

Waitsfield BRF 013-4(39) VT 100, Bridge 177 Over the Mad River Regional Concerns Meeting



Christopher P. Williams, P.E.
Chris.Williams@State.VT.US

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) with short-term bridge closure is key
- Impacts to property and resources is minimized
- Less impacts = Less Process = Faster Project Delivery
- Standard details repeated on many projects
- 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
- Currently team of 5
- All projects will begin in the PIIT
- Very efficient process
- Consistent approach throughout Structures Program
- 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

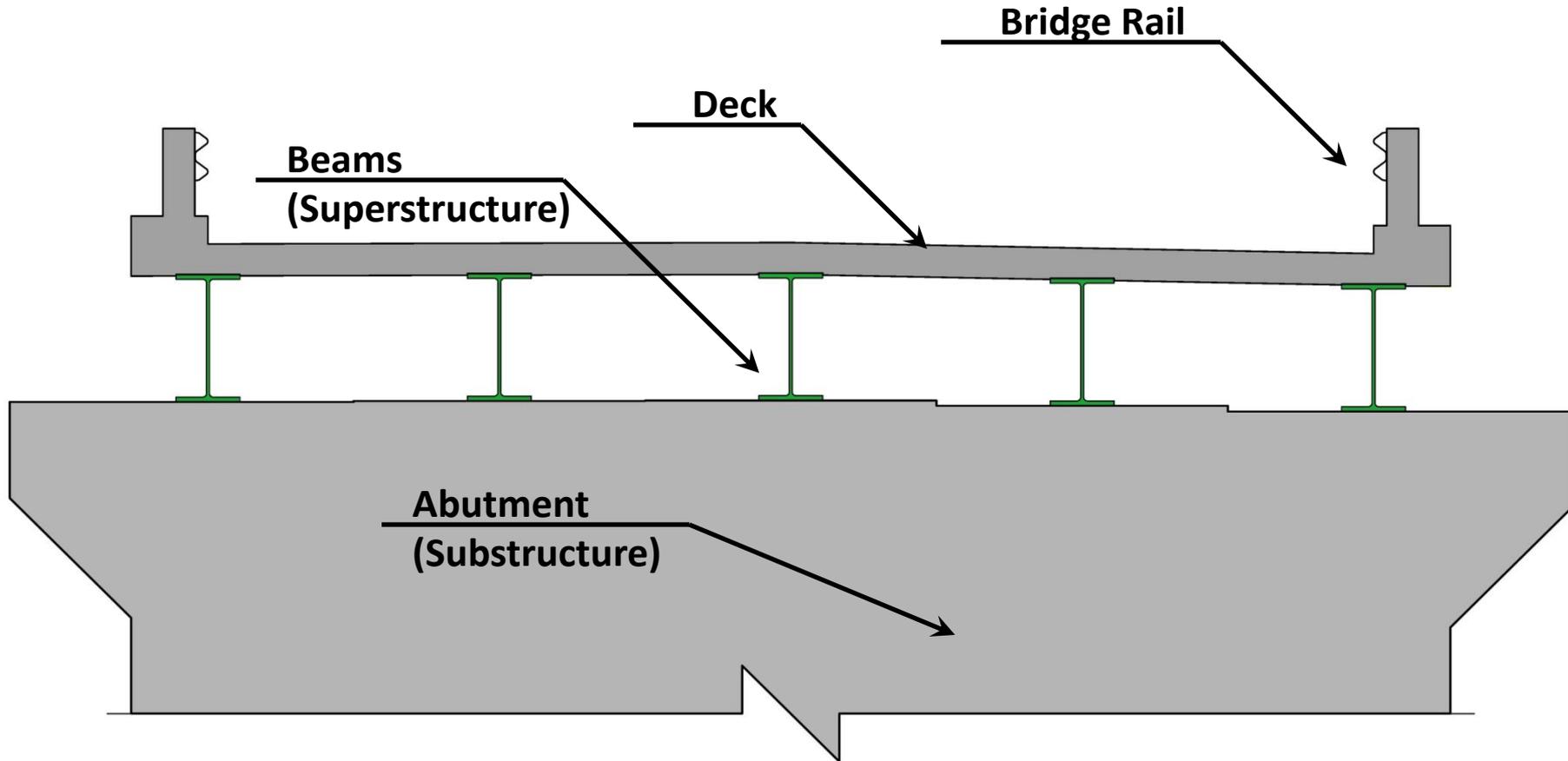
Public Participation

- Quantify areas of impact

- Environmental permits

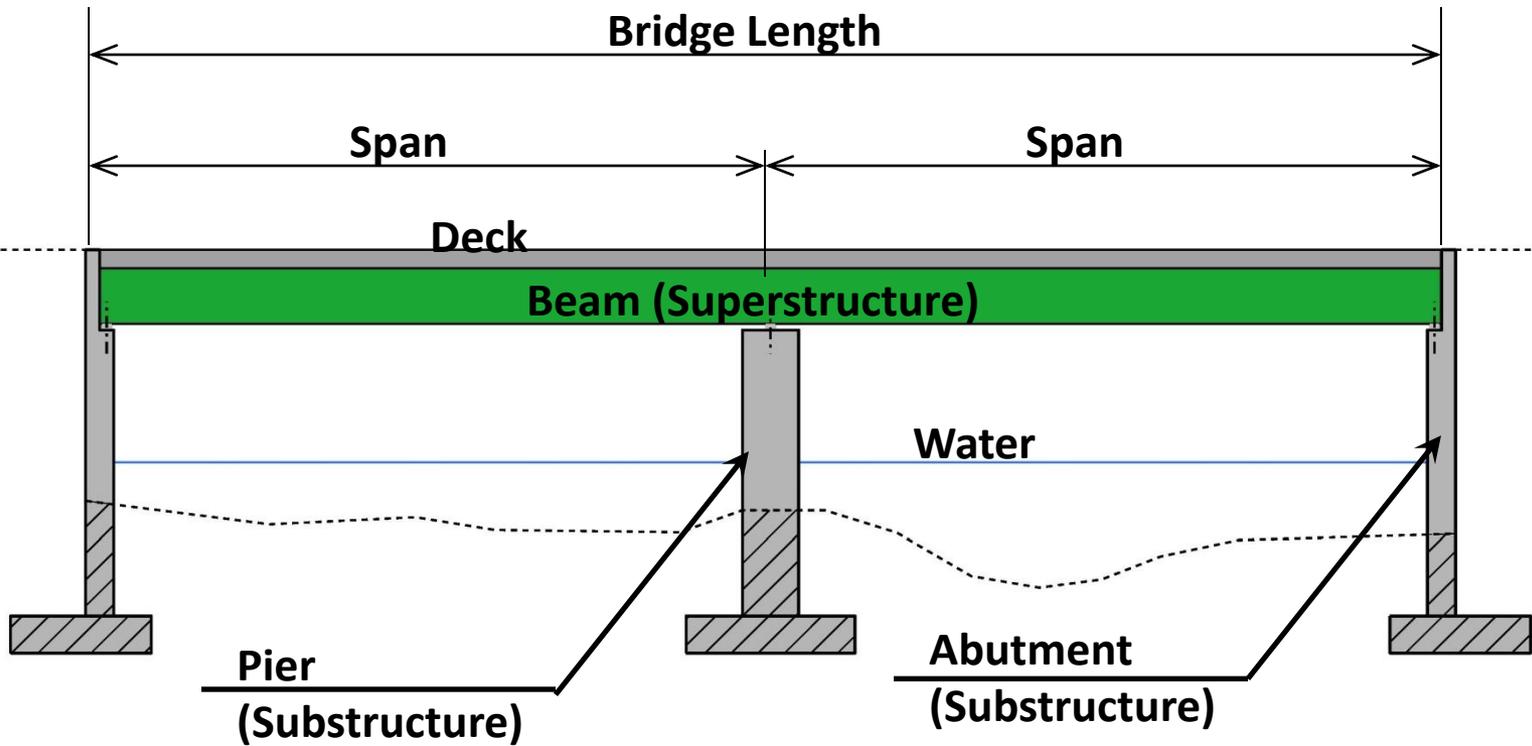
- Develop plans, estimate and specifications

Description of Terms Used



Cross Section of Bridge

More Terms Used



Elevation View of Bridge

Project Background

- **Priority 21** in the State Bridge Program
- The structure is owned and maintained by the State (no local funds)
- Functional classification for VT 100 is **Rural Minor Arterial**.
- Existing bridge is a 2 span steel beam bridge with a concrete deck
- Span lengths are 81'-81' (168' overall length)
- Bridge width = 23' between railings
- Built in **1938 (74 years old)**
- Bridge is structurally deficient and has a Federal sufficiency rating of **54.0 (out of 100) -**

Traffic Data

TRAFFIC DATA	2015	2035
AADT	4,100	4,400
DHV	610	650
ADTT	230	400
%T	6.2	10.1

Existing Bridge Deficiencies

Deficiencies

Structural Capacity/Condition of the Bridge Deck and substructures

Bridge Width

Vertical Alignment (“K” Value or “hump” in road over bridge)

Inspection Report Information (Based on a scale of 9)

Bridge Deck Rating 4 Poor

Superstructure Rating 6 Satisfactory

Substructure Rating 5 Fair

Existing Site Conditions

- Bridge Width (Face-Face Rail) = 23'
- Posted Speed Limit = 40 mph
- No Postings for Weight Restriction
- Overhead Utilities present along west side-

