# CMAR Influenced Solutions Result in Longest Steel Girder Span Bridge in Arizona

HDR | ADOT | Kiewit

WBES | 2023

01 Project Background

02 CMAR Considerations for Bridge Layout and Design

03 Other Project CMAR Considerations

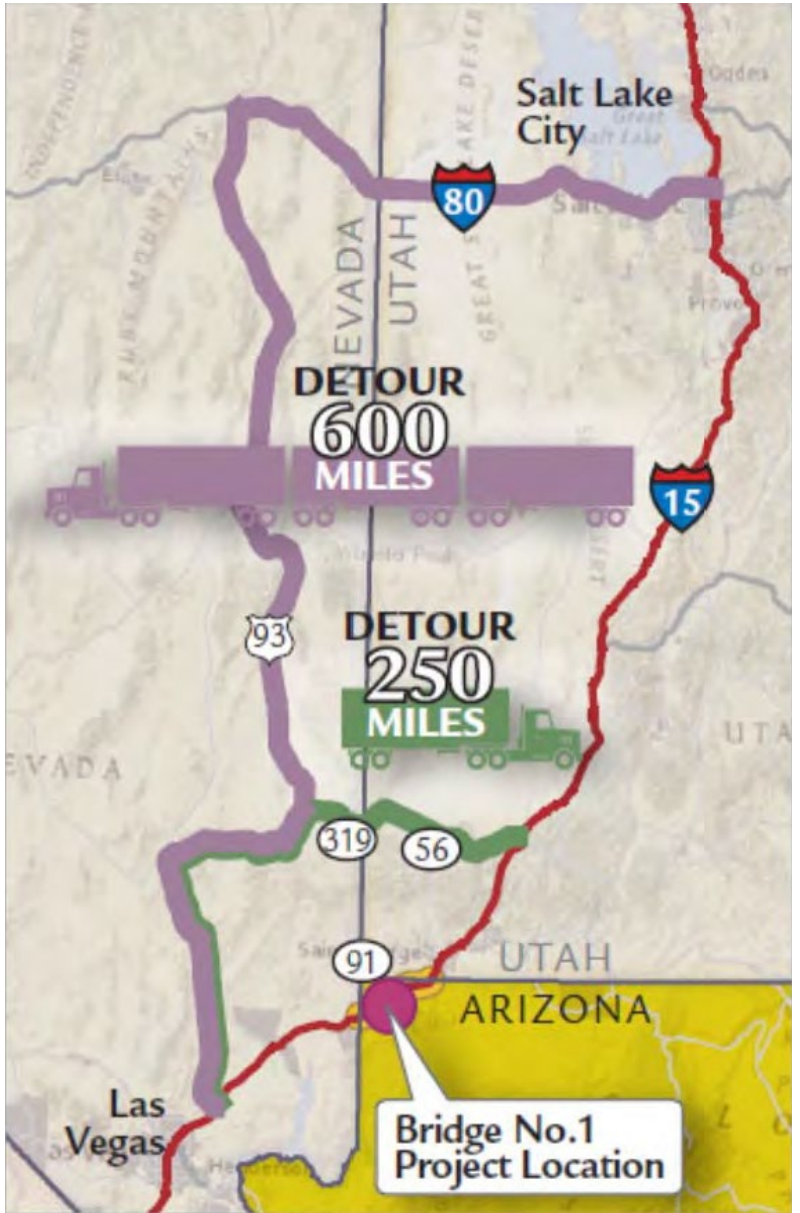
04 Construction Photos & Current Status

# 01

# Project Background

# I-15 Corridor

- Major North-South Commercial Corridor
  - $244B Movement of Goods in 2040
- Major Route between Los Angeles, Las Vegas, Salt Lake City
- Triple Trailers Allowed
- Detour Route
  - 250 miles for Commercial Trucks
  - 600 miles for Oversized Loads

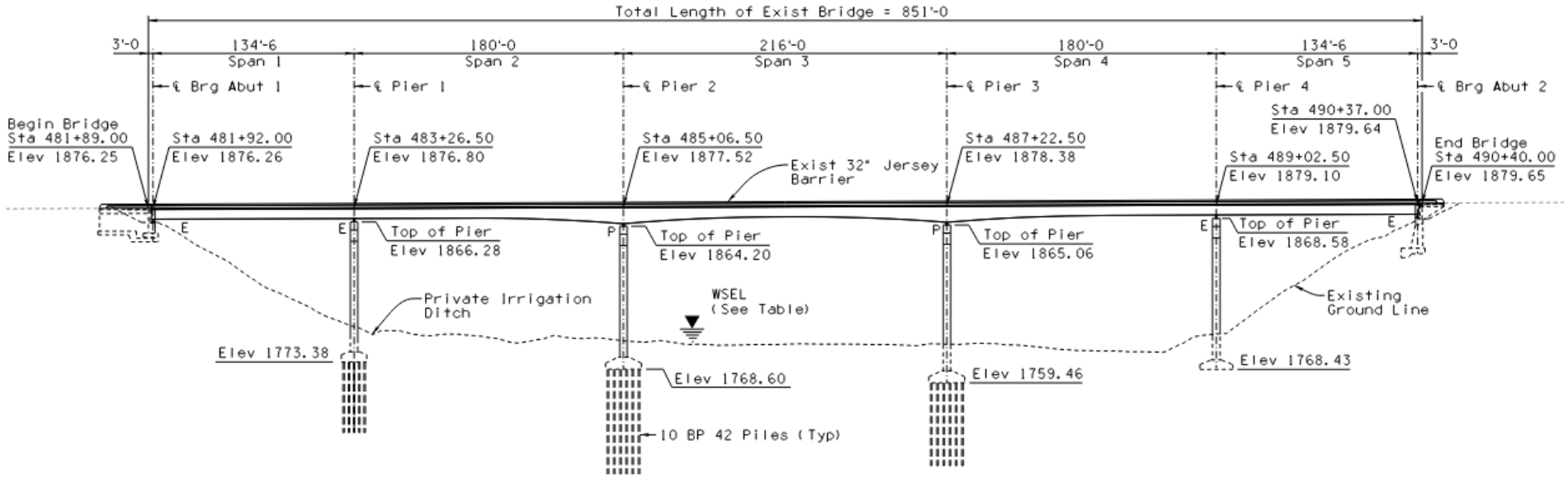


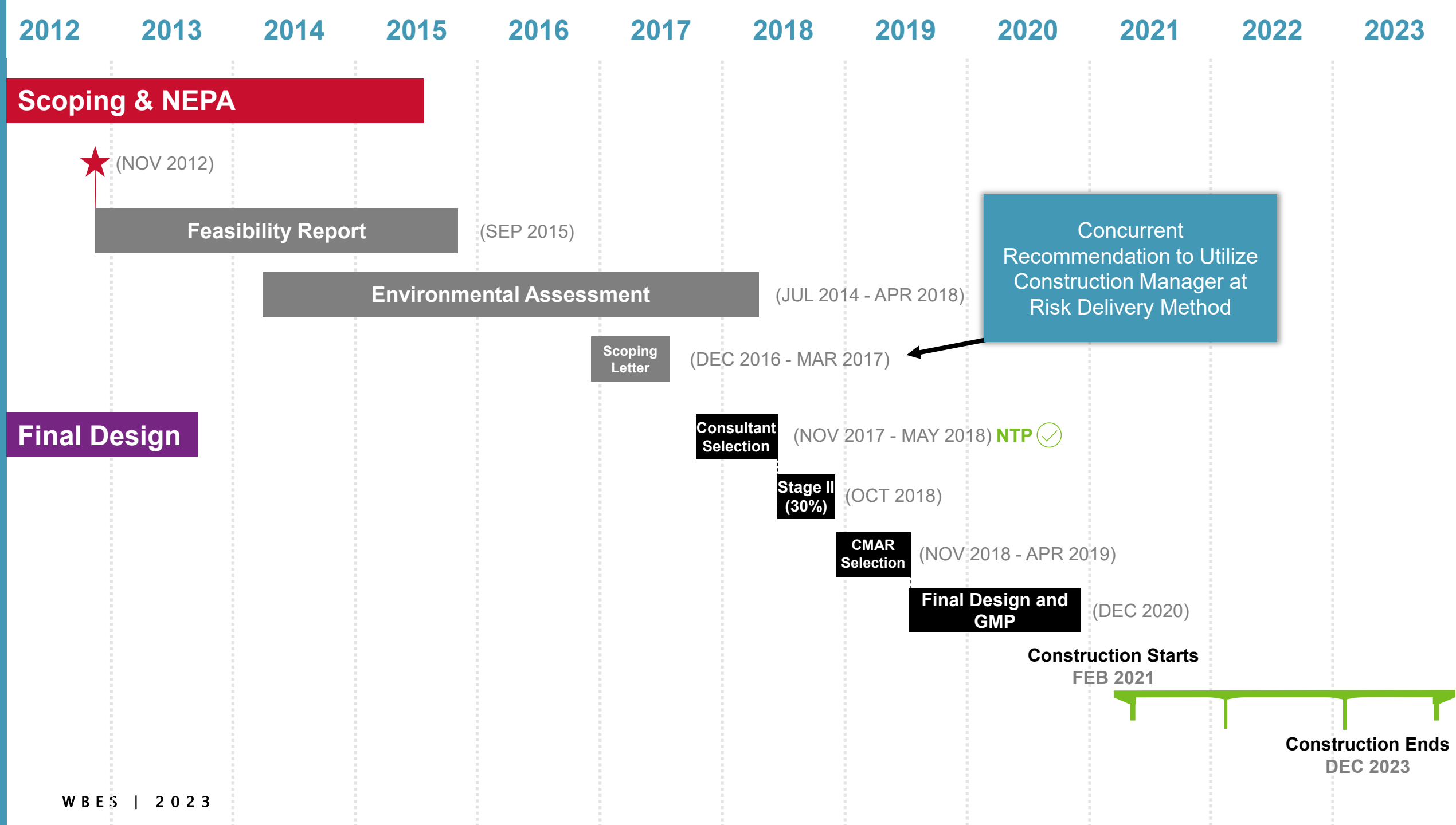
# I-15 in Arizona

- 29 Miles in Length
- Crosses Virgin River 7 Times
  - All Bridges are Steel Girder Bridges
- ADOT Focused on Rehabilitation and Replacement
  - Recent Rehabilitation Work on Bridges #2, #4, #5
  - Recent Superstructure Replacement and Widening on Bridge #6

