



# Triangle Expressway

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## Operations Statistics Report

**2018 Fourth Quarter**  
October - December

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# Introduction

## Purpose

The North Carolina Turnpike Authority (NCTA) presents the operations statistics for the Triangle Expressway during the fourth quarter (October – December) of 2018. The report includes data related to traffic volumes, roadway operations, and maintenance. The statistics will allow for future analysis to identify quarterly and annual trends over time, providing a quantifiable method to track performance.

## Project

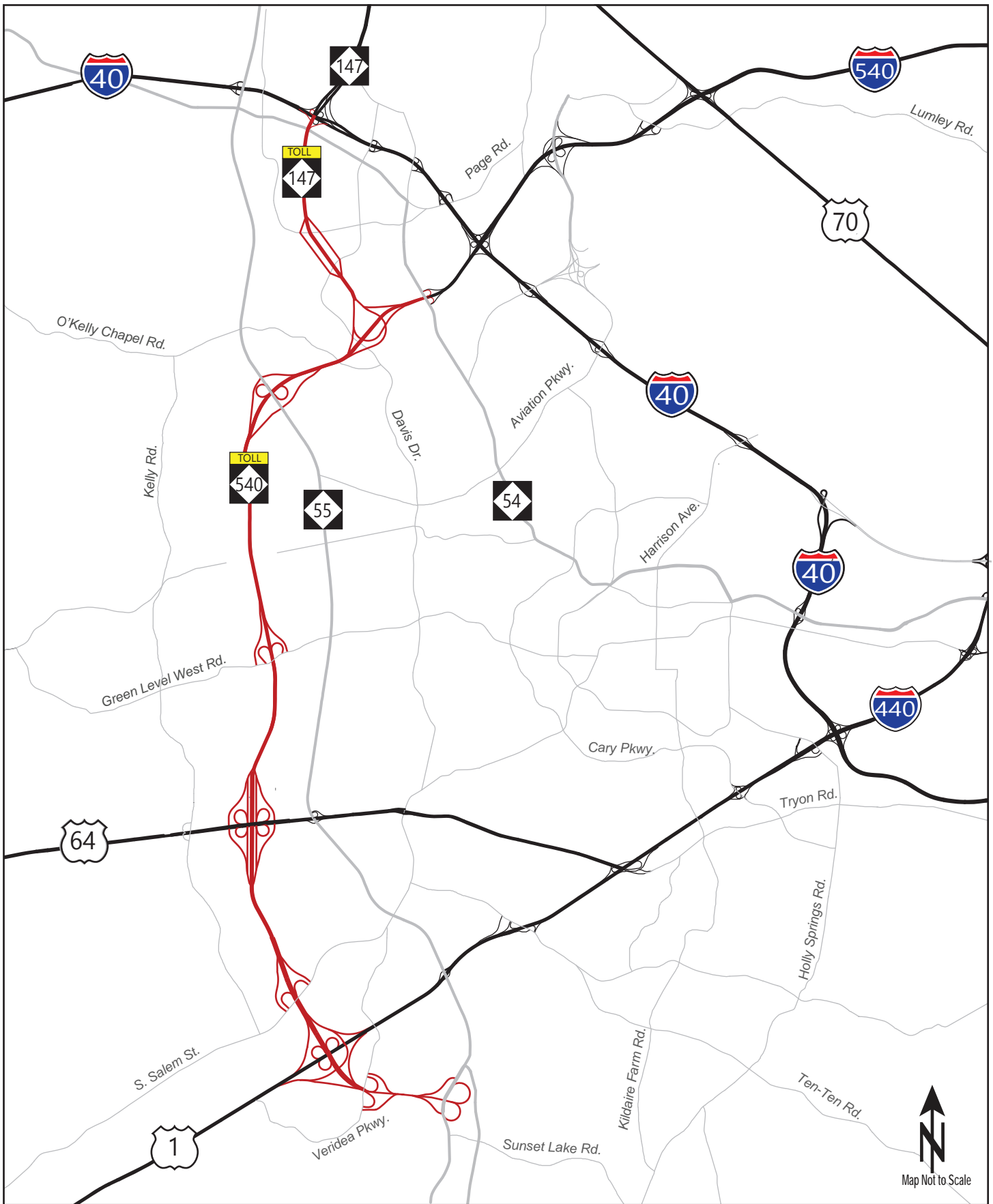
The Triangle Expressway is an 18.8-mile toll road that extends the partially completed “Outer Loop” around the greater Raleigh, North Carolina area from I-40 to N.C. 55 Bypass. The six-lane, controlled-access toll facility relieves congestion on N.C. 55 while improving access to the Research Triangle Park by reducing travel times for commuters residing to the south and east. The Triangle Expressway is currently comprised of two sections: Toll N.C. 147 and Toll N.C. 540.

Toll N.C. 147 includes 3.4 miles of toll road between I-40 and Toll N.C. 540. This section of the Triangle Expressway includes interchanges at Hopson Road, Davis Drive, and Toll N.C. 540. It opened to toll-free traffic on December 8, 2011; tolling on this section began on January 3, 2012.

Toll N.C. 540 includes 15.4 miles of toll road between N.C. 54 in western Cary and the N.C. 55 Bypass near the Town of Holly Springs. The section from N.C. 54 to U.S. 64 opened to general traffic (toll-free) on August 1, 2012, and toll collection started on August 2, 2012. This section includes interchanges at N.C. 54, N.C. 55, Green Level West Road, and U.S. 64. The section from U.S. 64 to N.C. 55 Bypass opened to general traffic (toll-free) on December 20, 2012, and toll collection started on January 2, 2013. This section includes interchanges at S. Salem Street, U.S. 1, and N.C. 55 Bypass. On April 3, 2017, a new interchange at Veridea Parkway was opened in this last section of Toll N.C. 540.

The Triangle Expressway utilizes an all-electronic, non-stop tolling system where there are no toll plazas at which drivers stop and pay cash tolls. Instead, free-flow toll zones are employed where vehicles are detected while traveling at highway speeds. Payments are accepted through an Electronic Toll Collection (ETC) program called NC Quick Pass® or a video billing program called Bill by Mail.

NCTA toll zones are located along the Triangle Expressway at mainline and interchange ramp locations. An illustration of the Triangle Expressway can be seen in *Figure 1*.



**Triangle Expressway System Map**

**Figure  
1**

# Traffic Statistics

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# Traffic Statistics

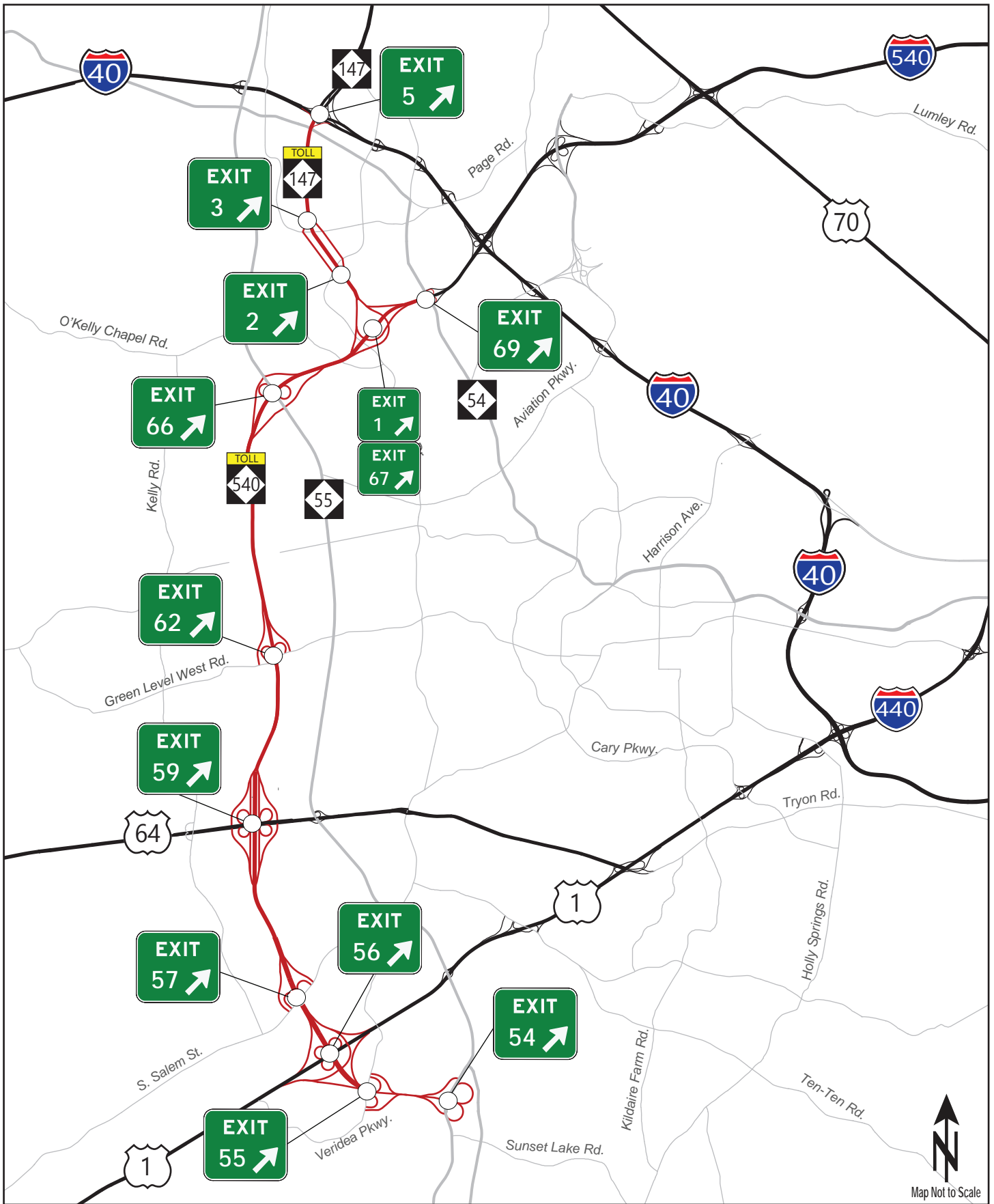
Current and historical traffic data is collected and stored using roadside microwave vehicle detectors (MVDs) installed throughout the Triangle Expressway, providing an overview of the roadway's current utilization. The data is analyzed to identify trends that could more accurately predict future utilization.

It should be noted that the Triangle Expressway is transitioning from a traffic pattern known as “ramp-up” to a steady-state pattern. During a ramp-up period, the traffic volumes on a new facility increase at a faster rate than typical growth on existing facilities. Traffic volumes increase significantly as the customers become more familiar with the facility. The ramp-up period for the Triangle Expressway is expected to continue through 2018.

## Average Weekday Traffic (AWT)

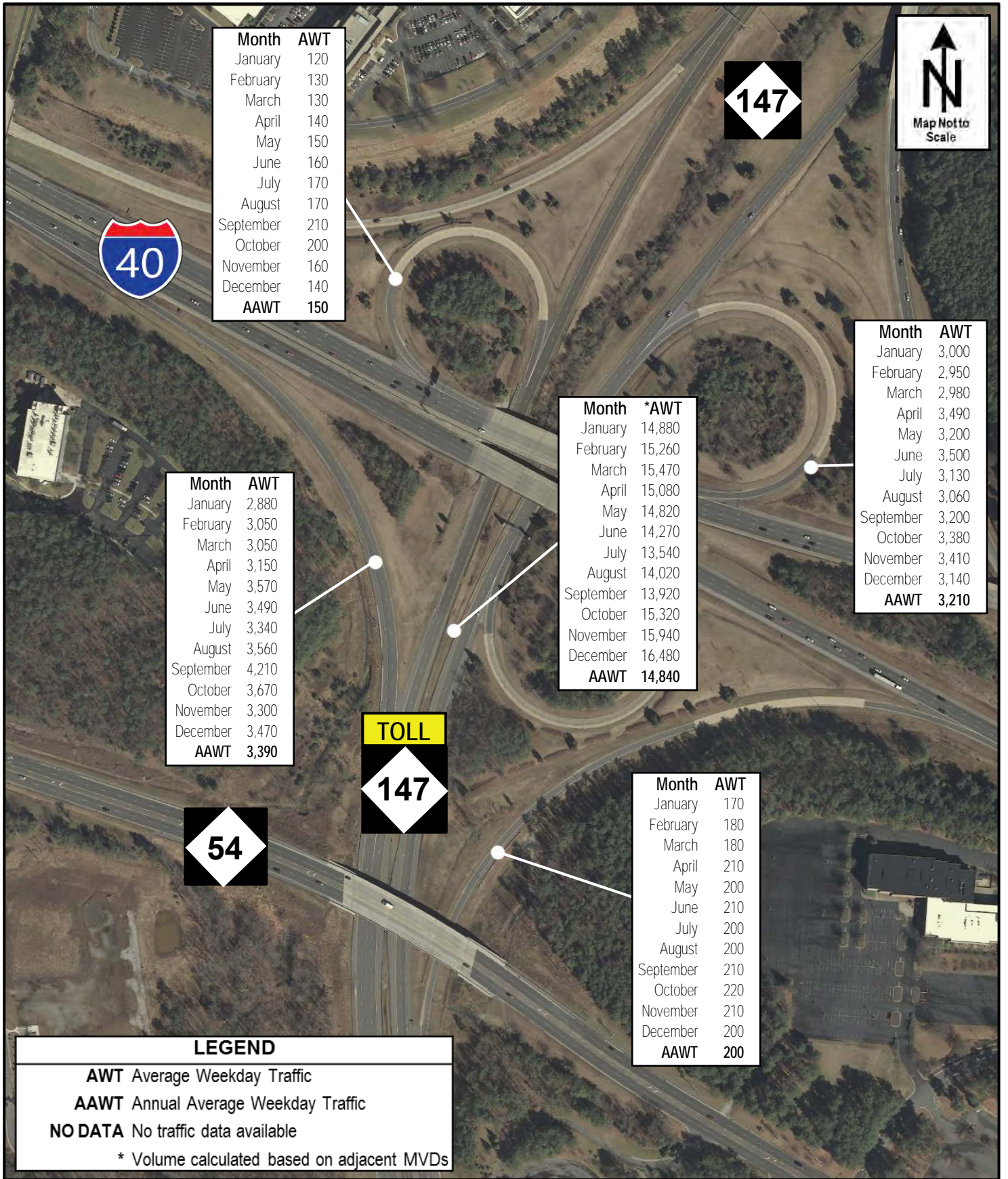
Traffic volume data is collected at all ramps and mainline segments between interchanges. The location of interchanges along the Triangle Expressway can be seen in *Figure 2*. Typically, there is a large difference between peak and off-peak volumes, as well as between weekday and weekend volumes. This gap becomes significantly larger for a tolled facility because it tends to have a much higher percentage of traffic on weekdays during peak hours than non-toll facilities, as there is less of a benefit for toll users during off-peak hours. For this reason, Average Weekday Traffic (AWT) is reported instead of Average Daily Traffic (ADT). AWT is a measure of the average daily traffic collected on a typical Monday through Friday over a designated time period.

