



US 169 / I-35 Buck O'Neil Bridge Replacement

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Lee Holtman, PE

September 25, 2025



US 169 / I-35 Interchange & Missouri River Crossing

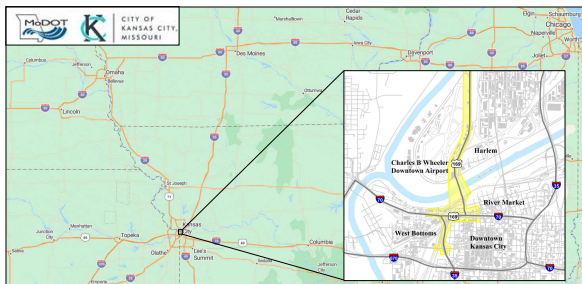
Roadmap

1. Project Location and Overview
2. Site Features
3. Roadway Design and Phasing
4. Levitating Roads (i.e. Bridges)



1. Project Location and Overview

Location



Site History

- 1956 Open to Traffic
- 1991 Ownership -> MoDOT
- 2015 Deterioration Accel.
- 2018 Short-Term Rehab



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ONEL
BRIDGE

MASSMAN CLARKSON
CONSTRUCTION PARTNERSHIP

HNTB

Project Definition

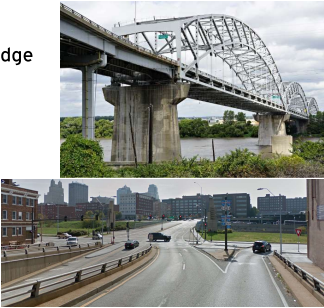
• Replace 169 Missouri River Bridge

• Connect 169-35 Systems

• Improve Operations & Safety

• Provide Pedestrian Facilities

• Maintain Access & Traffic



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Project Timeline

• 2018

• 2020

• 2020 Sept

• 2021 Mar

• 2024 Dec

PEL

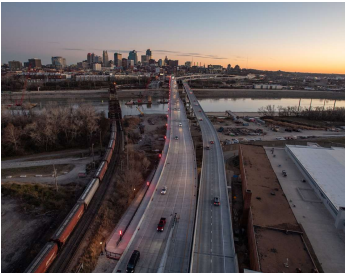
EA

RFP

NTP

Activity!

Open



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The Team

Contractor & Designer		Owner
Massman Construction		MoDOT
Clarkson Construction	City of Kansas City, Missouri	
HNTB	Burns & McDonnell	

3

The Team

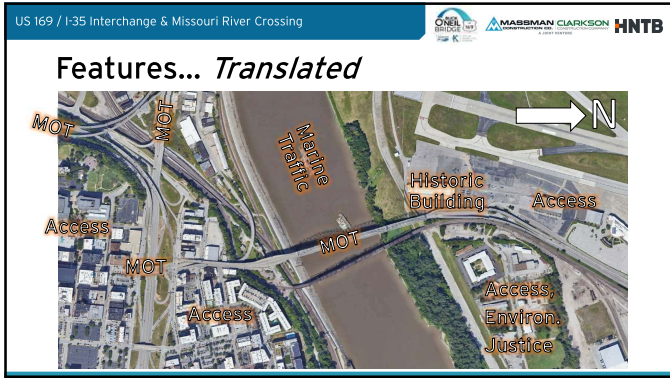
Contractor & Designer	Owner
Massman Construction	MoDOT
Clarkson Construction	City of Kansas City, Missouri
HNTB	Burns & McDonnell

