Evaluation of Strengthening/Replacement Alternatives John G. Lewis Memorial Bridge on Route 673 (Featherbed Lane) over Catoctin Creek

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Link to the project webpage:

http://www.virginiadot.org/projects/northernvirginia/route_673_over_catoctin_creek.asp

Alternative 1

Features

Provide new 2-span continuous thru-girders along the fascia of the existing bridge to support the existing truss bridge

- Existing truss to remain: 158’ span steel pin connected Pratt through truss with new glu-lam timber deck and floor beams
- Restores 15 ton vehicular capacity
- Maintain one-lane bridge (11’-2” clear width) with 2-way traffic
- Functionally Obsolete bridge roadway width (12’ min.) per Chapter 32 of the VDOT BDM Vol. V, Part 2
- New pier and abutment widening

- **Estimated Cost $1.6M to $2.6M**

Alternative 1

Add Steel Thru Girders to Fascia of Existing Truss Bridge

Alternative 2

Features

Replace bridge with new two-span continuous steel beam bridge (80'-80') spans with glu-lam timber deck

- Attach existing truss members to the new bridge to maintain the appearance of the existing truss bridge
- Provide one-lane bridge (14' clear width) with 2-way traffic
- Eliminates Functionally Obsolete bridge roadway width (12' min.) per Chapter 32 of the VDOT BDM Vol. V, Part 2
- Designed for AASHTO LRFD HL-93 loading plus weight of truss members
- New Pier and Abutments

- **Estimated Cost $3.0M to $4.0M**

Alternative 2

New Two-Span Continuous Steel Beam Bridge with Existing Truss Members Attached

VDOT Virginia Department of Transportation

John G. Lewis Memorial Bridge over Catoctin Creek

ALTERNATIVE 2 - Two-Span Continuous Steel Beam and Timber Deck Bridge with Existing Truss Members Attached. Widened Bridge by 3 ft. for Guardrail Deflection Clearance

Alternative 2A

Features

Replace bridge with new two-span continuous steel beam bridge (80'-80') spans with glu-lam timber deck

- Attach existing truss members to the new bridge to maintain the appearance of the existing truss bridge
- Provide one-lane bridge (10'-2" clear width) with 2-way traffic
- Does not eliminate Functionally Obsolete bridge roadway width (12' min.) per Chapter 32 of the VDOT BDM Vol. V, Part 2
- New steel beams designed for minimum 15 ton vehicular capacity
- New Pier and Abutments