Looking North over Bridge



03.13.2012

Looking North at Approach to Bridge



Looking South over Bridge



03.13.2012

Looking South on Upstream (West) side



Looking South on Upstream (West) side



03.13.2012

Looking South on Upstream (West) side



Deck Surface

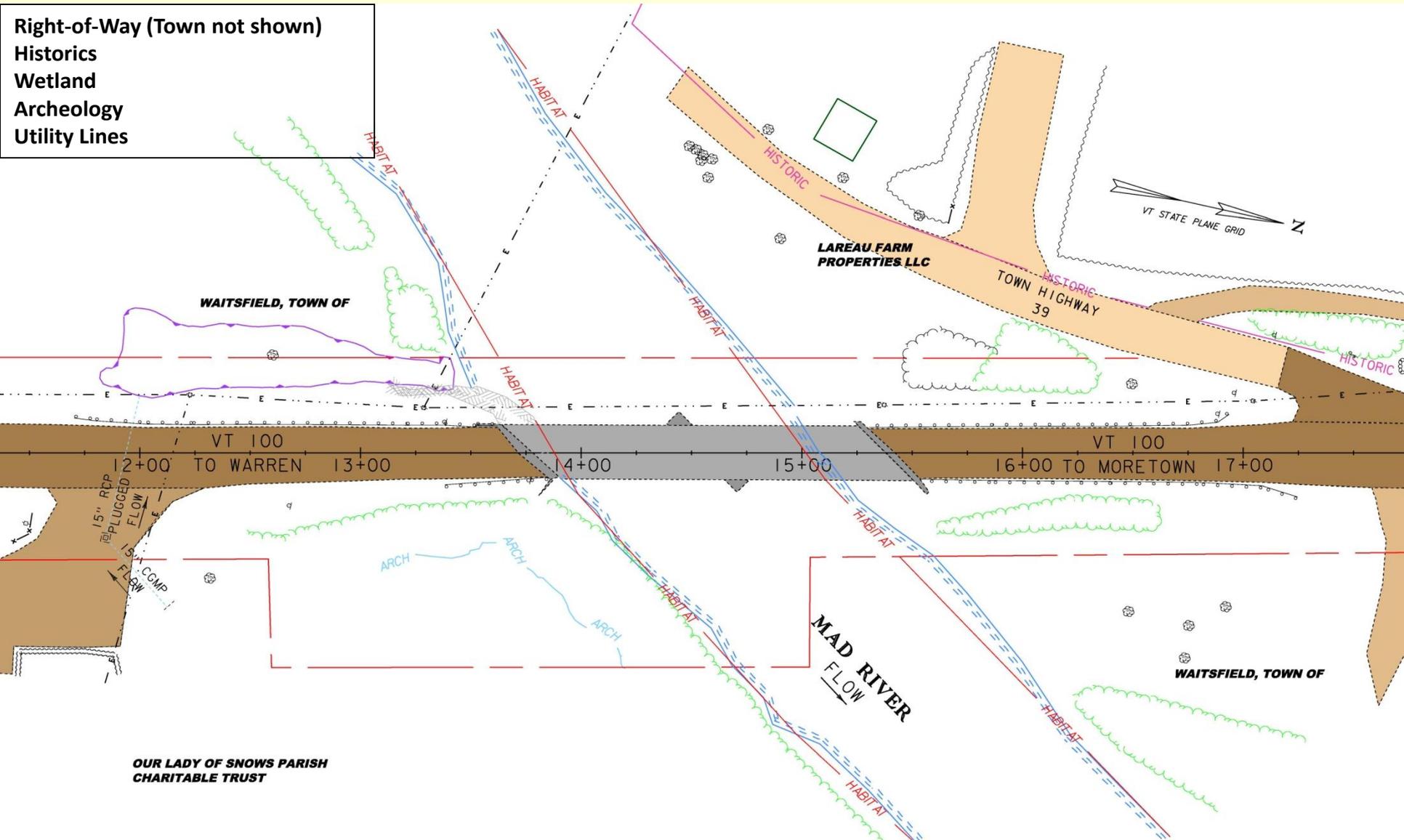


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Pier



Layout Showing Constraints



Alternatives Discussion Note

Note that some alternatives were considered in the Scoping Report that did not warrant future consideration so are not included in this presentation. Refer to the Scoping Report for more details on all the alternatives considered.

Alternatives Included in Presentation

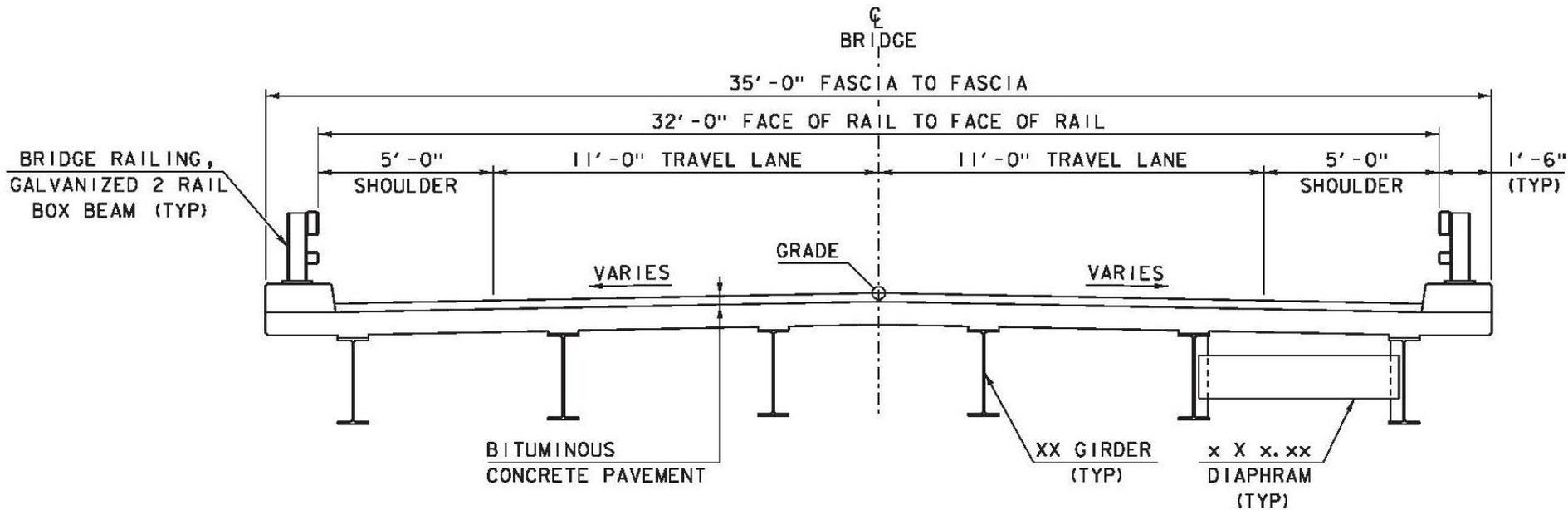
- Bridge Replacement w/ Two-way Temporary Bridge
- Bridge Replacement using ABC w/ Off-site Detour

