NPS Form 10-900
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NAT. REGISTER OF HISTORIC PLACES
NATIONAL PARK SERVICE

United States Department of the Interior
National Park Service

National Register of Historic Places
Registration Form

1. Name of Property

historic name New River Gorge Bridge

other names/site number

2. Location

street & number U.S. 19 over the New River ☐ not for publication

city or town Fayetteville ☒ vicinity

state West Virginia code WV county Fayette code 019 zip code 25862

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, 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 for 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.)

Susan M. Pierce, DSHPO June 11, 2013
Signature of certifying official/Title Date

West Virginia State Historic Preservation Office
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 certifying official/Title Date

State or Federal agency and bureau

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

by Barbara Wyatt 8-14-13

5. Classification

Ownership of Property

- ☐ private
- ☐ public-local
- ☒ public-State
- ☐ public-Federal

Category of Property

- ☐ building(s)
- ☐ district
- ☐ site
- ☒ structure
- ☐ object

Number of Resources within Property

Contributing	Noncontributing	
		buildings
		sites
1	1	structures
		objects
1	1	Total

Name of related multiple property listing

N/A

Number of Contributing resources previously listed in the National Register

0

6. Function or Use

Historic Functions

Transportation: road-related

Current Functions

Transportation: road-related

7. Description

Architectural Classification

OTHER: single-span steel arch truss

Materials

foundation Concrete
walls
roof
other METAL: Steel

Narrative Description

See Continuation Sheets

8. Statement of Significance

Applicable National Register Criteria

☒ **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

Property is:

☐ **A** owned by a religious institution or used for religious purposes.

☐ **B**. removed from its original location.

☐ **C**. birthplace or grave of a historical figure of outstanding importance.

☐ **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.

Levels of Significance (local, state, national)
National
Local

Areas of Significance
Engineering
Transportation

Period of Significance
1977-c.1985

Significant Dates
1977

Significant Person
N/A

Cultural Affiliation

Architect/Builder
Michael Baker Jr., Inc.
United States Steel/American Bridge Division

Narrative Statement of Significance:
See Continuation sheets

9. Major Bibliographical References

Bibliography

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 # HAER WV-41

Primary location of additional data:

☒ State Historic Preservation Office
☒ Other State Agency
☐ Federal Agency
☐ Local Government
☐ University
☐ Other

Name of repository:
WV Division of Highways; WV State Archives

10. Geographical Data

Acreage of Property 5.11

UTM References
17 492755 4213437 (Fayetteville Quad, WGS 1984 Web Mercator - Auxiliary Sphere)

Latitude/Longitude
38.068665/-81.082592

Verbal Boundary Description
See Continuation Sheets

Boundary Justification
See Continuation Sheets

11. Form Prepared By

name/title Erin M. Riebe, National Register of Historic Places Coordinator
organization WV State Historic Preservation Office date May 2013
street & number 1900 Kanawha Blvd., East telephone 304.558.0240
city or town Charleston state WV zip code 25305

Property Owner

Bridge: WV Division of Highways
Property: National Park Service (New River Gorge National River)

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 listing. 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 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 Projects (1024-0018), Washington, DC 20303.

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National Park Service

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Section number 7 Page 1

Description[1]

The New River Gorge Bridge is located in a once remote area of West Virginia just north of Fayetteville in Fayette County, West Virginia. The bridge is situated in the northern section of the 53-mile long New River Gorge National River – a unit of the U.S. National Park Service – and is surrounded by lush Appalachian Mountain forest. It carries U.S. Route 19 (Corridor L) across the deep gorge of the New River which runs 876 feet below (see Figures 1-2, Photos 1-2, and Images 1 and 11). A rail line runs along each side of the river at the bottom of the gorge while Fayette Station Road (State Route 82) winds its way down the steep terrain and under the bridge on both the north and south sides (see Photos 6 and 8 and Images 1-3, 5, 11).

Overall, the bridge is a continuous-span, open-spandrel, arch truss bridge constructed of steel (see Figure 2 and Photos 1-2). The main components of the bridge include the arch truss and the deck truss which carries the roadway. The deck and roadway are supported by 21 bents (each bent includes two vertical columns connected with diagonal bracing – see Figure 3, Photos 3 and 12, and Images 4 and 12) and an arch-centered inverted A-frame member (see Photos 4, 8 and 9). Twelve of the bents extend upward from the arch. The remaining nine carry the approach ways and are supported by concrete pedestal embedded in the mountainsides. The arch, bents, and deck are described in further detail below.

The overall length of the bridge is 3,030 feet, 6 inches (measured from center-to-center of end bearings) and the arch, the longest steel arch in the United States[2], measures 1,700 feet. The width of the bridge is 73 feet 5 inches to the outside of the parapet walls. In total, the massive structure weighs in at 88 million pounds including 21,000 tons of structural steel, 1,700 tons of reinforcing steel, 17,000 cubic yards of substructure concrete, and 6,000 cubic yards of superstructure concrete.[3]

The bridge includes four 12 foot vehicular lanes, a 6 foot 10 inch median with barrier, and two 8 foot wide shoulders with safety parapets (see Photo 5). All structural steel for the bridge is "COR-TEN B," a weathering steel that rusts when exposed to the elements for several years and eliminates the need for painting. Its chemical makeup also increases its resistance to corrosion. High-strength bolts, conforming to the standards of the American Society for Testing and Materials, were used in connections (see Photos 9, 13-14).

The roadway consists of an 8¼ inch thick reinforced concrete slab with a 1 inch latex modified concrete overlay. Reinforced concrete safety parapets run along each side of the bridge and include a 1 foot 3 inch high aluminum railing. Approach guardrails at each end of the bridge are attached to the safety parapets. For inspection purposes, each bent includes a ladder and platform providing access to an opening in each column. Special

[1] Unless otherwise noted, the vast majority of the description was taken directly from the Inventory Bridge Inspection Report for the New River Gorge Bridge prepared by Michael Baker Jr., Inc. in 1991 for the West Virginia Department of Transportation (available from the bridge inspection files at the West Virginia Department of Transportation, Charleston, West Virginia).
[2] U.S. Department of Transportation, Federal Highway Administration, *Steel Bridge Design Handbook: Structural Behavior of Steel*, Publication No. FHWA-IF-12-052 - Vol. 4, November 2012, p. 30.
[3] WV Department of Transportation, Division of Highways, "Highway News" (press release), 16 June 1997. Available in the inspection files of the WV Division of Highways, Charleston, W.Va.

inspection and maintenance walkways are situated at each of the expansion joints. The bridge also includes a 24 inch inspection walkway at the centerline of the bottom chord of the deck truss and runs the entire length of the bridge (see Photo 7). It has a railing on both sides as well as a modern harness system recently installed for the safety of bridge walk tour-goers (the harness system is clamped, not bolted, to the bridge). A metal walkway, approximately 250 feet long with rails and entrance gate, was also constructed in recent years at each the north and south ends of the bridge leading to the center walkway (see Photo 5). The walkways are also not attached to the bridge. The system is considered a noncontributing structure within the boundary.

Arch (Figure 2, Photos 1-2, and Images 6, and 9-12)

The arch is a two-hinged truss arch with a rise of 370 feet (see Figure 2 and Photos 1-2).[4] Two-hinged arches have hinges only at the supports (anchorages) as opposed to a three-hinged arch, which also includes a hinge at the crown. The anchorages are two pairs of reinforced concrete thrust blocks that were built in combination with the reinforced concrete pedestal footings for bents 5 and 19.

The depth of the trusses making up the ribs – the distance between the top and bottom chord of the arch – varies from 34 feet at the crown up to 53 feet at the anchorages (see Figure 2 and Photos 3-4). The truss chord members are single-cell welded boxes. Except for the chord members immediately adjacent to the anchorages, all box sections are made up of two 58 inch deep webs with thickness varying from 2 to 4 inches. The cover plates are two 39-inch plates varying from $1^{3}/_{16}$ inch to 1½ inch thick.

The bracing between the upper and lower chords of the arch is a Howe truss configuration (see Figure 2 and Photos 3-4). Each member of the bracing is also formed of welded box sections. The lateral bracing between the two ribs consists of K-braces (see Photo 3) with the diagonals fabricated as steel H-sections 2 feet 3 inches deep. The struts (compressive members) perpendicular to the plane of the arches are welded box sections 2 feet 3 inches deep for most of their length except for their hunched ends. Sway bracing is provided at the bent locations by a V-brace system formed of fabricated steel H-sections 1 foot 9 inches deep.

Bents (see Figure 3, Photos 3 and 21, and Images 1-2, 4, and 12)

The entire deck is situated on top of 21 bents (see Figures 2 and 3, and Photos 3 and 21) and a centered inverted A-frame (sometimes referenced as a 22nd bent – see Photos 8 and 9). The primary members of each bent, the two columns, are spaced 72 feet apart and are fabricated from hollow steel sections 3 feet 6 inches deep by widths varying from 4 feet 1 inch to 12 feet. Diagonal cross-bracing is used in all of the bents, between the two columns, except for the two shortest (bents 11 and 13) at the crown of the arch (see Photos 3 and 21). The diagonal braces are welded H-sections (see Photo 14), 2 feet 5 inches deep with 1 foot 10 inch wide flanges.

Twelve bents (6-11 and 13-18), ranging in height from 25 feet to 304 feet, are attached to the top chord of the arch and are commonly referred to as spandrel column and beam bents. They are attached to the arch by a tongue

[4] The rise to span ratio is 1:4.6.

plate welded to the arch chord and bolted to the 1¼ inch end plates of the column (see Figure 4). The side column plates are bolted to the arch chord web plates by gusset plates (see Figure 4). Two of the bents on each side of the center of the arch span (bents 10, 11, 13 and 14) have rocker-type shoes at the top for the support of the deck trusses (see Photo 11).[5] The other eight bents of the arch span (bents 6-9 and 15-18) have fixed shoes. The bents at the ends of the arch (bents 5 and 19) have expansion bearing in a gear configuration to prevent sliding (see Figure 5 and Photo 10). Relief joints in the stringers (described under "Deck" below) also allow for movement.

All of the approach deck truss spans are supported on steel land bents (bents 1-5 and 19-22) which range in height from 83 feet to 391 feet (see Figure 2 and Photos 1-2). The nine approach span bents are supported by nine pairs of reinforced concrete pedestals (see Photo 12) on spread footings and have fixed bearing shoes (as opposed to the rocker-type shoes mentioned above).

Deck (Figure 2, Photos 1-5, and 7, and Images 11-12)

The entire deck is composed of 23 truss spans of varying lengths, 14 of which, each 129 feet 9 inches long, are supported by the arch (see Figure 2, Photos 1-5, 7, and Images 11-12). These 14 truss spans are situated on 12 bents (bents 6-11 and 13-18). The north and south approaches (the section of the bridge not above the arch) are supported by the remaining nine trusses. On the south approach, there are five continuous deck truss spans measuring 126 feet 6 inches. The north approach includes four continuous deck truss spans that each measure 143 feet 6 inches.

The floor system which supports the concrete deck for the full length of the bridge is composed of nine stringers (a supporting beam running the length of the bridge) spaced 8 feet 4 inches apart (see Photo 7). The stringers are supported by steel truss floor beams 18 feet deep, 72 feet apart. Oversized bolt holes allow for movement of the stringers. The top chord of the floor beam truss is fabricated from hollow steel sections 1 foot 8 inches deep by widths varying from 1 foot 3 inches to 1 foot 9 inches. The bottom chord is formed by hollow steel sections 1 foot deep by 1 foot 1 inch wide. There are six types of Warren truss floor beam systems on the bridge composed of 12 or 14 inch wide flange verticals and 12 inch wide flange diagonals (see Photos 3-5).

The floor beam trusses frame into the 18 feet deep Warren deck trusses. The top and bottom chords of the deck truss are sealed box members 1 foot 2 inches wide by 1 foot 8 ¾ inches high (see Photos 7-8). The diagonals of the deck truss are composed of 14 inch wide flange shapes or fabricated H sections 1 foot 2 inches deep with 1 foot wide flanges. The lateral bracing for the deck trusses consists of crossed diagonals formed by hollow steel sections 1 foot deep by 10 ½ inches wide (see Photos 6-8). Each bent is separated by a six-bay truss. Stringer relief joints are provided at the center of span 3 and at bent 21 for the approach spans. In the central deck truss unit over the arch, a stringer relief joint occurs at every seventh panel of the deck truss. All stringer relief

[5] Deck expansion bearings were designed to permit a total movement of 27 inches (including 17 inches anticipated for temperature ranges and 10 inches for live load deflections). United States Steel, "New River Gorge Bridge, Fayette County, West Virginia," unpublished bridge report. May 1978, p. 16-17.

joints, as well as the joints at the abutments (the substructure at either end of the bridge), are armored pre-formed elastomeric joints. The stringers are continuous between relief joints.

The bottom chords of the deck truss are pinned to eye bars embedded 20 feet deep into the north and south abutments (see Photo 5). The north and south abutments are reinforced concrete stub abutments on stepped footings (see Photo 5).

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Statement of Significance

The New River Gorge Bridge is eligible for listing in the National Register at the National level of significance under *Criterion C: Engineering* as an exceptionally important engineering achievement. At time of construction, its arch made it the longest steel arch bridge in the world, a title it held until 2003 with the construction of China's Shanghai's Lupu Bridge. It is currently the longest single-span steel arch bridge in the United States and the third highest bridge in the country. Though the bridge itself employs a fairly conventional design, its construction represents a number of construction achievements. The engineers and ironworkers overcame major obstacles due to its enormous scale and the then-remote Appalachian location. The period of significance under Criterion C is 1977, the year construction was complete.

The New River Gorge Bridge is also eligible for listing at the local level under *Criterion A: Transportation* for the extremely important role it played in linking West Virginia's "Corridor L Communities" with the rest of the state and providing a vital link in the state's highway system, cutting off nearly 45 miles of travel. The period of significance is 1977 to c.1985, reflecting the initial period of rapid growth and development following the opening of the bridge.

The bridge also meets *Criteria Consideration G: Properties that have Achieved Significance Within the Last Fifty Years* since it is of exceptional importance.

Background History

Concept and Design

The need for an adequate transportation route in the New River Gorge area was long recognized by local residents. In September 1956, the headline article in Oak Hill's *Fayette Tribune* urged the construction of a bridge to span the New River Gorge. Such a structure, the article argued, would "greatly increase present prosperity and act as a guarantee of good times for the future." It would attract industry and therefore help develop the Fayetteville-Oak Hill area as well as the "immense undeveloped coal area" on the opposite side of the river.[6] The exact location and design of such a bridge, however, would not be initiated for more than a decade and would not reach fruition until 1977, more than 20 years after the *Fayette Tribune* article. From that time, many obstacles were overcome to create the mega structure.

In 1963, President Kennedy asked the President's Appalachian Regional Commission (PARC) to prepare a comprehensive plan for the economic development of the Appalachian region. A year later PARC reported that Appalachia would not see economic growth unless the construction of a modern highway system throughout the region became a top priority. The result was the Appalachian Development Act of 1965 that formally established the Appalachian Regional Commission (ARC) and authorized the Appalachian Development Highway System (ADHS). The new highway system was not only to provide economic development in rural areas, but also to

[6] "Bridge to Link Oak Hill and Babcock Park Urged," *The Fayette Tribune*, September 13, 1956.

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supplement the growing interstate system and provide access to areas within the region. One documentary described the system in West Virginia as "a combination of enterprise, ingenuity, courage, and technology [that] began forging the key links to a highway system that would at last open up one of America's most beautiful states to all of its citizens."[7] In its early years, the development of highways, including six in West Virginia, was ARC's most noticeable achievement.[8]

One of those highways, known as Corridor L (U.S. 19), was to be a 70-mile link between I-79 near Sutton and I-77 near Beckley. Once constructed, Corridor L would save travelers nearly 45 miles and an extra hour of travel. One obstacle to this route, however, was the deep gorge of the New River in Fayette County. The first discussions on how to span the gorge included the construction of a four-lane highway descending one side of the gorge and ascending the other. At a potential cost of $65 million, that concept was quickly eliminated as too expensive.[9] Thus, the State Road Commission decided a mammoth bridge was the only option.

