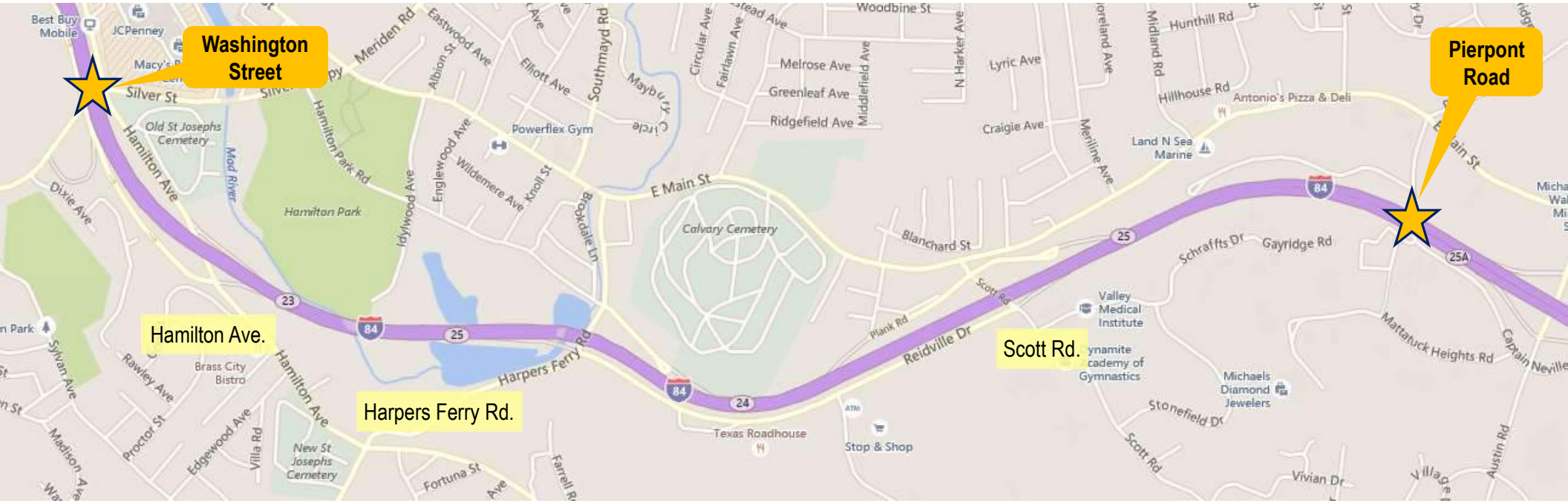
I-84 Waterbury Project

PROJECT DESCRIPTION

2.7 miles of highway reconstruction to provide a continuous third lane

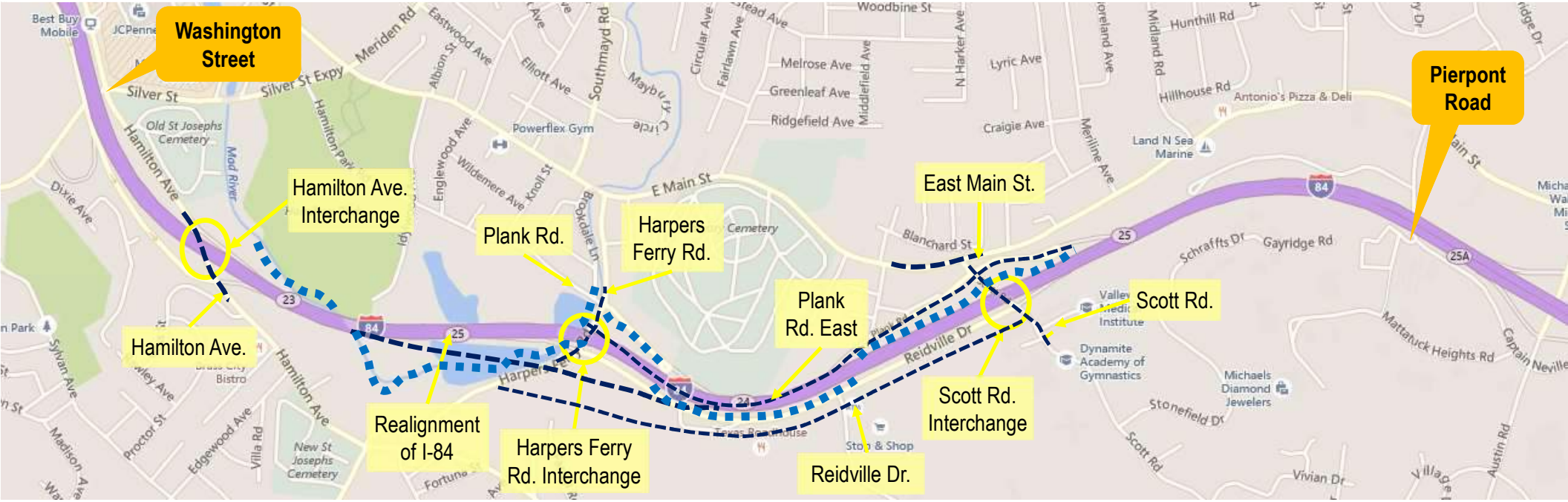
- From Washington Street to Pierpont Road



PROJECT DESCRIPTION

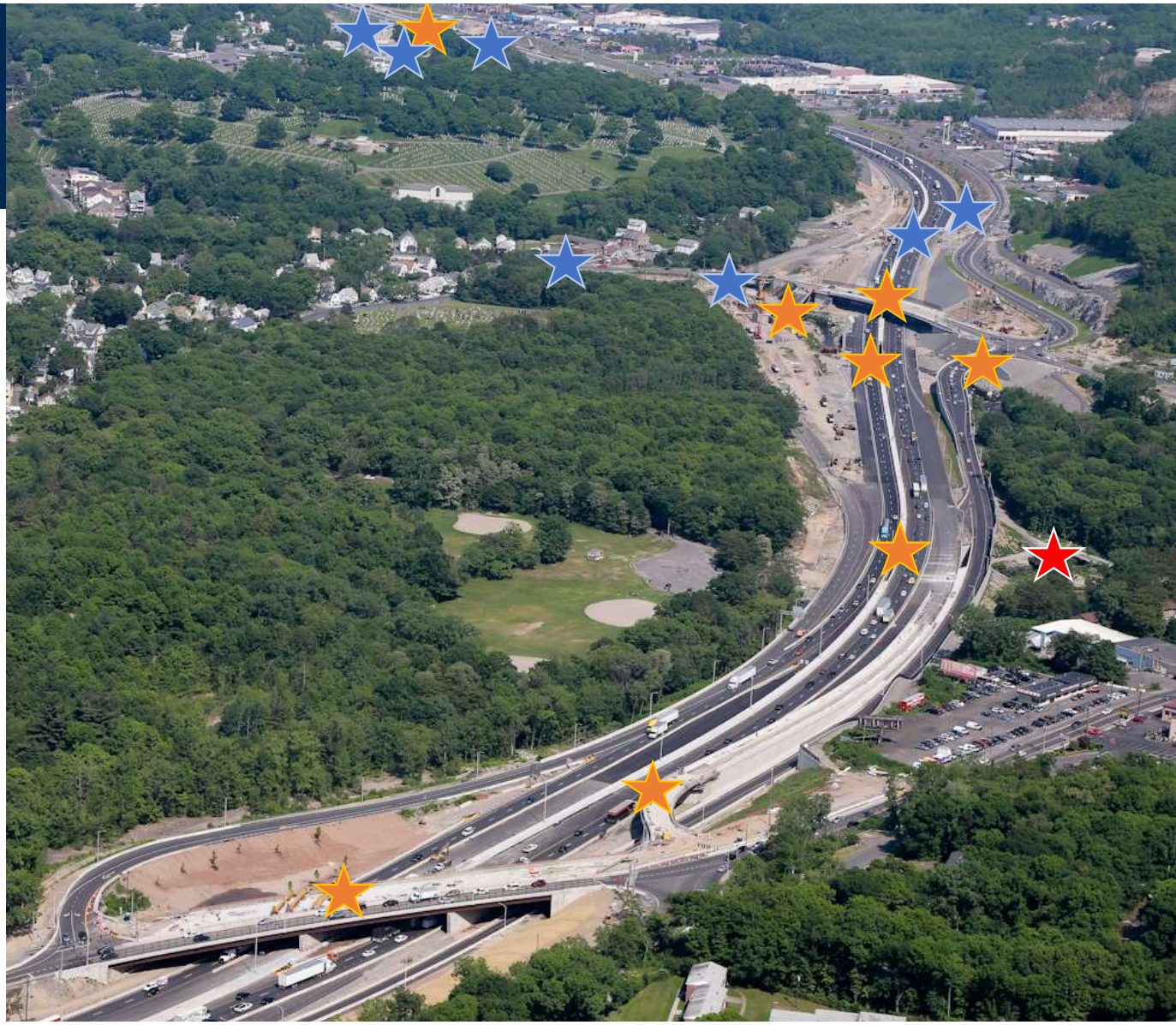
2.7 miles of highway reconstruction and includes:

- Relocation of Mad River and Beaver Pond Brook



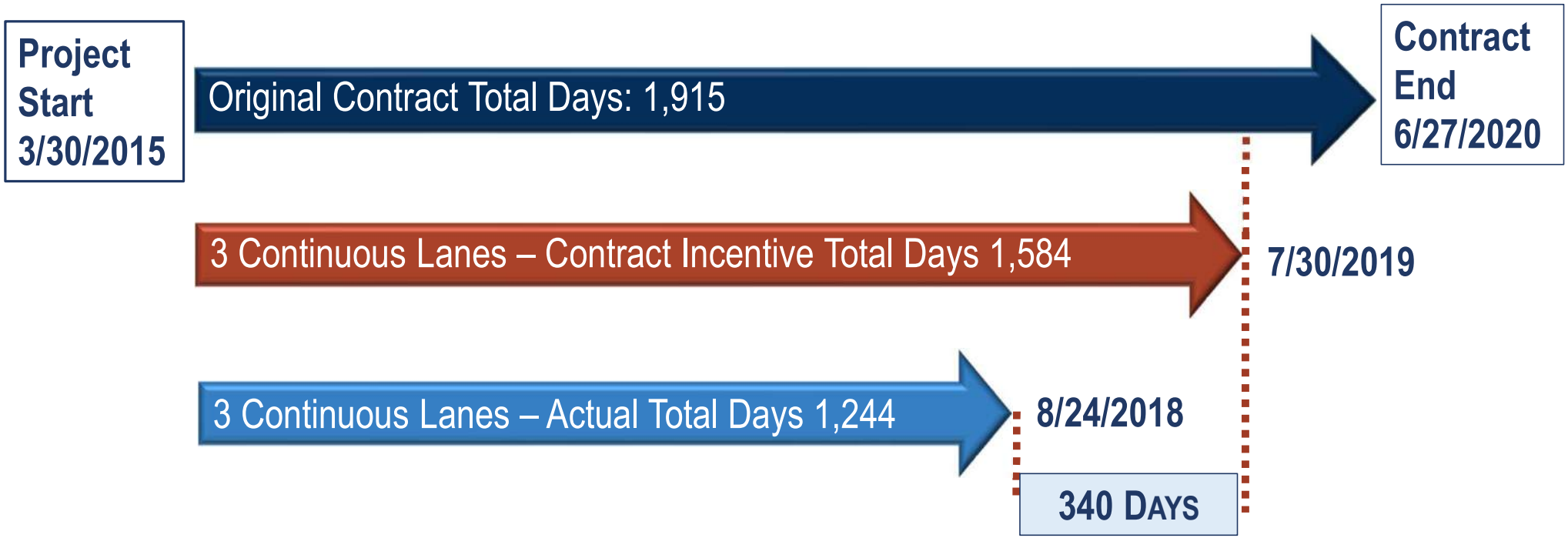
Project Overview

- Replacement of 8 Highway Bridges
- One Pedestrian Bridge
- Seven Culverts
  - 20 Retaining Walls
  - Replacing/Upgrading Traffic Signals
  - New Highway Illumination, Signs & Pavement Markings
  - Replacing Sanitary Sewer, Potable Water & Other Utilities



Construction Schedule and Cost

Original Contract Value:	$260 Million
Change Orders:	$ 18 Million
Total Cost:	$278 Million



Major Overpasses/Interchanges

Hamilton Avenue Bridge Vicinity

June 2015

Hamilton Avenue Bridge

Hamilton Avenue Bridge

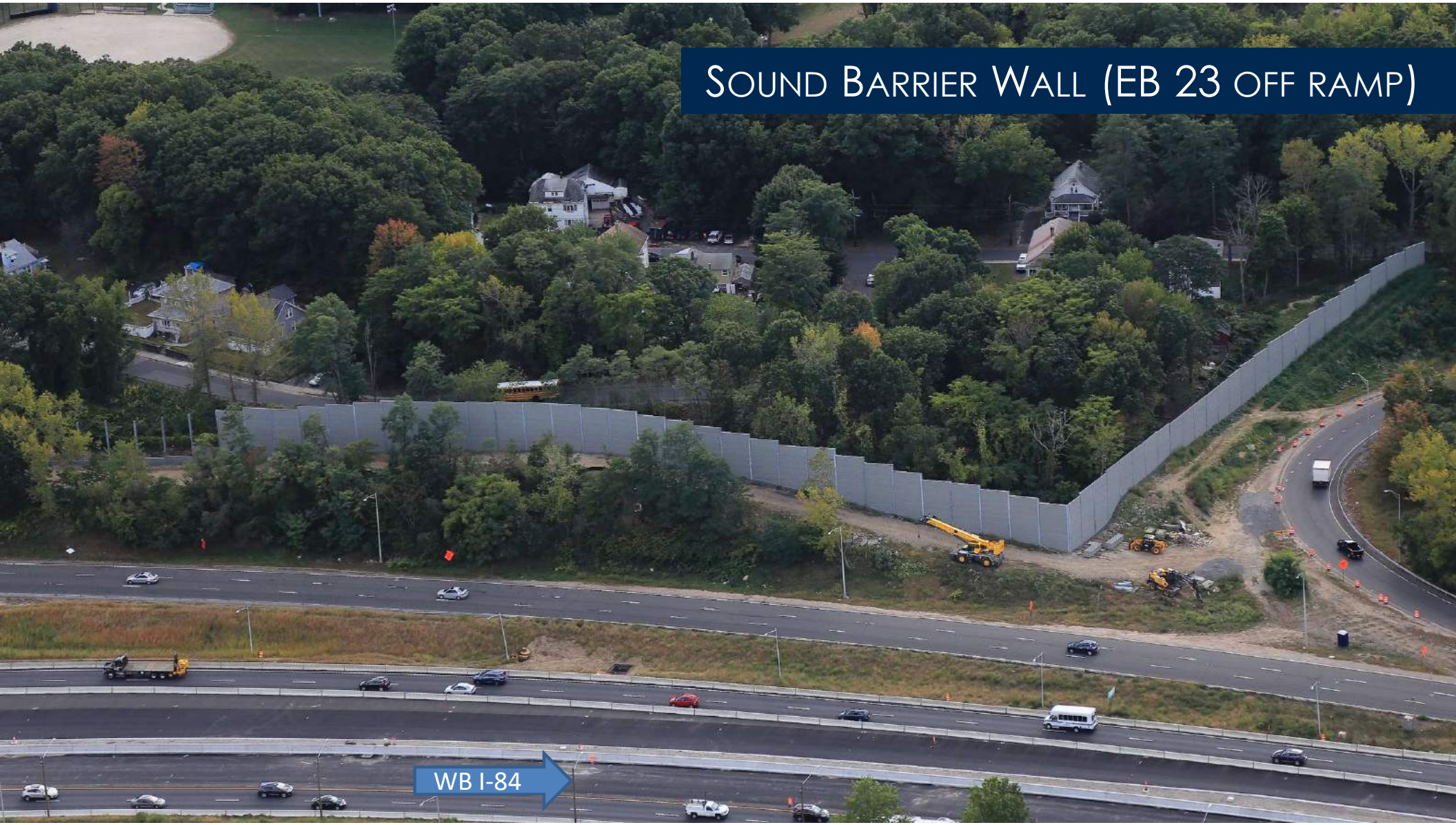

HAMILTON AVENUE BRIDGE
WB I-84


HAMILTON AVENUE BRIDGE
Former Eastern Portion for Demolition and Reconstruction
New Western Portion with Shifted Traffic
WB I-84

Hamilton Avenue Bridge Vicinity and I-84 EB Off-ramp

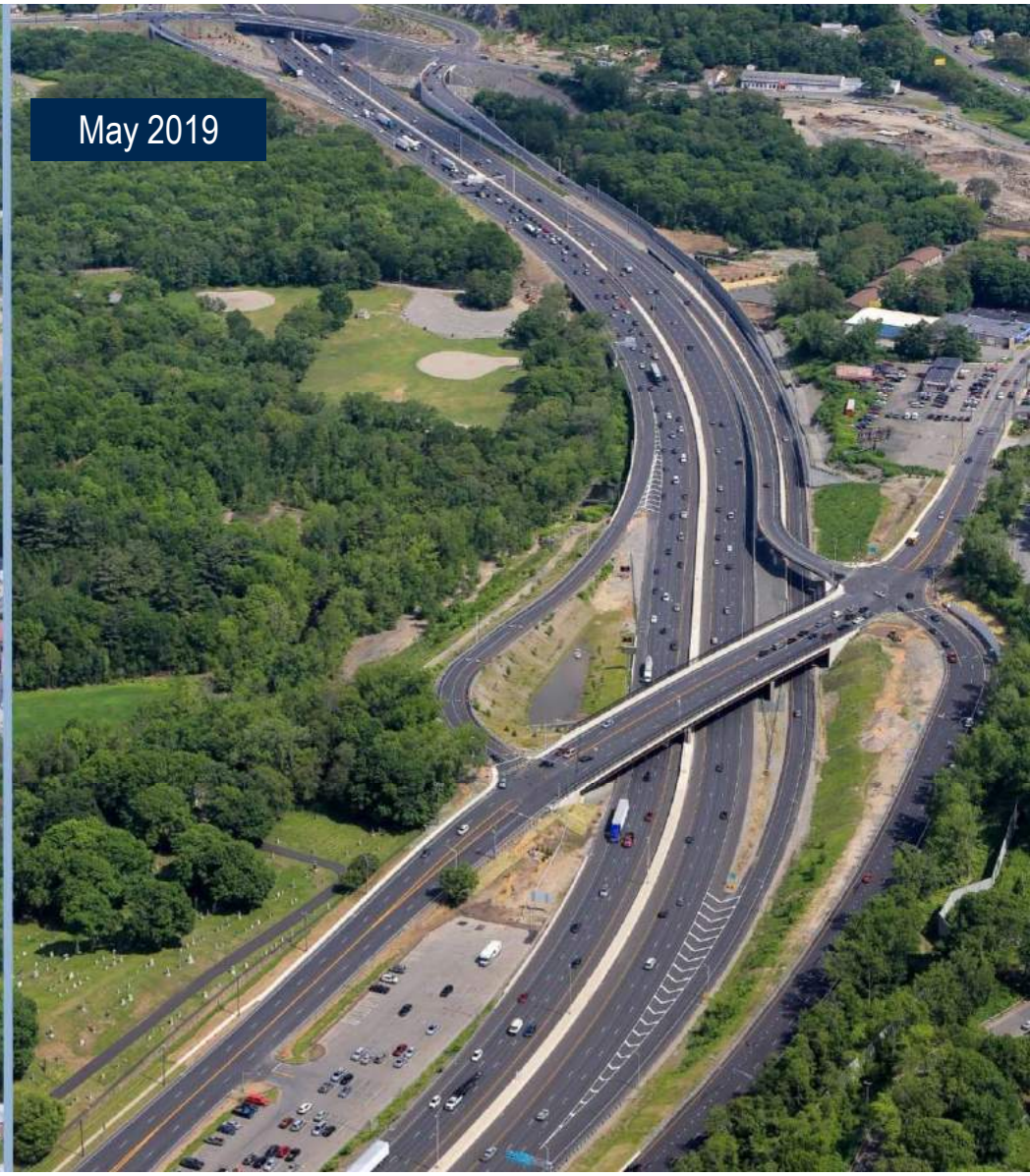
Future EB 23 On-Ramp from Hamilton Avenue

Sound Barrier Wall (EB 23 off ramp)



