

KU Structures  
Conference

March 7, 2024

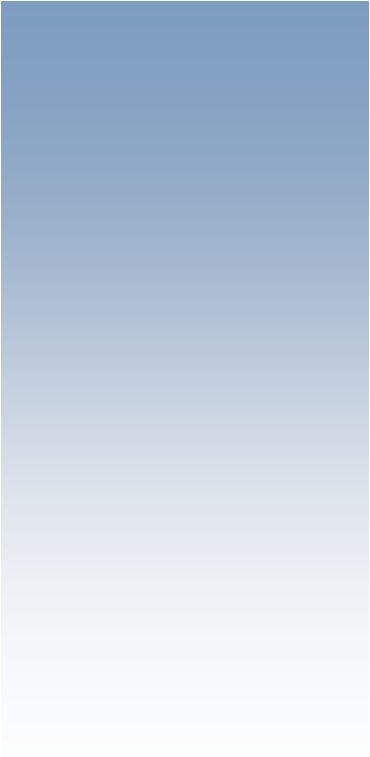
# BNSF Bridge 53.5 (Online Accelerated Bridge Replacement)

Mike Herzog (BNSF), Sean Cooney (HNTB) and Luke Sykora (AAC)





# OUTLINE

- 
- Project Overview
  - Bridge Design Overview
  - Phase Changeouts
    - Phase 1 Changeout – August 2022
    - Phase 2 Changeout - June 2023

# PROJECT OVERVIEW

PROJECT  
OVERVIEW

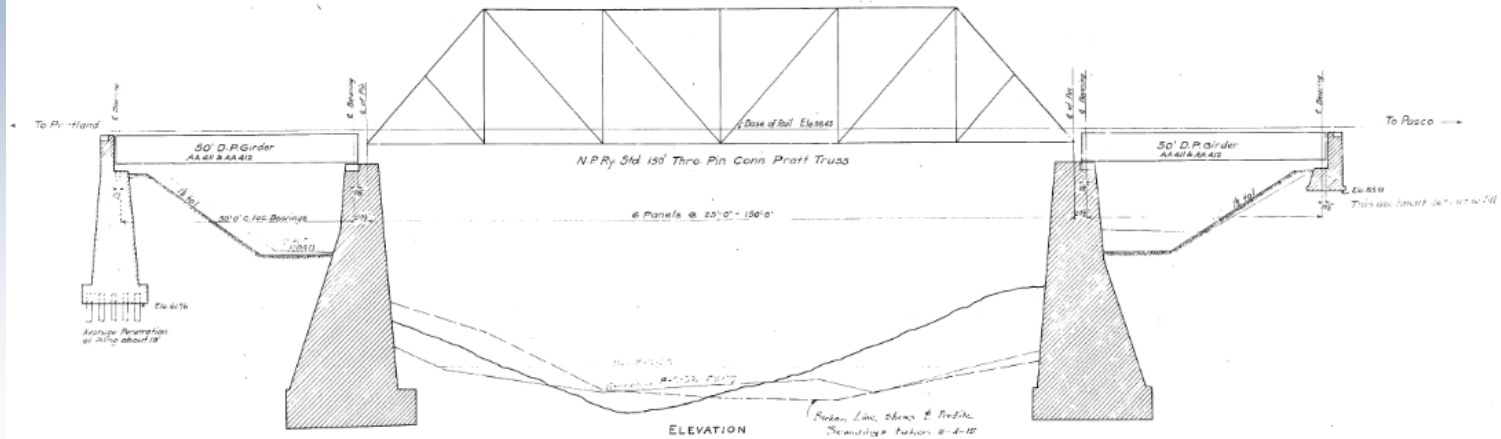


# FORMER LAYOUT



*Design needed to consider site constraints and constructability*

# FORMER LAYOUT

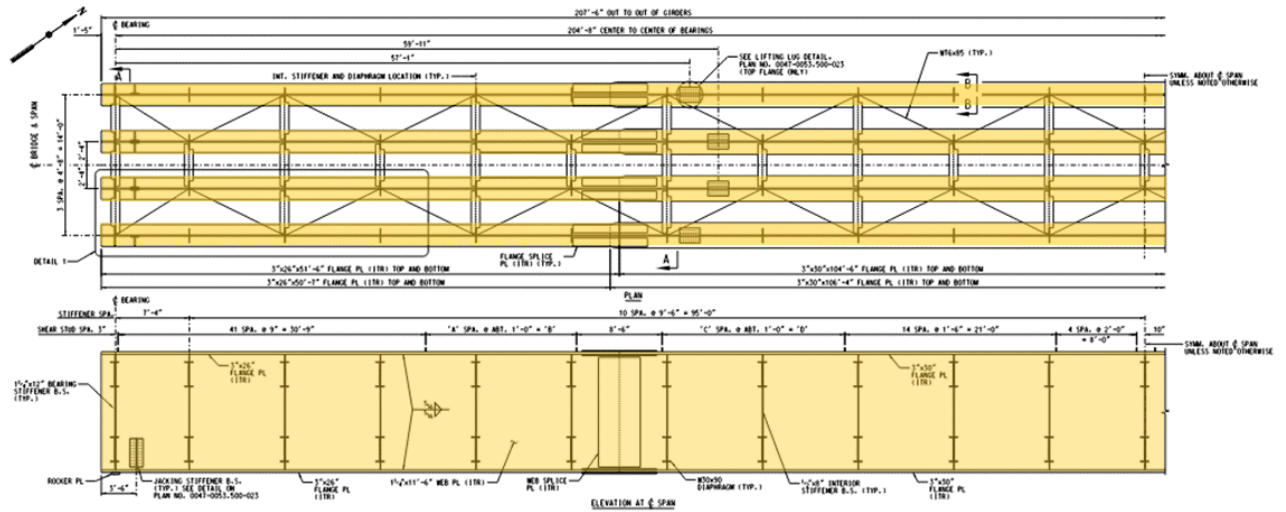
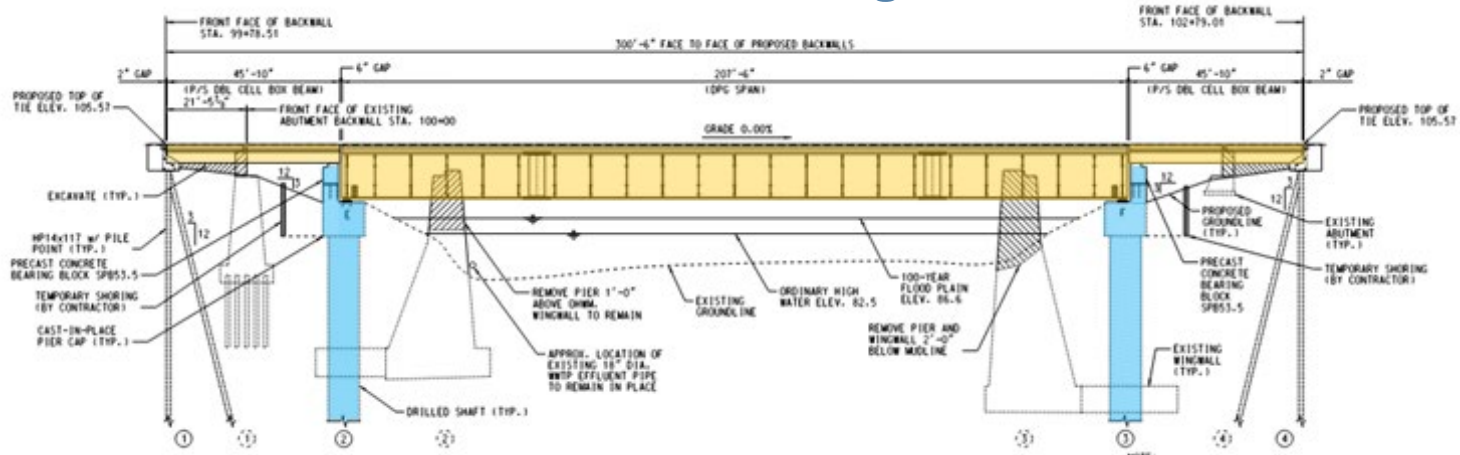


