

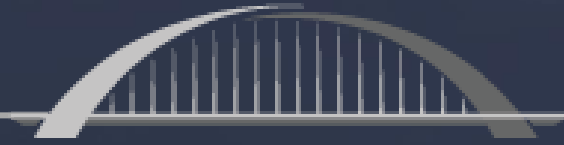


## I-74 Bridge Project

2017-2021



QUAD CITIES



# Signature Project: I-74 Mississippi River Crossing



# I-74 Corridor Overview



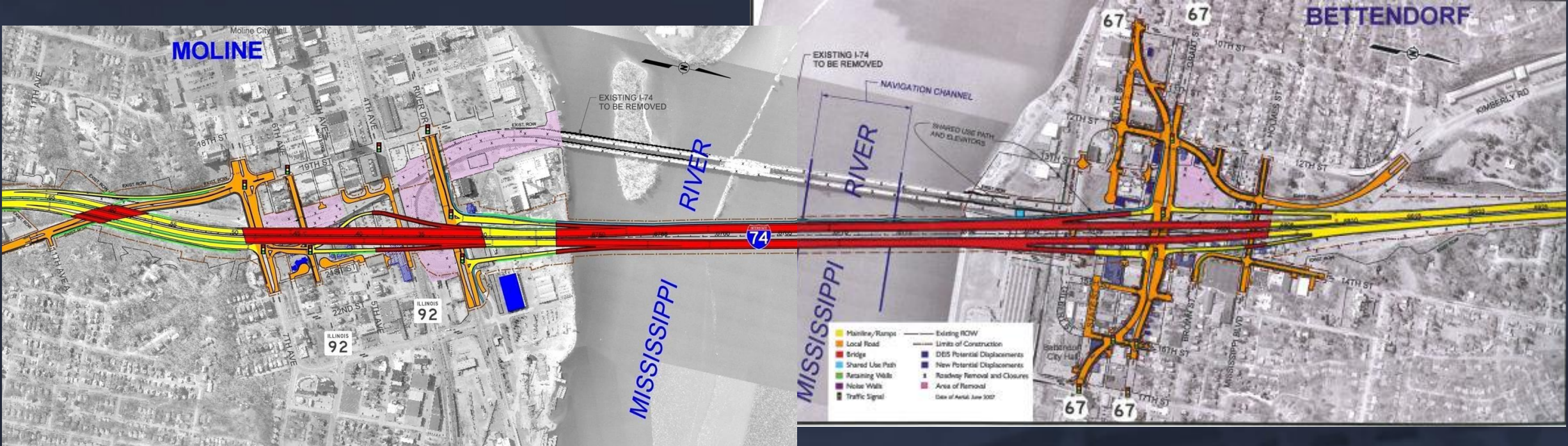
- 9 Contracts
- 15 Contractors
- 44 Mix Designs
- 216,311.25 Cubic Yards
- Over \$1B Total Project Cost



# Project Partners



# Bridge Replacement Project



# Bridge Replacement Project



## Existing Structures

- Twin Suspension Bridges
- Built 1935 & 1960
- 2 Lanes Each Direction
- 24' Deck Width (each)

