitation options at a minimum include the sizeable task of replacing the floor system to extend the structure's life, the additional work in this alternative does not yield a significant increase in cost between the minimum and 7-ton weight limit alternatives. The positive outcomes of the 10-ton weight limit rehabilitation alternative include increased structural capacity of the bridge. A summary of the rehabilitation options presented in this HBRA Phase 1 are presented below in **Table 6**.

Table 6: Rehabilitation Summary

Rehabilitation Option	Section 106 Adverse Effect**	SOI Standards	Cost Estimate*	Comments
Minimum (4-ton) Rehabilitation	No/No	Yes	$15,595,000	4-ton Posting, 10-15 Year Design Life, Maintenance Plan Required
7-ton Rehabilitation	No/No	Yes	$15,664,000	7-ton Posting, 10-15 Year Design Life, Maintenance Plan Required
10-ton Rehabilitation	No/No	Yes	$17,269,000	10-ton Posting, Extensive Rehab, 25 Year Design Life, Maintenance Plan Required

*Costs are from the 2014 Feasibility Study and escalated to 2022 dollars, including deck replacement and more significant substructure repairs.
**Shown as anticipated No Adverse Effect on the bridge/ anticipated No Adverse Effect on Milanville Historic District.

5.1 SOI Standards

All three of the rehabilitations would be performed in accordance with the Secretary of Interior *Standards for Rehabilitation.* As discussed, all three of the alternatives would implement repair and in-kind replacement strategies where possible. New replacement shouldered pins are required due to current engineering standards. The proposed pin replacements will not change the overall function of the bridge as a pin-connected through truss, will replace a deteriorated bridge member, and add an added layer of protection to prevent sliding of bridge members. Therefore the pin replacements would be performed in-kind, result in a more stable preservation of the bridge, and reduce the potential of catastrophic failure due to bridge members sliding off the pins. The exterior of the wingwalls will be repaired, a new pile supported foundation under the reconstructed masonry abutments and wingwalls will also be necessary to support the rehabilitated bridge. The installation of pile foundations under the

masonry wingwalls and abutments does not affect the form and function of the substructure units.

As a result of retaining the character of the Baltimore through truss, the rehabilitation would meet the SOI standards for retaining the historic character of the bridge. Further, these activities meet the SOI standards for preserving distinctive constructive techniques, features that characterize the bridge, and associated decorative features. Additionally by retaining the decorative features, these activities would meet the SOI standards for retaining the historic character of the bridge. The galvanizing and painting meets the SOI standards to match color, texture and visual qualities of the existing features.

5.1.1 Rehabilitation Effects As An Individually Listed Resource

All three of the rehabilitation alternatives would result in impacts to character defining features of the bridge. The truss members, pin connections, abutment stems and capstones will be replaced in kind. However, new replacement shouldered pins are required due to current engineering standards. Because the pin connected nature of the bridge is maintained, a No Adverse Effect to the NRHP Listed Skinners Falls Bridge is anticipated for all three rehabilitation options. As an intact example of a Baltimore Through Truss bridge, the Skinners Falls Bridge would retain its eligibility as an individually eligible resource under Criterion C (Engineering Significance) of the NRHP.

5.1.2 Rehabilitation Effects As a Contributing Resource to the Milanville, PA Historic District

All three of the rehabilitation alternatives are anticipated to result in a finding of No Adverse Effect to the Skinners Falls bridge. In addition to being individually listed resource on the NRHP, the Skinners Falls Bridge is also a contributing resource to the Milanville, PA Historic District. None of the alternatives change the appearance, size and scale of the bridge. The overall location of the Skinners Falls Bridge within the Milanville, PA Historic District would not change, since the bridge would remain in its existing location and alignment. All alternatives retain the bridges material design, workmanship and scale. Decorative features will be reused or repaired where possible. Where decorative cannot be reused or repaired, they will be replaced in-kind. As rehabilitated, the bridge would remain an intact example of a Baltimore Through Truss bridge constructed during the period of significance for the Milanville, PA Historic District.

5.2 Next Steps

This report was prepared to evaluate rehabilitating the existing Skinners Falls bridge to a 4, 7, and 10-ton weight posting and to evaluate whether these rehabilitations can be performed to The Secretary of Interior Standards. Phase 2 of the HBRA will be prepared to evaluate additional, non-traditional rehabilitation options which would not meet the Secretary of Interior Standards. Phase 2 of the HBRA will also include a section on whether the Phase 1 or Phase 2 rehabilitation options meet the project purpose and need.

Appendix A:

National Register of Historic Places Data

And 2016 Section 106 Determination of Effects Documentation

National Register of Historic Places Data

Survey Number:	T-45
Bridge Name and Address:	Millanville -Skinners Falls Bridge L.R. 63027 over Delaware River Millanville , Wayne County, Pennsylvania Skinners Falls, Sullivan County, New York
Owner:	Commonwealth of Pennsylvania Department of Transportation Transportation & Safety Building Harrisburg, Pennsylvania 17120 State of New York Department of Transportation 1220 Washington Avenue Albany, New York 12232
Statement of Significance:	The Millanville-Skinner Falls Bridge is an intact example of multiple span Baltimore truss of moderate length. It was built in 1904. It is one of only three representative examples of this type of truss bridges included in this nomination. It is also unusual in its location. Most exemplary truss bridges included in this nomination were built in the north central, northwestern and southwestern sections of the state.
Area of Significance:	Engineering. Criteria C.
Boundary Description:	The nominated property consists of a 500 feet long by 30 feet wide rectangle, whose verticies coincide with the outside corners of the bridge's wing walls, and includes only bridge superstructure and substructure.
Acreage of Nominated Property:	Less than one acre.

NATIONAL REGISTER 000056

PENNSYLVANIA HISTORIC RESOURCE SURVEY FORM
Bureau for Historic Preservation Box 1026
PA Historical & Museum Commission Harrisburg, PA 17120

9. HISTORICAL DATA

8. USGS QUAD. Damascus

UTM's: Zone

E	4	9	5	1	2	0
N	4	6	1	2	8	8	0
E							
N							

Designer/Engineer: _____

Builder/Contractor: _____

Bridge Company: _____

Date(s): 1901 ; basis Pa. N.Y. Bridge info.

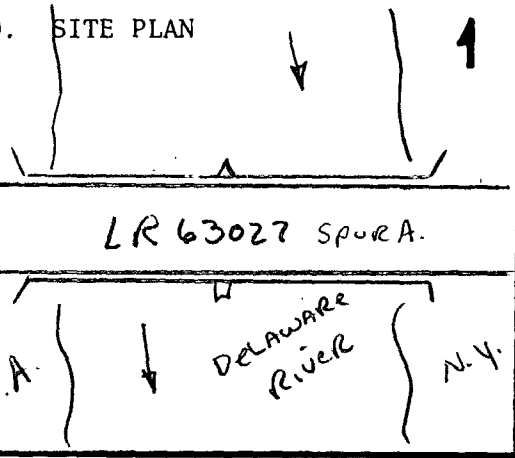
_____ ; basis

_____ ; basis

_____ ; basis

Use: Vehicular present; Vehicular original.

10. SITE PLAN



11. INTEGRITY

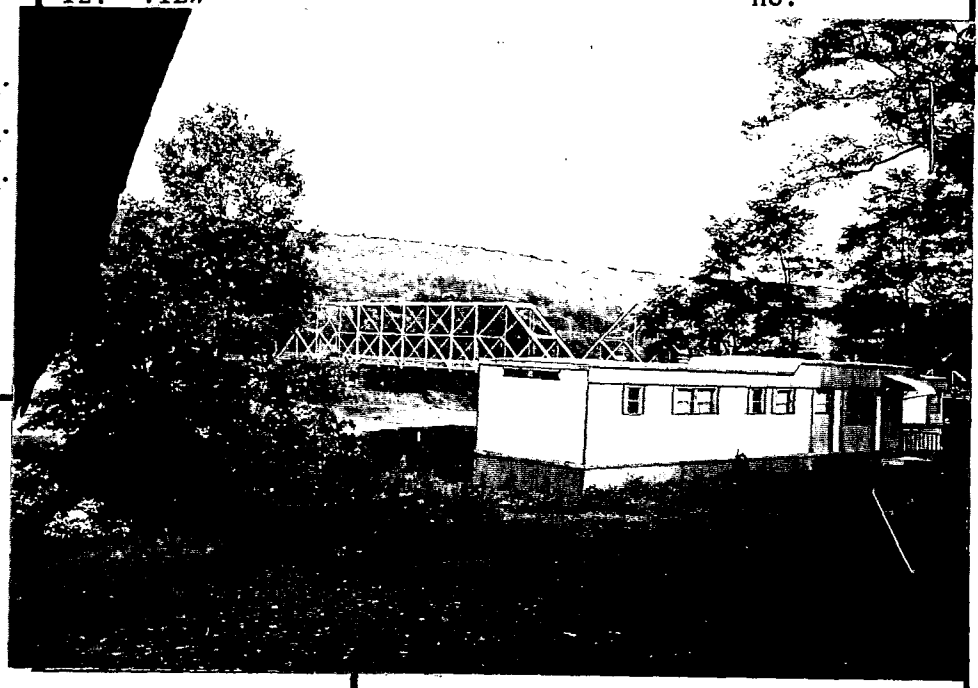
__altered; _____.

X unaltered; _____.

__moved; _____.

Explain:

12. VIEW



no.

13. COMMENTS

Unusual features:
Wood plank deck

Locale/environment:

Rural

Machinery (describe/identify type/ equipment):

N/A

14. DIMENSIONS

spans: 2 no., 464 ft. O/A

main: 2 no., 232 ft. each

secondary: ___ no., _____ ft.

approach: ___ no., _____ ft.

piers: ___ no.

towers: ___ no., _____ ft.

I cannot determine from picture w/19'

1. County: 64 Wayne #5 of 7

2. Municipality: Millanville, Pa. Skinners Falls, N.Y.

3. Structure No.

4. Survey Code: 40-310

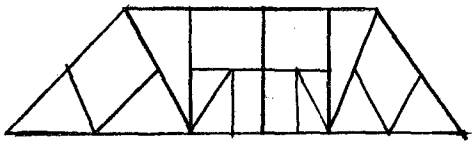
5. Present Name

6. Other name (historic name if any)

7. Crossing: L.R. 63027 Spur A over

15. TYPE 10 CHARACTERISTICS 61

[X] Truss: continuous/cantilever:



- [ ] webbing: _____.
- [X] anchor span: _____.
- [ ] cantilever span: _____.
- [ ] suspended span: _____.
- [X] thru/deck/low (pony): full-slope/half-hip.
- [X] connections: pin/riveted.
- [X] eyebars: loop welded/die forged. XXXXXX
- [X] railing: steel _____.
- [ ] columns: _____.

