Internal Rating: _____

WEST VIRGINIA HISTORIC PROPERTY INVENTORY FORM

Street Address Main Street (WV 31)	**Common/Historic Name/Both** ○ ○ ◉ Cairo Bridge	**Field Survey #** 43-031/00-009.82	**Site # *(SHPO Only)***
Town or Community Cairo	**County** Ritchie	**Negative No.** 1-16	**NR Listed Date**
Architect / Builder Vincennes Bridge Company	**Date of Construction** 1925	**Style** Parker Through Truss	
Exterior Siding/Materials Metal - Steel	**Roofing Material** --	**Foundation** Concrete - Poured	
Property Use or Function **Residence** ○ **Commercial** ○ **Other** ◉ Transportation	**UTM#** Zone 17 486268 E 4240088 N		
Survey Organization & Date Skelly and Loy, Inc. 06/08/2018	**QuadrangleName** Cairo, WV **Part of What Survey/FR#** Cairo Bridge Project STP-0031(037)D		

Sketch Map of Property
Or Attach Copy of USGS Map

Site No.

Present Owners
West Virginia Department of Transportation
Division of Highways

Phone #

Owners Mailing Address
624 Depot Street
Parkersburg, WV 26101-5127

Describe Setting

Rural. The bridge is located on the northwest edge of the unincorporated community of Cairo and the Cairo Historic District.

_____ **Acres**

_____ **Archaeological Artifacts Present**

Description of Building or Site (Original and Present) ____--_____**Stories** __ -- __**Front Bays**

See continuation sheet.

(Use Continuation Sheets)

Alterations ☒ **Yes** ☐ **No** **If yes, describe** Bolted connections; welded stay plates and additions to some vertical members; additions to floorbeams.

Additions ☐ **Yes** ☒ **No** **If yes, describe**

Describe All Outbuildings

(Use Continuation Sheets)

Statement of Significance

See continuation sheet.

(Use Continuation Sheets)

Bibliographical References

See continuation sheet

(Use Continuation Sheets)

Form Prepared By: Gerald M. Kuncio **Date:** 06/26/2018

Name/Organization: Skelly and Loy, Inc.
Address: 3280 William Pitt Way
Pittsburgh, PA 15238
Phone #: 412-828-1412

WEST VIRGINIA HISTORIC PROPERTY FORM
CONTINUATION SHEET

NAME Cairo Bridge **SITE#**

Description of Building or Site

The Cairo Bridge is a single-span, 184-foot-long Parker Through Truss bridge constructed in 1925 (Photographs 1 and 2). It carries West Virginia (WV) Route 31/Main Street over the North Fork Hughes River at the northwest edge of the unincorporated community of Cairo, Ritchie County, West Virginia. The structure is a contributing resource to the Cairo Historic District, which is eligible for listing in the National Register of Historic Places (NRHP). The community and historic district are located in a river valley surrounded by steep, hilly terrain and scattered farms. Historically, Cairo was serviced by a number of railroad lines, most notably the Baltimore & Ohio Railroad's Parkersburg Branch, but much of that line has been turned into a hiking and biking trail, the North Bend Rail Trail. The Cairo Historic District is predominantly located to the southeast of the bridge and contains approximately 70 contributing resources (Photographs 3 and 4).

The Cairo Bridge is a conventionally designed steel Parker Through Truss bridge. The upper chords and inclined endposts consist of built-up box sections composed of rolled channels, cover plates on the top, and laced bars on the bottom. The portal struts are heavily-built Warren Trusses composed of paired angles and riveted gusset plates. The interior struts are more lightly built Warren Trusses (Photographs 5 and 6). The vertical members are toe-out channels with lacing and the diagonals are paired angles (Photograph 7). When built, the diagonals were joined together by a series of bolted stay plates. A large number of the stay plates are now welded to the diagonal members (Photograph 8). In the middle panels of the truss are counter-diagonals that are also paired angles. The diagonals and counter-diagonals are bolted together at their midpoints (Photograph 9). The lower chords consist of two sets of paired angles joined by both bolted and welded stay plates. The floorbeams are rolled H-sections, and the rolled stringers frame into them (Photographs 10 and 11). The floorbeams and stringers support a steel pan, concrete filled deck surfaced with asphalt (see Photographs 6 and 11). The bridge has one sidewalk, which is cantilevered off the northeast side of the structure on built-up, angled brackets (see Photographs 1, 2, and 11). The sidewalk is concrete, surfaced with asphalt, and framed by a steel, three-high railing composed of angles and flat metal lattice bars (Photograph 12). The

bridge is supported on U-shaped concrete abutments and wingwalls with concrete bridge seats (Photographs 13 and 14).

