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October 28, 2019

Ms. Cheryl Lewis-Orr
Director of Revenue
Maryland Transportation Authority
2310 Broening Highway
Baltimore, MD 21224

Subject: **FINAL** FY 2020 Intercounty Connector Forecast Update

Dear Ms. Lewis-Orr:

The objective of this update study was to develop a traffic and revenue forecast for the Intercounty Connector (ICC) using up to date actual traffic and revenue data. The forecast period extends ten years from FY 2020 through FY 2029, beginning on July 1, 2019 and ending on June 30, 2029. The study also evaluated whether future traffic levels on the ICC would be approaching capacity of the facility under the current toll rate levels.

CDM Smith has conducted previous traffic and revenue studies of the ICC for MDTA. The most recent Comprehensive Traffic and Revenue Study was conducted in 2015. A final report for that study was submitted in January 2016. The 2015 study represented the first comprehensive study effort since the ICC opened to traffic in 2011. Since then, CDM Smith has performed annual forecast updates for the ICC beginning in November 2016. The annual forecast updates, including those referenced in this report, have used the framework of the 2015 Comprehensive Study as a basis for estimation.

ICC Description

The ICC opened to traffic in 2011 as the eighth MDTA toll facility and the first All-Electronic Toll (AET) road in Maryland. As shown in **Figure 1**, the ICC is an east-west limited access facility located in the Washington, D.C., and Baltimore Metropolitan Region. It connects I-370 in the Gaithersburg area to I-95 and US 1 in Laurel. The ICC is three lanes per direction between Shady Grove and I-95 and two lanes per direction between I-95 and US 1, with a posted speed limit of 60 miles per hour between I-370 and US 29 and 55 MPH between US 29 and US 1. **Figure 2** illustrates the existing configuration of the ICC and indicates the location of interchanges and toll gantries. There are currently six toll gantries per direction that cover movements between nine interchanges, as shown in **Table 1**.



