U.S. Department of Transportation
Federal Highway Administration

AECOM

TEAM DelDOT
Transparent Efficient Accountable Measured

J.D. ECKMAN INC.
CONSTRUCTION
J.D.E.
BRIDGE HIGHWAY
EST. 1945

Delaware Department of Transportation

BR 1-813 \ I-495

Emergency Repairs

AGENDA

- Construction Efforts
- Lessons Learned
- Acknowledgements

Introduction

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Introduction

AECOM

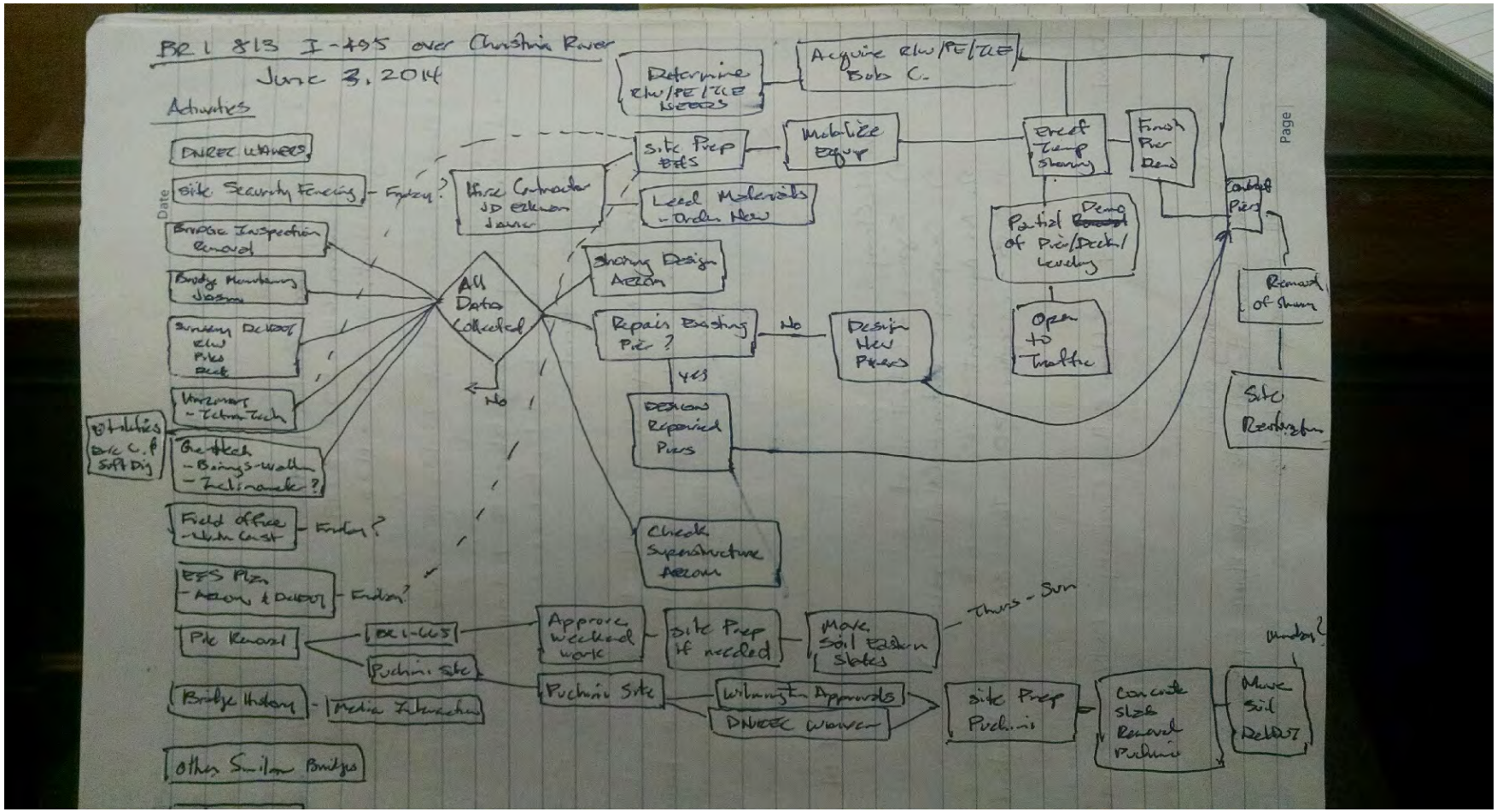
- Neil Shemo, PE – Design Project Manager
- Harry Roecker, PE – Technical Leader
- John Milius, PE – Structures
- Paul Moffitt, PE - Geotech
- Bruce Kay – Construction Project Manager
- Nicholas Hetrick, PE – Resident Engineer

J.D. Eckman, Inc.