By the spring of 1967, the West Virginia State Road Commission engaged Michael Baker, Jr., Inc.[10] to proceed with designing an 11-mile section of Corridor L, including a bridge to span the gorge. Three bridge options were proposed; a suspension bridge, a truss, or a steel arch bridge. However, the bridge type was not chosen until the final location was selected. Baker was also responsible for consideration of different routes and thus, the bridge's location, within a corridor about a mile wide.[11] They established nine different possible routes that met the prevailing criteria for horizontal and vertical alignment for the terrain and development of the area. The nine routes included two different possible bridge locations. The final route and bridge location were selected based on economic considerations, design characteristics, and the social and environmental effects on the area.[12] Once the location was finalized, Clarence V. Knudsen, chief engineer and Director of Structural Service for Bridge Designers at Michael Baker, described how the first two bridge options were eliminated:

> A suspension bridge would have been 2,000 to 3,100 feet long, well within an economical range for such bridges. But this type [of] structure was ruled out, for the bridge towers, which would rise 300 to 350 feet on top of the mountains on each side of the gorge would have posed a hazard for aircraft.
>
> A truss bridge with eight spans was technically feasible. But this scheme was ruled out because: in this setting, it wouldn't look good; it would require extremely high piers, very expensive to construct; and erecting the trusses in-place, by cantilevering out from individual piers would be difficult, requiring hoisting of steel from railroad cars along the river to heights up to 900 feet.

[7] United States Steel [presenter], *New Records at New River*, (The Original Copy; A Mode-Art pictures production, 1981). Player video file. http://www.librarycommission.wv.gov/collections/libraryvideos/Pages/infohistorical.aspx (accessed 2 April 2013).
[8] Tom D. Miller, "Appalachian Regional Commission," in *The West Virginia Encyclopedia*, ed. Ken Sullivan (Charleston, W.Va.: West Virginia Humanities Council, 2006), p. 19.
[9] "New River Gorge Bridge: 10 Years in the Making," *Register and Post-Herald*, Beckley, W.Va., October 22, 1977.
[10] Michael Baker Jr., Inc. is an engineering unit at Michael Baker Corporation (Baker).
[11] "Proposed Gorge Span to be Highest East of Rockies," in *The Baker Engineer*, Volume XXV, 1977 Special Edition, p. 4.
[12] Michael Baker Jr., Inc., The West Virginia Department of Highways Public Hearing Project A.P.D – 482 (2), Corridor 'L,' 24 April 1970. Unpublished public hearing materials on file at the WV Division of Highways, Charleston, W.Va..

> Thus it seemed the best solution would be a steel arch bridge (the span was much too long to even consider using a concrete arch).[13]

It is estimated that man hours used in the design of the bridge by Baker were equivalent to one individual working full-time for 15 years.[14]

Construction

Once the design was complete, construction was to begin in 1971. However, the contract to construct the bridge was not awarded until June 21, 1973. The contract was awarded to United States Steel (USS) Corporations' American Bridge Division (ABD) which beat three other bids with a proposal just under $34 million dollars. ABD's bid was nearly seven million less than their closest competitor and 26-percent under estimates.[15] Even so, at the time, the project was the West Virginia Department of Highways' largest undertaking in its history, not only due to the extraordinarily high cost, but also because the federal government shared in 70 percent of the cost, rather than the standard 50 percent.[16] The current governor, Arch Moore, described the forthcoming undertaking:

> From an engineering and construction viewpoint, this bridge will be truly a most significant undertaking. But, even more importantly, the construction and completion of this project will contribute greatly to the economy of the state in general and the Fayetteville area in particular.[17]

Once the ink on the contract was dry, it did not take long for construction to get underway. By that summer, ABD began constructing access roads at the proposed approach-ways.[18] To keep on schedule, they planned various tasks to take place simultaneously. While hillsides were cleared, concrete forms were taking shape as they were being filled with concrete by the Foster-Creighton Company.[19] The construction also had to overcome the massive, deep ground voids left behind by prior coal mining. These voids were discovered under critical places, including the intended locations of piers 4 and 20. They were sealed through 6 inch holes with a special sand and concrete grouting mix that formed a series of conical supports and thus provided footing. The process was monitored by below-ground cameras.[20] Meanwhile, fabricating plants in Ambridge, Pennsylvania and Gary, Indiana were busy "converting mathematics to reality" by preparing steel members, assembling them to confirm accuracy, and disassembling them for transport. Chords were milled to a tolerance of one-one hundredths of an

[13] "2 Options on Bridge Ruled Out," *Register and Post-Herald*, Beckley, W.Va., October 22, 1977.
[14] "Bridge Facts and Figures," *Register and Post-Herald*, Beckley, W.Va., October 22, 1977.
[15] "New River Gorge Span Goes to U.S. Steel For $33.9 Million," in *The Baker Engineer*, Volume XXV, 1977, p. 6. And, "New River Gorge Bridge: 10 Years…"
[16] "New River Gorge Bridge: 10 Years…".
[17] "New River Gorge Span Goes to U.S. Steel…"
[18] "New River Gorge Bridge Work Begins," *Daily Mail*, Charleston, W.Va., February 13, 1974, p. 1B.
[19] "New River Gorge Bridge: 10 Years…" And, *New Records at New River*.
[20] *New Records at New River*. And, United States Steel, "New River Gorge Bridge, Fayette County, West Virginia," unpublished bridge report. May 1978, p. 5. Available in the inspection files of the WV Division of Highways, Charleston, W.Va.

inch, cutting the bolt requirement for major chords by fifty percent and reducing costs considerably.[21] Such precision was established through use of numerically-controlled drilling equipment.[22]

The steep terrain and width of the gorge did not pose the only problem (Photos 1-2, and Images 1, 3, and 11). The remote location of the chosen site also presented a unique issue. Massive steel members and heavy equipment had to traverse treacherous and winding roads to get to the site location. With no rail line in close proximity, ABD established a small line as close as they could, 19 miles away, in Nallen, West Virginia. From there, the steel was moved from the train's freight cars to truck trailers. Some especially long members were given their own wheels (see Image 8) and transported to the storage and assembly area on the gorge's north side where it was organized. However, the largest steel members that were too heavy to be moved on the remote road system were transported via rail to the bottom of the gorge and hoisted by the cable system, described below.[23]

The steel product used in construction of the bridge was U.S. Steel Corporation's own COR-TEN B steel (also, corten and Cor-Ten). During a presentation to the Fayette Plateau Chamber of Commerce, J.J. Long, president of ABD, described COR-TEN steel with regard to the New River Gorge Bridge:

> The special steel oxidizes for a period of time and weathers to form its own protective coating blending with the rugged terrain in this mountainous region. The deep russet-colored steel will combine the qualities of the high strength, aesthetic beauty, and low maintenance.[24]

Since the use of COR-TEN steel negated the need to paint the bridge,[25] the DOH estimated they would save one million dollars per needed paint job.[26]

Ironworkers were hired through Charleston's Local 301 of the International Association of Bridge, Structural, Ornamental & Reinforcing Iron Workers in Charleston. One ironworker, Clarence "Spud" Chandler, described working as part of the bolting crew on the New River Gorge Bridge as an honor, something he is proud of doing. He began work on the bridge as an apprentice at the age of 21 and earned journeyman status on the project. Though some of the crewmembers working on the bridge travelled the country only working on the largest projects, Chandler was from West Virginia. He carpooled to the job site every day with five or six others from the Charleston area, a distance of approximately fifty miles.[27]

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[21] *New Records at New River*.
[22] United States Steel, "New River Gorge Bridge, Fayette County, West Virginia."
[23] *New Records at New River*.
[24] "Full Construction Work Set On Fayette Bridge," *Raleigh Register*, May 19, 1975.
[25] While the use of COR-TEN steel negates the need for painting, routine inspections are more difficult than those for painted steel structures. On a painted steel structure, rust indicates developing paint failure, and fatigue cracks are made evident by the color of paint and the rust along the crack. Since the entire weathering steel bridge is covered with rust, inspectors must have knowledge of different stages of exposure of the oxide film and must examine it using hammers and wire brushes to determine if it adheres to the steel base. Michael Baker, Jr., Inc., Inventory Bridge Inspection Report, 1991.
[26] "New River Gorge Bridge: 10 Years..."
[27] Clarence "Spud" Chandler, interview by author, 10 June, 2013, Charleston, W.Va., digital recording, WV State Historic Preservation Office.

In February 1974 the ironworkers began construction of concrete supports for the bridge's vertical columns on each side of the gorge (see Photos 12, and Image 2). The abutments (see Photo 5) and column supports included 17,300 cubic yards of concrete and 618 tons of reinforcing bars.[28] Each concrete foundation included sturdy steel grillage and embedded high-strength bolts that would eventually line up with steel box sections of the columns. After tension was applied to the anchor bolts, their pipe sleeves were filled with non-shrink grout.[29]

The wide and deep gorge also required the construction of a "bridge that would build a bridge" – a unique cableway (or track of cables) that trolleyed steel out into the gorge and lowered it into place (see Figure 6, and Photos 2, 9-10, and 12). While the method was used before construction of the New River Gorge Bridge, it was never done on this scale. Measuring 3500 feet, like the bridge, the cableway set a record as well.[30] Four towers, two on each side of the gorge each 330-feet high, were constructed. Each side had a boom-type hoist to be used in hoisting cables into position.[31]

On Tuesday, February 12, 1974 construction of the bridge entered into the aerial phase. Though an early morning snow storm threatened operations that day, U.S. Steel's American Bridge Division was able to use a helicopter to string four 5,000-foot, half-inch wire cables from the towers constructed on each side of the gorge. Additional cables were attached making each of the four increasingly larger until they were each three inches in diameter. Each cable included 294 individual steel wires and weighed 30 tons. In all, twenty-two miles of cable were used.[32] Once complete, trolleys were mounted on wheels and operated on the cables. Powered by diesel engines, they could travel at 195 feet per minute.[33] Each trolley had a 50-ton capacity and transported steel beams for the construction of the bridge as well as skip boxes that carried the ironworkers out over the gorge and into position.[34] Used in tandem, the cableway could transport up to 100 tons. Due to this capacity, many sections were assembled on the ground, saving time and money and cutting down work hazards. The heaviest steel section hoisted was 92 tons.[35]

Construction continued all year except when conditions were too cold, wet, or windy for workers to do their job safely.[36] Other safety measures were taken as well. Temporary handrails and ladders were installed and some ironworkers wore safety belts attached to the steel members. Nylon safety nets and chain link fences were installed (see Images 10 and 12) to provide additional protection. Sometimes called "flying carpets," they measured 95 by 135 feet and were attached to the bottom chord of the deck or arch truss. Ironworkers also

[28] "New River Gorge Bridge Work Begins."
[29] "Special Cable Hoist Operating as New River Gorge Bridge Steel Erection is Started," in *The Baker Engineer*, Volume XXV, 1977, p. 9. And, United States Steel, "New River Gorge Bridge, Fayette County, West Virginia."
[30] *New Records at New River*.
[31] "Special Cable Hoist Operating…," p. 9.
[32] "New River Gorge Bridge: 10 Years…"
[33] "World's Longest Main Arch Span Bridge," *The Nicholas Chronicle*, Summersville, W.Va., August 1, 1974.
[34] "New River Gorge Bridge Work Begins." And, Clarence "Spud" Chandler, interview.
[35] *New Records at New River*.
[36] "New River Gorge Bridge Offers Spectacular Display of Engineering," *Sunday Gazette-Mail*, Charleston, W.Va., February 22, 1976.

constructed many sections of the bridge on the ground rather than in the air.[37] Even so, in May 1974, a temporary platform shifted and several crewmembers fell, killing one, Dan Snodgrass of Malden. Seven others were injured.[38]

A month later, on June 14, ABD erected the first structural steel for the bridge when ironworkers[39] used the cable system to place a 30-foot steel box on a concrete foundation on the north side of the gorge. Pre-drilled holes in the base of the box were lined up with high-strength bolts embedded in the already-constructed concrete foundation for the tower. This piece was later topped with two additional boxes forming the first support column, 98 feet high.[40] Nine bents, or towers (two columns each with cross-support members), were built on to the concrete foundations to carry the north and south approaches out from the gorge sides to a point where the arch would begin.[41] Construction of these steel support columns coincided with construction of the floor truss spans on the approach-ways. In total, 23 truss spans, between 126 feet 6 inches to 143 feet 6 inches long, formed the base for the roadway. Each span was assembled at the construction site and then placed using the cable hoist and trolley system.[42] A routine was established; position, then pin and bolt, position, then pin and bolt. Once steel was lowered into position, it was temporally held together by drift pins and bolts. It was then positioned and permanently connected by high-strength bolts.[43] By mid-July, the northern approach extended out 325 feet.[44]

Assembly of the columns and trusses continued unobstructed until March 25, 1975 when two of the cable towers collapsed due to a malfunction in the luffing hoist brake system. Though some news outlets reported that the cables cut loose and snapped off nearby treetops, none of the cables broke and the bridge was not touched by the cables or towers.[45] Construction was halted for three months while the towers were rebuilt and resumed in June.[46]

On July 28, ABD began construction of the actual arch by placing its first chord, 60-feet long, into place.[47] Under typical lower arch bridge-construction circumstances, temporary falsework is constructed under the bridge to

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[37] *New Records at New River*.
[38] "The Bridge is Opening: 'World's Longest' Long Time Coming," *Daily Mail*, Charleston, W.Va., October 21, 1977. And, Bob Wills, "The Bridge Opening Was Magnificent," *Raleigh Register/Beckley Post-Herald*, Beckley, W.Va., combined edition, Sunday morning, October 23, 1977.
[39] Ironworkers were hired through Local 301 of the International Association of Bridge, Structural, Ornamental & Reinforcing Iron Workers in Charleston.
[40] "Special Cable Hoist Operating…," p. 9. And, "New River Gorge Bridge Construction Progressing," *Beckley Post-Herald*, Beckley, W.Va., June 17, 1974.
[41] "Special Cable Hoist Operating…," p. 10. And, *New Records at New River*.
[42] "Special Cable Hoist Operating…," p. 11.
[43] *New Records at New River*.
[44] "Work Progressing On New River Gorge Bridge," *Beckley Post-Herald*, Beckley, W.Va., July 16, 1974.
[45] "New River Bridge Towers Collapse; Cause Unknown." *The Charleston Gazette*, Charleston, W.Va., March 26, 1975. And, "New River Gorge Bridge Work Well Under Way," *Raleigh Register*, Beckley, W.Va., October 22, 1975.
[46] "Full Construction Work Set on Fayette Bridge," *Raleigh Register*, Beckley, W.Va., May 19, 1975.
[47] "At the Beginning," *Register and Post-Herald*, Beckley, W.Va., October 22, 1977. However, *New Records as New River* states that the first chords were places 8-13-1975.

provide support as the arch reaches further out. However, the New River Gorge, 876 feet deep, provided a challenge. Rather than falsework, engineers used a massive tieback system (steel pipe casing) resembling and functioning like huge fishing rods (see Figure 6 and Images 3-4, 7, and 9). While tiebacks were not new to bridge arch construction, as technology has changed, so have the details. The tiebacks were secured to huge anchors imbedded in a reinforced concrete foundation, called a "dead man," located approximately 200 feet behind the bridge abutment.[48] Each "dead man" was 7 feet thick and made up of 9 5/8 inch oil well casing threaded with 2 3/8 inch diameter bridge strands.[49] The project used nearly 10 miles of cable for the tieback system.[50]

Another feature of the New River Gorge Bridge was the way the weight is distributed. Most arch bridges are fixed, meaning both the top and bottom chords are anchored. The bottom chords carry the major portion of the compressive stress. However, this was not an option for the New River Gorge Bridge. Baker engineers ran numerous computer models to determine each member size as well as the estimated dead load (the weight of the structure itself). Due to the exceptionally long span, individual members were too large to be supported by only the bottom chords. Rather, both the top and bottom chords share in supporting the stress through a pin at the anchor that was located halfway between the top and bottom chords.[51] To gain a better understanding of the effect of live loads (such as wind and traffic), a computer program known as STRESS was used. The program was repeated on each bent to determine final design results for the uniform and concentrated live loads. For example, K-braces (see Images 1 and 3) were used between the two arches to provide resistance to wind forces.[52]

Though the original estimated completion date was the fall of 1976, it was pushed back a year due to weather and construction delays.[53] By early 1976, ABD was granted a one-year extension.[54] By that spring the arch was nearing completion with only one piece of steel remaining to create a true self-supporting arch. Though most arch bridges were completed by jacking up both sides of the arch far enough apart to place the final piece, each side of the New River Gorge Bridge were constructed slightly higher than final design. When the final piece of steel was positioned in May 1976 (see Image 10), both arms of the arch were simply lowered into place using the tieback system and sixteen 1,250-ton capacity hydraulic jacks.[55] Once the arch was complete, 12 bents (in addition to the nine already constructed carrying the approaches) and a centered inverted A-frame had to be constructed on the arch. Each bent included two steel columns, measuring from 26 to 305 feet in height, as well

