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

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Stakeholders' Advisory Working Group Traffic and Transit Group Meeting, September 6, 2007

The Traffic and Transit SAWG meeting #3 was held on September 9, 2007 at Best Western in Nyack, NY. View minutes of the meeting here (PDF, 20KB).

The presentation can be viewed in the following formats:

- [PDF format](#) (910KB)
- View the slides below with text narration

Title Slide.



The slide features a blue background with a white logo in the top left corner that includes a line graph and the text 'TAPPAN ZEE BRIDGE/I-287 ENVIRONMENTAL REVIEW'. The title 'Agenda' is displayed in large yellow font at the top right. A bulleted list in white text is centered on the slide. At the bottom, there are three logos: the New York State Department of Transportation, the MTA Metro-North Railroad, and the New York State Thruway Authority.

- What are high occupancy/toll (HOT) lanes?
- HOT Lane Examples from Other Cities
- HOT lanes in Rockland County

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Agenda.



The slide features a blue background with a white logo in the top left corner that includes a line graph and the text 'TAPPAN ZEE BRIDGE/I-287 ENVIRONMENTAL REVIEW'. The title 'What are High Occupancy/Toll (HOT) Lanes?' is displayed in large yellow font in the center. At the bottom, there are three logos: the New York State Department of Transportation, the MTA Metro-North Railroad, and the New York State Thruway Authority.

What are High Occupancy/Toll (HOT) Lanes?

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Introduction to HOT Lanes.



Concept

- **HOT lanes provide an un-congested roadway by charging variable tolls for use of the lanes. Buses and HOV's are allowed free use of the lanes, while single occupant vehicles are subject to a toll which increases as congestion increases, thus controlling the amount of traffic on the HOT lanes and insuring free-flow service.**



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The concept of HOT lanes.



History

- **High Occupancy Vehicle (HOV) started in 1960's – expansion of bus lanes**
- **Public generally reacted negatively to underutilized lanes**
- **High Occupancy and Toll (HOT) lanes first articulated in 1993**



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Brief history of HOT lanes as an adaptation of High Occupancy Vehicle Lanes.



Key Features

- Better utilization of HOV lane capacity by allowing a limited number of SOVs, removing them from GP lanes
- Congestion pricing: charging only those who choose to pay to avoid congestion



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HOT lanes provide better utilization and introduce congestion pricing for one lane.



Generic Benefits of HOT Lanes

- Enhanced Mobility
 - Trip Time Reliability
 - Travel Time Savings
 - Trip Options
- Transit Improvement - supports bus service
- Reduce demand on general-purpose lanes
- Facilitate emergency vehicle access
- Provide HOT/express lanes for weekend traffic
- Generate revenue



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A listing of the benefits of HOT Lanes.



How They Work

- Traffic is monitored electronically
- Tolls are dynamic – changing with traffic conditions (e.g., every 5 minutes)
- Tolls are increased to prevent overloading the HOT lane – to keep traffic moving
- Free vehicles (e.g., buses, HOV3+) are electronically flagged – special EZPass



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An explanation of how dynamic tolling works.