[ ] Arch: masonry/metal:

- [ ] thru/deck/½-thru.
- [ ] fixed (hingeless) /1/2/3-hinged.
- [ ] ribs: solid/braced; crescent/parallel.
- [ ] spandrels: open/solid/braced.
- [ ] intrados/vault; ribbed/solid.
- [ ] shape: semi-circular/elliptical/segmental; stilted.
- [ ] skew

[ ] Suspension:

- [ ] stiffening: braced-chain (1/2/3-hinged) /suspended truss.
- [ ] wire cable: twisted/parallel.
- [ ] eyebar chain.
- [ ] back-stay: straight/curved.

[ ] Bascule:

- [ ] single/double leaf.
- [ ] rolling lift: Schertzer.
- [ ] trunnion: simple (Chicago) /multiple (Strauss).
- [ ] counterweights: heel/overhead.
- [ ] Page/Rall.
- [ ] semi-lift/direct lift.

[ ] Swing:

- [ ] bearing: center/rim/combination.
- [ ] (see Truss above).

[ ] Vertical Lift:

- [ ] (see Truss above).

[ ] Other:

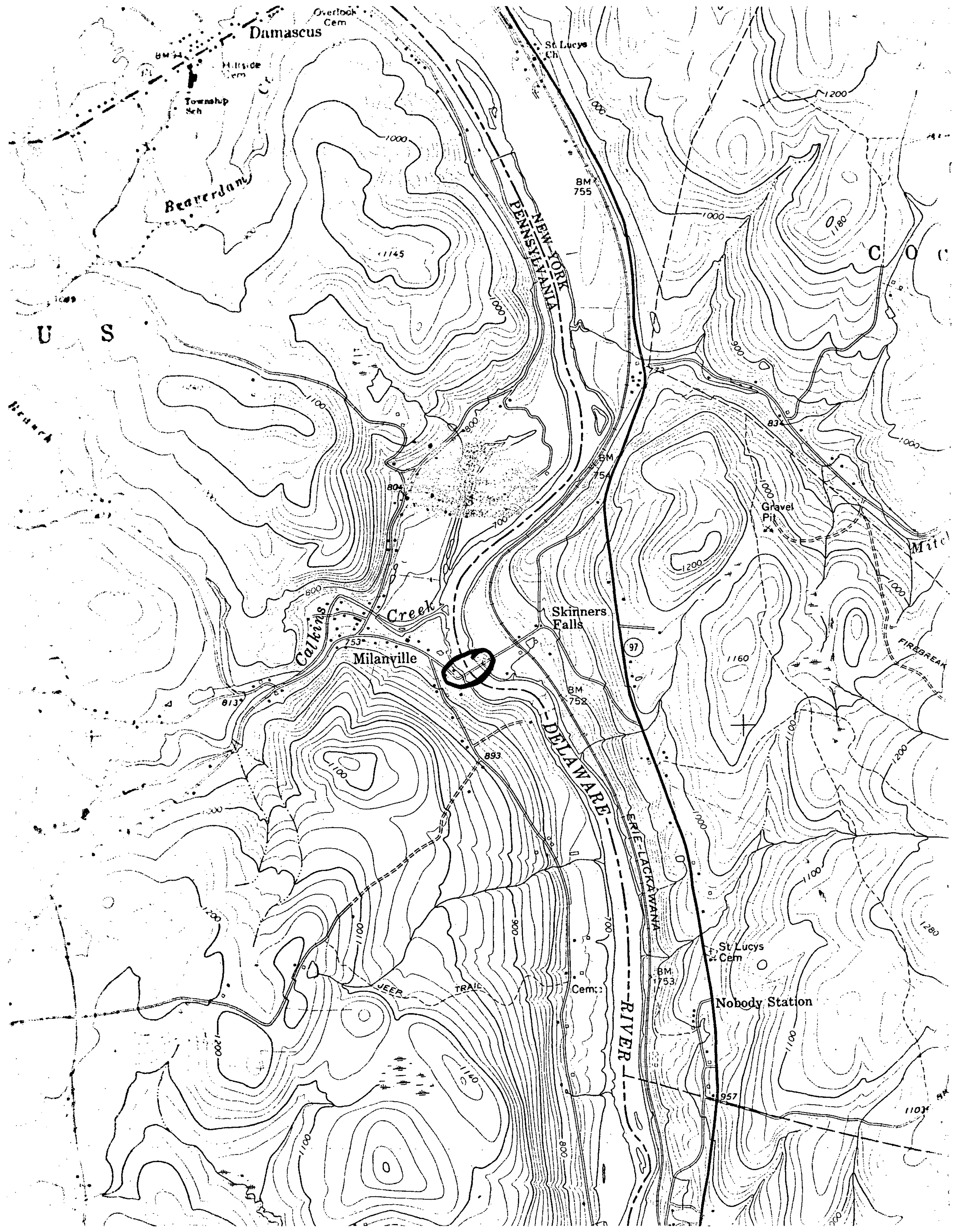
- [ ] other: _____.

16. MATERIALS (primary) 06, 09 15

Superstructure	type	treatment/finish	source
main span:	Steel	smooth/painted	-
towers:			
railings:	Steel	smooth/painted	-
Substructure			
piers:	CRM	Rough	-
abutments:	CRM	Rough	-
wings:	CRM	Rough	-
intrados/ribs:			
voussiors:			

17. PHOTO NO's. Roll #17
3-4-5-6-7-8-9-10

18. PREPARED BY: Edward P. Osnick
AGENCY/ORGANIZATION: Pa. Dept. of Transportation
; DATE: 8-19-82


Overlook Cem
Damascus
Hillside Cem
Township Sch
Beaverdam
St Lucys Ch
BM 755
NEW YORK
PENNSYLVANIA
1145
1180
C O C
U S
Branch
773
834
804
BM 754
Gravel Pit
Calkins
Creek
Skinners Falls
753
Milanville
97
1160
FIREBREAK
BM 752
813
893
DELAWARE
RIVER
ERIE-LACKAWANA
St Lucys Cem
BM 753
Nobody Station
JEER TRAIL
957
1280

NPS Form 10-900
(Rev. 8-86)

OMB No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations of eligibility for individual properties or districts. See instructions in *Guidelines for Completing National Register Forms* (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, styles, materials, and areas of significance, enter only the categories and subcategories listed in the instructions. For additional space use continuation sheets (Form 10-900a). Type all entries.

1. Name of Property

historic name Milanville Historic District
other names/site number N/A

2. Location

street & number Routes 63027 & 63029 N/A ☐ not for publication
city, town Milanville (Damascus Twp.) N/A ☐ vicinity
state Pennsylvania code PA county Wayne code 127 zip code 18415

3. Classification

Ownership of Property	Category of Property	Number of Resources within Property	
		Contributing	Noncontributing
☒ private	☐ building(s)	17	13 buildings
☐ public-local	☒ district		sites
☐ public-State	☐ site	1	structures
☐ public-Federal	☐ structure		objects
	☐ object	18	13 Total

Name of related multiple property listing: Historic and Architectural Resources of the Upper Delaware Valley, New York and Pennsylvania

Number of contributing resources previously listed in the National Register 1

4. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this ☐ nomination ☐ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. ☐ See continuation sheet.

Signature of certifying official — Date

State or Federal agency and bureau

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. ☐ See continuation sheet.

Signature of commenting or other official — Date

State or Federal agency and bureau

5. National Park Service Certification

I, hereby, certify that this property is:

☐ entered in the National Register.
☐ See continuation sheet.
☐ determined eligible for the National Register. ☐ See continuation sheet.
☐ determined not eligible for the National Register.
☐ removed from the National Register.
☐ other, (explain:) _____

Signature of the Keeper — Date of Action

NPS Form 10-900
(Rev. 8-86)

OMB No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

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Dr. Brent D. Glass — 3/24/93

Signature of certifying official — Date

PA Historical & Museum Commission

State or Federal agency and bureau

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. ☐ See continuation sheet.

Signature of commenting or other official — Date

State or Federal agency and bureau

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☐ See continuation sheet.
☐ determined eligible for the National Register. ☐ See continuation sheet.
☐ determined not eligible for the National Register.
☐ removed from the National Register.
☐ other, (explain:) _____

Signature of the Keeper — Date of Action

6. Function or Use

Historic Functions (enter categories from instructions)

domestic/single dwelling
commercial/department store
education/school

Current Functions (enter categories from instructions)

domestic/single dwelling
commercial/department store

7. Description

Architectural Classification (enter categories from instructions)

Mid-19th Century/Greek Revival
Late Victorian/Queen Anne
/Eastlake

Materials (enter categories from instructions)

foundation stone
walls weatherboard
roof asphalt
other

Describe present and historic physical appearance.

The Milanville Historic District is situated at the confluence of Calkins Creek and the Delaware River, with the river to the east and New York State beyond. Wooded hills to the west form a backdrop for the community. The creek flows west-to-east along the northern edge of the district. Route 63027 (River Road) and Route 63029 intersect at the center of the village, forming a Y-shaped **district. The district has nineteenth and early twentieth century** vernacular architecture, influenced by Queen Anne, Italianate, Greek Revival and Gothic Revival architectural styles. Buildings are wood framed, most of them built between 1850 and 1910. All buildings the size of garages or larger have been mapped, noted in the inventory chart, and counted. They range in style and size from small, one-car garages to sprawling, 15-room residences. No building exceeds two-and-one-half stories in height. Architectural integrity is generally good.

Set back in varying distances from the road, most residences and outbuildings are surrounded by lawns and landscaping that features mature shade trees. The few extant commercial buildings are closer to the road and unlandscaped.

Properties in the western section of the district are associated with the tannery/acid factory complex. Although the original factory buildings have been dismantled, the owners' residences and the company store are intact, and buildings that once served for factory storage (known locally as the Phone Company Building) have been converted to apartments. From the tannery area along Calkins Creek, there is a steep incline, with the old school and the c. 1880 school, to the west, holding a commanding view of the village, in winter when the trees are not in leaf.

From the intersection in front of the Volney Skinner House, Route 63027 winds to the east and south. Residences on the south and west side are elevated, at varying set-backs, above the road. There are no side-walks in the village, but dry-laid, stone retaining walls and flagstone walks lead from the road to the full-width, front porches of the Volney Skinner House (c.1840), the Weston Skinner House (c.1870), the Frank Davis House (c.1900) and the Milton Skinner House (c.1910). Buildings are more scattered on the north and east side of the road, where topography is uneven.

