Supplemental Phase II Evaluation
for Mn/DOT Bridge 9100/Bridge 54-009-95.8
on Trunk Highway 1/Trunk Highway 54
Oslo, Marshall County, Minnesota
Walshville Township, Walsh County, North Dakota

Mn/DOT S.P. No. 4509-05
NDDOT Project No. SCB-6-054 (008) 009

Authorized and Sponsored by:
Minnesota Department of Transportation
and
North Dakota Department of Transportation

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Management Summary

The Minnesota Department of Transportation (Mn/DOT) and North Dakota Department of Transportation (NDDOT) propose to replace or rehabilitate Bridge 9100/Bridge 54-009-95.8 (NDDOT Bridge 54-3) and improve Trunk Highway 1/Trunk Highway 54 (TH1/TH54) in Oslo, Minnesota, and Walshville Township, North Dakota. Bridge 9100/Bridge 54-009-95.8 carries TH1/TH54 across the Red River of the North (Red River), which demarcates the state line between Minnesota and North Dakota.

In 2010 Mn/DOT retained Mead & Hunt, Inc. (Mead & Hunt) to complete a Phase I Architecture/History survey (Phase I Survey) for the Bridge 9100/Bridge 54-009-95.8 reconstruction project and a Phase II Evaluation of properties that may be eligible for inclusion in the National Register of Historic Places (National Register). The Phase I Survey identified 23 historic age properties within the APE: 19 properties located in Minnesota, one property located in North Dakota, and three properties that span both states. Of the 23 historic age properties, three were identified for Phase II Evaluation: Bridge 9100 (MA-OCS-023), the Soo Line Swing Bridge (MA-OSC-004), and the Soo Line Railroad corridor (MA-RRD-001). As a result of the Phase II Evaluation, the Soo Line railroad corridor and the Soo Line Swing Bridge were recommended eligible for listing in the National Register. Bridge 9100/Bridge 54-009-95.8 was recommended not eligible for listing in the National Register.

The Minnesota State Historic Preservation Office (MnSHPO) concurred with the recommendations presented in the June 2010 report entitled *Phase I Architecture/History Survey and Phase II Evaluation for the Trunk Highway 1/Trunk Highway 54, Oslo, Marshall County, Minnesota, and Walshville Township, Walsh County, North Dakota* (hereinafter referred to as the "June 2010 Report").

The North Dakota State Historic Preservation Office (NDSHPO) concurred with the eligibility recommendations presented in the June 2010 Report for the Soo Line Railroad Corridor and the Soo Line Swing Bridge. However, the NDSHPO expressed a concern that the evaluation of Bridge 9100/Bridge 54-009-95.8 had not adequately taken into account North Dakota historic contexts related to National Register *Criterion A: History* and *Criterion C: Engineering*. The NDSHPO also indicated that it regards the bridge as eligible under *Criterion C*.

Because the National Register eligibility of a property is often based on the significance of the property within a historic context at the state level, it is possible that a property that spans the border between two states may be found to be eligible from the perspective of one state but not the other. Therefore, in response to the NDSHPO's comments, Mn/DOT requested that Mead & Hunt conduct an additional evaluation of Bridge 9100/Bridge 54-009-95.8 from the perspective of North Dakota historic contexts related to National Register *Criteria A* and *C*.

This report provides the results of the supplemental evaluation of Bridge 9100/Bridge 54-009-95.8. As a result of the supplemental evaluation, Bridge 9100/Bridge 54-009-95.8 is recommended as eligible for listing in the National Register under *Criterion C: Engineering* at the statewide level of significance in North Dakota.

Mead & Hunt's project team consisted of Principal Investigator Heather Goodson and architectural historians Bob Frame and Katherine Haun.

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Appendices

1.0 Introduction

In 2010 Mn/DOT contracted with Mead & Hunt to conduct a Phase I Architecture/History Survey and Phase II Evaluation for the TH 1/TH 54 project in Oslo, Marshall County, Minnesota, and Walshville Township, Walsh County, North Dakota, and prepare a report (hereinafter referred to as the "June 2010 Report") to present the findings.

In its comments on the June 2010 Report, the NDSHPO did not concur with the recommendation of not eligible for Bridge 9100/Bridge 54-009-95.8. It expressed a concern that the evaluation had not adequately taken into account North Dakota historic contexts related to National Register *Criteria A* and *C*.

