2010 â?? Vista Interchange Bridge

Description

Meta Fields

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Project Summary : Precast concrete abutment caps and precast concrete pier caps
Project Location : Vista Avenue over Interstate 84 in the city of Boise
Impact Category : Tier 6 (longer but reduced by months/years)
Dimensions : 182-ft-long and 197-ft-wide two-span prestressed concrete I-beam bridge (90.5 ft â?? 91.5 ft)
Average Daily Traffic At Time Of Construction : 166100
Traffic Management : extended use of on- and off-ramps and alternate routes
Existing Bridge Description : The existing five-span prestressed concrete I-beam bridge was 220 ft long and 74.3 ft wide with cast-in-place substructure on spread footings. It had a 64-ft-wide roadway section with four lanes and a center turning lane, and 5.1-ft-wide sidewalks on each side of the roadway. Built in 1969, the bridge was replaced to improve traffic flow and safety and to accommodate the widening of I-84.
Replacement Or New Bridge : The replacement bridge has two 12-ft-wide through-traffic lanes in each direction, two 12-ft-wide left-turn lanes, and two 5.5-ft-wide pedestrian and bicycle lanes. The cross-section consists of 21 AASHTO Type IV pretensioned concrete beams spaced at 9.55 ft with an 8-inch-thick cast-in-place reinforced concrete deck. The abutments consist of precast caps on cast-in-place stems founded on cast-in-place spread footings. The interior pier consists of six individual 4-ft-wide and 4.5-ft-deep precast caps each supported on a cast-in-place variable-width column founded on cast-in-place spread footings. Three of the interior pier caps are 31.89 ft long, and the remaining three caps are 22.31 ft long to accommodate the two stages of construction. The lower part of each precast cap is beveled along its length and at ends for aesthetics. Each cap was fabricated with 40 three-inch-diameter corrugated galvanized metal ducts to fit over the reinforcing bars extending from the cast-in-place portions of the abutments and interior piers. Mechanical couplers were used in the precast pier cap connections. The lower portions of the substructures were cast in place because the construction staging did not benefit from accelerating the column construction.
Construction Method : The project upgraded the existing Vista Interchange to a Single-Point Urban Interchange (SPUI), which places a traffic signal at the center to accommodate protected left turns in each direction; the centralized signal system coordinates all traffic entering, exiting, and crossing the interstate. On- and off-ramps were lengthened and widened to improve traffic flow. The first half of the new bridge was built while traffic remained on the existing bridge. The cast-in-place portions of the abutments and interior supports were constructed. The precast caps were positioned over the reinforcing bars extending from the cast-in-place portions of the abutments and interior columns, the caps were lowered into position, and the ducts and mechanical couplers were grouted to complete the cap-to-column connections. Beams were erected onto elastomeric bearing pads, and the deck was constructed conventionally. Traffic was shifted to the new bridge, and the existing bridge was demolished in December 2009 during one night of overnight I-84 closures. The second half of the new bridge was then built similar to the first half. Approach slabs were cast in place. A deck overlay was not applied. All lanes of the bridge were then opened to traffic. Construction time allowed by the contract was 434 calendar days. The entire project took all of the 434 calendar days and was completed on time. The time adjustment from non-conventional to conventional bridge construction amounted to an additional 15 calendar days on an intermediate milestone; otherwise there were no time adjustments. There were no incentives/disincentives on this project. There were four intermediate milestones within contract time that were tied to liquidated damages. These were necessary to accommodate holiday traffic at the airport as well as other construction contracts in the vicinity. There was also a cap on the number of interstate closures allowed as well as the timeframes it could be closed. There were lane rental costs associated with the interstate closures.
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Contractor: Central Paving Company Boise, Idaho
Costs : The engineerâ??s estimate for the interchange project was $23.7 million. The low bid was $17.8 million. There were six bidders. The cost per square foot of bridge was $165 compared to $154 for conventional construction in this region in 2010. Total bridge costs were $5.95 million.

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