Schematic of HOT lane Operation



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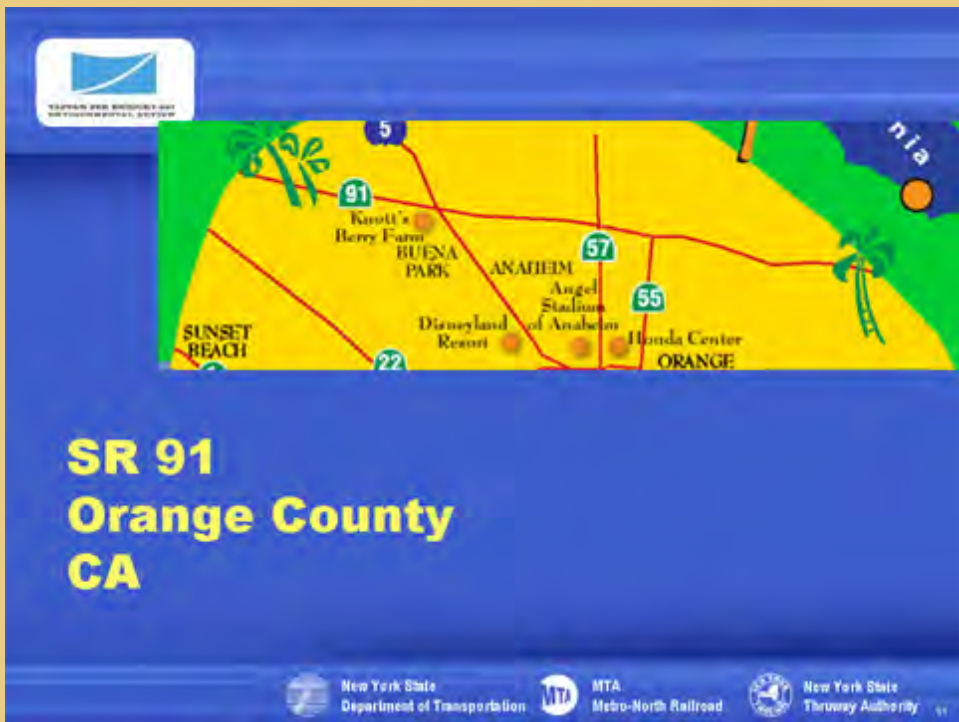


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A schematic illustration of HOT lane configuration.



Hot lane examples from other cities.



HOT lanes on Route 91 in Orange County California.



SR 91 Freeway

- Introduced 1995
- 10 miles, 2 lanes in each direction, slip ramps
- Originally, time-of-day tolls – now adjusted for congestion
- Tolls on weekends
- HOV2 pay 50% of toll, HOV3+ - Free
- Built by private consortium, now owned and operated by Orange County Transportation Authority



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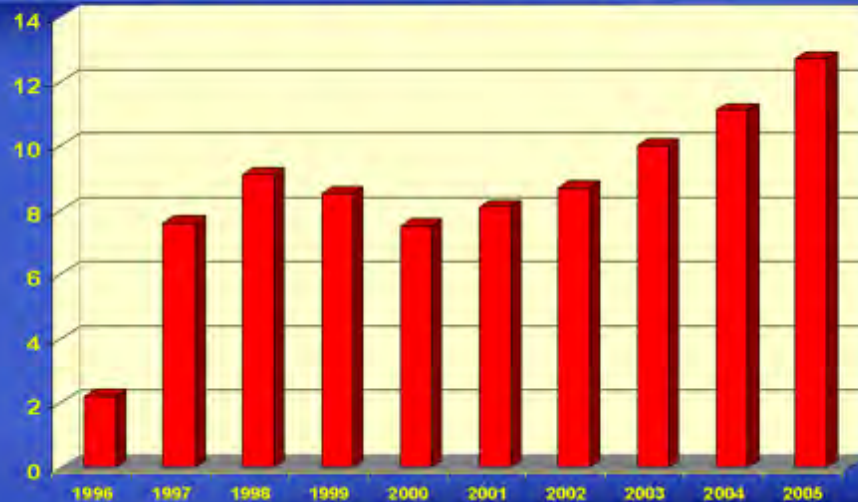
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A description of the SR 91 HOT lanes.



SR 91 HOT Lane Volume (Millions)



