Modeling Issues & Optimism Bias in the Proposed Beltway/I-270 Managed Lanes Widening Project

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The modeling around impacts of this proposal rely on a combination of assumptions, some of which are inexplicably optimistic and others of which are unreasonably rigid.

Donna Chen, a professor at the University of Virginia, found that at the peak of rush hour, tolls on the Virginia Beltway HOT lanes run between $1.50 and $1.80 per mile[1]. If drivers were to pay the same rates on Hogan's proposed Interstate 270 lanes, they would pay upward of $45 for the 25-mile trip from Frederick to Shady Grove. However, because MDOT's current models do not include specific prices or tests of drivers' willingness or ability to pay such prices, they are almost inevitably likely vulnerable to the "optimism bias" that the Federal Highway Administration found was common and widespread amongst the planning projections for U.S. P3 projects in a 2016 review[2].

All of the projected growth in traffic that this proposal is supposedly anticipating comes from a single scenario of where land use change and population/employment growth will happen in the future. This projection, called the Regional Cooperative Forecast, is assembled by the region's Metropolitan Washington Council of Governments (MWCOG) Transportation Planning Board, and it is roughly based based on an econometric model at the regional level. The subsequent allocation of future growth to highly specific projected locations is very speculative. While we do not dispute that significant future job and population growth is likely in our region's future, and that we should plan ahead, it is highly unlikely that this single, specific, static map of land use change can correctly show what the region will look like in 2040. Nor can it correctly show what it *has* to look like, given the potential of both transportation infrastructure improvements and land use policy change to reshape growth. By "marrying" this one land use scenario, we risk committing ourselves to a transportation solution to a land use problem that may not occur.

We do not have to wonder what it would look like to explore more uncertainty and flexibility in how our region grows and changes. Recently, MWCOG's own Long-Range Plan Task Force[3] explored 10 scenarios for reducing congestion in the region (and also looked at other goals), and found two other alternatives that did *more* to reduce congestion than priced-lane highway

[1] http://www.cts.virginia.edu/2018/08/01/cts-research-offers-insights-on-using-toll-roads-to-save-time/
[2] https://www.fhwa.dot.gov/ipd/p3/toolkit/publications/discussion_papers/revenue_risk_sharing/
[3] https://www.mwcog.org/documents/2017/12/20/long-range-plan-task-force-reports-projects-regional-transportation-priorities-plan-scenario-planning-tpb/

widening. Table E3 excerpt below from the executive summary of the Long Range Task Force's final report Executive Summary (page ix) compares priced-lane highway widening (labeled in the table as "Express Travel Network") with the nine other potential scenarios, including I8, "Regional Land Use Balance," and I10, "Travel Demand Management" (TDM). On metrics of travel time, daily vehicle hours of delay, and various emissions, regional land use balance and TDM dramatically outperform the toll lanes. These are the findings of the region's official travel model.

