

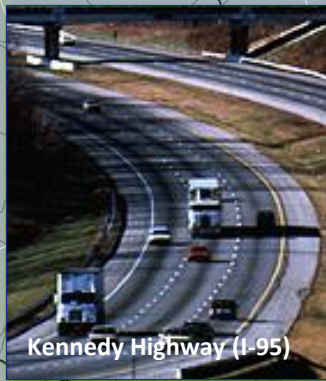
Maryland Transportation Authority FY 2023 Traffic and Toll Revenue Forecast Update



FINAL REPORT
November 2, 2022



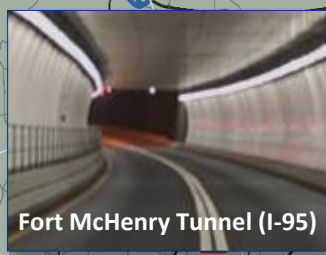
Maryland
Transportation
Authority



Kennedy Highway (I-95)



Hatem Bridge (US 40)



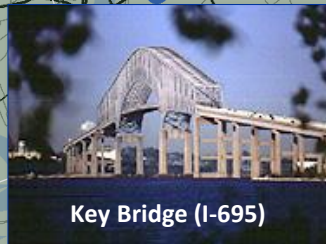
Fort McHenry Tunnel (I-95)



Harbor Tunnel (I-895)



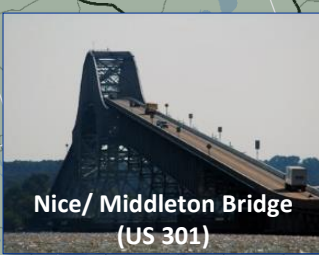
Intercounty Connector (ICC)



Key Bridge (I-695)



I-95 Express Toll Lanes (ETL)



Nice/ Middleton Bridge (US 301)



Bay Bridge (US 50/301)



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Chapter 1

Introduction

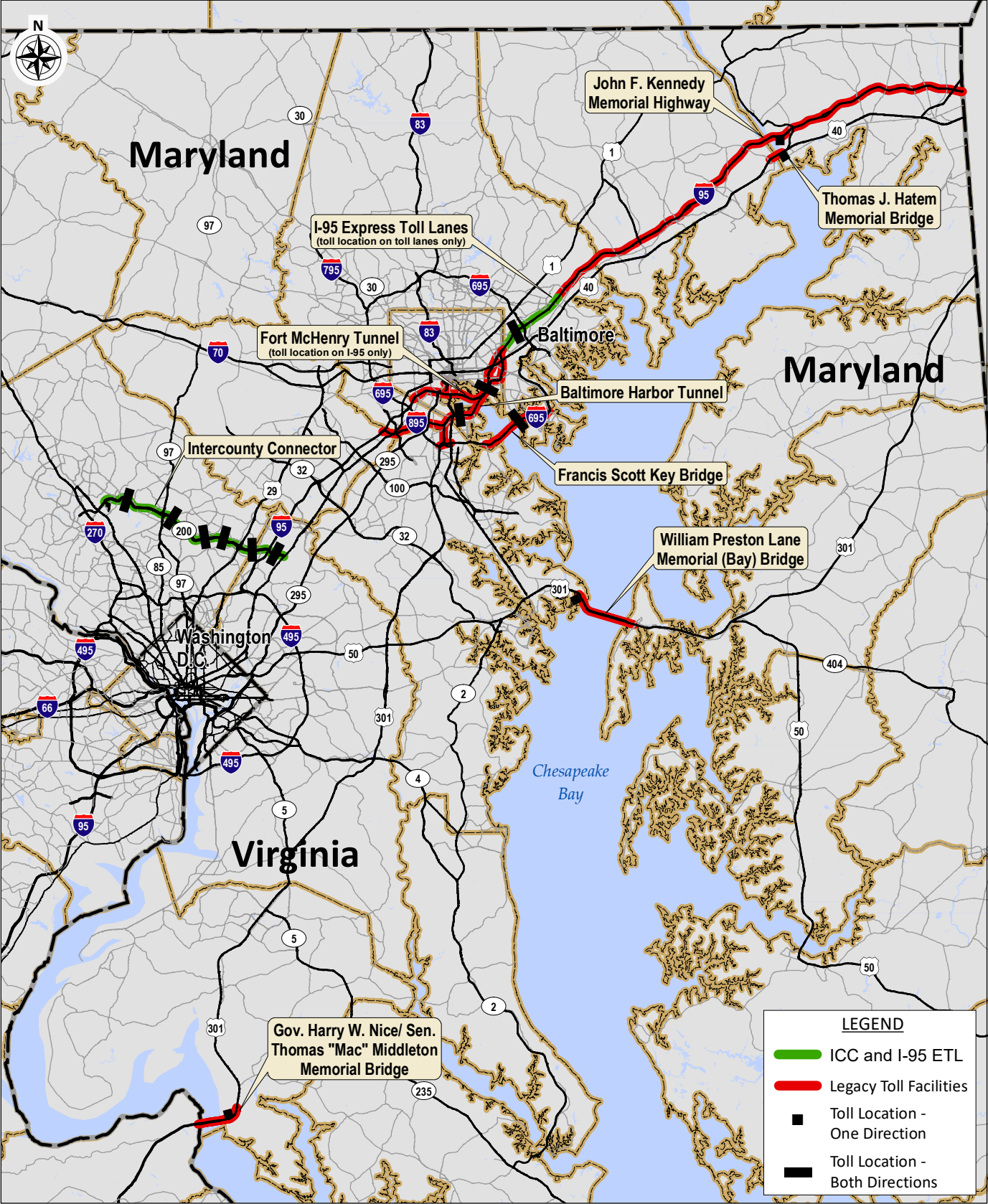
This letter report includes ten-year forecasts through FY 2032 for the seven “Legacy” toll facilities operated by MDTA, for the Intercounty Connector (ICC), and for the I-95 Express Toll Lanes (ETLs). It summarizes the study analysis, including a presentation of historical traffic and revenue trends, relevant socioeconomic conditions and forecasts, and the ten-year forecast results.

1.1 System Description

The nine facilities operated by MDTA are listed below. Collectively, the first seven facilities in the list below are referred to as the Legacy System.

- Thomas J. Hatem Memorial Bridge (Hatem Bridge, TJH)
- John F. Kennedy Memorial Highway, excluding the I-95 Express Toll Lanes (Kennedy Highway, JFK)
- Baltimore Harbor Tunnel (Harbor Tunnel, BHT)
- Fort McHenry Tunnel (Fort McHenry Tunnel, FMT)
- Francis Scott Key Bridge (Key Bridge, FSK)
- William Preston Lane Jr. Memorial Bridge (Bay Bridge, WPL)
- Governor Harry W. Nice Memorial/Senator Thomas “Mac” Middleton Bridge (Nice/Middleton Bridge, HWN)
- Intercounty Connector (ICC/MD 200)
- I-95 Express Toll Lanes (I-95 ETLs)

Figure 1-1 shows the locations of the MDTA Legacy system, ICC, and I-95 ETLs toll facilities and toll gantries in a regional context. As can be implied by the geographic distribution of the different facilities, the MDTA system serves a variety of travel purposes within the regional transportation system and consequently has a diverse mix of traffic classes and payment types.



X:\TFT Group\Projects\MD Read Only (Moved to ProjectWise)\MD 236880 MDTA Task 24 - 2020 Legacy T&R Update\Graphics\ArcMAP\Legacy Facility Location Map - Fig 1-1_2020.mxd \ 5-20-20



FACILITY LOCATION MAP MARYLAND TOLL FACILITIES

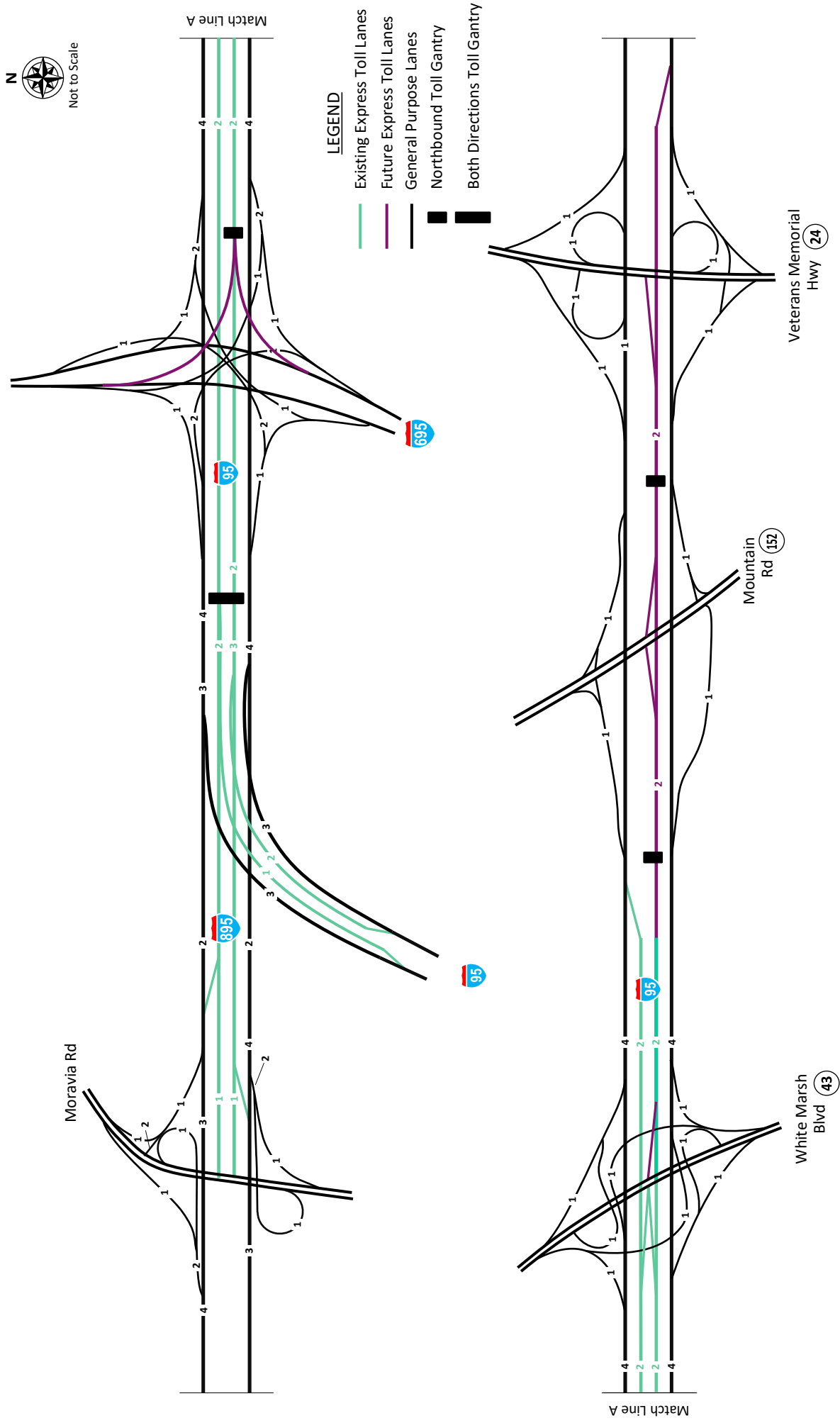
FIGURE 1-1

In the north, the Hatem Bridge and the Kennedy Highway form two parallel crossings of the Susquehanna River. The Hatem Bridge carries US 40 over the river and is the oldest of the MDTA's facilities, having been open to traffic since August 1940. The existing structure replaced an older bridge that first opened in 1910. The John F. Kennedy Memorial Highway is a 50-mile segment of I-95 that was opened in November 1963. It currently has one mainline toll plaza located just east of the Susquehanna River. The I-95 ETLs are a separate eight-mile toll facility on the Kennedy Highway between I-895 and MD 43 in Northeast Baltimore. The facility, which opened in December 2014, includes two express toll lanes in each direction in between the general purpose lanes on this segment of I-95. A northern extension of only the northbound I-95 ETL facility is planned to open in phases within the forecasting horizon of this report. The assumed opening dates of this extension are included in the assumptions in Chapter 4. **Figure 1-2** shows the assumed access and tolling points on the I-95 ETL extension.

There are three alternative MDTA toll routes that cross the Baltimore Harbor in the center of the region: the Baltimore Harbor Tunnel (I-895), the Francis Scott Key Bridge (I-695), and the Fort McHenry Tunnel (I-95), which are collectively referred to as the Baltimore Harbor crossings. The oldest of the three Baltimore Harbor crossings is the Harbor Tunnel which opened in November 1957. The Key Bridge was built to alleviate congestion and delays at the Harbor Tunnel and was opened in March 1977. The newest of these facilities, the Fort McHenry Tunnel, is an eight-lane crossing that opened in November 1985.

The ICC facility is in the northern Washington D.C. metro region and connects I-370 in the Gaithersburg area to I-95 and US 1 near Laurel. The ICC opened in phases. The initial segment between I-370 and MD 97 opened to traffic in February 2011 and began collecting tolls in March 2011. The segment from MD 97 to I-95 opened to traffic in November 2011 and began collecting tolls in December 2011, and the final segment between I-95 and US 1 opened and began collecting tolls in November 2014.

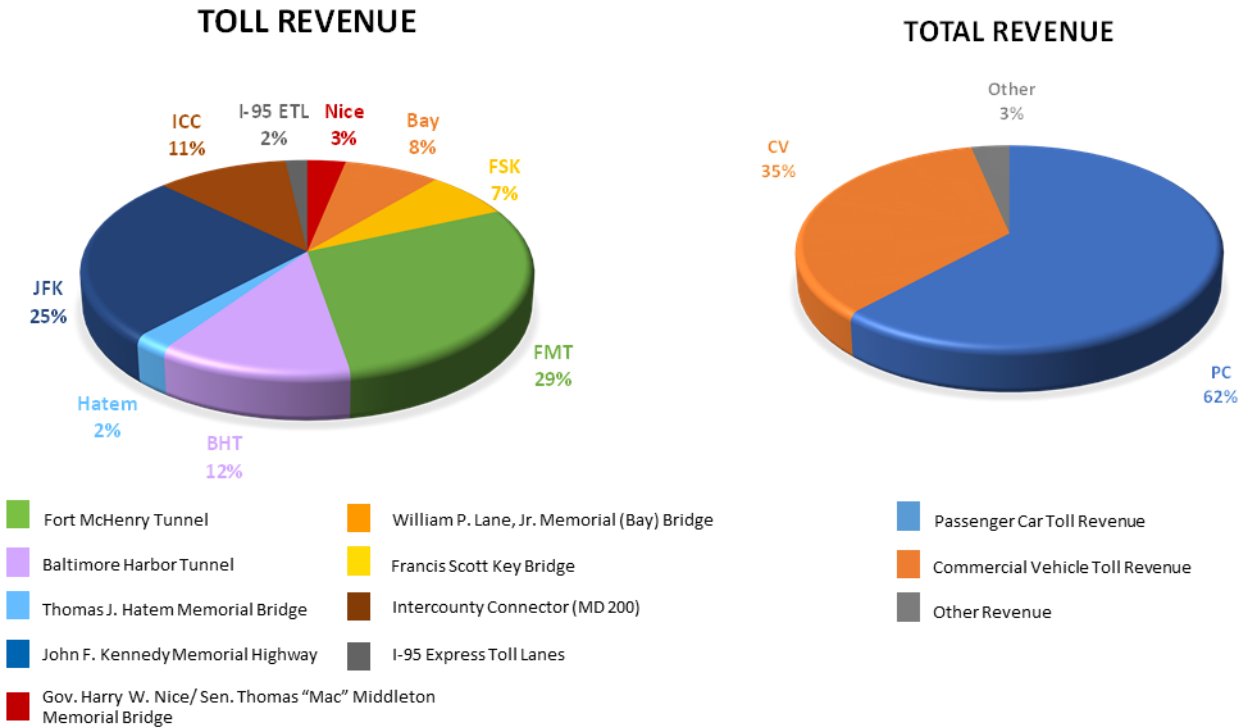
The southern region contains two facilities which carry US 301 to diverse destinations. The Governor Harry W. Nice Memorial/Senator Thomas "Mac" Middleton Bridge was opened in December 1940, connecting Maryland with Virginia, thereby allowing travelers making regional through-trips to bypass the Washington DC area. The William Preston Lane Jr. Memorial (Bay) Bridge was first opened to traffic in July 1952 and crosses the Chesapeake Bay. Twenty-one years later in June 1973, a parallel span carrying westbound traffic was opened, with the original span carrying eastbound traffic. A Tier 1 National Environmental Policy Act (NEPA) Study, called the Chesapeake Bay Crossing Study, was completed in the spring of this year. The study is considering alternatives to address congestion on the Bay Bridge. A Record of Decision (ROD) on the study and Final Environmental Impact Statement (Final EIS) were approved in April 2022 along with the Selected Corridor Alternative. Final project design and construction will follow final agency decisions based on completion of Tier 2 NEPA Study documents. Currently, there is no timetable for construction of a new crossing.



**I-95 EXPRESS TOLL LANES (ETL)
EXISTING & FUTURE CONFIGURATION W/ I-695 DC**

For context in this letter report, **Figure 1-3** shows the share of MDTA toll revenue by facility and total revenue by type for the most recent full fiscal year. As shown, nearly three quarters of toll revenue is from the Kennedy Highway, Fort McHenry Tunnel, Harbor Tunnel, and Key Bridge, which make up the I-95 corridor and parallel Interstate crossings near downtown Baltimore. Total revenue includes about 35 percent commercial vehicle toll revenue, about 62 percent passenger car toll revenue, and about 3 percent other revenue. Other revenue includes a combination of revenue collected and revenue deductions from unused Commuter Plan and Shoppers Plan trips, transponder fees and sales, the Hatem Bridge E-ZPass program, violation recovery (civil penalties), and commercial vehicle fees and discounts (post-usage discount, high frequency discount, and over-sized permit fees). The shares of revenue for FY 2022 were atypical compared to previous years due to the temporary business rule changes and ongoing processing of backlogged video invoices.

Figure 1-3
FY 2022 MDTA Share of Toll Revenue by Facility and Total Revenue by Type



1.2 Toll Rate and Civil Penalty Structure

1.2.1 Standard Toll Rates

Table 1-1 provides the standard Legacy system toll rates and toll collection direction. Toll rates vary by facility, method of payment, and vehicle class. The toll rates are grouped into three categories: Maryland E-ZPass, base toll rates which includes out-of-state E-ZPass and the pay-by-plate payment method, and video payment. Pay-by-Plate was introduced as another payment option for customers on April 29, 2021, which allows customers to pre-register their vehicle’s license plate for video payment and receive the prior cash toll rate. A discount for early payment

of video tolls was also introduced on April 29, 2021. This allows customers to receive a 15 percent discount (up to \$5.00) when they pay their video tolls before an invoice is mailed. Maryland E-ZPass toll rates apply to drivers who register for an E-ZPass account and receive a transponder from MDTA. These customers receive a discount compared to the base toll rate customers and can also enroll in discounts like the shopper and commuter rates and programs further described in **Table 1-2**. The base toll rate applies to out-of-state registered E-ZPass and pay-by-plate customers. Video customers pay a 50 percent surcharge over the base toll rate. Cash was a payment option at five of the seven Legacy facilities up until March 17, 2020 when cashless collection was initiated as a safety precaution related to the COVID-19 pandemic. The Hatem Bridge and Key Bridge facilities had already been converted to all-electronic tolling in October 2019. Permanent cashless tolling on these facilities that offered a cash payment option before the pandemic was announced on August 6, 2020.

Table 1-1
Standard MDTA Legacy System Toll Rates and Toll Collection Direction

Class	Hatem Bridge (Eastbound)	Kennedy Highway (Eastbound)	Harbor Facilities: FMT, BHT, FSK (Both)	Bay Bridge (Eastbound)	Nice/ Middleton Bridge (Westbound)
Maryland E-ZPass Payment Type					
Commuter ¹	\$2.80	\$2.80	\$1.40	\$1.40	\$2.10
Shopper ¹	NA	NA	NA	\$2.00	NA
2-axle	\$6.00	\$6.00	\$3.00	\$2.50	\$5.40
3-axle	\$11.20	\$16.00	\$8.00	\$8.00	\$12.00
4-axle	\$16.80	\$24.00	\$12.00	\$12.00	\$18.00
5-axle	\$48.00	\$48.00	\$24.00	\$24.00	\$36.00
6-axle+	\$60.00	\$60.00	\$30.00	\$30.00	\$45.00
Base Toll Rates: Other E-ZPass Payment Type and Pay-By-Plate Payment Type²					
2-axle	\$8.00	\$8.00	\$4.00	\$4.00	\$6.00
3-axle	\$16.00	\$16.00	\$8.00	\$8.00	\$12.00
4-axle	\$24.00	\$24.00	\$12.00	\$12.00	\$18.00
5-axle	\$48.00	\$48.00	\$24.00	\$24.00	\$36.00
6-axle+	\$60.00	\$60.00	\$30.00	\$30.00	\$45.00
Video Payment Type³					
2-axle	\$12.00	\$12.00	\$6.00	\$6.00	\$9.00
3-axle	\$24.00	\$24.00	\$12.00	\$12.00	\$18.00
4-axle	\$36.00	\$36.00	\$18.00	\$18.00	\$27.00
5-axle	\$63.00	\$63.00	\$36.00	\$36.00	\$51.00
6-axle+	\$75.00	\$75.00	\$45.00	\$45.00	\$60.00

¹Commuter and shopper programs for 2-axle vehicles only. Rates shown are if all trips are used

²ITOLs (video images matched to existing E-ZPass accounts) are charged the base toll rate.

³Customers that pay their video toll before an invoice is mailed are eligible for a 15% discount

Table 1-2 provides a description of the other MDTA Legacy system discount toll rate programs available to Maryland E-ZPass customers. The programs available for two-axle vehicles aim to provide discounts for drivers who use the MDTA facilities frequently. Commuter plans are available for the Baltimore Harbor crossings, the Nice/Middleton Bridge, and the Bay Bridge. These plans allow customers to complete a set number of trips within a 45-day period at a fixed price on specific facilities. Specific details of the commuter programs are shown in **Table 1-2**. In addition to the commuter plan at the Bay Bridge, there is a shopper plan that allows drivers to take ten trips Sunday through Thursday for \$20 over a 90-day period on the Bay Bridge. The Hatem Bridge has two plans offered: Hatem Plan A and Hatem Plan B. Both plans provide unlimited trips for a flat annual fee of \$20 and vary slightly in account setup and associated fees.

Two discount plans are offered for commercial vehicles with five-or-more axles: the post usage discount and supplemental rebate plan. The post usage discount reimburses business accounts a percentage of monthly tolls in the range of 10 to 20 percent based on the toll amount accrued in a 30-day period. The supplemental rebate program provides a similar structure for individual accounts by providing a discount in the range of 10 to 20 percent for accounts that make more than 60 trips per month. Also listed in **Table 1-2** are the Baltimore Harbor Tunnel Childs Street ramp and Key Bridge Broening Highway Turnaround tolls which are a lower toll rate for three-or-more axle vehicles using specific ramps near the Harbor Tunnel and Key Bridge

Tolls on the ICC differ from the Legacy system in that they're assessed on particular interchange-to-interchange movements, as shown in **Table 1-3**. The ICC is a cashless facility with E-ZPass, Pay-by-Plate or video payment options. This table provides the two-axle E-ZPass toll rates, which vary from \$0.40 to \$3.86 depending on the length of the trip and time of day. Higher toll rates are assessed on weekdays during the Peak Periods, which are 6:00 to 9:00 AM and 3:00 to 7:00 PM, compared to the Overnight (11:00 PM to 5:00 AM) and Off-Peak (all other hours) time periods. Tolls differ on the weekends for the Overnight and Off-Peak periods. E-ZPass toll rates are higher for commercial and recreational (boat and camper) vehicles based on the number of axles. Unlike toll rates on the Legacy system, E-ZPass rates are the same on the ICC for customers holding their accounts through MDTA and through other agencies. All video toll customers pay a 50 percent surcharge over the E-ZPass rate with a minimum of \$1 and maximum of \$15 above the E-ZPass rates. Pay-by-Plate customers pay a rate in between the video toll and E-ZPass customers.

