

2016 PTI Convention Long Beach, California

Technical Session #3

PT Bridge II



Project Updates on the St. Croix and Lesner Segmental Bridge Projects

Carlos Perez/ Ed Underhill
Freyssinet Inc.

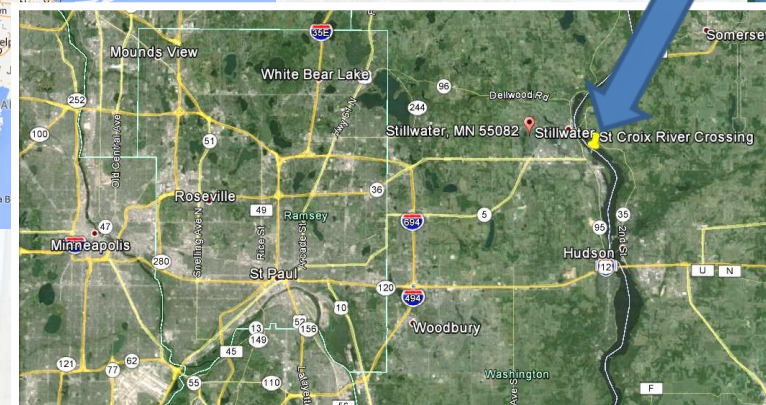
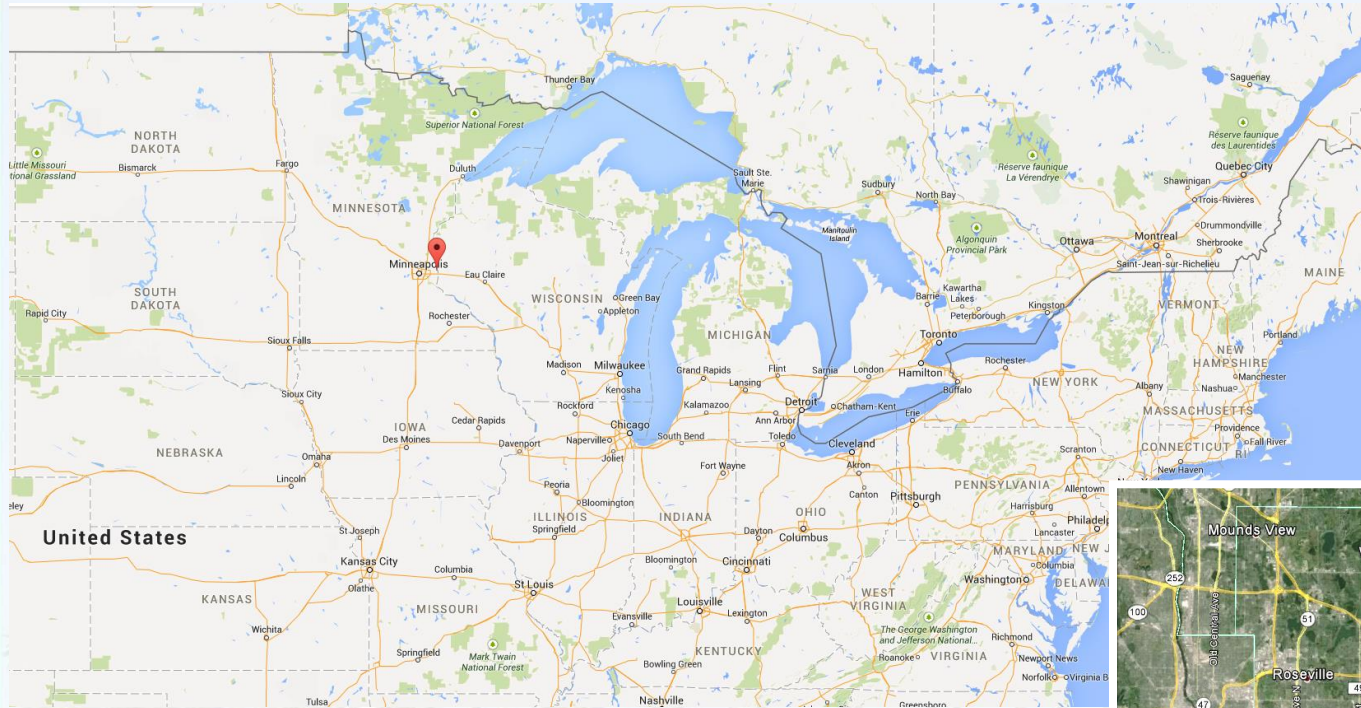


Presentation Goals

- Construction update of the St Croix River Crossing in Stillwater, MN
- Construction update of the Lesner Bridge replacement in Virginia Beach, VA

St. Croix River Crossing

- Connecting Stillwater, MN and St Joseph, WI



The Old Bridge



- 1930 Stillwater lift bridge
- Heavy traffic >18,000 AADT
- Environmentally protected area
- Historic area
- Different alternatives since 1995
- Aggressive construction schedule

St Croix River Crossing

5,200 ft long

4 x 600 ft extradosed spans

Typ 100 ft wide

Min 60 ft navigational clearance

Towers 70 ft height over deck

« Organic » design

Owner : MnDOT & WisDOT

Design: HDR / Buckland & Taylor

Consulting Engineer : Parsons Transportation Group/ International Bridge Technologies

Main Contractor: Lunda Ames J.V.

