Minnesota Department of Transportation (Mn/DOT)
Historic Bridge Management Plan

Bridge Number: 2440

Executive Summary

Bridge 2440 (Third Avenue Bridge) was completed in 1917 to carry Trunk Highway 65 (Third Avenue) over the Mississippi River just above St. Anthony Falls in Minneapolis, Hennepin County. It has an overall structure length on 1,887.8 feet and an out-out width of approximately 82 feet (wider over some piers). It has seven reinforced-concrete main spans, including five open-spandrel, rib-arch spans of 211 feet each, and two open-spandrel, barrel-arch spans of 131 feet each. There are two steel-beam approach spans on the south, and two prestressed I-beam approach spans on the north. The significant design features are the use of the Melan system of steel reinforcing in the main spans and the reverse S-curve of the alignment. The unusual geologic structure of the riverbed necessitated pier placements that resulted in the S-curve. The bridge features Classical Revival detailing, including an ornamental metal and concrete railing added in 1939. A major rehabilitation in 1979-80 resulted in complete deck removal and replacement with reinstallation of the 1939 railing.

With adequate roadway width and load capacity, and FHWA-compliant railings, Bridge 2440 serves as a major thoroughfare over the Mississippi River in downtown Minneapolis. However, deteriorated below deck concrete components in the main arch spans require extensive rehabilitation.

The recommended future use of the bridge is rehabilitation for continued vehicular use on-site. The bridge should be rehabilitated based on the Secretary of the Interior's Standards for Rehabilitation (Standards) [36 CFR Part 67] and Guidelines for Bridge Maintenance and Rehabilitation Based on the Secretary of the Interior's Standards (Guidelines).

Until the Federal Highway Administration (FHWA), State Historic Preservation Office (SHPO) and Minnesota Department of Transportation (Mn/DOT) have signed a historic bridge Programmatic Agreement, all proposed work on this bridge (including maintenance, preservation and stabilization activities) needs to be sent to the Mn/DOT Cultural Resources Unit (CRU) for formal review.

Minnesota Department of Transportation (Mn/DOT)
Historic Bridge Management Plan

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Minnesota Department of Transportation (Mn/DOT)

Historic Bridge Management Plan

I - Project Introduction Bridge Number: 2440

The Minnesota Department of Transportation (Mn/DOT), in cooperation with the Minnesota State Historic Preservation Office (SHPO) and Federal Highway Administration (FHWA), has committed to preserve selected historic bridges in Minnesota that are owned by the state and managed by Mn/DOT. In consultation with SHPO and FHWA, Mn/DOT selected 24 bridges as candidates for long-term preservation. Mn/DOT's objective was to preserve the structural and historic integrity and serviceability of these bridges following the Secretary of the Interior's Standards for the Treatment of Historic Properties (Standards) [36 CFR Part 68], and their adaptation for historic bridges by the Virginia Transportation Research Council as Guidelines for Bridge Maintenance and Rehabilitation Based on the Secretary of the Interior's Standards (Guidelines). The character-defining features of each bridge received special attention. Mn/DOT also hopes to encourage other owners of historic bridges to follow its model for preservation.

The Glossary in the Appendix explains historic preservation terms used in this plan, such as historic integrity and character-defining features, and engineering terms, such as serviceability and deficiency.

Mn/DOT's ongoing efforts to manage historic bridges are intended to comply with Section 106 of the National Historic Preservation Act of 1966, as amended, and Section 4(f) of the U.S. Department of Transportation Act of 1966. This effort began with Robert M. Frame's 1985 study and list of significant and endangered bridges in Minnesota and incorporates Jeffrey A. Hess's 1995 survey and inventory of historic bridges in Minnesota that were built before 1956. That inventory identified the subject bridge as eligible for listing in the National Register of Historic Places. Using the results of the 1995 study, Mn/DOT selected individual historic bridges for long-term preservation.

To achieve its preservation objectives, Mn/DOT retained the consultant team of Mead & Hunt and HNTB to develop management plans for 22 of the 24 selected bridges. The remaining two bridges have been addressed through separate projects.

Mn/DOT requested that the team consider a full range of options for each bridge and present the option that the team judged to be best for long-term preservation with due consideration given to transportation needs and reasonable costs. For example, if two options are explored that both result in an equivalent level of preservation for the bridge (e.g., retention of historically significant features and projected life span), but one option costs significantly more than the other, the less costly option will be recommended. In cases where one option results in a significantly better level of preservation than any other reasonable options but costs more, it will be the recommended action.

Preservation objectives call for conservation of as much of the existing historic fabric of the bridge as possible. However, safety, performance and practical considerations may have dictated replacement of historic fabric, especially of a minor feature, if such action improved the overall life expectancy of a bridge.

Options that were considered for the 22 historic bridges, listed from most to least preferred, are:
1. Rehabilitation for continued vehicular use on-site
2. Rehabilitation for less-demanding use on-site, such as one-way vehicular or pedestrian/bicycle traffic
3. Relocation and rehabilitation for less-demanding use
4. Closure and stabilization following construction of bypass structure
5. Partial reconstruction while preserving substantial historic fabric

A recommended option was selected for each bridge through consultation among the consultant team, Mn/DOT and SHPO. Within the recommended option, the plan identifies stabilization, preservation and maintenance activities. Stabilization activities address immediate needs in order to maintain a bridge's structural and historic integrity and serviceability. Preservation activities are near-term or long-term steps that need to be taken to maintain a bridge's structural and historic integrity and serviceability for the foreseeable future. Preservation activities may include rehabilitation and replacement of components, as

needed, and remedial activities to address a deficiency. Maintenance activities, along with regular structural inspections and anticipated bridge component replacement activities, are routine practices directed toward continued serviceability. Mn/DOT is responsible for final decisions concerning activities recommended in the plan.

Recommendations are intended to be consistent with the Standards. The Standards are ten basic principles created to help preserve the distinctive character of a historic property and its site, while allowing for reasonable change to meet new needs. They recommend repairing, rather than replacing, deteriorated features when possible. The Standards were developed to apply to historic properties of all periods, styles, types, materials, and sizes. They also encompass the property's site and environment as well as attached, adjacent, or related new construction.

Because the Standards cannot be easily applied to historic bridges, the Virginia Transportation Research Council prepared Guidelines, which adapted the Standards to address the special requirements of historic bridges. The Guidelines, published in the Council's 2001 Final Report: A Management Plan for Historic Bridges in Virginia, provide useful direction for undertaking historic bridge preservation and are included in the Appendix to this plan.

The individual bridge management plan draws from several existing data sources including: PONTIS, a bridge management system used by the Mn/DOT Bridge Office to manage its inventory of bridges statewide; the current Mn/DOT Structure Inventory Report and Mn/DOT Bridge Inspection Report for each bridge (the complete reports are included in the Appendix); database and inventory forms resulting from the 1995 statewide historic bridge inventory; past maintenance reports (if available, copy included in the Appendix); and other information provided by Mn/DOT. Because PONTIS uses System International (metric) units, data extracted from PONTIS are displayed in metric units.

The plan is based on information obtained from Mn/DOT in 2005, limited field examinations completed in 2005 for the purpose of making a qualitative assessment of the condition of the bridge, and current bridge design standards. Design exceptions are recommended where appropriate based on safety and traffic volume. The condition of a bridge and applicable design standards may change prior to plan implementation.

This plan includes a maintenance implementation summary at the end. This summary can be provided as a separate, stand-alone document for use by maintenance staff responsible for the bridge.

The plan for this individual bridge is part of a comprehensive effort led by Mn/DOT to manage the statewide population of historic bridges. The products of this management effort include:
1. Minnesota Historic Bridge Management Plan
2. Individual management plans for 22 bridges
3. National Register of Historic Places (NRHP) nomination forms for 2 bridges
4. Minnesota Historical Property Record (MHPR) documentation for 46 bridges

The first product, the Minnesota Historic Bridge Management Plan, is a general statewide management plan for historic bridges in Minnesota that are owned by the state, local governments or private parties. It is intended to be a single-source planning tool that will help bridge owners make management and preservation decisions relating to historic bridges. Approximately 240 historic bridges owned by parties other than Mn/DOT survive in the state as of 2005. Mn/DOT is developing this product to encourage owners of historic bridges to commit to their long-term preservation and offer guidance.

This individual plan represents the second product. The third and fourth products will be prepared as stand-alone documents.

II - Bridge Data — Bridge Number: 2440

Date of Construction 1917

SHPO Inventory Number HE-MPC-0165

Common Name (if any) Third Avenue Bridge

Location

Feature Carried: TH 65 (Third Avenue S.)

Feature Crossed: Mississippi River, railroad, and city streets

Descriptive Location: 0.3 Miles Northeast of Jct. TH 952A

UTM Zone: 15 NAD: 1983

Easting: 4981072 Northing: 479448

USGS Quad Name: Minneapolis South

Town or City: Minneapolis

County: Hennepin

Structure Data

Main Span Type: 111 Concrete Arch - Deck Total Length: 1888

Descriptive Information (or narrative as available)

Superstructure:

Substructure:

Floor/Deck:

Other Features:

Narrative:

The Third Avenue Bridge is the last major reinforced-concrete bridge constructed in the Twin Cities using Melan ribs (Westbrook 1983:18). As explained by Condit (1982:174-175):

"In the Melan system, the reinforcing consisted of a number of steel I-beams bent approximately to the shape of the arch axis and laid in a parallel series near the undersurface of the arch. The resulting structure might be regarded as a combination of the steel-rib arch and the concrete barrel, the concrete serving a protective as much as a structural purpose."

A detailed bridge description was presented in a 1915 article in Engineering News:

"There are five 211-ft. concrete arch spans with piers 20-ft. wide at the springing line and two 131-ft. spans with an intermediate pier 13.79-ft. wide. The two end, or abutment, piers and the pier between the 211-ft. and 134-ft. spans are 30-ft. wide. The approaches are steel girder spans on thin piers. All the river piers are skew to the center line. The 211-ft. spans are on the tangent of the 4? curves and the 134-ft. spans are on the 10? curves.

"Each of the 211-ft. spans is carried by three arched ribs of 36-ft. rise. The outside ribs are 12-ft. wide in the two end spans and 10 ft. in the intermediate spans, while all center ribs are 16 ft. wide. The reinforcing is of the Melan type, consisting of ribs of 4 x 4 x ½-in. angles laced with 3 x 3 x 5/16-in.

angles (at haunches) and 2½ x -in. bars. There are six of these ribs in each 16-ft. arch rib, five in the 12-ft. and four in the 10-ft. ribs. They are braced every 30 ft. with 3 x 3 x 5/16-in. angles.

