



**Thruway  
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**New York State  
Department of Transportation**



**Metro-North  
Railroad**



**TAPPAN ZEE BRIDGE/I-287  
ENVIRONMENTAL REVIEW**

**Tappan Zee Bridge / I-287 Environmental Review**

# **Alternatives Analysis Report**



**New York State Department of Transportation  
New York State Thruway Authority  
MTA Metro-North Railroad**

**Replace**



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## Executive Summary

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In April 2001, the New York State Thruway Authority (NYSTA) and Metro-North Railroad formed a partnership to undertake a comprehensive study of regional transportation needs and mobility within the Tappan Zee Bridge/I-287 Corridor. The corridor extends 30 miles from the I-287/87 interchange in Suffern, New York to the I-287/I-95 interchange in Port Chester, New York, and includes the Tappan Zee Bridge - its most important infrastructure element. Because of this project's regional significance and importance to the state's multimodal transportation system, the New York State Department of Transportation (NYSDOT) has assumed a coordinating role.

The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) are the joint lead agencies under the National Environmental Policy Act (NEPA), with NYSTA and Metro-North as project sponsors, for preparation of the Alternatives Analysis and the Environmental Impact Statement (EIS). The environmental review process will also satisfy the New York State Environmental Quality Review Act (SEQRA), which follows the same basic process as NEPA. The FHWA and FTA will be responsible collectively for the environmental review of the proposed project and would likely be funding sources for an approved project.

In addition, a regional Metropolitan Planning Organization was created specifically for this project to advise and guide NYSTA and Metro-North throughout the process. The Inter-Metropolitan Planning Organization (IMPO) consists of members of the Mid-Hudson South Transportation Coordinating Committee, the Orange County Transportation Council, and the Port Authority of New York and New Jersey (PANYNJ).

The Alternatives Analysis (AA) process, which is the subject of this study, is the first of three stages of the overall Corridor Study:

- **Stage 1 - Alternatives Analysis/Initial Environmental Review Process** – In this stage a large number of alternative elements were identified and screened to produce feasible and reasonable alternatives to be studied in more detail in the Draft Environmental Impact Statement (DEIS).
- **Stage 2 – Preparation of the Draft EIS** – This stage will involve the detailed environmental impact analysis of the feasible and reasonable alternatives developed in Stage 1. Public hearings pursuant to NEPA and SEQRA will be held on the DEIS. The locally preferred alternative (LPA) will be selected during the DEIS process.
- **Stage 3 – Preparation of the Final EIS** – This stage will involve response to outside agency and public comments on the DEIS. The process will culminate with the issuance of a Record of Decision (ROD) by the lead agencies pursuant to NEPA and a Findings Statement by NYSDOT pursuant to SEQRA.

The AA process included two levels of screening that resulted in six alternatives to be considered in the DEIS. The criteria for both levels of screening were developed with input provided by the general public, stakeholders, and IMPO. The screening criteria were developed to assess how various transportation improvement elements and scenarios met the following goals and objectives established at the beginning of the AA process:

- Improve the mobility and accessibility of people, goods and services for the travel markets served by the Tappan Zee Bridge/I-287 corridor.

- Maximize the flexibility and adaptability of new transportation infrastructure to accommodate changing long-term travel demand.
- Maintain and preserve vital elements of the transportation infrastructure.
- Improve the safety and security of the transportation system.
- Avoid, minimize, and/or mitigate any significant adverse environmental impacts caused by corridor improvements.
- Develop feasible, cost-effective solutions that can be implemented within a reasonable time horizon.

