Reopening the Headquarters Road Bridge

Summer/Fall 2014

What's Quick, Cost Effective, Compatible, and Safe?

The Headquarters Road (Sheephole) Bridge has been closed since March 2011. The main choice now being debated and considered is whether to rehabilitate the historic one lane bridge or remove it entirely and replace it with a two lane modern structure.

State and federal historic and environmental agencies are looking closely at this choice because this is no ordinary bridge. This 1812 bridge plays a key role in the Federal Wild and Scenic River designation that brings attention and resources to the Tinicum Creek and the Lower Delaware River. The bridge also has federal protection as the oldest and most prominent bridge in the bridge-themed Ridge Valley National Register Rural Historic District.

Removal of the bridge would obviously be an adverse effect on both these Federal resources. By law, adverse effects must be mitigated if they are permitted at all. Removal of a resource of this quality, if permitted at all, is not easy or quick. The Pennsylvania Department of Transportation (PennDOT) does have the resources to fix the Headquarters Road (Sheephole) Bridge but it has not committed to doing so and so is currently undertaking the historic reviews required by federal law to consider other options and their impacts. PennDOT will also need to prepare a thorough review on each alternative under the National Environmental Policy Act (NEPA) and Section 4(f) of the U.S. Department of Transportation Act (DOTA) in order to inform its final decision. The more changes PennDOT seeks to make to the existing national historic register listed bridge and state and federally protected waterway, the more extensive the various reviews and permitting will have to be.

So what is the right path? Which option could open the bridge fastest? Which would be most cost-effective? Which would be most compatible with the existing road system? And what about our health and safety, our unrivaled historic features, our beautiful and unspoiled environment, and the ecotourism and economic benefits we value as a community? This newsletter will explore some of these key issues.

Cultural and Historic Values of the Bridge: Irreplaceable and Fundamental

The Ridge Valley Rural Historic District ("RVRHD") which envelops the Headquarters Road Bridge is considered an "outstandingly remarkable cultural and historic resource value" for the Tinicum Creek segment of the Lower Delaware River and as such, was instrumental in gaining the segment's designation as a scenic river.[1] In a 2013 presentation, Kutztown University Professor Rob Reynolds, PhD — an expert in historic preservation — explained the significance of the Bridge in relation to the RVRHD:

> *"The current alignment of the Headquarters Road Bridge anchors the southern end of the Ridge Valley Rural Historic District. Removal of the bridge, installing a new bridge of modern design, altering the alignment, and changing the way the current bridge connects Headquarters Road, Sheep Hole Road, or Red Hill Road would be an adverse effect that could lead to delisting the district or reconfiguring the boundary for this area."*

Dr. Reynolds believes the bridge itself to be a key element in the historic district:

> *"The Headquarters Road Bridge remains an integral contributing resource of the Ridge Valley Rural Historic District. It is the oldest bridge of its type left in Pennsylvania and is one of only a few spans in America over 200 years old. The 1919 rebuilding of this bridge actually adds to, rather than detracts from, the integrity of the structure.*
>
> *Those renovations tie this span to a larger transformation of creek crossings in the Ridge Valley Historic District, which mostly date to the early auto era. The demolition of this span and the installation of a modern bridge will cause an irreparable adverse impact to the stellar collection of creek crossings, which form the central axis of the Ridge Valley Rural Historic District."*


Looking Downstream from the Headquarters Road Bridge

Rehabilitation Best Protects the Ecological Integrity of Tinicum Creek

The Tinicum Creek watershed has been honored with state and federal designations requiring the strictest possible protection at every level. It's listed as one of the very few Federal Wild and Scenic streams in the East. It also was ranked first quality for protection on a countywide study based on its variety of uncommon plant communities, large numbers of rare plant and animal species, and the exceptional quality of the water[2].

Construction of a new larger bridge would be much more damaging to the integrity and quality of Tinicum Creek than rehabilitation of the existing bridge. The excavations, clearing, grading and channeling required would have direct and adverse impacts on streambank stability, water quality, river hydraulics, and aquatic organisms.

A larger bridge requiring hardened banks would bring more pollution, runoff and construction harms to Tinicum Creek. It would alter stream flows causing habitat harms and changes to the flood plain, threatening the trees that now stabilize the banks and prevent erosion. Evaluating and mitigating these impacts, if possible, would add considerable cost and time to the environmental permitting process.

