



2009 ?? MD 362 Bridge over Monie Creek

Description

Meta Fields

Project Summary : The replacement bridge consists of a single-span prestressed concrete adjacent slab beam superstructure with precast abutments.

Project Location : on MD Route 362 (Mount Vernon Road, a rural major collector) over Monie Creek near the town of Jason

Mobility Impact Time :

- ABC: 37-day closure (5 weeks plus 2 days)
- Conventional: 10 weeks for <55-ft spans

Impact Category : Tier 5 (within 3 months)

Dimensions : 55-ft-long and 45-ft-wide single-span prestressed concrete slab bridge

Average Daily Traffic At Time Of Construction : 1700

Traffic Management : extended use of 7-mile detour for low-weight vehicles and 14-mile detour for trucks

Existing Bridge Description : The existing bridge was a 41-ft-long, 48-ft-wide single-span steel beam bridge with timber substructure. Built in 1934 and widened in 1963, the bridge had two 12-ft-wide traffic lanes, and two 12-ft-wide shoulders compared to two 8.5-ft-wide shoulders on the approaches. The substructure was structurally deficient and required replacement.

Replacement Or New Bridge : The replacement bridge has two 12-ft-wide traffic lanes and two 8.5-ft-wide shoulders. The cross-section consists of eleven 4-ft-wide, 2.25-ft-deep prestressed concrete solid slab beams that are post-tensioned together transversely, with a 5-inch-thick reinforced cast-in-place modified latex concrete overlay and precast curbs with embedded rods to connect metal railing. The abutments consist of 4-ft-square precast abutment caps on 12.75-ft-diameter steel pipe piles, and precast wings. The MDSA gave the contractor several options for constructing the abutments in pieces to allow weights of abutment sections to be no greater than slab beam weights.

Construction Method : The contractor chose to precast the abutment caps in half-sections with cast-in-place closure joints between the two cap sections and between the precast cap and wingwalls. The contractor chose the option of precast wingwall caps for the lower portion of the wingwalls, combined with cast-in-place wingwall stems. The abutment caps were cast with partial-depth pockets for the piles to fit into, and circular pipes that extend from the top of the pocket to the top surface of the cap for completion of the closure joints. The caps were cast with threaded inserts in the top of the pockets to allow connection of development reinforcement in the field. The use of threaded inserts simplified fabrication and allowed the caps to be shipped upright instead of upside-down, eliminating the additional step and complexity of flipping the caps in the field. The contractor drove the piles using single-lane weekend closures prior to closing the bridge. The piles were driven in a single row with a 6-inch tolerance to create a full-moment connection between the piles and abutment while allowing some movement. Steel caps were field-welded on top of the piles and covered with asphalt to allow traffic to be maintained. The bridge was then closed, the superstructure demolished, and the piles excavated. The piles were cut to the correct elevation and filled with concrete to 20 ft below the bottom of footing elevation. A 19-ft-long reinforcement cage was lowered into each pile, and temporary leveling pads were welded to the piles to support the abutment caps. The caps were delivered to the site, and 4-ft-long development bars were threaded into the inserts in the tops of the cap pockets. The caps were then lowered over the piles. Mechanical coupler splices were installed to develop the top and bottom reinforcement that extended from the caps into the 2-ft-wide closure joints. The closure joints and cap pockets were then cast. Because the bridge was directly against the stream and the ground elevations on site were close to sea level, driven sheet piling was specified in the contract for scour protection. The contractor installed the sheeting after excavation, before the piles were cut at their final elevation, to help dewater the area around the abutment. After the abutment cap was erected, the sheeting was connected to the cap with tie rods placed through preformed holes in the caps. The tie rods connected to a small water in front of the sheeting. A top mat of reinforcement was placed over the top of the water and sheeting, and the area between the existing and new abutment was filled with cast-in-place concrete as a cap for the sheeting. The scour protection and abutments were designed as a system, helping to minimize the section requirements of both the piles and the sheeting. After

