Appendix A

Traffic Studies

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APPENDIX A: Traffic Studies

Traffic studies are referenced in this Environmental Assessment (EA) to support the need for proposed projects, as well as to analyze impacts to traffic. Recent (2016) studies were completed to analyze traffic conditions on the airport loop road and identified the need for improvements to reduce existing and future congestion. An off-airport traffic analysis was completed as part of this EA to analyze the existing and future conditions of the intersections around the Airport, including impacts resulting from EA project development.

The following traffic studies are included in this appendix:

- Attachment 1: *Draft Traffic Analysis Study - BWI Marshall Lower Level Inbound Roadway Study*, AECOM and JMT, MAA-AE-14-002 (August 31, 2016).
- Attachment 2: *Draft Traffic Analysis Study - BWI Marshall International Concourse Roadway Widening Study*, AECOM and JMT, MAA-AE-14-006 (July 29, 2016).
- Attachment 3: *BWI Marshall Airport EA – Updated Draft Traffic Impact Study*, HNTB (December 2018).
- Attachment 4: Maryland State Highway Administration (SHA) and Anne Arundel County Correspondence (Meeting Minutes, Comments, and Responses)
    - July 16, 2015 – Anne Arundel County/MAA Meeting Minutes
    - September 4, 2015 – SHA/MAA Meeting Minutes
    - February 29, 2016 – SHA Comments on BWI EA Traffic Analysis – Existing Conditions Report
    - March 3, 2016 – Anne Arundel County Comments on BWI EA Traffic Analysis – Existing Conditions Report
    - July 11, 2017 – Response to SHA and Anne Arundel County Comments on Traffic Impact Study (existing, no-action and proposed action)

Attachment 1:

Draft Traffic Analysis Study

BWI Marshall Lower Level Inbound Roadway Study

(AECOM and JMT, MAA-AE-14-002)

August 31, 2016

Traffic Analysis Study – Draft Report

AECOM Task No.013

MAA-AE-14-002

BWI Marshall Lower Level Inbound Roadway Study

BALTIMORE/WASHINGTON INTERNATIONAL
BWI®
THURGOOD MARSHALL AIRPORT

Prepared By:

AECOM

And

JMT®
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®

MARYLAND DEPARTMENT OF TRANSPORTATION

MARYLAND AVIATION ADMINISTRATION

August 31, 2016

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APPENDIX

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I. EXECUTIVE SUMMARY

The initial goal of the Lower Level Inbound Roadway Study was to evaluate roadway widening on the I-195 inbound roadway in order to alleviate peak hour congestion. Five alternates were analyzed using traffic volumes, vehicle dwell times, and recent field observation calibration targets. The build conditions for all alternates include the proposed hotel and hotel access roadways. The five alternates and their estimated construction costs are:

- Alternative 1 – Widen the inbounds roadway towards the right side of the roadway to create three continuous lanes from the taxi/bus staging area to the departures level ramp. Approximate cost - $1 – 1.5 million.

- Alternative 2 Option 1– Widen the inbounds roadway towards the left side of the roadway to create an auxiliary lane for the Terminal Return Road inbound roadway. The Terminal Return Road will remain as one lane to align with the Hourly Garage entrance. Approximate cost - $3 – 4 million.

- Alternative 2 Option 2 –Widen the inbounds roadway towards the left side of the roadway to eliminate the left lane drop on Terminal Return Road. The auxiliary lane will connect to the Hourly Garage entrance. Approximate cost - $3 – 4 million.

- Alternative 3 – Remove and restripe the median at the Hourly Garage exit to provide extended access to the *Express Exit Lane*. This alternative will also restripe the Arrivals Level right lane to allow for earlier access into the *Authorized Vehicles Only* lanes. Approximate cost - $200,000

- Alternative 4 – This is a combination of Alternative 2 Option 2 and Alternative 3. The roadway will be widened towards the left side and the Arrivals Level right lane will be restriped to allow for earlier access into the *Authorized Vehicles Only* lanes. Approximate cost - $3 – 5 million.

- Alternative 5 – This is a combination of Alternative 1 and Alternative 4. The inbounds roadway will be widened to both the left and right sides to provide additional access to the *Express Exit Lane* and the Departures Level. Approximate cost - $4 – 5 million.

Traffic analysis of all five roadway widening alternates showed that they provide only modest short term improvements. The alternates presented can reduce que lengths for Terminal Return Road, the I-195 approach road, or both, but will not address the inbound bottleneck caused by inadequate curbside pickup length along Concourse A and B. Any reduced queue lengths from the alternates are gained by a redistribution of the queue. While the queue length may be shortened, the number of vehicles in the queue will not significantly change. Furthermore, the reduction of queue length that is shown in 22 MAP will no longer be viable at 30 MAP. All alternates will break down at 30 MAP regardless of the queue distribution.