- Jim Roberts – Project Manager
- Josh Smolinsky, PE – Project Engineer
- Joe Rovnan, PE – Senior Structural Engineer
- Greg Burkhart, PE – VP Steel Division

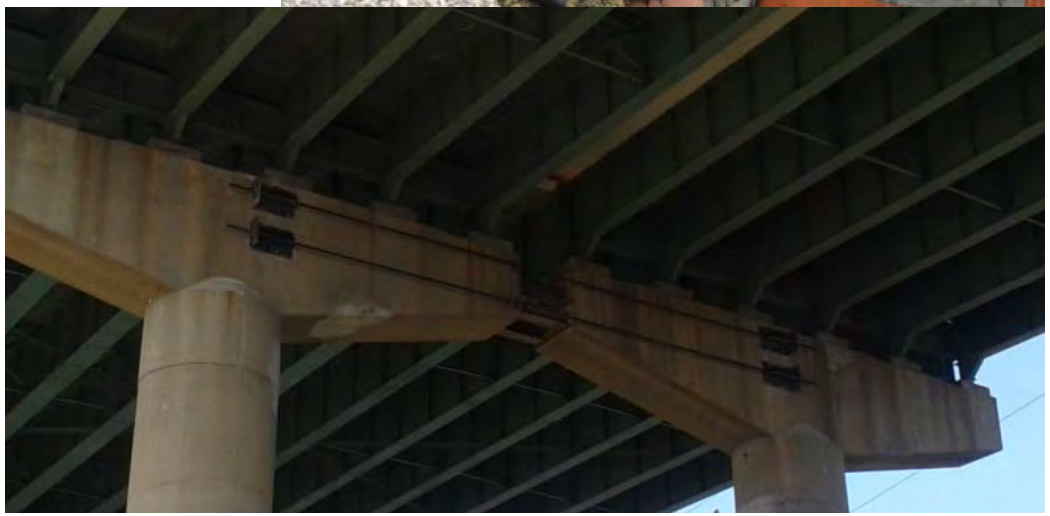
Construction Overview

- Putting the team together, planning, and execution



Construction Overview

- Construction
  - Began 6/9/2014
    - Site grading
    - Causeway
    - Pier ties
  - Drilling Began 6/13/2014
  - 32 of 32 drilled shafts installed by 7/16/2014
  - Grade Beams Constructed at:
    - 12 and 13 SB North & South – 7/8/14
    - 12 and 13 NB North & South – 7/25/14



Pier Ties Installed

Construction Overview

- Shoring Towers
  - 12 and 13 SB North & South – 7/22/14
  - 12 and 13 NB North & South – 8/5/14
- Underpinning
  - Pier 11 & 14 SB – 7/26/14
  - Pier 11 & 14 NB – 8/05/14
- Jacking
  - SB 7/29/14
  - **SB Open – 7/31/14**
  - NB 8/20/14
  - **NB Open – 8/23/14**

