MDTA: I-495/I-270 Phase I MDTA Preliminary Due Diligence: October 2020

The Maryland Transportation Authority (MDTA) has the responsibility under Maryland law to fix, revise, and set toll rates in accordance with the Transportation Article §4-312 of the Annotated Code of Maryland and Code of Maryland Regulations (COMAR) Title 11 Department of Transportation, Subtitle 07 MDTA, Chapter 05 Public Notice of Toll Schedule Revisions (11.07.05) for the I-495 & I-270 P3 Program. As a partner in the I-495 & I-270 P3 Program, the MDTA is beginning the toll rate setting process, which includes a toll rate proposal presented by MDTA staff to the MDTA Chairman and Board (Board), followed by a public comment period and hearings, and concluded with a final toll rate recommendation to the MDTA Board for approval. The MDTA staff anticipates presenting the toll rate proposal to the Board in Spring 2021.

Maryland law requires the establishment of a toll rate range for variably priced facilities, including dynamic pricing such as managed lanes. Managed lanes would provide a choice for drivers to use when they need them most, not for everyday use. Most drivers who use managed lanes only use a portion of the tollway and do not travel the entire length. Another benefit to managed lanes, is congestion in the general-purpose lanes is often relieved due to the disbursement of traffic. With dynamic pricing, tolls are continually adjusted according to traffic conditions in order to maintain a free-flowing level of traffic. The toll rate range is being evaluated to be set at a level that will meet the goal of providing customers who choose to pay a toll to use managed lanes a faster and more reliable trip and traffic congestion relief in one of the most congested corridors in the country without taxpayer contributions. The toll rate setting process also includes the establishment of any discounts, including High Occupancy Vehicle (HOV) reduced or free toll designations. Specifics regarding the MDTA staff's preliminary toll proposal are included as an attachment.

The MDTA, through future action of the Executive Director, also anticipates establishing a soft rate cap and operational metrics for this dynamically priced facility. The purpose of the soft rate cap, which is not required by law, is to constrain the toll rate charged to customers when throughput and speed performance targets will not otherwise be achieved. The soft rate cap may only be exceeded during times of deteriorating performance based on the established operational metrics when a controlled rate increase above the soft rate cap, but within the toll rate range established by the MDTA, will be permitted only until the throughput and speed performance targets are achieved by customers.

The following preliminary toll rate setting information is intended to span the entire Phase I corridor. Traffic volumes in Phase I South are greater than Phase I North and therefore the toll rates will work for both South & North. The only risk is if traffic is significantly lower in Phase I North, an argument could be made that the maximum toll rate and soft cap could be lower and still allow the Developer to maximize revenue.

Maximum Toll Rate

Base Rate * Real/Demand Growth * Inflation Factor

$$Rate_{Year} = Rate_{2020} * (1 + Esc)^{(Year - 2020)} * CPI_{Year} / CPI_{2020}$$

Where:

$Rate_{Year}$ = maximum toll rate in year x
$Rate_{2020}$ = maximum toll rate established in the 2020 toll setting
Esc = real growth escalation rate established in the 2020 toll setting
CPI_{Year} = consumer price index in year x
CPI_{2020} = consumer price index in 2020

Customers choose to use the managed lanes based on their perceived relationship between the value of money and time saved. An individual's value of money changes over time. A dollar today is worth less than a dollar in the future. The toll rate will need to increase over time to adjust for the value of money. Escalation factors allow the maximum toll rate to scale as the value of money changes. The toll rate range assumes a fixed and variable escalation factor and thereby reduces risk. Utilizing a combination creates a balance and greater predictability for stakeholders.

Another important point is the acceptability of this approach with investors. The acceptability of this approach for modeling is high and expected from lenders. Consistency promotes marketability. Deviation from this practice brings unnecessary risk to the project. Without this investor/market acceptance, the interest from the financial industry could be lessened.

