### Location

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Identification

Survey Name: 1746.04 HFM Bridge Camp Bridge  
Date Recorded: 03/08/2011

Field Recorder: Matthew Sneddon, Jennifer Gilpin

Owner’s Name: White River Forest LLC c/o Hancock Forest Management

Owner Address: 17700 SE Mill Plain Blvd

City: Vancouver  
State: Washington  
Zip: 98683-7580

Within a District? No

Contributing? No

National Register:  
Local District:  
National Register District/Thematic Nomination Name:  
Eligibility Status: Determined Eligible - SHPO

Determination Date: 5/29/2013

Determination Comments: 102912-17-DNR determined on 5/29/2013

Description

Historic Use: Transportation - Rail-Related  
Current Use: Transportation - Road-Related (vehicular)

Plan: Rectangle  
Structural System: Mixed

Stories: 1  
Changes to Interior: Not Applicable

Changes to Plan: Moderate

Changes to Original Cladding: Moderate

Changes to Original Windows: Not Applicable

Changes to Other: Not Applicable

Other (specify):

Style: Other - Utilitarian

Cladding: Metal

Roof Type: None

Roof Material: None

Form/Type: Bridge - Pratt Truss

Narrative

Study Unit

Transportation
Manufacturing/Industry

Date of Construction:  
1902 Built Date
1958 Remodel

Builder: American Bridge Company of New York

Engineer:
Bridge Camp Bridge is an example of a turn-of-the-century Northern Pacific Railway Company railroad bridge designed by renown bridge engineers Ralph Modjeski and George S. Morison that was later moved and converted for vehicular use by the Weyerhaeuser Timber Company. The bridge originally spanned the Green River about 4 miles east of Palmer Junction, Washington prior to its current location across the White River some 7 miles east of Enumclaw, Washington in a private forest reserve managed by Hancock Forest Management. Although the relocation and conversion diminished its original integrity, the bridge retains sufficient character-defining features and integrity of design, materials, workmanship, and association to convey its origins in the last years of the American system of design, and the bridge is significant for its associations with Modjeski, Morison, and two important industries in Washington—the transcontinental railroads and logging industry—with roots that date from the nineteenth century. The bridge appears eligible for listing in the National Register of Historic Places (NRHP), WHR, King County Landmarks Register (KCLR), and Pierce County Register of Historic Places (PCRHP) under Criteria B and C through its connection with Modjeski and Morison and the history of bridge engineering.

In completing its transcontinental railway to the Puget Sound region in the 1890s, the Northern Pacific faced a problem that most railway companies with western networks encountered: the need for many bridges. The development of railroads, bridge design, and the iron and steel industries were closely intertwined in the United States, and technological breakthroughs in one area often shaped the course of another. The introduction of the steam locomotive and iron railroad tracks in the 1830s, for example, required new bridges to handle increased loads generated by the weight and movement of the trains. Bridge designers turned to trusses as the starting point for shorter span bridges, and men like William Howe (1840), Squire Whipple (1841), and James Warren (1848) submitted patent applications for designs that still bear their names. At the same time, metallurgists and foundries worked to better meet the demand for metal rails and other structural products. Innovation and incorporation of metal structural components became the hallmarks of early bridges specifically designed to handle railroad traffic. Some notable examples include Wendel Bollman's patent for the first all-metal bridge in 1852, John Roebling's suspension bridge across the Niagara River in 1855, and the Eads Bridge across the Mississippi River in 1874.

