



Memorandum

To: Deb Sharpless

From: Ron Davis, Laszlo Medgyesy

Date: November 12, 2020

*Subject: Final I-495 & I-270 Managed Lanes Toll Rate Soft Cap Analysis
CONFIDENTIAL, PREDECISIONAL, DELIBERATIVE*

This technical memorandum provides estimated impacts of alternative toll rate soft caps for the I-495 and I-270 priced managed lanes project. The purpose of a soft cap is to set a cap on toll rates on a priced managed lane project, but to allow that cap to be exceeded only if warranted by managed lane performance criteria. This memorandum is an update of a previous version dated October 23, 2020. This update incorporates additional Virginia I-495 Express Lane toll rate data in Section 3, Soft Cap Frequency Estimates.

1. Introduction

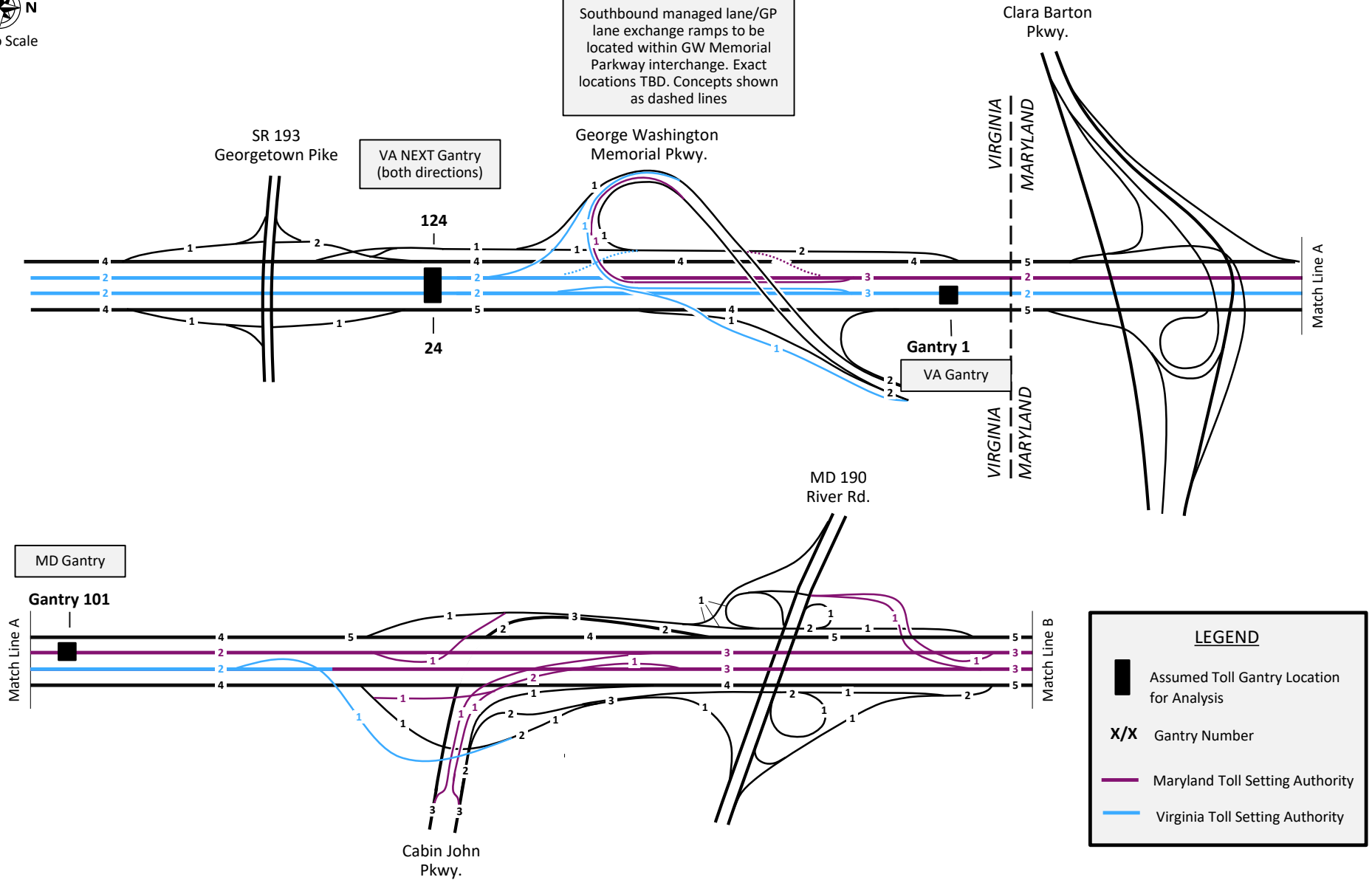
A list of key assumptions that were made for this impact analysis is provided below. A series of schematics are also provided in **Figures 1, 2, and 3** that illustrate the assumed access and gantry locations.

- Phase 1 South I-495 and I-270 priced managed lanes project, between the George Washington Parkway interchange with I-495 and the I-370 interchange with I-270
- Alternative 9 physical configuration and HOV pricing assumptions
- Virginia control of the Phase 1 South “Gantry 1” on northbound I-495 between the George Washington Parkway and River Road interchanges
- Two analysis years were considered, 2025 and 2045
- The soft cap performance criteria used for this analysis was traffic volumes exceeding a specific throughput threshold. The following alternative soft caps and throughput threshold scenarios were considered in this analysis:
 - \$1.50 (2021\$) soft cap, 2.1 percent annual real escalation of the soft cap, 1650 passenger car equivalent vehicles per hour per lane (pcephpl) throughput threshold
 - \$2.00 (2021\$) soft cap, 2.1 percent annual real escalation of the soft cap, 1650 pcephpl throughput threshold

I-495 and I-270 Priced Managed Lanes Traffic and Revenue Study



Southbound managed lane/GP lane exchange ramps to be located within GW Memorial Parkway interchange. Exact locations TBD. Concepts shown as dashed lines





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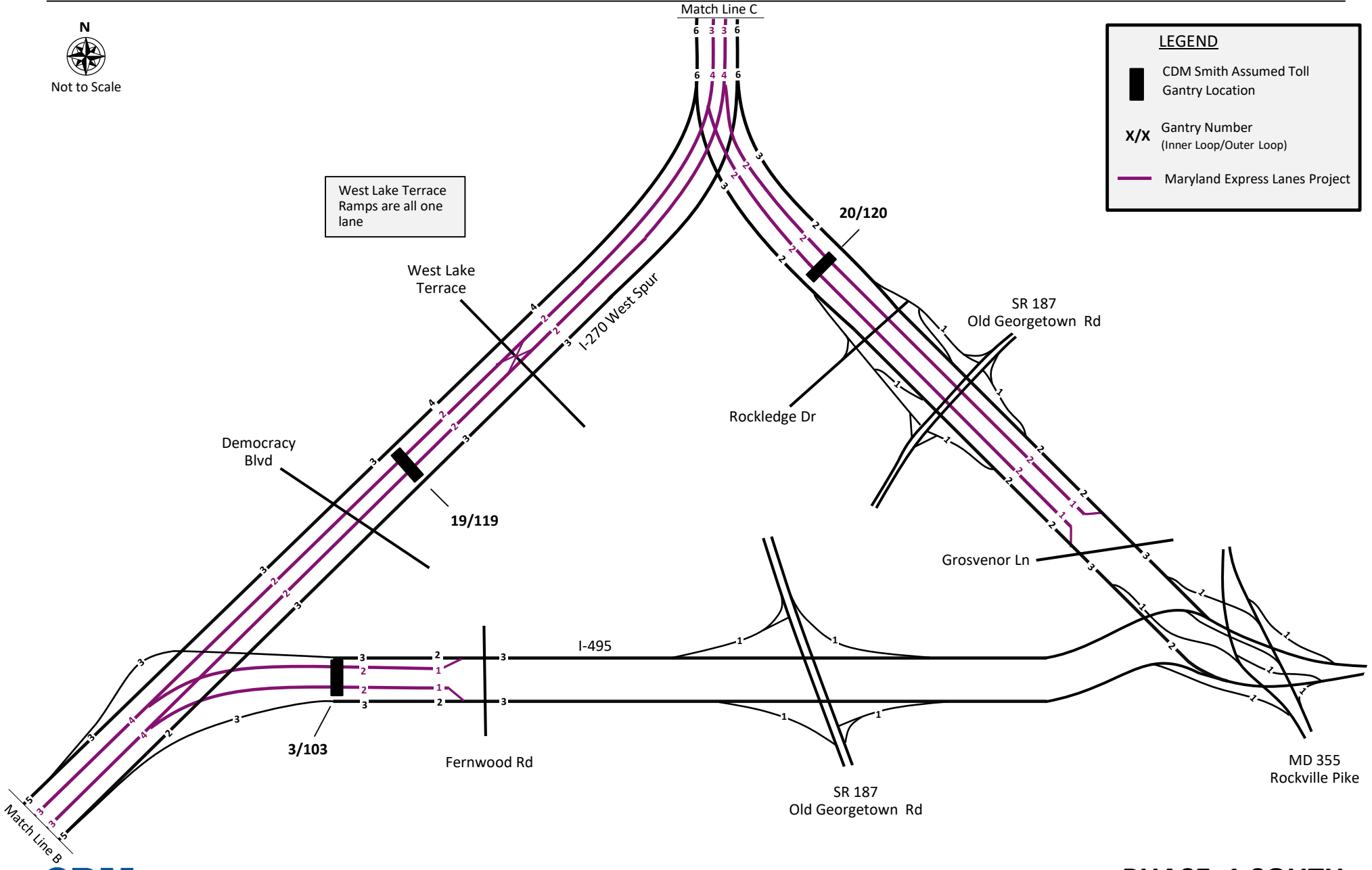
- Assumed Toll Gantry Location for Analysis
- X/X** Gantry Number
- Maryland Toll Setting Authority
- Virginia Toll Setting Authority