An extensive outreach program was a critical component of the AA process. Key elements of the program were:

- **Elected and Appointed Officials Briefings** – A concerted effort was made to reach out to federal, state, and local elected and appointed officials. This included meeting with key individuals or their staff as well as conducting general briefing updates at key milestones.
- **Westchester Rockland Tappan Zee Futures Task Force** – A group created by the Westchester and Rockland County Executives in 2005; the project team met with this group several times in the fall of 2005, receiving significant advice and support for public outreach efforts.
- **The Stakeholder Committee** - A Stakeholder Committee comprised of representatives of organizations in the region such as businesses, environmental and planning groups, recreation and tourism organizations, and universities was established in June 2002 and has met at study milestones.
- **IMPO** – Numerous meetings were held with IMPO at key points in the AA process.
- **TZBSITE.com** – A separate website ([www.tzbsite.com](http://www.tzbsite.com)) was launched at the outset of the project to provide history, background, and a timeline for the process and is updated.
- **Community and Interest Group Meetings and Presentations** – Throughout the AA process the project team met with numerous local communities in Rockland, Westchester, and Orange Counties as well as interest groups throughout the region.
- **Community Outreach Centers** - In March 2003, two Community Outreach Centers in Westchester and Rockland Counties were opened to serve as local meeting places and provide opportunities for the public to obtain study information and provide feedback.
- **Pre-Scoping Meetings** – In October 2001, two public meetings were held (one each in Westchester and Rockland Counties) to introduce the public to the study and indicate ways for them to be involved.
- **Public Scoping Meetings** - In mid-January 2003, three public scoping meetings were held, one each in Westchester, Rockland, and Orange Counties, to invite public comment on the scope of the study.
- **Workshops** - Workshops were held in April 2003, July 2003, and December 2005 to describe the progress being made on the study and key decisions being made.
- **Media Contacts** – The media has been kept apprised of study developments through press releases, briefings and site tours.

## The Level 1 and Level 2 Screening Processes

In Level 1 screening, a “long list” of approximately 150 alternative elements was identified, analyzed, and evaluated according to a limited set of selection criteria. The key criteria used in the screening process included corridor mobility, projected ridership, cost effectiveness, operational aspects, capital and

operating/maintenance costs, engineering and constructability considerations, and environmental impacts. These alternative elements were developed through a comprehensive program of public outreach, review of previous studies, and recommendations from various agencies and public officials, and were grouped into four broad categories: travel demand management/transportation system management (TDM/TSM); new/improved transit services; corridor improvements; and Hudson River crossing improvements. The 72 alternative elements that survived Level 1 screening were combined into 16 corridor-wide scenarios that represented combinations of the more promising elements for TDM/TSM, highway, transit, and river crossing options, as follows:

- No Build.
- Rehabilitation of the bridge with TDM/TSM measures.
- A highway improvement option with a replacement bridge.
- Seven transit single mode scenarios consisting of full corridor bus rapid transit (BRT), light rail transit (LRT), or commuter rail transit (CRT) options along with a variety of river crossing options.
- Six multi-modal alternatives that combined various transit elements with a variety of river crossing and highway improvement options.

In order to implement the Level 2 screening process, it was necessary to develop the scenarios in sufficient detail to permit the necessary transportation, engineering, environmental, and cost analyses associated with the Level 2 screening process. This involved developing conceptual designs for highway, bridge, and transit elements; developing conceptual level service plans for those scenarios with transit components; and extensive computer modeling to forecast future travel demand using the New York Metropolitan Transportation Council's Best Practice Model (BPM). The BPM was the key planning tool for the study and provided year 2025 (the analysis year for the AA report) estimates of vehicular traffic and transit ridership in the study corridor.

A variety of technical studies were conducted during this process on topics such as the need for climbing lanes, high occupancy toll lanes, transit modal options and alignments, and river crossing options. This AA report is a compendium of the findings of these studies. One of the most important findings is that traffic forecasts clearly demonstrate a demand for travel in the corridor that cannot be accommodated by highway improvements alone. The need to include transit improvements in a dedicated right-of-way across the corridor is indicated.