[48] United States Steel, "New River Gorge Bridge, Fayette County, West Virginia," p. 20.
[49] "Special Cable Hoist Operating…," p. 9. And, *New Records at New River.*
[50] "An Engineering Arch of Triumph: New River Gorge Bridge Arch Completed; Finish Date Targeted for September, 1977," in *The Baker Engineer*, Volume XXV, 1977, p. 17.
[51] *New Records at New River*. And, "An Engineering Arch of Triumph…," p. 18. And, United States Steel, "New River Gorge Bridge, Fayette County, West Virginia," p. 11.
[52] United States Steel, "New River Gorge Bridge, Fayette County, West Virginia," p. 13.
[53] "The Bridge is Opening: 'World's Longest' Long Time Coming." In addition to the collapse of the towers, failure of two of the pipe casing tiebacks occurred during construction, causing delay.
[54] "Gorge Bridge Progress Outlined by Engineer," *Raleigh Register*, Beckley, W.Va., February 5, 1976.
[55] *New Records at New River*. And, "New River Gorge Bridge Steel Erection Complete; Roadway Deck Paving Started," in *The Baker Engineer*, Volume XXV, 1977, p. 22.

as steel cross beams. To maintain weight distribution, cross beams were placed symmetrically from the centerline outward (the columns of the arch spandrel bents were attached concurrently as the arch was constructed).[56]

In June, ironworkers began work on the last major construction of the bridge; placement of the remaining 14 trusses that would carry Corridor L and link the largely inaccessible part of West Virginia with the rest of the country.[57] After a study of other similar deck trusses, it was determined that it should present the smallest possible area to wind. Therefore, the trusses were designed and constructed with open webs, rather than solid web plate girders.[58] On November 1, 1976, the final deck truss, 26 tons, was lowered into place. It was decorated with the state and U.S. Bicentennial flags as well as an evergreen tree. This "topping out" tradition is common amongst ironworkers worldwide to indicate a project, or phase of a project, has reached its maximum height.[59] Potentially having Scandinavian roots, the tradition was believed to drive out any evil spirits that moved in during construction.[60] Others believe the tradition that the tree on a structure's highest point gave thanks to the forest God for his wood and his blessing.[61]

As deck work was completed, the towers and cable system was dismantled. All that remained was the construction of the roadway. The bridge is four lanes and 73'5" wide (to the outside of the parapets). Though original design called for a width of 64 feet, it was increased after a wind analysis determined that the wider deck would decrease wind stress and the lateral deflections of the arch.[62] The bridge also included a thick slab of pavement and reinforcing steel, over 8 feet thick. The weight of the roadway was needed at the top as a counterweight to absorb and offset the heavy loads from traffic and high winds of the gorge. Lastly, the bridge was finished with a strong concrete parapet and rails along each side.[63]

Dedication and Bridge Opening

Prior to dedication day, the Charleston Daily Mail sponsored a contest to be the first to drive across the bridge with then Governor, Jay Rockefeller. Contestants had to enter by submitting an essay answering "Why I'd like to be with Jay as the first West Virginians to cross the New River Gorge Bridge." The official announcement in the newspaper included a caricature drawing of Governor Rockefeller driving a convertible over the bridge with a silhouette of a passenger wearing a question mark on his chest. Entries were judged by members of the news staff as well as state officials.[64] Although the ride was promoted and later hailed as the first car to drive across the bridge, that was not the case. The prior weekend, on Friday, October 14, 1977, Governor Rockefeller ordered

[56] *New Records at New River*.
[57] *New Records at New River*.
[58] United States Steel, "New River Gorge Bridge, Fayette County, West Virginia," p.15.
[59] John V. Robinson, "The 'Topping-Out' Tradition of the High-Steel Ironworker," *Western Folklore*, Vol. 60, No. 4 (Autumn 2001): p. 243.
[60] "New River Gorge Bridge: 10 Years…," And, "Bridge Facts and Figures."
[61] "New River Gorge Bridge Steel Erection Complete; Roadway Deck Paving Started," p. 22.
[62] United States Steel, "New River Gorge Bridge, Fayette County, West Virginia," p.12.
[63] *New Records at New River*.
[64] "Be No. 1 On The Bridge," *Daily Mail*, Charleston, W.Va., September 22, 1977.

that the bridge was open to accommodate the expected heavy traffic due to the opening of hunting season. It was opened on noon that day and closed Sunday at midnight.[65]

In preparation of dedication day, ABD cleared and leveled a field to be used for parking cars, and arrangements were made to transport people by bus to the bridge.[66] On dedication day, the Radio Emergency Associated Citizens Team (REACT) helped with crowd control and provided other general assistance to motorists. Prior to the crowd's arrival, they placed barriers at each end of the bridge to keep out onlookers before the official ceremony. Also on hand were the sheriff's office and nine employees of the Wackenhut Security Company.[67]

It is estimated that approximately 30,000 spectators arrived on October 22, 1977 to walk the bridge and enjoy the dedication.[68] Other than West Virginia, one on-looker reported seeing license plates from Rhode Island, Tennessee, Florida, North Carolina, Ohio, Virginia, Minnesota, Louisiana, Kentucky, Pennsylvania, and Ontario.[69] Though some of the spectators camped out the night before and others arrived as early as 5 a.m., the bridge was not open to pedestrians until 7:30 a.m.[70] When it was, staff from the *Charleston Gazette* was waiting in the middle of the bridge to pass out 10,500 scroll certificates. By running, high school student Randy Hicks was the first to arrive and received the first scroll to commemorate the event.[71]

During the hours leading up to the official ceremony, bridge-goers enjoyed the performances of five different Fayette County high school bands including Fayetteville, Mount Hope, Oak Hill, Midland Trail, and Meadow Bridge.[72] The Affiliated League of Emergency Radio Teams provided free coffee.[73] A mobile post office was set up to provide bridge-goers with the opportunity to obtain a souvenir. Post cards and letters were postmarked at the New River Gorge Bridge by postmaster J.C. Bloome. More than 10,000 special-issue stamps were sold.[74] Further, the West Virginia State Amateur Radio Council set up three ham radios where people sent out messages to friends and relatives from the bridge for free.[75]

Following the helicopter arrival of U.S. Senator Jennings Randolph and Representative Harley Staggers,[76] the official dedication ceremony began at noon. It opened with a rendition of the National Anthem played on a

[65] "Bridge Opens to Travelers," *Raleigh Register*, Beckley, W.Va., October 14, 1977. And, "New River Gorge Bridge Opens Briefly," *Weirton Daily Times*, Weirton, W.Va., October 14, 1977.
[66] "Parking Spaces for Bridge Dedication Made Available." *Register and Post-Herald*, Beckley, W.Va., October 22, 1977.
[67] "CB Group Aids Bridge Viewers," *Post-Herald and Register*, Beckley, W.Va., October 23, 1977.
[68] "Golden Spike?" *Raleigh Register/Beckley Post-Herald*, Beckley, W.Va., combined edition, October 23, 1977.
[69] "The Bridge Opening Was Magnificent."
[70] "Thousands Cross Largest Arch Span," *Sunday Gazette-Mail*, Charleston, W.Va., October 23, 1977.
[71] "Thousands Cross Largest Arch Span." And, "Today is the Big Day for Bridge Dedication," *The Charleston Gazette*, Charleston, W.Va., October 22, 1977. A generic copy of the certificate provided on dedication day was printed in the *Charleston Gazette*, October 19, 1977.
[72] "Today is the Big Day for Bridge Dedication."
[73] "The Bridge Opening was Magnificent."
[74] "CB Group Aids Bridge Viewers."
[75] "The Bridge is Opening: 'World's Longest' Long Time Coming."
[76] John D. Law, "Good Day for Politicians," *Fayette Tribune*, Oak Hill, W.Va., October 27, 1977.

harmonica by Country Music Hall of Fame member, Charlie McCoy. Dignitaries, such as Governor Rockefeller, Senator Jennings Randolph, and the Master of Ceremonies, Oak Hill Mayor J. Walter Brown, sat on a stage built to look like the bridge. After presentation of the colors by LaFayette Post 149 of the Fayetteville American Legion and an invocation by Reverend Billy Reed Wickline, Brown introduced and welcomed former Governors Moore, Smith, and Patteson. Introductions were followed by a number of speeches including those of representatives from the West Virginia Department of Highways, Michael Baker Corp., and U.S. Steel.[77]

Some speakers celebrated the positive impacts the bridge would have on the area. Governor Rockefeller hailed the bridge as a provider of "new life blood"[78] while Reverend Billy Reed Wickline of the Fayetteville UM Church called the bridge a "rainbow of promised prosperity and progress."[79] Executive director of the Federal Highways Administration, Lester Lamm, discussed how the bridge's opening "closes a gap between Pittsburgh and Miami."[80] Others affirmed its immediate engineering significance. Fayetteville Mayor John L. Witt said the bridge was a "phenomenal feat of man's ingenuity," while U.S. Steel's president, D.M. Roderick proclaimed it was "A new wonder of the world." U.S. Senator Robert C. Byrd declared it was "a technical masterpiece."[81]

At the end of the 1 ½-hour ceremony, Reverend Shirley Donnelly of the Veterans Administration hospital in Beckley delivered a benediction and the ceremony closed with a rendition of *Country Roads* by McCoy and Russ Hicks.[82] After the ribbon cutting by Governor Rockefeller, the first car drove across the bridge carrying him, his wife Sharon, and the winner of the Daily Mail's essay contest, 16-year-old Thomas Wood.[83] In his essay, which beat out 1,125 others, Wood told of his ancestor, Abraham Wood, who was the first European explorer of the New River during an expedition in the seventeenth century.[84]

The day after the dedication and official opening, an editorial in the combined Sunday edition of the *Raleigh Register* and *Beckley Post-Herald* described the dedication:

> It was an event of great moment to a lot of people. It made more or less official and certainly meaningful the appellation of "Corridor L Community" that has of late been applied to that part of West Virginia between Beckley and Sutton brought so much closer together by this magnificent engineering feat.
>
> It is rather like driving the golden spike that linked East and West by railroad in the 1870s.[85]

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[77] "30,000 Attend Dedication Events," *Raleigh Register/Beckley Post-Herald*, Beckley, W.Va., combined edition, October 23, 1977.
[78] *The Baker Engineer*, Volume XXV, 1977, p. 2.
[79] "30,000 Attend Dedication Events."
[80] "Pomp, Ceremony Mark Bridge's Dedication," *Fayette Tribune*, October 27, 1977.
[81] "30,000 Attend Dedication Events."
[82] "The Bridge is Opening: 'World's Longest' Long Time Coming."
[83] "Thousands Cross Largest Arch Span."
[84] "The Winner!" *Daily Mail*, Charleston, W.Va., October 14, 1977.
[85] "Golden Spike?"

The same paper included a full-page ad from Beckley Newspapers, Inc. proclaiming that, with the opening of the bridge, the region was "now a part of one." They welcomed readers to "West Virginia's newest citizen – the Corridor L Community that was born yesterday… It's a community bound to grow, bound to flourish, bound to join together the residents of Southern West Virginia." The article featured a drawing of the bridge with huge chain links on either side that circled around a list of nearby communities illustrating that they are now all linked by the bridge.[86]

Transportation Significance

As 1977 drew to a close, the local newspaper asked area residents, "What was important in '77?" Overwhelmingly, the top two answers were Middle East peace talks and opening of the New River Gorge Bridge.[87] As if the pomp and circumstance surrounding the opening of the bridge and dedication day was not proof enough of the significance of the bridge to the people of West Virginia, during and after construction, the bridge inspired – and continues to inspire – various works of art.

During the months leading up to the opening in 1977, one bridge observer, Al Brenneman, created a latch-hooked rug depicting the bridge.[88] Students at Stonewall Jackson High School in Charleston – approximately an hour away – built a scale model out of plastic and balsa wood while Connar Rule, a local retiree, built one out of toothpicks.[89] The arts and crafts department of the Fayette County Fair Association held a contest for drawings and paintings of the New River Gorge Bridge[90] and the West Virginia Sports Festival featured an image of the bridge on the cover and throughout its second annual souvenir booklet.[91]

Not missing an extraordinary opportunity, many companies sold merchandise depicting the bridge, while others used it in advertising. The Maxwell Hill Furniture Company offered for sale a "limited edition picture of [the] New River Gorge Bridge in sturdy solid red oak frame on rolled brass."[92] E.M. Payne Company offered special edition neckties with monogramed insignia of the bridge while Watkins Gifts offered oil paintings and pewter plates depicting the bridge.[93] The Pryor Funeral Home in East Bank offered complimentary souvenir trays depicting the "World's Longest Bridge."[94]

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[86] "Now a Part of One…," *Raleigh Register/Beckley Post-Herald*, Beckley, W.Va., combined edition, October 23, 1977.
[87] "What Was Important in '77? Area Residents Say Peace Talks and Bridge," *Raleigh Register*, Beckley, W.Va., December 23, 1977.
[88] "New River Gorge Bridge Inspiration for Rug Art," *Daily Mail*, Charleston, W.Va., May 25, 1977.
[89] "New River Gorge Bridge Won't Be Open to Traffic," *Raleigh Register/Beckley Post-Herald*, Beckley, W.Va., June 5, 1976. And, "Jay Can't Open This Tiny Bridge," *Daily Mail*, Charleston, W.Va., October 12, 1977.
[90] "Horse Show is Aug. 14," *Raleigh Register/Beckley Post-Herald*, Beckley, W.Va., August 6, 1977.
[91] "New River Gorge Bridge Featured On Book Cover," *Raleigh Register/Beckley Post-Herald*, Beckley, W.Va., August 20, 1977.
[92] Maxwell Hill Furniture Company, advertisement, *Raleigh Register*, Beckley, W.Va., October 21, 1977.
[93] *Raleigh Register/Beckley Post-Herald*, Beckley, W.Va., October 22, 1977.
[94] Souvenir tray in possession of author. Underside of tray reads, "Compliments of Pryor Funeral Home, East Bank, W.Va., 595-2611 or 949-2116."

