Tappan Zee Bridge / I-287 Corridor Project



Fall 2010 Update





Metro-North Railroad New York State Department of Transportation



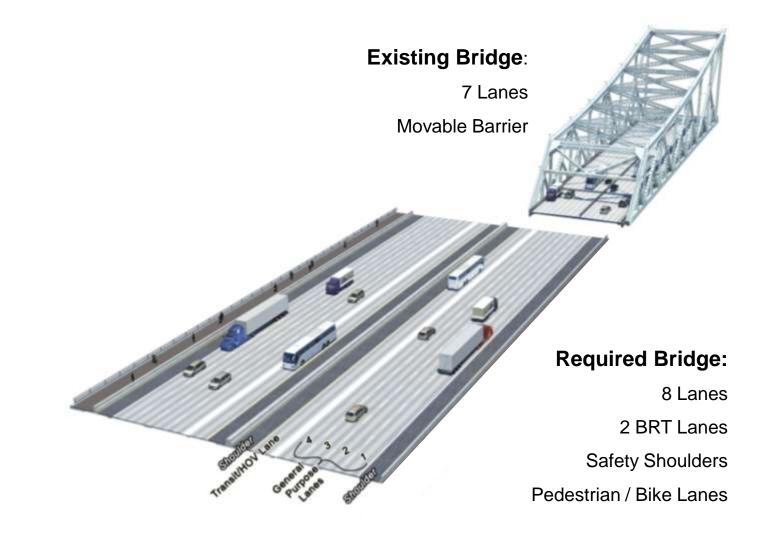


Today's Agenda

- 1. The need for the project
- 2. Bridge Option Recommendations
- 3. Transit Alignment Option Recommendations
- 4. Highway Improvement Recommendations
- 5. Status of Financing

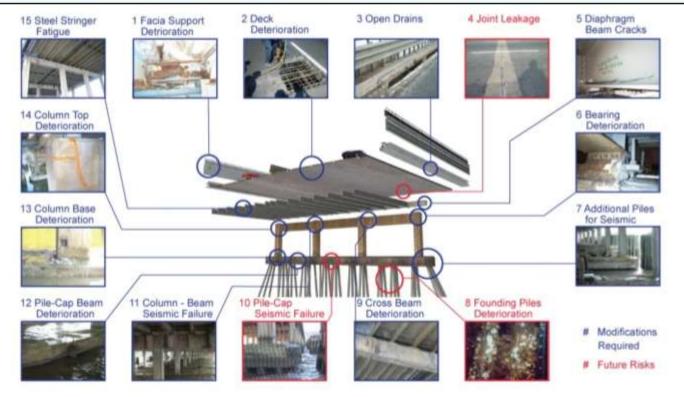
Existing Bridge vs. Required Bridge





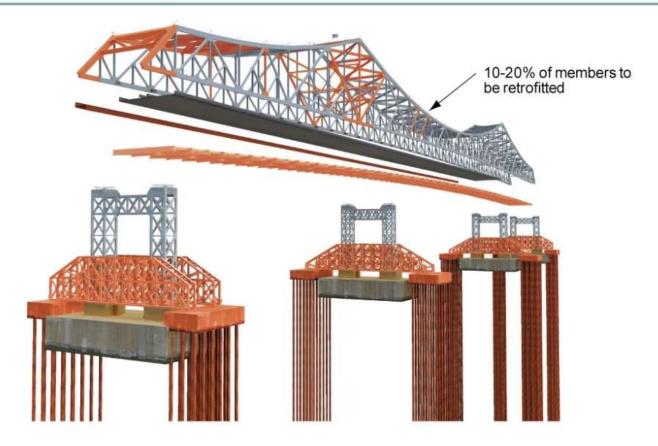


The Causeway is over Half the Length of the Bridge The Causeway *Must be Replaced* in all Cases



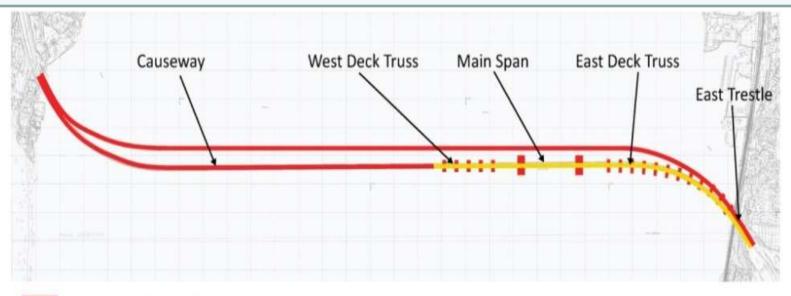


The Superstructure Requires Extensive Modifications While Significant Vulnerabilities are *Retained*





Rehabilitation Options Require Extensive New Construction Retaining Serious Vulnerabilities in the Remaining Superstructure



Replacement of Existing Structure Rehabilitation of Existing Structure



- 1. Rehabilitation of existing bridge in-kind is *not viable*
 - Does not meet project purpose and need
 - Retains serious vulnerabilities
- 2. Rehabilitation options require extensive new work
 - Costs are comparable to replacement options
 - River impacts comparable in all options
- 3. Rehabilitation options retain serious vulnerabilities
 - Existing main span retained is non-redundant
 - Retained structure will continue to deteriorate
- 4. Replacement options have high life cycle (150 yrs)

Replacement Bridge Capacity / Need for Transit





Possible Single-Level Configuration



Possible Dual-Level Configuration

Both options provide: •4 Traffic Lanes •2 Lanes for BRT (HOV) •2 Tracks for CRT •Safety Shoulders •Pedestrian and Bicycle Path

Capacity of 8 lane bridge is <u>limited</u>
Traffic demand will exceed 160,000
Impractical to provide more lanes
Would need to widen I-87 and I-287
Adding capacity for cars not feasible

New Transit is <u>only way</u> to relieve congestion and improve mobility in the corridor

New Transit is Essential for the Future



- Congestion in the Corridor is already significant and will continue to worsen.
- The replacement bridge will not provide additional relief.
- Only new transit systems will help improve mobility by affording alternative transportation choices in the future.
- Transit can also help promote and control smart growth.