After the build condition traffic analysis showed that the five alternates will not provide significant improvements, the Offices of Planning, Landside Operations, and Ground Transportation and Parking convened to discuss a range of operational and capital improvements that will lessen terminal approach roadway and lower level curb congestion being experienced on an increasing basis.

The late 1990s terminal roadway and curb design was based on a more equal distribution of passengers throughout the terminal. With the 2011 acquisition of AirTran, Southwest Airlines now discharges approximately 70% of the total peak period arriving passengers onto approximately 20% of the total available lower level curbside. More specifically, the Terminal A/B lower level vestibule doors #2, 3 and 4 provide the easiest and most direct exit from the Southwest baggage claim hall, resulting in a massing of passenger pick-ups on the outer public curb directly opposite from these three doors.

Congestion at the lower level curb can result in a 20 – 40 minute traffic back-up along the inbound roadway approach to the terminal, sometimes extending to the I-195/MD 170 interchange and beyond during evening peak period arrivals. The observed congestion has been most prevalent between 8:30pm and 10:30pm on Friday and Sunday evenings. When traffic backs up on the terminal approach roadway, both upper and lower level traffic destined for the terminal is affected.

The recommended improvements have been developed to help us achieve the following three goals:

1. **Reduce traffic volume destined for the lower level curb**;
2. **Spread the traffic from the A/B bag claim area to less used, but adjacent curbside areas**;
3. **Reduce the vehicle dwell time at the Terminal A/B curb areas**.

The recommended improvements that follow are grouped in two basic categories, **1. -Operational Improvements**; and **2. - Capital Improvements:**

<u>Operational Improvements:</u>

1. Reduce the number of taxis allowed to access the curb at one time. Approximate cost – Minimal for signage relocation. This is a contractual item between Operations and the Taxi Provider and no operational or capital construction costs are anticipated except for sign relocations.

2. Maintain improved lower level lighting – MAA Maintenance to verify all LED light bulbs are functioning properly. No additional cost beyond regular maintenance activities.

3. Reduce the length of the Terminal A lower level curb reserved for MTA buses, hotel shuttles, police staging and traffic cones to create a longer contiguous Terminal A/B public curbside – there is 410 feet of underutilized curb prior to vestibule door #2 that could be made more available for passenger pick-up to help alleviate the congestion across from doors #2, 3 and 4. Approximate cost of reducing length by relocating MTA Bus Stop is shown in Item Number 4.

4. Examine and consider the feasibility of relocating the MTA bus stop from the Terminal A curb to another lower level location – this would recapture almost 100 feet of curb to spread the congestion at doors #2, 3 and 4. **Approximate cost - $195,000 for bus shelter and signage relocation;**

5. Create a free cell phone application that shows flight arrival and baggage carousel arrival times. **Approximate cost - $100,000.***

   * Cost was estimated from experience with an app RFP that provided estimates from $50,000 - $75,000; this has been rounded to $100,000 based on integration of different data sources.

6. Install sequential column numbers on the lower level structural columns to encourage dispersion of passenger pickup, and install a sign in the cell phone lot indicating pick-up zones to increase public awareness of zone system – **approximate cost $195,000**. Also, install (easel type?) signs on top of bag claim belts 1 through 5 indicating column numbers where passengers should meet their vehicles to spread passengers along the curb, reduce congestion and shape passenger behavior - the goal being passengers will call their ride and say, “pick me up at column #__”. Easel signs are produced in-house and would not have significant cost. Combined with passenger education, these measures would help spread lower level curbside congestion away from vestibule doors #2, 3 and 4;

7. Encourage all airline passengers with no bags to be picked up on the upper level. Encourage Southwest utilization of Bag Claim units 6 and 7 in the B/C zone to disperse Southwest arriving passenger vehicle pick-ups – this would help spread the vehicle congestion away from doors #2, 3 and 4. **Approximate cost – $230,000**. Cost includes 4 wayfinding VMS signs inside the terminal building, terminal announcements, website information, etc. to modify passenger behavior and reduce number of lower level pick-ups. Terminal announcements and website improvements are assumed to have no additional costs.

8. Increase curb dwell time enforcement (primarily between 8pm and 11pm) through MdTA and curbside management services– reduction in dwell time from an observed average of approximately 2.5 minutes to approximately 1.5 minutes or lower during peak evening arrivals should greatly reduce vehicle congestion on the terminal roadway approach. **Cost of contracted curbside management support could range between $500,000 - $1M annually, depending upon the service offerings engaged by MAA**.

9. Institute a per-trip fee for private commercial vehicle (hotel and off-site parking shuttles, etc.) curbside access – this could help reduce vehicle trips on the terminal approach roadway and lower level curb. Approximate cost assumed to be administered by BWI Marshall Ground Transportation and Parking hiring a third party vendor (curbside management services, as mentioned earlier) to finance and operate equipment as well as administer fee collection and enforcement. **Installation is expected to be cost-neutral assuming the contractor will be paid through the generated per-trip fees**.

