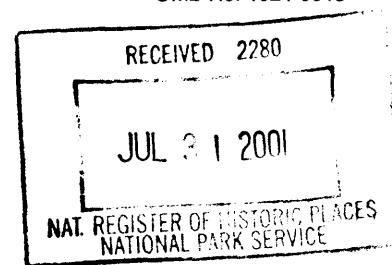


United States Department of the Interior  
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES  
REGISTRATION FORM

999



This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in How to Complete the National Register of Historic Places Registration Form (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Chamberlain Bridge  
other names/site number South Dakota Department of Trans. Br. No. 08-068-084

2. Location

street & number I-90 Loop over the Missouri River not for publication   
city or town Chamberlain vicinity \_\_\_\_\_  
state South Dakota code SD county Brule code 015 zip code 57325

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1986, as amended, I hereby certify that this  nomination  request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property  meets  does not meet the National Register Criteria. I recommend that this property be considered significant  nationally  statewide  locally. (  See continuation sheet for additional comments.)

Jay D. Voigt  
Signature of certifying official

07-23-2001  
Date

SP SHPO  
State or Federal agency and bureau

In my opinion, the property  meets  does not meet the National Register criteria. (  See continuation sheet for additional comments.)

\_\_\_\_\_  
Signature of commenting or other official

\_\_\_\_\_  
Date

**4. National Park Service Certification**

I hereby certify that the property is:

- entered in the National Register.  
 See continuation sheet
- determined eligible for the National Register.  
 See continuation sheet
- determined not eligible for the National Register
- removed from the National Register.
- other,

(explain:) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signature of the Keeper

Date of Action

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**5. Classification**

**Ownership of Property** (Check as many boxes as apply)

- \_\_\_ private
- \_\_\_ public-local
- X public-State
- \_\_\_ public-Federal

**Category of Property** (Check only one box)

- \_\_\_ building(s)
- \_\_\_ district
- \_\_\_ site
- X structure
- \_\_\_ object

**Number of Resources within Property**

Contributing	Noncontributing	
0	0	buildings
0	0	sites
1	0	structures
0	0	objects
1	0	Total

Number of contributing resources previously listed in the National Register 0

Name of related multiple property listing (Enter "N/A" if property is not part of a multiple property listing.) Historic Bridges in South Dakota

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**6. Function or Use**

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**Historic Functions** (Enter categories from instructions)

Cat: Transportation Sub: Road-Related  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Current Functions** (Enter categories from instructions)

Cat: Transportation Sub: Road-Related  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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**7. Description**

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**Architectural Classification** (Enter categories from instructions)

Other: Pennsylvania through truss  
\_\_\_\_\_  
\_\_\_\_\_

**Materials** (Enter categories from instructions)

foundation Concrete  
roof \_\_\_\_\_  
walls \_\_\_\_\_  
other Steel  
Concrete

**Narrative Description** (Describe the historic and current condition of the property on one or more continuation sheets.)

See Continuation Sheets

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### 8. Statement of Significance

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Applicable National Register Criteria (Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing)

- A** Property is associated with events that have made a significant contribution to the broad patterns of our history.
- B** Property is associated with the lives of persons significant in our past.
- C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- D** Property has yielded, or is likely to yield information important in prehistory or history.

**Criteria Considerations** (Mark "X" in all the boxes that apply.)

- A** owned by a religious institution or used for religious purposes.
- B** removed from its original location.
- C** a birthplace or a grave.
- D** a cemetery.
- E** a reconstructed building, object, or structure.
- F** a commemorative property
- G** less than 50 years of age or achieved significance within the past 50 years.

**Areas of Significance** (Enter categories from instructions)

Transportation  
Engineering

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**Period of Significance**

1925-1953

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Chamberlain Bridge  
Name of Property

Brule County, South Dakota  
County and State

**Significant Dates**    1925  
                                  1953  
                                  \_\_\_\_\_

**Significant Person** (Complete if Criterion B is marked above)  
N/A

**Cultural Affiliation**    N/A  
\_\_\_\_\_  
\_\_\_\_\_

**Architect/Builder**    Designer: State Highway Commission  
Builders: Missouri Valley Bridge and Iron Works &  
Kansas City Bridge Company

**Narrative Statement of Significance** (Explain the significance of the property on one or more continuation sheets.)

See Continuation Sheets

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## 9. Major Bibliographical References

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(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

### Previous documentation on file (NPS)

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

### Primary Location of Additional Data

- State Historic Preservation Office
- Other State agency
- Federal agency
- Local government
- University
- Other

Name of repository: South Dakota Department of Transportation

Chamberlain Bridge  
Name of Property

Brule County, South Dakota  
County and State

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## 10. Geographical Data

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**Acreage of Property** Less than one

### UTM References

(place additional UTM references on a continuation sheet.)