# Existing Virgin River Bridge #1

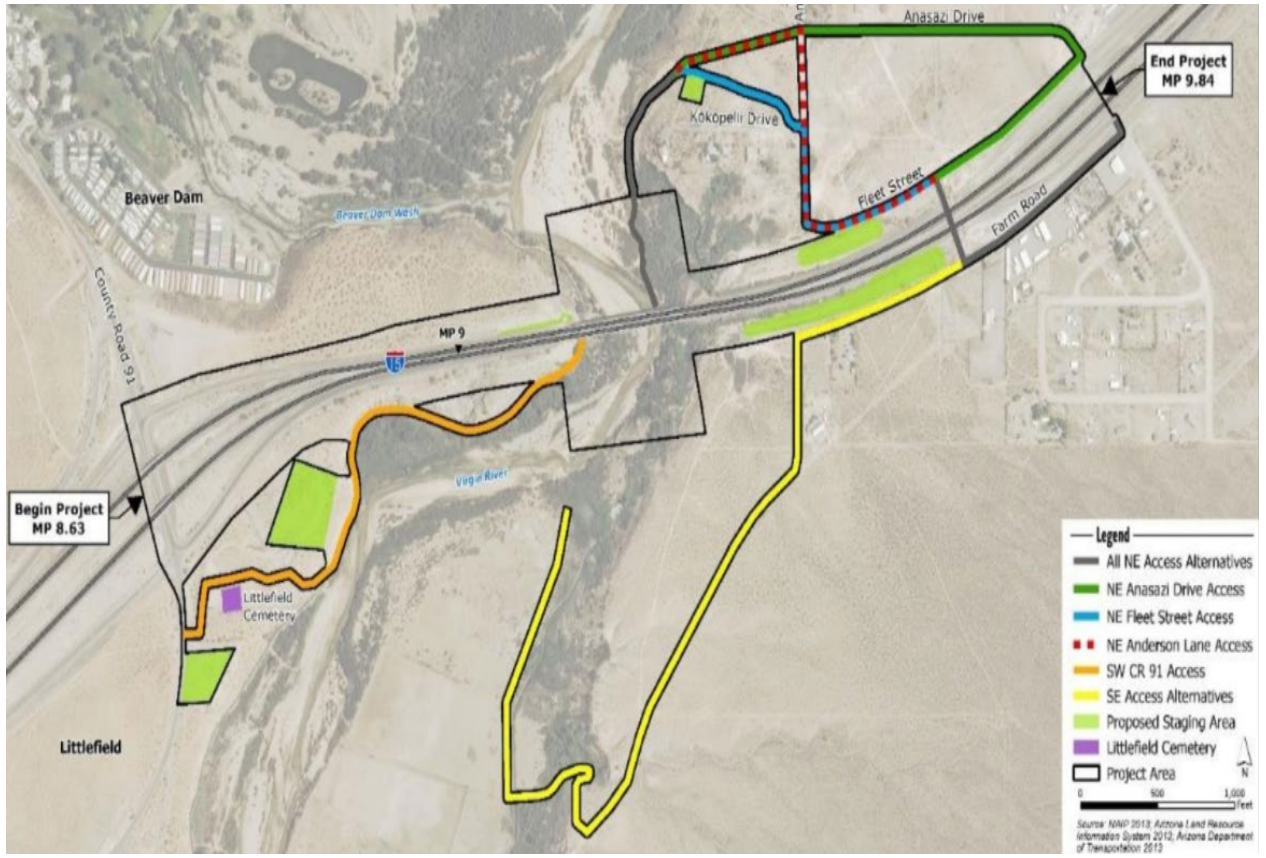
- 5-Span Haunched Steel Plate Girder Bridge (Length = 851', Width = 67'-4")
- Constructed in 1964
- Shallow and Deep Foundations




2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
Scoping & NEPA
(NOV 2012)
Feasibility Report
(SEP 2015)
Environmental Assessment
(JUL 2014 - APR 2018)
Concurrent Recommendation to Utilize Construction Manager at Risk Delivery Method
Scoping Letter
(DEC 2016 - MAR 2017)
Final Design
Consultant Selection
(NOV 2017 - MAY 2018) NTP
Stage II (30%)
(OCT 2018)
CMAR Selection
(NOV 2018 - APR 2019)
Final Design and GMP
(DEC 2020)
Construction Starts
FEB 2021
Construction Ends
DEC 2023

# Project Constraints

- Cultural Resources
- Limited & Challenging Access
- Environmental Resources & Impacts
- Maintain I-15 Traffic (One Lane Each Direction at All Times)



# 02

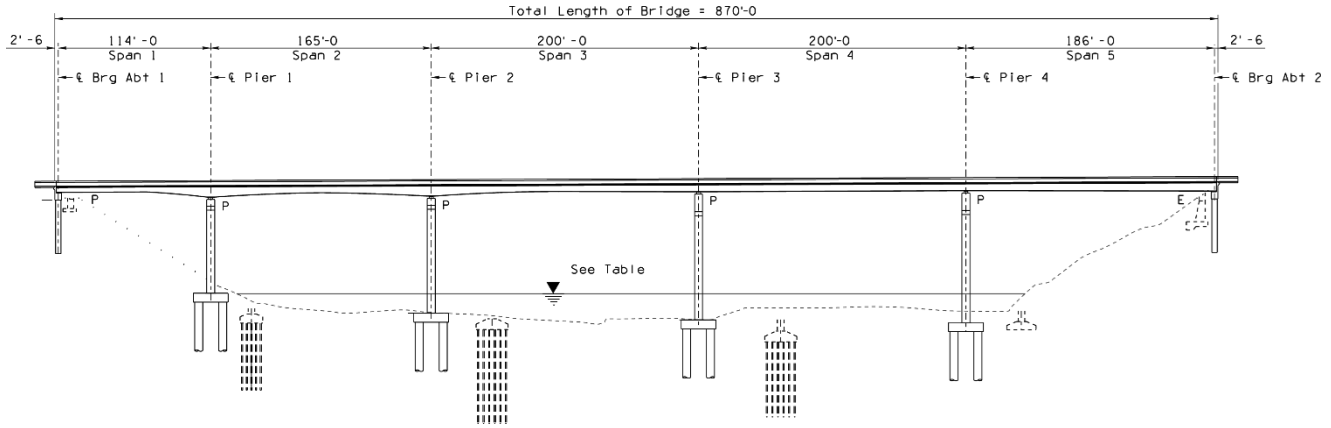
# CMAR Considerations for Bridge Layout and Design

# Alignment and Profile

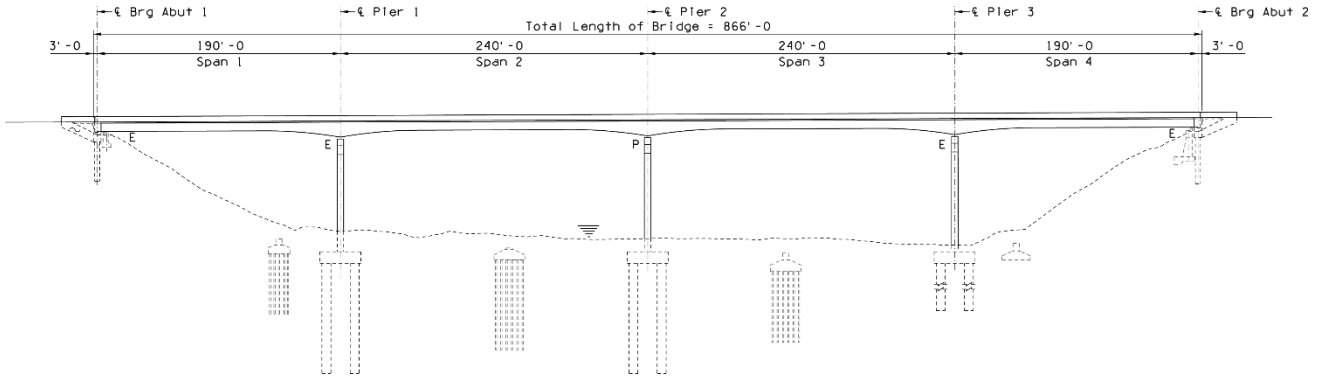
- Alignment Shift is Limited Due to Cultural Resources on Both Sides of I-15 and Topography
- Stage II Design – No Alignment Shift
- CMAR Input – 9’ Alignment Shift
- Maintain Same Profile With Tight Construction Clearances

# Span Arrangement

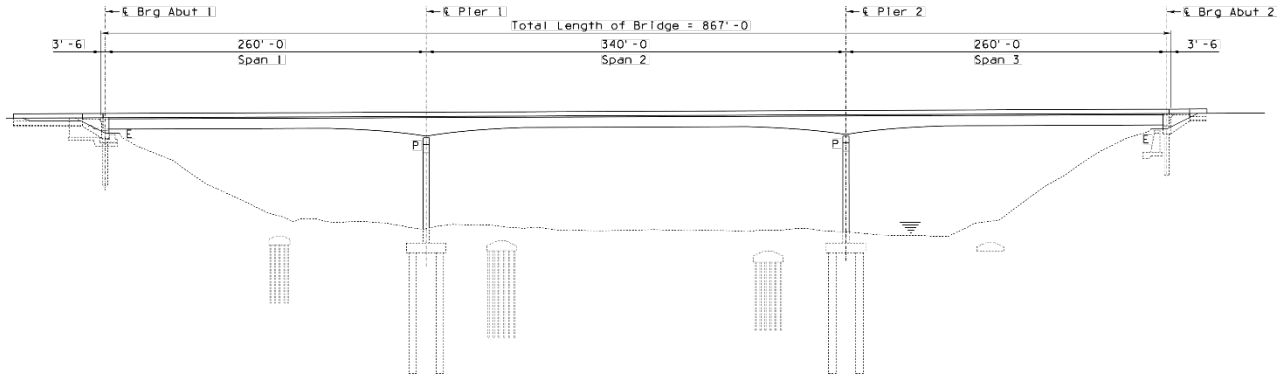
**5-Span Bridge**
(Scoping Phase Concept)