Because the National Register eligibility of a property is often based on the significance of the property within a historic context at the state level, it is possible that a property that spans the border between two states may be found to be eligible from the perspective of one state but not the other. For example, a type of historic property that is widespread in one state may be quite rare in another state, and the significance of a particular example of this property type will vary depending on this context. Therefore, in response to the NDSHPO's comments, Mn/DOT requested that Mead & Hunt conduct additional evaluation of Bridge 9100/Bridge 54-009-95.8 from the perspective of North Dakota historic contexts related to National Register *Criteria A* and *C*.

The following discussion and evaluation of Bridge 9100/Bridge 54-009-95.8 supplements the June 2010 Report, within the framework of North Dakota historic contexts related to National Register *Criteria A* and *C*.

2.0 Methods and Research Design

2.1 Objective

The objective of the Supplemental Phase II evaluation is to review and evaluate Bridge 9100/Bridge 54-009-95.8 within the framework of North Dakota historic contexts related to National Register *Criterion A* and *C*.

2.2 Methods

Bridge 9100/Bridge 54-009-95.8 was identified as a historic-age property in the June 2010 Report. The property was reviewed to assess integrity and significance within the context of Oslo, Marshall County, Minnesota, and Walsh County, North Dakota. This report supplements the assessment of the property's integrity and significance as discussed in the June 2010 Report from the perspective of North Dakota bridge history. No site visits or research trips were conducted to complete this supplemental evaluation.

3.0 Literature Search

3.1 Research

In addition to the sources reviewed to prepare the June 2010 Report, additional primary and secondary sources were reviewed to gain an understanding of the historic context for North Dakota regarding Bridge 9100/Bridge 54-009-95.8. These sources provided information about the Red River Valley's settlement and development patterns, transportation improvements, and information on the history of through truss bridges in North Dakota. In addition to the repositories consulted for the June 2010 Report, additional repositories consulted to obtain historical information include:

- Borchert Map Library, University of Minnesota, Minneapolis, Minnesota
- Hennepin County Library, Minneapolis, Minnesota

Additional primary and secondary sources consulted was limited to:

- Historic highway maps and aerial images
- Walsh County histories
- Histories of the Red River Valley
- United States Census data

Research specifically pertaining to individual truss bridges in North Dakota was limited to the results of a data summary from the North Dakota Bridge Inspection Database regarding extant truss bridges, the 2010 book entitled *Bridges Across North Dakota*, the report entitled *Historic Bridges in North Dakota: 2004 Revision* prepared by Renewable Technologies, Inc. (RTI), and bridge files maintained by the North Dakota Department of Transportation (NDDOT) for extant Warren through truss bridges.[1] Personal communications with Jeani Borchert and Valerie Bluemle of the NDDOT Cultural Resources, Environmental, and Transportation Services Division (NDDOT ETS); Gary L. Doerr of the NDDOT's Bridge Division; and Susan Quinnell, Review and Compliance Coordinator for the NDSHPO, also informed the supplemental evaluation.

3.2 Previously surveyed or previously evaluated properties within the APE

Mead & Hunt identified previously surveyed and previously evaluated properties within the APE in the June 2010 Report. No additional previously surveyed or previously evaluated properties were identified within the APE as a result of the Supplemental Phase II Evaluation.

[1] Data summary provided from Jeani Borchert, North Dakota Department of Transportation, to Dennis Gimmestad, Mn/DOT, and subsequently provided through personal communication to author, 10 November 2010; North Dakota Department of Transportation Cultural Resources Section, *Bridges Across North Dakota* (Bismarck, N.D.: North Dakota Department of Transportation, 2010); Renewable Technologies, Inc., *Historic Bridges in North Dakota: 2004 Revision (*Prepared for the North Dakota Department of Transportation, November 2004).

3.3 Historic context

In the June 2010 Report, Mead & Hunt developed a historic context for Bridge 9100/Bridge 54-009-95.8 that focused on three important themes: settlement, agriculture, and transportation. This context information was used to inform the Supplemental Phase II evaluation and is incorporated herein by reference, rather than being restated in this report. Additional information pertaining to the perspective of the North Dakota historic bridge context is incorporated in the evaluation of National Register significance in Section 4.0.

