

2023 Purdue Road School  
Transportation Conference and Expo

# Beauty and the Bridge

Presented by:

Andrew Borden



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**CiorbaGroup**  
CONSULTING ENGINEERS



# US 20 over US 31

- ▶ South Bend, IN
- ▶ Original Construction
  - ▶ 1966
- ▶ Expansion of US 20
  - ▶ 1991
- ▶ Major Bridge Deck Rehabs
  - ▶ 1976
  - ▶ 1997
- ▶ Heavy Hauler Impact
  - ▶ 2016
- ▶ Last Deck Overlay
  - ▶ 2017



# Purpose and Need

- ▶ To Enhance Operational Safety of the Bridge
  - ▶ Multiple hits and repairs on bridge beams
  - ▶ Shortened life span of asset
  - ▶ Substandard Vertical Clearance

Time for a new bridge



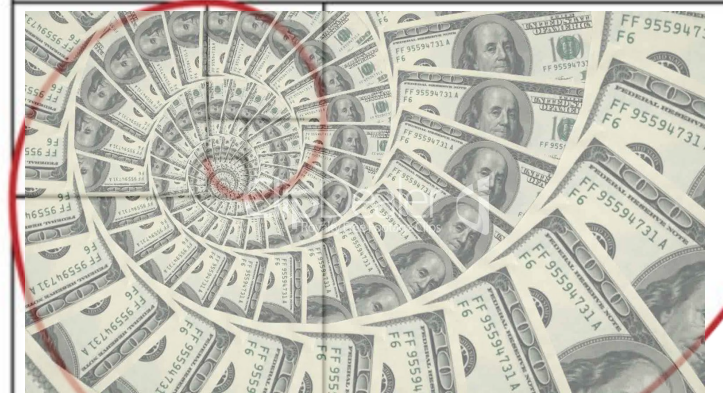
# Vision

- ▶ Anything is possible

▶ TIME