First Delivery of Casing Arrives 6/12/2014

Construction Efforts

First Drill Rig on Site
6/13/2014

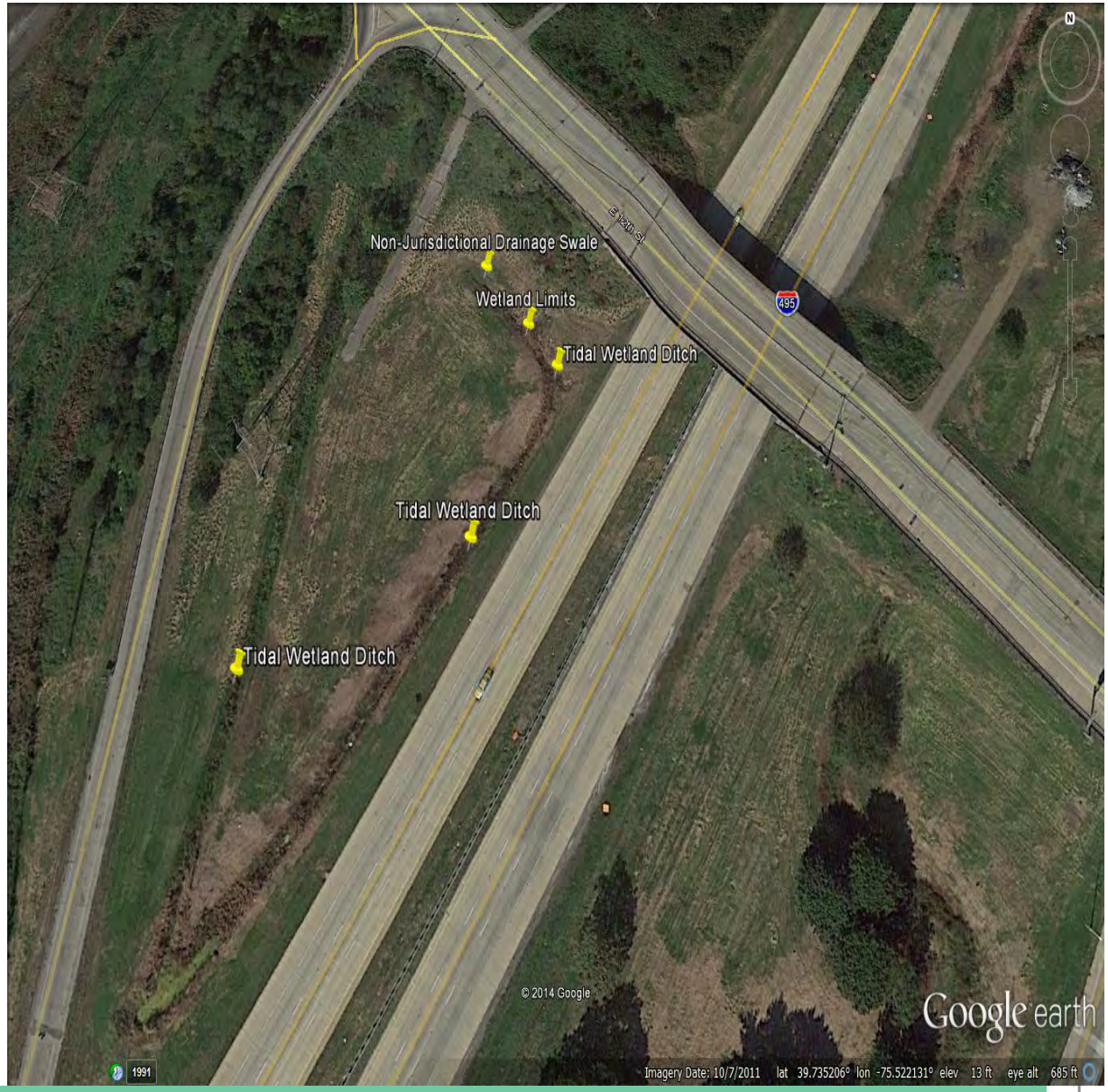
Rebar Cage from Tappan Zee
6/16/2014

Construction Efforts

Construction Efforts

Excessive Dirt

- Terminal Ave
- 12th St.
- Hazmat Disposal



Construction Efforts

Lifting 160 foot long Rebar Cage

Construction Efforts

First Drilled Shaft Reinforcing Cage
6/21/2014

Construction Efforts

Access Holes in Bridge Deck for Placement of Drilled Shaft Rebar

Construction Efforts

Construction Efforts

- Drilled Shafts – Pouring PCC
  - Casings went to bedrock and were filled with a slurry.
  - SCC concrete was tremie poured from the bottom and slurry was pumped out and recycled.

Construction Efforts

Construction Efforts

Construction Efforts

Construction Efforts

Construction Efforts

- Grade Beams (Piers 12 & 13)
  - Grade beams were formed on each side of the piers.
  - Poured in 2 segments. SB portions poured first.
  - Because of the mass of the pours, a thermal plan circulating water from the river to regulate the temperatures had to be used.