**Table 1-2
Other MDTA Legacy System Discount Toll Rate Programs and Rates**

Program	Details
Baltimore Region Commuter Discount Plan	For E-ZPass Maryland accounts holders driving two-axle vehicles . The Baltimore Regional Plan is \$70 for 50 trips on the Fort McHenry Tunnel, Harbor Tunnel, Key Bridge, Kennedy Highway, or Hatem Bridge. Two "trips" are deducted for each crossing of the Kennedy Highway and Hatem Bridge . Plans end after 45 days or when all of the trips are used, whichever comes first.
Nice Bridge Commuter Discount Plan	For E-ZPass Maryland accounts holders driving two-axle vehicles . The Nice bridge plan is \$52.50 and offers 25 trips. The plans ends after 45 days or when all of the trips are used, whichever comes first.
Bay Bridge Commuter Discount Plan	For E-ZPass Maryland accounts holders driving two-axle vehicles . The Bay Bridge Plan is \$35.00 and offers 25 trips. The plan ends after 45 days or when all of the trips are used, whichever comes first.
Bay Bridge Shopper Discount Plan	For E-ZPass Maryland accounts holders driving two-axle vehicles . The Bay Bridge Shopper plan is \$20.00 for ten two-axle trips that can be used Sunday through Thursday. The plan ends after 90 days or when all of the trips are used, whichever comes first.
Hattem Bridge Discount Plan A	An E-ZPass account with transponders valid only at the Hattem Bridge. This plan applies only to two-axle vehicles , and includes unlimited trips. This plan is subject to a flat annual fee of \$20.00. There are NO account fees, prepaid toll deposits or account statements.
Hattem Bridge Discount Plan B	This discount plan is attached to a normal Maryland E-ZPass account. This plan applies only to two-axle vehicles , and includes unlimited trips. This plan is subject to a flat annual fee of \$20.00. Account fees apply as with the normal Maryland E-ZPass account.
Post Usage Discount Plan	Business accounts operating five-or-more-axle vehicles qualify for an E-ZPass post-usage discount based on the tolls paid in every 30-day period, with a 10 percent discount offered for total monthly tolls of \$150.00 to \$1,999.99, 15 percent for total monthly tolls of \$2,000.00 to \$7,500.00 and 20 percent for total monthly tolls of over \$7,500.00.
Supplemental Rebate Plan	A supplemental rebate program is offered to five-or-more-axle vehicles with individual transponders making 60 or more trips per month. As of July 1, 2015, a 10 percent discount is offered for five- or more-axle vehicle transponders making 60-79 trips per month, 15 percent for 80-99 trips per month, and 20 percent for 100 or more per month.
Baltimore Harbor Childs Street Ramps and Key Bridge Broening Highway Turnaround Toll	Vehicles with a valid E-ZPass Maryland account and transponder will pay \$2 per axle for 3, 4, 5 and 6+ axle vehicles to use the I-895/Childs Street ramps at the Baltimore Harbor Tunnel and when making the Broening Highway Turnaround on the Key Bridge.

**Table 1-3
Intercounty Connector Two-Axle E-ZPass Toll Rates by Movement and Time Period**

Entrance	Time Period ¹	Exit						
		I-370 / Shady Grove Rd.	SR 97 / Georgia Ave.	SR 182 / Layhill Rd.	SR 650 / New Hampshire Ave.	US 29 / Briggs Cheney Rd.	I-95	Konterra Dr. / US 1
I-370; Shady Grove Rd.	Peak		\$1.24	\$1.74	\$2.37	\$2.92	\$3.52	\$3.86
	Off-Peak		\$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	\$1.24		\$0.50	\$1.13	\$1.68	\$2.28	\$2.61
	Off-Peak	\$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	\$1.74	\$0.50		\$0.62	\$1.18	\$1.78	\$2.11
	Off-Peak	\$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	\$2.37	\$1.13	\$0.62		\$0.55	\$1.15	\$1.49
	Off-Peak	\$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 / Briggs Cheney Rd.	Peak	\$2.92	\$1.68	\$1.18	\$0.55		\$0.60	\$0.94
	Off-Peak	\$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	\$3.52	\$2.28	\$1.78	\$1.15	\$0.60		\$0.44
	Off-Peak	\$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. / US 1	Peak	\$3.86	\$2.61	\$2.11	\$1.49	\$0.94	\$0.44	
	Off-Peak	\$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	

¹Time periods are:

Peak Period is defined as 6:00 to 9:00 AM and 4:00 to 7:00 PM on Weekdays (excluding federal holidays).

Off-Peak Period is defined as 5:00 to 6:00 AM, 9:00 AM to 4:00 PM, and 7:00 to 11:00 PM on Weekdays and 5:00 AM to 11:00 PM on Weekends and federal holidays.

Overnight is defined as 11:00 PM to 5:00 AM every day.

The I-95 ETLs are an express lane facility with a single tolling point in each direction. Similar to the ICC, toll rates vary by vehicle type and time period. It is a cashless facility with payment method options of E-ZPass, Pay-by-Plate, or video tolling. As shown previously in **Figure 1-2**, a northbound extension of the I-95 ETLs is also planned to open within the forecasting period.

Table 1-4 provides the toll rates by axle and payment type for the existing section from I-895 to MD 43, as well as the assumed toll rates for the two northbound extension tolling points, which extend through MD 24. Unlike toll rates on the Legacy system, E-ZPass rates are the same on the I-95 ETLs for customers holding their accounts through MDTA and through other agencies. Video toll customers pay a 50 percent surcharge over the E-ZPass rate with a minimum of \$1 and maximum of \$15 above the E-ZPass rates. Pay-by-plate customers pay a rate that is in between video toll and E-ZPass customers.

Table 1-4
I-95 Express Toll Lane Toll Rates

Class	Existing Section (I-895 to MD 43)			Northbound Extension Phase 1 (MD 43 to MD 152)			Northbound Extension Phase 2 (MD 152 to MD 24)		
	Peak	Off-Peak	Overnight	Peak	Off-Peak	Overnight	Peak	Off-Peak	Overnight
E-ZPass Payment Type									
2-axle	\$1.54	\$1.19	\$0.49	\$1.54	\$1.19	\$0.49	\$0.66	\$0.51	\$0.21
3-axle	\$3.08	\$2.38	\$0.98	\$3.08	\$2.38	\$0.98	\$1.32	\$1.02	\$0.42
4-axle	\$4.65	\$3.57	\$1.47	\$4.65	\$3.57	\$1.47	\$1.99	\$1.53	\$0.63
5-axle	\$9.24	\$7.14	\$2.94	\$9.24	\$7.14	\$2.94	\$3.96	\$3.06	\$1.26
6-axle+	\$11.55	\$8.93	\$3.68	\$11.55	\$8.93	\$3.68	\$4.95	\$3.83	\$1.58
Video Payment Type									
2-axle	\$2.54	\$2.19	\$1.49	\$2.54	\$2.19	\$1.49	\$1.09	\$0.94	\$0.64
3-axle	\$4.62	\$3.57	\$1.98	\$4.62	\$3.57	\$1.98	\$1.98	\$1.53	\$0.85
4-axle	\$6.93	\$5.36	\$2.47	\$6.93	\$5.36	\$2.47	\$2.97	\$2.30	\$1.06
5-axle	\$13.86	\$10.71	\$4.41	\$13.86	\$10.71	\$4.41	\$5.94	\$4.59	\$1.89
6-axle+	\$17.33	\$13.39	\$5.51	\$17.33	\$13.39	\$5.51	\$7.43	\$5.74	\$2.36

Time Periods:

Peak Period is defined as southbound from 6:00 to 9:00 AM Mon to Fri, northbound from 3:00 to 7:00 PM Mon to Fri, and both directions from 12:00 to 2:00 PM Sat and 2:00 to 5:00 PM Sun.

Off-Peak Period is defined as southbound from 5:00 to 6:00 AM/9:00 AM to 9:00 PM Mon to Fri, northbound from 5:00 AM to 3:00 PM/7:00 to 9:00 PM Mon to Fri, and both directions from 5:00 AM to 12:00 PM/2:00 to 9:00 PM Sat and 5:00 AM to 2:00 PM/5:00 to 9:00 PM Sunday.

Overnight is defined as 9:00 PM to 5:00 AM every day.

1.2.2 Temporary Business Rule Changes

On March 17, 2020 MDTA implemented systemwide cashless tolling until further notice. Most other larger toll agencies in the United States that had the capability to do so also converted to cashless (also called all-electronic) tolling around this time to prevent the potential spread of COVID-19 during exchanges of cash at toll booths. The MDTA cashless program was implemented by applying video tolling at cash toll rates at facilities where cash was normally accepted. The MDTA cashless tolling was applied to five facilities, the Kennedy Highway, Harbor Tunnel, Fort McHenry Tunnel, Bay Bridge, and Nice/Middleton Bridge. The other four MDTA facilities, the Hatem Bridge, Key Bridge, ICC, and I-95 ETLs, already operated with cashless tolling before the

pandemic. The Bay Bridge was already being planned to convert to cashless tolling before the pandemic. This facility officially converted to permanent cashless tolling on May 12, 2020.

Permanent cashless tolling on all facilities was announced on August 6, 2020 to provide convenience for motorists, less engine idling for better fuel efficiency and reduced emissions, decreased congestion, and increased safety. However, cash toll rates for video customers were still charged on the Kennedy Highway, Harbor Tunnel, Fort McHenry Tunnel, Bay Bridge, and Nice/Middleton Bridge until January 1, 2021 when video toll rates were reinstated. Additionally, mailing of Notice of Toll Due (NOTD) video invoices was paused in March 2020 but was resumed in the fall of 2020. While most of these video invoices have since been mailed, not all invoices have been paid and collection on these transactions will continue through FY 2023. To assist customers having to pay these backlogged transactions, the MDTA board approved a customer assistance plan on February 24th, 2022 which was effective immediately and will terminate on November 30th, 2022. This plan included a civil penalty waiver grace period and ceased referring toll bills to the Central Collection Unit (CCU) and MDOT Motor Vehicle Administration (MDOT MVA) temporarily.

1.2.3 Upcoming Toll Rate Changes

New vehicle class toll rate categories are planned that include 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 25 and 17 percent, respectively, lower toll than current three and four-axle rates. The assumed implementation schedule for the new toll rates is provided in the assumptions in Chapter 4.

Except for the changes listed in the previous paragraph, no other future toll rate changes were assumed in this MDTA system forecast for the forecasting period through FY 2032.

1.2.4 Civil Penalties

Due to the customer assistance plan discussed in 1.2.2, it is assumed in the forecast that civil penalties will not be assessed on unpaid video invoices until after the termination of the plan. Assessment of the \$25 civil penalty will resume beginning December 1st, 2022 for all unpaid video transactions, including those from video invoices issued prior to the expiration of the customer assistance plan.

1.3 Report Structure

Chapter 2, Historical Traffic and Revenue Trends, provides a summary of historical trends and variations of traffic and revenue on the Legacy bridges, tunnels, and highways operated by the MDTA, including recent trends due to the COVID-19 pandemic. Trends in different payment shares are also provided.

Chapter 3, Socioeconomic Review, provides a summary of the econometric modeling analysis that was performed as an input into this annual forecast update. This chapter documents how the modeling was performed and the output from the process.

Chapter 4, Forecasts by Facility, provides a summary of the underlying assumptions and methodology used in the traffic and revenue forecasting process. Also presented in this Chapter are the 10-year traffic and revenue forecasts by facility and vehicle class for each of the MDTA facilities, including forecasted other revenue.

Chapter 5, Total Forecast Results, summarizes the forecasts for the MDTA system.

Chapter 6, Forecast Comparisons, provides a comparison of the updated forecasts to previous forecasts for the MDTA facilities.

Chapter 2

Historical Trends

This chapter includes analysis of historical traffic, revenue, and payment type trends on the MDTA facilities. Analysis of traffic trends on other routes in Maryland is also provided for context. Recent historical data is especially important as an input to developing the updated forecast documented in this report.

2.1 Maryland Vehicle Miles Traveled

Vehicle miles traveled (VMT) trends were reviewed to better understand the general trends in traffic growth nationally and within Maryland. The Federal Highway Administration develops annual estimates of national and state-wide VMT by roadway type, which have been summarized in **Table 2-1** for years 2007 through 2021 for the United States (U.S.) and Maryland.

Total VMT growth trends for both Maryland and the U.S. have been generally similar during the Great Recession impacted years (2007 to 2009) and years following (2009 to 2019). In general, the trends indicate that total national and statewide Maryland VMT growth is similar. However, growth on Maryland's Interstate highways at 0.6 percent per annum has been much lower than the U.S. average of 1.5 percent per annum for the period between 2009 and 2019. Growth in the last decade on the Maryland interstate system is still occurring, albeit at a lower rate than the nation. The percent of total VMT occurring on Interstate routes has remained relatively constant throughout the past 13 years. Approximately 25 percent of national VMT and 30 percent of Maryland VMT are made on interstate routes, which account for 2.5 percent and 3.9 percent of all roads in the nation and Maryland, respectively. In 2020, due to travel restrictions and stay-at-home mandates from the COVID-19 pandemic, interstate VMT in the United States and Maryland declined by 13.1 and 19.1 percent, respectively. In 2021 interstate VMT increased by approximately 13 percent over 2020 levels in both the U.S. and Maryland. The U.S. interstate and total VMT in 2021 were still approximately one percent below pre-pandemic levels of 2019. Maryland interstate and total VMT recovered to 4.3 and 3.0 percent below 2019 levels.

These trends in VMT since 2007 are different from pre-2007 long-term historical trends (not shown on this table). Before the mid-2000s, VMT had been growing regionally and nationally by about 2 percent per year. In the years following the Great Recession VMT growth was about half of this, at 0.9 percent nationally and 0.8 percent in Maryland. These changes are indicative of changes in travel driven by underlying socioeconomic factors in Maryland and the U.S. Similar to the changes observed after the Great Recession, the potential for long-term changes in travel due to the ongoing COVID-19 pandemic will continue to be closely monitored.

Table 2-1
National and Statewide Trends in Vehicle Miles Traveled

Calendar Year	United States ⁽¹⁾					Maryland				
	Interstate			Total		Interstate			Total	
	VMT (Millions)	Percent Change	Percent of Total	VMT (Millions)	Percent Change	VMT (Millions)	Percent Change	Percent of Total	VMT (Millions)	Percent Change
2007	745,457	-	24.4	3,049,027	-	17,015	-	30.1	56,503	-
2008	725,078	(2.7)	24.2	2,992,705	(1.8)	16,710	(1.8)	30.4	55,023	(2.6)
2009	722,655	(0.3)	24.3	2,975,804	(0.6)	16,965	1.5	30.7	55,293	0.5
2010	729,015	0.9	24.4	2,985,854	0.3	17,040	0.4	30.4	56,126	1.5
2011	725,787	(0.4)	24.4	2,968,990	(0.6)	16,964	(0.4)	30.2	56,221	0.2
2012	735,915	1.4	24.6	2,988,021	0.6	17,054	0.5	30.2	56,475	0.5
2013	745,106	1.2	24.8	3,006,911	0.6	17,064	0.1	30.1	56,688	0.4
2014	756,374	1.5	24.9	3,040,220	1.1	17,057	(0.0)	30.2	56,432	(0.5)
2015	782,111	3.4	25.1	3,109,937	2.3	17,102	0.3	29.7	57,516	1.9
2016	810,264	3.6	25.4	3,188,972	2.5	17,584	2.8	29.7	59,137	2.8
2017	824,910	1.8	25.6	3,227,358	1.2	17,937	2.0	29.9	59,892	1.3
2018	833,803	1.1	25.6	3,255,347	0.9	17,932	(0.0)	30.1	59,629	(0.4)
2019	842,604	1.1	25.7	3,276,482	0.6	18,059	0.7	30.0	60,136	0.9
2020	732,078	(13.1)	25.1	2,917,383	(11.0)	14,604	(19.1)	28.9	50,592	(15.9)
2021	826,200	12.9	25.6	3,227,696	10.6	16,545	13.3	29.2	56,616	11.9
Average Annual Percent Change										
2007 to 2009		(1.5)			(1.2)		(0.1)			(1.1)
2009 to 2019		1.5			1.0		0.6			0.8
2019 to 2021		(1.0)			(0.7)		(4.3)			(3.0)
2007-2020 VMT Data source: Table VM-2, Highway Statistics 1994-2020, USDOT FHWA Office of Policy Information.										
2021 VMT Data source: Monthly Travel Volume Trends Reports, USDOT FHWA Office of Policy Information.										
⁽¹⁾ Includes Puerto Rico.										

2.2 MDTA Traffic and Revenue Trends

2.2.1 Collected Transactions and Revenue

This section provides a review of the historical collected toll transaction/trip trends and toll revenue trends for each of the seven MDTA Legacy facilities, I-95 Express Toll Lanes (ETLs), and the Intercounty Connector (ICC). Toll revenue is the revenue that is collected by transponder or by various forms of video payment (and formerly by in-lane cash payment) for payment of published toll rates. Other revenue includes a combination of revenue collected and revenue deductions from unused Commuter Plan and Shoppers Plan trips, transponder fees and sales, the Hatem Bridge E-ZPass® program, violation recovery (civil penalties), and commercial vehicle fees and discounts (post-usage discount, high frequency discount, and over-sized permit fees). The historical transaction/trip and revenue trends by facility for passenger cars, commercial vehicles and total traffic are presented by fiscal year in **Table 2-2**, **Table 2-3**, and **Table 2-4**, respectively. The historical transaction/trip and revenue trends for total vehicles by facility are graphically presented in **Figure 2-1**.

Table 2-2
MDTA Passenger Car Historic Collected Transactions and Toll Revenue

Fiscal Year	Hatem Bridge		Kennedy Highway		Harbor Tunnel		Fort McHenry Tunnel		Key Bridge		Bay Bridge		Nice/Middleton Bridge		ICC ⁽¹⁾		I-95 ETL ⁽¹⁾	
	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change
Passenger Car Transactions (in millions)																		
2007	5.286	-	12.874	-	24.891	-	40.945	-	10.970	-	12.409	-	3.112	-	-	-	-	-
2008	5.296	0.2	12.722	(1.2)	24.921	0.1	40.879	(0.2)	11.093	1.1	12.312	(0.8)	3.107	(0.2)	-	-	-	-
2009	4.942	(6.7)	12.794	0.6	24.795	(0.5)	39.851	(2.5)	10.601	(4.4)	11.902	(3.3)	3.097	(0.3)	-	-	-	-
2010	4.890	(1.1)	12.977	1.4	24.553	(1.0)	40.583	1.8	9.953	(6.1)	12.093	1.6	3.134	1.2	-	-	-	-
2011	4.961	1.4	13.565	4.5	25.397	3.4	42.704	5.2	10.587	6.4	12.608	4.3	3.181	1.5	-	-	-	-
2012	4.884	(1.5)	13.154	(3.0)	25.113	(1.1)	41.103	(3.7)	10.048	(5.1)	12.766	1.3	3.100	(2.5)	-	-	-	-
2013	4.391	(10.1)	12.912	(1.8)	23.414	(6.8)	40.116	(2.4)	9.982	(0.7)	11.865	(7.1)	3.071	(0.9)	-	-	-	-
2014	4.779	8.8	12.690	(1.7)	24.325	3.9	38.290	(4.6)	9.427	(5.6)	11.878	0.1	3.040	(1.0)	-	-	-	-
2015	5.064	6.0	13.022	2.6	26.517	9.0	38.353	0.2	9.632	2.2	12.008	1.1	3.095	1.8	-	-	-	-
2016	4.880	(3.6)	13.401	2.9	27.653	4.3	38.876	1.4	10.185	5.7	12.398	3.2	3.172	2.5	-	-	-	-
2017	4.893	0.3	13.745	2.6	26.974	(2.5)	41.381	6.4	10.257	0.7	12.692	2.4	3.209	1.2	31.758	-	8.614	-
2018	4.881	(0.2)	13.576	(1.2)	27.327	1.3	40.546	(2.0)	10.330	0.7	12.631	(0.5)	3.123	(2.7)	33.433	5.3	8.915	3.5
2019	4.869	(0.2)	13.316	(1.9)	20.254	(25.9)	43.955	8.4	11.674	13.0	12.706	0.6	3.104	(0.6)	35.231	5.4	9.331	4.7
2020	4.182	(14.1)	10.669	(19.9)	13.709	(32.3)	38.242	(13.0)	10.793	(7.5)	10.723	(15.6)	2.571	(17.2)	31.850	(9.6)	7.341	(21.3)
2021	2.868	(31.4)	7.287	(31.7)	11.489	(16.2)	25.709	(32.8)	7.490	(30.6)	7.799	(27.3)	1.591	(38.1)	10.947	(65.6)	4.840	(34.1)
2022	4.207	46.7	13.419	84.1	25.065	118.2	38.186	48.5	10.636	42.0	13.580	74.1	3.049	91.7	40.030	265.7	8.321	71.9
Passenger Car Revenue (in millions of dollars)																		
2007	1.119	-	58.915	-	29.926	-	56.924	-	10.805	-	24.652	-	7.154	-	-	-	-	-
2008	1.242	11.1	58.013	(1.5)	30.320	1.3	56.381	(1.0)	10.822	0.2	24.452	(0.8)	7.055	(1.4)	-	-	-	-
2009	1.255	1.0	58.467	0.8	30.840	1.7	55.224	(2.1)	10.512	(2.9)	23.740	(2.9)	7.020	(0.5)	-	-	-	-
2010	1.468	16.9	59.246	1.3	31.141	1.0	57.211	3.6	10.299	(2.0)	24.510	3.2	7.190	2.4	-	-	-	-
2011	1.622	10.5	59.906	1.1	31.856	2.3	58.288	1.9	10.658	3.5	25.105	2.4	7.233	0.6	-	-	-	-
2012	2.354	45.1	67.640	12.9	42.558	33.6	75.089	28.8	13.800	29.5	31.786	26.6	8.589	18.7	-	-	-	-
2013	3.993	69.6	73.602	8.8	46.871	10.1	87.559	16.6	16.450	19.2	36.113	13.6	9.577	11.5	-	-	-	-
2014	5.007	25.4	94.931	29.0	69.466	48.2	114.982	31.3	22.863	39.0	54.346	50.5	14.616	52.6	-	-	-	-
2015	5.113	2.1	97.301	2.5	77.033	10.9	115.294	0.3	24.330	6.4	55.630	2.4	15.198	4.0	-	-	-	-
2016	5.279	3.2	98.677	1.4	80.650	4.7	115.994	0.6	24.474	0.6	35.598	(36.0)	15.156	(0.3)	54.197	-	10.054	-
2017	5.619	6.5	101.363	2.7	80.207	(0.5)	124.262	7.1	25.478	4.1	36.562	2.7	15.419	1.7	58.795	8.5	10.765	7.1
2018	5.215	(7.2)	100.008	(1.3)	81.602	1.7	121.604	(2.1)	25.670	0.8	36.294	(0.7)	14.947	(3.1)	61.320	4.3	11.055	2.7
2019	5.298	1.6	97.883	(2.1)	61.575	(24.5)	132.376	8.9	29.335	14.3	36.714	1.2	14.897	(0.3)	62.688	2.2	11.529	4.3
2020	4.852	(8.4)	77.730	(20.6)	40.715	(33.9)	113.816	(14.0)	26.513	(9.6)	30.174	(17.8)	12.012	(19.4)	51.830	(17.3)	8.820	(23.5)
2021	3.377	(30.4)	52.666	(32.2)	32.941	(19.1)	74.337	(34.7)	18.388	(30.6)	20.418	(32.3)	7.279	(39.4)	18.781	(63.8)	5.873	(33.4)
2022	9.278	174.7	103.954	97.4	83.449	153.3	125.465	68.8	30.784	67.4	43.499	113.0	16.577	127.8	74.373	296.0	10.631	81.0

⁽¹⁾ Data for the ICC and I-95 ETL are presented beginning in FY 2017 for trips and FY 2016 for revenue due to vehicle class availability in data reporting. ICC transactions reported are trips.

