

TRB Managed Lanes Joint Subcommittee Meeting (AHB35(1))

Monday, January 10, 2005 (3:45 – 5:30 PM)

TRB Annual Meeting, Washington D.C.

The meeting began with self introductions. A sign-in sheet was passed around the room.

Ginger Goodin provided a brief description of the background and scope of the TRB Managed Lanes Joint Subcommittee. Dozens of projects are being developed in at least 15 states. Brief reports were given from representatives of the supporting committees:

- Pricing: Patrick DeCorla-Souza – The implementation of road pricing is being demonstrated now in managed lanes projects. The two committees should work closely together. There will be a solicitation of pricing proposals issued soon, with proposals due March 15th.
- Bus Transit Systems: Charles Prestrud – The three areas the committee is interested in regarding managed lanes: operations, funding/revenue use, and identifying research needs
- Freeway Operations: Jon Obenberger – There are interesting and challenging operational issues associated with managed lanes. Research problem statements are needed to address; current research problem statements vying for funding include managed lanes for freeway bottlenecks and automated occupancy enforcement. The January issue of Public Roads includes an article on managed lanes.
- HOV Systems: Ginger Goodin – The HOV committee is most interested in the role of HOVs in managed lanes, particularly since managed lanes are replacing current HOV operations or HOV project plans.

HOV/Pricing/Managed Lanes Conference

Katie Turnbull provided information on the 12th International HOV/Pricing/Managed Lanes Conference in Houston April 18-20. Those who submitted abstracts will be contacted by the end of January. Registration and program information will also be available by the end of the month.

Resources and Current Research Activities

The HOV Systems Committee's Managed Lanes White Paper should be published within the next month, according to TRB. Beverly Kuhn provided information on the FHWA Managed Lanes research (Attachment A to this summary) as well as TxDOT research. <http://managed-lanes.tamu.edu>

Managed Lanes – Issues/Questions/Unknowns/Research Needs

The floor was opened to comments on managed lanes as a way to begin formulating research problem statements and future conference sessions with sponsoring committees:

1. FTA vs. DOT policies – sometimes conflicting
2. Enforcement of occupancy for HOV exemptions
3. Will managed lanes supersede HOVLs?
 - a. Maryland: everyone pays - could it create more ridesharing because people will share tolls?
4. Managed lanes goals: What are you trying to accomplish?
5. Planning volumes for managed lanes
 - a. Simulation tools
 - b. Best practices for simulation analysis
6. How to treat managed lanes in environmental process:

- a. Where does operational strategy come into environmental process?
 - b. Fiscal constraint issues
- 7. Lane Separation - cost impacts and tradeoffs of alternative techniques
- 8. Designing for HOT lanes – space, cross-section, enforcement area, buffer
 - a. Current HOVLs may not be equipped for HOT operation
- 9. Information processing, where to sign
- 10. Financing – how much flexibility can your managed lane have when using bonding?
- 11. Carpooling formation, bus use
 - a. Cross-modal elasticities for planning purposes
- 12. Social marketing for different operating characteristics
- 13. Does road grid have capacity to feed MLs?
 - a. I-25 Denver - pricing will be affected by limited access at downtown grid
- 14. System-wide studies
 - a. ML system planning
- 15. Use of revenue

The following individuals agreed to develop a one-page description of their assigned issue:

Phil Shapiro/David Ungemah - Planning - #3 through #6, #11, #14

Chris Swenson/Ginger Goodin – Enforcement #2

Bill Finger/Charles Prestrud – Design - #7, #8, #13

Beverly Kuhn – Signing - #9

These will be circulated and reviewed prior to our next meeting in April at the HOV Conference in Houston.

Other Activities

The Subcommittee is begun development of an inventory of managed lane projects. WSDOT's HOT lanes inventory and the HOV Committee's Managed Lanes White Paper provide starting points for managed lane projects in operation and under development. The draft inventory is in Attachment B to this summary. Please let Ginger know if any projects need to be added or revised.

