US 90 Bridge over the Bay of St Louis

LTRC Structures Conference

Wednesday, February 20th, 2008

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US 90 Bridge over the Bay of St. Louis

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History of Project

- Hurricane Katrina August 29, 2005
- RFP issued November 3, 2005
- Technical proposal due January 13, 2006
- Bid Opening on January 23, 2006
- Contract awarded on January 24, 2006
- Final Design starts January 25, 2006

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Aftermath of Hurricane Katrina

Previous Bridge Obliterated by Hurricane Katrina

- Constructed in 1953
- Prestressed Concrete Girder, Concrete Deck
- Supported on Precast Piles

Aftermath of Hurricane Katrina

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Aftermath of Hurricane Katrina

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Demolition of Bascule Piers

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Design of New US 90 Bridge

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Overall Plan View

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Bridge Design: Superstructure

Bulb Tee 78 Girders:

- 154 foot spans, 11’-5” spacing
- Live Load Distribution Factor = S/13
- CONSPAN software used for beam design
- Creep effects included = time dependent T187 analysis

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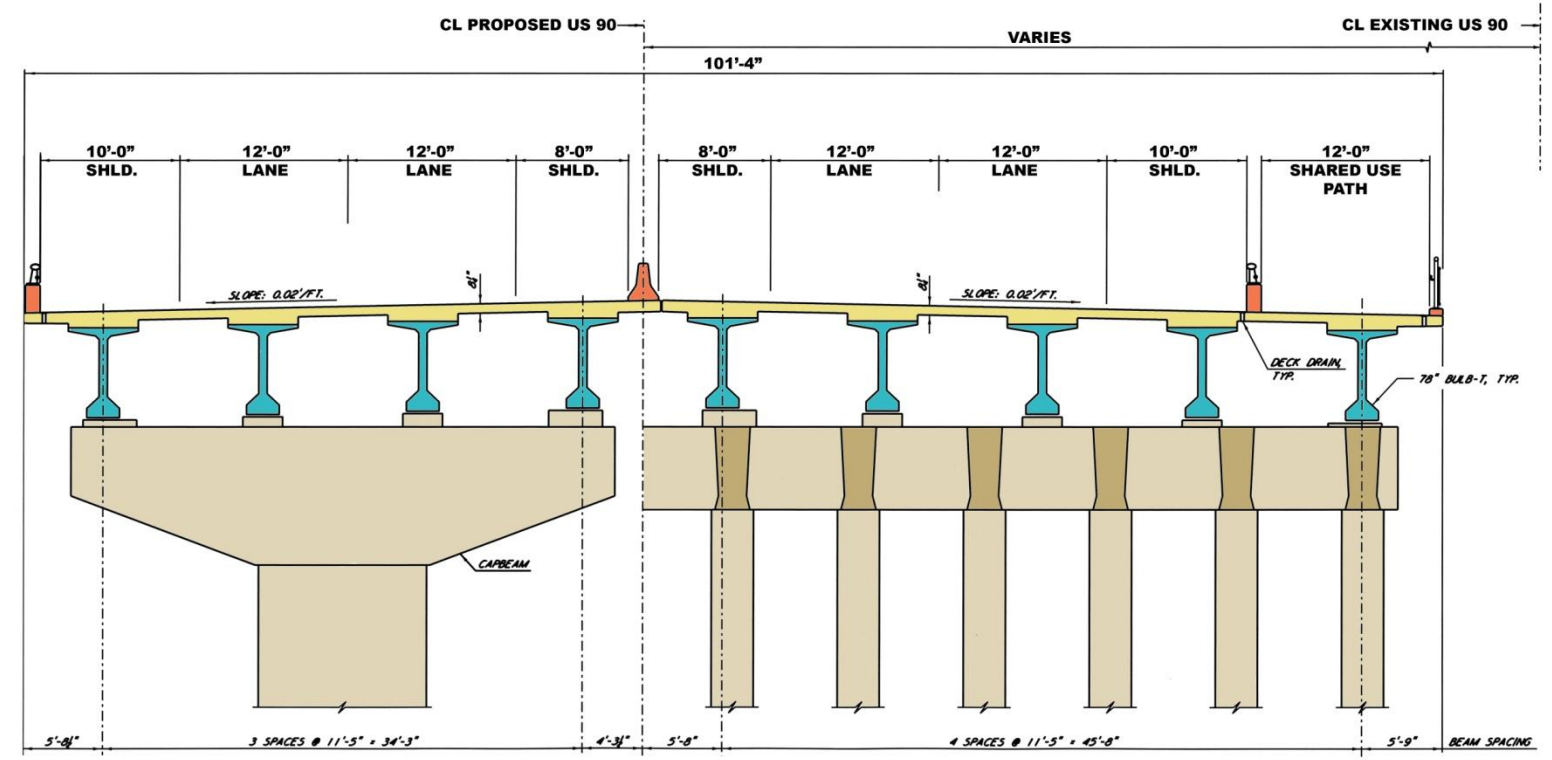
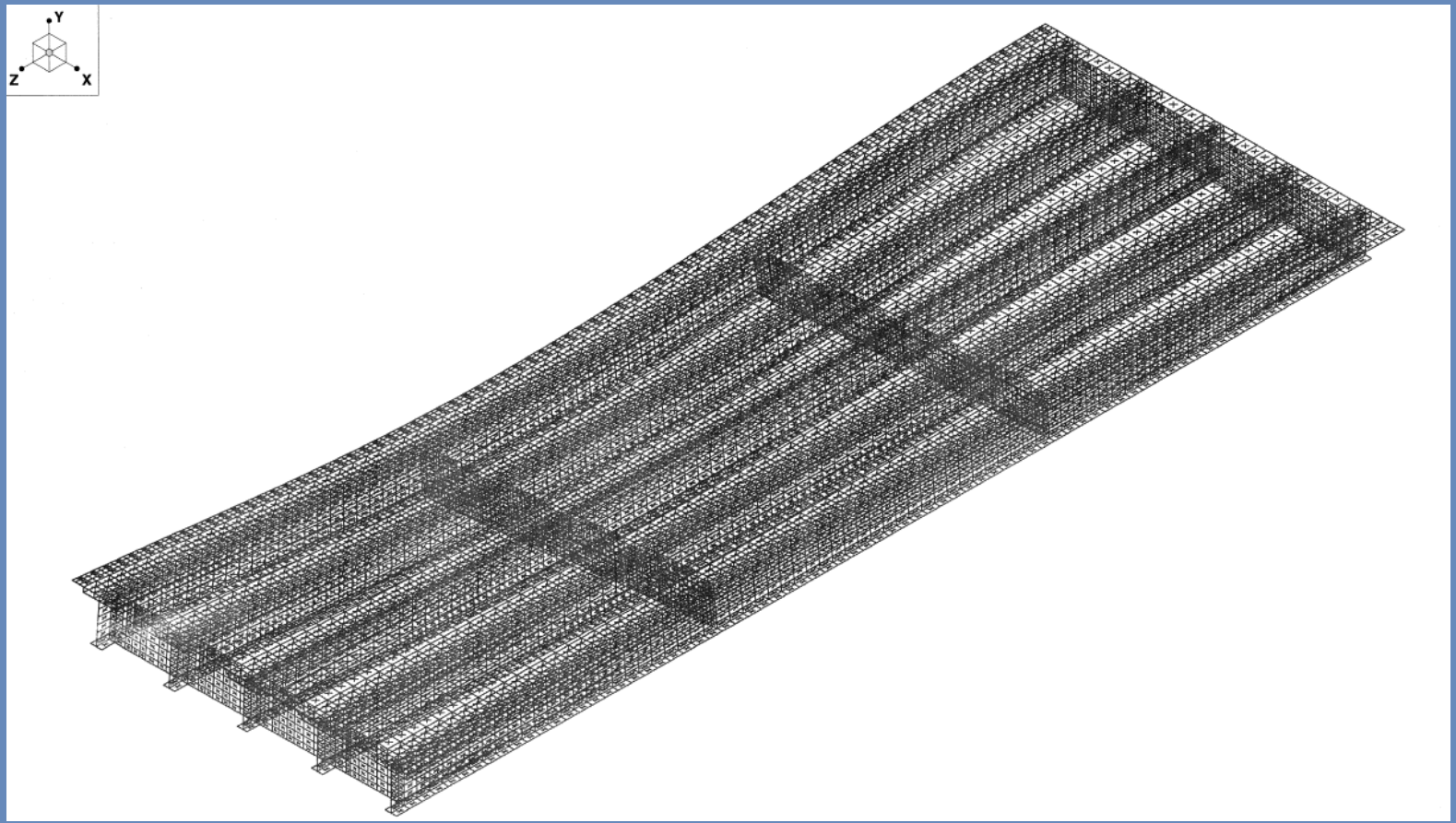
Typical Section



