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**Date** February 8, 2016  
**To** Dennis Simpson  
**From** Phil Eshelman  
**Subject** **I-95 ETL T&R Update**

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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).

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 opening in mid-December 2014, actual traffic and toll revenue results have outpaced forecasts. The cause of this is reviewed and how it is incorporated into the revised forecast is identified within this memorandum.

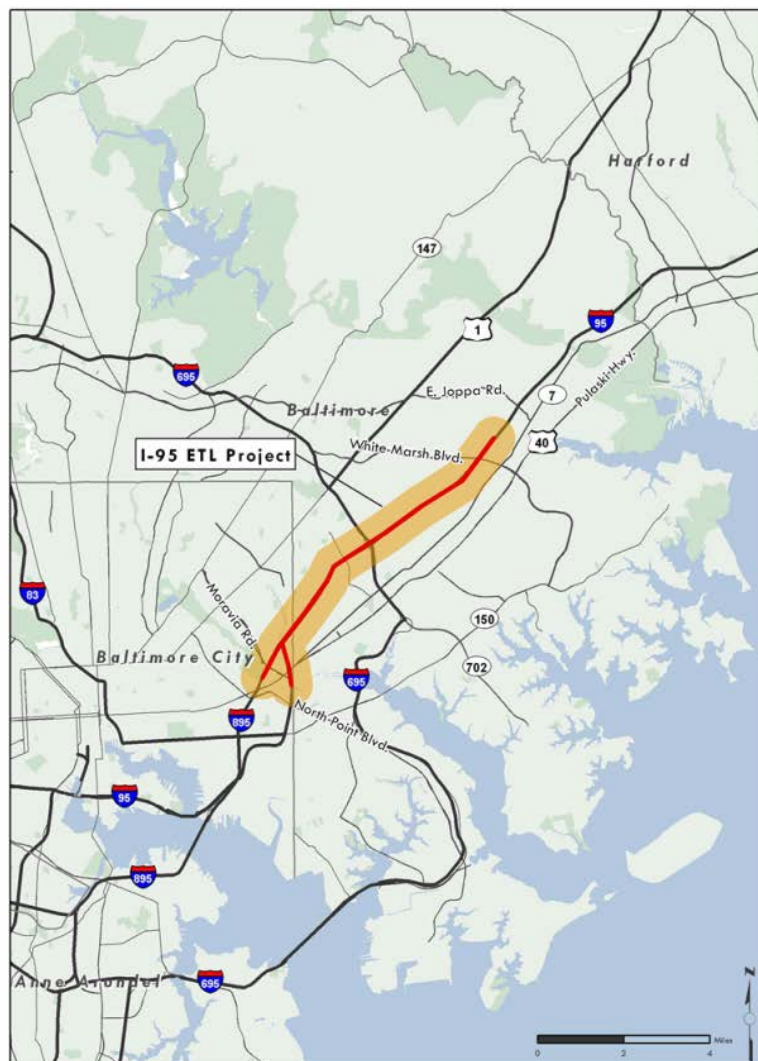
This memo is structured to review the existing conditions, specifically against the previous forecast, a brief review of changing economic conditions and revised estimates of traffic and toll revenue for the facility. Thus the sections are as follows:

1. Project Description
2. Data Collection, Summary and Actual vs. Forecast
3. Brief Economic Review; and
4. Revised Traffic and Toll Revenue Forecasts

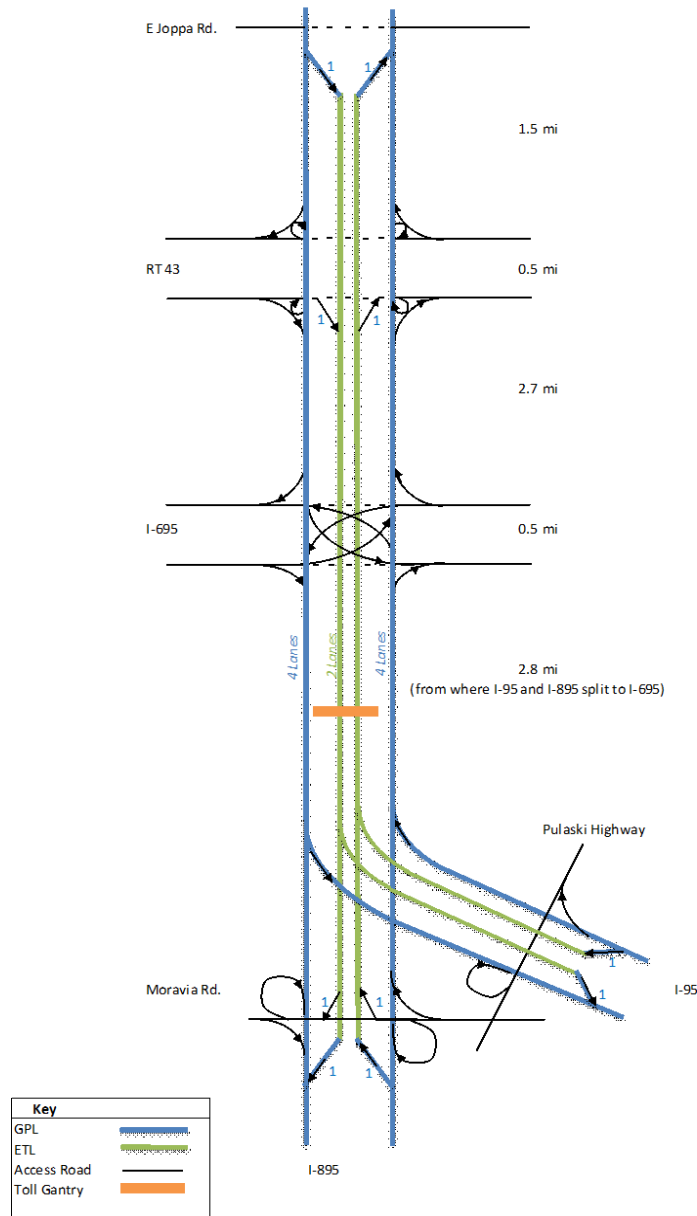
## 1. Project Description

The I-95 ETLs are two lanes in each direction running parallel to the I-95 general purpose 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 1-1 and Figure 1-2 provide the project location and the details as to access to the ETLs from the GP lanes, respectively.

**Figure 1-1: I-95 ETL Project Location Map**



**Figure 1-2: I-95 ETL 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. The passenger car toll rates and time period for the toll rates are shown in the following tables.

**Table 1-1: I-95 ETL Passenger Car Toll Rates**

Time Period	FY 15 Rates	FY16 Rates
Peak	\$1.75	\$1.54
Off-Peak	\$1.40	\$1.19
Night	\$0.70	\$0.49

**Table 1-2: I-95 ETL Toll Schedule Time Periods**

Time Period	Weekday	Saturday	Sunday
	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		

## **2. Data Collection/Summary and Actual vs. Forecast**

As was stated in the introduction, actual traffic and toll revenue has exceeded forecast. For FY2015, which was from opening of the roadway on December 14, 2014 until the end of the fiscal year on June 30, 2015, actual traffic and toll revenue were approximately twice the forecasts. The original forecast estimated 1.8M transaction producing \$3.1M in toll revenue. Actual traffic and revenue was approximately 3.9 transactions producing \$6.1M in toll revenue. In this section the details of this over performance are analyzed and determination of inclusion in on-going forecasts is discussed.

First the data that was collected for this analysis is presented and then the results of analysis are reviewed.

### **2.1 Data Collected**

For this analysis the following data were collected from the MDTA:

1. Traffic Data
  - a. Hourly ETL traffic by payment type
  - b. Every transaction by payment type and zip code
  - c. SHA traffic counts
  - d. Speed data from INRIX on the GP lanes and 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
3. Other data
  - a. Signage schematic
  - b. CHARTS incident data in the corridor

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.

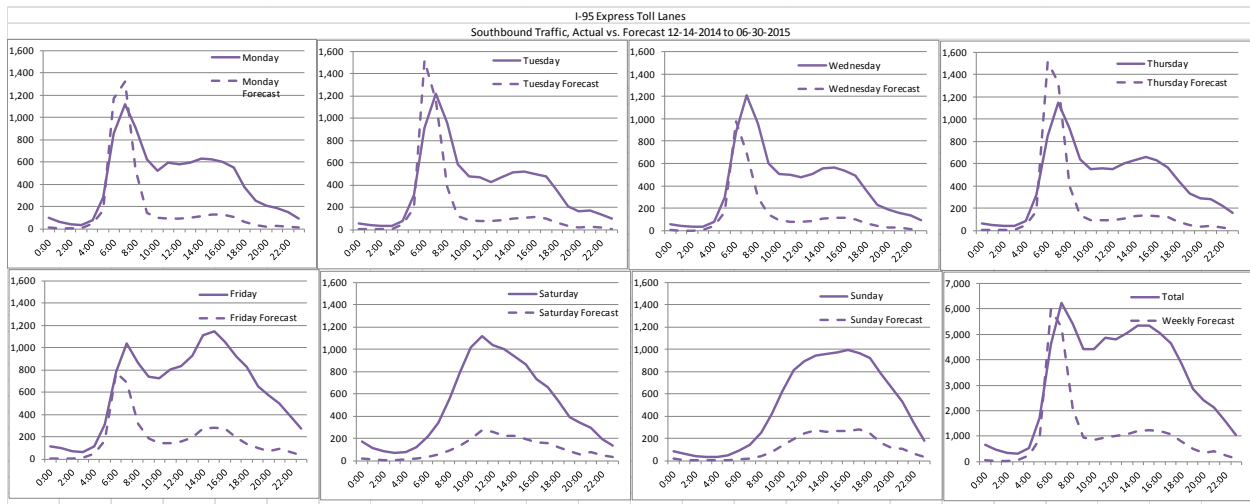
### **2.2 Actual Traffic versus Forecast by Time Period**

The first step of the analysis is to compare the actual results on the ETL for the last 6.5 months of FY15 (December 14, 2014 to June 2015) and the first 3.5 months of FY16 (July 1, 2015 to October 14, 2015) to the forecast. The following graphs and tables show the actual to forecast by direction, day of the week and hour. The table provides detail for peak, off-peak and night time traffic by direction and month. The

