



# Lafayette Brook Bridge Rehabilitation

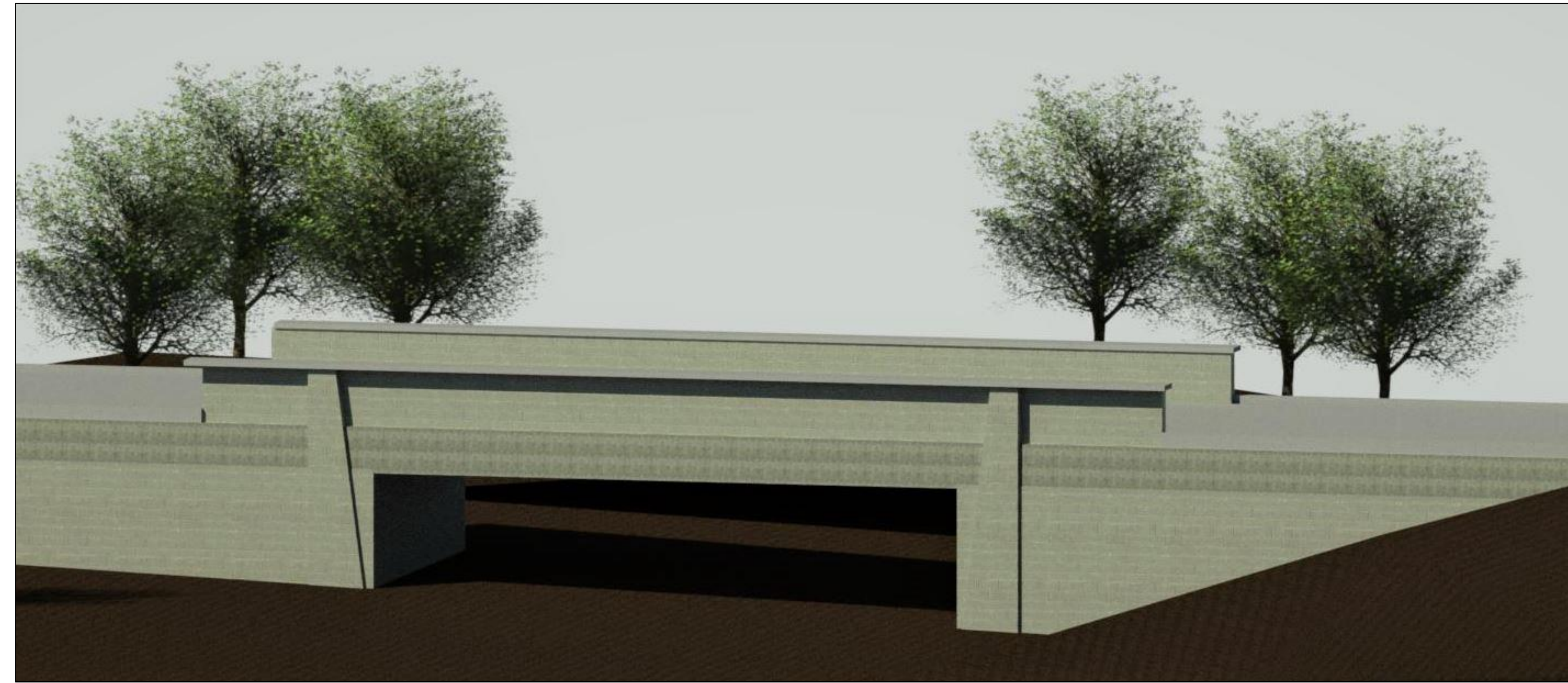
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## Existing Bridge

