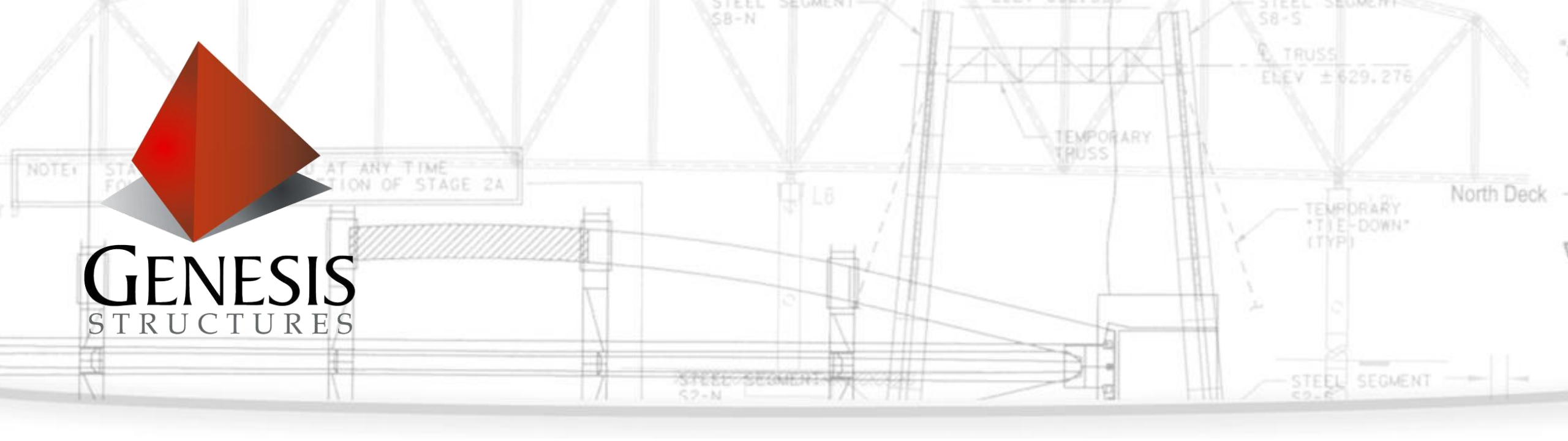


GENESIS
STRUCTURES

Portal North Bridge Erection

ABCD WNY Fall Conference 2025

Stephen Percassi Jr.

The Portal Project

The Portal Project

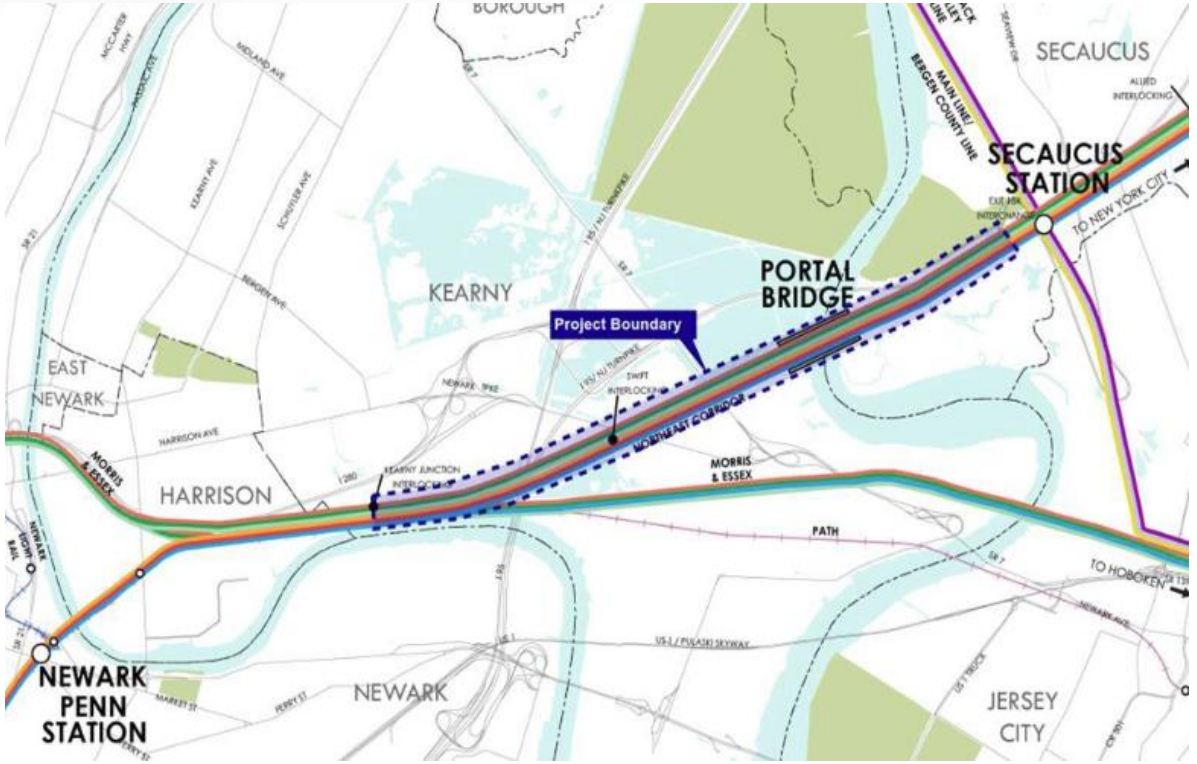
- *115 year-old swing span*
- *NJ Transit & Amtrak*

- *160,000 riders / day*
- *500 trains / day*

GENESIS
STRUCTURES

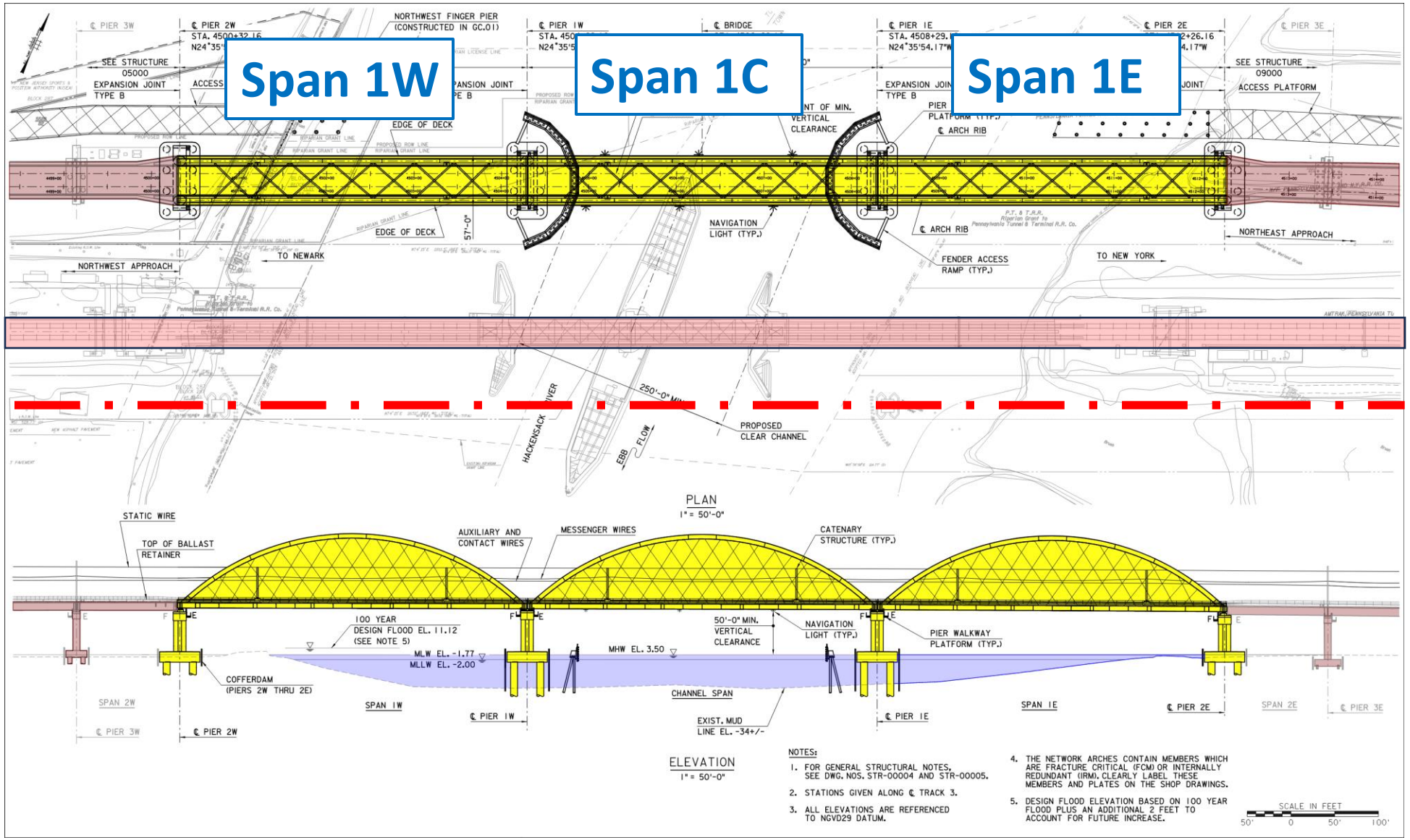
The Portal Project

- *2.7 miles of new track & bridge*
- *5,450 ft of approach structures*
- *Fixed high span over Hackensack river*
- *Feature spans are (3) 400 ft arches*
- *Key challenges*
  - ✓*Adjacent to live RR traffic*
  - ✓*Minimal disruption to marine traffic*
  - ✓*Coordinate existing bridge openings with construction activities*



GENESIS STRUCTURES

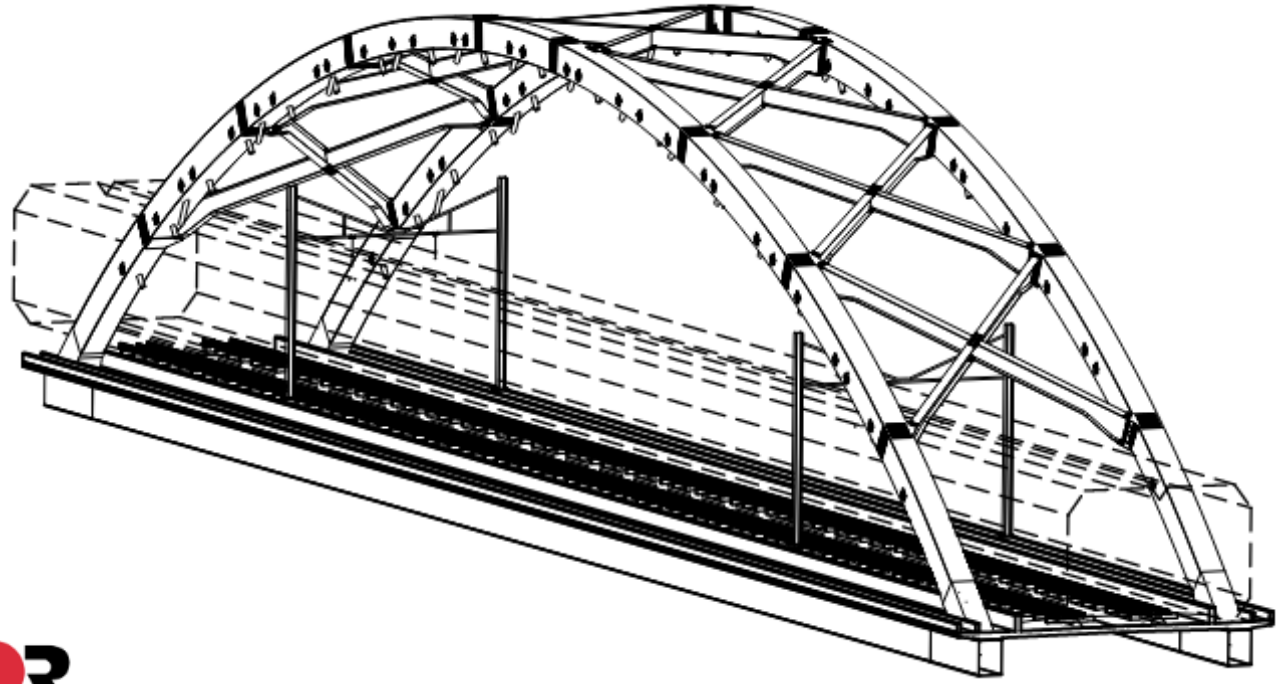
Portal North Arches

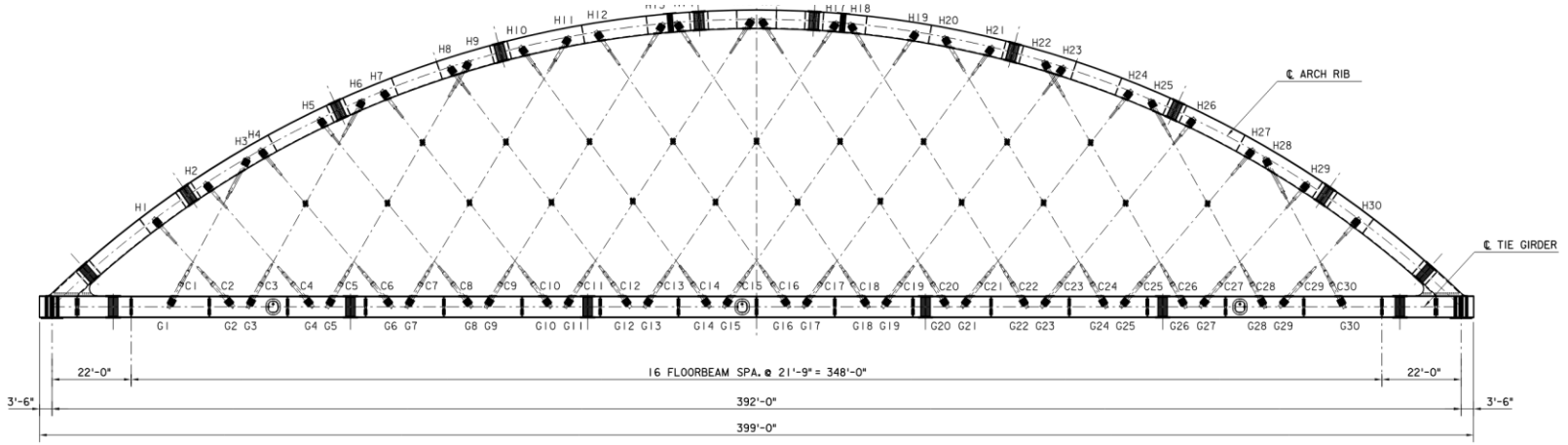


GENESIS STRUCTURES

Portal North Arches

- *400 ft Arch Span*
- *86 ft Tall*
- *49 ft Wide*
- *2900 Tons Steel*
- *Design Engineer* HNTB
- *GC* SKANSKA TRAYLOR TRAYLOR BROS., INC.





