An Analysis of a Regional System of Variably Priced Lanes in the Washington Region – Initial Results

Presentation to the TPB Technical Committee
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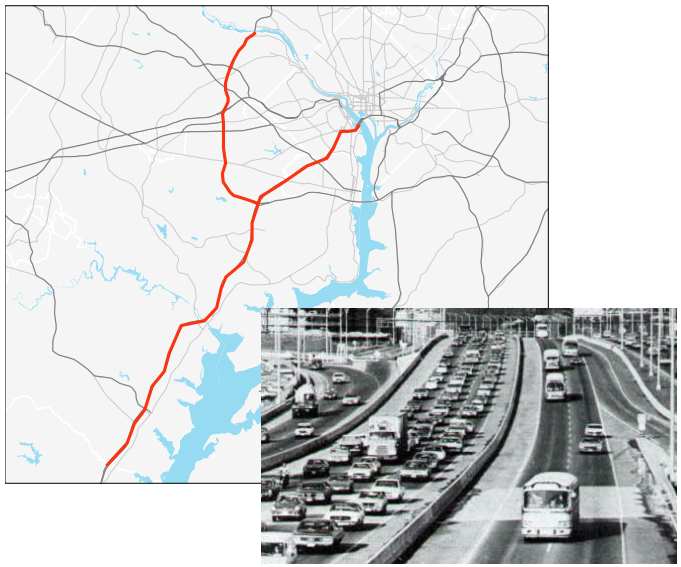
Ron Kirby, Director of Transportation Planning
Metropolitan Washington Council of Governments

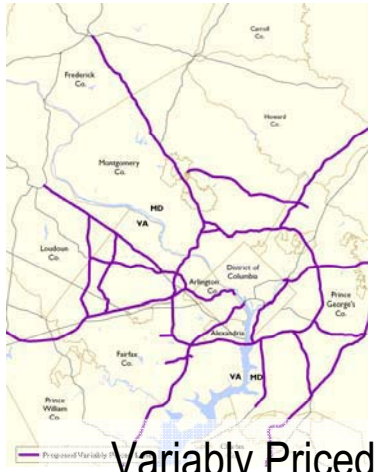
1) TPB Value Pricing Task Force

- Created Fall 2003 following June 2003 Regional Conference
- Examine the benefits of value pricing for the Washington region
- Goals approved by TPB, April 2005
- Study a regional system of variably priced lanes

Current TPB Value Pricing Analyses

- Furthering work of Value Pricing Task Force
- Assisting Virginia DOT in analyzing key corridors
  - Beltway
  - I-95/I-395
- Regional Mobility and Accessibility Study (RMAS)
  - "What If?" scenario for regional system of VPLs
  - Transit Sensitivity





