



2013 TH 36 over Keller Lake Bridge

Description

Meta Fields

Project Summary : superstructure and substructure precast elements

Project Location : State Highway 36 from Arcade Street to State Highway 61 southbound exit ramp in the city of Maplewood

Mobility Impact Time :

- ABC: 65 calendar days
- Conventional: 75 calendar days

Impact Category : Tier 5 (within 3 months)

Dimensions : 118.1-ft-long and 89.8-ft-wide 3-span prestressed concrete adjacent inverted T beam bridge (34.75 ft $\times$ 46.5 ft $\times$ 34.75 ft); 0° skew

Average Daily Traffic At Time Of Construction : 69000

Existing Bridge Description : The existing 3-span concrete tee beam bridge was 112.5-ft long and 80-ft wide with integral abutments. It had four 12-ft-wide traffic lanes and 2-ft inside and 10-ft outside shoulders. Built in 1937, the bridge was deteriorated and required replacement.

Replacement Or New Bridge : The replacement bridge has four 12-ft-wide traffic lanes, and 2-ft inside and 10-ft outside shoulders. The cross-section consists of sixteen 1.5-ft-deep adjacent inverted T beams spaced at 5.83 feet with a 7-inch-thick cast-in-place reinforced concrete deck. The precast concrete integral abutments were founded on prestressed concrete piling (prestressed concrete piling is new to MnDOT). In addition to the inverted T beams, other prefabricated elements included precast concrete pier caps and precast concrete abutment components.

Construction Method : The beams with their maximum 6-ft overall width allowed standard hauling and quick erection. This project was completed using staged construction. In each of the stages the contractor drove the prestressed concrete piles for the abutments and piers. A typical crane for this scale of project was used to install the precast abutments, pile caps and adjacent inverted T beams. The precast abutment pieces and precast caps were connected to the piles using high-strength flowable grout. The precast inverted T beams were erected, the longitudinal $\times$ drop in $\times$ steel reinforcement and deck reinforcement were placed, and the deck was cast and cured. For the first stage deck placement a conventional deck mix was used. For the second stage the deck mix was modified to use polypropylene fibers to reduce cracking. The contract required bridge construction to be completed in 60 calendar days. Liquidated damages were \$10,000 per day over 60 days.

Stakeholder Feedback : An inspection was conducted one year after the bridge was opened to traffic. Map cracking was detected on the deck surface of the stage that used the conventional deck mix. The second stage placement that included polypropylene fibers exhibited significantly less cracking. Future deck placements of this superstructure type will require fibers in the deck mix.

High Performance Material : polypropylene fibers in concrete deck

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Costs : The engineer's estimate for the project was \$2,386,566. The low bid was \$2,073,956. There were 3 bidders. The cost per square foot of bridge was \$195.66 compared to \$155.58 for conventional construction in this region during the same time period.

Contract Plans : 1

Year Abc Built : 2013

State : MN

Owner : State

Location : Urban

Spans : Three-span

Beam Material : Concrete

Max Span Length Ft : 46.5

Total Bridge Length Ft : 112.1