Outreach Activities

The primary outreach activity is the development of an email list for subcommittee. The email list will initially be built upon the attendees at the first two meetings along with others who previously expressed interest in the subcommittee. If you have a managed lanes news item to circulate please send it to Ginger.

ATTACHMENT A

CONTRACT NO: DTFH61-01-C-00182 MANAGED LANES TRAFFIC CONTROL AND SIGNING

This project builds upon previously completed managed lanes reports and current managed lanes initiatives, including such documents as *A Guide for HOT Lane Development*, the *Managed Lane Cross-Cutting Study*, and the *Managed Lanes Primer*. Utilizing these resources while delving into the depths of current and ongoing research and activities in managed lanes, TTI is working to develop tools to help FHWA in its managed lanes mission. FHWA is in need of a Managed Lanes 10-year Program Plan (Roadmap) to guide the focus and technical details for future managed lane research, technology transfer, and training initiatives and activities. This Program Plan will serve as a strategic and efficient means of ensuring that research and practice gaps are filled so that both FHWA and transportation agencies across the country have the most current and accurate information to effectively make decisions regarding the future of managed lane operational strategies and the face of urban travel for the 21st century and beyond.

TASK A: MANAGED LANES CROSS-CUTTING STUDIES & PRIMERS

A.1. Managed Lanes in The Planning Process: A Cross-Cutting Study / Primer Anticipated Completion – February 2005

This cross-cutting study will address managed lanes in the transportation planning process. It will provide guidance to agencies on addressing the complex issues surrounding a managed lanes project at the earliest stage possible in the planning process to maximize the potential for its success. The study will outline current issues to address at various stages in the planning process, highlight best practices and lessons learned, and illustrate the interrelationships that make the careful planning and development of these projects critical to their successful implementation and operation. It will also identify possible future directions of managed lanes and additional research needs within this framework. Information documented will support agencies considering a managed lane facility for their jurisdiction. The related primer is intended for a non-technical audience.

A.1. Managed Lanes in The Project Development Process: A Cross-Cutting Study / Primer Anticipated Completion – March 2005

This cross-cutting study will address managed lanes in the transportation project development process. It will provide guidance to agencies on addressing the complex issues surrounding a managed lanes project at the earliest stage possible in the project development process to maximize the potential for its success. The study will outline current issues to address at various stages in the project process, highlight best practices and lessons learned, and illustrate the interrelationships that make the careful planning and development of these projects critical to their successful implementation and operation. It will also identify possible future directions of managed lanes and additional research needs within this framework. Information documented will support agencies considering a managed lane facility for their jurisdiction. The related primer is intended for a non-technical audience.

TASK B - MANAGED LANES TRAFFIC CONTROL AND SIGNING REPORTS

B.1. Motorist Task Analysis Anticipated Completion – March 2005

This task will produce a prioritized list of driver information needs regarding managed lanes. A flow-chart of driver decision making will be developed for unfamiliar drivers, occasional users, and

regular users. The information needed to make decisions on lane choice, route choice, and maneuvers will be included. This is information which could be presented to drivers in a pre-trip planning phase or en route through static signs, dynamic message signs, in-vehicle technology, pavement markings, and other traffic control devices. A full matrix of managed lanes facility types will be included in this analysis, as information needs will vary across facility. This task analysis is a thought exercise which utilizes a standardized method to systematically identify decision points and necessary information to support decisions.

B.2. State-of-the-Practice Review
Anticipated Completion – March 2005

A thorough review of current traffic control device practices on existing managed lane facilities (including HOT, HOV, bus rapid transit, and truck lanes) will be conducted. This will be completed through reviewing manuals, standards sheets, and design guides. Photographs and engineering drawings of individual sign plans, channelization, pavement markings, and dynamic message signs will be included. The product of this task will be a report summarizing the current practices and research needs. The research needs will be in the form of a prioritized list of topics including scopes of work and suggested methodologies. The potential topics for future research include:

- Sign Color
- Symbols and Terminology
- Sign Placement
- Dynamic Message Signs
- Lane Control Signals
- Pavement Markings
- In-vehicle Technologies

B.3. Recommended Revisions to the MUTCD
Anticipated Completion – August 2005

The research team will work with FHWA staff to determine needed revisions to the MUTCD and provide them by the end of August as requested by Linda Brown.