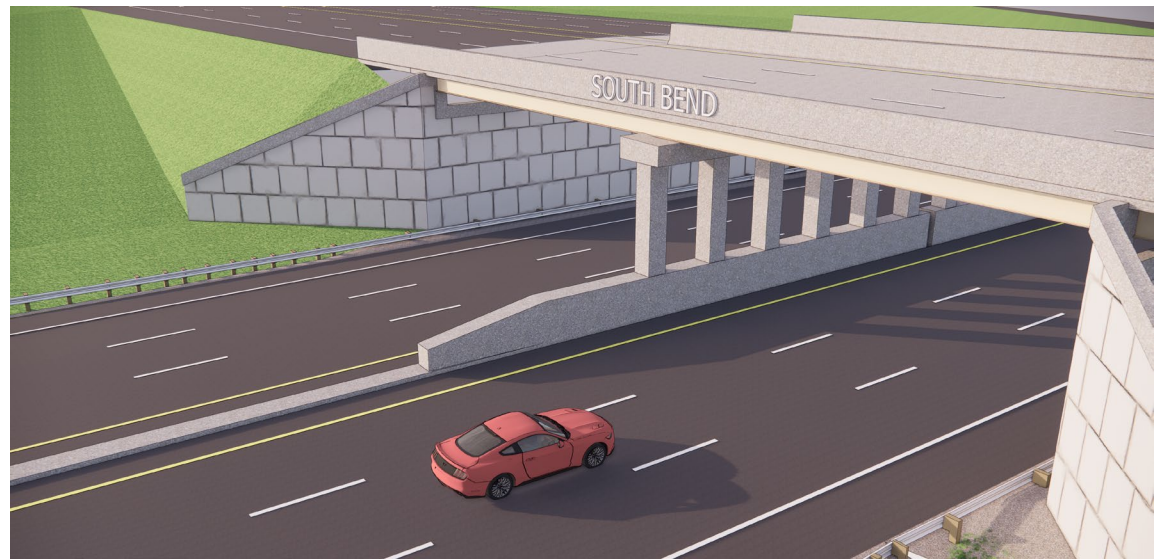


▶ MONEY



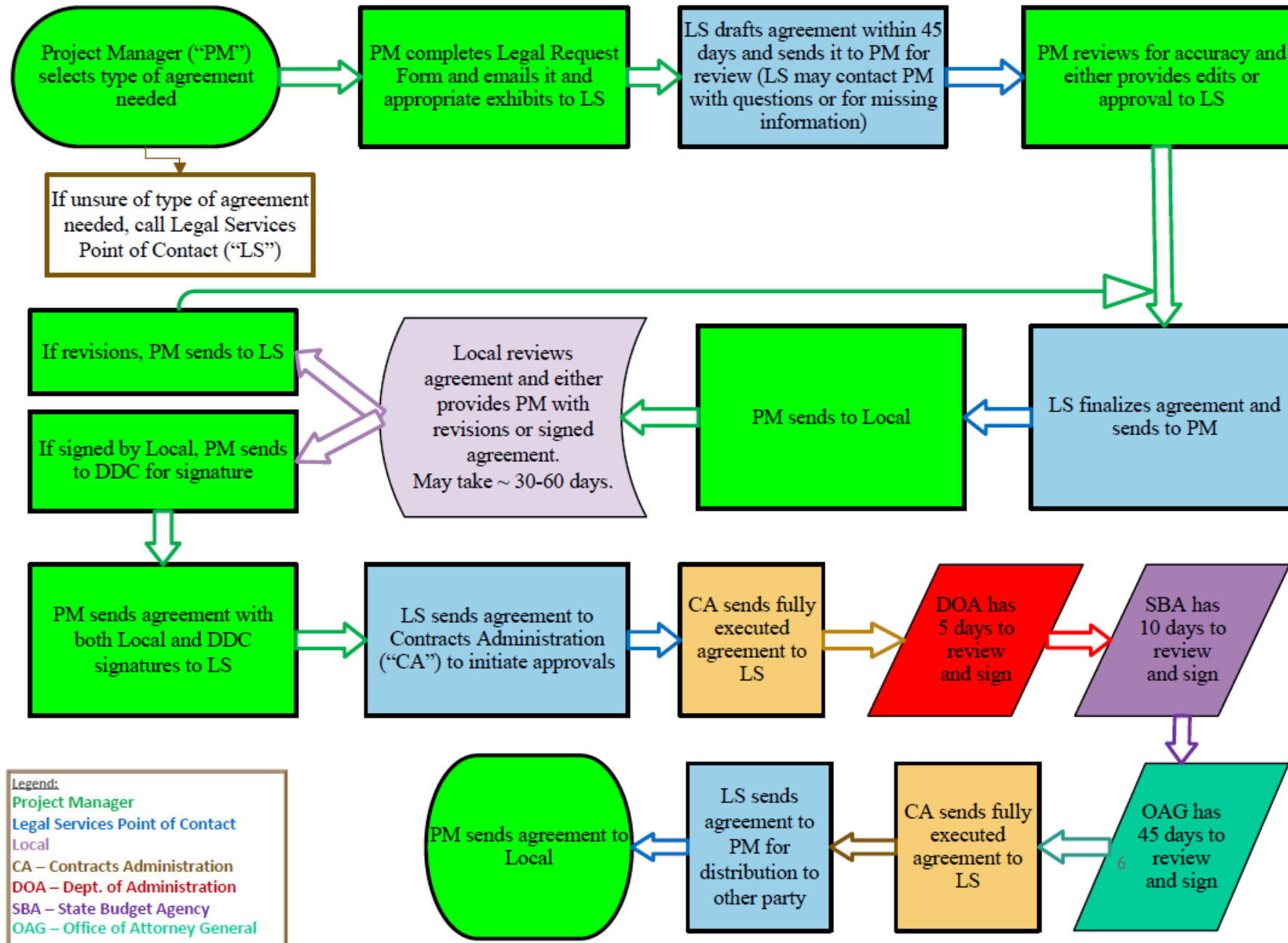


# Local Coordination



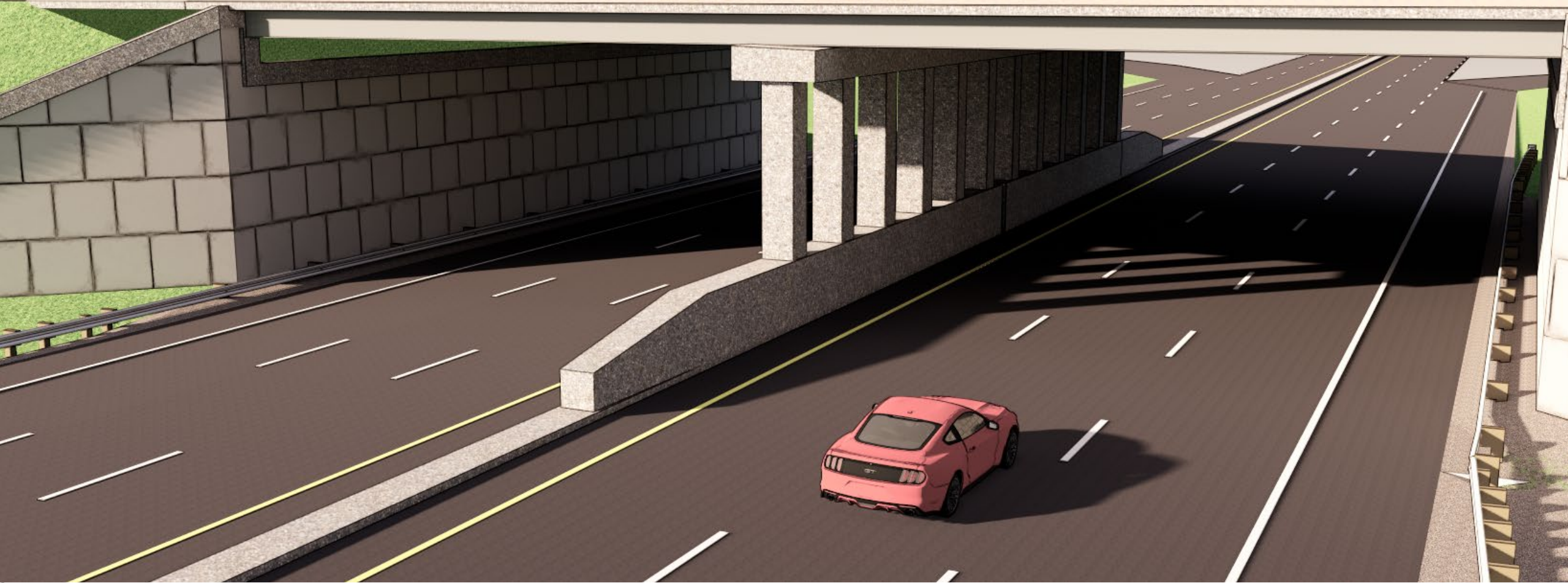
# The Process

## Interlocal Agreement Process Flowchart





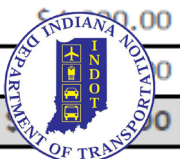
# SOUTH BEND



PAY ITEM #	ITEM	UNIT	TOTAL	UNIT PRICE	TOTAL COST
619-51860	PAINT STEEL BRIDGE, PARTIAL, BRIDGE NO. 020-71-10278, SOUTH BEND LOGO	L.S.	1	\$10,000.00	\$10,000.00
706-09959	RAILING, CONCRETE, FT FORM LINER	LFT	237	\$275.00	\$65,180.00
<b>Subtotal Cost</b>					<b>\$75,200.00</b>
	INFLATION (2 YRS @ 2%, COMPOUNDED ANNUALLY)	LS	1	\$4,000.00	\$4,000.00
	CONTINGENCY (15%, INCLUDES INFLATION)	LS	1	\$11,880.00	\$11,880.00
<b>Total Cost</b>					<b>\$91,080.00</b>