Live Load Distribution Factor: Risa 3D Analysis



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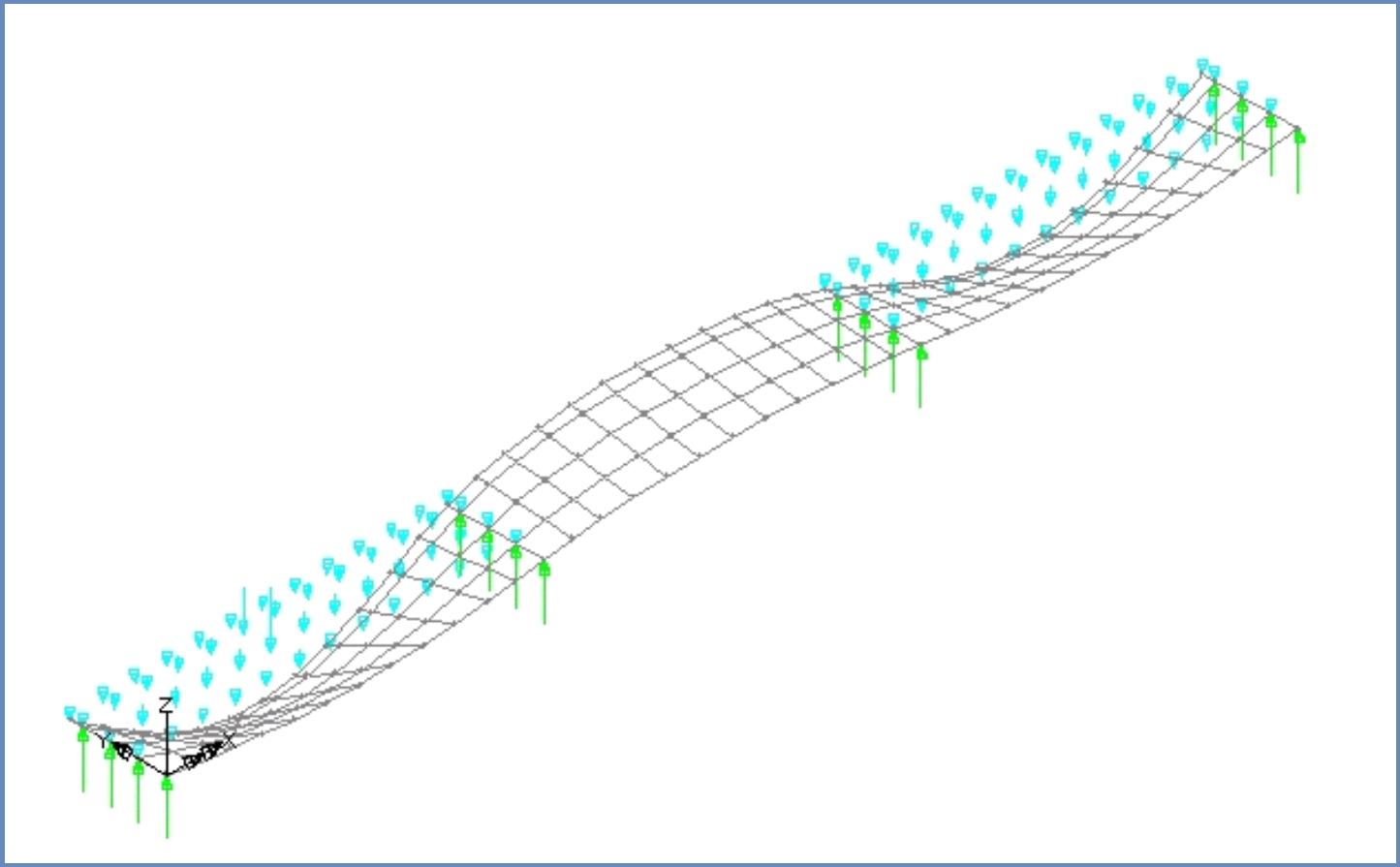
Live Load Distribution Factor : T187 Grillage Analysis



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Bridge Design: Superstructure

Spliced Bulb Tee Girders for Navigation Span:

- 200’ – 250’ – 200’ spans
- Longitudinal Post-Tensioning
  - 4 x 19k6 tendons
  - Stressed in stages

