The Swinging Bridge is a 220-foot pedestrian suspension bridge with a 126-foot main suspension span over the St. Louis River in Carlton County, Minnesota. The Civilian Conservation Corps (CCC) built the bridge in 1934 to replace an earlier suspension bridge at the site. It is located within the Jay Cooke State Park CCC/WPA/Rustic Style Historic District and is owned by the Minnesota Department of Natural Resources (MnDNR). The Swinging Bridge is considered a contributing resource to the Jay Cooke State Park CCC/WPA/Rustic Style Historic District.

A 2012 high water event caused extensive damage to the bridge’s steel superstructure and stone-veneered piers, requiring a substantial reconstruction and rehabilitation project that was completed in 2013. The steel suspension superstructure was completely reconstructed to the 1953 design with modifications to the concrete pier extensions and new anchorages for the suspension cables. The two northern approach spans were reconstructed with timber girders and railing to match the original 1934 construction. The stone-masonry-clad piers were rehabilitated using stone salvaged from the existing piers and supplemented with stone from the MnDNR stockpile. The south abutment was disassembled and reassembled using the original abutment stones. Trails and paths at the bridge site were reworked, in part to comply with Americans with Disabilities Act (ADA) requirements. The work was performed in accordance with the Secretary of the Interior’s Standards.
Jay Cooke State Park

Bridge Location: Jay Cooke State Park

Project Location: Carlton County

SEC 09 NW 1/4 OF SE 1/4 TO 048NN, R16W

USGS Quad Name: ESKO

UTM Zone: 15   NAD: 83

Easting: 548169 m (1798450 ft.)

Nordthing: 5166871 m (16951642 ft.)

JAY COOKE SWINGING BRIDGE (CL-THT-030)
STATE PARK TRAIL OVER ST. LOUIS RIVER
Executive Summary

Bridge Location

I. Project Introduction
II. Historic Data
III. Bridge Data
IV. Work Completed
V. Projected Costs

Appendices

A. Glossary
B. Guidelines for Bridge Maintenance and Rehabilitation based on the Secretary of the Interior’s Standards
C. Documents
This Abridged Bridge Report is a product of a comprehensive study performed for historic bridges owned by county, city, township, private and other state agencies besides MnDOT. The study is the third phase of a multi-phased process developed and executed in partnership with representatives from the Federal Highway Administration (FHWA); State Historic Preservation Office (SHPO); MnDOT State Aid; MnDOT Cultural Resources Unit (CRU); the US Army Corps of Engineers (USACE); local public works and county highway departments; county and township boards and city councils; the preservation community and the general public. To perform the study, MnDOT retained the consultant team of LHB Inc., Mead & Hunt Inc., and The 106 Group.

The general goals of the study include:

- Identification of bridges not included in the SIMS database or identified in previous studies, to either be studied further (those on local roads/systems) or tabulated for SHPO’s use (trails and abandoned bridges)
- Gathering and compiling the existing historic and bridge condition data and other relevant information on the bridges in the study group into bridge reports
- Reevaluation of Chicago, Milwaukee & St. Paul Grade Separation Historic District (Midtown Corridor)
- Preparing HAER documentation for a selected group of bridges
- Investigating and preparing a summary regarding how other states have funded historic bridge programs and suggestions for creation of a new funding mechanism for Minnesota’s local historic bridges

This Abridged Report compiles and summarizes historic and engineering information concerning the structure. It is important to note that this report indicates if a bridge is located within a known historic district, but it does not identify all known or potential historic properties. Potential impacts to adjacent or surrounding historic properties, such as archaeological sites or other structures must be considered. Contact MnDOT CRU early in the project planning process in order to identify other potential historic properties. Due to private ownership, recently completed engineering/preservation studies, or recently executed rehabilitation projects, a small number of bridges were identified for abridged reports. An abridged report compiles readily available information, especially data about the bridge’s historical significance. Additionally, recent rehabilitation work that has been completed is described and documented with photographs where available. Maintenance activities directed toward continued structure serviceability are recommended where appropriate.