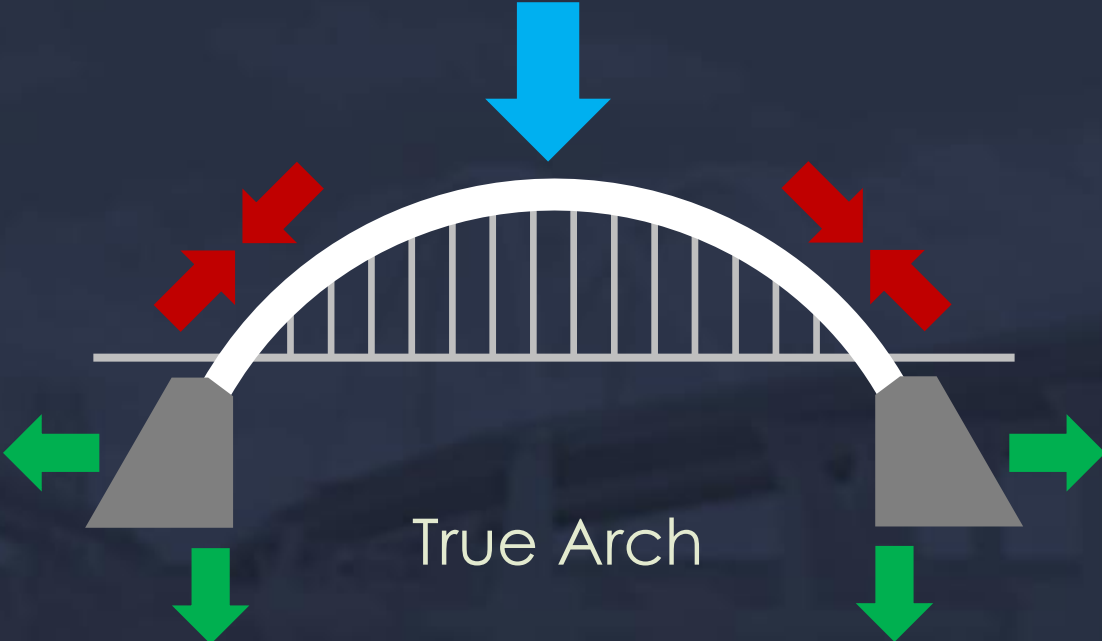
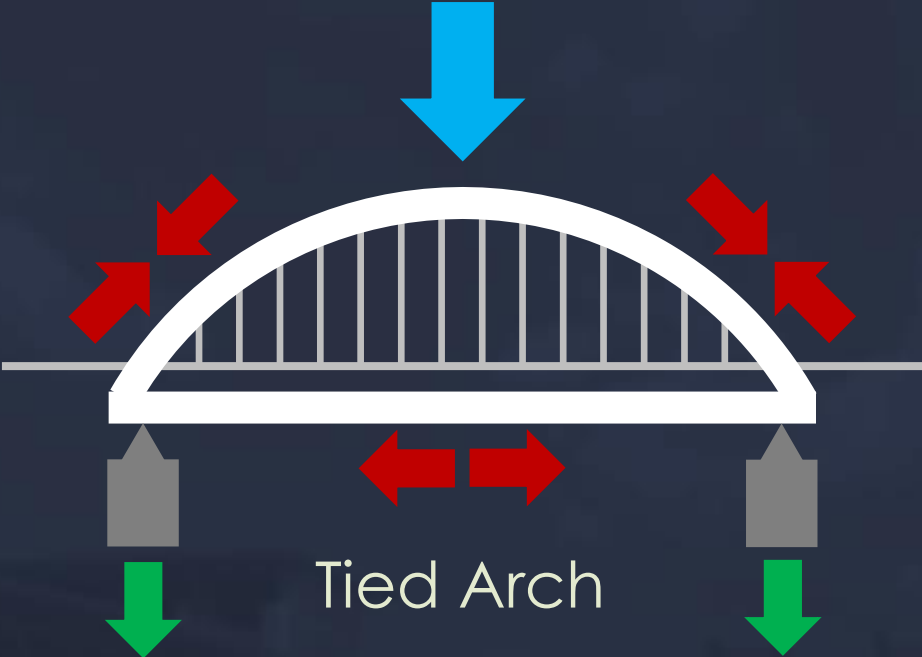
## Replacement Structures

- Twin True Arch Bridges
- 4 Lanes Each Direction
- 2 Full Shoulders Each Way
- 72' Deck Width (each)
- 14' Multi-use Trail





# Bridge Replacement Project – True Arch



# Challenges– Environmental



## 150181b.01 DESCRIPTION.

A. The work under this contract is located in an environmentally sensitive area within the Mississippi River (the River). This work has the potential to impact state and federally threatened and endangered mussels living in the River thus requiring areas in the river to be designated as Environmentally-Sensitive Areas (Restricted Access) [ES Areas]. No disturbances to the river bed, no propulsion, no propellers or motorized vehicles will be allowed in ES Areas. The ES Areas are shown as red hatched areas in Figures 1 and 2.

