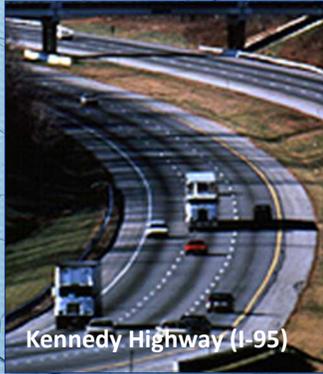


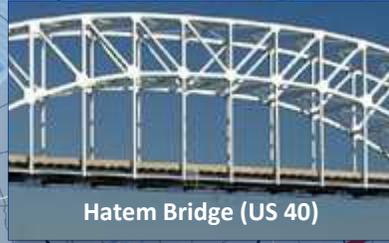
Maryland Transportation Authority 2016 Traffic and Toll Revenue Forecast Update (Legacy Facilities)



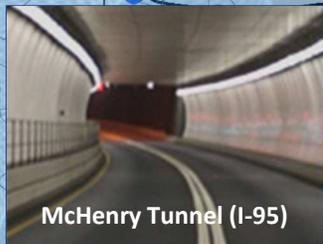
FINAL REPORT
December 2016



Kennedy Highway (I-95)



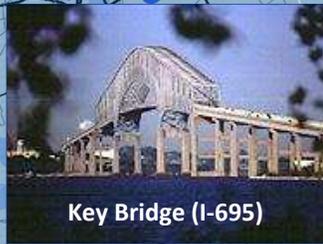
Hatem Bridge (US 40)



McHenry Tunnel (I-95)



Harbor Tunnel (I-895)



Key Bridge (I-695)



Nice Bridge (US 301)



Bay Bridge (US 50/301)

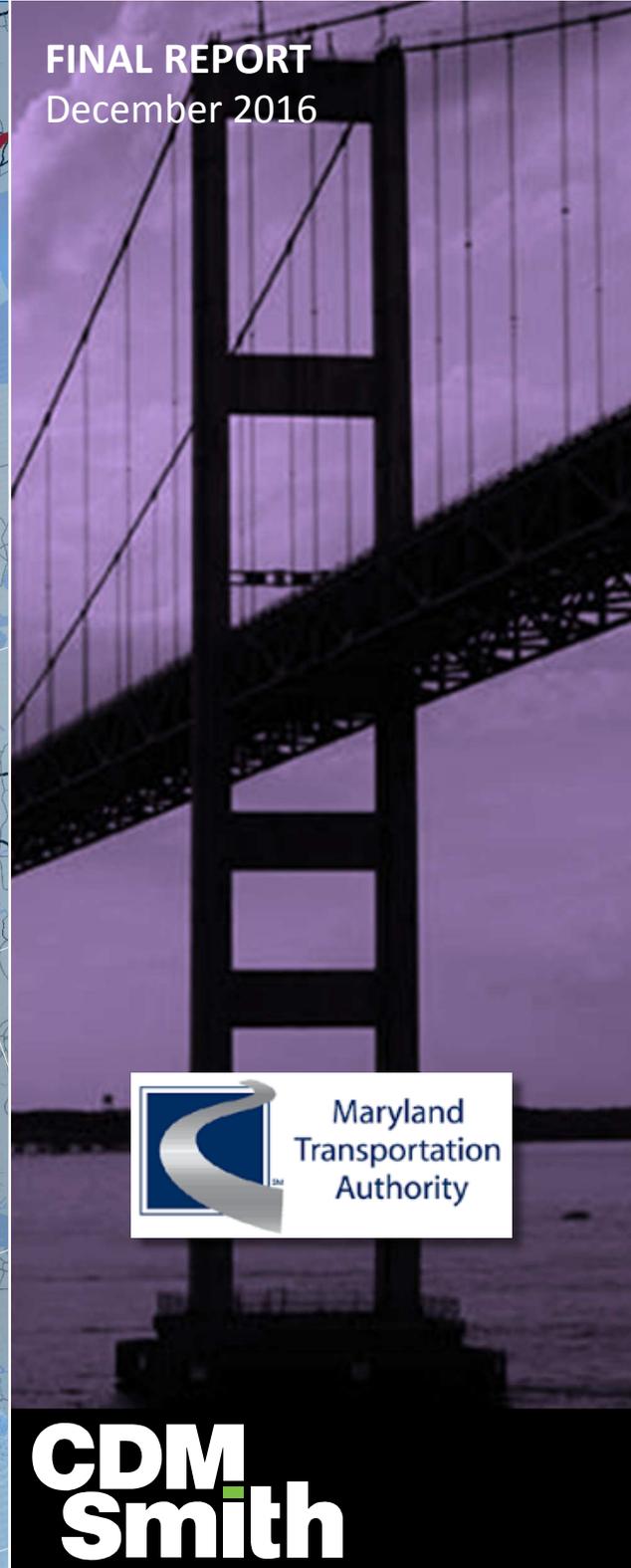


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Executive Summary

As one of the traffic and revenue consultants for the Maryland Transportation Authority (MDTA), CDM Smith conducted a traffic and revenue study for the seven legacy toll facilities operated by the MDTA shown in Figure ES-1. These seven facilities provide critical transportation infrastructure links for both local and regional movement of people and goods, and fulfill varied roles within the local and regional transportation system. Accordingly, they therefore serve a varied mix of passenger car and commercial vehicle traffic that make toll payments by E-ZPass®, video and cash methods. Collectively, these facilities generated \$581.4 million of In-Lane Toll Revenue in Fiscal Year (FY) 2016.

The objective of this study was to develop updated 10-year forecasts for each of the seven legacy facilities. The forecasts, including the impacts associated with toll reductions effective July 1, 2015, covered the period extending from FY 2017, beginning July 1, 2016, through FY 2026, ending June 30, 2026. The study made maximum use of all available data, including historical trend information by vehicle classification and methods of toll payment for each facility. The analysis also included a general overview of socioeconomic trends, both nationally and around the service areas of the tolled facility. A review and update of the socioeconomic and demographic data that help explain travel demand used to aid in forecasting transactions and revenue for each toll facility was also performed.

Transaction and toll revenue forecasts for the Intercounty Connector (ICC/MD 200), the State's first all-electronic, congestion-managed toll road, connecting the I-370 and I-95 corridors and the all-electronic, congestion-managed I-95 Express Toll LanesSM project were not included in this report. Separate traffic and revenue studies have been performed for these facilities.

In addition to estimates of transactions and In-Lane Toll Revenue for the seven legacy toll facilities, estimates of "Other Toll Revenue," including concession revenue, were prepared to provide a full picture of revenue potential through FY 2026. While historical and forecasted revenue are provided in Table ES-1, "Other Toll Revenue" by category are provided in Table ES-2, including items such as unused pre-paid toll revenue, transponder sales, civil penalties and discounts.

It should be noted that the forecasts are based on the current toll schedules, with toll reductions implemented on July 1, 2015 and presented in Tables 1-1 through 1-3 of Chapter 1 and in Appendix A of this report. Furthermore, these forecasts assume no toll rate or schedule adjustments will be made throughout the ten-year forecast period.

The seven MDTA legacy facilities shown in Figure ES-1 have been grouped into three geographic regions of the state. These are the Northern, Central and Southern Regions. The Northern Region consists of the John F. Kennedy Memorial Highway and the Thomas J. Hatem Bridge; the Central Region, the Fort McHenry Tunnel, the Baltimore Harbor Tunnel, and the Francis Scott Key Bridge; and the Southern Region, the Harry W. Nice Memorial Bridge and the William Preston Lane Jr. Memorial (Bay) Bridge. All the facilities are on either Interstates or major US routes that cross bodies of water with very limited competing alternative routes.

In the Northern Region, the Thomas J. Hatem Bridge and the John F. Kennedy Memorial Highway form two parallel crossings of the Susquehanna River. The Hatem Bridge carries US 40 across the river and is the oldest of the MDTA's facilities, having been open to traffic since August 1940. The existing

Figure ES-1
Legacy Facilities Location Map

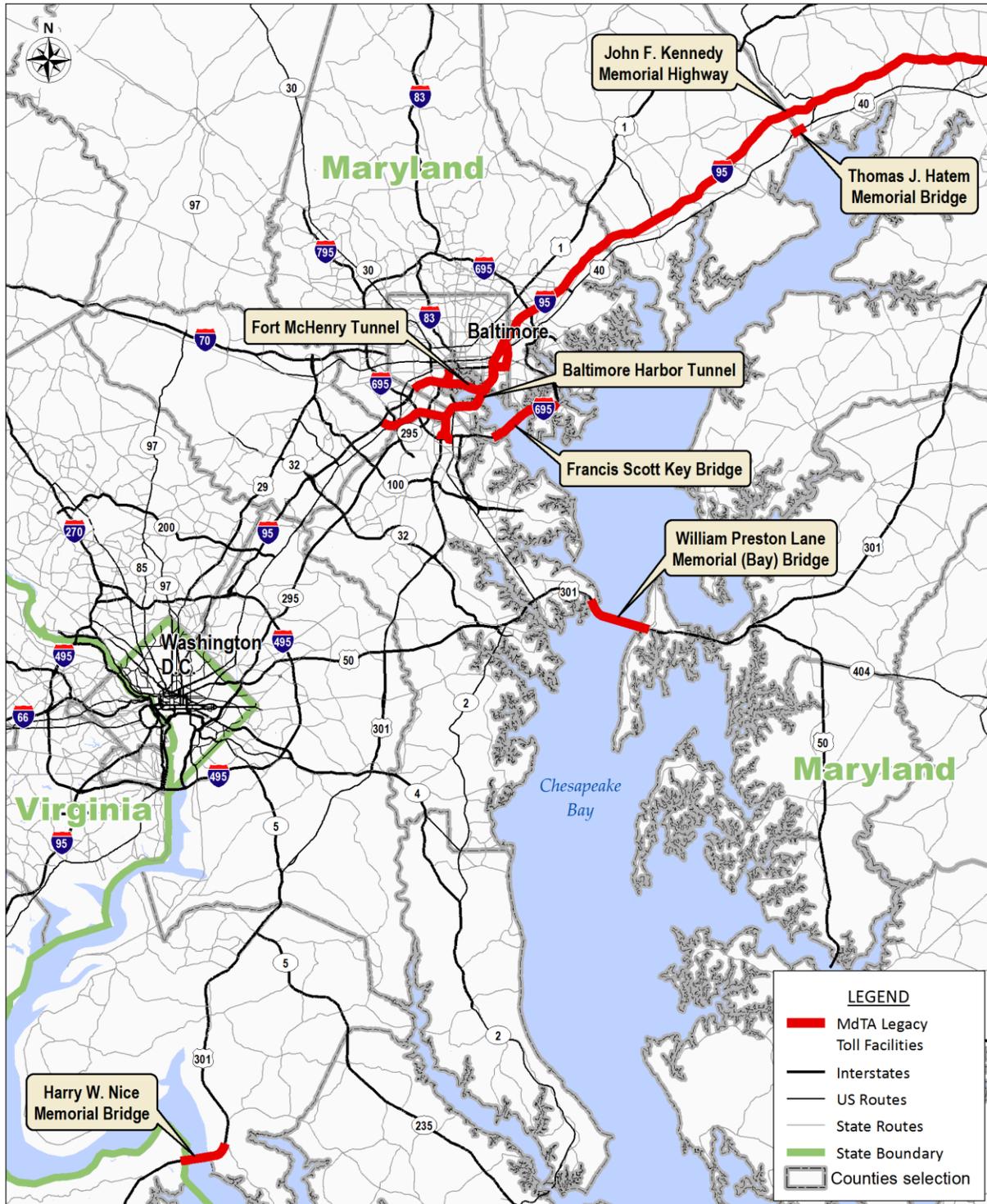


Table ES-1
Historical and Forecasted Transactions and In-Lane Toll Revenue

Fiscal Year	Transactions (Millions)								Percent Growth
	JFK	Hatem	BHT	FMT	FSK	Bay	Nice	Total ⁽¹⁾	
2006	14.74	5.56	26.26	43.57	11.89	13.27	3.36	118.65	0.6
2007	14.84	5.56	25.74	44.85	12.20	13.49	3.42	120.10	1.2
2008	14.65	5.56	25.77	44.83	12.34	13.37	3.39	119.91	(0.2)
2009	14.64	5.04	25.53	43.45	11.69	12.75	3.35	116.45	(2.9)
2010 ⁽²⁾	14.75	4.99	25.23	44.06	10.96	12.99	3.35	116.33	(0.1)
2011	15.38	5.07	26.12	46.29	11.65	13.56	3.40	121.47	4.4
2012 ⁽²⁾	14.82	5.03	25.75	44.52	11.05	13.63	3.29	118.09	(2.8)
2013 ⁽²⁾	14.58	4.56	23.97	43.58	10.92	12.74	3.26	113.61	(3.8)
2014 ⁽²⁾	14.38	4.95	24.90	41.88	10.42	12.76	3.24	112.53	(1.0)
2015	14.69	5.25	27.10	41.85	10.63	12.86	3.31	115.67	2.8
2016 ⁽³⁾	15.16	5.09	28.29	42.64	11.20	13.27	3.38	119.03	2.9
2017	15.26	5.16	26.81	45.36	11.99	13.34	3.35	121.26	1.9
2018	15.37	5.21	26.91	46.25	12.32	13.41	3.36	122.83	1.3
2019	15.49	5.24	24.62	48.55	12.77	13.41	3.38	123.46	0.5
2020	15.65	5.29	23.77	49.92	12.85	13.46	3.41	124.35	0.7
2021	15.73	5.31	23.76	50.13	12.87	13.43	3.42	124.65	0.2
2022	15.86	5.35	28.80	47.17	11.94	13.45	3.45	126.02	1.1
2023	16.00	5.39	29.35	47.29	11.90	13.46	3.47	126.86	0.7
2024	16.19	5.45	29.49	47.81	11.99	13.51	3.51	127.94	0.8
2025	16.28	5.48	29.47	48.07	12.01	13.48	3.52	128.32	0.3
2026	16.42	5.52	29.53	48.47	12.07	13.49	3.55	129.05	0.6

Fiscal Year	In-Lane Toll Revenue (\$ Millions)								Percent Growth
	JFK	Hatem	BHT	FMT	FSK	Bay	Nice	Total ⁽¹⁾	
2006	\$ 93.50	\$ 3.95	\$ 35.64	\$ 82.39	\$ 18.82	\$ 34.02	\$ 10.48	\$ 278.80	
2007	94.62	3.82	35.11	84.68	19.24	34.39	10.43	282.29	1.3
2008	92.71	3.89	35.33	84.03	19.41	33.88	10.08	279.33	(1.0)
2009	95.14	2.07	35.61	82.97	18.56	32.51	9.77	276.63	(1.0)
2010 ⁽²⁾	107.35	2.61	37.01	94.02	20.54	36.79	10.15	308.47	11.5
2011	107.39	2.82	37.85	95.32	20.78	37.62	10.15	311.93	1.1
2012 ⁽²⁾	116.01	5.25	48.74	118.82	25.82	46.74	11.60	372.98	19.6
2013 ⁽²⁾	121.86	7.80	52.05	135.61	28.94	52.40	12.97	411.63	10.4
2014 ⁽²⁾	162.80	10.17	77.56	183.13	40.26	79.76	20.40	574.08	39.5
2015	166.54	11.19	85.54	185.78	42.97	81.16	21.41	594.58	3.6
2016 ⁽³⁾	171.18	11.80	89.87	191.29	43.28	52.79	21.20	581.41	(2.2)
2017	171.94	11.99	85.05	201.50	45.36	53.13	20.64	589.62	1.4
2018	173.03	12.11	85.30	204.76	46.27	53.49	20.57	595.53	1.0
2019	174.05	12.16	78.04	212.12	47.94	53.63	20.68	598.62	0.5
2020	175.70	12.26	75.38	216.54	48.24	53.95	20.88	602.96	0.7
2021	176.40	12.29	75.31	216.99	48.34	54.00	20.98	604.31	0.2
2022	177.84	12.36	91.27	207.60	45.49	54.25	21.16	609.97	0.9
2023	179.30	12.43	93.04	207.88	45.40	54.51	21.35	613.91	0.6
2024	181.18	12.54	93.48	209.62	45.75	54.85	21.57	618.99	0.8
2025	182.09	12.58	93.41	210.22	45.86	54.88	21.68	620.72	0.3
2026	183.50	12.65	93.59	211.40	46.09	55.07	21.85	624.16	0.6

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

⁽²⁾ Year of toll increase.

⁽³⁾ Year of toll decrease.

- Represents actual data.

Table ES-2
Historical and Forecasted In-Lane and "Other" Toll Revenue

Table ES-2
Historical and Forecasted In-Lane and "Other" Toll Revenue

Fiscal Year	In-Lane Toll Revenue (\$ millions)		"Other Toll Revenue" (\$ millions)												Total "Other Toll Revenue" (6)	Total Revenue (6)
	Legacy Facilities	Total for Legacy Facilities	Legacy Facilities						New Facilities "Other Toll Revenue" (5)							
			Service Fees and Sales			Violation Recovery			Commercial Vehicles			Service Fees and Sales				
Unused Trip Revenue	Transponder Sales	Monthly Account Fees	Hatem E-Z Pass Program	Notice of Toll Due Fees	Civil Penalties (3)	Violation Fees	Post-Usage Discount	High Frequency Discount	Over-size Permit Fee	Concession Revenue (4)	Transponder Sales	Monthly Account Fees	Violation Fees	Civil Penalties	Total "Other Toll Revenue" (5)	
2006	\$ 278.80	\$ 3.50	\$ -	\$ -	\$ -	\$ 2.80	\$ (4.50)	\$ -	\$ -	\$ 7.80	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9.60
2007	282.30	4.00	-	-	-	3.00	(4.80)	-	-	8.10	-	-	-	-	-	10.30
2008	279.30	4.30	-	-	-	3.00	(5.00)	-	-	8.00	-	-	-	-	-	10.30
2009	276.60	4.50	-	-	-	1.90	(4.80)	-	-	8.00	-	-	-	-	-	9.60
2010 (1)	308.50	6.60	1.40	9.60	-	2.30	(6.60)	(0.20)	1.00	8.20	-	-	-	-	-	23.40
2011	312.00	6.50	1.90	9.90	-	1.30	(6.70)	(0.30)	1.20	7.90	-	-	-	-	-	23.00
2012 (1)	373.00	9.10	1.70	4.70	0.30	2.80	(5.90)	(0.20)	1.30	7.60	-	-	-	-	-	22.20
2013 (1)	411.60	11.50	1.30	5.30	0.80	4.00	(4.60)	(0.70)	1.30	4.10	-	-	-	-	-	23.10
2014 (1)	574.08	18.69	1.22	5.75	1.49	0.04	(5.89)	(0.64)	1.04	3.23	0.16	0.76	0.10	2.35	-	32.85
2015	594.58	16.81	1.44	5.87	1.52	0.01	(6.34)	(0.62)	1.15	5.07	0.19	0.79	0.01	5.73	-	42.38
2016 (2)	581.41	17.36	1.66	1.29	1.60	-	(6.39)	(1.06)	1.13	6.21	0.27	0.22	-	8.28	-	40.58
2017	589.62	17.45	1.66	-	1.61	-	(6.45)	(1.06)	1.15	5.66	0.27	-	-	8.32	-	38.71
2018	595.53	17.54	1.67	-	1.61	-	(6.52)	(1.07)	1.16	5.74	0.27	-	-	8.36	-	38.97
2019	598.62	17.62	1.68	-	1.62	-	(6.58)	(1.07)	1.17	5.81	0.28	-	-	8.40	-	39.24
2020	602.96	17.71	1.69	-	1.63	-	(6.65)	(1.08)	1.18	5.89	0.28	-	-	8.45	-	39.50
2021	604.31	17.80	1.70	-	1.64	-	(6.72)	(1.09)	1.19	5.96	0.28	-	-	8.49	-	39.77
2022	609.97	17.89	1.71	-	1.65	-	(6.78)	(1.09)	1.20	6.12	0.28	-	-	8.53	-	40.12
2023	613.91	17.98	1.72	-	1.65	-	(6.85)	(1.10)	1.22	7.22	0.28	-	-	8.57	-	41.42
2024	618.99	18.07	1.72	-	1.66	-	(6.92)	(1.10)	1.23	7.32	0.28	-	-	8.62	-	41.71
2025	620.72	18.16	1.73	-	1.67	-	(6.99)	(1.11)	1.24	7.41	0.28	-	-	8.66	-	42.01
2026	624.16	18.25	1.74	-	1.68	-	(7.06)	(1.11)	1.25	7.51	0.28	-	-	8.70	-	42.31

Source: Historical data from MDTA
 (1) Year of toll increase.
 (2) Year of toll decrease.
 (3) Civil Penalties actuals and estimates provided by MDTA.
 (4) Concession Revenue Forecast is 87% of the estimated concession revenue as previously prepared by Areas Inc.
 (5) InterCounty Connector and I-95 ETLs
 (6) Summations may not equal total revenue due to rounding.
 - Represents actual data.

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. The mainline toll plaza is located just east of the Susquehanna River.

The Central Region contains three alternative routes that cross Baltimore Harbor: the Baltimore Harbor Tunnel (I-895), the Francis Scott Key Bridge (I-695), and the Fort McHenry Tunnel (I-95). 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 Fort McHenry Tunnel, an eight-lane, 1.5 mile crossing that opened in November 1985, completed the triplet of existing harbor crossings.

The Southern Region contains two facilities which carry US 301 to diverse destinations. 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. The Harry W. Nice Bridge was opened in December 1940, connecting Maryland with Virginia, thereby allowing travelers making regional through-trips to bypass the Washington D.C. area.

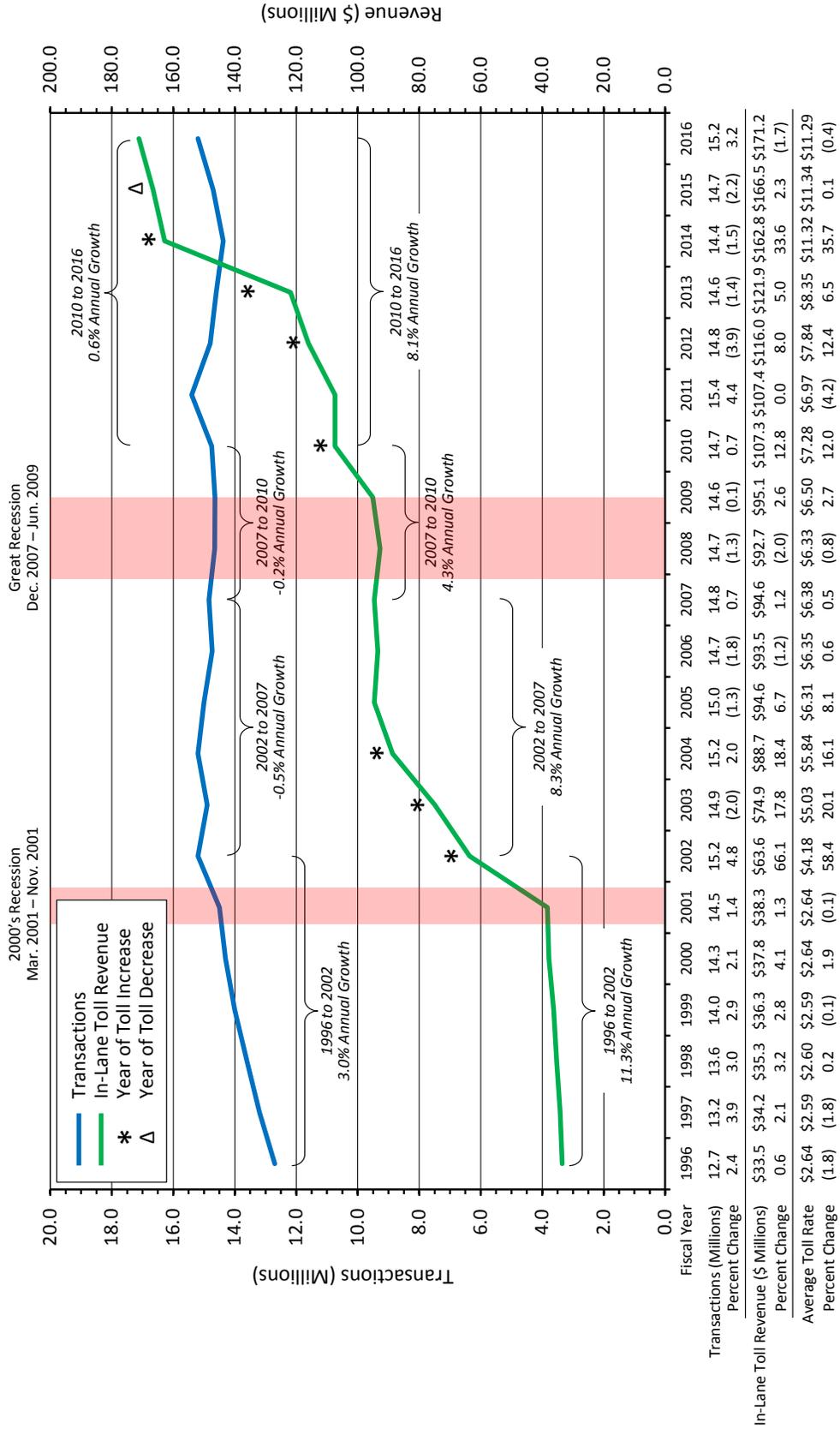
What follows in this executive summary is an overview of the full study effort including a review of historical transaction and revenue trends, relevant socioeconomic conditions, and the 10-year transaction and revenue forecasts.

Historical Transaction and Revenue Trends

During our work, a complete set of available historical traffic and economic data sets were compiled. Historical transaction and revenue trend data provided by the MDTA for each of the seven legacy toll facilities were reviewed, including regional traffic trends on adjacent competing highways. Regional trends were reviewed to better understand the context within which the MDTA facilities operate, including vehicle miles traveled (VMT) for Maryland and traffic counts on other major highways. Historical transaction and revenue trends for each of the legacy facilities were reviewed, as these trends served as inputs to updating future traffic growth rates used in developing the 10-year transaction and revenue forecasts. Additionally, E-ZPass® market penetration rates and vehicle classification distributions were also reviewed.

While transaction and revenue trends were reviewed for each facility, historical transaction and revenue data on a system-wide basis between FY 1996 and FY 2016 are described below and presented in Figure ES-2. Also shown in Figure ES-2 is the duration of recent recessions, as well as the years in which toll increases occurred. Even considering the recession which began in late FY 2001 and extended almost half way into FY 2002, transactions on a system-wide basis increased each year between FY 1996 and FY 2002 at a healthy average annual rate of 3.1 percent. However, during the subsequent five years from FY 2002 through FY 2007, transaction growth slowed to an average of 0.7 percent per annum. While this period predated the Great Recession, growth was also influenced by the three toll increases occurring each year from FY 2002 through FY 2004. Following this period of continued annual growth (except for FY 2003), transactions declined between FY 2007 and FY 2010 by an average of 1.1 percent per year, due to the impacts of the Great Recession and the FY 2010 toll increase. Transactions recovered in FY 2011, reaching a system high of 121.5 million, before decreasing annually through FY 2014 because of the toll increases which occurred each year from FY 2012 through FY 2014. Transactions rose by 2.8 percent in FY 2015 to 115.7 million and by 2.9

Figure ES-2
Systemwide Historical Transaction and Revenue Trends
FY 1996 through FY 2016



percent to 119.0 million in FY 2016. These higher growth rates during the last two fiscal years are due to several factors, the most significant being a delayed recovery from the Great Recession of 2008/2009, and recent declines in retail gasoline prices which have fueled traffic growth in general, and specifically on the MDTA facilities. Gasoline prices fell by more than 25 percent per gallon in 2015 from approximately \$3.50 to \$2.50 on average. Low gasoline prices continued in 2016 averaging close to \$2.25. A more modest portion of the traffic growth in FY 2016, estimated at approximately 0.5 percent, was the combined result of the toll reductions on the MDTA system for a select number of payment methods and vehicle categories and the additional day due to leap year.

As will be noted in Chapter 3, Socioeconomic Review, the economic recovery has resulted in growth in State and regional employment ranging from 1.3 percent to 1.7 percent per annum depending on the geography between 2010 to 2015. This is in contrast to reductions in employment during the overall 2005 and 2010 period inclusive of the recession, which ranged from -0.3 percent to -0.8 percent per annum. In addition to rising employment, there were also real increases in per capita income between 2010 to 2015 of between 1.3 percent to 2.1 percent per annum. These increases result in more disposable income for spending on various goods and services including those related to automobile travel.

Systemwide, In-Lane Toll Revenue increased each year between FY 1996 and FY 2016, except in FY 2008 and FY 2009. As shown in Figure ES-2, between FY 1996 and FY 2002, toll revenue grew at an average annual rate of 6.1 percent, the result of the 3.1 percent per annum increase in transactions, combined with a 2.8 percent per annum growth in the average toll; the latter influenced almost exclusively by the FY 2002 toll increase. Over the next five years, a series of toll increases resulted in an average annual revenue increase of 9.2 percent per year. As a result of the decreases in transaction growth related to the Great Recession, revenues declined in FY 2008 by 1.1 percent and in FY 2009 by 1.0 percent. However, due to the FY 2010 toll increase, toll revenue between FY 2007 and FY 2010 grew at an average annual rate of 3.0 percent. Revenues have recovered in recent years, aided by a series of toll increases. Revenues increased by 3.6 percent in FY 2015 to \$594.6 million, but declined by 2.5 percent in FY 2016 to \$584.4 million due to the select toll rate reductions.

As indicated in the two preceding paragraphs, except for FY 2016, legacy facility In-Lane Toll Revenues have increased significantly more than growth in transactions because of the adjustments to toll rates in recent years. Had these toll rate adjustments not been made, it is reasonable to assume that the number of transactions would have been higher, while growth in In-Lane Toll Revenue would have more closely tracked the rate of growth in transactions. Long-term historical growth, based on the historical transaction and revenue data during years without toll rate increases, decreases, or economic downturns, was estimated to be roughly 0.5 percent per year.

Socioeconomic Review

Economic growth is an important driving force for the region and is also linked with traffic growth. The growth in regional population and employment will tend to lead to an increase in traffic volumes for commuting purposes, as well as for other activities like shopping and recreation. Data for gross regional product, both state and the Baltimore region, were procured as a measure to reflect the relationship with the increasing trend of toll transactions at the legacy facilities. Historic and forecast data were also obtained from the United States Census Bureau, the United States Bureau of Economic Analysis (BEA), the United States Bureau Energy Information Administration (EIA), the Maryland State Data Center (MD SDC), Woods & Poole Economics (W&P), and Moody's Analytics for population,

employment, gross regional product (GRP), and gasoline prices, which were used for evaluation of the inputs used in deriving traffic growth forecasts as a function of these measures.

The latest historical and forecasts of socioeconomic data were collected and analyzed in this update, with the findings summarized in Chapter 3. Particularly noteworthy in the historical data is a combination of a solid improvement in the labor markets as employment and incomes increased and the unemployment rates continued to decline, along with substantial reductions in gasoline prices over the last two years. This blend of favorable factors likely contributed to a strong rebound in traffic volumes on the MDTA facilities since FY 2014. Based on the analysis of the forecast data, it was concluded that the latest socioeconomic growth projections for the next 10 years are overall very close to those developed for the previous round of traffic and revenue forecasts. Consequently, overall growth in traffic demand is anticipated to be moderate over the coming decade, and the recently experienced strong pace of traffic growth is expected to decelerate due to the impact of less advantageous future gasoline prices and employment and income improvements. These updated growth forecasts were incorporated into the current traffic and toll revenue forecast model.

Forecasts of Traffic and Revenue

A summary of both historical and forecasted transactions and In-Lane Toll Revenue from FY 2006 through FY 2026 by facility and aggregated to the total MDTA system is presented in Table ES-1 and shown graphically in Figure ES-3. The forecasts are also provided by facility and vehicle class in Appendix B. In FY 2017, the initial year of the forecast, transactions of 121.3 million have been forecasted, a 1.9 percent increase over FY 2016. In-Lane Toll Revenues are estimated at \$589.6 million, a 1.4 percent increase over FY 2016. Following the robust transaction increases in FY 2015 and FY 2016, which were heavily influenced by historically low gasoline prices, the delayed economic recovery, and the FY 2016 toll reductions, transaction and revenue growth rates going forward are estimated to increase at more moderate rates ranging from 0.2 to 1.9 percent, consistent with long-term historical trends. Total transactions are forecasted to grow to 129.1 million by FY 2026, or a total of 8.4 percent during the forecast period. This equates to a growth rate of 0.8 percent per annum. In-Lane Toll Revenue follows similar growth trends, increasing by a total of 7.4 percent from \$581.4 million in FY 2016 to \$624.2 million in FY 2026, equating to an average annual change of 0.7 percent.

In addition to the forecasted transactions and In-Lane Toll Revenue, forecasts of various “Other Toll Revenue” sources for the MDTA were developed. These include unused toll revenue through the commuter program, transponder sales, civil penalties, commercial discounts, over-size permits, concession revenue and revenue associated with the Hatem E-Z Pass program. The “Other Toll Revenue” forecasts, along with In-Lane and total revenue are provided in Table ES-2.