Preservation recommendations are not included within the Abridged Bridge Reports. However any future work should be consistent with the Secretary of the Interior’s Standards for the Treatment of Historic Properties (Standards). The Standards are basic principles created to help preserve the distinct character of a historic property and its site, while allowing for reasonable change to meet new engineering standards and codes. The Standards recommend repairing, rather than replacing deteriorated features whenever possible. The Standards apply to historic properties of all periods, styles, types, materials and sizes and encompass the property’s location and surrounding environment.
The Standards were developed with historic buildings in mind and cannot be easily applied to historic bridges. The Virginia Transportation Research Council (Council) prepared Guidelines, which adapted the Standards to address the special requirements of historic bridges. They were published in the Council’s 2001 Final Report: A Management Plan for Historic Bridges in Virginia, *The Secretary’s Standards with Regard to Repair, Rehabilitation, and Replacement Situations*, provide useful direction for undertaking historic bridge preservation and are included in the Appendix to this report.

Existing bridge data sources typically available for Minnesota bridges were gathered for the study. These sources include:

- Structure Information Management System (SIMS): system used by MnDOT to manage its inventory of bridges statewide
- The current MnDOT Structure Inventory Report and MnDOT Bridge Inspection Report. Reports are available for the majority of the bridges (not available for bridges in private ownership or bridges that are not tracked in SIMS)
- Database and inventory forms resulting from Phase II of the Minnesota Local Historic Bridge Study and other prior historic bridge studies as incorporated into the database
- Existing Minnesota historic contexts studies for bridges in Minnesota, including *Reinforced-Concrete Highway Bridges in Minnesota, 1900-1945*, *Minnesota Masonry-Arch Highway Bridges, 1870-1945*, *Iron and Steel Bridges in Minnesota, 1873-1945* and *Minnesota Bridges 1955-1970*

Additional data sources researched and gathered for some of the bridges as available also included:

- Files and records at MnDOT and Local Owner offices
- Original bridge construction plans, rehabilitation plans, and maintenance records of local owners
- Files and documents available at the SHPO office, including previous inventory forms, determinations of eligibility, studies, and compliance documents
- Existing historical and documentary material related to the National Register-eligible bridges

The Appendix contains the following: a Glossary explaining structural and historic preservation terms used in this report, the Guidelines for Bridge Maintenance and Rehabilitation based on the Secretary of the Interior’s Standards, a list of engineering and historic documents available for this bridge, and copies of the MnDOT Structure Inventory and Bridge Inspection Reports (if available) current at the time of the report preparation.

The Abridged Bridge Report will provide the bridge owner and other interested parties with detailed information related to the historic nature of the bridge and varied information concerning the condition of the bridge depending on information furnished at the time of report preparation. This information will enable historic bridge owners to make more informed decisions when planning for their historic properties.
This narrative is drawn from previous documents, as available for the subject bridge, which may include determination of eligibility (also known as Phase II evaluation), Minnesota Architecture/History Inventory Form, National Register nomination, Multiple Property Documentation Form, and/or applicable historic contexts. See Sources for details on which documents were used in compiling this Historic Data section.

Contractor: Civilian Conservation Corps

Designer/Engineer: Oscar Newstrom

Description
The Swinging Bridge is a suspension bridge with a 126-foot main span over the St. Louis River. It is located within the Jay Cooke State Park CCC/WPA/Rustic Style Historic District. The overall structure length of the bridge is 220 feet. Following extensive damage in a 2012 high-water event, the bridge was rebuilt in 2013. The suspension superstructure is supported by two massive pylons consisting of reinforced concrete piers faced with native stone laid in a rustic ashlar design. The suspension cables are anchored in a solid rock ledge on both the south and north ends of the bridge. A reinforced-concrete abutment with stone veneer supports the south end of the southern suspension span. Reinforced concrete piers with stone veneer support the north end of the northern suspension span, the main suspension span, and the timber approach spans. A new reinforced concrete north abutment was constructed in 2013. Peeled cedar logs are used as approach railings.