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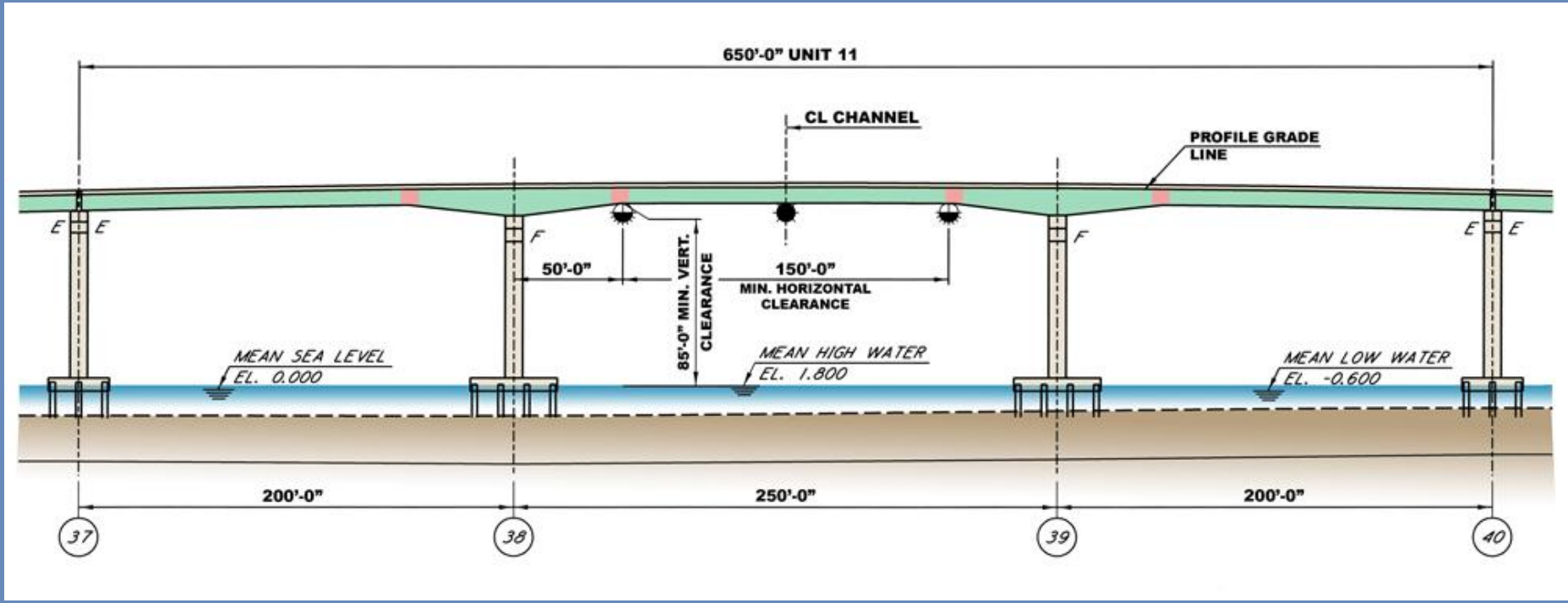
Spliced Bulb Tee Girders at Navigation Span



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Haunched Girder Segments

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Bridge Design - Substructure

- Pile Bent Design
  - HNTB PIER program used for capbeam design
  - T187 program used for 3D model of pile bents

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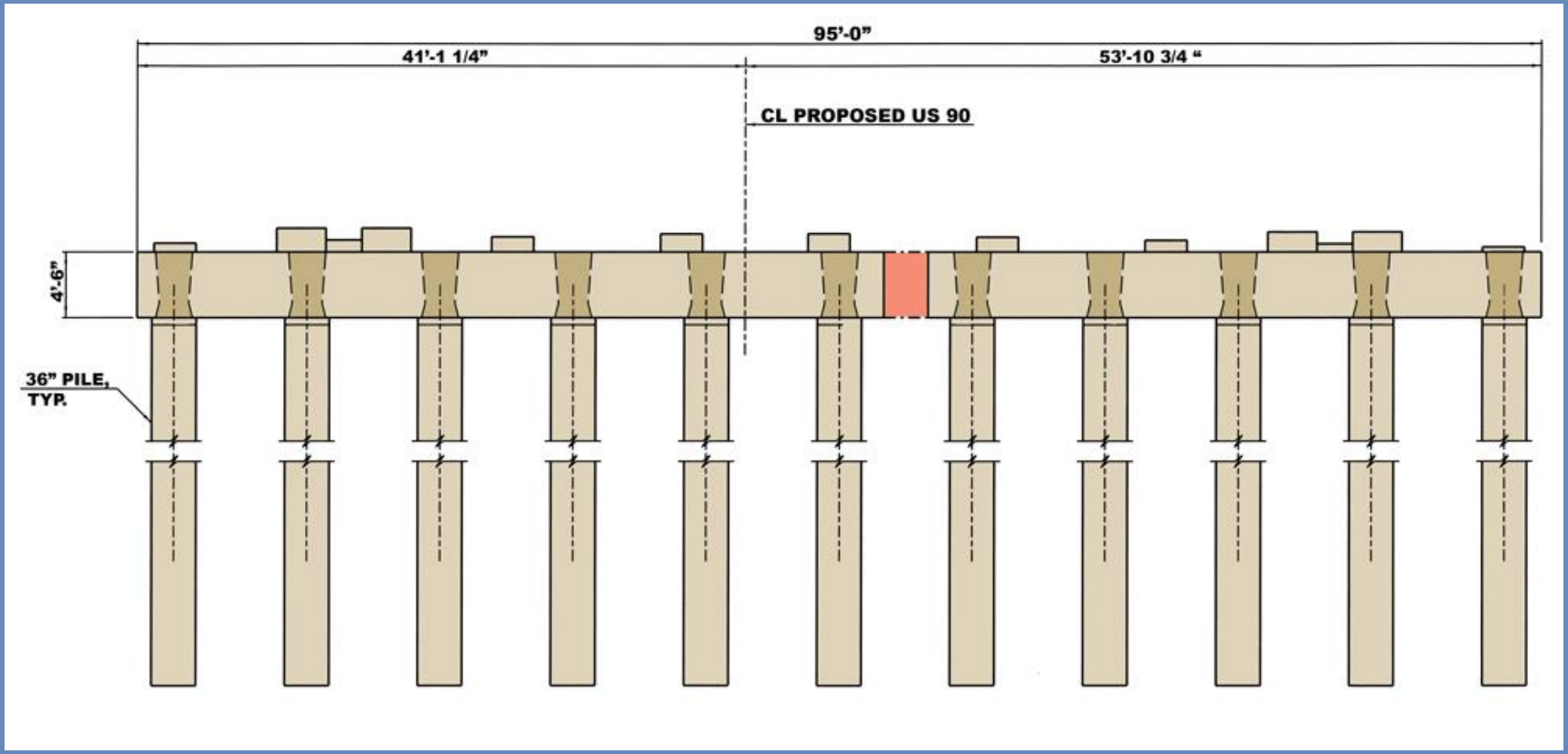
Typical Trestle Bent Section