Forecast Comparison

To set the context for the current forecast, this section provides a comparison of prior revenue forecasts to the actual revenue collected by MDTA, as well as a comparison of the most recent prior forecast to the current forecast. Table ES-3 provides prior forecasts of In-Lane Toll Revenue and Total Toll Revenue from FY 2010 through FY 2016, as well as the actual In-Lane Toll Revenue and Total Toll Revenue collected by MDTA. In general, this table provides an indication of the reasonableness of recent forecasts. The table identifies the year in which the forecast was prepared, the fiscal year being

Figure ES-3
Historical and Forecasted Transactions and In-Lane Toll Revenue

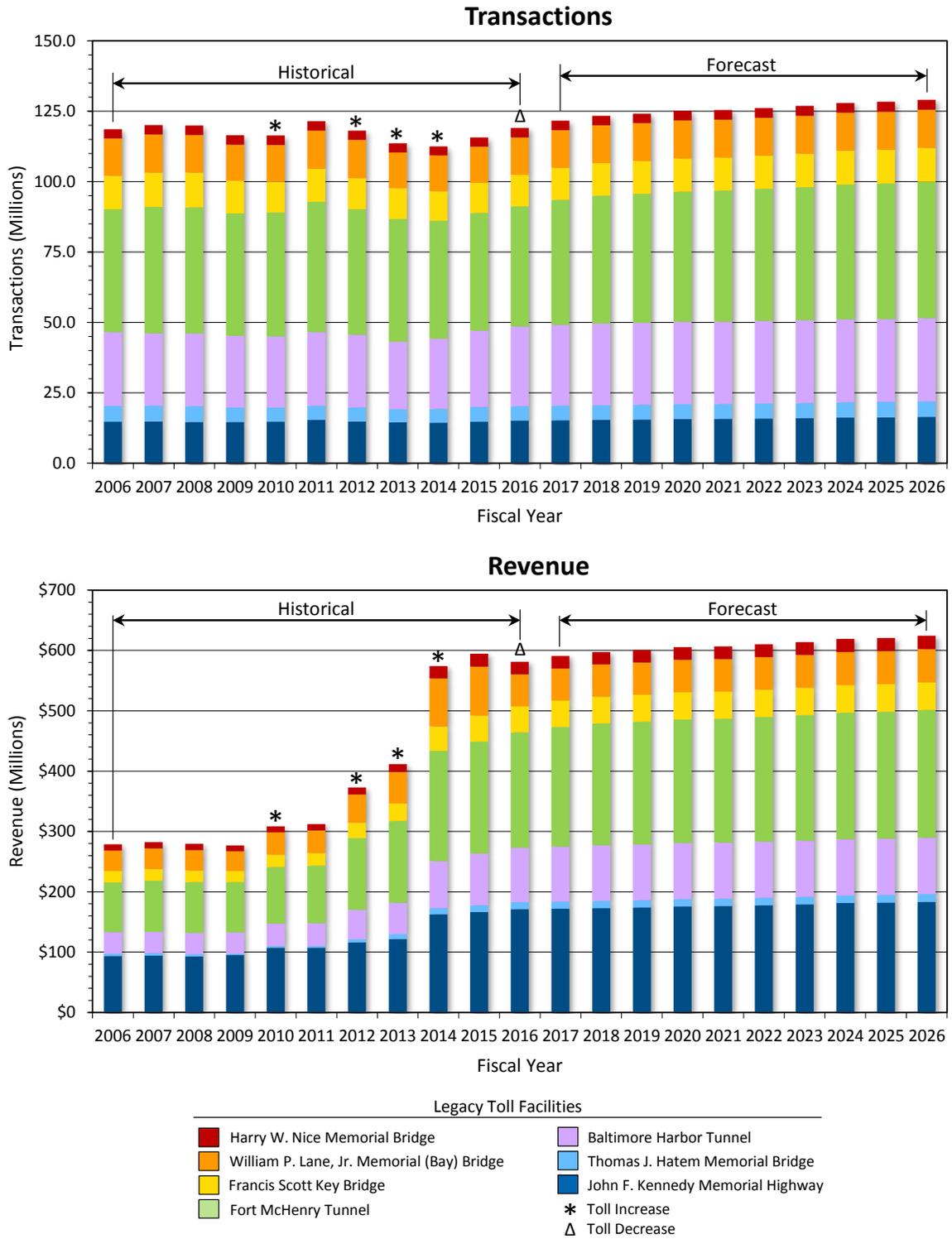


Table ES-3
Comparison of MDTA Forecasted Revenue versus Actual, FY 2010 through FY 2016

Year Forecast Prepared	Fiscal Year Forecasted	Forecast		Actual		Percent Difference	
		In-Lane Toll	Total Toll	In-Lane Toll	Total Toll	In-Lane Toll	Total Toll
		Revenue	Revenue	Revenue	Revenue	Revenue	Revenue
2009	⁽¹⁾ 2010	\$ 294.4	\$ 315.3	\$ 308.5	\$ 331.8	4.8	5.2
2009	⁽¹⁾ 2011	295.6	315.9	312.0	335.0	5.5	6.0
2010	⁽¹⁾ 2011	307.6	331.0	312.0	335.0	1.4	1.2
2011	⁽¹⁾ 2012	367.1	387.2	373.0	395.2	1.6	2.1
2011	⁽¹⁾ 2013	409.0	425.9	411.6	434.7	0.6	2.1
2012	⁽¹⁾ 2013	411.4	434.4	411.6	434.7	0.0	0.1
2013	⁽¹⁾ 2014	540.3	570.3	574.1	606.9	6.3	6.4
2014	⁽²⁾ 2015	575.1	611.1	594.6	637.0	3.4	4.2
2015	⁽²⁾ 2016	561.7	592.7	581.4	622.0	3.5	4.9

⁽¹⁾ Forecasts prepared by others.
⁽²⁾ Forecasts prepared by CDM Smith.

forecasted and the accuracy of those forecasts for both In-Lane Toll Revenue and Total Toll Revenue. Both actual In-Lane Toll Revenue and actual Total Toll Revenue have always exceeded the forecasts, with In-Lane Toll Revenue and Total Toll Revenue being 3.5 percent and 4.9 percent above the latest forecast, respectively. It is believed the differences between forecasted and actual In-Lane Toll Revenue may be the result of several factors including a delayed recovery from the 2008/2009 Great Recession and declining retail gasoline prices. Based on short-term fuel elasticity in the range of -0.02 to -0.03, the 20-25 percent drop in fuel prices in 2015/2016 potentially added a 0.50 percent to 0.75 percent increase in transactions and revenue systemwide. Without the fuel price impacts, the percent difference in In-Lane Toll Revenue would have been reduced to between 2.5 percent and 3.0 percent. Coupled with an underestimate in Other Revenue, Civil Penalties of \$5.9 million, the difference in forecasted versus actual Total Toll Revenue may have been closer to between 2.8 percent to 3.3 percent.

As part of prior studies, it was estimated that the FY 2016 toll reduction would increase MDTA legacy facility transactions by approximately 0.2 percent and decrease toll revenue by 6.5 percent, compared to estimated FY 2016 levels without the toll decrease. Some of the estimated decrease in toll revenue was the result of assumed shifts in method of payment due to the increased differential between Maryland E-ZPass® and the full fare methods of payment. From a review of FY 2016 transactions and revenue data, it is believed that these estimated impacts were generally realized based on the observed level of overall increases in Maryland E-ZPass® and decreases in cash, video and full fare methods of payment. Looking at year-over-year differences, total FY 2016 legacy facility transactions increased beyond the level of impact estimated because of the toll reductions, while revenues did not decrease as much as anticipated, due primarily to higher than anticipated traffic growth. This traffic growth resulted from the continuing economic recovery, as well as reductions in the price of gasoline.

Removing from consideration these other factors, the actual impacts of the FY 2016 toll decrease were comparable to those estimated as part of prior studies.

Table ES-4 provides a comparison of the last 10-year forecast for legacy facilities (prepared in November 2015, shortly after introduction of select toll rate reductions) with the current forecast. These forecasts include both In-Lane and "Other" Toll Revenue. Highlighted in blue is the FY 2016 actual total revenue collected, which was 4.8 percent or \$28.6 million higher than the forecast. The latest forecast of Total Revenue is 5.7 percent or \$344.5 million higher from FY 2016 to FY 2025.

Table ES-4
Comparison of 2015 Forecast versus 2016 Forecast
of Total Toll Revenue (In-Lane and "Other" Toll Revenue)

Fiscal Year	Total Revenue				Percent Difference
	2015 Forecast ⁽¹⁾	2016 Forecast	Difference		
2016	\$ 592.7	\$ 622.0	\$ 29.3	4.9	
2017	597.3	628.3	31.0	5.2	
2018	600.3	634.5	34.2	5.7	
2019	603.3	637.9	34.6	5.7	
2020	606.6	642.5	35.9	5.9	
2021	609.9	644.1	34.2	5.6	
2022	614.7	650.1	35.4	5.8	
2023	619.2	655.3	36.1	5.8	
2024	622.7	660.7	38.0	6.1	
2025	626.2	662.7	36.5	5.8	
Total	\$ 6,092.8	\$ 6,438.1	345.3	5.7	

⁽¹⁾ The 2015 forecast includes the estimated impacts of the July 1, 2015 toll rate reduction.

 - Represents actual data.

Chapter 1

Introduction

Under contract to the Maryland Transportation Authority (MDTA), CDM Smith conducted a Traffic and Revenue Update Study for the legacy bridges, tunnels, and highways currently operated by the MDTA. The study culminated in the development of 10-year transaction and revenue estimates for each facility through FY 2026. This report summarizes the study analysis, including a presentation of historical and current traffic trends, relevant socioeconomic conditions and forecasts, traffic and revenue impacts associated with select toll reductions implemented July 1, 2015, and the 10-year transaction and revenue forecasts.

1.1 System Description and History

The seven legacy toll facilities currently owned and operated by the MDTA include:

- Thomas J. Hatem Memorial Bridge (Hatem Bridge)
- John F. Kennedy Memorial Highway, excluding the Express Toll Lanes (Kennedy Highway)
- Baltimore Harbor Tunnel (Harbor Tunnel)
- Fort McHenry Tunnel (Fort McHenry Tunnel)
- Francis Scott Key Bridge (Key Bridge)
- William Preston Lane Jr. Memorial Bridge (Bay Bridge)
- Harry W. Nice Memorial Bridge (Nice Bridge)

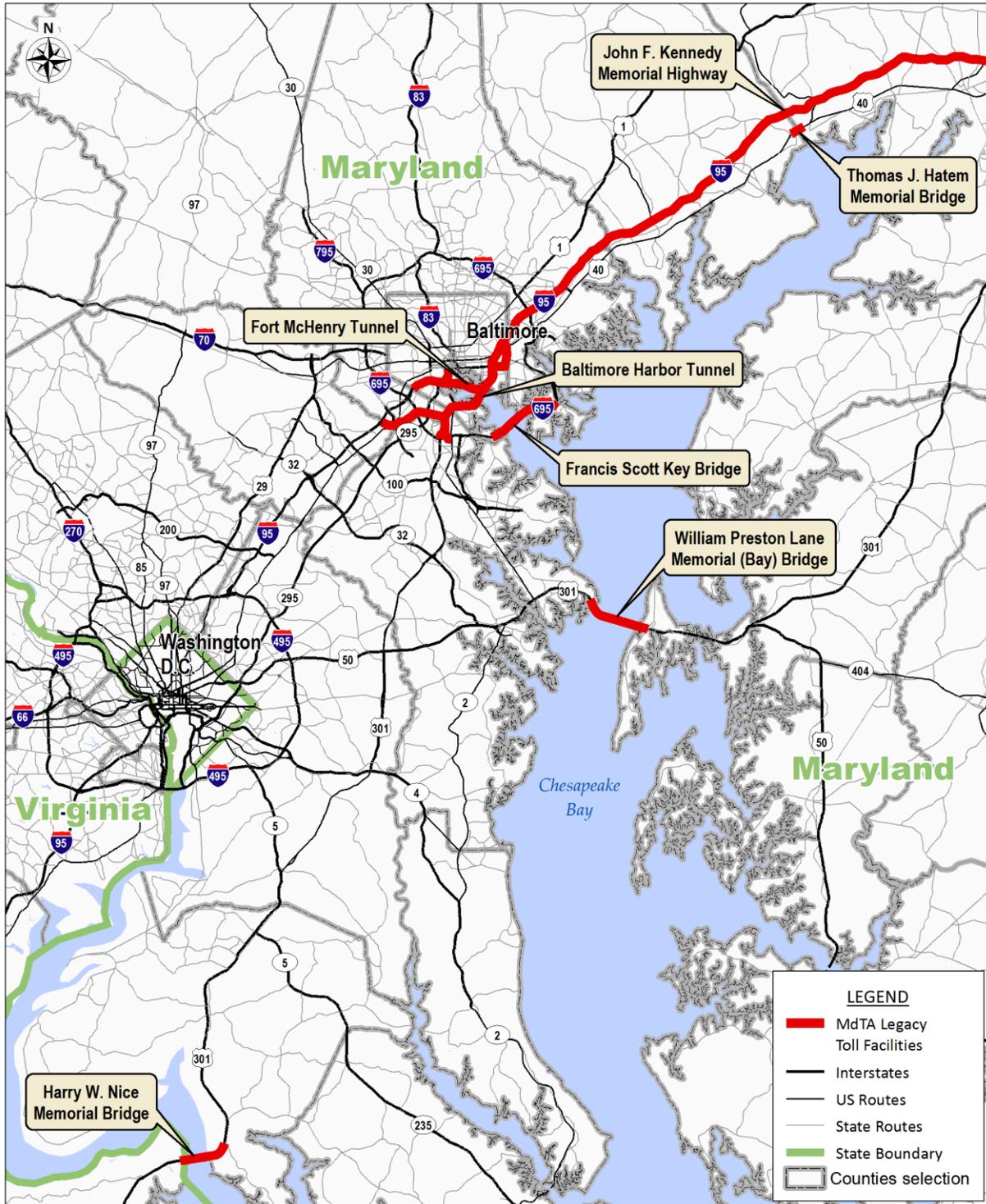
The Intercounty Connector (ICC/MD 200), the State's first all-electronic, congestion-managed toll road connecting the I-370 and I-95 corridors and the all-electronic congestion-managed I-95 Express Toll LanesSM project are *not addressed* in this report. Separate traffic and revenue studies have been performed for these facilities.

The objective of this analysis was to develop updated 10-year forecasts for each of the seven legacy facilities following the introduction of select toll rate decreases, the specifics of which are detailed later in this chapter. The forecast period extends from FY 2017, beginning July 1, 2016, through FY 2026, ending June 30, 2026. The study made maximum use of all available data, including historical traffic trend information by vehicle category and method of toll payment for each facility. The analysis also includes a general overview of economic trends, both nationally and within the service areas of each facility.

1.1.1 System Description

Figure 1-1 shows the locations of the seven MDTA legacy facilities in a regional context. The legacy facilities fulfill varied roles within the local and regional transportation system and consequently have a mix of traffic, including both E-ZPass[®], video and cash customers. Collectively, these facilities generated \$581.4 million of In-Lane Toll Revenue in FY 2016.

Figure 1-1
Legacy Facilities Location Map



The MDTA has separated the seven toll facilities into three regions. The Northern Region consists of the John F. Kennedy Memorial Highway and the Thomas J. Hatem Bridge. The Central Region consists of the Fort McHenry Tunnel, the Baltimore Harbor Tunnel, and the Francis Scott Key Bridge. The Southern Region consists of the Harry W. Nice Memorial Bridge and the William Preston Lane Jr. Memorial (Bay) Bridge.

In the Northern Region, the Thomas J. Hatem Bridge and the John F. Kennedy Memorial Highway form two parallel crossings of the Susquehanna River. The Hatem Bridge carries US 40 across 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. The mainline toll plaza is located just northeast of the Susquehanna River.

The Central Region contains three alternative routes that cross Baltimore Harbor: the Baltimore Harbor Tunnel (I-895), the Francis Scott Key Bridge (I-695), and the Fort McHenry Tunnel (I-95). 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, an eight-lane crossing that opened in November 1985, completed the triplet of existing harbor crossings.

The Southern Region contains two facilities which carry US 301 to diverse destinations. 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. The Harry W. Nice Bridge was opened in December 1940, connecting Maryland with Virginia, thereby allowing travelers making regional through-trips to bypass the Washington DC area.

1.1.2 Toll Rate Structure and History

An understanding of the structure of payment options for MDTA customers was necessary in developing the traffic and revenue forecasts. Since different method of payment categories tend to have different travel patterns, values of time and trip frequencies, the traffic and revenue forecasts were also developed by method of payment category. This necessitated an understanding of the various payment options offered by MDTA, a summary of which is provided here.

MDTA customers have the option of paying their toll through a variety of toll payment methods. The MDTA legacy facility customers can pay via E-ZPass®, video tolling or cash. In general, Maryland registered E-ZPass® customers receive a discount over cash customers, while E-ZPass® customers with transponders from out-of-state pay the same base toll rate as the cash customers. Video tolling customers pay a 50 percent surcharge over the base toll rate. MDTA also offers several discount programs for commuters, shoppers using the Bay Bridge, motorists using the Hatem Bridge, and high-volume and frequent-user commercial vehicle accounts. Some of these discounts are substantial, such as the Hatem Discount Plans, which provide Hatem Bridge customers with unlimited trips for a flat annual fee of \$20. The current toll schedule including select toll rate reductions effective on July 1, 2015 are provided by Region in Tables 1-1 through 1-3.

The two Northern Region facilities employ a one-way toll collection system; that is round-trip tolls are collected in the eastbound/northbound direction only. Hence, the round-trip tolls are generally the same as those of the Central Region toll facilities. The base toll is \$8.00 for passenger cars, with a video toll of \$12.00, including a 50 percent surcharge. Maryland two-axle, E-ZPass® customers receive

**Table 1-1
Northern Region Tolls**

Method of Payment	Vehicle Class	John F. Kennedy Memorial Highway (I-95)		Thomas J. Hatem Memorial Bridge (US 40) ⁽¹⁾	
		Before	After	Before	After
		July 1, 2015	July 1, 2015	July 1, 2015	July 1, 2015
Maryland E-ZPass	Commuter, 2-axles ⁽²⁾	\$2.80	**	\$2.80	**
	Class 2 2-axles	\$7.20	\$6.00	\$7.20	\$6.00
	Class 3 3-axles	\$16.00	**	\$16.00	\$11.20
	Class 4 4-axles	\$24.00	**	\$24.00	\$16.80
	Class 5 5-axles ⁽³⁾⁽⁴⁾	\$48.00	**	\$48.00	**
	Class 6 6+-axles ⁽³⁾⁽⁴⁾	\$60.00	**	\$60.00	**
Cash / Base	Class 2 2-axles	\$8.00	**	\$8.00	**
	Class 3 3-axles	\$16.00	**	\$16.00	**
	Class 4 4-axles	\$24.00	**	\$24.00	**
	Class 5 5-axles	\$48.00	**	\$48.00	**
	Class 6 6+-axles	\$60.00	**	\$60.00	**
	Video	Class 2 2-axles	\$12.00	**	\$12.00
Class 3 3-axles		\$24.00	**	\$24.00	**
Class 4 4-axles		\$36.00	**	\$36.00	**
Class 5 5-axles		\$63.00	**	\$63.00	**
Class 6 6+-axles		\$75.00	**	\$75.00	**

** Indicates no change from previous toll rate.

Notes:

⁽¹⁾ Two E-ZPass Hatem Bridge plans were made available as of Sept. 30, 2012:

- The first replaced the Hatem Bridge AVI Decal Program and was offered for two-axle vehicles only with an existing valid transponder beginning Feb. 1, 2012, providing unlimited trips on the Hatem Bridge only. The plan cost \$10 beginning on Feb. 1, 2012 and increased to \$20 on July 1, 2013.
- The second plan opened The Hatem Bridge-Only Plan to existing or new E-ZPass Maryland customers. The primary difference is that accounts under the second plan are subject to account and transponder fees and pre-paid toll deposits, while those under the first plan are not.

⁽²⁾ Commuter rates are for two-axle vehicles with a Maryland E-ZPass Commuter Plan, which includes 50 trips and costs \$70.00. Two "trips" are required per transaction for the Northern Region facilities per trip. All commuter plans (E-ZPass) are valid for 45 days.

⁽³⁾ Business accounts operating five-or-more-axle vehicles may 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.

⁽⁴⁾ 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.

**Table 1-2
Central Region Tolls**

Method of Payment	Vehicle Class	Baltimore Harbor Tunnel (I-895), Fort McHenry Tunnel (I-95/I-395) and Francis Scott Key Bridge (I-695)	
		Before July 1, 2015	After July 1, 2015
Maryland E-ZPass	Commuter, 2-axles ⁽¹⁾	\$1.40	**
	Class 2 2-axles	\$3.60	\$3.00
	Class 3 3-axles	\$8.00	**
	Class 4 4-axles	\$12.00	**
	Class 5 5-axles ⁽²⁾⁽³⁾	\$24.00	**
	Class 6 6+-axles ⁽²⁾⁽³⁾	\$30.00	**
Cash / Base	Class 2 2-axles	\$4.00	**
	Class 3 3-axles	\$8.00	**
	Class 4 4-axles	\$12.00	**
	Class 5 5-axles	\$24.00	**
	Class 6 6+-axles	\$30.00	**
	Video	Class 2 2-axles	\$6.00
Class 3 3-axles		\$12.00	**
Class 4 4-axles		\$18.00	**
Class 5 5-axles		\$36.00	**
Class 6 6+-axles		\$45.00	**

** Indicates no change from previous toll rate.

Notes:

- ⁽¹⁾ Commuter rates are for two-axle vehicles with a Maryland E-ZPass Commuter Plan, which includes 50 trips and costs \$70.00. All commuter plans (E-ZPass) are valid for 45 days.
- ⁽²⁾ Business accounts operating five-or-more-axle vehicles may 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.
- ⁽³⁾ 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.

**Table 1-3
Southern Region Tolls**

Method of Payment	Vehicle Class	William Preston Lane, Jr. Memorial (Bay) Bridge (US 50/301)		Gov. Harry W. Nice Memorial Bridge (US 301)	
		Before	After	Before	After
		July 1, 2015	July 1, 2015	July 1, 2015	July 1, 2015
Maryland E-ZPass	Commuter, 2-axles ⁽¹⁾	\$2.10	\$1.40	\$2.10	**
	Shoppers, 2-axles ⁽²⁾	\$3.00	\$2.00	Not Applicable at this Facility	
	Class 2 2-axles	\$5.40	\$2.50	\$5.40	\$4.50
	Class 3 3-axles	\$12.00	\$8.00	\$12.00	**
	Class 4 4-axles	\$18.00	\$12.00	\$18.00	**
	Class 5 5-axles ⁽³⁾⁽⁴⁾	\$36.00	\$24.00	\$36.00	**
Cash / Base	Class 6 6+-axles ⁽³⁾⁽⁴⁾	\$45.00	\$30.00	\$45.00	**
	Class 2 2-axles	\$6.00	\$4.00	\$6.00	**
	Class 3 3-axles	\$12.00	\$8.00	\$12.00	**
	Class 4 4-axles	\$18.00	\$12.00	\$18.00	**
	Class 5 5-axles	\$36.00	\$24.00	\$36.00	**
	Class 6 6+-axles	\$45.00	\$30.00	\$45.00	**
Video	Class 2 2-axles	\$9.00	\$6.00	\$9.00	**
	Class 3 3-axles	\$18.00	\$12.00	\$18.00	**
	Class 4 4-axles	\$27.00	\$18.00	\$27.00	**
	Class 5 5-axles	\$51.00	\$36.00	\$51.00	**
	Class 6 6+-axles	\$60.00	\$45.00	\$60.00	**

** Indicates no change from previous toll rate.

Notes:

⁽¹⁾ Commuter rates are for two-axle vehicles with a Maryland E-ZPass Commuter Plan, which includes 25 trips and are valid for 45 days. The Bay Bridge Plan costs \$35.00 and the Nice Bridge Plan costs \$52.50.

⁽²⁾ Shopper rates are for two-axle vehicles with a Maryland E-ZPass Commuter Plan, which includes 10 trips and costs \$20.00. All shopper plans are valid for 90 days.

⁽³⁾ Business accounts operating five-or-more-axle vehicles may 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.

⁽⁴⁾ 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.

a 25 percent discount, or a toll of \$6.00. For the Northern Region facilities, commuter tolls are offered for two-axle vehicles with a Maryland E-ZPass® Commuter Plan, which includes 50 trips and costs \$70.00 or \$1.40 per trip. Since the Northern Region facilities utilize one-way tolling, two "trips" are required per transaction, making the effective toll rate \$2.80 per transaction or a 65 percent discount over the base toll rate. Vehicles with three-or-more axles are charged progressively higher rates. While this is true, as of July 1, 2015, tolls for three and four-axle vehicles with Maryland E-ZPass® using the Hatem Bridge were reduced by 30 percent. With this discount, the toll for three-axle vehicles was reduced from \$16.00 to \$11.20 and for four-axle vehicles from \$24.00 to \$16.80. The current tolls for the Northern Region toll facilities are shown in Table 1-1.

Special discounts are available at the Hatem Bridge. Currently, two plans are offered: Hatem Plan A and Hatem Plan B. Both plans provide unlimited trips to two-axle E-ZPass® account holders for a flat annual fee of \$20. Plan A does not include account fees, prepaid toll deposits or account statements. However, an E-ZPass® account under Plan A cannot be used at other toll facilities or combined with other Maryland E-ZPass® discounts. Plan B is an add-on to a standard Maryland E-ZPass® account and is subject to the standard fees and pre-paid toll deposits. In addition, E-ZPass® accounts under Plan B can be used at other toll facilities and combined with other Maryland E-ZPass® discounts.

Tolls are collected in both directions at the three Baltimore Harbor crossings that comprise the Central Region. Passenger cars pay a base toll of \$4.00. Video customers pay \$6.00, which includes a 50 percent surcharge, while Maryland two-axle, E-ZPass® customers receive a 25 percent discount at a toll of \$3.00. Commuter discounts are offered to two-axle vehicles with a Maryland E-ZPass® Commuter Plan. This plan includes 50 trips at a cost of \$70.00, making the effective toll rate \$1.40 per transaction, or a 65 percent discount over the base toll rate. As shown in Table 1-2, vehicles with three-or-more axles are charged progressively higher rates.

The two Southern Region facilities employ one-way toll collection. The base toll at the Harry W. Nice Bridge is \$6.00 for passenger cars. Video toll customers pay a \$9.00 toll, including a 50 percent surcharge. Maryland two-axle, E-ZPass® customers receive a 25 percent discount, or a toll of \$4.50. Also at the Harry W. Nice Bridge, commuter discounts are offered to two-axle vehicles with a Maryland E-ZPass® Commuter Plan, which includes 25 trips at a cost of \$52.50, making the effective toll \$2.10 per transaction. This represents a 65 percent discount over the base toll. Progressively higher tolls are charged to vehicles with three-or-more-axes.

Following the July 1, 2015 toll reductions, the base toll at the Bay Bridge was reduced from \$6.00 to \$4.00 for passenger cars. The video toll is \$6.00, including a 50 percent surcharge. Maryland two-axle, E-ZPass® customers receive a 37.5 percent discount which reduces the toll from \$5.40 to \$2.50. Also at the William Preston Lane Memorial Bridge, commuter discounts are offered to two-axle vehicles with a Maryland E-ZPass® Commuter Plan, which includes 25 trips at a cost of \$35.00, making the effective toll \$1.40 per transaction, or a 65 percent discount over the base toll. While the tolls charged to three-or-more-axle vehicles are progressively higher, on July 1, 2015 the tolls for these vehicles were reduced by 33.3 percent. The current tolls for the Southern Region toll facilities are shown in Table 1-3.

Another discount option is offered specifically to motorists using the Bay Bridge. The E-ZPass® Maryland Shoppers' Plan is for MDTA E-ZPass® holders. Following the July 1, 2015 toll reductions, the plan costs \$20.00 for 10 trips, or \$2.00 per trip. The plan is valid for 90 days and can be used on Sundays through Thursdays, only.

Business accounts that operate vehicles with five-or-more-axles may qualify for a post-usage discount based on total tolls paid in 30-day cycles. The first 30-day cycle begins with the first use of the transponder. Discounts vary from 10 to 20 percent based on the total toll usage during the cycle and are credited back to the account 30 days after the completion of a cycle. In addition, the supplemental rebate program provides rebates to individual vehicles with five-or-more-axles and Maryland E-ZPass® transponders that make 60 or more trips per month.

1.2 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 currently operated by the MDTA.

Chapter 3, Socioeconomic Review, provides a summary of updated recent historical trends and forecasts of socioeconomic variables to provide the context for the traffic and revenue growth projections. The socioeconomic trends review and analysis consisted of data collection efforts that included compiling and updating a host of different pertinent variables such as population, employment, income, gasoline prices, and real gross regional product from a variety of public and private sources. These included the Bureau of Economic Analysis (BEA), US Census, Bureau of Labor Statistics (BLS), Maryland State Data Center (MD SDC), U.S. Energy Information Administration (EIA), Woods & Poole Economics (W&P), and Moody's Analytics (Moody's).

Chapter 4, Traffic and Revenue Forecast, provides a summary of the basic underlying assumptions used in the traffic and revenue forecasting process. Also presented are the 10-year traffic and revenue forecasts by facility and vehicle class for each of the legacy facilities and the system as a whole.

Chapter 2

Historical Traffic and Revenue Trends

Regional traffic trends as well as historical transactions and revenue trends provided by MDTA for each of the seven legacy toll facilities have been reviewed, with the results presented in this chapter. Regional trends were reviewed to understand the context within which the MDTA facilities operate, including vehicle miles traveled (VMT) and traffic counts on major Maryland highways. Historical transaction and revenue trends for each of the legacy facilities were reviewed, as these trends served as an input in developing the 10-year transaction growth rates for the traffic and revenue forecasts. Current E-ZPass® market penetration rates and vehicle classification distributions were also reviewed.

2.1 Regional Traffic Review

Regional traffic patterns and trends were analyzed in order to better understand the factors influencing traffic demand on the MDTA legacy facilities. Included in this analysis was a review of regional VMT trends and historical traffic counts on nearby competing routes. This data was used to ensure that near-term and future traffic growth rates developed for the MDTA facilities were reasonable within the context of these historical regional traffic patterns and trends.

2.1.1 Vehicle Miles Traveled

VMT represents the total number of miles travelled by all vehicles annually. VMT trends are important to a better understanding of general trends in traffic growth nationally and, more specifically, within a state or region. 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 the years FY 1994 through FY 2015 for the United States and Maryland.

Maryland VMT trends during the last 20 years have generally followed those of the United States. Prior to 2004, VMT increased at an average annual rate of 2.3 percent in both the United States and Maryland. Between 2004 and 2009, national and Maryland VMT experienced essentially no net growth. This was primarily because following the onset of the Great Recession of 2008/2009, VMT declined for the first time since 1980.

The average annual percent change in VMT was 0.4 percent both nationally and in Maryland between 2009 and 2014. These recent trends in VMT represent a significant change from prior long-term historical trends, with VMT levels generally remaining at or below the peak levels of 2007. Several factors may be responsible for the change. First, the reduction in employment caused by the Great Recession has led to general reductions in travel by commuters. Additionally the changes may be indicative of longer-term trends such as adjustments to gasoline prices, shifts in development patterns to revitalize traditional urban centers, and increases in telecommuting, carpooling and transit use.

However, 2015 national data suggests a change from the recent slowdown in VMT growth. National VMT increased by 3.5 percent in 2015. In the near term, this increase may represent a return to the growth rates experienced between 1994 and 2004, a result of the combined impacts associated with declines in gasoline prices and recovery from the Great Recession. Additionally, the favorable factors underpinning traffic increases since 2014, such as relatively robust labor market growth combined

Table 2-1
National and State-wide Trends in Vehicle Miles Traveled

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
1994	550,096	---	23.2	2,372,026	---	12,674	---	28.7	44,165	---
1995	569,024	3.4	23.3	2,438,244	2.8	13,263	4.6	29.6	44,882	1.6
1996 ⁽²⁾	581,579	2.2	23.4	2,482,201	1.8	13,721	3.5	29.8	46,033	2.6
1997	606,067	4.2	23.5	2,576,543	3.8	14,013	2.1	30.1	46,609	1.3
1998	630,157	4.0	23.9	2,641,891	2.5	14,407	2.8	29.8	48,343	3.7
1999	648,124	2.9	23.9	2,708,328	2.5	14,499	0.6	29.5	49,126	1.6
2000	667,603	3.0	24.1	2,767,363	2.2	15,208	4.9	30.3	50,174	2.1
2001	678,723	1.7	24.1	2,815,135	1.7	15,633	2.8	30.1	51,996	3.6
2002	693,942	2.2	24.1	2,873,866	2.1	16,214	3.7	30.2	53,702	3.3
2003	708,173	2.1	24.3	2,909,567	1.2	16,536	2.0	30.2	54,701	1.9
2004	727,163	2.7	24.4	2,982,017	2.5	16,668	0.8	30.1	55,284	1.1
2005	733,655	0.9	24.4	3,009,217	0.9	16,807	0.8	29.8	56,319	1.9
2006	741,000	1.0	24.4	3,033,752	0.8	16,850	0.3	29.9	56,302	(0.0)
2007	745,457	0.6	24.4	3,049,027	0.5	17,015	1.0	30.1	56,503	0.4
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	56432	(0.5)
2015	N/A			3,147,848	3.5				N/A	
Average Annual Percent Change										
1994-2014		1.6			1.2		1.5			1.2
1994-2004		2.8			2.3		2.8			2.3
2004-2014		0.4			0.2		0.2			0.2
2004-2009		(0.1)			(0.0)		0.4			0.0
2009-2014		0.9			0.4		0.1			0.4
2014-2015		---			3.5		---			---
1994-2014 VMT Data source: Table VM-2, Highway Statistics 1994-2014, USDOT FHWA Office of Policy Information.										
2015 VMT Data source: USDOT FHWA Office of Policy Information.										
⁽¹⁾ Includes Puerto Rico.										
⁽²⁾ Interstate-level VMT data unavailable for 1996, and was estimated based on the average 1995 and 1997 interstate miles as a percent of total VMT.										

with the unexpected declines in fuel prices, are unlikely to prove sustainable over the upcoming decade. Nevertheless, the forecasts of moderate socioeconomic growth may translate into continued modest increases in traffic demand on the legacy facilities over the coming decade.

The percent of total VMT occurring on Interstate routes has remained fairly constant throughout the past 20 years. Approximately 24 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.

The annual transaction growth rates from the transaction forecasts presented in Chapter 4, Traffic and Revenue Forecast, were compared with VMT growth to ensure that growth rates were reasonable in light of these trends in VMT.

2.1.2 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 FY 1995. These roads include interstates and major highways that compete with or compliment the MDTA legacy facilities. The data presented in this section are based on historical average annual daily traffic volumes and associated growth rates at each location. At MDTA locations where there is a one-way toll, the one-way average annual daily traffic volume was doubled to be more comparable to other locations. For comparative purposes, the roadways are grouped into three regions: Northern, Central, and Southern, corresponding to the MDTA regions.

Historical average annual daily traffic volumes and annual growth rates for the Northern Region facilities, located in proximity to the Susquehanna River, are presented in Table 2-2. Volumes are provided through 2015 for comparative purposes. Traffic volumes on the two Northern Region MDTA facilities have generally followed the regional trends over the last 20 years. Between 1995 and 2005, average annual traffic growth was 2.2 percent per year for the MDTA facilities and a comparable 2.4 percent per year for the region. Between 2005 and 2015, average annual traffic growth was -0.3 for both the MDTA facilities and the region, with the most significant decreases occurring in 2008, 2009 and 2013. This overall trend may be related to reductions in travel associated with the immediate and long-term impacts of the Great Recession of 2008/ 2009. Toll increases implemented in 2013 were also likely responsible for the decline in traffic on the MDTA facilities in that year. In 2015, traffic volumes increased on the MDTA facilities by 3.2 percent and for all Northern Region facilities by 2.3 percent. On a regional level, these growth rates are the highest in the last decade. Much of this increase is likely due to the continued economic recovery and the significant reductions in gasoline prices experienced in 2015.

Table 2-3 presents the historical average annual daily traffic volumes and annual growth rates for the Central Region, located in the Baltimore area. Historical average annual daily traffic volumes are provided through 2015 for comparative purposes. Traffic volumes at the three Central Region MDTA facilities have also generally followed the regional trends over the last 20 years. Between 1995 and 2005, average annual traffic growth was 2.1 percent per year for the MDTA facilities as compared with a slightly higher 2.6 percent per year for the region. Traffic volumes on the Maryland State Highway Administration (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 increased slightly, averaging 0.2 percent. On the MDTA facilities, traffic volumes did decrease in 2009 and 2010. These impacts resulted, at least in part, from the Great Recession and the 2010 toll increase. Sizeable traffic volume decreases occurred in both 2013 and 2014. Toll increases implemented in these years were likely the primary catalyst for the declines. Overall, average annual traffic growth between FY 1995 and FY 2015 was 1.0 percent per year for the MDTA facilities and 1.3 percent per year for all Central Region highways. In 2015, traffic volumes increased on the MDTA facilities by 3.1 percent. Much of this increase is likely due to the continued economic recovery and the significant reductions in gasoline prices experienced in 2015. Regional traffic volumes decreased in 2015, with MSHA facilities alone decreasing by an average of 2.0 percent over the prior year. This was due to construction-related decreases on I-695 and I-95 in 2015. Excluding those two locations, traffic volumes on the MSHA facilities grew by an average of 0.6 percent in 2015 and growth for all Central Region facilities averaged 1.6 percent. These growth rates, though not as robust as on the MDTA facilities alone, is still greater than much of the growth experienced in the region during the last decade.