"The two 134-ft. spans over the east channel are full-barrel arches with Melan ribs of 3 x 3 x 5/16-in. angles laced with 2½ x ¼-in. bars. These are spaced 34 in. center to center and cross-braced every 30 ft. with 3 x 3 x 3/8-in. angles.

"Carrying the floor system from the ribs are transverse walls and girders supporting the floor slab and brackets supporting the sidewalk slabs and parapet-wall beam.

"The piers were constructed in open coffer-dams of Lackawanna steel sheeting, some of the sheeting being used three and four times. The coffer-dam dimensions were as follows: Pier No. 2, 46 x 121-ft.; Nos. 3 to 6, inclusive, 37 x 113-ft.; No. 8, 24 x 101.5-ft.; No. 7 (between the larger and smaller arches), 46 x 131-ft.; east abutment pier, 42 x 110-ft.

"The construction of pier No. 2 is described in what follows and is typical of all the work. After placing the underbracing for the coffer-dam, the sheetpiling was driven. On this pier (also No. 3) it was necessary at the upstream end of the coffer-dam, because of the strong current, to anchor 15-in. I-beam sills to the rock bottom with 2-in. rods to hold the lower end of the sheeting in place.

"The steel sheeting was very tight and was made entirely water-tight by a filling of coal dust and fine cinders. Sandbags were placed around the bottom of the sheeting and then pumping was started. If water came in through fissures in the rock, pumping was stopped and the bottom curse of the concrete, 5 to 6 ft. think, was placed under water. After this had set, the coffer-dam was pumped out and the remainder of the work placed dry. This was done on piers Nos. 2, 6 and 8 and partly on No. 3. Excavating for piers Nos. 6 and 8 was done entirely with orange-peel buckets. The rock in those coffer-dams was cleaned by divers with water jets. The other foundations were place dry, but always in sections, and generally four sections to each coffer-dam.

"After the footings were completed, the piers were concreted in forms which were used over and over again. The first section above the footing was carried above water level, generally leaving a center space considerable below water level to receive the ends of the steel ribs. Finally this part of the pier containing the ribs was cast in one continuous pouring. This amounted to about 7,000 yd. on piers Nos. 3, 4, 5, and 6; 1,266 yd. on Nos. 7 and 9; and 750 yd. on pier No. 8. The record run was 1,000 yd. in 22 hr.

"Pier construction was carried on through the winter except when the temperature was below zero, special precautions being taken against freezing. The forms were entirely inclosed [sic] with tarpaulins and heated with coke stoves. The sand and rock bins were supplied with heaters, and when necessary the cableway buckets for handling concrete were dipped in hot-water tanks on shore. Careful records were kept of temperatures of materials at deposit points. As a result, there was no trouble from frozen concrete.

"Concrete deposited under the water was 1:2:4 mixture. All other concrete in the piers was 1:3:6. It was mixed in batches of about 1yd. (24 ft. of stone, 12 of sand and 4 sacks of cement), two batches to each bucket. The stone was mostly traprock from Dresser Junction, Wis., crushed to a maximum size of 3 ½ in. The sand was a Minnesota product. A timber tower about 50 ft. high, with crib bottom for anchorage, was placed adjacent to the pier, standing on the river bottom. The tower had a hopper near the top, with a chute to the forms. The cableway buckets delivered concrete to the hopper, where a man regulated the discharge to the chute. The towers were picked up bodily by the cableway and moved from place to place.

"The first coffer-dam (pier No. 2) was begun Aug. 2, 1914, and the pier work was finished June 28, 1915. The river froze solid early in December, and the ice left the west channel in March and the east channel in April. Between the dates mention, 27,000 yd. of concrete was laid in pier construction.

"Falsework for the arches was begun Apr. 19, after the ice was out. One set of falsework was designed for the center ribs for the five 211-ft. spans. It was made in seven sections per span, supported by 24-in. 70-lb. I-beams, 28 ft. long on the inside sections and 26 ft. on the two end sections. The I-beams were supported on cribs made of eight 10 x 10-in. posts braced and capped and having open plank bottoms for loading with sandbags to sink them into place. These cribs were placed 28 ft. 11 in. c. to c.

"The falsework to carry the ribs was of 8 x 8-in. posts braced with 2 x 10-in. planks. The bents were capped and furnished with wedges under caps supporting the joists which carried the lagging and the framework for the rib. The lagging and side forms were 1-in. tongued-and-grooved plank, the forms being supported by 4 x 4-in. posts and 4 x 6-in. longitudinal timbers.

"The I-beams rested on 8-in. blocking, so that when the centering had been used for one rib, the entire falsework could be moved into place for the next rib by replacing the blocking with rollers. This falsework was placed in position for the upstream rib first and cribs were place also for the center ribs at the same time. Trouble was experienced in placing them because of high water and because several cribs were located on the roll dams and aprons. The use of the 24-in. I-beams of 26- and 28-ft. length was decided upon in order to utilize the material for the floor spans of the approaches.

"The first arch rib, between piers Nos. 2 and 3, was poured July 8, 1915; 240 yd. of concrete was handled on one cableway in 11 hr. over the center section of the rib. The steel ribs were then riveted at the haunches during the next night and the two end sections poured simultaneously the following day, both cableways being used for 9 hr. to handle 340 yd. of concrete. The last upstream rib was poured Aug. 5. Two days later the centering was struck under the first rib and the falsework rolled over by means of a crab on pier No. 2, with block and tackle hitched to each section. The whole centering for one span was thus moved in one day.

"On Aug. 16 the centering for the next span was moved into position and on Aug. 19 and 21 the center rib was poured – 768 yd. in 24 hr. A record run was made on the center rib finished Aug. 28, when 450 yd. was poured in 7½ hr. with both cableways, or one bucket every 2 min., at a distance of 1,600 ft. from the mixers. The concrete for the ribs is a 1:2:4 mix, using ¼ to 1½-in. stone.

"The program for the rest of the work provided for pouring one rib a week until all 15 were completed. The cribs for the upstream ribs were moved and used again for the third ribs on the downstream side. The centering of the last rib was moved over into place in 2 hr. 40 min.

"In October, 1915, the timber for the first three 211-ft. spans was moved over to the 134-ft. spans in order to finished the arches before cold weather sets in. The transverse walls are being put in, and only the floor proper will remain to be put in next spring. It is expected that the new bridge will be opened to travel not later than June1, 1916.

"The alignment of the bridge and skew of the piers necessitated an elaborate system of location. The triangulation had for its base the center tangent line of the bridge. A series of large triangles was laid out on either side of this base line, regard being given to prominent points as targets for the apices of the triangles.

"A secondary triangulation system was calculated, with proper attention to balancing errors for the location of the instrument platforms. Upon this the intersection points of pier, transverse center lines and base line of platforms were accurately established. These intersections were established with

ordinary transits reading to 30 sec. Seconds were interpolated on the platforms by means of thread intersections; the minute next great and that next smaller to the actual triangle calculated to the nearest second were ready by the instrument man and recorded on the platform. Actual measurements show a maximum error of ¼-in. in 211 ft."

The bridge had ornamental railing installed in 1939, and was remodeled in 1979-1980. The rehabilitation consisted of complete deck removal; new light standards; raising of the spandrel columns; raising of the roadway grade by 5 feet; new approach pads; removal, cleaning and reinstallation of the 1939 railing; and pier repair.

Roadway Function:	Mainline
Ownership:	State
Custodian/Maint. Agency:	State

Contractor Unknown

Designer/Engineer Frederick W. Capellen

Significance Statement

The Third Avenue Bridge is individually eligible under Criterion C for its engineering significance and under Criterion A as a contributing element to the St. Anthony Falls Industrial Historic District.

The Third Avenue Bridge is an example of Melan arch construction. In 1894, Viennese engineer Josef Melan received an American patent for his innovative reinforcing system. It consisted "of a number of steel I-beams bent approximately to the shape of the arch axis and laid in a parallel series near the undersurface of the arch. The resulting structure might be regarded as a combination of the steel-rib arch and the concrete barrel, the concrete serving a protective as much as a structural purpose" (Frame 1988:3). The first American bridge to embody the Melan system reportedly was a small highway span designed by German-born engineer Fritz von Emperger and built by William S. Hewett at Rock Rapids, Iowa, the same year as the patent. Several small but early Melan bridges were built and designed by Hewett in Minneapolis and Saint Paul for the Twin Cities Rapid Transit and survive today as park structures (Frame 1988:3). The Third Avenue Bridge is significant because it reflects the design and engineering of Josef Melan's reinforcing system.

In 1912, Minneapolis planners solicited designs for a concrete-arch bridge from a New York-based company, the Concrete-Steel Engineering Co. The Third Avenue Bridge was to be constructed just above the St. Anthony Falls, originally planned to be to the north of the final location. The proposal, which called for sinking piers into the weak stratum that had caused the collapse of the Eastman Tunnel in the 1860s, was not well received by the public or the power companies (since a collapse of the falls would impact its power capabilities).

Frederick W. Capellen, Minneapolis city engineer, devised a solution by altering the bridge location and leapfrogging the bridge arches over the dangerous limestone breaks (Westbrook 1983:18). As described by A. M. Richter in an Engineering News article from 1915 (pp. 1269-1270):

"While bridge engineer for the city in previous years, Capellen had built six bridges across the Mississippi River and acquired a thorough knowledge of river conditions. He refused to approve the proposed location. The City Council then rejected the plans and instructed him to design a steel bridge that could be constructed without endangering the falls or affecting water-power-rights.

"His proposed location is shown on the plan, and his design included one span of 434 feet to clear entirely the area of the limestone breaks. The trusses were to be of the parabolic through-truss type. In the face of many objections (based mainly on aesthetic considerations), the City Council approved the plans and directed the engineer to proceed with construction."

At this time, however, Mr. Cappelen conceived the idea that by adopting a curved location for the line of the bridge, a design satisfactory to all parties might be worked out. On investigation it was found that at one point the limestone break could be spanned by a concrete arch of 211-foot clear-span. A revised plan for the desired ornamental structure was then presented. This proved satisfactory to all parties and was finally adopted."

Construction began on the Third Avenue Bridge in 1914, and the total project cost was $862,254.00.

