CENTERTON ROAD BRIDGE REPLACEMENT
FEASIBILITY STUDY

BURLINGTON COUNTY BRIDGE C4.4 OVER RANCOCAS CREEK
TOWNSHIPS OF MOUNT LAUREL, WESTAMPTON & WILLINGBORO
The existing Centerton Road Bridge is a 312’ long steel pony truss with 3 fixed spans and a center moveable swing span.

- Originally constructed in 1903.
- Major rehabilitation performed in 1949.
- Additional deck repairs made in 2010.
- Bridge closed April 23, 2015.

Route I-295 was built in 1971.

- 4<sup>th</sup> lane of travel over the Rancocas Creek between CR 626 (Beverly-Rancocas Road) and CR 636 (Creek Road).
- 4<sup>th</sup> lane specifically constructed to replace Centerton Road Bridge.
EXISTING BRIDGE CONDITIONS

- Bridge is founded on stone masonry abutments, a stone masonry pier under the swing span, and 3 steel I-beam piers.
- Existing clear roadway width of 18’-4” (lane width is 8’-6” in each direction).
- The existing bridge lacks pedestrian and bike access.
- The existing bridge also lacks shoulders along roadway.
- A full bridge inspection was performed by Taylor Wiseman & Taylor Engineers with underwater inspection performed by W.J. Castle PE & Associates in April 2015.
  - Based on findings, it was recommended the bridge remain closed to vehicular traffic.
  - “For the bridge’s long term future a major rehabilitation, complete replacement, permanent closure or complete removal should be evaluated due to the bridge’s age, substandard features and numerous major deficiencies.”
  - Burlington County Engineer’s Office concurred with the recommendations.
- All features of the bridge are substandard.
- The existing bridge is structurally deficient and functionally obsolete; its structural condition warrants demolition.
Maser Consulting P.A. considered the following four (4) alternatives and their associated impacts in their feasibility study.

- **Alternative 1**
  - No Build – Permanent Elimination of Crossing (removal of structure up to but not including abutments)

- **Alternative 2**
  - Three-Span Fixed *Vehicular* Bridge

- **Alternative 3**
  - Three-Span Fixed *Pedestrian* Bridge

- **Alternative 4**
  - New Moveable Swing Bridge
Since the closure of the Centerton Road Bridge, traffic has diverted to routes that run parallel, over Rancocas Creek.

Alternate routes consist of:
- US Route 130 (aka Burlington Pike)
- 4th Lane on Route I-295
  - Route specifically constructed to replace Centerton Road Bridge.

A traffic study and capacity analysis was performed using current traffic patterns in the area and anticipated demands into the year 2037.
- Analyses were performed based on current conditions (with the Centerton Road Bridge closed to traffic) as well as based on possible future conditions (construction of a new vehicular crossing).
- Since the closure of the Centerton Road Bridge, the level of service of I-295 has not been negatively impacted.
- By comparing results of the analyses, it was determined that a new vehicular crossing would not significantly improve the traffic patterns on I-295 into the year 2037.
HYDRAULICS & SCOUR ASSESSMENT

• Similar to the existing bridge, any bridge alternatives should be aligned with the flow and the channel.
• Piers should be streamlined and circular, if possible.
  • The smaller, the better - to minimize the potential scour depth effects.
• The bottom of deck should clear the hydraulic design elevation.
• Machinery associated with any of the alternatives should also be positioned above the flood elevations.
• Based on findings in the preliminary hydraulics and scour assessment, any of the alternatives considered can be designed as to withstand potential scour.
• It is recommended that subsurface investigations and hydraulic modeling be conducted during preliminary design phases for any of the alternatives to estimate potential scour depths and design parameters.
Currently, the Centerton Road Bridge provides less than < 4’-0” of vertical underclearance over the mean high water of Rancocas Creek.

Access to waterways in the vicinity of the bridge is limited to vessels with minimal draft and height requirements given the shallow depths and meandering nature of the waterway.

Either of the fixed bridge alternatives would provide 12’-0” underclearance over mean high water for a 60’-0” wide navigable channel.