The Swinging Bridge has undergone a series of alterations since the 1934-39 construction, all relating to damaging high water events at the site. The superstructure was originally 18 feet above the St. Louis River. The suspension deck was raised in 1941 because of high water. Extensive damage from an extreme high water event in 1950 required repairs in 1953 that involved reconstructing the suspension superstructure and extending (i.e., raising) the existing concrete cores of the pylons and creating new pylon caps. This raised the superstructure for additional clearance above the river. In 1977 the spalled concrete caps were repaired. The 2012 high-water event caused damage similar to the 1950 event, destroying the suspension superstructure. In the 2013 work the superstructure was completely reconstructed to the 1953 design, along with new anchorages for the suspension cables. Unlike the 1953 design, however, the pier extensions were reconstructed to conform to the 1934 plans with a concrete core and stone veneer in lieu of the 1953 concrete extensions. The two northern approach spans were reconstructed with timber girders and railing to match the original 1934 construction. The stone-masonry-clad pylons were rehabilitated using stone salvaged from the existing piers and supplemented with stone from the onsite MnDNR stockpile. The 1953 concrete caps were redesigned and rebuilt. The south abutment was disassembled and reassembled using the original abutment stones. Trails and paths at the bridge site were reworked, in part to comply with Americans with Disabilities Act (ADA) requirements.

Significance
Jay Cooke State Park was established in 1915 with a donation of 2,350 acres of land from the St. Louis Power Company. The first Swinging Bridge was constructed in 1924 by the U.S. Forest Service. It had simple peeled-log pylons resting on river rock outcroppings. There was no stone masonry. In 1933 large-scale development of the park was undertaken with the arrival of Civilian Conservation Corps (CCC) Camp SP-2, which constructed a new Swinging Bridge in 1934. The designer was Oscar Newstrom. A
second CCC Camp, SP-21, Company 1171, was established in the park in May 1939. This camp rebuilt the 1933 bridge, establishing the design that has been periodically rehabilitated and reconstructed since. The Swinging Bridge is one of two contributing resources to the National Register of Historic Places-listed Jay Cooke State Park CCC/WPA/Rustic Style Historic District. According to the nomination, the park is significant under Criterion A in the areas of Architecture, Landscape Architecture, Recreation, and Government. It is architecturally significant as an outstanding example of Rustic style construction featuring a dark native stone which blends with the rocky gorge of the adjacent St. Louis River. The Swinging Bridge is also significant as the best example of a suspension bridge in the state park system, and one of only two examples. The landscape design for the district is architecturally significant for its ability to successfully concentrate the intensive use areas of the park that had been previously scattered along the entire seven-mile park drive. Surviving master plans for the park also document both the sophistication and precision of the design.

The Jay Cooke State Park CCC/WPA/Rustic Style Historic District is historically significant for its association with the social, political, and economic impact of the Great Depression and the subsequent development of the various federal-relief programs that were responsible for its construction. It is also significant as a major recreational facility that received intensive use from residents of the surrounding communities and the City of Duluth.

The Jay Cook State Park Swinging Bridge is significant as a contributing resource to the Jay Cooke State Park CCC/WPA/Rustic Style Historic District; the bridge has not been individually evaluated for significance. The 2013 post-flood reconstruction and rehabilitation work was completed in compliance with the Secretary of the Interior’s Standards, and therefore the bridge has good integrity of design and materials, based on the combination of a reconstructed suspension superstructure and rehabilitated substructure. It has never been moved and its setting over the river is unchanged, so it retains integrity of location and setting. The suspension superstructure is largely fabricated of manufactured parts, but the stone masonry components were constructed by hand, so the aspect of workmanship applies for those features. Great care was used in the masonry rehabilitation; therefore, the bridge retains excellent evidence of workmanship, including original materials. Because the bridge has good or excellent integrity in the areas noted, it also retains excellent integrity of feeling and association and continues to contribute to the district.

**Historic Context**

Federal Relief Construction in Minnesota, 1933-1941

**National Register Status**

Contributing to Listed Historic District

**Criterion A Significance**

N/A

**Criterion C Significance**

N/A

**Historic District**

Jay Cooke State Park CCC/WPA/Rustic Style Historic District

**SHPO inventory number**

CL-THT-030
Sources Used to Compile Section II -- Historic Data


Heidemann, Mary Ann, SHPO, to David Radford, DNR Parks and Trails. Letter re accessibility turn-around at Swinging Bridge. April 10, 2012. Copy available in Compliance file, MnSHPO.

Heidemann, Mary Ann, SHPO, to Nicholas Mueller, FEMA. Letter re flood damage repairs to Swinging Bridge. February 12, 2013. Copy available in Compliance file, MnSHPO.


