Managed Lanes: A Popular and Effective Urban Solution

Ed Regan

Presented by Susan Buse

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Overview of Managed Lanes

- First ML: SR 91 – Orange County, CA – 1996
- Today About 23 Operating Projects in 9 States
- Basic Concept:
  - Only one or two lanes in each direction priced
  - Other "general purpose" lanes remain toll free
  - All electronic, cashless toll collection
  - Highly variable toll rates to manage demand and keep MLs free flowing
  - Usually limited to cars, very light trucks and buses

SR 91 Express Lanes- World's First Managed Lanes

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Strong Public and Political Support

- Managed Lanes Provide New Options For Drivers
  - Tolls are only paid by those who choose time savings advantage
  - Less perceived political risk since tolls not mandated to all drivers
- Preserve a Portion of Road Capacity Free of Congestion
  - Viewed as an "escape valve"– only used when drivers really need to get out of congestion
- Benefits Those Who Use Them and Those That Don't
  - Speeds also improve in non-toll lanes from cars shifting to managed lanes
- Not Typically "Lexus Lanes" as Many Initially Believed
  - Users across all income levels, although higher income tends to use more often

Managed Lane Types and Characteristics

- HOT (High Occupancy Toll) Lanes
  - Typically converted from HOV lanes
  - HOV's still toll-free
  - SOV's required to pay variable toll
- Express Toll Lanes
  - Few if any toll-free vehicles
- Often integrated with transit
  - Bus rapid transit
  - Park and ride lots
- Usage usually limited to 2-axle vehicles

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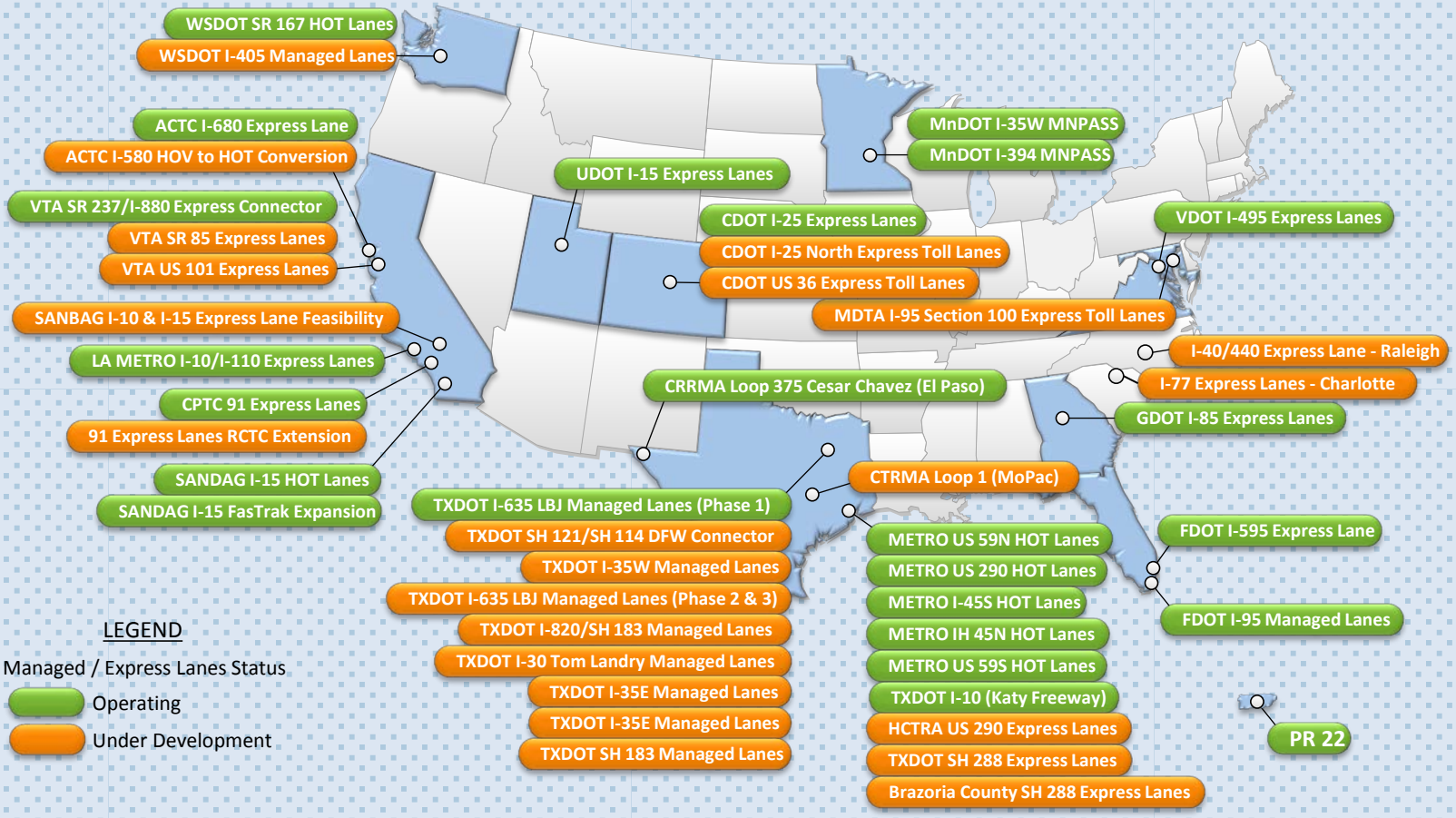
Operating and Planned Managed Lane Projects in the U.S.