1	<u>14</u> Zone	<u>472880</u> Easting	<u>4850760</u> Northing	3	<u>          </u> Zone	<u>          </u> Easting	<u>          </u> Northing
2	<u>          </u>	<u>          </u>	<u>          </u>	4	<u>          </u>	<u>          </u>	<u>          </u>

See continuation sheet

**Verbal Boundary Description** (Describe the boundaries of the property on a continuation sheet.) See Continuation Sheet

**Boundary Justification** (Explain why the boundaries were selected on a continuation sheet.) See Continuation Sheet

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## 11. Form Prepared By

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name/title Mark Hufstetler  
organization Renewable Technologies, Inc. date July 1, 2001  
street & number 511 Metals Bank Bldg. telephone 406-782-0494  
city or town Butte state MT zip code 59701

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## Additional Documentation

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Submit the following items with the completed form:

### Continuation Sheets

### Maps

**A USGS map** (7.5 or 15 minute series) indicating the property's location.

**A sketch map** for historic districts and properties having large acreage or numerous resources.

### Photographs

Representative **black and white photographs** of the property.

**Additional items** (Check with the SHPO or FPO for any additional items)

Chamberlain Bridge  
Name of Property

Brule County, South Dakota  
County and State

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**Property Owner**

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(Complete this item at the request of the SHPO or FPO.)

name \_\_\_\_\_  
street & number \_\_\_\_\_ telephone \_\_\_\_\_  
city or town \_\_\_\_\_ state SD zip code \_\_\_\_\_

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**Paperwork Reduction Act Statement:** This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C. 470 et seq.).

**Estimated Burden Statement:** Public reporting burden for this form is estimated to average 18.1 hours per response including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Chief, Administrative Services Division, National Park Service, P.O. Box 37127, Washington, DC 20013-7127; and the Office of Management and Budget, Paperwork Reductions Project (1024-0018), Washington, DC 20503.

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## Architectural Description

The Chamberlain Bridge is a large, multi-span structure spanning Lake Francis Case in south-central South Dakota. (Lake Francis Case is an artificial reservoir, which inundates the natural channel of the Missouri River.) The bridge carries a "Business Loop" of Interstate Highway 90 over the waterway, linking the communities of Chamberlain (east of the lake) and Oacoma (to the west). This roadway is an historic alignment of former U.S. Highway 16, a primary east-west route across the state of South Dakota.

The overall design of the bridge is both complex and unusual, reflecting the unique histories of both the bridge and the waterway over which it passes. The current Chamberlain Bridge is dominated by a total of ten, steel Pennsylvania through truss spans, all of which were first erected in 1925. The spans are of two comparable, yet distinct designs, and are little-altered from their date of construction. The four larger spans were constructed for use in an earlier incarnation of the Chamberlain Bridge, which stood at a location two city blocks north of the current structure. The remaining six spans originally comprised the "Wheeler Bridge," which spanned the Missouri at a location some 70 river miles south of Chamberlain. Both the Wheeler structure and the original Chamberlain Bridge existed from 1925 until 1953, and were products of a monumental state project to build South Dakota's first series of highway bridges across the Missouri River. When the rising waters of Lake Francis Case mandated the removal of both these bridges, their superstructure elements were reused in the current Chamberlain structure. Thus, while the major structural components of the current Chamberlain Bridge reflect a 1925 design and are evocative of that period, the bridge assemblage in its current configuration actually dates from 1953.

The reuse of the ten 1925 trusses in the 1953 Chamberlain bridge necessitated the development of an atypical overall design for the current Chamberlain structure. Changing highway design standards and increased traffic levels called for a greater bridge width than the 1925 trusses provided; to solve this problem, the 1953 design utilized five overall truss spans consisting of two paired, parallel trusses each. The northerly trusses in each pair carry westbound traffic, while the southerly trusses handle eastbound vehicles. Common approach spans handle both directions of traffic, and the paired trusses share common piers. The resulting design is unique to South Dakota, and highly uncommon nationally.