**4-Span Bridge**
(30% Design)



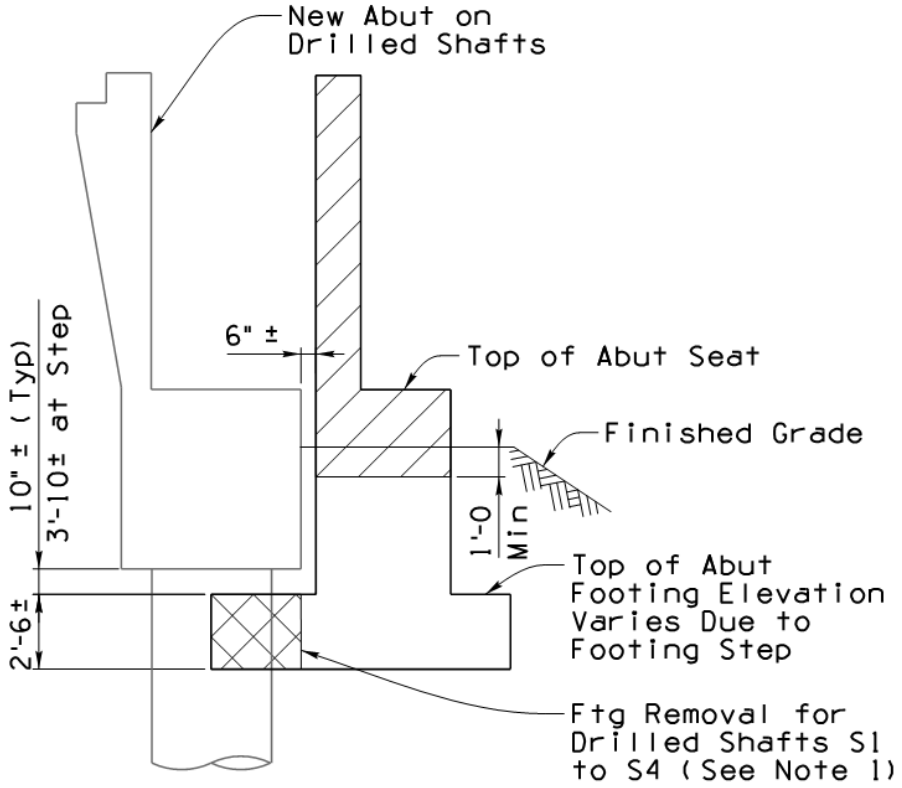

**3-Span Bridge**
(Final Design)



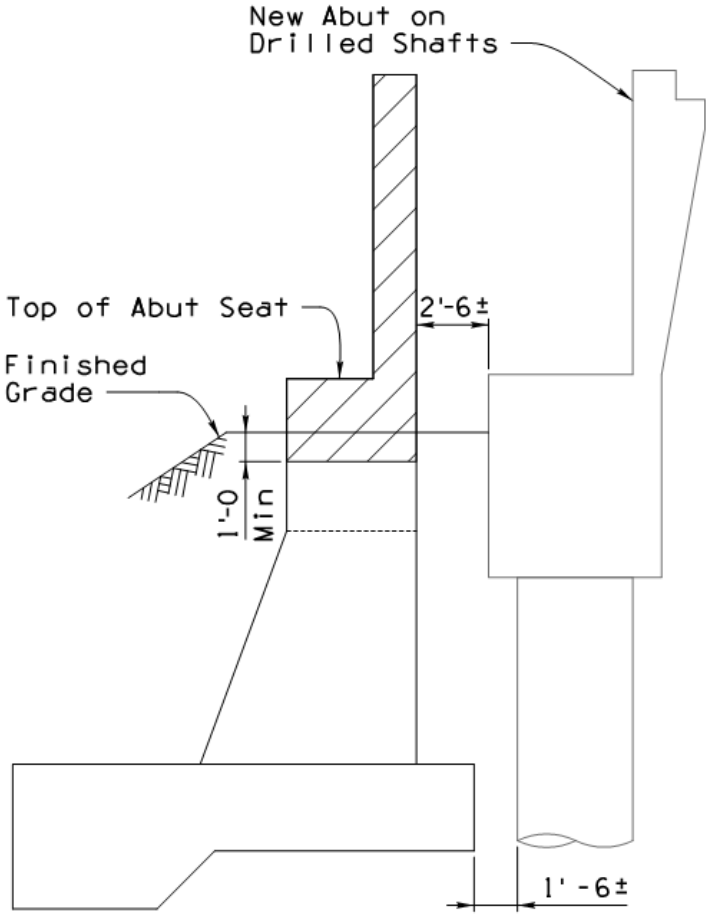

EXISTING BRIDGE


NEW BRIDGE

# Location of New Abutments




ABUTMENT 1 SECTION
No Scale



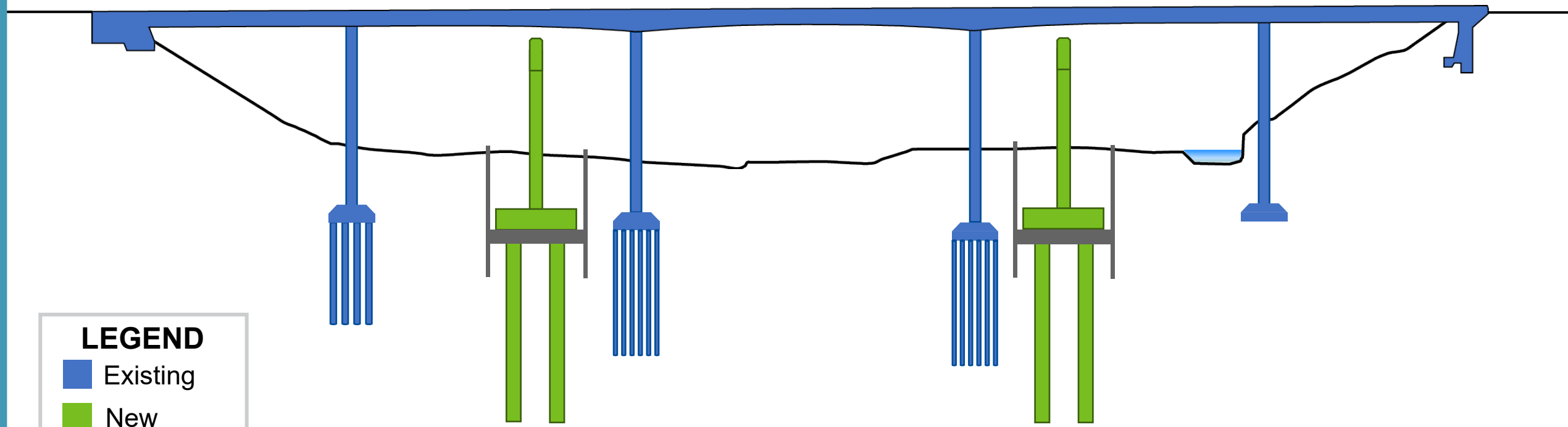

ABUTMENT 2 SECTION
No Scale

LEGEND:

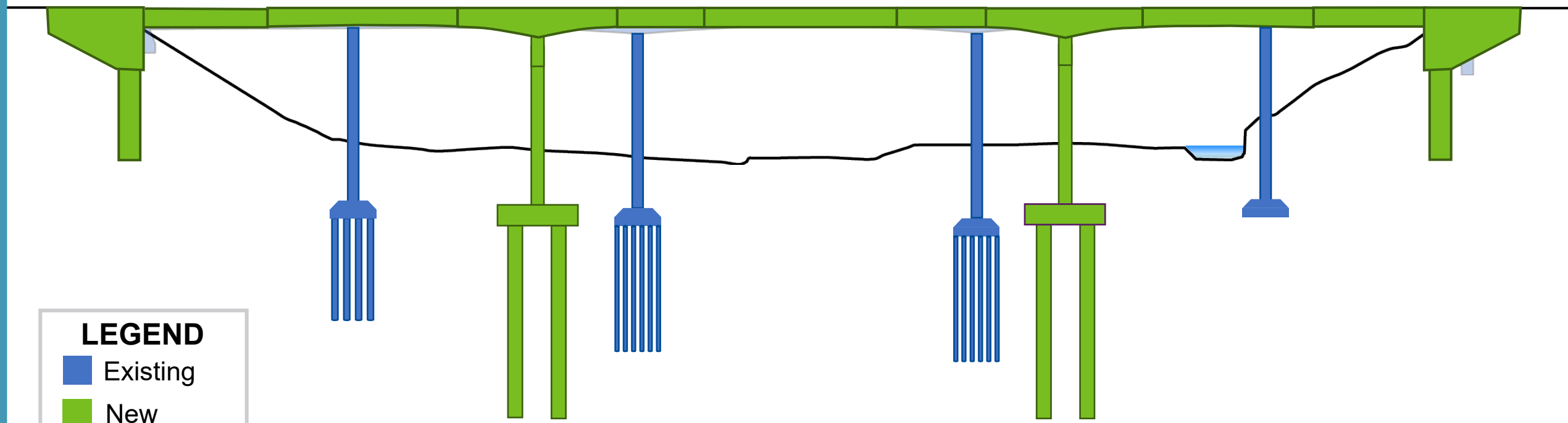
Indicates Abut, Wingwall, Barrier & Pier Removal Area

