



Memorandum

2705 Bee Cave Road, Suite 300
Austin, Texas 78746-5688
United States
T +1.512.314.3100
F +1.512.314.3135
www.jacobs.com

Date October 18, 2018
To Cheryl Lewis-Orr
From Phil Eshelman
Subject **I-95 ETL T&R Update Existing and Extension**

Jacobs was retained to conduct an update to the traffic and toll revenue estimates for Interstate 95 Express Toll Lanes (ETLs) operated and maintained by the Maryland Transportation Authority (MDTA). In addition, analysis was conducted to understand the potential traffic and toll revenue for the extension of the northbound ETLs 10 miles to the north.

Jacobs conducted and developed the original forecast of traffic and toll revenue for the I-95 ETLs in 2013 in anticipation of the opening in late 2014. The original analysis is documented in the report titled "I-95 Express Toll Lanes Comprehensive Traffic and Toll Revenue Study" dated December 2013. The majority of the analysis was conducted in the spring of 2013 with finalization of the report at the end of the year.

Since the original analysis was conducted, Jacobs has updated the forecast against actual results annually similar to the analysis documented in this memo. The purpose of these updates are to provide input into MDTA budgets.

This memo reviews the existing conditions of the facility including traffic levels and speeds, and revised estimates of traffic and toll revenue for the existing I-95 ETL facility. In addition the extension is analyzed, reviewing both exiting traffic demand, development of a toll diversion model, and estimates of traffic and toll revenue for the I-95 ETL extension. Thus the sections are as follows:

1. I-95 ETL Existing Facility
 - a. Data Collection/Summary
 - b. Updated Traffic and Toll Revenue Forecasts
 - c. Future Toll Schedule Changes to Manage Traffic
2. I-95 ETL Northbound Extension
 - a. Project Description
 - b. Data Collection/Summary
 - c. Traffic and Revenue Estimates

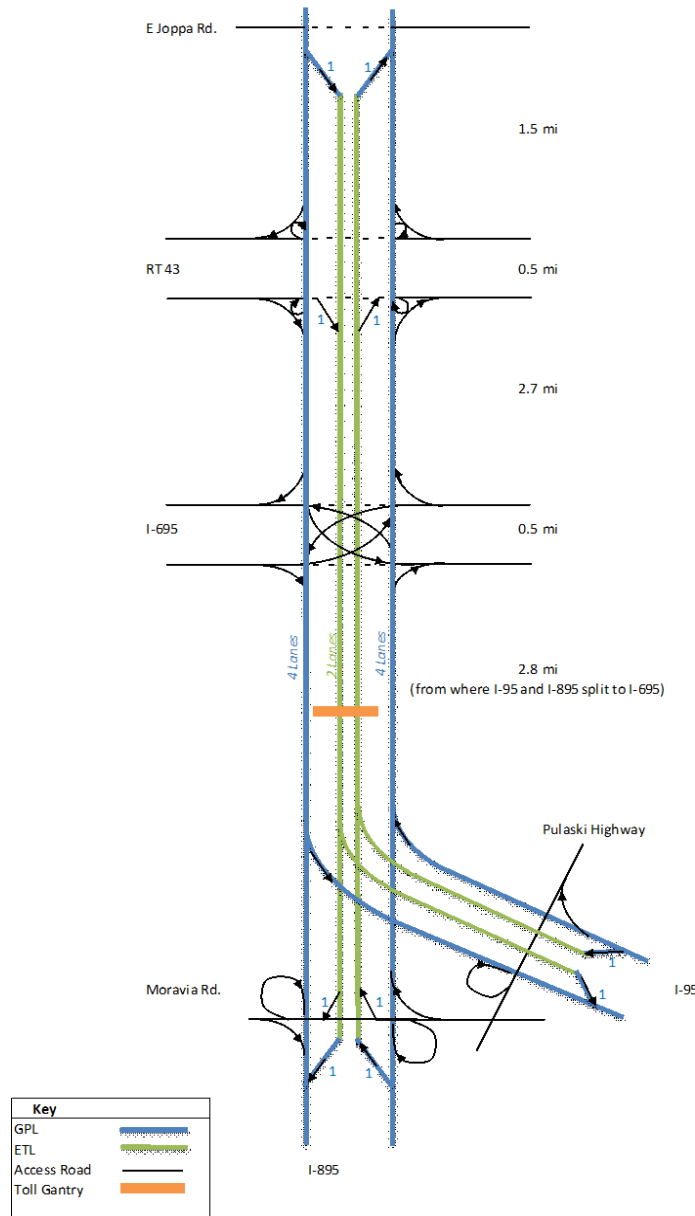
1. I-95 ETL Existing Facility - Project Description

The I-95 Express Toll Lanes (ETLs) are two lanes in each direction running parallel to the I-95 general purpose (GP) lanes for approximately 7.5 miles north of Baltimore from north of White Marsh Boulevard (MD 43) to the split of I-95/I-895 about 4 miles north of the Baltimore Harbor. Figure 1 and Figure 2 provide the project location and the details as to access to the ETLs from the GP lanes, respectively.

Figure 1: I-95 ETL Project Location Map



Figure 2: I-95 ETL Existing Stick Diagram



The facility offers faster travel speeds as compared to the general purpose lanes during congested times of the day. Key to the forecast of traffic and toll revenue on these ETLs is the determination of the levels of congestion on the GP lanes into the future and the propensity for motorists to pay a toll to avoid such congestion.

The toll schedule for the I-95 ETLs is by time of day, specific by direction and day of the week. The toll rates were lowered in FY16 (July 1, 2015), and remain unchanged since that time. The passenger car toll

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rates and time period for the toll rates are shown in the following tables. It is assumed that the current toll rates will be in effect throughout the forecast period.

Table 1: I-95 ETL Passenger Car Toll Rates

| Time Period | FY15 Rates | FY18 Rates |
|-------------|------------|------------|
| Peak | \$1.75 | \$1.54 |
| Off-Peak | \$1.40 | \$1.19 |
| Night | \$0.70 | \$0.49 |

Table 2: I-95 ETL Toll Schedule Time Periods

| | Weekday | Saturday | Sunday |
|-------------|-------------------------------|--------------------------------|-------------------------------|
| Time Period | Southbound | | |
| Peak | 6 AM to 9 AM | 12 PM to 2 PM | 2 PM to 5 PM |
| Off-Peak | 5 AM to 6 AM; 9 AM to 9 PM | 5 AM to 12 PM; 2 PM to 9 PM | 5 AM to 2 PM; 5 PM to 9 PM |
| Night | 9 PM to 5 AM | | |
| | Northbound | | |
| Peak | 3 PM to 7 PM | 12 PM to 2 PM | 2 PM to 5 PM |
| Off-Peak | 5 AM to 3 PM; 7 PM to 9 PM | 5 AM to 12 PM; 2 PM to 9 PM | 5 AM to 2 PM; 5 PM to 9 PM |
| Night | 9 PM to 5 AM | | |



1.1 Data Collection/Summary

In this section the data that was collected for this analysis is identified and the salient elements from those data as they affect the T&R forecast are analyzed.

1.1.1 Data Collected

For this analysis the following data were collected from the MDTA to supplement our existing databases:

1. Traffic Data
 - a. Hourly ETL traffic by payment type
 - b. SHA traffic counts
 - c. Speed data from MDTA readers on the ETLs and GP lanes separately
2. Revenue Data
 - a. Monthly E-ZPass toll revenue by vehicle class
 - b. Monthly paid video revenue

In addition to the data collected above specifically for this analysis, our databases and experience with existing managed lane systems and usage were used, as is typical on these projects.



1.1.2 Traffic and Toll Revenue

The historical annual traffic and toll revenue for FY15 through FY18 are presented by vehicle class and payment type in the following tables. The data show that there is an extremely high passenger car share as well as E-ZPass percentage for FY15 through FY18. The vehicle class percent share in each table adds to 100% reading down the table with sums provided by car and truck. The percent ETC shown in the final column of the tables is to each specific vehicle class across the rows of the table.

Table 3: ETL Traffic and Toll Revenue by Vehicle Class and Payment Type – FY15 (December 2014 to June 2015)

| Vehicle Class | E-ZPass | Video | Total | % Vehicle Class | % ETC |
|---------------|--------------------|------------------|--------------------|-----------------|--------------|
| Transactions | | | | | |
| Car | 3,747,950 | 57,847 | 3,805,797 | 96.5% | 98.5% |
| Truck | 133,882 | 5,954 | 139,836 | 3.5% | 95.7% |
| Total | 3,881,832 | 63,801 | 3,945,633 | 100.0% | 98.4% |
| Toll Revenue | | | | | |
| Car | \$5,244,604 | \$120,329 | \$5,364,933 | 87.3% | 97.8% |
| Truck | \$771,721 | \$9,055 | \$780,776 | 12.7% | 98.8% |
| Total | \$6,016,325 | \$129,384 | \$6,145,709 | 100.0% | 97.9% |

Table 4: ETL Traffic and Toll Revenue by Vehicle Class and Payment Type – FY16 (July 2015 to June 2016)

| Vehicle Class | E-ZPass | Video | Total | % Vehicle Class | % ETC |
|---------------|---------------------|------------------|---------------------|-----------------|--------------|
| Transactions | | | | | |
| Car | 7,752,270 | 204,022 | 7,956,292 | 96.3% | 97.4% |
| Truck | 295,749 | 13,584 | 309,333 | 3.7% | 95.6% |
| Total | 8,048,019 | 217,606 | 8,265,625 | 100.0% | 97.4% |
| Toll Revenue | | | | | |
| Car | \$9,641,558 | \$412,271 | \$10,053,829 | 88.3% | 95.9% |
| Truck | \$1,303,913 | \$27,452 | \$1,331,365 | 11.7% | 97.9% |
| Total | \$10,945,471 | \$439,723 | \$11,385,194 | 100.0% | 96.1% |