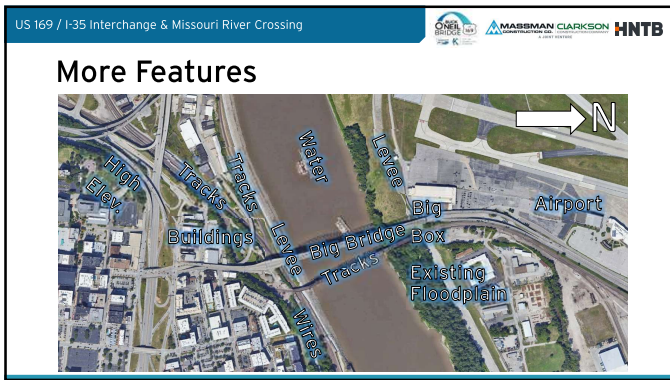
- Civil Design Inc.
 - EFK Moen
 - Terracon
 - TSI
 - Kaw Valley Eng.
 - HG Consult
 - Genesis Structures
 - McNary Bergeron & Johannesen
 - Realm Construction
 - Stupp Bridge Co.
 - Veritas Steel
 - DeLong's
 - CoreSlab
 - R.J. Watson
 - D.S. Brown
 - Commercial Metals
 - Viet
 - Tensor
 - DBM Vircom
 - 3-Feathers Construction
 - Silver Eagle
 - Reinforced Earth Co.
 - Forterra
 - SIP Inc.
 - J.H. Botts
- ...and many, many more.

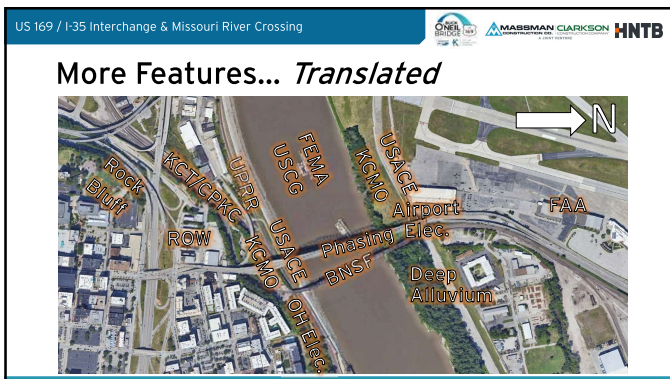
2. Site Features

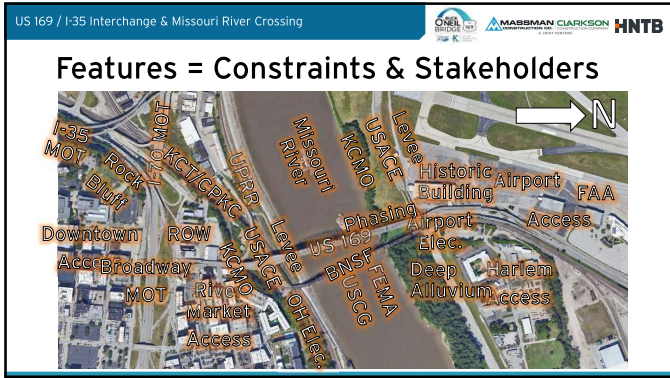
Features

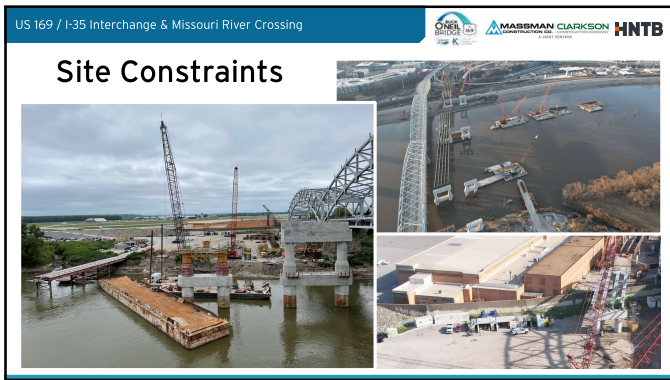














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Site Constraints



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...a tangent



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...a tangent



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A HNTB COMPANY

HNTB

Site Constraints



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Site Constraints



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Site Constraints



3. Roadway Design and Phasing

Operations and Safety

Existing Operational Deficiencies

- AM/PM Congestion, Queuing
- Intersections > Capacity

High Incident Frequency in

- Merge/Diverge Areas
- Intersections
- Narrow or No Shoulder



Improvements - Split Mainline

Direct System-to-System 169-35 Ramps

- Bypass Local System
- Multi-Level Geometrics
- Separate River Bridges



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Improvements - Geometrics

- Improved Geometric Layout
- Flatten Horiz. Curves
 - Remove Short Tangents
 - Vertical Crest/Sag K Values
 - 45mph Design Speed

