

Guilford BF 0113(68) Bridge 5 on US Route 5 over Broad Brook Regional Concerns Meeting



Presented by
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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

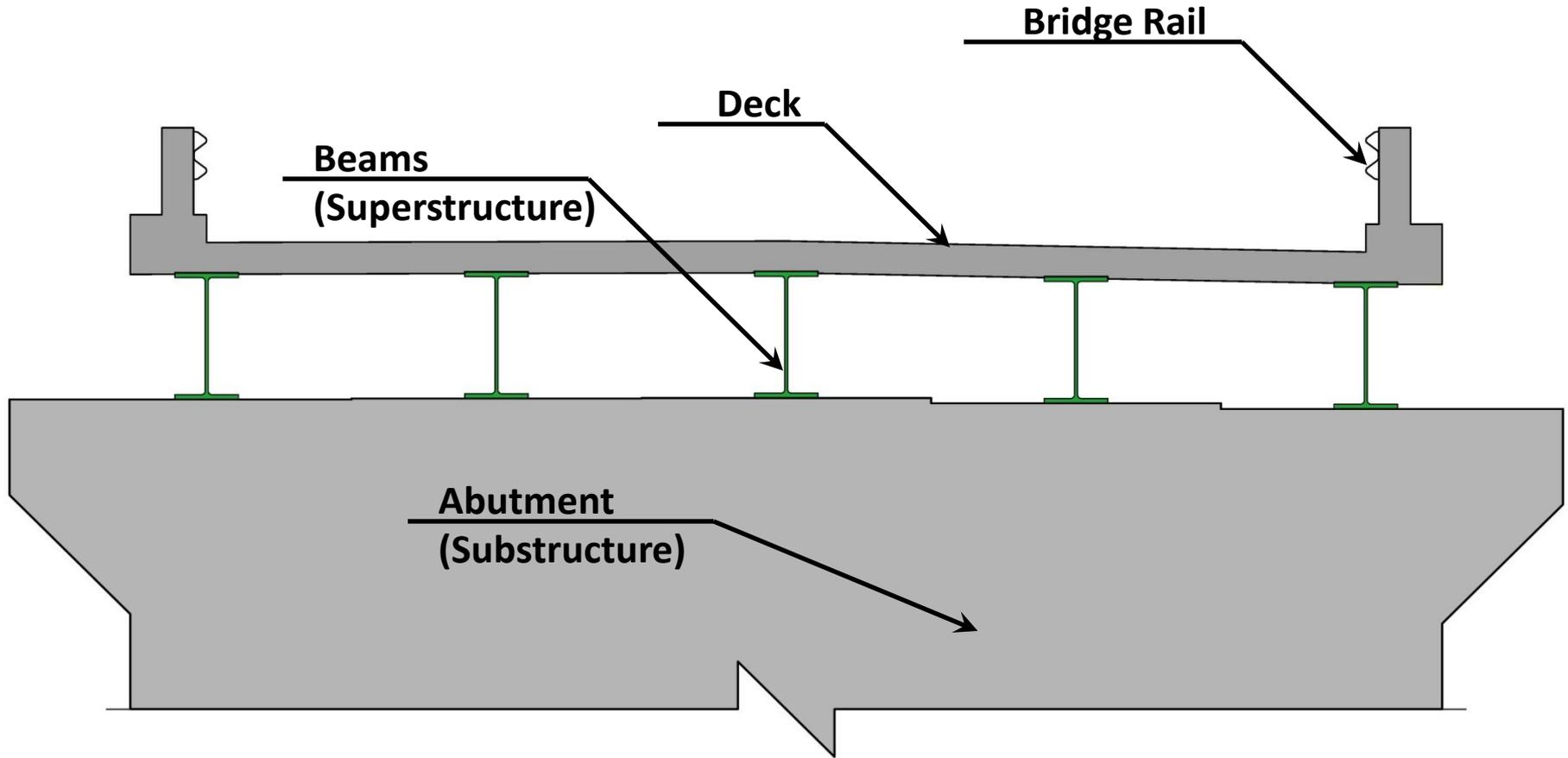
Build Consensus

- 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 = 53 feet
- Bridge Width = 21 feet
- The bridge was built in 1925 (88 years old)

Traffic Data

| | “Current Year” 2016 | “Design Year” 2036 |
|-------------------------------------|--------------------------------|-------------------------------|
| Average Annual Daily Traffic | 2,400 | 2,600 |
| Design Hourly Volume | 290 | 310 |
| Average Daily Truck Traffic | 250 | 400 |
| %Trucks | 10.3 | 15.0 |

EXISTING BRIDGE DEFICIENCIES

Inspection Rating Information (Based on a scale of 9)

| | |
|------------------------------|---------------|
| Bridge Deck Rating | 7 Good |
| Superstructure Rating | 5 Fair |
| Substructure Rating | 4 Poor |

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 a Poor substructure rating
- The bridge is too narrow for the roadway classification and design speed
- The bridge and approach railing are substandard
- The vertical and horizontal alignments are substandard south of the bridge

Looking north over Bridge



Looking south over Bridge



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Failed wingwalls (notice steel plate added)



