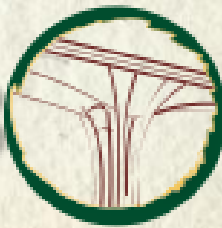


# I-91 BRATTLEBORO BRIDGE



A BRIDGE TO NATURE



## I-91 Bridge Improvements

I-91 Bridges 8N & 8S

I-91 Bridges 9N & 9S



# Project Components

Bridge 9



Brattleboro Bridge



Bridge 8

Roadway Re-alignment  
Drainage Improvements  
Retaining Walls

# History

Interstate 91 from the Massachusetts State line north to Brattleboro in Vermont opened to traffic on November 1, 1958. This was the first route with controlled access to open in Vermont. Construction of bridge 9S and 9N started in the spring of 1958. The bridge and roadway section through Brattleboro was opened on October 5, 1960.

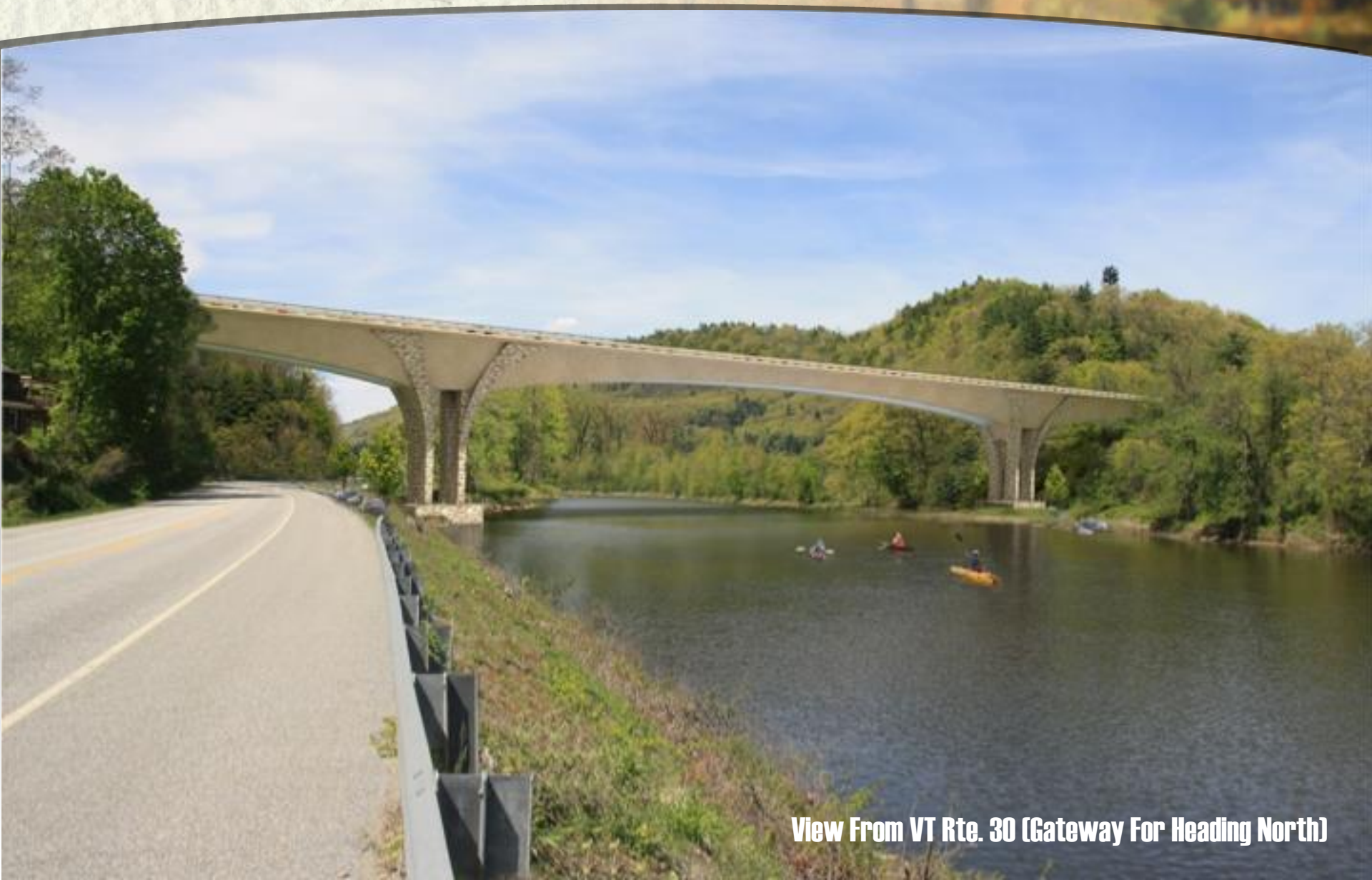


# Existing I-91 Bridges



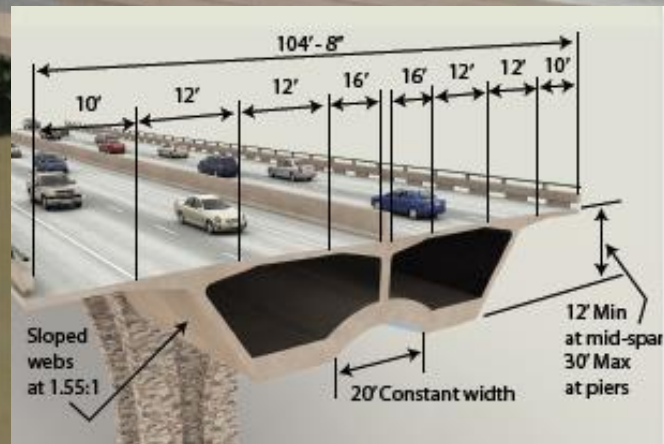
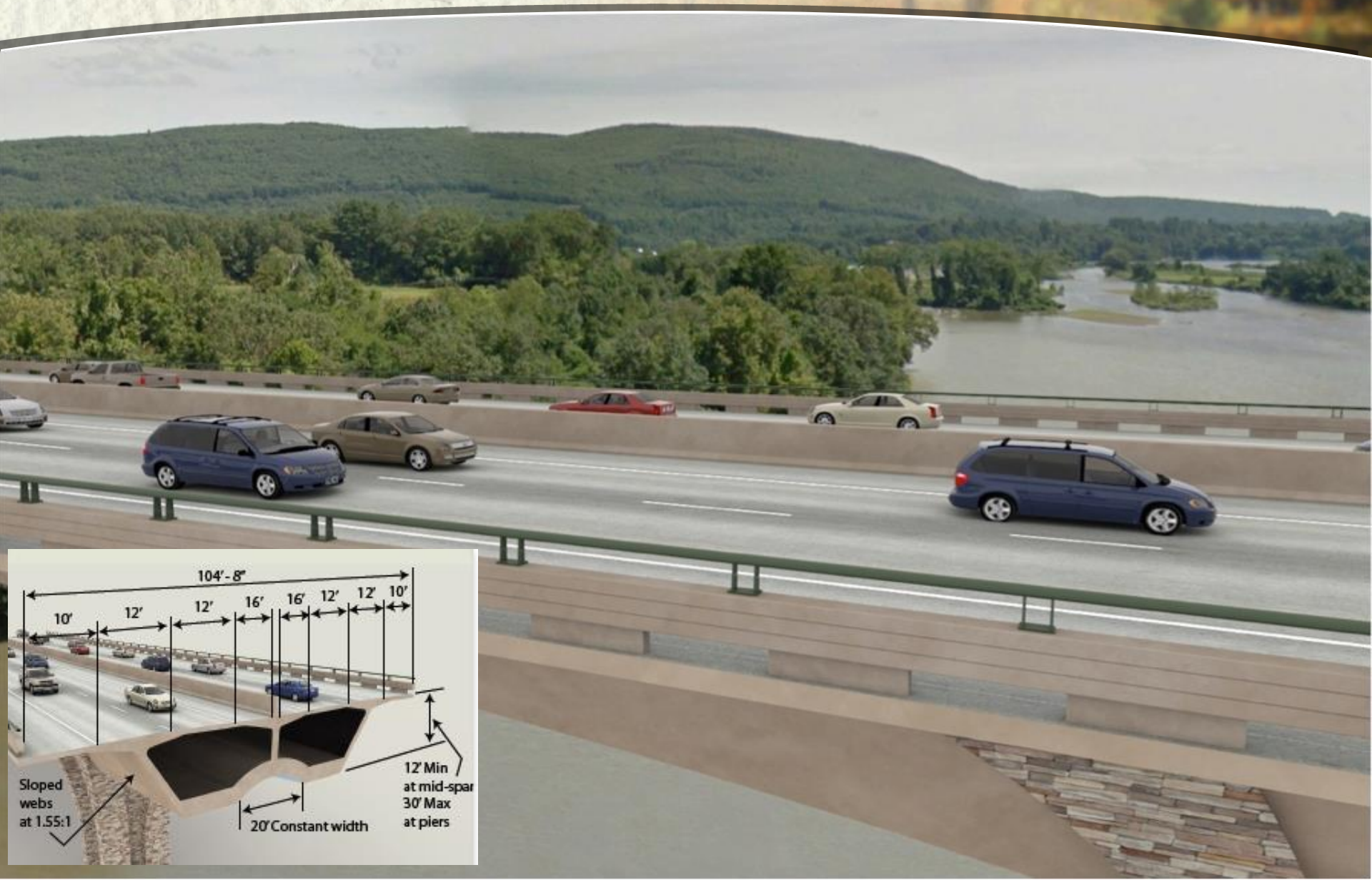
**View From VT Rte. 30 (Gateway For Heading North)**

# New I-91 Bridge



**View From VT Rte. 30 (Gateway For Heading North)**

# New I-91 Bridge



# Project Delivery

## Design-Build Contract

- **Best Value Selection**
- **50% Price + 50% Technical Score**



Team Rank	Technical Score	Price Proposal	Best Value Score
1	71.33	\$59,490,000	81.05
2	61.88	\$54,000,000	80.94
3	61.99	\$82,812,233	63.60

**PCL+FIGG** TEAM

# I-91 Bridge Improvements

## Request For Proposal

	<u>Points</u>
• Technical Approach	40
• Design Concepts	20
• Proposed Approach to Designing the Project	10
• Proposed Approach to Constructing the Project	10
• The Bridge Aesthetics	20
• Project Safety	5
• Maintenance of Traffic	10
• Project Management	20