4.0 Results

This report supplements the evaluation of Bridge 9100/Bridge 54-009-95.8 in the June 2010 Report with additional information and evaluation within the framework of North Dakota historic contexts. These contexts are related to National Register eligibility under *Criterion A: History* and *Criterion C: Engineering*.

The bridge was not evaluated under *Criterion B* since no evidence was found to suggest the structure is associated with a significant person. Likewise, the bridge was not evaluated under *Criterion D* since no evidence was found to suggest the structure would yield, or have the potential to yield, important information to contribute to our understanding of human history or prehistory.

4.1 *Criterion A*

A bridge may be eligible for National Register listing under *Criterion A* for its association with important historic events. Under *Criterion A*, Bridge 9100/Bridge 54-009-95.8 was evaluated under the following historic themes identified in the report *Historic Bridges in North Dakota: 2004 Revision*:[2]

- Exploration/settlement
- Politics/government
- Transportation

In addition to the themes identified above, other historic themes such as industry, conservation, commerce, and community planning and development under which bridges might be eligible for National Register listing were considered. However, initial research did not indicate a sufficient association between Bridge 9100/Bridge 54-009-95.8 and the historic themes to warrant evaluation of significance.

4.1.1 Exploration/settlement

Settlement of the Red River Valley, the fertile farm areas located in northeastern North Dakota, was predominantly located along the Red River and its tributaries until the arrival of the Great Northern (GN) and Northern Pacific (NP) railways in North Dakota in the 1890s.[3] The Minneapolis St. Paul & Sault Ste. Marie Railroad (MSP&SSM; popularly known as the Soo Line) Wheat Line was extended into northwestern Minnesota and northeastern North Dakota in the early twentieth century and further opened Walsh County to settlement. Across the border in Minnesota, the Soo Line formally platted the village of Oslo in 1905 and built a swing bridge to cross the Red River there. During the initial years of rail presence in Oslo, three grain elevators were constructed in addition to a passenger and freight depot. This provided farmers in eastern Walsh County with a connection to markets for their products.

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[2] Renewable Technologies, Inc., 50-51.

[3] Richard Prosser, *Rails to the North Star* (Minneapolis, Minn.: University of Minnesota Press, 2007), 221, 224, 226-7; C.F. Cooper & Co., *History of the Red River Valley, Past and Present: Including an Account of the Counties, Cities, Towns, and Villages of the Valley from the Time of their First Settlement and Formation* (Chicago: Herald Print Office, 1909), 201. The NP Railway reached Fargo in 1871; the GN Railway arrived in Grand Forks in 1879; the Chicago Milwaukee St. Paul and Pacific arrived in Fargo in 1884; the Soo Line arrived in southern North Dakota in 1886. However, the spread of the railroad into the Red River Valley did not occur until the 1890s.

Walsh County's population stood at 20,288 in 1900 and remained fairly steady at approximately 20,000 people through the 1940s. However, by the 1950s the county's population began a steady decrease to approximately 11,000 by 2009.[4]

Bridge 9100/Bridge 54-009-95.8 was constructed in 1959, well after the period of exploration and settlement of this area. Therefore, no evidence indicates this 1959 bridge has a significant association with the exploration and settlement of Walsh County as a whole or the area immediately adjacent to its crossing of the Red River.

4.1.2 Politics/government

Historic Bridges of North Dakota: 2004 Revision indicates that bridges may be eligible for National Register listing in the area of politics/government if they represent important patterns in the methods counties awarded contracts or are associated with standardized state designs. Additionally, bridges associated with important federal programs such as New Deal programs or early development of the Interstate Highway system may also be eligible for National Register listing in this area of significance.

Under a cooperative agreement, the North Dakota State Highway Department and the Minnesota Department of Highways (MHD) began planning for the construction of the subject bridge in 1956.[5] The MHD led the efforts of coordinating the design and construction project. This cooperative process, with each state taking turns at the lead, is common to managing projects crossing a common border between the two states.[6] The MHD, with concurrence from the North Dakota State Highway Department, contracted with the Walter Butler Company of Saint Paul, Minnesota, to design Bridge 9100/Bridge 54-009-95.8 and with Schultz and Lindsay Construction Company of Fargo, North Dakota, for the bridge's construction.[7] A review of the "Bridge 9100, 1956-59 correspondence files" available at the Mn/DOT Bridge Office in Oakdale, Minnesota, contains no evidence that Walsh County was involved in awarding contracts related to construction of the subject bridge, since it was a state-sponsored project. Therefore, Bridge 9100/Bridge 54-009-95.8 does not represent important patterns in the methods counties used to award contracts.