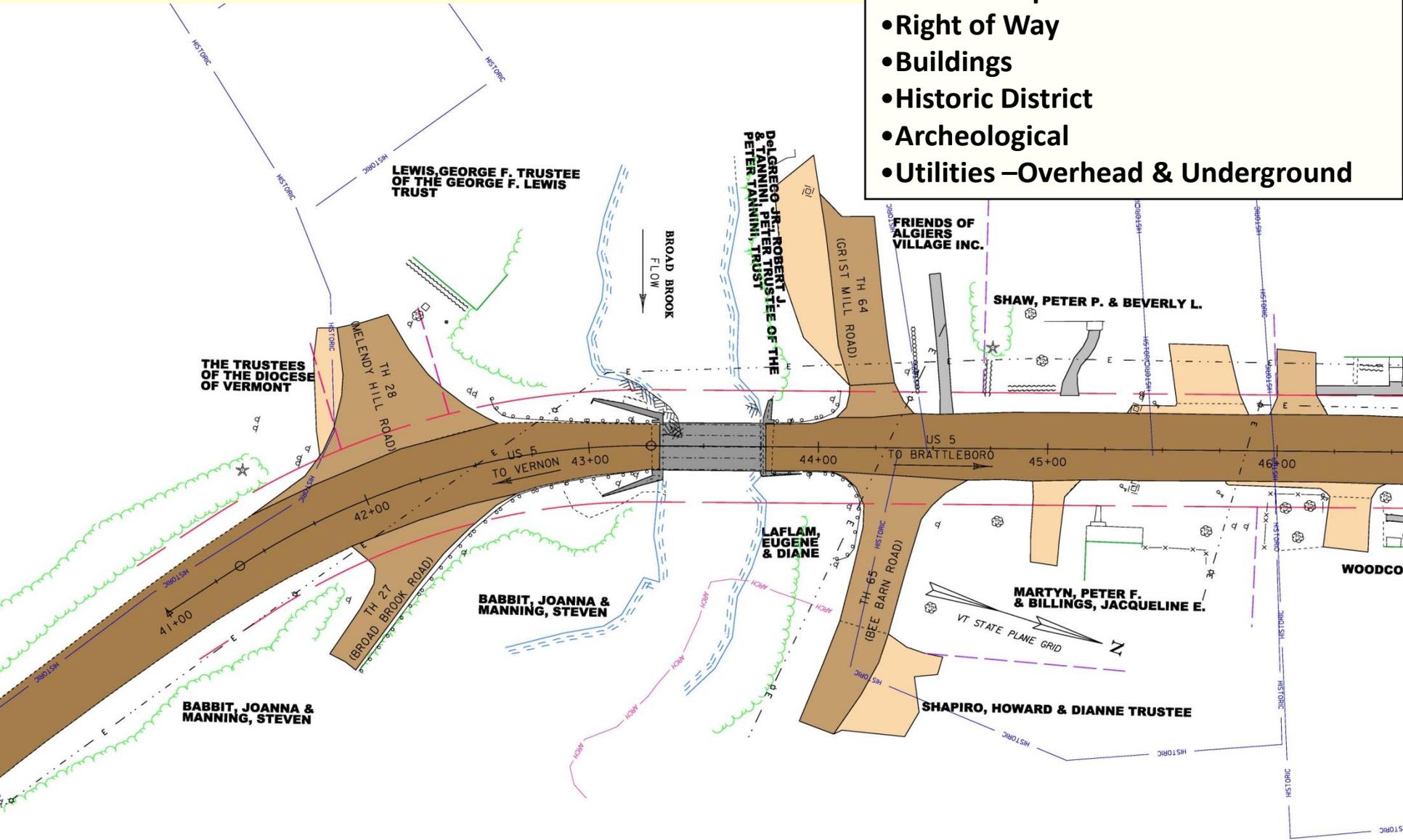
Delamination in Concrete T-Beam



Layout Showing Constraints

Constraints present

- Right of Way
- Buildings
- Historic District
- Archeological
- Utilities –Overhead & Underground



Alternatives Discussion

- Rehabilitation was ruled out due to the deteriorated condition of the existing abutments
- Rehabilitation was not detailed in the Scoping Report