Engineering firms: McNary Bergereon / Corven Engineering

PT Supplier: Freyssinet, Inc



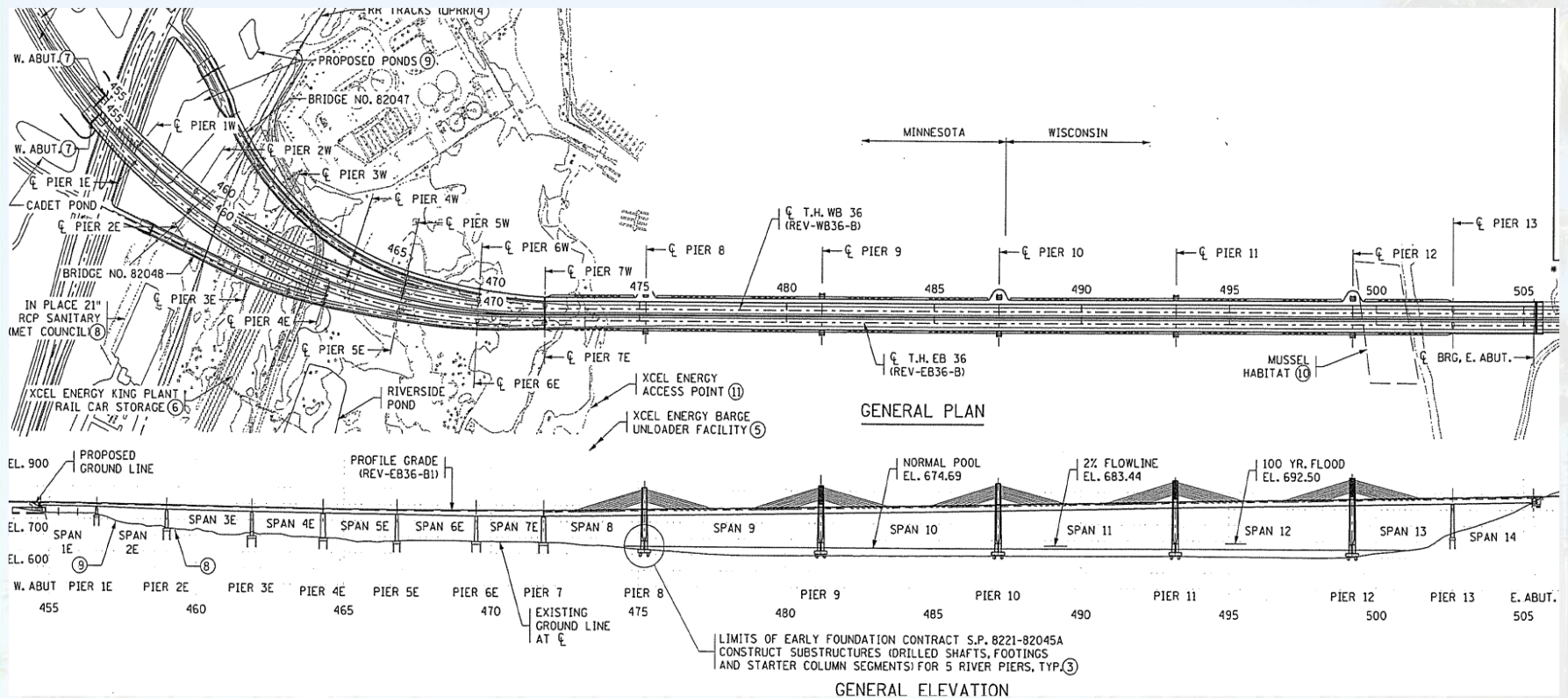
Project Schedule

St. Croix Crossing Project Schedule																								
	2012				2013				2014				2015				2016				2017			
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Final Design																								
Early Fnd Design																								
Pile Load Test contract																								
Early Fnd Contract																								
Superstructure Contract																								

5 Structures: 3 PC Segmental Bridges, 2 CIP on FW Bridges

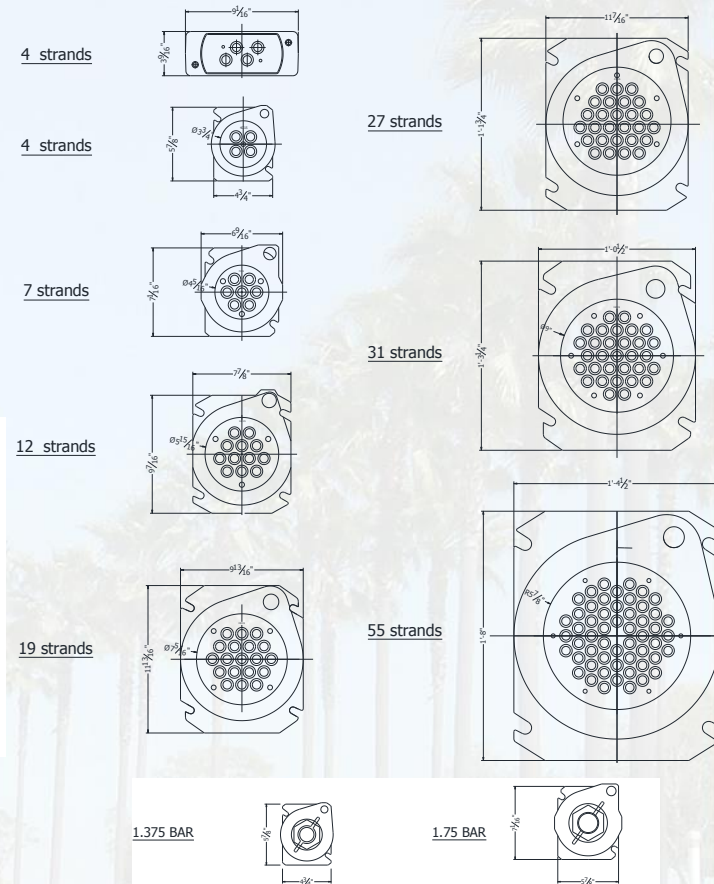
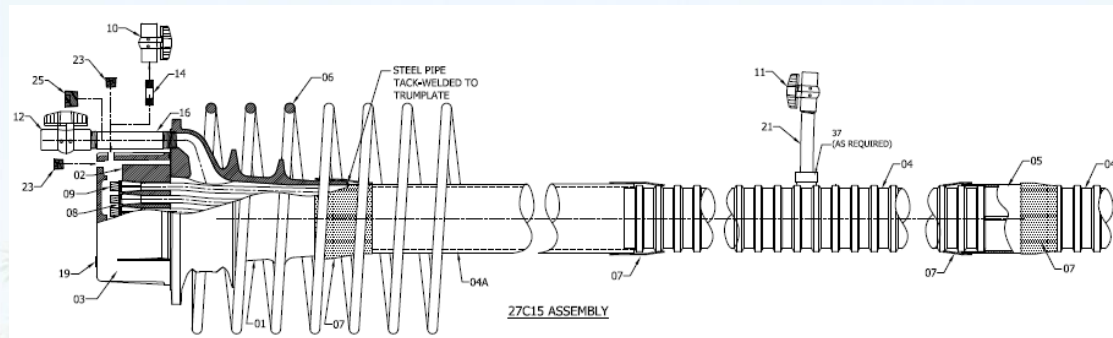