The eastern end of the district is anchored by the Skinner's Falls Bridge (National Register listed, 1988), a steel, Baltimore

[X] See continuation sheet

6. Function or Use

Historic Functions (enter categories from instructions)

domestic/single dwelling
commercial/department store
education/school

Current Functions (enter categories from instructions)

domestic/single dwelling
commercial/department store

7. Description

Architectural Classification (enter categories from instructions)

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roof asphalt
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The eastern end of the district is anchored by the Skinner's Falls Bridge (National Register listed, 1988), a steel, Baltimore

[X] See continuation sheet

truss bridge spanning the Delaware River. The bridge's access road curves sharply to the north, with Skinner's barn (c. 1900) on the east and overlooked by the Milton Skinner House (c. 1900). The Skinner property, with its wide expanse of lawn, extends to the road fork, where the bridge approach road curves to the southeast and Route 63027 continues south, as River Road. The Nathan Skinner House (1815) and the Milanville Methodist Church (1910) can be seen from this point, although vegetation and the curving road obscure views of other buildings.

The oldest buildings in the community are side-gabled, wood frame, clapboard-sided residences, with hints of Greek Revival influence. The Nathan Skinner House (1815), the Volney Skinner House (c.1840), and the Eli Beach House (c.1840) each include these features, and display frieze band ornamentation below their roof-lines. Other buildings are more typical of rural, vernacular styling of the Victorian era. The Milton Skinner House (c.1900) is the most stylish of the residences, with vergeboard, truss and fishscale shingle ornamentation within the steeply pitched cross gables, and full-width front porch with posts surmounted by decorative millwork brackets. The Milanville School (c.1880) displays picturesque architectural styling, with Italianate style bracketing along the roof line, a belfry with two-tiered roof, and tall arched and rectangular 6-over-6 windows.

The architectural integrity of Milanville's buildings of Milanville's buildings is generally good. Although the Old School and the Swendsen House have been remodeled, other buildings -- notably the Milanville School (c. 1880), the Volney Skinner House (c. 1840), the Milton Skinner House (c. 1900) -- have recently been saved from deterioration, and repaired with sensitivity to their historic character.

Few modern buildings intrude upon the district's historic appearance. Most of non-contributing buildings in the district are outbuildings. Of the 20 major structures, residences, and commercial buildings, only six are non-contributing, resulting in the overall impression of a high ratio of contributing to non-contributing buildings. Of the 13 buildings designated as non-contributing, six of them are garages or rear outbuildings. The

great majority of buildings within the district retain their simple, vernacular styling, with wood-frame construction, clapboard siding, gables, and full-width front porches. The non-contributing outbuildings are generally wood-frame, weatherboard or novelty sided, one-story gabled buildings, used as storage sheds or garages, and located unobtrusively to the rear of contributing buildings. Their location and size, coupled with the screening of landscaping and topography, results in their having little impact on the district's overall appearance.

Alterations to contributing buildings tend to be additions added to the rear, often when residences (e.g., the Eli Beach House, Milton Skinner House, the J. Howard Beach House) were converted to use as boarding houses in period between 1910 and 1940. New owners in the 1980s and 1990s have stablilized many of the deteriorating older buildings, and renovated them without major alteration to historic exteriors. In a few cases (e.g., the Old School House and the Phone Company Building) extensive alterations designed to convert buildings from public or commercial use to residences have severely compromised the buildings' historic architecture by alterating windows, doors, and siding; these are listed as non-contributing buildings within the district.

The high ratio of contributing to non-contributing resources, the unobtrusive nature of building alterations, and the overall impression of architectural integrity are important factors in qualifying the Milanville Historic District for National Register listing within the Historic and Architectural Resources of the Upper Delaware Valley.

Milanville Historic District
Historic and Architectural Resources of the Upper Delaware Valley
NY: Delaware, Orange, Sullivan Counties
PA: Pike, Wayne Counties

BUILDING INVENTORY CHART

Site #	Property Name	Photo #	Description
1	J. Howard Beach Residence		2-story, wood-frame, cross-gabled residence, c. 1870; Queen Anne detailing (full-width front porch with mill-work posts, 2-story bay window, delicately ornamented hood molds above windows); rear addition (post 1940); 1 1/2 story, wood-frame, weatherboard-sided, gabled outbuilding, c.1870 (contributing).
2	Milanville Store	1, 8	c. 1850, 2-story, wood-frame, commercial building; full-width, double porch; low-pitched roof; asbestos siding; front display windows.
3	Phone Company Building		c. 1890, long, front-gabled, 1-story, storage building, associated with the tannery; 2 connected sections; renovated for apartments, with novelty siding and front facade with recessed central entry flanked by small bay windows added c.1980; non-contributing.
4	Ahearn Residence	8	2-story, wood-frame residence, c.1880; gabled ended; enclosed pediment; simple,

Milanville Historic District
Historic and Architectural Resources of the Upper Delaware Valley
NY: Delaware, Orange, Sullivan Counties
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4 (continued)			wrap-around porch with front entry; 6-over-6 double-hung windows; novelty siding.
5	Swendsen Residence		non-contributing, much altered cottage, possibly dating to late 19th century; alterations include full-front porch, synthetic siding and rear addition.
6	Milanville Schoolhouse	3	c. 1880, Italianate style school building; gable-ended; front bracketed gable with 2-tiered roof surmounted by belfry; tall, narrow, 6-over-6, double-hung windows; 2 shed-roofed, front entrances flank a triple front window; stone foundation; clapboard siding; post-1930, wooden, gabled out-building (non-contributing).
7	Old Schoolhouse		non-contributing, much altered, 1-story residence; wide frieze band within front gable is only evidence of what may be c.1860 school; alterations include full-width porch, replacement windows, one-story addition; non-contributing, post-1940, cinder block, 1-car garage.

Milanville Historic District
Historic and Architectural Resources of the Upper Delaware Valley
NY: Delaware, Orange, Sullivan Counties
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8	Volney Skinner House	4	2-story, side-gabled, wood-frame residence; full-width front porch with millwork ballustrades on first and second story levels; clap-board siding; built c.1840; enlarged 1864.
9	Eli Beach House	2	large, 2-story, c.1850, cross-gabled, wood-frame tannery owner's residence, with early 20th century rear addition; full-width front porch; wide frieze band and returned cornice ornamentation; 1-story bay window on south side; 6-over-6, double-hung windows; non-contributing post-1940, wood-frame, 2-bay garage.
10	Weston Skinner House		2-story, side-gabled, wood-frame residence, c. 1870; full-width front porch with millwork posts; stone walk and steps leading to central entry; wood-frame, gable-roofed, weatherboard-sided, 1-story outbuilding, c.1880.
11	Frank Davis House		1 1/2-story, side-gabled residence, with small side addition, c.1900; full-width front porch with central entry; wood siding; non-contributing, post-1940, garage south of house.

Milanville Historic District
Historic and Architectural Resources of the Upper Delaware Valley
NY: Delaware, Orange, Sullivan Counties
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12	Ray Davis House		non-contributing, chalet style residence; c. 1970s; wood siding; gable-ended, with wrap-around porch.
13	Milanville Barbershop	5, 9	small, 1 1/2-story, wood-frame, clapboard-sided, commercial building; lean-to addition; central entrance flanked by boarded-up display windows; central, upper-story door; low-pitched gable roof masked by boom town style front facade; c.1880.
14	Illman-Skinner House		c. 1910, 2-story, cross-gabled, wood-frame house; full-width front porch with plain, millwork ballustrade and bracketed posts; aluminum sided; rear shed-roofed addition; non-contributing outbuilding: gambrel-roofed, post-1950, wood-frame, 2-story garage.
15	Milanville Methodist Church	10	built 1910, gabled-ended, wood-frame church building, with corner tower/entry surmounted by pyramidal roof, flaring eaves; pointed-arch, stained-glass windows and door, with design repeated in tower vents.

Milanville Historic District
Historic and Architectural Resources of the Upper Delaware Valley
NY: Delaware, Orange, Sullivan Counties
PA: Pike, Wayne Counties

16	Arthur Holmes House		non-contributing, ranch style wood-frame residence, with wood siding; c. 1957.
17	Nathan Skinner House	6, 10	1 1/2-story residence; gabled; clapboard sided; built 1815; post-and-beam construction; central entry with small front porch; windows double-hung on first story, eye-brow on second story; rear breezeway and connects to non-contributing, wood-frame, weatherboard-sided 2-story, barn style residence,c.1976.
18	trailer		non-contributing house trailer; small, wood-frame, barn-style shed adjacent; both post-1950.
19	Milton Skinner House	7	c.1900, 2-story, wood-frame, cross-gabled residence; Eastlake style details (decorative vergeboard and truss within front gable, full-width front porch with posts surmounted by decorative millwork brackets, fishscale shingling); wide, stone steps leading from road to central entry; 2-story gabled, wood-frame outbuilding at rear, and gabled, wooden barn across the road, both c. 1900 (both contributing).

Milanville Historic District
Historic and Architectural Resources of the Upper Delaware Valley
NY: Delaware, Orange, Sullivan Counties
PA: Pike, Wayne Counties

20	Skinners Falls Bridge	2-span, steel, Baltimore Truss bridge; built 1902; listed on the National Register, 1988.

8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties:
☐ nationally ☐ statewide ☒ locally

Applicable National Register Criteria ☒ A ☐ B ☒ C ☐ D

Criteria Considerations (Exceptions) ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G

Areas of Significance (enter categories from instructions)	Period of Significance	Significant Dates
Industry	1815-c.1920	N/A
Architecture	1815-c.1920	

Cultural Affiliation: N/A

Significant Person: N/A

Architect/Builder: unknown

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above.

The Milanville Historic District meets Criterion A for its significant contribution to nineteenth and early twentieth century industrial development of the area, especially during the active years of the tannery (1849-c.1898) and wood distillation (1898-c.1920) operation. It also meets Criterion C for its distinctive nineteenth and early twentieth century architecture. It relates to the multiple property nomination's Context 3: Upper Delaware Industry, 1614-1942.

Milanville is one of the most historically significant communities in the river valley, the eighteenth century center of the Delaware Company's Cushetunk settlement. All vestiges of the Calkins Creek settlement were lost during the Revolution, when Indians and Tories raided and burned throughout the valley. However, a number of the original Delaware Company families -- notably, the Skinners, Thomases, Calkins, and Tylers -- returned and resettled the area.

The extant buildings of the Milanville Historic District reflect the nineteenth and early twentieth century, when the village reached its most developed stage and was a center for lumbering and tanning, then wood distillation. Each of these industries based in Milanville played a key role in the history of the Upper Delaware Valley.

Lumbering provided the first major product to return profits to the area. Milanville's Skinner family, owners of the village sawmill, was the most important lumbering/timber rafting family in the valley. The tannery at Milanville, one of two in the valley, was a major producer of leather for the belts to operate the engines of America's industrial revolution. After the hemlocks needed for tanning were depleted, the Beach tannery was converted to an "acid factory," producing charcoal, wood alcohol, and chemicals used in explosives during World War I. By the 1920s, synthetic processes replaced wood distillation for production of these chemicals, and the acid factory closed.

