



# ACCELERATED BRIDGE CONSTRUCTION FHWA / DeIDOT WORKSHOP

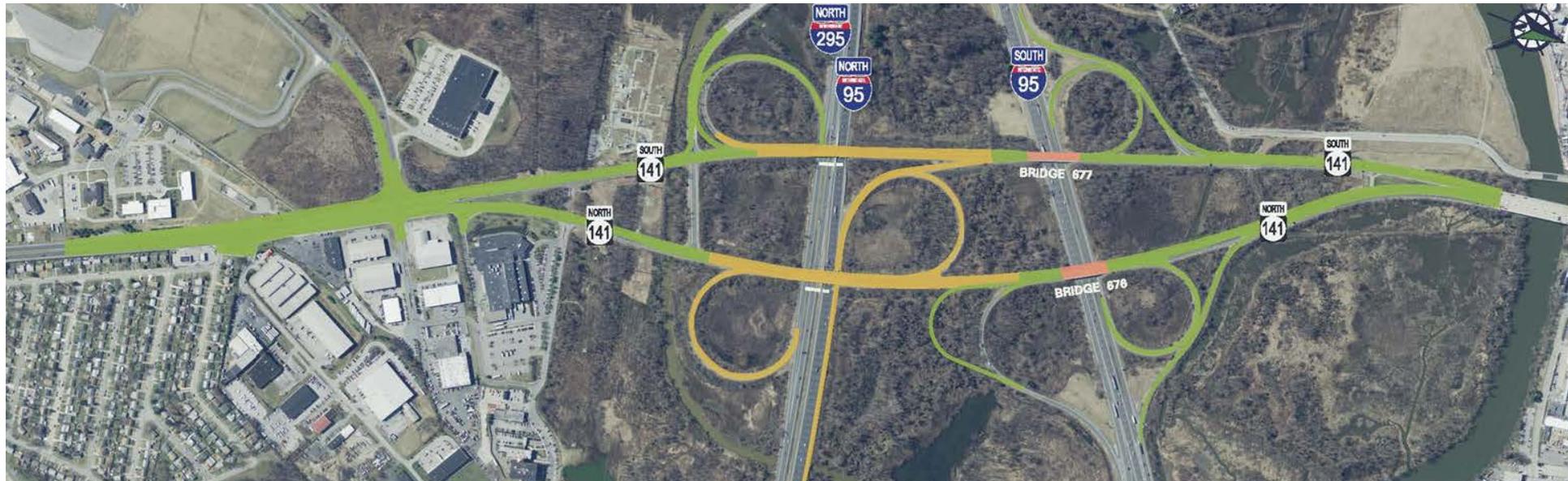
September 17, 2015

Delaware Department of Transportation

# Project Overview



## SR 141, Commons Boulevard Intersection Improvements



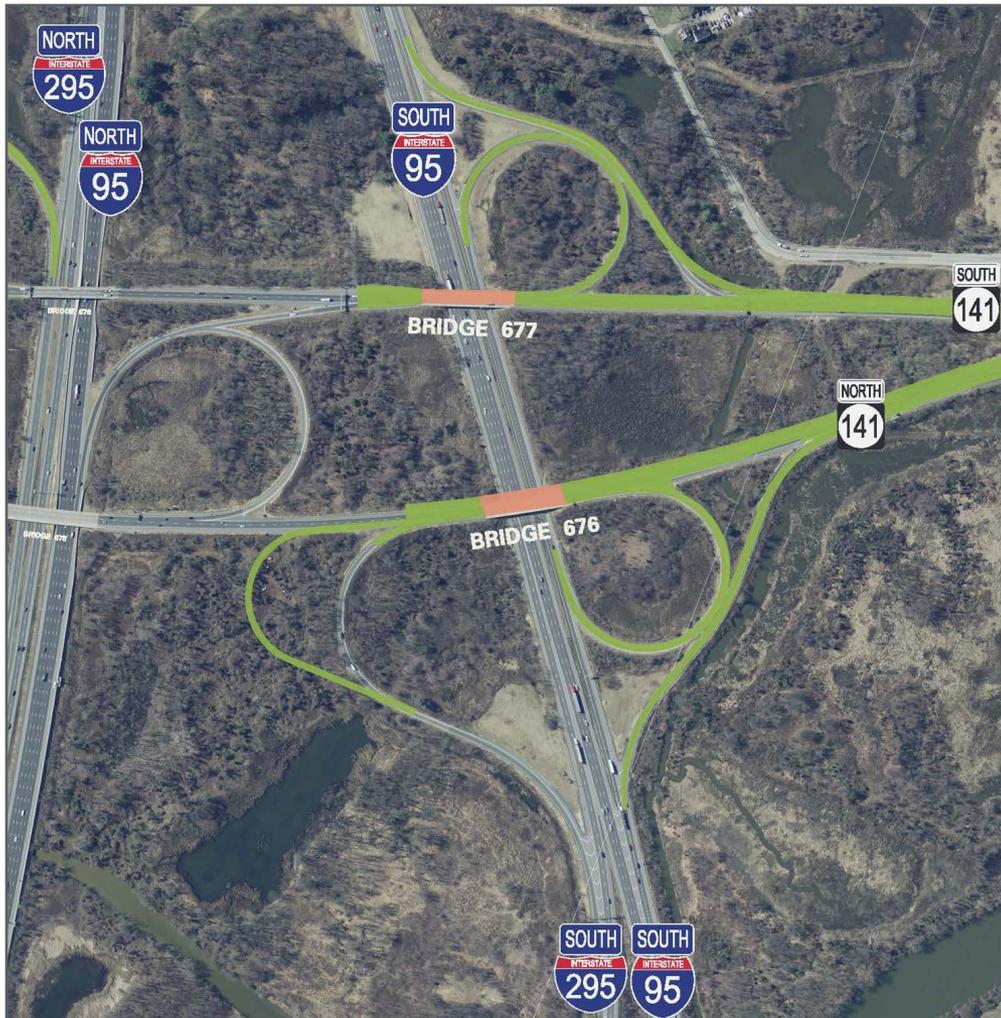
I-95 and SR 141 Interchange

- Follows completion of SR 141, Ramps G & F
- 3<sup>rd</sup> lane widening on SR 141/Pavement reconstruction
- Geometric improvements at ramps
- Capacity improvements at SR 141/Commons Blvd. Intersection
- Remove Airport Road signal and crossover

# Project Overview



## SR 141, Commons Boulevard Intersection Improvements



### I-95 and SR 141 Interchange

- Replace Bridges 676 and 677 (SR 141 over I-95 SB)