General Arrangement



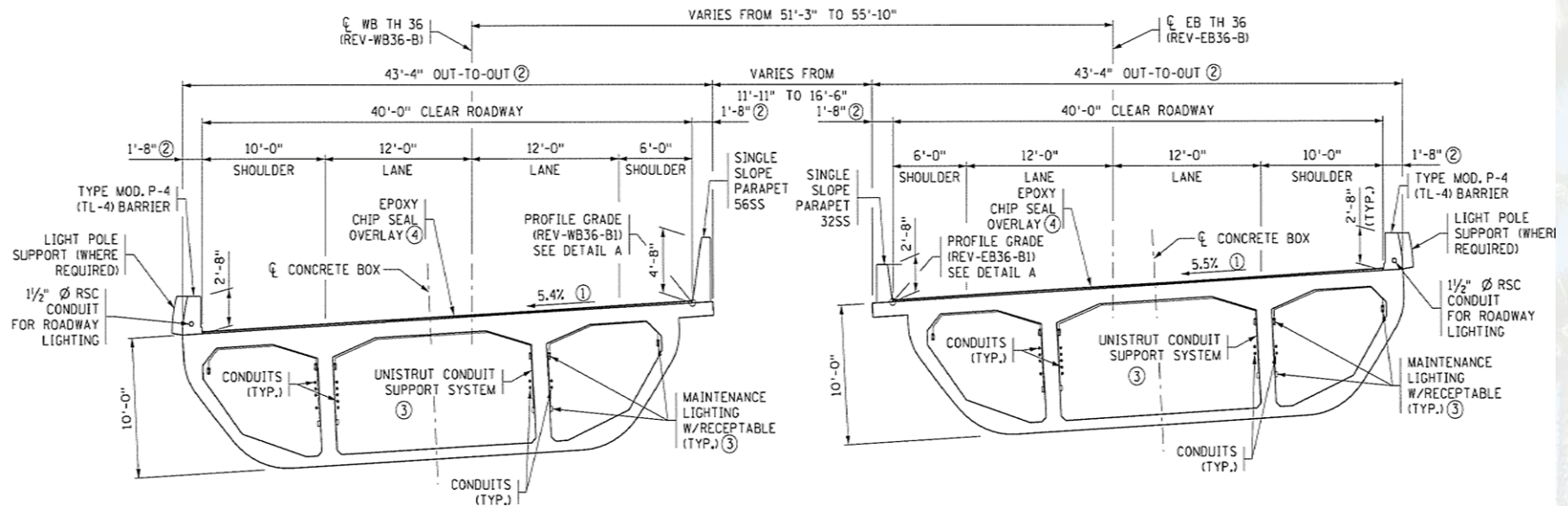
Wide Range of Post-tensioning

- 11.4 million ft strand (3,800 Ton)
- 35,000 ft PT bars 1 3/8" and 1 3/4"
- 16,000 Anchorages: 4 , 7, 12, 19, 27, 31, 55 strands.
Each anchor delivered Galvanized or Epoxy-Coated
- External PT with diabolos
- Anchorages galvanized/ epoxy coated
- PP duct and grout accessories as per MNDOT (FDOT) specs.



Typical Approach Segment

Multi-cell Sections



BR. 82045 (WB) - WEST ABUTMENT TO PIER 1W
TH 36 WB STA. 454+80 ± TO 456+75.32

BR. 82045 (EB) - WEST ABUTMENT TO PIER 1E
TH 36 EB STA. 454+66 ± TO 456+60.66

On-site Casting Yard



338 segments total

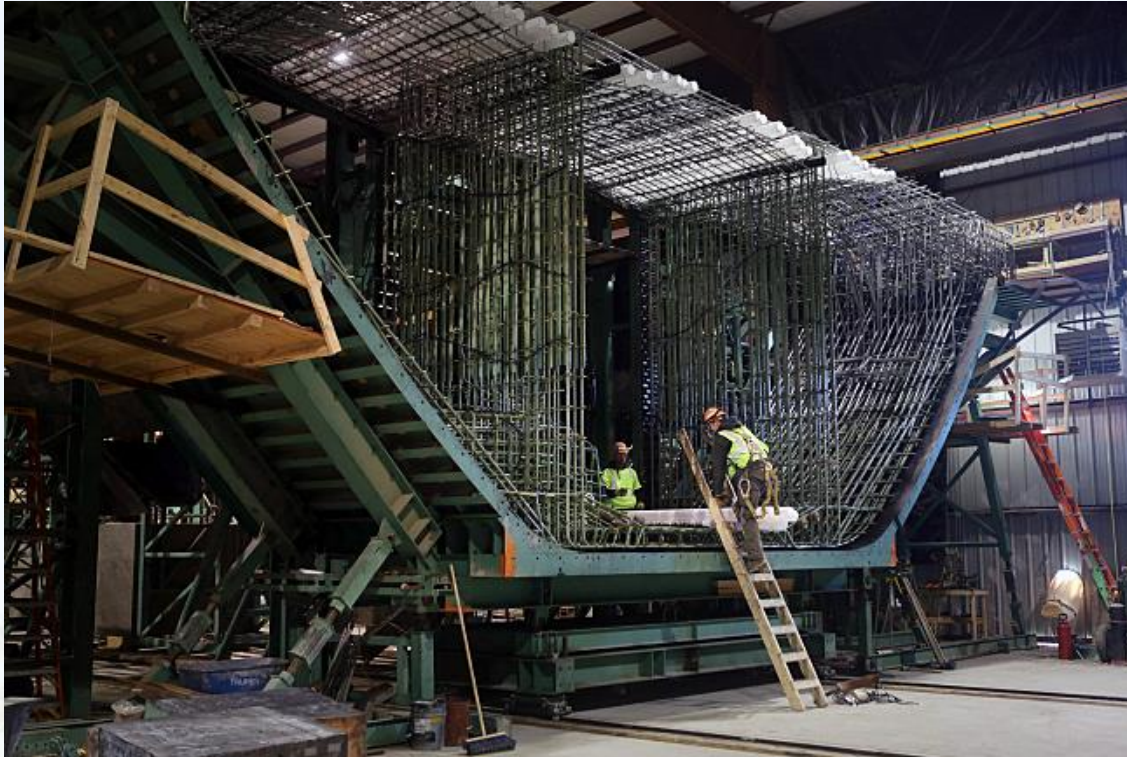
- 3 casting beds
- 80 to 90 tons each seg.



Grey Cloud Casting Yard

650 segments total

- 5 casting beds
- 140 to 180 Tons each
- Indoors, Year –round operations
- Segments hauled by barge



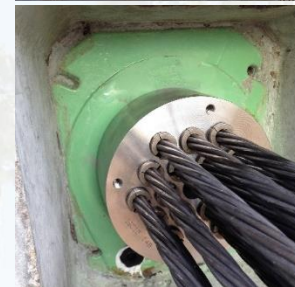
Transverse PT in Deck



Transverse PT in Pier Segments



Longitudinal PT



External Post Tensioning



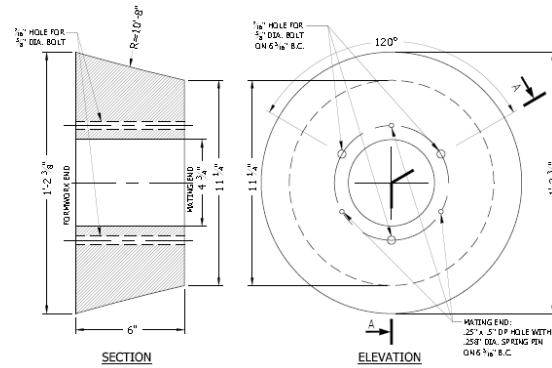
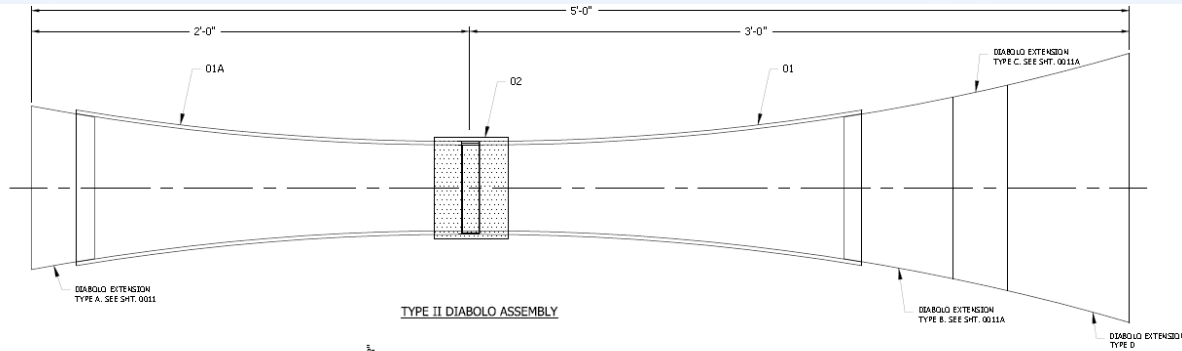
External PT