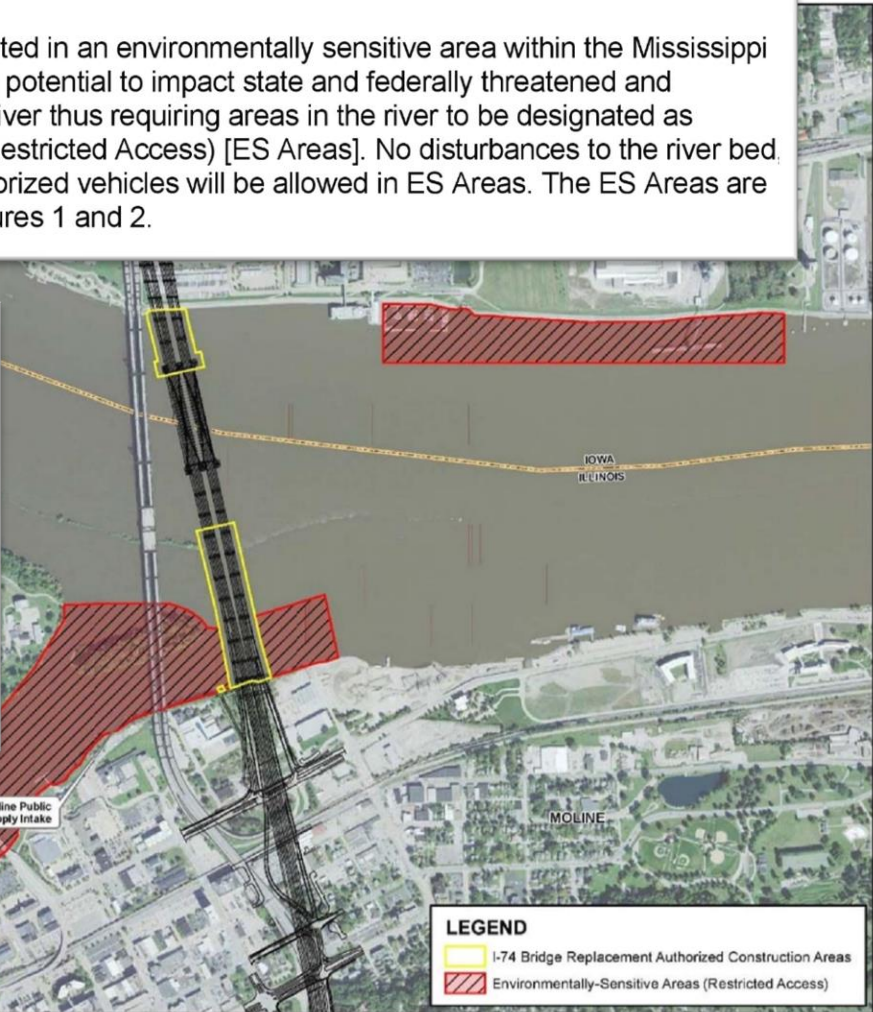
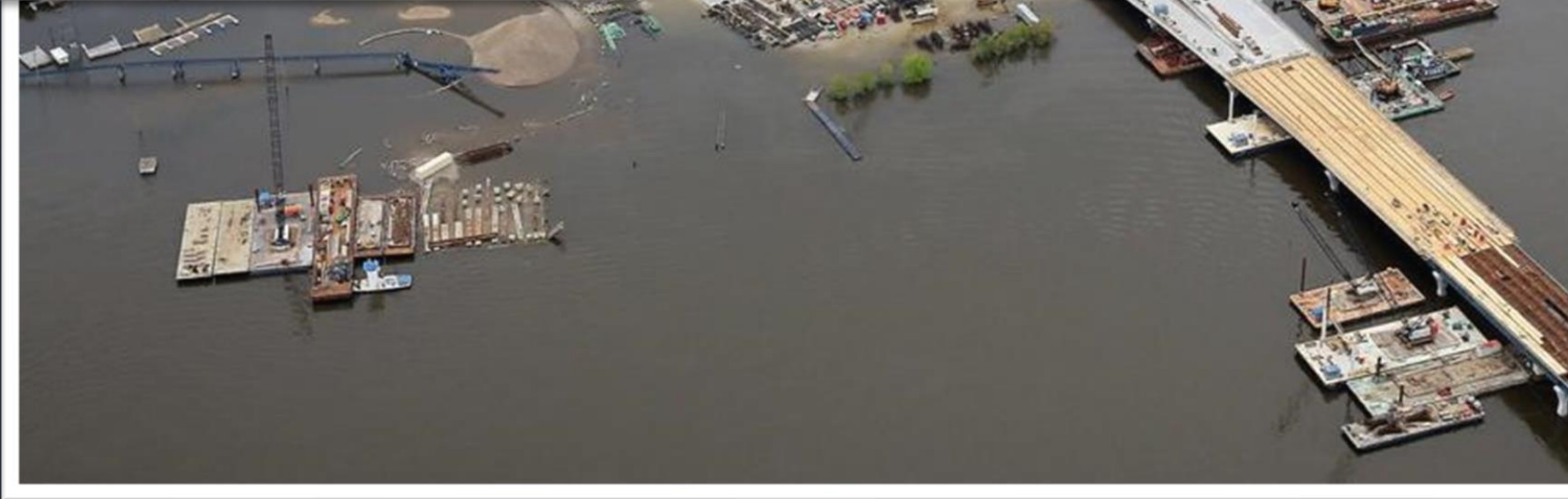
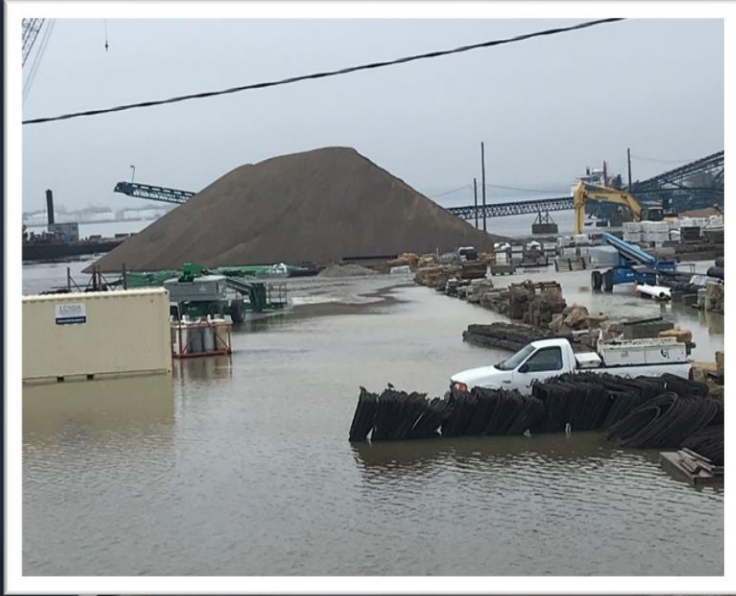