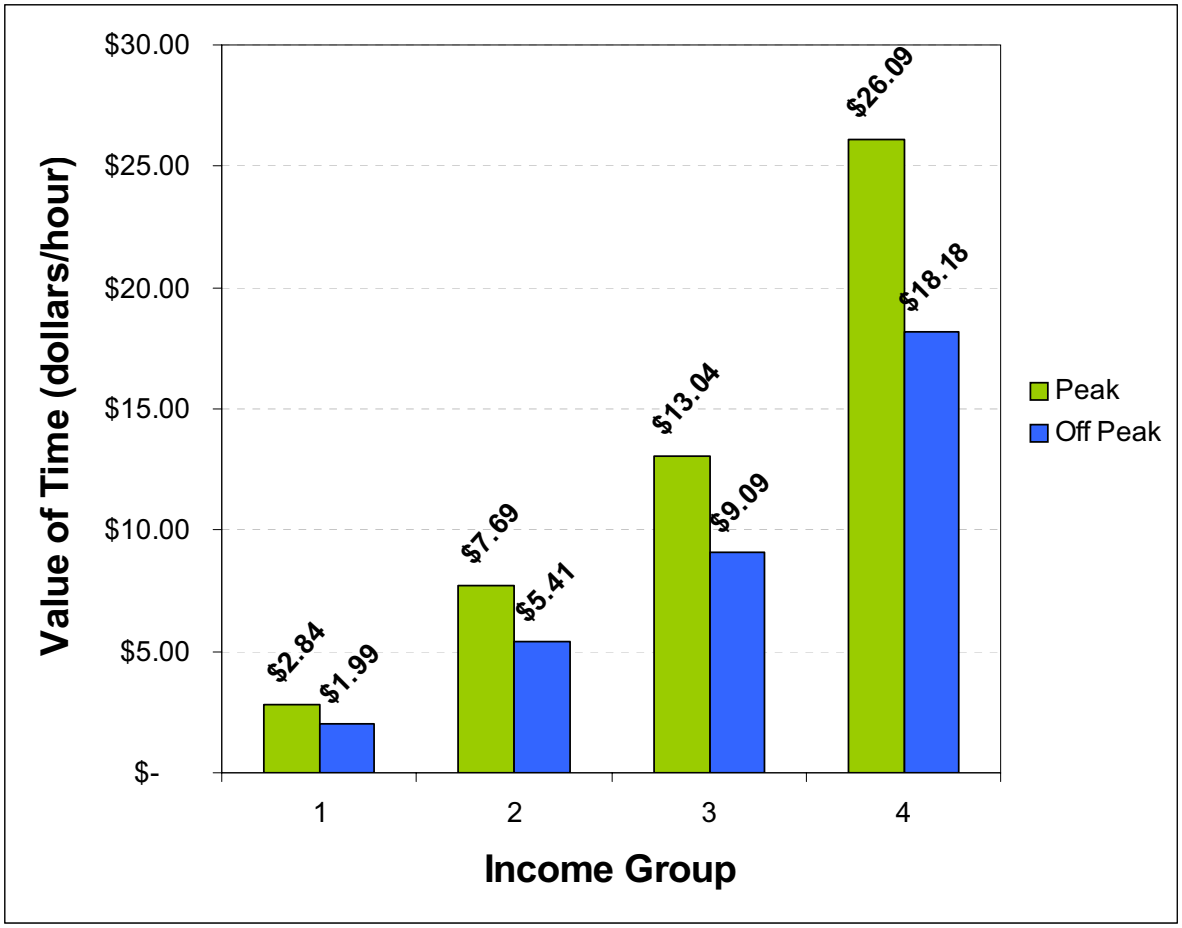
Variably Priced Lanes

2) Technical Methods

- “Toll time penalty” method
- Tolls can vary by segment, direction and time of day to ensure high level of service
- Tolls affect trip distribution, mode choice and traffic assignment

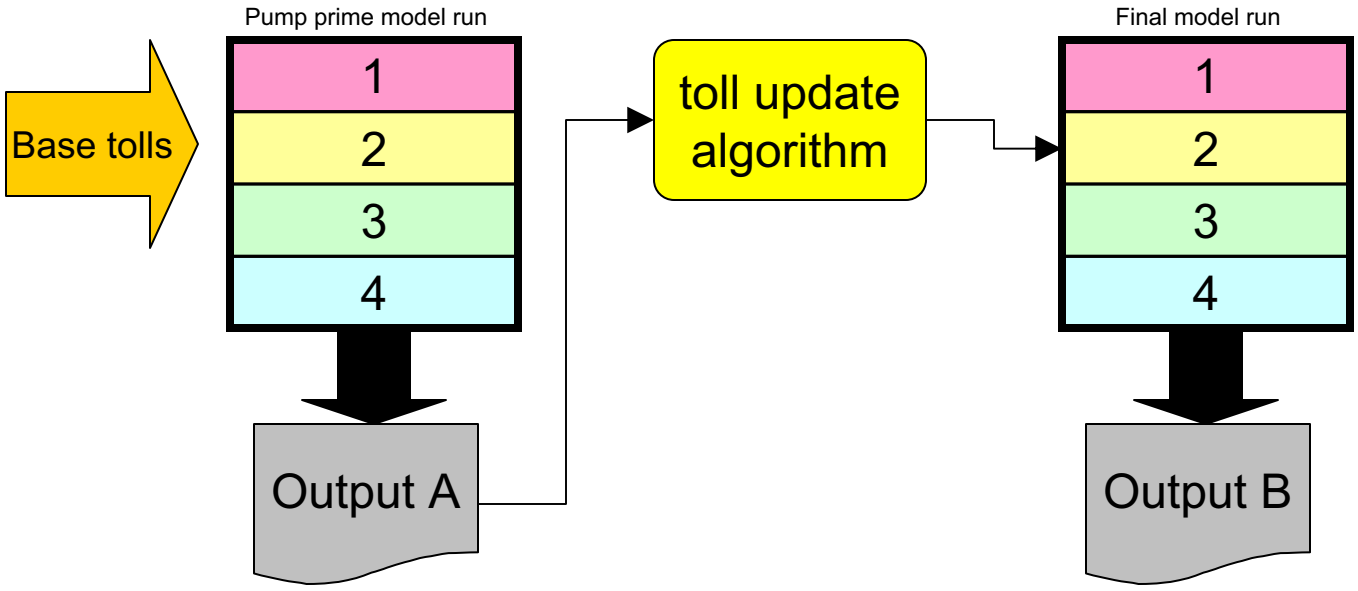
Toll Time Penalty Method

- Different values of time ("willingness to pay") used for different income groups