# Project Overview

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## Why Consider ABC?

- Traffic Volumes: SR 141 = 78,000 AADT , I-95 > 100,000 AADT
- Bridges 675 and 678 will be constructed under a prior contract beginning in Fall 2015 with a 2 year construction schedule.
- Evaluated temporary detours, however, adequate detours not available for the traffic volumes.
- The Decision was made to accelerate the bridge construction to match the anticipated roadway construction duration

# Bridge Overview

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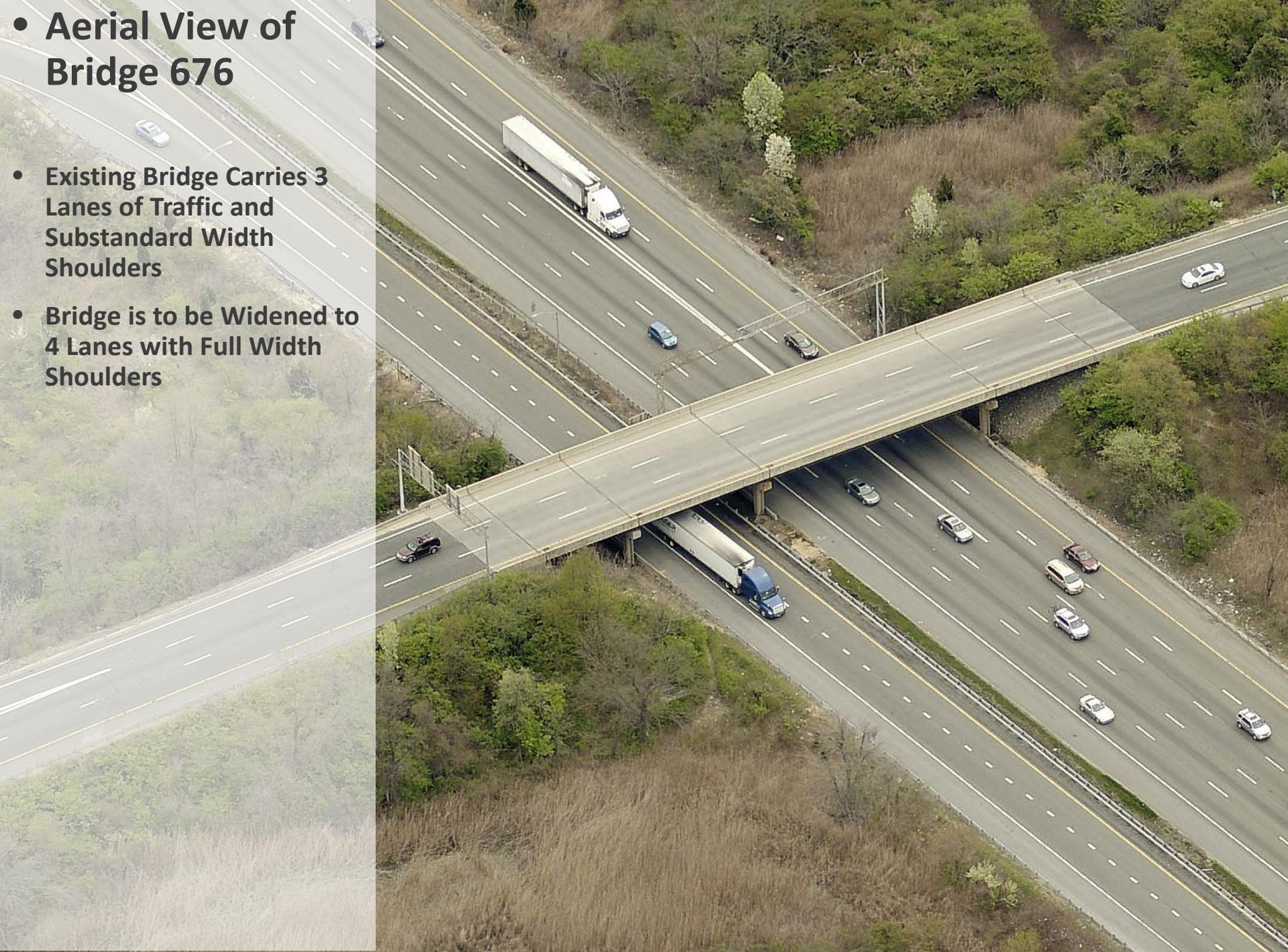


