

# WVDOH

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## Visualization: What's New?

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# Visualization Update

- » Dick Henderson Bridge
- » Bramwell Bridges
- » New River Gorge Bridge Lighting
- » Public Meeting Display Gear
- » Recent Creative Design Products

# **Dick Henderson Memorial Bridge**

EXISTING



# Richard J. "Dick" Henderson Memorial Bridge



This conceptual visualization does not represent a final implementation proposal.

ALTERNATE 3



EXISTING



ALTERNATIVE 3



ALTERNATIVE 4



ALTERNATIVE 5



ALTERNATIVE 6



This conceptual visualization does not represent a final implementation proposal.



West Virginia Department of Transportation  
Division of Highways



MARCH 2011

# Dick Henderson Memorial Bridge



# Build Alternatives Comparison

March 2011

- \$** = Cost\* (millions)
- 🕒** = Closure Time\* (days)
- ▲** = Maximum Grade

\*Both cost and closure time are estimated ranges.

**Alternative 3**  
Complete Superstructure Replacement  
3-Lane Main Span & Approaches  
Steel Plate Girder Design

**Alternatives 1 and 2**  
Rehabilitation of Existing Structure  
2-Lane Main Span  
Alternative 1: 9'-10" Lanes, Sidewalk Between Trusses  
Alternative 2: 10' Lanes, Sidewalk Outside Truss

**Alternative 4**  
Complete Superstructure Replacement  
3-Lane Main Span & Approaches  
Steel Through Truss Design

**Alternative 5**  
Complete Superstructure Replacement  
3-Lane Main Span & Approaches  
Cable Stayed Design

**Alternative 6**  
Complete Superstructure Replacement  
3-Lane Main Span & Approaches  
Extradosed Design

\$ 27-32  
🕒 360-570  
▲ 7.0%

\$ 25-28  
🕒 320-460  
▲ 7.6%

\$ 26-29  
🕒 380-520  
▲ 7.0%

\$ 32-35  
🕒 540-680  
▲ 7.3%

\$ 32-35  
🕒 460-600  
▲ 7.5%

**Where will the bridge cross the river?**  
All alternatives being considered will cross the river at the existing location. In fact, all alternatives will make use of the existing piers. The bridges are depicted alongside each other here for a visual comparison of the replacement alternatives.

Kanawha River

**Sidewalk**  
5ft-wide for each replacement alternative

**Shoulders**  
6ft-wide for each replacement alternative

**Travel Lanes**  
Three 12ft-wide lanes for each replacement alternative

St. Albans

Nitro

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Alternative 3 (Plate Girder Design)



Alternative 4 (Thru Truss Design)



Alternative 5 (Cable Stayed Design)





Alternative 6 (Extradosed Design)



Alternative 3 (Plate Girder Design)



Alternative 4 (Thru Truss Design)



Alternative 5 (Cable Stayed Design)



Alternative 6 (Extradosed Design)

# Dick Henderson Memorial Bridge



# Preferred Alternative Comparison

**\$ = Cost\* (millions)**

**🕒 = Closure Time\* (days)**

**▲ = Maximum Grade**

\*Both cost and closure time are estimated ranges.

**Existing Bridge**  
2-Lane Main Span  
9ft-10in Lanes  
Sidewalk Between Trusses

● \$27-32  
○ 360-570  
▲ 7.0%

**Preferred Alternative (Alternative 3)**  
Complete Superstructure Replacement  
3-Lane Main Span & Approaches  
Plate Girder Design

● \$25-28  
○ 320-460  
▲ 7.6%

**Where will the bridge cross the river?**  
The new bridge will cross the river at the existing location. In fact, the new bridge will make use of the existing piers. The bridges are depicted alongside each other here for a visual comparison of their features.

