

New Smithfield Viaduct Opens Weeks Ahead of Schedule

By Jay Adams
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The Rhode Island Department of Transportation (RIDOT) successfully opened the new Smithfield Viaduct five weeks ahead of schedule and well within budget because of the decision to close off the entire bridge to allow crews to work much more quickly.

"It wasn't just accelerated construction that got this done early. The fact that we closed the bridge was the biggest factor," said Heidi Gundmunson, spokesperson of RIDOT. "We chose this option rather than building it in phases. The accelerated bridge component was that all of the rails were pre-cast. Much of the rest of the bridge was cast in place through conventional construction methods."

"This is a rebuilding of an historic 1932 concrete span bridge. And it is basically a complete replica, modern technology of the old bridge," said DOT Director Michael Lewis in mid-October in a ceremony to reopen the 80-year-old structure.

According to DOT, the bridge opened five weeks ahead of schedule due to completely closing down the area to work on it.

Through a \$9.4-million contract with Northern Construction Services of Palmer and Weymouth, Mass., RIDOT made use of pre-cast components wherever possible and placed a \$10,000-per-day incentive clause in the contract for every day ahead of schedule the bridge was open to traffic (maximum of 30 days). Additionally, RIDOT coordinated closely with the community on the decision to close the bridge so work could be accelerated. Originally, RIDOT considered phased construction that would have kept the bridge partially open to traffic, but would have taken years to complete.

The decision to close the area came in March 2012. By mid-October, work was complete. The 80-year-old bridge carries Rte. 116 (George Washington Highway) over the Woonasquatucket River/Stillwater Reservoir. RIDOT completely replaced the superstructure, made sub-structure repairs and performed minor concrete repairs to the bridge's arches. The replacement structure is the same width as the existing bridge, with sidewalks on both sides.

"We chose to expedite the repairs by closing the bridge to traffic through a single-phase construction project. Construction took about seven months versus the projected three to four years," said Gundmunson. "We couldn't keep the bridge open without limiting access for heavy trucks, buses, etc. We would have had to post the bridge (put a weight restriction on it) that would have been even more of a hardship to the community."

Gundmunson added that the community was grateful to be involved throughout the design and construction project.

"The area has a lot of commercial businesses," she explained. "There also is a heavily used recreational area/walking trail under the bridge that had to be closed dur-