Construction Efforts

- Underpinning (Piers 11 & 14)
  - 4 Drilled Shafts per Pier
  - Poured in 2 lifts over existing footing.
  - Post tensioned to existing footing.
  - Also required a thermal plan due to the mass concrete pour.

Construction Efforts

View of Site Looking East
6/27/2014

Construction Efforts

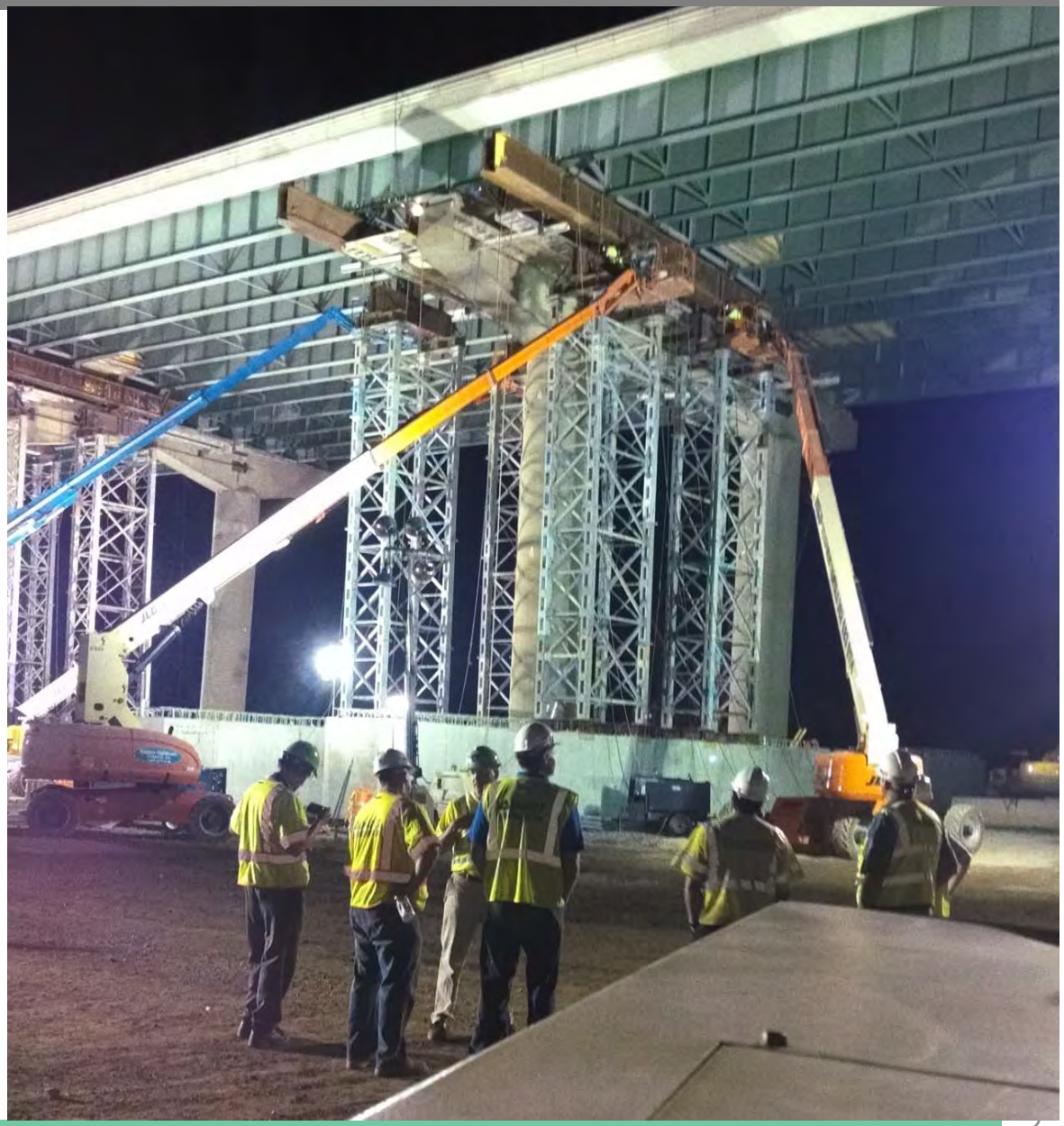
Construction Efforts