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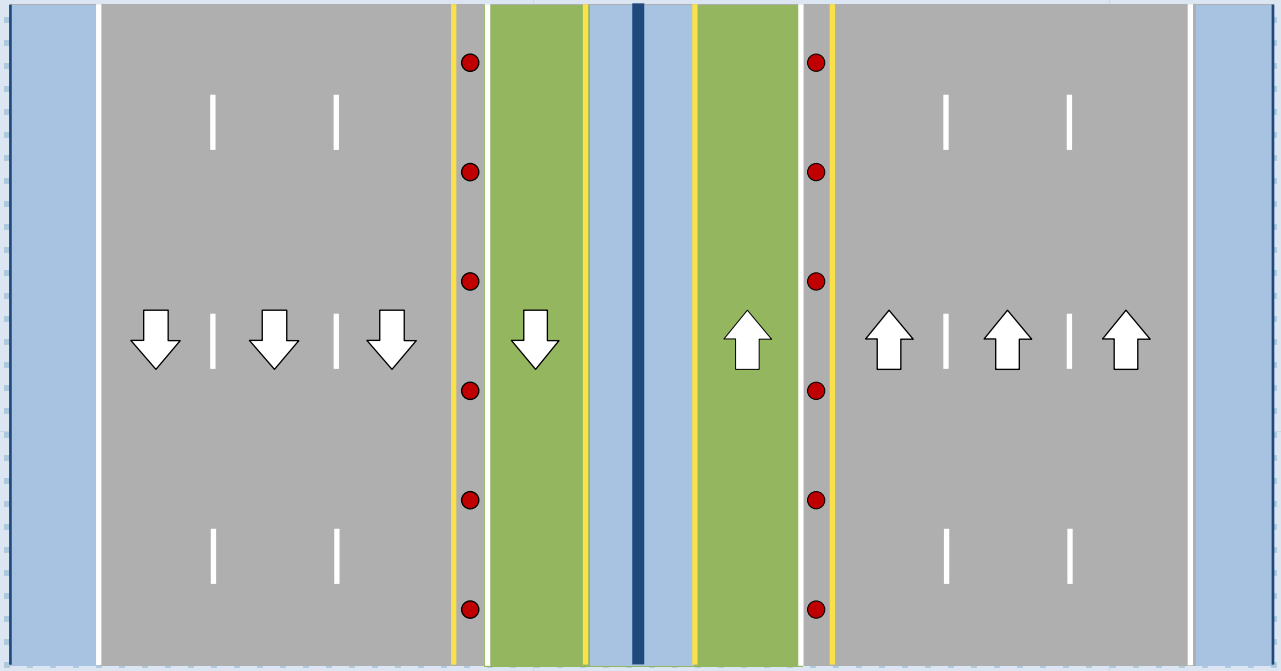
Potential Configurations: Single Lane Per Direction



Express Toll Lanes

Managed Lanes
General Purpose Lanes
Traffic Barrier
Double Stripe With Channelizer Posts

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I-394 Minneapolis- Single lane Section

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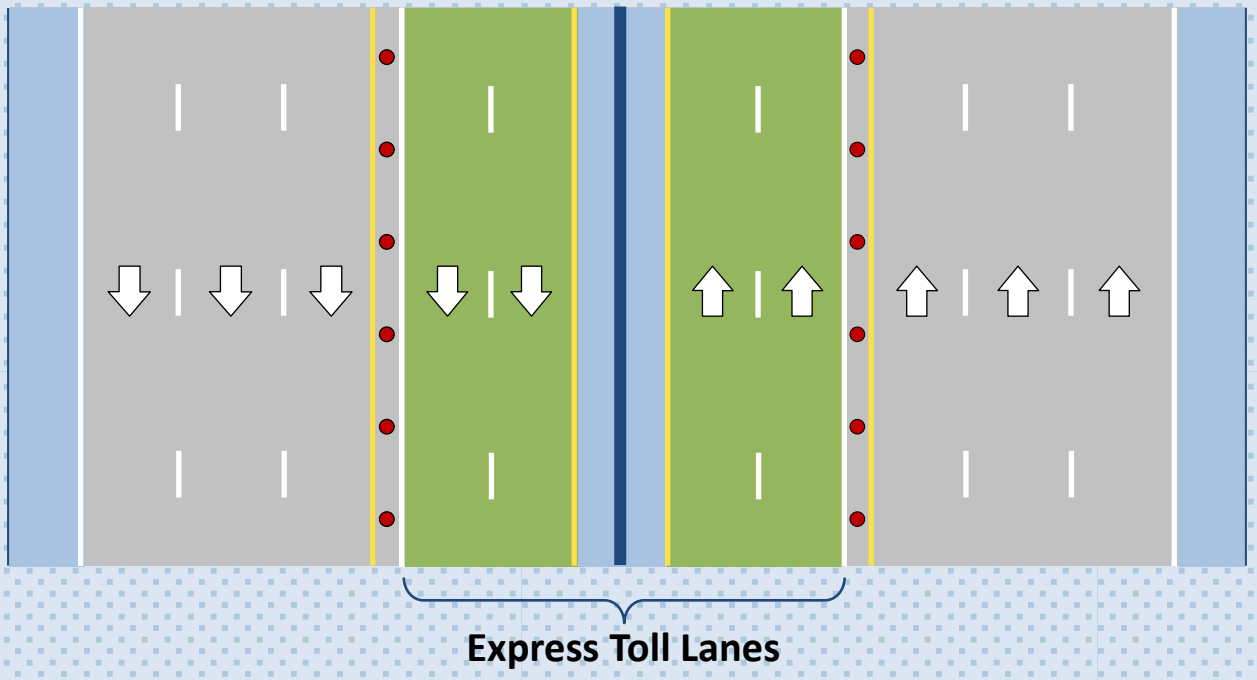
Potential Configurations: Two Lanes in Each Direction



