Pennsylvania Turnpike 2023 Traffic and Revenue Forecast Study

PENNA TURN-PIKE

Pennsylvania Turnpike Commission

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CDM Smith

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Chapter 1
Introduction

This report summarizes the analyses conducted by CDM Smith in developing a new detailed investment grade traffic and toll revenue estimates for the various toll facilities operated by the Pennsylvania Turnpike Commission (PTC). CDM Smith forecasts have been used by PTC for more than 25 years in support of the issuance of bond financing and for internal financial planning, with regular periodic updates to have up-to-date traffic and revenue forecasts based on the most current information available.

CDM Smith last developed a detailed investment grade traffic and toll revenue study in April 2018. Since that time additional "bring down" letters have also been developed to update forecasts developed in the 2018 Study. Bring down letters were developed in April 2019, May 2020, December 2020, May 2021, and July 2022. The purpose of a bring down letter is to update actual traffic and revenue experience since the last study and to adjust short-term (2- to 5-year) forecasts based on recent trends. Because CDM Smith does not conduct detailed economic analyses as part of a bring down letter, the longer-term forecasts set forth in the bring down letters were not adjusted from those originally developed as part of the 2018 investment grade study. Based on the advice of CDM Smith, the full investment grade study was delayed to 2023 to capture long-term implications from the COVID-19 pandemic and socio-economic changes that may occur and impact traffic trends in the long term.

This current study includes a comprehensive evaluation of the most currently available long-term socioeconomic forecasts and is therefore meant to be an update of the April 2018 investment grade study. This forecast is benchmarked to current traffic and revenue of the various PTC toll facilities, including average toll rates, payment types, and collection rates and includes updated long-term traffic and revenue forecasts through FY 2052-53 (the "forecast period"). PTC's most recent assumptions regarding future toll rate increases, discount levels for the Commercial Volume Discount Program, and future committed capital improvements have been incorporated into this study. CDM Smith also developed and incorporated estimates of future year E-ZPass penetration for passenger cars (PCs) and commercial vehicles (CVs) on PTC's toll facilities. In addition, CDM Smith has included estimated short-term traffic and revenue impacts that would be consistent with the possibility of a mild recession beginning later this year, consistent with the Federal Reserve's forecast assumption.

1.1 Report Structure

This report is comprised of four chapters, as follows:

Chapter 1: Introduction

Chapter 2: Turnpike Characteristics

Chapter 3: Socioeconomic Trends and Forecasts

Chapter 4: Transaction and Toll Revenue Forecasts

The following is a brief description of each chapter following this introduction.

Chapter 2 (Turnpike Characteristics) provides a review of monthly and annual transaction and toll revenue trends. Data are provided for passenger cars and commercial vehicles separately. Information is provided for the entire Turnpike System as well as for each of the individual toll facilities (Ticket System, Turnpike 43, etc.) that make up the Turnpike System. E-ZPass market share trends, historical toll rate adjustments, and changes to the Commercial Volume Discount Program are also summarized in Chapter 2.

Chapter 3 (Socioeconomic Trends and Forecasts) summarizes trends and forecasts in key socioeconomic variables, including population, employment, retail sales, and gross regional product. This data is broken down (at a county level) to reflect the actual market share for the various interchanges on the Turnpike System. Pennsylvania statewide data, as well as data for surrounding states and the United States, are also provided for each of these variables. Trends and forecasts in motor fuel prices are also covered in this chapter. The methodology used to estimate future traffic growth is described in detail. The ultimate product of Chapter 3 is a table showing the assumed normal growth rates used to develop traffic and toll revenue estimates for passenger cars and commercial vehicles for each Turnpike toll facility.

Chapter 4 (Transaction and Toll Revenue Forecasts) begins with a review of the assumed roadway improvement program for the Pennsylvania Turnpike. Planned toll rate adjustments throughout the 30-year forecast period are identified. Because of the toll differential that exists between Toll By Plate (TBP) and E-ZPass transactions, assumptions regarding future E-ZPass market share are important. All assumptions regarding E-ZPass market share throughout the forecast period are discussed in this chapter. Finally, estimates of traffic and gross toll revenue are provided through FY 2052-53. Forecasts are provided for passenger cars and commercial vehicles for both the Ticket System and the total Barrier System, as well as for the total Turnpike System. Lastly, adjustments are made to the toll revenue forecasts to account for TBP bad debt expenses. TBP “bad debt expense” is the term PTC uses to describe the portion of TBP invoices that are not paid. Bad debt expense can occur for a number of reasons, such as customer behaviors (including both confusion and theft) or system/data issues.

Chapter 2
Turnpike Characteristics

This chapter presents historical transaction and gross toll revenue trends on Turnpike facilities. **Section 2.1** describes Turnpike facilities, **Section 2.2** discusses historical toll rates and the Commercial Volume Discount Program, **Section 2.3** summarizes annual transaction trends, **Section 2.4** examines monthly transactions and gross toll revenue trends, **Section 2.5** compares measures of commercial activity against transaction trends, **Section 2.6** summarizes annual transaction and gross toll revenue trends, and **Section 2.7** discusses E-ZPass market share.

2.1 The Pennsylvania Turnpike Facilities

Figure 2-1 provides an overview of the Turnpike System, identifying each of its six toll facilities:

- Mainline I-76/I-276/I-95 from Ohio to New Jersey (359 miles) – This includes the barrier plazas at Gateway and Delaware River Bridge. I-80, which is toll-free and follows a similar east-west route across the state is a major competing route to the Mainline.
- Northeast Extension I-476 (110 miles) – This includes the Clarks Summit and Keyser Avenue barrier plazas.
- Turnpike 43 – Mon/Fayette Expressway (48 miles)
- Turnpike 66 – Amos K. Hutchinson Bypass (13 miles)
- Turnpike I-376 – Beaver Valley Expressway (16 miles)
- Turnpike I-576 – Southern Beltway (19 miles)

There are two toll collection systems on the Turnpike System: a Ticket System and a Barrier System. On the Ticket System, the motorist's toll rate varies depending on vehicle class, trip length, and payment type. At Barrier plazas, a defined toll amount is charged for each vehicle class and payment type passing through that point.

The Ticket System is comprised of the majority of Mainline I-76/I-276/I-95 (from Interchange 30 [Warrendale] in western Pennsylvania to Interchange 353 [Neshaminy Falls] near the New Jersey border) and the majority of the Northeast Extension (from Interchange 20 [Mid-County] to Interchange 131 [Wyoming Valley]). The Barrier System is comprised of Turnpike I-376 (Beaver Valley Expressway), Turnpike 66 (Amos K. Hutchinson Bypass), Turnpike 43 (Mon/Fayette Expressway), and Turnpike I-576 (Southern Beltway). There are also two barrier plazas on the Mainline I-76/I-276/I-95: Gateway (plaza 2) and the Delaware River Bridge (DRB) (plaza 359). Both Gateway and DRB have been converted from Ticket System plazas to Barrier System plazas, with conversions occurring in June 2003 for Gateway and January 2016 for DRB.

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Note: I-80 is not part of the Pennsylvania Turnpike System and is shown for comparative purposes only.

Figure 2-1
Pennsylvania Turnpike Commission Toll Road Facilities

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The Ticket System is by far the largest component of the Turnpike System. As seen in **Figure 2-2**, the Ticket System accounted for 83.8% of the Turnpike System's total gross toll revenue, and 71.3% of the total transactions in calendar year 2022. Fixed barrier locations accounted for only 16.2% of gross toll revenue and 28.7% of transactions.

2.2 Toll Rates and Commercial Volume Discount Program

2.2.1 Payment Options

The PTC began converting its facilities to all-electronic tolling starting with the Delaware River Bridge in 2016. The last two systems to convert to AET were the Ticket System, which converted in March 2020, and the Mon/Fayette Expressway, which converted in June 2020. All PTC facilities accept payment by electronic toll collection (ETC) via an E-ZPass transponder or Toll By Plate (TBP) video tolling, where an invoice is sent to registered owners of vehicles that pass through a tolling point without an E-ZPass transponder.

2.2.2 Historical Toll Rate Increases and E-ZPass vs. Cash/TBP Toll Differential

Since 2009, PTC has implemented annual toll rate increases on or close to January 1. Prior to 2009, toll rates were increased at irregular intervals. **Table 2-1** shows the toll rate changes since 1987. The rate increases were generally systemwide, with a few exceptions as noted.

Table 2-1 Historical Toll Rate Increases

Date	Percent Increase		Comment
	Cash/TBP (1)	E-ZPass	
1/2/1987	40.0	NA	E-ZPass was not yet implemented on the Turnpike
6/1/1991	32.0	NA	E-ZPass was not yet implemented on the Turnpike
8/1/2004	42.5	42.5	
1/4/2009	25.0	25.0	No increase on Findlay Connector or MFE between Uniontown and Brownsville
1/3/2010	3.0	3.0	No increase on Findlay Connector
1/2/2011	10.0	3.0	No increase on Findlay Connector
1/1/2012	10.0	0.0	No increase on Findlay Connector
1/6/2013	10.0	2.0	
1/5/2014	12.0	2.0	No increase on Findlay Connector
1/4/2015	5.0	5.0	No increase on Findlay Connector
1/3/2016	6.0	6.0	No increase on Findlay Connector; DRB converted from ticket system to barrier system and rate changes implemented
1/8/2017	6.0	6.0	No increase on Findlay Connector or DRB
1/7/2018	6.0	6.0	No increase on Findlay Connector, DRB, or the Northeast Extension barrier facilities
4/29/2018	6.0	6.0	Northeast Extension barrier facilities only (2)
6/3/2018	6.0	6.0	Findlay Connector only (2)
1/6/2019	6.0	6.0	
10/27/2019	6.0	6.0	BVE, AKH, and Gateway only; additional 45% surcharge over cash rate added to TBP rate at these locations
1/5/2020	6.0	6.0	No increase on BVE, AKH, or Gateway
1/3/2021	6.0	6.0	Additional 45% surcharge over cash rate added to TBP rate for Ticket System and MFE
1/2/2022	5.0	5.0	No increase on Southern Beltway
1/8/2023	5.0	5.0	

(1) Beginning in 2016, all cash toll rate increases also reflect TBP toll rate increases.

(2) Toll rate increase coincided with vehicle classification changes from a weight-based to an axle-based system.

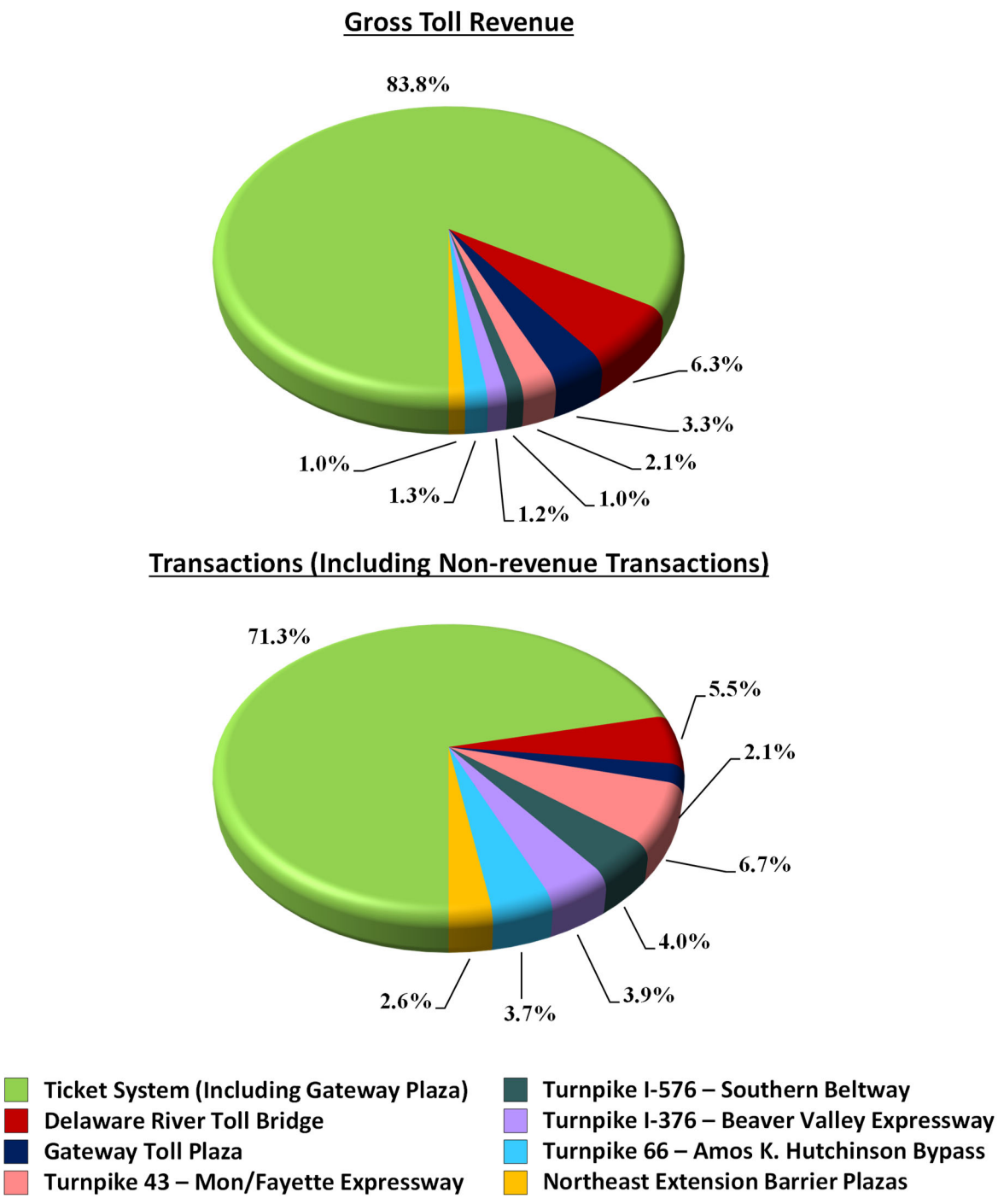

Figure 2-2
Percent of Calendar Year 2022 Transactions and Gross Toll Revenue by Facility

E-ZPass was phased in beginning in 2001. Initially, E-ZPass tolls and cash tolls were identical, but in 2011, cash tolls were increased by 10.0% over 2010 while E-ZPass tolls were increased by 3.0%, creating a toll differential between the two methods of payment. In 2011, cash tolls were about 7% greater than E-ZPass tolls. The toll differential was increased through 2014, when the cash toll was about 40% more than the E-ZPass toll. As AET was introduced to the PTC system, an additional 45% surcharge was imposed to offset leakage associated with TBP transactions while remaining revenue neutral and incentivizing E-ZPass participation. The resulting toll imposed on TBP transactions is now about double the E-ZPass rate. The Ticket System and Mon/Fayette Expressway were the last systems where this 45% surcharge was implemented, which occurred on January 3, 2021.

PTC plans to continue annual toll rate increases through the forecast period, and the toll rate increases are expected to be the same for E-ZPass and TBP. The planned annual rate increases are shown in **Table 4-2**.

2.2.3 Per-Mile Toll Rates

In 2023, a passenger car using E-ZPass pays $0.15 per-mile to travel the length of the Mainline, from the Gateway Toll Plaza to the Delaware River Bridge compared to $0.29 per mile for the same trip using TBP. **Figure 2-3** compares 2023 passenger-car per-mile toll rates for a through trip on 47 sample U.S. toll facilities. The per-mile rates are provided for ETC and TBP/video/cash payments. If the facility is AET, the license plate or TBP/video per-mile toll is represented in the TBP/video/cash column. The data is sorted from low to high by the ETC per-mile toll rates. When sorted this way, the Turnpike Mainline is situated 24th, exactly in the middle, of these 47 facilities in terms of per-mile costs for passenger cars using ETC. However, due to the nearly 100% per-mile toll differential between ETC and TBP transactions, the Turnpike Mainline is the 15th most expensive of these facilities for passenger cars paying via TBP/video or cash. This 100% per-mile toll differential is similar to that of other legacy toll road facilities that have converted to AET in recent years, including facilities operated by the Illinois Tollway and Maryland Transportation Authority (MDTA). Compared to the two connecting turnpike systems, the passenger car per-mile E-ZPass rate is very similar to the $0.16 rate of the New Jersey Turnpike at the eastern end of the state but about two and half times the $0.06 rate of the Ohio Turnpike at the western end of the state.

Figure 2-4 presents a similar comparison of five-axle commercial vehicle per-mile toll rates for through trips on the same 47 sample U.S. toll facilities. A trip on the Mainline from the Gateway Toll Plaza to the Delaware River Bridge costs $1.08 per mile for TBP customers as compared to $0.55 per mile for E-ZPass customers in 2023. Per-mile rates for five-axle commercial vehicles are relatively more expensive on the Turnpike Mainline compared to this sample of facilities, with ETC trips ranking as the 19th most expensive and TBP/video/cash rates ranking as the 16th most expensive. As with passenger car rates, the per-mile E-ZPass rate for commercial vehicles is very similar to the $0.54 per-mile E-ZPass rate for the New Jersey Turnpike, but almost three times the $0.19 per-mile of the Ohio Turnpike.

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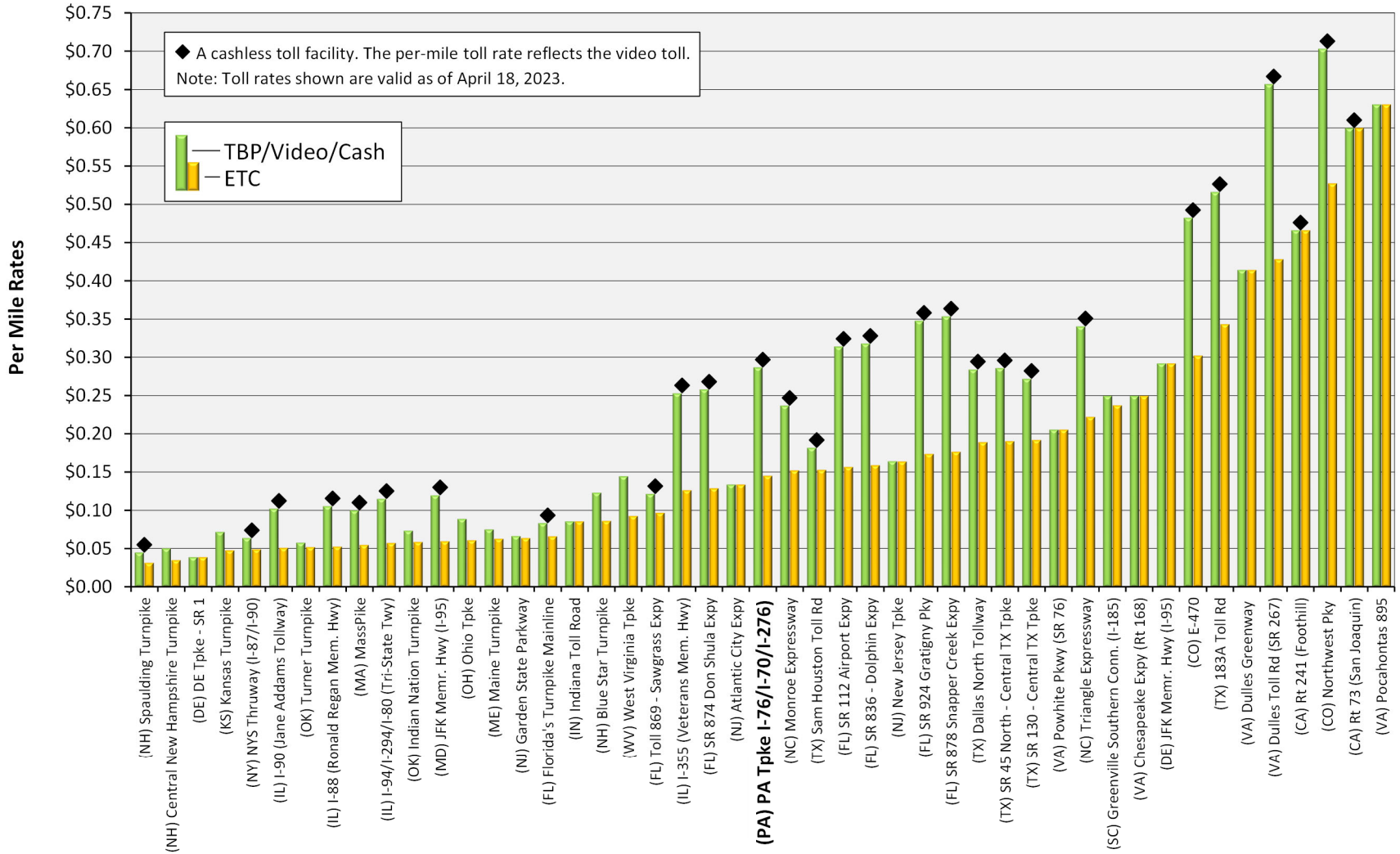

Figure 2-3
Comparison of 2023 Passenger Car Per-Mile Through Trip Toll Rates (Data Sorted by ETC Toll Rates)

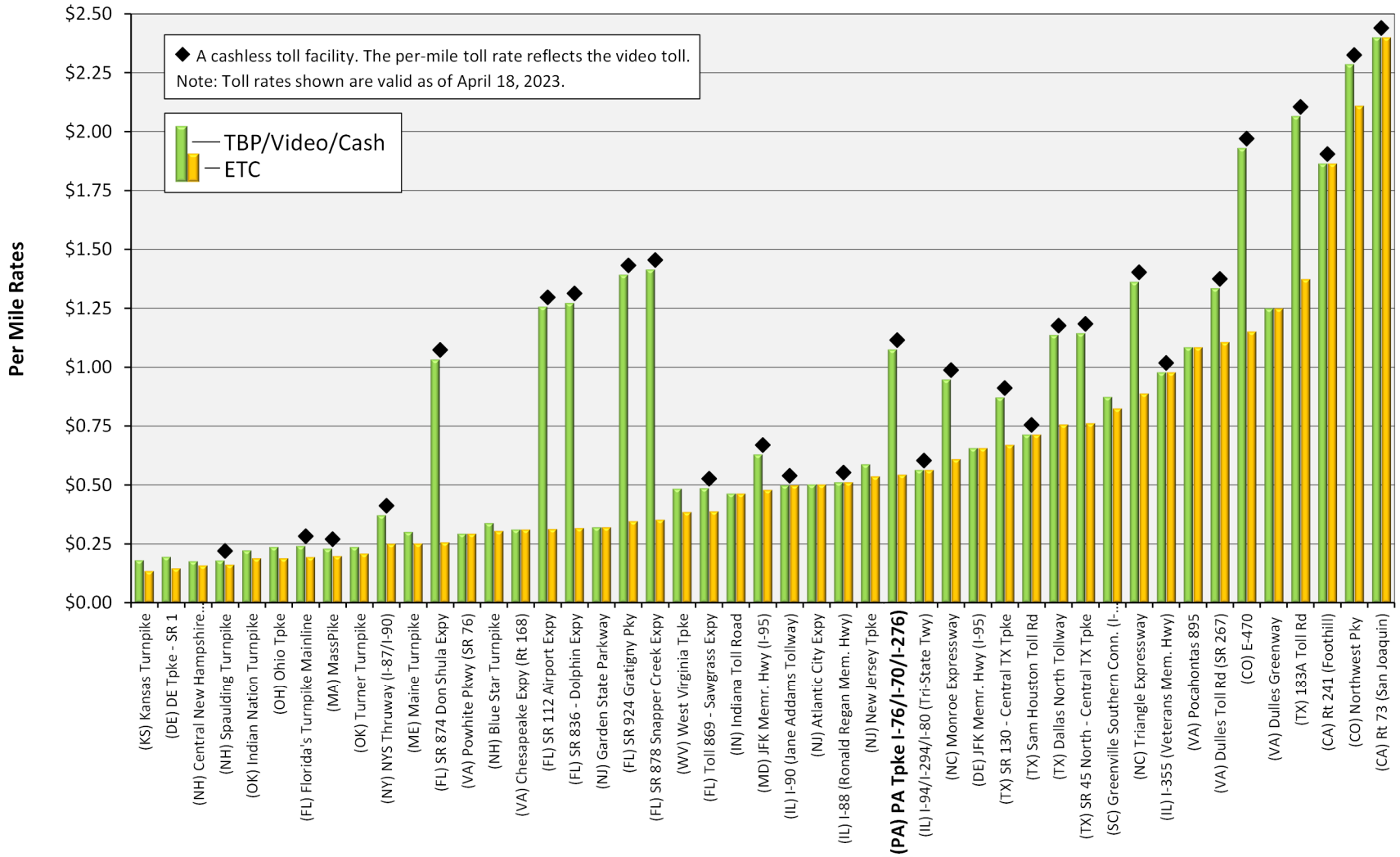

Figure 2-4
Comparison of 2023 Five-Axle Vehicle Per-Mile Through Trip Toll Rates (Data Sorted by ETC Toll Rates)

2.2.4 Commercial Volume Discount Program

The PTC operates a Commercial Volume Discount Program. Prior to the implementation of system-wide toll rates favorable to E-ZPass customers, a post-paid, commercial volume-discount program was established for high-volume, commercial E-ZPass accounts. Post-paid commercial E-ZPass customers could receive the varying levels of discounts based on the amount of their monthly tolls. With the implementation of E-ZPass and the large toll savings offered to E-ZPass customers, the Commercial Volume Discount Program was modified over the years. Currently,

commercial accounts that accrue greater than $20,000 per month on tolls receive a 3.0% discount.

2.3 Annual Daily Transaction Trends by Plaza

This section presents long-term annual transaction trends on the Ticket and Barrier Systems by toll plaza. Data is provided from 2007 through 2022 for Ticket and Barrier System toll plazas.

2.3.1 Ticket System Transaction Trends

Average annual daily transactions at the Ticket System's exiting toll plazas are shown in **Table 2-2**, **Table 2-3**, and **Table 2-4** for passenger cars, commercial vehicles, and total vehicles, respectively. The transactions include both revenue and non-revenue vehicles. Transactions at the Gateway and Delaware River Bridge (DRB) barrier plazas are not included in this table.

Some important changes occurred on the Ticket System that are reflected in the tables. In January 2016, the eastern terminus of the Ticket System was changed from the DRB (plaza 359) to a new plaza at Neshaminy Falls (plaza 353), where tolls are collected in the eastbound direction exiting and reported as part of the Ticket System. At this time, the DRB was converted from the Ticket System to a barrier plaza with toll collection in the westbound direction leaving New Jersey and entering Pennsylvania. Concurrently, toll collection was ended at Delaware Valley (plaza 358).

Additionally, the DRB (plaza 359) was closed from January 20 through March 9, 2017 due to a fracture in one of the structural support beams. Although the DRB is on the Barrier System, the closure also negatively affected Ticket System traffic and revenue in January, February, and March 2017.

In the past 20 years four new interchanges opened on the Ticket System: Virginia Drive (milepost 340) in 2002, Street Road (milepost 352) in 2010, SR 29 (milepost 320) in 2012, and Route 903 (milepost 87) in 2015. These were opened as E-ZPass-only interchanges where no cash was accepted even prior to the entire Ticket System's conversion to AET.

In Tables 2-2 through 2-4 transaction trends are summarized by average annual percent change (AAPC) into the following four periods:

1. The 12-year period prior to the COVID-19 pandemic from 2007-2019;
2. The one-year change to 2020 from 2019 coinciding with a drastic decline in transactions due to the COVID-19 pandemic;

3. The two-year period subsequent to the onset of the COVID-19 pandemic from 2020-2022; and

4. The entire 15-year period from 2007-2022.

As shown in Table 2-2, passenger car transactions on the Ticket System grew an average of 0.1% annually from 2007 to 2019 before declining 30.3% in 2020 during the height of the pandemic. In 2021 and 2022, transactions experienced 12.0% AAPC. These growth patterns have resulted in fewer average daily passenger car transactions in 2022 than in 2007. The only interchanges to show growth over this period are 339, 340, and 31, all of which are located in Montgomery County in the eastern portion of the state.

Table 2-3 shows the same information for Ticket System commercial vehicles. While commercial vehicle transactions declined in 2008 and 2009 during the Great Recession, growth has consistently outpaced that of passenger cars since 2010. For the pre-pandemic period from 2007 to 2019, commercial vehicle transactions grew an average of 0.6% annually. Commercial vehicle transactions declined 4.5% between 2019 and 2020 but recovered with 6.6% AAPC from 2020 to 2022. As a result, over the last 15 years commercial vehicle transactions grew an average of 1.0% annually, with 2022 having recorded the most commercial vehicle transactions of any year for the entire Ticket System as well as most interchanges. Growth has been stronger in the eastern part of the state than the western part, as most interchanges east of the Tuscarora Mountain Tunnel (interchanges 189 and above and the Northeast Extension) have met or exceeded 1.5% AAPC from 2007 to 2022, while none of the interchanges to the west (interchanges 180 and below) have done so.

Total transaction trends are shown in Table 2-4. Because passenger cars comprise a significant majority of total Ticket System traffic, the trends largely follow those of passenger cars, with 0.2% AAPC from 2007 to 2019, a 26.4% decline in 2020, and 10.9% AAPC from 2020 to 2022 resulting in fewer daily transactions in 2022 than in 2007. Within this period, passenger car transactions declined less sharply than did commercial vehicle transactions in 2008 and 2009 but since 2010 average daily transactions for commercial vehicles has consistently been stronger than for passenger cars. As a result, the share of total transactions belonging to commercial vehicle transactions has also grown over the last 15 years, growing from about one of every seven transactions on the Ticket System in 2007 to more than one in six transactions in 2022.