Aesthetic Cost Ratio = \$4.65 per 50 FT





Neg

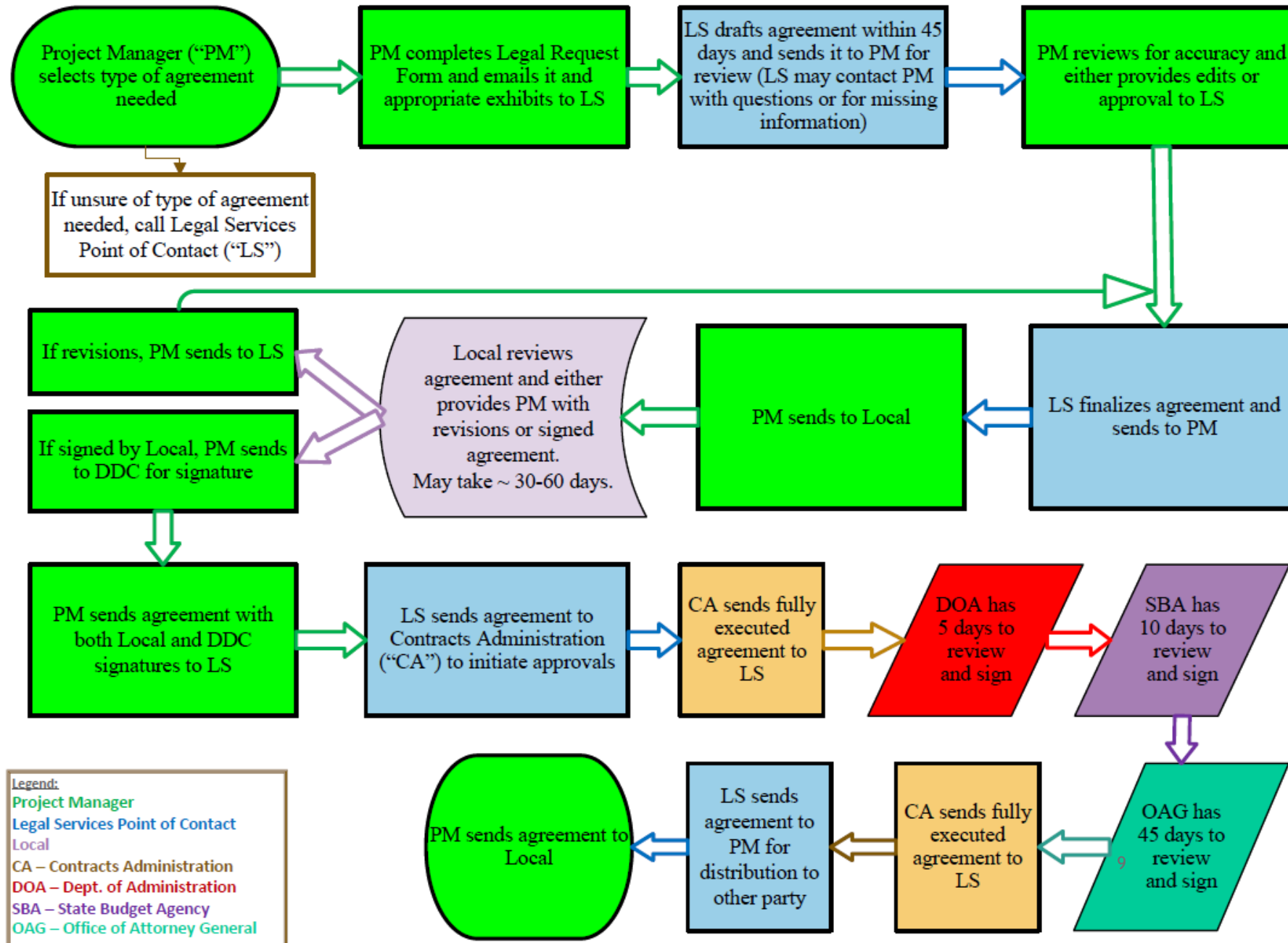


PAY ITEM #	ITEM	UNIT	TOTAL	UNIT PRICE	TOTAL COST	
619-51860	PAINT STEEL BRIDGE, PARTIAL, BRIDGE NO. 020-71-10278, SOUTH BEND LOGO	L.S.	1	\$10,000.00	\$10,000.00	
706-09959	RAILING, CONCRETE, FT FORM LINER	LFT	34	\$275.00	\$9,350.00	
				Subtotal Cost	\$19,350.00	
		INFLATION (2 YRS @ 2%, COMPOUNDED ANNUALLY)	LS	1	\$4,000.00	\$1,130.00
		CONTINGENCY (15%, INCLUDES INFLATION)	LS	1	\$11,880.00	\$3,072.00
				Total Cost	\$23,552.00	

Aesthetic Cost Ratio = \$4.65 per SQ FT

# The Process

## Interlocal Agreement Process Flowchart





# Existing Conditions

- ▶ Three span steel rolled beam bridge
- ▶ US 20
  - ▶ 3 lanes in each direction
  - ▶ 37,500 ADT
  - ▶ 22% Truck Traffic
  - ▶ 70 mph Design Speed
- ▶ US 31
  - ▶ 3 lanes in each direction
  - ▶ 28,800 ADT
  - ▶ 21% Truck Traffic
  - ▶ 50 mph Design Speed