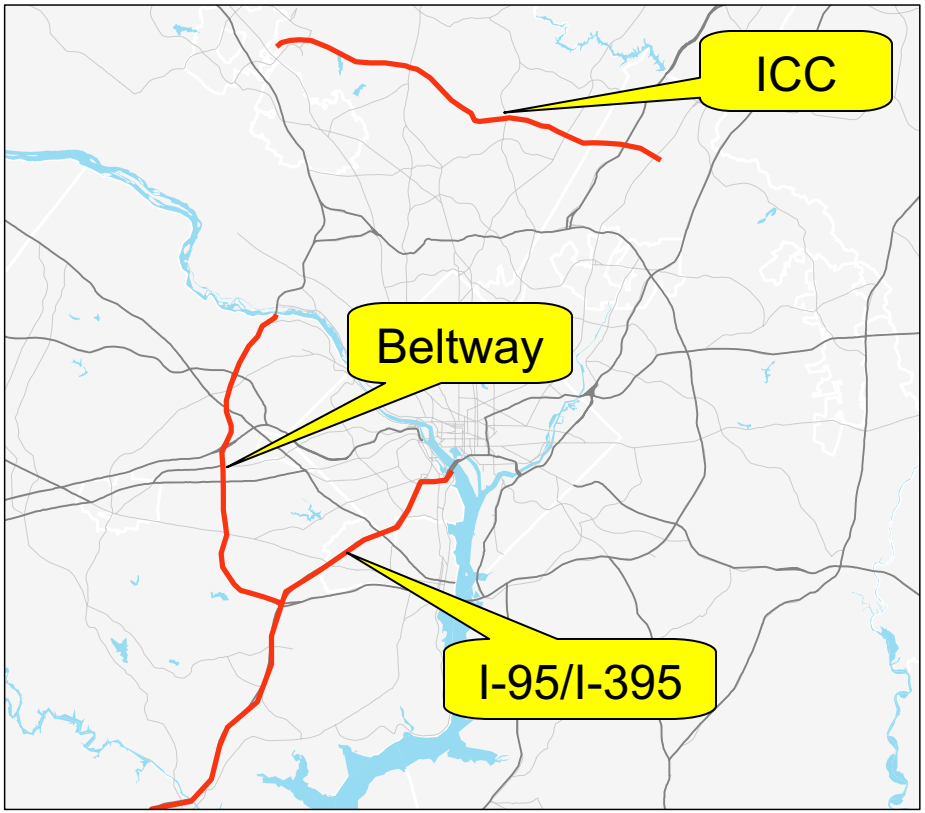
Toll Time Penalty Method

- Tolls translated into time penalties in 4-step model
  - Model run with base tolls
  - Higher tolls calculated for congested variably priced lane segments to ensure free-flow conditions
  - Model run with new tolls and travel times
- Two full model runs
  - Captures impacts of tolls on trip distribution, mode choice and traffic assignment



3) Current Value Pricing Projects

- Intercounty Connector (ICC)
  - 2004 CLRP Update*
- Beltway HOV
  - 2005 CLRP Update*
- I-95/I-395
  - Under development
- Regional Network
  - Regional Mobility and Accessibility Study

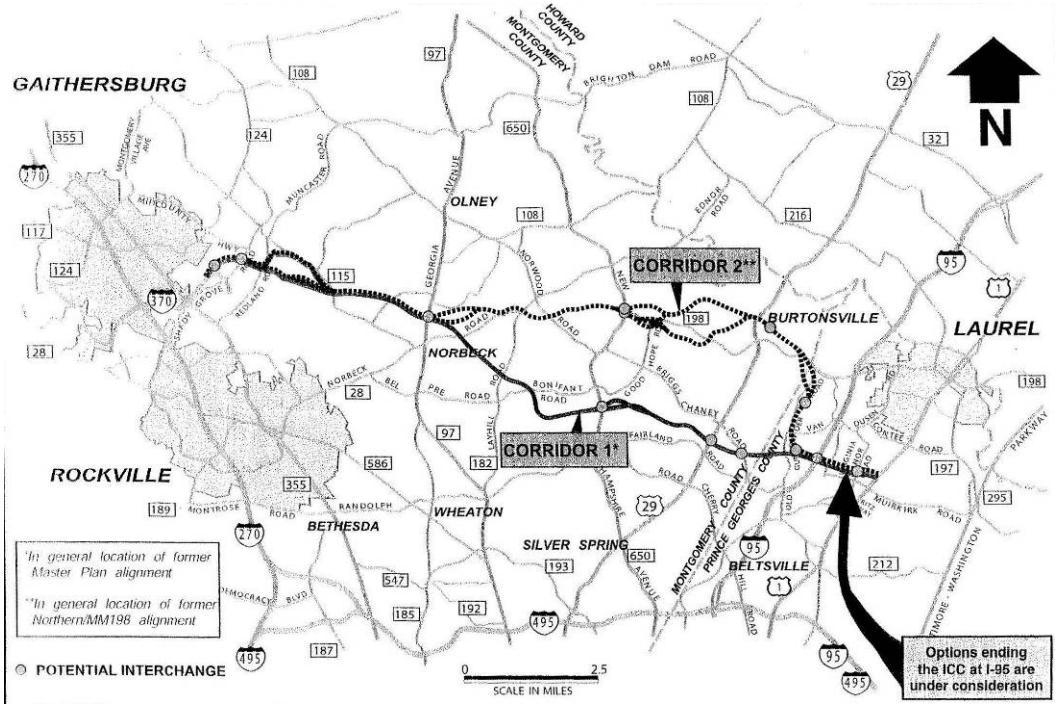


* Federal Record of Decision approved

Maryland Intercounty Connecter (ICC)