Shoring Towers on Grade Beam with Header Beam at 12 SB

7/24/2014

Construction Efforts

Southbound Jacking
7/29/2014



Construction Efforts

Southbound Jacking 7/29/14 - 7/31/14

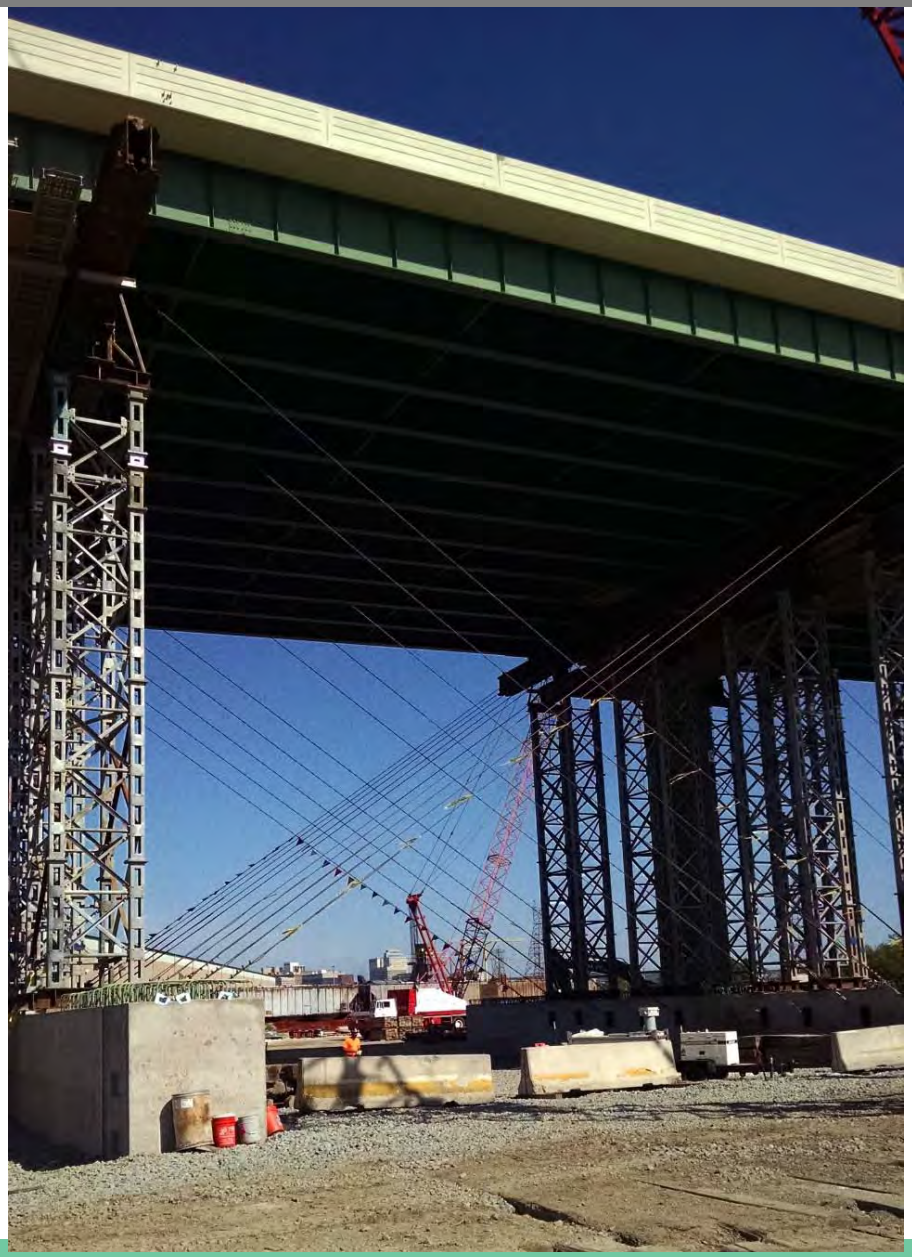
"…The credit belongs to the person who is actually in the arena…"

T. Roosevelt

Project team working through one unpredicted structural response during jacking.

