

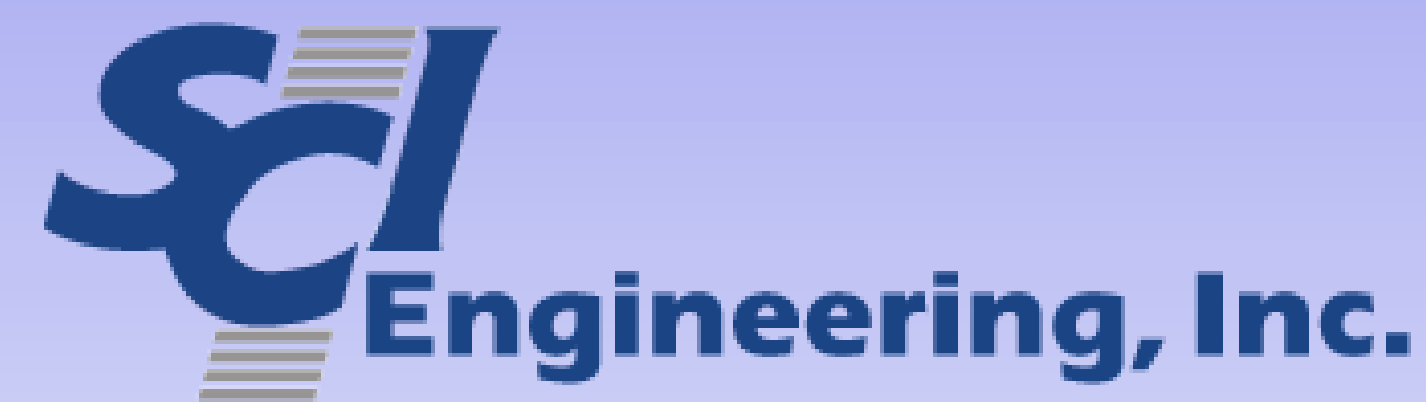
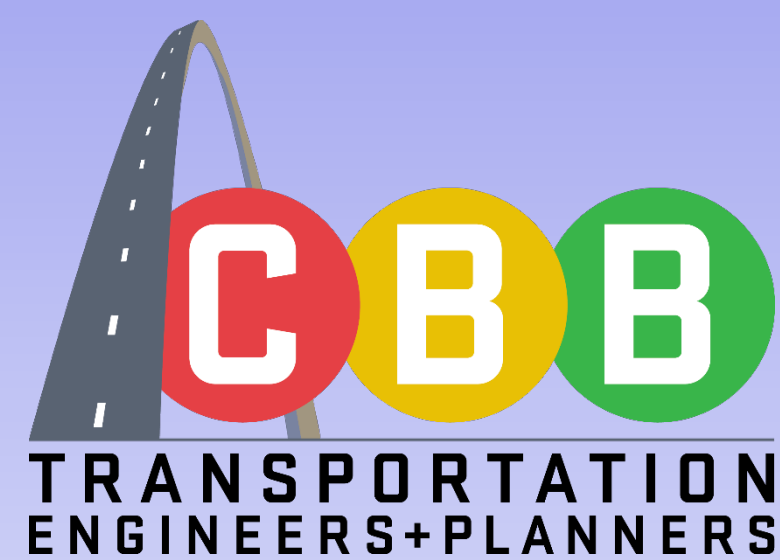


I-270 Mississippi River Bridge and Riverview Drive Interchange:

Two States, Two Projects, One Solution



Team Members





Need For the Project

Replacement for bridge is needed because:

- Age & condition of structure
- Increasing traffic volumes
- Safety issues



St. Louis Regional Freightway 2022 Priority Projects List

Project titles in bold indicate the St. Louis Regional Freightway's highest priority projects

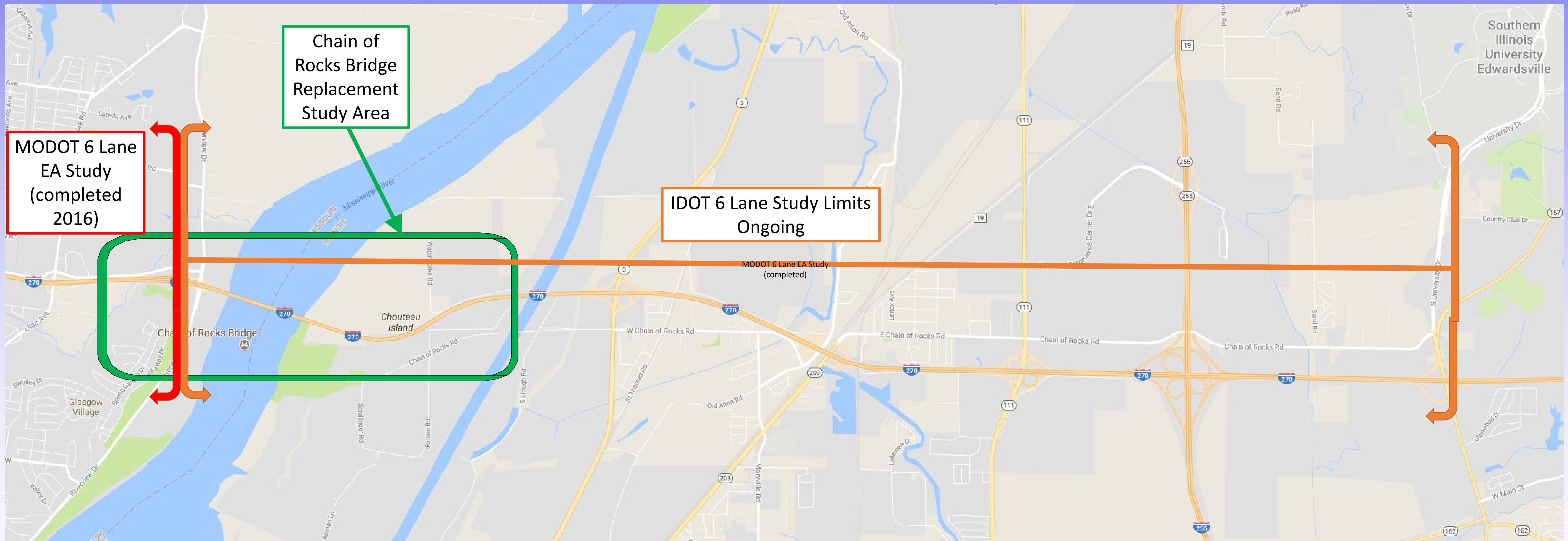
I-270 Improvements from I-70 (MO) to Illinois Route 157 (MO-IL) \$1.2B

- I-270 from I-70 on the west to east of Bellefontaine Road (MO) \$278M Funded
- **I-270 Mississippi River Chain of Rocks Bridge Replacement (MO/IL) \$223M Funded**
- I-270 Interchange reconstruction at Illinois 111 (IL) \$19M Funded
- I-270 from Mississippi River to west of Illinois 203, including Illinois 3 interchange (IL) \$84.5M Funded
- I-270 from west of Illinois Route 203 to east of Illinois Route 111 (IL) Not Funded
- I-270 from east of Bellefontaine Road to east of Riverview Drive (MO) Not Funded



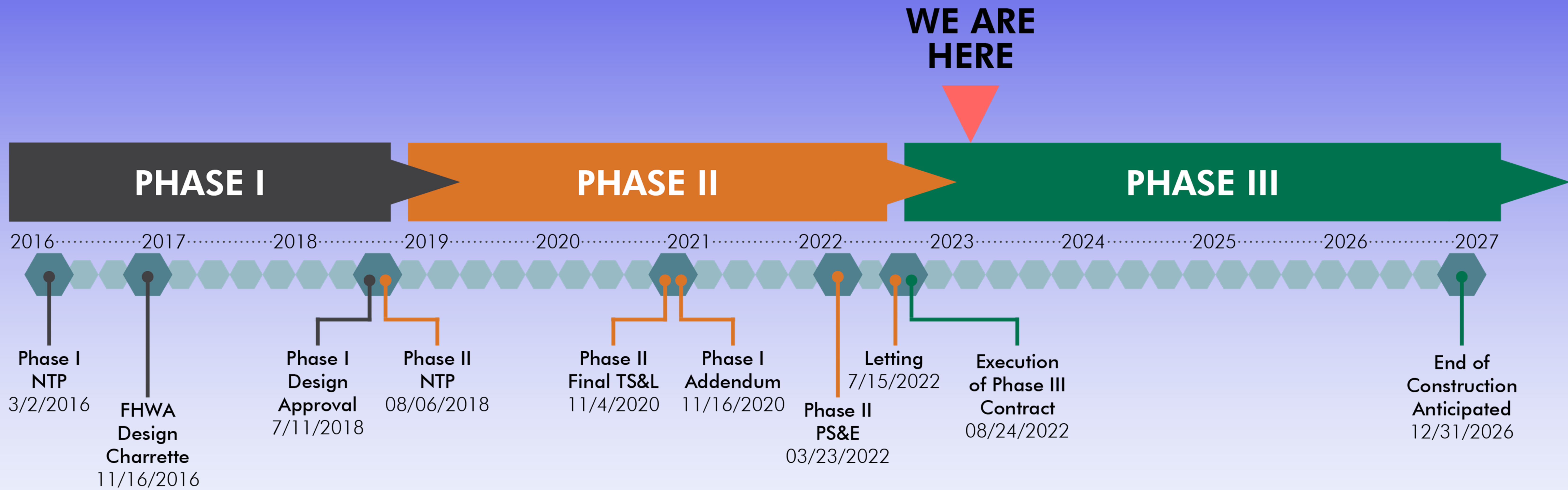
Study Overview

Other Studies within the area



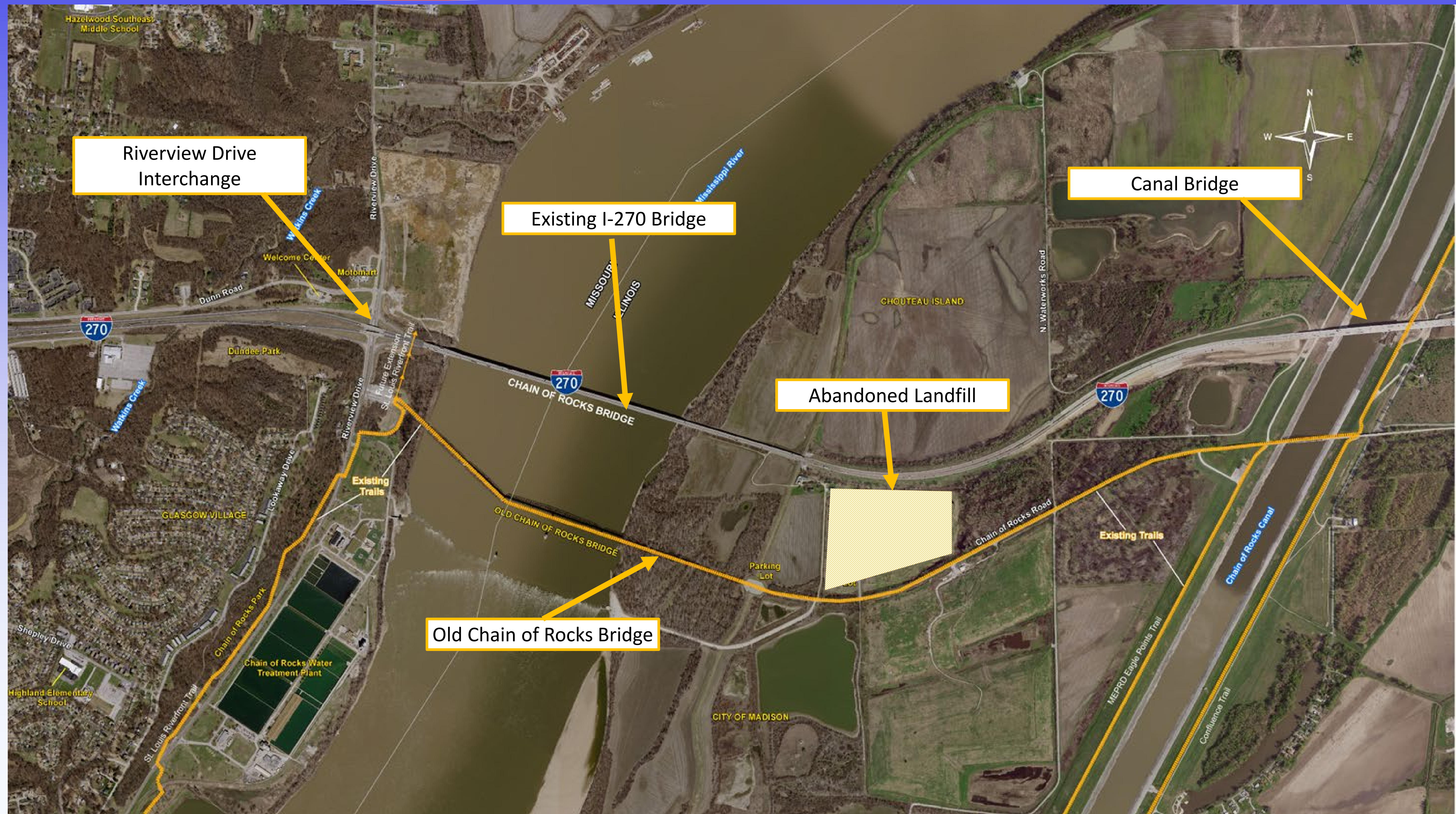


Project Timeline





Existing Conditions





NEPA Environmental Processing

Federally Approved Categorical Exclusion

- Minimal new right-of-way and/or easements.
- Although the bridge crosses the expansive Mississippi River, there were minimal environmental resources within the project area.
- The environmental resources that were present, were not considered “significant,” thus, not triggering in-depth permitting requirements.
- No expected public opposition.