(Added to CLRP November 2004)

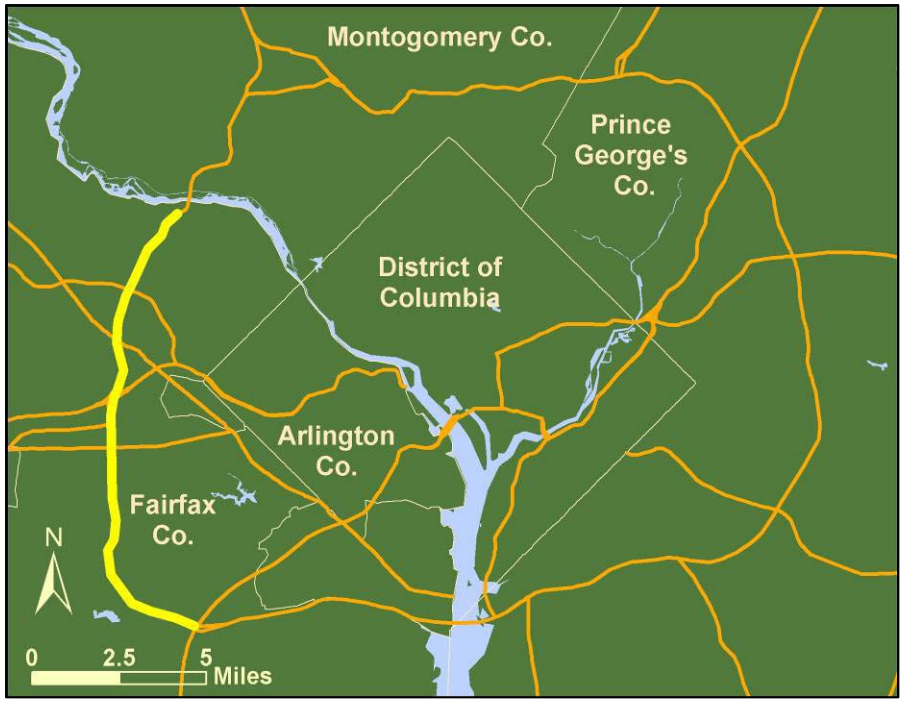
- 18 miles, 6 lanes, 9 interchanges
- Tolls vary by time of day (peak, off-peak)
- Express bus service



HOT lanes on the Capital Beltway in Northern Virginia

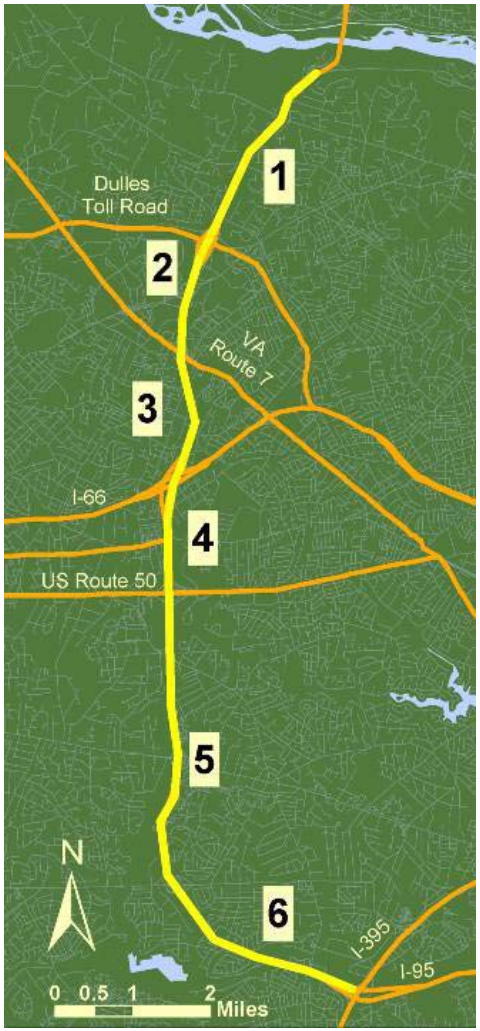
(Added to the CLRP October 2005)

- 4 new lanes added along 15-mile stretch
- Public-private partnership
- Free for HOV 3+, others pay toll that varies by time of day