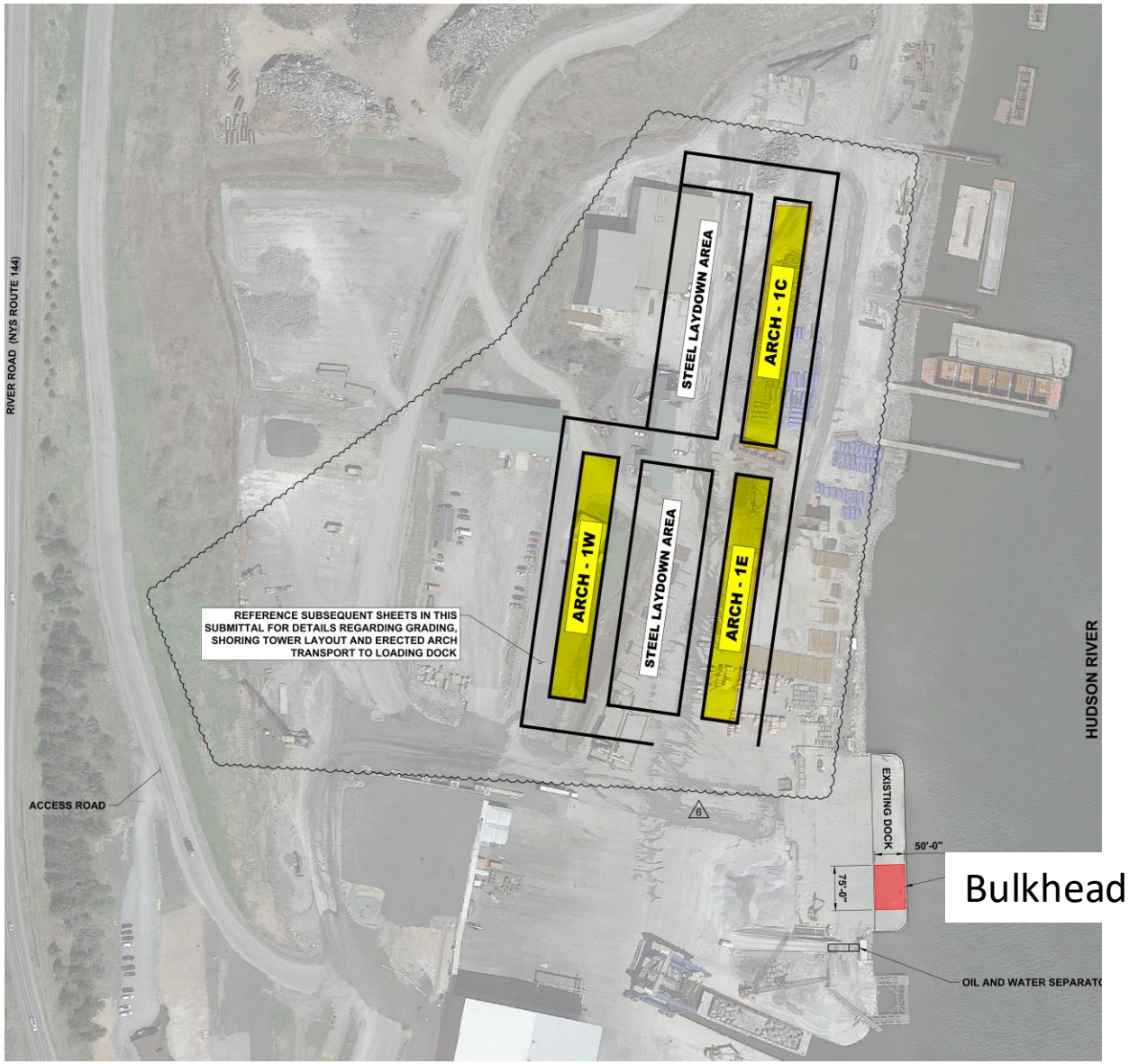
GENESIS STRUCTURES

The Winning Strategy

- *Erect steel on falsework*
- *Pick up with SPMT's*
- *Roll onto barge*
- *Float down the Hudson 150 miles*
- *Set down on temporary bent*
- *Pick back up with jacking barge*
- *Float bridge to piers*
- *Jack bridge vertically 50ft*
- *Land bridge on slide system*
- *Push bridge horizontally 100ft*
- *Jack down on permanent bearings*

GENESIS
STRUCTURES

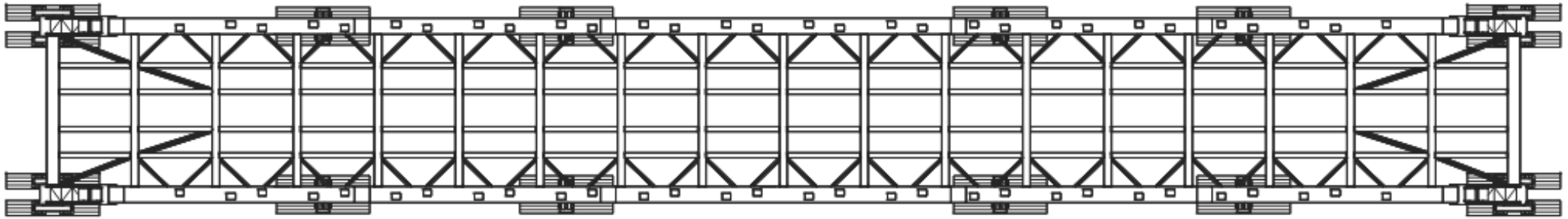
Arch Erection – Port of Coeymans [POC]



Bulkhead

GENESIS STRUCTURES

Arch Erection – Port of Coeymans [POC]



FLOOR SYSTEM

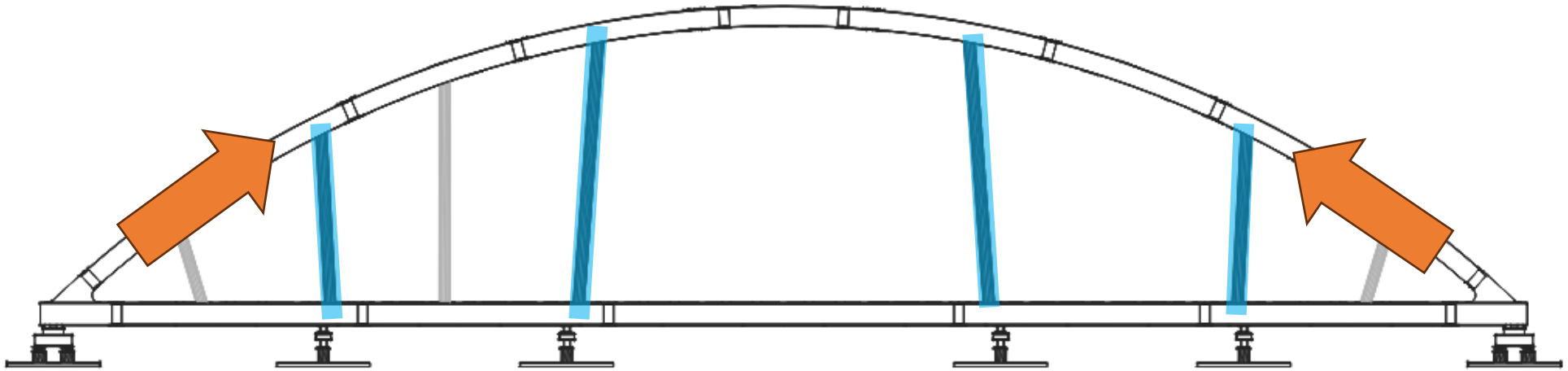
GENESIS STRUCTURES

GENESIS
STRUCTURES

GENESIS
STRUCTURES

GENESIS
STRUCTURES

Arch Erection - POC



GENESIS
STRUCTURES

GENESIS
STRUCTURES

Arch Erection - POC

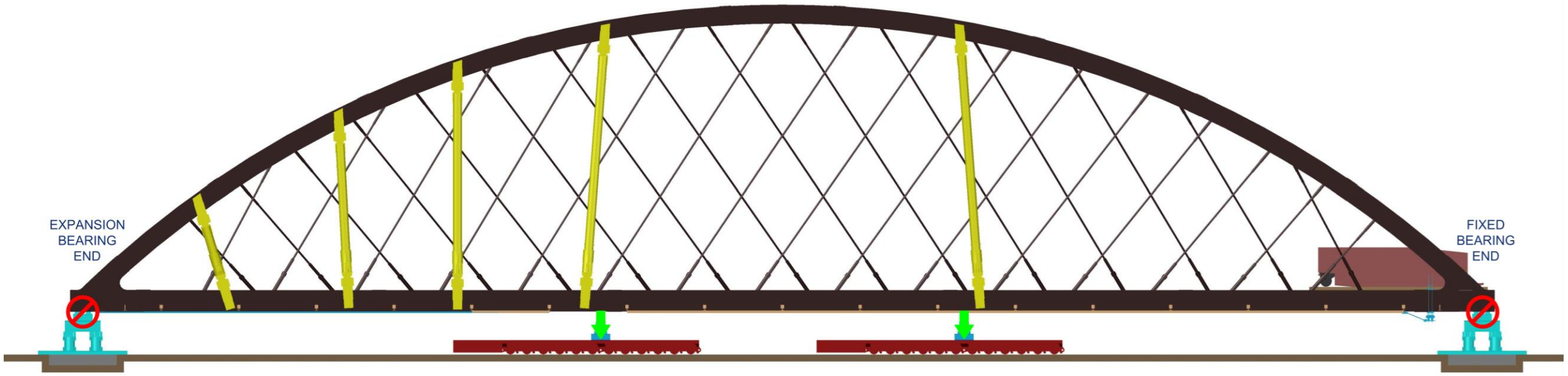
GENESIS STRUCTURES

Arch Roll-On - POC

- Challenges
  - Tight site, tough grades to maneuver the arches
  - Water elevations relative to top of bulkhead – Not Good
  - Tide fluctuations from NOAA (oceanic winds, rain upstream)
  - Available barge heights (16ft available, needed 20ft)
  - Maximum ramp slope 2%
  - Maximum SPMT stroke range (-12” to +12” theoretical)
  - Cold weather water ballasting

GENESIS
STRUCTURES

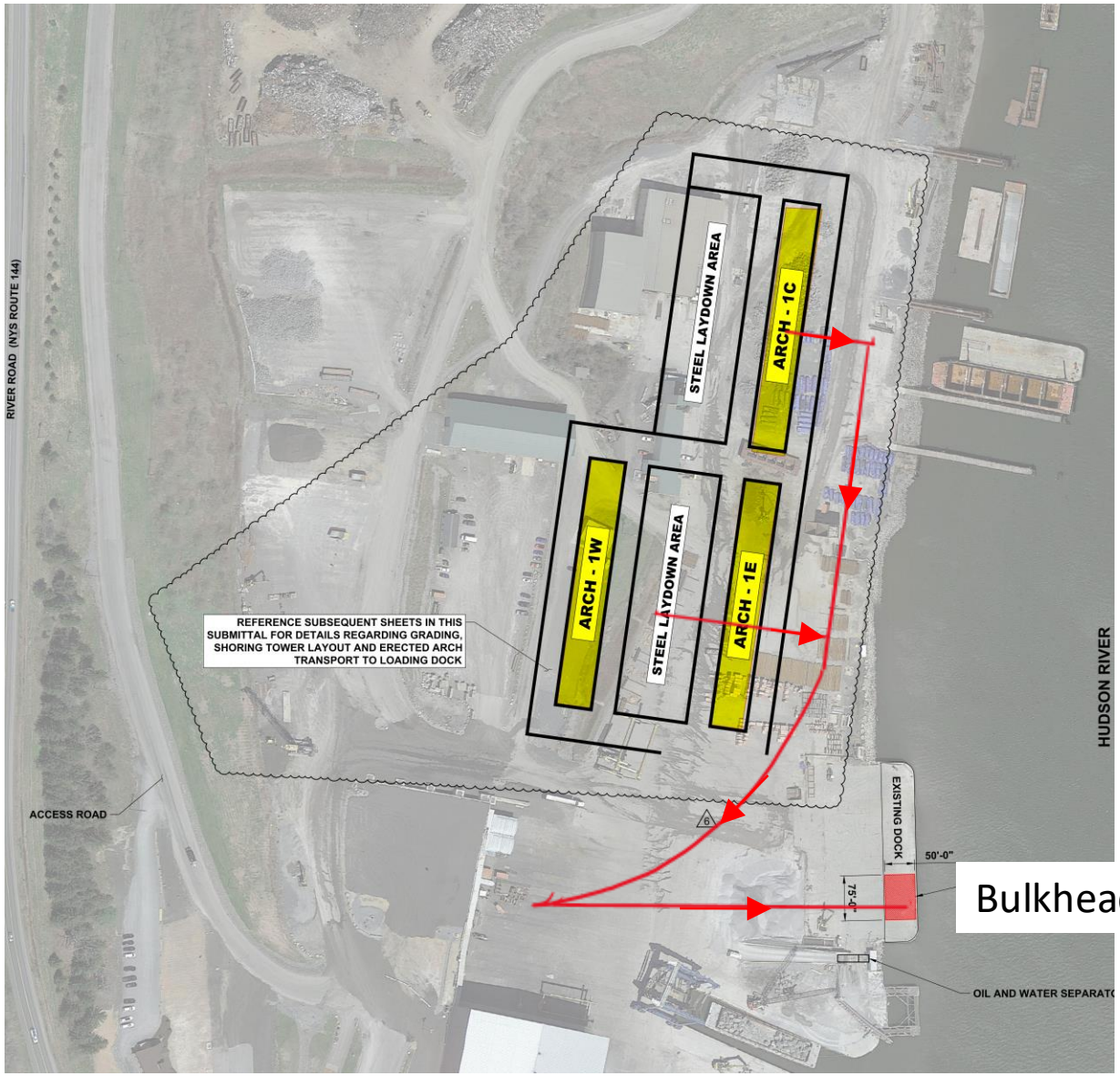
Arch Roll-On - POC



ELEVATION

GENESIS
STRUCTURES

Arch Erection – Port of Coeymans [POC]