Capital Improvements:

1. Restripe the existing "wide lane" adjacent to the lower level public curb to provide a dedicated lane for the curb, and enforce lane position and dwell time with resources identified in #2 above – this will reduce the number of vehicles that extend across more than one lane at the curb during passenger pick-up, and provide improved vehicular flow. **Approximate cost - $55,000**;

2. Construct lower level "commercial curb slot project" (currently in Design) – this will provide authorized vehicles (shuttle buses, taxis, etc.) with additional dedicated roadway length to access the lower level inner commercial curb. **Approximate cost - $410,000**;

3. Relocate cell phone lot to existing taxi staging area to provide more convenient access, and relocate taxis to another location. **Approximate cost – $1.2 Million** includes relocating taxi administration buildings with restrooms, paving and striping in both locations.

4. Install variable message signs in strategic locations to alert passenger vehicles of congestion, with alternate directions. See the **BWI Thurgood Marshall Airport Roadways Electronic Signage Replacement Study MAA–AE-14-003** for additional information. The design of this project is ongoing but not funded for construction. **Approximate cost - $1.9 Million to $5.0 Million;**

Additional measures to be considered after further evaluation:

1. Free 30 minute parking in the Hourly Garage between 8pm and 11pm to remove vehicles from lower level roadway congestion.

2. Tear down and rebuild the Hourly Garage with a Ground Transportation Center on the first floor.

3. Construct a "Triple Curb" on the Lower Level to function as a Ground Transportation Center.

4. Construct an Automated People Mover system to reduce MAA bus trips to the curbside.

5. Provide separate roadway and curbside access to future Concourse F.

	Vehicles per Hour Required to be Removed from Queue (A)	**Higher Utilization of Curbside C** 1. *Cell Phone Application* 2. *Paint Column Numbers* 3. *Bag Claim Units 6,7* 4. *Install VMS*		Remaining Vehicles Required to be Removed from Queue (A-B=C)	**Reclaim Initial Curbside at Terminal A** 1. *Relocate MTA Bus Stop*		Remaining Vehicles Required to be Removed from Queue (C-D=E)	**Maximize Dwell Time at 2.5 minutes** 1. *Enforcement* 2. *Transportation Management Personnel*		Remaining Vehicles to be Removed from Queue (E-F=G)
		Vehicles Removed (B)	Cost		Vehicles Removed (D)	Cost		Vehicles Removed (F)	Cost	
22 MAP	200-225	75-150	1. $100,000 2. $195,000 3. $0 4. $1.9M - $5.0M	100-150	125-225	1. $195,000	0-25	50-75	1. $0 2. $500,000 - $1M annually	**0**
30 MAP	350-375	125-150		200-250	125-225		0-125	50-75		0-75

	Vehicles per Hour Required to be Removed from Queue (H)	**Remove Shuttles / Buses from Curb** 1. *Triple Curb* *OR* 2. *Ground Transportation Center*		Remaining Vehicles Required to be Removed from Queue (H-I=J)
		Vehicles Removed (I)	Cost	
30 MAP	50-75*	75-100	TBD	**0**

II. INTRODUCTION

Maryland Aviation Administration (MAA) has requested a study be performed to identify options to improve inbound traffic operations during peak demand periods at Baltimore/Washington Thurgood Marshall International Airport (BWI Marshall). The emphasis of the study is on vehicle operations at the Terminal and to evaluate proposed alternative improvements. The primary objectives of this study are:

- Perform field observations and document any notable observed operational issues, especially Lower Level curbside pickup operations
- Create calibrated VISSIM model of the existing conditions and all alternates studied with 15 minute vehicle input resolution
- Analyze proposed improvements and compare changes in Measure of Effectiveness (MOEs)
- Include proposed airport hotel traffic as part of the VISSIM model
- Provide recommendations for improvements

Data collection for roadway counts, video recordings, and vehicle queuing observations was performed during the summer of 2014 as part of the AECOM task MAA-AE-14-006 Curbside Study.

This study also includes proposed roadway improvements for the proposed airport hotel. These improvements will be located at the existing employee surface parking lot adjacent to the Hourly Garage.

A. Existing Conditions

There are two major inbound roadways into BWI Marshall Airport: I-195 southbound and the Terminal Return Road. I-195 has a posted speed limit of 45 mph approximately 1,000 feet north of the MD 170 overpass, which reduces to a 30 mph speed limit starting at the BWI taxi and bus standing area entrance and exit. The airport *Arrivals Roadway* speed limit further reduces to a 15 mph speed limit at the entrance to the arrivals curbside as shown in Figure 1.

The inbound roadway splits into three roadways just prior to the entrance to the arrivals level curbside. At this split, motorists have options to exit to the left onto the *Express Exit* roadway; exit to the right to the Commercial curbside roadway (*Authorized Vehicles Only*) or stay on the mainline roadway for access to the arrivals curbside. Table 1 below shows the vehicle distribution to the three Lower Level roadways.