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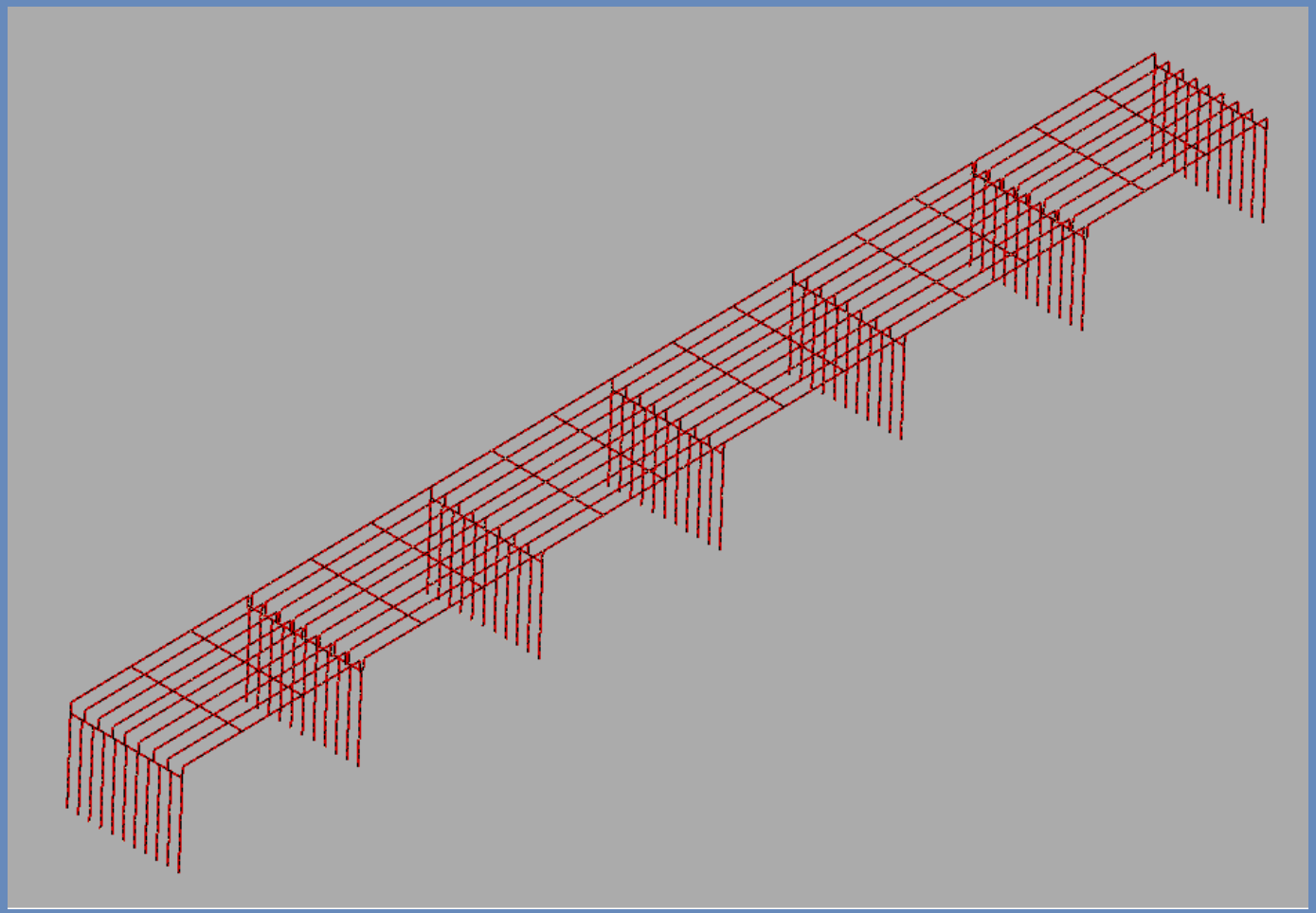
T187 Model: Pile Bent



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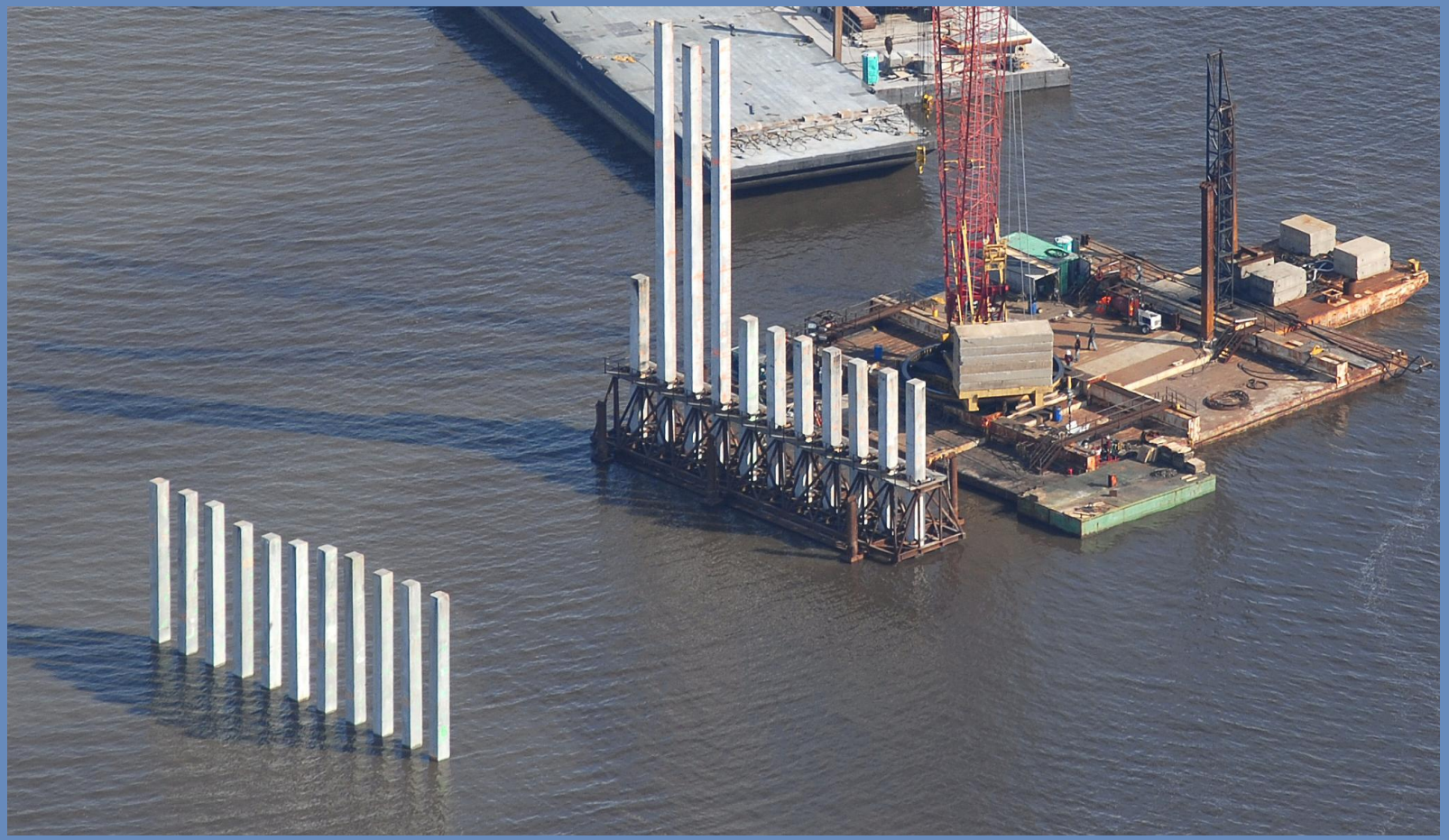
Pile Bent Construction