TASK C – MANAGED LANES PROGRAM PLAN (ROADMAP)

This task is on hold for the moment pending other developments with the Department of Transportation and available funding.

ATTACHMENT B

OVERVIEW OF MANAGED LANE PROJECTS, August 2004

LOCATION	CHARACTERISTICS	OPERATIONS/ MANAGEMENT	DETAILS
OPERATIONAL			
<p>San Diego, CA I-15</p> <p>(see note below on extension information)</p>	<ul style="list-style-type: none"> • 2 barrier separated reversible lanes • 8 miles (28 miles when fully constructed) • <u>Mid-point</u> access 	<ul style="list-style-type: none"> • “FasTrak” pricing program: <ul style="list-style-type: none"> ➢ operates Mon – Fri / 5:54 am-11 am SB/ 12 pm-7 pm NB/ Sa –Su, 24 hrs NB ➢ dynamic toll for SOVs to maintain LOS C ➢ toll between \$0.50 & \$4.00 w/ max of \$8 ➢ free for buses and HOV 2+ • Transponder technology w/ automatic billing 	<ul style="list-style-type: none"> • <u>OPENED</u>: HOV converted to HOT 1996; FasTrack 1998 • <u>COST</u>: initial 3 year demo \$10 million ('91) • <u>REVENUE</u>: Annual revenue approx \$2.0 million ('04) • <u>FINANCES</u>: Approx. 50% revenue for transit subsidy w/ remaining for enforcement, maintenance and operation • 75% of daily traffic on lanes HOV 2+; 25% FasTrak • Currently studying extension of HOT lanes on I-15
<p>Houston, Texas I-10 & US 290</p> <p>(see note below for extension information)</p>	<ul style="list-style-type: none"> • 1 barrier separated reversible lane • I-10 12.8 miles • US 290 10.6 miles • <u>No</u> mid-point access • <u>Primary direct connect ramps from park & ride lots</u> 	<ul style="list-style-type: none"> • “QuickRide” pricing program: <ul style="list-style-type: none"> ➢ Mon – Fri / during peak of peak periods ➢ free for buses and 3+ ➢ limited 2+ during peak hours w/ \$2 toll ➢ no Single Occupant Vehicles (SOVs) • Transponder technology w/ automatic billing 	<ul style="list-style-type: none"> • <u>OPENED</u>: I-10 in 01/98; US 290 in 11/00 • <u>COST</u>: Start up costs for I-10: \$362,389 ('97); Start up costs for US 290: \$52,482 ('00) • <u>REVENUE</u>: total annual revenue \$85,000 ('02) • <u>FINANCES</u>: Tolls pay for direct operating costs • Currently considering new pricing strategies: SOV buy-in; dynamic pricing; expanded hours of operation.
PROPOSED/ UNDER DEVELOPMENT			