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On dedication day, many companies purchased ads in local newspapers mentioning the bridge. Beckley's Hall Furniture Company advertisement read, "From Across the Bridge, Hello" while Mountaineer Tour & Travel, also in Beckley, advertised by inviting readers to "Cross Over the Bridge to Your Dream Vacation…" Crab Orchard Planing Mill's ad simply congratulated southern West Virginia on the opening and included a drawing of the bridge.[95]

Beckley National Bank purchased ad space that read, "The Bridge to Tomorrow…Today!" and went on to state that "the bridge will open new avenues of commercial development by making our area more accessible to interstate travel."[96] Trident Specialties welcomed "Neighbors On The Other Side Of The Bridge."[97] On the day before the dedication, Crawford Chevrolet's advertisement boasted, "The NEW RIVER GORGE BRIDGE Opens This Weekend. Come See The Official Opening and Stop by."[98] JCPenney opened their advertisement for a pantyhose sale at their Beckley store with, "Welcome Neighbors!"[99]

It is no wonder that the opening of the bridge sparked such massive interest from West Virginians and local businesses. The drive across the gorge at this location was reduced from a 45 minute drive on winding and often treacherous roads to less than a minute. Once it opened to regular traffic, the bridge completed the link to connect areas north and south of the gorge. Though the length of Corridor L was not even completed at the time, traffic along the route increased 140 percent with the opening of the bridge. The bridge opening had almost an immediate impact. For example, by April 1978, one trucking company reported an estimated savings in fuel and wages of approximately $3000 a day by cutting off 500 miles a week. Area hospitals located south of the bridge reported an increase in patients from north of the gorge including a 21% increase at Oak Hill Hospital, located about 15 minutes south of the gorge. Without the New River Gorge Bridge, such a trip would have taken about an hour. Prior to its opening, patients north of the gorge found it faster to get to Montgomery or Charleston for their health care needs.[100]

Due to a miners' strike, many area businesses, both north and south of the bridge, were unable to calculate the effects of the bridge opening at the time (spring 1978). Others, however, indicated that business had definitely increased. A car salesman in Summersville, located about 30 minutes north of the bridge, indicated that business picked up nearly 20 percent since the opening of the bridge while a truck stop in the same area reported an increase of 30 percent in overall revenue and 50 percent in truck business.[101]

Corridor L was completed later in 1978, "creating the fastest north-south highway route between Toronto, Canada, and Miami, Fla."[102] Prior to its opening, southbound travelers would have to continue southwesterly on

[95] *Raleigh Register/Beckley Post-Herald*, Beckley, W.Va., October 22, 1977.
[96] "The Bridge to Tomorrow…Today!" *Raleigh Register/Beckley Post-Herald*, Beckley, W.Va., October 22, 1977.
[97] "Get Ready for Winter." *Raleigh Register/Beckley Post-Herald*, October 22, 1977.
[98] Crawford Chevrolet, advertisement, *Daily Mail*, Charleston, W.Va., October 21, 1977.
[99] *Raleigh Register/Beckley Post-Herald*, Beckley, W.Va., October 22, 1977.
[100] Tony Bazzie, "The Bridge: Its Impact Just Beginning," *Beckley Post-Herald*. Beckley, W.Va., April 12, 1978.
[101] "The Bridge: Its Impact Just Beginning."
[102] "New River Gorge Bridge: 10 Years…"

Interstate 79 to Charleston before continuing south on the West Virginia Turnpike. The bridge across the gorge and the opening of Corridor L saved nearly 45 miles. Only the southern half, however, was completed with four lanes. The northern section was constructed for two-lane traffic with a third lane for slow moving vehicles at the steepest grades. However, once open, Corridor L became a major thoroughfare with traffic quickly outpacing estimates. In 1979, a portable traffic counter located at the south side of the New River Gorge Bridge estimated that 5,200 vehicles passed by every day. That number increased nearly 52 percent by 1982 and continued to grow. By 1988, average daily traffic numbered approximately 11,000 vehicles. To accommodate the growing traffic, the entire length of corridor L was widened to four lanes in the 1990s. Traffic has continued to increase. The latest count (2009) estimated nearly 26,000 vehicles a day.[103]

As a link on a major thoroughfare and as a connector of nearby communities, the bridge was bound to have a major impact. Without the bridge, the main link connecting the northern and southern sections of Corridor L, this area of the state would have remained remote and the two sides of the gorge would have remained unconnected unless using a long and treacherous drive down the gorge and back up again. A 1990s study commissioned by ARC proved just how much impact the ADHS had on the Appalachian region. The 1998 report, *Economic Impact Study of the Appalachian Development Highway System*, reviewed the extent to which the completed corridors have helped the ARC's economy and the well-being of Appalachia. It determined that Corridor L had a constant dollar return of 6.34 percent (exclusive of inflation) and, along with all of the other completed corridors, was considered a "good investment" of federal tax dollars. The study determined that all of the completed corridors created jobs and continues to do so. It estimated that by 2015, over 42,000 jobs will exist that would not exist without the ADHS. The study also determined that the system has led to increased production (increasing job opportunities as well as increased wages), has made the area more competitive, and benefits both highway and non-highway users.[104] Without the bridge forming the vital link over the deep New River gorge, Corridor L and these benefits would not have been possible.

An earlier study completed in 1995 detailed various criticisms of ARC that contended its programs have failed to benefit the Appalachian people. However, the study concluded that counties served by ARC programs grew at a faster pace than their comparisons – similar lagging counties outside of Appalachia that did not receive such federal funding.[105] In a 30th anniversary special edition of *Appalachia: Journal of the Appalachian Regional Commission*, ARC declared that "the [New River Gorge Bridge] has generated significant economic growth in four West Virginia counties formerly isolated from tourism and commercial traffic."[106]

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[103] West Virginia Department of Transportation. Traffic Counts. http://www.transportation.wv.gov/highways/programplanning/preliminary_engineering/traffic_analysis/trafficvolume/Pages/default.aspx (accessed 22 April 2013). And, electronic mail from Donna Swigger, WV Department of Transportation Division of Highways, Program Planning and Administration, Traffic Analysis Section, April 17, 2013.

[104] Wilbur Smith Associates, "Appalachian Development Highways Economic Impact Studies," July 1998, p 4, 4-16, and 5-11.

[105] Andrew Isserman and Terrance Rephann, "The Economic Effects of the Appalachian Regional Commission: An Empirical Assessment of 26 Years of Regional Development Planning," American Planning Association, Journal of the American Planning Association, Summer 1995, p. 349, 351, and 362.

[106] "Commemorating 30 Years of Service to the People of Appalachia," *Appalachia: Journal of the Appalachian Regional Commission*, Special Edition, Vol. 28, No. 1&2, Winter/Spring 1995, pg. 43.

The immediate effects of the opening of the bridge and construction of Corridor L are reflected in the area's population. Between 1970 and 1980 the population of Fayette County, where the bridge is located, increased 17.3 percent. Raleigh County, at the southern terminus of Corridor L, increased 23.9 percent. The town of Fayetteville, the closest incorporated community, located a few miles south of the gorge, grew over 38% between 1970 and 1980. Comparatively, the population of adjacent Kanawha County where the state capital is located increased less than one percent during the same time period while the state capitol, Charleston, lost over 10% of its population.[107] Though other factors may have contributed, the improved access to the area undoubtedly had an impact on its growth during this time. By the 1990 census, however, the area's population decreased proportionally with the rest of the state. While the opening of the bridge continues to have an effect on the area and the state, the major portion of the impact on the development on the Fayette County area came in the immediate decade following the bridge's opening. Thus, the period of significance under Criterion A is 1977, the year it opened, and ends c.1985 to reflect the initial period of growth and development.

Engineering Significance

In 1976, though not yet completed, the Guinness Book of World Records listed the New River Gorge Bridge as the longest single-span steel arch bridge in the world.[108] Though not designed or constructed to boast, it beat out former record-holder, New Jersey's Bayonne Bridge over the Kill van Kull Strait, by a mere 48 feet. New Jersey's bridge held the title since it was constructed in 1931. At 876 feet, when constructed, the New River Gorge Bridge was the second highest in the country; second only to the Royal Gorge Bridge in Colorado and 325 feet taller than the Washington Monument.[109] The enormity of the New River Gorge Bridge and its massive single arch over the deep, wide gorge are a testament to the vast technological advances in engineering at the time. The design and construction of the New River Gorge Bridge highlighted the changes in bridge design and construction, including the extensive use of computer programs, since the previous record-holder was constructed in 1931.

Immediately, the bridge began to win praise and accolades from professionals in the field. In 1978, it was awarded merit honors from the National Steel Bridge Alliance (a division of the American Institute of Steel Construction) in their yearly Prize Bridge Award Competition. The competition, which provides "national recognition to the most outstanding steel bridges in the United States," started in 1928 and judges bridges based on innovation, aesthetics, design, and engineering solutions.[110] That same year, the National Society of Professional Engineers awarded the New River Gorge Bridge as one of the ten outstanding engineering achievements of 1977. Other achievements they honored included the Space Shuttle Enterprise, the Trans-

[107] United States Census Bureau. http://www.census.gov/ (accessed 23 April 2013).
[108] "Guinness Calls it World Record," *Raleigh Register and Beckley Post-Herald*, Beckley, W.Va., October 22, 1977.
[109] "Bridge Facts and Figures."
[110] The National Steel Bridge Alliance, http://www.aisc.org/contentNSBA.aspx?id=20354&linkidentifier=id&itemid =20354 and http://www.aisc.org/contentNSBA.aspx?id=20352&linkidentifier=id&itemid=20352 (accessed 22 March 2013).

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Alaskan Pipeline, and Mile High Stadium in Denver.[111] In 1978, the New River Gorge Bridge was also a nominee for the Outstanding Civil Engineering Achievement Award of the American Society of Civil Engineers.[112]

The professional community has continued to recognize the New River Gorge Bridge as honors have continued in the twenty-first century. The American Road & Transportation Builders Association listed the New River Gorge Bridge as one of the "Top 100 American Transportation Projects of the 20th Century" as a vital component to the Appalachian Highway System in West Virginia and as the longest steel arch bridge in the country. The list recognized two significant infrastructure projects in every state from the 20th century, listing West Virginia's interstate as the other significant project.[113] In 2006, long-standing trade publication, *Roads & Bridges Magazine*, listed the New River Gorge Bridge as one of the 10 "Top All-Time Bridges." Listing it in the company of those such as the Golden Gate Bridge, the Brooklyn Bridge, and the George Washington Bridge in New York, the magazine called it one of the 10 "most-heralded monuments to design, engineering and construction technique ever built."[114] The New River Gorge Bridge was also listed by *Architectural Digest* as one of "Ten Remarkable U.S. Bridges…combining monumental design, feats of engineering, and the natural beauty of the landscape."[115]

While there are many steel arch bridges in the United States, few compare to the New River Gorge Bridge. Perhaps the most similar from the time period include the Glen Canyon Dam Bridge (1959) in Coconino County, Arizona, the Burro Creek Bridge (1966) in Mohave County, Arizona, and the Perrine Bridge (1976) in Twin Falls County, Idaho. Like the New River Gorge Bridge, each of them is a deck arch bridge (the roadway is above the arch). The Glen Canyon Dam Bridge, also an open-spandrel, single-span deck arch, was completed with a span of 1,028 feet, towering 700 feet over the Colorado River. Like the New River Gorge Bridge, it too was constructed using a cableway and tieback system.[116] The Burro Creek Bridge arch spans 680 feet across the Burro Creek and the Perrine Bridge reaches nearly 1000 feet across the Snake River. While these bridges are similar in design, their arch span lengths are considerably shorter than that of the massive New River Gorge Bridge, an indication of its status as a major engineering accomplishment. Further, while each of these bridges includes a truss-type arch, only the New River Gorge Bridge also includes a deck truss supporting the roadway. While this simple span does not add engineering significance, this design element further sets it apart from the others.

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[111] "New River Gorge Bridge Chosen as Outstanding Engineering Achievement of 1977," *Putnam Democrat*, Winfield, W.Va., November 30, 1978.
[112] "New River Gorge Bridge: World's Longest Steel Arch," *Civil Engineering Magazine*, June 1978, No. 6, Volume 48, p. 119-120.
[113] "ARTBA Applauds WV for Top 20th Century Projects," *Construction Equipment Guide*, http://www.construction equipmentguide.com/ARTBA-Applauds-WV-for-Top-20th-Century-Projects/2331 (accessed 14 March 2013).
[114] Allen Zeyher, "Top All-Time Bridges: Crossover Hits," *Roads & Bridges Magazine*, http://www.roadsbridges. com/top-all-time-bridges-crossover-hits (accessed 25 March 2013). And, "New River Bridge's Recognition Should Spark Pride Among Citizens," *The Register-Herald*, Beckley, W.Va., May 30, 2006.
[115] Kate Jerde, "Ten Remarkable U.S. Bridges," *Architectural Digest*. http://www.architecturaldigest.com/ad/2012-02/amazing-bridges-united-states-slideshow (accessed 28 February 2013).
[116] "Glen Canyon Dam Bridge," http://www.highestbridges.com/wiki/index.php?title=Glen_Canyon_Dam_Bridge (accessed 4 April 2013).

Though the arch of the New River Gorge Bridge is the longest in the country at 1700 feet, there are other bridges with a single-span arch over 1000 feet. However, many of them are of them are through arch bridges, carrying the deck below the arch, and are thus aesthetically different (for example, see Hell Gate Bridge in Queens County, New York; Roosevelt Lake Bridge in Gila County, Arizona; Fremont Bridge in Multnomah County, Oregon; and Bayonne Bridge in Hudson County, New Jersey). Deck arch bridges, like the New River Gorge Bridge, with a span over 1000 feet include the abovementioned Glen Canyon Dam Bridge, the Lewiston-Queenston Bridge (1960) in Niagara County, New York and the Mike O-Callaghan-Pat Tillman Memorial Bridge (2010) in Mohave County, Arizona. Neither of the latter two is of the truss design, however, and thus employed different types of design and construction techniques.

The Glen Canyon Dam Bridge, likely the most similar to West Virginia's, opened in 1959 with ribbon-cutting and dedication ceremonies like that at the New River, though on a much smaller scale. It too became a tourist attraction and also won accolades such as an award from the National Steel Bridge Alliance.[117] Its final cost totaled just over $4 million. Comparatively, just over a decade later, the lowest bid for construction of the New River Gorge Bridge was $34 million.[118] The final cost totaled more than $37 million. This price tag indicates not only the enormous scale of the bridge, but also the construction challenges it faced due to this remarkable size and the rugged West Virginia terrain and location. Overcoming such obstacles during construction, as well as the then-modern techniques – including computers – used to build the engineering marvel, add to the bridge's significance.

In a 1977 issue of *Civil Engineering Magazine* Clarence Knudsen, chief engineer at Baker, discussed the use of computers in the design and construction of the New River Gorge Bridge and its advantage:

> Today's engineers make use of powerful computers to analyze the stresses in the bridge's members. The computer allows stresses in the arch to be calculated much more accurately. The best shape of the arch and the most economical member size can be determined more accurately. Result: much less time needed to do calculations; a considerable savings in steel, since materials are being used more efficiently.[119]

As an example, Knudsen discussed the length of the closing member of the arch and the jacking method. Without the extensive use of computers, engineers for previously constructed major arch bridges – including the Bayonne Bridge and the Glen Canyon Dam Bridge – were required to measure loads and adjust the length of the closing member in the field, often proving to be an unreliable method. Using "modern" computers, accurately fabricated bridge members were produced for the New River Gorge Bridge at the fabrication plant and the final members were simply lowered into place by the cableway and trolley system and the two arms of the arch lowered into place. The New River Gorge Bridge was the first major bridge constructed using this method. Doing so

[117] "Glen Canyon Bridge Proves Drawing Card," *The Signal*, Santa Clarita, Ca., March 30, 1961. And, "Glen Rites to Mark 'Outstanding' Span," *The Salt Lake Tribune*, November 17, 1960.
[118] Adjusted for inflation, the Glen Canyon Dam Bridge would have cost approximately $6.1 million in 1973.
[119] Clarence V. Knudsen, "New River Gorge Bridge: World's Longest Steel Arch," *Civil Engineering* ASCE, Volume 47, No. 2, February 1977, p. 56.

indicated that the designers depended on the accuracy of fabrication.[120] The closing of the gap was described by the West Virginia Division of Highways in 1976:

> At the time of the actual closure, the gap between the top chord members will be only a few inches. The contractor will then relax the jacks on the arch tie back anchorage to lower the two halves to bear on a pin plate arrangement at the center of the top chords. As the jacks are being further released, the weight of the arch steel will be transferred to the top chord of the arch. This in turn will cause the center of the arch to rise somewhat. Finally, American Bridge Division will pin and bolt the top chords into position. No longer required, the arch tie back system will later be dismantled and removed.[121]

Computers were behind the numerically controlled drilling equipment that were able to mill the steel arch members to such a close tolerance that money was saved through the reduction in size and thickness of gusset and splice places as well as in the number of bolts required in connections.[122]

Knudsen's article went on to discuss other engineering advancements used in construction of the bridge. One of the improvements was the bolts. Whereas many earlier steel bridges were riveted together, the New River Gorge Bridge used high strength bolting. By doing so they cut the number of workers required for this aspect of the job in half, the job was completed faster than if riveted, and it allowed for thicker steel plates, thus increasing dependability. These thicker steel plates, up to four inches thick, also derived from technology not available to many of the earlier bridges.[123]

In a paper presented to the American Society of Civil Engineers a few years earlier in 1975, ABD engineer, William F. Hollingsworth, reviewed the unprecedented growth and achievement in steel arch bridge design and construction since the early twentieth century. He also discussed the major developments including the use of computers in bridge design and the increased accuracy in surveying. He noted the engineers' nod towards aesthetics and the improvement in the grades of steel and the high-strength bolt. Other achievements of the time he discussed included the employment of each of the efficient methods of construction (tiebacks and cableways) as well as the use of numerically controlled equipment. The paper discussed a number of representative bridges and ended with a comparison of the two longest spans – the Bayonne Bridge and the New River Gorge Bridge – constructed at opposite ends of his study period. West Virginia's bridge has achieved all of these then-modern advancements in bridge engineering and did so with major obstacles in its way – the terrain and the then-remote location.[124]

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[120] Knudsen, p. 56.
[121] "New River Gorge Bridge, Fayette Co., W.Va., World's Longest Steel Arch Bridge," program brochure, May 1976, courtesy of Bridge Walk, Lansing, W.Va.
[122] Knudsen, p. 56.
[123] Knudsen, p. 55-56.
[124] William F. Hollingsworth, "Fifty-Year Development: Construction of Steel Arch Bridges," *Journal of the Construction Division*, Volume 101, No. 1, March 1975, p. 85-103. Reprinted in *Modern Steel Construction*, 1975, Volume XV, No. 2., p. 3-15.