External PT Deviators and Injection Point Finishing



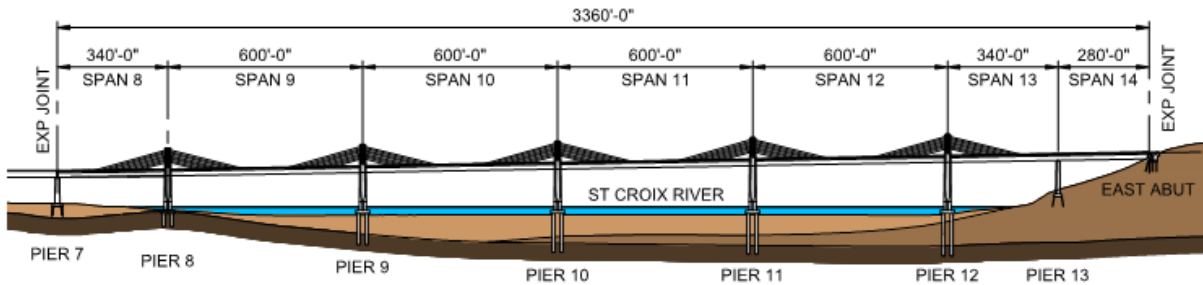
Diabolo Extensions



DIABOLO EXTENSION - TYPE D
BY FAYSSIGNET



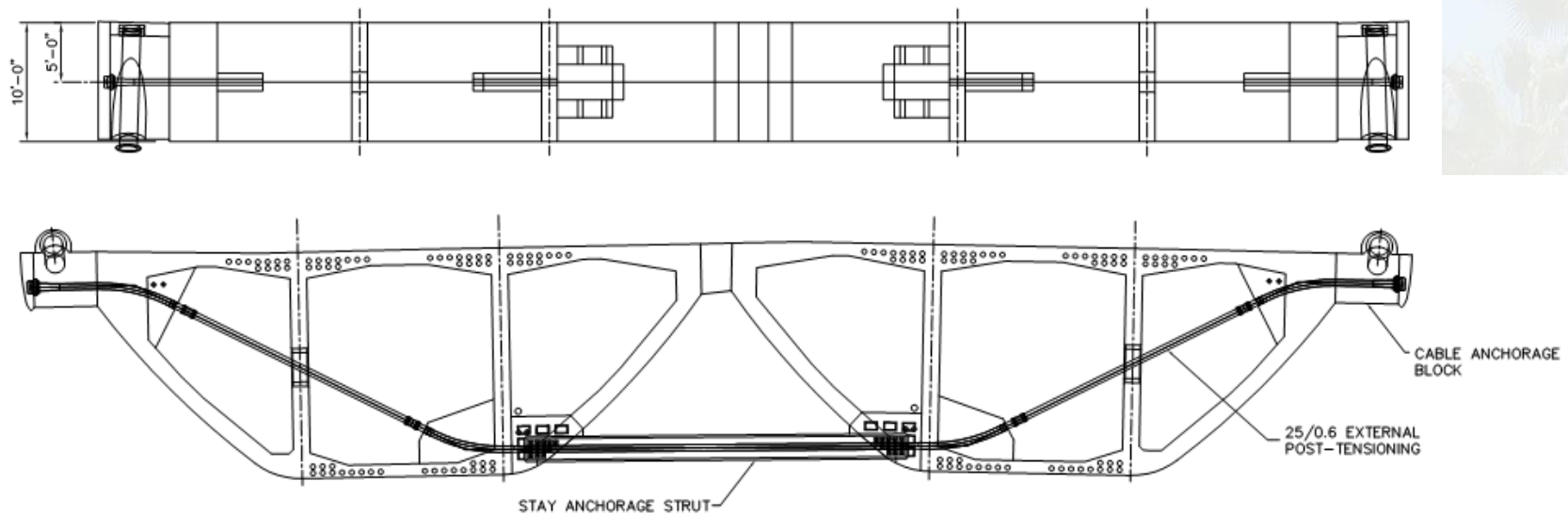
Main Bridge



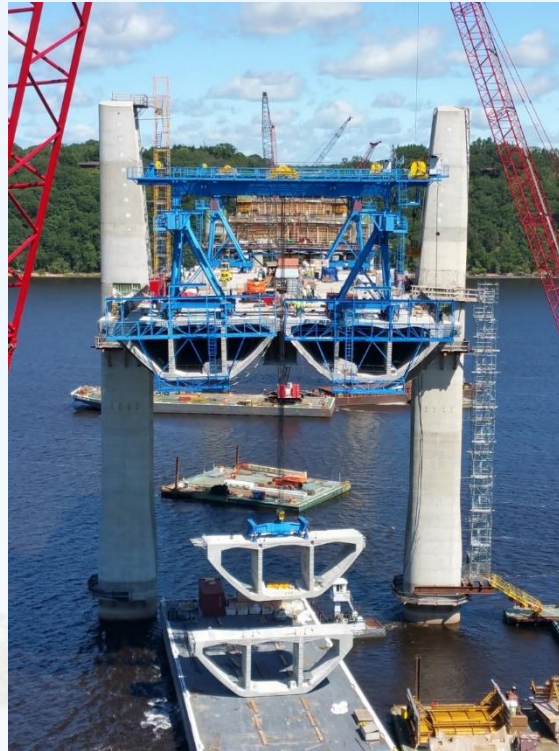
- Single structural unit over river
- Avoid in-span joints (maintenance concerns)
- Avoid sliding deck at end extradosed piers
- Complex knuckle design at crossbeam



