MANAGED (HOV-HOT) LANES

Description

Managed lanes is a broad term that refers to any lane or corridor that controls usage by vehicle, eligibility, price, or access management. The types of managed lanes commonly seen are:

- High occupancy (HOV).
- Congestion priced (High Occupancy Toll [HOT] or Express Toll).
- Exclusive lane use (bus or truck lanes).

HOV lanes allow those cars with two, three, or more passengers to use lanes separated from the main traffic lanes. The lanes are managed by eligibility, in that only HOVs are allowed on the lane. HOV lanes typically provide travel time savings and trip reliability, offering an incentive for ridesharing.

HOT lanes allow lower occupancy cars access to HOV lanes. Admission to these managed lanes is based on a fee paid by the driver. Those in the HOT lanes are assured of a high-speed and reliable trip time; the toll is adjusted to maintain free-flow conditions. This produces an alternative to congestion and generates revenue that can offset the cost for the implementation. In the Dallas-Fort Worth area, the term "managed HOV lanes" refers to variably priced lanes that provide a discount to HOVs.

Express toll lanes similarly charge a toll adjusted to maintain free-flow speeds, but may be distinguished from HOT lanes by charging all vehicles, regardless of occupancy.

Exclusive lanes restrict certain lanes to only buses, trucks, or other slower moving vehicles. A truck-specific lane typically separates the slower, less agile vehicles from the main lanes and allows higher speeds in the adjacent lanes for passenger cars. Bus lanes provide an added travel time benefit for using transit. Passenger cars are restricted from these lanes, reducing the effects of congestion felt by buses and decreasing wait time for passengers.

Cost:	●●●●●
Time:	**Moderate-Long**
Impact:	**Corridor**
Who:	**State with Local Partners**
Hurdles:	**Public Support, Operations & Revenue Needs**

Managed lanes provide travel alternatives, giving flexibility to users by allowing them to choose the best method of travel for the trip. This choice reduces congestion by maximizing the use of existing capacity more efficiently. If flow can be maintained by pricing, eligibility or access, more vehicle and person throughput can be gained through the corridor.

The term "managed lanes" is generally used by transportation professionals in reference to the family of special use lanes, but many agencies brand their facilities with more driver-friendly description, such as "express lanes."

Target Market

The type of lane, its design, and operating rules depend upon the primary goals of the lane: maintaining free-flow speed, maximizing person-

moving capacity, maximizing vehicle throughput, revenue needs, freight-moving capacity, etc. Managed lanes lend themselves to boosting efficiency of both the current transportation network and any new or alternative network (such as transit or freight traffic).

Transportation agencies may have a number of reasons for considering managed lanes in a freeway corridor. Among them are the following:

- The inability to build enough lanes to address congestion during peak periods. Because of construction and right-of-way costs, environmental concerns, or community issues, it may not be possible to expand the cross-section of a freeway to offer congestion-free travel at all times of the day. Managed lanes can provide a congestion "relief valve" to offer faster trips during peak periods.
- The desire to offer travel options in a congested corridor. Building on the success of HOV facilities, managed lanes can provide travel time savings for buses, vanpools, and carpools, creating an incentive to shift modes from single-occupant vehicles (SOV) to various forms of ride sharing. The idea of implementing bus rapid transit (BRT) within managed lanes as a way of providing high-capacity mass transit service evolved from the HOV experience.
- The need to address funding issues and the potential for revenue generation. As transportation funding declines, agencies are looking at managed lanes as a way to implement freeway improvements while covering all or a portion of capital costs, paying for operating expenses, or funding additional transportation improvements in a corridor (including transit service).
- The desire to increase effectiveness of HOV lanes. Employing management strategies such as pricing to existing HOV lanes has the potential to preserve person-movement objectives while enhancing an HOV lane's effectiveness in meeting other corridor-wide goals.
- The need to separate large vehicles. For safety considerations in corridors with heavy truck volumes, an operating agency may want to separate large trucks from other vehicles using a managed lanes approach.

In considering managed lanes for a particular corridor an agency may seek a combination of project objectives, both in the short term (10 years) and for long range needs (20 to 30 years). Designing for a flexible managed lane system will allow the agency to modify operations in response to changes in travel patterns in the corridor as well as long-term changes in broader community goals.

How Will This Help?

- Managed lanes can improve travel time reliability for transit or other eligible vehicles.
- Specific lanes for buses, trucks, carpools, vanpools, and toll payers increases speed and efficiency on main traffic lanes as a number of vehicles are removed.
- Managed lanes may increase safety by removing large trucks and transit vehicles from main traffic flow.

Implementation Examples

State Route 91 Express Lanes, Orange County, CA: The State Route (SR) 91 Express Lanes in California were the first in the United States to vary tolls by the level of congestion on the roadway. Built within the median of SR 91 and opened in 1995, the four express lanes are 10 miles in length with no access other than the end points. Two lanes are provided in each direction and they are separated from the main lanes by plastic pylons and a painted buffer. Variable toll rates are set according to the level

of congestion typically experienced on the roadway, making peak periods the most expensive time to travel, and currently range from $1.30 in the off-peaks to $8.95 in the peak hour. Although the facility is open 24 hours per day and seven days per week, and tolls are charged at all times, the operators use price to maintain free-flow speeds on the express lanes at all times. Tolls are paid exclusively through electronic collection. Facility users must have an account and a transponder. The facility also encourages travel in HOVs. Carpools with three or more occupants (HOV3+), motorcycles, zero-emission vehicles and vehicles with disabled person license plates are free at all times, with the exception of the evening peak period in the peak direction, when HOVs are charged 50 percent of the posted toll.

