Design Build Rehabilitation of the Sherman Minton Arch Bridge

Presented by:

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www.in.gov/indot
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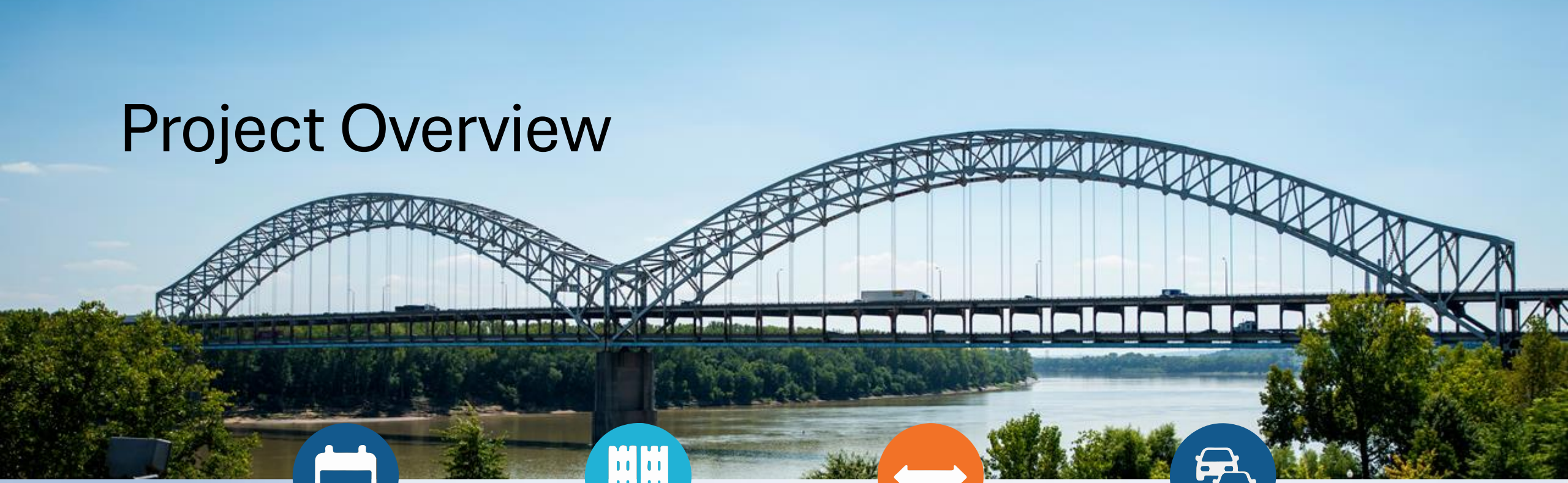
Agenda

- Design-Build Best Value
- NEPA and Public Involvement
- Risks & Mitigation Strategies
- Innovative Materials & Construction Techniques
- Alternative Technical Concepts & Design Solutions

Design-Build Best Value

Project Overview



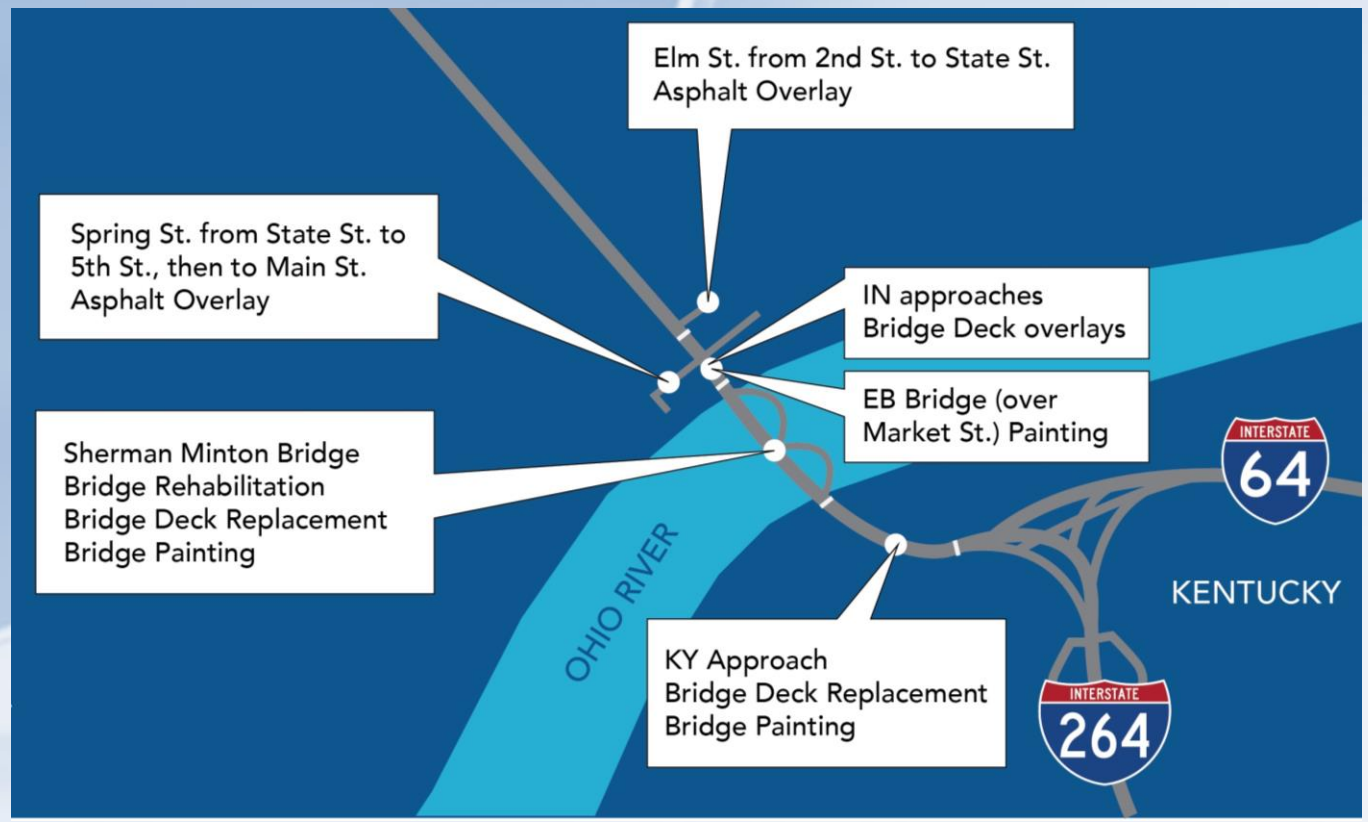
Opened in
1962
for usage

Traffic is carried by
6 LANES
across the bridge

Each span is
800 FEET
long

Used by
70,000
drivers a day

Project Goals



- 30-year service life extension
- Reduce Impact to community and travelling public
- Provide best value to public
  - Budget
  - Timeline
  - Impacts

Rehabilitation Work

- Replacement of Bridge Decks
- Hanger Replacement
- Structural Steel Repairs
- Bridge Deck Overlays
- Traffic Lighting
- Drainage Repairs
- Bridge Painting
- No addition of lanes or reconfiguration of interchanges.
  - I-265 in Indiana to I-264 in Kentucky (3 Lanes Each Direction)
  - Stay within existing ROW

Why Design Build Best Value

- **Public Need/Benefits** - project addresses the needs of the STIP by preservation of existing assets
- **Economic Development** - project critical to maintaining competitive industries and businesses in the region
- **Stakeholder Support** - environmental process allowed for developing stakeholder support
- **Legislative Considerations/Financial Feasibility** - bi-state project with shared and uniquely owned assets – DBBV process allows for both Owners to be considered
- **Project Term** - project seeks solutions to gain 30 years of life for the exiting crossing

Why Design Build Best Value

- Technical Feasibility
  - Project required complex technical design solutions
  - DBBV allowed an opportunity for innovative means & methods for associated work
  - Subsequent projects demanded a firm requirement for project completion
- Project Risks
  - Project had a need for innovative traffic management approaches
  - Owners and the community had a desire to minimize the time of closures
  - As a community resource, project had need for integrated public/media relations support
- INDOT Alternative Delivery Manual
  - https://www.in.gov/indot/projects/home/indot-alternative-delivery/

CONSTRUCTION SCHEDULE | 2021-2024

SHERMAN MINTON RENEWAL

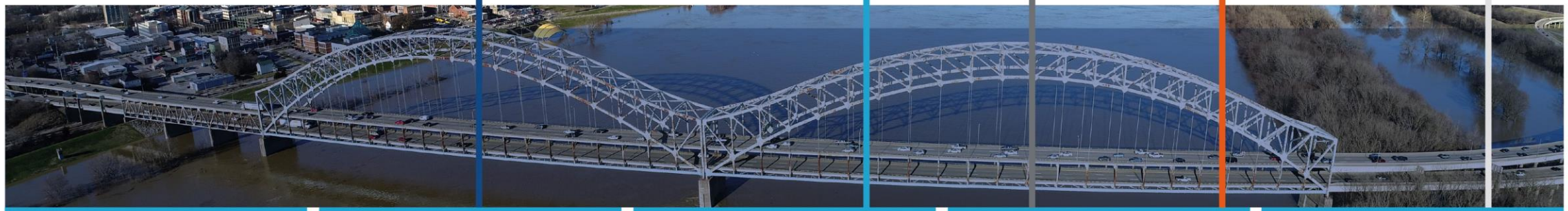
MID 2021 – LATE 2022

LATE 2022 – EARLY 2023

EARLY 2023 – LATE 2023

LATE 2023 – MID 2024

MID 2024



2020	2021	2022	2023	2024

ENVIRONMENTAL STUDY/ PROCUREMENT

- FHWA approves MOT approach (Fall 2020)
- Kokosing Construction Comapny, Inc. selected as Design-Build Best Value Contractor (December 2020)
- Contract negotiation and award (March 2021)

CONSTRUCTION

PHASE 1
Design, materials procurement and first half of EB construction on lower deck

PHASE 2
Second half of EB construction on lower deck

PHASE 3
First half of WB construction on upper deck

PHASE 4
Second half of WB construction on upper deck

PHASE 5
Final traffic configurations

* Construction dates are subject to change due to weather delays and other factors.