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I-95 Express in Miami

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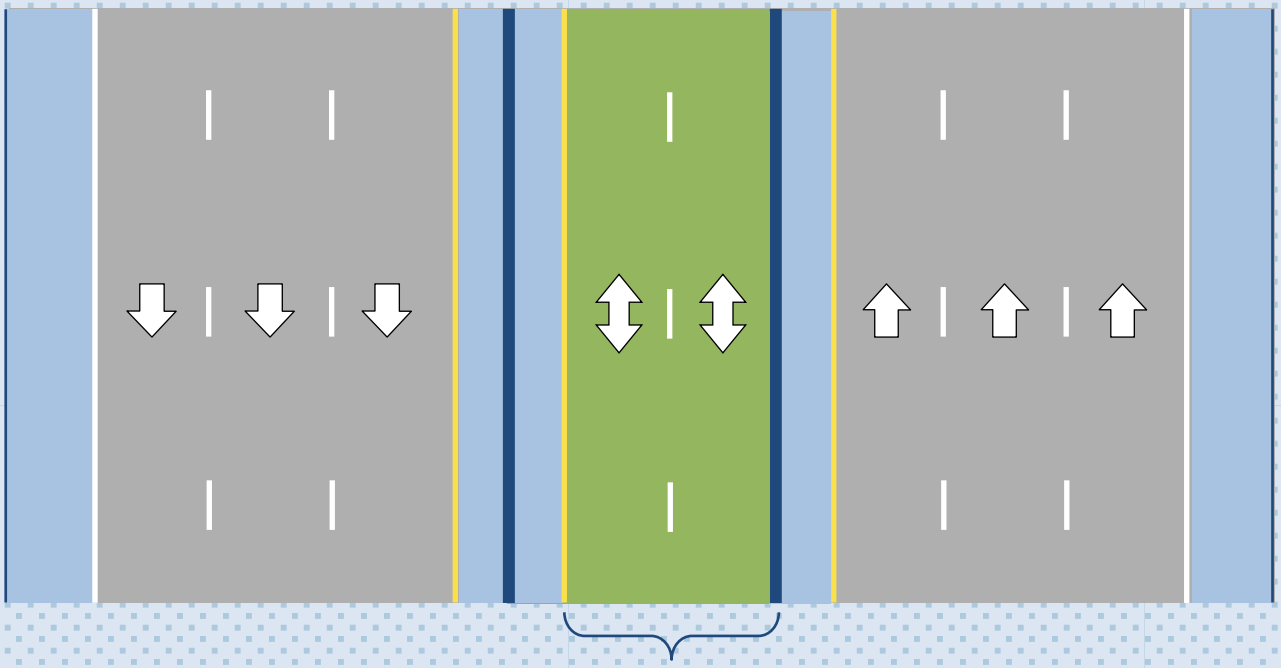
Potential Configurations: Two-Lane Reversible



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I-15 in San Diego – Original Project

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Managed Lanes Tolling

- Always Cashless Collection
  - Usually ETC only not full AET
- Typically Overhead Mounted Toll Zones About Managed Lanes Only
- Highly Variable Rates
  - To manage demand
  - Pre-set variable
  - Dynamic pricing
- Dynamic Rate Signing at Entry Points

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SR 91 Variable Toll Sign

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Pre-set vs. Dynamic Variable Pricing

- Pre-set (eg. SR 91)
  - Highly variable rates, that change hourly in a predictable pattern
    - Schedule published on line and periodically updated
  - Advantages
    - Drivers can anticipate rates –more likely to influence behavior
    - Rates can be better set to maximize revenue
    - Less complex signing
- Dynamic Pricing (eg. I-15 or I-394)
  - Rates may be adjusted every 3-6 minutes to managed demand
  - Advantages
    - Rate is adaptable to changing conditions
    - Enhanced ability to manage traffic and congestion levels
    - Better able to maintain minimum acceptable speeds in MLs
    - Potentially more equitable as rates can be adjusted in proportion to changing time savings and overall "value" provided by MLs