Indicates Abut Ftg Removal Area

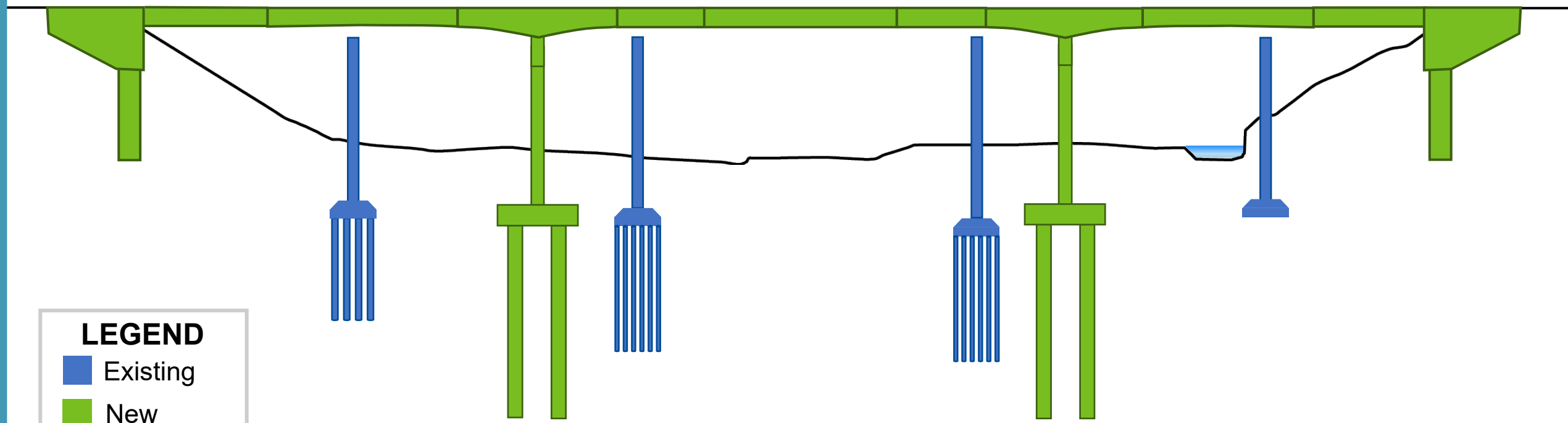
# Construction Sequencing



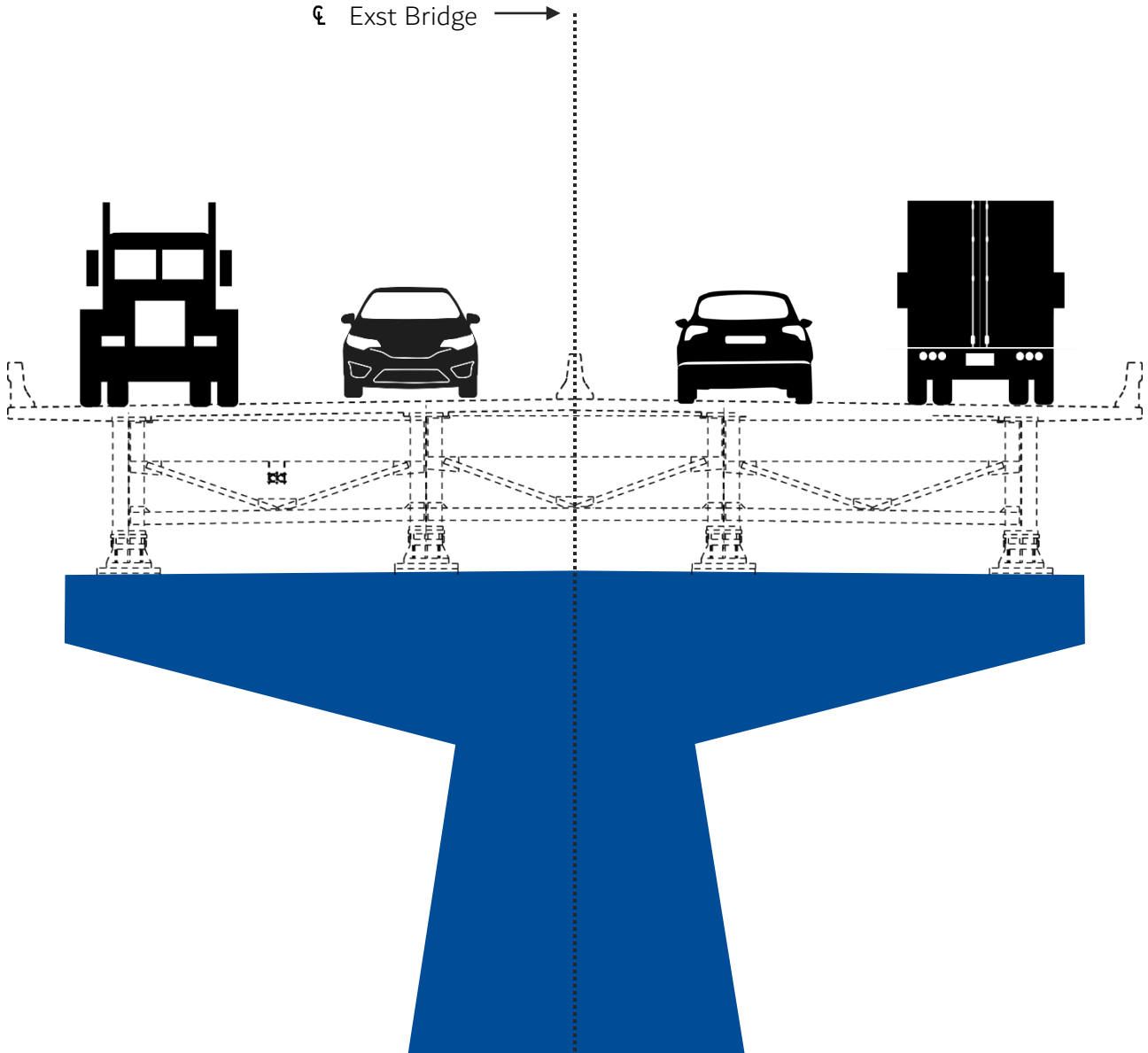
# Construction Sequencing



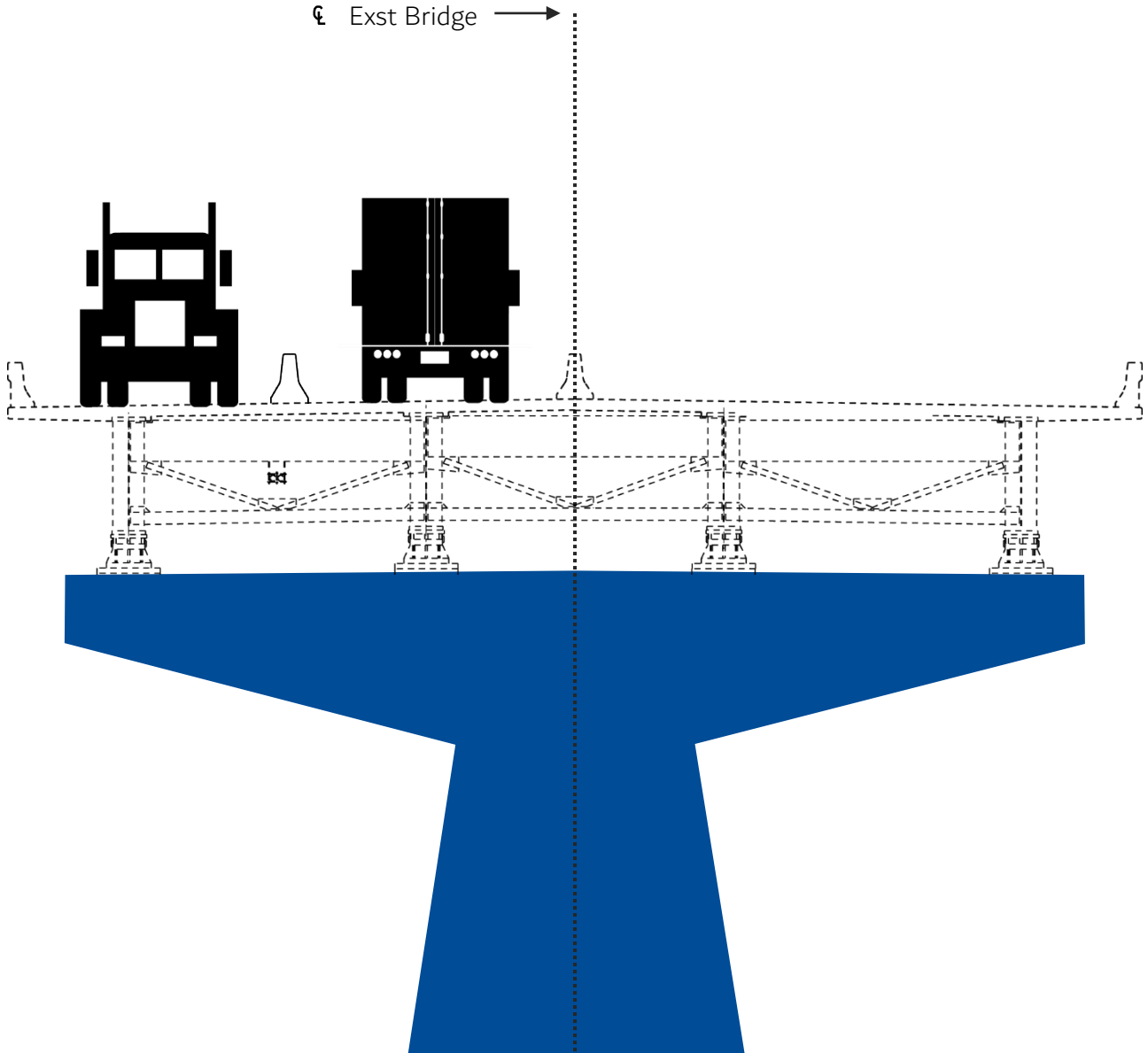