Scoping Results - June 2009 Replace the Tappan Zee Bridge

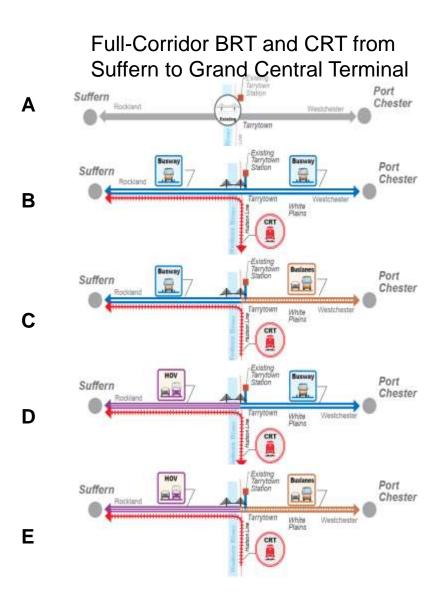


Possible Single-Level Configuration

Possible Dual-Level Configuration

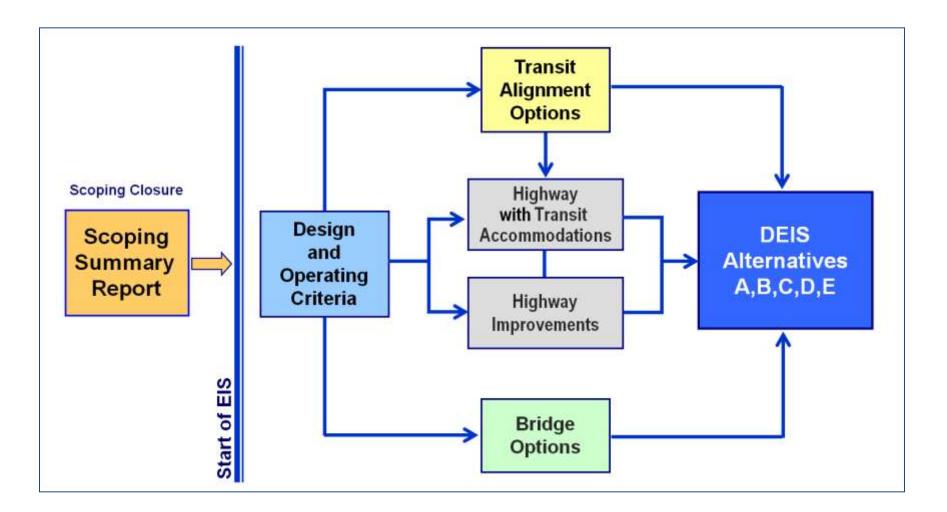


Transit for Future Mobility



Alternatives Development Roadmap





Public Outreach



- Bridge/transit reports available on <u>www.tzbsite.com</u>
- Open houses/working meetings for general public in Ramapo, Clarkstown, Orangetown, Greenburgh, White Plains, and Rye
- Working Meetings targeted to Environmental Justice populations
- Ongoing SAWG meetings

Transit-Related Outreach

- · 20 transit-related meetings with towns/villages across corridor
- Coordination with County Planning Departments
- Input from Participating Agencies
- Transit Oriented Development Training Initiative

Bridge-Related Outreach

- Series of meetings with villages and towns adjacent to bridge
- Input from Cooperating Agencies on Hudson River ecology issues
- Input from Consulting Parties and National Historic Landmark properties



Bridge Configurations









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Single Level Options







INVIRONMENTAL BEVIEW

Dual Level Options





5 CRT in North Bay



Transit below (CRT and BRT)

Engineering	Environmental (Operating)	Environmental (Construction)	Transportation	Cost
Structural Integrity	Land Use	Displacements and Acquisitions	Roadway Congestion	Capital Cost (Fully Built)
Operations and Risk Assessment	Displacements and Acquisitions	Historic Resources	Alternative Modes in Mixed Traffic	Capital Cost (Initial Construction)
Seismic	Historic Resources	Archeological Resources	Mode Split	Operating and Maintenance Cost
Redundancy	Archeological Resources	Parklands & Section 4(f)/6(f)	Transit Ridership	Life Cycle cost
Emergency Response	Parklands & Section 4(f)/6(f)	River Ecology	Non-Vehicular Travel	
Navigation	River Ecology	Community Noise	Reserve Capacity	
Construction	Avifauna		Transportation System Integration	
Life Span	Visual Resources & Aesthetics		Different	ating Criteria

Criteria not evaluated as common to all options

TAPPAR 2000 BRIDDING-887 ENVIRONMENTAL BEVIEW

Feasible Alternatives for DEIS: Consultants' Recommendations on Options



Single Level Options





Three-Columns



Option 1 – Single level Recommended for Elimination







- Option 1 has 180 columns compared to 120 in Option 3 resulting in greater impacts to river ecology, longer construction duration and larger total cost
- Because of restricted access, the center CRT structure would have to be constructed as part of the initial construction but would remain unused for a number of years pending the full introduction of CRT
- Separation of CRT and Highway structures is structurally inefficient, reduces the flexibility of highway operations, and limits access for emergency services

Option 2 – Single level Recommended for Elimination







- Option 2 has 180 columns compared to 120 in Option 3 resulting in greater impacts to river ecology, longer construction duration and larger total cost
- Separation of CRT and Highway structures is structurally inefficient particularly at the Main Spans, reduces the flexibility of highway operations, and limits access for emergency services
- Option 2 has the potential to provide the least amount of transit accommodation required by the Project's Purpose and Need statement as the entire, separate CRT structure could be deferred to a future date. Deferment would substantial increase property and aquatic impacts.

Option 3 – Single level Recommended to be further evaluated in DEIS







Single Level Option CRT Center with Two-Columns

- Two lines of columns reduce potential aquatic impacts to Hudson River compared to both Options 1 and 2
- Efficient and fully integrated substructure that supports all modes
- Safest emergency access for all modes
- Maximum future transportation flexibility
 and significant transit accommodation
- Minimum impact at landings for single level options as no gaps between structures
- Allows for deferment of CRT while avoiding up front construction of unused structural components required in Option 1
- Future implementation of CRT is from the highway decks without the property or aquatic impacts required in Option 2











Stacked







Option 4 – Dual level Recommended for Elimination





4 Stacked

- Option 4 has 120 columns compared to 66 in Options 5 and 6 resulting in greater impacts to river ecology, longer construction duration and larger total costs
- Because a central tower is not possible at the Main Spans, the resulting structural form is difficult to construct and lacks redundancy
- Because it is necessary to build the north highway deck first at the landings access to construct the CRT deck below is difficult
- Because of restricted access, the lower CRT structure would have to be constructed as part of the initial construction but would remain unused for a number of years pending the full introduction of CRT

Option 5 – Dual level Recommended to be further evaluated in DEIS







Dual Level Option CRT North on Two-Columns

- Deep deck structure results in long spans minimizing the number of columns required (66) compared to Option 4 (120)
- Minimum number of columns shortens construction duration and minimizes river ecology impacts
- Fully integrated substructure supports all modes on common columns
- Superstructure form inherently has the structural stiffness required to meet CRT displacement limitations
- Maximizes future transportation flexibility and redundancy as all highway lanes are on the same level

Option 6 – Dual level Recommended for Elimination





Reasons for recommendation

- BRT on lower level limits flexibility for highway operations compared to Option 5 where all highway lanes are on one level.
- Vulnerable to intentional events facilitated by BRT on the lower level with potential for disproportionate consequences to full bridge operations



Transit below (CRT and BRT)