**Table 2-2
Average Annual Daily Traffic for Selected Northern Region Facilities**

Calendar Year	MDTA Facilities				MSHA Facilities ⁽¹⁾				MDTA Facilities		Northern Region	
	John F. Kennedy Mem. Highway	Thomas J. Hatem Mem. Bridge	I-83 S of Belfast Rd.	US 1 E of Cedar Church Rd.	US 301 S of River Rd.	Average	AAPC ⁽²⁾	Average	AAPC ⁽²⁾	Average	AAPC ⁽²⁾	
	AAPC ⁽²⁾	AAPC ⁽²⁾	AAPC ⁽²⁾	AAPC ⁽²⁾	AAPC ⁽²⁾	AAPC ⁽²⁾	AAPC ⁽²⁾	AAPC ⁽²⁾	AAPC ⁽²⁾	AAPC ⁽²⁾		
1995	67,890	22,521	46,539	8,675	9,450	45,206	---	31,015	---	---	---	
2000	78,466	25,205	50,219	9,650	10,475	51,836	2.8	40,885	2.8	5.7	5.7	
2005	81,957	30,520	61,975	9,950	11,425	56,239	1.6	39,165	1.6	(0.9)	(0.9)	
2006	80,744	30,450	66,760	9,852	11,650	55,597	(1.1)	39,891	(1.1)	1.9	1.9	
2007	81,317	30,474	62,068	11,640	11,531	55,896	0.5	39,406	0.5	(1.2)	(1.2)	
2008	80,283	30,445	59,830	11,061	10,952	55,364	(1.0)	38,514	(1.0)	(2.3)	(2.3)	
2009	80,229	27,617	61,620	11,282	10,370	53,923	(2.6)	38,224	(2.6)	(0.8)	(0.8)	
2010	80,815	27,325	61,971	10,050	10,451	54,070	0.3	38,122	0.3	(0.3)	(0.3)	
2011	84,739	27,797	60,988	9,861	10,252	56,268	4.1	38,727	4.1	1.6	1.6	
2012	84,402	27,810	60,165	9,882	10,620	56,106	(0.3)	38,576	(0.3)	(0.4)	(0.4)	
2013	80,448	25,002	60,401	9,310	10,571	52,725	(6.0)	37,146	(6.0)	(3.7)	(3.7)	
2014	78,780	27,115	60,041	9,301	10,562	52,948	0.4	37,160	0.4	0.0	0.0	
2015	80,495	28,747	61,311	9,522	9,920	54,621	3.2	37,999	3.2	2.3	2.3	
Average Annual Percent Change												
1995-2005	1.9		3.1	1.4	1.9		2.2	2.4		2.2	2.4	
2005-2015	(0.2)		(0.6)	(0.4)	(1.4)		(0.3)	(0.3)		(0.3)	(0.3)	
1995-2015	0.9		1.2	0.5	0.2		1.0	1.0		1.0	1.0	

Source: MDTA and MSHA AADT Reports.
⁽¹⁾ Maryland State Highway Administration.
⁽²⁾ Annual Average Percent Change.

Table 2-3
Average Annual Daily Traffic for Selected Central Region Facilities

Calendar Year	MSHA Facilities ⁽¹⁾										
	I-83 N of N Charles St AAPC ⁽²⁾	I-95 N of MD 99 AAPC ⁽²⁾	I-95 N of MD 100 AAPC ⁽²⁾	I-97 N of MD 176 AAPC ⁽²⁾	I-695 S of I 70 AAPC ⁽²⁾	I-695 E of MD 146 AAPC ⁽²⁾	MD 285 N of MD 100 AAPC ⁽²⁾				
1995	46,900	134,475	153,275	70,500	156,175	142,475	59,075				
2000	50,850	139,575	192,575	95,575	175,125	147,725	58,025				
2005	113,475	173,825	189,825	99,325	188,325	152,650	86,250				
2006	113,481	161,780	191,880	102,610	188,333	152,652	85,302				
2007	113,482	161,781	191,881	102,611	193,050	155,270	91,630				
2008	111,230	157,742	188,042	100,562	189,191	152,171	88,881				
2009	112,341	160,880	192,100	105,110	188,860	153,692	88,882				
2010	112,792	161,521	192,871	105,531	189,621	150,850	89,423				
2011	102,860	161,682	193,062	105,642	189,812	151,001	93,390				
2012	103,371	162,493	191,280	106,210	190,763	151,762	92,641				
2013	104,302	165,972	193,001	107,171	192,484	149,460	92,832				
2014	116,260	165,815	192,812	107,062	192,295	149,311	107,730				
2015	119,051	159,150	197,443	106,490	173,900	152,892	101,350				
Average Annual Percent Change											
1995-2005	9.2	2.6	2.2	3.5	1.9	0.7	3.9				
2005-2015	0.5	(0.9)	0.4	0.7	(0.8)	0.0	1.6				
1995-2015	4.8	0.8	1.3	2.1	0.5	0.4	2.7				

Calendar Year	MDTA Facilities					
	Baltimore Harbor Tunnel AAPC ⁽²⁾	Francis Scott Key Bridge AAPC ⁽²⁾	Fort McHenry Tunnel AAPC ⁽²⁾	MDTA Facilities Average AAPC ⁽²⁾	Central Region Average AAPC ⁽²⁾	
1995	109,096	52,603	198,356	120,018	112,293	
2000	126,192	59,945	223,342	136,493	126,893	
2005	138,720	66,324	238,453	148,166	144,817	
2006	143,902	65,171	238,754	149,276	144,396	
2007	141,042	66,867	245,776	151,228	146,339	
2008	141,209	67,632	245,639	151,493	144,230	
2009	139,914	64,045	238,059	147,339	144,388	
2010	138,222	60,050	241,443	146,572	144,232	
2011	143,746	64,410	255,169	154,442	146,077	
2012	144,402	63,992	253,771	154,055	146,069	
2013	131,354	59,847	238,775	143,325	143,520	
2014	136,398	57,093	229,454	140,982	145,423	
2015	148,480	58,233	229,299	145,337	144,629	
Average Annual Percent Change						
1995-2005	2.5	2.3	1.9	2.1	2.6	
2005-2015	0.6	(1.3)	(0.4)	(0.2)	(0.0)	
1995-2015	1.6	0.5	0.7	1.0	1.3	

Source: MDTA and MSHA AADT Reports.
⁽¹⁾ Maryland State Highway Administration.
⁽²⁾ Annual Average Percent Change.

Historical average annual daily traffic volumes and annual growth rates for the Southern Region are presented in Table 2-4. Due to the proximity to Virginia, two county locations in northern Virginia have also been included. Historical average annual daily traffic volumes are provided through 2015. Traffic volumes on the two Southern Region MDTA facilities have generally followed the regional trends over the last 20 years. Between 1995 and 2005, average annual traffic growth was 2.5 percent per year for the MDTA facilities and a slightly higher 2.8 percent per year for the region. During the 2005 to 2015 period, MSHA and Virginia roadways experienced decreases in volumes during 2008. MDTA facilities also experienced decreases in volume in 2008 and 2009. This pattern may be the result of some immediate and some lagging impacts of the Great Recession. A traffic volume decrease on the MDTA facilities also occurred in 2013, with no growth occurring in 2014. Both of these impacts are likely the result of toll increases. However, overall average annual traffic growth between 1995 and 2015 was 1.2 percent per year for the MDTA facilities and 1.4 percent per year for the region. In 2015, traffic volumes increased on the MDTA facilities by 1.0 percent and for all Southern Region facilities by 1.7 percent. On a regional level, these growth rates were the greatest since 2006. Much of this increase is likely due to the continued economic recovery and the significant reductions in gasoline prices.

Based on the data available for the selected facilities, the MDTA legacy facilities have generally exhibited traffic growth in line with that of the region. Moreover, traffic volumes have grown at similar rates among the three regions, averaging between 2.0 to 2.5 percent between 1995 and 2005, with slight increases of approximately 1.0 percent between 1995 and 2015. These trends were used as a guide in estimating near-term future year traffic growth for the traffic and revenue forecasts presented in Chapter 4.

2.2 MDTA Toll Transaction and In-Lane Revenue Trends

A review of the historical toll transaction and In-Lane Toll Revenue trends for each of the seven MDTA legacy facilities follows. In-Lane Toll Revenue is the revenue that is collected at the point of transaction and excludes any fees. “Other Toll Revenue”, which will be discussed further in Chapter 4, is the revenue produced by service fees and sales, violation recovery, concession revenue, and additional commercial vehicle revenue. What follows is an overview of the recent short-term trends, including the impacts of the FY 2016 toll reductions. Historical data are presented by facility on a fiscal year (July 1 to June 30) basis. In addition, current E-ZPass® market penetration rates and vehicle classification percentages are also presented. These data serve as important inputs used in developing the 10-year transaction and revenue forecasts.

2.2.1 Short-Term Traffic and Revenue Impacts

The latest FY 2016 traffic and revenue data were reviewed to understand the factors impacting traffic demand at the MDTA legacy facilities. These data were compared to the prior forecast, as shown in Table 2-5. Actual FY 2016 transactions were 1.65 million, or 1.4 percent greater than those previously forecasted. In-lane toll revenue exceeded the forecast by \$19.72 million or 3.5 percent, while other toll revenues exceeded the forecast by \$9.62 million or 31.1 percent. Several factors contributed to actual transactions and revenues exceeding forecasts. In addition to normal growth, three major impacts to transactions and revenue were identified in FY 2016. These included (1) the select toll rate reductions, (2) the declining price of gasoline, and (3) the impact of the additional leap year day. Using available data, each of these impacts were considered in estimating future normal growth rates.

**Table 2-4
Average Annual Daily Traffic for Selected Southern Region Facilities**

Calendar Year	MDTA Facilities				MSHA Facilities ⁽¹⁾				Virginia DOT Facilities				Southern Region	
	William P. Lane, Jr. Mem. (Bay) Bridge	AAPC ⁽²⁾	Harry W. Nice Mem. Bridge	AAPC ⁽²⁾	US 301 S of MD 234	AAPC ⁽²⁾	I-95 (Virginia) N of Courthouse Rd.	AAPC ⁽²⁾	US 301 (Virginia) N of Kings Hwy	AAPC ⁽²⁾	MDTA Facilities Average	AAPC ⁽²⁾	Southern Region Average	AAPC ⁽²⁾
1995	55,233	---	14,137	---	17,350	---	99,000	---	N/A	---	34,685	---	46,430	---
2000	64,877	3.3	14,849	1.0	25,400	7.9	120,000	3.9	N/A	---	39,863	2.8	56,282	3.9
2005	71,123	1.9	17,592	3.4	22,975	(2.0)	134,000	2.2	13,000	---	44,358	2.2	51,738	1.8 ⁽³⁾
2006	72,716	2.2	18,385	4.5	22,751	(1.0)	138,000	3.0	14,000	7.7	45,551	2.7	53,170	2.8
2007	73,941	1.7	18,731	1.9	22,522	(1.0)	137,000	(0.7)	14,000	-	46,336	1.7	53,239	0.1
2008	73,260	(0.9)	18,580	(0.8)	21,403	(5.0)	133,000	(2.9)	13,000	(7.1)	45,920	(0.9)	51,849	(2.6)
2009	69,874	(4.6)	18,341	(1.3)	21,834	2.0	136,000	2.3	13,000	-	44,108	(3.9)	51,810	(0.1)
2010	71,200	1.9	18,378	0.2	22,520	3.1	136,000	-	12,000	(7.7)	44,789	1.5	52,020	0.4
2011	74,651	4.8	18,693	1.7	22,091	(1.9)	135,000	(0.7)	12,000	-	46,672	4.2	52,487	0.9
2012	74,248	(0.5)	18,308	(2.1)	22,142	0.2	135,000	-	12,000	-	46,278	(0.8)	52,340	(0.3)
2013	69,783	(6.0)	17,868	(2.4)	20,840	(5.9)	132,000	(2.2)	13,000	8.3	43,826	(5.3)	50,698	(3.1)
2014	69,911	0.2	17,770	(0.5)	20,821	(0.1)	131,000	(0.8)	14,000	7.7	43,841	0.0	50,700	0.0
2015	70,442	0.8	18,112	1.9	21,322	2.4	134,000	2.3	14,000	-	44,277	1.0	51,575	1.7
Average Annual Percent Change														
1995-2005		2.6		2.2		2.8		3.1		---		2.5		2.8 ⁽³⁾
2005-2015		(0.1)		0.3		(0.7)		-		0.7		(0.0)		(0.0)
1995-2015		1.2		1.2		1.0		1.5		---		1.2		1.4 ⁽³⁾

Source: MDTA, MSHA and Virginia DOT AADT Reports.

⁽¹⁾ Maryland State Highway Administration.

⁽²⁾ Annual Average Percent Change.

⁽³⁾ For comparative purposes, percent change calculated based on averages that excludes US 301 (Virginia) traffic volumes.

2.2.1.1 Estimated FY 2016 Toll Rate Reduction Impacts

The first short-term impact considered was related to the select FY 2016 toll rate reductions. Effective July 1, 2015, MDTA made several changes to the tolls and fees charged on their facilities, which are as follows:

- The discount for Maryland E-ZPass® was increased from 10 percent to 25 percent for the Baltimore Harbor (I-895) and Fort McHenry (I-95) tunnels, the Francis Scott Key Bridge (I-695), the Thomas J. Hatem Memorial Bridge (US 40) and the John F. Kennedy Memorial Highway (I-95), reducing the round-trip toll from \$7.20 to \$6.00. The round-trip toll at the Governor Harry W. Nice Memorial Bridge (US 301) was reduced from \$5.40 to \$4.50;
- Eliminated the Maryland E-ZPass® \$1.50 monthly account fee for Maryland residents;
- Reduced all cash, video, commuter and shoppers' toll rates at the Bay Bridge (US 50/301), including reducing the two-axle cash rate from \$6.00 to \$4.00 round trip and the commuter rate from \$2.10 to \$1.40. In addition, the Maryland E-ZPass® toll rate was reduced from \$5.40 to \$2.50;
- Reduced the toll at the Hatem Bridge by 30 percent for three- and four-axle vehicles with Maryland E-ZPass®. The three-axle toll was reduced from \$16.00 to \$11.20, while four-axle toll was reduced from \$24.00 to \$16.80;
- Increased the Maryland E-ZPass® supplemental rebate program for vehicles with five-or-more axles by 5 percent per trip. Prior to July 1, 2015 discounts were 5 percent for 60-79 trips, 10 percent for 80-99 trips, and 15 percent for 100 or more trips per transponder in a calendar month. These were changed to 10 percent for 60-79 trips, 15 percent for 80-99 trips, and 20 percent for 100 or more trips; and
- Effective January 1, 2016, for vehicles using the Childs Street and I-695 turnaround exits at the Baltimore Harbor Tunnel and Key Bridge respectively, Maryland E-ZPass toll rates were decreased to \$2.00 per axle for three-to-six-plus-axle vehicles. For example, three-axle vehicles will see a toll reduction from \$8.00 to \$6.00 and four-axle vehicles from \$12.00 to \$8.00.

As part of prior studies, it was estimated that the FY 2016 toll reduction would increase MDTA legacy facility transactions by approximately 0.2 percent and decrease toll revenue by 6.5 percent, compared to estimated FY 2016 levels without the toll decrease. Some of the estimated decrease in toll revenue was the result of assumed shifts in method of payment due to the increased differential between Maryland E-ZPass® and the full fare methods of payment. From a review of FY 2016 transactions and revenue data, it is believed that these estimated impacts were generally realized based on the observed level of overall increases in Maryland E-ZPass® and decreases in cash, video and full fare methods of payment. Looking at the year-over-year differences, total FY 2016 legacy facility transactions increased beyond the level of impact estimated because of the toll reductions, while revenues did not decrease as much as anticipated, due primarily to higher than anticipated traffic growth. This higher than anticipated traffic growth resulted from the continuing economic recovery, as well as continued reductions in the price of gasoline. Removing from consideration these other factors, as discussed in greater detail in the next section, the actual impacts of the FY 2016 toll decrease were comparable to those estimated as part of prior studies.

2.2.1.2 Estimated FY 2016 Leap Year and Gasoline Price Impacts

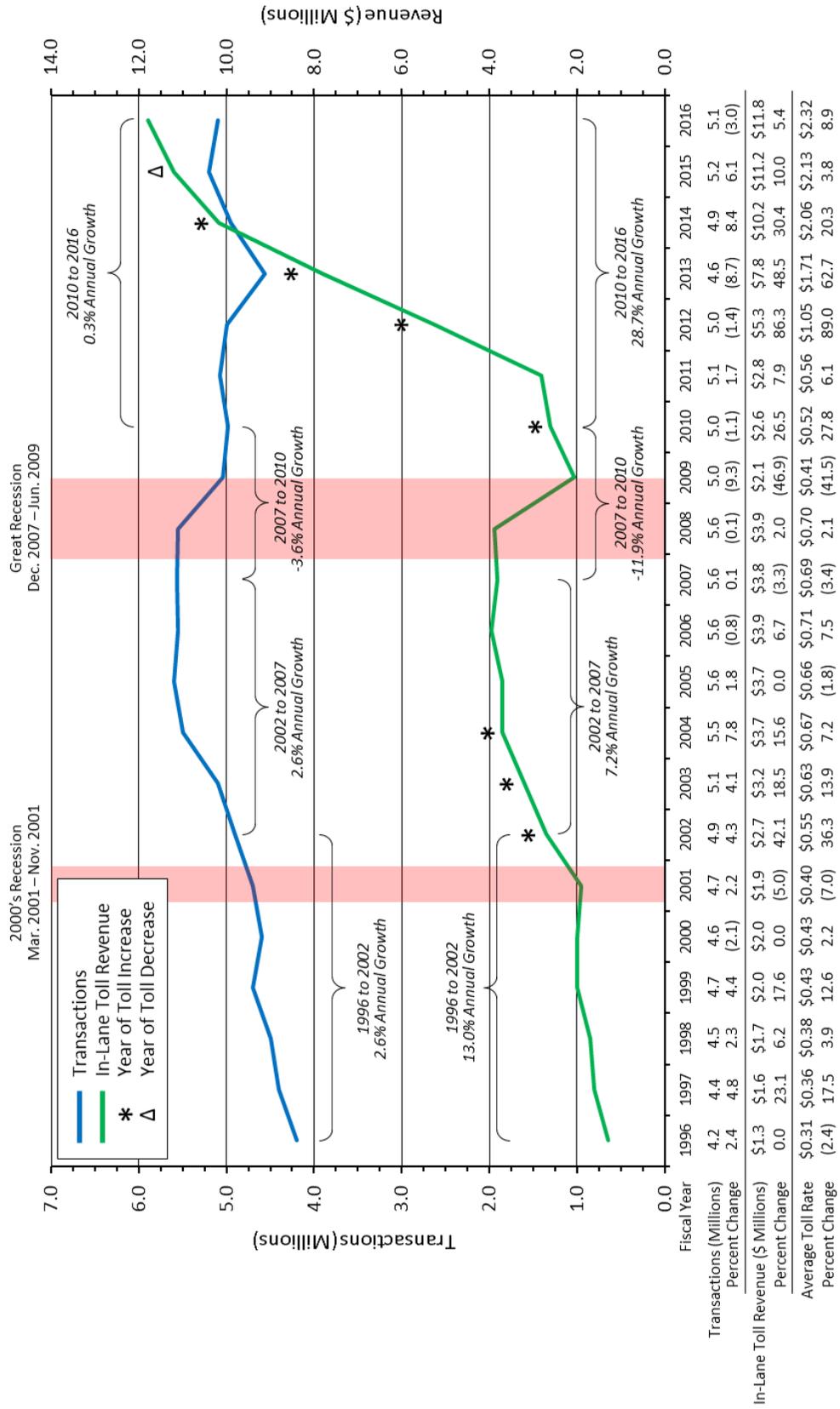
In addition to normal growth and the impacts of the toll rate reductions, other factors impacting transaction and revenue growth included the declining price of gasoline and the impact of an additional leap year day. The estimated impact of an additional day in February was a 0.2 percent increase in annual transactions and toll revenue. With respect to motor fuel, gasoline prices in the Central Atlantic Region dropped from an average of \$2.99 in FY 2015 to an average of \$2.36 in FY 2016, a decrease of more than 21 percent, per data from the Energy Information Administration (EIA). Based on assumed short-run fuel elasticities, this fuel price reduction would produce an estimated increase in legacy facility transactions and revenue of between 0.50 and 0.75 percent.

These short-term impacts on FY 2016 transactions and toll revenue were assessed to estimate normal traffic growth on the legacy facilities. Removing the estimated impacts of the toll reduction, the lower price of gasoline, and the additional leap year day from the FY 2016 total transaction growth of 2.9 percent, produced an estimated normal growth rate ranging between 1.75 and 2.00 percent. This growth is supported by the current socioeconomic trends, which include continued population and employment growth, income growth and low inflation. These trends are discussed in greater detail in Chapter 3.

2.2.2 Thomas J. Hatem Memorial Bridge

Historical transactions and revenue for the Thomas J. Hatem Memorial Bridge between FY 1996 and FY 2016 are provided in Figure 2-1. Toll rate increases are represented with an asterisk for each fiscal year that an increase occurred. The toll rate decrease of FY 2016 is represented by a triangle. It should be noted that toll rate increases did not necessarily occur in the beginning of the fiscal year, but in fact varied by year. Transactions grew steadily between FY 1996 and FY 2002 at an average annual rate of 2.6 percent. Transactions decreased in FY 2000 prior to the 2001 recession, but then recovered the following year. Despite three toll increases, transactions then continued to grow between FY 2002 and FY 2007 at an average annual rate of 2.6 percent. Transactions peaked in FY 2005 at 5.6 million prior to the 2008/2009 Great Recession. The recession may have begun influencing transactions on the Thomas J. Hatem Memorial Bridge as early as FY 2006, as transactions dipped 0.8 percent in that year. Transactions remained at 5.6 million until FY 2009 when they decreased by 9.3 percent, the largest decrease occurring in a year without a toll increase. Following this decrease, continued economic uncertainty and several toll increases decreased transactions further to 4.6 million in FY 2013. Transactions recovered slightly to 4.9 million in FY 2014, despite the toll increase that year, and grew again in FY 2015 by 6.1 percent to 5.2 million, resulting in an average annual post-recession growth rate of 0.8 percent between FY 2010 and FY 2015. Transactions on the Hatem Bridge decreased in FY 2016 by 3.0 percent, driven by a correction in Hatem A Discount Plan participation from the prior year. In October 2014, Hatem A Discount Plan participation increased by roughly 250,000 transactions, compared to the prior year. This appears to have been a one-time impact, with October 2015 transactions decreasing over the prior year by roughly 250,000, suggesting that FY 2016 represents a return to normal monthly patterns. Transactions using other methods of payment increased by 7.5 percent in FY 2016, a growth rate consistent with that of FY 2014 and FY 2015. Overall, average annual transaction growth was 1.0 percent per year between FY 1996 and FY 2016. These levels are significantly lower than current trends due to a combination of toll increases and recessionary impacts between FY 2009 and FY 2013. Excluding those years, annual transaction growth on the Hatem Bridge averaged 3.0 percent per year. Between FY 2013 and FY 2016, annual

Figure 2-1
Historical Transactions and In-Lane Toll Revenue, FY 1996 through FY 2016
Thomas J. Hatem Memorial Bridge



transaction growth rates averaged 3.5 percent per year. This suggests that the Hatem Bridge is currently growing slightly faster than the historic “normal” growth rate, which is most likely the result of lower gasoline prices, economic recovery and, in FY 2016, the impacts of the toll reduction.

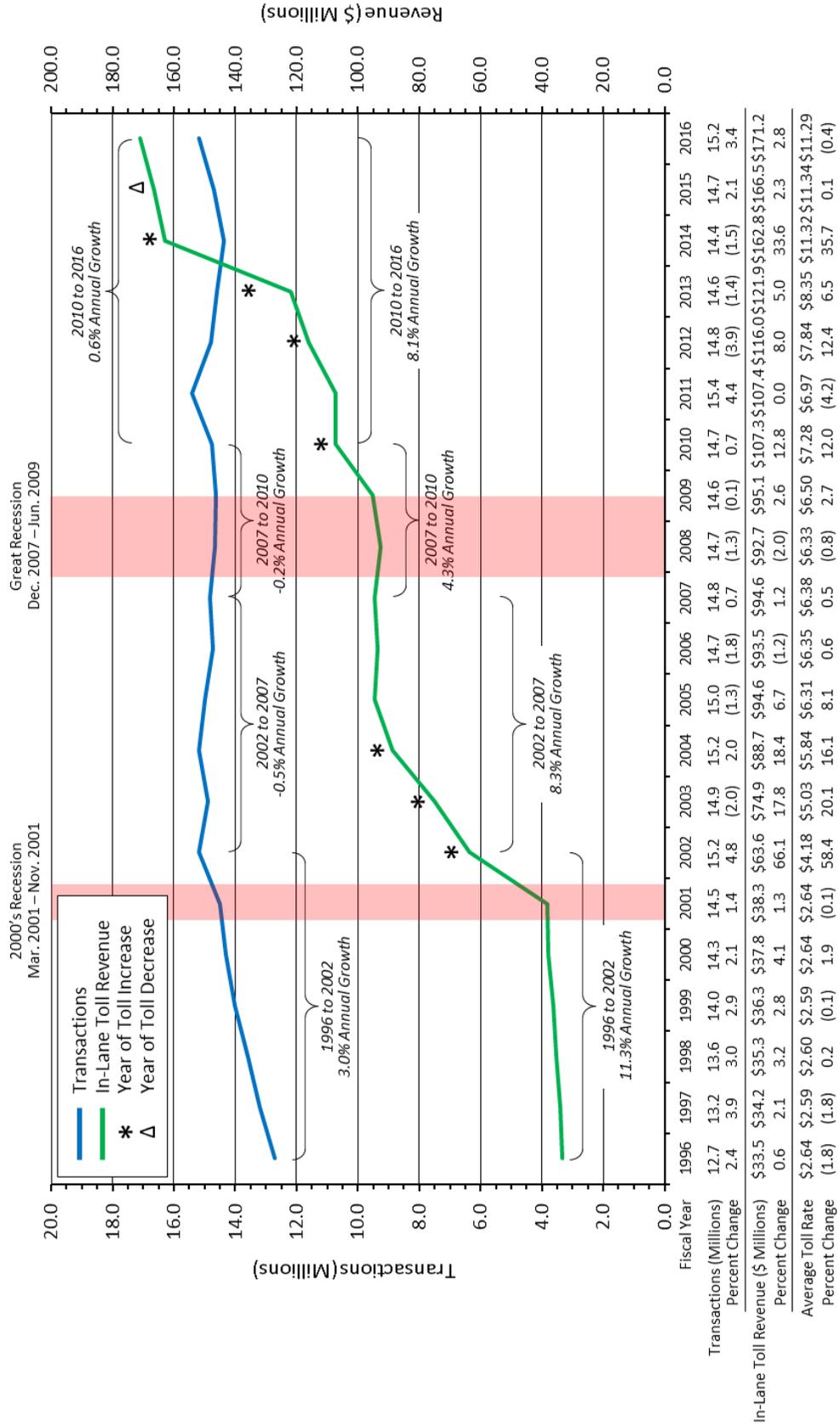
Revenue increased steadily between FY 1996 and FY 2002 at an average annual rate of 13.0 percent. Over the next three years, a series of toll increases resulted in an average annual increase of about 25 percent per year. Revenues then remained relatively stable between FY 2004 and FY 2008, at about \$3.8 million. After experiencing a large dip between FY 2008 and FY 2009 as a result of the decrease in transactions associated with the Great Recession, revenue has steadily grown reaching \$11.2 million in FY 2015. This growth in revenue has been aided by a series of toll increases indicated by the increases in average toll rate, leading to an average annual growth rate of 33.9 percent between FY 2010 and FY 2015. Toll revenue on the Hatem Bridge increased by 5.4 percent in FY 2016. The increase was primarily the result of shifts in passenger car method of payment from the discount plan to E-ZPass® (as previously discussed) and strong growth in commercial vehicle transactions. Commercial vehicle transactions increased by 14.6 percent in FY 2016, with revenue increasing by 7.4 percent. Some of this increase, as well as the differential in growth between commercial vehicle transactions and revenue, are related to the 30 percent reduction in 3- and 4-axle commercial vehicle toll rates. Similar commercial vehicle growth levels also occurred in FY 2015. Therefore, some of the increased commercial vehicle traffic, specifically in the E-ZPass® payment category and in 5-axle trucks, is likely the result of the ongoing economic recovery. Overall average annual In-Lane Toll Revenue growth was 11.7 percent between FY 1996 and FY 2016, with the primary growth in revenues occurring as a result of a series of toll increases implemented during the last five years.

2.2.3 John F. Kennedy Memorial Highway

Historical transactions and revenue for the John F. Kennedy Memorial Highway (JFK) between FY 1996 and FY 2016 are provided in Figure 2-2. Between FY 1996 and FY 2002, transactions grew at an average annual rate of 3.0 percent, despite the 2001 recession. Between FY 2002 and FY 2007, transactions remained at about 15.0 million, but declined in FY 2008 by 1.3 percent and again in FY 2009 by 0.1 percent, as a result of the impacts of the Great Recession. Transactions then recovered and reached a peak of 15.4 million in FY 2011 despite the FY 2010 toll increase. The toll increases in FY 2012 through FY 2014 were likely the impetus for the annual decreases in transactions to 14.4 million in FY 2014. The number of transactions increased in FY 2015 to 14.7 million, a growth of 2.1 percent over FY 2014. Transactions on the JFK increased in FY 2016 by 3.4 percent, with the majority of growth occurring in all E-ZPass® payment categories, but primarily Maryland E-ZPass®. In addition to the roughly 200,000 transaction reduction in other methods of payment, the JFK netted an additional 400,000 E-ZPass® transactions, with over 300,000 more Maryland E-ZPass® transactions. These method of payment shifts and increases in transactions are most likely the result of the FY 2016 toll rate decrease, especially considering long-term historical growth rates. Notwithstanding individual years of robust growth over the last 20 years, average annual transaction growth was 0.9 percent per year between FY 1996 and FY 2016. Between FY 2013 and FY 2016, average annual transaction growth was 1.4 percent per year.

Revenue increased steadily between FY 1996 and FY 2002 at an average annual rate of 11.3 percent. Over the next three years, a series of toll increases resulted in an average annual revenue increase of 32.3 percent per year. Revenues then increased to \$94.6 million in FY 2005 and generally remained at that level until FY 2009. This included a 2.0 percent decrease in FY 2008, most likely associated with the impacts of the Great Recession, and a 2.6 percent recovery in FY 2009. Since FY 2009, revenues

Figure 2-2
Historical Transactions and In-Lane Toll Revenue, FY 1996 through FY 2016
John F. Kennedy Memorial Highway



have grown steadily, reaching \$171.2 million in FY 2016. This growth in revenue has been aided by a series of toll increases indicated by the increases in average toll rate provided in the legend of Figure 2-2. The increases have led to an average annual growth rate of 9.2 percent between FY 2010 and FY 2015.

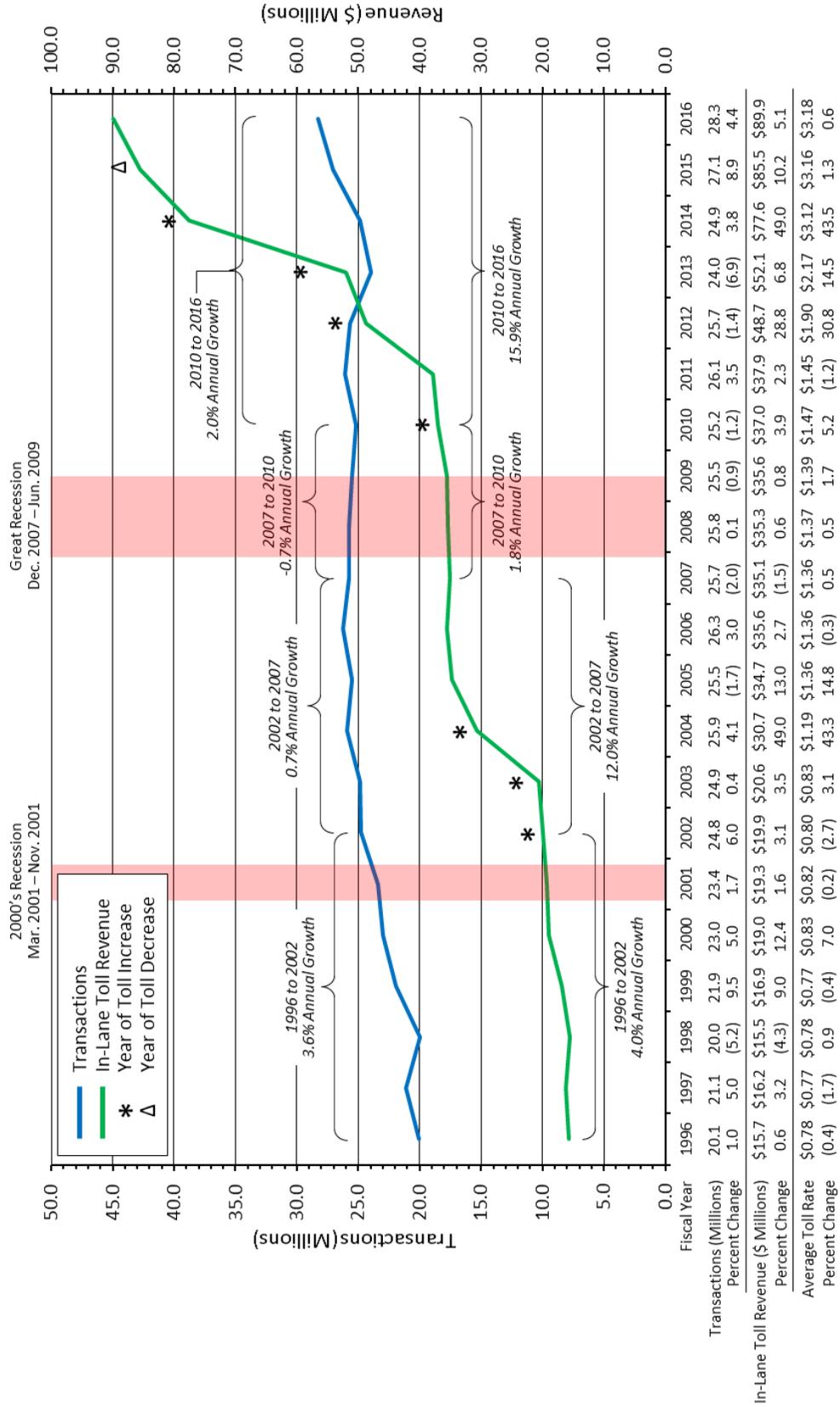
In FY 2016, toll revenues increased by 2.8 percent. The increase was primarily the result of shifts in passenger car method of payment (as discussed previously) and strong growth in commercial vehicle transactions. Commercial vehicle transactions increased by 4.5 percent in FY 2016, with revenue increasing by 4.7 percent. These represent an increase in commercial vehicle transactions and toll revenue growth rates compared to those of FY 2015, which were 3.0 percent and 3.5 percent, respectively. This increased commercial vehicle traffic may be the result of the FY 2016 toll reductions for trucks making frequent trips, as well as the ongoing economic recovery, especially on the JFK, which is a primary route for long-distance travel within the Boston-New York-Washington corridor. Overall, average annual In-Lane Toll Revenue growth was 8.5 percent per year between FY 1996 and FY 2016, with the primary growth in revenues occurring between FY 2001 and FY 2004 and during the last five years.

2.2.4 Baltimore Harbor Tunnel

Historical transactions and revenue for Baltimore Harbor Tunnel between FY 1996 and FY 2016 are shown in Figure 2-3. Transactions increased every year between FY 1996 and FY 2002, except for a slight one-year decrease in FY 1998. This was despite the impacts of the 2001 recession and three toll increases. The average annual growth rate for this period was 3.6 percent. Transactions declined in FY 2005 by 1.7 percent and in FY 2007 by 2.0, possibly as a result of the considerable increases in the average price of gasoline that occurred in those years. Even with these setbacks, transactions reached a pre-recession peak of 25.8 million in FY 2008, before declining by 0.9 percent in FY 2009 in the wake of the Great Recession. Despite a 1.2 percent decrease in FY 2010, transaction growth recovered in FY 2011 and reached 26.1 million. Transactions of 27.1 million were recorded in FY 2015, an increase of 8.9 percent over FY 2014. This considerable increase is in part the result of traffic diversions from deck rehabilitation on I-95 south of the Fort McHenry Tunnel. Transactions on the Baltimore Harbor Tunnel increased in FY 2016 by 4.4 percent. Almost all of this growth occurred in Maryland E-ZPass® transactions. While commuter discount transactions decreased by more than 1.0 million, Maryland E-ZPass® transactions increased by almost 1.4 million. This may reflect the preference of less frequent commuter discount program customers to save the time of purchasing a new plan every 45 days in light of the lower E-ZPass® toll rates following the FY 2016 toll decrease. Full fare E-ZPass® also increased by over 500,000 transactions in FY 2016. On average, transactions at the Baltimore Harbor Tunnel have exhibited long-term growth of 1.7 percent per year between FY 1996 and FY 2016, and a 5.6 percent short-term growth rate between FY 2013 and FY 2016.