I-495 and I-270 Priced Managed Lanes Traffic and Revenue Study



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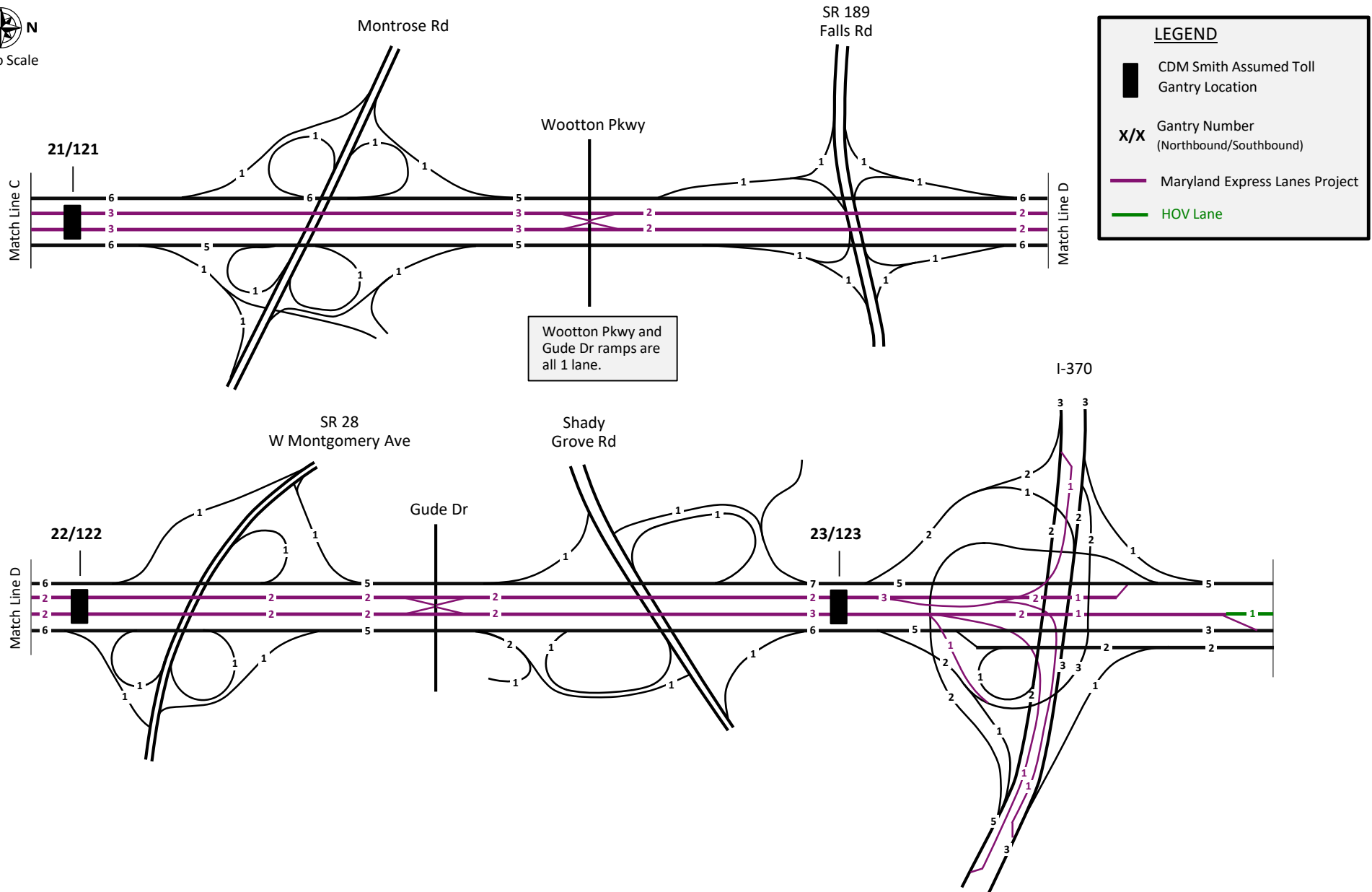
-  CDM Smith Assumed Toll Gantry Location
- X/X** Gantry Number (Inner Loop/Outer Loop)
-  Maryland Express Lanes Project



PHASE 1 SOUTH

FIGURE 2

I-495 and I-270 Priced Managed Lanes Traffic and Revenue Study



The remainder of this memo includes the following sections:

- Section 2 contains tables showing the model-estimated average per-mile toll rates by gantry and time period and model-estimated traffic levels by gantry and time period with the soft cap in place
- Section 3 includes the estimated frequency results in number of weekdays per year of reaching the soft cap at each gantry in each model time period. This section includes a summary of the variability of the Virginia I-495 Express Lane toll rate data that was used for the frequency analysis
- Section 4 includes the estimated annual revenue impacts resulting from the implementation of the soft cap

2. Model Estimated Per-Mile Toll Rates with Soft Rate Cap

Tables 1, 2, 3, and 4 contain the model-estimated per-mile average toll rates resulting from the soft cap runs for all toll gantries in all model time periods. Rates in red are those which reached or exceeded the soft cap in that specific time period at that specific gantry. A summary of the results is provided below:

- 2025, \$1.50 (2021\$) soft cap, 2.1% annual real escalation results
 - Two gantries were estimated to have rates capped at the soft cap in the PM peak
- 2045, \$1.50 (2021\$) soft cap, 2.1% annual real escalation results
 - Five gantries were estimated to have rates capped at the soft cap in the PM peak
 - Three gantries were estimated to have rates allowed to go over the soft cap in the PM peak due to sufficient traffic volume, Gantry 19 in the 4 & 5 PM hours, Gantry 22 in the 6 PM hour, and Gantry 23 in the 6 PM hour
- 2025, \$2.00 (2021\$) soft cap, 2.1% annual real escalation results
 - One gantry was estimated to have rates capped at the soft cap in the PM peak
- 2045, \$2.00 (2021\$) soft cap, 2.1% annual real escalation results
 - One gantry was estimated to have rates capped at the soft cap in the PM peak

Tables 5, 6, 7, and 8 contain the model-estimated throughput estimates in pcephpl resulting from the soft cap runs for all toll gantries in all model time periods. Rates in red are those which reached or exceeded 1650 pcephpl in that specific time period at that specific gantry.

Maryland I-495/I-270 Managed Lanes—Soft Toll Rate Caps

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Table 1 – 2025 Estimated Weekday Average Per Mile Toll Rates in 2021\$
At \$1.50 (2021\$) Soft Cap, 1650 pcephpl Soft Cap Threshold
\$1.50 (2021\$) Soft Cap in 2021 Escalated 2.1% Annually Equals \$1.63 (2021\$) Soft Cap in 2025
Rates in Red were Estimated to Reach or Exceed the Soft Cap

Roadway	Toll Gantry	Dist. (miles)	5 AM	6 AM	7 & 8 AM	9 AM	10 & 11 AM	12 & 1 PM	2 PM	3 PM	4 & 5 PM	6 PM	7 PM	8 PM to 12 AM	12 AM to 5 AM
MD I-495 IL (VA Controlled)	1	2.6	\$0.31	\$0.83	\$1.60	\$0.93	\$0.46	\$0.41	\$0.98	\$1.24	\$2.38	\$2.32	\$0.83	\$0.31	\$0.21
MD I-495 Outer Loop	101	2.6	\$0.36	\$0.77	\$0.88	\$0.88	\$0.41	\$0.36	\$0.46	\$1.03	\$1.29	\$0.98	\$0.36	\$0.21	\$0.21
MD I-495 Inner Loop	3	3.2	\$0.36	\$0.83	\$1.29	\$0.77	\$0.41	\$0.41	\$1.03	\$1.03	\$1.39	\$1.63	\$0.83	\$0.31	\$0.21
MD I-495 Outer Loop	103	3.2	\$0.36	\$0.52	\$0.67	\$0.72	\$0.36	\$0.36	\$0.57	\$0.98	\$1.34	\$0.93	\$0.36	\$0.21	\$0.21
MD I-495 IL / I-270 W Spur NB	19	2.7	\$0.21	\$0.88	\$0.88	\$0.41	\$0.21	\$0.36	\$0.67	\$1.14	\$1.63	\$1.63	\$0.57	\$0.21	\$0.21
MD I-495 OL / I-270 W Spur SB	119	2.7	\$0.36	\$0.67	\$1.03	\$0.88	\$0.41	\$0.36	\$0.36	\$0.67	\$1.08	\$0.88	\$0.31	\$0.21	\$0.21
I-270 E Spur NB	20	1.9	\$0.21	\$0.21	\$0.21	\$0.21	\$0.21	\$0.21	\$0.31	\$0.41	\$0.72	\$0.88	\$0.52	\$0.21	\$0.21
I-270 E Spur SB	120	1.9	\$0.21	\$0.52	\$0.93	\$0.88	\$0.31	\$0.21	\$0.21	\$0.21	\$0.36	\$0.21	\$0.21	\$0.21	\$0.21
I-270 Northbound	21	3	\$0.21	\$0.41	\$0.41	\$0.36	\$0.21	\$0.31	\$0.52	\$0.88	\$1.55	\$1.50	\$0.57	\$0.21	\$0.21
I-270 Southbound	121	3	\$0.21	\$0.62	\$1.03	\$0.93	\$0.36	\$0.36	\$0.31	\$0.41	\$0.46	\$0.57	\$0.21	\$0.21	\$0.21
I-270 Northbound	22	2.8	\$0.21	\$0.36	\$0.36	\$0.36	\$0.21	\$0.36	\$0.52	\$0.77	\$1.50	\$1.50	\$0.57	\$0.21	\$0.21
I-270 Southbound	122	2.8	\$0.21	\$0.67	\$1.24	\$1.08	\$0.36	\$0.36	\$0.31	\$0.36	\$0.41	\$0.41	\$0.21	\$0.21	\$0.21
I-270 Northbound	23	1.8	\$0.21	\$0.36	\$0.36	\$0.36	\$0.21	\$0.36	\$0.57	\$0.83	\$1.55	\$1.60	\$0.57	\$0.21	\$0.21
I-270 Southbound	123	1.8	\$0.21	\$0.67	\$1.34	\$1.08	\$0.36	\$0.36	\$0.31	\$0.31	\$0.36	\$0.36	\$0.21	\$0.21	\$0.21