Note the proposed bridge will be essentially the same for both options

Proposed Project Highlights

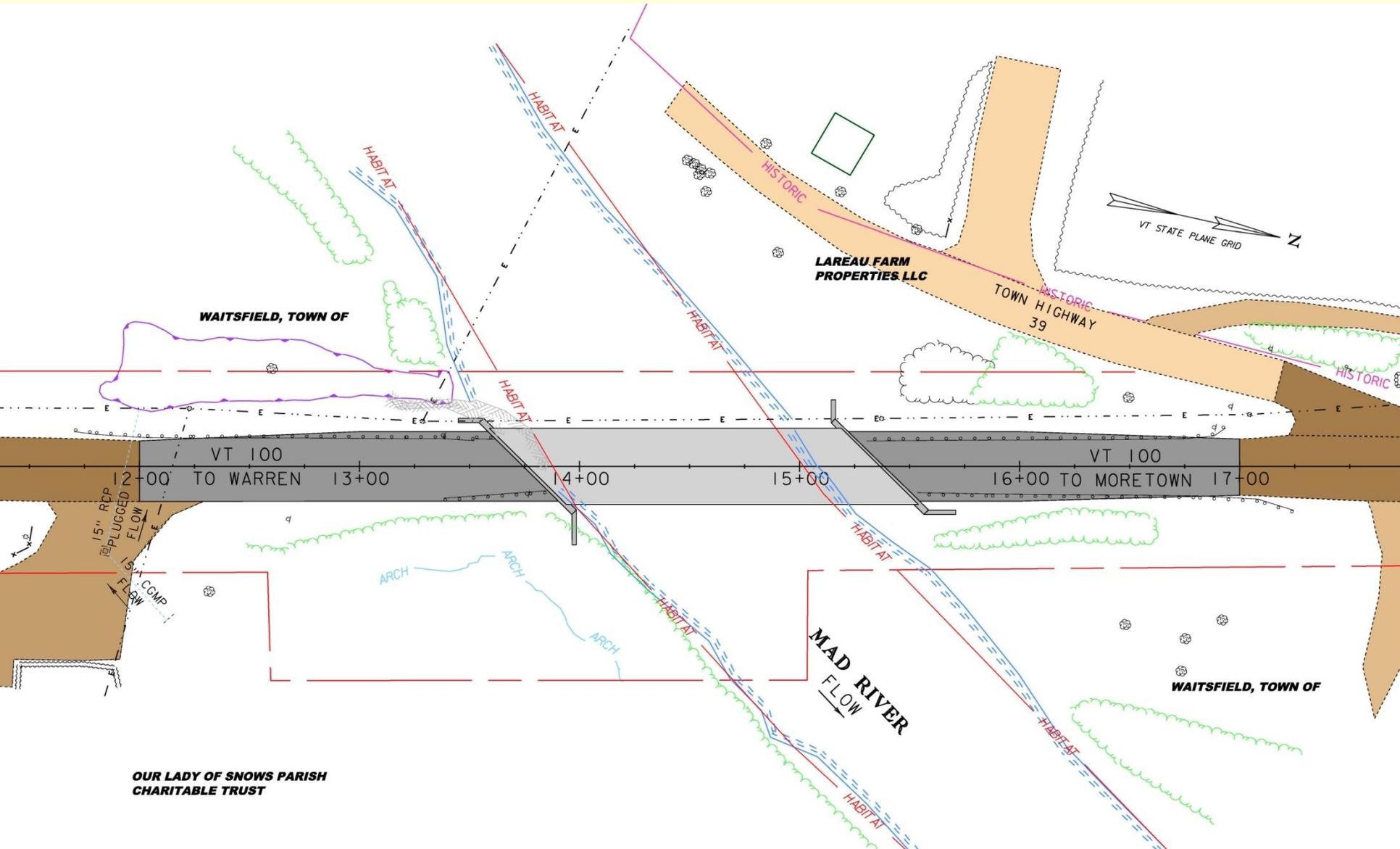
- Complete bridge replacement needed
- Use 11' lanes and 5' shoulders (32' rail-rail width)
- Eliminate pier
- Use approx. 160' single-span bridge w/ 45 deg. skew
- Maintain existing centerline of road
- Maintain vertical grade -