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Crews dealt with the steep terrain and remote location by building a rail line not far from the construction site and hauling steel members by truck to an assembly site where entire truss sections were built on site on the ground and hoisted over the gorge by the cable system. Though the tower-and-cable system was used for decades before the construction of the New River Gorge Bridge, it was never used on such a massive scale. The 5,000 foot cables were capable of hauling 100 tons of steel out to the center of the gorge (as compared to the 1,540 foot, 25-ton capacity cable system of the Glen Canyon Dam Bridge[125]).

Immediately, due to the magnitude of the project and the massiveness of the bridge and arch, the New River Gorge Bridge became a major attraction. Even before construction was complete, the New River Gorge Bridge drew tourists from all over the country. By 1975 two temporary overlooks with parking areas were constructed to help corral tourists who came to see the massive structure reach from one side of the gorge to the other.[126] The closing of the arch itself drew 6,000 spectators as well as officials from the Federal Highway Administration.[127] The bridge remains one of West Virginia's major points of interest.

Just northeast of the bridge the National Park Service constructed the Canyon Rim Visitor Center in the early 1990s replacing an earlier facility. Though the main purpose of the center is to serve visitors to the park and provide information on the New River Gorge National River (established in 1978), many of the 300,000 to 400,000 annual visitors are attracted by the bridge.[128] A short trail from the center descends to a wooden boardwalk with observation decks that provide unobstructed views of the bridge's massive 1700 foot arch. Further, due to the considerable height over the gorge and the large size of the bridge, it is home to one of West Virginia's best known events. Every fall since 1980 festival goers converge on the small community to attend Bridge Day, the only day of the year when it is legal to walk on, as well as jump and rappel from the bridge. The festival has grown from its humble beginnings with five parachutists and a few thousand onlookers to welcome an average of 80,000 spectators every year watching nearly 400 B.A.S.E. jumpers and 300 rappellers.[129] They patronize local hotels, restaurants, and filling stations impacting the local economy significantly. Also contributing to the local economy are the over 11,000 Bridge Walk "walkers" who have come to Fayette County to walk the catwalk that runs the entire length of the bridge inside the deck truss, under the roadway. Walkers have come from all 50 states and 42 countries with one proclaiming, "I have been in 30 countries and this is one of the best sites in the world!"[130]

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[125] Hollingsworth, p. 10.
[126] "World's Longest: New River Bridge Engineering Feat," *Times West Virginian*, August 17, 1975. And, "New River Gorge "Bridge Already Draws Tourists," *Southwest Times*, Pulaski,Va., September 18, 1975.
[127] "FHWA by Day: A Look at the History of the Federal Highway Administration," http://www.fhwa.dot.gov/byday/fhbd0513.htm (accessed 26 April 2013).
[128] "Canyon Rim Visitor Center," New River Gorge National River, http://www.nps.gov/neri/planyurvisit/crvc.htm (accessed 22 March 2013). And, Joe Kennedy, "What's New at New River: The Superintendent's Update," unpublished manuscript in the clipping file of the WV State Archives, Charleston, W.Va. And, Mannix Porterfield, "Welcome Center Greets Tourists Year Round," *The Register-Herald*, September 26-27, 1998.
[129] Officialbridgeday.com (accessed 28 March 2013).
[130] "Bridge Walk: For the Walk of Your Life," brochure courtesy of Bridge Walk, Lansing, W.Va.

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Criteria Consideration G

Though not yet 50 years old, the New River Gorge Bridge is of exceptional importance as a major engineering and construction achievement as well as for its extreme importance in linking this part of Appalachia with the rest of the state.

The context for evaluation of its engineering significance is bridge design and construction in the United States. The New River Gorge Bridge represents exceptional significance as its design and construction value was quickly recognized as significant by the engineering profession. As noted under "Engineering Significance," the bridge has received immediate praise and honors from various recognized organizations and continues to be recognized through the twenty-first century. At the time of construction, modern advancements in technology, such as the use of the computer, had made the design and construction of the massive structure over the deep gorge possible and distinguished it from the previous arch record-holder, the Bayonne Bridge.

The context for evaluation for its exceptional local transportation significance is the development of the area following the opening of the New River Gorge Bridge. The bridge, the "largest single road project of the Appalachian Development Highway System,"[131] was part of the Appalachian Development Highway System. The ADHS linked Appalachia to the federal interstate highways systems, opening up the areas to tourism and economic growth, and putting jobs, education, and health care within reach to many.[132] Immediately after its opening, local business north and south of the gorge reported an increase in business and others reported savings in transportation costs. The bridge reduced the river crossing from a 45 minute drive on a winding road down one side of the gorge and up the other to less than one minute.

Summary

Prior to the completion of the New River Gorge Bridge, ABD built many large and remarkable bridges and structures throughout the country and the world. Even so, during his talk to the Fayette County Chamber of Commerce in 1975, ABD President J.J. Long wrapped up by declaring, "I can promise you that you will be proud of your bridge and, in my view, this project will later be honored as one of the great engineering construction feats of this century."[133] His proclamation was exactly right. Not only has the bridge been honored for its design and construction, but the people of West Virginia are exceptionally proud as well.

In 2005, it was picked overwhelming by the people as the single image to reflect the state on the 2005 state quarter and is also commemorated on a 2011 U.S. Postal Service stamp.

[131] "A Report to the Region," *Appalachia: Journal of the Appalachian Regional Commission*, January-February 1980, p. 4.
[132] "Commemorating 30 Years of Service to the People of Appalachia," p. 72.
[133] "Full Construction Work Set On Fayette Bridge," *Raleigh Register*, Beckley, W.Va., May 19, 1975. And, "Construction Work Will Start On New River Gorge Bridge July 1," *Beckley Post-Herald*, Beckley, W.Va., May 20, 1975.

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The bridge retains all of the National Register seven aspects of integrity. Other than minor alterations and upkeep, the bridge remains as originally built. It is eligible on the national level under Criterion C: Engineering and on the local level under Criterion A: Transportation.

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VERBAL BOUNDARY DESCRIPTION

The boundary for the New River Gorge Bridge begins at a point (Z17/E493111/N4213708) on the northern side of the gorge and continues southeast for a distance of approximately 72 feet to a second point (Z17/E493126/N4213692). From here it continues southwesterly for approximately 3030 feet six inches to a third point (Z17/E492358/N4213193) before continuing northwest 72 feet to a fourth point (Z17/E492349/N4213218). From this point, the boundary continues northeasterly to the point of beginning.

BOUNDARY JUSTIFICATION
The National Register boundary for the New River Gorge Bridge includes the entire footprint of the bridge including the superstructure, deck, foundations, abutments, and approaches. It includes the entire area historically associated with the bridge and extends along the outside of the material edges of the bridge 73 feet, five inches wide by 3030 feet, six inches long.

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PHOTOS

Photographer: Tyler Evert, WV Division of Culture and History
Date: May 2, 2013

Photo 1 of 14	Bridge overview, facing northwest
Photo 2 of 14	Bridge overview, with original New River crossing in foreground, facing northwest
Photo 3 of 14	Arch, bents, and deck truss detail (see cross sections between column bents), facing west
Photo 4 of 14	Arch and deck truss detail (see inverted A-frame member in arch center), facing west
Photo 5 of 14	Showing roadway, parapet walls, rails, and deck truss. Also shows modern walkway constructed within the boundary. Facing west-southwest
Photo 6 of 14	View downward (southeast) toward New River and two rail lines 851 feet below the catwalk through arch truss.
Photo 7 of 14	Inside deck truss showing catwalk, stringers, and floor beams, facing southwest.
Photo 8 of 14	Truss members of deck truss and center inverted A-frame member, facing southeast.
Photo 9 of 14	Center inverted A-frame member between center of arch and deck truss.
Photo 10 of 14	Example of expansion joint (gear configuration).
Photo 11 of 14	Example of a rocker shoe.
Photo 12 of 14	Bent 21, downstream column (showing cross bracing between bents), facing southwest.
Photo 13 of 14	Bent 21, downstream column detail, facing southwest.
Photo 14 of 14	Bent 21, cross bracing detail, facing southwest.

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IMAGES (see continuation sheets)

Images courtesy of the State Archives, WV Division of Culture and History, unless otherwise noted.

Image 1 of 13	Construction photo showing approach bents and deck truss as well as arch arms, facing east.
Image 2 of 13	Construction photo showing north side approach and arch arm as well as twin towers and cable system, facing east.
Image 3 of 13	Construction photo showing K-bracing on arch arm and tiebacks, facing south-southwest.
Image 4 of 13	Construction photo showing tieback system from arch arm to approach, facing west-southwest.
Image 5 of 13	Arch construction detail showing ladders and safety nets, facing northeast.
Image 6 of 13	Construction photo showing arch arms nearly complete. Also showing tieback and cable system, facing west.
Image 7 of 13	Tieback system detail, facing west.
Image 8 of 13	Members being transported to the construction site.
Image 9 of 13	Arch nearly complete, showing tieback and cable system.
Image 10 of 13	Final member of arch being lowered into place, showing cable system.
Image 11 of 13	Deck truss nearly complete, facing west.
Image 12 of 13	Bridge nearly complete, showing tower and cable system, facing west-southwest.
Image 13 of 13	Bridge Day festival, 2007 (courtesy of the Fayette County Chamber of Commerce).

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Image 1 of 13 Construction photo showing approach bents and deck truss as well as arch arms, facing east.

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National Park Service

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Section number **Images** Page **35**

Image 2 of 13 Construction photo showing north side approach and arch arm as well as twin towers and cable system, facing east.

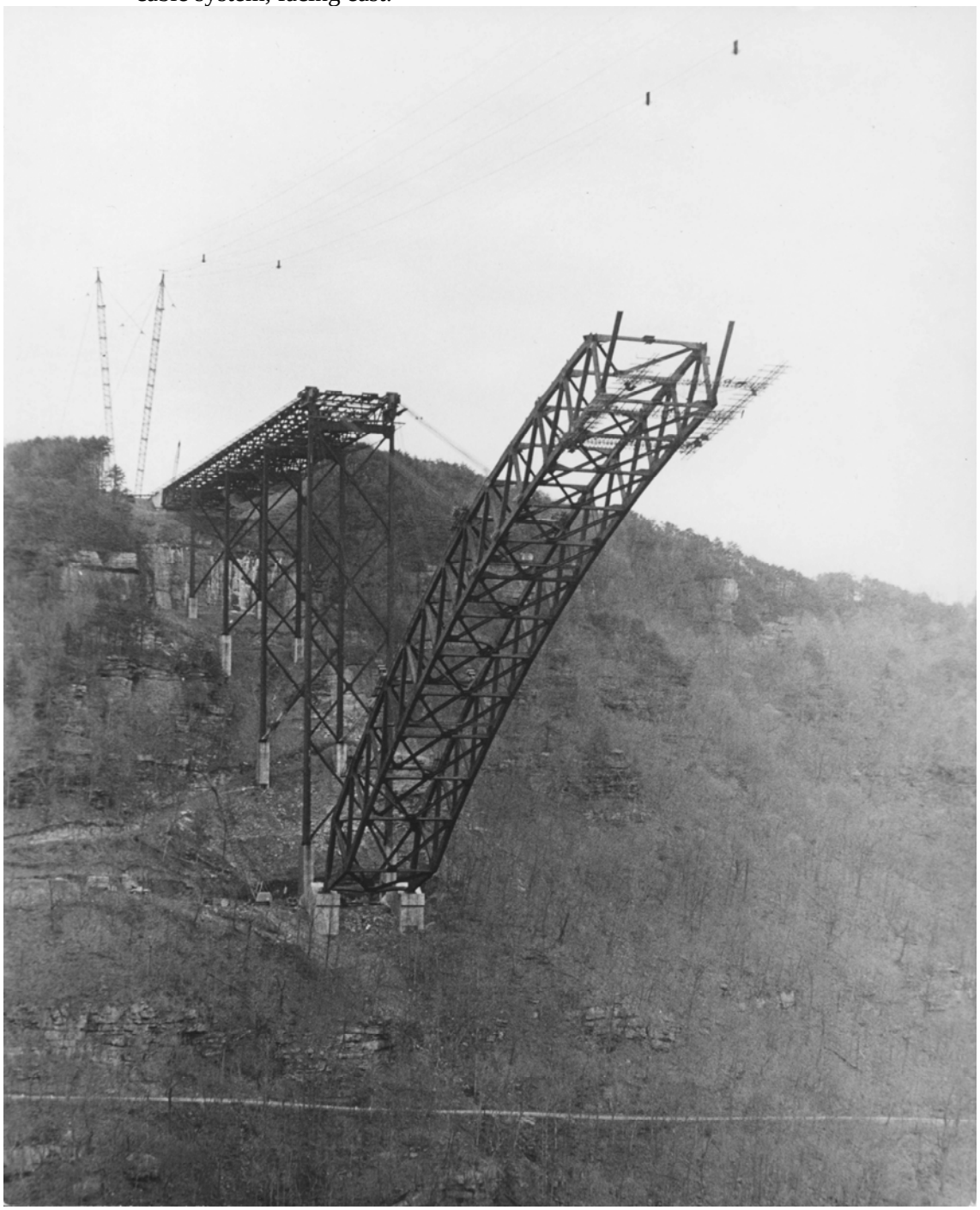

Image 3 of 13 Construction photo showing K-bracing on arch arm and tiebacks, facing south-southwest.

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Section number **Images** Page **37**

Image 4 of 13 Construction photo showing tieback system from arch arm to approach, facing west-southwest.

Image 5 of 13 Arch construction detail showing ladders and safety nets, facing northeast.

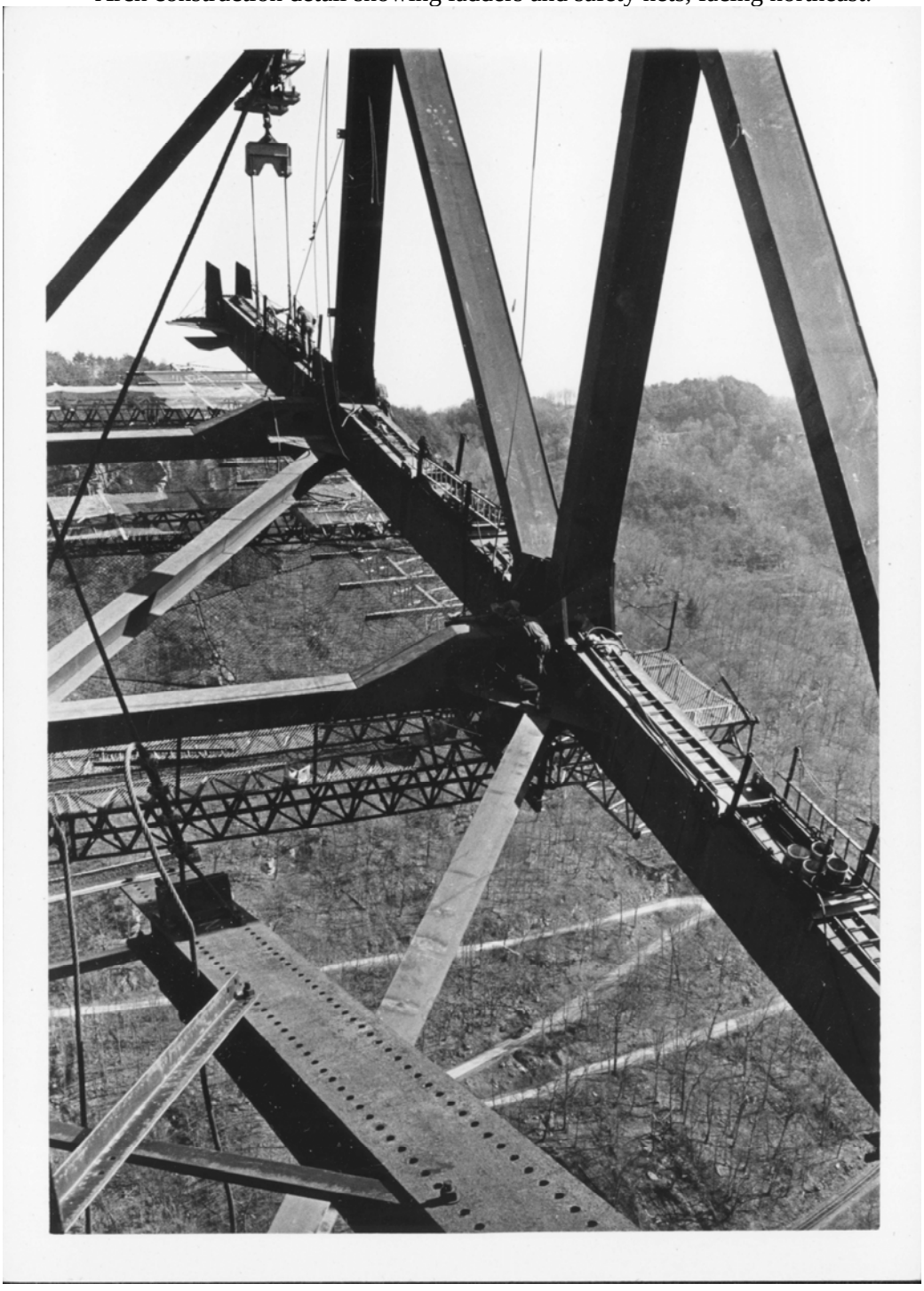

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Image 6 of 13
Construction photo showing arch arms nearly complete. Also showing tieback and cable system, facing west.