Maryland I-495/I-270 Managed Lanes—Soft Toll Rate Caps

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Table 2 – 2045 Estimated Weekday Average Per Mile Toll Rates in 2021\$
At \$1.50 (2021\$) Soft Cap, 1650 pcephpl Soft Cap Threshold
\$1.50 (2021\$) Soft Cap in 2021 Escalated 2.1% Annually Equals \$2.47 (2021\$) Soft Cap in 2045
Rates in Red were Estimated to Reach or Exceed the Soft Cap

Roadway	Toll Gantry	Dist. (miles)	5 AM	6 AM	7 & 8 AM	9 AM	10 & 11 AM	12 & 1 PM	2 PM	3 PM	4 & 5 PM	6 PM	7 PM	8 PM to 12 AM	12 AM to 5 AM
MD I-495 IL (VA Controlled)	1	2.6	\$0.36	\$1.14	\$2.74	\$1.39	\$0.72	\$0.67	\$1.81	\$2.22	\$3.92	\$3.67	\$1.34	\$0.41	\$0.21
MD I-495 Outer Loop	101	2.6	\$0.41	\$1.34	\$1.81	\$1.45	\$0.67	\$0.57	\$0.77	\$1.60	\$2.17	\$1.60	\$0.57	\$0.21	\$0.21
MD I-495 Inner Loop	3	3.2	\$0.36	\$1.14	\$1.96	\$1.08	\$0.67	\$0.67	\$1.65	\$1.60	\$2.43	\$2.47	\$1.19	\$0.46	\$0.21
MD I-495 Outer Loop	103	3.2	\$0.41	\$0.88	\$1.34	\$1.19	\$0.57	\$0.46	\$0.98	\$1.50	\$2.27	\$1.45	\$0.67	\$0.21	\$0.21
MD I-495 IL / I-270 W Spur NB	19	2.7	\$0.21	\$0.88	\$1.29	\$0.67	\$0.36	\$0.41	\$1.19	\$2.07	\$2.79	\$2.47	\$1.03	\$0.36	\$0.21
MD I-495 OL / I-270 W Spur SB	119	2.7	\$0.36	\$1.24	\$1.96	\$1.55	\$0.72	\$0.57	\$0.67	\$1.14	\$1.70	\$1.34	\$0.41	\$0.21	\$0.21
I-270 E Spur NB	20	1.9	\$0.21	\$0.21	\$0.31	\$0.31	\$0.31	\$0.36	\$0.36	\$0.57	\$1.19	\$1.34	\$0.77	\$0.21	\$0.21
I-270 E Spur SB	120	1.9	\$0.21	\$0.83	\$1.65	\$1.29	\$0.52	\$0.41	\$0.36	\$0.26	\$0.46	\$0.31	\$0.21	\$0.21	\$0.21
I-270 Northbound	21	3	\$0.21	\$0.52	\$0.62	\$0.41	\$0.36	\$0.41	\$0.98	\$1.81	\$2.47	\$2.47	\$0.93	\$0.36	\$0.21
I-270 Southbound	121	3	\$0.36	\$1.14	\$2.01	\$1.50	\$0.62	\$0.52	\$0.46	\$0.67	\$0.83	\$1.08	\$0.36	\$0.21	\$0.21
I-270 Northbound	22	2.8	\$0.21	\$0.36	\$0.46	\$0.41	\$0.36	\$0.46	\$0.83	\$1.60	\$2.47	\$2.74	\$0.98	\$0.36	\$0.21
I-270 Southbound	122	2.8	\$0.36	\$1.24	\$2.17	\$1.65	\$0.72	\$0.57	\$0.52	\$0.52	\$0.62	\$0.83	\$0.36	\$0.21	\$0.21
I-270 Northbound	23	1.8	\$0.21	\$0.36	\$0.52	\$0.41	\$0.36	\$0.57	\$0.93	\$1.65	\$2.47	\$3.10	\$1.03	\$0.36	\$0.21
I-270 Southbound	123	1.8	\$0.36	\$1.24	\$2.27	\$1.70	\$0.67	\$0.57	\$0.52	\$0.46	\$0.52	\$0.62	\$0.36	\$0.21	\$0.21

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Table 3 – 2025 Estimated Weekday Average Per Mile Toll Rates in 2021\$
At \$2.00 (2021\$) Soft Cap, 1650 pcephpl Soft Cap Threshold
\$2.00 (2021\$) Soft Cap in 2021 Escalated 2.1% Annually Equals \$2.17 (2021\$) Soft Cap in 2025
Rates in Red were Estimated to Reach or Exceed the Soft Cap

Roadway	Toll Gantry	Dist. (miles)	5 AM	6 AM	7 & 8 AM	9 AM	10 & 11 AM	12 & 1 PM	2 PM	3 PM	4 & 5 PM	6 PM	7 PM	8 PM to 12 AM	12 AM to 5 AM
MD I-495 IL (VA Controlled)	1	2.6	\$0.31	\$0.83	\$1.60	\$0.93	\$0.46	\$0.41	\$0.98	\$1.24	\$2.38	\$2.32	\$0.83	\$0.31	\$0.21
MD I-495 Outer Loop	101	2.6	\$0.36	\$0.77	\$0.88	\$0.88	\$0.41	\$0.36	\$0.46	\$1.03	\$1.29	\$0.98	\$0.36	\$0.21	\$0.21
MD I-495 Inner Loop	3	3.2	\$0.36	\$0.83	\$1.29	\$0.77	\$0.41	\$0.41	\$1.03	\$1.03	\$1.39	\$2.17	\$0.83	\$0.31	\$0.21
MD I-495 Outer Loop	103	3.2	\$0.36	\$0.52	\$0.67	\$0.72	\$0.36	\$0.36	\$0.57	\$0.98	\$1.34	\$0.93	\$0.36	\$0.21	\$0.21
MD I-495 IL / I-270 W Spur NB	19	2.7	\$0.21	\$0.88	\$0.88	\$0.41	\$0.21	\$0.36	\$0.67	\$1.14	\$2.01	\$1.81	\$0.57	\$0.21	\$0.21
MD I-495 OL / I-270 W Spur SB	119	2.7	\$0.36	\$0.67	\$1.03	\$0.88	\$0.41	\$0.36	\$0.36	\$0.67	\$1.08	\$0.88	\$0.31	\$0.21	\$0.21
I-270 E Spur NB	20	1.9	\$0.21	\$0.21	\$0.21	\$0.21	\$0.21	\$0.21	\$0.31	\$0.41	\$0.72	\$0.88	\$0.52	\$0.21	\$0.21
I-270 E Spur SB	120	1.9	\$0.21	\$0.52	\$0.93	\$0.88	\$0.31	\$0.21	\$0.21	\$0.21	\$0.36	\$0.21	\$0.21	\$0.21	\$0.21
I-270 Northbound	21	3	\$0.21	\$0.41	\$0.41	\$0.36	\$0.21	\$0.31	\$0.52	\$0.88	\$1.55	\$1.50	\$0.57	\$0.21	\$0.21
I-270 Southbound	121	3	\$0.21	\$0.62	\$1.03	\$0.93	\$0.36	\$0.36	\$0.31	\$0.41	\$0.46	\$0.57	\$0.21	\$0.21	\$0.21
I-270 Northbound	22	2.8	\$0.21	\$0.36	\$0.36	\$0.36	\$0.21	\$0.36	\$0.52	\$0.77	\$1.50	\$1.50	\$0.57	\$0.21	\$0.21
I-270 Southbound	122	2.8	\$0.21	\$0.67	\$1.24	\$1.08	\$0.36	\$0.36	\$0.31	\$0.36	\$0.41	\$0.41	\$0.21	\$0.21	\$0.21
I-270 Northbound	23	1.8	\$0.21	\$0.36	\$0.36	\$0.36	\$0.21	\$0.36	\$0.57	\$0.83	\$1.55	\$1.60	\$0.57	\$0.21	\$0.21
I-270 Southbound	123	1.8	\$0.21	\$0.67	\$1.34	\$1.08	\$0.36	\$0.36	\$0.31	\$0.31	\$0.36	\$0.36	\$0.21	\$0.21	\$0.21