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## Highway Scenarios

Given the roadway constraints in Westchester County, highway improvements in Rockland County and on the bridge should create a balance with the effective number of lanes and throughput in Westchester County to improve traffic conditions on local roadways. In Westchester County, no highway improvements beyond those programmed as part of the April 1998 I-287 ROD and the March 2000 revised ROD were considered.<sup>1</sup>

Two scenarios were developed to improve traffic safety and operations on I-287 in Rockland County, one with additional general-purpose lanes and one with high occupancy toll (HOT) lanes. Both of these scenarios would include the reconstruction of the full roadway between the bridge and Suffern, with

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<sup>1</sup> Final Environmental Impact Statement for PIN 8729.30, I-287/Cross Westchester Expressway, New York State Thruway, Route 303 to Route 120 Westchester and Rockland Counties, New York.



improvements to interchanges and bridges/overpasses (as necessary). The reconstructed roadway would conform to current design standards, eliminating existing sub-standard features.

The Level 2 screening process resulted in the recommendation to eliminate from further consideration expansion of the highway to eight general-purpose lanes in Rockland County. The introduction of HOT lanes is preferred over general-purpose lanes because they would offer significant benefits, such as:

- Accommodating a transit component (buses could travel outside of the congested general purpose lanes) and induce fewer single occupant vehicle (SOV) trips than general-purpose lanes by providing an uncongested route for non-SOV traffic.
- Reducing demand on general-purpose lanes by moving buses, high-occupancy vehicles, and some SOVs (willing to pay the toll) into the HOT lanes.
- Generating revenue to offset operating costs.
- Providing an uncongested lane for emergency vehicles.
- Providing potential to relieve weekend traffic congestion by using the HOT lanes as express lanes in each direction between Suffern and the Tappan Zee Bridge.

The analyses determined that addition of HOT lanes alone would not be as effective as general purpose lanes in improving levels of service in the westbound direction in the three-lane segments west of Interchange 11 (Nyack). As a result, additional improvements (such as climbing lanes) were considered to be included with HOT lanes to better meet the goals and objectives of the study. With respect to climbing lanes, an analysis of the critical lengths of grade and the highway service levels (using NYSDOT and American Association of State Highway and Transportation Officials [AASHTO] criteria) indicates that they would be warranted for certain segments of I-87/I-287 with long 3-percent grades, where reduced truck speeds result in lower levels of service (LOS) and unsafe operating conditions.

In conclusion, a set of highway improvements is proposed that would include HOT lanes in both directions in a reconstructed I-87/I-287 corridor in Rockland County and westbound and eastbound climbing lanes for selected segments of I-87/I-287 in Rockland County.

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## Transit Mode Scenarios/Modal Options

The existing and future travel market in the corridor has two general components that were considered in the development of the transit mode scenarios and transit modal options:

- The circumferential market consisting of a myriad of origins and destinations running from northern New Jersey and Rockland and Orange Counties, across Rockland and Westchester Counties and on to Connecticut, including intra-county trips and trans-Hudson trips.
- The Manhattan bound market originating west of the river in Rockland and Orange Counties.

Early on in the process, it was concluded that to meet project objectives, a high capacity and reliable transit element that operates independent of general purpose highway traffic is needed. Furthermore, while the Manhattan-bound transit market is at present dominant, the circumferential transit market is significant and has tremendous growth potential, especially if future land development planning reinforces the need for major transit investment in the corridor.

After consideration of the initial set of transit improvements contained in the original scenarios, it became apparent that seven subsets or refinements of these scenarios offered the most potential transportation benefits in the corridor. Thus, the next step in the AA process focused on the analysis of seven potential transit modal options:

1. Full Corridor Commuter Rail (CRT) and Manhattan-bound CRT (via Connection to Hudson Line).
2. Full Corridor Hybrid Light Rail Transit (LRT).
3. Full Corridor Bus Rapid Transit (BRT).
4. Manhattan-Bound CRT with Full Corridor BRT.
5. Manhattan-Bound CRT with Full Corridor LRT.
6. Manhattan-Bound CRT with LRT in Westchester County.
7. Manhattan-Bound CRT with BRT in Westchester County.

