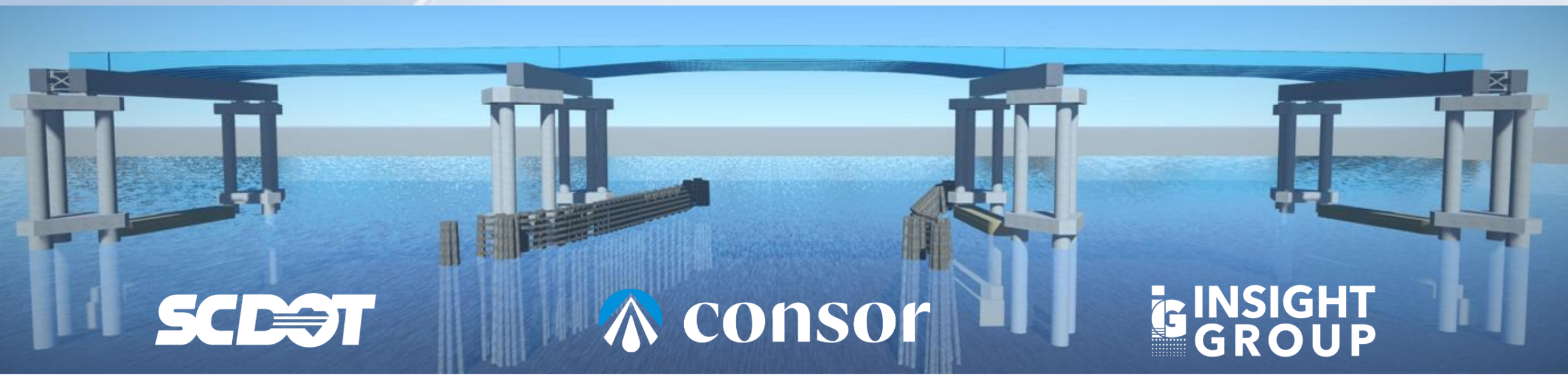


# US 17 Over the Waccamaw River

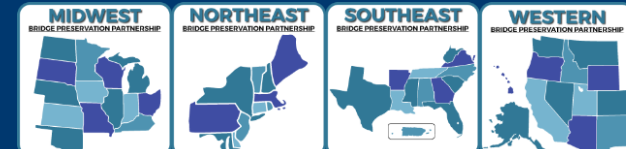
A \$49 Million Emergency Repair due to an Underwater Inspection



**SCDOT**

 **consor**

 **INSIGHT  
GROUP**



# Agenda

**01** Background

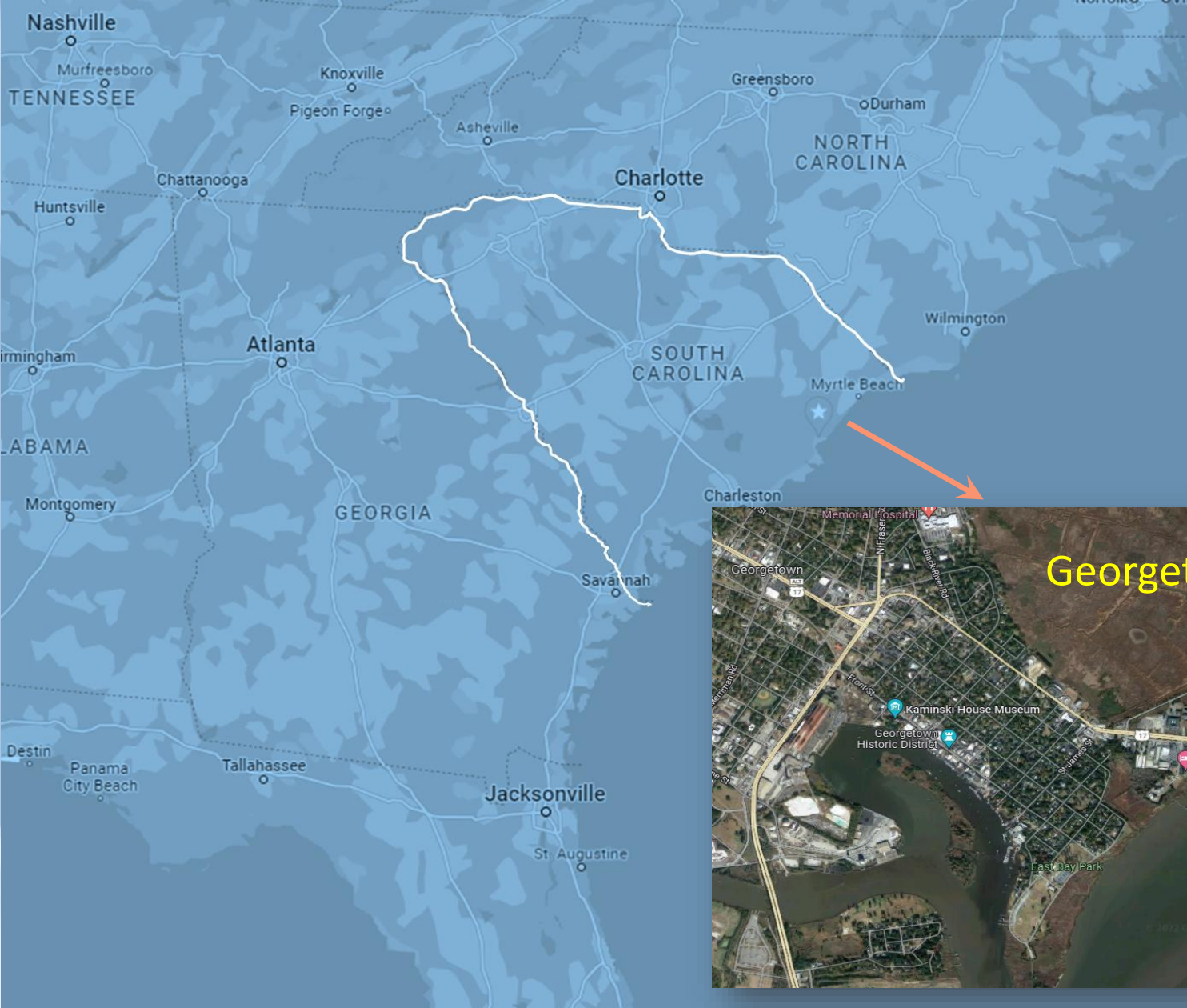
**02** Identification

**03** The Solution

**04** Construction



# 01 Background



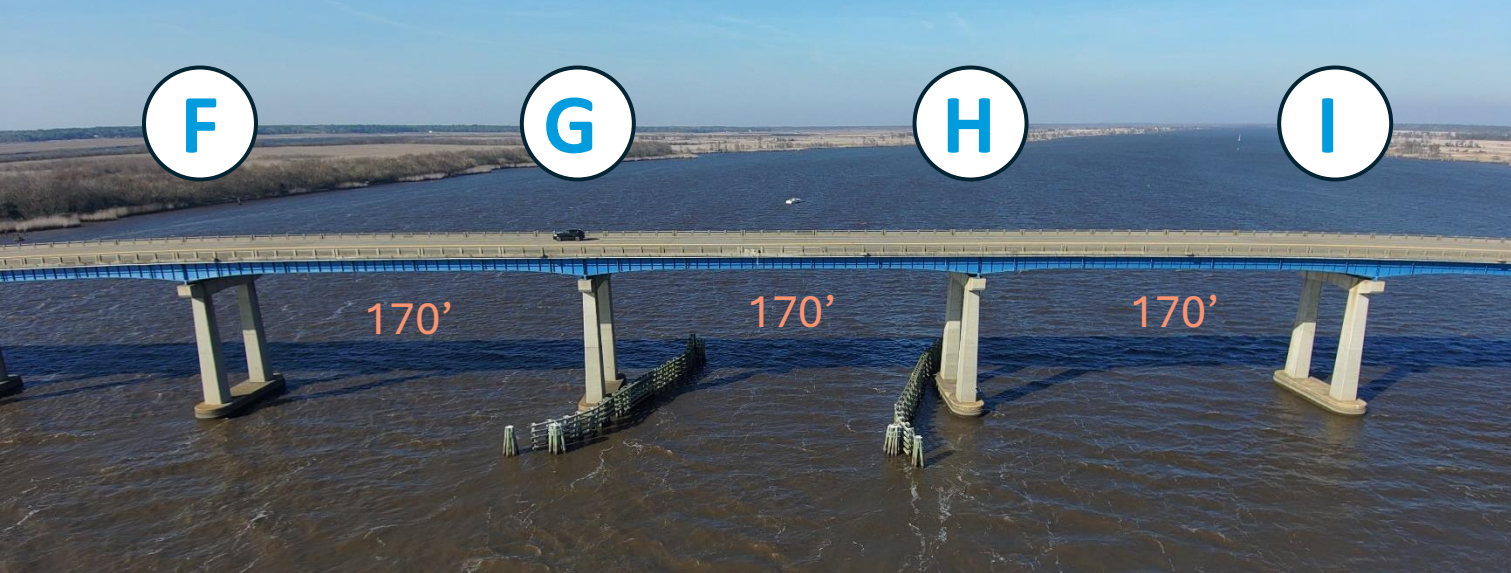
Over 2-hour  
Detour



## Stats

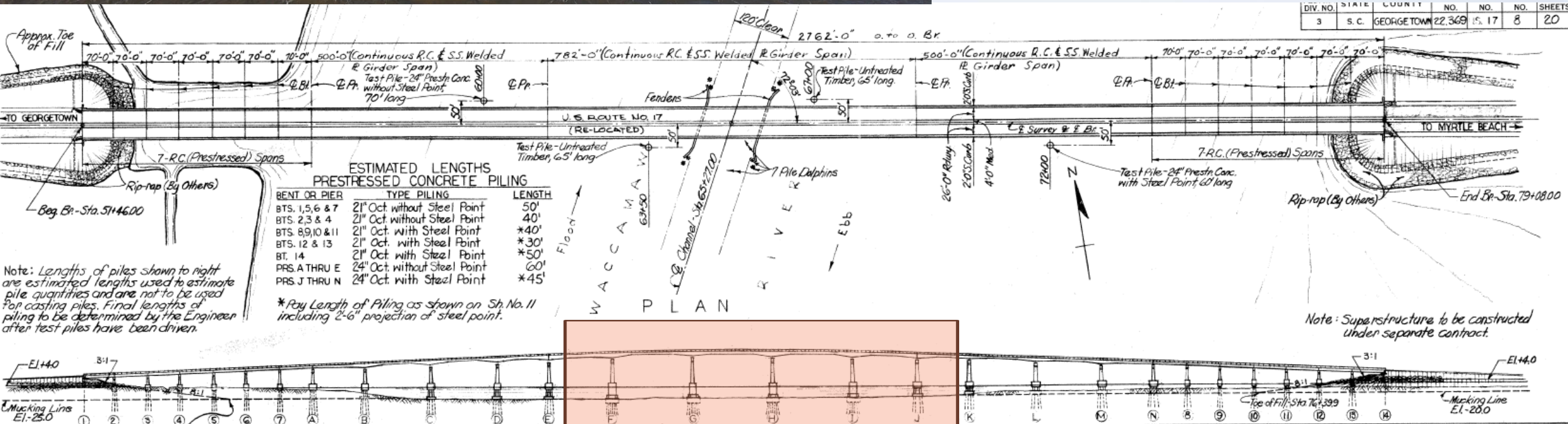
- 2762' long bridge
- 782' -five span continuous main span
- Max water depth ~50'
- Tidal flow with brackish water