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Precast Caps

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Bridge Design - Substructure

- Waterline Footing Bent Design
  - PIER program used for AASHTO loading
  - FB Pier program used for Vessel Impact analysis

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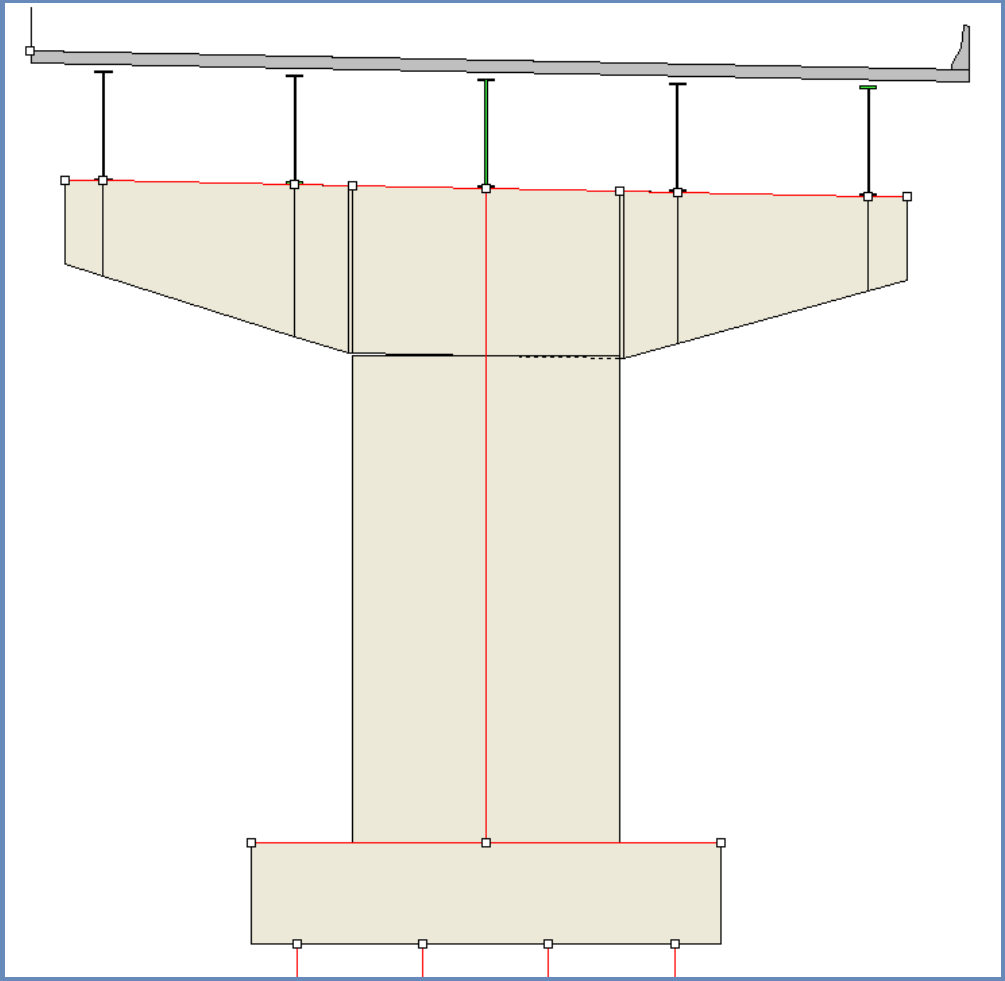
PIER Program



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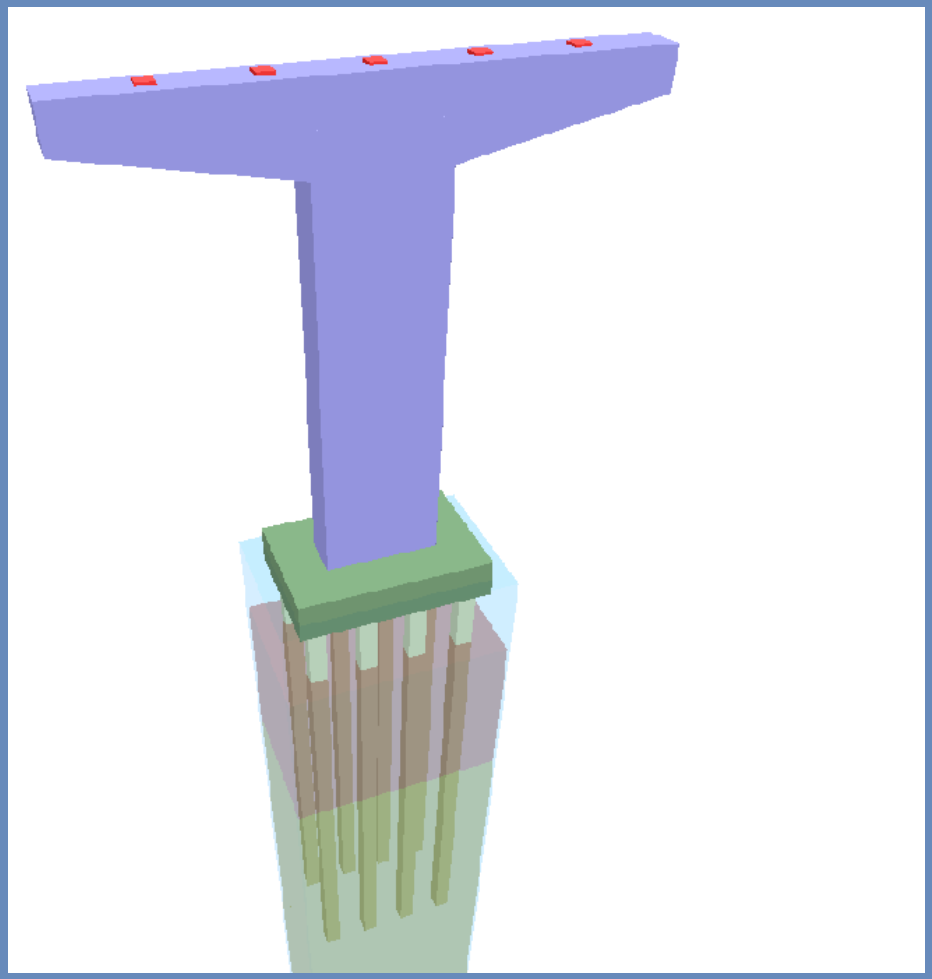
FB Pier Model