The detailed analysis of the seven transit modal options led to the elimination of the following:

- **Full Corridor Hybrid LRT (Option 2)** – This combination of high-speed and in-street LRT mode was the least cost-effective transit mode studied and was ineffective in serving many potential markets. It had the least favorable cost effectiveness of the seven options.
- **Duplicative Transit Modes in Rockland County (Options 4 and 5)** – Ridership forecasts did not justify the duplication of two transit modes in Rockland County (i.e., CRT/LRT or CRT/BRT). In particular, they did not support having both CRT and LRT modes in Rockland or on a replacement bridge. Furthermore, providing sufficient right-of-way for two modes through some points in the corridor created the need for additional right-of-way and environmental problems. The exclusive busway option in Rockland County was eliminated since the HOT lane busway would be more effectively used by high occupancy vehicles and SOVs willing to pay a premium, as well as by buses.

A variety of decisions on transit alignments and service options were also made (such as the need for a direct connection to the Hudson Line as opposed to a transfer connection for CRT service). As a result, transit modal options 1, 3, 6, and 7 were recommended for further consideration in the DEIS.

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## River Crossing Scenarios

A variety of bridge and tunnel options were studied in the Level 2 scenarios, including preserving the existing bridge; conducting a major rehabilitation of the existing bridge with a seismic retrofit; constructing a replacement bridge with or without transit; constructing a replacement tunnel for highway and transit modes; constructing a separate tunnel for CRT only (with the highway mode on a new or rehabilitated bridge). Of the five options, three are recommended for inclusion in the DEIS, for further development and more detailed evaluation:

- Preservation as part of the No Build Alternative.
- Rehabilitation as part of the Rehabilitation Alternative.
- A replacement bridge as part of the Build Alternatives that carries the highway, HOT/BRT lanes, and CRT, depending on the alternative.

During the Level 2 screening process, numerous possible alignments for a potential new replacement bridge were analyzed using transportation, engineering, and environmental screening criteria. The results of these studies indicated that a northern highway bridge alignment (i.e., north of the present Tappan Zee Bridge) is recommended, as it would take greater advantage of available right-of-way (ROW) and reduce impacts on highway operations during construction. It would also avoid the PANYNJ jurisdictional boundary. Any new bridge, however, would need to touch down on the Rockland and Westchester shores at or very near to where the existing bridge connects to I-287. Several potential bridge cross sections were considered such as: a dual-level bridge in which CRT and BRT/HOT lanes would be on the lower level with general purpose highway lanes on the upper level; and a single-level bridge in which all highway lanes and transit modes are on one level. The decision on bridge cross section will be made in the DEIS Stage.

The reasonableness of including rail freight on a new bridge or tunnel crossing was evaluated. The river crossing options considered provide for future freight service, but with certain restrictions. For example, standard freight with axle loadings of up to 65,000 pounds could be accommodated on a bridge without additional significant bridge strengthening. Heavier freight service would require bridge strengthening at additional cost, some of which (\$300 to \$500 million) would need to be incurred at the time a new bridge is constructed. The analysis also concluded that a rail freight component would provide only limited additional flexibility in the rail freight network while (1) requiring a significant upfront capital investment and (2) doing little to alter the underlying infrastructure and institutional problems that constrain the movement of rail freight to either the east side of the Hudson River along the Hudson Line south or to New England. Thus, standard freight is not being precluded, but additional cost for design for non-standard freight is not included.

The two river crossing options that feature highway and/or CRT tunnels are not recommended for further consideration for the reasons outlined below.