–Proposed tolls range from $0.10 to $0.35 per mile

TPB Analysis: Capital Beltway Proposal in Northern Virginia



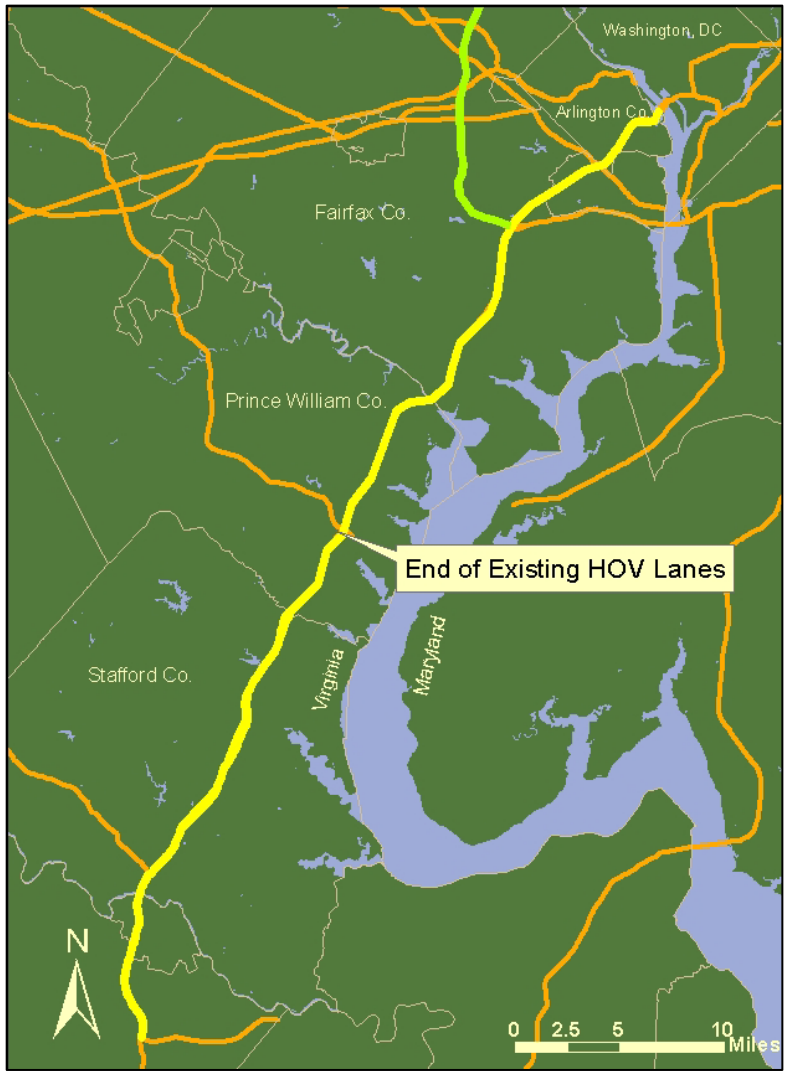
- Tolls will vary by time of day, segment, and direction to ensure high level of service

TPB Analysis Results, Tolls per Mile, 2010

Segment	Southbound		Northbound	
	AM	PM	AM	PM
1	$0.20	$0.20	$0.20	**$0.60**
⋮	⋮	⋮	⋮	⋮
3	$0.20	**$1.10**	**$0.70**	**$0.60**
⋮	⋮	⋮	⋮	⋮
⋮	⋮	⋮	⋮	⋮
6	$0.20	**$0.40**	$0.20	**$0.60**

Currently Under Development: I-95/395 HOT Lanes Proposal

- HOT lanes proposed by two private consortia in 2004/2005
- Assumes Northern Virginia Beltway HOT Lanes
- Add new capacity
  - Widen existing reversible HOV lanes to Dumfries from 2 to 3 lanes (30 miles)
  - Extend 2 reversible HOT lanes from Dumfries to Fredricksburg area (20 – 28 miles)
- Free for HOV3+, others pay toll
  - Proposed peak period tolls range from $0.10 to $0.30 per mile



TPB Analysis: I-95/I-395 Proposal

- Tolls will vary by time of day, segment, and direction to ensure high level of service