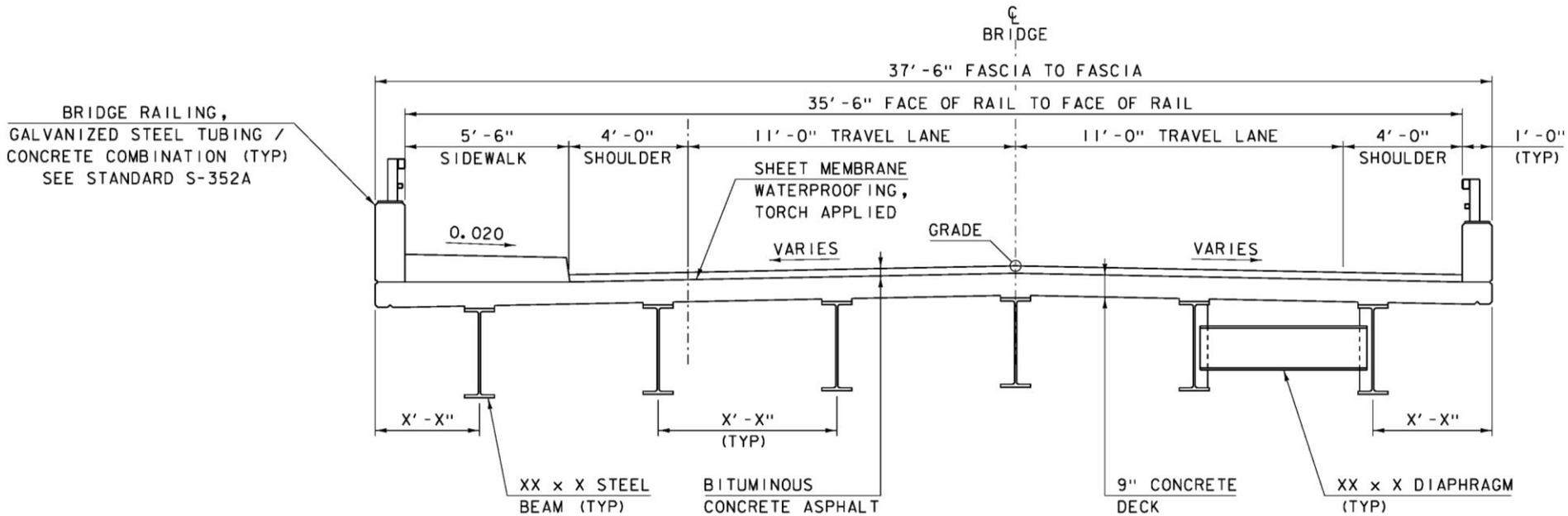
Full bridge replacement is the only alternative considered in this study

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

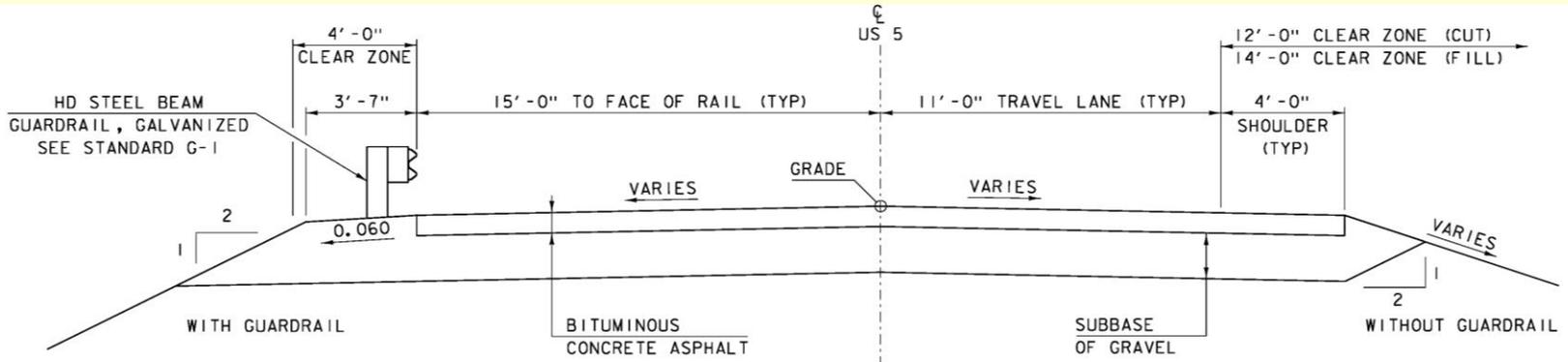
Replacement Details

- 30' width curb-curb (4-11-11-4) w/ 5.5' sidewalk upstream
- A local agreement would be required to maintain (i.e. plow) bridge sidewalk
- Maintain existing centerline of road
 - Flattening curve would create problems w/ Broad Brk Rd
 - Standards can be met by banking for curve
- Raise grade to meet the standards (12" south, 6" north)
- Increase span length to 90'
- Long term (80 year) solution