Data collected by the MVDs is utilized to present AWT along the facility in *Figures 3 to 14*. It should be noted that if an MVD fails to provide reliable data (meeting the established threshold) for at least five days in a month then “NO DATA” is reported for that MVD. Reliability of MVD devices are monitored daily by comparing volumes with transaction counts and expected volumes. Maintenance tickets are submitted if MVD devices do not meet established thresholds.



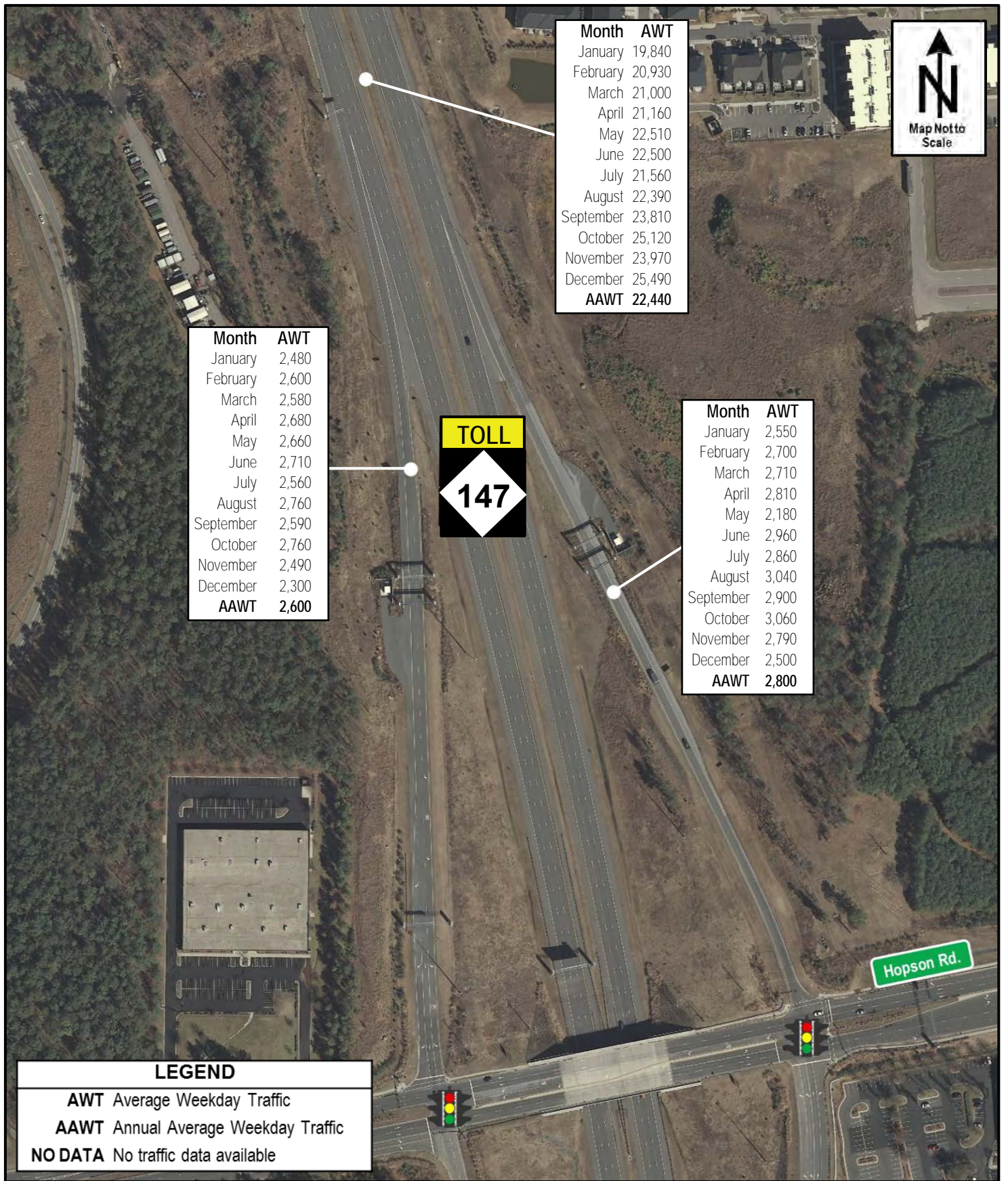
**Triangle Expressway Interchange Map**

**Figure 2**



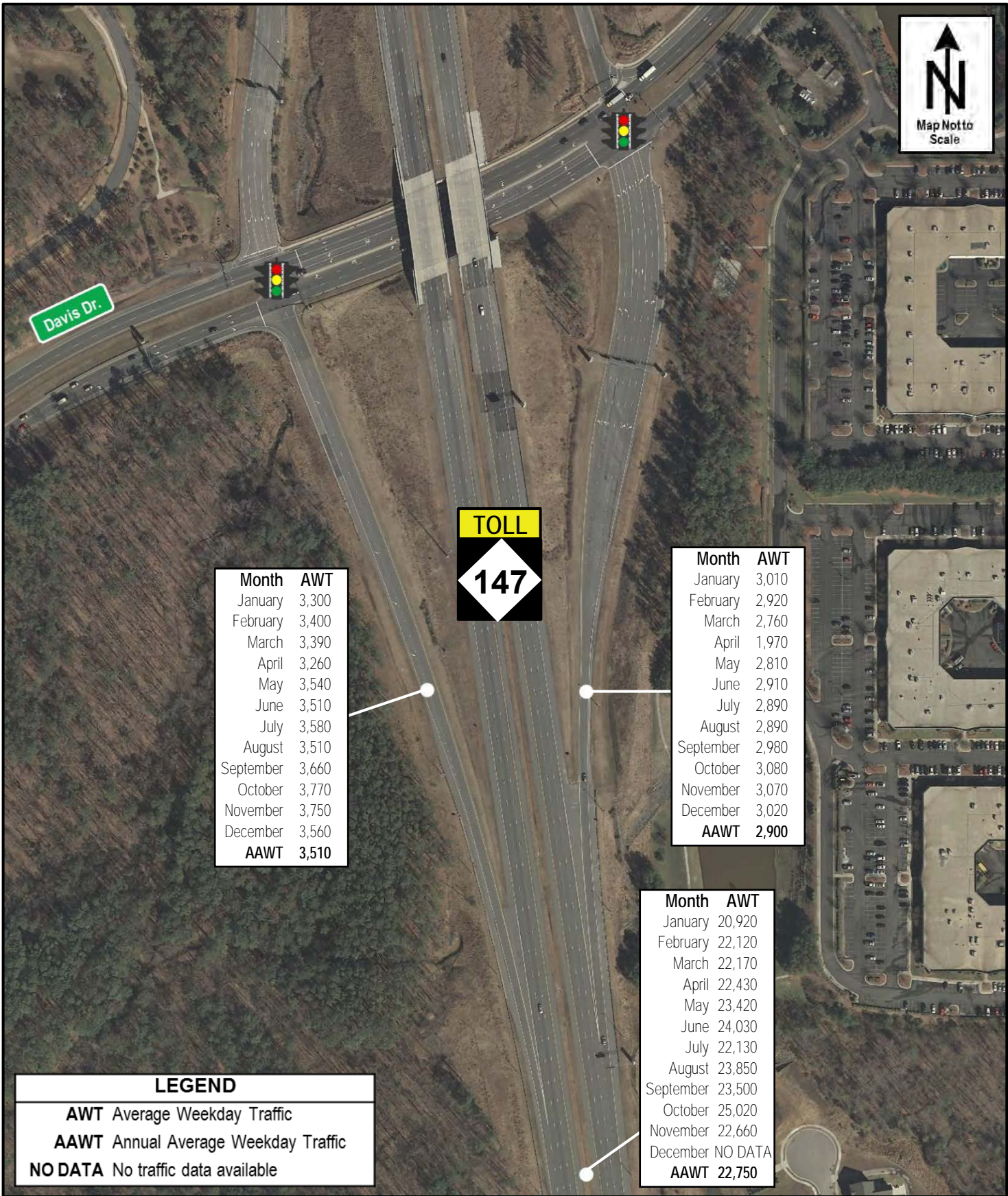
**Toll N.C. 147 at I-40 Interchange**  
2018 Average Weekday Traffic

**Figure**  
**3**



**Toll N.C. 147 at Hopson Rd. Interchange**  
2018 Average Weekday Traffic

**Figure 4**



Month	AWT
January	3,300
February	3,400
March	3,390
April	3,260
May	3,540
June	3,510
July	3,580
August	3,510
September	3,660
October	3,770
November	3,750
December	3,560
<b>AAWT</b>	<b>3,510</b>

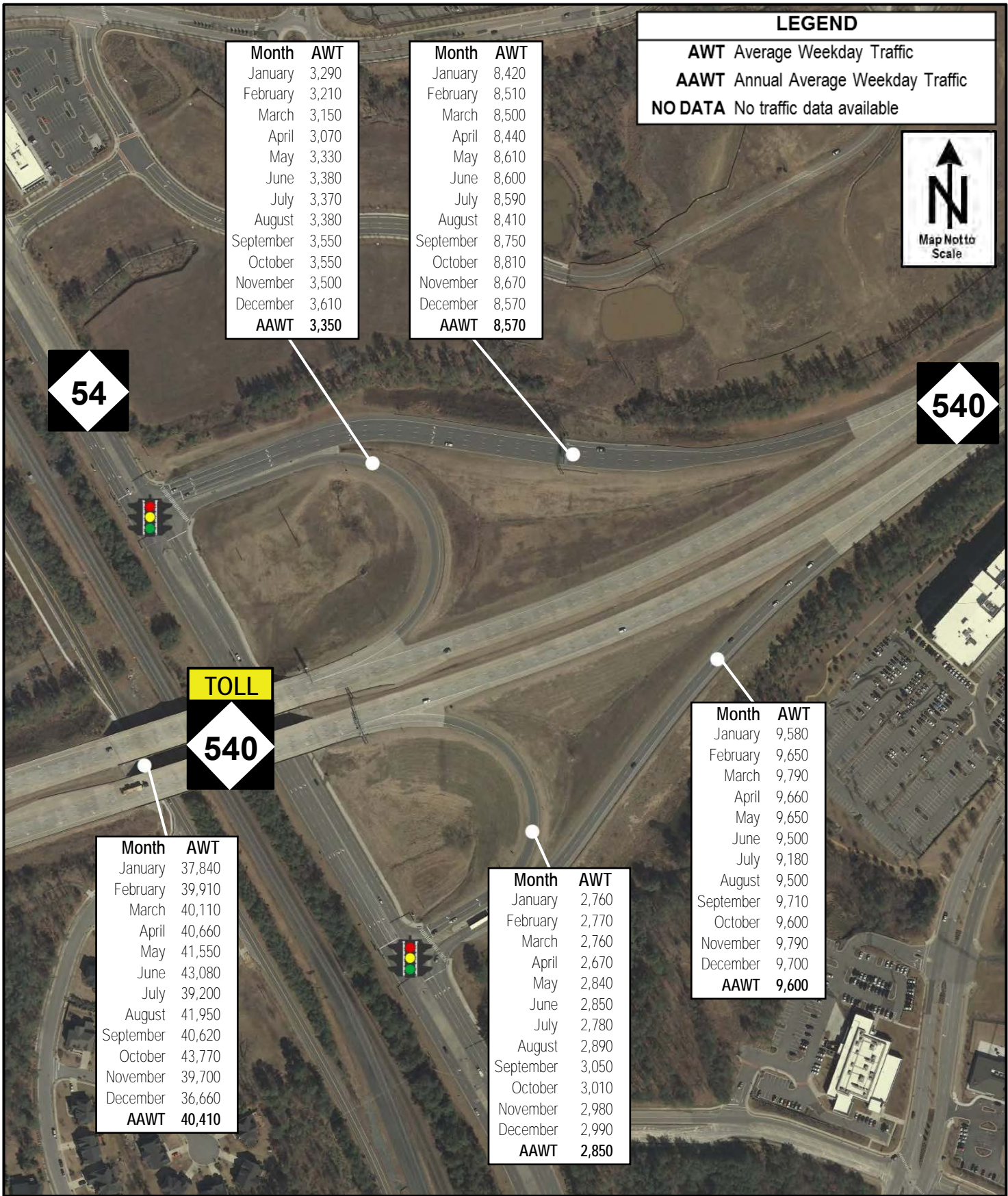
Month	AWT
January	3,010
February	2,920
March	2,760
April	1,970
May	2,810
June	2,910
July	2,890
August	2,890
September	2,980
October	3,080
November	3,070
December	3,020
<b>AAWT</b>	<b>2,900</b>

Month	AWT
January	20,920
February	22,120
March	22,170
April	22,430
May	23,420
June	24,030
July	22,130
August	23,850
September	23,500
October	25,020
November	22,660
December	NO DATA
<b>AAWT</b>	<b>22,750</b>

LEGEND	
<b>AWT</b>	Average Weekday Traffic
<b>AAWT</b>	Annual Average Weekday Traffic
<b>NO DATA</b>	No traffic data available