Maryland I-495/I-270 Managed Lanes—Soft Toll Rate Caps

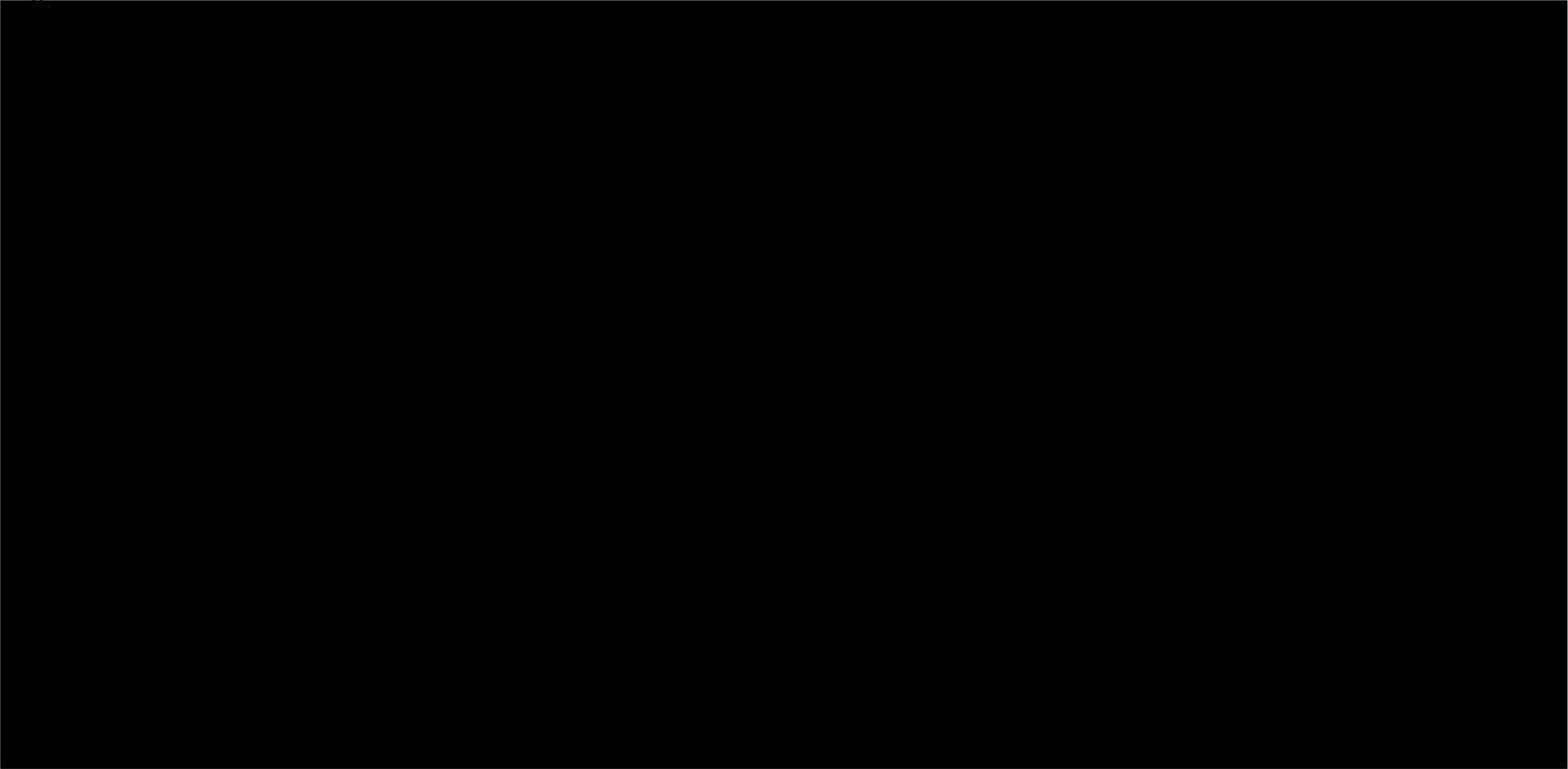
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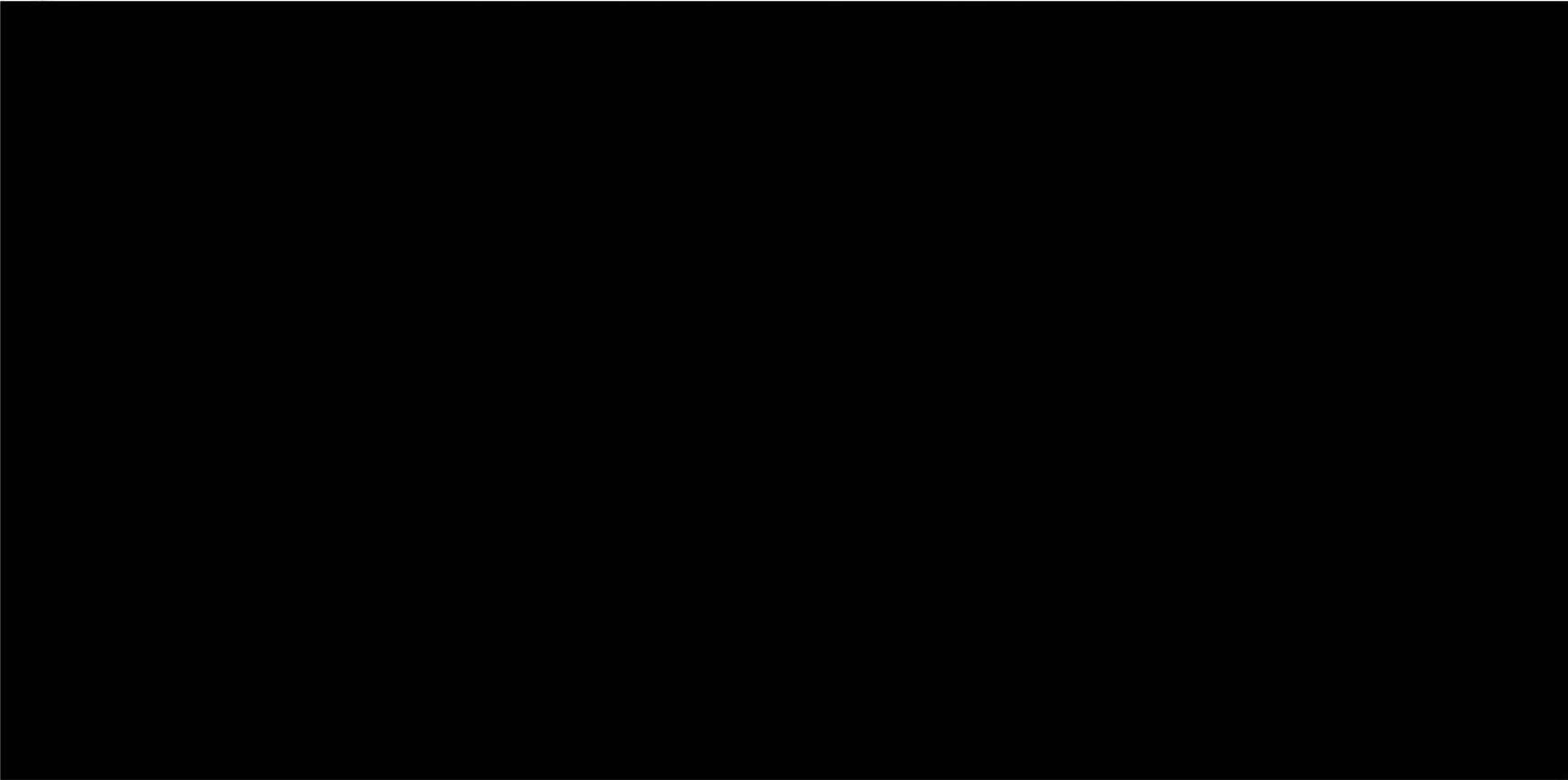
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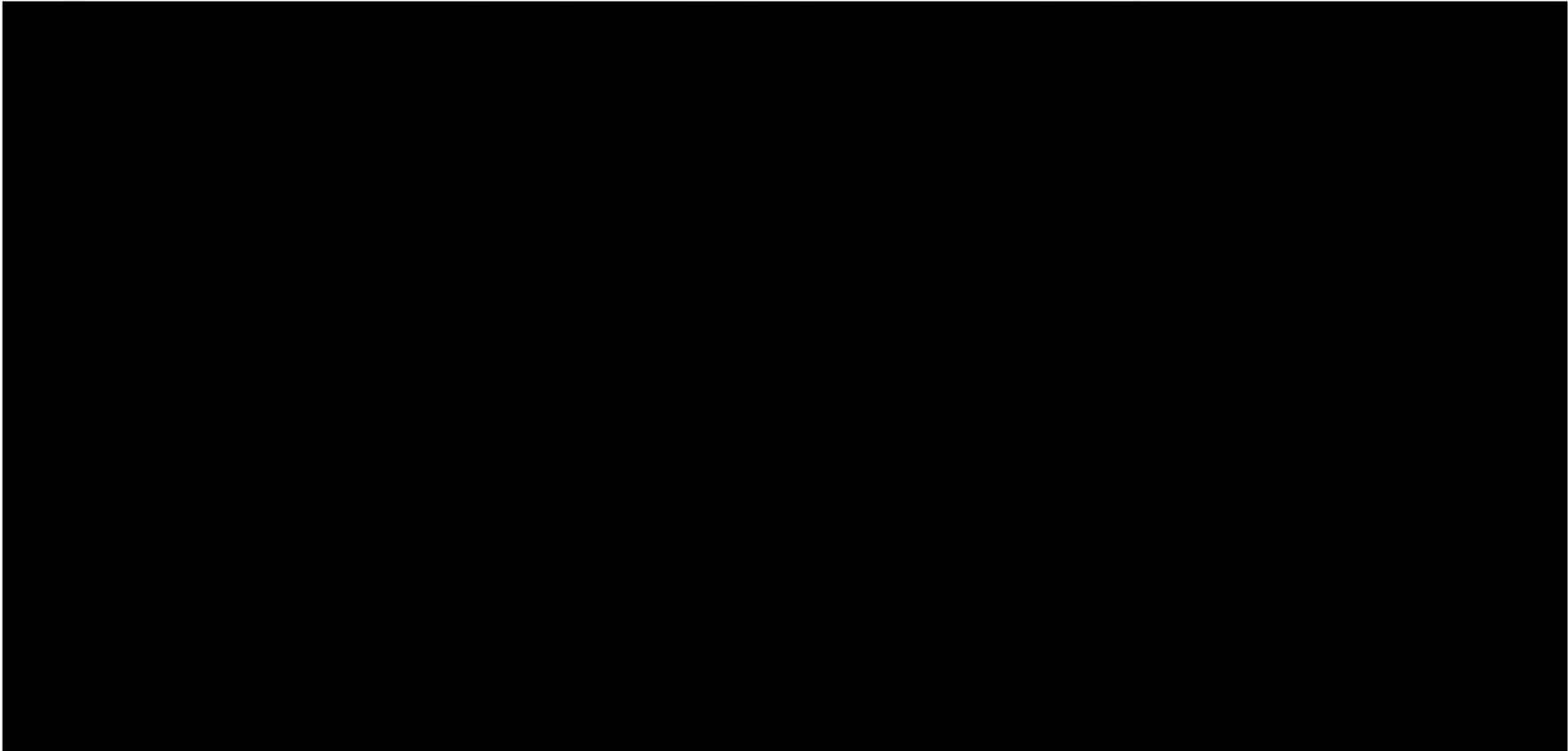
Table 4 – 2045 Estimated Weekday Average Per Mile Toll Rates in 2021\$
At \$2.00 (2021\$) Soft Cap, 1650 pcephpl Soft Cap Threshold
\$2.00 (2021\$) Soft Cap in 2021 Escalated 2.1% Annually Equals \$3.29 (2021\$) Soft Cap in 2045
Rates in Red were Estimated to Reach or Exceed the Soft Cap