Bridge – Phase I Goals

- Ease of inspectability and maintenance
- Maintain I-270 2-Lanes of Traffic during construction
- Avoid raising Water Surface Elevation for proposed solution
- USCG Recommended Horizontal and Vertical Clearances under new structure
- Avoid impacts to Private Levee

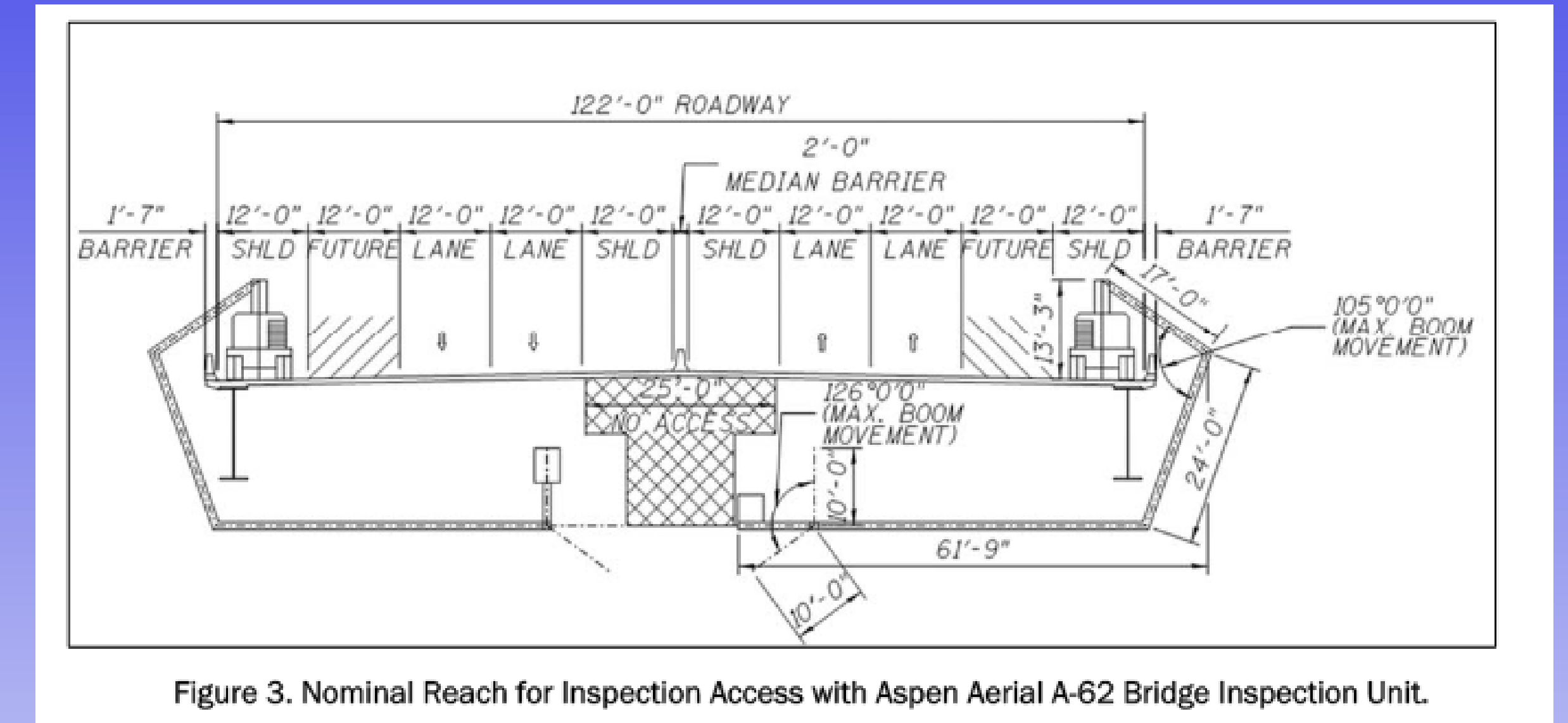
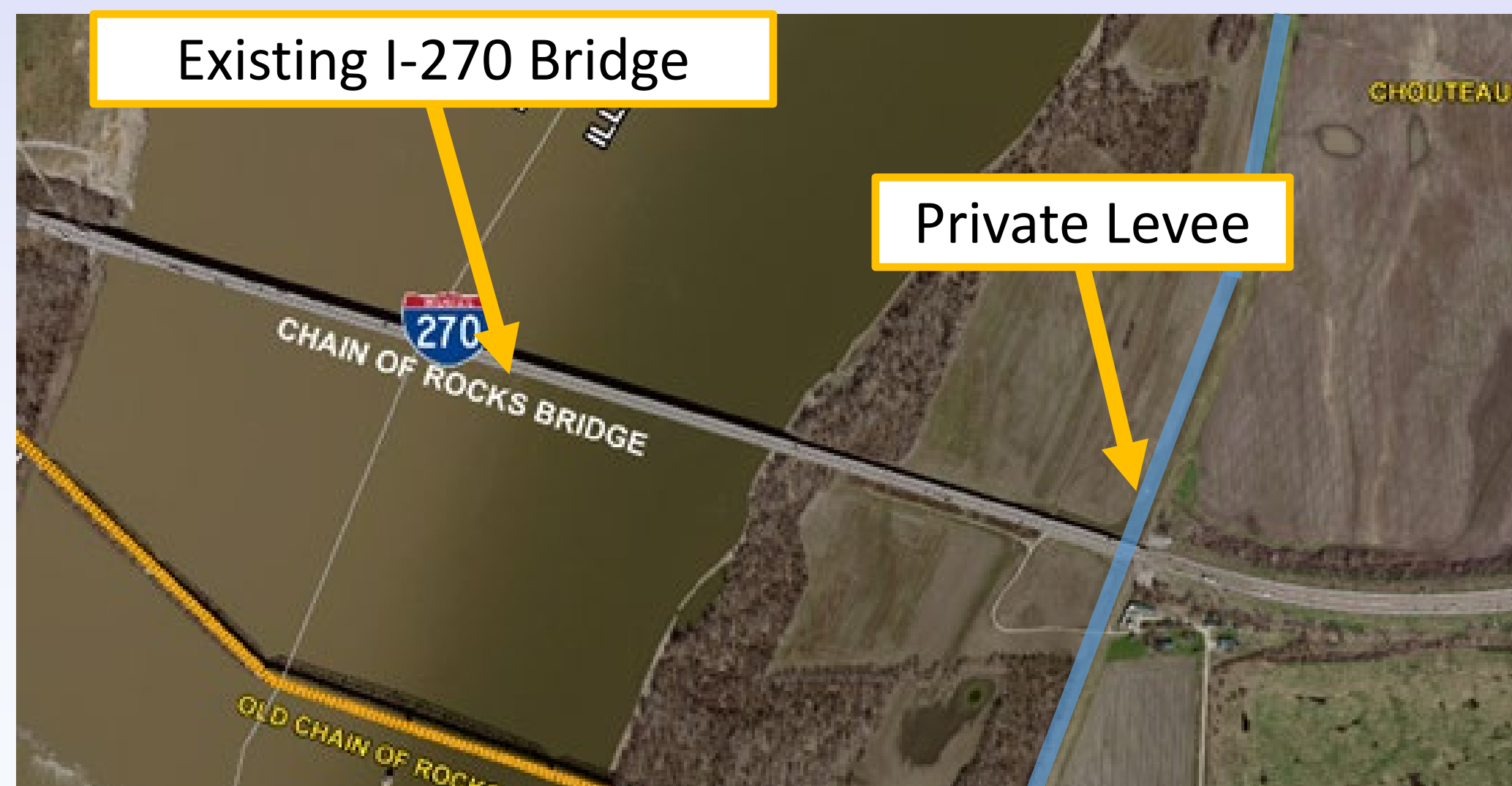
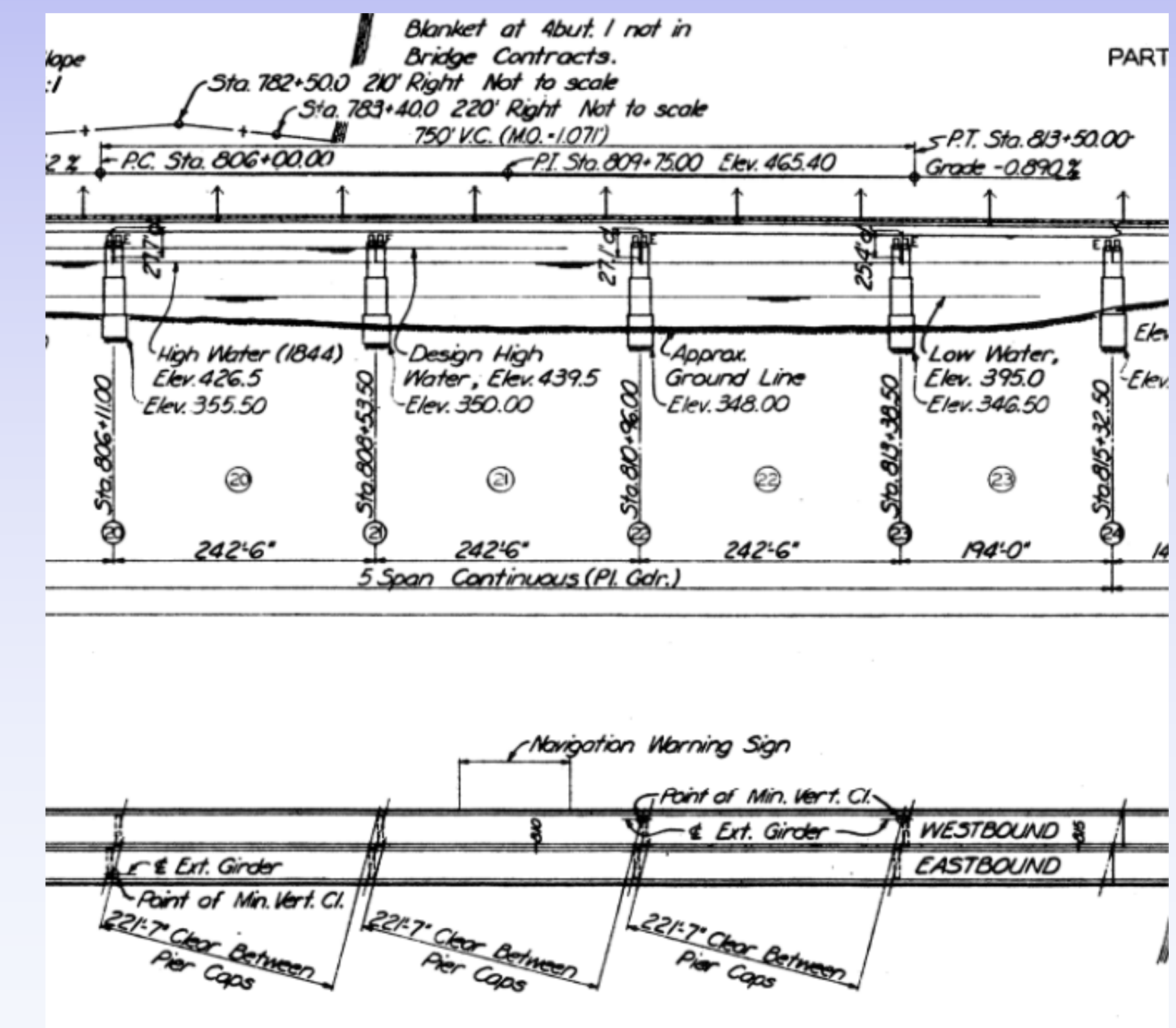