April 2018


May 2015


May 2019

HARPERS FERRY ROAD BRIDGE VICINITY

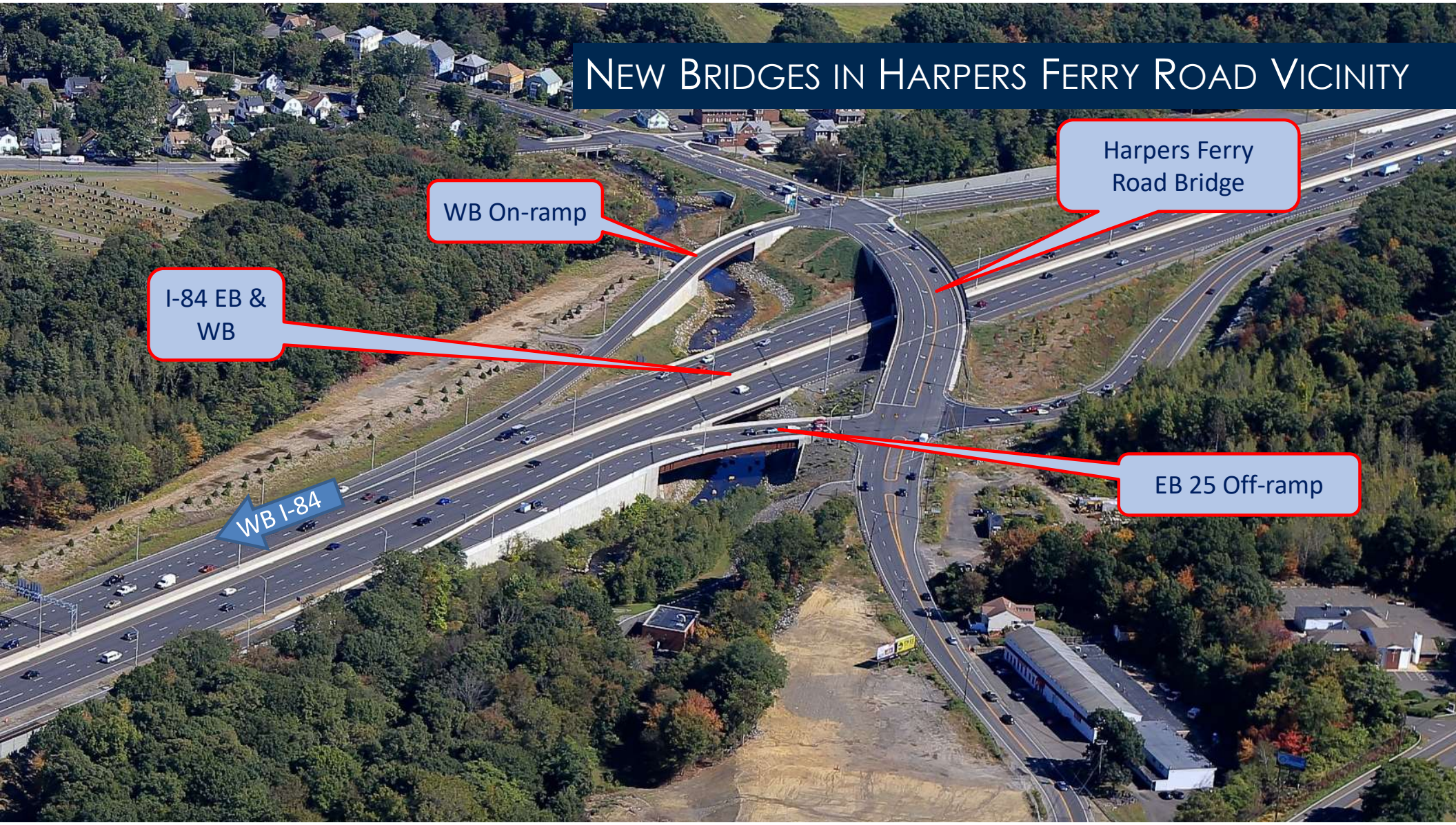
September 2017

Future I-84 Over Mad River Western Crossing


Future I-84 bridge
SEA BOX
RENTALS


Future I-84 bridge
April 2018


WB I-84


NEW BRIDGES IN HARPERS FERRY ROAD VICINITY
Harpers Ferry Road Bridge
WB On-ramp
I-84 EB & WB
EB 25 Off-ramp
WB I-84

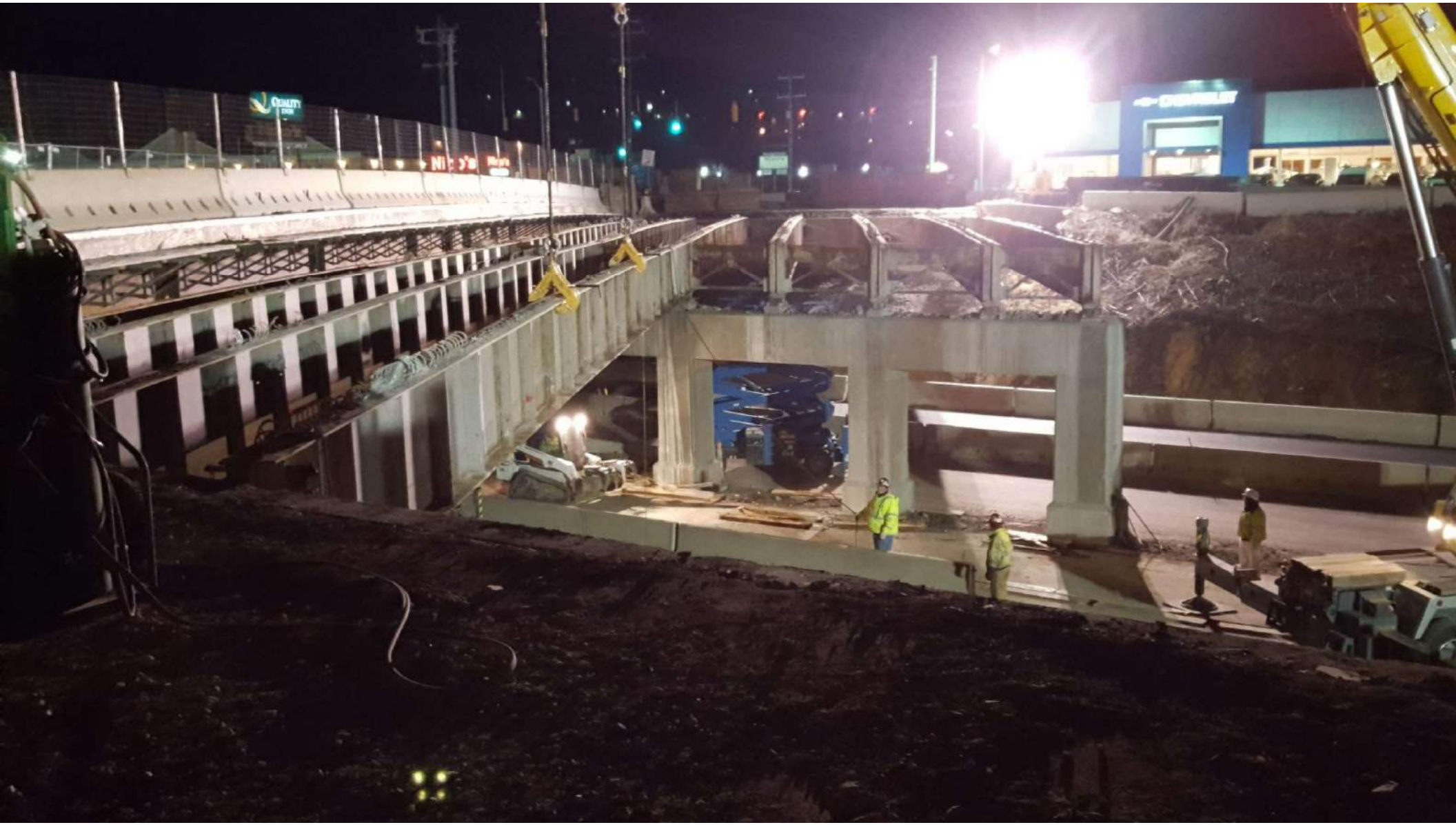
Path for I-84 From Harpers Ferry Road Bridge Vicinity, Facing West