Originally built in 1909 for the Spokane, Portland & Seattle Railway

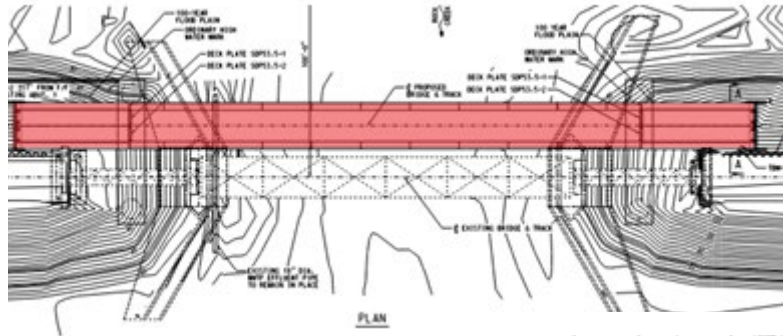
DESIGN OVERVIEW

# NEW LAYOUT

← 300'-6" Total Length →

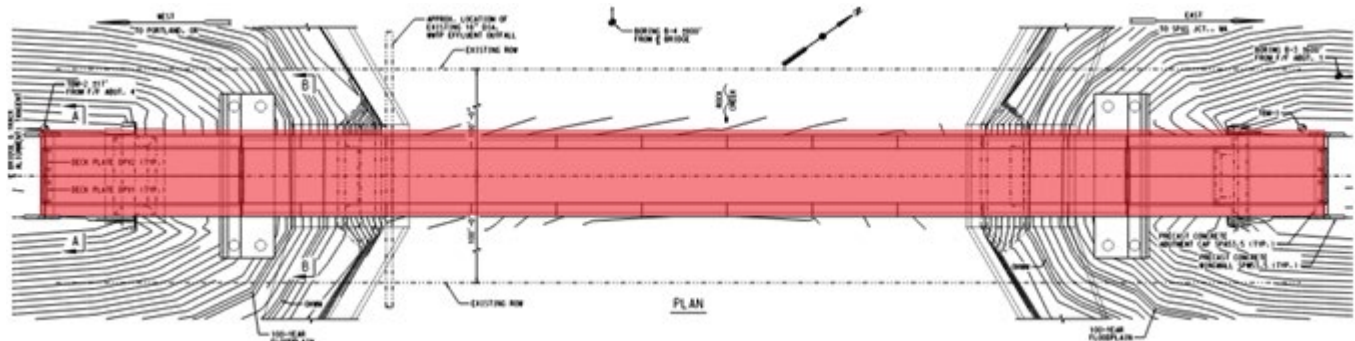
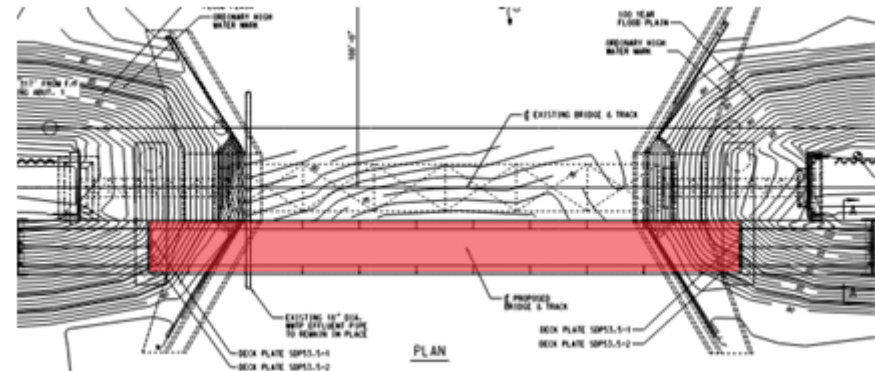