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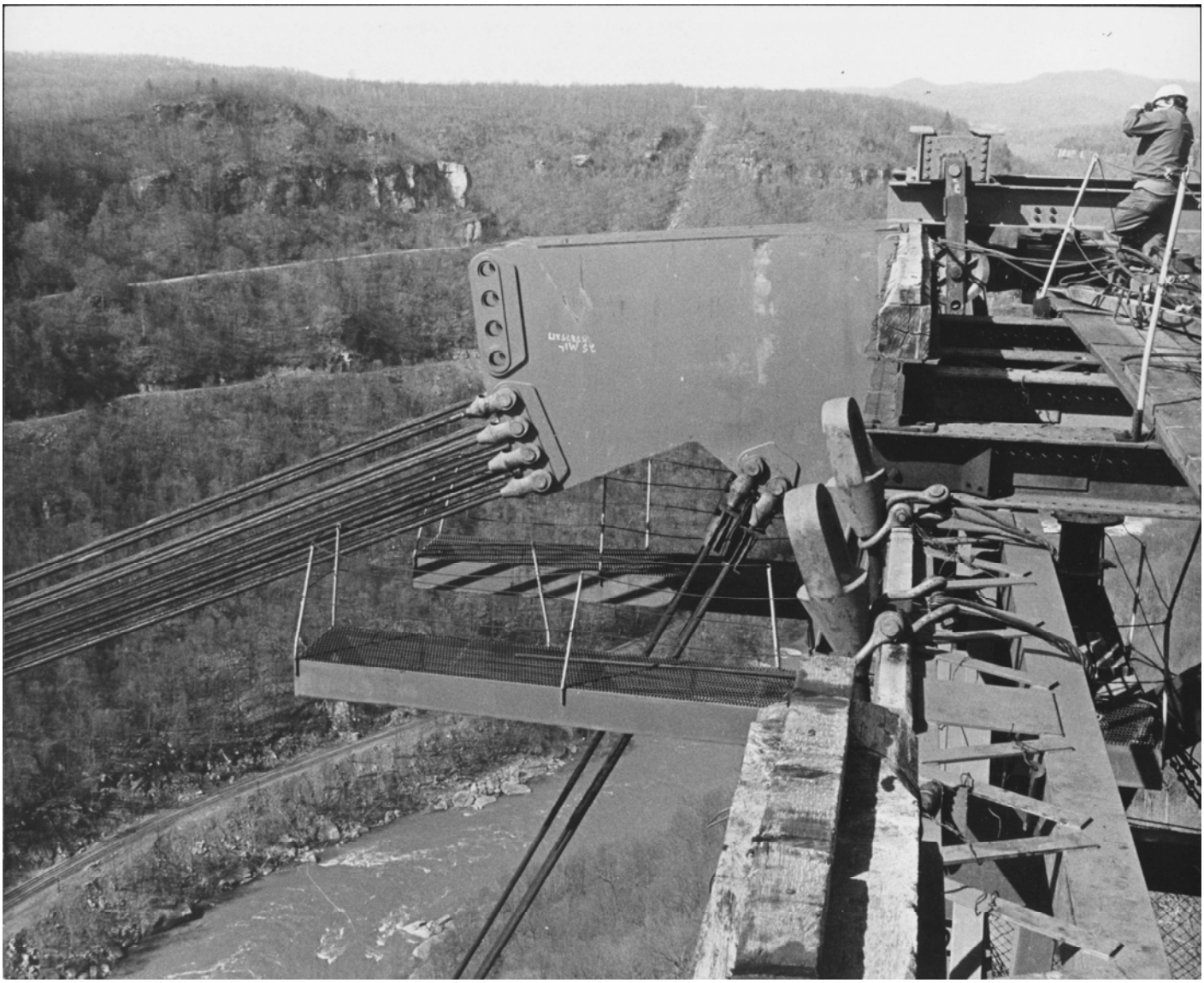
Section number **Images** Page **40**

Image 7 of 13 Tieback system detail, facing west.



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Section number **Images** Page **41**

Image 8 of 13 Members being transported to the construction site.

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Section number **Images** Page **42**

Image 9 of 13 Arch nearly complete, showing tieback and cable system.

Image 10 of 13 Final member of arch being lowered into place, showing cable system.

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Section number **Images** Page **44**

Image 11 of 13 Deck truss nearly complete, facing west.

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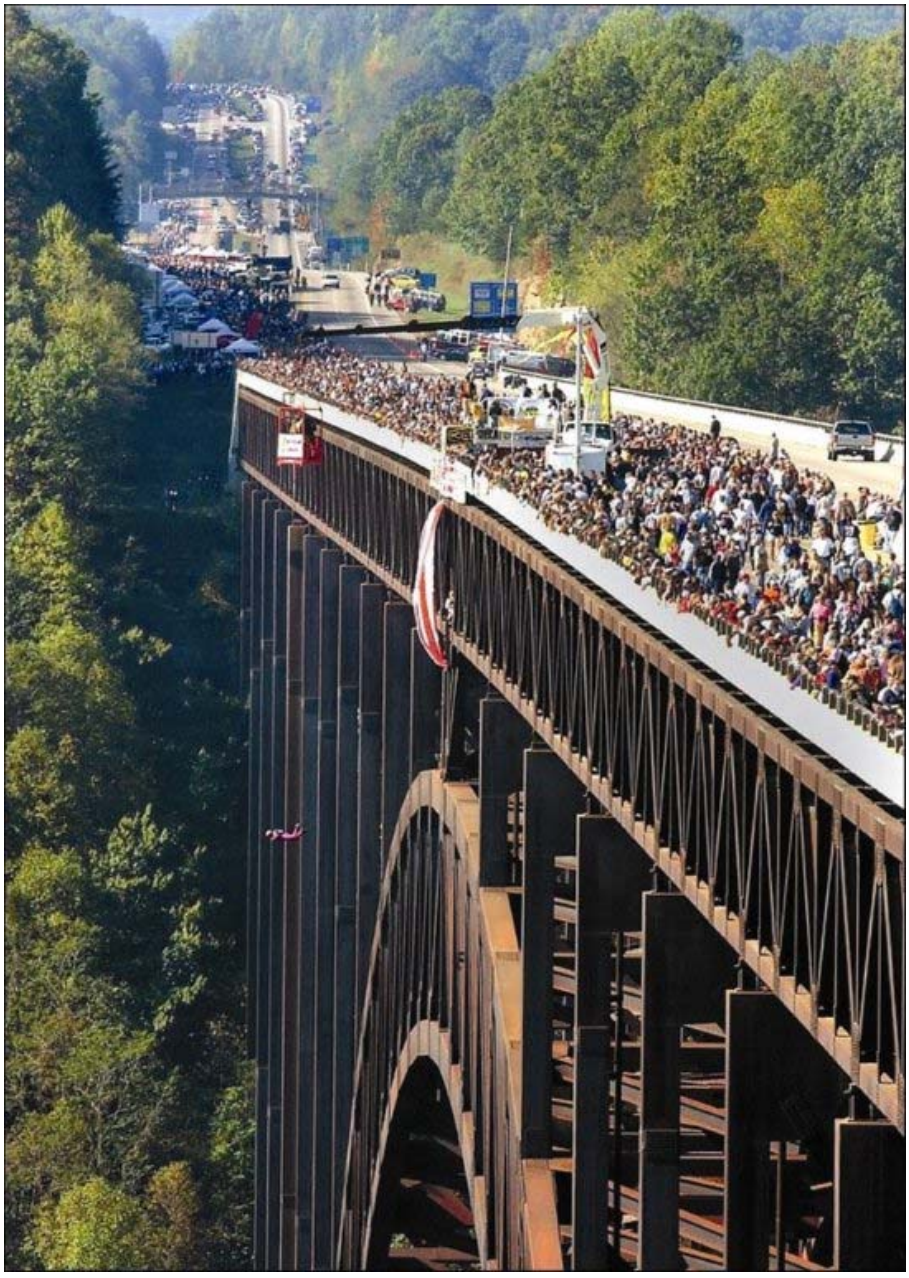
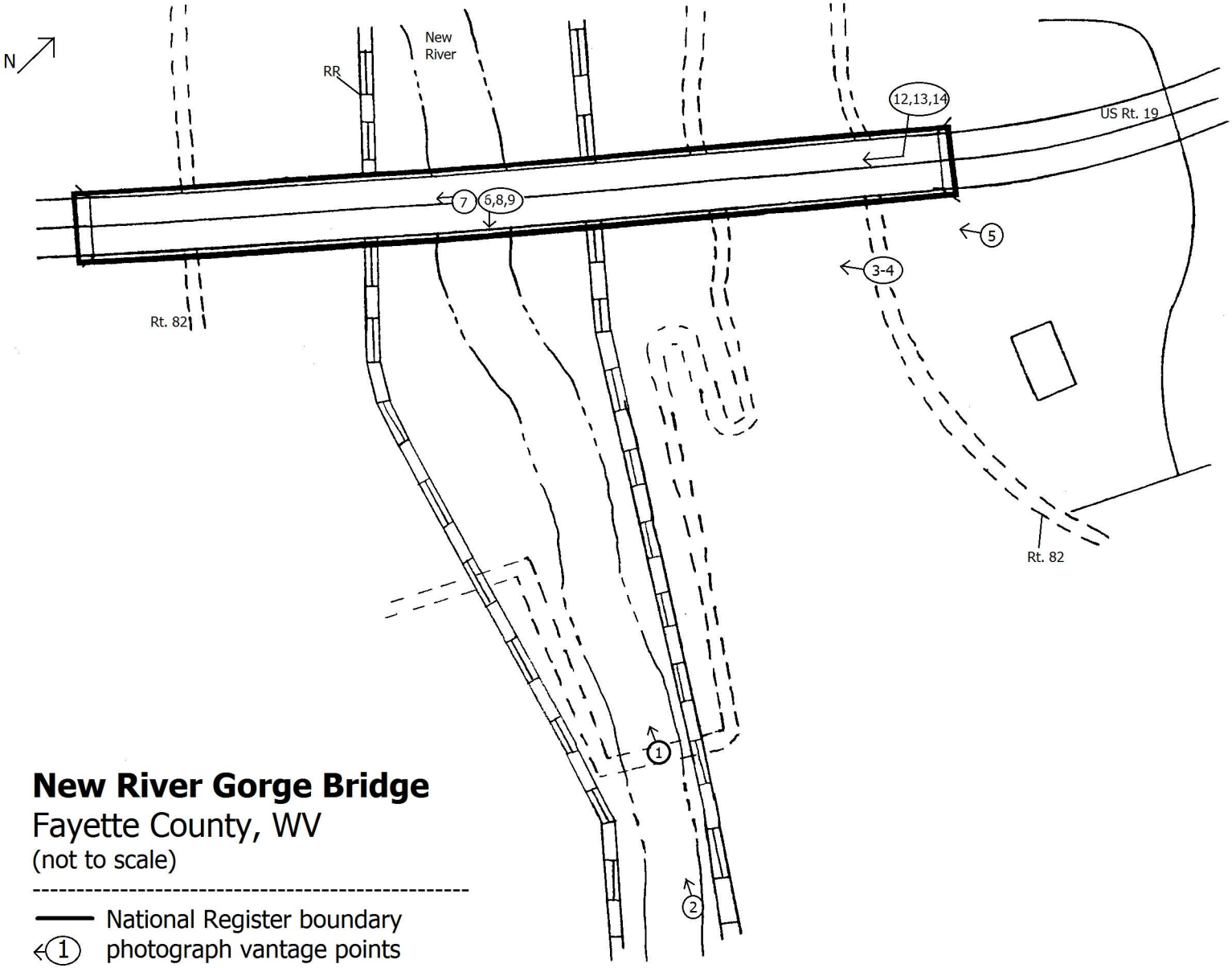
Section number **Images** Page **45**

Image 12 of 13 Bridge nearly complete, showing tower and cable system, facing west-southwest.

Image 13 of 13 Bridge Day festival, 2007 (courtesy of the Fayette County Chamber of Commerce).

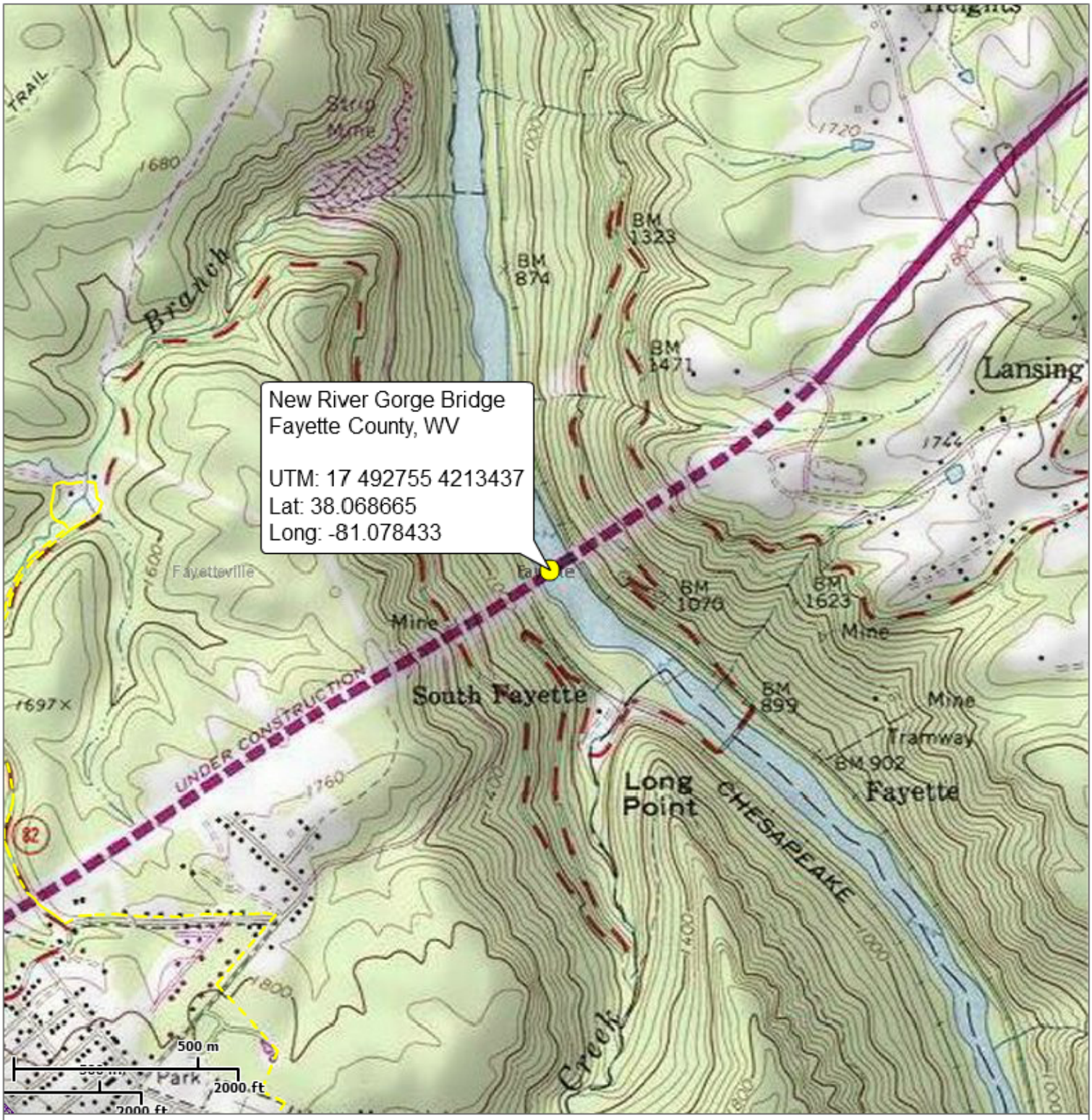




New River Gorge Bridge
Fayette County, WV
(not to scale)

National Register boundary
① photograph vantage points

New River Gorge Bridge, Fayette County, WV



This map is created by West Virginia GIS Technical Center for West Virginia SHPO GIS Map Viewer.