TPB Analysis Results, Tolls per Mile, 2010

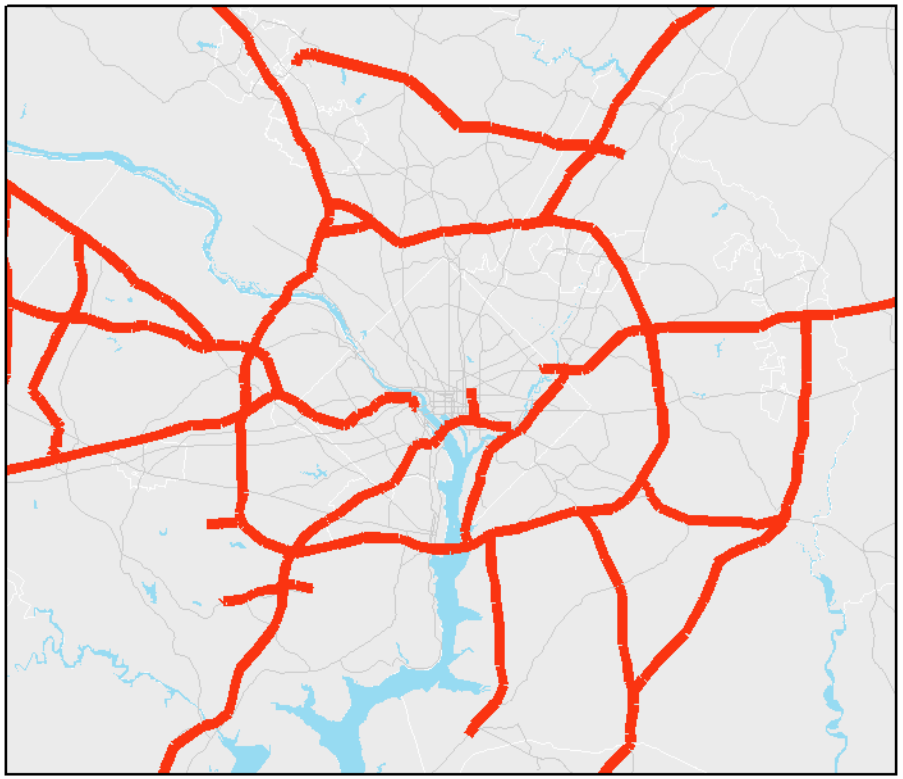
Segment	Southbound (PM Peak)	Northbound (AM Peak)
1	$1.10	$0.80
2	$1.00	$1.10
3	$1.60	$1.00
4	$0.80	$0.80
5	$0.23	$0.23

4) Analyzing a Regional System of Variably Priced Lanes

- Develop “starting point” scenario
- Analyze “starting point” scenario
- Conduct sensitivity tests, including impacts of enhanced transit
- Identify high potential corridors for first phase regional network
- Access and Egress Issues