• Work Breakdown Structure	4
• Project Schedule	4
• Environmental Commitments	5
• Quality Control and Quality Assurance	7



# Windham Regional Commission Transportation Committee

## How did Aesthetic get into the project?

- VTrans hosted two public meetings about the replacement of the I-91 bridge over the West River/Route 30.
- Concern was raised by participants that design proposals had been developed without public input.
- The Windham Regional Commission Transportation Committee sent a letter to VTrans asking for public input, and volunteered to help with the process.
- VTrans responded that they could organize a process to advise about aesthetic criteria, but would need that criteria to be incorporate into a Request for Proposals.
- The WRCTC was successful in holding a Town meeting to develop criteria from town participants and send the Aesthetic Criteria for I-91 Bridge 9 to VTrans for incorporation into the RFP.

# Bridge Aesthetics

## Aesthetic Evaluation Committee:

The Committee formed by the Windham Regional Planning Commission to review and evaluate the Design-Build Proposals with regard to Bridge 9N and 9S aesthetics. The Aesthetic Evaluation Committee will evaluate the following subfactors:

- Approach to Visual Quality.
- Bridge 9 N&S rendered views from VT Route 30 and Interstate 91.
- Proposed Bridge 9 N&S Substructure and Superstructure **Geometry**.
- Proposed Superstructure **Shape, Texture, and Color**.
- Proposed Substructure **Shape, Texture, and Color**.