It was during this early stage of experimentation with trusses that Caleb and Thomas Pratt patented their design in 1844. Given the later classification of the Pratt type as a truss characterized by parallel top and bottom chords with bottom chords and diagonals in tension and top chords and vertical posts in compression, except for the verticals adjacent to the inclined ends (Holstine and Hobbs 2005:255), the actual patentable claim presented by the Pratts is often overlooked. The Pratts summarized the import and novelty of their design as "the combination of two diagonal tension braces and straining blocks, in each panel of the truss frame of a bridge; by means of which the camber may be regulated so as to increase or to diminish it, either in whole or in sectional part of the bridge," and envisioned a "longitudinally" curved upper chord as one possible configuration (Pratt 1844:2). The Pratt truss reflected the transition from wood to metal components in truss design. It was designed to be wood except for the diagonal braces, "being a metallic rod or bar" (Pratt 1844:1). The original intent of the design—the ability to adjust the tension in the cross-braces—faded, but the Pratt truss gained popularity in slightly modified form (some panels have only a single diagonal brace in tension) when iron and then steel became standard for truss fabrication for its economy of materials and simplicity of construction (Waddell 1916:468).
Truss design began to standardize to a certain degree in the late nineteenth century, with most bridge and railroad companies adopting some variant of the steel Pratt truss with pins used to connect the truss chords and eye-bar bracing for spans between 100 and 250 ft. One advantage of the pin connection was in the analysis of forces: the pin-connected truss was statically determinate, that is, a structure where the reactions and forces could be determined from the equations of static equilibrium, which were well known to engineers of the late nineteenth century. In contrast, riveted connections were statically indeterminate and force distributions could be only approximated. Pin-connected trusses in the United States became known as the "American System" of bridge design, favored for its facility of manufacture, ease of field erection, ability to be transported in pieces, and minimization of field riveting—all characteristics well suited to remote river or gorge crossings in the West (Gasparini and Simmons 1997:130–132).

Another factor behind the standardization movement was the increasing weight and speeds of the freight and passenger trains: adopting heavier rolling stock often necessitated the replacement of a large percentage of bridges along certain routes. In the 1890s, the Northern Pacific sought to address the problem by standardizing bridge designs. The first attempt was suspended when rolling stock again increased, at which point the company turned to two of America's most prominent bridge engineers, George S. Morison and Ralph Modjeski, for a new standardized design. Morison let the younger Modjeski take the design lead (Modjeski 1901:51–52). Between 1900 and 1902, Modjeski produced drawings for I-beam spans from 10 to 30 ft, deck-plate girders from 25 to 100 ft, through-plate girders from 30 to 100 ft, deck-lattice and pony-lattice spans for 110 and 120 ft, and deck and through pin-connected truss spans from 130 to 200 ft. One of these latter designs for a 160-ft span, pin-connected, Pratt through-truss provided the model for Bridge Camp Bridge (Modjeski 1901:Figure 7).

Modjeski's work on a standardized bridge for the Northern Pacific coincided with a period of consolidation of heavy industries in the United States. In the late nineteenth century, industrialists and financiers like Andrew Carnegie, John Rockefeller, J. P. Morgan, and James J. Hill endeavored to control various sectors of the American economy with corporate acquisitions, mergers, and consolidations. One product of these efforts, the American Bridge Company, was formed from 27 existing bridge companies by J. P. Morgan in 1900. The original American Bridge Company had been established in 1870 in Chicago and reorganized as American Bridge Works in 1891 before its incorporation into Morgan's company, which ultimately commanded more than 90 percent of the U.S. bridge construction market (Currey 1918:16). The American Bridge Company was later made a subsidiary of US Steel Corporation after its formation in 1901 and was associated with the design and construction of many large-scale bridge projects as well as the construction of iconic building projects nationwide including New York City's Chrysler Building (1929) and Empire State Building (1931), the San Francisco–Oakland Bay Bridge (1932), and Boeing’s 747 manufacturing plant in Everett, Washington (1968) (American Bridge Company 2011a). The company constructed 14 bridges over the Columbia River and its tributaries, and as a part of US Steel (from 1901–1987), had roles in establishing railroads throughout the country and abroad (American Bridge Company 2011b).