☒ See continuation sheet

Milanville Historic District
Historic and Architectural Resources of the Upper Delaware Valley
NYS: Delaware, Orange, Sullivan Counties
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The sawmill, tannery, acid factory, and creamery are now gone. But the residences and a few commercial buildings remain with strong historic and visual ties to those lost industries.

Within the district, the earliest extant building is the Nathan Skinner House, framed out at Tammany Flats (seven miles up-river) and floated downstream on timber rafts, in 1815. This is just one of several early Milanville buildings associated with the Skinner family. Daniel Skinner is universally credited with beginning the Upper Delaware timber rafting industry, the key to development and settlement of the region. Daniel's son, Nathan, who built this house, was Wayne County's first surveyor and an important chronicler of the pioneer era. Nathan's son, Calvin, who lived over 70 years in the house, was a lumberman, raftsman and civic leader, who gave Milanville its name (in honor of Napoleon's Decree of Milan). Four other residences in the district trace their heritage to Calvin Skinner's children: the Volney Skinner House (c.1840), the Weston Skinner House (c.1870), the Illman-Skinner House (c.1910), and the Milton Skinner House (c.1900).

The other important Milanville Historic District family--also associated with a key local industry -- was the Beach family. The Eli Beach House (c.1850) is named for Milanville's primary tannery owner, who moved into the house when he came to the village in 1854. The Milanville Store (c.1850) was the company store for Beach's Rock Glen Tannery, later known as Eli Beach & Sons. The J. Howard Beach House (c.1870) was built for the oldest of those sons.

Although one of the smaller communities in the river valley, Milanville has an unusually large number of extant buildings which reflect nineteenth and early twentieth century architectural motifs. Three of these buildings are especially fine examples of **vernacular architecture** found in several of the historic communities of the Upper Delaware Valley. The Milanville School (c.1880) boasts picturesque styling with bracketed roof-lines, arched upper-level windows, and a belfry with a two-tiered roof. It has been converted to a residence without damage to its historic exterior. The Milanville Store (c.1850), a rare example of a local store that retains both architectural integrity and traditional function, is dominated by a full-width, two-story, front porch, architectural feature found in a number of commercial buildings in the valley.. The barbershop, for many years the village's polling

place, is a commercial building with a boom-town style false front, a style popular for Main Street architecture elsewhere in the valley.

Architectural significance, however, is not limited to these three buildings. The five residences associated with the Skinner family, for instance, retain their distinctive nineteenth and early twentieth century architectural flavor, drawing upon styles popular in the river valley during that period. The Nathan Skinner House (1815) is an example of early Greek Revival building, with post and beam construction. The Volney Skinner House (c.1840) exhibits original Greek Revival massing and frieze band trim typical of that style. The Weston Skinner House (c.1870) is a simple, unaltered, residence showing the Queen Anne influence in its full-width front porch and millwork balustrade. The Milton Skinner House (c.1910) is a **Eastlake style** residence with steep gables and decorative vergeboard. Combined with the other contributing resources of the district, these buildings represent especially well crafted examples of the architectural styles which dominated the Upper Delaware Valley during the period of significance.

With the exception of three non-contributing residences -- the ranch style Arthur Holmes House (c.1957), the Puchammer house trailer and the Ray Davis chalet (c.1970) -- every residence and commercial building in the historic distric was constructed during the period of significance, and reflects the architectural styling of that period. Even those buildings (i.e., the Old School and the Swendsen House), which have been so remodeled as to be classified as non-contributing, retain enough of the architectural detail and original building features to reveal their nineteenth and early twentieth century origins.

Anchoring the southern end of the district is the 1902 Milanville-Skinners Falls Bridge, an intact example of a multiple-span Baltimore truss bridge. Already listed on the National Register of Historic Places, the bridge represents a bridge construction style common to the district's period of significance.

All of the Upper Delaware's villages have a sense of the past, a strong visual link with the nineteenth century and early twentieth century, the valley's most prosperous period. For Milanville, this is especially true. Unlike most of the other

communities, Milanville has not been impacted by a major highway. Unlike any of the other communities, Milanville's general store, the village's social center, retains not only its traditional function but also its architectural integrity. Unlike other communities, Milanville has very few modern buildings anywhere in the community.

The topography and natural features, especially the Delaware River, Calkins Creek, and the hills which rise steeply to the north and west, dominate the Milanville landscape, as they did in the nineteenth century. Second-growth timber and matured landscape plantings give the area a greener, more natural look than it would have had during the community's early development. However, it also adds to the general impression of Milanville as a rural community largely untouched by modern construction.

9. Major Bibliographical References

☒ See continuation sheet

Previous documentation on file (NPS):

- ☐ preliminary determination of individual listing (36 CFR 67) has been requested
- ☒ previously listed in the National Register
- ☐ previously determined eligible by the National Register
- ☐ designated a National Historic Landmark
- ☐ recorded by Historic American Buildings Survey # _____
- ☐ recorded by Historic American Engineering Record # _____

Primary location of additional data:

- ☐ State historic preservation office
- ☐ Other State agency
- ☒ Federal agency
- ☐ Local government
- ☐ University
- ☐ Other

Specify repository:

Resource Management Office, National Park Service, Milanville PA

10. Geographical Data

Acreage of property 20

UTM References

	Zone	Easting	Northing
A	18	494560	4613280
B	18	495150	4611290
C	18	494980	4612850
D	18	494360	4613010

☐ See continuation sheet

Verbal Boundary Description

☒ See continuation sheet

Boundary Justification

☒ See continuation sheet

11. Form Prepared By

name/title Mary Curtis, Cultural Resources Specialist

organization National Park Service date September 24, 1992

street & number P. O. Box C telephone 717-729-7842

city or town Narrowsburg state New York zip code 12764

★U.S.GPO:1988-0-223-918

Milanville Historic District
Historic and Architectural Resources of the Upper Delaware Valley
NY: Delaware, Orange, Sullivan Counties
PA: Pike, Wayne Counties

Bibliography

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Curtis, Charles T. Stories of the Raftsmen. Callicoon: Sullivan County Democrat. 1922.

Hopkins. map of Milanville. 1860.

Mathews, Alfred. History of Wayne, Pike and Monroe Counties, Pennsylvania. Philadelphia: R.T. Peck. 1886.

Meyers, Arthur. Milanville, The Center of Cushetunk. Milanville: W. C. Dillmuth. 1964

Meyers, Arthur. Crossing the Delaware River . . . Via Toll Bridges. Narrowsburg, NY: The Delaware Valley Press. 1970.

Poland, Clarence B. and Margaret A. A Record of Milanville, 1795-1989: The People, The Homes, The Industries, The Businesses. unpublished work in progress, 1989

State University of New York at Binghamton. Cultural Resources Survey of the Upper Delaware National Scenic and Recreational River. Philadelphia: National Park Service. 1983.

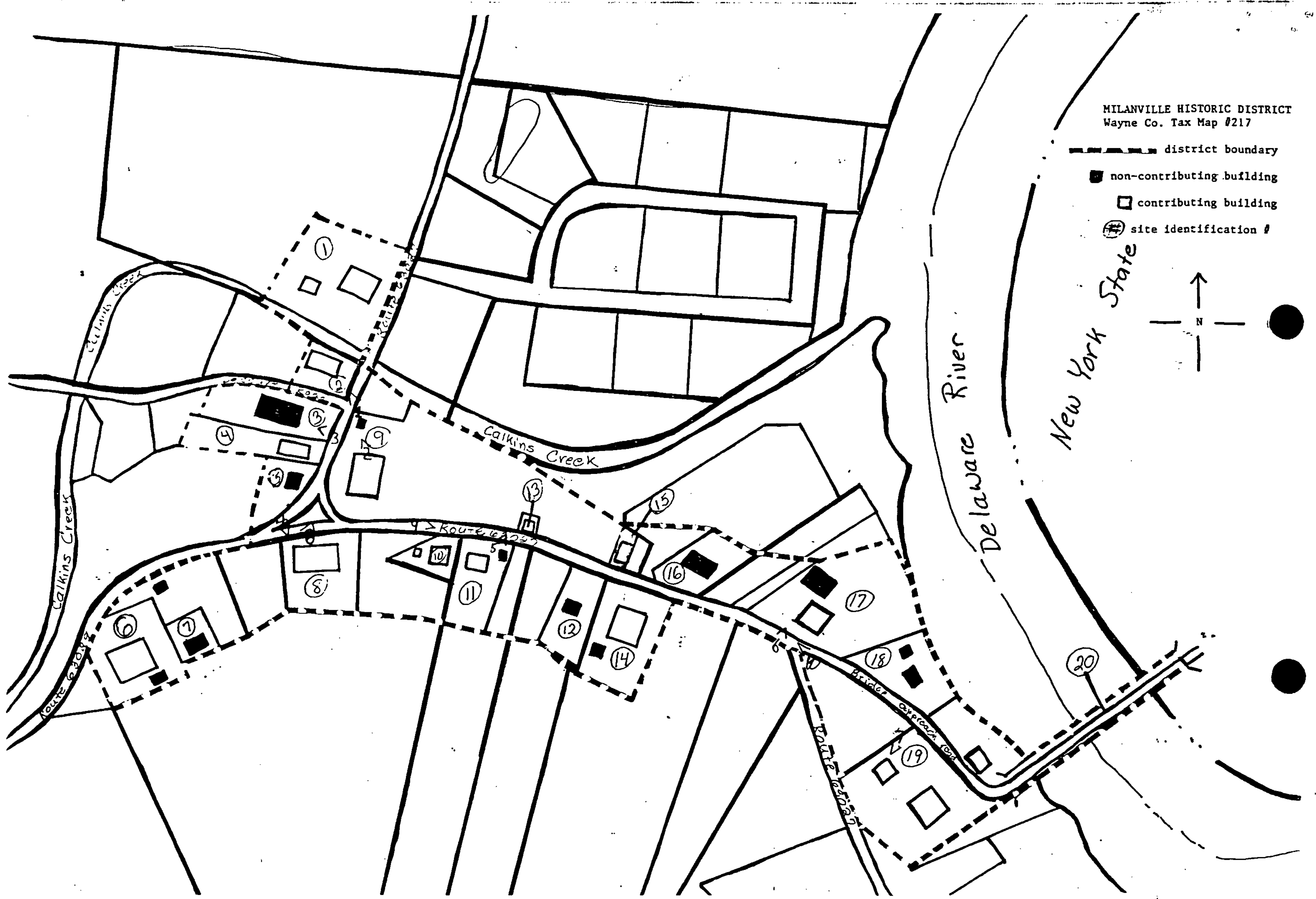
Milanville Historic District
Historic and Architectural Resources of the Upper Delaware Valley
NY: Delaware, Orange, Sullivan Counties
PA: Pike, Wayne Counties