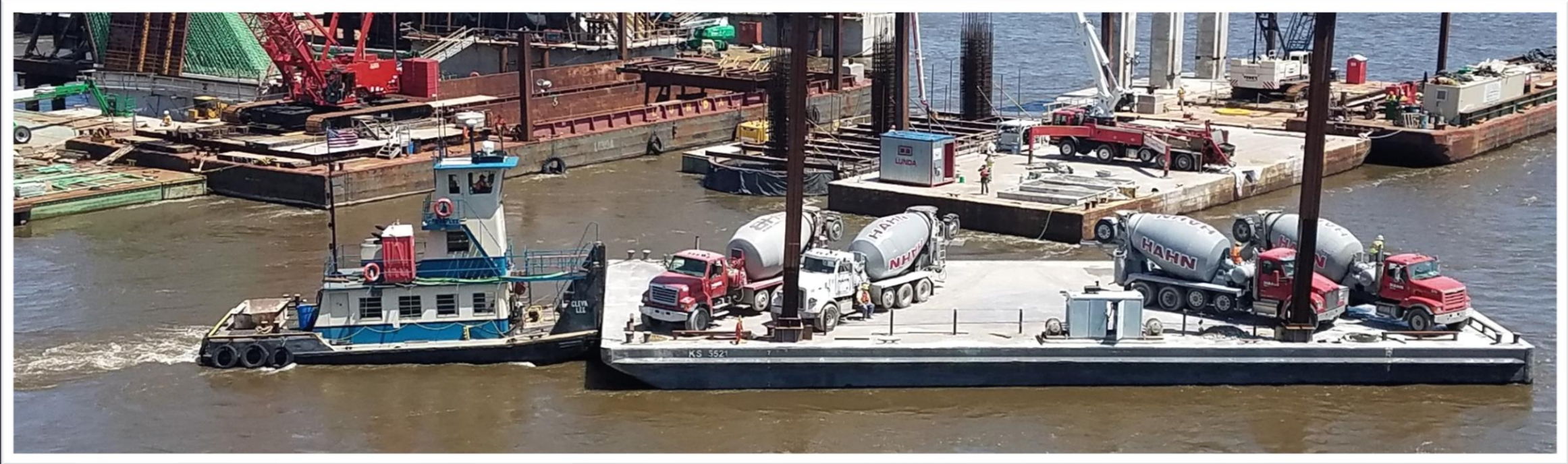
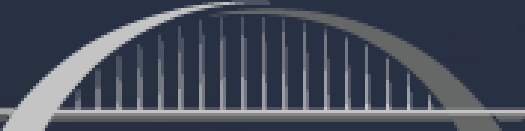
Figure 2. Project constraints map, I-74 over the Mississippi River.



