2011 â?? Salem Street Bridge Eastbound (93Fast14)

Description

Meta Fields

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Project Summary : This four-lane Modular Decked Beam bridge was one of fourteen I-93 bridges in Medford (totaling 41 spans) that were replaced in 10 weeks under the MassDOT 93FAST14 project. The bridge was replaced during a weekend closure.
Project Location : Interstate 93 Southbound over Salem Street / Route 60 Eastbound in the city of Medford, approximately five miles north of Boston
Mobility Impact Time :

- ABC: One weekend closure per superstructure (55 hrs); 10 weeks for all 14 bridges
- Conventional: 4 years for all 14 bridges

Impact Category : Tier 2 (within 3 days)
Dimensions : 160-ft-long and 68.79-ft wide adjacent three-span Modular Decked steel Beam bridges (38 ft â?? 78 ft â?? 38 ft)
Average Daily Traffic At Time Of Construction : 181000
Traffic Management : extended use of detour through city streets
Existing Bridge Description : The existing four-lane steel girder bridge was originally built in 1961. Its joints and median barriers were rebuilt and the surface repaved in 1974. The piers and bearings were rehabilitated in 1990 and 1991. In 2010 the bridgeâ??s cast-in-place concrete deck and beam-ends were deteriorated and required replacement.
Replacement Or New Bridge : The bridge has four lanes in one direction, a 12-ft-wide low-speed shoulder, and a 5.5-ft-wide high-speed shoulder. A shallow-depth superstructure was required because of the limited vertical clearance below the bridge. The superstructure consists of 18 modular decked beams for each direction of I-93. These modular decked beams are called â??Prefabricated Bridge Unitsâ?• or â??PBUsâ?• by MassDOT. Each 9.42-ft-wide interior unit in the center (78 ft) span has two 12.44-ft-deep Grade 50W plate girders spaced at 6.04 ft, and an 8-inch-thick composite concrete deck. The units were designed as simple spans for dead and live loads. The superstructures were made jointless by the use of link slabs over the interior supports after erection. The units were also designed to allow side-to-side or end-to-end construction using conventional cranes. The units are connected with 2.67-ft-wide longitudinal cast-in-place concrete closure joints. The width of the joint was selected to reduce the width and weight of the units, facilitate shipping and handling of the units, and permit conventional reinforcing lap splices within the closure pours.
Construction Method : The steel girders were shipped to a precast plant in New Jersey where the deck sections were cast. The composite modular decked beams were then transported to the site for installation. At 6:00 pm on Friday, July 15, Salem Street/Route 60 was closed near the bridge. At 8:00 pm, Southbound traffic on I-93 was crossed over onto the opposite side of the highway using a movable temporary concrete barrier, with two lanes of traffic in each direction maintained on the adjacent bridge throughout the weekend. In addition, MassDOTâ??s public involvement program helped divert traffic to other routes during the weekend. The existing bridge superstructure was demolished conventionally. The abutments and substructures were repaired prior to demolition of superstructure, and the superstructure modules erected with a high-capacity crane. The closure joints between the superstructure modules were cast with high-early-strength concrete, and the decks over the interior supports were made jointless using the â??link slabâ?• technology. The deck was sprayed with waterproofing membrane, and a 1.5-inch-thick Superpave overlay was placed. Temporary barriers were placed in the shoulders, and both roads were fully reopened at 5:00 am Monday. The parapets were cast in place after the bridge was opened to traffic. The I-93 Southbound Bridge over Salem Street / Route 60 westbound was replaced concurrently over the same weekend. For this project a Special Provision was developed in accordance with the FHWA Technical Advisory Incentive/Disincentive for Early Completion Number T 5080.10. The clause was used to encourage innovative methodologies and techniques to achieve milestones. The incentive/disincentive clause included an incentive payment, incentive payment reductions, disincentive deductions, and a corrective action plan requirement. Weekly â??all handsâ?• and breakout meetings were held for decision-making throughout construction. The team also used over the shoulder reviews and electronic submittals to speed project delivery.

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