## Highway Tunnel

Conceptual highway tunnel river crossing designs were developed for several alignments across the Hudson River. Their assessment indicates that a replacement highway in a tunnel would result in degraded transportation performance, extensive property impacts and acquisitions, environmental and construction impacts, and significantly higher cost than the various replacement bridges considered, and should not be considered further. The most significant obstacles to this option include:

- Bypassing Interchanges 9, 10, and 11 and the resultant need for backtracking.
- Long and steeper grades that exceed recommended highway standards.
- Relocation of the toll plaza to Rockland.
- Property acquisition.
- Several large vertical construction shafts (some in the river).
- Extraction, handling, and disposal of more than 8 million cubic yards of spoil, some of which would be contaminated.
- Duration of construction that would be expected to be 2 to 3 years longer than a new bridge, even with work progressing on multiple tunnel tubes.
- Disturbance of the river bottom at the rock/soil access shafts on both shores to an extent greater than for a bridge (up to 50 acres of underwater habitat could be affected).
- Displacement of 25 acres of wetlands in the Talleyrand Swamp in Westchester County.
- Visual impacts of ventilation buildings, which would be large, conspicuous structures.
- Capital costs for the highway tunnel crossing would be two to three times that of a new bridge (\$4-6 billion more).



## Commuter Rail Tunnel

A wide range of possible designs and alignments for a CRT tunnel river crossing was developed to supplement a highway bridge. Assessment of those options indicates that the most likely CRT tunnel crossing alignment would follow the existing highway alignment in Rockland and tunnel under the river north of the existing bridge. Reaching the Westchester shoreline north of the existing Tarrytown Station, the alignment would lead to a new underground CRT station beneath and just west of that station. South of Tarrytown Station, this new alignment would split, with one branch rising up and merging with the Hudson Line and the other turning east in a tunnel to provide cross-Westchester CRT service.

To assess the merits of this CRT Tunnel Option, it was compared against a CRT Bridge Option (i.e., adding CRT to the selected highway bridge alignment). The Tunnel Option with a highway-only bridge would result in two Hudson River crossings. In Westchester in the Bridge Option, the CRT alignment would leave the bridge and immediately enter a tunnel leading to a new Tappan Zee Station below and just to the north of the bridge's toll plaza area. East of this station, the CRT alignment would split to provide connections to the Hudson Line to the south and to Cross-Westchester CRT service to the east.

Assessment of the Bridge and Tunnel Options indicated that the Tunnel Option should be eliminated from further consideration. Compared with the Bridge Option, the Tunnel Option was found to be less favorable and would:

- Result in longer emergency response and evacuation times due to limited access.
- Pose a greater security risk; the Tunnel Option includes a rail tunnel and highway bridge necessitating protection of two facilities.
- Take longer to repair and place back in service after a major event.
- Result in considerably greater impacts to Metro-North's existing operations during construction in the Tarrytown Station area and in the "interlocking" track switching areas south of the station.
- Pose greater construction risks due to the challenges of tunneling in difficult soil conditions under the river and in the Tarrytown Station area and necessitate disposal of 1.5 million cubic yards of spoils.
- Include a deep and complexly constructed tunnel and relatively deep underground station (below the existing Tarrytown Station) with potentially inconvenient passenger transfers among transit modes between CRT and LRT/BRT (as compared to a cross-platform transfer at the Tappan Zee Bridge Station in the Bridge Option).
- Add a major new construction site in downtown Tarrytown (at and around the existing Tarrytown Station), involving extensive complex construction over a period of 3 to 4 years with significant property takings at the proposed Ferry Landing site and likely disruption to Horans Landing and Losee Parks, the marina, and existing commuter parking.
- Focus existing and future CRT (and possible LRT/BRT) related traffic at the already congested Tarrytown Station and surrounding capacity – constrained street network.
- Have visual impacts at the Rockland and Westchester shores related to the construction of ventilation facilities with stacks up to 100-feet tall.
- Temporarily disturb more Hudson River habitat.
- Have an increased capital cost above the Bridge Option of approximately \$1.3 billion.

## DEIS Alternatives

The AA process culminated in the identification of six alternatives to be carried forward into the DEIS.