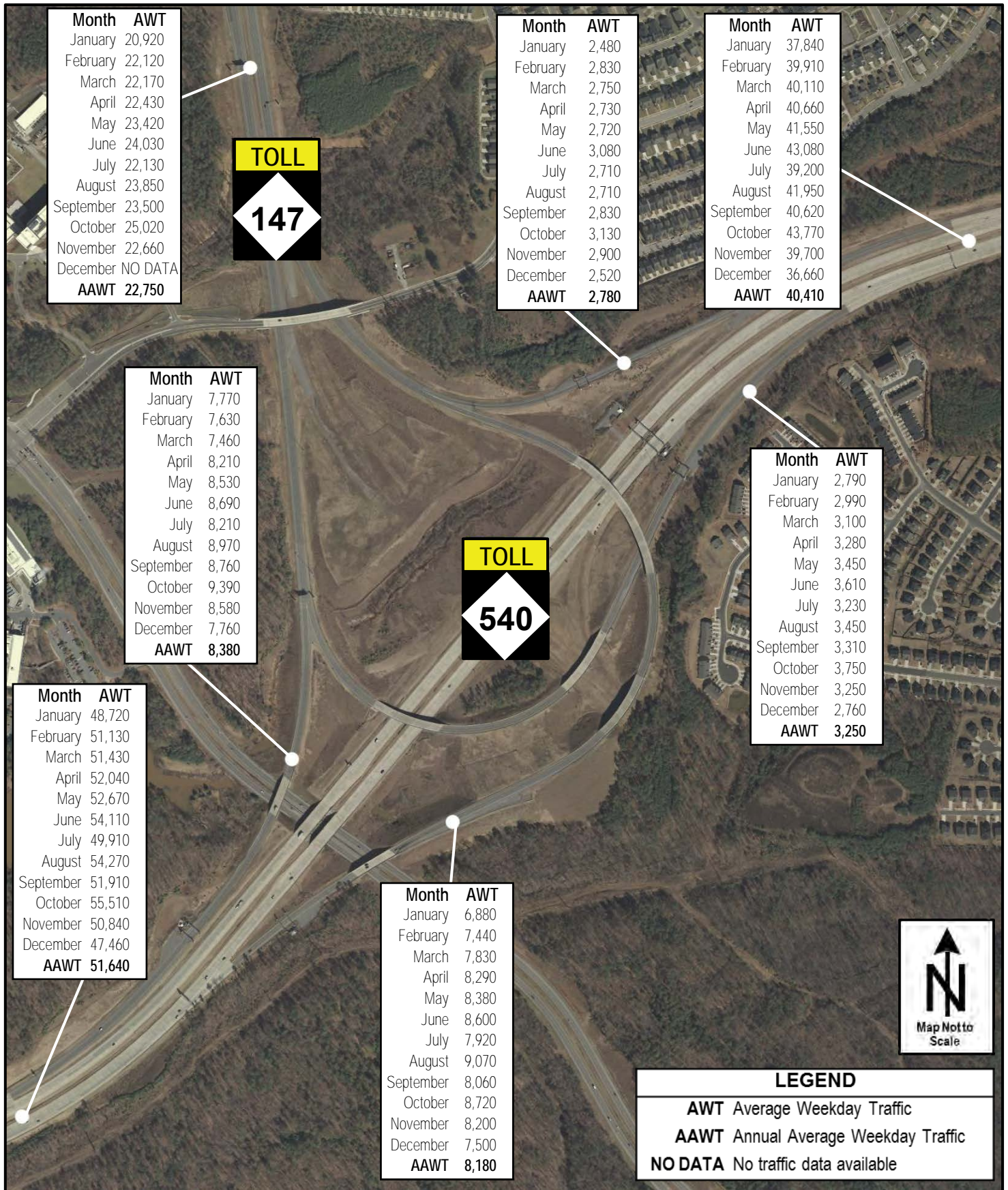
**Toll N.C. 147 at Davis Dr. Interchange**  
2018 Average Weekday Traffic

**Figure 5**



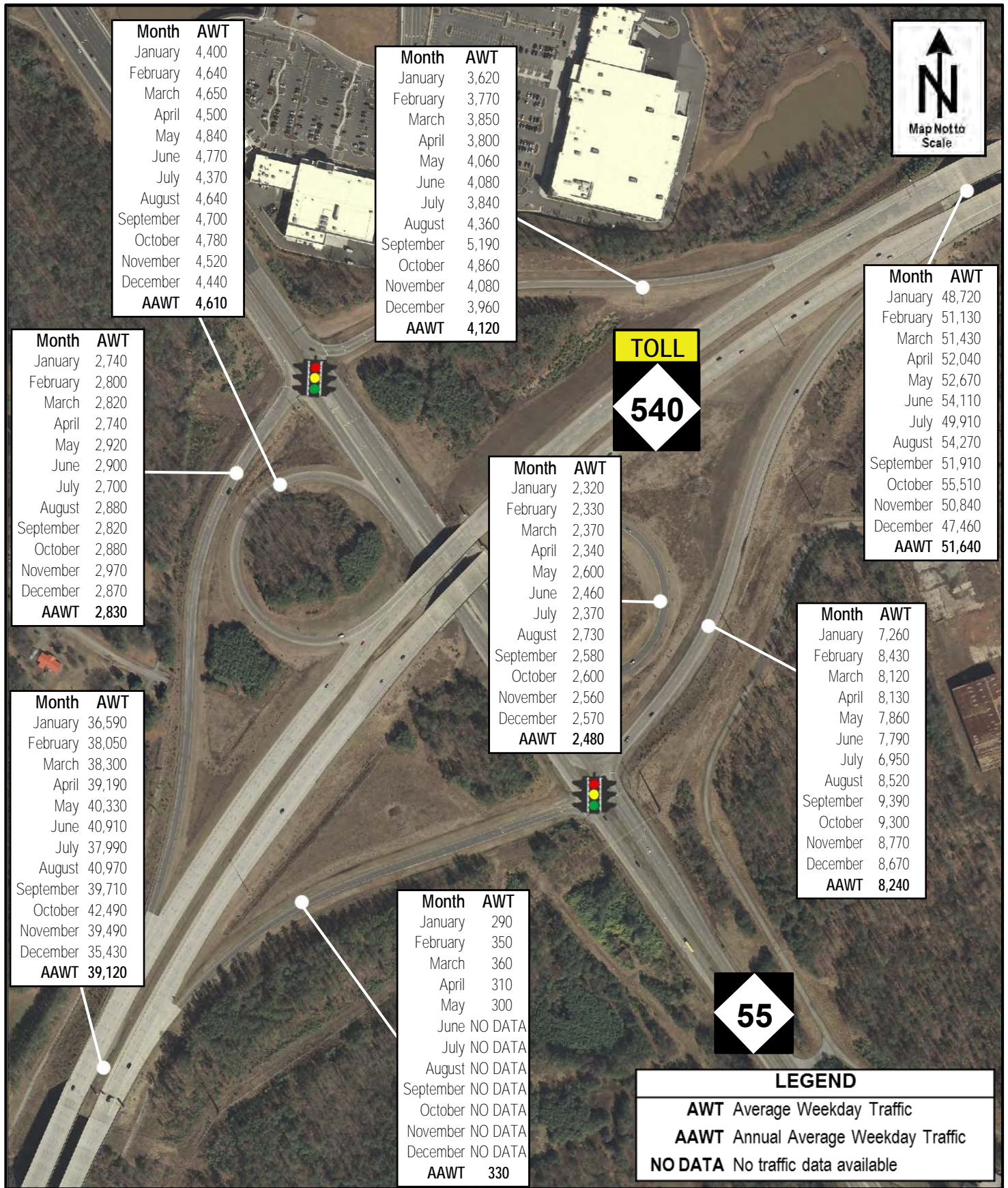
**Toll N.C. 540 at N.C. 54 Interchange**  
 2018 Average Weekday Traffic