# Construction Sequencing



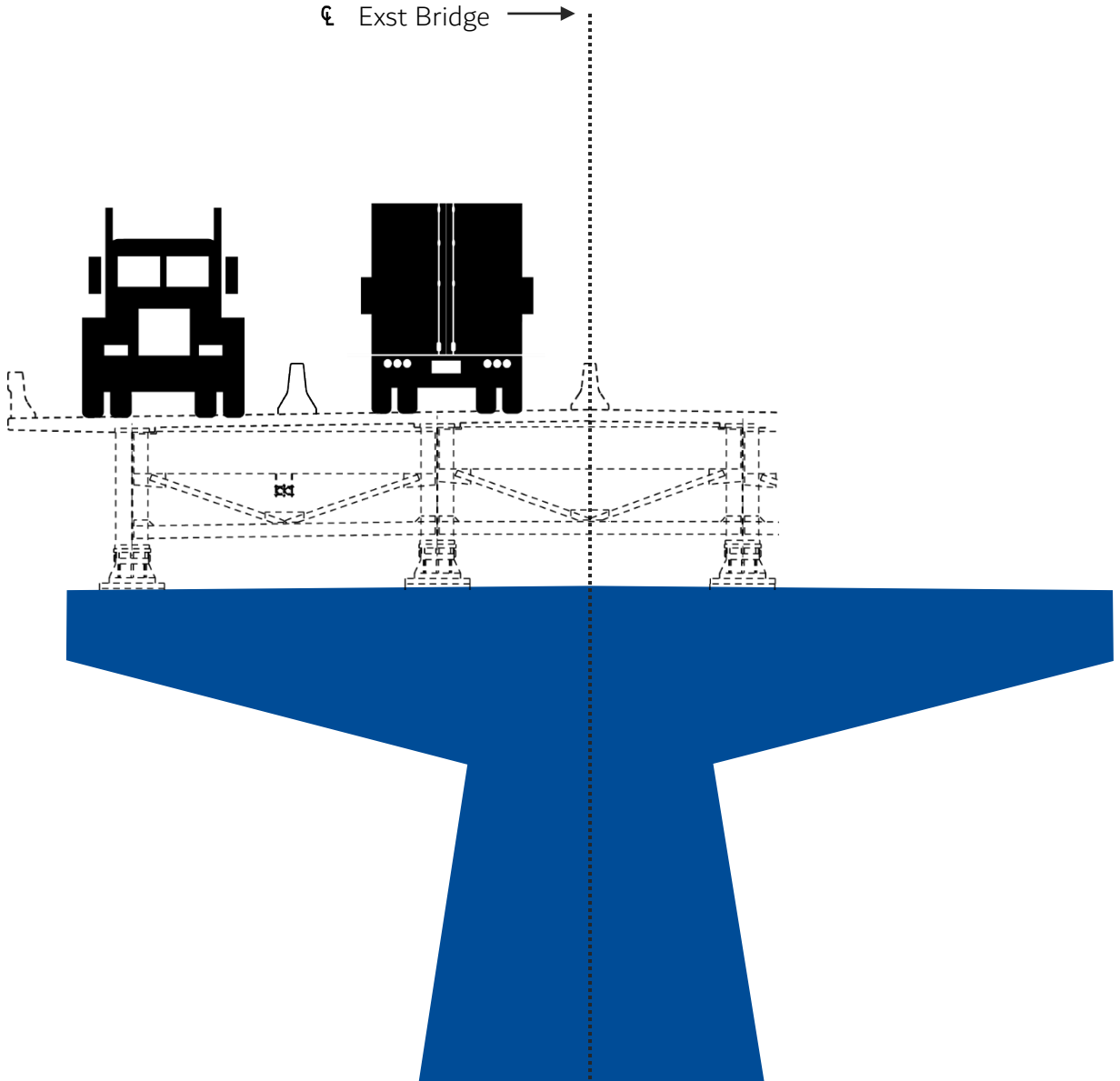
# Staged Construction



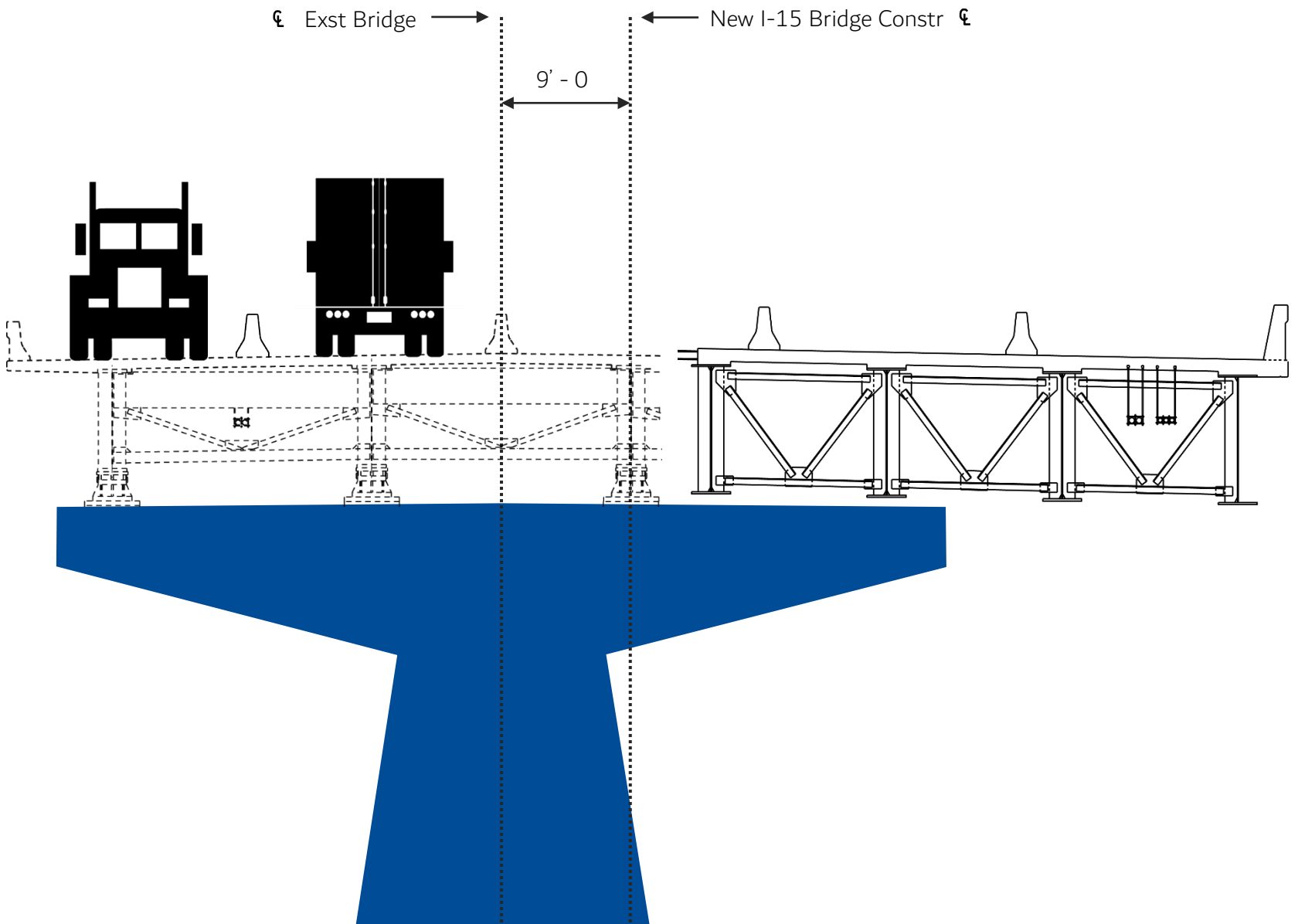
# Stage 1



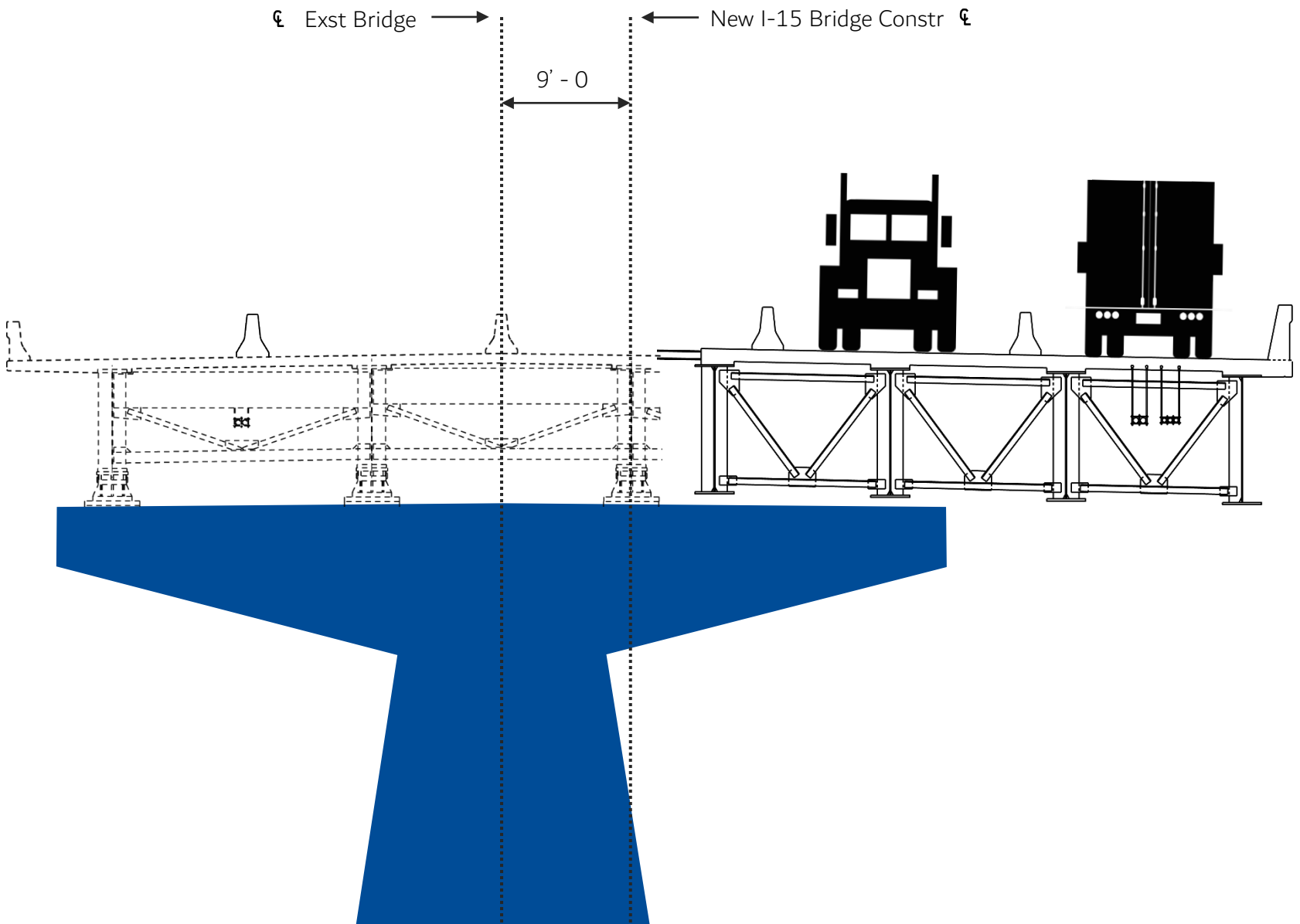
# Stage 1



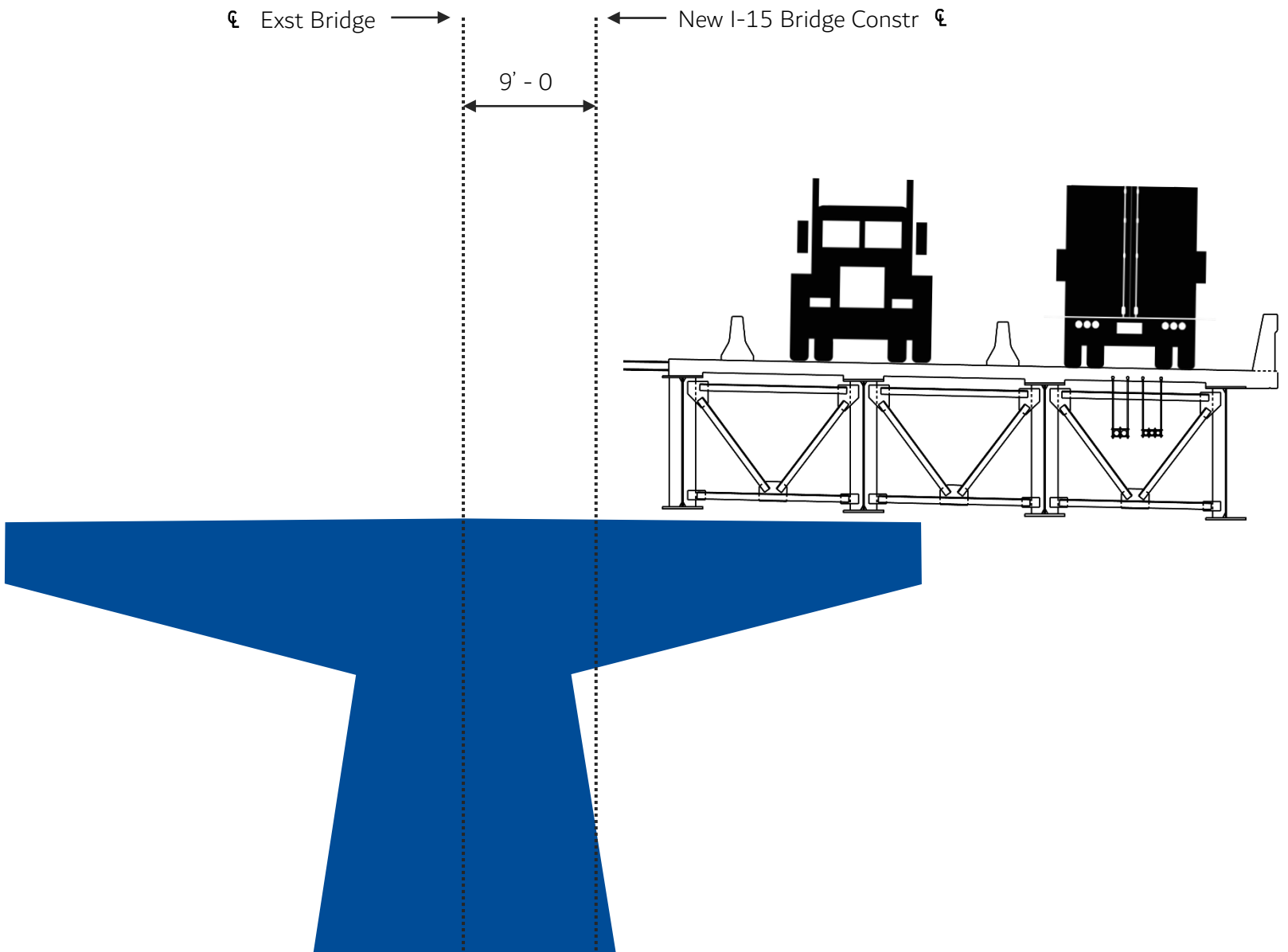