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Table 5: ETL Traffic and Toll Revenue by Vehicle Class and Payment Type – FY17 (July 2016 to June 2017)

| Vehicle Class | E-ZPass | Video | Total | % Vehicle Class | % ETC |
|---------------|---------------------|------------------|---------------------|-----------------|--------------|
| Transactions | | | | | |
| Car | 8,367,883 | 263,322 | 8,631,205 | 95.6% | 96.9% |
| Truck | 382,620 | 17,085 | 399,705 | 4.4% | 95.7% |
| Total | 8,750,503 | 280,407 | 9,030,910 | 100.0% | 96.9% |
| Toll Revenue | | | | | |
| Car | \$10,240,285 | \$524,730 | \$10,765,014 | 86.3% | 95.1% |
| Truck | \$1,678,824 | \$34,124 | \$1,712,948 | 13.7% | 98.0% |
| Total | \$11,919,108 | \$558,854 | \$12,477,962 | 100.0% | 95.5% |

Table 6: ETL Traffic and Toll Revenue by Vehicle Class and Payment Type – FY18 (July 2017 to June 2018)

| Vehicle Class | E-ZPass | Video | Total | % Vehicle Class | % ETC |
|---------------|---------------------|------------------|---------------------|-----------------|--------------|
| Transactions | | | | | |
| Car | 8,697,183 | 218,025 | 8,915,208 | 94.9% | 97.6% |
| Truck | 464,036 | 13,667 | 477,703 | 5.1% | 97.1% |
| Total | 9,161,219 | 231,692 | 9,392,911 | 100.0% | 97.5% |
| Toll Revenue | | | | | |
| Car | \$10,585,779 | \$469,314 | \$11,055,093 | 84.1% | 95.8% |
| Truck | \$2,063,521 | \$29,446 | \$2,092,967 | 15.9% | 98.6% |
| Total | \$12,649,300 | \$498,760 | \$13,148,060 | 100.0% | 96.2% |

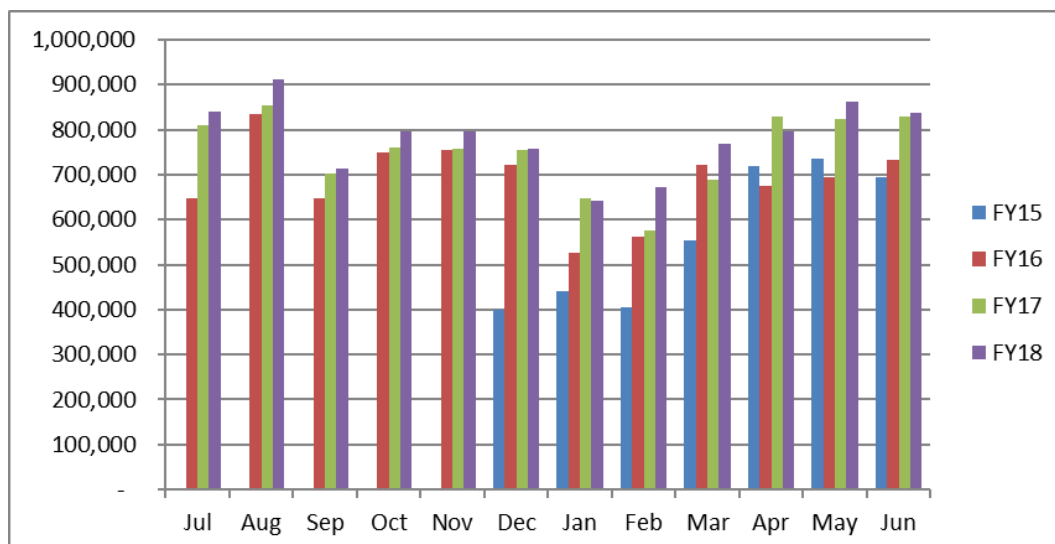


Traffic and toll revenue by month were also reviewed and are presented in the tables and figures that follow. Monthly growth in traffic and toll revenue is quite large in specific months, which is common for managed lane facilities, specifically in the early years.

Table 7: ETL Traffic by Month (FY15 to FY18)

| Month | FY15 | FY16 | FY17 | FY18 | FY17 to FY18 | |
|-------|-----------|-----------|-----------|-----------|-----------------|----------|
| | | | | | Absolute Growth | % Growth |
| Jul | | 646,335 | 809,286 | 841,204 | 31,918 | 3.9% |
| Aug | | 833,649 | 852,663 | 910,280 | 57,617 | 6.8% |
| Sep | | 648,335 | 702,868 | 713,701 | 10,833 | 1.5% |
| Oct | | 749,627 | 761,186 | 795,708 | 34,522 | 4.5% |
| Nov | | 755,746 | 756,373 | 794,684 | 38,311 | 5.1% |
| Dec | 398,374 | 722,575 | 754,126 | 757,283 | 3,157 | 0.4% |
| Jan | 439,591 | 526,351 | 646,974 | 640,994 | -5,980 | -0.9% |
| Feb | 406,215 | 561,057 | 575,068 | 672,188 | 97,120 | 16.9% |
| Mar | 553,842 | 720,938 | 689,348 | 769,203 | 79,855 | 11.6% |
| Apr | 719,665 | 674,724 | 830,158 | 796,115 | -34,043 | -4.1% |
| May | 734,606 | 693,601 | 823,981 | 863,249 | 39,268 | 4.8% |
| Jun | 693,340 | 732,687 | 828,879 | 838,302 | 9,423 | 1.1% |
| FY | 3,945,633 | 8,265,625 | 9,030,910 | 9,392,911 | 362,001 | 4.0% |
| Q1 | - | 2,128,319 | 2,364,817 | 2,465,185 | 100,368 | 4.2% |
| Q2 | 398,374 | 2,227,948 | 2,271,685 | 2,347,675 | 75,990 | 3.3% |
| Q3 | 1,399,648 | 1,808,346 | 1,911,390 | 2,082,385 | 170,995 | 8.9% |
| Q4 | 2,147,611 | 2,101,012 | 2,483,018 | 2,497,666 | 14,648 | 0.6% |

Figure 3: ETL Traffic by Month (FY15 to FY18)



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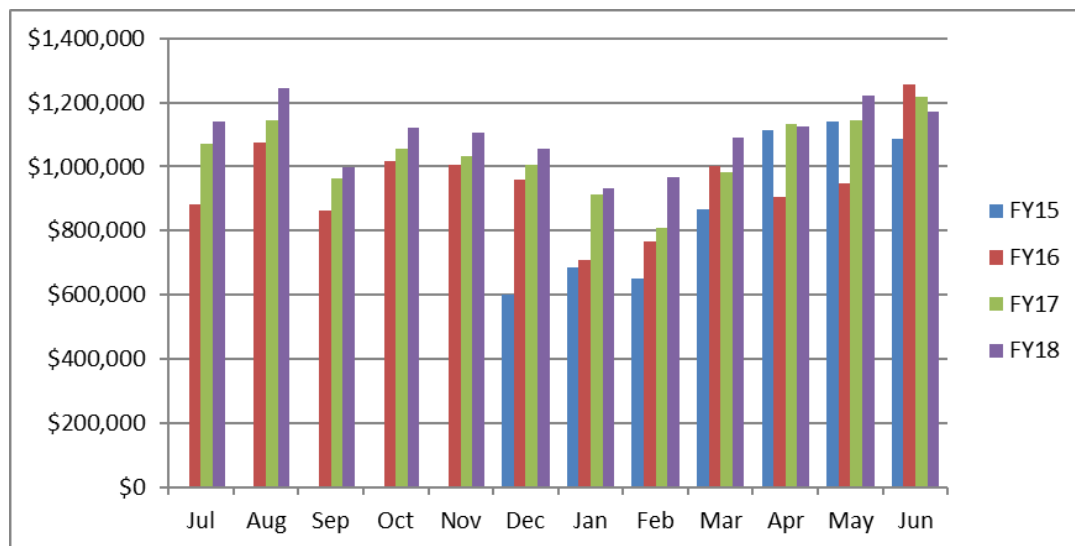


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Table 8: ETL Toll Revenue by Month (FY15 to FY18)

| Month | FY15 | FY16 | FY17 | FY18 | FY17 to FY18 | |
|-------|-------------|--------------|--------------|--------------|-----------------|----------|
| | | | | | Absolute Growth | % Growth |
| Jul | | \$882,454 | \$1,071,759 | \$1,138,515 | \$66,756 | 6.2% |
| Aug | | \$1,073,767 | \$1,144,096 | \$1,241,630 | \$97,533 | 8.5% |
| Sep | | \$864,654 | \$964,334 | \$996,538 | \$32,204 | 3.3% |
| Oct | | \$1,016,845 | \$1,054,222 | \$1,118,261 | \$64,039 | 6.1% |
| Nov | | \$1,003,773 | \$1,031,790 | \$1,106,255 | \$74,465 | 7.2% |
| Dec | \$602,088 | \$957,697 | \$1,007,192 | \$1,052,678 | \$45,486 | 4.5% |
| Jan | \$687,419 | \$709,807 | \$914,534 | \$932,171 | \$17,636 | 1.9% |
| Feb | \$650,605 | \$767,367 | \$810,432 | \$963,337 | \$152,905 | 18.9% |
| Mar | \$867,064 | \$1,002,253 | \$983,668 | \$1,089,911 | \$106,244 | 10.8% |
| Apr | \$1,112,133 | \$906,069 | \$1,133,774 | \$1,124,613 | -\$9,161 | -0.8% |
| May | \$1,138,891 | \$945,966 | \$1,143,452 | \$1,218,200 | \$74,748 | 6.5% |
| Jun | \$1,087,509 | \$1,254,542 | \$1,218,710 | \$1,165,952 | -\$52,758 | -4.3% |
| FY | \$6,145,709 | \$11,385,193 | \$12,477,962 | \$13,148,060 | \$670,098 | 5.4% |
| Q1 | \$0 | \$2,820,875 | \$3,180,189 | \$3,376,683 | \$196,493 | 6.2% |
| Q2 | \$602,088 | \$2,978,314 | \$3,093,204 | \$3,277,193 | \$183,990 | 5.9% |
| Q3 | \$2,205,088 | \$2,479,427 | \$2,708,634 | \$2,985,419 | \$276,785 | 10.2% |
| Q4 | \$3,338,533 | \$3,106,577 | \$3,495,936 | \$3,508,765 | \$12,829 | 0.4% |

Figure 4: ETL Toll Revenue by Month (FY15 to FY18)



These growth rates were taken into account when considering the continuation of growth on the ETLs outside of that due to benefits of travel time savings from congestion in the general purpose lanes, discussed in the next section.