Proposed Bridge Typical

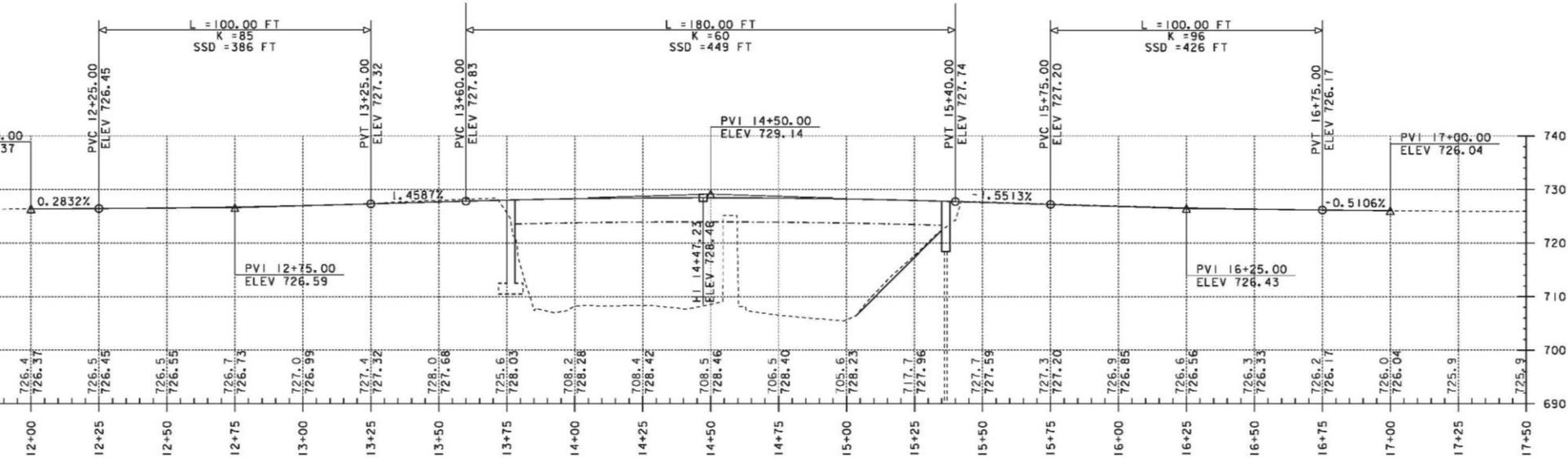


- With the temporary bridge option the deck will be cast-in-place concrete using conventional construction
- With the ABC option, Precast Bridge Units (PBUs) will be used and a field splice in the beams will be required

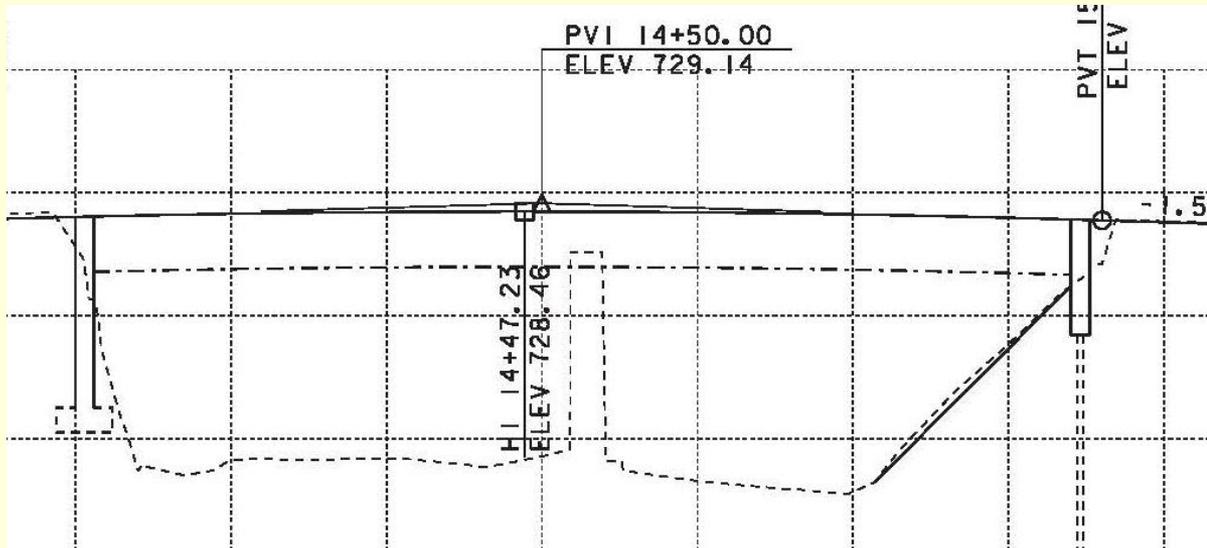
Layout of Proposed Bridge



Profile of Proposed Bridge



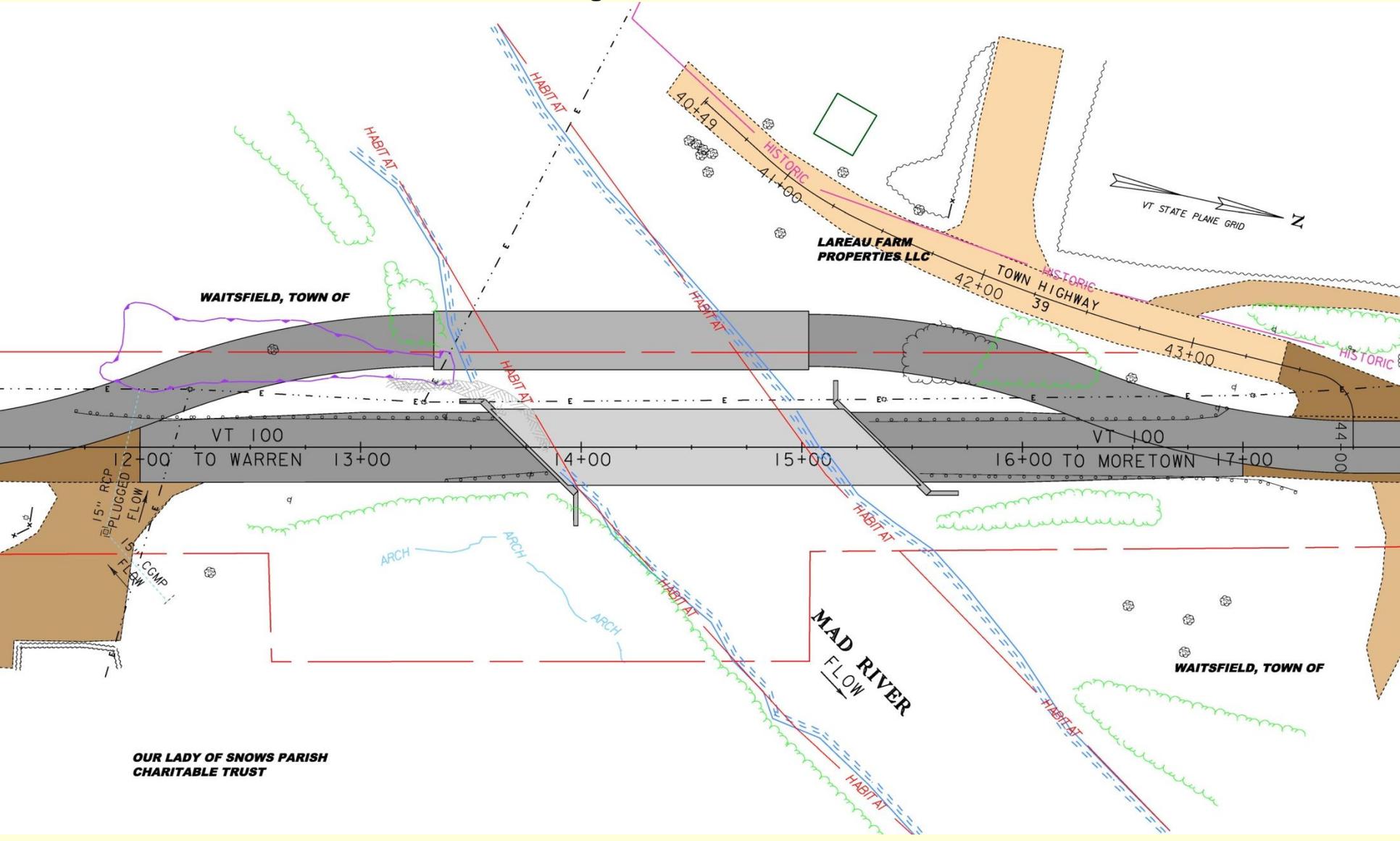
Closer Look
@ Bridge



Methods to Maintain Traffic

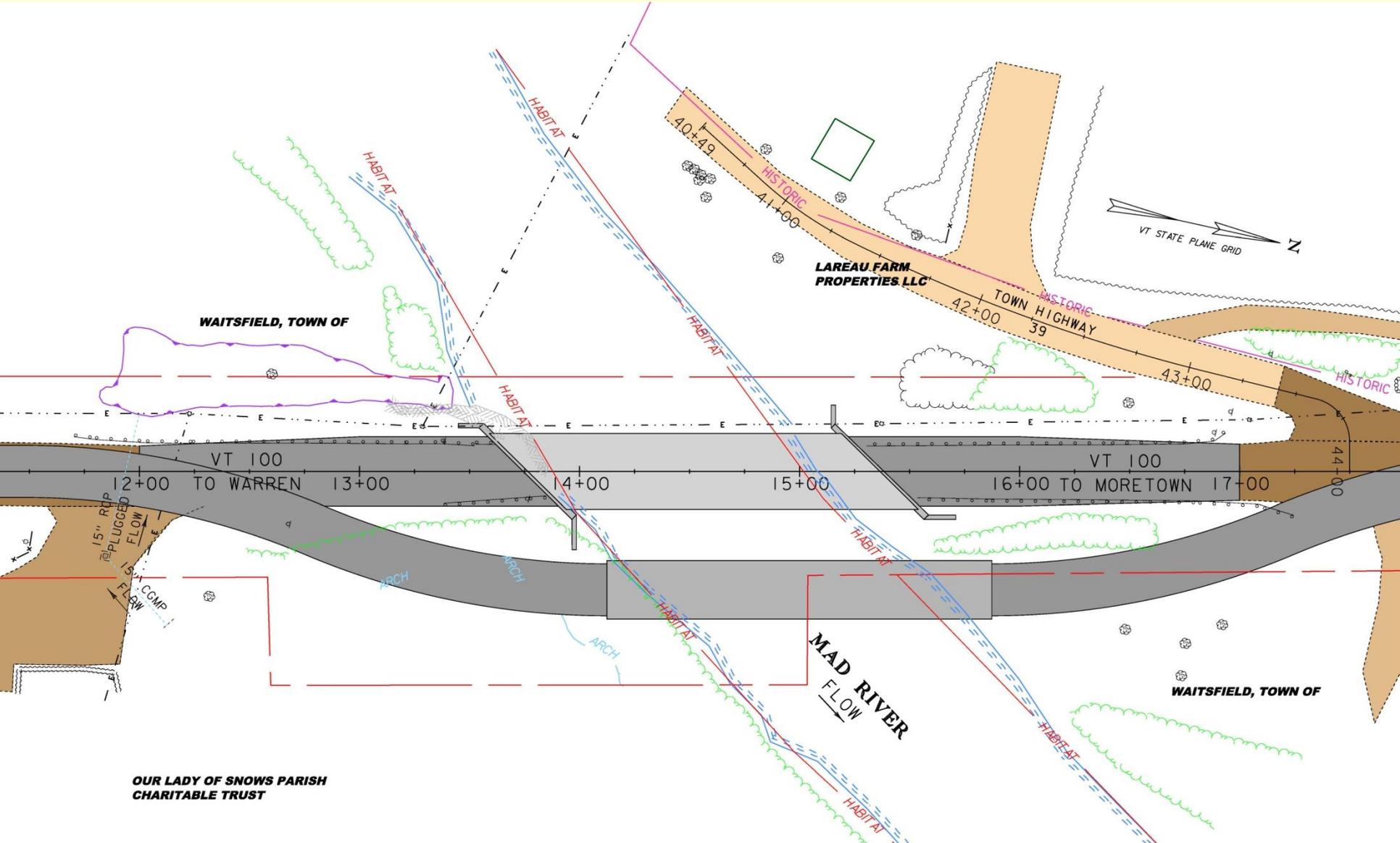
- Two-way Temporary Bridge
- Short-term bridge closure with off-site detour

Two-Way Temporary Bridge Upstream



**OUR LADY OF SNOWS PARISH
CHARITABLE TRUST**

Two-Way Temporary Bridge Downstream



Case Study of Temporary Bridge Project

- Look at Kingsbury truss project (Warren VT 100, Bridge 173)
- No disrespect or blame or judgment on success of project
- Continuous Improvement is our focus

Key facts for bridge 173 project

- Funded in 1986, Construction Awarded in 2012 (= 26 years)
- Public hearings date back to 1991
- Preliminary Engineering expended = \$995 K
- Right-of-Way expended = \$69 K
- Construction low bid = \$3.5 M
- Temporary Bridge item = \$250 K (ranged from \$250 - \$600)
- Construction Awarded Nov. 2012
- Deadline to open new bridge Oct. 2013 (11 months duration)
- Contract Completion Date = June 2014 (17 months duration) -

ABC with Bridge Closure Option

- Bridge 177 to be closed for 21 days
- 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)
- Detour would be on LOCAL highways (pending approval)
- Public Outreach to provide advance notice for planning
- Construction completed in 1 season (6 months)
- Project delivered within 2 years of Project Defined -

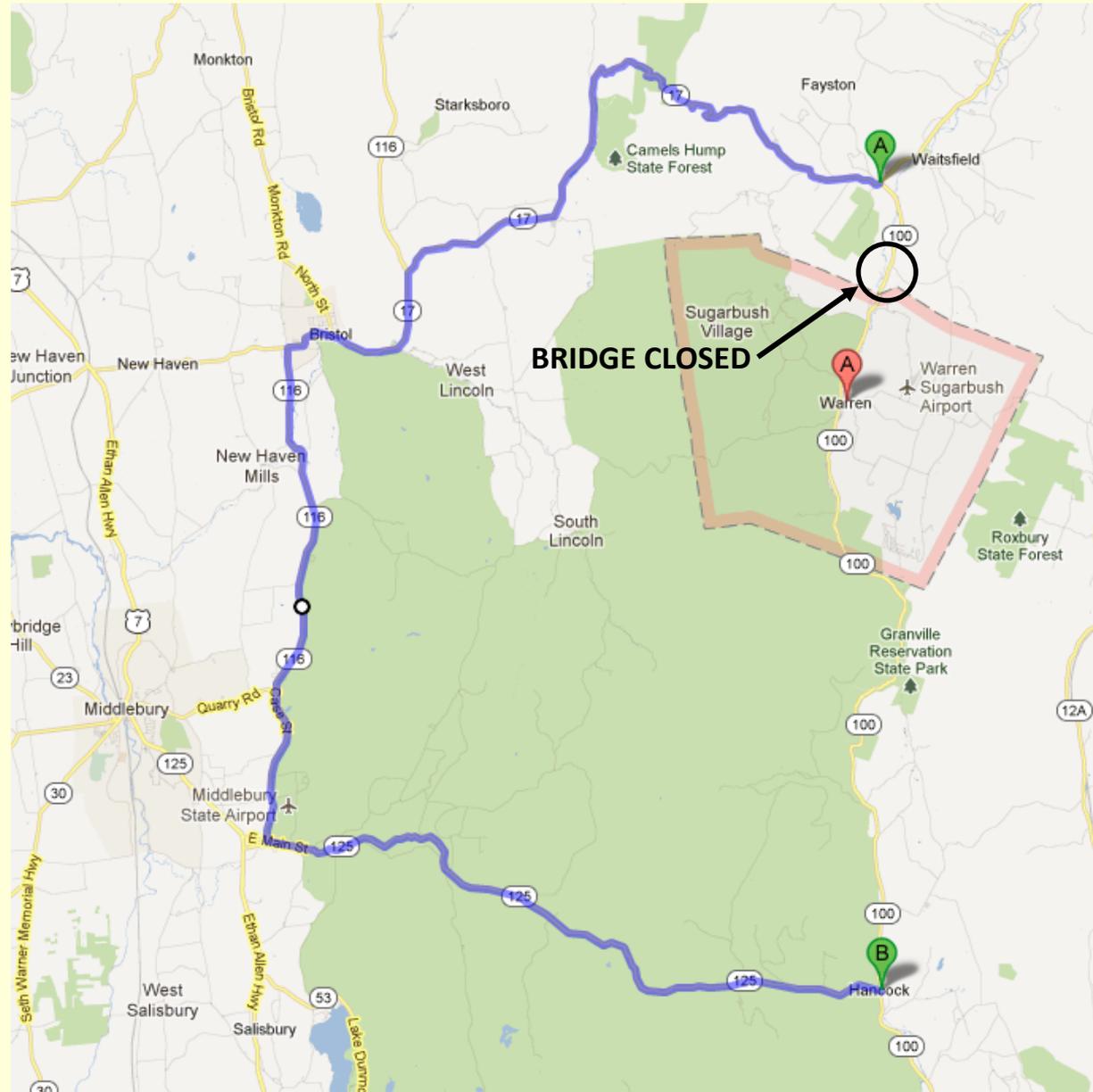
Shortest State Detour

Summary:

- A-B Thru = 20 miles
- A-B Detour = 47 miles
- Added = 27 miles
- End-End = 67 miles

This detour ruled out due to combination of:

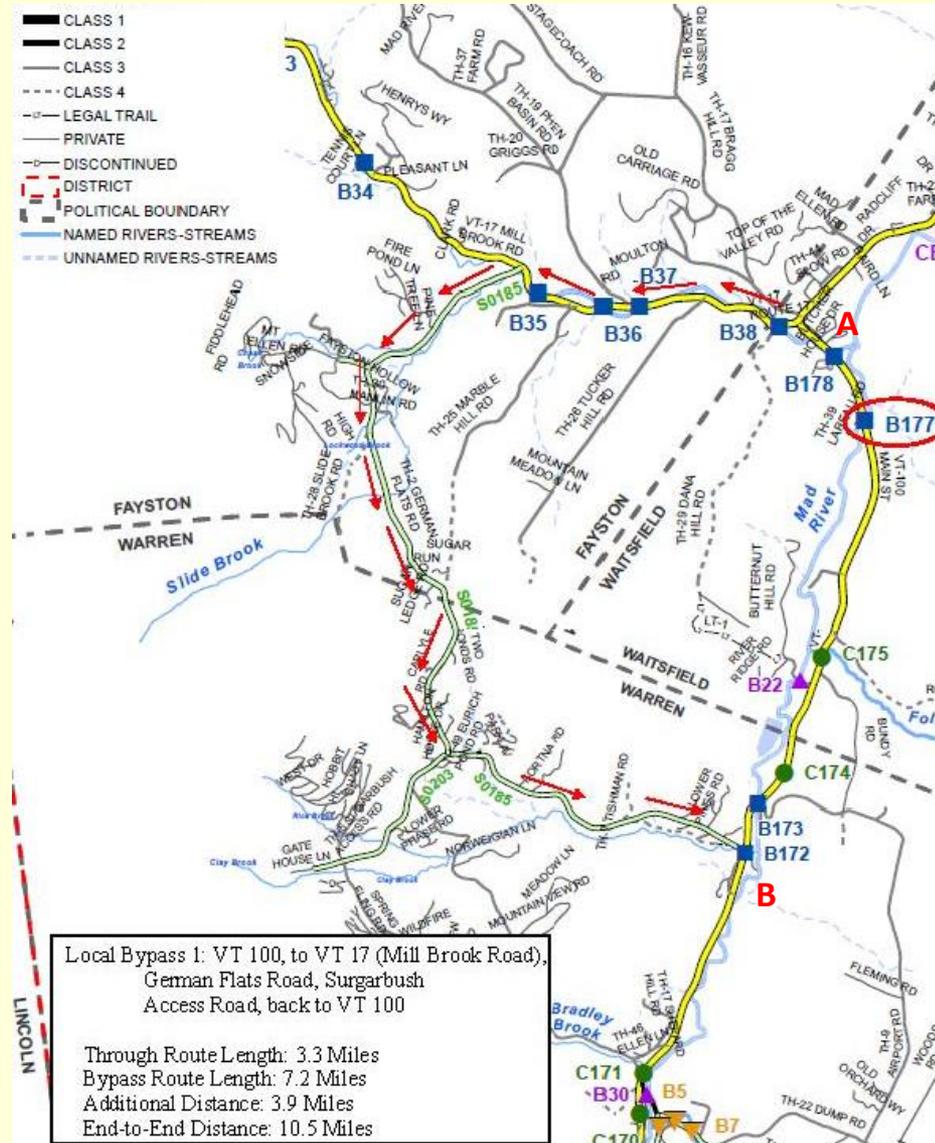
- ADT = 4,100
- Added miles = 27
- Closure Duration = 21 days



Local “Conditional” Detour Route

Summary:

- A-B Thru = 3 miles
- A-B Detour = 7 miles
- Added = 4 miles
- End-End = 10 miles



BRIDGE CLOSED

Local Detour Details

- Local detour route is partially on local roads so will need approval from Towns.
- Bridge contractor would be responsible for signing and maintaining the detour route as part of contract
- Roads would be in as good, or better, condition after project is complete
- When and where appropriate, we can provide:
 - Police presence to deter speeding
 - Uniformed Traffic Officers at peak times -

Traffic Volume Comparisons

Local road data based on actual past traffic counts

- ADT for Christmas week in past 3 years = 6,300
- ADT during July = 1,600

VT 100 @ Bridge 177 data based on projections

- ADT = 4,100

Anticipated volume on local detour during construction

- $ADT = 1,600 + 4,100 = \underline{\mathbf{5,700}}$ ($< 6,300$)
- This is less than occurs over Christmas week
- Driving conditions are better during construction season -

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

	Replacement w/ ABC and off-site detour	Replacement w/ Temporary Bridge
Temporary Bridge	\$0	\$300,000
Construction w/ CE + Contingencies	\$3,197,989	\$3,140,886
Preliminary Engineering	\$473,776	\$483,213
Right of Way	\$0	\$217,446
Total Cost	\$3,671,765	\$3,841,545
		4.6%
Project Development Duration	2 years	4+ years
Construction Duration	6 months	18 months
Closure Duration	21 days	None
Mobility Impact Duration	21 days	8 months

Conditional Recommendation

Pending approval to use local roads we recommend:

Full bridge replacement using ABC & 21 day closure

The benefits of this approach are:

- Project delivery expedited (saving several years)
- Could prevent future emergency bridge closure
- Saves future costs to maintain existing bridge
- Lower direct costs (Design, ROW and Construction)
- Minimal environmental impacts
- Minimal impact to adjacent property owners
- Improved safety for public and construction workers -

Alternate Recommendation

If we can not obtain permission to use the local roads for the detour, and/or if additional constraints are imposed on the project that rule out using Accelerated Bridge Construction methods, we propose:

Full bridge replacement maintaining traffic on a two-way temporary bridge

Questions