[1] The Lower Delaware River Management Plan (August 1997), p. 51.

[2] Rhoads, Ann F. and Timothy A. Block. 1999. Natural Areas Inventory of Bucks County, Pennsylvania. Bucks County Commissioners, Doylestown, PA.

Bridge Rehabilitation is More Compatible with All Regional, County and Local Plans for Tinicum

According to Transportation Expert Dr. Mark Stout[3], the historic Headquarters Road bridge is exactly what Tinicum Township needs to support its present and future growth and traffic needs.

The Planning Context

- Regional, county, and local plans all designate Tinicum Township as a rural resource/ conservation/natural area
- Delaware Valley Regional Planning Commission's Policy limits suburban expansion into rural areas; Tinicum classified as Rural Resource, Conservation Focus Areas
- Bucks County classifies Tinicum as Natural Resource/Conservation Area, Conservation Landscapes, Greenways
- New Township plan under development echoes the old plan which focuses on preserving and enhancing traditional character
- No population increase anticipated in township, according to expert Art Bernard, P.P.[4]

The Roadway Network

- Two-thirds of the bridges in Tinicum are one-lane bridges. One-half (14 of 28) of PennDOT's own bridges in Tinicum are one-lane.
- Tinicum is characterized by narrow, winding hilly roads with limited "sight distance", including the approaches to Headquarters Road Bridge.
- Except for 611 and River Road, Tinicum's roads have low traffic counts

Safety

Crash history is sparse for the Headquarters Road bridge. Accidents when they have occurred have been low speed. In the worst year in the Tinicum Township Police data base, a year in which barriers reduced the 16' width to only 10', just two accidents were recorded[5].

The existing one lane bridge acts as a traffic calming measure which narrows roadways to slow vehicle speeds and reduces the risk of side swipe and head-on crashes that are a risk with 2-lane configurations.

Minor geometric improvements (slope cut-back) on the east side of the bridge would allow emergency vehicles to safely navigate the turn onto Sheephole Road.

The configuration and geometry have successfully existed since the bridge was built in 1812 and are similar to many other bridges throughout the region.

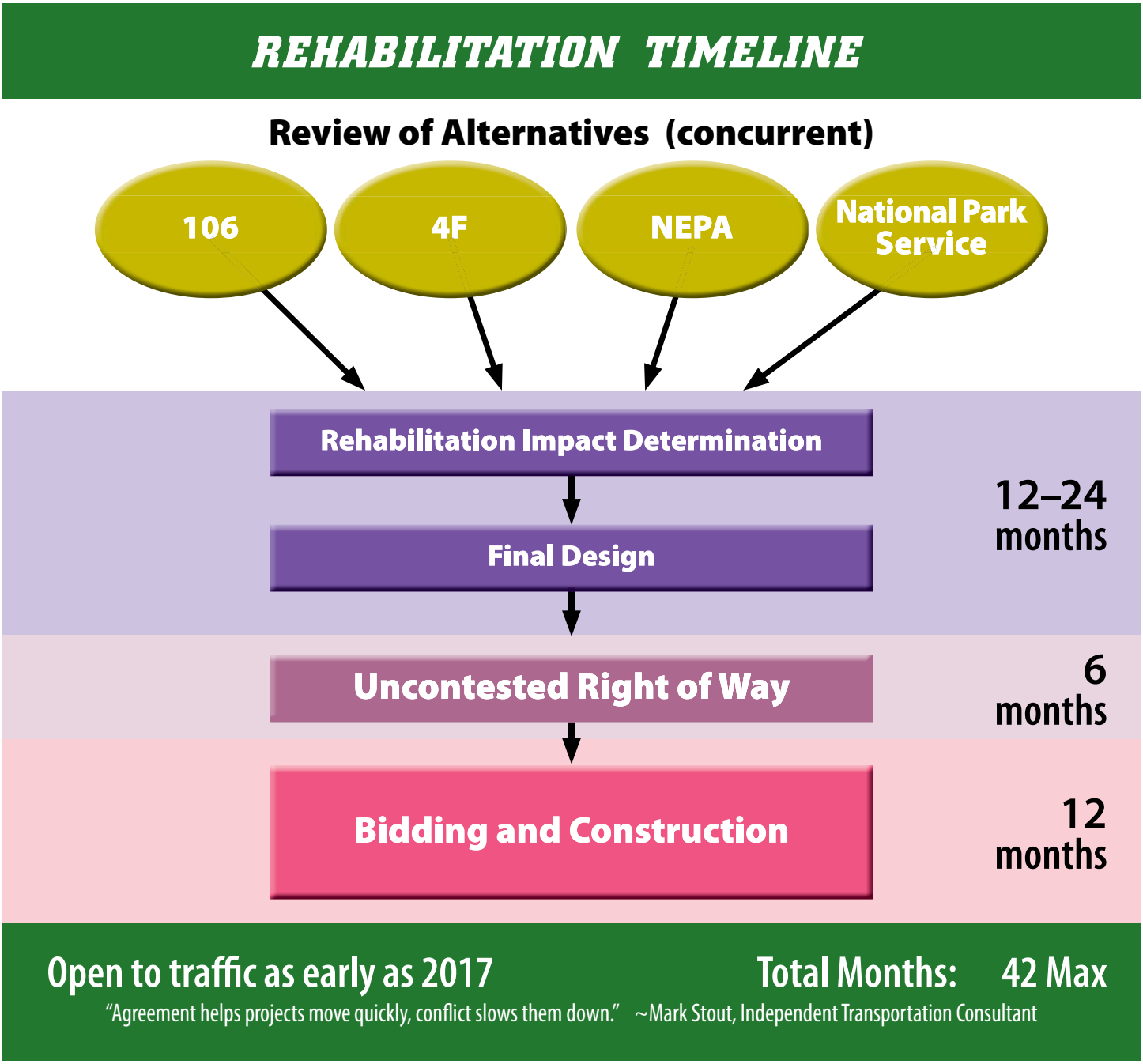
When Bridges Turn 200, They're Celebrated!