- **Estimated Cost $3.0M to $4.0M**

Alternative 2A

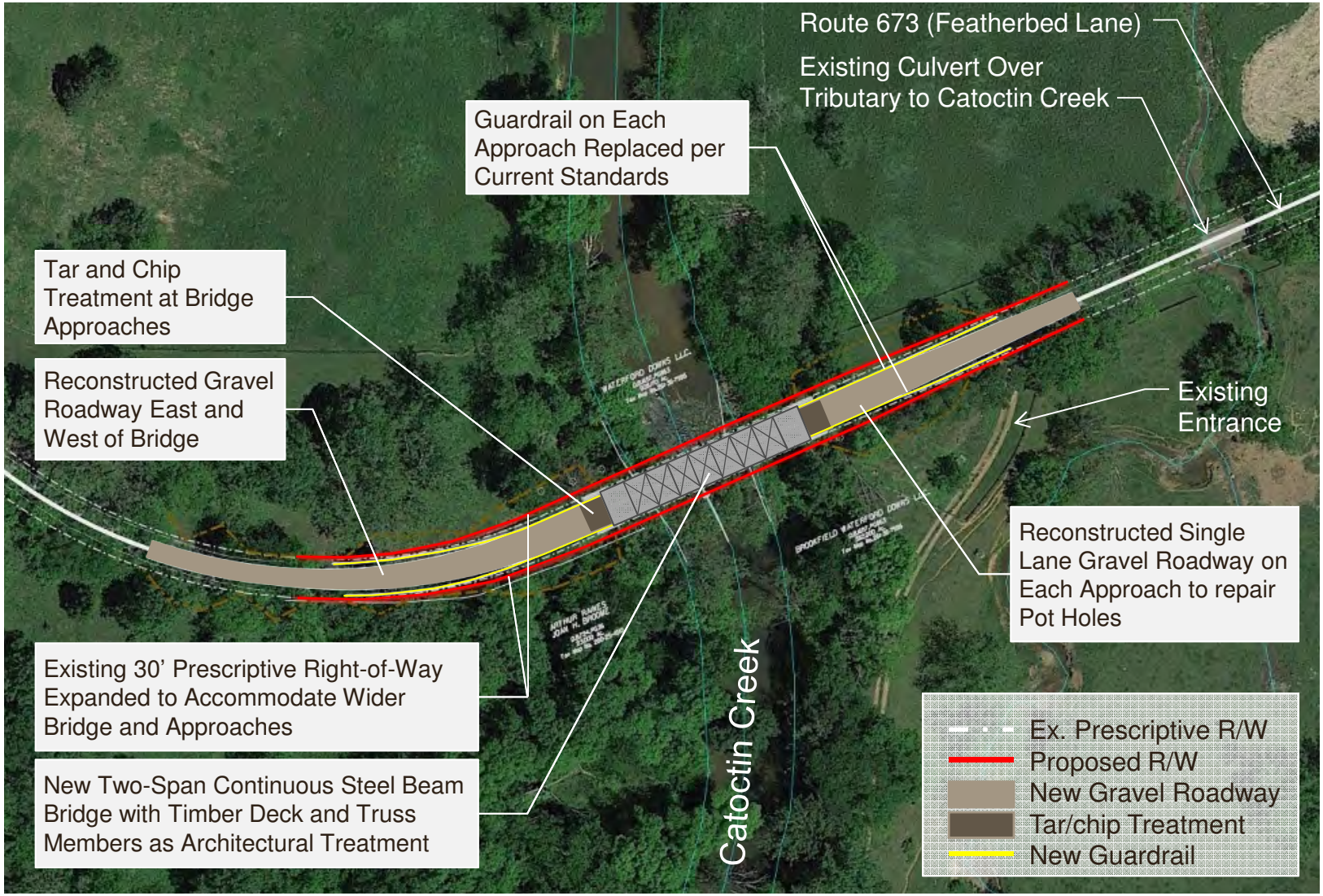
New Two-Span Continuous Steel Beam Bridge with Existing Truss Members Attached

VDOT Virginia Department of Transportation

John G. Lewis Memorial Bridge over Catoctin Creek

ALTERNATIVE 2A - Two Span Continuous Steel Beam and Timber Deck Bridge with Existing Truss Members Attached. Maintain Existing Bridge Width

Alternative 2 – Roadway Plan



Alternative 3

Features

Provide internal arch along existing truss members to restore 15 ton vehicular capacity and add structural redundancy

- Existing truss to remain: 158’ span steel pin connected Pratt thru truss with new glu-lam timber deck
- Maintains one-lane bridge (11’-2” clear width) with 2-way traffic
- Does not eliminate Functionally Obsolete bridge roadway width (12’ min.) per Chapter 32 of the VDOT BDM Vol. V, Part 2
- Requires additional steel arches, hangers, floor beams and bottom tension cables
- Abutment Widening

- **Estimated Cost $1.5M to $2.5M**

Alternative 3

Add Steel Internal Arch to Existing Truss Bridge

VDOT Virginia Department of Transportation

John G. Lewis Memorial Bridge over Catoctin Creek

ALTERNATIVE 3 - Add Steel Internal Arch to Existing Truss Bridge

Alternative 4

Features

Replace existing Pratt thru truss bridge with a new similar, wider Pratt through truss bridge

- Will carry two lanes, one lane each direction
- Meets minimum GS-4 criteria with two 10’ lanes and 1’ offsets to the railing on each side
- Designed for AASHTO LRFD HL-93 loading
- New Abutments

- **Estimated Cost $3.0M to $4.0M**

Alternative 4 – View 1

New Steel Thru Truss Bridge

Alternative 4 – View 2

New Steel Thru Truss Bridge

Alternative 4 – View 3

New Steel Thru Truss Bridge

Similar Historical Truss Bridge Replacement

Milton Street Bridge Replacement, Warren County, NY

Technical Description:

• Width:	29′ 7″
• Span:	155′
• Style:	Freedom Series Thru Truss
• Finish:	Weathering Steel
• Decking:	Concrete
Installation Date:	Fall 2011

- **Provided by U.S. Bridge**

Highlights:

The original 100 year old steel truss bridge was closed to traffic in 2008 for safety reasons.