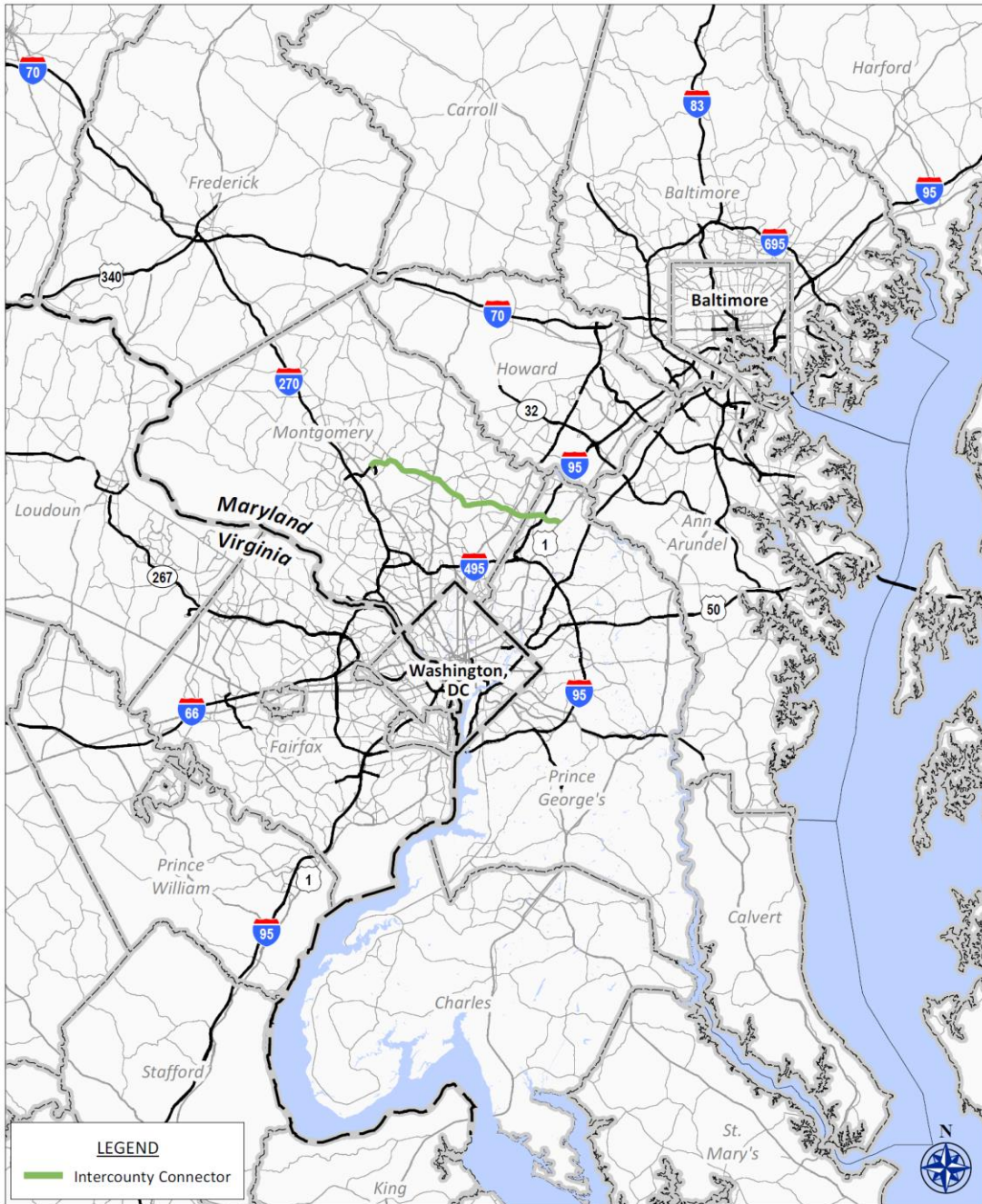


Figure 1
Regional Area Map

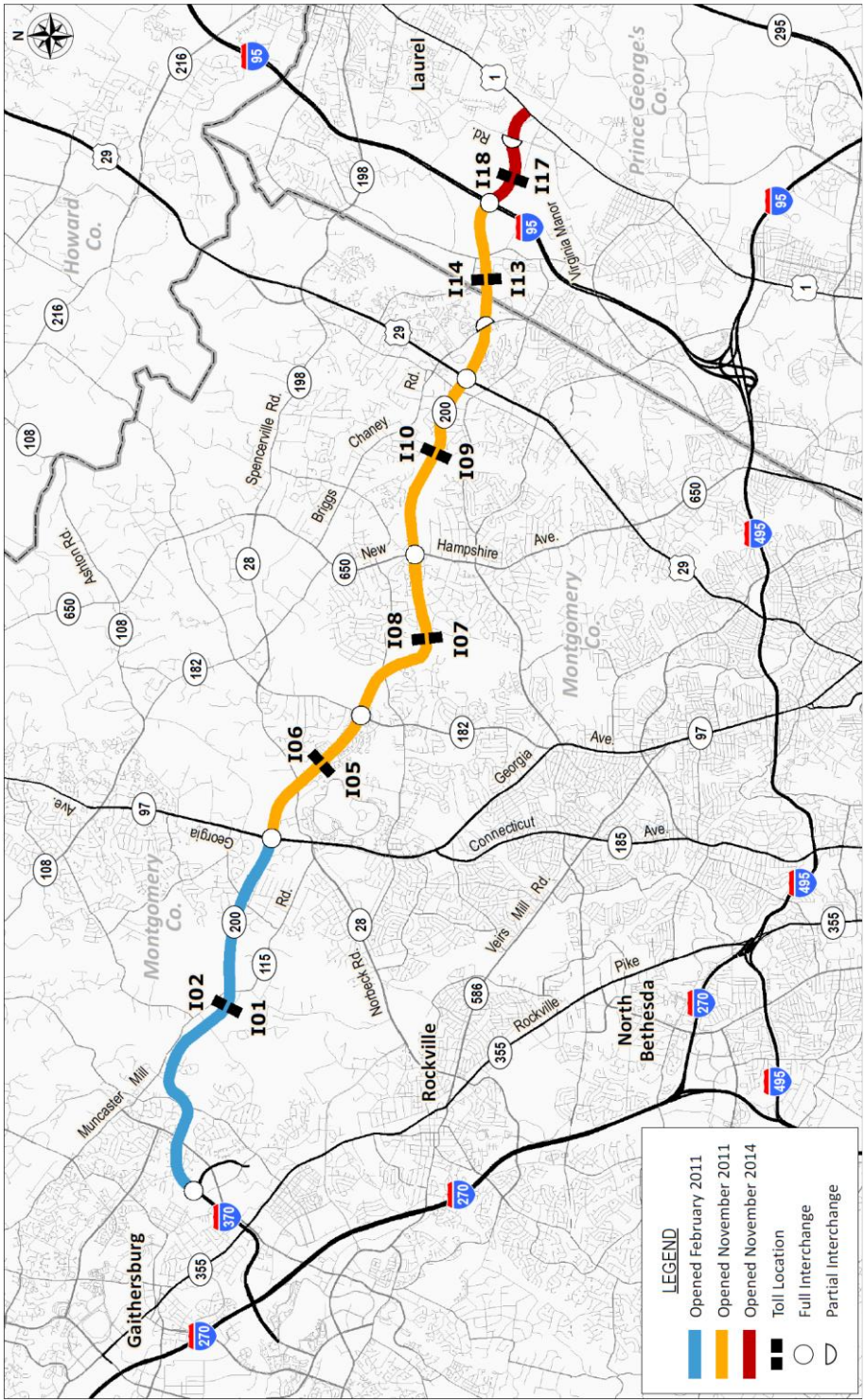


Figure 2
 Intercounty Connector Location Map

**Table 1
 Toll Gantry Locations on the Intercountry Connector**

Toll Gantry	Western Interchange(s)	Eastern Interchange(s)	Distance (mi.)
I01 / I02	I-370; Shady Grove Rd.	MD 97 / Georgia Ave.	5.65
I05 / I06	MD 97 / Georgia Ave.	MD 182 / Layhill Rd.	2.28
I07 / I08	MD 182 / Layhill Rd.	MD 650 / New Hampshire Ave.	2.84
I09 / I10	MD 650 / New Hampshire Ave.	US 29	2.51
I13 / I14	US 29 and Briggs Chaney Rd.	I-95	2.72
I17 / I18	I-95	Konterra Dr. and US 1	1.53
Total			17.53

Toll Rates

Current Toll Rates

Tolls on the ICC are assessed based on particular interchange-to-interchange movements, as shown in **Table 2**. Two-axle (passenger car) tolls range from \$0.40 to \$3.86 for E-ZPass® customers depending on the length of the trip and time of day. Higher E-ZPass® tolls are assessed on weekdays during Peak Period travel hours, which include 6:00 – 9:00 AM and 4:00 – 7:00 PM, than during Overnight Period hours (11:00 PM – 5:00 AM) or Off-Peak Period hours (all other hours). On the weekends, tolls also differ between the Overnight Period (11:00 PM – 5:00 AM) and Off-Peak Period (5:00 AM – 11:00 PM). E-ZPass® toll rates are greater for commercial and recreational (boat and camper) vehicles based on the number of axles.

Tolls are collected using an AET system, through the use of an E-ZPass® transponder. For those customers without an E-ZPass® transponder, an image of the customer’s license plate is taken, and the customer is then mailed a bill. To encourage E-ZPass® usage and offset the additional processing costs associated with video tolling, toll rates for video customers are 50 percent more than those using E-ZPass®, with differences ranging from \$1.00 to \$15.00 depending on vehicle class and trip length.

ICC toll rates were last changed on July 1, 2015 (beginning of FY 2016) which reduced prior toll rates by \$0.03 per mile for passenger car E-ZPass® customers.

**Table 2
Two-Axle E-ZPass® Toll Rates by Movement and Time Period on the Intercounty Connector**

Entrance	Time Period	Exit											
		I-370; Shady Grove Rd.	SR 97 / Georgia Ave.	SR 182 / Layhill Rd.	SR 650 / New Hampshire Ave.	US 29 and Briggs Cheney Rd.	I-95	Konterra Dr. and US 1					
I-370; Shady Grove Rd.	Peak Period	\$	1.24	\$	1.74	\$	2.37	\$	2.92	\$	3.52	\$	3.86
	Off-Peak Period	\$	0.96	\$	1.35	\$	1.83	\$	2.26	\$	2.72	\$	2.98
	Overnight	\$	0.40	\$	0.56	\$	0.75	\$	0.93	\$	1.12	\$	1.23
SR 97 / Georgia Ave.	Peak Period	\$	1.24	\$	0.50	\$	1.13	\$	1.68	\$	2.28	\$	2.61
	Off-Peak Period	\$	0.96	\$	0.40	\$	0.87	\$	1.30	\$	1.76	\$	2.02
	Overnight	\$	0.40	\$	0.40	\$	0.40	\$	0.53	\$	0.72	\$	0.83
SR 182 / Layhill Rd.	Peak Period	\$	1.74	\$	0.50	\$	0.62	\$	1.18	\$	1.78	\$	2.11
	Off-Peak Period	\$	1.35	\$	0.40	\$	0.48	\$	0.91	\$	1.37	\$	1.63
	Overnight	\$	0.56	\$	0.40	\$	0.40	\$	0.40	\$	0.56	\$	0.67
SR 650 / New Hampshire Ave.	Peak Period	\$	2.37	\$	1.13	\$	0.62	\$	0.55	\$	1.15	\$	1.49
	Off-Peak Period	\$	1.83	\$	0.87	\$	0.48	\$	0.43	\$	0.89	\$	1.15
	Overnight	\$	0.75	\$	0.40	\$	0.40	\$	0.40	\$	0.40	\$	0.47
US 29 and Briggs Cheney Rd.	Peak Period	\$	2.92	\$	1.68	\$	1.18	\$	0.55	\$	0.60	\$	0.94
	Off-Peak Period	\$	2.26	\$	1.30	\$	0.91	\$	0.43	\$	0.46	\$	0.72
	Overnight	\$	0.93	\$	0.53	\$	0.40	\$	0.40	\$	0.40	\$	0.40
I-95	Peak Period	\$	3.52	\$	2.28	\$	1.78	\$	1.15	\$	0.60	\$	0.44
	Off-Peak Period	\$	2.72	\$	1.76	\$	1.37	\$	0.89	\$	0.46	\$	0.40
	Overnight	\$	1.12	\$	0.72	\$	0.56	\$	0.40	\$	0.40	\$	0.40
Konterra Dr. and US 1	Peak Period	\$	3.86	\$	2.61	\$	2.11	\$	1.49	\$	0.94	\$	0.44
	Off-Peak Period	\$	2.98	\$	2.02	\$	1.63	\$	1.15	\$	0.72	\$	0.40
	Overnight	\$	1.23	\$	0.83	\$	0.67	\$	0.47	\$	0.40	\$	0.40

Note:
Peak Period is defined as 6:00 - 9:00 AM and 4:00 - 7:00 PM on Weekdays (excluding federal holidays).
Off-Peak Period is defined as 5:00 - 6:00 AM, 9:00 AM - 4:00 PM, and 7:00 - 11:00 PM on Weekdays and 5:00 AM - 11:00 PM on Weekends and federal holidays.
Overnight is defined as 11:00 PM - 5:00 AM every day.

