

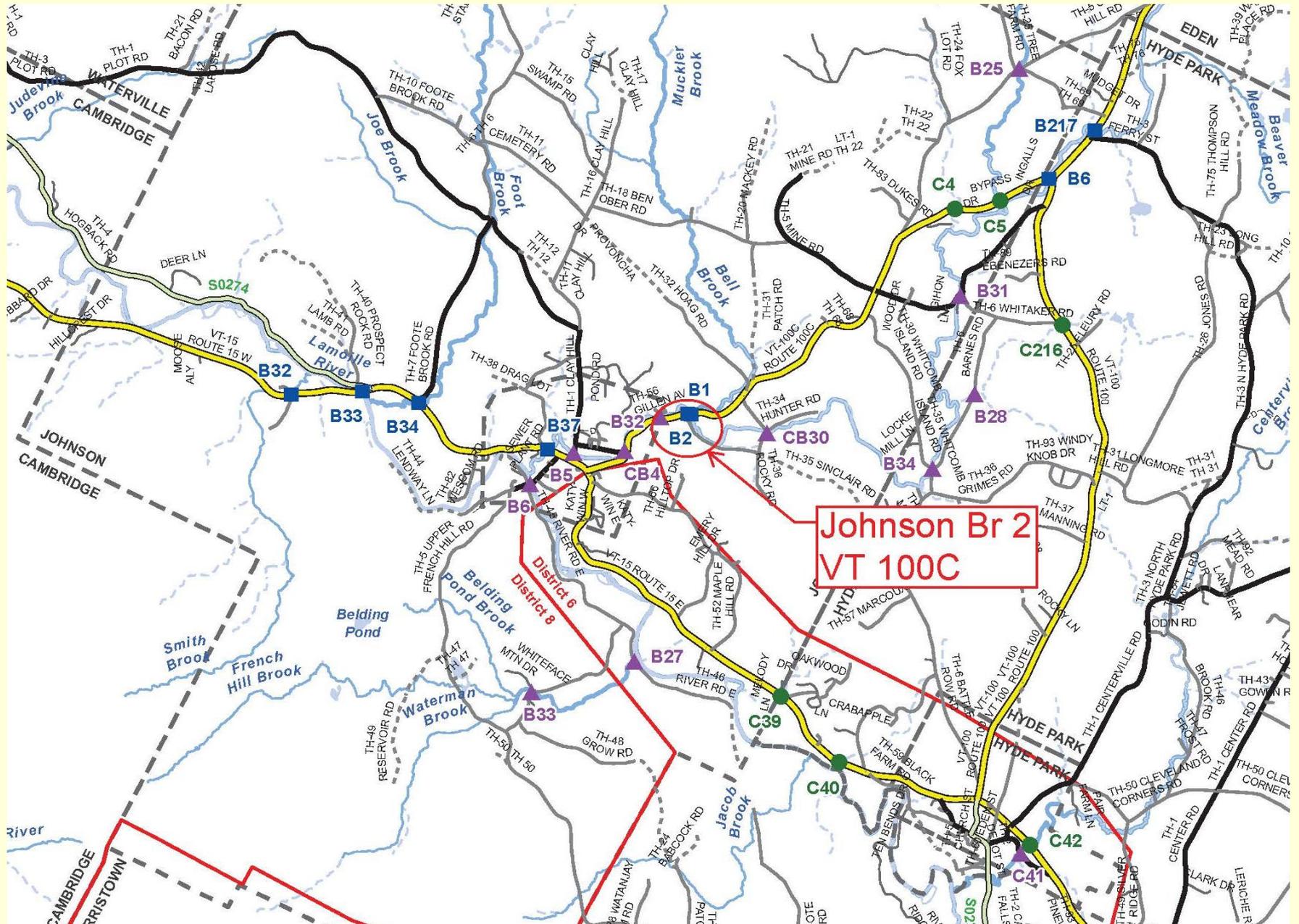
# Johnson BF 0248(4) Bridge 2 on VT Route 100C over the Gihon River Regional Concerns Meeting



Presented by  
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# PROJECT LOCATION



# Meeting Outline

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

# 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
- Short-term closures are key
- Impacts to property owners and resources is minimized
- Less impacts = less process = less money = faster delivery
- Accelerated Bridge Construction (ABC) is very efficient
- Accelerated Project Delivery is the result
- Shift from individual projects to programmatic approach
- Goal of 25% of projects into Accelerated Bridge Program
- Goal of 2 year design phase for ABP (5 years conventional)

# Project Initiation & Innovation Team

- Part of re-organization in January 2012
- All Structures 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