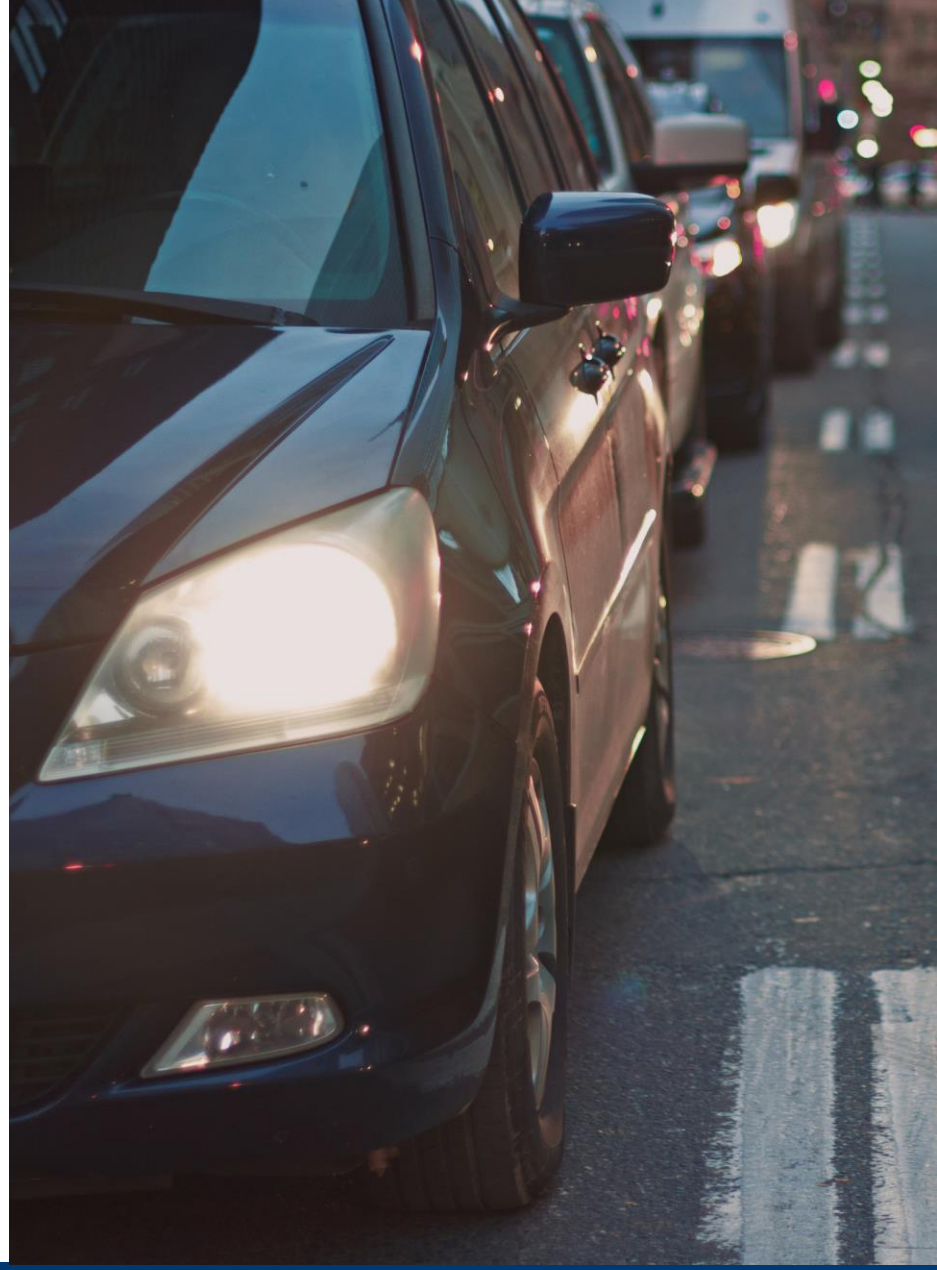
NEPA & Public Involvement

2011-2012 Emergency Repair

- Cracks discovered in Tie Girder during September 2011 Inspection
- Emergency closure ordered
- Closed for 5 months
- Repairs included 2.4 million pounds of new structural steel

Better the second time

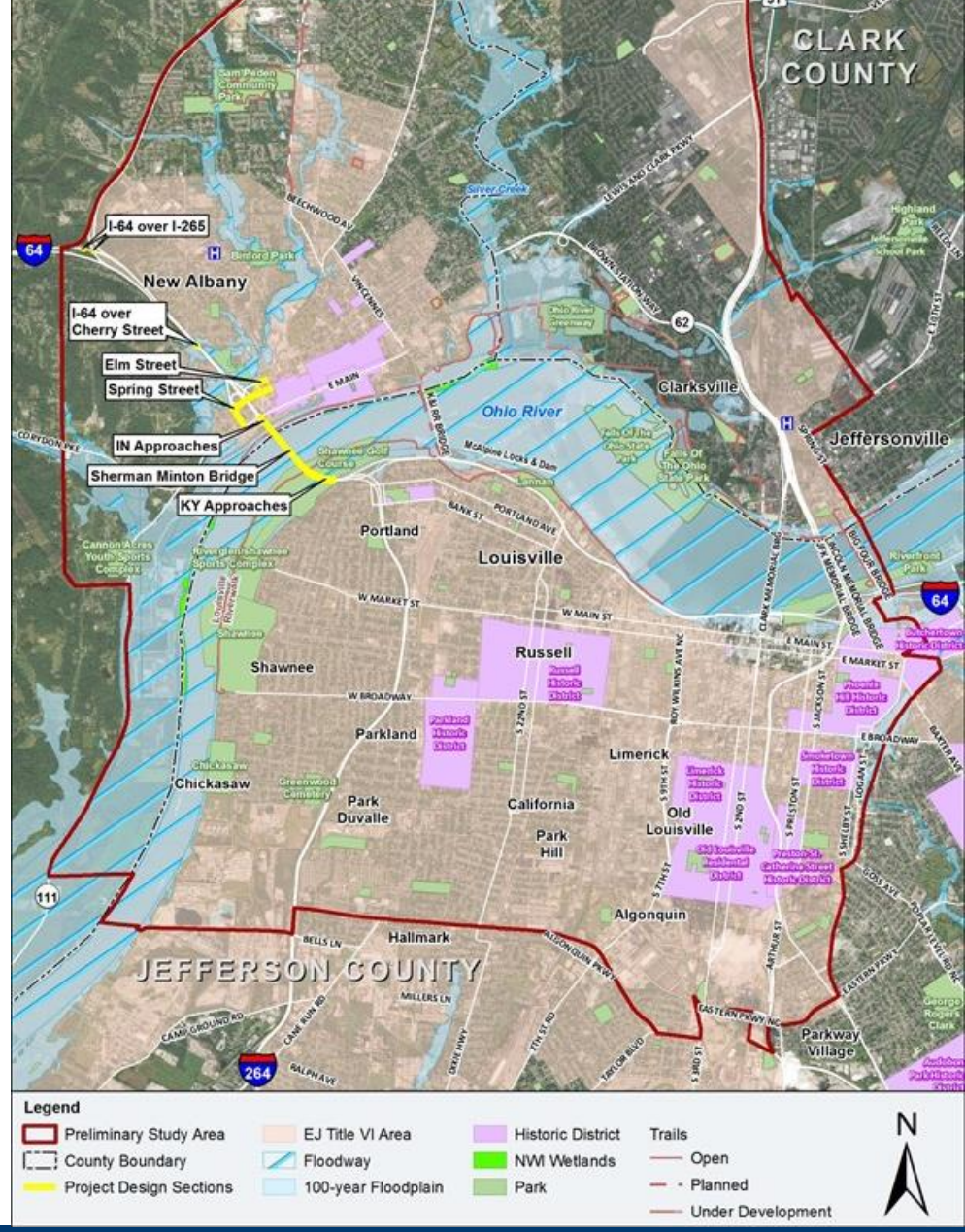
- How will this be different from 2011-12 Closure?
  - More Cross River Capacity
  - Time to Plan
  - Notice of Closures
  - Tolls *(on other bridges)*