Table 2-2 Passenger Cars – Average Daily Transactions on the Pennsylvania Turnpike Ticket System at Exiting Toll Plazas

Includes Revenue and Non-Revenue Vehicles

Interchange (Milepost)[1]	Calendar Year																Average Annual Percent Change			
	2007	2008	2009[2]	2010[2]	2011[2]	2012[2]	2013[2]	2014[2]	2015[2]	2016[2]	2017[2]	2018[2]	2019[2]	2020[2]	2021[2]	2022[2]	2007-19	2019-20	2020-22	2007-2022
30	11,940	12,056	12,232	12,118	12,023	11,939	12,413	12,339	12,542	12,704	12,844	12,805	12,357	8,547	10,342	10,448	0.3	(30.8)	10.6	(0.9)
39	5,613	5,627	5,495	5,527	5,333	5,416	5,832	5,855	5,540	5,821	5,699	5,606	5,509	4,067	4,807	4,935	(0.2)	(26.2)	10.1	(0.9)
48	9,406	9,226	9,087	8,879	8,576	8,734	9,171	9,147	8,882	9,101	8,889	8,756	8,533	6,055	6,941	7,094	(0.8)	(29.0)	8.2	(1.9)
57	18,198	18,305	18,083	17,452	17,172	17,130	17,399	17,336	17,792	17,660	17,576	17,169	16,660	11,752	13,662	13,854	(0.7)	(29.5)	8.6	(1.8)
67	9,614	9,068	8,674	8,776	8,718	8,955	8,870	8,783	9,037	8,807	8,675	8,606	8,380	6,205	7,098	7,230	(1.1)	(25.9)	7.9	(1.9)
75	8,806	8,522	8,433	8,550	8,246	8,539	8,556	8,701	8,861	8,545	8,405	8,299	8,095	5,971	7,127	7,111	(0.7)	(26.2)	9.1	(1.4)
91	2,478	2,395	2,351	2,371	2,279	2,352	2,393	2,344	2,403	2,385	2,447	2,391	2,355	1,965	2,289	2,223	(0.4)	(16.5)	6.4	(0.7)
110	2,067	2,119	2,104	2,136	2,159	2,156	2,048	2,027	2,101	2,048	2,065	2,052	2,095	1,534	1,975	1,950	0.1	(26.8)	12.8	(0.4)
146	3,059	2,994	2,972	2,945	2,848	2,779	2,715	2,773	2,803	2,746	2,707	2,430	2,453	1,662	2,182	2,294	(1.8)	(32.3)	17.5	(1.9)
161	6,216	6,005	6,356	6,262	6,064	6,023	6,057	6,000	6,087	5,916	5,777	5,418	5,289	3,615	4,729	4,582	(1.3)	(31.7)	12.6	(2.0)
180	711	675	655	658	645	610	593	586	608	608	627	594	596	509	549	542	(1.5)	(14.7)	3.2	(1.8)
189	440	426	409	418	409	391	378	385	406	421	442	405	425	349	412	406	(0.3)	(17.7)	7.7	(0.5)
201	662	614	603	642	634	628	625	594	605	650	669	624	603	456	539	536	(0.8)	(24.3)	8.4	(1.4)
226	4,973	4,736	4,628	4,899	4,705	4,541	4,637	4,667	4,813	4,541	4,642	4,477	4,429	2,854	3,580	3,654	(1.0)	(35.5)	13.1	(2.0)
236	4,661	4,507	4,470	5,074	4,883	4,689	4,762	4,846	5,181	5,128	5,207	5,088	5,198	3,121	3,897	4,182	0.9	(39.9)	15.8	(0.7)
242	5,265	6,068	5,894	5,476	5,371	5,159	5,295	5,530	5,823	5,615	5,656	5,546	5,721	3,525	4,163	4,506	0.7	(38.4)	13.1	(1.0)
247	9,902	10,073	9,952	10,478	10,155	9,948	10,074	10,175	10,598	10,521	10,535	10,271	9,986	6,320	8,120	8,752	0.1	(36.7)	17.7	(0.8)
266	3,740	3,577	3,484	3,571	3,442	3,519	3,621	3,640	3,815	3,940	4,066	4,067	4,251	2,828	3,646	3,685	1.1	(33.5)	14.2	(0.1)
286	7,397	7,060	6,910	6,937	6,766	6,736	6,886	7,026	7,393	7,545	7,713	7,679	7,307	5,197	6,469	6,530	(0.1)	(28.9)	12.1	(0.8)
298	7,446	7,448	7,176	7,018	6,789	6,588	6,737	7,022	7,383	7,501	7,564	7,576	7,426	5,119	6,036	6,155	(0.0)	(31.1)	9.7	(1.3)
312	11,011	10,635	10,234	10,353	10,315	10,347	10,444	10,692	10,522	10,186	9,963	9,677	9,518	5,933	6,933	6,935	(1.2)	(37.7)	8.1	(3.0)
320 [3]							3,539	4,667	5,223	5,292	5,453	5,420	5,522	3,032	3,685	3,829	-	(45.1)	12.4	-
326	27,069	26,975	27,783	29,284	28,965	28,780	28,066	28,423	29,777	30,197	30,737	31,199	31,328	19,805	25,155	26,162	1.2	(36.8)	14.9	(0.2)
333	11,312	11,848	11,904	12,166	12,093	11,860	11,811	11,598	11,235	11,319	11,313	11,245	11,092	7,054	8,325	9,189	(0.2)	(36.4)	14.1	(1.4)
20	36,659	35,518	34,961	35,236	35,478	36,231	36,441	36,305	37,726	38,010	37,978	37,442	37,505	28,248	34,787	35,889	0.2	(24.7)	12.7	(0.1)
339	21,203	20,312	20,989	22,973	23,265	23,582	23,852	23,849	24,711	24,709	24,910	24,528	24,642	17,616	21,171	21,934	1.3	(28.5)	11.6	0.2
340	1,537	1,521	1,370	1,422	1,447	1,409	1,484	1,627	1,721	1,842	1,913	1,904	1,948	1,144	1,438	1,624	2.0	(41.3)	19.1	0.4
343	26,054	25,277	25,165	26,569	26,178	25,858	25,323	24,896	25,105	25,628	25,447	25,239	25,608	18,679	22,373	22,992	(0.1)	(27.1)	10.9	(0.8)
351	29,917	29,315	29,196	29,690	28,170	27,512	27,316	26,689	27,226	27,475	27,137	26,289	25,334	16,985	19,914	20,735	(1.4)	(33.0)	10.5	(2.4)
352 [4]					1,805	2,146	2,384	2,676	2,949	3,111	3,826	3,802	3,913	2,587	3,803	3,938	-	(33.9)	23.4	-
353 [5]										20,067	18,835	20,782	20,218	13,201	17,300	18,109	-	(34.7)	17.1	-
358 [5]	5,917	5,964	5,767	5,716	5,538	5,386	5,090	4,950	4,951								-	-	-	-
359 [6]	17,727	17,274	16,943	17,255	16,846	16,164	16,333	16,608	17,943								-	-	-	-
31	13,304	13,389	13,431	13,432	12,950	12,742	12,669	12,472	12,853	13,033	13,741	14,501	15,100	11,105	13,101	13,955	1.1	(26.5)	12.1	0.3
44	8,235	8,313	8,399	8,478	8,157	8,040	8,021	7,953	8,091	8,248	8,090	8,242	8,538	6,102	7,273	7,645	0.3	(28.5)	11.9	(0.5)
56	15,581	14,950	15,339	16,008	15,365	15,028	15,012	14,785	15,013	15,093	15,218	15,493	15,777	11,932	14,513	14,243	0.1	(24.4)	9.3	(0.6)
74	4,796	4,811	4,723	4,722	4,580	4,490	4,459	4,385	4,354	4,179	4,256	4,270	4,295	3,648	4,140	4,083	(0.9)	(15.1)	5.8	(1.1)
87 [7]									1,389	1,564	1,779	1,814	1,931	1,918	2,424	2,447	-	(0.7)	13.0	-
95	4,761	4,709	5,021	5,200	4,859	4,640	4,639	4,633	4,693	4,511	4,432	4,483	4,365	3,232	3,918	3,720	(0.7)	(26.0)	7.3	(1.6)
105	3,188	3,062	3,232	3,337	3,234	3,152	3,099	3,102	3,248	3,195	3,291	3,317	3,153	2,406	2,937	2,889	(0.1)	(23.7)	9.6	(0.7)
115	4,043	4,128	4,289	4,067	3,948	3,856	3,890	3,861	4,036	3,904	3,992	4,054	4,065	2,755	3,679	3,708	0.0	(32.2)	16.0	(0.6)
Total	364,906	359,503	358,712	366,095	360,410	358,056	362,938	363,947	375,438	373,763	374,518	373,561	371,521	259,034	315,430	324,693	0.1	(30.3)	12.0	(0.8)
Percent Change over Prior Year		(1.5)	(0.2)	2.1	(1.6)	(0.7)	1.4	0.3	3.2	(0.4)	0.2	(0.3)	(0.5)	(30.3)	21.8	2.9				

(1) Interchanges 2 through 359 reflect those for the Mainline 1-76/I-276. Interchanges 31 through 115 correspond to those on the Northeast Extension I-476.
(2) A toll increase occurred during this year. Refer to table 2-1.
(3) Interchange 320 (Route 29) Opened in December 2012 as an E-ZPass only interchange.
(4) Interchange 352 (Street Road) opened in November 2010 as an eastbound only, E-ZPass only interchange.
(5) On January 3, 2016 the Delaware Valley Toll Plaza (358) was decommissioned and replaced by the Neshaminy Falls Toll Plaza (353).
(6) On January 3, 2016 the Delaware River Toll Plaza was replaced by the Delaware River Bridge ORT Toll Plaza. Average daily transactions for the new toll plaza are reported in Table 2-5.
(7) On June 29, 2015 Interchange 87 (Route 903) opened as an E-ZPass only interchange.

Table 2-3 Commercial Vehicles – Average Daily Transactions on the Pennsylvania Turnpike Ticket System at Exiting Toll Plazas

Includes Revenue and Non-Revenue Vehicles

Interchange (Milepost)[1]	Calendar Year																Average Annual Percent Change			
	2007	2008	2009[2]	2010[2]	2011[2]	2012[2]	2013[2]	2014[2]	2015[2]	2016[2]	2017[2]	2018[2]	2019[2]	2020[2]	2021[2]	2022[2]	2007-19	2019-20	2020-22	2007-2022
30	3,505	3,412	2,994	3,060	3,116	3,192	3,276	3,428	3,582	3,666	3,805	3,982	3,992	3,761	4,216	4,294	1.1	(5.8)	6.8	1.4
39	575	571	544	565	552	560	596	579	586	606	609	598	581	540	589	621	0.1	(7.2)	7.2	0.5
48	1,177	1,185	1,104	1,153	1,058	1,073	1,092	1,132	1,223	1,237	1,229	1,338	1,301	1,096	1,166	1,214	0.8	(15.7)	5.2	0.2
57	1,735	1,636	1,498	1,590	1,606	1,623	1,652	1,694	1,730	1,805	1,838	1,890	1,917	1,826	1,972	1,983	0.8	(4.8)	4.2	0.9
67	894	895	869	847	816	857	866	883	912	931	926	954	938	841	922	914	0.4	(10.4)	4.3	0.1
75	4,478	4,389	3,902	3,854	3,828	3,830	3,857	3,977	4,123	4,096	4,189	4,336	4,362	4,233	4,648	4,702	(0.2)	(2.9)	5.4	0.3
91	306	287	314	334	323	313	311	326	324	317	339	348	360	332	368	380	1.4	(7.8)	7.0	1.4
110	743	738	652	669	690	690	701	723	728	695	719	730	758	716	803	858	0.2	(5.6)	9.4	1.0
146	1,327	1,151	1,009	1,077	1,056	1,035	1,024	1,030	1,087	1,105	1,135	1,175	1,197	1,121	1,253	1,276	(0.9)	(6.3)	6.7	(0.3)
161	2,910	2,616	2,261	2,440	2,431	2,381	2,338	2,361	2,378	2,416	2,417	2,512	2,477	2,401	2,750	2,737	(1.3)	(3.1)	6.8	(0.4)
180	230	203	169	207	215	210	216	225	239	243	275	271	291	240	251	257	2.0	(17.5)	3.4	0.7
189	108	96	85	100	101	109	105	103	106	116	131	129	140	129	141	157	2.2	(7.8)	10.4	2.5
201	229	219	193	212	265	291	286	251	258	295	350	313	325	305	306	332	2.9	(6.2)	4.3	2.5
226	3,548	3,350	2,893	2,886	2,889	2,826	2,871	2,990	3,135	3,130	3,200	3,276	3,367	3,323	3,610	3,722	(0.4)	(1.3)	5.8	0.3
236	774	690	646	751	774	756	792	811	877	925	974	992	1,011	917	1,094	1,124	2.3	(9.3)	10.7	2.5
242	1,194	1,243	1,146	1,105	1,100	1,003	1,114	1,170	1,237	1,303	1,338	1,369	1,455	1,339	1,455	1,605	1.7	(8.0)	9.5	2.0
247	1,863	1,817	1,653	1,749	1,743	1,706	1,792	1,885	2,018	2,140	2,178	2,201	2,177	2,007	2,233	2,352	1.3	(7.8)	8.2	1.6
266	549	523	469	486	482	481	494	534	537	581	598	648	719	636	707	744	2.3	(11.5)	8.1	2.0
286	1,572	1,491	1,325	1,354	1,364	1,350	1,415	1,496	1,593	1,696	1,697	1,791	1,735	1,708	1,851	1,843	0.8	(1.5)	3.9	1.1
298	1,188	1,084	936	963	995	1,005	1,023	1,137	1,253	1,330	1,336	1,412	1,491	1,366	1,476	1,456	1.9	(8.4)	3.2	1.4
312	1,058	908	806	904	929	948	990	1,068	1,119	1,171	1,141	1,153	1,217	1,085	1,152	1,088	1.2	(10.9)	0.1	0.2
320 [3]							286	334	356	446	495	494	545	460	565	528	-	(15.6)	7.2	-
326	3,446	3,190	2,902	3,118	3,105	2,993	2,984	3,069	3,249	3,443	3,467	3,449	3,556	3,425	3,846	3,878	0.3	(3.7)	6.4	0.8
333	636	663	597	644	629	630	633	660	645	687	678	682	726	653	725	798	1.1	(10.1)	10.6	1.5
20	4,433	4,114	3,751	3,883	3,961	4,037	4,150	4,309	4,554	4,798	4,765	4,806	4,942	4,941	5,549	5,701	0.9	(0.0)	7.4	1.7
339	1,403	1,343	1,260	1,329	1,417	1,437	1,518	1,564	1,678	1,802	1,746	1,723	1,751	1,686	1,921	1,933	1.9	(3.7)	7.1	2.2
340	20	19	18	20	24	24	30	48	61	63	61	65	75	67	90	97	11.5	(10.5)	19.9	10.9
343	2,210	2,109	1,999	2,109	2,116	2,102	2,130	2,205	2,255	2,396	2,330	2,380	2,477	2,476	2,709	2,650	1.0	(0.0)	3.4	1.2
351	3,397	3,384	3,111	3,178	3,151	3,105	3,146	3,174	3,323	3,457	3,601	3,442	3,293	3,058	3,352	3,417	(0.3)	(7.1)	5.7	0.0
352 [4]					54	68	84	117	130	143	174	268	442	449	578	585	-	1.6	14.1	-
353 [5]										3,763	3,499	4,109	4,177	4,043	4,631	4,828	-	(3.2)	9.3	-
358 [5]	1,812	1,529	1,410	1,654	1,571	1,442	1,458	1,514	1,553								-	-	-	-
359 [6]	3,949	4,137	3,768	3,474	3,389	3,231	3,330	3,491	3,740								-	-	-	-
31	1,505	1,495	1,453	1,498	1,450	1,431	1,436	1,562	1,672	1,742	1,660	1,668	1,786	1,773	1,903	1,950	1.4	(0.7)	4.9	1.7
44	990	958	929	965	943	958	998	1,048	1,094	1,120	1,129	1,206	1,321	1,257	1,384	1,427	2.4	(4.9)	6.6	2.5
56	3,139	3,118	3,039	3,147	3,114	3,136	3,211	3,309	3,496	3,647	3,644	3,796	4,015	4,020	4,454	4,479	2.1	0.1	5.6	2.4
74	596	484	480	527	536	523	530	547	551	582	559	575	514	487	552	597	(1.2)	(5.4)	10.8	0.0
87 [7]									98	133	155	188	223	203	267	283	-	(9.0)	18.0	-
95	1,336	1,264	1,226	1,337	1,329	1,336	1,385	1,424	1,497	1,547	1,485	1,538	1,626	1,535	1,759	1,845	1.7	(5.6)	9.7	2.2
105	218	400	396	200	209	205	207	209	238	244	235	249	252	234	265	273	1.2	(7.1)	8.1	1.5
115	1,358	1,204	1,167	1,268	1,266	1,258	1,287	1,300	1,420	1,391	1,412	1,481	1,529	1,471	1,623	1,715	1.0	(3.8)	8.0	1.6
Total	60,413	57,914	52,971	54,657	54,597	54,152	55,615	57,686	60,657	61,210	61,517	63,537	65,063	62,160	69,135	70,641	0.6	(4.5)	6.6	1.0
Percent Change Over Prior Year		(4.1)	(8.5)	3.2	(0.1)	(0.8)	2.7	3.7	5.1	0.9	0.5	3.3	2.4	(4.5)	11.2	2.2				

(1) Interchanges 2 through 359 reflect those for the Mainline 1-76/I-276. Interchanges 31 through 115 correspond to those on the Northeast Extension I-476.
(2) A toll increase occurred during this year. Refer to table 2-1.
(3) Interchange 320 (Route 29) Opened in December 2012 as an E-ZPass only interchange.
(4) Interchange 352 (Street Road) opened in November 2010 as an eastbound only, E-ZPass only interchange.
(5) On January 3, 2016 the Delaware Valley Toll Plaza (358) was decommissioned and replaced by the Neshaminy Falls Toll Plaza (353).
(6) On January 3, 2016 the Delaware River Toll Plaza was replaced by the Delaware River Bridge ORT Toll Plaza. Average daily transactions for the new toll plaza are reported in Table 2-5.
(7) On June 29, 2015 Interchange 87 (Route 903) opened as an E-ZPass only interchange.

Table 2-4 Total Vehicles – Average Daily Transactions on the Pennsylvania Turnpike Ticket System at Exiting Toll Plazas

Includes Revenue and Non-Revenue Vehicles

Interchange (Milepost)[1]	Calendar Year																Average Annual Percent Change			
	2007	2008	2009[2]	2010[2]	2011[2]	2012[2]	2013[2]	2014[2]	2015[2]	2016[2]	2017[2]	2018[2]	2019[2]	2020[2]	2021[2]	2022[2]	2007-19	2019-20	2020-22	2007-2022
30	15,445	15,468	15,226	15,178	15,140	15,131	15,689	15,767	16,124	16,370	16,649	16,787	16,349	12,307	14,558	14,741	0.5	(24.7)	9.4	(0.3)
39	6,188	6,198	6,039	6,092	5,885	5,976	6,428	6,434	6,126	6,426	6,309	6,203	6,091	4,607	5,395	5,555	(0.1)	(24.4)	9.8	(0.7)
48	10,583	10,411	10,191	10,032	9,634	9,806	10,263	10,278	10,106	10,338	10,119	10,094	9,833	7,151	8,107	8,308	(0.6)	(27.3)	7.8	(1.6)
57	19,933	19,941	19,581	19,042	18,778	18,753	19,051	19,030	19,522	19,465	19,415	19,060	18,578	13,578	15,634	15,837	(0.6)	(26.9)	8.0	(1.5)
67	10,507	9,963	9,543	9,623	9,534	9,813	9,737	9,667	9,949	9,738	9,601	9,560	9,318	7,046	8,020	8,144	(1.0)	(24.4)	7.5	(1.7)
75	13,284	12,912	12,334	12,404	12,074	12,369	12,413	12,678	12,984	12,641	12,594	12,635	12,457	10,204	11,775	11,813	(0.5)	(18.1)	7.6	(0.8)
91	2,784	2,681	2,665	2,705	2,602	2,665	2,705	2,670	2,726	2,702	2,786	2,739	2,714	2,297	2,657	2,602	(0.2)	(15.4)	6.4	(0.4)
110	2,810	2,857	2,755	2,805	2,849	2,847	2,750	2,750	2,829	2,743	2,784	2,782	2,854	2,250	2,778	2,808	0.1	(21.2)	11.7	(0.0)
146	4,386	4,146	3,981	4,022	3,904	3,814	3,739	3,802	3,890	3,851	3,842	3,605	3,650	2,783	3,435	3,570	(1.5)	(23.8)	13.3	(1.4)
161	9,126	8,621	8,617	8,702	8,495	8,404	8,396	8,361	8,465	8,333	8,194	7,930	7,766	6,016	7,479	7,319	(1.3)	(22.5)	10.3	(1.5)
180	941	878	824	865	860	820	809	811	847	851	902	865	888	749	799	799	(0.5)	(15.6)	3.3	(1.1)
189	548	522	494	518	510	500	484	488	512	537	573	534	564	478	553	562	0.2	(15.3)	8.5	0.2
201	891	832	796	854	899	919	911	844	863	945	1,019	938	928	761	845	868	0.3	(18.0)	6.8	(0.2)
226	8,521	8,085	7,521	7,785	7,594	7,367	7,508	7,656	7,948	7,671	7,842	7,753	7,795	6,177	7,190	7,376	(0.7)	(20.8)	9.3	(1.0)
236	5,435	5,197	5,116	5,825	5,657	5,445	5,554	5,657	6,057	6,054	6,181	6,080	6,209	4,038	4,990	5,306	1.1	(35.0)	14.6	(0.2)
242	6,459	7,311	7,040	6,581	6,471	6,162	6,409	6,700	7,060	6,918	6,994	6,915	7,176	4,864	5,618	6,111	0.9	(32.2)	12.1	(0.4)
247	11,765	11,890	11,604	12,227	11,898	11,654	11,866	12,060	12,616	12,661	12,713	12,473	12,162	8,328	10,353	11,104	0.3	(31.5)	15.5	(0.4)
266	4,289	4,100	3,954	4,057	3,924	4,000	4,116	4,173	4,352	4,521	4,664	4,715	4,970	3,464	4,353	4,429	1.2	(30.3)	13.1	0.2
286	8,969	8,551	8,235	8,291	8,130	8,086	8,301	8,522	8,986	9,241	9,409	9,470	9,043	6,906	8,321	8,373	0.1	(23.6)	10.1	(0.5)
298	8,634	8,532	8,112	7,981	7,784	7,593	7,760	8,159	8,636	8,830	8,901	8,987	8,917	6,485	7,511	7,612	0.3	(27.3)	8.3	(0.8)
312	12,069	11,543	11,039	11,257	11,244	11,295	11,434	11,760	11,641	11,357	11,103	10,831	10,735	7,018	8,085	8,023	(1.0)	(34.6)	6.9	(2.7)
320 [3]							3,825	5,001	5,579	5,738	5,948	5,914	6,067	3,492	4,250	4,357	-	(42.4)	11.7	-
326	30,515	30,165	30,685	32,402	32,070	31,773	31,050	31,492	33,026	33,640	34,203	34,648	34,884	23,229	29,001	30,040	1.1	(33.4)	13.7	(0.1)
333	11,948	12,511	12,501	12,810	12,722	12,490	12,445	12,258	11,881	12,006	11,991	11,927	11,818	7,707	9,050	9,987	(0.1)	(34.8)	13.8	(1.2)
20	41,091	39,631	38,712	39,119	39,439	40,268	40,590	40,614	42,280	42,808	42,743	42,249	42,447	33,190	40,336	41,589	0.3	(21.8)	11.9	0.1
339	22,606	21,655	22,249	24,302	24,683	25,019	25,371	25,413	26,389	26,511	26,657	26,251	26,394	19,302	23,092	23,867	1.3	(26.9)	11.2	0.4
340	1,558	1,540	1,388	1,442	1,471	1,433	1,513	1,676	1,782	1,905	1,974	1,969	2,023	1,212	1,529	1,721	2.2	(40.1)	19.2	0.7
343	28,264	27,385	27,163	28,678	28,294	27,960	27,453	27,102	27,360	28,024	27,777	27,618	28,085	21,155	25,082	25,642	(0.1)	(24.7)	10.1	(0.6)
351	33,315	32,700	32,307	32,868	31,321	30,616	30,462	29,863	30,549	30,932	30,738	29,731	28,626	20,043	23,266	24,152	(1.3)	(30.0)	9.8	(2.1)
352 [4]					1,859	2,214	2,467	2,792	3,079	3,254	4,000	4,070	4,355	3,036	4,382	4,523	-	(30.3)	22.1	-
353 [5]										23,830	22,333	24,891	24,396	17,244	21,930	22,938	-	(29.3)	15.3	-
358 [5]	7,728	7,494	7,177	7,370	7,109	6,828	6,548	6,464	6,504								-	-	-	-
359 [6]	21,676	21,411	20,712	20,729	20,235	19,395	19,662	20,100	21,683								-	-	-	-
31	14,809	14,885	14,884	14,930	14,400	14,172	14,105	14,034	14,525	14,776	15,401	16,168	16,885	12,878	15,004	15,905	1.1	(23.7)	11.1	0.5
44	9,225	9,271	9,328	9,443	9,100	8,998	9,019	9,001	9,185	9,368	9,219	9,448	9,858	7,358	8,658	9,072	0.6	(25.4)	11.0	(0.1)
56	18,720	18,068	18,378	19,155	18,480	18,164	18,224	18,094	18,508	18,740	18,862	19,289	19,793	15,952	18,966	18,722	0.5	(19.4)	8.3	0.0
74	5,393	5,295	5,204	5,249	5,116	5,014	4,989	4,932	4,905	4,761	4,815	4,845	4,809	4,135	4,691	4,680	(0.9)	(14.0)	6.4	(0.9)
87 [7]									1,487	1,696	1,934	2,002	2,154	2,121	2,691	2,730	-	(1.5)	13.4	-
95	6,097	5,973	6,247	6,537	6,188	5,976	6,025	6,057	6,190	6,057	5,918	6,021	5,991	4,766	5,678	5,565	(0.1)	(20.4)	8.1	(0.6)
105	3,406	3,463	3,627	3,537	3,443	3,357	3,306	3,311	3,486	3,440	3,526	3,566	3,405	2,640	3,203	3,162	(0.0)	(22.5)	9.4	(0.5)
115	5,401	5,332	5,456	5,335	5,214	5,114	5,178	5,161	5,456	5,296	5,405	5,535	5,594	4,226	5,301	5,423	0.3	(24.5)	13.3	0.0
Total	425,319	417,417	411,683	420,752	415,008	412,208	418,553	421,633	436,095	434,973	436,036	437,098	436,583	321,194	384,565	395,334	0.2	(26.4)	10.9	(0.5)
Percent Change Over Prior Year		(1.9)	(1.4)	2.2	(1.4)	(0.7)	1.5	0.7	3.4	(0.3)	0.2	0.2	(0.1)	(26.4)	19.7	2.8				

(1) Interchanges 2 through 359 reflect those for the Mainline 1-76/I-276. Interchanges 31 through 115 correspond to those on the Northeast Extension I-476.
(2) A toll increase occurred during this year. Refer to table 2-1.
(3) Interchange 320 (Route 29) Opened in December 2012 as an E-ZPass only interchange.
(4) Interchange 352 (Street Road) opened in November 2010 as an eastbound only, E-ZPass only interchange.
(5) On January 3, 2016 the Delaware Valley Toll Plaza (358) was decommissioned and replaced by the Neshaminy Falls Toll Plaza (353).
(6) On January 3, 2016 the Delaware River Toll Plaza was replaced by the Delaware River Bridge ORT Toll Plaza. Average daily transactions for the new toll plaza are reported in Table 2-5.
(7) On June 29, 2015 Interchange 87 (Route 903) opened as an E-ZPass only interchange.

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2.3.2 Barrier System Transaction Trends

Average annual daily traffic trends at the Barrier System's toll plazas are shown in **Table 2-5**, **Table 2-6**, and **Table 2-7** for passenger cars, commercial vehicles, and total vehicles, respectively. Note that the Delaware River Bridge (Plaza 359) transactions are counted as part of the Barrier System beginning in 2016.

Transactions on the Barrier System have generally been increasing at a faster rate than on the Ticket System. Passenger car transactions experienced 3.1% AAPC from 2007-2019, although some of this growth can be attributed to DRB switching from the Ticket System to the Barrier System in 2016. In 2020, passenger car transactions declined by 24.7% before growing at an average annual rate of 17.4% in 2021 and 2022. Over the entire 15-year period, passenger car transactions grew at an average of 2.8% annually.

While growth on the Barrier System was also impacted by the Great Recession, slow economic recovery, annual toll rate increases, the temporary closure of the DRB in 2017, and the COVID-19 pandemic, there are a number of reasons why transaction growth rates on the Barrier System exceeded those of the Ticket System. The barrier facilities tend to be on the fringes of urban areas and have benefited from increasing suburban and exurban development in their corridors. Relatedly, the Mon/Fayette Expressway (MFE) and Southern Beltway have undergone significant expansions during this 15-year period, with MFE adding five ramps and a significant feeder road in West Virginia between 2010 and 2013 and the Southern Beltway adding a 13.2-mile extension and two toll plazas in 2021. Lastly, the Southern Beltway was exempt from scheduled toll increases in 2009, 2010, 2011, 2012, 2014, 2015, 2016, 2017, and 2022. The DRB was exempt from scheduled toll increases in 2017 and 2018.

Despite the overall growth of the Barrier System, there were significant differences in growth rates between barrier facilities. The Northeast Extension Barrier Facilities and Beaver Valley Expressway (BVE) both had declining rates of passenger car transactions prior to the pandemic, while the Amos K. Hutchinson Bypass (AKH) experienced modest annual growth from 2007 to 2019 but has failed to return to 2007 transaction levels in the post-pandemic period. Gateway and MFE each experienced consistent growth prior to the pandemic but have yet to return to 2019 transaction levels. The Southern Beltway, however, thanks to its aforementioned 13.2-mile expansion in 2021, had nearly quadruple the number of passenger car transactions in 2022 as in 2019.

Commercial vehicle average daily transaction trends are shown in Table 2-6, and like on the Ticket System, commercial vehicle transactions grew more quickly than did passenger car transactions. These trends also show stronger annual growth than the Ticket System. Commercial vehicle transactions experienced 5.3% AAPC from 2007-2019, a 4.5% decline in 2020, and 14.4% AAPC in 2021 and 2022. Overall AAPC from 2007 to 2022 was 5.8%.

Total Barrier System transactions increased annually by 3.4% from 2007-2019, fell by 21.7% in 2020, and grew an average of 16.8% annually in 2021 and 2022, for a total AAPC of 3.2% from 2007 to 2022.