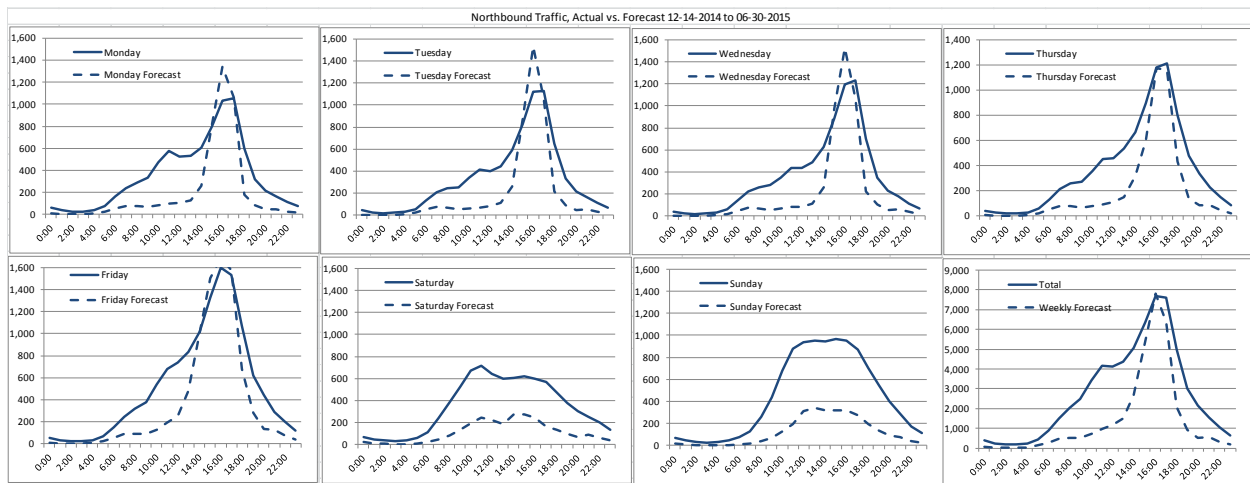
table is followed by graphs showing how the forecast in the different time periods fared. This is first provided for an average weekday, then for the weekend.

The overwhelming takeaway is that forecast is closest to actual during weekday peak. The table shows that actual traffic is 4.3 percent above forecast during the peak period for both directions. Outside of the peak period, actual traffic is much higher than forecast. With travel time savings largely in the peak period, it is difficult to ascertain the reasons for the high usage of the ETLs during off-peak and night. Subsequent analysis provided in this document attempts to reveal various reasons for this and evaluate the need to incorporate into on-going forecasts.

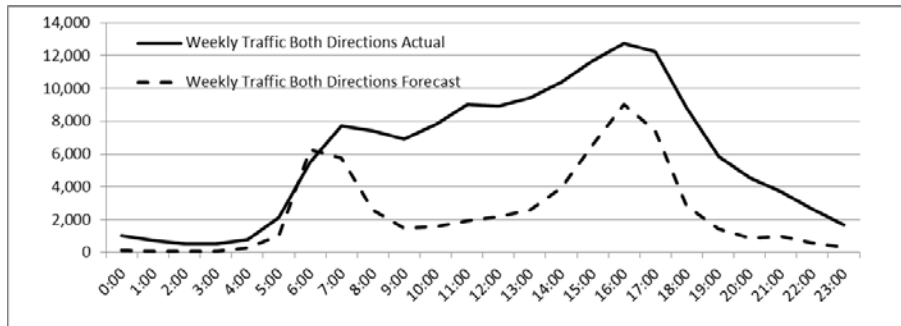
**Figure 2-1: ETL SB Traffic, Actual vs. Forecast – FY15**



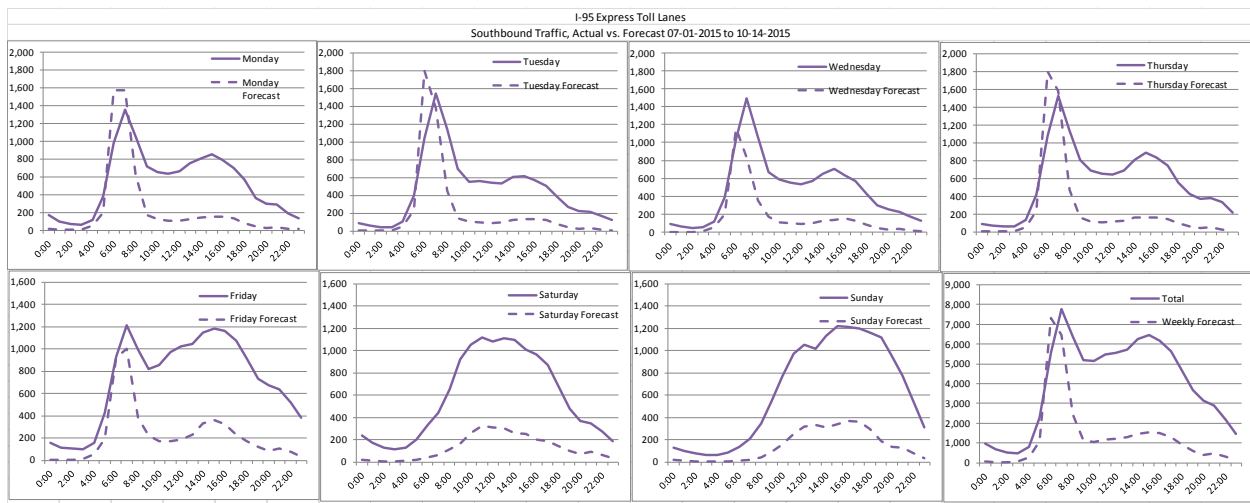
**Figure 2-2: ETL NB Traffic, Actual vs. Forecast – FY15**



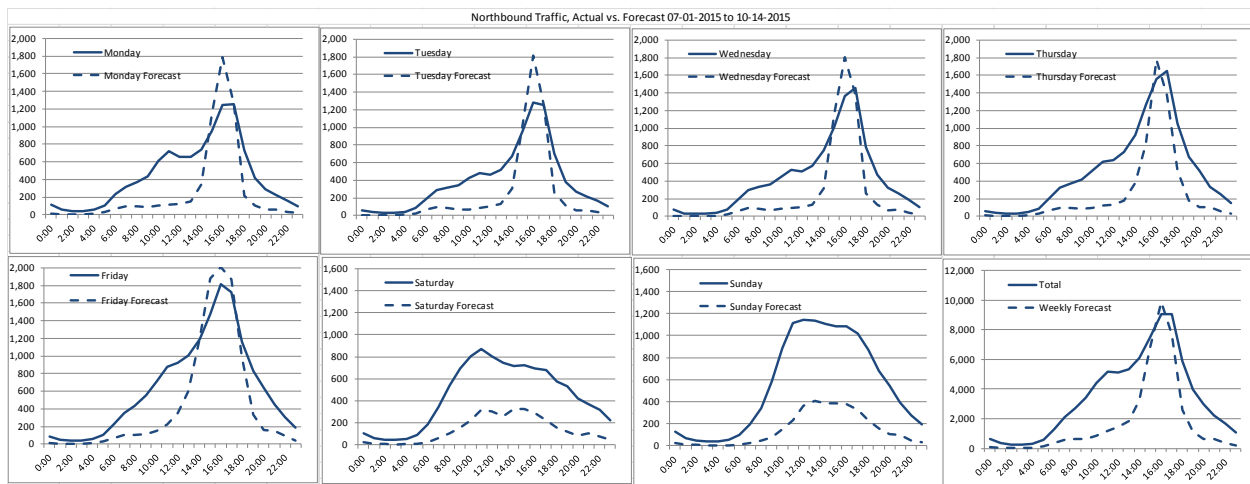
**Figure 2-3: ETL Weekly Traffic, Actual vs. Forecast – FY15 (Both Directions)**



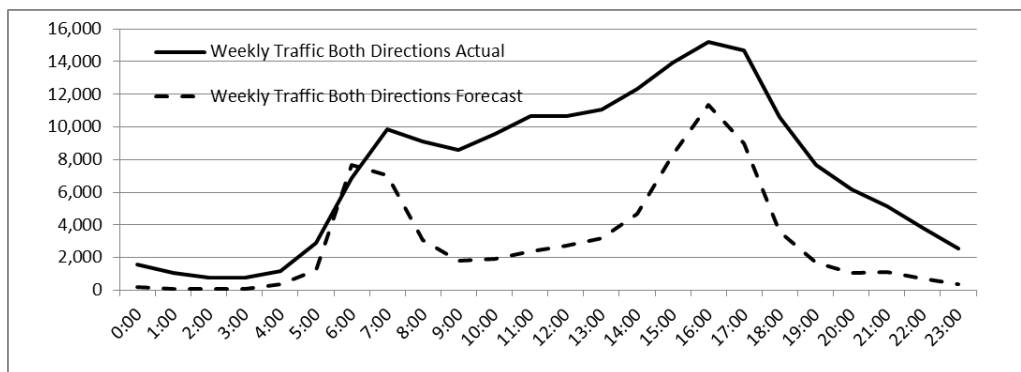
**Figure 2-4: ETL SB Traffic, Actual vs. Forecast – FY16**