<p>Denver, CO I-25/ US-36</p>	<ul style="list-style-type: none"> • 2 barrier separated reversible lanes • Total 7.5 miles • <u>No</u> midpoint access 	<ul style="list-style-type: none"> • Pricing program: <ul style="list-style-type: none"> ➢ Free for buses and 2+ ➢ Provisions to phase out SOVs if operations are degraded ➢ Pre-set variable pricing for SOVs to maximize throughput ➢ 7 days/ 24 hours (w/ temp closures to reverse direction) • Transponder technology w/ automatic billing 	<ul style="list-style-type: none"> • <u>OPENING</u>: scheduled for spring 2005 • <u>COST</u>: \$4 million to \$10 million • <u>FINANCES</u>: tolls to pay for maintenance, operations, enforcement and bond repayment • <u>Colorado Tolling Enterprise</u>
<p>Miami, FL I-95</p>	<ul style="list-style-type: none"> • Moveable zipper barrier to configure 2 or 3 HOT lanes • Reversible lanes • 12 miles • Midpoint access 	<ul style="list-style-type: none"> • Dynamic tolling for SOVs to be modeled after the I-15 FasTrak program. <p>Project still very conceptual. Details of pricing/ management strategy not currently available.</p>	<ul style="list-style-type: none"> • <u>OPENING</u>: projected opening in 2011 if project determined a “go” by current investment study • <u>COST</u>: Preliminary estimated capital cost \$250 million to \$600 million dependent on type of design ('03) • Public/private partnership
<p>Minneapolis, MN I-394</p>	<ul style="list-style-type: none"> • 3-miles, 2-lane barrier separated reversible lanes and 8-miles, 1-lane strip separated • 11 miles • Midpoint access 	<ul style="list-style-type: none"> • “MnPass” pricing program: <ul style="list-style-type: none"> ➢ will operate 24 hours, 7 days/wk ➢ free for buses, vanpools, and 2+ ➢ initially published rates transitioning to dynamic toll for SOVs to maintain traffic flow of 50 to 55 MPH • Transponder technology w/ automatic billing 	<ul style="list-style-type: none"> • <u>OPENING</u>: schedule for Spring 2005 • <u>COST</u>: \$8 to \$10 million ('04) • <u>REVENUE</u>: 3.1 million to 4.1 million ('04) • <u>FINANCES</u>: Tolls used to pay for operations. Excess revenue to pay for transit and other transportation needs. • Public/private partnership (Wilbur Smith funding 25% of cost)

<p>Northern Virginia I-495</p> <p>Unsolicited proposal</p>	<ul style="list-style-type: none"> Add 2 HOT lanes in each direction 12 miles paint stripe and pylon separation Midpoint access 	<ul style="list-style-type: none"> HOV 3+, buses, emergency vehicles free SOV and HOV 2 pay variable toll All electronic, only 	<ul style="list-style-type: none"> <u>Status</u>: detailed proposal under review concurrently with NEPA process <u>COST</u>: \$630 million <u>FINANCES</u>: Anticipating TIFIA loan, bonds and local contribution. Tolls will pay for operations Public/private partnership (Fluor Daniel)
<p>Northern Virginia I-95</p> <p>Unsolicited proposal(s)</p>	<ul style="list-style-type: none"> Add 1 lane to 2 existing HOV lanes Convert entire facility to HOT facility Reversible facility 17.5 miles, initially concrete barrier separation Would connect to Fluor proposal on I-495 	<ul style="list-style-type: none"> HOV 3+, buses, emergency vehicles free SOV and HOV 2 pay variable toll All electronic, only 	<ul style="list-style-type: none"> <u>Status</u>: detailed proposals under review <u>COST</u>: \$407 million <u>FINANCES</u>: No Federal money anticipated, although TIFIA will be used as credit enhancement; bonds will finance the facility
<p>Seattle, WA SR-167</p>	<ul style="list-style-type: none"> 1 barrier separated lane in each direction 9 mile length Mid-point access 	<ul style="list-style-type: none"> Pricing program: <ul style="list-style-type: none"> will operate 24 hours/ 7 days week variable priced toll for SOVs managed for free-flow traffic conditions (not to drop below 45mph more than 10% of time) Free for HOV 2+ and transit Opening peak hour toll estimate \$0.60 to \$1.20 Transponder technology w/ automatic billing 	<ul style="list-style-type: none"> <u>OPENING</u>: Scheduled to open 2007 <u>COST</u>: preliminary estimate \$14 million <u>REVENUE</u>: estimated annual revenue approx \$2 million a year <u>FINANCES</u>: Anticipating federal and state funding for design and construction costs with operation costs to be covered by facility generated revenue.