May 2015
May 2019

Scott Road Bridge Vicinity

June 2015


WB I-84
Mobil


QUALITY
CHEVROLET


BAY CRANE


FedEx
FedEx

Scott Road (Najla G. Noujaim Memorial) Bridge Vicinity


May 2015
May 2019

River/Brook Relocation - Enhancements

Mad River

Mad River

Mad River

Mad River


Mad River


MAD RIVER


MAD RIVER

Beaver Pond Brook

Relocating Beaver Pond Brook

Relocating Beaver Pond Brook

Relocating Beaver Pond Brook

Relocating Beaver Pond Brook

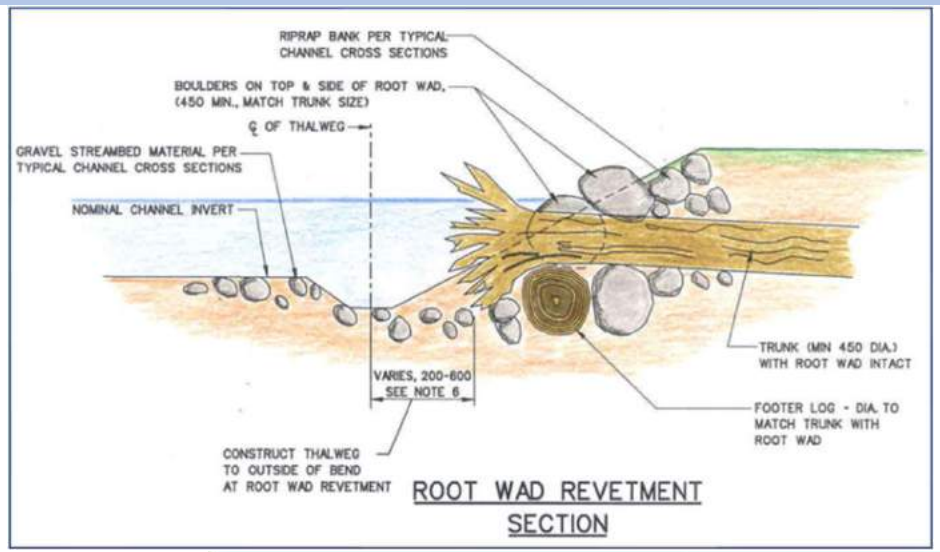
Relocating Beaver Pond Brook

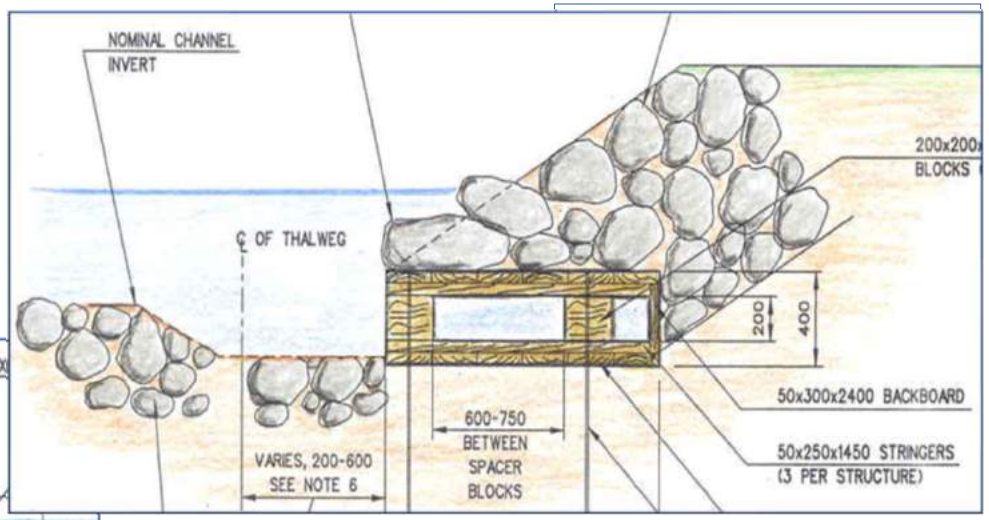
Relocating Beaver Pond Brook

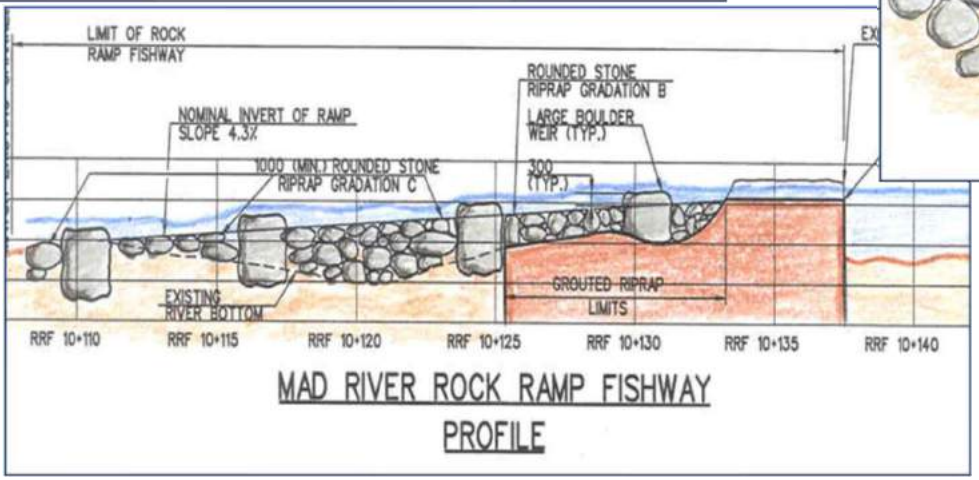
Relocating Beaver Pond Brook


RELOCATING BEAVER POND BROOK IN SCOTT ROAD VICINITY
To Here
From Here
May 2015

RIVER/BROOK RELOCATION ENHANCEMENTS







Local Roadways

Reidville Drive
October 2017

Reidville Drive


Reidville Drive
Blasting and MPT


REIDVILLE DRIVE
WB I-84


REIDVILLE DRIVE
WB I-84


REIDVILLE DRIVE
WB I-84
April 2017


REIDVILLE DRIVE
WB I-84
March 2018
WB I-84


REIDVILLE DRIVE
September 2018

Reidville Drive

PLANK ROAD EAST

June 2015


PLANK ROAD EAST
WB I-84

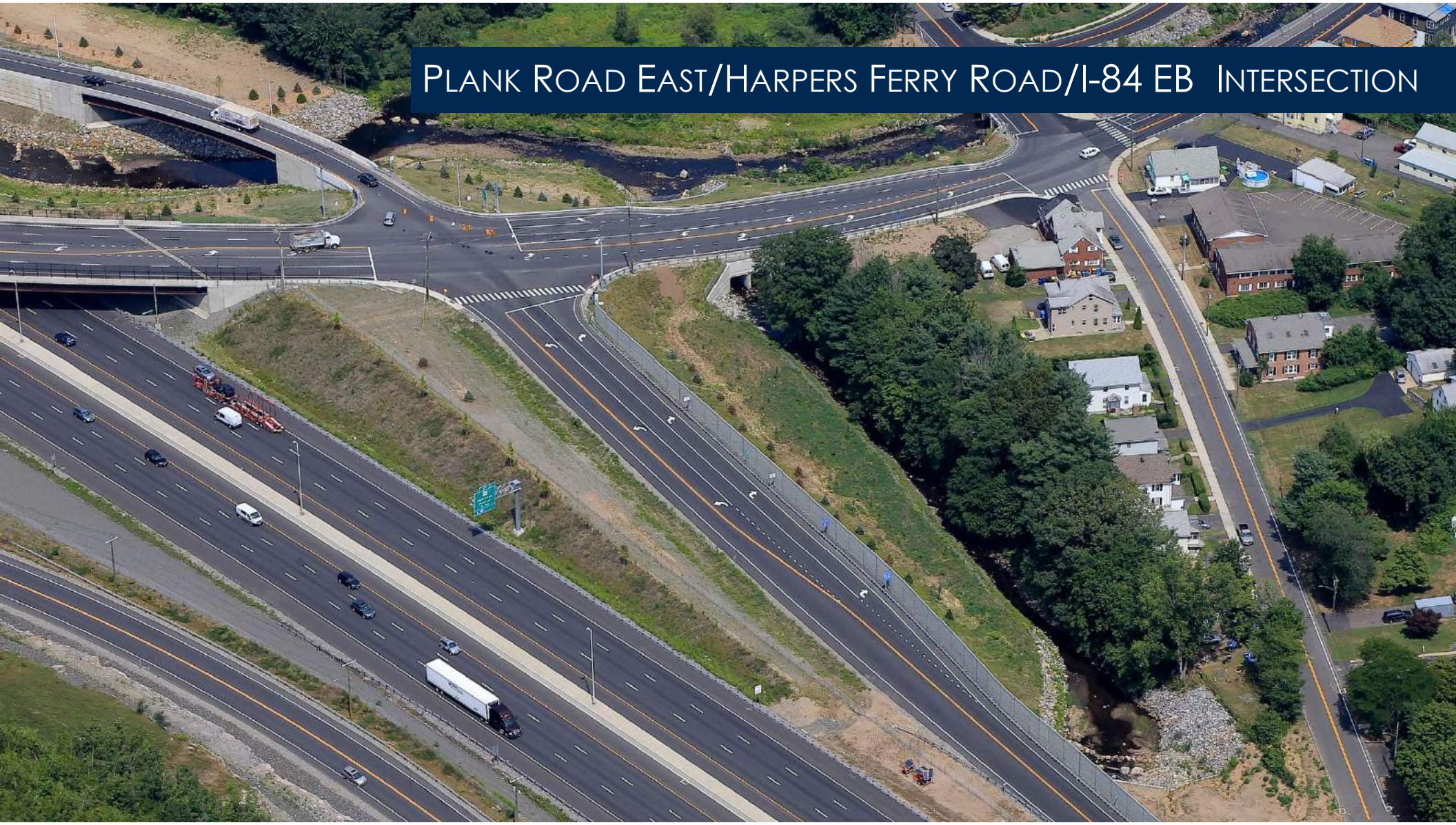
Plank Road East


PLANK ROAD EAST


BP

Plank Road East

Plank Road East/Harpers Ferry Road/I-84 EB Intersection



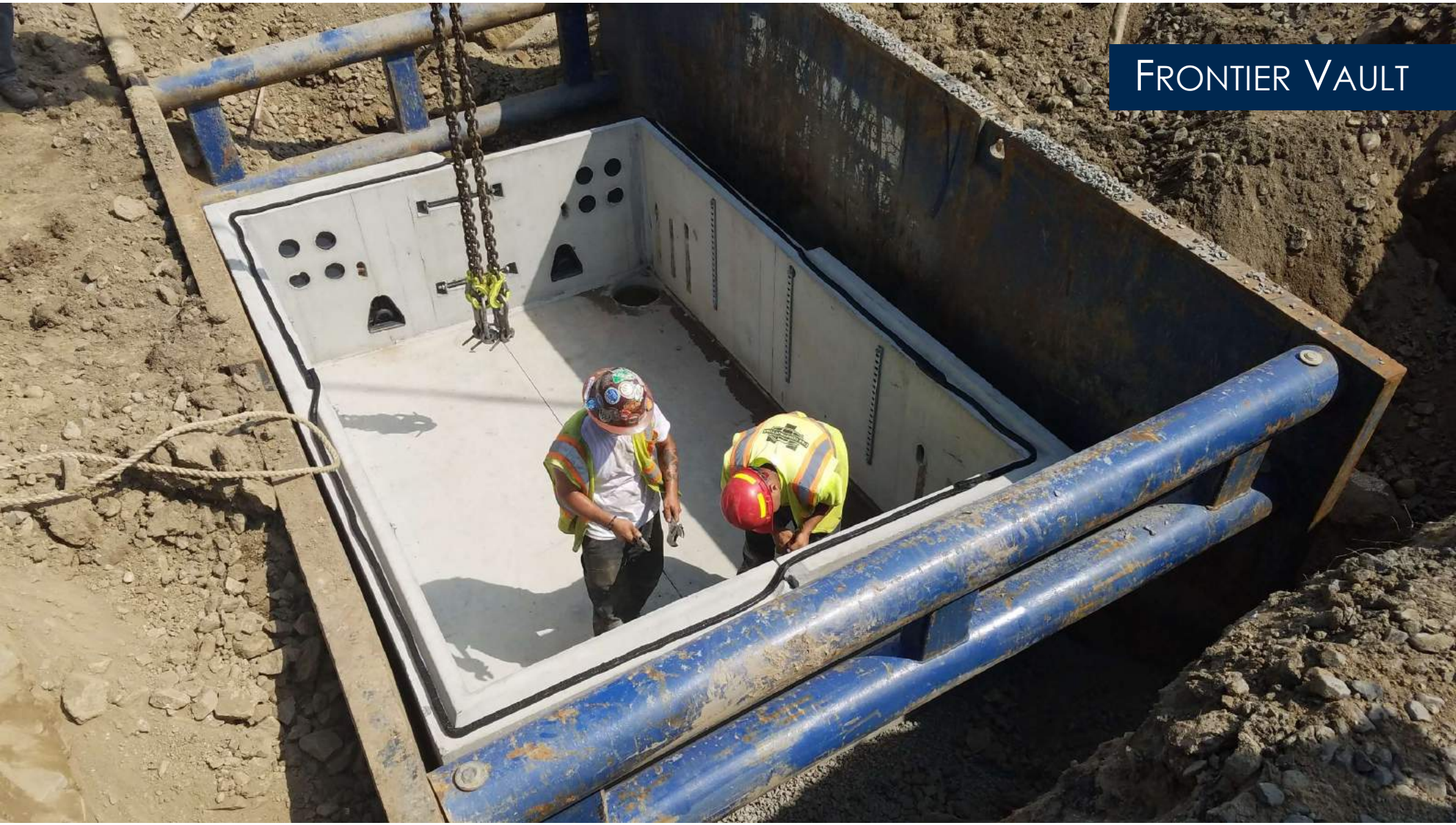
East Main Street


East Main Street

Challenges and Innovative Solutions

Utility Coordination


FRONTIER VAULT


FRONTIER VAULT

FRONTIER VAULT


FRONTIER VAULT


RIZZO

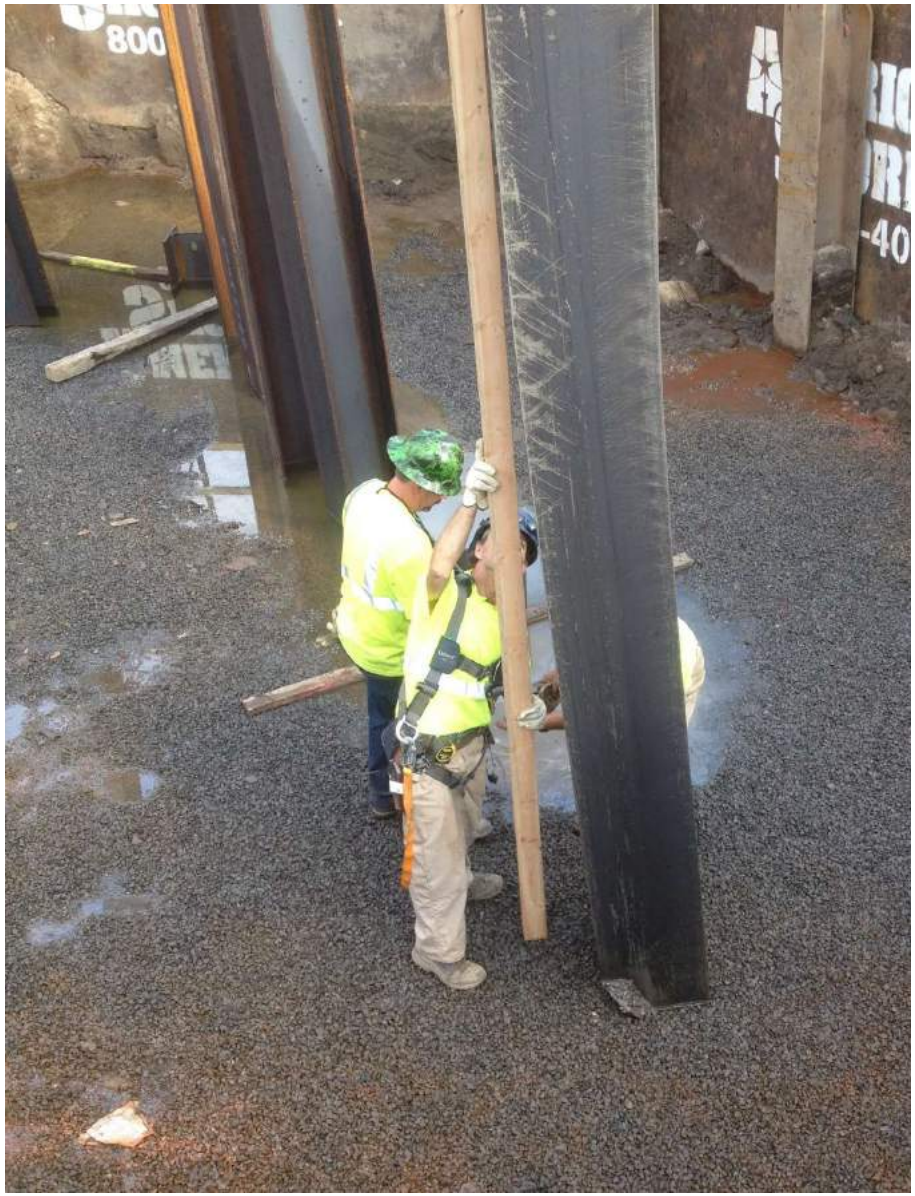
In-Water Work Coordination

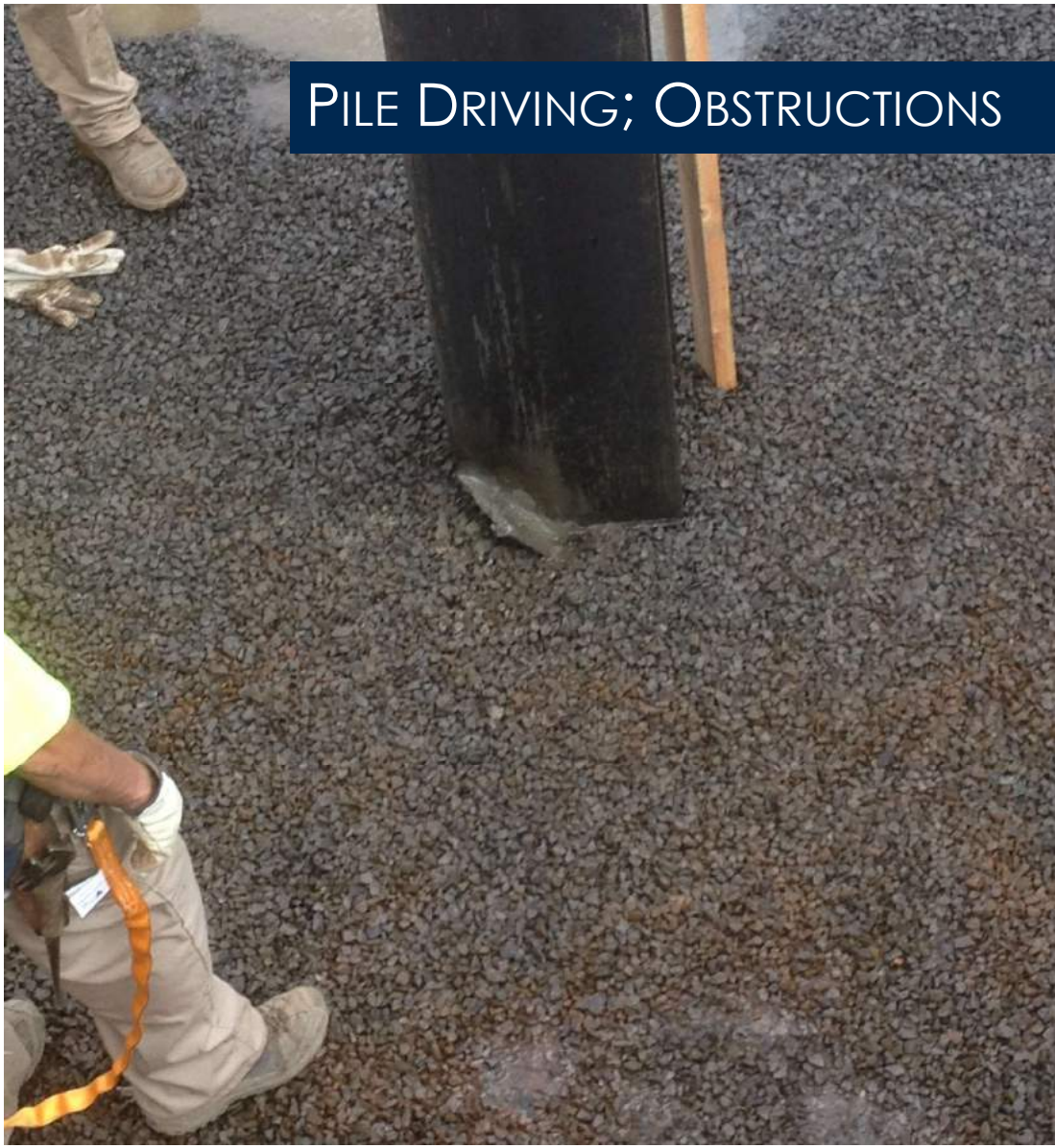

CAT


CAT

Pile Driving Obstructions

Pile Driving; Obstructions





Pile Driving; Obstructions

Pile Driving; Obstructions

Retaining Wall 106

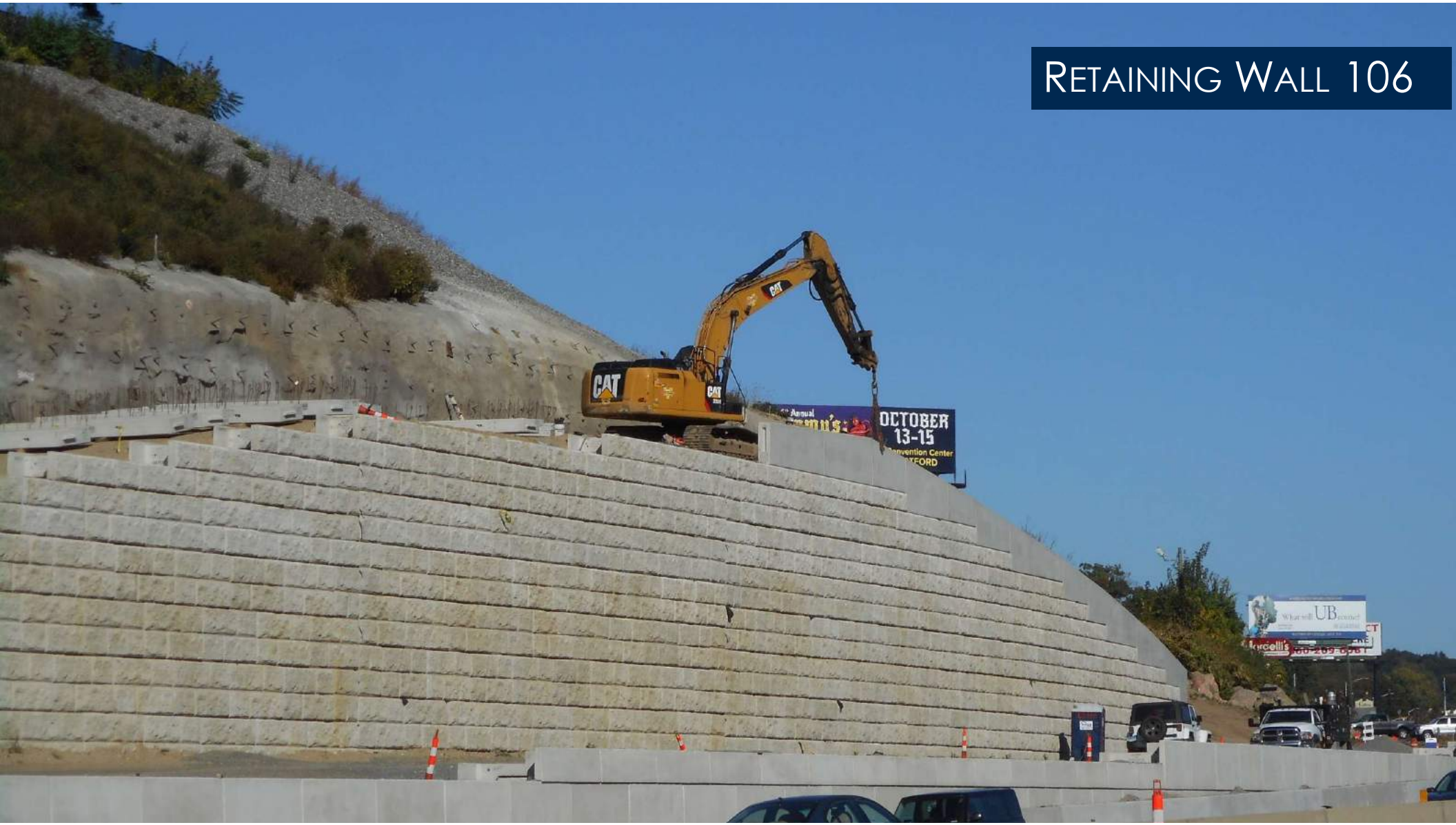
June 2017

RETAINING WALL 106

Retaining Wall 106

Retaining Wall 106

Retaining Wall 106



Retaining Wall 106

USE OF PRECAST DOUBLEWAL UNITS

North of Reidville Drive: Culvert Under I-84

RETAINING WALL 104 (SOUTH OF EB 23 ON RAMP)


UNITED
UNITED
UNITED
UNITED

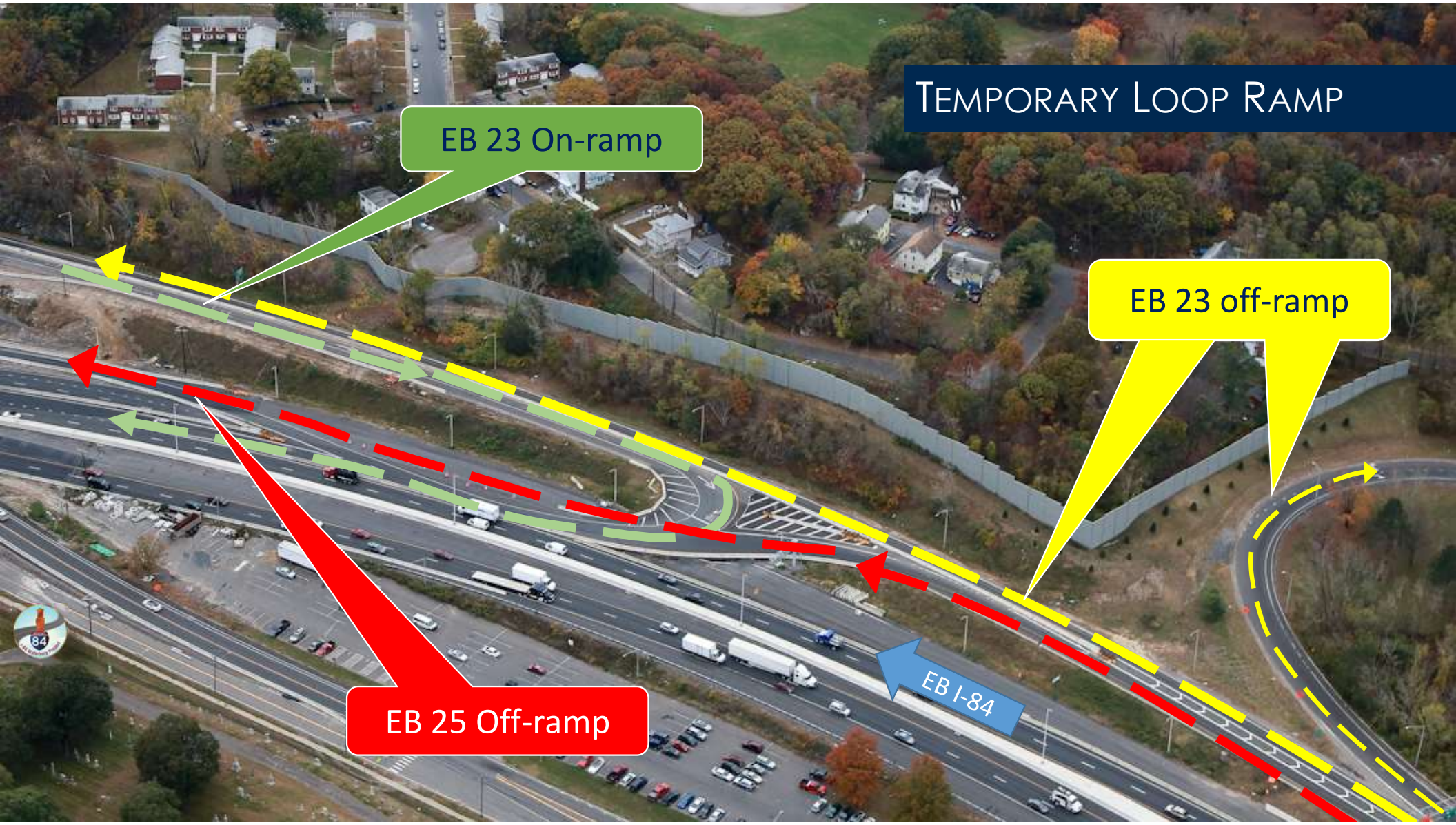

EXIT
25
24 HOUR
DINE IN
DRIVE THRU
CAT


CAT


CAT
UNITED
I-84 CONSTRUCTION JV
I-84 RECONSTRUCTION
CTDOT #151-273
WALL 104

Including Culvert & Bridge Wingwalls

Temporary Loop Ramp East of Hamilton Ave. Bridge


TEMPORARY LOOP RAMP
EB 23 On-ramp
EB 23 off-ramp
EB 25 Off-ramp
EB I-84

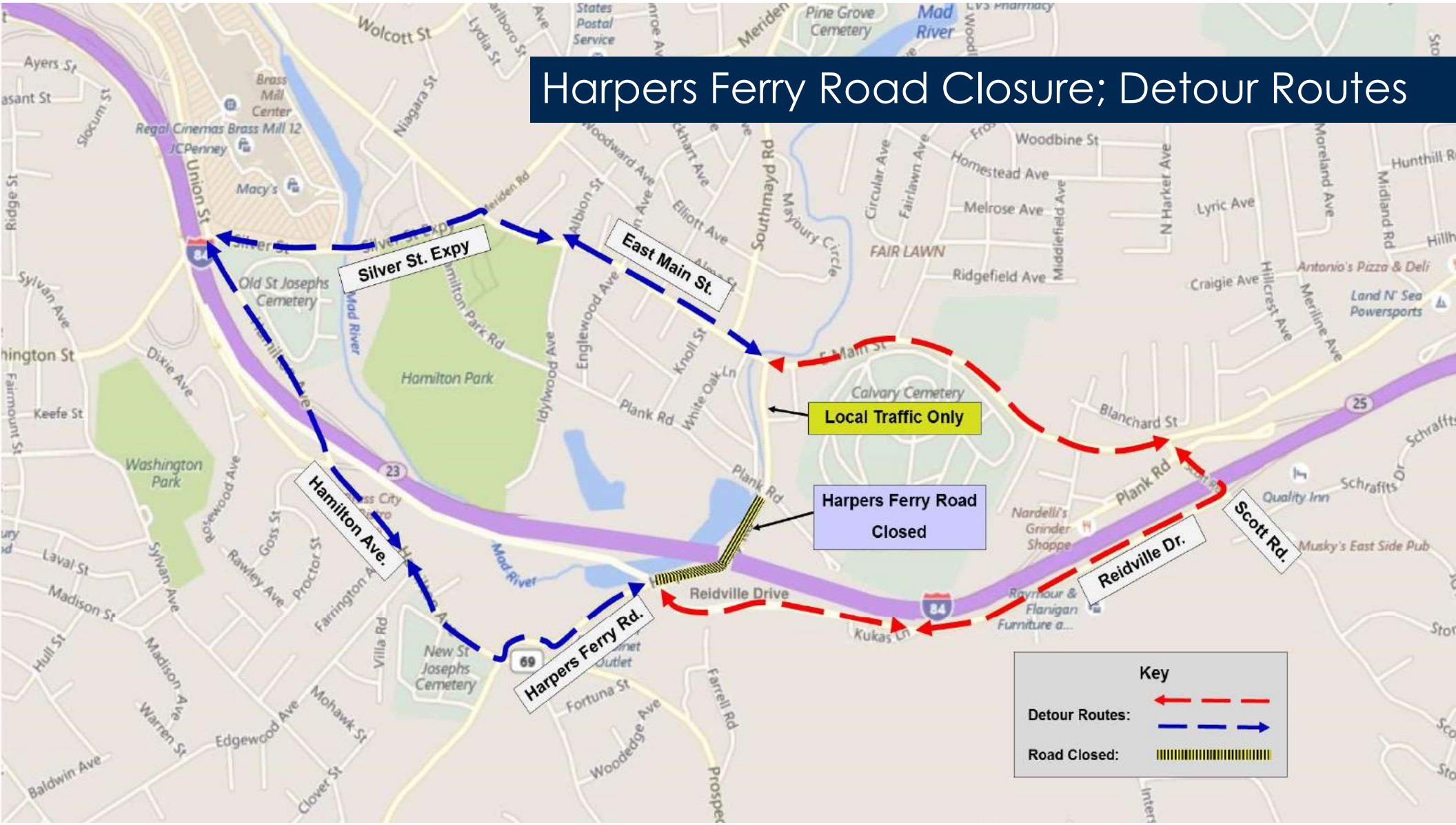
Harpers Ferry Road Closure and Detour From Reidville Drive to Plank Road


EAST END
Community Club
FUTURE HAMILTON AVENUE BRIDGE LANE CONFIGURATION
BOARD OF DIRECTORS

Harpers Ferry Road Closure and Detour Resulted In:

- Demolition of 3 Bridges:
  - Former Harpers Ferry Road
  - Former EB 25 off-ramp
  - Former I-84 bridge
- Construction of New Box Culvert Under Harpers Ferry Road
- Reconstruction of Harpers Ferry Road
- Construction of Plank Road East
- Construction of New WB 25 On-Ramp (including bridge over Mad River)
- Opening of Three Continuous Lanes on I-84 in Each Direction

Harpers Ferry Road Closure; Detour Routes



Why The Closure?