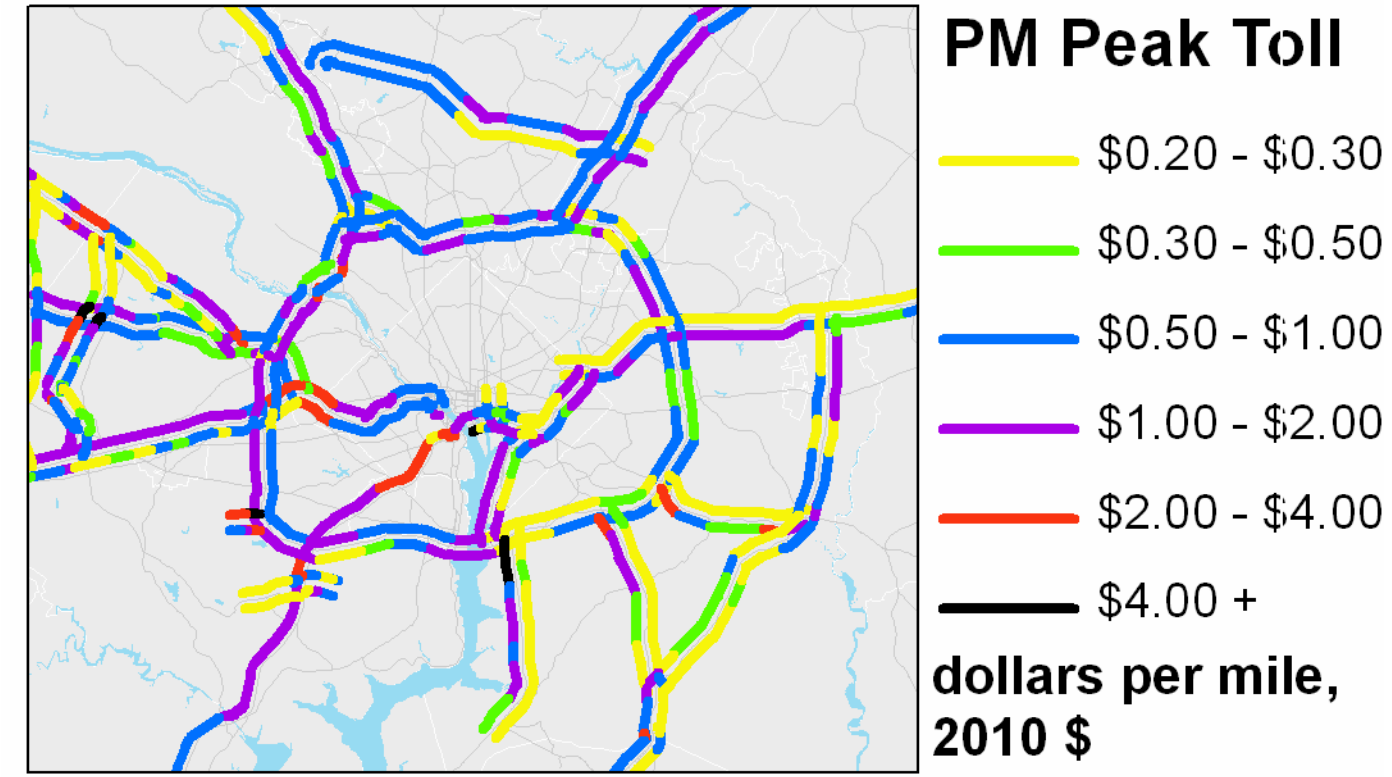
Develop “Starting Point” Scenario

- Variably Priced Lanes (VPL)
  - VA: HOT lanes, HOV 3+ free
  - DC, MD: Express Toll Lanes (ETL), all pay
- All Freeways:
  - Add 2 VPLs
- Arterials outside of beltway:
  - Add 1 VPL
- Existing HOV lanes:
  - Convert to VPLs
- Direct access ramps at key interchanges
- Incorporate existing transit service



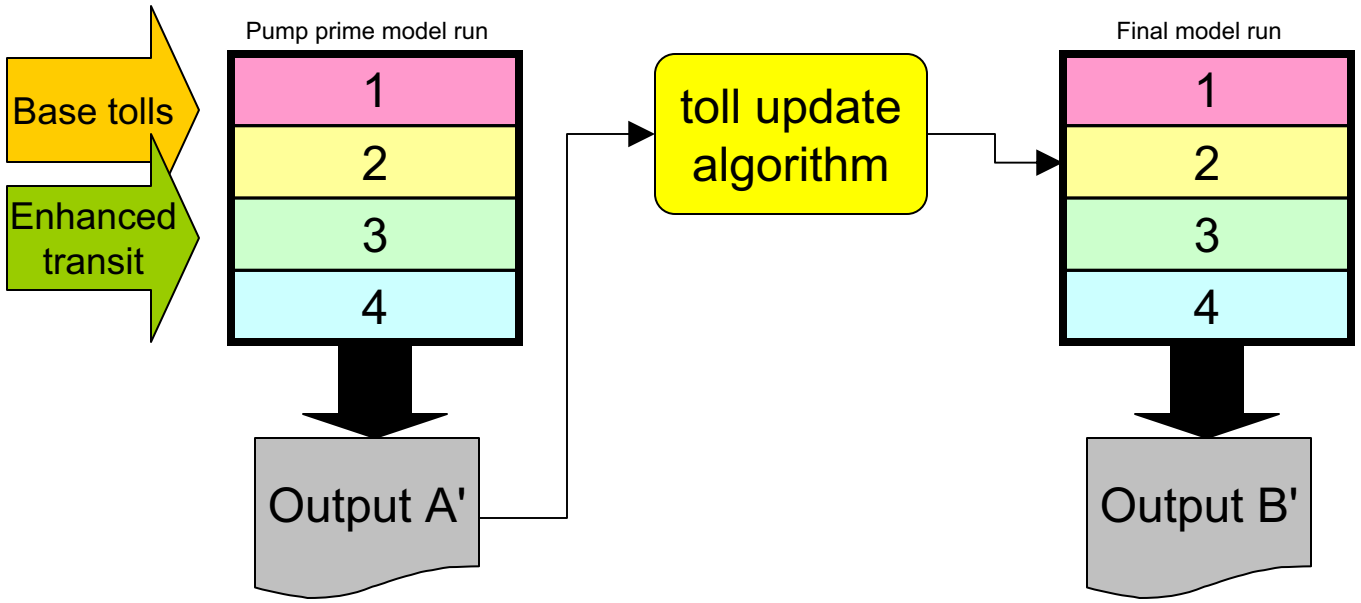
Initial Analysis of “Starting Point” Scenario

- To ensure free flow, toll rates vary significantly by segment, direction and time of day



Sensitivity Tests: Impacts of Enhanced Transit

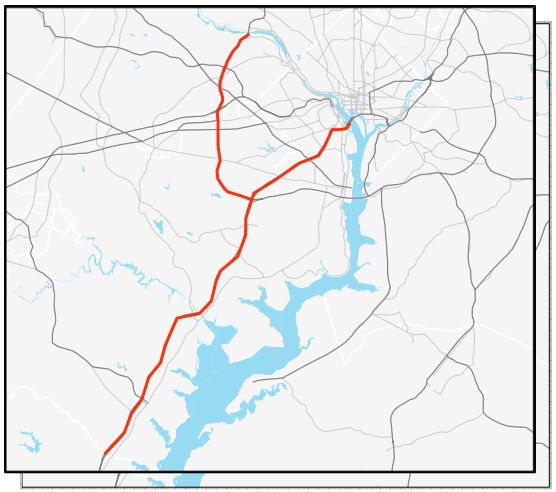
- Add transit enhancements to portions of the VPL network
- Interested in seeing potential changes in:
  - Toll rates
  - HOV usage
  - Transit mode-share
  - Total revenue
  - Vehicle miles traveled (VMT)
  - Speeds on mixed use lanes