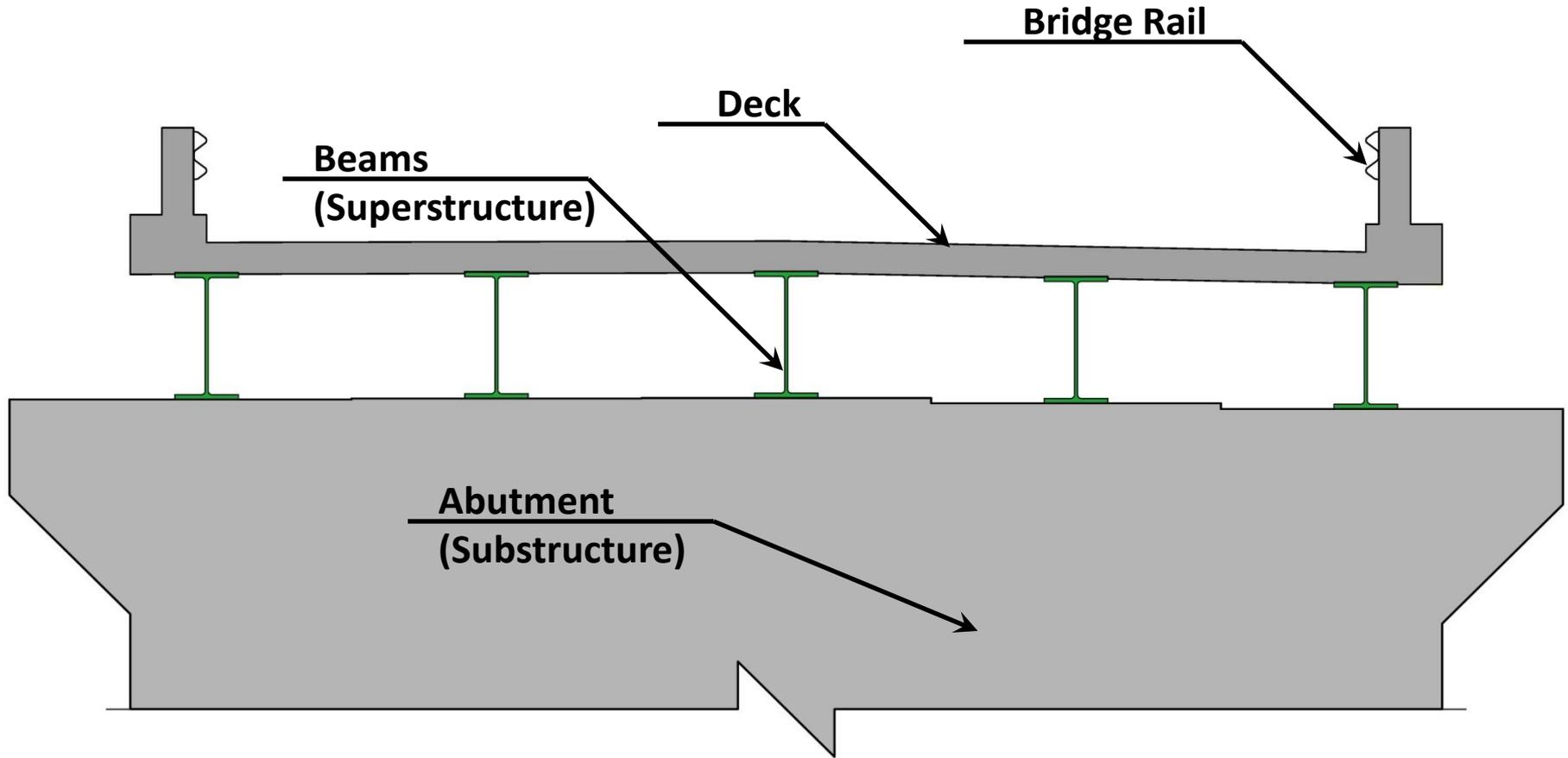
Build Consensus

- Quantify areas of impact

- Environmental permits

- Develop plans, estimate and specifications

# Description of Terms Used



**Cross Section of Bridge**

# Project Background

- The structure is owned and maintained by the State
- Funding will be 80/20 Federal/State (no local funds)
- Functionally labeled as a Rural Major Collector
- Posted Speed = 35 mph (Design Speed)
- Existing bridge is a single-span concrete T-beam
- Bridge length = 54 feet
- Bridge Width = 21 feet
- The bridge was built in 1928 (85 years old)

Note that bridge 1 is located 100' west of bridge 2 and has the same width but much better condition

# Traffic Data

	<b>“Current Year” 2016</b>	<b>“Design Year” 2036</b>
<b>Average Annual Daily Traffic</b>	<b>2,800</b>	<b>2,900</b>
<b>Design Hourly Volume</b>	<b>320</b>	<b>330</b>
<b>Average Daily Truck Traffic</b>	<b>190</b>	<b>290</b>
<b>%Trucks</b>	<b>5.1</b>	<b>7.6</b>

# EXISTING BRIDGE DEFICIENCIES

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

<b>Bridge Deck Rating</b>	<b>5 Fair</b>
<b>Superstructure Rating</b>	<b>4 Poor</b>
<b>Substructure Rating</b>	<b>7 Good</b>

## Rating Definitions

- 9 Excellent**
- 8 Very Good**
- 7 Good**
- 6 Satisfactory**
- 5 Fair**
- 4 Poor**
- 3 Serious**
- 2 Critical**
- 1 Imminent Failure**

## Deficiencies

- The bridge is structurally deficient with heavy deterioration of the T-Beams
- The bridge and approaches are too narrow for the roadway classification and design speed
- The bridge and approach railing are substandard
- The vertical and horizontal alignments are substandard
- The hydraulic opening is substandard

# Looking east over Bridge



# Looking west over Bridge



# Looking upstream under bridge



# Looking downstream



# Northeast wingwall



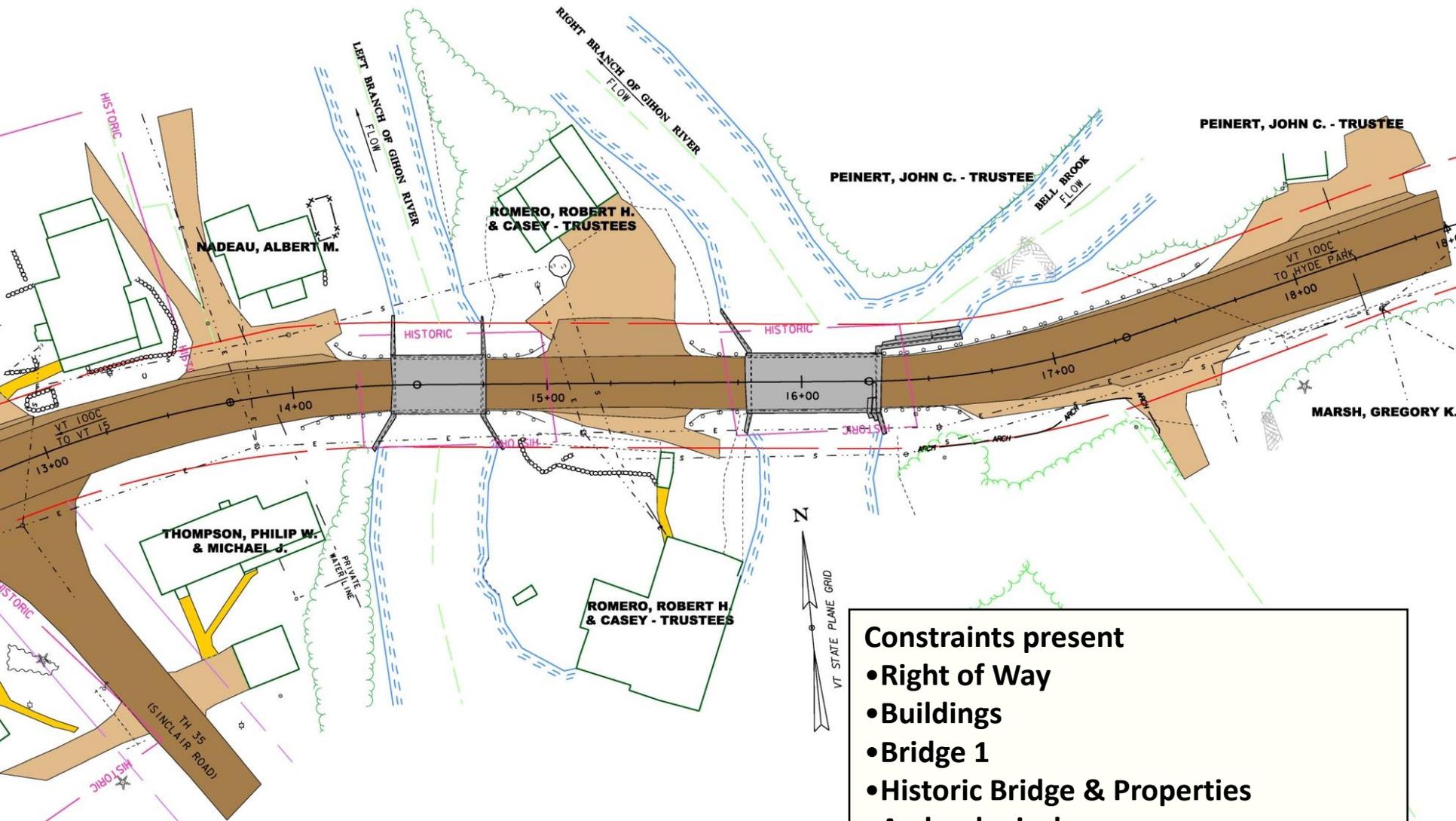
# Looking under the bridge at deck and beams



# Closeup of T-beams showing deterioration



# Layout Showing Constraints



- Constraints present**
- Right of Way
  - Buildings
  - Bridge 1
  - Historic Bridge & Properties
  - Archeological
  - Utilities –Overhead & Underground

# Alternatives Considered

- Rehabilitation (Minor) – Patching Superstructure
- Rehabilitation (Major) – Replace Superstructure
- Complete Bridge Replacement

Note: The method to maintain traffic during construction will be considered separately later in the presentation