Replacement TZB – DEIS Configuration Consultants' Recommended Options







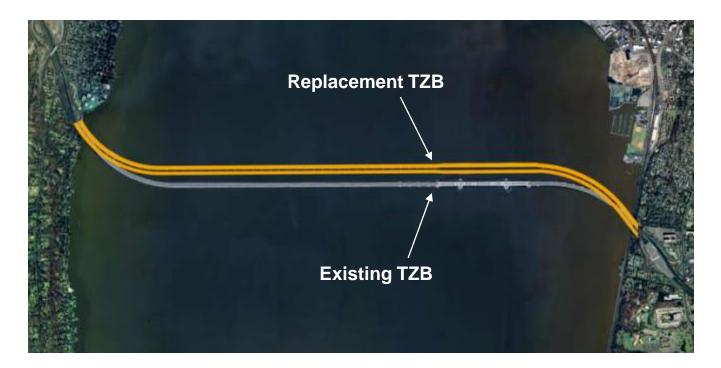
Single Level Option

Dual Level Option

Both recommended options include:

- Replacement TZB is on the north of the existing TZB
- At the landings the Replacement TZB is in the same location as that of the Existing TZB

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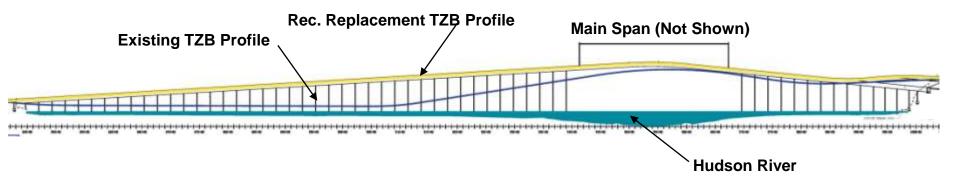


Replacement TZB Options – Vertical Profile

• Both recommended options include a flatter profile than the existing TZB

INVIRONMENTAL BEVIEW

• Flatter profile is advantageous for traffic flow and safety





Transit Alignment Options









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CRT and BRT Service Plans

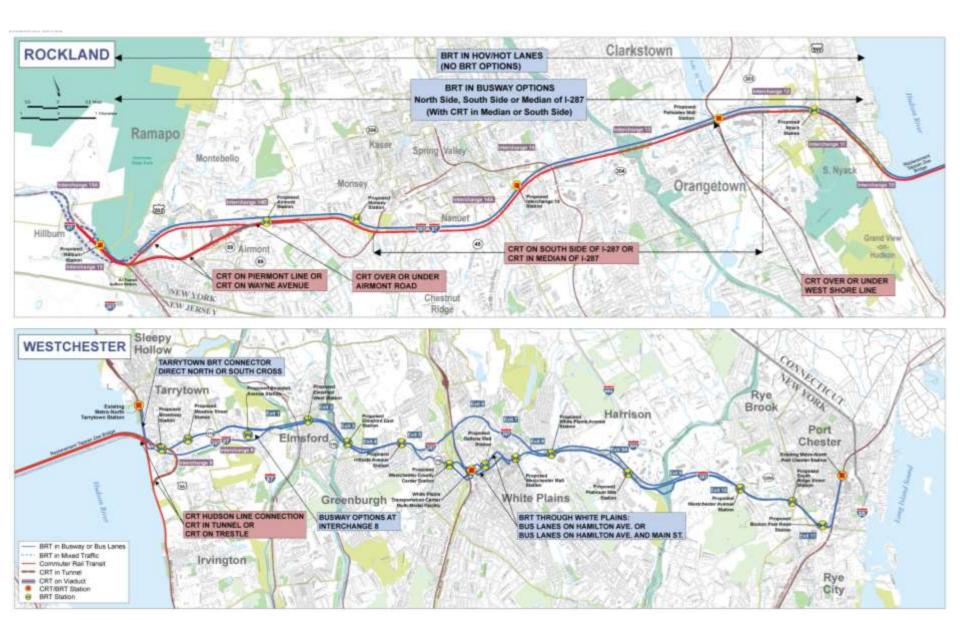


- A Middletow White Plains Transportation Center --- 8 Suffern No. of Headways Stamford & roel D Mt Ny Trains (minutes) White Plains Transportation Center Port Chester To Middletown 1 60 Port Jeivis Hoboiten (A Re. 1 2 - E Spring Valley Tanylown To Naverstrew Spring Valley Yorkers and Brore front 1 60 Port Jarvis New York Perm Station - O Spring Valley Hawthome (RL BA). - H New City White Plains Transportation Center Hau 60 1 Port Jervie Hoboken _ I Haverstraw White Plains Transportation Center To ML Ivy _ J Nyack Port Chester D 1 50 D Port Jervis New York Penn Station - K Bergen County - Port Chester L Croton Or M Fordham White Plains Transportation Center Croton Ossinin 2 (E) - Grand Central Terminal 30 Port Jervis To New City White Plains Transportation Center To Croton-Oseining н - N Yonkers Fort Chestor 4 15 (\mathbf{F}) Hatimat - Grand Central Terminal L Alex Liver (1) White Plains Transportation Center ---- O Vorktown To Yarktown 4 15 G Hilborn - Grand Central Terminal Stamford White Plains Transportation Center O (Bee Line 77) T Suffern - Port Chester Additional trains in 2030 and 2035 using the Trans Hudson Express Tunnel Outrient bus service 7o Port Jervis To Nyack G GF E map Tarrytown To Stamford Spring Valley I B P (-aud 0.80 Nyack Tarretown Hillburn Port Chester ACHILMOP Ci Balisbury Mills Port Jervis CD D B B A Hamman 🕑 m Rh Zee Bridge To Hobokar unwido K To Bergen Co. Part Spring Valley White Bloatsburg Plains To: Yohkers To Yorkers N (Rev Law 20) M Her Lie 43 To Fordham Hilbum G Nyack & Bronx ROCKLAND WESTCHESTER Suffern Tappar Zee Bridge Sufferin **Bus Rapid Transit Service Plan** Namuet 2 -Route 17 inlem-125" Street Loverd Central (E)E(0) 34 Street B D CA (Parts Station) Habaker