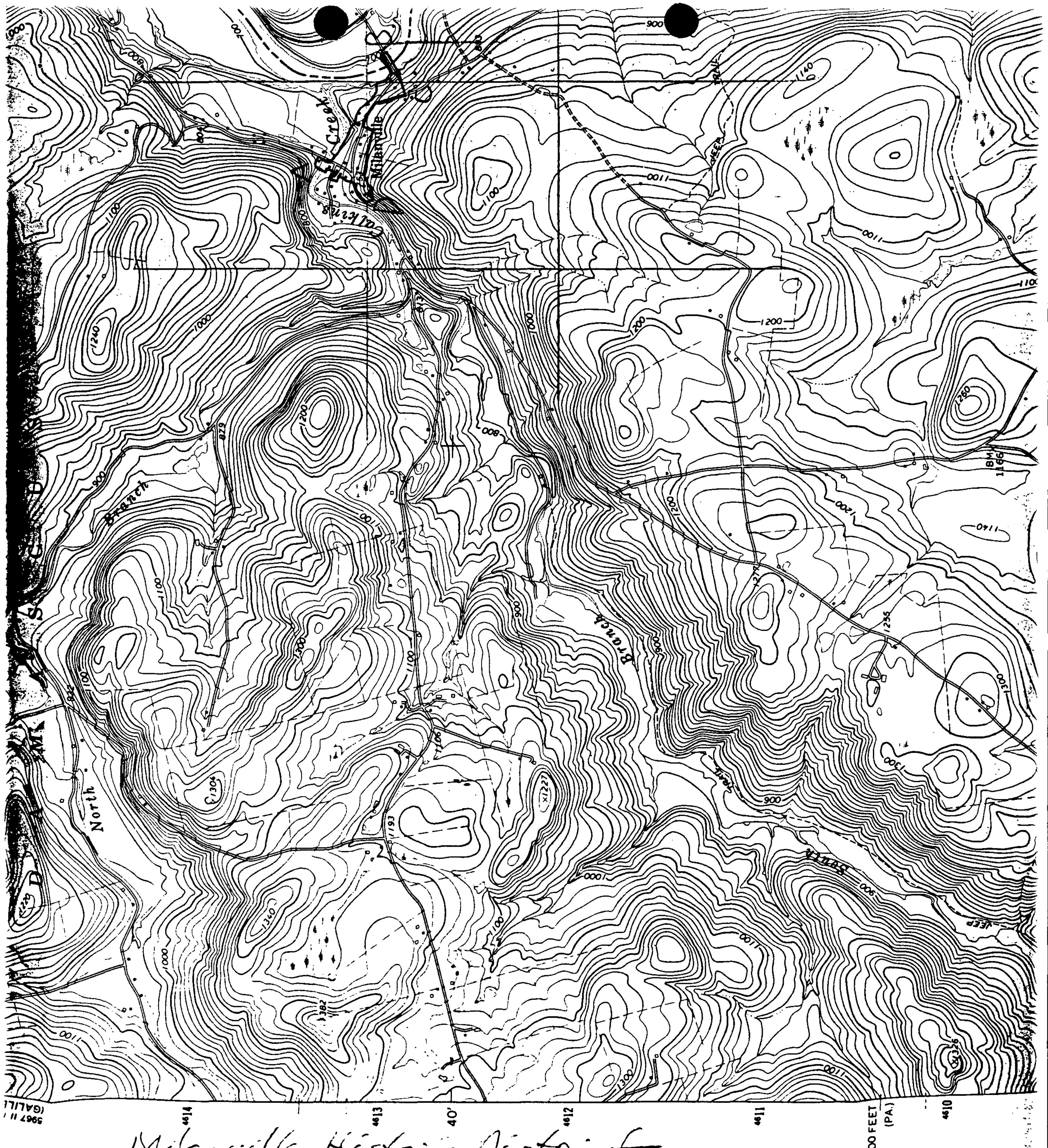
Verbal Boundary Description

All of the village's historic central area is included in the district, with boundaries generally following property lines. The western boundary of the historic district follows the property lines of lots 36, 57, 52, 50, 95, 80, and 79, as shown on tax map #217, Damascus Township, Wayne County, Pennsylvania. It follows the southern boundary of lots 79, 80, 95.1, 81, 82, 84, 85, 64, 66, 88, 89, the Interstate Bridge Commission property, and those portions of 95, 83 and 86 which are within 250' of Route 63027 or 63029. The remaining boundaries of the district follow the northern and eastern boundaries of lots 36, 58, 59, 60, 61, 62, 66, 67, and the Interstate Bridge Commission property, as well as those portions of lots 63, 64, and 65, which are within 250' of Route 63027.

Boundary Justification

This boundary includes all the major historic and architectural resources in the village. It follows property lines of lots along Routes 63027 and 63028, except in the case of very deep lots, where only 250 feet depth measured from the edge of the highway was included. Large tracts of land containing no extant cultural resources were excluded. Resources adjacent to these properties, beyond the boundaries established, do not contribute to the historic significance of the district.


MILANVILLE HISTORIC DISTRICT
Wayne Co. Tax Map #217
district boundary
non-contributing building
contributing building
site identification #
N
Delaware River
New York State
Calkins Creek
Route 63022
Route 63039
Bridge approach road
Route 63027



Milanville Historic District
Wayne County - Zone 18 - Damascus Quad
A E494560 N4612280   C E494980 N4612850
B E495150 N4612960   D E494350 N4613000

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
BUREAU OF ENVIRONMENTAL QUALITY

A.G. LICHTENSTEIN & ASSOCIATES, INC.

PENNSYLVANIA HISTORIC BRIDGE INVENTORY & EVALUATION

BMS #: 63100202300739 **DIST:** 4 **UTM:**

OLD BMS #: **CTY:** WAYNE **OWNER:** PA. & N.Y. IBC

MUNICIPALITY: DAMASCUS **LOCATION:** MILANVILLE-SKINNERS FALLS BRIDGE

FACILITY CARRIED: SR 1002

NAME/ FEATURE INTERSECTED: SR 1002 OVER DELAWARE RIVER

TYPE: THRU TRUSS **DESIGN:**

MATERIAL: STEEL

#SPANS: 2 **LENGTH:** 467 (142.3 m) **WIDTH:** 16.6 (5.1 m)

YR BUILT: 1901 **ALTERATION:** **SOURCE:** PLAQUE

DESIGNER/BUILDER: AMERICAN BRIDGE COMPANY

SETTING/CONTEXT:

CY01 INDIVIDUAL ELIGIBILITY: Listed. 11/14/88

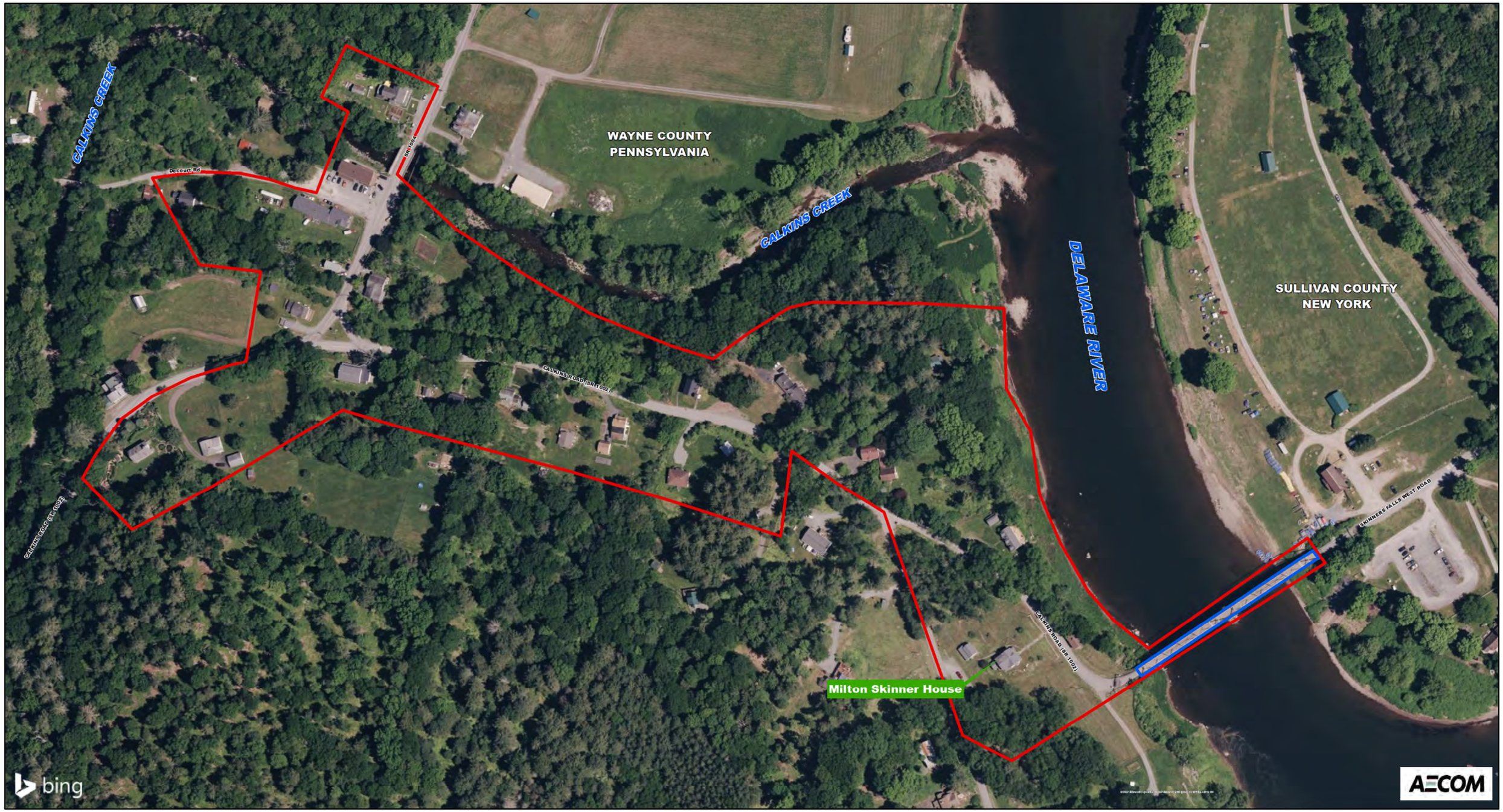
CY01 CONTRIBUTING STATUS: Not Contributing. No historic district.

AGL NR RECOMMENDATION: Listed. 11/14/88.

AGL SUMMARY: A modern guide rail system has been installed across the bridge.

PHOTO INDEX (DATE): 434:13-16 **REVIEWED BY/ DATE:** RKB (2/98)

Milanville, PA Historic District Map



Skinners Falls Bridge
SR 1002-0230 over the Delaware River
HISTORIC RESOURCES MAP

Source: USGS Earthstar Geographics SIO, 2014 Microsoft Corporation.