# ALTERNATIVES



North offset alignment

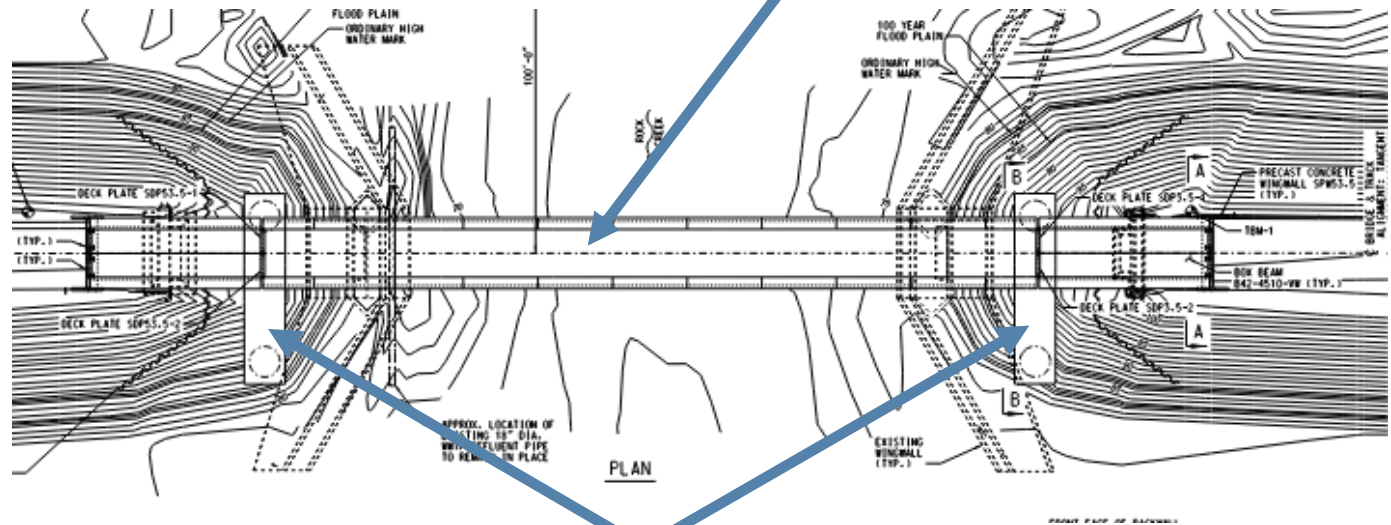
South offset alignment



Online alignment

# ALTERNATIVES

Constructed On Alignment

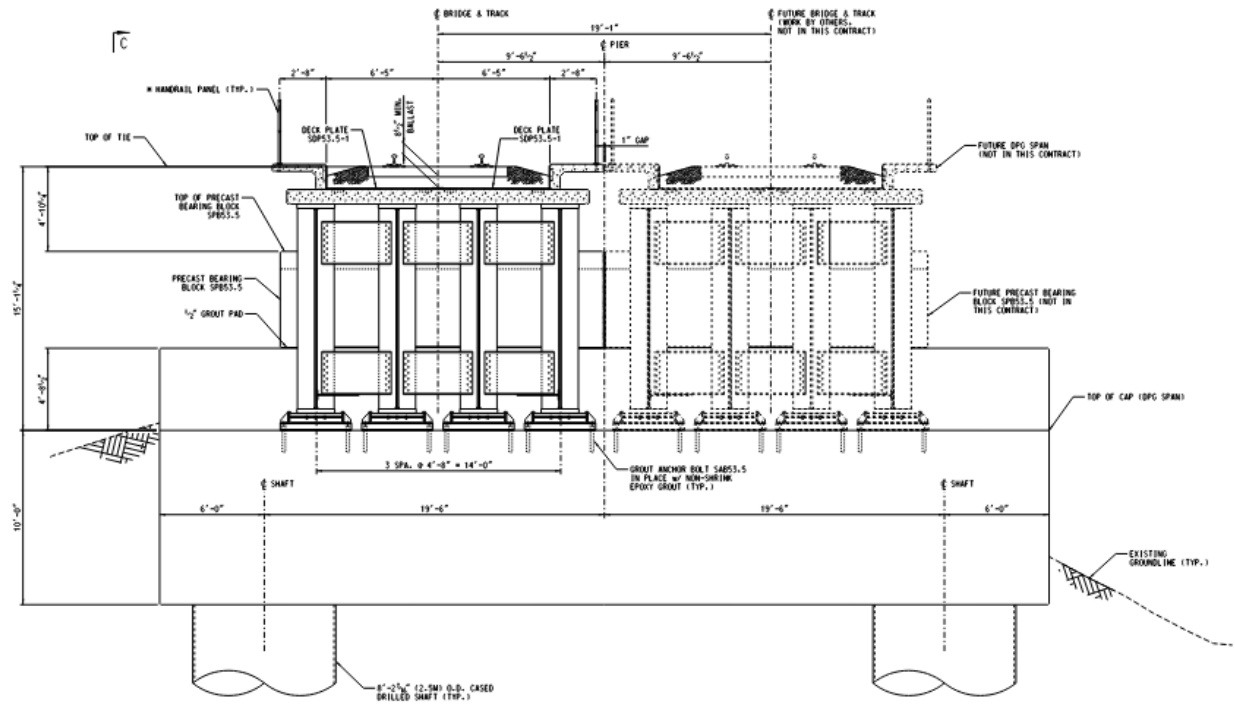


Double Track Foundations

Selected Alternative

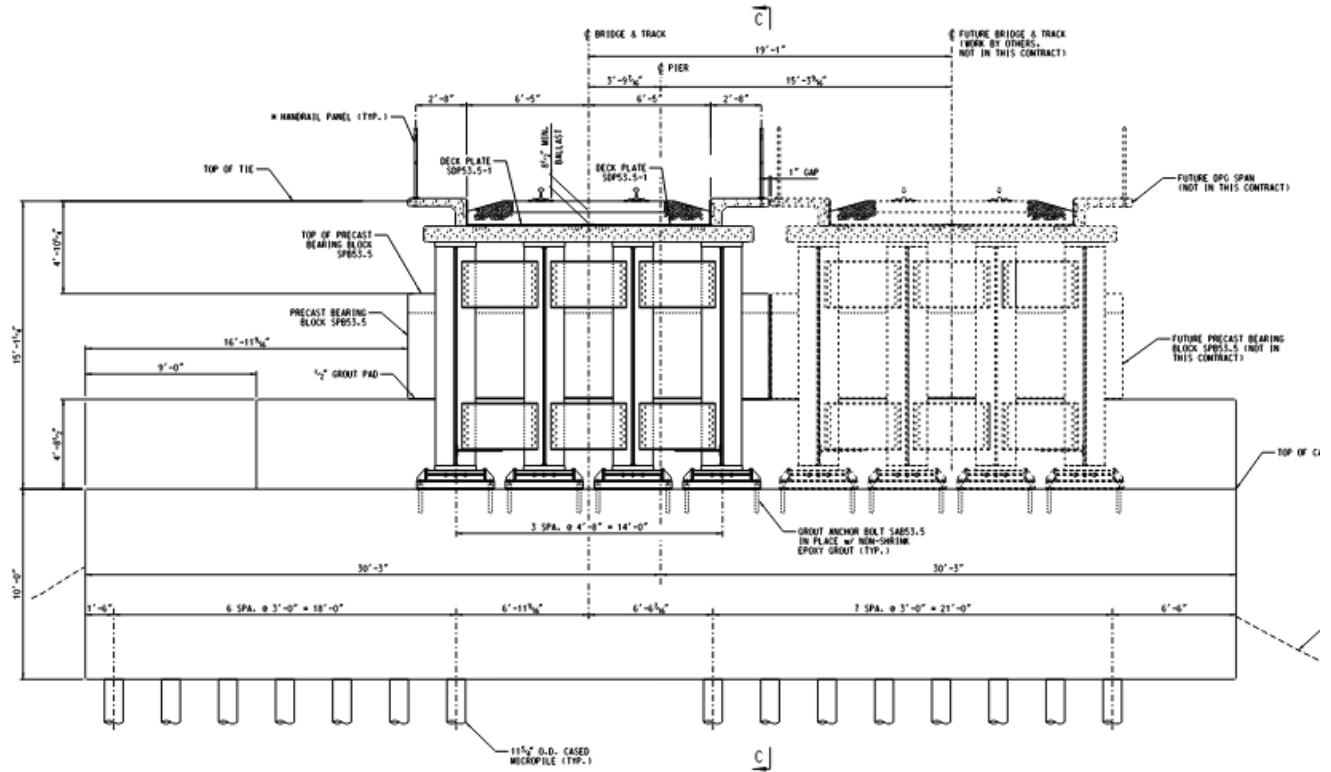


