



TAPPAN ZEE BRIDGE/I-287  
ENVIRONMENTAL REVIEW

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

**Presentation**


***Stakeholders' Advisory Working Groups (SAWGs)  
Traffic and Transit SAWG Meeting***

***Tappan Zee Bridge/I-287 Corridor Project***




November 4, 2010

## Tappan Zee Bridge / I-287 Corridor Project




EVALUATION OF HIGHWAY IMPROVEMENTS  
WESTBOUND AND EASTBOUND CLIMBING LANES



**Slide 1:**

This evening's SAWG will continue our discussion of the proposed highway improvements in Rockland County. The PowerPoint presentation explains the analyses that led to the proposal of westbound and eastbound climbing lanes in Rockland County.


### Westbound and Eastbound Climbing Lanes



**What are Climbing Lanes?  
What are their purpose?**

- An auxiliary lane added to improve operations and safety characteristics.
- Allows slower-moving vehicles their own lane, which minimizes interference with faster vehicles in the general purpose lanes.
- Provided on long steep highway sections

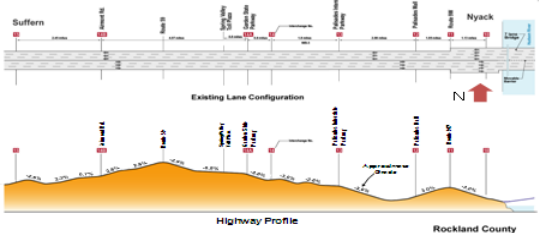
Slow moving trucks make other vehicles slow down and/or change lanes. These actions reduce the highway's effective capacity and can potentially cause an unsafe condition.



**Slide 2:**

A climbing lane is an auxiliary lane added to a steep section of a highway. By separating slower-moving vehicles such as trucks from general traffic, the climbing lane can improve the highway's operations and safety. The two photos on this slide show climbing lanes adjacent to general purpose lanes.

### Westbound and Eastbound Climbing Lanes in Project Corridor



Hills of the Hudson River Valley run north-south, whereas the Thruway runs east-west, creating long segments of uphill grades.

Analysis of adding a climbing lane is based on AASHTO & NYSDOT guidelines::

1. Reduction in truck speed on a steep grades: existing grades must reduce a heavy truck speed by 10mph
2. High vehicle volumes and congestion levels: Highway operates at LOS E or F in peak periods


**Slide 3:**

Morning and afternoon traffic on the Thruway is congested in part because of the highway's profile in Rockland County. Whereas the hills of the Hudson River Valley run north to south, the Thruway runs east to west, with long segments of uphill grades that exacerbate operations in heavy volumes. Climbing lanes are sometimes proposed to improve these conditions.

The American Association of State Highway and Transportation Officials (AASHTO) and NYSDOT have established guidelines to determine whether the addition of climbing lanes to a highway segment is justified. The project team has