1.1.3 Speed Review

One of the critical data to review are the speeds in the ETLs and the general purpose lanes by time of day and day of the week. As the tolled ETLs are adjacent to the toll-free general purpose lanes, it is the travel time savings in the form of higher travel speeds that provide value to motorists. A small portion of travel time savings is imbedded in the speed limit differential, such that the ETLs have a speed limit that is 5 miles per hour (mph) higher than the GPs. There are other benefits as well such as an increase in perceived safety, ease of use and other items detailed later in this memo. For the purely quantitative part of the analysis the following tables and figures present the average southbound and northbound speeds for the ETLs as well as the general purpose lanes. Note that the average speeds in the general purpose lanes dip to about 55 mph during the SB peak period and about 45 mph for the NB peak period during the week. During off-peak times the speeds are very similar. These speed differentials from the ETLs provide about a 1 to 3 minute time savings on average during the peak period. There is certainly volatility to those peak periods speeds over the course of a year and perceived time savings could be slightly more as a result.



Table 9: Average Speeds (MPH) by Hour and Day of the Week in the Corridor, Southbound Express Toll Lanes for the Past 12 Months

| Hour | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|-------------------|------|------|------|------|------|------|------|
| 12:00AM - 1:00AM | 68.8 | 69.3 | 67.9 | 67.9 | 68.2 | 68.5 | 68.8 |
| 1:00AM - 2:00AM | 68.4 | 68.2 | 67.8 | 67.3 | 67.6 | 68.2 | 68.4 |
| 2:00AM - 3:00AM | 68.6 | 68.1 | 68.0 | 67.4 | 68.2 | 68.2 | 67.9 |
| 3:00AM - 4:00AM | 68.4 | 69.4 | 68.6 | 68.4 | 68.8 | 68.7 | 68.8 |
| 4:00AM - 5:00AM | 68.4 | 71.1 | 70.3 | 70.0 | 70.3 | 69.9 | 68.6 |
| 5:00AM - 6:00AM | 70.3 | 72.1 | 71.8 | 71.7 | 71.7 | 71.9 | 70.3 |
| 6:00AM - 7:00AM | 71.6 | 69.6 | 69.5 | 69.1 | 69.4 | 70.7 | 71.4 |
| 7:00AM - 8:00AM | 71.9 | 64.5 | 61.7 | 63.2 | 63.8 | 69.0 | 72.4 |
| 8:00AM - 9:00AM | 71.8 | 66.4 | 60.0 | 63.8 | 64.3 | 70.0 | 71.8 |
| 9:00AM - 10:00AM | 71.7 | 70.9 | 70.1 | 70.3 | 70.4 | 70.5 | 71.2 |
| 10:00AM - 11:00AM | 71.6 | 70.6 | 69.9 | 69.6 | 69.9 | 70.2 | 70.7 |
| 11:00AM - 12:00PM | 71.3 | 70.5 | 69.6 | 69.1 | 69.7 | 70.3 | 70.6 |
| 12:00PM - 1:00PM | 71.3 | 70.6 | 69.4 | 68.8 | 69.7 | 70.3 | 70.6 |
| 1:00PM - 2:00PM | 71.0 | 70.4 | 69.2 | 68.8 | 69.6 | 69.8 | 70.2 |
| 2:00PM - 3:00PM | 70.9 | 70.0 | 69.4 | 69.2 | 69.8 | 69.4 | 70.2 |
| 3:00PM - 4:00PM | 70.8 | 70.1 | 69.6 | 69.6 | 69.8 | 68.8 | 69.8 |
| 4:00PM - 5:00PM | 70.6 | 70.4 | 69.8 | 69.8 | 70.1 | 68.5 | 70.0 |
| 5:00PM - 6:00PM | 70.0 | 70.0 | 69.8 | 69.9 | 69.8 | 69.0 | 70.1 |
| 6:00PM - 7:00PM | 70.0 | 69.8 | 69.8 | 69.6 | 68.5 | 69.4 | 69.9 |
| 7:00PM - 8:00PM | 70.2 | 69.8 | 69.5 | 69.6 | 70.0 | 69.7 | 69.7 |
| 8:00PM - 9:00PM | 70.1 | 69.8 | 68.7 | 68.8 | 69.6 | 69.7 | 69.6 |
| 9:00PM - 10:00PM | 70.0 | 69.4 | 68.8 | 68.7 | 69.2 | 69.2 | 69.0 |
| 10:00PM - 11:00PM | 70.3 | 69.3 | 68.8 | 68.5 | 69.0 | 69.4 | 69.4 |
| 11:00PM - 12:00AM | 69.9 | 68.8 | 68.2 | 68.2 | 68.9 | 69.0 | 69.2 |

Figure 5: Average Speeds (MPH) by Hour and Day of the Week in the Corridor, Southbound Express Toll Lanes for the Past 12 Months

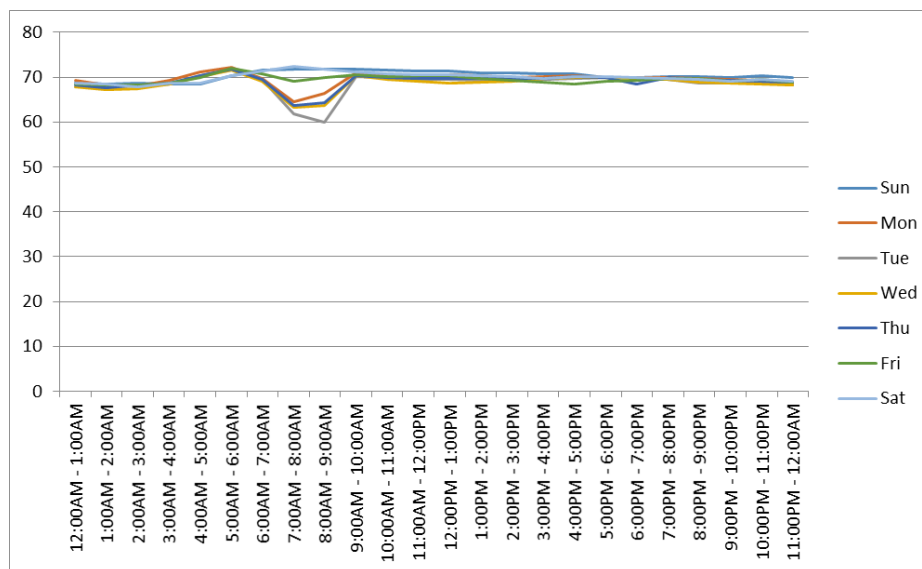




Table 10: Average Speeds (MPH) by Hour and Day of the Week in the Corridor, Northbound Express Toll Lanes for the Past 12 Months

| Hour | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|-------------------|------|------|------|------|------|------|------|
| 12:00AM - 1:00AM | 70.3 | 69.0 | 69.4 | 68.4 | 68.8 | 69.4 | 68.9 |
| 1:00AM - 2:00AM | 69.2 | 67.5 | 68.1 | 67.5 | 67.3 | 68.4 | 68.2 |
| 2:00AM - 3:00AM | 68.2 | 68.0 | 67.0 | 67.2 | 67.1 | 67.7 | 68.2 |
| 3:00AM - 4:00AM | 69.4 | 68.3 | 68.0 | 67.6 | 67.9 | 67.8 | 67.8 |
| 4:00AM - 5:00AM | 69.0 | 69.2 | 68.6 | 68.1 | 68.4 | 69.0 | 67.9 |
| 5:00AM - 6:00AM | 69.0 | 70.4 | 69.6 | 69.1 | 69.2 | 69.5 | 69.4 |
| 6:00AM - 7:00AM | 71.4 | 70.3 | 70.1 | 69.8 | 69.9 | 70.4 | 71.3 |
| 7:00AM - 8:00AM | 72.5 | 71.1 | 70.0 | 70.7 | 71.3 | 71.4 | 72.5 |
| 8:00AM - 9:00AM | 72.3 | 70.5 | 69.5 | 70.2 | 70.6 | 70.8 | 72.2 |
| 9:00AM - 10:00AM | 72.2 | 70.3 | 69.0 | 70.1 | 70.4 | 70.6 | 72.1 |
| 10:00AM - 11:00AM | 72.3 | 70.3 | 69.9 | 69.8 | 70.0 | 70.6 | 72.1 |
| 11:00AM - 12:00PM | 72.2 | 70.3 | 69.9 | 69.2 | 70.1 | 70.7 | 72.1 |
| 12:00PM - 1:00PM | 72.4 | 70.7 | 69.8 | 69.4 | 70.5 | 71.1 | 71.7 |
| 1:00PM - 2:00PM | 72.1 | 70.8 | 70.0 | 69.9 | 70.7 | 70.8 | 72.3 |
| 2:00PM - 3:00PM | 72.3 | 71.3 | 70.9 | 70.3 | 71.1 | 69.7 | 72.5 |
| 3:00PM - 4:00PM | 72.1 | 71.1 | 71.1 | 68.9 | 69.6 | 67.0 | 72.2 |
| 4:00PM - 5:00PM | 72.2 | 70.6 | 69.8 | 68.1 | 67.1 | 59.4 | 72.4 |
| 5:00PM - 6:00PM | 71.6 | 69.6 | 68.7 | 67.7 | 65.7 | 57.2 | 71.5 |
| 6:00PM - 7:00PM | 71.4 | 70.5 | 70.0 | 69.5 | 69.1 | 66.3 | 70.8 |
| 7:00PM - 8:00PM | 71.6 | 71.2 | 70.9 | 70.9 | 71.0 | 70.4 | 70.6 |
| 8:00PM - 9:00PM | 71.2 | 70.4 | 70.1 | 70.3 | 70.5 | 70.7 | 70.3 |
| 9:00PM - 10:00PM | 70.6 | 69.7 | 69.7 | 69.7 | 69.9 | 70.3 | 70.0 |
| 10:00PM - 11:00PM | 70.4 | 69.2 | 69.0 | 69.0 | 69.6 | 69.6 | 70.5 |
| 11:00PM - 12:00AM | 69.7 | 68.9 | 68.8 | 68.6 | 69.5 | 69.4 | 70.5 |

Figure 6: Average Speeds (MPH) by Hour and Day of the Week in the Corridor, Northbound Express Toll Lanes for the Past 12 Months