Shoulder Improvements

- Full Width Shoulders
- Focus on Horiz. SSD
- Flyover Shoulder Flip



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Improvements - Ramps



Tight!



Existing

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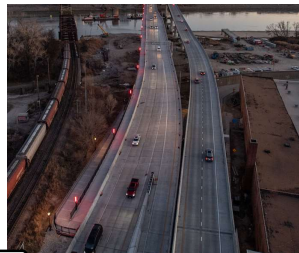


Improvements - Ramps



(Viewing North)

Final



(Viewing South)

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Improvements - Ramps

- Increased Gore to Gore Spacing
- Parallel Style Accel./Decel. Lanes w/ Increased Lengths
- Gore Area Escape Lanes at "Exit Only" Ramps



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Improvements - Pedestrian Access



Existing



Final

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Improvements - Pedestrian Access

- Shared Use Path Connections, ADA Compliance Upgrades
- Reduce Length of Intersection Crossings
- Pedestrian Facility Lighting
- Mural



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Phasing Considerations

- Design Off-Alignment
 - (Except Tie-Ins & R/W Limits)
- Early construction focus:
 - Offline Substructure
 - Airport Ramp Improvements
 - Utility Relocations
- NB US-169 Open Thru Project
- Public Involvement Campaign
 - Project Website
 - Social Media Progress Updates

Buck O'Neill Bridge August 2024 Update

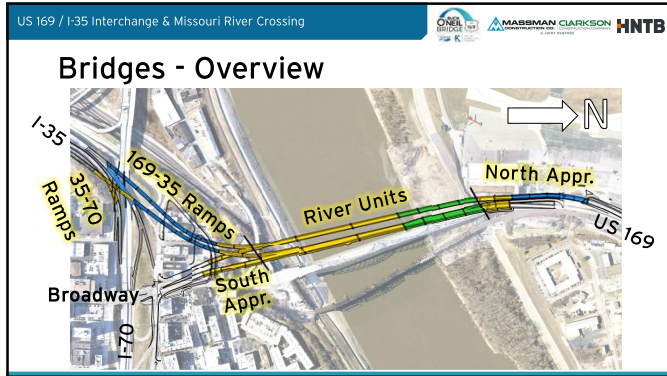
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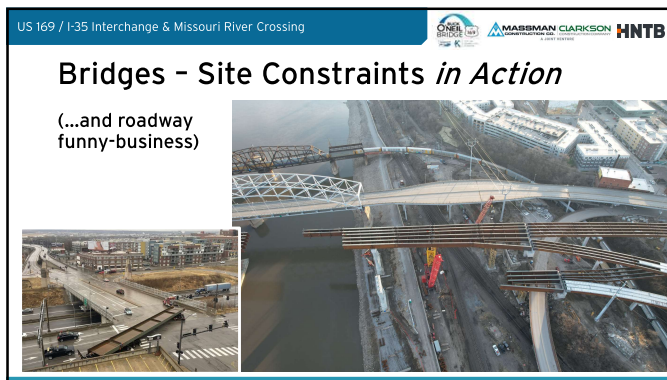
4. Bridges