# Piers Supporting Main Spans

Bridge Built in 1963

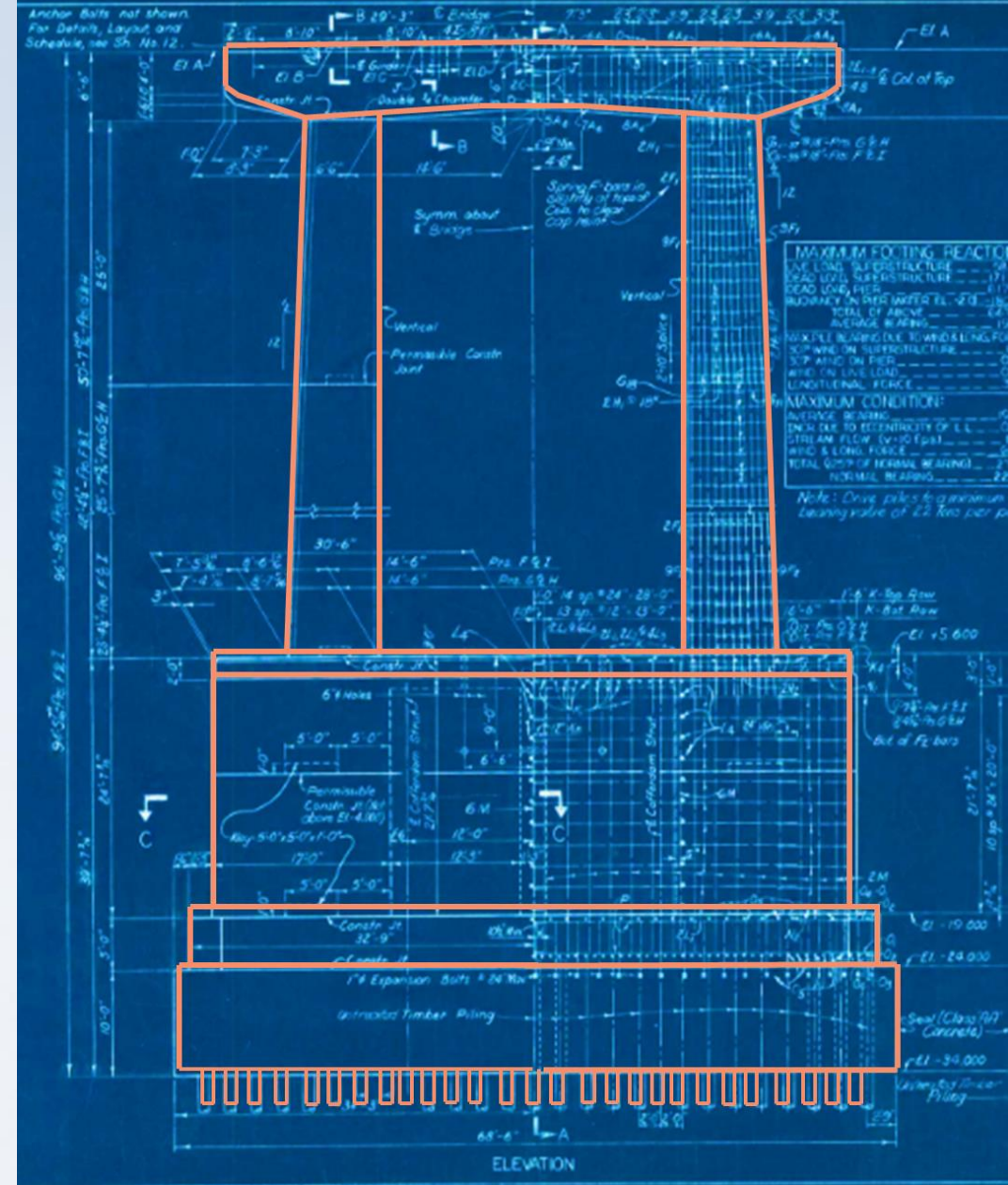


DIV. NO.	STATE	COUNTY	NO.	NO.	NO.	SHEET
3	S. C.	GEORGETOWN	22,369	15, 17	8	20

# Piers F to I

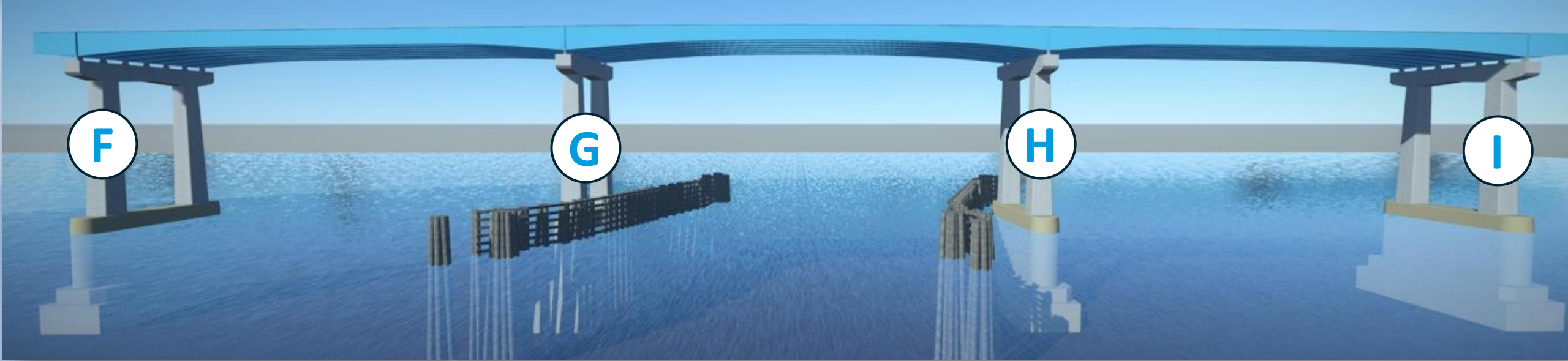
## Pile supported foundation

- Designed with timber pile supports
- ~40' vertical clearance from water to superstructure



# 02 Investigation

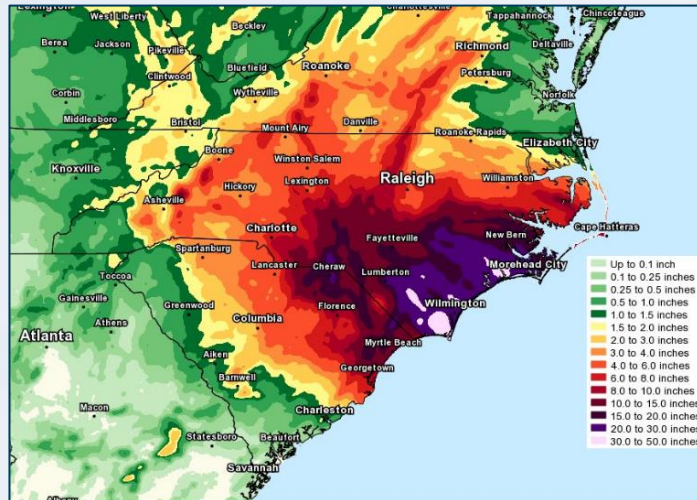




## 2001 - 2016

- Routine U/W Inspections every 60 months
- Undermining up to 2' high at Piers F and I
- Piles were “felt” with a survey rod under the footings