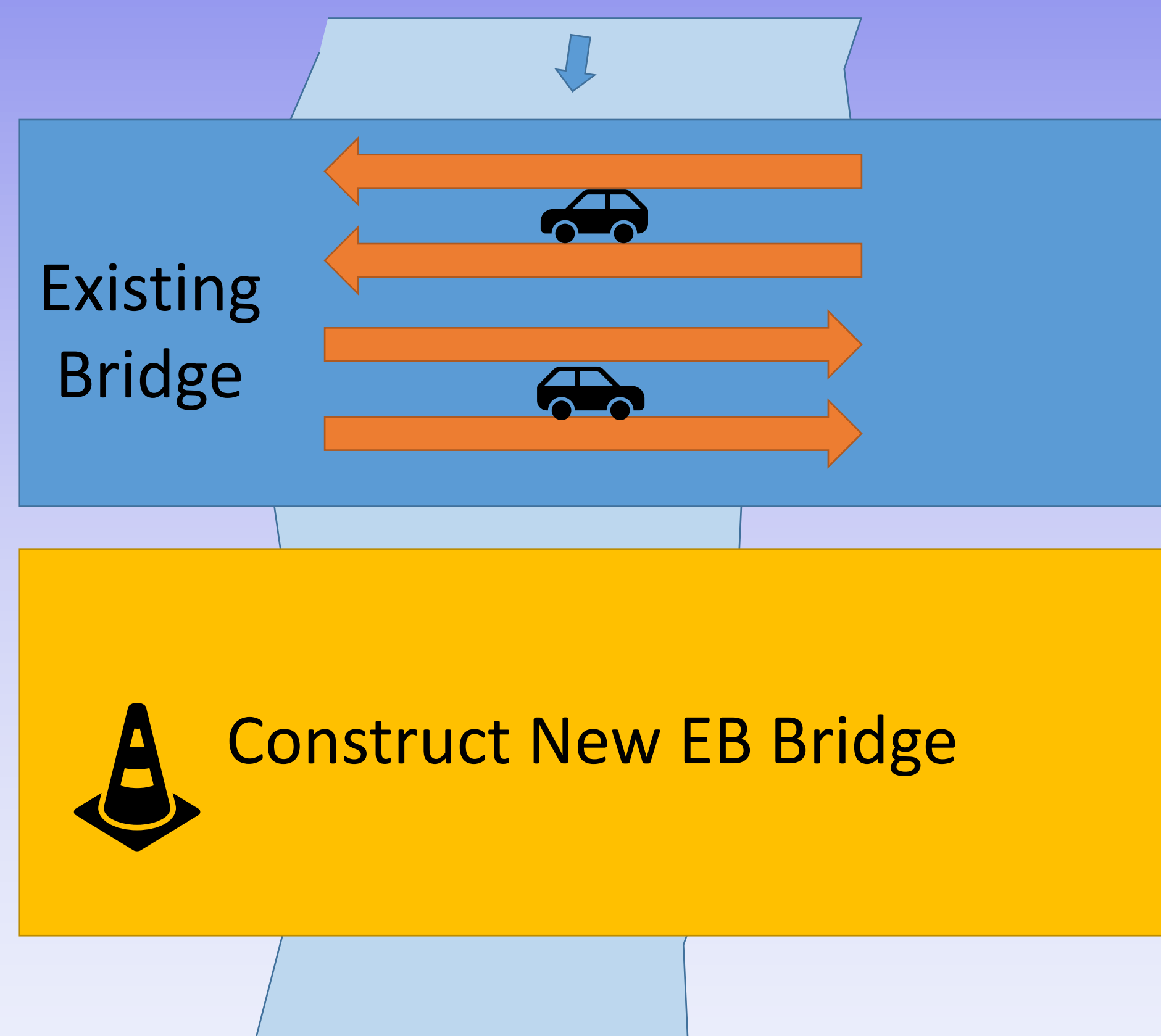
Figure 3. Nominal Reach for Inspection Access with Aspen Aerial A-62 Bridge Inspection Unit.



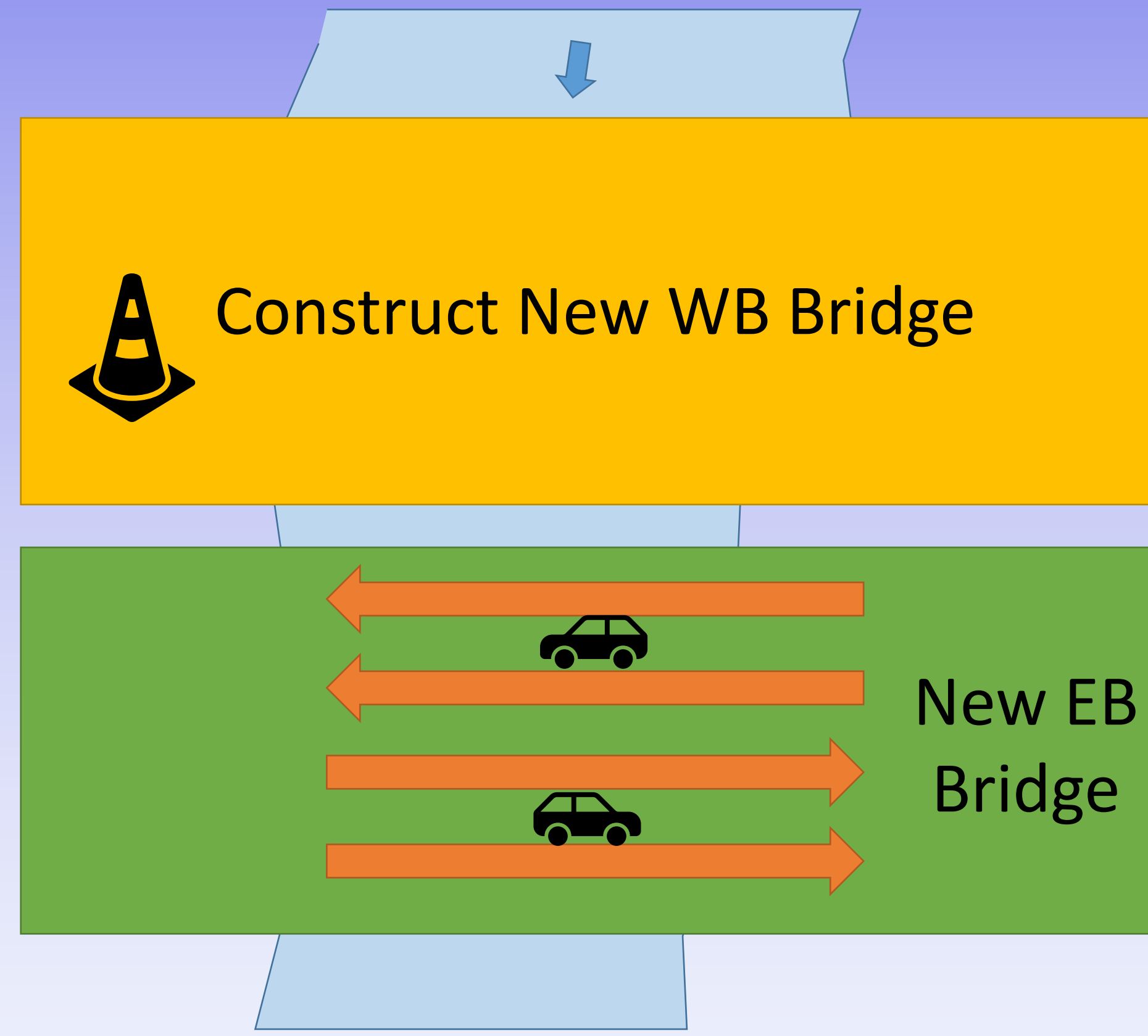


MOT Requirement

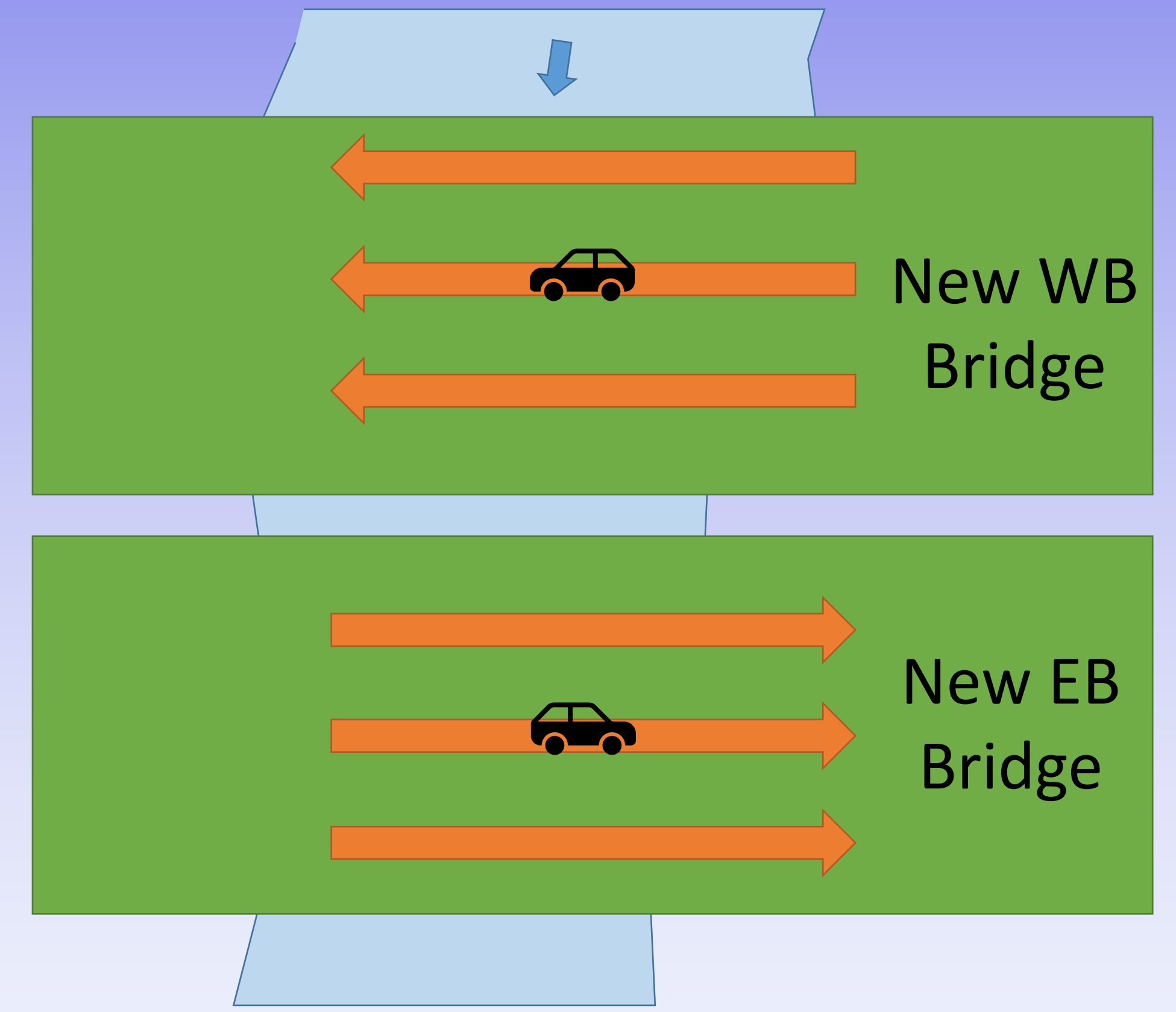
- 2-lanes of traffic each direction open throughout construction



Phase 1



Phase 2

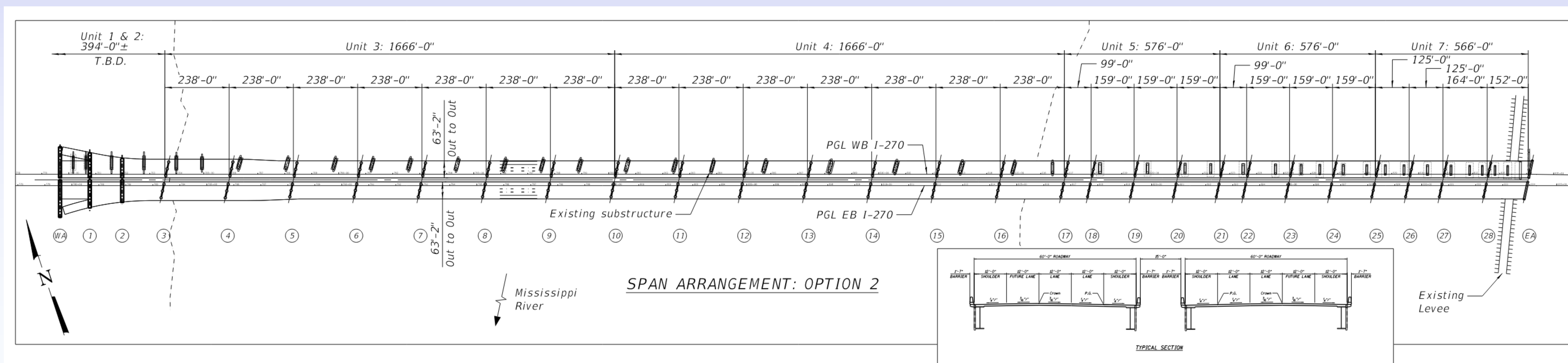
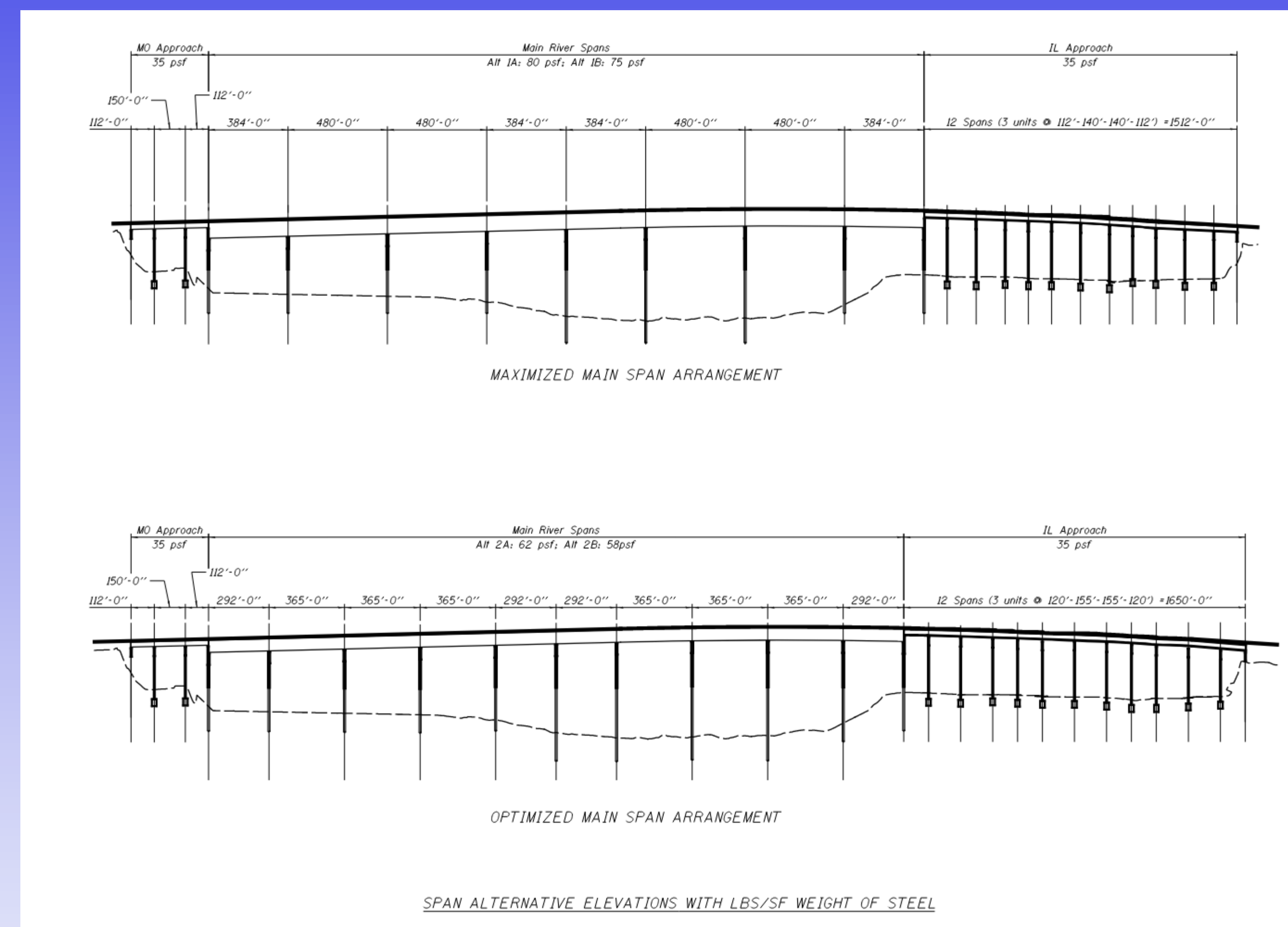