Milanville-Skinners Falls Bridge - National Register Listed

Milanville Historic District - National Registrar Listed

0 100 200
Feet

N

2016 Determination of Effects Documentation

OS-600

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

PENNDOT Cultural Resources Submission

DATE: April 1, 2016

SUBJECT:

District: 4-0 County: Wayne MPMS Num: 107072
Municipality: Damascus Township

SR: 1002 Section: EMG
Project Name: SR 1002 over Delaware River Emergency Repairs
ER Number: 2013-8011-127 Fed-Aid: Y/(N) Fed Permit: Y/(N)

Contact name: Kevin Mock Phone: 570.815.9498

TO: Andrea McDonald, Bureau Director
State Historic Preservation Office
Historical and Museum Commission

FROM: Brian G. Thompson, PE, Bureau Director
Bureau of Project Delivery
Department of Transportation

The Pennsylvania Department of Transportation Engineering District 4-0 proposes emergency repairs to the Skinners Falls Bridge in Damascus Township, Wayne County. Failure of stringers, U-bolts, timber running boards, and pin caps resulted in the closure of the bridge in December of 2015. A major rehabilitation of this bridge is programmed, but the below repairs are necessary to re-open the bridge to traffic in the interim.

Area of Potential Effect and Historic Resources

The Area of Potential Effect (APE) encompasses the footprint of the bridge and the overhead clearance portal frames, and measures approximately 650 feet by 50 feet. There are two resources within this APE: the Skinners Falls Bridge and the Milanville Historic District. The National Register-listed Skinners Falls Bridge is a two-span Baltimore truss constructed in 1901. It is significant under criterion C for engineering, and is an intact example of a moderate-length, multiple-span Baltimore truss (National Register nomination, 1982). It crosses the Delaware River, connecting Milanville, Pennsylvania to Skinners Falls, New York. The bridge is also a contributing resource to the National Register-listed Milanville Historic District. The District expands westward from the bridge, and the bridge is on the extreme eastern end of the National Register boundary. The District is significant under Criteria A and C for its contribution to the industrial development of the area and as an intact example of a late 19th and early 20th century village of the Upper Delaware River. The survey forms for both of these resources can be found on ProjectPATH:
http://search.paprojectpath.org/PostingDetails.aspx?ProjectID=4487&PostingID=20592

Proposed Scope of Work

The proposed scope of work is as follows:

1. Remove and replace forty-four (44) existing stringers with proposed w6x20 stringers. This type of replacement member (w6x20 stringer) was also used during the 2013 emergency repairs.
2. Remove select timber blocking to allow for proposed stringer removals and replacements.
3. Replace seven (7) floorbeam-to-truss lower chord U-bolts, all of which exhibit section loss as a result of corrosion. U-bolts will be replaced in-kind.
4. Install new pin caps at five (5) truss joint locations. The pin caps, which are currently missing, will be replaced in-kind based on existing pin caps.
5. Clean and paint existing the structural steel on Span 1 at member L0-L2, left truss, inboard and outboard eye-bar, and at identified structural steel repair locations.
6. Replace select timber running boards on bridge deck.
7. Construct two overhead clearance bar portal frames (one on the Pennsylvania side and one on the New York side of the bridge). This includes the construction of drilled caisson foundations and the steel structure.

Please see the attached photo sheets for pictures of existing conditions and plan sheets detailing the work.

Evaluation of Effects Historic Structures

As a federally-funded project, Section 106 of the National Historic Preservation Act requires the lead agency to take into account the effects of their project on any National Register-listed or eligible properties in the APE. Possible effects of the project on both resources were evaluated. An effect to a National Register eligible or listed resource may occur when there is alteration to the characteristics of a historic resource qualifying it for inclusion in or eligibility for the National Register as defined in Section 800.16(i).

Milanville Historic District

The project will result in no effect to the Milanville Historic District. The District is eligible for the National Register under Criteria A and C, for its contribution to the industrial development of the area and architectural significance of the 19th and early 20th-century community. Repairing the Skinners Falls Bridge, a contributing resource to the historic district, will extend the longevity of the contributing structure. The overhead clearance bar portal frame will be constructed at the very eastern edge of the historic district, where Milanville Road makes a sharp 90-degree turn. It will be visible only from the Skinners Falls Bridge and the adjacent Milton Skinner House (also a contributing resource). Based on its location on the edge of the District and the relative small size of the structure, the overhead clearance frame will have no effect on the District. The proposed repairs to the Skinners Falls Bridge will not affect the characteristics which qualify the District for inclusion in the National Register, as defined in Section 800.16(i).

Skinners Falls Bridge

This project will result in an effect to the Skinners Falls Bridge, as original fabric will be altered/replaced. The Criteria of Adverse Effect according to Section 800.5(a)(2) was

applied to evaluate if the project would adversely affect the Skinners Falls Bridge. The proposed repairs will replace 44 of the 264 (17%) steel stringers with new steel stringers. However, the stringers are not part of the structural system that makes the bridge significant. Several of the temporary wood blocking installed in the 2013 repairs will be removed to allow for the replacement of the stringers. Most of the wood blocking will remain but they do not detract from the characteristics that make the bridge significant, and help to preserve the original material, avoiding full replacement of members. Two repairs to the character-defining feature of the bridge (the connection of the truss) will need to be made: the replacement of seven U-bolts and the installation of five missing pin caps. The U-bolt replacement will be in-kind, steel replacing steel, of the same configuration. The missing pin caps will also be replaced in-kind with steel, matching the dimensions and configuration of the existing pin caps, thereby retaining the significant pin-connection technology of the truss. These select in-kind replacements are minor alterations on a 467' long, two-span bridge that will not alter the engineering significance of the structure. The proposed repairs will aid in the preservation of the bridge and ensure its continued use as a transportation resource. While the emergency repairs do result in a minimal loss of original material, primarily from its non-contributing elements, it will not change the structural configuration of the truss system or the engineering significance of the bridge.

Archaeological Investigations

The proposed undertaking will include the installation of overhead clearance bars with drilled caissons. As archaeological investigations are incomplete (two archaeological sites have been identified but not evaluated for NR significance on the Pennsylvania downstream side of the bridge), PennDOT is recommended the excavation of four one-meter by one-meter test units: one each for the drilled caisson locations. The excavation of the test units will be completed prior to the installation of the crash bars during the course of the emergency repairs.

The results of the excavations will be presented in a report and submitted to PA and NYSHPOs and federally recognized tribes.

The proposed emergency repairs should result in a finding of: **No Historic Properties Adversely Affected.**

Should you require any additional information, please do not hesitate to contact Kevin Mock at 570.963.4364 and kmock@pa.gov

April 4, 2016

Brian Thompson, Director
Bureau of Project Delivery
Attn: Kevin Mock, District 4-0
PA Department of Transportation
P.O. Box 2966
Harrisburg, PA 17105

RE: ER 2013-8011-127-D (MPMS 107072); S.R. 1002, Section EMG; SR 1002 over Delaware River Emergency Repair; Damascus Township, Wayne County; Determination of Effects: Archaeology and Historic Structures

Dear Mr. Thompson,

Thank you for submitting information concerning the above referenced project. The Pennsylvania State Historic Preservation Office (PA SHPO) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

Archaeological Resources
We agree with the proposed work plan proposed by the agency regarding archaeological resources and investigations.

Above Ground Resources
We are in receipt of the detailed plans, description, and mapping for the above-listed project which includes replacement of seven U-bolts and 44 stringers; removal of temporary timber blocking; installation of new pin caps at five locations; cleaning and painting of existing structural steel on Span 1; replacement of select timber running boards on bridge deck; and the construction of two overhead clearance bar portal frames. We concur that this project as outlined will have **No Effect** on the **Milanville Historic District (Key No. 105106)** to which the bridge is a contributing resource. The changes to the bridge are minor in nature in comparison to the scale of the district and will not affect the integrity of the district. We also concur the project will have **No Adverse Effect** on the **Milanville-Skinners Falls Bridge (Key No. 000056).** The work proposed will not affect the character-defining features of the bridge as the flooring system (stringers and floor beams) does not contribute to the structure's significance as an example of a multiple-span Baltimore truss. In addition, the proposed truss connection will be of the same materials, size and configuration as the existing in accordance with Standard 6 of the *Secretary of Interior's Standards for Rehabilitation.*

For questions concerning archaeological resources, please contact Mark Shaffer at mshaffer@pa.gov or (717) 783-9900. For questions concerning above ground resources, please contact Emma Diehl at emdiehl@pa.gov or (717) 787-9121.

Sincerely,

Douglas C. McLearen, Chief
Division of Archaeology and Protection

NEW YORK STATE OF OPPORTUNITY. | Parks, Recreation, and Historic Preservation

ANDREW M. CUOMO
Governor

ROSE HARVEY
Commissioner

June 27, 2016

Mr. Kevin Mock
District Archaeologist
Pennsylvania Department of Transportation
55 Keystone Industrial Park
District 4-0
Dunmore, PA 18512

Re: FHWA
Skinners Falls Bridge Emergency Repairs
Skinners Falls Road West, Cochecton, NY
16PR02150
MPMS# 107072

Dear Mr. Mock:

Thank you for requesting the comments of the New York State Historic Preservation Office (SHPO). We have reviewed the submitted materials in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources.

I have reviewed the report entitled "Skinners Falls Emergency Bridge Repair Project, S.R. 1002, Section 651, Damascus Township, Wayne County, Pennsylvania and Town of Cochecton, Sullivan County, New York" (May 2016). I concur with Pennsylvania Department of Transportation's finding that on the New York State side of the Skinners Falls Bridge, the project will no effect upon cultural resources in or eligible for inclusion in the National Register of Historic Places.

If further correspondence is required regarding this project, please refer to the SHPO Project Review (PR) number noted above. If you have any questions I can be reached at 518-268-2186.

Sincerely,

Tim Lloyd, Ph.D., RPA
Scientist - Archaeology
timothy.lloyd@parks.ny.gov

via e-mail only

Appendix B

Site Photographs

Photo 1 - Skinners Falls Bridge: Downstream Elevation (Looking North)

Photo 2 - Skinners Falls Bridge: Downstream Elevation (Looking East)

Photo 3 - Skinners Falls Bridge: Typical Guiderail across Structure Looking Ahead

Photo 4 - Skinners Falls Bridge: Typical Top of Deck and Bridge Rail

Photo 5 - Skinners Falls Bridge: Timber Running Board Deterioration

Photo 6 - Skinners Falls Bridge: Headache Bar at NY Approach

Photo 7 - Skinners Falls Bridge: View of Channel Looking Upstream

Photo 8 - Skinners Falls Bridge: View of Channel Looking Downstream

Photo 9 - Skinners Falls Bridge: Left Truss Top Chord flaking paint and minor surface rust

Photo 10 - Skinners Falls Bridge: Left Truss Top Chord section loss

Photo 11 - Skinners Falls Bridge: Bent and misaligned bolts in top chord splices in Span 2 resulting in displacement of top chord channels.