The four truss spans of the original Chamberlain Bridge comprise the two easternmost paired spans of the current structure. Each of these four historic trusses is an identical Pennsylvania through



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truss, 336 feet long. The trusses are steel, with riveted connections, and display the following structural members:

- Upper chords: built-up channel sections (two pair of angle sections with continuous steel plates) riveted with a continuous cover plate along the upper flanges and with lattice bars along the lower flanges;
- Lower chords: at the first full panel, these chords are two pair of angle sections with batten bars; the remaining lower chords are two groups of four angle sections with batten bars;
- Vertical members: two channel sections with lacing bars;
- Horizontal struts: two pair of angle sections with lacing bars;
- Diagonals: in the first half of the first panel, the diagonals are angle sections with lacing bars; the diagonals in the second half of the first panel and the second panel consist of two pairs of angle sections with batten bars; the diagonals in the remainder of the panels are two angle sections with batten bars;
- Counters: below the horizontal struts, the counters are angle sections; the counters above are two angle sections with batten bars;
- Floor beams: Steel I-beams, riveted to gusset plates above the lower chord;
- Portal bracing: paired channel sections with lattice bars, with single angle section cross-bracing;
- Sway bracing: paired angle sections with lattice bars, with single angle section cross-bracing and a pair of angle sections at the bottom.

The above configuration dates wholly from 1925, but the current bridge deck and railing are products of the 1953 reconstruction. The deck is corrugated steel with a concrete overlay, atop steel stringers which rest on the upper flanges of the floor beams. The three-rail railing is comprised of an angle section and two "T" sections.

The three paired spans to the west utilize the six trusses reused from the former Wheeler Bridge. These six trusses are identical Pennsylvania through trusses; each is steel, 256 feet long, with riveted connections. The structural members utilized in these trusses are similar to those found in the 336-foot trusses, but not identical:

- Upper chords: built-up channel sections (two pair of angle sections with continuous steel plates) riveted with a continuous cover plate along the upper flanges and with lattice bars along the lower flanges;

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- Lower chords: at the first full panel, these chords are two channel sections with lattice bars on each flange; the remaining lower chords are punched steel eyebars;
- Vertical members: two channel sections with lattice bars on each flange;
- Horizontal struts: two pair of angle sections with lacing bars;
- Diagonals: punched steel eyebars, except the middle panel which has two angle sections with batten bars;
- Counters: below the horizontal struts, forged steel square rods with turnbuckles; those above are punched steel eyebars;
- Floor beams: steel I-beams, riveted to the vertical members above the lower chord;
- Portal bracing, sway bracing, deck system, and guardrail: same as described above.

All of the Chamberlain Bridge's approach spans date from 1953, as does the entire bridge substructure. The eastern approach to the trusses is a two-span continuous steel deck girder structure, consisting of six girders with angle-section crossbracing. The deck and curb are concrete, and a three-rung steel guardrail protects the edges of the approach. The railings feature square concrete endposts decorated with recessed concrete panels. The bridge's western approach displays a similar design, but is four spans in length. All abutments and intermediate piers are concrete; most piers are a three-pile open concrete design.

The eastern end of the Chamberlain Bridge opens directly into the street grid of the town of Chamberlain, near the south end of the community's commercial district. Leaving the bridge to the west, the highway traverses a long, low fill that extends about seven-tenths of a mile across former river bottomlands, now largely inundated. (This is the former location of American Island, which was long used as a recreation area by local residents.) The town of Oacoma is about one mile from the western end of the bridge. North of the current Chamberlain Bridge, and parallel to it, a row of five concrete piers still marks the site of the 1925 Chamberlain Bridge.

