

# Barton Village BHF 0286(5) Bridge 20 on VT Route 16 (TH 2) Over Crystal Lake Outlet Alternatives Presentation





# Meeting Outline

- Purpose of the Meeting
- Structures Section Re-organization
- Existing bridge deficiencies
- Alternatives considered
- Summary and recommendation

# Purpose of Meeting

- Present the alternatives that we have considered
- Explain the constraints to the project
- Help you understand our approach to the project
- Provide you with the chance to ask questions
- Provide you with the chance to voice concerns
- Build consensus for the recommended alternative-

# Accelerated Bridge Program

- Began in January 2012
- Bridges are deteriorating faster than we can fix them
- Accelerated Bridge Construction (ABC) is key
- Impacts to property and resources is minimized
- Standard details repeated on many projects
- Shift from individual projects to programmatic approach
- Accelerated Project Delivery
- Goal of 2 year design phase for ABP (5 years conventional)
- Goal of 25% of projects into Accelerated Bridge Program

# Project Initiation & Innovation Team

- Part of re-organization in January 2012
- Currently team of 5
- All projects will begin in the PIIT
- Very efficient process
- Look for innovative solutions whenever possible
- Involved until Project Scope is defined
- Hand off to PM to continue Project Design phase

# Phases of Development

Project  
Funded

Project  
Defined

Contract  
Award

Project Definition

Project Design

Construction

Identify resources &  
constraints

Evaluate alternatives

Public Participation

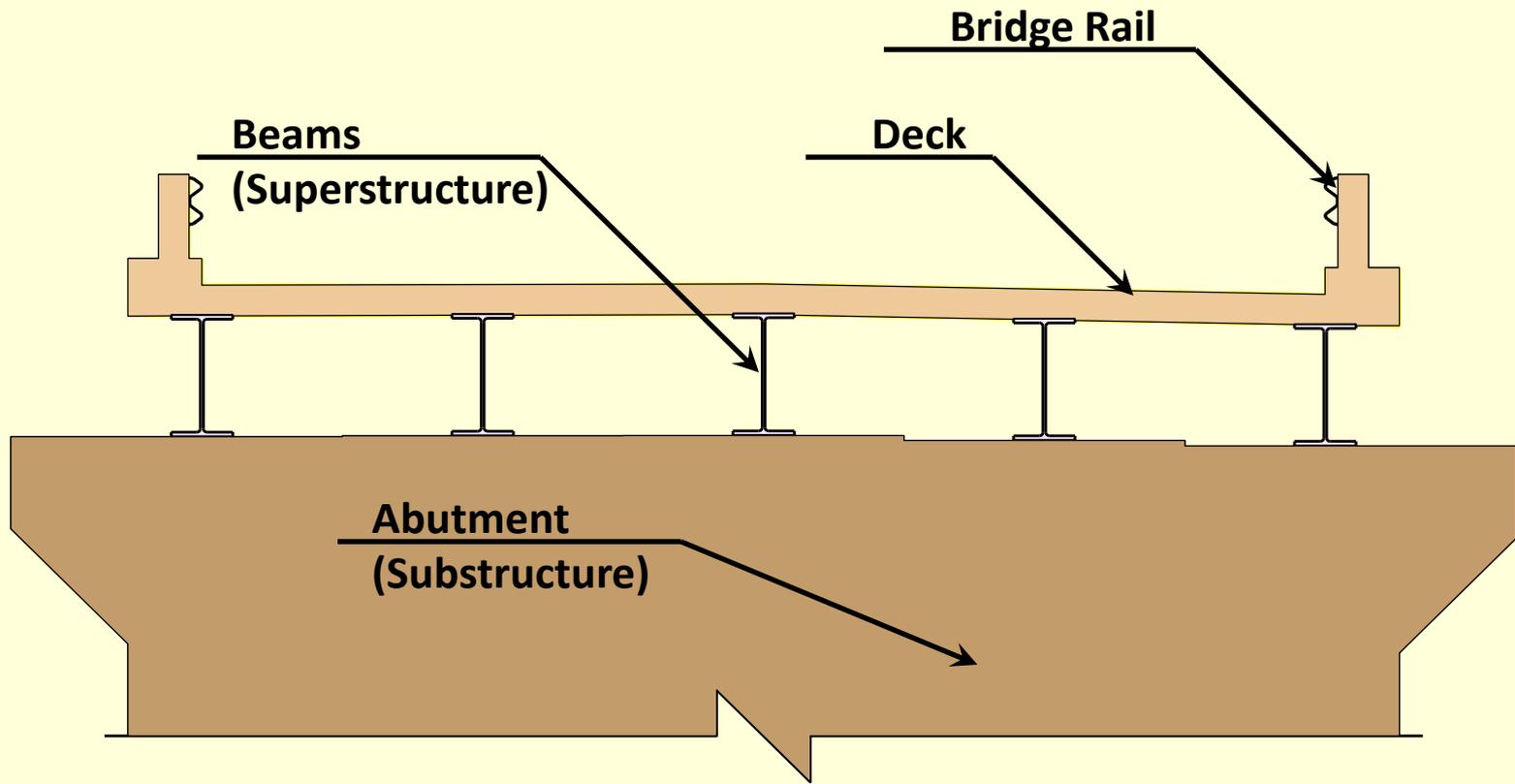
Build Consensus

- Quantify areas of impact

- Environmental permits

- Develop plans, estimate and specifications

# Description of Terms Used



# Project Background

- **Priority 22** in the Town Highway Bridge Program
- The structure is owned and maintained by the Town
- VT Rte 16 (TH 2) is a Class 1 Town Highway
- Existing bridge is a two-span granite slab bridge
- Two spans of 9 feet (24' overall) and width of 30 feet
- The age of the structure is unknown
- Bridge is structurally deficient and has a Federal sufficiency rating of **67.6 (out of 100) -**

# Project Background (Cont)

- Traffic Data

<b>TRAFFIC DATA</b>	<b>2015</b>	<b>2035</b>
<b>ADT</b>	<b>4,100</b>	<b>4,300</b>
<b>DHV</b>	<b>540</b>	<b>560</b>
<b>ADTT</b>	<b>340</b>	<b>500</b>
<b>%T</b>	<b>6.5</b>	<b>9.3</b>

# EXISTING BRIDGE DEFICIENCIES

## Deficiencies

- The granite slabs are in fair condition and have an unknown capacity
- The bridge does not have adequate hydraulic capacity
- The bridge rail is substandard