Table 2-3
MDTA Commercial Vehicle Historic Collected Transactions and Toll Revenue

Fiscal Year	Hattem Bridge		Kennedy Highway		Harbor Tunnel		Fort McHenry Tunnel		Key Bridge		Bay Bridge		Nice/Middleton Bridge		ICC ⁽¹⁾		I-95 ETL ⁽¹⁾	
	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change
Commercial Vehicle Transactions (in millions)																		
2007	0.276	-	1.966	-	0.849	-	3.909	-	1.233	-	1.086	-	0.306	-	-	-	-	-
2008	0.260	(5.6)	1.930	(1.8)	0.850	0.1	3.950	1.1	1.250	1.3	1.058	(2.5)	0.284	(7.3)	-	-	-	-
2009	0.098	(62.1)	1.848	(4.2)	0.739	(13.1)	3.595	(9.0)	1.087	(13.0)	0.850	(19.7)	0.250	(12.0)	-	-	-	-
2010	0.103	4.9	1.773	(4.1)	0.672	(9.0)	3.480	(3.2)	1.006	(7.5)	0.901	6.0	0.220	(12.1)	-	-	-	-
2011	0.110	6.3	1.810	2.1	0.720	7.1	3.590	3.2	1.060	5.4	0.950	5.4	0.220	0.1	-	-	-	-
2012	0.150	36.6	1.670	(7.7)	0.637	(11.6)	3.420	(4.7)	1.000	(5.7)	0.900	(5.3)	0.190	(13.6)	-	-	-	-
2013	0.172	15.0	1.670	-	0.558	(12.3)	3.460	1.2	0.940	(6.0)	0.871	(3.2)	0.190	-	-	-	-	-
2014	0.169	(1.8)	1.687	1.0	0.568	1.6	3.586	3.6	0.993	5.6	0.881	1.1	0.203	7.0	-	-	-	-
2015	0.182	7.3	1.668	(1.1)	0.580	2.2	3.494	(2.6)	0.995	0.2	0.847	(3.8)	0.211	3.5	-	-	-	-
2016	0.210	15.6	1.762	5.7	0.633	9.1	3.763	7.7	1.010	1.5	0.874	3.2	0.209	(0.6)	-	-	-	-
2017	0.210	(0.2)	1.803	2.3	0.639	0.8	3.999	6.3	1.054	4.4	0.895	2.4	0.210	0.5	-	-	0.400	-
2018	0.205	(2.3)	1.875	4.0	0.685	7.3	4.174	4.4	1.096	3.9	0.887	(0.8)	0.203	(3.7)	-	-	0.968	10.6
2019	0.220	7.3	1.889	0.7	0.585	(14.6)	4.292	2.8	1.153	5.2	0.887	(0.1)	0.211	4.0	-	-	1.056	9.1
2020	0.212	(3.7)	1.830	(3.1)	0.459	(21.5)	4.055	(5.5)	1.142	(0.9)	0.824	(7.1)	0.183	(13.3)	-	-	1.096	3.8
2021	0.185	(12.8)	1.542	(15.8)	0.442	(3.7)	3.328	(17.9)	0.947	(17.1)	0.656	(20.3)	0.123	(32.5)	-	-	0.378	(65.5)
2022	0.268	45.2	2.229	44.6	0.793	79.3	4.888	46.9	1.354	43.0	0.928	41.4	0.252	104.1	-	-	1.431	278.4
Commercial Vehicle Revenue (in millions)																		
2007	2.699	-	35.704	-	5.183	-	27.761	-	8.437	-	9.741	-	3.277	-	-	-	-	-
2008	2.652	(1.7)	34.695	(2.8)	5.007	(3.4)	27.652	(0.4)	8.586	1.8	9.427	(3.2)	3.024	(7.7)	-	-	-	-
2009	0.811	(69.4)	36.671	5.7	4.770	(4.7)	27.746	0.3	8.051	(6.2)	8.770	(7.0)	2.750	(9.1)	-	-	-	-
2010	1.145	41.2	48.103	31.2	5.869	23.0	36.809	32.7	10.238	27.2	12.284	40.1	2.956	7.5	-	-	-	-
2011	1.197	4.5	47.484	(1.3)	5.995	2.1	37.029	0.6	10.117	(1.2)	12.512	1.9	2.916	(1.4)	-	-	-	-
2012	2.896	142.0	48.370	1.9	6.176	3.0	43.730	18.1	12.020	18.8	14.956	19.5	3.011	3.3	-	-	-	-
2013	3.972	37.2	51.104	5.7	6.203	0.5	51.125	16.9	13.170	9.6	17.263	15.4	3.588	19.1	-	-	-	-
2014	5.168	30.1	67.872	32.8	8.093	30.5	68.147	33.3	17.396	32.1	25.410	47.2	5.781	61.1	-	-	-	-
2015	6.076	17.6	69.234	2.0	8.505	5.1	70.486	3.4	18.645	7.2	25.529	0.5	6.214	7.5	-	-	-	-
2016	6.524	7.4	72.499	4.7	9.222	8.4	75.293	6.8	18.805	0.9	17.193	(32.7)	6.047	(2.7)	-	-	5.116	-
2017	6.468	(0.9)	74.448	2.7	9.254	0.3	79.920	6.1	19.464	3.5	17.399	1.2	6.046	(0.0)	-	-	5.522	7.9
2018	6.368	(1.6)	77.192	3.7	9.786	5.8	83.458	4.4	20.208	3.8	17.136	(94.9)	5.794	(4.2)	-	-	6.190	12.1
2019	6.874	8.0	78.103	1.2	8.690	(11.2)	85.073	1.9	21.196	4.9	17.030	(0.1)	6.072	4.8	-	-	6.627	7.1
2020	6.534	(5.0)	76.356	(2.2)	6.794	(21.8)	80.530	(5.3)	21.036	(0.8)	15.823	(7.1)	5.307	(12.6)	-	-	6.312	(4.8)
2021	5.806	(11.1)	64.566	(15.4)	6.906	1.6	67.193	(16.6)	17.360	(17.5)	12.625	(20.2)	3.532	(33.4)	-	-	2.532	(59.9)
2022	8.975	54.6	93.030	44.1	12.226	77.0	100.144	49.0	25.071	44.4	18.117	41.4	7.512	112.7	-	-	10.529	315.8

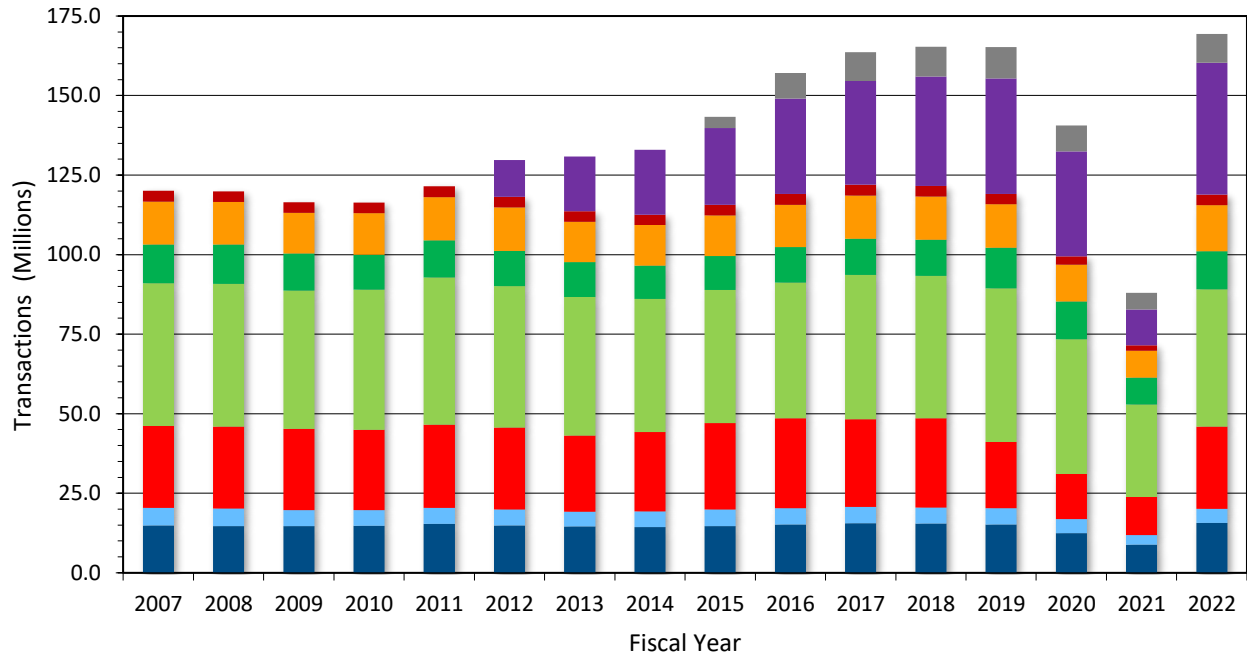
⁽¹⁾ Data for the ICC and I-95 ETL are presented beginning in FY 2017 for trips and FY 2016 for revenue due to vehicle class availability in data reporting. ICC transactions reported are trips.

Table 2-4
MDTA Total Traffic Historic Collected Transactions and Toll Revenue

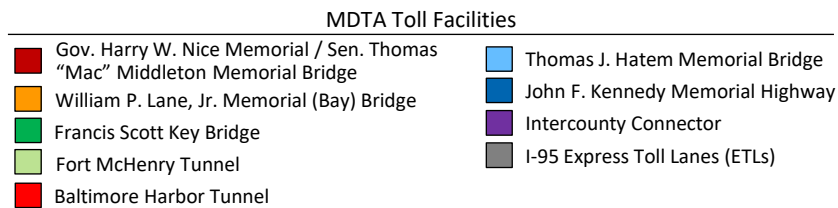
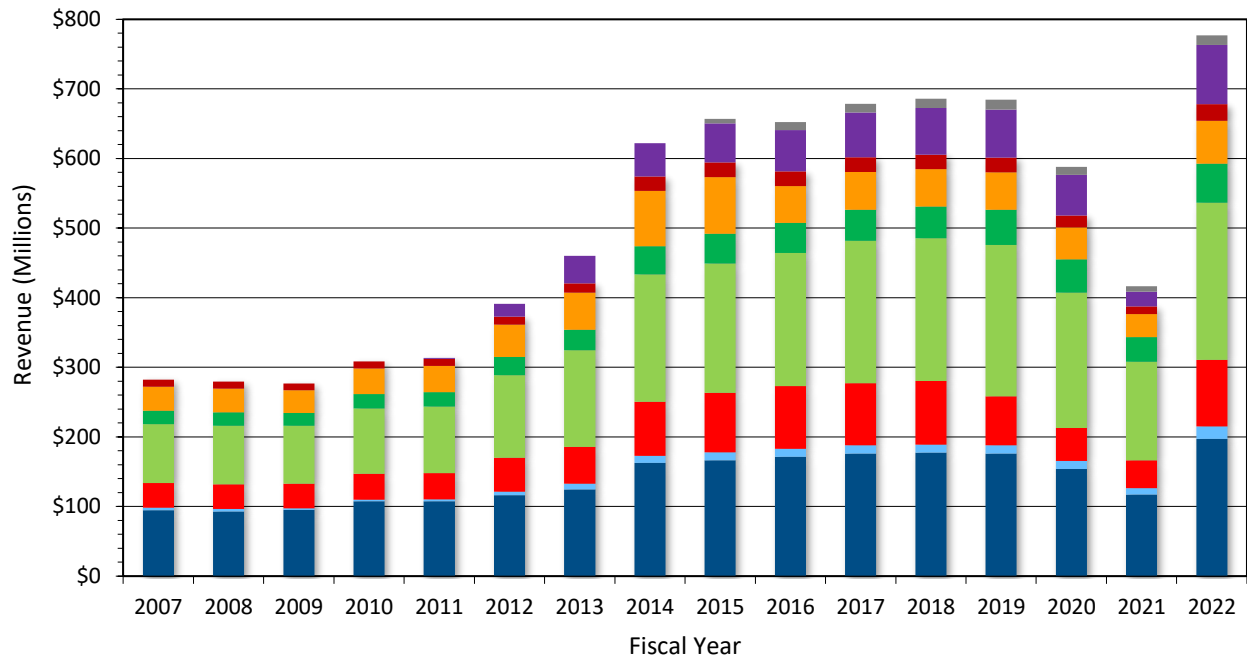
Fiscal Year	Hatem Bridge		Kennedy Highway		Harbor Tunnel		Fort McHenry Tunnel		Key Bridge		Bay Bridge		Nice/Middleton Bridge		ICC ⁽¹⁾		I-95 ETL	
	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change
Total Transactions (in millions)																		
2007	5,561	-	14,840	-	25,740	-	44,854	-	12,203	-	13,494	-	3,418	-	-	-	-	-
2008	5,556	(0.1)	14,652	(1.3)	25,771	0.1	44,829	(0.1)	12,343	1.1	13,370	(0.9)	3,391	(0.8)	-	-	-	-
2009	5,040	(9.3)	14,642	(0.1)	25,534	(0.9)	43,446	(3.1)	11,688	(5.3)	12,752	(4.6)	3,347	(1.3)	-	-	-	-
2010	4,993	(0.9)	14,750	0.7	25,226	(1.2)	44,063	1.4	10,959	(6.2)	12,994	1.9	3,354	0.2	-	-	-	-
2011	5,070	1.5	15,375	4.2	26,117	3.5	46,294	5.1	11,647	6.3	13,558	4.3	3,401	1.4	-	-	-	-
2012	5,034	(0.7)	14,824	(3.6)	25,750	(1.4)	44,523	(3.8)	11,048	(5.1)	13,666	0.8	3,290	(3.3)	-	-	-	-
2013	4,563	(9.4)	14,582	(1.6)	23,973	(6.9)	43,576	(2.1)	10,922	(1.1)	12,736	(6.8)	3,261	(0.9)	17,198	48.7	-	-
2014	4,948	8.4	14,377	(1.4)	24,893	3.8	41,875	(3.9)	10,419	(4.6)	12,759	0.2	3,243	(0.6)	20,476	19.1	-	-
2015	5,246	6.0	14,690	2.2	27,098	8.9	41,847	(0.1)	10,627	2.0	12,856	0.8	3,305	1.9	24,118	17.8	3,483	-
2016	5,090	(3.0)	15,163	3.2	28,287	4.4	42,639	1.9	11,195	5.3	13,272	3.2	3,381	2.3	29,975	24.3	8,048	131.0
2017	5,102	0.2	15,548	2.5	27,612	(2.4)	45,380	6.4	11,311	1.0	13,587	2.4	3,419	1.1	32,634	8.9	9,014	12.0
2018	5,086	(0.3)	15,451	(0.6)	28,012	1.4	44,720	(1.5)	11,425	1.0	13,518	(0.5)	3,325	(2.8)	34,401	5.4	9,393	4.2
2019	5,089	0.1	15,205	(1.6)	20,839	(25.6)	48,247	7.9	12,827	12.3	13,593	0.5	3,315	(0.3)	36,287	5.5	9,868	5.1
2020	4,394	(13.6)	12,499	(17.8)	14,168	(32.0)	42,297	(12.3)	11,935	(6.9)	11,547	(15.1)	2,753	(16.9)	32,946	(9.2)	7,789	(21.1)
2021	3,052	(30.5)	8,829	(29.4)	11,931	(15.8)	29,037	(31.3)	8,437	(29.3)	8,456	(26.8)	1,714	(37.8)	11,325	(65.6)	5,202	(33.2)
2022	4,475	46.6	15,648	77.2	25,858	116.7	43,074	48.3	11,990	42.1	14,508	71.6	3,301	92.6	41,461	266.1	9,000	73.0
Total Revenue (in millions of dollars)																		
2007	3,817	-	94,619	-	35,109	-	84,685	-	19,243	-	34,393	-	10,432	-	-	-	-	-
2008	3,894	2.0	92,707	(2.0)	35,328	0.6	84,032	(0.8)	19,408	0.9	33,879	(1.5)	10,079	(3.4)	-	-	-	-
2009	2,066	(46.9)	95,138	2.6	35,610	0.8	82,970	(1.3)	18,563	(4.4)	32,510	(4.0)	9,770	(3.1)	-	-	-	-
2010	2,613	26.5	107,349	12.8	37,010	3.9	94,020	13.3	20,537	10.6	36,794	13.2	10,146	3.8	-	-	-	-
2011	2,819	7.9	107,390	0.0	37,851	2.3	95,316	1.4	20,775	1.2	37,617	2.2	10,149	0.0	1,474	-	-	-
2012	5,250	86.2	116,010	8.0	48,734	28.8	118,819	24.7	25,820	24.3	46,742	24.3	11,601	14.3	18,063	1,125.4	-	-
2013	7,966	51.7	124,706	7.5	53,074	8.9	138,684	16.7	29,619	14.7	53,376	14.2	13,165	13.5	39,586	119.2	-	-
2014	10,174	27.7	162,803	30.5	77,559	46.1	183,130	32.0	40,260	35.9	79,756	49.4	20,397	54.9	48,029	21.3	-	-
2015	11,189	10.0	166,535	2.3	85,538	10.3	185,780	1.4	42,975	6.7	81,159	1.8	21,412	5.0	56,018	16.6	6,146	-
2016	11,803	5.5	171,176	2.8	89,872	5.1	191,287	3.0	43,279	0.7	52,791	(35.0)	21,203	(1.0)	59,312	5.9	11,385	85.3
2017	12,087	2.4	175,811	2.7	89,461	(0.5)	204,182	6.7	44,942	3.8	53,960	2.2	21,465	1.2	64,317	8.4	12,478	9.6
2018	11,582	(4.2)	177,199	0.8	91,388	2.2	205,063	0.4	45,878	2.1	53,429	(1.0)	20,741	(3.4)	67,511	5.0	13,148	5.4
2019	12,172	5.1	175,987	(0.7)	70,265	(23.1)	217,449	6.0	50,531	10.1	53,744	0.6	20,968	1.1	69,316	2.7	13,921	5.9
2020	11,386	(6.5)	154,086	(12.4)	47,509	(32.4)	194,346	(10.6)	47,549	(5.9)	45,997	(14.4)	17,319	(17.4)	58,142	(16.1)	10,751	(22.8)
2021	9,184	(19.3)	117,231	(23.9)	39,847	(16.1)	141,531	(27.2)	35,748	(24.8)	33,042	(28.2)	10,811	(37.6)	21,313	(63.3)	7,753	(27.9)
2022	18,253	98.8	196,984	68.0	95,675	140.1	225,610	59.4	55,855	56.2	61,615	86.5	24,089	122.8	84,903	298.4	14,090	81.7

⁽¹⁾ ICC transactions reported are trips.

Collected Transactions



Collected Revenue



HISTORICAL COLLECTED TRANSACTIONS AND COLLECTED TOLL REVENUE BY FACILITY



Table 2-5 summarizes the average annual percent change in passenger car and commercial vehicle transactions and revenue trends by facility during the Great Recession years (FY 2007 to 2009) and post-recession years (FY 2009 to 2019) for the Legacy facilities based on the data provided in **Table 2-2** and **Table 2-3**. For all facilities, including the ICC and I-95 ETL, average annual percent change in passenger car and commercial vehicles transactions/trips and revenue are shown for the period from 2017 to 2019 due to data by vehicle class availability for the ICC and I-95 ETLs. FY 2019 to 2022 is shown for all facilities to show the period impacted by the COVID-19 pandemic, cashless conversion, and back-office transition.

Table 2-5
Average Annual Percent Change in Collected Transactions and Revenue by Facility

Fiscal Year	Hatem Bridge	Kennedy Highway	Harbor Tunnel	Fort McHenry Tunnel	Key Bridge	Bay Bridge	Nice/Middleton Bridge	ICC ⁽¹⁾	I-95 ETL ⁽¹⁾
Passenger Car Transactions									
2007 to 2009	(3.3)	(0.3)	(0.2)	(1.3)	(1.7)	(2.1)	(0.2)	-	-
2009 to 2019	(0.1)	0.4	(2.0)	1.0	1.0	0.7	0.0	-	-
2017 to 2019	(0.2)	(1.6)	(13.3)	3.1	6.7	0.1	(1.6)	5.3	4.1
2019 to 2022	(4.8)	0.3	7.4	(4.6)	(3.1)	2.2	(0.6)	4.3	(3.7)
Passenger Car Revenue									
2007 to 2009	14.8	(1.0)	3.8	(3.8)	(3.4)	(4.7)	(2.4)	-	-
2009 to 2019	38.7	13.2	17.9	22.8	27.0	11.1	19.5	-	-
2017 to 2019	(2.9)	(1.7)	(12.4)	3.2	7.3	0.2	(1.7)	3.3	3.5
2019 to 2022	20.5	2.0	10.7	(1.8)	1.6	5.8	3.6	5.9	(2.7)
Commercial Vehicle Transactions									
2007 to 2009	(40.2)	(3.0)	(6.7)	(4.1)	(6.1)	(11.5)	(9.7)	-	-
2009 to 2019	8.4	0.2	(2.3)	1.8	0.6	0.4	(1.7)	-	-
2017 to 2019	2.4	2.3	(4.3)	3.6	4.6	(0.4)	0.1	9.8	16.0
2019 to 2022	6.9	5.7	10.7	4.4	5.5	1.5	6.1	10.7	8.1
Commercial Vehicle Revenue									
2007 to 2009	(112.9)	3.4	(10.2)	(0.1)	(5.8)	(12.8)	(21.0)	-	-
2009 to 2019	59.6	19.6	15.5	29.6	25.4	17.2	20.6	-	-
2017 to 2019	3.1	2.4	(3.1)	3.2	4.4	(1.1)	0.2	9.6	18.2
2019 to 2022	9.3	6.0	12.1	5.6	5.8	2.1	7.4	16.7	13.1

⁽¹⁾ AAPC for ICC and I-95 ETL transactions/trips and revenue presented beginning FY 2017 due to vehicle class data availability.

As shown in **Table 2-5**, between FY 2007 and FY 2009, the passenger car transactions decreased on all seven legacy facilities, with the largest decrease of 3.3 percent per annum on the Hatem bridge. The smallest decrease in passenger car transactions during this period was 0.2 percent per annum on the Harbor Tunnel and Nice/Middleton Bridge. The commercial vehicle transactions decreased significantly between FY 2007 and FY 2009 on all the legacy facilities, with the largest decrease of 40.2 percent per annum on the Hatem Bridge. Following these decreases associated with the Great Recession, continued economic uncertainty and several toll increases resulted in the total Legacy system transactions decreasing by 3.4 percent from 116.5 million in FY 2009 to 112.5 million in FY 2014. Due to the toll increases, the Legacy system revenue grew from about 277 million in FY 2009 to 595 million in FY 2015. Total transactions increased by 2.8 percent in FY 2015 reaching FY 115.7 million, mostly due to the high growth on

Hatem Bridge and Baltimore Harbor Tunnel, where transactions increased by 6.0 percent and 8.9 percent respectively, compared to FY 2014. Similarly, the Legacy system transactions grew by 2.9 percent in FY 2016 and 2.5 percent in FY 2017 compared to previous years. The revenue decreased in FY 2016 by 2.2 percent due to the toll decrease implemented on July 1, 2015. The traffic increases between FY 2015 and FY 2017 on the system were the result of strong economic performance and the FY 2016 toll decrease. This upward trend came to an end in FY 2018, when the system transactions decreased by 0.3 percent. In FY 2019, the transactions decreased further by 2.0 percent, driven especially by the 25.6 drop in transactions on the Baltimore Harbor Tunnel due to construction. Revenue followed a similar trend decreasing by 2.1 percent and 0.7 percent in FY 2018 and FY 2019 respectively. Overall, between FY 2009 and FY 2019, the total legacy system transactions increased by 0.2 percent per annum and revenue increased by 7.8 per annum. Beginning in March 2020, the COVID-19 pandemic caused significant reductions in traffic on the MDTA system. This has caused the FY 2020 Legacy system transaction to decrease by 16.4 percent and revenue to decrease by 13.8 percent compared to FY 2019. In FY 2021, ongoing pandemic impacts, back office transition collection issues, and the conversion to cashless tolling have caused a further 28.3 percent decline in transactions over FY 2020. In FY 2022, transactions and revenue increased by 66.3 and 75.0 percent, respectively, over the prior year. This is due to ongoing COVID-19 recovery as well as collections on transactions from previous years due to the business rule changes.

For the Intercounty Connector, tolling began on the second segment of the ICC from MD-97/Georgia Avenue to I-95 in FY 2012, making FY 2013 the first full fiscal year of I-370 to I-95 operations on the ICC. Trips then increased by 19.1 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 17.8 percent growth in trips 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. Trips in FY 2016 grew at a faster rate than FY 2015, which can be attributed in part to the toll reduction implemented on July 1, 2015. Toll revenue for FY 2016 was 5.9 percent higher than FY 2015, which reflects continued robust growth in trips offset in part by the negative revenue impact of the lower tolls. Trips growth for FY 2017 was strong at 8.9 percent. FY 2018 and FY 2019 had trips growth at 5.4 and 5.5 percent, respectively. This 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. As was seen with the Legacy facilities, due to the COVID-19 pandemic, there was a 9.2 decrease in trips and 16.1 percent decrease in revenue in FY 2020 compared to FY 2019. FY 2021 transactions and revenue were 65.6 and 63.3 percent lower than FY 2020, respectively, due to ongoing pandemic impacts, back office transition collection issues, and the conversion to cashless tolling. In FY 2022 transactions and revenue nearly tripled over FY 2021 due to processing of transactions from the previous fiscal years as well as some recovery from COVID-19 traffic impacts.

The I-95 ETLs opened in FY 2015, and FY 2016 was the first full fiscal year of operations. In FY 2017, transactions and revenue on the ETLs increased by 12.0 percent and 9.6 percent, respectively, compared to FY 2016. This was due primarily to facility ramp-up, the phenomenon that occurs with the opening of a new facility as explained above. This growth continued in FY

2018 and FY 2019, when transactions increased by 4.2 percent and 5.1 percent, respectively, over their previous years. Revenue grew at slightly higher levels than transactions with a 5.4 percent growth in FY 2018 and 5.9 percent growth in FY 2019. Due to COVID-19 pandemic, FY 2020 transactions and revenue decreased significantly by 21.1 percent and 22.8 percent, respectively, compared to FY 2019. Ongoing pandemic impacts, back-office transition collection issues, and the conversion to cashless tolling, caused FY 2021 transactions to be 33.2 percent lower than FY 2020 and revenue to be 27.9 percent lower. In FY 2022, transactions and revenue were 73 and 81.7 percent higher than FY 2021, respectively.

2.2.2 In-Lane Traffic

This section provides a brief review of the historical raw in-lane traffic trends for each of the seven MDTA Legacy facilities, I-95 ETLs, and the ICC. Data shown is for traffic at the toll gantry locations. Data for the ICC, which has several toll gantries, is shown as the total in-lane traffic at all toll gantries. This data allows analysis of traffic trends without the impacts of recent collection related challenges. **Table 2-6** summarizes this data annually for FY 2019 through FY 2022 for passenger cars and commercial vehicles.