The 12’-0” underclearance over mean high water was established for either of the fixed bridge alternatives through coordination with the U.S. Coast Guard and the New Jersey Marine Police (NJSP).
ECOLOGICAL ASSESSMENT

• All designs must attempt to minimize impacts to environmentally sensitive features while also meeting public needs and the requirements for associated permits.

• Redevelopment of any bridge structure at the project site will be subject to NJDEP permitting and compliance with:
  • Coastal Zone Management Rules (N.J.A.C.7:7)
  • Freshwater Wetlands Protection Act Rules (N.J.A.C 7:7A)
  • Flood Hazard Area Control Act Rules (N.J.A.C. 7:13)
  • U.S.A.C.E. approval (under Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act)
  • U.S. Coast Guard review

• The NJDEP cites potential occurrences of habitat for rare, threatened and/or endangered species in the vicinity of County Bridge #C4.4. The onsite wetlands will be classified as intermediate resource value wetlands with a 50-foot wide transition area or buffer.
• Based on a review conducted by the Department of Environmental Protection Natural & Historic Resources Historic Preservation Office, the Centerton Road Bridge is individually eligible for listing in the New Jersey and National Registers of Historic Places under Criterion C for its engineering significance.

• Burlington County was granted permission to remove the bridge by the State Historic Preservation Office. SHPO requests that a plaque be installed near the bridge to commemorate its existence after its removal.

• RGA, Inc conducted a Phase IA historical and archaeological survey and reconnaissance-level historic architectural survey for the proposed replacement of Centerton Road Bridge.

• The Phase IA historical and archaeological survey was conducted to determine the archaeological sensitivity of the Area of Potential Effect for Archaeology (APE-Archaeology).
  • No registered archaeological sites are located within or adjacent to the APE-Archaeology, but 23 registered prehistoric and/or historic archaeology sites are located within one mile of the APE-Archaeology.

• A Phase IB archaeological survey was recommended for portions of the APE-Archaeology with high archaeological sensitivity.
APE – ARCHAEOLOGY
(AREAS OF ARCHEOLOGICAL SENSITIVITY)
To accommodate new underclearence requirements established (for fixed bridge alternatives), the vertical alignment of the roadway will be changed dramatically.

- A dramatic change in vertical alignment requires the entire roadway within the project limits to be fully reconstructed with new full depth pavement.

- Retaining walls are proposed for both sides of the roadway to minimize environmental disturbances and right of way acquisitions that are associated with raising the roadway so that fixed bridge alternatives meet the underclearence heights established.

- The next two slides illustrate the significant change in the roadway profile required for Alternative 2 (or any fixed crossing alike).
ALTERNATIVE 2
BRIDGE ELEVATION (1 OF 3)

PROPOSED CENTERTON ROADWAY

EXISTING ROADWAY

± 180'-0"

∆ IN ELEVATION = ± 5'

∆ IN ELEVATION = ± 9'

± 180'-0"
ALTERNATIVE 2
BRIDGE ELEVATION (2 OF 3)

\[ \Delta \text{IN ELEVATION} = \pm 9' \]

\[ \Delta \text{IN ELEVATION} = \pm 10' \]

± 80'-0"

NEW 3-SPAN BRIDGE (± 310'-5'"")
ALTERNATIVE 2
BRIDGE ELEVATION (3 OF 3)
ROADWAY PROFILE (ALTERNATIVE 2)

$\Delta$ IN ELEVATION = $\pm$ 4'

$\pm$ 200'-0''
ROADWAY PROFILE (ALTERNATIVE 2)

\[ \Delta \text{ IN ELEVATION} = \pm 8' \]

\[ \pm 575'-0'' \]
• While all crossings (Alternatives 2, 3 & 4) would require some right of way takings, Alternative 2 (Three-Span Fixed Vehicular Bridge) would require the most.