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Some Unique Revenue Characteristics on Managed Lanes

- Vast majority of revenue occurs in peak direction during peak hours
  - Strongest projects may be those with congestion even in shoulder and mid-day periods
- Revenue is somewhat less predictable and less stable than traditional toll roads
  - Especially in early years of operation
- Revenue growth is typically much stronger than traditional toll roads over a number of years
  - Very sensitive to small changes in total corridor demand
  - 3-4 times overall corridor growth

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Some Simple (but Challenging) Axioms About Managed Lanes

- The revenue potential and overall ***financial success*** of priced express lanes depends, in part, on the ***operational failure*** of the adjacent general purpose lanes
- Maximum revenue from the express lanes often comes at prices which yield traffic in the lanes that is well below "free-flow" capacity
- This creates a natural public policy "trade-off" on pricing strategies – between maximizing revenue to get a project financed vs. maximizing throughput (and minimizing pain) in the overall corridor

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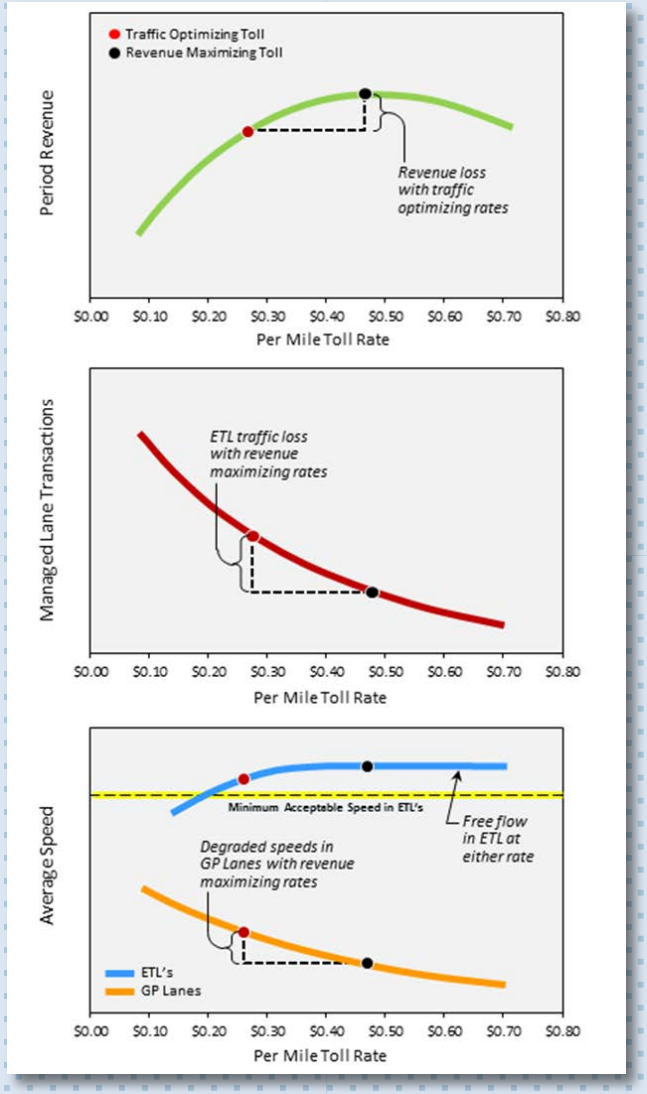
Three Objectives in Managed Lane Pricing

- Set tolls at least at levels which will sufficiently manage demand and ensure that the lanes keep moving above minimum targeted speed; and
- Set rates to maximize revenue potential; or
- Set rates to optimize the distribution of traffic between the GP and managed lanes to maximize overall corridor vehicle throughput.
  - The last two of these are often in conflict

Pricing Policy Tradeoffs

- Revenue maximizing rate reduces traffic using managed lanes, and results in increased congestion and lower speeds in GP lanes
- Traffic optimizing rates allows more traffic in managed lanes, reduces congestion in GP lanes, but generates less revenue
- Either rate preserves acceptable speeds in managed lanes
- Rate selection depends on policy objectives and revenue needs



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Factors Affecting ML Revenue Potential

- Congestion in Parallel Non-Toll Lanes
- Proportion of Vehicles Allowed Free Usage
  - HOV-2+
  - HOV-3+
  - None
- Pricing Policy Objectives
  - Revenue maximization vs. traffic optimization
- Number of Lanes Per Direction
- Enforcement Techniques and Aggressiveness