Original Schedule for This Work was Eight *Months:* **246 Days**

Working with the City of Waterbury, developing and implementing the Detour and Closures Plan *reduced the work schedule* to:

- One-Way Traffic

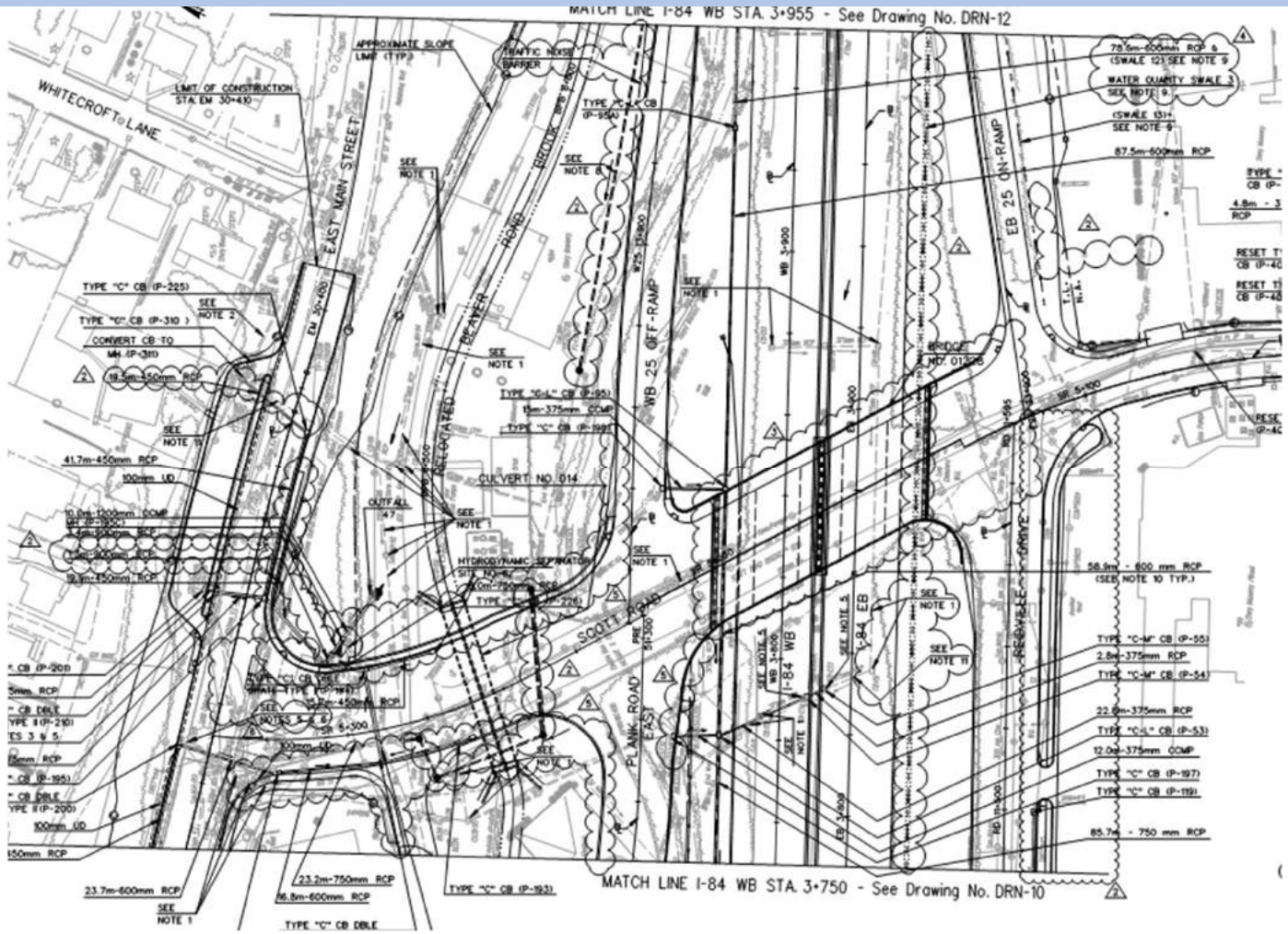
Eight *Weeks* **61 Days**

Resulting in:

- Reduced completion time, by ¾, or six months
- Reduced impact on travelers

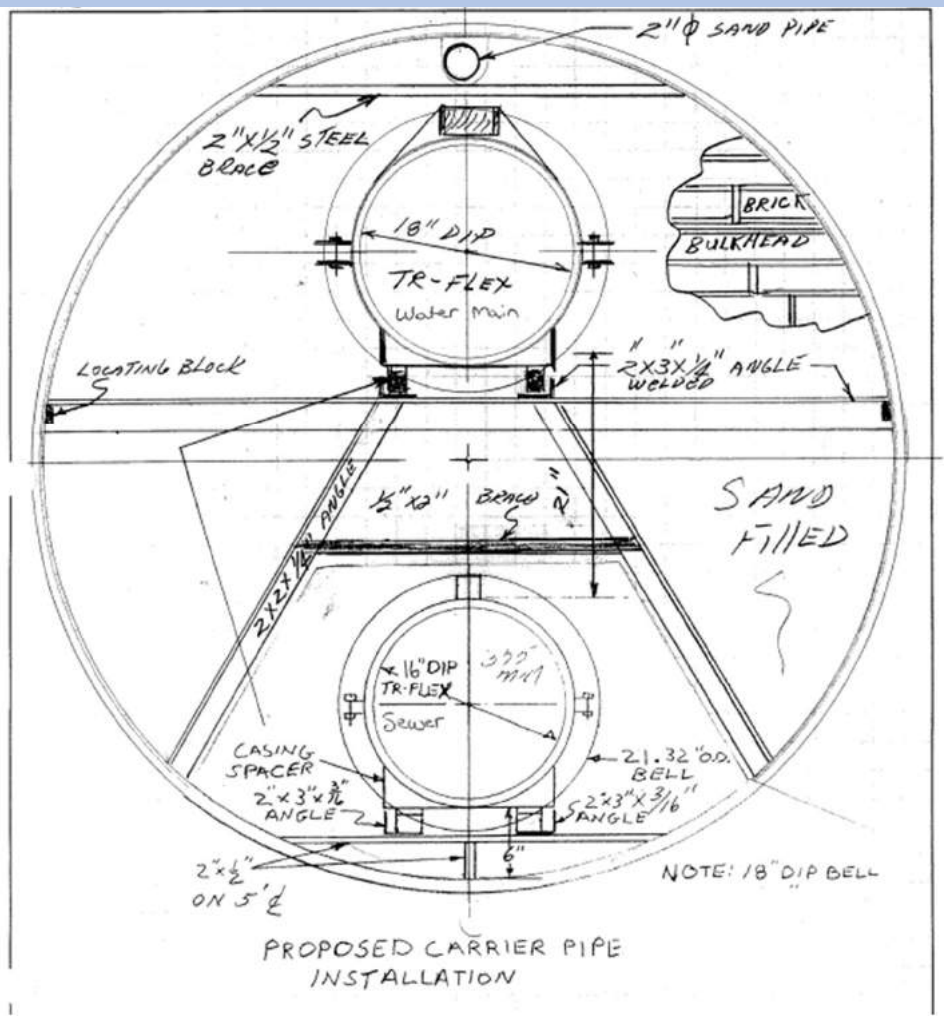
SCOTT ROAD BRIDGE

ELIMINATED DEMOLITION IN FIRST STAGE

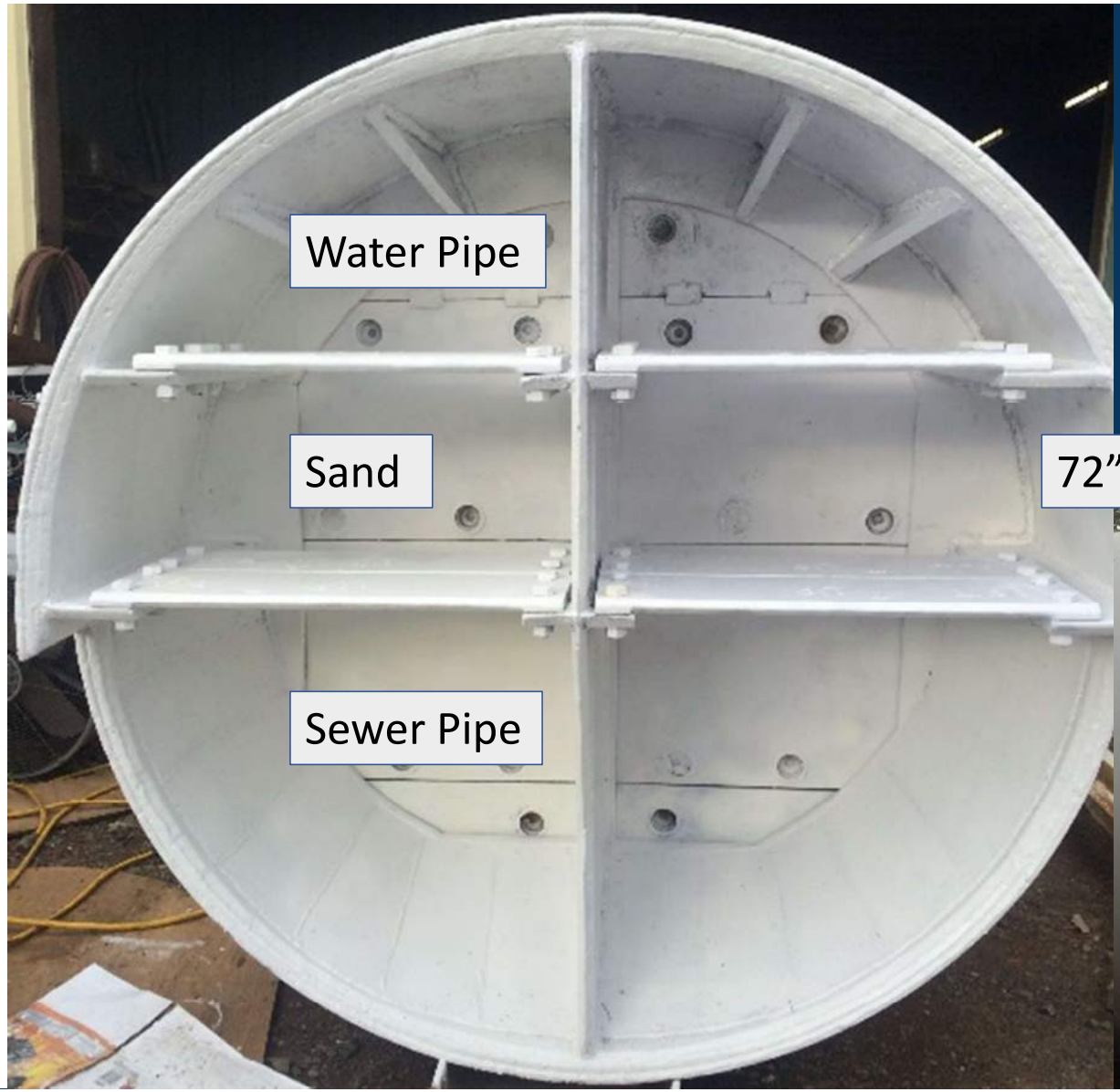


Scott Road Bridge Vicinity

Pipe Jacking



Scale – 1”= 10”



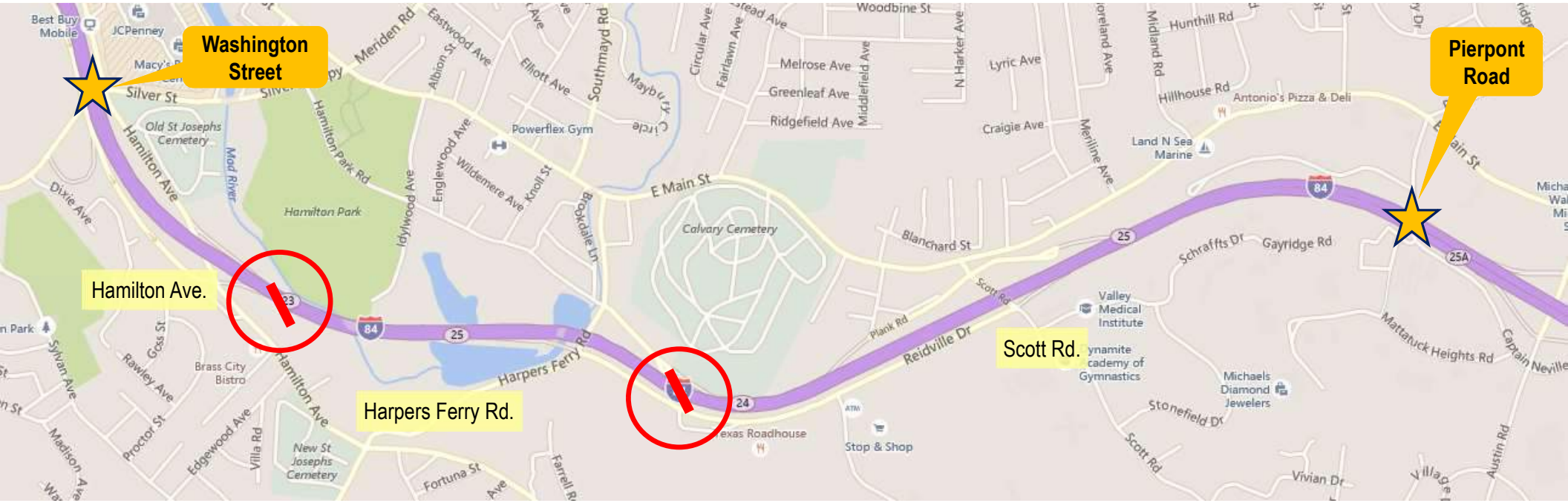
One Sewer Pipe Sleeve Carries:

- Potable Water
- Sanitary Sewer

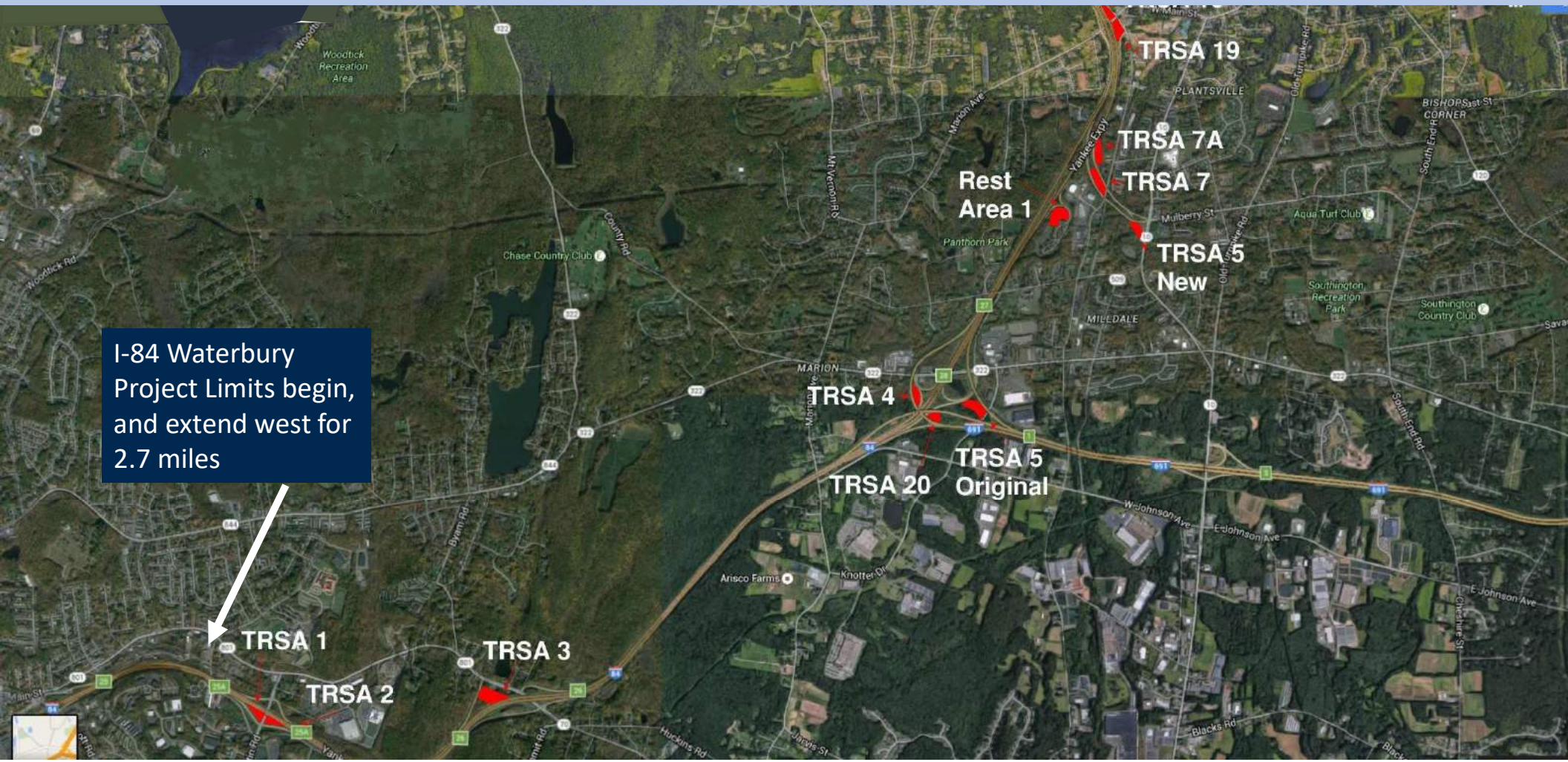
72” Diameter


M&P
PIPE
JACKING
CORP.

PIPE JACKING SITES



TEMPORARY RE-USE STOCKPILE AREAS (TRSA)




TRSA Site 19

TRSA Usage Financial Savings

Total Volume of TRSA Material: 300,000 Cu M

Contract TRSA Storage Volume: - 84,000 Cu M

Resulting Surplus Material: 216,000 Cu M (414,720 Tons)

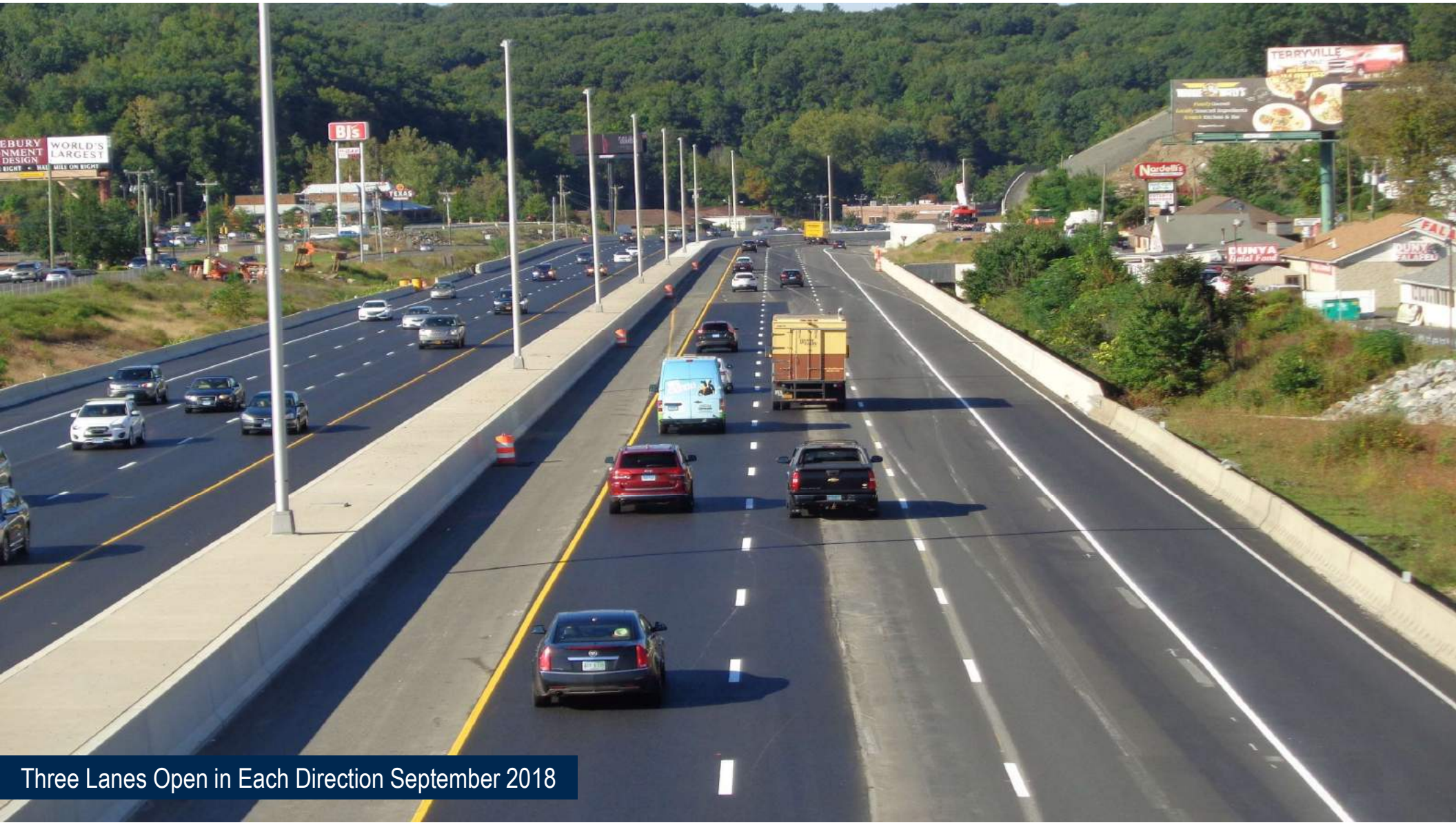
Cost to Dispose of Excess Controlled Material: **$ 22,890,600 ($ 55.00/Ton)**