Table E3: Summary of Performance Across Quantitative MOEs Relative to 2040 CLRP

QUANTITATIVE MEASURES OF EFFECTIVENESS	BASE 2040 CLRP	I1 Express Travel Network	I2 Operational Improvements & Hot Spot Relief	I3 Add'l North Bridge	I4 BRT and Transitways	I5 Commuter Rail	I6 Metrorail Core Capacity	I7 Transit Rail Extensions	I8 Regional Land-Use Balance	I9 Transit Fare Policy Changes	I10 Travel Demand Management
Travel Time (SOV)	50.7	-2%	-4%	0%	-1%	-1%	-2%	-1%	-5%	0%	-4%
Travel Time (HOV)	58.9	-5%	-4%	-1%	-1%	-1%	-1%	-1%	-6%	<1%	-6%
Travel Time (Transit)	53.9	-1%	-2%	-<1%	-1%	<1%	-6%	- <1%	-5%	1%	<1%
Daily Vehicle Hours of Delay	1.85 million	-11%	-8%	-3%	-2%	-2%	-9%	-3%	-18%	-2%	-24%
Jobs Accessible by Transit	523,000	2%	2%	-<1%	4%	1%	19%	10%	10%	0%	0%
Jobs Accessible by Auto	876,000	5%	8%	1%	1%	<1%	2%	1%	10%	<1%	10%
Mode Share: SOV	58.1%	<1%	3%	<1%	-1%	-1%	-4%	-1%	-2%	<1%	-8%*
Mode Share: HOV	11.6%	-1%	-7%	0%	-1%	-1%	-5%	-3%	-4%	-2%	24%*
Mode Share: Transit	24.6%	1%	-4%	-<1%	4%	2%	11%	5%	<1%	2%	6%*
Mode Share: Non-Motorized	5.6%	0%	0%	0%	<1%	<1%	<1%	<1%	29%	0%	16%*
Travel on Reliable Modes**	11.5%	42%	-5%	-2%	6%	2%	9%	6%	0%	3%	-3%
VMT daily	141.91 million	<1%	2%	1%	- <1%	- <1%	-1%	-1%	-3%	-1%	-6%
VMT daily per capita	21.17	<1%	2%	1%	- <1%	- <1%	-1%	-1%	-6%	-1%	-6%
Share of Households in Zones with High-Capacity Transit	39.9%	0%	0%	-<1%	25%	<1%	<1%	17%	9%	0%	0%
Share of Jobs in Zones with High-Capacity Transit	57.7%	0%	0%	-<1%	15%	<1%	0%	13%	2%	0%	0%
VOC Emissions	18.9	0%	-3%	1%	-1%	0%	-2%	-1%	-4%	-1%	-8%
NOx Emissions	18.8	0%	0%	1%	0%	0%	-2%	-1%	-4%	-1%	-7%
CO_2 Emissions	47,082	0%	-1%	1%	-1%	0%	-2%	-1%	-4%	-1%	-7%

* Mode shares reflect trips taken. Due to telework, actual number of transit trips declines; bicycle/pedestrian stays flat; HOV increases slightly.

**Travel on reliable modes reflects the percentage of passenger miles on express lanes, Metrorail, bus rapid transit, commuter rail, walking, and biking; it does not reflect improvements in reliability due to reduced traffic congestion or programs that affect non-recurring delay, such as improved incident management.

Source: Analyses performed by COG, ICF, Sabra Wang (SWA), Fehr & Peers (F&P), and Shapiro Transportation Consulting (STC).

Some have criticized the alternative scenarios explored by the Long Range Task Force as unrealistic. However, the details of the scenarios are in fact quite reasonable. For example, I8, "Optimize Regional Land Use Balance," is described in the final report as:

8. Optimize Regional Land-Use Balance
• Optimize jobs/housing balance regionwide.
• Increase jobs and housing around underutilized rail stations and Activity Centers with high-capacity transit.
• Build more housing in the region to match employment (about 130,000 more households) and reduce the number of long distance commuters outside of the region.

Table 5, excerpt from the Detailed Technical Report of the task force (p. 52), shows the current Regional Cooperative Forecast that provides the future land use scenario underneath both our region's travel model and MDOT's modeling work for their managed lane proposal, and contrasts it with an alternative Regional Land Use Balance scenario. The alternative, which would have dramatic and unmatchable performance outcomes for transportation in our region across modes including vehicular congestion relief, involves shifting approximately 100,000 jobs from the western part of our region to the east, a 4% adjustment in west/east distribution. It also involves an additional 130,000 currently projected out-of-region households to instead locate within the region (at a 60%/40% west/east split that still favors population growth in the larger western subregion), reducing extreme long-distance commuting.

Table 5 Regional Job and Household Summary

	2040 CLRP			Initiative 8 Land-Use		
	Households	Jobs	Ratio	Households	Jobs	Ratio
Eastern Subregion	1,054,764	1,604,039	1.52	1,107,094	1,702,578	1.54
Western Subregion	1,513,958	2,546,274	1.68	1,591,628	2,447,735	1.54
TPB Planning Region Total	2,568,722	4,150,313	1.62	2,698,722	4,150,313	1.54

Figure 23: TPB East-West Division and Jurisdictions
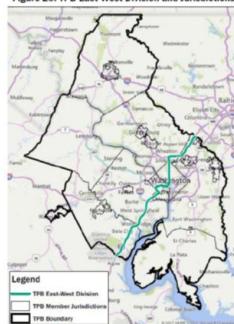
This alternative scenario is only modestly different from the Regional Cooperative Forecast, but requires a very different kind of engagement with local governments and the private sector

than the proposed managed lanes P3. While such engagement may not be MDOT's core expertise, every challenge the state of Maryland faces should not be treated as a nail in need of MDOT's hammer. The state has other tools that could do the job better *and* at lower cost.