Stay Anchor Segment Transverse External PT



Erection Using Segment Lifters



Closure Pour Between EB & WB Segments w/ PC Transverse Strut

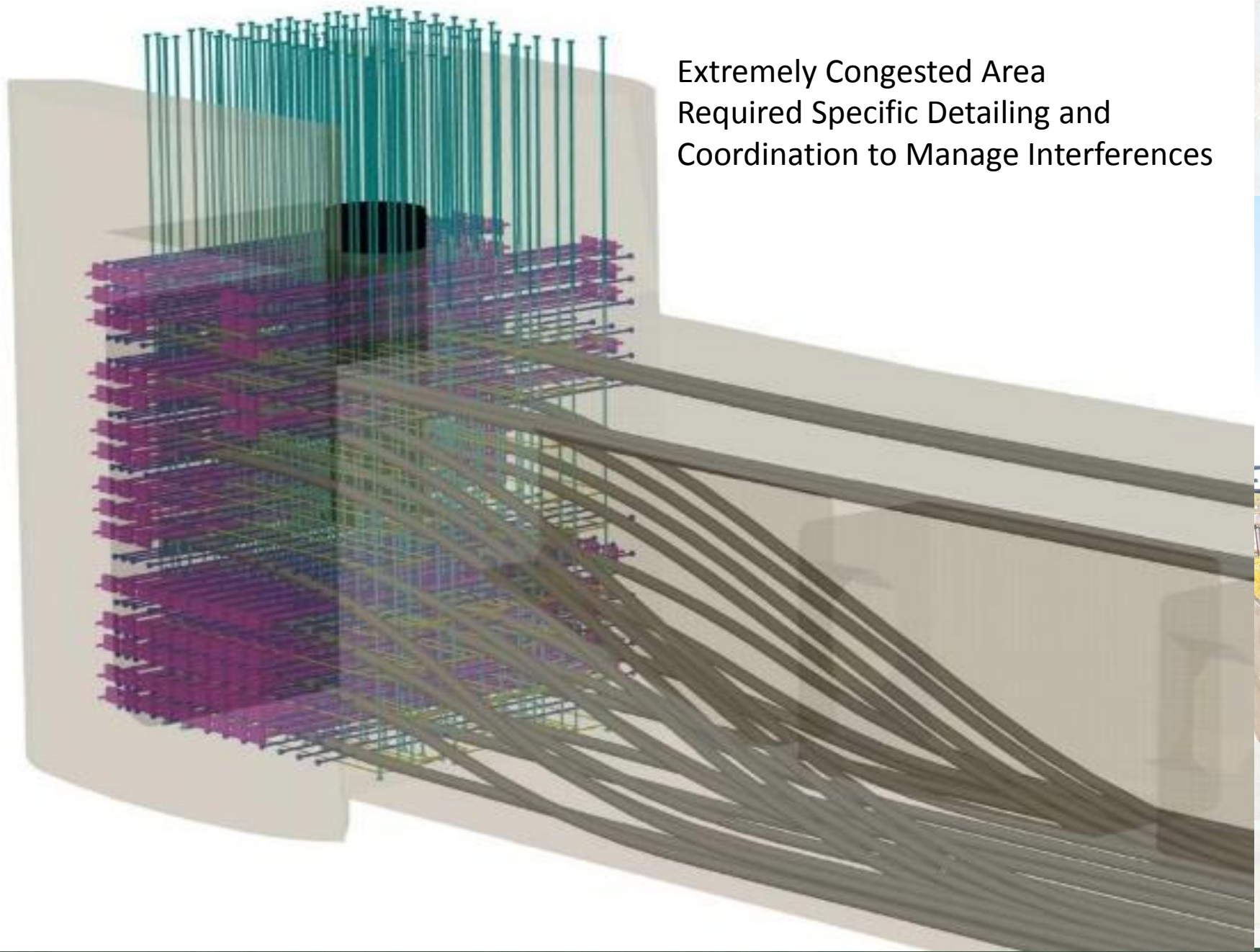


Stay Cable Erection and Stressing



Stay Cable Erection

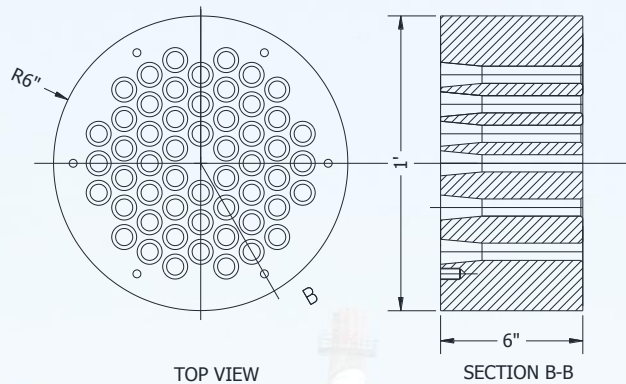




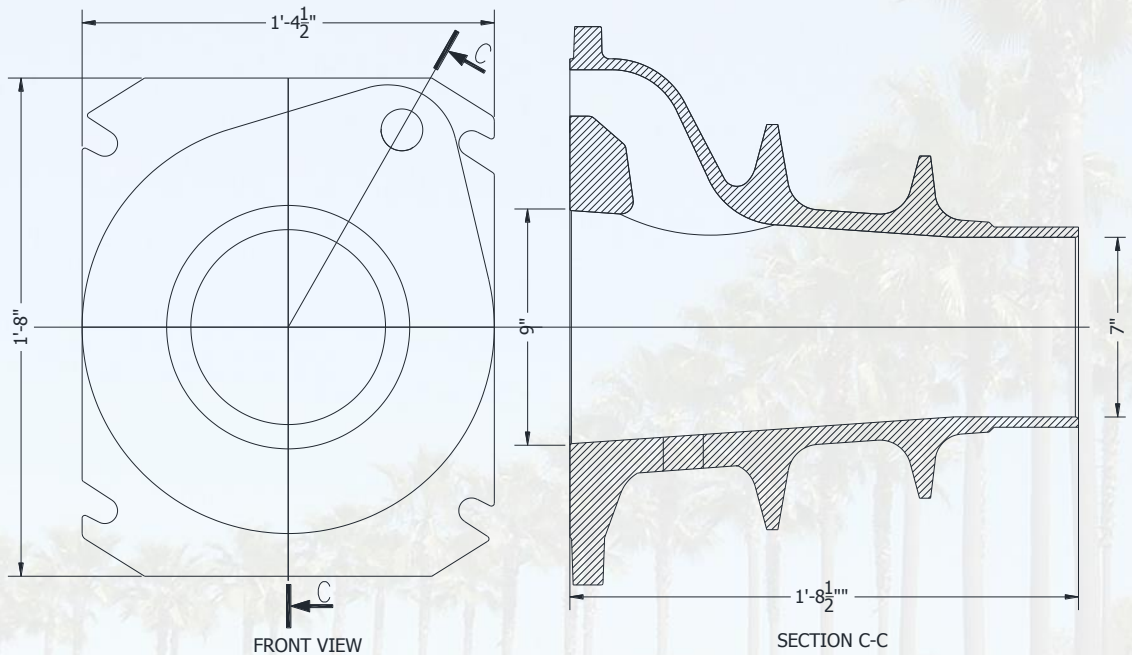
Extremely Congested Area
Required Specific Detailing and
Coordination to Manage Interferences

