

high and are composed of 154 precast concrete elements stacked two units high. This project marks Delaware's first use of this wall type. Installation of the 540 ft length of proprietary wall took approximately eight days to complete.

Precast Concrete Decked Bulb-Tee Beams

The superstructures of Bridges 1-488N&S consist of eight 125-ft-long, 5-ft 6-in.-deep, 6-ft-wide prestressed, precast concrete decked bulb-tee beams. Using longer beams and significantly extending the spans of the bridges provided a cost-effective solution that helped limit the duration and quantity of the backfill work needed to raise the profile of the bridges approximately 8 ft. 6 in. Additionally, the use of the decked bulb-tee beams eliminated the need for drawn-out placement of the CIP deck.

Each of the precast concrete decked bulb-tee beams weighs roughly 105 tons. Given the size of these elements, placement of the beams required multiple steps using two cranes. Because a single crane was not large enough to place the beams in their final position, the contractor opted to build a temporary support system at midspan in the channel. On the south side of the channel, the contractor staged a 500-ton crane to pick the beams off the trailer and walk the beams out to the temporary support. The beams were landed on the support, and the crane's pick points were adjusted. A second crane, located on the north side of the channel, was attached to the



Moment slab segments were cast with the sleeper slabs to accommodate the transition from bridge barrier to guardrail.

beams, and together, the two cranes maneuvered each beam into its final position. This approach was efficient and well planned by the contractor, with each beam lift requiring skill and precision to ensure precise installation.

Placement of the beams took two days per bridge. With the precast concrete beams in place, the UHPC connections could be placed, and the remaining precast concrete elements could be installed. (For more information on the use of UHPC on this project, see the Concrete Bridge Technology article on page 26.)

Precast Concrete Sleeper Slabs and Approach Slabs

The use of fully precast concrete sleeper slabs and approach slabs as part of the

bridge replacement project marks a first for DelDOT. The use of sleeper slabs and approach slabs helps alleviate the issue of settlement behind the bridge and improves rideability. Additionally, the interface between these two elements is located where bridge movement is designed to occur. Moving the joints off the bridge helps extend the life of the bearings.

The sleeper slabs are 51 ft 6 in. wide and were cast as a single precast concrete element. In accordance with DelDOT's *Bridge Design Manual*,¹ moment slab segments were cast with the sleeper slabs to accommodate the transition from bridge barrier to guardrail. The sleeper slabs were the most complex element from a prefabrication standpoint. Each



AESTHETICS COMMENTARY

by Frederick Gottemoeller

In the last issue of *ASPIRE*® (Spring 2026), we considered the successful application of innovative precast concrete elements to the Sonoma–Marin Area Rail Transit (SMART) bridge in San Rafael, Calif., which created an attractive background bridge. In this issue, we are reflecting on the successful application of innovative precast concrete elements to accelerate the construction of US 13 over Blackbird Creek in Delaware, which has also created attractive background bridges.

The common feature of these bridges is that the visible precast concrete elements are themselves simple and go together in a visually simple and straightforward manner. (Of course, in practice, the requirements of ultra-high-performance concrete design are far from simple.)

The bulb-tee beams of the US 13 over Blackbird Creek bridges are slim and have an attractive horizontal shadow line, which makes them appear

even thinner, and they rest neatly on the simple shapes of the precast concrete stub abutments. All the other precast concrete elements are hidden within the pavement or embankment.

Background bridges are not meant to attract attention, but they can still be features of urban or rural scenes. The use of attractive precast concrete elements offers a great aesthetic advantage, as it always results in the creation of an attractive bridge. Local residents and visitors alike are the beneficiaries of the care that went into the bridge design.