The gusset plates at the upper chord panel points have both riveted and bolted connections (Photograph 15). This suggests that the vertical members were shop riveted to the gusset plates and shipped to the bridge site, where the diagonals were bolted to the gusset plates. The lower chord connections were mostly likely similarly constructed. However, all are now bolted (see Photograph 10), which appears to be a repair, dating to rehabilitation either undertaken in 1976 and 1989. Other changes include steel plates welded to the bottom portion of some vertical members (Photograph 16) and the strengthening of all floorbeams through the addition of smaller, supplemental floorbeams (see Photograph 11) to increase load-carrying capacity.

History and Significance

The Cairo Bridge was built in 1925 by the Vincennes Bridge Company of Vincennes, Indiana, one of the Hoosier State's most successful bridge building firms, with a practice that extended primarily into the South, Midwest, and West. The Vincennes Bridge Company was founded in 1899 by brothers John and Frank Oliphant, along with Jacob L. Riddle. John had worked between 1896 and 1898 for Indiana's New Castle Bridge Company, while Frank had been an educator. Initially capitalized with stock totaling $20,000, in 1902 the company increased the investment to $50,000, combining that with profits to underwrite a four-fold expansion of its physical plant. By 1911, the Vincennes Bridge Company had a weekly payroll in the thousands of dollars and the firm had manufactured more than 2,000 miles of spans. Annual production soon reached 1,200 spans, with annual sales of around $1,000,000. Most of the company's engineers came from Indiana's Purdue University. The Vincennes Bridge Company designed primarily simplified, standard design truss bridges in a variety of long and short forms. They emphasized function and economy over elegance and novelty (Cooper 1987:28), a description that fits the Cairo Bridge.

WEST VIRGINIA HISTORIC PROPERTY FORM
CONTINUATION SHEET

NAME Cairo Bridge **SITE#**

The Vincennes Bridge Company continued to supply full-service bridge building even after World War I, when most bridge companies had subcontracted construction work to contractors. The company retained crews prepared to build concrete substructures and erect its spans. It aggressively pursued contracts offered by state highway departments following the expansion of federal highway funds to such entities in 1916 and 1921, including a number of bridges in West Virginia. The marketing effort was so successful that in early 1927 the Vincennes Bridge Company increased its capital stock from $50,000 to $750,000 (Cooper 1987:28-29). In 1932, the company reincorporated as the Vincennes Steel Corporation, expanding into other products and markets and making greater use of assembly line production methods. Its growth continued through World War II and into the post-war years. In 1956, the company was taken over by Industrial Enterprises, Inc., ending Oliphant family control of the business (O'Reilly and Smith 1988:5). Into the 1980s, Vincennes Steel Corporation was still specializing in girder and truss bridges (Maxwell 1985:4).

The Cairo Bridge is an example of a Parker Through Truss bridge. The truss design is credited to Charles H. Parker, a mechanical engineer with the National Bridge and Iron Works of Boston, who applied for a patent for a similar design in 1870. All trusses use triangular shapes to create beams that are longer and stronger than rolled beams. In the case of a Parker Truss, the webs of the beams consist of right triangles, the same triangular shape used by the Pratt Truss, of which the Parker Truss is a variation. A Pratt Truss has straight upper chords while the upper chords of a Parker Truss are polygonal. The truss design recognizes that depth of truss required at mid-span is greater than that required at the end of the span. Because of the polygonal upper chords, the design progressively shortens the vertical and diagonal members from the center to the ends of the truss, resulting in a greater economy of material and a lighter truss than a Pratt Truss of equal length. However, because the Parker Truss requires different length vertical and diagonal members at each panel, fabrication and erection costs are increased. The lighter weight of the polygonal upper chords tend to offset the increased labor costs for spans over a certain length (Cridlebaugh 2008; Condit 1960:153; Parsons Brinckerhoff and Engineering and Industrial Heritage 2005:3-34).

WEST VIRGINIA HISTORIC PROPERTY FORM
CONTINUATION SHEET

NAME Cairo Bridge **SITE#**

The Cairo Bridge was determined not eligible for NRHP listing in 2013 as part of the West Virginia Statewide Historic Bridge Survey. The bridge, however, is a contributing resource to the NRHP eligible Cairo Historic District.