Environmental Process

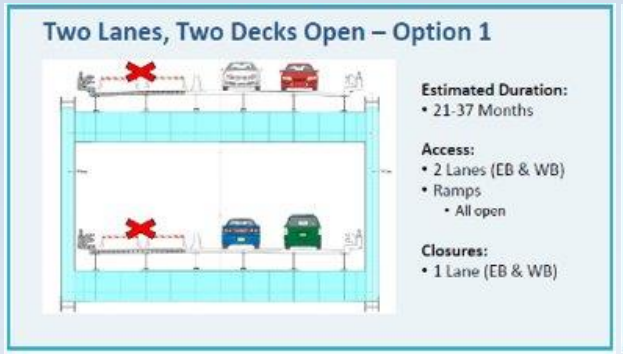
- NEPA Environmental study
  - Social
    - EJ Title VI Area
  - Economic
  - Environmental Impacts
    - 100-year Floodplain
    - Wetlands

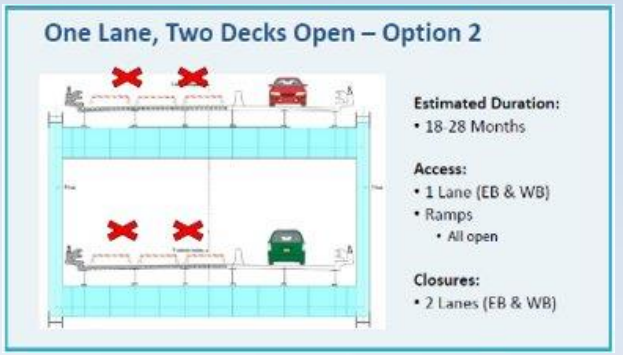
- **Identify Best Approach**

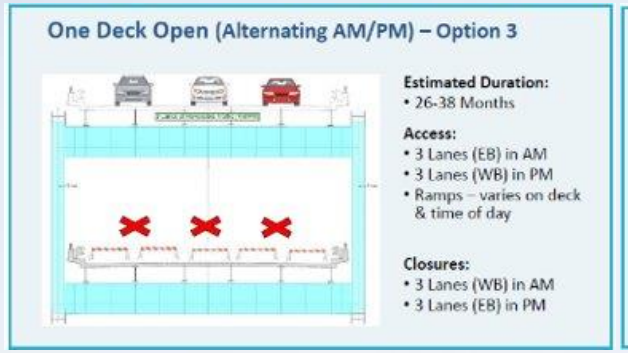


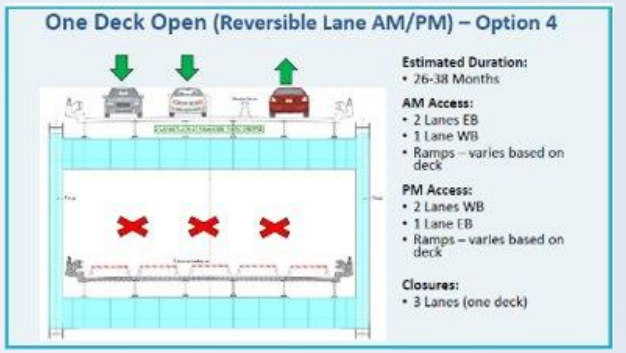
Traffic Analysis & MOT

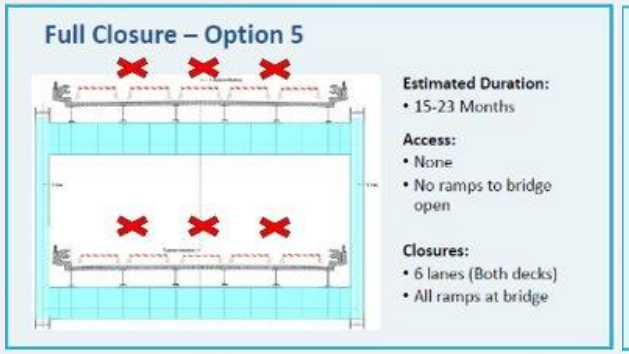
- TWO DECKS OPEN
  - MOT 1: Two lanes, two decks open
  - MOT 2: One lane, two decks open
- FULL CLOSURE
  - MOT 5: Full Closure
- ONE DECK OPEN
  - MOT 3: Alternating directions AM/PM
  - MOT 4: Reversible lanes AM/PM
  - MOT 6: One direction, two phases

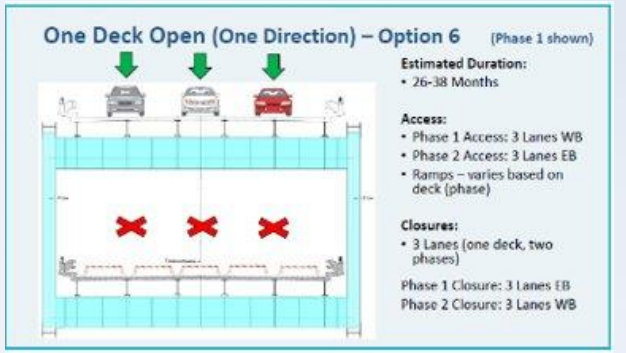




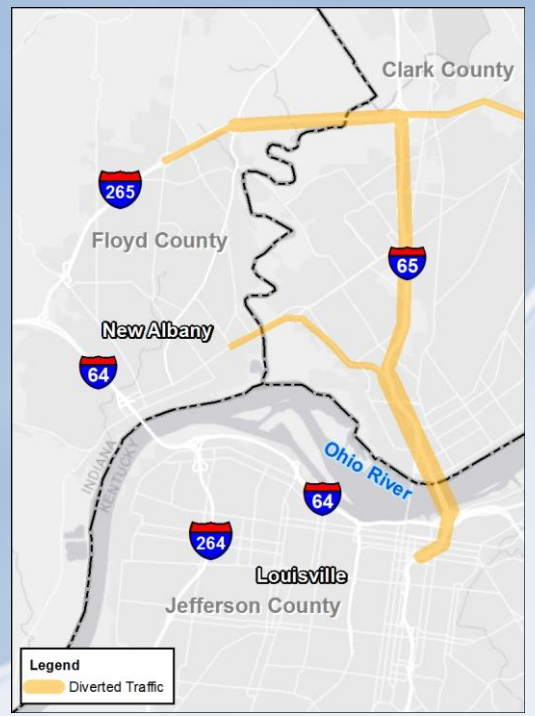






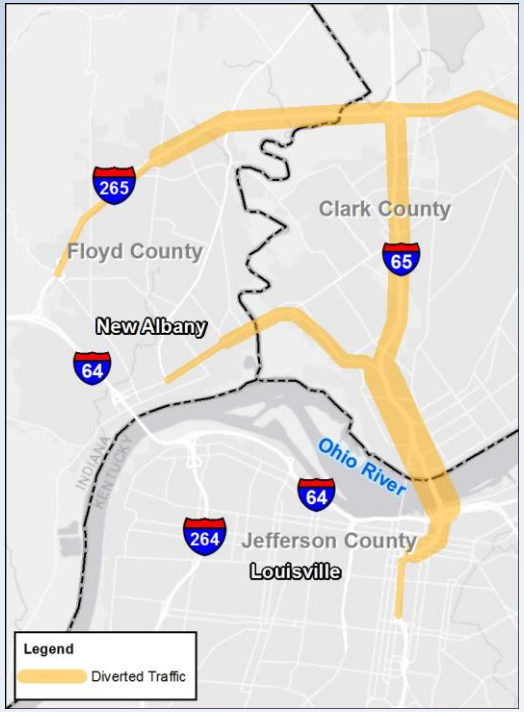


Traffic Analysis



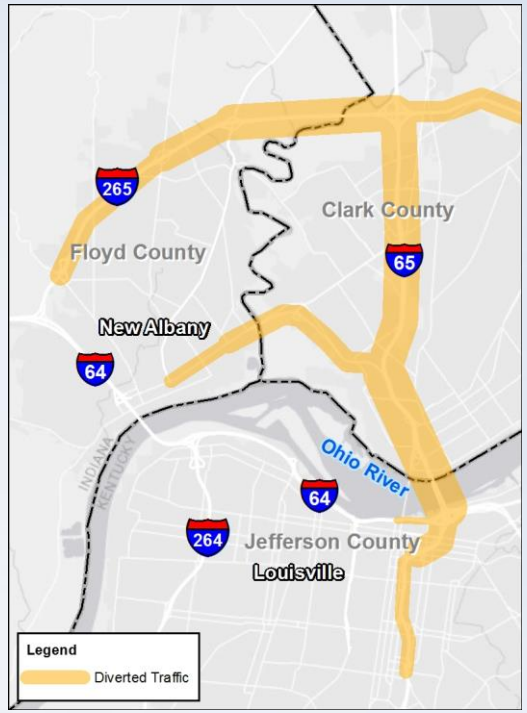
2 Lanes Open

7,400 vehicles (8%)