**Kanawha River**

**Shoulders**  
6ft-wide

**Sidewalk**  
5ft-wide

**Travel Lanes**  
Three 12ft-wide lanes

St. Albans  
Nitro

ONLY

ONLY



The Dick Henderson Memorial Bridge, Saint Albans - Nitro, West Virginia | Preferred Alternative Visualization, July 2011  
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ИТРО

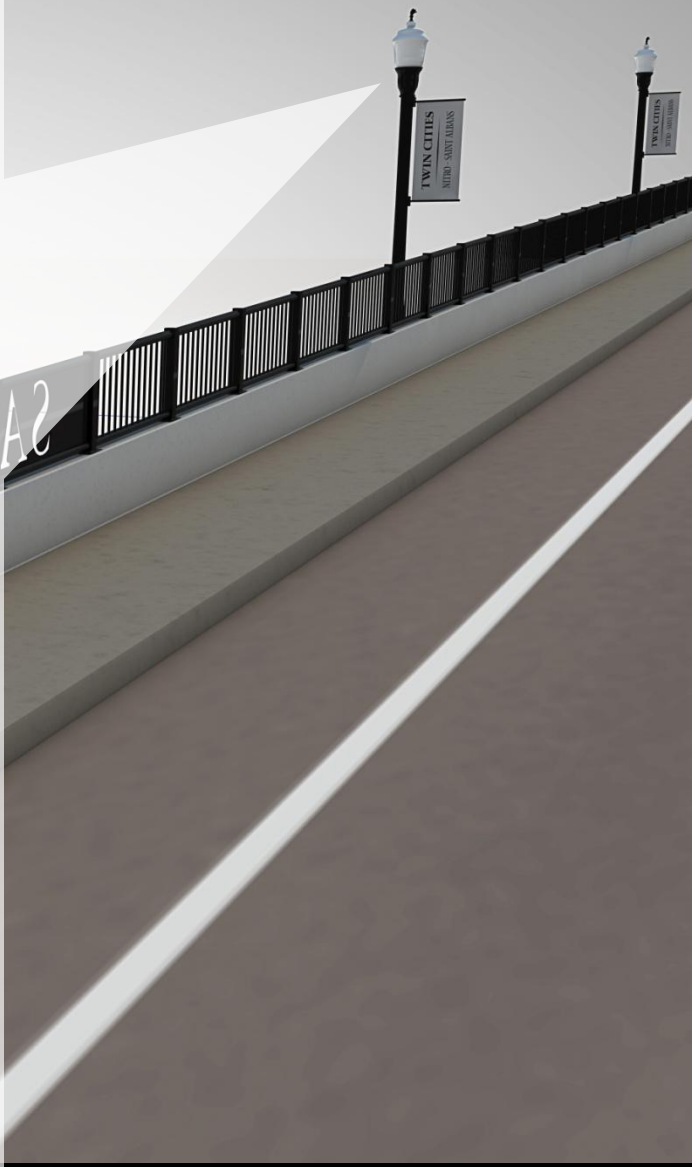
NITRO

ИТРО



The Dick Henderson Memorial Bridge, Saint Albans - Nitro, West Virginia | Preferred Alternative Visualization, July 2011  
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The Dick Henderson Memorial Bridge, Saint Albans - Nitro  
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**The Dick Henderson Memorial Bridge, Saint Albans - Nitro, West Virginia | Preferred Alternative Visualization, July 2011**

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FS 37886

Flat Yellow

FS 36622

Gray





# Public Workshop Results

# What is Project Visualization?

Visual communication of infrastructure projects to an audience  
(especially to stakeholders).

# Dick Henderson Memorial Bridge Public Workshop | Nitro, WV





EXISTING

ALTERNATIVE 3

ALTERNATIVE 4

ALTERNATIVE 5

ALTERNATIVE 6

MARCH 2011

### Dick Henderson Memorial Bridge Build Alternatives Comparison

Alternative 1	Alternative 2	Alternative 3
Complete Superstructure Requirement	Complete Superstructure Requirement	Complete Superstructure Requirement
3 Lane Main Span & Approaches	3 Lane Main Span & Approaches	3 Lane Main Span & Approaches
Lane Beyond Design	Lane Beyond Design	Lane Beyond Design

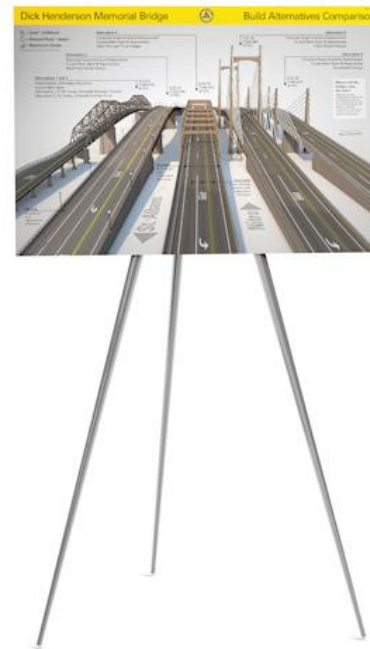
Where will the bridge cross the river?