# SUBSTRUCTURE



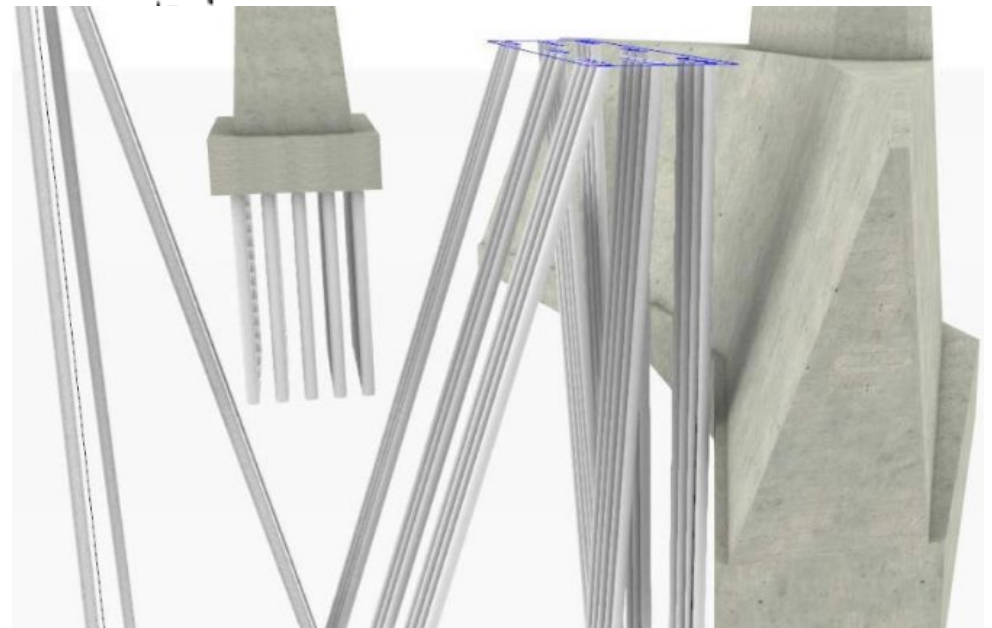
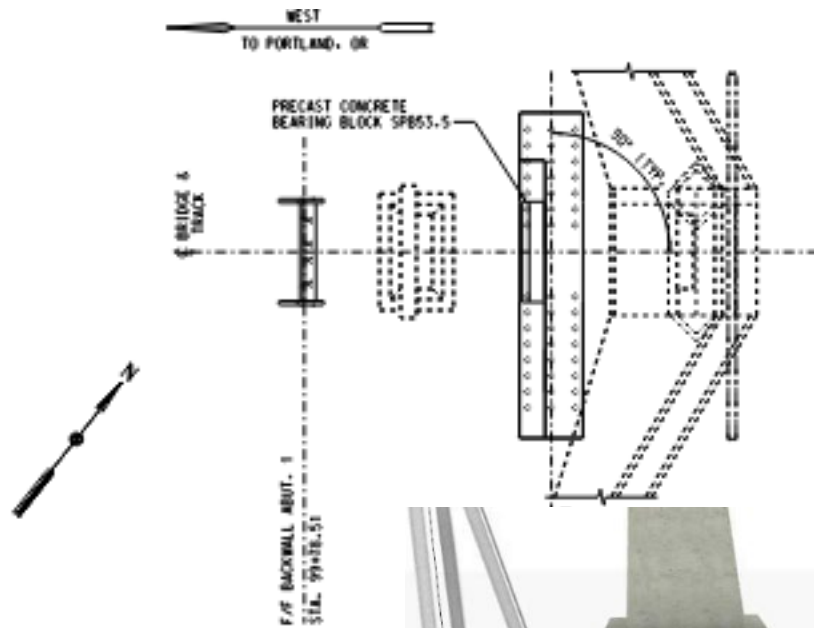
Drilled Shaft Foundations

# SUBSTRUCTURE



Micropile alternative

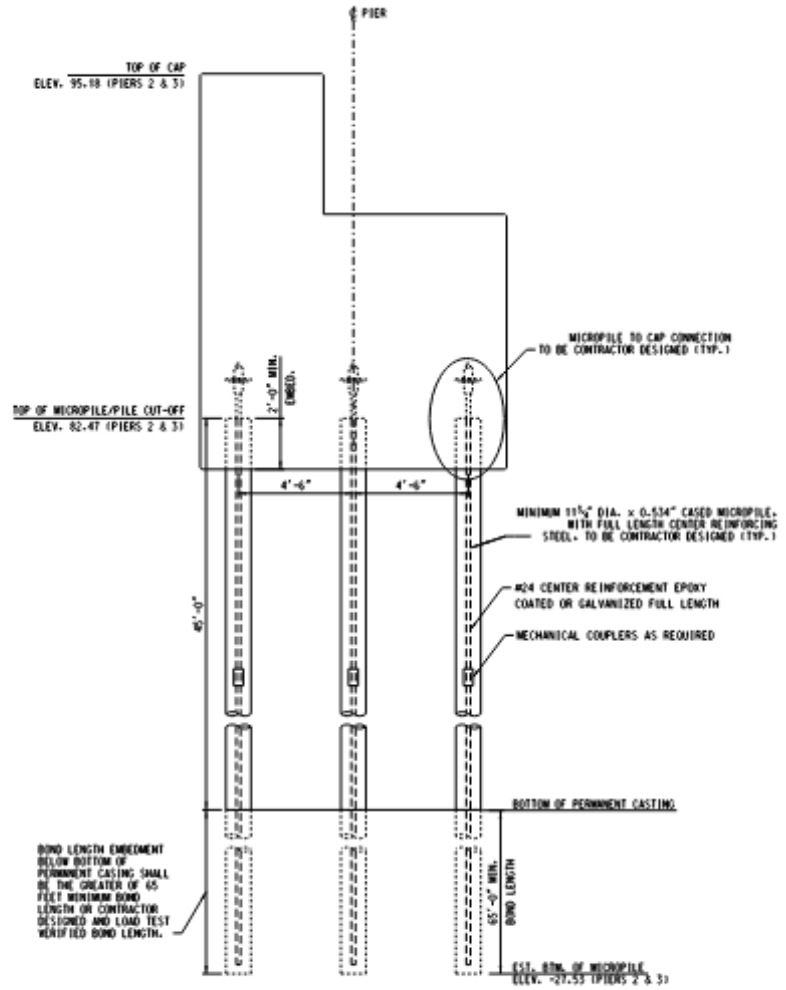
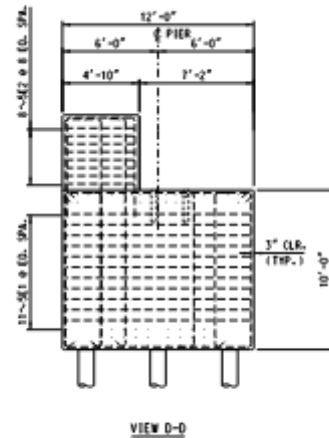
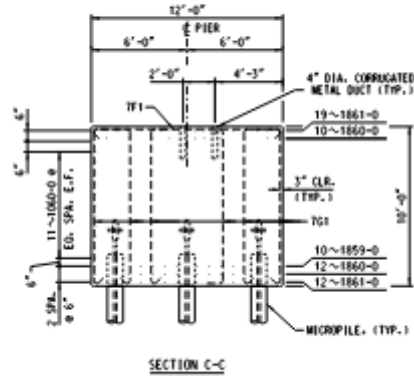
# SUBSTRUCTURE