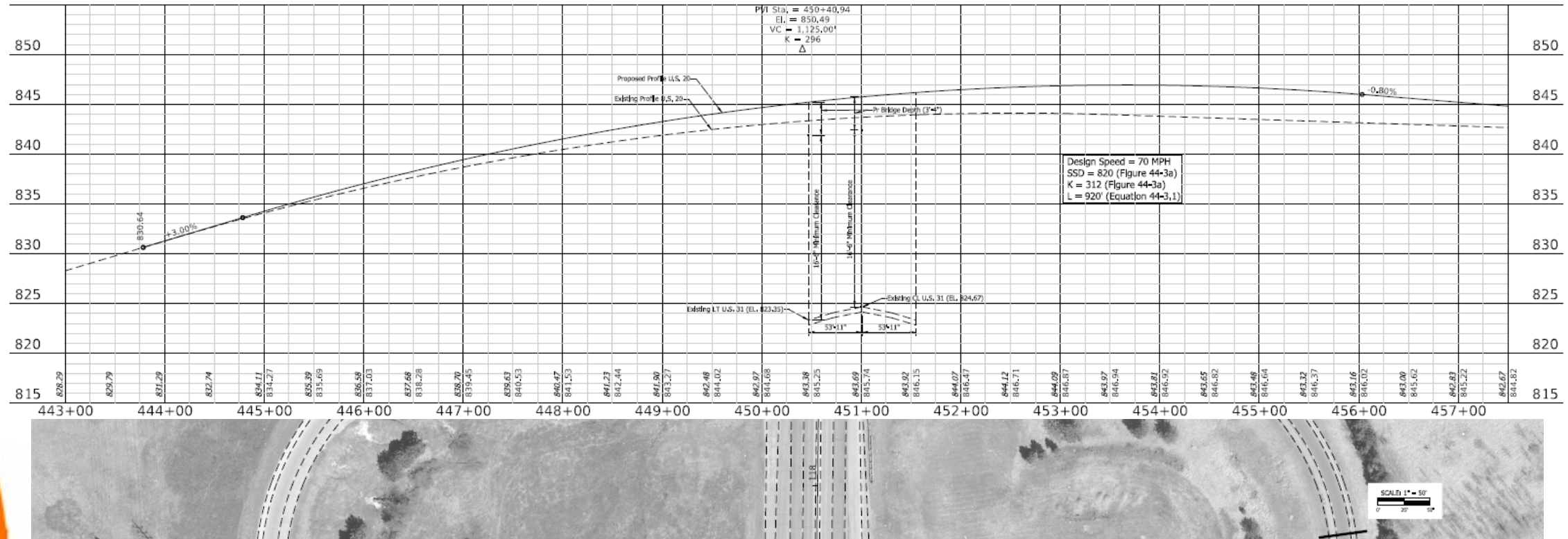
# Design Goals

- ▶ Improve vertical clearance
  - ▶ Existing minimum vertical clearance 14'-6"
  - ▶ Evidence of vehicle impact to existing beams
- ▶ Provide reduced maintenance structure
- ▶ Minimize traffic disruptions to US 20 and US 31



