

CONTEXT SENSITIVE DESIGN CASE STUDY NO. 9

Route 29 through Trenton, New Jersey

LOCATION

New Jersey State Highway Route 29 through the City of Trenton in Mercer County, from the Route 29/Route 129 interchange in the south to the Amtrak Bridge in the north; covering 2.5 miles in length.

PROJECT DESCRIPTION

The project is known as the Route 29 Highway Tunnel and encompasses 2.5 miles of roadway, including a 1/2-mile section of tunnel. The tunnel was constructed as a cut and cover post-tensioned tunnel. The southbound lanes are open to the Delaware River on the west and the northbound lanes are within a fully enclosed tunnel.

The roadway consists of two 12-foot roadway lanes, a 12-foot right shoulder and 3-foot left shoulder. The roadways are separated by concrete barrier curb along the south roadway approach to the tunnel. North of the tunnel the roadways are separated by concrete barrier curb to Waterfront Park, where a grassed and planted median strip separates the north- and southbound traffic.

The overall highway tunnel complex includes an off-site Tunnel Control Building, Intelligent Transportation Systems, a pre-stressed concrete bridge and six retaining wall structures. The facility creates a depressed section of highway and takes major traffic volume off city streets. The tunnel itself serves as the platform upon which a city park, South Riverwalk Park, will be constructed. Additional waterfront recreational facilities are being developed and coordinated with the efforts of the NJDOT.

The project cost for the tunnel was \$105 million; the park on top of the tunnel costs an additional \$10M. Other ancillary projects will total approximately \$40 million with the county and city contributing approximately half of this cost.

PURPOSE AND NEED STATEMENT

The project's Purpose and Need Statement was developed for the Environmental Impact Statement (EIS) approved in 1981 for the entire Trenton Complex of roads. When the Route 29 project was taken up in 1995-96 the project team did an Environmental Reevaluation and did not revisit the Purpose and Need Statement from the previous document.

CONTEXT SENSITIVE FACTORS

There were many context sensitive factors in this project stemming from the project location that impacted residences in two historic districts and the National Register Riverview Cemetery and extended to the environmentally sensitive Delaware River. Given that residents knew that the approved EIS allowed revisiting of rebuilding Route 29, it was clear from the beginning that community involvement and responsiveness to community interests and concerns would be essential to get the project built.

The community wanted truck traffic off of Lambertson Road but did not want a large transportation facility to “wall off” the residences from the river. All interested parties seemed to want a scaled down transportation facility that would minimize impacts on the human and natural environment.

While the EIS had been approved in 1981 assuming that Route 29 would be rebuilt to interstate standards (70 mph design speed), the project team adopted design elements that reflected the community’s desire for scaling down the roadway design including a 45 mph design speed. Curves around the Riverview Cemetery and at the railroad bridge were designed to slow traffic. Traffic signals were retained at the request of residents. With the adoption of this design speed, no design exceptions were required. Where the EIS had proposed impacting 2-1/2 acres of the river, the final design to accommodate the tunnel construction required a 0.67-acre section of river to be filled.

NJDOT’s commitment to fund the design and construction of the South Riverwalk Park was initially controversial within the department, but was an important mitigation effort to gain community acceptance of the tunnel design.

HISTORY OF PROJECT

The Trenton Complex is a system of highways that was first proposed in the late 1950’s and commenced construction in the 1980’s. The system includes connections between several interstate and state routes to facilitate the movement of people and goods in and around the State Capitol. The entire road complex was designed to function together to provide connections within and around the City, while relieving congestion on local roads.

Route 29 was originally proposed as a 6-lane freeway to be cantilevered over the eastern banks of the Delaware River. The design followed rigid highway design principles and was not sensitive to the City’s relationship to the riverfront or the historic and environmental resources in the area. The city of Trenton strongly objected to the design desiring a scaled down boulevard-style facility with increased access points to the waterfront for citizens. Ultimately the NJDOT agreed to leave the proposed Route 29 un-constructed until all of the other elements of the Trenton Complex had been completed. At that time they would work with major stakeholders to make a decision whether it was necessary to rebuild Route 29. The entire complex, minus Route 29, was completed in December 1995.