**Figure 2-5: ETL NB Traffic, Actual vs. Forecast – FY16**



**Figure 2-6: ETL Weekly Traffic, Actual vs. Forecast – FY16 (Both Directions)**



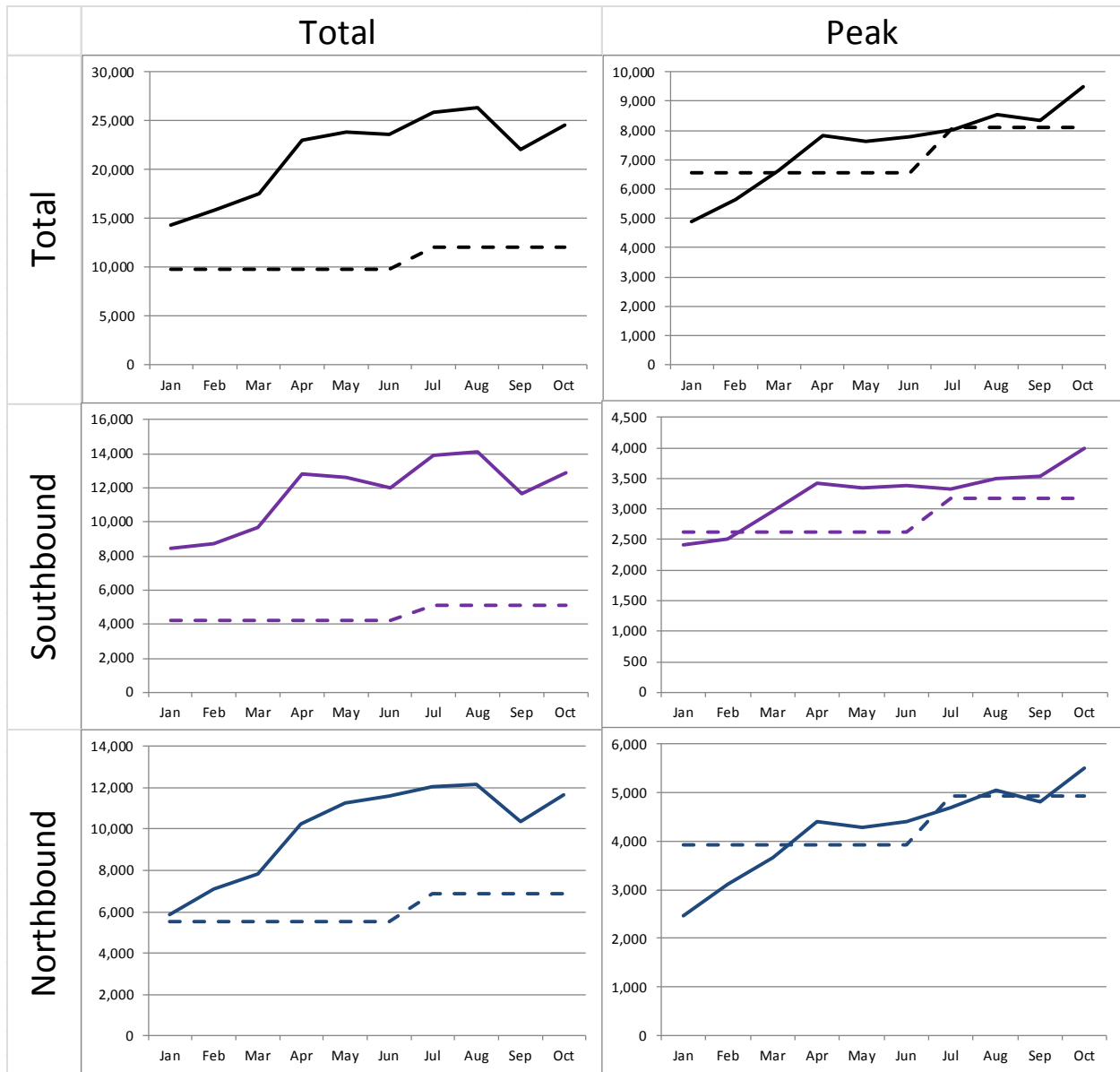
**Table 2-1: ETL Weekday Traffic, Actual vs. Forecast by Time Period**

I-95 ETL T&R 2015																
Average Weekday Traffic																
Month	Total				Peak				Off-Peak				Night			
	Forecast	Actual	Difference		Forecast	Actual	Difference		Forecast	Actual	Difference		Forecast	Actual	Difference	
			Absolute	Percent			Absolute	Percent			Absolute	Percent			Absolute	Percent
Jan	9,796	14,318	4,522	46.2%	6,551	4,881	-1,670	-25.5%	2,930	8,539	5,609	191.4%	315	898	583	184.9%
Feb	9,796	15,814	6,017	61.4%	6,551	5,625	-926	-14.1%	2,930	9,082	6,152	209.9%	315	1,107	792	251.2%
Mar	9,796	17,535	7,739	79.0%	6,551	6,620	69	1.1%	2,930	9,609	6,679	227.9%	315	1,306	990	314.2%
Apr	9,796	23,025	13,228	135.0%	6,551	7,838	1,287	19.6%	2,930	13,337	10,406	355.1%	315	1,851	1,535	487.1%
May	9,796	23,889	14,093	143.9%	6,551	7,640	1,089	16.6%	2,930	14,212	11,282	385.0%	315	2,037	1,722	546.1%
Jun	9,796	23,547	13,751	140.4%	6,551	7,784	1,233	18.8%	2,930	13,873	10,943	373.5%	315	1,890	1,575	499.6%
Jul	12,021	25,914	13,893	115.6%	8,104	8,010	-94	-1.2%	3,541	15,424	11,883	335.6%	376	2,480	2,104	559.4%
Aug	12,021	26,296	14,276	118.8%	8,104	8,562	458	5.7%	3,541	15,405	11,864	335.1%	376	2,330	1,953	519.5%
Sep	12,021	22,058	10,038	83.5%	8,104	8,334	230	2.8%	3,541	11,977	8,436	238.2%	376	1,747	1,371	364.6%
Oct	12,021	24,502	12,481	103.8%	8,104	9,502	1,398	17.3%	3,541	13,100	9,559	269.9%	376	1,901	1,524	405.4%
Average	10,686	21,690	11,004	103.0%	7,172	7,480	308	4.3%	3,175	12,456	9,281	292.4%	340	1,755	1,415	416.7%
Southbound																
Jan	4,247	8,437	4,190	98.7%	2,616	2,407	-209	-8.0%	1,480	5,500	4,020	271.7%	152	530	378	249.7%
Feb	4,247	8,720	4,473	105.3%	2,616	2,508	-108	-4.1%	1,480	5,523	4,043	273.2%	152	689	538	354.9%
Mar	4,247	9,710	5,463	128.6%	2,616	2,956	340	13.0%	1,480	5,961	4,481	302.9%	152	794	642	423.8%
Apr	4,247	12,799	8,552	201.4%	2,616	3,427	811	31.0%	1,480	8,181	6,701	452.9%	152	1,191	1,040	686.3%
May	4,247	12,626	8,379	197.3%	2,616	3,345	729	27.9%	1,480	8,093	6,613	447.0%	152	1,188	1,037	684.2%
Jun	4,247	11,966	7,719	181.8%	2,616	3,380	764	29.2%	1,480	7,607	6,128	414.1%	152	979	827	546.1%
Jul	5,143	13,888	8,744	170.0%	3,182	3,320	138	4.4%	1,782	9,120	7,338	411.9%	180	1,448	1,268	702.8%
Aug	5,143	14,143	9,000	175.0%	3,182	3,504	322	10.1%	1,782	9,235	7,453	418.4%	180	1,405	1,225	679.2%
Sep	5,143	11,671	6,527	126.9%	3,182	3,529	347	10.9%	1,782	7,128	5,347	300.1%	180	1,014	833	462.0%
Oct	5,143	12,869	7,726	150.2%	3,182	3,989	808	25.4%	1,782	7,714	5,933	333.0%	180	1,166	985	546.2%
Average	4,606	11,683	7,077	153.7%	2,842	3,237	394	13.9%	1,600	7,406	5,806	362.8%	163	1,040	877	538.1%
Northbound																
Jan	5,549	5,881	332	6.0%	3,935	2,474	-1,461	-37.1%	1,451	3,039	1,588	109.5%	164	368	204	124.9%
Feb	5,549	7,094	1,544	27.8%	3,935	3,116	-819	-20.8%	1,451	3,559	2,109	145.4%	164	418	254	155.3%
Mar	5,549	7,825	2,275	41.0%	3,935	3,664	-271	-6.9%	1,451	3,648	2,198	151.5%	164	512	348	212.7%
Apr	5,549	10,225	4,676	84.3%	3,935	4,411	476	12.1%	1,451	5,156	3,705	255.4%	164	659	496	302.7%
May	5,549	11,263	5,714	103.0%	3,935	4,295	360	9.1%	1,451	6,120	4,669	321.8%	164	849	685	418.3%
Jun	5,549	11,581	6,031	108.7%	3,935	4,404	468	11.9%	1,451	6,266	4,816	332.0%	164	911	747	456.5%
Jul	6,877	12,026	5,149	74.9%	4,922	4,690	-232	-4.7%	1,759	6,304	4,545	258.3%	196	1,032	836	427.3%
Aug	6,877	12,153	5,276	76.7%	4,922	5,058	136	2.8%	1,759	6,170	4,411	250.7%	196	924	729	372.3%
Sep	6,877	10,388	3,510	51.0%	4,922	4,805	-117	-2.4%	1,759	4,849	3,089	175.6%	196	734	538	274.9%
Oct	6,877	11,633	4,756	69.2%	4,922	5,513	591	12.0%	1,759	5,385	3,626	206.1%	196	735	539	275.6%
Average	6,081	10,007	3,926	64.6%	4,330	4,243	-87	-2.0%	1,574	5,050	3,476	220.8%	177	714	538	304.6%