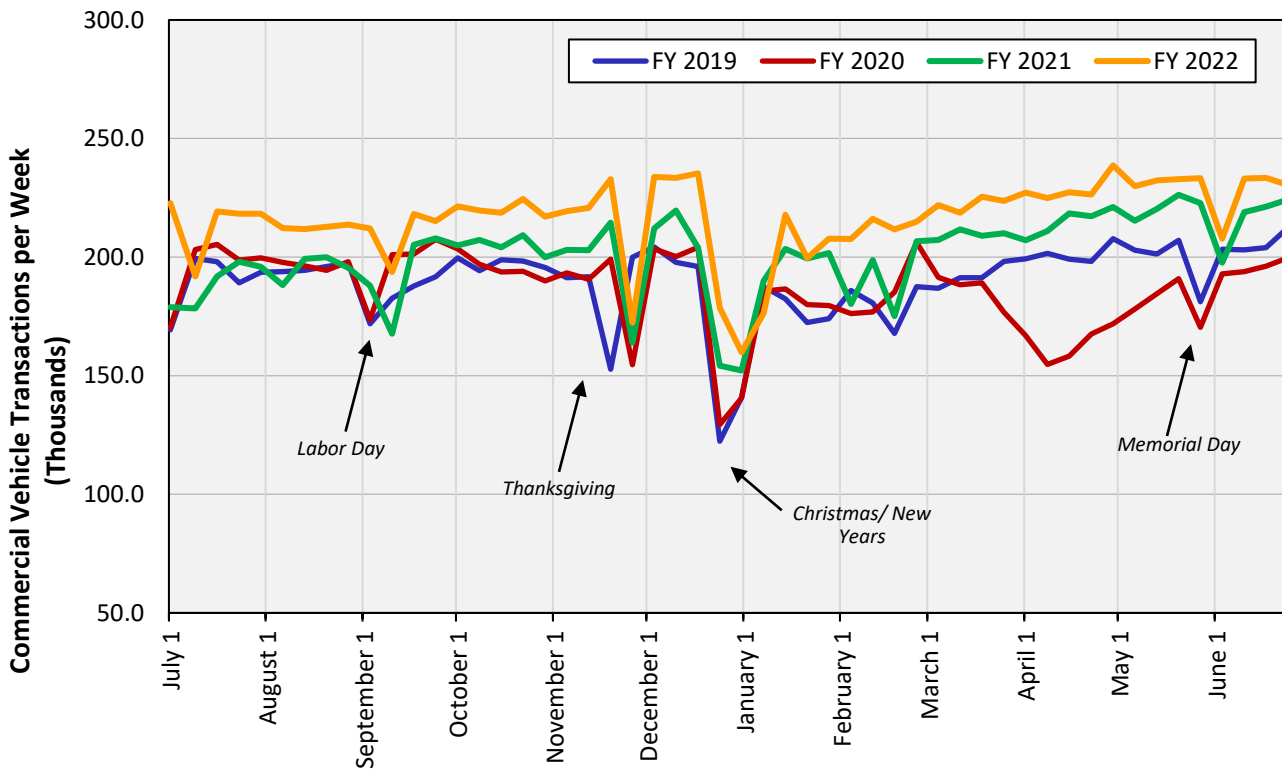
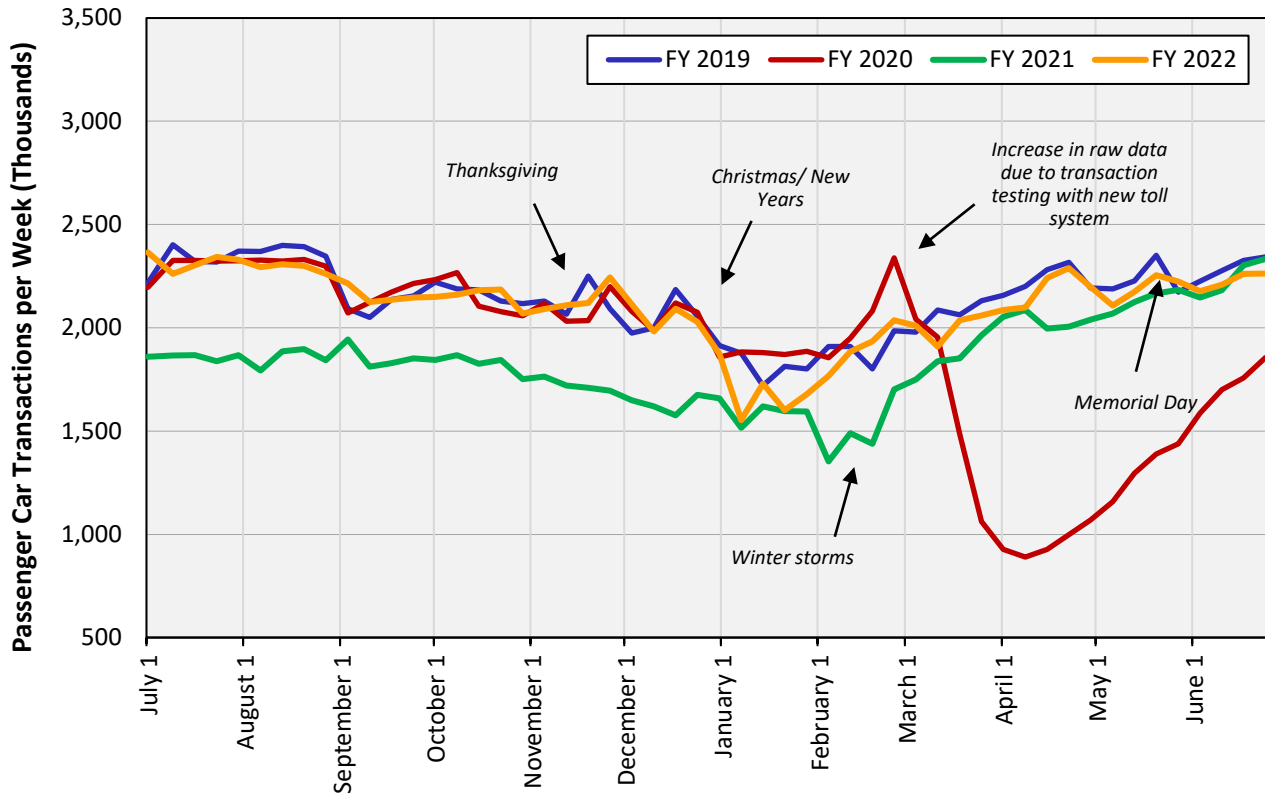
Considering FY 2020 had just three and a half months of COVID-19 impacted travel, FY 2021 made a strong recovery over FY 2020 particularly on the Kennedy Highway and the Bay Bridge for passenger cars. Due to the completion of construction on the Harbor Tunnel, passenger car traffic has increased significantly over FY 2020 and has pulled some traffic back that had diverted to the Fort McHenry and Francis Scott Key Bridge. Commercial vehicle traffic has made a strong recovery and experienced significant growth over FY 2020 for all Legacy facilities. In FY 2022, all facilities had positive growth over FY 2021 with the Kennedy Highway, Bay Bridge, and Nice Bridge maintaining higher growth than the other facilities.

The ICC and I-95 ETLs have not recovered at the same pace as the Legacy facilities due to their larger commuting share of traffic and the congestion relief nature of these two facilities. This sector of traffic has dropped significantly as remote working increased during the pandemic and will likely continue to recover at a slower pace as a portion of employees gradually return to work. Due to this, the ICC declined by 13.8 percent year-over-year in both FY 2020 and FY 2021 for passenger cars. The I-95 ETLs fared worse in FY 2021 and declined by almost 21 percent, compared to a decline of 17.5 percent in FY 2020. In FY 2022, the ICC and ETLs had positive growth of 24 and 34.4 percent, respectively, for passenger cars. Commercial vehicles make up a very small portion of traffic on both of these facilities, but similar to the Legacy facilities they showed less impact due to COVID-19 in FY 2020 and were recovered to 2019 levels in FY 2021, with the ICC experiencing an increase in traffic of 1.7 percent year-over-year. In FY 2022, the ICC and ETL commercial vehicles had positive growth of 4.6 and 41.9 percent, respectively, and both now exceed 2019 levels. This large percent increase on the I-95 ETLs equates to an increase of approximately 200,000 commercial vehicles.

Figure 2-2 provides a graphical representation of these year-over-year trends for in-lane data from FY 2019 through FY 2022 for the total Legacy System passenger cars and commercial vehicles. **Figure 2-3** and **Figure 2-4** show the same information for the Intercounty Connector and I-95 ETLs.

Table 2-6
MDTA In-Lane Traffic by Fiscal Year

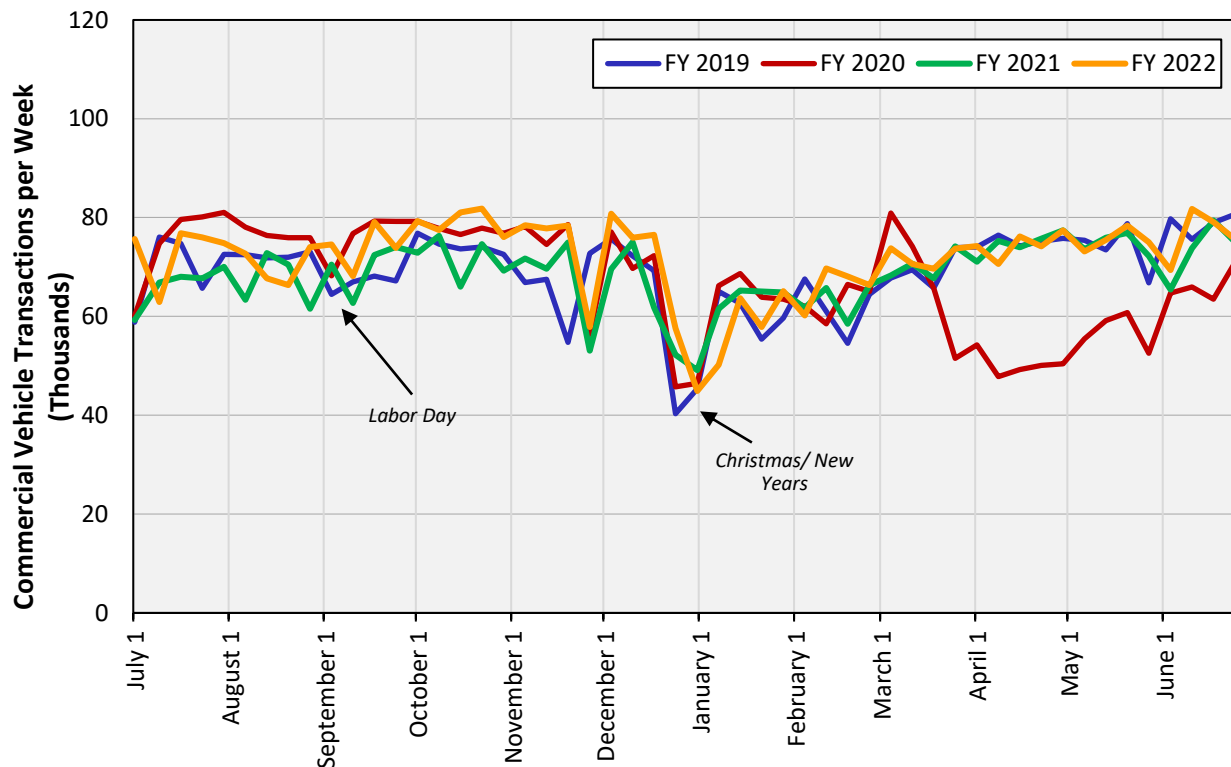
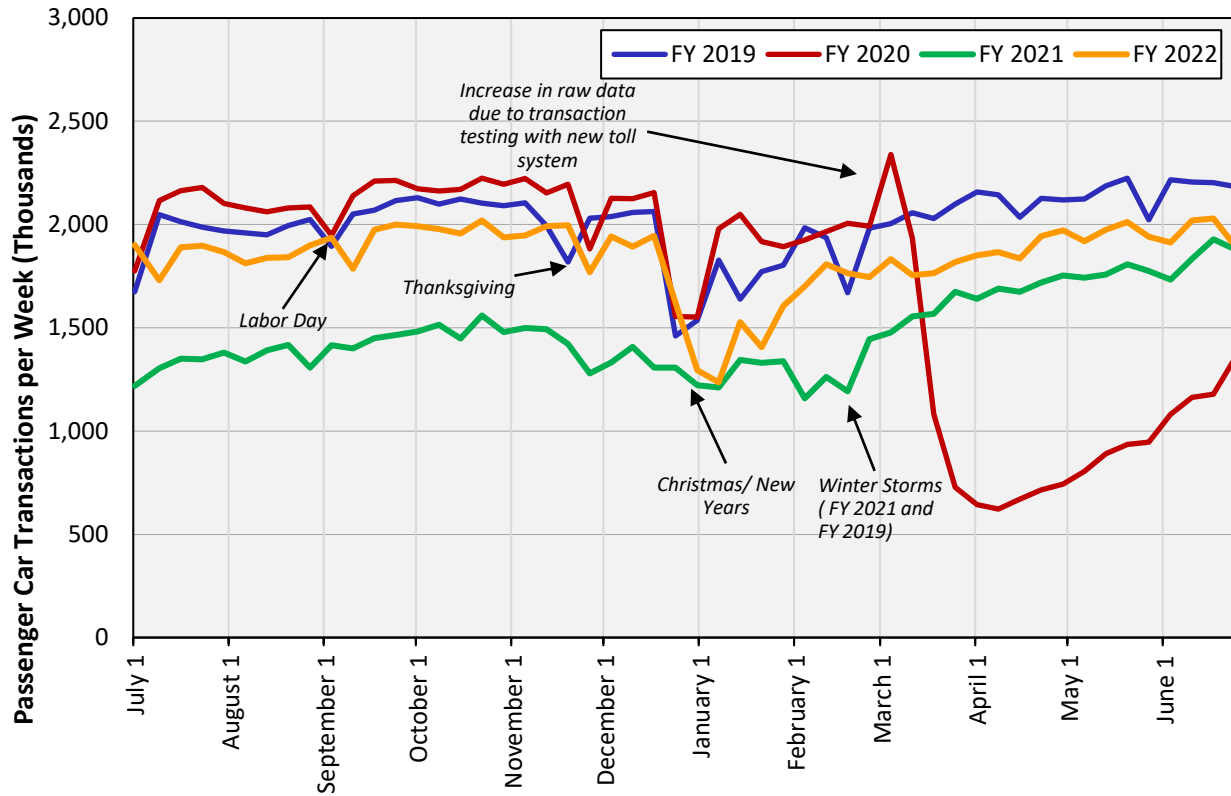
Fiscal Year	Hattem Bridge		Kennedy Highway		Harbor Tunnel		Fort McHenry Tunnel		Key Bridge		Bay Bridge		Nice/Middleton Bridge		ICC (1)		I-95 ETL (1)	
	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change
In-Lane Passenger Car Traffic (in millions)																		
2019	4.898	-	13.530	-	20.908	-	44.617	-	11.866	-	12.747	-	3.147	-	104.334	-	9.349	-
2020	4.450	(9.1)	11.367	(16.0)	15.189	(27.3)	40.757	(8.7)	11.821	(0.4)	11.703	(8.2)	2.803	(10.9)	89.920	(13.8)	7.709	(17.5)
2021	4.137	(7.0)	11.472	0.9	17.964	18.3	37.951	(6.9)	10.654	(9.9)	11.510	(1.6)	2.652	(5.4)	77.548	(13.8)	6.100	(20.9)
2022	4.535	9.6	13.445	17.2	26.441	47.2	38.986	2.7	10.936	2.6	12.443	8.1	3.076	16.0	96.128	24.0	8.199	34.4
In-Lane Commercial Vehicle Traffic (in millions)																		
2019	0.228	-	1.995	-	0.794	-	4.535	-	1.209	-	0.915	-	0.215	-	3.595	-	0.558	-
2020	0.228	(0.3)	2.022	1.4	0.652	(17.8)	4.496	(0.8)	1.247	3.2	0.923	0.9	0.202	(6.4)	3.528	(1.9)	0.490	(12.1)
2021	0.249	9.4	2.210	9.3	0.681	4.5	4.907	9.1	1.305	4.6	0.943	2.2	0.215	6.4	3.588	1.7	0.478	(2.6)
2022	0.270	8.4	2.349	6.3	0.921	35.2	5.156	5.1	1.402	7.4	0.946	0.3	0.265	23.3	3.753	4.6	0.678	41.9
Total In-Lane Traffic (in millions)																		
2019	5.126	-	15.525	-	21.702	-	49.151	-	13.075	-	13.662	-	3.363	-	107.930	-	9.907	-
2020	4.677	(8.8)	13.389	(13.8)	15.842	(27.0)	45.253	(7.9)	13.068	(0.1)	12.626	(7.6)	3.004	(10.7)	93.448	(13.4)	8.200	(17.2)
2021	4.386	(6.2)	13.682	2.2	18.646	17.7	42.858	(5.3)	11.959	(8.5)	12.453	(1.4)	2.866	(4.6)	81.136	(13.2)	6.578	(19.8)
2022	4.805	9.6	15.795	15.4	27.362	46.7	44.141	3.0	12.338	3.2	13.390	7.5	3.340	16.6	99.881	23.1	8.877	34.9



Source: Maryland Transportation Authority E-ZPass Operations, Daily Transactions

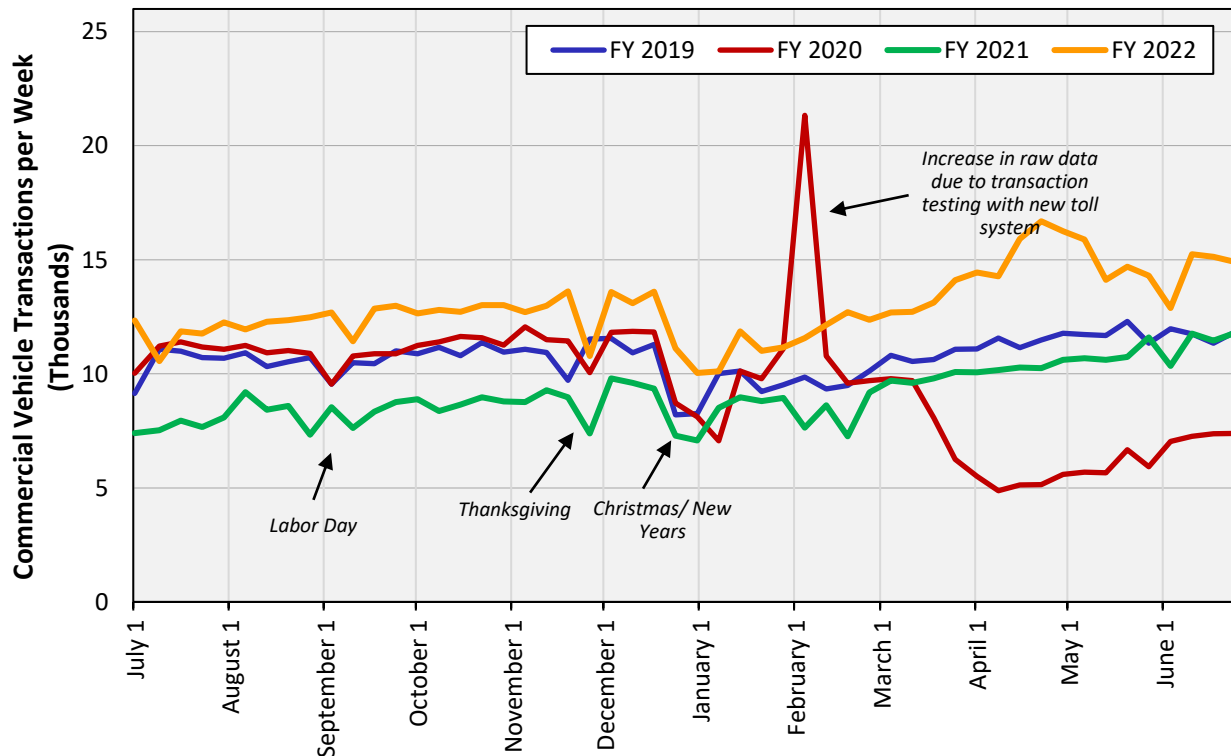
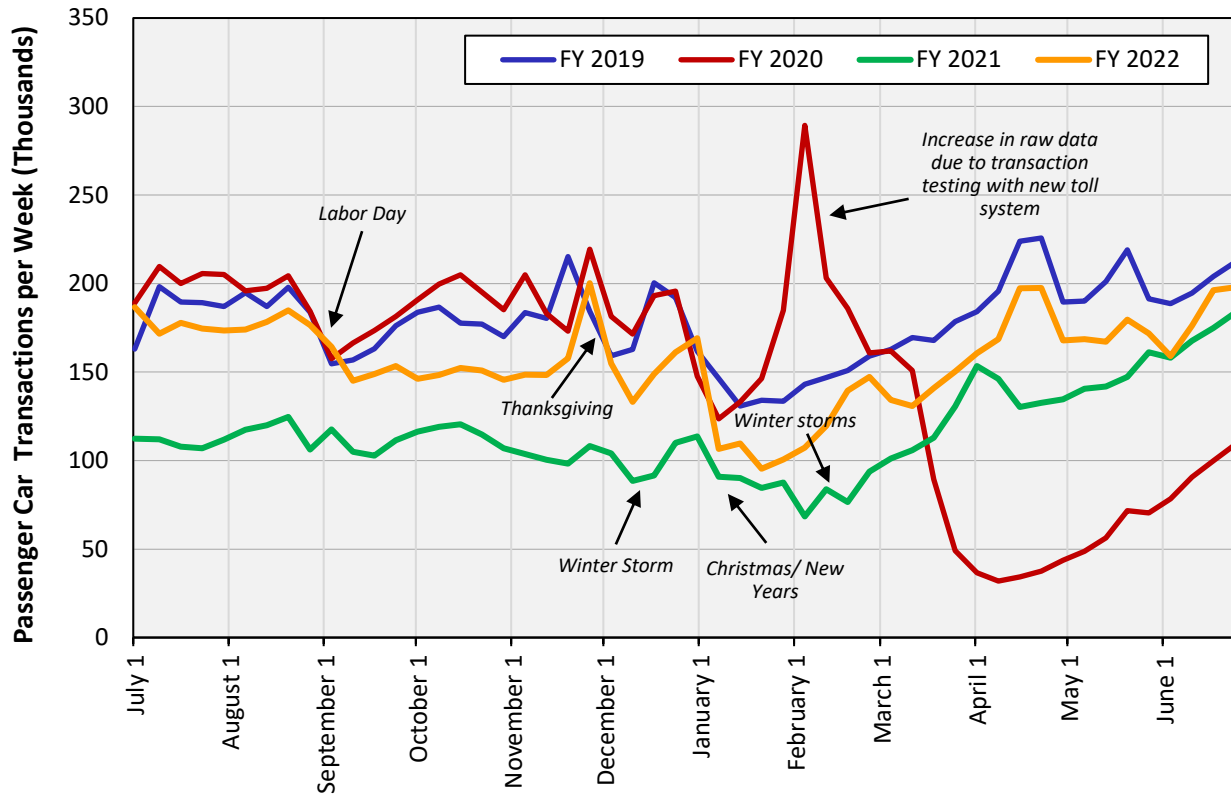
**TRANSACTIONS PER WEEK BY FISCAL YEAR
LEGACY SYSTEM**





Source: Maryland Transportation Authority E-ZPass Operations, Daily Transactions

TRANSACTIONS PER WEEK BY FISCAL YEAR INTERCOUNTY CONNECTOR



Source: Maryland Transportation Authority E-ZPass Operations, Daily Transactions

TRANSACTIONS PER WEEK BY FISCAL YEAR I-95 EXPRESS TOLL LANES (ETL)

2.3 Historical Traffic on Other Major Highways

In order to better understand regional traffic growth patterns, historical traffic counts on select competing major routes were reviewed dating back to 2007. These roads include interstates and major highways that compete with or complement the MDTA Legacy facilities. The data presented in this section are based on calendar year average annual daily traffic volumes and associated growth rates at each location. Historical average annual daily traffic volumes and annual growth rates on six Maryland State Highway Authority (MSHA) roadways and one Virginia roadway through 2020 are presented in **Table 2-7**. Data is not yet available for 2021.

As shown in **Table 2-7**, the traffic volumes on the northern region MSHA roadway, US 1 (east of Cedar Church Road), followed a more positive trend compared to the northern MDTA facilities, with a growth of 1.1 percent between 2009 and 2019. This compares to a transaction growth of 0.4 percent for passenger cars and 0.2 percent for commercial vehicles during this period on the Kennedy highway. Toll increases implemented during this period would contribute to the more modest growth trends on the MDTA facilities. In 2020, traffic decreased by 12.9 percent due to the COVID-19 pandemic.

The historical average annual daily traffic volumes and annual growth rates for the central region MSHA roadways are represented in **Table 2-9** by I-95 (N of MD 100), I-97 (N of MD 176) and I-695 (E of MD 146), which are all located in the Baltimore area. Traffic volumes on the MSHA facilities decreased by an average of 2.2 percent in 2008, most likely due to the impacts of the Great Recession, while traffic volumes on the Central Region MDTA facilities did not experience significant effects of the recession until 2009 with volumes decreasing by 2.7 percent. Traffic volume decreases on the central MDTA facilities also occurred in years 2012 and 2013 due to toll rate increases. Overall, during the great recession years (2007 to 2009), traffic decreased by an average of 0.1 percent and 1.3 percent per year on central region MSHA and MDTA facilities, respectively. During the 2009 to 2019 post-recession period, traffic has increased by 0.2 percent on the MDTA facilities and 0.5 percent on the MSHA facilities in the central region. In 2020 the central region MSHA facilities decreased by 19.5 percent compared to 2019.

The historical average annual daily traffic volumes and annual growth rates on one southern region MSHA roadway is represented by US 301 (South of MD 234) in **Table 2-7**. Due to the proximity of the Bay Bridge (US 50) to Virginia, one traffic count location in northern Virginia has also been included in the table. On an average, traffic volumes on the two southern region MDTA facilities (Bay Bridge and Nice/Middleton Bridge) have grown higher than the comparison locations. During the 2009 to 2019 post-recession period, traffic has increased modestly, averaging 0.5 percent per annum on the MDTA facilities and 0.1 percent on the combined MSHA and VDOT facilities. Traffic volume decreases on the southern MDTA facilities occurred in years 2012 and 2013 due to toll rate increases. Following this, both on the MDTA and on the combined Southern Region MSHA and Virginia facilities, traffic has grown at relatively higher levels. Between 2015 and 2017 growth averaged 2.1 percent on the two southern MDTA facilities and 1.6 percent on the MSHA and Virginia roads. Since then, traffic has been flat or declined on both southern region MDTA and MSHA facilities, before declining further in 2020.