Cost to Haul/Handle/Store Material in TRSAs: **$ - 1,556,000 ($ 3.77/Ton)**

Total Project TRSA Savings **$ 21,243,600 (93%)**

Opening of 3 Lanes in Each Direction

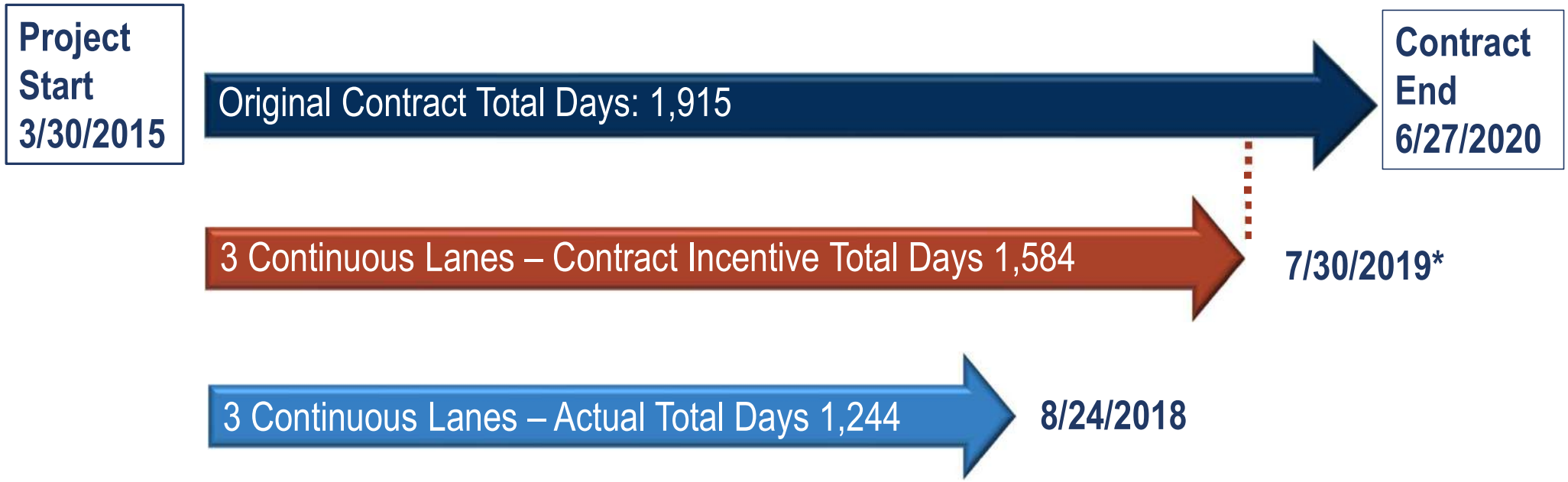
Ribbon Cutting Event August 2018



Three Lanes Open in Each Direction September 2018

Punch List Items

Contractor Incentive



*Contractor received **$6.45 Million** for early substantial completion

Traffic Study Results

Lane Speeds

AM Peak - Average Lane Speed - 15 minutes Peak Period (MPH)		
	Pre-Construction	Post-Construction
Eastbound Right Lane	18.8	56.4
Eastbound Middle Lane	N/A	57.6
Eastbound Left Lane	20.5	61.5
	Pre-Construction	Post-Construction
PM Peak - Average Lane Speed - 15 minutes Peak Period (MPH)		
Eastbound Right Lane	15.5	56.5
Eastbound Middle Lane	N/A	57.4
Eastbound Left Lane	19.1	61.8

Lane Speeds: Sensor 2 - Washington Street Underpass

AM Peak - Average Lane Speed - 15 minutes Peak Period		
	Pre-Construction	Post-Construction
Westbound Left Lane	36.2	66.6
Westbound Middle Lane	33.1	61.8
Westbound Right Lane	34.5	59.3
Westbound Aux Lane	36.7	51.5

PM Peak - Average Lane Speed - 15 minutes Peak Period		
	Pre-Construction	Post-Construction
Westbound Left Lane	9.2	57.0
Westbound Middle Lane	8.0	54.0
Westbound Right Lane	7.1	51.0
Westbound Aux Lane	7.3	45.9

Lane Speeds: Sensor 9 – East of Interchange 25A

AM Peak - Average Lane Speed - 15 minutes Peak Period (MPH)		
	Pre-Construction	Post-Construction
Eastbound Right Lane	18.8	56.4
Eastbound Middle Lane	N/A	57.6
Eastbound Left Lane	20.5	61.5
PM Peak - Average Lane Speed - 15 minutes Peak Period (MPH)		
Eastbound Right Lane	15.5	56.5
Eastbound Middle Lane	N/A	57.4
Eastbound Left Lane	19.1	61.8

Travel Time Through the Project

Average Daily Travel Times		
I-84	Pre-Construction	Post-Construction
Eastbound	7.5 Minutes	2.7 minutes
Westbound	9.9 Minutes	4.0 minutes
I-84 Average Peak Period Travel Times		
	Pre-Construction	Post-Construction
Eastbound AM	13.3 minutes	2.7 minutes
Eastbound PM	13.1 minutes	2.8 minutes
Westbound AM	11.6 minutes	3.8 minutes
Westbound PM	30.3 minutes	4.2 minutes

Level of Service: Sensor 2 - Washington Street Underpass

AM Peak Period – Lane Density/Level of Service				
	Pre-Construction		Post-Construction	
	Vehicles/Mile	LOS	Vehicles/Mile	LOS
EB - Right Lane	47	F	6.1	A
EB – Middle Lane	N/A	N/A	18.0	B
EB - Left Lane	40	F	19.0	C
PM Peak Period – Lane Density/Level of Service				
	Pre-Construction		Post-Construction	
	Vehicles/Mile	LOS	Vehicles/Mile	LOS
EB - Right Lane	102	F	6.7	A
EB - Middle Lane	N/A	N/A	16.2	B
EB - Left Lane	66	F	16.8	B

Level of Service: Sensor 9 – East of Interchange 25A

AM Peak Period – Lane Density/Level of Service				
	Pre-Construction		Post-Construction	
	Vehicles/Mile	LOS	Vehicles/Mile	LOS
WB - Left Lane	17.9	B	15.6	B
WB - Middle Lane	19.1	C	17.8	B
WB - Right Lane	14.9	B	12.0	B
WB Aux Lanes	63.6	A	6.0	A
PM Peak Period – Lane Density/Level of Service				
	Pre-Construction		Post-Construction	
	Vehicles/Mile	LOS	Vehicles/Mile	LOS
WB - Left Lane	45.2	F	24.7	C
WB - Middle Lane	48.8	F	20.6	C
WB - Right Lane	60.3	F	17.2	B
WB Aux Lane	64.4	F	8.6	A

Traffic Study Results

Crash Data

Monthly Crash Rate	
Pre-Construction	Post-Construction
38 /month (more than one crash per day)	3.2 (Reduction in crashes of more than 90%)

Daily Savings of Travel Times

Based on average daily traffic volumes & the reduction of daily travel times:

- EB: Daily savings of **4,200 hours of travel time**
- WB: Daily savings of **5,100 hours of travel time**

AWARDS - 2019

AMERICA'S transportation awards

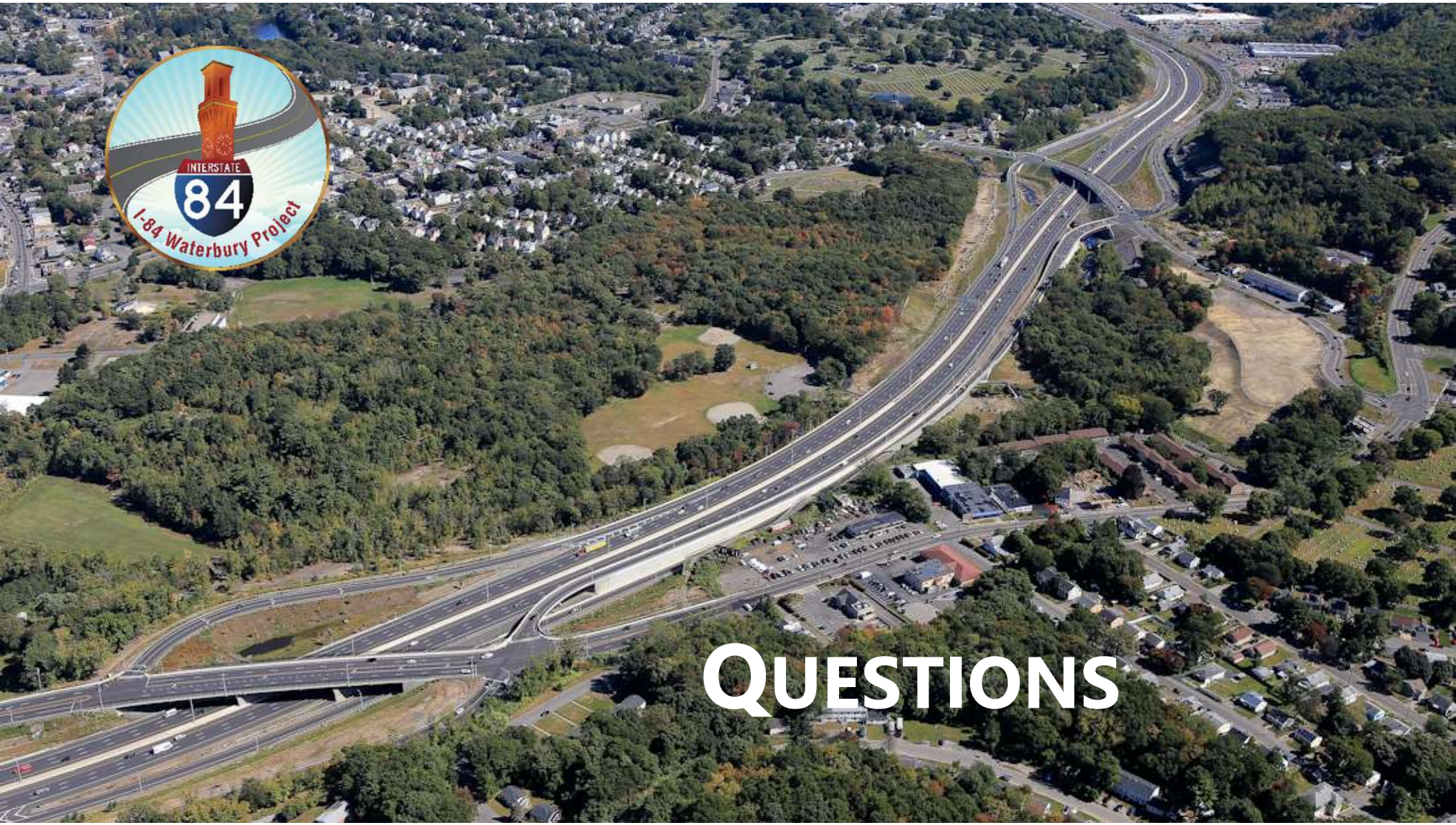
Regional Finalist

CONNECTICUT ROAD BUILDERS ASSOCIATION CRBA

Arthur W. Gruhn Excellence in Construction Awards, Large Project

CMAA CONNECTICUT CHAPTER

Project Achievement Award for Best Infrastructure Project over $25 Million



QUESTIONS

Additional Slides/Area of Work for Consideration

Additional Slides/Extra Slides


UNITED
CONCRETE

SIGNALIZATION


JLG LIFT

I-84 EB Exit 25 Over Mad River


BAY CRANE
BAY CRANE
BAY CRANE

RETAINING WALLS 113 & 114 – I-84 EB 25 OFF-RAMP

Curved Steel Erection

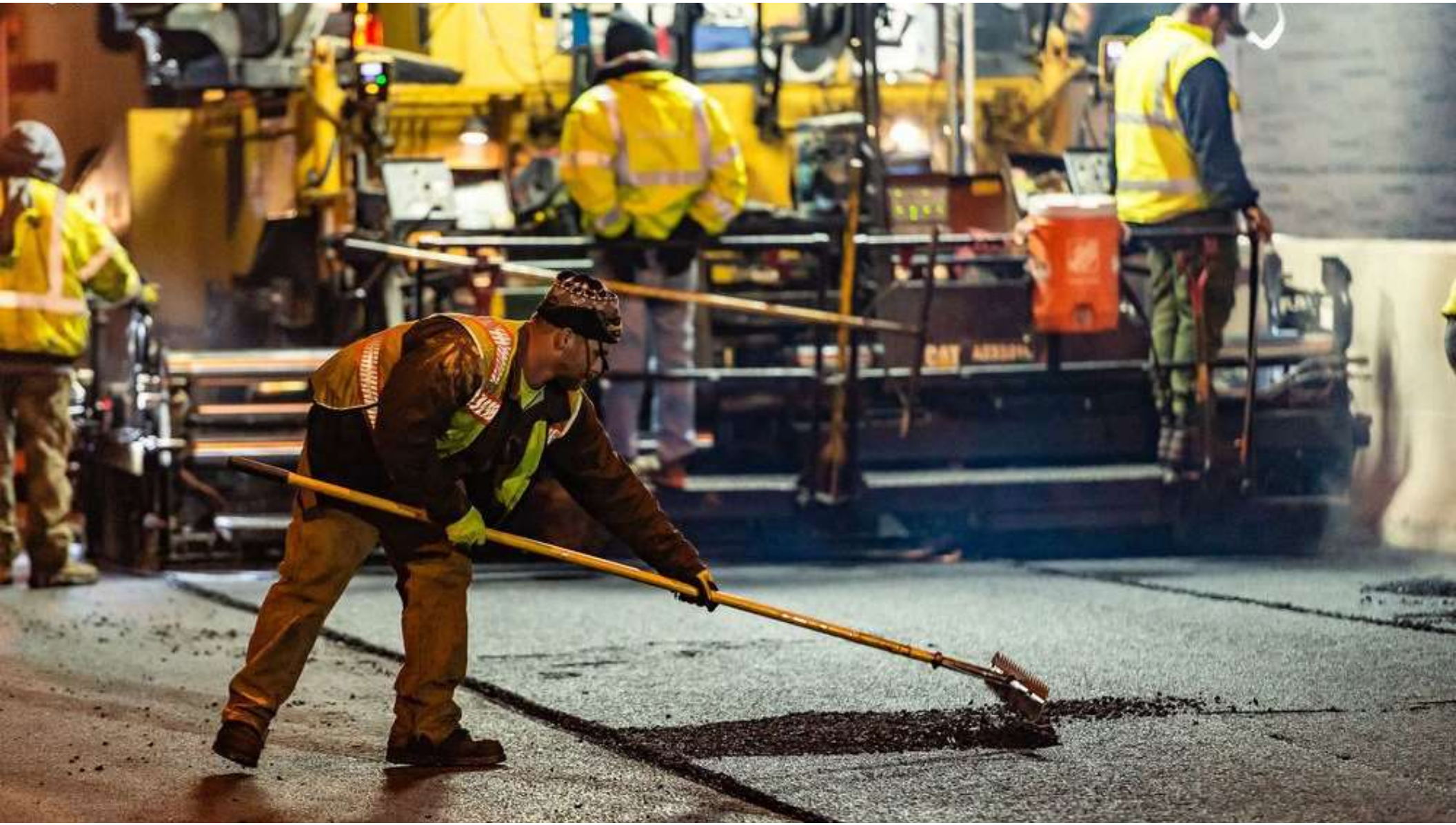
I-84 EB Exit 25) Over Mad River


WB I-84

I-84 Over Mad River; EB 25 off-ramp to Harpers Ferry Road

October 2017


FedEx
Freight
FedEx
FedEx
CAT



Hamilton Avenue – Swinging Signals

Pile Driving; Obstructions

Pile Driving; Obstructions

Pile Driving; Obstructions

Pile Driving; Obstructions

I-84 Over the Mad River; Harpers Ferry Road Vicinity


Future I-84 bridge


Future I-84 bridge


Future I-84 bridge

Future I-84 bridge


Future I-84 bridge


Future I-84 bridge


Future I-84 bridge


Future I-84 bridge
June 2017

Harpers Ferry Road/ Reidville Drive Vicinity

Summary and Schedule:

- EB 25 off ramp & new Reidville Drive alignment opened
  Fall 2017
- Shifted I-84 EB traffic into new alignment
  Winter 2017
- Shift I-84 WB traffic into new alignment
  Fall 2018
- Three continuous lanes in each direction
  Fall 2018
- Plank Road East and WB 25 on-ramp construction ***Summer 2018***

Harpers Ferry Road Bridge Vicinity

April 2


TRSA Site 20

TRSA Purpose

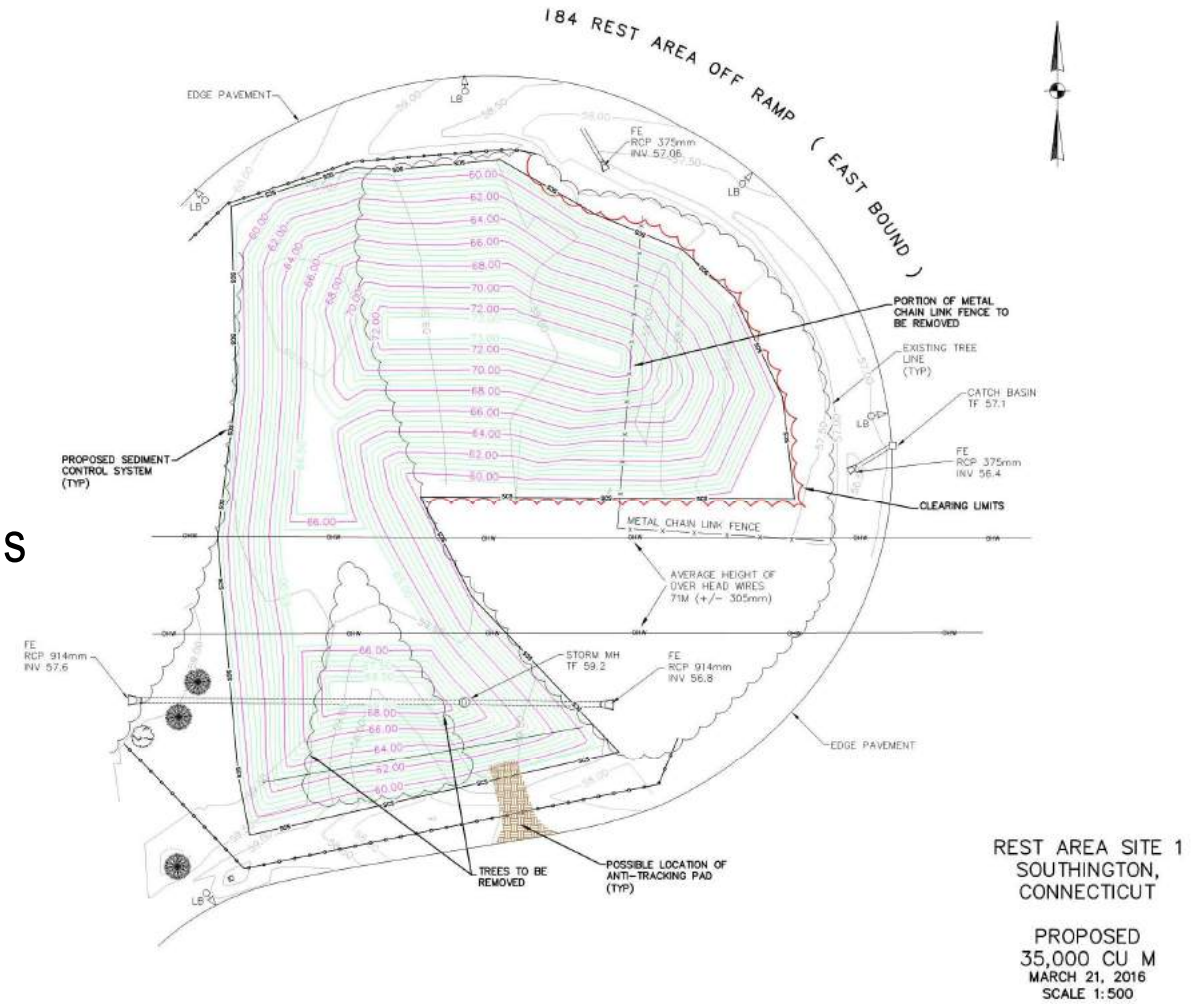
Cost-effective way to temporarily dispose of reusable material

- Reduced travel time -- Disposal efforts are close to project limits
- No costly disposal fees
- Material is:
  - Easily accessible/reusable
  - Project-ready, when needed
  - Stored with consideration given positive environmental impact

EB I-84 Rest Area Site 1, Southington, CT

Plans Include:

- Site Preparation Information
  - Tree removal
  - Tracking pad location
  - Structures for removal
  - Overhead wires/utility locations
- Site Capacity
  - Dimensions of piles
  - Proposed cubic meters