I-91 Bridge view from Route 30 looking north

# Visual Quality Management Plan

**A LIVING DOCUMENT**

I-91 Bridges 8 and 9  
Brattleboro IM 091-1 (65)  
A Design-Build Project

Prepared by the

**PCL+FIGG** TEAM



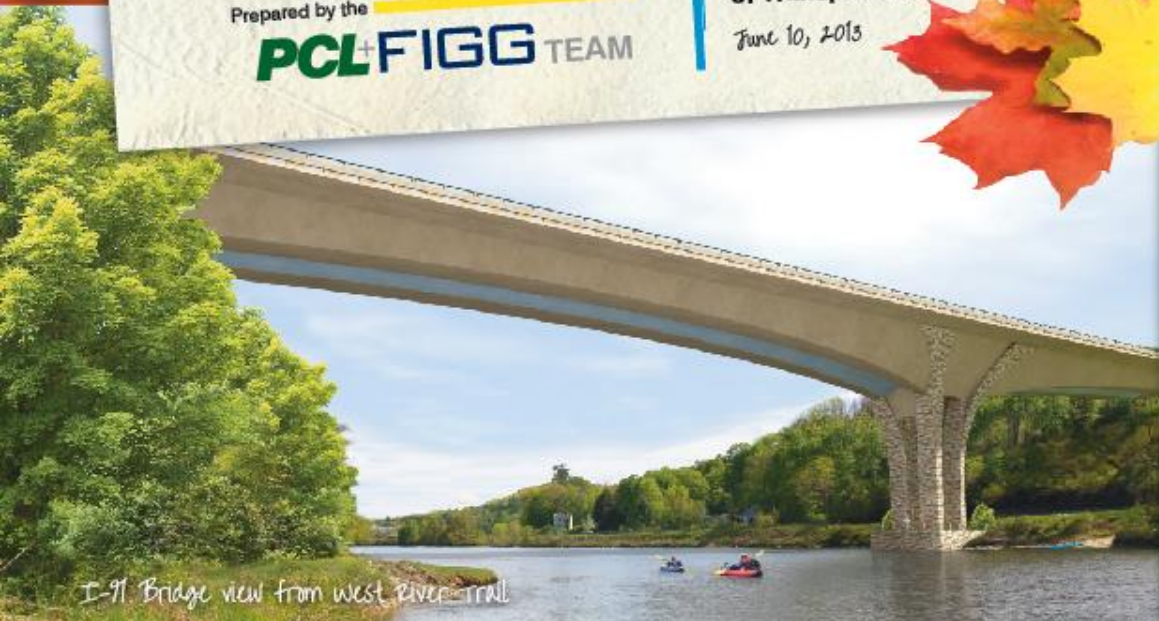
for the  
**VTrans**  
Vermont Agency  
of Transportation

June 10, 2013



V E R M O N T : A B R I D G E T O N A T U R E

## The I-91 Brattleboro Bridge Visual Quality Management Plan (VQMP) Visual Quality Advisory Team (VQAT)



I-91 Bridge view from west river-trail

# Visual Quality Advisory Team review

Visual Quality Advisory Team Review of Various Items	Results of Discussions
Formliner footing	
Formliner pier	
Concrete pattern on viewing platform	
Viewing platform railing (style & color)	
Footing & pier staining (color)	
Bridges 9 & 8 staining (color)	
Bridge concrete barrier staining & railing (color)	
Pier area landscaping	
I-91 median landscaping	

# Visual Quality Advisory Team Meeting

July 23, 2013  
Brattleboro, Vermont



# Bridge Aesthetics Used in FIGG Design Principals



Establish a Theme  
“A Bridge to Nature”

Blend Shapes

Create Shadows

Select Appropriate  
Textures

Choose Pleasing Colors

Open New Vistas

Use Native Landscaping

# Viewing Platforms - Gallery of the Natural Habitat



Deck pattern representing the White Pine Tree and the Great Seal of the State of Vermont with 14 branches like the first state seal.

Concrete walkway with slate pattern

Nature pedestrian railing

Solid Steel railing posts decided by Aesthetic Evaluation Committee

# Permanent Eco-stain with Stone Pattern



Allegheny River Bridge, PA



# Viewing Platforms - Gallery of the Natural Habitat



**Vault and Faceted Surfaces Break up 104' Width**  
**Stain Lightens the Underside Appearance / Blends with Sky**

# News Worthy



## A plan with no holes

FIGG, PCL Civil Constructors thorough with execution of I-91 span

# Brattleboro Reformer

Delivering Your Local News for 100 Years

Volume 102, No. 37  
 © 2014 New England Newspapers Inc. Tuesday, April 15, 2014 • Brattleboro, Vermont • www.reformer.com 75 cents

News | Local & State

## I-91 bridge emphasizes Vermont's dilemma

By Kevin O'Connor  
 Staff Writer | July 20, 2014

Like 0 Tweet 0 Email Article Print Article

## Shift in I-91 northbound bridge caused closure

By CHRIS MAYS

**BRATTLEBORO**—Public safety was cited as the main reason for the unexpected closure of the Interstate, between Exits 1 and 2, Saturday night through Sunday night, after “slight shifting” on the northbound bridge occurred during demolition. The closure lasted until just before 11 p.m., Sunday night, and created a traffic nightmare for travelers.

“We weren’t anticipating it being closed as long as it was. We had to make sure it was safe,” said Eric Foster, VTtrans resident engineer on the project.

After the slight movements were first detected, Saturday, the contractor and engineer did an analysis using a model for calculations.

“That told them how to jack the bridge back into place and what they needed to do to restrain the bridge from further movement,” said Vermont Agency of Trans-

portation Construction Engineer David Hoyne. “They did repairs. When it was complete, the engineer was consulted. Based on some information, he was able to determine the bridge was stable at its current place.”

Hoyne told the Reformer that the northbound bridge was the only structure that moved. The existing bridge which carries southbound traffic did not.

However, until it was determined what the structure’s shifting meant for the entire project, both lanes of the bridge were closed.

The bridge was closed in coordination with the Vermont Agency of Transportation. According to a press release, concerns encountered during the demolition were fully addressed before the bridge’s reopening.

PCL Marketing Manager Natalie Bagg told the Reformer that during demolition phases, sched-

See BRIDGE, Page 3



Kevin O'Connor / Staff Photo

Linn (right) leads a tour of an project — the biggest in state leborbo exits 2 and 3.

## The CommonsOnline

YOUR INDEPENDENT, NONPROFIT SOURCE OF NEWS AND VIEWS FROM WINDHAM COUNTY, VERMONT

## Interstate 91 bridge construction is behind schedule

Harsh winter, other delays push expected completion date to Nov. 2016

By Olga Peters/The Commons

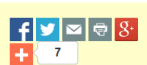
**BRATTLEBORO**—A heavy Vermont winter, delayed storm water management permits, and soil issues have extended the expected opening date for the Interstate 91 West River bridge into November 2016.

The project’s original deadline was by the end of the 2015-16 winter season, Secretary of Transportation Susan Minter told town officials Monday.

Minter broke the unpleasant news to the Selectboard and department heads during a special board meeting.

“This bridge is behind schedule,” she said. “That is not the news I like to bring to you.”

Minter visited town to break the news in person. She and AOT colleagues discussed the \$66 million project’s new deadline and solicited feedback from the board and municipal employees about lessening the impact of traffic on the community.



Originally published in The Commons issue #298 (Wednesday, March 25, 2015). This story appeared on page A1.

If you’d like to share this story on your website, please feel free to do so with credit to The Commons and a link back to commonsnews.org.

## Bridge

Continued from Page 1

ing can be difficult to predict.

Project managers had expected to have the bridge opened again on Sunday morning but it took more time to assess the situation. “Traffic from both lanes on I-91 were sent the south Brattleboro in downtown streets, Canal Street and Route 5 were among the roads that were most backed up.”

Brattleboro Interim Town Manager Patrick Moreland said he believed project managers had done the right thing.