Roadway	Toll Gantry	Dist. (miles)	5 AM	6 AM	7 & 8 AM	9 AM	10 & 11 AM	12 & 1 PM	2 PM	3 PM	4 & 5 PM	6 PM	7 PM	8 PM to 12 AM	12 AM to 5 AM
MD I-495 IL (VA Controlled)	1	2.6	\$0.36	\$1.14	\$2.74	\$1.39	\$0.72	\$0.67	\$1.81	\$2.22	\$3.92	\$3.67	\$1.34	\$0.41	\$0.21
MD I-495 Outer Loop	101	2.6	\$0.41	\$1.34	\$1.81	\$1.45	\$0.67	\$0.57	\$0.77	\$1.60	\$2.17	\$1.60	\$0.57	\$0.21	\$0.21
MD I-495 Inner Loop	3	3.2	\$0.36	\$1.14	\$1.96	\$1.08	\$0.67	\$0.67	\$1.65	\$1.60	\$2.43	\$3.05	\$1.19	\$0.46	\$0.21
MD I-495 Outer Loop	103	3.2	\$0.41	\$0.88	\$1.34	\$1.19	\$0.57	\$0.46	\$0.98	\$1.50	\$2.27	\$1.45	\$0.67	\$0.21	\$0.21
MD I-495 IL / I-270 W Spur NB	19	2.7	\$0.21	\$0.88	\$1.29	\$0.67	\$0.36	\$0.41	\$1.19	\$2.07	\$3.29	\$3.15	\$1.03	\$0.36	\$0.21
MD I-495 OL / I-270 W Spur SB	119	2.7	\$0.36	\$1.24	\$1.96	\$1.55	\$0.72	\$0.57	\$0.67	\$1.14	\$1.70	\$1.34	\$0.41	\$0.21	\$0.21
I-270 E Spur NB	20	1.9	\$0.21	\$0.21	\$0.31	\$0.31	\$0.31	\$0.36	\$0.36	\$0.57	\$1.19	\$1.34	\$0.77	\$0.21	\$0.21
I-270 E Spur SB	120	1.9	\$0.21	\$0.83	\$1.65	\$1.29	\$0.52	\$0.41	\$0.36	\$0.26	\$0.46	\$0.31	\$0.21	\$0.21	\$0.21
I-270 Northbound	21	3	\$0.21	\$0.52	\$0.62	\$0.41	\$0.36	\$0.41	\$0.98	\$1.81	\$2.68	\$2.58	\$0.93	\$0.36	\$0.21
I-270 Southbound	121	3	\$0.36	\$1.14	\$2.01	\$1.50	\$0.62	\$0.52	\$0.46	\$0.67	\$0.83	\$1.08	\$0.36	\$0.21	\$0.21
I-270 Northbound	22	2.8	\$0.21	\$0.36	\$0.46	\$0.41	\$0.36	\$0.46	\$0.83	\$1.60	\$2.58	\$2.74	\$0.98	\$0.36	\$0.21
I-270 Southbound	122	2.8	\$0.36	\$1.24	\$2.17	\$1.65	\$0.72	\$0.57	\$0.52	\$0.52	\$0.62	\$0.83	\$0.36	\$0.21	\$0.21
I-270 Northbound	23	1.8	\$0.21	\$0.36	\$0.52	\$0.41	\$0.36	\$0.57	\$0.93	\$1.65	\$2.63	\$2.89	\$1.03	\$0.36	\$0.21
I-270 Southbound	123	1.8	\$0.36	\$1.24	\$2.27	\$1.70	\$0.67	\$0.57	\$0.52	\$0.46	\$0.52	\$0.62	\$0.36	\$0.21	\$0.21









3. Soft Cap Frequency Estimates

The toll rates shown previously in **Tables 1, 2, 3, and 4** are the weekday averages estimated from the model. In reality, peak daily toll rates on the I-495 and I-270 managed lane project will vary each day based on factors including day-to-day variability in traffic demand and travel time savings.

To estimate the day-to-day variability of toll rates for the Maryland I-495 and I-270 project, historical toll rates from the Virginia I-495 Express Lanes were analyzed. The data for this analysis was taken from email alerts received by CDM Smith staff at certain times every weekday which indicate the end to end tolls charged on the existing Virginia I-495 express lanes by direction. Data from both directions for all non-holiday weekdays between January 1, 2018 and December 31, 2019 was utilized for this analysis. The data times analyzed were 8:00 AM, 9:30 AM, 11:00 AM, 3:30 PM, 5:00 PM, 6:30 PM, and 7:30 PM. These times were selected as the midpoints of time periods used by CDM Smith for the modeling and based on data availability from the email alerts.

Using this data, the average toll rate for each of the times was calculated. CDM Smith then calculated the ratio between the toll rate on a given day versus the average toll rate by time. For example, if the 2018 to 2019 average weekday northbound 8:00 AM toll rate for a full-length trip was \$5.00, but on a specific day the toll rate was \$6.00, then the ratio would be calculated as 1.20. **Figures 4 through 17** contain histograms which illustrate the spread of the Virginia I-495 Express Lane toll rates by direction and by time period. It should be noted the Virginia I-495 Express Lanes facility has the highest toll rates in the PM in the southbound direction and the AM in the northbound direction.

Tables 9, 10, 11, and 12 contain estimates of the number of weekdays per year that the toll rate cap may be reached or exceeded on the Maryland I-495 and I-270 Phase 1 south. Each table header describes the estimate year (2025 or 2045) and the soft toll rate cap scenario (\$1.50 or \$2.00 in 2021 dollars). These estimates were produced by calculating the ratio of the soft toll rate cap divided by the average toll rate estimated by the model. This ratio was then compared against the Virginia 495 toll rate distributions (illustrated in **Figures 4 through 17**) to estimate in what percentile this ratio fell in the distribution. Because of different peaking characteristics, the Virginia 495 toll rate distributions for the northbound direction were used for the southbound Maryland project and vice versa. As an example, in 2025 under the \$1.50 soft rate cap scenario, at Gantry 101 in the 3 PM hour, the model-estimated average toll rate was \$1.00. The soft cap was calculated to be 158% of the average toll rate. This corresponded with the 96th percentile of the Virginia 495 toll rate distribution for northbound 3:30 PM, implying that the soft toll rate cap would be exceeded in four percent of the weekdays. We have assumed there are 252 non-holiday weekdays per year. Thus, the soft toll rate cap was estimated to be exceeded on 11 days per year (four percent of 252 days). The soft toll rate caps are most likely to be exceeded during the PM peak hours (4 & 5 PM and 6 PM time periods) in the northbound direction. This includes gantries 3, 19, 21, 22 and 23. As expected, the soft toll rate cap will be exceeded more regularly at the lower rate cap. For example, at Gantry 19 in the 4 & 5 PM period in model year 2025, it is expected that the \$1.50 soft toll rate cap will be exceeded 230 weekdays per year, but only 70 days per weekdays per year under the \$2.00 rate cap scenario.

Figure 4 – Northbound 8:00 AM Distribution of Full-Length Virginia I-495 Express Lane Hourly Toll Rates

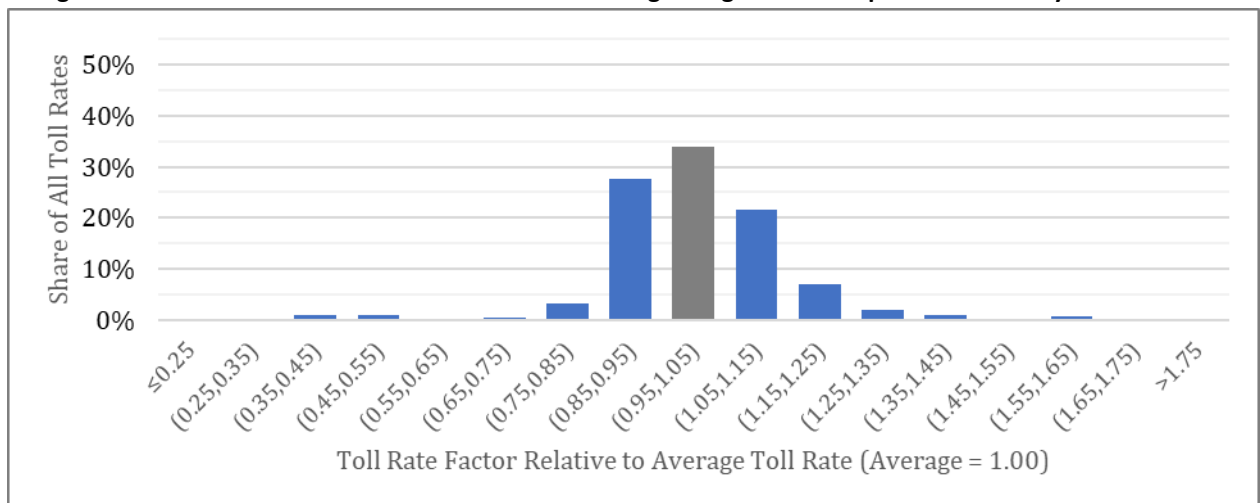


Figure 5 – Northbound 9:30 AM Distribution of Full-Length Virginia I-495 Express Lane Hourly Toll Rates