## 2018

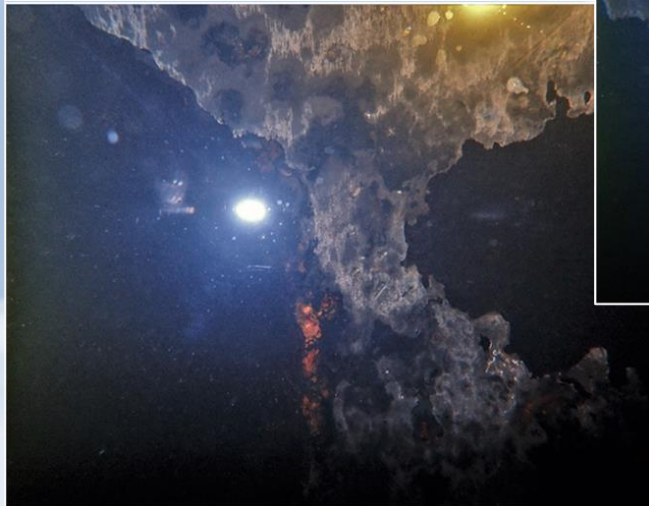
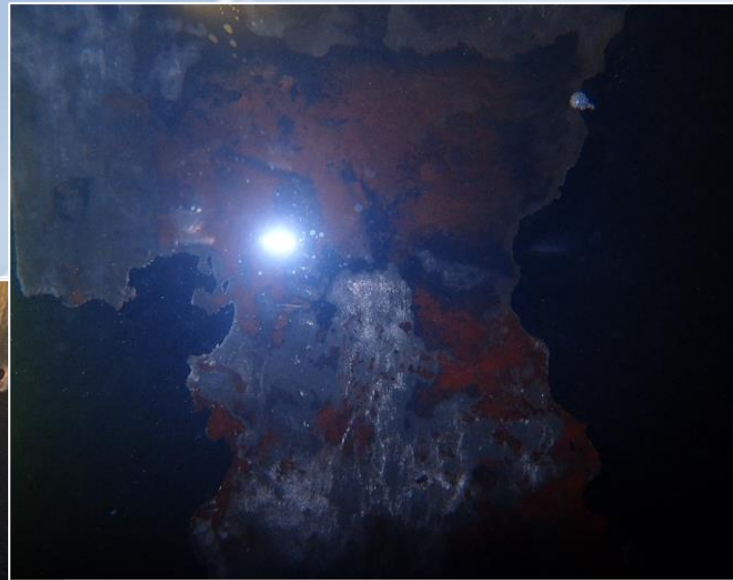
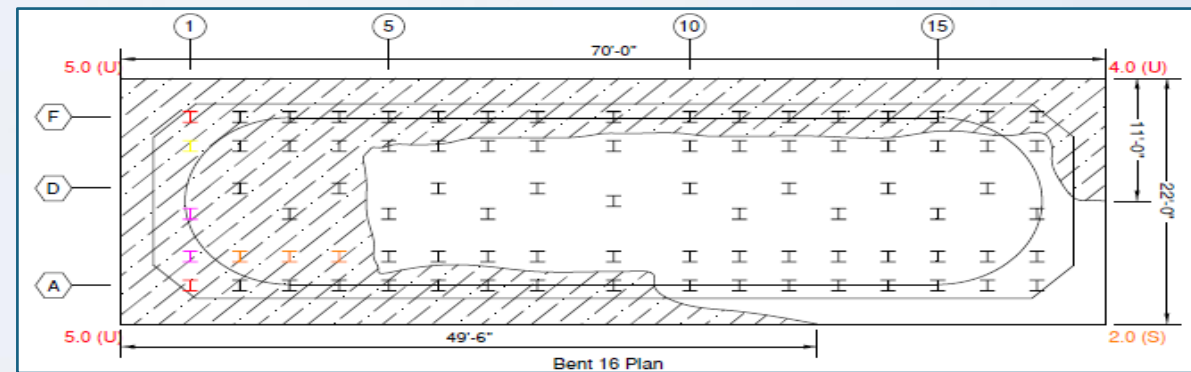
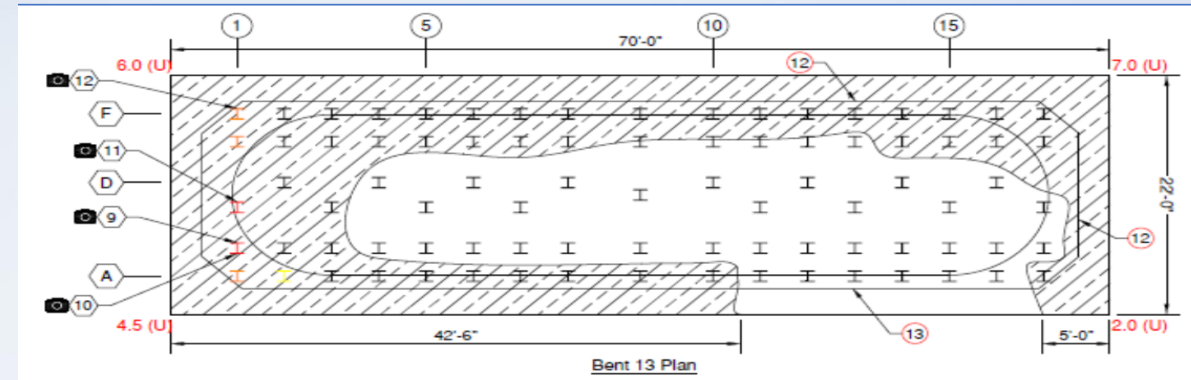
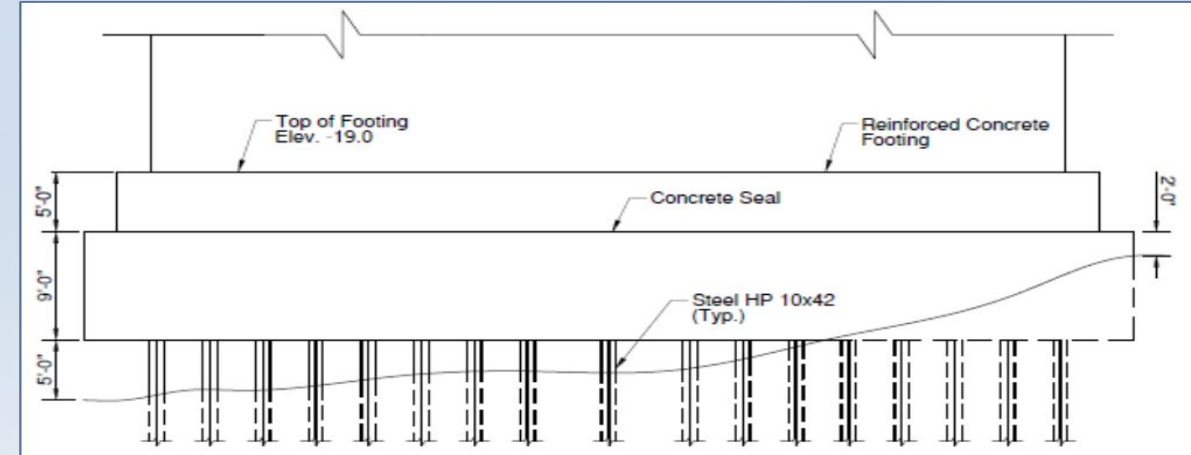


## 2021

- Undermining up to 7' high at Piers F and I
- Divers able to penetrate under the footing
- Divers assessed the exposed piles

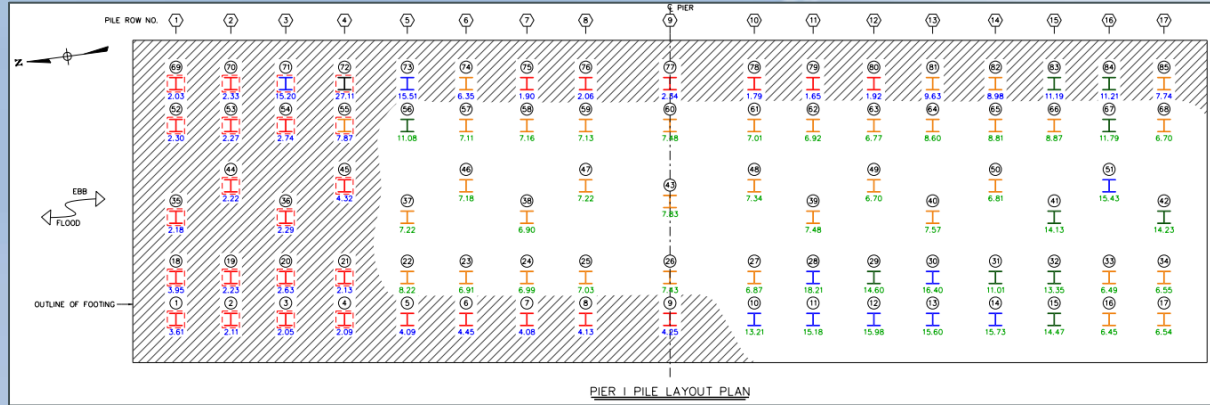
# Unexpected Findings

- Steel piles, not timber piles
- Significant deterioration of the steel piles
- Up to 100% section loss of the flanges

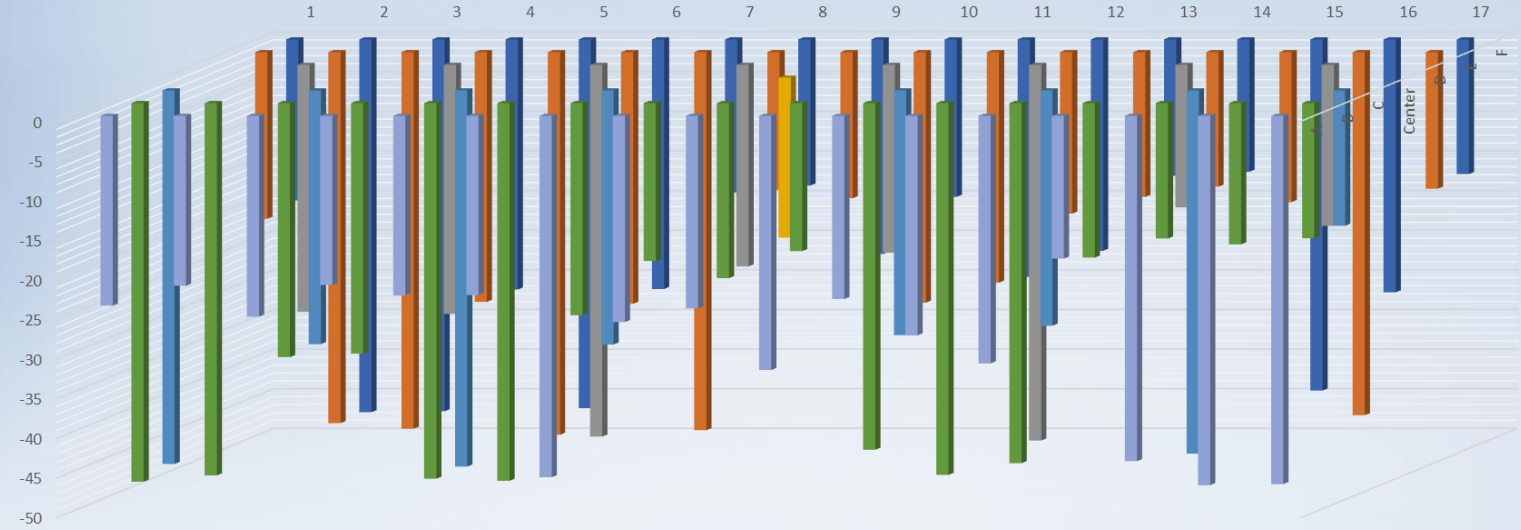


# PILE EMBEDMENT PLAN VIEW

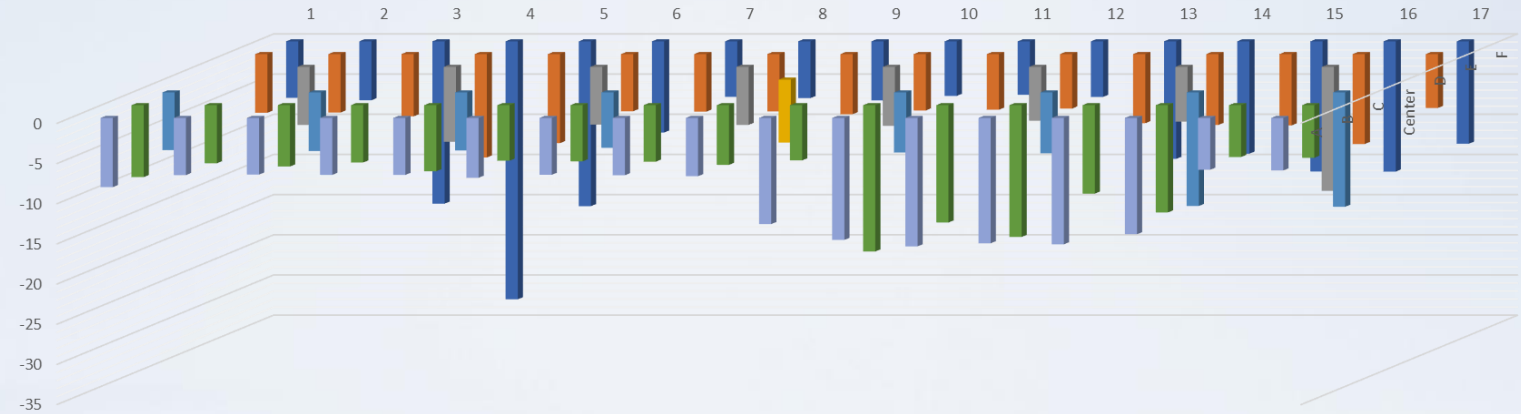
(2021 UW Inspection)