By the fall of 1995 truck traffic had increased significantly on Lambertson Road causing noise, vibrations and air quality concerns. Public officials and residents asked for a meeting with

NJDOT officials to investigate alternatives to relieve these concerns. Early the next year NJDOT began planning and project scope development for Route 29 responding to the community's sense of urgency in finding a solution to traffic problems.

A truck ban seemed the most direct way to reduce the citizens' concerns, but NJDOT officials ruled that their agency did not have authority to institute a truck ban. Project planning proceeded in a collaborative manner with substantial community involvement until a non-profit transportation/environmental group learned of the project and filed several lawsuits against it. Although the suits were dismissed, the dynamic of opposition made the public involvement process more contentious and less productive in the later phases of the project. Instead of a collaborative "give and take" tone, community involvement moved more toward tinkering with the design to respond to one or another interest in the area. Exacerbating this fact was the choice to make this a Design Build project which negatively affected the context sensitive design elements of this project as described in other sections of the case study..

Construction brought with it detours, dust, noise and more heavy traffic in the form of construction vehicles. There were troublesome problems with construction resulting in flooding in some residential basements and cracks in walls due to pile driving. Residents were concerned about whether the positive improvements to the waterfront would materialize. NJDOT decided public outreach efforts needed to continue and be more far-reaching and in August 2001 created a Community Partnering Team (CPT) to bring together all the stakeholders in the project area. The CPT was charged with continuing input on the South Riverwalk Park and guiding waterfront development projects along the Route 29 waterfront in Trenton and surrounding areas. The CPT was to reach out to all interested members of the residential, business and government communities including regulatory agencies. The team was to work toward consensus building on as many issues as were brought to the table by its members.

HIGHWAY AGENCY INVOLVEMENT

NJDOT was involved throughout this project from preparing the EIS approved in 1981 to rescoping the project once it was initiated in 1995. Working with a consulting engineering firm to develop the project scope and then preliminary design, NJDOT received FHWA approval to proceed with the project in a Design Build mode. Preliminary plans and specifications were developed prior to the bidding of the contract. Final design, engineering and construction plans followed the awarding of the project. Although initiated in response to residents who wanted the project completed quickly, all project stakeholders consulted agreed the Design Build approach was a poor choice for this project that involved very sensitive human and environmental resources and interests. NJDOT was not prepared to provide adequate oversight to ensure the project would be built based on the agreed upon design.

In June 2000 NJDOT hired a construction management firm to oversee the remainder of the construction work. In August of 2001 a Community Partnering Team was established by NJDOT to bring together all stakeholders to continue assistance on design of South Riverwalk Park and on a series of interconnected waterfront projects

RESOURCE AGENCIES INVOLVEMENT

An Environmental Impact Statement for the Trenton Complex was completed and approved in January 1981. In the EIS NJDOT agreed to build the Route 29 piece last and to reevaluate the needs at a later time. When the project was taken up at the end of 1995, NJDOT staff initiated monthly meetings in early 1996 with Resource Agency personnel to coordinate needed environmental reviews.

These agencies included the Department of Environmental Protection (DEP), which includes the State Historic Preservation Office, the Corps of Engineers, National Marine Fisheries, and the Fish & Wildlife Service. A waterfront development permit was needed from DEP. A permit was needed from the Corps of Engineers. The other agencies were commentators on the two required permits.

From the beginning it was clear there were challenging and valid interests to be balanced in choosing the final design for the project. If the road were moved inland to avoid environmental impacts to the river, it would impact numerous resources in the historic districts. If it was moved toward the river to avoid historic district impacts, there were greater environmental impacts along the river.

After the project was awarded to the design-build contractor, it was discovered that tidelands licenses for several riparian parcels had not been obtained. The Tidelands license application process was complicated by the concurrent value engineering re-design proposed by the Design-Build contractor, which actually reduced environmental impacts to the Delaware River. The re-design required modifications to the environmental permits for the project, re-opening the door for opponents of the project to protest the Tidelands license process and the permit modifications.