# Site Considerations – River Conditions (Flood)



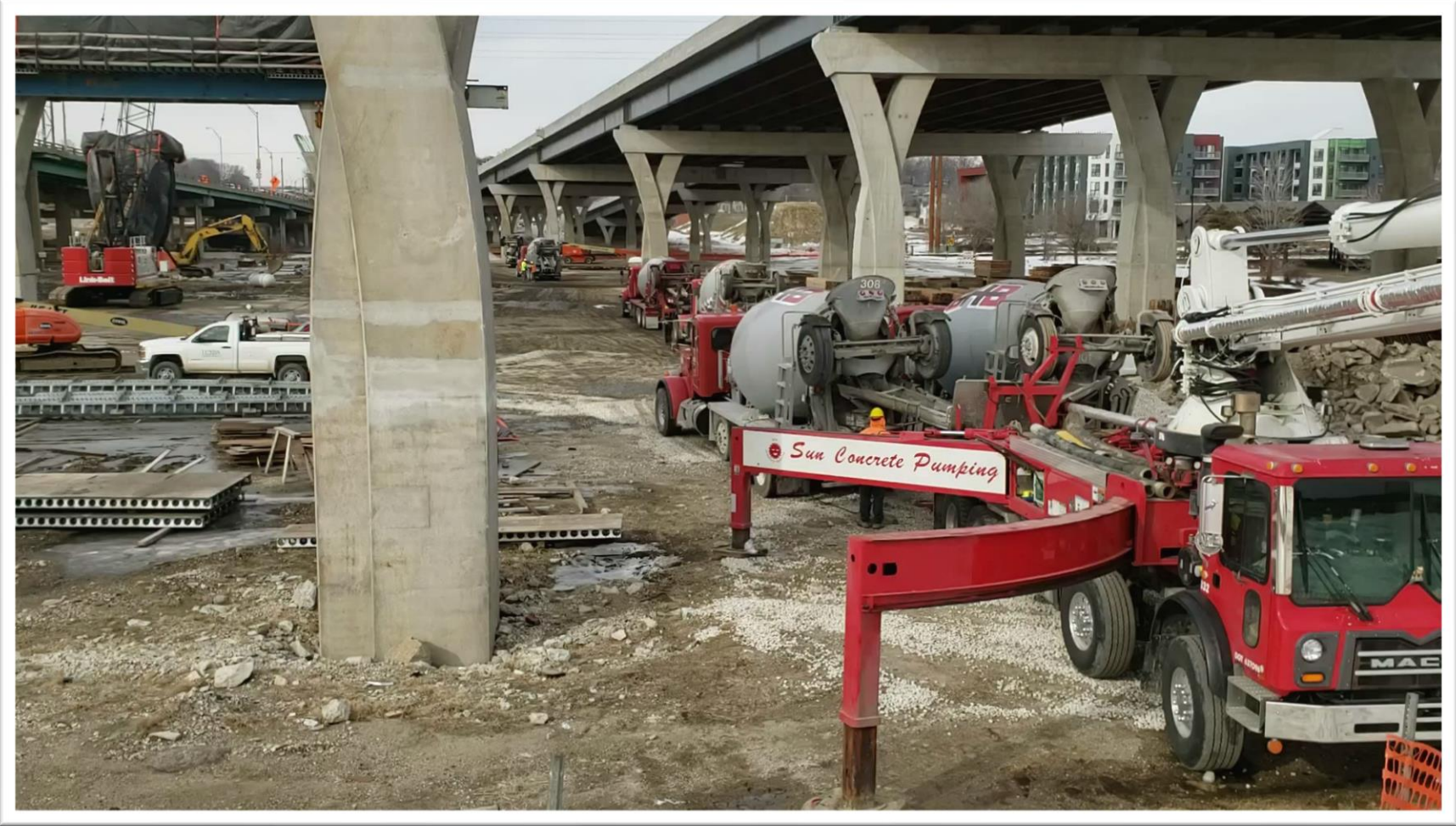
# Challenges— Access



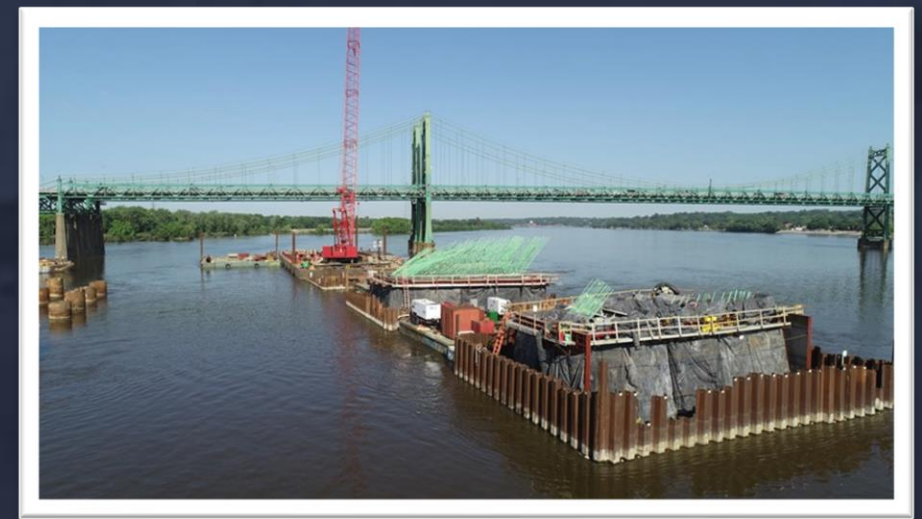