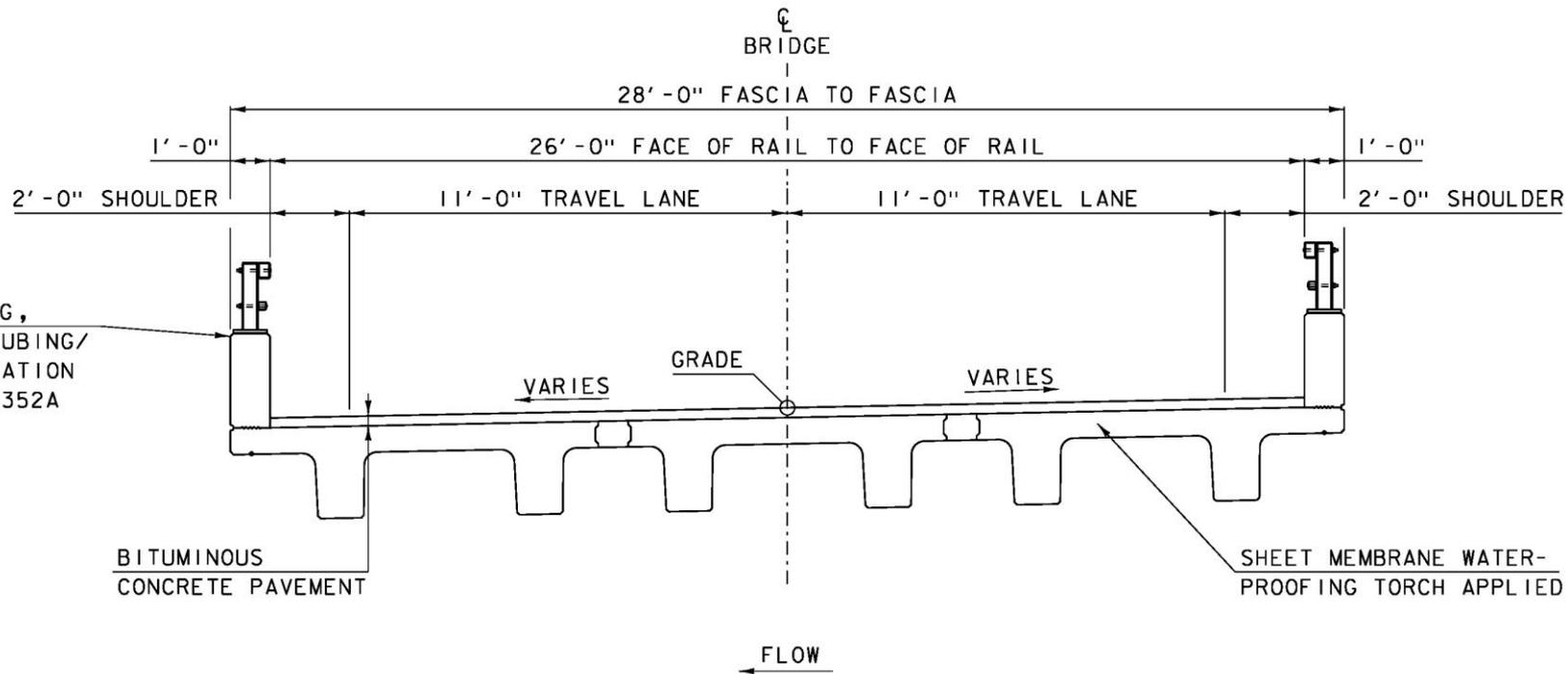
# Rehabilitation - Patching

- Replace deteriorated concrete in beams and deck
- Address erosion at end of northeast wingwall
- Existing width would be maintained
- All substandard features would remain except beam deterioration
- Short-term (20 year) solution
- Could be performed using lane closures

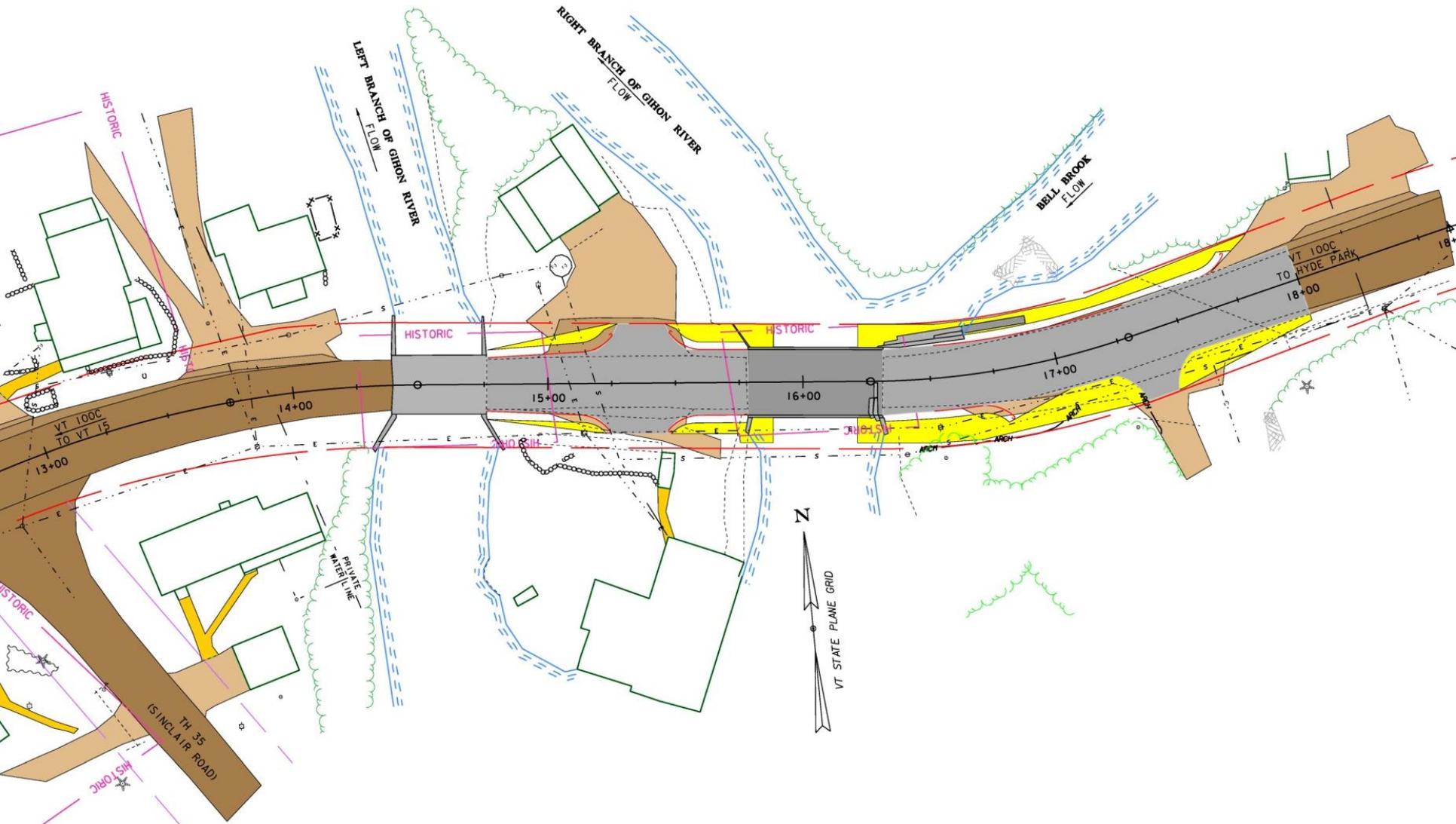
# Rehabilitation – Superstructure Replacement