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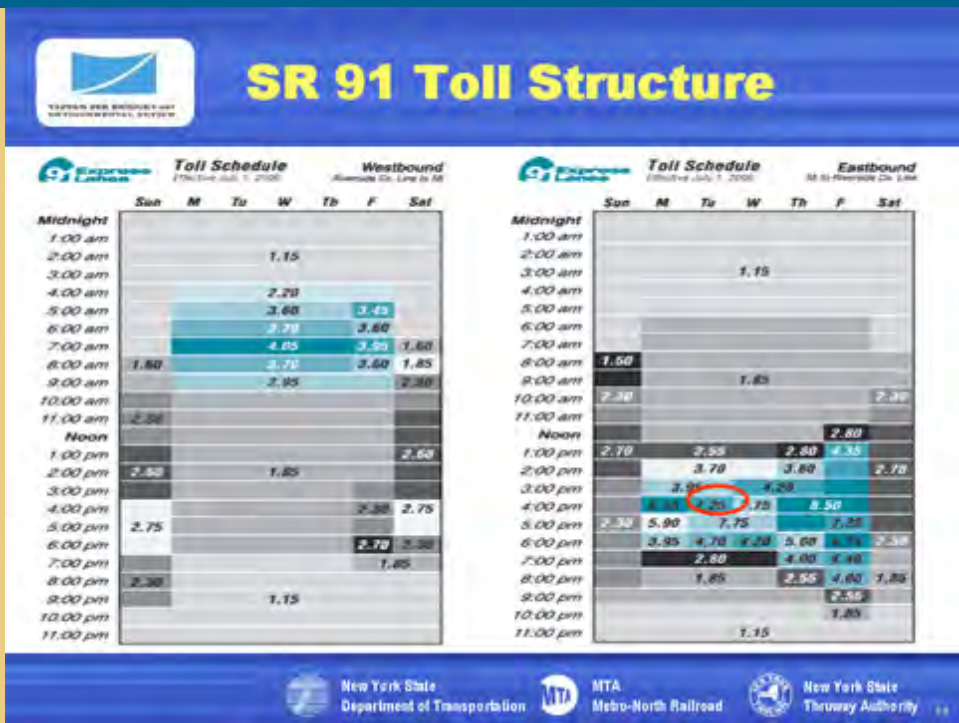
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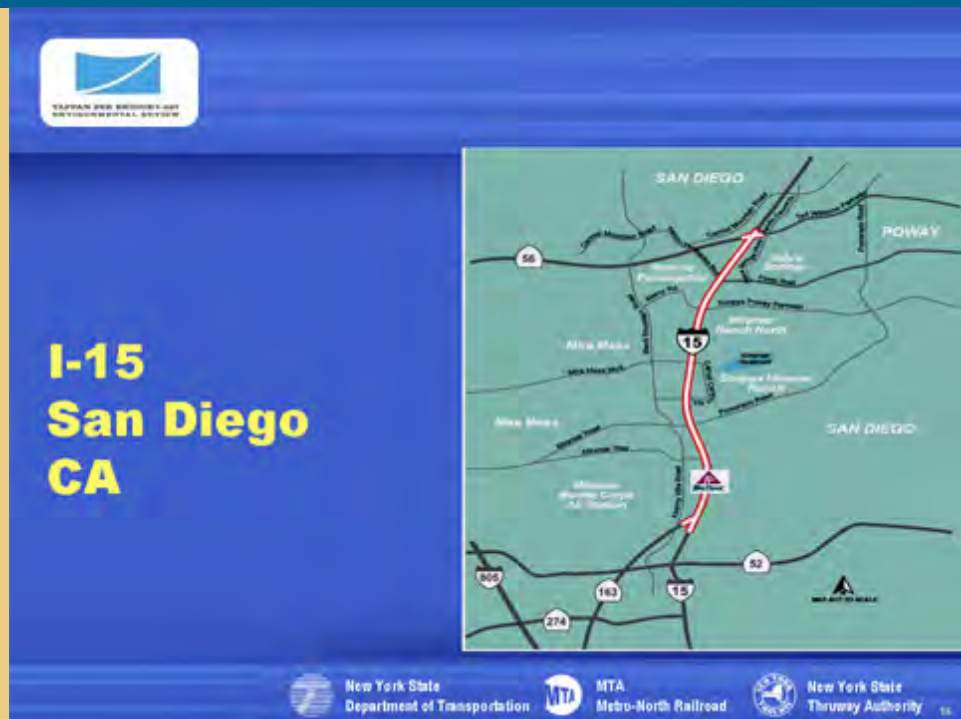
A graph illustrating the revenue growth on SR 91.



SR 91 toll structure by time of day.



Comments from SR 91 users in the Annual Report.



HOT lanes on I-15 in San Diego County, California.



A description of the I-15 HOT lanes.



I-15 Weekday Tolls

Current Toll Schedules

Weekday Morning Period (Southbound)

Maximum Toll	5:30-6:00	6:00-6:30	6:30-7:00	7:00-7:30	7:30-8:00	8:00-8:30	8:30-9:00	9:00-12:00
\$4.00								
\$3.00								
\$2.50								
\$2.00								
\$1.50								
\$1.00								
\$.75								
\$.50								

The I-15 Express Lanes are closed commencing from 10 p.m. to 5 a.m. on the entire toll fee treatment area southbound to Newburgh.