Annual revenue increased each year between FY 1996 and FY 2002, aside from a one-year decline from FY 1997 to FY 1998. The average annual increase during this period was 4.0 percent. Over the next five years, a series of toll increases resulted in an average annual revenue increase of 12.0 percent per year. Between FY 2007 and FY 2010, toll revenues increased from \$35.1 million to \$37.0 million, despite declines related to the impacts of the Great Recession. Since FY 2010, revenues have grown steadily to \$89.9 million in FY 2016, aided by a series of toll increases and the aforementioned traffic diversions. In FY 2016, toll revenues increased by 5.1 percent. The increase was primarily the result of shifts in passenger car method of payment (as discussed previously) and growth in commercial vehicle transactions. Commercial vehicle transactions increased by 7.8 percent in FY 2016, with revenue increasing by 8.4 percent, most likely as a result of the ongoing economic

Figure 2-3
Historical Transactions and In-Lane Toll Revenue, FY 1996 through FY 2016
Baltimore Harbor Tunnel



recovery, lower fuel prices, and the FY 2016 toll reductions for trucks with a high trip frequency. The average annual growth rate in revenue between FY 2013 and FY 2016 was 5.0 percent. Overall average annual In-Lane Toll Revenue growth was 9.1 percent per year between FY 1996 and FY 2016, with the primary growth in revenues, resulting from toll increases occurring between FY 2001 and FY 2004 and during the last five years.

2.2.5 Fort McHenry Tunnel

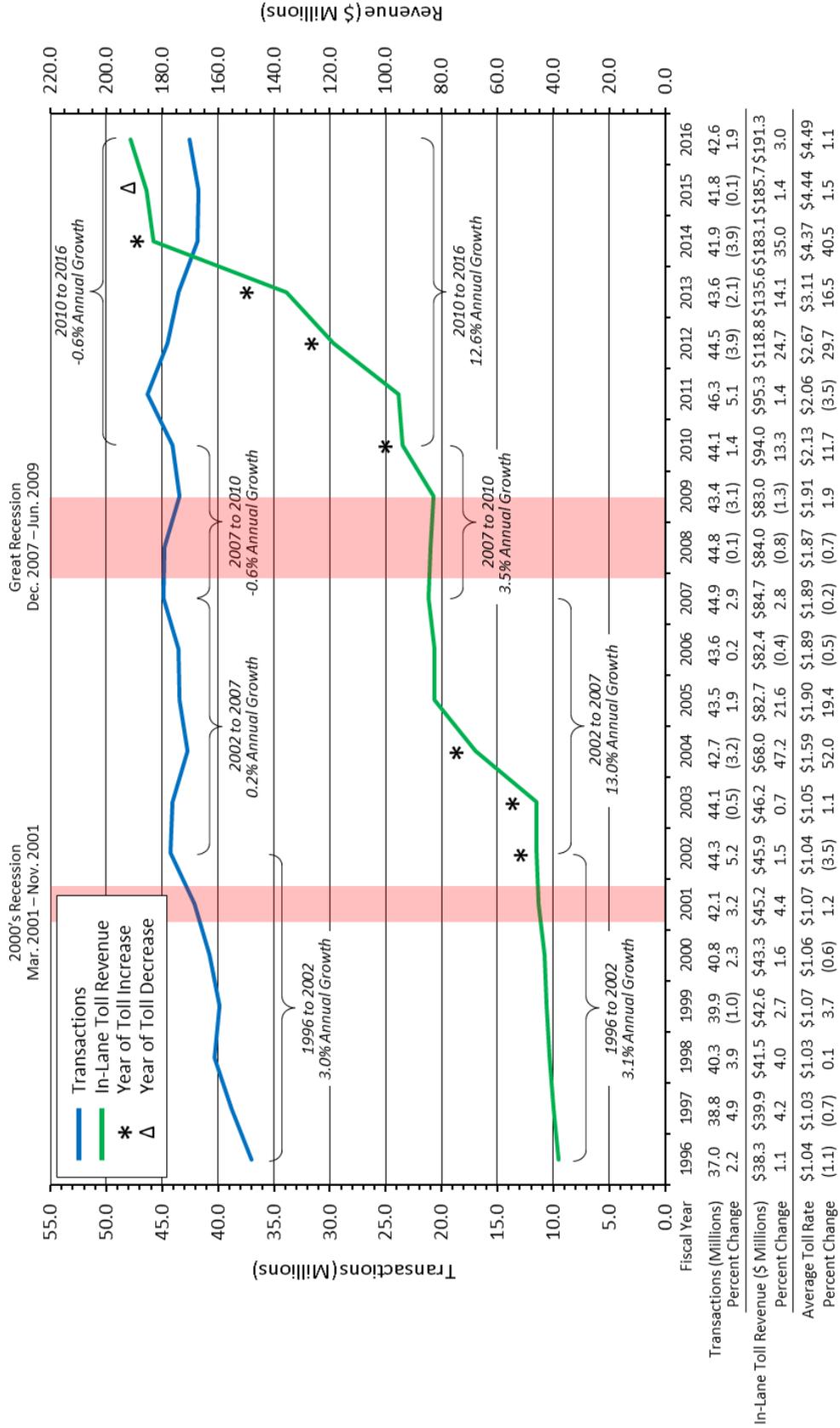
Historical transactions and revenue for the Fort McHenry Tunnel between FY 1996 and FY 2016 are provided in Figure 2-4. Transactions increased each year between FY 1996 and FY 2002 at an average annual rate of 3.0 percent per year despite the 2001 recession, aside from a 1.0 percent decrease in FY 1999. In FY 2003 and FY 2004, transactions decreased to 42.7 million, possibly due to the impacts of the FY 2002 to FY 2004 toll increases. By FY 2007, transactions had recovered to FY 2002 levels. However, transactions then declined in FY 2008 by 0.1 percent and again in FY 2009 by 3.1 percent, as a result of the impacts of the Great Recession. Transactions then recovered and reached a peak in FY 2011 at 46.3 million notwithstanding the FY 2010 toll increase. The toll increases in FY 2012 through FY 2014 were likely the primary impetus resulting in the decreases in transactions to 41.9 million by FY 2014. Transactions in FY 2015 declined slightly to 41.8 million, the result of the deck rehabilitation on I-95 south of the tunnel. Transactions at the Fort McHenry Tunnel increased in FY 2016 by 1.9 percent. Similar to the FY 2016 growth patterns at the Baltimore Harbor Tunnel, almost all of the growth at the Fort McHenry Tunnel occurred in Maryland E-ZPass® transactions. Maryland E-ZPass® transactions increased by over 1.7 million in FY 2016, while commuter discount transactions decreased by almost 1.2. As previously noted, this shift may reflect the preference of less frequent commuter discount program customers to save the time of purchasing a new plan every 45 days in light of the lower E-ZPass® toll rates following the FY 2016 toll decrease. Overall, despite individual years of robust growth over the last 20 years, transactions grew by a modest average of 0.7 percent per year between FY 1996 and FY 2016. However, in the last three years (FY 2013 and FY 2016), transactions declined by 0.7 percent per year.

Revenue has grown in 16 of the last 20 years, with minor declines in FY 2006, FY 2008, and FY 2009. Between FY 1996 and FY 2002, revenues grew at an average annual rate of 3.1 percent. Over the next three years, a series of toll increases resulted in an average annual revenue increase of 14.6 percent per year. Revenues then increased to \$82.7 million in FY 2005 and remained at about that level until FY 2009. Since FY 2010, aided by a series of toll increases, revenues have grown steadily and have reached \$191.3 million in FY 2016. Toll revenues increased by 3.0 percent in FY 2016 over the prior year. Almost all of this growth was driven by a 6.8 percent growth in commercial vehicle toll revenue. Supported by a 6.5 percent growth in commercial vehicle transactions, the FY 2016 growth in revenue is most likely a result of the ongoing economic recovery, lower fuel prices, and the FY 2016 toll reductions for trucks with a high trip frequency. Between FY 2013 and FY 2016, the average annual revenue growth rate was 12.2 percent. Overall average annual In-Lane Toll Revenue growth was 8.4 percent per year between 1996 and 2016.

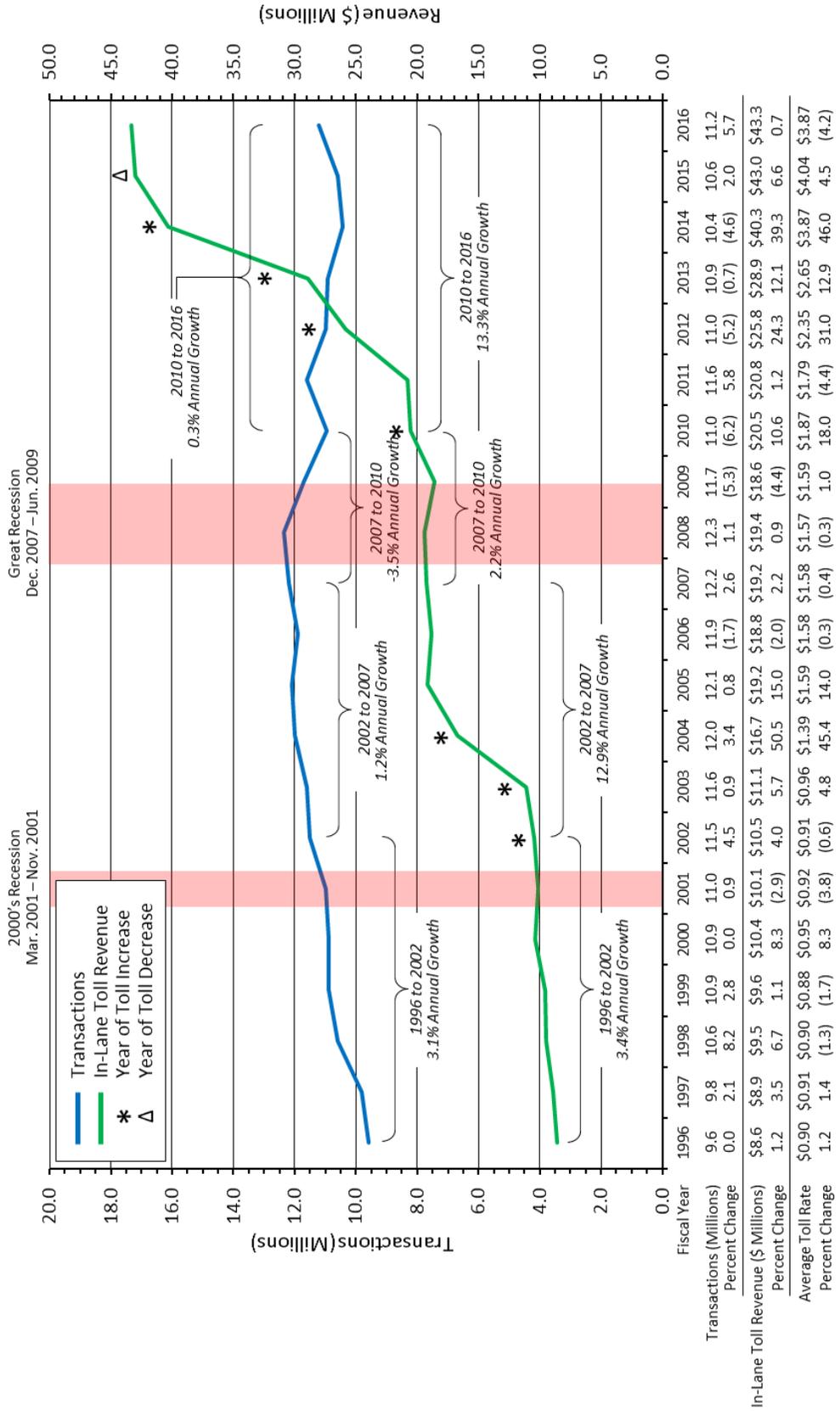
2.2.6 Francis Scott Key Bridge

Historical transactions and revenue for the Francis Scott Key Bridge between FY 1996 and FY 2016 are provided in Figure 2-5. Transactions increased between FY 1996 through FY 2005 at an average annual rate of 2.6 percent. Following a decrease of 1.7 percent in FY 2006, transactions peaked in FY 2008 at 12.3 million. Transactions then declined in FY 2009 by 5.3 percent as a result of the impacts of the Great Recession. Following this, transactions decreased again in FY 2010 by 6.2 percent, most likely due to a combination of the lingering impacts of the Great Recession and the impacts of the FY

Figure 2-4
Historical Transactions and In-Lane Toll Revenue, FY 1996 through FY 2016
Fort McHenry Tunnel



**Figure 2-5
Historical Transactions and In-Lane Toll Revenue, FY 1996 through FY 2016
Francis Scott Key Bridge**



2010 toll increase. Transactions recovered slightly in FY 2011 before decreasing each year from FY 2012 through FY 2014. The toll increases in FY 2012 through FY 2014 were likely

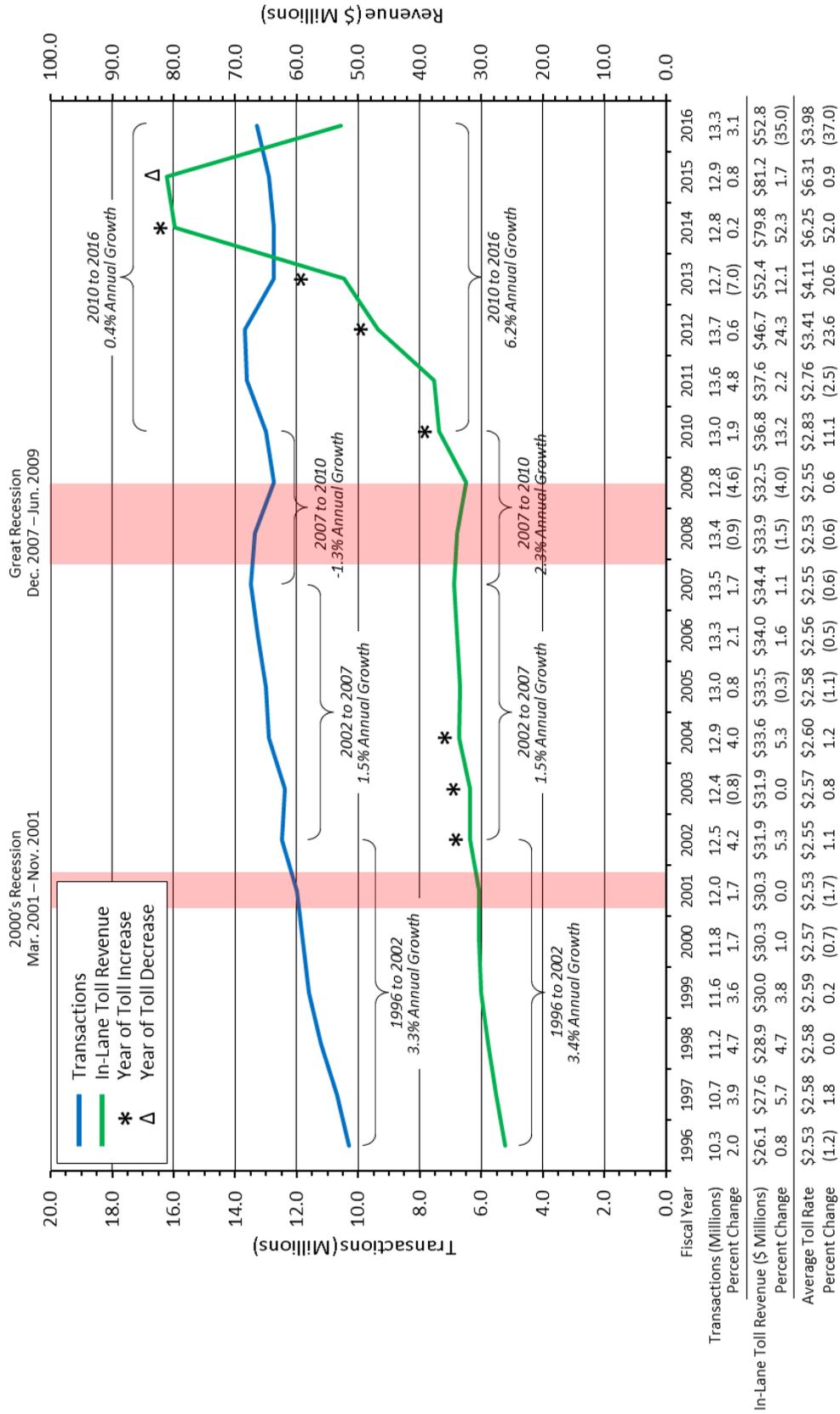
the primary impetus for the declines. Transactions increased by 2.0 percent to 10.6 million in FY 2015 and by 5.7 percent in FY 2016. Unlike the FY 2016 growth patterns on the other Central Region facilities, the primary growth on the Francis Scott Key Bridge occurred in the commuter discount program. The facility experienced an increase of 380,000 commuter discount transactions in FY 2016. While this accounts for over two-thirds of the growth in transactions, it is not enough to suggest that all of the reductions in commuter discount program transactions at the other Central Region facilities are due to shifts to the Francis Scott Key Bridge. Maryland E-ZPass® transactions also increased by roughly 170,000 transactions in FY 2016. Overall, transactions grew at an average annual rate of 0.8 percent per year between FY 1996 and FY 2016, primarily due to a decline in transactions between FY 2008 and FY 2014. Excluding those years, average growth on the Francis Scott Key Bridge was 2.3 percent per year. Over the past three years (FY 2013 through FY 2016), transactions have increased by an average of 0.9 percent per year.

In-Lane Toll Revenue on the Francis Scott Key Bridge has increased each year between FY 1996 and FY 2005 except for a one-year drop in FY 2001. Between FY 1995 and FY 2002, revenues grew at an average annual rate of 3.1 percent. Over the next three years, a series of toll increases resulted in an average annual increase of 18.2 percent per year. Revenues then increased to \$19.2 million in FY 2005 and remained at about that level until FY 2008. After experiencing a 4.4 percent decrease in FY 2009 as a result of the impact of the Great Recession, revenues have grown steadily reaching \$43.3 million in FY 2016. The recent growth in In-Lane Toll Revenue is primarily due to a series of toll increases. Revenue grew at an average annual rate of 3.6 percent between FY 2014 and FY 2016. Despite significant increases in commuter discount program and Maryland E-ZPass® transactions, total toll revenue growth in FY 2016 was 0.7 percent. Moreover, unlike the other Central Region facilities, the Francis Scott Key Bridge did not experience large increases in commercial vehicle traffic in FY 2016. Instead, toll revenue from commercial vehicles grew by 0.9 percent, comparable to passenger car growth rates. The differential between transaction and revenue growth is due to the shift of transactions from cash and video to Maryland E-ZPass®, as well as the actual toll reduction. Overall average annual In-Lane Toll Revenue growth has been 8.4 percent per year between FY 1996 and FY 2016.

2.2.7 William Preston Lane Jr. Memorial (Bay) Bridge

Historical transaction and revenue data for the William Preston Lane Jr. Memorial (Bay) Bridge between FY 1996 and FY 2016 are provided in Figure 2-6. Transactions increased each year from FY 1996 to FY 2007, at an average of 2.5 percent per year, except for a one-year decrease between FY 2002 and FY 2003, likely related to the toll increase that year. Transactions declined in FY 2008 by 0.9 percent and again in FY 2009 by 4.6 percent as a result of the Great Recession. Transactions then recovered and reached a peak of 13.7 million in FY 2012 despite a toll increase. The toll increases in FY 2012 through FY 2014 were likely the primary impetus for the decline in transactions to 12.8 million in FY 2014. Transactions increased by 0.8 percent to 12.9 million in FY 2015. Transactions at the Bay Bridge increased in FY 2016 by 3.1 percent following a 53.7 percent reduction in the Maryland E-ZPass® toll rate and a 33.3 percent reduction in all other toll categories. Almost all of the growth on this facility occurred in Maryland E-ZPass® transactions. Of the approximately 560,000 increase in E-ZPass® transactions, roughly 240,000 are estimated to have shifted from the commuter discount program. As previously noted, this may reflect the preference of less frequent commuter discount

Figure 2-6
Historical Transactions and In-Lane Toll Revenue, FY 1996 through FY 2016
William Preston Lane Jr. Memorial (Bay) Bridge



program customers to save the time of purchasing a new a plan every 45 days in light of the lower E-ZPass® toll rates following the FY 2016 toll decrease. Between FY 2013 and FY 2016, transactions increased by an average of 1.6 percent, while over the last 20 years (FY 1996 to FY 2016) transactions grew by an average of 1.3 percent per year between FY 1996 and FY 2015.

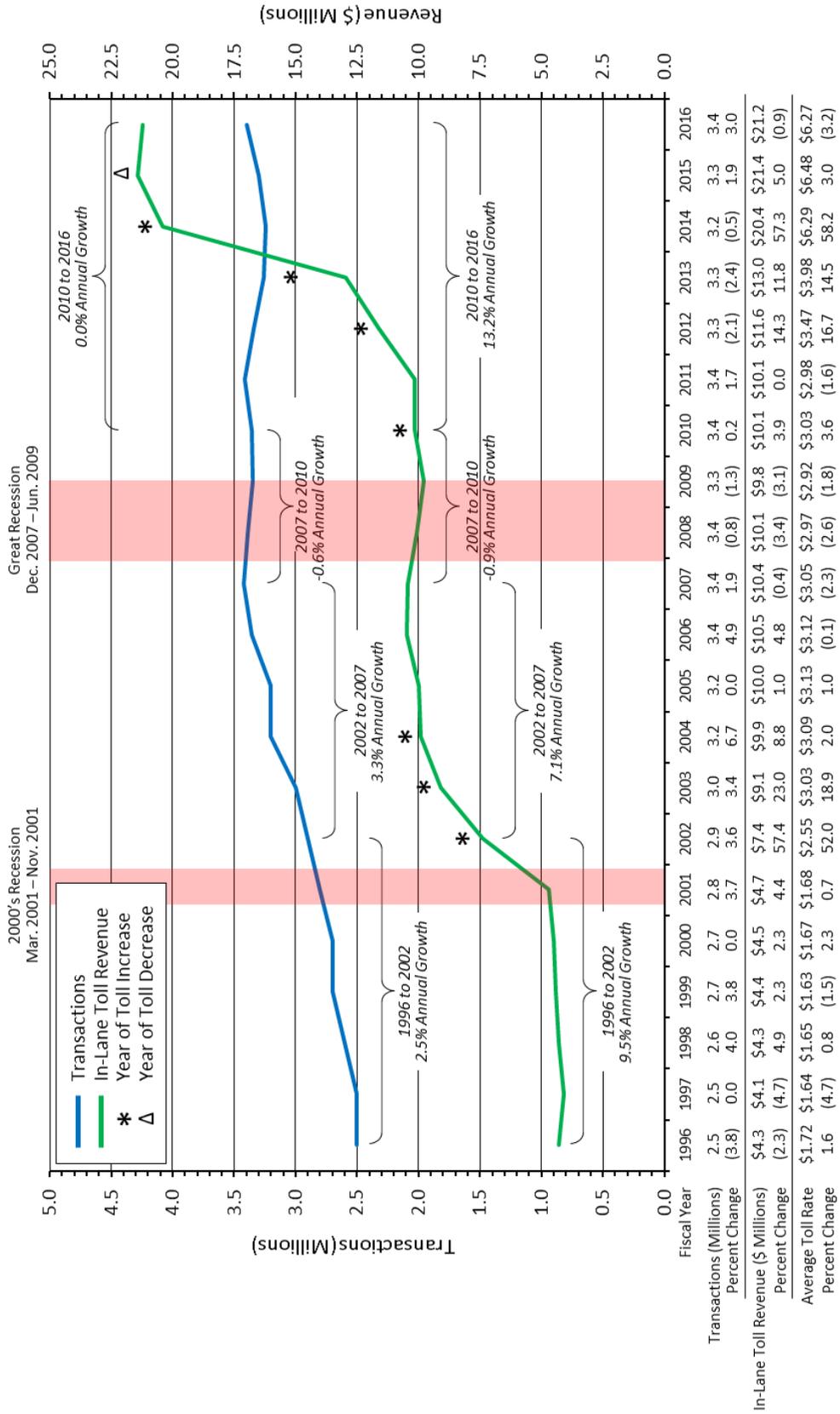
In-Lane Toll Revenue has increased each year between FY 1996 and FY 2003 except between FY 2000 and FY 2001 and between FY 2002 and FY 2003, where no growth occurred. Between FY 1996 and FY 2002, revenues grew at an average annual rate of 3.4 percent. Over the next three years, a series of toll increases had limited impacts on toll revenue, with an average annual increase of 3.5 percent per year occurring in those years. After a small decrease of 0.3 percent in FY 2005, most likely due to the increases in gasoline prices that year, revenue continued to grow at about 1.3 percent through FY 2007. Annual decreases in FY 2008 and FY 2009 were most likely related to the impacts of the Great Recession. Since FY 2009, revenues have grown steadily due, in part, to a series of toll increases, reaching \$81.2 million in FY 2015. Despite the increases in Maryland E-ZPass® transactions, total toll revenue decreased by 35.0 percent in FY 2016. This is due to the magnitude of the toll decrease at the Bay Bridge. While other facilities experienced decreases in Maryland E-ZPass® or 3- and 4-axle commercial vehicle toll rates only, Maryland E-ZPass® toll rates were reduced by 53.7 percent and all other toll rates were reduced by 33 percent on the Bay Bridge. This, coupled with the shift in traffic from the commuter discount program to Maryland E-ZPass®, contributed to the decrease in revenue over FY 2015. Due primarily to the FY 2016 toll reductions, revenues on the Bay Bridge are now at FY 2013 levels. Between FY 2013 and FY 2016, revenue has grown at an average annual rate of 2.5 percent. Overall, In-Lane Toll Revenue has grown by 3.6 percent per year between FY 1996 and FY 2016.

2.2.8 Harry W. Nice Memorial Bridge

Historical transaction and revenue data for the Harry W. Nice Memorial Bridge between FY 1996 and FY 2016 are provided in Figure 2-7. Transactions declined in FY 1996 and FY 1997, before recovering and steadily growing through FY 2007. Between FY 1997 and FY 2007, transactions grew at an average annual rate of 3.1 percent, despite the 2001 recession and three toll increases. FY 2007 represented the peak transaction level of 3.4 million. Transactions declined in FY 2008 by 0.8 percent and in FY 2009 by 1.3 percent, because of the impacts of the Great Recession. The toll increases in FY 2012 through FY 2014 were likely the primary impetus for the decline in transactions to 3.2 million through FY 2014. Transactions increased by 1.9 percent to 3.3 million in FY 2015 and in FY 2016 by 3.0 percent, with growth occurring in commuter discount and E-ZPass® transactions. Average annual transaction growth was 1.5 percent per year between FY 1996 and FY 2016, although in the last three years (FY 2013 through FY 2016) they increased by a lower average of 1.0 percent per year.

In-Lane Toll Revenue totals for the Harry W. Nice Memorial Bridge display a similar pattern of growth to those of transactions between FY 1996 and FY 2001, decreasing in both FY 1996 and FY 1997, before growing steadily through FY 2006. Between FY 1996 and FY 2002, revenues grew at an average annual rate of 9.5 percent. Over the next three years, a series of toll increases resulted in an average annual increase of 28.2 percent. As a result of the decreases in transactions related to the Great Recession, revenues declined between FY 2007 and FY 2010 by an average of 0.9 percent per year. Revenues have recovered in recent years. Aided by series of toll increases, revenues have grown to \$21.2 million in FY 2016, representing an average annual growth rate since FY 2014 of 1.9 percent.

Figure 2-7
Historical Transactions and In-Lane Toll Revenue, FY 1996 through FY 2016
Harry W. Nice Memorial Bridge



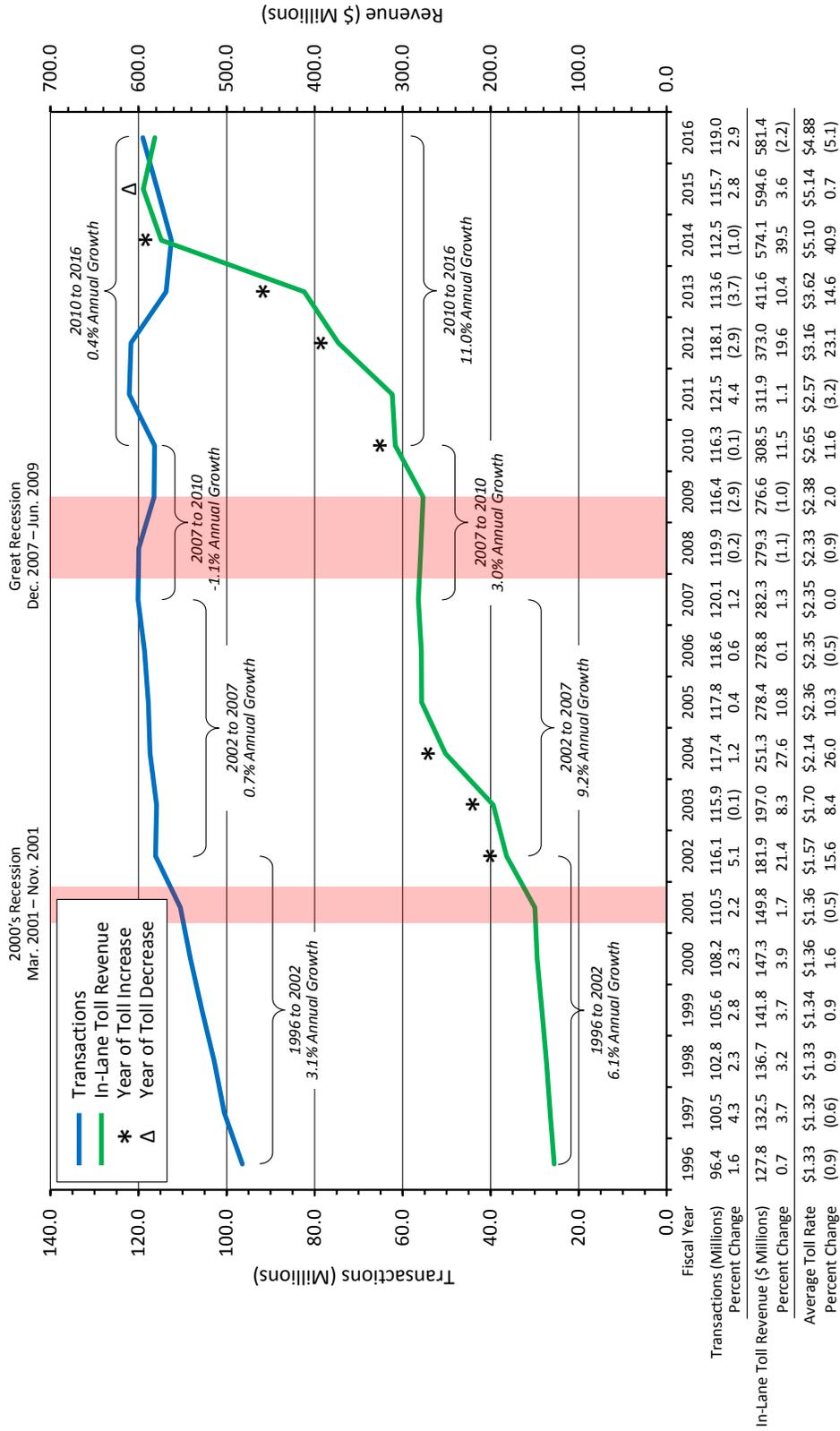
Despite the increases in commuter discount and Maryland E-ZPass® transactions, total toll revenues decreased by 0.9 percent in FY 2016. This is due primarily to the shift of transactions from cash to Maryland E-ZPass®, due to the toll reduction. Overall average annual In-Lane Toll Revenue growth was 8.3 percent per year between 1996 and 2016, with the primary growth in revenues occurring between FY 2002 and FY 2004 and during the last five years.

2.2.9 MDTA Legacy Facilities Total

Transaction and revenue data for the legacy system between FY 1996 and FY 2016 are provided in Figure 2-8. Transactions increased each year between FY 1996 and FY 2007 at an average annual rate of 2.0 percent, except for a very minor decline between FY 2002 and FY 2003, possibly related to the toll increase that year. However, following this steady growth, transactions declined between FY 2007 and FY 2010 by an average of 1.1 percent per year, most likely due to the impacts of the Great Recession and the FY 2010 toll increase. Transactions recovered in FY 2011, reaching a system high of 121.5 million, before decreasing annually through FY 2014. The decline in transactions through FY 2014 to 112.5 million were likely the result of successive toll increases implemented each year from FY 2012 through FY 2014. Transactions increased by 2.8 percent to 115.7 million in FY 2015. The higher level of growth in FY 2015 is most likely due to the delayed recovery from the Great Recession and other short-term factors, such as the historically low gas prices in FY 2015. There may also be some recovery in FY 2015 from the impacts of the toll increases in FY 2012 through FY 2014, as some motorists returned to the legacy facilities. In addition to the positive impacts of the FY 2016 toll reduction, FY 2016 transaction growth continued to be impacted by many of the same economic factors occurring in FY 2015, such as the economic recovery and lower gasoline prices. On average, the MDTA legacy facility transactions increased by 2.9 percent in FY 2016. As discussed previously, this includes the estimated impacts of the additional day in the leap year (0.2 percent), the toll rate reduction (0.3 percent), gas price reductions (0.50-0.75 percent) and normal growth (1.65-1.90 percent). Average annual transaction growth for the legacy facilities on a system-wide basis was 1.1 percent per year between FY 1996 and FY 2016.

Systemwide In-Lane Toll Revenue for the legacy facilities increased each year between FY 1996 and FY 2016, except in FY 2008, FY 2009 and FY 2016. Between FY 1996 and FY 2002, revenues grew at an average annual rate of 6.1 percent. Over the next three years, during which a series of toll increases were implemented, revenue increased at an average of 18.8 percent per year. As a result of the decreases in transaction growth related to the Great Recession, revenues declined in FY 2008 by 1.1 percent and again in FY 2009 by 1.0 percent. Revenues have recovered in recent years, aided by a series of toll increases. Revenues increased by 3.5 percent to \$594.6 million in FY 2015, resulting in an average annual growth rate of 14.0 percent per annum since FY 2010. In FY 2016, toll revenue decreased by 2.2 percent following the FY 2016 select toll rate reductions. The majority of this decrease was due to the toll rate decreases on the Bay Bridge. The Northern and Central Regions, where trips tend to be more commuter- and business-related than discretionary, were able to offset the losses in toll revenue due to the toll decrease with additional revenues generated by shifts in method of payment. Overall, annual In-Lane Toll Revenue growth has averaged 7.7 percent per year between FY 1996 and FY 2016.

Figure 2-8
Historical Transactions and In-Lane Toll Revenue, FY 1996 through FY 2016



Legacy facility In-Lane Toll Revenue has increased significantly more than the growth in transactions because of the adjustments to toll rates in recent years. Had these toll rate adjustments not been made, it is reasonable to assume that transactions would have been higher, while growth in In-Lane Revenues would have more closely tracked the rate of growth in transactions. Long-term historical growth, based on transaction and revenue data in those years without toll rate increases or economic downturns, is estimated to be roughly 0.5 percent per year.

2.2.10 Vehicle Class Distribution

Table 2-6 presents a summary of the distribution of annual transactions by vehicle class for FY 2016 for each of the legacy facilities and on a total system basis. Two-axle vehicles, which include passenger cars, motorcycles, vans and SUVs, comprised 92.9 percent of all transactions. Vehicles with three-or-more-axles, which include trucks, buses and other commercial vehicles, accounted for the remaining 7.1 percent. The John F. Kennedy Memorial Highway (I-95) had the greatest percentage of commercial vehicle transactions with 11.6 percent, while the Baltimore Harbor Tunnel had the lowest percentage with 2.2 percent of total transactions.

2.2.11 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®. Toll collection through E-ZPass® provides faster toll processing and decreased collection costs and leakage rates over the alternative video and cash options. As such, increases in E-ZPass® market share represent potential increases in total paid (net) revenues.