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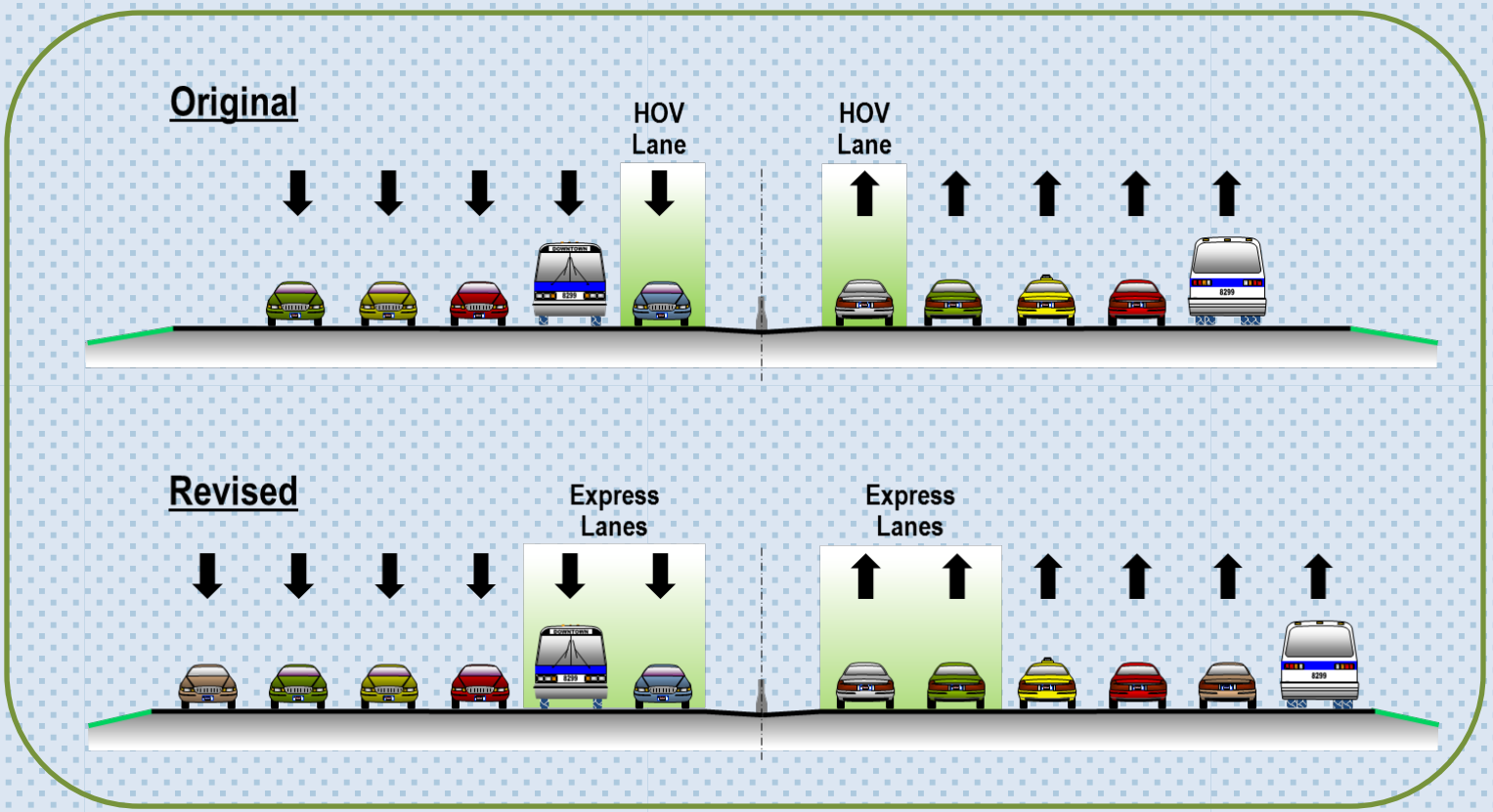
A Closer Look at a Successful Managed Lanes Project – I-95 Express in Miami



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I-95 Express Lanes Project

- **Phase 1-A** (Northbound)
  Opened December 2008
- **Phase 1-B** (Southbound)
  Opened January 2010
- **Phase 2**
  Opens 2015

