To: I-5 North HOT Lane Technical Working Group

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Subject: Purpose of a HOT Lane

At the outset of a HOT lane review, it is important to consider the intended purpose of a HOT lane. Different purposes can lead to different approaches.

The terms “tolling” and “congestion pricing” are used variously in reviews of HOT lanes. To be clear, tolling refers generally to applying a price to use of a lane or an entire facility without specifying a purpose for that pricing. Congestion pricing refers to applying a toll with the intent of managing congestion.

Examples of potential purposes of tolling include the following:

1. Managing congestion by optimally using all lanes (albeit in different ways). This could be described as maximizing the value of time saved for all travelers.
2. Providing maximum advantage for HOVs and tolled vehicles
3. Providing very high reliability of travel time in the HOT lane
4. Maximizing revenue

The importance of addressing the purpose of tolling rests in the following areas:

1. Different purposes will lead to different tolling principles (and, therefore, different traveler behavior). For example, if revenue maximization is selected as the purpose, the gross revenue could be 20% to 30% higher than using a different purpose and peak period traffic in the general purpose lanes could be slower than might otherwise be the case.

2. Unless a purpose is selected, or if all purposes are held to be of equal value, different parties will see different purposes and effectiveness will be difficult to assess. The tolling principles, freeway management techniques, and public information need to be coordinated.

3. Elected officials, the media, and others will want to know why tolling is being considered. Having one common and agreed upon response will be important.

4. With air quality, AB 32, SB 375, and related topics, it will be important to be clear about how HOVs will be treated, the degree to which a HOT lane would affect capacity and usage, and how revenues would be used.

Observations on the implications of different tolling purposes are reviewed in the table on the following pages.

At the August 18 I-5 North HOT Lane Technical Working Group meeting, we will review these possible tolling purposes as they may apply to the corridor.

Possible Tolling Principle	Intended Impact	How Principle May Be Applied	Questions to Anticipate
Managing congestion by optimally using all lanes (i.e. with the intention of keeping the HOT lane "full" and pricing such that users of the general purpose lanes are encouraged to pay the toll)	✓ Improve travel time for all ✓ Keep HOT lane flowing at all times ✓ Provide priority for HOVs ✓ As HOT lane fills with HOVs, take steps to keep it functioning for HOV purposes	✓ Dynamic pricing (varying in response to congestion and intended to optimize flow in general purpose and HOT lanes) ✓ As HOV volumes rise, increase toll to discourage use of lane by solo drivers ✓ Need to manage volume in HOT lane such that tolled vehicles don't displace HOVs ✓ Increase 2+ requirement to 3+ ✓ Reconsider eligible lane users	✓ How can everyone gain from putting a HOT lane in? ✓ At some point, won't the general purpose lanes become more congested than the HOT lane? ✓ Would the HOV requirement be increased from 2+ to 3+ just to make room for more tolled vehicles?
Providing maximum advantage for HOVs and tolled vehicles	✓ Increase number of HOV vehicles ✓ Allow tolled vehicles up to the amount that will fill the space available after accounting for HOVs	✓ Let traffic in general purpose lanes become more congested ✓ Improve operational effectiveness (and, therefore, capacity) of HOT lane by widening, improving ingress/egress, etc.	✓ How bad will you let the general purpose lanes get? ✓ Why do the HOVs and tolled vehicles get such a relative benefit?

Possible Tolling Principle	Intended Impact	How Principle May Be Applied	Questions to Anticipate
Providing very high reliability of travel time in the HOT lane	✓ Limit the numbers of tolled vehicles in the HOT lane (and, perhaps, the number of HOV vehicles) to assure that the lane does not slow or break down	✓ Increase HOV requirement from 2+ to 3+ early ✓ Set toll levels higher than might be set otherwise to limit the number of tolled vehicles	✓ Won't maximizing reliability limit both HOV usage and toll revenue?
Maximizing revenue	✓ Provide for all HOVs that want to use the lane (set priority for HOV users) but switch to 3+ at earliest opportunity ✓ Set toll rates to gain highest revenue in all time periods ✓ Let general purpose traffic become congested	✓ User lower HOV threshold than would be used in other scenarios (e.g., switch to 3+ when HOV volumes exceed 1400 vehicles per lane per hour … rather than 1650) ✓ Use dynamic pricing based on detailed economic assessment of user behavior and response[1]	✓ If this project is all about generating revenue, is that equitable for all users? ✓ What are the mobility and environmental effects?