This year, two local Delaware River bridges join the 202 year old Headquarters Road bridge in beginning their third century. The towns of New Hope and Centre Bridge are celebrating their bridges for their history, beauty, continuing usefulness. These three bridges embody the value that Bucks County's unique heritage has for the nation.

[3] Mark Stout is a former New Jersey Department of Transportation Assistant Commissioner and is an independent transportation consultant. With over 30 years of experience he is a nationally recognized expert in transportation policy and smart growth planning.

[4] Managing member and Professional Planner, Art Bernard and Associates, L.L.C. Housing and Land Use Planning

[5] Year records only available data from Tinicum Township Police data base



Testing of the Piers Demonstrates Rehabilitation is a Solid Option

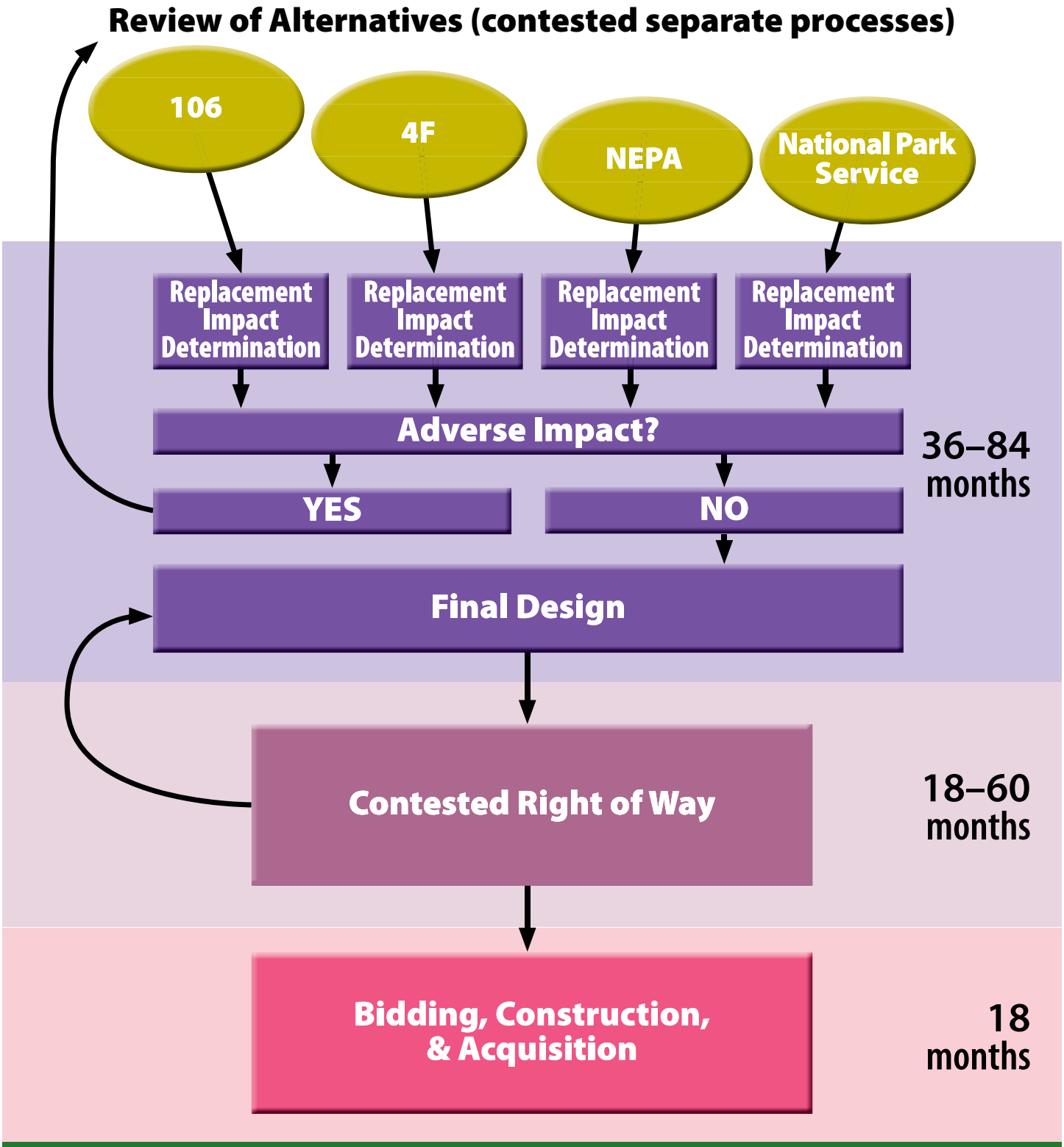
After delays of over a year despite an offer from the Delaware Riverkeeper Network to cover the cost, PennDOT finally conducted borings of the existing historic piers to confirm if they were solid enough for the rehabilitation option. The results of those tests demonstrate that "yes" the piers were built solidly when first constructed and that they maintain the integrity necessary, with some appropriate rehabilitative interventions, to solidly support the present and expected traffic of Tinicum Township.

According to historic bridge expert and engineer Doug Bond[6]:

> *"The core tests confirmed that the 200 year old stone masonry piers and abutments are built with large face stones with smaller interior fill stones that can be rehabilitated using traditional stone masonry repair techniques to provide a solid support for the bridge beams and deck."*