- Replace entire superstructure (beams and deck)
- Widen deck from 21' to 26' (rail to rail)
- Address erosion at end of northeast wingwall
- Hydraulic standards could be met by raising bottom of beams (vertical alignment would not change much)
- All other substandard features would remain
- Moderate-term (40 year) solution

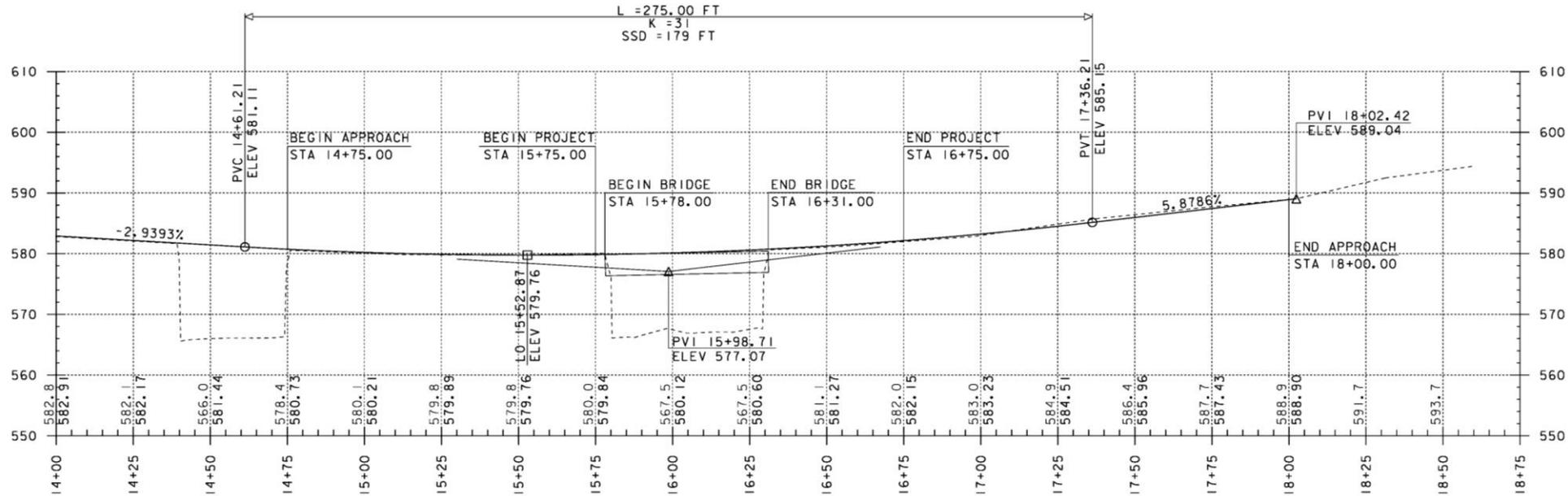
# Bridge Typical for Superstructure Replacement