Bibliographical References

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2018 Aerial photograph of the Cairo Bridge, Cairo, West Virginia. Bing Corporation, Bellevue, Washington.

Condit, C.W.
1960 *American Building Art: The Nineteenth Century.* Oxford University Press, New York.

Cooper, J.L.
1987 *Iron Monuments to Distant Prosperity: Indiana's Metal Bridges, 1870-1930.* Depauw University, Greencastle, Indiana.

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1988 *Cache River Bridge, HAER No. AR-25*. Historic American Engineering Record, Washington, D.C. Website at http://cdn.loc.gov/master/pnp/habshaer/ar/ar0000/ar0083/data/ar0083data.pdf. Accessed June 12, 2018.

WEST VIRGINIA HISTORIC PROPERTY FORM
CONTINUATION SHEET

NAME Cairo Bridge **SITE#**

Parsons Brinckerhoff and Engineering and Industrial Heritage

2005 *A Context for Common Historic Bridge Types. NCHRP Project 25-25, Task 15*. Prepared for the National Cooperative Highway Research Program, Transportation Research Council, National Research Council, Washington, D.C.

United States Geological Survey

1977 Cairo, WV quadrangle, 7.5 minute series. United States Geological Survey, Washington, D.C.

WEST VIRGINIA HISTORIC PROPERTY FORM
CONTINUATION SHEET

NAME Cairo Bridge **SITE#**

WV_Ritchie County_Cairo Bridge_0001. Elevation view, facing SE.

WV_Ritchie County_Cairo Bridge_0002. Elevation view, facing NW.

WEST VIRGINIA HISTORIC PROPERTY FORM
CONTINUATION SHEET

NAME Cairo Bridge **SITE#**

WV_Ritchie County_Cairo Bridge_0003. View of the bridge from the Cairo Historic District, facing NW.

WV_Ritchie County_Cairo Bridge_0004. View of the Cairo Historic District from the bridge, facing SE.

WEST VIRGINIA HISTORIC PROPERTY FORM
CONTINUATION SHEET

NAME Cairo Bridge **SITE#**

WV_Ritchie County_Cairo Bridge_0005. Through view, facing NE.

WV_Ritchie County_Cairo Bridge_0006. Through view, facing SE.

WEST VIRGINIA HISTORIC PROPERTY FORM
CONTINUATION SHEET

NAME Cairo Bridge **SITE#**

WV_Ritchie County_Cairo Bridge_0007. Detail of vertical and diagonal members, facing NW.

WEST VIRGINIA HISTORIC PROPERTY FORM
CONTINUATION SHEET

NAME Cairo Bridge **SITE#**

WV_Ritchie County_Cairo Bridge_0008. Detail of welded stay plates on a diagonal member, facing NW.

WEST VIRGINIA HISTORIC PROPERTY FORM
CONTINUATION SHEET

NAME Cairo Bridge **SITE#**

WV_Ritchie County_Cairo Bridge_0009. Detail of joining the diagonal and counter-diagonal members, facing S.

WEST VIRGINIA HISTORIC PROPERTY FORM
CONTINUATION SHEET

NAME Cairo Bridge **SITE#**

WV_Ritchie County_Cairo Bridge_0010. Lower chord panel point connection, facing N.

WV_Ritchie County_Cairo Bridge_0011. Underside of the bridge showing lower chords and supplemented floorbeams, facing NW.

WEST VIRGINIA HISTORIC PROPERTY FORM
CONTINUATION SHEET

NAME Cairo Bridge **SITE#**

WV_Ritchie County_Cairo Bridge_0012. Detail of the bridge railing, facing SE.

WV_Ritchie County_Cairo Bridge_0013. Southeast abutment and wingwall, facing SE.

WEST VIRGINIA HISTORIC PROPERTY FORM
CONTINUATION SHEET

NAME Cairo Bridge **SITE#**

WV_Ritchie County_Cairo Bridge_0014. Northwest abutment and wingwall, facing NW.

WV_Ritchie County_Cairo Bridge_0015. Upper chord panel point connection showing rivets and bolts, facing S.

WEST VIRGINIA HISTORIC PROPERTY FORM
CONTINUATION SHEET

NAME Cairo Bridge **SITE#**

WV_Ritchie County_Cairo Bridge_0016. Representative image of a steel plate welded to a vertical, facing NW.