Two other companies absorbed as part of the bridge company consolidation in 1900 included the Toledo Bridge Company of Toledo, Ohio, and the Edge Moor Bridge Works of Wilmington, Delaware. The original drawings for Bridge Camp Bridge, once designated either Bridge No. 209 or Bridge No. 210 of the Pacific Division, Second District of the Northern Pacific system, indicated that the bridge was "built" by the Toledo Bridge Company, with some components fabricated by the steel works of the Edge Moor Bridge Company (Northern Pacific 1901:Sheets 1-2; Northern Pacific 1947:1). Both companies were owned by the American Bridge Company in 1902 when the bridge was erected across the Green River in King County, Washington. The drawings were reviewed by Modjeski and based on his standardized plans for Northern Pacific bridges. Thus the bridge’s manufacturer’s plaque on Bridge Camp Bridge that reads “American Bridge Company of New York, [U.] S.A. 1902” reflects its origins in an era of corporation consolidations but obscures some of its design and fabrication history.
One of Weyerhaeuser’s competitors in the White River area was the WRLC, founded in 1897 by Carl Hanson and his sons Axel, Charles, and Frank, together with Louis Olson and Alexander Turnbull. The Hansons had emigrated from Sweden, and operated a small sawmill on a homestead claim near Seattle (American Swedish Historical Foundation 1947:58). The group pooled resources to purchase the White River Mill Company, whose holdings included a planing mill in Enumclaw and a sawmill and timber lands near the White River, and reincorporated it as the WRLC. A wooden flume was used to transport lumber from the sawmill to the planing mill in Enumclaw, a distance of about 3 miles. After a forest fire destroyed the sawmill in 1902, the company rebuilt and modernized the mill. By 1910, the WRLC employed 500 people and was established as one of the area’s most influential businesses (Andrews 1998; Poppleton 1976:33).

Both the national and more local dimensions of this industry were represented in the Green and White River watersheds of Pierce and King Counties by Weyerhaeuser and WRLC. In one of the largest land transactions in U.S. history, Minnesota timber baron Frederick Weyerhaeuser purchased 900,000 acres of timberlands in Washington from railroad magnate James J. Hill in 1900. He incorporated Weyerhaeuser Timber Company, now known as Weyerhaeuser Company, shortly thereafter. Weyerhaeuser had built a fortune in the timber industry supported by logging companies (BLM 2012). The early twentieth century, the principal owner of much of forested land along Green River from its headwaters to Palmer was the Weyerhaeuser Timber Company (Weyerhaeuser); smaller outfits like the Page Lumber Company also owned sizeable acreage. Weyerhaeuser bought land to the south along the White River as well in an area where the White River Logging Company (WRLC) had a presence (Anderson Map Company 1907). Logging and Lumber Mills in Western Washington

Sawmills were among the earliest structures built by Euroamericans establishing communities in the Puget Sound. Swedish immigrant Nicholas De Lin built a mill near the future city of Tacoma in 1852, as did Henry Yesler in Seattle (Lange 2003; Pierce County 2012). The early timber industry quickly grew in western Washington, primarily driven by demand from San Francisco markets. As coastal areas were cleared, logging moved inland. Teams of oxen and horses, rivers, and flumes were used to move logs out of the woods to the mills. Scores of mills were built in Pierce and King Counties, from the massive waterfront facilities of Tacoma and Seattle to the more remote mills of small towns like Fairfax and Enumclaw. By the late nineteenth century, the timber industry was established as one of the leading sectors of the region’s economy (Schwantes 1996:215–220).

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In 1929, the WRLC accepted an offer by Weyerhaeuser to purchase a controlling interest in the company's stock. As a result of the incorporation of a "new" WRLC, the company enlarged their plant in Enumclaw, which allowed Weyerhaeuser to cut and mill the White River timber more conveniently (Hidy et al. 1963:410–411). The WRLC operated as an affiliate until 1949, when Weyerhaeuser absorbed it (Andrews 1998; Hidy et al. 1963:559; Poppleton 1976:33).

The history of the WRLC’s logging operations exemplified some of the important technological changes that transformed logging in the first half of the twentieth century. The WRLC initially relied on horse teams and flumes to transport logs to their mills (Enumclaw Courier Herald 1946:7). The company soon purchased a steam-powered winch or "donkey engine" to drag logs to a centralized collection point. In 1904, the WRLC invested in its first locomotive, a 25-ton Climax, and began building a network of logging tracks deep into the forests surrounding the White River. At roughly the same time, loggers developed "high-lead" logging, a temporary system of cables, blocks, pulleys, and chokers set up around a tall central pole—initially a "spar" or tall tree with its branches removed and topped—to facilitate movement of logs.