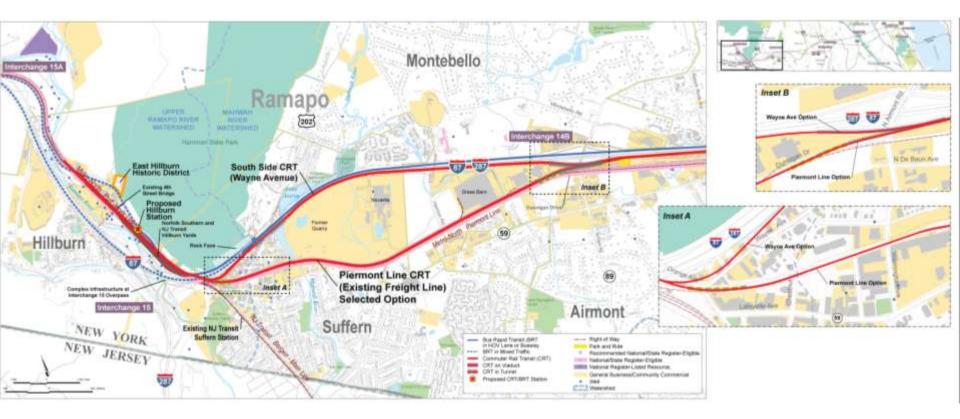
Commuter Rail Transit Service Plan

Transit Alignment Options Evaluated



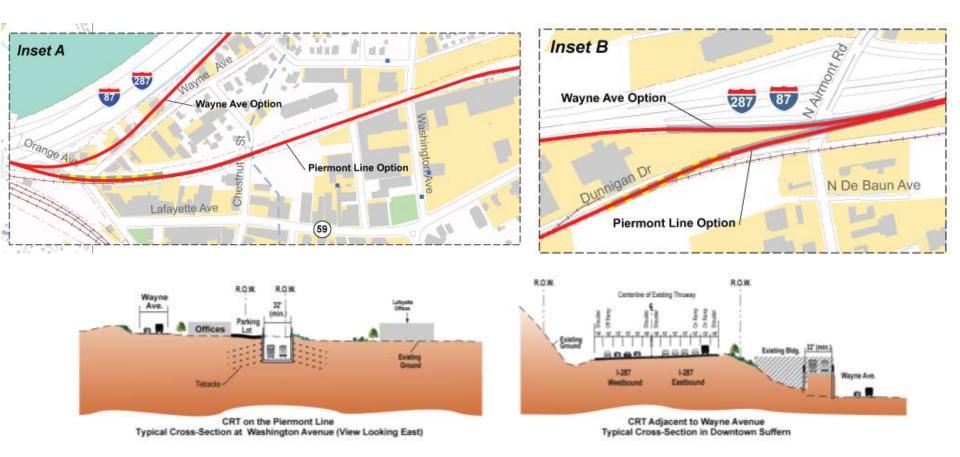


Hillburn to Airmont Recommended: CRT in Piermont Line Right-of-Way



Options Evaluated: CRT in Piermont Line ROW CRT on Wayne Avenue

Hillburn to Airmont Recommended: CRT in Piermont Line Right-of-Way

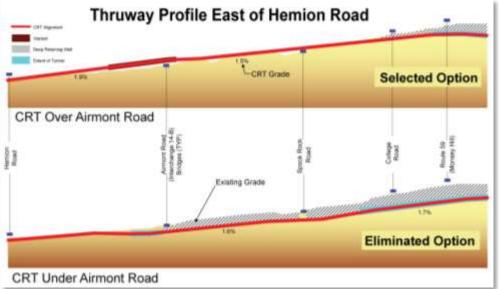


- Piermont Line Option takes three structures (2 businesses and 1 dwelling unit)
- Wayne Avenue Options takes 16 structures (6 businesses and 64 dwelling units)
- Piermont Line Option is \$170 M less costly
- Piermont Line Option has flatter CRT profile

Airmont to Monsey Recommended: CRT Over Airmont Road







Options Evaluated:

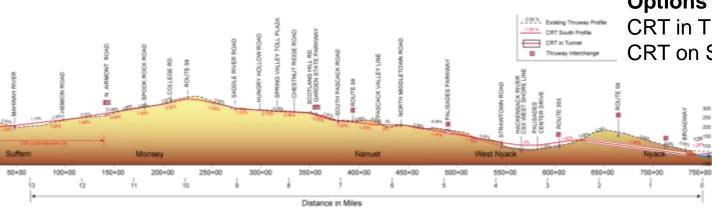
CRT over Airmont Road CRT under Airmont Road

- Under Option requires a tunnel beneath Airmont Rd and deep cuts and a long tunnel to Route 59 in Monsey
- Over Option is close to Thruway grade; has 1 year shorter construction duration and less costly by \$1.0 billion

Monsey to West Nyack Recommended: CRT on South Side



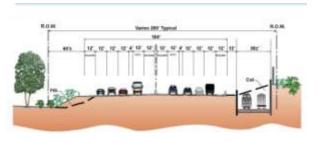
- Bus Sapid Transit in HOV Lane 🖆 Bridge over Throwing (304) ---- BRT in Mixed Traffic ---- Commuter Rail Transit Park and Ride Repartmended Natural State Register Eligible Internal Register-Listed Resource. CRT on Visitett CRT in Turnel General Business/Community Commercial **Palisades Mall** 2 CRITIBRIT Distort WARE **BRT Daten** Watershed Station Right of May Strawtown Rd ork & Hide Materic District Spring Valley (306) Kaser Interestinger TAX. 59 Interchange 14 Monsey Station Station, Nanuet Truck Toll Plaza 287 87 Orangetown (45) Chestnut Ridge



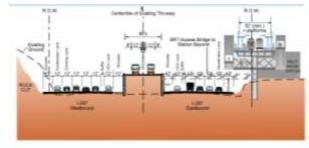
Options Evaluated: CRT in Thruway Median CRT on South Side of Thruway

Monsey to West Nyack Recommended: CRT on South Side



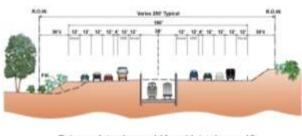


Between Interchange 14A and Interchange 13

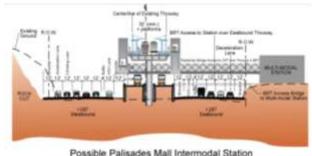


Possible Palisades Mall Intermodal Station

- Thruway relocation and reconstruction is required for Median, not for South Side
- Thruway/CRT operations, maintenance and access favor the South Side





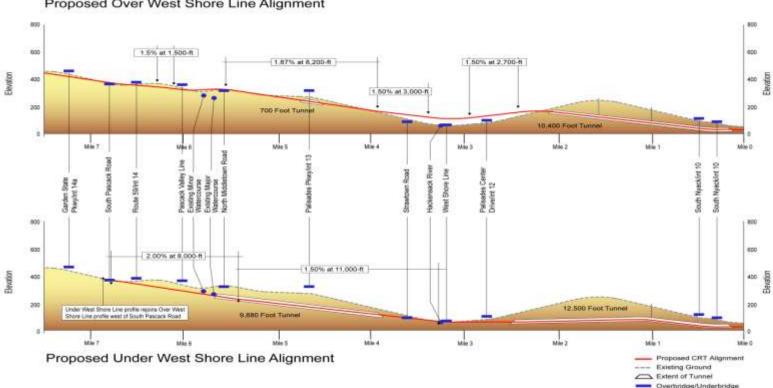


Possible Palisades Mall Intermodal Station

- CRT stations on south side are simpler to construct with simpler passenger access.
- BRT access ramps from HOV/HOT lanes are split and doubled to clear Median CRT
- South side construction duration is up to 3 years shorter
- South side construction cost is \$1.0 to \$1.7 billion less