**Figure 6**



**Toll N.C. 540 at Toll N.C. 147 Interchange**  
 2018 Average Weekday Traffic

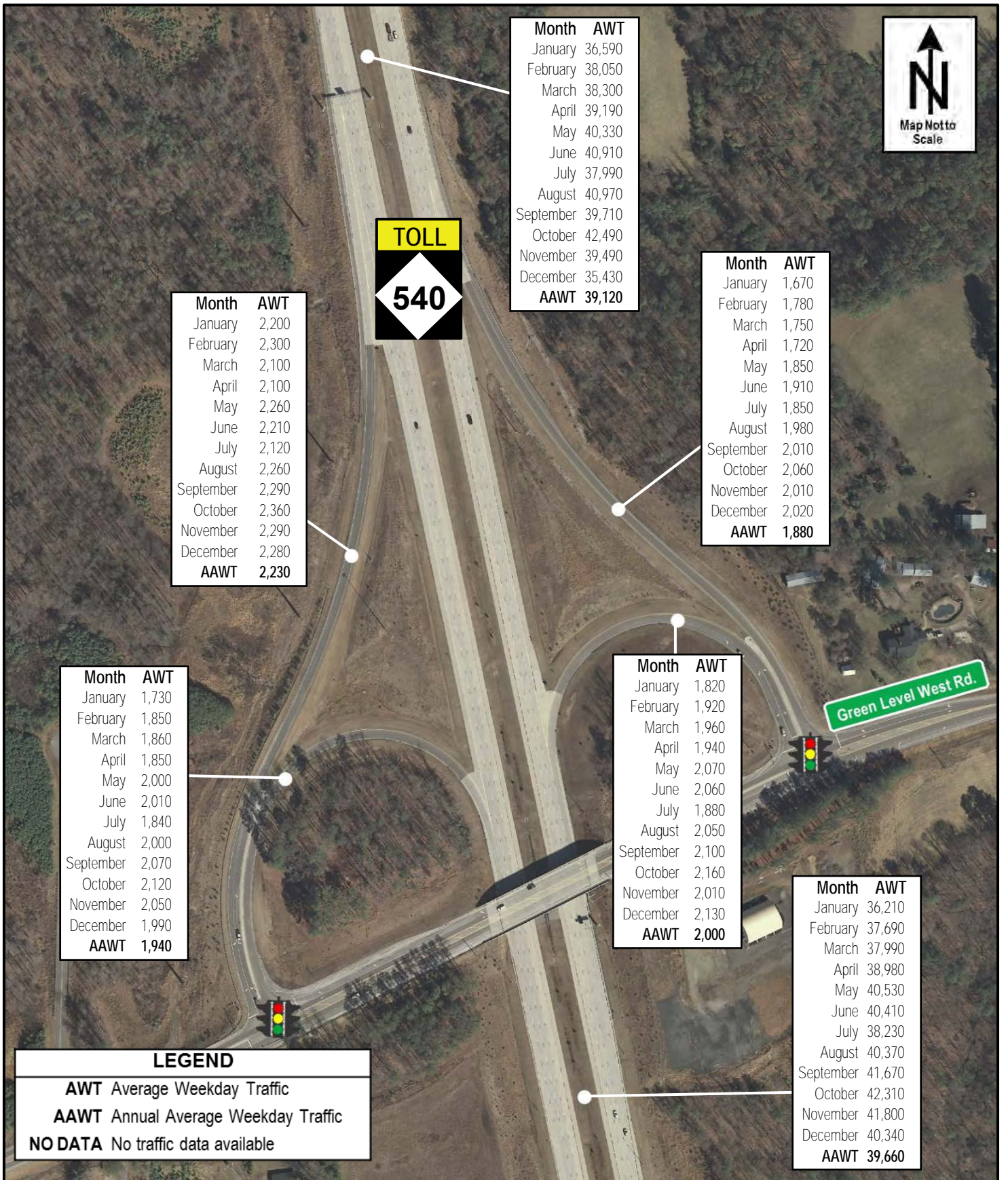
**Figure**  
**7**



**Toll N.C. 540 at N.C. 55 Interchange**  
2018 Average Weekday Traffic

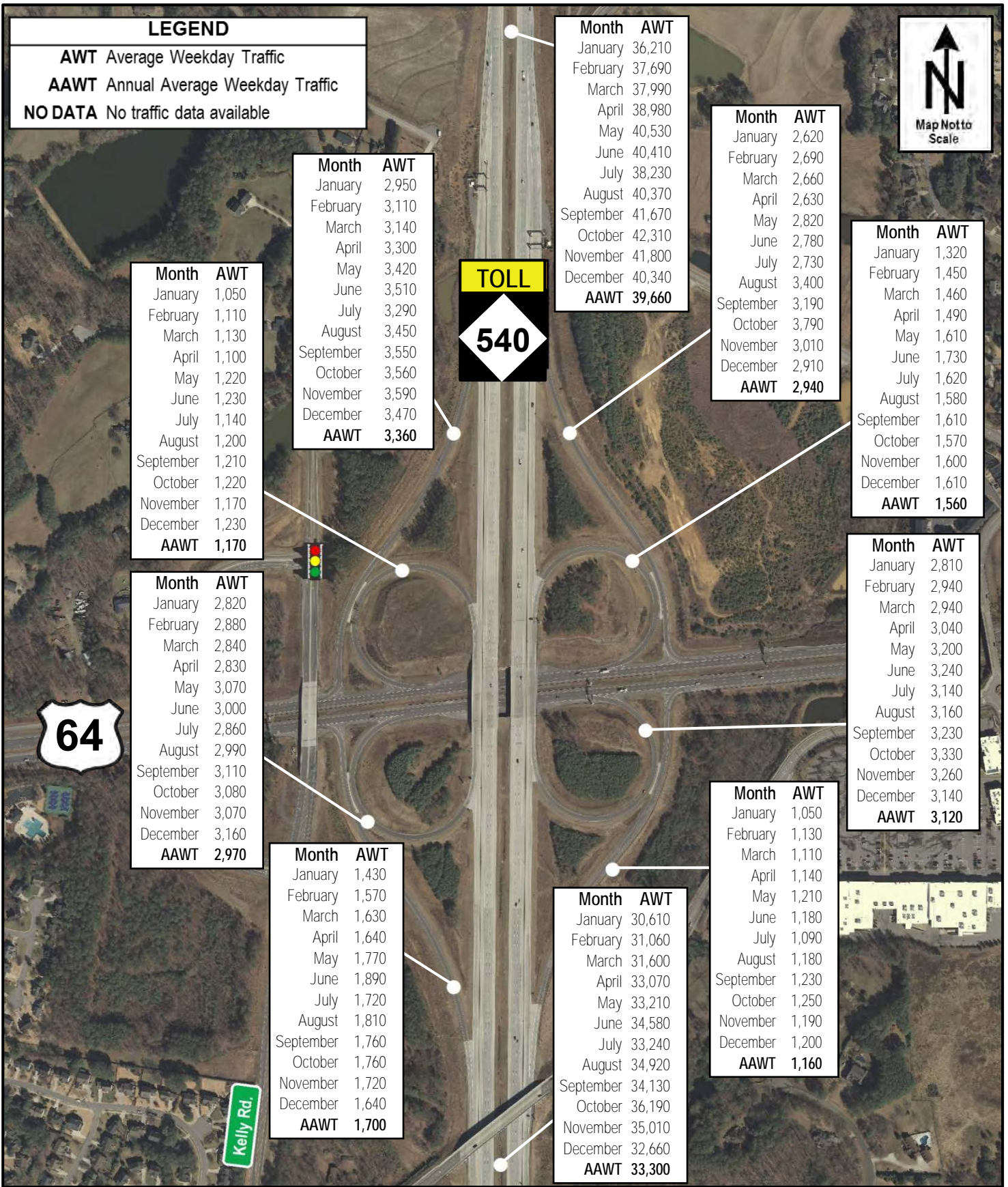
**Figure 8**





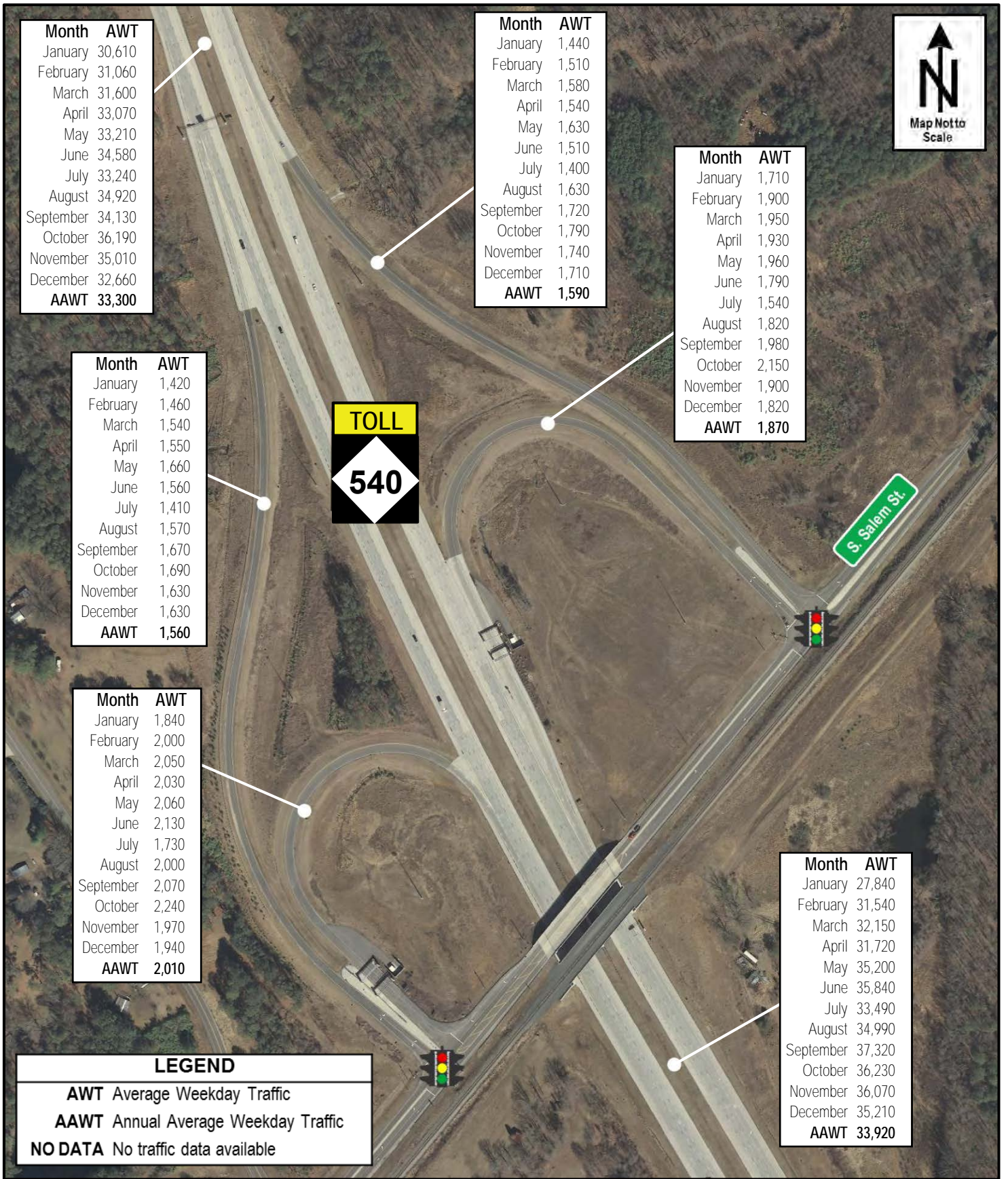
**Toll N.C. 540 at Green Level West Rd. Interchange**  
 2018 Average Weekday Traffic

**Figure**  
**9**



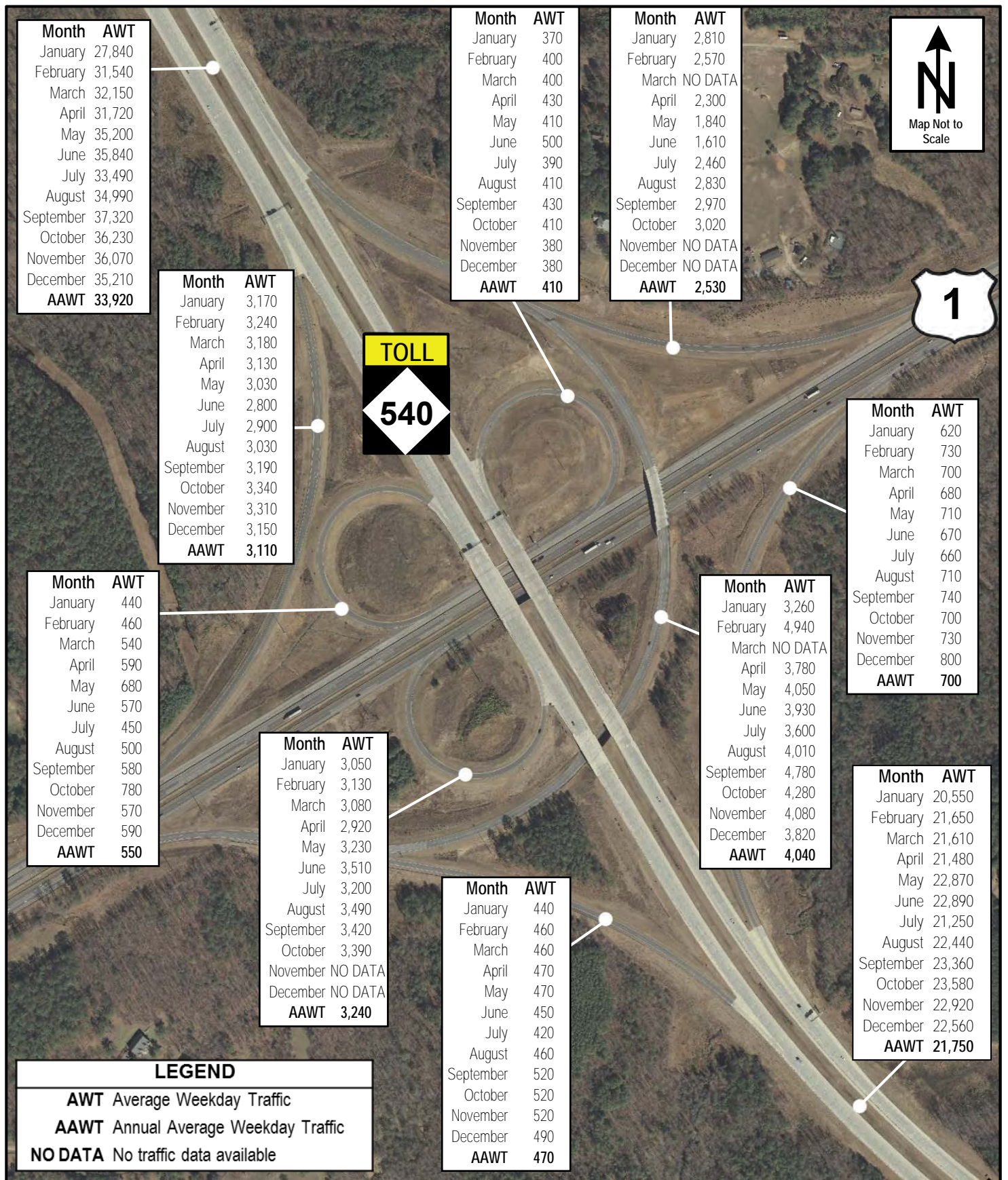
**Toll N.C. 540 at U.S. 64 Interchange**  
 2018 Average Weekday Traffic

**Figure 10**



**Toll N.C. 540 at S. Salem St. Interchange**  
 2018 Average Weekday Traffic

**Figure**  
**11**



**Toll N.C. 540 at U.S. 1 Interchange**  
2018 Average Weekday Traffic

**Figure 12**

**LEGEND**

**AWT** Average Weekday Traffic

**AAWT** Annual Average Weekday Traffic

**NO DATA** No traffic data available



Map Not to Scale

**Veridea Pkwy.**

Month	AWT
January	20,550
February	21,650
March	21,610
April	21,480
May	22,870
June	22,890
July	21,250
August	22,440
September	23,360
October	23,580
November	22,920
December	22,560
<b>AAWT</b>	<b>21,750</b>

Month	AWT
January	1,050
February	1,140
March	1,100
April	1,110
May	1,170
June	1,240
July	1,140
August	1,280
September	1,290
October	1,400
November	1,340
December	1,280
<b>AAWT</b>	<b>1,210</b>

Month	AWT
January	50
February	50
March	50
April	60
May	70
June	70
July	60
August	60
September	60
October	60
November	70
December	80
<b>AAWT</b>	<b>60</b>

Month	AWT
January	1,120
February	1,190
March	1,140
April	1,080
May	1,210
June	1,350
July	1,200
August	1,300
September	1,330
October	1,470
November	1,420
December	1,340
<b>AAWT</b>	<b>1,260</b>

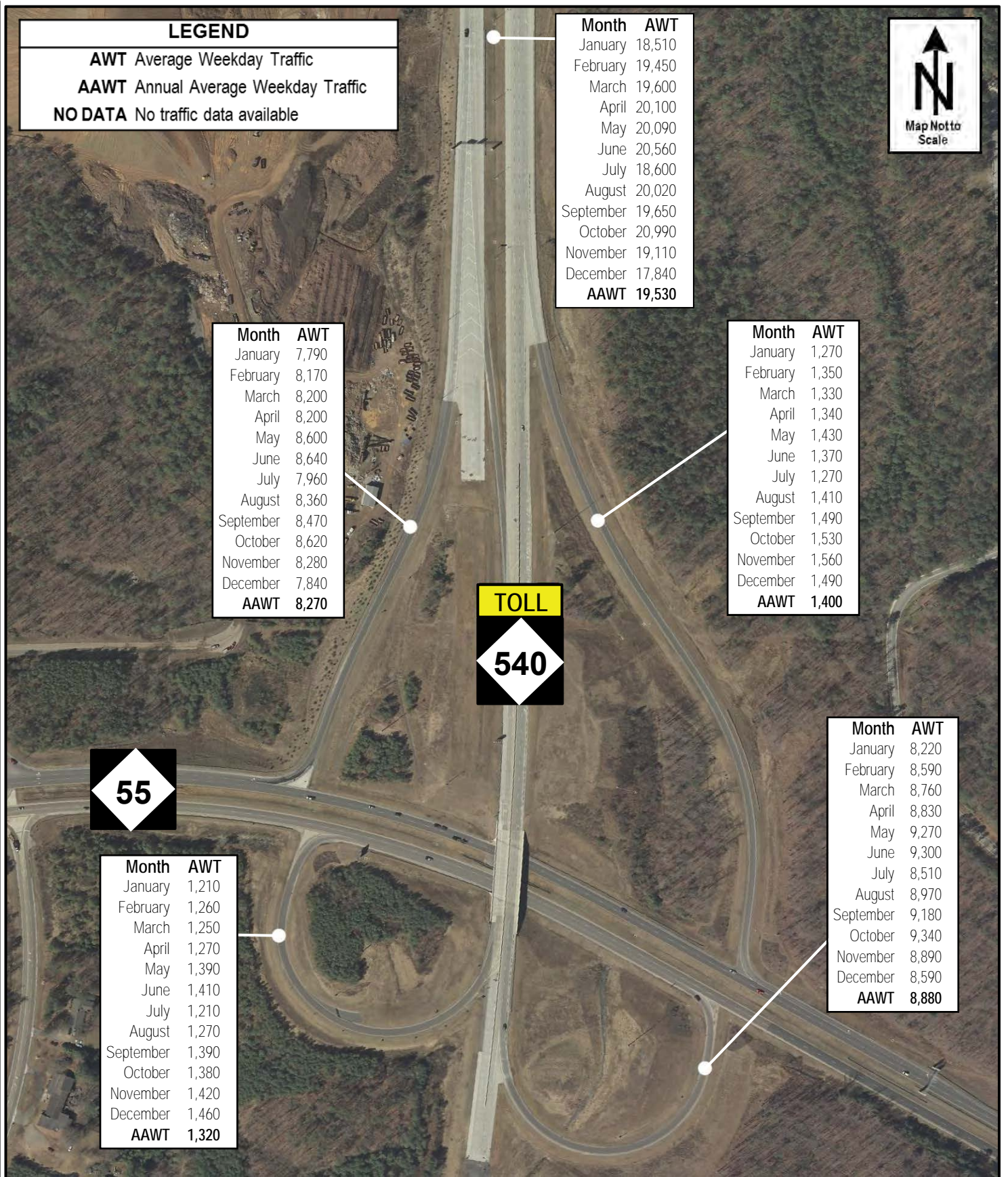
Month	AWT
January	40
February	40
March	60
April	60
May	60
June	50
July	50
August	50
September	60
October	50
November	50
December	50
<b>AAWT</b>	<b>50</b>



Month	AWT
January	18,510
February	19,450
March	19,600
April	20,100
May	20,090
June	20,560
July	18,600
August	20,020
September	19,650
October	20,990
November	19,110
December	17,840
<b>AAWT</b>	<b>19,530</b>

**Toll N.C. 540 at Veridea Pkwy. Interchange**  
2018 Average Weekday Traffic

**Figure 13**



**Toll N.C. 540 at N.C. 55 Bypass Interchange**  
 2018 Average Weekday Traffic

**Figure**  
**14**

# Toll System Statistics

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# Toll System Statistics

These statistics provide an overview of the current toll operations on the facility and identifies any utilization trends. It also allows for comparison of historical and projected data. Transaction and Classification data are collected from the toll zones throughout the facility using all-electronic tolling (AET); toll gantries and the roadside toll vaults house the AET equipment.

## Weekly, Monthly, and Year-to-Date (YTD) Statistics

The statistics provided in the following section are representative of the entire Triangle Expressway facility. Weekly, monthly, and/or year-to-date (YTD) statistics are presented in the following datasets:

- Transactions
- Classification

It should be noted that the percentages of the total provided in this section might not sum to 100% due to rounding. In addition, weekly statistics are based on weeks starting Monday and ending Sunday.



## Transactions

This section presents the volume and percentage of North Carolina Quick Pass<sup>®</sup> (NCQP) users compared to Bill by Mail users. NCQP users have established accounts that are identified using the vehicle's onboard transponder, whereas Bill by Mail users do not have established accounts and are identified using vehicle license plate recognition software.

Table 1 presents a summary of the total weekly transactions for NC Quick Pass<sup>®</sup> and Bill by Mail users.

**Table 1: Transactions, Fourth Quarter by Week**

Week Ending	Transponder (NC Quick Pass <sup>®</sup> )		Video (Bill by Mail)		Total
	Transactions	% of Total	Transactions	% of Total	
10/7/2018	665,321	58.9%	464,788	41.1%	1,130,109
10/14/2018	623,071	59.0%	432,976	41.0%	1,056,047
10/21/2018	675,904	58.5%	479,387	41.5%	1,155,291
10/28/2018	655,018	59.3%	449,587	40.7%	1,104,605
11/4/2018	661,682	58.8%	463,286	41.2%	1,124,968
11/11/2018	664,278	58.5%	471,037	41.5%	1,135,315
11/18/2018 <sup>1</sup>	646,869	58.8%	453,303	41.2%	1,100,172
11/25/2018 <sup>2</sup>	477,259	55.9%	377,038	44.1%	854,297
12/2/2018	669,407	58.9%	467,659	41.1%	1,137,066
12/9/2018	642,313	59.4%	438,441	40.6%	1,080,754
12/16/2018	569,439	58.9%	397,414	41.1%	966,853
12/23/2018	655,508	58.2%	471,316	41.8%	1,126,824
12/30/2018 <sup>3</sup>	349,160	54.4%	293,268	45.6%	642,428
12/31/2018 <sup>4</sup>	54,756	56.0%	42,970	44.0%	97,726

<sup>1</sup>Week ending includes Veterans Day

<sup>2</sup>Week ending includes Thanksgiving Day

<sup>3</sup>Week ending includes Christmas Day

<sup>4</sup>Week ending consists of one day of data

Table 2 presents a summary of the total monthly transactions for NC Quick Pass<sup>®</sup> and Bill by Mail users. This monthly transaction data was compiled 6 calendar days after the end of each month.