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[4] U.S. Department of the Census. "North Dakota Population of Counties by Decennial Census: 1900 to 1990," www.census.gov/population/cencounts/nd190090.txt (accessed 4 February 2011).

[5] A.O. Torgerson, "Letter to M.P. Wynkoop, North Dakota State Highway Department, Re: Oslo Bridge," 17 July 1956. Available at Minnesota Department of Transportation, Bridge 9100, 1956-57 files, Minnesota Department of Transportation bridge office, Oakdale, Minn.

[6] Vince Bovitz, "Letter to Richard Youngblood, *Northwest News*, concerning the bridge at Oslo, Minnesota," 14 August 1958. Available at Minnesota Department of Transportation, Bridge 9100, 1956-57 files, Minnesota Department of Transportation bridge office, Oakdale, Minn.

[7] Vince Bovitz, "Letter to Richard Youngblood, *Northwest News*, concerning the bridge at Oslo, Minnesota," 14 August 1958.

Furthermore, Bridge 9100/Bridge 54-009-95.8 is not associated with historically significant federal programs. Design and construction of the subject bridge post-dated federal New Deal programs and was not undertaken in conjunction with development of the Interstate Highway system.

4.1.3 Transportation

Bridge 9100/Bridge 54-009-95.8 is associated with the broad pattern of transportation in the Red River Valley. It is one of numerous crossings over the Red River and carries TH 1/TH 54 between the two states. In a cooperative effort, North Dakota and Minnesota constructed Bridge 9100/Bridge 54-009-95.8 to replace the 1913 vehicular lift bridge and to upgrade the TH 1/TH 54 crossing of the Red River at Oslo. As the third bridge (second vehicular bridge) to cross the Red River at this general location near Oslo, Minnesota, the subject bridge did not serve to open new areas in northeastern North Dakota to agricultural development, commercial trade, or economic development. Generally, the agricultural industry, commercial trade, and economic development in this area of the state were well established by the time the bridge was constructed, and the bridge simply facilitated their continuation by providing an upgraded crossing of the river. Additionally, upgrading the state highway with construction of the new bridge in 1959 to replace the 1913 vehicular lift bridge was typical to ensure the road network continued to serve the needs of the traveling public and to accommodate the larger-sized vehicles of the time period.

North Dakota's beet industry was one area of agricultural production that developed primarily in the twentieth century and was more dependent on the road network than the railroad network for transportation. Farmers in northeastern North Dakota experimented with production of sugar beets as early as the 1870s and 1880s, and by the 1920s sugar beets were being produced commercially. However, the North Dakota sugar beet industry experienced limited growth until the 1970s. when harvesting and processing were mechanized and the industry began experiencing more substantial growth. Although the sugar beet industry and other agriculture-based industries have been important to North Dakota's economy, research did not reveal any significant associations in the area of transportation between Bridge 9100/Bridge 54-009-95.8 and these industries.

4.2 *Criterion C*

A bridge may be eligible for National Register listing under *Criterion C: Engineering* if it embodies the distinctive characteristics of a type, period, or method of construction; represents the work of a master; possesses high artistic value; or represents a significant and distinguishable entity whose components may lack individual distinction.

Based on research conducted for this supplemental evaluation, the most appropriate aspect of *Criterion C* under which to evaluate Bridge 9100/Bridge 54-009-95.8 from the North Dakota perspective is the embodiment of distinctive characteristics of a type, period, or method of construction. Bridges with distinctive characteristics of a type, period, or method of construction demonstrate the following:

- The pattern of features common to a particular type of bridge
- The individuality or variation of features that occur within the type
- The evolution or transition of that bridge type

Historic Bridges in North Dakota: 2004 Revision identifies the following registration requirements for eligibility of a truss bridge under *Criterion C*:

1. Built prior to 1900
2. A pony truss bridge that is not a standard Pratt or standard Warren pony truss design
3. A through truss bridge
4. A pony truss bridge with an intact historic substructure
5. The oldest bridge in a county
6. The oldest bridge of a type in North Dakota
7. The longest bridge of a type in North Dakota

Registration requirement three (through truss bridge) states: "Such bridges were once the most common structures used for major waterway crossings in the state, and are now becoming increasingly rare."[8] In the supplemental *Criterion C* evaluation below, registration requirement three is applied and supported with information regarding the extant bridge population.

