November 18, 2020

Deborah Sharpless, CPA
Chief Financial Officer
Maryland Transportation Authority
2310 Broening Highway
Baltimore, MD 21224

RE: Feedback on the I-495 & I-270 P3 Program Preliminary Toll Rates

Dear Ms Sharpless,

Thank you for your memorandum dated November 4, 2020 regarding the I-495 & I-270 P3 Program Preliminary Toll Rates. Accelerate Maryland Partners, the Proposer Team with equity members Transurban (USA) Operations Inc. and Macquarie Infrastructure Developments LLC, understand Maryland Transportation Authority (MDTA) is at the start of the toll rate setting process, which is anticipated to be completed after a presentation to the MDTA Board in Spring 2021. The toll rates are a critical element in evaluating project economics, and we appreciate the opportunity to provide feedback.

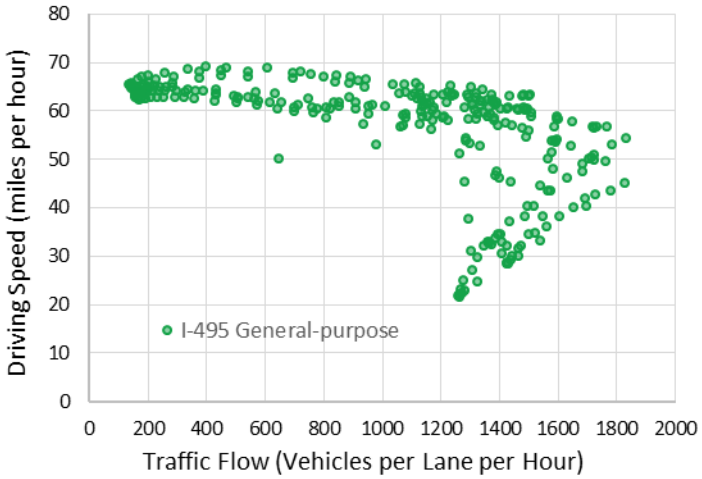
Please find our feedback below with specific focus on the toll rate escalator, soft rate cap, soft rate cap escalator, toll rate update interval and toll rate update size, as well as the impact of High Occupancy Vehicles.

Toll Rate Escalator:

The proposed maximum and soft cap toll rate escalator is based on these factors:

- 1.1% per annum for population and employment growth
- 1.0% per annum for per capita personal income real growth rate
- Regional consumer price index or CPI-U (Washington Metro) - BLS code CUURS35ASA0

The proposed escalation formula, while it captures well the impact of the purchasing power real growth and adjusts it correctly for inflation, does not reflect the real dynamic between the increasing value proposition of the managed lanes (increasing travel time savings, growing reliability) and the toll prices needed in order to provide these benefits.



The issue arises because of the non-linear relationship between traffic level (driven by population and employment growth) and driving speeds: when traffic levels are low, volumes can increase significantly without noticeably reducing journey times. However, at a certain "tipping point" the level of traffic starts to dramatically impact on journey times, to the point where there is an almost logarithmic relationship between traffic and delay.

We therefore recommend that the maximum and the soft cap toll rate escalator also include a factor to capture the growth of congestion index.

Soft Rate Cap

The soft rate cap is set to levels that, under normal traffic conditions, guarantee that managed lanes operate at or above 50 mph and traffic flow rate at or below 1,650 Passenger Car Equivalent (PCE) per hour per lane.

The proposed soft caps are not set at proper levels considering the following:

- I-495 and I-270 in the project corridor carry some of the highest level of traffic in the region and suffer some of the worst congestion levels.
- Managed Lanes benefits (travel time savings, guaranteed journeys, improvement in safety, easy of navigation, etc) are significant
- Driving population is amongst the highest income in the nation and willing to pay for time value

The demand for managed lanes will be very high particularly for certain segment of the road, for example across the American Legion Bridge.

Our preliminary analysis shows that in order to deliver the MDOT's goals for the priced managed lanes, soft toll rate for year 2021 should be set for Passenger Car Equivalent (PCE) starting at $2.00 (2021$/mile). The rates for the other vehicle and payment types need to be adjusted accordingly.

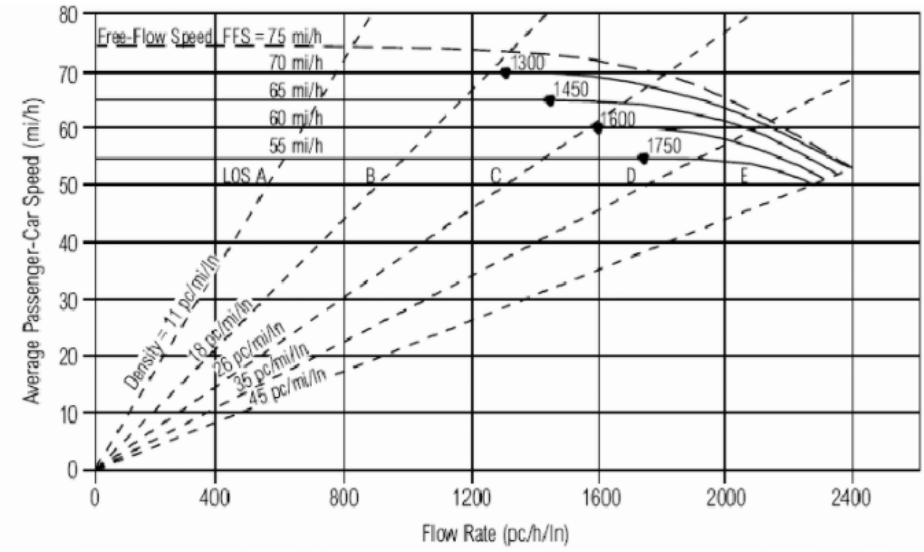
Soft rate cap mechanism

The toll rate at a gantry cannot exceed the soft rate cap unless the average traffic volume measured at that gantry over the preceding five-minute period exceeds a threshold of 1,650 PCE vehicles per hour per lane and average speed measured at that gantry over the preceding five-minute period is below 50 mph.

