



2010 - Eastern Avenue Bridge

Description

Meta Fields

Project Summary : One construction season to replace bridge in major inbound-outbound DC/Maryland corridor

Project Location : Eastern Avenue over Kenilworth Avenue NE (I-295) in the northeastern corner of Washington, DC at the border with Prince George's County, Maryland

Mobility Impact Time : ABC: Less than 10-month closure; one construction season Conventional: Two construction seasons for staged construction

Impact Category : Tier 6 (longer but reduced by months/years)

Dimensions : 84.67-ft-long two-span modular decked steel beam bridge (42.33 ft $\times$ 42.33 ft); 180-ft wide at abutments and 156-ft wide at interior pier due to curvature of bridge fascia

Average Daily Traffic At Time Of Construction : 155000

Traffic Management : Traffic management alternative, if constructed conventionally: extended use of detour on I-295 service roads, longer out-of-service time for bridge, longer impacts to surrounding community, longer impact to commute through this major inbound-outbound corridor

Existing Bridge Description : The existing single-span prestressed girder bridge was 84.5-ft long and 173.7-ft wide with two longitudinal joints. It provided three 11-ft traffic lanes in each direction and two dedicated U-turn lanes. The 58 girders were 3.25-ft deep at 3-ft spacing. Built in 1956, it had a minimum vertical clearance of 14 ft which resulted in repeated over-height vehicle hits that had damaged the bottom flanges of some of the girders.

Replacement Or New Bridge : The replacement bridge has two spans to minimize superstructure depth and increase the vertical clearance under the bridge to the minimum 16.5 ft. It has two traffic lanes in each direction, two 14-ft-wide sidewalks, one dedicated U-turn lane, and landscape planters along both sides with fencing to provide safe pedestrian crossings. The superstructure cross-section consists of 14 prefabricated segments, each weighing 50 tons, and cast-in-place fascia segments. Each prefabricated segment consists of two W16x100 rolled steel beams spaced at 5 ft with a 9-ft-wide and 7.5-inch-thick lightweight concrete deck. The deck has transverse hoop reinforcement extending from its sides into the 1-ft-wide closure joints. The precast portion of the 16 hammerhead piers is 2 ft x 4 ft at its base and varies to 2 ft x 8.8 ft at the top of the cap, plus a 1.5-inch-thick architectural treatment on its sides. Each pier unit is 12.7 ft in length.

Construction Method : The existing abutments were partially demolished and reconstructed to be semi-integral. The pier footing and median barrier were cast in place. The 12-ton precast hammerhead piers were erected onto cast-in-place median barrier seats with mechanical coupler connections and closure pours. Each prefabricated superstructure segment was erected onto a pier unit, followed by placement of the lightweight concrete closure joints to make a uniform continuous deck. A waterproofing membrane was placed on the deck, followed by a 3-inch-thick asphalt overlay. One traffic lane in each direction on Kenilworth Avenue was diverted onto service roads during abutment and pier construction. This allowed Kenilworth Avenue to maintain all six lanes throughout bridge construction. Eastern Avenue traffic was detoured at Burroughs Avenue by a temporary dedicated U-Turn lane during construction. The bridge was closed February 1 and reopened October 20, less than 10 months later. There were no contractor performance incentives, but the contract did include \$1,500 per day liquidated damages for the bridge opening delay.

High Performance Material :

- Lightweight concrete deck
- Shallow superstructure beams placed at close interval to improve overhead clearance
- Waterproofing membrane under Superpave A/C overlay on superstructure deck
- Fabric reinforced Superpave A/C on resurfaced adjacent approaches and service road intersections

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Costs : The engineer's estimate for the project was \$ 8,992,000. The low bid was \$8,668,000 (\$224K = 3.6% lower than engineer's estimate). There were three bidders. The cost per square foot of bridge was \$654 compared to \$745 for conventional construction in this region in 2010. ABC