Weekday Evening Period (Northbound)

Maximum Toll	3:00-3:30	3:30-4:00	4:00-4:30	4:30-5:00	5:00-5:30	5:30-6:00	6:00-6:30	6:30-7:00
\$4.00								
\$3.00								
\$2.50								
\$2.00								
\$1.50								
\$1.00								
\$.75								
\$.50								



Weekday toll structure on I-15.



I-15 Weekend Tolls

Friday Evening Period (Northbound) Only

Maximum Toll	1:00pm-2:00pm	2:00pm-3:00pm	3:00pm-4:00pm	4:00pm-5:00pm	5:00pm-6:00pm	6:00pm-6:30pm	6:30pm-7:00pm	7:00pm-7:30pm	7:30pm-8:00pm	8:00pm-8:30pm	8:30pm-9:00pm	9:00pm-10:00pm	10:00pm-11:00pm	11:00pm-12:00am
\$4.00														
\$3.00														
\$2.50														
\$2.00														
\$1.50														
\$1.00														
\$.75														
\$.50														

Weekend Toll Schedule

Weekend (Northbound)

Maximum Toll	12:00pm-1:00pm	1:00pm-2:00pm	2:00pm-3:00pm	3:00pm-4:00pm	4:00pm-5:00pm	5:00pm-6:00pm	6:00pm-7:00pm	7:00pm-8:00pm	8:00pm-9:00pm	9:00pm-10:00pm	10:00pm-11:00pm	11:00pm-12:00am
\$4.00												
\$3.00												
\$2.50												
\$2.00												
\$1.50												
\$1.00												
\$.75												
\$.50												



Weekend toll structure on I-15.



I-394 Minneapolis MN



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HOT Lanes on I-394 in Hennepin County, Minnesota.



MnPASS I-394 Express Lanes

- Former HOV lanes
- 12 miles
- Two entrances and exits
- 20% private funding to construct
- Eastbound has 52% of trips and 65% of revenue
 - Auxiliary lane reduced westbound use/revenue
- 95% of time speeds above 50 mph



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A description of I-394 HOT lanes.



Access design for I-394 HOT lanes.

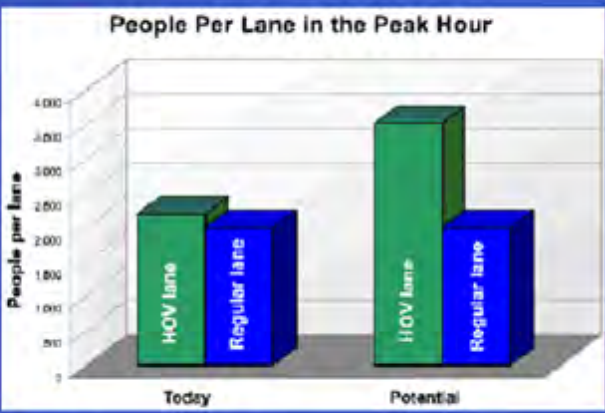


Map of Bay Area HOT lanes planned.






Colorado


- 7 miles of I-25 – just converted
- Was HOV, underutilized
- Serves Boulder and NE suburbs



Scenario	HOV Lane	Regular Lane
Today	~250	~250
Potential	~3800	~250





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Description of I-25 HOT lanes in Denver County and Boulder County, Colorado.



Houston QuickRide

- Reversible two-lane HOV lanes in freeway median
- Free for HOV 3+
- \$2 for HOV 2 during operating hours
- Very limited hours of operation (6:45-8 am and 5-6 pm)
- No SOVs – lanes were built with HOV restriction
- Only on two of six freeways – more planned


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Description of Houston HOT lane operations.



Maryland

- **Express lanes planned – not HOT lanes**
 - toll for SOVs and HOVs
 - I-95 north of Baltimore (former JFK Toll road) under construction
 - Capital Beltway
 - I-270
- **Most will be new lanes – some may be converted GP lanes**



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Description of Maryland Express Lanes planning.