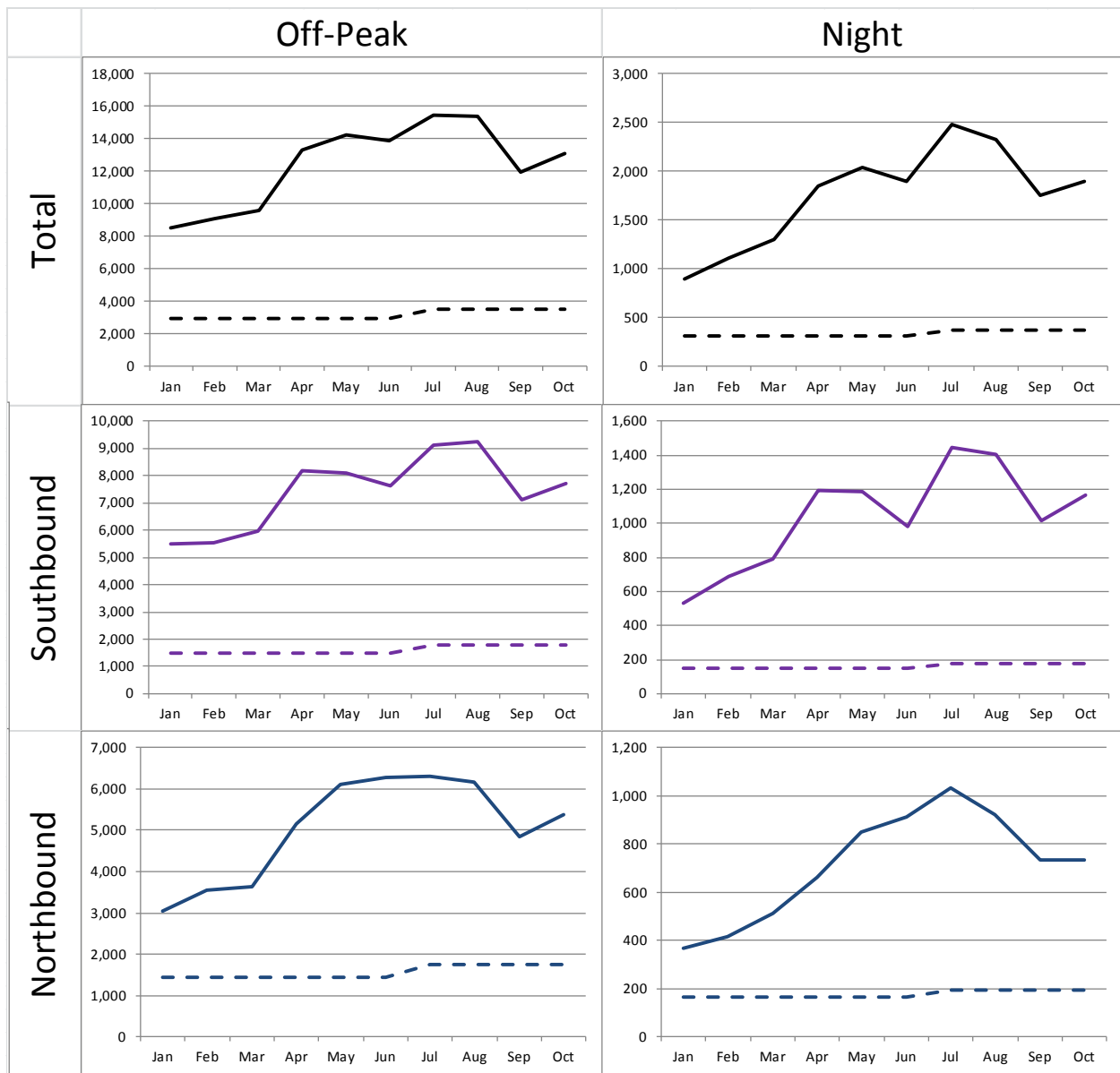
**Figure 2-7: ETL Weekday Traffic, Actual vs. Forecast, Total and Peak Period Traffic**

(Forecast is represented by dotted line)



**Figure 2-8: ETL Weekday Traffic, Actual vs. Forecast, Off-Peak and Night Period Traffic**

(Forecast is represented by dotted line)

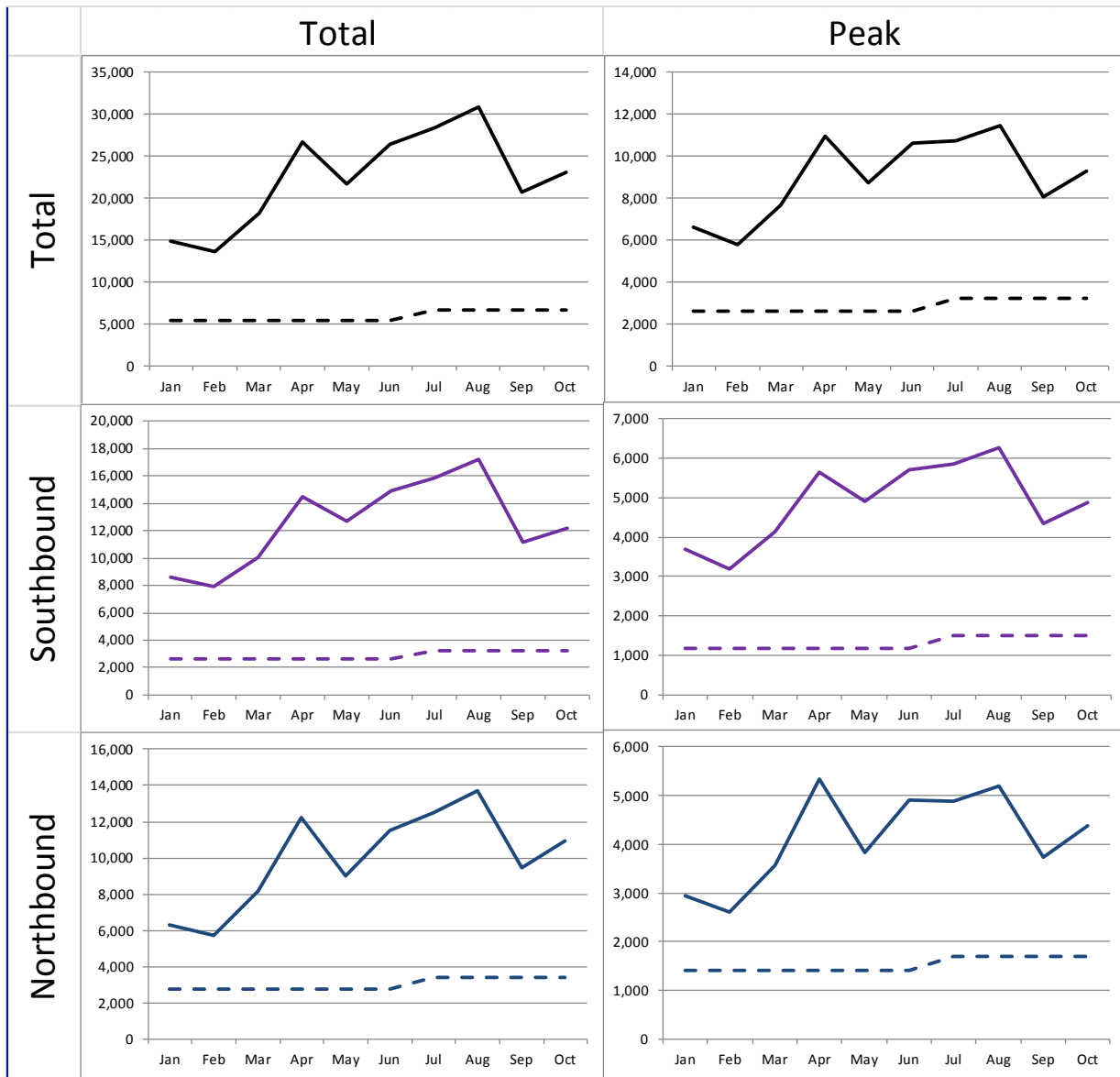


**Table 2-2: ETL Weekend Traffic, Actual vs. Forecast by Time Period**

I-95 ETL T&R 2015																
Average Weekend Traffic																
Month	Total				Peak				Off-Peak				Night			
	Forecast	Actual	Difference		Forecast	Actual	Difference		Forecast	Actual	Difference		Forecast	Actual	Difference	
			Absolute	Percent			Absolute	Percent			Absolute	Percent			Absolute	Percent
Jan	5,453	14,909	9,456	173.4%	2,594	6,641	4,047	156.0%	2,422	7,244	4,822	199.1%	438	1,025	587	134.1%
Feb	5,453	13,672	8,218	150.7%	2,594	5,813	3,218	124.1%	2,422	6,837	4,416	182.4%	438	1,022	584	133.4%
Mar	5,453	18,208	12,754	233.9%	2,594	7,691	5,097	196.5%	2,422	8,941	6,519	269.2%	438	1,576	1,138	260.0%
Apr	5,453	26,709	21,256	389.8%	2,594	10,979	8,385	323.2%	2,422	13,296	10,874	449.0%	438	2,435	1,997	456.2%
May	5,453	21,690	16,236	297.7%	2,594	8,731	6,137	236.6%	2,422	11,042	8,620	356.0%	438	1,917	1,479	337.9%
Jun	5,453	26,446	20,992	384.9%	2,594	10,618	8,024	309.3%	2,422	13,096	10,675	440.8%	438	2,731	2,294	523.9%
Jul	6,642	28,374	21,732	327.2%	3,210	10,723	7,512	234.0%	2,951	14,324	11,373	385.4%	481	3,328	2,846	591.6%
Aug	6,642	30,897	24,254	365.1%	3,210	11,466	8,256	257.2%	2,951	15,576	12,625	427.8%	481	3,854	3,373	701.0%
Sep	6,642	20,664	14,021	211.1%	3,210	8,066	4,856	151.3%	2,951	10,486	7,535	255.3%	481	2,112	1,630	338.9%
Oct	6,642	23,131	16,489	248.2%	3,210	9,270	6,059	188.7%	2,951	11,725	8,774	297.3%	481	2,137	1,656	344.2%
Average	5,929	22,470	16,541	279.0%	2,841	9,000	6,159	216.8%	2,633	11,257	8,623	327.5%	455	2,214	1,758	386.4%
Southbound																
Jan	2,660	8,584	5,924	222.6%	1,189	3,701	2,512	211.2%	1,246	4,180	2,935	235.6%	225	703	477	211.6%
Feb	2,660	7,910	5,249	197.3%	1,189	3,206	2,016	169.5%	1,246	3,955	2,710	217.5%	225	749	523	232.1%
Mar	2,660	10,057	7,396	278.0%	1,189	4,129	2,940	247.2%	1,246	4,980	3,735	299.8%	225	947	722	320.1%
Apr	2,660	14,493	11,833	444.8%	1,189	5,652	4,462	375.2%	1,246	7,180	5,935	476.4%	225	1,662	1,436	637.0%
May	2,660	12,654	9,993	375.6%	1,189	4,907	3,718	312.6%	1,246	6,426	5,180	415.9%	225	1,320	1,095	485.6%
Jun	2,660	14,902	12,241	460.1%	1,189	5,712	4,522	380.2%	1,246	7,428	6,183	496.4%	225	1,762	1,537	681.5%
Jul	3,249	15,872	12,623	388.5%	1,501	5,851	4,350	289.8%	1,523	8,035	6,512	427.7%	225	1,986	1,761	780.9%
Aug	3,249	17,220	13,971	430.0%	1,501	6,263	4,762	317.2%	1,523	8,627	7,104	466.5%	225	2,331	2,105	933.7%
Sep	3,249	11,192	7,943	244.5%	1,501	4,335	2,834	188.8%	1,523	5,583	4,060	266.6%	225	1,274	1,049	465.2%
Oct	3,249	12,180	8,930	274.8%	1,501	4,883	3,382	225.3%	1,523	6,030	4,507	296.0%	225	1,267	1,042	462.0%
Average	2,896	12,506	9,610	331.9%	1,314	4,864	3,550	270.1%	1,356	6,242	4,886	360.2%	225	1,400	1,175	521.0%
Northbound																
Jan	2,793	6,325	3,533	126.5%	1,405	2,940	1,535	109.3%	1,176	3,063	1,887	160.5%	212	322	110	51.8%
Feb	2,793	5,762	2,969	106.3%	1,405	2,607	1,202	85.6%	1,176	2,882	1,706	145.1%	212	273	61	28.6%
Mar	2,793	8,151	5,358	191.8%	1,405	3,562	2,157	153.6%	1,176	3,960	2,784	236.8%	212	629	416	196.1%
Apr	2,793	12,216	9,423	337.4%	1,405	5,327	3,923	279.3%	1,176	6,115	4,939	420.0%	212	773	561	264.2%
May	2,793	9,036	6,243	223.5%	1,405	3,824	2,419	172.2%	1,176	4,616	3,440	292.5%	212	596	384	180.9%
Jun	2,793	11,544	8,751	313.3%	1,405	4,907	3,502	249.3%	1,176	5,668	4,492	382.0%	212	969	757	356.6%
Jul	3,393	12,502	9,109	268.5%	1,709	4,872	3,162	185.0%	1,428	6,289	4,861	340.4%	256	1,341	1,086	424.6%
Aug	3,393	13,676	10,283	303.1%	1,709	5,204	3,494	204.4%	1,428	6,950	5,521	386.6%	256	1,523	1,268	495.9%
Sep	3,393	9,471	6,078	179.1%	1,709	3,731	2,022	118.3%	1,428	4,903	3,475	243.3%	256	837	581	227.4%
Oct	3,393	10,952	7,558	222.8%	1,709	4,387	2,677	156.6%	1,428	5,695	4,267	298.8%	256	870	614	240.2%
Average	3,033	9,964	6,931	228.5%	1,526	4,136	2,609	170.9%	1,277	5,014	3,737	292.7%	230	813	584	254.2%