Table 2-7
Average Annual Daily Traffic Trends on Major Highways

Calendar Year	US 1 E of Cedar Church Rd.		I-95 N of MD 100		I-97 N of MD 176		I-695 E of MD 146		MD 295 N of MD 100		US 301 S of MD 234		I-95 (Virginia) N of Courthouse Rd	
	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change	Value	Change
2007	11,600	-	191,900	-	102,600	-	155,300	-	91,600	-	22,500	-	137,000	-
2008	11,100	(4.3)	188,000	(2.0)	100,600	(1.9)	152,200	(2.0)	88,900	(2.9)	21,400	(4.9)	133,000	(2.9)
2009	11,300	1.8	192,100	2.2	105,100	4.5	153,700	1.0	88,900	-	21,800	1.9	136,000	2.3
2010	10,100	(10.6)	192,900	0.4	105,500	0.4	150,900	(1.8)	89,400	0.6	22,500	3.2	136,000	-
2011	9,900	(2.0)	193,100	0.1	105,600	0.1	151,000	0.1	93,400	4.5	22,100	(1.8)	135,000	(0.7)
2012	9,900	-	191,300	(0.9)	106,200	0.6	151,800	0.5	92,600	(0.9)	22,100	-	135,000	-
2013	9,300	(6.1)	193,000	0.9	107,200	0.9	149,500	(1.5)	92,800	0.2	20,800	(5.9)	132,000	(2.2)
2014	9,300	-	192,800	(0.1)	107,100	(0.1)	149,300	(0.1)	107,700	16.1	20,800	-	131,000	(0.8)
2015	10,100	8.6	207,300	7.5	111,800	4.4	160,500	7.5	108,500	0.7	22,600	8.7	134,000	2.3
2016	11,500	13.9	201,600	(2.7)	108,700	(2.8)	150,200	(6.4)	103,300	(4.8)	21,900	(3.1)	136,000	1.5
2017	11,800	2.6	206,400	2.4	111,300	2.4	153,800	2.4	105,400	2.0	22,400	2.3	137,000	0.7
2018	11,700	(0.8)	205,200	(0.6)	121,100	8.8	152,900	(0.6)	104,500	(0.9)	22,200	(0.9)	136,000	(0.7)
2019	12,600	7.7	180,200	(12.2)	122,000	0.7	161,300	5.5	104,500	-	21,800	(1.8)	137,000	0.7
2020	10,971	(12.9)	145,051	(19.5)	98,182	(19.5)	129,811	(19.5)	87,223	(16.5)	18,031	(17.3)	127,000	(7.3)
Average Annual Percent Change														
2007 to 2009		(1.3)		0.1		1.2		(0.5)		(1.5)		(1.6)		(0.4)
2009 to 2019		1.1		(0.6)		1.5		0.5		1.6		-		0.1
2019 to 2020		(12.9)		(19.5)		(19.5)		(19.5)		(16.5)		(17.3)		(7.3)

Trends over the past 13-year period for both the MDTA system and the other major highways were used as a reference in assessing the estimated ten-year traffic growth for the traffic and revenue forecasts presented in Chapter 4.

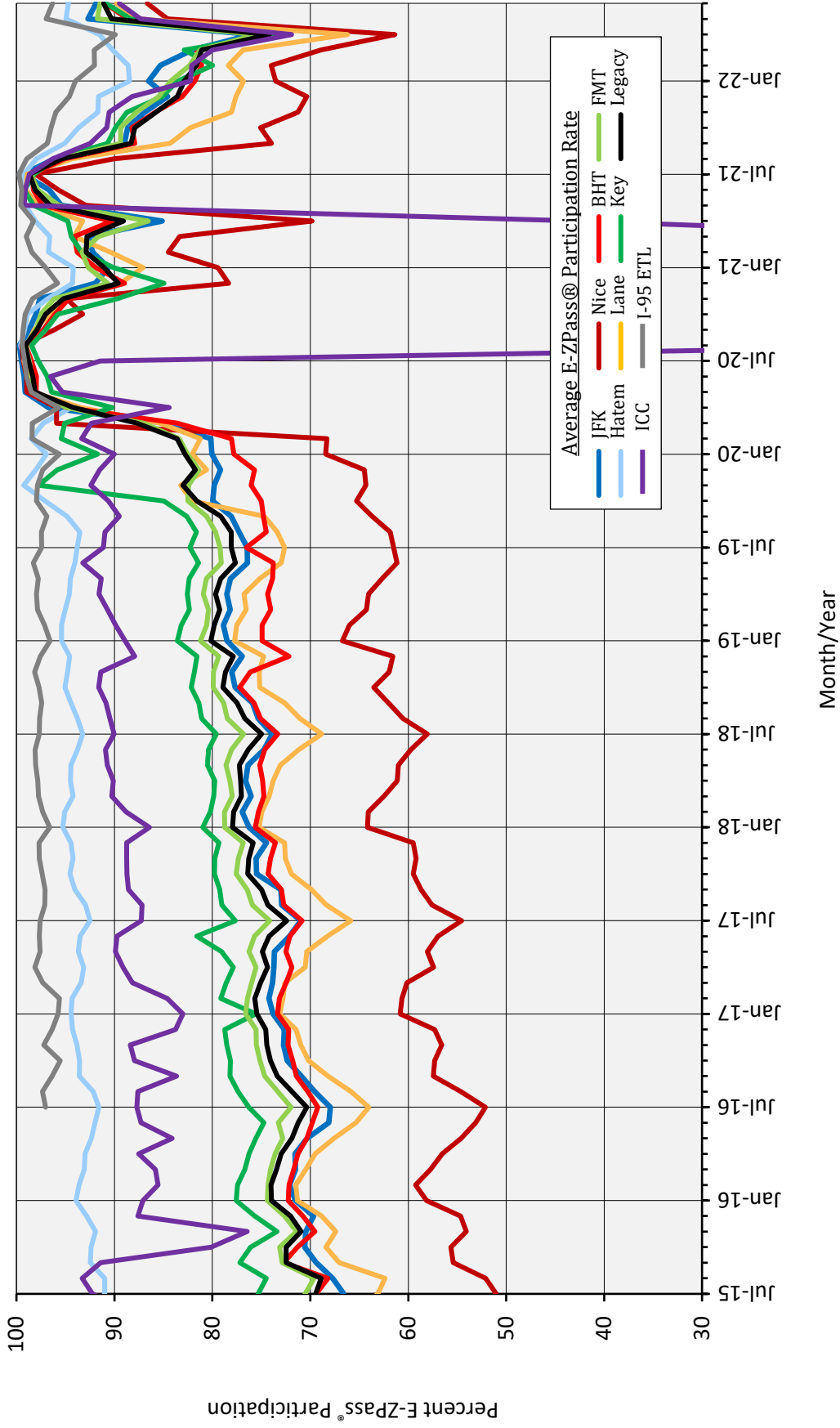
2.4 MDTA E-ZPass® Market Share

In recent years, electronic toll collection has played an increasingly important role in transaction processing for toll agencies across the nation. MDTA collects electronic tolls via E-ZPass®. **Figure 2-5** provides a graphic summary of the E-ZPass® market share for each of the seven Legacy facilities, the total Legacy system, the Intercounty Connector, and the I-95 Express Toll Lanes (ETL) from July 2008 through June 2022 for collected transactions.

From July 2019 to February 2020, E-ZPass® transactions accounted for an average of 80.8 percent of the total Legacy system transactions, an increase of 2.9 percent over the same period in FY 2019. Of these, 66.8 percent were made by Maryland E-ZPass® customers, including in-state E-ZPass® customers, commuter plans, shopper plans and Hatem Bridge plans. Over the same time period, in terms of individual facilities, the Thomas J. Hatem Memorial Bridge had the greatest percentage of E-ZPass® customers at 96.3 percent of total transactions over this time period, primarily due to the Hatem Bridge Toll Plans and its conversion to cashless tolling prior to March. The Governor Harry W. Nice Memorial/Senator Thomas “Mac” Middleton Bridge had the lowest percentage of E-ZPass® transactions during this time period at 64.4 percent. On a total system basis, between July 2019 and February 2020, cash transactions accounted for a combined 17.0 percent of all transactions, a decrease of 3.3 percent over same period in FY 2019. Video transactions accounted for 2.1 percent of all transactions made between July 2019 and February 2020.

On March 17, 2020 MDTA implemented systemwide cashless tolling to prevent the potential spread of COVID-19 during exchanges of cash at toll booths. Additionally, mailing of Notice of Toll Due (NOTD) video invoices was paused until October 2020. Due to these changes and other collection challenges related to the back-office transition, E-ZPass® transactions accounted for 94 percent of all Legacy system transactions in April 2020 and about 98 percent of the total transactions in May and June 2020. The pause of the NOTD invoicing mailings and the back-office transition caused FY 2021 E-ZPass® trends to be more volatile than previous years. In particular, the ICC shows a significant drop in E-ZPass® marketshare due to challenges with trip reconstruction related to the back-office transition. By the end of the fiscal year in July, E-ZPass® marketshare for all facilities was returning to levels seen initially after transition to all-electronic tolling.

In FY 2022, as more NOTD invoices were mailed and paid from the paused period, the E-ZPass marketshare became volatile again as higher shares of video tolls were being paid. Due to this, the share of E-ZPass declined throughout the fiscal year before rebounding in May and June 2022.



Note: FY 2021 Intercounty Connector toll revenue collection impacted by delay in trip reconstruction.
 FY 2022 impacted by video toll collection from delayed NOTDs from business rule changes.

Collected Transaction E-ZPass® Marketshare Trends by Facility



Chapter 3

Econometric Analysis and Growth Forecasts

An econometric analysis was conducted to estimate future baseline travel demand on MDTA's legacy bridges and tunnels, with historical demand estimated via regression equations using regional socioeconomics and other characteristics as explanatory variables. This analysis was done under Work Task #10 as a planned input into this year's annual forecast update and is documented in detail in this chapter. With such historical trend-based equations, regional socioeconomic forecasts were applied to the equation coefficients to estimate annual future demand.

Sixteen demand equations were attempted for seven individual facilities (and one combination of downtown Baltimore facilities), each separately for passenger and commercial vehicles.

3.1 Modeling Overview

Multivariate regression analysis establishes a mathematical equation for a dependent variable (e.g., annual transactions) as a function of other independent variables (e.g., annual socioeconomic data), with associated statistics explaining the equation robustness. Generally, a regression equation is expressed as follows:

$$y_t = \alpha + (\beta_1 * x_{1,t}) + (\beta_2 * x_{2,t}) + \dots + \varepsilon$$

- y_t is the dependent variable (e.g., annual transactions) in timeframe t
- $x_{1,t}$ and $x_{2,t}$ etc. are the independent variables (e.g., socioeconomics, etc.) in timeframe t
- α is the intercept coefficient
- β_1 and β_2 etc. are the slope coefficients for the respective independent variables
- ε is the residual error

In each regression equation, an *analysis of variation* (ANOVA) table explains statistical parameters, such as adjusted R^2 (*coefficient of determination*) and t-statistics, indicating overall equation and independent variable robustness, respectively. A regression equation can be used to forecast the dependent variable if: ANOVA metrics are statistically significant; the equation's relationships are conceptually valid; and credible independent variable forecasts are available.

Such ANOVA statistics and relationship parameters are evaluated jointly for each equation and when comparing alternative, multiple-option solutions. Tradeoffs between overall statistical fits and individual variable coefficients, statistics, and logic help identify which variable(s) merit inclusion/exclusion, when adjusting historical timeseries is warranted, and/or if variables warrant transformation (e.g., logarithmic equations for curvilinear relationships), etc.

3.2 Data and Testing

Individual highway travel occurs for myriad reasons: recreation, commuting, trade, etc., and is influenced by fuel and other travel costs, weather, trip urgency, etc. Aggregate highway travel

volumes typically trend closely with regional socioeconomic variables. As such, conceptually relevant socioeconomic data were hypothesized, compiled, and regression-tested with other possible explanatory variables, such as dummy variables, fuel prices, average effective toll rates, etc.

Multiple regression equations evaluated for each facility-vehicle type reflect various geographies (county clusters) for each socioeconomic variable combined with other possible explanatory variables. A final equation was selected based on multiple criteria, including:

- overall equation robustness (adjusted R^2),
- independent variable robustness (t-statistics and p-values),
- equation's coefficient(S) logic and reasonableness,
- geographic catchment area logic and reasonableness relative to the facility location, and
- independent variable(s) and source(s) credibility.

3.2.1 Facilities (Dependents)

Seven legacy facility bridges and tunnels were ranked by revenue contribution over the last few years, shown in **Table 3-1**. Note the three downtown Baltimore crossings (Fort McHenry, Baltimore Harbor, and Francis Scott Key) were combined for testing due to proximity and historical traffic diversions during individual facility closures, maintenance, and construction. Sixteen equations were sought, representing each facility/combination for passenger cars (PC) and commercial vehicles (CV) (i.e., $[7 + 1] * 2 = 16$).

Table 3-1
Revenue Contribution Ranking by Legacy Facility

Mnemonic	Facility	PC	CV
JFK	John F. Kennedy Memorial Highway	2	4
TJH	Thomas J. Hatem Memorial Bridge	14	12
FMT	Fort McHenry Tunnel	1	3
BHT	Baltimore Harbor Tunnel	5	11
FSK	Francis Scott Key Bridge	7	8
WPL	William Preston Lane Memorial (Bay) Bridge	6	9
HWN	Harry W. Nice/Thomas Middleton Bridge	10	13
BHC3	Baltimore Harbor Crossings (FMT/BHT/FSK)	-	-

Annual facility transaction and revenue data were compiled since 1984 (except Fort McHenry, which extends to 1986) through 2020, providing 37 timeseries data observations per equation. Transaction data are the equations' dependent variables, and facility's revenue per transactions ratios (i.e., average annual effective toll rates) were tested as possible explanatory variables.

Historical transaction data were compiled from MDTA sources such as Traffic Volume Income (TVI) reports, annual reports, and financial statements. Some data limitations were identified in early years for data pulled from the public reports, such as partial years and rounding. Data were adjusted/normalized to eliminate influences of single-occurrence exogenous factors that affected traffic (i.e., construction shut-downs, facility reconfigurations, one-/two-way toll conversions,

leap-years, etc.) prior-to regression modeling with socioeconomic variables. Adjustments to data in the early years were estimated based on documentation in the public reports, while adjustments to data since FY 2013 was based on more detailed data provided by MDTA in previous CDM Smith work tasks.

3.2.2 Explanatory Variables (Independents)

Socioeconomic, macroeconomic, and other data were compiled or estimated for the same historical timeseries, which include:

- *MDTA* – historical facility revenues/transactions (average effective toll rates)
- *United States Census Bureau* – historical population
- *United States Bureau of Economic Analysis (BEA)* – historical employment
- *Woods & Poole Economics, Inc., 2022 (WP22)* – historical and forecast population, employment, real income, income per capita, real gross regional product (GRP), and real retail sales
- *Moody's Analytics* – historical and forecast Maryland population, real gross regional product (GRP), and retail sales (top level comparison against WP22 forecasts)
- *Energy Information Administration (EIA)* – historical and forecast real- and nominal-dollar denominated gasoline and diesel fuel prices
- *Dummy Variables* – COVID-19 (2020); Great Recession (2008/09); September 11th (2001); Construction (facility-specific)

3.2.3 Geographies

Socioeconomic data have geographic and temporal dimensions. Annual timeseries data for each variable/source were compiled for all states and counties within and abutting Maryland (MD), including Delaware (DE), the District of Columbia (DC), New Jersey (NJ), Pennsylvania (PA), Virginia (VA), and West Virginia (WV). State and county socioeconomic data can be aggregated, such that various combinations of clustered counties can be tested. Numerous logical and contiguous geographic clusters were tested for the available socioeconomic variables to ascertain which variable(s) were best suited to explain historical transaction data at which geographic catchment. Note the geographic catchments ultimately identified and selected do not necessarily represent most traffic/transaction origins and/or destinations, but rather such catchments' macroeconomic characteristics most closely represent and/or correlate with historically observed transactions.

3.3 Caveats

Econometrically derived demand forecasts drive further transaction and toll revenues estimates. Regression-based growth forecasts do not explicitly consider route choice assumptions, existing roadway network and planned improvements, existing and anticipated roadway capacities, origin-destination pairing, peak and directional factors, or traffic diversions.

As this regression analysis attempts to estimate aggregate travel demand, the equations cannot account for all potentially influencing factors, especially small-scale, qualitative/difficult-to-quantify, and/or irregularly occurring factors. Also, a regression analysis is incapable of forecasting unprecedented factors (positive or negative influence) such as catastrophic climate

change, health epidemics, terrorism, natural disasters, or any other significantly destabilizing factors.

Forecasts are estimates, limited by the availability and robustness of input data, both historical and projected. Data unavailability, discrepancies, aberrations, and inaccuracies can hinder the robustness and results of econometric forecasting.

3.4 Equations' Characteristics

Various equations for each facility-vehicle type were tested, reflecting combinations of socioeconomics, geographies, other variables, linear versus ln-linear functions, and different historical timeseries (e.g., adjustable start year). A single best-suited equation was identified for 14 of 16 facility-vehicle types, considering overall statistical robustness, logic and magnitude of explanatory variable coefficients, logic and consistency of variable selection and geographic clustering between facilities, and other factors. The summary of these equations is shown below in **Table 3-2**.

Table 3-2
Econometric Equations Summary

	Facility	Adj. R ²	Start Year	Explanatory Variables (and Counties)
Passenger Cars	JFK	98.7%	1984	Population (4), Nominal Toll Rates, COVID-19, Nominal Gasoline
	TJH	95.4%	1984	Population (4), Nominal Toll Rates, COVID-19
	FMT	96.9%	1989	GRP (2), Nominal Toll Rates, COVID-19
	BHT	94.3%	1988	GRP (8), Nominal Toll Rates, COVID-19, Construction
	FSK	85.5%	1987	GRP (3), Nominal Toll Rates
	WPL	99.4%	1984	Population (3), Nominal Toll Rates, COVID-19
	HWN	98.5%	1984	Population (3), Nominal Toll Rates, COVID-19
	BHC3	97.8%	1991	GRP (3), Nominal Toll Rates, COVID-19
Commercial Vehicles	JFK	84.1%	1990	Retail (10), Nominal Toll Rates
	TJH	N/A	N/A	N/A
	FMT	87.0%	1991	Retail (16), Nominal Toll Rates
	BHT	93.0%	2000	Retail (9), Nominal Toll Rates, COVID-19
	FSK	93.9%	1990	Retail (9), Nominal Toll Rates
	WPL	91.6%	1987	Retail (1), Nominal Toll Rates, COVID-19, Nominal Diesel
	HWN	N/A	N/A	N/A
	BHC3	91.8%	1990	Retail (17), Nominal Toll Rates

3.4.1 Statistics

Overall goodness of fits (adj. R²) for most equations are relatively high, at over 90%; three were lower, in the mid-80%; adjusted R² ranges from 84.1% to 99.4%. Relatively high fits indicate good statistical and correlative relationships (i.e., limited outliers, or residuals, statistically unexplainable from the independent data series).

Passenger car equations exhibit higher adjusted R² than commercial, mostly due to higher aggregate facility passenger volumes and the relatively greater annual changes for commercial

(passenger trends are typically more stable than commercial). Statistically sensible equations for the Thomas J. Hatem and Harry W. Nice bridges' commercial transactions could not be identified due to relatively low volumes with amplified trends and unexplained up/down cycles relative to larger-scale facilities, as well as dependent data rounding-level limitations. Both unidentifiable facilities-vehicle types are the smallest contributors to MDTA's total revenue yields.

3.4.2 Timeseries Considerations

Many facility-vehicle type timeseries exhibited aberrant fluctuations in the earlier years (late '80s and early '90s) with outlier highs/lows never subsequently observed since then. Unusual early-year observations may reflect simpler data collection processes relative to newer, more modern, and accurate processes, or discontinuity from updating such processes without normalizing or adjusting previous-methodologies' data. Additionally, there were likely some bridge closures and disruptions from maintenance and rehabilitation, which shifted/diverted traffic patterns between certain facilities.

A concerted effort to identify causal factors for the unusual early-year observations yielded some information about construction timeframes, which were converted into dummy variables. However, while some explainable factors were identified, some data remained unexplained; hence early year data accuracy was difficult to corroborate. Consequently, some early years were excluded from equations.

3.4.3 Explanatory Variables

For some facility-vehicle type equations, more than one statistically defensible and logic solution was possible; for many, only one sensible solution was identified.

Selected Variables – A single socioeconomic variable for a clustered group of contiguous counties (differs between equations), in conjunction with historical nominal effective toll rates explain most historical transaction equation variation. In most equations, a COVID-19 dummy variable was required to explain the unprecedented declines in 2020 beyond the socioeconomic variables. Also, a construction dummy variable was required for one equation and fuel prices for two.

Relative Importance – In all equations, the socioeconomic variable correlated most closely with historical transactions. However, observed historical transactions often exhibited decelerated growth or annual declines in years where socioeconomic growth occurred. Such divergences were almost fully explained via inclusion of the effective toll rate variable, as significant toll rate changes were implemented (especially 1990, 2002, 2004, 2010, 2012, 2013, and 2014). Such relatively significant effective toll rate increases resulted in some relatively inelastic demand declines – enough to warrant inclusion in every identified equation. Dummy variables (COVID-19 and construction) reconciled precipitous transaction declines otherwise not as pronounced in the socioeconomic trends, and the fuel price inclusion was statistically significant for two equations, but not a major explanatory factor.

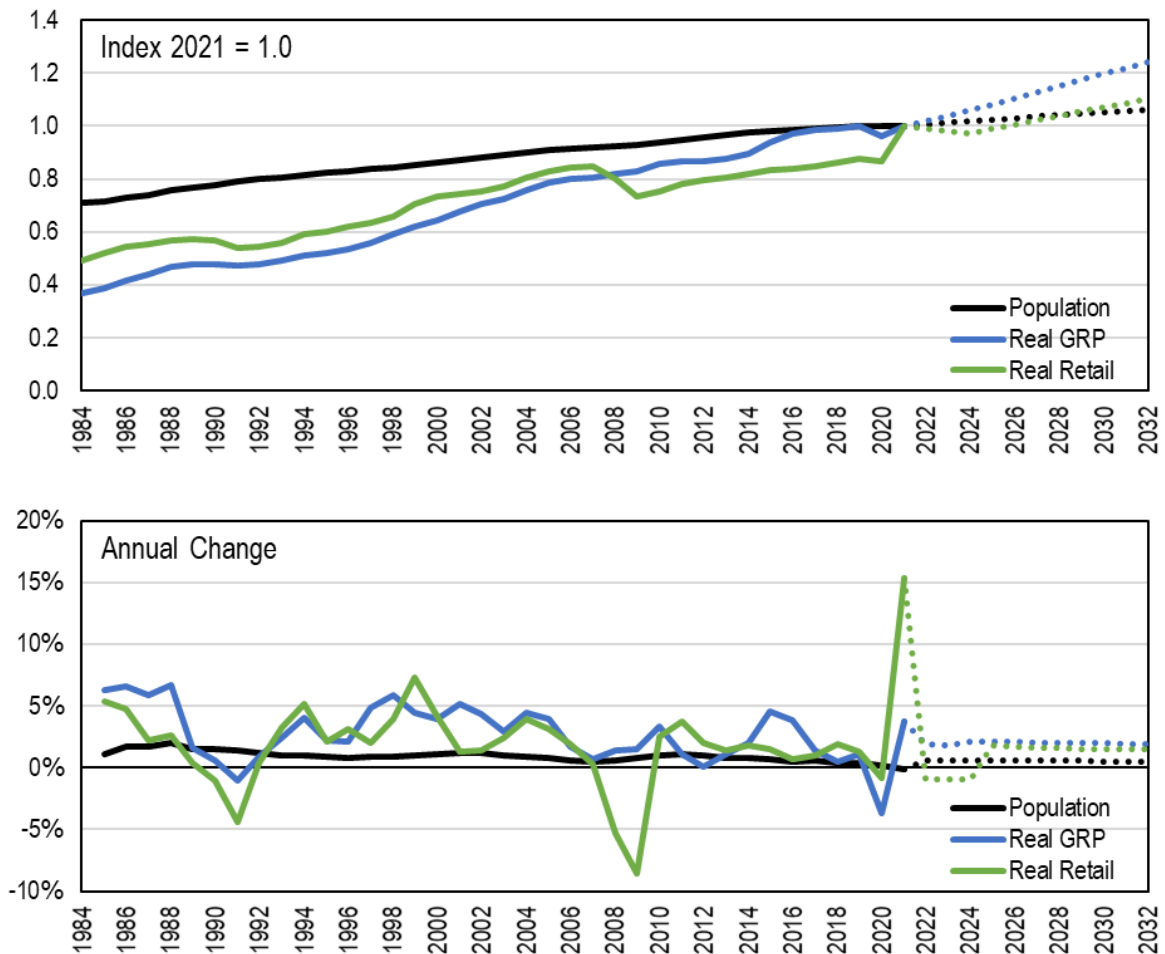
Comparable Similarities – Explanatory socioeconomic variables between equations exhibit some similarities. Commercial vehicle equations apply real retail sales universally (although a couple facilities' historical transactions also could correlate with regional real GRP, albeit slightly lower than real retail). Passenger car equations for the downtown Baltimore facilities (FMT, BHT, and

FSK) relate most closely to regional real GRP, while the non-Baltimore bridges (JFK, TJH, WPL, and HWN) relate most closely to regional population. Note the county grouping for each equation is different, as elaborated in the next subsection.