[6] McMullan & Associates, Inc., Reston, VA, www.mcmse.com
Doug Bond has over 22 years experience in renovating historic structures including bridges. He is a registered professional engineer in seven states. McMullan & Associates clients have included several federal agencies.

REPLACEMENT TIMELINE



Open to traffic 2020 or later

Total Months: 72–162

"Agreement helps projects move quickly, conflict slows them down." ~Mark Stout, Independent Transportation Consultant

What's Faster and More Cost Effective? Rehabilitation or Replacement?

A comparison of project costs, permitting obligations, and impacts to Tinicum residents supports repair/rehabilitation as the most timely, cost effective and community protective solution. These estimates were based on conversations with experts.

PennDOT's own bridge inspection completed just before closure of the bridge recommended repairs, not replacement.[7]

PennDOT has recently repaired bridges in Sellersville and Wrightstown that are not as historic or significant as this one, nor in as good condition.

Cost Comparisons

Options:	Repair Existing Structure	Replace Bridge
Design and Construction:	$2.1 million	$3.3 million
Right of Way Lands Needed	existing footprint	Legal Fees for Eminent domain: $20,000+ Property Costs Unknown
Stream Impacts including permits	$585,000 (no EIS under NEPA)	$840,850 to $2,590,850 (includes EIS under NEPA)
TOTAL	$2.65 million	$4.14 million +

PennDOT's Poor Record in the Area

PennDOT's previous bridge replacement projects in Tinicum Township have not improved safety nor respected or preserved the historic and natural character of the area.