Historic Context Reinforced-Concrete Highway Bridges in Minnesota, 1900-1945

National Register Criteria A, C

References

Bridge Inventory Files, Bridge no. 2440, Minnesota Department of Transportation Office; Condit, C.W. " Reinforced Concrete: Buildings and Bridges," in American Building: Materials and Techniques from the First Colonial Settlements to the Present, 2d ed. Chicago and London: University of Chicago Press, 1982; Frame, Robert M. "Reinforced-Concrete Highway Bridges of Minnesota," National Register of Historic Places Multiple Property Documentation Form, Sec. F, 8, 1988, in files of State Historic Preservation Office, Minnesota Historical Society, St. Paul, Minnesota; Richter, A.M. "A 2,223-Ft. Concrete-Arch Bridge Built on Reverse Curve," Engineering News 74, no. 27 (1915):1268-1273, on file at the State Historic Preservation Office, Bridge no. 2440 property file, Minnesota Historical Society, St. Paul, Minnesota; Westbrook, N., ed. A Guide to the Industrial Archaeology of the Twin Cities. 1982, prepared for the Twelfth Annual Conference of the Society for Industrial Archaeology, on file at the State Historic Preservation Office, Bridge no. 2440 property file, Minnesota Historical Society, St. Paul, Minnesota.

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.

Feature 1. Melan-system reinforced-concrete arches. The Melan system, patented in 1894, uses steel I-beams bent approximately to the shape of the arch axis and laid in a parallel series near the undersurface of the arch. The Third Avenue Bridge has seven large Melan arches, including two barrel arches and five three-rib arches, including the example in this photograph. It is considered to be the last major reinforced-concrete bridge constructed in the Twin Cities using the Melan system.

Feature 2. Reverse S-curve alignment. The bridge location lies in an area of the Mississippi River between Nicollet Island and St. Anthony Falls that has an irregular limestone base. The placement of piers and engineering of the spans required considerable engineering analysis to avoid unstable areas. The final plan resulted in a reverse S-curve alignment, which spanned the poor foundation sections and produced an aesthetic form that added to the bridge's overall image as a gateway to downtown Minneapolis.

Feature 3. Classical Revival aesthetic treatment. A gateway structure, the Third Avenue Bridge received a Classical Revival aesthetic treatment. Classical elements include piers and the projecting pedestrian bays, which were restored or reconstructed in the 1979-80 deck-replacement project, and the 1939 ornamental railing.

Feature 4. St. Anthony Falls setting. The Third Avenue Bridge is located just above the falls, as visible in this photograph. It spans elements of the V-shaped, upper-dam system that channeled water into east and west mill ponds on the east and west sides of the falls. The ponds provided water to the waterpower canals for the flour-milling district. The bridge is within the St. Anthony Falls Historic District (National Register of Historic Places).

Inspection Date	9/16/2004	*(Inspection and inventory data in this section was provided for this project by Mn/DOT in May 2005)*
Sufficiency Rating [1]	80.3	
Operating Rating [1,2]	31.75	
Inventory Rating [1,2]	18.14	
Posted Load [1]	0	
Design Load [1]	6	
Deficiency Rating Status [1]	S	

Condition Codes

Deck:	6
Superstructure:	6
Substructure:	5
Channel and Prot.:	6
Culvert:	N

Appraisal Ratings

Struct. Eval.:	5
Deck Geometery:	5
Underclearances:	9
Waterway Adequacy:	N
Appr. Alignment:	8

Smart Flag Data [1] ☐ *(A check indicates data items are listed on the Bridge Inspection Report)*

Fracture Critical [1] N

Last Inspection Date

Waterway Data

Scour Code [1]: A scour evaluation has been completed for Bridge 2440 and determined that it has a low risk of scour failure.

Roadway Data

ADT Total:	18500
Truck ADT Percentage:	2
Bypass Detour Length [2]:	1.6093

Roadway Clearances

Roadway Width [2]:	17.89176
Vert. Clearance Over Rdwy [2]:	99.99
Vert. Clearance Under Rdwy [2]:	7.3152
Lat. Under Clearance Right [2]:	4.572
Lat. Under Clearance Left [2]:	

Geometry Characteristics

Skew:	0
Structure Flared:	0

[1] These items are defined in the glossary in Appendix A. [2] These items are provided in metric units.

Roadway Characteristics

Floodplain Data

Available data indicates that Bridge 2440 will not inundate during a Q100 flood event.

Accident Data

The Mn/DOT Accident Database reports 76 accidents associated with this bridge for the 15-year period of 1990-2004.

43 – Property Damage – No Apparent Injury accidents
17 – Injury – Possible Injury accidents
13 – Injury – Non-incapacitating Injury accidents
2 – Injury –Incapacitating Injury accidents
1 – Fatality accident

Location of Plans

Bridge Office

Existing Conditions

Available information was reviewed prior to assessing the various options for preservation of Bridge 2440 and visiting the bridge site. This information is cited in the Project Introduction section of this plan. A site visit was conducted to qualitatively establish the following:

1. General condition of structural members
2. Conformation to available extant plans
3. Roadway geometry and alignment
4. Bridge geometry and clearances

Serviceability Observations:

Bridge 2440 has a roadway width of 58.7 feet which is adequate for a four-lane structure with an ADT of 15,500 (2004).

The load ratings (based on a 1980 analysis) are adequate with an inventory rating of HS20 and an operating rating of HS35.

The inventory report identifies the vehicular railings as FHWA-compliant.

The posted speed limit on the bridge is 30 mph.

Structural Condition Observations:

Deck and Sidewalk Observations

The inspection report states that 43 strip-seal expansion joints were replaced or installed in the deck in 2003. The report also states that they require continual repair.

Checker plates over the sidewalk expansion joints were not extended to the end of the joint.

There is cracking in the deck on the west shoulder of the bridge. Localized ponding of water was visible in isolated locations on the east sidewalk during the site visit.

The top surface of the west sidewalk has popouts and minor cracking.

The soffit of the deck on the north approach spans has cracks with efflorescence.

Superstructure Observations

The prestressed concrete beams supporting the north approach spans appear in good condition.

The weathering steel girders on the south approach spans are staining the substructure units, with the heaviest staining under the fascias.

Substructure Observations

Vines cover the west face of the north abutment. A large portion of the breastwall over the building attached to the north abutment has been painted gray, most likely to cover graffiti.

Without access to the river spans (below the deck) during our site visit it is impossible to estimate the amount of deterioration in the arch spans. Photos taken from the river banks indicate that spandrel column deterioration may be widespread. The inspection report notes that multiple spandrel columns near mid-span of the arches have sheared at the top just below the deck. In addition, pier elements below the spring line of the arches generally appear deteriorated.

The west and east faces of the south river pier have been repaired and appear to be in better condition than adjacent pier elements.

The inspection report indicates that an underwater inspection of the foundations found that several piers have exposed and/or undermined foundations.

There is a substantial amount of graffiti on the inner walls of the pier on the north bank of the river. There are also several vertical cracks over the access openings. Shotcrete repairs on the west face of the pier have failed. During the site visit, water was visibly draining out of the pier in the spalled region.

The inspection report notes that bearings for the south approach spans have been damaged due to movement of the south abutment northward, locking the beams against the first arch pier.

The top of the concrete retaining wall supporting the embankment on the southwest corner of the bridge (along West River Road Parkway) appears to be tilting north.

Railing Observations
Metal railing components on the vehicular railing are rusting near “sharp” edges of components and staining the concrete below.

The west vehicular railing at the north expansion joint has a vertical offset over the paving block.

The metal pedestrian railing appears to be in fair to good condition.

A significant spall (2’ x 3’) with exposed rebar is present on the east face of the east vehicular railing 25 feet north of a missing roadway light.

In several locations on the east and west vehicular railings the expansion joints and internal joints show significant distress. There is a 2”+ vertical offset of the metal railing on the northern end of the east vehicular railing. The offset must have been present prior to the expansion joint work, because concrete elements do not have a similar offset.

One segment of the east vehicular railing has rotated (top to the east) along the north approach. A horizontal offset of 1-2” is noted at the height of the metal railing.

Non-Structural Observations:

Roadway Approach Observations

The north approach roadway pavement is bituminous and has extensive cracking. The pavement is in poor condition next to the north expansion joint.

The northwest approach sidewalk near the modern stairs has settled and has been repaired with bituminous patches.

The bituminous approach for the south end of the bridge has also cracked extensively and appears heavily worn with minor rutting.

Lighting Observations

On the bridge, modern roadway lighting is attached to the top of the vehicular railings. The lighting components are not compatible with the historic features of the bridge. Roadway lights are missing in several locations. Wires for the lights are exposed at these locations. In other locations, anchorage details appear corroded.

Substandard electrical wiring is displayed on the south end of the east vehicular railing. A gray cable exits a partially closed junction box and is attached to the metal vehicular railing with zip ties until it reaches the next light, roughly 20 to 25 feet away.

Miscellaneous Observations

Weeds are growing in the joints between concrete components

The 30-mph speed limit sign on the west pedestrian railing is attached with only a clamp and wire. Likewise, a small white sign is attached to a concrete post at the south end of the west pedestrian railing with 2 metal bands . The metal bands have stretched, leaving the sign tilting west.

Many utilities are carried by the bridge, with most under the deck just inside the outer arch ribs.

Date of Site Visit

October 5, 2005

Figure 1. Looking north at the bridge from the south approach. The vehicle barriers are not symmetrical on the south end. A low profile barrier is provided on the east and a taller barrier is provided on the west. The approach roadway pavement is deteriorated and has extensive cracking.

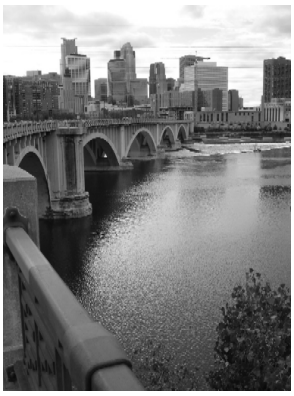

Figure 2. Looking south along the west side of the bridge from the west sidewalk. Stained, deteriorated concrete on the pier below the overlook is visible.

Figure 3. Looking north at the north end of the east sidewalk. Localized ponding adjacent to a reconstructed sidewalk expansion joint is visible. Staining on the vehicle barrier from the metal railing components and anchorages is typical.

Figure 4. Looking north at the east vehicular railing on the north approach. Settlement has led to shifting of the barrier both vertically and laterally.

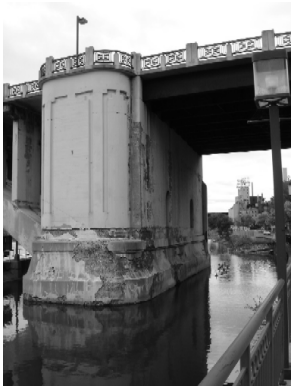

Figure 5. Looking east at the southernmost river pier. Deteriorated concrete is visible in many locations, primarily near the water line. The weathering steel beams supporting the south approach spans are also visible.

