Team

Owner:
King County Department of Transportation
Seattle, WA

Engineer:
Entranco Inc., Bellevue, WA

General Contractor:
Atkinson Construction LLC., Renton, WA

Reinforcing Bar Fabricator:
Harvard Steel, Auburn, WA

Total Project Cost:
$4.2 million

Total Project Size:
17,620 sq ft

STRUCTURAL FRAMING SYSTEM

Cedar Mountain Bridge is a concrete structure providing vehicle access from a major state highway (SR 169) to local residences across the Cedar River in King County, Washington. The bridge is approximately 291’ long and 52’ wide for a total bridge deck area of 15,033 square feet. There is a 25-foot concrete approach slab at each end of the bridge totaling approximately 1,300 sf.

The primary structural system of the Cedar Mountain Bridge is a three-span precast concrete girder with a cast-in-place (CIP) concrete deck. The bridge superstructure was made continuous over the piers with steel reinforcing bars for the live load design. All the bridge deck top reinforcing rebar were epoxy coated.

Two intermediate piers consist of three CIP concrete square columns supported on individual 6-foot diameter concrete drilled shafts. The drilled shafts were drilled approximately 20’ into the sandstone for a total depth of approximately 60 feet.

Each abutment wall was constructed with CIP concrete, supported on 4-foot diameter concrete drilled shafts. Abutment 1 also features a CIP reinforced concrete retaining wall at each side up to 30’ high, supported on a series of concrete drilled shafts.

Another unique feature is use of long span girders to keep the intermediate piers out of the ordinary high water mark. To minimize the impacts to the environmentally sensitive Cedar River, Washington state’s WB3G precast girders were used for the 165-foot-long span, which was the longest precast concrete girder in King County to date.

REASONS FOR CHOOSING REINFORCED CONCRETE

FLEXIBILITY. Cast-in-place (CIP) reinforced concrete allows for the creation of virtually any shape desired, at any location. It allows both contractor and engineer to make any changes necessary to meet the field conditions – especially those that were not foreseen. This feature was particularly important to this project since the new bridge was constructed in stages around the existing structure, which was built in 1950 in tight space. Ability to accommodate site conditions during construction was one of the primary reasons for early completion of construction.

COST-EFFECTIVENESS. Another very important feature of CIP reinforced concrete construction is its cost-effectiveness, especially in the western Washington region where good quality concrete is readily available. Contractors are very familiar with this construction method, which allowed for a competitive bidding process, bringing a cost-effective product to the owners.

PROVEN STRUCTURAL SYSTEM. During the preliminary design phase, it was determined that reinforced concrete drilled shafts would be the most feasible foundation type for this project in lieu of steel or precast concrete piling. It took into account the environmental and constructibility constraints. Driving piles was not considered to be prudent due to noise and unstable slopes near the project site. Construction of reinforced concrete columns on top of single drilled shafts was also a well-established construction method used for this bridge.