Bridge Typical

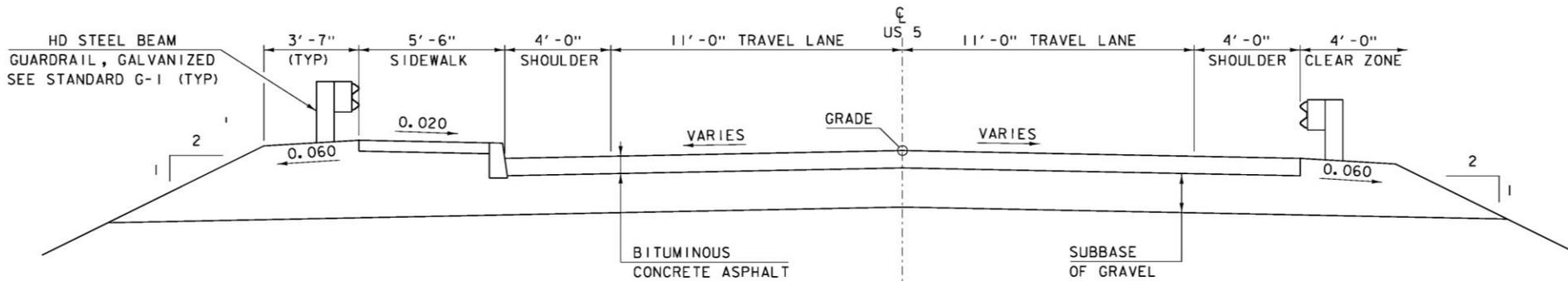


Roadway Typical



PROPOSED US 5 TYPICAL SECTION

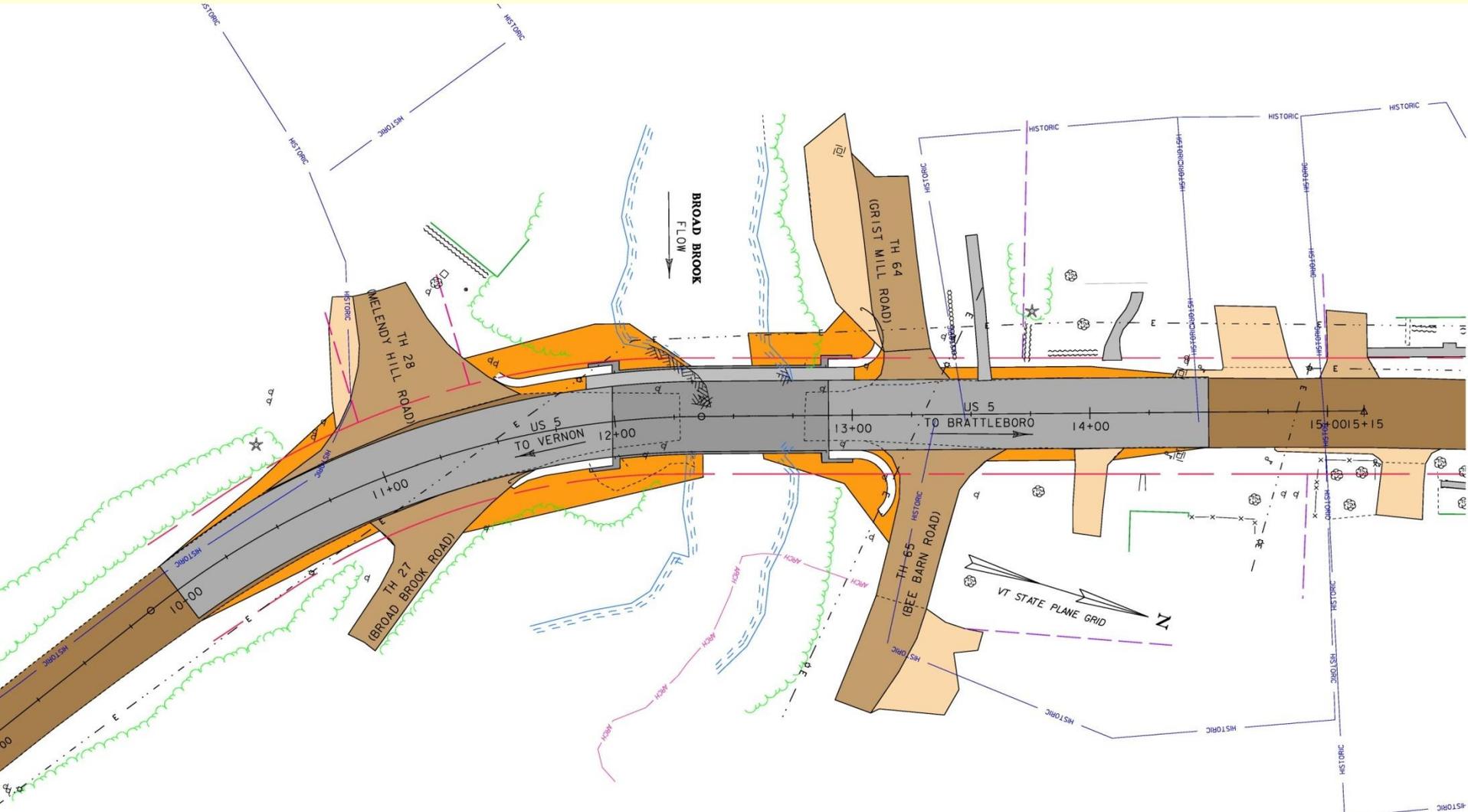
SCALE $\frac{3}{8}$ " = 1'-0"