*Verification of pile layout with respect to existing foundations*

DESIGN  
OVERVIEW

# SUBSTRUCTURE



MICROPILE ELEVATION

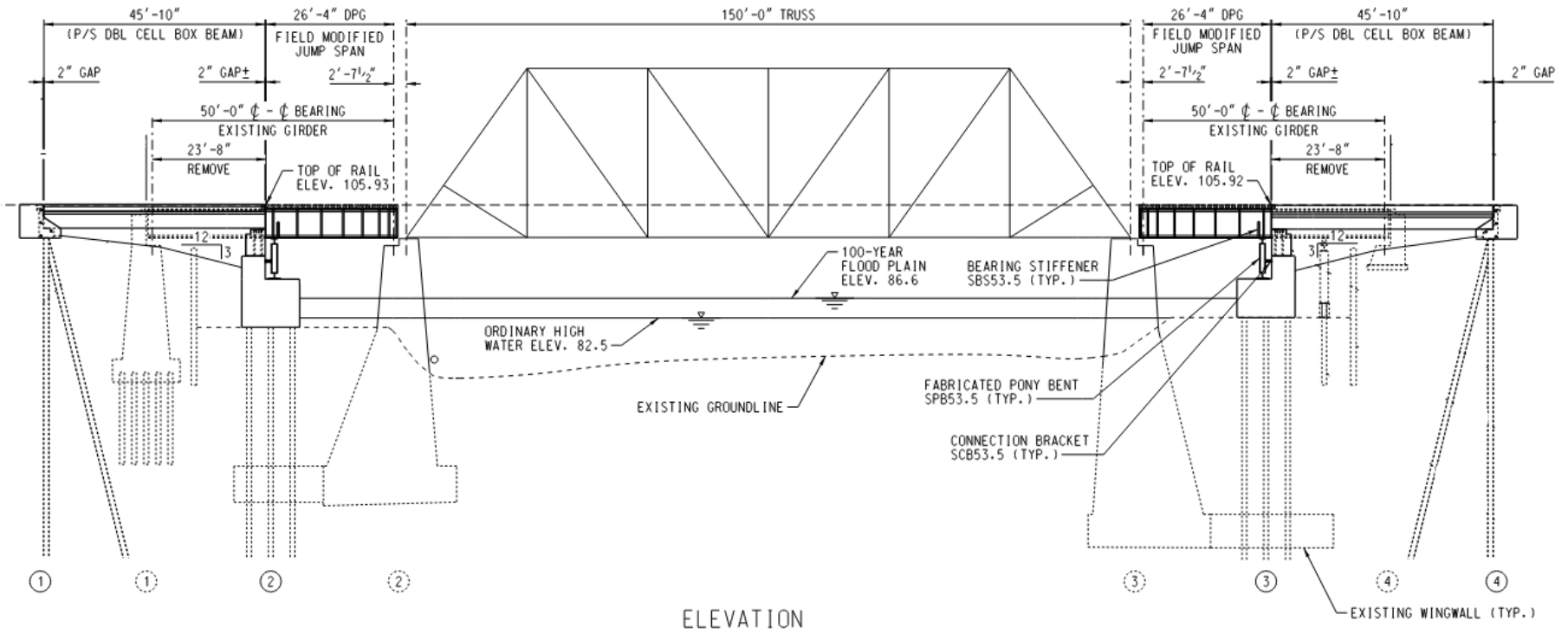
# EXISTING PIER REMEDIATION

DESIGN  
OVERVIEW



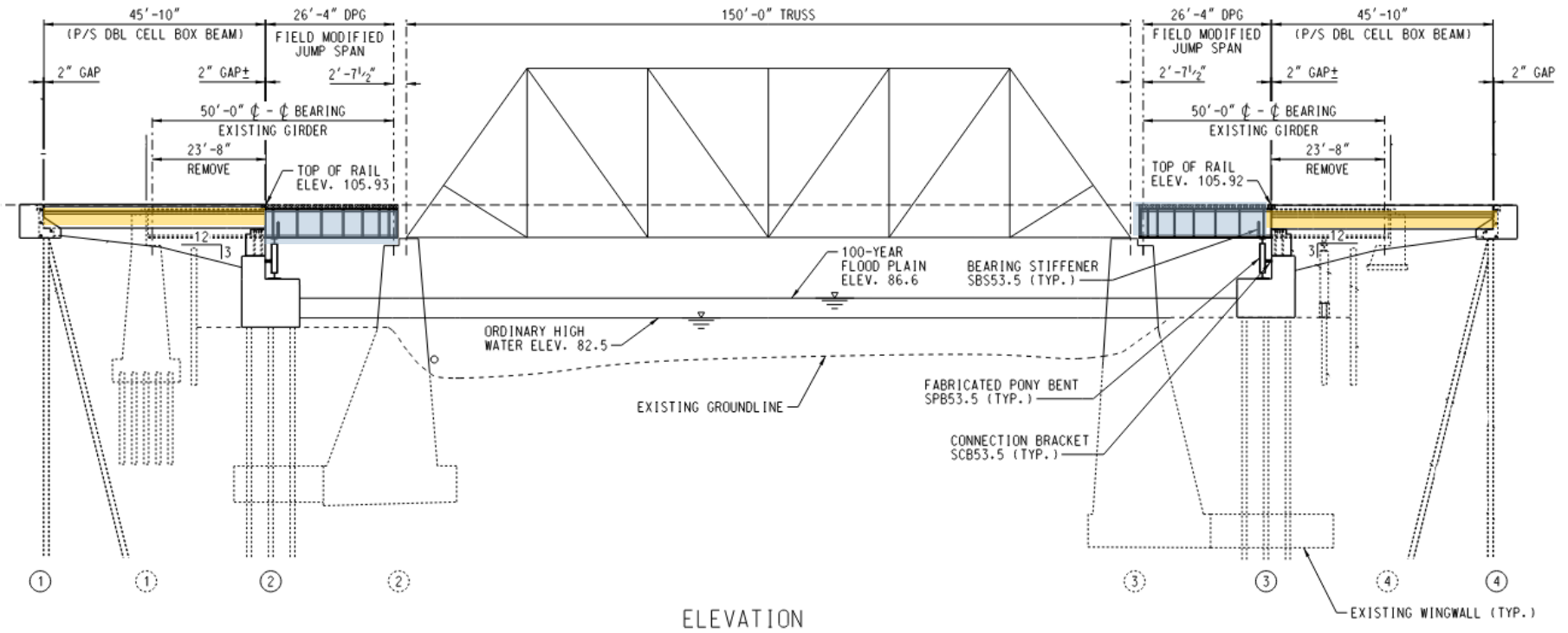
DESIGN  
OVERVIEW

# EXISTING PIER REMEDIATION



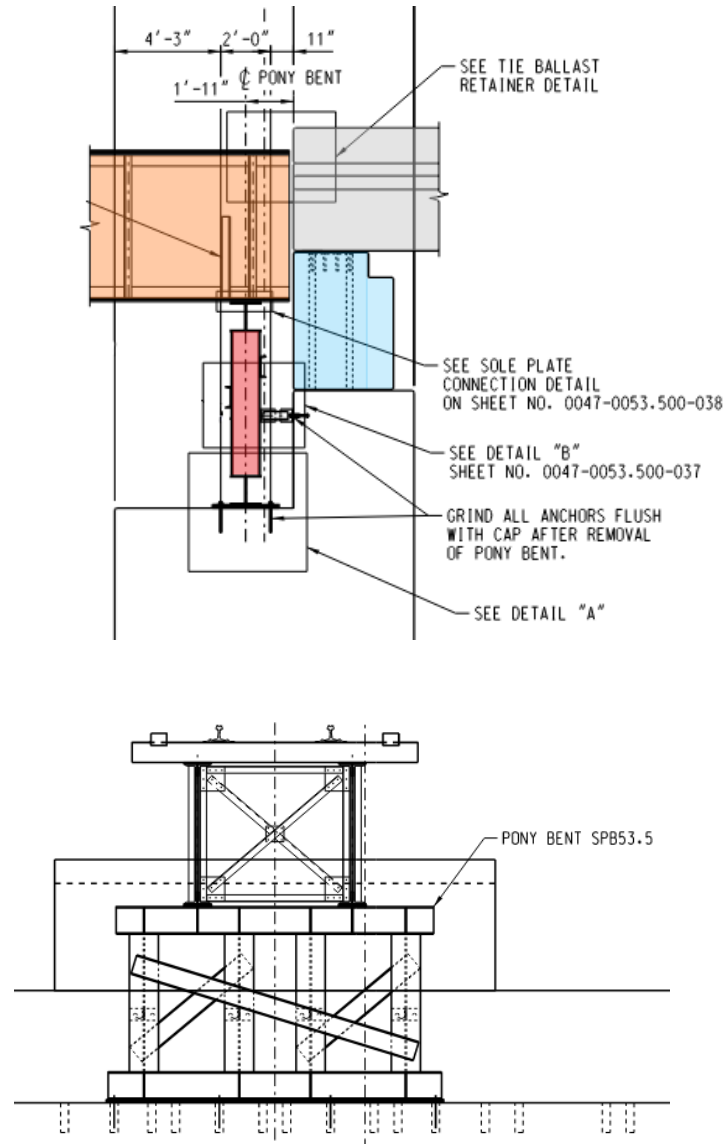
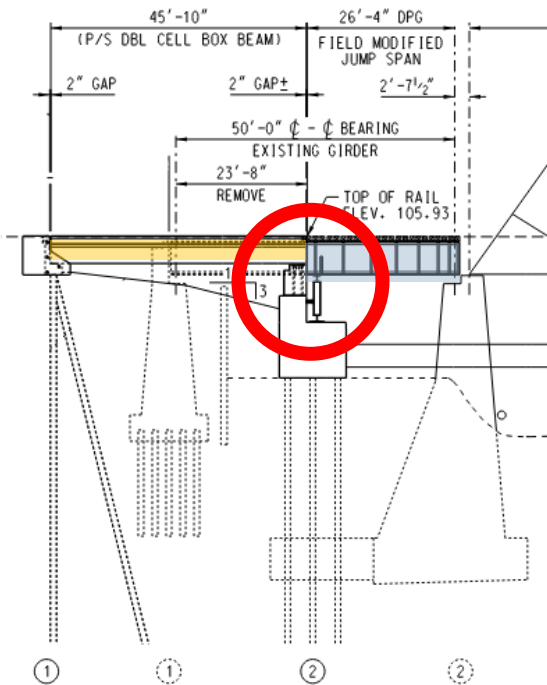
DESIGN  
OVERVIEW

# EXISTING PIER REMEDIATION



DESIGN  
OVERVIEW

# EXISTING PIER REMEDIATION





PHASE  
CHANGEOUTS

# PHASE I - CHANGEOUT

## August 2022



PHASE  
CHANGEOUTS

# PHASE I - CHANGEOUT

## August 2022



PHASE  
CHANGEOUTS

# PHASE I - CHANGEOUT

## August 2022



# PHASE II - BRIDGE ERECTION

## JAN 2023 – JUNE 2023

- On-site Girder Erection
- Pour in Place Concrete Decking/Walkways
- Waterproofing
- Track Panel Install

PHASE  
CHANGEOUTS

# PHASE II - BRIDGE ERECTION

## JAN 2023 – JUNE 2023



PHASE  
CHANGEOUTS

# PHASE II - BRIDGE ERECTION

## JAN 2023 – JUNE 2023



PHASE  
CHANGEOUTS

# PHASE II - BRIDGE ERECTION JAN 2023 – JUNE 2023



<https://www.youtube.com/watch?v=z6mlbdwwZ2g>

PHASE  
CHANGEOUTS

# PHASE II - BRIDGE ERECTION

## JAN 2023 – JUNE 2023





PHASE  
CHANGEOUTS

# PHASE II - BRIDGE ERECTION

## JAN 2023 – JUNE 2023



# PHASE II – CHANGEOUT PREP

## JUNE 2023

- Ringer Crane Build Up
- Existing Pier Cutting
- Floating Platform – North Bonneville Dam Coordination
- Truss Prep
- Slide System Installation