# Stage 1



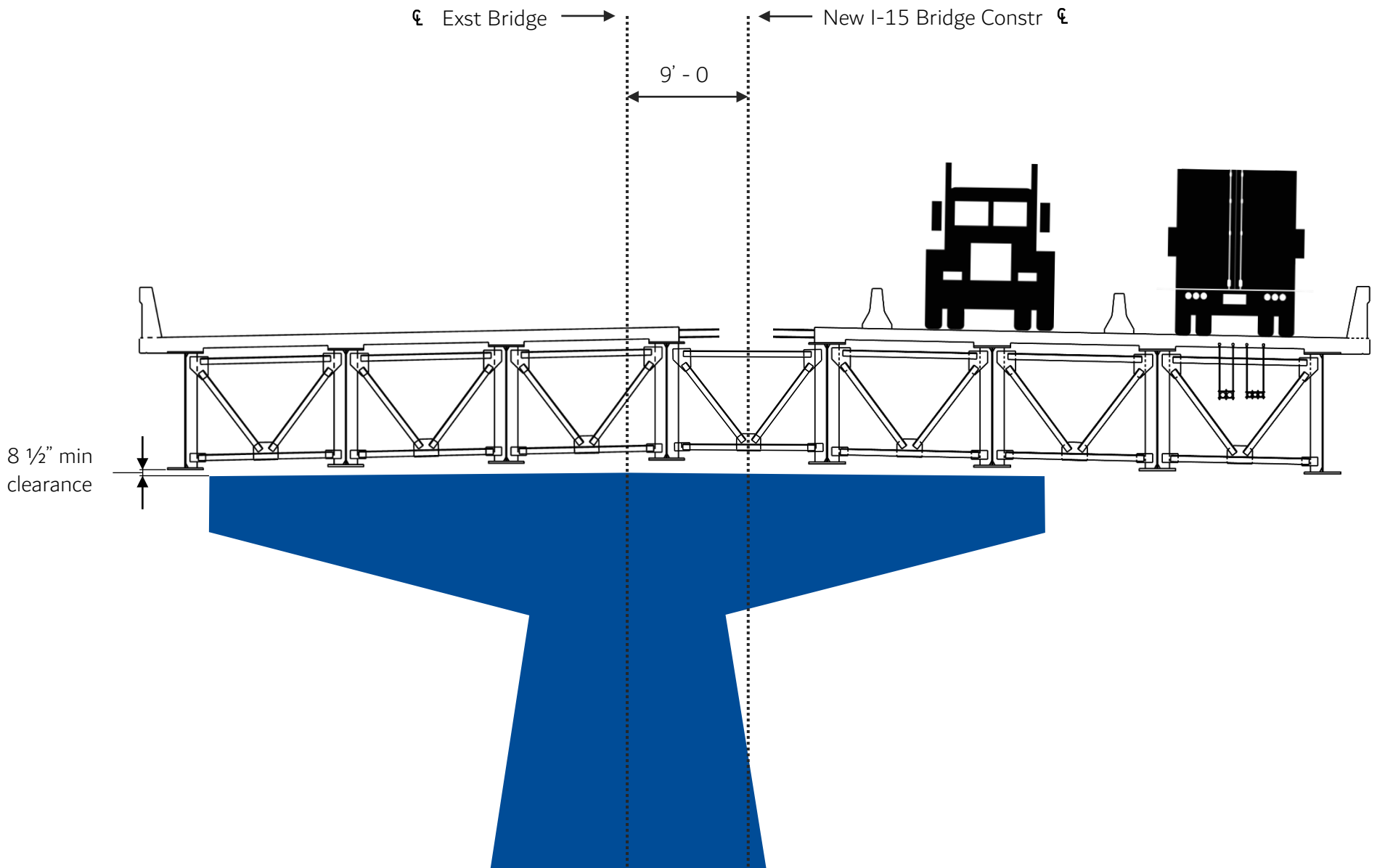
# Stage 2



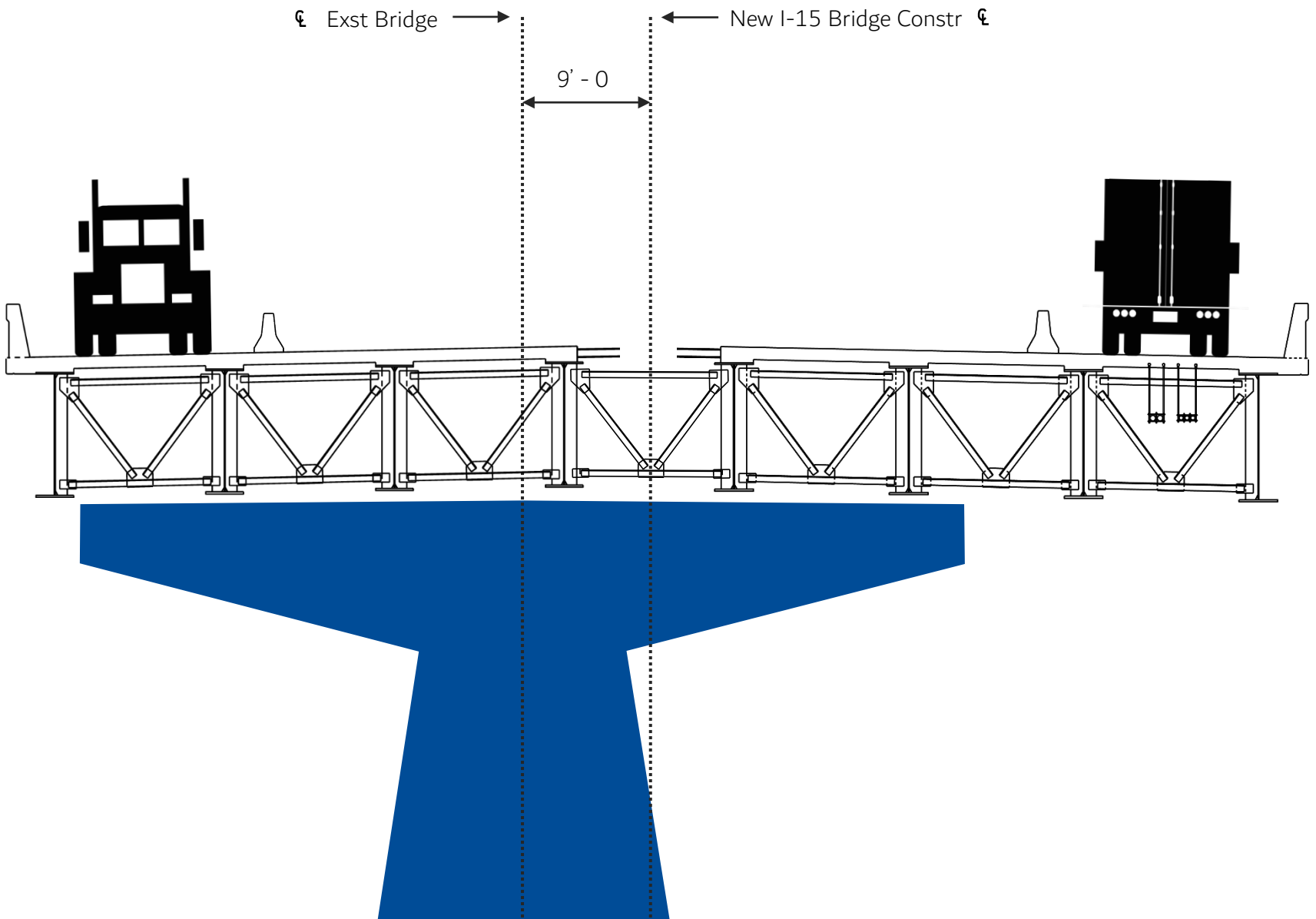
# Stage 2



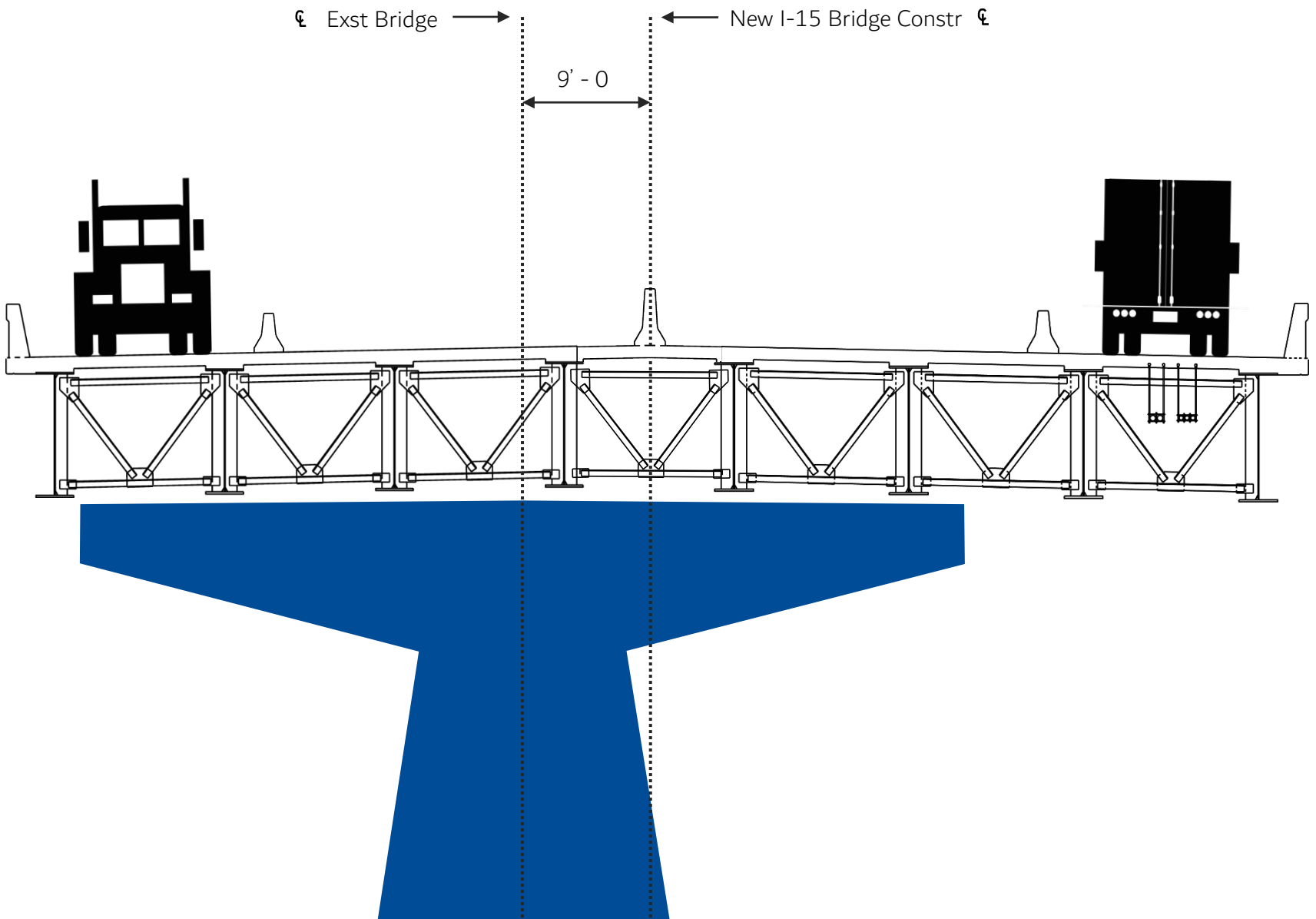
# Stage 2



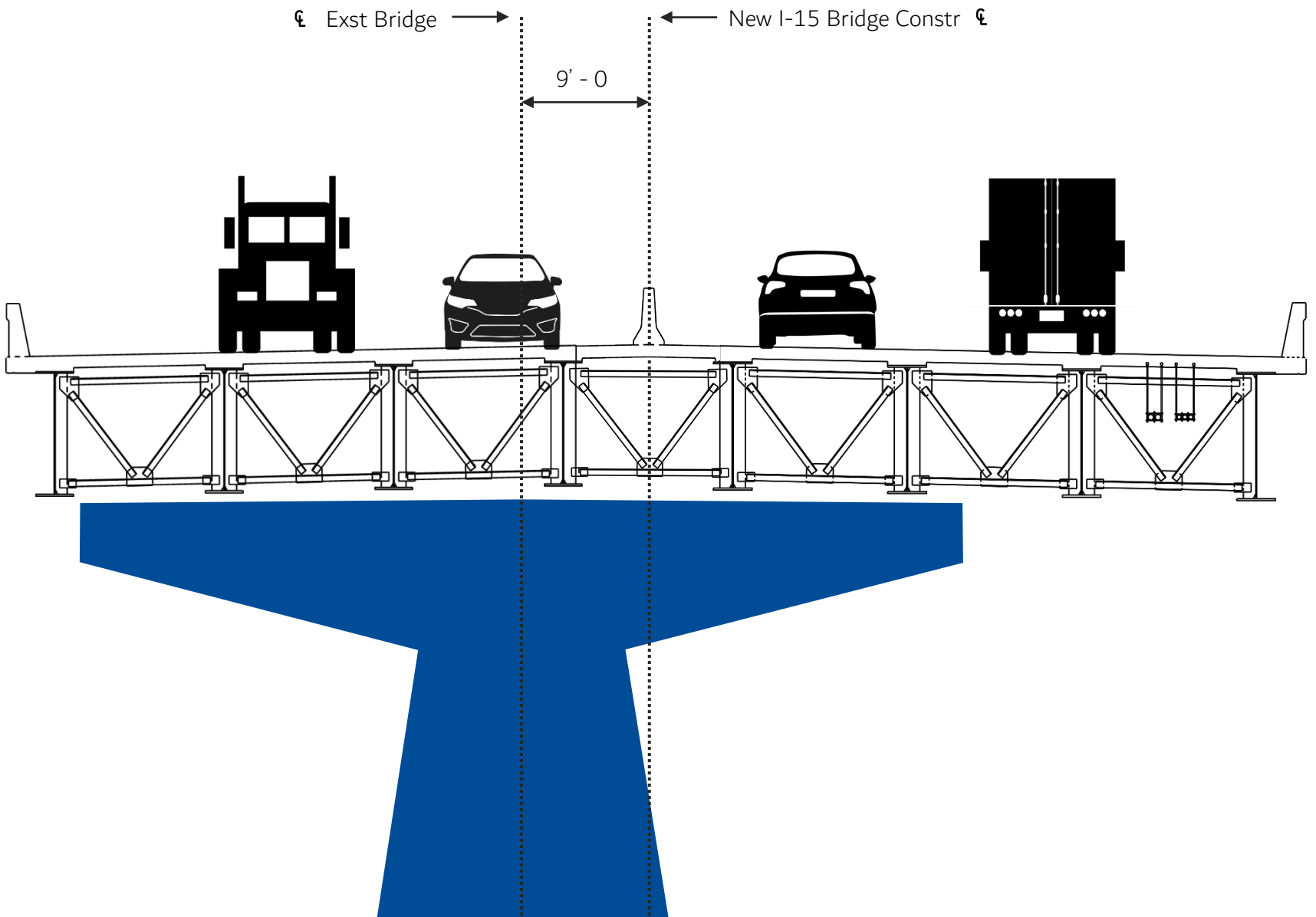