• Right of way acquisitions required for Alternative 2 are summarized in the table below:

<table>
<thead>
<tr>
<th>Property Location</th>
<th>Township</th>
<th>Property Owner</th>
<th>R.O.W. Taking (SF)</th>
<th>R.O.W. Easement (SF)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block: 103 Lot: 8</td>
<td>Mt Laurel</td>
<td>Sherwood Forest Homes, LLC 4 Old Centerton Pike</td>
<td>714</td>
<td>-</td>
<td></td>
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<tr>
<td>Block: 103 Lot: 3</td>
<td>Mt Laurel</td>
<td>Deborah A. Scott &amp; James K. Grace 905 Centerton Road</td>
<td>1043</td>
<td>-</td>
<td></td>
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<tr>
<td>Block: 102 Lot: 1</td>
<td>Mt Laurel</td>
<td>Michael L. D'Ambra, II &amp; Kathleen M. Casper 100 Texas Avenue</td>
<td>1559</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Block: 101 Lot: 8</td>
<td>Mt Laurel</td>
<td>FANNIE MAE</td>
<td>469</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Block: 100.11 Lot: 7</td>
<td>Mt Laurel</td>
<td>Stephen R. Mazzagatti 896 Centerton Road</td>
<td>473</td>
<td>-</td>
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<tr>
<td>Block: 100.11 Lot: 8</td>
<td>Mt Laurel</td>
<td>Itziar Otegui 902 Centerton Road</td>
<td>269</td>
<td>-</td>
<td></td>
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<tr>
<td>Block: 100.11 Lot: 9</td>
<td>Mt Laurel</td>
<td>Barry Victor Cranmer A &amp; Ruth Catherine Cramner 910 Centerton Road</td>
<td>645</td>
<td>-</td>
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<tr>
<td>Block: 100.11 Lot: 5</td>
<td>Mt Laurel</td>
<td>Capuano Realty 876 Centerton Road</td>
<td>2773</td>
<td>-</td>
<td></td>
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<tr>
<td>Block: 201 Lot: 1</td>
<td>Westampton</td>
<td>Burlington County Board of Chosen Freeholders 375 Bridge Street</td>
<td>28915</td>
<td>-</td>
<td>Already Owned By County</td>
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<tr>
<td>Block: 1128 Lot: 20</td>
<td>Westampton</td>
<td>Gilbert A. Gehin, Sr. &amp; Ruth M. Gehin-Scott 630 Bridge Street</td>
<td>8854</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
• Existing electrical service lines and a submarine cable (not operable) are being removed during demolition of bridge. In stream materials will be abandoned in-place.

• An 18-inch water main runs below the approach roadways and to the east of the bridge, underneath Rancocas Creek.
  • Subsequent to bridge replacement, the water main may need to be replaced as well.
  • In 1989, the County received an estimate of $2 million to replace the water main – the cost to do so could be up to +/-$4 million today.

• All existing utilities will be maintained and protected during construction.
ALTERNATIVE 1: NO BUILD – PERMANENT ELIMINATION OF CROSSING

- This option would eliminate the flow of vehicular traffic at this location.
- The nearest vehicular crossings are via the I-295 Bridge (~1400’ to the east), exits 43 and 45, and via Route 130 (Burlington Pike) to the west.
- This alternative will have no additional environmental impacts, to those already identified as part of the current demolition project.
- This alternative has no cost associated with it, since the existing bridge demolition will be done under a separate contract. All alternatives require demolition of the existing bridge.
**ALTERNATIVE 2: THREE-SPAN FIXED VEHICULAR BRIDGE**

- The bridge will consist of prefabricated type steel trusses (3-Spans).
- The bridge would carry standard NJDOT vehicular, pedestrian and bicycle traffic.
- The proposed bridge underclearance will be 12’-0” for a 60’-0” wide navigable channel; as per the navigation study.
- Raising the low chord elevation of the bridge will require significant raising of the approach roadways (in excess of 8 feet) requiring property acquisitions.
- The total cost of a new bridge would be approximately $25 million.
- This alternative would have significant environmental and right-of-way impacts.
ALTERNATIVE 2: THREE-SPAN FIXED VEHICULAR BRIDGE
ALTERNATIVE 3: THREE-SPAN FIXED PEDESTRIAN BRIDGE