“There was a plan worked out to reroute traffic around the bridge as an emergency situation like this,” he added. “It’s not surprising to me there was traffic congestion. We were able to identify

There were reports of traffic causing massive delays and local police presence at the scene was questioned.

“The bridge closure was forced and not optional,” said Vermont State Police Troop D Commander Captain Ray Keele. “Resources were in place and no emergencies were left unhandled. Any time there is a forced closure or delay such as occurred here, there is understandable frustration by motorists and we of course did everything we could to mitigate such frustrations.”

According to Bagg, the project is on schedule and the portion of I-91 that was closed is expected to reopen soon.

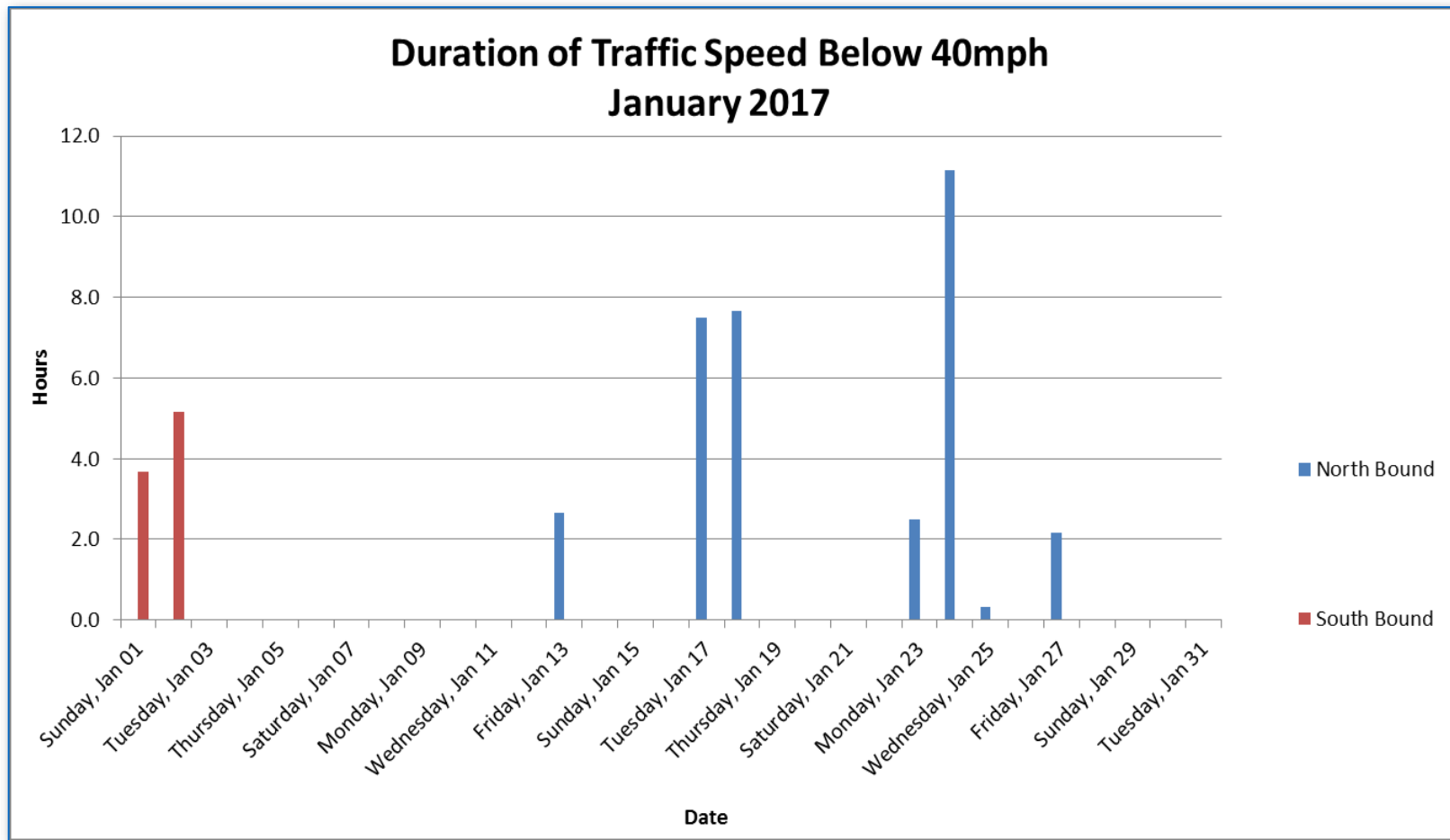
“We’re back on track,” she said. Chris Mays can be reached at



Construction on the I-91 bridge on April 9.

Photo: Alan Reformer

# Traffic Monitoring – Smart Work Zone



# Public Outreach

**PCL FIGG TEAM** VERMONT AGENCY OF TRANSPORTATION

**I-91 BRATTLEBORO BRIDGE** | A BRIDGE TO NATURE

Stakeholder updates  
Texting Services  
Live Cameras  
Progress photos

- PROJECT UPDATES
- TRAFFIC MONITORING
- FRIENDS OF WEST RIVER TRAIL
- CONSTRUCTION GALLERY
- COMMUNITY OUTREACH
- PROJECT TEAM
- COMMENTS

The I-91 Brattleboro Bridge Improvements Project located in Brattleboro, Vermont includes the replacement of four bridges with two new bridges (Bridges 8 & 9). This Design/Build project is being designed by FIGG Bridge Engineers, Inc. and built by PCL Civil Constructors, Inc. for the Vermont Agency of Transportation (VTrans).

Bridge 8 will carry the northbound and southbound lanes of I-91 over Upper Dummerston Road using NEXT Beams. Bridge 9 will be a new 3-span, 1,036-foot arching concrete bridge over the West River built utilizing balanced cantilever construction. Standing 100 feet above the scenic valley, the 515-foot main span forms an open gateway anchored by curving, cathedral piers. This postcard worthy bridge will feature viewing platforms for pedestrians, hikers and visitors at the base of each pier overlooking the West River and mountainous valley. True to its theme "A Bridge to Nature," every detail of the uniquely-shaped superstructure, piers, viewing platforms, and the railings will be complementary of the natural landscape. The piers will feature Vermont inspired, stone-formed concrete that blends

### TRAFFIC ALERTS

[Public Invited to Trail Talk, Saturday, July 12](#)

[Click Here for Live Traffic Cameras.](#)