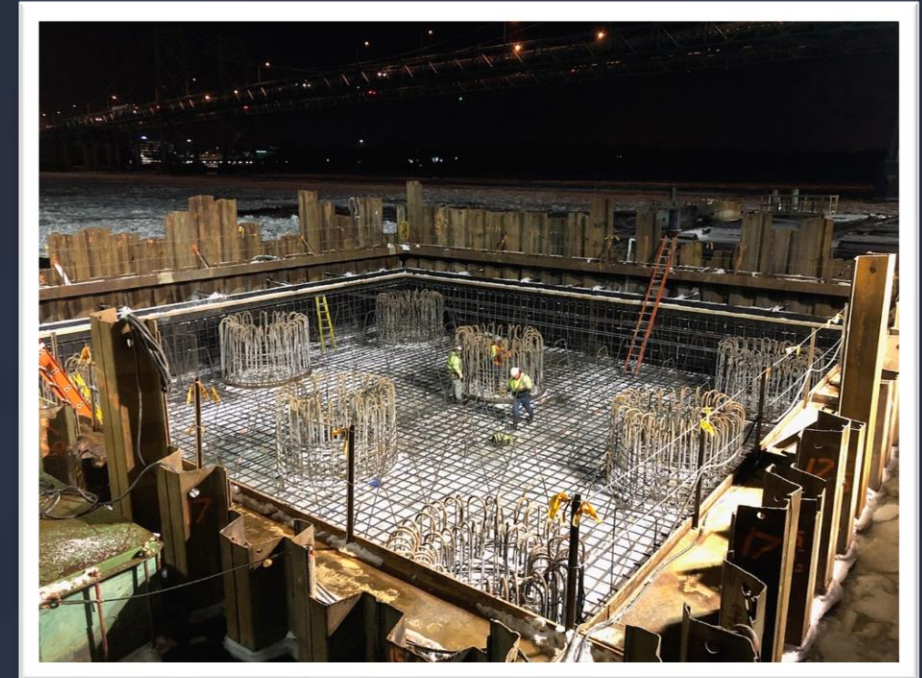
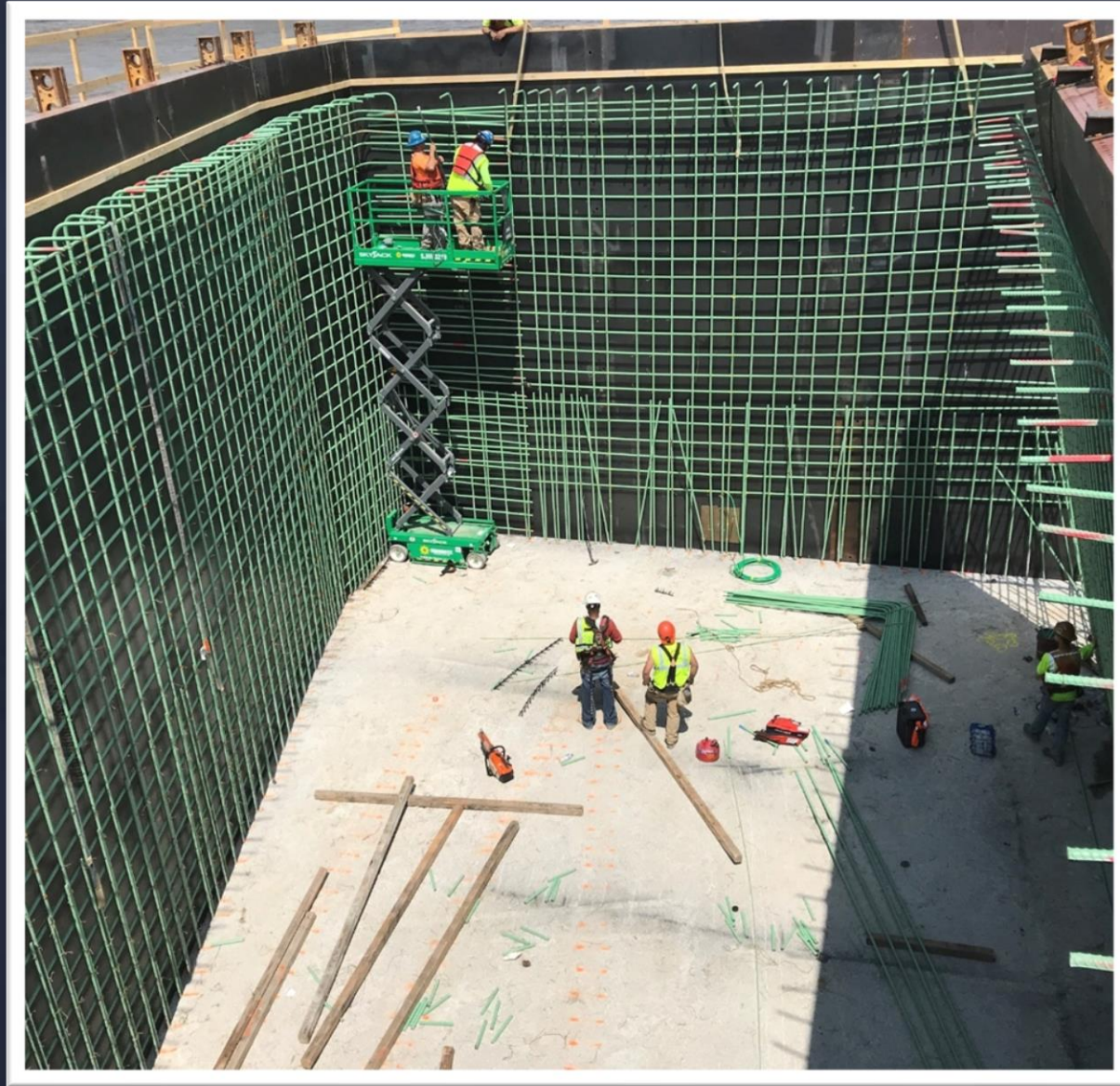
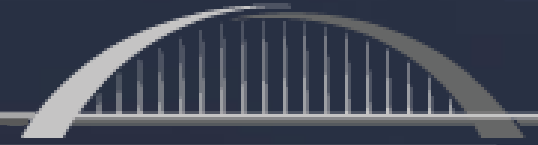
# Challenges– River Conditions (Ice)