Virginia

- **Planned improvements to approximately 56 miles on I-95/395**
- **Two-way, two-lane HOT lanes, built within ROW - PPP**
- **Multiple entry and exit points**



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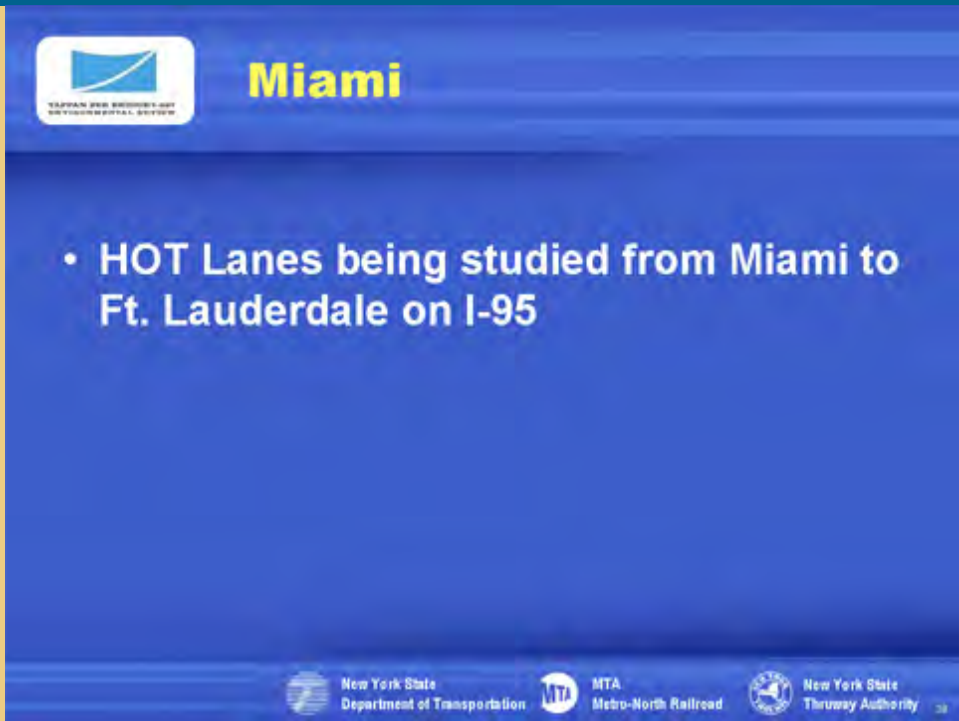
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Description of planned I-395 and I-495 HOT Lanes in Virginia.



Description of I-95 HOT lanes proposed in Dade County and Broward County, Florida.



HOT lanes on I-287 in Rockland County, New York.



Background

- Congestion in GP lanes is inevitable
- HOT lane dependability is a transit/HOV benefit
- Revenue potential for fully utilizing any new lanes
- Substantial weekend revenue potential
- Markets to be served include trips from Rockland and Orange across bridge, and to a lesser extent within Rockland



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Background of HOT lane concept in Rockland County and across the Tappan Zee Bridge.



Design Issues

- Start and end points
- Entrance and exit slip ramps
- Direct access ramps from overpasses or park-and-rides
 - For BRT
 - For HOVs
 - For SOVs
- Movements served/prohibited
 - Access to Int. 9
 - Access to/from GSP
- Barrier or painted buffer separation
- Shoulders