## Replacement of Bridges 676 and 677

- Goal is to Replace Both Bridges in a Single Construction Season
- Construction will be a Combination of both Conventional and Accelerated Bridge Construction Techniques
- Presentation will Focus on Bridge 676

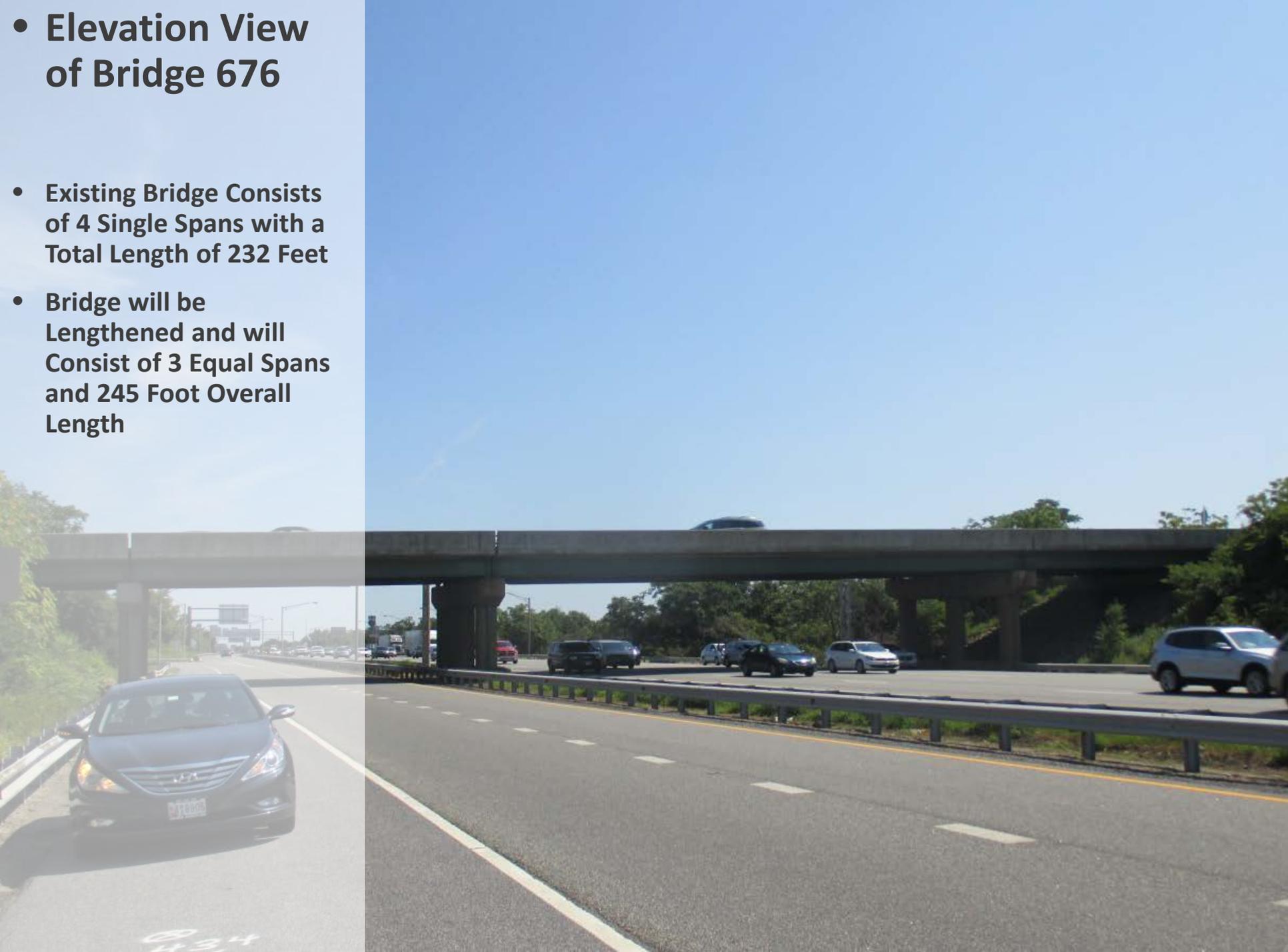
# • Aerial View of Bridge 676

- Existing Bridge Carries 3 Lanes of Traffic and Substandard Width Shoulders