Clarkstown/Orangetown Recommended: CRT Over CSX West Shore Line





Proposed Over West Shore Line Alignment

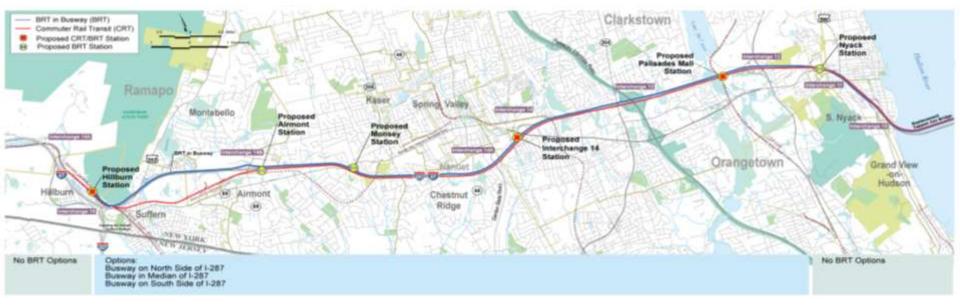
Options Evaluated:

CRT Over West Shore Line CRT Under West Shore Line Under WSL negative impacts include:

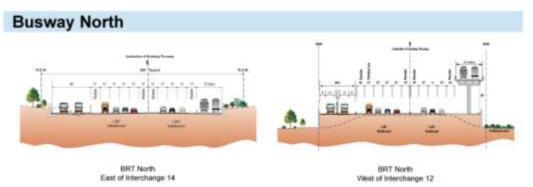
- Long 2-mile tunnel to the west; longer tunnel to the east
- Strawtown Road to be lowered 10 to 15 feet
- Tunnel to the west intersects two major water courses
- Interchange 14 CRT station not feasible at preferred location
- Construction one year longer
- Costs an extra \$680 million

Rockland County Recommended: Busway on North Side of Thruway





Options Evaluated: North side, south side and median



Busway on North advantages include: Thruway relocation not required BRT Airmont, Monsey and Interchange Stations are preferable on north side Palisades Mall and Nyack Stations are on south side for all options Shortest construction duration and \$500 million less costly

Tarrytown Recommended: CRT Hudson Line Connector in Tunnel





Options Evaluated:

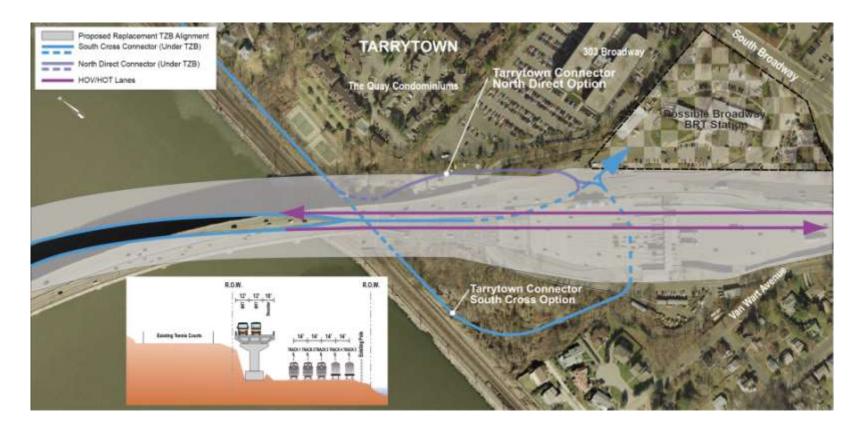
CRT Connector in Tunnel CRT Connector on Trestle

Tunnel has:

- Minimal visual impacts
- Fewer in-river impacts
- Less noise impacts

Tarrytown Recommended: South Cross BRT Connector





Options Evaluated:

North Direct BRT Connector South Cross BRT Connector

South Cross :

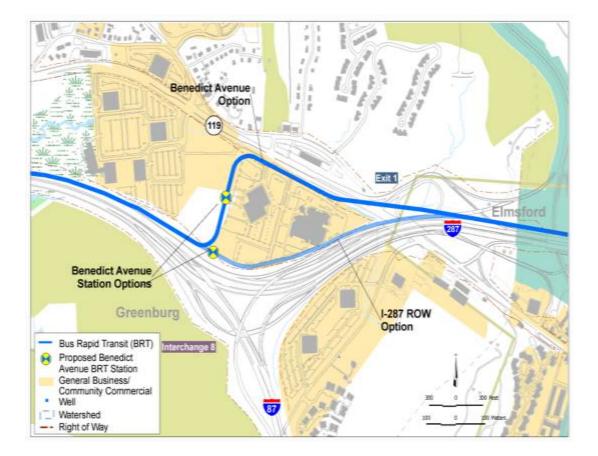
- Incorporates integrated access
- Avoids area of tight ROW
- Reduces construction complexity

North Direct :

- Reduces flexibility for bridge pier locations
- More visual impact at Tappan Landing

Tarrytown Busway Recommended: Benedict Avenue near Interchange 8

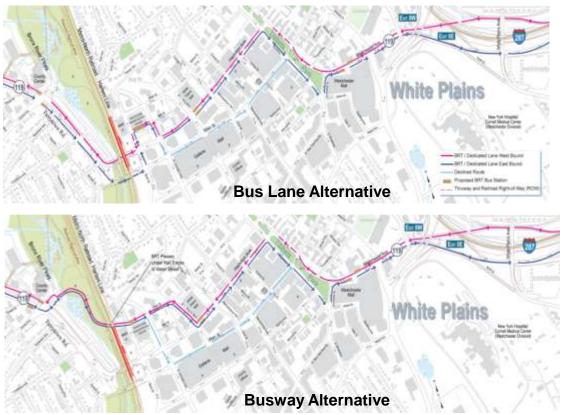




Options Evaluated: Benedict Avenue I-287 ROW

- Benedict Avenue Station more easily accessible in center of office parks
- Along Interchange 8 there is limited area for alignment and poor station location. Hotel rear access impacted

White Plains Recommended: Bi-directional bus lanes on Hamilton Ave



Options Evaluated:

Bi-directional Bus Lanes on Hamilton Avenue

Bus Lanes on Hamilton Avenue and Main Street

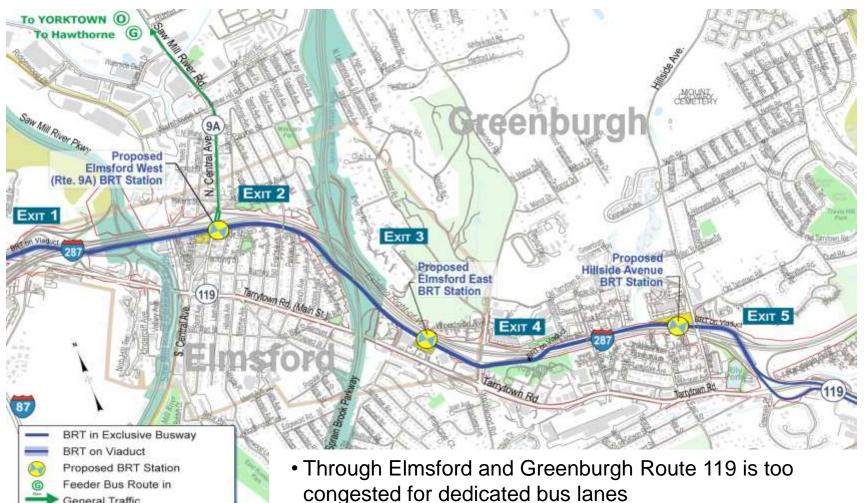
Dedicated lanes on Main Street and Hamilton Avenue and bi-directional on Hamilton Avenue were evaluated:

- Bus lanes on Hamilton Avenue and Main Street create severe traffic impacts on Main Street
- Bus lanes on Hamilton Avenue (bi-directional) have less impacts to downtown traffic
- Project will assume bi-directional on Hamilton Avenue for EIS, but will be refined in Tier 2 transit analyses

Bus Lanes Alternative will access downtown from the west using Main Street and Hamilton Avenue. Busway Alternative will evaluate an underpass beneath the Harlem Line to WP Transportation Center

Elmsford and Greenburgh Recommended: BRT Bus Lanes Alignment





General Traffic

Thruway Right-of-Way (ROW)

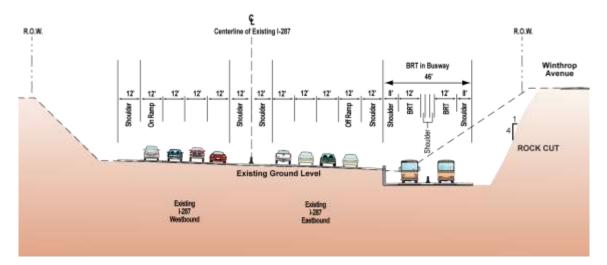
Proposed Park and Ride Facility

• Busway alignment provided adjacent to south side of I-287 and then to the north side for the Hillside Station

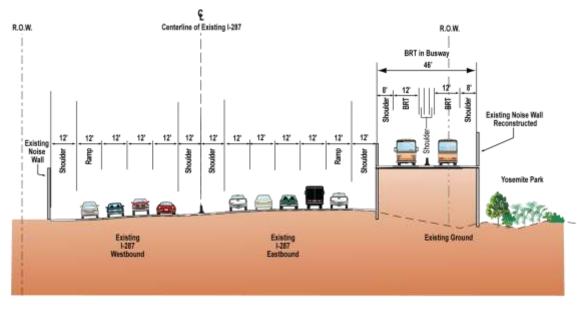
Elmsford and Greenburgh



Recommended: BRT Bus Lanes Alignment - Typical Cross Sections TAPTAN SEE DRIDGET AND THE DRIDG



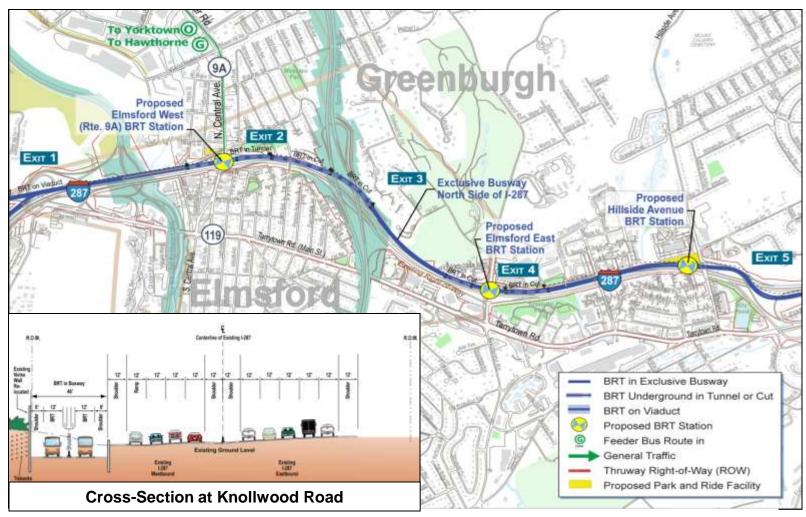
Bus Lanes Alignment in Elmsford at Winthrop Avenue



Bus Lanes Alignment in Greenburgh at Yosemite Park

Elmsford and Greenburgh Recommended: BRT Busway Alignment

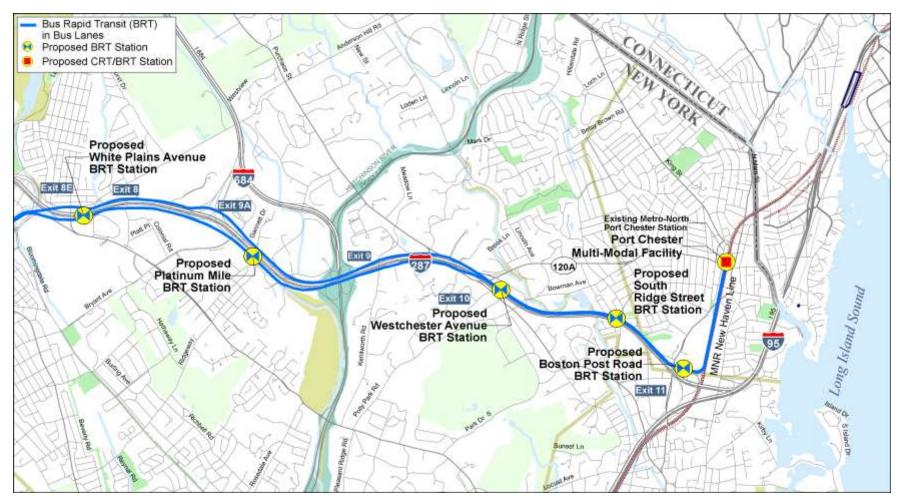




East of the Benedict Avenue alignment the busway continues adjacent to the north side of I-287 through Elmsford and Greenburgh.

East of Downtown White Plains Recommended: BRT Bus Lane Alignment



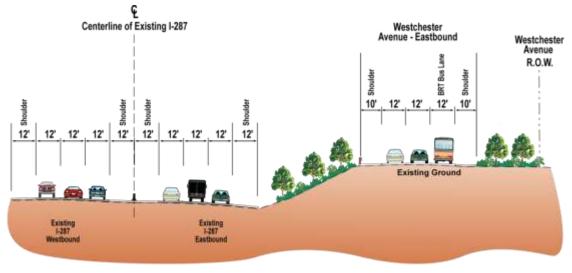


East of White Plains BRT is in dedicated bus lanes on Westchester Avenue to Exit 10. BRT then becomes a busway adjacent to the north side of I-287, and north along the west side of the Metro-North New Haven Line to the Port Chester Station.