Future Toll Rates

This forecast incorporates future classification and payment type toll rate change assumptions as listed below:

- Pay-by-Plate:** Beginning on May 1, 2020, a Pay-by-Plate payment method will be offered. This new payment method allows tolls to automatically bill to credit cards at a lower rate than Pay-by-Invoice. For the ICC, customers who use this method will pay at least 20 percent less than the Pay-by-Invoice rate (which is the same as the current video rate) and 25% more than the E-ZPass rate.
- New Vehicle Classes:** Beginning on September 1, 2020, new vehicle class toll rate categories will be created with lower toll rates. These new classes are motorcycles and certain three and four-axle vehicles, specifically “light” vehicles towing one and two-axle trailers such as those towing watercraft or landscaping equipment. Motorcycles will pay a 50 percent lower toll than current two-axle rates. Three and four-axle light vehicles will pay a 25 and 17 percent, respectively, lower toll than current three and four-axle rates.



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- **Early Payment of Video Tolls:** Beginning on May 1, 2020, Pay-by-Invoice customers who pay their video toll before their invoices are mailed will receive a 15 percent toll discount from the full Pay-by-Invoice rate.

With the exception of the assumed payment type and classification changes listed above, no other future toll changes are assumed on the ICC for the forecasting period.

ICC Historical Trends

Monthly trips, toll revenue, and transaction data for the ICC can be found in **Table 3**, **Table 4**, and **Table 5**, respectively. Transactions shown are based on in-lane traffic, which counts a transaction anytime a vehicle passes under a toll gantry, regardless of whether payment is collected. A trip which has an entrance and an exit on the ICC may pass through multiple gantries, and therefore would count as multiple transactions. Gantry transactions have been found to be a more consistent measure of historical performance than trips and collected revenue. Trips and collected revenue trends tend to be distorted by when video toll revenue is collected and can be impacted by collection and enforcement policies evolving over time. Thus, much of the discussion of trends below focuses on transactions.

About halfway through FY 2012 (on December 5, 2011), tolling began on the second segment of the ICC from MD-97/Georgia Avenue to I-95, making FY 2013 the first full fiscal year of I-370 to I-95 operations on the ICC. Transactions then increased by 20 percent in FY 2014. This was due primarily to facility “ramp-up,” when motorists adjust their travel patterns over time as they become aware of a new facility and the benefits that it offers over their current route of travel. This ramp-up period continued into FY 2015, with a 19.1 percent growth in transactions and a 16.6 percent growth in toll revenue. FY 2015 growth also included the opening of the final segment of the ICC in November 2014; a 1.53-mile extension on the eastern end between I-95 and US 1. Transactions in FY 2016 grew at a faster rate than FY 2015, which can be attributed to the continued recovery in the economy, lower gas prices, relatively good weather, and the toll reduction implemented on July 1, 2015. Toll revenue for FY 2016 was 5.9 percent higher than FY 2015, which reflects the negative revenue impact of the lower toll in combination with continued robust growth in transactions. Had ICC toll rates not been reduced in FY 2016; it is estimated toll revenue would have been roughly 17 percent higher than FY 2015. Transaction growth for FY 2017 was very strong at 9.9 percent. This growth was higher than national and regional trends on other toll facilities operated by other toll agencies that are regularly monitored by CDM Smith.

Table 3 ICC Historical Monthly Trips											
Month	FY 2014	Percent Change	FY 2015 ⁽¹⁾	Percent Change	FY 2016 ⁽²⁾	Percent Change	FY 2017	Percent Change	FY 2018	Percent Change	FY 2019
July	1,542,091	23.7	1,907,931	8.0	2,061,250	23.8	2,552,101	9.2	2,786,398	3.2	2,876,849
August	1,572,277	18.4	1,861,332	17.1	2,179,113	24.0	2,701,597	9.2	2,949,391	8.2	3,191,236
September	1,667,445	13.4	1,890,179	22.5	2,315,943	18.1	2,734,339	2.4	2,799,991	3.2	2,888,807
October	1,645,699	27.9	2,104,968	34.4	2,828,075	(1.5)	2,786,910	8.8	3,032,910	4.1	3,158,226
November	1,650,635	19.3	1,969,550	45.7	2,870,275	(6.8)	2,675,985	6.4	2,847,419	0.8	2,871,385
December	1,709,865	20.7	2,063,945	16.2	2,398,829	15.3	2,765,863	(3.0)	2,681,770	14.5	3,069,799
January	1,773,367	4.0	1,844,428	31.2	2,420,242	9.1	2,640,451	3.8	2,740,518	1.3	2,776,957
February	1,524,953	18.7	1,809,800	30.7	2,365,912	0.6	2,380,496	8.7	2,586,927	2.7	2,655,776
March	1,702,593	23.6	2,104,210	25.1	2,632,225	4.5	2,749,637	9.4	3,007,143	0.9	3,035,149
April	1,765,109	25.1	2,208,418	18.8	2,623,933	4.2	2,733,884	8.1	2,955,179	15.7	3,418,339
May	1,922,541	17.8	2,264,064	11.9	2,532,758	18.7	3,006,208	2.0	3,066,258	6.1	3,254,180
June	1,999,011	4.5	2,089,262	31.5	2,746,613	5.8	2,906,348	1.4	2,946,755	4.9	3,090,026
Total	20,475,586	17.8	24,118,087	24.3	29,975,168	8.9	32,633,819	5.4	34,400,659	5.5	36,286,729

Table 4 ICC Historical Monthly Toll Revenue											
Month	FY 2014	Percent Change	FY 2015 ⁽¹⁾	Percent Change	FY 2016 ⁽²⁾	Percent Change	FY 2017	Percent Change	FY 2018	Percent Change	FY 2019
July	\$ 3,699,627	23.3	\$ 4,559,966	(3.7)	\$ 4,389,381	13.2	\$ 4,968,539	11.5	\$ 5,541,352	1.4	\$ 5,618,057
August	3,655,486	19.7	4,375,893	(2.8)	4,254,110	32.7	5,645,666	5.2	5,936,904	1.4	6,017,666
September	3,935,482	13.0	4,447,191	0.6	4,473,262	16.3	5,203,198	5.8	5,507,106	0.1	5,514,091
October	3,784,073	31.2	4,965,811	14.3	5,677,201	(2.9)	5,514,636	8.0	5,954,272	3.1	6,138,834
November	3,885,860	19.2	4,631,170	26.0	5,834,056	(9.4)	5,283,579	7.4	5,674,426	(2.2)	5,547,498
December	4,096,985	15.1	4,713,666	(4.3)	4,508,851	6.6	4,806,853	9.8	5,277,599	6.2	5,604,426
January	4,175,884	(1.3)	4,121,721	0.2	4,131,701	30.2	5,380,060	2.4	5,509,339	(3.8)	5,302,588
February	3,607,784	14.2	4,121,202	11.9	4,611,929	3.9	4,791,597	5.7	5,065,797	(0.0)	5,064,670
March	3,954,160	22.7	4,852,101	7.8	5,232,530	7.1	5,606,049	(0.1)	5,599,337	4.7	5,862,377
April	4,063,734	26.5	5,142,214	0.7	5,177,603	7.3	5,553,268	1.5	5,638,842	1.2	5,705,830
May	4,458,570	14.8	5,119,367	(3.1)	4,960,516	19.0	5,903,109	2.3	6,036,420	5.3	6,355,044
June	4,711,132	5.4	4,967,301	22.0	6,061,303	(6.6)	5,660,296	1.9	5,769,181	14.1	6,584,562
Total	\$ 48,028,779	16.6	\$ 56,017,601	5.9	\$ 59,312,440	8.4	\$ 64,316,849	5.0	\$ 67,510,574	2.7	\$ 69,315,643

⁽¹⁾ Toll Gantries I17/I18 opened November 10, 2014 (FY 2015).
⁽²⁾ Toll Rates were decreased effective July 2015 (FY 2016).