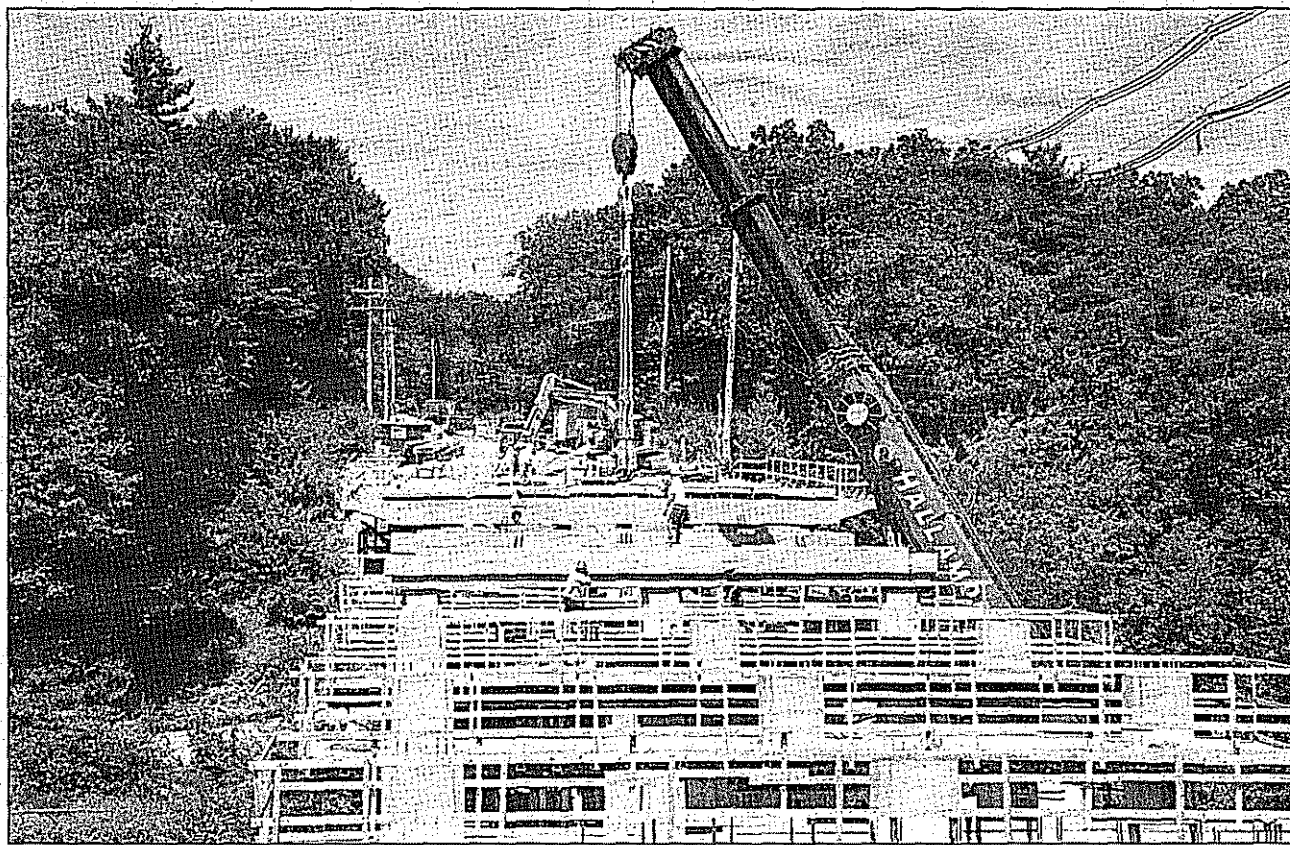


Photo courtesy of RIDOT

During closure, crews performed a number of repairs including replacing concrete railing in-kind, installing new crash tested railing and replacing entire superstructure (joint elimination).



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ing construction. We kept businesses open but had to close the trail during construction.

Detour routes were designed especially to accommodate large trucks. The average daily traffic crossing the bridge in Smithfield is 10,000 vehicles.

The bridge marked 80 years of operation in 2012. It is 450 ft. (137 m) long with 11 huge spans underneath it. These proportions were kept exactly the same after construction, including the two 12-ft. (3.6 m) lanes in each direction. There are two 8-ft. (2.4 m) shoulders and two 4.59-ft. (1.3 m) sidewalks on each side.

There are 10 approach spans and one main arch span of 119-ft. (36.2 m) underneath the Stillwater Viaduct. During closure, crews performed the following repairs:

- Replaced concrete railing in-kind

Gundmunson. "There was significant concrete deterioration, spalling, cracking, ice and salt penetration — from salting roads/ice and snow) — rebar deterioration, as well as a failure of some of the elements, such as the sidewalks.

The bridge main span is an open spandrel, reinforced concrete three-ribbed arch, spanning 80 ft. (24 m). The concrete approach spans vary in length, and are supported on 10 concrete post bents consisting of three square columns.

Materials used in the project included:

- Asphalt: 1,105 tons (1,003 t)
- Base: 182 tons (165 t)
- Binder: 175 tons (158 t)
- I-I: 748 tons (678 t)
- C.I.P. Concrete: 867 cu. yds. (622 cu m)

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Decision to Close Bridge Completely Decreased Work Time

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- End Posts: 23 cu. yds. (17.5 cu m)
- Approach Slabs: 55 cu. yds. (42 cu m)
- Backwalls: 21 cu. yds. (16 cu m)
- Bridge Deck: 523 cu. yds. (399 cu m)
- Bridge Sidewalk: 112 cu. yds. (85 cu m)
- Columns/Spandrel, Walls: 37 cu. yds. (28 cu m)
- Diaphragms: 94 cu. yds. (71 cu m)

The Viaduct is eligible for listing on the National Register of Historic Places for its historical association with the massive bridge building campaign initiated by the state in the 1920s and 1930s, and as an important local example of an open spandrel arch bridge.