Cross Beam

Freyssinet 55C15 Anchorage



(02) FREYSSINET 55C15 ANCHOR BLOCK



(01) FREYSSINET 55C15 TRUMPLATE

Cross Beam

20 - 52 x 0.6" Strand Tendons



Installation of 55-Strand Tendons



Cross Beam PT Bars



Cross Beam PT Bars



Acknowledgements



Pictures Courtesy of MNDOT/WIDOT / Lunda Ames JV

Engineers and Contractors

- HDR
- Buckland & Taylor
- HNTB
- Parsons
- IBT
- Parsons Brinkerhoff
- Kraemer North America
- Lunda / Ames Joint Venture
- McNary Bergeron
- Corven Engineering
- Figg

Material Suppliers

- Freyssinet
- VSL
- GTI
- EFCO
- Mageba
- Sika
- Eulcid
- Southern Forms
- Watson Bowman
- Williams Form Eng

Project Information

Project Website

www.mndot.gov/stcroixcrossing/

E-mail

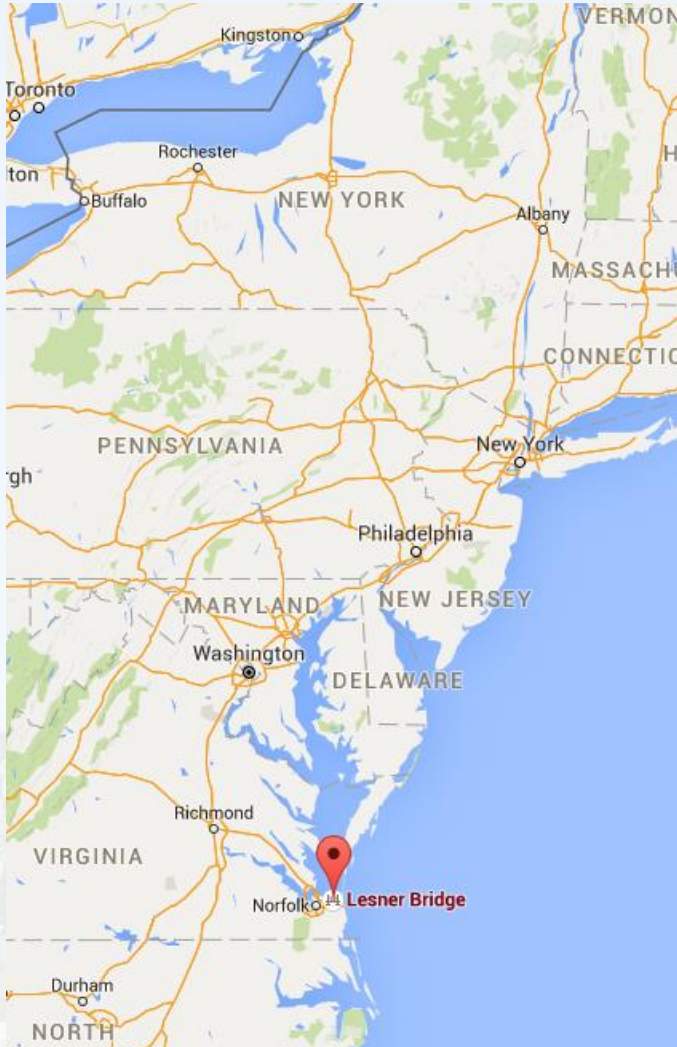
stcroixcrossing.dot@state.mn.us

Facebook

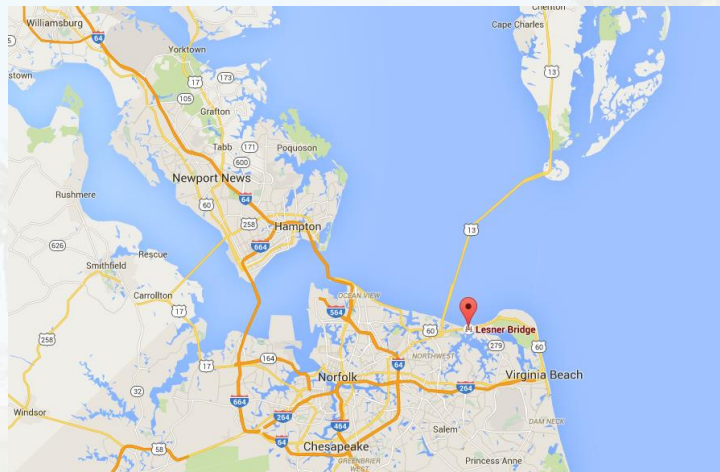
www.facebook.com/saintcroixcrossingmndot

Twitter @stcroixcrossing

Lesner Bridge Replacement



City of Virginia
Beach, VA
Lynnhaven Inlet



Lesner Bridge Replacement

1,575 ft ft long
4 x 150 ft + 225 ft + 4 x
150 ft
2 bridges 53' 8' wide



Owner : City of Virginia Beach (co-founding VDOT FHWA)

Design: FIGG

Consulting Engineer : Parsons Transportation Group/
International Bridge Technologies

Main Contractor: McLean Contracting Company.