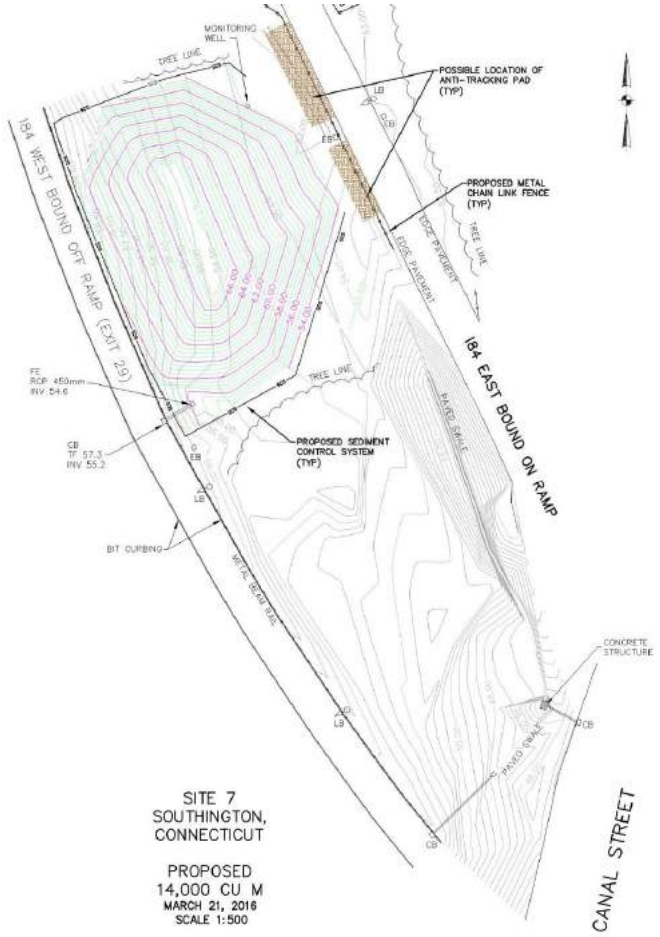
PROCESS

OEP Designates Approved Site Locations

- Non-wetlands/Non-floodway
- Non-interference with Endangered and Threatened Species

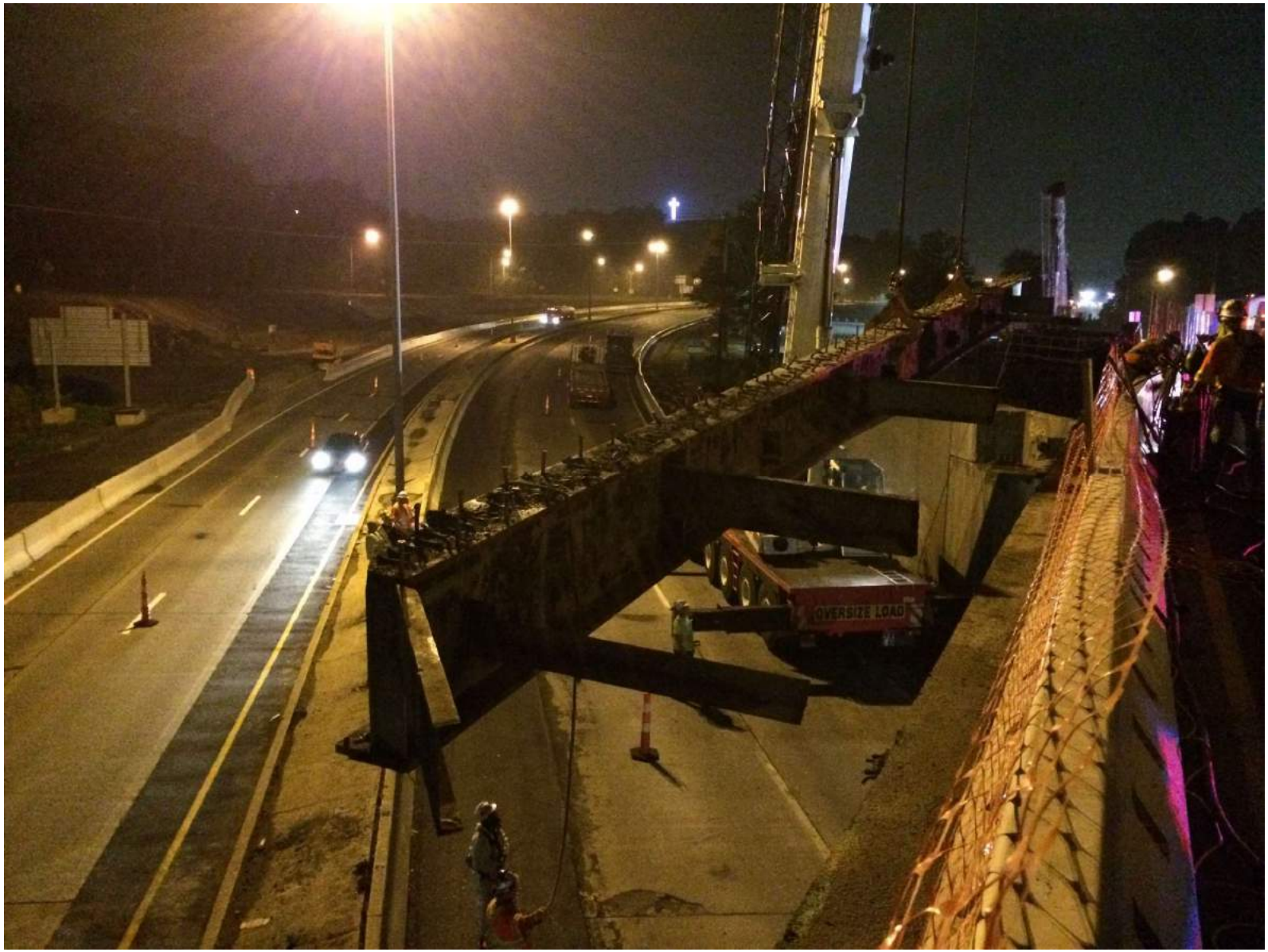
DOT Determines Site Feasibility for Project

- Survey
- Grading Plan
- Environmental Controls
    - Anti-tracking Pads
    - Silt Fence
    - Riprap
    - Wildflower Plantings



N AVENUE BRIDGE VICINITY

April 2018


OVERSIZE LOAD


CONCORD

Sound Barrier Wall (EB 23 off ramp)

Sound Barrier Wall (EB 23 off ramp)

Hamilton Avenue Bridge Vicinity

March 2015

September 2017

Retaining Wall 104 (south of EB 23 on ramp)

Hamilton Avenue Bridge

March 2017

HAMILTON AVENUE BRIDGE

April 2017


FUTURE EB 23 ON-RAMP FROM HAMILTON AVENUE
WB I-84
April 2017


FUTURE EB 23 ON-RAMP FROM HAMILTON AVENUE
Future EB 23 on-ramp
EB 25 off-ramp
WB I-84
October 2017

Future EB 23 On-Ramp from Hamilton Avenue

October 2017

Future EB 23 On-Ramp from Hamilton Avenue

Summer/Fall Work Harpers Ferry Road Vicinity:

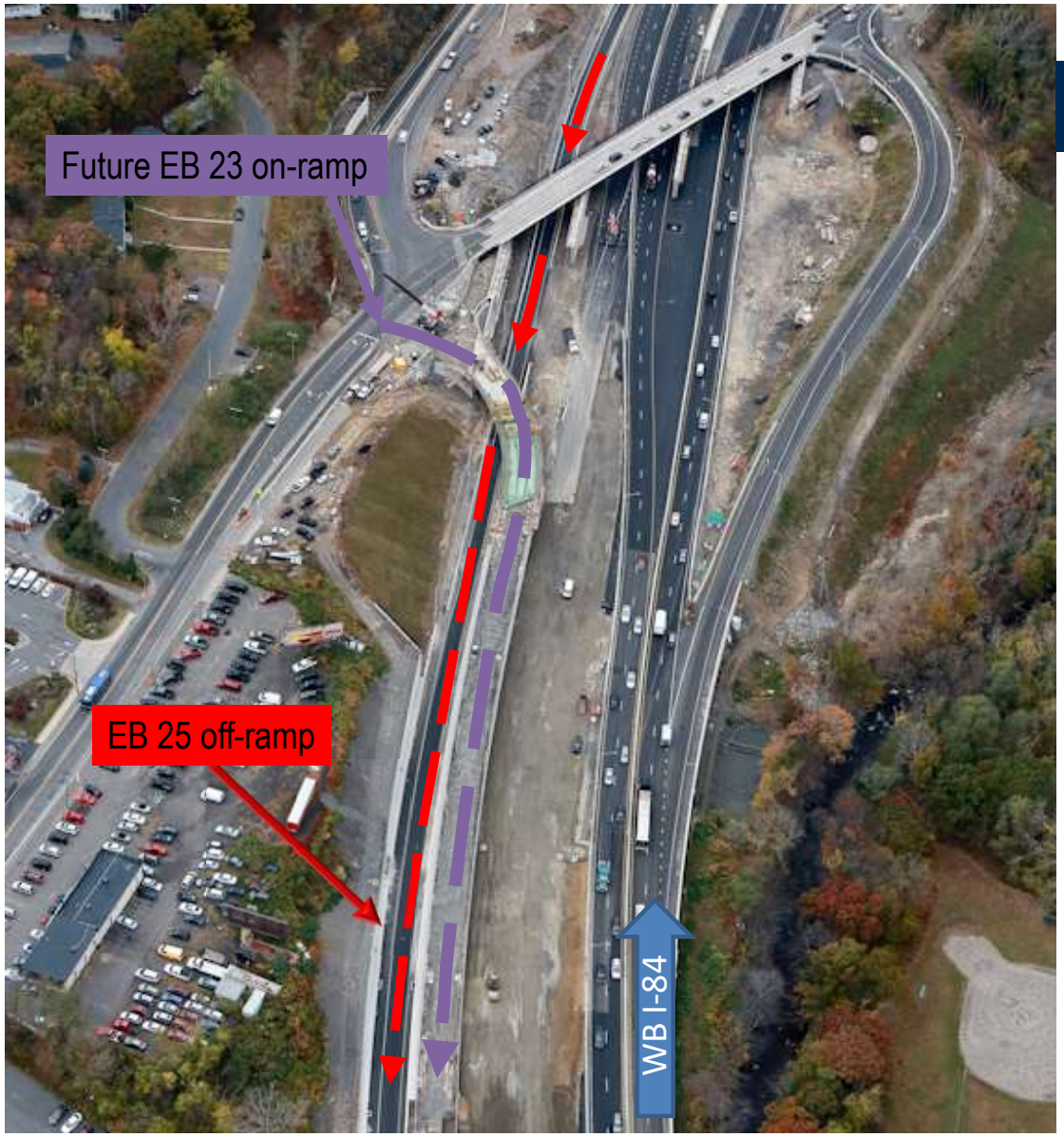
- Shift WB I-84 to New Alignment
- Demolish 3 Bridges:
  - Former Harpers Ferry Road
  - Former EB 25 off-ramp
  - Former I-84 bridge
- Reconstruct Harpers Ferry Road
- Construct Plank Road East
- Construct New WB 25 On-Ramp

Future EB 25 Off-Ramp Under Hamilton Avenue

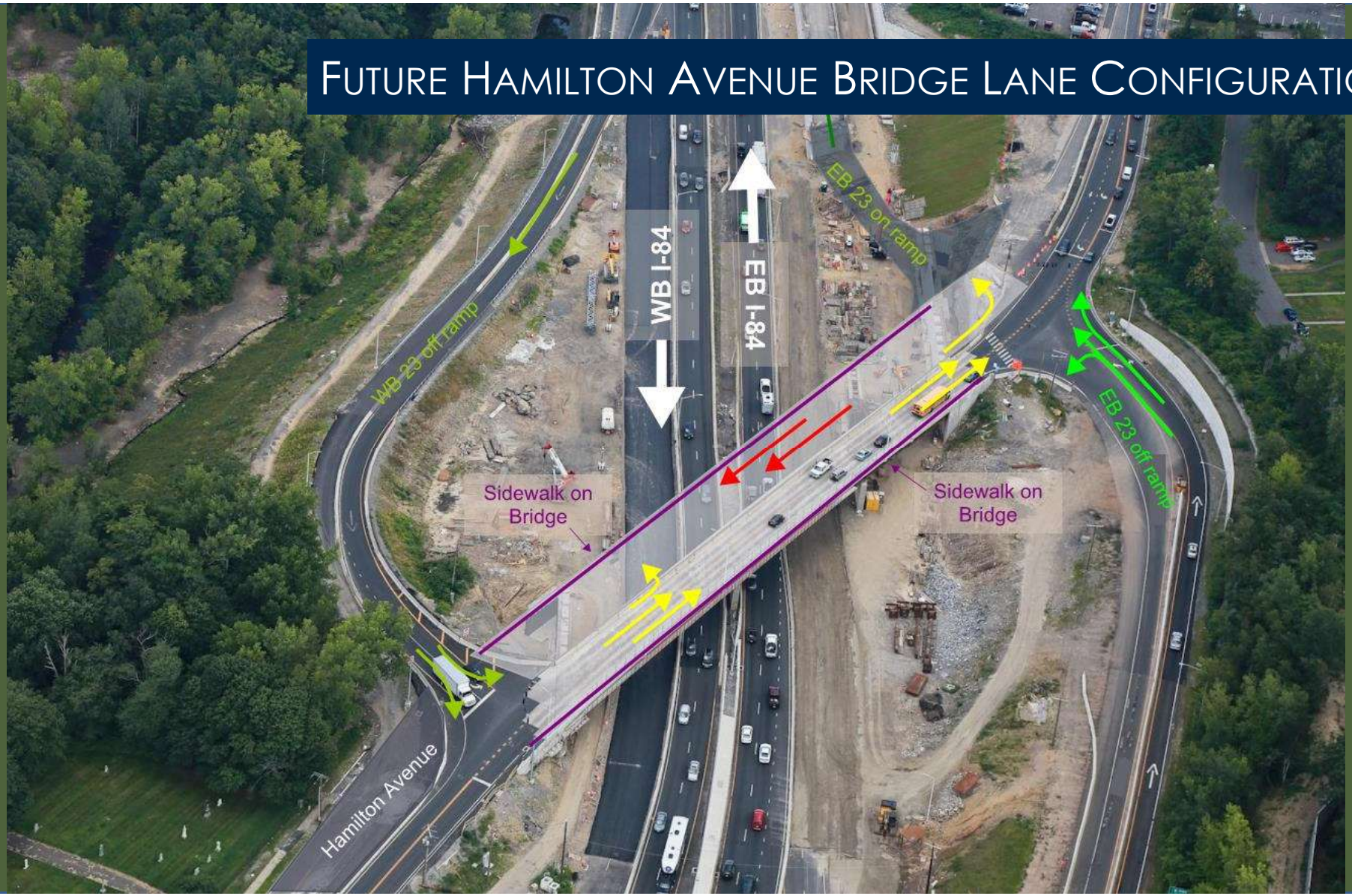
EB 25 OFF-RAMP UNDER EB 23 ON-RAMP

East of Hamilton Avenue

East of Hamilton Avenue



Future Hamilton Avenue Bridge Lane Configuration

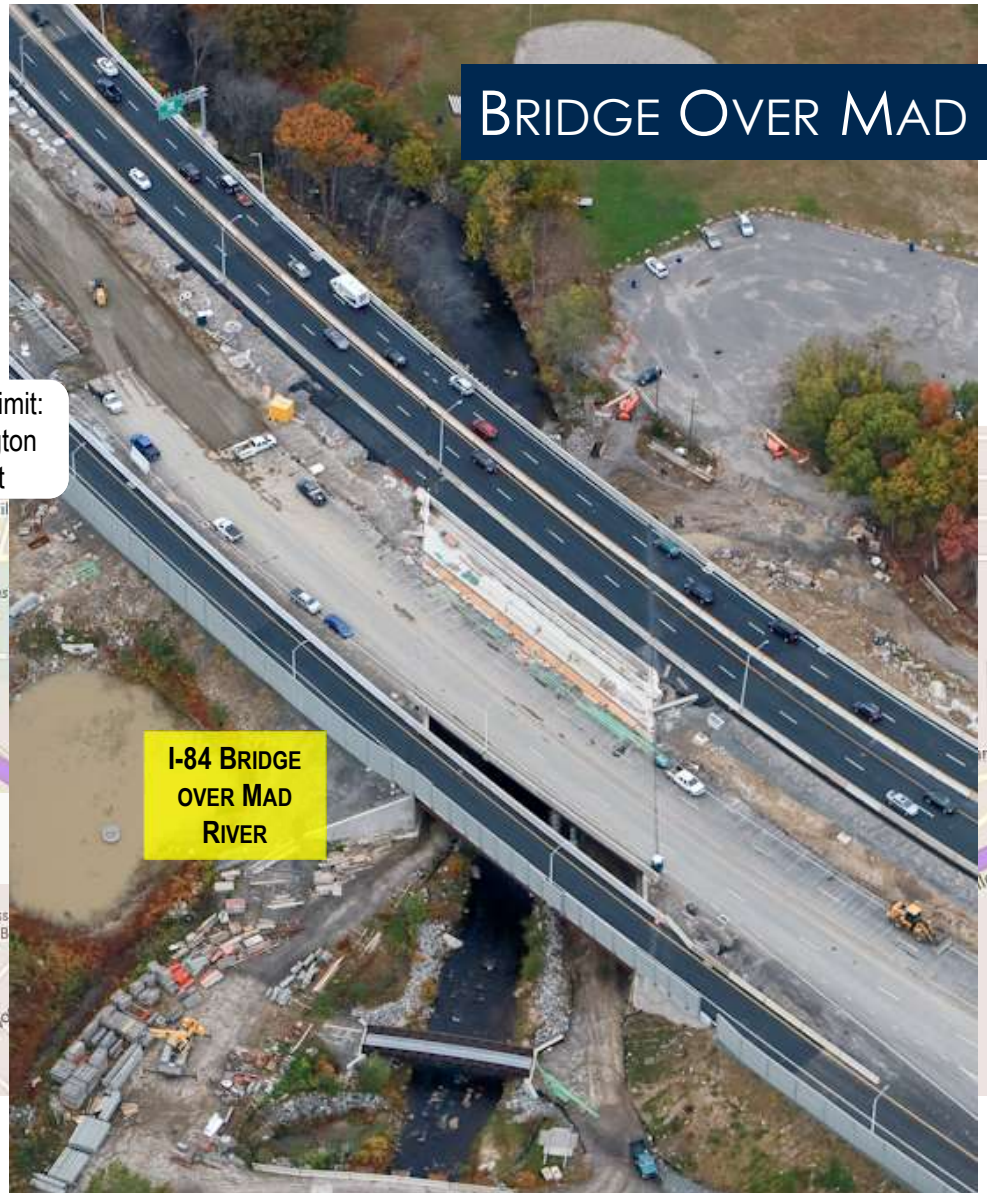


RETAINING WALL 104 ALONG FUTURE EB 25 OFF-RAMP

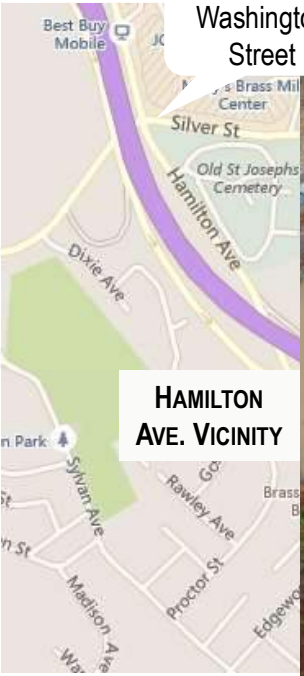
EB 25 OFF-RAMP BETWEEN EB 23 ON-RAMP AND RW 104