- Bridge is to be Widened to 4 Lanes with Full Width Shoulders

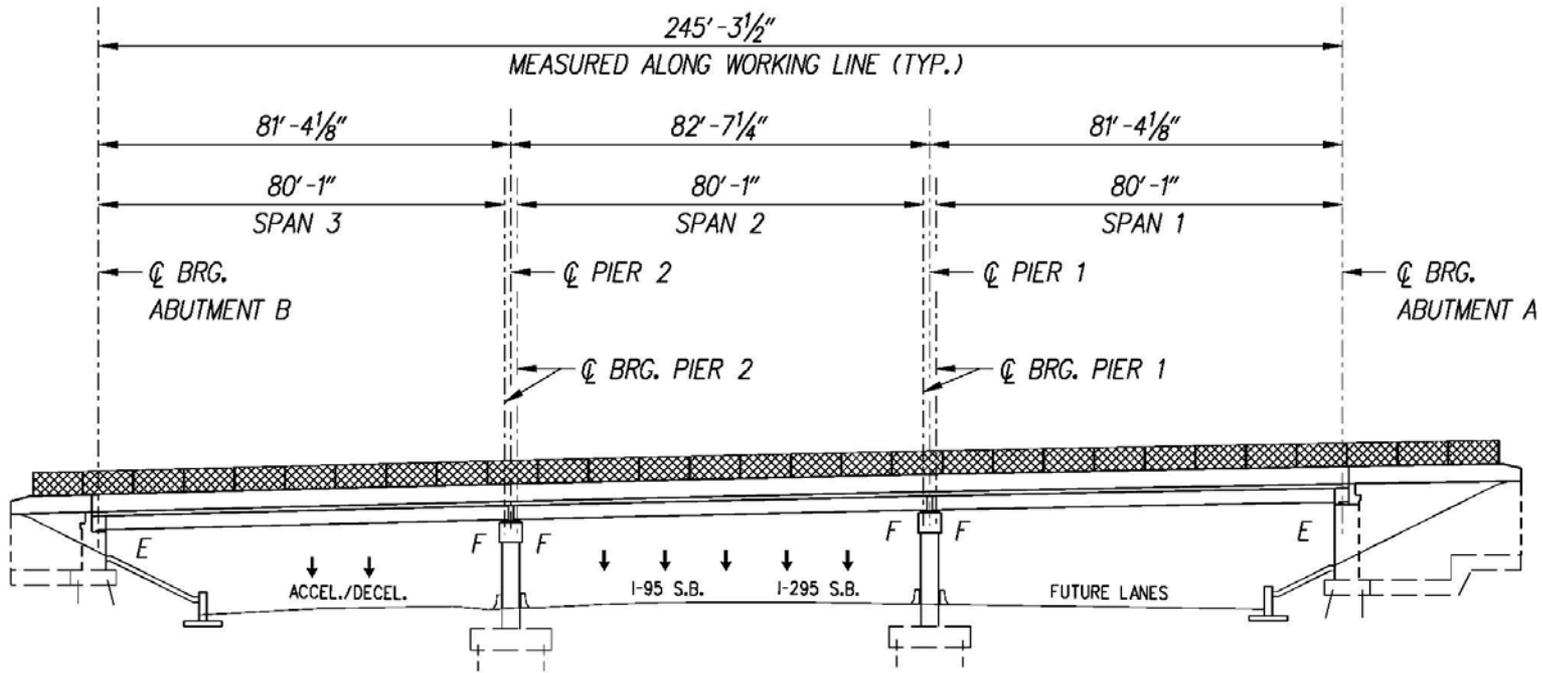


- **Elevation View of Bridge 676**

- Existing Bridge Consists of 4 Single Spans with a Total Length of 232 Feet
- Bridge will be Lengthened and will Consist of 3 Equal Spans and 245 Foot Overall Length