Table 5
 ICC Historical Monthly Transactions

Month	FY 2014		FY 2015 ⁽¹⁾		FY 2016 ⁽²⁾		FY 2017		FY 2018		FY 2019	
		Percent Change		Percent Change		Percent Change		Percent Change		Percent Change		Percent Change
July	4,968,063	22.0	6,059,285	22.0	7,393,525	8.7	8,037,215	6.5	8,560,179	6.5	8,826,612	3.1
August	5,172,549	14.1	5,899,486	22.2	7,207,909	16.8	8,422,268	5.8	8,914,528	5.8	9,218,087	3.4
September	5,134,767	16.6	5,987,275	23.8	7,412,760	13.0	8,378,444	2.3	8,570,834	2.3	8,809,219	2.8
October	5,449,704	17.5	6,405,597	23.5	7,909,398	10.4	8,733,855	4.6	9,139,165	4.6	9,770,839	6.9
November	5,129,634	16.1	5,956,146	25.9	7,496,219	12.1	8,401,893	4.5	8,779,046	4.5	8,937,547	1.8
December	4,940,797	25.1	6,179,337	21.5	7,510,457	8.6	8,156,499	(0.1)	8,145,142	4.0	8,469,907	4.0
January	4,850,107	16.4	5,647,160	12.8	6,370,282	20.7	7,687,667	4.9	8,064,604	(1.0)	7,986,037	7.986,037
February	4,478,360	20.0	5,373,124	32.6	7,122,875	3.1	7,341,463	3.9	7,629,181	2.2	7,799,895	2.2
March	5,223,840	22.5	6,399,917	24.4	7,959,170	5.2	8,369,493	3.6	8,667,999	5.7	9,163,214	5.7
April	5,685,357	20.1	6,829,125	17.6	8,029,474	5.7	8,486,724	4.5	8,868,669	6.7	9,463,768	6.7
May	6,083,490	18.0	7,179,475	15.8	8,315,440	10.2	9,166,564	3.4	9,482,368	4.4	9,902,706	4.4
June	5,976,215	20.6	7,204,505	19.6	8,618,803	6.5	9,179,108	(0.0)	9,176,122	4.4	9,581,914	4.4
Total	63,092,883	19.1	75,120,432	21.6	91,346,312	9.9	100,361,193	3.6	103,997,837	3.6	107,929,745	3.8

⁽¹⁾ Toll Gantries I17/I18 opened November 10, 2014 (FY 2015).

⁽²⁾ Toll Rates were decreased effective July 2015 (FY 2016).

FY 2018 and FY 2019 had stabilizing transaction growth at 3.6 and 3.8 percent, respectively. While the transaction growth has stabilized, it remains strong. The strong growth is likely due to increasing regional population and employment as well as the ICC serving as a congestion relief route as an uncongested facility in a region where congestion is growing. Trips growth in FY 2018 and FY 2019 was higher than transactions at 5.4 and 5.5 percent, respectively. This may indicate an increasing share of shorter distance trips on the facility which would travel under fewer toll gantries (and thus have fewer transactions) per trip. Revenue growth in FY 2018 at 5.0 percent was similar to trips growth. However, revenue growth in FY 2019 was 2.7 percent which is lower than for trips. Lower revenue growth relative to trips growth was due to a lower average toll rate in FY 2019 compared to FY 2018. The lower average toll was partially due to an increasing ETC share on the facility.

Figure 3 graphically demonstrates the historical progression of monthly transactions and toll revenue on the ICC.

Explanatory Factors for Trends

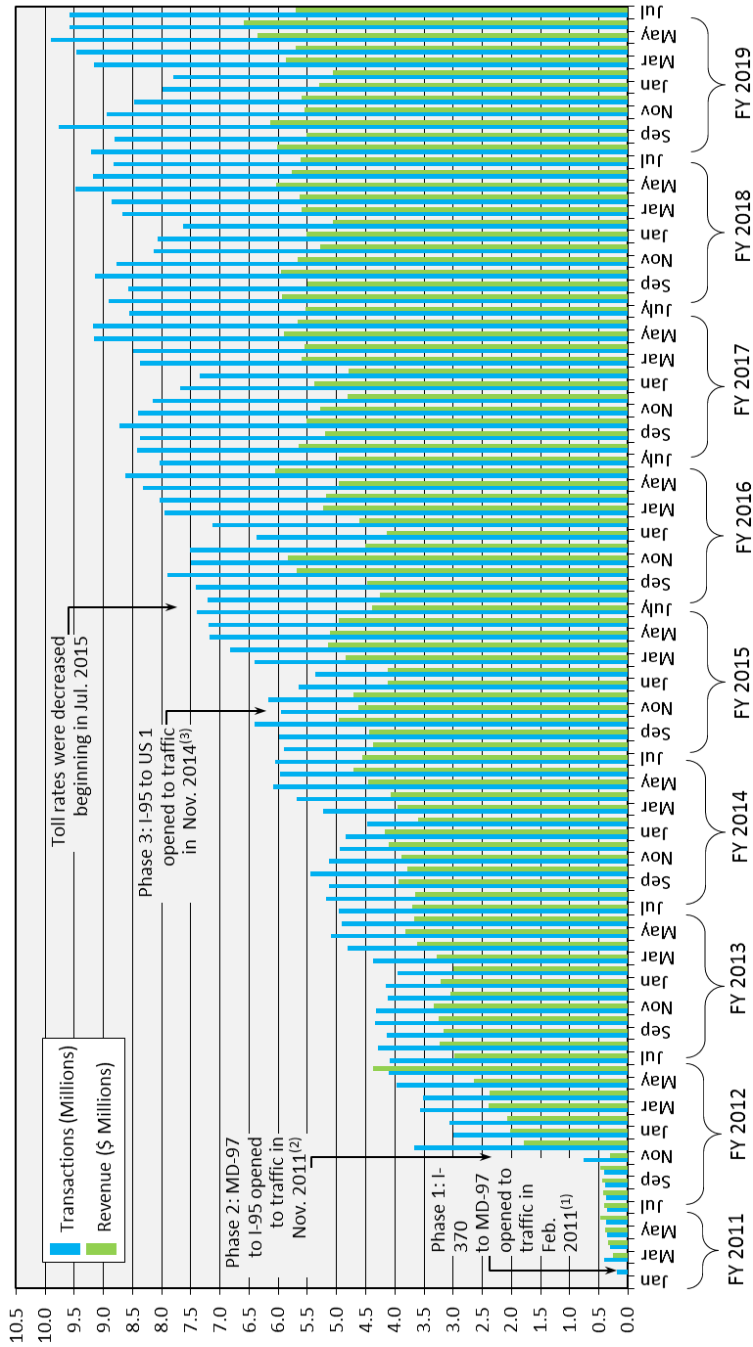
Several factors are monitored to help explain trends traffic and toll revenue on the ICC. This section considers three factors, motor fuel prices, unemployment rate, and weather impacts, in more detail.

Fuel Prices

Figure 4 presents historical gasoline prices for the Central Atlantic Region from January 2013 through August 2019. Beginning around October 2014, gasoline prices began a noticeable decline. The declining fuel prices, in combination with ramp-up from the I-95 to US 1 extension opening in November 2014, caused continued rapid growth on the ICC in calendar year 2015 and early 2016. Most recently, gasoline has averaged around \$2.80 per gallon for the Central Atlantic Region for FY 2019 and beginning of FY 2020 through August 2019.

Based on forecasts from the U.S. Energy Information Administration, fuel prices are expected to increase at relatively similar rates to recent 2016 to 2018 experience over the 10-year forecasting period. Based on these forecasts, fuel prices are not expected to significantly impact long-term traffic and revenue growth on the ICC. However, it should be noted gasoline prices tend to be more volatile than average inflation trends and other commodity price swings, due to the unique international markets. As such there is inherent short-term uncertainty with gasoline forecasts. For example, any major geopolitical shift has the potential to affect prices.