PHASE  
CHANGEOUTS

# PHASE II – CHANGEOUT PREP

## Crane Build Up



PHASE  
CHANGEOUTS

# PHASE II – CHANGEOUT PREP

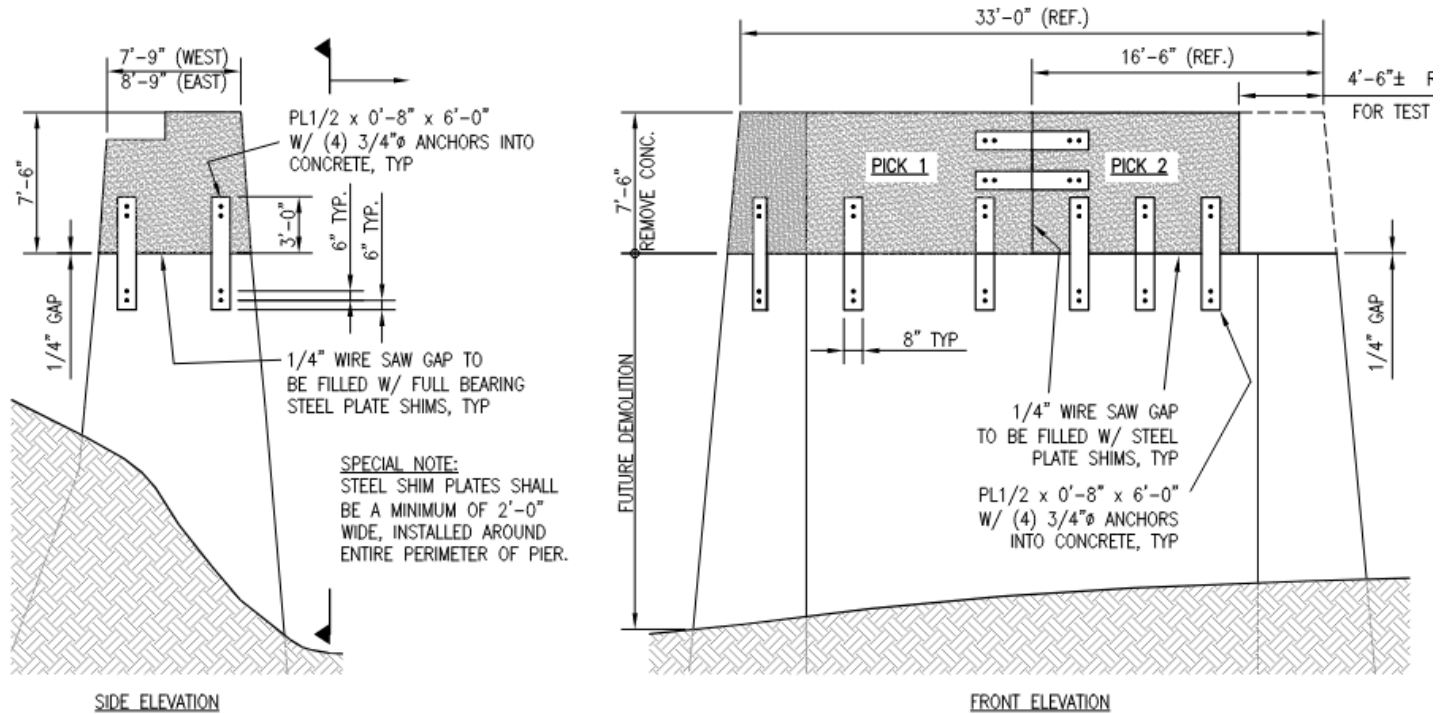
## Crane Build Up



PHASE  
CHANGEOUTS

# PHASE II – CHANGEOUT PREP

## Pier Cutting

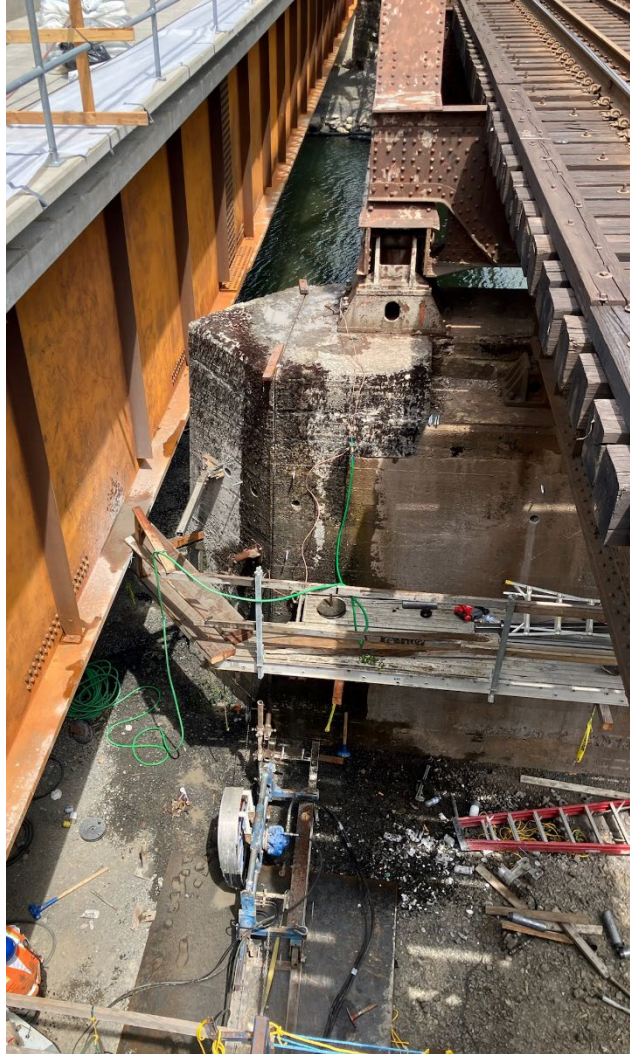


1/01 EXISTING WEST PIER – (SAWCUT & TEMP. SUPPORT)  
WEST PIER (SHOWN) EAST PIER SIMILAR

PHASE  
CHANGEOUTS

# PHASE II – CHANGEOUT PREP

## Pier Cutting



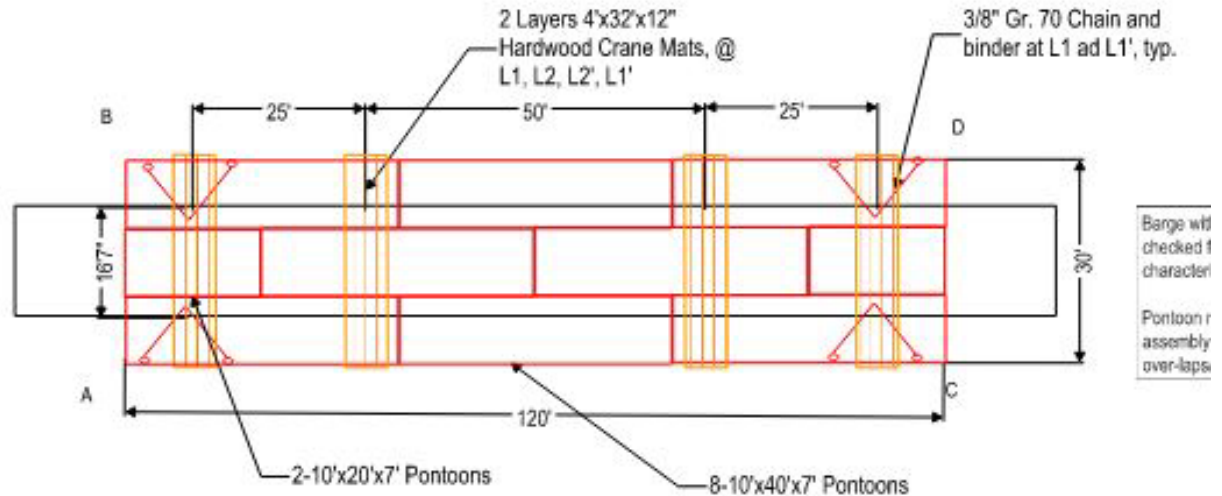
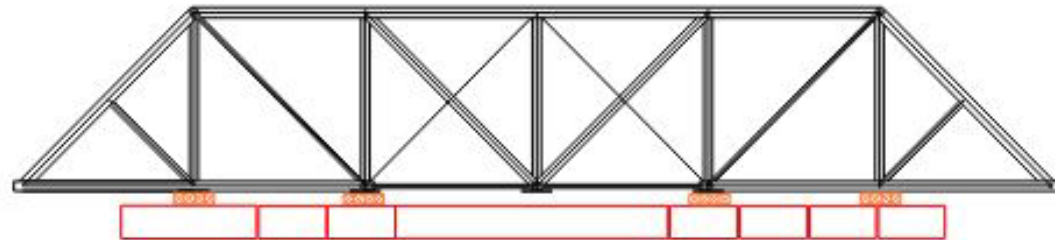
# PHASE II – CHANGEOUT PREP