Real/Demand Growth

The managed lane capacity is fixed at two lanes (supply). Increased traffic volumes caused by changes in employment, per capita income, and population will increase the demand for the facility. The demand will increase but the supply will be fixed and therefore, the toll rate must increase over time to account for the increased demand. Without adjusting for demand growth, the facility will not produce average speed of 45 mph driving during peak periods. Note, average speed is a more appropriate measure compared to throughput because traffic demand is not consistent.

The predictability of the demand growth is significantly less volatile compared to inflation and therefore, a confidence level exists. We have decades of data based on population, employment, and per capita income growth that support this. Annual population/employment growth has been in the range of 1% and annual real per capita income growth has been in the range of 1%. Together the growth rate is ~2.1.

Notes:

Maryland Socioeconomic Growth Variables

"Washington Suburban" includes Frederick, Montgomery, and Prince George's Counties

From \\NHVSVR2\tft\TFT Group\Projects\MD 250510 MDTA Task 3 Annual Forecast Update\Economics\2020_09_04 Update from PES\MDTA Socioeconomic Review Tab

	Population			Nonfarm Civilian Employment			Per Capita Personal Income (2019$)		
Geography	2005	Average Annual Growth	2019	2005	Average Annual Growth	2019	2005	Average Annual Growth	2019
United States	295,516,599	0.8%	328,239,523	167,656,400	1.2%	198,458,600	45,281	1.6%	56,278
Mid-Atlantic	40,234,574	0.2%	41,137,740	22,436,766	1.1%	26,105,820	50,920	2.0%	66,941
South Atlantic	56,145,779	1.1%	65,784,817	31,959,491	1.5%	39,476,950	45,178	1.1%	52,532
Maryland	5,592,379	0.6%	6,045,680	3,247,945	1.1%	3,803,740	55,376	1.2%	65,312
Baltimore	2,599,352	0.4%	2,749,672	1,574,679	1.2%	1,867,050	53,556	1.3%	64,403
Lower Eastern Shore	199,904	0.5%	213,430	115,465	0.4%	121,420	40,593	1.0%	46,813
Southern Maryland	321,725	1.0%	369,292	138,844	1.3%	166,830	50,212	1.4%	60,636
Upper Eastern Shore	229,249	0.4%	243,245	110,751	0.8%	123,420	49,206	1.1%	57,140
Washington Suburban	**1,996,003**	**0.8%**	**2,219,562**	**1,173,020**	**1.2%**	**1,385,040**	**62,781**	**1.0%**	**72,037**
Western Maryland	246,146	0.1%	250,479	135,186	0.2%	139,980	39,058	1.2%	46,151

Inflation Factor

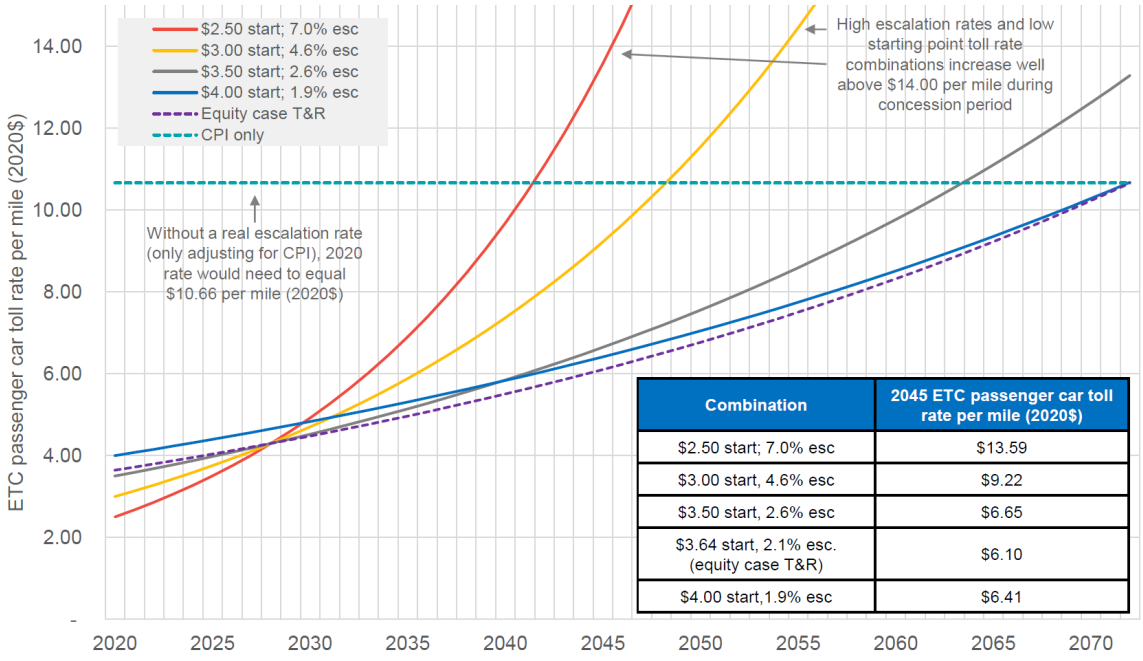
Inflation is difficult to predict. MDTA recommends basing the inflation factor on the Consumer Price Index (CPI) - Urban- Washington DC Metro area, which is published semi-monthly.
This index closely tracks price level changes in the affected region. Although the CPI-Urban-Nationwide inflation factor index is published monthly and the public is likely to be more familiar with the index, the CPI for Washington DC Metro will be the best reflection of users of the managed lane facility.