1 Lane Open

33,400 vehicles (37%)



Full Closure

90,000 vehicles (100%)

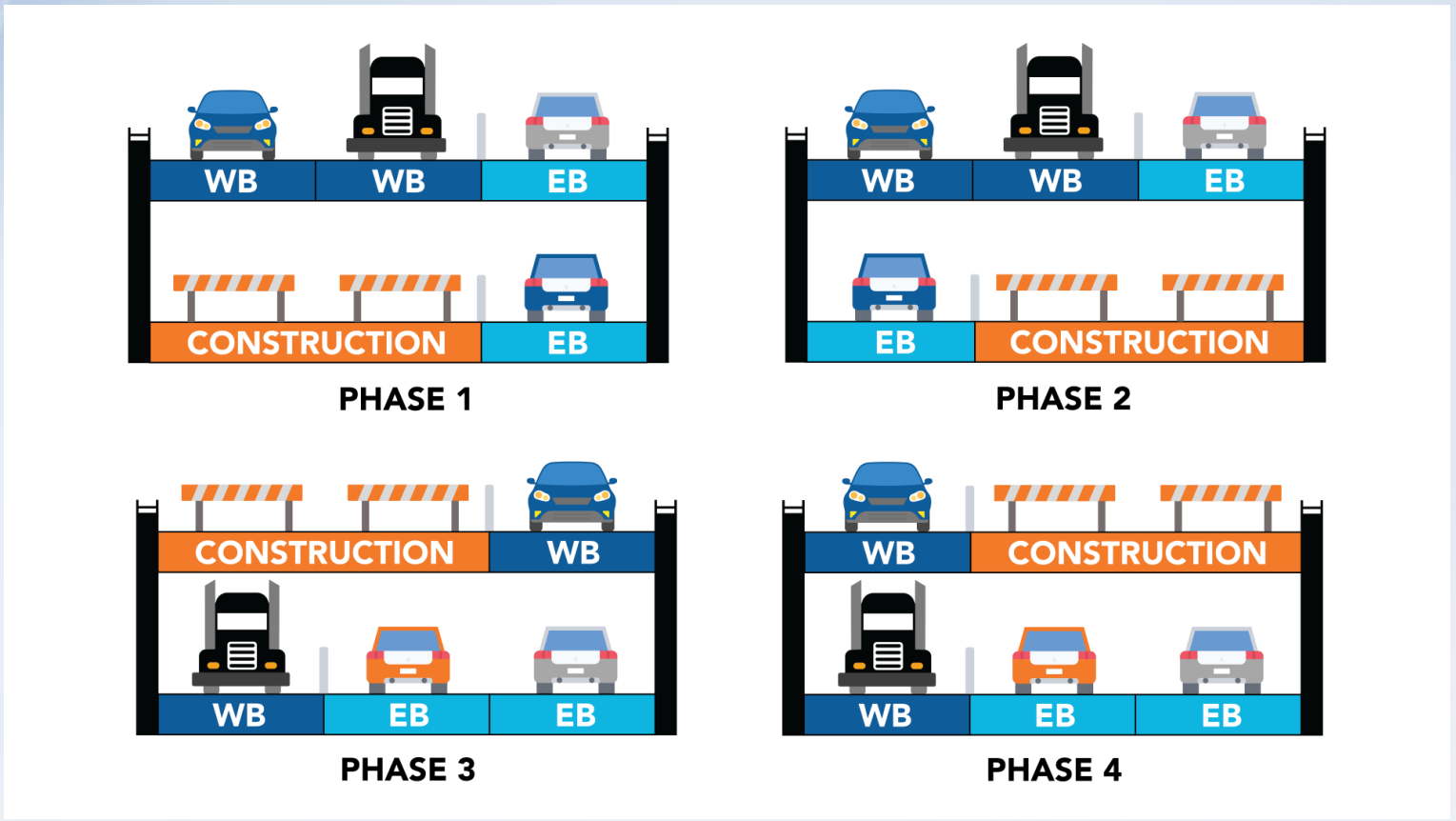
Environmental Commitments

- Protection of the Environment
- Public Awareness
  - Notices to public/first responders
  - Coordination for impacts to 4(f) or 6(f) properties
- Minimization of Impacts
  - Holidays and Special Events

Risk & Mitigation Strategies

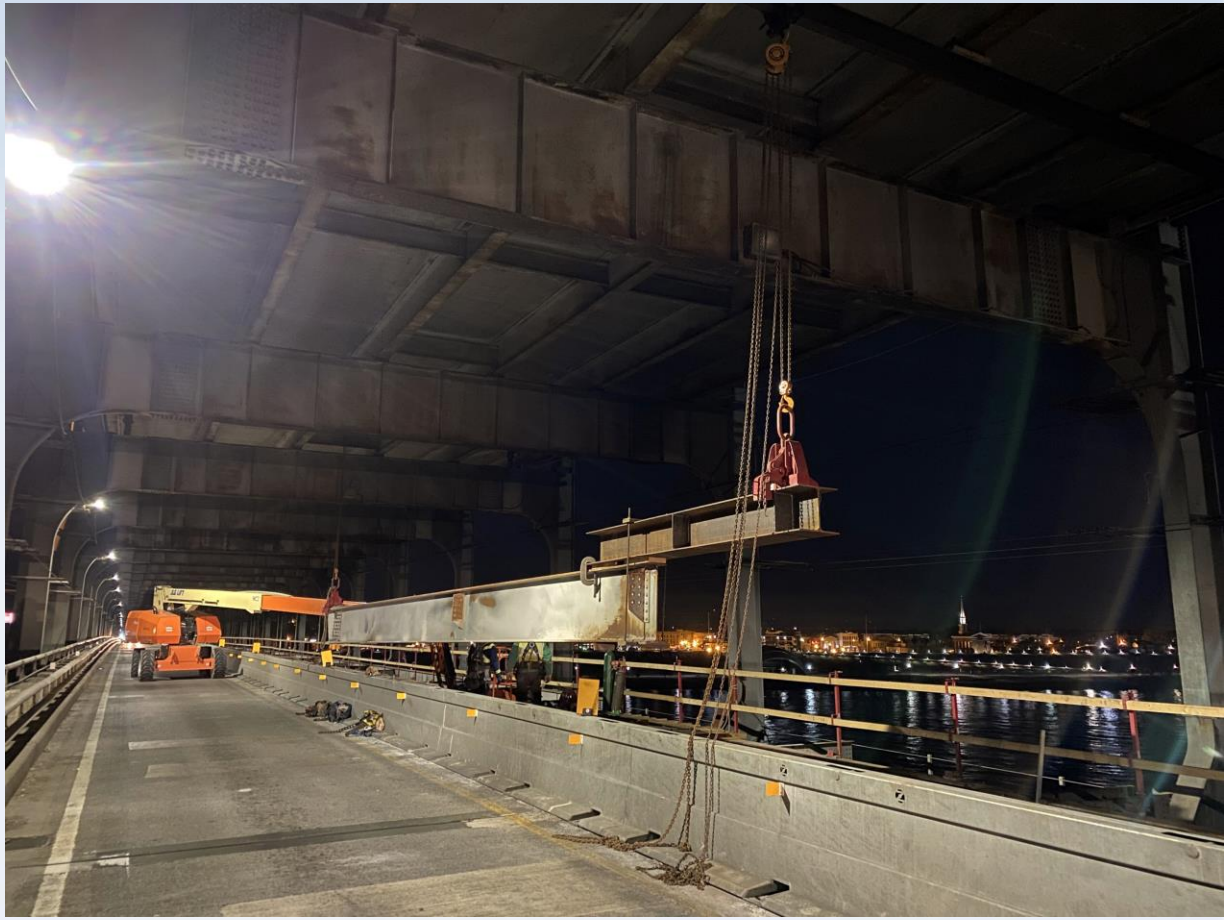
Mitigating Traffic Impacts

- TYPICAL MOT
  - Maintain 2 lanes each direction



Allowable Closures

- **OFF PEAK CLOSURES** (Each Direction)
  - Up to 360 nightly closures
  - 60 additional nightly closures (post Substantial Completion for approved work)