# Stage 3 – Closure Pour



# Stage 3 – Closure Pour



# Existing Pier Removal

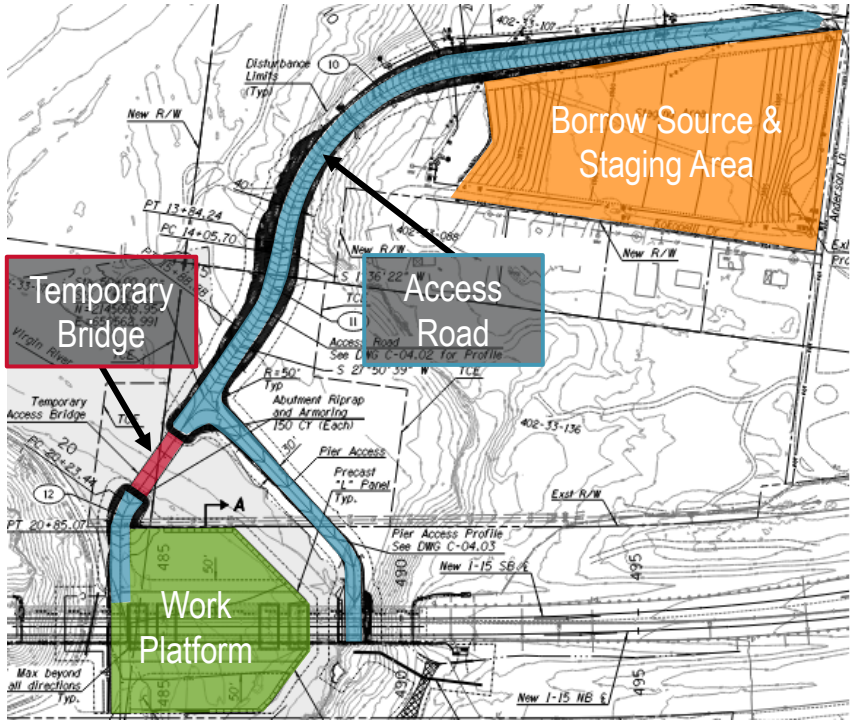


# 03

# Other Project CMAR Considerations

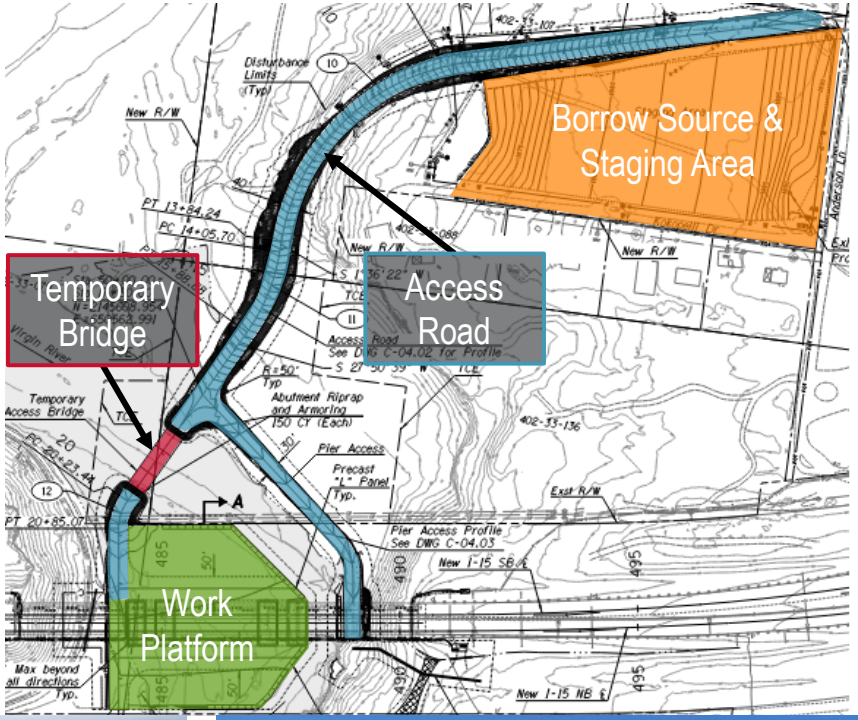
# Staging Area, Access Road & Work Platform