Minnesota DNR. “The Swinging Bridge: historic photos and timeline.” www.dnr.state.mn.us/state_parks/jay_cooke/swinging_bridge.html

Character-Defining Features

Character-defining features are prominent or distinctive aspects, qualities, or characteristics of a historic property that contribute significantly to its physical character. Features may include materials, engineering design, and structural and decorative details. Often, the character-defining features include important historic fabric. However, historic fabric can also be found on other elements of a bridge that have not been noted as character-defining. For this reason, it is important to consider both character-defining features and the bridge’s historic fabric when planning any work.

Feature 1: Design and construction of the suspension-bridge superstructure.
Feature 2: Rustic stone masonry construction of the pylons, piers, and related components.
**III – Bridge Data**

<table>
<thead>
<tr>
<th>Date of Construction (remodel)</th>
<th>1934</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Name (if any)</td>
<td>Jay Cooke Swinging Bridge</td>
</tr>
</tbody>
</table>

**Location**
- Feature Carried: State Park Trail
- Feature Crossed: St. Louis River
- County: Carlton
- Ownership: MN Department of Natural Resources (MnDNR)

**Structure Data**
- *Data Current (as of): Sep 2015*
- Main Span Type: 423 – Continuous Steel Suspension
- Main Span detail:
- Total Number of Span(s): 5
- Substructure Type - Foundation Type:
  - Abutment: North: 1-Concrete - 1-Spread/Soil; South: 1-Concrete - 2-Spread/Rock
  - Piers: 1-Concrete - 2-Spread/Rock

**Roadway Characteristics**
- Lane Widths: 4 ft Trail
- Shoulder Width: N/A Trail
- Shoulders Paved or Unpaved: N/A Trail
- Roadway Surfacing: Concrete Trail/Walk

**Number of Crashes reported in MnMCAT within 500 feet of Bridge Site**
- 0

**Location of Plans**
- MnDNR
- 1935 Original Plan
- 1940 Suspension Bridge Details
- 1940 Suspension Bridge Revision
- 1953 Reconstruction Plan
- 2013 Reconstruction Plan (2014 Record Drawings)

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* Non-MnDOT data collected during field survey. All other fields of data collected from MnDOT September of 2013. See Appendix C for MnDOT inventory and inspection report data.

** Unless a significant number of crashes are noted on or near a bridge, the accident data is not detailed in this report.
Following the extensive damage to the bridge in June 2012, the Minnesota DNR completed reconstruction and rehabilitation. The plans were prepared in 2013 by LHB, Inc., for the DNR. The work included removal and reconstruction of the entire suspension superstructure to replicate the 1953 design, and northern timber approach spans to replicate the 1934 design. The work also included rehabilitation of the suspension span piers, with new design and reconstruction of the extended caps. The southern stone-faced abutment was disassembled and reassembled using the existing abutment veneer stones. The northern reinforced-concrete abutment was removed and reconstructed. Original stone salvaged from piers as well as stone from an onsite MnDNR stockpile was used in the reconstruction. The work also included installation of new rock anchors and primary and secondary suspension cables; construction of a revised south approach to accommodate ADA requirements for a turnaround area; repainting to match previous color, but with lead-free epoxy based paint; and work on a walking trail adjacent to the north approach to the bridge.

The completed work complied with the Secretary of the Interior’s Standards for Rehabilitation. The Minnesota SHPO concurred with the DNR that the work would have no adverse effect to the historic property. The work was completed in November 2013.

Overall Recommendations

The Jay Cooke State Park Swinging Bridge is currently open to pedestrian traffic. The recently completed rehabilitation will ensure that the bridge will be functional for 20 years or longer. Regular inspection of all elements of the bridge should be performed bi-annually at a minimum. In order to prolong the life of the structure, any issues discovered during routine inspections should be addressed in a timely manner. Refer to the Management Plan for Historic Bridges in Minnesota for technical guidance on stabilization, preservation, and maintenance activities, available on MnDOT’s website.

Recommended Annual Maintenance Activities

No maintenance items have been identified to be performed on an annual basis. However, any maintenance items identified during routine inspections such as painting of steel elements, staining of timer railings, removal of debris, etc., should be addressed as they are identified. Regular and timely maintenance will ensure favorable condition and continued use of this historic structure.
No costs were estimated because there were no annual maintenance items identified for this structure.
Appendix A. Glossary
Glossary

**Abutment** – Component of bridge substructure at either end of bridge that transfers load from superstructure to foundation and provides lateral support for the approach roadway embankment.