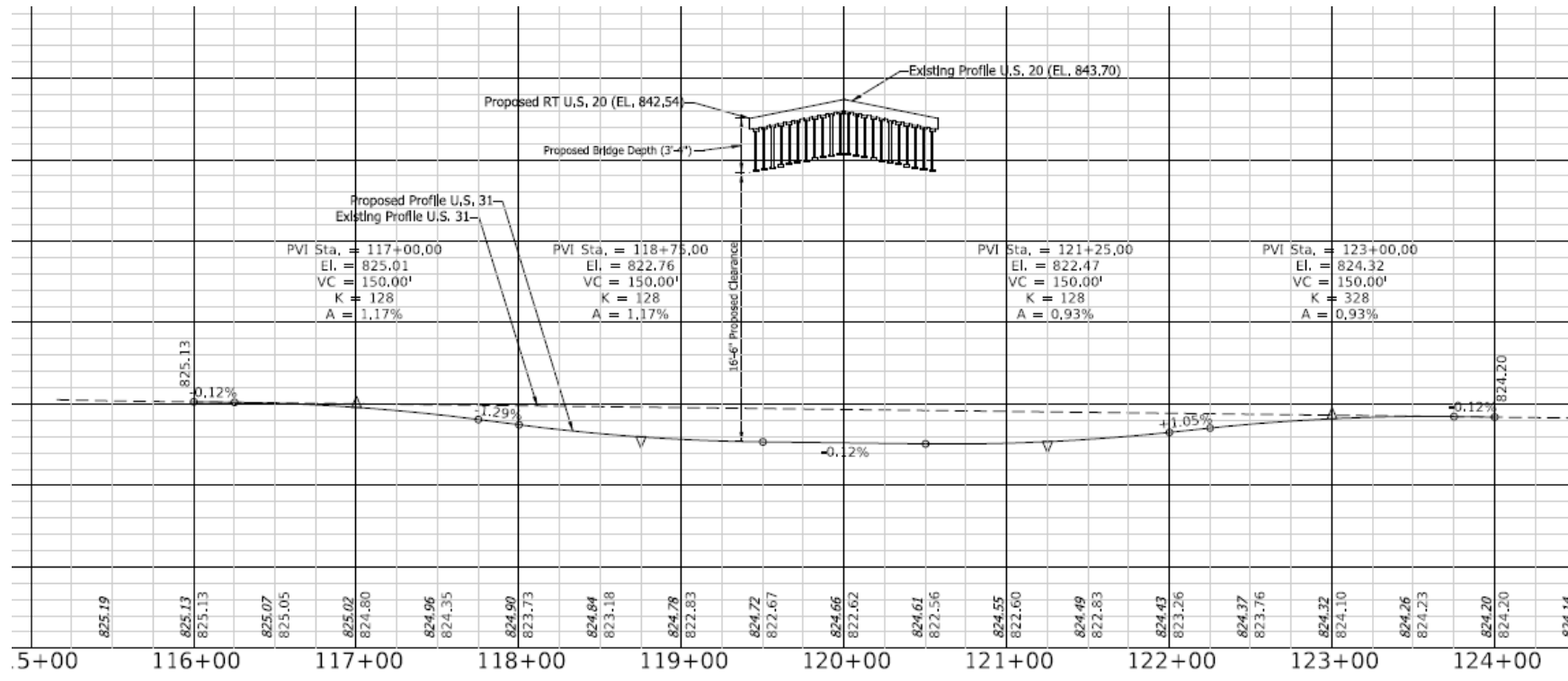
# Design

## ▶ Alternate 1-Raise US 20



# Design

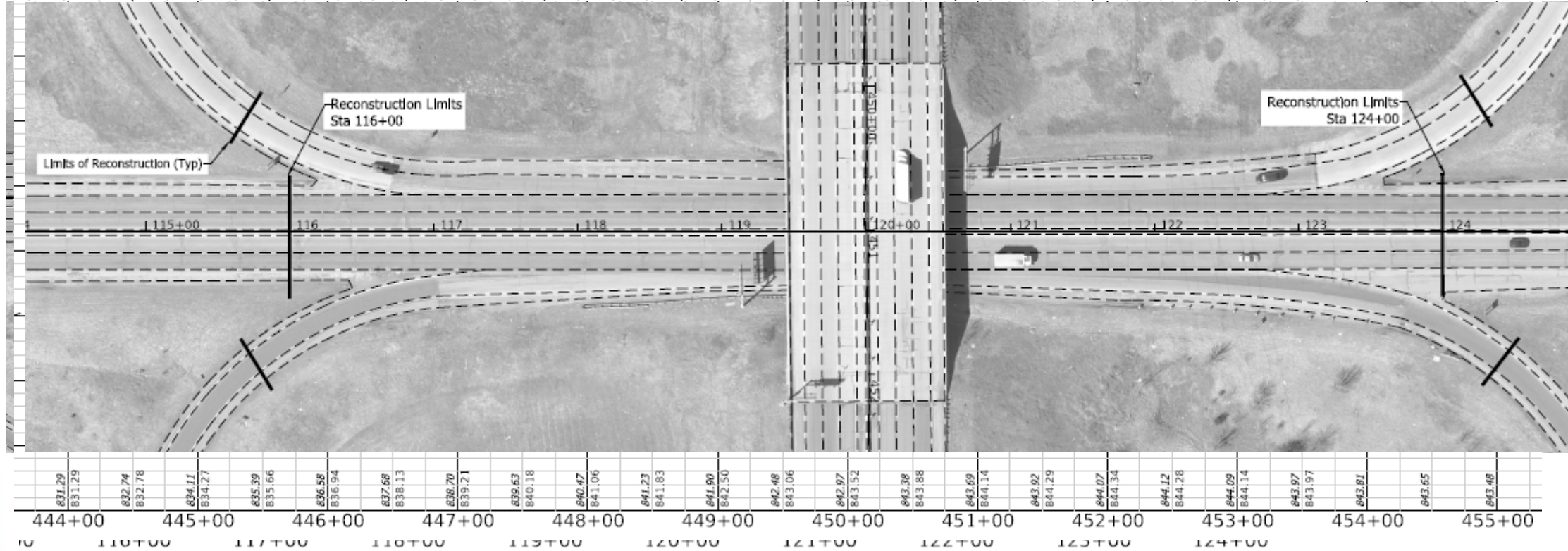
▶ Alternate 2-Lower US 31





# Design

▶ Alternate 3-Combination of Both