The County decided to replace the narrow one-lane Bridge with a wider and safer two-lane bridge. The County wanted to keep the same "feel" of the old historic bridge and decided to go with a Thru Truss.

The new 155 ft long x 26 ft wide two-lane bridge is an all-bolted steel structure with a self-weathering finish and concrete deck. The bridge loading was rated HS25 and also carries utilities across the river.

Alternative 5

Features

Construct new two-span continuous steel beam bridge (80'-80') spans with concrete deck parallel to the existing truss Bridge. Retain existing truss bridge as-is to carry only pedestrian and bicycle traffic.

- New Bridge will carry two lanes, one lane each direction
- Meets minimum GS-4 criteria with two 10' lanes and 1' offsets to the railing on each side
- Designed for AASHTO LRFD HL-93 loading
- New Pier and Abutments

- **Estimated Cost $3.0M to $4.0M**

Alternative 5 – View 1

New Two-Span Continuous Steel Beam Bridge and Existing Truss Bridge for Pedestrians

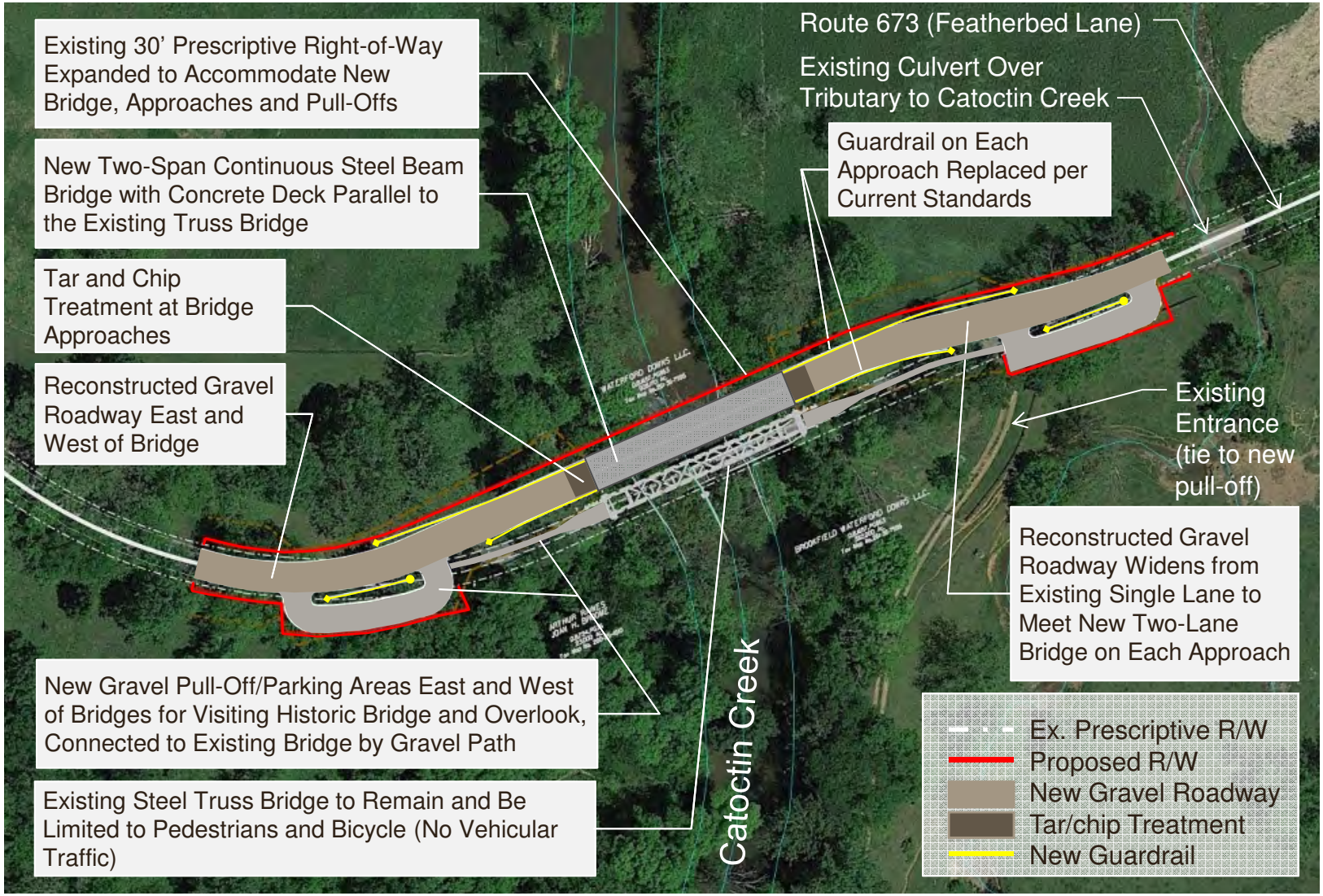
Alternative 5 – View 2

New Two-Span Continuous Steel Beam Bridge and Existing Truss Bridge for Pedestrians

Alternative 5 – View 3

New Two-Span Continuous Steel Beam Bridge and Existing Truss Bridge for Pedestrians

Alternative 5 – Roadway Plan



VDOT Virginia Department of Transportation

Historical Truss Bridge Preservation
Springbrook Road Truss over Linville Creek, Broadway,VA
Single Span (136 ft) Thatcher through truss bridge, Built 1898

Before

After

Highlights:

Listed in the National Registry of Historic Places and in Virginia Landmarks Registry.

Built in 1898, the capacity was recently reduced to a 4 ton weight limit posting.

It was decided to close the bridge for safety reasons (non-redundant design can lead to instantaneous collapse, no emergency responder vehicle access).