Final



Bridge – Phase I

- Existing Pier Re-use Evaluation
 - Re-Use **New Construction** ✓
- Superstructure type
 - **Steel Plate Girder** ✓
 - Identified during scoping
- Span Arrangement Evaluation
 - Maximized **Optimized** ✓



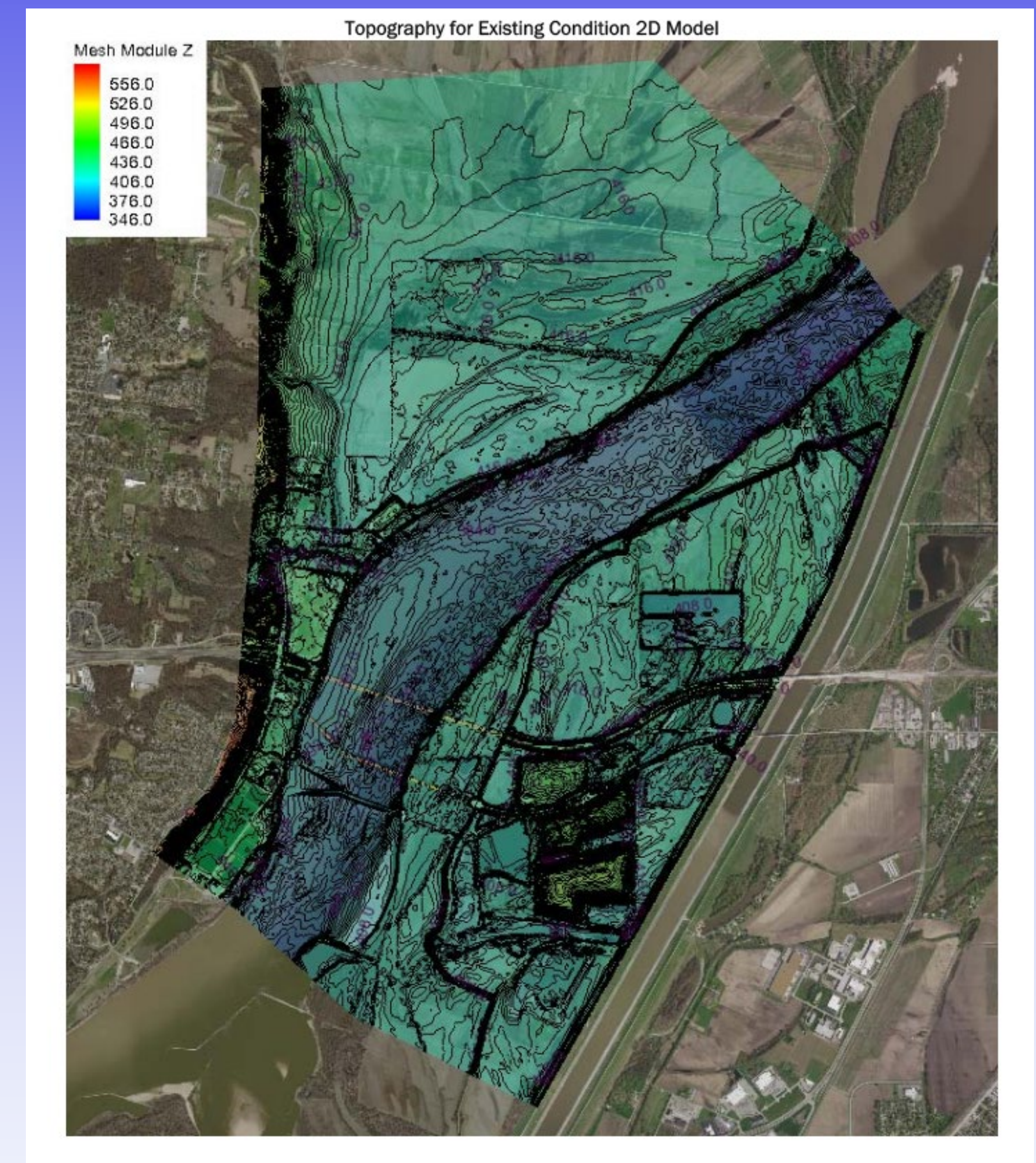


Bridge Hydraulics - Challenges

- IDNR-OWR – Construction NO RISE
- 2D modeling – Surface-water Modeling System (SMS)
- 1D Modeling – USACE HEC-RAS
- Permitting required 1D modeling results

Table 6. 1D and 2D Water Surface Elevation Comparison

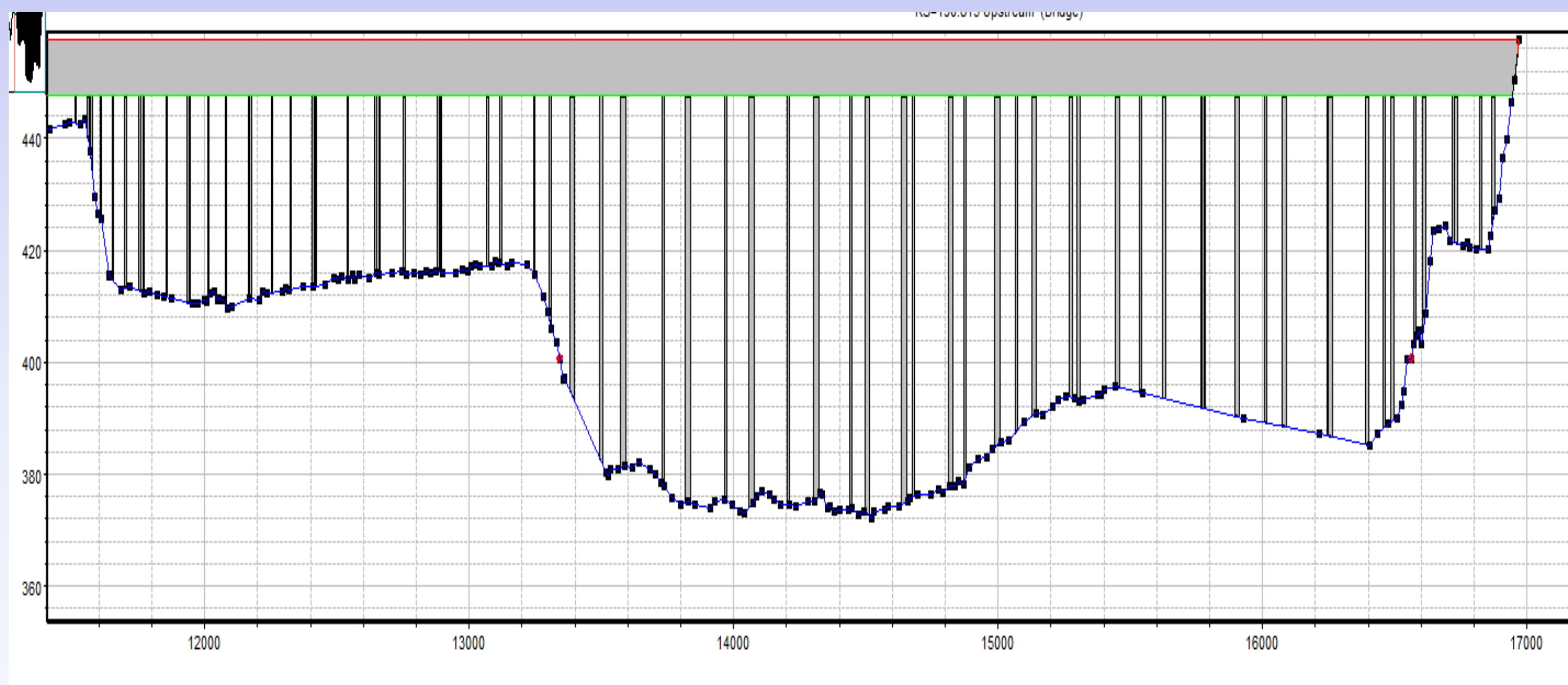
Condition	1D WSE (feet)					2D WSE (feet)				
	10-yr	50-yr	100-yr	200-yr	500-yr	10-yr	50-yr	100-yr	200-yr	500-yr
Existing	426.4	433.5	435.5	438.0	440.1	426.5	433.5	435.6	438.0	440.5
Natural	426.3	433.3	435.4	437.8	439.9	426.4	433.3	435.4	437.8	440.1
Proposed	426.3	433.4	435.5	438.0	440.1	426.5	433.5	435.5	438.0	440.4
Proposed w/ Existing	426.5	433.5	435.6	438.1	440.2	426.7	433.7	435.7	438.2	440.6



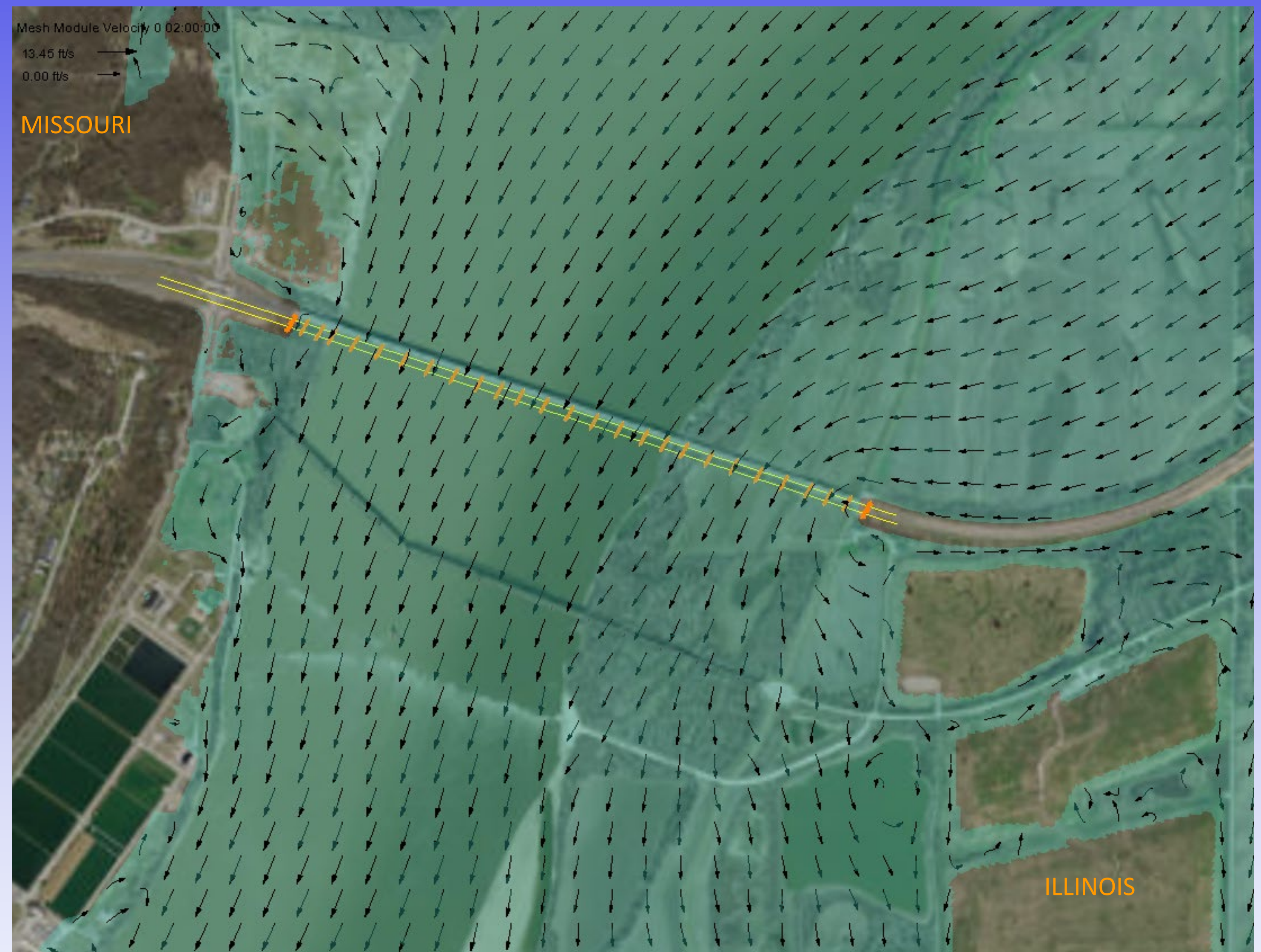


Bridge Hydraulics - Solutions

- Pier Arrangement
- Pier Size/Rotation – Inline
- Protection against Armor Swirl - Riprap