Coordinate System: WGS 1984 Web Mercator (Auxiliary Sphere)

Map Created on 5/1/2013

Architectural
- Point
- Area

National Register
- Point
- Area

User Notes:

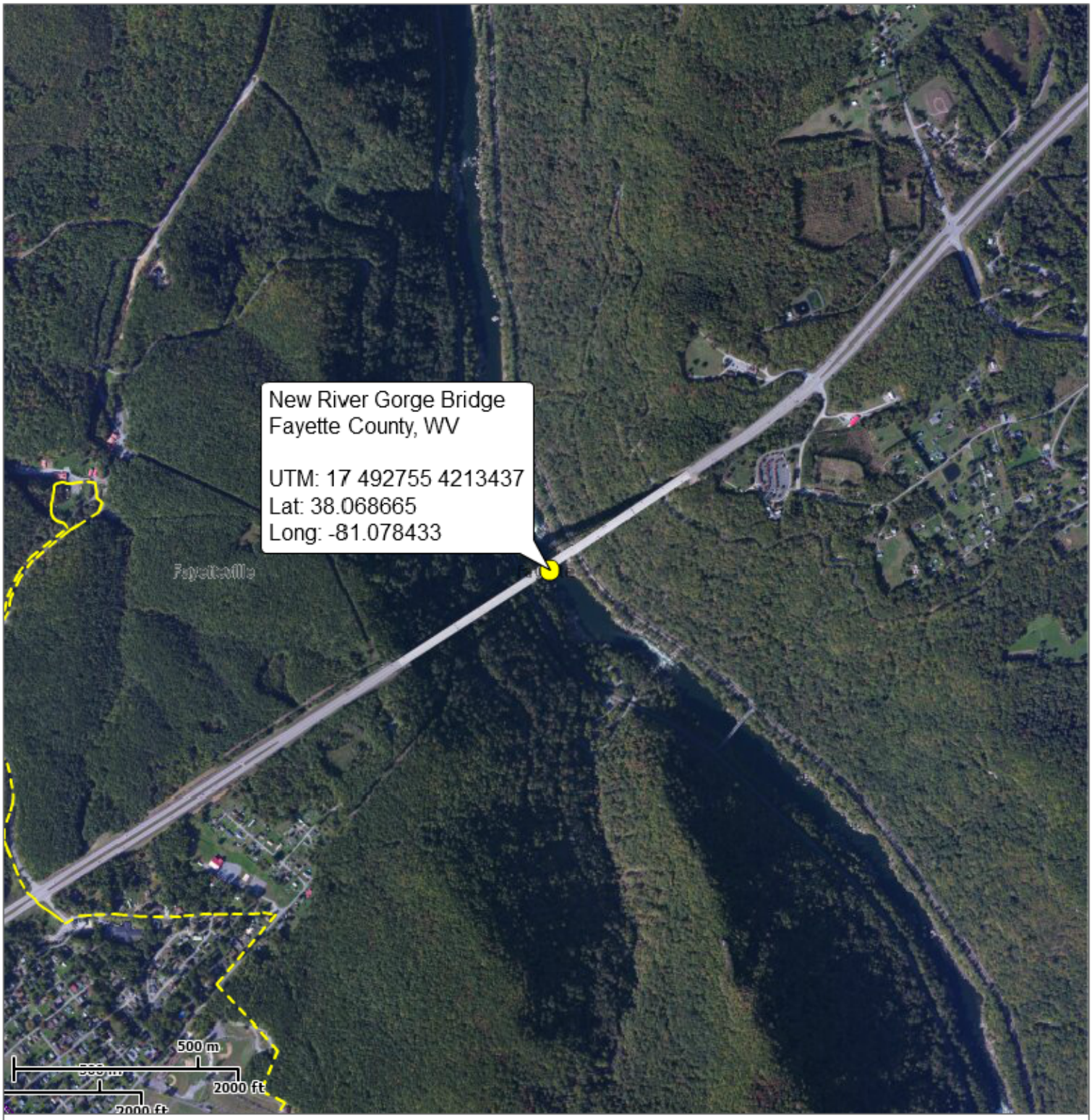
USGS 7.5' topographic quadrangles: Fayetteville
UTM: 17 492755 4213437
Lat: 38.068665
Long: -81.078433

Disclaimer:

The West Virginia State Historic Preservation Office Interactive Map is designed to provide professional consultants, state/federal agency employees and the public with a means to make informed decisions with regards to the cultural resource location.

N

New River Gorge Bridge, Fayette County, WV



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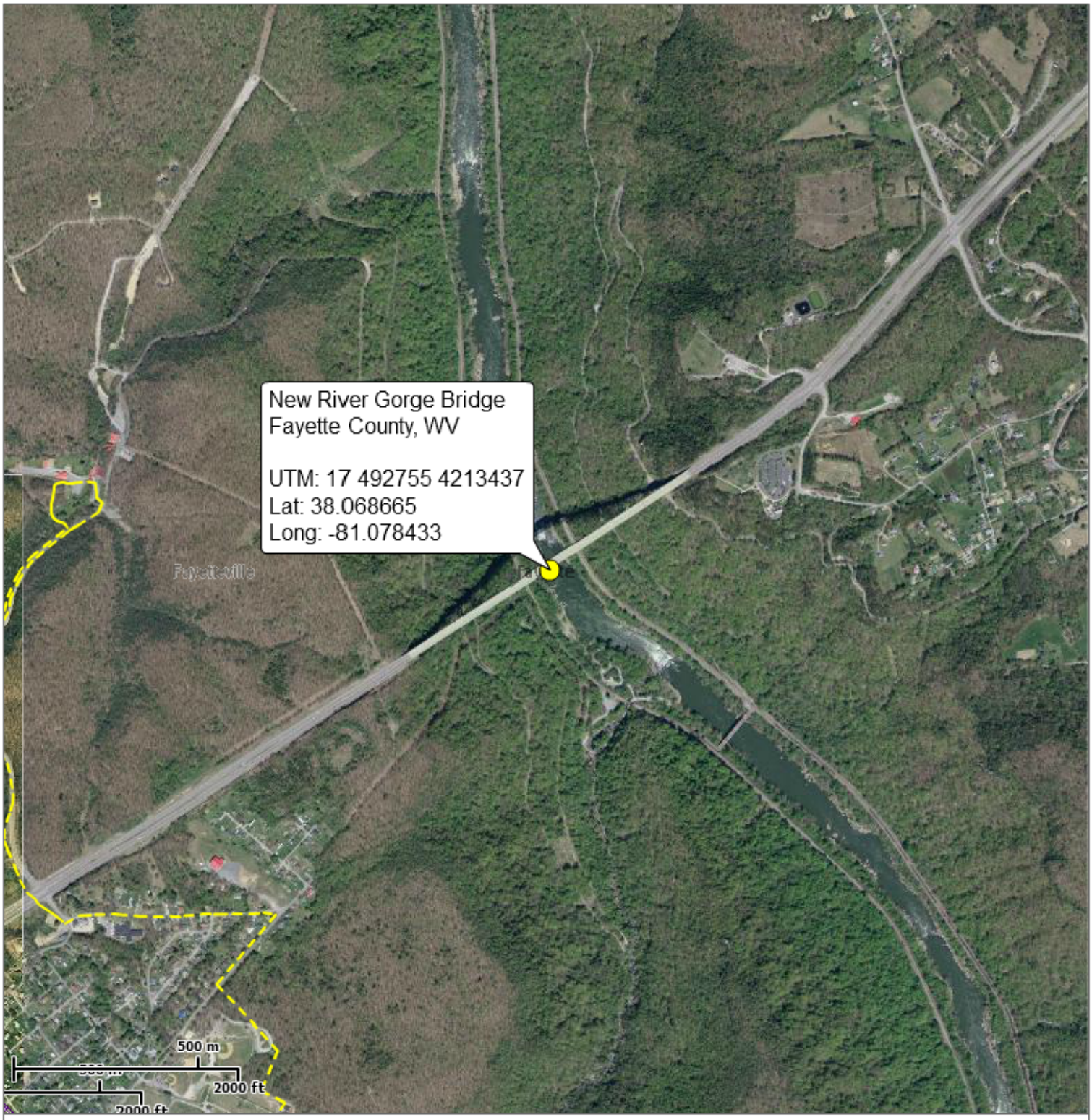

This map is created by West Virginia GIS Technical Center for West Virginia SHPO GIS Map Viewer.

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Map Created on 5/1/2013

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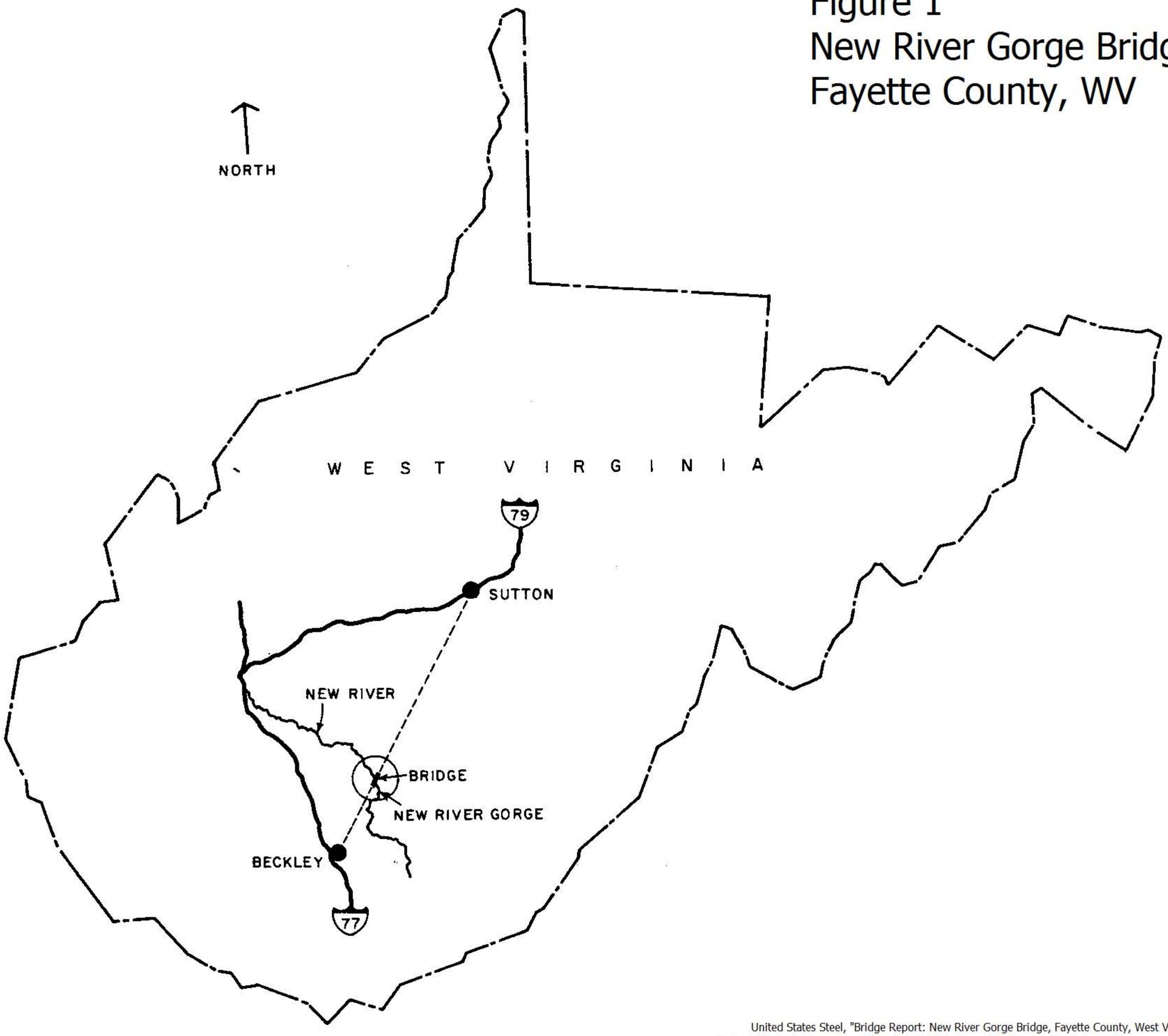
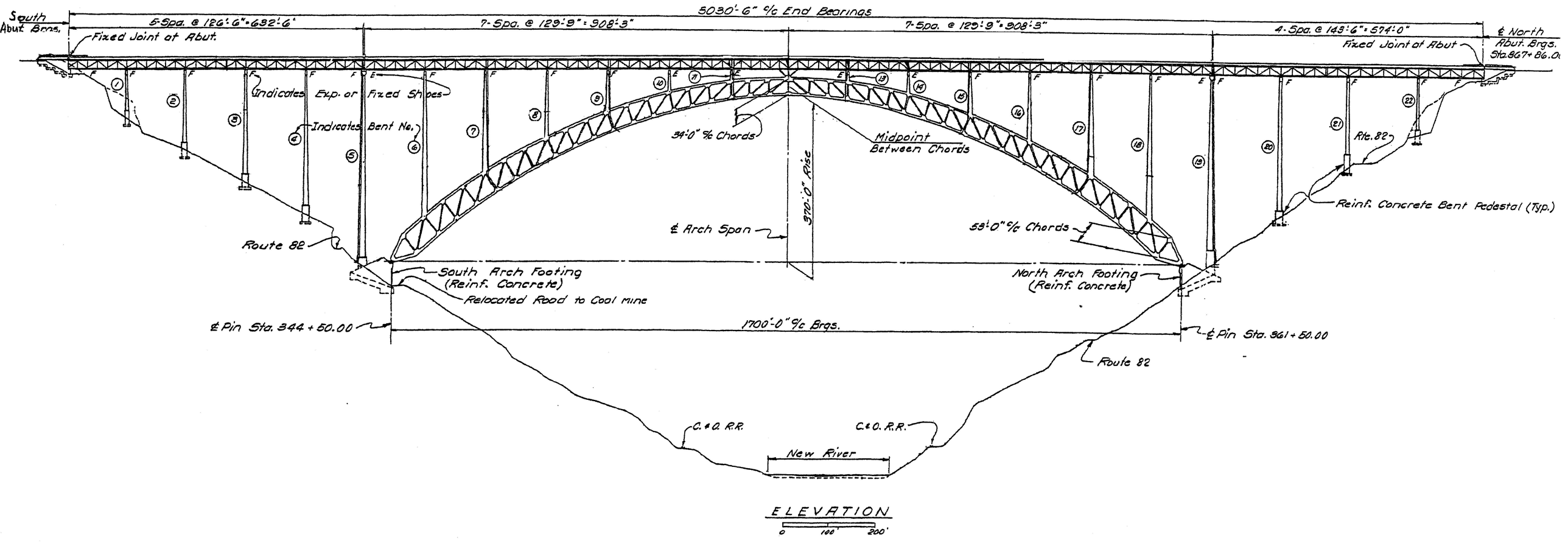
N

Figure 1
New River Gorge Bridge
Fayette County, WV



United States Steel, "Bridge Report: New River Gorge Bridge, Fayette County, West Virginia," pg. 2. Available in the inspection files of the WV Division of Highways, Charleston, W.Va.

Figure 2
New River Gorge Bridge
Fayette County, WV



Michael Baker Jr., Inc., "Inventory Bridge Inspection Report: New River Gorge Bridge, Bridge No. 10-19-15.37(2719)," November 1991. Available in the inspection files of the WV Division of Highways, Charleston, W.Va.