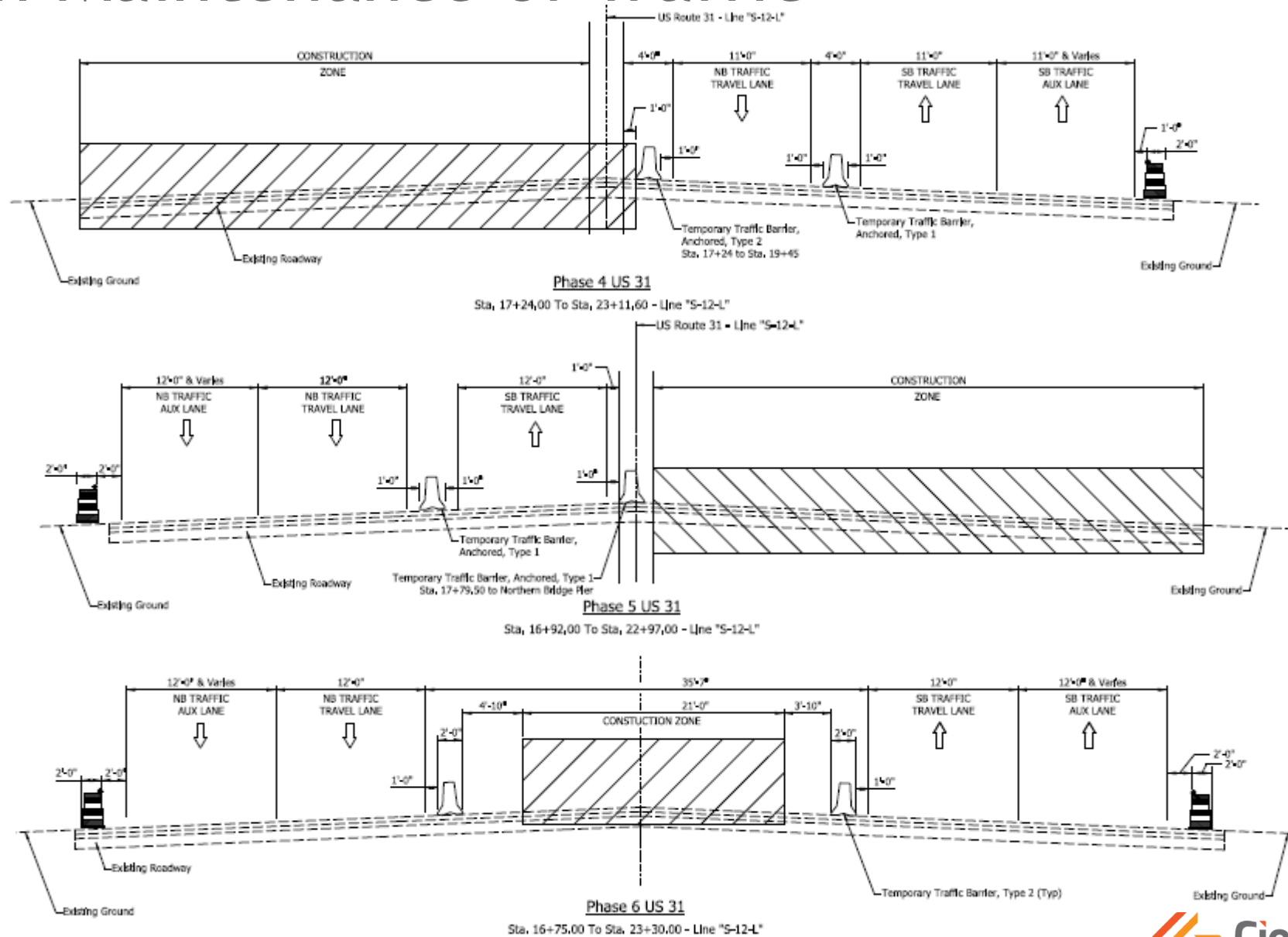




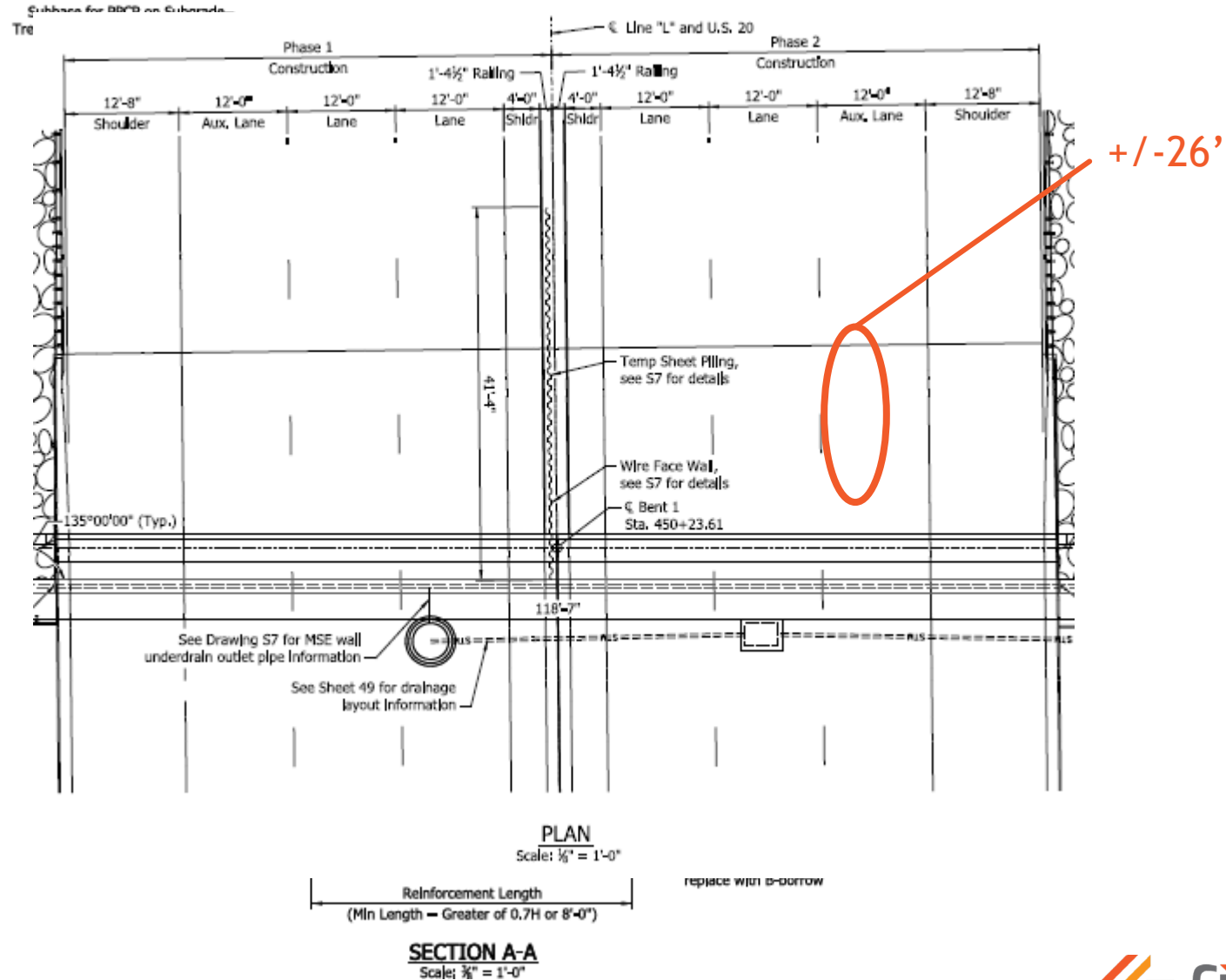




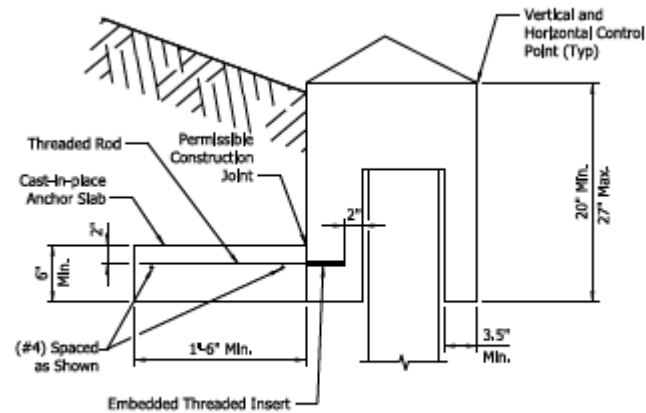
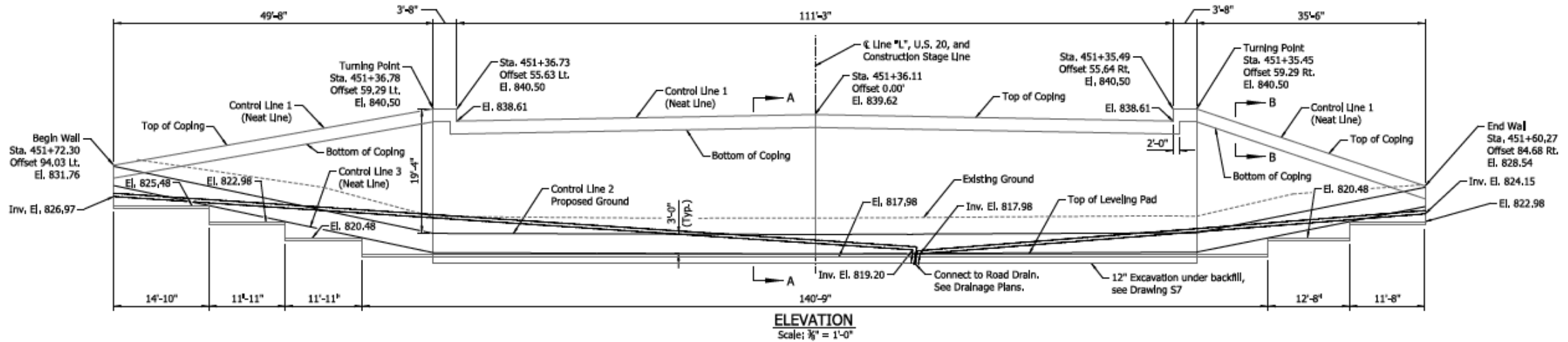
# Design-Maintenance of Traffic