Figure 6. Looking northwest at the north abutment. A recently installed stairway of modern design to access the west sidewalk on the bridge is visible just to left of the building attached to the abutment.

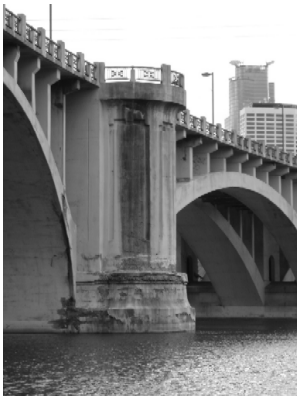

Figure 7. Staining and concrete spalls are visible on the north face of the west end of the pier between the barrel and rib arches.

Figure 8. Looking east at the northernmost river pier. Shotcrete repairs to the pier have failed. Large spalled regions, with water draining out of the deteriorated area, were visible during the site visit.

Overall Recommendations

With a sufficiency rating just over 80, Bridge 2440 is in fair condition.

Bridge 2440 has characteristics (adequate roadway width, load capacity, and FHWA compliant railings) that will permit it to function as part of the trunk highway system for the 20-year planning window of this management plan. Extensive rehabilitation will be necessary to reach the end of the planning window without significant loss of historic fabric. Other less desirable preservation options were not considered.

Recommended Future Use:

Rehabilitation for continued vehicular use on-site.

Recommended Stabilization Activities:

1. Repair the exposed and undermined regions of the foundations for the river piers utilizing standard Mn/DOT procedures.

2. Inspect and test the drainage features on the bridge to confirm they are properly conveying water. Identify the source of water leaking out of the north river-bank pier to prevent additional deterioration.

3. The shearing of spandrel column tops and the continual repair of expansion joints indicate that the bridge is moving in unanticipated directions. The movement patterns are likely complicated by the reverse curve alignment and the translation of the south approach spans north. Develop and implement a plan to monitor and collect the geometry of the bridge's superstructure and substructure as it moves with changes in temperature for a period of at least two years.

Recommended Preservation Activities:

1. Conduct a concrete material testing program. Through the use of sounding, mini-cores, and chloride sampling, determine the condition and chloride contamination of concrete components. Test original and reconstructed components. Delineate the location and size of deteriorated regions for future rehabilitation efforts.

2. Assemble a three-dimensional structural analysis model of the bridge. Utilizing the field-collected temperature movement data, calibrate the boundary conditions of the analysis model.

3. Load rate the bridge utilizing the calibrated three-dimensional analysis model, which should be based on the condition (section loss) of the concrete components and their material properties.

4. Seal cracks in the deck and sidewalks utilizing standard Mn/DOT procedures.

5. Clean and paint the metal components of the vehicular railings. Utilize Mn/DOT standard procedures and match the existing paint color on the pedestrian railing.

6. Replace missing roadway lights and properly wire fixtures. If feasible, paint the roadway light standards to match the color of the metal railing components. When the vehicular railing requires replacement, install a roadway lighting system with more historically appropriate light standards and fixtures. Select the new lighting in consultation with CRU and the Bridge Office.

7. Remove the bituminous approach panels. Contingent upon the location of utilities, excavate the approach backfill behind the abutments down to the level of the footings. To minimize future movements and settlements, rebuild the approach fills utilizing select granular material placed in layers with

geotextile fabric to reinforce and contain the backfill. Install new concrete approach panels.

8. Remove graffiti on the substructure units utilizing standard Mn/DOT procedures.

9. Remove the vegetation growing in the various joints on the bridge.

10. Based on the results of the concrete testing program, identify appropriate repairs for deteriorated regions. Repair deteriorated concrete components subsequent to any electrochemical chloride extraction rehabilitation. Conduct concrete repair using standard Mn/DOT repair methods and in compliance with National Park Service Preservation Bulletin 15 – Preservation of Historic Concrete. Consult with Mn/DOT's Office of Bridges and Structures before making final determination of the means and methods of concrete repairs. Apply Mn/DOT special surface finish to exposed concrete subsequent to the repairs. Apply anti-graffiti coating to the areas of the concrete susceptible to graffiti.

11. Attach signage to the bridge utilizing base plates and inserts in the sidewalk concrete. Take care not to damage pedestrian railing components.

Projected Inspections to Monitor Bridge Condition

Routine:

1. Routine annual inspections are recommended. Perform recommended maintenance activities identified as part of the inspection within a 12-month period.

2. Conduct in-depth, arm's length inspections on an interval not to exceed 4 years. Conduct maintenance and repair activities identified as part of the in-depth inspection within 24 months.

Special:

Conduct underwater inspections at 5-year intervals. Implement resulting recommended maintenance or repair efforts within a 24-month period.

Recommended Maintenance Activities

1. Flush the deck, railings, sidewalks, and fascia components with water annually.

2. Seal cracks in the deck and sidewalks on a 5-year cycle utilizing standard Mn/DOT procedures.

3. Spot paint metal railing components on a 5-year cycle utilizing standard Mn/DOT procedures.

4. Repaint metal railing components on a 40-year cycle utilizing standard Mn/DOT procedures.

5. Confirm that all strip-seal glands are in good working during routine inspections. Replace damaged glands utilizing standard Mn/DOT procedures.

VI - Projected Agency Costs — Bridge Number: 2440

Qualifier Statement

The opinions of probable costs provided below are in 2006 dollars. The costs were developed without benefit of preliminary plans and are based on the above identified tasks using engineering judgment and/or gross estimates of quantities and historic unit prices and are intended to provide a programming level of estimated costs. Refinement of the probable costs is recommended once preliminary plans have been developed. The estimated preservation costs include a 20% contingency and 5% mobilization allowance of the preservation activities, excluding soft costs (see Appendix D, Cost Detail, Item 5: Other). Actual costs may vary significantly from those opinions of cost provided herein.

For itemized activity listing and costs, see Appendix D.

Summarized Costs

Maintenance costs: $45,300 annualized

Stabilization activities
Superstructure: $0
Substructure: $400,000
Railing: $0
Deck: $40,000
Other: $75,000
Total: $515,000

Preservation activities
Superstructure: $2,000,000
Substructure: $8,000,000
Railing: $250,000
Deck: $180,000
Other: $1,667,000
Contingency: $2,608,000
Total: $14,705,000

Applicable Funding

The majority of funding for the rehabilitation and reuse of historic bridges in the state of Minnesota is available through federal funding programs. The legislation authorizing the various federal funding programs is the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).

SAFETEA-LU programs include the Transportation Enhancement (TE) Fund, the Surface Transportation Program (STP), the Highway Bridge Replacement and Rehabilitation Program (HBRRP), National Highway System Funds, and the National Historic Covered-Bridge Preservation Program. A program not covered by SAFETEA-LU, the Save America's Treasures Program, is also available for rehabilitation and reuse of historic bridges that have national significance.

Other than the Save America's Treasures Program, the federal funds listed above are passed through Mn/DOT for purposes of funding eligible activities. While the criteria for determining eligible activities are determined largely by federal guidelines, Mn/DOT has more discretion in determining eligible activities under the TE fund.

The federal funding programs typically provide 80-percent federal funding and require a 20-percent state/local match. Typical eligible activities associated with these funds include replacement or rehabilitation of structurally deficient or functionally obsolete bridges for vehicular and, non-vehicular uses, painting, seismic retrofit, and preventive maintenance. If a historic bridge is relocated, the

estimated cost of demolition can be applied to its rehabilitation at a new site. It should be noted that the federal funds available for non-vehicular uses are limited to this estimated cost of demolition. However, TE funds can be applied to bridge rehabilitation for non-vehicular use.

State or federal bridge bond funds are available for eligible rehabilitation or reconstruction work on any publicly owned bridge or culvert longer than 20 feet. State bridge bond funds are available for up to 100 percent of the "abutment to abutment" cost for bridges or culverts longer than 10 feet that meet eligibility criteria.

A more in-depth discussion regarding funding can be found in the Minnesota Historic Bridge Management Plan.

Special Funding Note

N/A

Appendix A. Glossary of Preservation and Engineering Terms

Glossary

Appraisal ratings – Five National Bridge Inventory (NBI) inspection 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 it 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 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); element ratings range from 1 (poor) to 3 (good). In rating a bridge's condition, Mn/DOT 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.

Deck geometry – One of five NBI inspection 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 Average Daily Traffic (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 standard bridge design practices 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 metric tons according to the 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 demands. A bridge that is posted for load restrictions may not be adequate to accommodate present or expected truck traffic.

Fracture critical – Classification of a bridge having primary superstructure or substructure components subject to tension stresses and which are non-redundant. A failure of one of these components could lead to collapse of a span or the bridge. Tension members of truss bridges are often fracture critical. The associated inspection date is a numerical code that includes frequency of inspection in months, followed by year, and month of last inspection.

Functionally obsolete (FO) – The FHWA classification of a bridge that cannot 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.

Historic fabric – The material in a bridge that was part of original construction or a subsequent alteration within the historic period (e.g., more than 50 years old) that has significance in and of itself. Historic fabric includes both character-defining and minor features. Minor features have less importance and may be replaced more readily.

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.

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

Inventory rating – The load level a bridge can safely carry for an indefinite amount of time expressed in metric 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.

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

Minnesota Historical Property Record (MHPR) – A documentary record of an important architectural, engineering, or industrial site, maintained by the MHS 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 vehicle type, expressed in metric tons or by the rating factor described in design load (see above).

Posted load – Legal live-load capacity for a bridge usually associated with the operating or inventory ratings as determined by a state transportation agency. A bridge posted for load restrictions may be inadequate for 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. Mn/DOT's *Bridge Preservation, Improvement and Replacement Guidelines* (BPIRG) 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, retard 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. However, Mn/DOT's *Bridge Preservation, Improvement and Replacement Guidelines* (BPIRG) 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.*

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 bridge's vulnerability to scour (see above), ranging from 0 (scour critical, failed, and closed to traffic) to 9 (foundations are on dry land well above flood water elevations). This code can also be expressed as U (unknown), N (bridge is not over a waterway), or T (bridge is over tidal waters and considered low risk).

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

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.

Stabilization – The act or process of sustaining a bridge by means of making minor repairs until a more permanent repair or rehabilitation can be completed.