In order to keep the bridge at the current location, the County decided to repurpose the one-lane Truss Bridge as a pedestrian bridge. A new parallel 2-lane bridge was constructed to carry traffic (4-spans, prestressed box beams with concrete overlay, 136 ft long x 32 ft wide).

The project maintains the old historic truss bridge in its current setting and provides a new bridge to meet current and future traffic needs.

Alternative 6

Features

Construct new single span steel pony truss bridge (160’) with concrete deck

- Will carry two lanes, one lane each direction
- Meets minimum GS-4 criteria with two 10’ lanes and 1’ offsets to the railing on each side
- Designed for AASHTO LRFD HL-93 loading
- New Abutments

- **Estimated Cost $2.5M to $3.5M**

Alternative 6 – View 1

New Steel Pony Truss Bridge

Alternative 6 – View 2

New Steel Pony Truss Bridge

Alternative 6 – View 3

New Steel Pony Truss Bridge

Similar Historical Truss Bridge Replacement

Clem Lowell Road Bridge, Carroll County, Georgia

Technical Description:	
• Width:	28 -ft.
• Span:	130 -ft.
• Style:	Cambridge Flat
• Finish:	Weathering Steel
• Decking:	Concrete
Installation Date:	2008

- **Provided by U.S. Bridge**

Highlights:

After providing maintenance and repair for the original 70 year old steel truss bridge for many years and lowering the load limit on the bridge to 3 tons, the County closed the bridge to traffic in 2008 after a heavy truck cracked members supporting the deck.

Recognizing the shortfalls of the now compromised bridge, Carroll County officials determined that instead of facing the prospect of continued repairs, it was best to replace the entire structure and install new abutments.

The County wanted the new structure to resemble the original structure. The new 130 ft long x 28 ft wide Pony Truss Bridge was selected as the structure that best replicated the old Clem Lowell Road Bridge while also providing the current load rating standards and structural integrity.

