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Project 0-4160: Operating Freeways with Managed Lanes

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Developing a Managed Lanes Position Paper for a Policy-Maker Audience



The managed lane concept is currently being considered on major freeway projects in Texas cities. While the high-occupancy vehicle (HOV) concept is familiar in most urban areas, motorists are less familiar with managed lanes.

The term “managed lanes” encompasses a variety of facility types, including HOV lanes, high-occupancy toll (HOT) lanes, single-occupancy vehicle (SOV) express lanes, special use lanes, and truck lanes. The premise of the managed lanes concept is to increase freeway efficiency and provide free flow operations for certain freeway users by packaging various operational and design strategies. The strategies deployed offer the flexibility to be adjusted to match changing corridor and regional goals.

Communicating a complex concept, such as managed lanes, to the public can be very challenging.

Additionally, there are no facilities in operation that encompass the complete range of managed lane strategies. Not having a tangible project to point to as an example makes the task even more difficult.

What We Did . . .

The research team produced a position paper on managed lanes intended to provide a statewide perspective on managed lanes. The paper provides policy makers with information about managed lanes, how they may be operated, the benefits of managed lanes, where successful projects have been implemented, and what TxDOT is planning for Texas. The ideas in the paper are a result of research conducted on managed lane projects and studies throughout the country.

What We Found . . .

The research identified common messages necessary for project acceptance. These include:

- *Choice* – Research has shown that the public does not perceive pricing as inequitable when it is presented as a choice for commuters. The education process is key to communicating this message.
- *Tool* – The public may perceive a project that utilizes pricing concepts as a “Band-aid” or short-term solution. Messages should emphasize that it is only one tool that works with a comprehensive plan.
- *Efficiency* – Typically the public does not understand how underutilized a high-occupancy vehicle

(HOV) lane may be. When shown that pricing maximizes available capacity, the pricing concept is more acceptable.

- *Operations* – People want to know how the proposed operational strategy will work. Presenting examples of successful projects and how they operate helps facilitate understanding and support. This is especially true in areas where there are no HOV lanes or toll roads. They need assurances that toll collection will not impede travel that is already congested because they may be unfamiliar with electronic toll collection.
- *Enforcement* – Enforcement is especially important in areas that currently operate HOV lanes because enforcement preserves the integrity of HOV lane. The traveling public wants to know that if they pay for a premium service others will not be allowed a “free ride.”
- *Revenue Use* – How the managing agency plans to use the revenue must be clearly defined from the outset of the project. Successful projects have targeted the money for improvements in a corridor where the project is occurring. Public opinion research indicates that people are evenly split on revenue use for transit improvements or to fund roadway projects. Additionally, as part of the on-going public information, improvements that are made with revenue should be highlighted.
- *Transportation Funding* – Research has shown that the public is unaware of how transportation projects are

funded. Messages should focus on the funding shortfall and show pricing as a means to raise revenue for projects that might otherwise not be funded. This reinforces the idea that a pricing project is a management tool in a comprehensive plan that will impact the entire region.

The Researchers Recommend . . .

The position paper that follows provides an overview of TxDOT’s position of managed lanes and what the department hopes to achieve. However, each region of the state will have different goals for the region or for a particular corridor. It is important for policy makers to tailor the message of managed lanes and its concepts to match these goals. Focus groups, telephone interviews, and surveys have been used to gauge public perception before a project has been implemented. The methods should also be employed in areas around the state where managed lanes are being considered. The results from this input will be invaluable in defining the message for the public. Communicating a clear, concise message to the intended audience will help achieve consensus to formulate policy.

The position paper will help policy makers articulate the concept of managed lanes as a means to achieve statewide mobility goals. The position can then be further refined to match regional and community objectives. By communicating the concept, TxDOT can begin to build consensus to utilize an available tool to maximize efficiency of the transportation network and provide options for the traveling public.

Managed Lanes: More Efficient Use of The Freeway System: A Position Paper for Policy Makers

INTRODUCTION

The mission of the Texas Department of Transportation (TxDOT) is “to provide the safe, effective, and efficient movement of people and goods.” Through the department’s mission and vision, TxDOT strives to be a progressive transportation agency by providing transportation systems and alternatives that are comfortable, safe, durable, cost-effective, accessible, environmentally sensitive, and aesthetically appealing. TxDOT continually refines its policies and strategies to achieve these goals and objectives.