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 structurally deficient bridge is restricted to lightweight vehicles; requires immediate rehabilitation to remain open to traffic; or requires maintenance, rehabilitation, or replacement.

Structural evaluation – Condition 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.

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. Mn/DOT may use the rating as a basis for establishing eligibility and priority for replacement or rehabilitation. Typically, bridges rated between 50 and 80 are eligible for rehabilitation and those rated 50 and below are eligible for replacement.

Under-clearances – One of five NBI inspection 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 standard bridge design practices 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.

Waterway adequacy – One of five NBI inspection ratings. This rating appraises a bridge's waterway opening and passage of flow 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

Guidelines for Bridge Maintenance and Rehabilitation Based on the Secretary of the Interior's Standards

1. 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.
2. 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.
3. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
4. Distinctive engineering and stylistic features, finishes, and construction techniques or examples of craftsmanship that characterize an historic property shall be preserved.
5. 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.
6. 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.
7. 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.
8. 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.
9. 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.

Source: Ann Miller, et al. *A Management Plan for Historic Bridges in Virginia*. Charlottesville, Va.: Virginia Transportation Research Council, 2001.

Appendix C. Current Mn/DOT Structure Inventory Report

Current Mn/DOT Bridge Inspection Report

Past Maintenance Reports (if available)

Other Reports (if available)

Mn/DOT STRUCTURE INVENTORY REPORT

Bridge ID: **2440** **TH 65 (3RD AVE S) OVER MISS R, BN RR& CITY STS** Date: 01/04/2006

* IDENTIFICATION *

Agency Br. No. (6206) (RS 1) - 1
District 05 **Maint. Area** 5A
County 27 HENNEPIN (53)
City 2585 MINNEAPOLIS
Township
Placecode 43000
Desc. Loc. 0.3 MI NE OF JCT TH 952A
Sect. 23 **Tnsp.** 029N **Range** 24W
Lat. 44d 59m 00s **UTM-Y** 4981147.56
Long. 93d 15m 13s **UTM-X** 479988.03
Toll Bridge (Road) NO
Custodian STATE
Owner STATE
Inspector METRO DISTRICT
BMU Agreement No
Year Built 1917 **Yr Fed Rehab**
Year Remod. 1980
Temp.
Skew 0 **Plan Avail.** CENTRAL

* STRUCTURE DATA *

Service On HWY;PED
Service Under HWY;RR;STREAM

MN Main Span 112 CONCR/ARCH
MN MSpn Det Def OPEN SPANDREL ARCH

MN Appr. Span 401 STLCNT/BM SPAN
MN ASpn Det Def

Culvert Type
Barrel Length

No. Main Spans 7 **No. Appr.Span** 4
Total Spans 11 **NBI Len. (?)** YES

Main Span Length 236.7 ft
Structure Length 1,887.8 ft

Abut. Mat'l. CONCRETE
Abut. Fnd. Type FTNG/PILE
Pier Mat'l. CONCRETE
Pier Fnd. Type SPRD/ROCK

Deck Width 81.6 ft
Deck Material CIP CONC
Wear Surf. Type LO SLP CON
Wear Surf. Inst. Yr. 1980
Wr. Crs/Fill Depth 0.17 ft
Deck Membrane NONE
Deck Rebars EPOXY REBAR
Deck Rebars Inst. Yr. 1980
Structure Area 154,044 sq ft
Roadway Area 110,815 sq ft
Swk Width L/R 8.0 ft 8.0 ft
Curb Ht. L/R 0.3 ft 0.3 ft
Rail L/R/FHWA 23 23 YES
Ped. Fencing
Hist. Significance NATL REGISTER
Bird Nests (?) NO

* ROADWAY DATA *

Route System (Fed) MNTH
Mn. Route System MNTH
Route Number 65
Roadway Name TH 65 (3RD AVE S)
Roadway Function MAINLINE
Roadway Type 2 WAY TRAF
Control Section 2710
BDG. Reference Point 001+00.716
Date Opened to Traffic 10-01-1980
Detour Length 1 mi
Lanes 4 ON BRIDGE (1)
ADT 15,500 **HCADT** 310
ADT Year 2004
Functional Class URB/MINOR ART
Nat'l. Hwy. System NOT NHS
STRAHNET NOT STRAHNET
Truck Net NOT TRUCKNET
Fed. Lands Hwy. N/A
OnBaseNet NOT BASENET

* ROADWAY CLEARANCES *

	If Divided	NB-EB	SB-WB
Rdwy. Wid. Rd 1/Rd 2		58.7 ft	
Vrt. Clr. Ovr. Rd 1/Rd 2			
Max Vert Clr Rd 1/ Rd 2			
Horz U/Clr - Rd 1/Rd 2		327.8 ft	
Lat UndClr Left/Right			
RR UndClr Vert/Lat		27.0 ft	12.0 ft
Appr. Surface Width		64.0 ft	
Median Width			

* ROADWAY TIS DATA *

	TIS 1st KEY	TIS 2nd KEY
Route System	03	
Route Number	00000065	
High End	944	
Low End	944	
Direction	N	
Reference Pt.	001+00.716	
Interchg. Elem.		

* MISC. BRIDGE DATA *

Struct. Flared
Parallel Struct. NONE
Field Conn. ID BOLTED
Cantilever ID
Permit Code A 1
Permit Code B 1
Permit Code C 1
Permit Code Fut.

* BRIDGE SIGNS *

Posted Load NO SIGNS
Traffic NO SIGNS
Horizontal NO SIGNS
Vertical NO SIGNS

Def. Status ADEQ **Suff. Rating** 80.3

* WATERWAY DATA *

Drng. Area
Wtrwy. Opening 99,999 sq ft
Navigation Control NO PERM REQD
Nav. Vert./Hrz Clr.
Nav. Vert. Lift Clr.
MN Scour Code L-STBL;LOW RISK
Scour Eval. Year 1993

* INSPECTION DATA *

Inspection Date 05-19-2005 (YGIH)
Inspection Frequency 24
Inspector METRO

Condition Codes		Appraisal Ratings	
Deck	6	**Struct. Eval.**	5
Superstruct.	6	**Deck Geometry**	5
Substruct.	5	**Underclearances**	9
Chan. & Prot.	6	**Waterway Adeq'cy**	N
Culvert	N	**Appr. Alignment**	8

Other Inspection Codes

Open, Posted, Clsd.	A	**Rail Rating**	1
Pier Protection		**Appr. Guardrail**	0
Scour Critical	8	**Appr. Trans.**	0
Deck Pct. Unsnd.	2 %	**Appr. Term.**	N

In Depth Inspections

	Y/N	Freq.	Last Insp.
Frac. Critical			
Pinned Asbly.			
Underwater	Y	60	02/2004
Spec. Feat.			

* PAINT DATA *

Year Painted 1980 **Pct.Unsound**
Total Painted Area
Primer Type 3309 UNPAINTED
Finish Type 3309 UNPAINTED

* CAPACITY RATINGS *

Design Load HS20MOD
MN
Operating Rating HS 35.0
Inventory Rating HS 20.0
Posting Veh: Semi: Dbl:
Rtg Date 04-01-1980

* IMPROVEMENT DATA *

Prop. Work REHAB DET
Work By CONTRACT
Prop. Structure BRIDGE
Length 1,886.5 ft **Width** 49.2 ft
Appr. Rdwy. Work
Bridge Cost 8,155,000
Approach Cost 100,000
Project Cost 1,500,000
Data - Year/Method 2003 COMPUTER

Mn/DOT STRUCTURE INVENTORY REPORT

Bridge ID: **2440** **TH 65 (3RD AVE S) OVER MISS R, BN RR& CITY STS** Date: 01/04/2006

* IDENTIFICATION *

Agency Br. No. (6206) (RS 2) - A
District 05 **Maint. Area** 5A
County 27 HENNEPIN (53)
City 2585 MINNEAPOLIS
Township
Placecode 43000
Desc. Loc. 0.3 MI NE OF JCT TH 952A
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Deck Rebars EPOXY REBAR
Deck Rebars Inst. Yr. 1980
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Curb Ht. L/R 0.3 ft 0.3 ft
Rail L/R/FHWA 23 23 YES
Ped. Fencing
Hist. Significance NATL REGISTER
Bird Nests (?) NO

* ROADWAY DATA *

Route System (Fed) CITY
Mn. Route System MUN
Route Number 699
Roadway Name MAIN ST SE
Roadway Function MAINLINE
Roadway Type 2 WAY TRAF
Control Section
BDG. Reference Point
Date Opened to Traffic 10-01-1980
Detour Length 1 mi
Lanes 4 UNDER BRIDGE (A)
ADT 2,100 **HCADT**
ADT Year 1995
Functional Class URB COLL
Nat'l. Hwy. System NOT NHS
STRAHNET NOT STRAHNET
Truck Net NOT TRUCKNET
Fed. Lands Hwy. N/A
OnBaseNet NOT BASENET

* ROADWAY CLEARANCES *

	If Divided	NB-EB	SB-WB
Rdwy. Wid. Rd 1/Rd 2		50.0 ft	
Vrt. Clr. Ovr. Rd 1/Rd 2		24.0 ft	
Max Vert Clr Rd 1/ Rd 2		24.0 ft	
Horz U/Clr - Rd 1/Rd 2		327.8 ft	
Lat UndClr Left/Right			15.0 ft
RR UndClr Vert/Lat			12.0 ft
Appr. Surface Width		53.0 ft	
Median Width			

* ROADWAY TIS DATA *

	TIS 1st KEY	TIS 2nd KEY
Route System	10	
Route Number	25850699	
High End	944	
Low End	944	
Direction		
Reference Pt.	000+00.210	
Interchg. Elem.		

* MISC. BRIDGE DATA *

Struct. Flared
Parallel Struct. NONE
Field Conn. ID BOLTED
Cantilever ID
Permit Code A 1
Permit Code B 1
Permit Code C 1
Permit Code Fut.