## Inspection Report Information (Based on a scale of 9)

Deck Rating	5 Fair
Superstructure Rating	5 Fair
Substructure Rating	5 Fair

# Bridge Looking North



# Bridge Looking South



# Looking North Along Approach



# Looking South along Downstream Fascia



# Looking Upstream



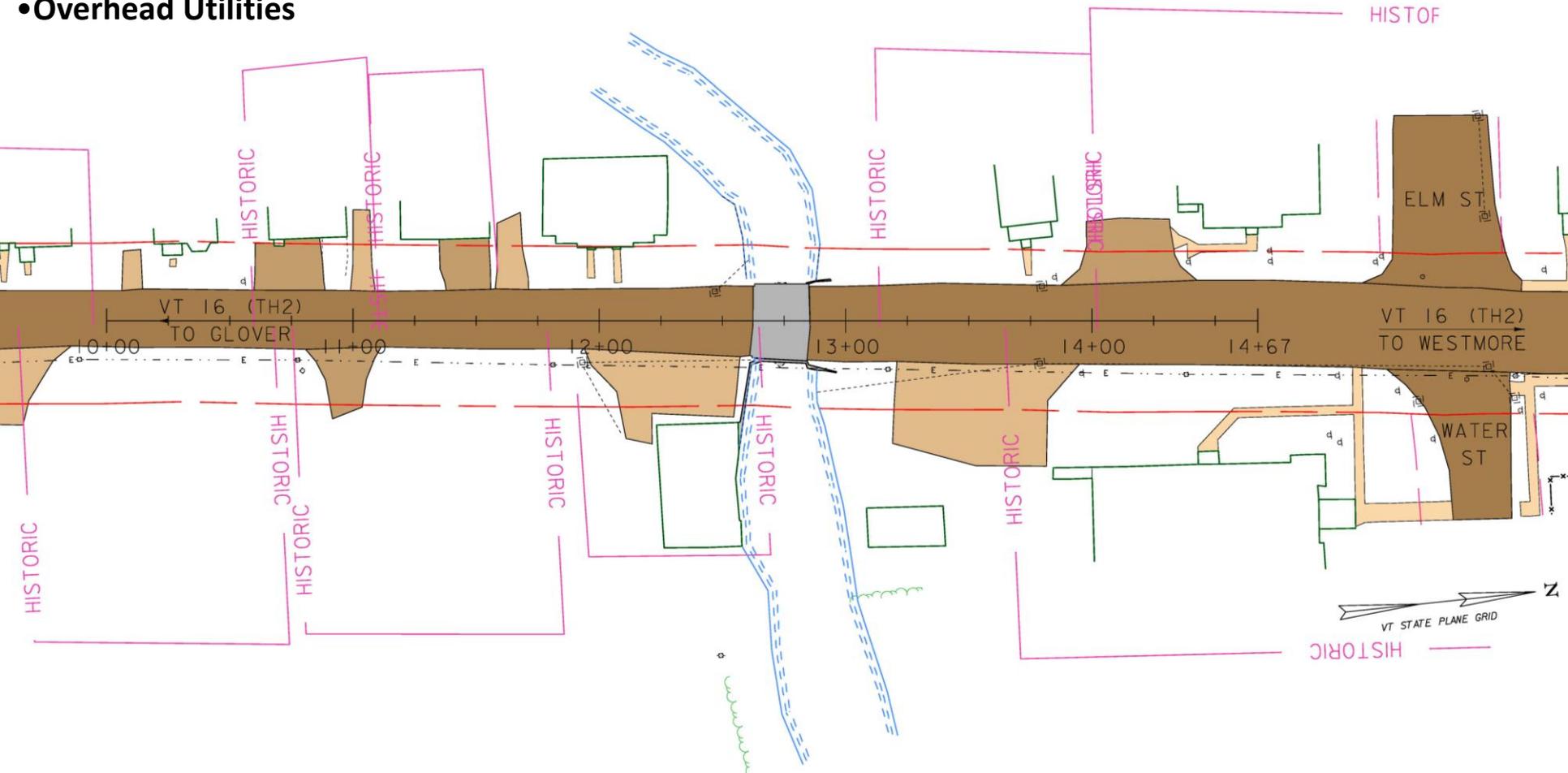
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## **Existing Site Conditions**

- Bridge Width (Face-Face Rail) = 30.9'
- Design Speed Limit = 30 mph (Posted speed)
- No Postings for Weight Restriction
- Overhead Utilities present along eastern fascia

