2008 â?? Riverdale Road Bridge over I-84

Description

Meta Fields

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Project Location :

Riverdale Road over I-84 in the city of Riverdale in Weber County

Mobility Impact Time : ABC: no reduction in number of lanes during construction ; Conventional: estimated 8 months (4 months per phase), plus winter weather delays
Impact Category : Tier 1 (within 1 day)
Dimensions : 155.5-ft-long and 170.83-ft-wide two-span steel plate-girder bridge (76.5 ft â?? 76.5 ft); 5Âº skew
Average Daily Traffic At Time Of Construction : 31475
Traffic Management : Traffic management alternative, if constructed conventionally: extended use of reduced lane and shoulder widths and lane shifts
Existing Bridge Description : The existing two-span reinforced concrete beam bridge was 203-ft long and 76-ft wide with concrete substructure founded on piles. It had four 12-ft-wide traffic lanes, a 10-ft-wide left-turn lane, a 4-ft-wide central median, and two 3-ft-wide shoulders. Built in 1967, the bridge was deteriorated and required replacement.
Replacement Or New Bridge : The replacement bridge accommodates a Single Point Urban Interchange (SPUI). It has six 12-ft-wide traffic lanes, two 12-ft-wide turning lanes, two 4-ft-wide minimum shoulders, and two 6-ft-wide sidewalks. The cross-section consists of twenty 3-ft-deep steel plate girders spaced at 8.67-ft with an 8.25-inch-thick non-composite full-depth precast deck. The precast abutments are founded on steel HP 14x102 piles. The interior pier consists of four separate precast caps, each supported on two precast columns, also founded on steel HP piles. Other prefabricated elements include precast end diaphragms and precast approach slabs.Mechanically-stabilized earth (MSE) wall abutments were used for the bridge. The MSE walls used lightweight fill to minimize settlement and avoid surcharging. This reduction in settlement accommodated the phased construction better and significantly reduced the project schedule by eliminating surcharge time.
Construction Method : The new bridge was designed much larger than the existing structure to limit impacts. Part of the minimize-impact strategy was to make an oversized square SPUI instead of an hour-glass SPUI bridge to accommodate the phased construction and traffic with minimal impacts. The contractor match-cast the prefabricated elements at an onsite casting yard. The bridge remained open throughout construction, which consisted of two phases. In Phase I, two 42.21-ft-wide bridges were constructed on either side of the existing bridge while traffic was maintained on the existing bridge. In Phase 2, traffic was shifted to the new bridges, the existing bridge was demolished, and the middle half of the new bridge was built and connected to the Phase I bridges. In Phase 1, piles were driven. Post-tensioning bars and ducts, dead anchor accessories, and anchorage zone reinforcement were placed in the footing forms. The footing reinforcement was placed, and the footings were cast. After footing strength was achieved, the abutment stems were erected over the embedded post-tensioning bars in the footings. Adjoining faces were epoxy coated prior to erection. After the top segment was erected and the epoxy reached strength, the vertical post-tensioning strands were stressed and duct connections were grouted.The precast columns were erected onto the cast-in-place footings and similarly connected to the footings. The precast caps were erected and post-tensioned to the columns, and the steel plate-girders were erected on the caps. The non-composite precast deck panels were erected onto neoprene foam strips on the edges of the top flanges of the girders; there were no shear studs connecting the panels to the girders. The longitudinal post-tensioning ducts, spaced at 2.5 ft across the deck width, were coupled and tendons were threaded through the ducts. The transverse deck joints were grouted. The longitudinal post-tensioning tendons were stressed and ducts were grouted. Haunches over the girder flanges were grouted. The precast end diaphragms were then bolted onto the backs of the girders. The precast approach slabs were placed, and a closure joint was cast to connect the deck, end diaphragm, and approach slabs. Bridge parapets and sidewalks were cast.In Phase 2, traffic was then switched to the two new outside bridges, the existing bridge was demolished, and the middle half of the bridge was constructed, tying the two outside bridges together and forming the final cross-section. The abutment closure joints and the longitudinal closure joints were cast. A polymer concrete overlay was applied and the bridge was opened to traffic. The Construction

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