# Challenges – Pumping



# Challenges – Mass Concrete



# Challenges – Mass Concrete – Liquid Nitrogen

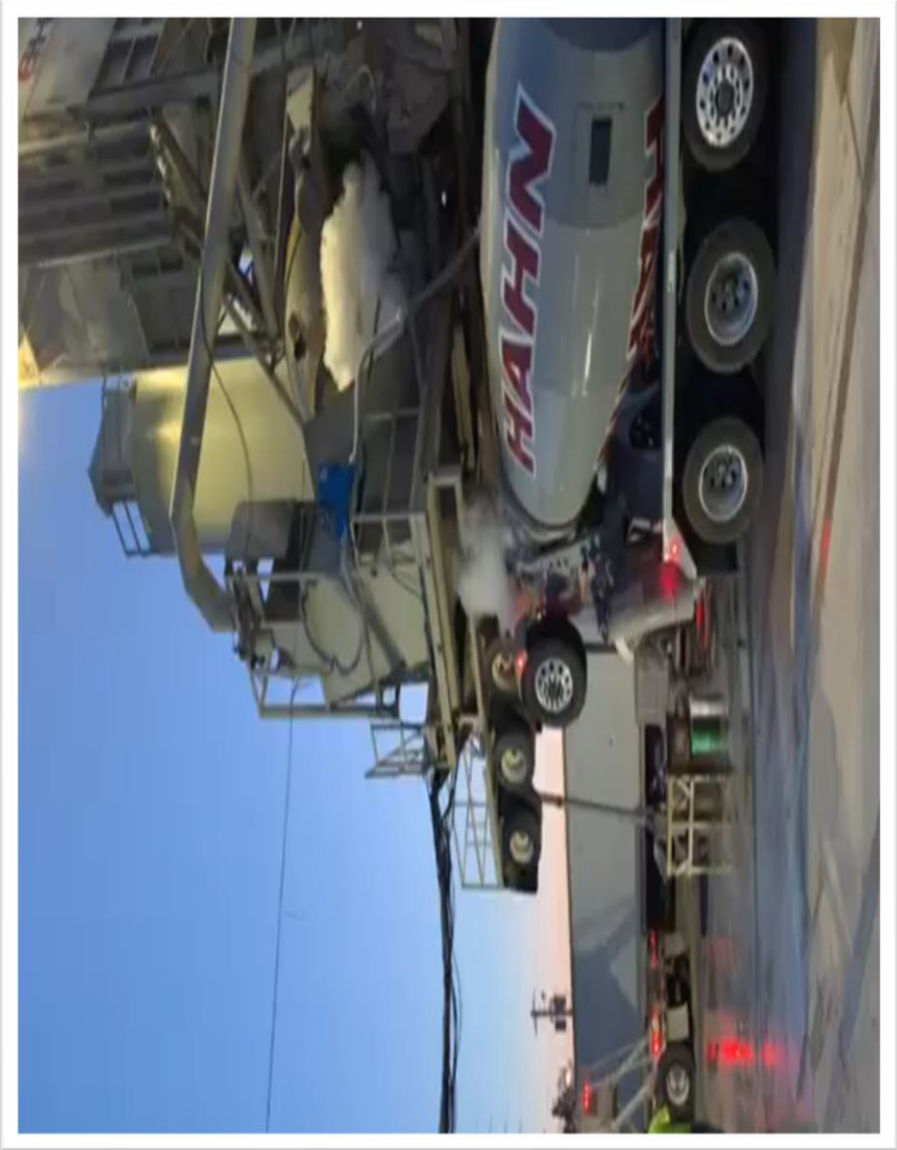
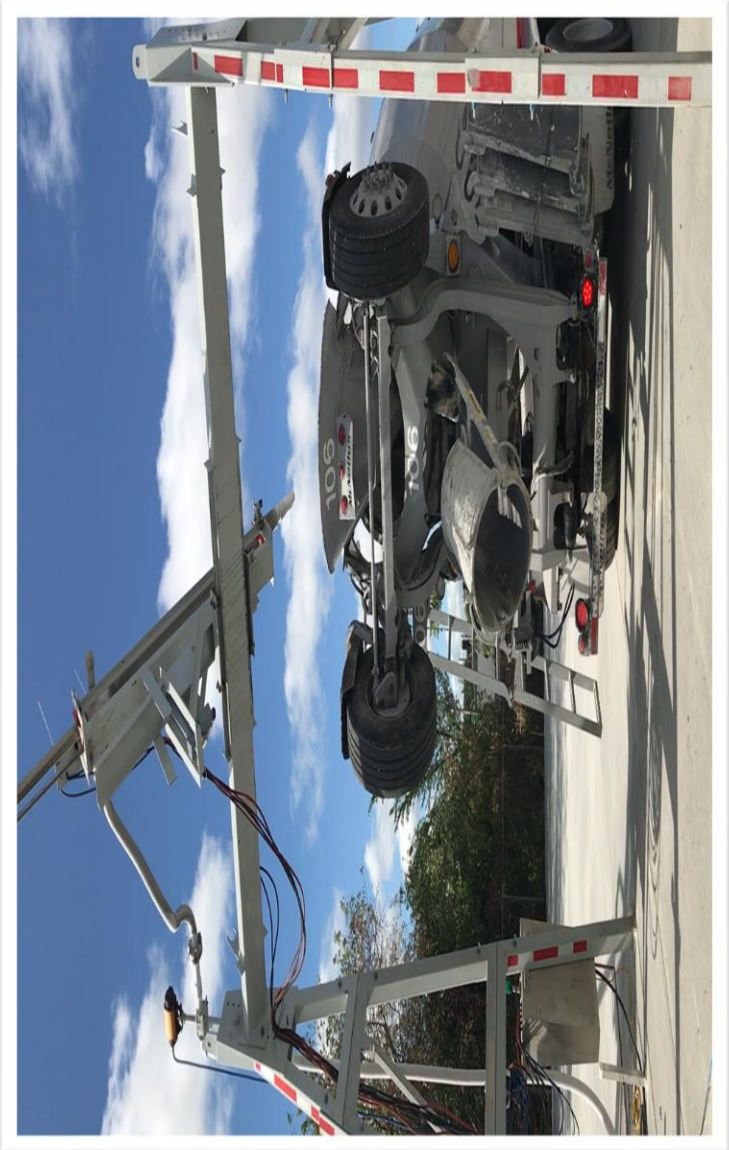