# Layout Showing Constraints

- Right of Way (4 rods)
- Historic properties (not bridge)
- Overhead Utilities



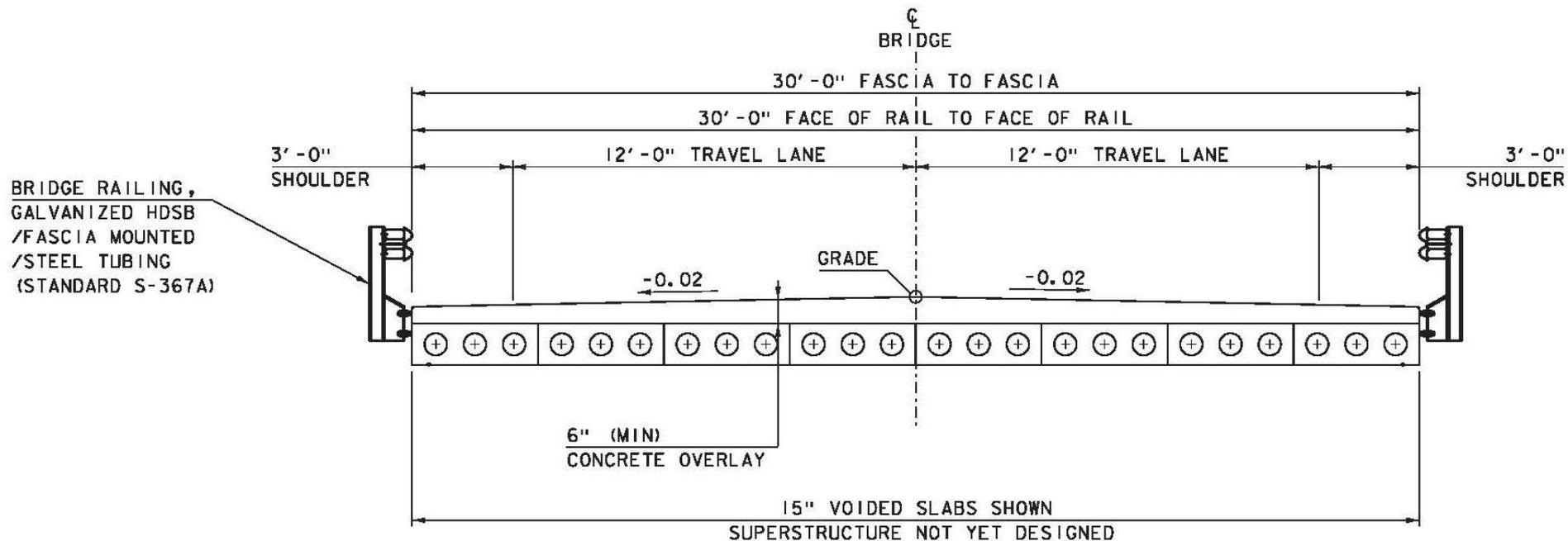
# Alternatives

1. Superstructure replacement
2. Full replacement

Note that other alternatives considered in the Scoping Report are not shown in this presentation