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Table 2-5 Passenger Cars – Average Daily Transactions on the Pennsylvania Turnpike Barrier System

Includes Revenue and Non-Revenue Vehicles

Toll Location	Calendar Year[1] 2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Average Annual Percent Change 2007-19	2019-20	2020-22	2007-2022
Northeast Extension Barrier Plazas																				
Keyser Ave.	6,736	6,782	7,012	6,935	6,970	6,960	7,156	7,017	7,037	6,653	6,575	6,367	6,722	4,212	5,359	5,571	(0.0)	(37.3)	15.0	(1.3)
Clarks Summit	6,740	6,790	6,850	6,670	6,673	6,702	7,270	7,135	6,842	6,337	6,104	6,015	6,445	4,054	5,090	5,280	(0.4)	(37.1)	14.1	(1.6)
Subtotal	13,476	13,572	13,862	13,605	13,643	13,662	14,426	14,152	13,879	12,990	12,679	12,381	13,167	8,266	10,448	10,851	(0.2)	(37.2)	14.6	(1.4)
Turnpike I-376 - Beaver Valley Expressway																				
East Toll 376	10,334	10,288	9,897	9,884	9,940	9,685	9,235	8,971	8,918	8,477	8,386	9,038	9,333	6,746	7,887	8,178	(0.8)	(27.7)	10.1	(1.5)
Beaver Falls Rte. 551	434	458	430	455	430	437	425	387	410	391	414	448	475	450	456	440	0.7	(5.4)	(1.1)	0.1
Moravia Rte. 168	756	808	706	674	778	775	728	712	700	667	656	666	708	599	656	648	(0.5)	(15.4)	4.0	(1.0)
West Toll 376	7,524	7,633	7,617	7,738	7,632	7,430	7,178	7,292	7,333	7,239	7,434	8,117	8,489	6,149	7,207	7,235	1.0	(27.6)	8.5	(0.3)
Mt. Jackson Rte. 108	1,277	1,557	1,390	1,236	1,173	1,094	1,019	953	981	982	1,021	1,117	1,147	931	980	962	(0.9)	(18.9)	1.7	(1.9)
Subtotal	20,326	20,744	20,040	19,987	19,953	19,419	18,587	18,315	18,342	17,756	17,912	19,386	20,153	14,874	17,186	17,462	(0.1)	(26.2)	8.4	(1.0)
Turnpike 66 - Amos K. Hutchinson Bypass																				
Rte. 136	597	806	727	742	731	738	708	749	786	754	755	775	791	700	952	985	2.4	(11.5)	18.6	3.4
AKH Mainline	12,308	12,327	12,114	12,276	11,947	11,843	11,721	11,728	11,623	11,102	11,203	11,304	11,020	8,853	10,161	10,116	(0.9)	(19.7)	6.9	(1.3)
Route 30	2,889	4,617	4,645	4,921	4,809	4,686	4,625	4,625	4,599	4,544	4,496	4,469	4,297	3,741	4,289	4,182	3.4	(12.9)	5.7	2.5
Route 130	1,260	1,370	1,370	1,397	1,459	1,336	1,326	1,377	1,335	1,325	1,323	1,372	1,381	1,069	1,307	1,262	0.8	(22.6)	8.6	0.0
Route 66	580	762	738	752	774	754	753	834	815	850	827	829	768	601	722	751	2.4	(21.7)	11.8	1.7
Subtotal	17,633	19,883	19,594	20,088	19,719	19,356	19,133	19,313	19,158	18,576	18,605	18,749	18,257	14,963	17,430	17,296	0.3	(18.0)	7.5	(0.1)
Turnpike 43 - Mon/Fayette Expressway[2]																				
Ramp M4	39	32	22	22	147	299	315	308	313	295	292	270	278	252	295	302	17.9	(9.2)	9.4	14.7
M5	2,151	2,257	2,301	2,477	3,467	4,933	5,224	5,663	6,042	6,055	6,073	6,157	6,180	5,316	6,185	6,173	9.2	(14.0)	7.8	7.3
Ramp M15				13	109	86	81	77	88	81	82	77	77	76	91	101	-	(1.5)	15.2	-
Ramp M18				114	228	281	290	284	327	317	296	281	286	257	282	283	-	(10.1)	4.9	-
M19				275	3,543	4,537	4,896	5,079	5,587	5,744	5,564	5,865	5,784	4,678	5,413	5,646	-	(19.1)	9.9	-
Ramp M22							186	160	170	151	149	139	152	128	134	132	-	(15.9)	1.5	-
Ramp M26							740	769	842	796	836	831	844	739	770	767	-	(12.4)	1.9	-
M35 California	10,224	10,530	10,318	10,515	10,407	10,605	10,587	10,649	11,074	10,635	10,265	10,337	10,266	7,901	9,058	9,759	0.0	(23.0)	11.1	(0.3)
Ramp M39	1,030	1,052	1,050	1,067	1,073	1,056	1,046	1,006	1,015	1,026	988	966	921	755	871	860	(0.9)	(18.0)	6.7	(1.2)
Ramp M44	745	749	703	692	665	651	641	647	685	670	704	715	668	507	592	596	(0.9)	(24.1)	8.3	(1.5)
Ramp M48	3,213	3,301	3,356	3,471	3,478	3,537	3,511	3,579	4,054	3,812	3,830	3,987	4,016	3,518	3,570	3,550	1.9	(12.4)	0.4	0.7
M52	7,179	7,351	7,181	7,161	7,149	7,464	7,233	7,033	6,906	6,740	6,802	7,117	7,144	5,353	6,159	6,106	(0.0)	(25.1)	6.8	(1.1)
Subtotal	24,581	25,273	24,931	25,807	30,266	33,450	34,751	35,255	37,104	36,325	35,881	36,741	36,617	29,482	33,422	34,275	3.4	(19.5)	7.8	2.2
I-576 - Southern Beltway[3]																				
SB Rte. 30	166	223	262	298	364	555	303	311	305	278	390	285					-	-	-	-
SB Westport Rd.	125	130	153	160	163	190	191	249	348	340	339	340					-	-	-	-
Rte. 22	2,914	3,320	3,727	3,897	4,135	4,209	4,005	4,154	4,232	4,290	4,363	4,179					-	-	-	-
S3												4,349	4,451	3,241	4,256	6,682	-	(27.2)	43.6	-
S7															4,235	5,332	-	-	-	-
S14															4,130	5,485	-	-	-	-
Subtotal	3,204	3,673	4,142	4,355	4,662	4,954	4,498	4,714	4,885	4,909	5,093	4,539	4,451	3,241	12,621	17,500	2.8	(27.2)	132.4	12.0
Gateway Toll Plaza[4]																				
Gateway	8,183	8,074	8,441	8,716	8,743	8,819	8,967	8,942	9,209	9,469	9,494	9,416	9,283	6,529	8,271	8,381	1.1	(29.7)	13.3	0.2
Delaware River Bridge[5]																				
DRB										18,551	16,234	20,099	24,713	18,065	23,910	25,655	-	(26.9)	19.2	-
All Barrier Facilities																				
Total	87,403	91,220	91,011	92,558	96,987	99,660	100,361	100,691	102,576	118,575	115,898	121,311	126,639	95,420	123,289	131,419	3.1	(24.7)	17.4	2.8
Percent Change Over Prior Year		4.4	(0.2)	1.7	4.8	2.8	0.7	0.3	1.9	15.6	(2.3)	4.7	4.4	(24.7)	29.2	6.6				

(1) Toll rate increases were implemented annually from 2009 through 2022. Some barrier facilities, especially I-576 were exempted from programmed toll increases in some years. Refer to Table 2-1 for details.

(2) On July 11, 2011, the West Virginia section of Turnpike 43 was opened.

(3) The Southern Beltway configuration was changed from three ramp tolls to one mainline toll in June 2018. A 13.2-mile extension with an additional two mainline tolls opened on October 15, 2021.

(4) In CDM Smith's last Investment Grade Traffic and Revenue Study in 2018, Gateway Toll Plaza transactions were reported with the Ticket System. On June 1, 2003 the Gateway Toll Plaza was converted from the western terminus of the ticket system to a barrier plaza and toll classifications were switched from weight-based to axle-based. On January 2, 2006, toll collection was converted from two-way to one-way collection.

(5) On January 3, 2016 the Delaware River Bridge was converted to ORT and separated from the Ticket System.

Table 2-6 Commercial Vehicles – Average Daily Transactions on the Pennsylvania Turnpike Barrier System

Includes Revenue and Non-Revenue Vehicles

Toll Location	Calendar Year[1]																Average Annual Percent Change			
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2007-19	2019-20	2020-22	2007-2022
Northeast Extension Barrier Plazas																				
Keyser Ave.	1,408	1,363	1,306	1,365	1,492	1,532	1,606	1,643	1,687	1,690	1,751	1,842	1,923	1,835	2,000	2,099	2.6	(4.6)	7.0	2.7
Clarks Summit	1,162	1,096	1,047	1,082	1,149	1,228	1,369	1,436	1,404	1,391	1,429	1,446	1,568	1,530	1,594	1,625	2.5	(2.4)	3.1	2.3
Subtotal	2,570	2,459	2,353	2,447	2,641	2,759	2,975	3,079	3,091	3,081	3,180	3,288	3,491	3,365	3,595	3,725	2.6	(3.6)	5.2	2.5
Turnpike I-376 - Beaver Valley Expressway																				
East Toll 376	1,490	1,548	1,342	1,506	1,621	1,693	1,729	1,830	1,859	1,826	1,871	2,114	2,126	1,926	2,152	2,375	3.0	(9.4)	11.0	3.2
Beaver Falls Rte. 551	36	39	31	48	59	59	50	48	51	43	54	59	62	75	66	63	4.6	19.6	(8.2)	3.7
Moravia Rte. 168	96	145	60	73	92	86	73	97	82	61	76	99	96	136	139	157	(0.0)	41.3	7.6	3.3
West Toll 376	1,133	1,170	1,034	1,196	1,211	1,226	1,202	1,279	1,272	1,244	1,299	1,383	1,405	1,304	1,399	1,424	1.8	(7.2)	4.5	1.5
Mt. Jackson Rte. 108	98	108	113	98	133	164	135	148	154	152	163	189	158	150	163	148	4.1	(4.8)	(0.7)	2.8
Subtotal	2,854	3,010	2,580	2,921	3,116	3,228	3,190	3,402	3,418	3,326	3,463	3,843	3,848	3,591	3,920	4,167	2.5	(6.7)	7.7	2.6
Turnpike 66 - Amos K. Hutchinson Bypass																				
Rte. 136	211	183	146	165	183	178	177	749	197	171	168	190	187	157	199	242	(1.0)	(15.9)	24.1	0.9
AKH Mainline	2,070	2,146	2,010	2,261	2,333	2,348	2,372	2,603	2,514	2,397	2,495	2,643	2,580	2,389	2,694	2,820	1.9	(7.4)	8.7	2.1
Route 30	290	282	265	300	292	315	313	306	283	279	298	307	307	270	288	300	0.5	(11.9)	5.4	0.2
Route 130	38	29	30	26	26	26	28	32	27	29	30	31	32	31	31	31	(1.4)	(4.2)	1.2	(1.2)
Route 66	15	16	17	18	19	22	19	21	18	18	19	18	17	16	15	17	0.7	(7.4)	5.6	0.8
Subtotal	2,623	2,656	2,468	2,770	2,853	2,890	2,908	3,710	3,040	2,893	3,009	3,189	3,122	2,863	3,227	3,411	1.5	(8.3)	9.2	1.8
Turnpike 43 - Mon/Fayette Expressway[2]																				
Ramp M4	1	2	1	1	4	7	8	8	8	7	8	7	10	10	10	10	18.5	(0.5)	2.7	14.9
M5	140	196	240	275	366	529	665	819	838	742	777	780	812	726	842	907	15.8	(10.7)	11.8	13.3
Ramp M15				0	6	7	9	13	14	8	9	8	8	8	9	10	-	(5.7)	13.0	-
Ramp M18				6	16	19	20	17	36	16	15	19	17	12	13	15	-	(28.1)	11.4	-
M19				182	302	437	605	679	751	661	705	790	815	637	586	681	-	(21.9)	3.4	-
Ramp M22							29	24	40	15	14	14	19	12	12	12	-	(34.9)	1.0	-
Ramp M26							18	22	27	21	23	30	79	56	40	90	-	(28.1)	26.0	-
M35 California	384	478	532	573	574	694	827	1,002	974	871	934	1,004	1,078	854	801	937	9.0	(20.8)	4.8	6.1
Ramp M39	32	34	35	40	45	44	55	61	74	64	85	77	56	54	64	63	4.8	(4.3)	8.4	4.6
Ramp M44	46	68	33	29	53	47	53	56	107	100	96	89	68	56	45	41	3.2	(17.3)	(14.5)	(0.8)
Ramp M48	65	66	60	73	85	97	102	128	165	125	132	125	130	132	124	132	6.0	1.0	0.2	4.9
M52	111	127	125	143	156	173	183	197	210	212	224	235	240	199	223	226	6.7	(17.0)	6.6	4.9
Subtotal	779	971	1,025	1,322	1,607	2,053	2,573	3,026	3,244	2,842	3,022	3,179	3,331	2,754	2,769	3,124	12.9	(17.3)	6.5	9.7
I-576 - Southern Beltway[3]																				
SB Rte. 30	18	27	31	36	29	38	26	31	37	29	37	46					-	-	-	-
SB Westport Rd.	6	14	56	58	33	37	45	84	146	183	183	194					-	-	-	-
Rte. 22	210	249	287	311	312	322	356	391	470	426	444	455					-	-	-	-
S3												821	1,065	1,044	1,346	1,947	-	(1.9)	36.6	-
S7															866	1,241	-	-	-	-
S14															850	1,278	-	-	-	-
Subtotal	234	290	375	405	375	397	427	506	653	637	664	768	1,065	1,044	3,062	4,466	13.5	(1.9)	106.8	21.7
Gateway Toll Plaza[4]																				
Gateway	2,702	2,614	2,259	2,432	2,515	2,457	2,539	2,650	2,731	2,720	2,779	2,916	2,919	2,979	3,325	3,398	0.6	2.1	6.8	1.5
Delaware River Bridge[5]																				
DRB										3,127	2,836	3,601	4,118	4,304	4,805	5,057	-	4.5	8.4	-
All Barrier Facilities																				
Total	11,762	11,999	11,060	12,297	13,107	13,784	14,611	16,372	16,177	18,627	18,953	20,784	21,893	20,900	24,701	27,347	5.3	(4.5)	14.4	5.8
Percent Change Over Prior Year		2.0	(7.8)	11.2	6.6	5.2	6.0	12.0	(1.2)	15.1	1.8	9.7	5.3	(4.5)	18.2	10.7				

(1) Toll rate increases were implemented annually from 2009 through 2022. Some barrier facilities, especially I-576 were exempted from programmed toll increases in some years. Refer to Table 2-1 for details.

(2) On July 11, 2011, the West Virginia section of Turnpike 43 was opened.

(3) The Southern Beltway configuration was changed from three ramp tolls to one mainline toll in June 2018. A 13.2-mile extension with an additional two mainline tolls opened on October 15, 2021.

(4) In CDM Smith's last Investment Grade Traffic and Revenue Study in 2018, Gateway Toll Plaza transactions were reported with the Ticket System. On June 1, 2003 the Gateway Toll Plaza was converted from the western terminus of the ticket system to a barrier plaza and toll classifications were switched from weight-based to axle-based. On January 2, 2006, toll collection was converted from two-way to one-way collection.

(5) On January 3, 2016 the Delaware River Bridge was converted to ORT and separated from the Ticket System.

Table 2-7 Total Vehicles – Average Daily Transactions on the Pennsylvania Turnpike Barrier System

Includes Revenue and Non-Revenue Vehicles

Toll Location	Calendar Year																Average Annual Percent Change			
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2007-19	2019-20	2020-22	2007-2022
Northeast Extension Barrier Plazas																				
Keyser Ave.	8,144	8,144	8,318	8,300	8,462	8,492	8,761	8,660	8,724	8,343	8,326	8,209	8,645	6,046	7,359	7,670	0.5	(30.1)	12.6	(0.4)
Clarks Summit	7,903	7,887	7,897	7,752	7,822	7,930	8,639	8,571	8,246	7,728	7,533	7,460	8,013	5,584	6,684	6,905	0.1	(30.3)	11.2	(0.9)
Subtotal	16,047	16,031	16,215	16,052	16,284	16,422	17,401	17,231	16,970	16,071	15,859	15,669	16,658	11,631	14,043	14,576	0.3	(30.2)	11.9	(0.6)
Turnpike I-376 - Beaver Valley Expressway																				
East Toll 376	11,824	11,836	11,239	11,390	11,561	11,377	10,965	10,801	10,777	10,303	10,257	11,152	11,459	8,673	10,039	10,552	(0.3)	(24.3)	10.3	(0.8)
Beaver Falls Rte. 551	471	497	461	503	490	496	476	435	461	434	469	507	538	524	523	503	1.1	(2.5)	(2.1)	0.4
Moravia Rte. 168	853	953	766	747	869	861	801	809	782	728	732	765	804	735	796	805	(0.5)	(8.6)	4.6	(0.4)
West Toll 376	8,658	8,803	8,651	8,934	8,844	8,655	8,381	8,572	8,605	8,483	8,733	9,500	9,894	7,452	8,606	8,659	1.1	(24.7)	7.8	0.0
Mt. Jackson Rte. 108	1,375	1,665	1,503	1,334	1,306	1,258	1,154	1,101	1,135	1,134	1,184	1,305	1,305	1,081	1,143	1,110	(0.4)	(17.2)	1.3	(1.4)
Subtotal	23,180	23,754	22,620	22,908	23,070	22,648	21,776	21,717	21,760	21,082	21,375	23,229	24,000	18,465	21,106	21,629	0.3	(23.1)	8.2	(0.5)
Turnpike 66 - Amos K. Hutchinson Bypass																				
Rte. 136	808	989	873	907	914	916	885	1,497	982	926	923	965	977	857	1,151	1,226	1.6	(12.4)	19.7	2.8
AKH Mainline	14,378	14,473	14,124	14,537	14,280	14,191	14,093	14,331	14,137	13,499	13,697	13,947	13,600	11,242	12,854	12,937	(0.5)	(17.3)	7.3	(0.7)
Route 30	3,178	4,899	4,910	5,221	5,101	5,001	4,938	4,930	4,883	4,823	4,795	4,776	4,604	4,012	4,577	4,483	3.1	(12.9)	5.7	2.3
Route 130	1,298	1,399	1,400	1,423	1,485	1,362	1,354	1,409	1,362	1,354	1,354	1,402	1,413	1,100	1,338	1,293	0.7	(22.2)	8.4	(0.0)
Route 66	595	778	754	770	793	776	771	855	833	868	846	847	784	616	737	768	2.3	(21.4)	11.6	1.7
Subtotal	20,256	22,539	22,062	22,858	22,572	22,245	22,041	23,022	22,198	21,469	21,614	21,938	21,379	17,826	20,657	20,707	0.5	(16.6)	7.8	0.1
Turnpike 43 - Mon/Fayette Expressway																				
Ramp M4	40	34	23	23	151	306	323	316	321	303	300	277	288	262	305	312	17.9	(8.9)	9.1	14.7
M5	2,292	2,453	2,541	2,752	3,833	5,462	5,889	6,482	6,879	6,797	6,850	6,937	6,992	6,041	7,027	7,080	9.7	(13.6)	8.3	7.8
Ramp M15				13	115	93	90	91	102	89	91	85	85	83	101	110	-	(1.9)	15.0	-
Ramp M18				120	244	300	310	301	363	333	311	300	303	269	295	298	-	(11.1)	5.2	-
M19				457	3,845	4,974	5,501	5,758	6,338	6,406	6,269	6,655	6,599	5,315	5,999	6,327	-	(19.5)	9.1	-
Ramp M22							215	184	210	166	163	153	171	140	146	144	-	(18.0)	1.5	-
Ramp M26							758	791	869	817	858	861	923	796	810	857	-	(13.8)	3.8	-
M35 California	10,608	11,008	10,849	11,088	10,981	11,298	11,414	11,651	12,047	11,506	11,199	11,341	11,344	8,755	9,859	10,696	0.6	(22.8)	10.5	0.1
Ramp M39	1,062	1,087	1,085	1,107	1,118	1,101	1,101	1,067	1,089	1,090	1,073	1,042	977	809	935	923	(0.7)	(17.2)	6.8	(0.9)
Ramp M44	792	817	736	721	718	698	694	703	793	770	800	804	736	564	637	637	(0.6)	(23.4)	6.3	(1.4)
Ramp M48	3,277	3,368	3,416	3,544	3,563	3,634	3,613	3,707	4,219	3,937	3,962	4,112	4,146	3,650	3,694	3,682	2.0	(12.0)	0.4	0.8
M52	7,289	7,478	7,306	7,304	7,305	7,637	7,415	7,230	7,116	6,952	7,027	7,352	7,384	5,552	6,382	6,332	0.1	(24.8)	6.8	(0.9)
Subtotal	25,360	26,245	25,956	27,129	31,873	35,503	37,324	38,281	40,348	39,167	38,903	39,920	39,947	32,236	36,191	37,398	3.9	(19.3)	7.7	2.6
I-576 -Southern Beltway																				
SB Rte. 30	184	250	293	334	394	593	328	342	342	307	427	331					-	-	-	-
SB Westport Rd.	131	144	209	218	196	227	236	333	494	523	522	534					-	-	-	-
Rte. 22	3,124	3,569	4,014	4,208	4,447	4,531	4,361	4,546	4,702	4,716	4,807	4,634					-	-	-	-
S3												5,170	5,515	4,285	5,602	8,630	-	(22.3)	41.9	-
S7															5,102	6,573	-	-	-	-
S14															4,980	6,763	-	-	-	-
Subtotal	3,438	3,963	4,517	4,760	5,037	5,351	4,925	5,220	5,538	5,546	5,756	5,307	5,515	4,285	15,683	21,966	4.0	(22.3)	126.4	13.2
Gateway Toll Plaza[4]																				
Gateway	10,884	10,688	10,700	11,148	11,258	11,276	11,506	11,592	11,939	12,189	12,273	12,331	12,202	9,508	11,596	11,779	1.0	(22.1)	11.3	0.5
Delaware River Bridge[5]																				
DRB										21,678	19,070	23,700	28,831	22,368	28,715	30,712	-	(22.4)	17.2	-
All Barrier Facilities																				
Total	99,165	103,219	102,070	104,855	110,094	113,445	114,973	117,063	118,753	137,202	134,851	142,095	148,533	116,320	147,991	158,766	3.4	(21.7)	16.8	3.2
Percent Change Over Prior Year		4.1	(1.1)	2.7	5.0	3.0	1.3	1.8	1.4	15.5	(1.7)	5.4	4.5	(21.7)	27.2	7.3				

(1) Toll rate increases were implemented annually from 2009 through 2022. Some barrier facilities, especially I-576 were exempted from programmed toll increases in some years. Refer to Table 2-1 for details.

(2) On July 11, 2011, the West Virginia section of Turnpike 43 was opened.

(3) The Southern Beltway configuration was changed from three ramp tolls to one mainline toll in June 2018. A 13.2-mile extension with an additional two mainline tolls opened on October 15, 2021.

(4) In CDM Smith's last Investment Grade Traffic and Revenue Study in 2018, Gateway Toll Plaza transactions were reported with the Ticket System. On June 1, 2003 the Gateway Toll Plaza was converted from the western terminus of the ticket system to a barrier plaza and toll classifications were switched from weight-based to axle-based. On January 2, 2006, toll collection was converted from two-way to one-way collection.

(5) On January 3, 2016 the Delaware River Bridge was converted to ORT and separated from the Ticket System.

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2.4 Monthly Transactions and Gross Toll Revenue Trends

This section discusses monthly transactions and toll revenue trends by fiscal year (FY) from FY 2018-19 through FY 2022-23 for the Ticket System, Barrier System, and the total Turnpike System. The last actual data point is March 2023. Trend data is provided separately for passenger cars and commercial vehicles. The transaction data includes only toll transactions at exiting toll plazas and includes non-revenue transactions. These tables present the relationship between the transactions and toll revenue, highlight differences in seasonal variation, and isolate shorter-term impacts that may not be apparent in annual trends.

2.4.1 Ticket System Monthly Trends

Monthly transaction and toll revenue trends for the Ticket System are presented in **Table 2-8** from FY 2018-19 through March of FY 2022-23. Passenger car transactions decreased by 13.8% in FY 2019-20 and decreased a further 14.7% in FY 2020-21 compared to the previous year. The decline is a result of the COVID-19 pandemic, which began impacting Turnpike traffic in March 2020 due to school and business closures and stay-at-home orders being implemented across the nation. While the impacts were confined to the last three months of the fiscal year, these three months (March, April, and May of 2020) were also the most heavily impacted as passenger car traffic was 38-70% lower than the equivalent month in 2019. While monthly impacts lessened throughout FY 2020-21, transactions still declined more than 22% each month through February 2021 before experiencing significant increases in March, April, and May as monthly transactions began to be compared against the first months of the pandemic. As the pandemic moved into its second year, traffic recovered significantly, with FY 2021-22 transactions outpacing FY 2020-21 transactions by 19.0%.

Through the first 10 months of FY 2022-23, passenger car transactions have grown 0.9% over the same period in the previous fiscal year. However, that overall growth level has been bifurcated, with six consecutive months of negative growth from June through December, followed by four consecutive months of positive growth from December through March. January 2023 had particularly high growth of 16.3% because of depressed transaction levels in January 2022 that resulted from numerous heavy snowfalls and a surge in COVID-19 cases due to the Omicron variant.

Passenger car toll revenue performed better than transactions due to annual toll rate increases. Passenger car toll revenue declined 8.8% in FY 2019-20 and a further 12.8% in FY 2020-21. Revenue was somewhat bolstered in FY 2020-21 by the implementation of a 45% surcharge for TBP transactions in January 2021. Revenue had a strong recovery in FY 2021-22, growing 34.9% over the previous fiscal year and exceeding revenue in the last full fiscal year prior to the pandemic. In the current fiscal year, passenger car toll revenue on the Ticket System increased by 4.4% through March 2023 compared to the same period in the previous year. Although this is 3.5% higher in absolute terms than transactions growth over the same period, it is less than the 5% toll rate increase that was instituted in this period, indicating that average trips lengths are decreasing even as the total number of transactions rise.

During this same period, commercial vehicle transactions and revenue did not decline as severely as and recovered more quickly and strongly than did passenger car transactions and revenue. Transactions declined only 2.8% in FY 2019-20 and grew 4.6% in FY 2020-21 and a further 7.9% in FY 2021-22. However, year-to-date in FY 2022-23, CV transactions have experienced very slight negative growth of 0.1%, with transaction levels remaining within plus-or-minus 5% of the previous year for each of the 10 months completed thus far in the fiscal year. Furthermore, six of the past seven months have experienced negative transactions growth, indicating a softening of the strong demand for CV traffic that lasted throughout 2021 and 2022. Annual toll revenue increased 1.0% in FY 2019-20, 6.5% in FY 2020-21, and 15.2% in FY 2021-22. Through March 2023, FY 2022-23 revenue has grown 5.7% compared to the same period in the previous fiscal year. Conversely to what was experienced by PCs, this represents more growth than what would be expected by the 5% toll rate increase alone, indicating that CV revenues are a result of a higher increase in TBP revenue compared to CV E-ZPass revenue, longer trips, and/or larger vehicles compared to the prior year.

Total Ticket System transactions decreased by 12.2% in FY 2019-20 and a further 11.6% in FY 2020-21. In FY 2021-22 transactions grew 16.9% percent. Through March 2023, FY 2022-23 transactions have increased 0.7% compared to the same period in the prior fiscal year. Total Ticket System toll revenue decreased by 4.3% in FY 2019-20 and by 3.5% in FY 2020-21 before increasing 24.5% in FY 2021-22. Year-to-date toll revenue through March in FY 2022-23 has increased by 5.0% compared to the same period in the prior fiscal year.

Table 2-8 Ticket System – Monthly Transaction and Revenue Trends

Toll Transactions (in 1,000s, including both tolled and non-revenue transactions)

	Passenger Cars									Commercial Vehicles									Total Vehicles								
Month	2018-19	% Chg	2019-20	% Chg	2020-21	% Chg	2021-22	% Chg	2022-23	2018-19	% Chg	2019-20	% Chg	2020-21	% Chg	2021-22	% Chg	2022-23	2018-19	% Chg	2019-20	% Chg	2020-21	% Chg	2021-22	% Chg	2022-23
June	12,180	(2.9)	11,829	(36.1)	7,560	39.8	10,569	(1.0)	10,458	2,059	(1.5)	2,029	(0.2)	2,024	11.3	2,253	3.6	2,334	14,239	(2.7)	13,857	(30.8)	9,584	33.8	12,822	(0.2)	12,793
July	12,218	(0.9)	12,103	(27.1)	8,817	26.1	11,115	(4.2)	10,650	2,036	4.8	2,133	(2.6)	2,077	7.6	2,235	(2.2)	2,185	14,255	(0.1)	14,236	(23.5)	10,894	22.5	13,350	(3.9)	12,835
August	12,665	(1.7)	12,447	(25.8)	9,241	18.6	10,964	(0.9)	10,867	2,173	(0.4)	2,163	(5.1)	2,053	10.8	2,276	4.5	2,379	14,838	(1.5)	14,610	(22.7)	11,294	17.2	13,240	0.0	13,246
September	11,420	(0.5)	11,368	(22.4)	8,824	16.7	10,295	(0.3)	10,261	1,910	5.3	2,010	2.1	2,052	9.3	2,243	(0.3)	2,237	13,329	0.4	13,378	(18.7)	10,876	15.3	12,538	(0.3)	12,498
October	12,090	(0.8)	11,999	(22.8)	9,269	17.2	10,867	(2.2)	10,623	2,162	0.8	2,179	(2.4)	2,126	6.8	2,270	(2.6)	2,211	14,252	(0.5)	14,178	(19.6)	11,395	15.3	13,137	(2.3)	12,834
November	11,171	(0.3)	11,141	(29.3)	7,872	27.8	10,063	(0.8)	9,984	1,906	(0.3)	1,902	(0.5)	1,892	11.3	2,106	(1.1)	2,083	13,078	(0.3)	13,042	(25.1)	9,764	24.6	12,169	(0.8)	12,067
December	11,007	(0.8)	10,920	(33.0)	7,314	33.5	9,762	0.5	9,806	1,761	2.9	1,812	4.4	1,892	8.7	2,057	(3.4)	1,987	12,768	(0.3)	12,732	(27.7)	9,205	28.4	11,819	(0.2)	11,793
January	9,973	1.8	10,157	(27.7)	7,341	6.4	7,808	16.3	9,085	1,817	2.7	1,866	(2.4)	1,821	3.2	1,879	4.6	1,965	11,790	2.0	12,022	(23.8)	9,162	5.7	9,687	14.1	11,049
February	9,433	4.7	9,876	(35.2)	6,398	29.8	8,307	3.4	8,586	1,661	4.0	1,727	(5.8)	1,626	14.9	1,869	(1.6)	1,840	11,094	4.6	11,602	(30.8)	8,024	26.8	10,177	2.4	10,426
March	11,057	(37.6)	6,901	24.9	8,622	10.0	9,483	3.7	9,837	1,888	(5.4)	1,786	18.7	2,121	5.0	2,228	(2.7)	2,168	12,945	(32.9)	8,687	23.7	10,743	9.0	11,710	2.5	12,005
April	11,325	(69.7)	3,437	165.4	9,122	8.9	9,934			2,017	(25.6)	1,501	41.3	2,120	1.6	2,154			13,342	(63.0)	4,938	127.7	11,243	7.5	12,088		
May	12,010	(53.9)	5,540	80.7	10,014	3.2	10,332			2,137	(17.9)	1,755	20.0	2,106	6.3	2,238			14,147	(48.4)	7,295	66.1	12,119	3.7	12,569		
Total Year	136,551	(13.8)	117,716	(14.7)	100,394	19.0	119,499			23,527	(2.8)	22,863	4.6	23,910	7.9	25,807			160,078	(12.2)	140,579	(11.6)	124,304	16.9	145,306		
June - Mar	113,215	(4.0)	108,739	(25.3)	81,258	22.1	99,233	0.9	100,157	19,373	1.2	19,607	0.4	19,684	8.8	21,415	(0.1)	21,389	132,589	(3.2)	128,346	(21.4)	100,942	19.5	120,648	0.7	121,546

Toll Revenue (in $1,000s)

	Passenger Cars									Commercial Vehicles									Total Vehicles								
Month	2018-19	% Chg	2019-20	% Chg	2020-21	% Chg	2021-22	% Chg	2022-23	2018-19	% Chg	2019-20	% Chg	2020-21	% Chg	2021-22	% Chg	2022-23	2018-19	% Chg	2019-20	% Chg	2020-21	% Chg	2021-22	% Chg	2022-23
June	$56,349	7.6	$60,635	(41.8)	$35,319	62.5	$57,377	7.3	$61,561	$43,898	5.1	$46,135	(2.0)	$45,213	18.6	$53,638	11.7	$59,916	$100,247	6.5	$106,770	(24.6)	$80,532	37.9	$111,015	9.4	$121,477
July	59,123	8.5	64,149	(33.4)	42,697	60.3	68,423	(1.6)	67,357	43,294	10.4	47,784	(4.3)	45,733	17.3	53,654	7.4	57,631	102,417	9.3	111,932	(21.0)	88,430	38.0	122,077	2.4	124,988
August	60,200	8.8	65,501	(28.3)	46,956	38.1	64,828	4.2	67,533	46,144	5.5	48,699	(4.5)	46,518	17.4	54,595	13.3	61,836	106,344	7.4	114,200	(18.1)	93,474	27.8	119,423	8.3	129,369
September	51,234	7.0	54,814	(24.3)	41,486	29.3	53,642	12.7	60,460	41,775	7.7	45,003	0.1	45,044	14.7	51,683	11.4	57,574	93,009	7.3	99,817	(13.3)	86,530	21.7	105,325	12.1	118,034
October	51,943	9.7	57,006	(21.0)	45,050	44.2	64,959	(7.8)	59,891	45,892	5.4	48,375	(0.2)	48,290	18.7	57,319	(0.5)	57,051	97,835	7.7	105,381	(11.4)	93,340	31.0	122,279	(4.4)	116,941
November	49,943	7.6	53,745	(32.5)	36,273	32.8	48,187	18.1	56,911	41,520	1.1	41,991	1.6	42,656	13.9	48,605	11.7	54,268	91,463	4.7	95,736	(17.6)	78,929	22.6	96,792	14.9	111,179
December	48,312	10.0	53,142	(35.4)	34,329	72.9	59,349	(8.0)	54,612	38,457	7.1	41,206	8.0	44,492	20.5	53,632	(3.6)	51,699	86,769	8.7	94,348	(16.5)	78,821	43.3	112,981	(5.9)	106,311
January	42,828	10.1	47,167	(23.0)	36,314	26.5	45,926	9.2	50,149	42,586	7.4	45,721	(1.1)	45,231	14.1	51,605	3.1	53,183	85,414	8.8	92,888	(12.2)	81,545	19.6	97,532	5.9	103,331
February	41,868	10.5	46,274	(33.2)	30,899	40.9	43,533	5.5	45,943	39,811	8.3	43,112	(2.3)	42,135	18.8	50,044	2.1	51,084	81,679	9.4	89,386	(18.3)	73,034	28.1	93,578	3.7	97,027
March	51,714	(40.2)	30,904	39.5	43,127	17.6	50,734	12.0	56,814	45,684	(6.7)	42,610	25.4	53,427	11.3	59,456	1.9	60,613	97,398	(24.5)	73,515	31.3	96,553	14.1	110,190	6.6	117,427
April	53,860	(75.2)	13,360	265.6	48,848	14.9	56,151			46,431	(21.4)	36,517	42.4	51,990	7.4	55,817			100,291	(50.3)	49,878	102.2	100,838	11.0	111,968		
May	59,310	(57.6)	25,131	128.4	57,404	3.8	59,559			48,818	(12.8)	42,565	25.3	53,338	12.5	60,013			108,128	(37.4)	67,696	63.6	110,743	8.0	119,573		
Total Year	$626,685	(8.8)	$571,829	(12.8)	$498,703	34.9	$672,668			$524,309	1.0	$529,717	6.5	$564,067	15.2	$650,063			$1,150,994	(4.3)	$1,101,546	(3.5)	$1,062,770	24.5	$1,322,732		
June - Mar	513,514	3.9	533,337	(26.4)	392,450	41.9	556,958	4.4	$581,231	429,060	5.0	450,635	1.8	458,739	16.5	534,233	5.7	$564,853	942,575	4.4	983,972	(13.5)	851,189	28.2	1,091,191	5.0	$1,146,084

NOTES:

(1) Toll increases occur every year with exceptions. Refer to Table 2-1 for details.