The final modified environmental permits were approved a year after the Design Build contract was awarded.

COMMUNITY INVOLVEMENT

The project was started following a meeting of residents and city, county and state officials that occurred on the street corner of Lalor and Lambertson in November 1995. The residents of that area of South Trenton were very upset because of the large number of heavy trucks traveling along Lambertson Street in front of their homes.

From the start of project scope development in early 1996, an extensive community involvement effort was mounted. Since Mercer County was at the same time doing a redevelopment study of lands around the ballpark in the project area, NJDOT established monthly project meetings with Mercer County officials, other public officials, resident's groups, business owners and other interested stakeholders to examine project issues. Numerous informal meetings with small groups were held as well as larger Public Information meetings.

A project newsletter was started with bilingual text and 500 copies printed. In response to a request from FHWA, NJDOT staff developed a Community Relations Plan in November 1996 summarizing efforts made to date and the future schedule for community involvement. That fall as well NJDOT's project manager gave interested citizens the opportunity to go to the consulting engineers' office to give direct suggestions for project elements as the engineers worked on a CADD program to show how these suggestions would impact the project design.

From 1996 through the next year community involvement efforts were generally well received and there was substantial support for the project. Although the project managers thought they had been inclusive in bringing in stakeholders, early in 1998 the Tri-State Transportation Campaign came out in opposition to the project and filed a lawsuit. The entering of lawsuits had the effect of making community involvement efforts more difficult and more contentious. It was much harder to maintain a collaborative community involvement effort. With charges of presenting false facts being made by opponents, NJDOT staff were put on the defensive.

In August of 2001 NJDOT decided to strengthen its community outreach program and created a Route 29 Waterfront Community Partnering team (CPT). The CPT was charged with guiding waterfront development projects along the Route 29 waterfront in Trenton and surrounding areas. The CPT was to reach out to all interested members of the residential, business and government communities. The team was to work toward consensus on as many issues as were brought to the table by its members.

The first meeting of the CPT outlined its goals:

- * To afford communication with and between the stakeholders in order to share understanding of the projects in the community and region;
- * To identify the interests and concerns of local residents, organizations, county and municipal agencies, and businesses in the project area;
- * To provide a forum for active participation in the development of transportation-related projects such as parks, walkways, and bikeways; and seek to minimize any detrimental impacts on the community; and
- * To provide input and recommendations to a steering committee in a consensus-building manner to reach agreement on the various issues.

Also at that first meeting, the team spelled out 32 issues they wanted to address. These issues were categorized and divided into five subject areas. A subcommittee was created to address each of the issues in that subject area. The five subcommittees were: Project Coordination/Natural Resource Protection; Bike path Corridor/Pedestrian Access Issues; Safety/Security/Maintenance; Parking; and Landscape Design. Over the course of the CPT's progress, a sixth subcommittee dedicated to local issues was formed.

The CPT successfully brought together local residents, business leaders, and government representatives from city, county, state and regional agencies. Although their individual agendas were diverse, the overall goal of improving the Trenton waterfront and its associated neighborhoods was shared by all. The coordination amongst all the levels of government and their constituents has led to a much more open dialogue and helped advance the goal of a rejuvenated Trenton waterfront.

NATURAL ENVIRONMENT ISSUES

The original opposition of the city of Trenton to rebuilding Route 29 stemmed in part from a concern that mature Sycamore trees along the 2-lane Lambertson Road not be destroyed. While project specifications called for most *of* these trees to be preserved, during construction most were removed and will be replaced, due to their poor health and underground utility conflicts.

The push for rebuilding Route 29 along the waterfront came from neighbors' distress at increasing truck traffic along Lambertson Road. A NJDOT study of the trucks showed that there were approximately 1600 heavy trucks on the road in a 12-hour period and that 1200 of these were garbage trucks headed from various origin points in New York to a landfill in Pennsylvania. At the time, NJDOT did not believe they had the authority to ban trucks from Route 29 and did not see alternatives that would redirect this truck traffic to another viable route.