Proposed and Existing Pier Locations
1D RAS Model

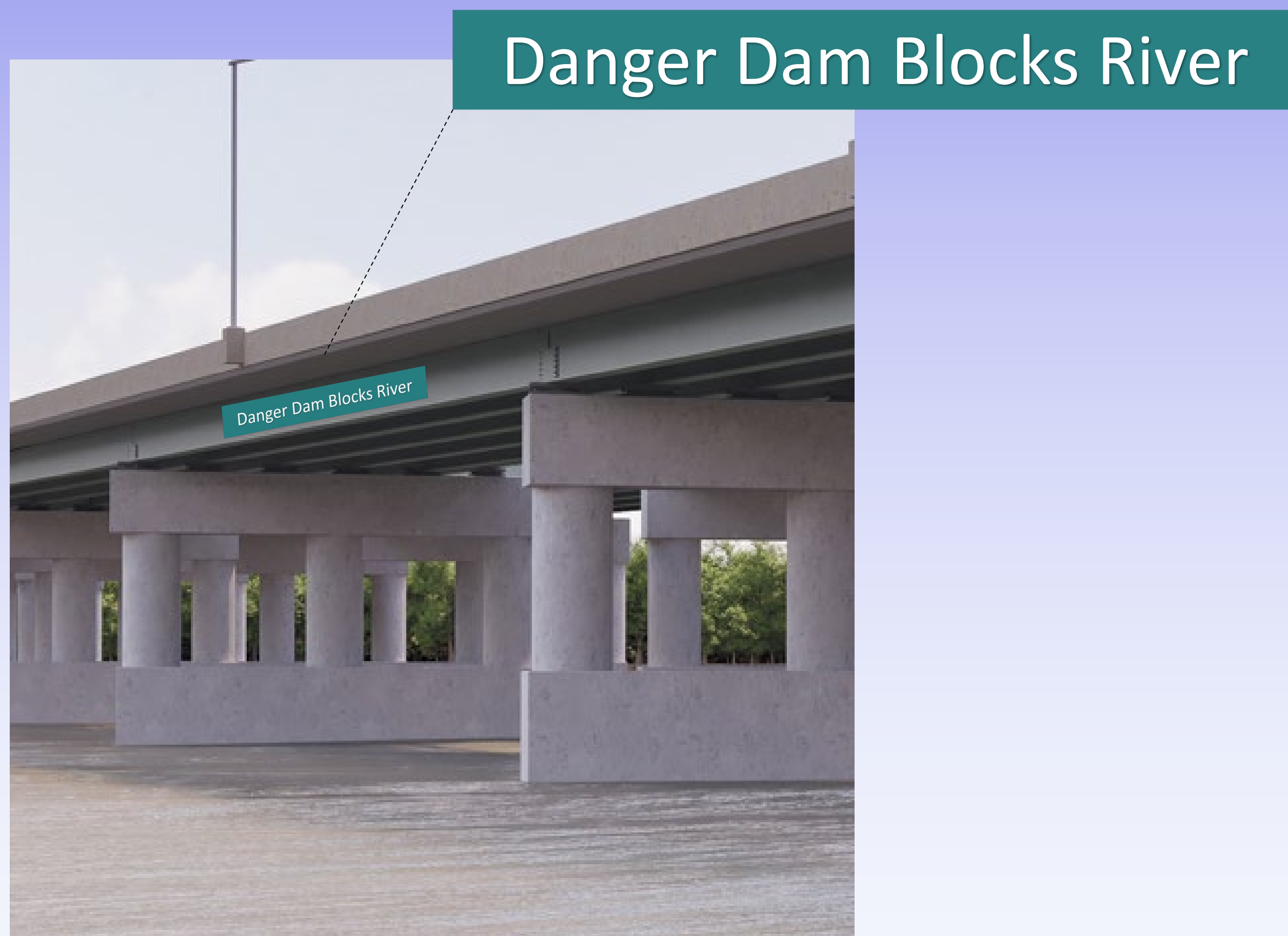


Velocity Vectors from 2D Hydraulic Model

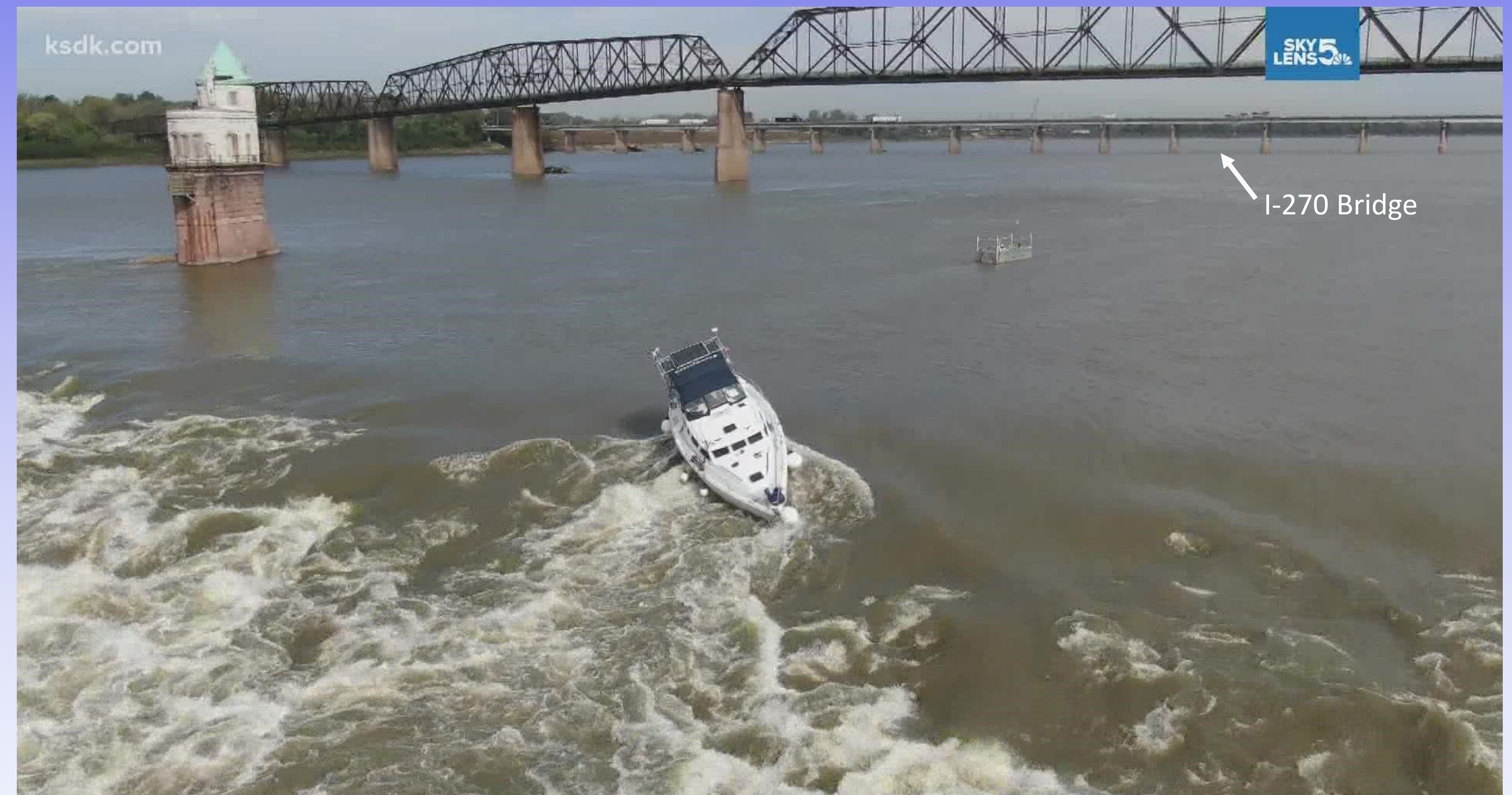


Navigable or Not?

- Not Commercially Navigable (Normal Pool)
- Break away Barge Design
- Signage



Proposed Signage – Span 15



Boat stuck on Chain of Rocks due to missed turn



Design Charrette

November 2016

- National FHWA Lead
- 3 – Days
- Out of State Contractors & Designers
- MoDOT and IDOT representatives
- IDOT Bridge Office
- MoDOT Bridge Office
- National, Illinois and Missouri FHWA





Alternative Selected

Adjacent South Alternative with Tight Diamond Interchange

- Maximized utilization of existing infrastructure
- Eliminated Impacts to Existing Landfill
- Minimized Impacts to Farmland (Heritage/Legacy)
- Minimized Impacts to GRG Property
- Avoided the Missouri Welcome Center (Since removed)
- Consistent with MoDOT EA findings



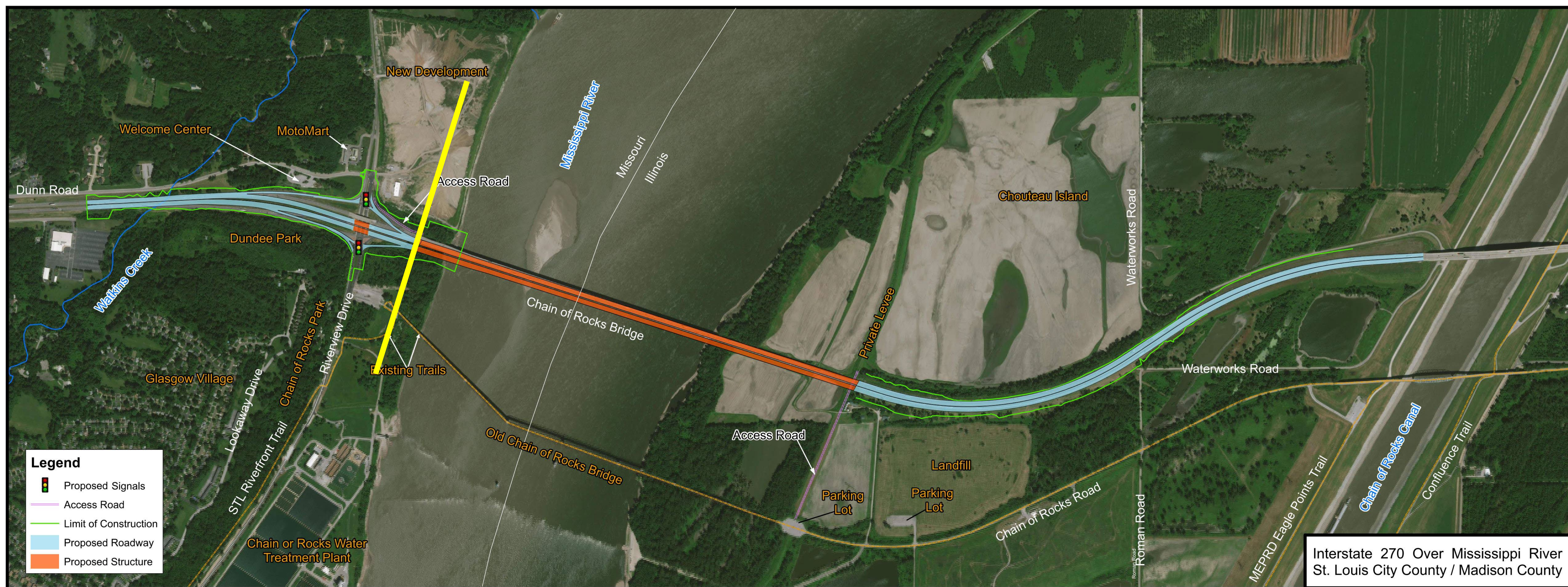
Transition to Phase II

- Phase II contracts split
- Agreed to 10' Shoulder inside and out on Bridges
 - IDOT Led River Bridge and Illinois Approach (Contract 76J90)
 - IDOT standards and specs
 - MoDOT Led Riverview Drive Interchange (Contract J6I3020C)
 - MoDOT standards and specs
- Coordinated MOT between contracts
- Goal is to award to one Contractor

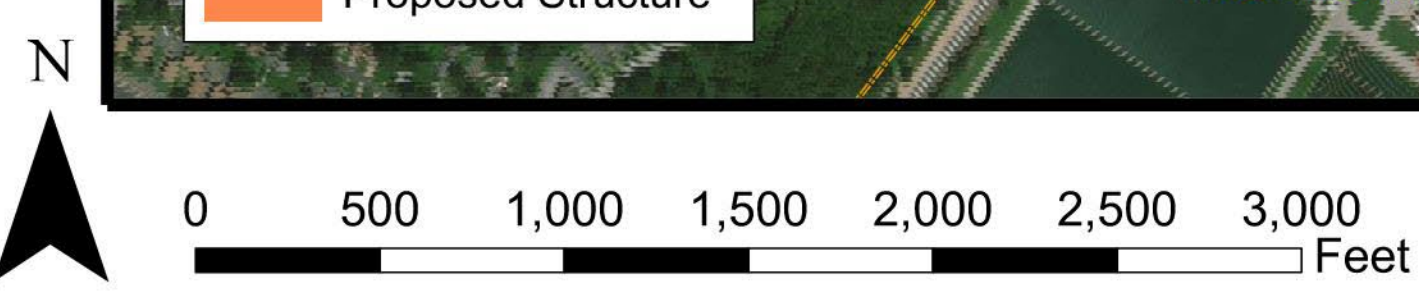




Overview of the Projects



Interstate 270 Over Mississippi River
St. Louis City County / Madison County





Phase II IDOT Roadway Design Challenges

- Re-use of as much of the CRCP Pavement from the recent Canal Bridge replacement.
- IDOT compensatory storage requirement in the American Bottoms.