(2) Ramps connecting I-95 to I-276 opened to traffic in September 2018.

(3) Leap year occurred in 2020, resulting in exaggerated traffic and toll revenue impacts in February 2020 compared to February 2019.

(4) In response to the COVID-19 pandemic, schools were closed state-wide on March 16, 2020 and stay-at-home orders for some counties began to effect on March 23, 2020. A state-wide stay-at-home order was issued April 1, 2020 and lifted on June 5, 2020.

(5) AET conversion occurred in June 2020.

(6) Totals may not equal the sum of all parts due to rounding.

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2.4.2 Barrier System Monthly Trends

Table 2-9 presents monthly transaction and toll revenue trends for the Barrier System. Traffic and revenue trends for both passenger car and commercial vehicles were largely similar to those experienced on the Ticket System. Passenger car transactions decreased by 9.6% in FY 2019-20 and 9.0% in FY 2020-21 before growing by 22.3% in FY 2021-22. The opening of a 13.2-mile extension of the Southern Beltway in October 2021 provided additional transaction and revenue growth beyond continued recovery from the COVID-19 pandemic. Passenger car transactions through March have increased by 8.8% in FY 2022-23 year-to-date compared to the previous fiscal year.

Passenger car toll revenue decreased by 1.6% in FY 2019-20 and by less than 0.1% in FY 2020-21. In FY 2021-22 passenger car toll revenue increased by 31.8%. Thus far in FY 2022-23, passenger car revenue has increased by 12.4% compared to the same period in the prior fiscal year. Revenue declines in FY 2019-20 and 2020-21 were much smaller than declines for transactions or Ticket System revenues, primarily due to the implementation of a 45% TBP toll surcharge on BVE, AKH, and Gateway in October 2019 and MFE in January 2021.

Commercial vehicle transactions decreased by 1.0% in FY 2019-20 and grew by 3.1% in FY 2020-21 and 14.9% in FY 2021-22. Year-to-date, FY 2022-23 commercial vehicle transactions have increased 12.3% over the same period in the prior year. Toll revenue on the Barrier System has increased each of the past three fiscal years, including during the pandemic. Commercial vehicle toll revenue grew 7.7% in FY 2019-20, 10.6% in FY 2020-21, and 17.5% in FY 2021-22. Thus far in FY 2022-23, commercial vehicle toll revenue has increased by 11.7% through March 2023. These increases in toll revenue are driven by the strong performance of commercial vehicle traffic through the pandemic, annual toll increases, and the imposition of a 45% TBP toll surcharge on BVE, AKH, and Gateway during this period.

Total Barrier System transactions decreased by 8.4% in FY 2019-20 and by 7.1% in FY 2020-21. In FY 2021-22, transactions increased by 21.0%. Through March, transactions in FY 2022-23 have increased by 9.4% over the same time period in the prior fiscal year. Total Barrier System toll revenue increased by 2.0% in FY 2019-20, 4.3% in FY 2020-21, and 25.6% in FY 2021-22. Toll revenue year-to-date in FY 2022-23 has increased by 12.1% compared to the same period in the prior fiscal year.

2.4.3 Total Turnpike System Monthly Trends

Table 2-10 presents the monthly transaction and toll revenue trends for the total Turnpike System. Passenger car transactions declined 12.8% in FY 2019-20 and 13.2% in FY 2020-21 before increasing 19.9% in FY 2021-22. Passenger car transactions have increased 3.1% in FY 2022-23 year-to-date compared to the prior year. Passenger car toll revenue performed more strongly than did transactions due to toll rate increases that were implemented each year and TBP surcharges implemented on some toll systems in 2019, 2020, and 2021. Passenger car toll revenue decreased 7.7% in FY 2019-20 and 10.7% in FY 2020-21 before increasing 34.3% in FY 2021-22. Through March 2023, passenger car toll revenue in FY 2022-23 has increased 5.8% compared to the same period in the prior fiscal year.

Commercial vehicle transactions decreased 2.4% in FY 2019-20 and increased by 4.2% in FY 2020-21 and 9.7% in FY 2021-22. Through March, FY 2022-23 transactions have grown 3.1% compared to the same period in the prior fiscal year. Toll revenue increased 1.8% in FY 2019-20, 7.0% in FY 2020-21, 15.5% in FY 2021-22, and 6.5% in FY 2022-23 through March 2023.

Total transactions decreased 11.2% in FY 2019-20 and 10.4% in FY 2020-21 before increasing 18.0% in FY 2021-22 and 3.1% through March 2023 in FY 2023-23 compared to the same period in the prior year. Total toll revenue decreased by 3.4% in FY 2019-20 and 2.4% in FY 2020-21 but increased by 24.6% in FY 2021-22 and 6.1% in FY 2022-23 through March 2023.

Table 2-9 Combined Barrier Facilities – Monthly Transaction and Revenue Trends

Toll Transactions (in 1,000s, including both tolled and non-revenue transactions)

	Passenger Cars									Commercial Vehicles									Total Vehicles								
Month	2018-19	% Chg	2019-20	% Chg	2020-21	% Chg	2021-22	% Chg	2022-23	2018-19	% Chg	2019-20	% Chg	2020-21	% Chg	2021-22	% Chg	2022-23	2018-19	% Chg	2019-20	% Chg	2020-21	% Chg	2021-22	% Chg	2022-23
June	3,907	5.9	4,137	(27.6)	2,997	26.5	3,791	11.0	4,207	675	2.2	690	0.3	692	8.3	749	20.8	905	4,581	5.4	4,827	(23.6)	3,689	23.1	4,541	12.6	5,112
July	4,099	6.4	4,362	(21.8)	3,410	18.9	4,056	10.2	4,470	680	6.7	725	(1.9)	711	3.5	736	17.3	863	4,779	6.4	5,087	(19.0)	4,121	16.3	4,792	11.3	5,332
August	4,247	4.2	4,424	(20.4)	3,521	15.1	4,053	12.5	4,560	735	0.1	736	(6.0)	692	8.5	751	25.7	944	4,982	3.6	5,160	(18.4)	4,212	14.0	4,804	14.6	5,504
September	3,791	4.1	3,946	(14.6)	3,369	11.8	3,765	13.6	4,278	645	6.8	689	2.4	706	4.8	739	21.2	896	4,436	4.5	4,635	(12.1)	4,074	10.6	4,504	14.9	5,174
October	4,046	1.2	4,096	(16.2)	3,433	19.3	4,097	6.9	4,378	727	3.1	749	(4.6)	715	10.1	787	13.0	889	4,773	1.5	4,845	(14.4)	4,148	17.7	4,884	7.9	5,268
November	3,737	(0.9)	3,705	(22.9)	2,858	37.6	3,932	2.3	4,024	623	2.9	641	(3.8)	617	24.5	768	7.7	827	4,360	(0.3)	4,346	(20.1)	3,474	35.3	4,700	3.2	4,851
December	3,666	(0.4)	3,651	(27.8)	2,635	44.5	3,809	3.0	3,924	565	4.7	592	1.4	600	24.8	749	2.6	768	4,231	0.3	4,243	(23.8)	3,235	40.9	4,557	3.0	4,692
January	3,171	3.6	3,284	(20.9)	2,597	18.2	3,069	16.1	3,562	589	4.5	615	(4.3)	589	16.6	686	10.5	758	3,760	3.7	3,899	(18.3)	3,186	17.9	3,755	15.0	4,320
February	3,108	2.3	3,180	(24.9)	2,387	32.6	3,165	7.4	3,400	542	5.7	573	(4.3)	549	24.8	685	4.6	716	3,650	2.8	3,753	(21.8)	2,935	31.1	3,849	6.9	4,116
March	3,668	(32.1)	2,489	26.7	3,155	18.2	3,730	6.2	3,960	626	(3.8)	603	15.3	695	20.4	837	0.9	844	4,294	(28.0)	3,092	24.5	3,849	18.6	4,567	5.2	4,804
April	3,825	(62.2)	1,445	129.8	3,322	19.6	3,972			686	(25.0)	515	38.5	713	13.8	811			4,511	(56.5)	1,960	105.8	4,035	18.5	4,783		
May	4,131	(44.3)	2,303	57.9	3,637	15.2	4,191			726	(15.7)	611	14.4	699	24.5	871			4,857	(40.0)	2,914	48.8	4,336	16.7	5,062		
Total Year	45,395	(9.6)	41,022	(9.0)	37,320	22.3	45,629			7,819	(1.0)	7,739	3.1	7,977	14.9	9,169			53,214	(8.4)	48,761	(7.1)	45,296	21.0	54,798		
June - Mar	37,439	(0.4)	37,274	(18.5)	30,361	23.4	37,466	8.8	40,763	6,408	3.2	6,612	(0.7)	6,564	14.0	7,486	12.3	8,410	43,847	0.1	43,886	(15.9)	36,925	21.7	44,952	9.4	49,173

Toll Revenue (in $1,000s)

	Passenger Cars									Commercial Vehicles									Total Vehicles								
Month	2018-19	% Chg	2019-20	% Chg	2020-21	% Chg	2021-22	% Chg	2022-23	2018-19	% Chg	2019-20	% Chg	2020-21	% Chg	2021-22	% Chg	2022-23	2018-19	% Chg	2019-20	% Chg	2020-21	% Chg	2021-22	% Chg	2022-23
June	$9,506	16.4	$11,069	(21.7)	$8,667	40.4	$12,165	13.7	$13,826	$5,890	8.1	$6,367	9.8	$6,989	14.6	$8,010	18.7	$9,504	$15,396	13.2	$17,436	(10.2)	$15,656	28.9	$20,175	15.6	$23,330
July	10,022	17.7	11,799	(18.8)	9,577	43.0	13,699	10.9	15,191	5,808	14.2	6,633	5.5	6,997	13.3	7,928	15.3	9,142	15,830	16.4	18,433	(10.1)	16,574	30.5	21,627	12.5	24,333
August	10,308	14.5	11,807	(10.7)	10,540	23.0	12,969	14.7	14,872	6,262	8.4	6,791	3.3	7,012	14.1	8,002	22.5	9,803	16,570	12.2	18,598	(5.6)	17,552	19.5	20,971	17.7	24,674
September	9,083	13.8	10,333	(8.3)	9,477	24.1	11,765	18.9	13,988	5,566	14.3	6,363	9.9	6,995	12.2	7,851	19.2	9,357	14,649	14.0	16,696	(1.3)	16,472	19.1	19,616	19.0	23,345
October	9,634	9.7	10,569	(1.9)	10,366	30.2	13,492	6.2	14,332	6,326	10.4	6,983	6.1	7,406	15.8	8,573	8.4	9,291	15,961	10.0	17,552	1.3	17,772	24.2	22,065	7.1	23,623
November	9,185	12.0	10,291	(24.6)	7,756	53.6	11,913	10.1	13,120	5,595	12.5	6,296	1.4	6,383	23.7	7,895	11.6	8,807	14,780	12.2	16,587	(14.8)	14,140	40.1	19,808	10.7	21,927
December	9,040	15.0	10,392	(22.8)	8,018	48.3	11,890	7.1	12,733	5,198	16.6	6,061	8.6	6,580	23.3	8,109	1.7	8,247	14,238	15.6	16,452	(11.3)	14,597	37.0	19,999	4.9	20,980
January	8,114	18.7	9,627	(16.8)	8,010	26.9	10,163	18.9	12,088	5,702	13.7	6,482	3.1	6,685	15.3	7,705	11.2	8,568	13,816	16.6	16,109	(8.8)	14,695	21.6	17,868	15.6	20,656
February	7,950	14.2	9,083	(24.0)	6,905	50.9	10,423	10.2	11,483	5,311	13.7	6,038	0.0	6,040	28.0	7,731	5.3	8,141	13,261	14.0	15,121	(14.4)	12,945	40.2	18,154	8.1	19,624
March	9,682	(31.4)	6,642	47.8	9,815	21.0	11,875	15.1	13,668	6,075	4.4	6,345	23.3	7,821	18.1	9,237	4.4	9,639	15,757	(17.6)	12,987	35.8	17,636	19.7	21,112	10.4	23,307
April	10,047	(62.4)	3,774	182.4	10,658	22.1	13,009			6,395	(11.9)	5,632	37.7	7,757	13.8	8,830			16,443	(42.8)	9,406	95.8	18,414	18.6	21,839		
May	10,950	(42.5)	6,295	88.4	11,862	15.9	13,753			6,741	(5.9)	6,343	21.8	7,727	20.5	9,309			17,691	(28.6)	12,638	55.0	19,589	17.7	23,062		
Total Year	$113,521	(1.6)	$111,681	(0.0)	$111,651	31.8	$147,115			$70,871	7.7	$76,334	10.6	$84,391	17.5	$99,180			$184,392	2.0	$188,015	4.3	$196,042	25.6	$246,295		
June - Mar	92,524	9.8	101,612	(12.3)	89,131	35.0	120,354	12.4	$135,301	57,734	11.5	64,358	7.1	68,908	17.6	81,041	11.7	$90,498	150,258	10.5	165,971	(4.8)	158,038	27.4	201,394	12.1	$225,799

NOTES:

(1) Toll increases occur every year with exceptions. Refer to Table 2-1 for details.

(2) Leap year occurred in 2020, resulting in exaggerated traffic and toll revenue impacts in February 2020 compared to February 2019.

(3) In response to the COVID-19 pandemic, schools were closed state-wide on March 16, 2020 and stay-at-home orders for some counties began to effect on March 23, 2020. A state-wide stay-at-home order was issued April 1, 2020 and lifted on June 5, 2020.

(4) AET conversions at Southern Beltway, Amos K Hutchinson Bypass, Gateway Toll Plaza, and Mon/Fayette Expressway occurred in June 2018, October 2019, October 2019, and June 2020, respectively .

(5) A 13.2-mile extension of the Southern Beltway opened on October 15, 2021.

(6) Totals may not equal the sum of all parts due to rounding.

Table 2-10 Total Turnpike System – Monthly Transaction and Revenue Trends

Toll Transactions (in 1,000s, including both tolled and non-revenue transactions)

	Passenger Cars									Commercial Vehicles									Total Vehicles								
Month	2018-19	% Chg	2019-20	% Chg	2020-21	% Chg	2021-22	% Chg	2022-23	2018-19	% Chg	2019-20	% Chg	2020-21	% Chg	2021-22	% Chg	2022-23	2018-19	% Chg	2019-20	% Chg	2020-21	% Chg	2021-22	% Chg	2022-23
June	16,087	(0.8)	15,966	(33.9)	10,557	36.0	14,360	2.1	14,665	2,734	(0.6)	2,719	(0.1)	2,716	10.6	3,002	7.9	3,239	18,821	(0.7)	18,685	(29.0)	13,273	30.8	17,363	3.1	17,904
July	16,318	0.9	16,464	(25.7)	12,228	24.1	15,171	(0.3)	15,120	2,716	5.2	2,858	(2.5)	2,788	6.5	2,970	2.6	3,047	19,033	1.5	19,323	(22.3)	15,016	20.8	18,141	0.1	18,167
August	16,912	(0.2)	16,871	(24.4)	12,762	17.7	15,017	2.7	15,427	2,908	(0.3)	2,899	(5.3)	2,745	10.3	3,026	9.8	3,323	19,820	(0.3)	19,770	(21.6)	15,507	16.4	18,044	3.9	18,750
September	15,211	0.7	15,314	(20.4)	12,193	15.3	14,060	3.4	14,539	2,554	5.7	2,699	2.2	2,758	8.2	2,983	5.0	3,133	17,765	1.4	18,013	(17.0)	14,951	14.0	17,042	3.7	17,672
October	16,136	(0.3)	16,095	(21.1)	12,702	17.8	14,963	0.3	15,002	2,889	1.4	2,928	(3.0)	2,841	7.6	3,057	1.4	3,100	19,025	(0.0)	19,023	(18.3)	15,543	15.9	18,021	0.5	18,102
November	14,909	(0.4)	14,846	(27.7)	10,730	30.4	13,995	0.1	14,008	2,530	0.5	2,543	(1.3)	2,509	14.6	2,874	1.3	2,910	17,438	(0.3)	17,388	(23.9)	13,238	27.4	16,869	0.3	16,918
December	14,673	(0.7)	14,571	(31.7)	9,949	36.4	13,570	1.2	13,730	2,327	3.3	2,404	3.6	2,492	12.6	2,806	(1.8)	2,756	17,000	(0.1)	16,975	(26.7)	12,441	31.6	16,376	0.7	16,485
January	13,144	2.3	13,441	(26.1)	9,939	9.4	10,877	16.3	12,646	2,406	3.1	2,481	(2.9)	2,410	6.4	2,565	6.2	2,723	15,550	2.4	15,922	(22.4)	12,348	8.9	13,442	14.3	15,369
February	12,541	4.1	13,055	(32.7)	8,785	30.6	11,472	4.5	11,986	2,203	4.4	2,300	(5.4)	2,175	17.4	2,554	0.1	2,556	14,745	4.1	15,355	(28.6)	10,960	28.0	14,026	3.7	14,542
March	14,725	(36.2)	9,390	25.4	11,777	12.2	13,213	4.4	13,797	2,515	(5.0)	2,389	17.9	2,816	8.8	3,064	(1.7)	3,012	17,239	(31.7)	11,779	23.9	14,593	11.5	16,277	3.3	16,810
April	15,150	(67.8)	4,882	154.9	12,444	11.7	13,906			2,703	(25.4)	2,016	40.6	2,833	4.7	2,965			17,853	(61.4)	6,898	121.5	15,277	10.4	16,871		
May	16,141	(51.4)	7,843	74.0	13,650	6.4	14,523			2,863	(17.3)	2,366	18.6	2,805	10.8	3,109			19,004	(46.3)	10,209	61.2	16,456	7.1	17,632		
Total Year	181,946	(12.8)	158,738	(13.2)	137,714	19.9	165,128			31,347	(2.4)	30,602	4.2	31,887	9.7	34,976			213,292	(11.2)	189,340	(10.4)	169,601	18.0	200,103		
June - Mar	150,654	(3.1)	146,013	(23.6)	111,619	22.5	136,699	3.1	140,920	25,781	1.7	26,220	0.1	26,248	10.1	28,902	3.1	29,800	176,435	(2.4)	172,233	(20.0)	137,868	20.1	165,601	3.1	170,719

Toll Revenue (in $1,000s)

	Passenger Cars									Commercial Vehicles									Total Vehicles								
Month	2018-19	% Chg	2019-20	% Chg	2020-21	% Chg	2021-22	% Chg	2022-23	2018-19	% Chg	2019-20	% Chg	2020-21	% Chg	2021-22	% Chg	2022-23	2018-19	% Chg	2019-20	% Chg	2020-21	% Chg	2021-22	% Chg	2022-23
June	$65,855	8.9	$71,705	(38.7)	$43,987	58.1	$69,542	8.4	$75,387	$49,788	5.5	$52,502	(0.6)	$52,201	18.1	$61,648	12.6	$69,420	$115,643	7.4	$124,206	(22.6)	$96,188	36.4	$131,190	10.4	$144,807
July	69,145	9.8	75,948	(31.2)	52,274	57.1	82,121	0.5	82,549	49,102	10.8	54,417	(3.1)	52,730	16.8	61,582	8.4	66,772	118,247	10.2	130,365	(19.5)	105,004	36.9	143,703	3.9	149,321
August	70,508	9.6	77,308	(25.6)	57,496	35.3	77,797	5.9	82,405	52,406	5.9	55,490	(3.5)	53,529	16.9	62,598	14.4	71,638	122,914	8.0	132,798	(16.4)	111,025	26.5	140,394	9.7	154,043
September	60,317	8.0	65,147	(21.8)	50,963	28.3	65,407	13.8	74,449	47,341	8.5	51,366	1.3	52,040	14.4	59,534	12.4	66,931	107,658	8.2	116,512	(11.6)	103,003	21.3	124,941	13.2	141,379
October	61,577	9.7	67,575	(18.0)	55,416	41.6	78,451	(5.4)	74,223	52,218	6.0	55,358	0.6	55,697	18.3	65,892	0.7	66,341	113,795	8.0	122,933	(9.6)	111,112	29.9	144,344	(2.6)	140,564
November	59,128	8.3	64,036	(31.2)	44,030	36.5	60,100	16.5	70,031	47,115	2.5	48,287	1.6	49,039	15.2	56,500	11.6	63,075	106,243	5.7	112,323	(17.1)	93,069	25.3	116,600	14.2	133,106
December	57,352	10.8	63,533	(33.3)	42,347	68.2	71,239	(5.5)	67,345	43,656	8.3	47,267	8.1	51,072	20.9	61,742	(2.9)	59,946	101,007	9.7	110,800	(15.7)	93,418	42.3	132,981	(4.3)	127,291
January	50,941	11.5	56,794	(22.0)	44,324	26.5	56,090	11.0	62,236	48,288	8.1	52,202	(0.5)	51,916	14.2	59,310	4.1	61,751	99,230	9.8	108,997	(11.7)	96,240	19.9	115,400	7.4	123,987
February	49,819	11.1	55,357	(31.7)	37,804	42.7	53,956	6.4	57,427	45,122	8.9	49,150	(2.0)	48,175	19.9	57,775	2.5	59,224	94,940	10.1	104,507	(17.7)	85,979	30.0	111,731	4.4	116,651
March	61,396	(38.8)	37,546	41.0	52,941	18.3	62,609	12.6	70,482	51,759	(5.4)	48,955	25.1	61,248	12.2	68,693	2.3	70,252	113,155	(23.6)	86,502	32.0	114,189	15.0	131,302	7.2	140,733
April	63,907	(73.2)	17,134	247.3	59,506	16.2	69,160			52,826	(20.2)	42,149	41.8	59,747	8.2	64,647			116,733	(49.2)	59,283	101.2	119,253	12.2	133,806		
May	70,260	(55.3)	31,426	120.4	69,267	5.8	73,312			55,560	(12.0)	48,909	24.9	61,065	13.5	69,323			125,820	(36.2)	80,335	62.2	130,332	9.4	142,635		
Total Year	$740,205	(7.7)	$683,511	(10.7)	$610,353	34.3	$819,784			$595,180	1.8	$606,050	7.0	$648,458	15.5	$749,243			$1,335,385	(3.4)	$1,289,561	(2.4)	$1,258,812	24.6	$1,569,027		
June - Mar	606,038	4.8	634,950	(24.2)	481,581	40.6	677,312	5.8	$716,533	486,795	5.8	514,993	2.5	527,646	16.6	615,273	6.5	$655,351	1,092,833	5.2	1,149,943	(12.2)	1,009,227	28.1	1,292,585	6.1	$1,371,883

NOTES:

(1) Toll increases occur every year with exceptions. Refer to Table 2-1 for details.

(2) Ramps connecting I-95 to I-276 opened to traffic in September 2018.

(3) Leap year occurred in 2020, resulting in exaggerated traffic and toll revenue impacts in February 2020 compared to February 2019.

(4) In response to the COVID-19 pandemic, schools were closed state-wide on March 16, 2020 and stay-at-home orders for some counties began to effect on March 23, 2020. A state-wide stay-at-home order was issued April 1, 2020 and lifted on June 5, 2020.

(5) AET conversions at Southern Beltway, Amos K Hutchinson Bypass, Gateway Toll Plaza, Mon/Fayette Expressway, and the Ticket System occurred in June 2018, October 2019, October 2019, June 2020, and June 2020, respectively .

(6) A 13.2-mile extension of the Southern Beltway opened on October 15, 2021.

(7) Totals may not equal the sum of all parts due to rounding.

2.5 Comparison of Commercial Activity and Total Turnpike Toll Transactions

Table 2-11 presents a comparison between three measures of economic growth, and transaction growth on the Turnpike System from 2015 through 2022. Annual percent changes in Turnpike System transactions over the prior year are compared to annual percent changes in the U.S. gross domestic product (GDP); the gross regional product (GRP) for Pennsylvania, New York, and New Jersey combined; and the Pennsylvania gross state product (GSP). U.S. GDP is actual through 2022, while the GRP and GSP are actual through 2021 and estimated for 2022.

Over this period, U.S. GDP generally performed equal to or better than did GRP or GSP, with the one exception coming in 2022 where GSP and GDP both grew 2.1% and GRP grew 2.9%. This indicates that in 2022 Pennsylvania's economic growth was on par with the United States as a whole, while New York and New Jersey combined had even stronger growth, which aligns with the strong performance of the Mid-Atlantic GRP. As discussed previously, commercial vehicle transactions growth has generally been stronger than passenger car transactions growth, with the exception coming in 2021 due to passenger car transactions rebounding from the steep decline experienced in 2020 because of the COVID-19 pandemic.

In general, transactions growth of commercial vehicles has tended to parallel regional economic growth, with both having steady growth in 2015 and 2016, before slowing in 2017. Transactions were additionally negatively impacted beyond economic conditions due to the temporary closure of the DRB from January 20, 2017 through March 9, 2017. Both GRP and commercial vehicle transactions experienced stronger growth in 2018 and 2019, declined significantly in 2020 due to the COVID-19 pandemic, and had a strong recovery in 2021 before slowing, while still exhibiting strong growth, in 2022. Passenger cars have exhibited a similar pattern, but with a wider variation, especially in the post-COVID era.

Table 2-11 Near-Term Measures of Commercial Activity and Growth in Total Turnpike System Transactions – Percent Change over Prior Year

Calendar Year	Gross Domestic Product Growth (U.S.) (1) (2)	Gross Regional Product Growth (NJ, NY, PA) (1) (3)	Gross State Product Growth (PA) (1) (3)	PA Turnpike System Percent Transaction Growth (4)		
				Passenger Cars	Commercial Vehicles	All Vehicles
2015	2.7 %	1.6 %	1.9 %	2.6 %	4.4 %	2.9 %
2016	1.7	1.6	0.9	3.4	4.3	3.5
2017 (5)	2.2	0.9	0.9	(0.6)	0.5	(0.5)
2018	2.9	2.3	1.3	1.5	5.4	2.0
2019	2.3	2.3	1.6	0.7	3.1	1.0
2020	(2.8)	(4.6)	(4.8)	(28.7)	(4.2)	(25.0)
2021	5.9	5.4	4.4	21.6	11.0	19.6
2022	2.1	2.9	2.1	5.5	5.9	5.6

(1) The percent changes in U.S. GDP, GRP, and GSP are based on chained 2012 dollars.

(2) U.S. GDP is actual through 2022. Data was obtained from the U.S. Bureau of Economic Analysis.

(3) GRP and GSP are actual through 2021. Data was obtained from the U.S. Bureau of Economic Analysis. 2022 is estimated by Moody's Analytics

(4) Turnpike system growth rates are actual through 2022.

(5) Transaction growth was negatively impacted by DRB closure from January 20 to March 9, 2017.

2.6 Annual Transaction and Gross Toll Revenue Trends

Table 2-12 provides a summary of annual total Turnpike System transactions and gross toll revenue trends from FY 1998-99 through FY 2021-22. Note that transactions and gross toll revenue in Table 2-12 reflect final audited Turnpike System totals prior to adjustments and discounts available from the Commercial Volume Discount Program described earlier in this chapter.

Throughout this period, the Turnpike System has experienced greater growth in toll revenue than transactions. This has been especially true since 2009, during which period transaction growth was negatively impacted by both annual rate increases and a slow recovery from the Great Recession. Over the decade from FY 1998-99 to FY 2008-09, total transactions and revenue grew 1.8% and 5.8% annually, respectively. Over the next decade, from FY 2008-09 to FY 2018-19, annual total transactions growth slowed to 1.4%, while annual total revenue growth accelerated to 8.0%

As a result of the COVID-19 pandemic, total transactions decreased 10.8% annually between FY 2018-19 and FY 2020-21. However, passenger cars and commercial vehicles were impacted very differently, with passenger car transactions declining by 13.0% and commercial vehicle transactions growing 0.9% annually. Total transactions grew 18.0% in FY 2021-22, with passenger car transactions growing 19.9% as pandemic-related restrictions were lifted and many employees resumed commuting to their workplaces. Commercial vehicle traffic continued to perform strongly, with transactions growing 9.7%. Despite this growth, total transactions in FY 2021-22 were fewer than in FY 2018-19. While total revenue declined 2.9% annually from FY 18-19 to FY20-21, it grew 24.6% in FY 2021-22. As a result, PTC collected more total toll revenue in FY 2021-22 than in any year prior.

This same data is represented in **Figure 2-5**, which clearly illustrates the greater growth rate of toll revenue compared to the relatively flat growth of toll transactions since 2009. Toll rate increases are represented by a black diamond over the fiscal year in which the increase was implemented.