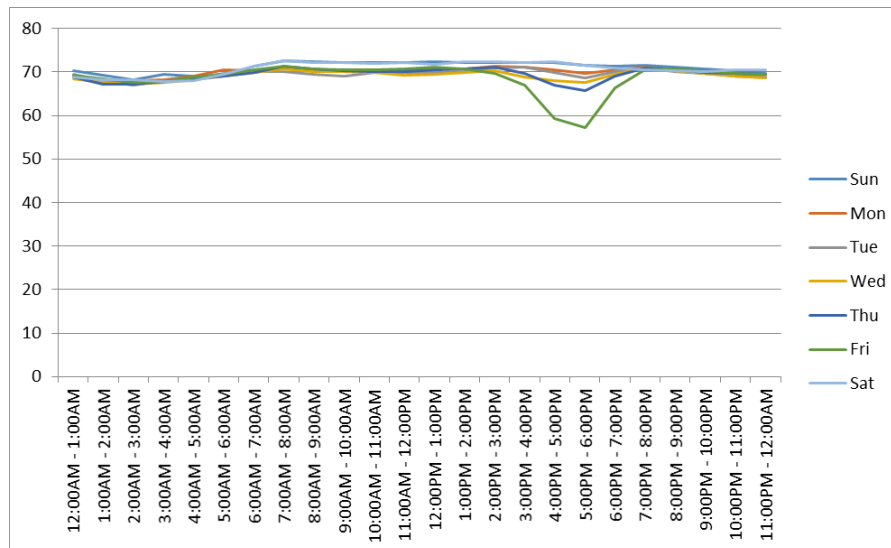




Table 11: Average Speeds (MPH) by Hour and Day of the Week in the Corridor, Southbound General Purpose Lanes for the Past 12 Months

| Hour | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|-------------------|------|------|------|------|------|------|------|
| 12:00AM - 1:00AM | 69.3 | 70.0 | 68.6 | 67.7 | 68.0 | 68.7 | 69.1 |
| 1:00AM - 2:00AM | 69.1 | 69.2 | 68.3 | 68.1 | 68.2 | 69.2 | 68.6 |
| 2:00AM - 3:00AM | 69.3 | 69.2 | 68.2 | 68.3 | 68.5 | 68.1 | 68.8 |
| 3:00AM - 4:00AM | 69.8 | 69.5 | 69.1 | 68.7 | 69.5 | 69.3 | 69.0 |
| 4:00AM - 5:00AM | 69.9 | 70.4 | 70.3 | 69.6 | 69.9 | 70.2 | 69.9 |
| 5:00AM - 6:00AM | 70.8 | 68.8 | 69.2 | 68.9 | 68.0 | 69.4 | 70.6 |
| 6:00AM - 7:00AM | 71.8 | 63.2 | 62.6 | 62.6 | 61.8 | 65.3 | 70.9 |
| 7:00AM - 8:00AM | 72.4 | 54.8 | 48.4 | 47.9 | 51.1 | 61.7 | 71.6 |
| 8:00AM - 9:00AM | 72.4 | 61.2 | 51.8 | 53.4 | 54.6 | 66.7 | 71.3 |
| 9:00AM - 10:00AM | 69.5 | 68.6 | 66.7 | 67.4 | 67.2 | 68.3 | 69.8 |
| 10:00AM - 11:00AM | 70.8 | 69.1 | 68.5 | 68.0 | 66.8 | 68.5 | 69.1 |
| 11:00AM - 12:00PM | 68.0 | 68.9 | 68.1 | 67.9 | 67.8 | 66.9 | 68.8 |
| 12:00PM - 1:00PM | 69.3 | 66.6 | 67.5 | 67.3 | 67.4 | 68.0 | 68.2 |
| 1:00PM - 2:00PM | 69.2 | 68.7 | 67.0 | 67.6 | 68.4 | 67.4 | 68.3 |
| 2:00PM - 3:00PM | 67.2 | 68.2 | 67.0 | 67.7 | 68.2 | 66.3 | 68.4 |
| 3:00PM - 4:00PM | 69.0 | 68.4 | 67.6 | 67.5 | 67.6 | 66.4 | 67.6 |
| 4:00PM - 5:00PM | 68.3 | 69.0 | 67.6 | 67.9 | 66.5 | 66.5 | 67.7 |
| 5:00PM - 6:00PM | 67.1 | 66.6 | 67.5 | 68.0 | 66.2 | 66.5 | 67.5 |
| 6:00PM - 7:00PM | 67.4 | 66.9 | 68.3 | 68.4 | 67.5 | 67.2 | 67.3 |
| 7:00PM - 8:00PM | 67.8 | 69.0 | 68.7 | 69.1 | 68.4 | 67.9 | 68.2 |
| 8:00PM - 9:00PM | 68.2 | 69.3 | 68.4 | 68.7 | 68.6 | 67.9 | 68.1 |
| 9:00PM - 10:00PM | 69.0 | 69.1 | 68.2 | 68.2 | 68.3 | 68.0 | 68.4 |
| 10:00PM - 11:00PM | 69.9 | 69.1 | 68.4 | 68.6 | 68.0 | 68.7 | 68.9 |
| 11:00PM - 12:00AM | 70.3 | 69.4 | 68.4 | 68.2 | 68.9 | 69.2 | 69.6 |

Figure 7: Average Speeds (MPH) by Hour and Day of the Week in the Corridor, Southbound General Purpose Lanes for the Past 12 Months

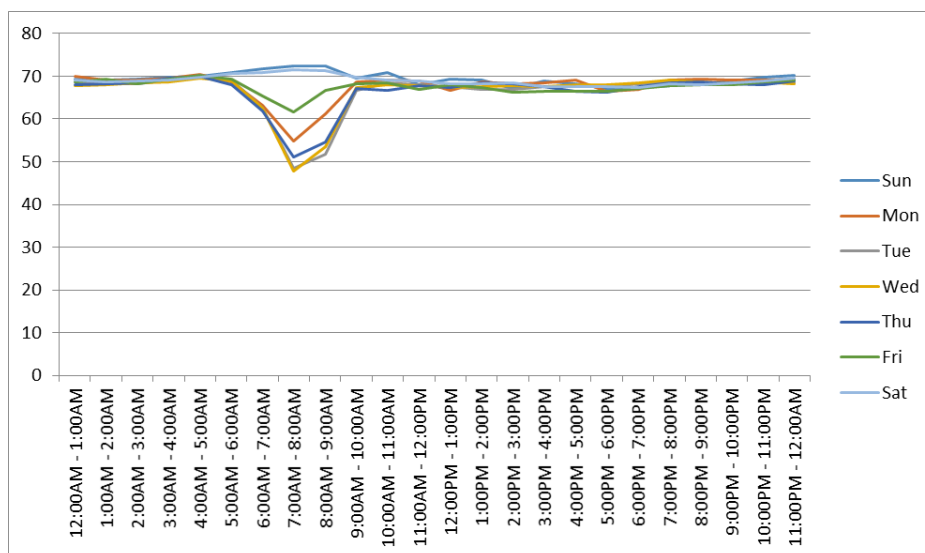
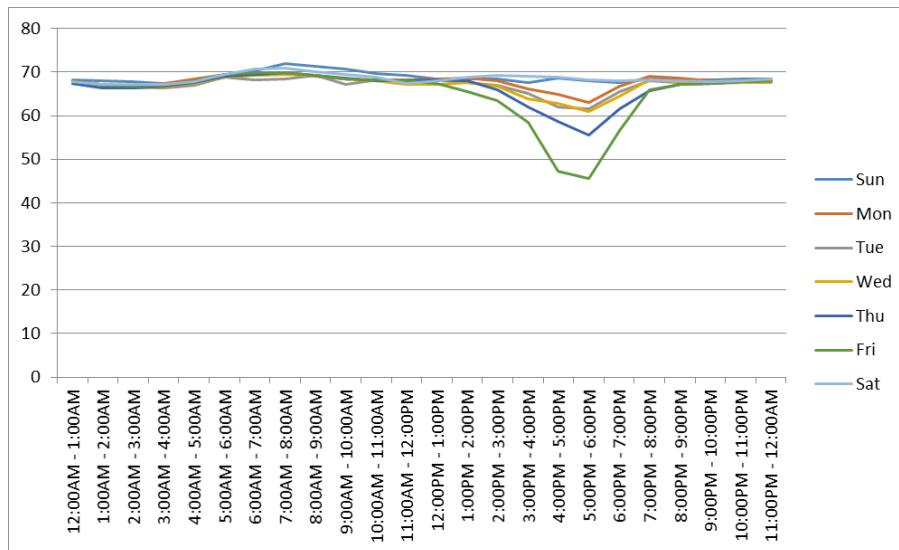




Table 12: Average Speeds (MPH) by Hour and Day of the Week in the Corridor, Northbound General Purpose Lanes for the Past 12 Months