Allowable Closures

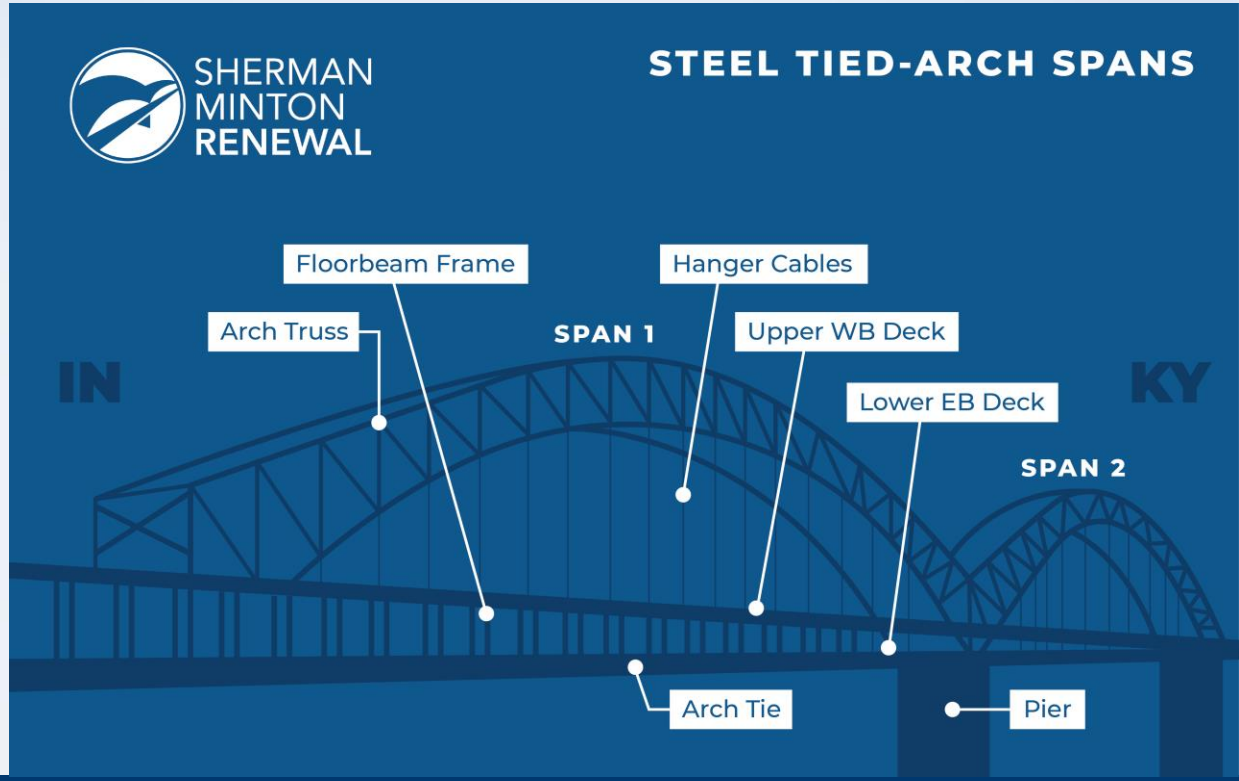
- **PEAK** (Each Direction)
  - One (1) nine (9) consecutive day Full Directional Closure per calendar year period
  - Up to three (3) weekend periods per calendar year
  - One (1) lane for one (1) fifteen (15) consecutive day closure for As-Built Bridge Reference Document Verification inspection

BI-State Project

Structural Steel Repairs Risk

Challenge: Obtaining 30-year service life

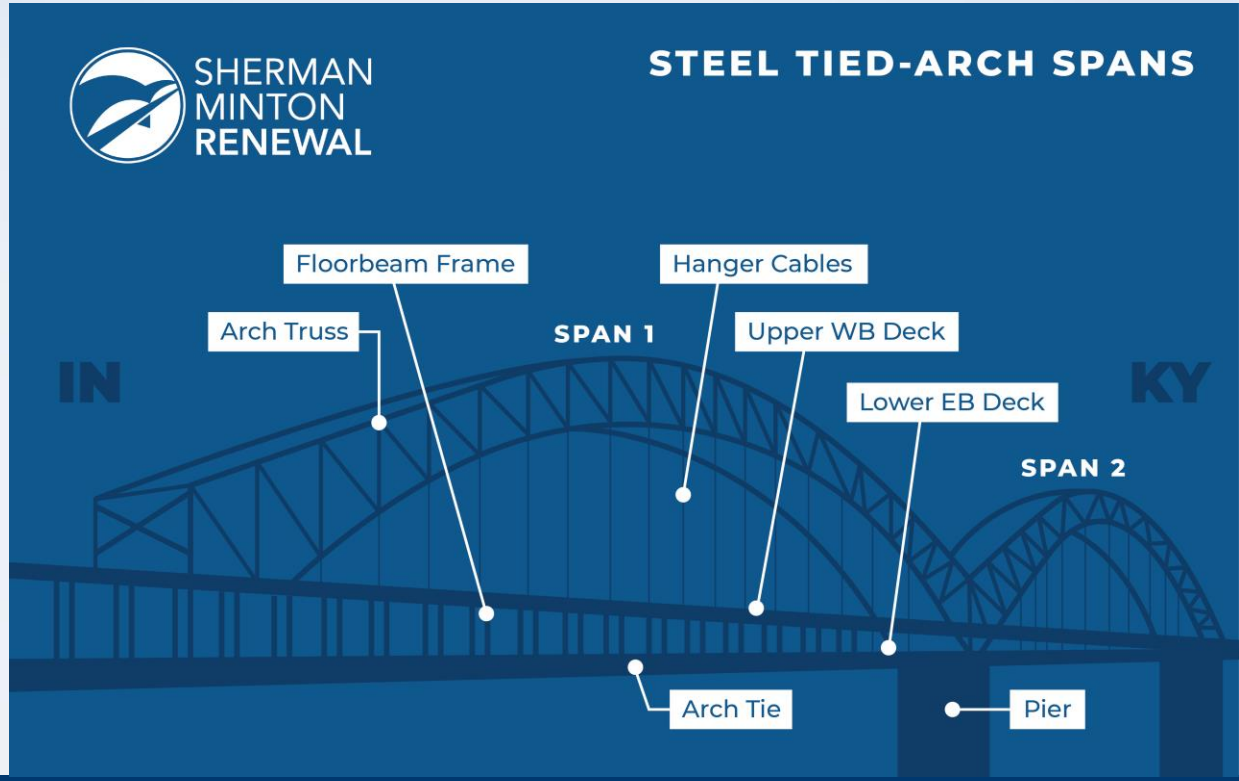
- Prescriptive Repairs
  - Cable Hanger Replacement
  - Clean and Paint all Steel
  - Remediate Pack Rust



Structural Steel Repairs Risk

Challenge: Obtaining 30-year service life

- Performance Based Approach for Strengthening
  - Capacity/Load Rating acceptance criteria
  - Known Deficiencies
    - 2019 Inspection
    - DBC field view/Inspection
- Unknown Deficiencies
  - Allowances
    - Stringer end repairs
    - Floorbeam Strengthening
    - Fatigue Crack Arrest
    - Bolt Replacement



Kentucky Approach Piers

- **Long term durability concerns**
  - Remove all concrete cover on Pier Caps
  - Repair Spalled/Delaminated Pier Columns
  - Cathodic Protection through Galvanic Anodes
- **Allowance for patching concrete structures** (Not previously identified)

Innovative Materials & Construction Techniques

NATIONAL BRIDGE PRESERVATION CONFERENCE 2024
Innovation for Infrastructure Resiliency

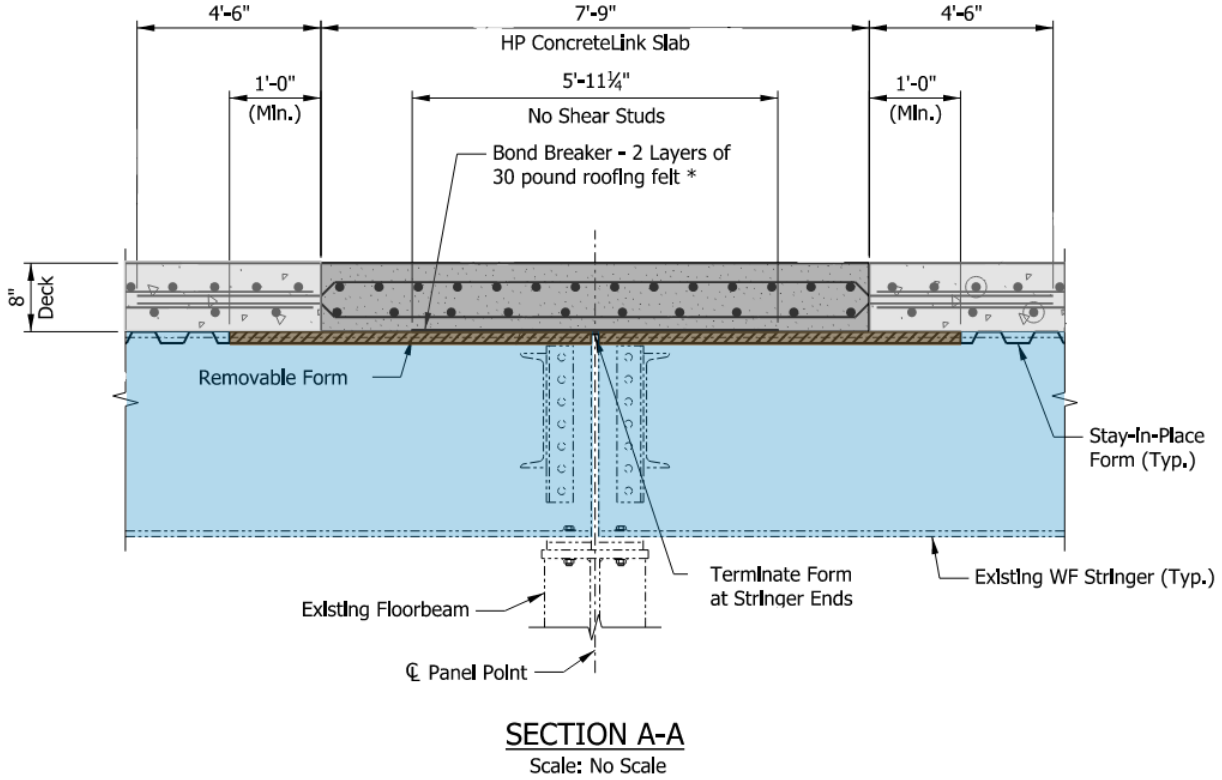
Bridge Deck Replacement

- **Full Bridge Deck Replacement**
  - Sherman Minton (Spans 1, 2, A-C) and KY Approach
  - All Bridge Decks shall be CIP Concrete
    - ATC's Allowed (Pre-Cast Panels)
  - Match Existing Bridge Profile
  - SIP Forms Allowed
    - Partial depth P/S forms not permitted
- **Utilized E5 Internal Cured Concrete**
  - Nano Silica (Liquid Flyash)
  - Eliminates need for wet cure

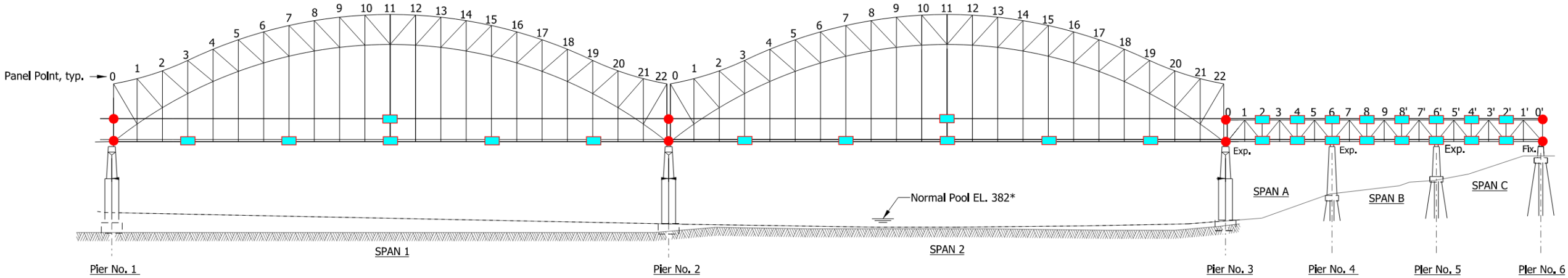
Joint Elimination

Sherman Minton Spans 1, 2, A-C

- All Intermediate Joints (28 in all)
  - Replaced with link slabs
  - DBC required to assess
- Joint Replacement (Ends)



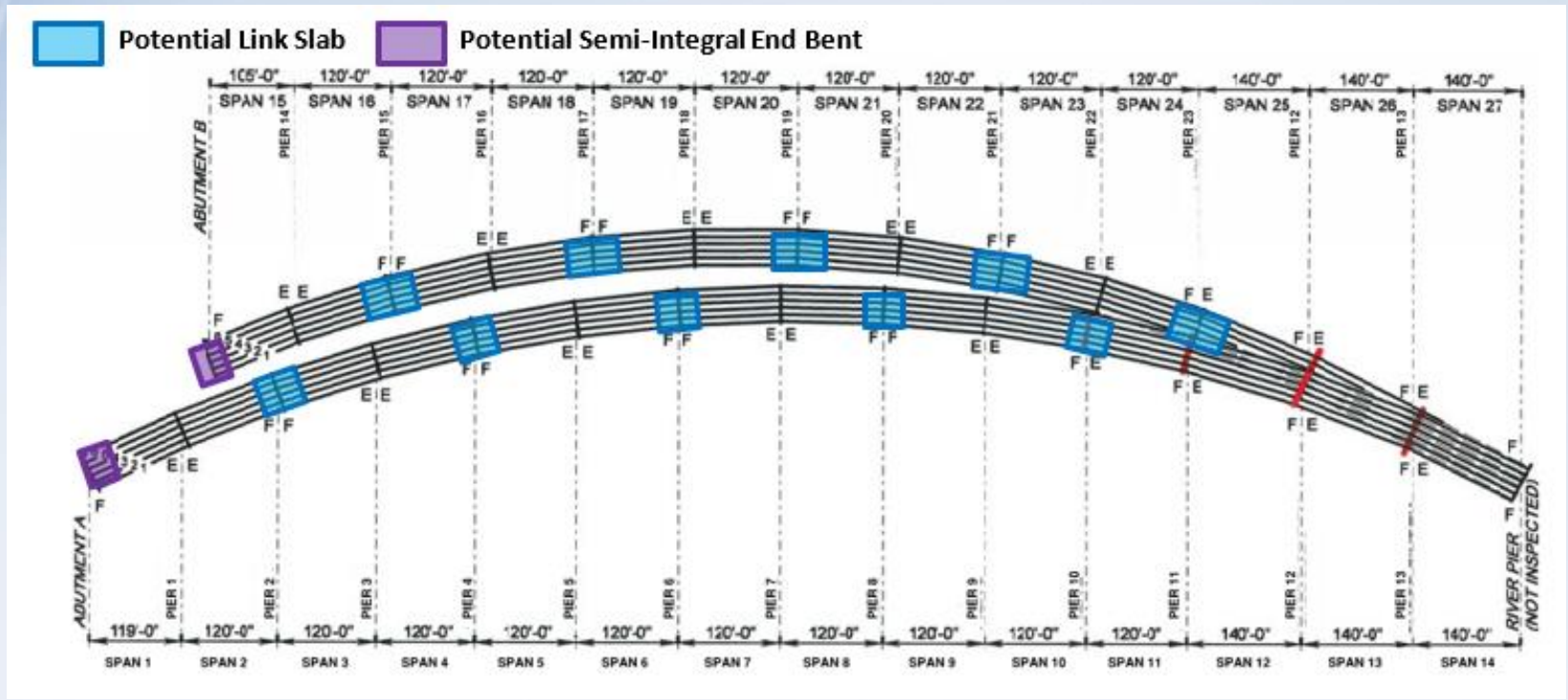
SECTION A-A
Scale: No Scale



Joint Elimination

Kentucky Approach (Spans 1-27)

- Replace total of 10 joints with link slabs
  - Evaluate substructure for D/C
- Semi Integral End Bent Conversion or Encase steel beam ends