**Table 2: Transactions, Fourth Quarter by Month**

Month	Transponder (NC Quick Pass <sup>®</sup> )		Video (Bill by Mail)		Total
	Transactions	% of Total	Transactions	% of Total	
October	2,960,093	59.1%	2,051,666	40.9%	5,011,759
November	2,681,522	58.3%	1,921,735	41.7%	4,603,257
December	2,368,370	57.8%	1,729,069	42.2%	4,097,439

Figure 15 presents the total monthly transactions and NC Quick Pass<sup>®</sup> utilization during 2018.

Figure 15: 2018 Transactions, YTD

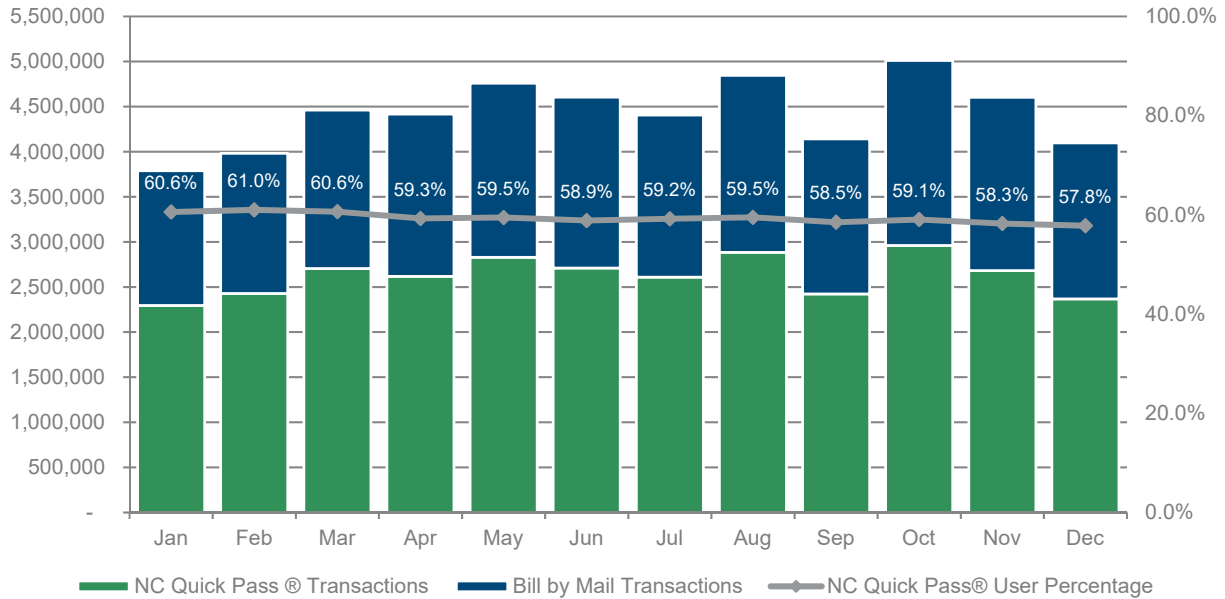


Table 3 presents a summary of the total NC Quick Pass® and Bill by Mail transactions, by year. Project to date is the total number of transactions since opening the facility to toll traffic. It should be noted that total annual transaction is calculated by adding the total monthly transactions recorded throughout the year, which are compiled 6 calendar days after the end of each month.

Table 3: Transactions, by Year

Year	Transponder (NC Quick Pass®)		Video (Bill by Mail)		Total
	Transactions	% of Total	Transactions	% of Total	
2012	2,803,043	49.2%	2,892,496	50.8%	5,695,539
2013	13,249,972	57.5%	9,792,975	42.5%	23,042,947
2014	17,733,089	58.1%	12,802,237	41.9%	30,535,326
2015	22,083,270	57.6%	16,235,360	42.4%	38,318,630
2016	26,360,672	58.3%	18,883,195	41.7%	45,243,867
2017	29,015,941	58.7%	20,440,241	41.3%	49,456,182
2018	31,513,475	59.3%	21,607,176	40.7%	53,120,651
<b>Project to Date</b>	<b>142,759,462</b>	<b>58.2%</b>	<b>102,653,680</b>	<b>41.8%</b>	<b>245,413,142</b>

## Classification

This section presents the volume and percentage of users based on classification. The classification system used by NCTA includes three classes, determined by the vehicle's number of axles. The three classes include Class 1 (2-axle), Class 2 (3-axle), and Class 3 (4+-axle) vehicles.

Table 4 presents a summary of the total weekly transactions for each vehicle class.

**Table 4: Classification, Fourth Quarter by Week**

Week Ending	Class 1 (2-axle)		Class 2 (3-axle)		Class 3 (4+axle)	
	Transactions	% of Total	Transactions	% of Total	Transactions	% of Total
10/7/2018	1,084,858	96.0%	14,270	1.3%	30,981	2.7%
10/14/2018	1,017,269	96.3%	12,113	1.1%	26,665	2.5%
10/21/2018	1,109,975	96.1%	14,012	1.2%	31,304	2.7%
10/28/2018	1,063,563	96.3%	12,507	1.1%	28,535	2.6%
11/4/2018	1,082,501	96.2%	13,369	1.2%	29,098	2.6%
11/11/2018	1,095,739	96.5%	12,534	1.1%	27,042	2.4%
11/18/2018 <sup>1</sup>	1,068,023	97.1%	9,688	0.9%	22,461	2.0%
11/25/2018 <sup>2</sup>	825,189	96.6%	9,454	1.1%	19,654	2.3%
12/2/2018	1,095,675	96.4%	13,116	1.2%	28,275	2.5%
12/9/2018	1,038,303	96.1%	13,233	1.2%	29,218	2.7%
12/16/2018	942,272	97.5%	7,330	0.8%	17,251	1.8%
12/23/2018	1,090,460	96.8%	10,887	1.0%	25,477	2.3%
12/30/2018 <sup>3</sup>	622,847	97.0%	6,409	1.0%	13,172	2.1%
12/31/2018 <sup>4</sup>	95,104	97.3%	835	0.9%	1,787	1.8%

<sup>1</sup> Week ending includes Veterans Day

<sup>2</sup> Week ending includes Thanksgiving Day

<sup>3</sup> Week ending includes Christmas Day

<sup>4</sup> Week ending consists of one day of data

Table 5 presents a summary of the total monthly transactions by classification. This monthly transaction data was compiled 6 calendar days after the end of each month.

**Table 5: Classification, Fourth Quarter by Month**

Month	Class 1 (2-axle)		Class 2 (3-axle)		Class 3 (4+axle)	
	Transactions	% of Total	Transactions	% of Total	Transactions	% of Total
October	4,817,268	96.1%	60,271	1.2%	134,220	2.7%
November	4,445,823	96.6%	49,769	1.1%	107,665	2.3%
December	3,968,687	96.9%	39,717	1.0%	89,035	2.2%

Figure 16 presents the total monthly percentage of transactions during 2018 for each vehicle class.

Figure 16: 2018 Classification, Percentage YTD

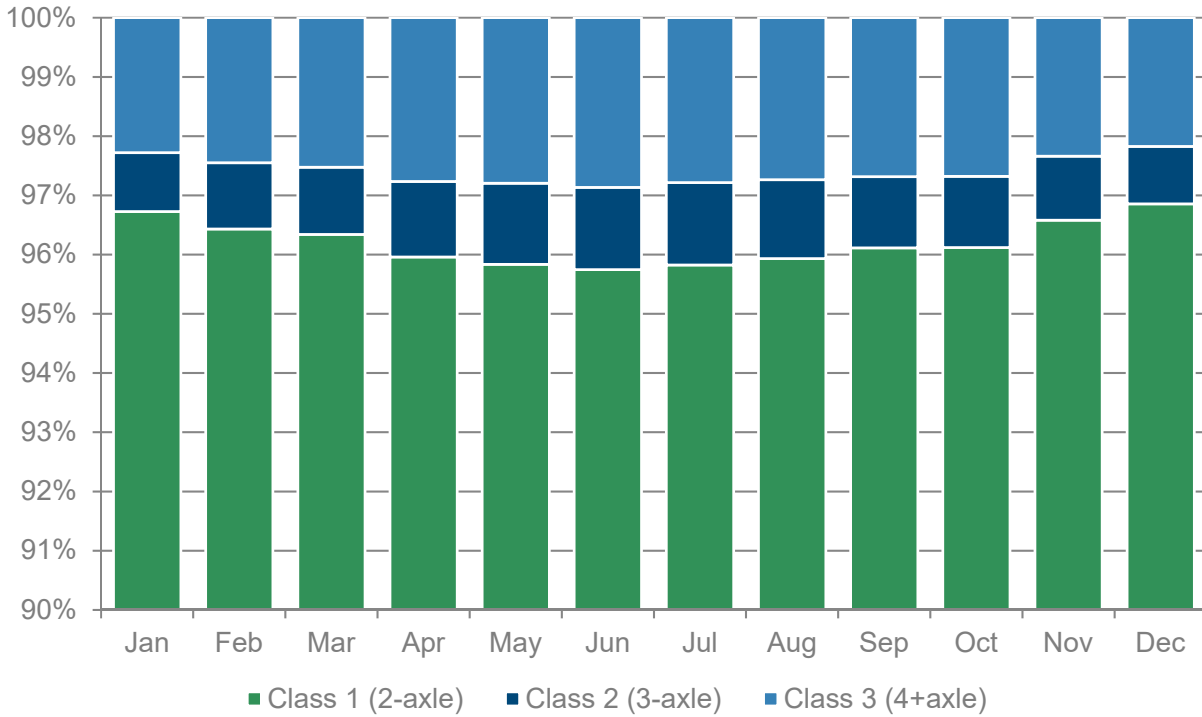


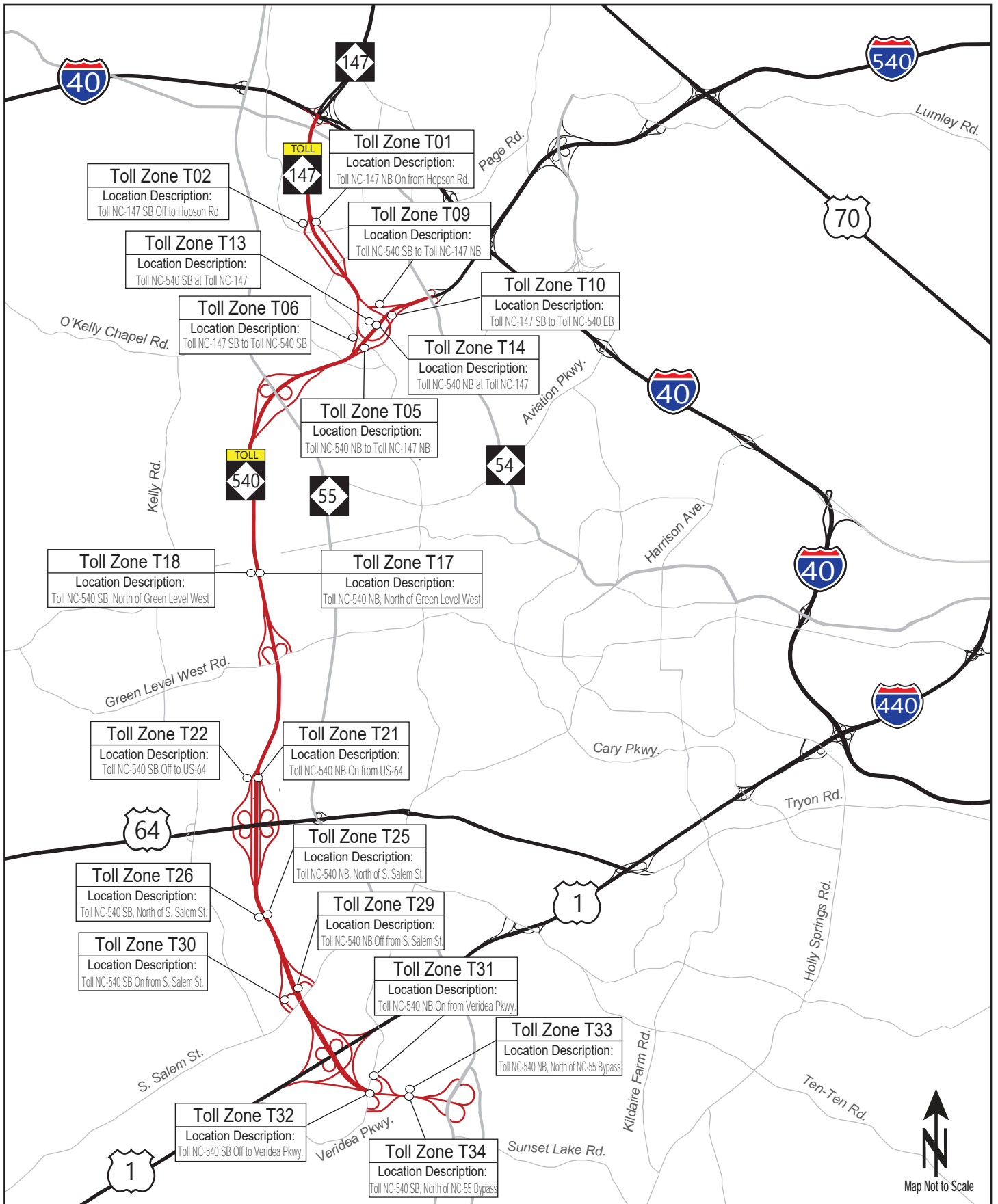
Table 6 presents a summary of the total transactions for Class 1, Class 2, and Class 3 vehicles, by year. Project to date is the total number of transactions since opening the facility to toll traffic. It should be noted that total annual transactions are calculated by adding the total monthly transactions recorded throughout the year, which is compiled 6 calendar days after the end of each month.