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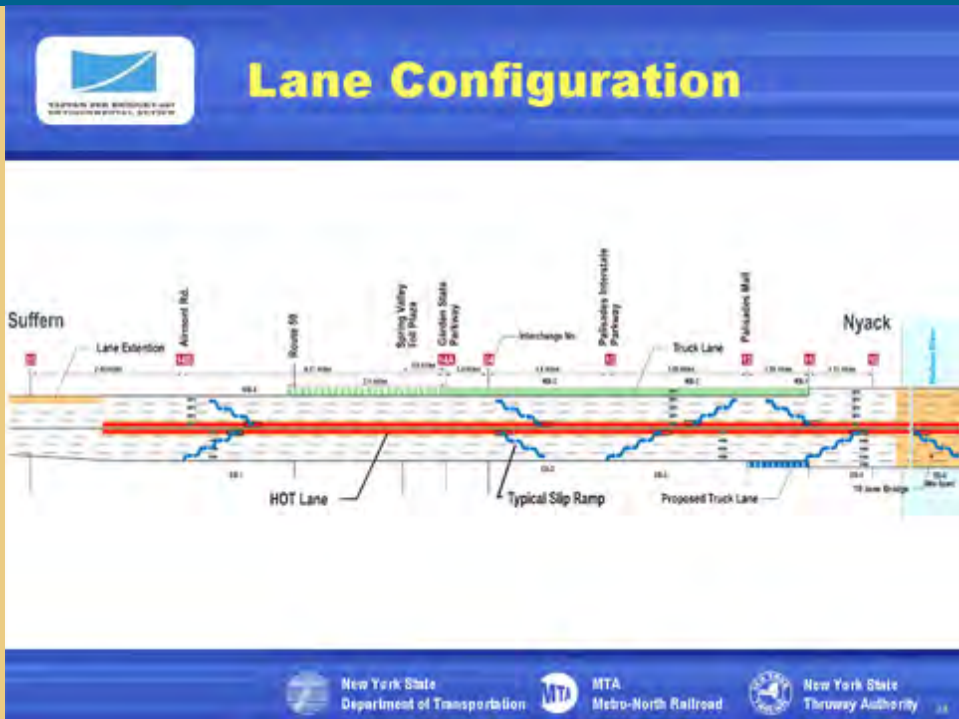
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Description of the design issues faced in Rockland County, New York.



Planned lane configuration of I-287 Rockland County.

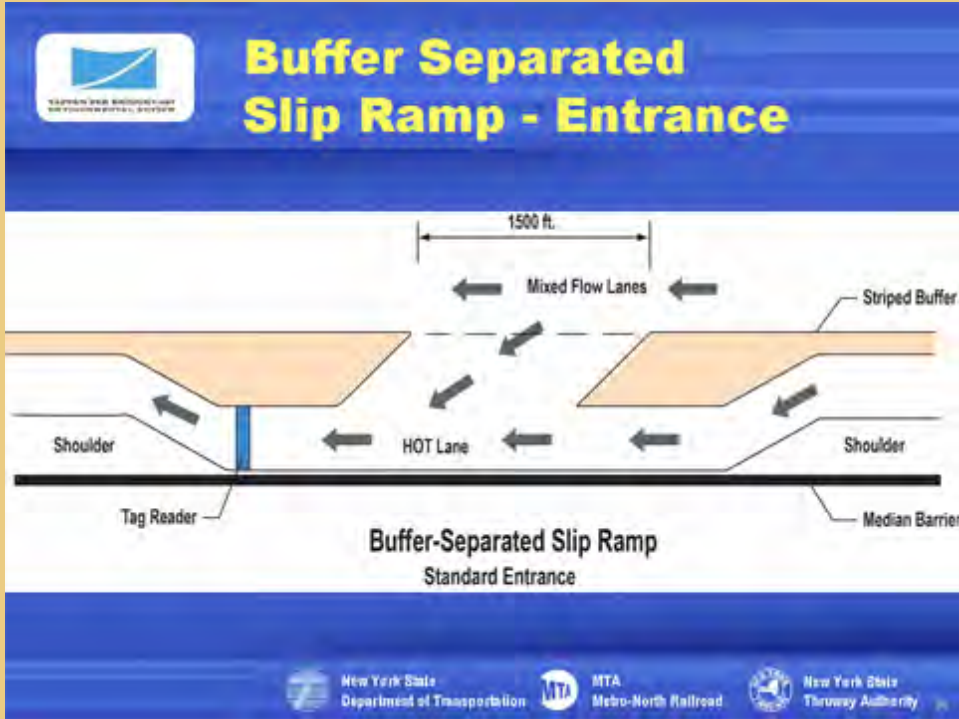


Illustration of Buffer Separated Slip Ramp entrance.