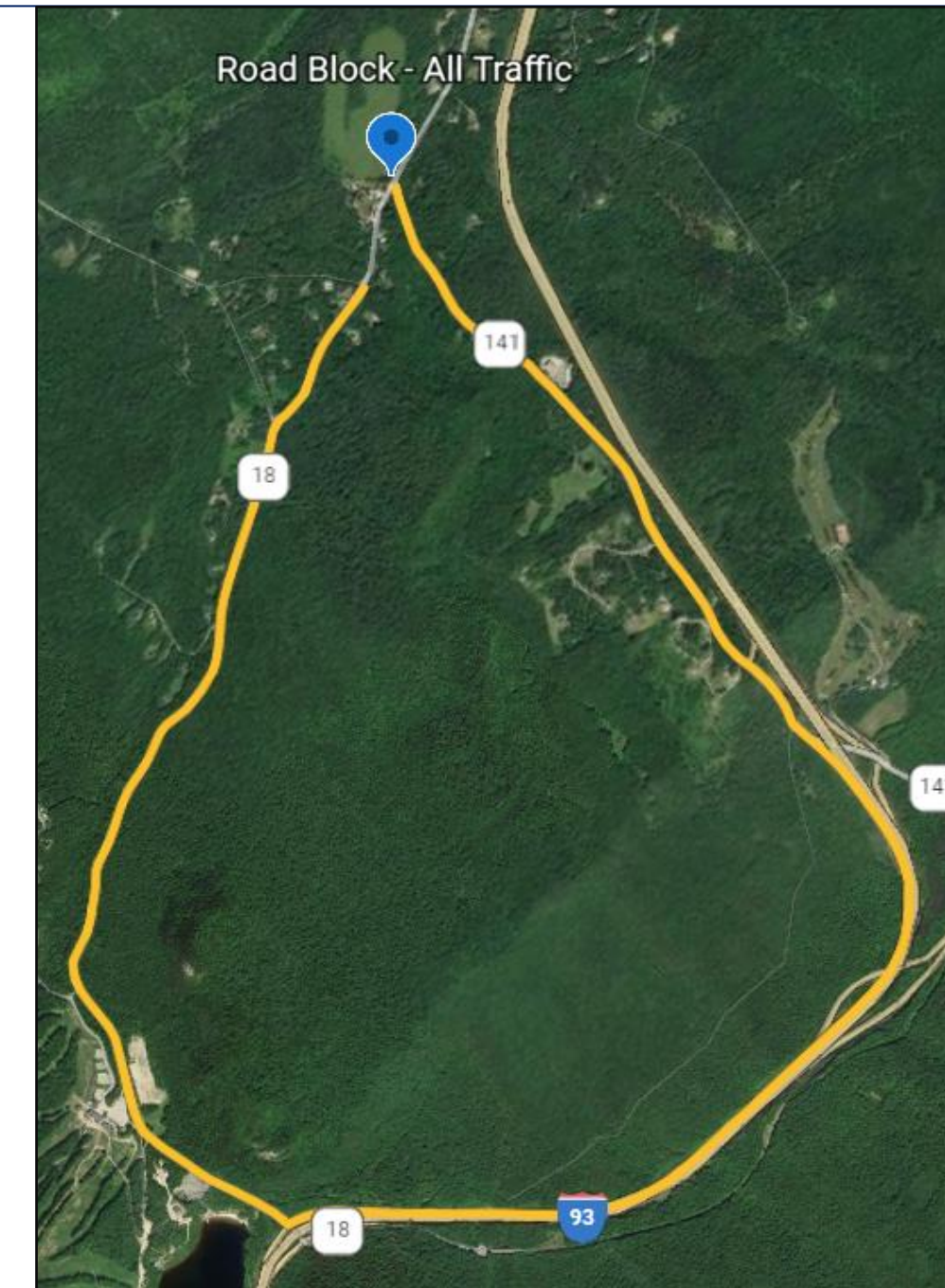


## Finalized Design

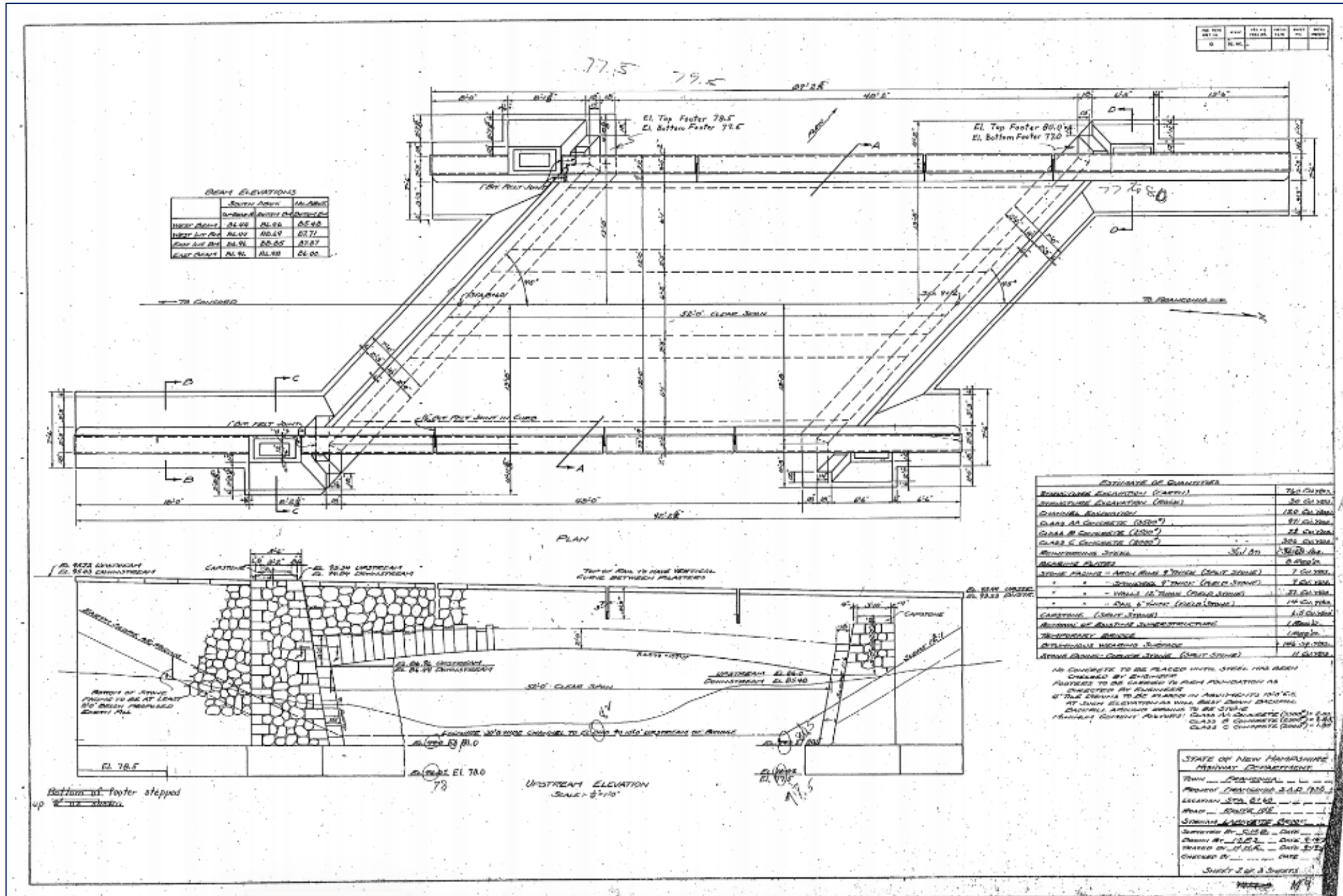


## Traffic Detour Plan

- **2 miles** of additional travel to end up at the north end of the bridge on Profile Road
- **10 minutes** of additional travel time
- **4 - 6 weeks** estimated construction time
- **Rapid reconstruction** will decrease disturbances/displacement of local businesses and residences.



## Existing Bridge Details



## Load Calculations

### Dead/Live Loads

Dead Load (DW)		
CTW	22	ft
Weight FWS	0.8	klf
Utility Load	2	klf
Total Dead Load	2.8	klf
Wu,DW	.07	klf/beam

Dead Load (DC)		
Weight Barrier	420	plf
W_Barrier	0.21	klf
W Beam	4.95	klf
W Deck	2.4	klf
Misc (10% Weight Beams)	0.50	klf
Total Dead Load	8.1	klf
Wu,DC	2.0	klr/beam