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## Statement of Significance

In accordance with the guidelines established in the Multiple Property Documentation form for "Historic Roadway Bridges in South Dakota," the Chamberlain Bridge is eligible for listing in the National Register of Historic Places with statewide significance under Criteria "A" and "C." The bridge is significant under Criterion "A" as the last surviving representation of the State of South Dakota's massive, 1920s-era construction program to link the eastern and western halves of the state with a series of Missouri River bridges. This effort, unprecedented in the state's history, saw the completion of five large, through-truss bridges across the Missouri, resulting in the completion of the first through roadway corridors across the state. The bridges, designed and funded by the state and constructed efficiently and inexpensively, were a dramatic success for the State Highway Commission, and gave that young agency a legitimacy that foreshadowed its future importance in the evolution of state commerce and transportation. The completion of the five Missouri bridges also signaled the continuing ascendancy of the automobile in South Dakota transportation, greatly helping to facilitate and further encourage auto travel in the state.

Criteria consideration "B" applies to this statement of significance, since all ten of the Chamberlain Bridge's truss members were moved to this location in 1953 (see Section 7, above). The bridge trusses remain eligible despite the move, since they are the only significant surviving remnants of the state's pivotally important 1920s Missouri River bridge construction program. In addition, the trusses continue to span the Missouri River channel as they did originally, and continue to serve in their intended role as a roadway bridge. Finally, despite their changed location and configuration, the trusses continue to strongly evoke the design philosophies and construction techniques of a major, early twentieth-century roadway bridge.

The bridge is also eligible under Criterion "C" as a well-preserved example of early twentieth-century truss design. The trusses of the Chamberlain Bridge retain an excellent level of integrity, and are among the largest and most technically sophisticated truss configurations used in South Dakota roadway bridges. The Pennsylvania truss design involves an unusually complex arrangement of structural members, and was historically utilized only in relatively large and important highway and railway spans. Only one other Pennsylvania truss is known to survive in South Dakota in 2001, and it is a smaller, single-span structure. Criteria consideration "B" also applies to this statement of significance. The continued significance of the relocated trusses is justified by the rarity and importance of their design, and for the additional reasons outlined in the previous paragraph.

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Finally, the bridge is also eligible under Criterion "C" as an unusual example of innovative and complex bridge design and assembly in the early 1950s. In designing the current Chamberlain Bridge, state highway engineers developed an inventive plan to recycle existing truss units on a new substructure. The resulting paired-truss design is unique to South Dakota, and rare nationally. The plan also necessitated the development of novel and site-specific construction techniques, in particular the barging of individual truss members along the Missouri River to the current bridge site. The end result was an effective bridge with a superstructure that was assembled quickly, and at considerable cost savings. The design also produced an historically-evocative and visually-striking structure that has served as a community symbol of the town of Chamberlain for decades.

Criteria consideration "G" applies to this statement of significance, since the current Chamberlain Bridge has been in place for only 48 years as of this writing. The structure remains eligible, however, due to the extreme rarity of its design, as noted above.

### *Historical background:*

The Missouri River is among the most significant geographic features in the State of South Dakota, effectively dividing the state into eastern and western halves. Throughout the history of the region, the river's presence also proved to be both an opportunity and an obstacle to local travelers. North-south journeys across South Dakota could be made on the water, at least during the summer months, but this travel method became less and less relevant as regional and national transportation technologies changed in the nineteenth and early twentieth centuries. These changes, coupled with ever-increasing Euro-American settlement in South Dakota, caused the River—unbridged, and difficult to cross—to be viewed locally more and more as an barrier to efficient transportation. By inference, the river became a perceived obstacle to the continued growth and modernization of the state.

Early twentieth-century South Dakota was dependent on two primary modes of transportation—the railway and the road—and the development of both modes was hindered by the presence of the river. The lack of permanent bridges across the Missouri forced travelers to use seasonal ferries in the summer, and hope for reliable ice bridges during mid-winter; these limited options made long distance travel slow and seasonally unpredictable. The railway companies tackled this problem first, and by the 1910s had constructed three Missouri River bridges in the state, including one at Chamberlain. This was only a partial solution, however, since the ever-increasing number of long-distance automobile travelers in the state were forced to rely on ad hoc arrangements to use the limited railroad bridges. Clearly, it was time for the state to construct its first highway bridges across

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the Missouri, but the perceived cost was a formidable obstacle. Political difficulties were also present, since several bridges were plainly needed and each area of the state naturally wanted a local bridge to take priority.