# Bridge Typical

## Same for Both Alternatives



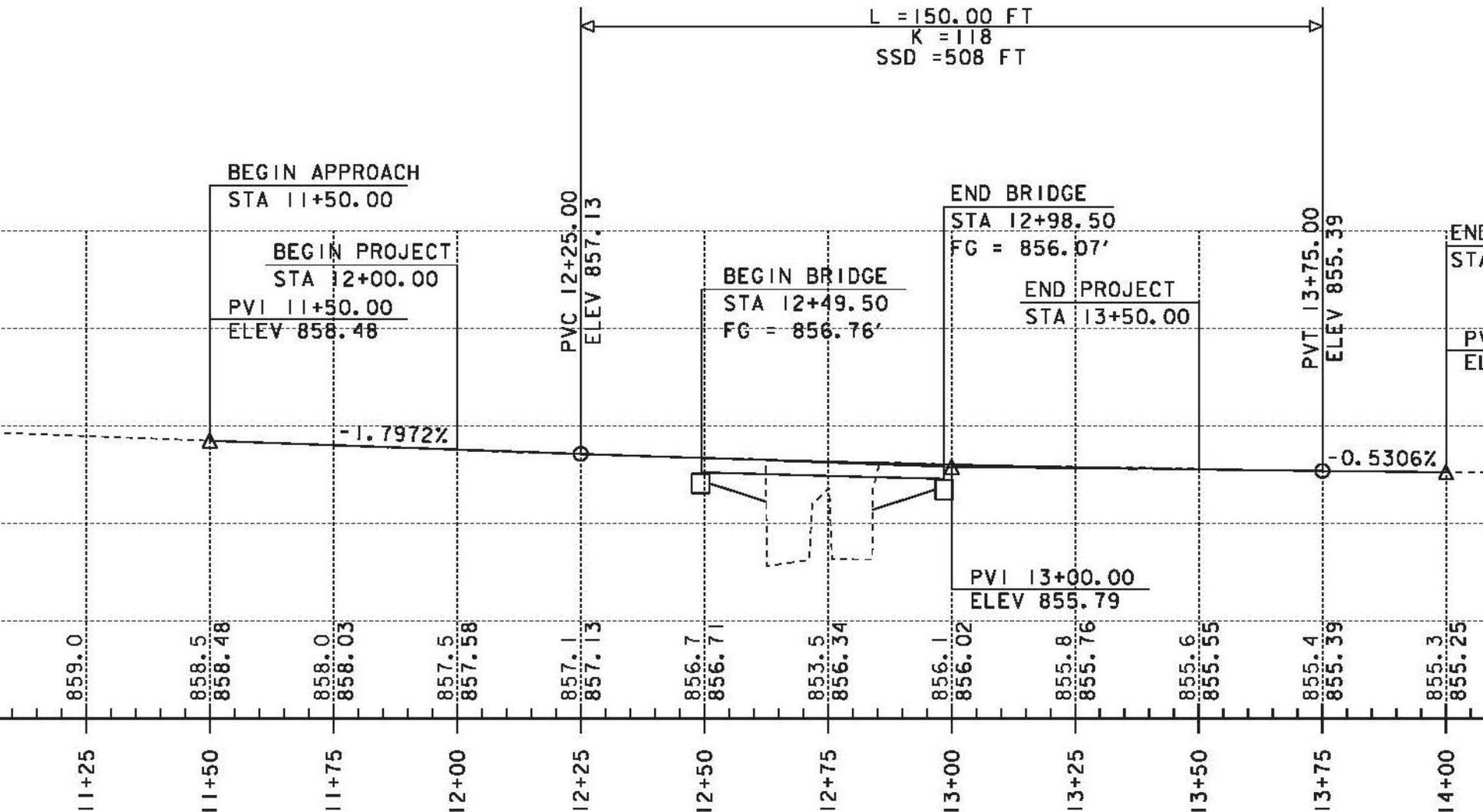
# Superstructure Replacement

- Replace superstructure
- Remove pier but leave abutments to retain fill
- 30' wide rail to rail
- Superstructure set on “sleeper slabs” behind abutments
- Maintain existing centerline of bridge
- Maintain approximate vertical grade of bridge
- Projected 30 year design life
- Minor hydraulic improvement