Axial Live Load, 32		
Pu, 32	12.8	K
Pu, Lumped	28.7	K

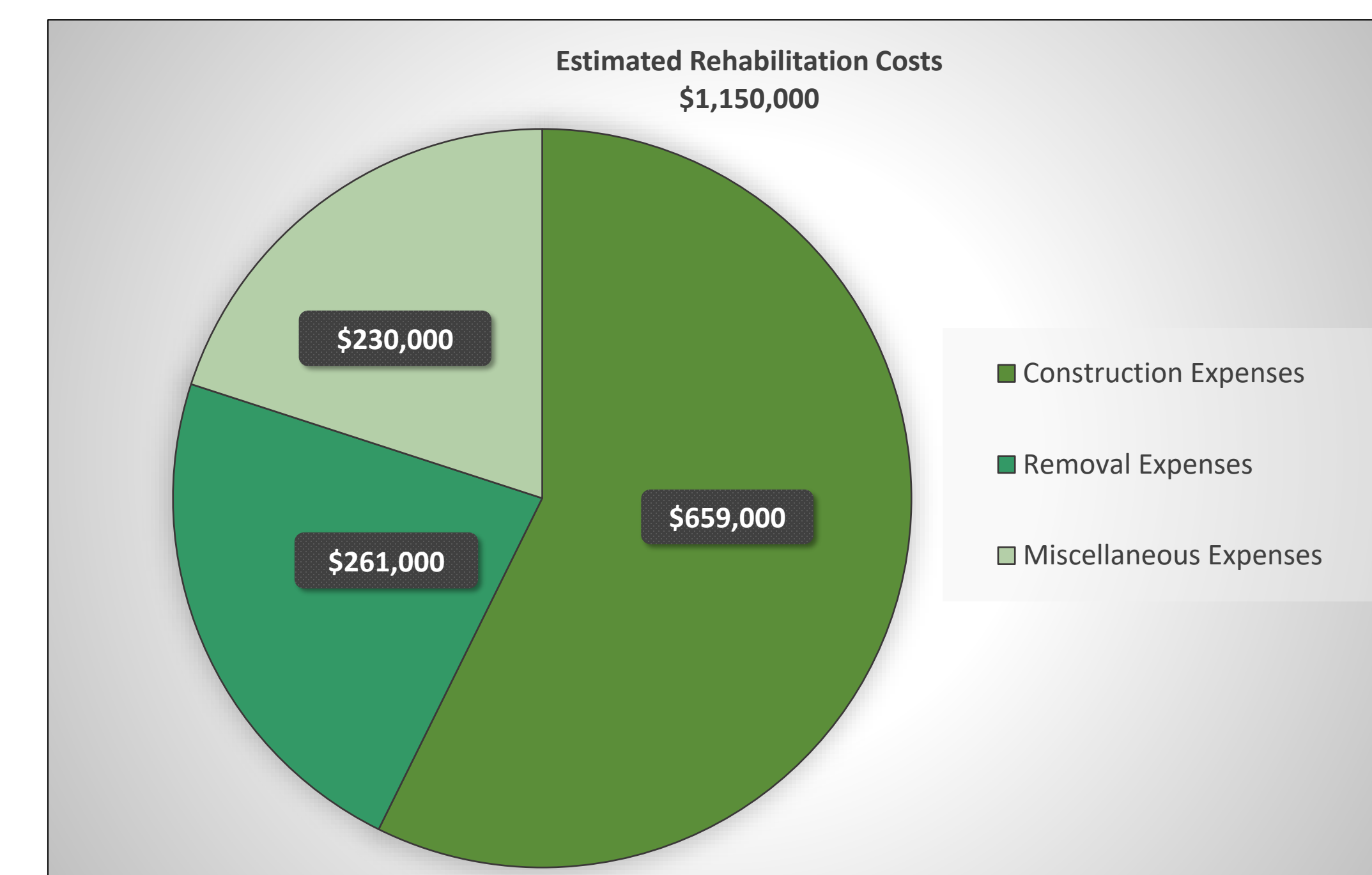
Lane Load for and interior beam		
Mg 1-lanes (Concrete Spread Box Beams)	5.6	
Wu, Lane Load	3.6	klf/Beam

### Moment/Shear

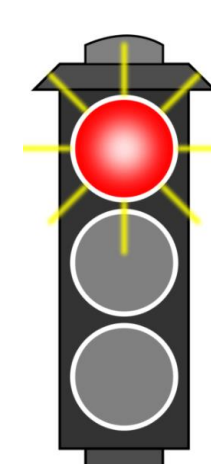
Max Moment		
Design Lane	216.3	Ft-K
R	4.4	Kips
Moment of Truck	32.0	Ft-K
Modified Moment	25.9	Ft-K

Shear		
Vu	191.8	K
Phi Vn	1077.8	K
Modified Vu	257.0	K
Modified Vn	1444.3	K
Shear Check	Yes	

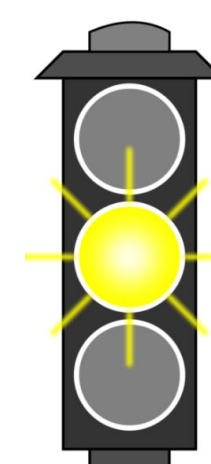
## Cost Estimate



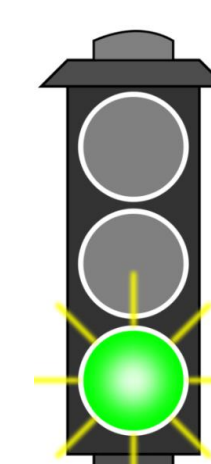
## Existing Conditions



**SUPERSTRUCTURE**  
Cracking, minor spalls, efflorescence, delamination and elevated chloride levels present in several parts of the superstructure including concrete T-beam structures.