| Hour | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|-------------------|------|------|------|------|------|------|------|
| 12:00AM - 1:00AM | 68.3 | 67.9 | 67.7 | 67.4 | 67.4 | 67.9 | 67.7 |
| 1:00AM - 2:00AM | 67.9 | 67.1 | 66.8 | 66.4 | 66.2 | 67.0 | 67.2 |
| 2:00AM - 3:00AM | 67.7 | 66.9 | 66.6 | 66.5 | 66.2 | 66.8 | 67.2 |
| 3:00AM - 4:00AM | 67.3 | 67.4 | 66.3 | 66.5 | 66.7 | 66.9 | 67.2 |
| 4:00AM - 5:00AM | 67.7 | 68.4 | 66.9 | 67.4 | 67.6 | 68.0 | 67.7 |
| 5:00AM - 6:00AM | 68.7 | 69.4 | 68.7 | 68.9 | 69.1 | 69.4 | 69.5 |
| 6:00AM - 7:00AM | 70.3 | 69.3 | 68.3 | 69.1 | 69.5 | 69.8 | 70.6 |
| 7:00AM - 8:00AM | 71.9 | 69.7 | 68.5 | 69.5 | 69.8 | 69.8 | 71.0 |
| 8:00AM - 9:00AM | 71.2 | 69.1 | 69.3 | 69.3 | 69.2 | 69.2 | 70.1 |
| 9:00AM - 10:00AM | 70.7 | 68.4 | 67.1 | 68.4 | 68.6 | 68.5 | 69.5 |
| 10:00AM - 11:00AM | 69.7 | 68.3 | 68.1 | 68.0 | 67.9 | 68.2 | 68.9 |
| 11:00AM - 12:00PM | 69.2 | 68.2 | 68.0 | 67.1 | 68.1 | 67.9 | 67.4 |
| 12:00PM - 1:00PM | 68.3 | 68.5 | 68.1 | 67.1 | 68.1 | 67.3 | 67.9 |
| 1:00PM - 2:00PM | 68.5 | 68.6 | 67.6 | 67.6 | 67.9 | 65.6 | 68.8 |
| 2:00PM - 3:00PM | 68.5 | 67.9 | 66.9 | 66.8 | 65.8 | 63.5 | 69.3 |
| 3:00PM - 4:00PM | 67.6 | 66.2 | 65.1 | 63.9 | 62.0 | 58.5 | 69.1 |
| 4:00PM - 5:00PM | 68.6 | 64.8 | 61.9 | 62.8 | 58.7 | 47.3 | 68.9 |
| 5:00PM - 6:00PM | 67.9 | 63.0 | 61.5 | 61.0 | 55.6 | 45.6 | 68.2 |
| 6:00PM - 7:00PM | 67.5 | 66.7 | 65.4 | 64.4 | 61.6 | 56.6 | 68.0 |
| 7:00PM - 8:00PM | 68.4 | 68.9 | 68.0 | 68.2 | 65.7 | 65.9 | 68.3 |
| 8:00PM - 9:00PM | 68.1 | 68.6 | 67.5 | 67.7 | 67.2 | 67.2 | 68.0 |
| 9:00PM - 10:00PM | 68.1 | 68.1 | 67.7 | 67.4 | 67.4 | 67.4 | 67.8 |
| 10:00PM - 11:00PM | 68.5 | 68.1 | 67.6 | 67.6 | 67.8 | 67.8 | 68.0 |
| 11:00PM - 12:00AM | 68.4 | 68.0 | 67.8 | 67.5 | 67.9 | 67.9 | 68.5 |

Figure 8: Average Speeds (MPH) by Hour and Day of the Week in the Corridor, Northbound General Purpose Lanes for the Past 12 Months





Previously in this section, the volatility of speeds in the general purpose lanes was mentioned as a potential indication of perceived time savings by motorists as opposed to actual average time savings. This volatility can be shown in the distribution of peak period speeds in the general purpose lanes for the peak period in each direction. While the average is 45 to 55 miles per hour during these peak time periods, as shown in the figures that follow, there are occurrences of much lower speeds that influence driver behavior. This volatility is considered in the forecasting model as well.

Figure 9: Southbound General Purpose Lanes Speeds, Weekday AM Peak Hour (7AM to 8AM)

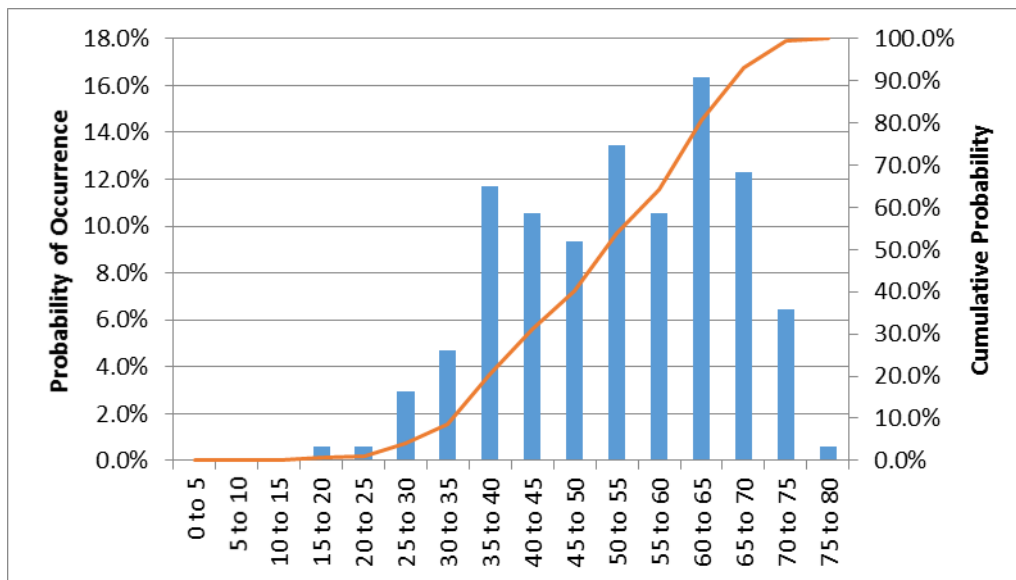
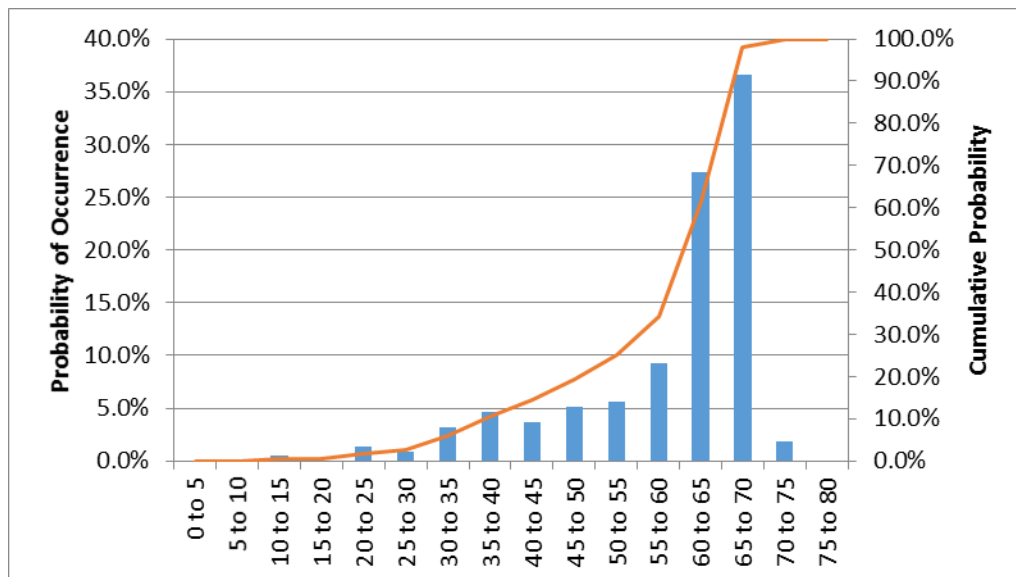


Figure 10: Northbound General Purpose Lanes Speeds, Weekday PM Peak Hour (5PM to 6PM)





A similar analysis was conducted for the ETLs to understand the potential need for changes in the toll rate. One of the goals of the ETLs is to provide free flow speeds which are generally considered to be between 45 and 50 mph. As shown this is achieved the vast majority of the time for each direction during their respective peak. In the future it may be the case that the toll rate for the northbound PM peak hour should be raised to maintain speed goals for the MDTA.

Figure 11: Southbound Express Toll Lanes Speeds, Weekday AM Peak Hour (7AM to 8AM)

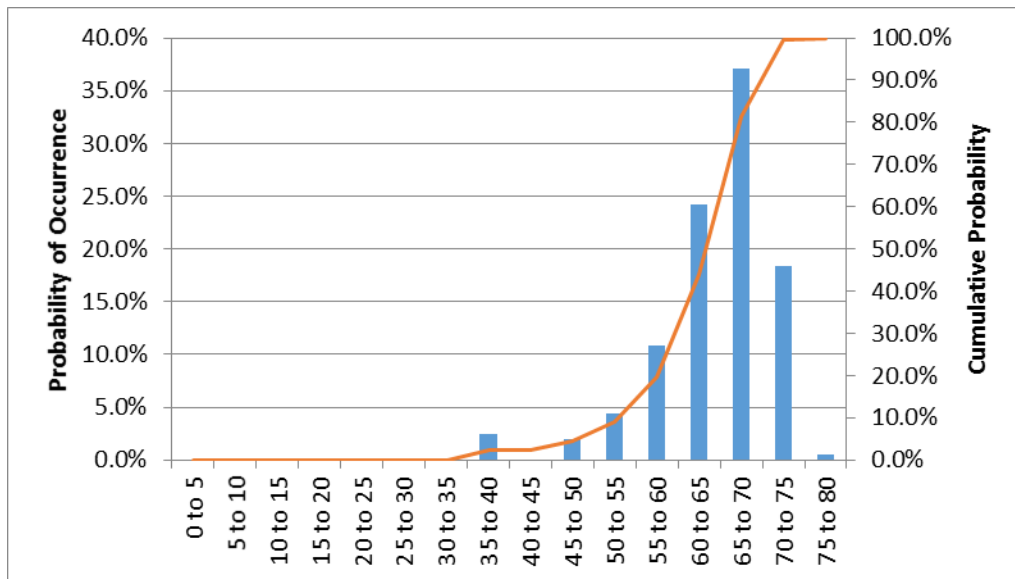
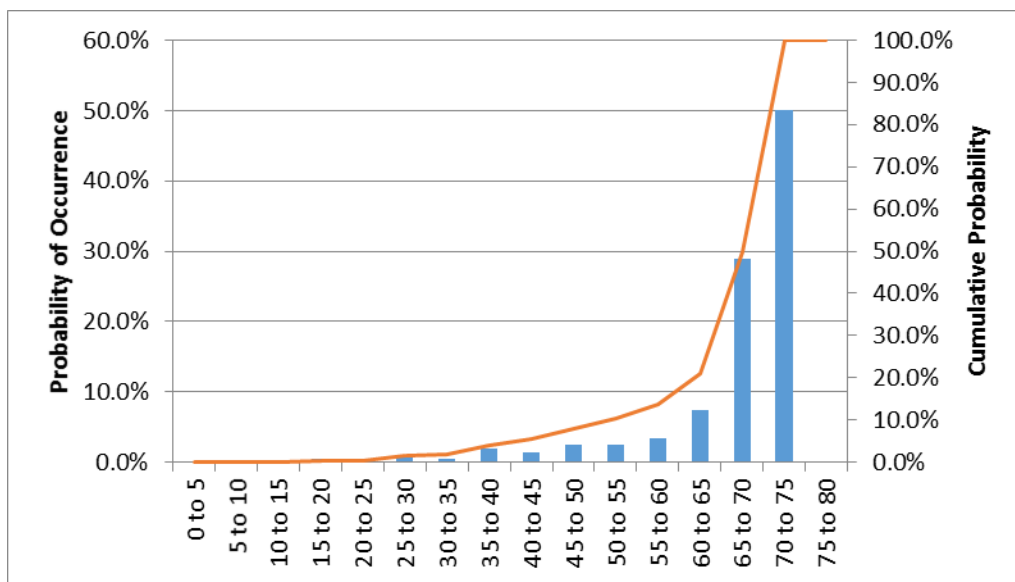


Figure 12: Northbound Express Toll Lanes Speeds, Weekday PM Peak Hour (5PM to 6PM)





1.1.4 Possible Reasons for ETL Usage Apart from Time Savings

Over the years conducted managed lane analyses we have reviewed potential reasons for high ETL usage in the face of limited time savings so as to mitigate these during the modeling effort if necessary. Previous analysis documented the high level of one-time users which points to a potential correction of behavior after taking it once or twice. The following table provides a description of potential reasons and the resulting action taken for the modeling process. Generally, it is estimated that over time, usage of the ETLs will be more dependent upon travel time savings and not curiosity, unfamiliarity or the like.