Construction Engineering firms: McNary Bergeron,
RS&H & FIGG

Segment precast : Atlantic Metrocast

PT Supplier: Freyssinet, Inc

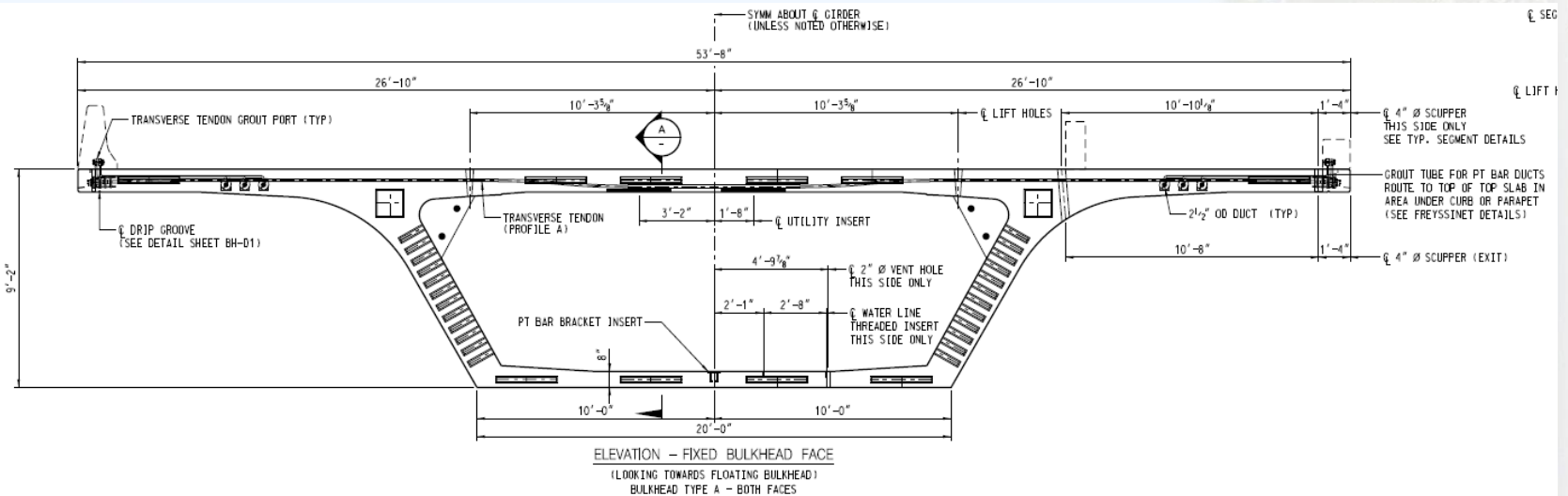
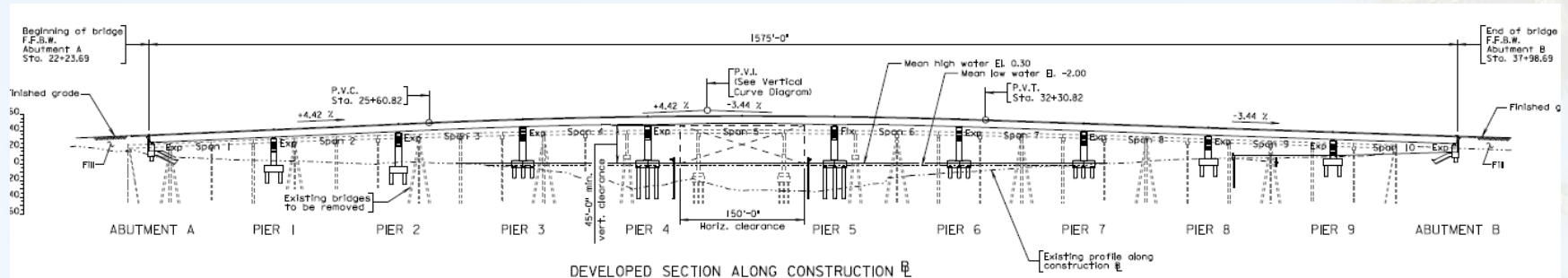
Pictures courtesy of Mc Lean Contracting Company
City of Virginia Beach

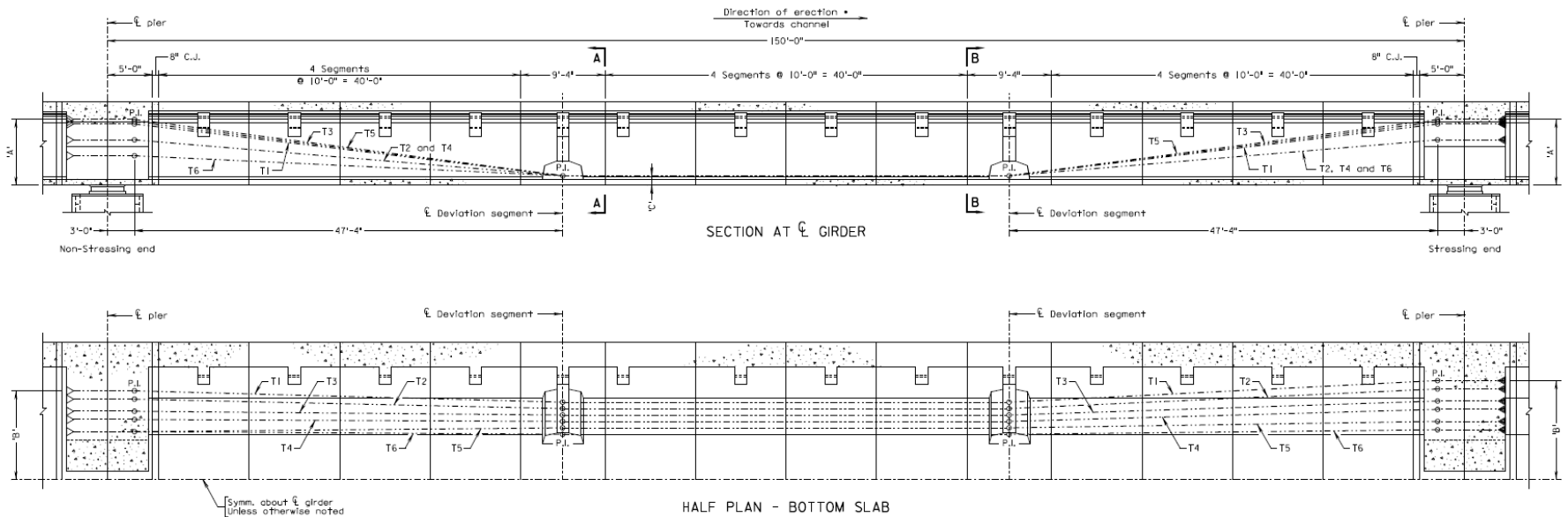
Existing John A. Lesner Bridge



From 1957 (EB) and 1958 (WB)
Structurally Deficient

General Arrangement

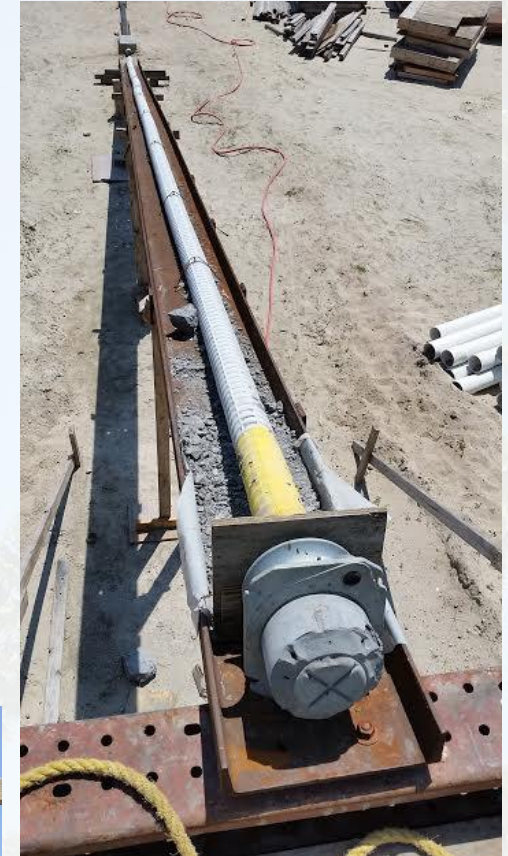




Embedded Anchorage Components Galvanized

- Transverse PT: 4F15
- External PT: 27C15 and 19 C15
- Cantilever Top Slab PT: 19C15

Grout Mock Up Test at the Beach



Overhead Gantry



Typical Precast Segment



Aprox. 70%
completed

9'-4" and 10' long

Depth 9'-2" to 10'