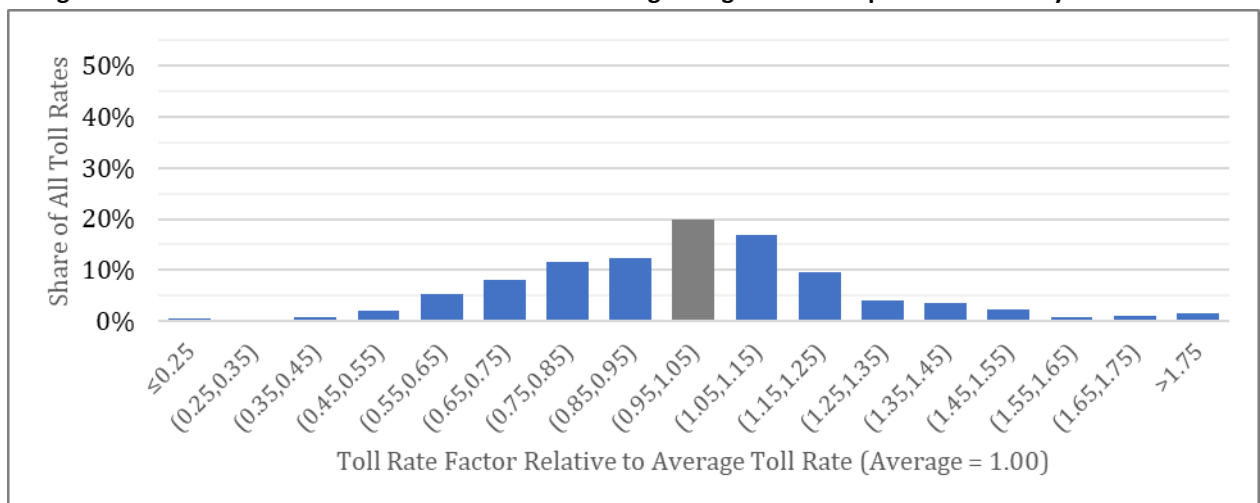


Figure 6 – Northbound 11:00 AM Distribution of Full-Length Virginia I-495 Express Lane Hourly Toll Rates

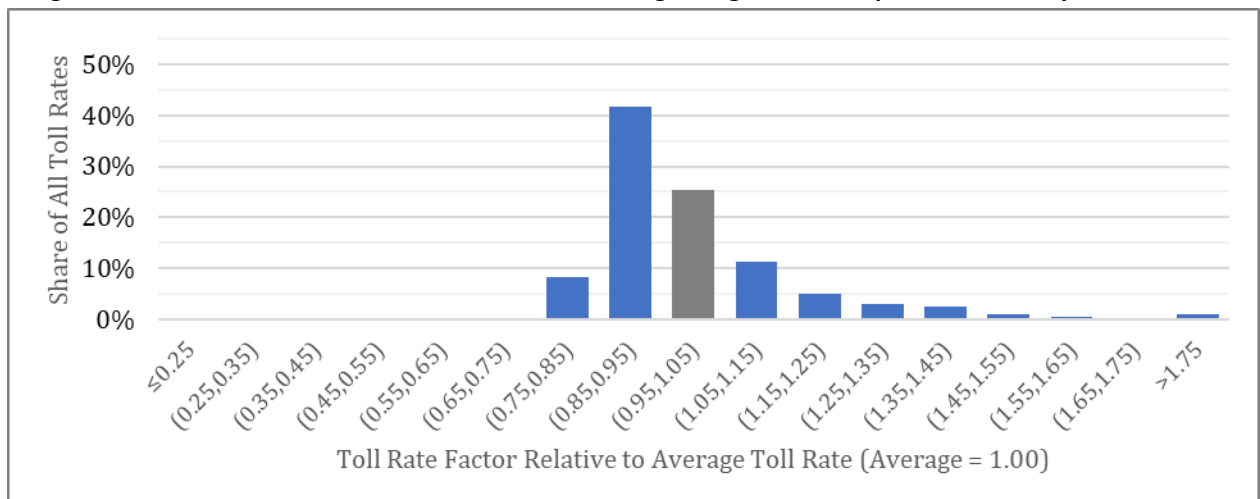


Figure 7 – Northbound 3:30 PM Distribution of Full-Length Virginia I-495 Express Lane Hourly Toll Rates

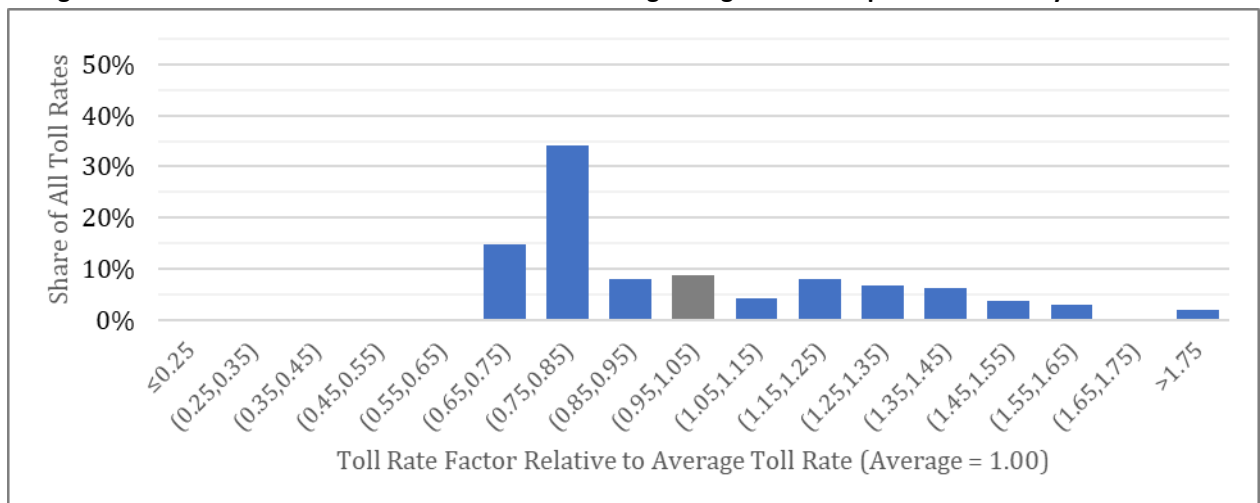


Figure 8 – Northbound 5:00 PM Distribution of Full-Length Virginia I-495 Express Lane Hourly Toll Rates

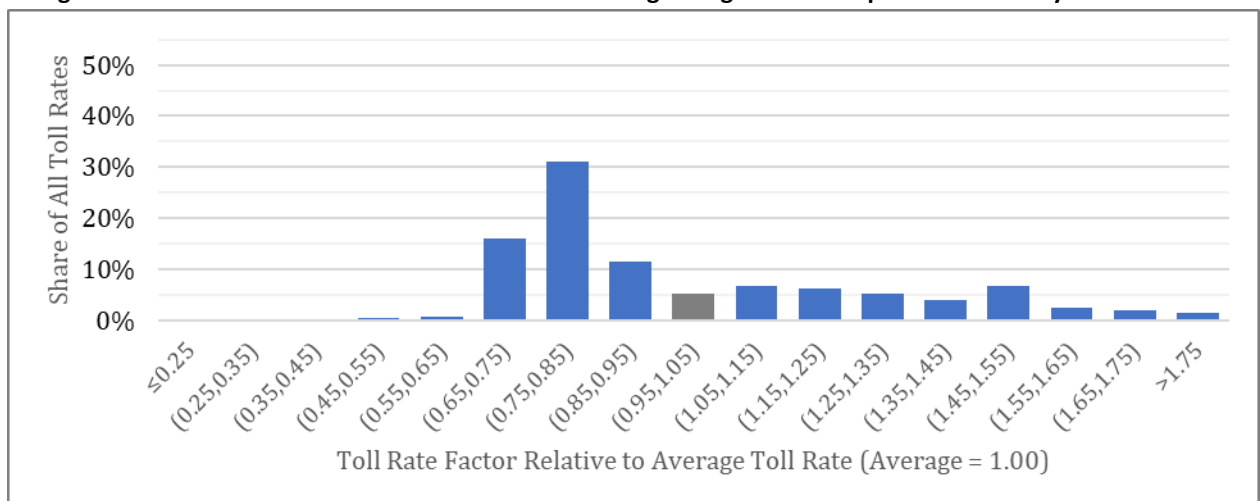


Figure 9 – Northbound 6:30 PM Distribution of Full-Length Virginia I-495 Express Lane Hourly Toll Rates

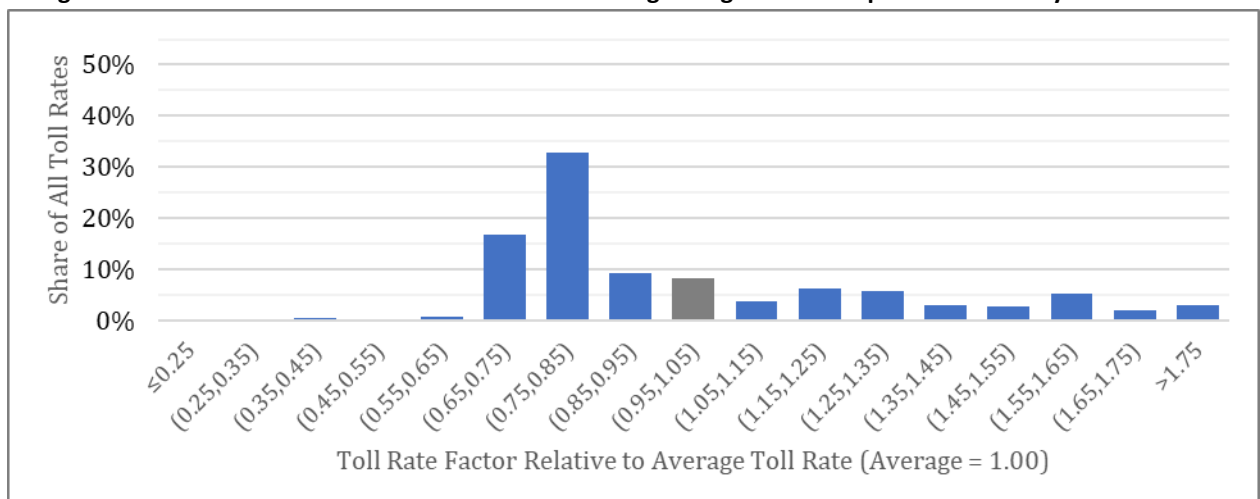


Figure 10 – Northbound 7:30 PM Distribution of Full-Length Virginia I-495 Express Lane Hourly Toll Rates