Bulkhead

GENESIS STRUCTURES


160 ft Axle-to-Axle

GENESIS
STRUCTURES

Arch Roll-On - POC

GENESIS
STRUCTURES

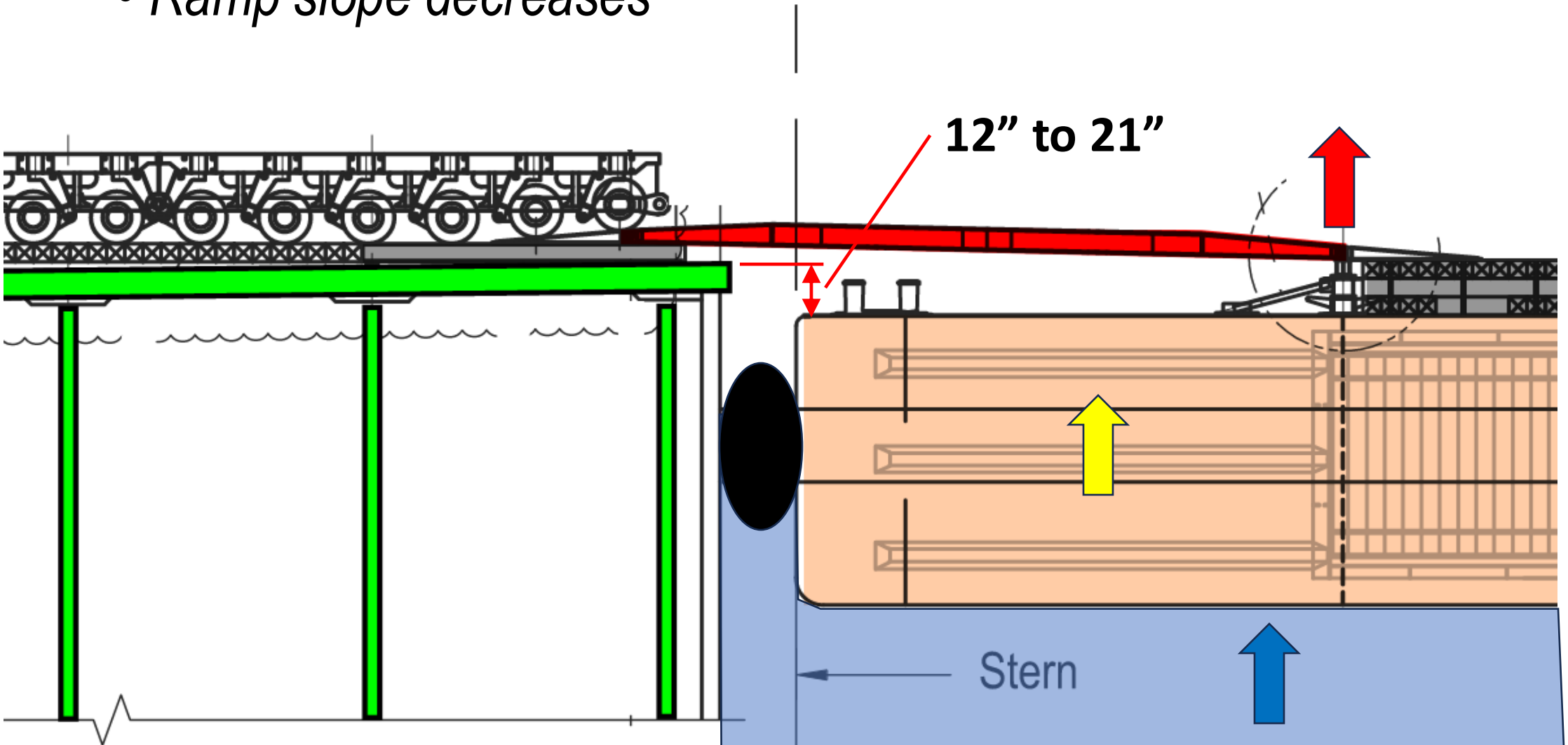
GENESIS
STRUCTURES

Arch Roll-On - POC

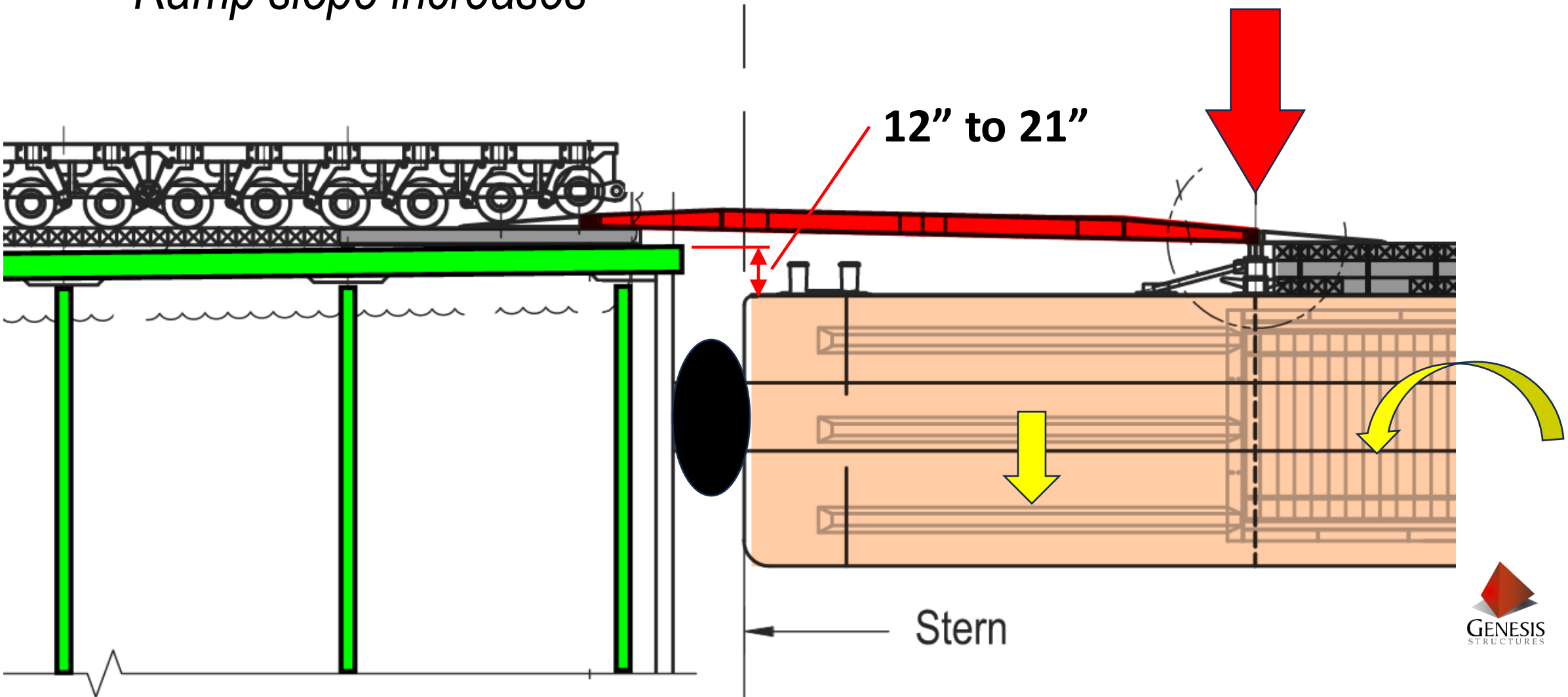
- Challenges
  - Tight site, tough grades to maneuver the arches
  - Maximum ramp slope 2%
  - Water elevations relative to top of bulkhead
  - Tide fluctuations from NOAA (oceanic winds, rain, upstream)
  - Available barge heights (16ft available, needed 20ft)
  - Maximum SPMT stroke range (-12” to +12” theoretical)
  - Cold weather water ballasting

GENESIS STRUCTURES

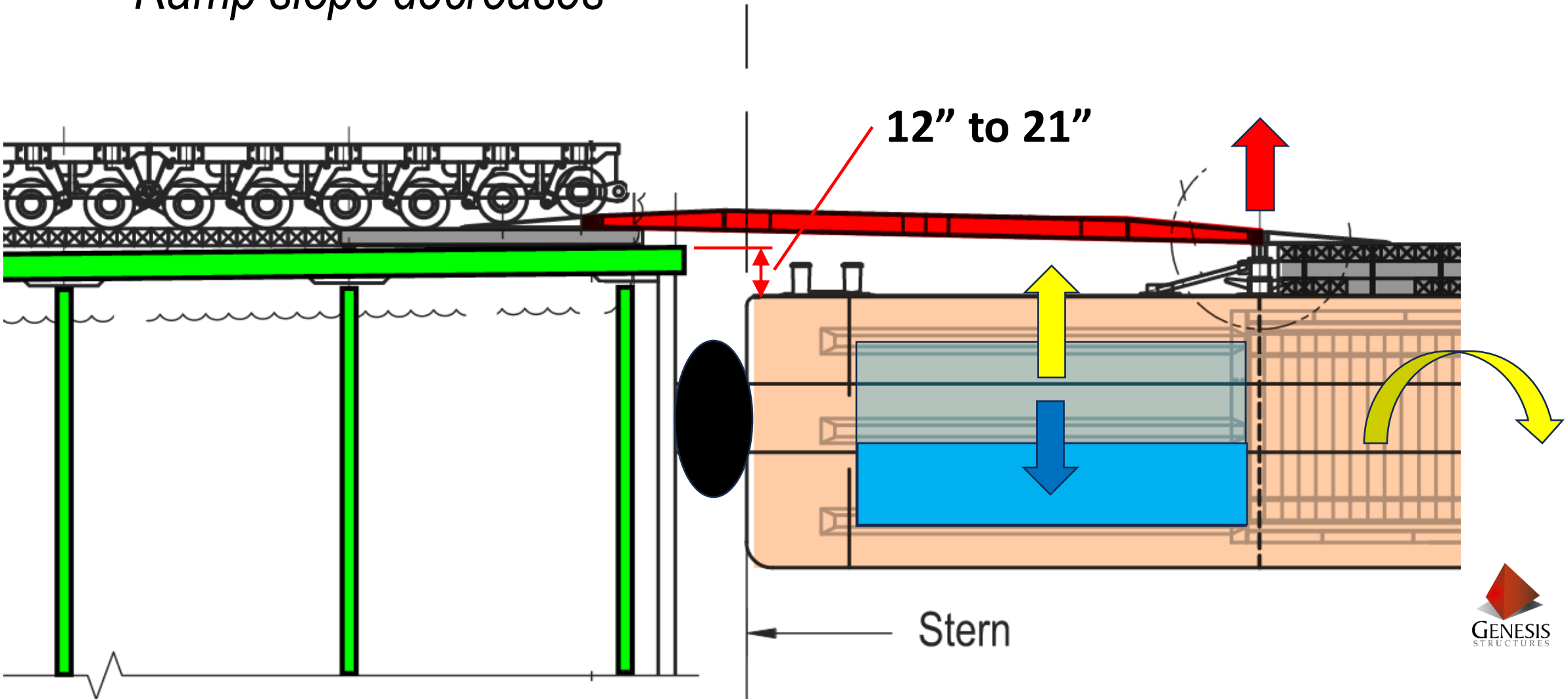
- *Tide Rising*
  - *Barge Rises*
  - *Ramp slope decreases*



- *Ramp reaction increasing*
  - *Barge draft increases and trims*
  - *Ramp slope increases*



- *Ballast weight decreasing*
  - *Barge draft increases*
  - *Ramp slope decreases*




ERIN ELIZABETH


MAMMOET
MAMMOET
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11


MAM
MOET
MAM
MOET
MAM

Arch Roll-On - POC

- Challenges
  - Tight site, tough grades to maneuver the arches
  - Maximum ramp slope 2%
  - Water elevations relative to top of bulkhead
  - Tide fluctuations from NOAA (oceanic winds, rain upstream)
  - Available barge heights (16ft available, needed 20ft)
  - Maximum SPMT stroke range (-12” to +12” theoretical)
  - Cold weather water ballasting

GENESIS STRUCTURES

GENESIS
STRUCTURES

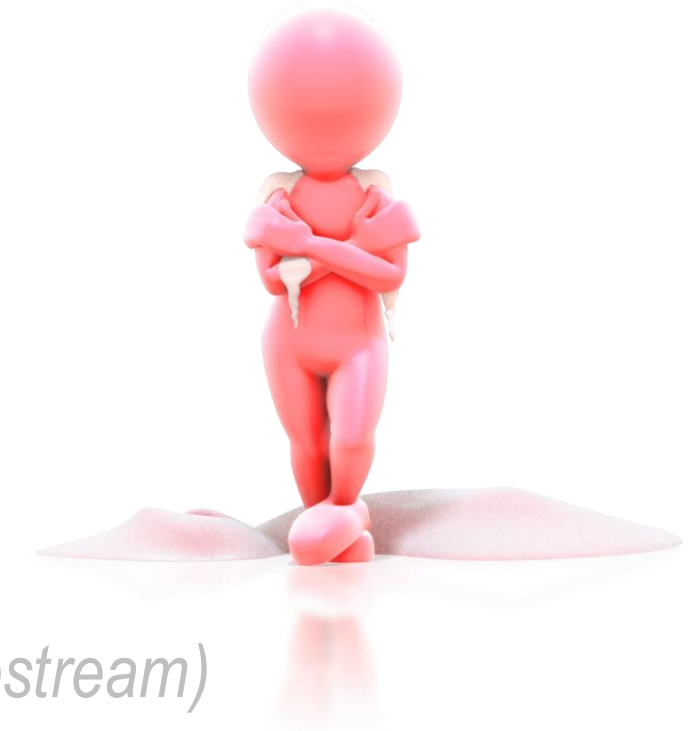
GENESIS
STRUCTURES

GENESIS
STRUCTURES

GENESIS
STRUCTURES

Arch Roll-On - POC

- Challenges
  - Tight site, tough grades to maneuver the arches
  - Maximum ramp slope 2%
  - Water elevations relative to top of bulkhead
  - Tide fluctuations from NOAA (oceanic winds, rain upstream)
  - Available barge heights (16ft available, needed 20ft)
  - Maximum SPMT stroke range (-12” to +12” theoretical)
  - Cold weather & ballasting operations