Table 2-12 Annual Systemwide Traffic and Gross Toll Revenue Trends

Fiscal Year (1)	Transactions (values in thousands) Cars	Percent Change Over Prior Year	Trucks	Percent Change Over Prior Year	Total	Percent Change Over Prior Year	Gross Toll Revenue (values in thousands) Cars	Percent Change Over Prior Year	Trucks	Percent Change Over Prior Year	Total	Percent Change Over Prior Year
1998-99	136,399	3.0	19,833	6.5	156,232	3.4	$ 191,804	3.0	$ 158,761	6.5	$ 350,565	4.5
1999-00	138,762	1.7	21,341	7.6	160,103	2.5	195,301	1.8	172,035	8.4	367,336	4.8
2000-01	141,033	1.6	21,278	(0.3)	162,311	1.4	193,563	(0.9)	172,337	0.2	365,900	(0.4)
2001-02	150,496	6.7	22,298	4.8	172,794	6.5	212,650	9.9	163,101	(5.4)	375,751	2.7
2002-03	156,220	3.8	23,179	4.0	179,399	3.8	219,201	3.1	168,021	3.0	387,222	3.1
2003-04	163,612	4.7	24,407	5.3	188,019	4.8	228,515	4.2	180,229	7.3	408,744	5.6
2004-05 (2)	163,316	(0.2)	25,109	2.9	188,425	0.2	309,032	35.2	236,126	31.0	545,158	33.4
2005-06	160,590	(1.7)	25,311	0.8	185,901	(1.3)	321,268	4.0	267,369	13.2	588,637	8.0
2006-07	160,107	(0.3)	25,316	0.0	185,423	(0.3)	322,781	0.5	269,861	0.9	592,642	0.7
2007-08	164,097	2.5	25,455	0.5	189,552	2.2	332,035	2.9	265,637	(1.6)	597,672	0.8
2008-09 (2)	162,638	(0.9)	23,583	(7.4)	186,220	(1.8)	356,345	7.3	260,047	(2.1)	616,392	3.1
2009-10 (2)	166,497	2.4	23,705	0.5	190,201	2.1	415,981	16.7	302,057	16.2	718,038	16.5
2010-11 (2)(3)	167,761	0.8	24,529	3.5	192,290	1.1	435,752	4.8	328,105	8.6	763,856	6.4
2011-12 (2)(3)	167,971	0.1	24,860	1.3	192,831	0.3	455,133	4.4	342,646	4.4	797,779	4.4
2012-13 (2)(3)	166,961	(0.6)	24,985	0.5	191,945	(0.5)	471,514	3.6	350,226	2.2	821,740	3.0
2013-14 (2)(3)	167,387	0.3	25,729	3.0	193,116	0.6	497,671	5.5	368,395	5.2	866,066	5.4
2014-15 (2)(3)	170,371	1.8	27,130	5.4	197,501	2.3	533,054	7.1	401,197	8.9	934,252	7.9
2015-16 (2)(3)	176,369	3.5	28,414	4.7	204,783	3.7	588,295	10.4	443,325	10.5	1,031,620	10.4
2016-17 (2)(3)	178,244	1.1	28,898	1.7	207,142	1.2	638,787	8.6	476,188	7.4	1,114,975	8.1
2017-18 (2)(3)	179,125	0.5	29,985	3.8	209,110	1.0	678,720	6.3	524,438	10.1	1,203,158	7.9
2018-19 (2)(3)	181,946	1.6	31,347	4.5	213,292	2.0	740,205	9.1	595,180	13.5	1,335,385	11.0
2019-20 (2)(3)	158,738	(12.8)	30,602	(2.4)	189,340	(11.2)	683,511	(7.7)	606,050	1.8	1,289,561	(3.4)
2020-21 (2)(3)	137,714	(13.2)	31,887	4.2	169,601	(10.4)	610,353	(10.7)	648,458	7.0	1,258,812	(2.4)
2021-22 (2)(3)	165,128	19.9	34,976	9.7	200,103	18.0	819,784	34.3	749,243	15.5	1,569,027	24.6

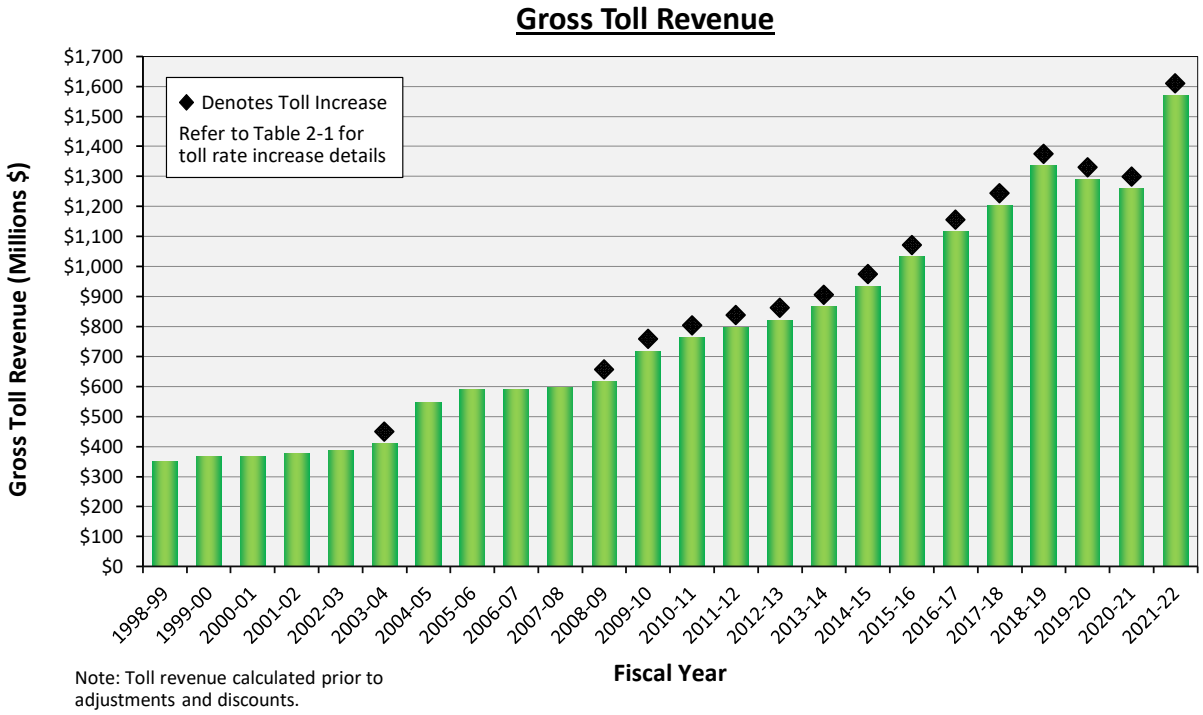
Average Annual Percent Change

Fiscal Year	Transactions Cars	Trucks	Total	Gross Toll Revenue Cars	Trucks	Total
FY 1998-99 - FY 2008-09	1.8	1.7	1.8	6.4	5.1	5.8
FY 2008-09 - FY 2018-19	1.1	2.9	1.4	7.6	8.6	8.0
FY 2018-19 - FY 2020-21	(13.0)	0.9	(10.8)	(9.2)	4.4	(2.9)
FY 2020-21 - FY 2021-22	19.9	9.7	18.0	34.3	15.5	24.6
FY 1998-99 - FY 2021-22	0.8	2.5	1.1	6.5	7.0	6.7

(1) PTC Fiscal Years begin June 1 and end May 31.

(2) A toll increase occurred during this fiscal year. Refer to table 2-1.

(3) Transaction counts are from PTC's "restated" figures and include non-revenue transactions.



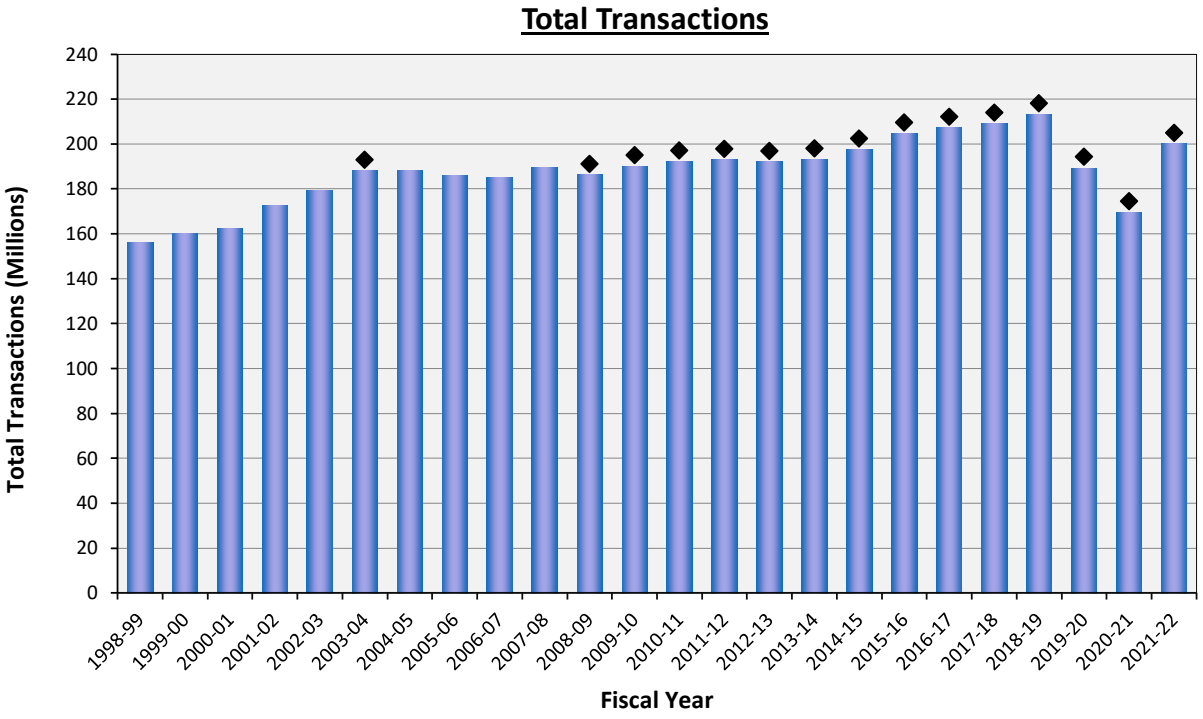


Figure 2-5 Pennsylvania Turnpike System Historical Transactions and Adjusted Gross Toll Revenue

2.7 E-ZPass Market Share

Table 2-13 shows the historical growth in E-ZPass transactions as a percent of total toll transactions on the Turnpike System. The E-ZPass market share includes both successful transponder transactions as well as vTolls, which are transactions that are not initially picked up by a transponder but are later charged to an E-ZPass account after image review. Over the nine years from FY 2010-11 to FY 2019-20, passenger-car E-ZPass market share increased by 25.9 percentage points, from 57.9% to 83.8% of total toll transactions. Commercial vehicle market share started as a much higher base but also grew significantly, increasing by 13.3 percentage points from 77.5% in FY 2010-11 to 92.3% in FY 2019-20. Over the same period, total Turnpike System E-ZPass usage grew from 60.4% to 85.2%. In FY 2020-21 and 2021-22 the E-ZPass market share continued to grow for passenger cars but declined slightly for commercial vehicles as PTC introduced the Toll by Plate (TBP) option.

Table 2-13 Annual E-ZPass Market Share: Turnpike System Based on Toll Transactions

	Annual Percent E-ZPass Market Share By Vehicle Class (1)		
Fiscal Year (2)	Passenger Cars	Commercial Vehicles	Total
2010-11[3,4]	57.9 %	77.5 %	60.4 %
2011-12[3,4]	62.2	79.7	64.5
2012-13[3,4]	66.5	82.4	68.6
2013-14[3,4]	70.5	84.7	72.4
2014-15[3]	73.2	86.2	75.0
2015-16[3]	75.3	87.8	77.1
2016-17[3]	77.6	89.2	79.2
2017-18[3]	80.2	90.4	81.7
2018-19[3]	82.2	91.5	83.6
2019-20[3,5]	83.8	92.3	85.2
2020-21[3,6]	84.6	91.0	85.8
2021-22[3]	86.6	90.8	87.4

(1) E-ZPass market share includes vTolls.
(2) PTC Fiscal Years begin June 1 and end May 31.
(3) A toll increase occurred during this year. Refer to table 2-1.
(4) The toll differential increased between E-ZPass and cash.
(5) A 45% surcharge over the cash rate was added to the TBP rate on I-376 BVE, PA 66 AKH, and Gateway Toll Plaza.
(6) A 45% surcharge over the cash rate was added to the TBP rate on the Ticket System and Mon/Fayette Expressway.

Table 2-14 presents monthly E-ZPass market share trends on the Ticket System for FY 2021-22, the most recently completed fiscal year. As in Table 2-13, the market shares presented in this table include vToll transactions. It is apparent from a comparison of Tables 2-13 and 2-14 that E-ZPass participation was slightly higher on the Ticket System than on the Turnpike System as a whole. Ticket System E-ZPass penetration averaged 87.7% for passenger cars, 91.3% for commercial vehicles, and 88.4% for all vehicles. Monthly trend data shows that E-ZPass penetration was lowest in the summer months and November as non-regular vacation and Thanksgiving travelers comprise a larger share of transactions, and peaks in the winter and spring months from December to May when there are fewer leisure travelers. There is less month-to-month variation in commercial vehicles' E-ZPass market share, as all but three months had E-ZPass market share of between 90.3% and 92.2%, with market share falling below that range in September and November and rising above it in December.

Table 2-14 Monthly E-ZPass Market Share: Ticket System Based on Toll Transactions

	FY 2021-22 Percent E-Zpass Market Share By Vehicle Class (1) (2)		
Month	Passenger Cars	Commercial Vehicles	Total Vehicles
June 2021	85.0 %	90.8 %	86.1 %
July	86.2	90.5	86.9
August	86.1	90.3	86.8
September	85.3	89.1	86.0
October	90.3	92.9	90.7
November	84.5	88.7	85.3
December	92.3	94.2	92.6
January 2022	90.0	92.2	90.4
February	89.2	92.0	89.8
March	89.0	92.0	89.5
April	88.1	91.3	88.7
May	88.0	91.5	88.6
FY Total	87.7 %	91.3 %	88.4 %

(1) PTC Fiscal Years begin June 1 and end May 31.
(2) E-ZPass market share includes vTolls.

Chapter 3

Socioeconomic Trends and Growth Forecasts

Historical and forecast socioeconomic data were collected and evaluated to understand state and regional trends. Discussions with local Metropolitan Planning Organization (MPO) representatives were also conducted to confirm and substantiate the socioeconomic data and trends. This information was then used in an econometric analysis to estimate long-term baseline travel demand on the Pennsylvania Turnpike.

3.1 Socioeconomic Trends and Forecasts

Evaluating long-term socioeconomic trends and forecasts for areas along and surrounding the Pennsylvania Turnpike provides context and inputs for the traffic growth analysis. The following tables and figures summarize the reviewed socioeconomic data, including population, employment, unemployment rates, real retail sales, real gross regional product, and retail gasoline prices.

An economic growth analysis identified any potential explanatory factors that may have influenced historical toll transaction growth. Such explanatory factors were tested and applied within a regression-based econometric analysis to derive traffic growth forecasts.

In the subsequent tables, socioeconomic trends are presented as compound average annual percent change (AAPC), mostly in decade increments from 1980 through 2050. Year 2022 (or 2021) was the last year in which full-year historical data were available. Geographically, the United States is presented along with the Commonwealth of Pennsylvania and the surrounding states of Maryland, New Jersey, New York, Ohio, and West Virginia. Additionally, the Pennsylvania counties along the Turnpike are presented in **Figure 3-1** and grouped for ease of presentation into four aggregations:

- **Pittsburgh Area:** Allegheny, Armstrong, Beaver, Butler, Indiana, Lawrence, Washington, and Westmoreland;
- **Interurban Area:** Adams, Bedford, Blair, Cambria, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Perry, Somerset, and York;
- **Philadelphia Area:** Berks, Bucks, Chester, Delaware, Montgomery, and Philadelphia; and,
- **Northeastern Corridor:** Carbon, Lackawanna, Lehigh, Luzerne, Northampton, and Wyoming.

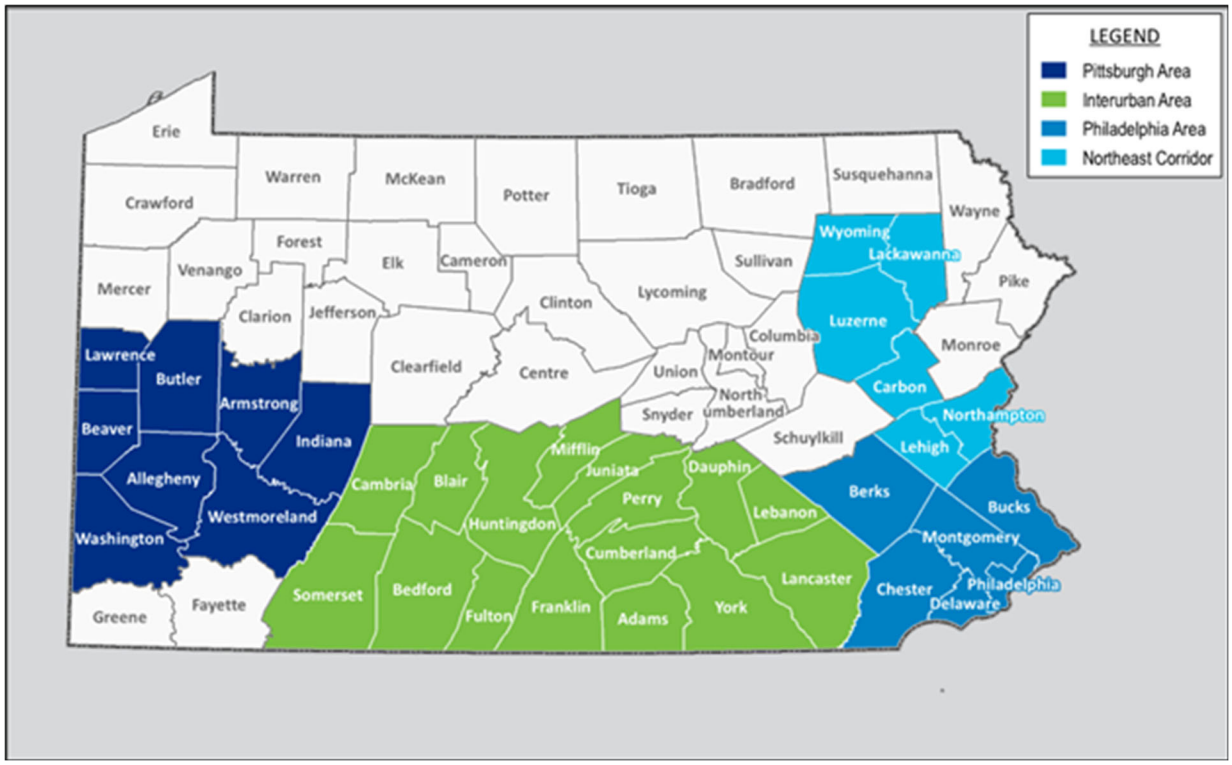


Figure 3-1
Pennsylvania County Groupings

3.1.1 Population

Historical population growth trends and forecasts are presented in **Table 3-1** and **Figure 3-2**. Historically available data were from the United States Census Bureau (census years and intercensal estimates), while forecasts through 2050 are from the Woods & Poole, Inc. 2022 Complete Economic and Demographic Data Source (CEDDS)[1].

Historic population growth along the Pennsylvania Turnpike and the surrounding states has generally been considerably lower relative to the United States as a whole. Pennsylvania's population has increased slowly since 1980, with no growth in that decade, followed by 0.3% annually from 1990 through 2010. Since 2010, growth decelerated to 0.2% per year through 2021. In contrast, the national growth has been at least three times that in Pennsylvania during all time periods.

Population growth along the Pennsylvania Turnpike corridor was similar to statewide growth. This is reasonable considering that the counties in the four aggregations referenced constitute more than 80% of the statewide total. Within the Pennsylvania Turnpike corridor counties, the Pittsburgh Area has experienced a continuous population decline since the 1980s, whereas the other areas to the east of Pittsburgh have experienced modest growth.

[1] Woods & Poole Economics, Inc. Washington, D.C. Copyright 2022. 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.

Population is forecast to generally continue along historical trends, with relatively modest growth in Pennsylvania, the surrounding states, and the counties along and surrounding the Turnpike. Pennsylvania population growth is forecast to average 0.2% annually through 2030, and thereafter decelerate to 0.1% through 2050. Within the Commonwealth, Pittsburgh is forecast to continue contracting while the other areas are forecast to exhibit growth similar to Pennsylvania as a whole, with relatively faster growth in the Interurban counties between Pittsburgh and Philadelphia.

Table 3-1 Population Trends and Forecasts

Geography	History				Forecast		
	1980-'90	1990-'00	2000-'10	2010-'21	2021-'30	2030-'40	2040-'50
Pittsburgh Area	(0.7%)	(0.2%)	(0.3%)	(0.0%)	(0.1%)	(0.2%)	(0.3%)
Interurban Area	0.5%	0.7%	0.8%	0.4%	0.5%	0.4%	0.3%
Philadelphia Area	0.2%	0.4%	0.5%	0.4%	0.3%	0.2%	0.1%
Northeast Corridor	0.2%	0.2%	0.6%	0.3%	0.3%	0.3%	0.3%
Subtotal PA	0.0%	0.3%	0.4%	0.3%	0.3%	0.2%	0.1%
Maryland	1.3%	1.0%	0.9%	0.6%	0.6%	0.4%	0.4%
New Jersey	0.5%	0.8%	0.4%	0.5%	0.3%	0.2%	0.1%
New York	0.2%	0.5%	0.2%	0.2%	0.2%	0.1%	0.0%
Ohio	0.0%	0.5%	0.2%	0.2%	0.2%	0.1%	0.1%
Pennsylvania	0.0%	0.3%	0.3%	0.2%	0.2%	0.1%	0.1%
West Virginia	(0.8%)	0.1%	0.2%	(0.3%)	0.2%	0.1%	0.1%
Subtotal States	0.2%	0.5%	0.3%	0.3%	0.3%	0.2%	0.1%
United States	0.9%	1.2%	0.9%	0.7%	0.7%	0.6%	0.5%

Source: United States Census Bureau and Woods & Poole Economics, Inc. 2022

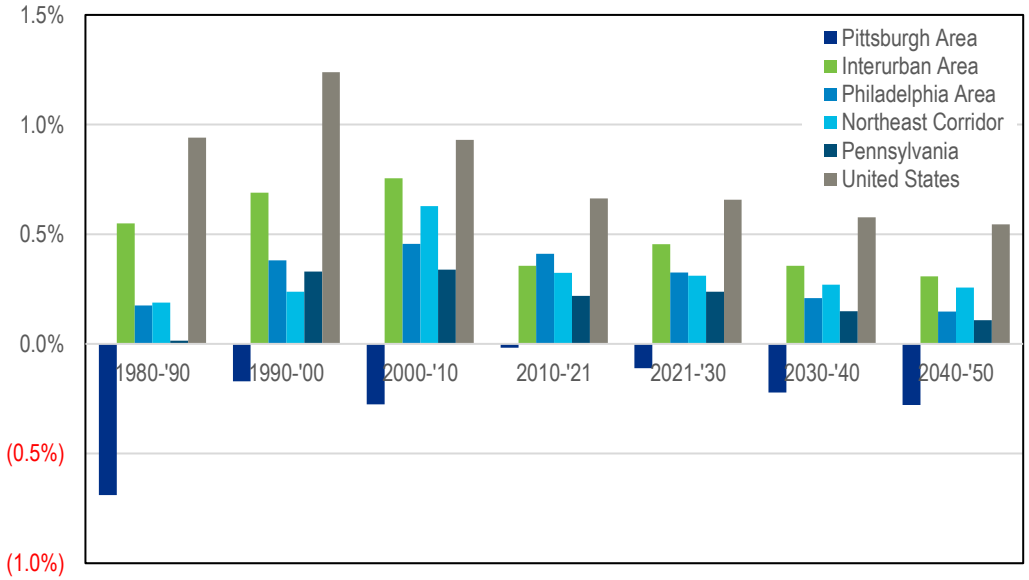


Figure 3-2
Population Trends and Forecasts

3.1.2 Employment and Unemployment

Historical employment data were obtained from the United States Department of Commerce (Bureau of Economic Analysis from 1980 through 2022), while future growth is forecast by Woods & Poole. Additional historical Bureau of Labor Statistics (BLS) unemployment data for the three major metro areas (which differ from the four Pennsylvania Turnpike socioeconomic groupings) are also compared and contrasted to state and national unemployment levels.

Employment

Historical employment growth generally decelerated from 1980 through 2010, with the most pronounced slowdown occurring during the 2000-2010 decade, reflective of the official recession from December 2007 through June 2009 ("Great Recession"). Since 2010, employment growth has mostly rebounded to longer-term historical averages, with Pennsylvania exhibiting 0.8% average growth in that time, which is similar relative growth to the 1990s. As with population, employment growth within Pennsylvania was historically slower than the nation (about half the rate). The Pittsburgh Area experienced the slowest relative historical employment growth, while the Interurban, Philadelphia, and Northeastern Corridor Areas experienced growth closely paralleling the Commonwealth. Historical employment growth and forecasts are presented in **Table 3-2** and **Figure 3-3**.

Although employment since 2010 (e.g., the Great Recession) rebounded to longer-term historical patterns, the forecast is for decelerating growth. Average growth for Pennsylvania and the United States is at 1.5% and 1.8%, respectively, through 2030, then decelerating to 0.8% and 1.1%, respectively, between 2030 and 2040, then to 0.6% and 1.0% through 2050.

Table 3-2 Employment Trends and Forecasts

Geography	History				Forecast		
	1980-'90	1990-'00	2000-'10	2010-'22	2022-'30	2030-'40	2040-'50
Pittsburgh Area	0.4%	0.9%	0.1%	0.5%	1.2%	0.5%	0.3%
Interurban Area	1.8%	1.2%	0.4%	0.8%	1.6%	0.9%	0.8%
Philadelphia Area	1.3%	0.7%	0.4%	1.2%	1.6%	0.8%	0.6%
Northeast Corridor	1.1%	0.9%	0.5%	1.0%	1.7%	1.1%	1.0%
Subtotal PA	1.1%	0.9%	0.4%	0.9%	1.5%	0.8%	0.7%
Maryland	2.8%	1.2%	0.8%	1.1%	1.7%	1.0%	0.8%
New Jersey	1.8%	1.0%	0.4%	1.2%	1.7%	0.9%	0.7%
New York	1.2%	0.7%	0.6%	1.1%	1.9%	0.9%	0.7%
Ohio	1.2%	1.5%	(0.6%)	0.9%	1.2%	0.6%	0.5%
Pennsylvania	1.1%	0.9%	0.3%	0.8%	1.5%	0.8%	0.6%
West Virginia	(0.1%)	1.2%	0.3%	(0.2%)	1.0%	0.5%	0.4%
Subtotal States	1.4%	1.0%	0.3%	1.0%	1.6%	0.8%	0.7%
United States	2.0%	1.8%	0.5%	1.5%	1.8%	1.1%	1.0%

Source: United States Bureau of Economic Analysis and Woods & Poole Economics, Inc. 2022

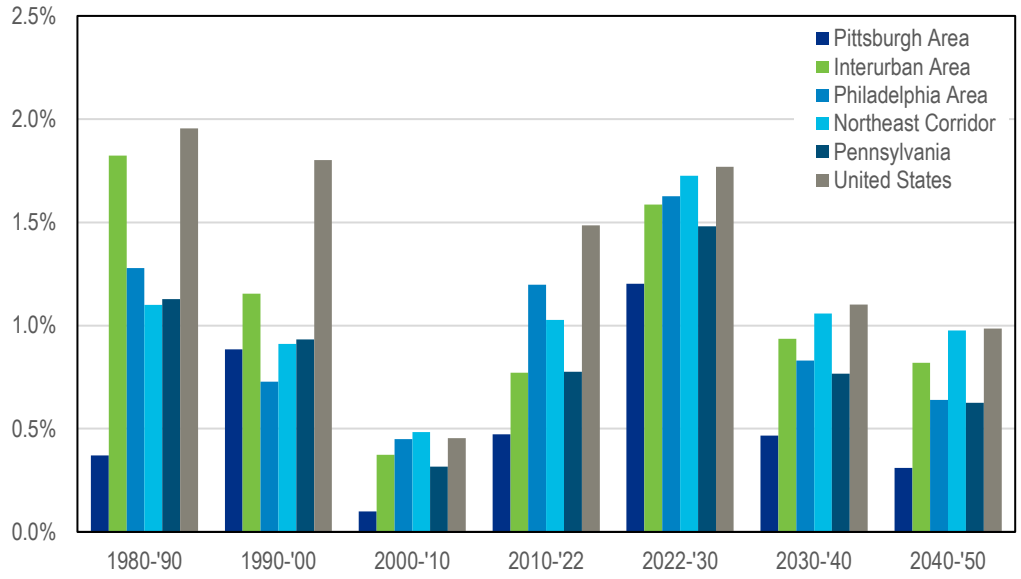


Figure 3-3
Employment Trends and Forecasts

Unemployment Rates

Seasonally unadjusted monthly unemployment rates in the preceding decade (January 2013 through February/March 2023) are presented in **Figure 3-4** for the three major Metropolitan Statistical Areas (MSA) in Pennsylvania located along the Turnpike Mainline. These are the Philadelphia-Camden-Wilmington MSA, the Harrisburg-Carlisle MSA, and the Pittsburgh MSA. Additionally, unemployment data for the Commonwealth of Pennsylvania and the United States are also presented for compatibility. As the data are seasonally unadjusted, the graph depicts both the seasonal cyclicality and the longer-term trends.

Unemployment rates for the Commonwealth and MSAs generally parallel the nation. After a steep increase in 2008 and 2009 due to the Great Recession, unemployment rates exhibited a decade of steady decline to around 4.0% at the end of 2019. Unemployment rates spiked in the early months of the COVID-19 pandemic (2020 Q2), but after a few years of pandemic-induced labor market shock adjustments, unemployment rates declined again to aground 4.0% by late 2022/early 2023. Although the trends parallel, Pennsylvania's unemployment has been above that of the United States since 2016. Harrisburg-Carlisle generally exhibited the lowest relative unemployment rates, reflective of the more stable government employment in the State Capitol (compared to more volatile private-sector employment). Pittsburgh exhibited slightly higher unemployment rates.

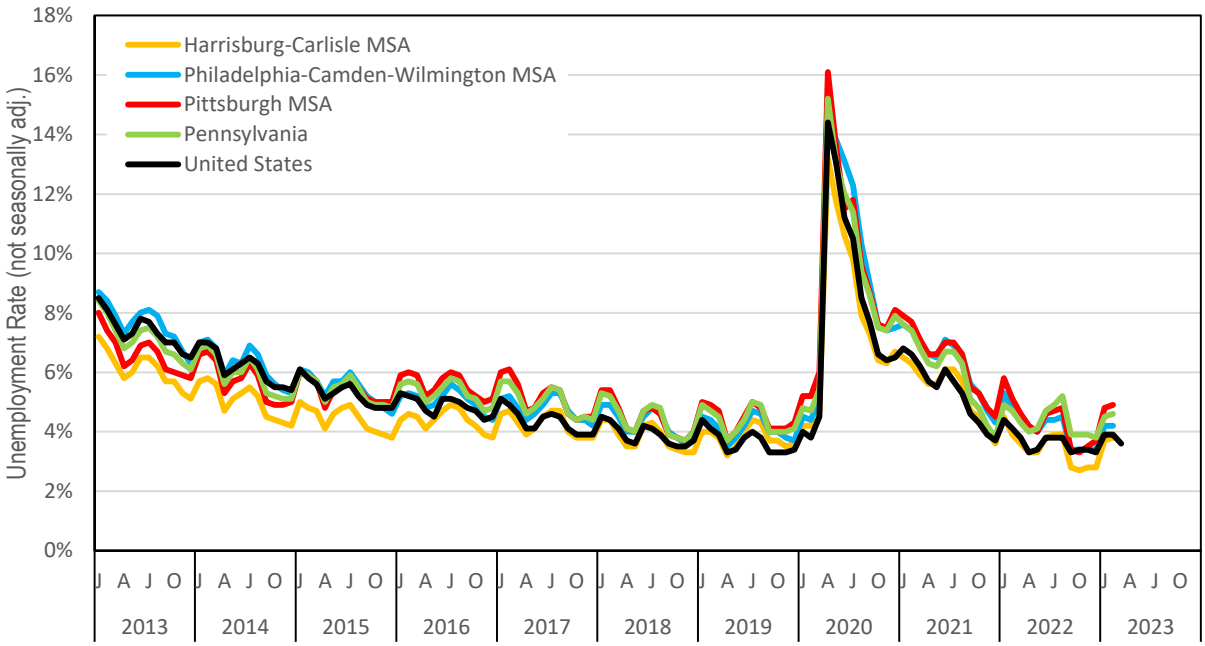


Figure 3-4
Unemployment Rate Trends

3.1.3 Real Retail Sales

Retail sales, in real or constant dollar terms (excluding inflation), trends and forecasts are presented in **Table 3-3** and **Figure 3-5** with data from Woods & Poole. Nationally, real retail sales grew 2.0% in the 1980s, accelerated to 3.3% in the 1990s, and was a tepid 0.5% in the decade from 2000 to 2010 (due to recession in 2008/09). Since 2010, national growth has rebounded to 3.0%. Pennsylvania trends paralleled the nation, albeit at a relatively slower pace before the Great Recession and 3.6% since. Within the Commonwealth, the Pittsburgh Area appears to have experienced the fastest post-recession relative growth (7.2%), however, this is entirely attributable to a pronounced increase from 2013 through 2015 in Allegheny County in W&P database updates not depicted in previous v2017 W&P, per last analysis timeframe, but is in the v2021 and v2022 series releases and is likely a reporting error. Such aberrant patterns are not observed in older W&P versions, or for other counties in proximity to Alleghany.