Table 2-7 provides a concise summary of FY 2016 transactions by method of payment. They are shown individually for each of the seven legacy facilities, as well as on a total system basis. E-ZPass® transactions accounted for 71.9 percent of all transactions. Of these, 66.1 percent were made by Maryland E-ZPass® customers, including in-state E-ZPass® customers, commuter plans, shopper plans and Hatem Bridge plans. In terms of individual facilities, the Thomas J. Hatem Memorial Bridge had the greatest percentage of E-ZPass® customers at 92.5 percent of total transactions, primarily due to the Hatem Bridge Toll Plans. The Hatem Bridge Toll Plans provide local residents and commuters with greater access to local businesses and employment centers while also providing the convenience of E-ZPass® and significant travel cost savings. The Harry W. Nice Memorial Bridge had the smallest percentage of transaction made by E-ZPass® customers at 54.9 percent. On a total system basis, cash and video transactions accounted for a combined 25.4 percent of all transactions. Transactions made by non-revenue vehicles accounted for 1.3 percent of all transactions, while violations accounted for 1.5 percent.

While Table 2-7 presents a snapshot of the FY 2016 E-ZPass® market share, Figure 2-9 provides a summary for each of the seven legacy facilities and for the system as a whole from FY 2010 through August 2016 (FY 2017).

**Table 2-6
Vehicle Class Distribution for the MDTA Legacy Facilities**

Vehicle Class	FY 2016 Transactions (000) ⁽¹⁾										Total	
	John F. Kennedy Mem. Highway	Thomas J. Hatem Mem. Bridge	Baltimore Harbor Tunnel	Francis Scott Key Bridge	Fort McHenry Tunnel	William P. Lane, Jr. Mem. (Bay) Bridge	Harry W. Nice Mem. Bridge					
2-Axle	13,401	4,880	27,653	10,185	38,876	12,398	3,172					110,565
Percent of Total	88.4	95.9	97.8	91.0	91.2	93.4	93.8					92.9
3+-Axle	1,762	210	633	1,010	3,763	874	209					8,462
Percent of Total	11.6	4.1	2.2	9.0	8.8	6.6	6.2					7.1
Total	15,163	5,090	28,287	11,195	42,639	13,272	3,381					119,027
Percent of Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0					100.0

Source: MDTA

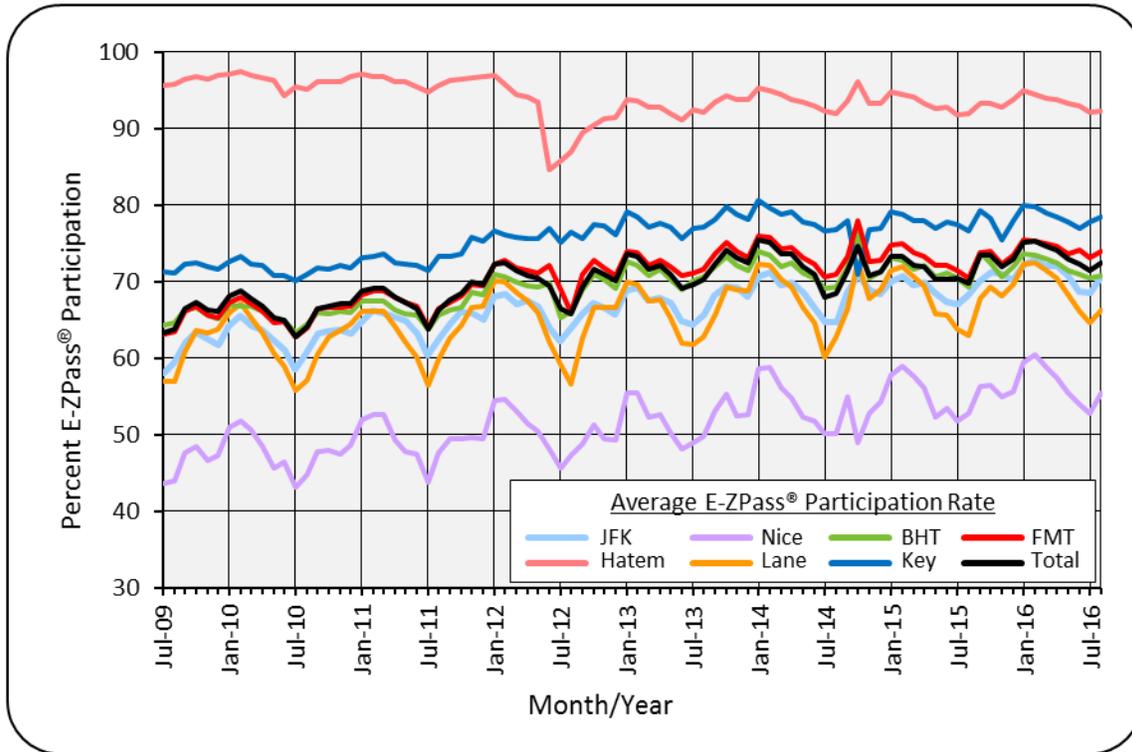
⁽¹⁾ Includes violation transactions.

**Table 2-7
Method of Payment Distribution for the MDTA Legacy Facilities**

Method of Payment	FY 2016 Transactions (000)											Total	
	John F. Kennedy Mem. Highway	Thomas J. Hatem Mem. Bridge	Baltimore Harbor Tunnel	Francis Scott Key Bridge	Fort McHenry Tunnel	William P. Lane, Jr. Mem. (Bay) Bridge	Harry W. Nice Mem. Bridge						
E-ZPass													
Commuter / Shopper / Hatem Plans	864	4,168	9,018	5,186	12,078	3,531	801						35,646
Percent of Total	5.7	81.9	31.9	46.3	28.3	26.6	23.7						29.9
MDTA (2-axle only)													
Percent of Total	1,897	183	5,643	2,012	7,535	3,184	425						20,879
	12.5	3.6	20.0	18.0	17.7	24.0	12.6						17.5
Non-MDTA (2-axle and 3+ axle)													
Percent of Total	7,823	358	5,330	1,285	11,366	2,219	630						29,011
	51.6	7.0	18.8	11.5	26.7	16.7	18.6						24.4
Total E-ZPass	10,583	4,709	19,992	8,483	30,980	8,934	1,855						85,536
Percent of Total	69.8	92.5	70.7	75.8	72.7	67.3	54.9						71.9
Cash/Video													
2-axle and 3+axle	4,318	299	7,408	2,229	10,475	4,048	1,463						30,240
Percent of Total	28.5	5.9	26.2	19.9	24.6	30.5	43.3						25.4
Non-Revenue													
Official Duty	100	47	438	286	472	124	33						1,499
Percent of Total	0.7	0.9	1.5	2.6	1.1	0.9	1.0						1.3
Violations													
Violations	162	35	449	197	713	166	31						1,752
Percent of Total	1.1	0.7	1.6	1.8	1.7	1.2	0.9						1.5
Total	15,163	5,090	28,287	11,195	42,639	13,272	3,381						119,027
Percent of Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0						100.0

Source: MDTA

Figure 2-9
E-ZPass® Market Share Trends



As shown, the E-ZPass® market share has gradually increased since FY 2010. In FY 2010, the E-ZPass® share ranged from a low of approximately 47 percent at the Harry W. Nice Memorial Bridge to a high of 96 percent at the Thomas J. Hatem Memorial Bridge. By Region, the E-ZPass® shares were 59 percent for the combined Southern Region facilities, 67 percent for the combined Central Region facilities and 71 percent for the Northern Region facilities. For all legacy facilities combined the E-ZPass® share was 66 percent. By FY 2016, the E-ZPass® market share for all legacy facilities combined increased to 72 percent and ranged from a low of 55 percent at the Harry W. Nice Memorial Bridge to a high of 93 percent at the Thomas J. Hatem Memorial Bridge. By Region, the E-ZPass® shares increased in the range of 1 to 2 percent. Approximately one-quarter of all transactions are made by customers that still preferred the cash option.

Section 3

Socioeconomic Review

3.1 Introduction

Vehicle trips on Maryland’s tolled facilities are made for various reasons, including, but not limited to: commuting, recreation, and commerce. Forecasting the expected traffic usage on the MDTA legacy toll facilities for the aforementioned reasons or otherwise is, to an extent, a function of identifying and evaluating projections of socioeconomic variables, such as population, employment, and income, as these types of variables generally explain the levels of and growth in commuting, commerce, etc. Economic forecasts are often seen as one of the key sources of uncertainty in the forecasting process. Consequently, for any traffic and revenue forecast, the economic growth forecast is one of the critical input data elements. The purpose of this chapter is to describe the historical and forecasted trends in the study area socioeconomics to provide the context for updating travel demand growth forecasts. The socioeconomic trends review and analysis entailed a comprehensive data collection effort that included gathering a host of different pertinent variables from a variety of public and private sources.

3.1.1 Review of Socioeconomic Historical Trends and Forecasts

An evaluation of socioeconomic trends and forecasts for the geographies along and surrounding the MDTA legacy toll facilities was conducted as part of the traffic forecasting update process. Such trends serve as inputs to the traffic growth analysis. Subsections below provide a summary of various demographic and economic measures reviewed for this study, including total population, employment, income, real gross regional product (GRP), inflation, and gasoline prices.

The various governmental agencies and private sector forecasting companies from which data were obtained included the United States Census Bureau, the United States Bureau of Labor Statistics (BLS), the United States Bureau of Economic Analysis (BEA), the Energy Information Administration (EIA), the MD State Data Center (MD SDC), Woods & Poole Complete Economic and Demographic Data Source (CEDDS) by Woods & Poole Economics, Inc., 2016 (Woods & Poole), and Moody’s Analytics.

In the following tables, the growth rates for the socioeconomic data are presented as compound average annual growth (CAAGR) percentages, reported in four- to six-year plus increments from 2000 through 2026, as applicable. In regards to the geographic coverage, this review started with the “big picture” at the US national and regional levels¹, and then focuses on the State of Maryland with sub-state groupings. County compositions of the respective geographic areas are included within footnotes.

¹ South Atlantic and Middle Atlantic, with the former for the most part consisting of the states of Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia, and D.C.; while the latter includes New Jersey, New York, and Pennsylvania.

3.2 National and Larger Regional Level

Historical Trends

3.2.1 Population

The historical population data were obtained from the United States Census Bureau (census years and intercensal estimates). As presented in Table 3-1 below, population in the United States grew from about 281 million in the year 2000 to over 321 million in 2015, an average growth rate of 0.9 percent per annum. Comparatively, the South Atlantic Region, which includes Maryland, grew at a faster pace of 1.3 percent, while the Mid-Atlantic Region lagged behind at a relatively fractional growth of 0.3 percent per year.

Table 3-1
Population – Historical Growth Trends

Area	Levels				Compound Average Annual Growth Rate (Percent)			
	2000	2005	2010	2015	2000 - 2005	2005 - 2010	2010 - 2015	2000 - 2015
United States	281,421,906	295,516,599	308,745,538	321,418,820	1.0%	0.9%	0.8%	0.9%
Mid Atlantic	39,671,861	40,234,574	40,872,375	41,556,307	0.3%	0.3%	0.3%	0.3%
South Atlantic	51,769,160	56,145,779	59,777,037	63,276,764	1.6%	1.3%	1.1%	1.3%

Source: U.S. Census data

3.2.2 Employment and Unemployment

The historical employment data were collected from the BEA. Employment trends presented in Table 3-2 are typically more volatile than population and more closely resemble overall economic cycles, with relatively higher growth during pre-recession years (2000-2005), followed by notable declines in the period encompassing a recession (2005-2010), and then a subsequent ongoing recovery (2010-2015). Overall, the South Atlantic Region experienced average annual growth in employment of about 0.6 percent between 2000 and 2015, while the Mid-Atlantic region experienced a slower overall growth of 0.2 percent per year, while the US as a whole grew by 0.3 percent per annum over the same time period.

Table 3-2
Employment – Historical Growth Trends

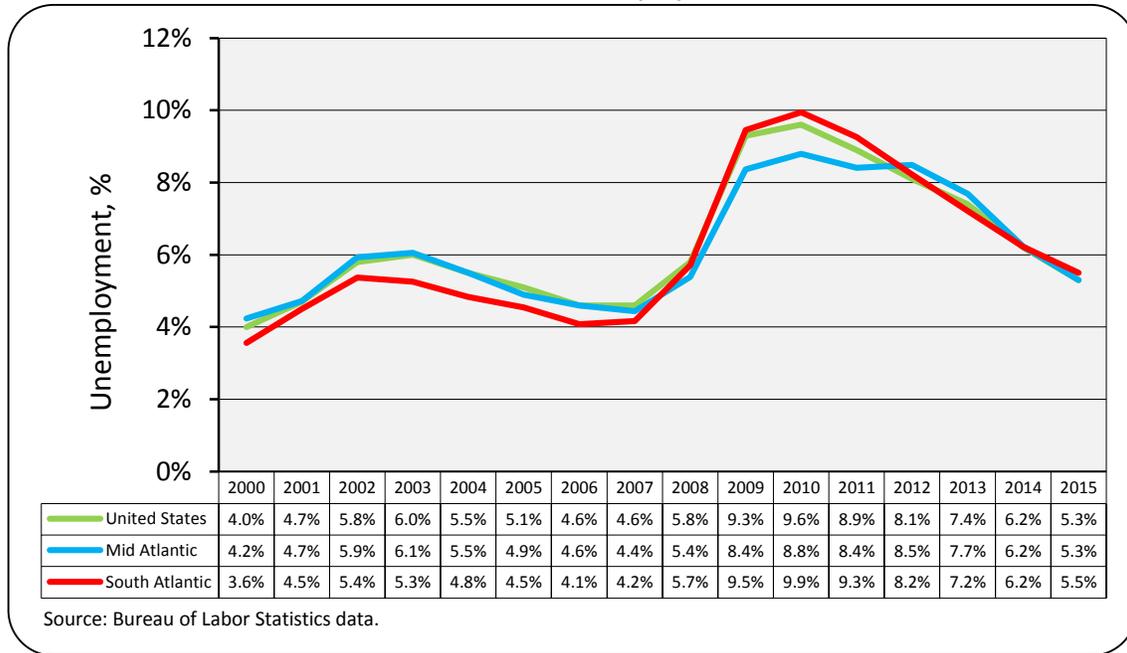
Area	Levels				Compound Average Annual Growth Rate (Percent)			
	2000	2005	2010	2015	2000 - 2005	2005 - 2010	2010 - 2015	2000 - 2015
United States	137,610,000	139,560,000	135,526,000	144,891,000	0.3%	-0.6%	1.3%	0.3%
Mid Atlantic	18,774,163	18,730,677	18,430,980	19,488,372	0.0%	-0.3%	1.1%	0.2%
South Atlantic	25,857,475	27,004,726	25,958,746	28,282,858	0.9%	-0.8%	1.7%	0.6%

Source: Bureau of Economic Analysis data for wage and salary employment, 2016

Figure 3-1 presents annual unemployment rates over the 2000 through 2015 period, based on BLS data. Unemployment rates for the South and Mid-Atlantic Regions have generally tracked fairly closely with those for the Nation, with the South Atlantic Region showing wider moves in both directions. Unemployment rates were all around 4 percent to 6 percent during the pre-recession years. The unemployment rates then spiked closer to 10 percent in 2009, and gradually decreased to near 5

percent by the end of 2015. The unemployment rate continued to improve during 2015 with the national rate at 5 percent as of September 2016.

Figure 3-1
Historical Trends in Unemployment Rate



3.2.3 Per Capita Real Income

Historical per capita real income is presented in Table 3-3. Nationwide, per capita annual income stood at almost \$44,000 (in 2009 constant dollars) in 2015, which represents real growth of 1.2 percent per annum during the 2000-2015 time period. The corresponding income level in the South Atlantic Region is about \$3,000 less than the national average, and has in the recent past grown at rates at or below 0.9 percent per annum, which is also below the national average. Per capita income levels are substantially higher in the Mid-Atlantic Region, averaging about \$7,000 per year more than the national average in 2015, and have also increased faster than the South Atlantic Region and the US average during the 2000-2015 time period.

Table 3-3
Income Per Capita (real, 2009 Dollars) – Historical Growth Trends

Area	Levels				Compound Average Annual Growth Rate (Percent)			
	2000	2005	2010	2015	2000 - 2005	2005 - 2010	2010 - 2015	2000 - 2015
United States	36,788	38,864	39,617	43,868	1.1%	0.4%	2.1%	1.2%
Mid Atlantic	41,634	43,895	46,600	50,726	1.1%	1.2%	1.7%	1.3%
South Atlantic	35,691	38,645	38,438	40,929	1.6%	-0.1%	1.3%	0.9%

Source: Moody's Analytics, September 2016 based on BEA data

3.2.4 Real Gross Domestic Product (GDP)

Another fundamental economic indicator that has bearing on traffic demand is gross domestic product (or gross state product/gross regional product, depending on the geographic focus). Historical real GDP is shown in Table 3-4. Based on the BEA data, national real gross domestic product has averaged 1.8 percent annually from 2000-2015. This is similar to the 1.6 percent per year growth rate in the South Atlantic Region. The real GDP in the Mid-Atlantic Region has expanded relatively more slowly since 2000, averaging 1.3 percent per year.

Table 3-4
Gross Domestic Product (real, in Millions of 2009 Dollars) – Historical Growth Trends

Area	Levels				Compound Average Annual Growth Rate (Percent)			
	2000	2005	2010	2015	2000 - 2005	2005 - 2010	2010 - 2015	2000 - 2015
United States	12,559,700	14,234,200	14,783,800	16,397,200	2.5%	0.8%	2.1%	1.8%
Mid Atlantic	1,974,027	2,171,022	2,251,894	2,400,594	1.9%	0.7%	1.3%	1.3%
South Atlantic	2,247,491	2,639,799	2,668,454	2,845,381	3.3%	0.2%	1.3%	1.6%

Source: Bureau of Economic Analysis data

3.2.5 Inflation

Inflation, as measured by the popular Consumer Price Index, averaged about 2.2 percent per annum in the US over the 2000 to 2015 timeframe, and reached a high of 4.1 percent in 2007, in the pre-recession period. It then dropped sharply in 2008, and over the last two years slipped to under 1 percent annually, as shown in Figure 3-2. Inflation in the Northeast Region (proxy for Mid-Atlantic States) averaged 2.3 percent annually, which was slightly higher than the national rate, while general prices in the South, including Maryland, trended at 2.1 percent annually, or slightly below the national average since 2000. The Washington-Baltimore Metro area, however, experienced a higher inflation rate compared to the rest of the South and the Nation, averaging 2.5 percent during the same period.

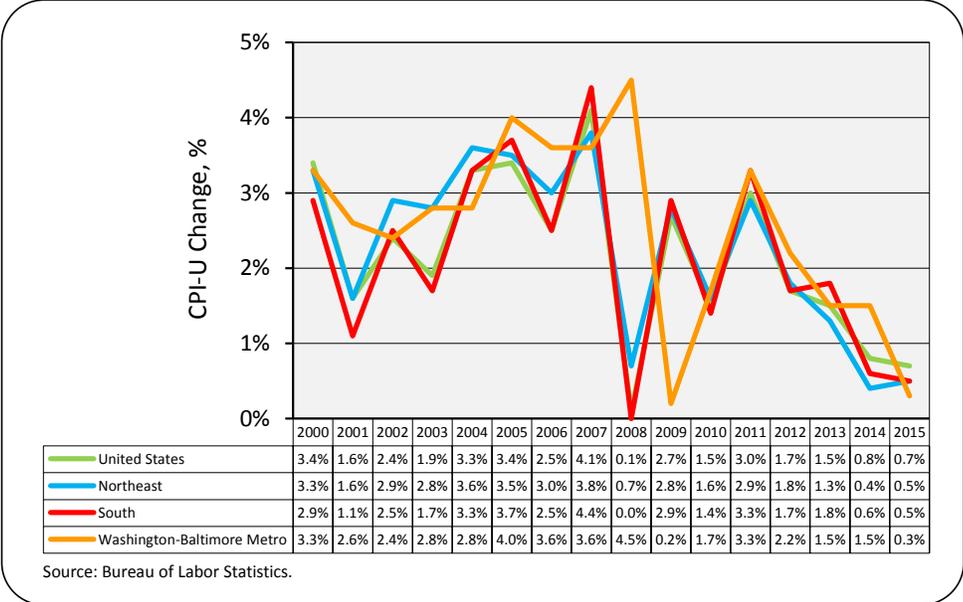
3.2.6 Gasoline Prices

Another factor that can influence travel demand is the price of gasoline. Figure 3-3 displays the annual average nominal retail price per gallon (in current dollars) of unleaded gasoline (all grades, all formulations) from years 2000 to 2015. The historical data from the EIA are shown for the United States, the Central Atlantic Region (including Maryland, and the rest of the Mid-Atlantic States)² and Lower Atlantic Region (largely equivalent to the South Regional definition by the US Census).³ Between these regions, price variation is relatively narrow, with the Lower Atlantic Region closely tracking the national average, and the Central Atlantic Region at somewhat higher levels (typically \$0.02 to \$0.10 more per gallon). Overall, between 2000 and 2015 average national gasoline prices increased from about \$1.52 per gallon to 2.52 per gallon, with an annual low over that time period at \$1.39 in 2002. However, average national gasoline prices have most recently declined significantly, staying firmly under \$2.50 per gallon through 2016, and lately (as of September 2016) even leveling close to \$2.30 per gallon.

² Central Atlantic region includes: Delaware, District of Columbia, Maryland, New Jersey, New York and Pennsylvania.

³ Lower Atlantic region includes: Florida, Georgia, North Carolina, South Carolina, Virginia and West Virginia.

**Figure 3-2
Inflation (CPI-U) – Historical Trends**



It should be noted that retail gasoline prices are strongly influenced by larger trends in crude oil prices. The latter can be quite volatile, and are challenging to accurately predict going forward. Since 2000, monthly crude oil prices (for West Texas Intermediate [WTI] benchmark) fluctuated in the \$19.40 per barrel (in December 2001) to \$133.90 per barrel (June 2008), as illustrated in Figure 3-4. As an example of this volatility in crude oil prices, the most recent monthly quote (for September 2016) of \$45.20 was more than 50 percent lower than the \$93.20 equivalent price just two years earlier (in September of 2014).

**Figure 3-3
Trends in Retail Gasoline Price**

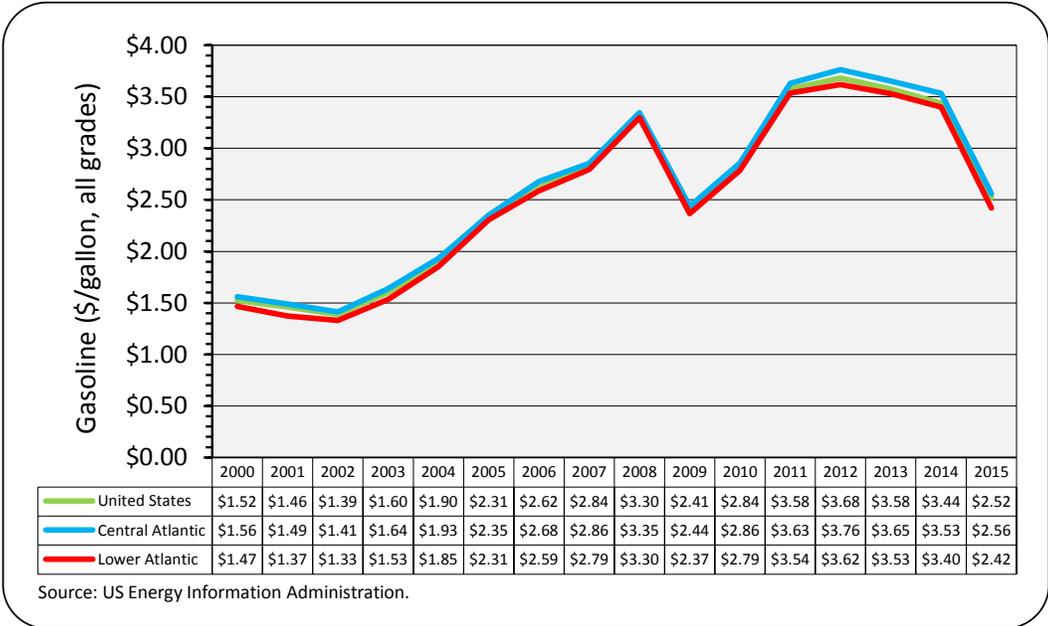
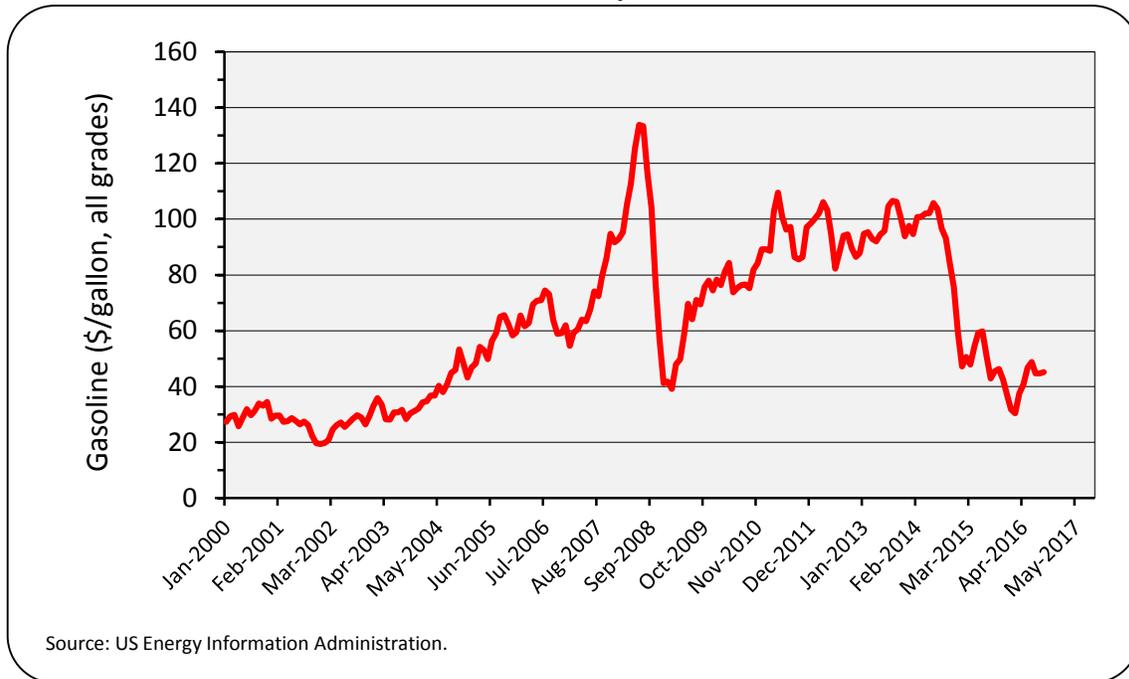


Figure 3-4
Crude Oil Prices – Monthly Historical Trends



Forecasts

3.2.7 Population

As presented in Table 3-5, US population is forecasted to increase over the next decade at an annual rate of 0.7 percent, according to both the US Census Bureau and Moody's Analytics, which is marginally slower than the pace experienced in the past decade as previously shown in Table 3-1, while Woods & Poole Economics (W&P)⁴ projects the national population growth to be at 0.9 percent per year. Population in the South Atlantic Region is projected to increase faster, at 1.4 percent per year according to Moody's Analytics, and 1.2 percent annually according to W&P. The Mid-Atlantic Region is forecasted to experience a relatively anemic growth of around 0.1 percent annually as per Moody's, and a modest rate of 0.4 percent yearly as per W&P.

⁴ Source: Woods & Poole Economics, Inc. Washington, D.C. Copyright 2016. Complete Economic and Demographic Data Source (CEDDS). Woods & Poole does not guarantee the accuracy of this data. The use of this data and the conclusion drawn from it are solely the responsibility of the Consultant.

Table 3-5
Projected Population Growth ⁽¹⁾

Area	Census Bureau		Moody's Analytics		Woods & Poole	
	2015 - 2020	2020 - 2026	2014 - 2020	2020 - 2026	2015 - 2020	2020 - 2026
United States	0.8%	0.7%	0.7%	0.7%	0.9%	0.9%
Mid Atlantic	N/A	N/A	0.1%	0.0%	0.4%	0.4%
South Atlantic	N/A	N/A	1.5%	1.4%	1.2%	1.2%

Source: U.S. Census Bureau, December 2014; Moody's Analytics, September 2016; and Woods & Poole, 2016 CEDDS.

⁽¹⁾ Percentages are presented as compound average annual growth.

3.2.8 Employment and Unemployment

Employment in the Nation is projected to grow by an average of 1.4 percent per year through 2026 according to W&P, while Moody's Analytics expects growth deceleration from 1.1 percent annually through 2020 to 0.6 per annum during the subsequent 2020-2026 interval, as shown in Table 3-6. Regionally, with future growth averaging around 1.2 percent annually, the South Atlantic Region is expected to outperform both the Nation and the Mid-Atlantic Region, according to Moody's. The Mid-Atlantic Region is forecasted to have employment increases of about 0.4 percent per annum, or half the pace for the US as a whole, according to Moody's. The forecasts call for growth rates higher than the corresponding averages experienced since 2000, but below those in the recent post-recessionary period (as previously presented in Table 3-2).

Table 3-6
Projected Employment Growth ⁽¹⁾

Area	Moody's Analytics		Woods & Poole	
	2015 - 2020	2020 - 2026	2015 - 2020	2020 - 2026
United States	1.1%	0.6%	1.5%	1.4%
Mid Atlantic	0.7%	0.2%	1.2%	1.0%
South Atlantic	1.6%	0.9%	1.7%	1.6%

Source: Moody's Analytics, September 2016; and Woods & Poole, 2016 CEDDS.

⁽¹⁾ Percentages are presented as compound average annual growth.

As employment grows in the coming years, the national unemployment rate is also forecasted to improve and approach full employment. According to a handful of key national sources that forecast medium to long-term US unemployment, the average rates through year 2026 are projected to inch down from the 2015 average rate of 5.3 percent to about 5.0 percent, as shown in Table 3-7.

Table 3-7
Projected US Unemployment Rates ⁽¹⁾

Source	Release Date	2015 - 2019	2020 - 2026
Congressional Budget Office	August 2016	4.8%	5.0%
Federal Reserve Bank, FOMC ⁽²⁾	September 2016	4.6%	4.8%
Office of Management and Budget	July 2016	4.8%	4.8%
Moody's Analytics	September 2015	5.0%	5.2%
	Average	4.8%	5.0%

⁽¹⁾ Percentages represent average rates of unemployment per timeframe.
⁽²⁾ Federal Open Market Committee

3.2.9 Per Capita Real Income

As shown in Table 3-8, US per capita real income is forecasted to increase at an average annual rate of around 1.4 percent through 2020, then decelerating to 1.1 percent through 2026, with the South Atlantic Region projected to experience a slightly higher average pace through 2026, according to Moody's Analytics. As in the past, the Mid-Atlantic Region is forecasted to experience stronger (by about 0.5%/year) income growth relative to the national average.

Table 3-8
Projected Real Growth in Per Capita Income ⁽¹⁾

Area	Moody's Analytics		Woods & Poole	
	2015 - 2020	2020 - 2026	2015 - 2020	2020 - 2026
United States	1.4%	1.1%	1.6%	1.5%
Mid Atlantic	2.0%	1.6%	1.7%	1.6%
South Atlantic	1.7%	1.3%	1.5%	1.4%

Source: Moody's Analytics, September 2016; and Woods & Poole, 2016 CEDDS
⁽¹⁾ Percentages are presented as compound average annual growth.

3.2.10 Real Gross Domestic Product

Following a modest 1 percent average annual growth in the first half of 2016, the US real GDP picked up some steam (to 2.9% in annualized terms) in the third quarter, and is projected by major macroeconomic forecasters to increase by around 2.2 percent per year through 2019, followed by a deceleration to around 2.0 percent annually in subsequent years through 2026, as summarized in Table 3-9.

Table 3-9
Projected Growth in US Real Gross Domestic Product ⁽¹⁾

<u>Source</u>	<u>Release Date</u>	<u>2015 - 2019</u>	<u>2020 - 2026</u>
Congressional Budget Office	August 2016	2.1%	1.9%
Federal Reserve Bank, FOMC ⁽²⁾	September 2016	1.9%	1.8%
Office of Management and Budget	July 2016	2.3%	2.2%
Woods & Poole Economics	April 2016	2.4%	2.2%
Moody's Analytics	September 2016	2.4%	1.9%
	Average	2.2%	2.0%

⁽¹⁾ Percentages represent average rates of unemployment per timeframe.
⁽²⁾ Federal Open Market Committee

3.2.11 Inflation

As the post-recessionary capacity slack still lingers, inflation is expected to remain relatively moderate and inch upward in the near term, but needs to be watched for potential increases in the medium- to longer-term. Further removal of spare capacity in the labor markets may lead to increased pressures on wages as markets tighten and approach full employment later in the business cycle. Additionally, as volatile energy prices approach an equilibrium, they are expected to add somewhat to the general increases in prices as well. A sample of major macroeconomic forecasters expect US annual inflation to generally increase to about 1.7 percent through 2019, with further acceleration to about 2.2 percent on average per year over the subsequent years through 2026 as shown in Table 3-10.

Table 3-10
Projected Growth in Inflation ⁽¹⁾

<u>Source</u>	<u>Release Date</u>	<u>2015 - 2019</u>	<u>2020 - 2026</u>
Congressional Budget Office	August 2016	1.6%	2.0%
Federal Reserve Bank, FOMC ⁽²⁾	September 2016	1.8%	2.0%
Office of Management and Budget	July 2016	1.6%	2.3%
Moody's Analytics	August 2016	1.8%	2.3%
	Average	1.7%	2.2%

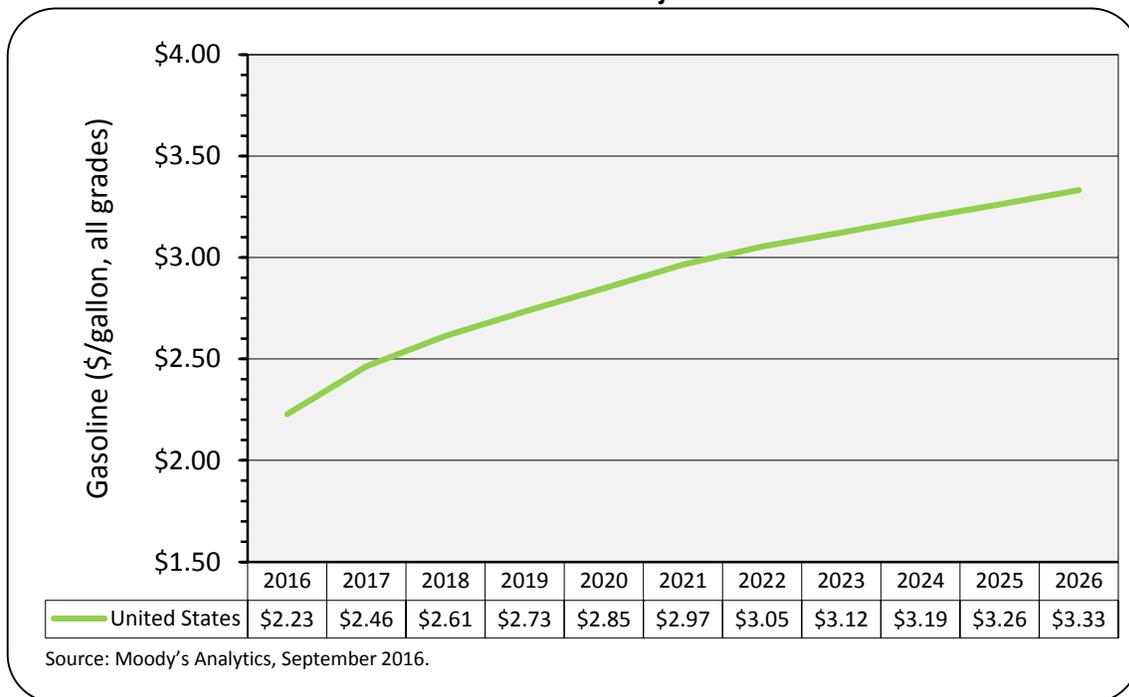
⁽¹⁾ Percentages represent average rates of unemployment per timeframe.
⁽²⁾ Federal Open Market Committee, using the PCE measure.