Socioeconomic Forecasting – Socioeconomic forecasts applied to the equations’ coefficients to estimate future demand growth are sourced from Woods & Poole’s 2022 Complete Economic and Demographic Data Source (CEDDS), via county-level aggregations. A top-level visualization of Maryland’s population, real GSP, and real retail sales are shown below in **Figure 3-1**, with the three state-level socioeconomic measures plotted as indexed values (2021 = 1.0) for trendline comparability, and as annual growth below. WP22’s compound average annual growth rate (CAGR) forecasts between 2021 and 2032 for Maryland’s population, real GSP, and real retail sales are 0.6%, 2.0%, and 0.9%, respectively. Similar data were purchased from Moody’s (only for Maryland, not the counties); with population forecasted to remain unchanged at 0.1% CAGR, but with real GSP effectively identical to WP22 at 2.0% CAGR; retail sales were unavailable in a real-dollar (2012\$) denomination and precluded direct comparison.

Figure 3-1

Maryland Population, Real GSP, and Real Retail Sales Index and Annual Growth



Non-Socioeconomic Forecasting – Nominal effective average toll rates are assumed to hold constant in the equation forecasts, reflecting no toll rate increases or decreases. Dummy variables for COVID-19 and construction are likewise assumed to revert to “0” values (non-COVID-19 and non-construction) in 2021 and thereafter. As such, dummy variable inclusion only affects a forecast by adjusting the equations’ fit, not by a changing future trend. Actual multi-year COVID-19 related effects in 2021 and beyond are handled in post-processing the econometric forecasts based on actual observed data in 2021 and 2022 (YTD) and other analyses. As such, the equations’ forecasts are driven predominately by the underlying socioeconomic forecasts (although two equations also include fuel prices, assumed to growth annually at historically observed rates).

3.4.4 Geographies

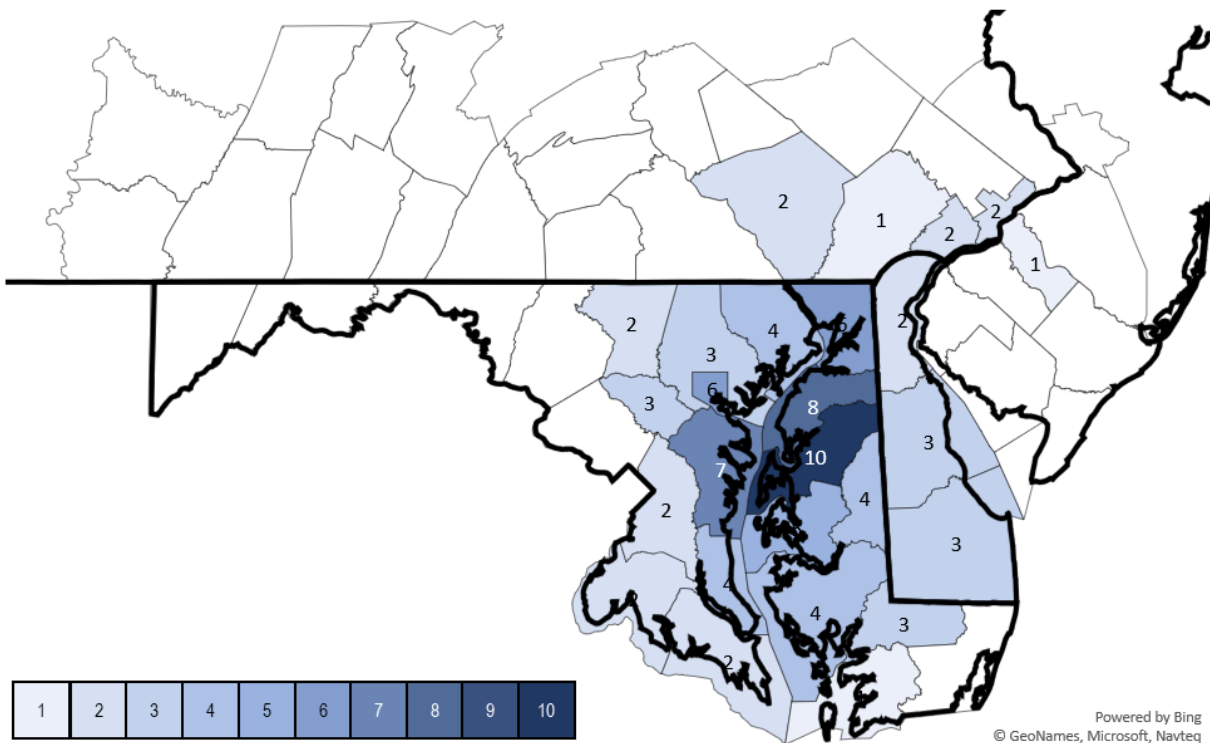
Socioeconomic data were tested with various geographic combinations, primarily Maryland counties in conjunction with adjacent state counties. Typically, the socioeconomic trends of the county where a facility is located correlates with historical transactions, but not as well as county aggregation that includes neighboring geographies. Aggregating counties enables myriad possible combinations, and the testing process was iterative with many successive county inclusion and exclusion trials at different scales/distances from each facility location. Each county’s individual socioeconomic trends, relative contribution to an aggregated geographic total, and sensible geospatial logic (i.e., clustered, contiguous, non-gerrymandered, etc.) were considered in testing.

Ultimately, a cluster of contiguous counties anchored around a facility’s location were selected for each equation to maximize the statistical/explanatory relationships with historical transactions. A geographic cluster does not imply that all travel on the facilities stems exclusively from such geographies, but a significant proportion likely does, and the historical socioeconomic patterns for such county clusters correlates most closely with observed historical facility transactions.

Counties in the equations are tallied below in **Figure 3-2**, counting the number of inclusions in any of the 14 estimated equations. As expected, mostly counties included in the socioeconomic variables surround the facility locations and the Chesapeake Bay, with Queen Annes (10 times), Kent (8), and Anne Arundel (7) included most. The more peripheral counties are only included once-to-few times.

As noted, the county clustering for each equation is different, clustering around the specific facility and expanding into adjoining counties. Counties included range from 1 (WPL CV at Queen Annes) to 17 (combined three Baltimore Harbor Crossings from St. Mary’s in the south up to Philadelphia in the north). On average, about four counties are included per equation’s socioeconomic data.

Figure 3-2
Counties Included in Equations (Count = Number of Equations)



3.5 Econometric Growth Forecasts

Econometrically derived travel demand forecasts are based on applying forecasted explanatory variables' data (variable socioeconomics and fuel, and constant toll rates and dummy variables) to the estimated regression coefficients for the selected equations. Annual forecast growth estimates are shown below in **Table 3-3**, with a summary CAGR for the next decade.

Between 1990 and 2019 (excluding unusual observations in the late '80s and the precipitous declines in 2020 from COVID-19) passenger transactions' growth for all legacy facilities was 1.4% CAGR (ranging between 0.9% and 1.8% between individual facilities). Commercial vehicles' growth was 0.8% (ranging 0.7% to 1.8%). Estimated forecasts are slightly higher than historical timeseries, at 1.5% for all passenger transactions, and 1.1% for commercial, with ranges for passenger slightly wider than historical (0.7% to 2.1%) and commercial narrower (0.3% to 1.1%). As tabulated below, the relatively fastest growth rates are forecasted for the three Baltimore bridges and tunnels (FMT, BHT, and FSK), and the slowest relative growth on the WPL Memorial Bay Bridge crossing the Chesapeake Bay.

Table 3-3
Econometric Demand Growth Forecast Summary

	Facility	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	CAGR	
Passenger Cars	JFK	0.9%	0.9%	0.9%	0.9%	0.9%	0.8%	0.8%	0.8%	0.8%	0.8%	0.7%	0.8%	
	TJH	0.8%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	
	FMT	1.4%	1.3%	1.7%	1.6%	1.6%	1.6%	1.5%	1.5%	1.5%	1.5%	1.4%	1.5%	
	BHT	2.0%	2.0%	2.3%	2.2%	2.2%	2.2%	2.1%	2.1%	2.1%	2.1%	2.0%	2.0%	2.1%
	FSK	1.3%	1.3%	1.4%	1.4%	1.4%	1.4%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%
	WPL	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%
	BHC3	1.3%	1.3%	1.6%	1.5%	1.5%	1.5%	1.5%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%
Commercial Vehicles	JFK	-0.6%	-0.6%	-0.6%	1.2%	1.2%	1.2%	1.1%	1.1%	1.1%	1.0%	1.0%	0.6%	
	TJH	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	FMT	-1.2%	-1.3%	-1.3%	2.0%	1.9%	1.8%	1.7%	1.7%	1.7%	1.6%	1.6%	0.9%	
	BHT	-1.5%	-1.5%	-1.6%	2.5%	2.3%	2.2%	2.1%	2.1%	2.0%	1.9%	1.9%	1.1%	
	FSK	-0.9%	-0.9%	-0.9%	2.1%	2.0%	1.9%	1.9%	1.8%	1.8%	1.8%	1.7%	1.1%	
	WPL	-0.9%	-0.9%	-0.9%	0.8%	0.8%	0.8%	0.7%	0.7%	0.7%	0.7%	0.7%	0.3%	
	BHC3	-1.1%	-1.1%	-1.1%	1.9%	1.8%	1.7%	1.6%	1.6%	1.5%	1.5%	1.5%	0.9%	

Post-processing the econometric forecasts and revenues estimates are the last component of the forecasting analysis. Growth rates developed from this econometric regression analysis are normal baseline growth rates excluding impacts of other elements such as COVID-19, construction, and recent traffic and economic trends. These elements were considered in the growth rates that were ultimately used in the traffic and revenue forecasted that will be presented and discussed in more detail in **Chapter 4**.

Chapter 4

Forecasts by Facility

This chapter summarizes the development of the forecasts of future year transactions and toll revenue for the MDTA system. Separate sections and discussions are provided for the overall assumptions, the Legacy facilities, ICC, I-95 ETLs, and other revenue. The 10-year annual forecast results by facility through FY 2031 are included in this chapter. Monthly forecasts for FY 2023 and FY 2024 are also included.

4.1 Assumptions

Transaction and revenue forecasts were predicated upon the following basic assumptions, which are considered reasonable by CDM Smith for purposes of the forecast:

1. The MDTA toll facilities and approach roads will continue to be well-maintained and effectively signed;
2. No competing highway projects other than those identified in this report will be constructed or significantly improved during the forecast period;
3. MDTA will continue to operate within its business rules and practices;
4. For the purposes of this forecast, it is assumed that no toll rate or toll schedule adjustments will be made during the forecasting period other than those presented in **Chapter 1**;
5. Annual revenue estimates are expressed in future year dollars (nominal);
6. No major recession, natural disasters, future pandemics, or other significant exogenous events will occur that would significantly reduce travel in the region;
7. Socioeconomic growth, including related to population and employment, will occur as presented in this study; and
8. Motor fuel will remain in adequate supply, and future price increases will not significantly exceed the long-term rate of inflation.

Any significant departure from these basic assumptions could materially affect forecasted transactions and toll revenue.

Detailed Assumptions

In addition to the basic assumptions listed above, several other more specific assumptions were made as provided in **Table 4-1**.

**Table 4-1
Detailed Forecast Assumptions**

Assumption Category	Assumption Detail
COVID-19 Impacts	Slightly more negative impacts were assumed on the ICC, I-95 ETLs, and passenger cars on non-harbor crossing facilities based on most recent trends. A near-term positive Legacy System commercial vehicle impact was assumed to account for greater than anticipated volumes through FY 2022.
Construction	Rehabilitation of Decks at the Curtis Creek Bascule Span Approaches pushed from Spring of 2025 to Fall of 2029, duration of subgrade improvements east of Bear Creek was reduced from 24 months to 18 months, and the FSK bridge deck replacement was moved up from spring of 2026 to summer of 2025. For the I-95 ETLs, the northbound extension was included with the addition of I-695 direct connectors. The opening date for these ramps was assumed to occur simultaneously with phase 2 of the extension.
Backlogged E-ZPass Transactions	A share of remaining backlogged E-ZPass transactions and revenue will be processed by October 2022 based on information provided by MDTA on 8/23/2022.
Backlogged Video Transactions	A share of remaining backlogged video transactions and revenue will be processed and invoiced within FY 2023 based on information provided by MDTA on 8/23/2022. Reduced collection rates were assumed for backlog video transactions.
NOTD Collection Rates	Collection rates for video transactions were updated based on the latest monthly collection trends provided by MDTA through FY 2022, which accounts for potential delays in collected toll revenue due to the impacts of the customer assistance plan. Collection rates are assumed to return to historical averages by FY 2025.
Customer Assistance Plan/ Civil Penalties	On 2/24/2022, the MDTA board approved the customer assistance plan which applied a civil penalty waiver grace period and ceased referring toll bills to MVA and CCU through 11/30/22. No civil penalty collection was assumed on NOTDs issued prior to FY 2023.
Pay-by-Plate and Early Pay NOTD Payment Options	Pay-by-plate and early pay NOTD assumptions were updated based on latest trends through FY 2022. The shares were kept constant through the forecast until more data is available to identify growth potential.
New Vehicle Classifications	Assumed the new motorcycle, 3-axle light, and 4-axle light vehicle classifications and toll rates will go into effect later in FY 2023.
Toll Changes	No future toll rate changes are assumed.
Forecasting Approach	All transactions and toll revenue as well as civil penalty revenue are forecasted in the month of collection (cash accounting).

As discussed previously in **Chapter 1**, several business rules were changed in FY 2021 due to the COVID-19 pandemic that led to additional assumptions for this forecast related to the backlogged transactions and civil penalty collections in FY 2022. Assumptions related to the construction projects listed in **Table 4-1** are discussed in more detail later in this chapter.

4.2 Legacy System

This section provides an overview of the development of the traffic and toll revenue forecasts for the Legacy system. The inputs to the forecast included toll rates by payment method, traffic growth forecasts, E-ZPass® participation percentages, and the impacts associated with planned roadway improvements on the Legacy facilities.

4.2.1 Forecast Methodology

Econometric models were developed for the Legacy system traffic growth forecasts and summarized previously in **Chapter 3**. The econometric models sought to establish correlative relationships between various socioeconomic independent variables (such as population, employment, GRP, etc.) and the dependent variable, transactions. The traffic growth used in this current study is based on the growth from the econometric analysis with adjustments as

necessary to account for the most recent traffic and economic trends related to inflation and gas prices, long-term pandemic-related commuting trend changes, as well as construction impacts summarized in the subsequent section. Passenger car and commercial vehicle transactions were forecasted independently by facility using these growth rates and by benchmarking to actual pre-COVID-19 trends.

Assumptions including those related to construction impacts, the Pay-by-Plate and Early Pay NOTD payment programs, and new toll rates for some vehicle classifications were then applied to the estimated normal growth rates. The end-product of the model was a baseline 10-year forecast of transactions and revenue by facility, by vehicle class (passenger cars and commercial vehicles), and by method of payment (electronic, video, and cash) without COVID-19 impacts and without cashless tolling. These results were then processed through a “Waterfall” analysis spreadsheet model developed by CDM Smith to estimate the impacts of cashless tolling, including leakage and violation processing. Video and ITOL revenue were then adjusted using a spreadsheet model to account for the changes in MDTA business rules and NOTD mailing of the backlog transactions listed in **Table 4-1**. Finally, transactions and revenue by facility, vehicle class, and payment type from the different files were adjusted using forecasted COVID-19 impact factors to account for recovery from ongoing impacts on traffic and travel patterns related to the pandemic.

4.2.2 Construction Impacts

The major construction projects expected to impact traffic and revenue on the MDTA Legacy system are described below. In reviewing these projects and estimating the traffic impacts, it was estimated that during the construction periods, some traffic would divert to the next best alternative tolled or toll-free crossing if possible, while a small portion of more discretionary trips would be suppressed.

1. **Eastbound Span of William Preston Lane, Jr Memorial Bridge (US-50)** – This project will rehabilitate the deck of the eastbound span of the William Preston Lane (Bay) Bridge. Construction is scheduled to take three years, and the anticipated construction start time is Fall 2022. Major construction will be performed primarily during off-peak night closures which are anticipated to begin Spring of 2023. Preliminary completion is estimated for Fall 2025.
2. **Subgrade Improvements east of Bear Creek, Francis Scott Key (I-695)** - This project involves drainage repairs and replacement, major roadway subgrade improvements, and roadway paving necessary to address ongoing road and barrier settlement. The project is scheduled to begin in the Spring of 2023. Construction will require long term closure of one direction of I-695 (two lanes) and placing single lane contra flow traffic in the other travel direction. Once the improvements on the closed side are complete, traffic will be switched on to the completed roadway while the other side will be closed to perform improvements. The estimated construction duration is 18 months. For this study, construction was assumed to begin to April 2023.
3. **Rehabilitation of Decks at Curtis Creek Bascule Span, Francis Scott Key Bridge (I-695)** – This project involves replacing the deck of the approach spans of the bascule spans of both inner loop and outer loop bridges of the Curtis Creek bridge. The project is scheduled to begin in the fall of 2029. Construction will require long term closure of one direction of I-695 and placing

contra flow traffic in the other travel direction. Once the deck replacement of the closed side is complete, traffic will be switched on to the completed deck while the other side will be closed to perform deck replacement. The estimated construction duration is 18 months. For this study, this project was assumed to begin after the completion of the subgrade improvements east of Bear Creek.

- 4. Francis Scott Key Bridge Deck Replacement** - This project involves replacing the deck for the entire length of the bridge as well as the installation of fiberglass jacket protection system at the water pier columns. This project is scheduled to begin the summer of 2025. Construction will require long term closure of one direction of I-695 and placing contra flow traffic in the other travel direction. Once the deck replacement of the closed side is complete, traffic will be switched on to the completed deck while the other side will be closed to perform deck replacement. The estimated construction duration is 30 months.
- 5. Replacement of I-895 over I-695 Bridge** - This project proposes to replace the two existing I-895 four simple span steel stringer bridges with two span continuous steel girder bridges crossing over I-695 in Lansdowne, within Baltimore County Maryland. Additional work will include replacement of existing traffic barriers and resurfacing of the roadway within the project limits. One lane will be maintained in each direction utilizing one bridge while constructing the other bridge. Construction will occur on the I-895 southbound bridge first and then on the northbound bridge. Temporary crossovers for the traffic shift and temporary concrete barriers between the two travel directions will both be used. The ramp from the I-695 outer loop to I-895 northbound will be closed when the I-895 northbound bridge is under construction. Traffic will be detoured to continue on the I-695 outer loop, use the exit to MD 295 northbound, and then to get back on I-895 northbound. Construction is anticipated to begin in 2024 and continue for three years.
- 6. Baltimore Harbor Tunnel (I-895) AET Conversion** - This project supports the recent conversion of the facility to cashless tolling by permanently removing the existing toll plaza and installing a gantry tolling system. The project scope also includes geometric improvements to the adjacent interchange ramps at Childs Street, Frankfurst Avenue, and Shell Road to comply with AASHTO standards, as well as removal and replacement of the Shell Road ramp, Frankfurst Avenue, and access road bridge structures along I-895. The project is tentatively scheduled to begin construction in 2025 with an estimated construction duration of 3 years. For this study, construction was assumed to begin April 2025.
- 7. I-95 ETL Northbound Extension** - This project will involve the widening and reconstruction of I-95 northbound from MD 43 to north of MD 24 to accommodate two new ETL lanes in the northbound direction. The lane configuration from MD 43 to MD 24 will be four general purpose lanes and two ETLs. From MD 24 northbound the configuration will be three general purpose lanes and two ETLs. The ETLs will transition to a single lane ETL and then run concurrent to the three GP lanes until the four lanes transition back to three lanes in advance of the MD 136/Calvary Road Overpass approximately two miles north of MD 24. The completion of construction through the MD 152 Interchange is scheduled for the summer of 2024. The completion of construction through the MD 24 Interchange is scheduled for fall of 2027. Coinciding with the completion of the northbound extension, direct connectors from I-695 eastbound and westbound to I-95 northbound will open as well. Upon completion of the program, there will be three northbound

tolling zones on the I-95 ETLs between the I-95/895 split and MD 24: from the I-95/895 split to MD 43, MD 43 to MD 152, and MD 152 to MD 24.

Additional construction projects on the MDTA facilities and competing non-MDTA highways and arterials were also reviewed, but it was determined that the construction activity associated with these projects will result in negligible impacts on MDTA traffic and toll revenue.

4.2.3 Forecast Results

Table 4-2 presents actual collected transactions and toll revenue for the Legacy system for FY 2022 and forecasted collected transactions and toll revenue for FY 2023 through FY 2032 by passenger cars and commercial vehicles. The forecasts reflect collections after assumed reductions due to unbillable and unpaid trips. **Table 4-3** provides historical and forecasted total transactions and toll revenue for the Legacy system by facility. FY 2023 transactions and revenue are forecasted to decrease over FY 2022 due to reduced collections of backlogged transactions, as all transactions are anticipated to be invoiced by the middle of FY 2023. Transactions and revenue are forecasted to return to levels generally more consistent with pre-pandemic conditions after FY 2023. Some declines are forecasted to occur in FY 2026 to FY 2027 due to the construction planned for the I-696/Francis Scott Key Bridge and I-895/Baltimore Harbor Tunnel facilities as detailed previously in **Section 4.2.2**. These projects are forecasted to cause diversion to other MDTA Legacy facilities and some diversion off the MDTA system from customers foregoing trips or using non-tolled alternatives. These changes can be observed in **Table 4-3**. After FY 2027, transactions and revenue are not assumed to be impacted by such large construction projects and reflect expected normal growth through the end of the forecast period in FY 2032.

For purposes of budgeting and the tracking of actual versus forecasted transactions and revenue, monthly forecasts of transaction and toll revenue were developed for FY 2023 and FY 2024.

Table 4-4 provides the forecasted monthly transactions and **Table 4-5** provides the forecasted monthly toll revenue for the total Legacy system. Actual July 2022 data is shown for both transactions and revenue. All other monthly data presented in these tables is forecasted.

Table 4-2
Total Legacy System Forecasted Transactions and Toll Revenue Collected by Class

Fiscal Year	Transactions (Millions) ⁽¹⁾			Toll Revenue (\$ Millions) ⁽¹⁾		
	PC	CV	Total	PC	CV	Total
2022 ⁽²⁾	109.3	10.7	120.0	413.6	265.4	679.0
2023	101.3	9.8	111.1	371.8	242.5	614.3
2024	100.6	9.5	110.1	369.5	234.1	603.6
2025	102.0	9.5	111.5	372.3	233.6	605.9
2026	100.2	9.5	109.8	367.1	234.9	602.1
2027	101.0	9.6	110.6	369.8	236.2	606.0
2028	104.0	9.7	113.7	379.2	237.8	617.0
2029	106.9	9.8	116.7	388.0	239.6	627.6
2030	106.5	9.8	116.3	388.4	240.8	629.2
2031	107.2	9.9	117.0	391.1	241.9	633.0
2032	109.3	9.9	119.2	396.0	243.0	639.0

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

⁽²⁾ Represents actual data.