Figure 3
Intercounty Connector Historical Monthly Transactions and Toll Revenue

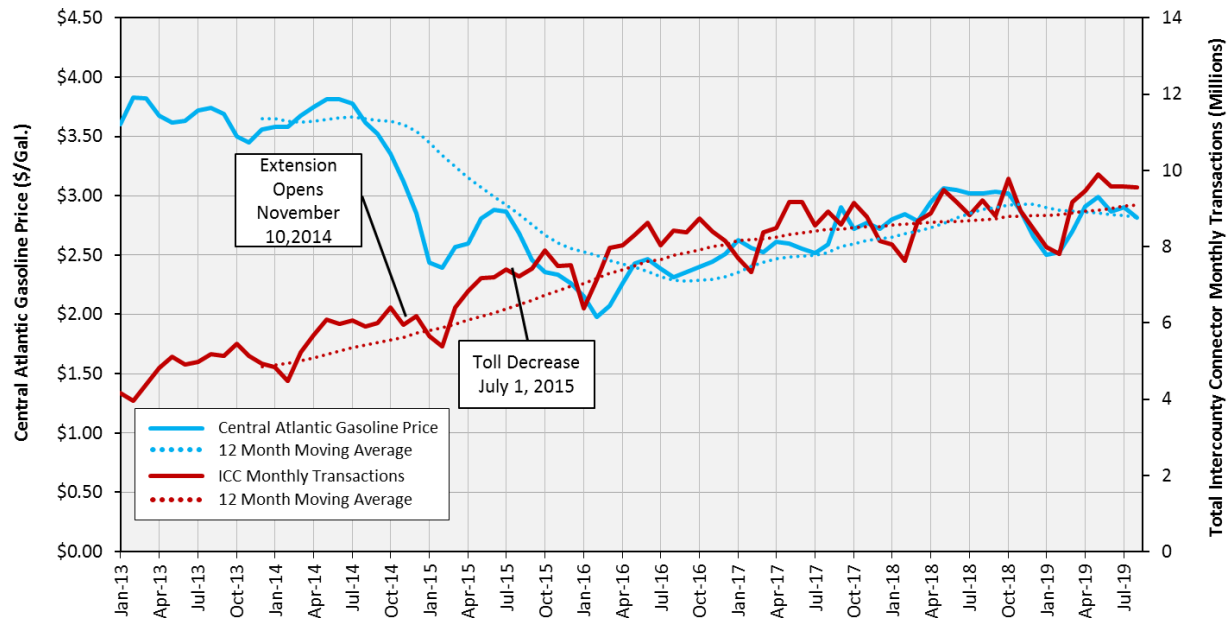


(1) The segment between I-370 and MD 97 (location of Toll Gantries I01/I02) opened on February 23, 2011 and was the only segment open in FY 2011. The segment operated toll free until the beginning of E-ZPass[®] toll operations on March 7, 2011 and the beginning of video toll operations on April 6, 2011.

(2) Toll Gantries I05/I06, I07/I08, I09/I10, and I13/I14 opened in November 22, 2011 (FY 2012). Toll operations began December 5, 2011.

(3) Toll Gantries I17/I18 opened November 10, 2014 (FY 2015).

Figure 4
Comparison of Monthly Central Atlantic Gasoline Prices and
Intercounty Connector Toll Transactions



Source: US Energy Information Administration; Maryland Transportation Authority (MDTA).

Unemployment Rate

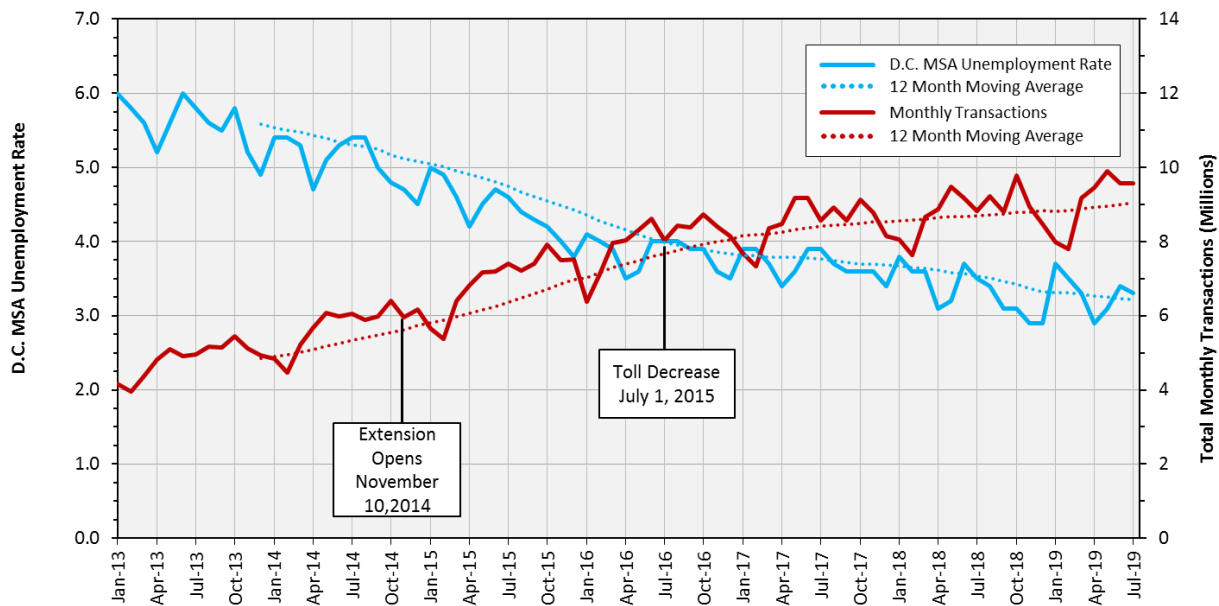
For the past two years, the ICC has shown growth patterns more typical of a mature but growing toll facility after the early years of high ramp-up growth. Thus, regional macroeconomic trends are becoming more important to facility growth. One macroeconomic factor that has been found to be important for passenger car growth on other toll facilities is the unemployment rate. Because the ICC has a relatively high percentage of passenger cars and commuting traffic, low unemployment and other positive labor market indicators are especially important to ICC transaction growth.

Figure 5 presents a similar graph to **Figure 4** but includes Washington D.C. Metropolitan Statistical Area (MSA) unemployment rate instead of gasoline prices. The Washington D.C. MSA includes Washington D.C., several counties in northeastern Virginia, Jefferson County in West Virginia, and several counties in southern Maryland – including those surrounding the ICC facility.

The Washington D.C. MSA unemployment rate has trended steadily downward in the past several years, from rates between 5.0 and 6.0 percent in 2013 to between 3.0 and 4.0 percent since February 2016. National forecasts indicate unemployment rates are expected to increase slightly between 2019 and 2022 to more historically normal levels of between 4.0 and 5.0 percent. After 2022 the unemployment rate is expected to level off based on available forecasts, including those

from Moody's and the Congressional Budget Office. No source is forecasting a foreseeable problem in the labor market. Based on forecasts from Woods & Poole, growth in employment in the Washington Suburban area of Maryland is expected to continue at just over 1.0 percent annually over the 10-year forecast period. This is lower than the 2010 to 2018 post-recession trend of 1.5 percent annually for the Washington Suburban area, but still represents a healthy, growing job market. Based on these forecasts in unemployment and employment, labor markets are anticipated to continue to be generally stable in the areas served by the ICC, which is anticipated to contribute to stability in long-term traffic growth trends.

Figure 5
Comparison of Monthly Washington D.C. Metropolitan Statistical Area Unemployment Rate and Intercounty Connector Toll Transactions



Source: US Bureau of Labor Statistics; Maryland Transportation Authority (MDTA).