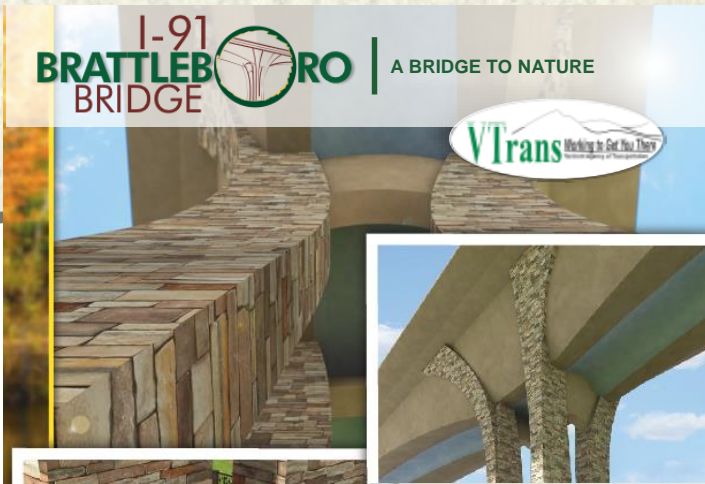
We recommend using [Google Chrome](#) to view the live traffic cameras.  
[Click here to download the Google Chrome browser.](#)

# Community “Trail Talks”- Second Saturday of Each Month



**Trail Talks to Share  
The Progress of Construction**

Trail Talks – Each month

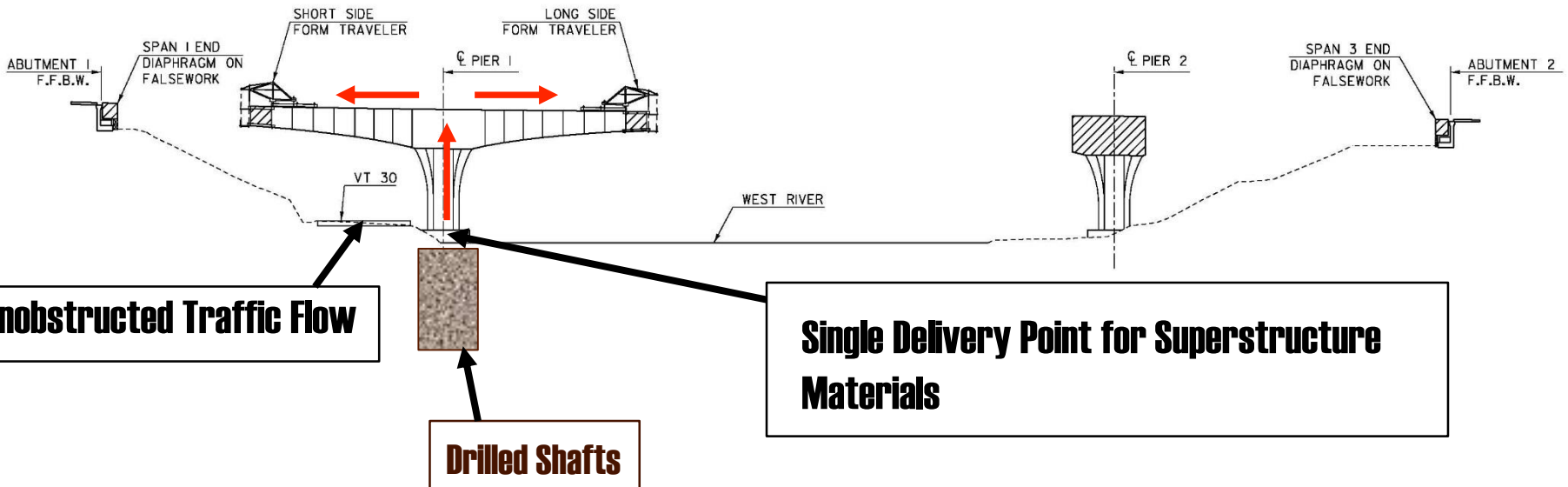


**Educational Tool for School Children Customized with the Brattleboro Bridge**

Local middle schools will be given a Bridge Basics Kit, created by FIGG and the National Building Museum

# Cast in Place Balanced Cantilever Construction

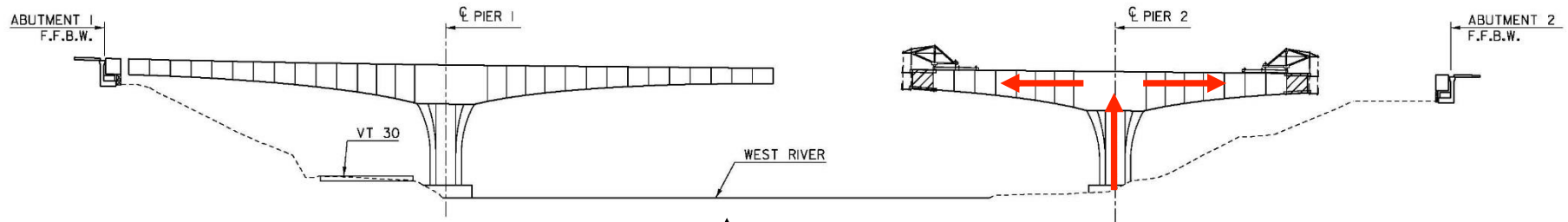
1. Construct Substructure
2. Complete Demo of Existing Bridge
3. Construct Cantilever 1