3.2.12 Gasoline Prices

The relatively low oil prices of late are attributable to an imbalance between global oil supply and demand, with additional oil exploration in North America and slower global economic growth, particularly in major overseas markets such as China and Brazil, as main factors. Additionally, fuel efficiency gains and environmental concerns have continued to lessen demand for crude oil as the major energy source.

Consequently, there are winners (energy consumers/importers) and losers producers/exporters) stemming from the recent crude oil price declines, and the US and global economy as a whole tends to benefit as prices remain relatively low. US retail prices which hovered around \$2.30 per gallon in September 2016 are expected to remain below the \$2.50 per gallon levels through 2017, according to the EIA's recent (October) Short-Term Energy Outlook report. It is, however, important to recognize that short-term fluctuations in energy prices can be quite volatile, both to the downside as well as the upside. Moody's Analytics recent (September 2016-generated) projection of US retail gasoline prices called for average annual 2016 prices of \$2.23 per gallon, rising at an average annual rate of 2.9 percent to about \$3.33 per gallon by the year 2026, as illustrated in Figure 3-5. This future level would still be below the previous national annual peak in fuel price of \$3.55 per gallon (in nominal terms) reached in 2012, as shown in Figure 3-3. According to the EIA (in its latest – 2016 - Annual Energy Outlook), however, the average price per gallon is projected to rise by about 6.3 percent, from \$2.06 in 2016 to \$3.79 in 2026.

Figure 3-5
Retail Gasoline Price – National Projected Growth Trend



3.3 Maryland and Sub-State Regional Level

This section provides the historical socioeconomic growth context as well as forecasts for the State of Maryland and its major planning regions⁵.

Historical Trends

3.3.1 Population

As presented in Table 3-11, the historical statewide population of Maryland grew by about 0.7 million from 5.3 million in 2000 to almost 6.0 million in 2015, or 0.8 percent annually. The largest region in the State, Baltimore, expanded its population base at the relatively slowest pace of 0.6 percent annually during the 2000-2015 period, while Southern Maryland grew almost three times faster at 1.6 percent per year. The population in the remaining three major regions increased in the range of 0.8 to 1.1 percent per annum over the same period.

Table 3-11
Population – Regional Historical Growth Trend

Area	Levels				Compound Average Annual Growth Rate (Percent)			
	2000	2005	2010	2015	2000 - 2005	2005 - 2010	2010 - 2015	2000 - 2015
Maryland Statewide	5,296,647	5,592,379	5,773,552	6,006,401	1.1%	0.6%	0.8%	0.8%
Baltimore Region	2,512,557	2,599,352	2,662,691	2,748,503	0.7%	0.5%	0.6%	0.6%
Washington Suburban	1,870,242	1,996,003	2,068,582	2,194,973	1.3%	0.7%	1.2%	1.1%
Southern MD	281,276	321,725	340,439	358,126	2.7%	1.1%	1.0%	1.6%
Upper Eastern Shore	209,286	229,249	239,951	241,164	1.8%	0.9%	0.1%	0.9%
Lower Eastern Shore	186,614	199,904	209,275	212,062	1.4%	0.9%	0.3%	0.9%

Source: U.S. Census data

3.3.2 Employment

Employment in Maryland grew considerably slower than population in the 2000 to 2014 period, which included the impacts of the Great Recession⁶. Statewide employment change averaged 0.4 percent per year, which included a dip of around -0.4 percent annually in the 2005-2010 time period that included the economic recession, as presented in Table 3-12. Employment in the Baltimore Region also grew at 0.4 percent on average, while employment in Maryland's Washington suburbs increased at a 0.2 percent annual rate. The Lower Eastern Shore performed the weakest, increasing at 0.1 percent per year, while Southern Maryland saw the fastest rate of employment growth at 1.3 percent per annum during the same historical period.

⁵ The Maryland Department of Planning along with its State Data Center (SDC) groups all the counties/equivalents in the state into the following 6 planning regions: Baltimore consisting of Anne Arundel, Baltimore, Carroll, Harford, Howard Counties and Baltimore City; Washington Suburban consisting of: Frederick, Montgomery and Prince George's Counties; Southern Maryland consisting of: Calvert, Charles, and St Mary's Counties; Upper Eastern Shore consisting of: Caroline, Cecil, Kent and Queen Anne's Counties; Lower Eastern Shore consisting of: Dorchester, Somerset, Wicomico and Worcester Counties; and Western Maryland consisting of: Alleghany, Garret and Washington Counties. Please note that due to its relative remoteness from the MDTA facilities, the Western Maryland Region in the Maryland Panhandle was not included in this review update.

⁶ 2007-2009. National Bureau of Economic Research.

Table 3-12
Employment – MD Regional Historical Growth Trend

Area	Levels				Compound Average Annual Growth Rate (Percent)			
	2000	2005	2010	2014	2000 - 2005	2005 - 2010	2010 - 2014	2000 - 2014
Maryland Statewide	2,581,832	2,677,583	2,625,019	2,729,502	0.7%	-0.4%	1.0%	0.4%
Baltimore Region	1,303,524	1,336,483	1,314,076	1,386,232	0.5%	-0.3%	1.3%	0.4%
Washington Suburban	906,899	938,396	914,128	934,827	0.7%	-0.5%	0.6%	0.2%
Southern MD	96,233	109,750	113,404	115,816	2.7%	0.7%	0.5%	1.3%
Upper Eastern Shore	74,373	83,557	81,874	86,586	2.4%	-0.4%	1.4%	1.1%
Lower Eastern Shore	89,594	94,327	89,570	90,991	1.0%	-1.0%	0.4%	0.1%

Source: Bureau of Economic Analysis data for wage and salary employment

3.3.3 Per Capita Real Income

Historical per capita real income in Maryland stood at about \$49,700 in 2014 (in 2009 dollars), having increased by about 1 percent per year in real terms since 2000. Baltimore and Washington Suburban, have recently reached income levels and growth rates above or close to the statewide averages, as presented in Table 3-13. The 2014 per capita income level for the Baltimore Region was close to the statewide average, after growing at 1.2 percent annually since 2000. Even though the Washington Suburban Region experienced the slowest sub-state regional average rate of per capita income growth of 0.7 percent annually since 2000, it enjoyed the highest 2014 income level of close to \$54,200. Per capita incomes in Southern Maryland grew at the relatively highest pace of 1.5 percent per year, and reached the 2014 level of about \$50,000, which is slightly higher than the Maryland as a whole.

Table 3-13
Income Per Capita (real) – MD Regional Historical Growth Trend

Area	Levels (in 2009\$)				Compound Average Annual Growth Rate (Percent)			
	2000	2005	2010	2014	2000 - 2005	2005 - 2010	2010 - 2014	2000 - 2014
Maryland Statewide	42,517	46,933	48,875	49,655	2.0%	0.8%	0.3%	1.0%
Baltimore Region	41,231	46,041	47,854	49,209	2.2%	0.8%	0.6%	1.2%
Washington Suburban	48,536	52,411	54,382	54,164	1.5%	0.7%	-0.1%	0.7%
Southern MD	37,540	43,114	47,202	46,959	2.8%	1.8%	-0.1%	1.5%
Upper Eastern Shore	37,640	42,101	41,978	44,061	2.3%	-0.1%	1.0%	1.1%
Lower Eastern Shore	30,338	34,008	35,452	36,380	2.3%	0.8%	0.5%	1.2%

Source: Woods & Poole, 2016 based on BEA data

3.3.4 Real Gross Regional Product

Total economic output in Maryland, as measured in terms of Gross State Product, reached \$320 billion (in 2009\$) in 2014, having grown at the average pace of 2.3 percent per annum from 2000 to 2014, as shown in Table 3-14. Growth rates that exceeded or matched the national average were also experienced by all of Maryland's five major planning regions, with the Lower Eastern Shore growing the slowest at 1.8 percent per annum, and Southern Maryland expanding at a more robust real annual rate of 3.4 percent.

Table 3-14
Gross Regional Product (real) – MD Regional Historical Growth Trend

Area	Levels (in millions of 2009\$)				Compound Average Annual Growth Rate (Percent)			
	2000	2005	2010	2014	2000 - 2005	2005 - 2010	2010 - 2014	2000 - 2014
Maryland Statewide	232,084	286,935	308,999	319,995	4.3%	1.5%	0.9%	2.3%
Baltimore Region	115,543	142,485	151,620	160,724	4.3%	1.3%	1.5%	2.4%
Washington Suburban	89,822	110,213	121,097	122,239	4.2%	1.9%	0.2%	2.2%
Southern MD	7,858	10,769	12,330	12,467	6.5%	2.7%	0.3%	3.4%
Upper Eastern Shore	5,432	7,224	7,382	7,729	5.9%	0.4%	1.2%	2.6%
Lower Eastern Shore	5,843	7,186	7,402	7,503	4.2%	0.6%	0.3%	1.8%

Source: Woods & Poole, 2016 based on BEA data

Forecasts

3.3.5 Population

Maryland's population is forecast to grow at an average rate of 0.7 percent per annum, according to the MD SDC, and at a faster pace of 1.0 percent annually according to W&P over the coming decade, as shown in Table 3-15⁷. While the Washington Suburban Region is projected to approximately equal the statewide population growth rate, according to both sources, the Baltimore Region is forecasted to somewhat lag the State in population growth. Southern Maryland is expected to continue to outperform the rest of the State, with future population growth at 1.6 percent through 2026.

Table 3-15
Projected Regional Population Growth ⁽¹⁾

Area	Maryland State Data Center		Woods & Poole	
	2015 - 2020	2020 - 2026	2015 - 2020	2020 - 2026
Maryland Statewide	0.7%	0.6%	1.0%	1.0%
Baltimore Region	0.6%	0.4%	0.9%	0.9%
Washington Suburban	0.6%	0.7%	1.1%	1.0%
Southern MD	1.7%	1.5%	1.6%	1.6%
Upper Eastern Shore	1.0%	1.2%	1.2%	1.2%
Lower Eastern Shore	1.1%	0.9%	0.9%	0.8%

Source: MD SDC, July 2014; and Woods & Poole, 2016 CEDDS

⁽¹⁾ Percentages are presented as compound average annual growth.

3.3.6 Employment

Similar to the national trends, employment in Maryland is expected to rebound relative to both its historical trend and population growth. Statewide employment is forecasted to increase on average in the 1.1 percent to 0.6 percent per annum range through 2026, according to the MD SDC, and close to 1.5 percent annually according to W&P, as shown in Table 3-16. While most of the other regions are

⁷ While county-level forecast from Moody' Analytics were also procured, not all the counties were included to fully match each of the Maryland major planning regions. Consequently, for population and the other variables covered in this section the two main sources used are MD SDC and W&P.

Also, MD SDC provides projections in five-year intervals, year 2026 values were interpolated.

projected to experience employment growth rates relatively similar to the statewide average, Southern Maryland, Baltimore Region and the Upper Eastern Shore are forecasted to be the fastest growing sub-state regions.

Table 3-16
Projected Regional Employment Growth ⁽¹⁾

Area	Maryland State Data Center		Woods & Poole	
	2015 - 2020	2020 - 2026	2015 - 2020	2020 - 2026
Maryland Statewide	1.1%	0.6%	1.5%	1.4%
Baltimore Region	1.0%	0.6%	1.6%	1.4%
Washington Suburban	1.1%	0.7%	1.5%	1.3%
Southern MD	1.4%	1.1%	1.8%	1.7%
Upper Eastern Shore	1.5%	1.0%	1.6%	1.4%
Lower Eastern Shore	1.3%	0.6%	1.4%	1.3%

Source: MD SDC, January 2015; and Woods & Poole, 2016 CEDDS
⁽¹⁾ Percentages are presented as compound average annual growth.

3.3.7 Per Capita Real Income

In line with national trends, per capita real income in Maryland is projected to grow through 2026 at a rate faster than in the recent past. Statewide per capita real income is forecasted to increase by about 1.4 percent annually on average. It is the temporal distribution of that growth that differs between the two sources. The MD SDC predicts a substantial deceleration of growth past 2020, while the W&P forecast calls for a relatively steady pace through 2026, as shown in Table 3-17.

Table 3-17
Projected Regional Real Per Capita Income Growth ⁽¹⁾

Area	Maryland State Data Center		Woods & Poole	
	2015 - 2020	2020 - 2026	2015 - 2020	2020 - 2026
Maryland Statewide	1.8%	1.1%	1.5%	1.4%
Baltimore Region	2.0%	1.2%	1.6%	1.6%
Washington Suburban	1.6%	1.0%	1.4%	1.3%
Southern MD	1.9%	1.1%	1.2%	1.1%
Upper Eastern Shore	2.0%	1.1%	1.4%	1.4%
Lower Eastern Shore	1.8%	1.0%	1.6%	1.6%

Source: MD SDC, January 2015; and Woods & Poole, 2016 CEDDS
⁽¹⁾ Percentages are presented as compound average annual growth.

3.3.8 Real Gross Regional Product

According to W&P, Maryland's Statewide Gross Regional Product (GRP) is forecasted to show real growth of about to 2.3 percent per annum as presented in Table 3-18. This is similar to the State's

recent historical pace, and somewhat higher than the forecasted average GDP rate for the Nation as a whole for the next decade. The Baltimore planning region is projected to slightly exceed the real GRP rate for the State and the other planning regions, while the Southern Maryland is expected to lag behind at close to 2.0 percent per year on average through 2026.

Table 3-18
Projected Real Growth in Gross Regional Product ⁽¹⁾

Area	Woods & Poole	
	2015 - 2020	2020 - 2026
Maryland Statewide	2.3%	2.2%
Baltimore Region	2.4%	2.3%
Washington Suburban	2.3%	2.2%
Southern MD	2.1%	1.9%
Upper Eastern Shore	2.4%	2.2%
Lower Eastern Shore	2.3%	2.1%

Source: Woods & Poole, 2016 CEDDS

⁽¹⁾ Percentages are presented as compound average annual growth.

3.4 Summary and Conclusion

Having endured the Great Recession and the relatively delayed recovery in the recent past, the general macroeconomic environment in the US, Maryland, and the South and Mid-Atlantic Regions have lately been strengthening, which is likely to bode well for the area in the near future. Within Maryland, the Southern sub-state planning region is projected to experience particularly strong growth with respect to most of the analyzed measures relative to the other Maryland regional groupings.

A majority of credible forecasting agencies (both public and private) are now publishing expectations for continued economic output, employment and income expansion, accompanied by only moderate increases in gasoline prices and general inflation within the short- to medium-term future. While labor markets along with the larger economic activity measures, have continued to improve into 2016, the uneven nature of this strengthening has persisted. A number of risks, such as the fragility of the economic landscapes in the different European Asian and Latin American trading partners, exacerbated threats of extremism in the Middle East, fluctuations in commodity (especially gasoline) and currency markets, and the public sector fiscal difficulties and constraints, still remain a headwind on growth in the short-term, as the larger US and global economies have tried to gain a stronger expansionary momentum.

While the growth momentum in Maryland and the surrounding regional economies has generally strengthened and broadened of late, one can be cautiously optimistic about the ongoing economic expansion that is likely to be experienced in the MDTA geographic influence area. However, it should be kept in mind that the favorable factors behind the strong traffic increases since 2014, such as relatively robust labor market growth combined with the unexpected declines in fuel prices, are unlikely to prove sustainable over the upcoming decade. Nevertheless, it is believed that the

moderate socioeconomic growth in the influence area may translate into continued modest increases in traffic demand on the MDTA legacy facilities over the coming decade. Moreover, there are other factors, e.g., toll rates and/or transportation network changes, etc., beyond the overall socioeconomic growth that will also influence the pace of traffic growth on the legacy system.

Chapter 4

Traffic and Revenue Forecast

This chapter summarizes the development of the forecasts of future year transactions and toll revenue for the seven legacy toll facilities of the MDTA. These 10-year annual forecasts have been prepared by facility and vehicle category through FY 2026, and include monthly forecasts for FY 2017 and 2018.

4.1 Traffic and Toll Revenue Forecasts

This section provides an overview of the development of the traffic and toll revenue forecasts including a description of how the traffic and toll revenue model was developed and the major model data inputs. These data inputs including toll rates by payment method, traffic growth forecasts, E-ZPass® participation percentages, and the impacts associated with planned roadway improvements on the legacy facilities.

4.1.1 Traffic and Toll Revenue Forecast Model

The traffic and toll revenue model with resulting transaction and toll revenue forecasts were made independently by facility based on actual transaction and revenue data from FY 2010 through September 2016.

The model developed for this study uses actual transaction and toll revenue data provided by the MDTA as the foundation. The data was provided by facility, month and vehicle classification through September 2016. The end-product of the model was forecasts of transactions by the following vehicle and payment classes:

- **Passenger Cars:**
 - Cash
 - MD Plan E-ZPass®
 - Non-MD Plan E-ZPass®
 - Video
 - Commuter/Shopper
 - Hatem A and B
 - Official Duty
- **Commercial Vehicles (3+ axles):**
 - Cash
 - MD Plan E-ZPass®
 - Non-MD Plan E-ZPass®
 - Video

A passenger car is defined as a two-axle vehicle, while commercial vehicles are those having 3-or-more axles. Passenger car and commercial vehicle transactions were forecasted independently by facility based upon growth rates of the historical and projected correlation with the economic variables described in more detail in Chapter 3. The forecasts by vehicle type were then disaggregated into applicable payment categories based upon historical and projected participation trends. These forecasted transactions by payment type were then converted to toll revenue estimates based on existing toll rates for the respective vehicle and payment classes. Appendix A provides the toll schedules by facility and payment class. Following this, the transaction and revenue impacts of planned roadway improvements were then incorporated.

The major traffic and toll revenue model data input variables are discussed below.

4.1.1.1 Toll Rates and Fee Adjustments

The transaction and toll revenue forecast model used the toll rates shown previously in Tables 1-1 through 1-3. These rates incorporate select toll reductions effective as of July 1, 2015. The details associated with these reductions are as follows:

- The discount for Maryland E-ZPass® was increased from 10 percent to 25 percent for the Baltimore Harbor (I-895) and Fort McHenry (I-95) tunnels, the Francis Scott Key Bridge (I-695), the Thomas J. Hatem Memorial Bridge (US 40) and the John F. Kennedy Memorial Highway (I-95), reducing the round-trip toll from \$7.20 to \$6.00. The round-trip toll at the Governor Harry W. Nice Memorial Bridge (US 301) was reduced from \$5.40 to \$4.50;
- Eliminated the Maryland E-ZPass® \$1.50 monthly account fee for Maryland residents;
- Reduced all cash, video, commuter and shoppers' toll rates at the Bay Bridge (US 50/301), including reducing the two-axle cash rate from \$6.00 to \$4.00 round trip and the commuter rate from \$2.10 to \$1.40. In addition, the Maryland E-ZPass® toll rate was reduced from \$5.40 to \$2.50;
- Reduced the toll at the Hatem Bridge by 30 percent for three- and four-axle vehicles with Maryland E-ZPass®. The three-axle toll was reduced from \$16.00 to \$11.20, while four-axle toll was reduced from \$24.00 to \$16.80;
- Increased the Maryland E-ZPass® supplemental rebate program for vehicles with five-or-more axles by 5 percent per trip. Prior to July 1, 2015 discounts were 5 percent for 60-79 trips, 10 percent for 80-99 trips, and 15 percent for 100 or more trips per transponder in a calendar month. These were changed to 10 percent for 60-79 trips, 15 percent for 80-99 trips, and 20 percent for 100 or more trips; and
- Effective January 1, 2016, for vehicles using the Childs Street and I-695 turnaround exits at the Baltimore Harbor Tunnel and Key Bridge respectively, Maryland E-ZPass toll rates will decrease to \$2.00 per axle for three-to-six-plus-axle vehicles. For example, three-axle vehicles will see a toll reduction from \$8.00 to \$6.00 and four-axle vehicles from \$12.00 to \$8.00.

4.1.1.2 Normal Traffic Growth

Economic growth is an important driving force for the region and is also linked with traffic growth. Growth in regional population and employment will generally result in an increase in traffic volumes for commuting purposes, as well as for other activities like shopping and recreation. Data for gross regional product, both state and the Baltimore region, were procured as a measure to reflect the relationship with the increasing trend of toll transactions at the legacy facilities. Historic and forecast data were also obtained from:

- The United States Census Bureau;
- The United States Bureau of Economic Analysis (BEA);
- The United States Energy Information Administration (EIA);
- Maryland State Data Center (MD SDC);
- Woods & Poole Economics (W&P); and
- Moody's Analytics.

Population, employment, gross regional product (GRP), and gasoline prices were obtained from these sources and were used for evaluation of the inputs used in deriving traffic growth forecasts as a function of these measures.

The econometric models developed and used for the traffic growth forecasts in the March 2015 traffic and revenue study sought to establish correlative relationships between various independent variables (such as population, employment, GRP, etc.) and the dependent variable (transactions). The selected independent variables were then used in the forecasting process together with the available-at-the-time future year forecast data. In some cases, adjustments that would have a more local effect on the traffic volumes of the toll facilities were also incorporated. This included localized construction impacts associated with major planned highway improvements.

The latest historical and forecasts of socioeconomic/independent variable-related data were collected and analyzed in this update, with the findings summarized in Chapter 3. As a result of this analysis, it was concluded that while some of the latest socioeconomic growth projections for the next 10 years were slightly higher and some slightly lower (depending on the variable and geography) than those developed for the earlier forecasts, overall the two rounds balanced to be about the same. Consequently, this update resulted in only minor adjustments, mostly based on the newly-released historical transaction data, to the early years of the forecasts horizon. These updated growth forecasts were incorporated into the traffic and toll revenue forecast model.

4.1.1.3 Planned Roadway Improvements

The three major improvements expected to impact traffic and revenue on the MDTA legacy facilities, and included in the forecast model 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 crossing, while a small portion of more discretionary trips would be suppressed.

- **Baltimore Harbor Tunnel (I-895)** - Replace the deck and superstructure of the bridge over the Patapsco Flats (north of MD 295 to the I-895 Spur merge). Construction is scheduled to extend from August 2016 to May 2019. Plans call for one lane in each direction to be maintained throughout construction;
- **Fort McHenry Tunnel (I-95)** - This project involves improvements from the tunnel to the I-895 merge. When completed, continuous 4-lanes in each direction will be provided. Construction is scheduled to run from March 2017 to December 2018 and will involve off-peak lane closures and full-time shoulder closures. This project will also provide capacity on I-95 allowing for some diversion from I-895 when the I-895 Canton Viaduct replacement project begins.
- **Canton Viaduct Replacement (I-895)** - This project, extending from the tunnel to Interstate Avenue, will be replacing the Canton Viaduct and ramp to Holabird Avenue. Construction is scheduled to run from June 2018 to July 2021. One lane in each direction will be maintained from January 2019 to July 2021. As part of the considerations of this project, lane closures would not occur until January 2019, allowing for the I-95 improvements to be completed to help facilitate any traffic diversions to I-95.

4.2 Basic Assumptions

Transaction and revenue estimates for the MDTA legacy toll facilities were predicated upon the following assumptions, which are considered reasonable by CDM Smith for purposes of the forecast:

1. This study is limited to the seven MDTA legacy facilities and does not include forecasts for the Intercounty Connector or the I-95 Express Toll LanesSM ;
2. The seven legacy toll facilities and approach roads will continue to be well-maintained and effectively signed;
3. No competing highway projects other than those identified in this report will be constructed or significantly improved during the forecast period;
4. MDTA will continue to operate within its business rules and practices;
5. The existing toll collection concept and toll schedules will be in effect throughout the forecast period;
6. For the purposes of this report, it is assumed that no toll adjustments will be made during the forecasting period and that any conversion of facilities to all-electronic tolling will be revenue neutral;
7. Annual revenue estimates are expressed in future year dollars (nominal);
8. No major recession, natural disasters or other significant exogenous events will occur that would significantly reduce travel in the region;
9. Population and employment growth will occur as presented in this study; and
10. 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 for the seven facilities.

4.3 Transaction and In-Lane Toll Revenue Forecasts

4.3.1 Annual Transactions and In-Lane Toll Revenue by Facility

A summary of estimated transactions and In-Lane Toll Revenue forecasts from FY 2016 through FY 2026 for each of the seven MDTA legacy facilities by passenger car and commercial vehicle classes is presented in this section in Tables 4-1 through 4-7. The forecasts were developed based on the previously described spreadsheet model and modeling process, which in addition to incorporating existing FY 2016 traffic as its base input, included estimated normal traffic growth, estimated traffic impacts from major construction projects on the legacy facilities, and adjustments associated with the impacts of leap year. It should be noted that the forecasts include slightly higher growth rates in FY 2020 and FY 2024, accounting for the positive impact of an extra day in these leap years. Transactions in the following year have been forecasted to grow at slightly lower rates, adding a negative adjustment to account for the higher number of transactions in the leap year.

4.3.1.1 John F. Kennedy Memorial Highway (I-95)

Forecasts of annual transactions and In-Lane Toll Revenue for the John F. Kennedy Memorial Highway (I-95) are provided in Table 4-1. The John F. Kennedy Memorial Highway processed 15.2 million transactions in FY 2016, an increase of 3.4 percent over FY 2015. In-Lane Toll Revenue increased by 2.8 percent in FY 2016 from \$166.5 million in FY 2015 to \$171.2 million. Additionally, commercial vehicles, which accounted for 12 percent of transactions in FY 2016, generated more than 42 percent of the revenue. With the positive impacts of the economic recovery and lower fuel prices already accounted for in the FY 2016 transaction growth, FY 2017 transactions were estimated to increase at a normal growth rate of 0.6 percent to 15.3 million. This growth also includes an adjustment of -0.3 percent to account for the extra day of growth in actual FY 2016 transactions due to leap year. During the FY 2017 to FY 2026 forecast period, transactions have been estimated to increase by 0.8 percent per annum, reaching 16.4 million by FY 2026. In-Lane Toll Revenue has been forecasted to increase by 0.7 percent per annum from \$171.9 million in FY 2017 to \$183.5 million in FY 2026.

4.3.1.2 Thomas J. Hatem Memorial Bridge

Forecasts of annual transactions and In-Lane Toll Revenue for the Thomas J. Hatem Memorial Bridge (US 40) are provided in Table 4-2. The Hatem Bridge processed 5.1 million transactions in FY 2016, a decrease of 3.0 percent over FY 2015 transactions of 5.3 million. In accounting for this decrease, it was noted that passenger car transactions (excluding violations) had grown from 0.413 million in October of FY 2014 to 0.665 million in October of FY 2015, a growth of more than 61 percent. This magnitude of growth was not consistent with prior years, and FY 2016 transactions decreased by 0.248 million, to a more normal 0.417 million. Much of this decrease was in Hatem Plan transactions, which realized an approximate 0.230 million transaction decline for all of FY 2016. It appears that some of these declines were offset, in part, by an increase in full-fare and MD E-ZPass transactions. Also noted was a shift from manual/cash transactions to E-ZPass among 3- and 4-axle commercial vehicles taking advantage of the 30 percent toll reduction. In addition to these shifts, five-axle commercial vehicle transactions grew by 17 percent.

The decrease in transactions was accompanied by an increase in In-Lane Toll Revenue of 5.5 percent from \$11.2 million in FY 2015 to \$11.8 million in FY 2016. This was the combined result of lower tolled Hatem Plan transactions being offset by higher tolled E-ZPass transactions among passenger vehicles, accompanied by the large increase in 5-axle commercial vehicles offsetting the shift by 3- and 4-axle vehicles from cash/manual to MD E-ZPass. Commercial vehicles which accounted for 12 percent of transactions in FY 2016, generated more than 42 percent of the revenue.

With the positive impacts of the economic recovery and lower fuel prices already accounted for in the FY 2016 transaction growth, FY 2017 transactions were estimated to increase at a normal growth rate of 0.6 percent to 15.3 million. This growth also included an adjustment of -0.3 percent to account for the extra day of growth in actual FY 2016 transactions due to leap year. During the FY 2017 to FY 2026 forecast period, transactions have been estimated to increase by 0.8 percent per annum, reaching 16.4 million by FY 2026. In-Lane Toll Revenue has been forecasted to increase by 0.7 percent per annum from \$171.9 million in FY 2017 to \$183.5 million in FY 2026.

4.3.1.3 Baltimore Harbor Tunnel

Baltimore Harbor Tunnel transactions and In-Lane Toll Revenue are presented in Table 4-3. Transactions in FY 2016 were 28.3 million, a 4.4 percent increase over FY 2015. In-Lane Toll Revenue of \$89.9 million was collected in FY 2016, an increase of 5.1 percent over FY 2015. In three of the four forecast years between FY 2017 and FY 2020, transactions and revenue are estimated to

Table 4-1
John F. Kennedy Memorial Highway (I-95)
Transactions and In-Lane Toll Revenue Estimates by Vehicle Class

		Transactions (millions)					
Fiscal	Passenger Cars		Commercial Vehicles		Total		
Year	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾	
2016	13.40		1.76		15.16		
2017	13.49	0.7%	1.76	0.1%	15.26	0.6%	
2018	13.60	0.8%	1.77	0.4%	15.37	0.8%	
2019	13.71	0.8%	1.78	0.3%	15.49	0.7%	
2020	13.86	1.1%	1.79	0.8%	15.65	1.0%	
2021	13.93	0.5%	1.79	0.2%	15.73	0.5%	
2022	14.06	0.9%	1.81	0.7%	15.86	0.9%	
2023	14.18	0.9%	1.82	0.7%	16.00	0.9%	
2024	14.35	1.2%	1.84	0.9%	16.19	1.1%	
2025	14.44	0.6%	1.84	0.3%	16.28	0.6%	
2026	14.57	0.9%	1.85	0.6%	16.42	0.9%	
		In-Lane Toll Revenues (millions)					
Fiscal	Passenger Cars		Commercial Vehicles		Total		
Year	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾	
2016	\$98.68		\$72.50		\$171.18		
2017	99.37	0.7%	72.58	0.1%	171.94	0.4%	
2018	100.16	0.8%	72.87	0.4%	173.03	0.6%	
2019	100.96	0.8%	73.09	0.3%	174.05	0.6%	
2020	102.05	1.1%	73.65	0.8%	175.70	0.9%	
2021	102.58	0.5%	73.82	0.2%	176.40	0.4%	
2022	103.51	0.9%	74.34	0.7%	177.84	0.8%	
2023	104.44	0.9%	74.86	0.7%	179.30	0.8%	
2024	105.67	1.2%	75.51	0.9%	181.18	1.1%	
2025	106.33	0.6%	75.76	0.3%	182.09	0.5%	
2026	107.28	0.9%	76.21	0.6%	183.50	0.8%	

⁽¹⁾ Average Annual Percent Change

Table 4-2
Thomas J. Hatem Memorial Bridge (US 40)
Transactions and In-Lane Toll Revenue Estimates by Vehicle Class

Fiscal Year	Transactions (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾
2016	4.88		0.21		5.09	
2017	4.94	1.3%	0.21	1.8%	5.16	1.3%
2018	4.99	1.0%	0.22	1.0%	5.21	1.0%
2019	5.02	0.6%	0.22	0.3%	5.24	0.6%
2020	5.07	1.0%	0.22	0.7%	5.29	1.0%
2021	5.09	0.4%	0.22	0.1%	5.31	0.4%
2022	5.13	0.8%	0.22	0.4%	5.35	0.8%
2023	5.17	0.8%	0.22	0.4%	5.39	0.8%
2024	5.23	1.1%	0.22	0.7%	5.45	1.1%
2025	5.26	0.5%	0.22	0.1%	5.48	0.5%
2026	5.30	0.8%	0.22	0.4%	5.52	0.8%
Fiscal Year	In-Lane Toll Revenues (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾
2016	\$5.28		\$6.52		\$11.80	
2017	5.35	1.3%	6.64	1.8%	11.99	1.6%
2018	5.40	1.0%	6.71	1.0%	12.11	1.0%
2019	5.43	0.6%	6.73	0.3%	12.16	0.4%
2020	5.49	1.0%	6.77	0.7%	12.26	0.8%
2021	5.51	0.4%	6.78	0.1%	12.29	0.3%
2022	5.55	0.8%	6.81	0.4%	12.36	0.6%
2023	5.60	0.8%	6.84	0.4%	12.43	0.6%
2024	5.66	1.1%	6.88	0.7%	12.54	0.9%
2025	5.69	0.5%	6.89	0.1%	12.58	0.3%
2026	5.73	0.8%	6.92	0.4%	12.65	0.6%

⁽¹⁾ Average Annual Percent Change

Table 4-3
Baltimore Harbor Tunnel (I-895)
Transactions and In-Lane Toll Revenue Estimates by Vehicle Class

Fiscal Year	Transactions (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾
2016	27.65		0.63		28.29	
2017 ⁽²⁾	26.22	-5.2%	0.59	-6.9%	26.81	-5.2%
2018	26.32	0.4%	0.59	-0.4%	26.91	0.4%
2019 ^(2,3)	24.09	-8.5%	0.53	-8.8%	24.62	-8.5%
2020	23.25	-3.5%	0.52	-3.5%	23.77	-3.5%
2021	23.25	0.0%	0.52	0.0%	23.76	0.0%
2022 ⁽³⁾	28.17	21.2%	0.63	21.2%	28.80	21.2%
2023	28.72	1.9%	0.64	1.9%	29.35	1.9%
2024	28.85	0.5%	0.64	0.5%	29.49	0.5%
2025	28.83	-0.1%	0.64	-0.1%	29.47	-0.1%
2026	28.89	0.2%	0.64	0.2%	29.53	0.2%
Fiscal Year	In-Lane Toll Revenues (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾
2016	\$80.65		\$9.22		\$89.87	
2017 ⁽²⁾	76.47	-5.2%	8.58	-6.9%	85.05	-5.4%
2018	76.76	0.4%	8.54	-0.4%	85.30	0.3%
2019 ^(2,3)	70.25	-8.5%	7.79	-8.8%	78.04	-8.5%
2020	67.86	-3.4%	7.52	-3.4%	75.38	-3.4%
2021	67.80	-0.1%	7.52	-0.1%	75.31	-0.1%
2022 ⁽³⁾	82.16	21.2%	9.11	21.2%	91.27	21.2%
2023	83.75	1.9%	9.28	1.9%	93.04	1.9%
2024	84.15	0.5%	9.33	0.5%	93.48	0.5%
2025	84.09	-0.1%	9.32	-0.1%	93.41	-0.1%
2026	84.25	0.2%	9.34	0.2%	93.59	0.2%

⁽¹⁾ Average Annual Percent Change.
⁽²⁾ Construction begins on Patapsco Flats Bridge on August 2016 and ends May 2019.
⁽³⁾ Construction begins on Canton Viaduct replacement on January 2019 and ends July 2021.

decrease because of traffic diversion to other parallel MDTA facilities as a result of planned construction on the approaches to the Tunnel. In FY 2020, transactions are forecasted to decline to 23.8 million, primarily the result of traffic diversions due to the Canton Viaduct replacement construction project. Due in part to the construction impacts, revenue in FY 2020 is forecasted at \$75.4 million. By FY 2026, transactions are forecasted to increase to 29.5 million generating \$93.6 million in toll revenue. Throughout the forecast period, commercial vehicles represent approximately 2 percent of total transaction, but 10 percent of in-lane toll revenue.

4.3.1.4 Fort McHenry Tunnel

The Fort McHenry Tunnel transactions and In-Lane Toll Revenue forecasts are presented in Table 4-4. This facility recorded the highest total transactions of all the legacy toll facilities at 42.6 million in FY 2016, an increase of 1.9 percent over FY 2015. In-Lane Toll Revenue of \$191.3 million was collected in FY 2016, an increase of 3.0 percent over FY 2015. Transactions are forecasted to grow to an estimated 49.9 million by FY 2020, partly the result of traffic diversions from the construction activities at the Baltimore Harbor Tunnel (BHT). With the return of traffic to the BHT following completion of construction activities, transactions in FY 2022 were forecasted to decline by almost 6 percent to 47.2 million. By FY 2026, transaction are forecasted at 48.5 million, a growth of 1.3 percent over the 10-year forecast period. These transactions resulted in the highest toll revenue among the legacy facilities, forecasted to reach \$211.4 million by FY 2026. Throughout the forecast period, commercial vehicles represent approximately 8 percent of total transaction, but 37 percent of in-lane toll revenue.