Photo 12 - Skinners Falls Bridge: Collision damage to vertical members at deck level behind the bridge railing

Photo 13 - Skinners Falls Bridge: Typical losses to eyebar heads at middle panel points

Photo 14- Skinners Falls Bridge: Span 1, Right Truss, Panel Point L8 retrofit pin cap (Looking Left)

Photo 15 - Skinners Falls Bridge: ¼" Section Loss to one side of pin at Span 1, Left Truss, Panel Point L0 (Looking Back)

Photo 16 - Skinners Falls Bridge: Existing field welded s to lower chord forged eyebar heads

Photo 17 - Skinners Falls Bridge: Span 1, Left Truss, Panel Point L6 pin sleeve broken (Looking Ahead)

Photo 18- Skinners Falls Bridge: Span 2, Left Truss, Panel Point L6 extensive pack rust (Looking Back)

Photo 19 - Skinners Falls Bridge: Typical deck underside condition. Note missing clips

Photo 20 - Skinners Falls Bridge: Gap between stringer and deck due to section loss

Photo 21 - Skinners Falls Bridge: Floor Beam Support deterioration

Photo 22 - Skinners Falls Bridge: Span 2, Floor Beam Bay 12, 100% section loss to bottom lateral bracing

Photo 23 - Skinners Falls Bridge: Far Left Wingwall with Crack Monitoring Points and Full Height Step Cracking

Photo 24 - Skinners Falls Bridge: Far Left Wingwall with Crack Monitoring Points and Full Height Step Cracking

Photo 25 - Skinners Falls Bridge: Far Abutment with Crack Monitoring Points and Full Height Step Cracking

Photo 26 - Skinners Falls Bridge: Near Abutment with wide mortar joints with deep voids at the top half

Photo 27 - Skinners Falls Bridge: Steel Cap at the Top of the Upstream Nose of Pier

Photo 28- Skinners Falls Bridge: Sediment Island with Vegetation Downstream of Pier

Photo 29 - Skinners Falls Bridge: Near Abutment Left Truss

Photo 30 - Skinners Falls Bridge: Near Advanced "ONE LANE BRIDGE" Sign and 10 M.P.H. Advisory Placards

Photo 31 - Skinners Falls Bridge: Near Advanced 90° Left Arrow and 10 M.P.H. Signage

Photo 32 - Skinners Falls Bridge: Near Advanced "BRIDGE MAY BE SLIPPERY" Sign

Photo 33 - Skinners Falls Bridge: Typical Deterioration of Left Edge of Deck.

Photo 34 - Skinners Falls Bridge: Typical Cracks and Splitting Throughout Left Tread

Photo 35 - Skinners Falls Bridge: Typical Damaged Tread Connection (Span 2 Shown)

Photo 36 - Skinners Falls Bridge: Typical View of Decorative Railing

Photo 37 - Skinners Falls Bridge: Close Up View of Rosette (Typical)

Photo 38 - Skinners Falls Bridge: Railing Bolted to Vertical Truss Member, Span 2

Appendix C:

Rehabilitation Engineering Information

Hydraulic Deficiency Information

Hydraulic Deficiencies Technical Information:

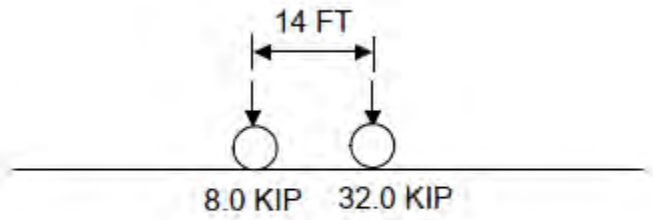
The Delaware River flows in a southeasterly direction through the project area forming the boundary of PA and NY. The Delaware River 100-year floodplain partially encompasses the overbank areas both upstream and downstream of the Skinners Falls Bridge, inundating residential and commercial properties and the northeastern side of Skinners Falls Road. There has been a history of flooding along the Delaware River, with the most noteworthy floods in the upper basin occurring in 2004, 2005, and 2006. A record height was recorded during a June 26-28, 2006 storm at the Callicoon gauge, approximately 7.42 miles upstream of Milanville, and reports indicated that the areas adjacent to the Skinners Falls Bridge were inundated as a result. Federal Emergency Management Agency (FEMA) published 100-year flood elevation just upstream of the bridge is approximately 725' and the 100-year floodplain has an average approximate width of 1,000'in the vicinity of the bridge

The preliminary hydraulic analysis undertaken for this project evaluated the FEMA 100-year, FEMA 50-year, and the PennDOT 100-year events using the U.S. Army Corps of Engineers' (USACE) River Analysis System (HEC-RAS) Version 5.0.6). The project team obtained the FEMA HEC-RAS model (Version 3.1.3) for the Delaware River, which was used as a comparison for the existing HEC-RAS results. The PennDOT HEC-RAS v6.2 model was compiled with survey of the Skinners Falls Bridge and hydraulic sections for a length of 4,315' of the river in the vicinity of the bridge, along with LiDAR in the floodplain overbank areas. The FEMA 100-year published flow was modeled for existing conditions to evaluate federal floodplain management criteria. Since the existing structure encroaches on the FEMA regulated floodway, the allowable increase in the FEMA 100-year flood elevation is 0.00'. Risk was evaluated using the PennDOT 100-year event as it is an approximately 12% greater flow than the published FEMA 100-year flow. The existing Skinners Falls Bridge has more than 9'of freeboard from the low chord to the FEMA 100-year event and more than 7' of freeboard for the PennDOT 100-year event. The FEMA 50-year water surface elevation overtops the northeast approach roadway.

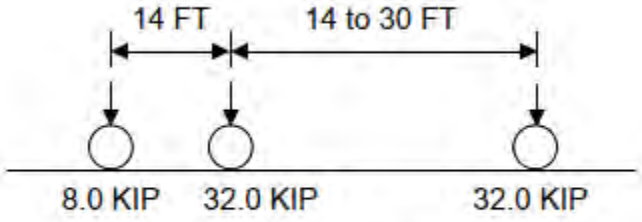
Load Rating Information

Rating Vehicle Supplementary Information

(PennDOT Publication Design Manual 15M and supplemental information)



H20 Truck (US)



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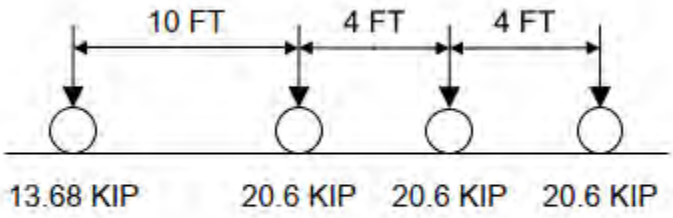
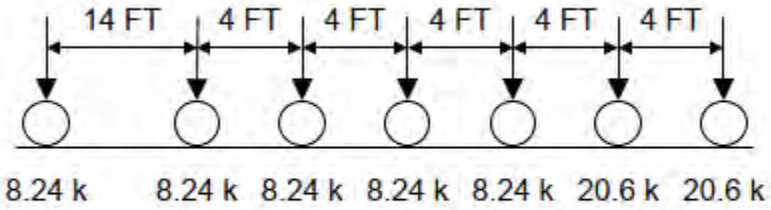
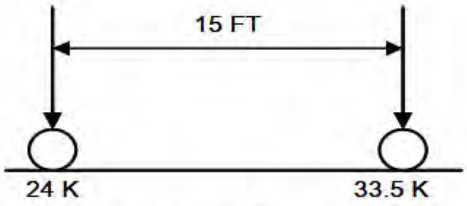


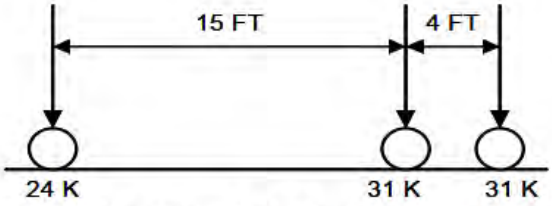
ML-80
Rating Truck (US)



TK527
Rating Truck (US)



EV2 (Single Rear Axle Emergency Vehicle)



EV3 (Tandem Rear Axle Emergency Vehicle)

Structural Information

Summary of Members to be Replaced and Retrofitted (10-ton Alternative)					
Members	Total	To Be Replaced	% To Be Replaced	To Be Retrofitted	% To Be Retrofitted
Structural Framing Members					
Stringers	264	264	100%	0	0%
Floorbeams	22	22	100%	0	0%
Total Stringers and Floorbeams	**286**	**286**	**100%**	**0**	**0%**
Truss Members (10-ton Alernative)					
Lower Chord Eyebars	24	10	42%	0	0%
Upper Chord Built-up Members	32	1	3%	20	63%
Hanger Members	32	22	69%	0	0%
Diagonal Eyebars	32	3	9%	8	25%
Diagonal Loop Rods	8	0	0%	0	0%
Diagonal Built-up Members	24	14	58%	0	0%
Built-up Vertical Members	12	11	92%	0	0%
Built-up Mid-Height Members	8	0	0%	0	0%
Total Truss Members (43 members/truss)	**172**	**61**	**35%**	**28**	**16%**
Total Bridge Members	**458**	**347**	**76%**	**28**	**6%**

AECOM

Job Number: 60277137
Task: Skinners Fall Bridge Rehabilitation
Members to Be Replaced/Retrofitted

Orig: CCR Date: 1/10/2023
Checker: _____ Date: _____

Summary of Members to be Replaced (10-ton Alternative)									
Members	Total	Total Original Members	Total Previously Replaced/Retrofitted Members	Total to Be Replaced	% Total to Be Replaced	Original Members to Be Replaced	% Original Members to Be Replaced	Previously Replaced/Retrofitted Members to Be Replaced	% Previously Replaced/Retrofitted Members to Be Replaced
Structural Framing Members									
Stringers	264	0	264	264	100%	0	0%	264	100%
Floorbeams	22	22	0	22	100%	22	100%	0	0%
Total Stringers and Floorbeams	**286**	**22**	**264**	**286**	**100%**	**22**	**100%**	**264**	**100%**
Truss Members									
Lower Chord Eyebars	24	23	1	10	42%	9	39%	1	100%
Upper Chord Built-up Members	32	20	12	1	3%	0	0%	1	8%
Hanger Members	32	25	7	22	69%	15	60%	7	100%
Diagonal Eyebars	32	32	0	3	9%	3	9%	0	0%
Diagonal Loop Rods	8	8	0	0	0%	0	0%	0	0%
Diagonal Built-up Members	24	10	14	14	58%	0	0%	14	100%
Built-up Vertical Members	12	12	0	11	92%	11	92%	0	0%
Built-up Mid-Height Members	8	8	0	0	0%	0	0%	0	0%
Total Truss Members (43 members/truss)	**172**	**138**	**34**	**61**	**35%**	**38**	**28%**	**23**	**68%**
Total Bridge Members	**458**	**160**	**298**	**347**	**76%**	**60**	**38%**	**287**	**96%**