Weather Impacts

Traffic is often impacted by weather events, especially in the winter months due to snow, icy conditions, and very low temperatures. Because of its vicinity to federal governmental related employment, traffic on the ICC has been found to be especially impacted by federal government dismissal days. These days are normally related to winter weather events.

Table 6 includes a summary of federal dismissal procedures since 2014 broken down by delayed, early closure, and closed days. The data used to create this table was taken from the United States Office of Personnel Management website. All dismissals shown are related to weather except the

closed days in January 2018, February 2018, December 2018, January 2019, and February 2019 which were due to federal government shutdowns. The dismissal days can sometimes help to explain certain monthly trends compared to previous years. For example, January 2016 had the lowest gantry transaction growth in FY 2016, at 12.8 percent (see **Table 5**). This was partially due to seven federal dismissal days in January 2016 compared to only two in January 2015.

Table 6
Federal Dismissal Procedures Since 2014

<u>Year</u>	<u>Month</u>	<u>Delayed</u>	<u>Early Closure</u>	<u>Closed</u>
2014	Jan	1		1
2014	Feb	1		1
2014	Mar	1		2
2014	Total	3	0	4
2015	Jan	2		
2015	Feb	1		1
2015	Mar	2		1
2015	Total	5	0	2
2016	Jan	2	1	4
2016	Feb	1		
2016	Total	3	1	4
2017	Mar	1		
2017	Total	1	0	0
2018	Jan ⁽¹⁾	1		3
2018	Feb ⁽¹⁾	1		1
2018	Mar	1		2
2018	Dec ⁽¹⁾			8
2018	Total⁽¹⁾	3	0	14
2019	Jan ⁽¹⁾	1	1	22
2019	Feb	1		1
2019	Total⁽¹⁾	2	1	23

⁽¹⁾ Jan, Feb, and Dec 2018 and Jan 2019 closures due to federal gov. shutdowns.

Regional Transportation Improvements

A review of regional transportation improvement projects was conducted as part of this update to assess whether any changes in future project assumptions may have an impact on the ICC forecasts. The review was conducted by evaluating the latest regional transportation improvement plans and future project information on transportation agency websites and in news articles. The plans reviewed included the following:

- Financially Constrained Long-Range Transportation Plan for the National Capital Region
- Montgomery County Capital Budget & Capital Improvements Program projects
- 2019 Prince George's County Transportation Priorities Letter
- Various project websites

Table 7 includes a summary of notable projects near the ICC. Most projects are not anticipated to have a significant impact on the ICC forecasts. However, the final project shown in **Table 7**, the I-495 and I-270 Priced Managed Lanes project, may have a significant impact on the ICC. The most current information available on this project was taken from the Maryland Department of Transportation State Highway Administration project website (<https://495-270-p3.com>). No potential construction timeline or phasing is currently available on the website, but the website states a Final Environmental Impact Statement and Record of Decision is planned to be completed by fall of 2020. Assuming construction begins soon after, the project may be open by the outer years of this ICC forecast update.

Preliminary, sketch-level modeling of the impacts of the I-495 and I-270 Managed Lanes project on the ICC for last year's forecast update showed the potential for an over 10 percent negative impact on ICC traffic due to the full project. The sketch-level modeling assumed two priced managed lanes in both directions for the entirety of the I-495 and I-270 project limits. The ICC impacts appeared to be most dependent on managed lanes on the I-495 north beltway between I-270 and I-95, as this section of I-495 is parallel to and serves as an alternative route to the ICC for some trips. Because information on project phasing assumptions and construction timeline is not currently available for the I-495 and I-270 project, impacts are not included in this forecast update. However, especially due to the potential for significant negative impacts on ICC transactions and revenue, I-495 and I-270 project updates will continue to be closely monitored. Once more detailed information becomes available, CDM Smith recommends that a detailed modeling and analysis exercise be undertaken to understand and quantify the potential impacts on the ICC and determine whether forecast adjustments are warranted.

**Table 7
 Regional Transportation Improvements**

Facility	Improvement	Additional Comments	Schedule
Montrose Parkway East	Construct new 4-lane facility between MD 355 and MD 586		Construction anticipated FY 2022 to FY 2025
MD-28 (Norbeck Rd)/ MD-198 (Spencerville Rd)	Widen to 4-6 lanes on several segments between Georgia Ave and I-95	Project is split into 5 segments, with each segment having different improvement alternatives. Project is approaching end of planning phase. Three segments most likely to proceed to construction are Old Columbia Rd to US-29, MD 650 to Old Columbia Rd, and Georgia Ave to Layhill Rd	Planned to open between 2025 and 2030 (Three segments)
US 29 (Columbia Pike)	Upgrade two at-grade intersections to grade separated interchanges	Per MDOT project website the project is currently on hold	NA
Midcounty Highway	Construct new highway sections between Clarksburg and Gaithersburg	Per Montgomery County project website, the project is currently on hold	NA
I-495 and I-270 Priced Managed Lanes	Add priced managed lanes to I-495 in Maryland and to I-270 from I-495 to I-370	Project is currently being studied using a P3 delivery model. The number of lanes and access points are currently being studied.	Final EIS and ROD planned for completion in Fall 2020

Forecast Results

Impact of Classification and Payment Type Toll Rate Changes

This section provides the impact results of the Pay-by-Plate program, motorcycle, and “light” new vehicle classes, and early payment of Pay-by-Invoice video tolls. The assumed toll rates and implementation schedules associated with these changes are described previously in this report in the “Future Toll Rates” sub-section. Other assumptions associated with these changes are listed below.

- **Pay-by-Plate:** A 12.5 percent share of total video tolls were assumed to be Pay-by Plate.
- **New Vehicle Classes:** Based on data collection results provided by MDTA, 0.15 percent of the current 2-axle class were assumed to be motorcycles, 17 percent of current 3-axle vehicles were assumed to be “light” vehicles pulling trailers, and 49 percent of current 4-axle vehicles were assumed to be “light” vehicles pulling trailers.
- **Early Payment of Video Tolls:** A 25 percent share of remaining video tolls after Pay-by-Plate (25 percent of Pay-by-Invoice) were assumed to pay early.

The resulting impact of classification and payment type toll rate changes are provided in **Table 8**.

Fiscal Year	Estimated Collected Revenue Impact (\$millions)			
	Pay-by-Plate	Early Pay NOTD	New Vehicle Classes	Total Impact
2020 ⁽¹⁾	\$ (0.032)	\$ (0.050)	\$ -	\$ (0.081)
2021 ⁽²⁾	(0.189)	(0.297)	(0.182)	(0.668)
2022	(0.193)	(0.303)	(0.223)	(0.719)
2023	(0.197)	(0.310)	(0.228)	(0.734)
2024	(0.201)	(0.316)	(0.232)	(0.749)
2025	(0.205)	(0.322)	(0.237)	(0.764)
2026	(0.209)	(0.329)	(0.241)	(0.779)
2027	(0.213)	(0.335)	(0.246)	(0.795)
2028	(0.217)	(0.342)	(0.251)	(0.810)
2029	(0.222)	(0.349)	(0.256)	(0.826)

⁽¹⁾ Pay-by-Plate and early pay NOTD assumed to begin 5/1/2020
⁽²⁾ New vehicle classes assumed to be implemented 9/1/2020

Annual Forecast Results

Estimates of annual toll trips and toll revenue for the ICC through FY 2028 are presented in **Table 9**. Actual data between FY 2011 and FY 2019 are also provided for comparative purposes. Short-term annual trip and toll revenue forecasts are based on a review and analysis of the most recent historical trends and adjusting growth rates estimated in last year’s forecast update. Estimated revenue reflects collected toll revenue by MDTA after assumed reductions due to unbillable and unpaid trips. Leakage rates were assumed to be constant throughout the forecast period. The

forecasts assume the Pay-by-Plate and early payment of video tolls programs to begin on May 1, 2020 and the classification changes to be implemented on September 1, 2020.