* BRIDGE SIGNS *

Posted Load NO SIGNS
Traffic NO SIGNS
Horizontal NO SIGNS
Vertical NO SIGNS

Def. Status ADEQ **Suff. Rating** 80.3

* WATERWAY DATA *

Drng. Area
Wtrwy. Opening 99,999 sq ft
Navigation Control NO PERM REQD
Nav. Vert./Hrz Clr.
Nav. Vert. Lift Clr.
MN Scour Code L-STBL;LOW RISK
Scour Eval. Year 1993

* INSPECTION DATA *

Inspection Date 05-19-2005 (YGIH)
Inspection Frequency 24
Inspector METRO

Condition Codes		Appraisal Ratings	
Deck	6	**Struct. Eval.**	5
Superstruct.	6	**Deck Geometry**	5
Substruct.	5	**Underclearances**	9
Chan. & Prot.	6	**Waterway Adeq'cy**	N
Culvert	N	**Appr. Alignment**	8

Other Inspection Codes

Open, Posted, Clsd.	A	**Rail Rating**	1
Pier Protection		**Appr. Guardrail**	0
Scour Critical	8	**Appr. Trans.**	0
Deck Pct. Unsnd.	2 %	**Appr. Term.**	N

In Depth Inspections

	Y/N	Freq.	Last Insp.
Frac. Critical			
Pinned Asbly.			
Underwater	Y	60	02/2004
Spec. Feat.			

* PAINT DATA *

Year Painted 1980 **Pct.Unsound**
Total Painted Area
Primer Type 3309 UNPAINTED
Finish Type 3309 UNPAINTED

* CAPACITY RATINGS *

Design Load HS20MOD
MN
Operating Rating HS 35.0
Inventory Rating HS 20.0
Posting Veh: Semi: Dbl:
Rtg Date 04-01-1980

* IMPROVEMENT DATA *

Prop. Work REHAB DET
Work By CONTRACT
Prop. Structure BRIDGE
Length 1,886.5 ft **Width** 49.2 ft
Appr. Rdwy. Work
Bridge Cost 8,155,000
Approach Cost 100,000
Project Cost 1,500,000
Data - Year/Method 2003 COMPUTER

Mn/DOT STRUCTURE INVENTORY REPORT

Bridge ID: **2440** **TH 65 (3RD AVE S) OVER MISS R, BN RR& CITY STS** Date: 01/04/2006

* IDENTIFICATION *

Agency Br. No. (6206) (RS 3) - B
District 05 **Maint. Area** 5A
County 27 HENNEPIN (53)
City 2585 MINNEAPOLIS
Township
Placecode 43000
Desc. Loc. 0.3 MI NE OF JCT TH 952A
Sect. 23 **Tnsp.** 029N **Range** 24W
Lat. 44d 59m 00s **UTM-Y** 4981147.56
Long. 93d 15m 13s **UTM-X** 479988.03
Toll Bridge (Road) NO
Custodian STATE
Owner STATE
Inspector METRO DISTRICT
BMU Agreement No
Year Built 1917 **Yr Fed Rehab**
Year Remod. 1980
Temp.
Skew 0 **Plan Avail.** CENTRAL

* STRUCTURE DATA *

Service On HWY;PED
Service Under HWY;RR;STREAM

MN Main Span 112 CONCR/ARCH
MN MSpn Det Def OPEN SPANDREL ARCH

MN Appr. Span 401 STLCNT/BM SPAN
MN ASpn Det Def

Culvert Type
Barrel Length

No. Main Spans 7 **No. Appr.Span** 4
Total Spans 11 **NBI Len. (?)** YES

Main Span Length 236.7 ft
Structure Length 1,887.8 ft

Abut. Mat'l. CONCRETE
Abut. Fnd. Type FTNG/PILE
Pier Mat'l. CONCRETE
Pier Fnd. Type SPRD/ROCK

Deck Width 81.6 ft
Deck Material CIP CONC
Wear Surf. Type LO SLP CON
Wear Surf. Inst. Yr. 1980
Wr. Crs/Fill Depth 0.17 ft
Deck Membrane NONE
Deck Rebars EPOXY REBAR
Deck Rebars Inst. Yr. 1980
Structure Area 154,044 sq ft
Roadway Area 110,815 sq ft
Swk Width L/R 8.0 ft 8.0 ft
Curb Ht. L/R 0.3 ft 0.3 ft
Rail L/R/FHWA 23 23 YES
Ped. Fencing
Hist. Significance NATL REGISTER
Bird Nests (?) NO

* ROADWAY DATA *

Route System (Fed) CITY
Mn. Route System MUN
Route Number
Roadway Name WEST RIVER PKWY
Roadway Function MAINLINE
Roadway Type 2 WAY TRAF

Control Section
BDG. Reference Point
Date Opened to Traffic 01-01-1993

Detour Length 1 mi
Lanes 2 UNDER BRIDGE (B)

ADT 500 **HCADT**
ADT Year 1993
Functional Class URB COLL

Nat'l. Hwy. System NOT NHS
STRAHNET NOT STRAHNET
Truck Net NOT TRUCKNET
Fed. Lands Hwy. N/A
OnBaseNet NOT BASENET

* ROADWAY CLEARANCES *

	If Divided	NB-EB	SB-WB
Rdwy. Wid. Rd 1/Rd 2		14.0 ft	14.0 ft
Vrt. Clr. Ovr. Rd 1/Rd 2		30.0 ft	30.0 ft
Max Vert Clr Rd 1/ Rd 2		30.0 ft	30.0 ft
Horz U/Clr - Rd 1/Rd 2		24.0 ft	24.0 ft
Lat UndClr Left/Right		2.0 ft	12.0 ft
RR UndClr Vert/Lat			12.0 ft
Appr. Surface Width		38.0 ft	
Median Width		10.0 ft	

* ROADWAY TIS DATA *

	TIS 1st KEY	TIS 2nd KEY
Route System		
Route Number		
High End		
Low End		
Direction		
Reference Pt.		
Interchg. Elem.		

* MISC. BRIDGE DATA *

Struct. Flared
Parallel Struct. NONE
Field Conn. ID BOLTED
Cantilever ID
Permit Code A 1
Permit Code B 1
Permit Code C 1
Permit Code Fut.

* BRIDGE SIGNS *

Posted Load NO SIGNS
Traffic NO SIGNS
Horizontal NO SIGNS
Vertical NO SIGNS

Def. Status ADEQ **Suff. Rating** 80.3

* WATERWAY DATA *

Drng. Area
Wtrwy. Opening 99,999 sq ft
Navigation Control NO PERM REQD
Nav. Vert./Hrz Clr.
Nav. Vert. Lift Clr.
MN Scour Code L-STBL;LOW RISK
Scour Eval. Year 1993

* INSPECTION DATA *

Inspection Date 05-19-2005 (YGIH)
Inspection Frequency 24
Inspector METRO

Condition Codes		Appraisal Ratings	
Deck	6	**Struct. Eval.**	5
Superstruct.	6	**Deck Geometry**	5
Substruct.	5	**Underclearances**	9
Chan. & Prot.	6	**Waterway Adeq'cy**	N
Culvert	N	**Appr. Alignment**	8

Other Inspection Codes

Open, Posted, Clsd.	A	**Rail Rating**	1
Pier Protection		**Appr. Guardrail**	0
Scour Critical	8	**Appr. Trans.**	0
Deck Pct. Unsnd.	2 %	**Appr. Term.**	N

In Depth Inspections

	Y/N	Freq.	Last Insp.
Frac. Critical			
Pinned Asbly.			
Underwater	Y	60	02/2004
Spec. Feat.			

* PAINT DATA *

Year Painted 1980 **Pct.Unsound**
Total Painted Area
Primer Type 3309 UNPAINTED
Finish Type 3309 UNPAINTED

* CAPACITY RATINGS *

Design Load HS20MOD
MN
Operating Rating HS 35.0
Inventory Rating HS 20.0
Posting Veh: Semi: Dbl:
Rtg Date 04-01-1980

* IMPROVEMENT DATA *

Prop. Work REHAB DET
Work By CONTRACT
Prop. Structure BRIDGE
Length 1,886.5 ft **Width** 49.2 ft
Appr. Rdwy. Work
Bridge Cost 8,155,000
Approach Cost 100,000
Project Cost 1,500,000
Data - Year/Method 2003 COMPUTER

Crew Number: 7627
Inspector: METRO

Mn/DOT BRIDGE INSPECTION REPORT

BRIDGE 2440 TH 65 (3RD AVE S) OVER MISS R, BN RR& CITY STS INSP. DATE: 05-19-2005

County: HENNEPIN
City: MINNEAPOLIS
Township:
Section: 23 Township: 029N Range: 24W
Span Type: CONCR / ARCH
NBI Deck: 6 Super: 6 Sub: 5 Chan: 6 Culv: N

Location: 0.3 MI NE OF JCT TH 952A
Route: MNTH 65 Ref. Pt.: 001+00.716
Control Section: 2710 Maint. Area: 5A
Local Agency Bridge Nbr: 6206

Length: 1,887.8 ft
Deck Width: 81.6 ft
Rdwy. Area / Pct. Unsnd: 110,814 sq ft 2 %
Paint Area / Pct. Unsnd:

Open, Posted, Closed: OPEN

Appraisal Ratings - Approach: 8 Waterway: N
MN Scour Code: L-STBL;LOW RISK Def. Stat: ADEQ Suff. Rate: 80.3

Load Posting: NO SIGNS Traffic Signs: NO SIGNS Horiz. Cntl. Signs: NO SIGNS Vert. Cntl. Signs:

STRUCTURE UNIT: 0

ELEM NBR	ELEMENT NAME	STR UNIT	ENV	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4	QTY CS 5
377	CONC DECK-EPOXY&LSCO	0	2	05-19-2005	30,937 SF	0	30,937	0	0	0
				09-16-2004	30,937 SF	0	30,937	0	0	0
	Notes: [2003] Type 1 & 3 deck repair, seal deck cracks. Two approach spans at each end. [1980] New deck (7" deep) with 2" low slump overlay (only top mat has epoxy rebar).									
378	CONC SLAB-EPOXY&LSCO	0	2	05-19-2005	123,107 SF	0	123,107	0	0	0
				09-16-2004	123,107 SF	0	123,107	0	0	0
	Notes: 7 arch spans. [2003] Type 1 & 3 deck repair, seal deck cracks. [1980] New slab (9" deep) with 2" low slump overlay (only top mat has epoxy rebar). [83/2000] Extensive conc patches along poured jts (continual repairs required). [2004] 2% deck unsound.									
300	STRIP SEAL JOINT	0	2	05-19-2005	2,982 LF	2,982	0	0	N/A	N/A
				09-16-2004	2,982 LF	2,982	0	0	N/A	N/A
	Notes: 300) [2003] 43 Strip seal joints replaced at abutments, arch piers & spans.									
301	POURED DECK JOINT	0	2	05-19-2005	496 LF	496	0	0	N/A	N/A
				09-16-2004	496 LF	496	0	0	N/A	N/A
	Notes: [2003] Pourable joints replaced at sidewalk & pier bent 2 (north approach).									
320	CONC APPR SLAB-BITOL	0	2	05-19-2005	2 EA	0	2	0	0	N/A
				09-16-2004	2 EA	0	2	0	0	N/A
	Notes: Both approaches are bituminous. [97/2004] Each approach has longitudinal cracking, with 100 SF bituminous patches along abutment end block.									
333	RAILING - OTHER	0	2	05-19-2005	4,091 LF	1,546	2,045	500	N/A	N/A
				09-16-2004	4,091 LF	1,546	2,045	500	N/A	N/A
	Notes: [2003] Special surface finish on railing. [1980] Roadway rail code 23 (J-rail with line pipe). [1983/88] Rail base has moderate scale & 600 LF of vertical cracks. [1997] Metal pipe has extensive corrosion, 2 sections on SE approach radius are bent (traffic impact).									
334	METAL RAIL-COATED	0	2	05-19-2005	4,086 LF	2,043	2,043	0	0	0
				09-16-2004	4,086 LF	2,043	2,043	0	0	0
	Notes: Pedestrian ornamental metal rail with concrete posts - metal railings are original (refurbished in 1980). [1997] Metal portions have minor corrosion.									
106	UNPNTD STEEL GIRDER	0	2	05-19-2005	1,856 LF	1,556	300	0	0	N/A
				09-16-2004	1,856 LF	1,556	300	0	0	N/A
	Notes: [1980] S approach spans reconstructed (36"-56" deep welded beams - unpainted weathering steel). [1991/99] Beam ends at N end have no room for expansion (contacting parapet on arch pier 1). As a result, fixed bearings at S abut have been damaged (anchor bolts bent southward).									
109	P/S CONCRETE GIRDER	0	2	05-19-2005	1,828 LF	1,828	0	0	0	N/A
				09-16-2004	1,828 LF	1,828	0	0	0	N/A
	Notes: [1980] North approach spans reconstructed (54" deep pre-stressed beams).									
144	CONCRETE ARCH	0	2	05-19-2005	3,812 LF	0	3,312	500	0	N/A
				09-16-2004	3,812 LF	0	3,312	500	0	N/A

Mn/DOT BRIDGE INSPECTION REPORT

BRIDGE 2440 TH 65 (3RD AVE S) OVER MISS R, BN RR& CITY STS INSP. DATE: 05-19-2005

STRUCTURE UNIT: 0

ELEM NBR	ELEMENT NAME	STR UNIT	ENV	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4	QTY CS 5
	Notes: Spans 1 - 5 have 3 arch ribs, spans 6 & 7 have a solid arch barrel (all are original 1917 construction). [1980] Repair patches along arch edges. [1994/98] Arch barrels have minor longitudinal cracking, arch ribs have map cracking & spalling along edges.									
385	CONC SPANDREL COLUMN	0	2	05-19-2005	230 EA	0	115	115	0	N/A
				09-16-2004	230 EA	0	115	115	0	N/A
	Notes: Spans 1 - 5 have spandrel columns, spans 6 & 7 have spandrel walls. [1980] Upper portions reconstructed (lower portions original 1917 construction). [94/2000] Shear cracks have developed in column stubs near center of arch spans (some have cracked through & shifted up to 1/4"), several spandel columns have cracking & delam. Spandrel walls have cracking at horiz'l exp jts (some minor spalling), some areas of cracking, delam, and spalls.									
380	SECONDARY ELEMENTS	0	1	05-19-2005	1 EA	1	0	0	0	N/A
				09-16-2004	1 EA	1	0	0	0	N/A
	Notes: 380) Stairway at west side north end.									
310	ELASTOMERIC BEARING	0	2	05-19-2005	48 EA	47	1	0	N/A	N/A
				09-16-2004	48 EA	47	1	0	N/A	N/A
	Notes: Bent 1, south face arch pier 1, north face arch pier 8 & bent 2.									
313	FIXED BEARING	0	2	05-19-2005	20 EA	10	10	0	N/A	N/A
				09-16-2004	20 EA	10	10	0	N/A	N/A
	Notes: Fixed bearings at abutments. The anchor bolts bent southward at the south abutment.									
205	CONCRETE COLUMN	0	2	05-19-2005	9 EA	9	0	0	0	N/A
				09-16-2004	9 EA	9	0	0	0	N/A
	Notes: [1980] Bents 1 & 2 on approach spans.									
210	CONCRETE PIER WALL	0	2	05-19-2005	720 LF	0	520	200	0	N/A
				09-16-2004	720 LF	0	520	200	0	N/A
	Notes: Element includes arch piers (both the footings & upper portions) - with the exception of far upper sections, all are orig 1917 construction. [1984] Arch pier footings have severe spalling (up to 8" deep) below deck drains. [1996] Underwater insp found severe scale along waterline (all piers), with "voids" at upstream ends of piers 1 & 5. [1992/97] Pier 8: upper portion of pier wall (curved E end) has a severe vert crack (3/4" wide) severe spalling (4" deep). The curved W end has similar cracking, but not as severe. [2003] Good condition pier footings, inspected by construction inspector Tom Waks during low water.									
215	CONCRETE ABUTMENT	0	2	05-19-2005	168 LF	168	0	0	0	N/A
				09-16-2004	168 LF	168	0	0	0	N/A
	Notes: < none >									
234	CONCRETE CAP	0	2	05-19-2005	6,320 LF	2,860	3,160	300	0	N/A
				09-16-2004	6,320 LF	2,860	3,160	300	0	N/A
	Notes: Element includes the spandrel caps (spans #1 - 5),& appr span pier caps. [1980] All spandrel caps & pier caps reconstructed. [1994] Some spandrel caps (mainly near center of arch spans) have severe shear cracks at column connections. [1997] Spandrel caps located below poured deck jts have rust stains, horizl cracking & delam, some areas of severe spall.									
387	CONCRETE WINGWALL	0	2	05-19-2005	4 EA	2	1	1	0	N/A
				09-16-2004	4 EA	2	1	1	0	N/A
	Notes: < none >									
358	CONC DECK CRACKING	0	2	05-19-2005	1 EA	0	0	1	0	N/A
				09-16-2004	1 EA	0	0	1	0	N/A
	Notes: 358) [1983/84] Overlay (arch spans) has extensive map cracking, with 2,500 LF of longitudinal cracks. South approach spans have some transverse cracking.									
359	CONC DECK UNDERSIDE	0	2	05-19-2005	1 EA	0	0	0	1	0
				09-16-2004	1 EA	0	0	0	1	0

Crew Number: 7627
Inspector: METRO

Mn/DOT BRIDGE INSPECTION REPORT

BRIDGE 2440 **TH 65 (3RD AVE S) OVER MISS R, BN RR& CITY STS** **INSP. DATE: 05-19-2005**

STRUCTURE UNIT: 0

ELEM NBR	ELEMENT NAME	STR UNIT	ENV	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4	QTY CS 5
	Notes: Arch spans. [2003] Conc repaired at old pourable jt locations. [97/2000] Underside of slab has some longtdl leaching cracks (rust stains & delam). Slab is deteriorating along spandrel caps (below poured jts) water sat, delam, spalling & exp rebar. S appr spans. [1991] Underside of deck has 200 LF trans leaching cracks. [1999] 30 SF delam along cracks.									
360	SETTLEMENT	0	2	05-19-2005	1 EA	0	1	0	N/A	N/A
				09-16-2004	1 EA	0	1	0	N/A	N/A
	Notes: [1992/98] NE retaining wall (along N abut appr) is tipping outward 2-1/2" (lower portion of the wall is original 1917 construction) - should be monitored (offset along sidewalk & railing above). The NW retaining wall is also tipped out slightly (1/2" gap offset at coping).									
361	SCOUR	0	2	05-19-2005	1 EA	0	1	0	N/A	N/A
				09-16-2004	1 EA	0	1	0	N/A	N/A
	Notes: [1996] Underwater inspection found portions of footings exposed on arch piers 2, 5, 6, & 7. [2004] Underwater Inspection by "Ayres Associates" found at pier #1 undermining of 18" to 24" deep by 6" high by 12 FT long along W side near the upstream nose & undermining of 18" to 24" deep by 6" to 24" high by 17.5 FT long along W side near the downstream nose. Pier #3 was only inspected at the downstream nose. High water velocity prohibited safe access to the upstream nose. No significant changes to structure condition. Pier #5 has undermining 3 FT high by 6 FT long by 18" deep on W side near the upstream nose. Upstream nose has undermining 6" by 6" by 18" deep. Pier #6 has numerous small undermines at the upstream nose. Pier #7 has undermining 2 FT deep by 30 FT long along it's side.									
964	CRITICAL FINDING	0	2	05-19-2005	1 EA	1	0	N/A	N/A	N/A
				09-16-2004	1 EA	1	0	N/A	N/A	N/A
	Notes: 964) Do not delete this critical finding smart flag.									
981	SIGNING	0	2	05-19-2005	1 EA	1	0	0	N/A	N/A
				09-16-2004	1 EA	1	0	0	N/A	N/A
	Notes: < none >									
983	PLOWSTRAPS	0	2	05-19-2005	1 EA	1	0	0	N/A	N/A
				09-16-2004	1 EA	1	0	0	N/A	N/A
	Notes: < none >									
984	DRAINAGE	0	2	05-19-2005	1 EA	0	1	0	N/A	N/A
				09-16-2004	1 EA	0	1	0	N/A	N/A
	Notes: 984) Deck drains directly into river. [1984] Deck drains are eroding pier footings. [1998] Pier 8: water ponding inside hollow pier wall (west end).									
985	SLOPES	0	2	05-19-2005	1 EA	0	1	0	N/A	N/A
				09-16-2004	1 EA	0	1	0	N/A	N/A
	Notes: 985) [1998] Pier 8: bituminous slopes along pier base are undermined by erosion.									
986	CURB & SIDEWALK	0	2	05-19-2005	1 EA	0	1	0	N/A	N/A
				09-16-2004	1 EA	0	1	0	N/A	N/A
	Notes: 986) [92/1998] Sidewalks have 780 LF of cracks, with patching & spalling along the poured deck joints (arch spans).									
988	MISCELLANEOUS	0	2	05-19-2005	1 EA	0	0	1	N/A	N/A
				09-16-2004	1 EA	0	0	1	N/A	N/A
	Notes: Catwalk, 36" watermain & phone conduits running below bridge. [1998] Utility supports have corrosion below poured deck jts. Deck lighting mounted on ext railings. [1990] Light pole blown into river during high wind - severe section loss found on light pole bases (under anchor bolt covers). 3 poles were replaced - the anchor bolt covers were removed, and light pole bases repainted. [2000] Graffiti "artists" are accessing catwalk from the arched openings on pier #8 (facing SE Main St.) - there is extensive graffiti throughout the arch superstructure.									