- 2017/2018 – Direct addition of nitrogen to the rear of the mixer truck
  - Lots of Supply Issues
  - Time Consuming
  - Cracking mixer drums
  - Visibility Issues
  - Cost Effective
  - Significant air content growth on SCC mixes
- 2019-2021 – Addition of nitrogen to aggregates on the charge belt of the plant
  - Less total cooling capacity
  - Freezing gates on the plant
  - Destroying the belt on the plant
  - Visibility Issues
  - Much Quicker
  - Much Safer

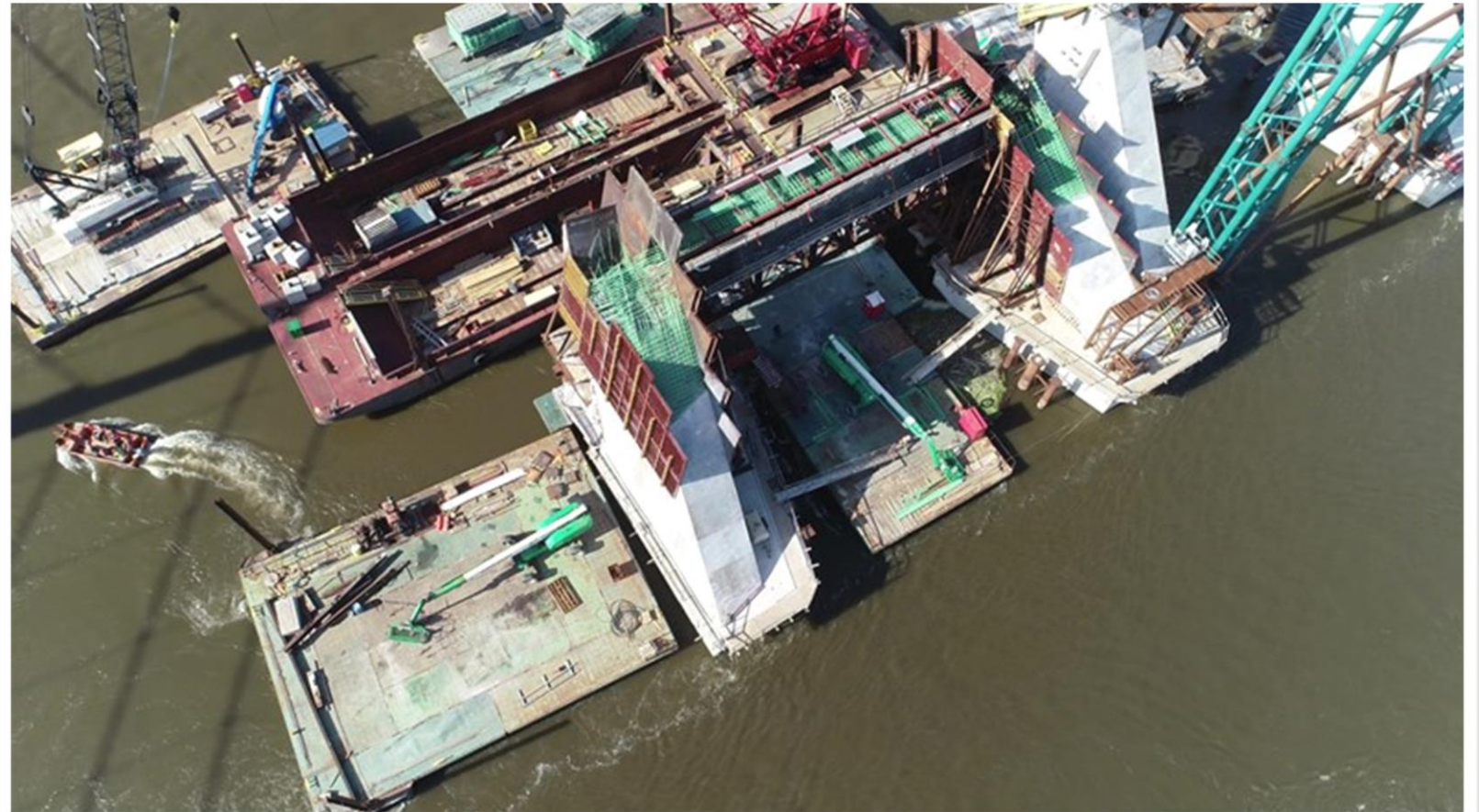




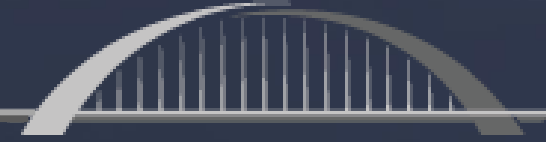
# Challenges – Mass Concrete – Liquid Nitrogen



# Challenges – Arch Ribs



# Challenges – Mass SCC



- Custom SCC mix developed
  - Lean (675lbs cementitious)
  - 70% GGBFS
  - 25-27" Spread
  - Normally .35-.37 w/c ratio
  - 5.5-8.5% Air
  - Max 55° concrete temp at placement
  - VSI not to exceed 1
  - J-Ring test within 2"
  - Up to 850cy placements
  - 7500psi specified, 9000-12000psi in place



# Challenges – Decorative Concrete



# I-74 Mississippi River Crossing



# I-74 Mississippi River Crossing