4.2.1 Description

Constructed in 1959, Bridge 9100/Bridge 54-009-95.8 consists of two steel, through truss, simple main spans with four cantilevered, steel-beam, approach spans on the east and three cantilevered, steel-beam, approach spans on the west.[9] The main span through trusses have a Warren-with-verticals configuration with polygonal top chords. Each main span is 220 feet long. Upper chord members are back-to-back rolled channels with riveted top cover plates and bottom X-lacing. End-post diagonals at the portals are back-to-back channels with cover plates riveted on the top and bottom, with regularly spaced rounded openings in the bottom plates. Lower chord members are back-to-back channels with riveted batten plates on the top and bottom. Vertical and diagonal members are rolled I-beams; however, each truss diagonal and end vertical I-beam has been re-fabricated in the shop by cutting a longitudinal section from the middle of web and welding the beam together, creating a new and more shallow web section.

The east approach has two 45-foot end spans and two 55-foot middle spans, as measured between piers and bents. The west approach has two 45-foot end spans and a single 55-foot middle span, as measured between piers, bents, and abutments. The lengths of the approach sections are different when measured by deck length between hinges or joints, since five of the approach spans are cantilevered and two are not. Each approach span is comprised of four equally spaced rolled I-beams with rivet-connected steel diaphragms and a composite concrete deck. In addition to being hinged by having one end of each deck section resting on the adjacent cantilevered section, each of the approach deck sections is joined to its neighboring approach section (except the spans resting on Pier Nos. 1 and 3) with a pin-connected "swivel" at the

[8] Renewable Technologies, Inc., 56-57.

[9] A simple span structure extends from one pier, column, or abutment to another without crossing an intermediate support or creating a cantilever. A cantilevered span is a structural member that projects beyond the supporting pier, column, or abutment and is counterbalanced and/or supported at only one end.

centerline of the deck. The bridge substructure is designed to interact with the span and deck arrangement described above, in such a manner that the connections between bents and approach-span decks have the ability to move or flex in the longitudinal direction of the bridge structure. The piers do not have the ability to flex and thus hold the main truss spans stable. The overall effect is to isolate the main river spans from any movement of soil and embankments, which is absorbed by the approaches (see the June 2010 Report, beginning on page 44, for a comprehensive description of the bridge).

4.2.2 Evaluation

4.2.2.1 National Context of Truss Bridges

A variety of truss types has been used throughout U.S. truss bridge history, and the Pratt and Warren types represent two of the most common truss types. According to *Historic Bridges in North Dakota: 2004 Revision*, the Pratt and Warren truss types were the only truss types used for North Dakota highway bridges.[10]

Engineer Thomas Pratt designed the first Pratt truss in 1842. The original design, patented in 1844, consisted of "vertical compression members of wood and wrought iron diagonals in tension, the reverse of the earlier Howe truss, which used diagonals in compression and verticals in tension."[11] With a simple design that was easily erected in the field and was relatively economical, the Pratt truss constructed of steel became popular by the late nineteenth century for highway and railroad spans of less than 250 feet in length.[12] Introduced in 1870, the Parker truss is a variation or subtype of the Pratt truss. Essentially a Pratt truss with polygonal top chord, the Parker truss features progressively shorter vertical and diagonal members from the center to the ends of the truss, using less metal than a parallel chord Pratt truss of equal length.[13]

In the early twentieth century, steel replaced iron as the preferred structural material for bridges, and bridge designs were refined to be more economical in the use of materials. One such example of this was the Warren truss. By the 1920s, the Warren truss superseded the Pratt truss, which had been the standard American bridge form between 1890 and 1925, as the most common truss type used across the United States.[14] The Warren truss, patented in 1848 by two British engineers, eliminated verticals found in most other truss forms, using diagonals to

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[10] In *Historic Bridges in North Dakota: 2004 Revision*, the Parker truss is discussed as a sub-type of the Pratt truss. Several variations of the Warren truss, including the Warren pony truss, Warren bedstead pony truss, Warren through truss with polygonal top chords, and the Warren-Turner type, are also discussed; Renewable Technologies, Inc., 53.