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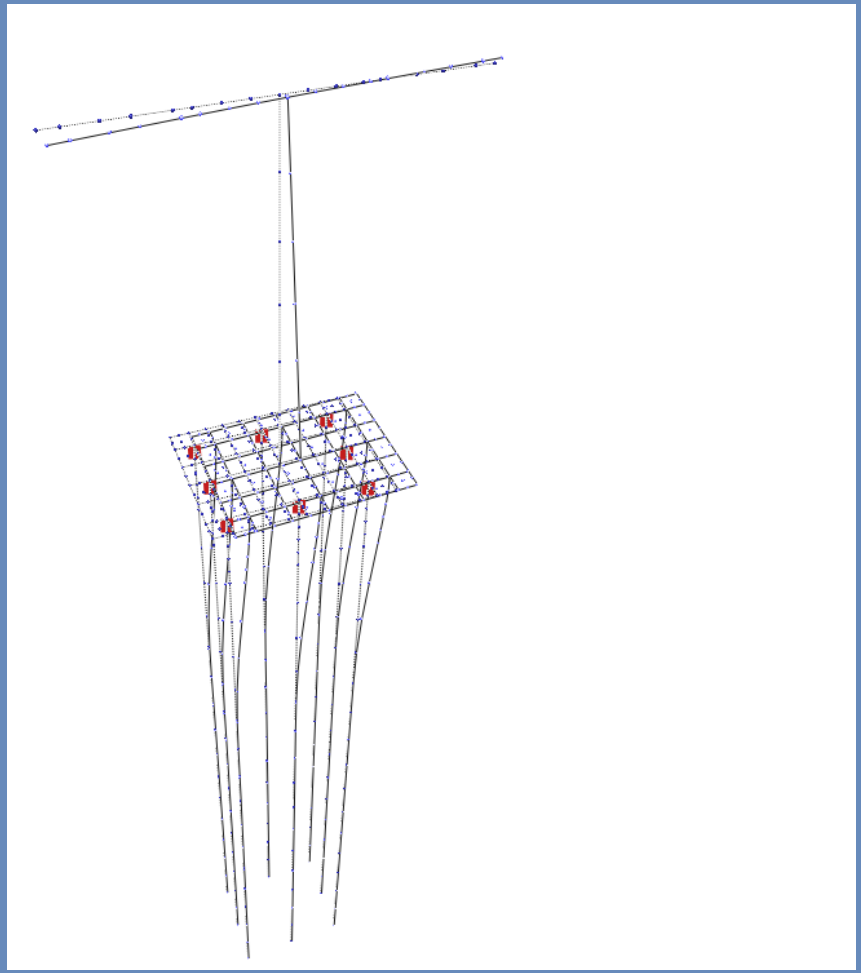
FB Pier Model



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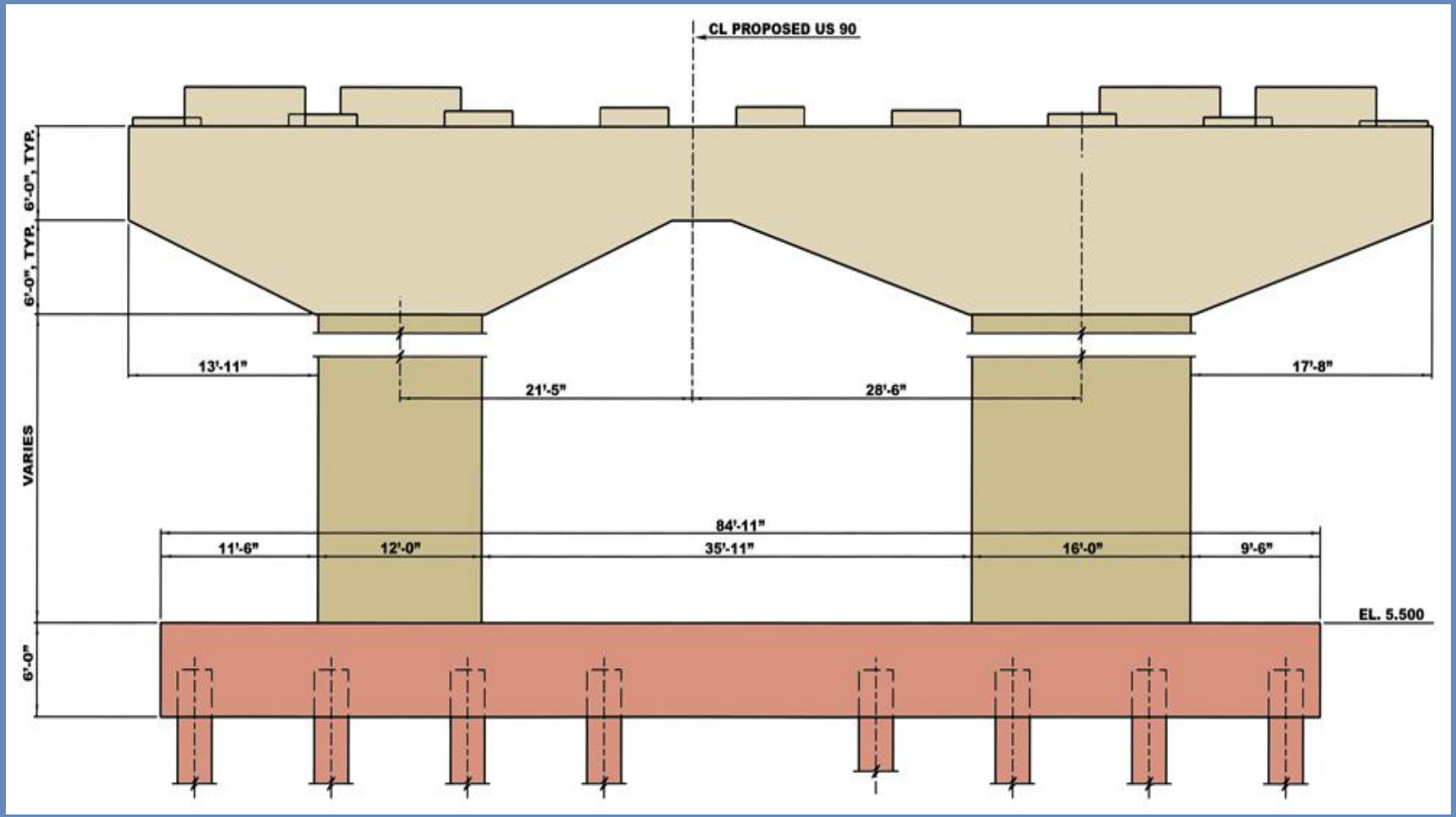
Waterline Footing Bent