Real retail sales growth is forecast to decelerate from the rebound since the Great Recession. Nationally, Woods & Poole forecasts annual growth of about 1.4% through 2050. Pennsylvania is forecast to grow at a slower relative pace of about 1.0%. Within the Commonwealth, growth within the Interurban Area is forecast slightly higher than the other three clustered areas, of which the Pittsburgh Area is forecast to grow at the slowest relative average rate (reinforcing that pronounced historical growth in Allegheny County during the mid-2010s is likely a reporting error).

Table 3-3 Real Retail Sales Trends and Forecasts

Geography	History				Forecast		
	1980-'90	1990-'00	2000-'10	2010-'22	2022-'30	2030-'40	2040-'50
Pittsburgh Area	0.3%	2.4%	0.1%	7.2%[1]	0.3%	0.7%	0.8%
Interurban Area	2.2%	2.7%	(0.0%)	2.7%	0.9%	1.4%	1.4%
Philadelphia Area	2.1%	2.6%	0.3%	2.5%	0.8%	1.3%	1.3%
Northeast Corridor	1.6%	2.5%	1.7%	2.0%	0.8%	1.3%	1.4%
Subtotal PA	1.6%	2.5%	0.4%	3.8%	0.7%	1.1%	1.2%
Maryland	2.4%	2.7%	0.2%	2.3%	1.0%	1.4%	1.4%
New Jersey	2.2%	2.7%	0.1%	2.4%	0.7%	1.1%	1.2%
New York	1.5%	2.4%	0.9%	2.8%	0.6%	1.0%	1.1%
Ohio	1.2%	3.0%	(0.6%)	2.5%	0.6%	1.1%	1.2%
Pennsylvania	1.6%	2.5%	0.3%	3.6%	0.7%	1.1%	1.2%
West Virginia	(0.2%)	2.8%	0.1%	1.5%	0.6%	1.1%	1.2%
Subtotal States	1.6%	2.6%	0.3%	2.8%	0.7%	1.1%	1.2%
United States	2.0%	3.3%	0.5%	3.0%	1.1%	1.5%	1.6%

(1) Pittsburgh Area growth from 2010-2022 is likely a reporting error.

Source: Woods & Poole Economics, Inc. 2022

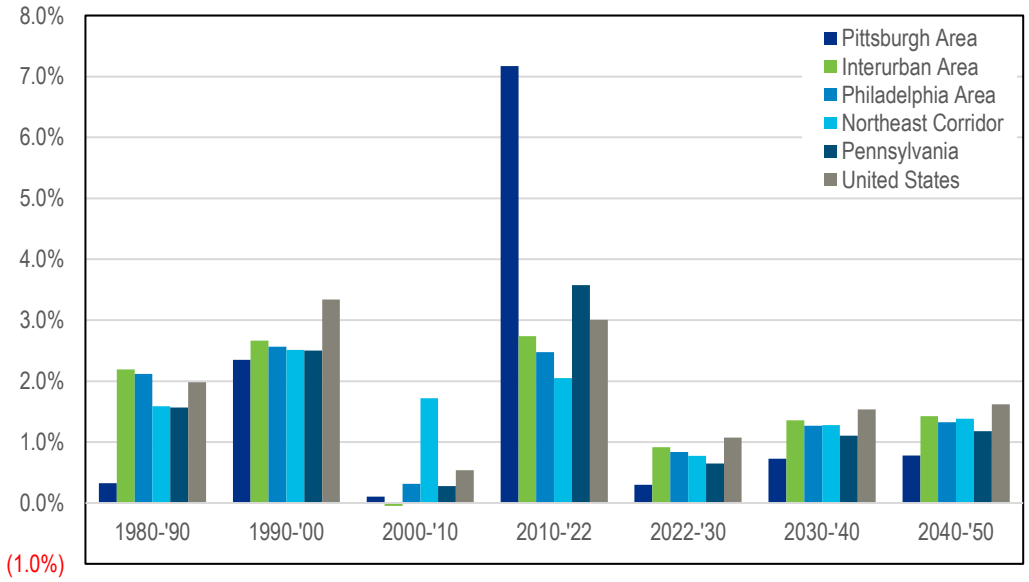


Figure 3-5
Real Retail Sales Trends and Forecasts

3.1.4 Real Gross Regional Product (GRP)

Real gross regional product (GRP) (or gross state product/gross domestic product, depending on the geographic focus) is the inflation-adjusted standard metric for total economic activity. Real GRP trends and forecasts are presented in **Table 3-4** and **Figure 3-6** and are sourced to Woods & Poole, based on Bureau of Economic Analysis data.

National real gross domestic product (GDP) decelerated from an annual 3.6% in the 1990s to about half that (1.8%) between 2000 to 2010 (reflective of the Great Recession). Since that recession, national real GDP has increased 2.1% annually. Prior to the Great Recession, Pennsylvania's real gross state product (GSP) grew 2.6% annually in the 1990s and decelerated

to 1.9% from 2000 to 2010. After 2010, growth decelerated further to 1.4% through 2022. Within the Commonwealth, Philadelphia historically outpaced the other MSAs.

Real GRP forecasts are for 2.1% per annum for the United States through 2030 and 1.9% for Pennsylvania. As with the forecasts for other socioeconomics, a general deceleration is forecast for GRP. In the corridor counties, like the entire Commonwealth, real GRP growth is projected to average 2.0% through 2030, with a general deceleration thereafter. Within the Pennsylvania Turnpike corridor, the Pittsburgh and Philadelphia Areas are forecast to have the slowest relative growth.

Table 3-4 Real Gross Regional Product Trends and Forecasts

Geography	History				Forecast		
	1980-'90	1990-'00	2000-'10	2010-'22	2022-'30	2030-'40	2040-'50
Pittsburgh Area	0.4%	2.5%	2.1%	1.5%	1.8%	1.5%	1.4%
Interurban Area	2.9%	2.6%	1.9%	1.3%	2.0%	1.8%	1.7%
Philadelphia Area	3.4%	2.7%	2.2%	1.5%	2.0%	1.7%	1.5%
Northeast Corridor	2.4%	2.9%	(0.2%)	1.5%	2.1%	1.9%	1.8%
Subtotal PA	2.4%	2.7%	1.8%	1.5%	2.0%	1.7%	1.5%
Maryland	4.5%	3.0%	2.9%	1.4%	2.0%	1.8%	1.6%
New Jersey	4.7%	2.7%	1.1%	1.2%	1.9%	1.6%	1.4%
New York	3.1%	2.4%	1.8%	2.3%	2.1%	1.7%	1.4%
Ohio	2.0%	3.0%	0.4%	1.7%	1.6%	1.4%	1.3%
Pennsylvania	2.3%	2.6%	1.9%	1.4%	1.9%	1.7%	1.5%
West Virginia	(0.2%)	2.1%	2.4%	0.4%	1.3%	1.1%	1.1%
Subtotal States	3.0%	2.6%	1.6%	1.8%	1.9%	1.6%	1.4%
United States	3.1%	3.6%	1.8%	2.1%	2.1%	1.9%	1.8%

Source: Woods & Poole Economics, Inc. 2022

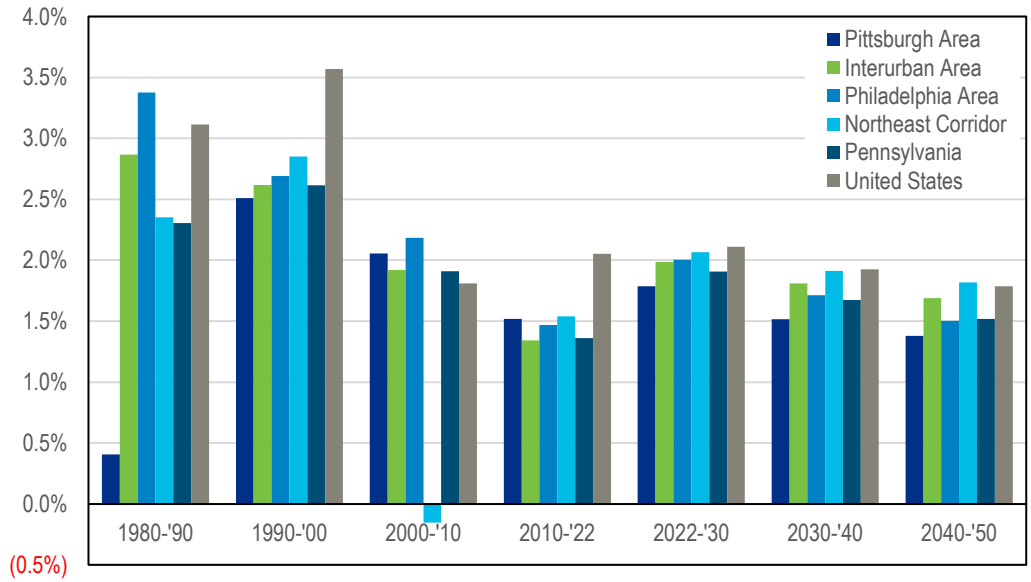
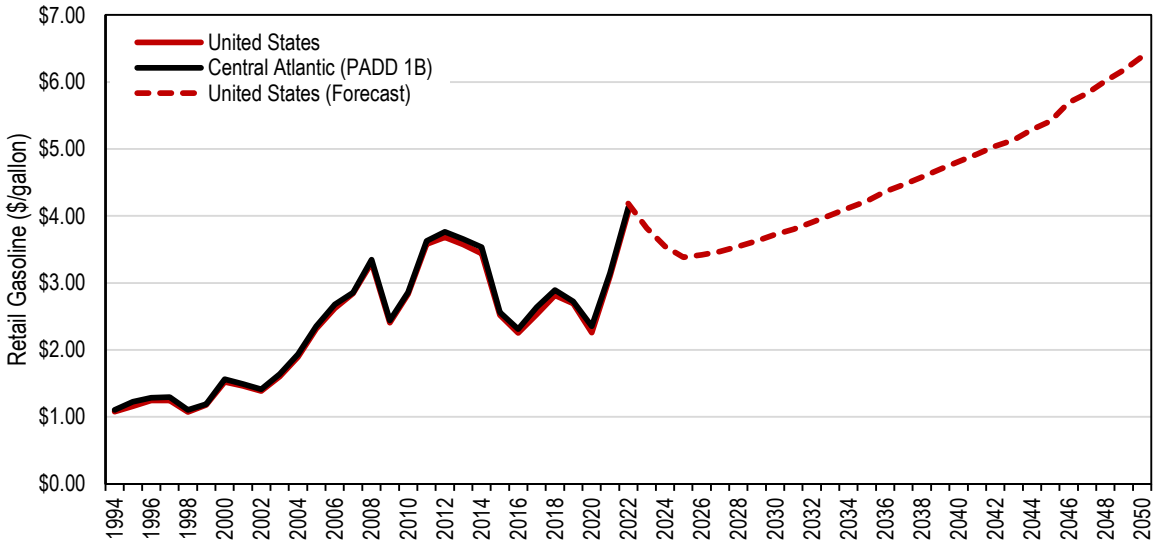


Figure 3-6
Real Gross Regional Product Trends and Forecasts

3.1.5 Motor Fuel Prices

Historical gasoline prices (in current dollars/gallon for all grades, all formulations) for the Central Atlantic region (NY, NJ, PA, DE, and DC) and the United States are presented in **Figure 3-7**, from the U.S. Energy Information Administration (EIA). Average annual gasoline prices for the United States and the Central Atlantic region were nearly identical historically, with the Central Atlantic region between $0.01 and $0.11 per gallon above the national price. Prices peaked at close to $3.70 per gallon in 2012, declined through 2016, then fluctuated slightly higher until 2020, which was almost the same as 2016. Prices increased in 2021 and again in 2022 to over $4.00 per gallon, stemming mostly from the Russia-Ukraine conflict. According to the EIA Annual Energy Outlook, future average national gasoline prices are forecast to decline through 2025 ($3.38) and then steadily increase to almost $6.50/gallon by 2050 in current dollars.



Source: Energy Information Administration

Figure 3-7
Gasoline Prices

3.2 MPO Outreach and Regional Economic Conditions

To supplement the socioeconomic data analysis, additional qualitative inputs were collected for the geographic areas represented by four of the five major metropolitan planning organizations (MPO) containing Pennsylvania Turnpike corridors. The inputs were collected via discussions with representatives from the MPOs. These discussions were used to add context, when possible, to socioeconomic datasets to ensure that the data analysis did not miss any known local dynamics that could impact traffic growth during the forecast period. In the end, the local perspective gained from these conversations supplemented the socioeconomic datasets but did not result in any changes to the econometric forecast.

As shown in **Figure 3-8**, the geographic areas covered by these five MPOs partially overlap with the four Pennsylvania Turnpike areas analyzed in the previous subsection. While characteristics reviewed and discussed varied by MPO, they generally included housing and residential, employment and industry, and freight and shipping. The five MPOs include:

- Southwestern Pennsylvania Commission (SPC)
- Delaware Valley Regional Planning Commission (DVRPC)
- Tri-County Regional Planning Commission (TCRPC)
- Lackawanna-Luzerne Metropolitan Planning Organization (LLMPO)
- Lehigh Valley Planning Commission (LVPC)

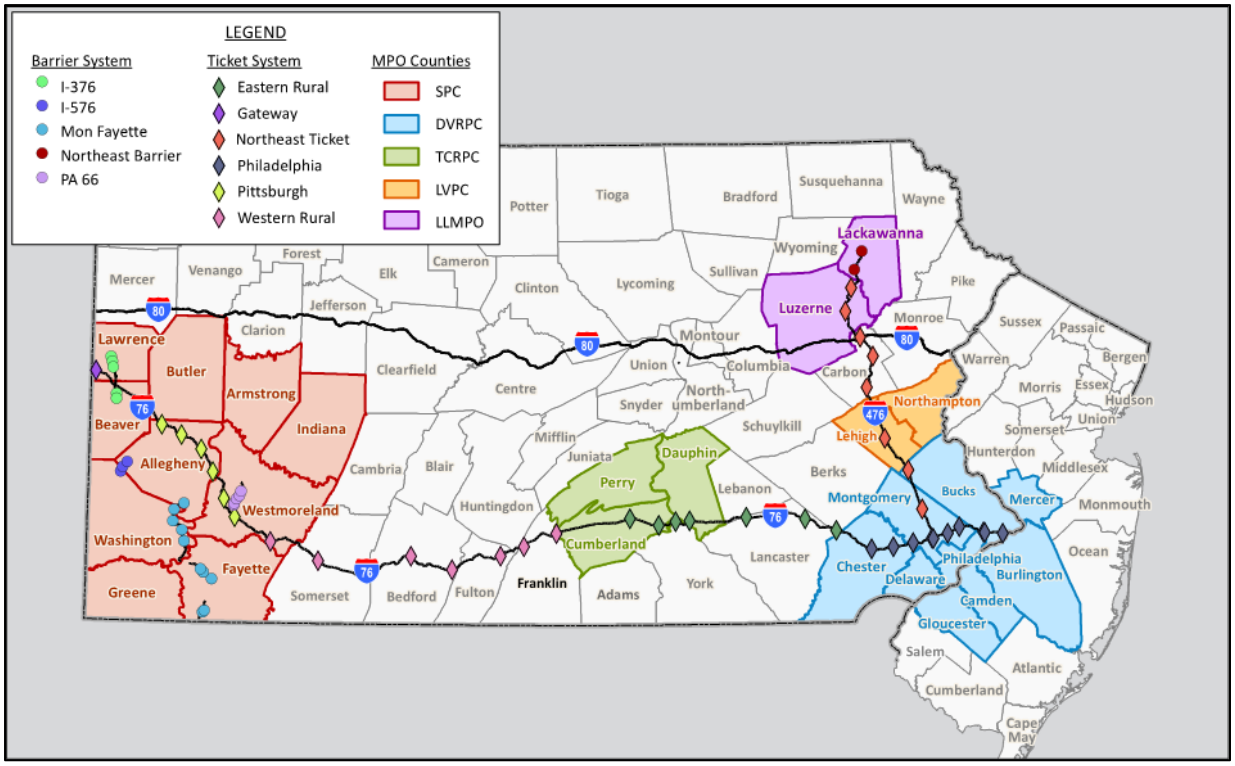


Figure 3-8
Pennsylvania MPOs

3.2.1 Southwestern Pennsylvania Commission

The Southwestern Pennsylvania Commission includes the eight Pittsburgh Area counties as well as the two counties bordering West Virginia (Fayette and Greene).

Housing and Residential

Although regional population growth has been stagnant over the last decade, average household sizes have decreased, which has resulted in the number of households growing. Washington County and Butler County, especially the southwest portion of it, have seen the most growth in the region. Additionally, a number of office buildings in downtown Pittsburgh have been converted to condos and apartments. Although this shift was occurring prior to the pandemic, increased prevalence of telecommuting in the past three years has accelerated this trend.

Employment and Industry

The Southpointe business park in Cecil Township, Washington County, 17 miles south of Pittsburg, accommodates over 300 businesses and is mostly built out. The lack of availability within Southpointe combined with the recent extension of the Southern Beltway to I-79 have resulted in proposals for additional residential and warehouse development, including the proposed Cool Valley development, a proposed 900-acre mixed use development. While coal output and associated employment continue to decline, the warehousing, life sciences, medical, technology, and robotics industries continue to grow. An ethylene cracker plant developed by Shell Oil in Beaver County opened in November and is expected to drive new supporting and spinoff local development.

Freight and Shipping

Local distribution facilities, including Amazon, continue to expand throughout the area, especially along the Southern Beltway corridor. MPO planners expect to see PennDOT's regional truck reliability target for the region increase, which would make freight shipments more predictable and reliable. MPO planners indicated that they see some evidence of through traffic finding alternate toll-free routes in the area and expressed concern that toll rate increases may negatively impact future growth. Due to the decline of the coal industry, freight traffic on the Monongahela River is down and has nearly dried up on the Allegheny River, although it remains strong on the Ohio River.

3.2.2 Delaware Valley Regional Planning Commission

The Delaware Valley Regional Planning Commission includes five of the six Philadelphia-area Pennsylvania Turnpike counties, excluding Berks, and four neighboring New Jersey counties (Burlington, Camden, Gloucester, and Mercer).

Housing and Residential

The population of the urban core of Philadelphia and the suburban counties are all growing. In the 2010s, population growth shifted from exurban and greenfield development towards urban and inner ring suburbs, with the DVRPC region accounting for about three quarters of the state's total population growth during the decade. While Philadelphia County had the largest absolute increase in population, including a number of office-to-residential conversion in Center City, Chester County had the greatest percentage growth. Notable regional projects include the redevelopment of the Philadelphia Navy Yard (located in South Philadelphia adjacent to the Delaware and Schuylkill Rivers, I-95, and Philadelphia International Airport) and Naval Air Station (NAS) Willow Grove (located near I-476 and I-276 in Montgomery County). DVRPC staff indicated that Philadelphia Navy Yard will take about 10 to 15 years to fully build out, while the NAS Willow Grove redevelopment will take about the same amount of time to get underway.

Employment and Industry

While employment growth continues in both the Philadelphia core and the suburban area, telecommuting trends have resulted in residential displacement of office space in downtown Philadelphia. In the suburbs, the largest employment center is in and surrounding King of Prussia, Upper Merion Township, and Lower Merion Township in Montgomery County. This area contains a number of office parks as well as the King of Prussia Mall, one of the largest in the country, and the Villages at Valley Forge, a 122-acre mixed-use town center development adjacent to the mall.

Although brick-and-mortar retail has struggled in many locations, the mall has many upscale retailers that continue to attract customers. Given such growth in this area, the Southeastern Pennsylvania Transportation Authority (SEPTA) has explored extending high-speed rail to King of Prussia, although as of March 2023 the project is paused because of rising project costs due to inflation and high interest rates. Additionally, now that the Turnpike has converted to AET and thus eliminated the need for toll plazas, Montgomery County is exploring making more slip ramps and interchanges with the Turnpike in order to increase highway accessibility.

Two additional developments in the planning stages aim to grow the region's life sciences industry. The first is the Bellwether District in South Philadelphia, which plans to convert a 1,300-acre site from a former refinery into a life sciences campus. The second is the proposed Schuylkill Yards in Philadelphia's University City neighborhood and adjacent to the University of Pennsylvania, Drexel University, and 30th Street Station, which serves Amtrak as well as subway and commuter rail lines operated by SEPTA. The project would cap the rail yards at 30th Street Station and then create commercial, residential, retail, office, and life science laboratory spaces.

Freight and Shipping

With a major international port and commercial service airport along the eastern seaboard, the region accommodates a large volume of directional freight (inbound, outbound, internal, and through) by all four modes (truck, rail, port, and air). Furthermore, the Keystone Trade Center in Falls Township, Bucks County, is an underway development of a former U.S. Steel factory into a distribution and logistics hub with millions of square feet of space. As the region's freight capacity builds out, freight center growth has moved northward along the Pennsylvania Turnpike's Northeast Extension into the Leigh Valley area, discussed further in the next section.

3.2.3 Lehigh Valley Planning Commission

The Lehigh Valley Planning Commission is the Metropolitan Planning Organization for Lehigh and Northampton Counties, which include the cities of Allentown (Lehigh County), Easton, and Bethlehem (Northampton County). Both counties are among the six counties aggregated into the Northeastern Corridor counties for econometric analysis.

Housing and Residential

Housing demand has been strong in recent years, with the number of new residential units permitted in 2021 being the highest since 2007. Much of this demand reflects migration from New York and New Jersey. Some of the growth has come in downtown Allentown, which is undergoing a revitalization.

Employment and Industry

Fogelsville, along I-78 and just west of I-476, is the region's main industrial area. Healthcare and education continue to be leading industries in the region, with the Hecktown Oaks Hospital opening in Lower Nazareth Township in Northampton County in 2021 and a smaller hospital recently proposed for Macungie in Lehigh County. In 2020, Lehigh University opened a new School of Health that will likely grow in coming years. Other developments include recent expansion of the Wind Creek Bethlehem casino and a redevelopment of the long-vacant Lehigh Valley Dairy in Whitehall Township.

Freight and Shipping

Freight and logistics has been a growth area for the region due to its proximity to highways and major metropolitan areas and land availability. There are a number of underway or planned warehousing developments including the Route 309 Commerce Center in Upper Saucon Township, the former headquarters site of Air Products in Upper Macungie Township (both near I-476 and I-78), and the River Pointe Logistics Park in Upper Mount Bethel Township. Additionally, Lehigh Valley International Airport has seen growth in both passenger and freight flights in recent years, with freight having particularly strong growth as the airport has served as a relief valve for New York City area airports and FedEx Ground has increased operations. Development around the airport is likely to continue, although no specific large-scale plans are underway as the area undergoes rezoning to align with the airport's master plan.

Although freight and shipping developments have moved northwards along the Northeast Extension into the Lehigh Valley from the Philadelphia area, appropriate developable parcels have begun to dry up. As a result, warehousing development has continued to move further north into the Wilkes-Barre and Scranton areas.

3.2.4 Lackawanna-Luzerne Metropolitan Planning Organization

The Lackawanna-Luzerne MPO is the MPO for Lackawanna and Luzerne Counties, which include the cities of Scranton and Wilkes-Barre, respectively. Both counties are among the six counties aggregated into the Northeastern Corridor counties for econometric analysis.

Housing and Residential

Population remains stable with residential in-migration into downtown Scranton induced by the Medical College enrollment and reverse suburbanization trends of older residents seeking more-urbanized access to retail, entertainment, medical, etc. Downtown Scranton population growth has been further enabled by conversion of old manufacturing facilities into residential units.

Employment and Industry

In addition to the strong growth exhibited by the freight distribution and shipping industries (see below), the finance and insurance industries and tourism generated by the Steamtown National Historic Site, Mohegan Sun casino, and Montage Mountain resort facilitate modest economic growth in the region. Montage Mountain, in particular, is poised to grow in coming years as the resort has proposed a large hotel to support its plans to develop year-round programming, which includes a summer concert series and water park. Conversely, some businesses have left downtown Wilkes-Barre due to the increased prevalence of telecommuting, which has left businesses in the area without a customer base during working hours. Wilkes-Barre/Scranton International Airport has also lost some passenger service in recent years as customers seem to be increasingly opting to utilize the airports in Allentown (to the south) and Binghamton (to the north) instead.

Freight and Shipping

As is the case in the Lehigh Valley region, freight and shipping continue to be a strong and growing sector of the regional economy. The most significant warehousing centers in the region are Hazleton and White Haven along PA 424, with additional freight warehousing along I-81 and U.S. 6. MPO planners believe that demand for warehousing will continue to move north, as there

have recently been rezoning requests for multi-million square foot warehouses along rural parts of I-84 in Lackawanna County. Of note, planners do not have any indications that truck traffic is avoiding I-476 despite the presence of toll-free I-81 as the more direct and congestion-free route it offers is more valuable than toll savings.

3.2.5 Tri-County Regional Planning Commission

Within the sixteen-county Interurban Area, the Tri-County Regional Planning Commission (TCRPC) comprises the three central counties of Cumberland, Dauphin, and Perry around the state capitol of Harrisburg. CDM Smith reached out to the MPO several times but were unable to engage. Located to the west of the DVRPC region and east of the rural central portion of the state, the region is the fourth-largest metropolitan area in the state (after Philadelphia, Pittsburgh, and Allentown). With nearly 8% population growth during the 2010s, it is the fastest growing region of the state.

CDM Smith did speak to TCRPC planners as part of the 2018 study, and many of the points discussed then still hold true. Dauphin and Cumberland Counties continue to be the region's population centers, while rural Perry County's population remained flat during the 2010s. Like much of Pennsylvania, the regional economy has shifted away from manufacturing and towards services, with the state government in Harrisburg, the Penn State Hershey Medical Center, Giant Food Stores corporate headquarters, Hershey Company Resort and Factory, and various military installations being significant employers. Additionally, the region's location along multiple interstate highways, proximity to major population centers of the east coast, and a major intermodal rail facility continue to drive freight traffic in the region.

3.2.6 Conclusion

After receiving and reviewing information provided by MPO staff and comparing it against socioeconomic data received from other sources, CDM Smith determined that the qualitative MPO outreach discussions of local economic conditions confirmed the quantitative analysis of socioeconomic trends that went into the subsequent econometric growth analysis. The due diligence outreach found no developments or conditions that were not captured in socioeconomic data that would alter the quantitative forecasting process. Therefore, no econometric equations were modified. Rather, the outreach corroborated and substantiated the socioeconomic trends with local depictions of where residential and/or business growth was (or was not) occurring and why.

3.3 Economic Growth Analysis

An econometric analysis was conducted to estimate long-term baseline travel demand on the Pennsylvania Turnpike. Historical travel demand was econometrically estimated via regression equations for toll plazas groupings (explained in **Section 3.3.1.2**). Regional socioeconomics and other variables were tested as explanatory factors (see **Section 3.3.1.3**). With statistically significant historical equations, independent variable forecasts were applied to equation coefficients to estimate future demand through 2060. Twenty equations were tested for either individual plazas or groups of proximate plazas for both passenger cars (PCs) and commercial vehicles (CVs). A majority of the twenty plaza-vehicle grouping equations yielded statistically significant, defensibly logical results.

An econometric analysis as such was conducted in 2018 and revisited in 2023 to determine the current reasonableness of previously estimated equations and update, as necessary. Factors differing from the 2018 estimations include the following, which are elaborated upon in subsequent subsections:

- additional historical timeframe (2017 through 2022, inclusive)
- revised historical socioeconomic data (e.g., Census's population retrospective revisions)
- updated dollar denomination for real retail sales and gross regional product (2009$ to 2012$)
- additional toll index detail (nuanced between facility groupings)
- consideration of a COVID-19 explanatory variable

Subsequent toll modeling analyses conditionally incorporates these econometrically derived baseline travel demand forecasts, which consider a range of future toll policies and rate structures in estimating future revenue potential.

3.3.1 Econometric Modeling

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

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

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

In addition to linear relationships and coefficients, multivariate regression variables can be transformed (e.g., natural ln), lagged (e.g., t-1), and/or combined in other mathematical ways to identify more logical and improved statistical relationships. Linear and logarithmic linear (ln-linear) regressions were tested for all twenty plaza-vehicle groupings.

In each regression equation, an analysis of variation (ANOVA) output table explains the statistical parameters, such as adjusted R^2 (coefficient of determination) and t-statistics/p-values for each independent variable, which indicate the overall robustness of the equation and independent variable(s), respectively. A regression equation can be leveraged for forecasting the dependent variable if ANOVA metrics are statistically significant, the equation's relationships are conceptually valid, and forecasts of independent variables are credibly available.

Growth rates developed from econometric analysis are used within the forecasting model to develop traffic and revenue projections, with some adjustments made to consider additional factors. However, some of the Barrier System facilities have relatively weak correlations, and therefore the econometric models may be dismissed and supplanted with alternative growth assumptions derived from recent trend extrapolations or other non-econometric means.

3.3.1.1 Regression Testing

Individual highway travel occurs for myriad reasons, such as recreation, commuting, trade, etc., and is influenced by factors such as fuel prices, other travel costs, weather, trip urgency, and economics. Aggregate highway travel, however, typically trends closely with regional socioeconomic variables (although, not always). As such, conceptually relevant socioeconomic data were hypothesized, compiled, and regression-tested for explaining annual travel demand. Data tested include population, employment, real gross regional product, and real retail sales, compiled at various geographic levels.

In addition to regional socioeconomics, average fuel prices and indexed toll variables were tested as explanatory factors. In 2018, only a generalized historical toll rate increase schedule representing the aggregate mainline facilities was available, but in 2023, additional details were available for the non-mainline historical increases. Such detailed toll indexes were tested against the respective groupings.

With an extended historical timeframe since the 2018 analysis (2017 through 2022) and the corresponding transaction declines following the COVID-19 pandemic, an additional variable warranted consideration: a COVID-19 pandemic normalcy index. Based on aggregate travel volumes observed in 2019 through 2022, separate indexes were tested for PCs and CVs. Prior to COVID-19 (2019 and previously) the index is 1.0 (e.g., "normal" full-demand behavior). For PCs, it declines to 0.75 in 2020, 0.85 in 2021, and is held at a constant 0.90 from 2022 through the end of the forecast period. This reflects a 10% permanent adjustment that effectively reanchors now-institutionalized increased work-from-home proportions. CVs did not decline as precipitously in 2020, with the index falling to only 0.95, and then rebounded beyond pre-COVID levels to a relative 1.05 index in 2021 and held at a constant 1.10 from 2022 through the end of the forecast period. These index levels reflect supply chain patterns stemming from COVID-19's further behavior shift from in-store to online purchasing for both personal and business spending. Such COVID-19 indexes were tested in conjunction with the regional socioeconomics, as the socioeconomic data typically did not fully explain the amplified reductions in traffic relative to socioeconomic activity (e.g., national real GRP declined 2.8% in 2020, while national traffic contracted by a much larger proportion).

Multiple regression equations were tested and evaluated for each toll plaza-vehicle grouping to account for the numerous possible combinations of relevant geographies (county clusters) for each possible socioeconomic variable and combinations with fuel, toll index, and/or COVID-19 factors. A final equation was selected based on multiple criteria, including but not limited to, overall equation robustness (adjusted R^2), independent variable robustness (t-statistics and p-values), logic and reasonableness of equation coefficients, logic and reasonableness of geographic catchment area relative to the physical location of the toll plaza(s), and the credibility of the

independent variable(s) and source(s). Additional consideration of the 2018 econometric structures and results framed subsequent adjustments.

3.3.1.2 Toll Plaza Groupings (Dependent Variables)

In order to reduce regression testing to a reasonably manageable data universe, toll plazas were clustered into the ten groupings (from 69 individual plazas) based-on similarities in historical travel demand patterns, proximity, data availability, and other characteristics such as operating history. These groupings are identified in **Table 3-5** and mapped in **Figure 3-9**. Some individual plazas were excluded from the groupings due to data gaps (e.g., I-376 and PA 66), staggered plaza openings and closings (e.g., Mon/Fayette), or too short annual timeseries data (e.g., I-576), as inclusion would artificially distort the historical demand trends. For a long-term 30-year forecast such as the one provided in this study, any toll plazas with a relatively shorter operating history may have trends that are artificially distorted by short-term ramp ups or other factors. Therefore, of the 69 individual toll plazas, 39 were included in the groupings. The 30 excluded mostly pertain to the smaller Barrier System facilities.