# Balanced Cantilever Construction

4. Construct Cantilever 2

5. Construct Abutments and End Diaphragms



**Unobstructed  
Recreational River  
Access**



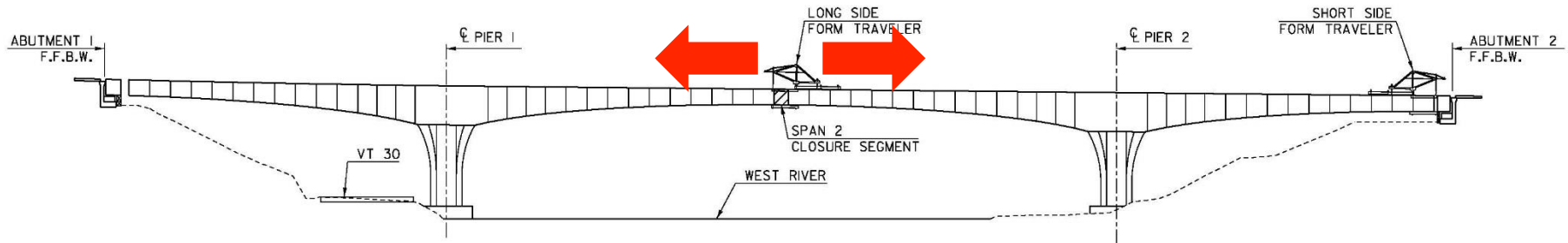
# Balanced Cantilever Construction

6. Longitudinally Jack Main Span

7. Close Span 2

8. Close Span 1

9. Close Span 3

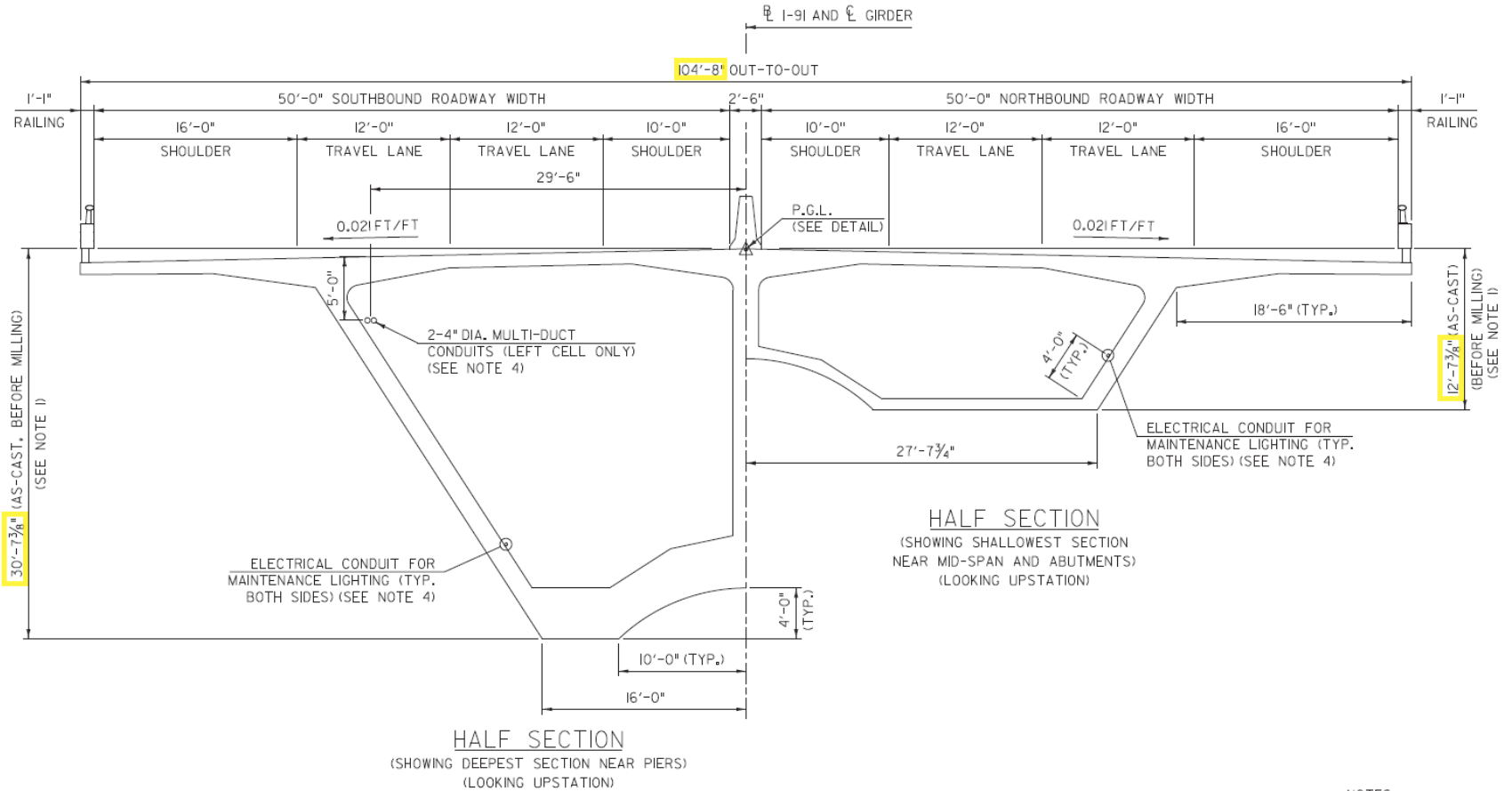


**14,000 CY Superstructure Concrete (8,000 psi) -56 million pounds**

**1,100,000 LB Post-Tensioning**

**3,000,000 LB Rebar (incl. 900,000 LB Stainless)**

# Cross-Section of Bridge



NOTES

# Pier 1



# Pier 2



# Aerial Photo



# Route 30



# Completed Structure



# Cost of Project

<b>Original Bid Price:</b>	<b>\$59,490,000.00</b>
<b>Current Contract Value:</b>	<b>\$60,233,048.30</b>
<b>Change Orders:</b>	<b>\$2,118,888.30</b>
<b>Global Settlement:</b>	<b><u>\$(1,375,840.00)</u></b>
<b>Increase in Contract Value (+1.3%):</b>	<b>\$743,048.30</b>



# Project Schedule

The current milestone dates for the Project are as follows:

## Contract Dates

- Contract Substantial Completion June 29, 2017
- Contract Final Completion November 22, 2017

## Current Schedule (01/09/16)

- Contractors Scheduled Substantial Completion June 20, 2017
- Contractors Scheduled Final Completion October 30, 2017

## Milestones

- Two lanes Northbound March 13, 2017
- One lane Southbound April 19, 2017
- Four lanes of Traffic June 15, 2017