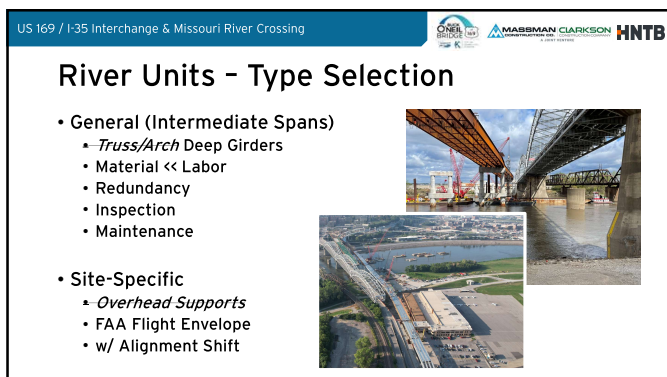
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Bridges - Overview

- 2 Major River Crossings
- System-to-System Ramps
- Shared Use Across River
- 17 New Bridge Units
- Total >360,000 SF (6.3ff)
- Total >9,000 LF (1.7mi)
- SB = 4,150 LF (0.8mi)







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River Units - Geometry

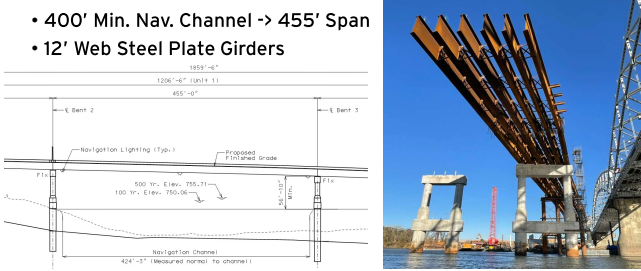
- Split Verticals -> 2 Bridges
- Roadway Challenges Solved (= Bridge Challenges Created)



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River Units - Superstructure

- 400' Min. Nav. Channel -> 455' Span
- 12' Web Steel Plate Girders



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River Units - Superstructure



Quad Pick (460,000 lb)

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River Units - Hydraulics

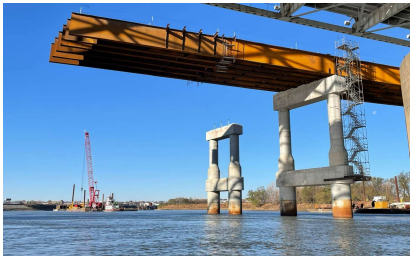
- N. Overbank < 160' Span
 - NU-Shape Prestressed Tee
- Limits Substructure Dims
 - Balance vs. Total Piers



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River Units - Substructure



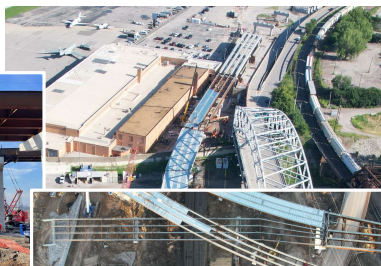
- Cased 11' Shafts
- Twin Shaft/Column
- Waterline Strut
- Constructability
- Vessel Collision Performance
 - Design Impact 3,500,000 lb

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Short Span - Type Selection

- Steel
 - Pick Weight
 - Geometry



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Short Span - Type Selection

- Prestressed
 - Material Cost
 - No Aerial Assembly



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Prestressed Superstructures

- NU Bulb Tees (NU43 thru NU78+3)
- 10,000 psi Concrete Strength

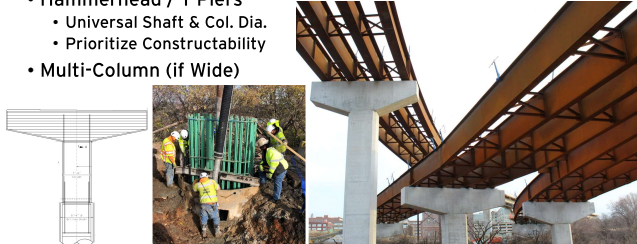


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ONEL BRIDGE HNTB MASSMAN CLARKSON

Short Span - Substructure

- Hammerhead / T-Piers
 - Universal Shaft & Col. Dia.
 - Prioritize Constructability
- Multi-Column (if Wide)



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Questions