Note that the Delaware River Bridge (DRB) and the Southern Beltway (I-576) were not econometrically tested similarly to other groupings. The DRB changed operations recently, therefore the historical trend may not appropriately correspond with current and future conditions. The Southern Beltway opened as the Findlay Connector between the Pittsburgh Airport and U.S. 22 in 2006 and was extended to I-79 in October 2021. The relatively short historical data includes a ramp-up trend that does not statistically correspond to any regional socioeconomic characteristics.

Where available, historical traffic data were used as continuous annual time series from 1987 through 2022. Annualized data were available for most of the Ticket System facilities, exempting a few plazas opening after 1987 (and thus excluded). However, Barrier System data were more limited: available only since 1994 with data gaps, or toll plazas that were opened too recently to provide a statistically defensible trend (insufficient number of data points). Many of the 30 excluded plazas are barrier toll plazas with shorter historical operating timeframes than since 1994.

Table 3-5 Toll Plaza Groupings

	Plaza Grouping	Type	Included	Excluded
1	Gateway	Ticket	1	0
2	Pittsburgh	Ticket	5	1
3	Western Rural	Ticket	7	0
4	Eastern Rural	Ticket	7	0
5	Philadelphia	Ticket	6	5
6	Northeast Ticket	Ticket	7	2
7	Northeast Barrier	Barrier	2	0
8	I-376	Barrier	2	3
9	PA 66	Barrier	1	4
10	Mon Fayette	Barrier	1	11
*	DRB	Ticket	1	0
*	I-576	Barrier	3	0

Source: CDM Smith

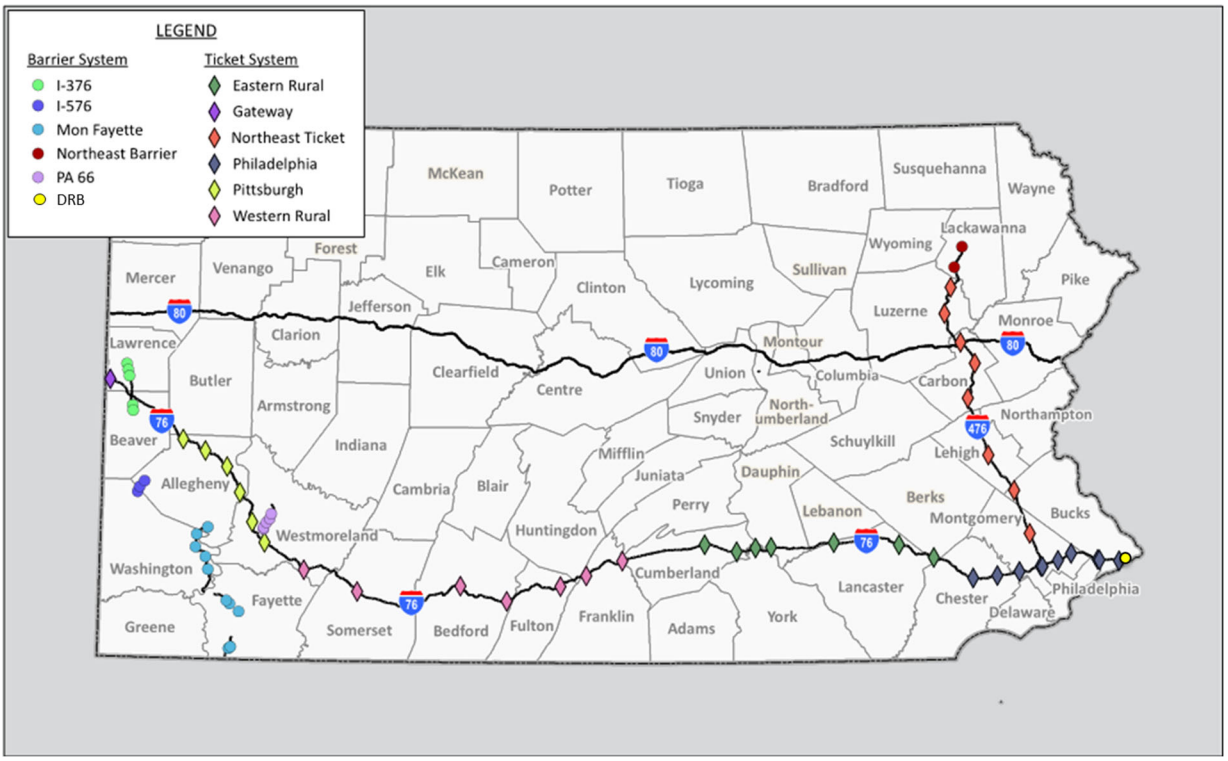


Figure 3-9
Toll Plaza Groupings

3.3.1.3 Socioeconomic Data (Independent Variables)

Data inputs include historical and forecast data for the possible explanatory independent variables, which comprise socioeconomics for geographies surrounding the Turnpike (i.e., Pennsylvania and surrounding states' counties). Data compiled for regression testing included:

- Pennsylvania Turnpike Commission – historical transactions and toll rate schedules
- United States Census Bureau – historical population
- United States Bureau of Economic Analysis (BEA) – historical employment
- United States Energy Information Administration (EIA) – historical and forecast fuel prices
- Woods & Poole Economics, Inc. – historical and forecast population, employment, real gross regional product (GRP), and real retail sales
- Moody's Analytics – historical and forecast real gross regional product (GRP)

Socioeconomic data were tested as explanatory variables at various combinations of counties surrounding the toll plazas groupings. Data was compiled for all counties in Pennsylvania, New York, New Jersey, Delaware, Maryland, Virginia, West Virginia, and Ohio.

3.3.1.4 Regression Caveats

Econometrically derived long-term demand forecasts serve as a basis for further transaction and toll revenues estimates. Growth forecasts from the regressions do not explicitly consider route choice assumptions, the existing roadway network and planned improvements, existing and anticipated roadway capacities, origin-destination pairing, peak and directional factors, or traffic diversions. As such, the regression-based forecast long-term growth rates are conditionally incorporated into further traffic and revenue modeling.

As this regression analysis attempted to estimate aggregate travel demand, the equations cannot account for all potentially influencing factors, especially any small-scale, qualitative/difficult-to-quantify, and/or irregularly occurring factors. Also, a regression analysis is incapable of forecasting unprecedented factors (positive or negative influence) such as future catastrophic climate change, health epidemics, terrorism, natural disasters, or any other significantly destabilizing factors.

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

3.3.1.5 Regression Equations and Forecasting

A final regression equation was estimated for each toll plaza-vehicle grouping, relating historical annual travel demand with a regionalized socioeconomic variable, and sometimes with a toll index and/or COVID-19 index as additional explanatory factors. A regression summary for the 20 toll plaza-vehicle groupings is provided in **Table 3-6**. After testing socioeconomics at various regional county clusters, it was determined that real GRP was the best-suited explanatory variable for most equations, with population being best-suited for a few more. Explanatory socioeconomic variables identified in the 2018 analysis were unchanged in this 2023 update. However, the geographic catchments (county clusters) were adjusted and the COVID-19 variable was newly necessary, especially for PCs.

Geographically, regional combinations of contiguous counties in Pennsylvania, New Jersey, Delaware, Maryland, West Virginia, and Ohio served as logical and statistically acceptable catchment areas. Although each equation has a unique county combination, anchored around the respective plaza groupings, the counties included in each equation are along and adjacent to the Pennsylvania Turnpike system. 2018 equations were updated with county catchment adjustments, mostly removing some peripheral counties bordering Pennsylvania, resulting in slightly narrower areas surrounding the respective plazas groupings. Catchment areas regionalize socioeconomic variables as related to travel demand. However, the catchment areas should not imply that travel demand is only from those geographies, but rather that the catchments' socioeconomic data are a relatively logical, statistically valid relationship for the aggregate demand.

Most of the twenty equations exhibited sensible relationships with acceptable statistics, however, despite concerted diligence, a few equations could not be improved upon while yielding relatively poor statistics, questionable relationships, and/or unusual forecasts (especially compared to history). In such instances, the historical travel demand patterns did not trend overly well with

any regional socioeconomics and/or the toll rate factors, and are instead probably more influenced by localized, sub-county factors such as toll plaza operating characteristics, diversion potentials, construction closures, etc. Such historical transaction volatility disjointed from regional socioeconomic trends was encountered for single toll plaza equations (i.e., Gateway CV) and the smaller Barrier System facilities (i.e., Northeast Barrier PC and CV). Contrastingly, the Ticket System groupings with multiple major toll plazas that contribute to a significant majority of the total Pennsylvania Turnpike transactions and revenues exhibited statistically significant equations and coefficients, with consistent relationships across adjacent groupings and logical results.

Table 3-6 Regression Summary

Grouping/Vehicles	Start Yr	Adj. R2	Independent Variables			PA	Non-PA	Counties
Gateway PV	1987	91.5%	GDP	COVID-19		3	4	7
Pittsburgh PV	1987	94.7%	GDP	Toll Index	COVID-19	18	9	27
Western Rural PV	1987	90.1%	GDP	Toll Index	COVID-19	14	6	20
Eastern Rural PV	1987	97.7%	GDP	Toll Index	COVID-19	10	4	14
Philadelphia PV	1987	93.2%	GDP	Toll Index	COVID-19	13	7	20
Northeast Ticket PV	1987	98.0%	Population	Toll Index	COVID-19	8	4	12
Northeast Barrier PV	1994	79.8%	Population	COVID-19		2		2
I-376 PV	1994	91.1%	GDP	Toll Index	COVID-19	3		3
PA 66 PV	1994	96.4%	GDP	Toll Index		7	3	10
Mon Fayette PV	1994	93.4%	GDP	Toll Index	COVID-19	4	1	5
Gateway CV	1987	90.3%	Retail Sales			2		2
Pittsburgh CV	1987	95.9%	GDP	Toll Index	COVID-19	2	1	3
Western Rural CV	1987	92.3%	GDP	Toll Index	COVID-19	15	9	24
Eastern Rural CV	1987	96.5%	GDP			9	5	14
Philadelphia CV	1987	92.7%	GDP			6	4	10
Northeast Ticket CV	1987	99.4%	GDP	COVID-19		12	2	14
Northeast Barrier CV	1994	73.9%	GDP			3		3
I-376 CV	1994	96.7%	GDP			8	2	10
PA 66 CV	1994	95.1%	GDP			4		4
Mon Fayette CV	1994	92.5%	GDP			3	5	8

Source: CDM Smith

Aside from the few equations at single- and small Barrier System groupings with relatively poor statistical fits, the remaining equations that correspond to a significant majority of Pennsylvania Turnpike toll transactions and revenues exhibit robust adjusted R^2 statistics, ranging between 90.1% and 99.4%. Such relatively high statistical fits indicate good relationships. Similar results occurred in the 2018 analysis, with the same vehicle-grouping equation outliers (e.g., the same general statistical relativity between equations mostly held). Compared to the 2018 adjusted R^2, about half the equations (9 out of 20) improved, and about half (11 out of 20) declined, mostly with relatively minor (+/-1%) differences, although some barrier PCs' adjusted R^2 increased more. Effectively, the identified equations in 2018 generally held (logically and statistically) with some adjustments to the counties included per socioeconomic variables and the necessary inclusion of COVID-19 indexing. In three CVs equations, the previous generalized toll increase index was an included explanatory variable but has now dropped.

With the final equations, socioeconomic and toll index forecasts were applied to the regression coefficients to estimate future long-term travel demand. (Although the COVID-19 index variables

explained recent historical variations, they are assumed to hold constant in forecasts at observed 2022 levels and thus have no further effect on growth estimates). Socioeconomic forecasts were obtained from both Woods & Poole Economics, Inc. at a detailed county level and Moody's Analytics at a more macroscopic statewide and metropolitan statistical area (MSA) level. Both sources forecast almost identical long-term annual real GRP trends for comparable statewide and MSA geographies, with very minor average growth rate differentials only marginally noticeable after 2035. Given the availability of Woods & Poole forecasts at a granular county level, it was applied to equations to forecast baseline travel demand. The toll index forecast assumes a 5.0% annually recurring increase through 2025, 4.0% in 2026, 3.5% in 2027, and a deceleration to 3% in 2028 and thereafter.

In further traffic and revenue modeling, it was decided that econometric-derived forecast growth estimates for some of the identified sub-par equations fits not be applied. Instead, it was decided that alternative growth forecasts from a simpler, non-econometric based extrapolation of most recent historical trends be employed. A similar recommendation to consider simpler, alternative forecasts for the remaining barrier-system forecasts was also made because of the more localized characteristics of such facilities. Given the acceptable logic and statistical significance of the ticket-system equations, it was recommended that the econometric-based growth forecasts be applied in further traffic and revenue modeling for those major facilities.

3.3.2 Demand Growth Results

Econometrically derived travel demand forecasts for the Pennsylvania Turnpike are summarized in **Table 3-7**, based on applied W&P forecasts for the regional socioeconomics and future toll index growth assumptions to the respective regression coefficients. Compound average growth rates (CAGR) for the plaza groupings are shown for three historical timeframes as comparative context, and generally in ten-year future increments through year 2060. The last column in Table 3-7 presents the average growth over the entire 2023 through 2060 forecast period.

Average annual growth rates vary by toll plaza grouping, vehicle category, and period (hence, subcategorizing the facilities as conducted). Consequently, it is challenging to concisely summarize. However, generally, passenger car growth was historically slower than commercial vehicle growth. Barrier System facilities' transactions generally grew relatively faster than the older Ticket System facilities, although less so in more recent years than an entire historical timeframe. Also, for the major Ticket System groupings, the western portions (Gateway, Pittsburgh, and Western Rural) grew relatively slower than the eastern portions (Eastern Rural, Philadelphia, and the Northeast Extension). All three generalized relativities are expected to mostly continue through the econometric-based growth forecasts. Additionally, the future growth in transactions is universally forecast to decelerate relative to historical trends. Compared with 2018 econometric growth estimates (through 2050 rather than 2060), the PCs exhibit mostly similar long-term trends, albeit with slightly decelerated expectations (with the Northeast equations, as population-driven, not real GRP, effectively flatline). CVs are mostly similar to the 2018 estimates, especially the mainline groupings, but the barrier facilities exhibit some relative acceleration or deceleration. At the tail end of the forecast, PC transactions on both the Northeast Ticket System and PA 66 are expected to have a continued decline due to socioeconomic projections of slow growth combined with a compounding effect of annual toll rate increases. In all, the revised forecasts based on updated 2018 equations mostly yield similar results, with

differences attributable to the minor refinements noted (plus the re-anchored PCs equations' current base at still-below COVID-19 levels).

Table 3-7 Transaction Growth Summary

Grouping/Vehicles	'87-'22	'94-'22	'12-'22	'23-'30	'30-'40	'40-'50	'50-'60	'23-'60
Gateway PV	1.1%	0.6%	-0.5%	1.2%	1.0%	0.9%	0.8%	1.0%
Pittsburgh PV	0.1%	-0.2%	-1.9%	0.4%	0.5%	0.4%	0.3%	0.4%
Western Rural PV	0.3%	0.0%	-1.8%	0.4%	0.4%	0.3%	0.2%	0.3%
Eastern Rural PV	1.3%	0.8%	-1.0%	1.5%	1.4%	1.2%	1.1%	1.3%
Philadelphia PV	1.2%	0.4%	-1.7%	0.9%	0.8%	0.2%	-0.4%	0.3%
Northeast Ticket PV	2.3%	1.5%	-0.4%	0.1%	-0.1%	-0.7%	-1.3%	-0.6%
Northeast Barrier PV	#N/A	-0.4%	-2.3%	0.2%	-0.2%	-0.5%	-0.1%	-0.2%
I-376 PV	#N/A	1.3%	-1.1%	1.4%	1.2%	0.8%	0.5%	0.9%
PA 66 PV	#N/A	2.0%	-1.6%	1.1%	0.7%	-0.4%	-1.7%	-0.2%
Mon Fayette PV	#N/A	2.1%	-0.9%	1.8%	1.6%	1.3%	1.1%	1.4%
Gateway CV	1.1%	1.3%	3.3%	0.9%	1.1%	1.2%	1.3%	1.1%
Pittsburgh CV	1.4%	1.4%	1.7%	0.9%	0.8%	0.4%	0.0%	0.5%
Western Rural CV	1.5%	1.7%	1.7%	1.2%	1.1%	0.9%	0.8%	1.0%
Eastern Rural CV	2.6%	2.6%	3.4%	2.1%	1.9%	1.7%	1.6%	1.8%
Philadelphia CV	1.7%	2.0%	2.0%	1.5%	1.3%	1.2%	1.1%	1.3%
Northeast Ticket CV	3.9%	3.5%	3.3%	2.6%	2.3%	2.0%	1.8%	2.1%
Northeast Barrier CV	#N/A	1.9%	3.0%	1.5%	1.3%	1.2%	1.1%	1.3%
I-376 CV	#N/A	4.4%	2.6%	2.5%	2.1%	1.8%	1.7%	2.0%
PA 66 CV	#N/A	4.1%	1.8%	2.1%	1.7%	1.4%	1.2%	1.6%
Mon Fayette CV	#N/A	5.2%	3.0%	2.4%	2.1%	1.9%	1.8%	2.0%

Source: CDM Smith

A refined traffic and revenue analysis is the last component of the forecasting analysis. Growth rates developed from this econometric analysis are conditionally considered and applied to further traffic and revenue modeling. Some post-processing adjustments to the econometric forecasts prior to further modeling that consider additional factors such as long-term roadway capacities are expected. Also, some of the econometrically based forecasts for smaller Barrier System facilities may be dismissed due to relatively weak descriptor statistics and supplanted with alternative growth assumptions via recent trend extrapolations or other non-econometric means.

Chapter 4

Transaction and Toll Revenue Forecasts

Traffic and gross toll revenue forecasts are presented in this chapter for the Ticket System, the Barrier System, and the total Turnpike System. Forecasts are presented by fiscal year from 2022-23 through 2052-53. Also presented in this chapter are important inputs to the forecasts, including committed roadway projects, assumed future toll rate increases and assumed future E-ZPass market shares.

4.1 Committed Turnpike System Roadway Improvements

Through discussions with PTC personnel and by reviewing both the PTC Construction website and the State Transportation Improvement Plan (STIP) and Twelve-Year Program (TYP), CDM Smith identified the major committed roadway improvements that would potentially impact traffic and toll revenue on the Turnpike System. Projects were identified on the Mainline I-76/276/95 and the Northeast Extension. **Table 4-1** lists the identified projects and **Figure 4-1** presents the locations of the projects. All listed projects reflect information included in PTC's FY 2023-24 Capital Plan approved at the May 2, 2023 Commission meeting. In total, there are 26 projects identified.

A majority of these, 15 in all, are part of PTC's Total Reconstruction Initiative, which aims to rebuild and widen much of the Mainline Turnpike and Northeast Extension in order to provide a safer and more efficient travel experience. More than 150 miles have already been completed and more than 60 additional miles are under construction or funded. While these projects will improve the travel experience, they are not expected to affect transactions or revenue figures.

An additional six projects are related to PTC's planned conversion to segment-based, or open road tolling (ORT) on the Ticket System and associated changes to vehicle classification. The ORT conversion is the final phase of AET implementation and will allow vehicles to drive at highway speeds beneath overhead gantries without slowing down at toll plazas and while entering and exiting the Turnpike. The eastern portion of the Mainline Turnpike will include 19 gantries — with small utility buildings to house the required equipment — east of the Reading Interchange (Exit 286) to the New Jersey line and along the entire Northeast Extension (I-476). The eastern ORT system is expected to go live in 2025. The ORT system for the central and western Mainline Turnpike roadway is expected to begin construction in 2025, with an anticipated go-live date of 2027. Vehicle classification changes will alter the classification system of vehicles to be based on both height and number of axles, as is currently done on both the Southern Beltway and Northeast Extension barrier plazas. On the Mainline and Northeast Extension portions of the Ticket System, this will be done in conjunction with conversion to ORT. On the Beaver Valley Expressway and A.K. Hutchinson Bypass, this is expected to occur in January 2025.

Four projects include construction of new roadways and/or interchanges. Two new Mainline interchanges are planned: one with SR 130 at milepost 63 in Penn Township, Westmoreland

County, and one with Lafayette Street at milepost 331 in Plymouth Township, Montgomery County. These interchanges are planned to open in 2035 and 2030, respectively.

Table 4-1 Major Committed Roadway Improvements on the Pennsylvania Turnpike System

Milepost	Counties	Description (1)	Actual or Assumed Start Date	Assumed Completion Date
Mainline I-76/I-276/I-95				
Gateway Toll Plaza	Lawrence	Relocate toll plaza to MP 5.2	Spring 2024	January 2027
12-14	Beaver	Reconstruct and widen to 3 lanes in each direction	Fall 2022	September 2027
53-57	Alleghany	Reconstruct and widen to 3 lanes in each direction	2029	2032
57-68	Alleghany and Westmoreland	Reconstruct and widen to 3 lanes in each direction	2029	2033
63	Westmoreland	Construct a new interchange at SR 130	2031	2035
102-109	Somerset County	Reconstruct and widen to 3 lanes in each direction	January 2021	August 2024
126-131	Somerset and Bedford	Reconstruct and widen to 3 lanes in each direction	June 2022	Fall 2026
149-155	Bedford	Reconstruct and widen to 3 lanes in each direction	2032	2033
312-316	Chester	Reconstruct and widen to 3 lanes in each direction	Spring 2023	2027
324-326	Chester and Montgomery	Reconstruct and widen to 3 lanes in each direction	Fall 2021	Summer 2025
331	Montgomery	Construct a new interchange at Lafayette Street	2027	2030
350-352	Bucks	Reconstruct and widen to 3 lanes in each direction	2032	2033
352-355	Bucks	Reconstruct and widen to 3 lanes in each direction	2027	2030
355-356	Bucks	Reconstruct and widen to 3 lanes in each direction	2024	2027
System-wide		Convert from entry-exit tolling to segment-based (open road) tolling	Spring 2023	2028
System-wide		Convert vehicle classification to axle- and height-based system	2025	2028
Northeast Extension I-476				
A38-A44	Montgomery and Bucks	Reconstruct and widen to 3 lanes in each direction	April 2022	November 2024
A44-A48	Bucks and Lehigh	Reconstruct and widen to 3 lanes in each direction	2031	2033
A48-A53	Lehigh	Reconstruct and widen to 3 lanes in each direction	2027	2032
A53-A57	Lehigh	Reconstruct and widen to 3 lanes in each direction	2031	2033
Scranton Beltway	Lackawanna and Luzerne	Link I-476 to I-81 with two interchanges to create a Scranton Beltway	2029	2032
System-wide		Convert from entry-exit tolling to segment-based (open road) tolling	Spring 2023	2025
System-wide		Convert vehicle classification to axle- and height-based system	Spring 2023	2025
Mon/Fayette Expressway Turnpike 43				
PA 51 to SR 2043	Allegheny	Construct an extension of the existing Turnpike 43 including one new interchange	March 2023	Spring 2027
Beaver Valley Expressway I-376				
System-wide	Lawrence and Beaver	Convert vehicle classification to axle- and height-based system	2024	January 2025
A.K. Hutchinson Bypass PA 66				
System-wide	Westmoreland	Convert vehicle classification to axle- and height-based system	2024	January 2025

(1) The major committed roadway improvement projects listed here are a small subset of all projects listed in PTC's FY 2024 Ten Year Capital Plan.

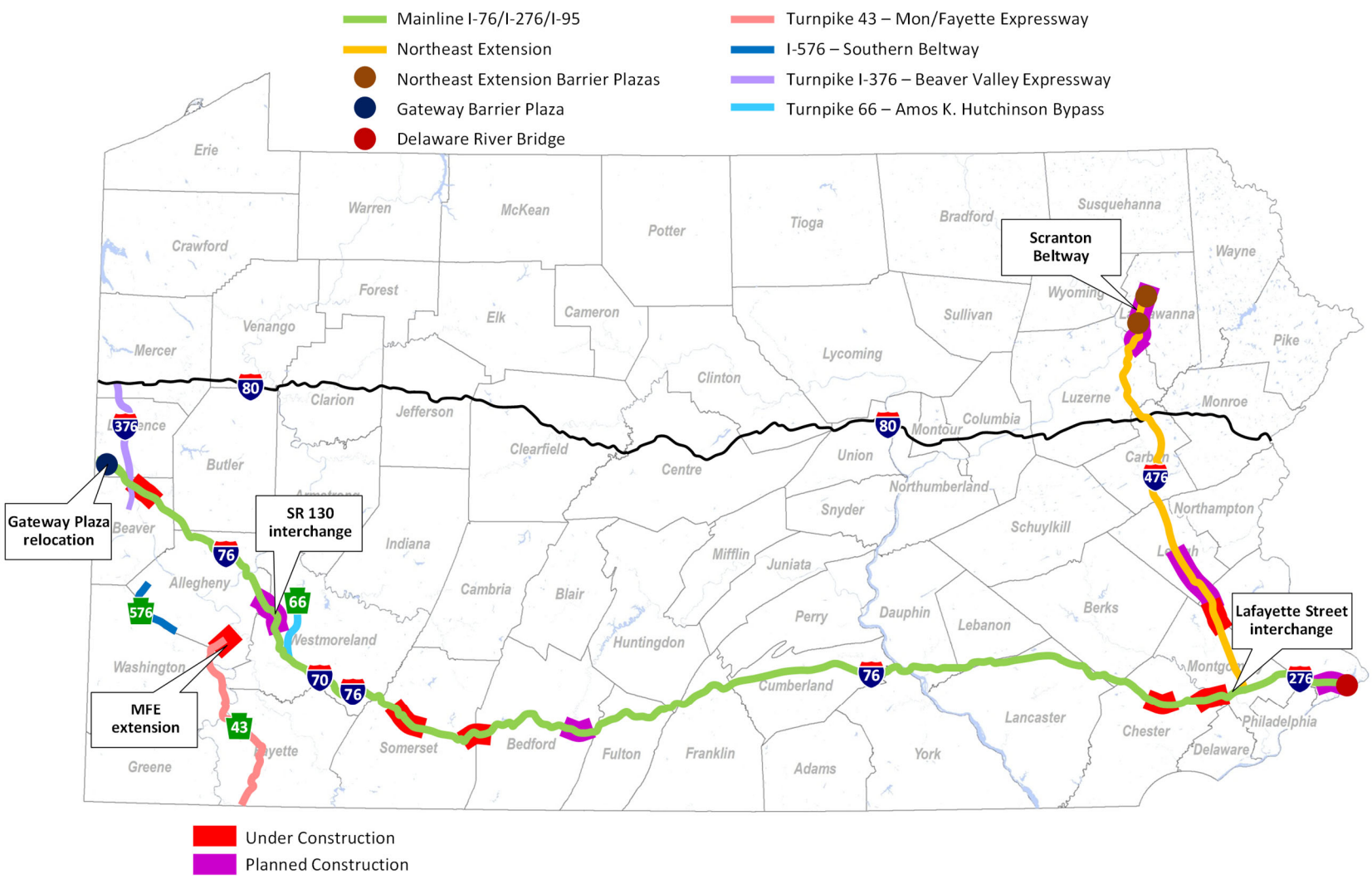


Figure 4-1
Pennsylvania Turnpike Commission Major Roadway Improvement Projects

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The Scranton Beltway project will link the Northeast Extension to I-81 with highway-speed connections that will enable motorists to seamlessly drive from interstate to interstate in northbound and southbound directions. There will be two separate connections between the I-476 and I-81 near the current Northeast Extension interchanges at Wyoming Valley (MP A115) and Clarks Summit (MP 131). Construction is expected to occur between 2029 and 2032.

An extension of the Mon/Fayette Expressway (MFE) is currently underway. The original construction of MFE was divided into four separate projects, three of which have been constructed. The last project will extend MFE from PA 51 to I-376 and is divided into two sections, one south of the Monongahela River and one to the north. The southern section from MFE's current terminus at PA 51 to the Monongahela River is the first to be constructed and is itself divided into seven construction sections. The first two of these sections, 53A1 and 53A2 are the only ones currently funded and will extend MFE three miles northwards to an interchange with Camp Hollow Road (SR 2043). Construction began in March 2023 and is expected to be complete in spring 2027.

The final project is the relocation of the Gateway Toll Plaza from its current location at MP 1.4 to MP 5.2. Construction is expected to occur from spring 2024 to January 2027. No other operational changes are planned with this relocation.

4.2 Construction Related Impacts on Turnpike System Traffic

Ongoing construction-related impacts stemming from roadway widening and reconstruction projects on the Turnpike System are expected to be minimal. Construction projects on the Turnpike System are planned to minimize lane closures or any restrictions to the Turnpike. When such measures are necessary, they are conducted overnight to avoid interfering with heavier daytime traffic volumes. Generally, preference is given to Turnpike Mainline traffic and construction-related disruptions are more likely to affect cross streets and Turnpike access points. Two travel lanes are maintained in both directions during construction activities.

For purposes of conservatism, each of these projects are assumed to have no net effect on Turnpike revenue figures. Conversion of the Ticket System to open road tolling (ORT) has been analyzed and is assumed to be revenue neutral on a system-wide basis. Axle- and height-based vehicle classification on the Ticket System has been separately analyzed and is also assumed to be revenue neutral. PTC will decide what these revenue-neutral toll rates will be prior to system conversion.

Conversion to axle- and height-based vehicle classification on barrier systems that have not yet been converted has not yet been analyzed but is expected to have no or minimal revenue impacts. While the extension of MFE and construction of new interchanges with SR 130, Lafayette Street, and I-81 are expected to bring more transactions, and possibly more revenue, to the Turnpike System, construction of these projects is not expected to be completed until after ORT conversion. Therefore, traffic and revenue impacts of these projects has not yet been analyzed or accounted for in this forecast.

4.3 Assumed Toll Rate Increases on the Turnpike

At the direction of the PTC, annual toll rate increases are assumed to occur on the entire Turnpike System. The toll rate increases are assumed to occur within several days of January 1 of each year. **Table 4-2** presents actual and assumed percent increases in toll rates for each calendar year from 2023 through 2053.

Table 4-2 Actual and Assumed Future Toll Rate Increases

Calendar Year		Percent Increase (1)	Sample Toll Rates		
			$1.00 Toll	$2.50 Toll	$10.00 Toll
2023	(2)(3)	5.0	$1.00	$2.50	$10.00
2024	(3)	5.0	1.10	2.70	10.50
2025	(4)	5.0	1.16	2.84	11.03
2026		4.0	1.21	2.95	11.47
2027		3.5	1.25	3.05	11.87
2028		3.0	1.29	3.14	12.23
2029		3.0	1.33	3.23	12.60
2030		3.0	1.37	3.33	12.98
2031		3.0	1.41	3.43	13.37
2032		3.0	1.45	3.53	13.77
2033		3.0	1.49	3.64	14.18
2034		3.0	1.53	3.75	14.61
2035		3.0	1.58	3.86	15.05
2036		3.0	1.63	3.98	15.50
2037		3.0	1.68	4.10	15.97
2038		3.0	1.73	4.22	16.45
2039		3.0	1.78	4.35	16.94
2040		3.0	1.83	4.48	17.45
2041		3.0	1.88	4.61	17.97
2042		3.0	1.94	4.75	18.51
2043		3.0	2.00	4.89	19.07
2044		3.0	2.06	5.04	19.64
2045		3.0	2.12	5.19	20.23
2046		3.0	2.18	5.35	20.84
2047		3.0	2.25	5.51	21.47
2048		3.0	2.32	5.68	22.11
2049		3.0	2.39	5.85	22.77
2050		3.0	2.46	6.03	23.45
2051		3.0	2.53	6.21	24.15
2052		3.0	2.61	6.40	24.87
2053		3.0	2.69	6.59	25.62

(1) Future toll rate increases are assumed to be implemented within several days of January 1.
(2) Reflects actual toll rate increases on the Turnpike System.
(3) By PTC Policy, all rates are rounded up to the nearest dime.
(4) Beginning in 2025, tolls are rounded to the nearest penny due to undetermined policies after conversion to ORT.