# Design-MSE Staging

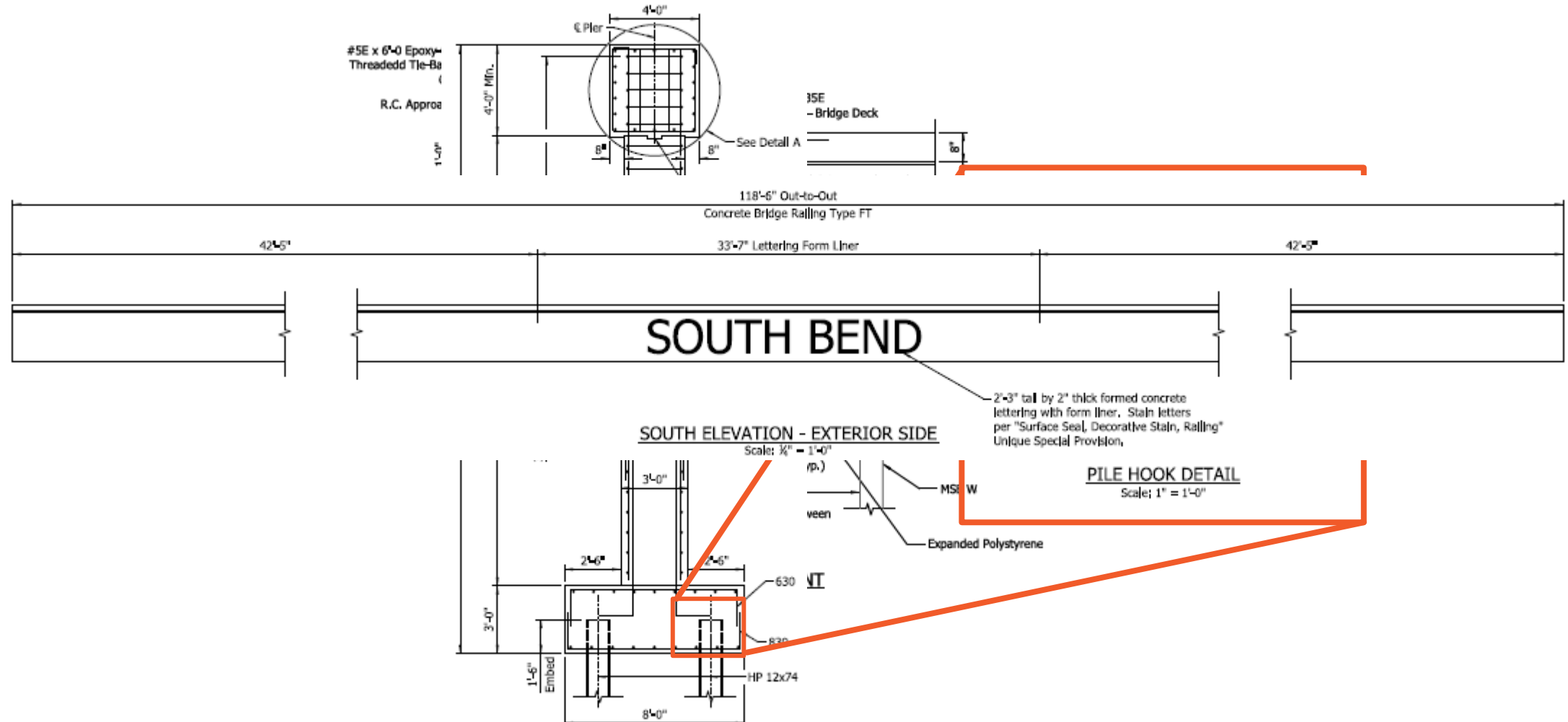


# MSE Wall Design





# Other Design Details



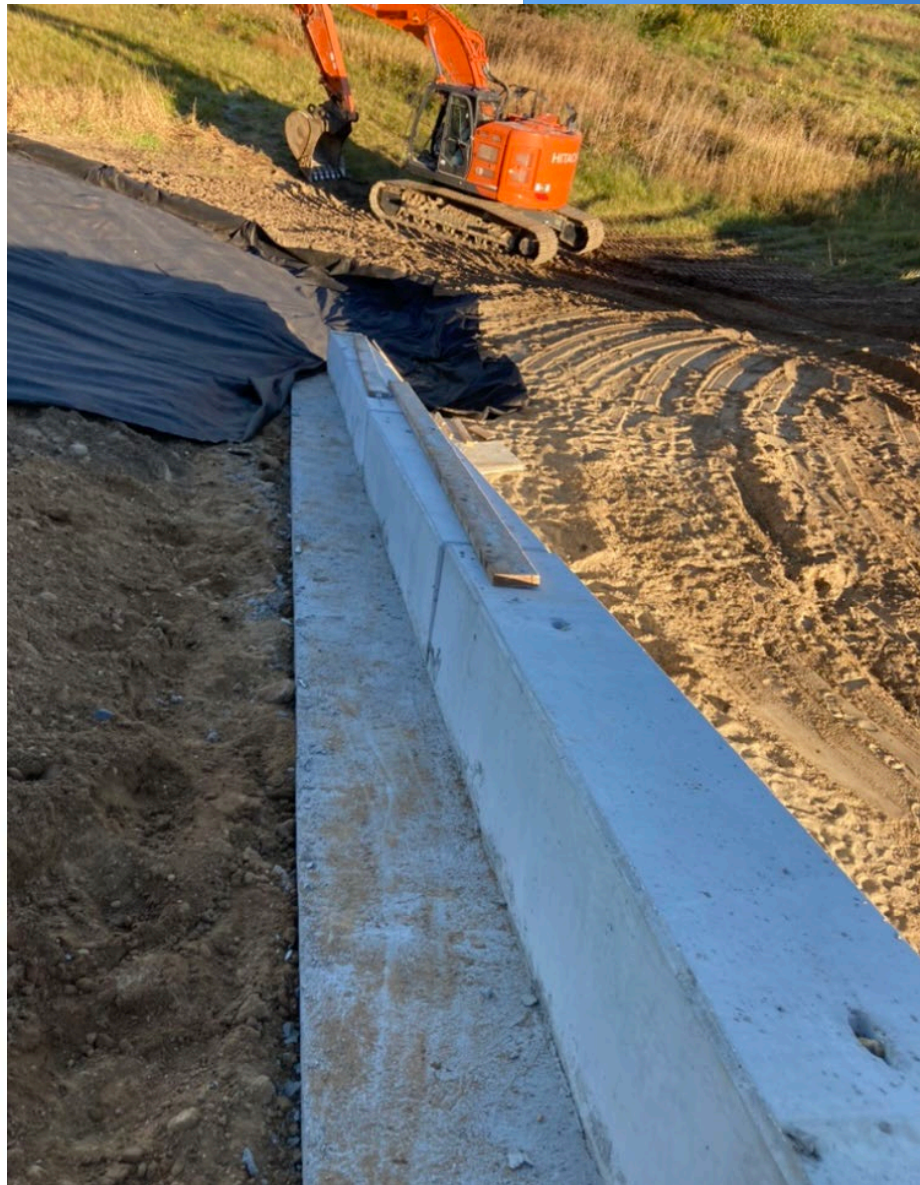
# Bridge Demolition

- ▶ Deck Removal
- ▶ Beam Removal
- ▶ Required Nighttime full closures on US 31





# Bridge Construction-Abutments/MSE Wall





# Bridge Construction-Pier



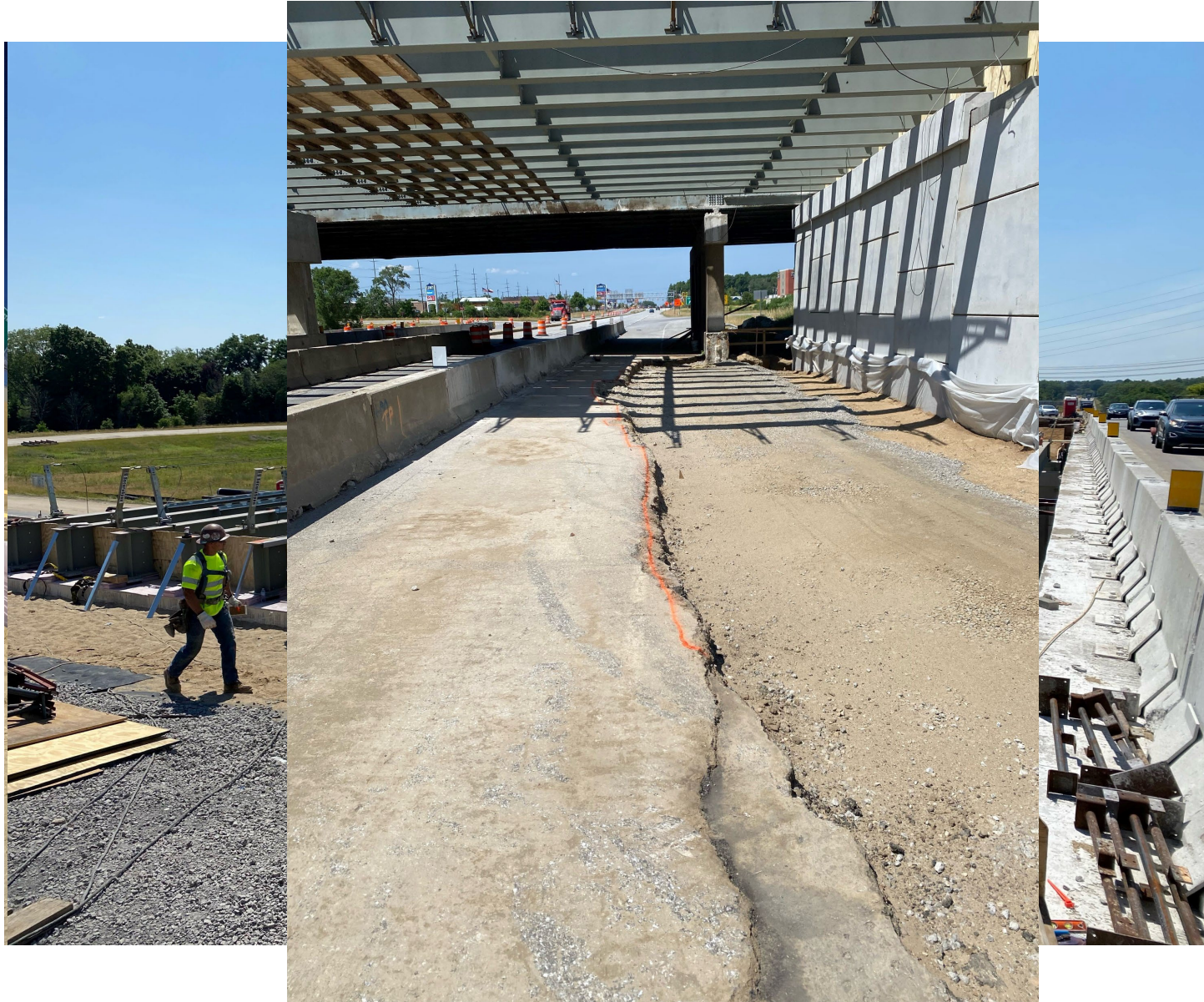


# Bridge Construction-Pier





# Bridge Construction-Superstructure





# Bridge Construction-Railing





# Project Timeline

- ▶ November 2021 Letting
- ▶ US 20 work/bridge reconstruction began March 2022
- ▶ US 20 opened to traffic December 2022
- ▶ US 31 construction/profile lowering to start March 2023
- ▶ To be fully opened to traffic Fall 2023



# Project Team

- ▶ Ciorba Group (Engineer of Record) coordinated with:



- ▶ Subconsultants

- ▶ Etica Group
- ▶ Metric Environmental
- ▶ Terracon

- ▶ Superior Construction - General Contractor

- ▶ Construction Cost: \$10.9M

- ▶ City of South Bend

- ▶ Zach Hurst, PE
- ▶ City Board of Public Works

- ▶ INDOT

- ▶ John Krueckeberg & Amber Thomas
- ▶ Nicky Mendenhall & Beth Wendling



CiorbaGroup





# Questions?