GENESIS STRUCTURES

GENESIS
STRUCTURES

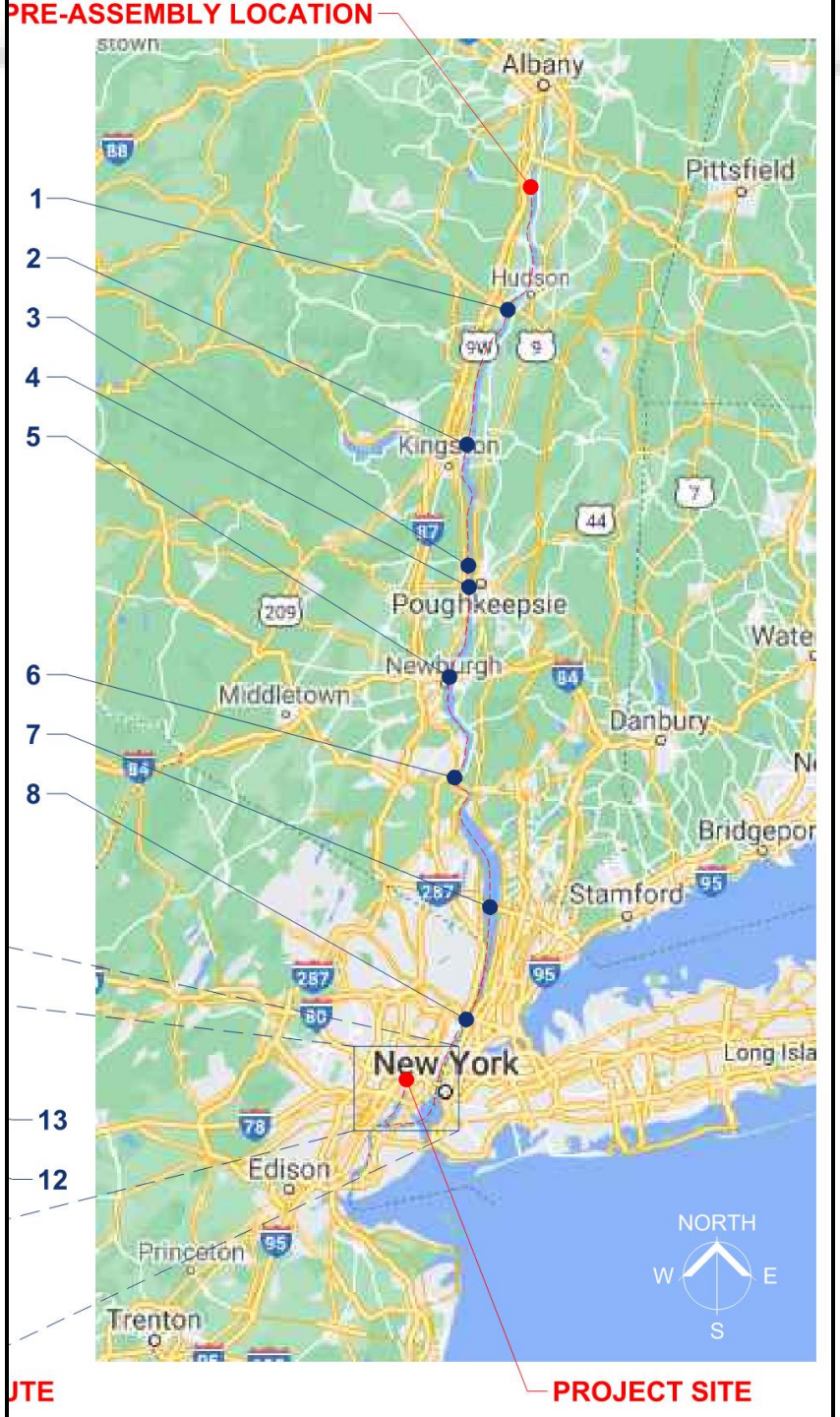
Arch Roll-On - POC

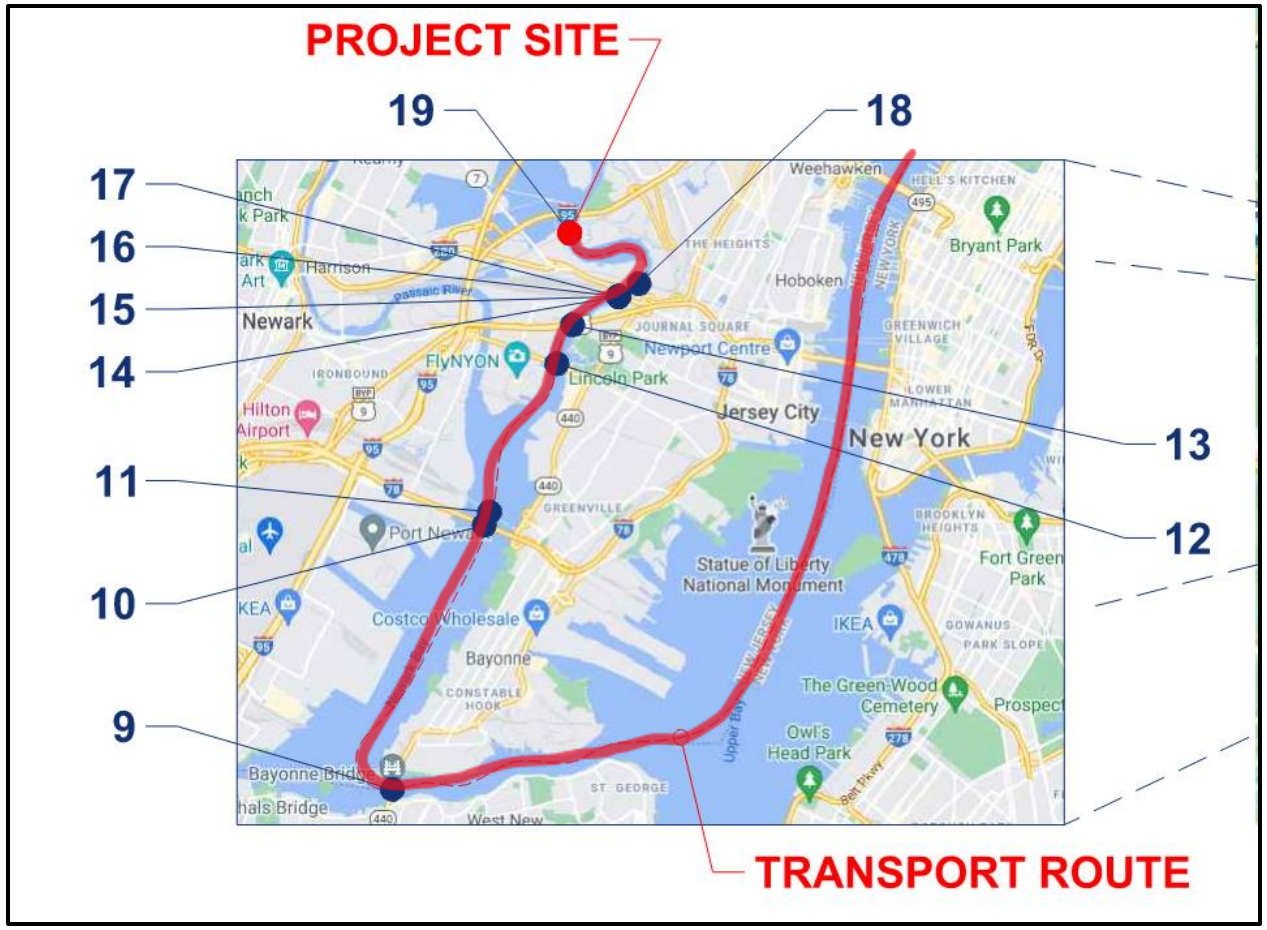
GENESIS
STRUCTURES

Transport to NJ

- *Many Cool Photo Ops ☺*
- *No vertical or horizontal problems on the Hudson*

GENESIS
STRUCTURES





GENESIS STRUCTURES


ERIN ELIZABETH
Carver
SKANSKA TAYLOR
ERIN ELIZABETH
SKANSKA

GENESIS
STRUCTURES

Transport to NJ

GENESIS
STRUCTURES

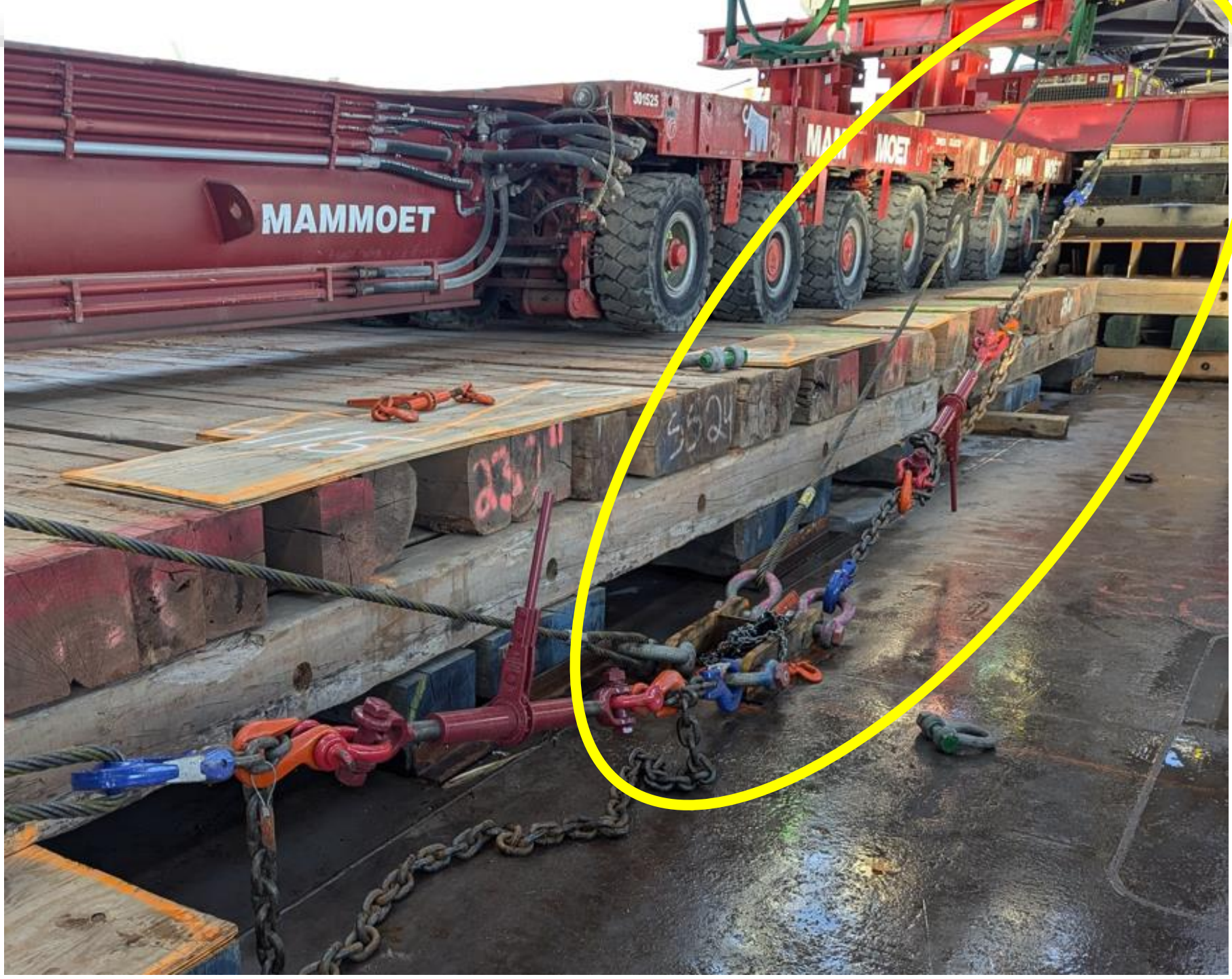
GENESIS
STRUCTURES

Transport to NJ

- *Challenges*
  - *Lashing for impact and wind*
  - *Vertical Height Clearance at Site – Overhead Electrical*
  - *Horizontal Width Clearance at Site – Existing Bridge*

