

November 18, 2020

Deborah E. Sharpless, CPA
Maryland Transportation Authority
2310 Broening Highway
Baltimore, Maryland 21224

RE: Comments on the Preliminary Toll Proposal and Soft Rate Cap and Operational Metrics for Capital Express Mobility Partners for Phase 1 of the I-495 & I-270 P3 Program

Dear Ms. Sharpless,

We received your letter dated November 4, 2020 regarding MDTA's preliminary toll rates for the I-495 & I-270 P3 Program. We appreciate the opportunity to review this information and provide feedback. We have a few comments for your consideration, which are detailed below. The comments are organized by policy assumption in the order presented in the Preliminary Toll Proposal and Soft Rate Cap and Operational Metrics document (Proposed Policy) attached to your letter.

Minimum, Maximum, and Soft Rate Cap Toll per Mile

1. Toll per Mile - We propose no changes to the toll rate per mile set for the minimum, soft cap, and maximum toll rates set for 2-axle light vehicles.
2. Vehicle Classification and Multipliers - We recommend a dimension-based definition of truck as an alternative to the axle-based classification. A dimension-based classification would permit differential pricing for oversized two-axle vehicles, like delivery vans or commercial busses. We estimate the combined revenue upside from switching to a volume-based classification with similar toll multipliers and including oversized two-axle vehicles at a 3x multiplier is approximately one percent.
3. Toll Escalation Factors – In our experience operating other facilities, we have learned that relying on a single month's CPI to escalate tolls from one year to the next can produce unpredictable magnitudes of increase, as the year-on-year growth in CPI for a single month can deviate from the annual average by more than one percent in some cases. We recommend that the CPI metric be measured as the annual average of each year, January through December. This change would streamline the process of making annual updates to the various caps and should not have a meaningful long-run impact on the asset's revenue generating ability.

Soft Rate Cap Mechanism

Our experience in operating over 30 miles of soft-capped managed lanes in Dallas – Ft. Worth, Texas has reinforced our conceptual approach to pricing, which is that a good soft cap mechanism preserves an excellent user experience by effectively ensuring a fast and reliable trip to all drivers

who choose the managed lanes while also being perceived as fair and transparent. Applying this pricing philosophy to the unique I-495 & I-270 P3 Program corridor, we recommend the following three adjustments to the mechanism for exceeding the soft cap:

4. Conditions to Exceed Soft Cap – The proposed mechanism allows the soft cap to be exceeded when the flow observed at a toll gantry measures more than 1,650 PCEphpl *and* a speed of 50 mph or lower over a five minute period.
 - a. Speed *and* Volume Requirement – Considering the managed lanes will operate with pylon separation between the GPL and ML, the above requirement to observe a flow rate of 1,650 PCEphpl may be beyond the operational ability of the managed lanes in some stretches of the highway due to effects like sympathy slowing and weaving. Empirical studies have shown pylon separated facilities can have lower throughput by as much as 400 PCEphpl at 50 mph (see **Figure 1** below for reference). Additionally, the requirement to include both speed and flow would not allow the operator to manage demand through price in a situation where drivers may experience speeds below 50 mph but volumes measure slightly below 1,650 PCEphpl. We estimate that changing “*and*” to “*or*” would generate an additional four percent revenue in addition to preserving a superior user experience.