OVERVIEW OF NEW CONSTRUCTION HOT LANES & HOT LANE STUDIES

OPERATIONAL

<p>Orange Cnty,</p>	<ul style="list-style-type: none"> 2 barrier 	<ul style="list-style-type: none"> “FasTrak” pricing program: 	<ul style="list-style-type: none"> <u>OPENED</u>: 1995
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CA SR 91	separated lanes in each direction <ul style="list-style-type: none"> • 10 mile length • No mid-point access 	<ul style="list-style-type: none"> ➤ operates 24 hours, 7 days/wk ➤ variable pricing for SOVs to maximize throughput ➤ 50% toll discount E-bound 4-6 p.m. only for HOV 3+ (HOV 3+ free all other times), 0 emissions, motor cycles, veterans, disabilities free ➤ variable between \$1-\$5.50 	<ul style="list-style-type: none"> • <u>COST</u>: \$135 million • <u>REVENUE</u>: Annual revenue over \$29 million • Excess revenue used for corridor improvements including transit
PROPOSED/ UNDER DEVELOPMENT			
Alameda Cnty, CA I-680 (Planning Study Complete)	<ul style="list-style-type: none"> • 13 mile length • Convert 1 existing S bound HOV to HOT to 1 new priced HOT • N bound lanes proposed design - non-barrier separated 	<ul style="list-style-type: none"> • Electronic toll collection technology modeled after FasTrak • Dynamic variable toll managed for free-flow w/ peak toll verify? \$3.13 or .22 cents/ml 	<ul style="list-style-type: none"> • Southbound HOV lane built, Northbound lanes will be built in near future Seeking funding for implementation (verify) • <u>REVENUE</u>: Annual revenue \$6.3 to 14.7 million (depending on design)
Dallas, TX I-635 (LBJ FREEWAY) (Planning Study Complete)	<ul style="list-style-type: none"> • 21 mile length • up to 6 hot lanes – 3 in each direction 	Variable tolling to provide free flow conditions	<ul style="list-style-type: none"> • <u>COST</u>: locals have raised \$117 million towards project costs
Denver, CO C-470 (Planning Study Complete, Environmental Assessment Underway)	<ul style="list-style-type: none"> • 12 to 27 miles (to be determined) • ultimate design 2 lanes each direction • Evaluating several managed lane design alternatives 	<ul style="list-style-type: none"> • Dynamic tolling managing to LOS C or D • Potentially tolling all users w/ possible exception of public transit (verify) 	<ul style="list-style-type: none"> • Issuing bonds • “Investment grade” feasibility study underway

	<ul style="list-style-type: none"> • mid-point access 		
Portland, OR Hwy 217 (Corridor Study Underway)	<ul style="list-style-type: none"> • 7 mile highway • Evaluating several HOT lane and ramp meter bypass as alternatives 	<ul style="list-style-type: none"> • Study still very conceptual. Considering FAIR lanes among other value pricing approaches at ramp meters • All new lane miles require pricing to be studied as an alternative in the Regional Transportation Plan 	Intensive public involvement process ongoing
San Diego, CA I-15 HOT extension (Operating project, extension under construction)	<ul style="list-style-type: none"> • 20 miles when fully constructed (8 miles in operation) • 4 lane facility with/moveable barrier • mid-point access 	<ul style="list-style-type: none"> • skewed per mile rate, toll to vary based on where the customer enters 	<ul style="list-style-type: none"> • Will be built in 3 stages. Phase 1 completed by 2007 and Phase 2 and 3 completed by 2010. • 5 Direct Access points and 6 at grade access points
San Antonio, TX I-35 (Planning Study)	<ul style="list-style-type: none"> • 15 mile length 	Study still very conceptual. Study will evaluate value-pricing scenarios.	
Fairfax, Virginia I-495 (Capital Beltway) (DEIS complete, FEIS under review)	<ul style="list-style-type: none"> • 14 mile length • 2 HOT lanes in each direction 	<ul style="list-style-type: none"> • Free to HOV 3+ and bus • SOV and HOV 2 + pay variable toll 	<ul style="list-style-type: none"> • <u>COST</u>: \$693.4 million • Public/private partnership
Houston, Texas I-10 extension (Operating project, extension under construction)	<ul style="list-style-type: none"> • I-10 23 miles total (12.8 miles currently operating) 4 HOT lanes – 2 each direction. From State 	<ul style="list-style-type: none"> • “QuickRide” pricing program will include: • free for buses, HOV 3+ • SOV, HOV 2 pay variable toll 	<ul style="list-style-type: none"> • Extension not open • Construction began 2004 • To be run by Harris County Toll Authority • Public/Private Partnership • <u>OPENING</u>: 2009