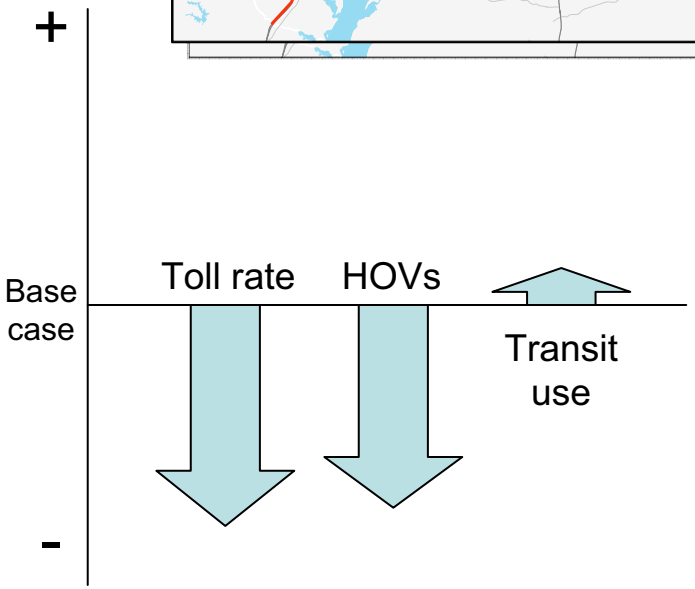


Initial Results: Impacts of Enhanced Transit

Transit service levels increased on Beltway and I-95/395 HOT Lane transit routes

- Decrease in toll rates and HOV use
- Increase in transit use
- Slight increase in VMT
- Total revenue essentially unchanged
- Slight increase in speeds on mixed use lanes



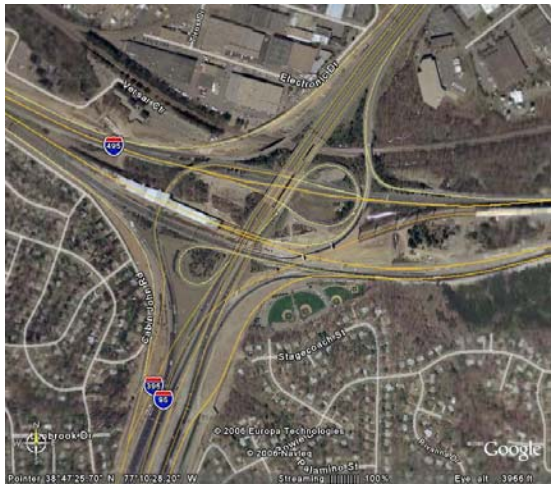


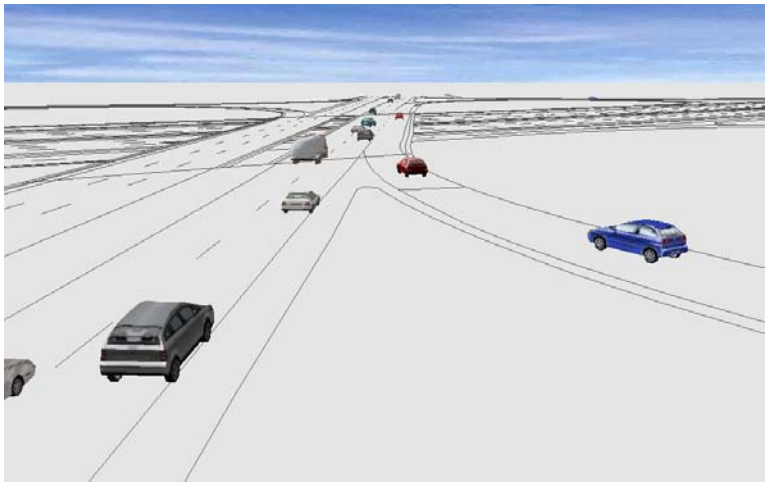
Identify High Potential Corridors for First Phase Regional Network

- Based on starting point scenario, define “first phase” regional network of high potential corridors
- Regional network will have higher tolls and usage than sum of individual, stand-alone segments (the “network effect”)
- Land use impacts of regional network will need to be assessed and incorporated

Access and Egress Issues

- Can vehicles get on and off the toll lanes without delay?
  - Some locations of potential concern:
    - 14th Street Bridge
    - Beltway/I-95/I-395 Interchange
    - Tysons Corner
  - Planned use of microsimulation tools to analyze potential chokepoints





6) Findings to Date

- Toll levels will have to vary by segment, direction and time of day
- Transit services will affect demand and toll levels, and need to be explicitly incorporated
- Full network of VPLs has higher value than the sum of the individual segments (the “network effect”)
- Access and egress issues need to be addressed

7) Next Steps

- Incorporate DC bridges and other facilities into an expanded test network
  - Under grant from FHWA Value Pricing Pilot Program
- Additional sensitivity tests
- Microsimulation studies
- Land use impacts (RMAS)