Today’s levels of congestion in the urban centers throughout the state are affecting the safety, the economic viability, and the quality of life for everyone in those areas. Peak periods of congestion in these areas may stretch to six hours. Even with this increased congestion, the daily vehicle miles traveled continue to increase. Texans drove more than 2.1 billion miles in 2000. The time spent in traffic congestion results in wasted fuel, increased air pollution, and lack of productivity.

The simple answer to these problems may appear to be more roads; however, many factors make this option impractical, if not impossible. Construction cost, right-of-way limitations, environmental concerns, and neighborhood impacts make adding capacity or building new capacity on the transportation network very challenging. TxDOT is exploring a number of alternative concepts for

maximizing the existing capacity while maintaining the safety of the system for users.

MANAGED LANES

One concept TxDOT is considering is *managed lanes*. TxDOT defines managed lanes as follows:

“A facility that increases freeway efficiency by packaging various operational and design actions. Lane management operations can be adjusted at any time to match regional goals.”

The theory behind managed lanes is to set aside certain freeway lanes and to use a variety of operating strategies to move traffic more efficiently, providing travelers with more choices than driving alone on a congested freeway. Strategies that could be used include:

- allowing certain vehicle groups by time of day,
- charging a toll for access to the lanes to manage demand, or
- controlling access points.

Whatever strategies are used, the idea is to modify the strategies as needed over time to meet regional goals. This concept provides flexibility that results in optimal use of the system.

BENEFITS OF MANAGED LANES

Managed lanes seek to:

- improve freeway efficiency,
- manage demand in the corridor,
- offer choices that provide travel time savings and trip reliability, and
- improve safety.

Revenue Generation

In addition to providing flexibility and maximizing efficiency, a managed lanes project may generate revenue by charging a toll. TxDOT estimates that it currently has only 35 percent of the funds needed to complete projects necessary to maintain mobility throughout the state. Therefore, utilizing tolling may provide the only opportunity to get the project built.

Time Savings

Additionally, a tolling project that is funded by bond proceeds may be completed in less time than one funded by traditional state financing methods. By implementing a tolling project financed through bond money, the money that was allocated for this project may be reallocated to other local non-tolling projects in the funding pipeline, allowing those projects to advance more quickly.

Safety

Managed lanes may improve the safety of a roadway. By maintaining free-flow, uncongested travel conditions within the managed lanes, the chances for conflict are minimized. This situation is especially true in the case of large trucks. Large trucks do not have the maneuverability of passenger autos and thus are at increased risk. A lane or lanes restricted to trucks takes the trucks out of the regular mix of traffic resulting in a decreased risk for both motorists and truckers.

Environmental Benefits

Other potentially positive benefits of managed lanes are environmental impacts. As

congestion in large urban areas increases air quality decreases. Emissions from motor vehicles stuck in traffic contribute to the decline in air quality. Emissions, combined with other pollutants, may lead to a non-attainment designation by the U.S. Environmental Protection Agency. This designation has many ramifications, one of which is the loss of millions of dollars in federal highway funding. This loss could seriously limit roadway construction and the ability to make improvements that reduce traffic congestion.

Community Acceptance

Even though population in these urban areas is increasing and congestion is becoming worse, new roadway construction is limited by a number of factors, such as right-of-way acquisition, construction limitations, and neighborhood and community impacts, creating a cycle of problems. By more effectively managing existing capacity, the need to add more capacity is lessened. This results in fewer negative community impacts. For instance, by installing managed lanes in the median of an existing roadway TxDOT may not need to acquire additional right-of-way where neighborhoods may be affected. At the same time, the managed lanes may move more people in high-occupancy vehicles (HOVs) than simply adding general-purpose lanes.