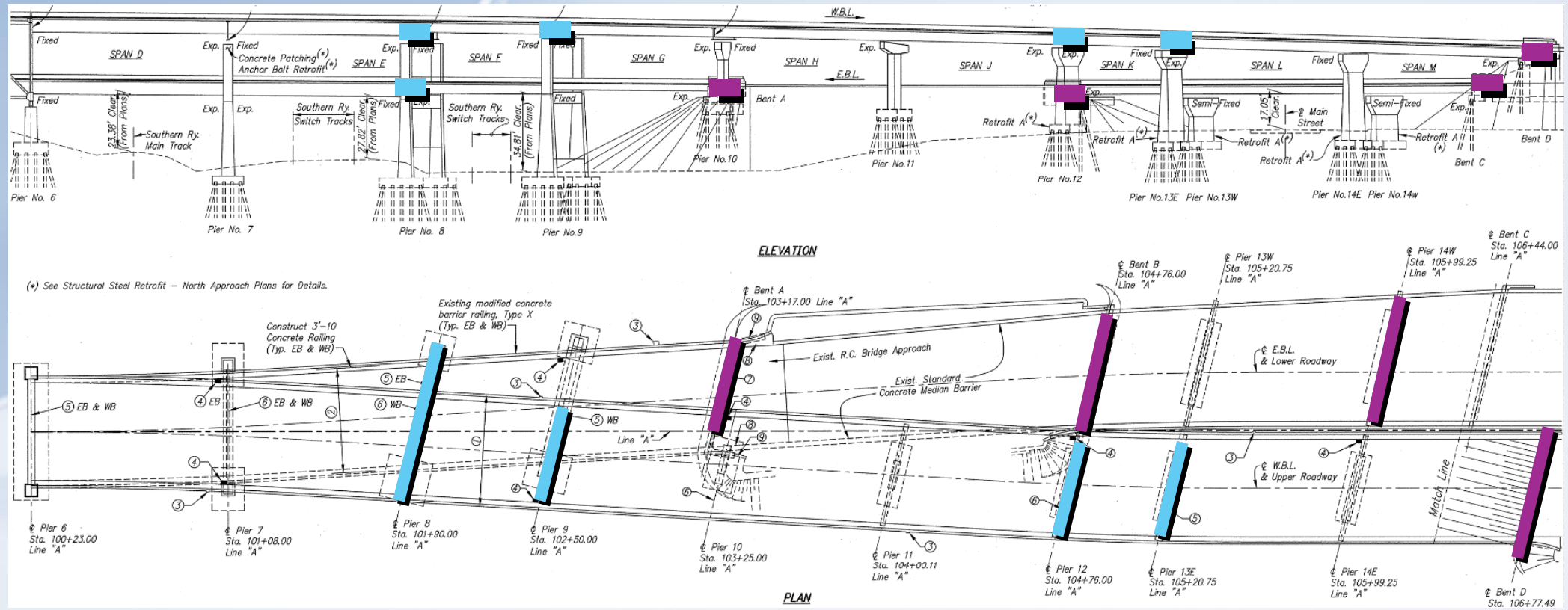
Joint Elimination

Indiana Approach

- Eliminated half of existing joints

Link Slab

Semi Integral End Bent Conversion



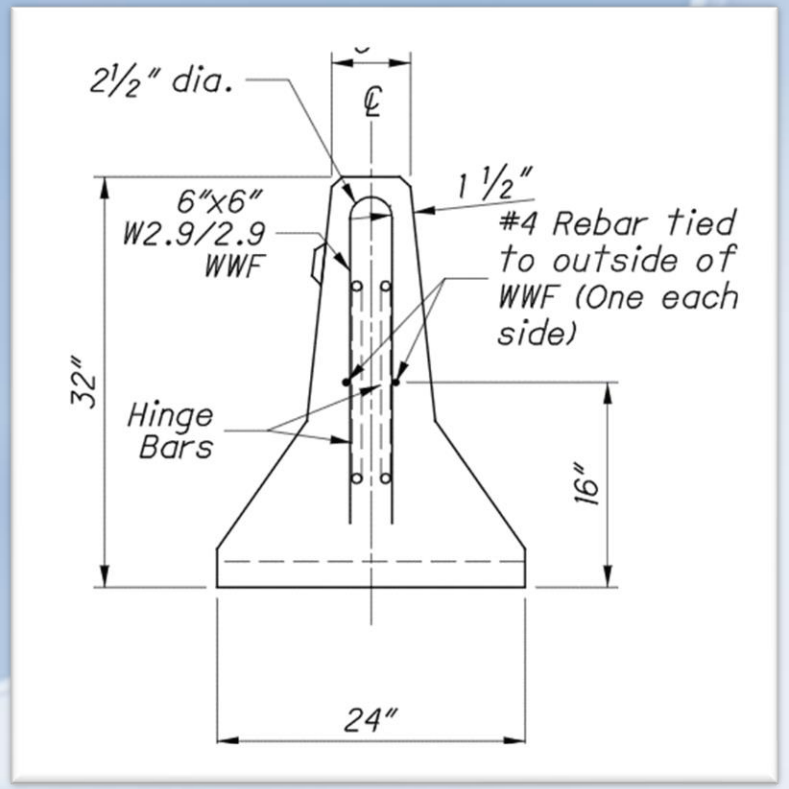
Hydrodemolition

AquaJet Aqua Cutter is a remote controlled and telescoping hydro demolition equipment to be utilized for cover concrete removal

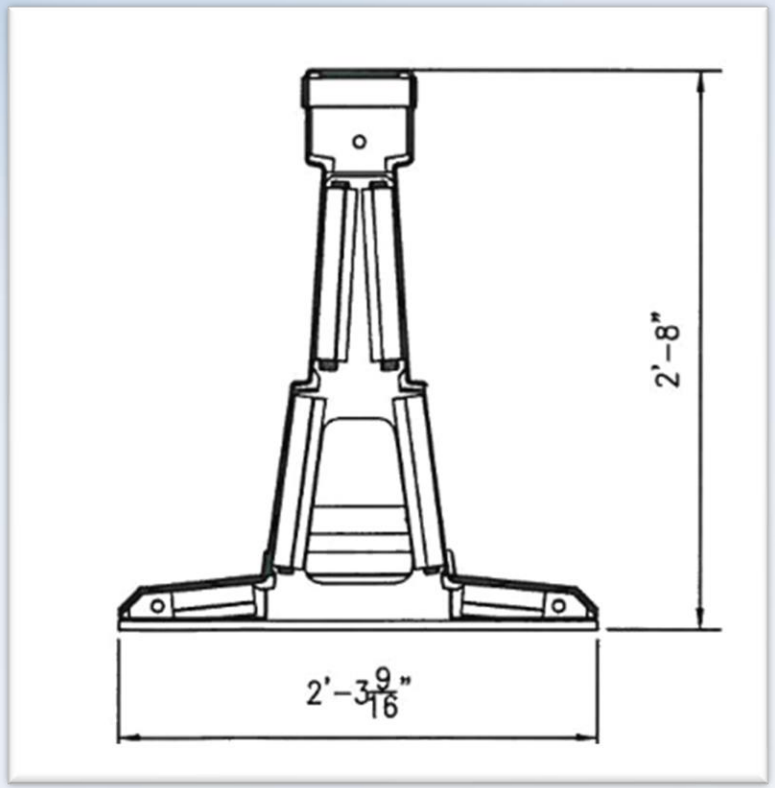
Hydrodemolition

Alternative Technical Concepts & Design Solutions

Temporary Barrier ATC



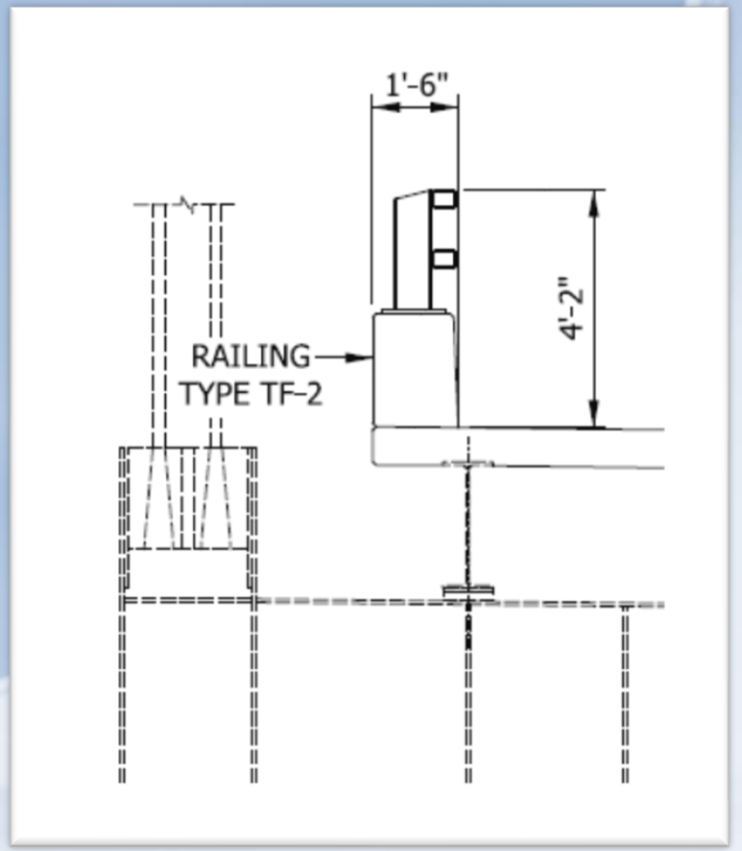
ODOT 32" PCB
Contraflow Condition



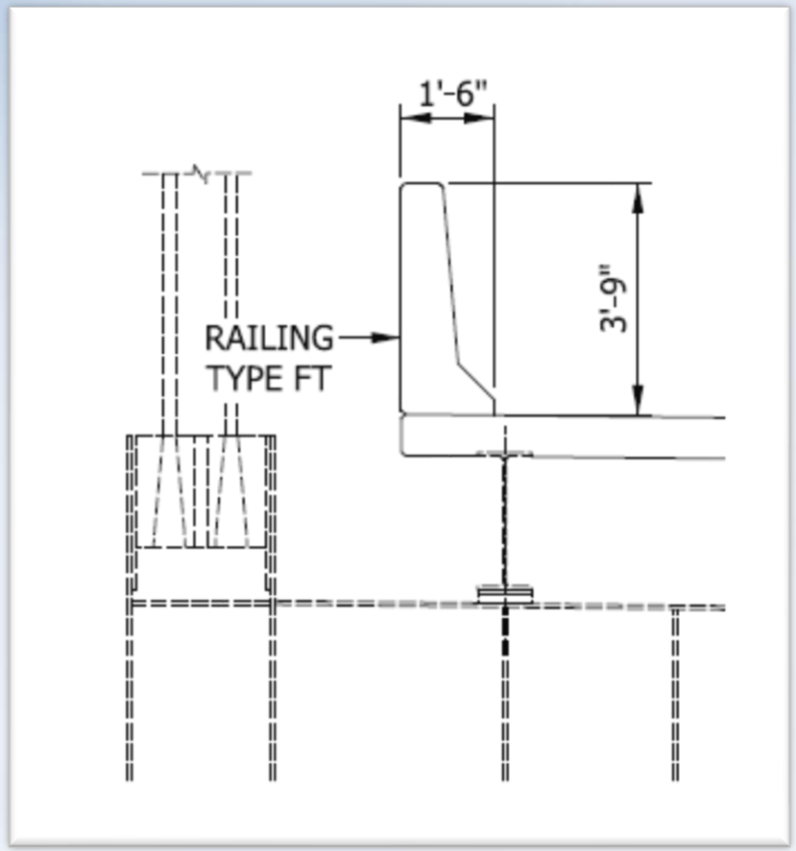
Steel TL-3 Temp Barrier
Adjacent to Work Zone

DBC Proposed
Temporary Barriers

Barrier ATC



Technical Provisions



Alternate Technical Concept

Substitute FT Barrier for TF-2 Barrier

Fascia Stringer Repl.