# Superstructure Replacement - Layout



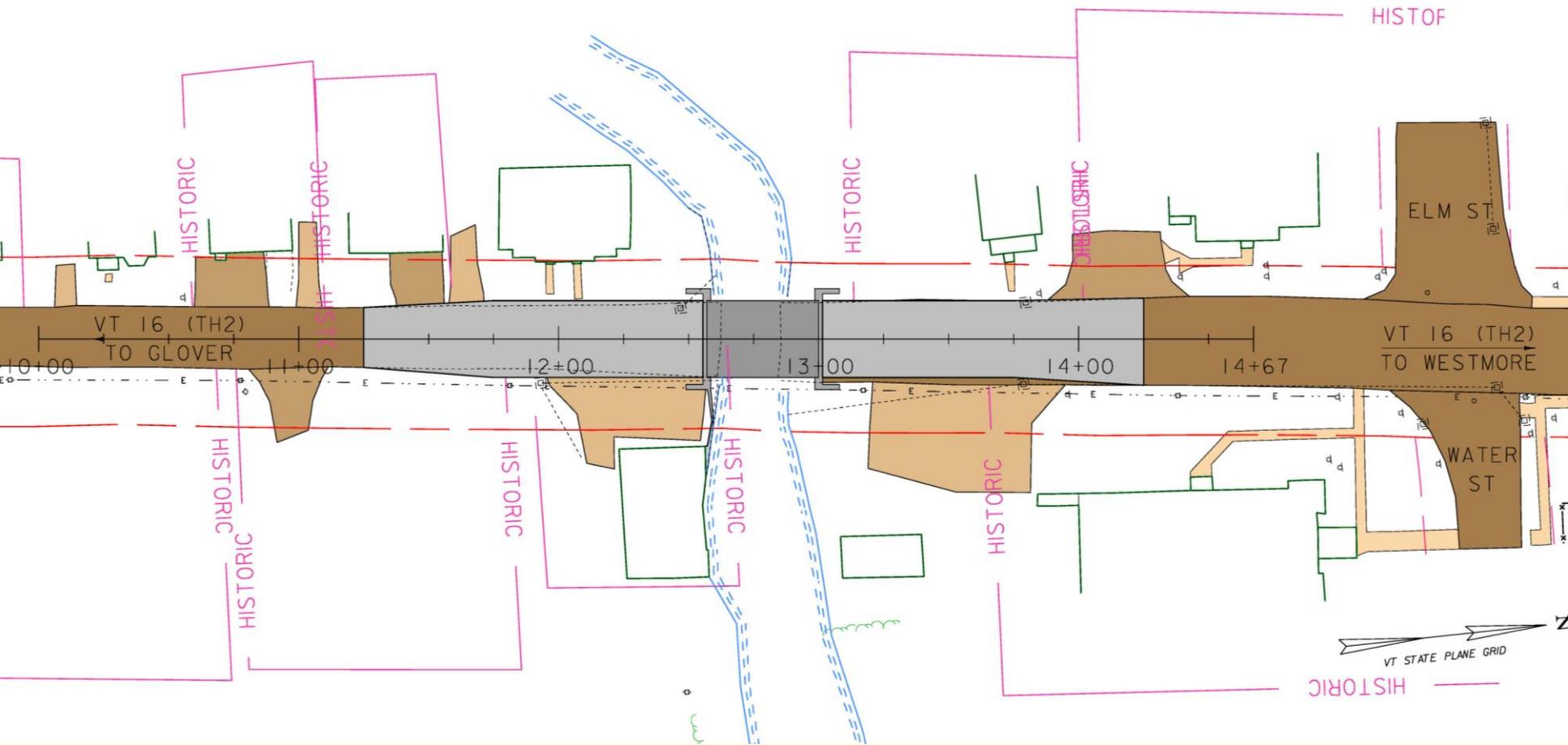
# Superstructure Replacement - Profile



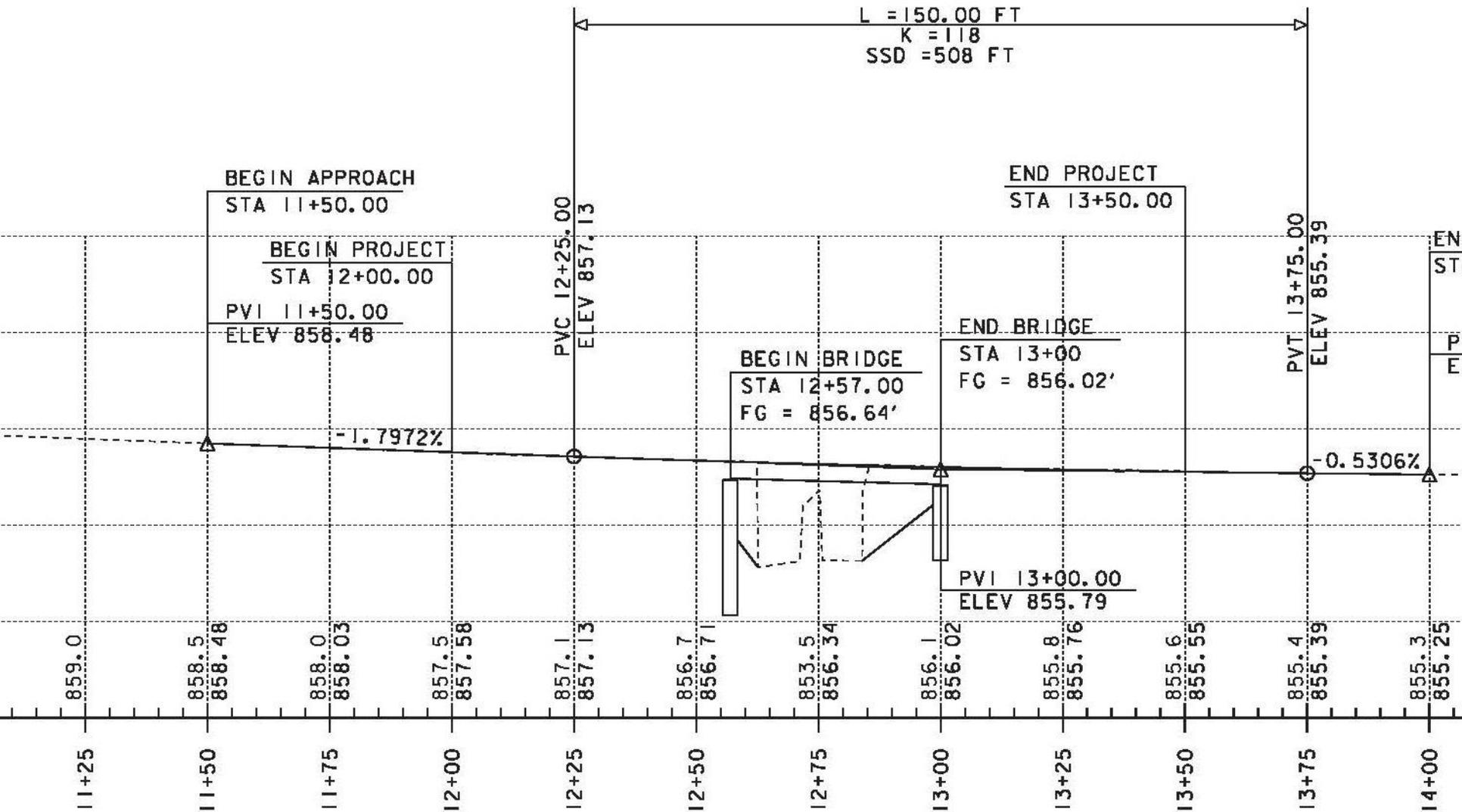
# Full Bridge Replacement

- Complete Bridge replacement
- 43' span w/ substructure on steel H piles
- 30' width between face of rail
- Maintain existing centerline of bridge
- Maintain approximate vertical grade of bridge
- Long term (80 year) solution

# Full Replacement - Layout



# Full Replacement - Profile



# Methods to Maintain Traffic

## Temporary Bridge

- One-way would only be possible
- Traffic congestion due to traffic lights
- Environmental & Property Impacts
- High cost

## Phased Construction

- Traffic congestion due to traffic lights
- Much longer construction phase
- Safety concerns

## Short-term bridge closure with detour

- Recommended method to be discussed further

# ABC with Bridge Closure Option

- Bridge 20 to be closed for 28 days (maximum)
- Allow 24/7 construction during bridge closure
- Contract incentives/dis-incentives to encourage contractor
- Community would have input on time of closure (between June 1 and September 1)
- State will be responsible for detour route
- Public Outreach to provide advance notice for planning
- Local share will be cut in half (10% reduced to 5%)-