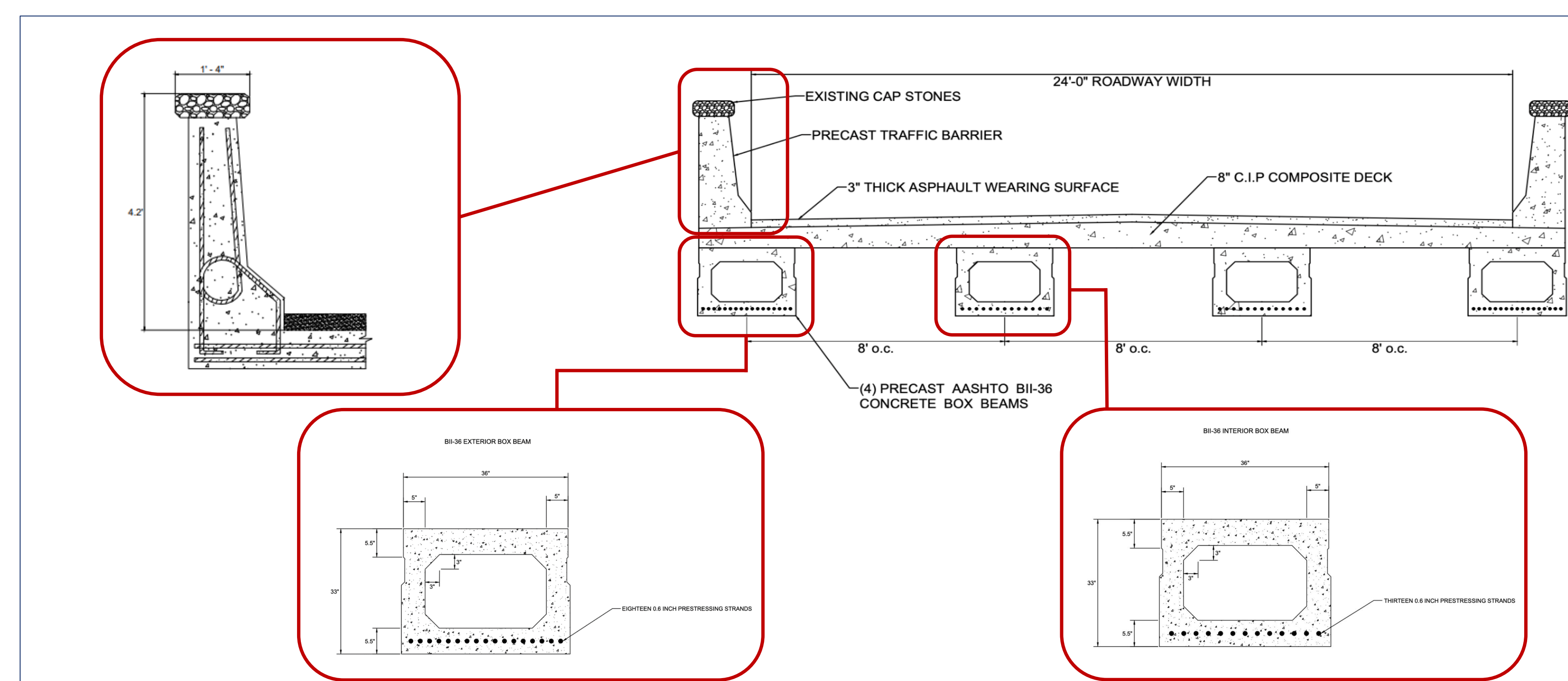


**DECKING**  
Northwest and Southeast ends of the bridge deck revealed fractures with considerable leakage elevated chloride levels present and exposed rebar on both the surface and underside of the bridge's decking.



**SUBSTRUCTURE**  
Concrete coring tests revealed a compressive strength of 6000 psi concluding that the abutments are in acceptable condition based on both visual inspection and empirical testing.

## Section Details



## Hydrology

### 100 Year Water Shed Elevation

Runoff area delineated from the bridge is 6.53 square miles with an overall channel slope of 27.39%

36% tree cover, helping to reduce the peak flows.

**FEMA Flood Zone A:**  
1% probability of flooding each year.



## References

- American Association of State Highway and Transportation Officials (AASHTO). 2007. AASHTO LRFD Bridge Design Specifications. 4th ed. Washington, DC: AASHTO.
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- US Department of Transportation Federal Highway Administration. (2020, August 11). Frequently asked questions: Barriers, terminals, transitions, attenuators, and bridge railings. Safety. Retrieved March 23, 2022
- NH DOT. (2021). Department of Transportation weighted ... - New Hampshire. Weighted Average Unit Prices For Projects Between 1/1/2021 - 12/31/2021. Retrieved April 9, 2022
- Precast/Prestressed Concrete Institute. (2011). BDM Design Charts - PCI. PCI Bridge Design Manual. Retrieved April 9, 2022

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