Table 1: Lower Level Authorized Vehicles Only, Arrivals, and Express Exit Roadway Vehicle Distribution

Express Exit	Arrivals Roadway	Authorized Vehicles Only
Passenger Cars Overheight Vehicles	Passenger Cars MTA Buses Hotel Shuttles Private Taxis Off-site Parking Shuttles: - Preflight - Econopark - FastPark and FastPark 2 - Park & Fly	BWI Buses/Shuttles: - Long Term A - Long Term B - Express - Daily - AMTRAK - Rental Car BWI Taxis & Limos Super Shuttles

The *Express Exit Roadway* is used by passenger cars as an express exit from the arrivals roadway. There are two access points to the *Express Exit Roadway* from the arrivals roadway. The access points are located directly in front of Concourse C and are spaced approximately 500 feet apart. Overheight vehicles also use the *Express Exit Roadway* to bypass the arrivals roadway.

The *Authorized Vehicle Only* roadway has one travel lane and one parking lane allowing buses, shuttles, and taxis to load passengers or to stage. The *Arrivals Roadway* has two travel lanes with one striped parking lane wide enough (~20 feet) to allow for double parking without impeding traffic in the two travel lanes. The *Express Exit* roadway is one lane except where two lanes merge at the access points from arrivals roadway.

Figure 1: BWI Marshall Airport Arrivals Roadway

The BWI Marshall Arrivals Roadway is below the Departures Roadway for approximately 2,200 feet. Within the Arrivals roadway, there is approximately 410 feet designated as a parking area for MTA buses, hotel shuttles, and police cars near the Arrivals roadway entrance.

BWI Marshall Airport has a bus/shuttle and taxi staging area located along the terminal inbound roadway where buses and taxis are staged. All returning BWI taxis must re-enter the staging area before they are called to the Arrivals queue by ushers located near Doors 5 and 13.

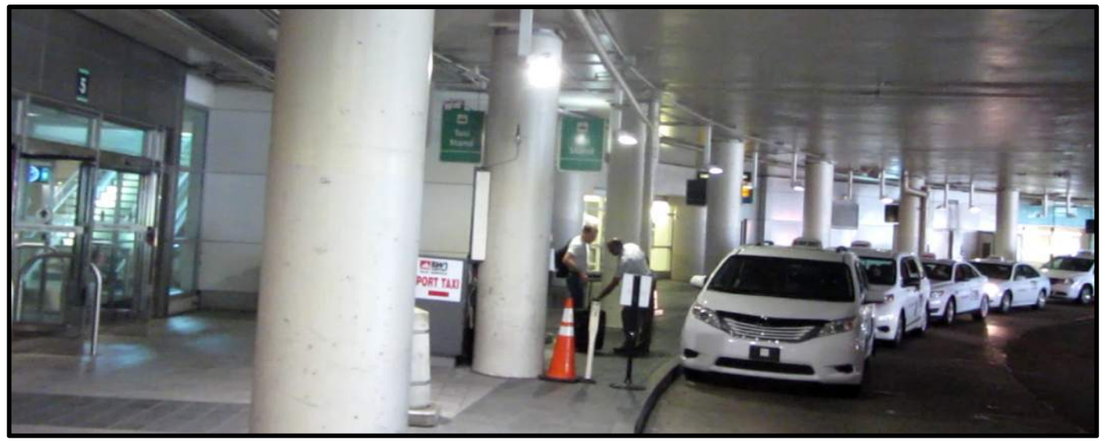
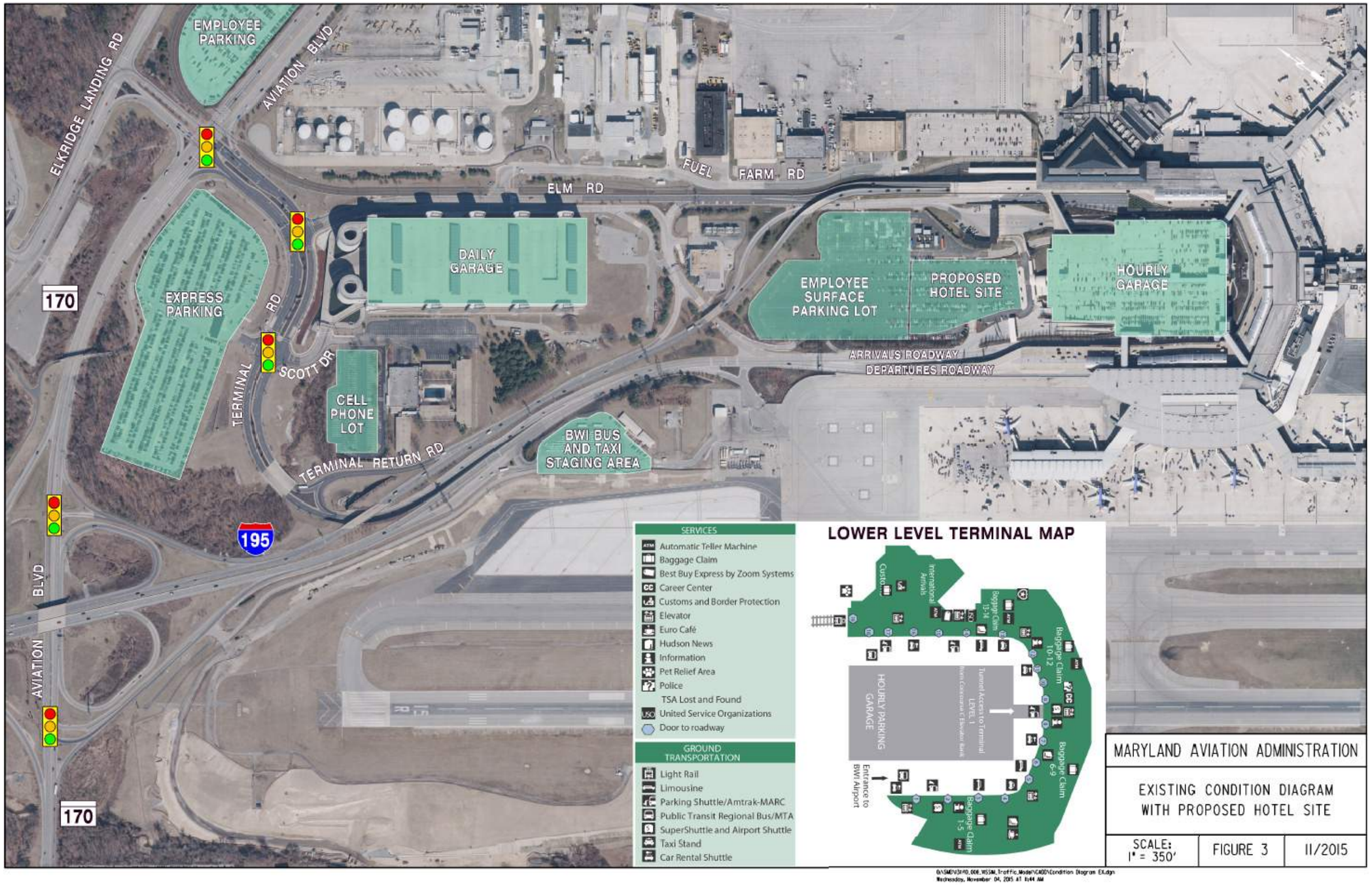