# Pier F Embedment

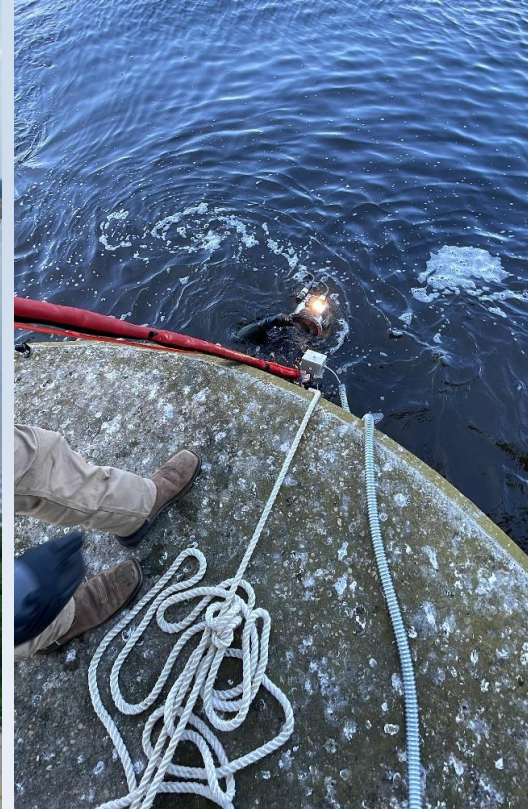


# Pier I Embedment



■ F ■ E ■ D ■ Center ■ C ■ B ■ A

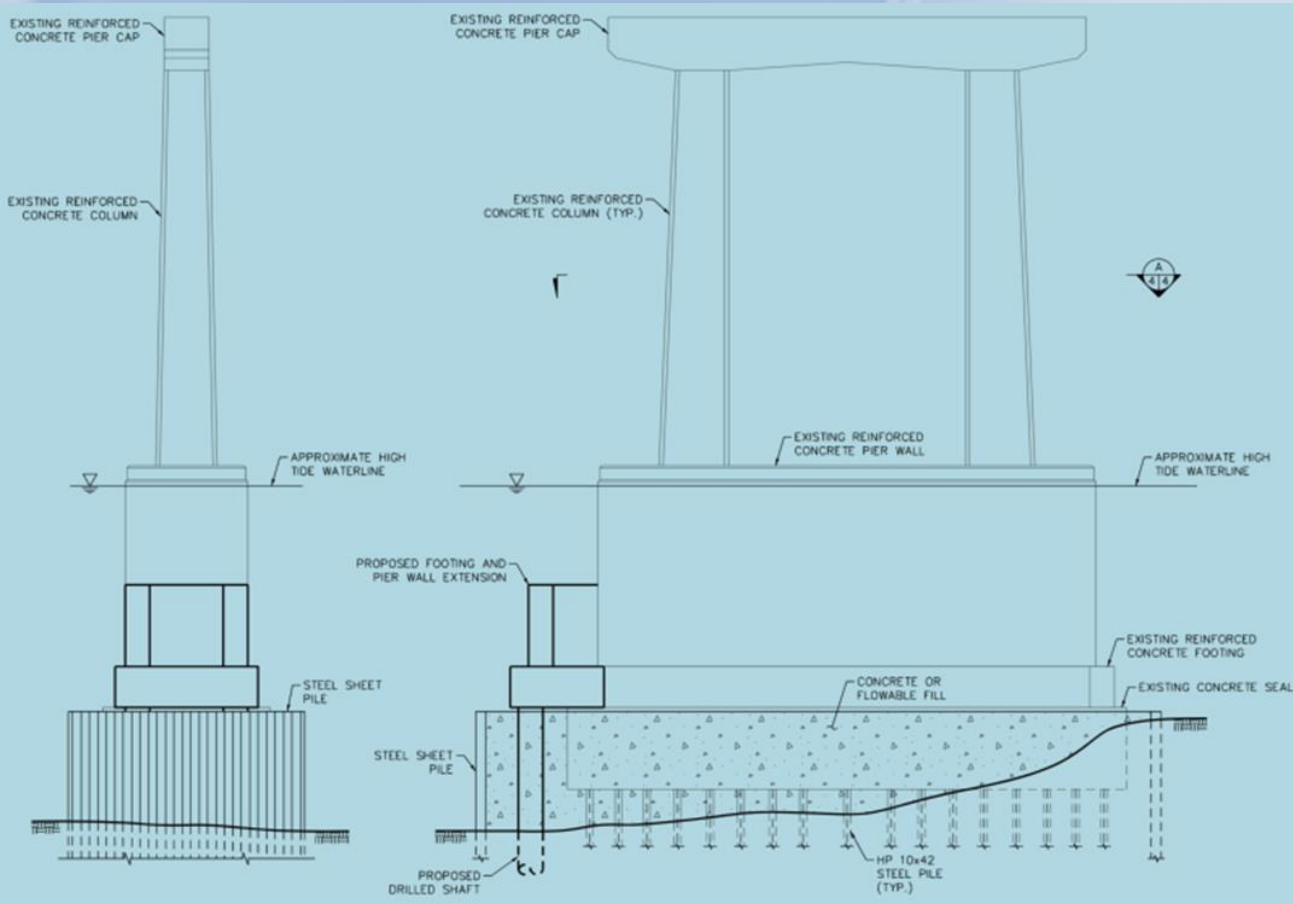
# 03 The Solution



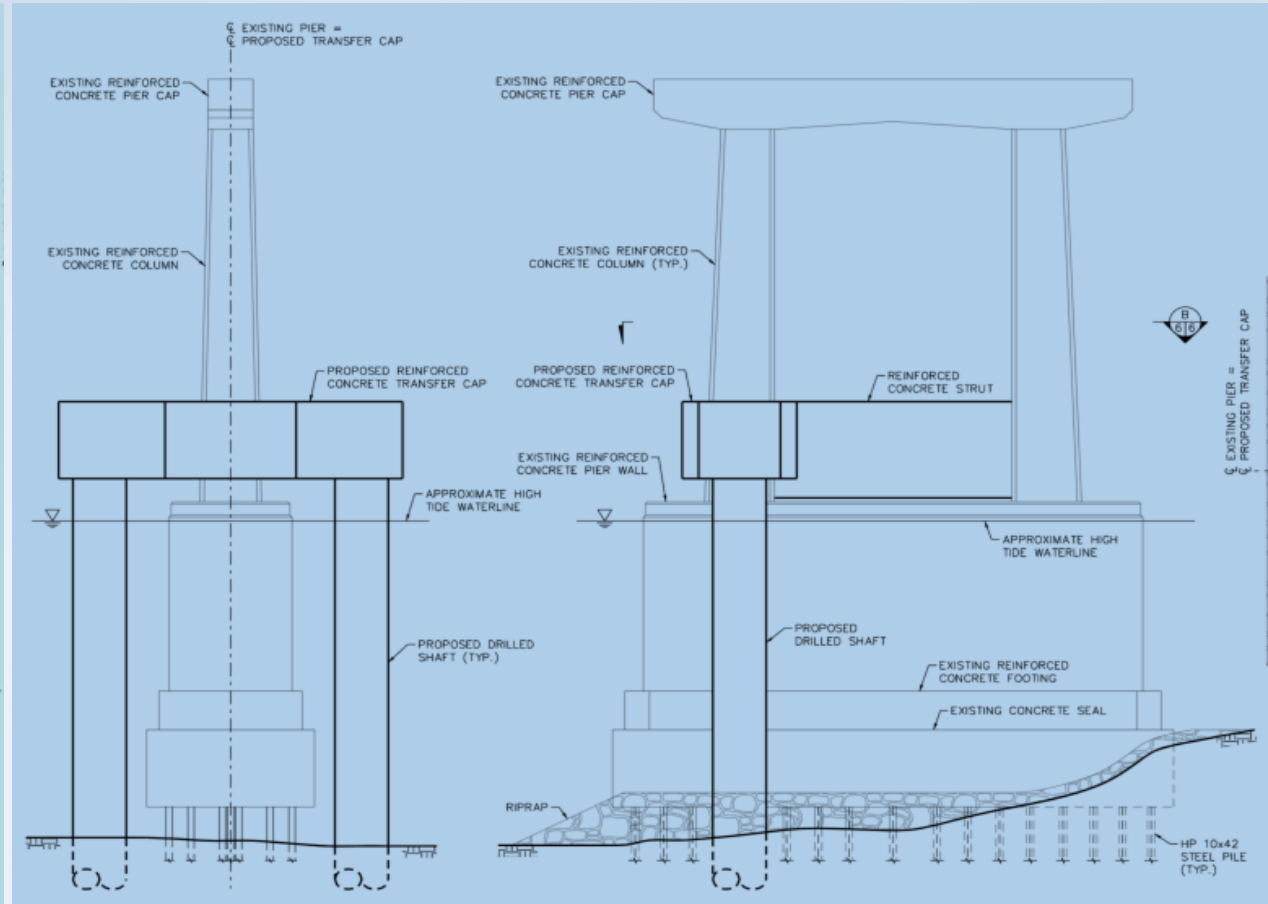
# Emergency Solution

- Analyze the bridge – currently can carry the loads
- Monitor the bridge – tilt meters, GPS, vibration
- Design emergency repairs for the bridge