Construction Efforts

Longitudinal Bracing



Construction Efforts

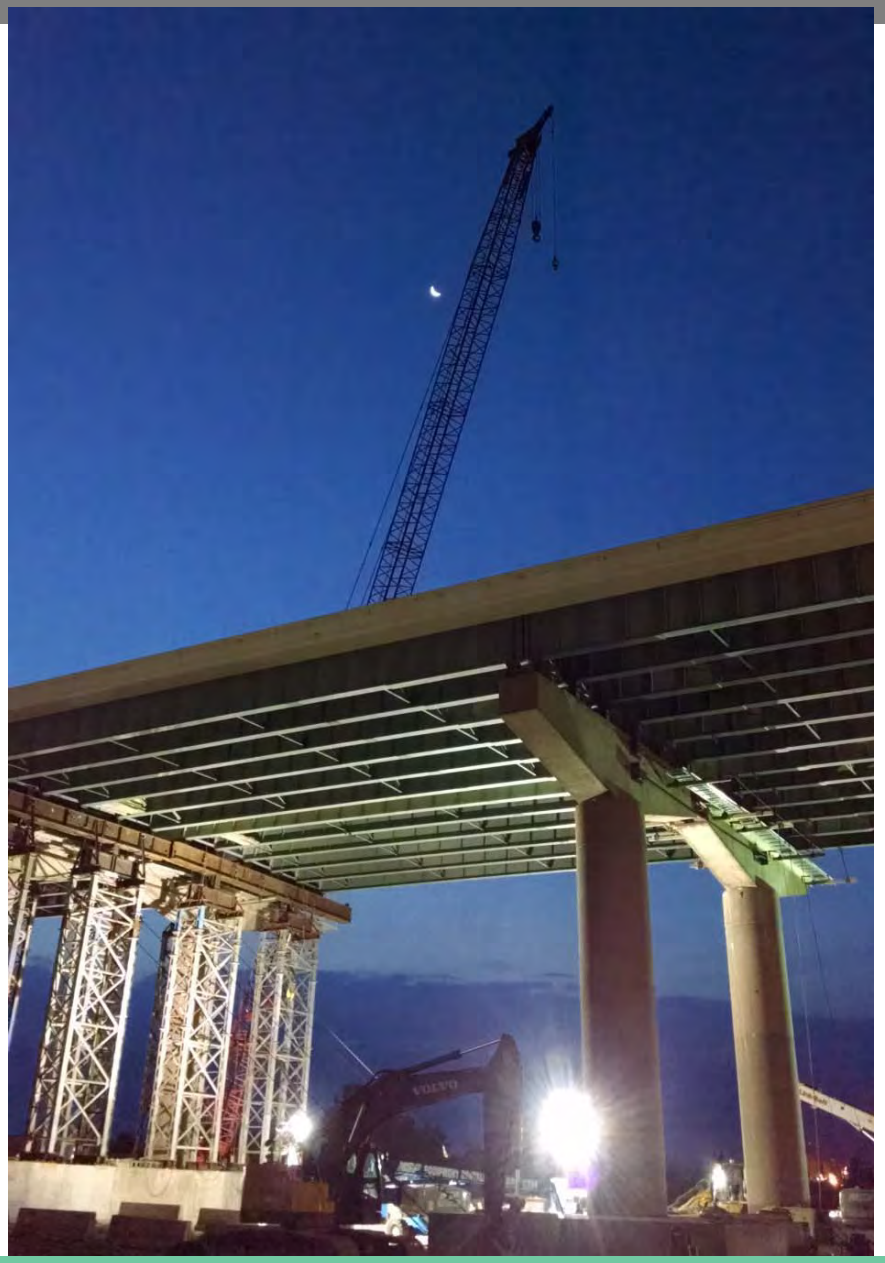
Southbound Opening
7/31/2014

Construction Efforts

Erecting Shoring Towers on NB
8/4/2014

Construction Efforts