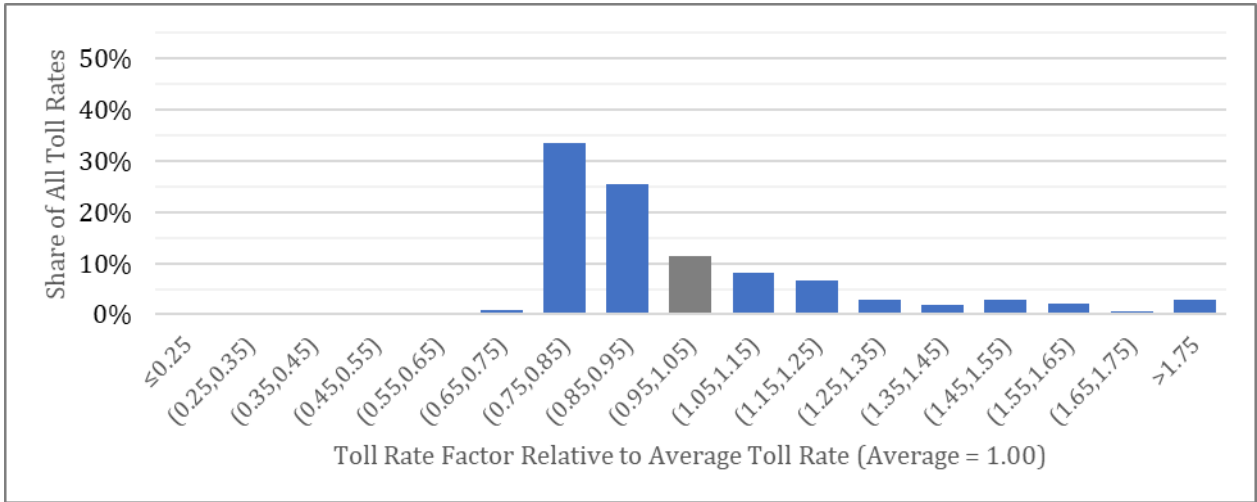


Figure 11 – Southbound 8:00 AM Distribution of Full-Length Virginia I-495 Express Lane Hourly Toll Rates

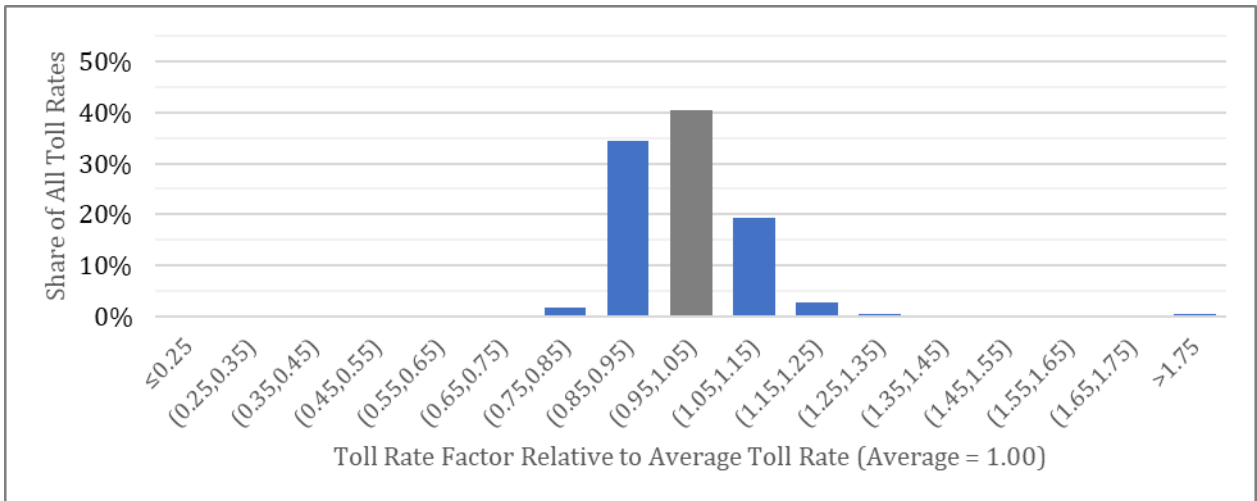


Figure 12 – Southbound 9:30 AM Distribution of Full-Length Virginia I-495 Express Lane Hourly Toll Rates

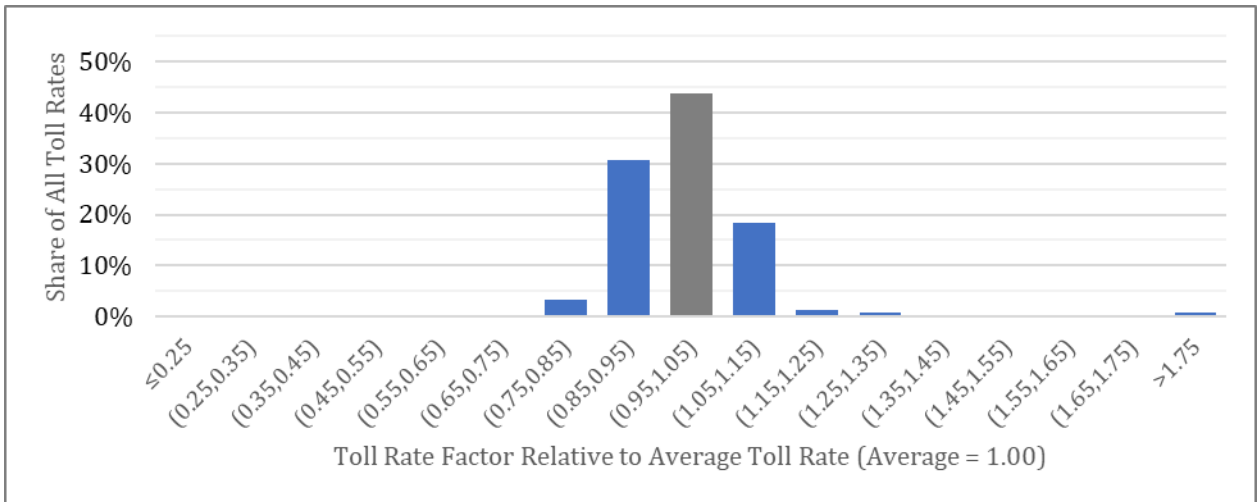


Figure 13 – Southbound 11:00 AM Distribution of Full-Length Virginia I-495 Express Lane Hourly Toll Rates

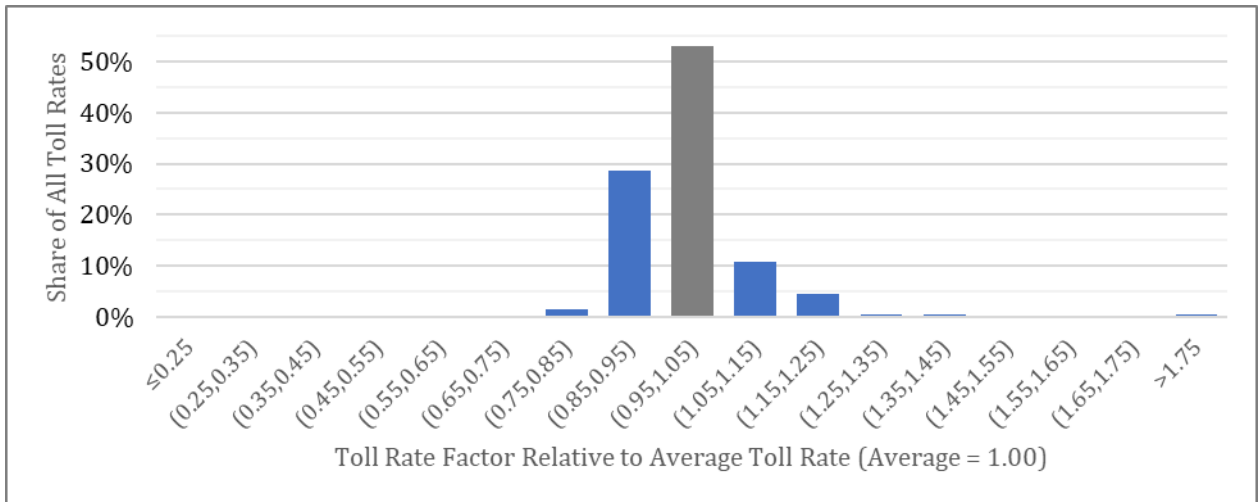


Figure 14 – Southbound 3:30 PM Distribution of Full-Length Virginia I-495 Express Lane Hourly Toll Rates

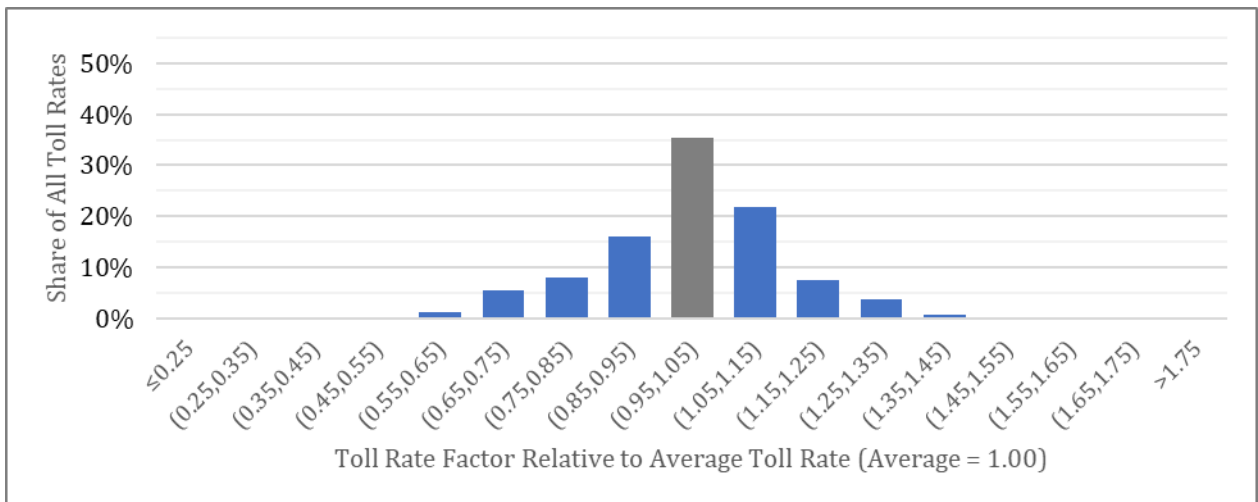


Figure 15 – Southbound 5:00 PM Distribution of Full-Length Virginia I-495 Express Lane Hourly Toll Rates