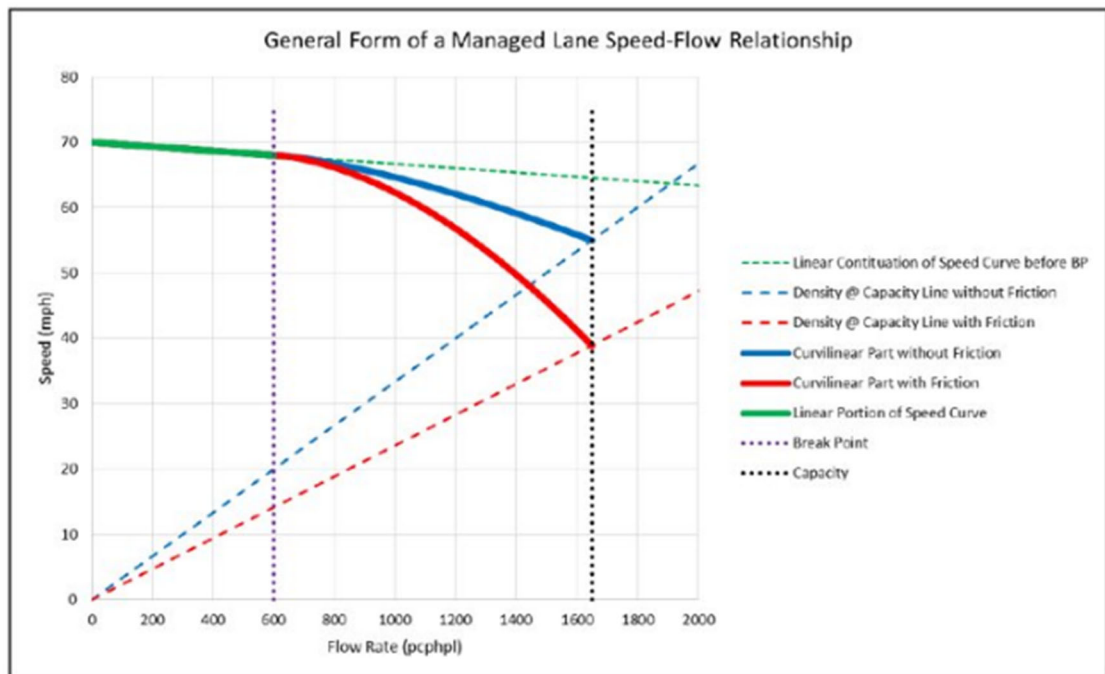


Figure 1. Speed-Flow Relationship for Managed Lanes with and Without ‘Friction’
Source: *Integrating Managed Lanes Analysis into the HCM Freeway Facilities Methodology – NCHRP 03-115 (Aghdashi et al., 2014)*

- b. Average Traffic Volume and Speed Threshold – Recognizing that some managed lanes segments may exhibit different speed-flow curves, we recommend that MDTA replace the universal thresholds of 1,650 PCEphpl and 50 mph with a range of possible values and further include the option for the developer and MDOT to select the appropriate volume and speed thresholds for each measurement point of the highway

periodically after opening when the actual speed-flow relationship can be observed. For example, we propose that, based on the above NCHRP research, the volume threshold be set between 1,400 and 1,650 PCEPhpl and the speed threshold be set between 50 mph and 55 mph. This flexibility will also ensure an excellent user experience, as the operator and MDOT can choose to proactively raise tolls above the soft cap levels when the observed conditions on the managed lanes are very likely to lead to a degraded experience if demand increases a little more.

5. Demand Factor – The soft cap mechanism requires the operator to raise prices by a predetermined Demand Factor that increases in line with the observed volume on the managed lanes. It may be impossible to achieve flow rates over 1,650, and the speed-flow relationship may be such that once speeds dip below 50 mph, saturated flow results in *decreased* throughput, making it difficult to raise prices by the needed amount to manage the high level of demand. We recommend that the existing Demand Factor requirement be replaced with a more flexible demand factor which might allow the operator to innovate and to more quickly and efficiently clear any congestion from the managed lanes. For example, such a mechanism could allow the operator to charge up to 15% above the soft cap upon the first instance in which the soft cap mechanism is triggered. This 15% could be raised by an additional 15% to 30% if the situation persists after ten minutes. While we do not believe such a change would materially impact the revenue generating ability of the corridor, such a mechanism would provide the operator with the flexibility to innovate when setting prices above the cap.

6. Measurement at the Gantry – We recommend that the requirement to measure speed-flow at the gantry be replaced with an allowance for the operator to measure speed and flow on one-mile stretches along the highway. Should a one-mile stretch of road show excessive volume or low speed, then the gantries immediately upstream of the degraded link could exceed the cap. This would allow the operator to limit future flow from upstream entry points. The removal of this requirement would also permit the operator to place gantries to efficiently capture trips without concern for how the placement of gantries may impact its ability to exceed the soft cap when necessary and in turn its ability to ensure an excellent user experience.

Thank you again for the opportunity to comment on the Proposed Policy. We would welcome the opportunity to discuss the above comments with you. Please do not hesitate to contact us if you have any questions or need any additional information.

Respectfully,



Rebecca Brooks
Proposer Representative
Capital Express Mobility Partners