# 2013 â?? I-84 Bridges over Dingle Ridge Road

## Description

### Meta Fields


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**Project Summary :** In September 2013, the New York State Department of Transportation replaced the twin 135-ft-long, three-span I-84 bridges using ABC techniques because only a single night closure for each bridge would be required. Closure of the roadway for 18 hours allowed for the rapid demolition of the existing bridge and slide-in of the new superstructure.
**Project Location :** Interstate 84 EB and WB over Dingle Ridge Road in Putnam County, 50 miles north of NYC (2.2 MI E JCT RTS I-84+I-684)
**Mobility Impact Time :** ABC: 18-hour closure each (2 Saturday nights total); Conventional: 2 years
**Impact Category :** Tier 1 (within 1 day)
**Dimensions :** Twin 82-ft-long and 57-ft wide single-span prestressed concrete NEXT D beam bridges; no skew
**Average Daily Traffic At Time Of Construction :** 38348
**Traffic Management :**

If constructed conventionally: two years of detours.

## Existing Bridge Description :

Each existing 3-span steel I-girder bridge was 135-ft long and 33-ft wide on conventional concrete substructures with shallow foundations. It had two 12-ft-wide traffic lanes and two 4-ft-wide shoulders.

## Replacement Or New Bridge :

Each replacement bridge has three 12-ft-wide traffic lanes, a 6-ft-wide (left) shoulder, and a 12-ft-wide (right) shoulder with TL-5 concrete barriers. Each cross-section consists of six adjacent 36-inch-deep NEXT D beams with 6-inch-wide UHPC closure joints. The semi-integral abutments consist of elevated cast-in-place concrete straddle-bent cap beams supported on 6-ft-diameter rock-socketed drilled shaft foundations. Precast elements include NEXT D beams, 4-ft-wide end diaphragms cast monolithically with four slide shoes, wingwalls, approach slabs slid with the spans, and sleeper slabs.

The 15 percent grade of the existing bridge and the significantly wider replacement bridge created a challenge in maintaining the design requirements for minimum under-clearance. NEXT D beams minimized structure depth to address the under-clearance issue, were cost effective, and expedited design and construction. The NEXT beams were fabricated with 5-inch rebar extensions along their length; the outside NEXT beams were fabricated with barrier rebar extending from the deck.

The new bridges are approximately two feet higher in elevation than the existing bridges to provide adequate under-clearance. Both bridges are jointless, with expansion joints provided only at the ends of the approach slabs. The approach slabs were designed for both dead load and live load to act as jump spans until the controlled low-strength material fill was placed behind the abutments. All details for the NEXT beam superstructure, precast approach slabs, and UHPC closure joints were developed according to the standard ABC concepts in the SHRP2 R04 Toolkit.

## Construction Method :

Existing approach roadways were widened into the median to accommodate the additional lane in each direction. Significant earthwork was needed to achieve the desired profiles due to the elevation difference between eastbound and westbound roadways. The contractor also used the median for access and work areas.

Abutment drilled shafts were constructed on either side of the existing bridge outside the existing bridge footprint due to the limited under-clearance available to the drilling rigs. The cast-in-place concrete straddle-bent abutments were then constructed under the existing bridge with limited excavation. This work was done prior to closure, without disrupting traffic.

Temporary falsework to support the new spans was built adjacent to and in line with the new abutments. Secondary falsework was built adjacent to the new sleeper slab locations. The new spans and approach slabs were constructed on the temporary falsework concurrently with substructure construction.

The precast end diaphragms with slide shoes, the NEXT beams, and the approach slabs were delivered to the job site just prior to installation. The end diaphragms were erected over the slide tracks on the falsework. The reinforced elastomeric bearing pads were then placed on the end diaphragms, and the NEXT beams were erected on the pads. The approach slabs were erected, supported on the end diaphragm at one end and on the secondary falsework at the other end. After the approach slabs were erected, the end diaphragms, NEXT beams, and approach slabs were made integral with UHPC closure pours. The concrete barriers were slip formed after the longitudinal closure joints were cast.


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