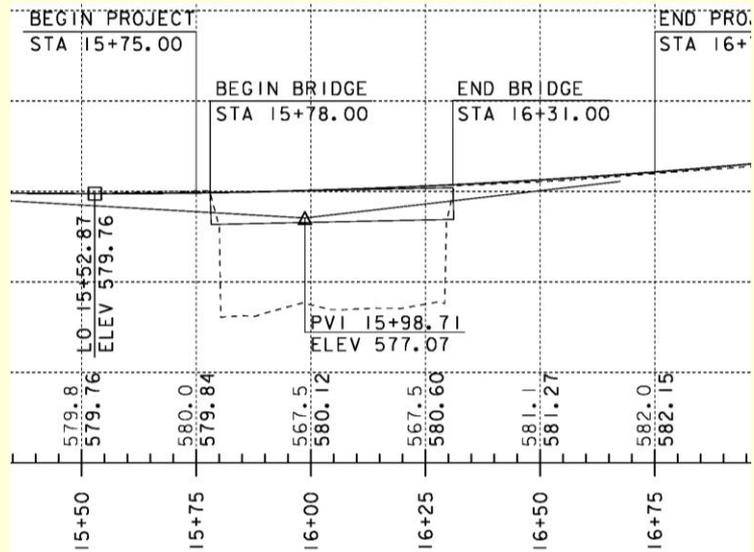
# Layout – Superstructure Replacement



# Profile - Superstructure Replacement



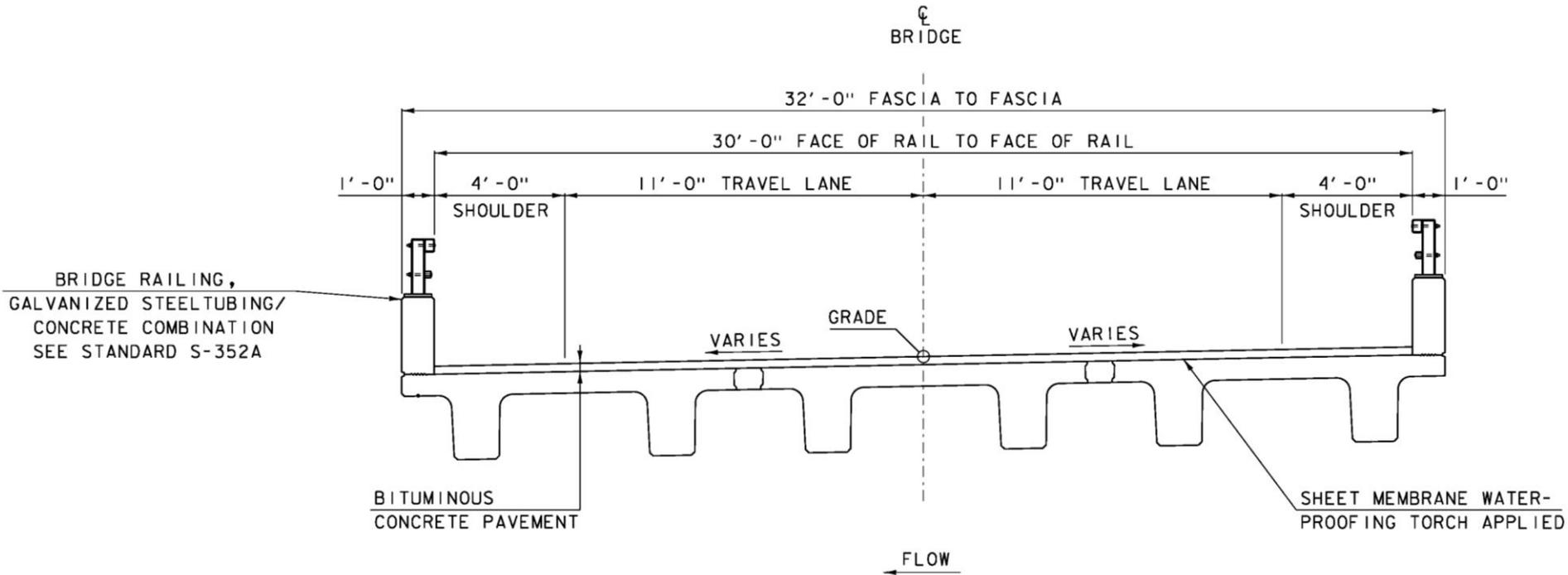
**Enlarged view  
of bridge 2**



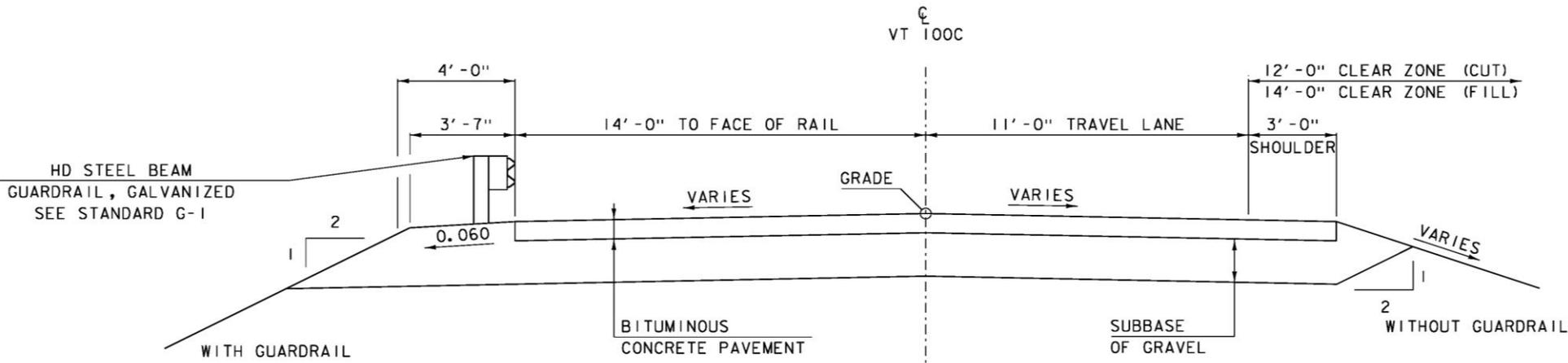
# Complete Replacement Alternative

- 70' span w/ 10 degree skew
- 30' width rail to rail (4'-11'-11'- 4')
- Vertical alignment would meet standards but would require raising grade at bridge 1
- Complicated due to location of bridge 1 that is in good condition
- Long term (80 year) solution

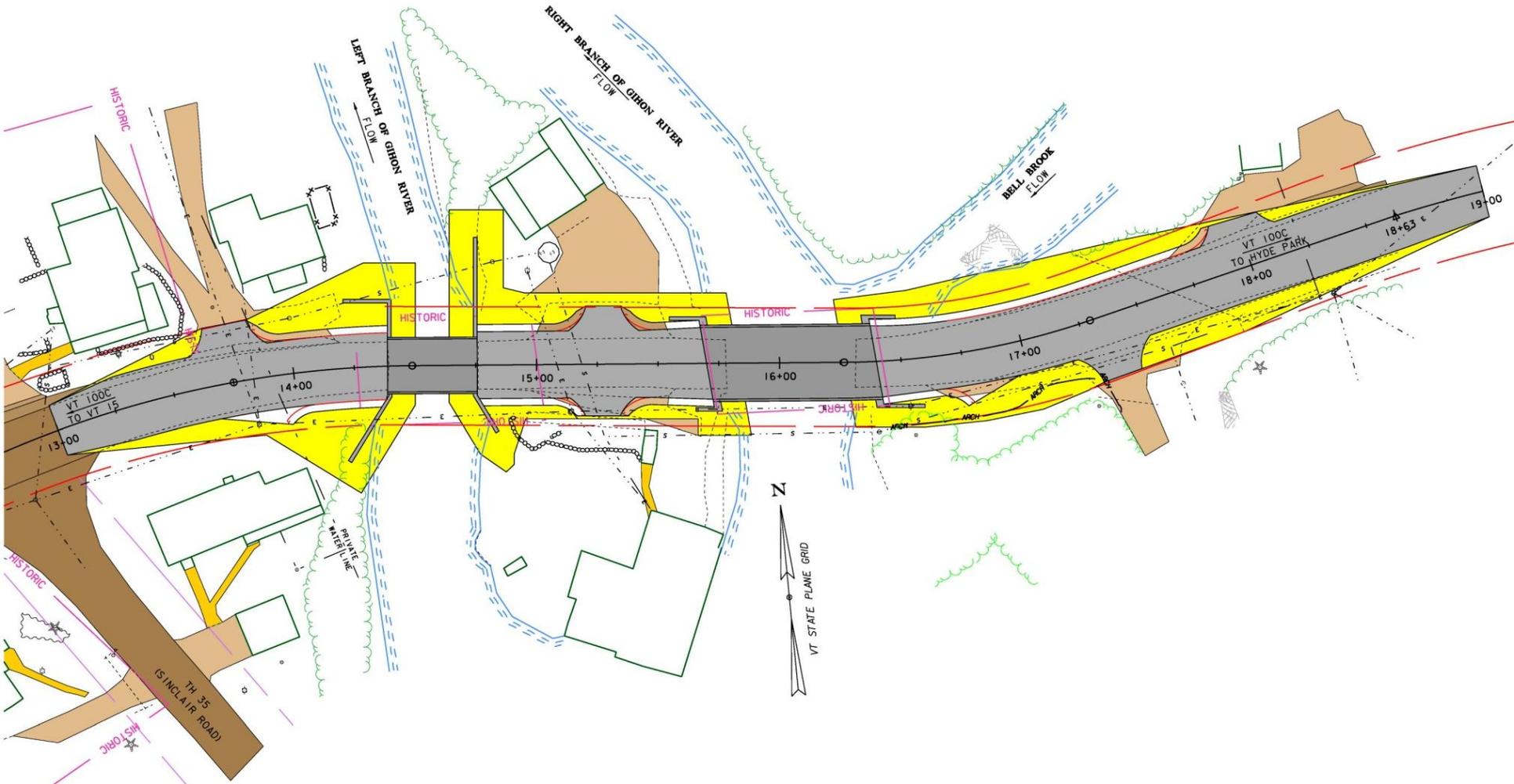
# Bridge Typical for Complete Replacement



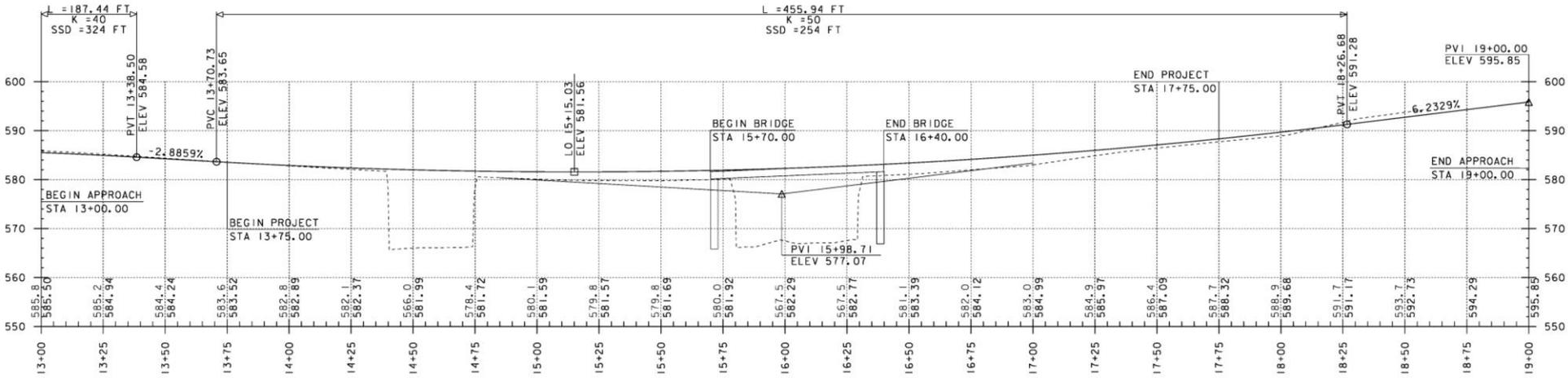
# Roadway Typical for Complete Replacement