### Alternative 1 - No Build

As per NEPA and SEQRA requirements, a No Build Alternative will be analyzed in the EIS. The potential impacts of this alternative were identified in the No Build Scenario studied in the AA analysis, which was created to establish the baseline against which to measure the impacts of the other scenarios. However, it was determined that the No Build Scenario would likely not meet the goals and objectives established for the study. One of the key findings of the AA analysis was that both highway and transit improvements were necessary to improve mobility in the corridor. The key components of Alternative 1 include maintenance of the bridge structure and highway to avoid unacceptable levels of deterioration that would lead to operational and safety deficiencies, as well as projects in the Transportation Improvement Program (TIP) (FY 2004-2006). The capital cost of Alternative 1 is estimated at \$0.5-0.7 billion (2004 dollars).

### Alternative 2 - Bridge Rehabilitation with TDM/TSM Measures

The bridge would be retained and structurally rehabilitated to provide an additional 50 to 100 years of reliable service. The rehabilitation would include the retrofit measures necessary to bring the bridge into compliance with the current seismic criteria, as befits a lifeline structure. However, existing conditions such as narrow lanes, no shoulders, and the movable barrier for the seven-lane bridge would remain.

TDM/TSM measures were also studied. It was concluded that TDM/TSM measures alone (such as ramp metering and congestion pricing) would not be effective in meeting corridor needs, but together with major capital investments would offer benefits worthy of further consideration. Thus, these relatively low-cost strategies will be advanced as part of a package of improvements in all of the DEIS build alternatives.

The key components of Alternative 2 include: projects in the TIP (FY 2004-2006); rehabilitation and seismic retrofit of the bridge; proposed transit improvements in the 2025 Metro-North and New Jersey Transit Capital Investment Schedule for West of Hudson; and TDM/TSM measures. The capital cost of Alternative 2 is estimated at \$2-2.5 billion (2004 dollars).

### Common Elements of Alternatives 3, 4A, 4B, and 4C

The major build alternatives (3, 4A, 4C, 4B and 4C) include a number of common elements. They fundamentally differ in the transit modes. The common elements are:

- **Highway** – Six general purpose lanes, two HOT lanes, westbound climbing lane from a replacement Tappan Zee Bridge to Interchange 14A (or possibly the Spring Valley Toll Plaza or Route 59 in Monsey), and new eastbound climbing lane from Interchange 12 to 11 (which connects to the existing eastbound fourth lane) in Rockland County.
- **TDM/TSM Measures** – Same as Alternative 2.
- **River Crossing** – New bridge with two HOT lanes, eight general purpose lanes, and shoulders. The bridge would also include amenities such as a full-length pedestrian/bicycle path linking Rockland and Westchester, areas for viewing and respite

along the pathway, and designated recreation areas. Two CRT tracks would be included for Alternatives 4A, 4B, and 4C.

### **Alternative 3 – Full Corridor BRT, New Bridge, and Highway Improvements in Rockland**

The transit component of Alternative 3 includes BRT between Suffern and Port Chester with connections to Tarrytown Station. Buses would use HOT lanes in Rockland County and a barrier-separated facility (exclusive busway) in portions of Westchester County (alongside I-87/I-287) and exclusive bus lanes on Route 119 in Tarrytown and White Plains. (It should be noted that bus origins/destinations include locations beyond Suffern and north and south of Port Chester.) There would be direct access ramps for buses from park-and-ride lots to the HOT lanes. Service connections would be possible to the Port Jervis, Pascack Valley, Harlem, and New Haven Lines. BRT would provide service between Orange and Rockland Counties and employment centers in Westchester County and Connecticut, as well as intra-county trips. The capital cost of Alternative 3 is estimated at \$5-6.5 billion (2004 dollars).