4.3.1.5 Francis Scott Key Bridge

Table 4-5 provides forecasts of transactions and In-Lane Toll Revenue for the Francis Scott Key Bridge. In 2016, total transactions processed were 11.2 million, an increase of 5.7 percent over FY 2015. In-Lane Toll Revenue of \$43.3 million was collected in FY 2016, an increase of 0.7 percent over FY 2015. By FY 2020 transactions are forecasted to increase to 12.9 million, partly the result of traffic diversions from the construction activities at the Baltimore Harbor and Fort McHenry Tunnels. Transactions are forecasted to reach 12.1 million by FY 2026, an average annual percent growth of 0.8 percent over the ten-year forecast period. Revenue is forecasted to reach \$46.1 million by FY 2026, an average annual percent growth of 0.6 percent over the forecast period. Throughout the forecast period, commercial vehicles represent approximately 8 to 9 percent of total transaction, but 42 percent of in-lane toll revenue.

4.3.1.6 William Preston Lane Jr. Memorial (Bay) Bridge

As shown in Table 4-6, the William Preston Lane Jr. Memorial (Bay) Bridge processed a total of 13.3 million transactions in FY 2016, an increase of 3.1 percent over FY 2015. Of these, 6.6 percent or 0.9 million were commercial vehicle transactions. While total transactions increased by 3.1 percent, total In-Lane Toll Revenue decreased by 35.0 percent from \$81.2 million in FY 2015 to \$52.8 million in FY 2016, because of the toll decreases. The average toll for all transactions combined decreased by approximately 35 percent from \$6.31 in FY 2015 to \$3.98 in FY 2016. Going forward, transactions are forecasted to reach an estimated 13.5 million by FY 2026. In-Lane Toll Revenue is forecasted to increase from \$52.8 million in FY 2016 to \$55.1 million by FY 2026.

4.3.1.7 Harry W. Nice Memorial Bridge

Estimates of transactions and In-Lane Toll Revenue for the Harry W. Nice Memorial Bridge are provided in Table 4-7. The Bridge produced the lowest number of total transaction of the seven legacy facilities, reaching 3.4 million in FY 2016, a growth of 3.0 percent over FY 2015. Commercial

Table 4-4
Fort McHenry Tunnel (I-95)
Transactions and In-Lane Toll Revenue Estimates by Vehicle Class

Fiscal Year	Transactions (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾
2016	38.88		3.76		42.64	
2017 ^(2,3)	41.48	6.7%	3.89	3.3%	45.36	6.4%
2018	42.33	2.1%	3.92	0.9%	46.25	2.0%
2019 ^(2,3,4)	44.56	5.3%	3.98	1.6%	48.55	5.0%
2020	45.91	3.0%	4.01	0.8%	49.92	2.8%
2021	46.12	0.5%	4.00	-0.3%	50.13	0.4%
2022 ⁽⁴⁾	43.25	-6.2%	3.93	-1.8%	47.17	-5.9%
2023	43.37	0.3%	3.92	-0.2%	47.29	0.2%
2024	43.88	1.2%	3.93	0.3%	47.81	1.1%
2025	44.15	0.6%	3.92	-0.3%	48.07	0.6%
2026	44.55	0.9%	3.92	0.0%	48.47	0.8%
Fiscal Year	In-Lane Toll Revenues (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾
2016	\$115.99		\$75.29		\$191.29	
2017 ^(2,3)	123.75	6.7%	77.75	3.3%	201.50	5.3%
2018	126.31	2.1%	78.45	0.9%	204.76	1.6%
2019 ^(2,3,4)	132.76	5.1%	79.36	1.2%	212.12	3.6%
2020	136.68	3.0%	79.86	0.6%	216.54	2.1%
2021	137.34	0.5%	79.64	-0.3%	216.99	0.2%
2022 ⁽⁴⁾	129.01	-6.1%	78.59	-1.3%	207.60	-4.3%
2023	129.39	0.3%	78.49	-0.1%	207.88	0.1%
2024	130.91	1.2%	78.71	0.3%	209.62	0.8%
2025	131.73	0.6%	78.49	-0.3%	210.22	0.3%
2026	132.91	0.9%	78.49	0.0%	211.40	0.6%

⁽¹⁾ Average Annual Percent Change
⁽²⁾ Construction begins on Patapsco Flats Bridge on August 2016 and ends May 2019.
⁽³⁾ Construction begins on I-95 improvements on February 2017 and ends December 2018.
⁽⁴⁾ Construction begins on Canton Viaduct replacement on January 2019 and ends July 2021.

Table 4-5
Francis Scott Key Bridge (I-695)
Transactions and In-Lane Toll Revenue Estimates by Vehicle Class

Fiscal Year	Transactions (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾
2016	10.19		1.01		11.20	
2017 ^(2,3)	10.97	7.7%	1.02	1.1%	11.99	7.1%
2018	11.29	3.0%	1.03	0.7%	12.32	2.8%
2019 ^(2,3,4)	11.73	3.9%	1.04	1.3%	12.77	3.6%
2020	11.80	0.6%	1.05	0.7%	12.85	0.6%
2021	11.82	0.2%	1.05	0.2%	12.87	0.2%
2022 ⁽⁴⁾	10.90	-7.8%	1.03	-1.6%	11.94	-7.3%
2023	10.86	-0.4%	1.04	0.3%	11.90	-0.3%
2024	10.94	0.8%	1.05	0.8%	11.99	0.8%
2025	10.97	0.2%	1.05	0.2%	12.01	0.2%
2026	11.02	0.5%	1.05	0.5%	12.07	0.5%
Fiscal Year	In-Lane Toll Revenues (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾
2016	\$24.47		\$18.80		\$43.28	
2017 ^(2,3)	26.35	7.7%	19.01	1.1%	45.36	4.8%
2018	27.14	3.0%	19.13	0.7%	46.27	2.0%
2019 ^(2,3,4)	28.66	5.6%	19.28	0.8%	47.94	3.6%
2020	28.82	0.5%	19.42	0.7%	48.24	0.6%
2021	28.88	0.2%	19.47	0.2%	48.34	0.2%
2022 ⁽⁴⁾	26.24	-9.1%	19.25	-1.1%	45.49	-5.9%
2023	26.09	-0.6%	19.31	0.3%	45.40	-0.2%
2024	26.29	0.8%	19.46	0.8%	45.75	0.8%
2025	26.35	0.2%	19.50	0.2%	45.86	0.2%
2026	26.48	0.5%	19.60	0.5%	46.09	0.5%

⁽¹⁾ Average Annual Percent Change
⁽²⁾ Construction begins on Patapsco Flats Bridge on August 2016 and ends May 2019.
⁽³⁾ Construction begins on I-95 improvements on February 2017 and ends December 2018.
⁽⁴⁾ Construction begins on Canton Viaduct replacement on January 2019 and ends July 2021.

Table 4-6
William Preston Lane Jr. Memorial Bridge (US 50/301)
Transactions and In-Lane Toll Revenue Estimates by Vehicle Class

Transactions (millions)						
Fiscal	Passenger Cars		Commercial Vehicles		Total	
Year	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾
2016	12.40		0.87		13.27	
2017	12.45	0.4%	0.88	1.1%	13.34	0.5%
2018	12.52	0.5%	0.89	1.0%	13.41	0.5%
2019	12.52	0.0%	0.90	0.8%	13.41	0.1%
2020	12.55	0.3%	0.91	1.3%	13.46	0.3%
2021	12.52	-0.3%	0.92	0.8%	13.43	-0.2%
2022	12.52	0.0%	0.93	1.4%	13.45	0.1%
2023	12.52	0.0%	0.94	1.4%	13.46	0.1%
2024	12.55	0.3%	0.96	1.3%	13.51	0.3%
2025	12.52	-0.3%	0.96	0.7%	13.48	-0.2%
2026	12.52	0.0%	0.97	1.0%	13.49	0.1%
In-Lane Toll Revenues (millions)						
Fiscal	Passenger Cars		Commercial Vehicles		Total	
Year	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾
2016	\$35.60		\$17.19		\$52.79	
2017	35.76	0.4%	17.38	1.1%	53.13	0.7%
2018	35.93	0.5%	17.55	1.0%	53.49	0.7%
2019	35.93	0.0%	17.69	0.8%	53.63	0.3%
2020	36.03	0.3%	17.92	1.3%	53.95	0.6%
2021	35.93	-0.3%	18.07	0.8%	54.00	0.1%
2022	35.93	0.0%	18.32	1.4%	54.25	0.5%
2023	35.93	0.0%	18.58	1.4%	54.51	0.5%
2024	36.03	0.3%	18.81	1.3%	54.85	0.6%
2025	35.93	-0.3%	18.95	0.7%	54.88	0.1%
2026	35.93	0.0%	19.14	1.0%	55.07	0.3%

⁽¹⁾ Average Annual Percent Change

Table 4-7
Harry W. Nice Memorial Bridge (US 301)
Transactions and In-Lane Toll Revenue Estimates by Vehicle Class

Transactions (millions)						
Fiscal	Passenger Cars		Commercial Vehicles		Total	
Year	Transactions	AAPC⁽¹⁾	Transactions	AAPC⁽¹⁾	Transactions	AAPC⁽¹⁾
2016	3.17		0.21		3.38	
2017	3.16	-0.3%	0.19	-8.5%	3.35	-0.8%
2018	3.17	0.3%	0.19	-2.0%	3.36	0.2%
2019	3.19	0.6%	0.19	0.3%	3.38	0.6%
2020	3.22	0.9%	0.19	1.3%	3.41	0.9%
2021	3.23	0.3%	0.19	0.8%	3.42	0.4%
2022	3.25	0.7%	0.19	1.4%	3.45	0.7%
2023	3.27	0.7%	0.20	1.4%	3.47	0.7%
2024	3.31	1.0%	0.20	1.3%	3.51	1.0%
2025	3.32	0.4%	0.20	0.7%	3.52	0.4%
2026	3.34	0.7%	0.20	1.0%	3.55	0.7%
In-Lane Toll Revenues (millions)						
Fiscal	Passenger Cars		Commercial Vehicles		Total	
Year	Revenue	AAPC⁽¹⁾	Revenue	AAPC⁽¹⁾	Revenue	AAPC⁽¹⁾
2016	\$15.16		\$6.05		\$21.20	
2017	15.10	-0.3%	5.53	-8.5%	20.64	-2.7%
2018	15.15	0.3%	5.42	-2.0%	20.57	-0.3%
2019	15.24	0.6%	5.44	0.3%	20.68	0.5%
2020	15.37	0.9%	5.51	1.3%	20.88	1.0%
2021	15.42	0.3%	5.55	0.8%	20.98	0.5%
2022	15.53	0.7%	5.63	1.4%	21.16	0.9%
2023	15.64	0.7%	5.71	1.4%	21.35	0.9%
2024	15.79	1.0%	5.78	1.3%	21.57	1.1%
2025	15.86	0.4%	5.82	0.7%	21.68	0.5%
2026	15.97	0.7%	5.88	1.0%	21.85	0.8%

⁽¹⁾ Average Annual Percent Change

vehicles accounted for 6 percent of the total. Passenger car transactions increased by 2.6 percent in FY 2016, while commercial vehicles experienced almost no growth. This facility is estimated to have an average annual growth in transactions of 0.5 percent through FY 2026, when transactions are expected to reach 3.6 million. Revenue in FY 2016 was \$21.2 million, a 1.0 percent decrease from FY 2015, primarily a result of the 16.7 percent toll decrease for MD E-ZPass passenger vehicles. Revenue is forecasted to grow by 0.3 percent per year on average to FY 2026, when revenue of \$21.9 million is forecasted.

4.3.2 Systemwide Annual Transactions and In-Lane Toll Revenue Forecasts

Table 4-8 presents historical and forecasted In-Lane Toll Revenue from FY 2006 to FY 2026. Systemwide transactions have fluctuated between FY 2006 and FY 2015, but overall have decreased from 118.9 million in FY 2006 to 115.7 million in FY 2015, a decrease of 2.5 percent, or 0.3 percent per annum. The historical fluctuations are largely due to both the negative effects of the Great Recession and a series of toll increases, most recently in FY 2012, FY 2013 and FY 2014. The combined effects of normal traffic growth, the continued economic recovery from the Great Recession, historically low gasoline prices, and the toll decreases in FY 2016, have resulted in transactions growing by 2.9 percent in FY 2016. During the FY 2006 to FY 2016 period, the number of systemwide transactions peaked at 121.5 million in FY 2011, resulting in revenue of \$311.9 million.

In FY 2017, the initial year of the forecast, transactions of 121.3 million have been forecasted, a 1.9 percent increase over FY 2016. In-Lane Toll Revenue is estimated at \$589.6 million, a 1.4 percent increase over FY 2016. The impacts of the FY 2016 toll decrease have been carried forward through the forecast period. Recent observed historical growth trends are carried through to FY 2018, before transactions and revenue growth are assumed to increase at rates more consistent with long-term historical trends. Total transactions are forecasted to grow to 129.1 million by FY 2026, or a total of 8.4 percent during the FY 2016 to FY 2026 forecast period. This equates to a growth rate of 0.8 percent per annum. In-Lane Toll Revenue follows similar growth trends, increasing by a total of 7.4 percent from \$581.4 million in FY 2016 to \$624.2 million in FY 2026, an average annual change of 0.7 percent.

4.4 Other Revenue

In addition to In-Lane Toll Revenue, MDTA also collects Other Revenue associated with the operation of its facilities. These have been summarized into six categories:

1. Unused Commuter and Shoppers Plan Trips
2. Transponder Fees and Sales
 - a. Transponder sales (legacy and ICC)
 - b. Monthly Service Fees (legacy and ICC)
3. Violation Recovery
4. Commercial Vehicles Fees and Discounts
 - a. Post-Usage Discount
 - b. High Frequency Discount
 - c. Over-Size Permit Fee
5. Concession Revenues
6. Hatem E-ZPass® program

Table 4-8
Historical and Forecasted Transactions and In-Lane Toll Revenue

Fiscal Year	Transactions (Millions)								Percent Growth
	JFK	Hatem	BHT	FMT	FSK	Bay	Nice	Total ⁽¹⁾	
2006	14.74	5.56	26.26	43.57	11.89	13.27	3.36	118.65	
2007	14.84	5.56	25.74	44.85	12.20	13.49	3.42	120.10	1.2
2008	14.65	5.56	25.77	44.83	12.34	13.37	3.39	119.91	(0.2)
2009	14.64	5.04	25.53	43.45	11.69	12.75	3.35	116.45	(2.9)
2010 ⁽²⁾	14.75	4.99	25.23	44.06	10.96	12.99	3.35	116.33	(0.1)
2011	15.38	5.07	26.12	46.29	11.65	13.56	3.40	121.47	4.4
2012 ⁽²⁾	14.82	5.03	25.75	44.52	11.05	13.63	3.29	118.09	(2.8)
2013 ⁽²⁾	14.58	4.56	23.97	43.58	10.92	12.74	3.26	113.61	(3.8)
2014 ⁽²⁾	14.38	4.95	24.90	41.88	10.42	12.76	3.24	112.53	(1.0)
2015	14.69	5.25	27.10	41.85	10.63	12.86	3.31	115.67	2.8
2016 ⁽³⁾	15.16	5.09	28.29	42.64	11.20	13.27	3.38	119.03	2.9
2017	15.26	5.16	26.81	45.36	11.99	13.34	3.35	121.26	1.9
2018	15.37	5.21	26.91	46.25	12.32	13.41	3.36	122.83	1.3
2019	15.49	5.24	24.62	48.55	12.77	13.41	3.38	123.46	0.5
2020	15.65	5.29	23.77	49.92	12.85	13.46	3.41	124.35	0.7
2021	15.73	5.31	23.76	50.13	12.87	13.43	3.42	124.65	0.2
2022	15.86	5.35	28.80	47.17	11.94	13.45	3.45	126.02	1.1
2023	16.00	5.39	29.35	47.29	11.90	13.46	3.47	126.86	0.7
2024	16.19	5.45	29.49	47.81	11.99	13.51	3.51	127.94	0.8
2025	16.28	5.48	29.47	48.07	12.01	13.48	3.52	128.32	0.3
2026	16.42	5.52	29.53	48.47	12.07	13.49	3.55	129.05	0.6

Fiscal Year	In-Lane Toll Revenue (\$ Millions)								Percent Growth
	JFK	Hatem	BHT	FMT	FSK	Bay	Nice	Total ⁽¹⁾	
2006	\$ 93.50	\$ 3.95	\$ 35.64	\$ 82.39	\$ 18.82	\$ 34.02	\$ 10.48	\$ 278.80	
2007	94.62	3.82	35.11	84.68	19.24	34.39	10.43	282.29	1.3
2008	92.71	3.89	35.33	84.03	19.41	33.88	10.08	279.33	(1.0)
2009	95.14	2.07	35.61	82.97	18.56	32.51	9.77	276.63	(1.0)
2010 ⁽²⁾	107.35	2.61	37.01	94.02	20.54	36.79	10.15	308.47	11.5
2011	107.39	2.82	37.85	95.32	20.78	37.62	10.15	311.93	1.1
2012 ⁽²⁾	116.01	5.25	48.74	118.82	25.82	46.74	11.60	372.98	19.6
2013 ⁽²⁾	121.86	7.80	52.05	135.61	28.94	52.40	12.97	411.63	10.4
2014 ⁽²⁾	162.80	10.17	77.56	183.13	40.26	79.76	20.40	574.08	39.5
2015	166.54	11.19	85.54	185.78	42.97	81.16	21.41	594.58	3.6
2016 ⁽³⁾	171.18	11.80	89.87	191.29	43.28	52.79	21.20	581.41	(2.2)
2017	171.94	11.99	85.05	201.50	45.36	53.13	20.64	589.62	1.4
2018	173.03	12.11	85.30	204.76	46.27	53.49	20.57	595.53	1.0
2019	174.05	12.16	78.04	212.12	47.94	53.63	20.68	598.62	0.5
2020	175.70	12.26	75.38	216.54	48.24	53.95	20.88	602.96	0.7
2021	176.40	12.29	75.31	216.99	48.34	54.00	20.98	604.31	0.2
2022	177.84	12.36	91.27	207.60	45.49	54.25	21.16	609.97	0.9
2023	179.30	12.43	93.04	207.88	45.40	54.51	21.35	613.91	0.6
2024	181.18	12.54	93.48	209.62	45.75	54.85	21.57	618.99	0.8
2025	182.09	12.58	93.41	210.22	45.86	54.88	21.68	620.72	0.3
2026	183.50	12.65	93.59	211.40	46.09	55.07	21.85	624.16	0.6

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

⁽²⁾ Year of toll increase.

⁽³⁾ Year of toll decrease.

 - Represents actual data.

The following provides a description of each of the Other Revenue categories. The forecasts of these annual revenue streams are provided in Tables 4-9 through 4-11.

4.4.1 Unused Commuter and Shoppers Plan Trips

MDTA provides customers the option to enroll in the Commuter Plan, which provides discounts for frequent trips. MDTA offers two Commuter Plans based on the facilities included in the plan. The first plan allows commuters to pay \$1.40 per trip for 50 trips at the Fort McHenry Tunnel, Baltimore Harbor Tunnel, Francis Scott Key Bridge, JFK Memorial Highway, and the Hatem Bridge. However, these trips must be used within 45 days. Another plan gives customers the option to pay \$2.10 per trip for 25 trips at the Nice Bridge, and similar to the first plan must be used within 45 days. As of July 1, 2015, the toll per trip for this plan at the Bay Bridge was reduced by one-third from \$2.10 to \$1.40.

The Shoppers Plan is slightly different. As of July 1, 2015, MDTA gives customers the option to pay \$2.00 per trip for 10 trips crossing the Bay Bridge that can be used Sunday through Thursday, with an expiration of 90 days. Prior to July 1, 2015 the toll was \$3.00 per trip.

Any remaining balance after time period from the Commuter or Shoppers Plans have expired is added to a separate account and referred to as Unused Toll Revenue. As seen in Table 4-9 (shown previously), this value is expected to increase gradually through FY 2025 as participation in the program increases due to normal traffic growth.

4.4.2 Transponder Fees and Sales

As of July 1, 2016, the cost of an E-ZPass® transponder is \$7.50 for the Standard, \$15.00 for the Exterior, and \$50.00 for the Fusion. 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. The forecast of future sales revenue is based on data provided by MDTA showing historical trends and the share of each transponder type as a percent of total sales.

In addition to transponder fees, 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 residents. The estimates for these fees for both the ICC and the legacy facilities are presented separately in Table 4-9.

4.4.3 Violation Recovery

Prior to FY 2016, violation fees were charged to drivers who choose not to initially pay their toll. Historical data through FY 2015 have been provided by MDTA. Since video customers are no longer assessed violations fees, but are instead assessed civil penalties if they do not pay their video tolls within 30 days, no estimates of future violation fee revenue for the legacy facilities, the ICC and I-95 Express Toll LanesSM are included in Table 4-9.

**Table 4-9
Historical and Forecasted Legacy Facilities "Other Toll Revenue"**

Fiscal Year	Service Fees and Sales					Violation Recovery				Commercial Vehicles				Total Legacy Other Revenue (5)
	Unused Pre-Paid Trip Revenue	Transponder Sales	Monthly Account Fees	Hattem E-Z Pass Program	Notice of Toll Due Fees	Civil Penalties (3)	Violation Fees	Post-Usage Discount	Vehicle High Frequency Discount	Over-size Permit Fee	Concession Revenue (4)			
2006	\$ 3.50	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2.80	\$ (4.50)	\$ -	\$ -	\$ 7.80	\$ 9.60		
2007	4.00	-	-	-	-	-	3.00	(4.80)	-	-	8.10	10.30		
2008	4.30	-	-	-	-	-	3.00	(5.00)	-	-	8.00	10.30		
2009	4.50	-	-	-	-	-	1.90	(4.80)	-	-	8.00	9.60		
2010	6.60	1.40	9.60	-	1.10	-	2.30	(6.60)	(0.20)	1.00	8.20	23.40		
2011	6.50	1.90	9.90	-	1.30	-	1.30	(6.70)	(0.30)	1.20	7.90	23.00		
2012	9.10	1.70	4.70	0.30	0.80	-	2.80	(5.90)	(0.20)	1.30	7.60	22.20		
2013	11.50	1.30	5.30	0.80	0.10	-	4.00	(4.60)	(0.70)	1.30	4.10	23.10		
2014	18.69	1.22	5.75	1.49	-	4.55	0.04	(5.89)	(0.64)	1.04	3.23	29.48		
2015	16.81	1.44	5.87	1.52	-	10.75	0.01	(6.34)	(0.62)	1.15	5.07	35.66		
2016	17.36	1.66	1.29	1.60	-	10.01	-	(6.39)	(1.06)	1.13	6.21	31.82		
2017	17.45	1.66	-	1.61	-	10.11	-	(6.45)	(1.06)	1.15	5.66	30.12		
2018	17.54	1.67	-	1.61	-	10.21	-	(6.52)	(1.07)	1.16	5.74	30.34		
2019	17.62	1.68	-	1.62	-	10.31	-	(6.58)	(1.07)	1.17	5.81	30.56		
2020	17.71	1.69	-	1.63	-	10.41	-	(6.65)	(1.08)	1.18	5.89	30.78		
2021	17.80	1.70	-	1.64	-	10.52	-	(6.72)	(1.09)	1.19	5.96	31.01		
2022	17.89	1.71	-	1.65	-	10.62	-	(6.78)	(1.09)	1.20	6.12	31.32		
2023	17.98	1.72	-	1.65	-	10.73	-	(6.85)	(1.10)	1.22	7.22	32.57		
2024	18.07	1.72	-	1.66	-	10.84	-	(6.92)	(1.10)	1.23	7.32	32.81		
2025	18.16	1.73	-	1.67	-	10.94	-	(6.99)	(1.11)	1.24	7.41	33.07		
2026	18.25	1.74	-	1.68	-	11.05	-	(7.06)	(1.11)	1.25	7.51	33.32		

Source: Historical data from MDTA

(1) Year of toll increase.

(2) Year of select toll rate reductions.

(3) Civil Penalties actuals provided by MDTA.

(4) Concession Revenue Forecast is 85% of the estimated concession revenue between 2017 and 2022, and 90% between 2023 and 2026 as prepared by Areas Inc.

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

- Represents actual data.

**Table 4-10
New Facilities Historical and Forecasted "Other Toll Revenue"**

Fiscal Year	New Facilities Other Revenue (\$ millions)																		
	InterCounty Connector						I-95 ETLs						New Facilities Total						
	Service Fees and Sales		Violation Recovery		Notice of Toll Due Fees (4)		Service Fees and Sales		Violation Recovery		Civil Penalties (3)		Violation Recovery		Total New Facilities Other Revenue (4)				
	Transponder Sales	Monthly Account Fees	Violation Fees	Civil Penalties	Notice of Toll Due Fees (4)	Transponder Sales	Monthly Account Fees	Violation Fees	Civil Penalties (3)	Transponder Sales	Monthly Account Fees	Violation Fees	Civil Penalties (3)	Transponder Sales	Monthly Account Fees	Violation Fees	Civil Penalties (3)	Other Revenue (4)	
2006	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2013	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2014	0.16	0.76	0.10	2.35	-	-	-	-	-	-	-	-	-	-	0.16	0.76	0.10	2.35	3.37
2015	0.18	0.72	0.01	5.61	-	0.01	0.06	0.01	0.12	0.19	0.79	0.01	0.12	0.19	0.79	0.01	5.73	6.72	6.72
2016	0.23	0.18	-	7.22	-	0.04	0.03	-	1.05	0.27	0.22	-	1.05	0.27	0.22	-	8.28	8.77	8.77
2017	0.23	-	-	7.26	-	0.04	-	-	1.06	0.27	-	-	1.06	0.27	-	-	-	8.32	8.59
2018	0.23	-	-	7.30	-	0.04	-	-	1.06	0.27	-	-	1.06	0.27	-	-	-	8.36	8.64
2019	0.23	-	-	7.33	-	0.04	-	-	1.07	0.28	-	-	1.07	0.28	-	-	-	8.40	8.68
2020	0.23	-	-	7.37	-	0.04	-	-	1.08	0.28	-	-	1.08	0.28	-	-	-	8.45	8.72
2021	0.23	-	-	7.41	-	0.04	-	-	1.08	0.28	-	-	1.08	0.28	-	-	-	8.49	8.77
2022	0.23	-	-	7.44	-	0.04	-	-	1.09	0.28	-	-	1.09	0.28	-	-	-	8.53	8.81
2023	0.24	-	-	7.48	-	0.05	-	-	1.09	0.28	-	-	1.09	0.28	-	-	-	8.57	8.85
2024	0.24	-	-	7.52	-	0.05	-	-	1.10	0.28	-	-	1.10	0.28	-	-	-	8.62	8.90
2025	0.24	-	-	7.56	-	0.05	-	-	1.10	0.28	-	-	1.10	0.28	-	-	-	8.66	8.94
2026	0.24	-	-	7.59	-	0.05	-	-	1.11	0.28	-	-	1.11	0.28	-	-	-	8.70	8.99

Source: Historical data from MDTA

(1) Year of toll increase.

(2) Year of select toll rate reductions.

(3) Civil Penalties actuals and estimates provided by MDTA.

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

- Represents actual data.

Table 4-11
Historical and Forecasted In-Lane and "Other" Toll Revenue

Fiscal Year	In-Lane Toll Revenue		"Other Toll Revenue"		Total Revenue ⁽⁴⁾
	Legacy Facilities	Legacy Facilities	New Facilities ⁽³⁾	Total ⁽⁴⁾	
2006	\$ 278.80	\$ 9.60	\$ -	\$ 9.60	\$ 288.40
2007	282.30	10.30	-	10.30	292.60
2008	279.30	10.30	-	10.30	289.60
2009	276.60	9.60	-	9.60	286.20
2010 ⁽¹⁾	308.50	23.40	-	23.40	331.90
2011	312.00	23.00	-	23.00	335.00
2012 ⁽¹⁾	373.00	22.20	-	22.20	395.20
2013 ⁽¹⁾	411.60	23.10	-	23.10	434.70
2014 ⁽¹⁾	574.08	29.48	3.37	32.85	606.93
2015	594.58	35.66	6.72	42.38	636.96
2016 ⁽²⁾	581.41	31.82	8.77	40.58	621.99
2017	589.62	30.12	8.59	38.71	628.33
2018	595.53	30.34	8.64	38.97	634.50
2019	598.62	30.56	8.68	39.24	637.86
2020	602.96	30.78	8.72	39.50	642.46
2021	604.31	31.01	8.77	39.77	644.09
2022	609.97	31.32	8.81	40.12	650.10
2023	613.91	32.57	8.85	41.42	655.33
2024	618.99	32.81	8.90	41.71	660.70
2025	620.72	33.07	8.94	42.01	662.72
2026	624.16	33.32	8.99	42.31	666.47

Source: Historical data from MdTA

⁽¹⁾ Year of toll increase.

⁽²⁾ Year of select toll rate reductions.

⁽³⁾ Intercounty Connector and I-95 ETLs

⁽⁴⁾ Summations may not match total due to rounding.

- Represents actual data.

MDTA staff indicated that two factors related to future civil penalty fees should be considered. First, the payment rate for Notice of Toll Dues (NOTDs) is expected to rise as more enforcement tools come online. Second, MDTA implemented a civil penalty waiver program, available through November 2015, which provided a one-time opportunity for video customers to pay their unpaid toll balance and be excused from any associated civil penalties. The potential impact of the civil penalty waiver program was anticipated to reduce revenues from this “Other Toll Revenue” source by 8.3 percent, at a minimum. In order to assume a conservative estimate of future civil penalty fees, MDTA recommended that a new baseline for civil penalty revenues for FY 2016 be estimated by reducing FY 2015 actuals of \$10.75 million by 25 percent and then including an additional one-time reduction of 8.3 percent, for a total of a 31.25 percent reduction or \$7.39 million. This recommended procedure was used for both the legacy and ICC baseline amounts to reflect the civil penalty waiver program. In FY 2017, and thereafter, legacy facility civil penalties were expected to increase by 1 percent per year and ICC civil penalties would be expected to increase by 0.5 percent per year. These FY 2016 reductions proved to be too severe as actual civil penalty revenue collected was \$10.01 million on the legacy facilities, a reduction of only 6.9 percent. On the ICC, the MDTA-provided FY 2016 forecast was \$3.86 million, with actual collections of \$7.22 million. In total, MDTA had forecasted FY 2016 revenue of \$11.3 million and collected \$17.2 million.

4.4.4 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 over-sized and/or overweight vehicles. As of May 1, 2009, a \$25 permit fee was charged and covered all Authority maintained roadways along the vehicle’s route. This fee is a one-time charge and will not be applied at any tolling location.

4.4.5 Concession Revenues

There are two travel plazas along the JFK Highway that provide additional revenue to MDTA through concessions. Both facilities were newly renovated and reopened to the public in 2014. The Maryland House Travel Plaza opened on January 16, 2014 and the Chesapeake House Travel Plaza opened on August 5, 2014. As can be seen in Table 4-9, concession revenue was lower in 2014, a result of closures due to construction activity. However, revenue increased by approximately \$1.8 million in FY 2015 and by \$1.1 million in FY 2016. Concession revenue is forecasted to continually increase through 2026 by approximately 3.4 percent per annum. The data and information used to develop the concession revenue forecast was provided by MDTA based on revenue projections developed by Areas USA MDTP, LLC, the company that redeveloped and currently operates the two travel plazas. For purposes of this report, revenues paid to MDTA by Areas USA are assumed to be 85 percent of Areas USA’s original estimates between FY 2017 and FY 2022, and 90 percent between FY 2023 and FY 2026.

4.4.6 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 E-ZPass® Maryland account. This allows drivers to pay \$20 per year for unlimited trips, plus a transponder charge if it's a new account. 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 cash rate for two-axle vehicle 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.

4.5 Total Annual Revenue Forecasts

Table 4-12 presents a summary of the total systemwide In-Lane Toll Revenue and Other Revenue forecast for FY 2017 through FY 2026, as well as historical data from FY 2011 to FY 2016. Figure 4-1 provides a graphical representation of the systemwide forecasted transactions and In-Lane and “Other Toll Revenue” presented in Table 4-12. The historical data presented in the figure sets the forecast in perspective relative to recent actual trends. Total revenues increased considerably between FY 2011 and FY 2014, growing from \$335.0 million to \$607.0 million, primarily because of the toll increases implemented in these years. Revenues in FY 2015 then increased by 4.9 percent to \$637.0 million. This growth was higher than the average annual increase in revenue in previous years not impacted by toll increases. In those years, growth averaged less than 1 percent. The higher level of growth in FY 2015 was likely related to both the delayed economic recovery from the Great Recession of 2008-2009 and historically low gasoline prices. In FY 2016, revenues decreased by 2.4 percent from \$637.0 million to \$622.0 million, or by \$15.0 million. This was primarily the effect of the toll rate reductions which resulted in In-Lane Toll Revenue declining by \$13.2 million, or 88 percent of the total \$15.0 million decrease.

In FY 2017, the initial year of the forecast, total revenues are estimated at \$628.3 million, a 1.0 percent increase over FY 2016. In the absence of any toll rate changes, annual revenue growth rates going forward has been estimated to increase at more moderate rates ranging from 0.2 to 1.4 percent. In-Lane Toll Revenue is forecasted to increase to \$604.3 million by FY 2021, and to \$624.2 million by FY 2026. Other Revenue, representing approximately 6 percent of the total revenue, is forecasted to grow from \$38.7 million in FY 2017, to \$39.8 million in FY 2021, and to \$42.3 million in FY 2026. In-Lane Toll Revenue is forecasted to increase by 0.6 percent per annum over the 9-year forecast period, while Other Revenue is forecasted to increase by 1.0 percent per annum.