The clear roadway width between curbs is 40 ft. (12 m). There is approximately 3 in. (7.6 cm) of bituminous concrete overlay on a concrete deck slab. The two concrete sidewalks have concrete decorative railings.

"We are definitely pleased with the results and it was gratifying to put the bridge back into service five weeks early and rightfully return it to the community," Gundmunson stated. "We are fortunate to have had such an accomplished team, with our staff, design consultant — VHB, and contractor — Northern Construction Services. They were responsible for performing the work and securing the necessary subcontractors and vendors to complete the work in accordance with contract documents.

"We relied on them to get issues resolved out in the field promptly. They also were extremely cooperative in making modifications and changes necessary to keep the job moving forward," said Gundmunson.

Northern, an Impressive Company

According to its site, Northern Construction Service LLC is a Massachusetts-based general contractor specializing in bridge construction, site work, marine construction, concrete work and utilities. Northern has completed hundreds of projects throughout New England and New York.

John L. DiVito and John N. Rahkonen founded Northern in 1993. Since then, the company has experienced steady growth, along with a reputation for quality workmanship.

Northern's impressive list of clients includes federal, state and municipal agencies as well as private industrial and utility organizations. The company employs upwards of 80 to 100 people and is pre-qualified with the Massachusetts Highway Department and the Connecticut Department of Transportation.

Northern's numerous projects in seven states include rebuilding historic covered bridges, keystone arch bridges as well as

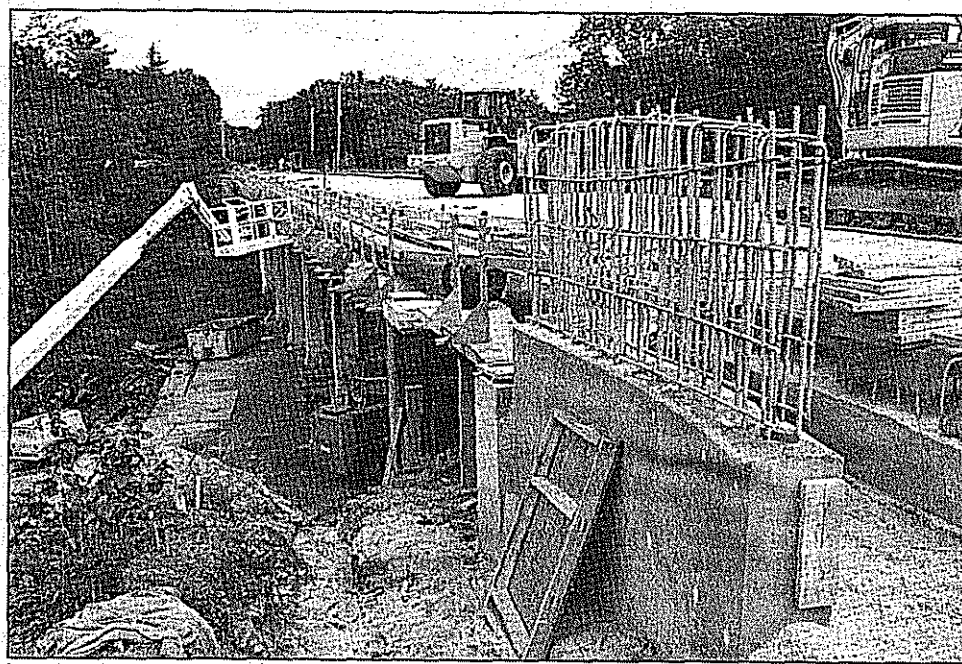


Photo courtesy of RIDOT

There also is a heavily used recreational area/walking trail under the bridge that had to be closed during construction.