GENESIS
STRUCTURES

GENESIS
STRUCTURES



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STRUCTURES

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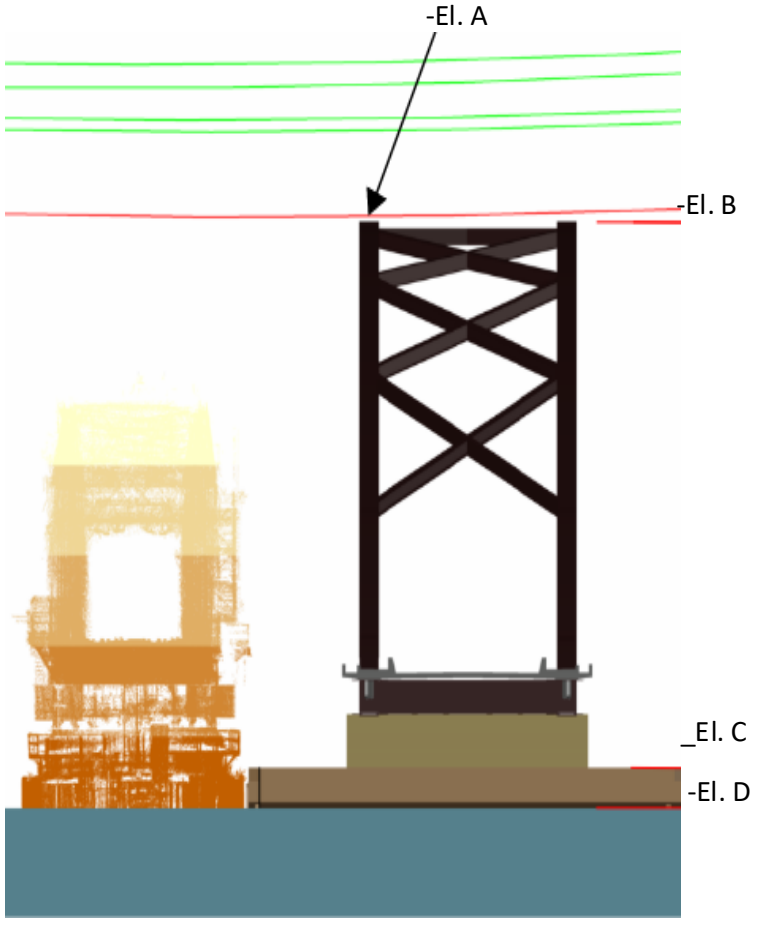
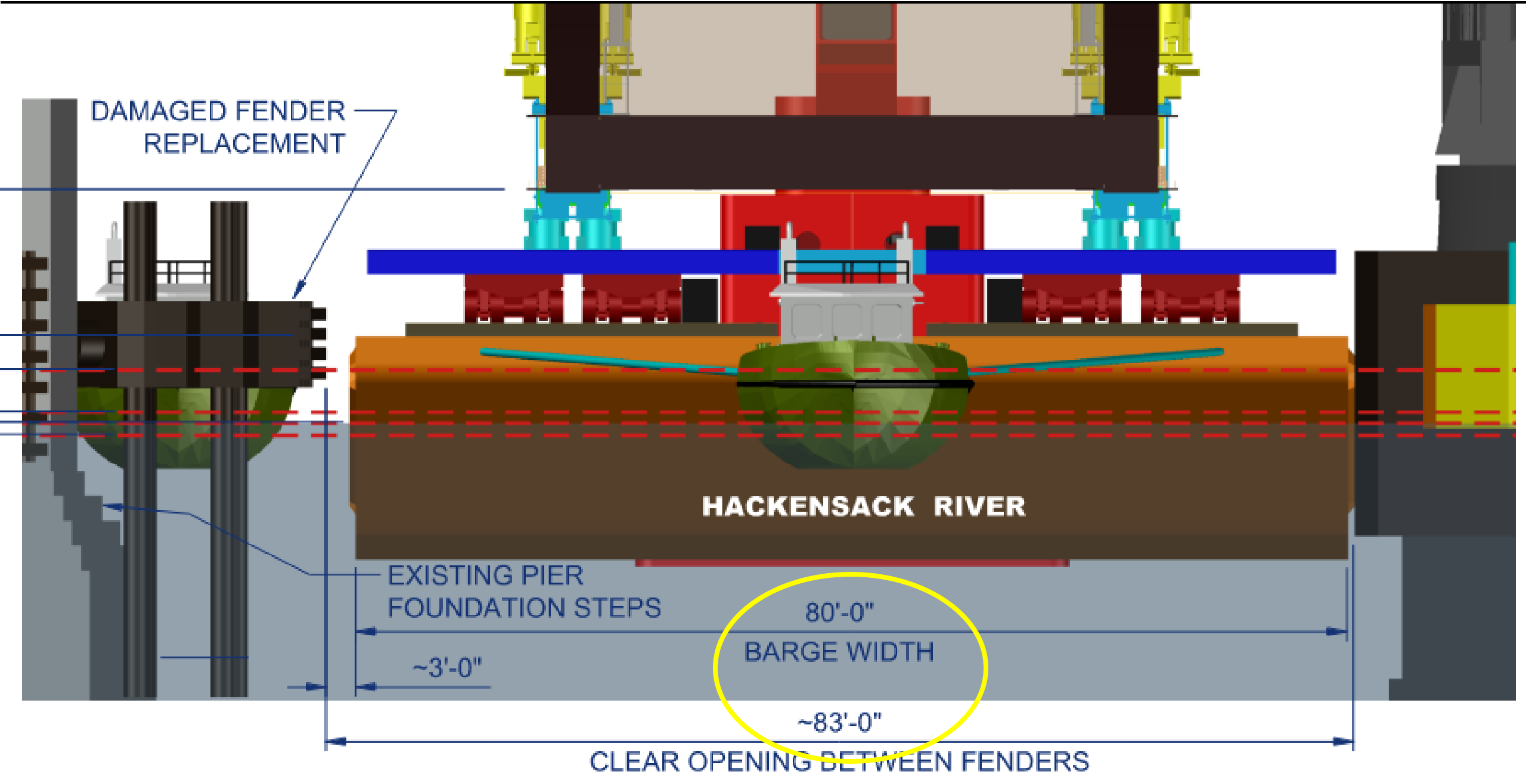


GENESIS
STRUCTURES



END VIEW - LOOKING SOUTH

Transfer Bents

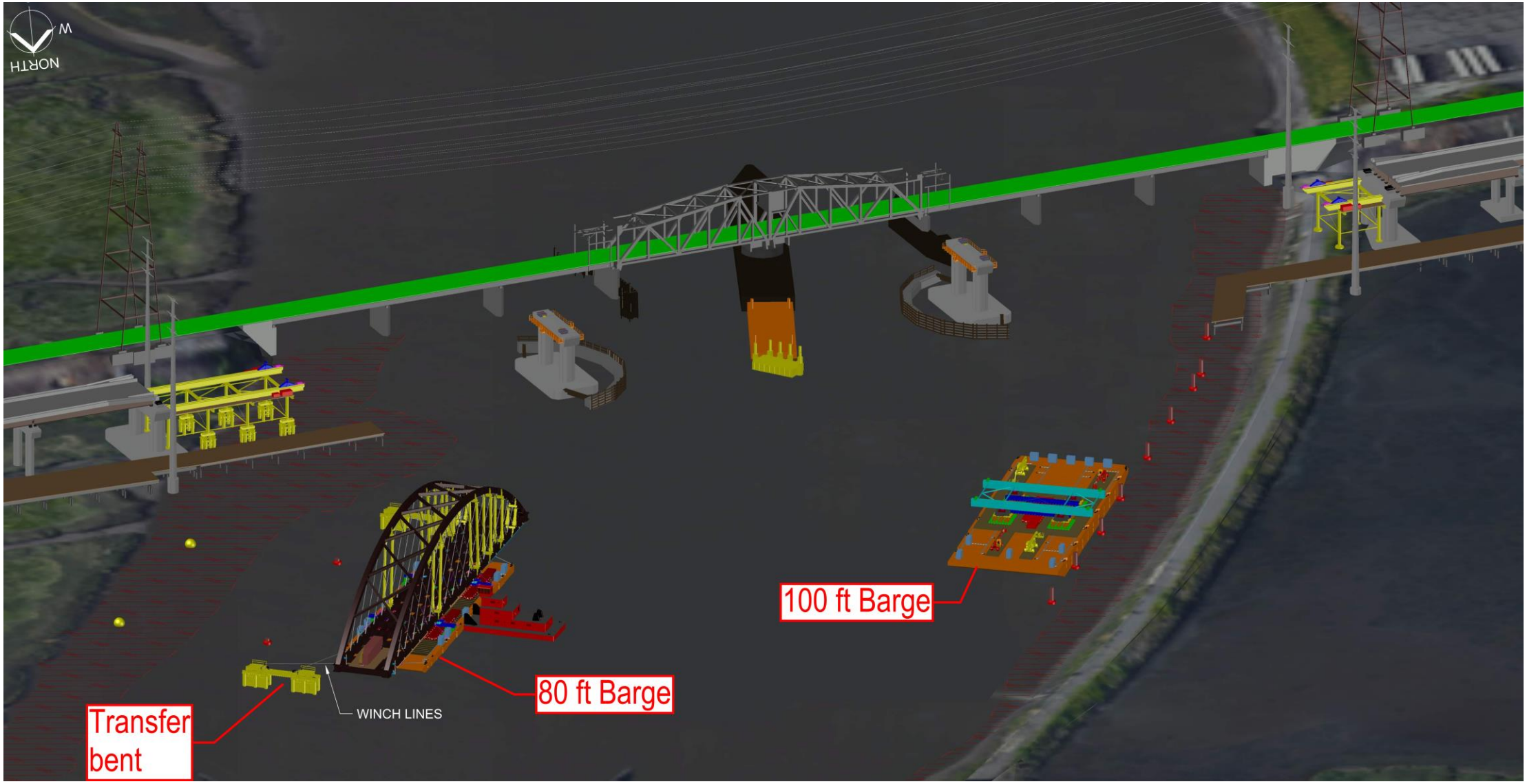
GENESIS
STRUCTURES

Transfer Bent

- *Challenges*
  - *Timing transfer with tide*
  - *Tide fluctuations from NOAA (oceanic winds, rain upstream)*
  - *Monitoring weather – Wind restrictions*

GENESIS
STRUCTURES

Transfer Bent – Set down with 80ft



GENESIS STRUCTURES

- *Drop off with 80ft barge*
- *High tide*

GENESIS
STRUCTURES

GENESIS
STRUCTURES

GENESIS
STRUCTURES

Transfer Bent – Pick up with 100ft

GENESIS
STRUCTURES


HUGHES 660


MAGNI
United Rentals

- *Pick up with 100ft barge*
- *LOW tide*

GENESIS
STRUCTURES


SUNBELT
SUNBELT

(Span 1C – ONLY 2 struts per arch)

GENESIS
STRUCTURES

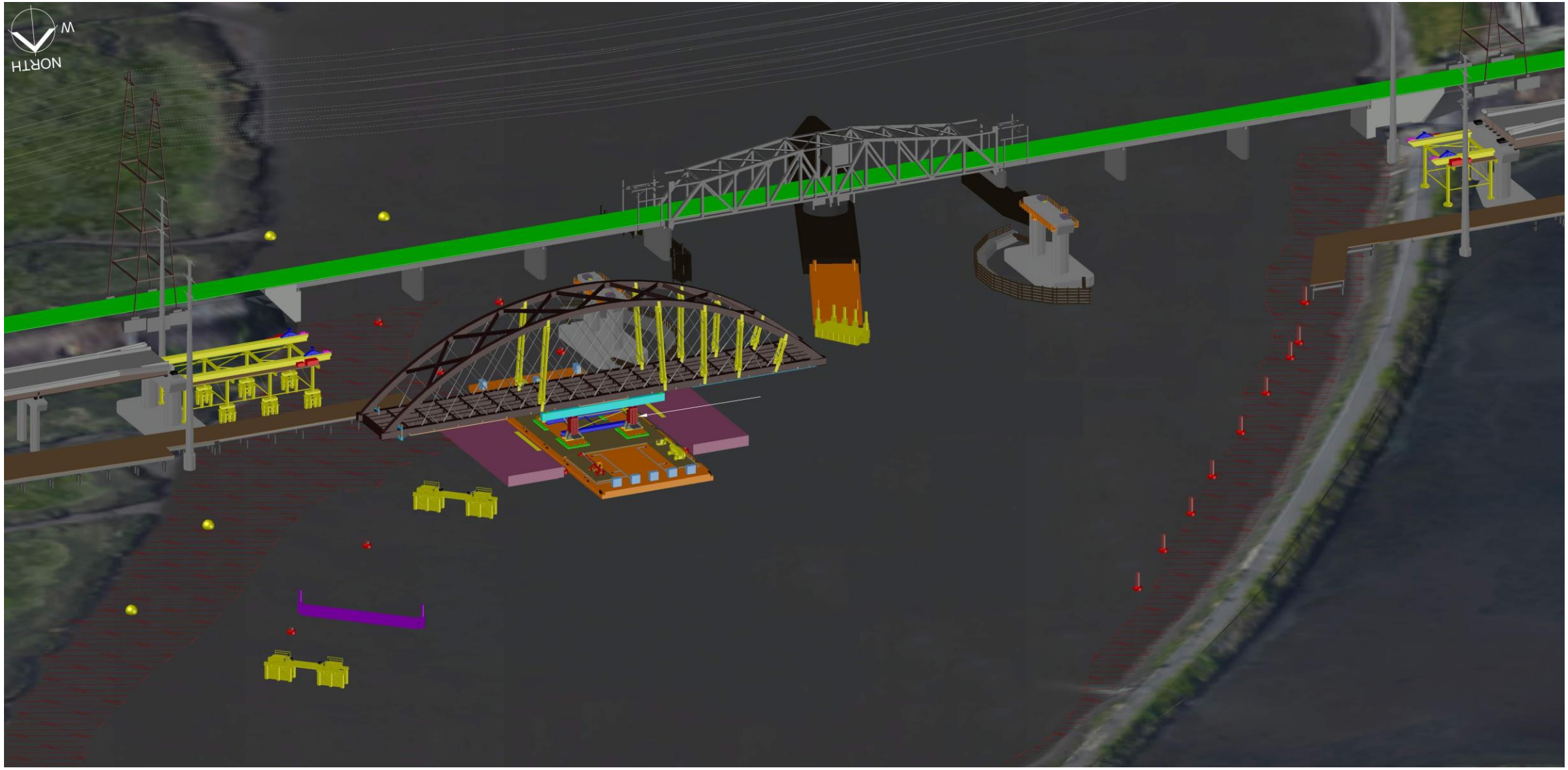
GENESIS
STRUCTURES

Float-in and Jacking

- *Challenges*
  - *Timing Float-In with Tide*
  - *Tide fluctuations from NOAA (oceanic winds, rain upstream)*
  - *Monitoring weather – Wind restrictions*
  - *Installing bracing during the jacking operations*
  - *Accurate Touch-Down Tolerances*