Phase II IDOT Bridge Plan Development

Span
Configuration
Study
Fall 2018

Initial Borings
Jan 2020

Draft TS&L and
Supplemental
Span
Configuration
Study
May 2020

Signed TS&L
Oct 2020

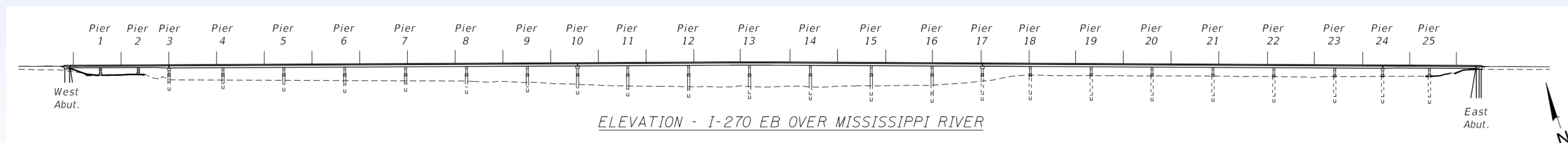
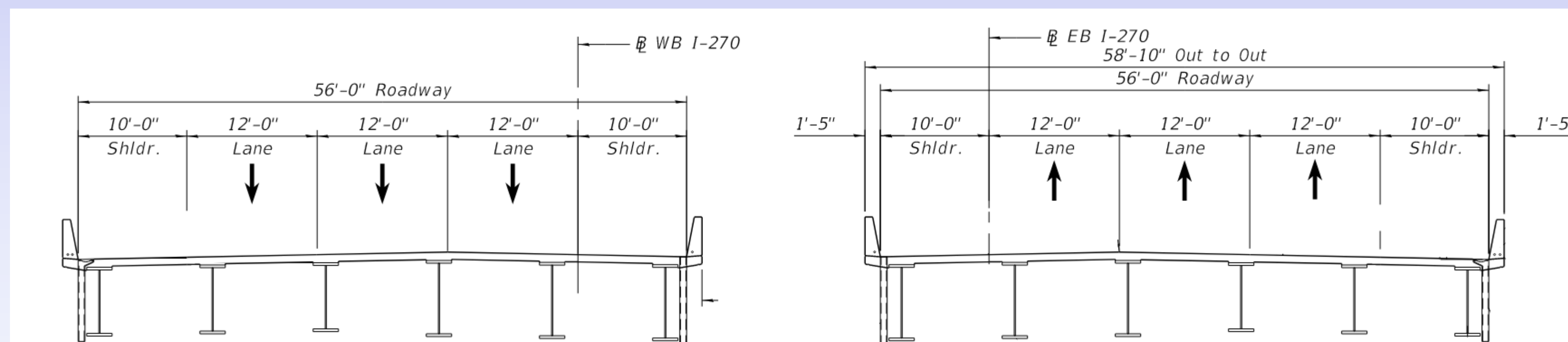
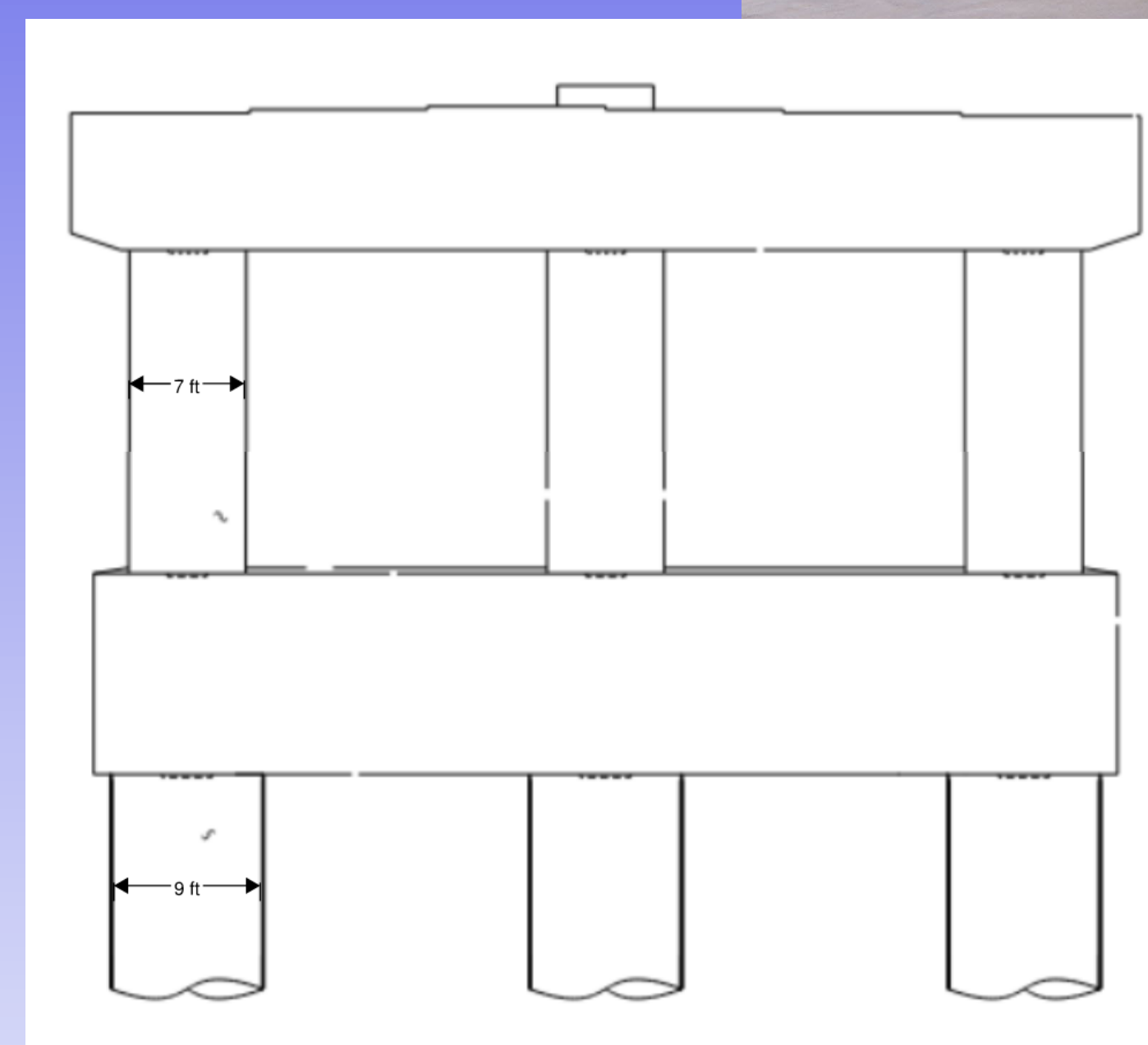
Final
Geotechnical
Report
Oct 2021

Final Plans
Mar 2022



IDOT – Mississippi River Bridge Solution

- Twin 5456ft structures
- 5 Units (3 – 7 – 7 – 7 – 2)
- Max Span Length = 236ft
- 80” Web Plate Girders
- 3- Column/Drilled Shaft Substructures