I-95 Lane Before Express Lanes

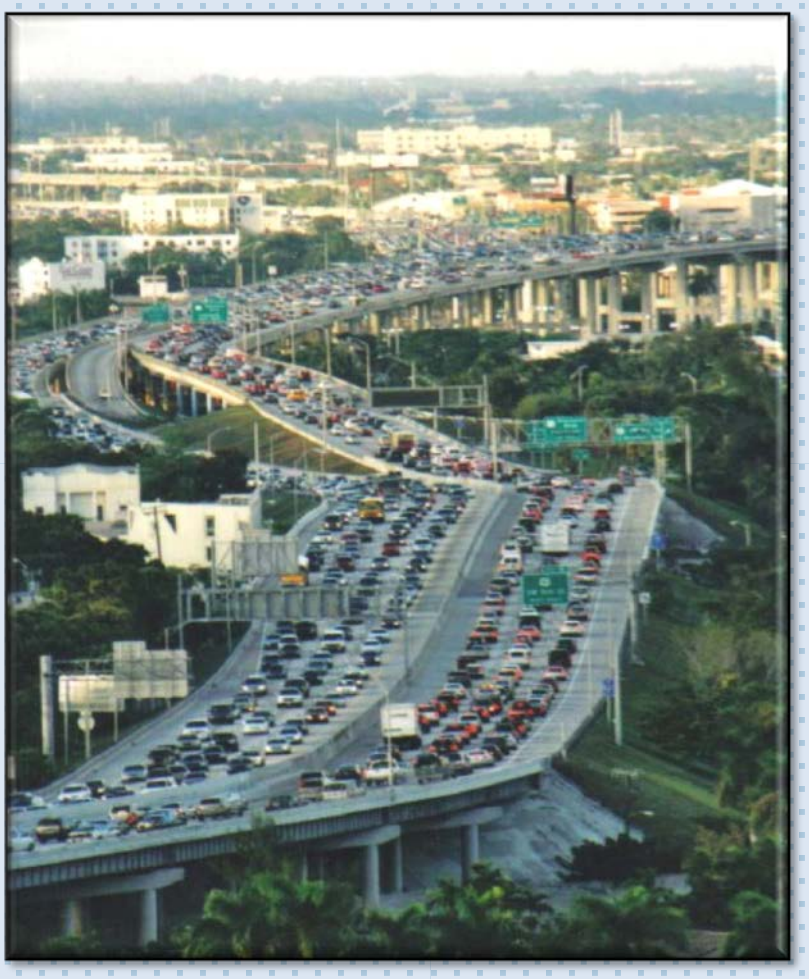
23-Mile Congested Corridor

Over 300,000 ADT on Some Sections

Average Peak Hour Speeds

- HOV Lanes - 20 MPH
- GP Lanes - 19 MPH

No tolls prior to Managed Lanes project



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Miami I-95 Express Lanes Project

- Converted A Single HOV Lane in Each Direction to TWO Express Toll Lanes
- Restriping With Reduced Lane Widths
- Changed Definition of What Vehicles Could Use Lanes Free of Charge
- From Any Vehicle With Two or More Occupants to Registered 3-Person Car Pools
- Added Extensive New Bus Rapid Transit on New Express Lanes
- Added Variable Priced All-electronic Tolling on Express Lane

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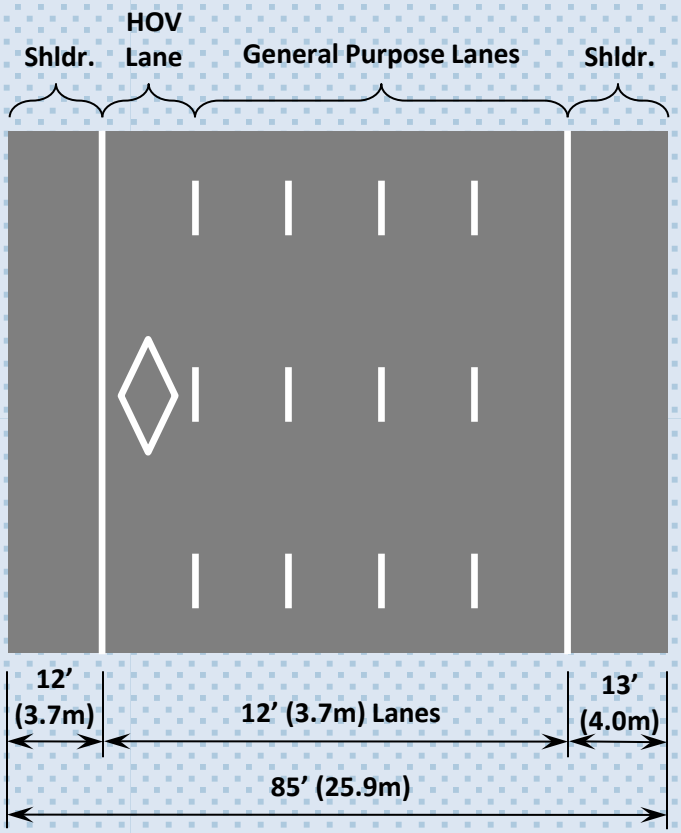
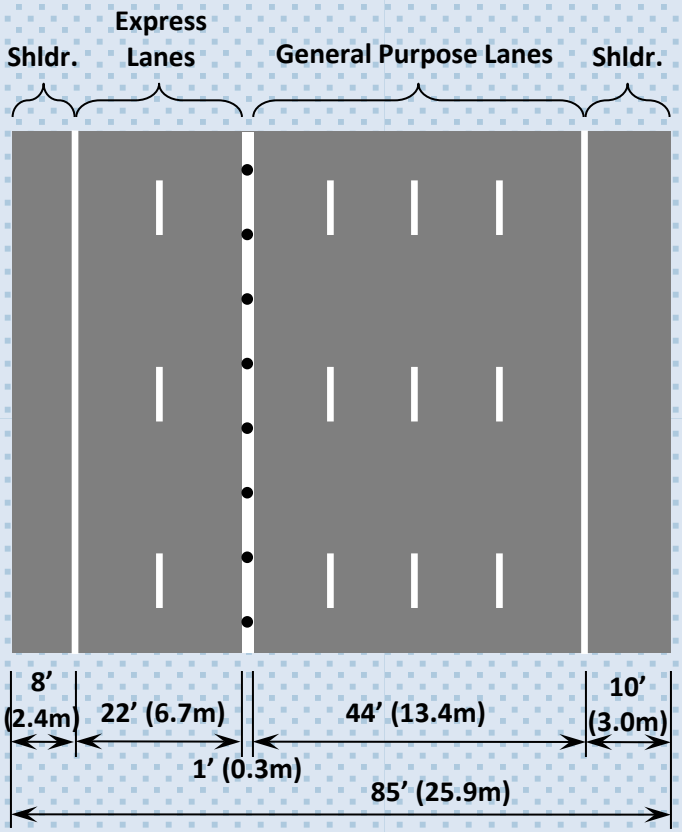
I-95 Express Lanes Conversion