Table 14: Possible Reasons for ETL Usage

| Potential Reason | Analysis | Modeling Mitigation |
|--|--|---|
| Construction on General Purpose Lanes causing restrictions | No known construction on GP lanes that would encourage ETL usage | None |
| Spot congestion at entry points | No known spot congestion at entries | None |
| Confusion over signage | The signs show that E-ZPass should use the left lanes as motorists approach the entries to the ETLs. This signage is similar to signage at the tunnels and JFK Memorial where E-ZPass uses the leftmost lanes. It is possible that motorists with E-ZPass simply follow the signs. | Phase out one time users |
| Navigation directions pushing motorists into ETLs | Apple Maps, Yahoo Maps and Tom Tom provided guidance to use the ETLs; Google Maps, Mapquest and Bing Maps directs motorists to GP Lanes | Users will use navigation advice once or twice before making decision to take GP Lanes |
| Perceived value of lanes because of pricing | Possibly a Veblen Good - provides status of relatively low cost | Continue some usage regardless of future time savings |
| "Tourist" usage - i.e. trying something once to see how it works | Frequency data seems to suggest that this may be the case | Removal of one time users over the years as motorists become familiar with the corridor |
| Fear of potential slowdown in GP lanes with value seen in the reliability and perceived safety/comfort of the ETLs | This is a reason for managed lane usage across the nation and appears to be applicable to this facility | Continue some usage regardless of future time savings |



1.2 Updated Traffic and Revenue Forecasts

Due to the unique nature of the facility, motorists will slowly learn the relative benefit of the facility and for the various reasons stated in the preceding documentation; usage will lower to match actual travel time savings between the ETLs and the general purpose lanes.

The forecasting model was revised to account for the current level of usage with slow removal of that usage over the course of few years as unfamiliar motorists become familiar with the corridor. The forecasting model does take into account the continual introduction of first-time users to the facility, which allows for more usage throughout the forecast.

The FY 2018-2023 Consolidated Transportation Program was reviewed to address potential impacts that any proposed projects may have on the ETLs. This forecast assumes the improvements to I-95 between MD 152 and MD 24 will be implemented according to the current schedule as documented in subsequent sections of this memo.

The forecast assumes the current toll schedule will be in place through 2028. The estimates of traffic and toll revenue are provided in the following table. The figures shown for FY2015 through FY2018 are actual results. The high growth from FY2015 to FY2016 is mostly a function of FY2015 only being open for 6.5 months. Even with this accommodation there is higher growth than would normally be considered as a function of the ramp-up for any new facility. The growth from FY2016 to FY2017 did continue to be strong and then tempered a bit from FY2017 to FY2018.

The forecast assumes limited growth through FY2020 and then increasing growth in both traffic and toll revenue as congestion increases slightly in the corridor. The 1.0 to 1.5 percent growth rate for the next few years is a function of estimated general background growth on the I-95 corridor. Revenue is expected to grow slightly higher than traffic due to more of the traffic within the peak period during which toll rates are higher. In the longer term, growth is expected to increase above the estimated background growth rate of one percent as congestion builds as compared to current conditions. During the peak period it is estimated that average speeds in the general purpose lanes will not change dramatically over the forecast period, but that the reliability of travel will continue to deteriorate and therefore motorists will increasingly choose the ETLs as an insurance policy against delay. The forecast presented represents a conservative view of potential revenue. The ETLs are highly sensitive to congestion in the general purpose lanes. The forecasting model estimates that the congestion in the general purpose lanes will be limited during the forecast period but if background growth exceeds one percent, specifically in the peak periods, it is possible that the transactions and toll revenue will exceed forecast.



Table 13: I-95 ETL Traffic and Toll Revenue Estimates

| Annual T&R Estimates for I-95 Express Toll Lanes | | | | |
|--|------------|---------------|--------------|---------------|
| Fiscal Year | Traffic | | Toll Revenue | |
| | Volume | Annual Growth | Volume | Annual Growth |
| 2015 * | 3,945,633 | | \$6,145,709 | |
| 2016 * | 8,265,625 | 109.5% | \$11,385,193 | 85.3% |
| 2017 * | 9,030,910 | 9.3% | \$12,477,962 | 9.6% |
| 2018 * | 9,392,911 | 4.0% | \$13,148,060 | 5.4% |
| 2019 | 9,535,000 | 1.5% | \$13,521,000 | 2.8% |
| 2020 | 9,632,000 | 1.0% | \$13,803,000 | 2.1% |
| 2021 | 9,825,000 | 2.0% | \$14,231,000 | 3.1% |
| 2022 | 10,046,000 | 2.2% | \$14,722,000 | 3.5% |
| 2023 | 10,297,000 | 2.5% | \$15,281,000 | 3.8% |
| 2024 | 10,580,000 | 2.7% | \$15,915,000 | 4.1% |
| 2025 | 10,871,000 | 2.8% | \$16,591,000 | 4.2% |
| 2026 | 11,170,000 | 2.8% | \$17,313,000 | 4.4% |
| 2027 | 11,477,000 | 2.7% | \$18,066,000 | 4.3% |
| 2028 | 11,793,000 | 2.8% | \$18,852,000 | 4.4% |

*FY2015 - FY2018 are actual results

1.3 Future Toll Schedule Changes to Manage Traffic

The forecast in the preceding section is predicated on the existing toll schedule being in place for the full forecast period. On average, it is estimated that the current toll schedule by hour by day will be sufficient to manage traffic into the future. Furthermore, for the traffic and toll revenue forecast for the ten-year period it is estimated that any small changes to the toll schedule to manage traffic that is discussed in this section will not have a significant impact on revenue.

It is anticipated that there may be individual days into the future that may require increased tolls to effectively manage traffic demand on the ETLs. This would exclude any anomalies such as traffic accidents.

From review of the speed and traffic data on the ETLs on individual days and hours there is currently sufficient capacity to handle the future demands but the Friday PM peak period does demonstrate volatility that could require management techniques if so desired by the MDTA. On average the traffic can double during the Friday PM Peak and speeds in the non-merging section of the ETLs will be maintained to 45 miles per hour. Therefore any management of traffic through increases of toll rates would most likely be a function of dynamically pricing the lanes, in which toll rates could change in real time to manage specific anticipated congestion issues on the ETLs.

It is recommended that any changes to the toll schedule for the Friday PM Peak be consistent with overall goals of the corridor and project. There would be opportunities to manage traffic in real time, through

Memorandum

I-95 ETL T&R Update Existing and Extension

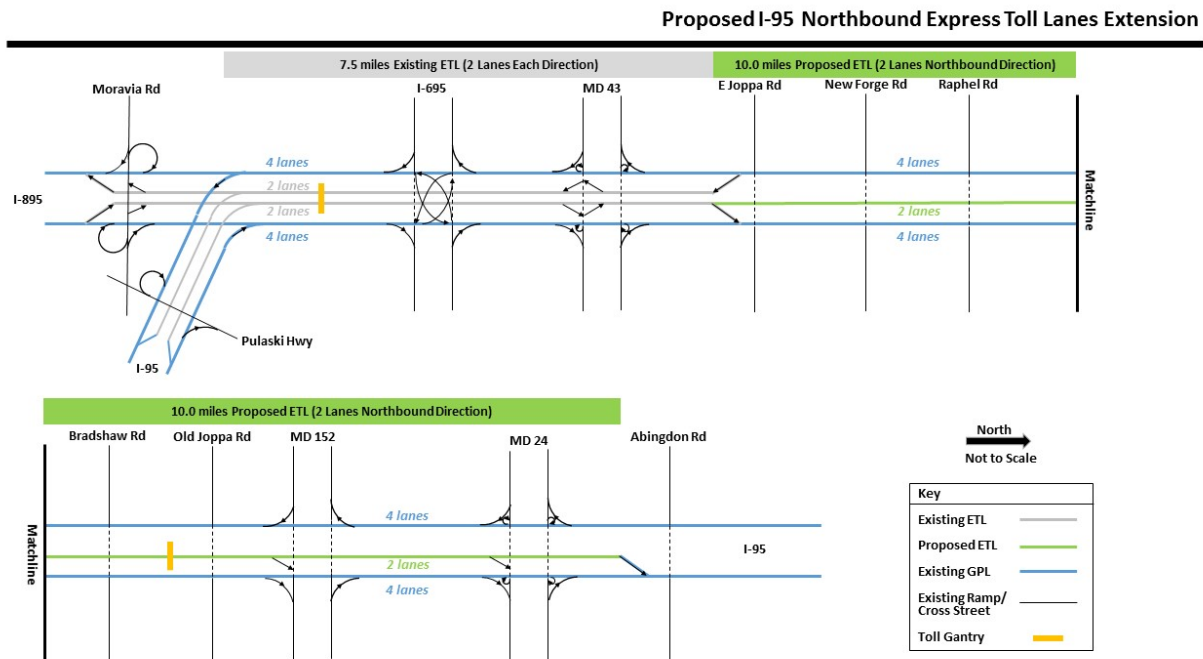


dynamic pricing, if the MDTA would like to do so. However if the MDTA would consider the average day as the basis for any toll changes then the current schedule should be sufficient for the forecast period.