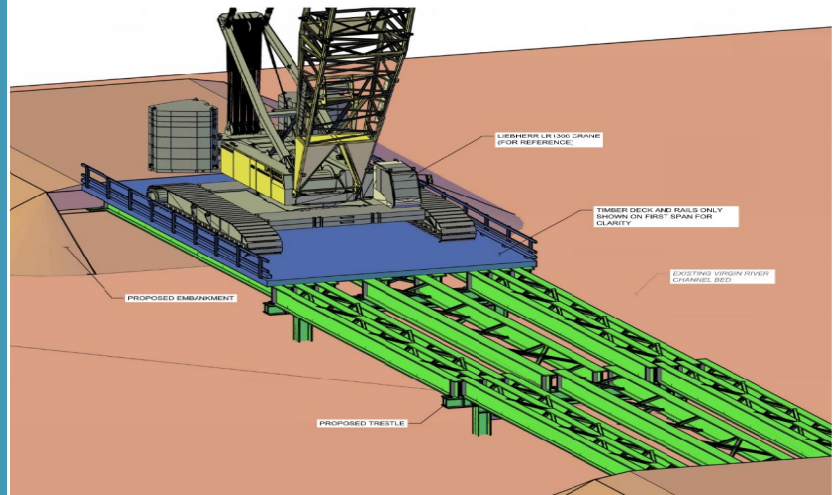
- Northwest Access Preferred
- Width & Geometry Tied to Means & Methods
  - Cofferdam & Drilled Shaft Construction
  - Pier Reinforcing, Forming & Girder Erection
- Footprint Led to EA Re-evaluation
- Riverside Limits Controlled by Hydraulics
  - 2-year Event
- Scour Protection Required
  - Sheet Piles and Precast Concrete L-Panels




# Temporary Bridge Layout

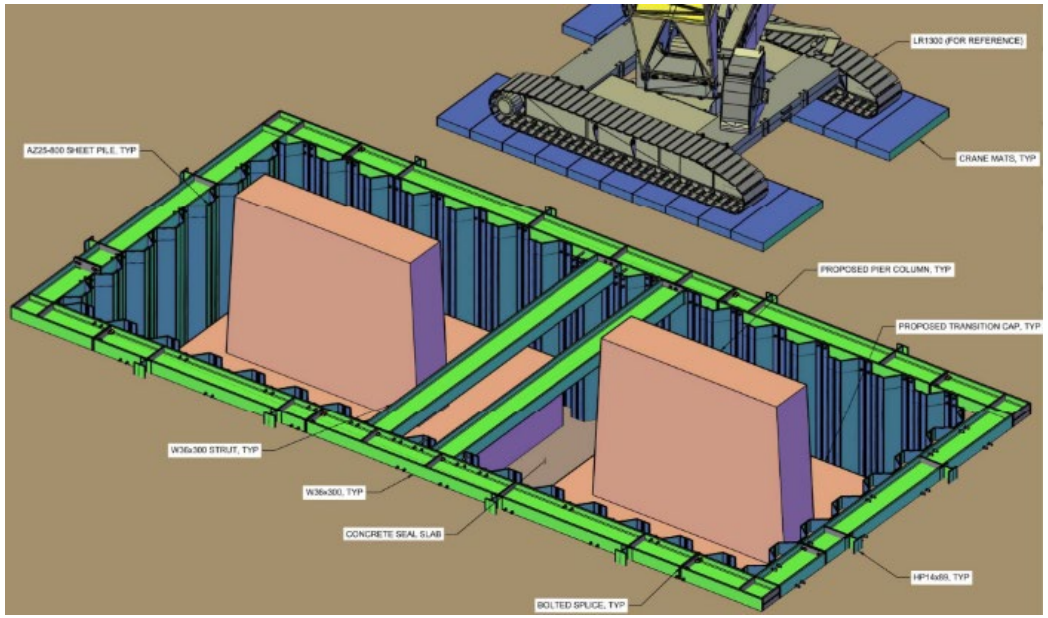
- Maximum of 3-Spans per EA
  - No Limit on Bridge Length or Width
- Hydraulic Opening = 2-year Event
  - Superstructure Removal for Events > 2-year
- Scour = 10-year Event
- Contractor Selection = 3-span Steel Girder



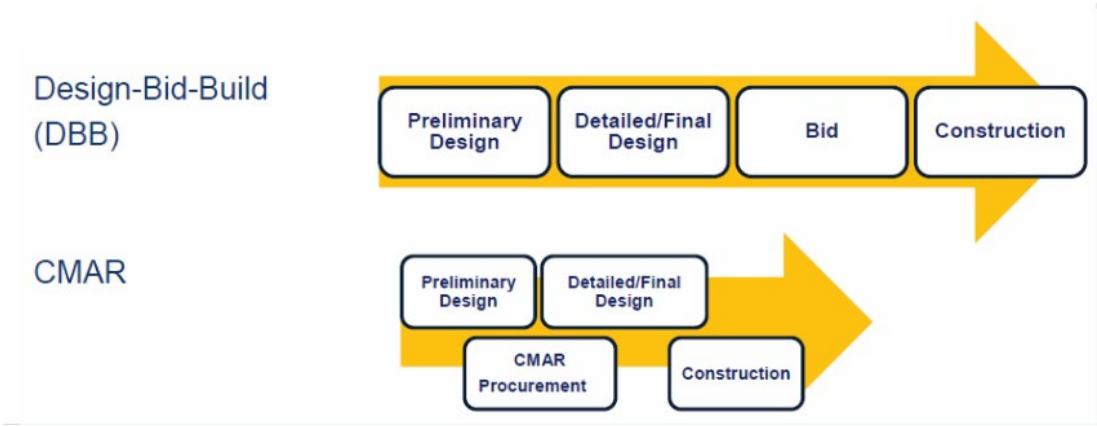

# Cofferdams

- Shallow Groundwater (5’ - 8’)
- Required for Pier Foundation Construction
- 6’ Thick Concrete Seal Slab
- Kiewit Type Selection & Design
- Limits Shown on 404 Permit Application




# Special Provisions

- CMAR Based Special Provisions to Address Risk Identified by Team
- Traditional DBB Specifications Lead to Kiewit Including Risk in Bid
- Allowances to Cover Risks "if" They Occur
- Examples:
  - Temporary Bridge Superstructure Removal
  - Repairs to Temporary Bridge
  - Drilled Shaft Length Variations
  - Lead Based Paint Disposal




**ITEM 9400020 – CMAR ALLOWANCE (REMOVE AND REINSTALL TEMPORARY BRIDGE) (OPEN):**

**Description:**

This item establishes an open allowance to provide for removal and reinstallation of the temporary bridge superstructure due to high flow events.

**Construction Requirements:**

The CMAR shall obtain written permission from the Engineer prior to the use of each allowance.

The CMAR shall monitor the various websites specified under Item 9240053 for weather forecasts, rainfall amounts and stream gauge flows to assist in the evaluation of the need to remove the temporary bridge. The CMAR shall immediately notify the Engineer if the CMAR determines the bridge needs to be removed based on an evaluation of forecasts, rainfall amounts and stream gauge flows.

In the event of a storm that is expected to overtop the temporary bridge superstructure, the contractor shall move the temporary bridge superstructure to a location above the high flow. The temporary bridge superstructure shall be protected in its new location.

Once the storm has subsided, the open allowance will cover the cost of restoring the bridge superstructure.

Final removal of the temporary bridge superstructure and substructure at completion of the project will be paid under Item 9240053 Miscellaneous Work (Temporary Bridge).

# 04

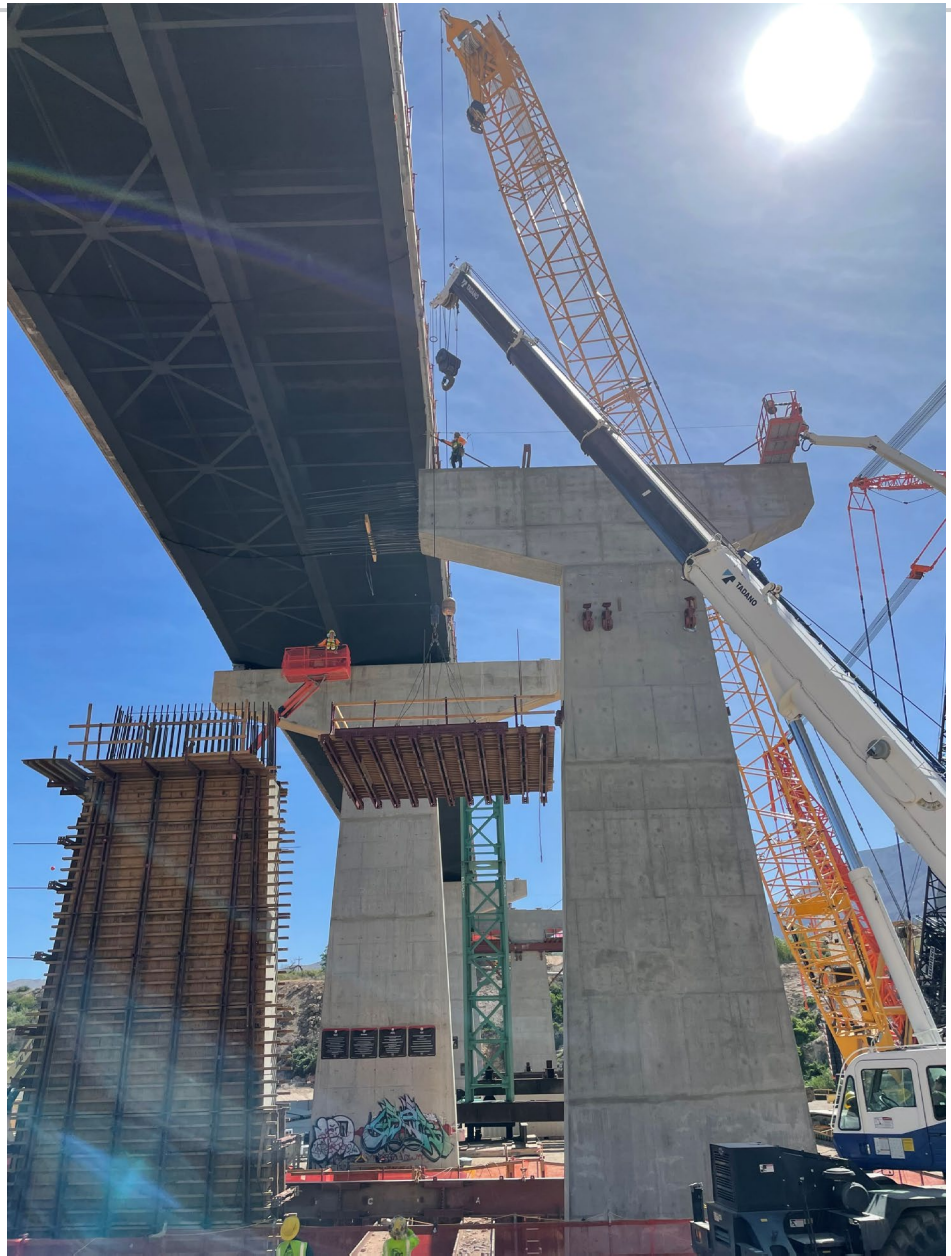
# Construction Photos & Current Status

# Access Road and Work Pad

# Pier Cofferdam

# Pier Shafts

# Pier Footing and Columns



# Girder Erection

# Current Status

# Project Team