[1] The sponsoring organization could consider creating a policy such that the system does not become revenue negative in any given year. This could lead to not using an HOV volume as the threshold for migrating from HOT2+ to HOT3+; the approach could be to take steps to keep (net) revenue positive

San Joaquin COG I-5 North Stockton HOT Lanes Study

Summary of Existing HOT Lanes

Facility		**SR 91, Orange County, CA**	**I-15, San Diego County, CA**	**I-95 Miami, FL**	**I-25, Denver, CO**
Operating Agency		Orange County Transportation Authority (OCTA)	San Diego Association of Governments (SANDAG)	Florida DOT (Districts 4 & 6)	CDOT, CO Tolling Enterprise
Design Characteristics	Number of Lanes	4 (2 in each direction)	Northern 8 miles has 4 lanes with one reversible lane each (3x1 or 1x3) and 2 reversible lanes in the Southern 8 miles. .	4 (2 in each direction)	2 reversible lanes.
	Distance	10 miles	16 miles, will expand to 20 miles.	10 miles	7 miles
	Access Control	No intermediate access points, Pylons separates the HOT and general purpose lanes	Access at ends and intermediate locations	Separated by flexible plastic poles, access and egress at designate points (NB – 2 entries and 3 exits, SB – 3 entries and 2 exits)	Access at ends, SOV users enter HOT lane through separate path
	Tolling Technology/ Methodology	Open toll/fully automated	Open toll/fully automated Gantries located en route	Open toll/fully automated	Open toll/fully automated
	Payment Method	Transponder (pre paid). All vehicles have to have a transponder.	Transponder (pre paid). Only SOV needs to have a transponder.	Transponder (pre paid)	Transponder (pre paid)
Operational Policies	Hours of Operation	24 hours, 7 days a week	The northern 8 miles - 24 hours, 7 days a week in both directions. Typical hours of operation for the Southern section <u>Mondays – Thursdays</u> SB: 5:30 AM – 12 PM, NB: 1 – 7 p.m. <u>Fridays</u> SB: 5:30AM – 12 PM, NB: 1 PM - Mon 4:30 AM Holidays - NB direction only	24 hours, 7 days a week	24 hrs/7days, except time for switching direction
	Toll ($)	$1.25 to $9.55	Typical range - 50¢ to $4.00 (Max $8.00)	25¢ to $2.65 (It could go as high as $6.20 under extreme condition)	$0.50 to $3.25
	Toll Adjustment	Varies by time, direction, days of the week and level of congestion, but not dynamically priced	Dynamic toll based on traffic density. Toll based on the distance traveled in the lanes and a rate per mile for their entry location.	Dynamic tolling-	variable pricing based on time-of-day but not dynamic pricing
	Eligibility for free or discounted use	HOV 3+, low emission vehicles, motorcycles and disabled plates drive free most hours, Pay 50% of toll 4-6 PM in peak direction	HOV 2+, motorcycles and Clean Air vehicles with decals drive free	Registered HOV 3+, motorcycles and registered low emission vehicles exempted.	HOV 2+ toll free
Enforcement		License plate camera record violators. $20 plus amount of the toll per toll violation	CHP enforces the law in the Express Lanes for vehicle occupancy, toll evasion, and other motor vehicle requirements. Carpool violations carry a minimum fine of $341 for the first offense.	Toll violators are photographed via automatic violation enforcement system. Enforcement beacons on the gantry structures will alert Highway Patrol troopers monitoring the lanes when a vehicle without a transponder passes underneath.	License plate camera record violators
Other Requirements/Considerations		No trucks are allowed.	Commercial trucks with more than two axles, trailers and boats are not allowed on the Express Lanes	Trucks with 3 or more axles are not allowed unless they are designated as emergency vehicles to specific incidents	
Annual Revenue		$ 46,236,247 in operating revenue (FY 09)			$2,155,869 in toll rev + $239,478 in fees and fines from violation (FY 09)

San Joaquin COG I-5 North Stockton HOT Lanes Study

Summary of Existing HOT Lanes (Continued)

Facility		I-394, Minneapolis, MN	US 290 Quick Ride, Houston, TX	I-10 Katy Freeway, Houston, TX	I-15, Salt Lake City, UT Pilot Program through 2009	SR 167, King County, WA Pilot Project through 4/2012
Agency		MN DOT	Houston Metro	Houston Metro	UDOT	Washington DOT
Design Characteristics	Number of Lanes	1 lane in each direction, eastern section provides 2 reversible lanes	2 reversible lanes	2 lanes in each direction	1 lane	2 lanes (1 in each direction)
	Distance	11 miles	15 miles	13 miles	44 miles	9 miles
	Access Control	Separated by pylons, access at ends and four intermediate locations	SOV users enter a HOT lane through a separate path.	SOV users enter a HOT lane through a separate path.	Access at ends and 19 intermediate locations, Striped buffer	Access at ends and 19 intermediate locations, Striped buffer
	Tolling Technology/ Methodology	Open toll/fully automated	Open toll/fully automated	Open toll/fully automated	n/a	Open toll/fully automated
	Toll Collection	Transponder (pre paid)	Transponder (pre paid)	Transponder (pre paid)	Decals purchased on the UDOT website. Users receive new decals every month.	Transponder (pre paid)
Operational Policies	Hours of Operation	Non-reversible lanes: 6 AM to 10 AM, 2 PM to 7 PM Open to general traffic the rest of each week day and on weekends Reversible lanes: 6 AM - 1 PM in EB direction, 2 PM - 5 AM in WB direction	6:45 AM – 8:00 AM	6:00 AM – 11:00 AM 2:00 PM – 8:00 PM	n/a	5 AM – 7PM Open to general traffic between 7 PM and 5 AM
	Toll ($)	$1.00 to $4.00 (maximum of $8.00 in extreme conditions)	$2 (fixed toll)	$2 (fixed toll)	$50 /month (1,500 decals sold monthly)	$0.50 to $9.00
	Toll Adjustment	Dynamic pricing (tolls vary based on time of day, days of week, and level of congestion)	None	None	Monthly flat-fee sticker-based system for unlimited use (dynamic pricing is planned to be implemented in 2010)	Dynamic pricing
	Eligibility for free or discounted use	HOV 2+, transit buses, and motorcyclists are exempted.	HOV 3+ toll free	HOV 3+ toll free HOV2+ free, except peak periods between 6:45 AM and 8:00 AM in the inbound direction and 5:00 PM and 6:00 PM in the outbound direction	HOV 2+ and Hybrids toll free	HOV 2+ and motorcycles toll free
Enforcement		Enforcement by Highway Patrol (HP) carrying portable readers and conducting visual HOV enforcement	License plate camera record violators	License plate camera record violators	Enforcement by Highway Patrol (HP) conducting visual HOV enforcement	Enforcement beacons on the gantry structures will alert Highway Patrol troopers monitoring the lanes when a vehicle without a transponder passes underneath.
Other Requirements/Considerations						
Annual Revenue					$900,000	NA