To extend its logging railroad into the White River forests, the WRLC had to build trestles and bridges to cross creeks and rivers. A 1927 map of the WRLC’s logging-railroad system shows a rail bridge over the White River at approximately the same location of the current Bridge Camp Bridge (WRLC 1927). Little is known of this bridge, but a logging camp known as "Bridge Camp" was established just east of the bridge’s current location. A photo of the Bridge Camp area from 1946 shows a deck bridge of some kind at the crossing. This deck bridge was likely replaced in the late 1950s by the current Bridge Camp Bridge, possibly in conjunction with a flood-control project on the Green River.

Both the Green and White Rivers were prone to flooding. By the 1950s, enough support had been marshaled for a flood-control project on the Green River, which the U.S. Army Corps of Engineers carried out between 1956 and 1959. The centerpiece of the project was a dam to regulate flow on the river, later named the Howard Hanson Dam. The project required relocating 14 mi of Northern Pacific track, which rendered several bridges unnecessary (Seattle Times 1958:3). Aerial photographs show that Northern Pacific bridges 209 through 211—still in place in 1952—had been removed by 1968 (USGS 1952, 1968). Weyerhaeuser owned much of the land near the Northern Pacific bridges on this stretch of the Green River, and at some point the timber company acquired and moved one of the former Northern Pacific bridges to its White River property at the crossing point near the former Bridge Camp logging camp.

Weyerhaeuser closed Bridge Camp in 1953. That same year, the company completed a trucking road parallel to the railroad and removed the tracks, ending nearly 50 years of hauling logs to the mills by railroads (Weyerhaeuser Magazine 1952:1). At some point, likely around 1957 or 1958, the deck bridge near the old camp was replaced with the current Pratt-truss bridge. Although evidence has not been found, it makes sense that the former Northern Pacific bridge was modified during its relocation to the White River site by removal of the overhead top chord bracing, addition of the "external" braces, and conversion of the bridge deck from rail to truck traffic. When Bridge Camp was closed, Weyerhaeuser still had tall, heavy equipment in the vicinity that may have required passage over the river; removal of the top bracing of the bridge allowed tall loads to use the bridge unencumbered. Logging trucks also carried high loads, and the bridge modifications avoided problems encountered in other truss bridges not specifically designed for logging trucks, such as the 1923 Dosewallips Bridge in Jefferson County that endured repeated collisions with portal and top bracing despite being raised 7 ft to provide additional clearance (Holstine and Hobbs 2005:71).

Weyerhaeuser sold the property in the vicinity of Bridge Camp Bridge to White River Forest, LLC, in 2002. The area currently is managed by HFM, and logging trucks continue to use Bridge Camp Bridge in 2012.
A case for significance under Criterion A may be made for Bridge Camp Bridge’s association with the historic Northern Pacific transcontinental railroad, the era of corporate consolidation of the bridge and steel industry, and the history of logging in western Washington. However, the bridge was neither an original nor a unique component of the Wallula to Tacoma section that completed the Northern Pacific’s transcontinental line. The Stuck River Bridge (1905) near Auburn and the Burlington Northern & Santa Fe’s (BNSF) Naches River Bridge (1911) in Yakima still function as railroad bridges on this route and better represent the railway history.

The manufacturer’s plaque on the bridge identifies the builder as the American Bridge Company, although as discussed in the historic context, the true fabricator, manufacturer, and designers were the Edge Moor Bridge Works, Toledo Bridge Company, and Ralph Modjeski and George Morison. J. P. Morgan’s consolidation of 24 bridge companies under the corporate umbrella of the American Bridge Company in 1900 was part of a larger trend toward horizontal and vertical integration of heavy industry in the United States with enormous implications for the economy and society, but this historical development is not uniquely represented by nor easily discerned in Bridge Camp Bridge.

When repurposed from a railroad bridge to a bridge for logging trucks, Bridge Camp Bridge gained a connection to the history of logging in western Washington and represents a significant transition from railroads to trucking in the movement of logs from remote forested areas, but Bridge Camp Bridge is one of many in the state dedicated to logging trucks, and likely never served as a logging railroad bridge, which are far more rare.