Figure 2: BWI Marshall Taxi Staging Area at Door 5

An existing condition diagram of the airport roadway network with the location of the proposed hotel site is shown in Figure 3.

Figure 3: BWI Marshall Airport Existing Condition Diagram



B. Arrivals Curbside Traffic Observations

Several video cameras were setup along the Arrivals Roadway to record intervals of data during three separate weeks. Attached in Appendix 1a, 1b, and 1c are figures showing the camera locations for each week of recording. Observations were performed during the peak period for the Arrivals Roadway on Friday evening when volumes are the highest and queues are the longest. The peak period was from 8:30 PM to 10:30 PM. Traffic observations were performed on I-195, the Terminal Return Road inbound roadway, and on the Arrivals Roadway. Looking at driver behavior in Figure 4, comparing video recordings on August 1, 2014 (Week 2) at Site 1 and Site 9 (approximately 780 feet downstream from site 1), drivers are observed to slow down significantly and increase their headway from leading vehicles at Site 1. Along the Lower Level roadway drivers begin to search and take the first available parking along the loading and unloading lane as observed at Site 9.

Figure 4: Video Recordings (Friday. August 1, 2014. 8:33PM) at Site 9 (Left) and Site 1 (Right)

Additional video observations on July 11, 2014 (Week 1) at Site 3 and Site 6 (approximately 2,200 feet downstream from Site 3) in Figure 5 shows clearer evidence of vehicles queuing bumper-to-bumper upstream from the MTA bus stop and hotel shuttle loading area while vehicles dissipate further downstream.

Figure 5: Video Recordings (Friday. July 11, 2014. 9:34PM) at Site 3 (Left) and Site 6 (Right)

It is believed part of the reason for this significant change in driver behavior as vehicles approach the coned police vehicle area is the presence of a police car which often times has its red lights flashing. The increase in vehicle headway and reduction in traffic flow speed reduce the overall capacity of the Arrivals roadway, causing a queue to form.