GENESIS
STRUCTURES

Float-in and Jacking



GENESIS
STRUCTURES

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STRUCTURES

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STRUCTURES

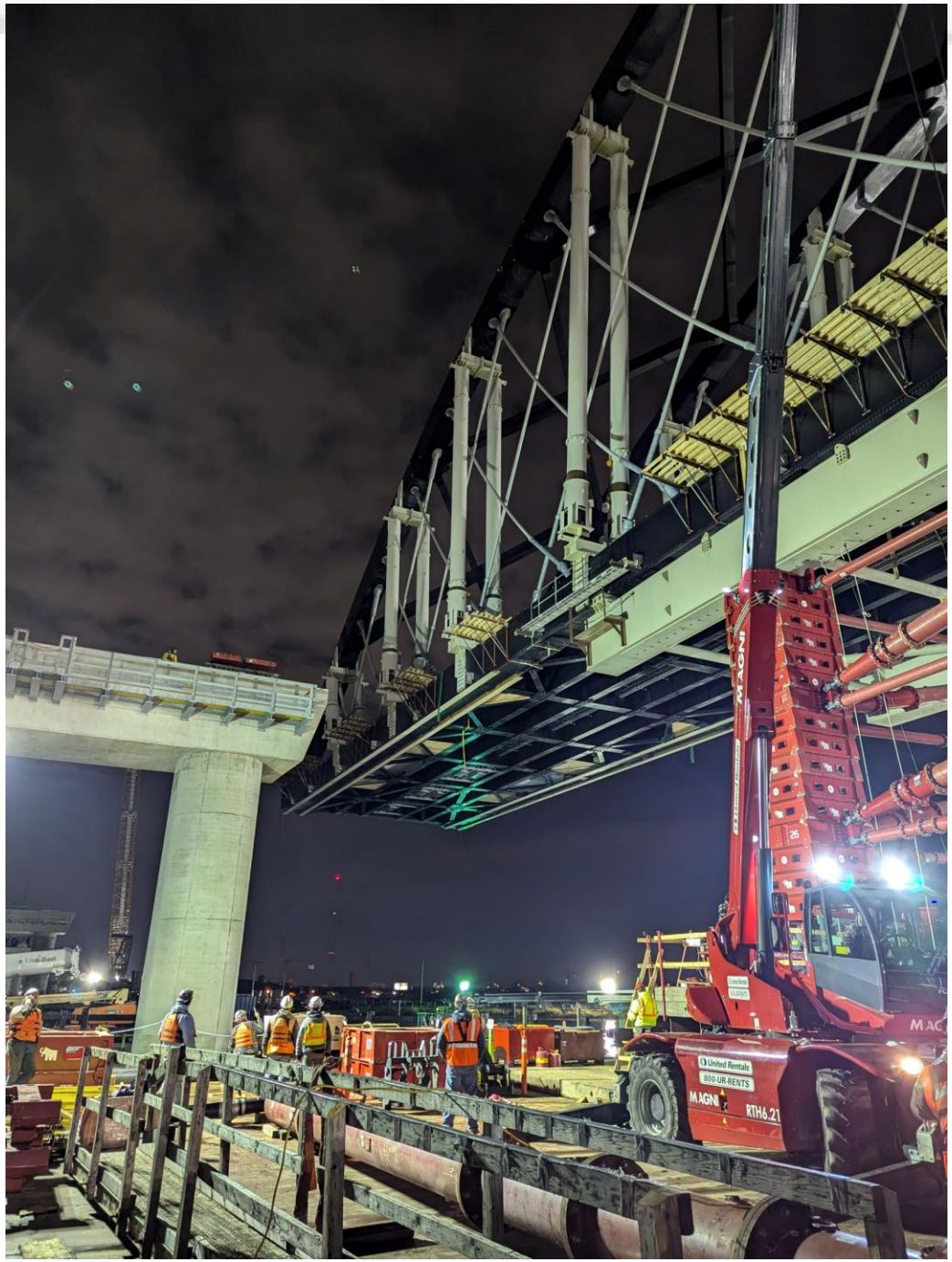
GENESIS
STRUCTURES

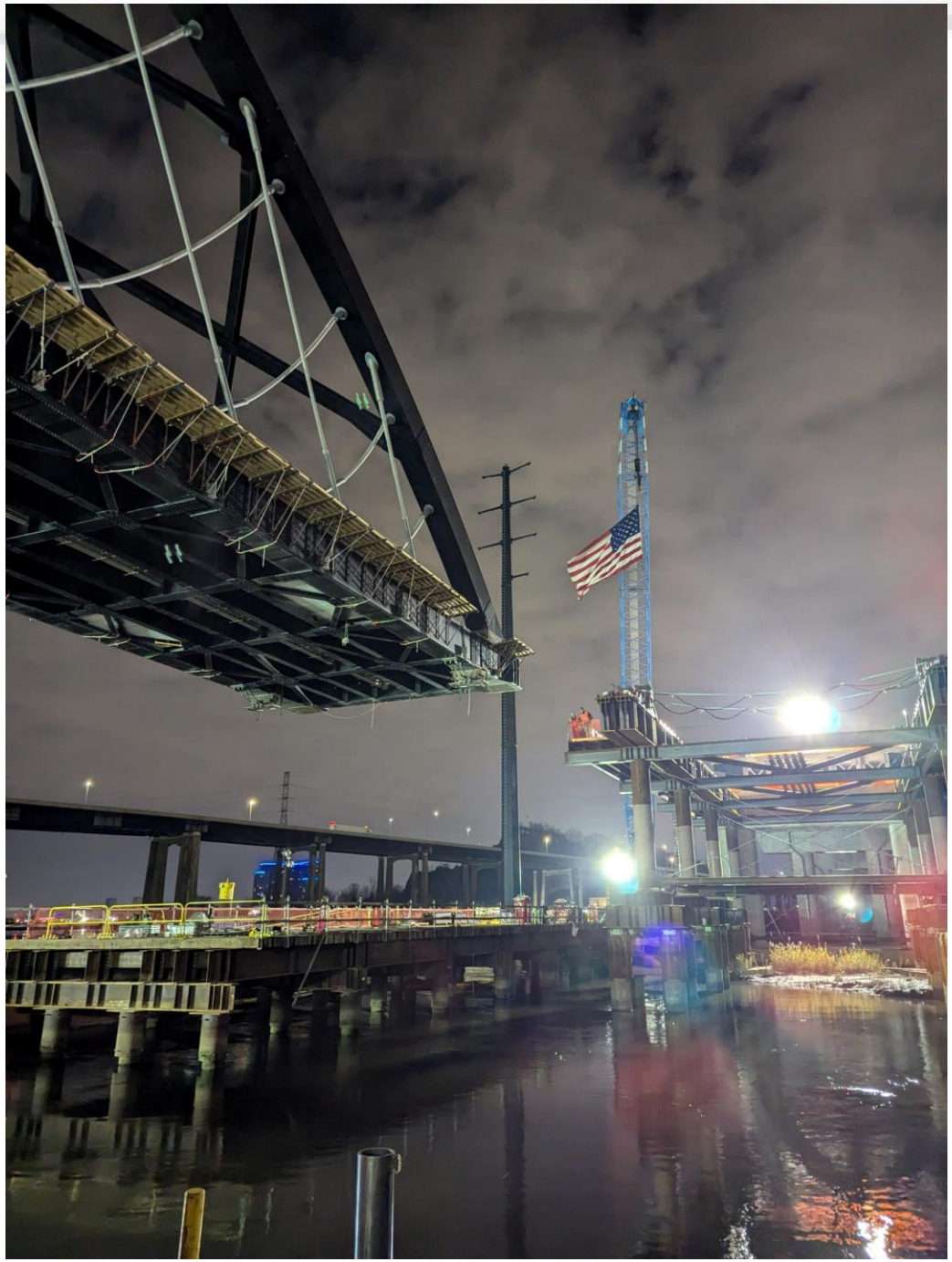
GENESIS
STRUCTURES

Float-in and Jacking

- Challenges
  - Timing Float-In with Tide
  - Tide fluctuations from NOAA (oceanic winds, rain upstream)
  - Monitoring weather (jacking operations had wind restrictions)
  - Installing bracing during the jacking operations
  - Accurate Touch-Down Tolerances

GENESIS
STRUCTURES





GENESIS
STRUCTURES

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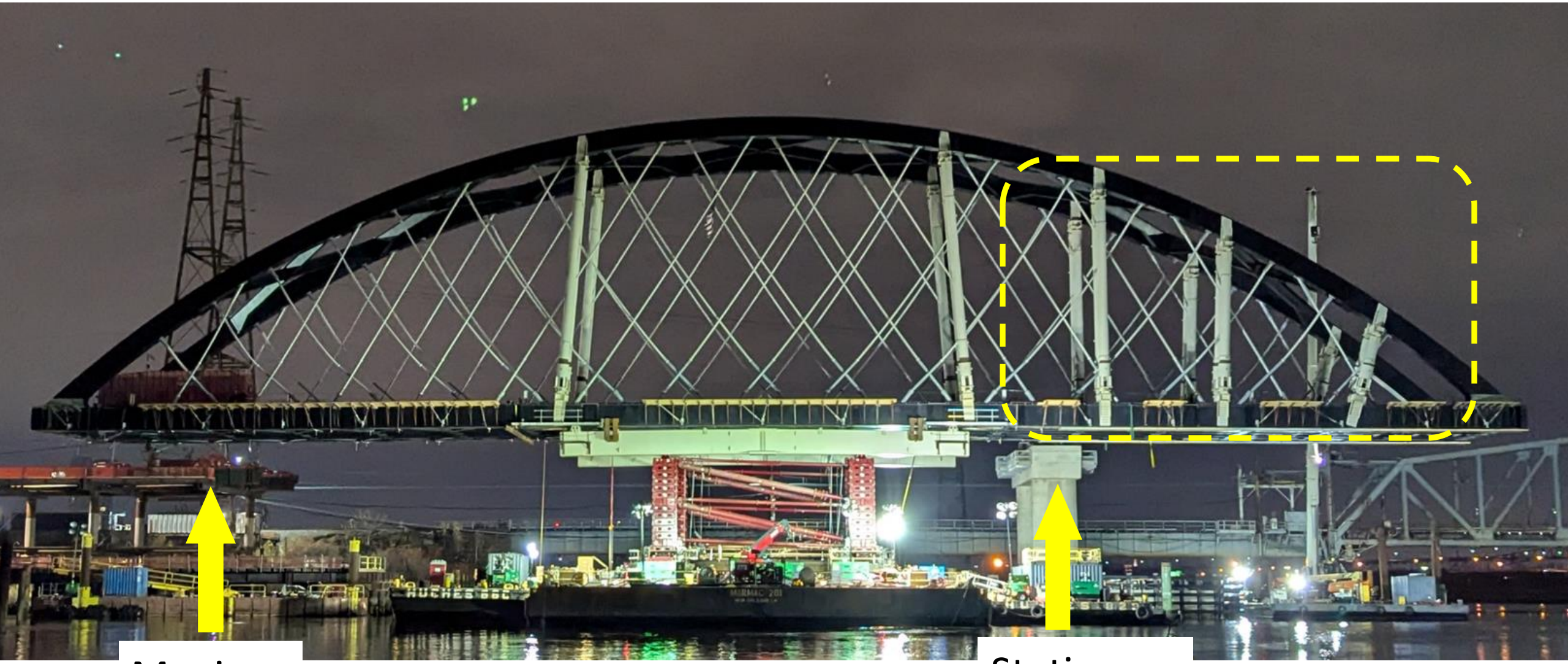


GENESIS STRUCTURES

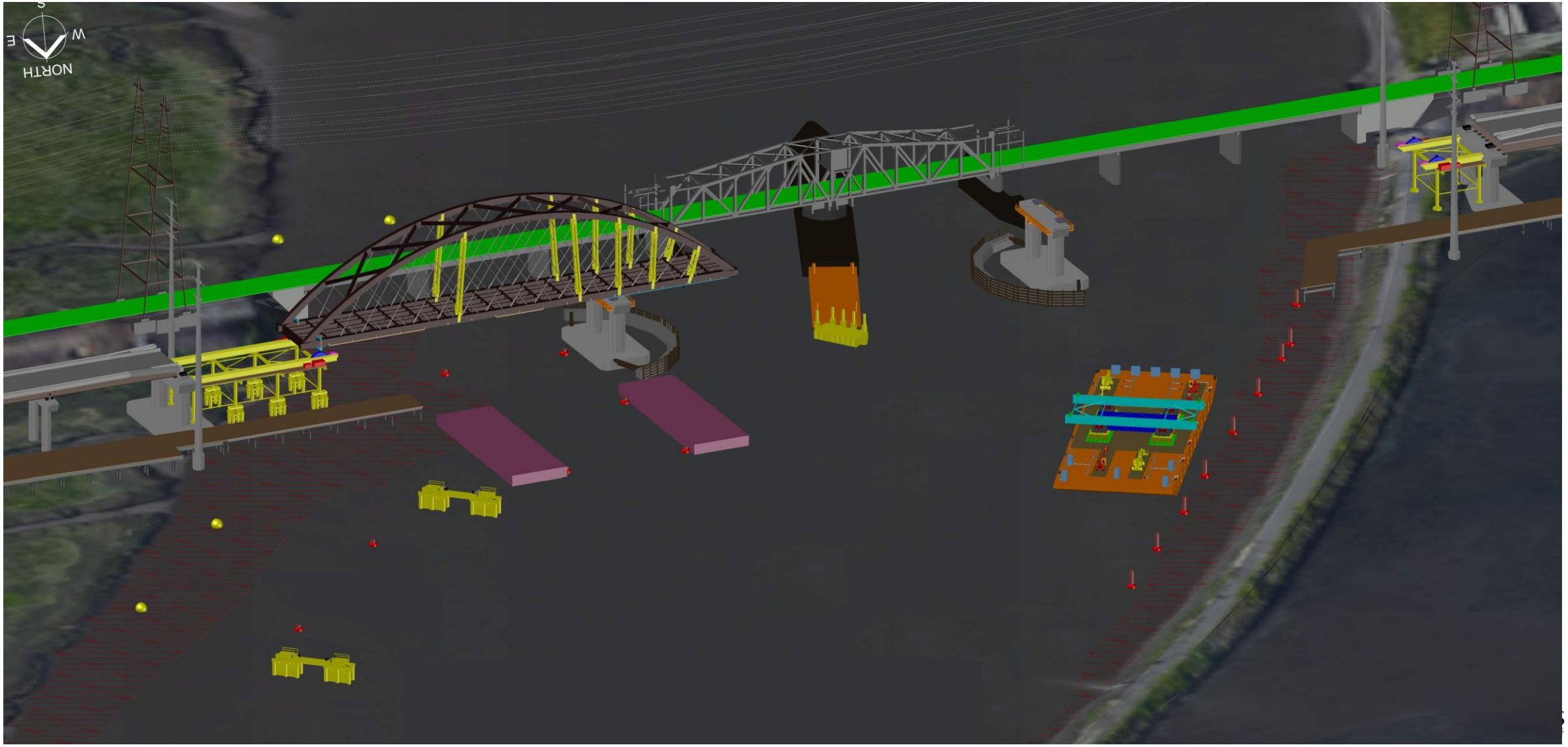
GENESIS
STRUCTURES

Arch Longitudinal Slide

- *Challenges*
  - *Stability of slide frame (where/how to brace)*
  - *Sliding friction*
  - *Steering Slide*
  - *Jacking the truss down once in final position*