A 4.2 percent increase in trips to 37.8 million and a 1.1 percent increase in collected toll revenues to \$70.1 million is estimated for FY 2020. Revenue growth is anticipated to be lower than trips growth in FY 2020 due to an increasing ETC payment share and lower average toll rates. As discussed previously in this report, lower revenue growth compared to trips growth was also observed in FY 2019. Trips in FY 2021 are estimated to increase by 2.0 percent to 35.9 million. Collected toll revenues in FY 2020 are estimated to increase by 1.3 percent to \$71.0 million. Revenue growth is estimated to be lower than trips growth in FY 2020 due to the full phasing in of the payment type and classification changes.

By FY 2029, annual total trips are estimated to reach 45.3 million, representing an average annual increase of 2.0 percent from FY 2020. These trips are forecasted to produce \$83.3 million in annual toll revenue. The average annual growth increase of 2.0 percent is based on the long-term growth projections from the January 2016 ICC Comprehensive Traffic and Revenue Study, with some adjustments to near-term growth based on recent performance. It should be noted that the current forecast does not assume any toll rate increases during peak periods in the future to manage congestion. Also, as described previously in the “Regional Transportation Improvements” section, the forecast does not include potential impacts on the ICC due to the proposed I-495 and I-270 Managed Lanes project. Once more detailed information becomes available on this project, CDM Smith recommends that a detailed modeling and analysis exercise be undertaken to understand and quantify the potential impacts on the ICC.

Monthly Forecast Results

CDM Smith developed estimates of monthly trips and toll revenue for the ICC for all months of FY 2020 and FY 2021. The estimates are presented in **Table 10**. FY 2020 estimates incorporate preliminary TVI report data for July, August, and September.



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**Table 9
 Estimated Annual Trips and Toll Revenue**

Fiscal Year	Peak / Off Peak / Overnight / Per Mile Toll Rate	Estimated Annual Trips (millions)				Estimated Collected Revenue (\$millions) ⁽¹⁾					
		ETC		Video		ETC		Video		Total	
		Trips	AAPC ⁽²⁾	Trips	AAPC ⁽²⁾	Revenue	AAPC ⁽²⁾	Revenue	AAPC ⁽²⁾	Toll Revenue	Average Toll
2011 ⁽³⁾	\$0.25 / \$0.20 / \$0.10	1.64	74.7	0.55	2.19	\$ 1.43	\$ 0.87	\$ 0.04	\$ 0.07	\$ 1.47	\$ 0.67
2012 ⁽³⁾	\$0.25 / \$0.20 / \$0.10	9.41	474.3	0.63	10.04	18.06	1,159.6	1.92	2.65	19.73	1,238.7
2013 ⁽³⁾	\$0.25 / \$0.20 / \$0.10	15.68	666	1.52	17.20	34.70	92.1	2.21	3.23	39.59	100.6
2014 ⁽³⁾	\$0.25 / \$0.20 / \$0.10	18.36	17.0	89.6	20.48	40.92	18.0	2.23	3.35	48.03	21.3
2015 ⁽³⁾	\$0.25 / \$0.20 / \$0.10	21.60	17.7	89.6	24.12	47.71	16.6	2.21	3.30	56.02	16.6
2016 ⁽³⁾	\$0.22 / \$0.17 / \$0.07	25.83	19.6	86.2	29.98	47.70	(0.0)	1.85	2.80	59.31	5.9
2017 ⁽³⁾	\$0.22 / \$0.17 / \$0.07	28.40	10.0	87.0	32.63	52.35	9.7	1.84	2.83	64.32	8.4
2018 ⁽³⁾	\$0.22 / \$0.17 / \$0.07	30.59	7.7	88.9	34.40	55.94	6.9	1.83	3.03	67.51	5.0
2019 ⁽³⁾	\$0.22 / \$0.17 / \$0.07	32.91	7.6	90.7	36.29	58.94	5.4	1.79	3.08	69.32	2.7
2020 ⁽⁴⁾	\$0.22 / \$0.17 / \$0.07	34.91	6.1	92.3	37.82	61.14	3.7	1.75	3.08	70.07	1.1
2021 ⁽⁵⁾	\$0.22 / \$0.17 / \$0.07	35.74	2.4	92.5	38.62	62.48	2.2	1.75	2.94	70.98	1.3
2022	\$0.22 / \$0.17 / \$0.07	36.50	2.1	92.5	39.45	63.78	2.1	1.75	2.94	72.46	2.1
2023	\$0.22 / \$0.17 / \$0.07	37.28	2.1	92.5	40.29	65.14	2.1	1.75	2.94	74.01	2.1
2024	\$0.22 / \$0.17 / \$0.07	38.02	2.0	92.5	41.09	66.44	2.0	1.75	2.94	75.48	2.0
2025	\$0.22 / \$0.17 / \$0.07	38.78	2.0	92.5	41.91	67.76	2.0	1.75	2.94	76.98	2.0
2026	\$0.22 / \$0.17 / \$0.07	39.55	2.0	92.5	42.74	69.10	2.0	1.75	2.94	78.51	2.0
2027	\$0.22 / \$0.17 / \$0.07	40.34	2.0	92.5	43.59	70.48	2.0	1.75	2.94	80.07	2.0
2028	\$0.22 / \$0.17 / \$0.07	41.14	2.0	92.5	44.46	71.88	2.0	1.75	2.94	81.66	2.0
2029	\$0.22 / \$0.17 / \$0.07	41.96	2.0	92.5	45.34	73.31	2.0	1.75	2.94	83.28	2.0

(1) Includes revenue impacts due to leakage, including unpaid transactions.
 (2) Average Annual Percent Change.
 (3) Actual
 (4) Pay-by-Plate and early pay NOTD assumed to begin 5/1/2020
 (5) New vehicle classes assumed to be implemented 9/1/2020



**Table 10
Estimated ICC Monthly Trips and Collected Toll Revenue**

FY 2020								
Month	Estimated Trips (millions)				Estimated Collected Toll Revenue (\$millions) ⁽¹⁾			
	PC ETC	CV ETC	Video	Total	PC ETC	CV ETC	Video	Total
Jul ⁽²⁾	2.756	0.087	0.282	3.125	\$ 4.569	\$ 0.600	\$ 0.532	\$ 5.701
Aug ⁽²⁾	2.749	0.087	0.282	3.118	4.609	0.605	0.858	6.072
Sep ⁽²⁾	2.641	0.077	0.331	3.050	4.427	0.540	0.975	5.942
Oct	3.099	0.092	0.242	3.433	4.932	0.593	0.805	6.330
Nov	2.823	0.077	0.218	3.118	4.492	0.495	0.726	5.713
Dec	2.737	0.078	0.214	3.030	4.356	0.502	0.713	5.572
Jan	2.576	0.072	0.187	2.835	4.100	0.460	0.623	5.182
Feb	2.525	0.070	0.201	2.795	4.018	0.448	0.668	5.134
Mar	2.945	0.085	0.218	3.248	4.686	0.544	0.727	5.957
Apr	3.000	0.091	0.224	3.315	4.774	0.583	0.747	6.104
May ⁽³⁾	3.022	0.085	0.242	3.349	4.810	0.549	0.745	6.104
Jun	3.044	0.094	0.263	3.401	4.845	0.601	0.812	6.258
Total	33.917	0.994	2.904	37.816	\$ 54.620	\$ 6.518	\$ 8.931	\$ 70.069