Alternative 7

Features

Replace existing Pratt thru truss bridge with a new through truss bridge similar in appearance

- Will carry one reversible lane
- Designed for AASHTO LRFD HL-93 loading
- Increases horizontal clearance between the bridge railings from 11’-2” to 14’
- Crash tested bridge safety railing
- Timber Glu-lam Deck

- **New Abutments**
- **Estimated Cost $3.0M to $4.0M**

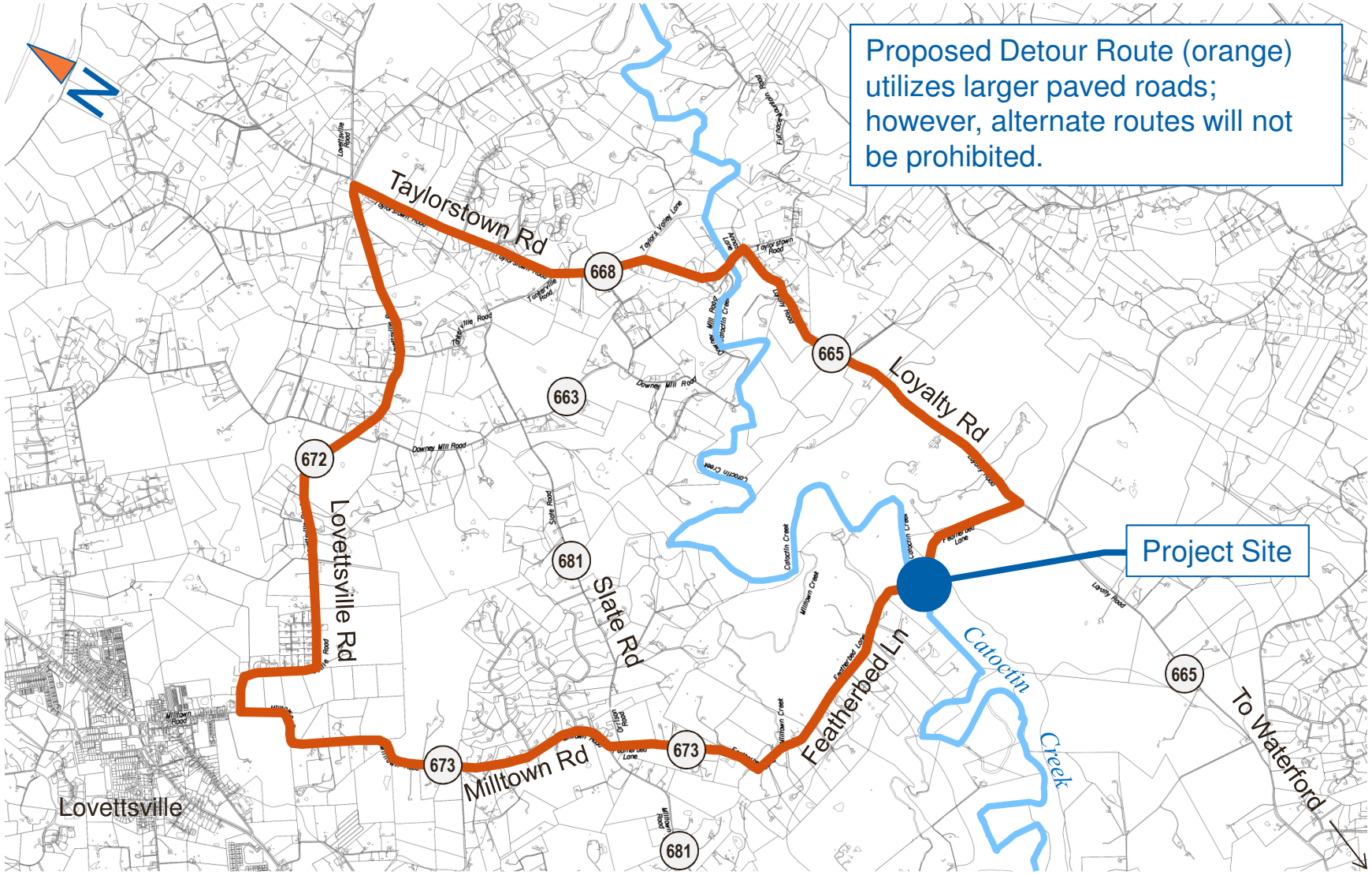
Alternative 7 New Single Lane Steel Thru Truss Bridge

Virginia Department of Transportation

John G. Lewis Memorial Bridge over Catoctin Creek

ALTERNATIVE 7 - New Single Lane Steel Thru Truss Bridge

Detour Route (All Alternatives)



QUESTIONS & COMMENTS

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