Table 4-3
Legacy System Historical and Forecasted Transactions and Toll Revenue Collected by Facility

Fiscal Year ⁽¹⁾	Transactions (Millions) ⁽⁵⁾								Percent Growth
	JFK	Hatem	BHT	FMT	FSK	Bay	Nice	Total ⁽²⁾	
2016 ^(3,4)	15.2	5.1	28.3	42.6	11.2	13.3	3.4	119.0	2.8
2017	15.5	5.1	27.6	45.4	11.3	13.6	3.4	122.0	2.5
2018	15.5	5.1	28.0	44.7	11.4	13.5	3.3	121.5	(0.3)
2019	15.2	5.1	20.8	48.2	12.8	13.6	3.3	119.1	(2.0)
2020 ⁽³⁾	12.5	4.4	14.2	42.3	11.9	11.5	2.8	99.6	(16.4)
2021	8.8	3.1	11.9	29.0	8.4	8.5	1.7	71.5	(28.3)
2022	15.7	4.5	26.0	43.4	12.2	14.8	3.4	120.0	68.0
2023	14.2	4.7	27.5	40.8	9.0	12.1	2.7	111.1	(7.5)
2024 ⁽³⁾	14.0	4.8	30.3	41.0	5.4	12.0	2.7	110.1	(0.8)
2025	14.2	4.8	26.0	42.8	8.9	12.0	2.8	111.5	1.2
2026	14.3	4.9	21.2	46.3	8.0	12.4	2.8	109.8	(1.5)
2027	14.4	4.9	21.5	46.6	8.0	12.4	2.8	110.6	0.8
2028 ⁽³⁾	14.4	4.9	25.9	44.2	9.0	12.4	2.9	113.7	2.8
2029	14.5	4.9	29.1	42.5	10.3	12.5	2.9	116.7	2.6
2030	14.6	4.9	31.3	42.9	7.2	12.5	2.9	116.3	(0.4)
2031	14.7	4.9	31.9	43.2	6.9	12.5	2.9	117.0	0.6
2032	14.7	4.9	30.0	43.5	10.5	12.6	3.0	119.2	1.8
Fiscal Year ⁽¹⁾	Toll Revenue (\$ Millions) ⁽⁵⁾								Percent Growth
	JFK	Hatem	BHT	FMT	FSK	Bay	Nice	Total ⁽²⁾	
2016 ^(3,4)	\$171.2	\$11.8	\$89.9	\$191.3	\$43.3	\$52.8	\$21.2	\$581.4	2.8
2017	175.8	12.1	89.5	204.2	44.9	54.0	21.5	601.9	3.5
2018	177.2	11.6	91.4	205.1	45.9	53.4	20.7	605.3	0.6
2019	176.0	12.2	70.3	217.4	50.5	53.7	21.0	601.1	(0.7)
2020 ⁽³⁾	154.1	11.4	47.5	194.3	47.5	46.0	17.3	518.2	(13.8)
2021	117.2	9.2	39.8	141.5	35.7	33.0	10.8	387.4	(25.2)
2022	197.0	18.3	95.7	225.6	55.9	61.9	24.7	679.0	75.3
2023	182.7	12.7	97.3	208.8	41.9	51.4	19.5	614.3	(9.5)
2024 ⁽³⁾	179.3	11.9	107.4	207.5	27.6	50.5	19.4	603.6	(1.7)
2025	179.7	11.9	91.7	212.2	40.2	50.6	19.6	605.9	0.4
2026	180.8	12.0	75.6	225.2	36.7	52.1	19.8	602.1	(0.6)
2027	181.9	12.0	76.6	226.5	37.0	52.2	19.9	606.0	0.7
2028 ⁽³⁾	182.9	12.0	91.1	217.8	40.8	52.4	20.1	617.0	1.8
2029	183.9	12.1	101.3	211.6	46.0	52.5	20.2	627.6	1.7
2030	184.9	12.1	108.5	212.9	37.8	52.7	20.4	629.2	0.3
2031	185.9	12.1	110.3	214.1	37.2	52.8	20.5	633.0	0.6
2032	186.8	12.2	104.3	215.4	46.7	53.0	20.7	639.0	1.0

⁽¹⁾ Actual data presented for FY 2016 through FY 2022.

⁽²⁾ Summations may not equal total due to rounding.

⁽³⁾ Leap Year

⁽⁴⁾ Year of toll decrease.

⁽⁵⁾ Includes impacts due to leakage, including unpaid transactions.

**Table 4-4
Monthly Collected Transactions by Method of Payment
FY 2023 and FY 2024**

Month	Commuters & Shoppers				Passenger Cars (2-Axle)				Commercial Vehicles (3+ Axle)				Total ⁽¹⁾		
	MD E-ZPass	Full Fare E-ZPass	Video	Official Duty	Hatem Plan A & B	Total 2-Axle	E-ZPass	Video	Total 3+ Axle						
FY 2023															
July	1.661	3.440	2.607	1.168	0.152	9.290	0.833	0.065	0.898	0.263	9.290	0.833	0.065	0.898	10.188
August	2.107	2.724	2.345	1.607	0.088	9.199	0.779	0.061	0.840	0.327	9.199	0.779	0.061	0.840	10.038
September	2.045	2.622	1.887	1.709	0.092	8.670	0.761	0.066	0.826	0.315	8.670	0.761	0.066	0.826	9.496
October	2.264	2.510	2.012	1.700	0.102	8.900	0.774	0.066	0.839	0.311	8.900	0.774	0.066	0.839	9.739
November	2.025	2.575	1.998	1.319	0.086	8.296	0.754	0.052	0.805	0.293	8.296	0.754	0.052	0.805	9.102
December	1.965	2.622	2.101	1.295	0.083	8.356	0.753	0.051	0.804	0.291	8.356	0.753	0.051	0.804	9.160
January	2.111	2.335	1.562	1.215	0.088	7.595	0.724	0.048	0.772	0.284	7.595	0.724	0.048	0.772	8.367
February	1.925	2.296	1.532	1.072	0.083	7.179	0.676	0.041	0.717	0.271	7.179	0.676	0.041	0.717	7.896
March	2.226	2.334	1.926	1.162	0.102	8.078	0.773	0.044	0.817	0.329	8.078	0.773	0.044	0.817	8.895
April	2.161	2.336	2.268	1.259	0.094	8.436	0.744	0.046	0.791	0.319	8.436	0.744	0.046	0.791	9.226
May	2.156	2.467	2.202	1.337	0.091	8.586	0.795	0.049	0.844	0.333	8.586	0.795	0.049	0.844	9.430
June	2.034	2.560	2.237	1.439	0.089	8.685	0.780	0.053	0.833	0.327	8.685	0.780	0.053	0.833	9.518
FY TOTAL	24.678	30.820	24.676	16.281	1.150	101.270	9.145	0.641	9.787	3.664	101.270	9.145	0.641	9.787	111.056
FY 2024															
July	2.088	2.705	2.357	1.486	0.090	9.048	0.720	0.053	0.774	0.321	9.048	0.720	0.053	0.774	9.821
August	2.064	2.731	2.396	1.523	0.087	9.137	0.776	0.055	0.831	0.336	9.137	0.776	0.055	0.831	9.968
September	1.988	2.628	1.913	1.488	0.090	8.427	0.733	0.054	0.787	0.319	8.427	0.733	0.054	0.787	9.213
October	2.226	2.503	2.033	1.409	0.101	8.594	0.780	0.051	0.830	0.322	8.594	0.780	0.051	0.830	9.424
November	1.973	2.561	2.037	1.318	0.085	8.274	0.750	0.047	0.797	0.301	8.274	0.750	0.047	0.797	9.071
December	1.912	2.591	2.142	1.274	0.081	8.294	0.727	0.045	0.773	0.293	8.294	0.727	0.045	0.773	9.067
January	2.080	2.355	1.593	1.208	0.088	7.620	0.738	0.044	0.781	0.296	7.620	0.738	0.044	0.781	8.401
February	1.961	2.366	1.618	1.134	0.084	7.452	0.700	0.041	0.741	0.289	7.452	0.700	0.041	0.741	8.193
March	2.156	2.315	1.968	1.209	0.099	8.075	0.733	0.044	0.776	0.328	8.075	0.733	0.044	0.776	8.851
April	2.115	2.325	2.289	1.288	0.092	8.441	0.773	0.047	0.820	0.332	8.441	0.773	0.047	0.820	9.261
May	2.111	2.471	2.261	1.354	0.090	8.631	0.794	0.049	0.843	0.343	8.631	0.794	0.049	0.843	9.474
June	1.960	2.528	2.268	1.440	0.086	8.609	0.740	0.052	0.792	0.326	8.609	0.740	0.052	0.792	9.401
FY TOTAL	24.635	30.080	24.875	16.131	1.073	100.601	8.963	0.581	9.544	3.807	100.601	8.963	0.581	9.544	110.145

⁽¹⁾ Includes impacts due to leakage, including unpaid transactions. Summations may not equal total due to rounding.

**Table 4-5
Monthly Collected Toll Revenue by Method of Payment
FY 2023 and FY 2024**

Month	Commuters & Shoppers				Passenger Cars (2-Axle)				Commercial Vehicles (3+ Axle)				Total ⁽¹⁾
	Commuters & Shoppers	MD E-ZPass	Full Fare E-ZPass	Video	Official Duty	Hattem Plan A & B	Total 2-Axle	E-ZPass	Video	Total 3+ Axle			
FY 2023													
July	\$ 2,539	\$ 11,134	\$ 13,410	\$ 8,050	\$ -	\$ -	\$ 35,134	\$ 20,388	\$ 2,000	\$ 22,388	\$ 57,522		
August	3,011	8,671	11,846	10,413	-	-	33,941	18,822	1,882	20,705	54,646		
September	2,999	8,484	9,764	11,275	-	-	32,523	18,428	2,084	20,512	53,034		
October	3,352	8,271	10,496	11,303	-	-	33,422	18,895	2,118	21,012	54,435		
November	2,918	8,259	10,205	8,896	-	-	30,278	18,314	1,725	20,039	50,317		
December	2,804	8,328	10,671	8,739	-	-	30,542	18,220	1,702	19,922	50,465		
January	3,176	7,748	8,223	8,216	-	-	27,363	17,544	1,584	19,128	46,492		
February	2,828	7,512	7,931	7,240	-	-	25,511	16,384	1,329	17,713	43,224		
March	3,305	7,671	9,995	7,757	-	-	28,728	18,720	1,380	20,100	48,828		
April	3,141	7,528	11,700	8,452	-	-	30,822	18,085	1,448	19,533	50,355		
May	3,128	7,951	11,310	8,994	-	-	31,383	19,370	1,542	20,912	52,295		
June	2,911	8,182	11,318	9,692	-	-	32,102	18,976	1,652	20,578	52,680		
FY TOTAL	\$ 36,111	\$ 99,741	\$ 126,871	\$ 109,027	\$ -	\$ -	\$ 371,750	\$ 222,096	\$ 20,446	\$ 242,542	\$ 614,293		
FY 2024													
July	\$ 3,011	\$ 8,682	\$ 12,033	\$ 10,079	\$ -	\$ -	\$ 33,805	\$ 17,335	\$ 1,662	\$ 18,997	\$ 52,803		
August	2,954	8,693	12,062	10,315	-	-	34,024	18,662	1,705	20,367	54,391		
September	2,921	8,511	9,896	10,069	-	-	31,397	17,612	1,665	19,277	50,674		
October	3,301	8,247	10,538	9,495	-	-	31,581	18,869	1,565	20,434	52,014		
November	2,851	8,227	10,365	8,869	-	-	30,313	18,119	1,451	19,570	49,883		
December	2,737	8,262	10,869	8,552	-	-	30,420	17,543	1,390	18,933	49,353		
January	3,133	7,806	8,335	8,123	-	-	27,397	17,757	1,343	19,100	46,497		
February	2,890	7,762	8,346	7,616	-	-	26,614	16,873	1,253	18,126	44,740		
March	3,209	7,638	10,244	8,064	-	-	29,155	17,675	1,324	18,998	48,154		
April	3,074	7,475	11,698	8,643	-	-	30,891	18,635	1,422	20,057	50,949		
May	3,070	7,980	11,600	9,111	-	-	31,761	19,255	1,502	20,757	52,518		
June	2,814	8,108	11,485	9,709	-	-	32,115	17,993	1,592	19,485	51,600		
FY TOTAL	\$ 35,967	\$ 97,392	\$ 127,470	\$ 108,645	\$ -	\$ -	\$ 369,474	\$ 216,230	\$ 17,872	\$ 234,102	\$ 603,576		

⁽¹⁾ Includes impacts due to leakage, including unpaid transactions. Summations may not equal total due to rounding.

4.3 Intercounty Connector

4.3.1 Forecast Methodology and Assumptions

Base ICC annual collected trip and toll revenue forecasts were made using a review and analysis of the most recent historical trends (pre-pandemic) and adjusting base growth rates estimated in the most recent previous ICC forecast update, as necessary. Additionally, updated COVID-19 impact factors were applied to the resulting base forecasts. Estimated trips and revenue reflects collected toll revenue by MDTA after assumed reductions due to leakage of unbillable and unpaid trips. The forecasts reflect the assumptions listed in **Section 4.1**, including those listed in **Table 4-1** related to MDTA business rules, such as NOTD invoicing, new payment methods, and new classifications.

Related to other projects that may potentially impact the ICC, previous sketch-level modeling of the impacts of the Maryland I-495 and I-270 Managed Lanes Traffic Relief Plan (TRP) on the ICC showed the potential for impacts on ICC traffic. The TRP is broken down into multiple phases. On May 12, 2021 the recommended preferred alternative (RPA) for the TRP program was announced to be American Legion Bridge I-270 to I-370 (Phase 1 South). This RPA focuses solely on building a new American Legion Bridge and delivering two high occupancy toll (HOT) managed lanes in each direction on Phase 1 South. No action was taken on the remainder of I-495 east of the I-270 eastern spur. Based on sketch-level modeling, Phase 1 South is not anticipated to have any negative impacts on the ICC forecast projections and could instead have a positive impact. In the future should other phases of the TRP program advance, the potential impacts would need to be monitored. Sketch-level modeling has shown that the ICC appeared to be negatively impacted by priced 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.

4.3.2 Forecast Results

Table 4-6 provides the Intercounty Connector actual collected trips and revenue for FY 2022 and the forecasted collected trips and revenue for FY 2023 through FY 2032, by ETC and video. Due to the changes in MDTA business rules discussed previously in the Legacy section, ETC and video transactions and revenue are forecasted to decrease in FY 2023 over FY 2022 but will be back to normal levels by FY 2024 and remain stable through the end of the forecast in FY 2032.

For purposes of budgeting and the tracking of actual versus forecasted transactions and revenue, monthly forecasts of transaction and toll revenue were developed for FY 2023 and FY 2024.

Table 4-7 presents the Intercounty Connector monthly forecasted trips and collected toll revenue for FY 2023 and FY 2024. Actual July 2022 data is shown for transactions and revenue. All other monthly data presented in this table is forecasted.

Table 4-6
Intercounty Connector Forecasted Collected Annual Trips and Collected Toll Revenue

Fiscal Year	Trips (Millions) ⁽¹⁾			Toll Revenue (\$ Millions) ⁽¹⁾		
	E-ZPass	Video	Total	E-ZPass	Video	Total
2022 ⁽²⁾	36.7	4.8	41.5	71.4	13.5	84.9
2023	31.3	2.6	33.9	56.0	7.6	63.5
2024	33.3	2.4	35.8	58.4	7.2	65.6
2025	34.5	2.6	37.2	60.5	7.7	68.2
2026	36.8	2.8	39.6	64.5	8.2	72.7
2027	37.6	2.8	40.4	65.8	8.4	74.2
2028	38.3	2.9	41.2	67.1	8.6	75.6
2029	39.1	3.0	42.0	68.4	8.7	77.1
2030	39.8	3.0	42.9	69.8	8.9	78.7
2031	40.5	3.1	43.5	70.8	9.0	79.9
2032	41.1	3.1	44.2	71.9	9.2	81.1

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

⁽²⁾ Represents actual data.

Table 4-7
Intercounty Connector Forecasted Collected Monthly Trips and Collected Toll Revenue

Month	Trips (Millions) ⁽¹⁾				Toll Revenue (\$ Millions) ⁽¹⁾			
	PC E-ZPass	CV E-ZPass	Video	Total	PC E-ZPass	CV E-ZPass	Video	Total
FY 2023								
July	2.217	0.084	0.369	2.670	\$ 3.917	\$ 0.611	\$ 1.057	\$ 5.584
August	2.628	0.088	0.235	2.950	4.232	0.576	0.661	5.469
September	2.661	0.091	0.251	3.003	4.429	0.678	0.715	5.822
October	2.822	0.097	0.252	3.171	4.689	0.718	0.716	6.122
November	2.505	0.073	0.202	2.780	4.034	0.481	0.579	5.094
December	2.359	0.070	0.196	2.625	3.800	0.462	0.561	4.822
January	2.225	0.064	0.181	2.470	3.580	0.410	0.521	4.511
February	2.145	0.063	0.166	2.373	3.451	0.402	0.481	4.334
March	2.671	0.082	0.175	2.928	4.298	0.522	0.511	5.331
April	2.618	0.080	0.186	2.884	4.212	0.512	0.546	5.271
May	2.781	0.085	0.201	3.068	4.476	0.547	0.591	5.613
June	2.721	0.087	0.216	3.025	4.378	0.560	0.637	5.575
FY TOTAL	30.353	0.965	2.630	33.949	\$ 49.496	\$ 6.478	\$ 7.575	\$ 63.548
FY 2024								
July	2.677	0.085	0.222	2.984	\$ 4.307	\$ 0.545	\$ 0.625	\$ 5.478
August	2.791	0.094	0.227	3.113	4.491	0.605	0.659	5.756
September	2.658	0.078	0.226	2.961	4.276	0.500	0.669	5.446
October	2.915	0.090	0.217	3.221	4.690	0.577	0.662	5.929
November	2.664	0.079	0.201	2.944	4.287	0.506	0.617	5.410
December	2.469	0.073	0.191	2.733	3.973	0.470	0.581	5.024
January	2.401	0.071	0.180	2.652	3.863	0.456	0.542	4.861
February	2.375	0.071	0.176	2.621	3.821	0.452	0.541	4.814
March	2.754	0.082	0.183	3.020	4.432	0.528	0.529	5.489
April	2.860	0.092	0.195	3.146	4.601	0.588	0.544	5.733
May	2.954	0.092	0.208	3.254	4.754	0.588	0.590	5.932
June	2.806	0.088	0.221	3.115	4.515	0.566	0.624	5.705
FY TOTAL	32.323	0.997	2.445	35.764	\$ 52.009	\$ 6.384	\$ 7.184	\$ 65.577

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

4.4 I-95 ETLs

4.4.1 Forecast Methodology and Assumptions

The I-95 ETL forecasts were made using a spreadsheet modeling methodology. The spreadsheet model was calibrated to actual pre-COVID-19 I-95 ETL traffic and revenue performance and was then used to forecast future traffic and revenue for the existing ETL section and the future ETL extensions.

To develop the I-95 ETL forecast spreadsheet model, a series of counts were first obtained from the Maryland ITMS count monitoring site to produce a 2019 average weekday traffic profile. The profile was balanced to 2019 levels so to provide a “normal” traffic profile excluding any impacts of the COVID-19 pandemic. The balanced traffic profile and speed data from INRIX were used to calibrate the tolling algorithms built into the spreadsheet model and to recognize the different peaking patterns by time of day and direction. Similar to a full travel demand model for a priced managed lane forecast, the spreadsheet model tolling algorithm considered value of time, toll rates, travel time savings, and travel time reliability to estimate demand for the ETL.

Once the spreadsheet model was calibrated, it was used to develop the 10-year forecast. The I-95 ETL forecast used the assumptions described in **Section 4.1**, including the detailed assumptions related to methods of payment and vehicle classifications. Also included for the I-95 ETL forecast was the assumption of the future northbound extension. This project will include widening and construction of the I-95 ETLs northbound from MD 43 to beyond MD 24 to accommodate two ETL lanes and I-695 direct connectors as detailed in the construction impacts discussion within **Section 4.2**. A schematic showing the I-95 ETL extensions is included in **Chapter 1**. A baseline growth forecast was applied to estimate future volumes on the corridor. Based on the calibrated settings within the model, the future year models estimated what percent of traffic will choose to use the ETLs based on capacity, estimated future speeds within the corridor, value of time, toll rates, and travel time reliability. The spreadsheet model was developed without COVID-19 impacts which were then applied to the forecast results as a post-processing adjustment.

4.4.2 Forecast Results

Table 4-8 provides the forecasted annual trips and toll revenue for the total of the existing section and planned extensions of the I-95 ETLs, including the I-695 direct connectors. Access changes to and from the ETLs are planned with the opening of the extensions

Table 4-8
I-95 ETL Total with Extensions Forecasted Collected Annual Trips and Toll Revenue

Fiscal Year	Trips (Millions) ⁽¹⁾			Toll Revenue (\$ Millions) ⁽¹⁾		
	E-ZPass	Video	Total	E-ZPass	Video	Total
2022 ⁽²⁾	8.6	0.4	9.0	13.2	0.9	14.1
2023	10.9	0.3	11.1	15.7	0.4	16.1
2024	11.6	0.3	11.9	16.8	0.4	17.2
2025 ⁽³⁾	12.0	0.3	12.3	18.9	0.5	19.4
2026	12.2	0.3	12.5	21.0	0.5	21.5
2027	12.8	0.3	13.1	22.2	0.6	22.8
2028 ⁽⁴⁾	14.7	0.4	15.1	26.5	0.7	27.2
2029	16.7	0.4	17.2	31.3	0.8	32.1
2030	17.6	0.5	18.0	33.0	0.8	33.9
2031	18.5	0.5	18.9	34.8	0.9	35.7
2032	19.4	0.5	19.9	36.7	0.9	37.7

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

⁽²⁾ Represents actual data.

⁽³⁾ Phase 1 of northbound extension assumed opening on Jan 1, 2025.

⁽⁴⁾ Phase 2 of northbound extension and I-695 DCs assumed opening on Jan 1, 2028.

For purposes of budgeting and the tracking of actual versus forecasted trips and revenue, monthly forecasts of collected trips and toll revenue were developed for FY 2023 and FY 2024. **Table 4-9** provides the monthly forecasted collected trips and toll revenue for the I-95 ETLs by passenger car and commercial vehicle. Actual July 2022 data is shown for transactions and revenue. All other monthly data presented in this table is forecasted.

Table 4-9
I-95 ETL Forecasted Monthly Collected Trips and Toll Revenue

Month	Trips (Millions) ⁽¹⁾			Toll Revenue (\$ Millions) ⁽¹⁾		
	E-ZPass	Video	Total	E-ZPass	Video	Total
FY 2022						
July	0.739	0.038	0.777	1.124	0.090	1.214
August	0.985	0.025	1.010	1.400	0.054	1.454
September	0.845	0.022	0.867	1.201	0.046	1.248
October	0.990	0.025	1.015	1.407	0.054	1.461
November	0.951	0.024	0.975	1.352	0.052	1.404
December	0.948	0.024	0.973	1.348	0.052	1.400
January	0.710	0.018	0.728	1.009	0.039	1.048
February	0.819	0.021	0.840	1.164	0.045	1.209
March	0.860	0.022	0.882	1.222	0.047	1.269
April	1.021	0.026	1.047	1.451	0.056	1.506
May	0.997	0.026	1.023	1.418	0.055	1.472
June	0.983	0.025	1.009	1.398	0.054	1.451
FY TOTAL	10.848	0.297	11.145	\$ 15.492	\$ 0.643	\$ 16.135
FY 2023						
July	1.068	0.027	1.095	1.519	0.059	1.577
August	1.031	0.026	1.058	1.466	0.057	1.523
September	0.877	0.022	0.899	1.247	0.048	1.295
October	1.033	0.026	1.060	1.470	0.057	1.526
November	0.993	0.025	1.019	1.412	0.054	1.467
December	0.987	0.025	1.012	1.404	0.054	1.458
January	0.755	0.019	0.774	1.074	0.041	1.115
February	0.888	0.023	0.911	1.264	0.049	1.312
March	0.889	0.023	0.912	1.265	0.049	1.313
April	1.055	0.027	1.082	1.501	0.058	1.558
May	1.055	0.027	1.082	1.500	0.058	1.558
June	1.017	0.026	1.043	1.447	0.056	1.503
FY TOTAL	11.649	0.299	11.948	\$ 16.567	\$ 0.638	\$ 17.206

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

4.5 Other Revenue

4.5.1 Forecast Methodology and Assumptions

In addition to collected toll revenue, MDTA also collects “Other Revenue” associated with the operation of its facilities. These have been summarized into the following categories:

1. Unused Commuter and Shoppers Plan Trips
2. Transponder Fees and Sales
 - a. Transponder sales
 - b. Monthly Service Fees
3. Hatem E-ZPass® program
4. Violation Recovery
5. Commercial Vehicle Fees and Discounts
 - a. Post-Usage Discount
 - b. Supplemental Rebate Plan
 - c. Over-Size Permit Fee

The following sub-sections provide a description of each of the other revenue categories that are considered in this forecast. Not that previously CDM Smith also included another category called concession revenue in the annual forecast update. At the direction of MDTA, in this forecast concession revenue is no longer included in other revenue.

Unused Commuter and Shoppers Plan Trips

MDTA provides customers the option to enroll in commuter plans which provide discounts for frequent trips. As discussed previously in **Chapter 1**, MDTA offers three different Commuter Plans based on the facilities included in the plan as well as a Shoppers Plan. All plans allow customers to purchase a large number of discounted trips that must be used in a specific time period. Any remaining balance after the time periods have expired is included in other revenue as “unused pre-paid trip revenue”.

Transponder Fees and Sales

As of May 23, 2018, the \$7.50 cost for the Standard E-ZPass® transponder was eliminated, while costs for the Exterior and Fusion transponders remained unchanged at \$15.00 and \$50.00, respectively. The Standard is the more typical windshield mounted transponder, the Exterior is mounted to a passenger car’s front license plate, and the Fusion is for commercial vehicles such as trucks and RVs.

Prior to July 1, 2015, account holders were subject to a monthly account fee of \$1.50. Accounts making three-or-more transactions per month were exempt from this fee, but any user with less than three transactions were charged. As of July 1, 2015, this monthly account fee was eliminated for Maryland E-ZPass® account holders. Monthly fees are still assessed on Maryland E-ZPass® accounts for out-of-state customers but were temporarily paused in FY 2022 as part of customer focused business rule changes. These fees were resumed in FY 2023 on August 10th, 2022.

Hatem E-ZPass® Program

The Hatem Bridge E-ZPass® Program provides drivers with two possible plan options. Choice A allows drivers with a two-axle vehicle to pay \$20 per year for unlimited trips plus a transponder fee without any additional fees or prepaid toll deposits. However, this plan allows the E-ZPass® to only be used on the Hatem Bridge, and cannot be used at other toll facilities or with other E-ZPass® discount plans. Choice B is an add-on to a standard Maryland E-ZPass® account. This allows drivers to pay \$20 per year for unlimited trips at the Hatem Bridge. There are associated account maintenance fees for non-Maryland accounts as well as a pre-paid toll balance, but this plan also gives drivers a discount off the base toll rate for two-axle vehicles at all Maryland toll facilities, excluding the Intercounty Connector and I-95 Express Toll Lanes, and can be combined with other discount plans. The discount provided is 37.5 percent for the Bay Bridge and 25 percent for all other facilities. Revenue associated with purchasing these plans is included in the other revenue.

