



ARORA and ASSOCIATES, PC  
Consulting Engineers

## Project Data

**Owner:**  
New Jersey  
Department of  
Environmental  
Protection,  
Department of Parks  
and Forestry

**Designer:**  
ARORA and  
ASSOCIATES, P.C.

**Construction Cost:**  
\$3.06 million

*Arora created a  
signature bridge to  
complement a  
national landmark.*

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## DELAWARE AND RARITAN CANAL BRIDGE OVER ROUTE US 1



Arora and Associates, P.C. was retained by the New Jersey Department of Transportation (NJDOT) to design a signature bridge for the Delaware and Raritan Canal Commission (DRCC), which would reconnect the Delaware and Raritan Canal's towpath across Route US 1. The challenge to Arora and Associates was to design a pedestrian overpass that would enhance the linear state park and to do so on a tight schedule and fixed budget. As the prime consultant, Arora provided complete engineering services including survey, geotechnical engineering, site development, structural design, maintenance and protection of traffic and environmental permitting.

The D&R Canal is on the National Register of Historic Places and is New Jersey's largest state park and natural resource. It is also a key element of the East Coast Greenway between Maine and Florida. During the concept development stage Arora's structural engineers worked closely with NJDOT, the DRCC, the Historic Preservation Office of the New Jersey Department of Environmental Protection and local community groups, before selection of the preferred alternative was made.

The choice of a curved-chord Pratt truss for the main span was inspired by railroad bridges, which were constructed during the period in which the D&R canal was in operation. The design evokes the history of the commercial growth of the region brought on by construction of the D&R Canal and the railroads. To further complement the park and the main truss span, steel thru-trusses were selected for the approach ramps and the substructures were detailed with coursed-rubble, gray sandstone masonry. Site improvements included construction of graded approaches, signage and parking lots. The resulting structure has been cited by NJDOT, the East Coast Greenway Alliance and environmentalists as an exceptional example of community partnering and Context Sensitive Design.

The pedestrian bridge consists of a 131-foot steel truss main span over Route US 1 with three 66-foot ramp trusses and concrete ramps supported by stone faced retaining walls on each approach. Bolted connections were used to mimic traditional riveted connections and to facilitate fabrication and erection. The trusses, picket fencing and enclosure fencing were painted black to firmly ground the structural architecture with the past. Although the bridge looks as if it predates the highway, Arora used state-of-the-art engineering and materials to meet the project objective of a durable, low-maintenance structure. This ADA compatible bridge was designed using AASHTO LRFD specifications for bridges and structures.



The preassembled main span truss is lifted into place.

The main truss was fabricated in Ohio and then shipped in pieces to the site. It was then reassembled on-site in the southbound shoulder of Route US 1. Using a 4-hour nighttime closure in October 2003, the preassembled 45-ton main span truss was lifted into place in a single operation. The bridge was opened to traffic in March 2004.

The project has been nominated by NJDOT for New Jersey's 2004 Historic Preservation Awards Program and FHWA's 2004 Excellence in Highway Design, and it has received the Project of the Year award from the Professional Engineers Society of Mercer County, NJ.

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