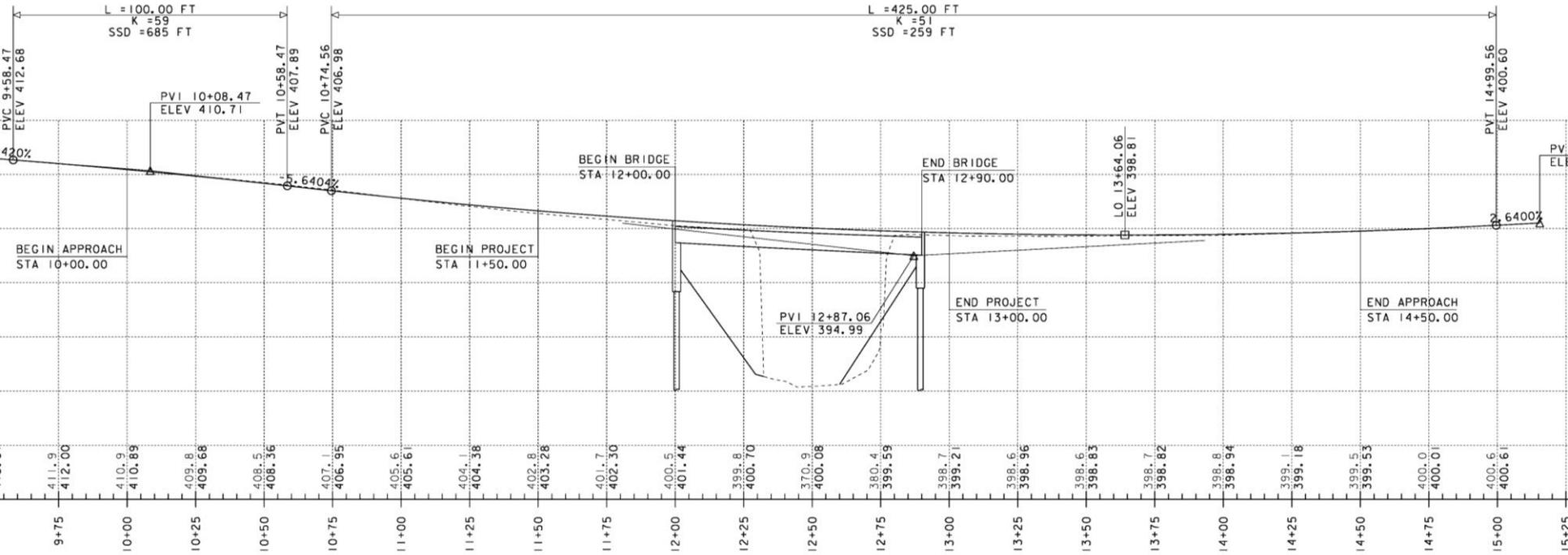
PROPOSED US 5 STA 11+50 - 13+25 TYPICAL SECTION

SCALE $\frac{3}{8}$ " = 1'-0"

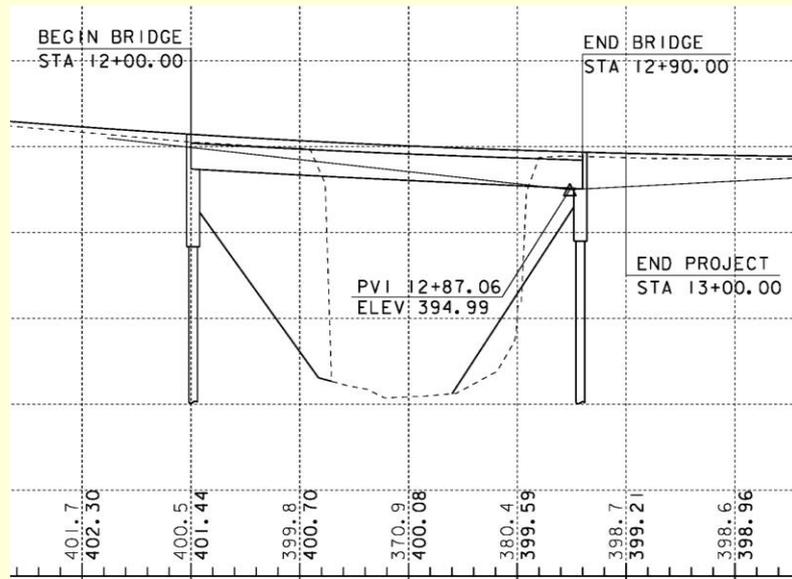
Layout – Complete Replacement



Profile - Complete Replacement



Enlarged view of bridge



Methods to Maintain Traffic

Three general methods available:

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

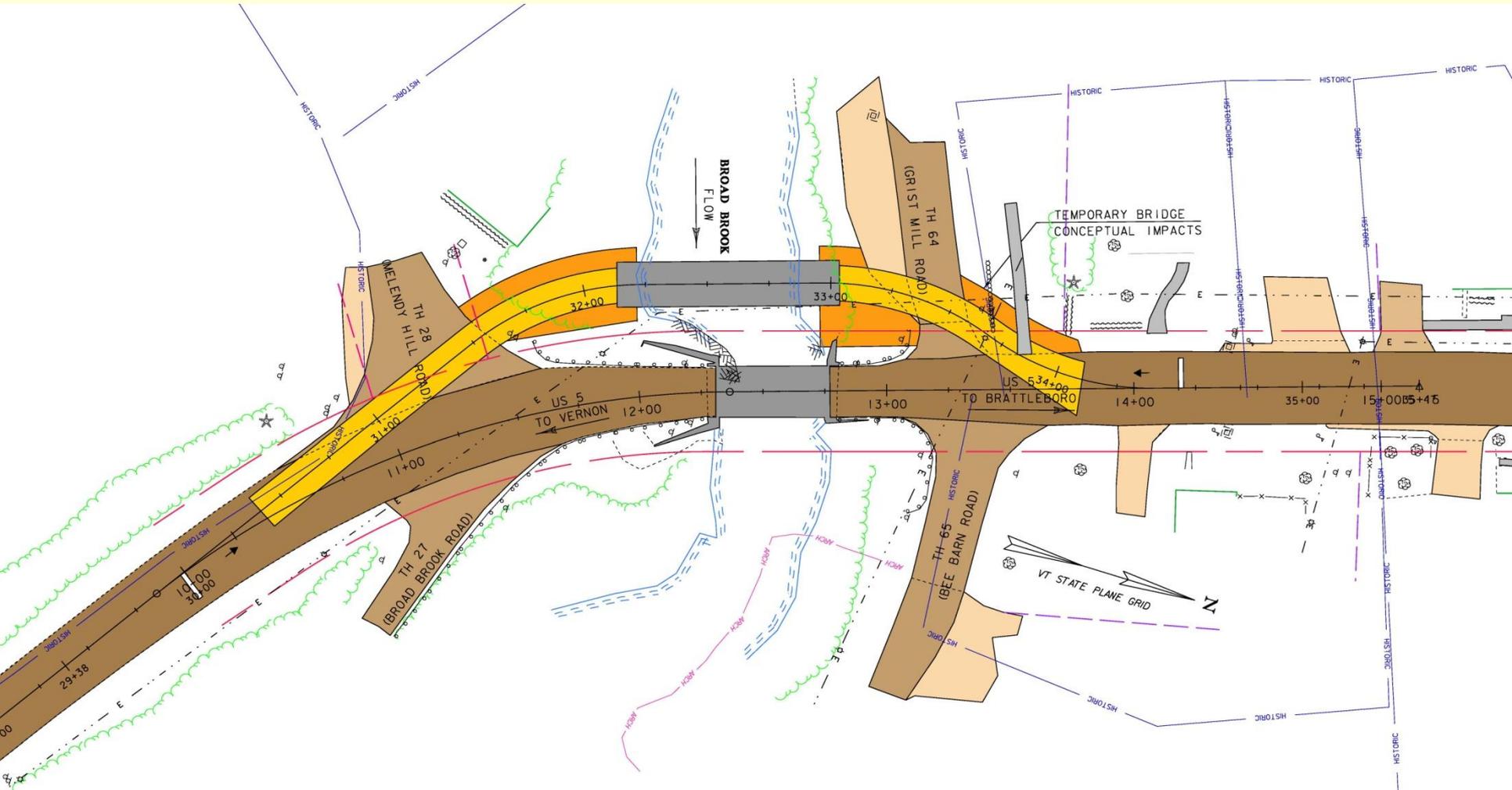
Phased Construction Option

- 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



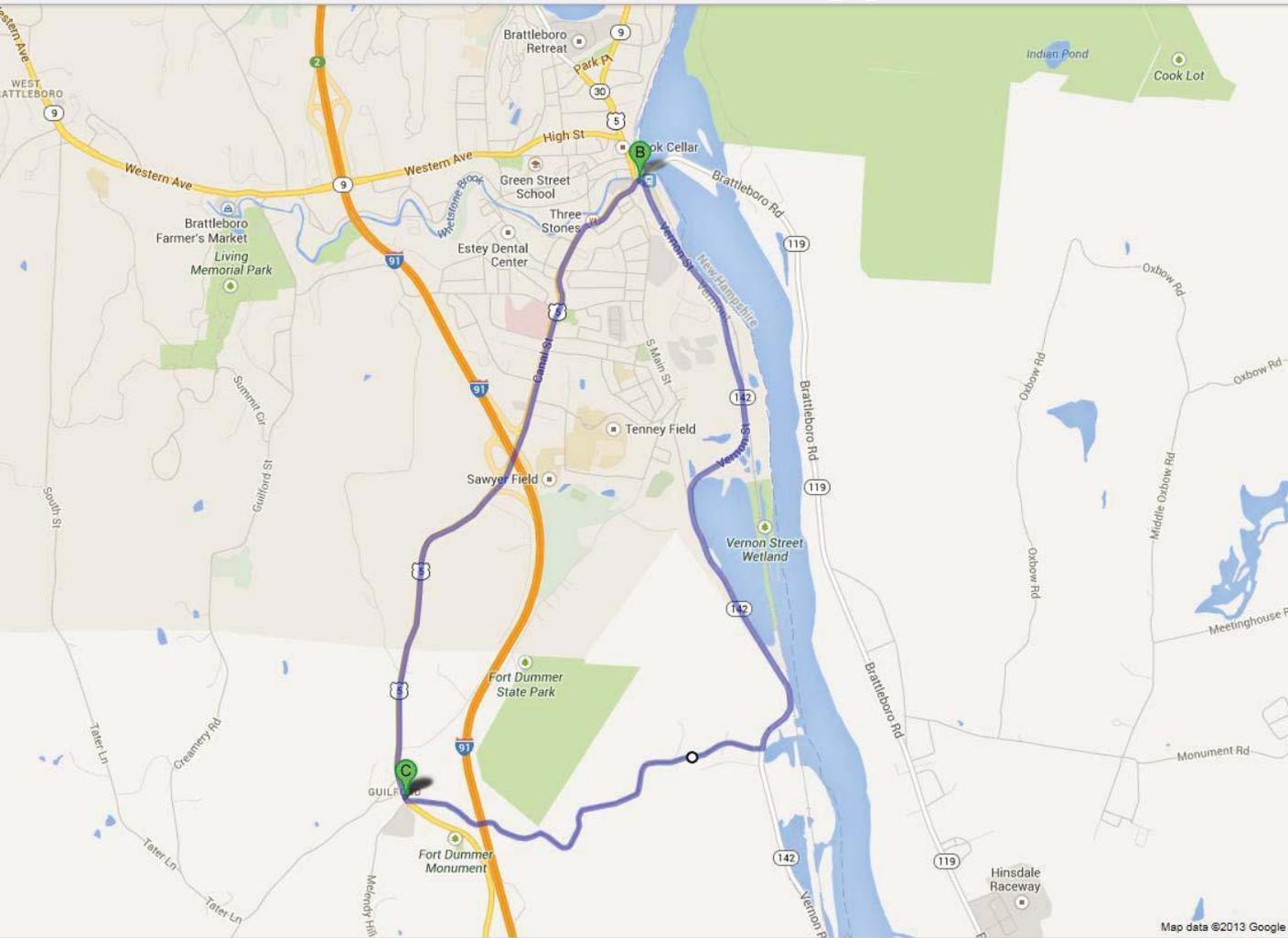
Accelerated Bridge Construction with Bridge Closure Option