Original



Revised



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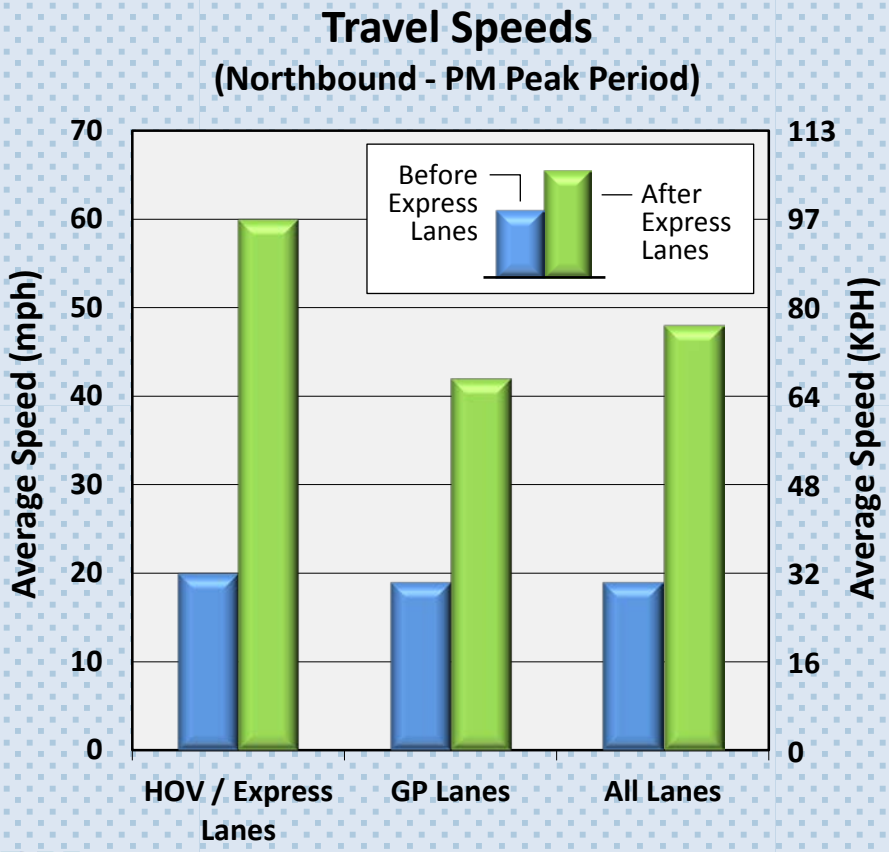
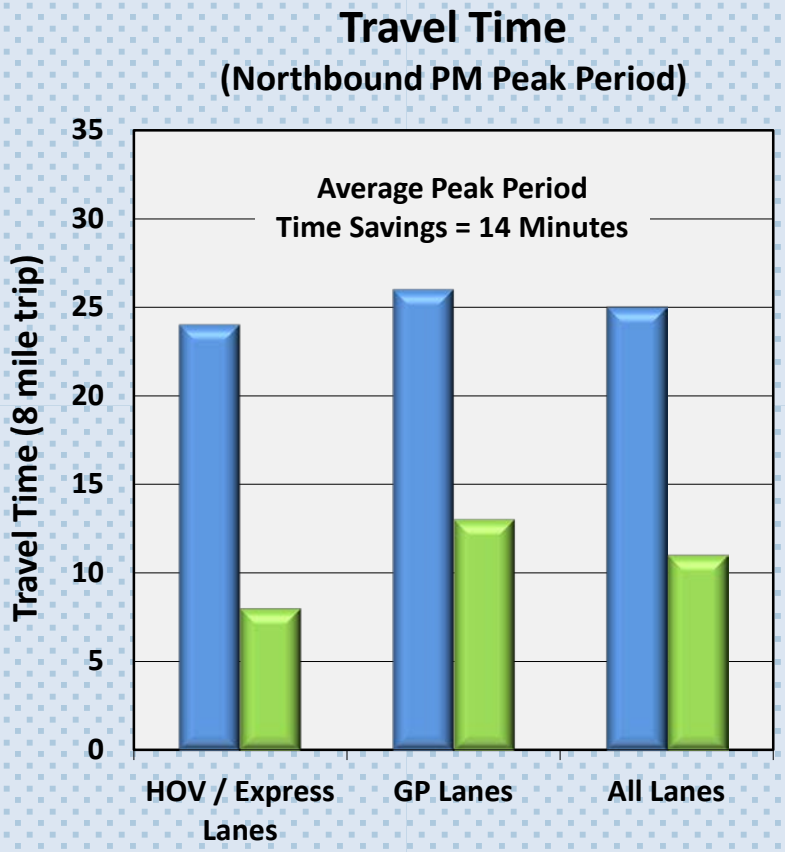
Impacts on Peak Period Speeds and Travel Times