- The bridge would accommodate both bicycle and pedestrian traffic.
- The proposed bridge underclearance will be 12’-0” for a 60’-0” wide navigable channel; as per the navigation study.
- Raising the low chord elevation of the bridge will require significant raising, which will require staircases and ramps to access the bridge.
- The total cost of a new pedestrian bridge would be approximately $5.5 million.
- This alternative will have lower environmental impacts, will have lower right-of-way impacts and will not require water main relocation; when compared to vehicular bridges.
ALTERNATIVE 3: THREE-SPAN FIXED PEDESTRIAN BRIDGE
The bridge would be comprised of non-moveable approach spans, similar to existing ones, and one movable center span (swing).

The new bridge will be able to carry all types of standard NJDOT vehicular and pedestrian traffic.

The approximate total cost of a new bridge would be approximately $37.0 million, including design and construction inspection.

This alternative has the highest construction cost, as well as long term maintenance costs associated with the moveable span operations.
ALTERNATIVE 4: NEW MOVEABLE SWING BRIDGE

-Red Area = R.O.W.
easements/acquisitions required for this alternative beyond existing R.O.W.
-Blue Line = existing R.O.W.
## Table of Impact Scores

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Property</th>
<th>Traffic</th>
<th>Hydraulics</th>
<th>Navigation</th>
<th>Ecological</th>
<th>Cultural</th>
<th>Roadway</th>
<th>Utilities</th>
<th>Cost</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Alternative 1: No Build – Permanent Elimination of Crossing</td>
<td>0</td>
<td>3</td>
<td>0</td>
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<td>1</td>
<td>1</td>
<td>0</td>
<td>6</td>
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<td>Alternative 2: Three-Span Fixed Vehicular Bridge</td>
<td>5</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>36</td>
</tr>
<tr>
<td>Alternative 3: Three-Span Fixed Pedestrian Bridge</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Alternative 4: New Movable Swing Bridge</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>33</td>
</tr>
</tbody>
</table>

The table above provides a score (between 0 – 5) for each alternative based on its negative impact on a particular aspect of the project.
## ALTERNATIVE COMPARISON
### COSTS, IMPACTS, & ESTIMATED SCHEDULES

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Cost</th>
<th>Impact Score (from table on slide 31)</th>
<th>Time for Design/Permitting</th>
<th>Time to Implement</th>
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</thead>
<tbody>
<tr>
<td>Alternative 1: No Build – Permanent Elimination of Crossing</td>
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<td>6</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Alternative 2: Three-Span Fixed Vehicular Bridge</td>
<td>$25.0 M</td>
<td>36</td>
<td>4-5 years</td>
<td>2 years</td>
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<tr>
<td>Alternative 3: Three-Span Fixed Pedestrian Bridge</td>
<td>$5.5 M</td>
<td>20</td>
<td>2-4 years</td>
<td>1 year</td>
</tr>
<tr>
<td>Alternative 4: New Movable Swing Bridge</td>
<td>$37.0 M</td>
<td>33</td>
<td>4-5 years</td>
<td>3 years</td>
</tr>
</tbody>
</table>
SUMMARY OF FINDINGS

1. Demolition of the existing bridge is necessary.

2. Alternatives 2 and 4 (replacement with a vehicular bridge) are not feasible due to the following factors:
   - Do not improve traffic conditions along Route 295.
   - Involve taking private property.
   - Need 3 to 4 years to secure funding (it should be noted that funding agencies are likely to reject these alternatives due to lack of justification).
   - Have significant environmental and cultural resources permitting requirements.
   - Need an additional 3 to 5 years for environmental permitting and land acquisition.

3. Alternative 3 (replacement with a pedestrian bridge):
   - Provides connectivity to the County’s trail system.
   - Cost is reasonable and funding is likely available.
   - Time needed to fund, design and construct is reasonable.
1. Proceed with the demolition of the existing bridge.

2. Consider Alternative 3 (replacement with a pedestrian bridge).