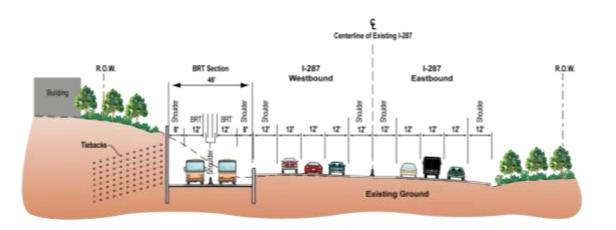
East of Downtown White Plains Recommended: BRT Bus Lane Alignment – Typical Cross Sections TATTAN SEE DRIDGET AND



Bus Lanes on Westchester Avenue at Butcher Avenue (eastbound)



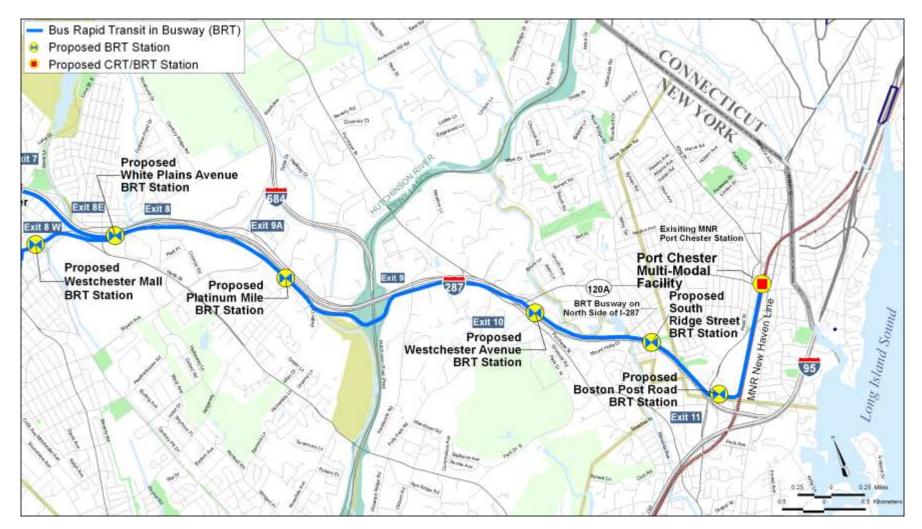
Corresponding Westchester Ave. Westbound cross section not shown



Bus Lanes (as a Busway) along North Side I-287 at South Ridge Street

East of Downtown White Plains Recommended: BRT Busway Alignment

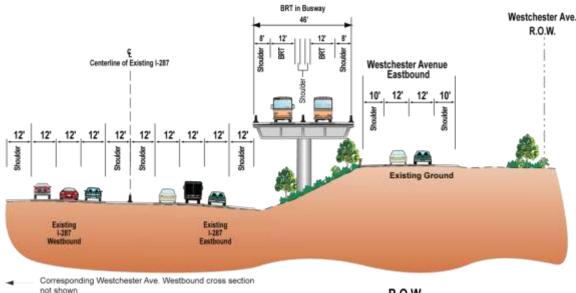




BRT in a busway adjacent to south side of I-287, then crosses to the north side near Exit 10. Busway continues to Metro-North Port Chester Station, similar to the Bus Lane alignment.

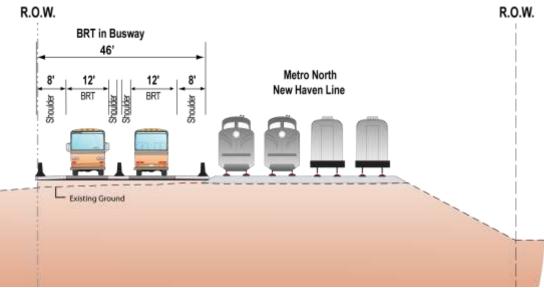
East of Downtown White Plains

Recommended: BRT in Busway Alignment – Typical Cross Sections TAPPAN SEE DELIDGEVI-SEY



Busway at Butcher Avenue

Busway along west side of Metro-North New Haven Line (View Looking North)





Highway Improvement Options







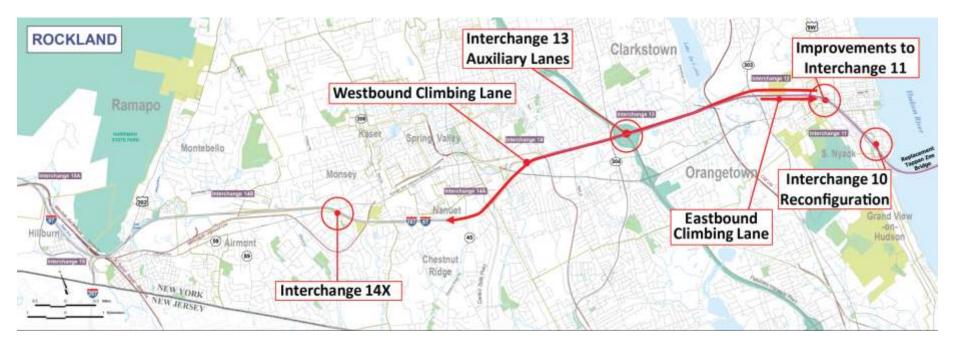


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Highway Improvement Options Evaluated





Westbound and Eastbound Climbing Lanes





Reduction in truck speeds greater than 10 mph would occur at:
WB highway between TZB and Route 59 in Monsey
EB between Interchange 14B and Route 59-Monsey, and Interchanges 11 and 12

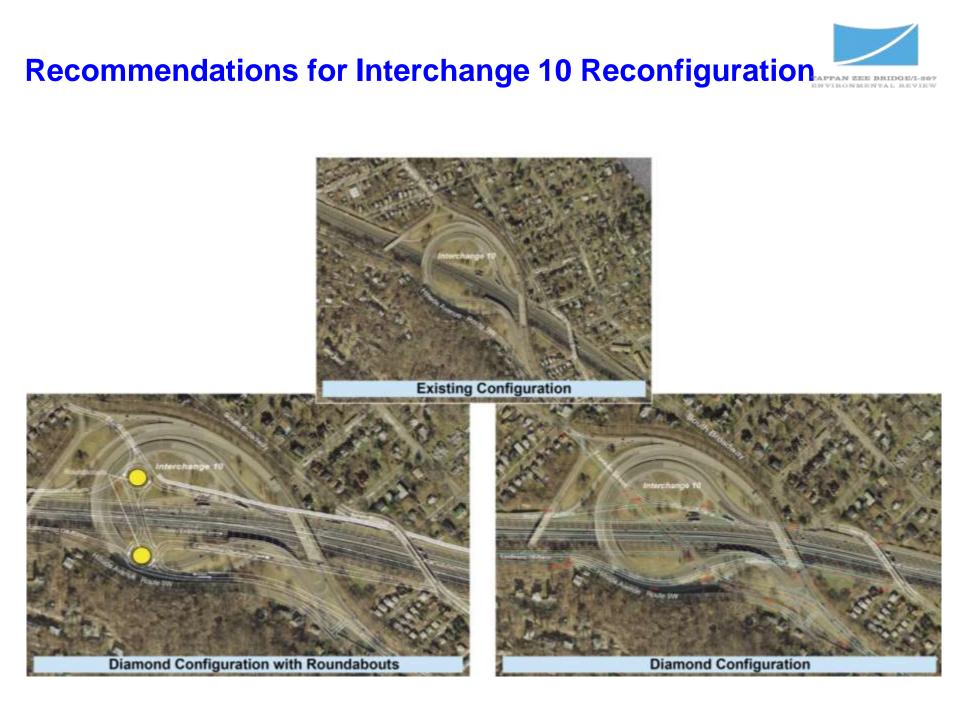
Projected high volumes and poor operating conditions would occur:WB PM peak period between the Bridge and Interchange 14AEB AM peak period between Interchange 14A and the bridge