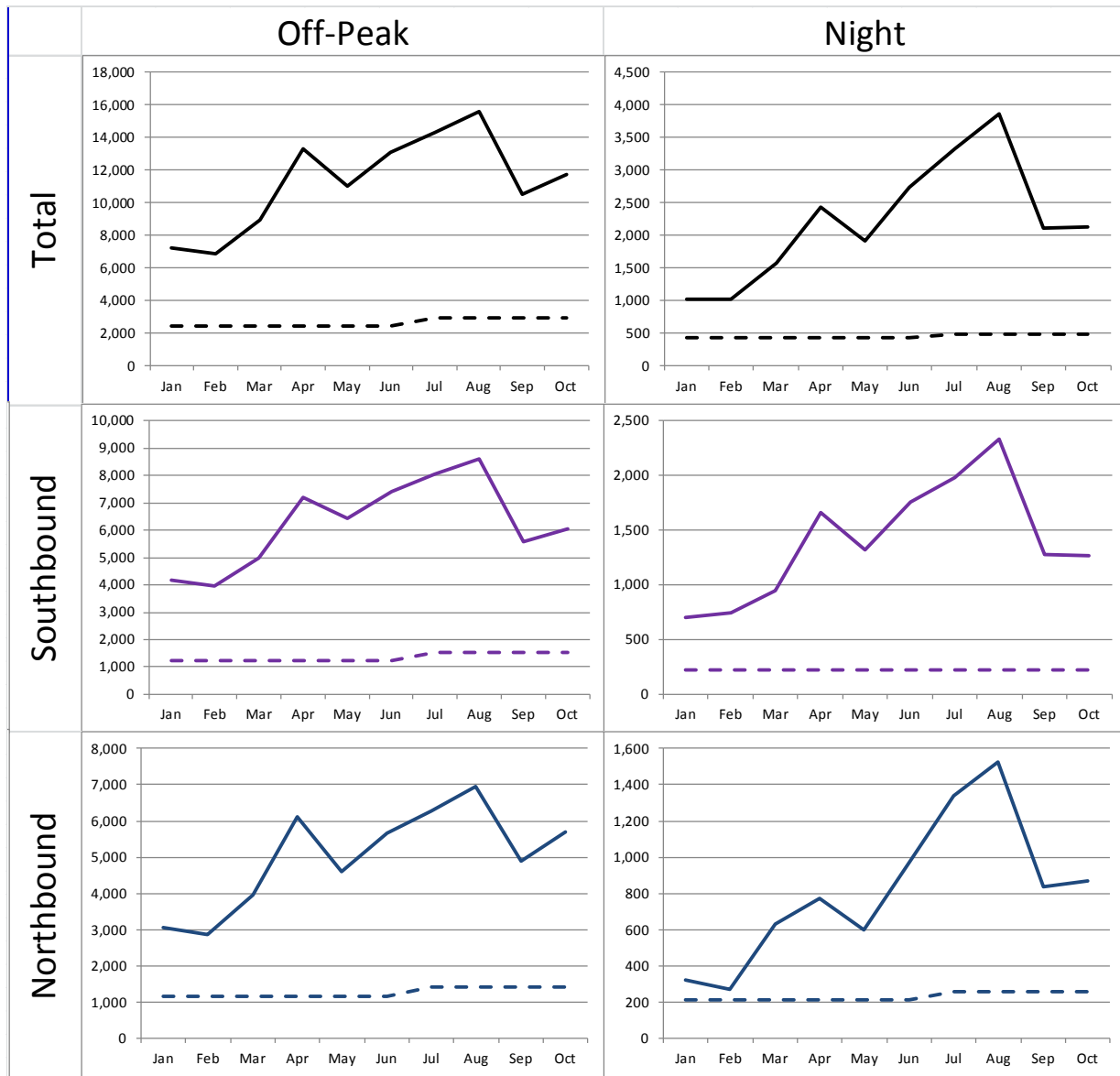
**Figure 2-9: ETL Weekend Traffic, Actual vs. Forecast, Total and Peak Period Traffic**

(Forecast is represented by dotted line)



**Figure 2-10: ETL Weekend Traffic, Actual vs. Forecast, Off-Peak and Night Period Traffic**

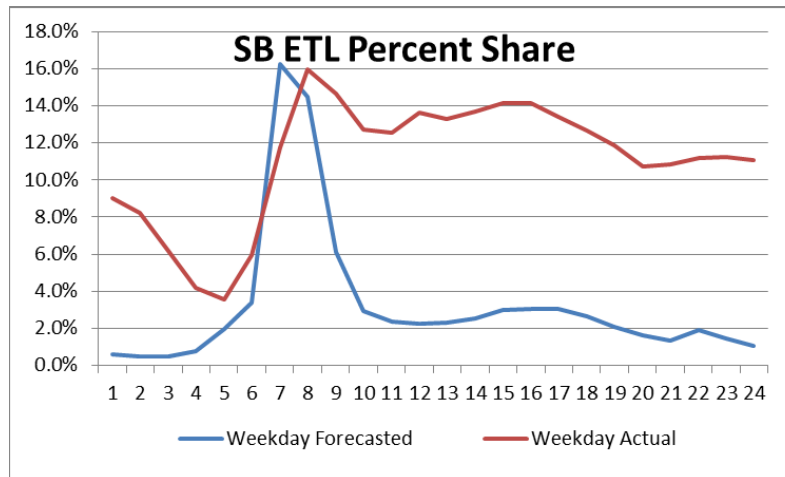
(Forecast is represented by dotted line)



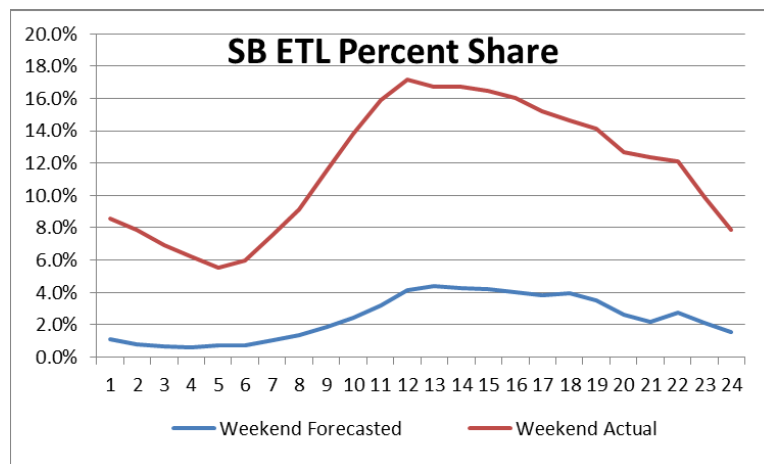
### 2.3 Estimated ETL Capture Rates

The capture rates of the ETLs show the estimated percentage of vehicles that are taking the ETLs as compared to the general purpose lanes. For this analysis general purpose lane traffic counts were not available so an estimate of general purpose lane traffic was used derived from previous analysis. With these counts the overall capture rate for the forecast and the actual traffic on the ETL was calculated. The following graphs present those capture rates by direction, day of week and hour. The results are very similar to the previous review of forecast to actual traffic with peak periods showing fairly close capture rates to forecast and off peak, quite a bit higher.