The industrial history of the area brought with it additional environmental problems. The industrial activities, which had occurred throughout the City's history along the waterfront, had left various contaminants in the soils. These had to be identified and then properly removed or contained on-site.

HUMAN ENVIRONMENT ISSUES

Extensive archaeological digs were performed in advance and during construction.

The history of Trenton, including its industrial prominence, will be preserved and celebrated in various park elements throughout the waterfront. The South Riverwalk Park will include a historic interpretive area which illustrates the history of Trenton through five (5) one hundred year time periods. Each segment will be marked by an arched structure indicative of the architecture of that time period and will present information about the local history of that era. Park visitors will be able to get a sense of "a passage through time" in the City's history as they travel along the interpretive timeline.

Access to the river, both for active and passive activities, has been one of the most important community concerns. The extensive linear park facilities do much to bring the riverfront back to the City's citizenry. Both passive and active recreation will be provided at the South Riverwalk Park. The County's boat docks and pedestrian access adjacent to the baseball stadium also provide water-based recreation and upland park facilities. The extension of the North Riverwalk to the Old Wharf provides opportunities for connectivity and fishing. Historically a fishing wharf, this area is the site of some of the best fishing along Trenton's riverfront.

SCHEDULE OF ACTIVITIES

- Fall 1995: Trenton Complex construction completed except for Route 29; public officials and area citizens asked NJDOT to deal with negative effects of increasing truck traffic along Lambertson Road.
- January 1996: Scoping of project began.
- July 1996: Public information Center presented alternatives examined.
- March 1997 Environmental Reevaluation approved.
- August 1996: Preliminary design began.
- September 1996: Landscape Design Workshop was held with stakeholders to discuss design of park.
- October 1996: NJDOT request for FHWA approval to fast track the project as a SEP-14 experimental project (Design-Build) was approved.
- October 1996: Steering Committee to help design park was established; met every 2 weeks.
- Spring 1997: Advertised Design Build contract.
- September 1997: Awarded contract to Design Build joint venture.
- September 1997: Archaeology and minor construction begins.
- Fall 1998: Secured Tidelands Resource Council permit and major construction began.
- Winter 1998: Governor bans trucks other than local ones from Route 29.
- January 1999-December 1999: Public meetings to discuss construction staging.
- June 2000: NJDOT hired construction management firm.
- August 2001: Community Partnering Team created to continue assistance on design of park and on a series of interconnected waterfront projects. Members represent business, city and county government representatives, elected officials, residents, resource agencies and various private and non-profit sector groups with a stake in the outcome of the waterfront.
- March 2002: Tunnel opens to traffic.

PROJECT OUTCOME AND LESSONS LEARNED

This project will be instrumental in transforming Trenton's waterfront in many positive ways. As a result of the tunnel construction, creation of the South Riverwalk Park and other planned projects, the city will accomplish significant reclamation of the waterfront as a resource for the community. The project is leveraging many additional benefits for the community and there is evidence that it will draw new investment into adjacent areas.

The Community Partnering Team concept now in place provides great value in bringing together all stakeholders, providing a forum for holistic understanding of the interconnectedness of various waterfront projects and taking the best advantage of coordinating investments by multiple partners.

In retrospect, the choice to use Design Build for this project was not satisfactory. Although there was documentation of project commitments of all types made in the scoping and feasibility assessment phases to guide the contractors as they bid the project and proceeded with work, once selected, the contractor changed some Context Sensitive Design elements of

the project through value engineering. Other elements were built with little sensitivity for the site and multiple layers of planning that had preceded construction.

For example, several utility boxes are in prominent places that will need to be moved or camouflaged through landscaping. A number of project elements did not get built as promised and others will need to be reworked adding to the cost of the project. For another example, parts of Lambertson Road were repaved with new curbs and gutters and will have to be narrowed and repaved again. For a third example, the value engineering effort undertaken by the Design Build contractor resulted in the northbound lanes being fully enclosed in a tunnel rather than open to the river. This design decision reduced construction costs but also reduced aesthetic quality and raised operating costs due to much higher needs for ventilation and lighting. Due to the experiences of this job and of others, NJDOT is not currently using the Design Build approach for any other projects.