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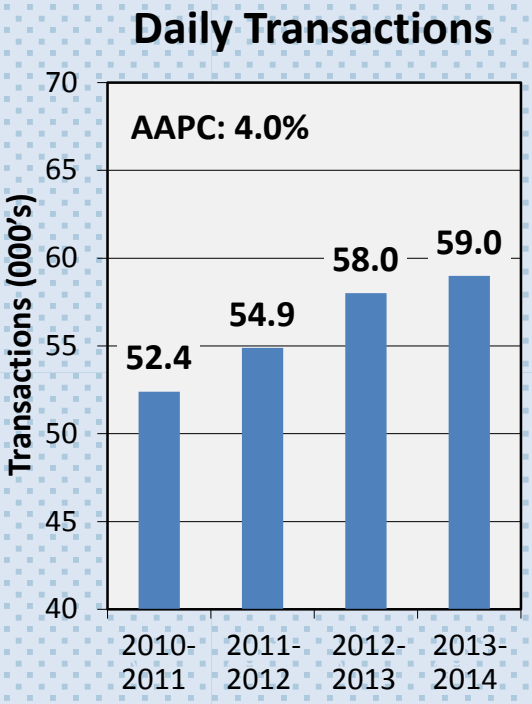
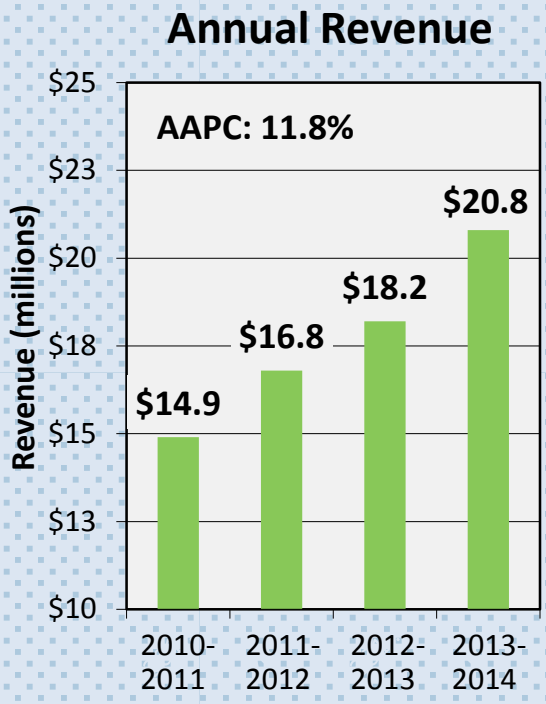
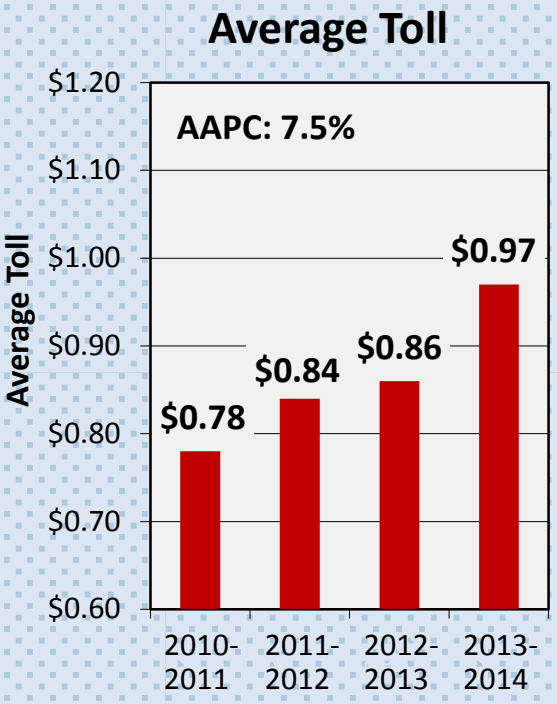
Annual Traffic and Revenue Trends I-95 Express Lanes







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Summary

- HOT and Express Toll Lanes have proven to be popular and effective urban mobility solutions in the U.S.
  - New driver options
  - Congestion relief and improved throughput
  - Strong support from public officials
- Likely to see continued growth in the concept
  - Managed lane networks in major cities such as Los Angeles, San Francisco, Dallas, Houston, Atlanta and Miami
- The can generate significant revenue… or not
  - Depending on how they are operated and policy tradeoffs