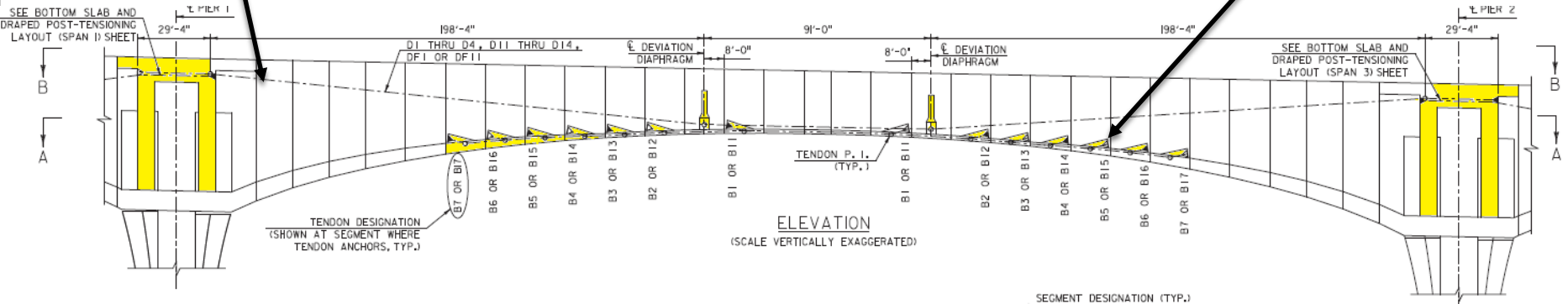
# Winter 2017 Construction



**Draped Tendons**



**Bottom Tendons**



# Winter 2017 Construction



**Expansion Joints**

# Winter 2017 Construction

## Bridge Rail



## Median Barrier



# Winter/Spring 2017 Construction

## Diamond Grinding the Deck

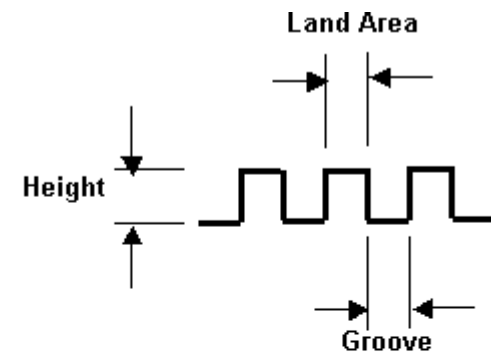


## Sealing the Deck



# Winter/Spring 2017 Construction

## Concrete Deck Grooving



	Range of Values mm (in)	Hard Aggregate mm (in)	Soft Aggregate mm (in)
<b>Grooves</b>	2.0 – 4.0 (0.08-0.16)	2.5 – 4.0 (0.1-0.16)	2.5 – 4.0 (0.1-0.16)
<b>Land Area</b>	1.5 – 3.5 (0.06-0.14)	2.0 (0.08)	2.5 (0.1)
<b>Height</b>	1.5 (0.06)	1.5 (0.06)	1.5 (0.06)
<b>No. Grooves per meter</b>	164 – 194 (50-60)	174 – 194 (53-60)	164 – 177 (50-54)

# Spring 2017 Construction

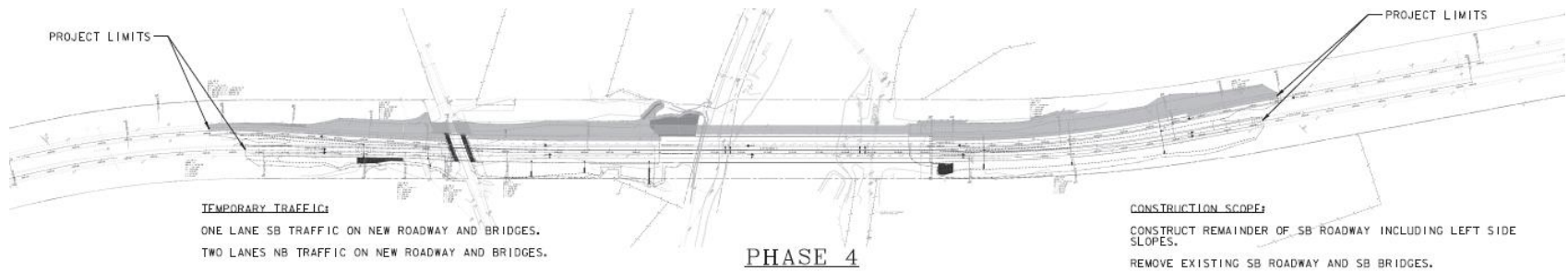
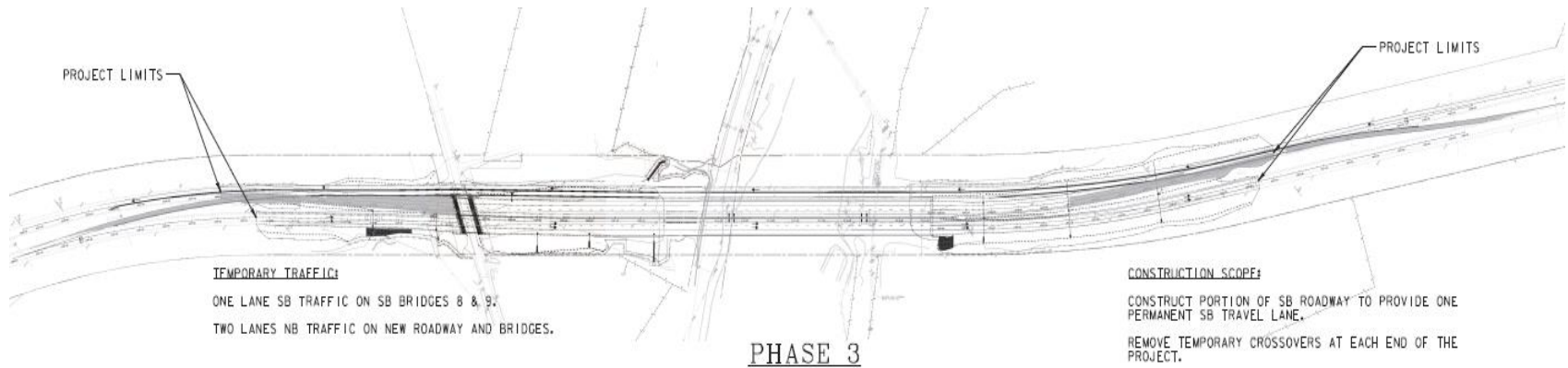