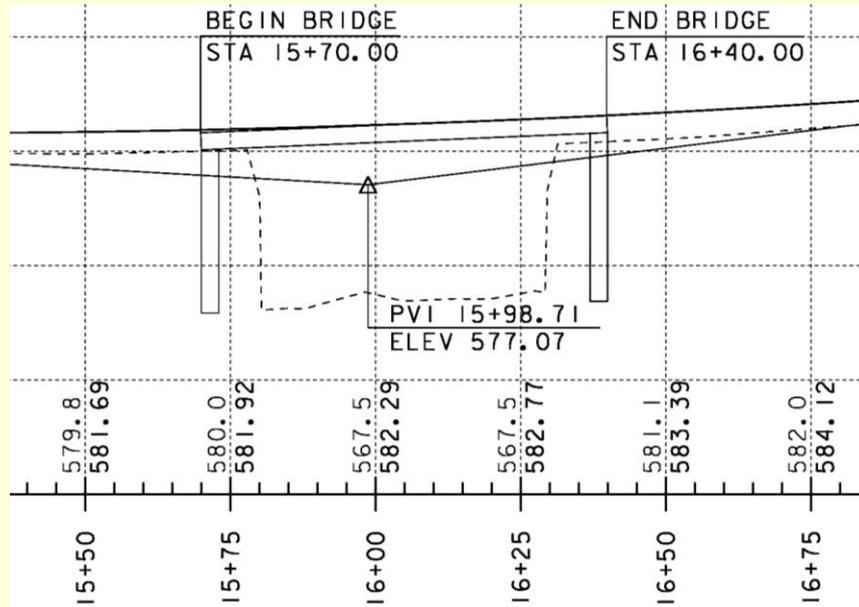
# Layout – Complete Replacement



# Profile - Complete Replacement



Enlarged view  
of bridge 2



# Methods to Maintain Traffic

Three general methods available:

- Phased Construction
- Temporary Bridge
- Short-term bridge closure w/ off-site detour & ABC

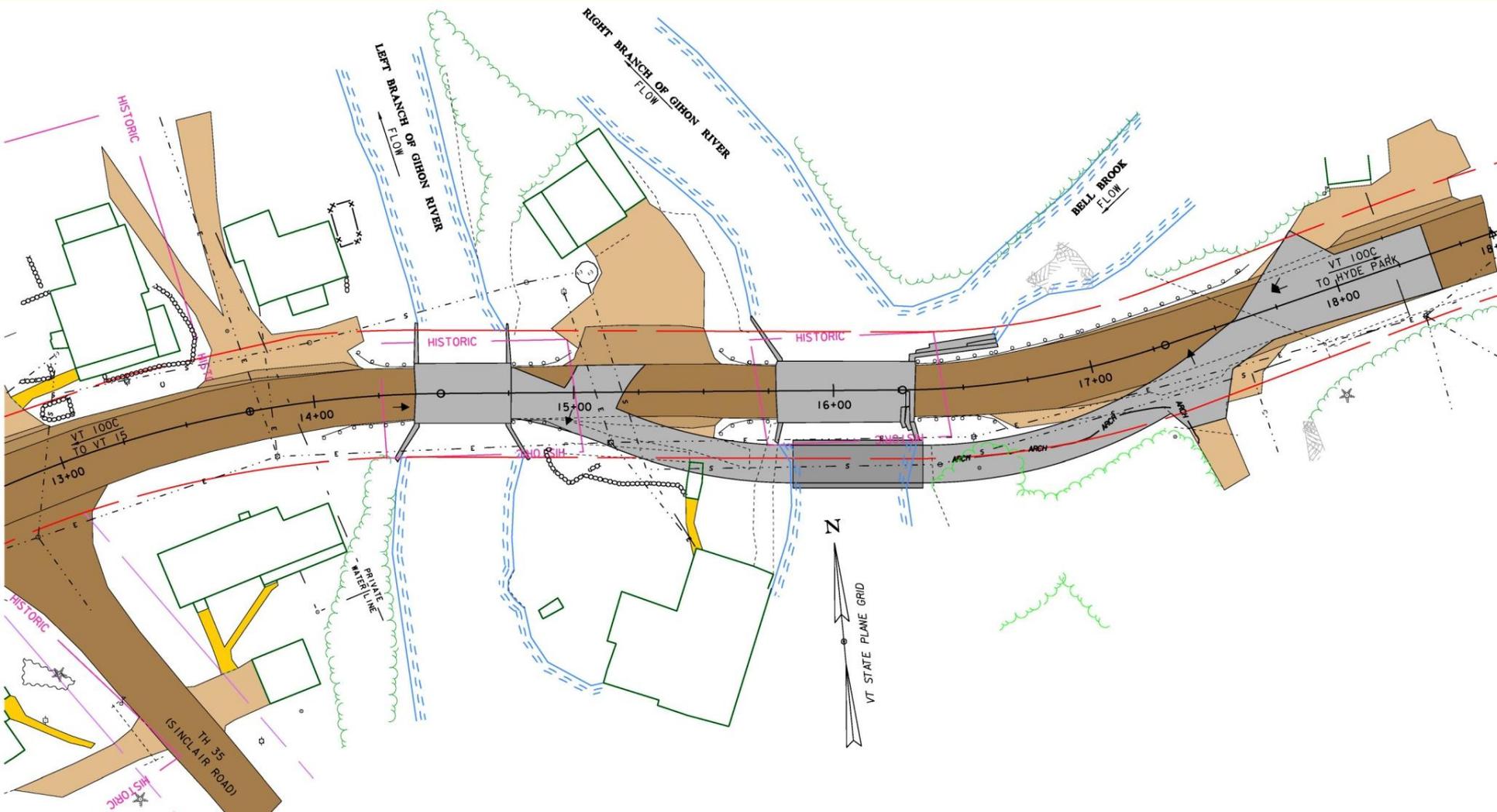
# Phased Construction Option

- Build half new bridge while traffic is on half of old bridge
- Switch traffic on new bridge portion
- Build remainder of new bridge
- One-Way alternating traffic with lights
- Queue lengths and queue times can be inconvenient
- Access to side drives/buildings needs to be considered
- Relatively long construction duration
- Workers & motorists in close proximity – safety concerns
- Can usually be done without ROW acquisition
- Ruled out since would require building wider than required or shifting the alignment due to the width of the existing bridge

