SH-55 is a two-lane major scenic route connecting Boise, Idaho, with the rest of the state to the north. As such, the route provides a vital north-south link for both commercial and tourist traffic without any other convenient detour available within the state borders. The project is located on SH-55 in a small resort town of Cascade, Idaho, 75 miles north of Boise. The superstructure of the existing 65-year old three-span steel girder bridge crossing North Fork Payette River just north of Cascade was rated as structurally deficient and originally scheduled for replacement in 2017. However, more recent underwater inspections revealed that the exposed slender steel piles supporting existing piers in the 20-foot deep river were excessively corroded and as such could no longer support heavy loads, causing bridge truck load restrictions and impeding commercial traffic. As a temporary fix, the Idaho Transportation Department (ITD) was prompted to reduce truck traffic limitations by quickly encapsulating 50% of the corroded piles with epoxy filled jackets, and then to proceed with the permanent bridge replacement as soon as possible.

**INNOVATIVE APPROACHES**

In order to minimize impact on traveling public and commercial freight, the bridge replacement was to be done in as short period of time as possible, while maintaining two-way traffic through the construction site at all times. This required that the new two-span 250-foot long concrete bridge replacement was to be quickly designed and built using Accelerated Bridge Construction (ABC) methods. The bridge removal and replacement was to be done in two stages and traffic handling called for a permanent shift of the roadway alignment. This alignment shift and the right-of-way limitations called for a construction of long MSE retaining walls at each end of the new bridge. Other challenges included limited access through a deep river available only on one side of the existing bridge and low hanging electrical power lines. The new bridge solution was a two-step process. The first stage was to construct the temporary work platform and erect it within the river while during stage two the access within the river was to be provided by the remainder of the existing bridge. The pier piles of the new bridge in stage two were actually installed through openings cut in the existing deck.

The superstructure and substructure of the new bridge consists entirely of prefabricated reinforced concrete components to be quickly assembled in the field. The precast 124'-3" long Deck Bulb-T girders were quickly erected on top of the precast substructure elements and the top flanges connected by 10" wide closure pours using high strength, fast curing, reinforced repair mortar. Top flange transverse girder reinforcement was protruding into the closure pour and headed rebar terminators were used in the bottom layer to enhance rebar development. By using this innovative approach, the finished deck surface imitates the behavior and durability of the cast-in-place deck.

**REASONS FOR CHOOSING REINFORCED CONCRETE**

The bridge replacement was accomplished within 4 months between May and September of 2015. (The comparable bridge constructed by conventional methods would require at least 10 months.) The weight of all precast elements, except girders, was kept under 30 tons in order to ease transportation and handling. Fast curing, high strength mortar and concrete were used in all connections as to minimize curing times.