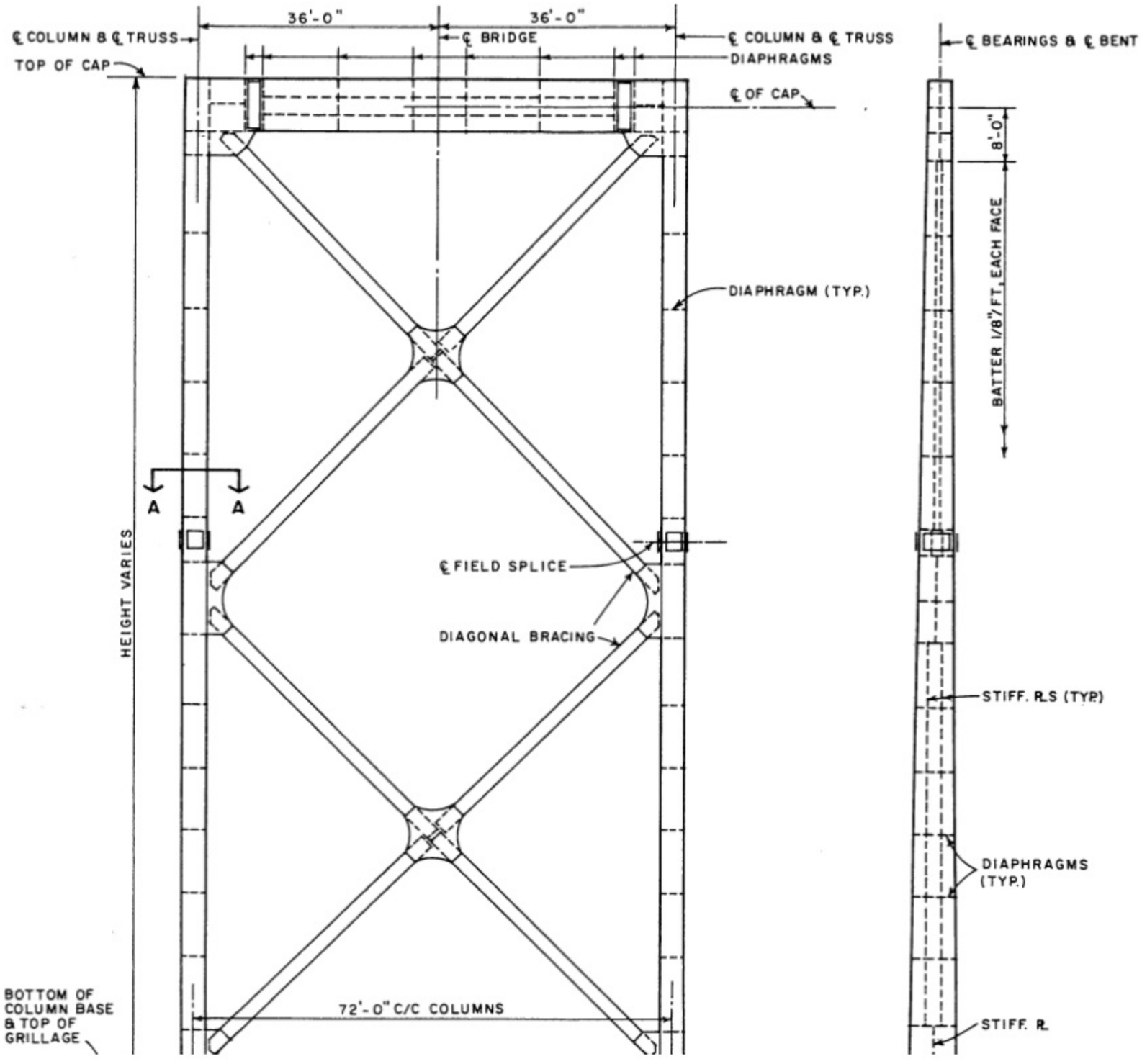
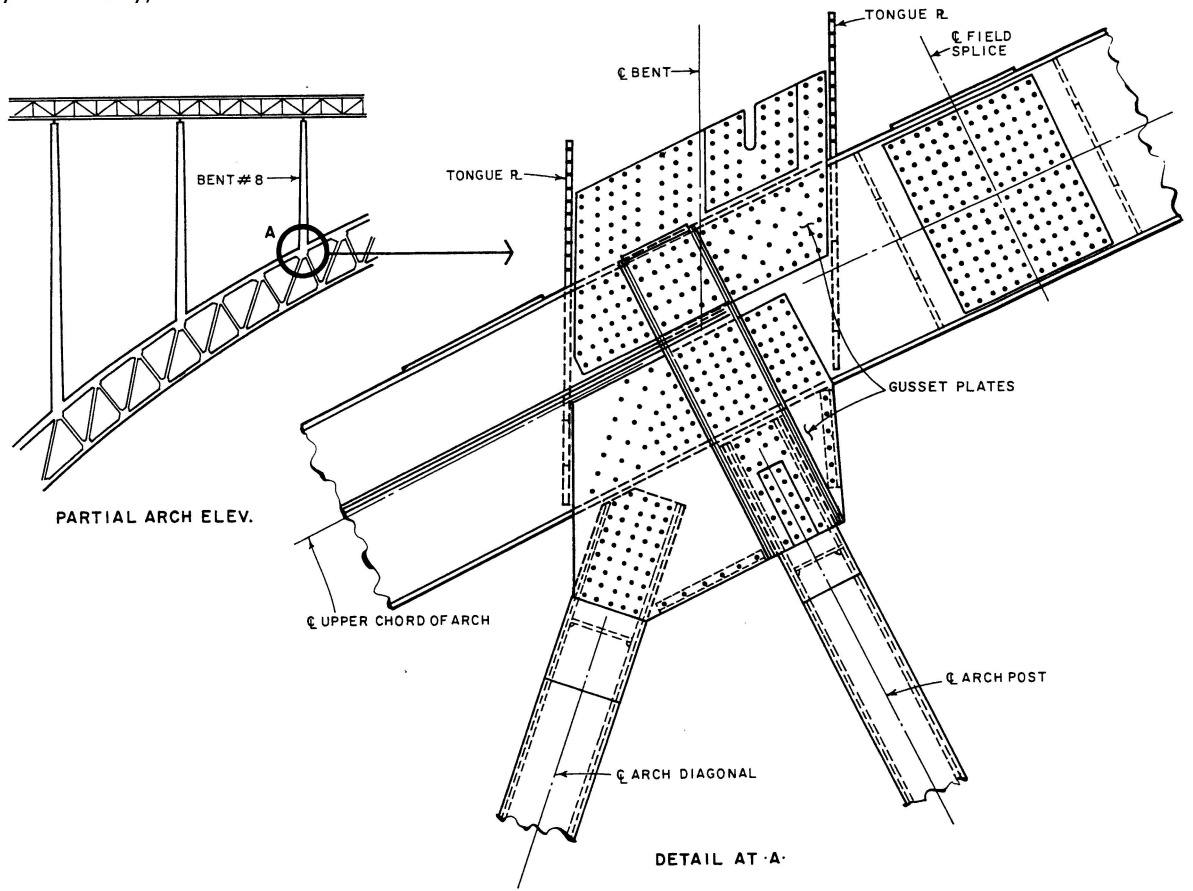


Figure 3
New River Gorge Bridge
Fayette County, WV

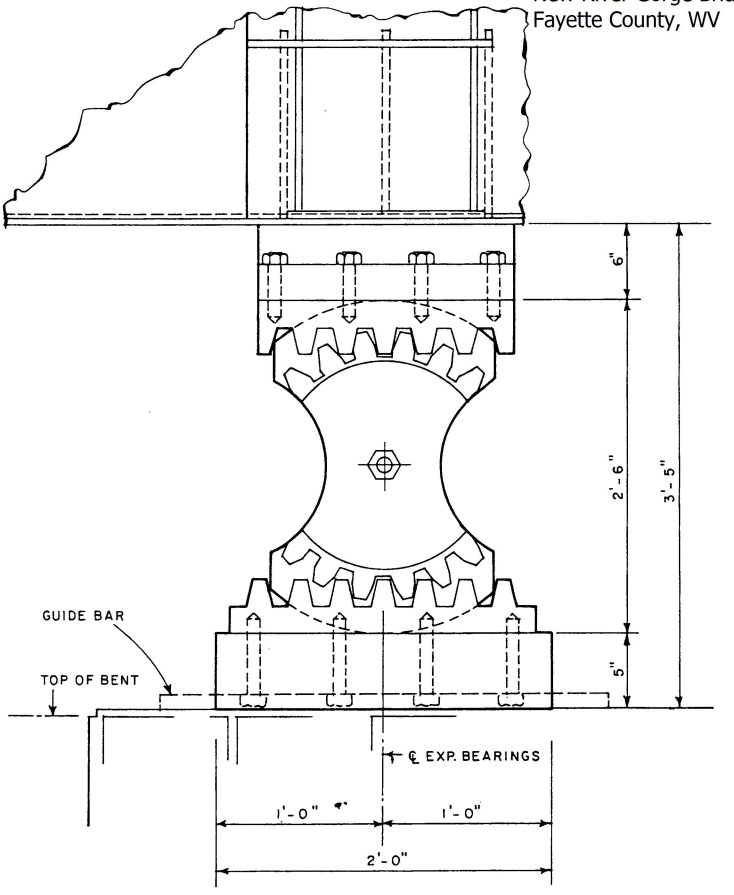
United States Steel, "Bridge Report, New River Gorge Bridge, Fayette County, West Virginia," pg. 10. Available in the inspection files of the WV Division of Highways, Charleston, W.Va.

Figure 4
New River Gorge Bridge
Fayette County, WV



United States Steel, "Bridge Report: New River Gorge Bridge, Fayette County, West Virginia," pg. 11. Available in the inspection files at the WV Division of Highways, Charleston, W.Va.

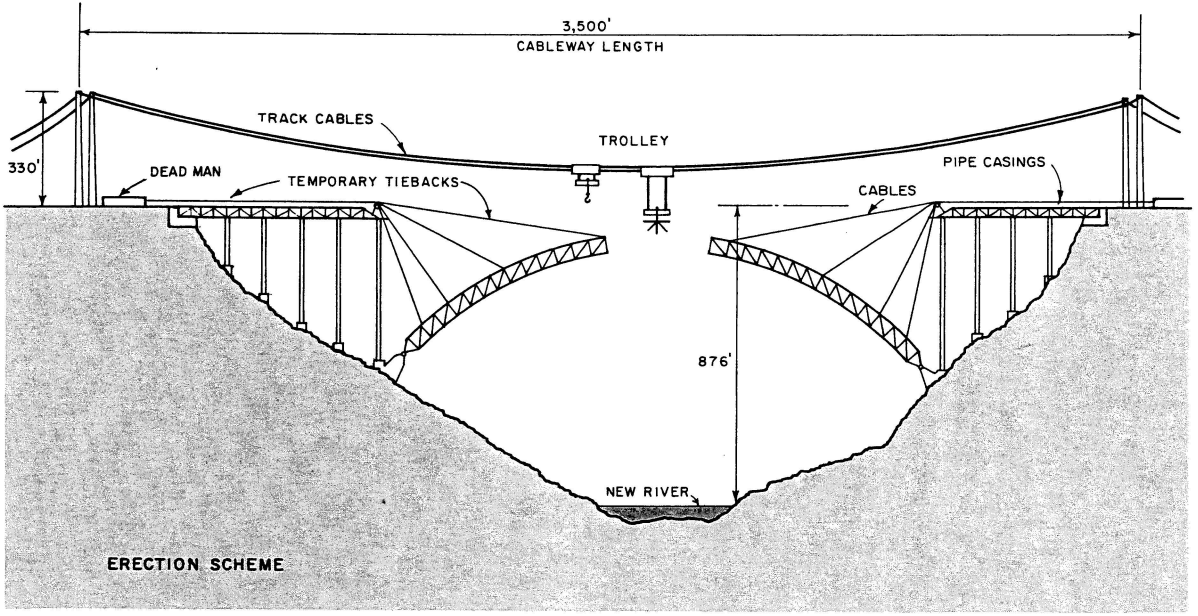
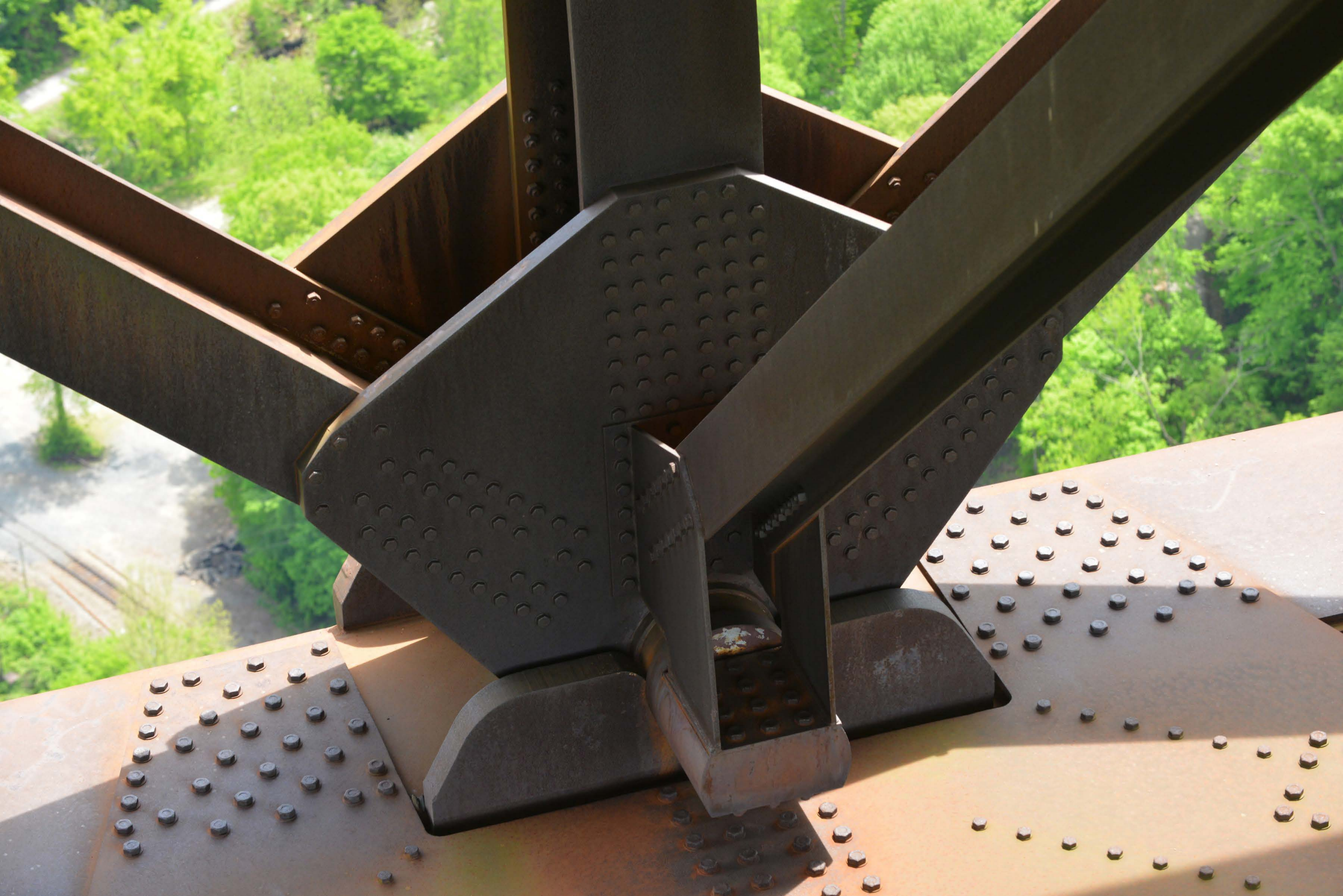
Figure 5
New River Gorge Bridge
Fayette County, WV



ELEVATION
DECK EXPANSION BEARING

United States Steel, "Bridge Report: New River Gorge Bridge, Fayette County, West Virginia," pg. 17. Available in the inspection files at the WV Division of Highways, Charleston, W.Va.

Figure 6
New River Gorge Bridge
Fayette County, WV



United States Steel, "Bridge Report: New River Gorge Bridge, Fayette County, West Virginia," pg. 19. Available in the inspection files at the WV Division of Highways, Charleston, W.Va.