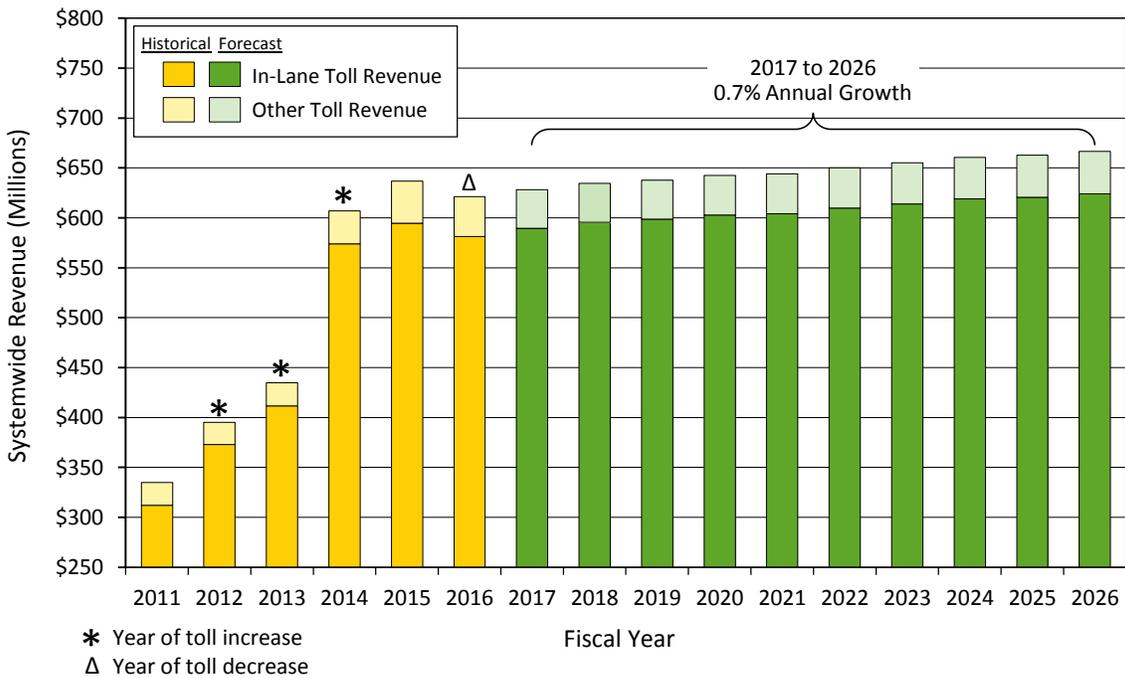
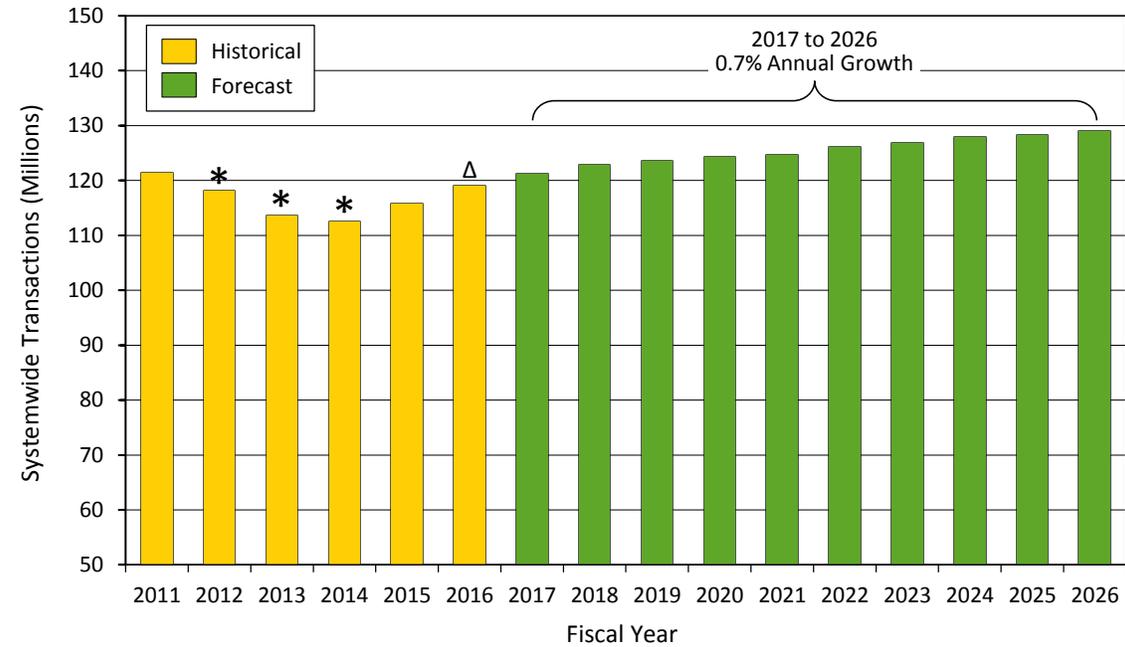
Table 4-12
In-Lane, "Other" and Total Revenue Forecasts

Fiscal Year	Toll Revenue (\$ Millions)					Percent Change
	In-Lane	Percent Change	Other⁽¹⁾	Percent Change	Total	
2011	312.0	1.1	23.0	(1.7)	335.0	0.9
2012	373.0	19.6	22.2	(3.5)	395.2	18.0
2013	411.6	10.3	23.1	4.1	434.7	10.0
2014	574.1	39.5	32.9	42.2	606.9	39.6
2015	594.6	3.6	42.4	29.0	637.0	4.9
2016	581.4	(2.2)	40.6	(4.2)	622.0	(2.4)
2017	589.6	1.4	38.7	(4.6)	628.3	1.0
2018	595.5	1.0	39.0	0.7	634.5	1.0
2019	598.6	0.5	39.2	0.7	637.9	0.5
2020	603.0	0.7	39.5	0.7	642.5	0.7
2021	604.3	0.2	39.8	0.7	644.1	0.3
2022	610.0	0.9	40.1	0.9	650.1	0.9
2023	613.9	0.6	41.4	3.2	655.3	0.8
2024	619.0	0.8	41.7	0.7	660.7	0.8
2025	620.7	0.3	42.0	0.7	662.7	0.3
2026	624.2	0.6	42.3	0.7	666.5	0.6

⁽¹⁾ Includes "Other Revenue" from the ICC and I-95 ETL

- Represents actual data.

Figure 4-1
Historical and Forecasted Transactions and Total Toll Revenue



4.6 Total Monthly Transaction and Toll Revenue Forecasts

For purposes of budgeting and the tracking of actual versus forecasted transactions and revenue by MDTA, monthly forecasts of transactions and In-Lane Toll Revenue were also developed for FY 2017 and FY 2018. Tables 4-13 and 4-14 summarize the forecasts of transactions and In-Lane Toll Revenue for the seven legacy facilities.

July was estimated to have the greatest number of transactions with 11.2 million in FY 2017 and 11.3 million in FY 2018. Alternatively, January represents the month with the fewest number of transactions at 8.3 million in FY 2017 and 8.4 million in FY 2018. In both years, the total number of E-ZPass® transactions (including commuters, shoppers, and Hatem A&B Plans) is approximately 156 percent greater than the cash/video transactions for two-axle vehicles. Additionally, in both FY 2017 and FY 2018, E-ZPass® transactions represent approximately 71 percent of all two-axle vehicle transactions, and 84 percent of all three-or-more-axle vehicle transactions.

The highest In-Lane Toll Revenue is forecasted to occur in July of FY 2017 and FY 2018, with totals of \$54.3 million and \$54.7 million, respectively. Further, the lowest revenue is forecasted in January FY 2017 and FY 2018 at \$39.9 million and \$40.3 million, respectively. The total forecasted In-Lane Toll Revenue is \$589.6 million in FY 2017 and \$595.5 million in FY 2018.

Table 4-15 provides a summary of the monthly In-Lane Toll Revenue, as well as “Other Toll Revenue” and Total Toll Revenue.

Table 4-13
Monthly Transactions and In-Lane Toll Revenue
by Method of Payment
FY 2017 and FY 2018

Month	Transactions (000)												Total
	2 Axle						3+ Axle						
	Commuters & Shoppers	MD Plan	Out-of-State Plan	Total	Cash / Video	Official Duty	Hattem Plan A + B	Total	E-ZPass	Cash / Video	Total		
July-16	2,868	1,909	2,003	3,912	3,160	139	365	10,444	625	127	752	11,195	
August-16	2,713	1,814	1,938	3,751	3,105	132	364	10,066	606	121	727	10,793	
September-16	2,773	1,816	1,847	3,662	2,559	131	347	9,472	600	117	717	10,189	
October-16	2,788	1,828	1,896	3,724	2,598	131	359	9,601	629	119	748	10,349	
November-16	2,639	1,744	1,854	3,597	2,692	125	332	9,386	564	108	672	10,057	
December-16	2,641	1,739	1,838	3,578	2,548	125	336	9,227	580	102	682	9,909	
January-17	2,276	1,487	1,537	3,024	1,944	106	304	7,654	518	86	604	8,257	
February-17	2,350	1,526	1,563	3,089	1,989	110	309	7,846	529	87	617	8,463	
March-17	2,838	1,857	1,939	3,796	2,508	133	365	9,641	638	111	749	10,390	
April-17	2,777	1,826	1,926	3,751	2,531	131	351	9,541	625	113	738	10,280	
May-17	2,825	1,869	1,980	3,849	2,744	134	357	9,909	630	120	750	10,659	
June-17	2,818	1,859	1,933	3,792	2,823	133	362	9,929	668	125	793	10,722	
FY 2017	32,307	21,273	22,251	43,525	31,202	1,531	4,150	112,715	7,213	1,336	8,549	121,264	
July-17	2,908	1,926	2,016	3,942	3,187	141	368	10,546	628	128	755	11,301	
August-17	2,752	1,836	1,958	3,794	3,142	134	368	10,191	610	122	732	10,922	
September-17	2,814	1,839	1,866	3,705	2,590	133	350	9,593	604	117	721	10,314	
October-17	2,830	1,852	1,916	3,768	2,630	133	362	9,723	633	120	753	10,476	
November-17	2,678	1,766	1,873	3,639	2,725	127	335	9,505	567	109	676	10,180	
December-17	2,680	1,761	1,858	3,619	2,579	127	339	9,344	584	103	686	10,030	
January-18	2,310	1,506	1,554	3,060	1,967	108	307	7,752	521	86	607	8,359	
February-18	2,388	1,549	1,586	3,136	2,019	112	312	7,966	533	88	621	8,587	
March-18	2,884	1,885	1,968	3,854	2,545	135	369	9,787	642	112	754	10,541	
April-18	2,822	1,853	1,954	3,808	2,569	133	355	9,685	630	114	743	10,429	
May-18	2,870	1,897	2,009	3,906	2,784	136	361	10,057	634	121	755	10,812	
June-18	2,864	1,888	1,962	3,850	2,864	135	365	10,078	673	126	798	10,876	
FY 2018	32,799	21,558	22,522	44,080	31,600	1,555	4,192	114,226	7,258	1,344	8,602	122,828	

**Table 4-14
Monthly Transactions and In-Lane Toll Revenue by
Method of Payment
FY 2017 and FY 2018**

Month	In-Lane Toll Revenue (000)													Total
	E-ZPass						2 Axle						3+ Axle	
	Commuters & Shoppers	MD Plan	State Plan	Out-of- State Plan	Total	Cash/ Video	Official Duty	Hatem Plan A + B	Total 2 Axle	E-ZPass	Cash/ Video	Total 3+ Axle		
July-16	\$ 4,207	\$ 6,221	\$ 10,561	\$ 16,782	\$ 15,154	-	-	\$ -	\$ 36,144	\$ 15,125	\$ 2,998	\$ 18,123	\$ 54,267	
August-16	3,992	5,956	10,367	16,323	14,924	-	-	-	35,239	14,700	2,870	17,570	52,810	
September-16	4,047	5,854	9,522	15,375	12,208	-	-	-	31,630	14,555	2,784	17,338	48,969	
October-16	4,073	5,924	9,818	15,742	12,514	-	-	-	32,329	15,275	2,873	18,148	50,477	
November-16	3,864	5,694	9,730	15,424	13,198	-	-	-	32,486	13,742	2,643	16,385	48,871	
December-16	3,864	5,667	9,595	15,262	12,201	-	-	-	31,327	14,124	2,473	16,597	47,924	
January-17	3,319	4,807	7,895	12,702	9,238	-	-	-	25,259	12,602	2,080	14,683	39,942	
February-17	3,423	4,922	7,991	12,913	9,415	-	-	-	25,751	12,871	2,115	14,986	40,737	
March-17	4,147	6,033	10,070	16,103	11,967	-	-	-	32,217	15,554	2,665	18,218	50,435	
April-17	4,062	5,950	10,080	16,031	12,131	-	-	-	32,224	15,237	2,724	17,961	50,185	
May-17	4,138	6,099	10,417	16,517	13,187	-	-	-	33,841	15,375	2,878	18,254	52,095	
June-17	4,119	6,014	10,007	16,021	13,562	-	-	-	33,701	16,236	2,966	19,203	52,904	
FY 2017	\$ 47,256	\$ 69,142	\$ 116,053	\$ 185,195	\$ 149,699	-	-	\$ -	\$ 382,150	\$ 175,397	\$ 32,070	\$ 207,467	\$ 589,617	
July-17	4,264	6,276	10,636	16,912	15,278	-	-	-	36,454	15,213	3,015	18,228	54,682	
August-17	4,048	6,028	10,468	16,496	15,092	-	-	-	35,637	14,778	2,886	17,664	53,301	
September-17	4,106	5,926	9,618	15,544	12,347	-	-	-	31,997	14,635	2,799	17,434	49,431	
October-17	4,133	5,998	9,917	15,915	12,658	-	-	-	32,706	15,359	2,888	18,248	50,954	
November-17	3,920	5,764	9,827	15,592	13,353	-	-	-	32,865	13,818	2,658	16,476	49,341	
December-17	3,920	5,737	9,691	15,429	12,341	-	-	-	31,689	14,203	2,488	16,691	48,380	
January-18	3,368	4,867	7,977	12,844	9,344	-	-	-	25,555	12,674	2,092	14,766	40,321	
February-18	3,477	4,995	8,099	13,095	9,548	-	-	-	26,119	12,953	2,129	15,081	41,200	
March-18	4,212	6,122	10,205	16,327	12,133	-	-	-	32,671	15,650	2,681	18,331	51,003	
April-18	4,126	6,037	10,214	16,252	12,299	-	-	-	32,676	15,331	2,741	18,072	50,748	
May-18	4,202	6,188	10,554	16,742	13,366	-	-	-	34,310	15,470	2,896	18,366	52,676	
June-18	4,184	6,103	10,141	16,244	13,743	-	-	-	34,171	16,337	2,984	19,321	53,491	
FY 2018	\$ 47,958	\$ 70,043	\$ 117,347	\$ 187,390	\$ 151,502	-	-	\$ -	\$ 386,850	\$ 176,420	\$ 32,257	\$ 208,677	\$ 595,527	

Table 4-15
Monthly Forecasted In-Lane and "Other" Toll Revenue

		Toll Revenue (\$ millions)		
	Month	In-Lane	Other ⁽¹⁾	Total
Fiscal Year 2017	Jul-16	\$ 54.27	\$ 2.21	\$ 56.48
	Aug-16	52.81	2.98	55.79
	Sep-16	48.97	2.59	51.56
	Oct-16	50.48	1.90	52.38
	Nov-16	48.87	1.82	50.69
	Dec-16	47.92	2.27	50.20
	Jan-17	39.94	2.60	42.55
	Feb-17	40.74	3.26	44.00
	Mar-17	50.44	3.54	53.98
	Apr-17	50.19	3.69	53.88
	May-17	52.10	3.71	55.81
	Jun-17	52.90	8.12	61.02
		Total	\$ 589.62	\$ 38.71
Fiscal Year 2018	Jul-17	\$ 54.68	\$ 2.64	\$ 57.32
	Aug-17	53.30	2.77	56.07
	Sep-17	49.43	2.31	51.74
	Oct-17	50.95	1.75	52.70
	Nov-17	49.34	1.62	50.96
	Dec-17	48.38	2.13	50.51
	Jan-18	40.32	2.53	42.85
	Feb-18	41.20	3.48	44.68
	Mar-18	51.00	3.81	54.81
	Apr-18	50.75	3.81	54.56
	May-18	52.68	3.79	56.46
	Jun-18	53.49	8.34	61.84
		Total	\$ 595.53	\$ 38.97

⁽¹⁾ Includes "Other Toll Revenue" from the ICC and I-95 ETL

4.7 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 Maryland Transportation Authority. CDM Smith also relied upon the reasonable assurances of independent parties and is not aware of any material facts that would make such information misleading.

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

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

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

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

CDM Smith is not, and has not been, a municipal advisor as defined in Federal law (the Dodd Frank Bill) to the Maryland Transportation Authority and does not owe a fiduciary duty pursuant to Section 15B of the Exchange Act to the Maryland Transportation Authority with respect to the information and material contained in this report. CDM Smith is not recommending and has not recommended any action to the Maryland Transportation Authority. The Maryland Transportation Authority should discuss the information and material contained in this report with any and all internal and external advisors that it deems appropriate before acting on this information.

Appendix A

Approved Toll Schedule

New Lower Toll Rates Effective July 1

William Preston Lane, Jr., Memorial (Bay) Bridge (US 50/301)*
 Increased *E-ZPass* Maryland discount from 10% to 37.5%
 Decreased Cash/Base, Commuter and Shoppers rates by 33%

Cash/Base Rates		
	Current	7/1/2015
2-axle	\$ 6.00	\$ 4.00
3-axle	\$ 12.00	\$ 8.00
4-axle	\$ 18.00	\$ 12.00
5-axle	\$ 36.00	\$ 24.00
6+-axle	\$ 45.00	\$ 30.00

<i>E-ZPass</i> Maryland Rates		
	Current	7/1/2015
Commuter	\$ 2.10	\$ 1.40
2-axle	\$ 5.40	\$ 2.50
Shoppers	\$ 3.00	\$ 2.00

Video Toll Rates		
	Current	7/1/2015
2-axle	\$ 9.00	\$ 6.00
3-axle	\$ 18.00	\$ 12.00
4-axle	\$ 27.00	\$ 18.00
5-axle	\$ 51.00	\$ 36.00
6+-axle	\$ 60.00	\$ 45.00

**Intercounty Connector (ICC)/MD 200
 I-95 Express Toll Lanes (ETL)**
 Reduced 2-axle rate ranges by \$0.03/mile

<i>E-ZPass</i> /Base Rates (Toll/Mile)		
	Current	7/1/2015
2-axle		
Peak	\$ 0.25	\$ 0.22
Off-peak	\$ 0.20	\$ 0.17
Overnight	\$ 0.10	\$ 0.07
3-axle		
Peak	\$ 0.75	\$ 0.44
Off-peak	\$ 0.60	\$ 0.34
Overnight	\$ 0.30	\$ 0.14
4-axle		
Peak	\$ 1.125	\$ 0.66
Off-peak	\$ 0.90	\$ 0.51
Overnight	\$ 0.45	\$ 0.21
5-axle		
Peak	\$ 1.50	\$ 1.32
Off-peak	\$ 1.20	\$ 1.02
Overnight	\$ 0.60	\$ 0.42
6+-axle		
Peak	\$ 1.875	\$ 1.65
Off-peak	\$ 1.50	\$ 1.275
Overnight	\$ 0.75	\$ 0.525

**Baltimore Harbor Tunnel (I-895),
 Fort McHenry Tunnel (I-95/I-395)
 and Francis Scott Key Bridge (I-695)**
 Increased *E-ZPass* Maryland discount from 10% to 25%

<i>E-ZPass</i> Maryland Rates		
	Current	7/1/2015
2-axle	\$ 3.60	\$ 3.00

John F. Kennedy Memorial Highway (I-95)*
 Increased *E-ZPass* Maryland discount from 10% to 25%

<i>E-ZPass</i> Maryland Rates		
	Current	7/1/2015
2-axle	\$ 7.20	\$ 6.00

Thomas J. Hatem Memorial Bridge (US 40)*
 Increased *E-ZPass* Maryland discount from 10% to 25%
 30% discount for 3- and 4-axle vehicles

<i>E-ZPass</i> Maryland Rates		
	Current	7/1/2015
2-axle	\$ 7.20	\$ 6.00
3-axle	\$ 16.00	\$ 11.20
4-axle	\$ 24.00	\$ 16.80

Gov. Harry W. Nice Memorial Bridge (US 301)*
 Increased *E-ZPass* Maryland discount from 10% to 25%

<i>E-ZPass</i> Maryland Rates		
	Current	7/1/2015
2-axle	\$ 5.40	\$ 4.50

* tolls collected in one direction only

Additional approved changes effective July 1, 2015:

- No \$1.50 *E-ZPass* monthly account maintenance fee for Maryland addresses and for out-of-state addresses with three or more trips at Maryland toll facilities in the previous statement period.
- Increase *E-ZPass* Maryland supplemental rebate program by 5 percentage points per trip level for vehicles with 5+ axles.

Additional approved changes effective January 1, 2016:

- Decrease toll rates to \$2 per axle for commercial vehicle drivers with *E-ZPass* Maryland using the Childs Street (I-895) and Francis Scott Key Bridge (I-695) turnaround exits.

Supplemental Rebate Program (%)		
Current	7/1/2015	Trips
5	10	60-79
10	15	80-99
15	20	100+

New Childs Street and I-695 Turnaround Discount		
	Current	1/1/2016
3-axle	\$ 8.00	\$ 6.00
4-axle	\$ 12.00	\$ 8.00
5-axle	\$ 24.00	\$ 10.00
6+-axle	\$ 30.00	\$ 12.00

For a full list of toll rates, ICC/ETL pricing periods and additional information, visit mdta.maryland.gov.

Appendix B

Detailed Traffic and Revenue Forecasts by Facility

Table B-1
John F. Kennedy Memorial Highway (I-95)
Transactions and In-Lane Toll Revenue Estimates by Vehicle Class

Fiscal Year	Transactions (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾
2016	13.40		1.76		15.16	
2017	13.49	0.7%	1.76	0.1%	15.26	0.6%
2018	13.60	0.8%	1.77	0.4%	15.37	0.8%
2019	13.71	0.8%	1.78	0.3%	15.49	0.7%
2020	13.86	1.1%	1.79	0.8%	15.65	1.0%
2021	13.93	0.5%	1.79	0.2%	15.73	0.5%
2022	14.06	0.9%	1.81	0.7%	15.86	0.9%
2023	14.18	0.9%	1.82	0.7%	16.00	0.9%
2024	14.35	1.2%	1.84	0.9%	16.19	1.1%
2025	14.44	0.6%	1.84	0.3%	16.28	0.6%
2026	14.57	0.9%	1.85	0.6%	16.42	0.9%
Fiscal Year	In-Lane Toll Revenues (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾
2016	\$98.68		\$72.50		\$171.18	
2017	99.37	0.7%	72.58	0.1%	171.94	0.4%
2018	100.16	0.8%	72.87	0.4%	173.03	0.6%
2019	100.96	0.8%	73.09	0.3%	174.05	0.6%
2020	102.05	1.1%	73.65	0.8%	175.70	0.9%
2021	102.58	0.5%	73.82	0.2%	176.40	0.4%
2022	103.51	0.9%	74.34	0.7%	177.84	0.8%
2023	104.44	0.9%	74.86	0.7%	179.30	0.8%
2024	105.67	1.2%	75.51	0.9%	181.18	1.1%
2025	106.33	0.6%	75.76	0.3%	182.09	0.5%
2026	107.28	0.9%	76.21	0.6%	183.50	0.8%

⁽¹⁾ Average Annual Percent Change

Table B-2
Thomas J. Hatem Memorial Bridge (US 40)
Transactions and In-Lane Toll Revenue Estimates by Vehicle Class

Fiscal Year	Transactions (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾
2016	4.88		0.21		5.09	
2017	4.94	1.3%	0.21	1.8%	5.16	1.3%
2018	4.99	1.0%	0.22	1.0%	5.21	1.0%
2019	5.02	0.6%	0.22	0.3%	5.24	0.6%
2020	5.07	1.0%	0.22	0.7%	5.29	1.0%
2021	5.09	0.4%	0.22	0.1%	5.31	0.4%
2022	5.13	0.8%	0.22	0.4%	5.35	0.8%
2023	5.17	0.8%	0.22	0.4%	5.39	0.8%
2024	5.23	1.1%	0.22	0.7%	5.45	1.1%
2025	5.26	0.5%	0.22	0.1%	5.48	0.5%
2026	5.30	0.8%	0.22	0.4%	5.52	0.8%
Fiscal Year	In-Lane Toll Revenues (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾
2016	\$5.28		\$6.52		\$11.80	
2017	5.35	1.3%	6.64	1.8%	11.99	1.6%
2018	5.40	1.0%	6.71	1.0%	12.11	1.0%
2019	5.43	0.6%	6.73	0.3%	12.16	0.4%
2020	5.49	1.0%	6.77	0.7%	12.26	0.8%
2021	5.51	0.4%	6.78	0.1%	12.29	0.3%
2022	5.55	0.8%	6.81	0.4%	12.36	0.6%
2023	5.60	0.8%	6.84	0.4%	12.43	0.6%
2024	5.66	1.1%	6.88	0.7%	12.54	0.9%
2025	5.69	0.5%	6.89	0.1%	12.58	0.3%
2026	5.73	0.8%	6.92	0.4%	12.65	0.6%

⁽¹⁾ Average Annual Percent Change

Table B-3
Baltimore Harbor Tunnel (I-895)
Transactions and In-Lane Toll Revenue Estimates by Vehicle Class

Fiscal Year	Transactions (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾
2016	27.65		0.63		28.29	
2017 ⁽²⁾	26.22	-5.2%	0.59	-6.9%	26.81	-5.2%
2018	26.32	0.4%	0.59	-0.4%	26.91	0.4%
2019 ^(2,3)	24.09	-8.5%	0.53	-8.8%	24.62	-8.5%
2020	23.25	-3.5%	0.52	-3.5%	23.77	-3.5%
2021	23.25	0.0%	0.52	0.0%	23.76	0.0%
2022 ⁽³⁾	28.17	21.2%	0.63	21.2%	28.80	21.2%
2023	28.72	1.9%	0.64	1.9%	29.35	1.9%
2024	28.85	0.5%	0.64	0.5%	29.49	0.5%
2025	28.83	-0.1%	0.64	-0.1%	29.47	-0.1%
2026	28.89	0.2%	0.64	0.2%	29.53	0.2%
Fiscal Year	In-Lane Toll Revenues (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾
2016	\$80.65		\$9.22		\$89.87	
2017 ⁽²⁾	76.47	-5.2%	8.58	-6.9%	85.05	-5.4%
2018	76.76	0.4%	8.54	-0.4%	85.30	0.3%
2019 ^(2,3)	70.25	-8.5%	7.79	-8.8%	78.04	-8.5%
2020	67.86	-3.4%	7.52	-3.4%	75.38	-3.4%
2021	67.80	-0.1%	7.52	-0.1%	75.31	-0.1%
2022 ⁽³⁾	82.16	21.2%	9.11	21.2%	91.27	21.2%
2023	83.75	1.9%	9.28	1.9%	93.04	1.9%
2024	84.15	0.5%	9.33	0.5%	93.48	0.5%
2025	84.09	-0.1%	9.32	-0.1%	93.41	-0.1%
2026	84.25	0.2%	9.34	0.2%	93.59	0.2%

⁽¹⁾ Average Annual Percent Change.
⁽²⁾ Construction begins on Patapsco Flats Bridge on August 2016 and ends May 2019.
⁽³⁾ Construction begins on Canton Viaduct replacement on January 2019 and ends July 2021.

Table B-4
Fort McHenry Tunnel (I-95)
Transactions and In-Lane Toll Revenue Estimates by Vehicle Class

Fiscal Year	Transactions (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾
2016	38.88		3.76		42.64	
2017 ^(2,3)	41.48	6.7%	3.89	3.3%	45.36	6.4%
2018	42.33	2.1%	3.92	0.9%	46.25	2.0%
2019 ^(2,3,4)	44.56	5.3%	3.98	1.6%	48.55	5.0%
2020	45.91	3.0%	4.01	0.8%	49.92	2.8%
2021	46.12	0.5%	4.00	-0.3%	50.13	0.4%
2022 ⁽⁴⁾	43.25	-6.2%	3.93	-1.8%	47.17	-5.9%
2023	43.37	0.3%	3.92	-0.2%	47.29	0.2%
2024	43.88	1.2%	3.93	0.3%	47.81	1.1%
2025	44.15	0.6%	3.92	-0.3%	48.07	0.6%
2026	44.55	0.9%	3.92	0.0%	48.47	0.8%
Fiscal Year	In-Lane Toll Revenues (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾
2016	\$115.99		\$75.29		\$191.29	
2017 ^(2,3)	123.75	6.7%	77.75	3.3%	201.50	5.3%
2018	126.31	2.1%	78.45	0.9%	204.76	1.6%
2019 ^(2,3,4)	132.76	5.1%	79.36	1.2%	212.12	3.6%
2020	136.68	3.0%	79.86	0.6%	216.54	2.1%
2021	137.34	0.5%	79.64	-0.3%	216.99	0.2%
2022 ⁽⁴⁾	129.01	-6.1%	78.59	-1.3%	207.60	-4.3%
2023	129.39	0.3%	78.49	-0.1%	207.88	0.1%
2024	130.91	1.2%	78.71	0.3%	209.62	0.8%
2025	131.73	0.6%	78.49	-0.3%	210.22	0.3%
2026	132.91	0.9%	78.49	0.0%	211.40	0.6%

⁽¹⁾ Average Annual Percent Change
⁽²⁾ Construction begins on Patapsco Flats Bridge on August 2016 and ends May 2019.
⁽³⁾ Construction begins on I-95 improvements on February 2017 and ends December 2018.
⁽⁴⁾ Construction begins on Canton Viaduct replacement on January 2019 and ends July 2021.

Table B-5
Francis Scott Key Bridge (I-695)
Transactions and In-Lane Toll Revenue Estimates by Vehicle Class

Fiscal Year	Transactions (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾
2016	10.19		1.01		11.20	
2017 ^(2,3)	10.97	7.7%	1.02	1.1%	11.99	7.1%
2018	11.29	3.0%	1.03	0.7%	12.32	2.8%
2019 ^(2,3,4)	11.73	3.9%	1.04	1.3%	12.77	3.6%
2020	11.80	0.6%	1.05	0.7%	12.85	0.6%
2021	11.82	0.2%	1.05	0.2%	12.87	0.2%
2022 ⁽⁴⁾	10.90	-7.8%	1.03	-1.6%	11.94	-7.3%
2023	10.86	-0.4%	1.04	0.3%	11.90	-0.3%
2024	10.94	0.8%	1.05	0.8%	11.99	0.8%
2025	10.97	0.2%	1.05	0.2%	12.01	0.2%
2026	11.02	0.5%	1.05	0.5%	12.07	0.5%
Fiscal Year	In-Lane Toll Revenues (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾
2016	\$24.47		\$18.80		\$43.28	
2017 ^(2,3)	26.35	7.7%	19.01	1.1%	45.36	4.8%
2018	27.14	3.0%	19.13	0.7%	46.27	2.0%
2019 ^(2,3,4)	28.66	5.6%	19.28	0.8%	47.94	3.6%
2020	28.82	0.5%	19.42	0.7%	48.24	0.6%
2021	28.88	0.2%	19.47	0.2%	48.34	0.2%
2022 ⁽⁴⁾	26.24	-9.1%	19.25	-1.1%	45.49	-5.9%
2023	26.09	-0.6%	19.31	0.3%	45.40	-0.2%
2024	26.29	0.8%	19.46	0.8%	45.75	0.8%
2025	26.35	0.2%	19.50	0.2%	45.86	0.2%
2026	26.48	0.5%	19.60	0.5%	46.09	0.5%

⁽¹⁾ Average Annual Percent Change
⁽²⁾ Construction begins on Patapsco Flats Bridge on August 2016 and ends May 2019.
⁽³⁾ Construction begins on I-95 improvements on February 2017 and ends December 2018.
⁽⁴⁾ Construction begins on Canton Viaduct replacement on January 2019 and ends July 2021.

Table B-6
William Preston Lane Jr. Memorial Bridge (US 50/301)
Transactions and In-Lane Toll Revenue Estimates by Vehicle Class

Fiscal Year	Transactions (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾
2016	12.40		0.87		13.27	
2017	12.45	0.4%	0.88	1.1%	13.34	0.5%
2018	12.52	0.5%	0.89	1.0%	13.41	0.5%
2019	12.52	0.0%	0.90	0.8%	13.41	0.1%
2020	12.55	0.3%	0.91	1.3%	13.46	0.3%
2021	12.52	-0.3%	0.92	0.8%	13.43	-0.2%
2022	12.52	0.0%	0.93	1.4%	13.45	0.1%
2023	12.52	0.0%	0.94	1.4%	13.46	0.1%
2024	12.55	0.3%	0.96	1.3%	13.51	0.3%
2025	12.52	-0.3%	0.96	0.7%	13.48	-0.2%
2026	12.52	0.0%	0.97	1.0%	13.49	0.1%
Fiscal Year	In-Lane Toll Revenues (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾
2016	\$35.60		\$17.19		\$52.79	
2017	35.76	0.4%	17.38	1.1%	53.13	0.7%
2018	35.93	0.5%	17.55	1.0%	53.49	0.7%
2019	35.93	0.0%	17.69	0.8%	53.63	0.3%
2020	36.03	0.3%	17.92	1.3%	53.95	0.6%
2021	35.93	-0.3%	18.07	0.8%	54.00	0.1%
2022	35.93	0.0%	18.32	1.4%	54.25	0.5%
2023	35.93	0.0%	18.58	1.4%	54.51	0.5%
2024	36.03	0.3%	18.81	1.3%	54.85	0.6%
2025	35.93	-0.3%	18.95	0.7%	54.88	0.1%
2026	35.93	0.0%	19.14	1.0%	55.07	0.3%

⁽¹⁾ Average Annual Percent Change

Table B-7
Harry W. Nice Memorial Bridge (US 301)
Transactions and In-Lane Toll Revenue Estimates by Vehicle Class

Fiscal Year	Transactions (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾
2016	3.17		0.21		3.38	
2017	3.16	-0.3%	0.19	-8.5%	3.35	-0.8%
2018	3.17	0.3%	0.19	-2.0%	3.36	0.2%
2019	3.19	0.6%	0.19	0.3%	3.38	0.6%
2020	3.22	0.9%	0.19	1.3%	3.41	0.9%
2021	3.23	0.3%	0.19	0.8%	3.42	0.4%
2022	3.25	0.7%	0.19	1.4%	3.45	0.7%
2023	3.27	0.7%	0.20	1.4%	3.47	0.7%
2024	3.31	1.0%	0.20	1.3%	3.51	1.0%
2025	3.32	0.4%	0.20	0.7%	3.52	0.4%
2026	3.34	0.7%	0.20	1.0%	3.55	0.7%
Fiscal Year	In-Lane Toll Revenues (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾
2016	\$15.16		\$6.05		\$21.20	
2017	15.10	-0.3%	5.53	-8.5%	20.64	-2.7%
2018	15.15	0.3%	5.42	-2.0%	20.57	-0.3%
2019	15.24	0.6%	5.44	0.3%	20.68	0.5%
2020	15.37	0.9%	5.51	1.3%	20.88	1.0%
2021	15.42	0.3%	5.55	0.8%	20.98	0.5%
2022	15.53	0.7%	5.63	1.4%	21.16	0.9%
2023	15.64	0.7%	5.71	1.4%	21.35	0.9%
2024	15.79	1.0%	5.78	1.3%	21.57	1.1%
2025	15.86	0.4%	5.82	0.7%	21.68	0.5%
2026	15.97	0.7%	5.88	1.0%	21.85	0.8%

⁽¹⁾ Average Annual Percent Change

Table B-8
Total Legacy Facilities
Transactions and In-Lane Toll Revenue Estimates by Vehicle Class

Fiscal Year	Transactions (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾	Transactions	AAPC ⁽¹⁾
2016	110.57		8.46		119.03	
2017	112.72	1.9%	8.55	1.0%	121.26	1.9%
2018	114.23	1.3%	8.60	0.6%	122.83	1.3%
2019	114.82	0.5%	8.64	0.4%	123.46	0.5%
2020	115.66	0.7%	8.69	0.6%	124.35	0.7%
2021	115.96	0.3%	8.69	0.1%	124.65	0.2%
2022	117.27	1.1%	8.74	0.6%	126.02	1.1%
2023	118.09	0.7%	8.78	0.4%	126.86	0.7%
2024	119.11	0.9%	8.83	0.6%	127.94	0.8%
2025	119.48	0.3%	8.84	0.1%	128.32	0.3%
2026	120.18	0.6%	8.87	0.3%	129.05	0.6%
Fiscal Year	In-Lane Toll Revenues (millions)					
	Passenger Cars		Commercial Vehicles		Total	
	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾	Revenue	AAPC ⁽¹⁾
2016	\$375.83		\$205.58		\$581.41	
2017	382.15	1.7%	207.47	0.9%	589.62	1.4%
2018	386.85	1.2%	208.68	0.6%	595.53	1.0%
2019	389.24	0.6%	209.37	0.3%	598.62	0.5%
2020	392.30	0.8%	210.66	0.6%	602.96	0.7%
2021	393.47	0.3%	210.85	0.1%	604.31	0.2%
2022	397.93	1.1%	212.04	0.6%	609.97	0.9%
2023	400.84	0.7%	213.07	0.5%	613.91	0.6%
2024	404.50	0.9%	214.49	0.7%	618.99	0.8%
2025	405.98	0.4%	214.74	0.1%	620.72	0.3%
2026	408.57	0.6%	215.59	0.4%	624.16	0.6%

⁽¹⁾ Average Annual Percent Change