# Partial Pier Support Solution



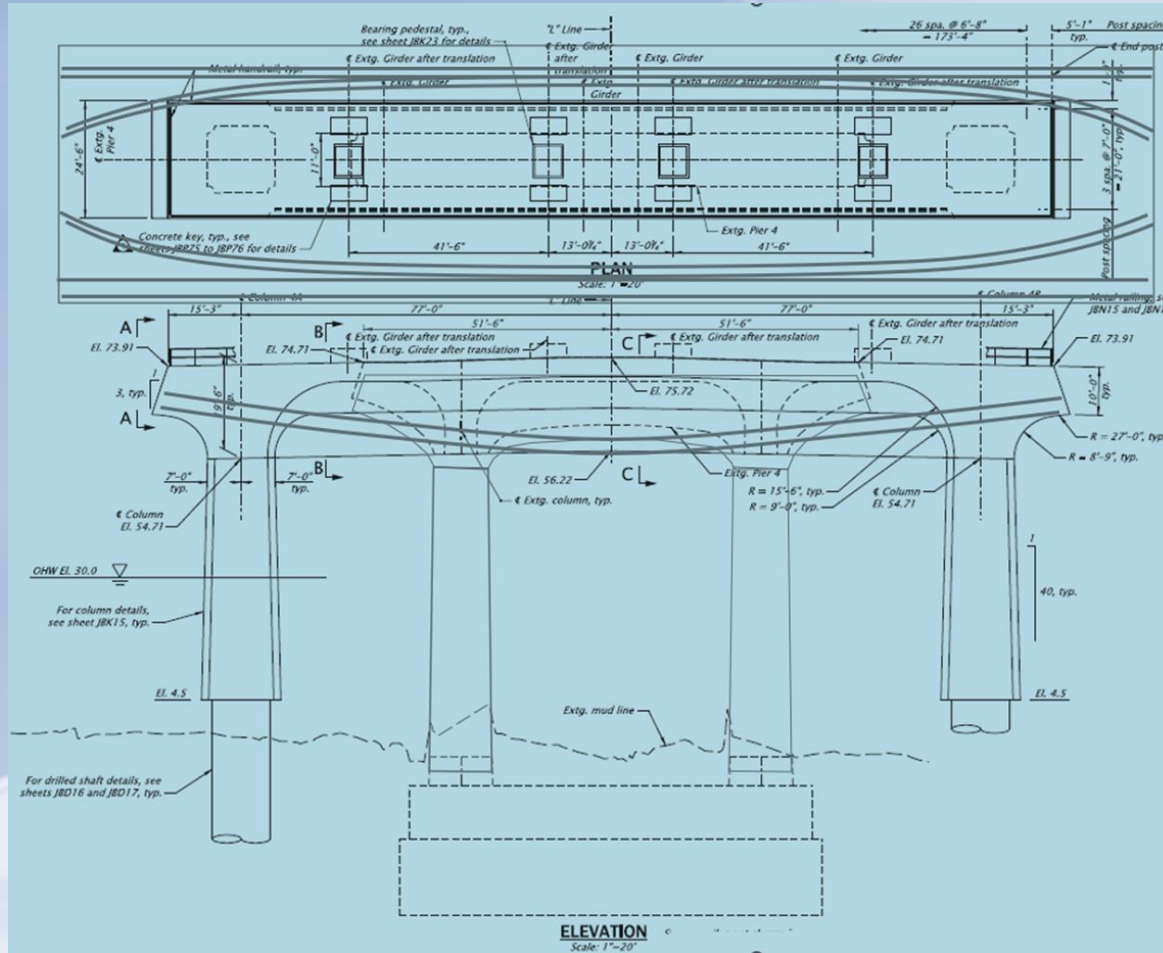
Underwater Solution



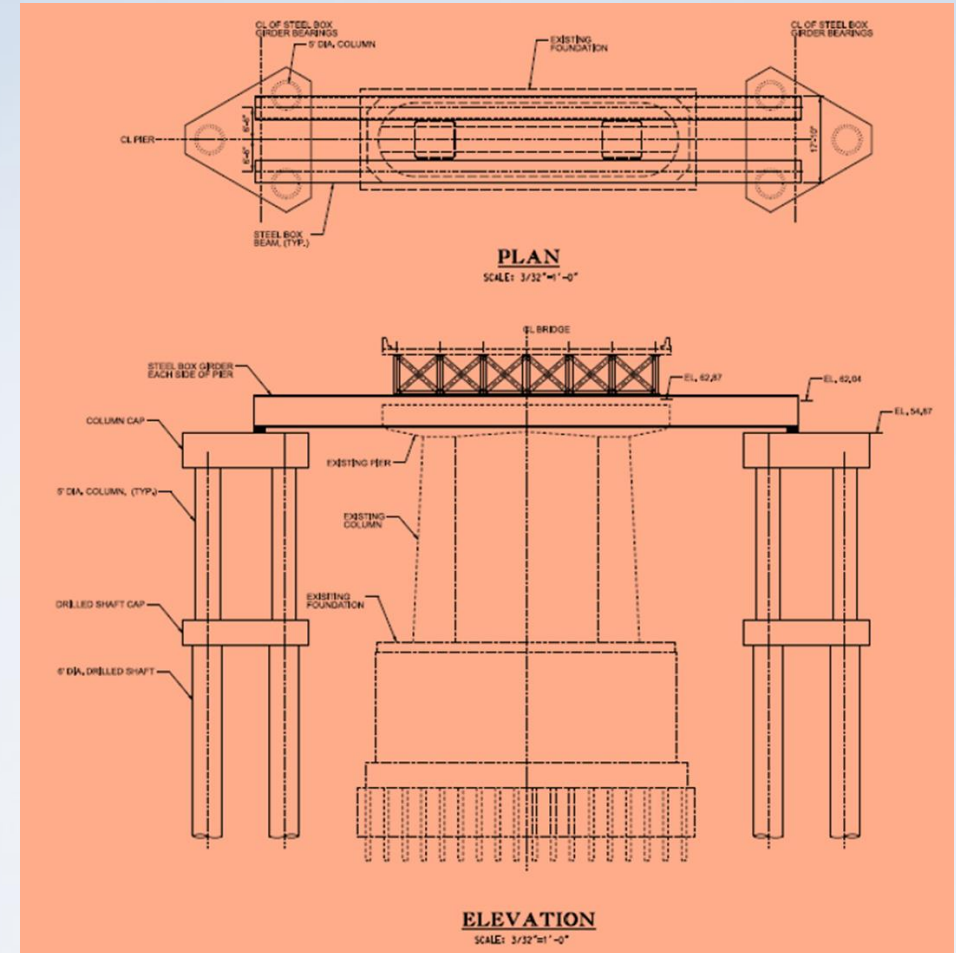
Above Water Solution



# Total Pier Support Solution

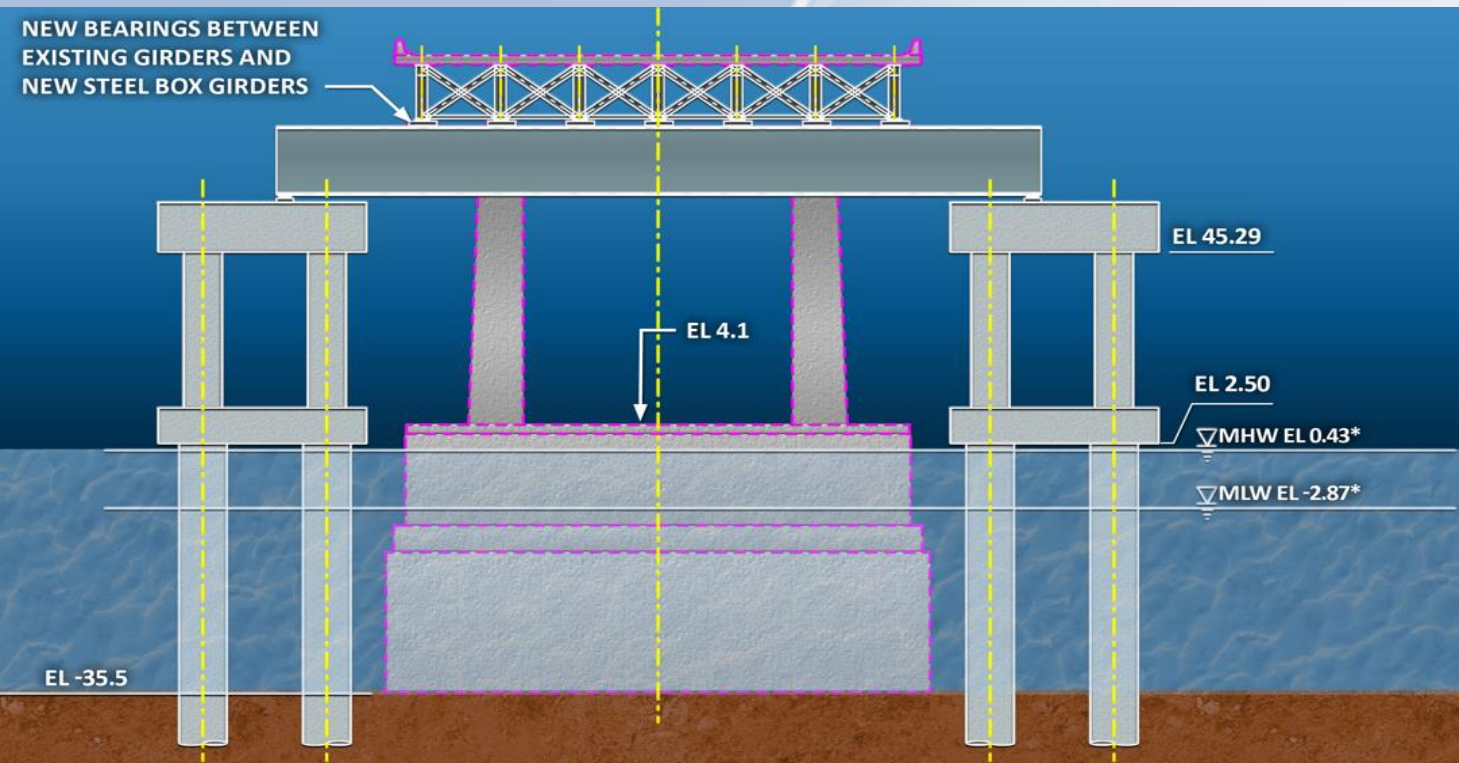


PT Encapsulation Solution



Double Steel Box Solution





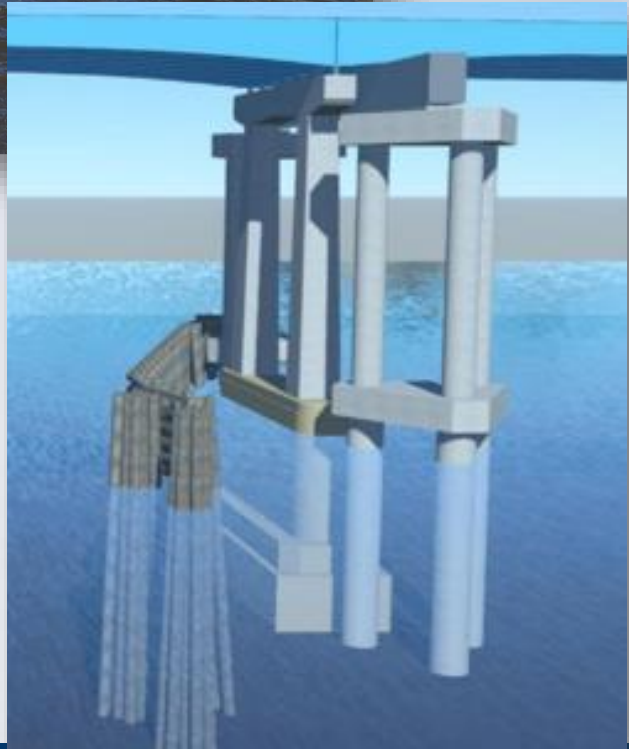
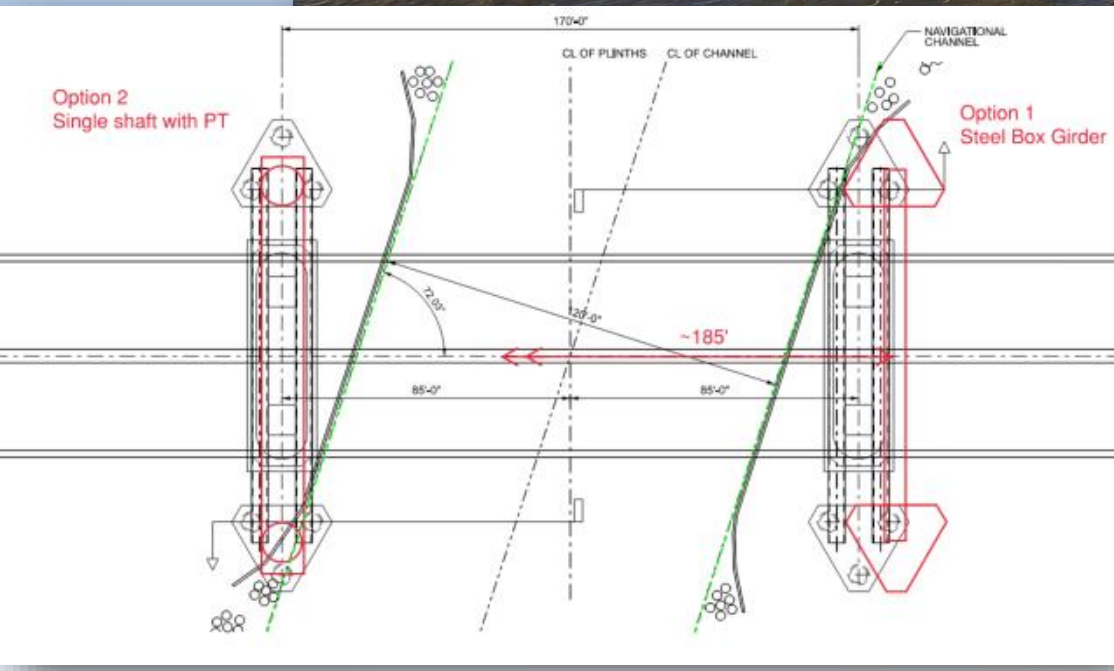
# Double Steel Box Solution

G

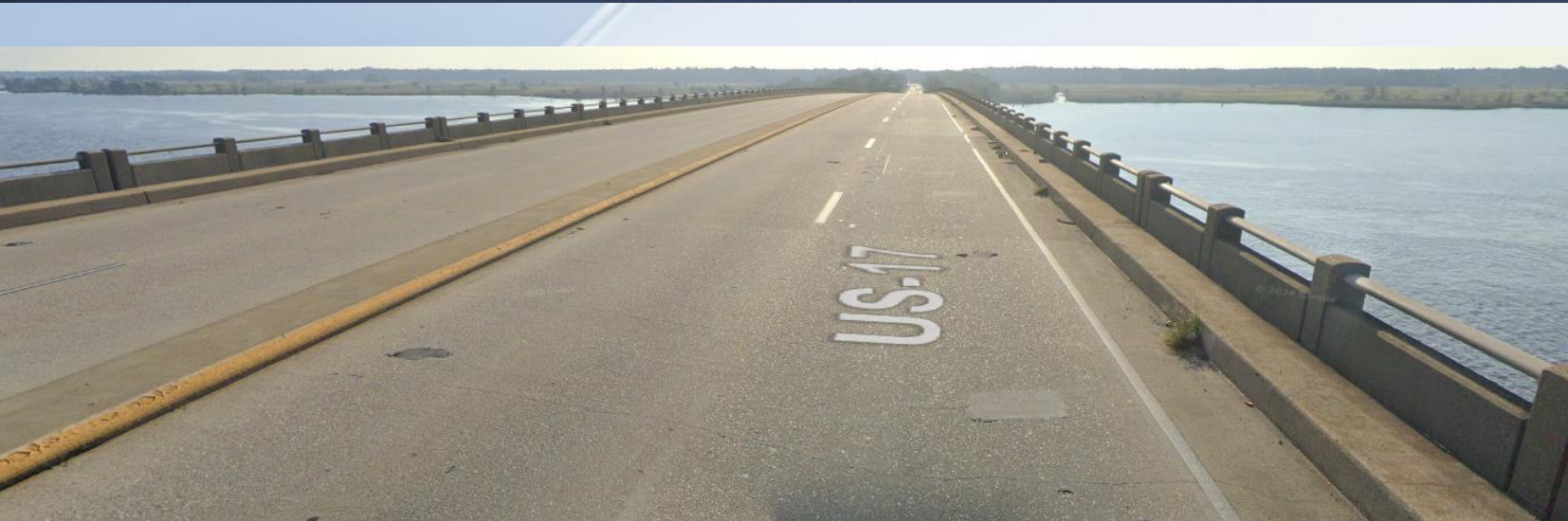
H



← Maintain 120' →  
skewed clearance



**Single Steel Box Solution**



## Lengthen the Main Span

- Make deck composite
- Cover plates on the top flange