The bridge is significant for its association with George S. Morison and Ralph Modjeski, two of the most prominent bridge engineers in U.S. history (ASCE 2012; Weingardt 2005:60). Morison began as an apprentice to Octave Chanute on construction of the first railroad bridge across the Missouri River in 1867. Over the next three decades, Morison’s work on railroad bridges made him one of the best-known bridge engineers of his generation (Griggs 2008:55). Morison hired Modjeski in 1885. Modjeski had emigrated from Poland to the United States after obtaining a degree in engineering from the prestigious École Nationale des Ponts et Chaussées and built a distinguished career as bridge designer and consultant. Modjeski was a versatile designer, producing landmark designs for both truss (Rock Island and Quebec) and suspension types (Mid-Hudson, Benjamin Franklin, and San Francisco Bay) (Weingardt 2005:60). The work on a standardized bridge design for the Northern Pacific between 1899 and 1901 was likely one of the last collaborations between the two engineers, as Morison died in 1903 after a brief illness.

Bridge Camp Bridge may be the last in Washington in which Morison had a hand in the design. Morison worked on two early railroad bridges in Washington for the Northern Pacific, the Ainsworth Bridge and Riparia Bridge—both across the Snake River—which were complete in 1884 and 1889, respectively, but only remnants of the piers of the Riparia Bridge now remain (Griggs 2008:55). Modjeski’s legacy has been more lasting in the Pacific Northwest, including the Celilo Bridge (1911–12) across the Columbia River, a BNSF swing bridge and truss span in Clark County (1908), and several bridges in the Portland, Oregon, area. Bridge Camp Bridge, however, may be one of the very few left in the country built from Modjeski’s standardized Northern Pacific plans developed between 1899 and 1901, and no other examples of this type of Modjeski bridge are currently listed in the historic registers for the state and either King or Pierce County.
By virtue of its later modifications, Bridge Camp Bridge represents a significant and unique example of a design that illustrates both turn-of-the-century truss bridge for railroads and a mid-twentieth-century logging bridge. The original 1901 design was a classic example of the “American system” of bridge design developed in the late nineteenth century, characterized by pin-connected, steel-truss through spans—typically a Pratt or Pratt variant—that made extensive use of latticed channel beams and posts and eye-bar connectors. Railroad versions such as Bridge Camp Bridge featured heavy steel stringers and beams with various forms of bracing to handle the heavy and dynamic loading of trains. Morison and Modjeski added roller-type expansion bearings at one end to better distribute forces to the abutments. The American system reflected the nature of railroad development in the United States in the second half of the nineteenth century, when facility of manufacture, ease of field erection, ability to be transported in pieces, and minimization of field riveting were characteristics well suited to construction of the transcontinental railroads and branch lines. In 1916, bridge engineer J. A. L. Waddell called the Pratt truss the most commonly used truss type for spans shorter than 250 feet (IDOT 2012). Based on its popularity, the American system Pratt truss should be commonplace in the United States. Moreover, Bridge Camp Bridge was based on a standardized design that was intended for construction in large numbers for the Northern Pacific: five of the 150-foot Pratt-truss models were ordered for one stretch of the Green River alone (Northern Pacific 1901:Sheet 10).

However prevalent the pin-connected Pratt truss railroad bridge once was, existing examples from this period are becoming harder to find, particularly in Washington State. Historic bridges in general are vulnerable to removal and demolition. Deterioration, insufficient load ratings, safety concerns, and maintenance and repair costs often lead to the loss of historic bridges. One study in Ohio, for example, found that Pratt truss bridges in the state were lost at a rate of 20 per year between 1984 and 2001 (Brozek 2002:8-3).