EXAMPLES OF SUCCESSFUL MANAGED LANE FACILITIES

A variety of managed lanes concepts have been implemented

successfully in several areas of the United States. One such project is the **FasTrak** program on I-15 in San Diego. Faced with increasing congestion and limited funding, the San Diego Association of Governments (SANDAG) implemented managed lanes, or Express Lanes, in the median of I-15. The reversible, barrier-separated lanes were previously operated as HOV lanes for buses and carpools of two or more people. However, this operating scenario

today by providing options for motorists.

The Express Lanes allow access only at the beginning and the end of the roadway. There are no intermediate access points along the eight-mile section of roadway. This limited access improves traffic flow on the Express Lanes as well as the adjacent mainlanes since there are no conflicts with traffic entering and exiting either facility. This operating strategy allows the entire corridor to operate more efficiently.

HOVs and transit ridership are encouraged by not charging a toll to these user groups. SOVs who choose to use the Express Lanes are issued an electronic transponder after an account is established. An electronic device reads the transponder when the

vehicle enters the Express Lanes and the toll is debited from the driver's account. The toll varies according to the level of congestion in the Express Lanes. Variable message signs, located before the entrance to the Express Lanes, indicate the amount of the toll; drivers can then decide whether or not to use the lanes.

Bus ridership in the corridor has increased by 25 percent, and the number of daily carpools increased 57 percent since project inception. It has provided options for commuters in the corridor that have

resulted in better overall operating efficiency of the entire facility. In addition to providing choices for the commuter, the project has generated revenue that has been used to fund transportation improvements in the corridor.

Recent public opinion research in the I-15 corridor indicates broad support for the project. Eighty-eight percent of the **FasTrak** users and 66 percent of the non-users approve of the program and a majority of both groups agree that the **FasTrak** program reduces congestion on I-15. A vast majority of the motorists agree that it is a good idea to have a time-savings option on I-15. These high levels of approval are represented across all income levels and ethnic groups.

QuickRide is a project similar to **FasTrak** that operates on I-10 in Houston during the morning and afternoon peak periods and on US 290 in the morning peak period. This program allows two-person HOVs (HOV2s) access to the HOV lane during the 3-or-more-person restriction by paying a flat toll of \$2.00 per trip. For this fee, HOV2s travel at free-flow conditions in the barrier-separated HOV lane. Like in the **FasTrak** program, participants in the program must register and be issued an electronic transponder and the tolls are debited from the driver's account.

Motorists who take advantage of the **QuickRide** cite flexibility as an incentive for using the program. These projects offer examples of how altering operating scenarios can maximize the efficiency of the transportation system. Agencies operating the programs are able to move more people and goods in a more efficient manner utilizing the available capacity of the transportation network. Agencies also have the flexibility to adjust operations quickly to respond to incidents or, over a longer time



Figure 1. I-15, San Diego, CA

resulted in excess capacity on the HOV lanes while the mainlanes of I-15 remained heavily congested. SANDAG, working with the California Department of Transportation and the Federal Highway Administration, implemented a demonstration managed lane program in 1996. The **FasTrak** program allows single-occupant vehicles (SOV) to “purchase” excess capacity on the Express Lanes by paying a toll for access to the lanes. The program continues to operate successfully

period, to meet regional goals. By matching the operating expectations of transportation systems to the regional goals of the community, TxDOT can produce results that will provide commuters with choices, enable goods to be transported expeditiously, and minimize community and environmental impacts.

THE FUTURE OF MANAGED LANES IN TEXAS

TxDOT is considering managed lane facilities as part of a number of freeway reconstruction projects around the state. Cities where managed lanes are under consideration are

- Houston – I-10
- Dallas – I-635
- San Antonio – I-35
- Ft. Worth – SH 121/SH 114
- Austin – Loop 1/US 183
- Waco – I-35

Each project has unique characteristics and TxDOT is approaching each in a way that meets the travel needs in the corridor and is consistent with community objectives. It is part of TxDOT's ongoing effort to explore alternatives that will maximize the efficiency of the system and balance demands with the desires of the communities that the roadways are to serve. Managed lane projects provide options in meeting these challenges.



Figure 2. I-10 Katy Freeway, Houston, Texas

For More Details . . .

Related Report:

Report 4160-7, *Marketing the Managed Lanes Concept*.

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