



2016 ?? Franklin Avenue Bridge Rehabilitation

Description

Meta Fields

Project Summary : Full-depth precast deck panels, precast cap beams, and precast ornamental railing panels were designed to replicate defining historic features.

Project Location : over Mississippi River and West River Pkwy and intersecting East River Pkwy in the city of Minneapolis, Minnesota

Mobility Impact Time :

- ABC: 116 days (less than 4 months)
- Conventional: Cast-in-place construction would have ranged between 15-24 months, and at a minimum, two construction seasons

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

Dimensions : 1049.94-ft-long and 66.3 to 76.3-ft-wide 5-span open spandrel concrete deck arch bridge (55.42 ft - 199.00 ft - 400.00 ft - 199.00 ft - 55.42 ft); 0° skew

Average Daily Traffic At Time Of Construction : 9900

Traffic Management : extended use of 4-mile detour

Existing Bridge Description : The existing 5-span open spandrel concrete deck arch bridge was 1049.94-ft long and 66.3-ft wide with six reinforced concrete supports. It had two 10-ft-wide traffic lanes, two 5-ft-wide bike paths, two 10-ft-wide shoulders (buffer) and two 7-ft-wide sidewalks. Built in 1923 and rehabilitated in 1970, the bridge is listed on the National Register of Historic Places and is recognized as a Minneapolis Landmark. Many of the original and rehabilitated elements were deteriorated and laden with chlorides. Degradation and changing usage warranted an extensive structural rehabilitation and required closure of the bridge for extensive concrete repair and full deck and spandrel cap beam replacement.

Replacement Or New Bridge : The newly rehabilitated bridge has two 11-ft-wide traffic lanes [each with 2-ft-wide striped shoulder (reaction area)] and two 17-ft-wide shared used paths from West abutment to Pier 4. The section tapers to four 11-ft-wide traffic lanes and two 12-ft-wide shared-use paths just east of Pier 4 and extends to the East abutment. The bridge has 4-ft-deep spandrel cap beams spaced from 13-ft to 28-ft, with 14-inch-thick 6,000 psi full-depth precast deck panels.

Construction Method : The bridge has two lines of arch ribs with no bracing between them. The column spacing was altered in the 1970 rehab from 14-ft spacing to 28-ft spacing, and the column size was also reduced by about ½. To replace the cap beams and keep traffic on the bridge would have required significant temporary works, would have put the public close to construction operations and would have brought several risks that could be avoided by closing the bridge. Therefore, the decision was made to close the bridge. Once the decision was made to close the bridge, the County and Public would not allow the bridge to be closed for 15-25 months. Thus, an ABC solution was moved forward to rehab the bridge during the summer months when the University of Minnesota was out of session. The Hennepin County/HNTB team engaged in intense planning with the general contractor, Kraemer North America (KNA), prior to the ABC period and established an erection sequence and construction contingencies. Precast elements were designed to replace the existing bridge deck and cap beams while replicating the defining historic features. The bridge rehab required 350 full-depth precast deck panels, 43 precast spandrel cap beams, and 163 precast ornamental railing panels. The contractor took advantage of a staging yard offered in the contract documents and developed a casting yard just upstream of the bridge at Bohemian Flats and self-performed the new mildly-reinforced bridge deck precast panels. The precast cap beams were fabricated by Forterra in Elk River, MN, and the ornamental railing panels were fabricated by American Artstone in New Ulm, MN. The yard was used to receive and store all precast elements. The precast elements were fabricated prior to closure of the bridge. Numerous other pre-closure activities, including deck sawing and utility relocation, were also completed while traffic remained on the bridge. The bridge was closed to traffic on May 8, 2016. The contractor worked 14 hours per day, 6 days a week, to replace the existing deck and cap beams with the precast elements. The precast elements were barged from the casting yard to the bridge as needed and hoisted to the deck by cranes. The cranes were also used to remove and lower sections of the old 1970s bridge deck and cap beams to barges below the bridge, to be ferried upriver and crushed to be hauled for recycling. Expansion joints were reduced from 15 to six through the use of