	<p>Highway 6 to Grand Pkwy 2 HOT lanes – 1 each direction</p> <ul style="list-style-type: none"> • 5 entry and exit points 	<ul style="list-style-type: none"> • Transponder technology w/ automatic billing 	
<p>Alameda County, CA I-680 (Planning Study)</p>	<ul style="list-style-type: none"> • Conceptual 	<ul style="list-style-type: none"> • Study will evaluate FAIR lanes and casual carpooling 	

OTHER AREAS WHERE HOT LANES HAVE BEEN EVALUATED

Atlanta, Georgia

The Atlanta Value Pricing Advisory Task Force conducted a two-year study to look at the possible role of pricing in addressing metro Atlanta's severe traffic congestion. The report concludes that "HOT/managed lanes... hold the greatest promise for implementing value pricing in this region at this time." The task force looked at adding HOT lanes on 17 miles of Georgia state highway 400 north of the I-285 Perimeter highway, shifting from flat rate to variable pricing on the tolled portion of Georgia 400, and adding HOT lanes to Georgia state highway 316. Georgia DOT is also looking into the possibility of a network of HOT lanes on the entire statewide freeway system.

Boulder Colorado

The City of Boulder Colorado conducted a value pricing study completed that produced a series of final reports in December 1998 that explored the costs and benefits of pricing in Boulder.

Connecticut

Info to be provided

Maryland

The Maryland DOT study is evaluating the feasibility of HOT lanes in several corridors, including I-270, I-495 (Capital Beltway), I-95 and US 50. Variable pricing and HOT lanes also are being considered for the proposed Intercounty Connector (ICC). The tolls could provide a revenue stream sufficient to support bonding for one third of the estimated \$1.7 billion facility.

North Carolina

The North Carolina DOT recently led an Interstate-40 High Occupancy Vehicle Congestion Management Study. The study assessed the design, Operational and financial feasibility, as well as expected public acceptance and use of Managed Lanes (ML), including High Occupancy Toll (HOT) lanes and other potential value pricing options, as part of value pricing implementation on I-40 in the Piedmont (Winston-Salem, Greensboro and High Point) and Research Triangle (Raleigh and Durham) areas of North Carolina.

San Francisco Bay, California

In California's San Francisco Bay Area, the Valley Transit Authority (VTA) is considering HOT lanes for several Santa Clara County freeways, after its plan to expand the fledgling light rail system was derailed and the multi-billion dollar extension of the BART rail system to San Jose faces

lengthy delays. An initial HOT lane feasibility study is likely to be approved before the end of the year, probably including portions of US 101, I-880, and SR-87.

Staten Island, NY

A corridor study in Staten Island investigated options such as HOT and Value Pricing for improved management of the existing HOV lanes along the I-278 corridor from Staten Island through lower Manhattan into Brooklyn. In the wake of substantial disruptions of the lower Manhattan transportation system after September 11th, further work on this study has been put on hold.

Phoenix, Arizona

The Arizona DOT and the Maricopa Association of Governments (MAG) conducted a Value Lane Study for the metropolitan Phoenix freeway system. The study evaluated the concept of value pricing on a number of different freeways where HOV lanes currently exist or are proposed. The study recommended five viable corridors for potential Value Lanes – which together could operate as a Value Lanes network. The study specifically recommended construction of a new HOT lane facility with, two lanes in each direction (one newly constructed lane and one lane converted from a HOV lane), on an approximately 11-mile segment of Interstate-10 – potentially as a demonstration project.

Internationally

Value pricing activities are occurring in Toronto, Canada; Singapore, Hong Kong, the United Kingdom, the Netherlands, Greece, Norway, Sweden, and France.