What are the legislative constraints or requirements at the federal and state levels?

Federal Level

At the federal level, *Considerations for the High Occupancy Vehicle (HOV) Lane to High Occupancy Toll (HOT) Lane Conversions Guidebook,* June 2007 (http://ops.fhwa.dot.gov/resources/news/news_detail.asp?ID=552) was prepared by the FHWA to address, among other items, the legal, planning and design framework considerations at the federal level. A summary of the key items in these areas are:

- Prior to the enactment of *Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)*, states were expressly prohibited from converting federal-aid highways and Interstates into toll facilities.

- *SAFETEA-LU* Pub. L. 109-59, August 10, 2005 modified the previous provisions to allow States and qualifying transportation agencies to use Federal funds for toll facility applications. Congress enabled three new exceptions, and modified one existing exception, to Title 23 of the United States Code, Section 301, which otherwise generally prohibits the imposition of tolls on facilities that use Federal funds.

- Through the applicable program States and qualifying transportation agencies may, with the execution of a toll agreement under Section 129 (a)(3), use Federal-aid funds for either the construction of or improvements to a toll facility or to the approach to a toll facility; or, for the reconstruction or conversion of a free highway, bridge or tunnel previously constructed with Federal-aid funds to a toll facility thus enabling conversion of HOV lanes to HOT lanes.

- Specifically related to the conversion of HOV to HOT lanes, Section 1121 of SAFETEA-LU replaces Section 102(a) of Title 23 of the United States Code (23 U.S.C.) with a new Section 166 that clarifies some aspects of the operation of HOV facilities and provides more exceptions to the vehicle occupancy requirements for HOV facilities. It also authorizes states to create HOT lanes and allows states to charge tolls to vehicles that do not meet the established occupancy requirements to use an HOV lane if the state establishes a program that addresses the selection of certified vehicles and procedures for enforcing the restrictions. Tolls under this section may be charged on both Interstate and non-Interstate facilities. There is no limit on the number of projects or the number of states that can participate.

- An additional federal consideration is the “requirement” (policy) to maintain a LOS C or better in the converted HOT Lane. Thus a volume of 1650 vehicles per hour per lane (vphpl) is considered to be the “maximum” allowable volume in the HOT lane.

State Level

At the state of California level, AB 1467 (Nunez) was passed into law in 2006 and added language to the Streets & Highways Code Section 149.7 that RTPA's could apply to the California Transportation Commission to develop and implement HOT lanes through 2012. AB 1467 set eligibility criteria and procedures and requires candidate HOT lane projects to:

- Demonstrate evidence that the application for a HOT lane was submitted in cooperation with the Department – hence, the reasoning we propose for engaging Caltrans (and others) in a PDT;
- Demonstrate the project plan is technically feasible – which the PA/ED phase has done;
- Demonstrate a financial plan which demonstrates the ability to finance the project – of which the *Traffic and Revenue Study* is a key step in achieving; and
- The RTPA has established performance measures for project tracking and reporting purposes.

Following on AB1467, the CTC issued their *Guidelines for Determination of Eligible Public Private Partnerships Transportation Projects High Occupancy Toll Lanes,* in October 2007 (http://www.catc.ca.gov/programs/HOTLanes/HOT_Lane_Guidelines.pdf) and Caltrans issued the *California Express Lane Business Plan, 2009* earlier this year.

Following this, the California Transportation Commission has taken up preparing guidance on this topic and it was presented at the August 2009 CTC meeting. The Guidance, not yet published, is summarized as follows: