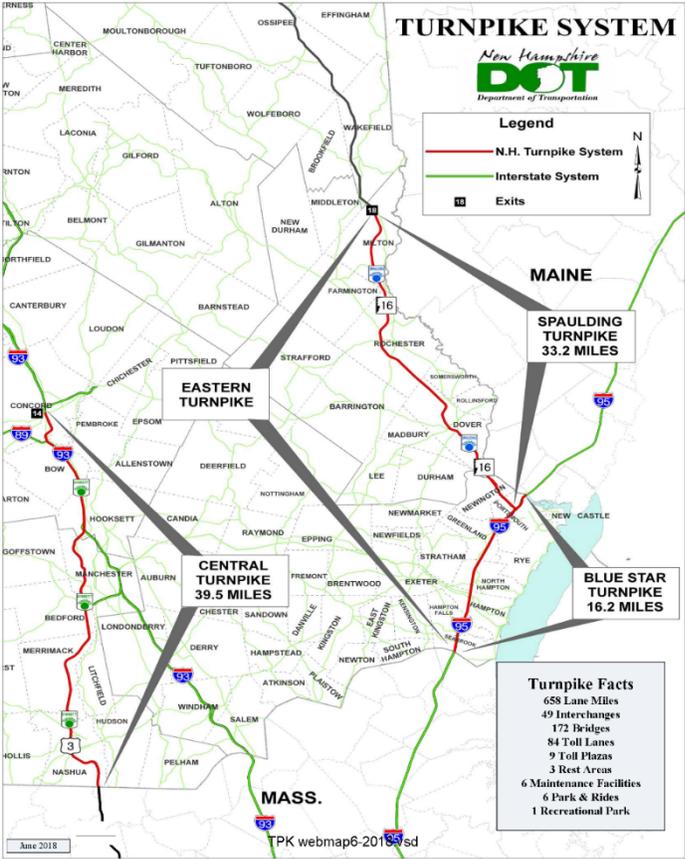


# New Hampshire Turnpike System Traffic and Revenue Study



Prepared for:



New Hampshire Department of Transportation

Prepared by:



October 23, 2019

## Sign-off Sheet

This document entitled New Hampshire Turnpike System Traffic and Revenue Study was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of New Hampshire Department of Transportation (the "Client") in connection with the issuance of the State of New Hampshire Turnpike System Revenue Bonds, 2019 Refunding Series (the "2019 Refunding"). Any reliance on this document by any third party other than in connection with the issuance of the 2019 Refunding is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not consider any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

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# NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

## Executive Summary

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## EXECUTIVE SUMMARY

Stantec Consulting Services Inc. was retained by the New Hampshire Department of Transportation (NHDOT) to conduct this traffic and revenue study for the New Hampshire Turnpike System (the “Turnpike System”) in connection with the issuance of the 2019 Refunding Bonds. Stantec analyzed historical traffic and revenue data for the entire Turnpike System to determine historical trends, correlated traffic with key economic indicators, and researched demographic data and other factors that have affected recent traffic and/or will affect future traffic. In addition, Stantec reviewed the historical and proposed Turnpike Capital Improvement Program as well as historical and projected expenditures for the Turnpike System related to operations, maintenance, renewal and replacement, and toll processing.

All of this information and analyses was then used to develop a traffic and revenue model to estimate annual traffic and toll revenue for the ten-year period from Fiscal Year 2020 (i.e., July 2019 – June 2020) through Fiscal Year 2029. Actual Fiscal Year (FY) 2018, unaudited actual for FY 2019 and projected annual toll revenues are summarized in Table ES-0.1. These forecasts assume no future toll increases. They take into account the planned conversion of the Dover and Rochester tolling plazas to all-electronic tolling (AET) in July 2021, as well as growth in traffic from the widening and improvement projects on the Spaulding Turnpike.

**Table ES-0.1: FY 2018 – FY2019 and Projected Annual Toll Revenues, FY 2020-2029 (in millions)**

Fiscal Year	Central Turnpike	Blue Star Turnpike	Spaulding Turnpike <sup>1</sup>	Total
<b>2018 Actual</b>	\$ 46.9	\$ 65.3	\$ 17.2	\$ 129.4
<b>2019 <sup>2</sup></b>	\$ 47.7	\$ 67.6	\$ 17.7	\$ 132.9
<b>2020</b>	\$ 48.2	\$ 67.3	\$ 17.8	\$ 133.4
<b>2021</b>	\$ 48.5	\$ 68.1	\$ 18.2	\$ 134.8
<b>2022</b>	\$ 48.9	\$ 68.9	\$ 16.4	\$ 134.2
<b>2023</b>	\$ 49.4	\$ 69.8	\$ 17.2	\$ 136.4
<b>2024</b>	\$ 49.8	\$ 70.7	\$ 17.6	\$ 138.1
<b>2025</b>	\$ 50.3	\$ 71.7	\$ 17.9	\$ 139.9
<b>2026</b>	\$ 50.8	\$ 72.6	\$ 18.2	\$ 141.7
<b>2027</b>	\$ 51.3	\$ 73.7	\$ 18.6	\$ 143.5
<b>2028</b>	\$ 51.8	\$ 74.7	\$ 18.9	\$ 145.4
<b>2029</b>	\$ 52.3	\$ 75.7	\$ 19.3	\$ 147.3

*Data will not necessarily add to totals because of rounding.*

*1. Toll revenues only; does not include any Video Tolling Fee due to AET conversion in FY 2022.*

*2. FY2019 are unaudited actuals.*

The study also included the use of a financial model to estimate net revenues, operating costs, debt service requirements, and bond coverage ratios and cash reserves for the Turnpike System. The analysis of the

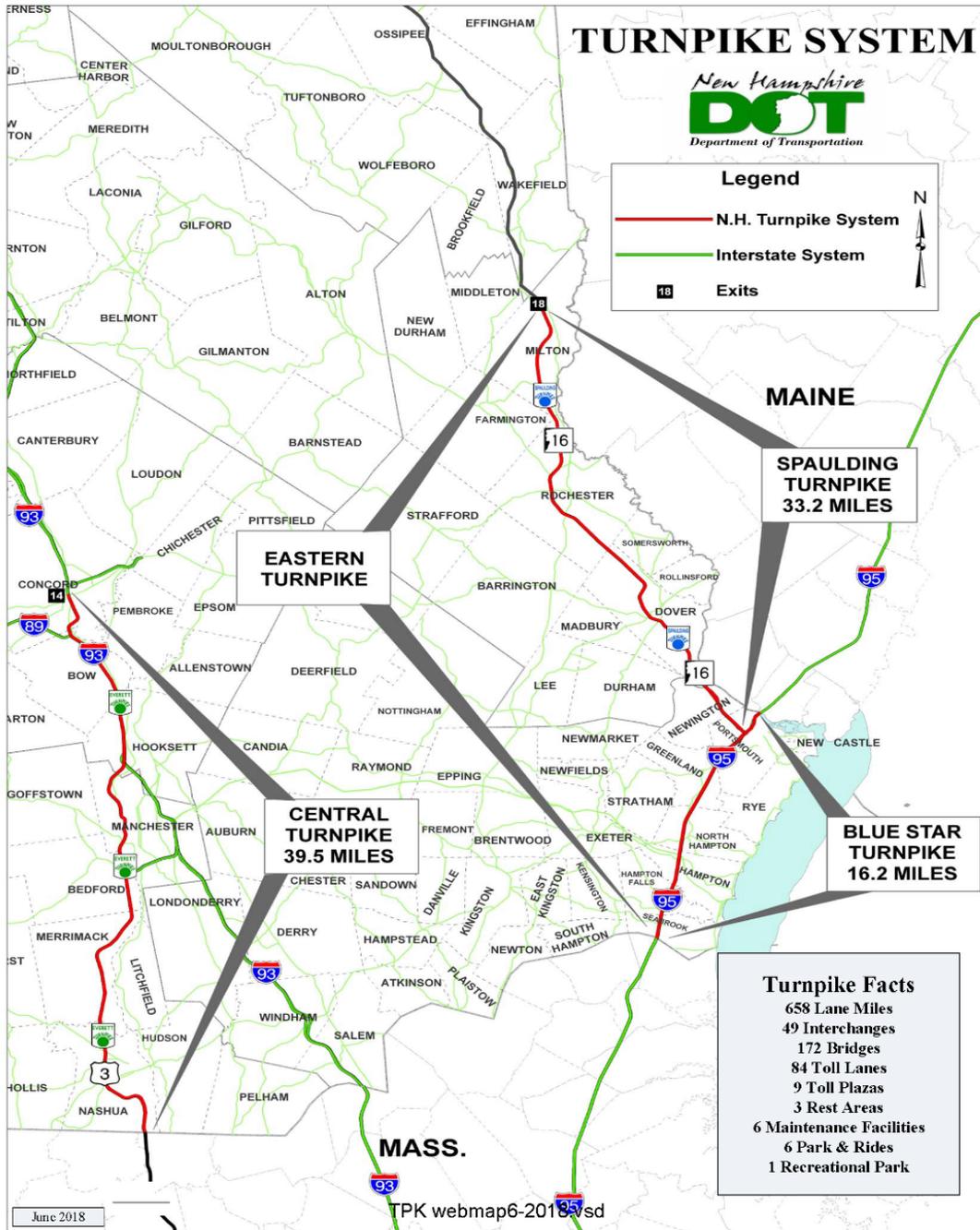
# NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

## Executive Summary

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financial plan showed that sufficient revenues will be generated to fund the proposed capital plan and to meet both the state's bond resolution's minimum debt service coverage requirements as well as the Turnpike's internal minimum requirements for the eleven-year forecast period, FY 2020-2029.

Figure ES-1: Project Study Area



# NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

## Introduction

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## 1.0 INTRODUCTION

The New Hampshire Department of Transportation (NHDOT) retained Stantec Consulting Services Inc. (Stantec) to prepare this investment-grade traffic and revenue (T&R) Study for their New Hampshire Turnpike System. In conducting this study, historical traffic and revenue data for the entire Turnpike System were collected and analyzed to determine historical trends and travel characteristics. Previous traffic and revenue projections were reviewed and compared to actual traffic and revenue data recorded by NHDOT.

This study also included a review of the historical and proposed Turnpike Capital Improvement Program, as well as historical and projected expenditures for the Turnpike System related to operations, maintenance, renewal and replacement, and toll processing. An additional review was conducted for regional and national economic factors such as gross domestic product, fuel cost impacts, housing and employment. The study also examined feeder and competitive roads and their impact on traffic on the Turnpike System.

All of this information and analyses was then used to develop a traffic and revenue model to estimate annual traffic and toll revenue for Fiscal Years 2020 through 2029. FY 2018 data and previous Fiscal Years are actual results; FY 2019 data are based on unaudited actuals and are subject to change. The study also included the development of a financial model to estimate net revenues, operating costs, debt service requirements and bond coverage ratios. An assessment was made to determine whether the toll revenues would be sufficient to meet the Turnpike bond requirements.

## 1.1 ORGANIZATION OF THE REPORT

The remainder of this report is organized into the following chapters:

*Chapter 2 - Description of the New Hampshire Turnpike System.* Provides context for the study area and a timeline of events that have impacted corridor performance.

*Chapter 3 – Historical Tolloed Traffic and Gross Toll Revenues.* Summarizes historical traffic and revenue for each roadway and compares a recent forecast to actual totals.

*Chapter 4 – Review of Proposed Capital Improvement Program.* Tabulates Turnpike capital improvement expenditures (past and future) by roadway and details major projects.

*Chapter 5 – Review of Historical and Projected Operation, Maintenance, Renewal and Replacement, and Debt Service Expenditures.* Presents a review of historical and projected Turnpike System operational expenditures and of the Turnpike System's historical and projected debt service expenditures.

*Chapter 6 - Review of National and Regional Socio-economic Conditions.* Describes historical trends as well as existing and forecasted socioeconomic conditions, and the assumptions used to assess future development in the study area.

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Introduction

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*Chapter 7 – Transportation Projects Relative to the New Hampshire Turnpike System.* Lists existing feeder roads and competitive roads for each Turnpike. Selected competitive travel time data are compared, and potential impacts of planned infrastructure projects are assessed.

*Chapter 8 – Traffic and Revenue Projections, 2020 - 2029.* Presents the T&R forecasts for the Turnpike System, and summarizes the assumptions and conditions used in preparing those forecasts.

*Chapter 9 - Financial Model Analyses.* Presents a financial analysis of the Turnpike System considering capital expenditures, operating expenditures, and debt service requirements as well as Turnpike System toll revenues and other revenues. This chapter also includes a cash flow analysis of the Turnpike System, as well as an analysis of the Turnpike System's debt service coverage ratios.

## Description of the New Hampshire Turnpike System

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## 2.0 DESCRIPTION OF THE NEW HAMPSHIRE TURNPIKE SYSTEM

### 2.1 EXISTING PROJECT STUDY AREA

The current Turnpike System is an open barrier toll system comprised of 49 interchanges, 9 toll plazas, 84 toll payment lanes, and approximately 89 linear miles. The system is composed of three independent Turnpike systems: the Central (F.E. Everett) Turnpike, the Blue Star Turnpike, and the Spaulding Turnpike, as shown in Figure 2.1.

The Central Turnpike, also known as the F.E. Everett Turnpike (or “FEET”) is the longest at 39.5 miles, extending from the Massachusetts state line in Nashua, New Hampshire to Exit 14 in Concord, New Hampshire. It comprises, in part, a portion of U.S. Interstate Highways 93 and 293 and connects the three largest cities in New Hampshire (Nashua, Manchester and Concord). The Central Turnpike also connects with major east-west highways such as NH 101, US 4 as well as Interstate 89. Currently there are two mainline toll plazas at Hooksett and Bedford, and three ramp plazas at Hooksett (I-93 Exit 11), Continental Boulevard (FEET Exit 11), and Merrimack Industrial Drive (FEET Exit 10). Tolling at Bedford Road (FEET Exit 12) ramp plaza was discontinued in late July 2014.

The Blue Star Turnpike extends from the Massachusetts state line in Seabrook, New Hampshire to the Maine state line in Portsmouth, New Hampshire. It is 16.2 miles in length and it covers the entirety of Interstate 95 in New Hampshire. The Blue Star Turnpike connects with major highways that include NH 101 and US 4. There is a mainline toll plaza and an entry/exit (“side”) toll plaza on the Blue Star Turnpike, both located in the Town of Hampton.

The Spaulding Turnpike is 33.2 miles long, extending from Portsmouth, New Hampshire, to Exit 18 in Milton, New Hampshire. It is the major north-south road in the eastern portion of the state, and connects the Blue Star Turnpike to NH 16, the major roadway to northern New Hampshire along the state’s eastern border. It links the three major cities in eastern New Hampshire (Portsmouth, Dover and Rochester) and connects to several major highways including US 4, NH 16, NH 125 and Interstate 95. There are two mainline toll locations at Dover and Rochester. The Spaulding Turnpike and Blue Star Turnpike are also collectively known as the Eastern Turnpike.

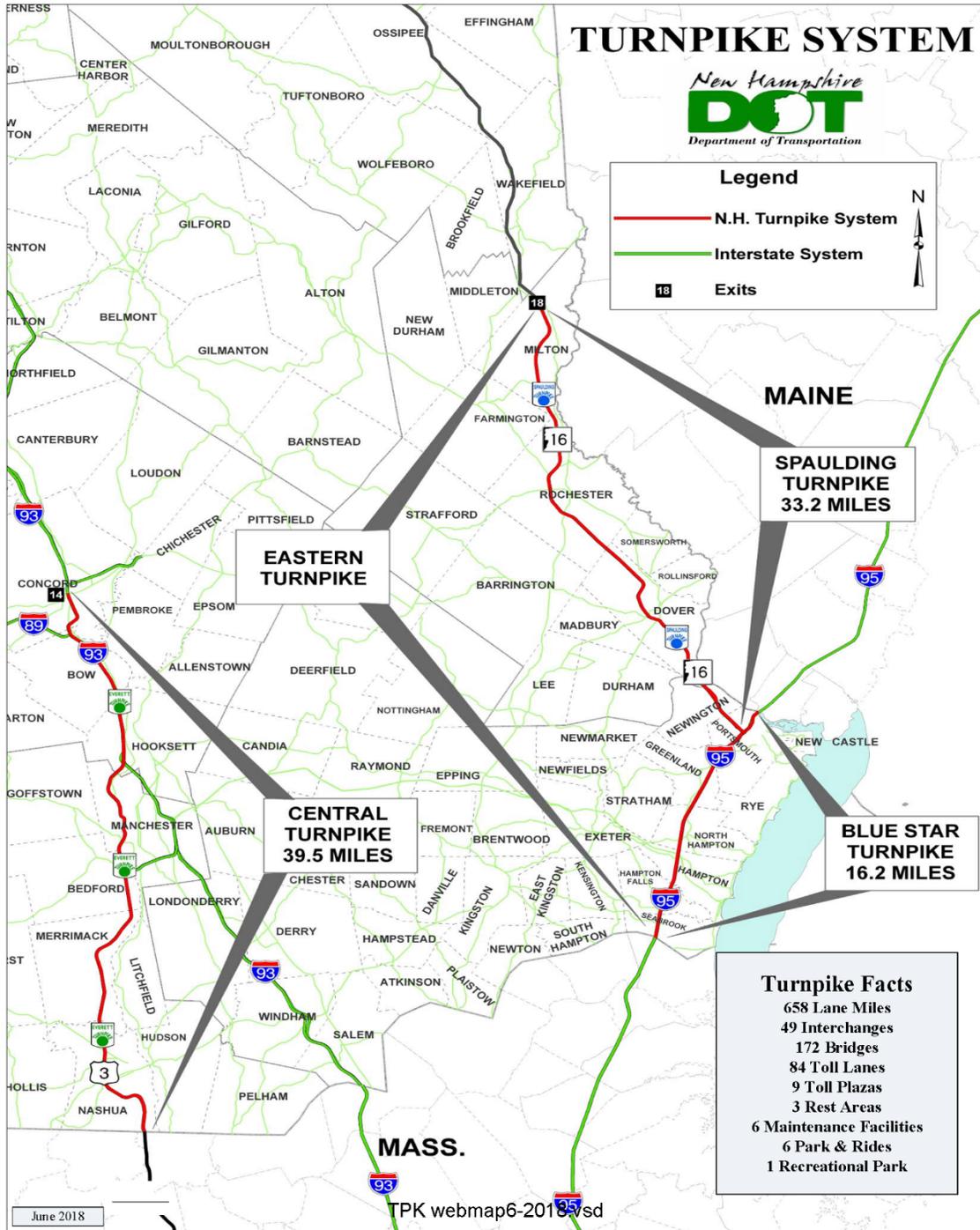
System changes in recent years have tended towards retraction rather than expansion. In June 2014 the toll plaza at the Bedford ramp ceased collecting tolls and was subsequently demolished. The Turnpike Bureau is also planning to convert the two plazas on the Spaulding Turnpike (Dover and Rochester) to all-electronic tolling (AET), which will lower operating costs.

# NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

## Description of the New Hampshire Turnpike System

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Figure 2.1: Project Study Area and Major Roadways



# NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

## Description of the New Hampshire Turnpike System

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## 2.2 MAJOR EVENTS

The major events that occurred in the development of the Turnpike System are summarized in Table 1, as follows:

**Table 2.1: Major Events on the New Hampshire Turnpike**

Date	Activity
1950 (Jun. 24)	First toll plaza opens - Hampton (toll was 20¢ for a passenger car).
1955	Completion of the Nashua to Manchester segment of the Central Turnpike.
1955 (Aug. 21)	Merrimack Toll Plaza opens. Toll was 25¢ for a passenger car.
1955	Tokens authorized providing a 1/3 discount. Two types of tokens were authorized. An "A" token had a trip fare value of 10¢ and a "B" token had a trip fare value of 15¢. Tokens could be used by any class of vehicle.
1956	The Portsmouth to Dover segment of the Spaulding Turnpike was completed.
1956 (Oct. 3)	Dover Toll Plaza opens. Toll was 10¢ for a passenger car.
1957	Increase in toll rate at Dover Toll to 15¢ for a passenger car.
1957	The Manchester to Concord segment of the Central Turnpike was completed.
1957	The Dover to Rochester segment of the Spaulding Turnpike was completed.
1957 (Aug. 29)	The Rochester Toll Plaza opens. Toll was 15¢ for a passenger car.
1957 (Aug. 30)	The Hooksett Toll Plaza opens. Toll was 25¢ for a passenger car.
1961	The rate decreased at Dover Toll to 10¢ for a passenger car.
1961 (Jun. 21)	Toll rate increased at Hampton Toll to 25¢ for a passenger car.
1972	Initiated charge program for commercial accounts. A 1/3 discount was provided in the program.
1975 (Jul. 1)	Toll rate increase at Hampton Toll to 40¢ for a passenger car.
1977	Eastern Turnpike (I-95) widened from 4 to 8 lanes.
1977 (Feb. 1)	Reconstruction and relocation of Hampton Toll completed with new ramp and mainline plazas opened to traffic.
1977 (Apr. 1)	Toll rates at Hooksett and Merrimack Tolls increased to 40¢ for a passenger car. Discontinued the sale of "A" tokens. Tokens restricted to two axle or four tire vehicles. Eliminated the 1/3 discount for commercial charge accounts.
1979 (Aug. 23)	Tolls eliminated at the Hampton Ramp Toll Plaza.
1979	Central Turnpike widened from 4 to 6 lanes from the junction of I-93/I-293 in Hooksett to I-93/I-89 in Bow.

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Description of the New Hampshire Turnpike System

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Date	Activity
1979 (Dec. 3)	Reconstruction completed on new Hooksett Toll Plaza ramp and mainline barrier.
1979 (Dec. 3)	Toll rates increased as follows. Merrimack, Hooksett & Hampton (main) 50¢ for a passenger car. Dover 15¢ for a passenger car. Rochester 20¢ for a passenger car.
1979 (Dec. 3)	Discount for commuter tokens increased to 50%.
1981 (Jul. 1)	Toll reinstated on the Hampton Ramp Toll Plaza.
1981 (Aug. 20)	Spaulding Turnpike Extension opened from Rochester to Milton.
1986 (Dec. 1)	Automated truck charge system initiated.
1987 (Apr. 15)	Toll rates increased at Dover & Rochester Toll to 25¢ for a passenger car.
1987 (Jul. 1)	Toll increased at Hampton Toll (mainline to 75¢ and ramp to 40¢ for a passenger car).
1987 (Oct. 28)	Toll reduced at Hampton Toll (mainline to 50¢ and ramp to 25¢ for a passenger car).
1987	Exit 8 Interchange, Nashua, New Hampshire. The first project to be completed in the Ten-Year Plan to expand and improve the New Hampshire Turnpike System (Chapter 203, Laws of 1986) was the Exit 8 Interchange in Nashua, New Hampshire that opened to traffic in June 1987.
1988 (Jan. 1)	Toll increased at Hampton Main Toll to 75¢ for passenger cars, Hampton Ramp remains at 25¢.
1989 (Jan. 4)	Merrimack Toll Plaza (Mainline and Ramps) closed. On this date, the Merrimack Toll Plaza discontinued collection of tolls and was dismantled.
1989 (Jan. 4)	Bedford Toll Plaza opened to traffic.
1989 (Jan. 4)	Exit 11 Ramp (Temporary) Toll Plaza opened to traffic. On this date, the Exit 11 Toll Plaza opened to traffic replacing the dismantled Merrimack Toll (Ramps).
1989 (Oct. 16)	General toll rate increase for entire Turnpike System. Increase of 25 cents at each plaza for passenger cars. Substantial increase for commercial vehicles (to recognize weight on turnpike infrastructure). Discount for commercial charge program 5% to 30% graduated. Discount for commuters decreased from 50% to 40%.
1990 (Jul. 11)	Commuter discount (Tokens) revised from 40% to 50%. Change in commercial charge discount (5-30%) applies to total transactions monthly.
1990 (Oct. 2)	Merrimack Industrial Interchange Toll Plaza opened to traffic.
1990 (Nov. 29)	Bedford Road Interchange Toll Plaza opened to traffic.
1991 (Feb. 4)	"Honor System" Toll Collection Began at Exit 11 Toll Plaza. Initiated unattended toll collection at Exit 11 Toll Plaza between the hours of 9 PM and 5 AM daily.
1991 (May 15)	Hampton Main Toll Plaza expansion completed.

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Description of the New Hampshire Turnpike System

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Date	Activity
1991 (Aug. 30)	Cheshire Toll Bridge began operation by the Bureau of Turnpikes.
1991 (Oct. 1)	Bedford Toll Plaza Toll Collection System Conversion.
1991 (Nov. 18)	Exit 11 Interchange Toll Plaza opens to traffic.
1991 (Dec. 1)	Hampton Main Toll Plaza Toll Collection System Conversion.
1992 (Feb.)	Hampton Ramp Toll Plaza Toll Collection System Conversion.
1992 (Apr. 1)	Dover Toll Plaza Toll Collection System Conversion.
1992 (Jun. 1)	Rochester Toll Plaza Toll Collection System Conversion.
1992 (Aug. 3)	Cheshire Bridge closed for rehabilitation.
1992 (Nov. 14)	Exit 11 Toll Plaza Toll Collection System Conversion.
1993 (Aug. 9)	"Honor System" Toll Collection begins at Cheshire Toll Bridge.
1993 (Jul. 30)	Exit 11 Interchange (Merrimack) completed as part of the Capital Improvement Program.
1993 (Nov. 18)	Gosling Road Interchange on the Spaulding Turnpike opened.
1993 (Dec. 20)	"Honor System" Toll Collection begins at Exit 10 and Exit 12.
1994 (Jun.)	Two seasonal toll lanes added to Hooksett Main Toll Plaza.
1994 (Jun.)	Hampton Main Toll Plaza changed to all-attended operation.
1994 (Nov. 1)	Increased discount in Commercial Charge Program to 50%.
1995 (Jul. 30)	Changes at Hampton Main Toll Plaza adding one reversible lane (replacing standard ACM lane) allowing 10 operational lanes in one direction of travel for the first time.
1995 (Aug. 4)	Initiated Tandem Toll Collection at Hampton Main Toll Plaza.
1995 (Aug. 14)	"Honor System" Toll Collection began at Hooksett Ramp Toll Plaza.
1995 (Aug. 14)	"Bi-directional" Toll Collection began at Rochester Toll Plaza.
1995 (Aug. 14)	"HOV" (High Occupancy Vehicle) Test began at Bedford Toll.
1995 (Oct.)	Reactivated Automatic Toll Lanes at Hampton Main Toll.
1995 (Nov. 1)	Truck charge card discount set at a flat 30% rate.
1996 (May)	Hampton Main Toll Plaza converted to entirely attended operation with all automatic lane equipment taken out of service.
1997 (Jun.)	Expanded Hampton Ramp Toll Plaza from 5 to 7 toll lanes.
1997 (Nov.)	Ended a two-year HOV Test at Bedford Toll Plaza.
2000 (Jul. 19)	Expansion of Dover Toll Plaza complete.

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Description of the New Hampshire Turnpike System

October 23, 2019

Date	Activity
2001 (Jul. 1)	Toll collection ceased at Cheshire Toll Bridge - per legislation.
2002 (Apr. 5)	Rochester Toll Plaza staffing changed back to conventional staffing.
2002	Completed the 5 <sup>th</sup> lane project at the Hampton Toll Plaza on I-95.
2003 (Jul. 23)	Opened an additional lane for the first time at the Hooksett Ramp toll facility.
2003 (Aug. 21)	One-way toll collection test initiated at the Hampton Toll Plaza.
2003 (Nov. 1)	Two-way tolling returns to Hampton Main Toll Plaza for the winter months.
2004 (Jan. 9)	Hampton Ramp Toll Plaza converted to all attended capability.
2004 (Jan. 29)	Two new toll lanes, one north and one south, at Bedford Toll Plaza, were opened to revenue collection.
2004 (Jun. 30)	One-way toll collection reinstated at the Hampton Toll Plaza.
2004 (Oct. 21)	Two-way tolling returns to Hampton Main Toll Plaza.
2005 (Mar.)	Hampton Ramp converted to an all attended plaza just like Hampton Main.
2005 (Apr. 12)	Hooksett Ramp converted back to a 24/7/365 plaza.
2005 (Jul. 11)	The first NH toll facilities to be converted to <b>E-ZPass</b> – Hooksett Main, Hooksett Ramp and Bedford Toll. Cars with NH <b>E-ZPass</b> tags receive a 30% discount from cash (compared to a 50% discount for tokens) and trucks with NH <b>E-ZPass</b> receive a 10% discount from cash (compared to a 30% discount with the Commercial Charge program). Non-New Hampshire <b>E-ZPass</b> tagholders pay the cash rates.
2005 (Jul. 18)	Phase Two of <b>E-ZPass</b> conversion takes place: Merrimack Ramp Toll Plazas (Exits 10, 11 and 12).
2005 (Aug. 2)	Phase Three of <b>E-ZPass</b> deployed at Hampton Main and Hampton Ramp.
2005 (Aug. 3)	The price of transponders increased from \$5.00 to \$23.85 each.
2005 (Aug. 15)	Phase Four of <b>E-ZPass</b> deployed at Dover and Rochester Toll Plazas.
2005 (Sept. 1)	NH Turnpike Token Sales cease per HB 2 of the FY 2006/FY 2007 biennial budget.
2005 (Sept. 26)	Price of transponders increased – from \$23.85 to \$24.61 for flat packs.
2005 (Sept. 30)	Commercial Charge Program ends at 11:59:59. Magnetically encoded card system replaced by <b>E-ZPass</b> .
2006 (Jan. 1)	NH Turnpike Tokens (B) are no longer accepted as valid toll fare payment per state law. Staffed ACM lanes from 1-1 through 1-9-2006 to ensure that motorists were aware that tokens are no longer accepted.

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Description of the New Hampshire Turnpike System

October 23, 2019

Date	Activity
2007 (Oct. 22)	New toll rate implemented at Dover \$0.50-\$0.75; Rochester \$0.50-\$0.75, Hampton Ramp \$0.50-\$0.75; Bedford and Hooksett \$0.75-\$1.00; and Hampton Main \$1.00-\$1.50.
2008 (May 1)	New terms, conditions, application and transponder price change went into effect. Price changed for interior tag from \$24.61 to \$20.95, and exterior tag from \$31.83 to \$33.04.
2008 (Jun. 9 & 16)	Granite Street ramps open to traffic at Exit 5 in Manchester.
2009 (Jun. 30)	HB 391 passes, authorizing the Turnpike Bureau to purchase the 1.6 miles of I-95 from the Portsmouth Traffic Circle to the Maine border, and authorizing the following projects: Hampton Open Road Tolling (“ORT”), Bedford ORT, Hooksett ORT, Portsmouth I-95 Soundwall, Seabrook NH 107 Bridge over I-95 and the Dover segment of the Newington –Dover Projects.
2009 (Jul. 1)	New toll rate implemented at Hampton Main \$1.50 → \$2.00.
2010 (Jun. 17)	ORT lanes opened at Hampton Main plaza, allowing high-speed toll collection for <b>E-ZPass</b> customers.
2011 (Nov. 11)	Manchester Airport Access Road opens, connecting to the Central Turnpike near the Bedford Main plaza. Vehicles using this road avoid all tolls in the Bedford/Merrimack area.
2012 (Apr. 1)	<b>E-ZPass</b> transponder prices changed. Price dropped for interior tag from to \$20.95 to \$8.90, and exterior tag from \$33.04 to \$15.19.
2012 (Jun. 14)	Premium Outlets, with 100 stores and more than 400,000 square feet, opens adjacent to Exit 10 in Merrimack, increasing toll transactions at Exit 10.
2013 (May 22)	ORT lanes opened at Hooksett Main plaza, allowing high-speed toll collection for <b>E-ZPass</b> customers.
2014 (Jul. 18)	Tolls were discontinued at the Bedford Road ramps (Exit 12 of the Central Turnpike).
2015 (May)	Violation cameras installed in cash lanes of NH Turnpike system.
2015 (July 7)	Spaulding Turnpike southbound exit 2 off ramp permanently closed.
2015 (Sept/Nov)	Opening of NHDOT P3 initiative with Granite State Hospitality for a new Hooksett Rest Areas on I93 Northbound and Southbound.
2017 (March)	Management of E-ZPass system transitioned to Cubic.
2017 (March 27)	E-ZPass transponders price change. Price dropped for an interior tag from \$8.90 to \$7.40 and exterior tag from \$15.19 to \$13.49.
2018 (Sept. 4)	Spaulding Turnpike northbound exit 2 on ramp permanently closed.
2019 (July 1)	E-ZPass transponders price change. Price dropped for an interior tag from \$7.40 to \$7.15 and exterior tag from \$13.49 to \$13.24.

## 3.0 HISTORICAL TOLLED TRAFFIC AND GROSS TOLL REVENUES

This section discusses historical traffic and toll revenue trends of the Turnpike System.

### 3.1 HISTORICAL TOLL TRANSACTIONS AND TOLL REVENUE TRENDS

Figure 3.1 illustrates toll transactions and revenue for the entire Turnpike System for FY 1950 through FY 2019. Both toll transaction and revenue graphs show that toll transactions and revenues have increased consistently across the Turnpike System. The graph shows that there were some short periods where toll transactions decreased but later recovered, and these coincide with economic recessions and toll rate increases. Revenues generally increased across the Turnpike System, although the growth was relatively flat for some short time periods. Tolls were last increased system wide in October 2007; the toll increases prior to that were in October 1989 and December 1979. After the 1989 toll increase, both traffic and revenue increased steadily until 2005. In July 2005, **E-ZPass** was implemented on the Turnpike System, and the toll discount was lowered from 50 percent to 30 percent for passenger cars and from 30 percent to 10 percent for commercial vehicles. NHDOT stopped accepting tokens (which provided a 50 percent discount for passenger cars) in January 2006.

The October 2007 toll increase – 25 cents for cars and 50 cents for trucks at most locations – brought about a small decline in traffic but a significant increase in toll revenue. In FY 2009, traffic continued to decrease but revenue increased over the previous year due to the October 2007 toll increase, though some of the traffic decrease could also be attributed to economic conditions, gas prices, and factors that caused traffic levels to flatten, then decrease, throughout the nation (as further discussed in Section 6.1). In 2009 the Hampton Main Plaza's toll increased from \$1.50 to \$2.00 which had little effect on traffic but increased revenues at that location.

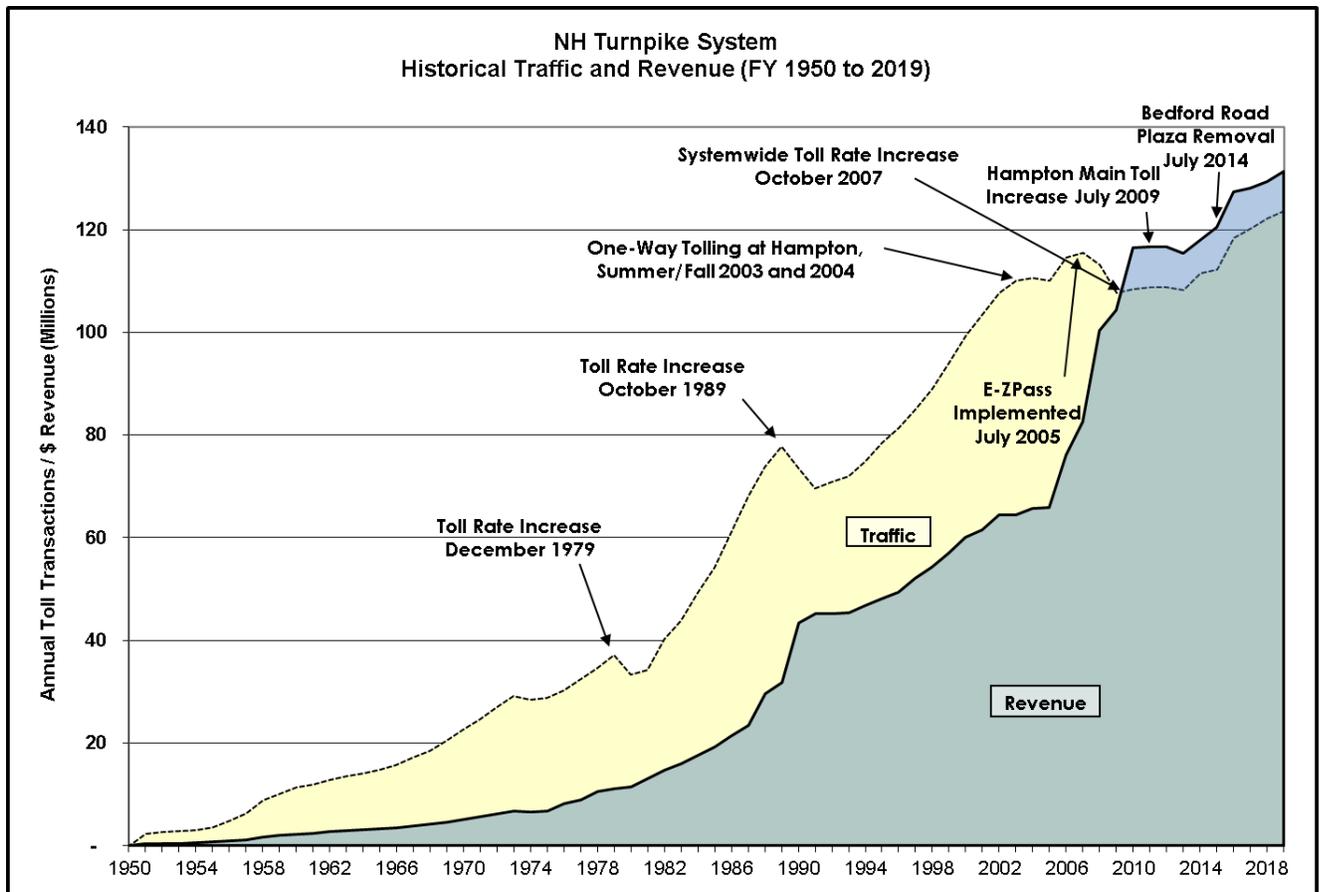
In November 2011 the Manchester Airport Access Road opened adjacent to the Bedford toll plaza. This new exit bypasses the plaza to connect the Central Turnpike and the Manchester Airport. Motivated drivers passing through this section of the Turnpike may also use the interchange to avoid the Bedford plaza entirely (discussed in section 7.2.1). These new untolled paths have caused some losses in traffic and revenue. FY 2013 saw the opening of an outlet mall in Merrimack, which has contributed to most of the growth in traffic observed at Exit 10. In July 2014 – a few weeks into FY 2015 - the Bedford Ramp Toll was discontinued. This slowed apparent systemwide growth in the year after the change, but overall effects have been negligible.

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Historical Tolloed Traffic and Gross Toll Revenues

October 23, 2019

**Figure 3.1: NH Turnpike System Historical Toll Transactions and Toll Revenue Trends Through 2019**



## 3.2 TOLL TRANSACTION TRENDS

Table 3.1 summarizes the annual toll transactions between FY 1991 and FY 2019 for each of the three Turnpikes as well as the entire Turnpike System. Annual toll transactions across the Turnpike System have increased in twenty-three out of the twenty-eight years shown. However, Blue Star Turnpike transactions decreased in both FY 2004 and FY 2005 due to the inability to record southbound traffic data at the Hampton Toll Plaza during the one-way tolling experiments conducted by NHDOT in the Summer/Fall of 2003 and 2004. The diversion caused by the October 2007 toll increase contributed to both the FY 2008 and 2009 decrease in Turnpike traffic, and the Central Turnpike's free interchange with the Manchester Airport Access Road in November 2011 contributed to some toll traffic loss in the Bedford area in FY 2012 and FY 2013. Tolling was discontinued at the Bedford Road Ramps (Exit 12) in July of 2014. This location had averaged 6,500 transactions per day in FY 2014. A small shift in traffic from Exit 11 to the newly untolled Exit 12 was associated with this closure.

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Historical Tolloed Traffic and Gross Toll Revenues

October 23, 2019

**Table 3.1: NH Turnpike System Historical Annual Toll Transactions (in millions)**

Fiscal Year	Central Turnpike	Blue Star Turnpike	Spaulding Turnpike	Total System
1991	32.5	23.4	13.7	69.6
1992	33.2	23.6	14.0	70.8
1993	33.5	24.0	14.5	72.0
1994	34.7	24.8	15.4	74.9
1995	35.9	26.1	16.5	78.5
1996	37.2	27.0	17.2	81.4
1997	38.9	28.1	18.0	85.0
1998	40.6	29.4	19.0	89.0
1999	42.6	31.4	20.0	94.0
2000	45.3	33.2	20.9	99.4
2001	47.6	34.0	22.0	103.6
2002	49.3	35.8	22.6	107.7
2003	50.5	36.4	23.1	110.0
2004 <sup>1</sup>	52.2	34.6	23.8	110.6
2005 <sup>1,2</sup>	53.9	32.2	23.9	110.0
2006 <sup>2</sup>	54.6	36.6	23.3	114.6
2007	54.7	37.4	23.4	115.5
2008 <sup>3</sup>	53.8	36.6	22.8	113.2
2009	51.5	34.7	21.4	107.7
2010 <sup>4</sup>	51.9	35.3	21.1	108.3
2011	52.4	35.3	21.1	108.7
2012 <sup>5</sup>	51.5	35.8	21.5	108.7
2013	50.7	35.8	21.8	108.2
2014	52.2	36.8	22.5	111.5
2015 <sup>6</sup>	51.4	37.7	23.3	112.3
2016	53.8	39.8	24.7	118.4
2017	54.5	40.4	25.3	120.2
2018	55.3	41.1	25.8	122.1
2019 <sup>7</sup>	55.9	41.6	26.2	123.7

<sup>1</sup> One-way tolling at Hampton Main Toll Plaza.

<sup>2</sup> Conversion to new toll system and implementation of **E-ZPass**.

<sup>3</sup> General toll Increase October 22, 2007.

<sup>4</sup> Hampton Main toll Increase July 1, 2009.

<sup>5</sup> Manchester Airport Access Road opened November 2011.

<sup>6</sup> Bedford Road Ramp (Exit 12) Toll Plaza Removed July 2014.

<sup>7</sup> FY2019 are unaudited actuals.

Notes: Non-paying transactions (valid and violations) are included in these numbers.

Data will not necessarily sum to totals due to rounding.

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Historical Tolloed Traffic and Gross Toll Revenues

October 23, 2019

Toll transactions on the individual Turnpikes increased at an average annual rate of 2.0 percent on the Central Turnpike, 2.3 percent on the Spaulding Turnpike, and 2.1 percent on the Blue Star Turnpike during the FY 1991 to FY 2019 time period, for a systemwide growth rate of 2.1 percent.

Historical toll transaction trends between FY 1950 and FY 2019 are illustrated in Figure 3.2 with volumes indexed to FY 1991 values. From this graphic, we can observe that the three general toll rate increases occurred close to periods of economic recessions, and in all cases, toll traffic transactions decreased. Transaction growth also slowed down during the other economic recession periods.

Between FY 1991 and FY 2003, total toll transactions across the entire Turnpike System increased annually by an average of 3.9 percent per year. After that time there was a period of flattened traffic for several years, through about 2007, followed by a 2.0 percent decrease in FY 2008. Traffic continued to decline another 4.9 percent in FY 2009 both as a result of the mid-FY 2008 toll increase and the economic downturn. This was followed by low growth rates of 0.6 percent in FY 2010 and 0.4 percent in FY 2011. There was no overall growth from FY 2011 to FY 2012, mainly due to a shift in traffic to the free Manchester Airport Access Road (MAAR) interchange on the Central Turnpike. FY 2013 had a slight decrease in traffic of 0.4 percent with more Central Turnpike traffic shifting to the free MAAR interchange, while FY 2014 saw some recovery with 3.0 percent growth in toll transactions.

Traffic growth has been moderate since FY 2014. The Central Turnpike saw a 1.6 percent decrease in transactions after the removal of the Bedford Road Ramp plaza. FY 2016 saw strong growth across all Turnpikes, with a system-wide growth of 5.4 percent. The past two years have seen growth stabilize to approximately 1.5 percent per year.

# NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

## Historical Tolled Traffic and Gross Toll Revenues

October 23, 2019

**Figure 3.2: NH Turnpike System Historical Toll Transaction Trends Through 2019**

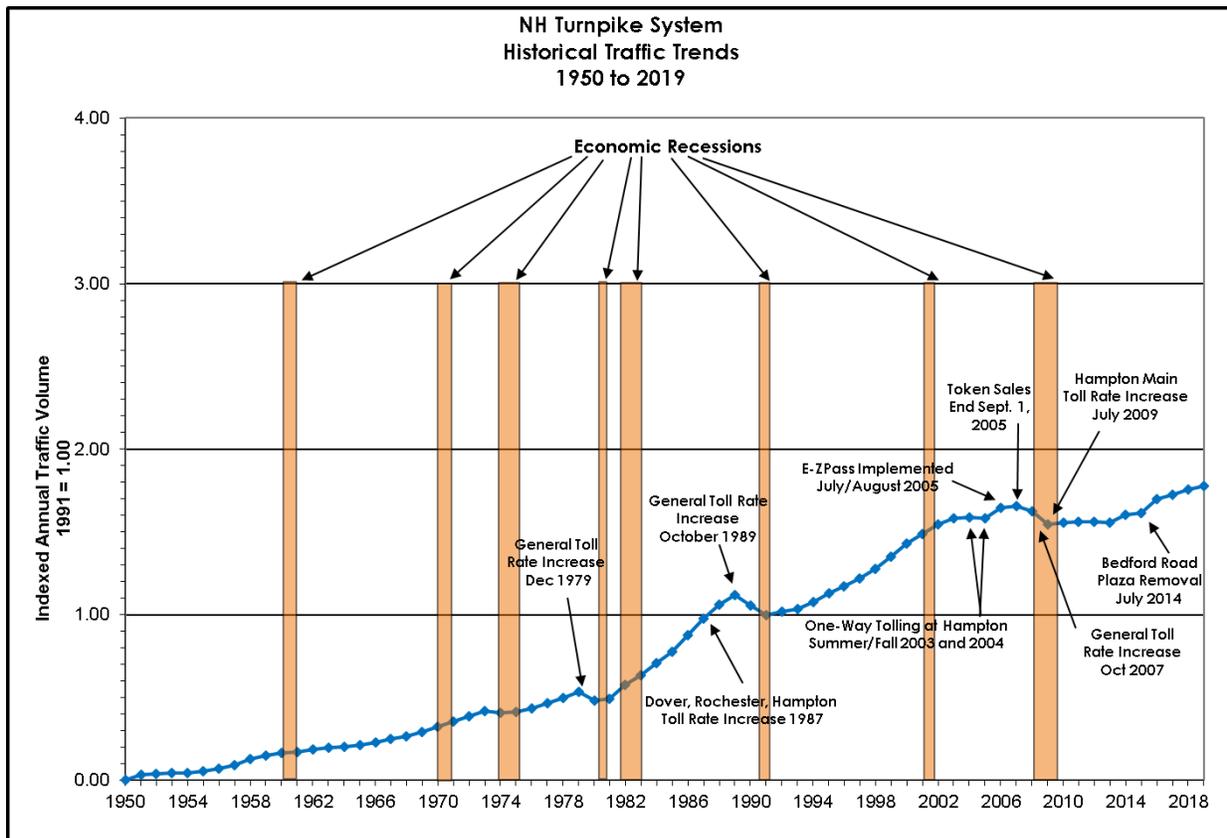


Figure 3.3 through Figure 3.5 show the historical toll transaction trends for cars and trucks on each of the three Turnpikes for the FY 1991-2018 period. (Actuals detailed by vehicle class for FY 2019 were not finalized at the publishing of this analysis.) The three Turnpikes exhibited similar patterns in car traffic, growing steadily from FY 1991 through the early 2000s, followed by flat growth in FY 2006 and 2007 and declines in FY 2009 and 2010. Annual traffic between FY 2010 and FY 2013 remained virtually unchanged, but during FY 2014-2018 grew to levels exceeding previous highs seen in FY 2005.

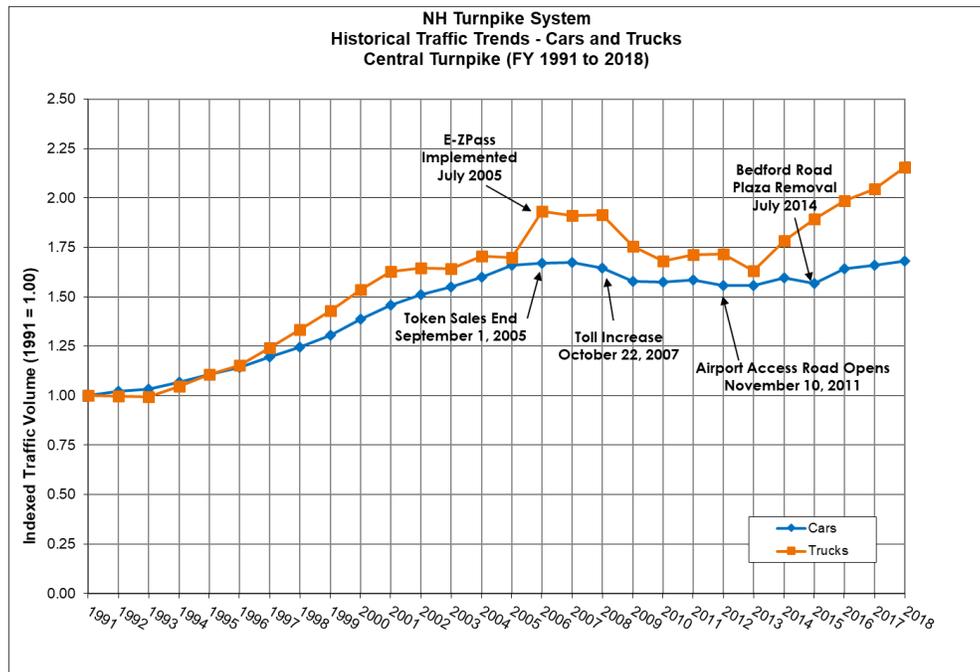
The Central and Spaulding Turnpikes, both serving more local than long-distance traffic, had flat-to-declining truck growth in 2006 through 2008, while the Blue Star Turnpike – more of a long-haul route – saw increasing truck traffic from FY 2006 through 2008. All three facilities saw a decline in truck traffic in FY 2009 and FY 2010 due to the downturn in the economy and FY 2008 toll increases. Similar to the car traffic, the truck traffic changed very little between FY 2010 and FY 2013, except at the Central Turnpike which saw some traffic loss due to the free MAAR interchange. Promising growth in truck transactions was seen in FY 2014-2016 on all three Turnpikes, with an average annual growth rate of 5.7 percent. Growth faltered in FY 2018, particularly among cars, leaving the overall annual passenger car transaction total 0.2 percent below the 2017 totals.

# NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

## Historical Tolloed Traffic and Gross Toll Revenues

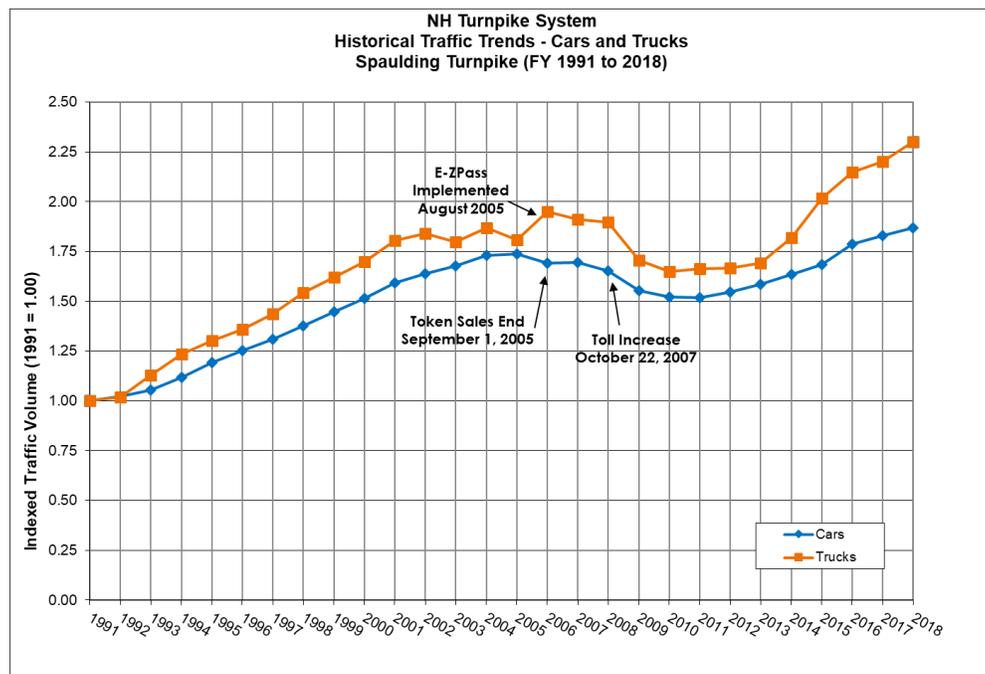
October 23, 2019

**Figure 3.3: Central Turnpike Historical Car and Truck Trends, FY 1991-2018\***



\*Most recently available audited actuals.

**Figure 3.4: Spaulding Turnpike Historical Toll Car and Truck Trends, FY 1991-2018\***



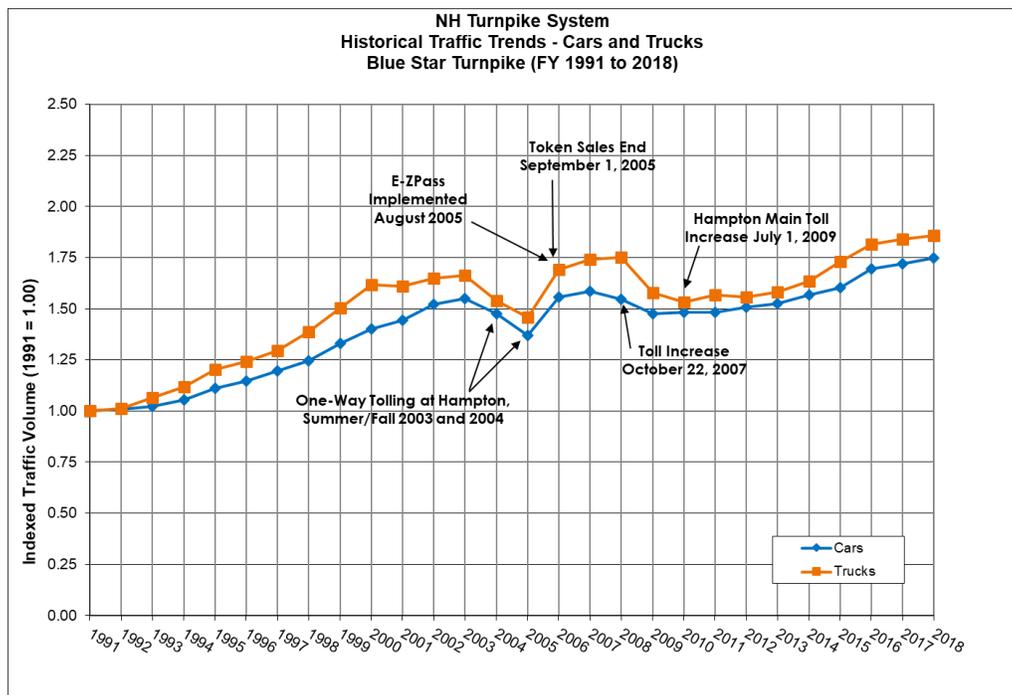
\*Most recently available audited actuals.

# NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

## Historical Tolloed Traffic and Gross Toll Revenues

October 23, 2019

**Figure 3.5: Blue Star Turnpike Historical Toll Car and Truck Trends, FY 1991-2018\***



\*Most recently available audited actuals.

### 3.3 TOLL REVENUE TRENDS

Annual toll revenues for each of the three Turnpikes as well as the entire system are summarized in Table 3.2 for the period FY 1991 to FY 2019.

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Historical Tolloed Traffic and Gross Toll Revenues

October 23, 2019

**Table 3.2: NH Turnpike System Historical Annual Toll Revenues (in millions)**

Fiscal Year	Central Turnpike	Blue Star Turnpike	Spaulding Turnpike	Total System
1991	\$18.9	\$20.8	\$5.5	\$45.3
1992	\$18.9	\$20.7	\$5.5	\$45.2
1993	\$18.8	\$20.8	\$5.7	\$45.4
1994	\$19.5	\$21.4	\$6.0	\$46.9
1995	\$19.8	\$22.2	\$6.2	\$48.1
1996	\$20.4	\$22.5	\$6.4	\$49.3
1997	\$21.6	\$23.8	\$6.7	\$52.2
1998	\$22.5	\$24.8	\$7.1	\$54.3
1999	\$23.6	\$26.1	\$7.4	\$57.1
2000	\$25.0	\$27.5	\$7.7	\$60.2
2001	\$26.0	\$27.5	\$8.0	\$61.5
2002	\$27.5	\$28.6	\$8.2	\$64.4
2003	\$27.3	\$28.7	\$8.4	\$64.4
2004 <sup>1</sup>	\$28.1	\$29.1	\$8.6	\$65.8
2005 <sup>1,2</sup>	\$28.7	\$28.4	\$8.8	\$65.9
2006 <sup>2</sup>	\$33.6	\$32.3	\$10.1	\$76.0
2007	\$36.7	\$34.8	\$11.1	\$82.6
2008 <sup>3</sup>	\$42.9	\$43.4	\$14.1	\$100.3
2009	\$43.5	\$46.3	\$14.7	\$104.4
2010 <sup>4</sup>	\$44.0	\$58.1	\$14.5	\$116.6
2011	\$44.2	\$58.2	\$14.4	\$116.7
2012 <sup>5</sup>	\$43.3	\$58.8	\$14.6	\$116.6
2013	\$41.9	\$58.8	\$14.7	\$115.4
2014	\$43.2	\$59.6	\$15.1	\$117.9
2015 <sup>6</sup>	\$43.7	\$61.0	\$15.7	\$120.4
2016	\$46.1	\$64.7	\$16.7	\$127.5
2017	\$46.3	\$65.0	\$16.9	\$128.1
2018	\$46.9	\$65.3	\$17.2	\$129.4
2019 <sup>7</sup>	\$47.7	\$67.6	\$17.7	\$132.9

<sup>1</sup> One-way tolling at Hampton Main Toll Plaza.

<sup>2</sup> Conversion to new toll system and implementation of **E-ZPass**.

<sup>3</sup> General toll Increase October 22, 2007.

<sup>4</sup> Hampton Main toll Increase July 1, 2009.

<sup>5</sup> The free Manchester Airport Access Road interchange on the Central Turnpike opened November 11, 2011.

<sup>6</sup> Bedford Road Ramp (Exit 12) Toll Plaza Removed July 2014.

<sup>7</sup> FY2019 unaudited actuals.

Notes: This table shows the historical toll revenues recorded on a cash basis.

FY 1991-2006 reported figures are derived from the Turnpike System's internal, monthly traffic and revenue report, which is prepared from information from the Turnpike System's **E-ZPass** and toll collection system vendors and does not include other income such as property sales.

Fiscal Years 2006-2011 figures are derived from the Turnpike System's internal accounting system and do not include property sales or other income.

Data will not necessarily add to totals because of rounding.

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Historical Tolled Traffic and Gross Toll Revenues

October 23, 2019

The table shows that annual toll revenues across the Turnpike System have increased in twenty-three out of the twenty-seven years in the period shown. The first large increase in toll revenues occurred between FY 2005 and FY 2006 due to the implementation of **E-ZPass** on the Turnpike System and discontinuation of token usage, which coincided with a decrease in the toll discount rate. In FY 2008, there was another significant increase in revenues - \$17.7 million or 21.4 percent over FY 2007— due to the October 2007 toll increase, and FY 2009 also saw a revenue increase of 4.1 percent due to this toll increase. The July 1, 2009 toll increase at the Hampton Main Plaza increased systemwide revenue by 11.6 percent in FY 2010 compared to the previous year. There was little change in total system revenue between FY 2010 and FY 2012, however, some losses were seen in FY 2012 and FY 2013 on the Central Turnpike due to the opening of the Manchester Airport Access Road on November 11, 2011 and the following shift in traffic from the Bedford area toll plazas to this free interchange. This reduced systemwide toll revenues for those two years. As the economy started improving, FY 2014 saw 2.2 percent revenue growth over FY 2013. FY 2016 was a particularly strong year of revenue growth, with a total increase of 5.9 percent. Recent years have been considerably weaker with 0.5 percent growth in FY 2017 and 1.0 percent growth in FY 2018. However it appears growth in FY 2019 recovered with a 2.7 percent annual growth rate.

Between FY 1991 and FY 2019, toll revenues increased annually by an average of 3.9 percent per year across the entire Turnpike System. The individual Turnpikes experienced annual revenue growth rates of 3.4 percent on the Central Turnpike, 4.3 percent on the Spaulding Turnpike, and 4.3 percent on the Blue Star Turnpike.

Figure 3.6 shows historical annual toll revenues between FY 1950 and FY 2019. This graphic shows that total system wide toll revenues showed little to no growth during most periods of economic recession. The exceptions were the economic recession in the early 1980s when revenue actually increased, and the recent recession, due to the general toll increase in October 2007 and the Hampton Main toll increase in July 2009. Even after the official end of the recent recession, toll revenue remained flat for several years. However, the improving economy is finally leading to some traffic growth, on the New Hampshire Turnpike System and on a nationwide basis, which experienced toll revenue growth from FY 2014 through FY 2019.

# NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

## Historical Tolerated Traffic and Gross Toll Revenues

October 23, 2019

Figure 3.6: NH Turnpike System Historical Toll Revenues Through 2019

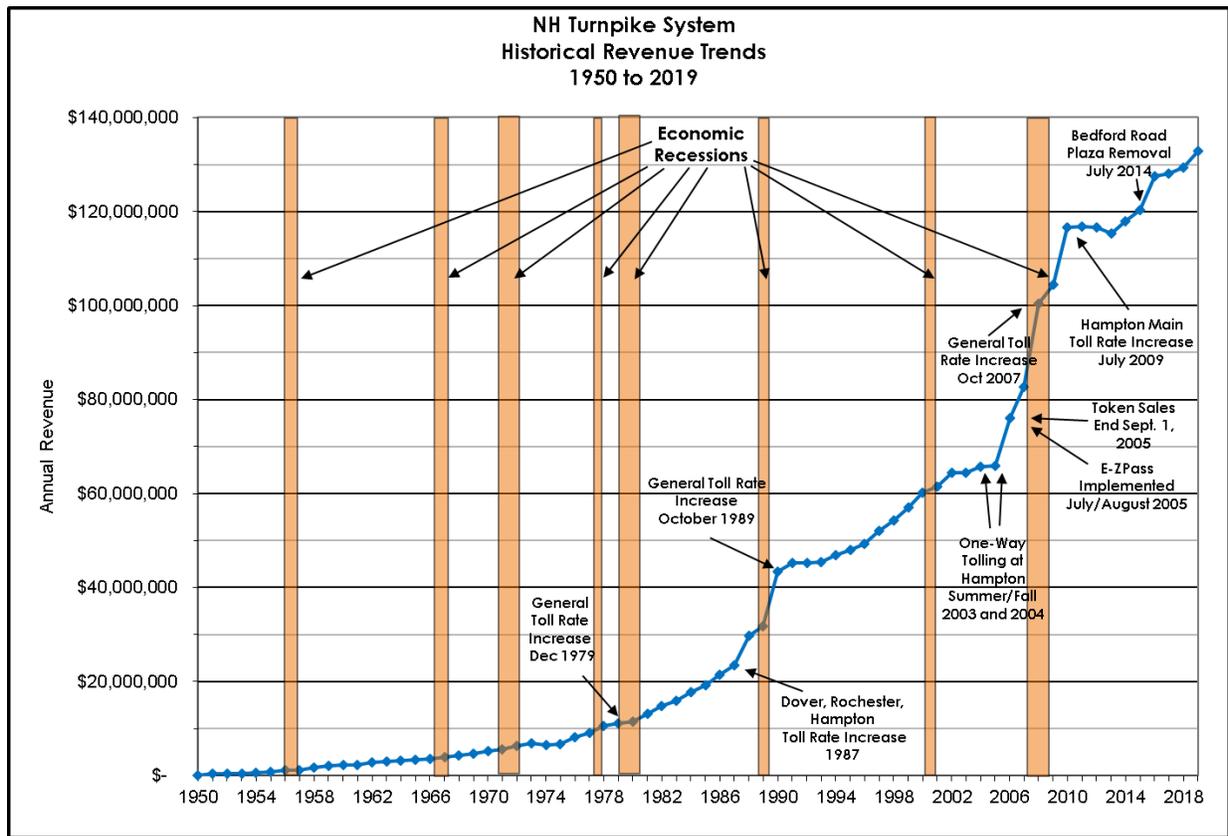


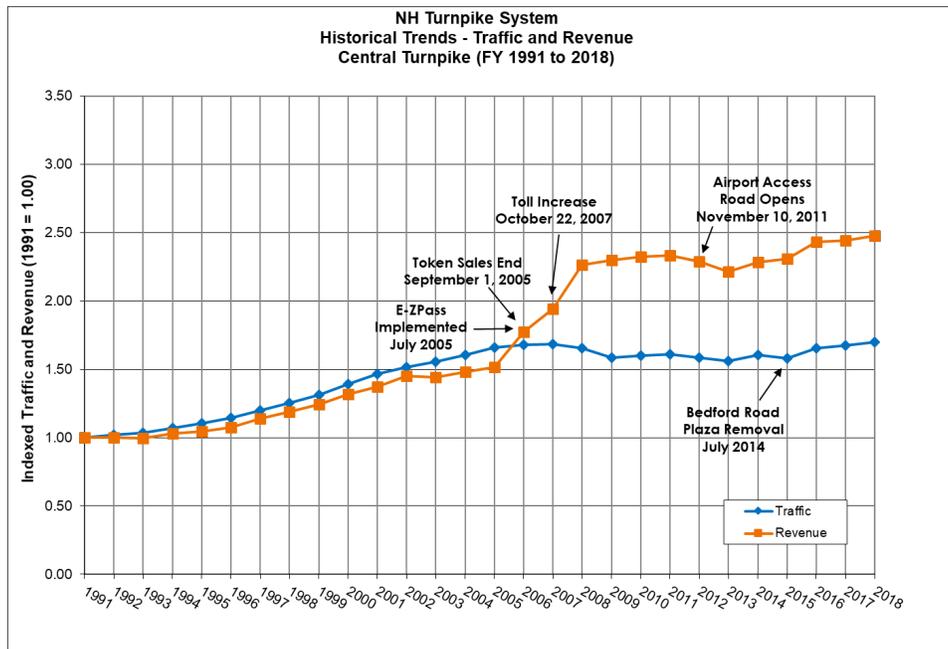
Figure 3.7 through Figure 3.9 show historical toll transaction and revenue trends for each of the three Turnpikes for the FY 1991 to FY 2018 period. Through about FY 2005, total toll revenue generally increased consistently on each Turnpike, with a small decrease on the Blue Star Turnpike in FY 2005. Also, toll revenues on the Blue Star Turnpike experienced very little growth between FY 2002 and FY 2005, due in part to the one-way tolling experiment. In FY 2005/2006 through FY 2007, all three Turnpikes experienced a flattening and then a decline in traffic after the October 2007 toll increase. After FY 2009 traffic has remained nearly flat on all three Turnpikes until FY 2014, when it increased by three percent over FY 2013. Toll revenues grew at a greater rate than usual in the past decade due to **E-ZPass** implementation and the end of token sales in FY 2006 (increasing the tolls for discounted trips), the October 2007 systemwide toll increase, and the July 2009 Hampton Main toll increase. The recovering traffic growth in FY 2014 increased total toll revenue by 2.2 percent. Toll revenue growth has suffered comparatively greater stagnation than traffic growth in recent years, with revenues growing by 0.5 percent and 1.0 percent in 2017 and 2018, respectively.

# NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

## Historical Tolerated Traffic and Gross Toll Revenues

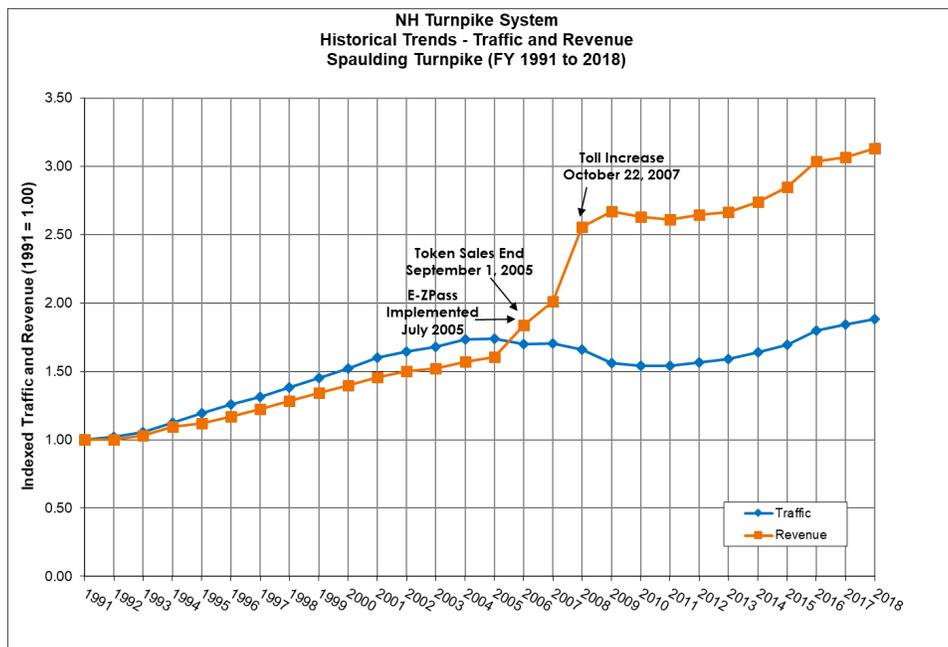
October 23, 2019

**Figure 3.7: Central Turnpike Historical Toll Transaction and Revenue Trends, 1991-2018\***



\*Most recently available audited actuals.

**Figure 3.8: Spaulding Turnpike Historical Toll Transaction and Revenue Trends, 1991-2018\***



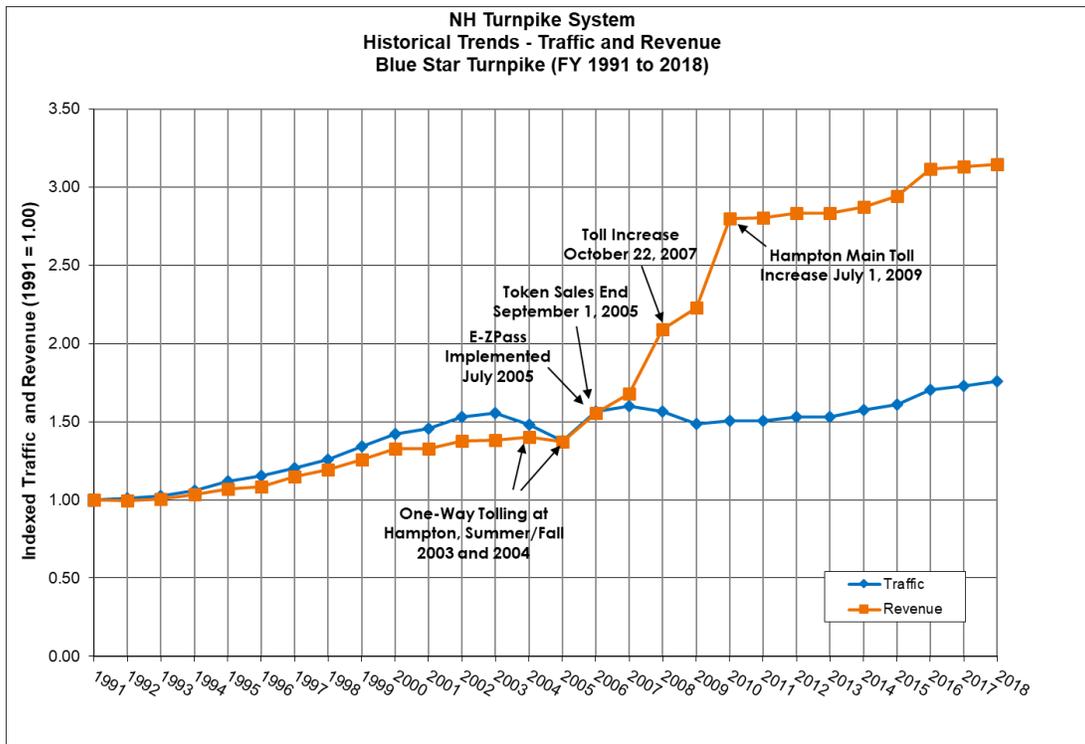
\*Most recently available audited actuals.

# NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

## Historical Tolerated Traffic and Gross Toll Revenues

October 23, 2019

**Figure 3.9: Blue Star Turnpike Historical Toll Transaction and Revenue Trends, 1991-2018\***



\*Most recently available audited actuals.

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Historical Tolled Traffic and Gross Toll Revenues

October 23, 2019

### 3.4 COMPARISON OF ACTUAL TOLL REVENUES TO RECENT PROJECTIONS

Jacobs Engineering conducted a traffic and revenue study for the Turnpike System in 2015, and subsequently updated it in December of 2016. Table 3.3 compares Jacobs's projections against the actual toll revenues collected by the Turnpike System for the fiscal years 2017 through 2019. Jacobs's 2016 projections slightly overestimated the actual revenue collected in two of these three years. The 2017 estimate was over by 1.2 percent, 2018 by 1.4 percent, and 2019 was on target. These differences are within the range of expected tolerances.

**Table 3.3: Actual Toll Revenues vs. December 2016 Projections, Millions**

Fiscal Year	December 2016 Projected Revenue	Actual Revenue	Percent Difference Actual vs. Projected
2017	\$129.6	\$128.1	-1.2%
2018	\$131.3	\$129.4	-1.4%
2019 <sup>1</sup>	\$132.9	\$132.9	0.0%

<sup>1</sup> FY2019 unaudited actuals.

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Review of Proposed Capital Improvement Program

October 23, 2019

## 4.0 REVIEW OF PROPOSED CAPITAL IMPROVEMENT PROGRAM

This section presents a review of the Turnpike System's historical and proposed capital improvement program for the period FY 2008-2029 as shown in Table 4.1.

**Table 4.1: 2008 – 2029 Historical and Proposed NHDOT Capital Expenditures, Millions**

Fiscal Year	Central Turnpike	Blue Star Turnpike	Spaulding Turnpike	Other Projects <sup>1</sup>	Total Turnpike
2008	\$0.4	\$0.2	\$7.4	\$3.1	\$11.1
2009	\$6.5	\$0.2	\$18.5	\$0.9	\$26.1
2010	\$9.7	\$11.8	\$42.0	\$2.9	\$66.4
2011	\$7.3	\$4.5	\$39.9	\$1.2	\$52.7
2012	\$12.5	\$1.0	\$32.7	\$0.7	\$46.9
2013	\$27.3	\$5.0	\$32.4	\$5.5	\$70.2
2014	\$21.2	\$2.4	\$20.4	\$5.9	\$49.7
2015	\$14.5	\$0.8	\$13.6	\$3.0	\$31.8
2016	\$10.3	\$4.9	\$26.3	\$0.4	\$42.0
2017	\$6.7	\$2.8	\$22.6	\$0.0	\$32.1
2018	\$3.5	\$3.3	\$20.8	-	\$27.5
<b>Total '08-'18</b>	<b>\$119.7</b>	<b>\$36.8</b>	<b>\$276.4</b>	<b>\$23.5</b>	<b>\$456.6</b>
2019	\$2.5	-	\$17.2	\$1.4	\$21.1
2020	\$14.0	-	\$19.9	-	\$33.9
2021	\$18.8	-	\$30.8	-	\$49.6
2022	\$46.7	-	\$14.7	-	\$61.4
2023	\$52.8	-	\$10.3	-	\$63.1
2024	\$50.3	-	\$ 6.9	-	\$57.2
2025	\$58.7	-	-	-	\$58.7
2026	\$47.6	-	-	-	\$47.6
2027	\$51.2	-	-	-	\$51.2
2028	\$63.4	-	-	-	\$63.4
2029	\$42.5	-	-	-	\$42.5
<b>Total '19-'29</b>	<b>\$448.5</b>	<b>-</b>	<b>\$99.8</b>	<b>\$1.4</b>	<b>\$549.7</b>

<sup>1</sup> Miscellaneous Turnpike System Projects funded with Federal Aid and matched with Turnpike funds, and/or Systemwide projects.

Notes:

Central Turnpike Projects include: Bow-Concord I-93 Widening, Manchester Exit 6 & 7 Interchange Improvements, Bedford ORT, and Nashua-Bedford Turnpike widening.

Completed Blue Star Turnpike Projects include: I-95 Bridge over the Taylor River.

Spaulding Turnpike Projects include: Newington-Dover Exit 6 reconstruction, General Sullivan Bridge Rehabilitation, Maintenance Facility Construction, and Improvements at Dover & Rochester Toll Plazas.

Data will not necessarily add to totals because of rounding.

This table is based on cash basis (not accrual).

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Review of Proposed Capital Improvement Program

October 23, 2019

Over the eleven-year period FY 2008–FY 2018, Turnpike System-funded capital expenditures totaled \$456.4 million. The largest share of this - \$276.4 million - was spent on Spaulding Turnpike projects. Funding sources for these projects include toll revenues, other Turnpike System revenues and Turnpike System bond proceeds. Total Turnpike system capital expenditures are programmed at a total of ~~\$552.8~~ million over the FY 2019–FY 2029 period.

After the completion of the Turnpike expansion in Nashua in the late 1990s, the ten-year capital improvement program had few major projects with the exception of the implementation of E-ZPass and the construction of the Granite Street interchange in Manchester. The toll rate increase in 2007, the first since 1989, allowed the capital improvement program to move forward with the expansion of the Spaulding Turnpike in Rochester along with improvement projects such as addressing red-listed bridges and improving safety and congestion on the Turnpike System.

Eighty-two percent of Turnpike System capital expenditures over the next eleven years will be for projects on the Central Turnpike, including reconstruction of Exits 6 and 7, roadway widening from Exit 8 in Nashua to I-293 in Bedford, and Bow-Concord I-93 widening project. Ongoing capital expenditures on the Spaulding Turnpike include the Exit 6 interchange reconstruction, General Sullivan Bridge Rehabilitation, and Dover & Rochester Toll Plaza improvements. No major capital improvement projects are planned for the Blue Star Turnpike at this time.

## 5.0 REVIEW OF HISTORICAL AND PROJECTED OPERATION, MAINTENANCE, RENEWAL AND REPLACEMENT, AND DEBT SERVICE EXPENDITURES

This section presents a review of historical and projected Turnpike System operational expenditures that consist of administrative costs, toll operations costs, maintenance costs, state police enforcement costs, welcome centers and rest areas, renewal and replacement (R&R) costs, toll processing costs, and conversion to all-electronic tolling on the Spaulding Turnpike. It also includes a review of the Turnpike System's historical and projected debt service expenditures.

Administrative costs include administrative salaries, benefits, expenses, equipment, indirect costs, cleaning, utilities, travel costs, audit expenses, and payments to other state agencies or DOT Bureaus for services.

Toll operations costs include toll operations salaries, benefits, expenses, utilities, toll system warranty, equipment and travel costs.

Maintenance costs include maintenance salaries, benefits, expenses, rents and lease costs, utilities, equipment and travel costs.

Renewal and replacement costs are related to construction projects to preserve, maintain and upgrade the existing infrastructure (i.e., paving, signing, guardrail, bridge rehabilitation, building and toll plaza repairs, bridge painting, etc.).

Toll processing costs include banking and credit card fees, **E-ZPass**-related costs (customer service center expenses, walk-in center expenses, Interagency Group (IAG) organizational dues, violation processing expenses, and vehicle registration look-up fees), toll system maintenance expenses through a vendor, and transponder purchases and replacement.

### 5.1 TOLL PROCESSING COSTS

Table 5.1 summarizes historical and projected NHDOT toll processing expenses for the period FY 2008 through FY 2029.

The majority of Toll Processing costs go to funding the **E-ZPass** customer service center (CSC). These costs have steadily increased over the past eleven years, rising from \$4.3 million in 2008 to a high of \$6.9 million in 2017, driving the net increase in total processing costs over the same period.

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Review of Historical and Projected Operation, Maintenance, Renewal and Replacement, and Debt Service Expenditures

October 23, 2019

**Table 5.1: FY 2008 – 2029 Historical and Forecasted Toll Processing Costs, Millions**

Fiscal Year	E-ZPass CSC Costs	Toll Maintenance Costs	E-ZPass Transponder Expenses	Total Toll Processing Costs
2008	\$4.3	\$1.0	\$0.8	\$6.1
2009	\$5.1	\$1.3	\$0.7	\$7.1
2010	\$5.3	\$1.6	\$0.8	\$7.7
2011	\$5.8	\$1.8	\$0.8	\$8.4
2012	\$5.3	\$1.4	\$0.8	\$7.5
2013	\$5.0	\$1.3	\$0.5	\$6.8
2014	\$5.9	\$0.8	\$0.6	\$7.3
2015	\$6.4	\$1.7	\$0.6	\$8.7
2016	\$6.9	\$1.2	\$1.1	\$9.2
2017	\$6.9	\$1.5	\$0.8	\$9.2
2018	\$6.3	\$2.1	\$0.8	\$9.2
<b>Total '08-'18</b>	<b>\$63.2</b>	<b>\$15.7</b>	<b>\$8.3</b>	<b>\$87.2</b>
2019 <sup>1</sup>	\$6.8	\$1.9	\$0.8	\$9.5
2020 <sup>2,3</sup>	\$15.6	\$2.5	\$0.5	\$18.6
2021 <sup>3</sup>	\$12.1	\$5.8	\$0.5	\$18.4
2022 <sup>4</sup>	\$13.7	\$4.4	\$0.5	\$18.6
2023	\$14.0	\$2.6	\$0.5	\$17.1
2024	\$14.3	\$2.7	\$0.5	\$17.5
2025	\$14.6	\$2.7	\$0.5	\$17.8
2026	\$14.9	\$2.8	\$0.5	\$18.2
2027	\$15.4	\$2.8	\$0.5	\$18.7
2028	\$16.0	\$2.9	\$0.5	\$19.4
2029	\$16.4	\$2.5	\$0.5	\$19.4
<b>Total '19-'29</b>	<b>\$153.8</b>	<b>\$33.6</b>	<b>\$5.8</b>	<b>\$193.2</b>

Note: Historical and forecasted data from NHDOT, and may not necessarily add to totals because of rounding.

<sup>1</sup> 2019 actual values.

<sup>2</sup> Increases in E-ZPass CSC costs are due to increases in E-ZPass accounts and invoice/violations transactions, increases in credit card rates under the new Merchant of Record, increases in postage rates especially for transponders, cost of additional customer's correspondence notification, and cost of new system design deliverables.

<sup>3</sup> Increases in Toll Maintenance Costs attributed to the future advertisement of a Lane System RFP as the existing contract is expiring and upgrades to lane system equipment are necessary.

<sup>4</sup> Values reflect impact of AET implementation at Dover and Rochester in FY 2022.

NHDOT estimates that approximately \$196 million will be spent on toll processing between FY 2019 and FY 2029, with E-ZPass customer service center costs accounting for \$156.7 million or 80 percent of that total. Future transponder purchases are forecasted at \$0.5 million per year beginning in FY2020, yielding a total of \$5.8 million over the eleven-year period. NHDOT recovers the transponder expenses by selling the transponder to the customer at cost. The Bureau has decreased the price of transponders twice in recent years, as shown in Table 5.2.

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Review of Historical and Projected Operation, Maintenance, Renewal and Replacement, and Debt Service Expenditures

October 23, 2019

**Table 5.2 E-ZPass Tag Price History**

Time Period	Interior Tag	Exterior Tag
Prior	\$8.90	\$15.19
3/27/17 to 7/1/19	\$7.40	\$13.49
7/1/19 to present	\$7.15	\$13.24

## 5.2 OPERATING EXPENDITURES

Table 5.3 summarizes historical and projected NHDOT expenses for the period FY 2008 through FY 2029.

**Table 5.3: FY 2008 – 2029 Historical and Forecasted NHDOT Operating Expenditures, Millions**

FY	Existing Operating Expenditure	Dover & Rochester AET Savings	State Police Enforcement	Toll Processing	Welcome Centers & Rest Areas	Tpk Funding of DOT-Hwy	O&M Lapse	Total O&M	Existing R&R Program	I-95 Payments from	I-95 Advance Payment	Additional R&R	Total Operating Expense
2008	\$24.9		\$5.2	\$6.1	\$0.0	\$0.9	\$0.0	\$37.1	\$11.8	\$0.0	\$0.0	\$0.0	\$48.9
2009	\$26.6		\$5.4	\$7.1	\$0.0	\$1.2	\$0.0	\$40.3	\$7.8	\$0.0	\$0.0	\$0.0	\$48.1
2010	\$26.3		\$5.0	\$7.7	\$0.0	\$1.1	\$0.0	\$40.1	\$7.8	\$30.0	\$0.0	\$0.0	\$77.9
2011	\$28.0		\$4.9	\$8.4	\$0.0	\$1.0	\$0.0	\$42.3	\$14.3	\$20.0	\$0.0	\$0.0	\$76.6
2012	\$25.5		\$4.9	\$7.5	\$1.2	\$1.6	\$0.0	\$40.7	\$9.2	\$26.0	\$0.0	\$0.0	\$75.9
2013	\$26.8		\$5.5	\$6.8	\$1.2	\$1.9	\$0.0	\$42.2	\$9.6	\$5.9	\$20.1	\$0.0	\$77.8
2014	\$25.8		\$5.8	\$7.3	\$1.2	\$2.4	\$0.0	\$42.5	\$11.3	\$5.9	\$9.1	\$0.0	\$68.8
2015	\$26.6		\$6.3	\$8.7	\$1.0	\$1.8	\$0.0	\$44.4	\$8.2	\$5.9	\$8.3	\$0.0	\$66.8
2016	\$24.1		\$7.2	\$9.2	\$0.9	\$1.6	\$0.0	\$43.0	\$7.9	\$0.4	\$0.0	\$0.0	\$51.3
2017	\$28.8		\$8.7	\$9.2	\$0.9	\$2.3	\$0.0	\$49.9	\$9.3	\$0.0	\$0.0	\$0.0	\$59.2
2018	\$27.9		\$8.2	\$9.2	\$1.0	\$2.3	\$0.0	\$48.6	\$8.7	\$0.0	\$0.0	\$0.0	\$57.3
<b>Total '09-'18</b>	<b>\$291.3</b>	<b>\$0.0</b>	<b>\$67.1</b>	<b>\$87.2</b>	<b>\$7.4</b>	<b>\$18.1</b>	<b>\$0.0</b>	<b>\$471.1</b>	<b>\$105.9</b>	<b>\$94.1</b>	<b>\$37.5</b>	<b>\$0.0</b>	<b>\$708.6</b>
2019 <sup>1</sup>	\$22.9		\$8.4	\$9.5	\$1.0	\$2.3	\$0.0	\$44.1	\$14.3				\$58.4
2020	\$35.6		\$8.6	\$18.6	\$1.1	\$2.5	-\$3.0	\$63.3	\$10.9			\$25.4	\$99.6
2021	\$35.4		\$8.7	\$18.4	\$1.2	\$2.5	-\$3.0	\$63.2	\$12.0			\$10.3	\$85.5
2022 <sup>2</sup>	\$35.4	-\$2.1	\$8.9	\$18.6	\$1.2	\$2.5	-\$3.0	\$61.6	\$13.2			\$0.7	\$75.5
2023	\$36.1	-\$2.1	\$9.1	\$17.1	\$1.2	\$2.6	-\$3.0	\$61.0	\$14.4				\$75.4
2024	\$36.8	-\$2.2	\$9.3	\$17.5	\$1.2	\$2.6	-\$3.0	\$62.2	\$13.3				\$75.5
2025	\$37.6	-\$2.2	\$9.5	\$17.8	\$1.3	\$2.7	-\$3.0	\$63.6	\$13.6				\$77.2
2026	\$38.3	-\$2.3	\$9.6	\$18.2	\$1.3	\$2.7	-\$3.0	\$64.9	\$13.8				\$78.7
2027	\$39.1	-\$2.3	\$9.8	\$18.7	\$1.4	\$2.8	-\$3.0	\$66.5	\$14.1				\$80.6
2028	\$39.9	-\$2.4	\$10.0	\$19.4	\$1.4	\$2.8	-\$3.0	\$68.1	\$14.4				\$82.5
2029	\$40.7	-\$2.4	\$10.2	\$19.4	\$1.4	\$2.9	-\$3.0	\$69.2	\$14.7				\$83.9
<b>Total '19-'29</b>	<b>\$397.7</b>	<b>-\$18.0</b>	<b>\$102.2</b>	<b>\$193.2</b>	<b>\$13.8</b>	<b>\$28.8</b>	<b>-\$30.0</b>	<b>\$687.6</b>	<b>\$148.6</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$36.4</b>	<b>\$872.6</b>

<sup>1</sup> Values are 2019 unaudited actuals, not model forecasts. Reduction of Existing Operating Expenditures from FY 2018 to FY 2019 is primarily due to a decrease of approximately \$4.8M in pension and other post-employment benefits.

<sup>2</sup> Values reflect impact of AET implementation in FY 2022.

The dollar values shown are tabulated on a cash basis. All numbers are tied to the Operating and Maintenance Report (Bureau of Turnpikes), except for certain financial categories which tie to the Comprehensive Annual Financial Reports. Data will not necessarily add to totals because of rounding.

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Review of Historical and Projected Operation, Maintenance, Renewal and Replacement, and Debt Service Expenditures

October 23, 2019

The Turnpike System's total annual operating expenditures (Operating and Maintenance, Renewal and Replacement, and I-95 Payments Costs) over the past eleven years ranged from a low of \$48.1 million in FY 2009 to a high of \$77.9 million in FY 2010. FY 2018 operating expenditures were \$57.3 million. Total operating expenditures amounted to \$708.6 million over the eleven-year period FY 2008-2018. About 41 percent of that total, \$291.3 million, was spent on existing operating expenditures, and \$87.2 million, roughly 12 percent, was spent on Toll Processing. Payments from the Bureau of Turnpikes' General Reserve Fund for the acquisition of a portion of I-95 into the Blue Star Turnpike greatly increased overall expenses in fiscal years 2010-2013. As this payment became smaller in FY 2014, total operating expenses declined by \$9.0 million or 12 percent from FY 2013 to FY 2014.

Total operating expenditures for the period FY 2019-2029 are projected to total \$872.6 million, about 23 percent higher than the expenditures of the previous eleven-year period. Factors that contribute to this projected increase include increased costs of toll operations, maintenance, and toll processing - in addition to background inflation. Toll processing costs in particular greatly increase from 2019-2029 compared to previous years – projected to more than double from \$87.2 million to \$193.2 million over the coming eleven years. This is due to the growth of E-ZPass accounts, invoice/violation transactions, increased credit card costs and increases in transactions, postage cost, and the implementation of AET in Dover and Rochester and new lane system.

Operation and maintenance expenditures are budgeted to provide for unforeseen costs. The amount not spent - the lapse - is shown in Table 5.4 over the twelve-year period from FY 2008 through 2019. The lapse has ranged from \$4.6 million in FY 2017 to \$11.8 million in FY 2018. Of these funds, Turnpike System renewal and replacement funds are carried forward to the following year; all other lapses for operating expenses return to retained earnings or the Bureau of Turnpikes' General Reserve Account.

**Table 5.4: FY 2008 – 2019 Historical Lapse**

FY	Lapse	Transfer from Retained Earnings	Net
2008	\$5,008,397	-	\$5,008,397
2009	\$4,736,858	-	\$4,736,858
2010	\$6,048,295	-	\$6,048,295
2011	\$8,367,782	\$27,500	\$8,340,282
2012	\$6,088,130	\$500,000	\$5,588,130
2013	\$11,017,323	\$106,060	\$10,911,263
2014	\$8,716,360	\$1,105,000	\$7,611,360
2015	\$10,656,141	\$1,937,159	\$8,718,982
2016	\$13,132,855	\$4,820,000	\$8,312,855
2017	\$11,311,176	\$6,680,900	\$4,630,276
2018	\$12,436,547	\$600,000	\$11,836,547
2019	\$ 7,669,772	\$2,296,000	\$5,373,772
<b>Total '08-'19</b>	<b>\$105,189,636</b>	<b>\$18,072,619</b>	<b>\$87,117,017</b>

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Review of Historical and Projected Operation, Maintenance, Renewal and Replacement, and Debt Service Expenditures

October 23, 2019

## 5.3 DEBT SERVICE REQUIREMENTS

Table 5.5 presents historical and scheduled debt service requirements for the period FY 2008-2029.

**Table 5.5: FY 2008 – 2029 Historical and Scheduled Debt Service Expenditures, Millions**

Fiscal Year	Existing Revenue Bonds	BABs Interest Subsidy <sup>1</sup>	Reduction in Subsidy due to 2019 Refunding	Projected Savings on 2019 Refunding	Net Total Revenue Bond Debt Service
2008	\$25.7	\$0.0	\$0.0	\$0.0	\$25.7
2009	\$25.9	\$0.0	\$0.0	\$0.0	\$25.9
2010	\$30.9	-\$1.3	\$0.0	\$0.0	\$29.6
2011	\$36.9	-\$3.1	\$0.0	\$0.0	\$33.8
2012	\$36.4	-\$3.1	\$0.0	\$0.0	\$33.3
2013	\$41.4	-\$3.1	\$0.0	\$0.0	\$38.3
2014	\$41.9	-\$2.9	\$0.0	\$0.0	\$39.0
2015	\$42.0	-\$2.9	\$0.0	\$0.0	\$39.1
2016	\$44.1	-\$2.8	\$0.0	\$0.0	\$41.3
2017	\$44.2	-\$2.9	\$0.0	\$0.0	\$41.3
2018	\$44.2	-\$2.9	\$0.0	\$0.0	\$41.3
<b>Total '08-'18</b>	<b>\$413.6</b>	<b>-\$25.1</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$388.5</b>
2019 <sup>2</sup>	\$44.3	\$0.0	\$0.0	-\$2.9	\$41.3
2020	\$44.3	\$0.7	-\$0.9	-\$2.9	\$41.1
2021	\$44.3	\$1.0	-\$1.2	-\$2.9	\$41.1
2022	\$37.4	\$1.0	-\$1.2	-\$2.9	\$34.3
2023	\$30.4	\$1.0	-\$1.2	-\$2.8	\$27.4
2024	\$28.9	\$1.0	-\$1.2	-\$2.6	\$26.1
2025	\$23.3	\$1.0	-\$2.7	-\$2.5	\$19.1
2026	\$23.1	\$0.9	-\$2.6	-\$2.3	\$19.1
2027	\$22.9	\$0.7	-\$2.4	-\$2.1	\$19.1
2028	\$22.7	\$0.5	-\$2.2	-\$1.9	\$19.1
2029	\$22.5	\$0.3	-\$2.0	-\$1.7	\$19.1
<b>Total '19-'29</b>	<b>\$344.0</b>	<b>\$8.4</b>	<b>-\$17.9</b>	<b>-\$27.6</b>	<b>\$307.0</b>

<sup>1</sup> Under current federal law, sequestration of reimbursements for direct-pay bonds (BABs) extended through FY 2029. The reduction in funding as a result of sequestration is 5.9% for FY2020. Revenue Interest Rebate has been reduced by 5.9% through 2029

<sup>2</sup> values are 2019 actuals, not model forecasts

Note: Data will not necessarily add to totals because of rounding.

Historical total revenue bond debt service payments ranged from a low of \$25.7 million in FY 2008 to a high of \$44.2 million in FY 2017 and FY 2018. Over the eleven-year period FY 2008-2018, the cumulative total revenue bond debt service was \$413.6 million. The historical BABs interest subsidy over this ten-year period totaled \$25.1 million, resulting in a net total revenue bond debt service of \$388.5 million.

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Review of Historical and Projected Operation, Maintenance, Renewal and Replacement, and Debt Service Expenditures

October 23, 2019

Scheduled total revenue bond debt service expenditures are projected to decrease over the period FY 2019-2029 from a high of \$44.3 million in FY 2019 through FY 2021 to a low of \$22.5 million in FY 2029. The cumulative total revenue bond debt service payment over this period is estimated to be \$344.0 million or about 17 percent less than the previous eleven-year period. The majority of this amount will be for existing revenue bond payments. Over the eleven-year forecast period FY 2019-2029, the total BABs interest subsidy is estimated to total \$27.6 million. The 2019 Refunding will reduce the subsidy amount while also introducing savings on existing debt service. This will result in a net total revenue bond debt service of \$307 million over the period 2019-2029.

## 6.0 REVIEW OF NATIONAL AND REGIONAL SOCIO-ECONOMIC CONDITIONS

### 6.1 ECONOMIC BACKDROP AND OUTLOOK FOR THE FUTURE

Any forecast of toll traffic and revenues will, of necessity, recognize the significant variations that can and do occur in the national, regional and local economies and population changes within the Turnpike corridors. Considering this, Stantec performed a detailed analysis of the historical economic trends seen over the last few decades, particularly as they relate to the economic influences that occurred and how traffic on the Turnpike facilities reacted to those trends.

In the preparation of Turnpike traffic and toll revenue forecasts, we considered a number of important national and regional economic trends that influence traffic and motorist behavior. Historically, passenger vehicle traffic has generally correlated to Gross Domestic Product (GDP), while truck traffic growth has shown some correlation to the Industrial Production Index (IPI). Factors such as unemployment and gas prices have also affected vehicle-miles traveled (VMT) by passenger vehicles.

#### 6.1.1 Gross Domestic Product (GDP)

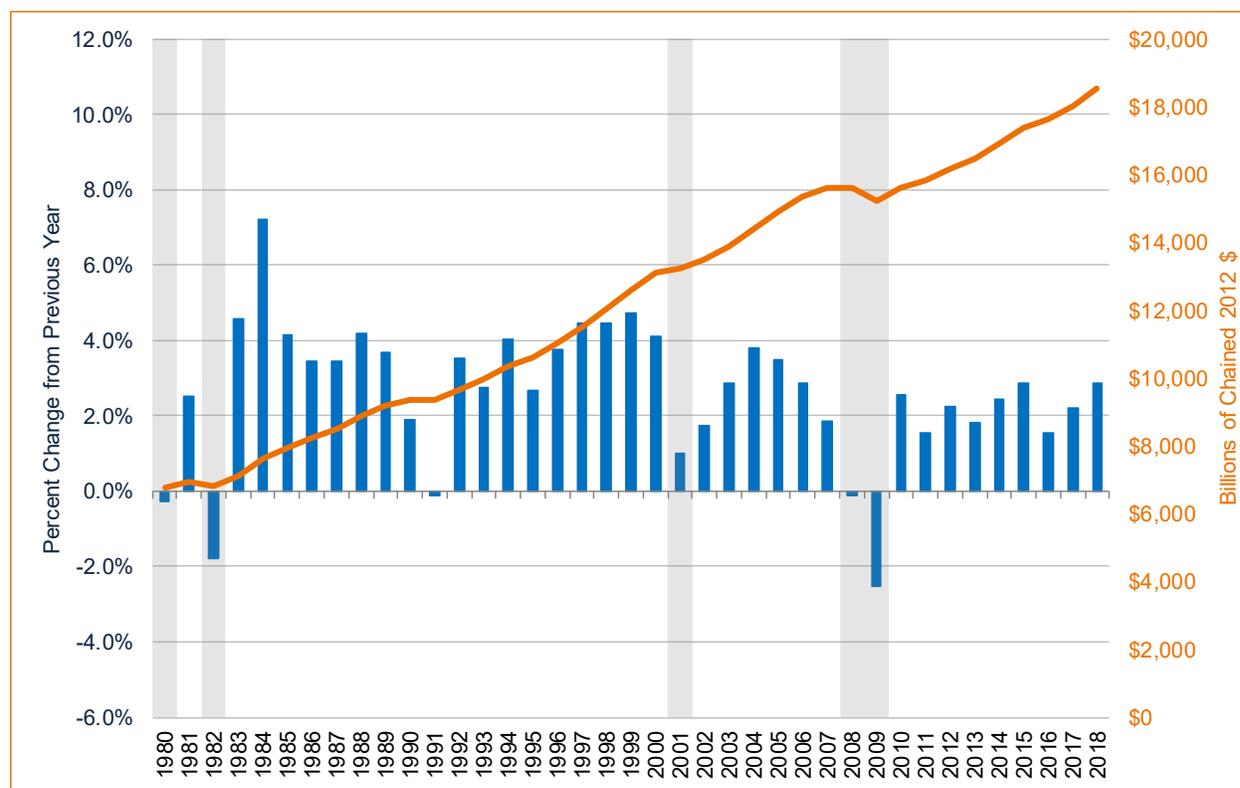
Figure 6.1 shows the real annual GDP from 1980 through the end of 2018, the most recent annual data available. From 2000 through 2018, real GDP in the United States increased at an average annual rate of 1.9 percent. This period included the 2001 recession and the recession that began in late 2007 and ended in June 2009. This most recent recession, which some economists termed the “Great Recession”, was far more severe than originally predicted and significantly deeper and longer than previous recessions. In 2008, real GDP decreased by 0.1 percent, and in 2009 the recession reached its nadir, with real GDP decreasing by 2.5 percent. Since 2010, the U.S. economy has recovered and shown consistent growth. Real GDP increased on an annual basis by between 1.6 and 2.6 percent in the years 2010 to 2016, then increased at an annual rate of 2.2 percent in 2017 and 2.9 percent in 2018, according to the most recently available data.<sup>1</sup> The first quarter 2019 real GDP was estimated at \$18.9 trillion.<sup>2</sup> Note that gray shaded areas on the figures in this section represent U.S. recessions as determined by the National Bureau of Economic Research. Recessions are technically defined as two consecutive calendar quarters of negative GDP growth.

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<sup>1</sup> Bureau of Economic Analysis, News Release: [Gross Domestic Product](#), May 30, 2019.

<sup>2</sup> Ibid.

Figure 6.1: Real Gross Domestic Product, Annual 1980 to 2018



Source: U.S. Census Bureau, Bureau of Economic Analysis, National Bureau of Economic Research.  
 Note: grey shaded areas of the graphic represent U.S. recessions.

Financial and economic analysts expect the U.S. economy to continue to grow in the near-term future. The most recent consensus forecast, derived from projections from more than 50 financial institutions and professional forecasting firms, is that real GDP will grow by 2.5 percent in 2019 and 1.8 percent in 2020.<sup>3</sup> Longer term, in the 2021-2025 timeframe, the consensus forecast is for real GDP to continue to grow by 1.9 percent annually.<sup>4</sup>

### 6.1.2 Industrial Production Index (IPI)

The Industrial Production Index (IPI) is a measure of real output published by the Board of Governors of the Federal Reserve System. The index is measured as a percentage of real output of a given base year, 2012 as noted by the Board of Governors of the Federal Reserve System, National Bureau of Economic Research. Stantec has been tracking traffic volumes on the Turnpike and other toll facilities throughout the northeast for over a decade and has found that growth in commercial traffic generally correlates to growth in IPI.

<sup>3</sup> “Blue Chip Economic Indicators: Top Analysts’ Forecasts of the U.S. Economic Outlook for the Year Ahead”, Wolters and Kluwer Law & Business, June 10, 2019.

<sup>4</sup> Blue Chip Economic Indicators: Top Analysts’ Forecasts of the U.S. Economic Outlook for the Year Ahead”, Wolters and Kluwer Law & Business, March 10, 2019.

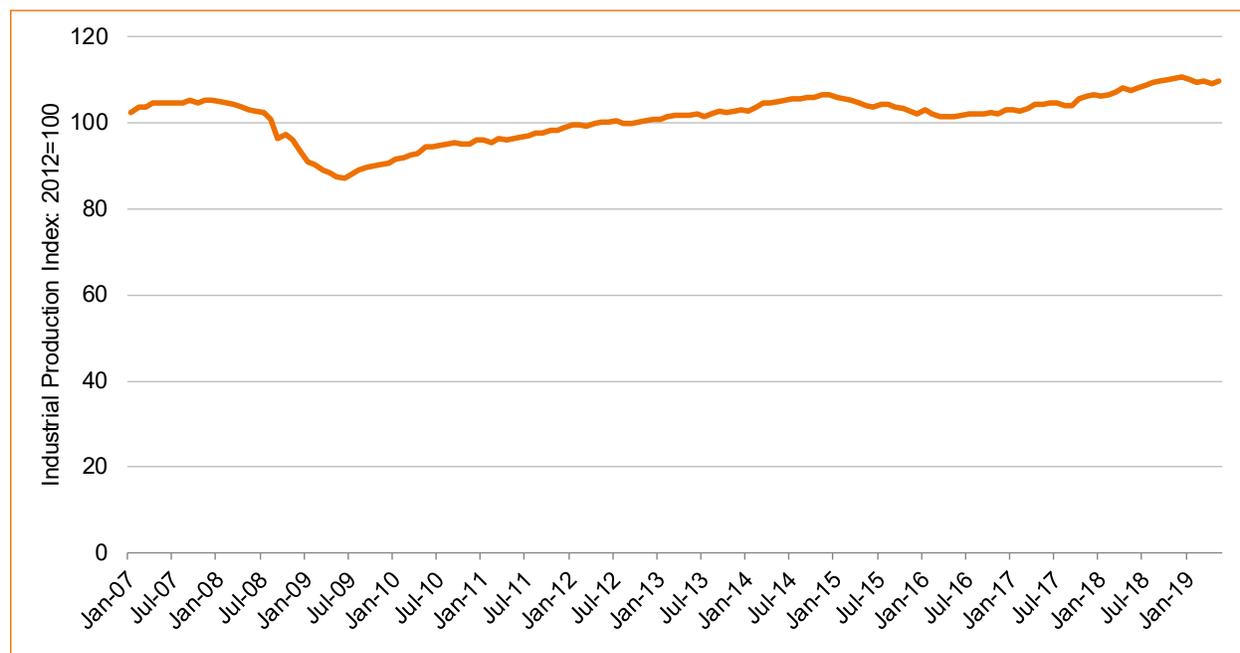
## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Review of National and Regional Socio-economic Conditions

October 23, 2019

As shown in Figure 6.2, the IPI hit its most recent trough in June 2009, the last month of the 2007 to 2009 recession. Since that time, it has generally been on an upward trajectory, increasing by 25.8 percent from June 2009 to May 2019.

**Figure 6.2: Industrial Production Index (IPI), Monthly January 2007 to May 2019**



Source: Board of Governors of the Federal Reserve System, National Bureau of Economic Research.

Based on consensus forecasts developed by financial institutions and industry analysts, the IPI is forecasted to increase by 1.7 percent in 2019 and by 1.4 percent in 2020.<sup>5</sup> Longer term, in the 2021-2025 timeframe, the consensus forecast is for the index to continue to grow by 2.0 percent annually.<sup>6</sup>

### 6.1.3 Unemployment Rates

At the beginning of 2008, the national unemployment rate was 5.0 percent, as it had been similarly for years. By October 2009 during the depth of the recent recession, unemployment peaked at approximately 10.0 percent. Total employment has since recovered and finally eclipsed its pre-recession peak, reaching 156.8 million persons in April 2019.<sup>7</sup> Consequently, as shown in Figure 6.3, the national unemployment rate has fallen to 3.6 percent as of April 2019.

<sup>5</sup> Blue Chip Economic Indicators: Top Analysts' Forecasts of the U.S. Economic Outlook for the Year Ahead", Wolters and Kluwer Law & Business, June 10, 2019.

<sup>6</sup> Blue Chip Economic Indicators: Top Analysts' Forecasts of the U.S. Economic Outlook for the Year Ahead", Wolters and Kluwer Law & Business, March 10, 2019.

<sup>7</sup> "Bureau Of Labor Statistics, Economic News Release, Employment Situation Summary Table A. Household Data, Seasonally Adjusted, Data Extracted June 17, 2019.

**Figure 6.3: Civilian Unemployment Rate, Seasonally Adjusted, Monthly January 2000 to April 2019**



Source: U.S. Department of Labor, Bureau of Labor Statistics, National Bureau of Economic Research.

Note: gray shaded areas of the graphic represent U.S. recessions.

Long-term forecasts of employment tend to differ, depending on varying assumptions of the impact of long-term structural trends such as advances in information technology, outsourcing, and an aging population. The U.S. Congressional Budget Office (CBO) has forecasted that the unemployment rate will remain under 5.0 percent through 2029 with a forecast of 4.2 percent for 2021, 4.6 percent for 2022, then increasing to 4.8 percent for the 2023-2027 time period before falling to 4.7 percent for 2028-2029.<sup>8</sup>

#### 6.1.4 National Trends in Vehicle Miles Traveled (VMT)

The United States experienced an historic flattening and drop in vehicle-miles traveled (VMT) on its highways, starting in 2008 and lasting until approximately 2014. A reduction in VMT means less revenue – in the form of gasoline taxes or tolls - for funding transportation operation, maintenance and capital expenses. However, beginning in mid-2014, VMT experienced a growth trend, increasing at an even more rapid rate than in the 1990s until a very recent plateau occurred in early 2018.

Figure 6.4 depicts the 12-month moving total of national travel mileage on all U.S. highways, from 1971 through the first quarter of 2019. As seen in this figure, there were temporary reductions in VMT during military combat, oil crises and economic recessions. Despite these temporary “dips”, the VMT continued

<sup>8</sup> “The Budget and Economic Outlook: 2019 to 2029”, Congressional Budget Office Report, January 2019.

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to grow rapidly over the years. The figure shows that, in recent years, with the exception of short, flat periods during the 1991 and 2001 recessions (each less than one year), VMT grew at a steady pace through about 2005, then grew at a much slower pace through 2008. The increase in gas prices and the downturn in economic activity that took hold in late 2008 resulted in a significant reduction in total national travel mileage after the December 2007 peak. VMT declined throughout 2008 and early 2009. From the official end of the recession in mid-2009 through 2013, VMT generally remained flat. Then, in 2014 through 2017, VMT increased at a strong rate not seen since the late 1990s. 2016 experienced the largest annual increase in VMT since tracking began in 1971.<sup>9</sup> This upward trend in VMT is likely due to an improved economy, employment and population growth, and a reduction in fuel prices.

In addition, recent data have shown that the Millennials, many of whom delayed purchasing a car, are now buying cars and driving more because they are now employed. On the other hand, there are factors that may slow down VMT growth over time, including baby boomers retiring and driving less, the ability of workers to work remotely, and communication technologies that can substitute for in-person interaction.<sup>10</sup> The State Smart Transport Initiative (SSTI) concluded in a 2014 report that a decline in per-capita VMT reflected “changing demographics, saturated highways, and a rising preference for compact, mixed-use neighborhoods, which reduce the need for driving.”<sup>11</sup> These factors may have come into play in the past few years; from late 2017 through early 2019, nationwide VMT has experienced little growth.

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<sup>9</sup> U.S. Department of Energy, Alternative Fuels Data Center, Maps and Data - Annual Vehicle Miles Traveled in the U.S.

<sup>10</sup> “Vehicle Miles Traveled: Another Look at Our Evolving Behavior”, Jill Misliniski, March 17, 2017.

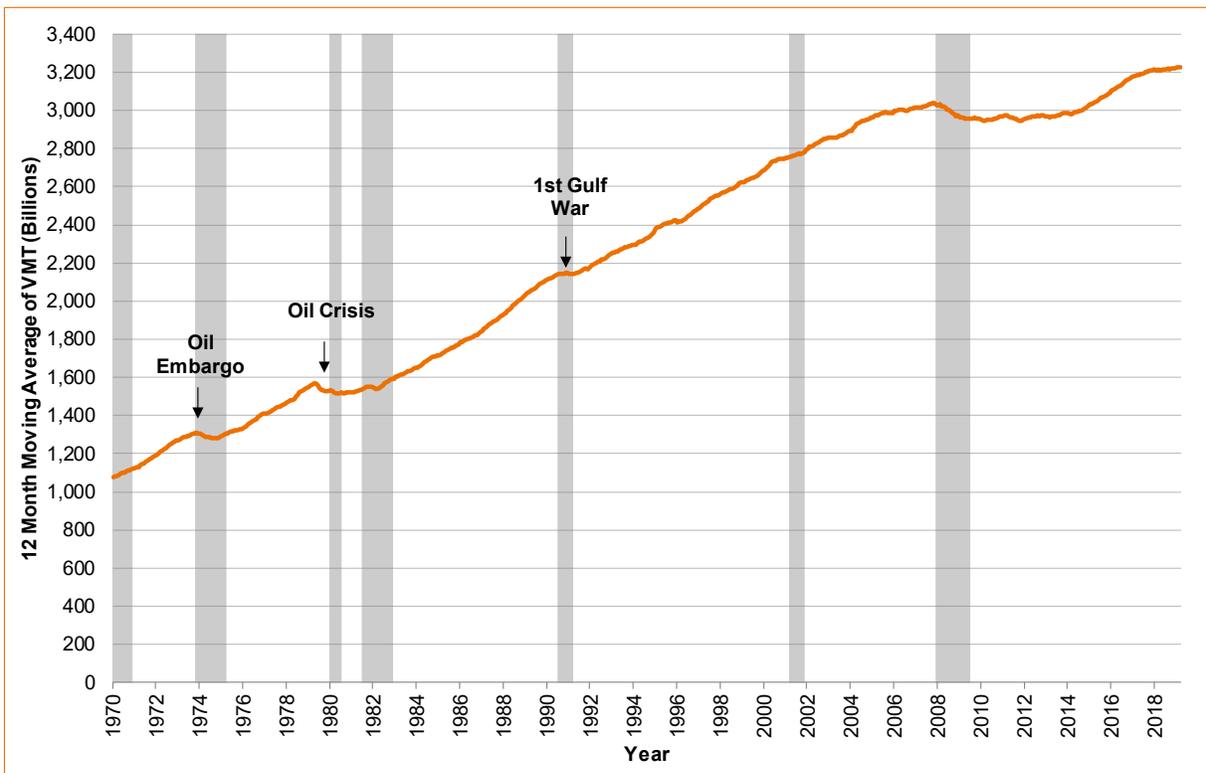
<sup>11</sup> State Smart Transportation Initiative News, “Per capita VMT drops for ninth straight year; DOTs taking notice,” Chris Cahill, February 24, 2014.

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**Figure 6.4: Vehicle Miles Traveled, Monthly January 1971 to March 2019**



Source: U.S. Department of Transportation, Federal Highway Administration, National Bureau of Economic Research.

The Federal Highway Administration prepares long term (20- and 30-year) forecasts of VMT each year for three different economic outlooks- baseline, low economic growth, and high economic growth. In its May 2018 report (the most recent report available), FHWA highlights “prospects for future economic growth, alternative interpretations of the causes of recent declines in vehicle ownership and use (particularly among younger Americans), and the potential effects on vehicle use of dramatic innovations in technology such as the advent of autonomous vehicles” as sources of uncertainty in its forecasts. While not attempting to capture the impacts of all these uncertainties in its forecasts, FHWA projects VMT growth under three different economic outlooks- baseline, low economic growth, and high economic growth, with the most recent forecasts shown in Table 6.1.<sup>12</sup> Interestingly, growth in vehicle mileage for single unit and combination trucks is forecast to be at a higher rate than light duty vehicles.

<sup>12</sup> “FHWA Forecasts of Vehicle Miles Traveled (VMT): Spring 2018,” Office of Highway Policy Information, May 2018, as accessed on September 5, 2018 at [https://www.fhwa.dot.gov/policyinformation/tables/vmt/vmt\\_forecast\\_sum.pdf](https://www.fhwa.dot.gov/policyinformation/tables/vmt/vmt_forecast_sum.pdf)

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**Table 6.1: FHWA Long-Term Growth Forecasts of National Vehicle Miles Traveled (VMT)**

Vehicle Class	Compound Annual Growth Rates					
	Low Economic Growth Outlook		Baseline Economic Growth Outlook		High Economic Growth Outlook	
	2016-2036 (20-Year)	2016-2046 (30-Year)	2016-2036 (20-Year)	2016-2046 (30-Year)	2016-2036 (20-Year)	2016-2046 (30-Year)
Light-Duty Vehicles	0.9%	0.7%	1.1%	0.8%	1.3%	1.0%
Single-Unit Trucks	1.4%	1.5%	1.8%	1.9%	2.3%	2.4%
Combination Trucks	1.2%	1.2%	1.6%	1.6%	1.9%	1.9%
TOTAL	0.9%	0.8%	1.2%	0.9%	1.3%	1.1%

Source: Office of Highway Policy Information U.S. DOT, Federal Highway Administration, May 2018. Most recent report available.

The Energy Information Administration (EIA) projects a similar differential between light duty vehicles and trucks for the 2018-2050 timeframe with lower projected rates of growth than in the FHWA forecasts for two vehicle categories but higher projected growth for the heaviest vehicle category:<sup>13</sup>

- 0.6 percent annually for light duty vehicles less than 8,501 pounds,
- 1.4 percent annually for light duty trucks (commercial trucks 8,501 to 10,000 pounds gross vehicle weight rating), and
- 1.3 percent annually for freight trucks greater than 10,000 pounds.

### 6.1.5 Fuel Cost Impacts on Travel

Gasoline prices are often cited as one of the primary factors that have a significant impact on travel trends. Figure 6.5 presents historical and projected gasoline and crude prices from the U.S. Energy Information Administration (EIA). Between the depths of the recession in December 2008 and mid-2011, gas prices jumped by more than 130 percent to \$4.13 in today's dollars. After three years of high gas prices, the prices plunged from \$3.69 in June 2014 to under \$2 per gallon in the first quarter of 2016<sup>14</sup>. Between the spring of 2016 and third quarter of 2017, gas prices generally remained in the \$2.20 to \$2.40 range. Since then (September 2017 through May 2019), prices have averaged \$2.65 per gallon, and the most recent EIA report indicates that U.S. monthly average regular gasoline retail prices are expected to be fairly stable for the rest of 2019, averaging \$2.69 per gallon over that period.<sup>15</sup> U.S. regular gasoline retail prices are forecast to average \$2.63 per gallon for 2019 overall and increase slightly to an average of \$2.75 in 2020.<sup>16</sup>

<sup>13</sup> Annual Energy Outlook, 2019, Transportation Sector Key Indicators accessed on March 15, 2019 at <https://www.eia.gov/outlooks/aeo/data/browser/#/?id=7-AEO2019&cases=ref2019&sourcekey=0>

<sup>14</sup> "Short-Term Energy Outlook," U.S. Energy Information Administration, June 2019.

<sup>15</sup> Ibid

<sup>16</sup> Ibid

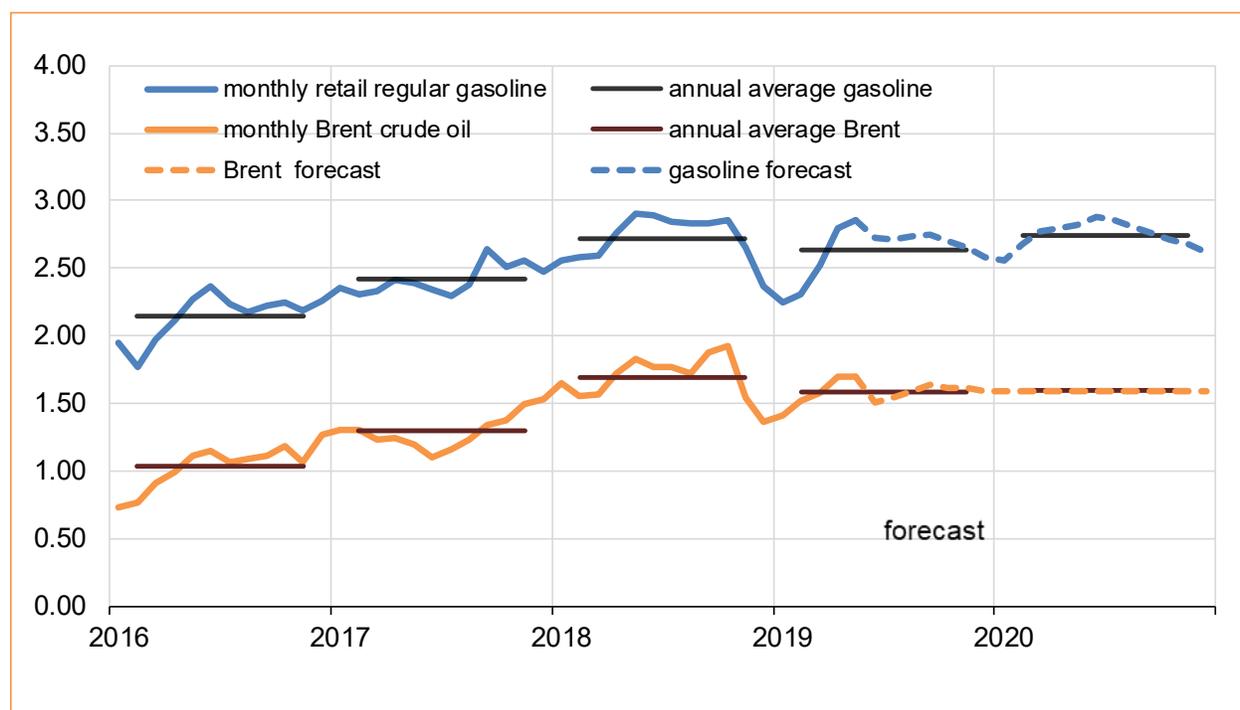
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As shown in the graph, the retail price for gasoline is expected to remain under \$3.00 per gallon in the near-term future. In addition to the reduced gas prices, it is important to note that average fuel economy increased by 29 percent <sup>17</sup> between 2004 and 2017, the latest year for which final fuel economy data are available.

**Figure 6.5: U.S. Gasoline and Crude Oil Prices, Monthly January 2016 to December 2020**



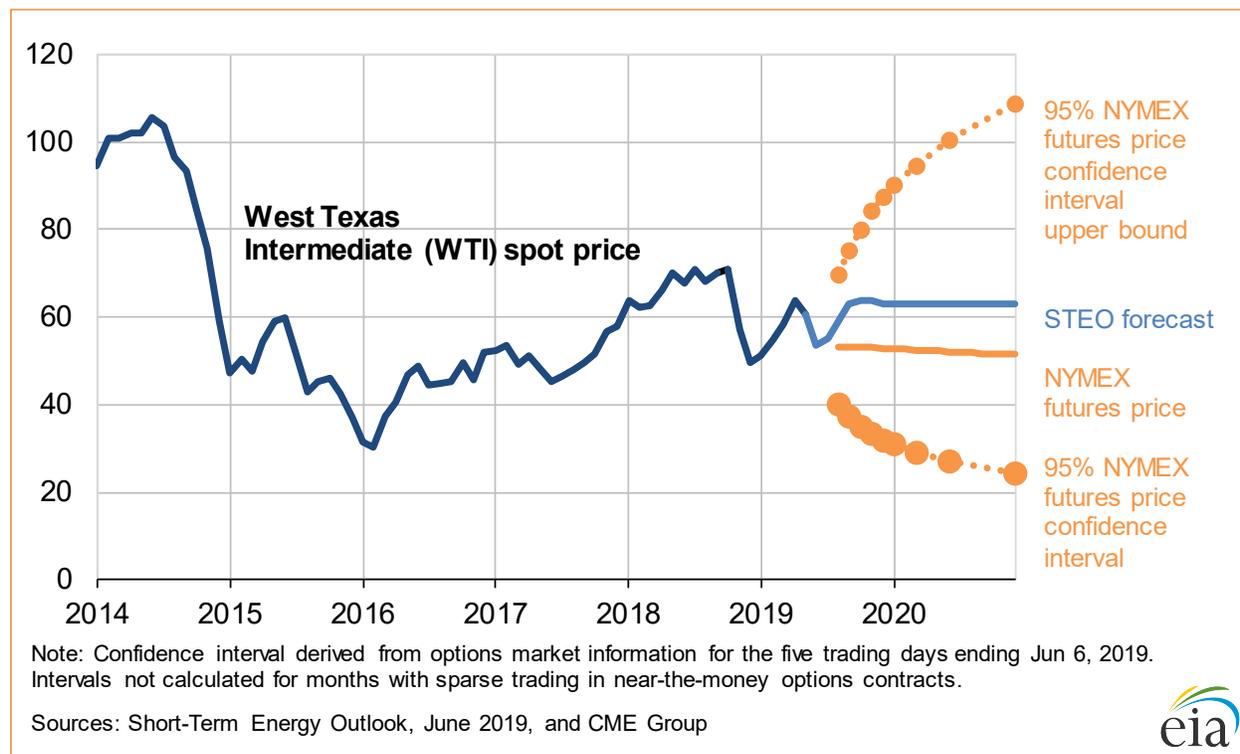
Source: U.S. Department of Energy, U.S. Energy Information Administration, *Short-Term Energy Outlook*, June 2019.

This relatively low, static forecast of future oil and gas prices may be reassuring; however, this figure does not show the level of uncertainty in these projections. Figure 6.6 presents the EIA's projections for West Texas Intermediate (WTI) Crude Oil Price. The base projection is similar to that illustrated in Figure 6.5, but it is the possible range of this price that represents a downside risk to the U.S. economy and VMT. Based on options markets, the 95 percent confidence interval for WTI is between 73 percent more to 61 percent less than current forecasts for December 2020.<sup>18</sup> Recognizing the impact fuel prices have on motorist behavior, with a wide range of possible future prices of oil and gasoline, accurately projecting traffic volumes has become an increasingly difficult task.

<sup>17</sup>Executive Summary: Greenhouse Gas Emissions, Fuel Economy, and Technology since 1975 EPA Automotive Trends Report, U.S. Environmental Protection Agency, March 2019, page ES6

<sup>18</sup> Short-Term Energy Outlook U.S. Energy Information Administration, June 2019.

**Figure 6.6: West Texas Intermediate (WTI) Crude Oil Prices and NYMEX Confidence Intervals, Monthly January 2014 to December 2020 (dollars per barrel)**



Source: U.S. Department of Energy, Energy Information Administration, Short-Term Energy Outlook and CME Group, June 2019.

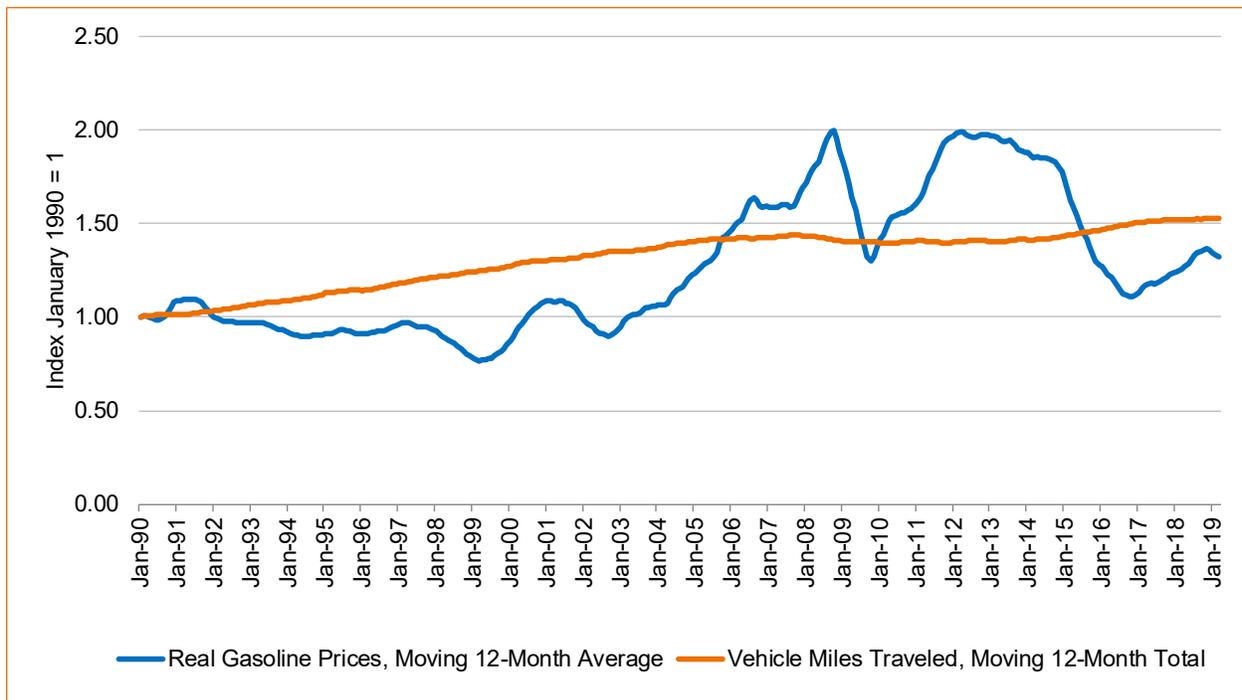
To understand the potential impact of future gas prices on traffic, we can look at their historical correlations. Figure 6.7 presents VMT across the United States as compared to real retail gasoline prices from 1990 through the beginning of 2019. The VMT and real gas prices represent a 12-month moving total and average, respectively, to remove any seasonality factors; all data are indexed to the 12 months ending January 1990. While the Great Recession began at the end of 2007, there was still a flattening, then decline, in vehicle miles traveled that started several years before, which is partially attributed to rising gas prices. The continuation of the decline, post-fall 2008, would be more attributable to the economic meltdown, as gas prices dropped significantly by early 2009. Gas prices then increased throughout the rest of 2009 and through the spring of 2011 with no noticeable change to VMT. However, between 2014 and 2016 there was a precipitous drop in gas prices which coincided with a steep increase in VMT. These data show that it is difficult to pinpoint the elasticity of travel as it relates to gas prices; however, very large gas price changes do generally result in a change in driving behavior.

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**Figure 6.7: National VMT vs. Real Gas Prices, Moving 12-Month Average, 1990 to 2019**



Source: U.S. Department of Energy, Energy Information Administration and U.S. Department of Transportation, Federal Highway Administration, June 2019.

## 6.2 NEW HAMPSHIRE DEMOGRAPHIC TRENDS

This section of the chapter summarizes historical and future demographic and economic conditions for the state of New Hampshire itself, including population and employment trends and developments in household income and tourism.

### 6.2.1 Population

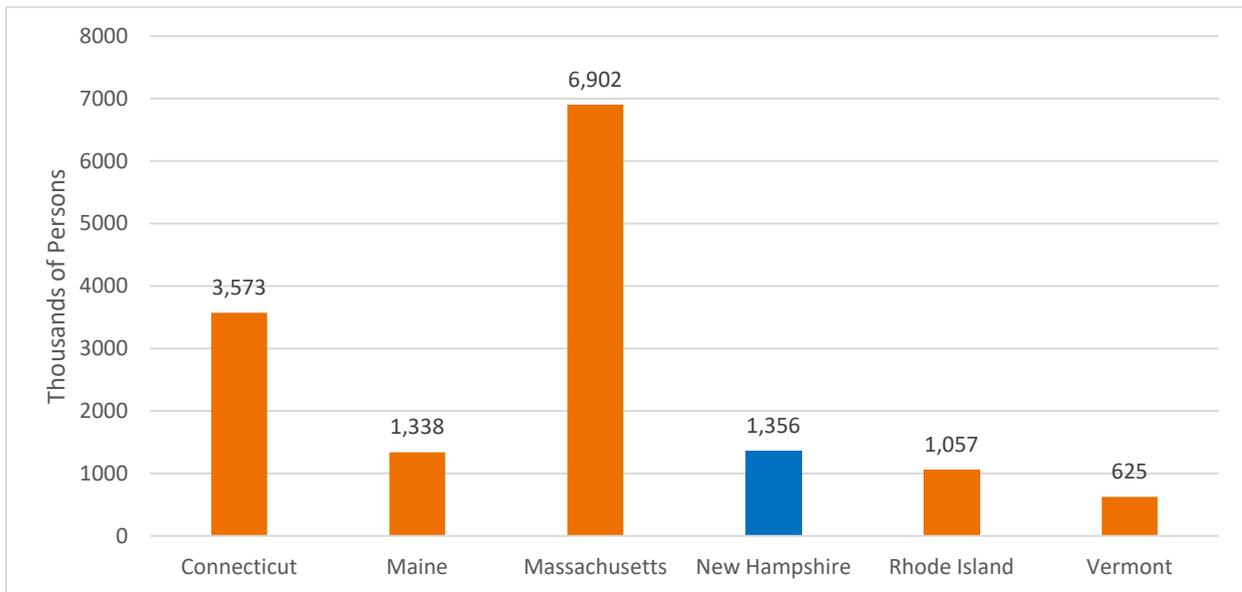
New Hampshire's current population, estimated at 1.36 million people, makes it the third most populous state in the region, as shown in Figure 6.8, but one of the least populous states in the United States.

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**Figure 6.8: Resident Population in New England States in 2018**



Source: U.S. Census Bureau.

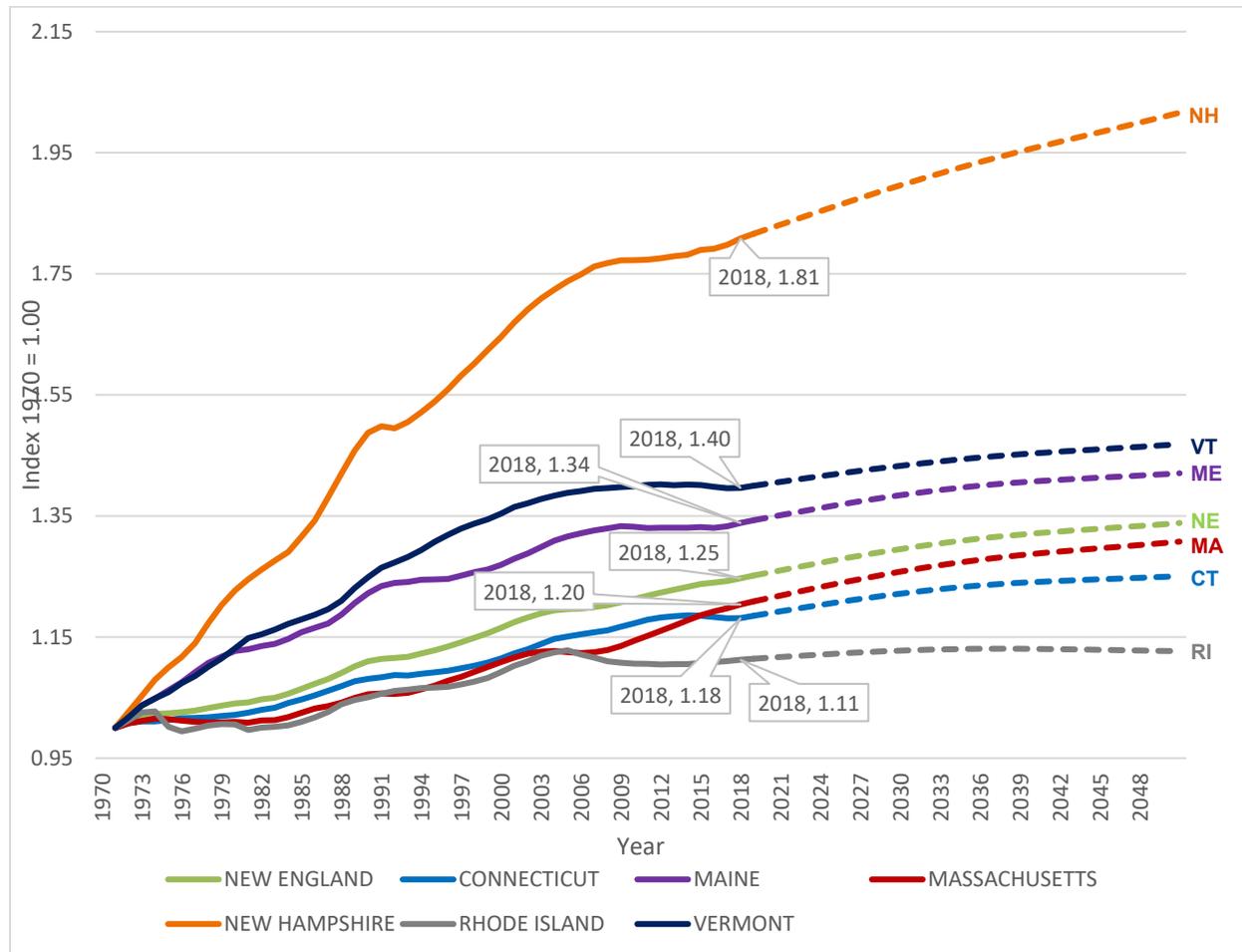
New Hampshire's population has grown significantly over the past 45 years, and is expected to continue to grow, albeit at much slower rates than in the past. From 1970 to 2018, the resident population in New Hampshire grew from 738,000 to 1.36 million, an increase of over 80 percent. This rate of population growth was the highest achieved in New England over this time period, as shown in Figure 6.9. In fact, the population growth rate in New Hampshire was almost double that of any other state in the region.

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**Figure 6.9: Index of Resident Population in New England States from 1970 to 2018, forecast to 2050**



Source: Woods & Poole Economics.

A closer look at population growth in New Hampshire, however, shows that it has been weakening. From 1970 to 1979, the population grew at an average annual rate of 2.3 percent. Average annual growth in population decreased to 2.0 percent from 1980 to 1989, and again to 0.9 percent from 1990 to 1999. The trend continued in the 2000s, with average annual growth in population reaching 0.7 percent from 2000 to 2009.

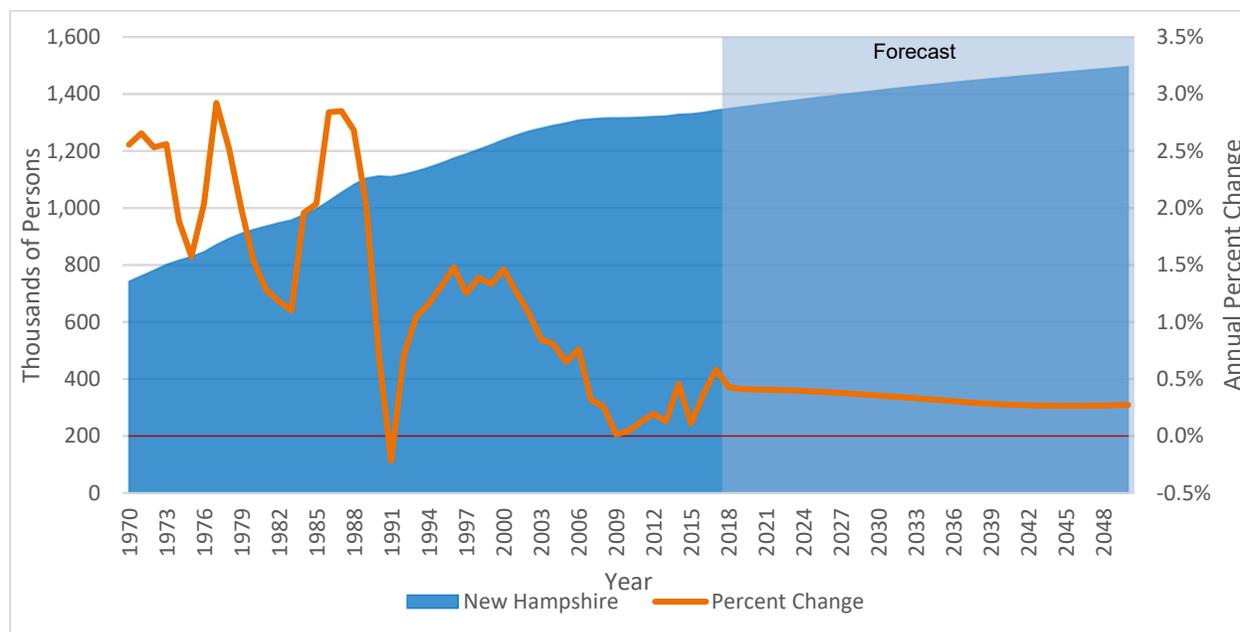
This trend of declining population growth is expected to continue into the near future. While the population is expected to reach 1.4 million by 2028, average annual rates of growth are expected to remain below 0.5 percent in the future. These trends are depicted in Figure 6.10.

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**Figure 6.10: Actual and Forecasted Resident New Hampshire Population and Percent Change, 1970 to 2050**



Source: Woods & Poole Economics.

For regional planning purposes, the State of New Hampshire also publishes county population projections in 5 year intervals to the year 2040, as shown in Table 6.2. According to the projections, the total population is slated to grow from 1.33 million in 2015 to 1.43 million in 2040, an overall increase of approximately 7.2 percent. Among the various counties, Belknap, Carrol, and Sullivan counties are expected to see the highest rates of growth. Coos County is the only county expected to lose population over the 25-year period.

**Table 6.2: Resident Population Projections for New Hampshire Counties**

Jurisdiction	2020	2025	2030	2035	2040	2045
New Hampshire	1,359,643	1,386,973	1,412,816	1,436,375	1,457,337	1,476,982
Belknap County	61,312	62,200	63,101	64,015	64,943	65,884
Carroll County	48,672	49,703	50,756	51,831	52,928	54,049
Cheshire County	76,280	76,816	77,357	77,901	78,448	79,000
Coos County	31,494	31,261	31,030	30,801	30,574	30,348
Grafton County	90,289	91,815	93,366	94,944	96,549	98,180
Hillsborough County	415,498	424,621	432,748	439,434	444,508	448,702
Merrimack County	150,719	153,256	155,837	158,461	161,129	163,843
Rockingham County	311,674	320,180	328,013	334,820	340,455	345,462
Strafford County	130,346	133,287	136,293	139,368	142,512	145,727
Sullivan County	43,359	43,834	44,315	44,800	45,291	45,787

Source: Woods & Poole Economics.

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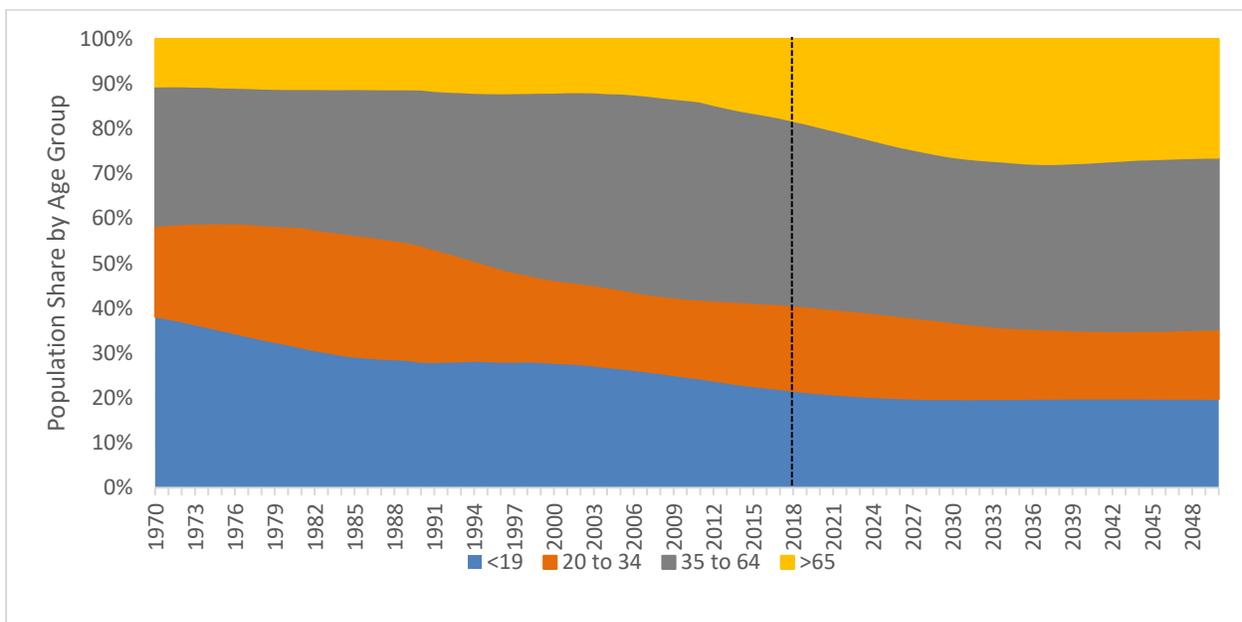
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#### 6.2.2 Population Age Distribution

Similar to national trends, the median age of the population in New Hampshire is increasing. In 1990, the median age in New Hampshire was 32.8 years, which increased to 37.1 years in 2000. By the 2010 Census, New Hampshire had a median age of 41.1 years, making it the 4th oldest state in the United States behind Maine (42.7 years), Vermont (41.5 years), and West Virginia (41.3 years). In 2017, the last year for which data are available, the median age had gone up to 43 years.

Figure 6.11 shows the proportion of New Hampshire population in each of the four main age groups for the years 1970-2050. The 0-19 age group declined from 28.2 percent of the total population in 1990 to 22.0 percent in 2017. More dramatically, the 20-34 age group decreased from 26.0 percent in 1990 to 17.3 percent in 2008, before rebounding somewhat to 18.9 percent by 2017. From 1990 to 2017 the 35-64 age group increased from 34.7 percent to 41.5 percent and the 65+ age group increased from 11.3 percent to 17.6 percent.

**Figure 6.11: Age Distribution of Population in New Hampshire**



Source: Woods & Poole Economics.

### 6.3 NEW HAMPSHIRE ECONOMIC TRENDS

The national and regional economies have a large impact on economic conditions in New Hampshire. Economic performance at the state level tends to mirror the economic performance of the nation but there are some areas, such as household income and unemployment, where New Hampshire tends to outperform the rest of the country.

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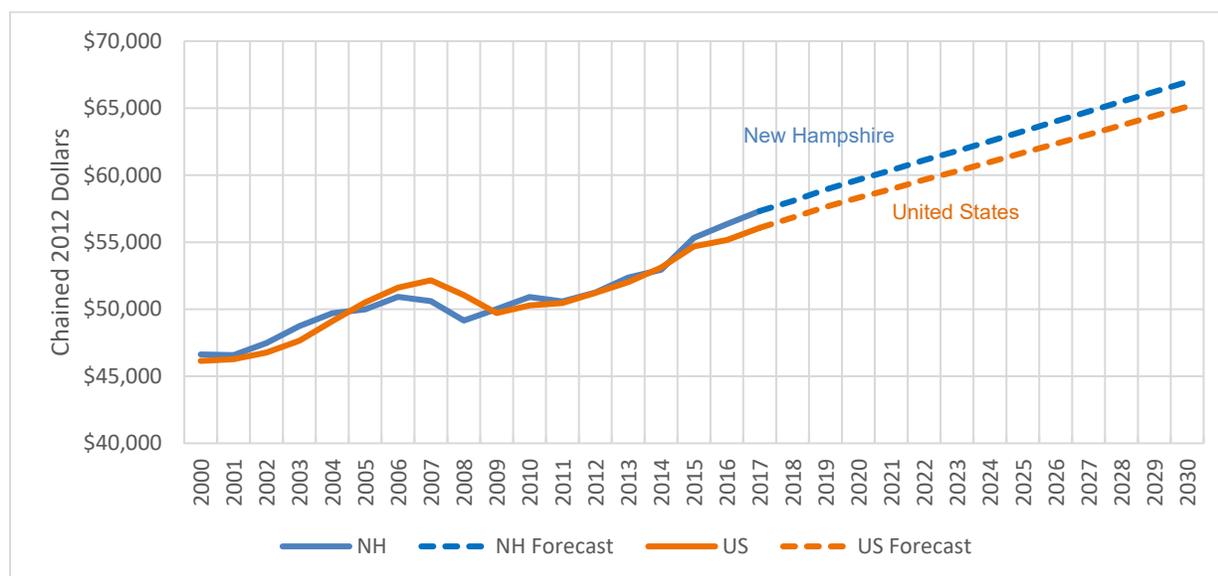
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#### 6.3.1 Output and Growth

As shown in Figure 6.12, real per capita GDP in New Hampshire reached \$57,324 in 2017, slightly greater than the level of real per capita GDP observed in the United States as a whole (\$56,070). In fact, since 2000, the trend in real per capita GDP in New Hampshire has mirrored the trend observed in the United States – it generally increased from 1997 to 2007 and then decreased during the most recent recession before rebounding in 2010.

**Figure 6.12: Actual and Forecasted Real per Capita Gross Domestic Product in New Hampshire and the United States, 2000 to 2030**



Source: Woods & Poole Economics.

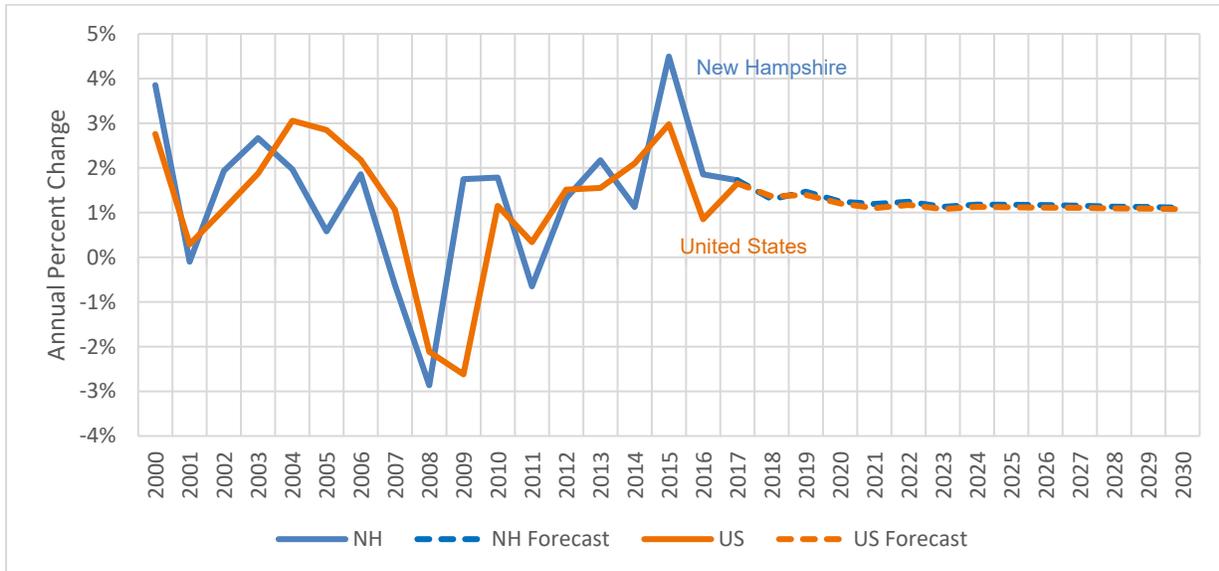
With respect to total output, the New Hampshire economy has performed very similarly to the United States' economy as a whole over the past decade and a half. At the end of the 1990s and the very beginning of the 2000s, real total GDP was increasing rapidly, growing between 2.4 and 6.3 percent per year. The 2001 recession caused growth in real total GDP to slow significantly, but from 2002 to 2006 the annual change in real total GDP fluctuated between 1.4 and 4.0 percent. The 2007 to 2009 recession caused real total GDP to contract in the state although it shrank at a slightly slower pace than that observed in the country as a whole. Following the recession, real total GDP started to grow again, achieving a 2.9 percent increase in 2010 with subsequent increases of around one percent each year since then. New Hampshire's GDP per capita eclipsed the national average between 2015 and 2017 and is projected to remain above average for the foreseeable future.

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**Figure 6.13: Actual and Forecasted Change in Real Total Gross Domestic Product in New Hampshire and the United States, 2000 to 2030**

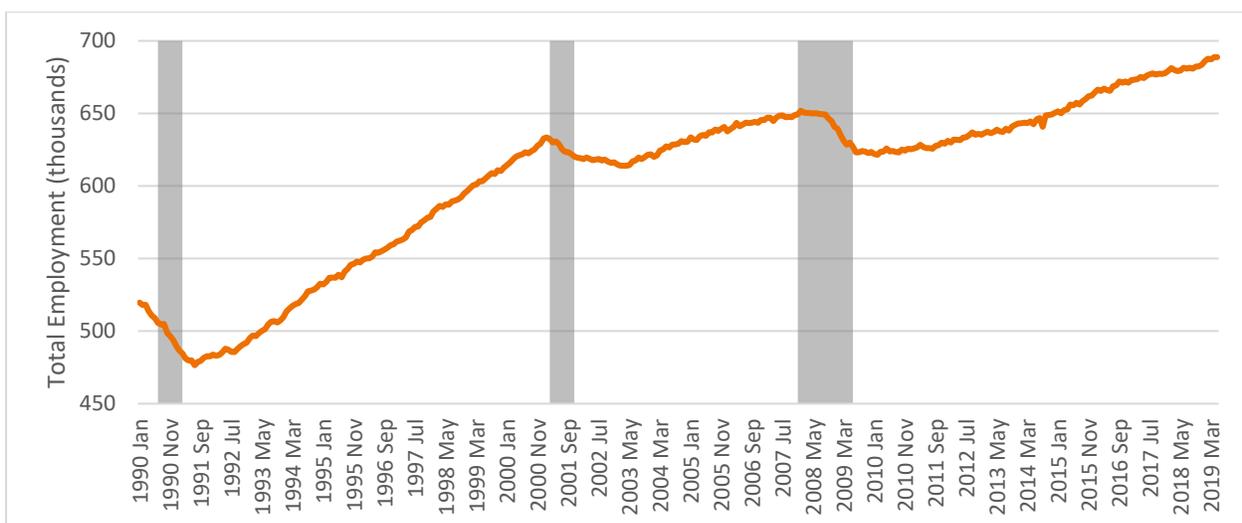


Source: Woods & Poole Economics.

### 6.3.2 Employment

Nonfarm employment in New Hampshire increased to 689,800 in May 2019, a growth of 1.4 percent over the previous year. Since July 2009, the end of the last recession, employment has increased by 6.0 percent, and gross employment passed its pre-recession peak of 652,700 by April of 2015. Figure 6.14 depicts New Hampshire employment levels from 1990 to present.

**Figure 6.14: Actual Nonfarm Employment in New Hampshire, 1990 to 2019**



Source: U.S. Bureau of Labor Statistics.

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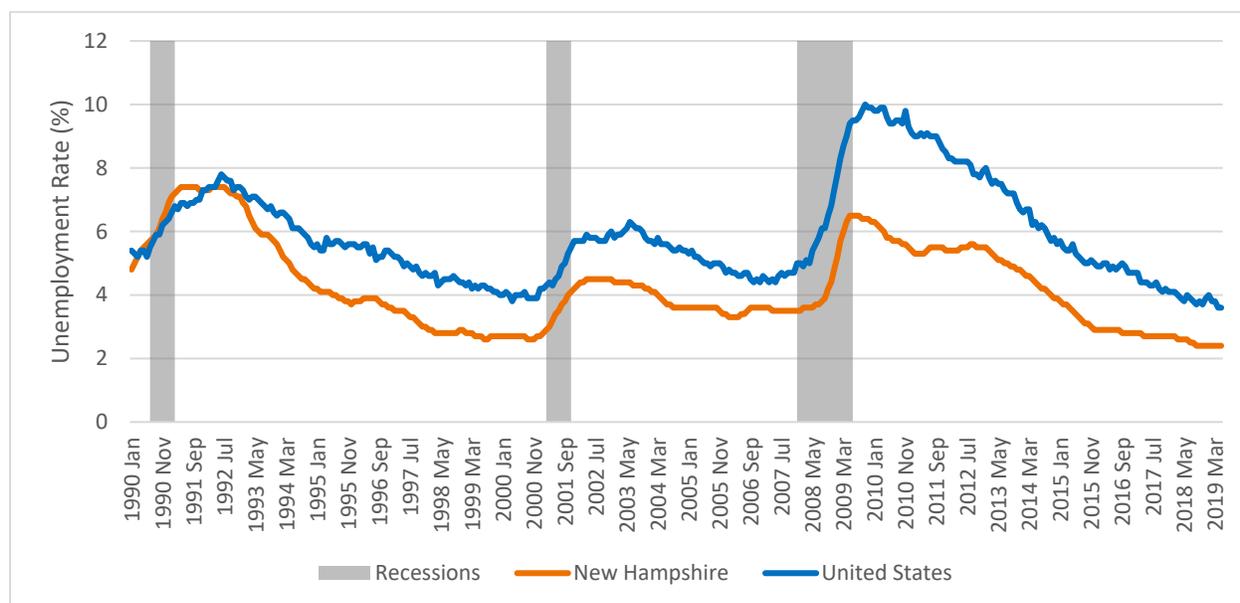
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Figure 6.15 displays the unemployment rate in both New Hampshire and the United States from January 1990 to May 2019. As shown in the graph, the labor market in New Hampshire with respect to unemployment has historically outperformed the labor market in the United States except for a brief period in the early 1990s.

As expected, unemployment tends to rise during recessions and fall during periods of economic expansion. The labor market in the United States was hit particularly hard by the 2008 recession. The unemployment rate in the country increased from 5.0 percent in January 2008 to 10.0 percent in October 2009. The labor market fared better in New Hampshire during the same period, where the unemployment rate reached a high of only 6.7 percent. The most recent data available from the Bureau of Labor Statistics suggest that the unemployment rates for both the United States and New Hampshire are reaching record lows as the job market saturates. The unemployment rates in New Hampshire and the United States stood at 2.4 and 3.6 percent, respectively, in May 2019 – both the lowest rate in over 30 years.

**Figure 6.15: Unemployment Rate in New Hampshire and the United States, January 1990 to May 2019**



Source: U.S. Bureau of Labor Statistics.

### 6.3.3 Income

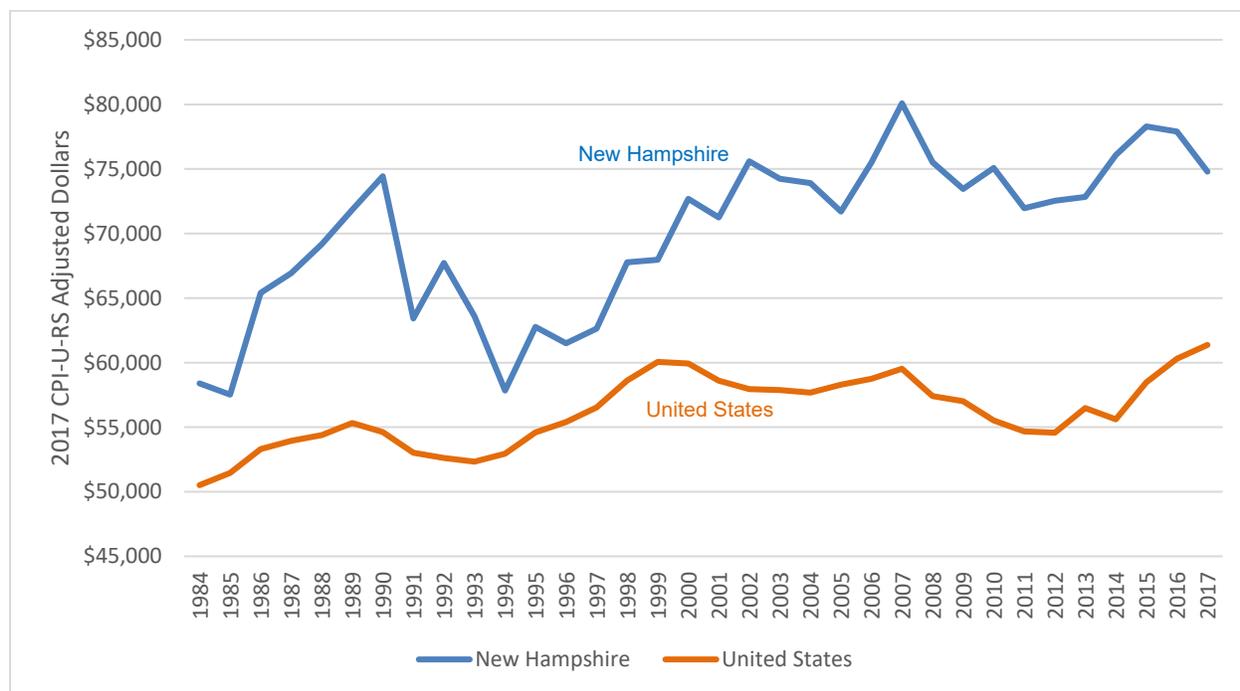
New Hampshire consistently ranks high among states in household income. In 2017, real median household income in New Hampshire, as shown in Figure 6.16, reached \$74,801, although this is still below the state's pre-recession peak median household income of \$80,088. According to American Community Survey Data, New Hampshire ranked seventh among all US States and Territories on this measure. Nevertheless, real household income increased in New Hampshire by 29.3 percent since, growing at an average annual rate of 1.1 percent. As shown in Figure 6.16, it is substantially higher than the level of real household income in the broader United States.