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Geotechnical Design

- Indicator Pile Program
  - 17 Indicator Piles in the Bay
  - 5 Indicator Piles on land
- The “HOLE”
- Statnamic Load Test
  - Similar to Static Load Test
  - Verify Capacity of Indicator Piles

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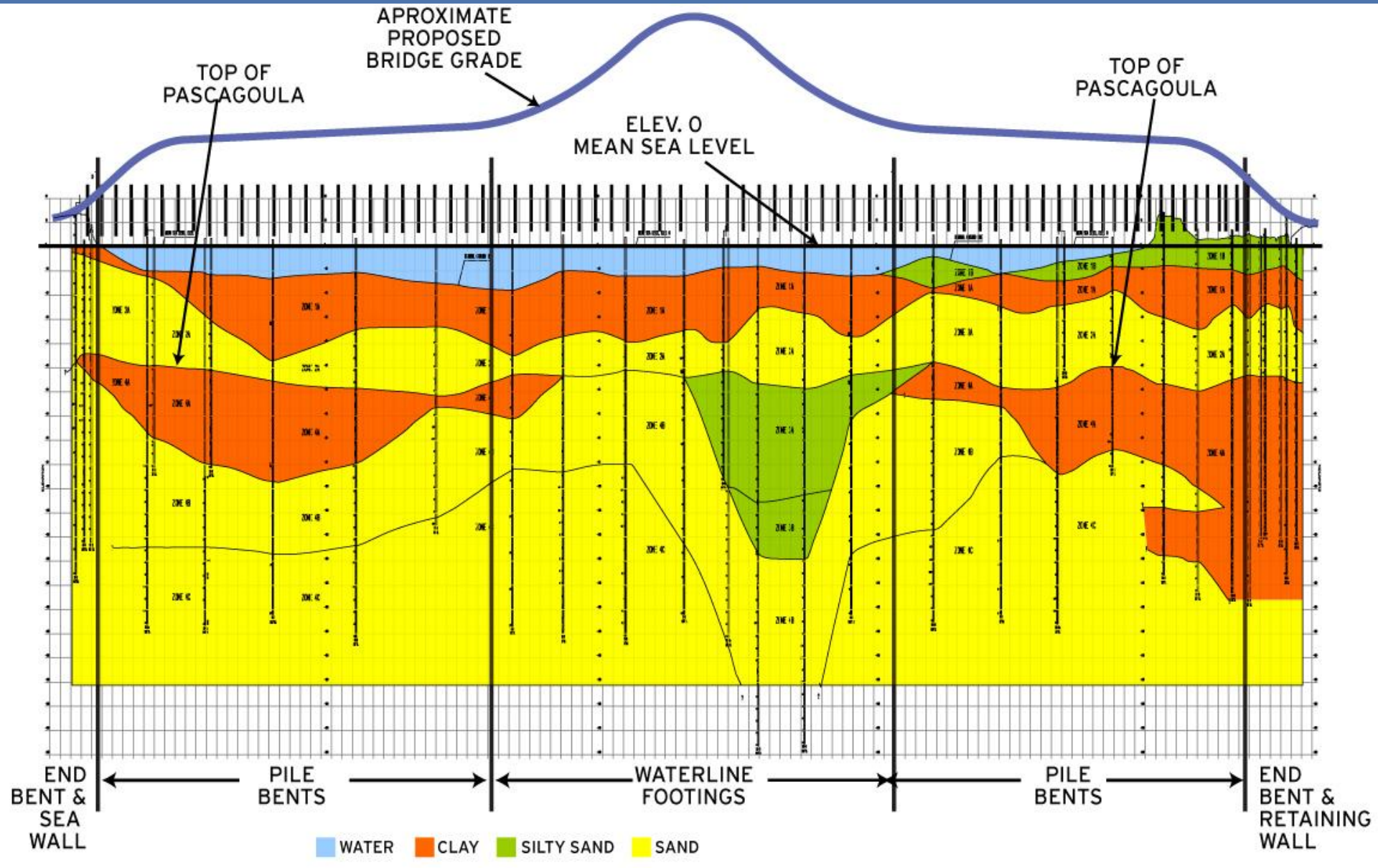
APROXIMATE
PROPOSED
BRIDGE GRADE
TOP OF
PASCAGOULA
ELEV. 0
MEAN SEA LEVEL
TOP OF
PASCAGOULA
END
BENT &
SEA
WALL
PILE
BENTS
WATERLINE
FOOTINGS
PILE
BENTS
END
BENT &
RETAINING
WALL
WATER
CLAY
SILTY SAND
SAND