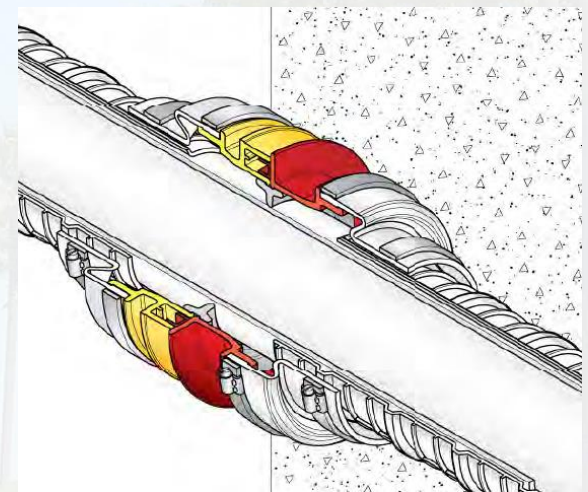
Precast Segment



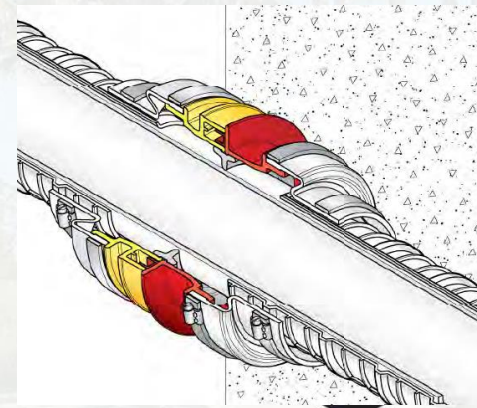
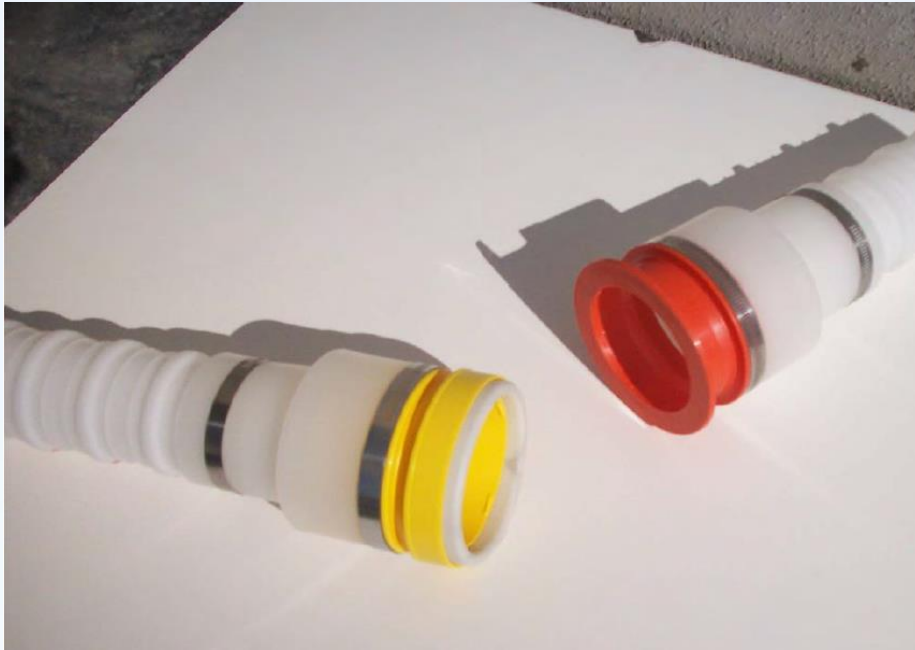
Deviation pipes instead of diabolos



Segmental Couplers



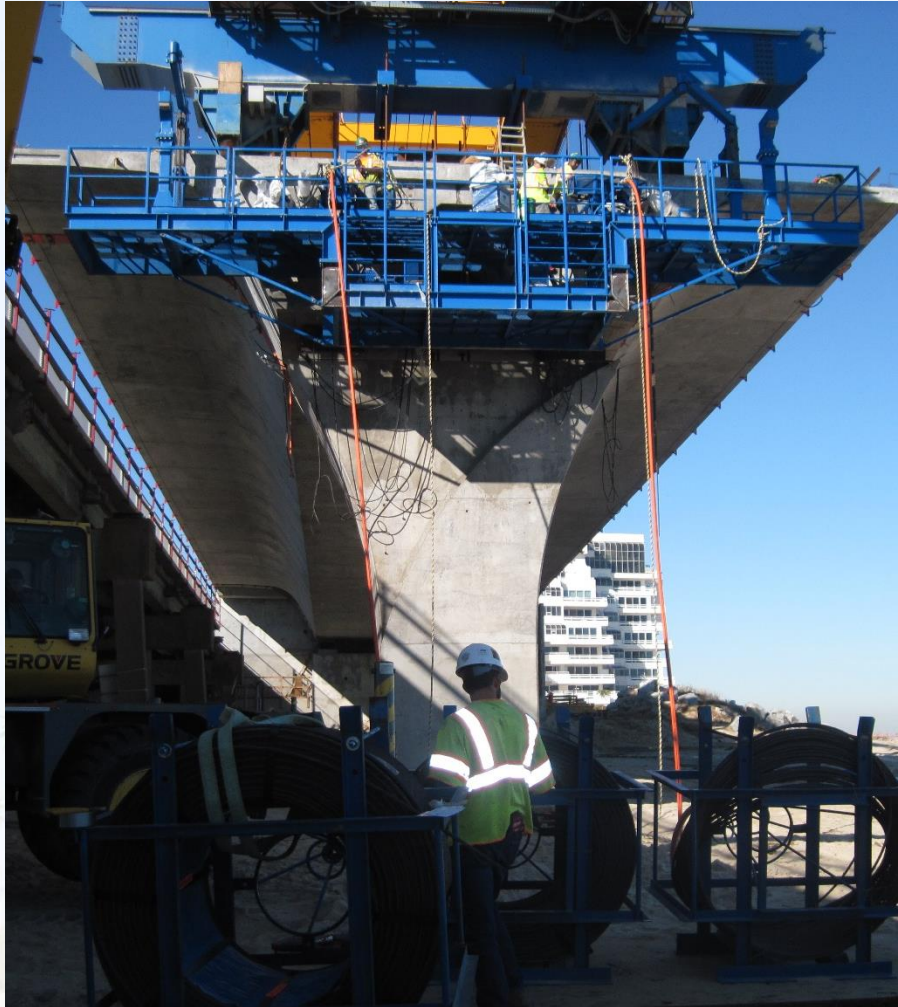
GTI Segmental Couplers



POST-TENSIONING
INSTITUTE™

Pushing External Tendons

Typically Prefabricated Winched
Far More Efficient Installation w/
Freyssinet Strand Pushers



Pushing External Tendons



Pushing External Tendons



2nd Span and
Following.

Push from Deck

Minimizes Labor &
Strand Exposure

Stressing Operations



Tendon Pairs Stressed Simultaneously



Thank You!

Questions ?