Furthermore, not long after Morison and Modjeski finalized their set of standardized Northern Pacific bridge plans, engineers began to favor riveted joints rather than pin connections for trusses. In their history of Washington bridges, Craig Holstine and Richard Hobbs (2005:7) note that "riveted-joint spans began replacing pin-connected spans after 1910, since they provided a more rigid structure with a greater load capability, fewer maintenance problems, and a longer life expectancy.” Consequently, few Pratt truss bridges remain in Washington to represent the era of the American system. The 1901 “F” Street Bridge in Palouse City, identified by one survey as one of the two oldest Pratt truss bridges in the state’s highway system, was torn down in 1992 (Bridgehunter 2012a). A “sister” bridge to Bridge Camp Bridge—one of the five ordered in 1901 for the Green River crossings—was recently removed by the City of Tacoma (Seattle Daily Journal 2009). A second “sister” bridge is in active use on the Snoqualmie Mainline in HFM’s Snoqualmie Forest, at the 16.5 mile-point (Stephan Dillon personal communication 2012), but the fate of the remaining two is uncertain. Another from this era spanning the Wenatchee River is slated for demolition in 2013 by the Washington Department of Transportation (WSDOT 2012). Perhaps the oldest extant pin-connected Pratt truss in Washington, a 160-foot-long bridge built by Chicago’s Lassig Bridge and Iron Works in 1891, was recently restored by the Northwest Railway Museum. This bridge was originally constructed over the Yellowstone River in Montana and moved to the south fork of the Snoqualmie River in 1923 (Northwest Railway Museum 2012). Two other examples exist—one spanning the Willapa River in Pacific County (1896) and one crossing Peshastin Creek in Chelan County (1897) (Bridgehunter 2012b). Bridge Camp Bridge may be next chronologically, likely one of the four or five oldest pin-connected Pratt truss bridges remaining in Washington.

Bridge Camp Bridge began service as a railroad bridge on the Green River. When it was relocated to the White River and converted to vehicular use by logging trucks, the portal and top chord lateral bracing were replaced with an external system of triangular bracing riveted to the vertical posts. Although this modification removed a character-defining feature of the bridge—the portal and top bracing specified in the standardized plans—it redefined the bridge’s purpose, expressed through the need to allow passage of the tall logging-truck loads. Thus the original design and later modifications uniquely illustrate two important facets of the history of technology in Washington: the railroad version of the American system bridge and the transition from railroad to truck logging.
Historic Property Inventory Report

Criterion D most commonly applies to properties that contain or are likely to contain information bearing on an important archeological research question. Bridge Camp Bridge is not likely to yield information important in prehistory or research theories concerning historical development.

Integrity

As outlined in National Register Bulletin 15, listing in the NRHP requires both the demonstration of significance under the National Register criteria, and sufficient integrity. Integrity in the NRHP process is defined as the ability of a property to convey its significance. Historic properties either retain integrity (this is, convey their historic context and period of significance) or they do not. Within the concept of integrity, the National Register criteria recognizes seven aspects or qualities that, in various combinations, define integrity. To retain historic integrity a property will always possess several, and usually most, of the aspects.

1. Location. Although Bridge Camp Bridge was moved from its original location on the Green River, cutting the historic connection to Northern Pacific, its current location on the White River has established a new association with logging. One of the advantages of the pin-connected Pratt truss bridge is ease of disassembly and transportation of components, so relocation of bridges was not uncommon. Some bridges such as the 1891 Pratt truss over the Snoqualmie River were moved to "low-density" locations when increases in the weight of rolling stock required heavier duty bridges (Northwest Railway Museum 2012).

2. Design. The integrity of design is complicated by the later field modifications to the bracing elements and deck. The rails were removed during conversion of the bridge to vehicular use, obscuring its origins as a railroad bridge. Many important aspects of the American-system Pratt truss are still evident, including pin connections, latticed channel posts and chords, steel stringers and beams, deck bracing, end bearings, eye-bar diagonals, counters, and bottom chords. Although easily identifiable as a Pratt truss, the removal of the top bracing and addition of the triangular bracing outside the vertical chord plane are not typical of the Pratt truss nor representative of Morison and Modjeski’s design. In this case, however, the modifications have historical value as an adaptive reengineering of a bridge for a new purpose.

3. Setting. The setting in woods across a remote stretch of the White River is similar to the bridge’s original setting on the Green River. A logging road now replaces the original railroad tracks as the functional setting.

4. Materials. Most of Bridge Camp Bridge's metal components are original and intact. Some elements are rusting but otherwise in fair condition. The rails and top bracing elements are gone and the wood approaches, deck surface, deck ties, and guard rails have been modified and replaced as needed over time.