- Bridge 5 to be closed for 4 weeks
- 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-

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 Town(s) for impacts due to increased traffic on one defined bypass routes
- Compensation amount would mitigate for:
 - Providing police presence to deter speeding
 - Providing enforcement to enforce weight limits
 - Dust control
 - Roadway Maintenance

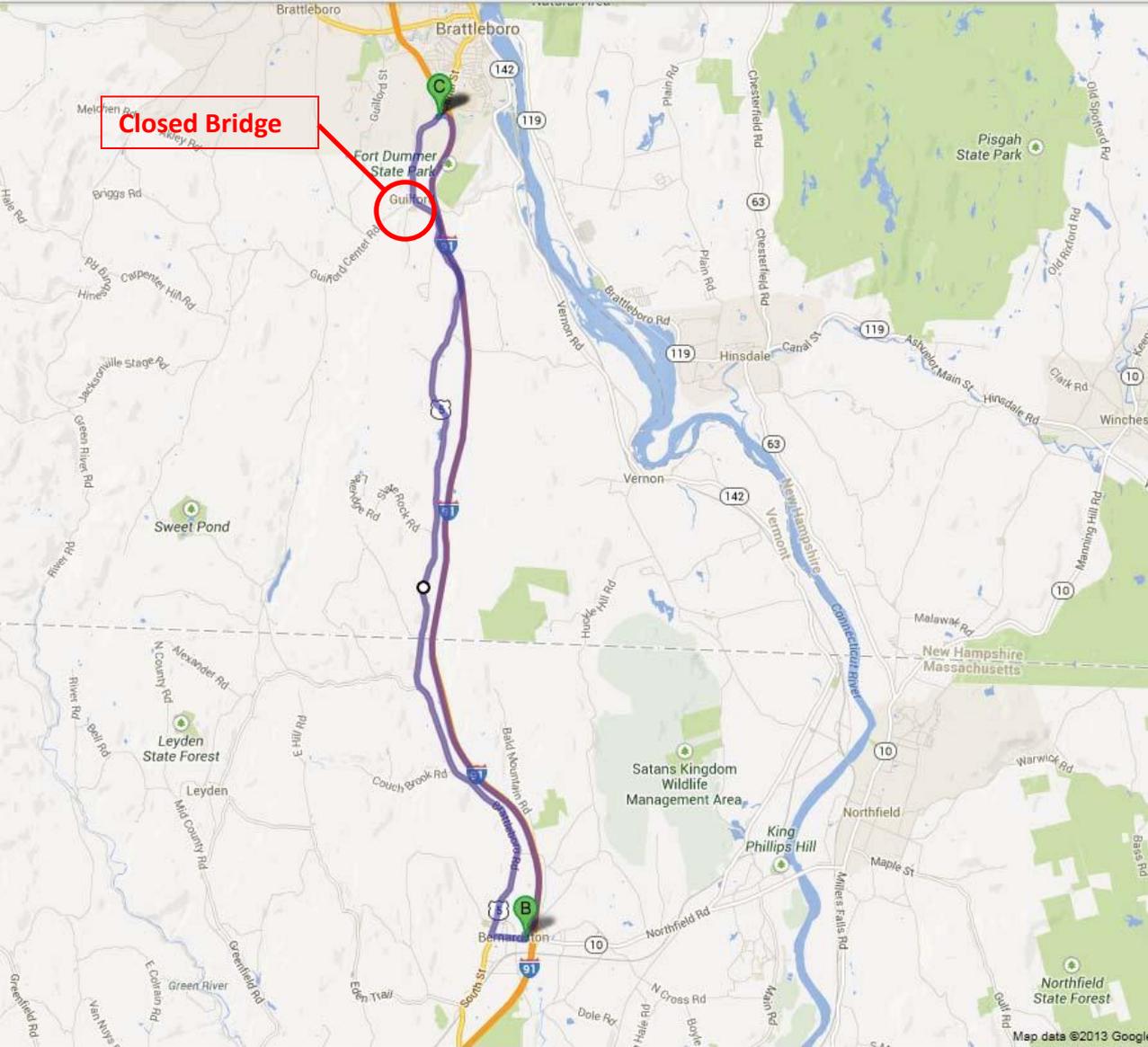
Local Bypass Map



Broad Brook Rd – VT 142 – US 5 (6.9 miles end to end)