**Appraisal ratings** – Five National Bridge Inventory (NBI) appraisal ratings (structural evaluation, deck geometry, under-clearances, waterway adequacy, and approach alignment, as defined below), collectively called appraisal ratings, are used to evaluate a bridge’s overall structural condition and load-carrying capacity. The evaluated bridge is compared with a new bridge built to current design standards. Ratings range from a low of 0 (closed bridge) to a high of 9 (superior). Any appraisal item not applicable to a specific bridge is coded N.

**Approach alignment** – One of five NBI inspection ratings. This rating appraises a bridge’s functionality based on the alignment of its approaches. It incorporates a typical motorist’s speed reduction because of the horizontal or vertical alignment of the approach.

**Character-defining features** – Prominent or distinctive aspects, qualities, or characteristics of a historic property that contribute significantly to its physical character. Features may include structural or decorative details and materials.

**Condition, fair** – A bridge or bridge component of which all primary structural elements are sound, but may have minor deterioration, section loss, cracking, spalling, or scour.

**Condition, good** – A bridge or bridge component which may have some minor deficiencies, but all primary structural elements are sound.

**Condition, poor** – A bridge or bridge component that displays advanced section loss, deterioration, cracking, spalling, or scour.

**Condition rating** – Level of deterioration of bridge components and elements expressed on a numerical scale according to the NBI system. Components include the substructure, superstructure, deck, channel, and culvert. Elements are subsets of components, e.g., piers and abutments are elements of the component substructure. The evaluated bridge is compared with a new bridge built to current design standards. Component ratings range from 0 (failure) to 9 (new) or N for (not applicable); elements are rated on a scale of 1-3, 1-4 or 1-5 (depending on the element type and material). In all cases condition state 1 is the best condition with condition state 3, 4 or 5 being the worst condition. In rating a bridge’s condition, MnDOT pairs the NBI system with the newer and more sophisticated Pontis element inspection information, which quantifies bridge elements in different condition states and is the basis for subsequent economic analysis.
Appendices

Bridge Number: Swinging Bridge

Corrosion – The general disintegration of metal through oxidation.

Cutwater – The wedge-shaped end of a bridge pier, designed to divide the current and break up ice.

Decay – Deterioration of wood as a result of fungi feeding on its cell walls.

Delamination – Surface separation of concrete, steel, glue laminated timber plies etc. into layers.

Deck geometry – One of five NBI appraisal ratings. This rating appraises the functionality of a bridge’s roadway width and vertical clearance, taking into account the type of roadway, number of lanes, and ADT.

Deficiency – The inadequacy of a bridge in terms of structure, serviceability, and/or function. Structural deficiency is determined through periodic inspections and is reflected in the ratings that are assigned to a bridge. Service deficiency is determined by comparing the facilities a bridge provides for vehicular, bicycle, and pedestrian traffic with those that are desired. Functional deficiency is another term for functionally obsolete (see below). Remedial activities may be needed to address any or all of these deficiencies.

Deficiency rating – A nonnumeric code indicating a bridge’s status as structurally deficient (SD) or functionally obsolete (FO). See below for the definitions of SD and FO. The deficiency rating status may be used as a basis for establishing a bridge’s eligibility and priority for replacement or rehabilitation.

Design exception – A deviation from federal design and geometric standards that takes into account environmental, scenic, aesthetic, historic, and community factors that may have bearing upon a transportation project. A design exception is used for federally funded projects where federal standards are not met. Approval requires appropriate justification and documentation that concerns for safety, durability, and economy of maintenance have been met.

Design load – The usable live-load capacity that a bridge was designed to carry, expressed in tons according to the AASHTO allowable stress, load factor, or load resistance factor rating methods. An additional code was recently added to assess design load by a rating factor instead of tons. This code is used to determine if a bridge has sufficient strength to accommodate traffic load demands. A bridge that is posted for load restrictions is not adequate to accommodate present or expected legal truck traffic.

Deterioration – Decline in condition of surfaces or structure over a period of time due to chemical or physical degradation.
Appendices

Efflorescence – A deposit on concrete or brick caused by crystallization of carbonates brought to the surface by moisture in the masonry or concrete.