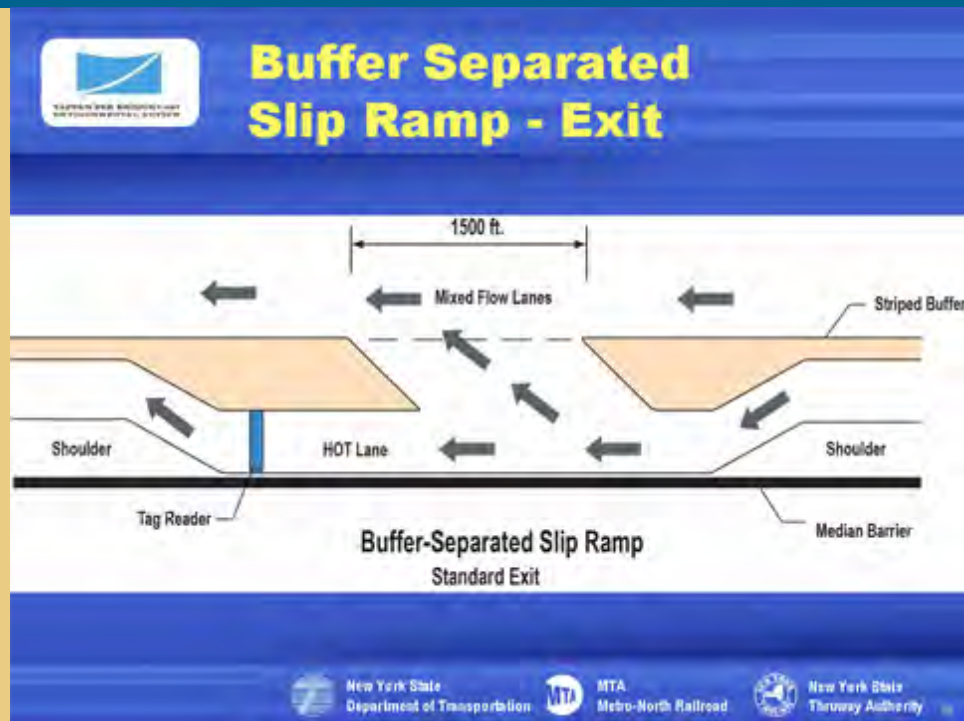


Illustration of Buffer Separated Slip Ramp exit.

-
- Design Recommendations**
- Start in vicinity of Airmont Road
 - End at Exit 9/Toll Plaza
 - Use slip ramps – spaced to avoid excess weaving
 - Limit direct ramp access to buses only (Alt 3 only)
 - Do not provide access to GSP from eastbound HOT lanes
 - Provision for direct access to/from Exit 9 for HOT lanes
 - Painted buffer separated
 - Full width shoulders
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Design Recommendations for Rockland County.



Technology Recommendations

- Sensors at entry/exit and midpoint – to allow sensing of violators
- Occupancy sensing probably not necessary, use visual enforcement
- Enforcement/violations – provision for police vehicle placement
- Automated Violations Processing



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Technology recommendations for Rockland County.



Forecasting, Pricing and Financing Recommendations

- Usage assumptions
 - Design – Could range from 1,100 to 1,800 vehicles/hr – recommend using 1,300 including buses and HOVs
 - Financing – tolls vs. usage – conservative forecasts necessary
- Toll policies
 - Toll only SOVs and HOV2s on weekdays, (50¢/mi on SR 91)
 - Two toll segments, west of Exit 13 and east of Exit 13
 - Toll all vehicles on Friday evenings and weekends
 - Tolls at all times
- Fines – range from \$40 to \$300 on current systems – recommend high fines



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Forecasting, pricing, and financing recommendations for Rockland County.



Operational Issues

- Lane management – speed near limit
- Toll collection – all high speed
- Enforcement
- Incident management very important
 - Emergency vehicle usage
- Maintenance – snow removal
- Weaving across GP lanes



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Operational issues in Rockland County.



Operational Recommendations

- Design should facilitate operational modifications during life of facility
- Pricing structure can be used to modify usage patterns
 - Zone vs. distance-based vs. graduated
- Signage/monitoring and enforcement strategies should be well defined but flexible
- Emergency operations need to be planned



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Operational recommendations for Rockland County.