Dick Henderson Memorial Bridge WVDOH Public Workshop | Nitro, West Virginia | March 8, 2011

# TV Display Rig



# Bramwell Bridges



# *Welcome*

## *Informational Workshop*

*The Yon-Peraldo Memorial Bridge*

*The Duhring Street Bridge  
(The Kate Hewitt Bridge)*

*The Historic Bramwell Depot*  
*Monday, August 1, 2011*  
*4 pm to 7 pm*

*[www.transportation.wv.gov](http://www.transportation.wv.gov)*



West Virginia  
Department of Transportation  
Division of Highways



U.S. Department  
of Transportation  
Federal Highway  
Administration



**Duhring Street Bridge  
Bramwell, WV**



**Duhring Street Bridge  
Bramwell, WV**

# *The Duhring Street Bridge (The Kate Hewitt Bridge) Bramwell, West Virginia*

Existing Bridge Photograph



Preferred Alternative Simulation (Silver Finish)



Preferred Alternative Simulation (Black Finish)









Kate Hewitt  
Bridge

**New Vehicle Library  
US Cars & Trucks**

**Duhring Street Bridge  
Bramwell, WV**

# **New River Gorge Bridge Lighting**

**COMING SOON:  
Internet Opinion Poll**

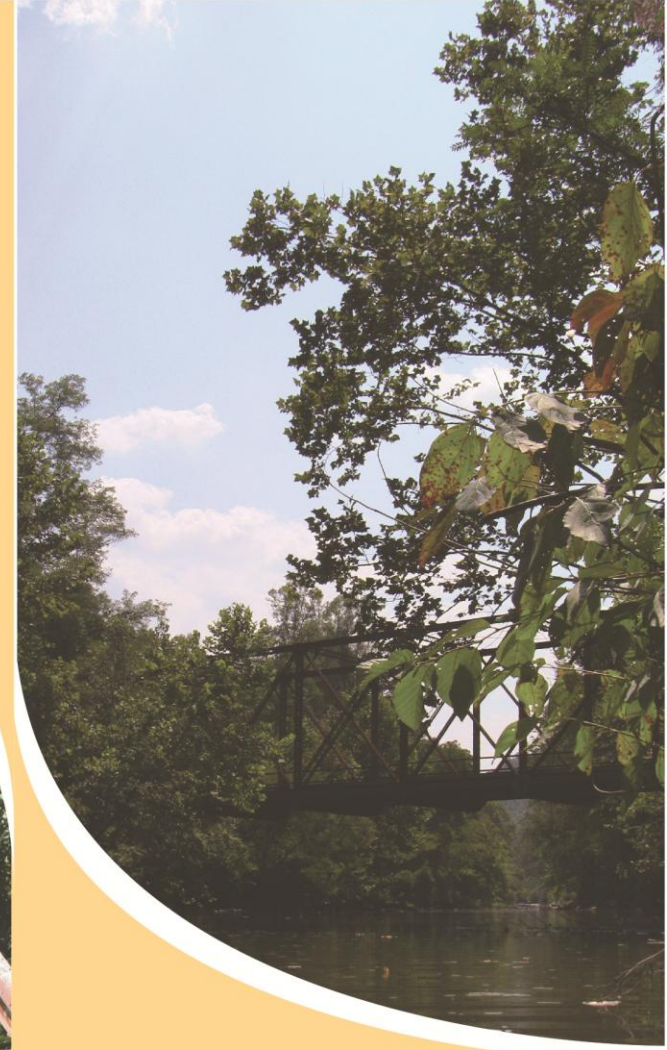
# Recent Creative Design Products

## what **Historical Services Unit** does

- Research and Write Historic Reports
- Determine National Register Eligibility
- Determine Historic Boundaries
- Determine Effects to Historic Properties
- Mitigate Adverse Effects to Historic Properties
- Complete Historic Documentations for Specific Historic Properties
- Historic Turnpike Research and Analysis
- Coordinate with Federal, State, and Local Resource Agencies
- Conduct Public Workshops for Specific Bridge and Highway Projects

## contactus

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edwight  
**bridge**  
*raleigh county*