- Combination of cover plates and PT bars for the bottom flange
- New bearing stiffeners



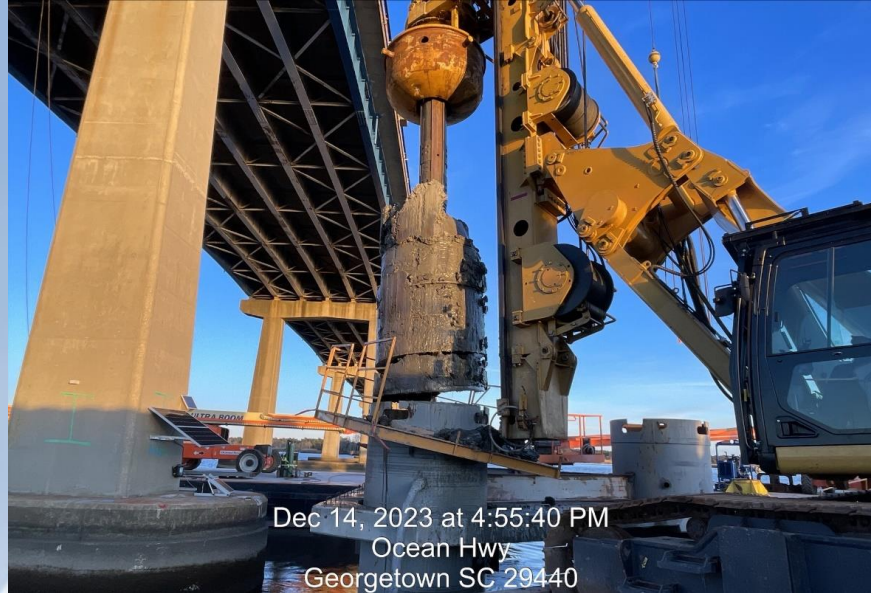
## Emergency Construction Contract

- Three preselected contractors
- Involved early on during the design
- Given 60% plans for review
- Lowest bid \$49M

# 04 Construction



Oct 10, 2023 at 10:56:07 AM  
Ocean Hwy  
Georgetown SC 29440



Dec 14, 2023 at 4:55:40 PM  
Ocean Hwy  
Georgetown SC 29440



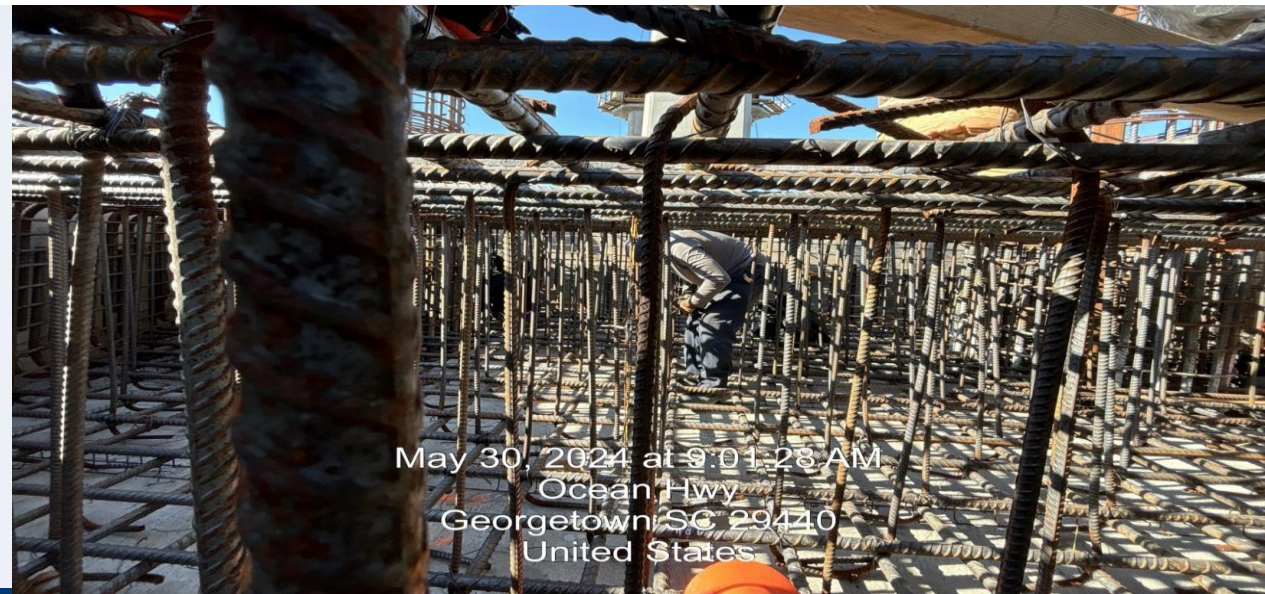
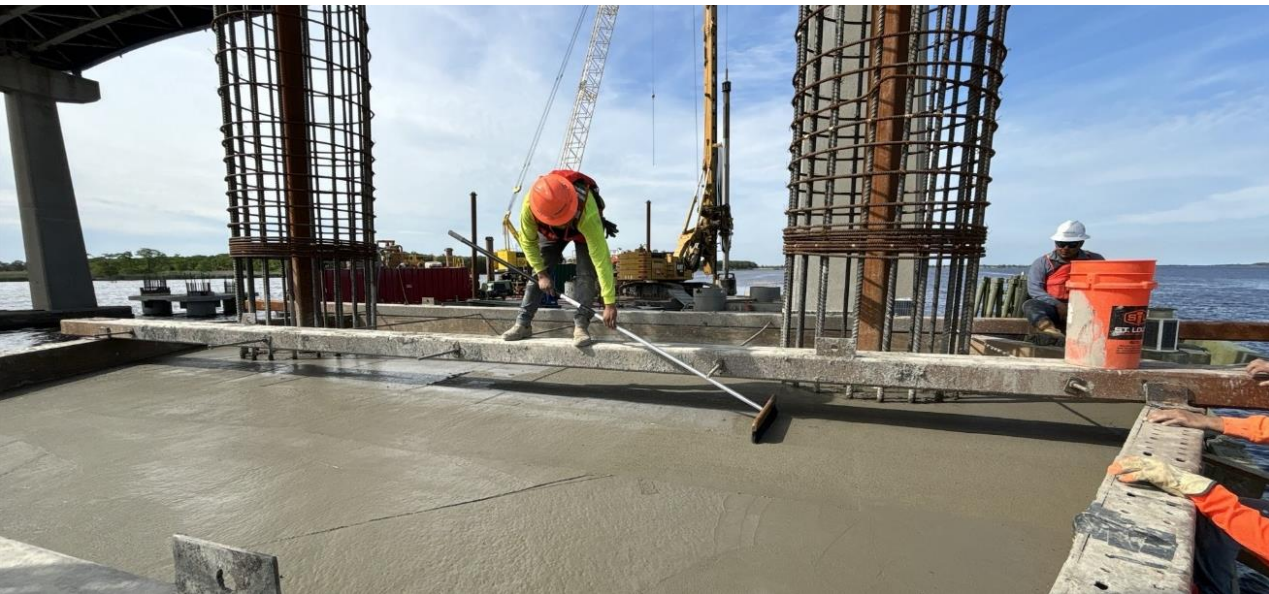
Mar 8, 2024 at 8:55:19 AM  
Ocean Hwy  
Georgetown SC 29440