This dilemma was solved during the early 1920s by an ambitious and well thought-out proposal to construct a total of five Missouri River highway bridges in the state, nearly simultaneously. The bridge sites—at Mobridge, Forest City, Pierre, Chamberlain, and Wheeler—were spaced across the width of the state, to provide the maximum overall benefit, and an innovative funding mechanism combining state and local support was developed to hasten construction. Planning and design work for the bridges was entrusted to the South Dakota State Highway Commission, which had been established in 1919 to develop and improve the state's road network. The complete plan was complex and ambitious, a difficult test for the new state agency.

The Highway Commission entrusted the planning and design work for the bridges to J.E. Kirkham, an ambitious and talented engineer. Kirkham developed efficient yet sophisticated designs for each of the spans, and oversaw a rapid yet efficient construction process. The final elements of the bridge program were authorized in 1923, and all five structures were completed by 1926 at a total cost of approximately two million dollars. The speed, efficiency and quality of the Missouri River bridge program was a significant feat for Kirkham and the Highway Commission, and garnered the agency statewide respect and political stability.

Both the Wheeler Bridge and the original Chamberlain Bridge were completed in 1925. The Wheeler structure was constructed under contract by the Kansas City Bridge Company with steel fabricated by the American Bridge Company, while the Chamberlain Bridge was erected by the Missouri Valley Bridge & Iron Works of Leavenworth, Kansas. All five of the state's new bridges served important cross-state travel routes, but the Chamberlain span was clearly the most important, serving the primary travel route between Sioux Falls and Rapid City, the state's two largest municipalities.

All five of South Dakota's 1920s-era Missouri River bridges remained in service until the early 1950s, but plans for replacement of most of the spans were imminent. Approval of the federal Flood Control Act of 1944 had initiated the development of a series of large dams and reservoirs occupying nearly all of the Missouri River in South Dakota. The new reservoirs would raise the river's water level enough to mandate the removal of the Mobridge, Forest City, Chamberlain, and Wheeler bridges. (The Pierre Bridge was later demolished and replaced due to traffic concerns.) Plans called for all but the Wheeler Bridge to be replaced on-site by newly designed spans.

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The replacement Mobridge and Forest City bridges were entirely new structures, but the State Highway Commission and the Army Corps of Engineers devised an innovative plan to reconfigure the former Wheeler and Chamberlain spans into a new, replacement bridge for Chamberlain. This design was accepted primarily for economic reasons, but was also an efficient choice, allowing for the reuse of existing structures. Work began at the new Chamberlain site in the summer of 1952, with the construction of a new substructure for the replacement bridge. The following May, contractors removed the first of the Wheeler spans and began to float it the 70 miles upriver to Chamberlain. All six of the Wheeler spans were in place by September 1953, and work on moving the Chamberlain spans into place then began. The reconstructed Chamberlain Bridge was opened for traffic on the morning of October 30, 1953, and a formal dedication ceremony was held the following December 7<sup>th</sup>.

The Chamberlain Bridge carried U.S. Highway 16 across the Missouri River until 1974, when a larger bridge was opened just downstream to carry Interstate Highway 90. The old bridge then reverted to a secondary role, but remains an important transportation link for the residents of Chamberlain and Oacoma. It is also a striking and evocative visual reminder of historic bridge design in South Dakota, and is an important historic and visual landmark for the citizens of Chamberlain and Brule County.

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## **Bibliography**

*Brule County History*. Pukwana : Brule County Historical Society. 1977.

"Chamberlain Bridge" vertical file, Bridge Division, South Dakota Department of Transportation.

*The Chamberlain Register* [newspaper], 1951-1953.

Kenneth R. Scurr, former South Dakota Bridge Engineer, interviewed by Prof. Emory Johnson, South Dakota State University, "Missouri River Bridges of South Dakota, 1946-1970," "Bridge" vertical file, South Dakota Cultural Heritage Center, Pierre, South Dakota.

*Maka Teepee 1880 to Chamberlain 1980*. Register Publishing Co, Inc. 1980.

## **Verbal Boundary Description**

The nominated property consists of a rectangle, 2010 feet long and 45 feet wide, whose vertices coincide with the outside corners of the bridge abutments at each end of the bridge, and includes only the bridge superstructure and substructure.

## **Boundary Justification**

Because the bridge is located on a public road, there are no legal boundary lines for the ends of the bridge. Therefore, these boundaries are drawn to encompass only the superstructure and substructure of the bridge itself.