https://data.bls.gov/pdq/SurveyOutputServlet?data_tool=dropmap&series_id=CUURS35ASA0,CUUSS35ASA0;

Base Rate

When establishing the base rate, the rate can be set to maximize throughput or revenue. In order to achieve the P3 program goals, the rate must be set to maximize revenue (minimum toll rate range to soft rate cap—revenue maximization; soft rate cap to maximum toll rate range—throughput). Technically, a lower rate would work operationally but would sacrifice the program goals. When balancing the public good/benefit, both the toll rates and future facilities must be a consideration. A base rate of $3.64 (2020$), multiplied by the demand factor achieves a maximum toll rate of $4.21 in 2027 (anticipated year of opening) (purple line in graph). The graph below shows multiple combinations of the demand factor and base rate to achieve ~ $4.21 maximum rate in 2027. MDTAs recommendation for the preliminary toll-rate proposal, is to assume the supported 2.1% demand factor which results in the base rate of $3.64. Per CDMSmith, traffic demand is only expected to achieve this level a couple times a year at an individual gantry level (isolated incidents). Current assumption is 8 gantries (Phase I South).

The needed toll rate to achieve the program goals is accomplished with all the variations shown below. If the base rate is lowered, the demand factor must be increased and vise-versa. When the demand factor is increased, it causes the toll rate curve to be steep, resulting in a high toll rate. Since the $3.64 *(1+.021) curve, is only expected to be exceeded a couple times per year, the steep other curves do not produce additional revenue. Recommending the steeper curves provides no financial benefit as the increased revenue would be minimal.



Combination	2045 ETC passenger car toll rate per mile (2020$)
$2.50 start; 7.0% esc	$13.59
$3.00 start, 4.6% esc	$9.22
$3.50 start, 2.6% esc	$6.65
$3.64 start, 2.1% esc. (equity case T&R)	$6.10
$4.00 start,1.9% esc	$6.41

When presenting the proposed toll rate range to the MDTA Board, the rates should be in the dollar year the proposal is presented and not the year the facility is expected to open. This approach avoids the risk of incorrectly assuming a future inflation rate.

Minimum Toll Rate

The minimum toll rate only grows by the inflation factor. Demand does not affect the minimum toll. The minimum toll rate is grown by the inflation factor to account for increased costs such as transaction costs. In theory, the Developer would never charge a toll below the minimum toll rate; however, if the rate does not grow by inflation there is a risk that the E-ZPass (ETC) transaction cost diverges from the other payment methods due to the impact on its facilities. If this occurred, the transaction fees paid by MDOT for non-E-ZPass payments might not cover the transaction cost. This risk is low. Additionally, the MDTA would likely increase the multiplier for these payment methods. At least for the preliminary proposal, including the inflation factor is reasonable. Based on feedback, it's easier to remove the factor than add the factor. The minimum toll rate preliminary proposal is $.20 per mile and $.50 per trip (2020$). This rate covers anticipated MDTA transaction costs (2019 estimate). Note estimate was prior to All-Electronic Tolling at MDTA facilities.