EB 25 OFF-RAMP BETWEEN EB 23 ON-RAMP & RW 104

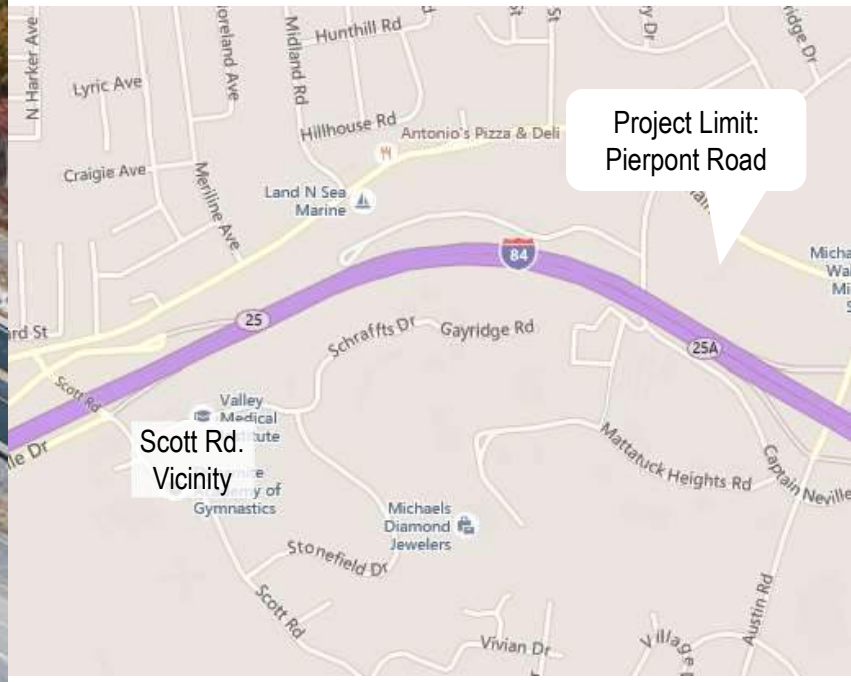
Bridge Over Mad River Eastern Crossing



Project Limit: Washington Street



Hamilton Ave. Vicinity



Project Limit: Pierpont Road

Scott Rd. Vicinity

I-84 Bridge Over Mad River

I-84 Bridge Over Mad River

I-84 Bridge Over Mad River

I-84 Bridge Over Mad River

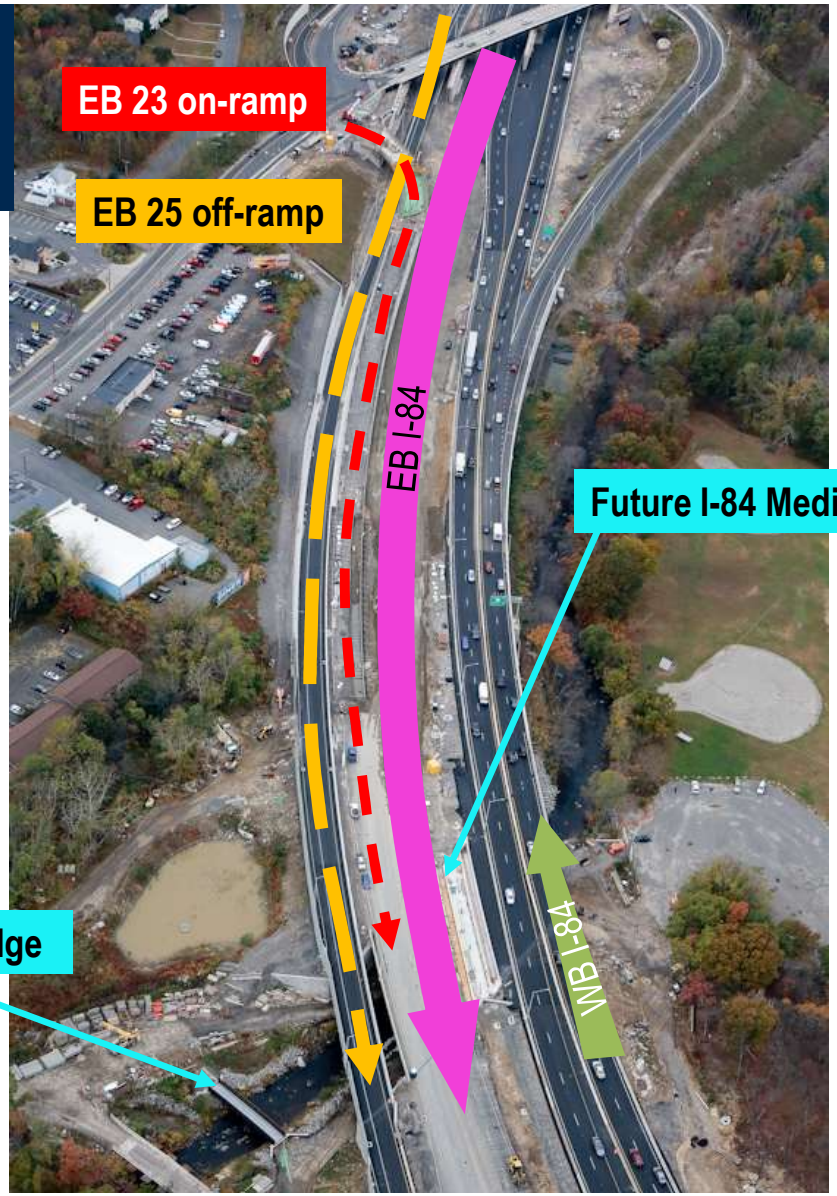
I-84 Bridge Over Mad River

I-84 Bridge Over Mad River

I-84 Bridge Over Mad River

BRIDGE OVER MAD RIVER

- New Lanes on Bridge
- Traffic Shift for construction of EB I-84 east of Hamilton Avenue
- Includes EB 25 off-ramp
- EB 23 On Ramp



I-84 Bridge : Northern Portion Construction

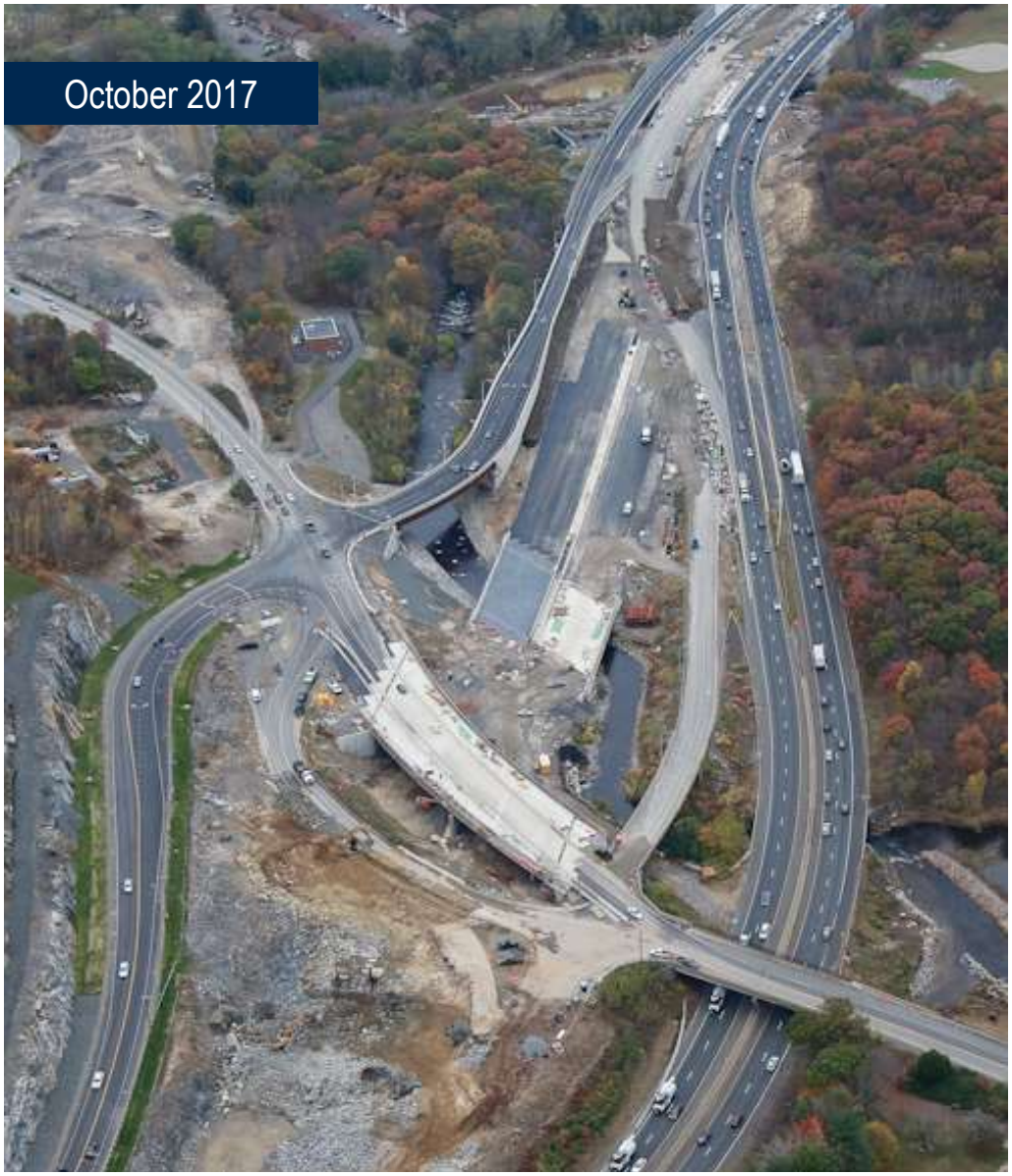

WB I-84
April 2017

Plank Road Vicinity

Retaining Wall 105 (Along Harpers Ferry Rd.)

Future Path of I-84


April 2017
EB 25 Off Ramp
I-84 EB
I-84 WB
Future Reidville Drive
WB I-84
Harpers Ferry Road Bridge


October 2017

Future I-84 Over Mad River Western Crossing

Future I-84 Over Mad River Western Crossing

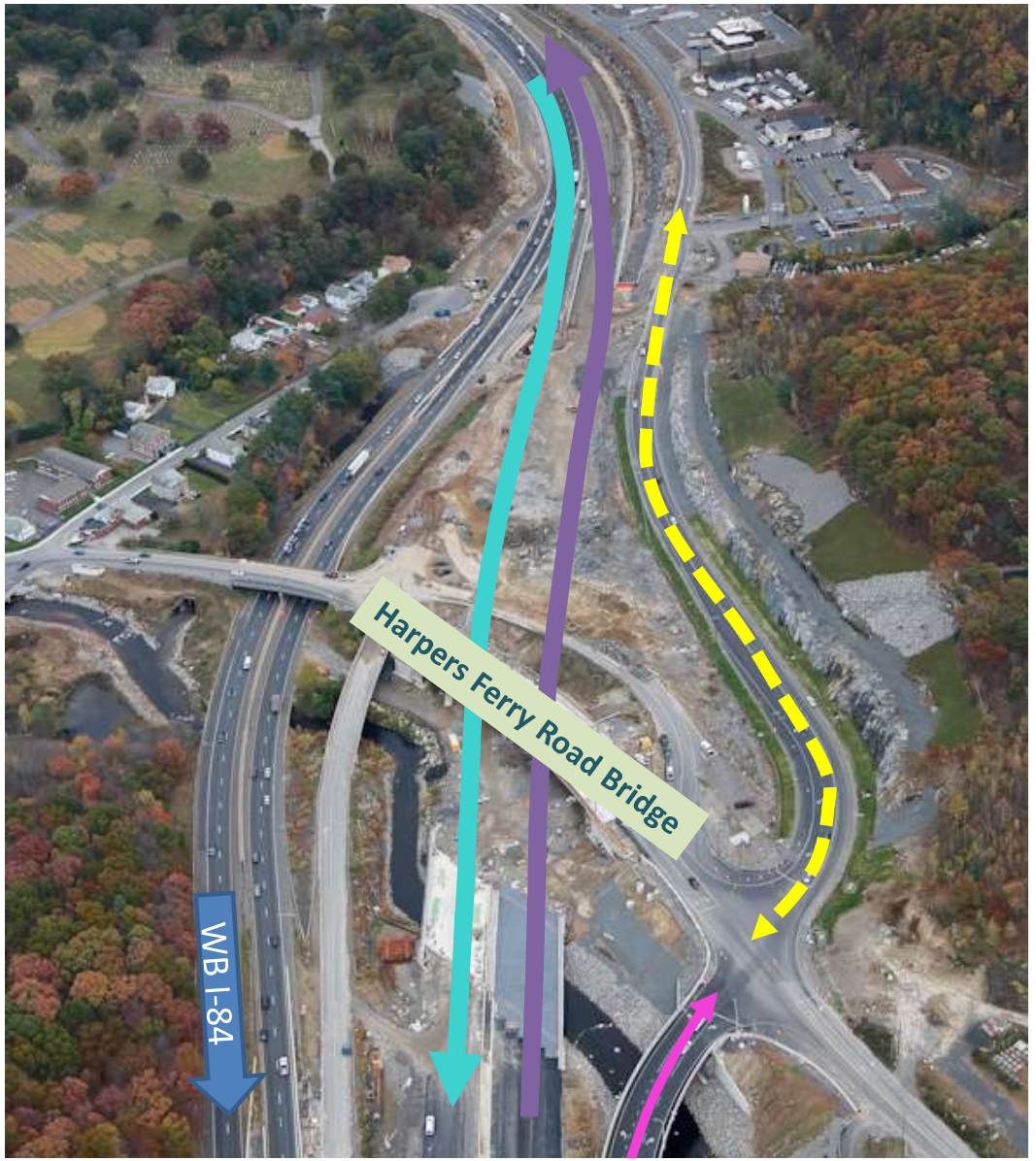
Future I-84 Over Mad River Western Crossing

Future I-84 Over Mad River Western Crossing

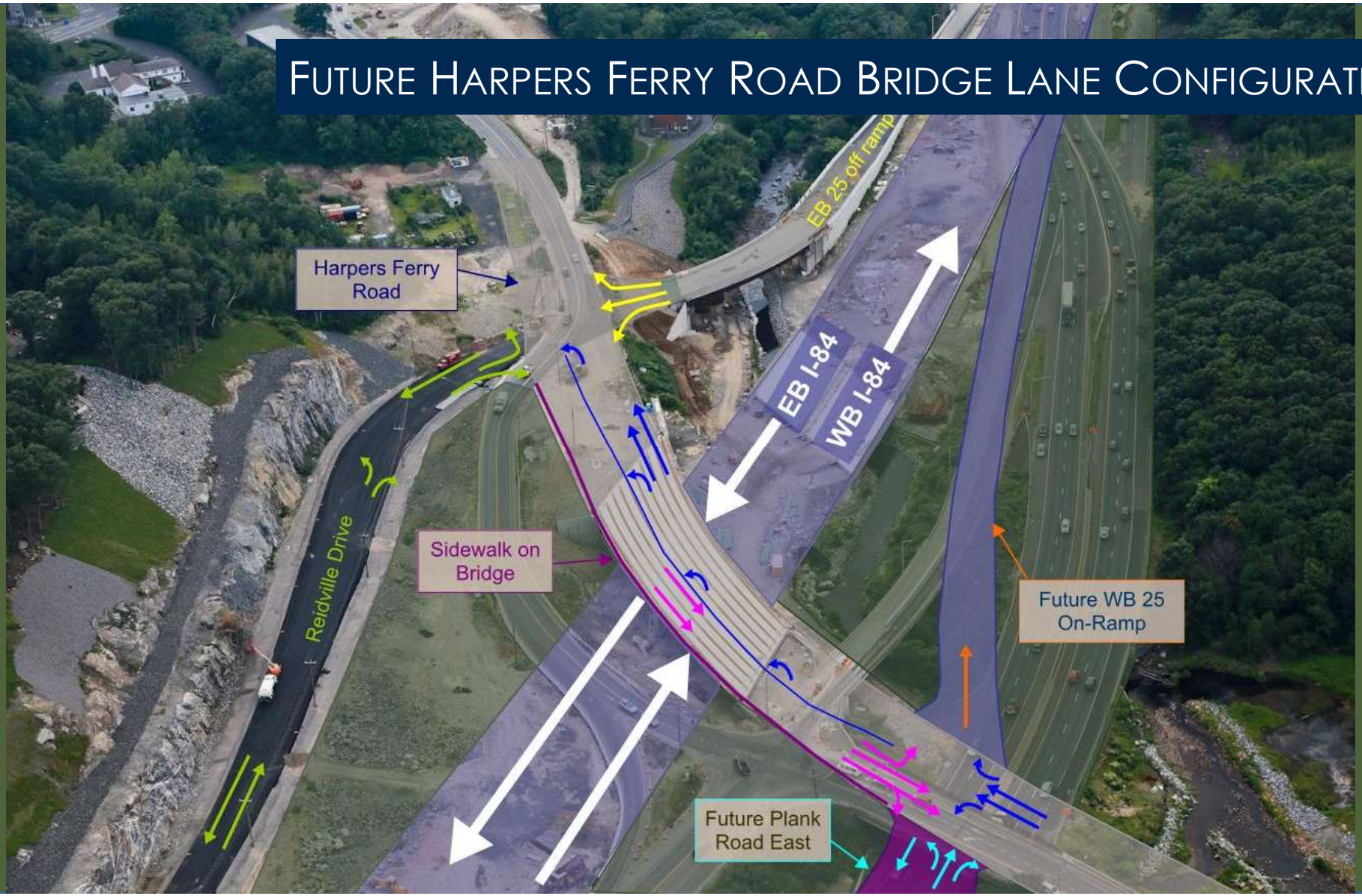
Harpers Ferry Road/ Reidville Drive Vicinity

Anticipated Schedule:

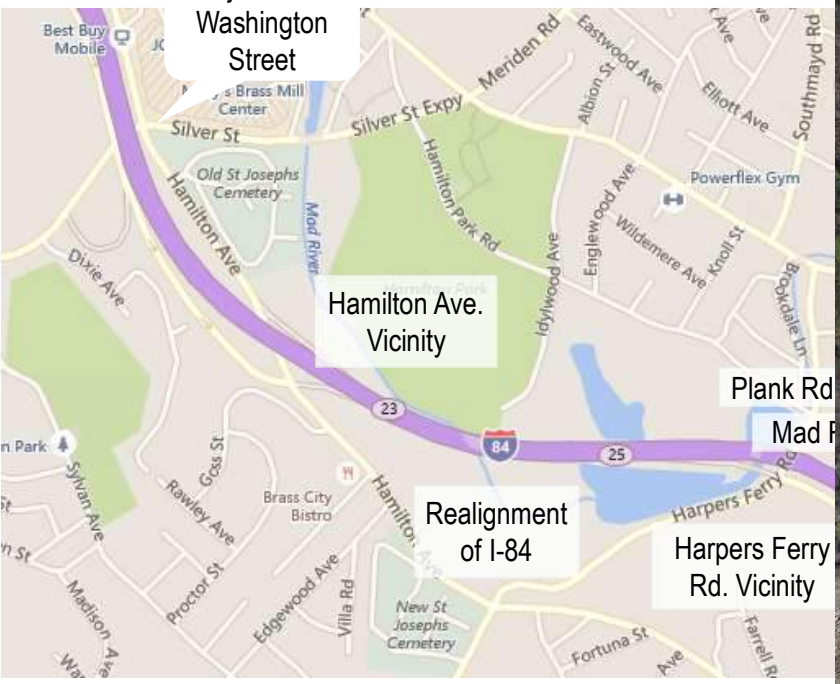
- EB 25 off ramp & new Reidville Drive alignment opened
  Fall 2017
- Shift I-84 EB traffic into new alignment
  Winter 2017
- Shift I-84 WB traffic into new alignment
  Spring 2018

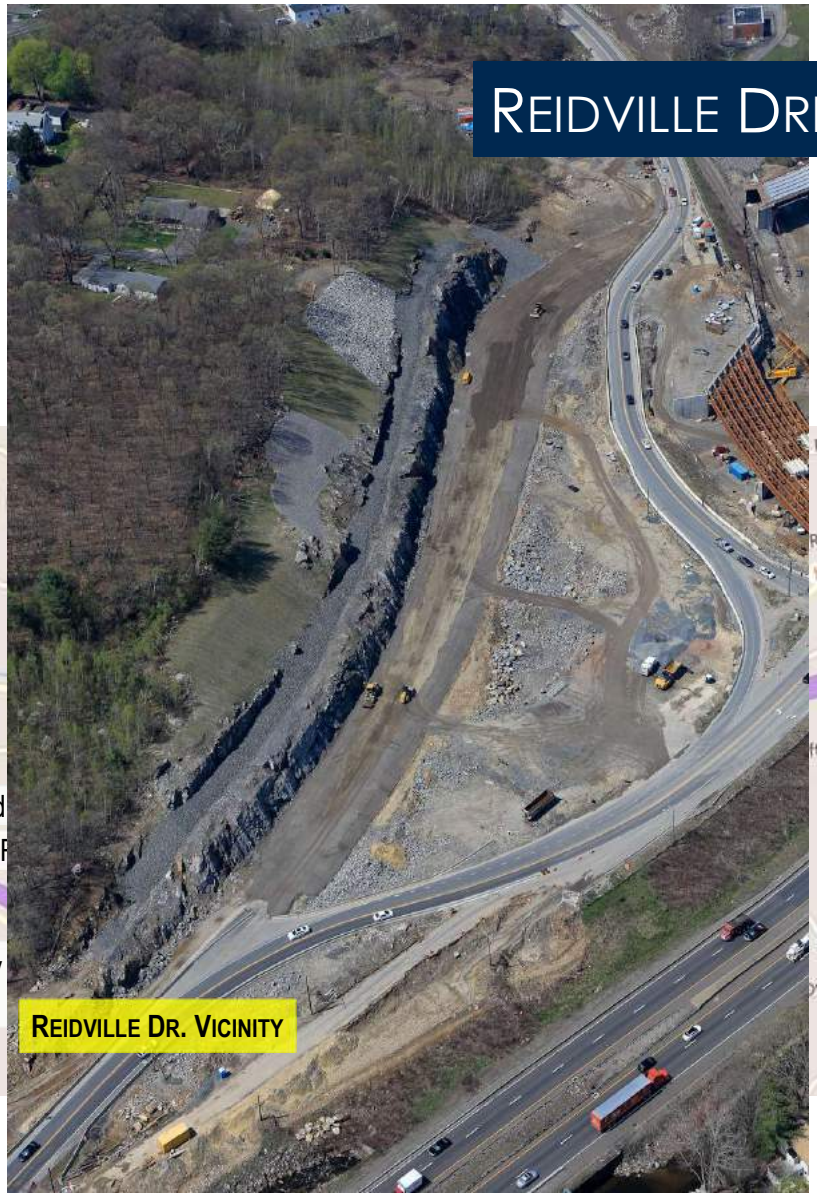


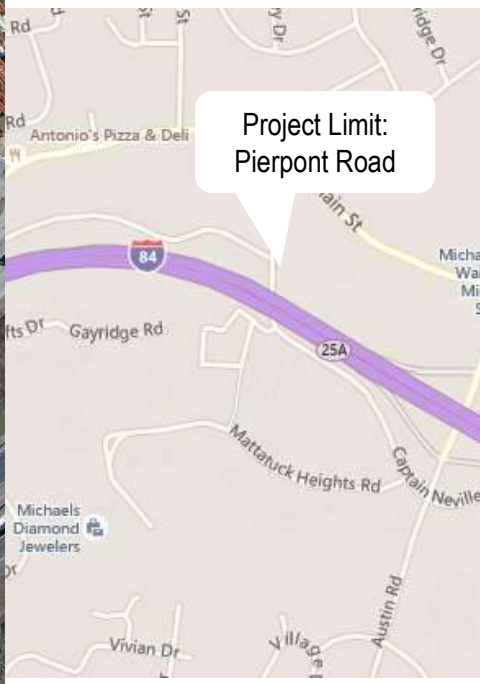
Future Harpers Ferry Road Bridge Lane Configuration