Table 6: Classification, by Year

Year	Class 1 (2-axle)		Class 2 (3-axle)		Class 3 (4+axle)	
	Transactions	% of Total	Transactions	% of Total	Transactions	% of Total
2012	5,562,061	97.7%	46,935	0.8%	86,543	1.5%
2013	22,282,351	96.7%	267,558	1.2%	493,038	2.1%
2014	29,530,077	96.7%	355,721	1.2%	649,528	2.1%
2015	37,050,375	96.7%	426,656	1.1%	841,599	2.2%
2016	43,567,844	96.3%	566,221	1.3%	1,109,803	2.5%
2017	47,596,172	96.2%	601,957	1.2%	1,258,053	2.5%
2018	51,096,151	96.2%	643,893	1.2%	1,380,607	2.6%
<b>Project to Date</b>	<b>236,685,031</b>	<b>96.4%</b>	<b>2,908,941</b>	<b>1.2%</b>	<b>5,819,171</b>	<b>2.4%</b>

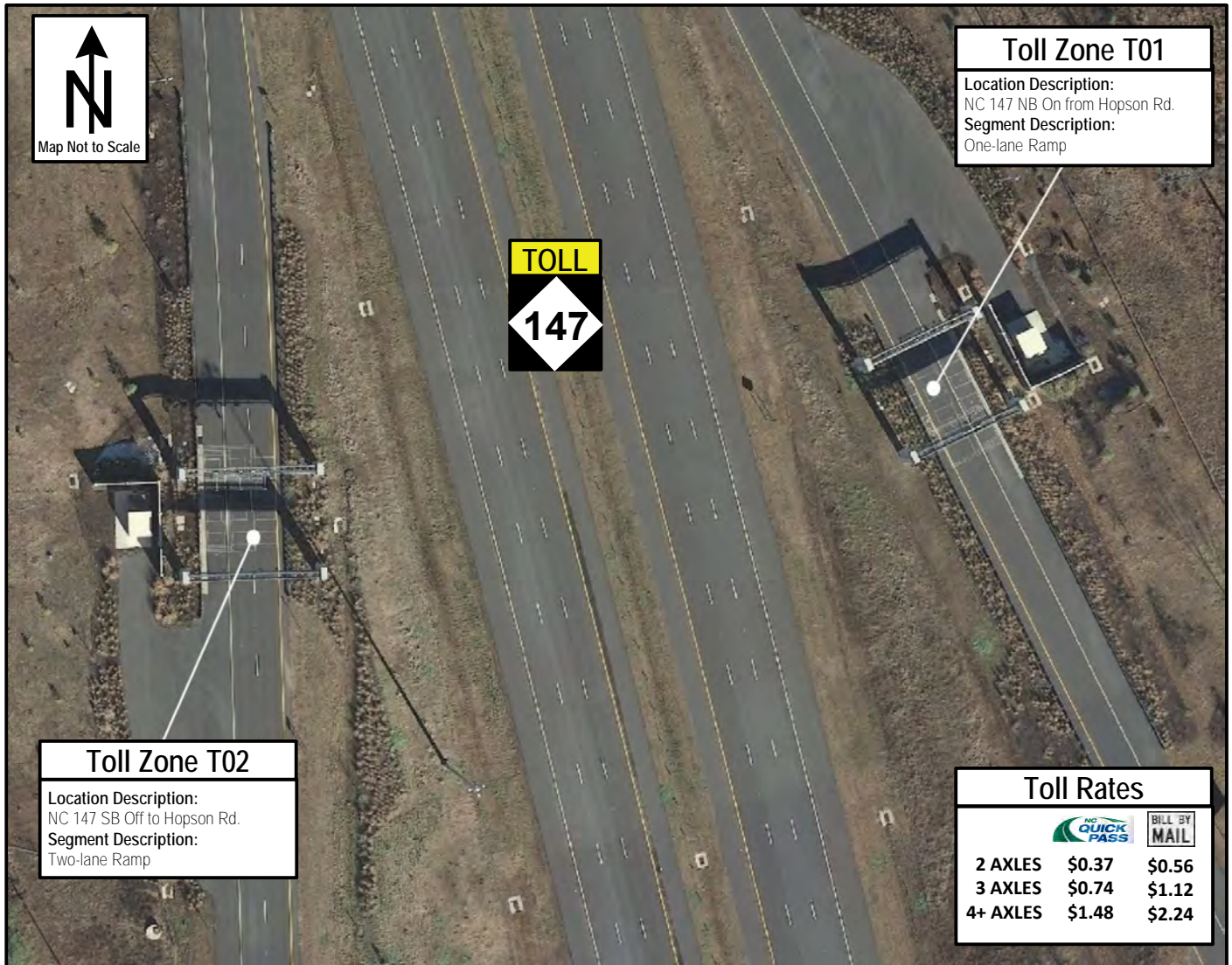
## Toll Zone Statistics

The location of the toll zones along the Triangle Expressway can be seen in *Figure 17*. *Figures 18 - 27* present the average weekday transactions (excludes holidays and days of inclement weather conditions) recorded at toll zones along the facility.



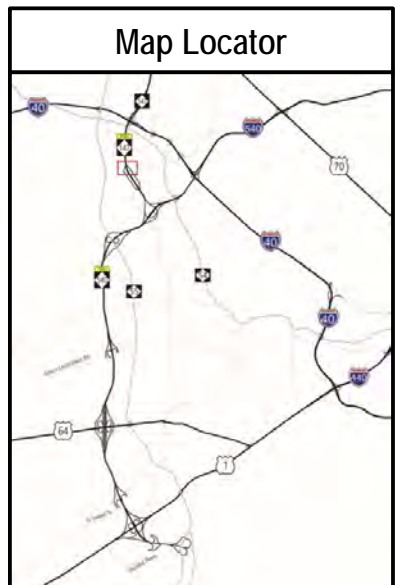
**Triangle Expressway Toll Zone Map**

**Figure 17**



Transactions by Direction		
Month	T01	T02
January	2,690	2,490
February	2,820	2,620
March	2,840	2,610
April	3,000	2,700
May	3,060	2,770
June	3,080	2,730
July	2,960	2,660
August	3,070	2,780
September	3,080	2,760
October	3,060	2,750
November	3,040	2,760
December	3,060	2,800

NC Quick Pass Percentage		
Month	T01	T02
January	62%	62%
February	61%	63%
March	61%	63%
April	61%	63%
May	59%	61%
June	59%	61%
July	59%	62%
August	59%	61%
September	58%	60%
October	58%	60%
November	58%	59%
December	58%	59%



**Hopson Road Ramp Toll Zones**  
2018 Average Weekday Toll Transactions

**Figure 18**



Transactions by Direction		
Month	T05	T06
January	7,830	7,890
February	8,130	8,260
March	8,180	8,300
April	8,320	8,560
May	8,580	9,000
June	8,570	8,850
July	8,300	8,610
August	8,720	9,130
September	8,910	9,410
October	8,910	9,290
November	8,900	9,360
December	9,010	9,390

NC Quick Pass Percentage		
Month	T05	T06
January	62%	64%
February	62%	64%
March	62%	63%
April	62%	57%
May	61%	61%
June	60%	61%
July	61%	61%
August	61%	60%
September	60%	60%
October	60%	60%
November	60%	60%
December	61%	60%



**Toll N.C. 147 South Ramp Toll Zones**  
 2018 Average Weekday Toll Transactions

**Figure 19**





**Toll Zone T14**  
**Location Description:**  
 NC 540 SB Mainline at NC 147  
**Segment Description:**  
 Three-lane Mainline

**Toll Zone T13**  
**Location Description:**  
 NC 540 NB Mainline at NC 147  
**Segment Description:**  
 Three-lane Mainline

**Toll Rates**

2 AXLES	\$0.65	\$1.00
3 AXLES	\$1.30	\$2.00
4+ AXLES	\$2.60	\$4.00

**Transactions by Direction**

Month	T13	T14
January	16,250	15,920
February	17,020	16,750
March	17,130	16,930
April	17,300	17,170
May	18,080	18,020
June	18,180	17,780
July	17,120	16,940
August	17,920	17,800
September	18,110	18,070
October	18,200	18,270
November	18,220	18,230
December	18,510	18,230

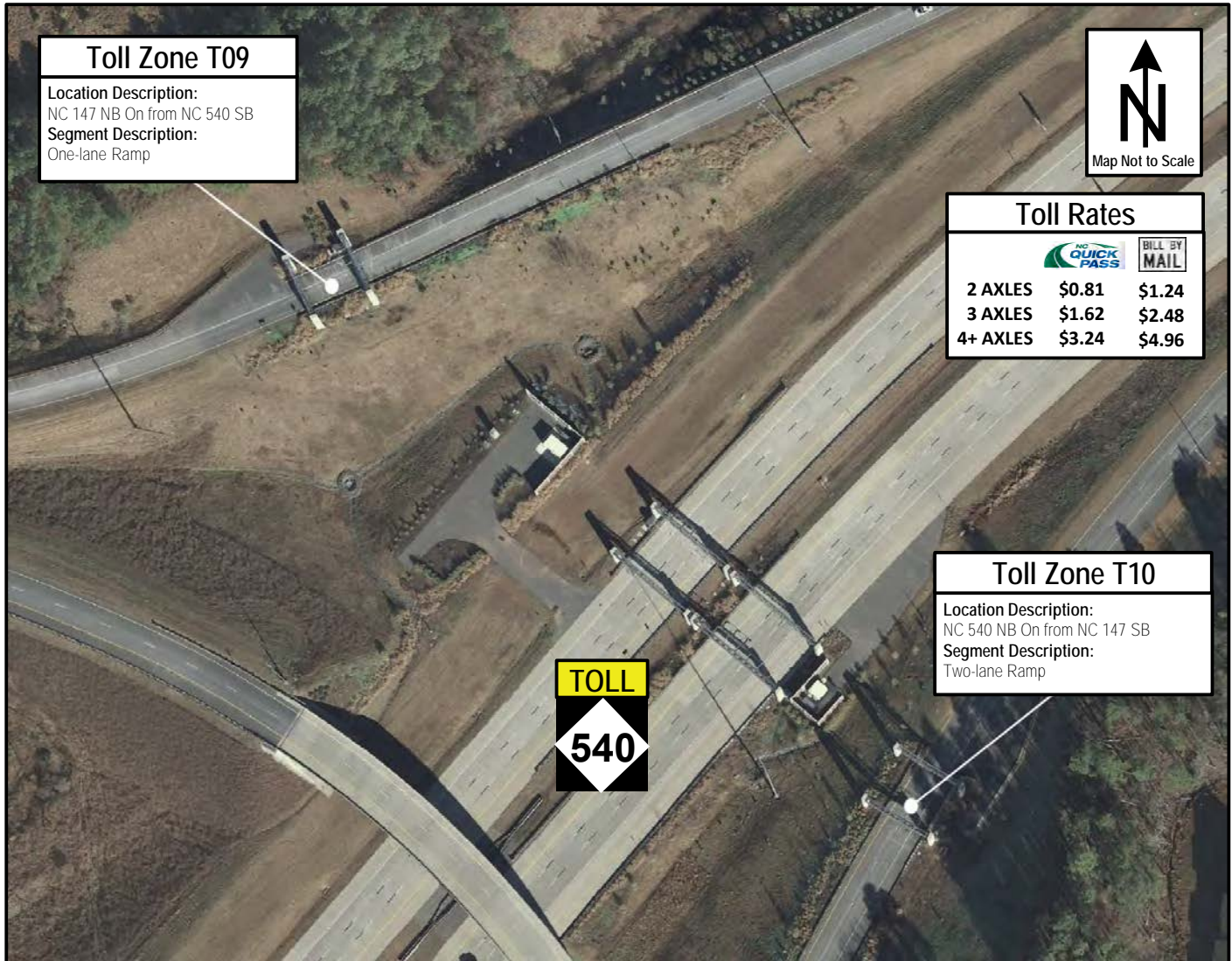
**NC Quick Pass Percentage**

Month	T13	T14
January	57%	63%
February	62%	62%
March	62%	62%
April	61%	55%
May	60%	60%
June	59%	59%
July	60%	60%
August	60%	60%
September	60%	60%
October	60%	60%
November	60%	60%
December	60%	60%

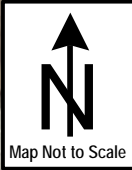


**Toll N.C. 540 Morrisville Mainline Toll Zones**  
 2018 Average Weekday Toll Transactions

**Figure 20**



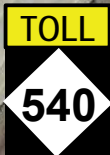
**Toll Zone T09**  
 Location Description:  
 NC 147 NB On from NC 540 SB  
 Segment Description:  
 One-lane Ramp



**Toll Rates**

2 AXLES	\$0.81	\$1.24
3 AXLES	\$1.62	\$2.48
4+ AXLES	\$3.24	\$4.96

**Toll Zone T10**  
 Location Description:  
 NC 540 NB On from NC 147 SB  
 Segment Description:  
 Two-lane Ramp



**Transactions by Direction**

Month	T09	T10
January	2,510	2,790
February	2,900	2,990
March	2,790	3,130
April	2,740	3,240
May	2,860	3,600
June	3,120	3,610
July	2,870	3,360
August	2,750	3,470
September	3,120	3,610
October	3,190	3,670
November	3,420	3,670
December	3,430	3,710

**NC Quick Pass Percentage**

Month	T09	T10
January	59%	64%
February	55%	63%
March	57%	61%
April	49%	60%
May	56%	57%
June	53%	55%
July	55%	57%
August	56%	57%
September	53%	56%
October	52%	55%
November	49%	54%
December	50%	54%