C. Arrivals Level Traffic Operations

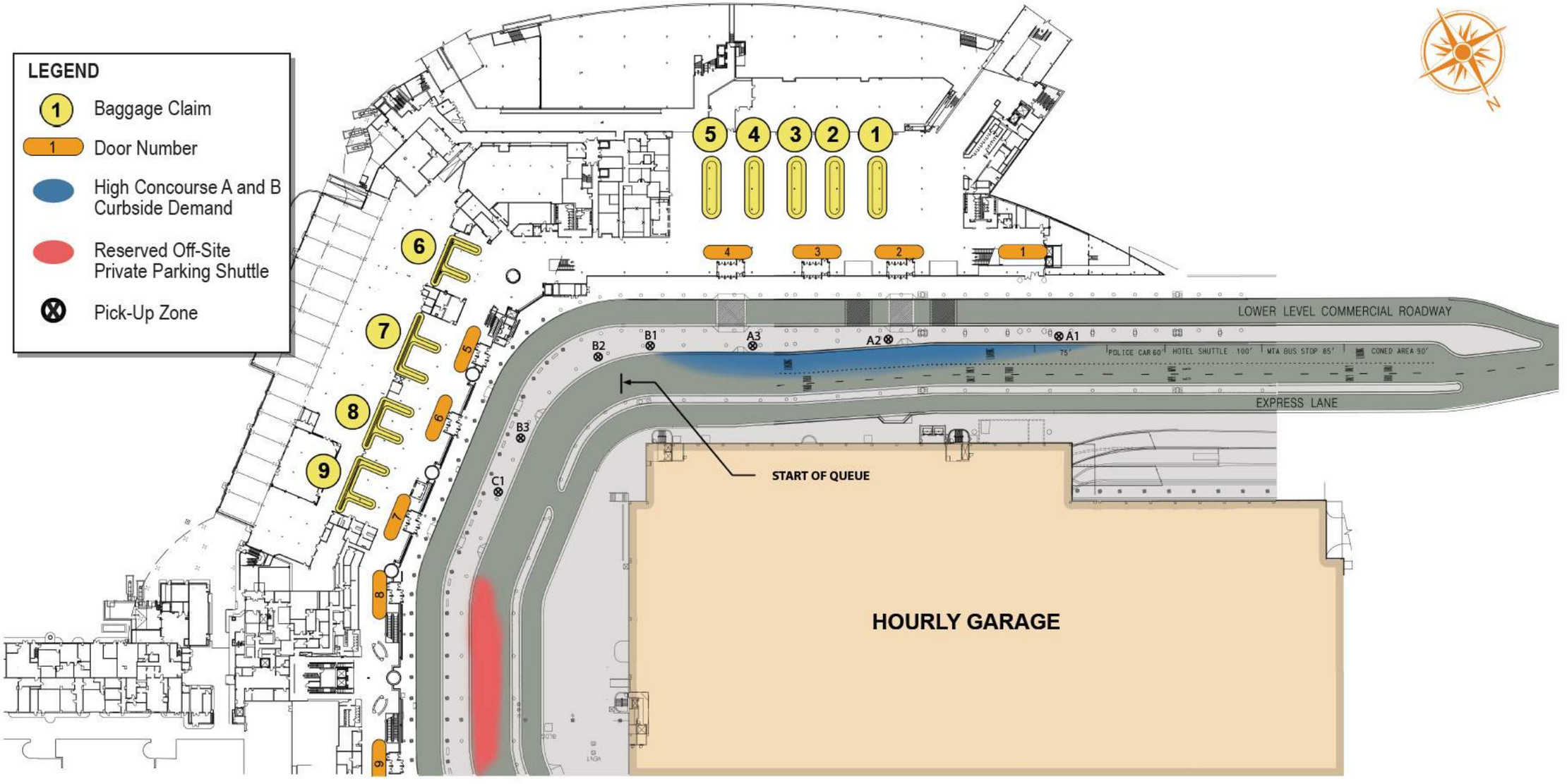
Video observations indicate that a high number of vehicles entering the Arrivals roadway begin to slow near the coned police parking and hotel shuttle area. Traffic downstream from that area also begins to slow down to less than an average of 10 mph as drivers search for passengers or available space along the curbside to pull into. As a result, traffic upstream of the MTA bus stop is clustered bumper-to-bumper as vehicles approach the location at an approximate speed of 15 mph and come to near a complete stop.

As shown in Figure 7, during the peak hours of 8:30 PM to 10:30 PM, the two inside parking lanes entering the Arrivals roadway are highly utilized between door numbers two and four, resulting in vehicle queues propagating upstream. Other lanes adjacent to those two lanes are seen blocked throughout the peak period, when queues from the arrivals roadway propagate back. The left photograph in Figure 5 shows the access into the *Express Exit* blocked due to vehicle queues.

Pedestrian volumes must cross the *Authorized Vehicles Only* roadway and wait along the median to be picked up by off-site private parking shuttles, MTA buses, and passenger cars. Pedestrians are not expected to cross beyond the striped loading area. However, there were several instances where pedestrians will walk into the Arrivals Roadway travel lanes (lane 3 or 4) to board a stopped passenger car, which further degrades operations, effectively reducing the number of available travel lanes from two to one or to zero for the duration when the vehicle is stopped, as shown in Figure 6.