Interstate 15 FasTrak Express Lanes, San Diego, CA: The Interstate 15 (IH-15) FasTrak Express Lanes in San Diego, CA, are operated by the San Diego Association of Governments (SANDAG). A 20-mile section consists of two managed lanes in each direction, dynamically priced for SOVs, with intermediate ramps serving areas along the corridor. Bus rapid transit (BRT) is a significant component of the expansion project, with new BRT transit stations built along the route as part of the project. The IH-15 express lanes use dynamic pricing. Toll rates typically vary from $0.50 to $4.00 but can rise as high as $8.00 in severely congested conditions. Technology deployed in the corridor allows for the assessment of current traffic conditions. The toll rate is adjusted dynamically to ensure free-flow conditions in the express lanes. Dynamic message signs posted prior to the entrance of the facility alert the drivers to the current toll.

FasTrak Express Lane, IH-15 (San Diego County)

Application Techniques and Principles

Given the broad description of managed lanes, there is not one set of guidelines that can be applied across all circumstances, since no two facilities are the same. However, there are several planning, design, and operational factors that should be considered.

The type of managed lane application should support the regional transportation vision and the goals/objectives for the specific corridor. What is the primary purpose? Are transit or other forms of ridesharing important to success? What role does revenue expectation play? Local agencies are increasingly considering networks of managed lanes, in which overall operating policies are defined for the system. There are also growing considerations for flexibility in incorporating active traffic management (ATM) strategies into managed lane operations.

The physical and operational characteristics of the corridor play a role in how managed lanes develop: can a managed lane be added to the existing cross section by reducing lane widths and converting the shoulder? Or is a multi-lane facility required, and is there sufficient space to implement it? How will the corridor trip patterns and demographics impact usage? Access points are also a critical consideration, both in terms of location and design, as are the methods by which managed and general purpose lanes are separated and delineated.

By their very nature, managed lanes are intended to promote a more efficient operation. Implementation of lane management strategies should be accompanied by a plan for continuous monitoring and evaluation, so operations can be adjusted as conditions change so that the facility can continue to meet the defined objectives.

Issues

Public acceptance is crucial to successfully integrating managed lanes into the transportation network. Public acceptance of the projects described above has been high, although not initially so. Project experience has shown that there is typically initial public reluctance to priced lanes in particular, but that sentiment changes after education and following the opening of the project, where travelers can experience the benefits. Surveys and usage studies of the Minneapolis, San Diego, and SR 91 projects show use of the facilities by drivers in all income brackets. The public outreach activities should be designed to communicate the goals and objectives for the lanes and engage public opinion throughout the entire process in order to adjust project elements and improve understanding and acceptance. Case studies have shown that strong project champions have been key to successful managed lane implementations.

Who Is Responsible?

The designation of responsibilities for implementation and operation is as varied as the types of projects represented under the broad managed lanes definition. Historically, HOV lanes in Texas have been implemented and operated jointly between the local TxDOT office and transit agency. Since priced managed lanes are more commonly used on freeways or other high-capacity highways, TxDOT certainly has a critical role; however, new partnerships with tolling entities and the private sector have emerged as next generation pricing projects have moved through development and into implementation.

Project Timeframe

The length of time required to implement a project, and its ultimate cost, will depend on whether a new lane is needed or if the current cross section can be repurposed to incorporate a managed lane. A new lane will require more time and expense than a shoulder conversion. Also, toll lanes may require new infrastructure that might not currently be in place. Items such as lane level and back office tolling systems would increase cost, and could increase the project timeframe, depending on regional experience with toll systems.

Cost

The project cost depends on the type of interchange being constructed. A project to construct a two-level interchange or overpass will typically cost in the range of $10 to $30 million. This is low when compared to the costs of more than $100 million to construct a larger three-level interchange. Additional right-of-way requirements may increase the cost dramatically. The entire FM 306 project is estimated to cost almost $40 million for two railroad grade separations and widening two miles of the highway from two lanes to four; the two railroad grade separations have estimated costs of about $10 and $15 million.[2]

Data Needs

Evaluating the need for managed lanes primarily requires volume and capacity data. Current traffic volumes, peak hour volumes, and speed data help evaluate the level of congestion on the roadway. Also, truck percentages, or truck volumes, are needed to examine the use of truck-only lanes. Lastly, the average bus delay and number of buses that use a particular route are needed. Useful data may also include lane widths, shoulder widths and pavement condition, segment lengths, area speed data, estimated congestion caused by large vehicles, volumes by time of day, and available right-of-way.

Managed (HOV-HOT) Lanes Best Practice

- Type of Location: Heavily congested freeway corridors.
- Agency Practices: Clear objectives for the project that are consistent with regional vision and corridor characteristics; strong coordination between agencies, including transit and tolling entities.
- Frequency of Reanalysis: Continuous re-analysis to ensure operational performance targets are met.
- Supporting Policies or Actions Needed: Extensive public outreach, strong project champions.
- Complementary Strategies: Adding new toll roads, bus rapid transit (BRT), active traffic management, variable pricing, and commercial vehicle accommodation.

For More Information

Operating Freeways with Managed Lanes. Texas Department of Transportation Research Project 0-4160. 2005.

FHWA Tolling and Pricing Program. http://www.ops.fhwa.dot.gov/tolling_pricing/resources.htm.

Mobility Improvement Checklist: Adding Capacity, Vol. 3, Texas Transportation Institute, College Station, TX, September 2004.