**Pavement Markings**

**Rubble Strips**



# Spring/Summer 2017 Construction



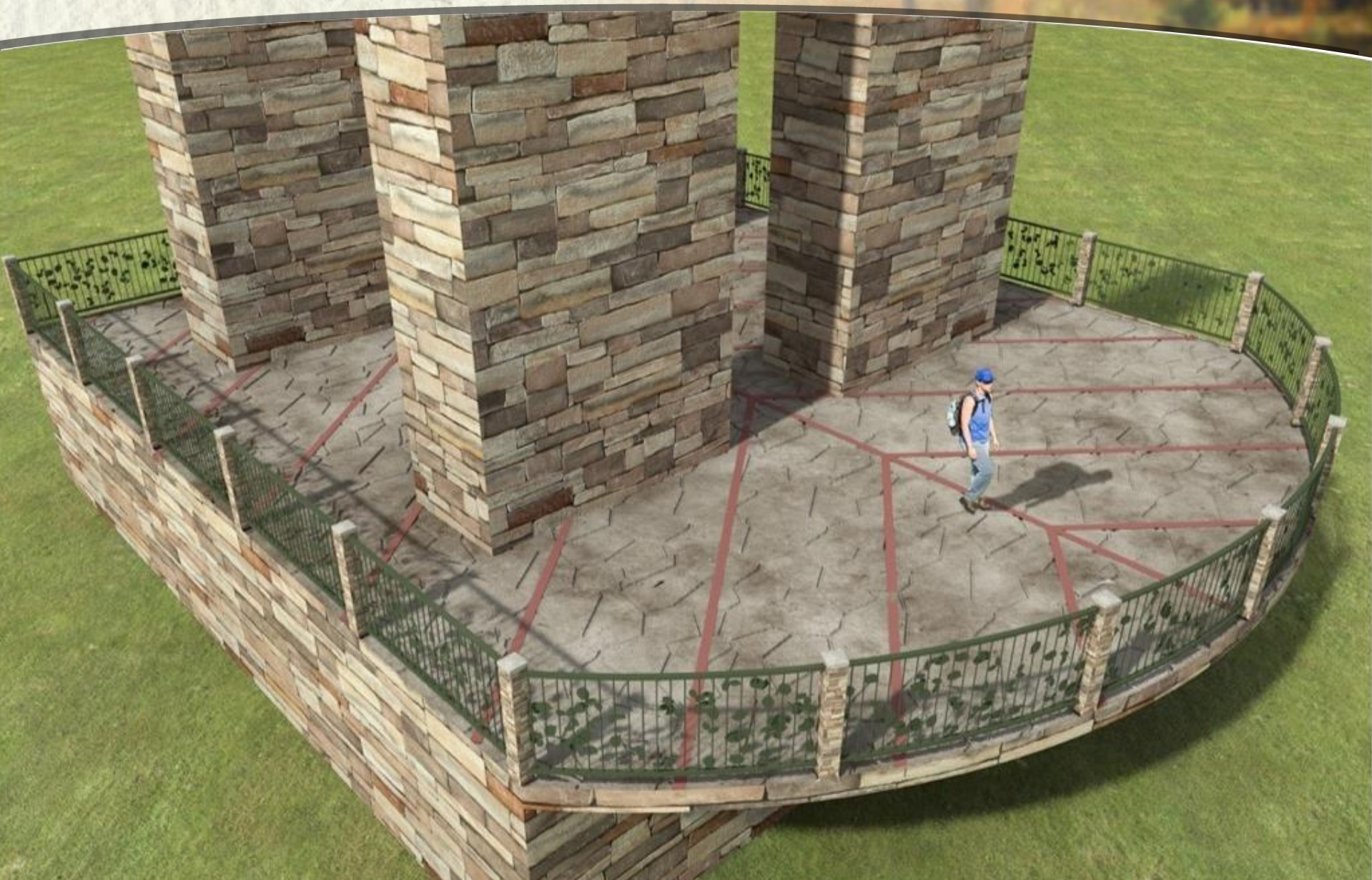


# Summer 2017 Construction

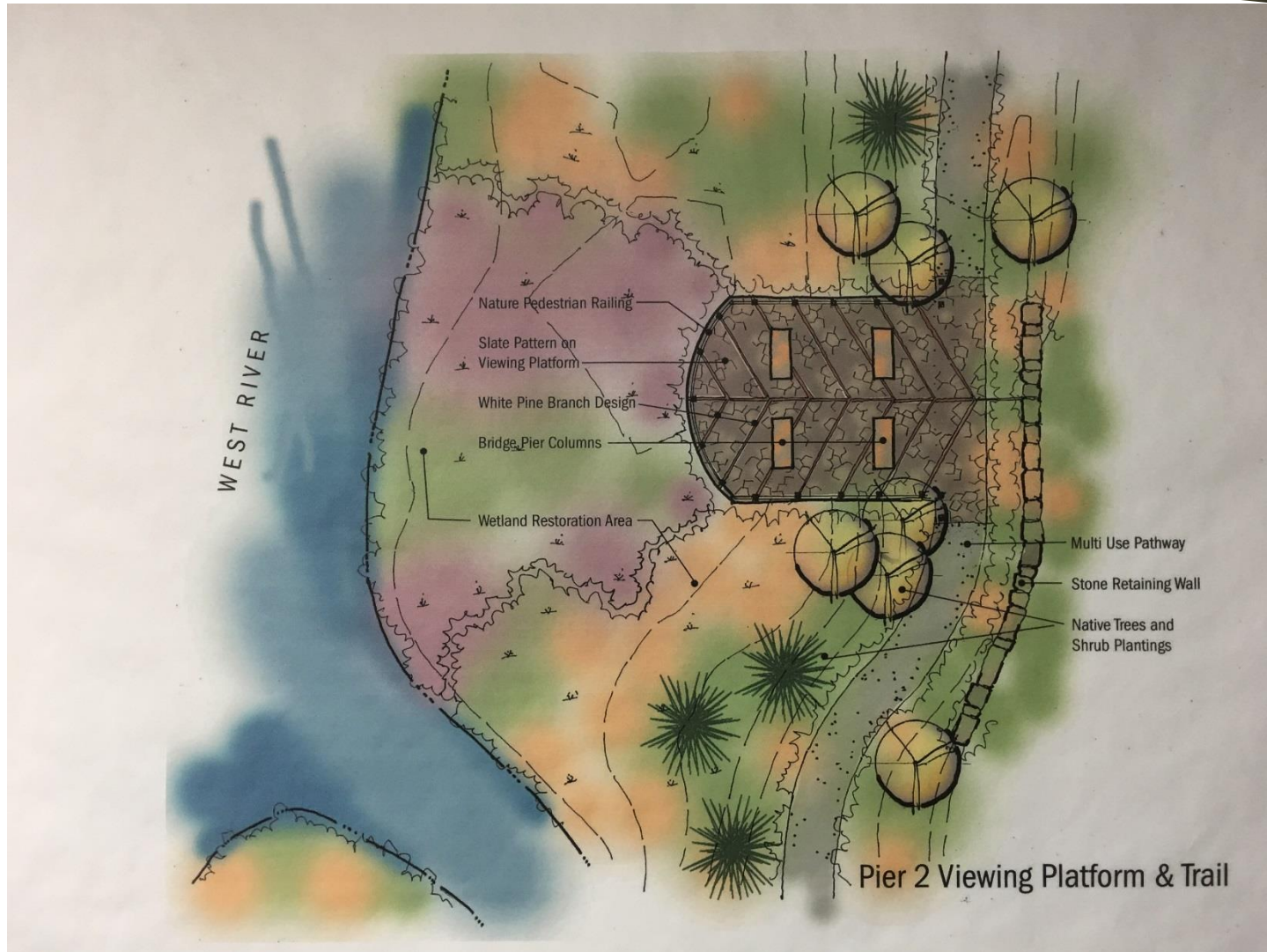


**Demolition of Bridge 8S and 9S**

# Summer 2017 - Viewing Platforms



# Summer 2017 Construction



## Landscaping



Questions?