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**Figure 6.16: Real Median Household Income in New Hampshire and the United States, 1984 to 2017**



Source: US Census Bureau.

Note: 2017 is most recent year available.

### 6.3.4 Tourism and Travel Trends

According to the state's Division of Travel and Tourism Development, New Hampshire ranks as one of the top ten states with respect to the importance of tourism to the state economy. Visitors to New Hampshire were far more likely to be on a leisure trip, rather than on a business trip. Tourism is driven, in large part, by outdoor seasonal attractions, such as skiing during winter months. There are also periodic attractions, such as NASCAR races and Bike Week. Tourism levels are generally affected by prevailing economic conditions, fuel and travel costs, and weather conditions. Because New Hampshire has no sales tax, many residents from neighboring states often travel to New Hampshire for retail shopping.

Tourist activity in New Hampshire has continued to grow since the most recent recession. Overnight visitor trips increased from 10.2 million in 2011 to 10.9 million in 2017 (the most recent data available), an increase of 6.9 percent. The number of overnight visitor days also increased from 31.3 million in 2011 to 33.1 million in 2017, an increase of 5.8 percent. The continued improvement in the U.S. and regional economies, combined with inexpensive retail gasoline prices, should help these trends continue into the near future.

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**Table 6.3: Tourist Activity in New Hampshire**

<b>Fiscal Year</b>	<b>Overnight Visitor Trips (millions)</b>	<b>Overnight Visitor Days (millions)</b>	<b>Total Spending (\$million)</b>
<b>2011</b>	10.2	31.3	5,057
<b>2013</b>	10.4	31.7	5,227
<b>2014</b>	10.5	32.0	5,376
<b>2015</b>	10.7	32.5	5,403
<b>2016</b>	10.7	32.4	5,364
<b>2017</b>	10.9	33.1	5,516
<b>'11 - '17 Change</b>	6.9%	5.8%	9.1%
<b>CAGR</b>	1.1%	0.9%	1.5%

*Source: Dean Runyan Associates for NH Division of Travel and Tourism Development.*

*Note: 2017 is the most recent data available..*

## 7.0 TRANSPORTATION PROJECTS RELATIVE TO THE NEW HAMPSHIRE TURNPIKE SYSTEM

This section identifies the existing feeder and competitive (diversionary) roads to the New Hampshire Turnpike System and includes future transportation projects slated for New Hampshire that may affect traffic on the System.

### 7.1 FEEDER ROADS

Several roadways direct traffic, or feed, into the Turnpike System. The classification of these roadways varies from interstate highways to arterials and collectors. Some of the feeder roads to the Central Turnpike are:

US Route 3 from Massachusetts	NH Route 130	Bedford Road
I-93	NH Route 111	East Dunstable Road
I-293	Somerset Parkways	Manchester Airport Access Road (Raymond Wieczorek Drive)
I-89	Industrial Drive	NH Route 101
NH Route 101A	Continental Boulevard	

For the Blue Star Highway, some of the feeder roads are:

I-95 from Massachusetts	Spaulding Turnpike	NH Route 101
NH Route 33	NH Route 107	
I-95 from Maine	Market Street	

For the Spaulding Turnpike, some of the feeder roads are:

I-95, the Blue Star Turnpike	US Route 202	NH Route 11
NH Route 125	NH Route 108	
US Route 4	NH Route 155	

### 7.2 COMPETITIVE ROADS

Several roadways compete with the Turnpike System, varying from arterials to collectors. We identified the following parallel routes as the most likely free alternatives for each New Hampshire Turnpike segment:

- Central Turnpike – US Route 3 / NH 3A
- Spaulding Turnpike – Dover Point Rd / NH 9 / NH 108
- Blue Star Turnpike – US Route 1

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### Transportation Projects Relative to the New Hampshire Turnpike System

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#### 7.2.1 Central Turnpike Parallel Routes - US Route 3 and NH 3A

US Route 3 and NH 3A are parallel routes to the Central Turnpike (Figure 7.1). From Nashua, US Route 3 is located west of the Merrimack River until it crosses the river via the Queen City Bridge in Manchester. US Route 3 then continues north along the east side of the river, cutting through downtown Manchester until the route crosses the river again in Concord to run through downtown Concord. NH 3A follows the Merrimack River along the eastern side from Massachusetts and joins I-293 at Exit 2 in Manchester where it crosses the river and continues north along I-293 until it diverges from I-293 at Exit 7. NH 3A then continues north along the west side of the river to Concord where it converges with US Route 3 when US Route 3 crosses back over from the Merrimack River.

The areas of congestion along US Route 3 are generally focused around Webster Street / Elm Street in downtown Manchester to the Budweiser Plant located in Merrimack (FEE Turnpike Exit 10, Merrimack Industrial). An alternative route to US Route 3 to bypass Manchester would be to take I-93 Exit 9 from the north to I-293 southbound and reconnect with US Route 3 at Exit 3.

US Route 3 intersects four times with the Central Turnpike along the route. The four Turnpike exit interchanges are:

- Exit 13 – I-93 / FEE Turnpike in Concord.
- Exit 4 – I-293 / FEE Turnpike in Manchester.
- Exit 3 – I-293 / US Route 3 / NH 3A Interchange.
- Exit 7 – FEE Turnpike / NH101A / US Route 3 split in Nashua.

NH 3A intersects with the Central Turnpike along these Turnpike junctions:

- Exit 12 – I-93 / FEE Turnpike in Concord.
- Exit 11 – FEE Turnpike in Hooksett (Hooksett Ramp Toll Plaza).
- Exit 7 (NB Exit only) – I-293 / FEE Turnpike in Manchester.
- Exit 3 – I-293 / US Route 3 / NH 3A Interchange.

NH 3A also intersects I-93 at Exit 10, which is immediately south of the I-93 junction with the FEE Turnpike.

US Route 3 runs parallel to the Central Turnpike from Nashua to Manchester and drivers going to or from Merrimack can use this alternate route to avoid the Merrimack ramp toll plazas (Merrimack Industrial, Exit 11 and Bedford Road). Drivers traveling on the Central Turnpike can avoid the Bedford Toll Plaza by using the Manchester Airport Access Road (Raymond Wieczorek Drive, FEE Turnpike Exit 13) which opened in 2011. It is possible for drivers to take this exit (from both northbound and southbound directions), make a series of short turns, and re-enter the Turnpike at the same exit, thus bypassing the Bedford Toll Plaza.

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NH 3A runs parallel to the Central Turnpike and is an alternate route that can be taken to avoid the Hooksett Toll Plaza. The roadway is toll free between Exit 3 (FEE Turnpike junction with I-293) in Bedford and FEE Turnpike junction with I-93 in Hooksett. NH 3A connects to the Turnpike at Exit 11 in Hooksett, at Hackett Hill Road where the Hooksett Ramp Toll Plaza is situated as well as at Exit 12 in Concord.

A longer alternate route to the Central Turnpike would be a composite route consisting of the US Route 3 and NH 3A routes from the state line to Concord. Though toll-free, the US Route 3 / NH 3A option is a slower, more congested route than the Central Turnpike, with numerous signalized intersections.

A driver traveling between Exit 3 (FEE Turnpike at I-293) in Manchester and Exit 7 (FEE Turnpike at NH 101A / US Route 3) in the north Nashua area would take approximately 17 minutes to travel the 14 miles on the Central Turnpike versus about 28 minutes on the parallel US Route.

In the Concord area, a driver traveling between Exit 14 (FEE Turnpike at Loudon Road) and FEE Turnpike at I-93 on the Central Turnpike would take approximately 18 minutes whereas it would take approximately 24 minutes to make the 14-mile trip on the parallel NH 3A.

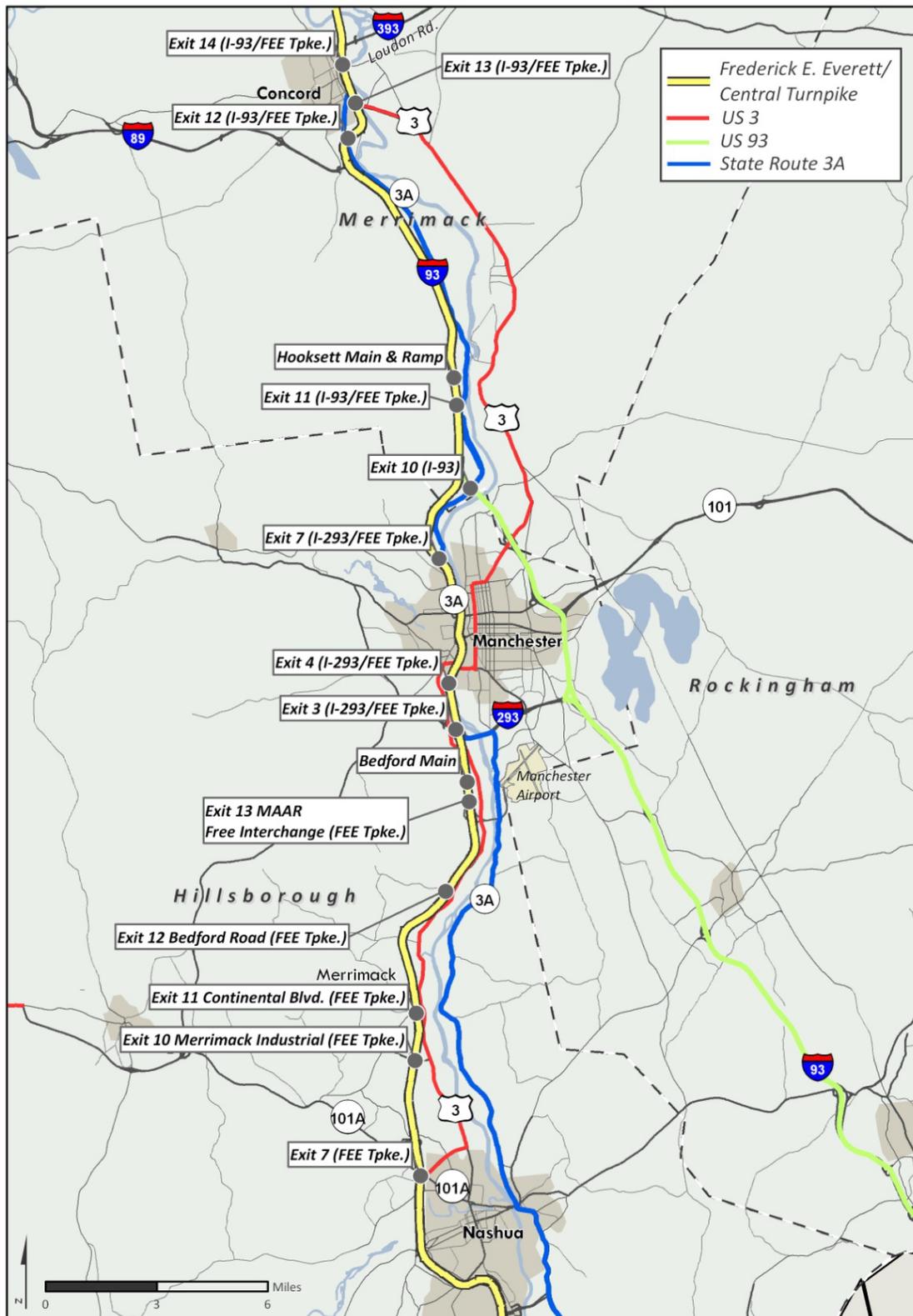
Travel time data were collected to estimate the length of time it would take for a driver to bypass the Bedford Toll Plaza by using the Manchester Airport Access Road. Results show that this total movement adds approximately 2 to 4 minutes to the total travel time on the Central Turnpike. Due to the configuration of the interchange, it takes less time to make this diversion when traveling northbound compared to traveling southbound.

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### Figure 7.1: Central Turnpike and Parallel Routes



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#### 7.2.2 Spaulding Turnpike Parallel Routes - Dover Point Rd / NH 9 / NH 108

The combination of Dover Point Road, NH 9, and NH 108 make up a parallel route that can be used as an alternative to the Spaulding Turnpike (Figure 7.2). Dover Point Road runs parallel with Spaulding Turnpike (NH 16) beginning at Exit 6 and ending at NH 108 in downtown Dover, where Exit 7 also intersects with NH 108. The Dover Mainline Toll Plaza is located between Exits 6 and Exit 7. The travel route path similarity to the Dover Toll Segment makes Dover Point Road a viable alternate route to bypass the toll plaza.

Travel time comparisons in Google Maps between Exit 6 and Exit 8 showed that vehicles that use Dover Point Road would take 11 minutes to traverse the 6 miles, versus 8 minutes on the Turnpike.

NH 108 traverses through downtown Dover and joins with NH 9, which leads to Spaulding Turnpike Exit 8. The two routes share the same travel path until they intersect with NH 16B and the Spaulding Turnpike at Exit 9. NH 108 continues to travel at a parallel path with the Rochester Toll Segment while NH 9 diverts away. NH 108, a major arterial through route in the region, runs along Rochester Hill Road and connects Dover with Rochester. NH 16B also runs parallel to the Turnpike through this region.

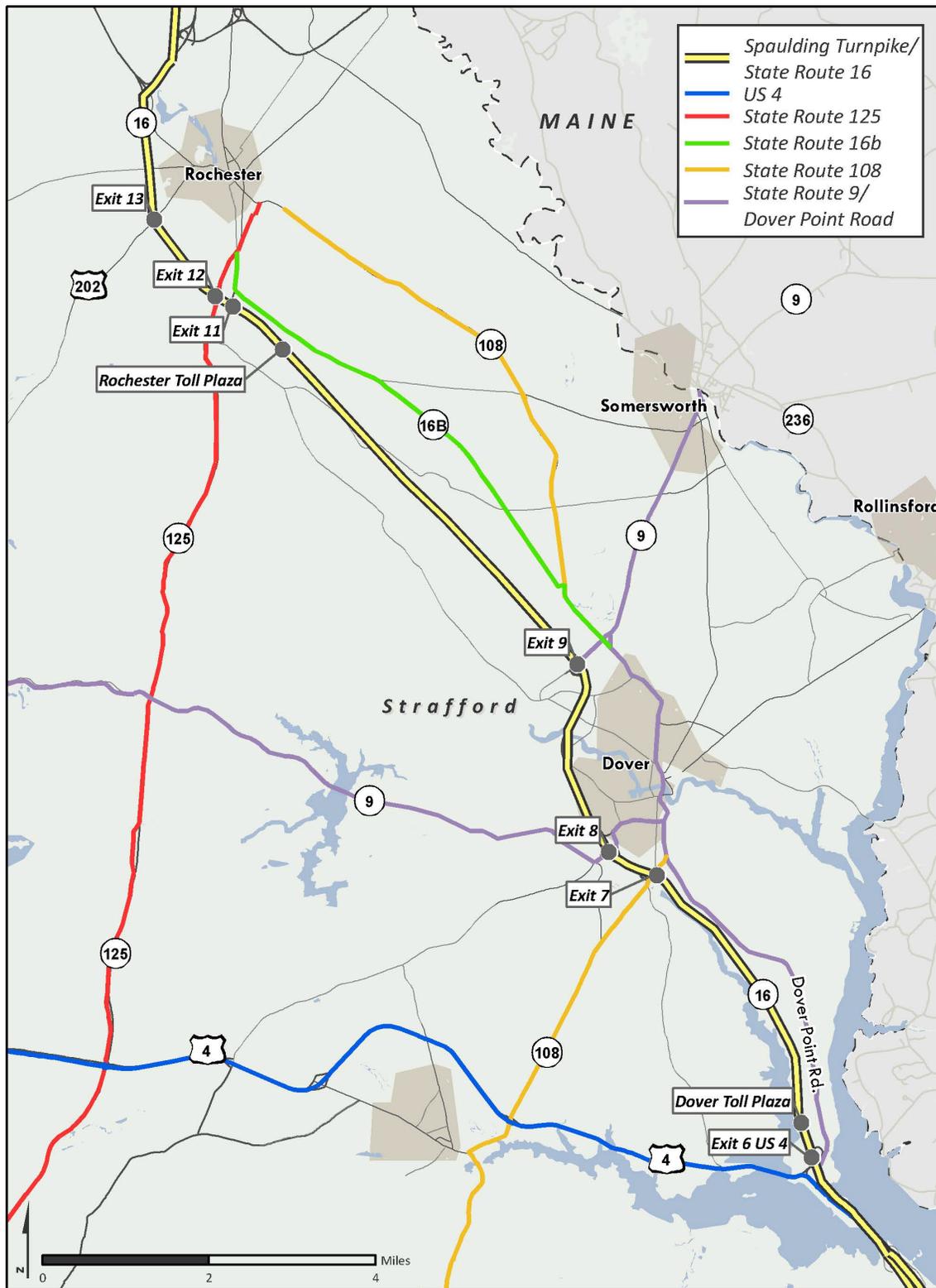
Travel time data comparisons in the Rochester area between Exit 8 and Exit 12 (a distance of 11 miles apart) showed that vehicles that use the combined NH 9 / NH 108 route would take more than double the time than if they used the Spaulding Turnpike (23 minutes on NH 9 / NH 108, versus 11 minutes on the Turnpike). Travel times along NH 16B show similar travel times – 24 minutes.

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### Figure 7.2: Spaulding Turnpike and Parallel Routes



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#### 7.2.3 Blue Star Turnpike Parallel Route - US Route 1

The best alternate route to the Blue Star Turnpike is US Route 1. Like US Route 3 in Merrimack, US Route 1 was the only major north-south arterial before the Turnpike was built. US Route 1 is the only accessible route that allows a bypass of the Hampton Toll Plaza (Exit 2) from Massachusetts (Figure 7.3). Starting at Blue Star Turnpike Exit 1 Junction, US Route 1 runs parallel with the Turnpike and reconnects with the Blue Star and Spaulding Turnpikes at Portsmouth Circle. The next toll-free interchange access to the Blue Star Turnpike after the Hampton Main Toll Plaza is 6.9 miles, where NH 33 carries commercial traffic from the Pease International Tradeport.

Travel time data in the Hampton area between Exit 1 (NH 107) and Exit 5 revealed that the use of the alternate route of US Route 1 would take more than twice as long (36 minutes) as driving the 14 miles on the Blue Star Turnpike, which would take approximately 13 minutes.

#### 7.2.4 Summary of Alternate Routes

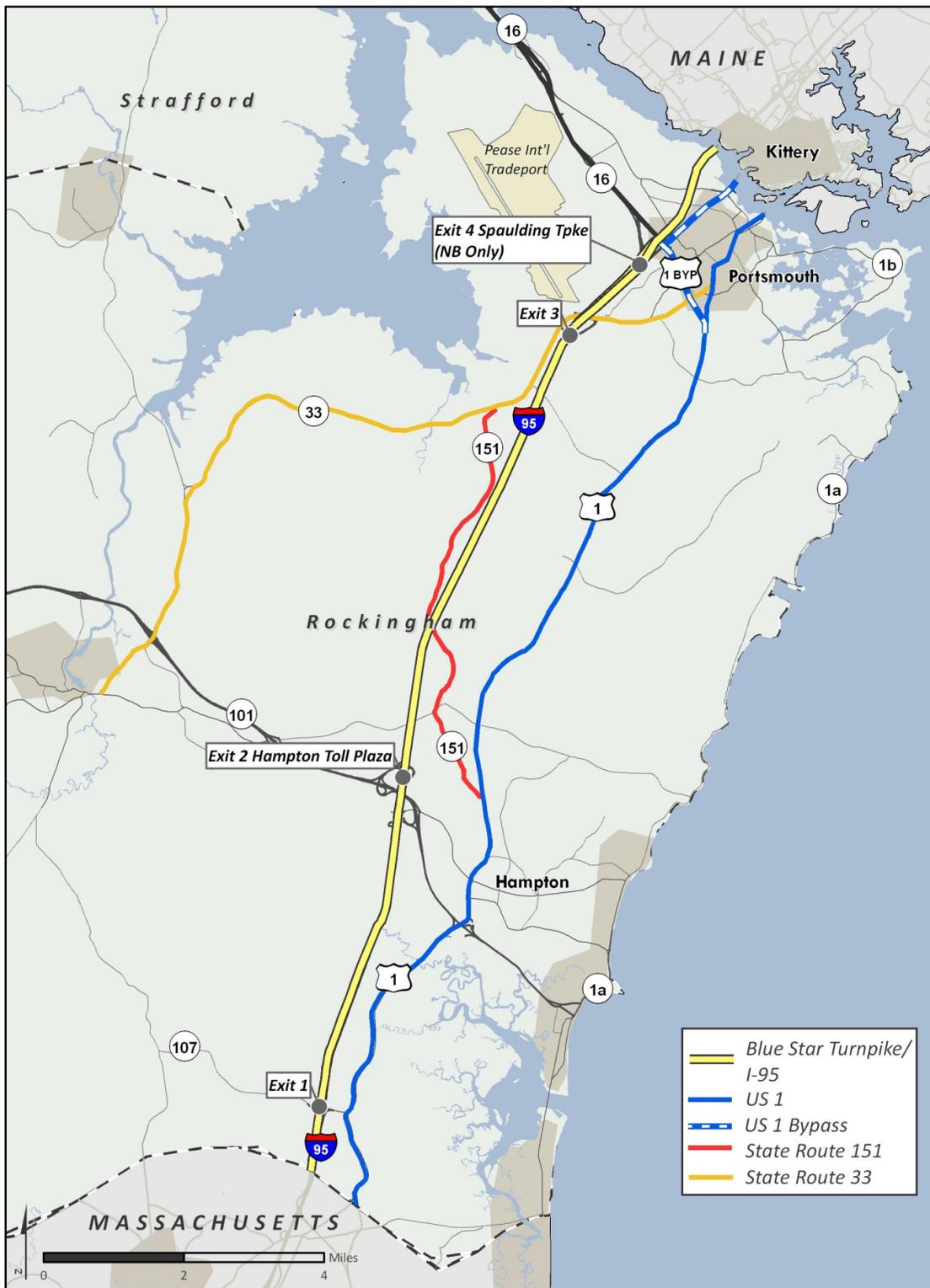
A review of the alternate routes suggests that at all toll locations on the entire New Hampshire Turnpike System, there are often alternate routes for those choosing not to pay a toll. For longer trips, free alternative routes are not preferable, due to their slower speeds, varying degrees of congestion, and often, traffic signals. In the Merrimack area, however, there were only one-to-two minute variations in travel time on tolled and free routes for short, local trips. The local ramp toll facilities appear to be primarily used by long distance trips either beginning or terminating at locations in relatively close proximity to these exits.

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### Figure 7.3: Blue Star Turnpike and Parallel Routes



## 7.3 POTENTIAL FUTURE TRANSPORTATION PROJECTS

There are several potential highway projects scheduled for completion in the forecast period that may impact traffic volumes on the NH Turnpike System. These projects were drawn from the Turnpike System Priority Capital Program and the Ten-Year Improvement Plan for 2009 to 2028, as well as from regional Transportation Improvement Programs (TIPs) developed by the largest metropolitan planning organizations (MPOs) in the state. Projects from the Priority Capital Program are identified by the State Number in parentheses for clarification. Potential future highway and projects that can potentially impact traffic on the NH Turnpike System are summarized in the following sections.

### 7.3.1 Central (Everett) Turnpike Region

Major transportation improvement projects programmed for funding or recently completed that could affect volumes on the Central Turnpike are:

Deployment of Intelligent Transportation Systems along the Central (F.E. Everett) Turnpike (29408) – Construction is now two-thirds complete and full completion is expected autumn 2019. This could result in improvements in future traffic flow.

Open Road Tolling (ORT) Implementation at Bedford (16100) – Previously planned ORT improvements have been discontinued, and AET feasibility is being assessed. Hooksett ORT was completed in 2013, while Bedford ORT had been slated for completion in FY 18. Pending the completion of the project's re-assessment, construction is planned to begin mid-2020. Note that conversion to AET at the Bedford toll plaza has *not* been considered in Stantec's traffic and revenue forecasts.

Nashua-Merrimack-Bedford FEET Turnpike Widening (13761) – This project will widen the Turnpike from Exit 8 in Nashua to I-293 in Bedford. Design work has is nearly complete, and construction is expected to start in FY 2021. No traffic changes have been assumed during the forecast period.

Bow-Concord I-93 (13742) – I-93 is planned to be widened from I-89 to the limit of the F.E. Everett Turnpike at Exit 14. Public hearings for the project were held in 2017 and 2018, and construction is forecasted to begin in 2026. No traffic changes have been assumed during the forecast period.

Manchester Exit 6 & 7 – This project is on I-293 (FEET) in Manchester and will reconstruct the Exit 6 Interchange (Amoskeag circle) and provide a new interchange for Exit 7 (NH 3A). The project will also consist of roadway widening and bridge work in this area. This project could temporarily decrease traffic on the Central Turnpike in Manchester from friction that routinely occurs with construction, however all traffic lanes would be available during construction. Construction is anticipated to start in 2023.

### 7.3.2 Blue Star Turnpike Region

No major transportation improvement projects that would impact Blue Star Turnpike traffic are planned at this time.

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#### 7.3.3 Spaulding Turnpike Region

Planned transportation improvement projects that could affect traffic volumes on the Spaulding Turnpike include:

Newington-Dover Turnpike Widening (11238) – This project involves the widening of the Spaulding Turnpike between Exit 1 and the Dover Toll Plaza, just north of Exit 6, with improvements to interchanges, bridge widening and rehabilitation, and construction of park 'n ride lots. The southbound Little Bay Bridge widening and park n' ride lots at Dover and Rochester have been completed, while the Newington portion of the widening was completed in the fall of 2016. The Dover portion of the widening is anticipated to be completed in FY 2021. Similar to the Turnpike expansion in Rochester, some additional traffic and revenue growth is expected after the roadway is fully widened. This is reflected explicitly in the forecast.

Improvements at Dover and Rochester Toll Plazas (29440) – All-electronic tolling (AET) was chosen to be implemented at the Dover and Rochester Toll plazas. The AET conversion will be completed in the summer of 2021. AET conversions are associated with decreases in toll revenue and increases in fee revenue. The forecast reflects these impacts.

Nearly \$500 million in funded capital improvements that are planned for the FY 2019 through FY 2028 time period will have a positive effect on the New Hampshire Turnpike System improving customer satisfaction and making travel safer and less congested. In terms of traffic and revenue, the improvements will provide capacity for the growth that has been projected.

## 8.0 TRAFFIC AND REVENUE PROJECTIONS, 2020 - 2029

This section discusses the methodologies and assumptions used in projecting traffic and revenue for the New Hampshire Turnpike System. It presents the traffic and revenue projections for FY 2020 through FY 2029.

### 8.1 TOLL RATES

#### 8.1.1 Assumed Toll Rates

No toll increases have been assumed during the forecast period. Table 8.1 shows the cash and **E-ZPass** toll rates for passenger cars (Class 1) and Class 8 (five-axle) trucks. Note that the **E-ZPass** toll applies only for New Hampshire **E-ZPass** accounts. Patrons with **E-ZPass** from other agencies are charged the same toll rate as cash. Cash tolls apply to drivers from both New Hampshire and other agencies. Overall 48% of cars and 29% of trucks pay the discounted rate **E-ZPass**.

**Table 8.1: Toll Rates for Select Vehicle Classes on the New Hampshire Turnpike System**

Turnpike	Toll Plaza	Car (Class 1) Tolls		Five-Axle Truck (Class 8) Tolls	
		Cash	E-ZPass <sup>1</sup>	Cash	E-ZPass <sup>1</sup>
Central Turnpike	Hooksett Main	\$ 1.00	\$ 0.70	\$ 3.50	\$ 3.15
	Hooksett Ramp	\$ 0.50	\$ 0.35	\$ 2.50	\$ 2.25
	Bedford Main	\$ 1.00	\$ 0.70	\$ 3.50	\$ 3.15
	Exit 11	\$ 0.50	\$ 0.35	\$ 2.50	\$ 2.25
	Exit 10/Merrimack Industrial	\$ 0.50	\$ 0.35	\$ 2.50	\$ 2.25
Blue Star Turnpike	Hampton Main	\$ 2.00	\$ 1.40	\$ 5.50	\$ 4.95
	Hampton Side	\$ 0.75	\$ 0.53	\$ 3.00	\$ 2.70
Spaulding Turnpike	Dover Toll	\$ 0.75	\$ 0.53	\$ 3.00	\$ 2.70
	Rochester Toll	\$ 0.75	\$ 0.53	\$ 3.00	\$ 2.70

<sup>1</sup>Tolls for patrons with New Hampshire-issued **E-ZPass** transponders. Patrons with **E-ZPass** transponders issued by other agencies pay the cash toll rate

#### 8.1.2 Reasonableness of Tolls / Comparison to Other E-ZPass Toll Facilities

Figure 8.1 compares the passenger car toll rates in cents per mile on the Blue Star, Spaulding and Central Turnpikes to other various **E-ZPass** toll roads in the northeastern quadrant of the U.S.A. Standard peak period toll rates are shown for each facility. A discounted **E-ZPass** toll rate is shown for those facilities that offer discounted **E-ZPass**. The Blue Star Turnpike has the highest passenger car per-mile toll rate of the three New Hampshire Turnpikes, but there are still thirteen major **E-ZPass** toll roads that have higher cash toll rates. The Central Turnpike and Spaulding Turnpikes are among the toll facilities with the lowest passenger car toll rates per mile. It can be said that the New Hampshire Turnpike passenger car toll rates are reasonable or below average compared to toll rates at other **E-ZPass** toll facilities.