5. Workmanship. The lack of ornamentation and concern for aesthetics on the bridge reflects the utilitarian priorities of the railroad companies in the late nineteenth century and a standardized design often intended for rural and remote locations. Earlier truss bridges sometimes featured decorative portal bracing, manufacturer’s plates centered atop the portal bracing, and ornamental finials on vertical posts (Bridgehunter 2012c, 2012d, 2012e, 2012f) but such elements are harder to find in railroad truss bridges built after 1900. The irregular built-up timber approaches and triangular bracing modifications added to the utilitarian character of the bridge, giving it decidedly ungraceful lines.

6. Feeling. The bridge’s feeling, or expression of the aesthetic or historic sense of a particular period of time, as an early twentieth-century railroad bridge has generally been lost due to the relocation and conversion to vehicular use, but its connection to logging operations is intact and still conveys the historic transition to truck logging in the mid-twentieth century.

7. Association. The association, or the direct link between an important historic event or person and a historic property, is most easily made through the manufacturer’s plaque, which is a little misleading. The plaque marking the erection date of 1902 accurately identifies the bridge’s era of design and construction, and association with the American Bridge Company of New York, the largest bridge company of the early twentieth century and one with a storied record of construction projects. Other important associations are difficult to discern; only research or expertise in bridge engineering would reveal connections to the Toledo Bridge Company, Edge Moor Bridge Works, George Morison, Ralph Modjeski, and Weyerhaeuser.
In this case, the unique history of Bridge Camp Bridge offsets some loss of original integrity due to the relocation, repurposing, and modifications. There are older pin-connected Pratt truss bridges in Washington, more famous examples of Modjeski’s designs, and others from the early years of the Northern Pacific’s transcontinental rail line, but none known in the state that combine all three aspects. The bridge possesses sufficient character-defining features and integrity of design, materials, workmanship, and association to convey its origins in the last years of the American system design, and the bridge is significant for its associations with two important industries in Washington—the transcontinental railroads and logging industry—with roots that date from the nineteenth century. Bridge Camp Bridge appears eligible for the NRHP, Washington Heritage Register, King County Landmarks List, and Pierce County Register of Historic Places under Criteria B and C.

Description of Physical Appearance:

Bridge Camp Bridge is an example of what is commonly classified as a Pratt truss bridge, a configuration derived from a design patented in 1844 by Caleb and Thomas Pratt. The Pratt truss is typically characterized as a truss with bottom chords and diagonals in tension and top chords and vertical posts in compression, except for the verticals adjacent to the inclined ends (Holstine and Hobbs 2005:255). This concept of load distribution is expressed in the Bridge Camp Bridge through the heavy latticed channel columns and beams used for the top chord and vertical posts and the relatively thin eye-bars used for the diagonals and the bulk of the bottom chord. A cracked plaque on one of the east inclined ends reads "American Bridge Company of New York, U.S.A. 1902.

The bridge truss is composed of six 25-ft-long, 28-ft-high panels for a total span of 150 ft from center to center of the end pins in the bearing supports. The bridge is symmetrical along the two axial centerlines. End panels have hip struts to brace the inclined ends; the central panels have two sets of diagonal eye-bar stays forming an X-pattern; and the second panel from each end has a single set of heavier diagonal eye-bars, inclined from top to bottom downward toward the center of the bridge. The upward sloped eye-bars in the central panels—that is, the “counters” sloped from bottom to top upward toward the center of the bridge—have turnbuckles to adjust the tension in the diagonal. Counters were commonly added to one or more central panels in Pratt trusses to better handle the tensions caused by moving loads (Calvert 2000). The primary connection points between panels are pin connected, a common feature of truss bridges designed between 1880 and 1915 (Gasparini and Simmons 1997:132). Shop and field riveting were used to join other structural elements.

The bridge deck is supported by steel girders riveted to steel floor beams with stringer brackets. The floor beams extend out to provide a mounting surface for the vertical posts, which are attached with rivets. The deck surface is composed of 12-by-12-in wood stringers placed atop wood cross stringers. The cross stringers are laid with roughly 6-in spacing atop the steel structural stringers, and appear similar in dimension to the 9-by-11 in by 12-ft long railroad ties specified in the original bridge drawings. In this original design, two sets of rails were laid across the ties, one with a 4-ft, 8.5-in separation between rails (U.S. standard gauge) and another laid approximately 3 ft (narrow gauge) apart, probably to allow maintenance equipment or narrow-gauge logging trains to pass over the bridge (Northern Pacific 1901:15). The railroad bridge was likely converted to handle vehicular traffic sometime between 1950 and 1960 as discussed in the historical context. The steel stringers that support the wood ties are braced with diagonals in a W-pattern between the girders. Counters also extend between the pin-connection brackets at the bottom of the vertical posts to further stiffen the bottom chords of the truss.