Edwight is a former coal camp located in northwestern Raleigh County. The area's first reported commercial mine, called Edwight No. 1 Drift, was opened in 1916 under the ownership of the Raleigh-Wyoming Coal Company. The town, which was called Launa prior to coal activities, was renamed Edwight around 1920 after Mr. Edward W. Knight, a prominent Charleston attorney and legal advisor for Raleigh-Wyoming. Edwight gained fame as one of the top coal-producing areas of the state, but this achievement came at a price, as at least 60 miners were killed during the service of the Edwight/Hazy mining operations, 1916-1959. Miners from Edwight joined the march to the Battle of Blair Mountain in 1921. In its heyday, the town had a company store, soda fountain, pool hall, doctor's office, barber shop, boarding houses, grocery store, movie theatre, a number of bars and restaurants, and dozens of company houses.

## Edwight History

Edwight Truss was determined eligible for the National Register of Historic Places as a result of its association with the development of the town of Edwight. The bridge provided an important local transportation link between the town and various mine sites, including the Sundial Refuse Pile, which was also considered eligible for the National Register. Edwight Truss was also a locally significant example of the camelback Parker Truss, a rare bridge type in Raleigh County. A camelback truss is distinguished by its sloped, rather than straight, top chords. Although the bridge will be replaced in 2012-13 because it does not meet current weight limits and safety standards, its role in Edwight's history has been studied and documented by the West Virginia Division of Highways.



**Location:** County Route 3/2 near the intersection of WV Route 3, spanning Marsh Fork  
**Type:** One-span steel camelback through-truss  
**Length:** 150 feet  
**Year constructed:** 1920  
**Contractor:** Unknown

## METAL TRUSS BRIDGES

Metal was used for bridge-building in the United States starting in the 1840s, when railroads were at the forefront of bridge technology. Early bridges were constructed of wrought or cast iron. It was not until the advancement of the steel-making process after about 1870 that metal bridges became economical for common use on roads. The truss bridge makes use of steel's properties in both compressive and tensile strength. When a load is applied to a truss, some of the members are "squeezed" from end to end (compression) and some are "pulled" (tension). Engineers were busy in the late nineteenth century inventing different configurations of trusses in order to achieve longer span lengths and use less material. Whipple, Howe, Baltimore, Pennsylvania, Pratt and Warren trusses are just a few examples of the many truss types constructed over the years. West Virginia's oldest known metal truss is the Capon Lake Whipple Truss in Hampshire County, built in 1874. Many Pratt through-trusses, the most common truss type for highway structures, were built through the 1920s, and some very large trusses, such as the Yeager Bridge on the West Virginia Turnpike in Charleston, continued to be built through the 20th century.



## ROSS BOOTH MEMORIAL BRIDGE (Winfield Toll Bridge)

LOCATION: WV 34, Winfield, Putnam County, spanning Kanawha River  
 LENGTH: 1466'-6"  
 YEAR CONSTRUCTED: 1955  
 DESIGNER: Harrington and Cortelyou, Inc.  
 CONTRACTOR: John F. Beasley Construction Company

The Ross Booth Memorial Bridge, which is a three-span cantilever Warren through-truss, replaced the 138-year-old ferryboat crossing between Winfield and Red House across the Kanawha River, greatly increasing efficiency of travel in the area. The length, size, and cantilever design made the bridge a rarity for the construction time period. This bridge qualifies for the National Register of Historic Places based on its effect on local and regional transportation and its innovative engineering technology. The structure underwent a major rehabilitation in 2010 at the cost of approximately \$15,000,000.



## KANAWHA FALLS BRIDGE

LOCATION: CR 13, near Gandy Bridges, Fayette County, spanning the Kanawha River, CR 13/2, CSX Railroad and Norfolk Southern Railroad  
 LENGTH: 1001'-8"  
 YEAR CONSTRUCTED: 1928  
 CONTRACTOR: McClintic-Marshall of Pittsburgh

The Kanawha Falls Bridge in the New River Gorge originally opened as a toll bridge built for the Kanawha Falls Bridge Company, Inc. The opening of the bridge in 1929 resulted in the end of the Kanawha Falls ferry that had been in operation for 125 years. The West Virginia Division of Highways acquired the bridge in 1977. It consists of three simple steel Pennsylvania through-truss spans and one simple steel rivet deck girder span. The Pennsylvania truss was developed by the Pennsylvania Railroad in 1875 and was less commonly used for highway bridges. The Kanawha Falls Bridge is one of the few remaining Pennsylvania truss highway bridges in the state and is eligible for the National Register of Historic Places for its architectural and engineering merit.