Accident rate is higher than Statewide Average



Analysis of Warrants (Standards) considers:

- Reduction in truck speed on a steep grades
- High vehicle volumes and congestion levels
- Accident rates above the Statewide Average



Recommended Improvements to Interchange 11



Existing & Future Conditions:

- Eastbound ramps meet Rt 59 at five-leg intersection creating long delays on Rt 59 and Mountain View Ave.
- Projected traffic on ramp spills backs onto the Thruway, and the intersection fails operationally.
- Westbound ramp intersection at High Avenue functions adequately





Recommend 2 Left Turn Lanes

Recommended Relocated Eastbound Ramps

Existing Interchange 11

Recommended Eastbound Improvement:

 Eastbound ramps relocated 600 ft to West Broadway Street intersection.

- Intersections operate at acceptable levels and traffic flow improves on ramps, along Rte 59 and Mountain View Ave.
- Improvements require property acquisition and modifications to Rte 59.

Recommended Interchange 13 Auxiliary Lanes





Auxiliary lanes separate the weave/merge operations in a separate roadway parallel to the highway. Traffic analyses show their effectiveness:

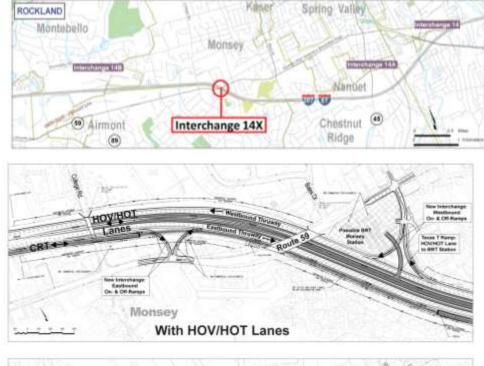
- Weaving area separated from mainline traffic creating smoother, safer traffic flow
- Requires interchange ramps to be reconstructed and entry and exit lanes to be lengthened

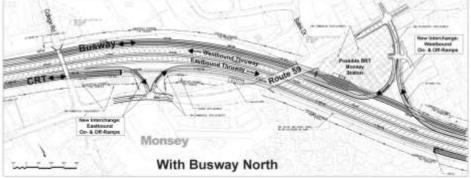
Properties adjacent to the interchange are acquired/impacted



Interchange 14X Evaluation: Not recommended to be advanced









Justification

FHWA Policy for new Interchanges:

- Improve conditions on the interstate
- Not added to alleviate local congestion

Results of traffic analyses :

- Worse conditions at Interchange 14B from higher volumes exiting in the AM and PM
- Slower speeds and longer delays on WB Thruway during PM peak period
- Many vehicles would enter 14X WB and exit at 14B using Thruway to bypass Route 59
- Minimal change in speed and travel times on Route 59

Planning for the Future



• The bridge must be replaced - there is no other viable solution.

• New transit services are essential to help reduce congestion and provide mobility choices.

• It is imperative that a workable Financial Plan be developed to make this plan a reality.

Finance Status









Metro-North Railroad New York State Department of Transportation





We remain on track

- Recent developments with ARC does not impede this Project. (And we will learn from this!)
- We are steadily working through:
 - The environmental process
 - Assessment of options for financing
 - Narrowing our range of options
- Maintaining momentum through "tiering"
 - Environmental process / financing / construction



"Tiering"

Transit-Ready Bridge & Highway Followed by Bus Rapid Transit Followed by Commuter Rail Transit

Financing to be addressed in parallel:

- focus on funding for the Transit-Ready Bridge and Highway first followed closely by funding for BRT
- Goal of having BRT operational when bridge opens



Estimating the Project Cost

\$ 8.3 billion Transit-Ready Bridge & Highways
 1.0 BRT
 6.7 CRT

\$16.0 billion (in current costs)

Depending on schedule, cost elements increase due to inflation. Timing of project – especially for each major phase – is yet to be determined.



First Phase: Transit-Ready Bridge & Highway

As described earlier in this presentation, this includes:

- Replacement bridge designed to accommodate BRT and CRT
- Rockland County highway improvements to the Thruway



Focus on Transit-Ready Bridge & Highway Financing

- Current cost estimate is \$8.3 billion
- Will explore opportunities for cost savings
- Assess traditional and innovative financing options
- Investigate "extraordinary" financing solutions
- Determine feasibility of tackling financing through further breakdown of the tiered elements





This is an extraordinary challenge

An extraordinary solution will be required

Multiple funding sources are needed

We continue to explore financing strategies



Finding The Money

- Explore traditional and innovative ideas
- Complete the EIS process
- Get ready for any and all opportunities
 - Federal reauthorization
 - Innovative programs like ARRA (\$760B in 2009)
- Keep narrowing the focus
- Full court press developing partnerships
 Federal, other states, local support



IDEAS: Engage Washington

Federal funding is the single most important revenue source.

Support possibilities for significant new grants and loans

- Direct Aid
 - Member items or specific earmarks
- Reauthorization
 - Advocate / prepare for new mega-project funding
 - Pursue "Project of National Significance" status
 - Pursue project grants
 - Pursue low cost loans (TIFIA, etc)
 - Support National Infrastructure Bank



IDEAS: Develop National Support³

Partner with :

Transportation officials from neighboring states (Massachusetts, Connecticut, New Jersey, Pennsylvania)

Coalition of Northeast Governors (CONEG)

American Association of State Highway and Transportation Officials (AASHTO)

Northeast Association of Transportation Officials (NASTO)

Support in Washington for :

Federal Transportation Reauthorization Issues

"Project of National Significance" Program

And other mutually beneficial initiatives



IDEAS: Expand / Align Regional Support

Engage State and Local Officials Engage Business and Industry Representatives Invite Organizations and Concerned Citizens, such as:

> AAA Mid-Hudson Pattern for Progress Regional Plan Association Rockland Business Association Rockland Economic Development Corporation Scenic Hudson The Business Council of New York State, Inc. Tri-State Transportation Campaign Westchester Business Council Westchester County Association

Questions?