GENESIS
STRUCTURES

Arch Longitudinal Slide



GENESIS
STRUCTURES

GENESIS
STRUCTURES

- *715T vertical ea.*
- *91T horiz. ea.*
- *4 total skids*

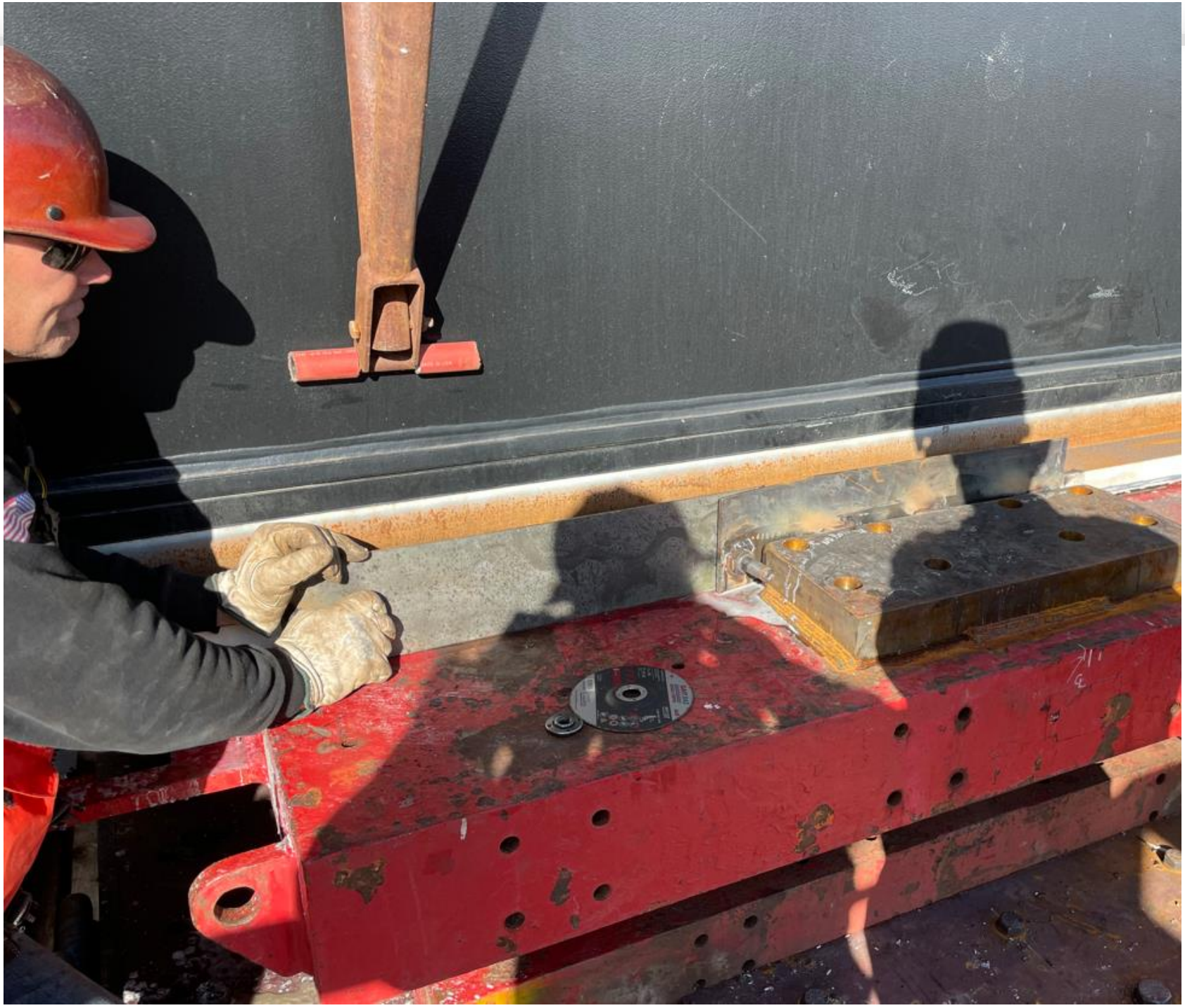
- *4.5ft stroke*

GENESIS
STRUCTURES

- *Steer arch*

GENESIS
STRUCTURES

GENESIS
STRUCTURES



GENESIS
STRUCTURES

GENESIS
STRUCTURES

GENESIS
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GENESIS
STRUCTURES

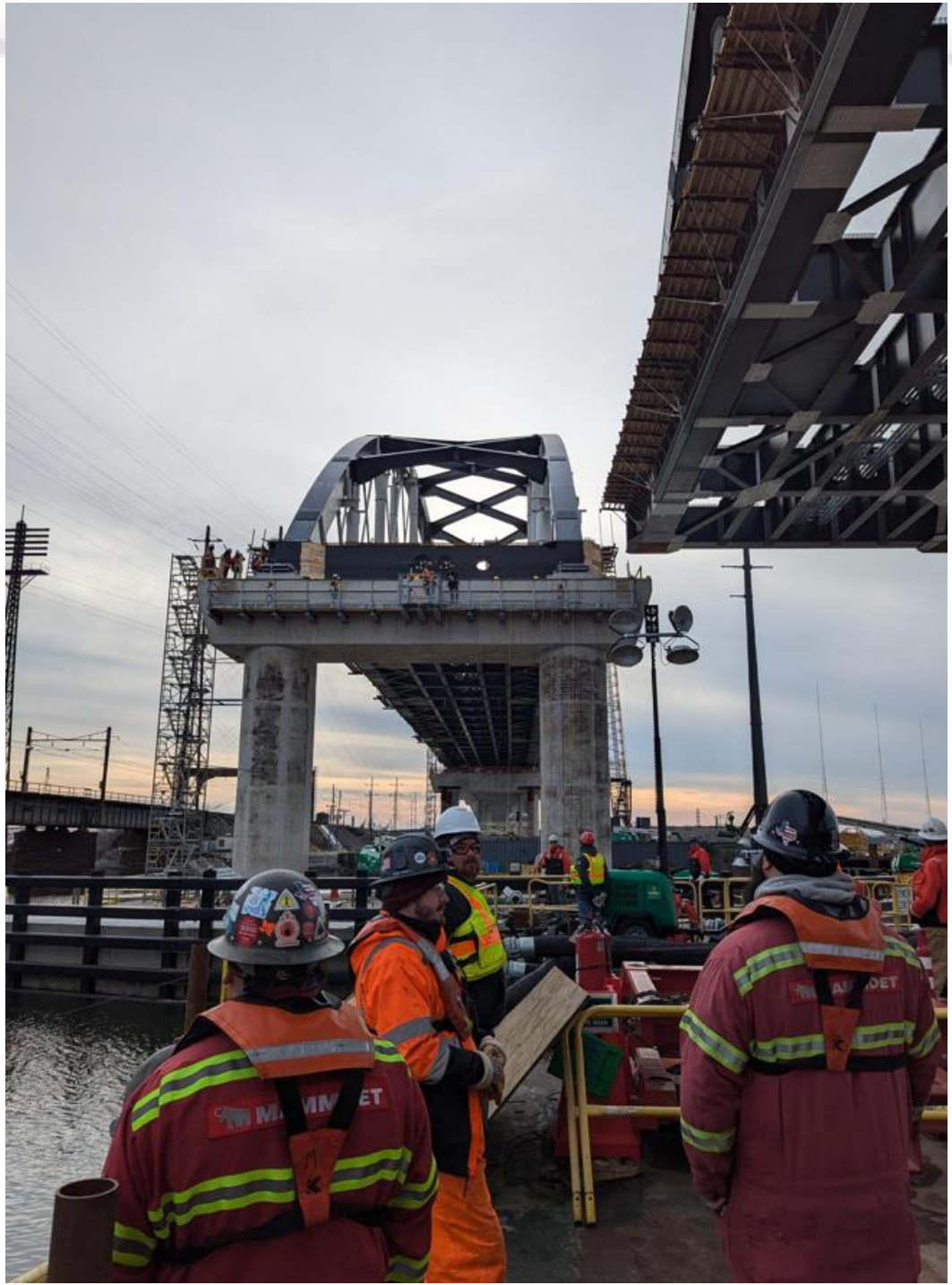
Span 1E – November 2024

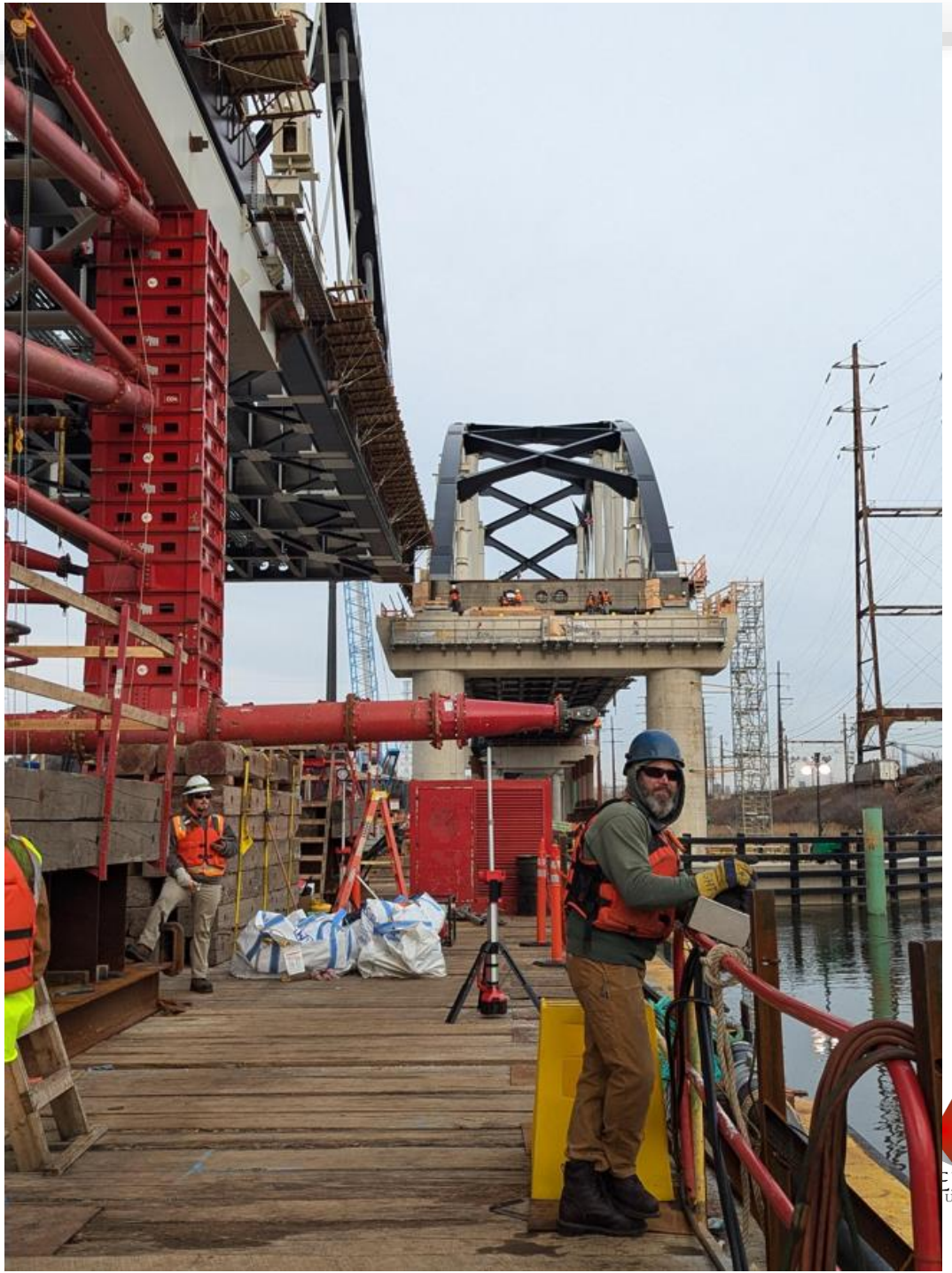
Span 1W – January 2025

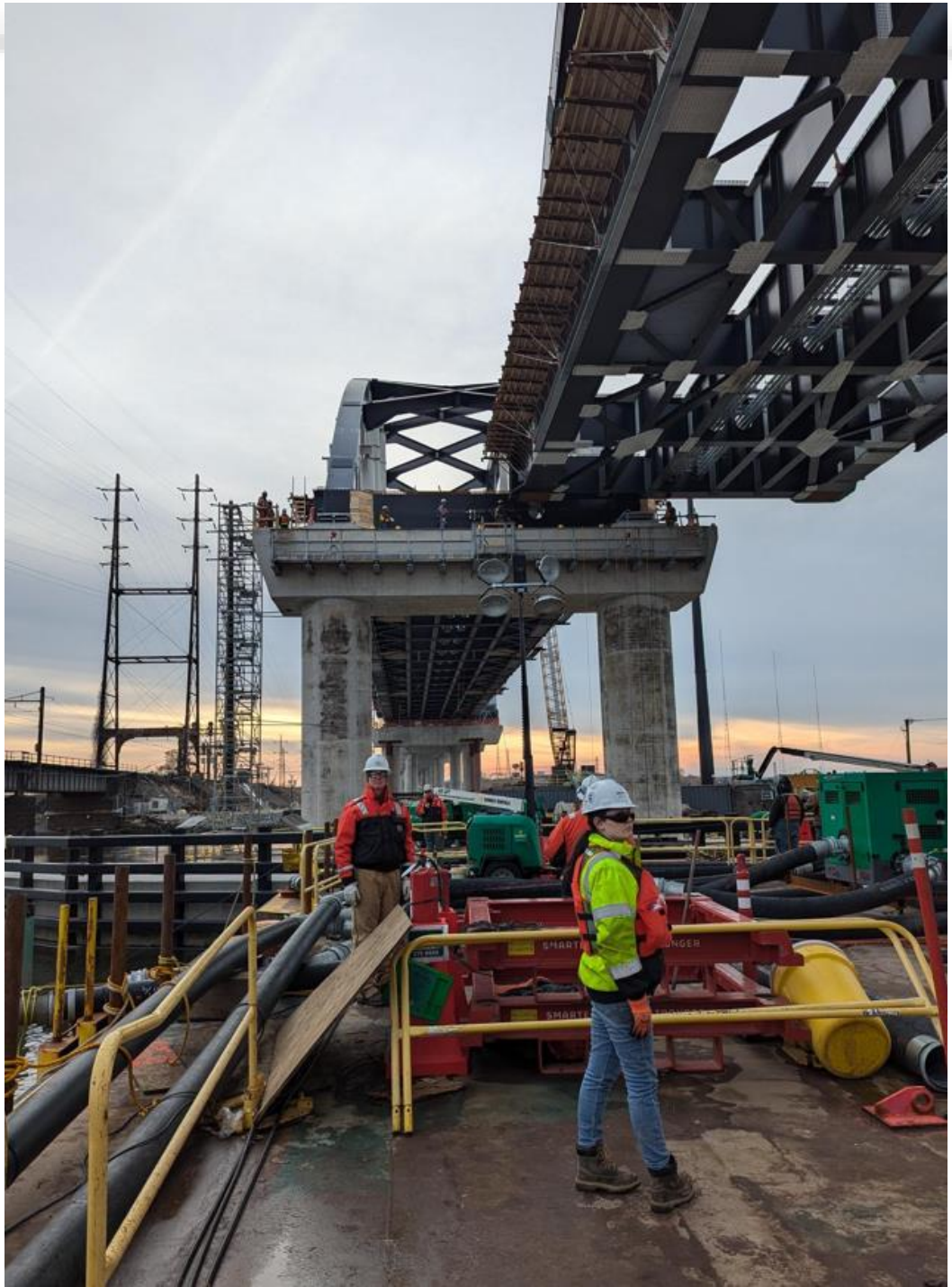
GENESIS
STRUCTURES

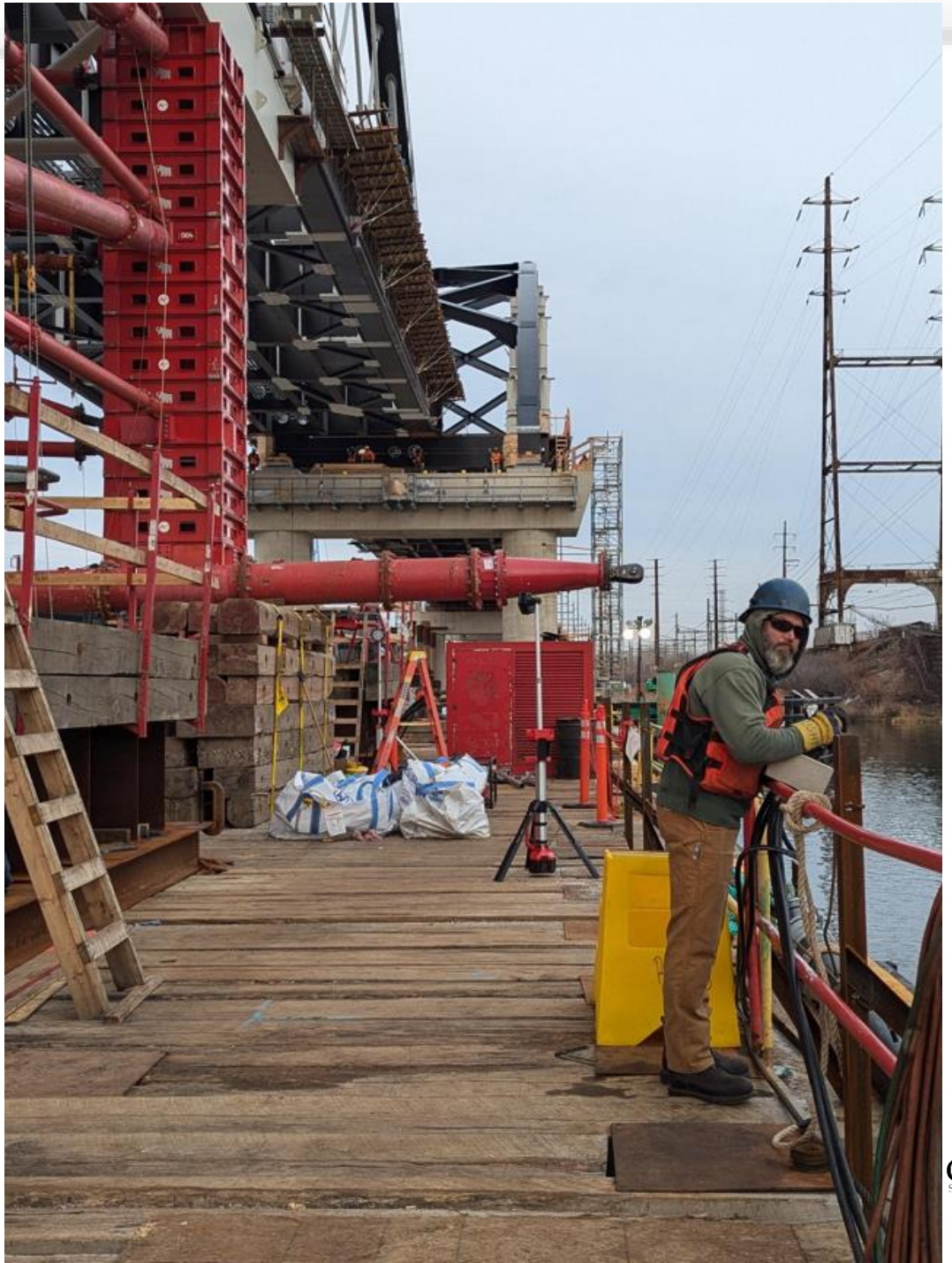
Span 1W – January 2025

Span 1C – February 2025

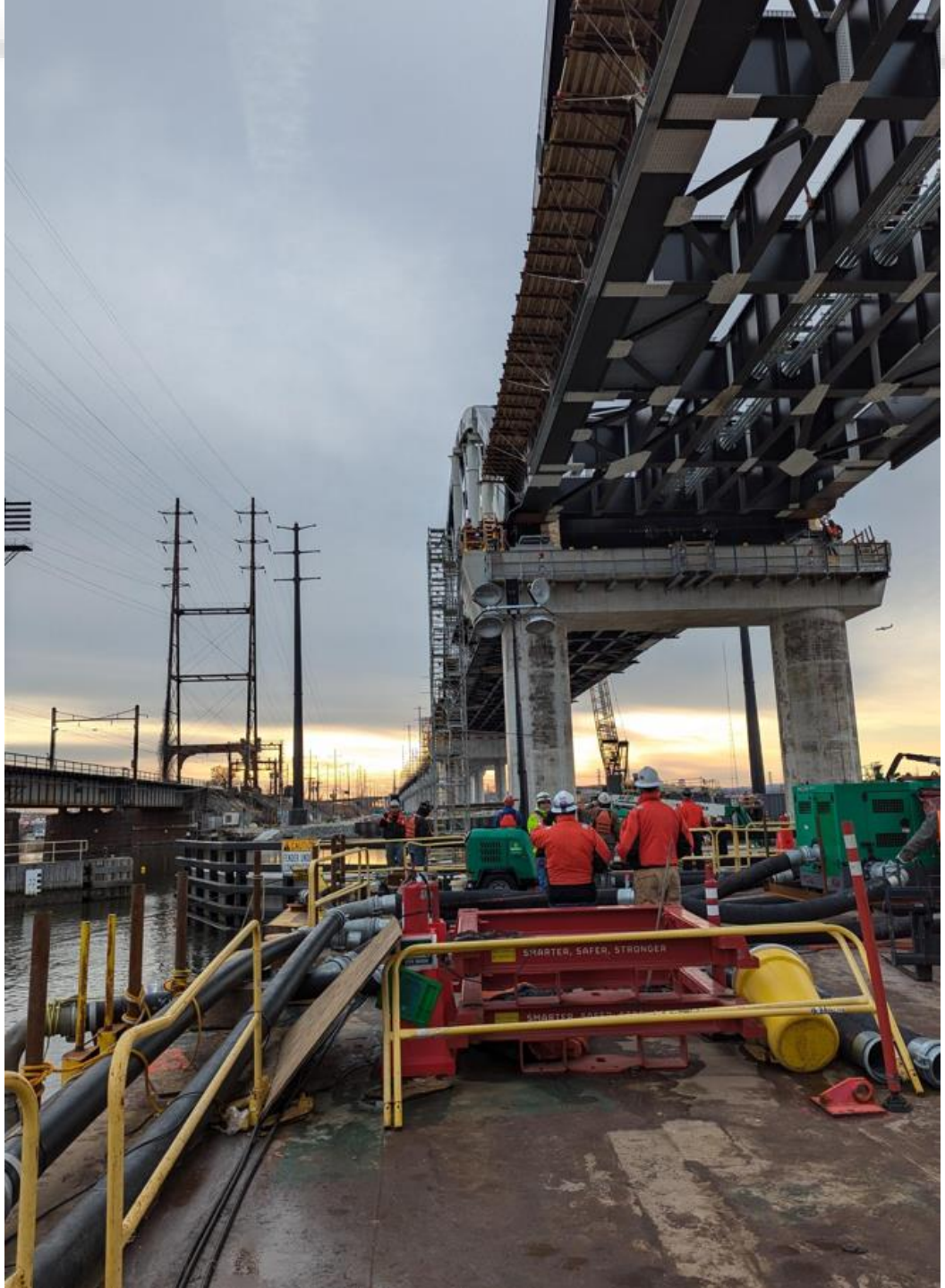


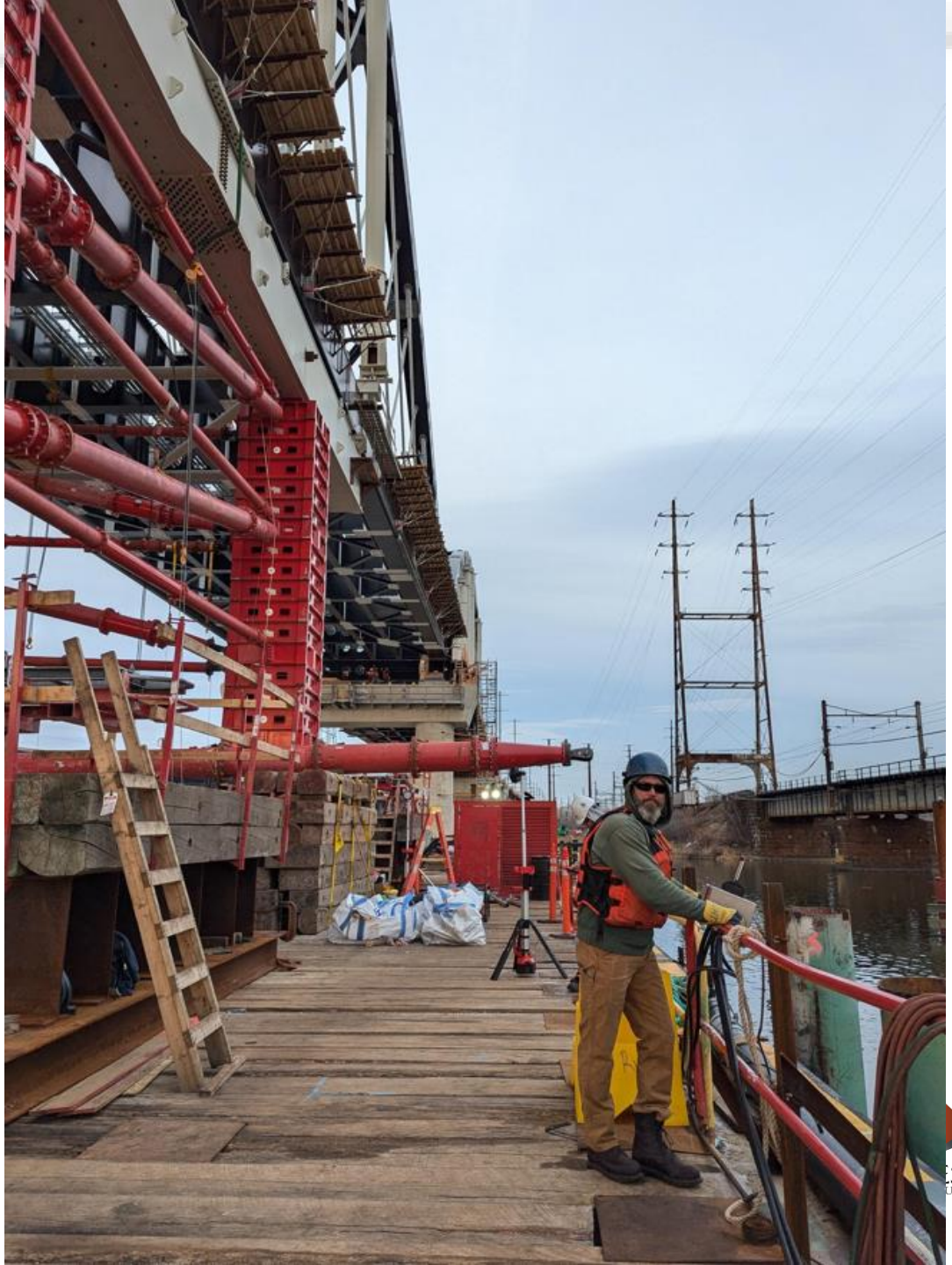






GENESIS
STRUCTURES


SMARTER, SAFER, STRONGER



Special Thanks…..

SKANSKA

TRAYLOR
TRAYLOR BROS., INC.

D.A. COLLINS
COMPANIES

PORT OF COEYMANS
MARINE TERMINAL
Connecting the world to the Northeast

VSL

MAMMOET

GENESIS
STRUCTURES

Learning Assessment

1. What type of arch structure are the Portal North Bridges?
   Network Tied Arch
2. How many struts were needed for the SPMT and barge float operations?
   Two
3. How was the vertical position of the barge relative to the bulkhead controlled.
   By pumping water in and out of the barge internal ballast tanks.

GENESIS
STRUCTURES

Learning Assessment

4. *Why were the arches lowered onto a transfer bent before landing on the piers?*
   To pick up with a wider barge with a Mega Jack System
5. *How many mega-jack were used to complete the vertical lift?*
   Four

GENESIS
STRUCTURES

Questions ??

GENESIS
STRUCTURES