Northbound Jacking
8/20/2014



Construction Efforts

Bridge Superstructure Displaced from Bearing and Pier at Pier 12 NB

Construction Efforts

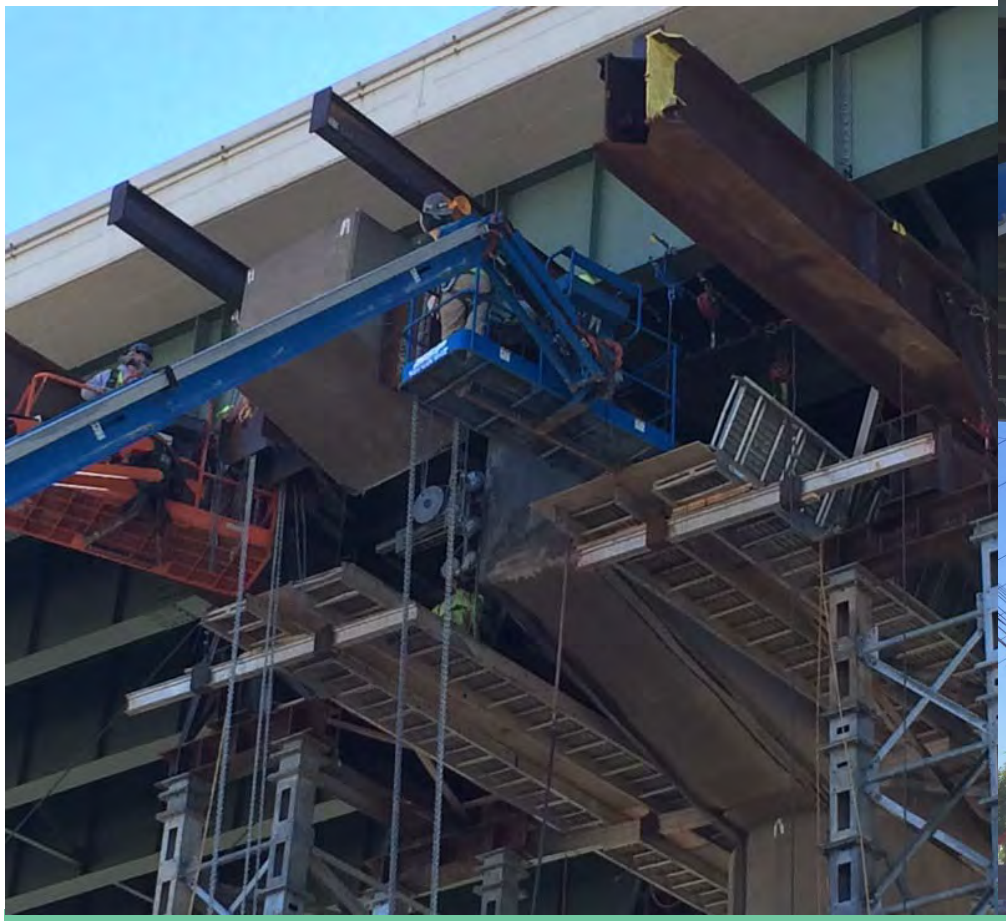
Completed underpinning and longitudinal bracing