General Notes: Bridge #2440 Year 2005
See previous year notes. These had to be deleted in order to enter new report for 2005. No new notes for 2005.
2005 Inspector: Palmer/Bergmann

Mn/DOT BRIDGE INSPECTION REPORT

BRIDGE 2440 **TH 65 (3RD AVE S) OVER MISS R, BN RR& CITY STS** **INSP. DATE: 05-19-2005**

STRUCTURE UNIT: 0

ELEM NBR	ELEMENT NAME	STR UNIT	ENV	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4	QTY CS 5

Inspector's Signature

Reviewer's Signature / Date

Appendix D. Cost Detail

Mn/DOT Historic Bridge Management Plan

BRIDGE No. 2440 MAINTENANCE/STABILIZATION/PRESERVATION (M/S/P) Activity Listing and Costs

Notes:

1 Costs are presented in 2006 dollars.

2 Unit costs are presented to the dollar or cent depending on the precision of the specific value.

STABILIZATION COST SUMMARY

	ITEM	COSTS
1.00	SUPERSTRUCTURE	$ -
2.00	SUBSTRUCTURE	$ 400,000
3.00	RAILINGS	$ -
4.00	DECK	$ 40,000
5.00	OTHER	$ 75,000
		$ 515,000

1.00 SUPERSTRUCTURE

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL
1.05					$ -	$ -
1.10					$ -	$ -
1.15					$ -	$ -
1.20					$ -	$ -
1.25					$ -	$ -
1.30					$ -	$ -
1.35					$ -	$ -
1.40					$ -	$ -
1.45					$ -	$ -
1.50					$ -	$ -
						$ -

2.00 SUBSTRUCTURE

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL
2.05	Repair exposed and undermined foundations	50	1	LS	$ 400,000	$ 400,000
2.10					$ -	$ -
2.15					$ -	$ -
2.20					$ -	$ -
2.25					$ -	$ -
2.30					$ -	$ -
2.35					$ -	$ -
2.40					$ -	$ -
2.45					$ -	$ -
2.50					$ -	$ -
						$ 400,000

3.00 RAILINGS

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL
3.05					$ -	$ -
3.10					$ -	$ -
3.15					$ -	$ -
3.20					$ -	$ -
3.25					$ -	$ -
3.30					$ -	$ -
3.35					$ -	$ -
3.40					$ -	$ -
3.45					$ -	$ -
3.50					$ -	$ -
						$ -

4.00 DECK

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL
4.05	Inspect and test drainage features	N.A.	1	LS	$ 40,000.00	$ 40,000
4.10					$ -	$ -
4.15					$ -	$ -
4.20					$ -	$ -
4.25					$ -	$ -
4.30					$ -	$ -
4.35					$ -	$ -
4.40					$ -	$ -
4.45					$ -	$ -
4.50					$ -	$ -
						$ 40,000

5.00 OTHER

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL
5.05	Superstructure and Substructure Survey	N.A.	1	LS	$ 75,000.00	$ 75,000
5.10					$ -	$ -
5.15					$ -	$ -
5.20					$ -	$ -
5.25					$ -	$ -
5.30					$ -	$ -
5.35					$ -	$ -
						$ 75,000

Mn/DOT Historic Bridge Management Plan

BRIDGE No. 2440 MAINTENANCE/STABILIZATION/PRESERVATION (M/S/P) Activity Listing and Costs

Notes:

1 Costs are presented in 2006 dollars.

2 Unit costs are presented to the dollar or cent depending on the precision of the specific value.

PRESERVATION COST SUMMARY

	ITEM	COSTS
1.00	SUPERSTRUCTURE	$ 2,000,000
2.00	SUBSTRUCTURE	$ 8,000,000
3.00	RAILINGS	$ 250,000
4.00	DECK	$ 180,000
5.00	OTHER	$ 1,667,000
		$ 12,097,000
	Mobilization @ 5% and 20% Contingency:	$ 2,608,000
		$ 14,705,000

1.00 SUPERSTRUCTURE

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL
1.05	Concrete repairs	50	1	LS	$ 2,000,000	$ 2,000,000
1.10					$ -	$ -
1.15					$ -	$ -
1.20					$ -	$ -
1.25					$ -	$ -
1.30					$ -	$ -
1.35					$ -	$ -
1.40					$ -	$ -
1.45					$ -	$ -
1.50					$ -	$ -
1.55					$ -	$ -
1.60					$ -	$ -
1.65					$ -	$ -
						$ 2,000,000

2.00 SUBSTRUCTURE

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL
2.05	Remove and rework abutment backfills	75	1	LS	$ 1,000,000	$ 1,000,000
2.10	Concrete repairs	50	1	LS	$ 7,000,000	$ 7,000,000
2.15					$ -	$ -
2.20					$ -	$ -
2.25					$ -	$ -
2.30					$ -	$ -
2.35					$ -	$ -
2.40					$ -	$ -
2.45					$ -	$ -
2.50					$ -	$ -
						$ 8,000,000

3.00 RAILINGS

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL
3.05	Paint railings	40	1	LS	$ 250,000	$ 250,000
3.10					$ -	$ -
3.15					$ -	$ -
3.20					$ -	$ -
3.25					$ -	$ -
3.30					$ -	$ -
3.35					$ -	$ -
3.40					$ -	$ -
3.45					$ -	$ -
3.50					$ -	$ -
3.55					$ -	$ -
3.60					$ -	$ -
3.65					$ -	$ -
3.70					$ -	$ -
						$ 250,000

4.00 DECK

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL
4.05	Seal cracks in the deck and sidewalks	5	1	LS	$ 100,000	$ 100,000
4.10	Install concrete approach panels	75	1	LS	$ 75,000	$ 75,000
4.15	Remove vegetation	5	1	LS	$ 5,000	$ 5,000
4.20					$ -	$ -
4.25					$ -	$ -
4.30					$ -	$ -
4.35					$ -	$ -
4.40					$ -	$ -
4.45					$ -	$ -
4.50					$ -	$ -
						$ 180,000

5.00 OTHER

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL
5.05	Concrete testing and mapping program	N.A.	1	LS	$ 250,000	$ 250,000
5.10	3D model and load rating	N.A.	1	LS	$ 125,000	$ 125,000
5.15	Replace missing light fixtures	N.A.	1	LS	$ 40,000	$ 40,000
5.20	Repair signage	N.A.	1	LS	$ 2,000	$ 2,000
5.25	Field work for rehabilitation project	N.A.	1	LS	$ 250,000	$ 250,000
5.30	Contract document preparation	N.A.	1	LS	$ 1,000,000	$ 1,000,000
5.35					$ -	$ -
						$ 1,667,000

Mn/DOT Historic Bridge Management Plan

BRIDGE No. 2440 MAINTENANCE/STABILIZATION/PRESERVATION (M/S/P) Activity Listing and Costs

Notes:

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MAINTENANCE COST SUMMARY

	ITEM	ANNUAL COSTS
1.00	SUPERSTRUCTURE	$ 3,000
2.00	SUBSTRUCTURE	$ 5,000
3.00	RAILINGS	$ 14,300
4.00	DECK	$ 6,000
5.00	OTHER	$ 17,000
		$ 45,300

1.00 SUPERSTRUCTURE

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL	ANNUAL COST
1.05	Flush fascia beams and arches w water	1	1	LS	$ 3,000	$ 3,000	$ 3,000
1.10					$ -	$ -	$ -
1.15					$ -	$ -	$ -
1.20					$ -	$ -	$ -
1.25					$ -	$ -	$ -
1.30					$ -	$ -	$ -
1.35					$ -	$ -	$ -
1.40					$ -	$ -	$ -
1.45					$ -	$ -	$ -
1.50					$ -	$ -	$ -
						$ 3,000	$ 3,000

2.00 SUBSTRUCTURE

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL	ANNUAL COST
2.05	Flush fascia faces of piers w water	1	1	LS	$ 5,000	$ 5,000	$ 5,000
2.10					$ -	$ -	$ -
2.15					$ -	$ -	$ -
2.20					$ -	$ -	$ -
2.25					$ -	$ -	$ -
2.30					$ -	$ -	$ -
2.35					$ -	$ -	$ -
2.40					$ -	$ -	$ -
2.45					$ -	$ -	$ -
2.50					$ -	$ -	$ -
						$ 5,000	$ 5,000

3.00 RAILINGS

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL	ANNUAL COST
3.05	Flush railings with water	1	1	LS	$ 3,000	$ 3,000	$ 3,000
3.10	Spot paint railings	5	1	LS	$ 25,000	$ 25,000	$ 5,000
3.15	Repaint railings	40	1	LS	$ 250,000	$ 250,000	$ 6,250
3.20					$ -	$ -	$ -
3.25					$ -	$ -	$ -
3.30					$ -	$ -	$ -
3.35					$ -	$ -	$ -
3.40					$ -	$ -	$ -
3.45					$ -	$ -	$ -
3.50					$ -	$ -	$ -
						$ 278,000	$ 14,250

4.00 DECK

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL	ANNUAL COST
4.05	Flush deck and sidewalks with water	1	1	LS	$ 6,000	$ 6,000	$ 6,000
4.10					$ -	$ -	$ -
4.15					$ -	$ -	$ -
4.20					$ -	$ -	$ -
4.25					$ -	$ -	$ -
4.30					$ -	$ -	$ -
4.35					$ -	$ -	$ -
4.40					$ -	$ -	$ -
4.45					$ -	$ -	$ -
4.50					$ -	$ -	$ -
						$ 6,000	$ 6,000

5.00 OTHER

REF. No.	ITEM / DESCRIPTION OF WORK	EXPECTED LIFE CYCLE - YEARS	ITEM QTY	QTY UNIT	UNIT COST	ITEM TOTAL	ANNUAL COST
5.05	Routine inspection	1	1	LS	$ 5,000	$ 5,000	$ 5,000
5.10	Arm's length inspection	4	1	LS	$ 32,000	$ 32,000	$ 8,000
5.15	Underwater inspection	5	1	LS	$ 20,000	$ 20,000	$ 4,000
5.20					$ -	$ -	$ -
5.25					$ -	$ -	$ -
5.30					$ -	$ -	$ -
5.35					$ -	$ -	$ -
						$ 57,000	$ 17,000