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## Traffic and Revenue Projections, 2020 - 2029

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**Figure 8.1: Passenger Car Toll Rates per Mile on Select E-ZPass Toll Facilities**

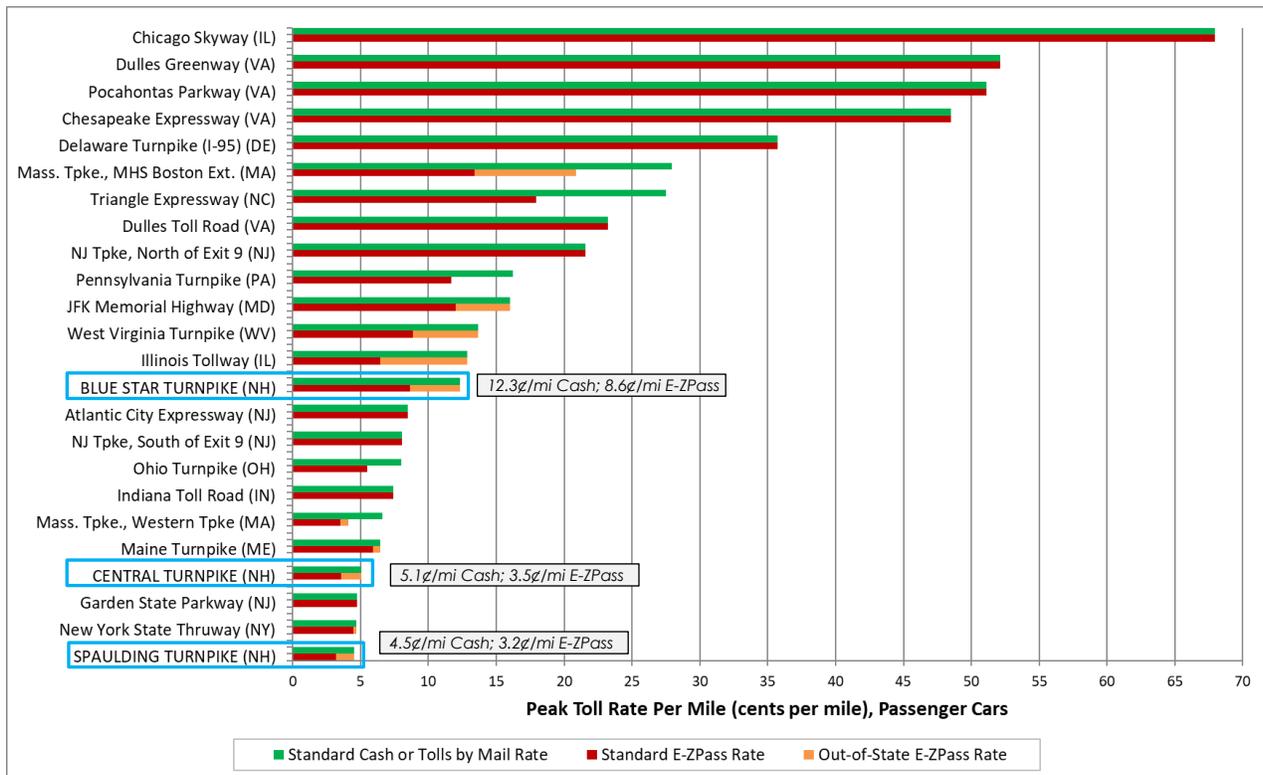


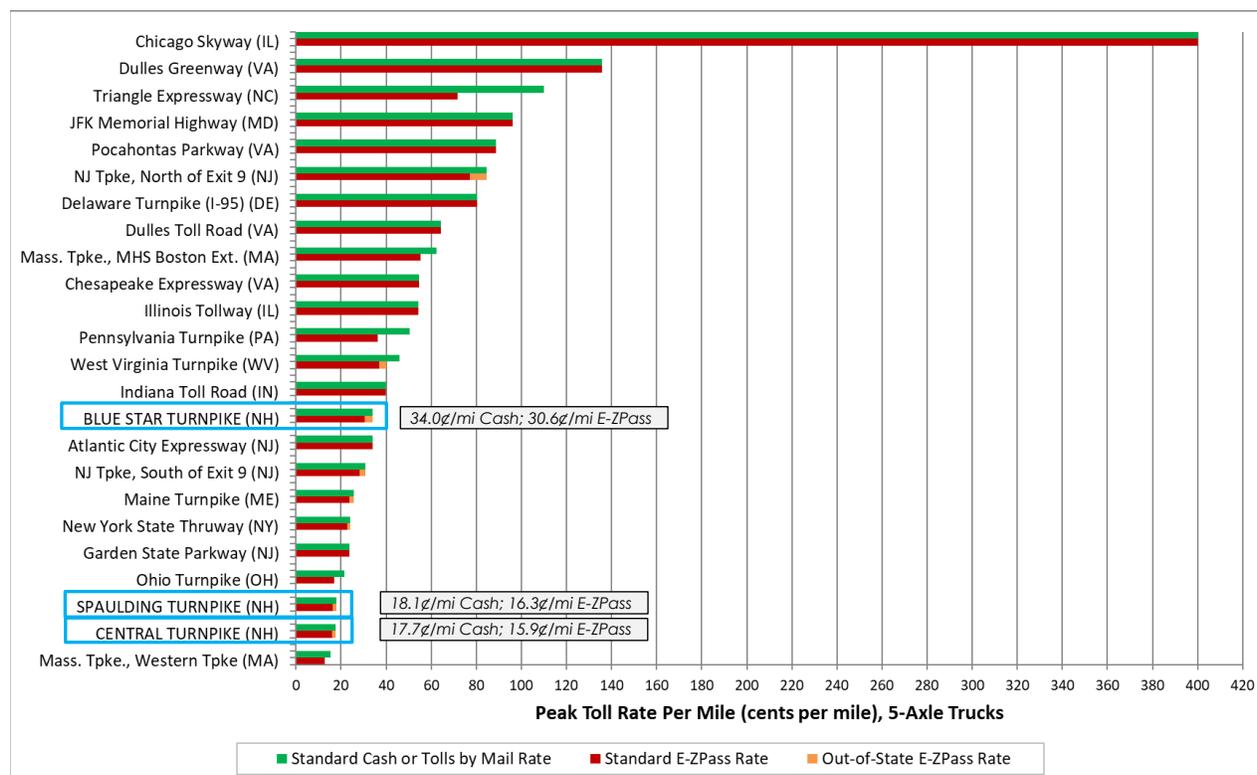
Figure 8.2 shows a similar comparison for five-axle vehicles. Again, although the Blue Star Turnpike has the highest toll rates of the three New Hampshire toll facilities, there are fourteen major **E-ZPass** toll facilities that have higher five-axle truck toll rates. Both the Central and Spaulding Turnpikes are among the toll facilities with low commercial toll rates per mile. It can be said that the New Hampshire Turnpike commercial vehicle toll rates are reasonable or below average compared to other **E-ZPass** toll facilities.

# NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

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**Figure 8.2: Commercial Vehicle Toll Rates on Select E-ZPass Toll Facilities**



## 8.2 METHODOLOGY USED FOR TRAFFIC AND REVENUE FORECASTS

### 8.2.1 Fiscal Year 2019 Estimates

The first step in the forecasting process was to develop model estimates for FY 2019 based on unaudited actuals. For each location, the historical patterns of seasonal growth were determined based on fiscal years 2015 through 2018, and this same pattern was applied to each location based upon the most recent 2019 data available.

### 8.2.2 Correlation to Economic Factors

The second step in developing the traffic and revenue projections was to develop a base of FY 1991 through FY 2019 toll transactions. Historical car toll transaction growth was then correlated to gross domestic product (GDP) and historical truck growth was correlated to increases in the U.S. total industrial production (IPI).

Future car and truck toll transactions were projected separately by applying the historical correlations to projected GDP and total IPI growth rates estimated by industry experts in the Blue Chip Economic Indicators. We expect that traffic growth throughout the forecast period will not be as high as it was in the

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1990s and early 2000s, due to such factors as Baby Boomers retiring, younger people driving less and technology making road travel less necessary, as discussed in Section 6.0 of this report. Therefore, some dampening was also applied to traffic growth rates over the forecast years.

#### 8.2.3 E-ZPass Market Shares

**E-ZPass** market shares were then projected for each facility separately for cars and trucks, and these market shares were applied to obtain projected cash and **E-ZPass** transactions. The market share projections were based on observing the growth in **E-ZPass** market share over the past several years. A maximum market share for each facility was assumed to be reached by FY 2026. Most of the growth in market share would be in the first few years of the forecast, with gradually less growth in market share in each subsequent year until the maximum is reached.

Additionally, as **E-ZPass** tags that are issued by the New Hampshire DOT (“Home”) are assessed a lower toll rate than other **E-ZPass** tags (“Away”), it was necessary to estimate future “Home” versus “Away” **E-ZPass** customers to calculate toll revenue correctly. In recent years, the “Home” share of **E-ZPass** trips at each toll location has generally declined slightly, as other states such as Ohio and Rhode Island installed electronic tolling technology at their facilities and began issuing **E-ZPass** tags themselves. Additionally, the Massachusetts Department of Transportation (MassDOT) converted to all-electronic tolling in FY 2017 and saw a large increase in E-ZPass market penetration with their issuance of free transponders, further contributing to this trend. We assumed that the future ratio of “Home” to “Away” transactions would stay the same as it is today, and not continue to decline. This may be a slightly conservative assumption, as a declining “Home” share means an increasing “Away” share, and “Away” **E-ZPass** traffic does not receive a discount.

The average cash and **E-ZPass** toll rates were then applied to the projected annual cash and **E-ZPass** transactions, respectively, in order to determine total cash and **E-ZPass** toll revenues for the period FY 2019-2029.

#### 8.2.4 System Changes and Developments

Some recent and future changes to the New Hampshire Turnpike System and its environs were investigated further to determine their effects on traffic and toll revenue. The Bedford Road (Exit 12) toll plazas were removed in July 2014, eliminating a small revenue source and shifting some traffic away from the nearby Exit 11 ramp plazas. The opening of the Manchester Airport Access Road (MAAR) with its free interchange on the Turnpike in November 2011 and the opening of the Merrimack Premium Outlets in June 2012 affected traffic at certain plazas on the Central Turnpike for a couple of years; however, no further traffic shifts are expected. In addition, open-road tolling (ORT) has commenced at several mainline plazas in recent years. This change has not caused any noticeable traffic or revenue changes; therefore, we have estimated that converting other plazas to include ORT will not affect their traffic or the revenue collected.

Two system changes are expected to have an effect on traffic and revenue: the conversion of the Dover and Rochester mainline plazas to all-electronic tolling (AET), and the widening of sections of the Spaulding Turnpike.

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#### 8.2.4.1 All-Electronic Tolling (AET) Conversion

In our base forecast, All Electronic Tolling (AET) is set to begin at the Dover and Rochester mainline plazas in July 2021, the beginning of FY 2022.

Additional analysis is necessary for facilities converting to AET, because there are some uncollectable revenues associated with Video Tolling. In addition, Video Tolling often requires more time to collect compared to E-ZPass. It can take several months after a trip is made to invoice and collect tolls from these customers.

Based upon Stantec's experience with other AET facilities, we are assuming no additional traffic growth at the two toll locations due to AET implementation. Stantec assumed that AET conversion would not change customer behavior in terms of payment type; cash customers will by default become Video Tolling customers. A fixed percentage of Video Tolling revenue was deemed uncollectable based upon comparable systems. The uncollectability of Video Tolling revenues is due to numerous independent variables that each cause changes to the ultimate amount of revenue collected, as described below:

Non-Usable Video Images: Not all license plates are readable due to various reasons such as weather or obstructions, or the plate may be a temporary one in the window of the vehicle, or it may be missing. In addition, there could be technical issues with the camera (image is too bright, dark, or blurry) or the plate may be out of view of the camera.

Business Rules: If the cost of collecting from certain customers is higher than the revenue that could potentially be collected, it is often not feasible to go after these customers. Agencies have business rules that determine which Video Tolling customers they will and will not pursue, which could change over time. For example, many agencies do not pursue customers with non-U.S. license plates because there is no DMV agreement in place to obtain vehicle ownership/registration information.

Invalid DMV record: A number of license plates do not match to valid DMV records, and therefore an invoice cannot be sent to these drivers.

Invalid Addresses: Many people who move do not change their address attached to their DMV vehicle registration and do not have mail forwarded; therefore, they would not be able to receive a Video Tolling invoice. When the first invoice is returned to the Department because of a bad address, another invoice would not be sent.

Nonpayment of Toll Bills / Violators: Of customers who receive toll bills, a certain share pay after receiving the first invoice, which includes a \$1 processing fee per transaction. Those that do not pay receive a second invoice for the toll amount plus a \$1.50 processing fee per transaction. If this is not paid, a third invoice is sent ("Violations Notice") which currently includes an Administrative fee of \$25 per transaction.

Dismissals/Forgiveness: AET facilities typically offer forgiveness of late fees or violations and dismissal of tolls for a very small share of customers. Reasons include incorrect identification of license plates, transponders mistakenly charged more than once for a trip, and other such errors or disputes.

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#### 8.2.4.2 Spaulding Turnpike Construction and Widening

About five miles of the Spaulding Turnpike were widened in the Rochester area between FY 2008 and FY 2013. Traffic growth was strong immediately following the completion of the widening north of the Rochester Toll Plaza, growing at an average annual rate of 6 percent between FY 2014 and FY 2016. However, the most recent data has shown traffic growth reduced to an average of 2.5 percent annually over FY 2016-FY 2018.

Currently, NHDOT is widening the Spaulding Turnpike and Little Bay Bridges in the Dover area. As this project has been under construction for several years without any apparent reduction in traffic volumes – since the NHDOT has maintained and will continue to maintain two lanes of traffic during construction – no traffic reductions have been assumed in our Dover Toll Plaza traffic forecasts. In addition, since this project adds new capacity to the Turnpike, we have assumed that when the construction is essentially completed in FY 2020 that there will be an additional increase in traffic of 2.0 percent (beyond forecasted background growth) and an additional increase in traffic of 1.0 percent each year for the following years until the end of the 11-year forecast period.

### 8.3 TOLL TRANSACTION PROJECTIONS BY TURNPIKE

The FY 2018 actual and projected future annual toll transactions on the New Hampshire Turnpike System during the period FY 2018-2029 are presented in Table 8.2. No toll increases are assumed in these forecasts. For reference, historical annual toll transactions were shown earlier in Table 3.1. A detailed summary of traffic, revenue, and **E-ZPass** market share by facility is presented in Table 8.3.

**Table 8.2: FY 2018 and Projected Annual Toll Transactions, FY 2018-2029 (in millions)**

Fiscal Year	Central Turnpike	Blue Star Turnpike	Spaulding Turnpike	Total
<b>2018 (Actual)</b>	55.3	41.1	25.8	122.1
<b>2019 <sup>1</sup></b>	55.9	41.6	26.2	123.7
<b>2020</b>	56.6	42.2	26.5	125.3
<b>2021</b>	57.0	42.6	27.1	126.7
<b>2022</b>	57.6	43.1	27.5	128.2
<b>2023</b>	58.1	43.6	28.0	129.7
<b>2024</b>	58.6	44.1	28.5	131.2
<b>2025</b>	59.2	44.6	29.0	132.8
<b>2026</b>	59.7	45.2	29.5	134.4
<b>2027</b>	60.3	45.7	30.0	136.0
<b>2028</b>	60.8	46.3	30.5	137.6
<b>2029</b>	61.4	46.8	31.0	139.3

*Note: Data will not necessarily add to totals because of rounding.*

*<sup>1</sup> FY2019 are unaudited actuals.*

**Table 8.3: Detailed Traffic and Revenue, FY 2018 Actual, FY 2019 Unaudited Actual, and FY 2020-2029 Projections**

Barriers/Ramps	Actual	18-19	Actual	Projected																			
	2018	Growth	2019 (1)	19-20 Growth	2020	20-21 Growth	2021	21-22 Growth	2022	22-23 Growth	2023	23-24 Growth	2024	24-25 Growth	2025	25-26 Growth	2026	26-27 Growth	2027	27-28 Growth	2028	28-29 Growth	2029
<b>CENTRAL TPKE</b>																							
Hooksett Barrier	28.3	0.89%	28.6	1.30%	29.0	0.81%	29.2	0.92%	29.5	0.93%	29.7	0.93%	30.0	0.93%	30.3	0.93%	30.6	0.93%	30.9	0.93%	31.2	0.93%	31.5
Hooksett Ramp	3.1	2.43%	3.2	0.18%	3.2	0.82%	3.2	0.93%	3.3	0.95%	3.3	0.95%	3.3	0.97%	3.4	0.97%	3.4	0.97%	3.4	0.97%	3.5	0.97%	3.5
Bedford Barrier	17.8	1.53%	18.1	1.15%	18.3	0.81%	18.5	0.92%	18.6	0.93%	18.8	0.93%	19.0	0.93%	19.1	0.93%	19.3	0.93%	19.5	0.93%	19.7	0.93%	19.9
Exit 11 Ramp	3.2	2.02%	3.3	2.50%	3.4	0.80%	3.4	0.91%	3.4	0.91%	3.5	0.91%	3.5	0.92%	3.5	0.92%	3.6	0.92%	3.6	0.92%	3.6	0.92%	3.7
Exit 10 Ramp	2.7	-0.76%	2.7	0.21%	2.7	0.81%	2.7	0.91%	2.8	0.92%	2.8	0.92%	2.8	0.92%	2.8	0.92%	2.9	0.92%	2.9	0.92%	2.9	0.92%	2.9
<b>Subtotal</b>	<b>55.3</b>	<b>1.17%</b>	<b>55.9</b>	<b>1.21%</b>	<b>56.6</b>	<b>0.81%</b>	<b>57.0</b>	<b>0.92%</b>	<b>57.6</b>	<b>0.93%</b>	<b>58.1</b>	<b>0.93%</b>	<b>58.6</b>	<b>0.93%</b>	<b>59.2</b>	<b>0.93%</b>	<b>59.7</b>	<b>0.93%</b>	<b>60.3</b>	<b>0.93%</b>	<b>60.8</b>	<b>0.93%</b>	<b>61.4</b>
<b>BLUE STAR TPKE</b>																							
Hampton Barrier	25.6	1.63%	26.0	1.20%	26.3	1.06%	26.6	1.10%	26.9	1.21%	27.2	1.22%	27.5	1.22%	27.9	1.22%	28.2	1.23%	28.6	1.23%	28.9	1.23%	29.3
Hampton Ramp	15.5	0.73%	15.6	1.62%	15.9	1.04%	16.0	1.06%	16.2	1.17%	16.4	1.18%	16.6	1.18%	16.8	1.18%	17.0	1.18%	17.2	1.18%	17.4	1.18%	17.6
<b>Subtotal</b>	<b>41.1</b>	<b>1.29%</b>	<b>41.6</b>	<b>1.36%</b>	<b>42.2</b>	<b>1.05%</b>	<b>42.6</b>	<b>1.09%</b>	<b>43.1</b>	<b>1.19%</b>	<b>43.6</b>	<b>1.20%</b>	<b>44.1</b>	<b>1.21%</b>	<b>44.6</b>	<b>1.21%</b>	<b>45.2</b>	<b>1.21%</b>	<b>45.7</b>	<b>1.21%</b>	<b>46.3</b>	<b>1.21%</b>	<b>46.8</b>
<b>SPAULDING TPKE</b>																							
Dover Barrier	15.3	1.31%	15.5	0.90%	15.6	2.92%	16.1	2.03%	16.4	2.03%	16.8	2.13%	17.1	2.13%	17.5	2.14%	17.9	2.14%	18.2	2.14%	18.6	2.14%	19.0
Rochester Barrier	10.5	2.65%	10.8	0.93%	10.9	0.92%	11.0	1.02%	11.1	1.03%	11.2	1.13%	11.4	1.13%	11.5	1.13%	11.6	1.13%	11.7	1.13%	11.9	1.13%	12.0
<b>Subtotal</b>	<b>25.8</b>	<b>1.47%</b>	<b>26.2</b>	<b>1.30%</b>	<b>26.5</b>	<b>2.09%</b>	<b>27.1</b>	<b>1.62%</b>	<b>27.5</b>	<b>1.63%</b>	<b>28.0</b>	<b>1.73%</b>	<b>28.5</b>	<b>1.73%</b>	<b>29.0</b>	<b>1.74%</b>	<b>29.5</b>	<b>1.74%</b>	<b>30.0</b>	<b>1.74%</b>	<b>30.5</b>	<b>1.75%</b>	<b>31.0</b>
<b>TOTAL:</b>	<b>122.1</b>	<b>1.27%</b>	<b>123.7</b>	<b>1.28%</b>	<b>125.3</b>	<b>1.16%</b>	<b>126.7</b>	<b>1.12%</b>	<b>128.2</b>	<b>1.17%</b>	<b>129.7</b>	<b>1.19%</b>	<b>131.2</b>	<b>1.20%</b>	<b>132.8</b>	<b>1.20%</b>	<b>134.4</b>	<b>1.20%</b>	<b>136.0</b>	<b>1.20%</b>	<b>137.6</b>	<b>1.21%</b>	<b>139.3</b>

**Total Toll Revenue (millions)**

Barriers/Ramps	Actual	18-19	Actual	Projected																			
	2018	Growth	2019 (1)	19-20 Growth	2020	20-21 Growth	2021	21-22 Growth	2022	22-23 Growth	2023	23-24 Growth	2024	24-25 Growth	2025	25-26 Growth	2026	26-27 Growth	2027	27-28 Growth	2028	28-29 Growth	2029
<b>CENTRAL TPKE</b>																							
Hooksett Barrier	\$26.4	0.46%	\$26.5	1.42%	\$26.9	0.69%	\$27.1	0.83%	\$27.3	0.89%	\$27.5	0.92%	\$27.8	0.95%	\$28.0	0.96%	\$28.3	1.00%	\$28.6	1.00%	\$28.9	1.00%	\$29.2
Hooksett Ramp	\$1.6	5.95%	\$1.7	1.16%	\$1.7	0.72%	\$1.7	0.88%	\$1.7	0.98%	\$1.8	1.00%	\$1.8	1.05%	\$1.8	1.06%	\$1.8	1.10%	\$1.8	1.10%	\$1.9	1.10%	\$1.9
Bedford Barrier	\$16.3	2.66%	\$16.7	1.34%	\$16.9	0.66%	\$17.0	0.81%	\$17.2	0.87%	\$17.3	0.90%	\$17.5	0.93%	\$17.6	0.94%	\$17.8	1.00%	\$18.0	1.00%	\$18.2	1.00%	\$18.3
Exit 11 Ramp	\$1.3	5.41%	\$1.4	0.26%	\$1.4	0.62%	\$1.4	0.76%	\$1.4	0.81%	\$1.4	0.85%	\$1.4	0.87%	\$1.5	0.89%	\$1.5	0.95%	\$1.5	0.95%	\$1.5	0.95%	\$1.5
Exit 10 Ramp	\$1.3	0.37%	\$1.3	-0.11%	\$1.3	0.70%	\$1.3	0.84%	\$1.3	0.89%	\$1.3	0.91%	\$1.3	0.93%	\$1.4	0.94%	\$1.4	0.98%	\$1.4	0.98%	\$1.4	0.98%	\$1.4
<b>Subtotal</b>	<b>\$46.9</b>	<b>1.34%</b>	<b>\$47.5</b>	<b>1.52%</b>	<b>\$48.2</b>	<b>0.68%</b>	<b>\$48.5</b>	<b>0.82%</b>	<b>\$48.9</b>	<b>0.89%</b>	<b>\$49.4</b>	<b>0.91%</b>	<b>\$49.8</b>	<b>0.94%</b>	<b>\$50.3</b>	<b>0.95%</b>	<b>\$50.8</b>	<b>1.00%</b>	<b>\$51.3</b>	<b>1.00%</b>	<b>\$51.8</b>	<b>1.00%</b>	<b>\$52.3</b>
<b>BLUE STAR TPKE</b>																							
Hampton Barrier	\$54.1	1.56%	\$54.9	1.57%	\$55.8	1.09%	\$56.4	1.19%	\$57.0	1.33%	\$57.8	1.36%	\$58.6	1.37%	\$59.4	1.38%	\$60.2	1.40%	\$61.0	1.40%	\$61.9	1.40%	\$62.8
Hampton Ramp	\$11.2	1.59%	\$11.4	1.60%	\$11.6	0.97%	\$11.7	1.08%	\$11.8	1.23%	\$12.0	1.28%	\$12.1	1.29%	\$12.3	1.31%	\$12.4	1.35%	\$12.6	1.35%	\$12.8	1.36%	\$12.9
<b>Subtotal</b>	<b>\$65.3</b>	<b>1.41%</b>	<b>\$66.2</b>	<b>1.73%</b>	<b>\$67.3</b>	<b>1.07%</b>	<b>\$68.1</b>	<b>1.17%</b>	<b>\$68.9</b>	<b>1.31%</b>	<b>\$69.8</b>	<b>1.35%</b>	<b>\$70.7</b>	<b>1.36%</b>	<b>\$71.7</b>	<b>1.36%</b>	<b>\$72.6</b>	<b>1.39%</b>	<b>\$73.7</b>	<b>1.39%</b>	<b>\$74.7</b>	<b>1.39%</b>	<b>\$75.7</b>
<b>SPAULDING TPKE</b>																							
Dover Barrier	\$10.2	1.76%	\$10.4	1.21%	\$10.5	2.77%	\$10.8	-8.97%	\$9.8	5.56%	\$10.4	2.28%	\$10.6	2.28%	\$10.9	2.27%	\$11.1	2.22%	\$11.4	2.22%	\$11.6	2.22%	\$11.9
Rochester Barrier	\$7.0	2.96%	\$7.2	1.09%	\$7.3	0.77%	\$7.3	-10.90%	\$6.5	4.89%	\$6.9	1.28%	\$6.9	1.28%	\$7.0	1.27%	\$7.1	1.21%	\$7.2	1.21%	\$7.3	1.21%	\$7.4
<b>Subtotal</b>	<b>\$17.2</b>	<b>2.25%</b>	<b>\$17.6</b>	<b>1.16%</b>	<b>\$17.8</b>	<b>1.95%</b>	<b>\$18.2</b>	<b>-9.75%</b>	<b>\$16.4</b>	<b>5.29%</b>	<b>\$17.2</b>	<b>1.88%</b>	<b>\$17.6</b>	<b>1.89%</b>	<b>\$17.9</b>	<b>1.88%</b>	<b>\$18.2</b>	<b>1.82%</b>	<b>\$18.6</b>	<b>1.83%</b>	<b>\$18.9</b>	<b>1.83%</b>	<b>\$19.3</b>
<b>TOTAL:</b>	<b>\$129.4</b>	<b>1.50%</b>	<b>\$131.3</b>	<b>1.58%</b>	<b>\$133.4</b>	<b>1.04%</b>	<b>\$134.8</b>	<b>-0.42%</b>	<b>\$134.2</b>	<b>1.64%</b>	<b>\$136.4</b>	<b>1.26%</b>	<b>\$138.1</b>	<b>1.27%</b>	<b>\$139.9</b>	<b>1.28%</b>	<b>\$141.7</b>	<b>1.31%</b>	<b>\$143.5</b>	<b>1.31%</b>	<b>\$145.4</b>	<b>1.31%</b>	<b>\$147.3</b>

**E-ZPass Market Shares**

Barriers/Ramps	Actual	18-19	Actual	Projected																			
	2018	Growth	2019 (1)	19-20 Growth	2020	20-21 Growth	2021	21-22 Growth	2022	22-23 Growth	2023	23-24 Growth	2024	24-25 Growth	2025	25-26 Growth	2026	26-27 Growth	2027	27-28 Growth	2028	28-29 Growth	2029
<b>CENTRAL TPKE</b>																							
Hooksett Barrier	74.8%	1.8%	76.6%	0.3%	76.9%	0.8%	77.7%	0.6%	78.3%	0.5%	78.8%	0.4%	79.2%	0.3%	79.5%	0.3%	79.7%	0.0%	79.7%	0.0%	79.7%	0.0%	79.7%
Hooksett Ramp	73.1%	1.9%	75.0%	0.3%	75.3%	0.7%	76.0%	0.6%	76.6%	0.5%	77.1%	0.3%	77.4%	0.3%	77.7%	0.2%	78.0%	0.0%	78.0%	0.0%	78.0%	0.0%	78.0%
Bedford Barrier	77.7%	1.7%	79.4%	0.4%	79.8%	0.8%	80.6%	0.6%	81.2%	0.5%	81.7%	0.3%	82.0%	0.3%	82.3%	0.2%	82.6%	0.0%	82.6%	0.0%	82.6%	0.0%	82.6%
Exit 11 Ramp	82.3%	1.5%	83.8%	0.7%	84.5%	0.8%	85.3%	0.6%	85.9%	0.5%	86.4%	0.3%	86.8%	0.3%	87.1%	0.2%	87.3%	0.0%	87.3%	0.0%	87.3%	0.0%	87.3%
Exit 10 Ramp	80.4%	1.4%	81.8%	0.6%	82.4%	0.8%	83.2%	0.6%	83.8%	0.5%	84.3%	0.3%	84.7%	0.3%	84.9%	0.2%	85.2%	0.0%	85.2%	0.0%	85.2%	0.0%	85.2%
<b>Subtotal</b>	<b>76.4%</b>	<b>1.7%</b>	<b>78.1%</b>	<b>0.4%</b>	<b>78.5%</b>	<b>0.8%</b>	<b>79.2%</b>	<b>0.6%</b>	<b>79.9%</b>	<b>0.5%</b>	<b>80.4%</b>	<b>0.3%</b>	<b>80.7%</b>	<b>0.3%</b>	<b>81.0%</b>	<b>0.2%</b>	<b>81.3%</b>	<b>0.0%</b>	<b>81.3%</b>	<b>0.0%</b>	<b>81.3%</b>	<b>0.0%</b>	<b>81.3%</b>
<b>BLUE STAR TPKE</b>																							
Hampton Barrier	80.1%	1.7%	81.8%	0.5%	82.3%	0.8%	83.1%	0.6%	83.7%	0.5%	84.2%	0.4%	84.6%	0.3%	84.9%	0.3%	85.1%	0.0%	85.1%	0.0%	85.1%	0.0%	85.2%
Hampton Ramp	79.3%	1.8%	81.1%	0.3%	81.4%	0.8%	82.2%	0.6%	82.8%	0.5%	83.3%	0.3%	83.6%	0.3%	83.9%	0.2%	84.2%	0.0%	84.2%	0.0%	84.2%	0.0%	84.2%
<b>Subtotal</b>	<b>79.8%</b>	<b>1.7%</b>	<b>81.5%</b>	<b>0.4%</b>	<b>81.9%</b>	<b>0.8%</b>	<b>82.7%</b>	<b>0.6%</b>	<b>83.4%</b>	<b>0.5%</b>	<b>83.9%</b>	<b>0.3%</b>	<b>84.2%</b>	<b>0.3%</b>	<b>84.5%</b>	<b>0.3%</b>	<b>84.8%</b>	<b>0.0%</b>	<b>84.8%</b>	<b>0.0%</b>	<b>84.8%</b>	<b>0.0%</b>	<b>84.8%</b>
<b>SPAULDING TPKE</b>																							
Dover Barrier	79.1%	1.7%	80.8%	0.4%	81.2%	0.8%	82.0%	0.6%	82.6%	0.5%	83.1%	0.3%	83.4%	0.3%	83.7%	0.2%	83.9%	0.0%	84.0%	0.0%	84.0%	0.0%	84.0%
Rochester Barrier	77.4%	1.7%	79.1%	0.4%	79.5%	0.8%	80.3%	0.6%	80.9%	0.5%	81.4%	0.3%	81.8%	0.3%	82.1%	0.2%	82.3%	0.0%	82.3%	0.0%	82.3%	0.0%	82.3%
<b>Subtotal</b>	<b>78.4%</b>	<b>1.7%</b>	<b>80.1%</b>	<b>0.4%</b>	<b>80.5%</b>	<b>0.8%</b>	<b>81.3%</b>	<b>0.6%</b>	<b>81.9%</b>	<b>0.5%</b>	<b>82.4%</b>	<b>0.3%</b>	<b>82.8%</b>	<b>0.3%</b>	<b>83.1%</b>	<b>0.2%</b>	<b>83.3%</b>	<b>0.0%</b>	<b>83.3%</b>	<b>0.0%</b>	<b>83.3%</b>	<b>0.0%</b>	<b>83.3%</b>
<b>TOTAL:</b>	<b>78.0%</b>	<b>1.7%</b>	<b>79.7%</b>	<b>0.4%</b>	<b>80.1%</b>	<b>0.8%</b>	<b>80.9%</b>	<b>0.6%</b>	<b>81.5%</b>	<b>0.5%</b>	<b>82.0%</b>	<b>0.3%</b>	<b>82.3%</b>	<b>0.3%</b>	<b>82.6%</b>	<b>0.3%</b>	<b>82.9%</b>	<b>0.0%</b>	<b>82.9%</b>	<b>0.0%</b>	<b>82.9%</b>	<b>0.0%</b>	<b>82.9%</b>

1. FY 2019 are unaudited actuals from NHDOT monthly data sources.

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Traffic and Revenue Projections, 2020 - 2029

October 23, 2019

Total toll transactions increased from 122.1 million toll transactions in FY 2018 to 123.9 million in FY 2019, a gain of 1.4 percent. Overall transaction growth slows in FY 2020 to 1.1 percent and remains between 1.1 and 1.2 percent for subsequent years. The Dover plaza of the Spaulding Turnpike sees strong growth of 2.9 percent after widening work is complete in FY 2021. For the final six years of the forecast period, it is forecasted that Turnpike toll traffic will grow 1.2 percent per year. Between FY 2019 and FY 2029, the projected average annual growth rates in paid toll transactions for the Central, Blue Star and Spaulding Turnpikes are 1.0 percent, 1.2 percent and 1.7 percent respectively, with the overall Turnpike toll transaction average growth rate at 1.2 percent.