# Drilled Shafts



# Shaft Caps

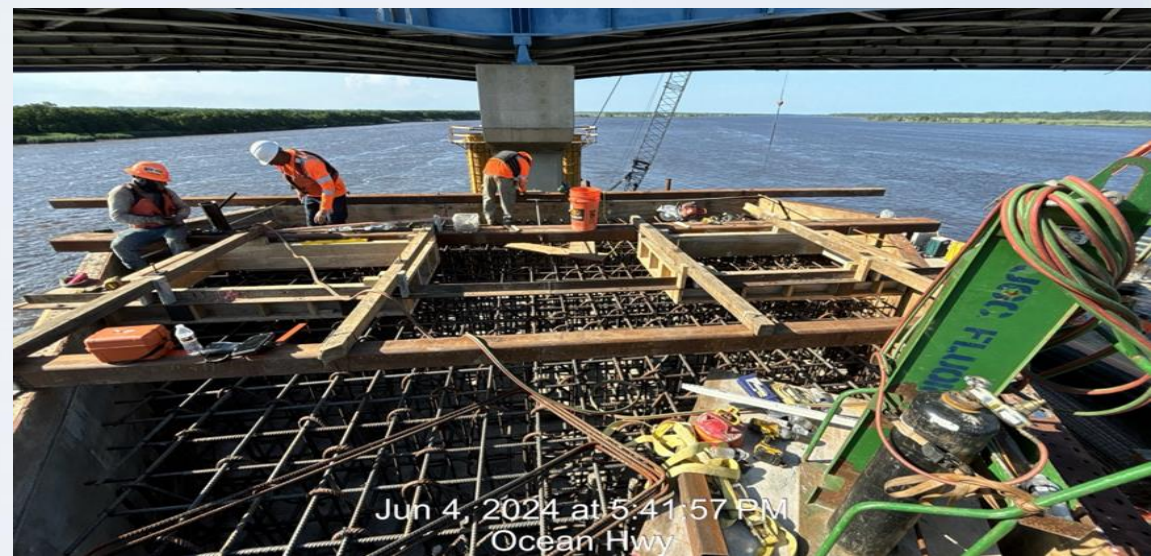
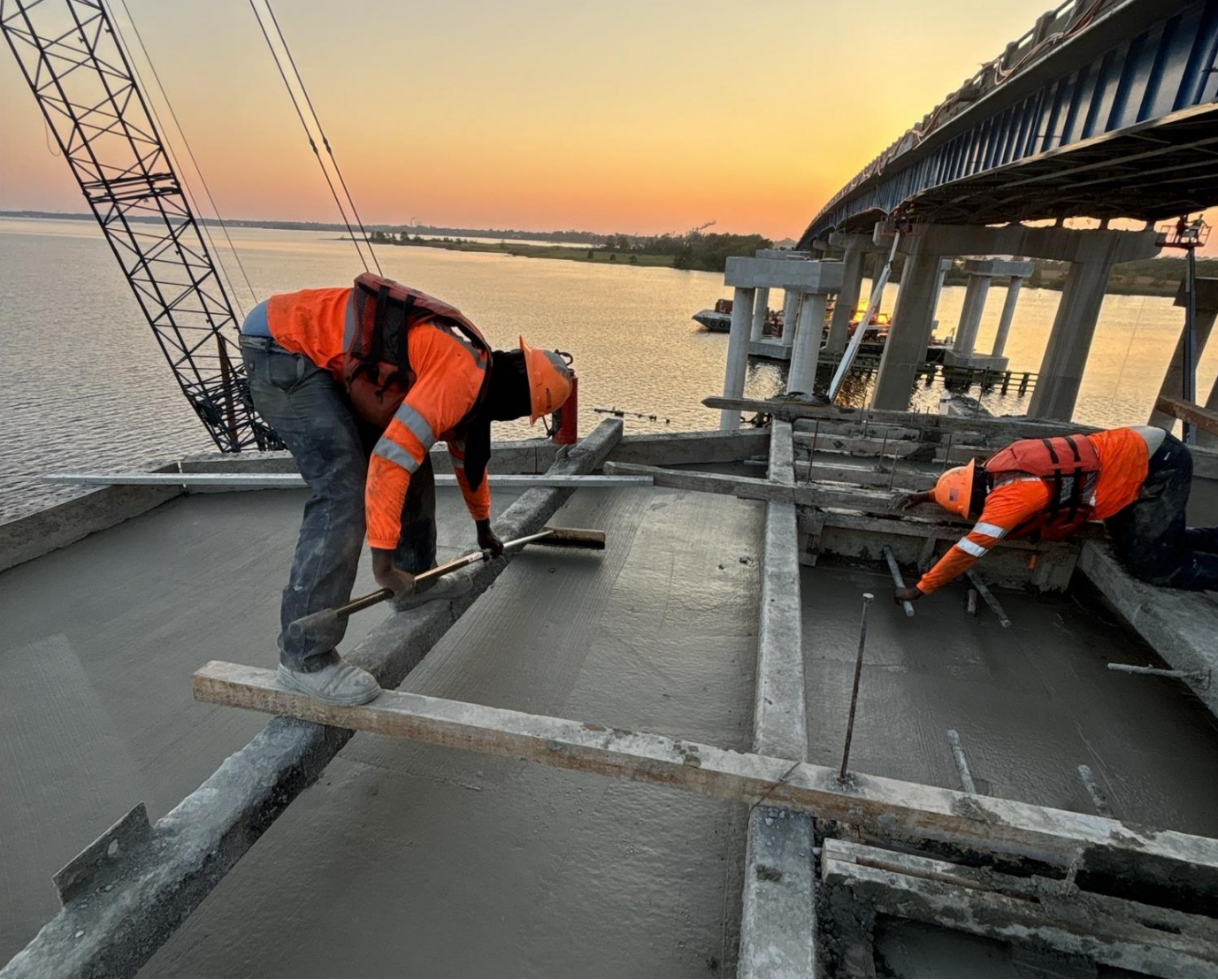