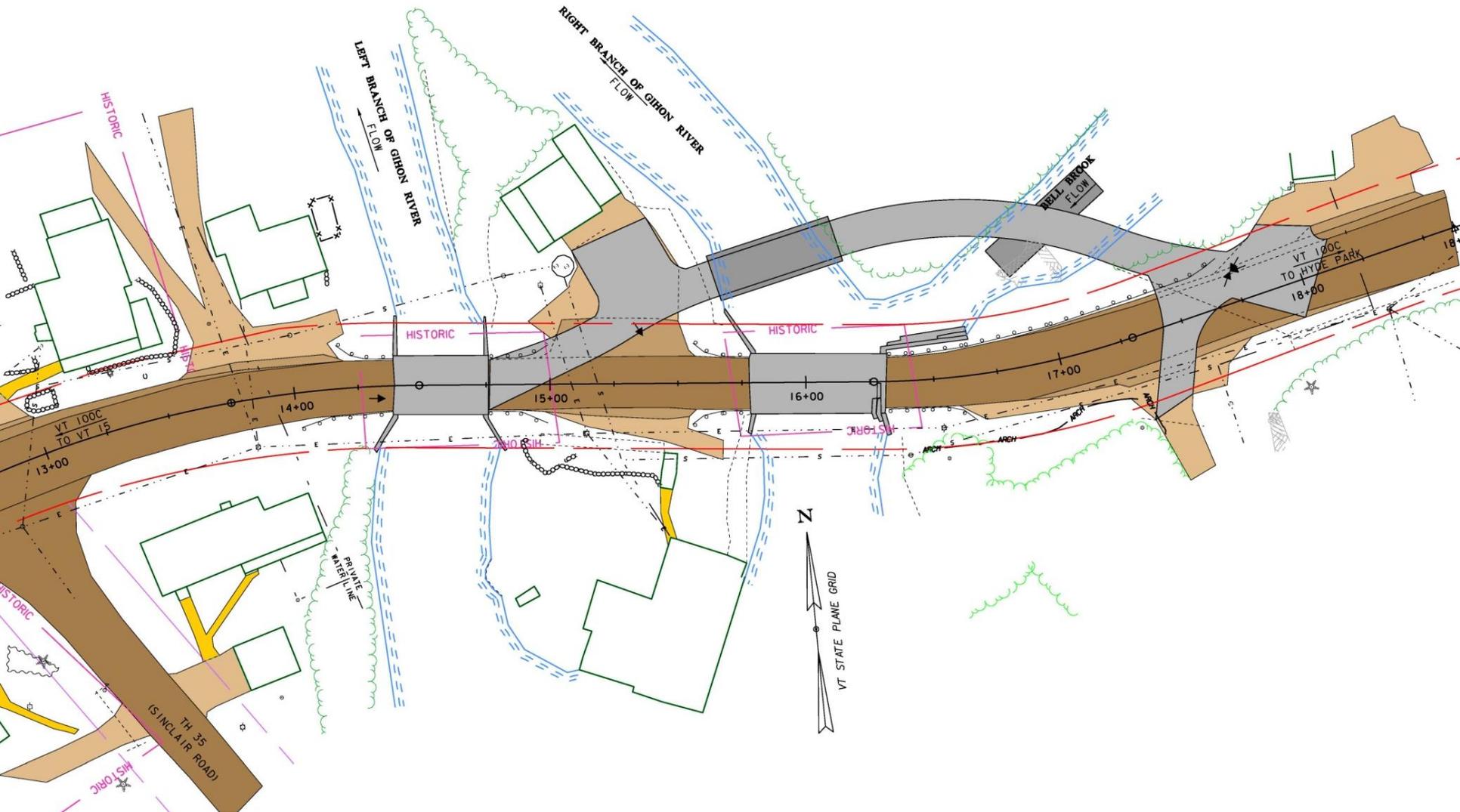
# Temporary Bridge Option

- Construct temporary bridge to maintain traffic
- One-Way alternating traffic with lights
- Queue lengths and queue times can be inconvenient
- Access to side drives/buildings needs to be considered
- Very long construction duration
- Right-Of-Way acquisition is necessary
- Environmental impacts are increased
- Property owner impacts are increased
- Project Delivery time increased
- Project Costs increased-

# Layout - Temporary Bridge Upstream



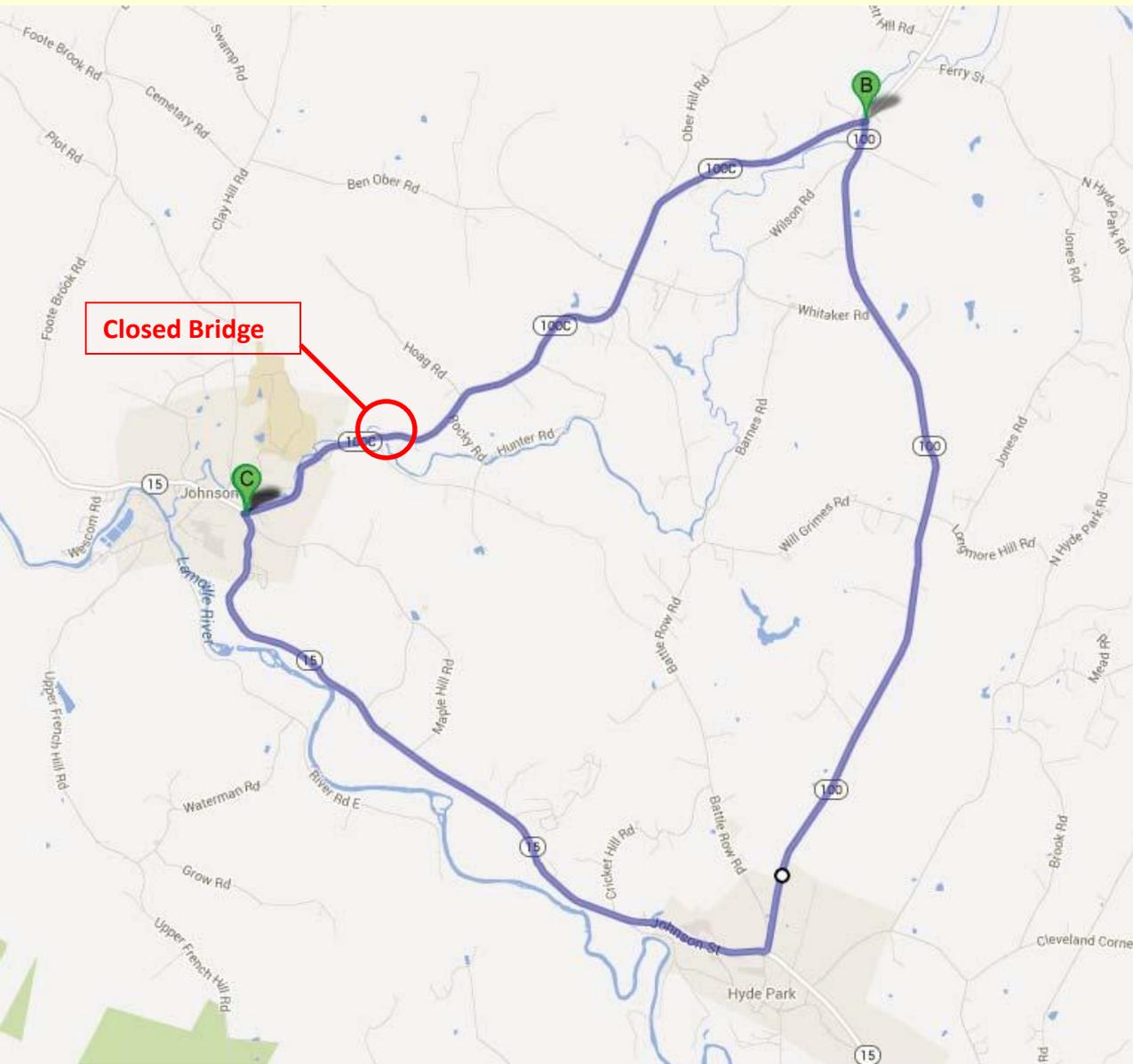
# Layout - Temporary Bridge Downstream



# Accelerated Bridge Construction with Bridge Closure Option

- Bridge 2 to be closed for 2 weeks (or 6 weeks depending on alternative selected)
- Allow 24/7 construction during bridge closure
- Contract incentives/dis-incentives to encourage contractor
- Contractor will receive more \$ if closure is less than stated in the contract
- Community would have input on time of closure (between June 1 and September 1)
- Detour would be on State highways
- Public Outreach to provide advance notice for planning-