# Proposed Configuration – Bridge 676



ELEVATION

SCALE:  $1'' = 30' - 0''$

# Bridge 676

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## The Challenges

- Bridges to Remain on the same Alignment while Maintaining the Roadway Existing Profiles
- Maintain 2 Lanes of Traffic During Construction
- Lengthen and Widen Both Bridges
- Located in an Area with Poor Underlying Soils Requiring Deep Foundations
- Accelerate Construction to Under 1 Year.

# Bridge 676



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## Proposed Accelerated Construction Techniques

- Utilize Precast Concrete Pier Caps (36 ft. lengths , 56 Ton Wt.)
- Still Evaluating the use of Precast Pier Columns
- Utilize Modular Steel Girder / Precast Concrete Slab Units with 6" Closure Pours (8'-2" out to out width, 80 ft. lengths, 46 Ton Wt.)
- Still Investigating Precasting the Concrete Barriers on Exterior Modular Units

# Bridge 676

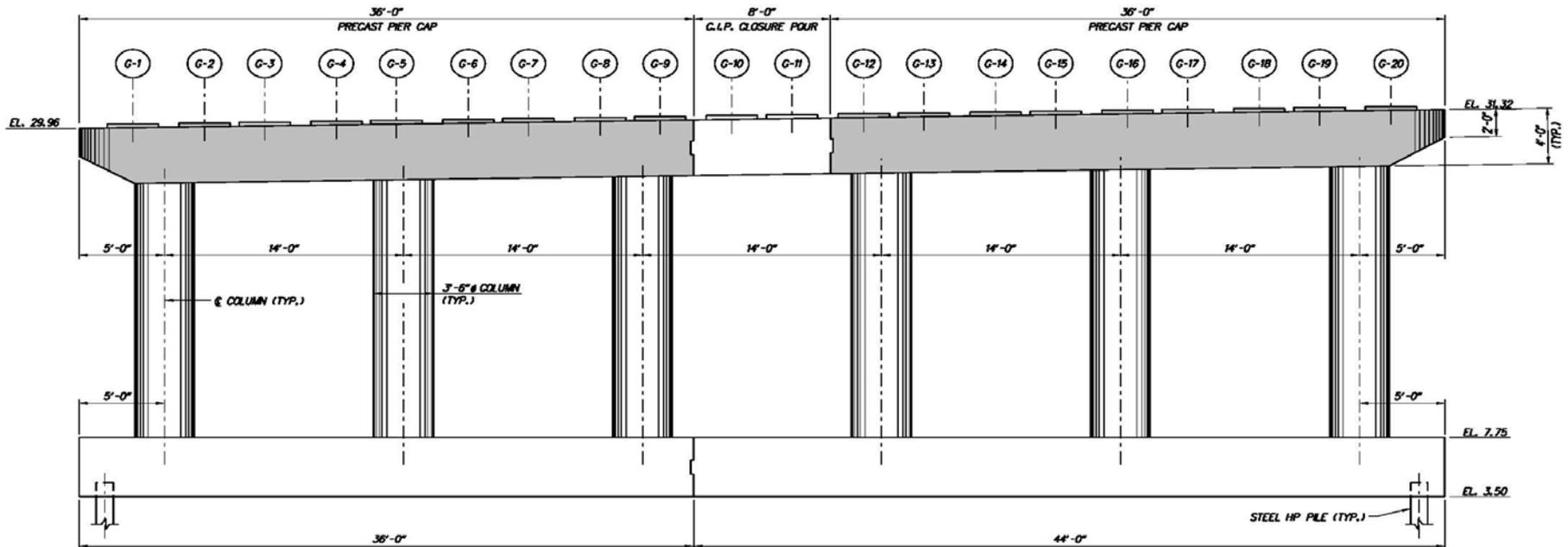
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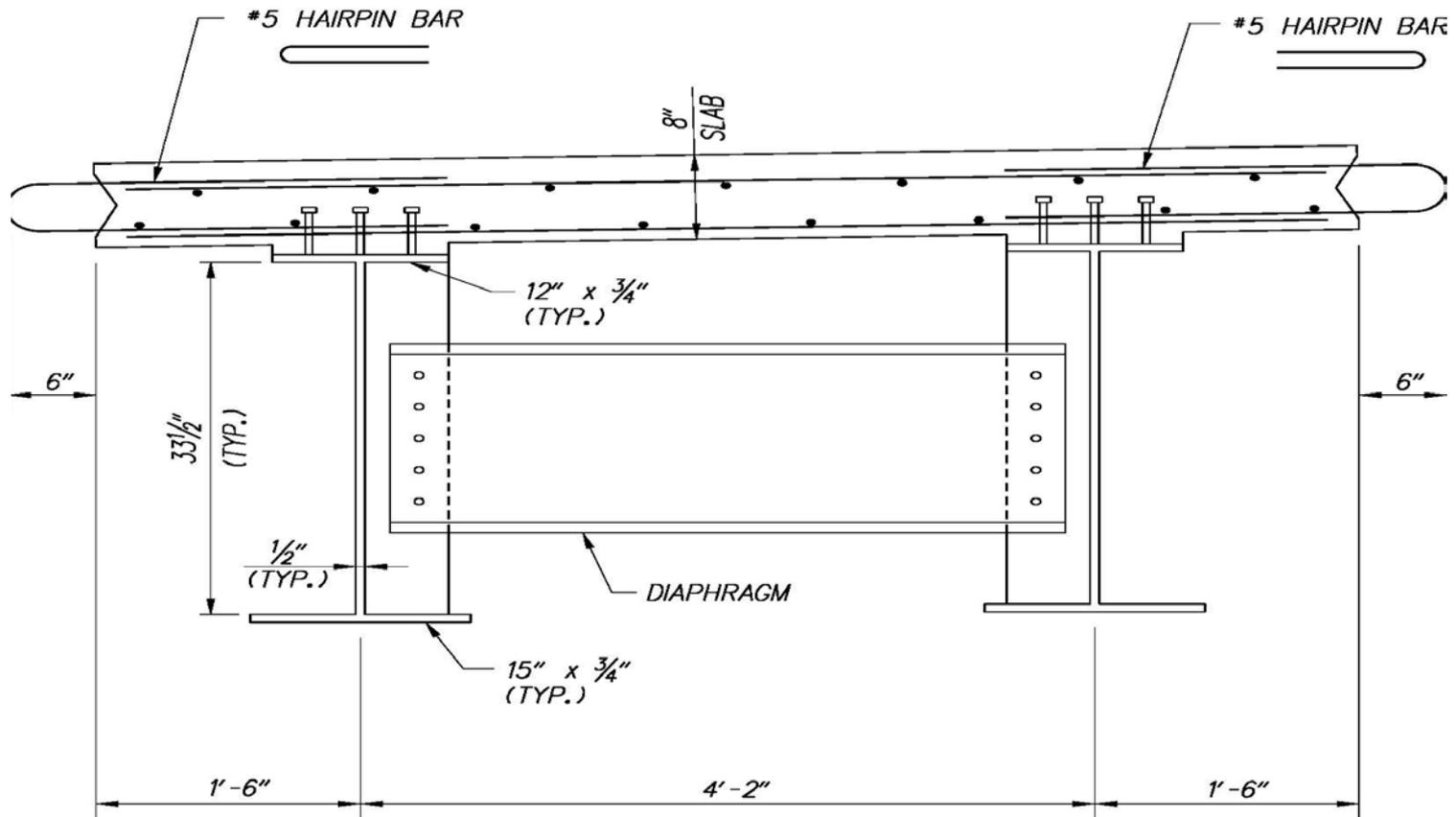
## Proposed Conventional Construction