**Toll N.C. 147 North Ramp Toll Zones**  
 2018 Average Weekday Toll Transactions

**Figure 21**



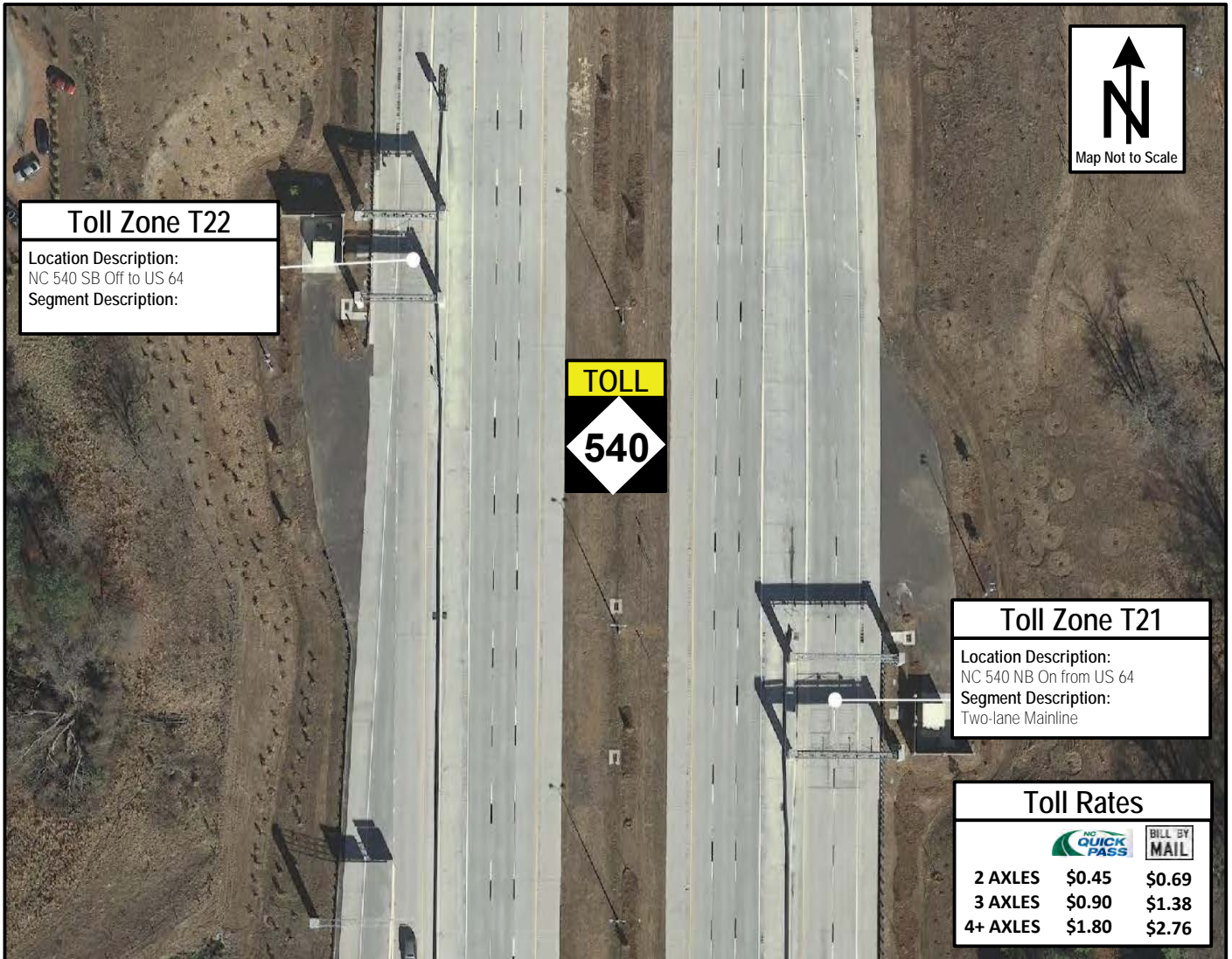
Transactions by Direction		
Month	T17	T18
January	17,870	18,840
February	18,650	19,590
March	18,750	19,760
April	19,240	20,210
May	19,960	21,170
June	19,920	21,170
July	19,090	20,300
August	20,030	21,380
September	20,610	21,660
October	20,720	21,610
November	20,890	21,790
December	20,970	22,130

NC Quick Pass Percentage		
Month	T17	T18
January	62%	63%
February	60%	63%
March	61%	62%
April	61%	61%
May	60%	61%
June	60%	60%
July	60%	60%
August	60%	60%
September	60%	60%
October	60%	59%
November	59%	59%
December	59%	60%



**Toll N.C. 540 Cary Mainline Toll Zones**  
2018 Average Weekday Toll Transactions

**Figure 22**



Transactions by Direction		
Month	T21	T22
January	5,450	5,780
February	5,650	6,000
March	5,510	6,020
April	5,840	6,200
May	6,070	6,520
June	6,050	6,530
July	5,860	6,280
August	6,040	6,540
September	6,170	6,680
October	6,230	6,580
November	6,270	6,750
December	6,350	6,910

NC Quick Pass Percentage		
Month	T21	T22
January	65%	64%
February	65%	64%
March	64%	64%
April	63%	62%
May	62%	62%
June	62%	61%
July	62%	61%
August	62%	61%
September	62%	61%
October	62%	61%
November	62%	61%
December	63%	62%



**U.S. 64 Ramp Toll Zones**  
 2018 Average Weekday Toll Transactions

**Figure 23**



**Toll Zone T26**  
**Location Description:**  
 NC 540 SB, North of S. Salem St.  
**Segment Description:**  
 Three-lane Mainline

**Toll Zone T25**  
**Location Description:**  
 NC 540 NB, North of S. Salem St.  
**Segment Description:**  
 Three-lane Mainline

Toll Rates		
2 AXLES	\$1.01	\$1.54
3 AXLES	\$2.02	\$3.08
4+ AXLES	\$4.04	\$6.16

Transactions by Direction		
Month	T25	T26
January	15,060	15,080
February	15,850	15,840
March	16,010	16,010
April	16,420	16,410
May	17,130	17,230
June	17,110	17,300
July	16,140	16,420
August	17,040	17,340
September	17,560	17,560
October	17,490	17,580
November	17,650	17,640
December	17,600	17,750

NC Quick Pass Percentage		
Month	T25	T26
January	58%	61%
February	60%	61%
March	60%	61%
April	60%	60%
May	60%	59%
June	59%	59%
July	60%	59%
August	60%	59%
September	56%	59%
October	59%	59%
November	57%	59%
December	57%	59%



**Toll N.C. 540 Apex Mainline Toll Zones**  
 2018 Average Weekday Toll Transactions

**Figure 24**



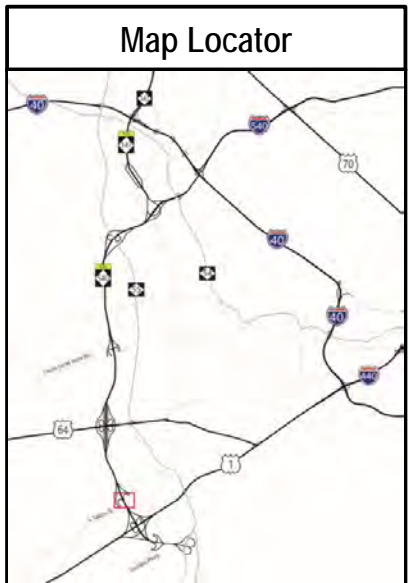
**Toll Zone T30**  
 Location Description:  
 NC 540 SB, On from S. Salem St.  
 Segment Description:  
 One-lane Ramp

**Toll Zone T29**  
 Location Description:  
 NC 540 NB, Off to S. Salem St.  
 Segment Description:  
 One-lane Ramp

Toll Rates		
2 AXLES	\$0.26	\$0.39
3 AXLES	\$0.52	\$0.78
4+ AXLES	\$1.04	\$1.56

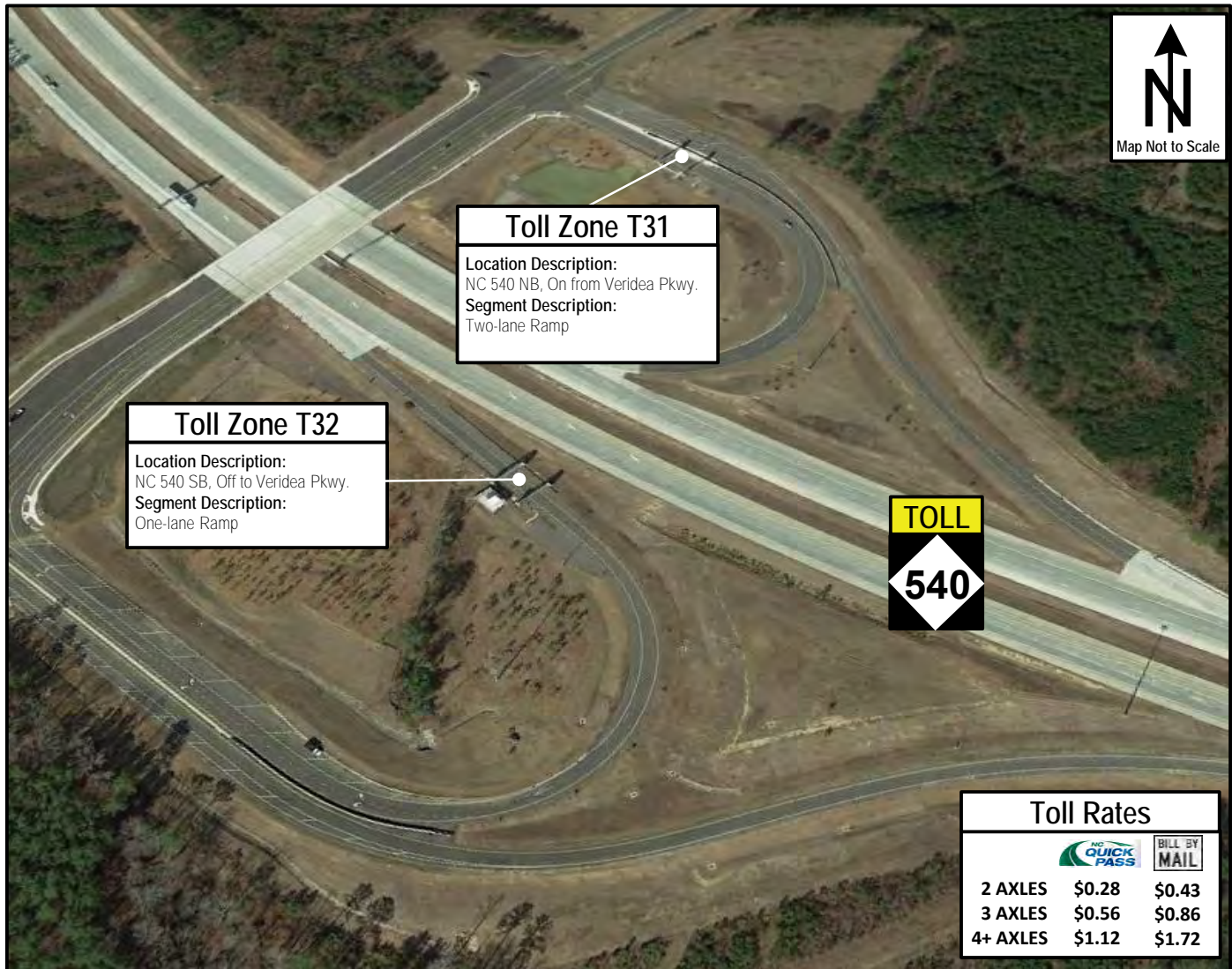
Transactions by Direction		
Month	T29	T30
January	1,750	1,890
February	1,920	2,010
March	1,990	2,060
April	1,940	2,020
May	2,040	2,120
June	1,810	2,140
July	1,600	1,790
August	1,860	2,020
September	2,130	2,190
October	2,130	2,210
November	2,090	2,150
December	2,120	2,250

NC Quick Pass Percentage		
Month	T29	T30
January	71%	71%
February	70%	72%
March	70%	71%
April	69%	70%
May	69%	69%
June	67%	67%
July	69%	70%
August	69%	70%
September	69%	70%
October	68%	69%
November	68%	68%
December	69%	69%



**South Salem Street Ramp Toll Zones**  
 2018 Average Weekday Toll Transactions

**Figure 25**



**Toll Zone T31**  
**Location Description:**  
 NC 540 NB, On from Veridea Pkwy.  
**Segment Description:**  
 Two-lane Ramp

**Toll Zone T32**  
**Location Description:**  
 NC 540 SB, Off to Veridea Pkwy.  
**Segment Description:**  
 One-lane Ramp

Toll Rates		
	QUICK PASS	BILL BY MAIL
2 AXLES	\$0.28	\$0.43
3 AXLES	\$0.56	\$0.86
4+ AXLES	\$1.12	\$1.72

Transactions by Direction		
Month	T31	T32
January	1,040	1,130
February	1,140	1,190
March	1,100	1,160
April	1,090	1,110
May	1,200	1,270
June	1,230	1,360
July	1,160	1,240
August	1,270	1,330
September	1,360	1,430
October	1,400	1,440
November	1,480	1,590
December	1,520	1,670

NC Quick Pass Percentage		
Month	T31	T32
January	71%	73%
February	71%	72%
March	71%	72%
April	70%	70%
May	68%	70%
June	70%	72%
July	70%	73%
August	70%	73%
September	71%	73%
October	70%	72%
November	69%	70%
December	69%	69%



**Toll N.C. 540 Ramps at Veridea Parkway**  
 2018 Average Weekday Toll Transactions

**Figure 26**



Transactions by Direction		
Month	T33	T34
January	9,490	9,050
February	9,980	9,500
March	10,050	9,590
April	10,350	9,760
May	10,640	10,050
June	10,520	10,060
July	9,800	9,430
August	10,330	9,840
September	10,720	10,080
October	10,540	10,050
November	10,530	9,930
December	10,650	9,930

NC Quick Pass Percentage		
Month	T33	T34
January	63%	63%
February	63%	63%
March	63%	63%
April	60%	63%
May	61%	62%
June	61%	62%
July	62%	62%
August	61%	61%
September	61%	62%
October	61%	61%
November	61%	61%
December	61%	61%



**Toll N.C. 540 Holly Springs Mainline Toll Zones  
2018 Average Weekday Toll Transactions**

**Figure  
27**



# Roadway Safety Statistics

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# Roadway Safety Statistics

Vehicle crashes are often related to deficiencies in the safety and capacity characteristics of a transportation facility. To identify these deficiencies early, and therefore reduce the likelihood of crashes on the Triangle Expressway, NCTA monitors safety conditions on the facility through quarterly crash analyses. These analyses involve the use of the Traffic Engineering Accident Analysis System (TEAAS) to collect monthly crash data along the facility, separated into four (4) segments:

- Toll N.C. 147, from I-40 to Toll N.C. 540
- Toll N.C. 540, from I-40 to N.C. 55
- Toll N.C. 540, from N.C. 55 to U.S. 64
- Toll N.C. 540, from U.S. 64 to N.C. 55 Bypass

The data collected includes total crashes and the number of fatal and injury crashes reported along each segment. This data is analyzed over a rolling three-year period to determine the Total Crash Rate of each of the four segments selected, as well as for the entire facility. These crash rates can then be compared to the Critical Crash Rates.

Total Crash Rates are a function of the length of roadway, average daily traffic, and number of reported crashes along a route during a specific time frame. These rates are expressed in crashes per 100 million vehicle miles traveled (MVMT). In the crash analysis conducted during the fourth quarter, the Total Crash Rates of the four segments selected and the entire facility were calculated based on the roadway segment length, the average annual daily traffic (AADT) and the number of crashes recorded from September 2015 through November 2018 for each segment. The AADT used for this quarter analysis was collected from the NCDOT 2016 Wake County AADT Map. The Statewide Crash Rate (129.58 crashes per 100 MVMT) used for comparison purposes in this analysis was collected from the 2015-2017 NCDOT Statewide Total Crash Rates for urban interstate facilities, as the Triangle Expressway operates more like an interstate than a state route.

Critical Crash Rates are crash rates that have been statistically adjusted with a 95% level of confidence to remove the elements of chance and randomness. They are used as a reference to determine if the Total Crash Rate at a given location is significantly higher than a predetermined average rate for locations with similar characteristics.

*Table 7* provides a summary of the crash data collected and the results of the fourth quarter analysis.

