Route 15/29 SBL Bridge Superstructure Replacement & Widening

NOVA District

AGENDA
- Existing Structure
- Scope
- Accelerated Construction Procedure
- Construction Staging (Superstructure)
- Preparatory Work (Substructure)
Questions

EXISTING STRUCTURE
Location: Route 15/29 SB Bridge over Broad Run, Prince William County
Superstructure: 3-Span, Concrete T beam, Simply Supported
Substructure: Wall Type Piers & Abutments
Year Built: 1952
Condition in 2005: Severe Deterioration of Superstructure

Bridge Elevation

SCOPE
- Replace & Widen Superstructure
- Minimize Traffic Disturbance
  - Construction at Night only
  - Maintain 1 Lane of Traffic at Night
- Restore Traffic to Normal (2 Lanes) at Day
- Complete Work in 12 Nights
ACCELERATED CONSTRUCTION PROCEDURE
(MODULAR CONSTRUCTION)

1. Preparatory Work
   - Maintain all Traffic Lanes
   - Widen Approaches
   - Modify Substructure for Modular Superstructure

2. Superstructure Replacement
   - Maintain 1 Lane of Traffic at Night
   - Remove Designated Portions of Superstructure
   - Replace with Modular Segments
   - Restore traffic to Normal (2 Lanes) at Day
   - Accomplish Work in 12 Nights

3. Overlay the Bridge and Approaches

PROPOSED MODULAR STRUCTURE

Module Configuration:
Each Module Consists of a Prefabricated Concrete Deck on Two Steel Beams
Module Width Arrangement in Transverse Section: (12’-11") (9’-0") (8’-9") (7’-10")
Max. Module Weight = ~35 tons (~30 tons w/ Lightweight Concrete)

Longitudinal Joints between Modules:
Grouted/Waterproofed Keyways
Diaphragms between Modules:
Field Installed Steel Diaphragms
Deck Parapets:
Plant Cast Concrete
Plan
Stage I @ Night

Span a  Span b  Span c
Traffic Lane
Transport Lane
Stage I Construction
Remove/Replace Superstructure

Plan
Stage II @ Night

Span a  Span b  Span c
Transport Lane
Stage II Construction
Stage I Construction
Remove/Replace Superstructure

Sequence of Construction - II

Day
Night
Span a  Span b  Span c
Stage II Construction
Stage I Construction
Remove/Replace Superstructure

Plan
Stage II @ Night
Stage II MOT for Nighttime Construction

1. Close the SB bridge to traffic from 9:00 p.m. to 5:00 a.m.
2. Route the SB traffic on NB via the crossover 300' north of the bridge.
3. Route the SB traffic back on SB via the crossover 400' south of the bridge.
4. Maintain both lanes of traffic on SB bridge from 5:00 a.m. to 9:00 p.m.
Typical Section
Sequence of Construction - IV

Day
Night

9pm-5am

Plan
Stage IV @ Night

Stage III
Construction

Stage II Construction

Stage I Construction

Stage IV Construction

Remove/Replace Superstructure

Transport Lane

Span a
Span b
Span c

Traffic Barrier

Traffic Lane

Span a
Span b
Span c

Railing

Railing

Median Exterior Edge

~7’-10”~12’-11”

36’-0” Roadway

4’ Shldr

12’ Lane

12’ Lane

~9’-0”

8’-0” Shoulder

Nighttime Operations Include:
- Install Middle Diaphragms
- Apply Rapid Set Joint Mortar
Concrete in Deck & Rails:
- Light Weight
- Low Permeability

Completed Structure

Overlay not shown

Transverse Section

AGENDA
Abutment A Modifications (Repair & Removal)

(Repair, Removal, Widening & Beam Seat Reconstruction)

Concrete in Substructure; – Low Permeability

Beam Seat Reconstruction (Self-Consolidating Concrete)

Backwall Removal & Modification (Nighttime Operation)

(Pier Modifications)

Beam Seat Reconstruction & Encasement of Post-Tensioning (Self-Consolidating Concrete)

AGENDA