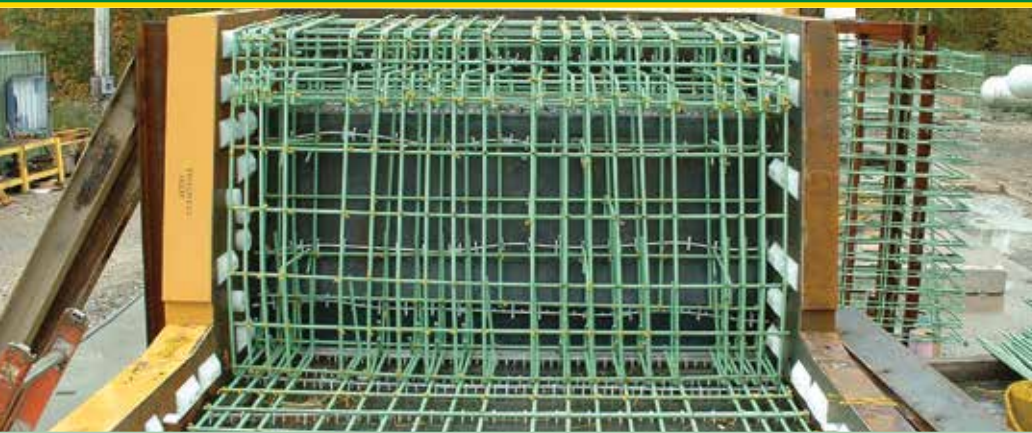


DCR Access Road Bridge over Route 24

Randolph, MA



The precast concrete “channel” design for the DCR Access Road Bridge over Route 24 will improve clearance for the heavily traveled road below, complement the surrounding scenic areas and reuse existing materials to reduce waste and lower costs. It also offers significant opportunities for expanding the capabilities of post-tensioned segmental construction.

The DCR Bridge is a 248-ft-long, two-span continuous precast concrete structure that increases vertical clearance over Route 24 to 16'5", adding more than 2 feet. The substructure consists of two new reinforced concrete stub-type abutments supported on steel piles and a new center pier.

The channel cross-section features a precast concrete superstructure with two edge beams that function as the main load-carrying elements, with the girders supported between them. The 8.2-ft-long U-shaped segmental girders feature a flange on both top edges that support the girders on erection beams that run from pier to pier on both sides.

This system eliminates the need for a below-deck support system, minimizing clearance and construction time while reducing life-cycle costs. The longitudinal edge beams also serve as traffic barriers. They are fully post-tensioned using a mix of 12- and 19-strand tendons. Additional longitudinal tendons are provided in the deck slab, using flat 4-strand tendons. All reinforcing steel in the deck sections consists of epoxy-coated reinforcing steel.

Once the existing bridge was demolished, the bridge's existing steel I-girders were rewelded to serve as the temporary erection beams supporting the precast concrete channel segments. Once the segments were post-tensioned, the steel beams were removed and recycled for reuse.

The channel design provides a sleek, low-profile appearance that provides functional clearance benefits while keeping it unobtrusive in scenic areas. Best of all, it minimizes long-term maintenance needs that will improve safety of construction crews and users while reducing costs over its service life.

Team

Owner:

Massachusetts Department of Transportation

Designer and General Contractor:

Purcell Associates, Boston, MA

Superstructure Engineer:

International Bridge Technologies Inc. (IBT)
San Diego, CA

Construction Engineer:

Finley Engineering Group Inc.,
Tallahassee, FL

Design Criteria:

- Add clearance without raising approach roads.
- Create an appearance that blends with the surroundings.
- Minimize long-term maintenance needs.
- Reuse or recycle as much material as possible.

Total Project Cost: \$3.86 million

Photography:

Photo courtesy of MassDOT
(Massachusetts Department of Transportation)

International Bridge Technologies Inc. (IBT)
San Diego, CA



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