2. I-95 ETL Northbound Extension - Project Description

The extension of the I-95 ETLs to the north has been analyzed in many different forms for a number of years. For this analysis, the most recent press release from MDTA on June 15, 2018 defines the infrastructure. The improvement is defined as an additional 2 northbound ETLs from the current northern limit of the ETLs to MD 24, an extension of 10 miles. In addition, there are other improvements such as improved connections on the general purpose lanes for operational enhancements. The stick diagram with the number of lanes that includes both the existing ETLs and proposed extension are presented in the following figure. For this analysis, we assumed one toll gantry south of the first exit on the northbound extension (MD 152) which covers the full 10 miles. As the extension project moves toward implementation more analysis should be undertaken to understand the optimal toll gantry placement (or multiple toll gantries placements) to achieve the goals of the MDTA and specifically this project. It was determined that the placement of one plaza at the location identified in the stick diagram was sufficient for this for this revenue budgeting exercise.

Figure 13: I-95 ETL – Existing and Extension Stick Diagram



It was also assumed that the toll structure would be identical to the existing I-95 ETLs, with time of day pricing as well as the same base per mile rates as shown in the following tables. These would represent the lowest rates to be used and could be increased as a function of traffic management on the ETLs during the forecast period.



Table 14: I95 ETL NB Extension Time of Day Tolling Assumed

| | Weekday | Saturday | Sunday |
|-------------|-------------------------------|--------------------------------|-------------------------------|
| Time Period | Northbound | | |
| Peak | 3 PM to 7 PM | 12 PM to 2 PM | 2 PM to 5 PM |
| Off-Peak | 5 AM to 3 PM; 7 PM to 9 PM | 5 AM to 12 PM; 2 PM to 9 PM | 5 AM to 2 PM; 5 PM to 9 PM |
| Night | 9 PM to 5 AM | | |

Table 15: I-95 ETL NB Extension Car E-ZPass Toll Charges Assumed

| Time Period | Toll Charge |
|-------------|-------------|
| Peak | \$2.20 |
| Off-Peak | \$1.70 |
| Night | \$0.70 |



2.1 Data Collection/Summary

In this section the pertinent traffic data that were collected for the analysis of the northbound extension of the ETLs is presented. These data include traffic volumes and speed data, as the demand and the implication of the demand on the roadway network in the form of congested speeds are the key drivers of traffic and revenue on the ETLs. This and the preceding information regarding the existing ETLs built the basis of the traffic and toll revenue forecasts for the extension.

Historical traffic volumes on the I-95 Corridor are shown including those within the existing sections of the ETLs and those in the northern extension. The northern section appears to have approximately 85 percent of the volume as the southern (existing) section, which shows strong demand for the full corridor from the Harbor to MD 24. The annual growth rates for the time period from 2008 to 2017 are presented as well, including the compounded annualized growth rate for the full period. As shown, it appears that the background growth rate for the corridor is historically between approximately 1 and 2 percent.

Table 16: I-95 Historical Traffic Counts by Section

| Year | I-95 Historical Traffic Counts by Section | | | |
|---------------------|---|----------------|--------------------|-----------------|
| | Existing Section of ETLs | | Northern Extension | |
| | I-895 to I695 | I-695 to MD 43 | MD 43 to Cnty Line | MD 152 to MD 24 |
| 2008 | 162,812 | 157,722 | 157,742 | 141,281 |
| 2009 | 164,443 | 159,303 | 160,880 | 146,750 |
| 2010 | 165,104 | 159,944 | 161,521 | 147,341 |
| 2011 | 165,275 | 160,105 | 161,682 | 144,542 |
| 2012 | 166,105 | 160,915 | 162,493 | 144,983 |
| 2013 | 166,549 | 173,324 | 165,972 | 152,715 |
| 2014 | 166,381 | 173,155 | 165,815 | 152,875 |
| 2015 | 178,425 | 176,150 | 159,150 | 149,075 |
| 2016 | 182,171 | 186,910 | 162,491 | 152,211 |
| 2017 | 186,542 | 191,401 | 166,392 | 155,562 |
| Annual Growth Rates | | | | |
| 2009 | 1.0% | 1.0% | 2.0% | 3.9% |
| 2010 | 0.4% | 0.4% | 0.4% | 0.4% |
| 2011 | 0.1% | 0.1% | 0.1% | -1.9% |
| 2012 | 0.5% | 0.5% | 0.5% | 0.3% |
| 2013 | 0.3% | 7.7% | 2.1% | 5.3% |
| 2014 | -0.1% | -0.1% | -0.1% | 0.1% |
| 2015 | 7.2% | 1.7% | -4.0% | -2.5% |
| 2016 | 2.1% | 6.1% | 2.1% | 2.1% |
| 2017 | 2.4% | 2.4% | 2.4% | 2.2% |
| 2008 to 2017 | 1.5% | 2.2% | 0.6% | 1.1% |



Similarly speed data were collected to understand the current average congestion levels in the corridor for northbound traffic by day of the week and by hour. These data are presented in the following four tables and figures representing two different data sources. These two sources were used to ensure a consistent understanding of congestion in the corridor. As shown the two sources of speed data for this northern section are not only similar to each other but also the speed data in the southern section for northbound traffic. These speeds in the northern section would of course improve with the implementation of the additional capacity and operational improvements planned for the corridor, but these data do provide a solid base conditions in which current motorists are facing. It is with these similarities of congestion that provide support to use the forecasting models of the existing ETLs to provide budget revenue estimates for the northern section.

Table 17: I-95 ETL Extension Section Average Speeds FY2018 (Here Data)

| Hour | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|-------------------|------|------|------|------|------|------|------|
| 12:00AM - 1:00AM | 67.4 | 66.6 | 65.6 | 65.8 | 66.2 | 65.9 | 66.6 |
| 1:00AM - 2:00AM | 67.4 | 66.5 | 65.6 | 65.9 | 66.0 | 66.4 | 66.4 |
| 2:00AM - 3:00AM | 66.9 | 66.2 | 66.0 | 66.1 | 65.9 | 66.3 | 66.6 |
| 3:00AM - 4:00AM | 66.4 | 66.5 | 66.5 | 66.3 | 67.0 | 66.7 | 66.9 |
| 4:00AM - 5:00AM | 66.7 | 67.2 | 67.2 | 67.0 | 67.3 | 67.2 | 66.8 |
| 5:00AM - 6:00AM | 67.2 | 66.8 | 67.2 | 66.9 | 67.1 | 67.0 | 66.8 |
| 6:00AM - 7:00AM | 67.9 | 66.9 | 67.1 | 66.3 | 66.9 | 66.9 | 67.7 |
| 7:00AM - 8:00AM | 69.2 | 66.4 | 66.3 | 65.1 | 66.3 | 66.2 | 67.9 |
| 8:00AM - 9:00AM | 69.4 | 65.9 | 66.0 | 65.6 | 65.8 | 65.4 | 67.1 |
| 9:00AM - 10:00AM | 69.2 | 66.0 | 66.0 | 65.7 | 64.9 | 65.1 | 65.9 |
| 10:00AM - 11:00AM | 68.5 | 65.6 | 65.4 | 65.3 | 64.1 | 64.5 | 63.6 |
| 11:00AM - 12:00PM | 64.5 | 65.3 | 64.8 | 64.4 | 63.6 | 62.3 | 59.3 |
| 12:00PM - 1:00PM | 57.9 | 64.7 | 64.7 | 63.9 | 62.7 | 59.7 | 58.7 |
| 1:00PM - 2:00PM | 53.5 | 65.1 | 64.1 | 64.2 | 63.3 | 56.9 | 60.0 |
| 2:00PM - 3:00PM | 53.0 | 64.7 | 64.4 | 65.0 | 63.2 | 53.3 | 62.8 |
| 3:00PM - 4:00PM | 53.9 | 65.2 | 64.4 | 65.5 | 63.7 | 50.6 | 64.5 |
| 4:00PM - 5:00PM | 54.0 | 65.5 | 63.3 | 63.1 | 62.0 | 50.1 | 66.1 |
| 5:00PM - 6:00PM | 55.6 | 63.3 | 62.1 | 61.0 | 60.2 | 49.9 | 66.2 |
| 6:00PM - 7:00PM | 60.7 | 65.7 | 65.0 | 63.1 | 63.1 | 51.4 | 66.8 |
| 7:00PM - 8:00PM | 64.9 | 67.1 | 66.2 | 65.4 | 66.0 | 54.7 | 67.4 |
| 8:00PM - 9:00PM | 66.1 | 67.0 | 65.9 | 65.9 | 65.7 | 60.9 | 66.7 |
| 9:00PM - 10:00PM | 66.3 | 66.3 | 65.8 | 65.7 | 64.9 | 65.4 | 66.7 |
| 10:00PM - 11:00PM | 66.6 | 65.8 | 65.3 | 66.0 | 65.0 | 66.5 | 66.8 |
| 11:00PM - 12:00AM | 66.3 | 65.5 | 65.5 | 65.8 | 65.1 | 66.2 | 67.1 |



Figure 14: I-95 ETL Extension Section Average Speeds FY2018 (Here Data)