Figure 6: Observed Instances of Pedestrians Loading into Passenger Cars within Designated "No Stopping" Lanes

Figure 7: Lower Level Curbside A + B Utilization



III. VEHICLE CLASS OBSERVATIONS

Vehicle types listed in Table 1 were considered and coded in VISSIM. Off-site private parking shuttles are typically considered as their own class due to the significant correlation between airline arrivals and departures with the parking shuttles arrival headways into the airport. They are typically observed parking and loading along the striped designated loading only lane on the Arrivals roadway adjacent to Concourse C curbside.

A. BWI Buses and Shuttles Headway

BWI buses were modeled according to their recommended headway based upon a study performed by Beckon Consulting that was submitted in December 2013 and implemented in early 2014. Table 2 lists the existing BWI buses with their associated headways for how frequently they approach the terminal in an hour. The routes for all BWI buses were simulated beginning from their originating parking lots, approaching the Departure Level *Authorized Vehicles Only* roadway to discharge passengers, heading toward Terminal Return Road, returning to the Lower Level *Authorized Vehicles Only* roadway and dwelling at their designated stops as shown in Appendix 4 to pick up passengers before finally returning to their parking lots.

Table 2: BWI Buses Headway Implemented Early 2014

Parking Lot	Headway (Minutes)	Buses/Hour to Upper or Lower Level	Buses/Hour Approaching Terminal
Long Term A	10	6	12
Long Term B	10	6	12
Express	8	8	16
Daily	5	12	24
AMTRAK/MARC	8	8	16
Rental Car Facility	4	15	30
Employee Parking*	10	6	6
Total	-	-	116

* Upper Level Only

All parking, AMTRAK/MARC, and Rental Car Facility shuttles only go to the Departure Level when there is at least one passenger on the shuttle. Number of shuttles approaching the terminal will be lower when the shuttles have no passengers and drive immediately to the Arrivals Level. Employee parking shuttles are destined for the Upper Level only and return directly to their parking lot without making a turnaround to the Lower Level.

B. Vehicle Classes Inbound Origin and Destination

Vehicle class counts were performed to find their distribution from their inbound origin (from I-195 or Terminal Road) to their destination (Upper or Lower Level) and their distributions over two hours are listed in Table 3. In combination with a machine (tubes) volume count that was performed from July 26 to August 1, 2013 (1 week), the Departure Level volume distribution was determined.

Table 3: Vehicle Class Origin to Destination Count and Proportion (Friday 8:30PM to 10:30PM)

Location	Passenger Cars	Taxis		Buses			Shuttles						
		BWI	Private	BWI	MTA	Other	Hotel	Super Shuttle	Pre Flight	Econo Park	Fast Park	Park & Fly	Other
From I-195	60%	100%	81%	53%	50%	-	49%	15%	73%	50%	6%	20%	60%
From Terminal Road	40%	0%	19%	47%	50%	-	51%	85%	27%	50%	94%	80%	40%
Total (2 Hours)	2254	103	16	183	14	0	47	20	11	18	52	25	10
To Upper Level	19%	0%	57%	39%	0%	-	27%	0%	7%	17%	11%	19%	21%
To Lower Level	81%	100%	43%	61%	100%	-	73%	100%	93%	83%	89%	81%	79%

C. Passenger Cars Curbside Parking Dwell Time

Passenger cars dwell time along the Lower Level were observed and documented for the following:

1) Percentage of vehicles entering the lower Arrivals Roadway standing in the "Loading Lane"
2) Dwell time of recorded standing vehicles (Average, Minimum, and Maximum)

Curbside classification study was performed along Concourses A, B, B/C, D, and E to count the number of vehicles standing (or double parking) along the curbside. Their observed dwell times were sampled in 30 minute range intervals as graphically shown in Figure 8.

Figure 8 below shows a significant fat-tailed right skew, where the average dwell time distribution is concentrated to the left while the outliers are located predominantly to the right for Concourses A, B, and B/C. The majority of drivers (over 70%) do not dwell longer than 2 minutes before pulling out of the loading zone and allowing other vehicles to dwell in the loading area. For Concourses D and E, where it is expected to have significantly lower activity compared to concourse locations closer to Southwest Airlines, there is a very even distribution.