# Detour Route



C to B on Thru Route: 4.6 Miles  
C to B on Detour Route: 9.5 Miles  
Added Miles: 4.9 Miles  
End to End Distance: 14.1 Miles

**Major Factors**  
Added Miles: 4.9  
Traffic Volume: 2,800 vpd  
Duration: 2 weeks (or 6 weeks)

# Local Bypass Details

- A local bypass route is the most likely route to see an increase in traffic during the bridge closure other than the detour route
- No local routes would be appropriate for the detour route
- Local bypass route would not be considered the detour route
- State would not add signing on any local roads
- Route could be used for emergency response as appropriate
- We are in the process of developing a way to fairly and consistently compensate Towns for impacts due to increased traffic on bypass routes
- Compensation amount would mitigate for:
  - Providing police presence to deter speeding
    - Providing enforcement to enforce weight limits
    - Dust control
    - Roadway Maintenance



# Concerned Stakeholders for Bridge Closures

A few groups we commonly hear concerns from:

- Businesses who lose drive-by traffic during the closure
- Schools who have a bus route over the closed bridge
- Motorists who have to travel a longer distance on the detour
- Emergency responders who have to respond quickly
- Owners living near the construction who are concerned with noise
- Owners living along a bypass route that will see increased traffic
- Municipalities who have increased impact to their local roads

# Mitigation Strategies for Bridge Closures

Some ideas on how these impacts are often mitigated:

- Allow municipality input on time of year for closure
- Accelerated construction duration including:
  - Allowance for working 24 hours per day and 7 days per week
  - Incentive/Dis-incentive clause to encourage the contractor (\$\$)
- Noise limits included in contract for night time work
- Municipalities are compensated for bypass impacts
- Signing to notify motorists of business districts open for business
- Grant assistance from Agency of Commerce & Community Development
- Many examples of creative solutions from people impacted-

# Alternatives Matrix

	Patching w/ Lane Closures	Superstructure Replacement w/ Detour	Superstructure Replacement w/ Temp Bridge	Complete Replacement w/ Detour	Complete Replacement w/ Temp Bridge
Construction w/ CE + Contingencies	\$441,300	\$841,300	\$1,212,500	\$2,361,300	\$2,663,800
Preliminary Engineering	\$105,900	\$201,900	\$291,000	\$472,300	\$532,800
Right of Way	\$0	\$0	\$72,800	\$86,400	\$86,400
<b>Total Project Cost</b>	<b>\$547,200</b>	<b>\$1,043,200</b>	<b>\$1,576,300</b>	<b>\$2,975,300</b>	<b>\$3,356,500</b>
Design Life	20 Years	40 Years	40 Years	80 Years	80 Years
Project Development Duration	2 years	2 years	4 years	4 years	4 years
Construction Duration	6 months	6 months	18 months	6 months	18 months
Closure Duration	None	2 weeks	None	6 weeks	None

## **Conclusion and Recommendation**

### **Superstructure Replacement w/ Short-term closure & detour**

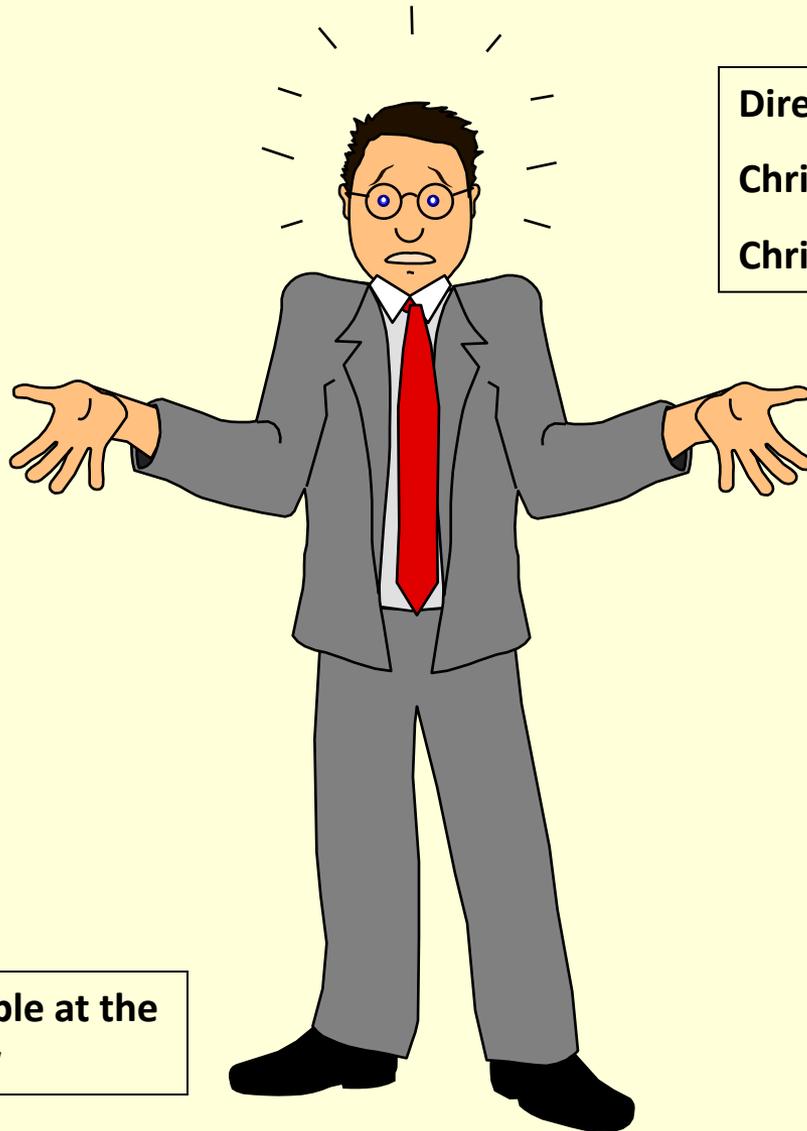
- Allows for slight widening and improved banking
- Addresses most immediate concerns
- Other concerns deferred until bridge 1 needs work
- Shorter bridge closure period
- Moderate-term (40 year) solution
- Short detour route with available local bypass route
- Safest alternative
- Minimal property owner and environmental impacts
- Project Delivery can be expedited

## Next Steps

This is a list of a few important activities expected in the near future and is not a complete list of activities.

- Meet to discuss comments from this public meeting
- Decide how to proceed and document
- Develop Conceptual Plans
- Hold public meeting if needed based on alternative
- Historic permitting process
- PROJECT DEFINED milestone
- Develop Preliminary Plans
- Environmental permitting
- Utility relocation

# Questions



Direct any questions to:  
**Christopher P. Williams, P.E.**  
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This presentation is available at the  
web address shown below

<https://outside.vermont.gov/agency/vtrans/external/Projects/Structures/13C066>