Reidville Drive Vicinity







Reidville Drive Vicinity

March 2015

October 2017

Reidville Drive Rock Cut

April 2017

Reidville Drive Rock Cut

October 2017

North of Reidville Drive: Excavation

North of Reidville Drive: Drilling Before Blasting

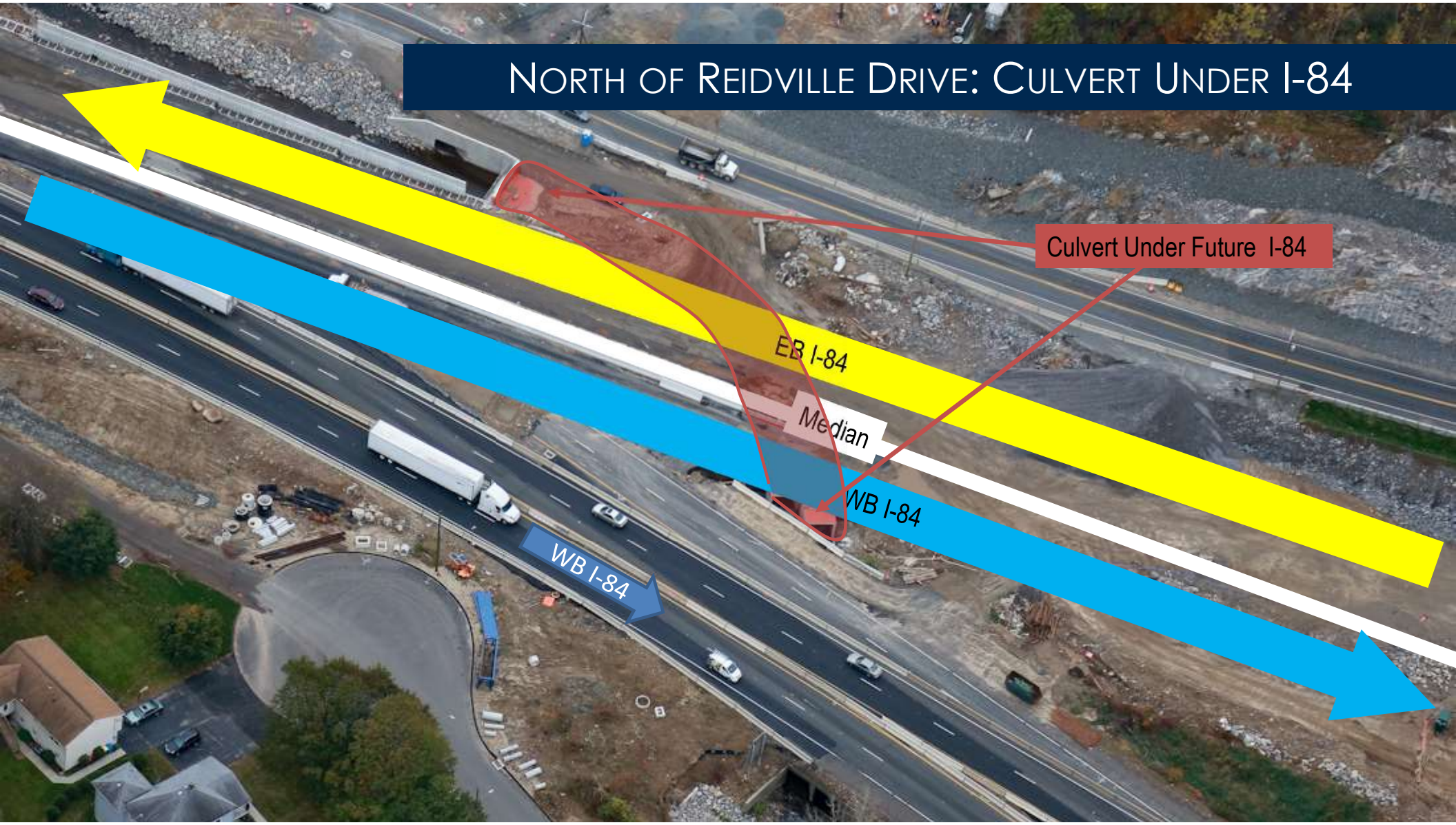
North of Reidville Drive: Breaking Blasted Rock

North of Reidville Drive: Rock Removal

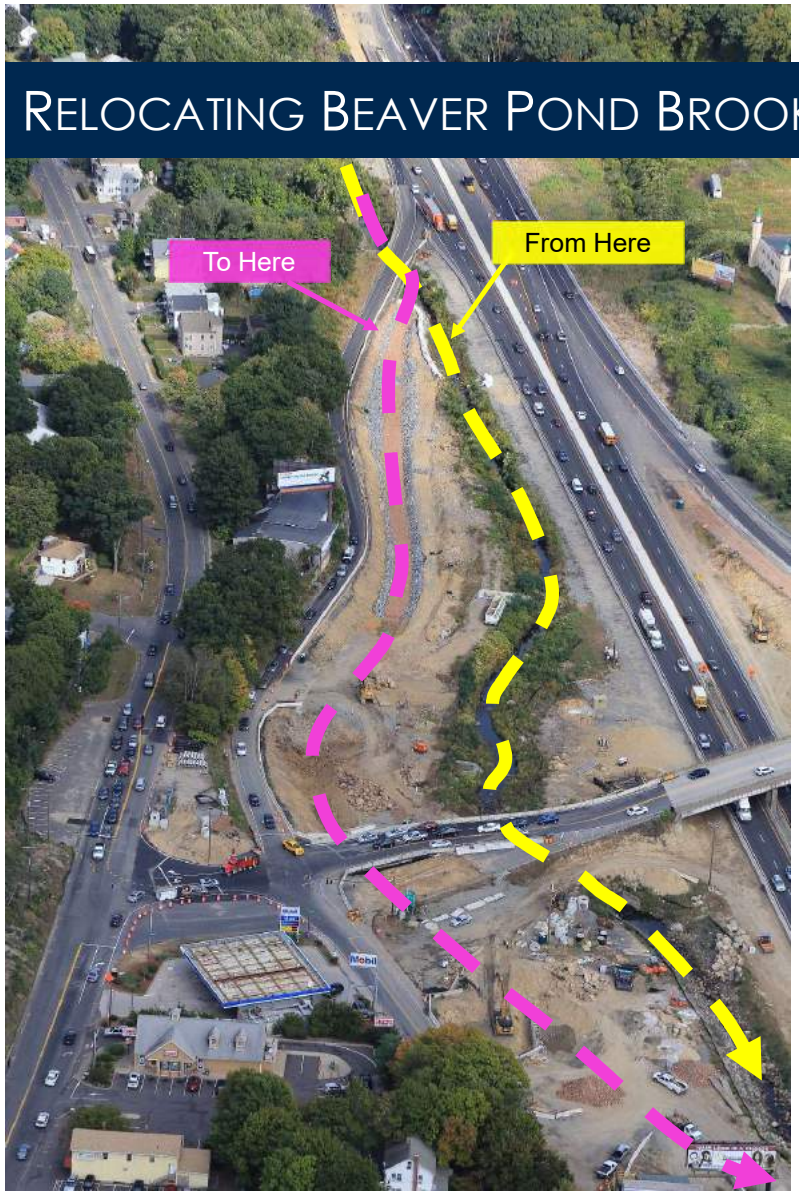
North of Reidville Drive: Parapet for Culvert Under I-84

North of Reidville Drive: Parapet for Culvert Under I-84

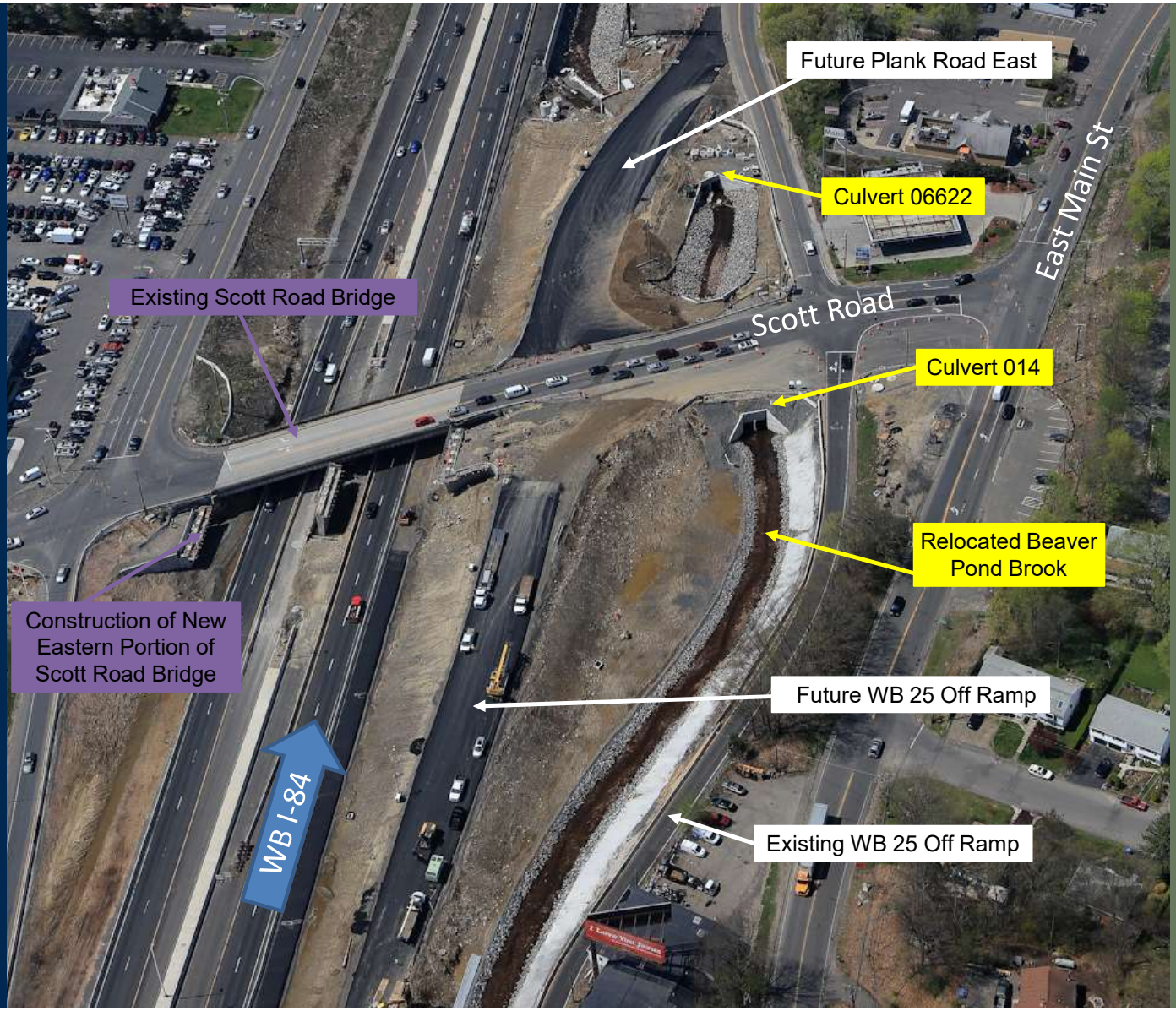
North of Reidville Drive: Culvert Under I-84

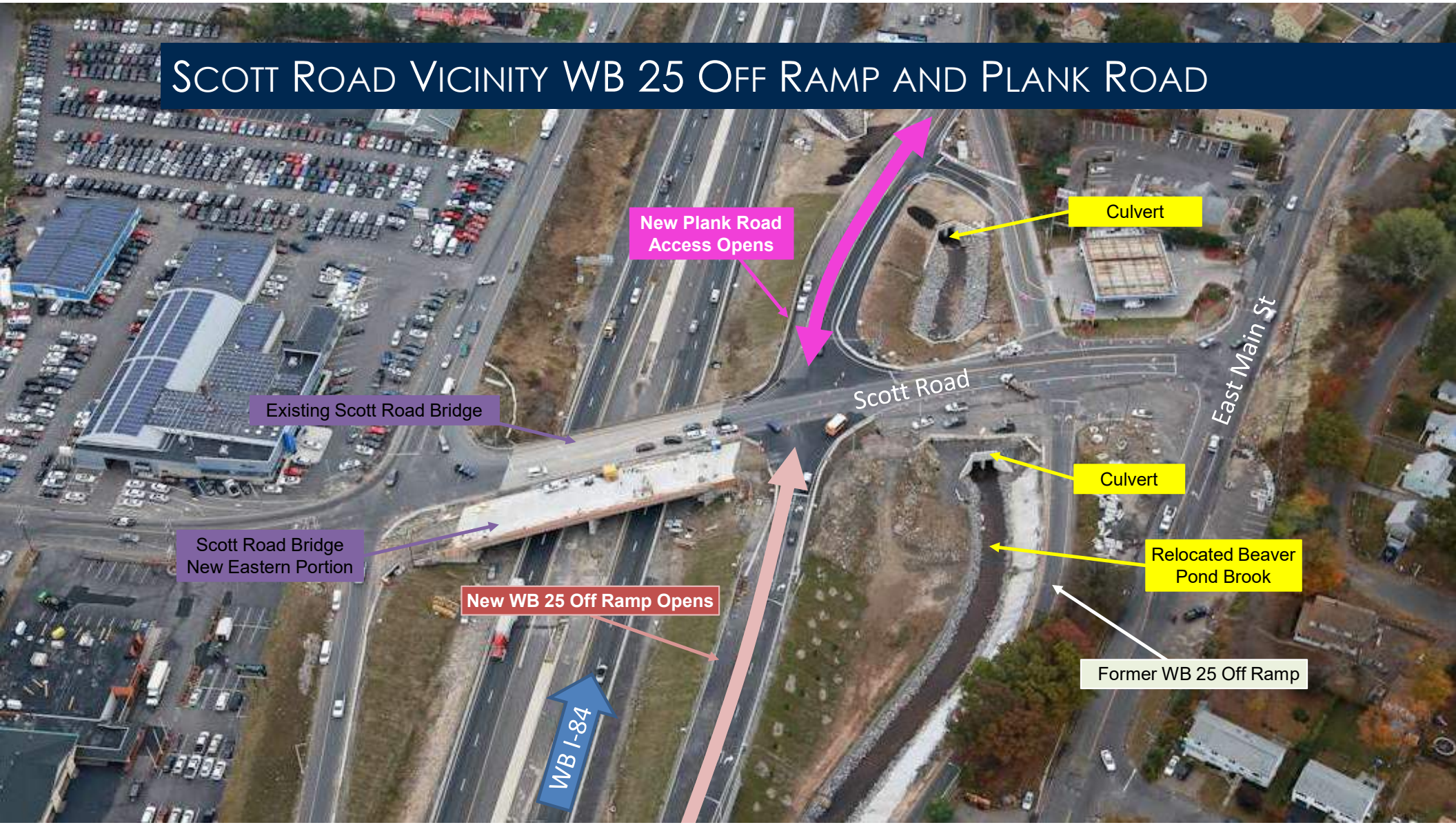


Relocating Beaver Pond Brook in Scott Road Vicinity

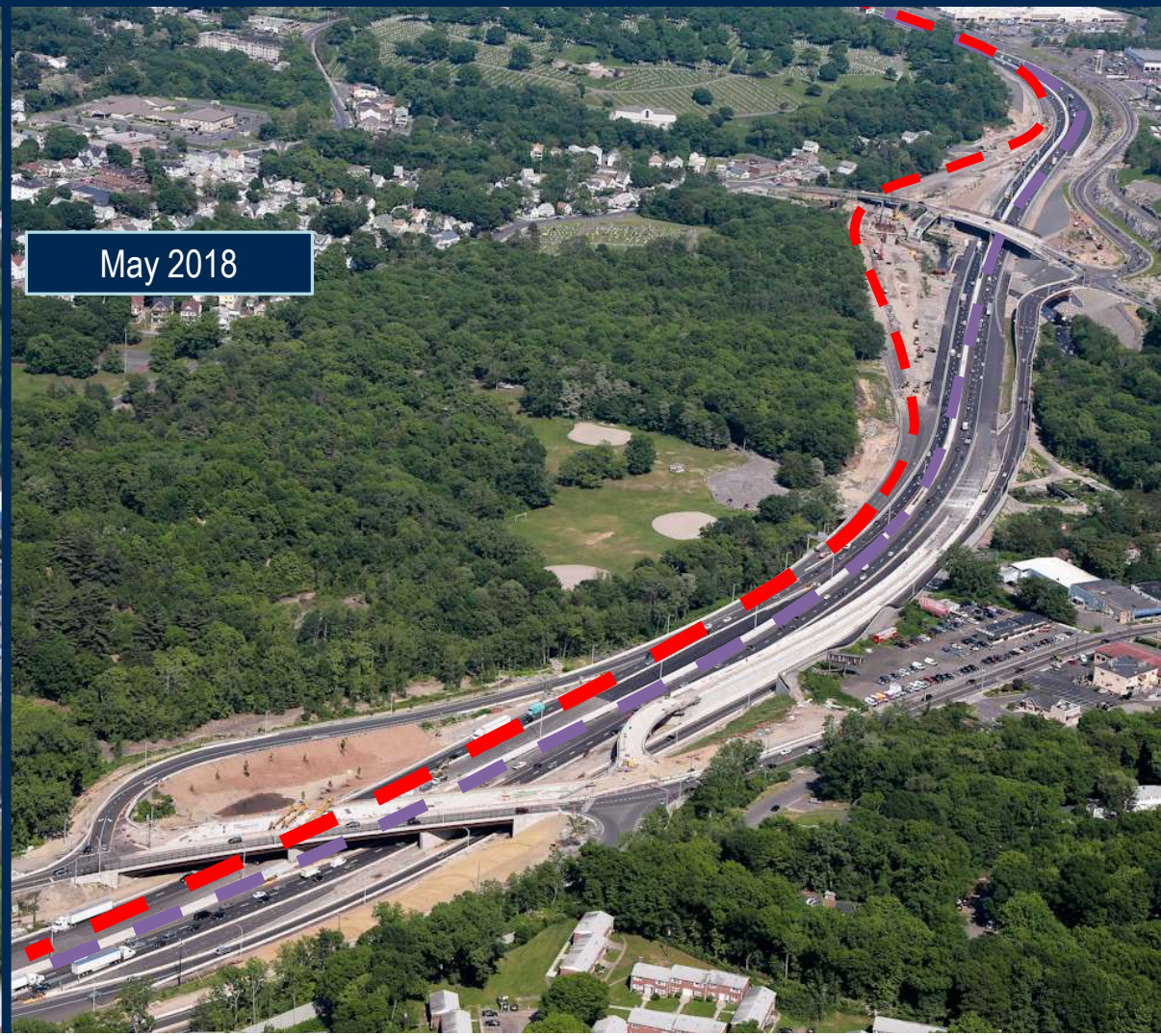


Scott Road Bridge Vicinity April 2017




SCOTT ROAD VICINITY WB 25 OFF RAMP AND PLANK ROAD
New Plank Road Access Opens
Culvert
East Main St
Scott Road
Existing Scott Road Bridge
Culvert
Scott Road Bridge New Eastern Portion
Relocated Beaver Pond Brook
New WB 25 Off Ramp Opens
Former WB 25 Off Ramp
WB I-84

I-84 New Alignment Looking East, to Harpers Ferry Road Bridge



Sound Barrier Wall (West of Pierpont Road)


UNITED
CONCRETE
UNITED
CONCRETE
UNITED
CONCRETE