### **Alternative 4A – Full Corridor CRT, New Bridge, and Highway Improvements in Rockland**

The transit component of Alternative 4A includes CRT between Suffern and Port Chester with a direct connection to the Hudson Line in Tarrytown for a one-seat ride to Manhattan from Orange and Rockland Counties. There would be a new Tappan Zee Station below and just to the north of the existing toll plaza for both Manhattan and I-287 commuter rail services. Connections also would be possible to the Port Jervis (direct), Pascack Valley (transfer), Harlem (transfer at White Plains), and New Haven Lines (direct). This would provide increased mobility within Westchester County, as well as increased access to Metro-North lines serving Manhattan. It would offer Orange and Rockland County riders a one-seat ride to employment centers in Westchester and Connecticut. The capital cost of Alternative 4A is estimated at \$11.5-14.5 billion (2004 dollars).

### **Alternative 4B – Manhattan-Bound CRT with LRT in Westchester County, New Bridge, and Highway Improvements in Rockland**

The transit component of Alternative 4B includes CRT between Suffern and Tarrytown, as well as LRT between the existing Hudson Line Tarrytown station and Port Chester. Manhattan-bound CRT would start in Suffern (with direct connection to the Port Jervis Line and transfer to the Pascack Valley Line) and connect to the Hudson Line as in Alternative 4A. There would be a new transfer facility (Tappan Zee Station) for transfer to Westchester LRT service.

The LRT service would start at the existing Tarrytown Station (allowing transfer to/from the existing Hudson Line) and continue to the Port Chester Station. It would follow an in-street alignment on Route 119 in Tarrytown and through White Plains. It would follow a high-speed alignment along I-287 in a portion of Greenburgh and for the connection to Port Chester (i.e., avoiding use of Route 119 in Elmsford and Route 120A in Port Chester). Future commuter rail service across the I-287 corridor would not be precluded. LRT connections would be possible to the Harlem and New Haven Lines.

This alternative would offer Orange and Rockland County riders a one-seat ride to Manhattan and a transfer to LRT serving employment centers in Westchester and Connecticut. It would provide increased mobility within Westchester County as well as increased access to Metro-North rail lines serving Manhattan. This alternative also provides a transfer from the Metro-North upper Hudson Line service

territory to LRT serving Westchester and Connecticut. The capital cost of Alternative 4B is estimated at \$10-12.5 billion (2004 dollars).

## **Alternative 4C – Manhattan-Bound CRT with BRT in Westchester County, New Bridge, and Highway Improvements in Rockland**

The transit component of Alternative 4C includes CRT between Suffern and Tarrytown, as well as BRT between the existing Hudson Line Tarrytown station and Port Chester. Manhattan-bound CRT would start in Suffern (with direct connection to the Port Jervis Line and transfer to the Pascack Valley Line) and connect to the Hudson Line as in Alternative 4A. There would be a new transfer facility (Tappan Zee Station) for transfer to Westchester BRT service.

The BRT service would start at the existing Tarrytown Station (allowing transfer to/from the existing Hudson Line) and continue to Port Chester. It would travel within a barrier-separated facility (exclusive busway) in portions of Westchester County (alongside I-87/I-287) and in exclusive bus lanes on Route 119 in Tarrytown and White Plains. Future commuter rail service across the I-287 corridor would not be precluded. BRT service connections would be possible to the Harlem and New Haven Lines. While buses would use the HOT lanes in Rockland County and provide service to Westchester County and Connecticut destinations, the BRT facilities envisioned in Rockland County as part of Alternative 3 (including direct access from park-and-ride lots to the HOT lanes) would not be provided.

This alternative would offer similar transit benefits as Alternative 4B. The capital cost of Alternative 4C is estimated at \$9-11.5 billion (2004 dollars).

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## **Next Steps**

Work has commenced on preparation of the DEIS. This includes an extensive amount of fieldwork (e.g., traffic data collection, aquatic surveys in the Hudson River, and noise monitoring). New forecasts of future traffic and transit ridership will be done using computer models. Computer models will also be used to estimate future air quality and noise levels. During this process, there may be modifications to the alternatives as the engineering and environmental analyses are advanced. The DEIS will discuss the environmental impacts of project alternatives in detail along with development of mitigation measures, where appropriate. The Locally Preferred Alternative will be identified.