## 8.4 REVENUE PROJECTIONS BY TURNPIKE

### 8.4.1 Toll Revenue

The actual and projected annual toll revenue on the New Hampshire Turnpike System during the period FY 2019-2029 is presented in Table 8.4. The forecast assumes existing toll levels for the duration of the forecast, and the conversion from cash to AET on the Spaulding Turnpike at the beginning of FY 2022. The toll revenue forecasts account for toll revenue only and do not include associated fee revenue. Detailed toll revenue projections for each toll plaza were presented previously in Table 8.3 (see Table 3.2 for historical toll revenues recorded on a cash basis). Note that FY 2019 revenue as unaudited actuals that differ slightly from the detailed revenue results by plaza as shown previously as these are from NHDOT Finance Division.

**Table 8.4: FY 2018 and Projected Annual Toll Revenue, FY 2019-2029 (in millions)**

Fiscal Year	Central Turnpike	Blue Star Turnpike	Spaulding Turnpike <sup>1</sup>	Total
<b>2018 Actual</b>	\$ 46.9	\$ 65.3	\$ 17.2	\$ 129.4
<b>2019<sup>2</sup></b>	\$ 47.7	\$ 67.6	\$ 17.7	\$ 132.9
<b>2020</b>	\$ 48.2	\$ 67.3	\$ 17.8	\$ 133.4
<b>2021</b>	\$ 48.5	\$ 68.1	\$ 18.2	\$ 134.8
<b>2022</b>	\$ 48.9	\$ 68.9	\$ 16.4	\$ 134.2
<b>2023</b>	\$ 49.4	\$ 69.8	\$ 17.2	\$ 136.4
<b>2024</b>	\$ 49.8	\$ 70.7	\$ 17.6	\$ 138.1
<b>2025</b>	\$ 50.3	\$ 71.7	\$ 17.9	\$ 139.9
<b>2026</b>	\$ 50.8	\$ 72.6	\$ 18.2	\$ 141.7
<b>2027</b>	\$ 51.3	\$ 73.7	\$ 18.6	\$ 143.5
<b>2028</b>	\$ 51.8	\$ 74.7	\$ 18.9	\$ 145.4
<b>2029</b>	\$ 52.3	\$ 75.7	\$ 19.3	\$ 147.3

Data will not necessarily add to totals because of rounding.

1. Toll revenues only; does not include any Video Tolling Fee due to AET conversion in FY 2022.

2. FY2019 are unaudited actuals from NHDOT finance.

Projected toll revenues for FY 2019 are \$132.9 million – about a 2.7 percent increase from FY 2018 revenues. Toll revenue on the Spaulding Turnpike is estimated to drop by 9.7 percent between FY 2021

# NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

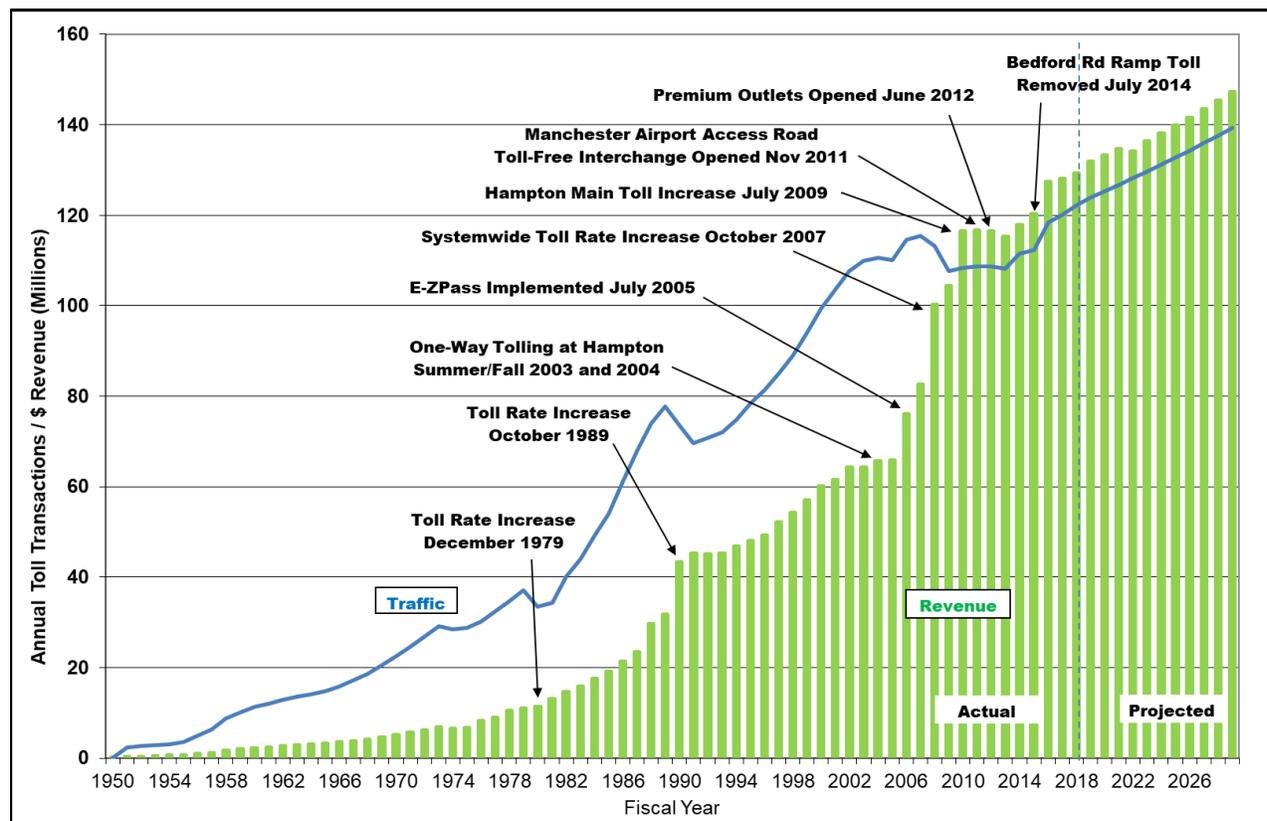
## Traffic and Revenue Projections, 2020 - 2029

October 23, 2019

and FY 2022 due to AET implementation. This reduction is due in part to the lag associated with revenue collections after a system crossover, and in part due to lower collection rates compared to other system designs. Spaulding revenue recover by 5.3 percent in FY 2023, the first full year of revenue collection, and stabilize at healthy revenue growth rates of 1.8 to 1.9 percent. From FY 2024 onward, systemwide revenue is expected to grow 1.3 percent per year. Toll revenues on the Central, Blue Star and Spaulding Turnpikes are expected to grow at an average annual rate of 0.9 percent, 1.1 percent and 0.9 percent respectively between FY 2019 and FY 2029, and the overall Turnpike annual revenue growth rate is estimated to be 1.0 percent.

Historical and projected toll transactions and revenues for the entire New Hampshire Turnpike System over the period FY 1950 to 2029 are presented in Figure 8.3.

**Figure 8.3: NH Turnpike System Historical and Projected Toll Transaction and Revenue Trends, FY 1950-2029**



### 8.4.2 Video Tolling Fee Revenue

A portion of the Spaulding Turnpike’s future Video Tolling transactions are expected to be assessed fees which account for the added cost of processing these transactions. Table 8.5 presents projected fee revenue attributable to the Spaulding Turnpike’s conversion to AET. During FY 2022, the first year of AET operations on the Spaulding Turnpike, fee revenues associated with AET are expected to total \$2.7 million.

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

### Traffic and Revenue Projections, 2020 - 2029

October 23, 2019

Fees would grow to \$4.6 million in FY 2023, and steadily grow to \$4.9 million by FY 2029. The fee revenue projections assume the following:

- A portion of video transactions cannot be billed, or customers are unwilling to ever pay their toll and fee,
- A portion of transactions are self-declared as video transactions within seven days. Customers making these transactions do not receive an invoice and are only assessed their toll. No fee is assessed.
- Of customers who receive toll bills, a certain share pays after receiving the first invoice, which includes a \$1 processing fee per transaction. Those that do not pay receive a second invoice for the toll amount plus a \$1.50 processing fee per transaction.
- If the 2nd invoice is not paid, a third invoice is sent (“Violations Notice”) which currently includes an administrative fee of \$25 per transaction. Some portion of customers receiving a Violations Notice may also have their fees forgiven by the Turnpike.

The proportions of transactions which are assessed no fee, the \$1.00, \$1.50, and /or \$25 administrative fee per transaction, or have their fee forgiven, are based on Stantec’s observations of other AET toll facilities in the northeast.

The projections assume that during the first year of AET operations, a portion of fee revenue will not be collected until the following fiscal year. This lag in fee revenue collections reflects the additional time needed to identify transactions, send an invoice, and ultimately collect the associated revenues, which typically takes up to 5 months.

**Table 8.5: Projected Video Tolling Fee Revenue Attributable to AET, FY 2022-2029 (in millions)**

Fiscal Year	Central Turnpike	Blue Star Turnpike	Spaulding Turnpike	Total
2022	n/a	n/a	\$2.7	\$2.7
2023	n/a	n/a	\$4.6	\$4.6
2024	n/a	n/a	\$4.6	\$4.6
2025	n/a	n/a	\$4.6	\$4.6
2026	n/a	n/a	\$4.6	\$4.6
2027	n/a	n/a	\$4.7	\$4.7
2028	n/a	n/a	\$4.8	\$4.8
2029	n/a	n/a	\$4.9	\$4.9

## NEW HAMPSHIRE TURNPIKE SYSTEM TRAFFIC AND REVENUE STUDY

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### 8.5 E-ZPASS MARKET SHARE PROJECTIONS

Table 8.6 presents the FY 2018 and projected **E-ZPass** market shares on the New Hampshire Turnpike System through FY 2029. Detailed **E-ZPass** market shares for each toll plaza were presented previously in Table 8.3.

**Table 8.6: Actual and Projected E-ZPass Market Shares, FY 2019-2029**

Fiscal Year	Central Turnpike	Blue Star Turnpike	Spaulding Turnpike	Total
2018 <sup>1</sup>	76.4%	79.8%	78.4%	78.0%
2019 <sup>2</sup>	78.1%	81.5%	70.1%	79.6%
2020	78.5%	81.9%	80.5%	80.1%
2021	79.2%	82.7%	81.3%	80.9%
2022	79.9%	83.4%	81.9%	81.5%
2023	80.4%	83.9%	82.4%	82.0%
2024	80.7%	84.2%	82.8%	82.3%
2025	81.0%	84.5%	83.1%	82.6%
2026-2029	81.3%	84.8%	83.3%	82.9%

<sup>1</sup> Actual.

<sup>2</sup> FY2019 is unaudited actual.

Total New Hampshire **E-ZPass** market share increased from 78.0 percent in FY 2018 to 79.6 percent in FY 2019. Growth in **E-ZPass** market share is expected to slow and flatten over time, as shown in the table. It is assumed to reach an overall maximum share of about 82.9 percent in FY 2026. The market share will differ by plaza, as it does currently. The Blue Star Turnpike, which has fewer commuters and more long-distance travelers than the Central and Spaulding Turnpikes, is expected to have slightly higher market share than the others because **E-ZPass** continues to be adopted by drivers from other states, as more and more agencies implement electronic toll collection.

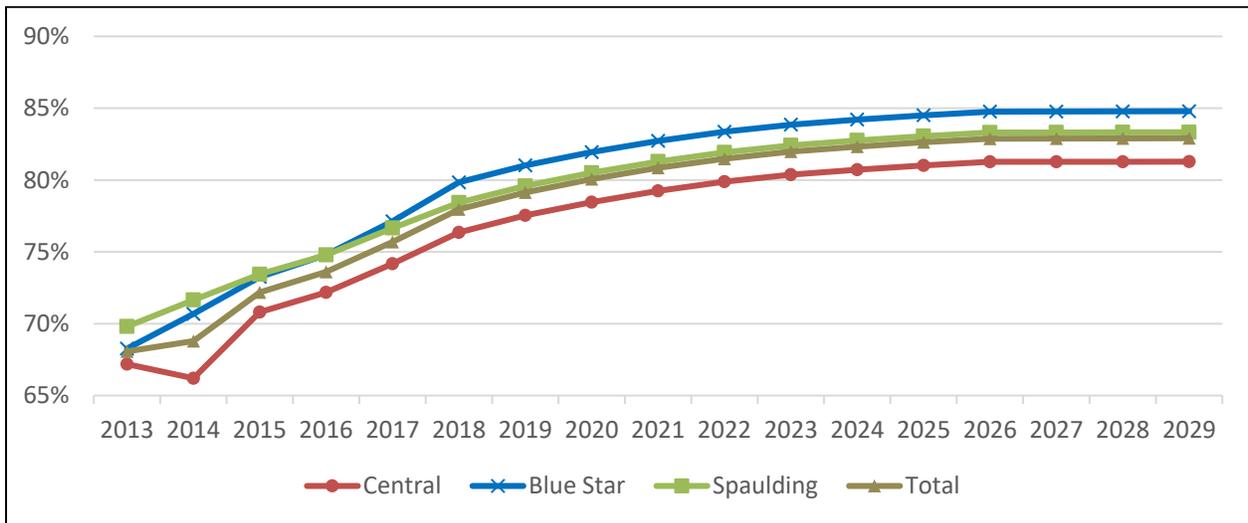
Figure 8.4 shows the historical and projected **E-ZPass** market shares for the period FY 2013 to FY 2029.

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**Figure 8.4: NH Turnpike Historical and Projected E-ZPass Market Shares, FY 2013-2029**



## 9.0 FINANCIAL MODEL ANALYSES

This section presents a financial analysis of the Turnpike System. The analysis considers Turnpike System capital expenditures, operating expenditures and debt service requirements as well as Turnpike System toll revenues and other revenues. The analysis also includes a cash flow analysis of the Turnpike System, as well as an analysis of the Turnpike System's debt service coverage ratios.

### 9.1 TOTAL TURNPIKE SYSTEM EXPENDITURES

Table 9.1 shows historical and projected capital, operating, and debt service expenditures for the 22-year period FY 2008 to FY 2029.

**Table 9.1: Historical and Projected Total NH Turnpike Expenditures, Millions**

FY	Capital Expenditures	O&M	Debt Service	Renewal and Replacement	I-95 Payments	Total Expenditures
2008	\$10.9	\$37.1	\$25.7	\$11.8	\$0.0	\$85.5
2009	\$26.1	\$40.3	\$25.9	\$7.8	\$0.0	\$100.1
2010	\$66.4	\$40.1	\$29.6	\$7.8	\$30.0	\$173.9
2011	\$52.7	\$42.3	\$33.8	\$14.3	\$20.0	\$163.1
2012	\$46.9	\$40.7	\$33.3	\$9.2	\$26.0	\$156.1
2013	\$70.2	\$42.2	\$38.3	\$9.6	\$26.0	\$186.3
2014	\$49.7	\$42.5	\$39.0	\$11.3	\$15.0	\$157.5
2015	\$31.8	\$44.4	\$39.1	\$8.2	\$14.2	\$137.7
2016	\$42.0	\$43.0	\$41.3	\$7.9	\$0.4	\$134.6
2017	\$32.1	\$49.9	\$41.3	\$9.3	\$0.0	\$132.6
2018	\$27.5	\$48.6	\$41.3	\$8.7	\$0.0	\$126.1
<b>Total '09-'18</b>	<b>\$456.4</b>	<b>\$471.1</b>	<b>\$388.5</b>	<b>\$105.9</b>	<b>\$131.6</b>	<b>\$1,553.6</b>
2019 <sup>1</sup>	\$21.1	\$44.1	\$41.4	\$14.3	\$0.0	\$120.9
2020	\$33.9	\$63.3	\$41.4	\$36.3	\$0.0	\$174.9
2021	\$49.6	\$63.2	\$41.2	\$22.3	\$0.0	\$176.2
2022 <sup>2</sup>	\$61.4	\$61.6	\$34.3	\$13.9	\$0.0	\$171.2
2023	\$63.1	\$61.0	\$27.4	\$14.4	\$0.0	\$165.9
2024	\$57.2	\$62.2	\$26.0	\$13.3	\$0.0	\$158.7
2025	\$58.7	\$63.6	\$19.1	\$13.6	\$0.0	\$155.0
2026	\$47.6	\$64.9	\$19.1	\$13.8	\$0.0	\$145.4
2027	\$51.2	\$66.5	\$19.1	\$14.1	\$0.0	\$150.9
2028	\$63.4	\$68.1	\$19.1	\$14.4	\$0.0	\$165.0
2029	\$42.5	\$69.2	\$19.1	\$14.7	\$0.0	\$145.5
<b>Total '19-'29</b>	<b>\$549.7</b>	<b>\$687.6</b>	<b>\$307.2</b>	<b>\$185.0</b>	<b>\$0.0</b>	<b>\$1,729.5</b>

Note: Data will not necessarily add to totals because of rounding.

1. FY 2019 are unaudited actuals.

2. Values reflect impact of AET implementation at Dover and Rochester in FY 2022.

Historical total Turnpike System expenditures over the FY 2008-2018 period have ranged from a low of \$85.5 million in FY 2008 to a high of \$186.3 million in FY 2013. Cumulative Turnpike System expenditures for the eleven-year period FY 2008-2018 totaled \$1,553.6 million with 55.3 percent or \$859.7 million accounting for by the sum of operating expenses and debt service expenditures. Total Turnpike System expenditures are projected to vary in the eleven-year FY 2019-2029 forecast period, ranging from a low of \$127.6 million in FY 2019 to a high of \$175.9 million in FY 2021. Cumulative Turnpike System expenditures over the eleven-year forecast period FY 2018-2029 are projected to be \$1,729.5 million or 1.11 times what was spent over the previous eleven years. Some 39.8 percent or ~~\$692.6~~ million of this total amount is estimated to be for O&M expenditures and 17.8 percent of the total or \$307.2 million will be for Turnpike System debt service requirements. Some 31.8 percent, or \$549.7 million, of total expenditures over this ~~ten~~-year period are expected to be capital expenditures, while 10.7 percent, or ~~\$180.5~~ million, is expected for renewal and replacement.

## 9.2 TURNPIKE SYSTEM FUNDS

Table 9.2 presents historical and projected toll revenues, other revenues, interest income, and bond proceeds for the Turnpike System over the 22-year period FY 2008-2029.

Historical annual Turnpike System revenues, which include toll revenue, transponder revenue, interest income and other revenue, ranged from a low of \$107.0 million in FY 2008 to a high of \$136.2 million in FY 2018. Total revenue including bond proceeds ranged from a low of \$107.0 million in FY 2008 to a high of \$268.1 million in FY 2010. Cumulative funds including net bond proceeds over the eleven-year FY 2008-2018 period totaled ~~\$1,655.6~~ million with toll revenues accounting for 78.1 percent of this amount or ~~\$1,293.7~~ million. Over the forecast period FY 2019-2029, annual Turnpike System revenues are projected to range from a low of \$141.4 million in FY 2020 to a high of \$160.9 million in FY 2029. Total Turnpike revenues over the eleven-year forecast period are \$1,658.8 million or approximately 0.2 percent more than revenues accumulated in the prior eleven years. Toll revenues are estimated to account for 92.1 percent or \$1,527.5 million of the projected \$1,658.8 million in total Turnpike System funds over the next eleven years.

It should be noted that the increase in "Other Revenue" in FY 19 is primarily attributed to the implementation of the E-ZPass System's second invoice and violation processing in FY 2019. The backlog along with the general increase in violations throughout the system contributed to the increase in Other Revenue.

**Table 9.2: FY 2008 to FY 2029 Historical and Projected NH Turnpike Funds, Millions**

FY	Toll Revenue <sup>1</sup>	Video Tolling Fee Revenue	Transponder Revenue	Other Revenue <sup>2</sup>	Hooksett Service Area Revenue	Interest Income	Total Revenues	Net Bond Proceeds for Construction <sup>3</sup>	Total Turnpike Funds
2008	\$100.4	N/A	\$0.9	\$3.2	N/A	\$2.5	\$107.0	\$0.0	\$107.0
2009	\$103.9	N/A	\$0.7	\$2.2	N/A	\$0.8	\$107.6	\$0.0	\$107.6
2010	\$116.0	N/A	\$0.7	\$1.8	N/A	\$0.8	\$119.3	\$148.8	\$268.1
2011	\$116.7	N/A	\$0.8	\$1.2	N/A	\$0.2	\$118.9	\$0.0	\$118.9
2012	\$116.8	N/A	\$0.7	\$1.1	N/A	\$0.1	\$118.7	\$0.0	\$118.7
2013	\$115.6	N/A	\$0.5	\$1.6	N/A	\$0.1	\$117.8	\$118.5	\$236.3
2014	\$117.5	N/A	\$0.6	\$1.1	N/A	\$0.1	\$119.3	\$0.0	\$119.3
2015	\$121.4	N/A	\$0.6	\$2.2	\$0.1	\$0.1	\$124.4	\$52.3	\$176.7
2016	\$127.1	N/A	\$1.1	\$1.8	\$0.8	\$1.0	\$131.8	\$0.0	\$131.8
2017	\$127.9	N/A	\$0.9	\$3.9	\$0.9	\$0.4	\$134.0	\$0.0	\$134.0
2018	\$129.4	N/A	\$0.8	\$3.9	\$1.0	\$1.1	\$136.2	\$0.0	\$136.2
<b>Total '08-'18</b>	<b>\$1,292.7</b>	<b>\$0.0</b>	<b>\$8.3</b>	<b>\$24.0</b>	<b>\$2.8</b>	<b>\$7.2</b>	<b>\$1,335.0</b>	<b>\$319.6</b>	<b>\$1,654.6</b>
2019 <sup>4</sup>	\$132.9	N/A	\$0.9	\$12.5	\$1.3	\$2.3	\$149.9		\$149.9
2020	\$133.4	N/A	\$0.5	\$4.1	\$1.3	\$2.1	\$141.4		\$141.4
2021	\$134.8	N/A	\$0.5	\$4.2	\$1.3	\$1.9	\$142.7		\$142.7
2022 <sup>5</sup>	\$134.2	\$2.7	\$0.5	\$4.3	\$1.3	\$1.7	\$144.7		\$144.7
2023	\$136.4	\$4.6	\$0.5	\$4.4	\$1.4	\$1.4	\$148.6		\$148.6
2024	\$138.1	\$4.6	\$0.5	\$4.4	\$1.4	\$1.3	\$150.3		\$150.3
2025	\$139.9	\$4.6	\$0.5	\$4.5	\$1.4	\$1.2	\$152.1		\$152.1
2026	\$141.7	\$4.6	\$0.5	\$4.6	\$1.4	\$1.2	\$154.0		\$154.0
2027	\$143.5	\$4.7	\$0.5	\$4.7	\$1.4	\$1.2	\$156.1		\$156.0
2028	\$145.4	\$4.8	\$0.5	\$4.8	\$1.4	\$1.2	\$158.1		\$158.1
2029	\$147.3	\$4.9	\$0.5	\$4.9	\$1.4	\$1.9	\$160.9		\$160.9
<b>Total '19-'29</b>	<b>\$1,527.5</b>	<b>\$35.5</b>	<b>\$5.9</b>	<b>\$57.4</b>	<b>\$15.0</b>	<b>\$17.5</b>	<b>\$1,658.8</b>		<b>\$1,658.8</b>

<sup>1</sup> Historical toll revenues measured on a cash basis and were used as a base for the toll revenue forecast.

<sup>2</sup> From Bureau of Turnpikes Financial Model Plan.

<sup>3</sup> Does not include cost for issuance premiums or payments into restricted debt service accounts.

<sup>4</sup> FY 2019 are unaudited actuals; increases in Other Revenue in FY 2019 are a results of backlog of violation processing with a more detailed explanation in the text of the report.

<sup>5</sup> Values reflect impact of AET implementation in FY 2022.

Note: Data will not necessarily add to totals because of rounding.

### 9.3 TURNPIKE COVERAGE RATIO ANALYSIS

Table 9.3 presents an analysis of the Bureau of Turnpikes' revenue bond debt service coverage ratios and all obligation bond coverage ratios for the forecast period FY 2019-2029.

The analysis shows that the Bureau of Turnpikes' revenue bond debt service coverage ratio is expected to range from a high of 4.79 in FY 2029 to a low of 1.90 in FY 2020. The low 1.90 revenue bond debt service coverage ratio in FY 2020 satisfies both the bond resolution's minimum requirement of 1.2 as well as the Bureau of Turnpikes' internal minimum coverage requirement of 1.3.

In comparison, the all obligation coverage ratio is projected to range from a high of 2.72 in FY 2022 to a low of 1.22 in FY 2020. The low all obligation coverage ratio of 1.22 in FY 2020 satisfies the both the bond resolution's minimum requirement of 1.0 and the Bureau of Turnpikes' internal minimum requirement of 1.1.

**Table 9.3: NH Turnpike Debt Coverage Analysis, FY 2019-2029, Millions**

Item	FY 2019	FY 2020	FY 2021	FY 2022 <sup>5</sup>	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Turnpike Revenues <sup>1</sup>	\$149.9	\$141.4	\$142.7	\$144.7	\$148.6	\$150.3	\$152.1	\$154.0	\$156.1	\$158.1	\$160.9
O&M Expenses <sup>2</sup>	\$44.1	\$63.3	\$63.2	\$61.6	\$61.0	\$62.2	\$63.6	\$64.9	\$66.5	\$68.1	\$69.2
Net Revenues (Sub-Total) (A)	\$105.8	\$78.1	\$79.5	\$83.1	\$87.7	\$88.1	\$88.5	\$89.1	\$89.6	\$90.0	\$91.7
Revenue Bond Debt Service (B) <sup>3</sup>	\$41.3	\$41.1	\$41.1	\$34.3	\$27.4	\$26.1	\$19.1	\$19.1	\$19.1	\$19.1	\$19.1
Revenue Bond Debt Service Coverage Ratio (A/B)	2.56	1.90	1.93	2.42	3.19	3.38	4.63	4.66	4.69	4.71	4.79
Existing Turnpike R&R Expenses (C)	\$14.3	\$22.9	\$22.3	\$13.9	\$14.4	\$13.3	\$13.6	\$13.8	\$14.1	\$14.4	\$14.7
Debt Service and Other Obligations (Sub-Total) (B+C) <sup>4</sup>	\$55.6	\$63.9	\$63.4	\$48.2	\$41.8	\$39.4	\$32.7	\$32.9	\$33.2	\$33.5	\$33.8
All Obligation Coverage Ratio (A/(B+C))	1.90	1.22	1.25	1.72	2.09	2.24	2.71	2.71	2.70	2.68	2.71

<sup>1</sup> Includes Toll Revenue, Other Revenue, Transponder Revenue, and Interest Income. FY 2019 are unaudited actuals.

<sup>2</sup> Includes Administrative Expenses, Toll Operations, Maintenance, Safety & Enforcement, Toll Processing, Welcome Centers and Rest Areas, and Turnpike Funding to Highway and O&M Lapses. R&R and I-95 Payments not included.

<sup>3</sup> Includes projected 2019 Refunding.

<sup>4</sup> Additional R+R has been excluded from the all obligation sub-total and coverage ratio.

<sup>5</sup> Values reflect impact of AET implementation in FY 2022.

<sup>6</sup> FY 2020, 2021 and 2022 All Obligation Coverage Ratio with removing Portsmouth-Kittery High-Level Bridge R&R would be 1.49, 1.49, and 1.75, respectively.

Table 9.4 is a projected cash flow analysis of the Turnpike System. The analysis reveals that the projected Bureau of Turnpikes cash reserves will be positive throughout the eleven-year forecast period. Cash reserves as a percentage of Bureau of Turnpikes toll revenues are projected to range from a high of 77 percent in FY 2019 to a low of 9 percent in FY 2024.

**Table 9.4: Projected Cash Flow Analysis, FY 2019-2029 (in millions)**

Item	FY 2019	FY 2020	FY 2021	FY 2022 <sup>2</sup>	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Net Income <sup>1</sup>	\$50.2	\$0.8	\$16.1	\$34.9	\$45.8	\$48.8	\$55.8	\$56.2	\$56.4	\$56.5	\$57.9
Net Bond Proceeds for Construction	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Set Aside Reserve on Bonds/Debt Service Reserve Funds Release	\$0.0	\$0.0	\$0.2	\$6.8	\$6.9	\$1.4	\$7.1	\$0.0	\$0.0	\$0.0	\$0.0
Capital Expenditures	\$21.1	\$33.9	\$49.6	\$61.4	\$63.1	\$57.2	\$58.7	\$47.6	\$51.2	\$63.4	\$42.5
Beginning Cash	\$103.8	\$129.7	\$96.5	\$63.3	\$43.5	\$33.2	\$26.2	\$30.3	\$38.9	\$44.1	\$37.2
Annual Capital Surplus / (Deficit)	\$29.1	-\$33.1	-\$33.5	-\$26.5	-\$17.3	-\$8.4	-\$2.9	\$8.6	\$5.2	-\$7.0	\$15.4
Cash-Accrual Adjustments	-\$3.2										
Deferred Revenue Acct - Prepaid Tolls (restricted)	\$14.8	\$13.0	\$13.0	\$13.0	\$13.0	\$13.0	\$13.0	\$13.0	\$13.0	\$13.0	\$11.7
Ending Cash	\$114.9	\$83.5	\$50.3	\$30.5	\$20.2	\$13.2	\$17.3	\$25.9	\$31.1	\$24.2	\$40.8
Cash as a Percent of Tpkc Revenues	77%	59%	35%	21%	14%	9%	11%	17%	20%	15%	25%

<sup>1</sup> Net Revenues less Revenue Bond Debt Service less Other Obligations less Renewal and Replacement.

<sup>2</sup> Values reflect impact of AET implementation in FY 2022.

## 9.4 LIMITS AND DISCLAIMERS

It is Stantec's opinion that the traffic and toll revenue estimates provided herein represent reasonable and achievable levels of traffic and toll revenues that can be expected to accrue on the Turnpike System over the forecast period and that they have been prepared in accordance with accepted industry-wide practice. However, as should be expected with any forecast, and given the uncertainties within the current economic climate, it is important to note the following assumptions which, in our opinion, are reasonable:

- This report presents the results of Stantec's consideration of the information available as of the date hereof and the application of our experience and professional judgment to that information. It is not a guarantee of any future events or trends.
- The traffic and gross toll revenue estimates will be subject to future economic and social conditions, demographic developments and regional transportation construction activities that cannot be predicted with certainty.
- The estimates contained in this report, while presented with numeric specificity, are based on a number of estimates and assumptions which, though considered reasonable to us, are inherently subject to economic and competitive uncertainties and contingencies, most of which are beyond the control of any tolling authority and cannot be predicted with certainty. In many instances, a broad range of alternative assumptions could be considered reasonable. Changes in the assumptions used could result in material differences in estimated outcomes.
- Stantec's traffic and gross toll revenue estimations only represent our best judgment and we do not warrant or represent that the actual gross toll revenues will not vary from our estimates.
- We do not express any opinion on the following items: socioeconomic and demographic forecasts, proposed land use development projects and potential improvements to the regional transportation network.
- The standards of operation and maintenance on all of the system will be maintained as planned within the business rules and practices.
- The general configuration and location of the system and its interchanges will remain as discussed in this report.
- Access to and from the system will remain as discussed in this report.
- No other competing highway projects, tolled or non-tolled are assumed to be constructed or significantly improved in the Turnpike System corridors during the forecast period, except those identified within this report.
- Major highway improvements that are currently underway or fully funded will be completed as planned.

- The system will be well maintained, efficiently operated, and effectively signed to encourage maximum usage.
- No reduced growth initiatives or related controls that would significantly inhibit normal development patterns will be introduced during the estimate period.
- There will be no future serious protracted recession during the estimate period.
- There will be no protracted fuel shortage during the estimate period.
- No local, regional, or national emergency will arise that will abnormally restrict the use of motor vehicles.

In Stantec's opinion, the assumptions underlying the projections provide a reasonable basis for the toll revenue projections. However, any financial projection is subject to uncertainties. Inevitably, some assumptions used to develop the projections will not be realized, and unanticipated events and circumstances may occur. There are likely to be differences between the projections and actual results, and those differences may be material. Because of these uncertainties, Stantec makes no guaranty or warranty with respect to the traffic and toll revenue projections in this Study.

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