## Pier Cutting



# PHASE II – CHANGEOUT PREP

## Floating Demo Platform





PHASE  
CHANGEOUTS

# PHASE II – CHANGEOUT PREP

## Floating Demo Platform



PHASE  
CHANGEOUTS

# PHASE II – CHANGEOUT PREP

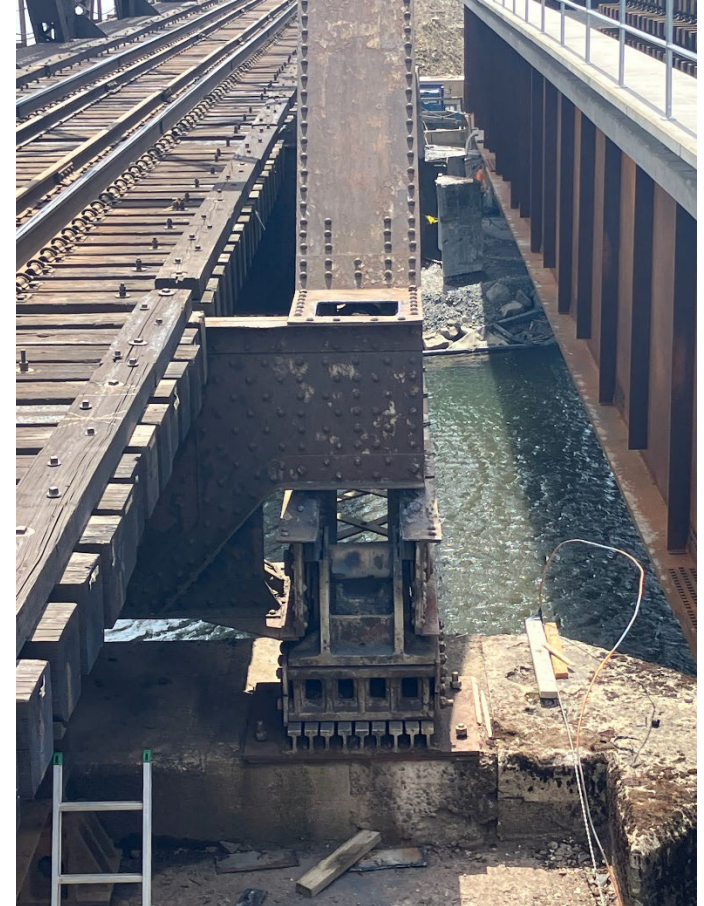
## Floating Demo Platform



PHASE  
CHANGEOUTS

# PHASE II – CHANGEOUT PREP

## Truss Prep



PHASE  
CHANGEOUTS

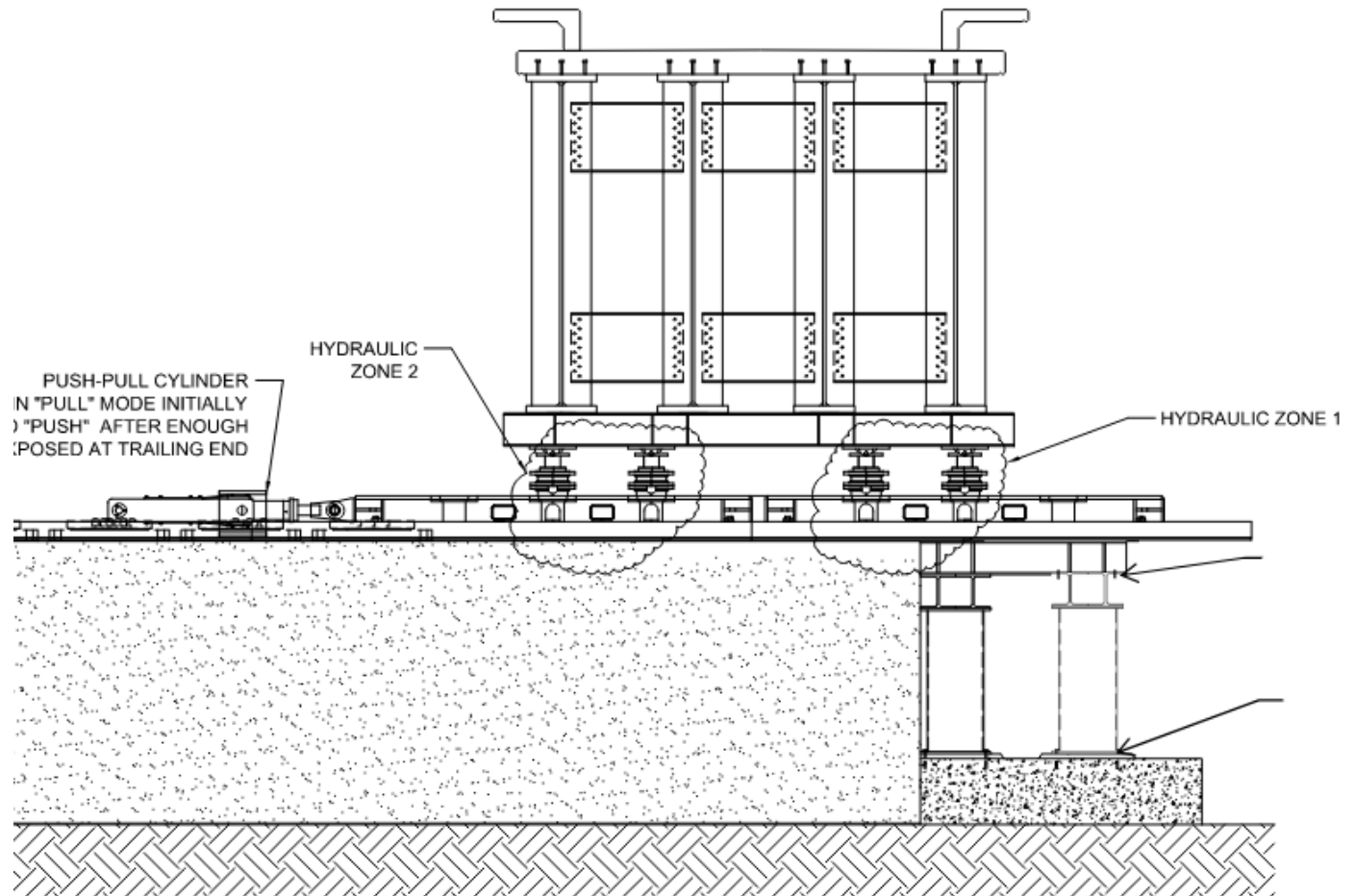
# PHASE II – CHANGEOUT PREP

## Truss Prep



# PHASE II – CHANGEOUT PREP

## Slide System Installation



PHASE  
CHANGEOUTS

# PHASE II – CHANGEOUT PREP

## Slide System Installation



PHASE  
CHANGEOUTS

# PHASE II – CHANGEOUT PREP

## Slide System Installation



# PHASE II – CHANGEOUT

## JUNE 25<sup>TH</sup>, 2023

- 31-hour rail shutdown

Step 1: DPG Removal



Step 2: Truss Removal



Step 3: Pier Demo



Step 4: Bridge Slide and Set



Step 5: RR Track and Surfacing



PHASE  
CHANGEOUTS

# PHASE II – CHANGEOUT DPG Removal



PHASE  
CHANGEOUTS

# PHASE II – CHANGEOUT

## Truss Removal



PHASE  
CHANGEOUTS

# PHASE II – CHANGEOUT

## Pier Demo



PHASE  
CHANGEOUTS

# PHASE II – CHANGEOUT

## Bridge Slide



PHASE  
CHANGEOUTS

# PHASE II – CHANGEOUT



[https://www.youtube.com/watch?v=i\\_BybLwuocM&t=1s](https://www.youtube.com/watch?v=i_BybLwuocM&t=1s)

QUESTIONS?