Extant – Currently or actually existing.

Extrados – The upper or outer surfaces of the voussoirs which compose the arch ring. Often contrasted with intrados.

Footing – The enlarged, lower portion of a substructure which distributes the structure load either to the earth or to supporting piles.

Fracture Critical Members – Tension members or tension components of bending members (including those subject to reversal of stress) whose failure would be expected to result in collapse of the bridge.

Functionally obsolete – The Federal Highway Administration (FHWA) classification of a bridge that does not meet current or projected traffic needs because of inadequate horizontal or vertical clearance, inadequate load-carrying capacity, and/or insufficient opening to accommodate water flow under the bridge. An appraisal rating of 3 or less for deck geometry, underclearance, approach alignment, structural evaluation or waterway adequacy will designate a bridge as functionally obsolete.

Gusset plate – A plate that connects the horizontal and vertical members of a truss structure and holds them in correct position at a joint.

Helicoidal – Arranged in or having the approximate shape of a flattened coil or spiral.

Historic fabric – The material in a bridge that was part of original construction or a subsequent alteration within the historic period of the bridge (i.e., more than 50 years old). Historic fabric is an important part of the character of the historic bridge and the removal, concealment, or alteration of any historic material or distinctive engineering or architectural feature should be avoided if possible. Often, the character-defining features include important historic fabric. However, historic fabric can also be found on other elements of a bridge that have not been noted as character-defining.

Historic bridge – A bridge that is listed in, or eligible for listing in, the National Register of Historic Places.

Historic integrity – The authenticity of a bridge’s historic identity, evidenced by the survival and/or restoration of physical characteristics that existed during the bridge’s historic period. A bridge may have integrity of location, design, setting, materials, workmanship, feeling, and association.
Appendices

**Inspections** – Periodic field assessments and subsequent consideration of the fitness of a structure and the associated approaches and amenities to continue to function safely.

**Intrados** – The inner or lower surface of an arch. Often contrasted with extrados.

**Inventory rating** – The load level a bridge can safely carry for an indefinite amount of time expressed in tons or by the rating factor described in design load (see above). Inventory rating values typically correspond to the original design load for a bridge without deterioration.

**Keystone** – Wedge-shaped stone, or voussoir, at the crown of an arch.

**Load Rating** – The determination of the live load carrying capacity of a bridge using bridge plans and supplemented by field inspection.

**Maintenance** – Work of a routine nature to prevent or control the process of deterioration of a bridge.

**Minnesota Historical Property Record** – A documentary record of an important architectural, engineering, or industrial site, maintained by the Minnesota Historical Society as part of the state’s commitment to historic preservation. MHPR typically includes large-format photographs and written history, and may also include historic photographs, drawings, and/or plans. This state-level documentation program is modeled after a federal program known as the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER).

**National Bridge Inventory** – Bridge inventory and appraisal data collected by the FHWA to fulfill the requirements of the National Bridge Inspection Standards (NBIS). Each state maintains an inventory of its bridges subject to NBIS and sends an annual update to the FHWA.

**National Bridge Inspection Standards** – Federal requirements for procedures and frequency of inspections, qualifications of personnel, inspection reports, and preparation and maintenance of state bridge inventories. NBIS applies to bridges located on public roads.

**National Register of Historic Places** – The official inventory of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture, which is maintained by the Secretary of the Interior under the authority of the National Historic Preservation Act of 1966 (as amended).

**Non-vehicular traffic** – Pedestrians, non-motorized recreational vehicles, and small motorized recreational vehicles moving along a transportation route that does not serve automobiles and trucks. Includes bicycles and snowmobiles.
**Operating rating** – Maximum permissible load level to which a bridge may be subjected based on a specific truck type, expressed in tons or by the rating factor described in design load (see above).

**Pack rust** – Rust forming between adjacent steel surfaces in contact which tends to force the surfaces apart due to the increase in steel volume.

**Pier** – A substructure unit that supports the spans of a multi-span superstructure at an intermediate location between its abutments.

**Pointing** – The compaction of mortar into the outermost portion of a joint and the troweling of its exposed surface to secure water tightness and/or desired architectural effect (when replacing deteriorated mortar).