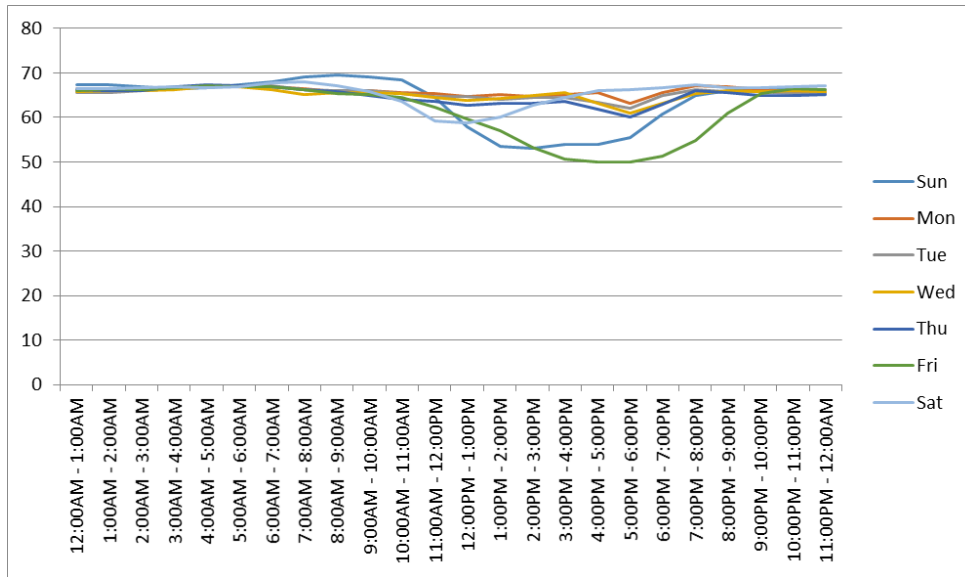
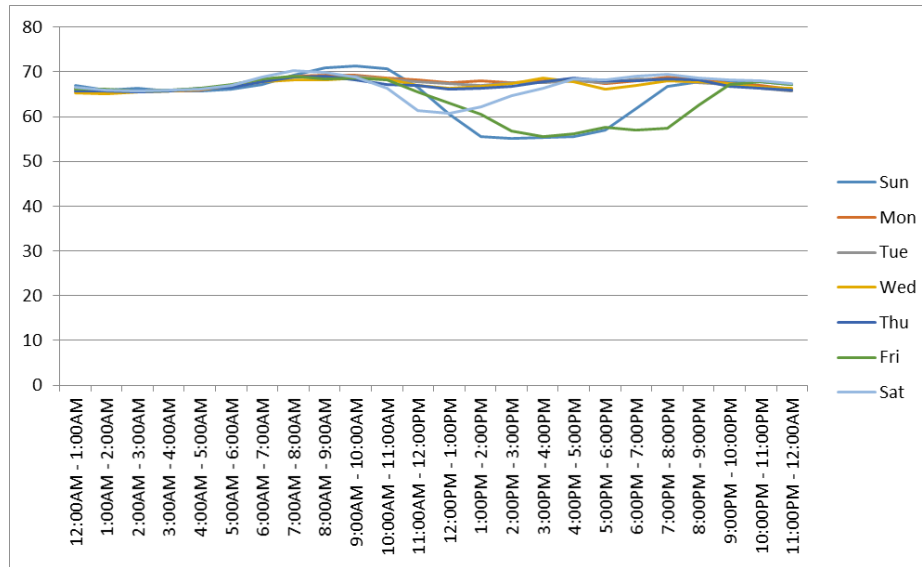


Table 18: I-95 ETL Extension Section Average Speeds FY2018 (INRIX Data)

| Hour | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|-------------------|------|------|------|------|------|------|------|
| 12:00AM - 1:00AM | 67.0 | 66.4 | 65.6 | 65.2 | 65.8 | 66.0 | 66.6 |
| 1:00AM - 2:00AM | 66.0 | 65.9 | 65.4 | 65.0 | 65.7 | 66.1 | 66.0 |
| 2:00AM - 3:00AM | 66.3 | 65.6 | 65.6 | 65.5 | 65.5 | 65.7 | 65.8 |
| 3:00AM - 4:00AM | 65.7 | 65.7 | 65.8 | 65.7 | 65.7 | 65.9 | 65.8 |
| 4:00AM - 5:00AM | 65.7 | 65.9 | 66.1 | 66.0 | 66.3 | 66.3 | 66.1 |
| 5:00AM - 6:00AM | 66.0 | 66.9 | 67.0 | 66.7 | 66.6 | 67.1 | 66.9 |
| 6:00AM - 7:00AM | 67.2 | 68.1 | 68.0 | 67.8 | 67.9 | 68.4 | 68.7 |
| 7:00AM - 8:00AM | 69.3 | 69.0 | 69.0 | 68.3 | 68.9 | 69.0 | 70.4 |
| 8:00AM - 9:00AM | 70.9 | 69.2 | 68.7 | 68.3 | 69.0 | 68.4 | 69.9 |
| 9:00AM - 10:00AM | 71.4 | 69.2 | 69.0 | 68.7 | 68.2 | 68.6 | 68.8 |
| 10:00AM - 11:00AM | 70.6 | 68.6 | 68.4 | 68.4 | 67.2 | 68.2 | 66.4 |
| 11:00AM - 12:00PM | 66.6 | 68.1 | 67.9 | 66.9 | 66.9 | 65.6 | 61.4 |
| 12:00PM - 1:00PM | 60.6 | 67.6 | 67.3 | 66.3 | 66.2 | 63.1 | 60.7 |
| 1:00PM - 2:00PM | 55.6 | 67.9 | 67.0 | 66.7 | 66.4 | 60.4 | 62.1 |
| 2:00PM - 3:00PM | 55.1 | 67.7 | 67.6 | 67.4 | 66.7 | 56.9 | 64.7 |
| 3:00PM - 4:00PM | 55.3 | 68.0 | 67.6 | 68.6 | 67.9 | 55.4 | 66.3 |
| 4:00PM - 5:00PM | 55.5 | 68.5 | 68.0 | 67.8 | 68.5 | 56.1 | 68.3 |
| 5:00PM - 6:00PM | 57.1 | 67.5 | 67.6 | 66.2 | 67.9 | 57.6 | 68.2 |
| 6:00PM - 7:00PM | 61.9 | 68.0 | 68.4 | 66.9 | 68.0 | 56.9 | 69.1 |
| 7:00PM - 8:00PM | 66.7 | 68.7 | 68.2 | 68.0 | 68.5 | 57.4 | 69.5 |
| 8:00PM - 9:00PM | 67.8 | 68.5 | 67.5 | 67.7 | 68.3 | 62.5 | 68.7 |
| 9:00PM - 10:00PM | 67.7 | 67.4 | 67.1 | 67.5 | 66.8 | 67.2 | 68.1 |
| 10:00PM - 11:00PM | 67.7 | 66.9 | 66.3 | 66.6 | 66.4 | 67.9 | 67.9 |
| 11:00PM - 12:00AM | 67.1 | 66.1 | 65.8 | 66.3 | 66.0 | 67.1 | 67.4 |



Figure 15: I-95 ETL Extension Section Average Speeds FY2018 (INRIX Data)



2.2 Traffic and Revenue Forecasts

Based on the preceding data including the detailed data from the performance of the existing ETLs, the traffic and toll revenue forecasting model was updated to include the new infrastructure of the NB extension as well as the applicable toll structure and rates as presented herein. The assumed opening date was July 1, 2022 or the first day of FY2023. For the extension, a very small and short ramp-up period was estimated as it connects to the existing tolled system. The ramp-up is estimated to last two years, FY2023 and FY2024 at 90 and 95 percent of total model demand. All other assumptions are consistent from the existing ETL forecast including payment and vehicle class, payment rates and the like.

Table 19: Annual T&R Estimates for I-95 ETL NB Extension

| Annual T&R Estimates for I-95 Express Toll Lanes - NB Extension | | | | |
|---|-----------|---------------|--------------|---------------|
| Fiscal Year | Traffic | | Toll Revenue | |
| | Volume | Annual Growth | Volume | Annual Growth |
| 2023 | 3,324,000 | | \$6,343,000 | |
| 2024 | 3,632,000 | 9.3% | \$7,023,000 | 10.7% |
| 2025 | 3,957,000 | 8.9% | \$7,762,000 | 10.5% |
| 2026 | 4,095,000 | 3.5% | \$8,158,000 | 5.1% |
| 2027 | 4,238,000 | 3.5% | \$8,574,000 | 5.1% |
| 2028 | 4,387,000 | 3.5% | \$9,011,000 | 5.1% |



3. Total Traffic and Revenue Forecasts

The combination of the transactions and toll revenue for both the existing I-95 ETLs and the northbound extension are presented in Table 20.

Table 20: Annual T&R Estimates for I-95 ETLs – Total System

| Annual T&R Estimates for I-95 Express Toll Lanes - Total System | | | | |
|---|------------|---------------|--------------|---------------|
| Fiscal Year | Traffic | | Toll Revenue | |
| | Volume | Annual Growth | Volume | Annual Growth |
| 2015 * | 3,945,633 | | \$6,145,709 | |
| 2016 * | 8,265,625 | 109.5% | \$11,385,193 | 85.3% |
| 2017 * | 9,030,910 | 9.3% | \$12,477,962 | 9.6% |
| 2018 * | 9,392,911 | 4.0% | \$13,148,060 | 5.4% |
| 2019 | 9,535,000 | 1.5% | \$13,521,000 | 2.8% |
| 2020 | 9,632,000 | 1.0% | \$13,803,000 | 2.1% |
| 2021 | 9,825,000 | 2.0% | \$14,231,000 | 3.1% |
| 2022 | 10,046,000 | 2.2% | \$14,722,000 | 3.5% |
| 2023 ** | 13,621,000 | 35.6% | \$21,624,000 | 46.9% |
| 2024 | 14,212,000 | 4.3% | \$22,938,000 | 6.1% |
| 2025 | 14,828,000 | 4.3% | \$24,353,000 | 6.2% |
| 2026 | 15,265,000 | 2.9% | \$25,471,000 | 4.6% |
| 2027 | 15,715,000 | 2.9% | \$26,640,000 | 4.6% |
| 2028 | 16,180,000 | 3.0% | \$27,863,000 | 4.6% |

*FY2015 - FY2018 are actual results

** Assumed opening of the NB Extension



4. Limits and Disclaimers

It is Jacobs' opinion that the traffic and toll revenue estimates provided herein are reasonable and that they have been prepared in accordance with accepted industry-wide practice. However, given the uncertainties within the current economic climate, it is important to note the following assumptions which, in our opinion, are reasonable:

- This limited synopsis presents the highlighted results of Jacobs' 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 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 the MDTA 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.
- Jacobs' traffic and toll revenue estimations only represent our best judgment and we do not warrant or represent that the actual 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 project corridor during the project 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 Jacobs' opinion, the assumptions underlying the projections provide a reasonable basis for the revenue projections and operating expenses. 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, Jacobs makes no guaranty or warranty with respect to the projections disclosed in this Study

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