- Driven Pile Foundations for Piers and Abutments
- Cast-in-Place Concrete Footings
- Cast-In-Place Concrete Abutments
- Cast-In-Place Approach Slabs
- Polyester Polymer Concrete (PPC) Deck Overlay

# Bridge 676 Details



# Bridge 676 Details

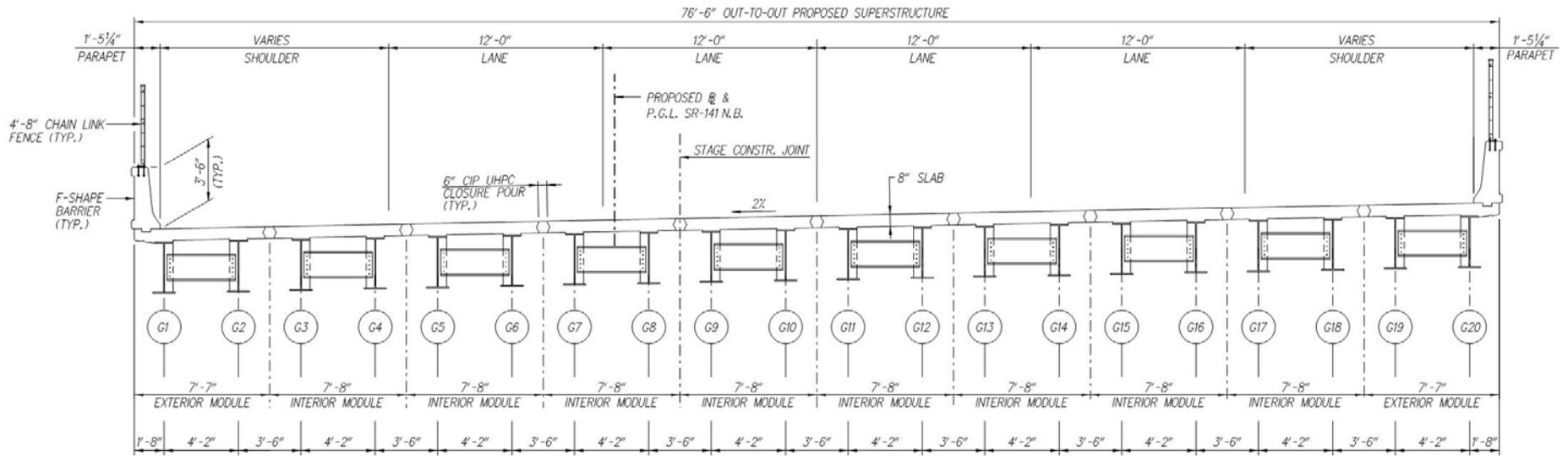


INTERIOR MODULE SECTION

# Bridge 676 Details



## Proposed Typical Section

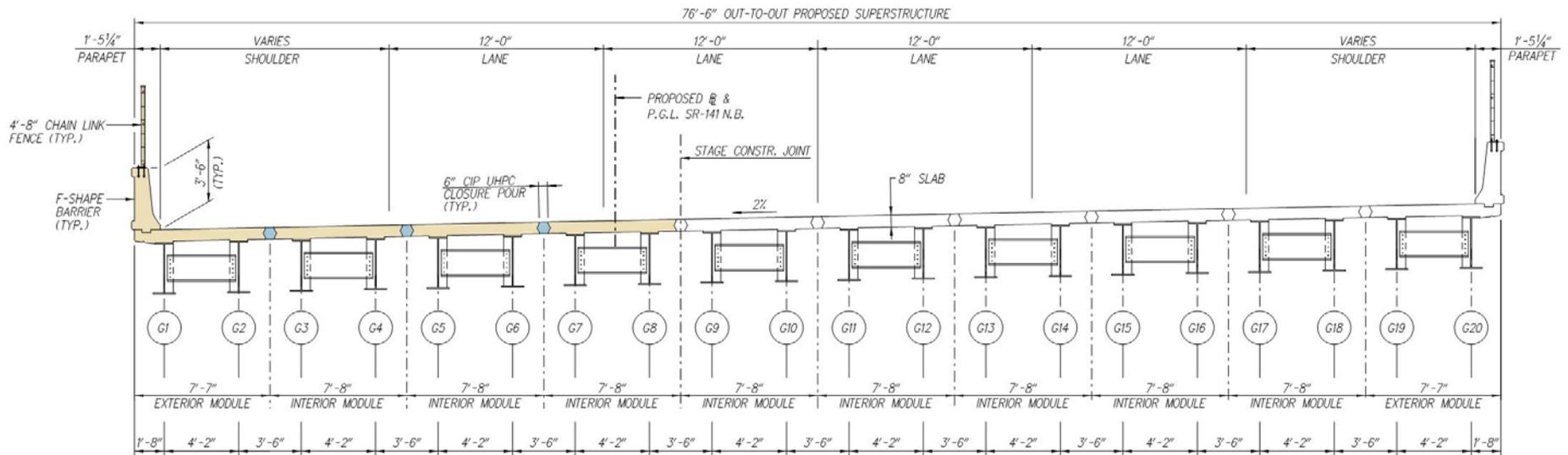


PROPOSED TYPICAL SECTION

# Bridge 676 Details



## Proposed Typical Section – Phase 1

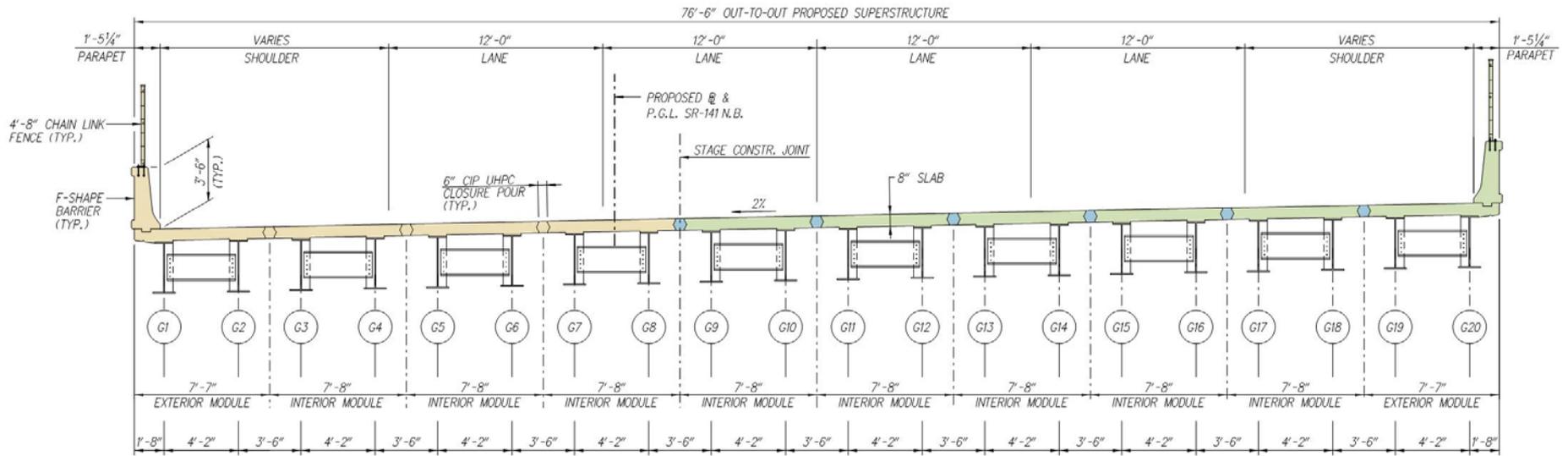


PROPOSED TYPICAL SECTION

# Bridge 676 Details



## Proposed Typical Section – Phase 2



PROPOSED TYPICAL SECTION



# Bridge 676

## Details

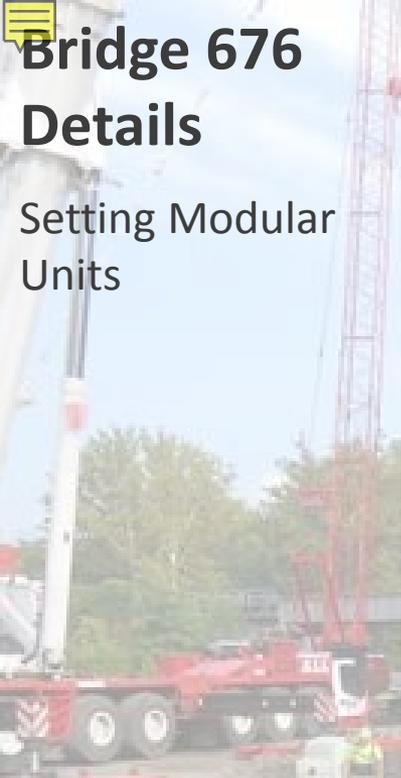


Typical Precast  
Pier Cap

# Bridge 676 Details

Fabricating  
Modular Units





# Bridge 676

## Details

Setting Modular  
Units



08.20.2014 17:17



# Bridge 676 Details

Longitudinal  
Closure Pours



05/30/2009



# Bridge 676 Construction Sequence



# Bridge 676 Construction Sequence

Phase 1:  
Demolition



# Bridge 676 Construction Sequence

Phase 1:  
Substructure  
Construction



# Bridge 676 Construction Sequence

Phase 1: Set  
Modular Girder  
Units



# Bridge 676 Construction Sequence

Phase 1:  
Longitudinal  
Closure Pours and  
Concrete Barrier  
Completed



# Bridge 676 Construction Sequence

Phase 2:  
Demolition



# Bridge 676 Construction Sequence

Phase 2:  
Substructure  
Construction



# Bridge 676 Construction Sequence

Phase 2: Set  
Modular Girder  
Units



# Bridge 676 Construction Sequence

Phase 2:  
Completed  
Structure



# Proposed Schedule

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- Currently Working on the Preliminary Design
- Project Advertisement - Fall 2017
- Construction Start - March 2018
- Both Bridges to be Completed in 8 Months. (4 Months Each MOT Phase)
- Bridges 676 and 677 Constructed Concurrently

# Conclusion

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## ABC Advantages for This Project

- Bridges 676 and 677 will be Constructed in Less than half the Time of Similar Bridges 675 and 678 Using Conventional Methods
- Construction Time Savings of More Than 1 Year over Earlier Contract
- Reduced Impacts to Motorists on Heavily SR 141 and I-95 SB
- Increased Safety for Construction Forces
- Improved Quality of Construction by Utilizing Precast Elements

# Questions ?

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