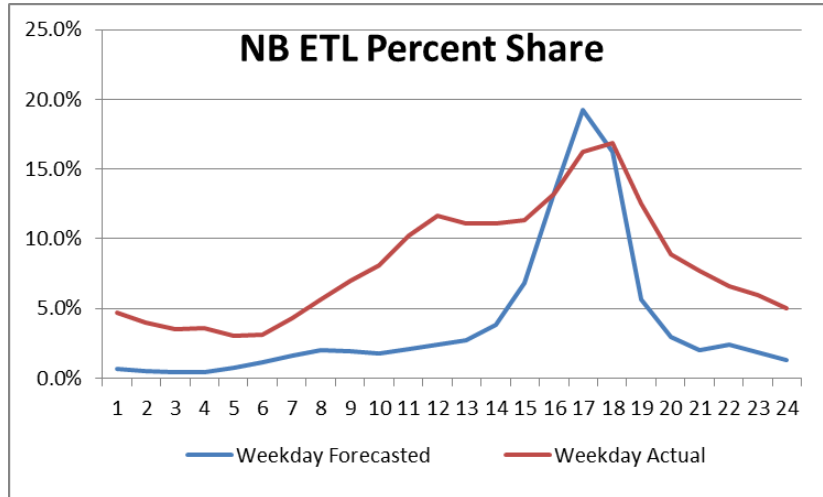
**Figure 2-11: Southbound ETL Percent Share – Weekday FY15**



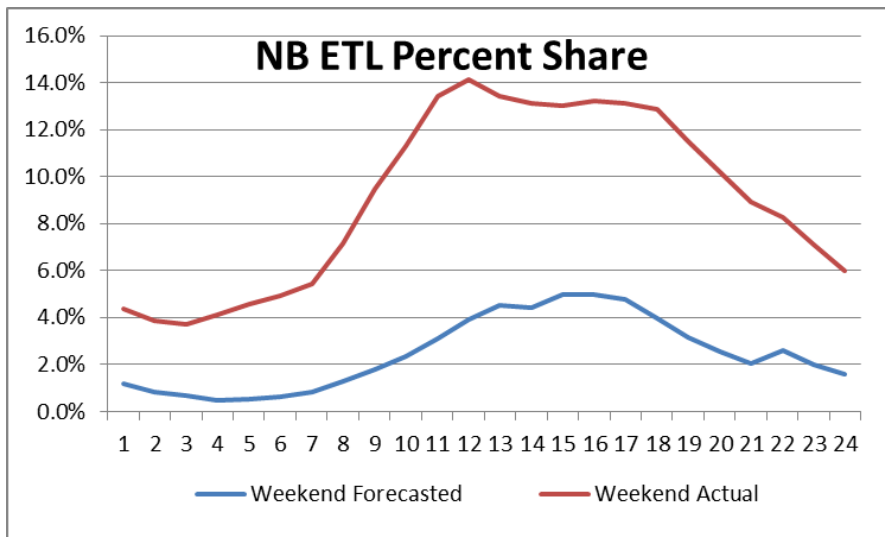
**Figure 2-12: Southbound ETL Percent Share – Weekend FY15**



**Figure 2-13: Northbound ETL Percent Share – Weekday FY15**



**Figure 2-14: Northbound ETL Percent Share – Weekend FY15**



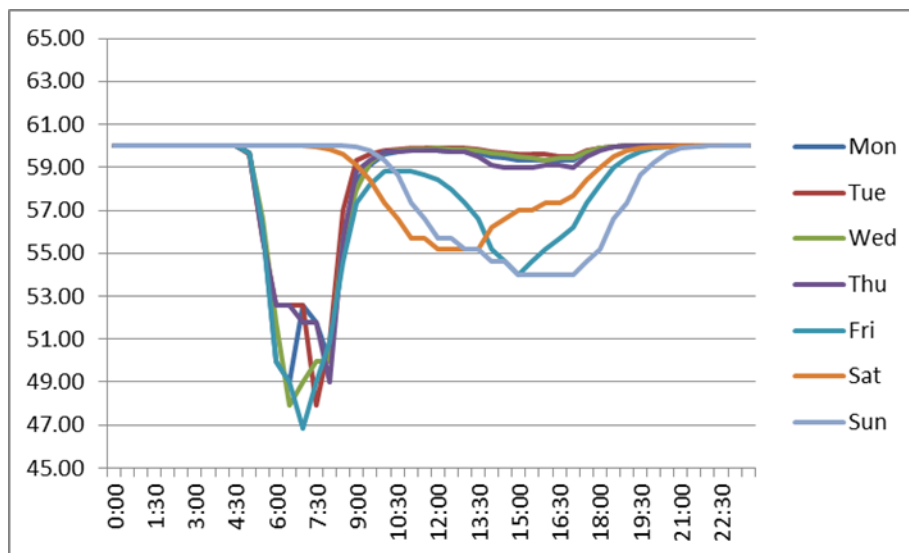
### 2.4 Speed Review

As was shown in the previous sections, the actual traffic in the ETLs exceeded forecasts. Since the forecasting models rely heavily on the relationship between the speeds on the ETLs and the GP lanes, a review was undertaken to compare the actual speeds to previously estimated speeds. The following figures show the forecasted speeds on the GP lanes by day of the week and hour of the day followed by the actual average speeds on those same days. The actual data includes data from January 2015 to June 2015. The ETL speeds were reviewed as well, showing speeds of 65 miles per hour (mph) or above at almost all times.

As can be seen from the graphs, actual speeds in the GP lanes were actually higher than forecasted. In the southbound direction, it was forecasted that speeds would be between 47 and 50 mph during the weekday AM peak. In reality those speeds were above 55 mph at all times. In the northbound direction forecasted speeds were in the same range, 47 to 50 mph, during the PM peak. Again, with the exception of Friday, the speeds were all well above 60 mph.

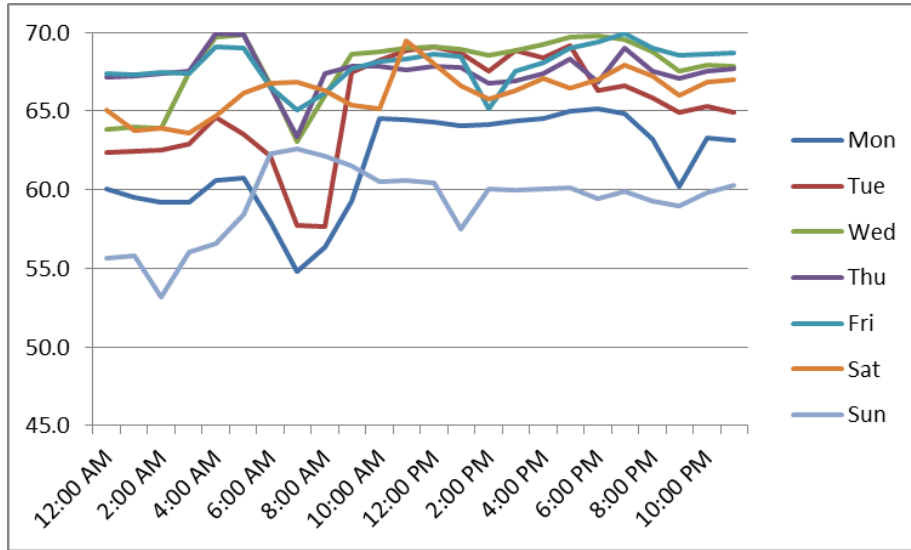
The actual speeds shown for FY15 are averages for each respective day. The distribution of those speeds were also reviewed to understand if motorists could expect to see excessive slowdowns every few days and thus plan for a travel time in the general purpose lane that was longer than actual results. Again, with the exception of the Friday northbound PM peak, the distributions were very tight around the average with very few exceptions. It is apparent that travel time savings is limited at this point. Even the possibility of delay appears to be rather limited based on the data reviewed.

**Figure 2-15: Southbound General Purpose Lane Speeds – Forecasted**

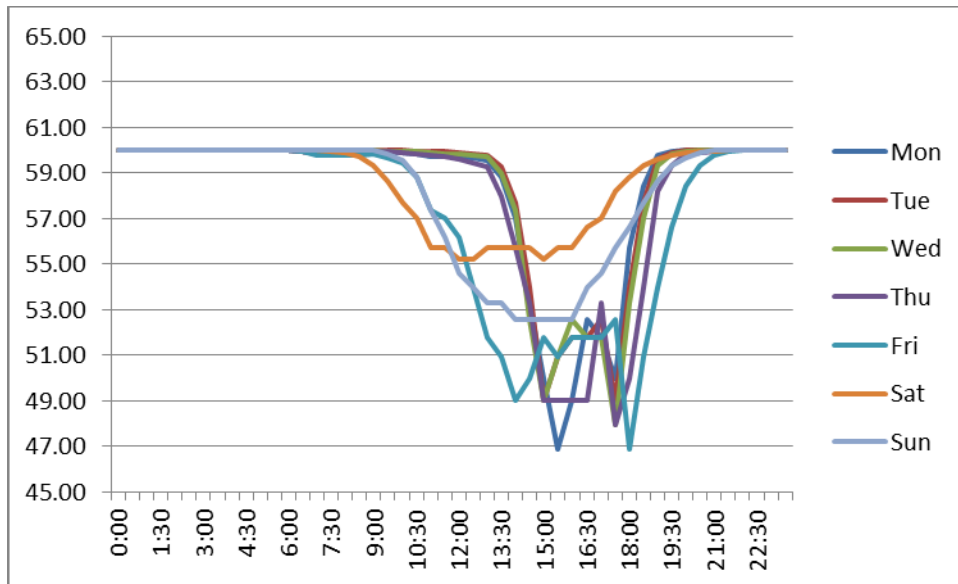




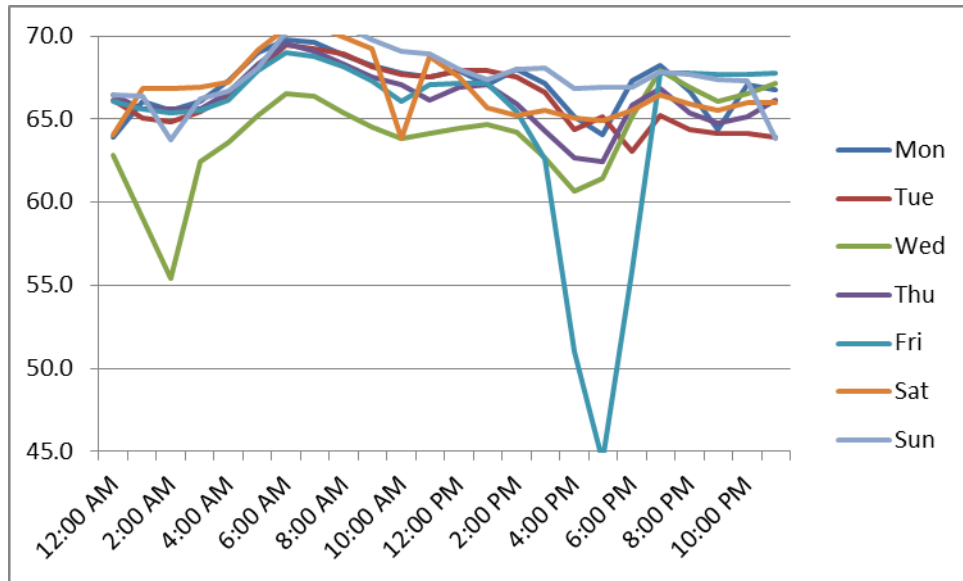
**Figure 2-16: Southbound General Purpose Lane Speeds – Actual**