Originally, the truss was a through design, with bracing between the top chords provided by steel-plate portal braces at the inclined ends, latticed channel beams between vertical posts, and diagonal rod stays between panels in the top chord plane (Northern Pacific 1901:15). The top chord-bracing systems were removed at some point, likely to provide clearance for tall loads such as steam-powered donkey engines or cranes used in logging operations and logging trucks. In place of the original top-chord-bracing elements, channel beams that extend out about 8 feet beyond the outside edge of the bridge truss were run underneath the deck on either side of the steel deck beams and connected to the upper part of the vertical posts with I-beams to create a triangular support at each post for lateral bracing.
The bridge is supported by different bearing systems on each end. The east end of the bridge rests on fixed-pin hinge bearings bolted to a steel shoe. The west end rests on a roller-type expansion bearings that the designer believed better distributed force loads to the bridge support structures, often made of masonry (Modjeski 1901:64). In this case, the bridge supports are largely built-up wood structures composed of layers of transversely laid 12-by-12-in ties supported by timber piles. Similarly, the bridge approaches on both ends are wood decks supported by wood stringers and timber bents. Long planks are nailed across the timber bents on the east bank for bracing. Nails in the decking and wood supports were likely manufactured within the past 30 to 40 years. Some of the wood elements of the bridge and approaches have been replaced due to deterioration and flooding. Field surveys noted a piling and diagonal support in the riverbed, and two piles of discarded bridge decking beams were observed within a few hundred feet southwest and southeast of the bridge. The pilings are currently armored against erosion by sub-angular riprap held together with 2-in-diameter cable. The entire bridge span, including the two approach sections, is 217 ft long. A wood guardrail runs along both sides of the span inside the bridge truss to protect the structural members from vehicular impact.

American Bridge Company

American Society of Civil Engineers (ASCE).

American Swedish Historical Foundation


Anderson Map Company

1907 Map of King County, Washington. Seattle, Washington.

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1947 Tacoma Division, Bridge No.74 and 75 Green River Rebuild Stringers, Sheet 1. Hancock Forest Management Archives, Orting, Washington.
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Schwantes, Carlos Arnaldo


1953a Photograph, page 6 Weyerhaeuser Magazine Steam skidders are becoming obsolete; this one is operating as a reload near the Bridge, January 1953. White River Branch Section, Weyerhaeuser Archives.


1953c Photograph, These houses have been moved down from The Bridge to the mill site at Camp Ellenson... page 2 Weyerhaeuser Magazine May, 1953. White River Branch Section, Weyerhaeuser Archives.


1958 Engineers Open Bids on Hanson Dam. Seattle Times 22 November:3.

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Seattle Daily Journal


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1958 Photograph, page 6 Weyerhaeuser Magazine Steam skidders are becoming obsolete; this one is operating as a reload near the Bridge, January 1953. White River Branch Section, Weyerhaeuser Archives.

Schwantes, Carlos Arnaldo


White River Lumber Company


White River Lumber Company

Photos

Bridge Camp Bridge, east approach deck and upper deck, looking west.
2011

South side of Bridge Camp Bridge, looking northeast.
2011

East approach deck, supports, looking northwest
2011

Bridge Camp Bridge, northeast diagonal end support, with "American Bridge Co... 1902" plaque
2011
2011

Bridge Camp Bridge, bottom chord and bracing, looking west

2011

Bridge Camp Bridge, frame and stacked support at west approach, looking northwest

2011

East side of Bridge Camp Bridge, showing timber trestle supporting east approach, looking east

2011

Bridge Camp Bridge, closer view of stacked supports at west approach, looking northeast

2011
Bridge Camp Bridge, riprap beneath west end approach.
2011