The traffic operation for the managed lanes is controlled and driven by tolls. In order to achieve certain levels of service, tolls are adjusted such that enough drivers in the road make the decision to:

- exit managed lanes if tolls are increased, and
- enter the managed lanes if tolls are lowered.

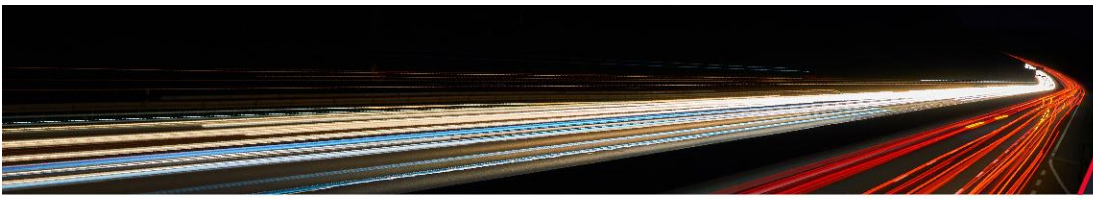
This dynamic relationship is complicated by the fact that individual drivers react at different pace and it takes certain amount of time for the managed lanes, as a system, to move from one stable condition to another state of equilibrium. Hence, and because of the non-linear traffic relationships, it is hard and takes time to restore once the traffic breakdowns occur. A proper management for managed lanes requires that the system is always kept operating remote from the unstable region.



Based on the established speed-traffic flow relationships and in order to guarantee that managed lanes almost always operate in stable and free flowing traffic, we propose that the traffic flow threshold is set at 1,450 PCE vehicles per hour per lane (assuming managed lanes posted speeds are set to 65 mph).

The proposed mechanism also asks for both speed (50 mph) and volume threshold (~~1,650~~ 1,450 PCE/lane/hour) are met simultaneously. This assumes that drop in traveling speeds is occurring only because of increasing traffic volume. The speeds can drop for variety of reasons, including but not limited to:

- accidents
- weather conditions
- queue spillback at managed lanes exit ramps



Since tolls (and also message signs) are basically the only control measure, we propose that the mechanism allows for tolls to exceed the soft cap in case only one condition is met, meaning either the speeds fall below 50 mph, or traffic flow is above 1,450 PCE/lane/hour.

In addition, the proposal refers of traffic measures taken at a single gantry when the managed lanes operate as a system on several pricing segments and gantries that, in combination, control the level of traffic meaning that the traffic traveling under one gantry is very much impacted by the tolls set up in the upstream segment/gantry. The mechanism should therefore be established for segments of the road, potentially for each pricing segment.

Toll Rate Update Interval

The proposal indicates that MDOT asks for toll rates to be updated at 5 minutes interval - “The time interval for altering the revised toll rate cap at a gantry should be once every 5 minutes”
The toll rate update period should be determined as a balance between:

- short intervals – which result in frequent variations of the tolls that do not provide for the necessary time for the managed lanes as a system to stabilise in the new state
- long intervals – which do not keep up with the events on the road and do not provide for active management of traffic flow.

From AM Partners’ experience with the pricing system in Virginia, where it has been operated a 160 lane-miles managed lanes network for over eight years, the price update intervals need to be determined based on the length of the pricing segments, vehicle mix, and also refined over time as corridor drivers gain the experience and become more familiar with the managed lanes. Our proposal asks that the Operator is allowed to determine the optimum update interval.

Toll Rate Update Size

The preliminary proposal states that “the revised toll rate cap for that gantry will be calculated by multiplying the prior revised toll rate cap (which may be the soft rate cap) by a demand factor between 1.00 and 1.25”

AM Partners recommends that the following issues are also considered:

- drops in the speed are not solely due to increasing traffic flow. If toll adjustment mechanism is tied to the demand rate, as an example, if queue spillback from general purpose lanes occurs, tolls will not be updated (measured traffic flow rate will be 0.0 PCE/lane/hour)
- pace of the toll increase/decrease is sluggish
- the proposed toll update mechanism is reactive – tolls always will lag and does not provide for proactive measures in order to avoid the congestion to occur.

The soft toll rate cap update size should be determined by the operating needs and goals of the Operator.

Impact of High Occupancy Vehicles

The proposed toll rates ignore the impact that level of HOV 3+ for the alternatives that allow high occupancy vehicles travel free of charge.

The growing level of HOV 3+ demand will reduce the managed lanes capacity for toll paying customers. As a result, growing corridor drivers will compete for diminishing capacity. In order for the managed lanes to guarantee minimum travel speed, tolls growth will need to accelerate.
This is not a concern in case of ETL alternatives.

The above discussion reflects our top priority feedback with respect to the toll rate memorandum. We anticipate engaging in a discussion on the technical implementation of the rates with MDTA during the predevelopment period. We are available to answer any questions you may have given this feedback and appreciate the opportunity to provide as much.

We look forward to receiving MDTA feedback on the above.

Sincerely,

Aaron Singer
Proposer Representative