Statnamic Load Test

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Aesthetics

- Barrier Rail
- Pylons
- Bridge Lighting

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Barrier Rail

Pylons

Bridge Lighting

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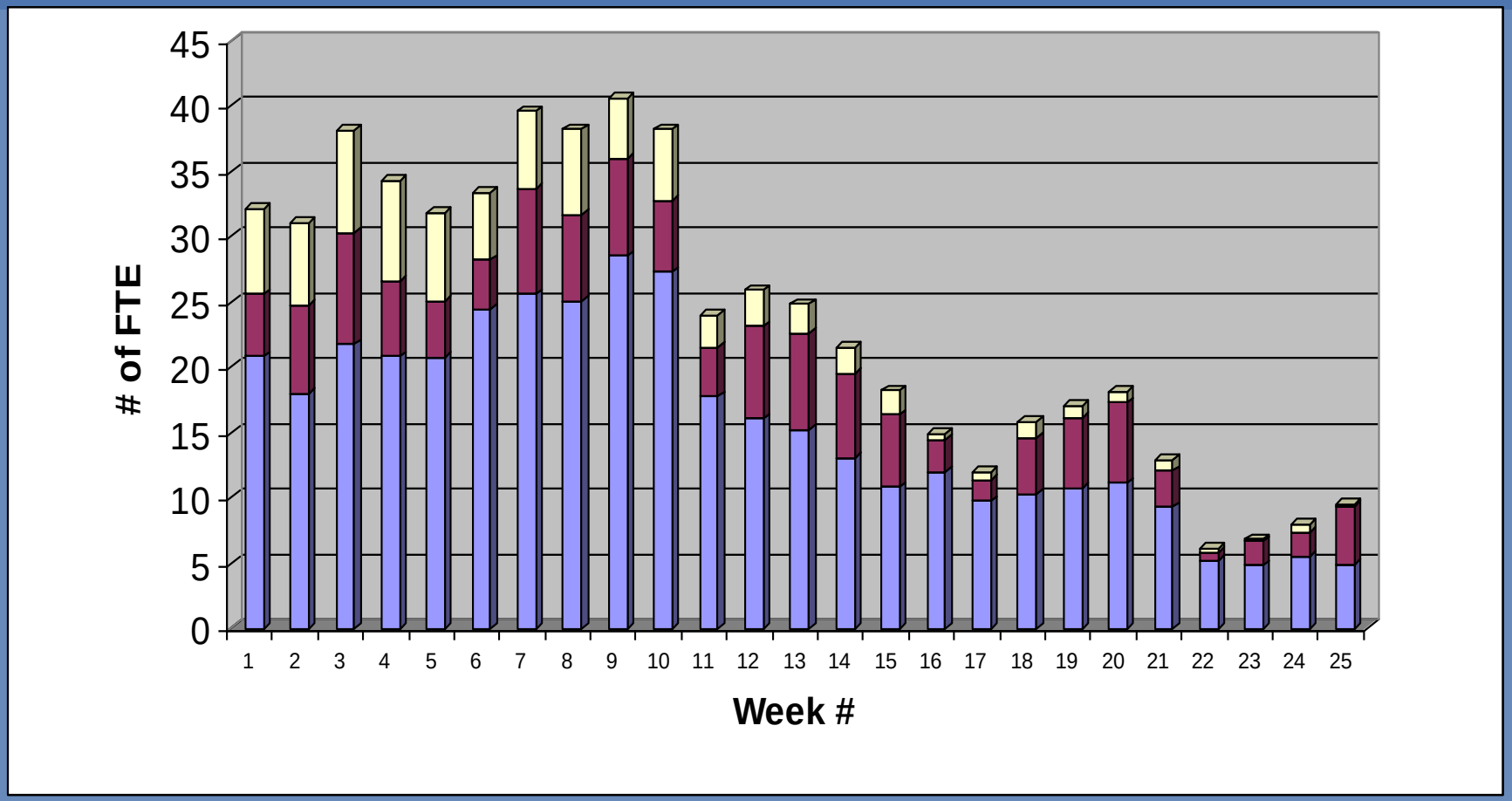
Design Effort



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Construction of US 90 Bridge

- Construction Schedule
  - 2 lanes open by May 16, 2007
  - Entire bridge open by November 30, 2007
  - EB lanes built first

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Construction of New US 90 Bridge

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Concrete Placement for Columns

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August 2006

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August 2006

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August 2006

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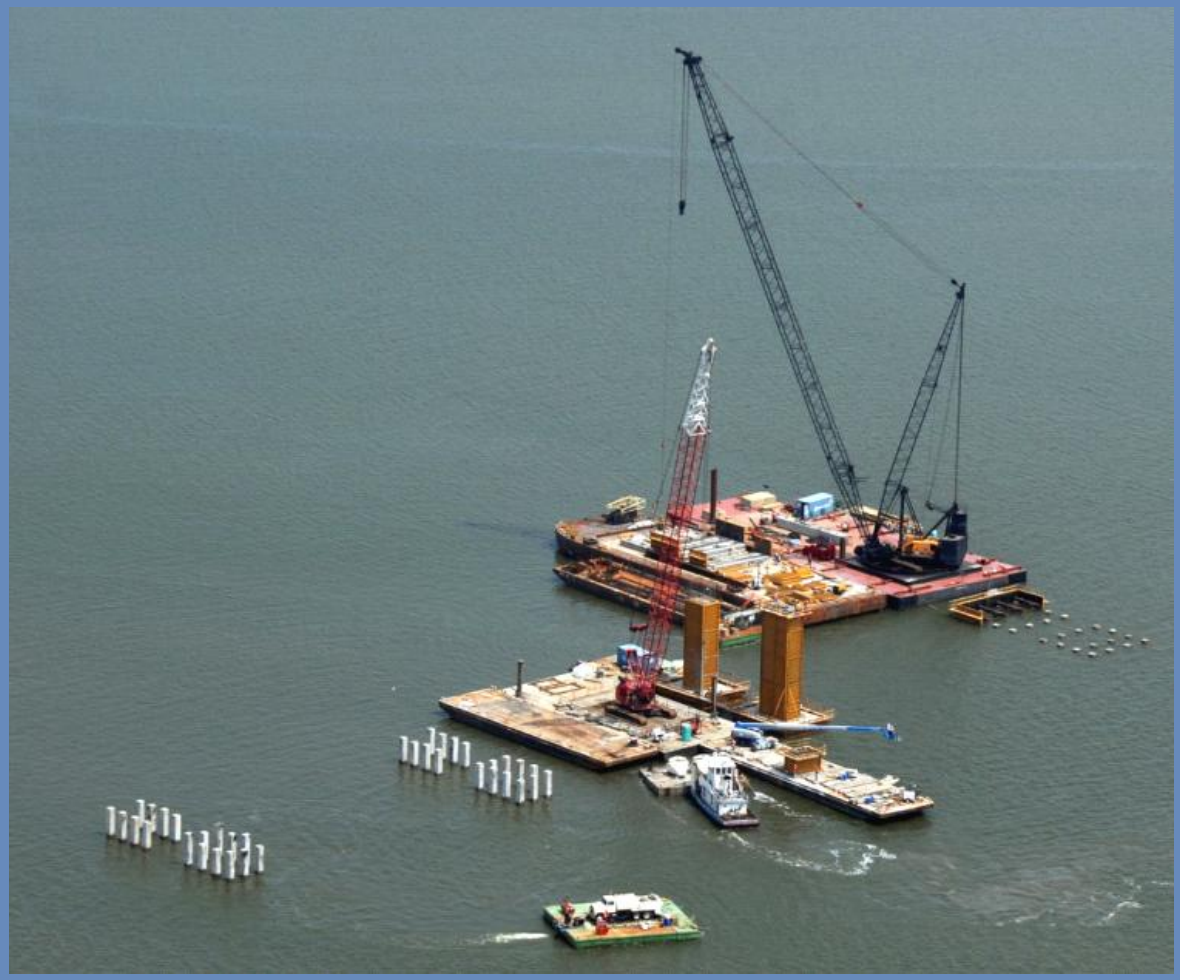
September 2006



September 2006

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January 2007

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January 2007

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January 2007

February 2007

February 2007

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Questions ?

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