[11] Parsons Brinckerhoff and Engineering and Industrial Heritage, *A Context for Common Historic Bridge Types* (National Cooperative Highway Research Program, October 2005), 3-25.

[12] Parsons Brinckerhoff and Engineering and Industrial Heritage, 3-25.

[13] Parsons Brinckerhoff and Engineering and Industrial Heritage, 3-34.

[14] Parsons Brinckerhoff and Engineering and Industrial Heritage, 2-27.

withstand both tensile and compressive forces. Warren trusses can include verticals, but they serve more as secondary bracing units than load-bearing units. The diagonal members form a "W" pattern along the length of the truss. Although early Warren trusses featured pin-connected members, trusses constructed in the early to mid-twentieth century featured riveted connections. A variation of the Warren truss type includes polygonal top chords. By the 1920s and 1930s state highway departments across the country were frequently using this through truss type for intermediate to long spans. Warren pony truss bridges were commonly used throughout the early to mid-twentieth century for short spans.[15]

The popular Warren truss bridge was used well into the mid-twentieth century. However, it was largely supplanted when post-World War II innovations in construction materials and methods allowed for the use of more efficient and cost-effective bridge types to achieve longer spans.

4.2.2.2 Truss Bridges in North Dakota

In order to understand the subject bridge's place within the context of truss bridges in North Dakota, and to provide an appropriate sample for evaluation of the subject bridge's eligibility for listing in the National Register, it is important to understand the general truss bridge population, which includes state owned (on-system) and county or locally owned (off-system) bridges, in the state. Although the number of truss bridges historically built in North Dakota is unknown, Table 1 identifies the number of truss bridges inventoried in 1999/2000 as part of a historic resources study compared to extant truss bridges identified in the state in 2011 using the same categories.[16]

Table 1. Extant truss bridges in North Dakota in 1999/2000 and 2011.

Type of Truss	1999/2000 Inventory	2011 Data
Pony truss	304	171
Through truss	50	36
Pratt/Parker	45	31
Warren	7*	5
Total	**354**	**206**

** Includes at least two truss bridges constructed in the 1950s-60s that were not inventoried in 1999/2000.*

Despite the Warren truss type's widespread use nationally after the 1920s, these statistics suggest that the type was not the most common through truss type in North Dakota.

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[15] Parsons Brinckerhoff and Engineering and Industrial Heritage, 3-39; Federick Quivik and Dale Martin. *Iron and Steel Bridges in Minnesota, 1873-1945, Multiple Property Document Form* (Washington D.C.: National Register of Historic Places, 1989), F-3.

[16] Personal communication with Jeani Borchert, North Dakota Department of Transportation, 18 March 2011; Personal communication with Gary L. Doerr, North Dakota Department of Transportation, 29 March 2011.

Generally distributed across the state's eastern counties, with a few located in the central and western counties, extant through trusses date from the 1880s through 1963, when the last state-owned through truss bridge was constructed. Table 2 lists the number of extant Warren and Pratt/Parker through truss bridges in North Dakota as of 2011, grouped by decade of construction.[17]

Table 2. Chronological Distribution of Extant Through Truss Bridges in North Dakota.

Decade of Construction	Pratt/Parker Through Truss Bridges	Warren Through Truss Bridges
1880	1	0
1890	1	0
1900	7	1
1910	5	0
1920	10	1
1930	2	0
1940	3	0
1950	1	3
1960	1	0
Total	**31**	**5**

Table 2, based on surviving bridge numbers, suggests that through truss bridge types built in North Dakota by decade generally reflects the national trends in bridge construction, with a peak use in the early twentieth century followed by a decline during the Depression era and World War II material shortages. As noted above, the period immediately following World War II was a time of significant innovations in bridge design, construction, and materials. After its initial use in 1949, prestressed concrete for bridge construction spread rapidly, especially after the beginning of the Interstate Highway system. Advances in steel technology allowed for the construction of longer steel-beam spans. As a result, truss bridges were supplanted by new concrete and steel bridge types that were more efficient and cost-effective to construct and maintain. North Dakota's last through truss bridge, a 1261-foot-long Parker through truss, was constructed in 1963, only four years after Bridge 9100/Bridge 54-009-95.8.

