TDOT's First CM/GC Design and Construction Project

Presented at the

2016 Ohio Transportation Engineering Conference
Project Location

• Located on the South Loop in Downtown Nashville
Project History

• CM/GC Alternate Delivery Method – 1st TDOT Project
• Design Consultant
• CM/GC - Kiewit Infrastructure South Co.
• Numerous Ongoing Maintenance Issues
• 140,000+ ADT
• Major Downtown Access Points
Options Studied as Part of the Project

• Deck Replacement with Full Depth Panels
• Superstructure Replacement
• Full Span Replacements
• Eliminate Spans
• Combination of Options
Option Evaluation Criteria

- Duration of Closures – Number of Weekends
- Rough Order of Magnitude Costs
- Life-Cycle Analysis
- Railroad / Utility / ROW Impacts
- Procurement of Materials
- Constructability
- Risk
Bridge Site 1 – Herman Street

- Existing 345’ 4-Span Continuous Rolled Wide Flange Beams
  - On-going Deck Maintenance
  - Over Herman St. & Nashville & Western Railroad
Bridge Site 1 – Herman Street

- Replace Superstructure with Steel beam Superstructure Units
  - Maintain Existing Beam Spacing
  - Existing Substructure in Good Condition
  - Modify Existing Abutment Endwall for New Cross-Slope & Expansion Joint
  - Spray Membrane Deck Seal & Asphalt Overlay
Herman Street
Herman Street

Herman EB Weekend Timelapse Video
Bridge Site 2 – Clinton – CSXT Crossing

- Existing 428’ 6-Span Continuous Rolled Wide Flange Beams
  - On-going Deck Maintenance
  - Over CSX Railroad and Clinton St.
Bridge Site 2 – Clinton – CSXT Crossing

- Superstructure Replacement of 2 Spans with 4 Spans Eliminated
  - Maintain Span 2 over CSXT and Span 5 over Clinton
  - Eliminate End Spans 1 & 6 and Interior Spans 3 & 4
  - Use Box Beams and Full Depth Deck Panels
  - Modify Existing Piers to act as Abutments
  - Spray Membrane Deck Seal & Asphalt Overlay
Clinton – CSXT Crossing
Clinton – CSXT Crossing

Clinton - CSX WB Weekend Timelapse Video
Bridge Site 3 – Jo Johnston Avenue

- Existing 3-Span 178’ AASHTO I Beams
  - On-going Deck Maintenance
  - Over Jo Johnston Ave.
Bridge Site 3 – Jo Johnston Avenue

- Superstructure Replacement of 1 Span with 2 Spans Eliminated
  - Maintain Span 2 over Jo Johnston Avenue
  - Eliminate End Spans 1 & 3
  - Use Box Beams and Full Depth Deck Panels
  - Use MSE walls to Contain New Roadway Fill
  - Modify Existing Piers to act as Abutments
  - Spray Membrane Deck Seal & Asphalt Overlay
Jo Johnston Avenue
Jo Johnston Avenue
Bridge Site 4 – Charlotte Avenue

- Existing 3-Span 196’ Continuous “K” Frame Wide Flange
  - Emergency Deck Repairs in 2013
  - Over Charlotte Ave.
Bridge Site 4 – Charlotte Avenue

- Structure Replacement with Single Span Steel Structure
  - Construct New Abutments Between “K-Frame” and Existing Abutment
  - Eliminate End Spans 1 & 3
  - Use Steel Superstructure Units to Replace Existing Bridge
  - Use MSE walls to Contain New Roadway Fill
  - Spray Membrane Deck Seal & Asphalt Overlay
Charlotte Avenue
Conclusions

• Early Contractor Involvement with CM/GC Contract
  • Team Approach to Project (Owner-Contractor-Designer)
  • Personnel Continuity between Design and Construction Phases
• On-Site Bridge Farm or Fabrication Yard
  • Adapting Conventional Bridge Construction to fit ABC Needs
• Bridge Type and Material Selection Process
• Ready-Mix Type Closure Pour Material
• Debrief or Lessons Learned Meetings after each closure
• Project Schedule – Incorporated all Phases and Disciplines
Questions