**Pony truss** – A through bridge with parallel chords and having no top lateral bracing over the deck between the top chords.

**Posted load** – Legal live-load capacity for a bridge which is associated with the operating rating. A bridge posted for load restrictions is inadequate for legal truck traffic.

**Pontis** – Computer-based bridge management system to store inventory and inspection data and assist in other bridge data management tasks.

**Preservation** – Preservation, as used in this report, refers to historic preservation that is consistent with the Secretary of the Interior’s Standards for the Treatment of Historic Properties. Historic preservation means saving from destruction or deterioration old and historic buildings, sites, structures, and objects, and providing for their continued use by means of restoration, rehabilitation, or adaptive reuse. It is the act or process of applying measures to sustain the existing form, integrity, and material of a historic building or structure, and its site and setting. MnDOT’s Bridge Preservation, Improvement and Replacement Guidelines describe preservation differently, focusing on repairing or delaying the deterioration of a bridge without significantly improving its function and without considerations for its historic integrity.

**Preventive maintenance** – The planned strategy of cost-effective treatments that preserve a bridge, slow future deterioration, and maintain or improve its functional condition without increasing structural capacity.
Reconstruction – The act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location. Activities should be consistent with the Secretary of the Interior’s Standards for the Treatment of Historic Properties.

Rehabilitation – The act or process of returning a historic property to a state of utility through repair or alteration which makes possible an efficient contemporary use, while preserving those portions or features of the property that are significant to its historical, architectural, and cultural values. Historic rehabilitation, as used in this report, refers to implementing activities that are consistent with the Secretary of the Interior’s Standards for the Treatment of Historic Properties. As such, rehabilitation retains historic fabric and is different from replacement. MnDOT’s Bridge Preservation, Improvement and Replacement Guidelines describe rehabilitation and replacement in similar terms.

Restoration – The act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time. Activities should be consistent with the Secretary of the Interior’s Standards for the Treatment of Historic Properties.

Ring stone – One of the separate stones of an arch that shows on the face of the headwall, or end of the arch. Also known as a voussoir.

Scaling – The gradual distentegration of a concrete surface due to the failure of the cement surface caused by chemical attack or freeze-thaw cycles or rebar too close to the surface and oxidizing from exposure to chlorides.

Scour – Removal of material from a river’s bed or bank by flowing water, compromising the strength, stability, and serviceability of a bridge.

Scour critical rating – A measure of a bridge’s vulnerability to scour (see above). MnDOT utilizes letter designations to represent specific descriptions of a bridges susceptibility and/or present condition in regards to scour. Range in condition and scour susceptibility does not necessarily correlate alpha numerically to the MnDOT scour code letters so it is important to understand the specific scour description for each MnDOT scour code. The scour codes and descriptions can be found in the “MNDOT Bridge Inspection Field Manual”.

Section loss – Loss of a member’s cross sectional area and resulting strength usually by corrosion or decay.

Serviceability – Level of facilities a bridge provides for vehicular, bicycle, and pedestrian traffic, compared with current design standards.
**Appendices**

**Bridge Number:** Swinging Bridge

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**Smart flag** – Special Pontis inspection element used to report the condition assessment of a deficiency that cannot be modeled, such as cracks, section loss, and steel fatigue.

**Spall** – Depression in concrete caused by a separation of a portion of the surface concrete, revealing a fracture parallel with or slightly inclined to the surface.

**Spring line** – The imaginary horizontal line at which an arch or vault begins to curve. As example, the point of transition from the vertical face of an abutment to the start of arch curvature extending from abutment face.

**Stabilization** – The act or process of stopping or slowing further deterioration of a bridge by means of making minor repairs until a more permanent repair or rehabilitation can be completed.

**Stringcourse** – A horizontal band of masonry, generally narrower than other courses and sometimes projecting, that extends across the structure’s horizontal face as an architectural accent. Also known as belt course.

**Structural evaluation** – Condition rating of a bridge designed to carry vehicular loads, expressed as a numeric value and based on the condition of the superstructure and substructure, the inventory load rating, and the ADT.