## PARK'S GAP BRIDGE

LOCATION: CR 6, Tomahawk vicinity, Berkeley County, spanning Back Creek  
 LENGTH: 98'-6"  
 YEAR CONSTRUCTED: 1892  
 CONTRACTOR: Vulcan Road Machine Company of Charles Town, WV

The Park's Gap Bridge consists of one simple steel pony truss span supported on full-height stone masonry abutments. The bridge is constructed entirely of railroad rails, loop rods and U-bolts. Park's Gap Bridge is listed on the National Register of Historic Places. The bridge is significant as an extant example of an unusual patented bridge truss and construction system. The bridge is unusual in its design, structural system and materials and is one of only three or four Lane truss bridges in the eastern United States. This is the only Lane truss bridge in West Virginia.



# Highways Through History

## CAPON LAKE WHIPPLE TRUSS

LOCATION: WV 259, Yellow Spring vicinity, Hampshire County, spanning the Capon River  
 YEAR CONSTRUCTED: 1874  
 CONTRACTOR: T.B. White and Sons of New Brighton, Pennsylvania

The Capon Lake Whipple Truss was built near Romney, WV, in 1874 on US 50, which follows the route of the Northwestern Turnpike. Squire Whipple invented the Whipple truss in 1847 and was one of the first designers to use scientific analysis for structural design. His book, *A Work on Bridge Building*, had a vast impact on bridge engineering. Metal truss bridges were marketed as movable structures that could be dismantled and re-erected elsewhere if necessary. This bridge was moved from its original location to the Capon River in 1938 and was closed to vehicular traffic in 1991. Due to its uncommon innovative design and age, the Capon Lake Whipple Truss is one of West Virginia's most significant bridges. It is maintained as a historical site for pedestrians by the West Virginia Division of Highways.



## CATALOG BRIDGES

Some companies, including the Wrought Iron Bridge Company of Canton, Ohio, published catalogs of different types of metal trusses, and clients could simply order the bridge that suited their needs and budget. In West Virginia, the county courts were responsible for road improvement prior to the establishment of the State Road Commission in 1917, and many counties purchased bridges through catalogs.



## GLENVILLE TRUSS BRIDGE

LOCATION: Glenville, Gilmer County, spanning the Little Kanawha River  
 LENGTH: 240'-6"  
 YEAR CONSTRUCTED: 1885  
 DESIGNER: Stewart, Shirreffs & Co. of Richmond, Virginia  
 FABRICATOR: Wrought Iron Bridge Company of Canton, Ohio

The Glenville Truss Bridge was built in 1885 as part of a series of transportation improvements proposed by Michael Stump, who was elected the first Surveyor of Lands for Gilmer County in 1845. Stewart, Shirreffs & Co. received a contract from the Gilmer County Court to design six wrought iron bridges in order to connect different parts of the county. Glenville Truss Bridge is the only remaining of these six structures, and serves as a reminder of the challenges faced by travelers before road improvement programs were undertaken on a large scale by local and state governments. Structures such as the Glenville Truss Bridge, as well as advances in road construction, were essential to the development of counties, towns, and rural areas throughout the state.



## BRIDGEPORT BRIDGE

LOCATION: No longer extant: US 40, Wheeling, Ohio County, spanning back channel of the Ohio River  
 LENGTH: 639'-6"  
 YEAR CONSTRUCTED: 1893  
 BUILDER: Wrought Iron Bridge Company of Canton, Ohio

The Bridgeport Bridge was built to improve the connection between West Virginia and Ohio via US 40 and replaced a covered bridge that was built at the site in 1837. The Wheeling and Belmont Bridge Company operated the bridge and charged tolls until the City of Wheeling acquired the structure in 1941 and conveyed it to the state in 1942. Bridgeport Bridge consisted of three modified bowstring steel truss spans and included architectural features such as finials and decorative railings. The bridge was documented with photography, measured drawings and historical information by the Historic American Engineering Record in 1974. Although not every significant bridge can be preserved in place, archiving structures through photographs and drawings helps to preserve important information about history and design for future generations.

# The Future

- » Modeling <-> Visualization Link
- » GIS <-> Visualization Link
- » 3D Printed Scale Models





# Questions?

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