FY 2021								
Month	Estimated Trips (millions)				Estimated Collected Toll Revenue (\$millions) ⁽¹⁾			
	PC ETC	CV ETC	Video	Total	PC ETC	CV ETC	Video	Total
Jul	2.945	0.093	0.259	3.297	\$ 4.742	\$ 0.610	\$ 0.765	\$ 6.117
Aug	2.891	0.091	0.255	3.237	4.656	0.597	0.753	6.006
Sep ⁽⁴⁾	2.879	0.083	0.259	3.220	4.632	0.530	0.763	5.925
Oct	3.091	0.092	0.253	3.436	4.974	0.590	0.744	6.308
Nov	2.857	0.079	0.230	3.166	4.596	0.508	0.677	5.782
Dec	2.814	0.083	0.228	3.126	4.528	0.532	0.672	5.733
Jan	2.530	0.069	0.193	2.793	4.071	0.442	0.570	5.083
Feb	2.494	0.071	0.206	2.771	4.013	0.455	0.606	5.074
Mar	3.024	0.090	0.232	3.345	4.865	0.576	0.683	6.124
Apr	3.046	0.094	0.237	3.376	4.900	0.602	0.696	6.198
May	3.058	0.088	0.255	3.401	4.920	0.564	0.750	6.235
Jun	3.080	0.096	0.278	3.455	4.956	0.617	0.819	6.393
Total	34.707	1.030	2.886	38.623	\$ 55.853	\$ 6.625	\$ 8.498	\$ 70.977

(1) Includes revenue impacts due to leakage, including unpaid transactions.

(2) From Preliminary TVI Reports with adjustments to account for official duty traffic being missing from the reports

(3) Pay-by-Plate and early pay NOTD assumed to begin 5/1/2020

(4) New vehicle classes assumed to be implemented 9/1/2020

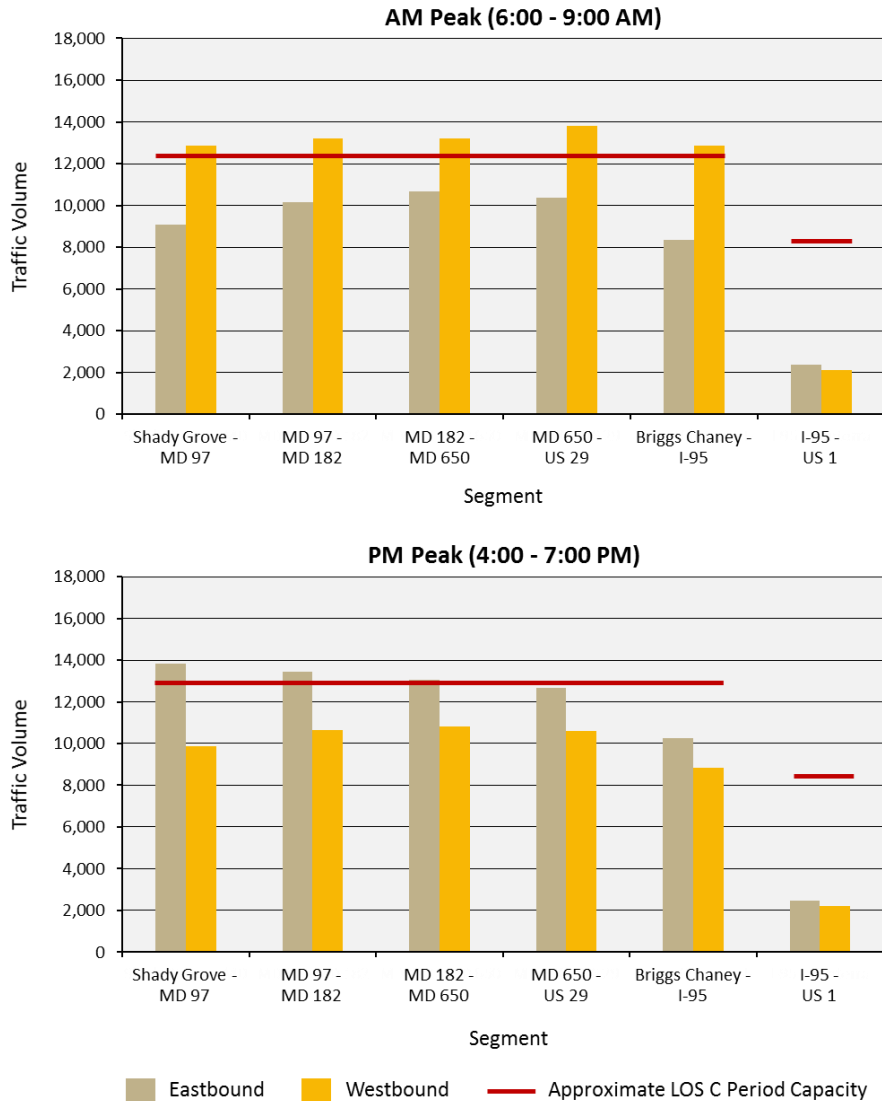
Capacity Analysis

One consideration for the future-year traffic volumes was whether travel demand along the individual mainline segments would exceed a theoretical capacity of the ICC. Although MDTA has not determined what threshold might trigger congestion-managed toll increases, for the purposes of this analysis it was assumed that “Level of Service C” represented that threshold. **Figure 5** illustrates the relationship between the theoretical “Level of Service C” Peak Period capacity and the estimated FY 2040 volumes during the AM Peak (6:00 – 9:00 AM) and PM Peak (4:00 – 7:00 PM) Periods on the ICC by segment and direction. Note that this analysis focused on the mainlines of the ICC and not any potential future operational issues that could be experienced at ramp junctions or intersections.

As is shown in the figure, FY 2040 estimated average Peak Period volumes on the ICC range between about 8,500 and 14,000 vehicles during the AM and PM Peak Periods and directions west of I-95, with the westbound direction in the AM Peak forecasted to exceed “Level of Service C” in all segments by 2040. The eastbound direction in the PM Peak is forecasted to exceed capacity in three of the five segments. The ICC section between I-95 and US 1 is estimated to carry between 2,000 and 2,500 vehicles during both the AM and PM Peak Periods, which is much less than the theoretical “Level of Service C” capacity for this section.

This analysis, which is based on estimated average weekday travel volumes along the ICC mainline travel segments in the peak month of travel, indicates toll increases would be required to maintain “Level of Service C” travel conditions. It is estimated that the westbound travel direction during the AM Peak could begin exceeding capacity in FY 2033 and the eastbound direction in the PM Peak in FY 2036. However, specific hourly traffic volumes will vary by day and hour within the peaks, and it is probable that the “Level of Service C” threshold will be reached in certain segments, travel directions, and hours sooner than FY 2030.

Note that this capacity analysis does not include potential impacts on the ICC due to the proposed I-495 and I-270 Managed Lanes project.



Note: Although MDTA has not determined what Level of Service threshold might trigger congestion managed toll increases, for purposes of this analysis, it is assumed that "Level of Service C" would be the maximum threshold (indicated by the red line).

Figure 5
FY 2040 Estimated AM and PM Period Segment Volumes
by Mainline Segment and Direction

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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 MDTA. 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 MDTA. These estimates and projections may not be indicative of actual or future values and are therefore subject to substantial uncertainty. Future developments, 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.

The report and its contents are intended solely for use by the MDTA and designated parties approved by MDTA and CDM Smith. Any use by third-parties, other than as noted above, is expressly prohibited. In addition, any publication of the report without the express written consent of CDM Smith is prohibited.

CDM Smith is not, and has not been, a municipal advisor as defined in Federal law (the Dodd Frank Bill) to MDTA and does not owe a fiduciary duty pursuant to Section 15B of the Exchange Act to MDTA with respect to the information and material contained in this report. CDM Smith is not



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recommending and has not recommended any action to MDTA. MDTA should discuss the information and material contained in this report with any and all internal and external advisors that it deems appropriate before acting on this information.

Very truly yours,

A handwritten signature in blue ink, appearing to read "Ronald Davis, III".

Ronald Davis, III
Project Manager
CDM Smith Inc.