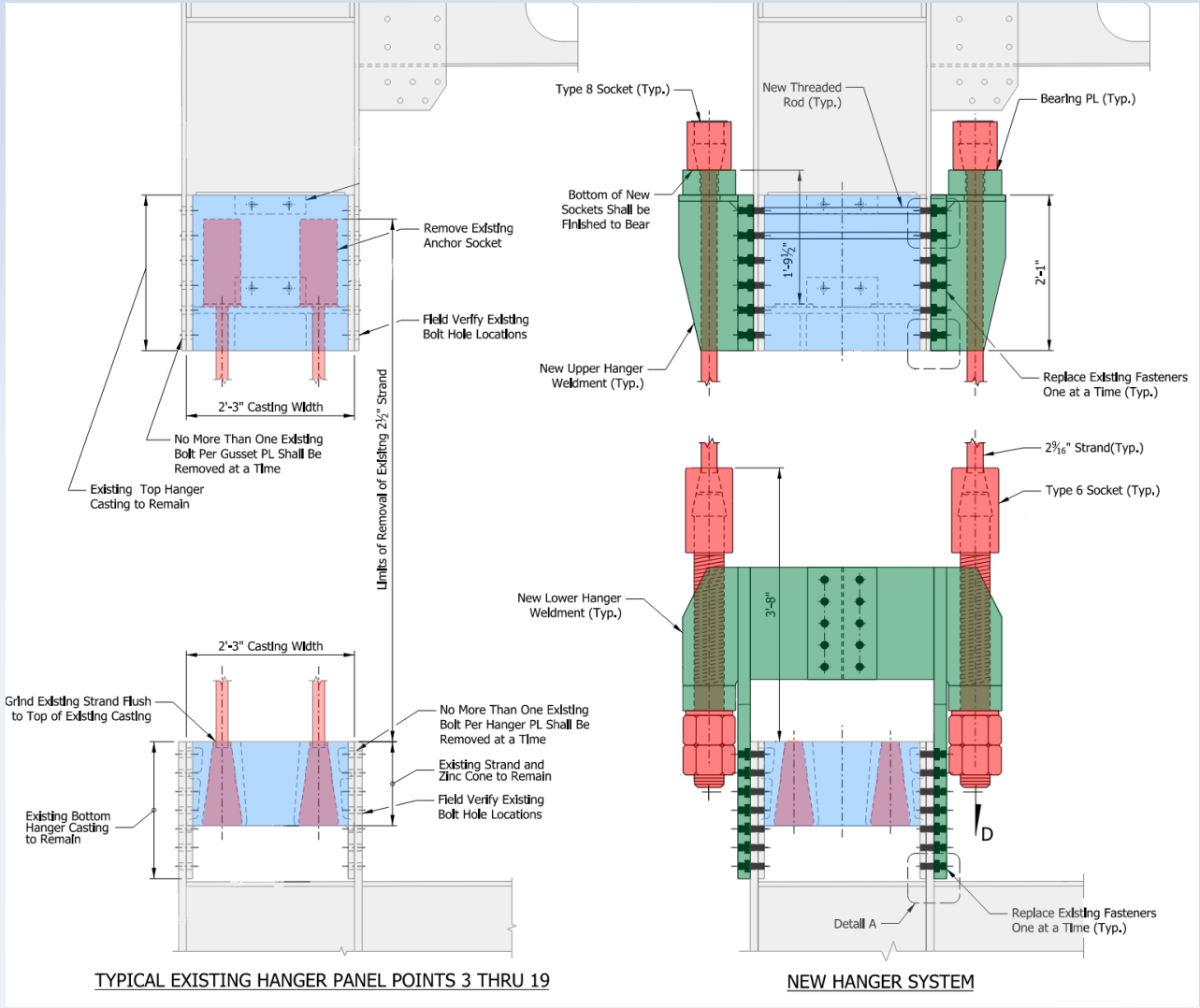
Value Added Proposal

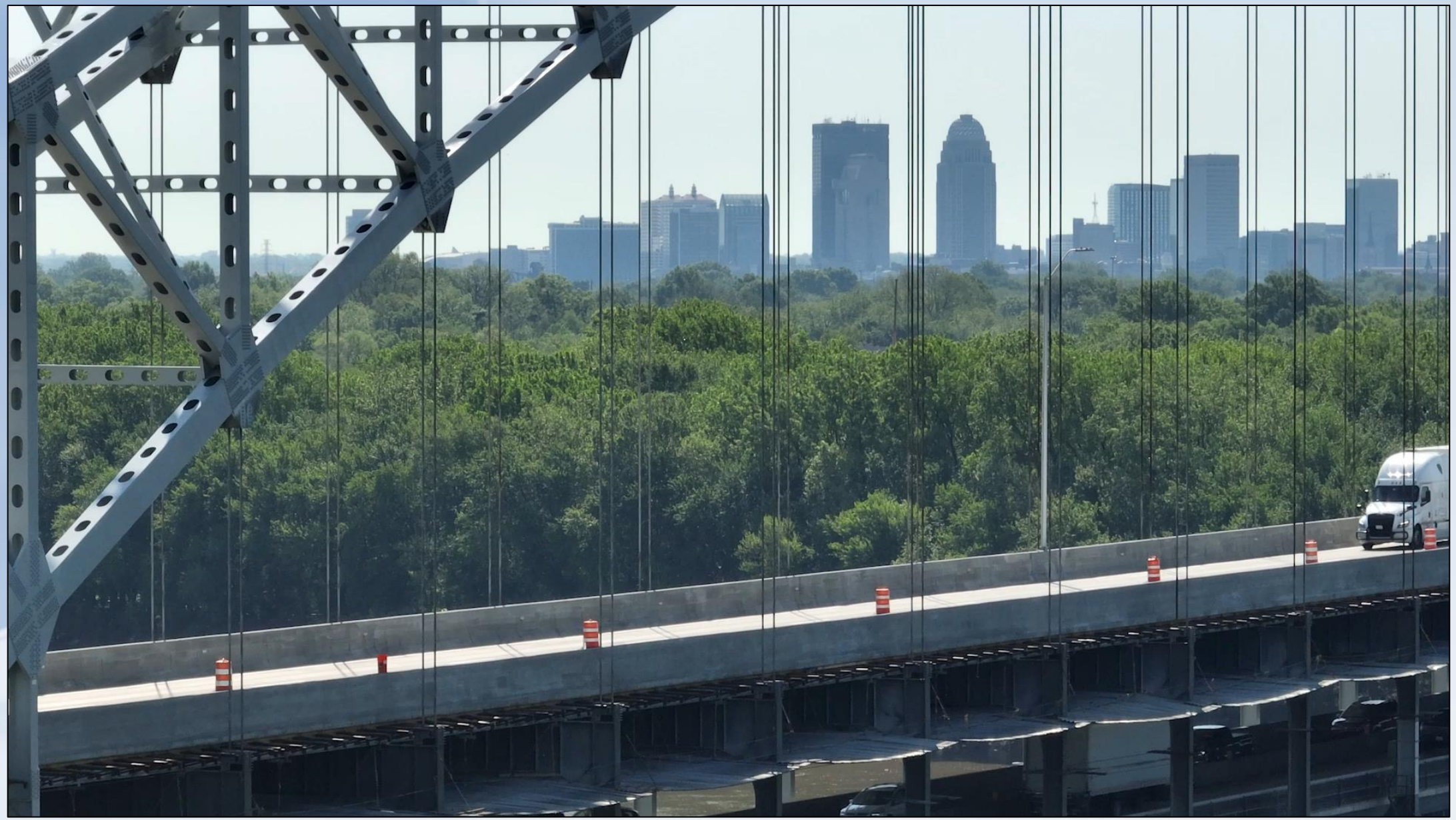
- Replaced Fascia Stringers
- Spans 1-2 (Arch) & A, B, C (Truss)
  - Cracking and Deterioration

Hanger Replacement

Internal Hangers vs External

- Eliminated temporary hanger
- Leave existing weldment in place





Questions?

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