Classification & Payment Multipliers

To enhance customer service consistency with MDTA's existing facilities is a goal of the MDTA and therefore, MDTA recommends consistency with current multipliers. Technically, there might be additional revenue if commercial multipliers were lower; however, additional revenue is expected to be marginal because of the anticipated low volume of commercial traffic. Additionally, if different, we will experience messaging issues, the cost of technology changes and most importantly pressure to lower the multiplier for MDTA roadways. To offset the impact, commercial discount and rebate programs (frequency based) exist and help offset costs for local truckers.

Discounts

Discount programs are part of the toll setting process, including HOV discounts. Free passage is considered a discount. NEPA for Phase I South assumes HOV3+ to be free. NEPA for Phase I North has not begun. The preliminary proposal should include HOV3+ to be free passage for the entire corridor. Should the NEPA for Phase I North not include HOV3+ free, it's understood toll hearings will be required to remove to comply with NEPA. The preferred alternative for Phase I South will become public prior to MDTA presenting the toll rate proposal to the MDTA Board.

Soft Rate Cap

The soft rate cap is the rate that can only be exceeded during times of deteriorating performance and when necessary to provide customers who choose to pay a toll a faster and more relative trip at for above 45 miles per hour. Traffic volume experienced at a gantry point must exceed certain limits and average speeds drop below 50 mph during a five-minute period for the soft rate cap to be exceeded. The soft cap rate would be set by the Executive Director.

Further analysis is needed to justify the soft rate cap. The analysis performed modeled average tolls. This is a different approach from the maximum toll rate modeling. The soft cap is intended to protect the customer when traffic conditions don't justify higher rates. The table below shows the soft cap is rarely, if ever breached and therefore, does not provide any protection. This causes question over the $3.64 base rate because it suggests this rate could be lower without an impact (i.e., the cap is rarely exceeded at $2.00, why does the base toll need to be $3.64). When using averages, high and low offset.

Year		Soft Cap ($/mile, 2020$) Using threshold of 1,650 PCE vehicles per hour per lane							Threshold of 1,700	
		No Soft Cap	$3.06	$2.55	$2.04	$1.53	$1.02	$0.77	$1.02	$0.77
2025	Share of Project Exceeding Soft Cap - Peak Hour[1]	n/a			0%	8%	22%	30%		30%
	Hours Per Day Exceeding Soft Cap in at Least One Gantry	n/a			0	2	3	5		3
2045	Share of Project Exceeding Soft Cap - Peak Hour[1]	n/a	13%	22%	22%	30%	38%		38%	
	Hours Per Day Exceeding Soft Cap in at Least One Gantry	n/a	3	3	3	5	6		6	

In order to present the information analyzed in a same/similar manner, approximately two weeks of modeling is required. This analysis will determine the frequency in which:

- A location demand achieves a stated number of passenger car equivalent per hour per lane (PCEphpl) are achieved and therefore, the soft cap would be exceeded; and
- A location does not achieve a stated number of PCEphpl but the Developer would like to go above the soft rate cap in order to maximize revenue but cannot because of the lack of capacity.

Both outcomes provide pricing protection to customers. The additional analysis is assuming a soft rate cap of $1.53 and $2.04 with PCEphpl of 1600 and 1650. Revenue increases with lower PCEphpl. Lowering the PCEphpl to 1600 could increase revenue slightly when traffic conditions are high. The PCEphpl should be lower than 1700 because at 1700 PCEphpl speed begin to deteriorate. Tolls need to increase prior to deterioration. Due to timing, MDTA recommends our preliminary proposal use a soft cap of $1.50 and 1650 PCEphpl. The rate is increased using the same fixed and variable applied to the maximum toll rate.