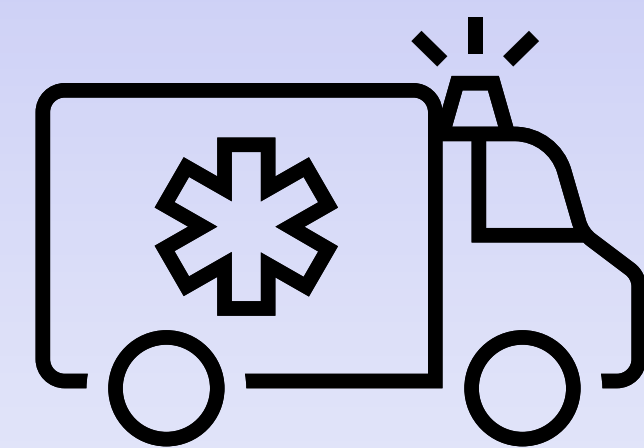




IDOT Seismic Design

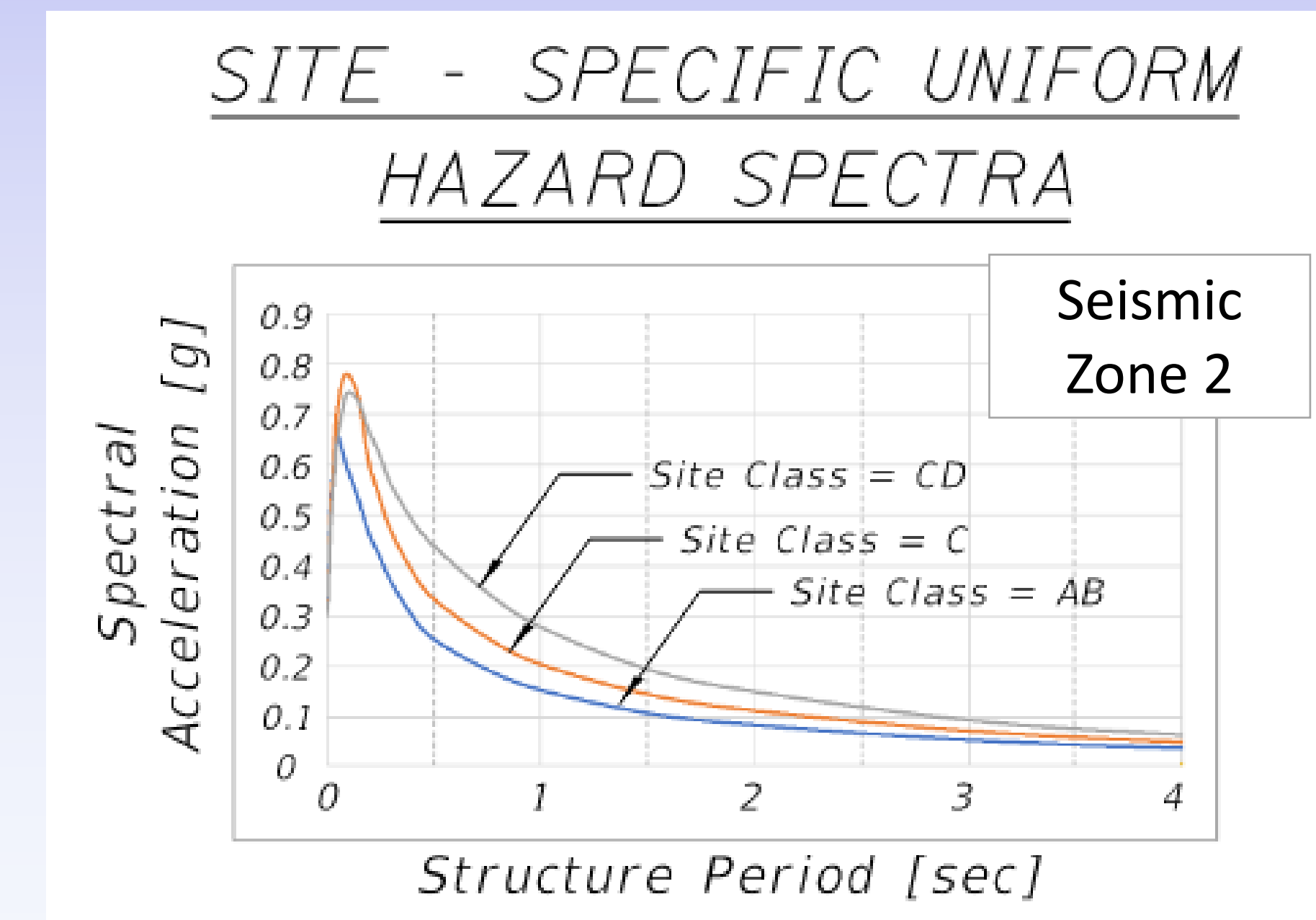
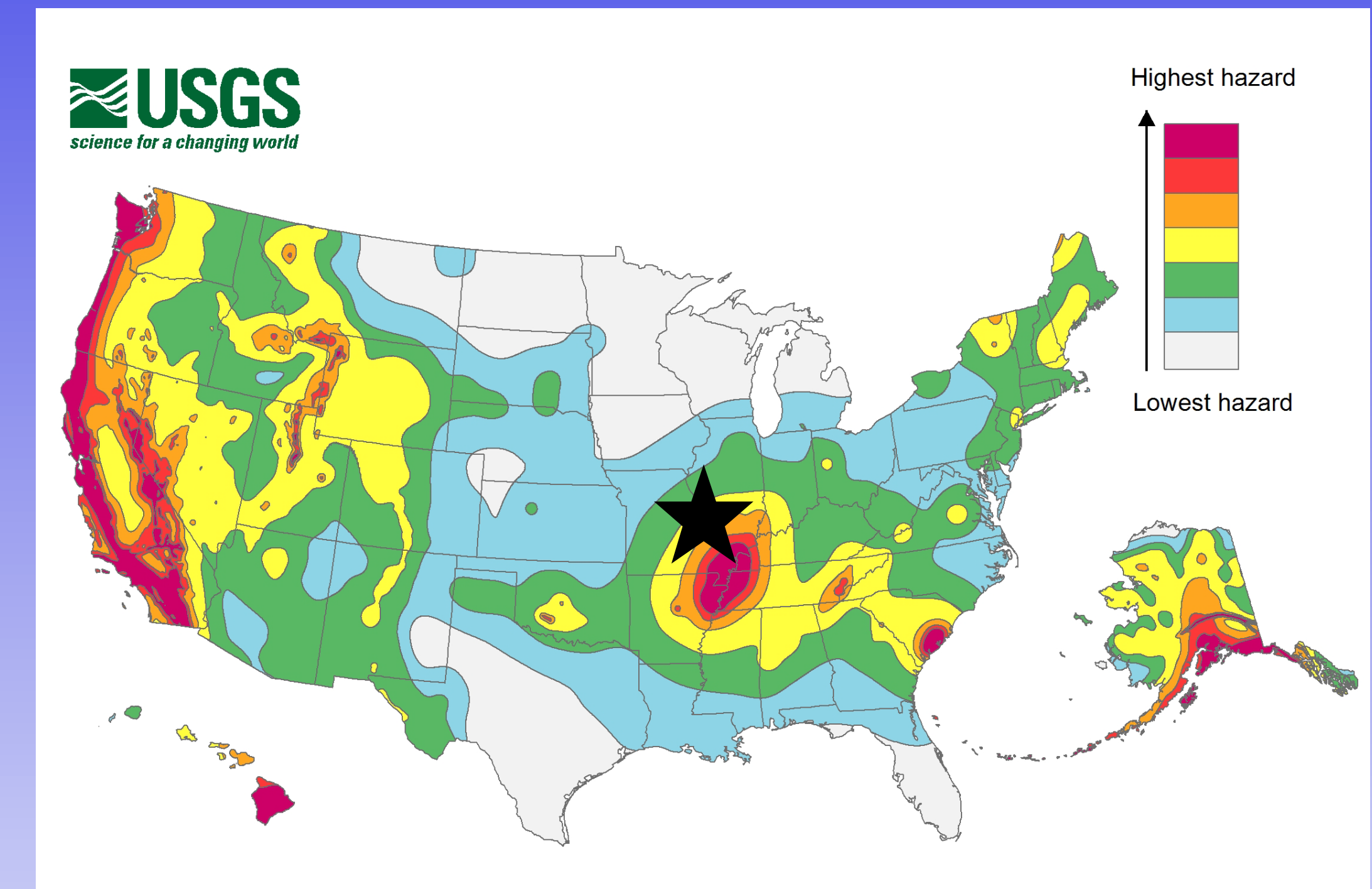
Criteria

- Critical Bridge
- 2018 USGS 2,500 YR earthquake maps
- Primary Earthquake Route
 - Usable by emergency vehicles and security/defense immediately after earthquake event



Design

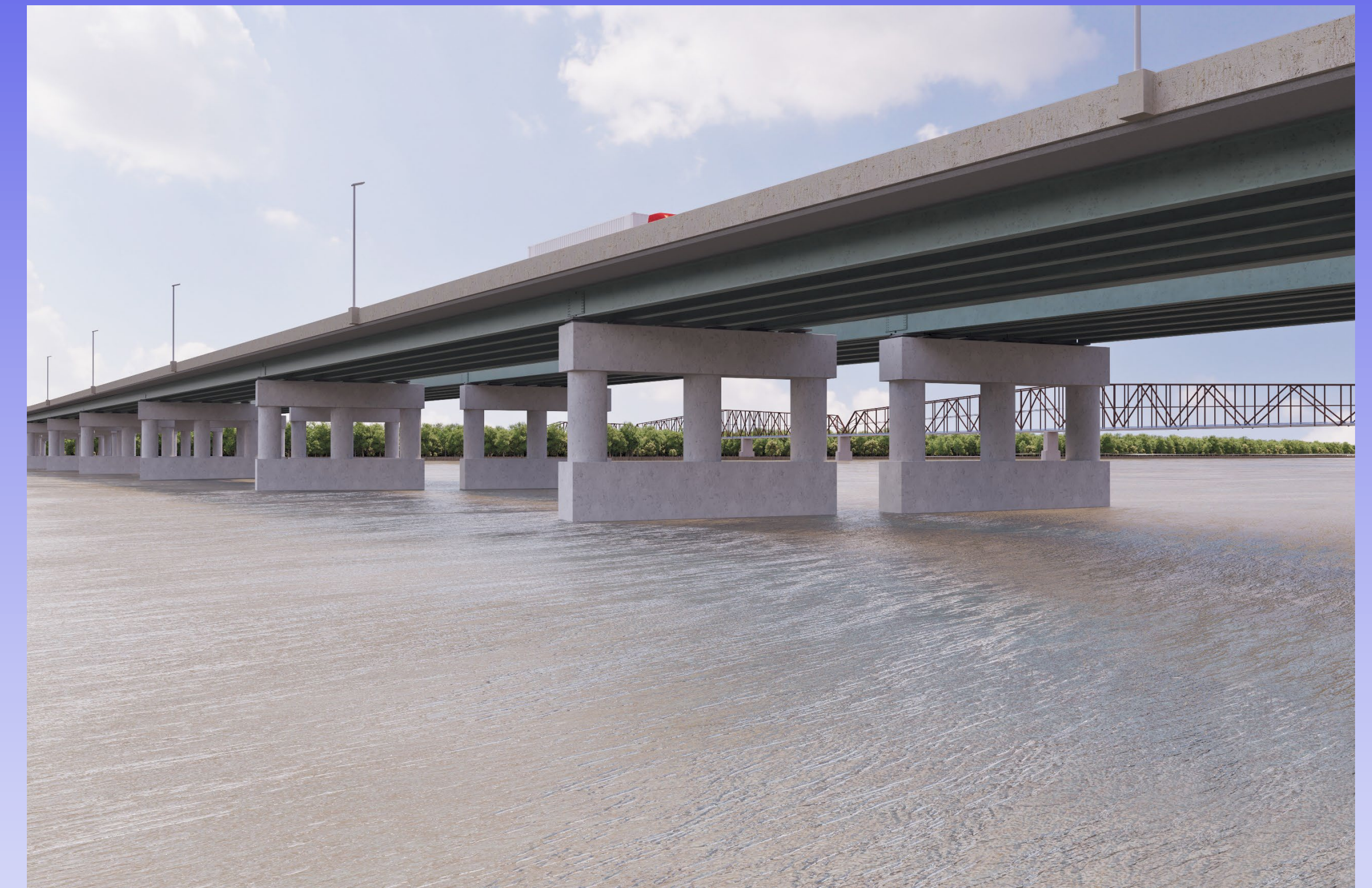
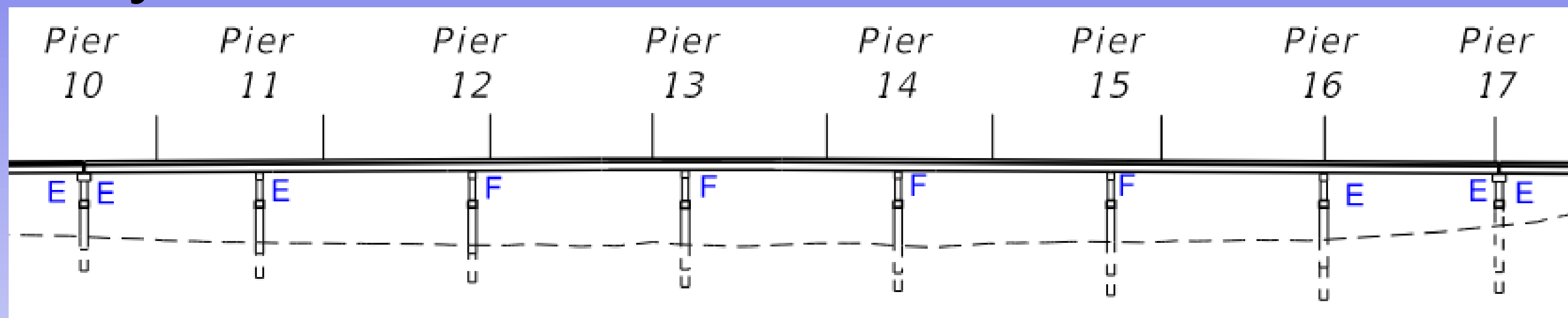
- Finite Element Response Spectrum Analysis
- R-Factor Method per AASHTO LRFD
- Shafts remain elastic during seismic event