**Figure 2-17: Northbound General Purpose Lane Speeds - Forecasted**



**Figure 2-18: Northbound General Purpose Lane Speeds - Actual**

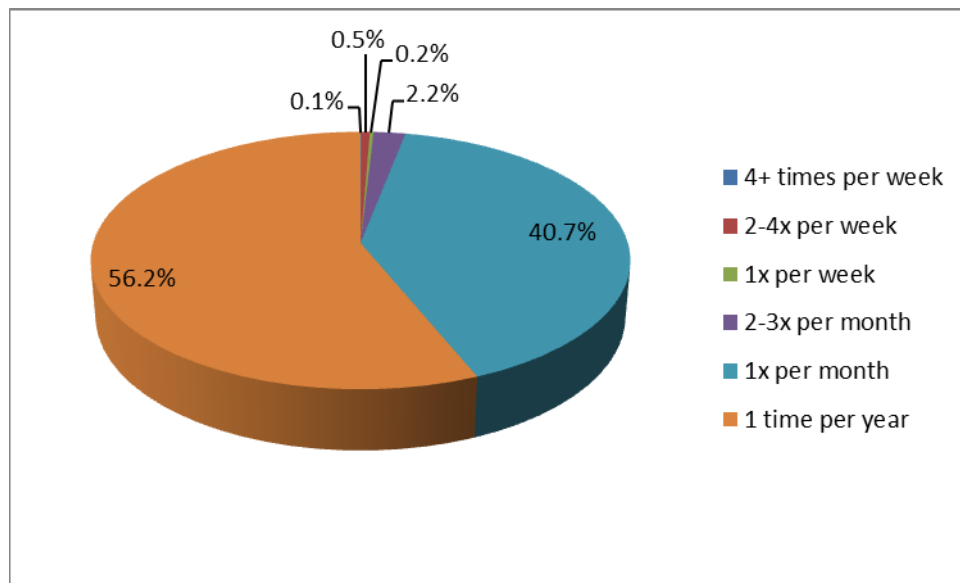


**2.5 Frequency of Use**

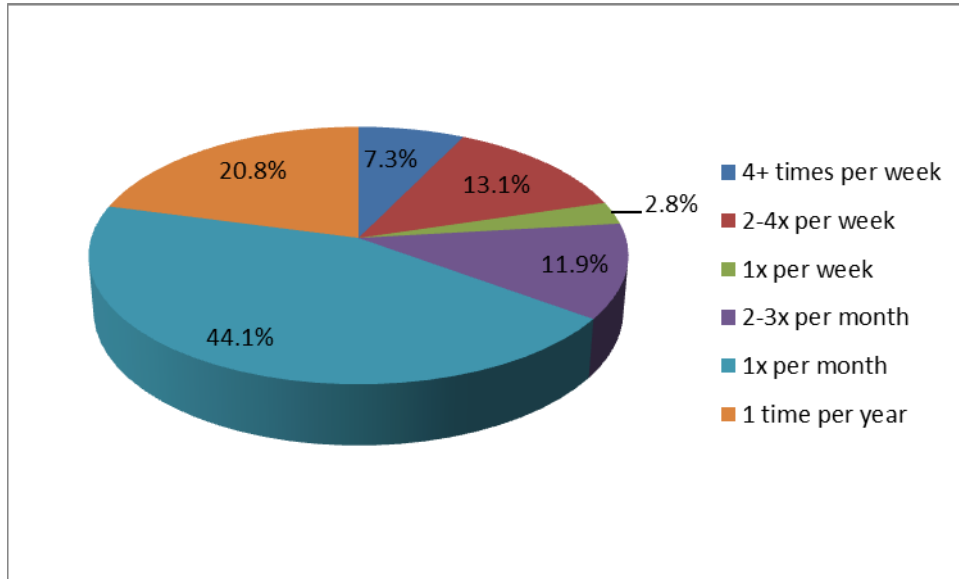
While the forecast had no explicit frequency of use assumed, this metric was reviewed to understand the potential sustainability of usage of the ETLs as motorists become more familiar with the relative benefits. For this analysis the frequency of usage was calculated for the full 9 months of data (January 2015 to September 2015) and then expanded based upon the preceding to an estimate full year frequency. Then the frequency data for the Baltimore Harbor Tunnel, Fort McHenry Tunnel and JFK Memorial highway were reviewed to understand the total number of unique people/motorists in the corridor. With this knowledge, the estimated number of unique motorists each year on I-95 adjacent to the ETLs can be estimated to be included in the analysis of when motorists in the corridor will become familiar with ETLs (i.e. encounter the ETLs for the second or more time) and therefore make decisions based on time savings and not unfamiliarity.

The following figures and tables present the estimated frequency of use for 9 months and then for one year with the extrapolation process.

**Figure 2-19: ETL Frequency of Use - People – 9 Months**



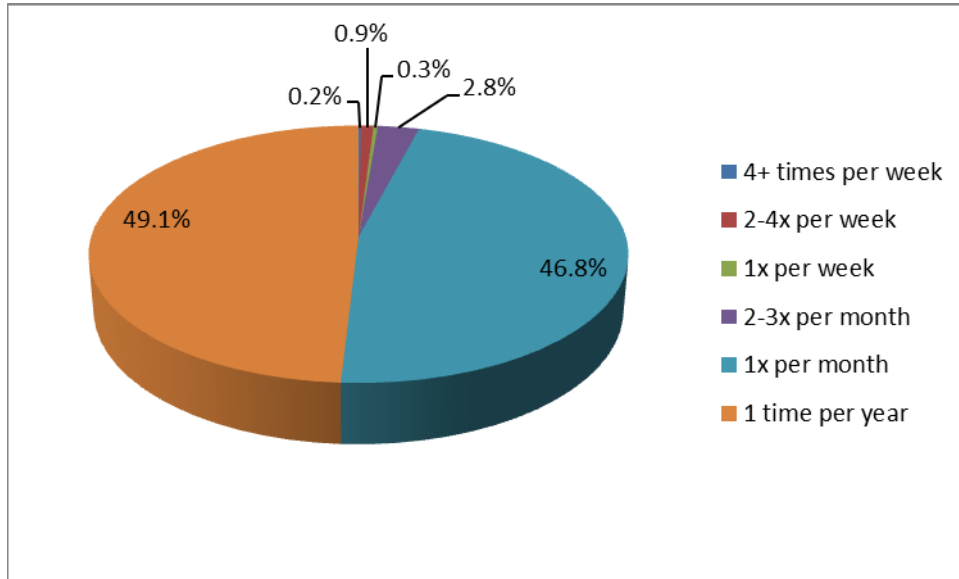
**Figure 2-20: ETL Frequency of Use - Trips – 9 Months**



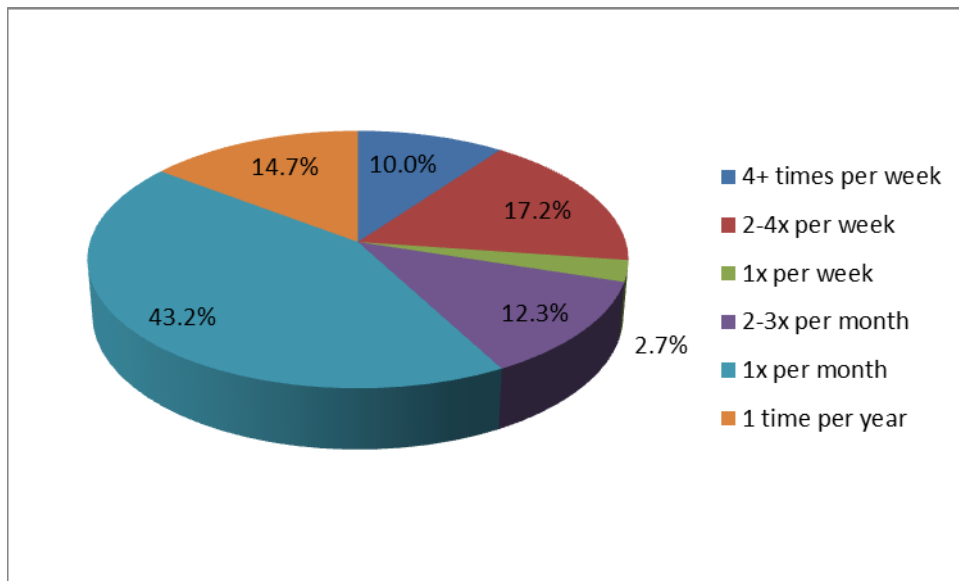
**Table 2-3: ETL Frequency of Use – 9 Months**

Frequency	People	Trips	People	Trips
4+ times per week	1,836	371,901	0.1%	7.3%
2-4x per week	10,271	670,690	0.5%	13.1%
1x per week	4,735	144,585	0.2%	2.8%
2-3x per month	41,216	609,192	2.2%	11.9%
1x per month	773,914	2,261,100	40.7%	44.1%
1 time per year	1,068,664	1,068,664	56.2%	20.8%
Total	1,900,636	5,126,132	100.0%	100.0%

**Figure 2-21: ETL Frequency of Use - People – Estimated Annually**



**Figure 2-22: ETL Frequency of Use – Trips – Estimated Annually**



**Table 2-4: ETL Frequency of Use – Estimated Annually**

Frequency	People	Trips	People	Trips
4+ times per week	3,545	718,164	0.2%	10.0%
2-4x per week	18,346	1,234,307	0.9%	17.2%
1x per week	6,273	191,209	0.3%	2.7%
2-3x per month	60,180	878,937	2.8%	12.3%
1x per month	1,001,161	3,093,208	46.8%	43.2%
1 time per year	1,050,494	1,050,494	49.1%	14.7%
Total	2,140,000	7,166,319	100.0%	100.0%

As shown, the vast majority of people using the ETLs and even trips on the ETL are from motorists who use it one time or less per month. It is estimated that some 97 percent of the people using the ETLs use it once a month or less. These motorists make up about 58 percent of the trips. It may be unwise to assume that these very occasional users would continue to use the facility as they become more familiar with the corridor. Furthermore, the remaining 88,000 motorists (frequent users) that make up the remaining 42 percent of trips, are estimated to be 1.5 percent of the total people in the corridor. The inability to predict the decisions of a very small selection of the population (frequent users) coupled with large usage of the facility by non-repeat customers (infrequent users) provides reasons for conservatism in the forecast going forward.