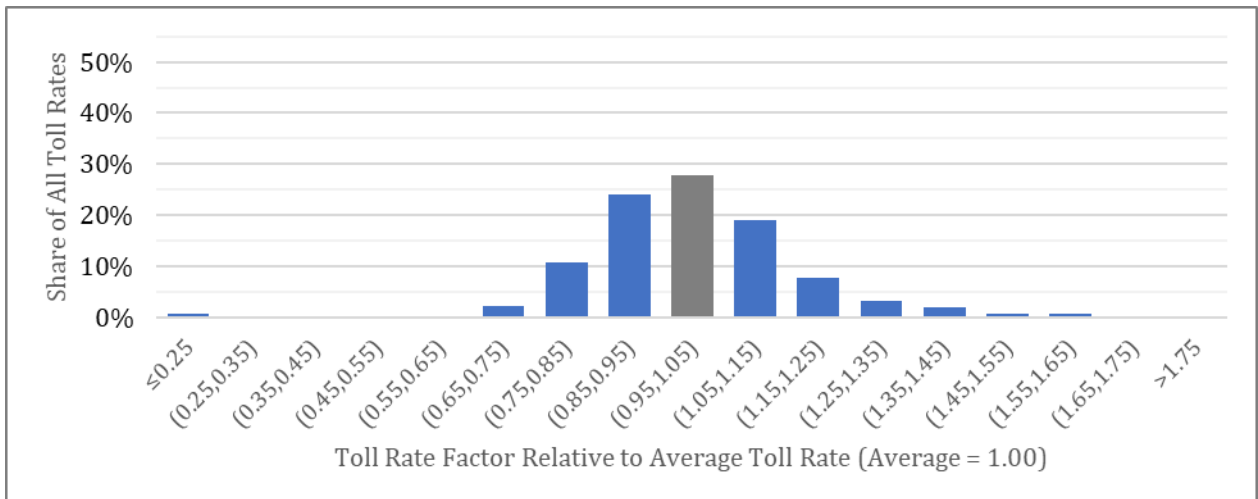


Figure 16 – Southbound 6:30 PM Distribution of Full-Length Virginia I-495 Express Lane Hourly Toll Rates

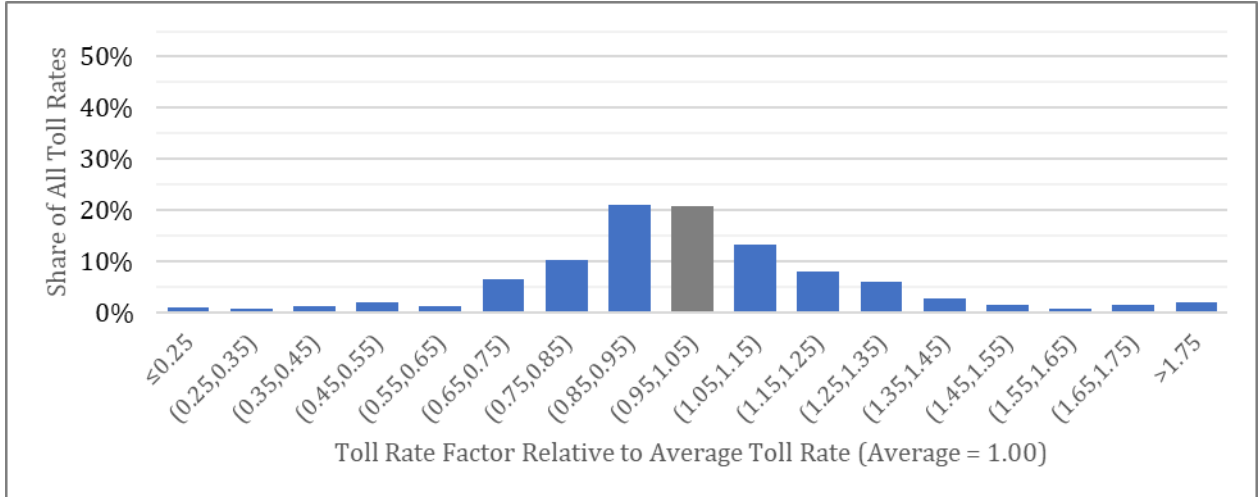
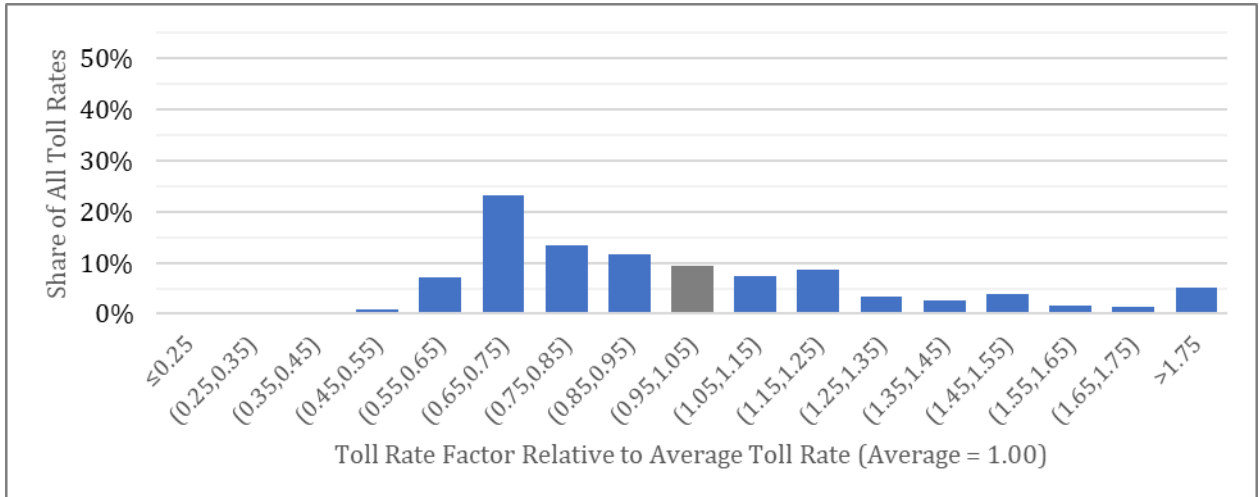


Figure 17 – Southbound 7:30 PM Distribution of Full-Length Virginia I-495 Express Lane Hourly Toll Rates



4. Annual Revenue Impacts

Negative revenue impacts due to the soft cap would occur when a toll rate higher than the soft cap is preferred at a specific gantry and time period, but traffic is not at least 1650 pcephpl to warrant charging more than the soft cap. The model results were used directly for the revenue impact estimates.

Table 13 includes the estimated annual revenue impacts of the different soft cap levels tested in this analysis. Results are provided with and without Gantry 1, which is assumed to be controlled by Virginia in this analysis. Estimated revenue impacts for the \$1.50 soft cap with 2.1 percent annual real escalation are modest, at less than 1.0 percent including Gantry 1 and less than 1.5 percent not including Gantry 1. The \$2.00 soft cap is not estimated to have revenue impacts. This is because preferred typical average rates from the model are either at or below the soft cap level. Days with higher demand than typical could result in preferred toll rates higher than the soft cap, including some of those days quantified in **Table 11 and Table 12**. However, it is likely that demand would be sufficiently higher (at least 1650 pcephpl) to warrant charging over the soft cap on most of these non-typical days, thereby mitigating the potential revenue impact.

Table 13 – Soft Cap Revenue Impacts

Year	\$1.50 (2021\$) Soft Cap w 2.1% Real Escalation	\$2.00 (2021\$) Soft Cap w 2.1% Real Escalation
Including VA Controlled Gantry 1		
2025	-0.5%	0.0%
2045	-0.8%	0.0%
Not Including VA Controlled Gantry 1		
2025	-0.8%	0.0%
2045	-1.3%	0.0%

Disclaimer

CDM Smith used currently-accepted professional practices and procedures in the development of the traffic and revenue estimates in this report. However, as with any forecast, it should be understood that differences between forecasted and actual results may occur, as caused by events and circumstances beyond the control of the forecasters. In formulating the estimates, CDM Smith reasonably relied upon the accuracy and completeness of information provided (both written and oral) by MDOT. CDM Smith also relied upon the reasonable assurances of independent parties and is not aware of any material facts that would make such information misleading.

CDM Smith made qualitative judgments related to several key variables in the development and analysis of the traffic and revenue estimates that must be considered as a whole; therefore, selecting portions of any individual result without consideration of the intent of the whole may create a misleading or incomplete view of the results and the underlying methodologies used to obtain the results. CDM Smith gives no opinion as to the value or merit of partial information extracted from this report.

All estimates and projections reported herein are based on CDM Smith's experience and judgment and on a review of information obtained from multiple agencies, including MDOT. These estimates and projections may not be indicative of actual or future values and are therefore subject to substantial uncertainty. Future developments and economic conditions cannot be predicted with certainty, and may affect the estimates or projections expressed in this report, such that CDM Smith does not specifically guarantee or warrant any estimate or projection contained within this report.

While CDM Smith believes that the projections and other forward-looking statements contained within the report are based on reasonable assumptions as of the date of the report, such forward-looking statements involve risks and uncertainties that may cause actual results to differ materially from the results predicted. Therefore, following the date of this report, CDM Smith will take no responsibility or assume any obligation to advise of changes that may affect its assumptions contained within the report, as they pertain to socioeconomic and demographic forecasts, proposed residential or commercial land use development projects and/or potential improvements to the regional transportation network.

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