The program of community outreach established in the AA process will continue during preparation of the DEIS. This will involve periodic meetings with the public, agencies, and key interest groups as the engineering and environmental analyses of the DEIS alternatives proceed. A formal public hearing will be held when the DEIS is completed. The input received during this public process will then be used to develop the FEIS. The process will culminate with the preparation of a ROD by the lead agencies pursuant to NEPA and a Findings Statement by NYSDOT pursuant to SEQRA.

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## List of Acronyms and Abbreviations

AA	Alternatives Analysis
AASHTO	American Association of State Highway and Transportation Officials
AGT	Automated Guideway Transit
ATC	Automatic Train Control
BPM	Best Practices Model
BRT	Bus Rapid Transit
CAA	Clean Air Act
CASI	Computer-Assisted Self-Interview
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CRT	Commuter Rail Transit
CRX	Cross Rockland Express
CZMA	Coastal Zone Management Act
dB	Decibel
dBA	Decibel with A scale weighting
DEIS	Draft Environmental Impact Statement
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
ESA	Endangered Species Act
ETR	Employer Trip Reduction
F	Fahrenheit
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FY	Fiscal Year
gal	gallon
GIS	Geographic Information System
GPS	Global Positioning System
HAR	Highway Advisory Radio
HOT	High Occupancy Toll
HOV	High Occupancy Vehicle
hr	hour



## List of Acronyms and Abbreviations

IMPO	Inter-Metropolitan Planning Organization
IP	Individual Permit
ITS	Intelligent Transportation Systems
lb	pound
lb/hp	pounds per horse power
LRT	Light Rail Transit
μ	micro
μg/l	micrograms per liter
MHSTCC	Mid-Hudson South Transportation Coordinating Committee
MHW	Mean High Water
MLLW	Mean Lower Low Water
MNR	Metro-North Railroad
mph	miles per hour
MPO	Metropolitan Planning Organization
MTA	Metropolitan Transportation Authority
NEPA	National Environmental Policy Act
NHL	National Historic Landmarks
NHPA	National Historic Preservation Act
NHRP	National Register of Historic Places
NJT	New Jersey Transit
NMFS	National Marine Fisheries Service
NO <sub>2</sub>	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWP	Nationwide Wetlands Permit
NYMTC	New York Metropolitan Transportation Council
NYSDEC	New York State Department of Environmental Conservation
NYSDOS	New York State Department of State
NYSDOT	New York State Department of Transportation
NYSTA	New York State Thruway Authority
OCTC	Orange County Transportation Council
OWL	Orange-Westchester Link
PANYNJ	Port Authority of New York & New Jersey
PATH	Port Authority Trans Hudson
PCE	passenger car equivalent
ppm	parts per million
PTS	Positive Train Stop
PVL	Pascack Valley Line

## List of Acronyms and Abbreviations

RHA	Rivers and Harbors Act
ROD	Record of Decision
RWIS	Roadway Weather Information System
SEQRA	State Environmental Quality Review Act
SHPA	State Historic Preservation Act
SHPO	State Historic Preservation Office
SO <sub>2</sub>	Sulfur Dioxide
SOV	Single-Occupant Vehicles
sq mi	square mile
TDM	Travel Demand Management
TIP	Transportation Improvement Program
TNM	Traffic Noise Model
TOR	Transit of Rockland
TRANSMIT	Transcom System for Managing Incidents and Traffic
TSM	Travel System Management
TZX	Tappan Zee Express
USACOE	US Army Corps of Engineers
USDOI	US Department of the Interior
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
VMS	Variable Message Signs
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
VPD	Vehicles per Day
VPH	Vehicles per Hour