Summary of Members to be Retrofitted (10-ton Alternative)									
Members	Total	Total Original Members	Total Previously Replaced/Retrofitted Members	Total to Be Retrofitted	% Total to Be Retrofitted	Original Members to Be Retrofitted	% Original Members to Be Retrofitted	Previously Replaced/Retrofitted Members to Be Retrofitted	% Previously Replaced/Retrofitted Members to Be Retrofitted
Structural Framing Members									
Stringers	264	0	264	264	100%	0	0%	0	0%
Floorbeams	22	22	0	22	100%	0	0%	0	0%
Total Stringers and Floorbeams	**286**	**22**	**264**	**286**	**100%**	**0**	**0%**	**0**	**0%**
Truss Members									
Lower Chord Eyebars	24	23	1	0	0%	0	0%	0	0%
Upper Chord Built-up Members	32	20	12	20	63%	9	45%	11	92%
Hanger Members	32	25	7	0	0%	0	0%	0	0%
Diagonal Eyebars	32	32	0	8	25%	8	25%	0	0%
Diagonal Loop Rods	8	8	0	0	0%	0	0%	0	0%
Diagonal Built-up Members	24	10	14	0	0%	0	0%	0	0%
Built-up Vertical Members	12	12	0	0	0%	0	0%	0	0%
Built-up Mid-Height Members	8	8	0	0	0%	0	0%	0	0%
Total Truss Members (43 members/truss)	**172**	**138**	**34**	**28**	**16%**	**17**	**12%**	**11**	**39%**
Total Bridge Members	**458**	**160**	**298**	**314**	**69%**	**17**	**11%**	**11**	**4%**

Appendix D:

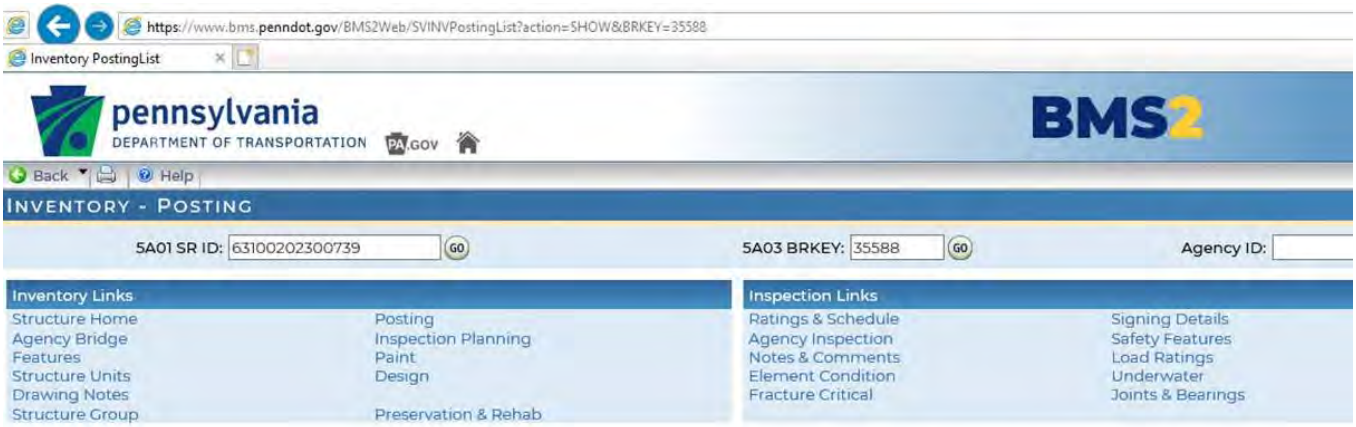
Additional Load Rating Investigation and Background

Appendix D – Additional Load Rating Investigation and Background

As stated in the HBRA Phase 1 report, the availability of original bridge records is limited. The following provides a summary of AECOM's investigative efforts to determine the bridge's original weight capacity and the evolution of weight posting reductions.

Prior to undertaking the comprehensive load rating calculations summarized in the draft 2013 Structural Assessment Report, AECOM reviewed the available bridge drawings and biennial inspection reports. It was confirmed that no original as-built record drawings were available on file and the prior rehabilitation drawings did not provide sufficient information to establish an original weight capacity or perform load ratings.

PennDOT BMS2 data indicated the weight capacity was originally 9 tons. Furthermore, it was determined that a 2006 load rating had been performed which served as the basis for a weight posting reduction in 2007, from 9 tons to 7 tons respectively. See below for PennDOT BMS2 Posting data.



Records 1 to 10 of 10 <<<1>>>

VP01 Status Date	VP02 Posting Status	VP03 Special Restrictive Posting	VP04 Posted Weight Limit
10/16/2019	C(K) - Closed to traffic		-1
10/19/2016	P - Posted for load		4
12/11/2015	C(K) - Closed to traffic	0 - Not Applicable	-1
12/22/2014	P - Posted for load	0 - Not Applicable	4
07/11/2012	P - Posted for load	0 - Not Applicable	7
04/03/2012	C(K) - Closed to traffic		-1
02/01/2010	P - Posted for load	0 - Not Applicable	7
01/19/2010	C(K) - Closed to traffic	0 - Not Applicable	-1
02/01/2007	P - Posted for load	0 - Not Applicable	7
10/17/1901	P - Posted for load	0 - Not Applicable	9

In December 2012, the 2006 Load Rating results and prior load rating assumptions were reviewed for validation of the expected approach for the new load ratings to be performed at that time. The 2006 Load Rating was completed using the original member section properties (ignoring deterioration observations) and the Upper Chord U4-U10 was identified as the controlling member with a rating of approximately 9 tons, consistent with PennDOT BMS2 data.

Due to the age of the bridge, the AASHTO Manual for Bridge Evaluation was referenced for an estimation of the minimum yield strength of steel at the time of construction. See Table 6A.6.2.1-1 below.

Table 6A.6.2.1-1—Minimum Mechanical Properties of Structural Steel by Year of Construction

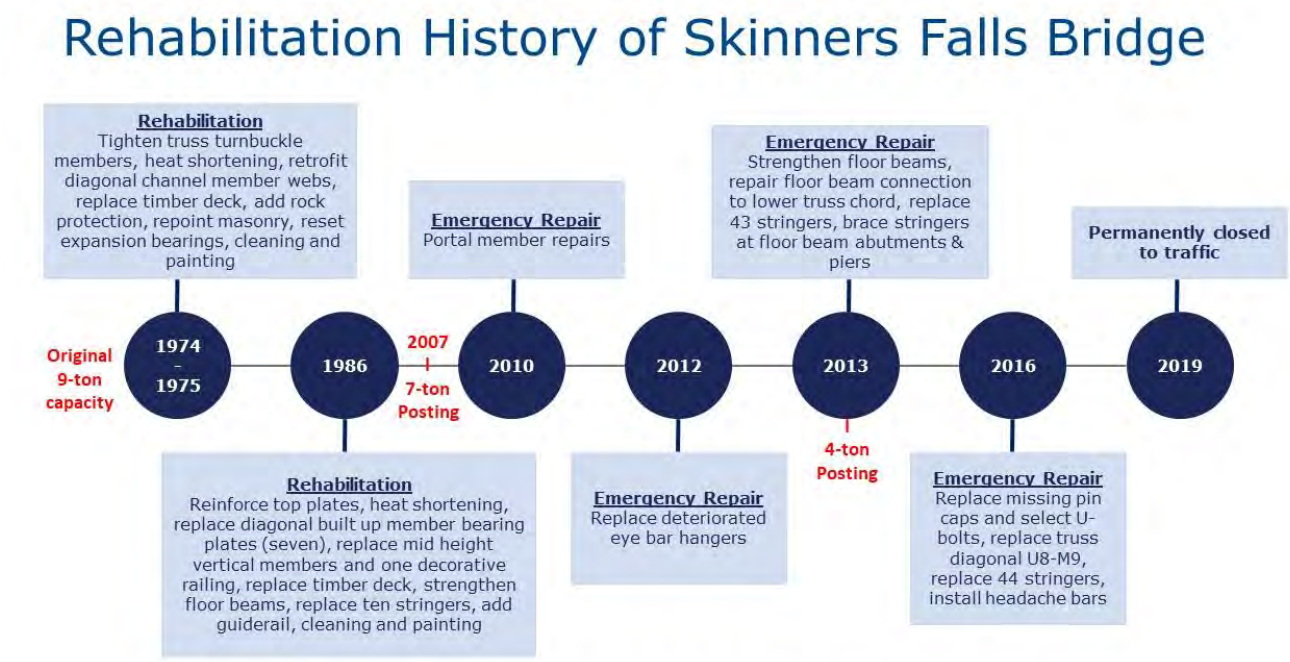
Year of Construction	Minimum Yield Point or Minimum Yield Strength, F_y, ksi	Minimum Tensile Strength, F_u, ksi
Prior to 1905	26	52
1905 to 1936	30	60
1936 to 1963	33	66
After 1963	36	66

In accordance with the tabulated recommendations, the minimum yield strength was estimated to be 26ksi for structural steel constructed prior to 1905. AECOM prepared "as-designed" load rating and an "as-inspected" load rating calculations with the assumed yield strength. As a result, the bridge posting was reduced to 4 tons in 2013.

Since the Skinners Falls Bridge was constructed in 1902, damaged during an ice event in 1904 and subsequently reconstructed, the project team recognized that the bridge may be comprised of members with differing minimum yield strength. In addition, fabricators often produce steel members that exceed the minimum yield strength to ensure that their steel qualifies for the minimum yield strength as sold – in the event third party testing would be performed at a later date.

Material testing had been performed on Skinners Falls Bridge but the results were not available until after the Draft Structural Assessment Report was submitted. Brinell Hardness tests were performed on a small sample size of truss members resulting in a minimum yield strength result of 34.7ksi. Considering the test results and the bridge history, AECOM concluded that a minimum yield strength of 30ksi would be appropriate for a future rehabilitation design and submitted a revised draft Structural Assessment Report in October 2013.

Repairs were performed on the bridge in 2014; however, the bridge continued to deteriorate. The bridge experienced several brief closures followed by emergency repairs performed as necessary to return the bridge to service at 4 tons. The bridge was closed due to a failed condition of the NY Abutment in October 2019 and remains closed at the present. See below for a summary of the rehabilitations and repairs at the bridge.



Plans for the rehab conducted in 1974-1975 were developed in 1971

Appendix E:

References

References

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