- The concrete Dark Hollow Road bridge built less than 20 years ago is already visibly failing.
- The new realignments resulting from PennDOT's replacements of the Tettemer and Cafferty Road bridges on Headquarters Road have led to an increase in speed along those roadways forcing PennDOT to add stop signs where none were needed before. At Tettemer, trucks now have difficulty making the new sharper turn. The new Cafferty Road bridge is inexplicably larger than the proposed design shown to the Township and residents. The new bridge places pedestrians walking along the roadway at risk.[8] Its extensive unplanned stream channelization is causing intensified flows, new flood patterns and downstream scour.
- PennDOT's Rte 32 bridge replacement project is already causing problems in the Village of Point Pleasant. Two temporary bridges across the Tohickon have recently washed out, depositing construction debris in the Delaware River due to inadequate preparation for flooding.


New Bridge at Tettemer Road

[7] PennDOT District 6-0 NBIS Inspection 11/3/2010

[8] Joan Ramage-Mcdonald presentation, April 2, 2014, 106 Consultation Meeting

The Most Durable Bridges Are Stone

Well built stone bridges last for centuries with simple maintenance. No other material, particularly concrete, can make that claim.

Historical preservation consultant Kathryn Ann Auerbach[9] has supervised the measuring and recording of every stone of the Headquarters Road bridge. She found, "The bridge is a remarkably intact example of a rare pillar bridge, the earliest of only two known in Pennsylvania. This bridge was the prototype for substructure for later wood-covered and truss bridges such as in New Hope. It was engineered to proven technology that has now almost been forgotten. The heavy stones were formed, moved and placed precisely with the slight vertical batter and curve to perform best in its situation. The bridge was built by local people for the public to use, and reflected the exuberance and optimism of young America creating its own independent future. They brought all their knowledge, expertise and care to building it right so it would last. It is a gift from these pioneers and early settlers to us."


Stonework on the Headquarters Rd. Bridge at Sheephole Rd

Properly built stone with proper mortars is able to work with the entire environment it's in. Moisture moves through the structure without harm and repairs if needed can be made in small increments. After 202 years and a severe absence of maintenance, the abutments and piers are still sound and essentially in their original conformation.

On the other hand, modern concrete bridges are demonstrating failure in less than fifty years. They are not expected to last 100 years. Modern concrete is much less forgiving; once cracked it is difficult to repair, moisture is captured inside corroding the internal steel. Deterioration usually means total replacement requiring extensive work in the stream banks and bedrock underlying the stream.

Conclusions

- The quickest solution is rehabilitation. Replacement faces stiff opposition and is a far more complex undertaking.
- The most cost effective solution is rehabilitation. It is initially less costly and is the only alternative that can be maintained indefinitely.
- The most compatible solution is rehabilitation as a wide one lane bridge. Most bridges in Tinicum are one lane whether state owned or local. The width and approaches would be typical of the rest of Headquarters Road. Unlike the jarring new widened bridges recently built on Headquarters Road, a rehabbed bridge would be safe.
- And by protecting the integrity of the Historic District and the Federal Wild and Scenic River, rehabilitation maintains federal recognition that this area is a special place needing to be preserved. These designations are of significant value in protecting the character and quality of life here that we all enjoy.

What you can do:

- Speak up in support of rehabilitation of the bridge, and urge your neighbors to unify behind this option.
- Go to DelawareRiverkeeper.org and click on the link for HQ Bridge and add your name to our e-petition.
- Let your local government representatives know how you feel.

- **State Representative Marguerite Quinn**
  1032 North Easton Road
  Doylestown, PA 18902-1055
  (215) 489-2126
- **Senator Bob Mensch**
  404 Main Street, Suite A
  Pennsburg, PA 18073
  (215) 541-2388

[9] Preservation Consultant & Instructor with Historic Preservation Program of the Bucks County Community College and has directed numerous Historic American Buildings Survey documentation projects (in Library of Congress) on National Park Service properties in Virginia and Maryland

More bridge replacements planned

PennDOT and Bucks County are moving toward replacing two other historic bridges in Tinicum Township. Besides the additional traffic and higher speeds modern bridges would bring, this would destroy the picturesque arched Clay Ridge Road bridge which contributes to the Ridge Valley Historic District, and the rare 1832 Creamery Road bridge which would impact the Tohickon Creek. The Delaware Riverkeeper Network and local citizens are seeking stronger protections for this stream.

For more information on the Headquarters Road Bridge project and to sign a letter of concern go to www.delawareriverkeeper.org

DELAWARE RIVERKEEPER NETWORK

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Headquarters Road Bridge Information