	<p>performed the analysis based on these guidelines.</p>
<div style="background-color: #003366; color: white; padding: 5px;"> <span style="float: left;"><b>Reduction in Truck Speed on a Steep Grades</b></span> <span style="float: right;"><b>Westbound and Eastbound Climbing Lanes</b></span> </div> <p>AASHTO recommends that a 10-mph reduction be used to determine the "critical lengths of grade"</p> <p>-- i.e., how long does a highway segment of a particular grade have to be before a climbing lane is potentially warranted.</p> <p style="font-size: small;">Exhibit 3-59. Critical Lengths of Grade for Design, Typical Heavy Truck of 200 lb/ft<sup>3</sup>. (AASHTO - Policy on Geometric Design of Highways and Streets – 2004)</p>	<p><b>Slide 4:</b></p> <p>AASHTO recommends that a 10-mph reduction in truck speed be used to determine the "critical length of grade" -- i.e., how long does a highway segment of a particular grade have to be before a truck speed reduction of 10 mph occurs?</p> <p>The Thruway has a number of locations with 3% grades and therefore has a corresponding critical length of grade of approximately 1,800 feet. Most of the steep grades on the Thruway are one mile or more in length.</p>
<div style="background-color: #003366; color: white; padding: 5px;"> <span style="float: left;"><b>Eastbound Truck Speed Profile</b></span> <span style="float: right;"><b>Westbound and Eastbound Climbing Lanes</b></span> </div> <p>EB reduction in truck speeds greater than 10 mph would occur between Int 14B and Rt 59-Monsey, and Interchanges 11 and 12</p>	<p><b>Slide 5:</b></p> <p>A truck speed profile model (TSPM) was developed to assess how trucks on the Thruway perform on upgrades. The results were then plotted for each direction of travel, as shown on the graph on the slide. Areas where estimated truck speeds would be 10 mph or more below a truck's desired speed level are highlighted.</p> <p>In the eastbound direction, reduction in truck speeds greater than 10 mph would occur between Interchange 14B and Route 59 in Monsey, and between Interchanges 11 and 12.</p>
<div style="background-color: #003366; color: white; padding: 5px;"> <span style="float: left;"><b>Westbound Truck Speed Profile</b></span> <span style="float: right;"><b>Westbound and Eastbound Climbing Lanes</b></span> </div> <p>WB reduction in truck speeds greater than 10 mph would occur between TZB and Rt 59 in Monsey</p>	<p><b>Slide 6:</b></p> <p>The graph on this slide depicts the TSPM results in the westbound direction. Reduction in truck speeds greater than 10 mph would occur between the Tappan Zee Bridge and Route 59 in Monsey.</p>