The prior approval of the EIS for the project as part of the Trenton Complex in 1981 required only an Environmental Reevaluation when the project was revived in 1995. Had a more holistic look at the broader project area and needs been undertaken in the mid-1990's, a different alternative for the tunnel design might have been chosen. If policy makers had examined more intensively the desirability and possibility of a truck ban on Route 29 when the project alternative was being chosen, the outcome might have been different.

As it is, there was dismay voiced by the Mayor of Trenton and members of the public when the Governor announced a truck ban on Route 29 shortly after the final permit approval for the highway tunnel. The city's support for the project had hinged on this being the only means to remove trucks from Lambertson Road, because the NJDOT assured the city that it did not have the authority to ban trucks on Route 29. Reversing this position through the Governor's action left many questioning the good faith of the department.

Some residents on Lambertson Road misunderstood what visibility of the river they would have once the tunnel was built and were unhappy with the outcome. Better, more accurate computer visualizations of the views from their specific houses could have helped establish reasonable expectations regarding views.

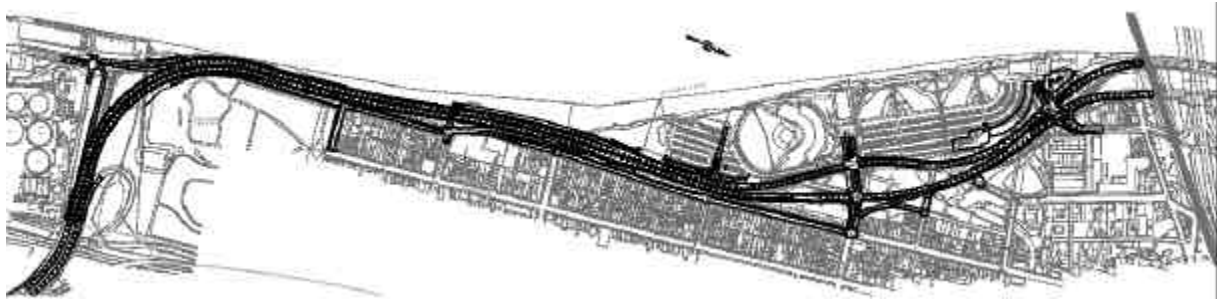
Lessons learned included the need to be as graphic as possible with the design team and stakeholders as designs proceed, but to be careful to keep visual aids at a realistic level of detail for each stage of the project, so people are not misled. The design team for the South Riverwalk Park found it valuable to have an artist on their team to prepare artistic renderings for use with the design team and the public.



E.1 Aerial photo in Trenton. 2-lane section of Lambertson Road is at top of photo.



E.2 Aerial photo in Trenton. 2-lane section of Lambertson Road is in middle of photo.



E.3 Drawing showing proposed route changes.



E.4 Concept elevation of bridge from Delaware River.



E.5 Computer visualization showing affect of tunnel design.



E.6 Model showing concepts for West Riverwalk Park.



E.7 Completed tunnel project. Park on deck has not been constructed.



E.8 Tunnel entrance from north.



E.9 North end of tunnel.



E.10 Roof deck of tunnel that will become West Riverwalk Park. Fill will be added to brick line on wall on left side of photo.



E.11 Roof deck of tunnel that will become park looking toward historic homes along Lamberton Road.



E.12 Entrance to tunnel at mid-section. Note utility boxes that will need to be moved or hidden.



E.13 View of Route 29 tunnel from shoreline.



E.14 Entrance to tunnel from south.



E.15 Beyond the south entrance to tunnel, the roadway passes very close to the historic Riverview Cemetery.



E.16 View of walkway next to south tunnel entrance. Safety fencing at right of walkway was to match that on other side of road but contractor did not put in footings adequate to support the fencing that was specified.