Violation Recovery

Historical violation recovery data through FY 2022 have been provided by MDTA. Prior to FY 2016, “violation fees” were charged to drivers who chose not to initially pay their toll. Since video customers are no longer assessed “violations fees” but are instead assessed civil penalties if they do not pay their video tolls within 45 days, no estimates of future “violation fee” revenue for the Legacy facilities, the ICC and I-95 Express Toll Lanes are included in the other revenue forecast. Future forecasts of civil penalty revenue are based on the following assumptions:

- Civil penalties were reduced from \$50 to \$25 in FY 2021 for all transactions with civil penalties and will remain at \$25 for the duration of the forecast.
- Civil penalty collections in FY 2022 were impacted due to the MDTA customer assistance program which was initiated in February 2022 and will remain in place through November 2022. Civil penalty collections are assumed to be reduced in FY 2023 due to the delay in the assessment and payment of civil penalties after the customer assistance program expires.

Commercial Vehicles Fees and Discounts

There are two available discount programs for commercial vehicles with five-or-more-axles. The first plan is the post-usage plan, which is account specific and can be used on all eligible facilities. With this plan, each account is assessed after 30 days and the post-usage discount is calculated based on the total toll usage. The fee estimates for this program were developed from existing data and historical trends.

The other available discount plan is similar in that it is account specific and can be used on all eligible facilities. With this plan however, the account assessment after 30 days calculates the discount based on the total trips per transponder.

In addition to the two discount plans available to commercial vehicles, there is a fee for oversized and/or overweight vehicles. As of May 1, 2009, a \$25 permit fee was charged and covered all MDTA maintained roadways along the vehicle’s route. This fee is a one-time charge and is not applied at any specific tolling location.

4.5.2 Forecast Results

Table 4-10 provides the historical and forecasted other revenue for the Legacy facilities, ICC, and I-95 ETLs. Historical data is shown for FY 2016 through FY 2022. Due to COVID-19 and the associated business rule changes, other revenue increased by 43 percent from FY 2021 to FY 2022. This is due to an increase in processing of the backlogged video transactions, leading to an increase in civil penalty collections in FY 2022 prior to the initiation of the customer assistance program. Other revenue is forecasted to decrease slightly in FY 2023 due to ongoing grace period for civil penalty collections from the customer assistance program. By FY 2024, civil penalties are forecasted to increase significantly as normal violation procedures are expected to be in place for the entire year.

Table 4-11 provides the FY 2023 and FY 2024 monthly other revenue forecast for the combined Legacy facilities, ICC, and I-95 ETLs.

**Table 4-10
Other Revenue by Facility**

Fiscal Year ⁽¹⁾	Legacy Facilities										Intercounty Connector & I-95 ETLs				Total Other Revenue ⁽³⁾
	Service Fees and Sales				Violation Recovery		Commercial Vehicles				Service Fees and Sales		Violation Recovery		
	Unused Pre-Trip Revenue	Transponder Sales	Monthly Account Fees	Hatem E-Z Pass Program	Civil Penalties	Violation Fees	Post-Usage Discount	High Frequency Discount	Over-size Permit Fee	Transponder Sales	Monthly Account Fees	Violation Fees	Civil Penalties		
2016 ⁽²⁾	17.36	1.66	1.29	1.60	10.00	-	(6.39)	(1.06)	1.13	0.27	0.22	-	8.28	34.36	
2017	14.04	2.00	1.42	1.62	20.65	-	(6.79)	(1.16)	1.16	0.22	0.24	-	21.04	54.46	
2018	13.64	1.40	1.51	1.67	16.13	-	(7.91)	(1.29)	1.16	0.35	0.26	-	13.61	40.52	
2019	14.00	(0.60)	1.59	1.68	21.27	-	(8.58)	(1.20)	1.26	(0.10)	0.27	-	10.19	39.78	
2020	10.64	0.22	2.05	1.69	16.93	-	(8.63)	(1.30)	1.06	0.04	0.34	-	11.93	34.96	
2021	4.49	(0.12)	2.01	1.57	13.66	-	(6.76)	(0.84)	1.05	(0.00)	0.05	-	3.58	18.70	
2022	11.41	0.33	(0.32)	1.76	18.03	-	(10.87)	(1.02)	1.19	0.04	(0.04)	-	6.17	26.68	
2023	11.78	0.05	1.35	1.76	13.41	-	(8.84)	(1.02)	1.17	0.04	0.28	-	2.60	22.58	
2024	11.79	0.05	1.62	1.80	33.67	-	(8.77)	(1.01)	1.16	0.04	0.28	-	5.80	46.42	
2025	11.90	0.05	1.63	1.77	38.67	-	(8.93)	(1.03)	1.18	0.04	0.28	-	4.99	50.56	
2026	11.96	0.05	1.64	1.78	37.72	-	(8.98)	(1.04)	1.19	0.04	0.28	-	5.36	50.01	
2027	12.02	0.05	1.65	1.78	37.90	-	(9.02)	(1.04)	1.19	0.04	0.29	-	5.73	50.59	
2028	12.08	0.05	1.66	1.79	39.58	-	(9.07)	(1.05)	1.20	0.04	0.29	-	5.89	52.46	
2029	12.14	0.05	1.67	1.79	40.01	-	(9.11)	(1.05)	1.21	0.04	0.29	-	6.05	53.08	
2030	12.20	0.05	1.67	1.80	40.09	-	(9.16)	(1.06)	1.21	0.04	0.29	-	6.22	53.35	
2031	12.26	0.05	1.68	1.80	40.39	-	(9.20)	(1.06)	1.22	0.04	0.29	-	6.29	53.75	
2032	12.32	0.05	1.69	1.80	40.75	-	(9.25)	(1.07)	1.22	0.04	0.29	-	6.35	54.21	

Source: Historical data from MDTA

(1) FY 2016 - 2021 represents actual data.

(2) Year of select toll rate reductions.

(3) Summations may not match total due to rounding.

Table 4-11
Forecasted Monthly Other Revenue

Month	Total Other Revenue
FY 2023	
July	0.660
August	0.632
September	0.565
October	0.587
November	0.529
December	0.535
January	2.433
February	2.449
March	2.290
April	3.905
May	3.588
June	4.404
FY TOTAL	\$ 22.579
FY 2023	
July	3.787
August	3.882
September	3.907
October	4.579
November	4.479
December	4.525
January	3.557
February	3.404
March	3.675
April	3.404
May	3.372
June	3.853
FY TOTAL	\$ 46.423

Chapter 5

Total Forecast Results

This chapter provides a summary of the total MDTA system collected transactions/trips and revenue for all facilities. **Table 5-1** provides the total annual collected transactions for the Legacy system and total trips for the Intercounty Connector (ICC) and I-95 ETLs for FY 2022 actual and the FY 2023 to FY 2032 forecast.

Table 5-1
Total System Collected Transactions/Trips

Fiscal Year	Transactions (millions)				Percent Change
	Legacy	ICC	I-95 ETL	Total ⁽¹⁾	
2022 ⁽²⁾	120.0	41.5	9.0	170.5	-
2023	111.1	33.9	11.1	156.1	(8.4)
2024	110.1	35.8	11.9	157.9	1.1
2025	111.5	37.2	12.3	161.0	2.0
2026	109.8	39.6	12.5	161.9	0.6
2027	110.6	40.4	13.1	164.2	1.4
2028	113.7	41.2	15.1	170.0	3.6
2029	116.7	42.0	17.2	175.9	3.5
2030	116.3	42.9	18.0	177.2	0.7
2031	117.0	43.5	18.9	179.5	1.3
2032	119.2	44.2	19.9	183.3	2.1

⁽¹⁾ Summations may not equal total due to rounding.

⁽²⁾ Represents actual data.

Table 5-2 provides the total system collected revenue, summarized by Legacy system toll revenue, ICC toll revenue, I-95 ETL toll revenue, and other revenue for all MDTA facilities for FY 2022 actual and the FY 2023 to FY 2032 forecast.

Figure 5-1 provides a graphical representation of the share of transactions/trips by facility for the first year and last year of the 10-year forecast, FY 2023 and 2032. In FY 2023, the Legacy system is forecasted to account for 71 percent of total transactions and trips, and the I-95 ETLs are forecasted to account for the smallest share at seven percent. By FY 2032, due to comparatively higher growth rates on the ICC and I-95 ETLs, more significant recovery from the COVID-19 impacts, and the I-95 ETL extension, the Legacy system is forecasted to account for 65 percent of total transactions. ICC trips are forecasted to increase slightly from 22 to 24 percent, and the I-95 ETL trips are forecasted to increase to 11 percent by FY 2032.

Table 5-2
Total System Collected Toll and Other Revenue

Fiscal Year	Revenue (\$ millions)					Percent Change
	Legacy	ICC	I-95 ETL	Other ⁽¹⁾	Total ⁽²⁾	
2022 ⁽³⁾	679.0	84.9	14.1	26.7	804.7	-
2023	614.3	63.5	16.1	22.6	716.6	(10.9)
2024	603.6	65.6	17.2	46.4	732.8	2.3
2025	605.9	68.2	19.4	50.6	744.1	1.5
2026	602.1	72.7	21.5	50.0	746.3	0.3
2027	606.0	74.2	22.8	50.6	753.5	1.0
2028	617.0	75.6	27.2	52.5	772.3	2.5
2029	627.6	77.1	32.1	53.1	789.9	2.3
2030	629.2	78.7	33.9	53.4	795.1	0.7
2031	633.0	79.9	35.7	53.8	802.3	0.9
2032	639.0	81.1	37.7	54.2	812.0	1.2

⁽¹⁾ Includes Other Revenue from Legacy, ICC, and I-95 ETL. Does not include concession revenue.

⁽²⁾ Summations may not equal total due to rounding.

⁽³⁾ Represents actual data.

Figure 5-1
Share of Collected Transactions/Trips, FY 2023 and FY 2032

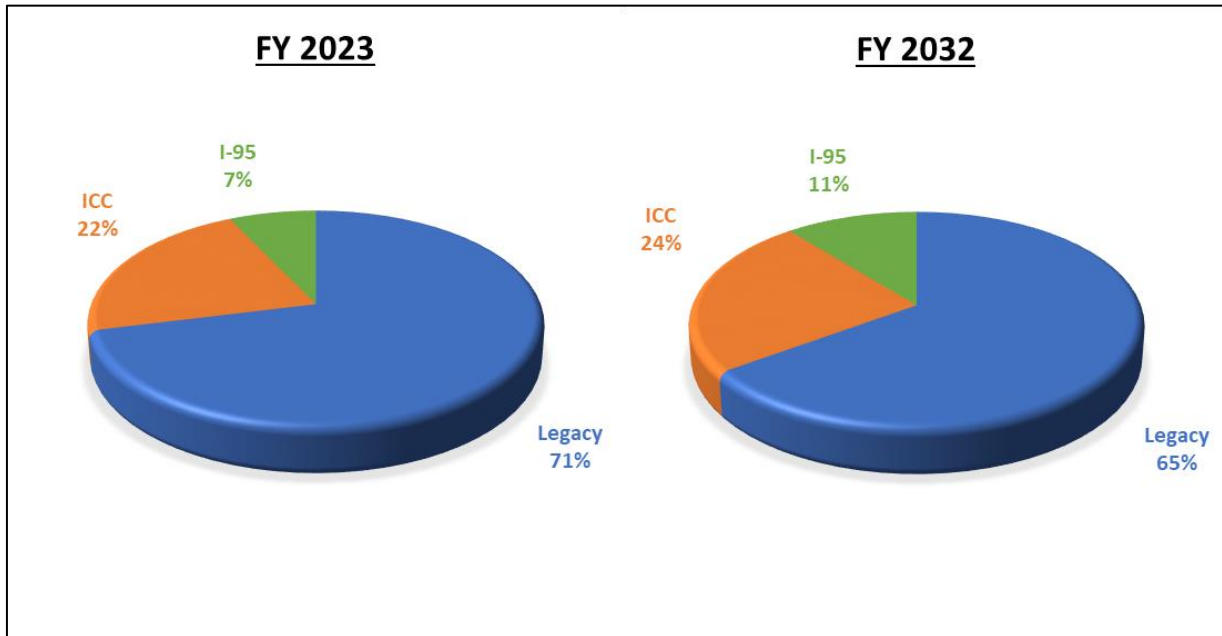


Figure 5-2 provides the same graphical representation for collected total revenue, separated by facility toll revenue and other revenue. Due to the higher share of transactions, the Legacy system also provides the highest share of total revenue and is forecasted to decrease from 86 percent in FY 2023 to 79 percent by FY 2032 for the same reasons as the transaction share changes. The ICC and I-95 ETLs will increase slightly from FY 2023 to FY 2032, while other revenue is forecasted to have the biggest increase in share of total revenue from three percent in FY 2023 to seven percent in FY 2032 due to the conversion to all cashless-tolling and forecasted corresponding increase in civil penalty revenue. However, it should be taken into account that FY 2023 other revenue will be lower than a typical year due to the customer assistance program which reduced the potential civil penalties that could be collected.

Figure 5-2
Share of Collected Total Revenue, FY 2023 and FY 2032

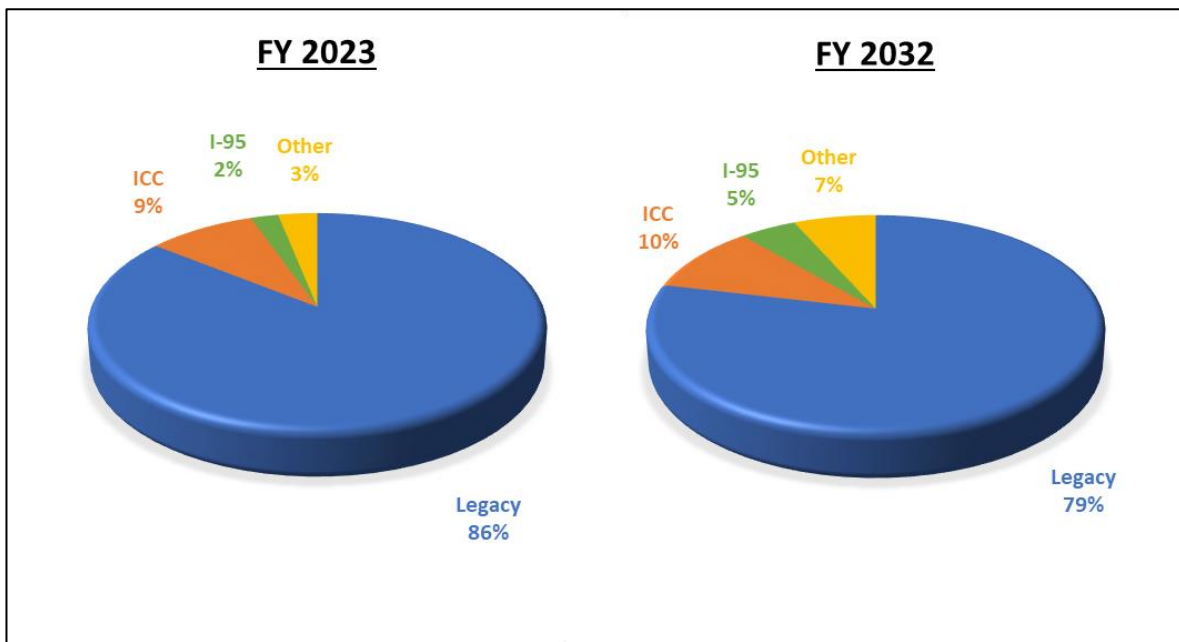


Table 5-3 summarizes the FY 2023 and FY 2024 monthly forecasted transactions, toll revenue, and other revenue for the combined Legacy system, ICC, and I-95 ETL's.

Table 5-3
Total System Collected Monthly Transactions, Toll Revenue, and Other Revenue

Month	Transactions (Millions) ⁽¹⁾	Revenue (\$ Millions) ⁽¹⁾⁽²⁾		
		Toll	Other	Total
FY 2023				
July	13.635	64.320	0.660	64.980
August	13.999	61.568	0.632	62.200
September	13.366	60.104	0.565	60.669
October	13.925	62.018	0.587	62.605
November	12.858	56.815	0.529	57.344
December	12.759	56.686	0.535	57.222
January	11.565	52.051	2.433	54.484
February	11.110	48.766	2.449	51.215
March	12.705	55.429	2.290	57.719
April	13.157	57.133	3.905	61.038
May	13.521	59.380	3.588	62.969
June	13.551	59.707	4.404	64.111
FY TOTAL	156.150	\$ 693.976	\$ 22.579	\$ 716.555
FY 2024				
July	13.900	59.857	3.787	63.645
August	14.138	61.670	3.882	65.552
September	13.073	57.414	3.907	61.320
October	13.706	59.470	4.579	64.049
November	13.033	56.760	4.479	61.239
December	12.813	55.835	4.525	60.360
January	11.827	52.473	3.557	56.030
February	11.725	50.866	3.404	54.270
March	12.783	54.956	3.675	58.631
April	13.490	58.240	3.404	61.644
May	13.809	60.008	3.372	63.381
June	13.559	58.808	3.853	62.661
FY TOTAL	157.857	\$ 686.359	\$ 46.423	\$ 732.782

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

⁽²⁾ Other revenue does not include concession revenue.

Chapter 6

Forecast Comparisons

This chapter provides comparisons of the current forecasts for the Legacy system, Intercounty Connector, and I-95 ETL’s against the previous forecasts from the September 2021 annual update in the report “Maryland Transportation Authority FY 2022 Traffic and Toll Revenue Forecast Update.”

Table 6-1 provides the forecast comparison for the Legacy system, with actual revenue shown for FY 2021 and FY 2022 in the current forecast. Passenger car revenue is forecasted to be lower than the previous forecast in FY 2023 due to tapering of the collected backlogged transactions, compounded by higher gas prices and inflation causing reduced travel in recent months. After FY 2023, the current forecast is generally higher than the September 2021 forecast due to updated growth rates and construction impacts. In the current forecast construction schedules were updated, as detailed in **Section 4.2.2**, with certain start dates and project durations being affected. This is the reason for the variability of the 2.7 percent increase in FY 2025 as well as the 0.9 percent decrease in FY 2027, compared to the previous forecast.

Commercial vehicles have performed well during the pandemic and have shown growth even over pre-pandemic levels. In the current forecast, the overperformance from FY 2022 of 5.2 percent is expected to taper in the next few years as pandemic induced trends start to wane, and to account for economic uncertainty with high inflation, gas prices, and cost of goods. In the outer years of the forecast from FY 2025 through FY 2031, the current forecast is generally 0.6 percent lower than the previous forecast due to lower growth rates. The variations seen in FY 2026 through FY 2028 are due to the construction impacts previously noted for passenger cars.

**Table 6-1
Legacy System Toll Revenue Comparison**

Fiscal Year	Passenger Cars			Commercial Vehicles			Total Vehicles		
	Sept. 2021	% Diff - Current vs. Sept. 2021	Current ⁽¹⁾	Sept. 2021	% Diff - Current vs. Sept. 2021	Current ⁽¹⁾	Sept. 2021	% Diff - Current vs. Sept. 2021	Current ⁽¹⁾
2021	\$ 209.5	0.7%	\$ 211.0	\$ 178.0	0.1%	\$ 178.2	\$ 387.5	0.4%	\$ 389.2
2022	448.1	-7.7%	413.6	252.2	5.2%	265.4	700.3	-3.0%	679.0
2023	376.0	-1.1%	371.8	234.1	3.6%	242.5	610.0	0.7%	614.3
2024	367.4	0.6%	369.5	233.2	0.4%	234.1	600.6	0.5%	603.6
2025	362.5	2.7%	372.3	235.0	-0.6%	233.6	597.5	1.4%	605.9
2026	365.9	0.3%	367.1	236.6	-0.7%	234.9	602.4	-0.1%	602.1
2027	373.3	-0.9%	369.8	237.1	-0.4%	236.2	610.4	-0.7%	606.0
2028	380.4	-0.3%	379.2	237.9	0.0%	237.8	618.3	-0.2%	617.0
2029	384.8	0.8%	388.0	241.0	-0.6%	239.6	625.8	0.3%	627.6
2030	388.2	0.0%	388.4	242.1	-0.6%	240.8	630.4	-0.2%	629.2
2031	390.8	0.1%	391.1	243.3	-0.6%	241.9	634.0	-0.2%	633.0
2032	-	-	396.0	-	-	243.0	-	-	639.0

⁽¹⁾ Actual revenue shown for 2021 and 2022.

Table 6-2 provides the forecast comparison for the Intercounty Connector. The current forecast is lower than the September 2021 forecast by 10.7 percent in FY 2023, tapering down to 4.2 percent by FY 2026. This reduction is due to revised forecast assumptions that some portion of the impacts of the pandemic on commuting and travel patterns will persist throughout the forecast period. Trips on the ICC, I-95 ETLs, and other congestion-based facilities in the region have had higher lingering COVID-19 impacts than traditional toll roads or the bridges and tunnels that comprise the Legacy system. The increase in telecommuting is having an ongoing impact of work-related trips, and there is uncertainty on when and if those trips will return in the future as various sectors of the workforce adapt to working from home.

Table 6-2
Intercounty Connector Comparison

Fiscal Year	Sept. 2021	% Diff - Current vs. Sept. 2021	Current ⁽¹⁾
2021	\$ 20.0	6.6%	\$ 21.3
2022	83.9	1.2%	84.9
2023	71.2	-10.7%	63.5
2024	72.9	-10.1%	65.6
2025	74.4	-8.3%	68.2
2026	75.9	-4.2%	72.7
2027	77.4	-4.2%	74.2
2028	78.9	-4.2%	75.6
2029	80.5	-4.2%	77.1
2030	82.1	-4.2%	78.7
2031	83.3	-4.2%	79.9
2032	-	-	81.1

⁽¹⁾ Actual revenue shown for 2021 and 2022.

Table 6-3 provides the forecast comparison for the I-95 ETLs. In the current forecast, near-term projections were revised to account for lingering COVID-19 impacts, similar to the ICC. Baseline growth was updated based on the growth for JFK and FMT since these facilities are also on I-95, producing a positive 0.3% change in FY 2026 and FY 2027. In FY 2028, the I-695 direct connector ramps are assumed to open mid-fiscal year which was not an assumption in the September 2021 forecast.

Table 6-3
I-95 ETLs Comparison

Fiscal Year	Sept. 2021	% Diff - Current vs. Sept. 2021	Current ⁽¹⁾
2021	\$ 7.7	1.2%	\$ 7.8
2022	14.9	-5.6%	14.1
2023	16.7	-3.2%	16.1
2024	17.8	-3.2%	17.2
2025	19.6	-0.8%	19.4
2026	21.5	0.3%	21.5
2027	22.7	0.3%	22.8
2028	24.8	9.8%	27.2
2029	26.9	19.0%	32.1
2030	28.5	19.0%	33.9
2031	30.0	19.0%	35.7
2032	-	-	37.7

⁽¹⁾ Actual revenue shown for 2021 and 2022.

Table 6-4 provides the forecast comparison for other revenue. Actual FY 2022 other revenue came in higher than forecast, due to overperformance in civil penalty collections. FY 2023 other revenue is forecasted to be nearly 41 percent lower than the previous forecast due to the delay in civil penalty collections from the customer assistance plan which was not assumed in the previous study. For all remaining years of the forecast, the current forecast is slightly higher than the previous forecast due to higher passenger car transactions leading to higher civil penalty collections.

Table 6-5 provides the forecasted total revenue comparison for the entire MDTA system.

Table 6-4
Other Revenue Comparison⁽¹⁾

Fiscal Year	Sept. 2021	% Diff - Current vs. Sept. 2021	Current ⁽²⁾
2021	\$ 18.7	2.8%	\$ 19.2
2022	23.8	12.1%	26.7
2023	38.2	-40.6%	22.7
2024	44.4	4.8%	46.5
2025	49.1	3.2%	50.6
2026	49.4	1.3%	50.1
2027	50.8	-0.2%	50.7
2028	52.4	0.3%	52.6
2029	52.1	2.0%	53.2
2030	52.4	2.0%	53.4
2031	52.7	2.2%	53.8
2032	-	-	54.3

⁽¹⁾ Other revenue forecasts do not include concession revenue.

⁽²⁾ Actual revenue shown for 2021 and 2022.

Table 6-5
Total System Revenue Comparison

Fiscal Year	Total System		
	Sept. 2021	% Diff - Current vs. Sept. 2021	Current ⁽¹⁾
2021	\$ 433.9	0.8%	\$ 437.5
2022	822.9	-2.2%	804.7
2023	736.0	-2.6%	716.6
2024	735.7	-0.4%	732.9
2025	740.6	0.5%	744.2
2026	749.2	-0.4%	746.4
2027	761.3	-1.0%	753.6
2028	774.4	-0.3%	772.4
2029	785.3	0.6%	790.0
2030	793.3	0.2%	795.2
2031	800.1	0.3%	802.4
2032	-	-	812.1

⁽¹⁾ Actual revenue shown for 2021 and 2022.

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 the 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.

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