Assumed percent increases in toll rates through the end of the forecast period are identical for cars and trucks and for E-ZPass and TBP transactions. Annual toll rate increases will remain at 5.0% through 2025 before tapering down to 3.0% in 2028 through 2053. Consistent with PTC's current tolling policy, in 2024 all toll rates will be rounded up to the nearest dime. After 2024, the sample rates shown in this table assume rounding to the nearest penny, which is reflected in the projections included in this report.

At the direction of PTC, the toll rate increases shown in Table 4-2 were used in the development of the traffic and toll revenue forecasts, including the assumption that the percent toll rate increases are the same for both E-ZPass and TBP transactions. PTC reserves the right to implement varying toll rate increases for E-ZPass and TBP in future years.

4.4 Estimated E-ZPass Market Share in Future Years

Because a price differential has been established between TBP and E-ZPass toll rates, it is important to estimate future year E-ZPass market shares in order to forecast gross toll revenues. Historically, cash and E-ZPass toll rates were virtually identical until 2011, differing only because cash rates were rounded up to the nearest nickel while E-ZPass rates were rounded up to the nearest cent. There was no reason for a customer to choose E-ZPass over cash based solely on the toll rate.

In 2011, 2012, 2013, and 2014, differential toll rate increases were implemented. As a result of these differential rate increases, theoretical cash toll rates became 39.5% greater than E-ZPass rates, with the actual differential being greater for lower price tolls due to the effect of rounding up to the nearest nickel for cash rates. With the advent of all-electronic tolling, TBP rates were assessed an additional 45% surcharge over cash rates to cover the costs of non-payment associated with TBP transactions and to incentivize E-ZPass participation. As a result, TBP rates are now approximately double E-ZPass rates. This differential creates incentives for TBP customers to shift to E-ZPass, and for new accounts to favor E-ZPass over TBP.

All image-based transactions are checked against E-ZPass customer license plates on file and if matches are found, then they are identified as vToll transactions. These vToll transactions are charged at the lower E-ZPass rate, which is approximately half the TBP rate. Because vTolls also receive the lower E-ZPass rate, they must also be accounted for in E-ZPass market share. As seen in **Figure 4-2**, the share of transactions conducted via vToll has been increasing since 2016, which is when PTC's first AET system was implemented on the Delaware River Bridge (DRB). As PTC converted more of its systems to AET, the share of vToll transactions has increased as E-ZPass customers traveling without a transponder on a given day are now captured via TBP tolling and cannot stop to pay cash instead. In 2015, prior to the first AET implementation, vTolls accounted for only 1.5% of system-wide transactions. By 2021, which was the first full calendar year with system-wide AET, vTolls had grown to 9.6% of all transactions. vToll market share is forecast to continue growing over the next few years, eventually reaching 12.8% of all transactions in 2027.

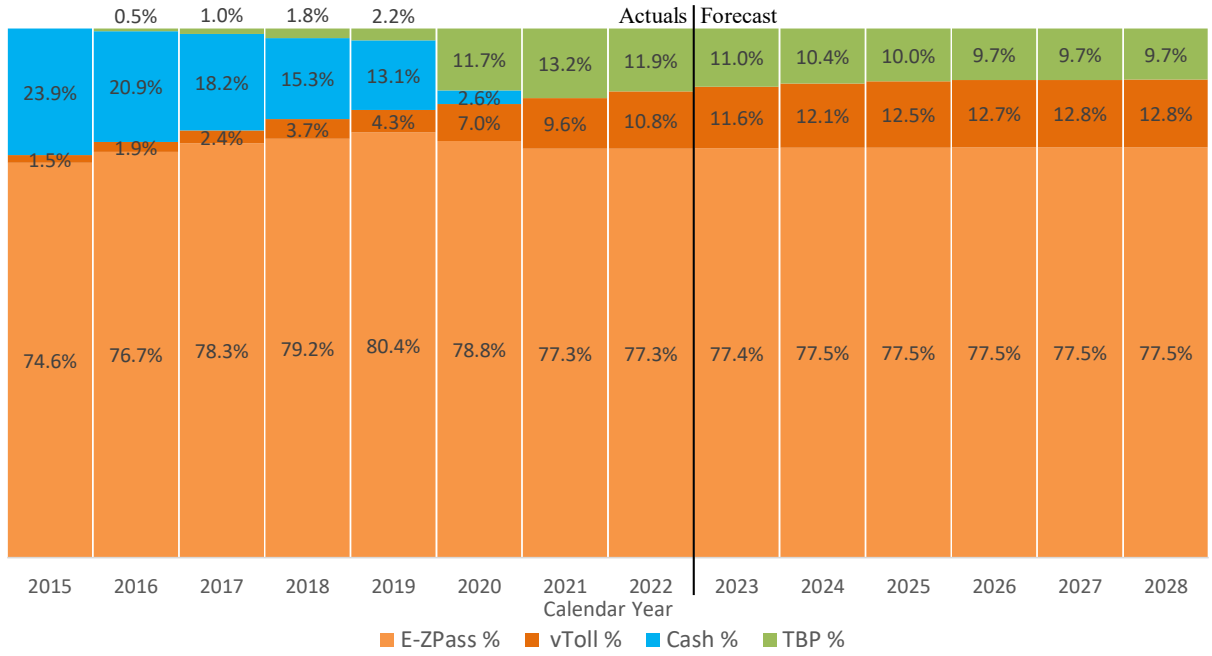

Figure 4-2 Historical and Forecast Market Shares of Total System-wide Transactions

Future year E-ZPass market shares (transponder read plus vToll transactions) were developed based on the assumed future toll rate increases shown in Table 4-2, and the historic trends in E-ZPass market share. **Table 4-3** presents the actual percent E-ZPass market shares of transactions from calendar years 2016 through 2022, the estimated percent E-ZPass market shares from 2023 through 2053, and the percentage point increase in E-ZPass market share over the prior year.

In 2016, the E-ZPass market share totaled 76.9% for passenger cars and 88.8% for commercial vehicles. By 2019, those values increased to 83.3% for passenger cars and 92.3% for commercial vehicles. However, with the conversion of the Ticket System and Mon/Fayette Expressway to all-electronic tolling (AET) in 2020, the E-ZPass market share for commercial vehicles declined in both 2020 and 2021. E-ZPass market share grew for both passenger cars and commercial vehicles in 2022, but the rate of growth is expected to slow until 2028. By this point, the market is expected to essentially be saturated with E-ZPass market shares of 89.8% for passenger cars, 92.9% for commercial vehicles, and 90.5% total. Market shares are expected to then increase only fractionally for the remainder of the forecast period as there will likely always be customers who choose not to use E-ZPass. Under AET, TBP offers relatively more convenient billing as opposed to the onerous process of conducting a cash transaction at the tolling point prior to AET implementation.

Table 4-3 Actual and Estimated E-ZPass Market Share

Calendar Year	Passenger Cars (1)		Commercial Vehicles (1)		Total Vehicles (1)	
	Percent Market Share	Percent Increase in Market Share	Percent Market Share	Percent Increase in Market Share	Percent Market Share	Percent Increase in Market Share
2015 (2)	74.3		87.2		76.1	
2016 (2)	76.9	2.6	88.8	1.6	78.5	2.4
2017 (2)	79.3	2.4	89.9	1.1	80.8	2.3
2018 (2)	81.5	2.2	91.0	1.1	82.9	2.1
2019 (2)	83.3	1.8	92.3	1.3	84.6	1.7
2020 (2)	84.4	1.1	91.5	(0.8)	85.7	1.1
2021 (2)	86.0	1.6	90.8	(0.7)	86.8	1.1
2022 (2)	87.4	1.4	91.4	0.6	88.1	1.3
2023 (3)	88.4	1.0	91.9	0.5	89.0	0.9
2024 (3)	89.1	0.7	92.2	0.3	89.6	0.6
2025 (3)	89.5	0.4	92.5	0.3	90.0	0.4
2026 (3)	89.7	0.2	92.7	0.2	90.3	0.3
2027 (3)	89.8	0.1	92.8	0.1	90.3	0.0
2028 (3)	89.8	0.0	92.9	0.1	90.3	0.0
2029 (3)	89.8	0.0	92.9	0.0	90.3	0.0
2030 (3)	89.8	0.0	92.9	0.0	90.3	0.0
2031 (3)	89.8	0.0	92.9	0.0	90.3	0.0
2032 (3)	89.8	0.0	92.9	0.0	90.4	0.1
2033 (3)	89.8	0.0	92.9	0.0	90.4	0.0
2034 (3)	89.8	0.0	92.9	0.0	90.4	0.0
2035 (3)	89.8	0.0	92.9	0.0	90.4	0.0
2036 (3)	89.8	0.0	92.9	0.0	90.4	0.0
2037 (3)	89.8	0.0	92.9	0.0	90.4	0.0
2038 (3)	89.8	0.0	92.9	0.0	90.4	0.0
2039 (3)	89.9	0.1	92.9	0.0	90.4	0.0
2040 (3)	89.9	0.0	92.9	0.0	90.4	0.0
2041 (3)	89.9	0.0	92.9	0.0	90.4	0.0
2042 (3)	89.9	0.0	92.9	0.0	90.4	0.0
2043 (3)	89.9	0.0	92.9	0.0	90.4	0.0
2044 (3)	89.9	0.0	92.9	0.0	90.4	0.0
2045 (3)	89.9	0.0	92.9	0.0	90.4	0.0
2046 (3)	89.9	0.0	92.9	0.0	90.5	0.1
2047 (3)	89.9	0.0	92.9	0.0	90.5	0.0
2048 (3)	89.9	0.0	92.9	0.0	90.5	0.0
2049 (3)	89.9	0.0	92.9	0.0	90.5	0.0
2050 (3)	89.9	0.0	92.9	0.0	90.5	0.0
2051 (3)	89.9	0.0	92.9	0.0	90.5	0.0
2052 (3)	89.9	0.0	92.9	0.0	90.5	0.0
2053 (3)	89.9	0.0	92.9	0.0	90.5	0.0

(1) E-ZPass market share includes both successful transponder transactions and vTolls.

(2) Actual E-ZPass market shares.

(3) Estimated E-ZPass market shares.

4.5 COVID-19 Impacts

Since March 2020, traffic and revenue on the Pennsylvania Turnpike System and all other highways have been impacted by the COVID-19 pandemic. Generally speaking, passenger car traffic has been negatively impacted as rates of telecommuting increased substantially and, at least in the early stages of the pandemic, social distancing and closure and capacity limitations of many businesses, public facilities, and events discouraged recreational travel. However, after an initial decline in the spring and summer of 2020, commercial vehicle traffic has been positively impacted as freight traffic grew due to increased consumer demand for ecommerce. While most of these impacts have now been reflected into baseline growth, CDM Smith has made minor adjustments to forecast passenger and commercial vehicle traffic to account for additional normalization expected to occur.

Passenger car traffic on the Pennsylvania Turnpike and other peer systems in the northeast and Midwest have not yet returned to 2019 levels due to shifts in commuting and travel patterns caused by the pandemic. While much of these changes are likely to be permanent, this forecast accounts for some modest additional recovery from lingering COVID-19 impacts by assuming an additional 3.5% growth in baseline passenger car traffic over the next two years, which will still be below 2019 levels.

Conversely, the high levels of growth experienced by commercial vehicle traffic since 2020 were impacted by the pandemic as demand for consumer goods increased. This level of demand likely cannot be sustained over the long-term, and COVID-19's positive impacts to commercial traffic have begun to weaken. Therefore, this forecast assumes a further 3.5% decline in baseline commercial vehicle traffic over the next two years, which will still keep it above 2019 levels.

4.6 Short-Term Economic Outlook

The forecast presented in this chapter includes a small adjustment to account for a mild recession. The Federal Reserve staff have outlined their projections for a recession during the March Federal Open Market Committee (FOMC). According to the meeting minutes, the staff expects "a mild recession starting later this year, with a recovery over the subsequent two years". In addition, the median projection for 2023 change in real GDP is +0.4%.

This forecast accounts for the latest recession probability forecasts by including a 50% probability of the Federal Reserve recession level taking place over the next year. The assumption for this forecast was that in the event of a recession, commercial vehicles would be more negatively impacted than passenger cars. The forecast assumes that recessionary impacts would negatively impact traffic in the short-term (through the second quarter of 2025) but have no impact on transactions and revenue in the long-term.

4.7 Transaction and Gross Toll Revenue Forecasts

This section summarizes the forecasts of toll transactions and gross toll revenue based on the information provided in the preceding sections of this report. All previously discussed information regarding future transaction growth rates in the various Turnpike corridors (Chapter 3) as well as assumed toll rates, E-ZPass market share, etc. are all brought together to develop the following forecasts.

A more detailed approach was taken in developing the short term forecast over the next two calendar years (2023 and 2024). Forecasts were developed on monthly basis during these two years for passenger cars and commercial vehicles and for each Turnpike toll facility (Ticket System, Beaver Valley, Mon/Fayette Expressway, etc.). This accomplished two things. First, it accounted for the most recent growth trends on all facilities. Second, it allowed for the creation of a "normal" calendar year by 2024, correcting for such things as adverse weather, the number of weekdays and weekend days in a month, and unique impacts such as the mid-year opening of the Southern Beltway. Once a normalized 2024 was developed, the longer-term growth rates established through the socioeconomic analysis described in Chapter 3 were applied to it and all future years throughout the forecast period.

Table 4-4 shows estimated Ticket System transactions and gross toll revenue through FY 2052-53. Actual data is shown for FY 2021-22 and for the first ten months of FY 2022-23 (through March 2023). As shown, total vehicle transactions are estimated to increase from about 145.3 million in FY 2021-22 (the latest full year of actual experience) to 171.6 million by FY 2052-53, which represents a total increase over this period of 18.1% or an average annual growth rate of 0.5%. Annual gross toll revenue is estimated to increase from $1.3 billion in FY 2021-22 to $4.3 billion by FY 2052-53. This represents an average annual increase of about 3.9% and includes the impacts of normal growth and annual toll rate increases.

Table 4-5 identifies the same transaction and gross toll revenue information for the Barrier System. As shown, total vehicle transactions are estimated to increase from about 54.8 million in FY 2021-22 to 67.0 million by FY 2052-53, which represents a total increase over this period of 22.3% or an average annual increase of about 0.7%. Estimated annual toll revenue is expected to increase from about $246.3 million in FY 2021-22 to $857.3 million by the end of the forecast period. This represents a 4.1% annual rate of increase. Again, this is influenced by normal growth and toll increases.

Table 4-6 identifies total combined transactions and gross toll revenue while also factoring in estimated toll discounts and adjustments. The vast majority of the discounts and adjustments results from commercial account toll adjustments due to the Turnpike's Commercial Volume Discount Program. The volume discount program allows for a 3.0% discount to be provided to accounts that accrue $20,000 or more in monthly tolls. Discounts and adjustments shown in Table 4-6 assume no further changes to the post-paid Commercial Volume Discount Program during the forecast period. As commercial traffic is expected to grow more quickly than passenger car traffic throughout the forecast period, a higher number of commercial accounts and/or vehicles are expected to qualify for the discount. Therefore, the negative adjustment applied for the discount grows from 1.9% of the commercial vehicle gross toll revenue in 2022-23 to 2.2% in FY 2052-53.

Total transactions increase from 200.1 million in FY 2021-22 to 238.6 million by FY 2052-53, which represents a total increase of about 19.2%, or an average annual increase of 0.6% over the forecast period. Total net revenue, after discounts and adjustments, is estimated to grow from approximately $1.6 billion in FY 2021-22 to $5.1 billion by FY 2052-53, representing a 3.9% average annual rate of growth. This includes normal growth, toll increase impacts, and toll discounts and adjustments.

Table 4-4 Ticket System Estimated Annual Transactions and Gross Toll Revenue

Fiscal Year (2)	Annual Traffic (in thousands) (1)			Annual Gross Toll Revenue (in thousands) (1)		
	Passenger Cars	Commercial Vehicles	Total Vehicles	Passenger Cars	Commercial Vehicles	Total Vehicles
2021-22 (3)	119,499	25,807	145,306	$672,668	$650,063	$1,322,732
2022-23 (4)	120,741	25,771	146,512	705,048	685,729	1,390,778
2023-24	120,706	25,021	145,727	730,375	696,007	1,426,382
2024-25	121,903	25,105	147,008	769,161	728,270	1,497,431
2025-26	123,364	25,455	148,819	809,714	770,553	1,580,267
2026-27	124,437	25,737	150,174	846,103	806,775	1,652,878
2027-28	125,386	26,027	151,413	880,739	841,751	1,722,490
2028-29	126,348	26,318	152,666	914,127	876,232	1,790,359
2029-30	127,253	26,600	153,853	948,297	912,167	1,860,464
2030-31	128,122	26,877	154,999	983,417	949,321	1,932,738
2031-32	128,956	27,155	156,111	1,019,517	987,900	2,007,417
2032-33	129,795	27,441	157,236	1,056,931	1,028,266	2,085,197
2033-34	130,659	27,739	158,398	1,095,889	1,070,645	2,166,534
2034-35	131,482	28,040	159,522	1,135,876	1,114,699	2,250,575
2035-36	132,262	28,342	160,604	1,176,898	1,160,500	2,337,398
2036-37	132,998	28,645	161,643	1,218,952	1,208,120	2,427,072
2037-38	133,688	28,951	162,639	1,262,040	1,257,627	2,519,667
2038-39	134,332	29,258	163,590	1,306,171	1,309,098	2,615,269
2039-40	134,932	29,567	164,499	1,351,360	1,362,620	2,713,980
2040-41	135,484	29,876	165,360	1,397,608	1,418,181	2,815,789
2041-42	135,989	30,183	166,172	1,444,902	1,475,706	2,920,608
2042-43	136,441	30,479	166,920	1,493,199	1,534,894	3,028,093
2043-44	136,838	30,762	167,600	1,542,476	1,595,622	3,138,098
2044-45	137,190	31,043	168,233	1,592,838	1,658,495	3,251,333
2045-46	137,497	31,322	168,819	1,644,295	1,723,595	3,367,890
2046-47	137,758	31,599	169,357	1,696,844	1,791,001	3,487,845
2047-48	137,974	31,875	169,849	1,750,492	1,860,800	3,611,292
2048-49	138,144	32,148	170,292	1,805,236	1,933,079	3,738,315
2049-50	138,268	32,421	170,689	1,861,068	2,007,929	3,868,997
2050-51	138,346	32,692	171,038	1,917,983	2,085,448	4,003,431
2051-52	138,376	32,961	171,337	1,975,963	2,165,731	4,141,694
2052-53	138,358	33,230	171,588	2,034,985	2,248,878	4,283,863

(1) Annual toll rate increases are implemented on or about January 1st of each year.

(2) PTC fiscal year ends May 31.

(3) Reflects actual traffic and revenue experience.

(4) Reflects actual experience through March 2023.

Table 4-5 Barrier System Estimated Annual Transactions and Gross Toll Revenue

Fiscal Year	(2)	Annual Traffic (in thousands) (1) Passenger Cars	Commercial Vehicles	Total Vehicles	Annual Gross Toll Revenue (in thousands) (1) Passenger Cars	Commercial Vehicles	Total Vehicles
2021-22	(3,4)	45,629	9,169	54,798	$147,115	$99,180	$246,295
2022-23	(5,6)	49,206	10,147	59,353	164,634	109,525	274,159
2023-24		49,787	10,099	59,886	176,647	112,846	289,493
2024-25		50,278	10,271	60,549	188,862	119,582	308,444
2025-26		50,790	10,503	61,293	199,318	127,013	326,331
2026-27		51,080	10,649	61,729	208,250	133,149	341,399
2027-28		51,285	10,792	62,077	216,377	139,008	355,385
2028-29		51,473	10,927	62,400	224,126	144,705	368,831
2029-30		51,635	11,059	62,694	232,035	150,565	382,600
2030-31		51,782	11,189	62,971	240,152	156,620	396,772
2031-32		51,919	11,319	63,238	248,496	162,897	411,393
2032-33		52,086	11,459	63,545	257,239	169,524	426,763
2033-34		52,303	11,618	63,921	266,484	176,590	443,074
2034-35		52,503	11,776	64,279	275,974	183,933	459,907
2035-36		52,691	11,916	64,607	285,721	191,433	477,154
2036-37		52,867	12,023	64,890	295,731	199,015	494,746
2037-38		53,026	12,132	65,158	305,994	206,894	512,888
2038-39		53,169	12,241	65,410	316,514	215,081	531,595
2039-40		53,296	12,350	65,646	327,297	223,591	550,888
2040-41		53,406	12,461	65,867	338,339	232,434	570,773
2041-42		53,496	12,571	66,067	349,628	241,605	591,233
2042-43		53,565	12,678	66,243	361,150	251,063	612,213
2043-44		53,612	12,781	66,393	372,894	260,792	633,686
2044-45		53,642	12,884	66,526	384,899	270,887	655,786
2045-46		53,655	12,988	66,643	397,167	281,359	678,526
2046-47		53,651	13,091	66,742	409,700	292,223	701,923
2047-48		53,631	13,194	66,825	422,502	303,495	725,997
2048-49		53,593	13,298	66,891	435,575	315,195	750,770
2049-50		53,540	13,402	66,942	448,919	327,347	776,266
2050-51		53,471	13,507	66,978	462,538	339,965	802,503
2051-52		53,387	13,612	66,999	476,432	353,068	829,500
2052-53		53,288	13,718	67,006	490,602	366,675	857,277

(1) Annual toll rate increases are implemented on or about January 1st of each year.

(2) PTC fiscal year ends May 31.

(3) Reflects actual traffic and revenue experience.

(4) The Southern Beltway between US 22 and I-79 opened in October 2021.

(5) Reflects actual experience through March 2023.

(6) Reflects opening of all ramp movements between the Southern Beltway and I-79 in June 2022.

Table 4-6 Total System Estimated Annual Transactions and Gross Toll Revenue

Traffic and Toll Revenue in Thousands

Fiscal Year		Annual Traffic (2) Passenger Cars	Commercial Vehicles	Total Vehicles	Annual Gross Toll Revenue (2) Passenger Cars	Commercial Vehicles	Total Vehicles	Discounts and Adjustments (3)	Net Toll Revenue
2021-22	(4,5)	165,128	34,976	200,103	$819,784	$749,243	$1,569,027	($12,997)	$1,556,030
2022-23	(6,7)	169,947	35,918	205,865	869,682	795,255	1,664,937	(15,299)	1,649,638
2023-24		170,493	35,120	205,613	907,022	808,853	1,715,875	(15,965)	1,699,910
2024-25		172,181	35,376	207,557	958,023	847,852	1,805,875	(17,159)	1,788,716
2025-26		174,154	35,958	210,112	1,009,032	897,566	1,906,598	(18,614)	1,887,984
2026-27		175,517	36,386	211,903	1,054,353	939,924	1,994,277	(19,727)	1,974,550
2027-28		176,671	36,819	213,490	1,097,116	980,759	2,077,875	(20,829)	2,057,046
2028-29		177,821	37,245	215,066	1,138,253	1,020,937	2,159,190	(21,938)	2,137,252
2029-30		178,888	37,659	216,547	1,180,332	1,062,732	2,243,064	(22,995)	2,220,069
2030-31		179,904	38,066	217,970	1,223,569	1,105,941	2,329,510	(24,096)	2,305,414
2031-32		180,875	38,474	219,349	1,268,013	1,150,797	2,418,810	(25,246)	2,393,564
2032-33		181,881	38,900	220,781	1,314,170	1,197,790	2,511,960	(26,277)	2,485,683
2033-34		182,962	39,357	222,319	1,362,373	1,247,235	2,609,608	(27,362)	2,582,246
2034-35		183,985	39,816	223,801	1,411,850	1,298,632	2,710,482	(28,489)	2,681,993
2035-36		184,953	40,258	225,211	1,462,619	1,351,933	2,814,552	(29,659)	2,784,893
2036-37		185,865	40,668	226,533	1,514,683	1,407,135	2,921,818	(30,870)	2,890,948
2037-38		186,714	41,083	227,797	1,568,034	1,464,521	3,032,555	(32,129)	3,000,426
2038-39		187,501	41,499	229,000	1,622,685	1,524,179	3,146,864	(33,438)	3,113,426
2039-40		188,228	41,917	230,145	1,678,657	1,586,211	3,264,868	(34,798)	3,230,070
2040-41		188,890	42,337	231,227	1,735,947	1,650,615	3,386,562	(36,211)	3,350,351
2041-42		189,485	42,754	232,239	1,794,530	1,717,311	3,511,841	(37,675)	3,474,166
2042-43		190,006	43,157	233,163	1,854,349	1,785,957	3,640,306	(39,180)	3,601,126
2043-44		190,450	43,543	233,993	1,915,370	1,856,414	3,771,784	(40,726)	3,731,058
2044-45		190,832	43,927	234,759	1,977,737	1,929,382	3,907,119	(42,327)	3,864,792
2045-46		191,152	44,310	235,462	2,041,462	2,004,954	4,046,416	(43,985)	4,002,431
2046-47		191,409	44,690	236,099	2,106,544	2,083,224	4,189,768	(45,702)	4,144,066
2047-48		191,605	45,069	236,674	2,172,994	2,164,295	4,337,289	(47,480)	4,289,809
2048-49		191,737	45,446	237,183	2,240,811	2,248,274	4,489,085	(49,323)	4,439,762
2049-50		191,808	45,823	237,631	2,309,987	2,335,276	4,645,263	(51,231)	4,594,032
2050-51		191,817	46,199	238,016	2,380,521	2,425,413	4,805,934	(53,209)	4,752,725
2051-52		191,763	46,573	238,336	2,452,395	2,518,799	4,971,194	(55,258)	4,915,936
2052-53		191,646	46,948	238,594	2,525,587	2,615,553	5,141,140	(57,380)	5,083,760

(1) PTC fiscal year ends May 31.

(2) Annual toll rate increases are implemented on or about January 1st of each year.

(3) Reflects the Commercial Vehicle Discount Program, discount for Registered TBP Accounts, and other adjustments.

(4) Reflects actual traffic and revenue experience.

(5) The Southern Beltway between US 22 and I-79 opened in October 2021.

(6) Reflects actual experience through March 2023.

(7) Reflects opening of all ramp movements between the Southern Beltway and I-79 in June 2022.

Finally, **Table 4-7** provides a summary of total Turnpike System net toll revenue after accounting for TBP bad debt expenses. TBP bad debt expenses is the term PTC uses to describe the portion of Toll By Plate (TBP) invoices that are not paid. The gross toll revenue PTC initially recognizes includes all TBP invoiceable transactions and toll revenue, thus, it is necessary to remove the estimated portion of that TBP toll revenue that is not expected to be paid. In FY 2021-22, 38.2% of TBP revenue was categorized as bad debt expense. Based on 10 months of actuals (through March 2023), bad debt expense in FY 2022-23 is expected to increase to 40.9% of TBP revenue. Analyses conducted by CDM Smith indicate that the bad debt expense proportion of TBP revenue will grow further, reaching 46.0% of TBP invoices that will not be paid by FY 2028-29 and stabilizing at that level for the remainder of the forecast period.

As shown in Table 4-7, TBP bad debt expenses from are estimated to increase from a loss of $99.0 million in FY 2021-22 to $109.2 million in FY 2022-23, eventually reaching $301.4 million by FY 2052-53. Although the dollar value of TBP bad debt expense continues to grow each year, FY 2022-23 represents its peak value in relation to net toll revenue. In FY 2022-23, TBP bad debt expense is forecast to equal 6.6% of net toll revenue. This figure is expected to gradually decline throughout the forecast period, reaching 5.9% of net toll revenue by FY 2052-53. The growth in annual TBP bad debt expense from $109.2 million to $301.4 million over the forecast period is mostly due to increasing traffic and toll rates, thereby resulting in both more gross revenue and more unpaid revenue, and the slight increase in the proportion of TBP bad debt expense discussed above.

It should be noted that PTC is, and will be, seeking to aggressively pursue TBP violators. In response to unpaid invoices, PTC attempts to collect outstanding amounts via various options where practical and permitted by law. These include, but are not limited to, working with two collection agencies to go after unpaid tolls, suspending vehicle registrations, and filing criminal and civil complaints against toll scofflaws. The Commission is also pursuing reciprocity agreements with other states to enhance cross state collections and is pursuing legislative changes to strengthen enforcement measures for toll violators, including recently enacted legislation that reduces the minimum value of unpaid tolls needed to incur vehicle registration suspension from $500 to $250. PTC has also established new cash payment channels for unbanked customers through a partnership with Kubra. Thus, over time, it may be that CDM Smith's assumptions of up to 46% of TBP revenue ending up as bad debt expense assumptions overstate the actual revenue losses.

Table 4-7 Total System Net Gross Toll Revenue After TBP Revenue Bad Debt Expense

Toll Revenue in Thousands

Fiscal Year		Net Toll Revenue (2)	Estimated TBP Revenue Bad Debt Expense	Net Toll Revenue Minus TBP Bad Debt Expense	Bad Debt Expense Percentage of Net Toll Revenue
2021-22	(3,4)	$1,556,030	($99,014)	$1,457,016	6.4
2022-23	(5,6)	1,649,638	(109,237)	1,540,401	6.6
2023-24		1,699,910	(109,903)	1,590,007	6.5
2024-25		1,788,716	(113,962)	1,674,754	6.4
2025-26		1,887,984	(116,447)	1,771,537	6.2
2026-27		1,974,550	(120,583)	1,853,967	6.1
2027-28		2,057,046	(125,694)	1,931,352	6.1
2028-29		2,137,252	(130,626)	2,006,626	6.1
2029-30		2,220,069	(135,571)	2,084,498	6.1
2030-31		2,305,414	(140,662)	2,164,752	6.1
2031-32		2,393,564	(145,909)	2,247,655	6.1
2032-33		2,485,683	(151,377)	2,334,306	6.1
2033-34		2,582,246	(157,105)	2,425,141	6.1
2034-35		2,681,993	(163,006)	2,518,987	6.1
2035-36		2,784,893	(169,081)	2,615,812	6.1
2036-37		2,890,948	(175,330)	2,715,618	6.1
2037-38		3,000,426	(181,762)	2,818,664	6.1
2038-39		3,113,426	(188,381)	2,925,045	6.1
2039-40		3,230,070	(195,193)	3,034,877	6.0
2040-41		3,350,351	(202,197)	3,148,154	6.0
2041-42		3,474,166	(209,389)	3,264,777	6.0
2042-43		3,601,126	(216,751)	3,384,375	6.0
2043-44		3,731,058	(224,276)	3,506,782	6.0
2044-45		3,864,792	(232,000)	3,632,792	6.0
2045-46		4,002,431	(239,928)	3,762,503	6.0
2046-47		4,144,066	(248,063)	3,896,003	6.0
2047-48		4,289,809	(256,409)	4,033,400	6.0
2048-49		4,439,762	(264,971)	4,174,791	6.0
2049-50		4,594,032	(273,751)	4,320,281	6.0
2050-51		4,752,725	(282,754)	4,469,971	5.9
2051-52		4,915,936	(291,982)	4,623,954	5.9
2052-53		5,083,760	(301,439)	4,782,321	5.9

(1) PTC fiscal year ends May 31.

(2) Annual toll rate increases are implemented on or about January 1st of each year.

(3) Reflects actual traffic and revenue experience.

(4) The Southern Beltway between US 22 and I-79 opened in October 2021.

(5) Reflects actual experience through March 2023.

(6) Reflects opening of all ramp movements between the Southern Beltway and I-79 in June 2022.

4.8 Fiduciary 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 Pennsylvania Turnpike Commission (PTC). 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 PTC. These estimates and projections may not be indicative of actual or future values and are therefore subject to substantial uncertainty. Certain variables such as future developments, economic cycles, pandemics, government actions, climate change related events, or impacts related to advances in automotive technology etc. 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 PTC and designated parties approved by PTC 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 PTC and does not owe a fiduciary duty pursuant to Section 15B of the Exchange Act to PTC with respect to the information and material contained in this report. CDM Smith is not recommending and has not recommended any action to PTC. PTC 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.

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