**Structurally deficient** – Classification indicating NBI condition rating of 4 or less for any of the following: deck condition, superstructure condition, substructure condition, or culvert condition. A bridge is also classified as structurally deficient if it has an appraisal rating of 2 or less for its structural evaluation or waterway adequacy. A structurally deficient bridge is restricted to lightweight vehicles; requires immediate rehabilitation to remain open to traffic; or requires maintenance, rehabilitation, or replacement.

**Sufficiency rating** – Rating of a bridge’s structural adequacy and safety for public use, and its serviceability and function, expressed on a numeric scale ranging from a low of 0 to a high of 100. It is a relative measure of a bridge’s deterioration, load capacity deficiency, or functional obsolescence. MnDOT may use the rating as a basis for establishing eligibility and priority for replacement or rehabilitation. Typically, bridges which are structurally deficient and have sufficiency ratings between 50 and 80 are eligible for federal rehabilitation funds and those which are structurally deficient with sufficiency ratings of 50 and below are eligible for replacement.

**Through truss** – A bridge with parallel top and bottom chords and top lateral bracing with the deck generally near the bottom chord.
Appendices

Under-clearrances – One of five NBI appraisal ratings. This rating appraises the suitability of the horizontal and vertical clearances of a grade-separation structure, taking into account whether traffic beneath the structure is one- or two-way.

Variance – A deviation from State Aid Operations Statute Rules that takes into account environmental, scenic, aesthetic, historic, and community factors that may have bearing upon a transportation project. A design variance is used for projects using state aid funds. Approval requires appropriate justification and documentation that concerns for safety, durability and economy of maintenance have been met.

Vehicular traffic – The passage of automobiles and trucks along a transportation route.

Voussoir – One of the separate stones forming an arch ring; also known as a ring stone.

Waterway adequacy – One of five NBI appraisal ratings. This rating appraises a bridge’s waterway opening and passage of flow under or through the bridge, frequency of roadway overtopping, and typical duration of an overtopping event.
Appendix B. Guidelines for Bridge Maintenance and Rehabilitation based on the Secretary of the Interior’s Standards
The Secretary’s Standards with Regard to Repair, Rehabilitation, and Replacement Situations

Adapted from:

The Secretary of the Interior’s Standards for the Treatment of Historic Properties, first codified in 1979 and revised in 1992, have been interpreted and applied largely to buildings rather than engineering structures. In this document, the differences between buildings and structures are recognized and the language of the Standards has been adapted to the special requirements of historic bridges.

1. Every reasonable effort shall be made to continue an historic bridge in useful transportation service. Primary consideration shall be given to rehabilitation of the bridge on site. Only when this option has been fully exhausted shall other alternatives be explored.

2. The original character-defining qualities or elements of a bridge, its site, and its environment should be respected. The removal, concealment, or alteration of any historic material or distinctive engineering or architectural feature should be avoided.

3. All bridges shall be recognized as products of their own time. Alterations that have no historical basis and that seek to create a false historical appearance shall not be undertaken.

4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

5. Distinctive engineering and stylistic features, finishes, and construction techniques or examples of craftsmanship that characterize an historic property shall be preserved.

6. Deteriorated structural members and architectural features shall be retained and repaired, rather than replaced. Where the severity of deterioration requires replacement of a distinctive element, the new element should match the old in design, texture, and other visual qualities and where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

7. Chemical and physical treatments that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the most environmentally sensitive means possible.
8. Significant archaeological and cultural resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

9. New additions, exterior alterations, structural reinforcements, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.
Appendix C. Documents
**Additional Electronic Data**

**Jay Cooke Swing Bridge**

**Historic Data**
- Research

**Local Data**
- N/A

**MnDOT Reports**
- Bridge Jay Cooke CrashDetailReport 2016-04-01

**Photos**
- Jay Cooke Swing Bridge_Historic_Photos
- Jay Cooke Swing Bridge_LHB Before Photos_04-10-2013
- Jay Cooke Swing Bridge_LHB Ribbon Cutting Photos_11-01-2013
- Jay Cooke Swing Bridge_LHB After Photos_11-12-2013
- Report Photos

**Plans**
- jay cooke sp swinging bridge plan 1935
- Jay Cooke Swinging Bridge_Suspension Bridge Details 1940
- Jay Cooke Swinging Bridge_Suspension Bridge Revision 1940
- jay cooke sp swinging bridge plan 1953
- Jay Cooke Swing Bridge_Record Drawings_08-29-2014