Construction Efforts

Northbound Opening
8/23/2014

Construction Efforts

Removal of Existing Piers 12 & 13



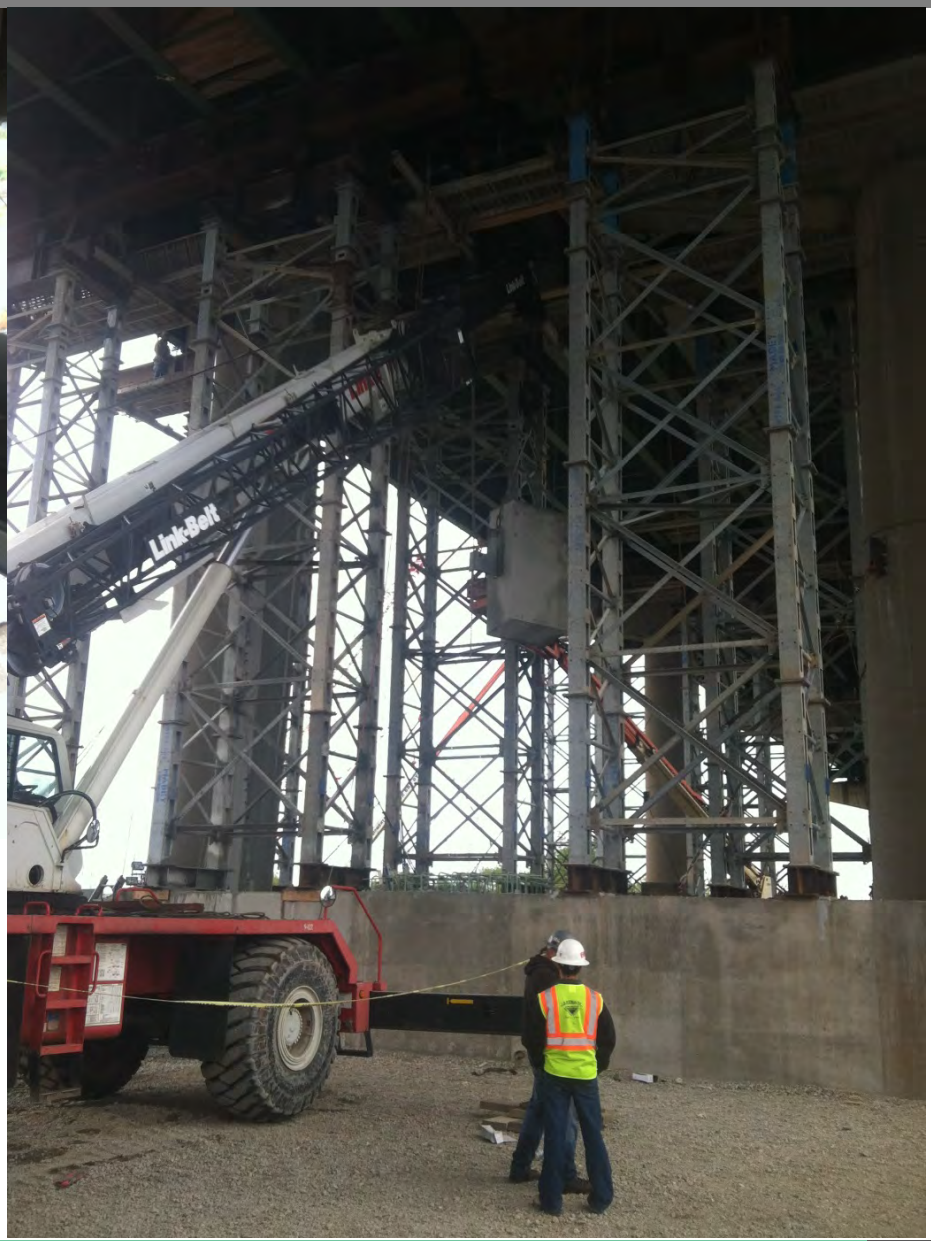
Construction Efforts

Cutting Pier Caps with Wire Saw

Construction Efforts

Lowering Exterior Cut Section

Construction Efforts



Lowering Interior Cut Section

Construction Efforts

Removing Columns

Construction Efforts

Pier 12E Removed
10/15/2014

Construction Efforts

Geofoam place between grade beams and caps poured. 10/30/14

Construction Efforts

Columns for new 3 Pile Bent Going Up
12/08/14

Construction Efforts

Temporary support structure for pier cap

Construction Efforts

Temporary Support structure for pier cap (limited room)

Construction Efforts

Tie complete rebar cage for pier cap.

Installed cooling tubes.

Set bulkheads.

Set pier cap forms.

Construction Efforts

Construction Efforts

Construction Efforts

Construction Efforts

Construction Efforts

Construction Efforts

Installation of Bearings at Pier 11.

Lessons Learned

- Lessons learned
  - Need to get design and construction team together ASAP.
  - Need qualified designer and contractor that has the expertise on board.
  - Identify long lead items
  - Establish chain of command
  - Manage site
  - Emergency Declaration
  - Communication to key stakeholders
  - There are no bad ideas. Consider all options and create atmosphere of cooperation and collaboration
  - Relationships are very important
  - Engage all sections of the Department

Acknowledgements

- AECOM
  - Neil Shemo, PE
  - Harry Roecker, PE
  - Bruce Kay, PE
  - John Millius, PE
  - Paul Moffitt, PE
  - Nicholas Hetrick, PE
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  - Dennis O'Shea, PE
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- DRBA
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- HNTB
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  - Matt Hurley
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  - Joe Rovnan
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- Entire DelDOT Team


QUESTIONS?