This route could be used by cyclists during a closure or by emergency responders

Detour Route



B to C on Thru Route: 12.4 Miles
B to C on Detour Route: 12.4 Miles
Added Miles: 0 Miles
End to End Distance: 24.8 Miles

Major Factors
Added Miles: 0.0
Traffic Volume: 2,400 vpd
Duration: 4 weeks

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

| | Complete Replacement w/ Temp Bridge | Complete Replacement w/ Detour |
|---------------------------------------|---|--------------------------------------|
| Construction w/ CE + Contingencies | \$1,867,500 | \$1,592,500 |
| Preliminary Engineering | \$373,500 | \$318,500 |
| Right of Way | \$150,000 | \$102,000 |
| Total Project Cost | \$2,391,000 | \$2,013,000 |
| | 19% over Base | Base |
| Design Life | 80 Years | 80 Years |
| | | |
| Project Development Duration | 4 years | 4 years |
| Construction Duration | 18 months | 6 months |
| Closure Duration | None | 4 weeks |

Conclusion and Recommendation

Complete Replacement w/ Short-term closure & detour

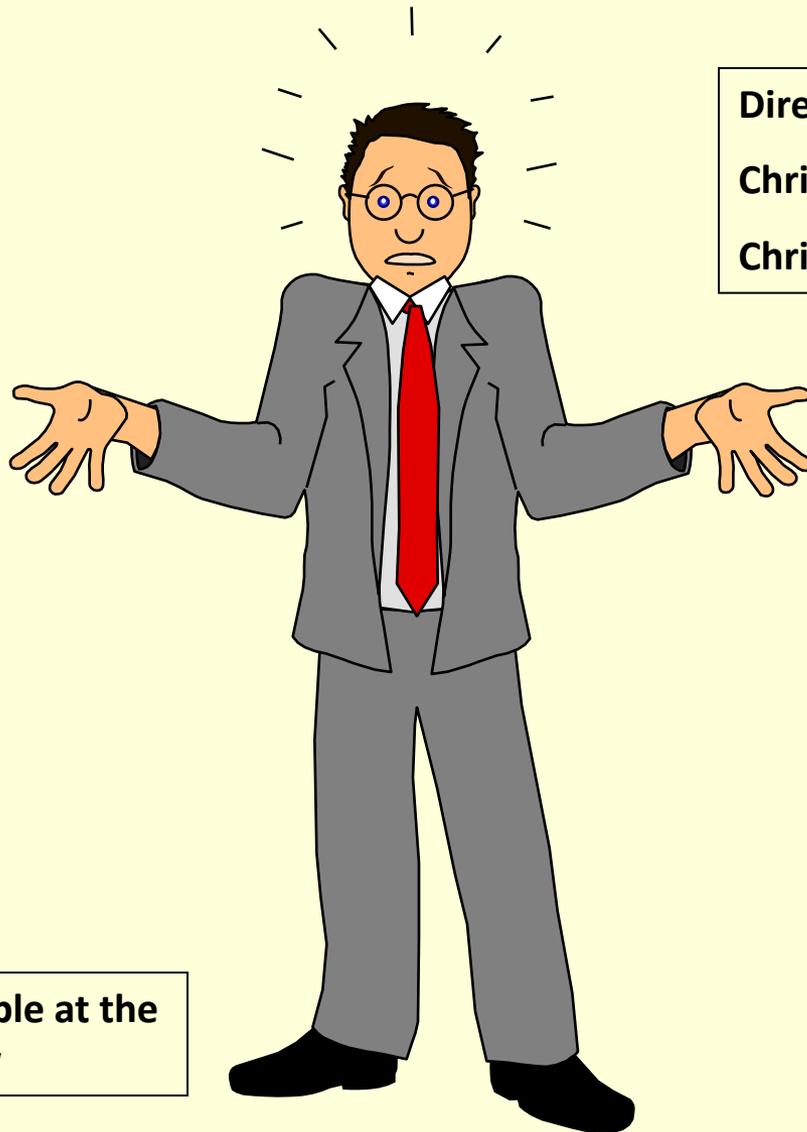
- Proposed bridge will meet all standards except railing approaches (due to intersecting roads)
- Bridge Closure is recommended based on:
 - Minimal impact to adjacent property owners
 - Minimal impact to environmental resources
 - Faster project delivery
 - 24.8 miles end to end for detour combined with 6.9 miles end to end for bypass is reasonable for this traffic volume and closure duration
 - Safest alternative for motorists and workers
 - Least expensive

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
- Process local agreement to maintain sidewalk
- Develop Preliminary Plans
- Environmental permitting
- Utility relocation

Questions



Direct any questions to:
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This presentation is available at the
web address shown below

<https://outside.vermont.gov/agency/vtrans/external/Projects/Structures/13C064>