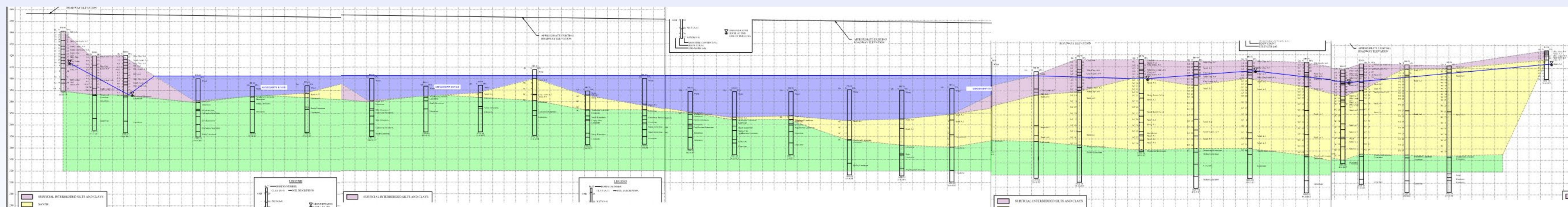


IDOT Bridge Design

- Empty Vessel Loads vs Seismic Demand
- 100-YR Design Life
- Fixity at Piers



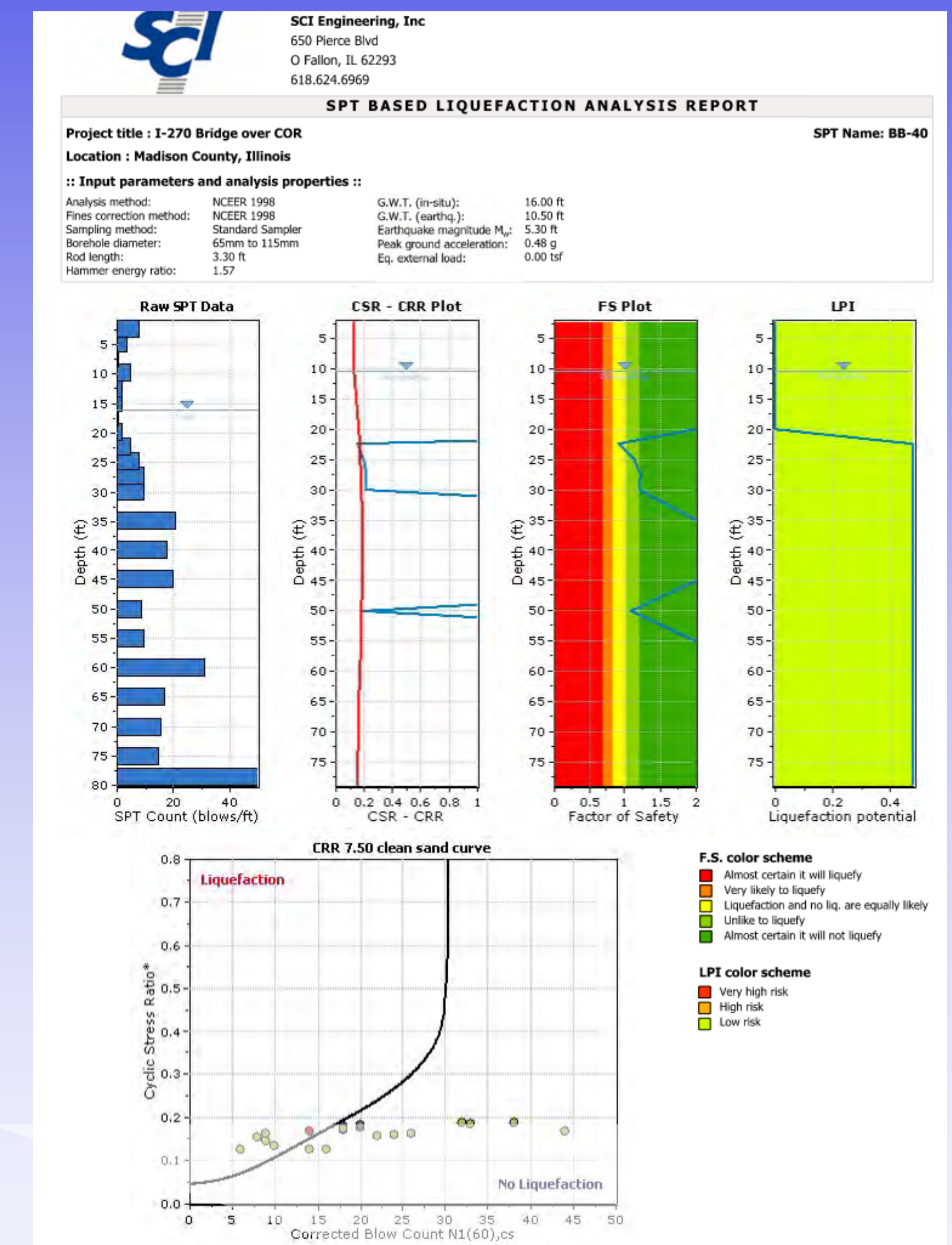
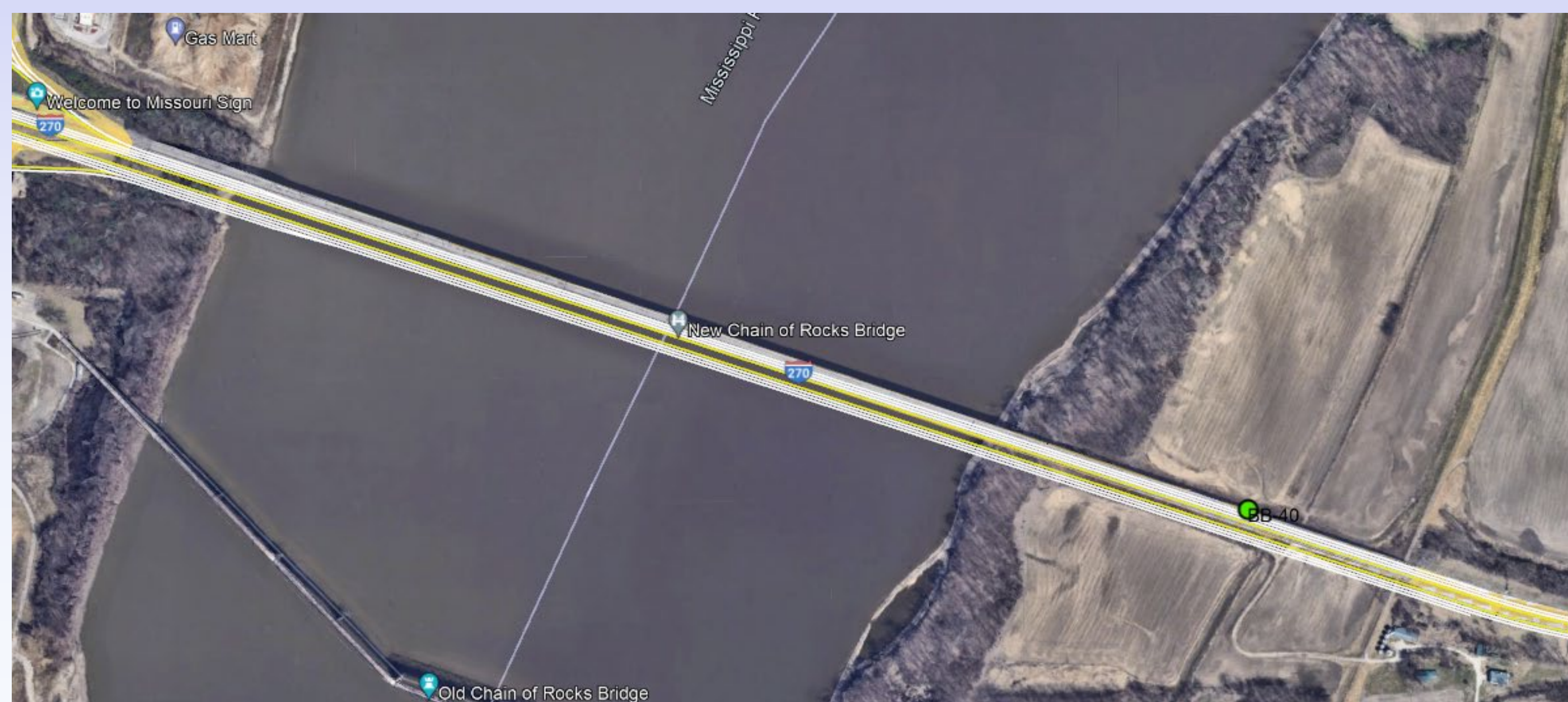
- Change in web depth – haunched vs pier step
- Scour Depths
Scour to Rock Piers 1-18
40ft Scour Depths Piers 19-25





IDOT Liquefaction

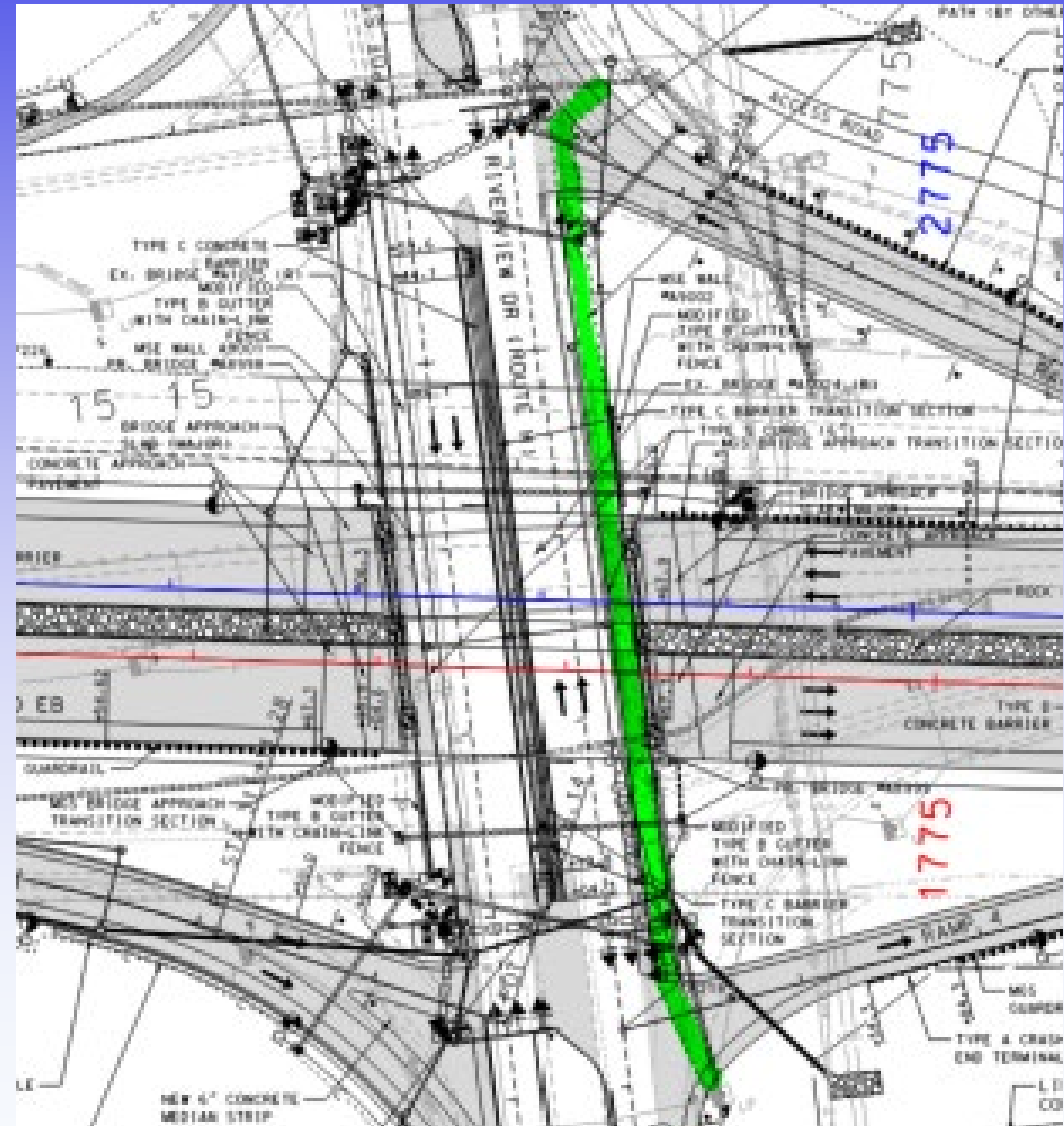
- Basic Liquefaction Potential Analysis - IDOT
- Risk Assessment
 - Parametric Study evaluation probability of analysis
 - Potential outcomes if liquefaction occurs





Phase II Riverview Drive Design Challenges

- Providing room for a future Bike Path crossing options by others
- Tight diamond did not improve Dunn Road intersection spacing
- Through USCG coordination only 3 spans required for navigation. Able to lower Missouri Abutment ~5' when compared to existing.
- Lane configuration at opening versus after future job completions to the west





MoDOT Bridge Design

- 2-span with MSE Walls vs. 4-span with Spill Slopes
- Seismic Design
 - AASHTO Guide Specifications for LRFD Seismic Bridge Design
 - Seismic Design Category B, $A_s = 0.225$
 - 30% increase in drilled shaft steel, remained elastic





A + B Bidding for Two contracts

- IDOT and MoDOT let the projects together in a combined special July 2022 letting.
- Only one contractor will be awarded both projects with the lowest combined cost.
- To be a responsive bidder need to bid on both projects





Kick-Off meeting



Walsh Construction
winning contractor

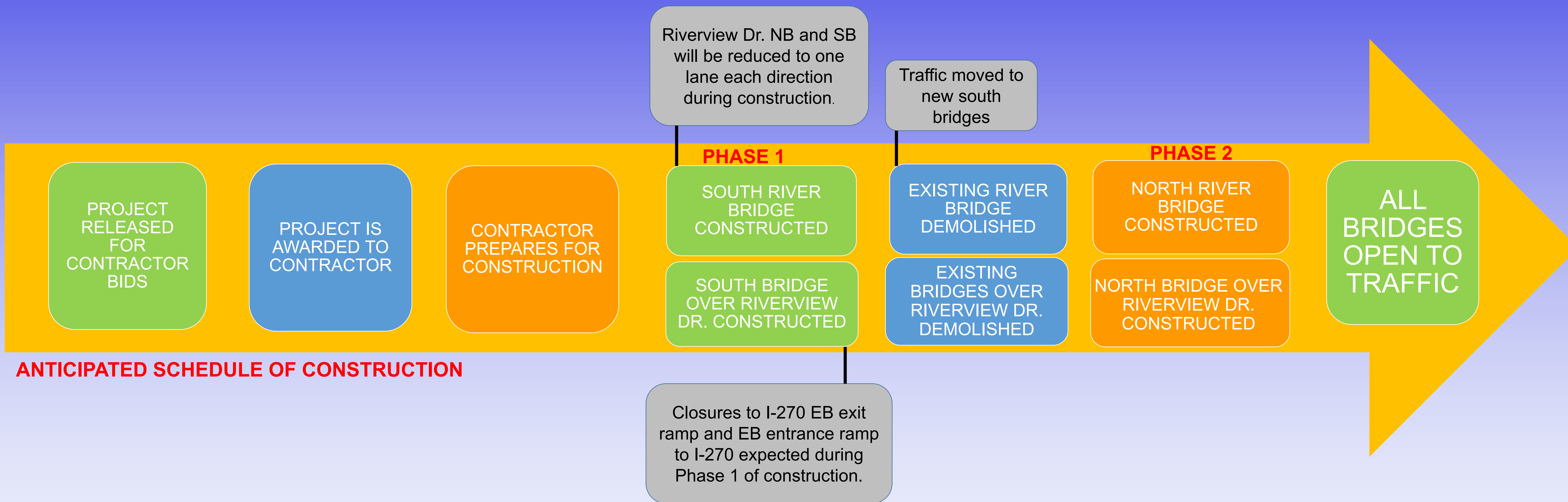
IDOT Contract Winning Bid
- \$496.2 Million

MoDOT Contract Winning
Bid - \$35.4 Million

Total Cost - \$531.6 Million



CONSTRUCTION PLAN



Anticipated End of Construction December 31, 2026



Construction

- Construction is underway
- Contractor has added construction access off 270 to Choteau island
- First sub structures expected in spring of 2023





Phase III Public Involvement

Combined both MoDOT and IDOT projects to one central location.

- Project Specific Website www.270mrb.com
- Hope to have live feed of construction
- All closures announcements
- Facebook <https://www.facebook.com/270MRB>
- Twitter <https://twitter.com/270MRB>
- Instagram https://www.instagram.com/270mrb_



***THANK YOU FOR YOUR
AUDIENCE!***