Table 2 further indicates the chronological distribution of extant Warren through truss bridges in the state, with a larger number from the last years of truss bridge construction. This group of Warren trusses is evaluated below.

[17] Data summary provided from Jeani Borchert, North Dakota Department of Transportation, to Dennis Gimmestad, Mn/DOT, and subsequently provided through personal communication to author, 10 November 2010; Updated data received through personal communication with Gary L. Doerr, North Dakota Department of Transportation, 29 March 2011; *Bridges Across North Dakota*, 20; Five of the extant through trusses are state-owned, or on-system, bridges, whereas the remaining 31 are locally-owned, or off-system, bridges.

4.2.2.3 Warren Through Truss Bridges in North Dakota

A comparison of major design features and data elements of the five extant Warren through truss bridges in North Dakota is provided in Table 3. An examination of the items in the table clarifies similarities and differences among the bridges.

- Two Warren through truss bridges (1904 and 1926) represent early eras of truss-bridge design and construction in North Dakota; these early bridges are single-span and much shorter than the other three in both main-span length and structure length.

- Three Warren through truss bridges represent the last years of truss bridge construction (1957-1959).

- The 1959 Long-X Bridge employs a Warren truss configuration that is completely unlike the other four truss designs.

- Two of the three 1950s Warren through truss bridges are virtually identical in main-span design and configuration employing the Warren truss; the same two bridges utilize the same approach and substructure solutions to the same Red River soil conditions (although at different locations, which accounts for the slight difference in length of approaches).

Table 3. Extant Warren Through Truss Bridges in North Dakota (subject bridge shaded in gray)

	14-108-12.0	18-136-09.0	49-129-05.0	54-009-95.8	85-126-56.2
Date of construction	1904	1926	1957	1959	1959
Facility carried	Closed	County highway	County highway	TH 1/TH 54	U.S. Highway 85
Feature crossed	James River	Morias River	Red River of the North	Red River of the North	Missouri River & Little Missouri River
Location	Vicinity of New Rockford, Eddy County	Vicinity of Manvel, Grand Forks County	Vicinity of Buxton, Traill County	On ND/MN border, Walsh County	Vicinity of ND 23, McKenzie County
Warren configuration/ variation	Parallel top chord	Parallel top chord	Polygonal top chord	Polygonal top chord	Continuous/ cantilever, with parallel top chord
No. of main spans	1	1	2	2	3
No. of approach spans	4	0	5	7	0
Main span length (in feet)	97	90	220	220	325
Overall structure length (in feet)	168	92	757	792	969

Table 3. Extant Warren Through Truss Bridges in North Dakota (subject bridge shaded in gray)

	14-108-12.0	18-136-09.0	49-129-05.0	54-009-95.8	85-126-56.2
Deck width (in feet)	18	18.5	26	32.7	30
Designer/ Engineer	Unknown	Unknown	Clifford Johnson, Denver, CO	Walter Butler Company, St. Paul, MN	Clifford Johnson, Denver, CO
Builder	Fargo Bridge & Iron Company	Unknown	Schultz & Lindsay Construction Company, Fargo, ND	Schultz & Lindsay Construction Company, Fargo, ND	Unknown
Ownership	County	County	County	State	State
National Register status	Listed	Previously determined eligible	Previously determined eligible	To be determined	Previously determined eligible
Other		Bridge records lost in 1997 flood	Cantilevered approach spans designed to respond to shifting soils of river banks	Cantilevered approach spans designed to respond to shifting soils of river banks	

Based on these observations, it is clear that two 1950s bridges (the subject bridge and Bridge 49-129-05.0) stand apart from the group of five in several elements of design and construction, despite the fact that all five are based on the Warren truss type. At the same time, it is clear that the two 1950s bridges are almost identical in all major engineering aspects, including their main-span configurations utilizing the Warren truss and their respective design solutions to the site conditions of the same river. In fact, they are the only Warren through truss bridges with polygonal top chords in North Dakota. The only notable difference between them is the use of different consulting engineers for the bridge design, although that difference has made no observable difference between the bridges in terms of engineering significance.