May 30, 2024 at 9:01:28 AM  
Ocean Hwy  
Georgetown, SC 29420  
United States



# Columns

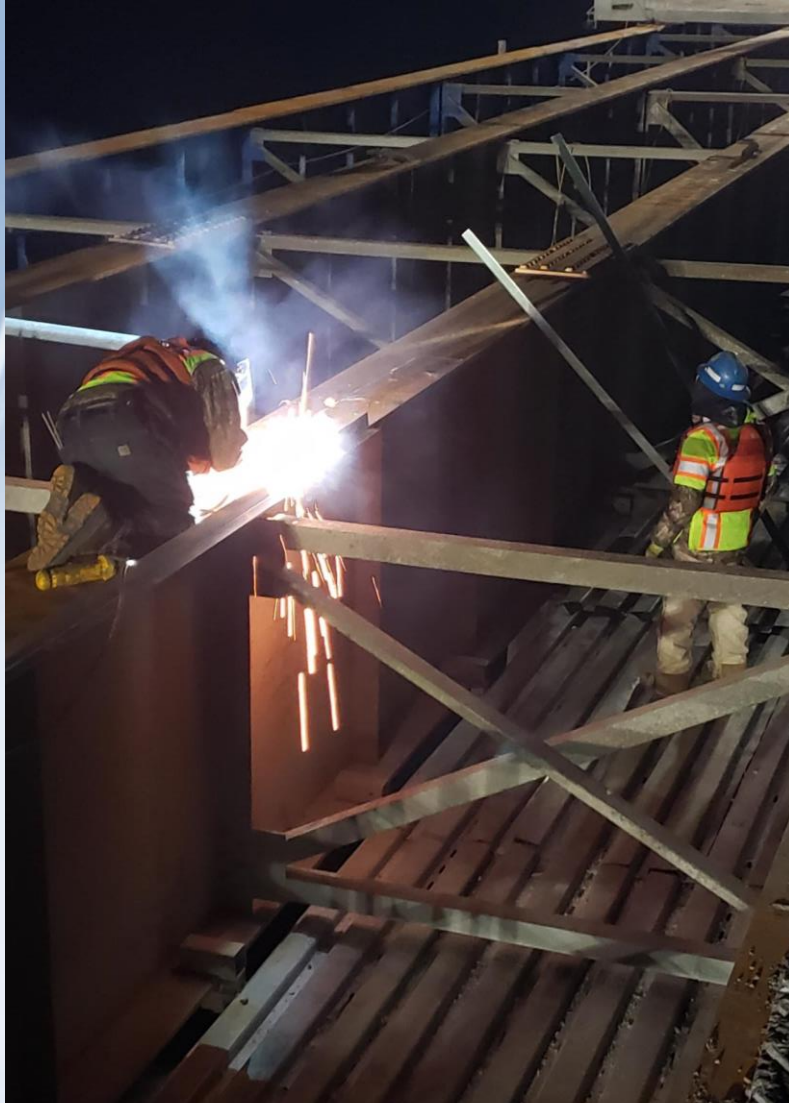
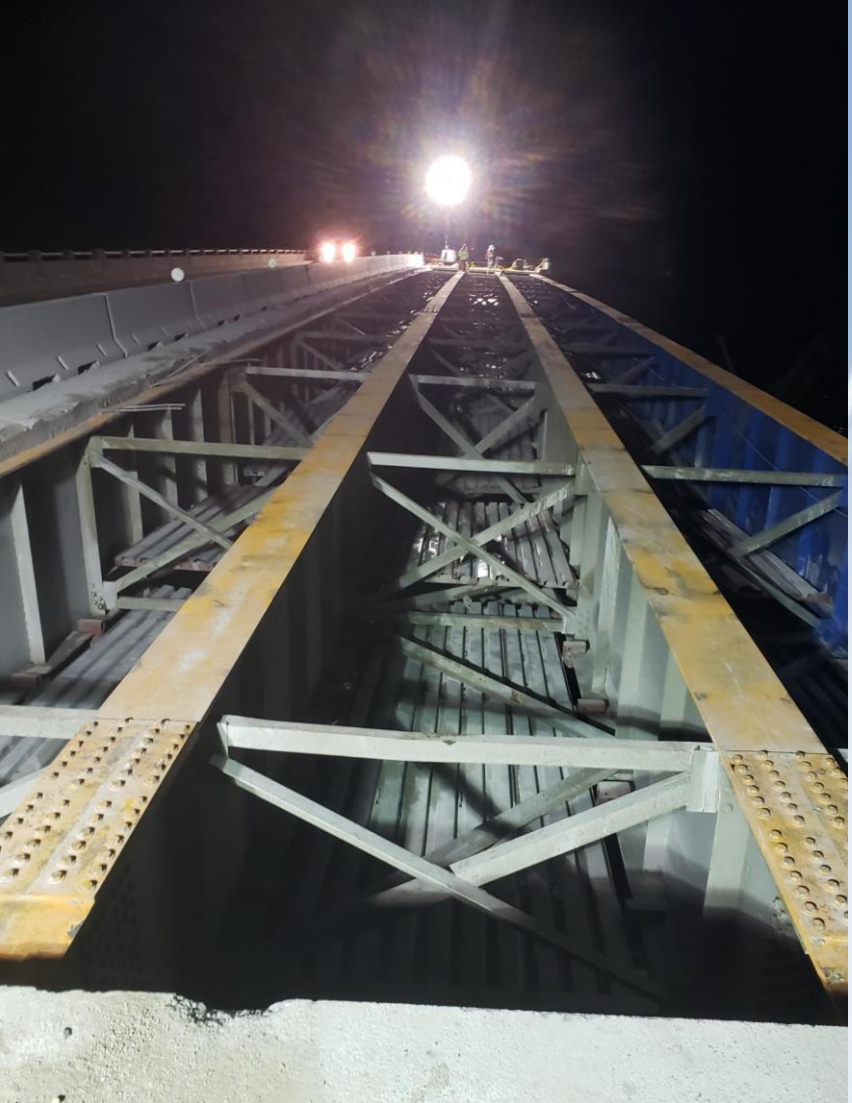




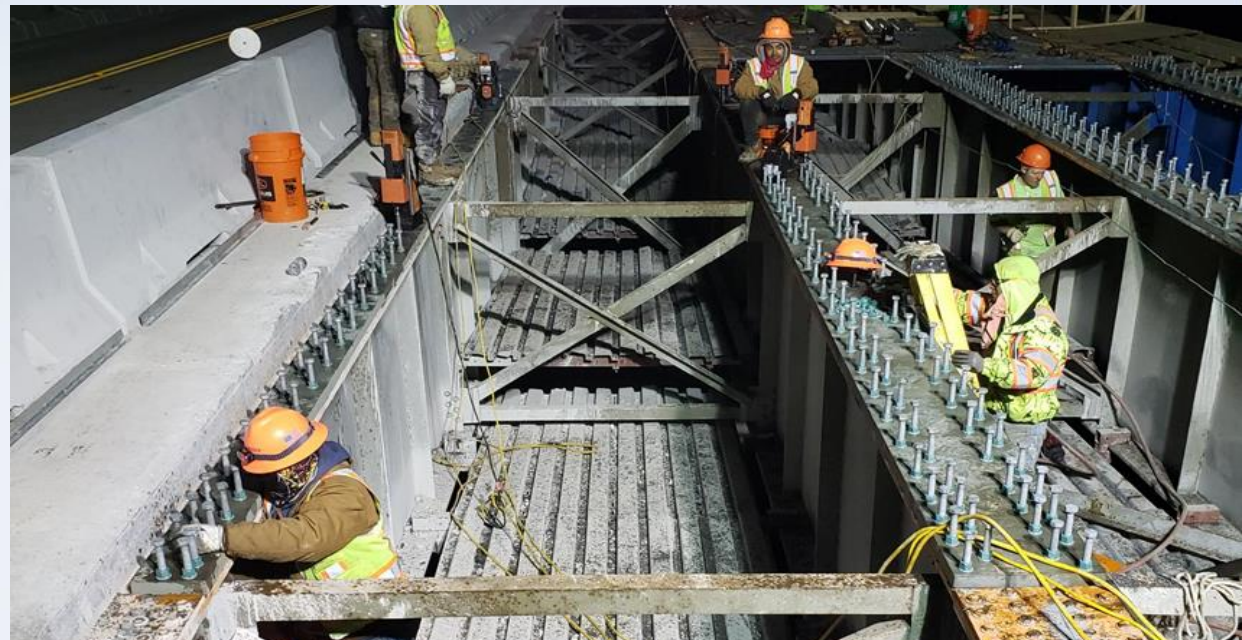
# Column Caps



# Bearings



# Deck Removal



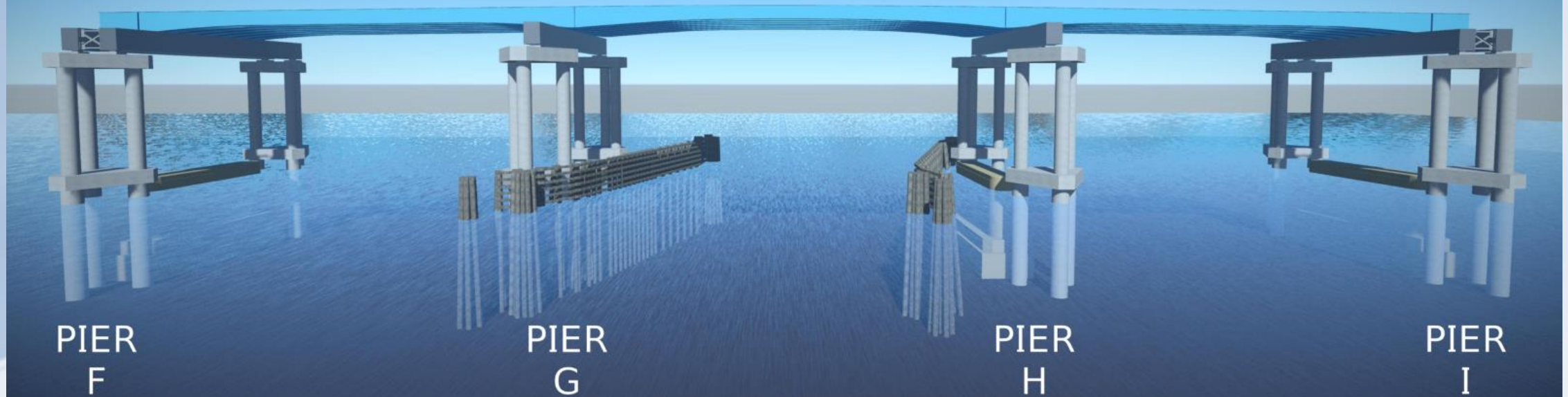
# Cover Plates, Shear Studs, Bearing Stiffeners



# Box Beams

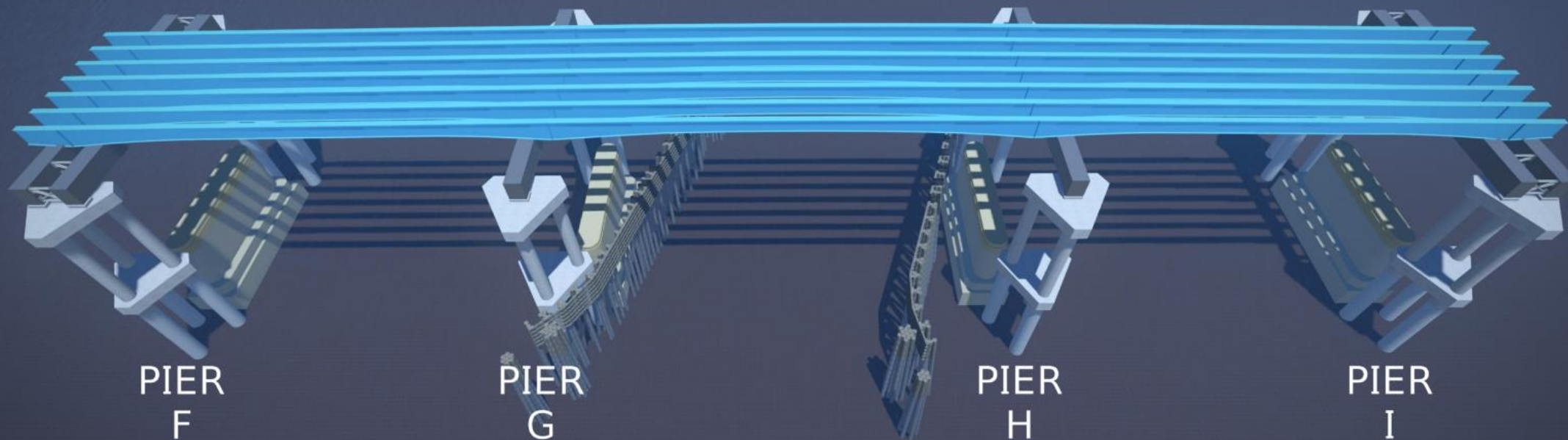
# US 17 OVER WACCAMAW RIVER PIER REPAIR

Expected Completion – End of 2024



AFTER PARTIAL PIER REMOVAL

# US 17 OVER WACCAMAW RIVER PIER REPAIR



AERIAL PERSPECTIVE AFTER PARTIAL PIER REMOVAL



# Questions?



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Consor Engineers, LLC

[jrowe@consoreng.com](mailto:jrowe@consoreng.com)

843.329.9776