With these data and previous frequency data for the BHT, FMT and JFK motorists, it is estimated that the total number of unique motorists in the I-95 corridor each year adjacent to the ETLs is approximately 4 million. It is estimated that during the first year of operation the ETLs will encounter approximately 2M unique users. Each year, new users will of course enter the corridor; therefore the forecast extends the time for removal of unfamiliar motorists from the ETLs and keeps a portion of the lanes filled with those motorists who choose the lanes for a number of reasons that are outside of time savings. A more detailed list of these reasons and the cause for such decision making is provided in a subsequent section of this documentation.

**2.6 Possible Reasons for ETL Usage Apart from Time Savings**

During the course of the analysis we 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. The high level of one time users 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 fully dependent upon travel time savings and not curiosity, unfamiliarity or the like.

**Table 2-5: 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

### 3. Economic Review

In this section major economic factors that drive traffic growth in the corridor are reviewed, specifically with regard to how these metrics have changed since the original forecast was developed in 2013. The purpose for this review is to understand if there were any sizable shifts in growth that we did not account for in the original forecast. It appears that through the various metrics of population, employment, unemployment rate, and output, the region is growing but not substantially different than it was assumed for the original analysis.

**Table 3-1: Maryland Population Projections**

Year	Mar 2012 Projections	Jul 2014 Projections	Difference	% Difference
2015	5,962,000	6,010,141	48,141	0.8%
2020	6,216,150	6,224,511	8,361	0.1%
2025	6,428,250	6,429,749	1,499	0.0%
2030	6,611,900	6,612,191	291	0.0%
2040	6,861,900	6,889,692	27,792	0.4%
CAGR	0.6%	0.5%	NA	NA

Source: Maryland Department of Planning, Planning Data Services, March 2012 and July 2014

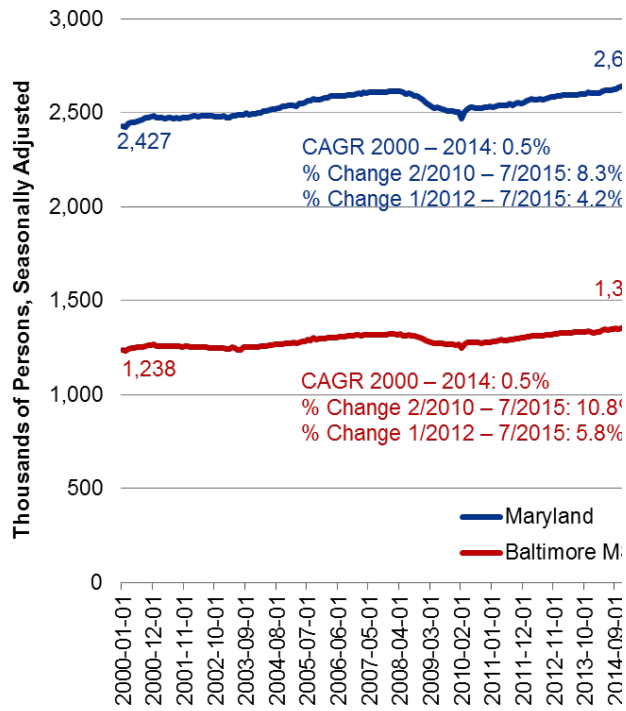
**Table 3-2: Baltimore Region Population Projections**

Year	Mar 2012 Projections	Jan 2015 Projections	Difference	% Difference
2015	2,725,650	2,746,250	20,600	0.8%
2020	2,816,250	2,827,890	11,640	0.4%
2025	2,875,500	2,885,650	10,150	0.4%
2030	2,919,450	2,933,500	14,050	0.5%
2040	2,973,600	3,014,900	41,300	1.4%
CAGR	0.3%	0.4%	NA	NA

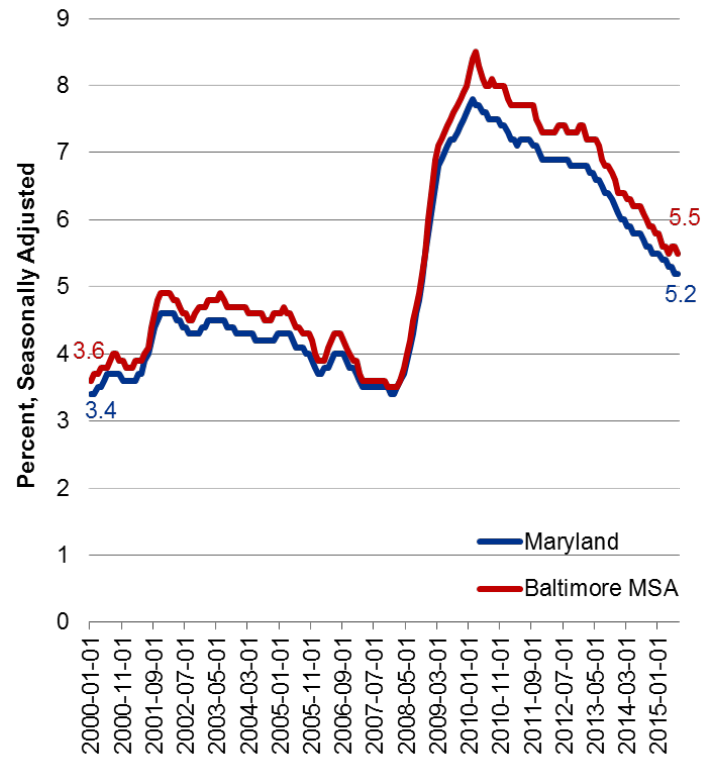
Source: Maryland Department of Planning, Planning Data Services, March 2012 and January 2015



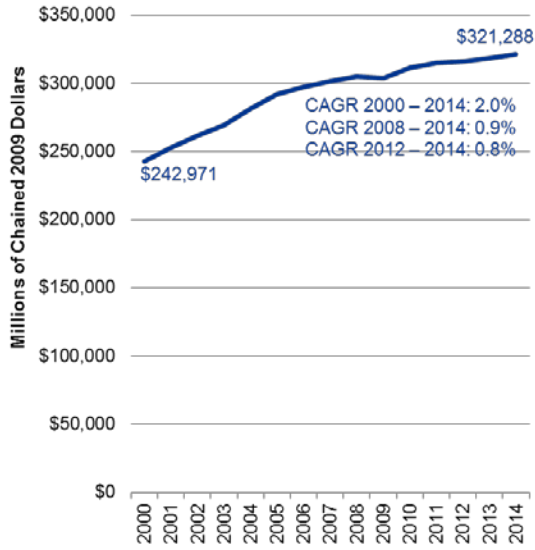
**Figure 3-1: Non-Farm Employment**



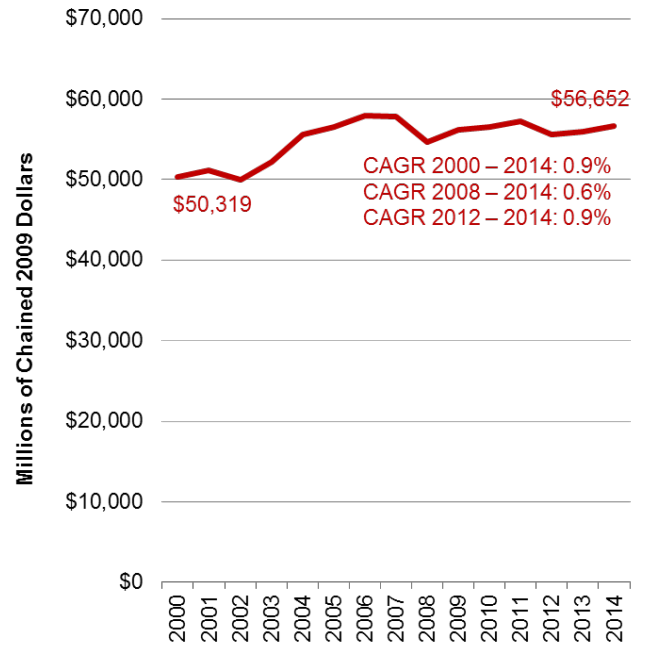
**Figure 3-2: Unemployment Rate**



**Figure 3-3: Real Maryland GDP**



**Figure 3-4: Real Delaware GDP**



**4. Traffic and Revenue Forecasts**

From the review of the performance of the first few months of the I-95 ETLs it is clear that actual usage is far outpacing the previous forecast. However, it is estimated that 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 three 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 than previously anticipated throughout the forecast.

The forecast assumes the current toll schedule will be in place through 2025. The estimates of traffic and toll revenue are provided in the following table. The estimates for FY2015 are actual results, as noted. The forecast assumes decline in traffic from FY16 to FY17 and onto FY18, as users become familiar with the corridor. At that point the traffic and toll revenue are estimated to grow based on increasing congestion in the corridor.

**Table 4-1: I-95 ETL Traffic and Toll Revenue Estimates**

Annual T&R Estimates for I-95 Express Toll Lanes		
Fiscal Year	Traffic	Toll Revenue
2015	3,945,633	\$6,145,709
2016	7,500,000	\$9,100,000
2017	6,900,000	\$8,400,000
2018	6,400,000	\$7,800,000
2019	6,600,000	\$8,100,000
2020	7,000,000	\$8,600,000
2021	7,200,000	\$8,800,000
2022	7,300,000	\$8,900,000
2023	7,600,000	\$9,300,000
2024	8,100,000	\$9,800,000
2025	8,300,000	\$10,000,000

\*FY2015 are actual results

## **5. 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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