Both bridges were constructed by the same contractor. Both are riveted, Warren through trusses with the variation of polygonal top chords, a configuration typically employed to provide strength where necessary through deeper truss sections in the center and conserve materials with a shallower truss section on the ends. Both bridges embody the distinctive characteristics of type, period, and method of construction in mid-twentieth-century North Dakota bridge construction. Both are also examples of a bridge type (through truss) that "once existed in very high numbers throughout the state, although the bridges are disappearing from the landscape at a relatively rapid rate," according to the authors of *Bridges Across North Dakota* (2010).[18]

[18] *Bridges Across North Dakota*, 24; Renewable Technologies, Inc., 55.

Bridge 49-129-05.0 has been determined eligible for listing in the National Register. As one of a small number of extant through truss bridges in North Dakota, Bridge 9100/Bridge 54-009-95.8 meets National Register eligibility registration requirement three identified in *Historic Bridges in North Dakota: 2004 Revision*.

4.3 Integrity

Bridge 9100/Bridge 54-009-95.8 retains a high degree of historic integrity of design, materials, workmanship, setting, location, feeling, and association. The bridge has experienced only minor alterations that have not affected the historic integrity of design, materials, or workmanship and have not diminished the bridge's ability to convey its historic significance.

4.4 Conclusion

Bridge 9100/Bridge 54-009-95.8 is recommended eligible for listing in the National Register under *Criterion C: Engineering* at the statewide level of significance within the context of bridges in the state of North Dakota. As a Warren through truss with polygonal top chord, the bridge embodies the distinctive characteristics of type, period, and method of construction in mid-twentieth-century North Dakota bridge construction. Additionally, as a through truss bridge of any configuration, it exemplifies a once common bridge type in North Dakota that is becoming increasingly rare.

Bridge 9100/Bridge 54-009-95.8 is recommended not eligible under *Criteria A*, *B*, or *D* in North Dakota.

The June 2009 Report recommended that Bridge 9100/Bridge 54-009-95.8 was not eligible for the National Register within the framework of related historic contexts pertinent to Minnesota. The MnSHPO has concurred with this determination.

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Appendix A. August 19, 2010, Letter from the North Dakota State Historic Preservation Officer

STATE HISTORICAL SOCIETY OF NORTH DAKOTA

August 19, 2010

Mr. Dennis Gimmestad
MN DOT Cultural Resources Unit
Office of Environmental Services
Mail Stop 620
395 John Ireland Boulevard
St. Paul MN 55155

ND SHPO Ref.: 10-1867 MN DOT SP 4509-05, ND DOT SCB-6-054(008)009 Bridge 9100/ND Bridge 54-3 over Red River of the North at Oslo, in Walsh County [T155N R51W Section 36] North Dakota and Marshall County, Minnesota

Dear Mr. Gimmestad,

We reviewed ND SHPO Ref.: 10-1867 MN DOT SP 4509-05, MN TH1/ND TH54 MN Bridge 9100/ND Bridge 54-3 over Red River of the North at Oslo, in Walsh County, North Dakota and Marshall County, Minnesota. We regard Warren Truss Bridge 9100 as eligible under Criteria C. The accompanying report does not contain any aspect of the historic importance of the bridge on the North Dakota side, so we are unable to evaluate for criteria A. In North Dakota we have only three riveted Parker bridges, (two by the end of this year). We have only three riveted Warren bridges left. The Oslo Bridge is the last riveted Warren bridge with a polygonal top and the last one with a cantilevered design in the State of North Dakota. We consider it eligible under at least Criteria C, as it is the last example of an important type of Warren truss bridge. We concur with the positive National Register determinations for the Soo Line Railroad Corridor and the Soo Line Swing Bridge.

Thank you for the opportunity to review this project to date. If you have any questions please contact Susan Quinnell, Review and Compliance Coordinator at (701) 328-3576, e-mail squinnell@nd.gov

Sincerely,

Merlan E. Paaverud, Jr.
State Historic Preservation Officer (North Dakota)

C: Jeani Borchert ND DOT ETS Division