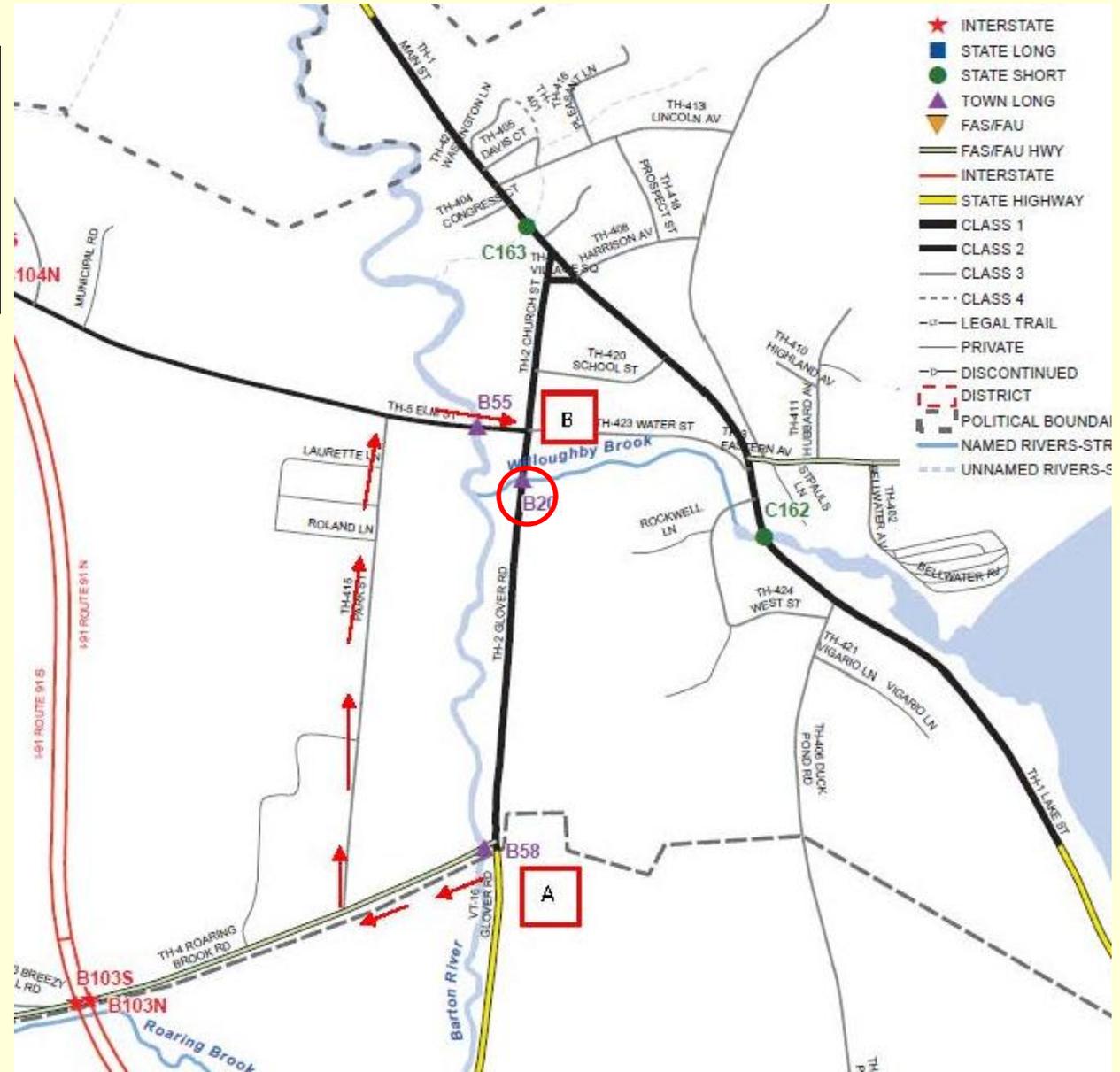
# Proposed Detour Route

A-B Thru Route = 0.4 miles

A-B Detour Route = 0.8 miles

Added Miles = 0.4 miles

End-End = 1.2 miles



# Accelerated Bridge Construction Examples

- We have been using ABC methods to build bridges since 2007 on approximately 20 projects.
- The following slides show some examples of past projects

# Accelerated Bridge Construction



**Driven steel piles with precast concrete cap for abutment**

# Accelerated Bridge Construction



The first of three Precast Concrete Caps being placed

# Accelerated Bridge Construction



**Precast concrete Abutment in place and ready for Superstructure**

# Accelerated Bridge Construction



**Precast Concrete NEXT Beam lifted into place**

# Accelerated Bridge Construction



The second NEXT Beam being placed

# Accelerated Bridge Construction



Three NEXT Beams in place with the final unit ready

# Accelerated Bridge Construction



**Precast Bridge Unit (PBU) delivered to site**

# Accelerated Bridge Construction



Precast Bridge Unit (PBU) lifted onto abutments

# Accelerated Bridge Construction



**Precast Bridge Units (PBUs) connected together**

# Alternatives Matrix Note

- The “Do Nothing” and several rehabilitation alternatives were considered in the Scoping Report that are not shown in the following matrix. Refer to the Scoping Report for that information.
- Since the proposed detour route crosses bridge 58 which has load restrictions, we assume that these projects will be coordinated as the development process advances. Funding for the design of Bridge 58 is planned in the very near future.

# Alternatives Matrix

	Super. Replacement w/ Short term closure	Full Replacement w/ Short term closure
Construction w/ CE and Contingencies	\$691,831	\$1,309,014
Preliminary Engineering	\$159,653	\$201,387
Right of Way	\$0	\$0
<b>Total Cost</b>	<b>\$851,485</b>	<b>\$1,510,400</b>
<b>Town Share</b>	<b>\$42,574 (5%)</b>	<b>\$75,520 (5%)</b>
Design Life (years)	30	80
Project Development Duration	3 years	3 years
Construction Duration	2 months	6 months
Closure Duration	2 weeks	4 weeks

# Conclusion and Recommendation

- Full Bridge Replacement using ABC & short-term closure
- Long term (80 year) fix
- Addresses most sub-standard features
- Improved hydraulic performance
- Project Development time minimized
- Minimal mobility impacts
- Minimal impact to environmental resources
- Minimal impact to adjacent property owners
- Takes advantage of reduced local share for closure--

# Questions