<div style="background-color: #003366; color: white; padding: 5px; border: 1px solid black;"> <span style="float: left;"><b>Traffic Volumes and Congestion Levels</b></span> <span style="float: right; font-size: small; color: white;">Westbound and Eastbound Climbing Lanes</span> <div style="clear: both; text-align: right; font-size: x-small; color: white;"> </div> </div> <p style="font-size: x-small; margin-top: 10px;">LEVEL OF SERVICE (LOS): describes the quality of highway operations on a scale from "A" to "F":</p> <p style="font-size: x-small;">A: free-flow conditions; no restrictions on maneuvering, changing lanes, etc.          B: reasonably free flow; slight restrictions on maneuvering          C: traffic flow still stable but freedom to maneuver noticeably restricted          D: traffic flow more unstable, subject to disruption; maneuvering drastically restricted          E: highway at capacity; flow is extremely unstable, no gaps in flow for maneuvering          F: breakdown conditions; stops in vehicle flow and queuing of vehicles</p> <p style="font-size: x-small; margin-top: 10px;">AASHTO Guideline for Climbing Lanes: Highway operates at LOS E or F in peak periods</p> <ul style="list-style-type: none"> <li>• Eastbound - LOS "E" or "F" criteria is met in the AM peak from Interchange 15 to the bridge.</li> <li>• Westbound – LOS F criteria is met from the Tappan Zee Bridge to past Interchange 14</li> </ul> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px; font-size: x-small;"> <caption style="text-align: center;">2035 No-Build Traffic Volumes</caption> <thead> <tr> <th rowspan="2">Highway Segments</th> <th colspan="2">Eastbound (AM peak)<sup>1</sup></th> <th colspan="2">Westbound (PM Peak)<sup>2</sup></th> </tr> <tr> <th>Volume</th> <th>LOS</th> <th>Volume</th> <th>LOS</th> </tr> </thead> <tbody> <tr> <td>15 - 14B</td> <td>2,700</td> <td>F<sup>3</sup></td> <td>4,700</td> <td>C</td> </tr> <tr> <td>14B – 14A</td> <td>3,800</td> <td>F<sup>3</sup></td> <td>5,300</td> <td>D</td> </tr> <tr> <td>14A – 13</td> <td>5,400</td> <td>E</td> <td>6,900</td> <td>F</td> </tr> <tr> <td>13 – 12</td> <td>5,300</td> <td>F</td> <td>6,400</td> <td>E</td> </tr> <tr> <td>12 – TZB</td> <td>6,500</td> <td>F</td> <td>7,600</td> <td>F</td> </tr> </tbody> </table> <p style="font-size: x-small; margin-top: 5px;"><sup>1</sup> Highest 1-hr. volumes in 7:00-9:00am and 4:00-6:00pm periods.  <sup>2</sup> Average volumes on this segment.  <sup>3</sup> LOS "F" likely due to downstream congestion that spills back.</p>	Highway Segments	Eastbound (AM peak) <sup>1</sup>		Westbound (PM Peak) <sup>2</sup>		Volume	LOS	Volume	LOS	15 - 14B	2,700	F <sup>3</sup>	4,700	C	14B – 14A	3,800	F <sup>3</sup>	5,300	D	14A – 13	5,400	E	6,900	F	13 – 12	5,300	F	6,400	E	12 – TZB	6,500	F	7,600	F	<p><b>Slide 7:</b></p> <p>The second guideline to justify climbing lanes is related to traffic operations, specifically the levels of service (LOS) provided by a highway. LOS describe the quality of highway operations on a scale from "A" to "F." The guideline states that the addition of climbing lanes is justified if a highway operates at LOS E or F during the peak periods.</p> <p>An analysis of peak-direction traffic volumes, projected to 2035, was performed. (Peak directions are westbound in the PM peak and eastbound in the AM peak.)</p> <p>The table highlights segments of the Thruway where uphill grades would result in lower heavy truck speeds and conditions below the AASHTO guidelines of LOS E and F. The analyses support the inclusion of climbing lanes in portions of the eastbound and westbound Thruway.</p>
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<div style="background-color: #003366; color: white; padding: 5px; border: 1px solid black;"> <span style="float: left;"><b>Traffic Safety in the Corridor</b></span> <span style="float: right; font-size: small; color: white;">Westbound and Eastbound Climbing Lanes</span> <div style="clear: both; text-align: right; font-size: x-small; color: white;"> </div> </div> <p style="font-size: x-small; margin-top: 10px;">Guidelines for Climbing Lanes are for safety as well as for highway operations. There is a close tie between accident rates and speed differentials on highways. AASHTO Policy indicates that:</p> <ul style="list-style-type: none"> <li>• Regardless of the average speeds on a highway, the more a vehicle deviates from the average speed, the greater its chances of becoming involved in a crash.</li> <li>• Accident probability increases significantly when a grade slows a truck by more than 10 mph, and accident rate with a 15-mph loss in speed is 2.4 times greater than for a 10-mph reduction.</li> <li>• Records from July 2004 - June 2007 indicate that the number of accidents between Interchange 15 and the Tappan Zee Bridge averaged 2.9 times the statewide average for similar state highways.</li> <li>• Experience elsewhere indicates that providing climbing lanes would reduce accident rates.</li> <li>• Based on the traffic analyses that warrant climbing lanes and taking into account the higher than average accident rate in this portion of the Thruway, the recommendation to add climbing lanes would be considered a safety improvement as well as an operational improvement.</li> </ul>	<p><b>Slide 8:</b></p> <p>This slide discusses the relationship of climbing lanes to safety.</p> <p>This portion of the Thruway has a higher than average accident rate. Therefore the recommendation to add climbing lanes would be a safety improvement as well as an operational improvement.</p>																																		

<p><b>Evaluation Results</b> Westbound and Eastbound Climbing Lanes</p>  <p><b>TRANSPORTATION:</b> traffic studies indicate that climbing lanes would be warranted:</p> <ul style="list-style-type: none"><li>• Eastbound - From Interchange 12 to Interchange 11, [1 mile]</li><li>• Westbound - Interchange 11 to the Spring Valley Truck Toll Plaza, [7 miles]</li></ul> <p><b>ENVIRONMENTAL:</b> assessment of the proposed climbing lanes did not identify any potentially significant environmental impacts associated with the improvements.</p> <p><b>COST:</b> estimated cost would be approximately \$446 million.</p>	<p><b>Slide 8:</b></p> <p>This slide describes the results of the evaluation, which was performed using transportation, environmental, and cost criteria. Based on these results, the project team recommended the inclusion of climbing lanes in each direction in the segments shown in the diagram. In the eastbound direction, climbing lanes are recommended from Interchange 12 to 11 based on truck speed reductions, heavy volumes, and poor LOS. In the westbound direction, climbing lanes are recommended from Interchange 11 to the Spring Valley truck toll barrier.</p>
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