**Table 7: Safety Statistics, December 1, 2015 –November 30, 2018**

Segment	Length	AADT <sup>1</sup>	Total Crashes	Vehicle Exposure (MVMT)	Total Crash Rate	Statewide Crash Rate <sup>2</sup>	Critical Crash Rate
Toll N.C. 147 I-40 to Toll N.C. 540	3.1	13,000	46	44.22	104.03	129.58	158.87
Toll N.C. 540 I-40 to N.C. 55	2.8	36,200	61	110.79	55.06	129.58	147.82
Toll N.C. 540 N.C. 55 to U.S. 64	6.7	28,200	91	206.24	44.12	129.58	142.86
Toll N.C. 540 U.S. 64 to N.C. 55 Bypass	5.9	20,700	68	132.85	51.19	129.58	146.20
<b>Triangle Expressway</b>	<b>18.4</b>	<b>24,500</b>	<b>266</b>	<b>494.73</b>	<b>53.77</b>	<b>129.58</b>	<b>138.10</b>

<sup>1</sup> AADT provided from NCDOT 2016 AADT Maps, Wake County

<sup>2</sup> Statewide Crash Rate for Urban Interstate Facilities Applied

# Roadway Operations Statistics

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# Roadway Operations Statistics

Highly trained NCTA operators monitor and manage traffic operations and coordinate incident response and maintenance/construction work along the Triangle Expressway. These operators work at the Traffic Management Center (TMC) located in the North Carolina National Guard's Joint Force Headquarters in Raleigh. They are responsible for monitoring the facility 24 hours a day, 7 days a week, and 365 days a year using closed-circuit TV (CCTV) cameras, microwave vehicle detectors (MVD), toll zone security cameras, and a Roadway Weather Information System (RWIS). Additionally, they monitor roadside toll technology and toll facilities.

Operators can communicate travel conditions and emergencies to customers via 10 full-color Dynamic Message Signs (DMS), NCDOT's 511 system, and NCDOT's Traveler Information Management System (TIMS) website. They can also quickly dispatch toll technology technicians to address equipment failures via the Maintenance Online Management Software (MOMS). Additionally, in the event of incidents on the facility, they can use interoperable 800MHz radio frequency dispatch from local 911 and statewide Highway Patrol communications to dispatch Incident Management Assistance Patrol (IMAP).

The NCTA Toll Safety Patrol program consists of dedicated SHP and IMAP services provided on the Triangle Expressway. This program provides one SHP officer and one IMAP responder to the facility during working hours, Monday through Friday. During this time, the assigned SHP officer and IMAP driver are responsible for patrolling the facility and responding to incidents reported by operators.

This section presents operations statistics reported by SHP and IMAP during the fourth quarter of 2018. It includes driver violations and warnings issued by SHP and total IMAP assistance recorded, as well as average monthly IMAP response and clearance time.

*Table 8* and *Table 9* present SHP operation statistics during 2018. "Chargeable Activities" are SHP activities involving fines. It should be noted that the "Other Violations" category includes chargeable activities such as load and equipment violations, driver's license violations, vehicle registration violations, and littering.

**Table 8: 2018 SHP Chargeable Activities, YTD**

Chargeable Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Speed Violations	43	33	35	57	56	47	41	39	40	51	39	30	511
Alcohol Violations	1	1	0	0	0	0	0	0	0	0	0	0	2
Seat Belt Violations	9	9	6	8	7	2	8	7	8	10	7	7	88
Child Restraint Violations	1	1	1	0	0	0	0	0	0	0	1	0	4
Reckless Driving	8	8	4	0	3	2	1	1	1	4	2	6	40
Drug Violations	0	0	0	0	0	0	0	0	0	0	0	0	0
Obstructed Plates	2	8	2	0	2	0	2	0	0	0	0	0	16
Other Violations	41	45	38	33	27	12	31	23	15	44	23	32	364
<b>Total Charges</b>	<b>105</b>	<b>105</b>	<b>86</b>	<b>98</b>	<b>95</b>	<b>63</b>	<b>83</b>	<b>70</b>	<b>64</b>	<b>109</b>	<b>72</b>	<b>75</b>	<b>1,025</b>

**Table 9: 2018 SHP Non-Chargeable Activities, YTD**

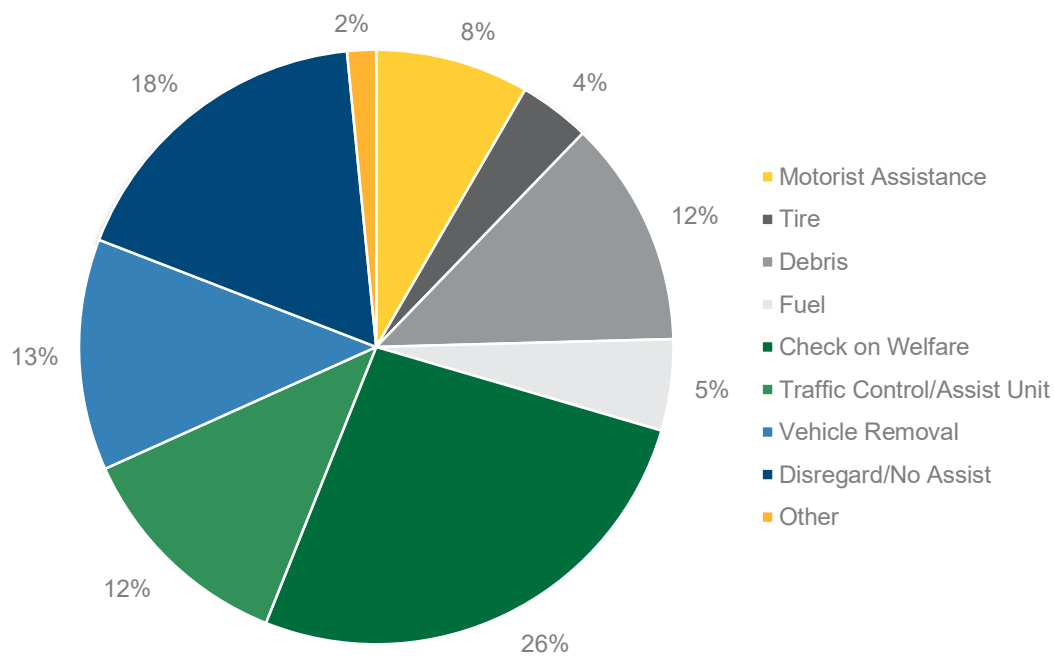
Non-Chargeable Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Warnings	78	56	46	60	47	66	69	66	67	49	47	29	680
Vehicles Towed	5	2	1	2	1	3	1	3	6	0	0	0	24
Crashes Investigated	37	1	2	7	1	12	4	6	12	10	10	7	109
<b>Total</b>	<b>120</b>	<b>59</b>	<b>49</b>	<b>69</b>	<b>49</b>	<b>81</b>	<b>74</b>	<b>75</b>	<b>85</b>	<b>59</b>	<b>57</b>	<b>36</b>	<b>813</b>

The IMAP assists with stranded motorists and incident clearance, thereby maintaining the flow of traffic along the roadway. *Table 10* and *Figure 28* present the monthly breakdown of IMAP services, by type, for the Triangle Expressway during 2018. The “other” category includes extinguish fire service, first aid service, and other rare miscellaneous services.

Table 10: 2018 IMAP Services, YTD

Assist Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Motorist Assistance	5	4	7	4	7	7	9	7	6	3	8	2	69
Tire	1	1	4	4	3	5	1	3	3	2	3	2	32
Debris	13	3	22	9	19	12	3	9	5	3	3	1	102
Fuel	5	3	8	3	2	2	3	4	3	5	3	0	41
Check on Welfare	27	15	30	6	9	16	22	27	22	17	17	11	219
Traffic Control / Assist Unit	23	5	17	3	18	6	8	3	3	8	6	1	101
Vehicle Removal	13	5	14	6	21	0	1	11	9	14	3	7	104
Disregard / No Assist	32	13	15	22	17	12	7	9	7	7	0	4	145
Other	0	1	1	1	2	7	0	1	0	0	0	0	13
<b>Total Charges</b>	<b>119</b>	<b>50</b>	<b>118</b>	<b>58</b>	<b>98</b>	<b>67</b>	<b>54</b>	<b>74</b>	<b>58</b>	<b>59</b>	<b>43</b>	<b>28</b>	<b>826</b>

Figure 28: 2018 IMAP Services by Type, YTD



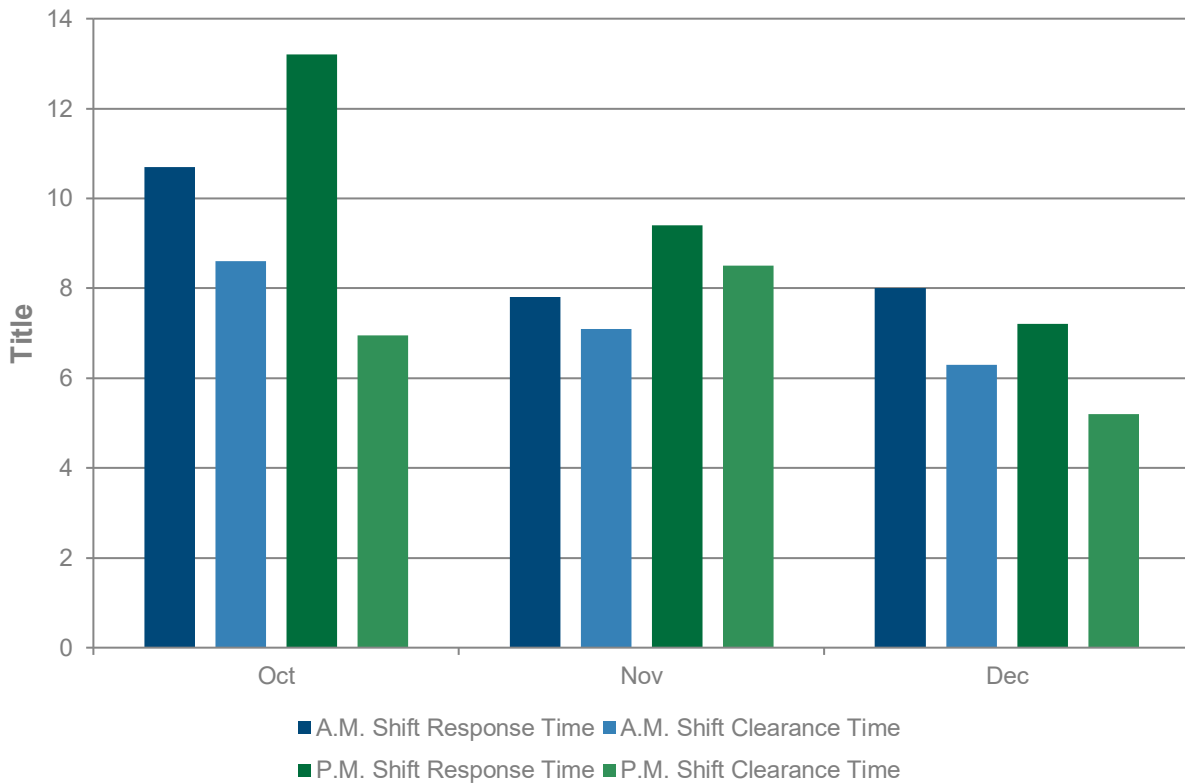
The response and clearance times for all IMAP assists are logged by IMAP and provided to the NCTA. Response time is the time from which a responder receives a call to the time they arrive on the scene. Clearance time is the time it takes the responder to clear the incident and return the roadway to normal operation. The IMAP staff's A.M. shift occurs from 6AM to 2PM, while the P.M. shift occurs from 2PM to 10PM. Shift response times may differ due to the number of drivers on duty and their coverage areas.

Table 11 and Figure 29 present the average IMAP assistance response and clearance times, in minutes, for the Triangle Expressway.

**Table 11: 2018 Average IMAP Assistance Response and Clearance Times (Minutes), YTD**

Response Type	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	2018 Average
A.M. Shift Response	14	15	17	5	10	8	12	9	9	11	8	8	10
A.M. Shift Clearance	4	7	15	11	8	9	8	10	8	9	7	6	9
P.M. Shift Response	17	16	12	0	9	8	9	14	14	13	9	7	11
P.M. Shift Clearance	4	8	6	0	10	10	14	4	9	7	9	5	7

**Figure 29: Average IMAP Assistance Response and Clearance Times (Minutes), Fourth Quarter by Month**





# Roadway Maintenance Statistics

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# Roadway Maintenance Statistics

This section outlines the NCTA Maintenance Rating Program (MRP), which is a maintenance evaluation program for roadway features and toll facilities. MRP is a comprehensive planning, measuring, and managing process that provides a means for communicating to managers, stakeholders, and key customers the impacts of policy and budget decisions on program service delivery.

Using outcome-based performance measures and the service level scale (0 through 100), the inspection results are rated against established threshold criteria. The program analysis is accomplished using sampling procedures that capture the level of service being provided for individual asset features. Over time, these ratings will then be charted to identify work needs and subsequent necessary actions. The evaluations are based on the establishment of threshold conditions that quantify the maximum defect allowed to exist for a characteristic before it is considered unacceptable. The NCTA performance standards, threshold criteria, and Maintenance Rating Program were developed through a collaborative effort by NCTA managers, NCDOT maintenance staff, and consultants.

Using field survey information, a maintenance matrix can be developed to show the ties between maintenance activities and the characteristics of various roadway features. The purpose of this evaluation is to provide information that will be used to schedule and prioritize routine maintenance activities and provide uniform maintenance conditions that meet established objectives.

## Assessment Schedule

As part of the NCTA MRP, a “baseline” assessment is scheduled for each newly opened roadway section soon after opening to toll collection. The baseline assessments include a complete inventory data collection and assessment on 100% of the roadway assets. A baseline assessment for the Veridea Parkway interchange was completed in March of 2018.

After the baseline assessment is completed, future assessments for that segment switch over to a statistical sampling assessment. Inspections are performed during the months of February, May, August, and November to account for dynamic seasonal changes to assets. These inspections are accomplished using statistically valid, random sampling procedures that capture the level of service for individual assets with a 95% confidence level in sampling.

## Assessment Results

Table 12 presents the 2018 quarterly and annual MRP Assessment rating for the Triangle Expressway. It is important to note that the Quarterly Ratings are only representative of the samples inspected during each quarter. Therefore, they are not a statistically valid representation of the assets' conditions; only the annual rating provides a 95% confidence level in statistical sampling.

**Table 12: MRP Assessment Results**

Element	Q1 2018 Rating	Q2 2018 Rating	Q3 2018 Rating	Q4 2018 Rating	2018 Annual Rating
Road Surface	98.5	99.2	99.2	99.2	99.0
Unpaved Shoulders and Ditches	97.8	96.8	97.1	99.0	97.7
Drainage	87.7	97.3	96.1	92.8	93.5
Roadside	92.2	91.3	94.9	97.1	93.9
Traffic Control Devices	83.8	91.1 <sup>1</sup>	94.6 <sup>1</sup>	95.1	90.9 <sup>2</sup>
<b>Overall MRP Performance Rating</b>	<b>91.3</b>	<b>94.8<sup>1</sup></b>	<b>96.4<sup>1</sup></b>	<b>96.6</b>	<b>94.7<sup>2</sup></b>

<sup>1</sup> Excludes all pavement striping characters, symbols, and pavement markers on concrete pavement surfaces.

<sup>2</sup> Excludes the second and third quarter ratings for characteristics listed above.