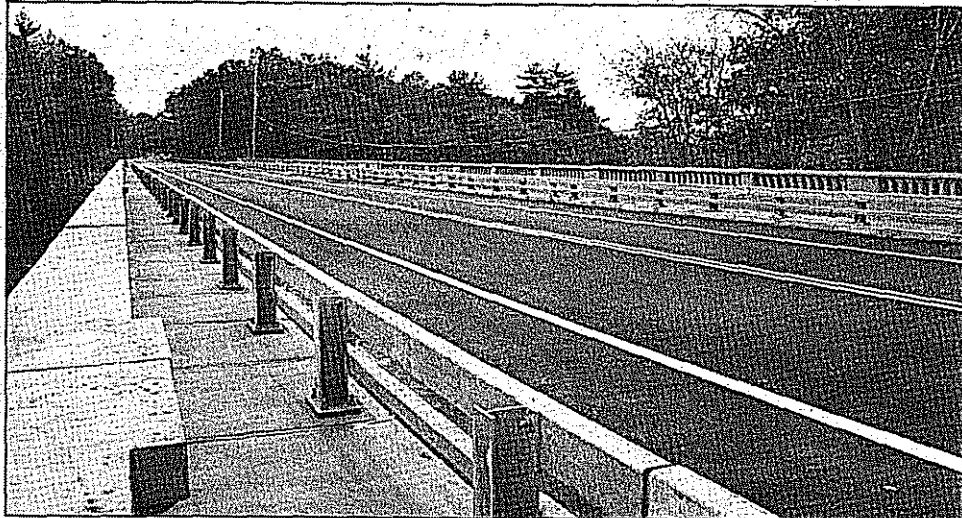


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concrete decks and steel spans. They also have repaired many dams, both privately and publicly owned. The company has completed salt marsh and pond restorations, replaced culverts, installed New England's first airport EMAS barrier on Cape Cod and relocated a historic lighthouse, among other seawall construction work.

Accelerating Bridges in Rhode Island

RIDOT has witnessed great success with other bridge projects using accelerated construction methods. In late 2010, RIDOT replaced the Round Top Bridge in Burrillville in just 41 days. More recently,

this past August, the Department reopened the Frenchtown Brook Bridge in East Greenwich in only 33 days.

All future bridge projects will be evaluated to determine the feasibility of using accelerated construction methods. Not all bridges can be rehabilitated in this way, the RIDOT stated. The impact to traffic (the use of these techniques often calls for a total road closure), the complexity of utility relocations and the amount of work that is needed to be accomplished in the project must be taken into consideration.

Similar approaches are planned for the replacement of larger bridge structures in the next two years including the East Shore

Expressway Bridge in East Providence, which carries traffic from Interstate 195 East onto Exit 7 (Route 114) and over Warren Avenue, and the Barton Corner Bridge, which carries Interstate 95 over Route 2 (Quaker Lane) on the Warwick/West Warwick line.

"We have used value engineering for several years to get the best value for the State's taxpayers. Accelerated bridge techniques are relatively new to RIDOT, but with the recent successes we have had, we plan to use similar techniques on future projects where we can," said Gundmunson.

Positive Reinforcement

Local officials were very pleased with the new bridge on the day of the opening in October.

"This is great," Michael J. Flynn, president of the Smithfield Town Council told Smithfield Patch. "This is a major linkage, (it) links the two sections of Smithfield together. Without it, we're fractured. The constituents and the Council are really very happy to see this put together, into operation."

"This needed a lot of work. In 2005, I was able to earmark, or as I like to say, Congressionally direct spending so that this bridge could be built, it was specifically targeted for this bridge," said U.S. Senator Jack Reed (D-R.I.) It will reopen Route 116 and provide safe and convenient transportation for the residents of this wonderful community. And, most important, at this juncture, it put people to work."

Sen. John J. Tassoni, Jr. (D-Smithfield, North Smithfield) joined officials in praising the completion of the Stillwater Viaduct bridge project in Smithfield.

"The DOT and its project contractor, Northern Construction Services of Massachusetts, deserve our thanks and compliments for a job well done, and ahead of schedule," said Senator Tassoni. "The importance of the bridge to the community, to local businesses in the area, cannot be overstated. Early completion of the project is great news and the DOT, by doing such an efficient job on this project, has provided great service to the community.

"This shows clearly how, with good planning, local-state cooperation and efficient construction techniques, a major project such as this can be done well. It will serve Rhode Islanders well for years to come."

The bridge is formally known as the Samuel A. Engdahl Bridge, named after former RIDOT bridge engineer who served Rhode Island over a 48-year career.

(This story also can be found on Construction Equipment Guide's Web site at www.constructionequipmentguide.com.) CEG