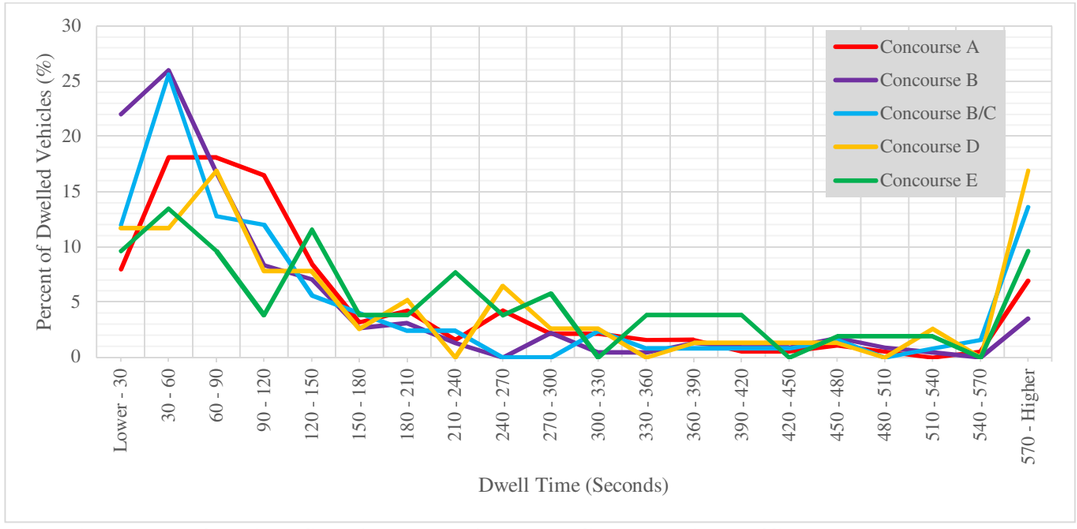


Figure 8: Number of Vehicles Standing Dwell Time along Concourse A, B, B/C, D, and E

Table 4 shows in detail the percentage of vehicles that were recorded dwelling less than 2 minutes, more than 10 minutes, and between 2 to 10 minutes at each concourse curbside.

Table 4: Passenger Cars Friday Evening 2 Hour Dwell Time Summary Data at Each Concourse

Concourse	Average (Seconds)	Mode* (Bin Range)	Maximum (Seconds)	2 Minutes or Less (%)	More than 5 Minutes (%)	Total Observed Vehicles
A	180	60 – 90	1,645	72.3	6.9	188
B	132	30 – 60	1,825	82.8	3.5	227
B/C	230	30 – 60	1,887	72.0	13.6	125
D	299	60 – 90	1,937	58.4	16.9	77
E	277	30 – 60	1,825	51.9	9.6	52

* 30 Second Interval with the Highest Number of Observed Vehicles

Summarized in Table 4, Concourse B shows the highest number of vehicles parking along the area with a relatively high number of observed dwell times of 2 minutes (120 seconds) or less at 82.8%. This indicates a frequent number of vehicles pulling in and out of that curbside location, causing high traffic turbulence within the two left travel lanes, as well as vehicles bottlenecking just upstream from that location (Concourse A). The results summarized above also indicate a significant amount of vehicles dwelling at the curbside parking for more than 10 minutes (600 seconds).

D. BWI Marshall Hourly Garage Utilization

For the Hourly Garage utilization, only passenger cars are expected to enter and exit the facility at any given time. It should be noted that the 5th level exit to the Departures Level can have a maximum of three exit booths operating at any given moment, while the Lower Level can have a maximum of eight booths operating (9th exit booth to Lower Level is for the Employee Parking Lot). The Hourly Garage exit booths can be seen below in Figure 9.

Figure 9: Three Exit Booths to Departure Level (Left) and Eight Exit Booths to Lower Level (Right)

Using tube counts performed during summer 2014 at the Hourly Garage lower level exit, there was a total of 236 and 238 vehicles recorded exiting at 8:30PM to 9:30PM and 9:30PM to 10:30PM respectively. The 5th level garage exit is likely to serve vehicles parked on the 5th and 6th floor while the lower level is expected to serve vehicles parked on the 1st through the 4th floor. Using the Hourly Garage exit booth transactions data, it was found that the exit volume from the 5th floor was approximately half of the traffic volume exiting at the lower level.

E. Inbound Roadway Queuing Observations

Observations were performed to find the approximate queue length for the inbound roadway into BWI Marshall Airport using video recording during the 8:30PM to 10:30PM peak hour on a Friday evening Figure 10 shows the approximate observed queue lengths associated with the time they were observed. The figure also shows the approximate queue length required before access to other roadways are blocked, causing those volumes to compound with volumes entering the Arrivals roadway.

The approximate number of vehicles queued was calculated based on the vehicle stationary space occupation of 25 feet to estimate jam density (211 veh/mi/ln). Vehicle queuing less than 1,500 feet (Departure Level Roadway Block Distance) is considered over two lanes, while over 1,500 feet is considered over three lanes (two lanes from I-195 inbound and one lane from Terminal Road inbound).

The volumes and turning movement counts were used to develop the vehicle demand for the BWI property shown in Figure 12. An additional volume diagram was developed to include the proposed hotel generated volume in Figure 13.

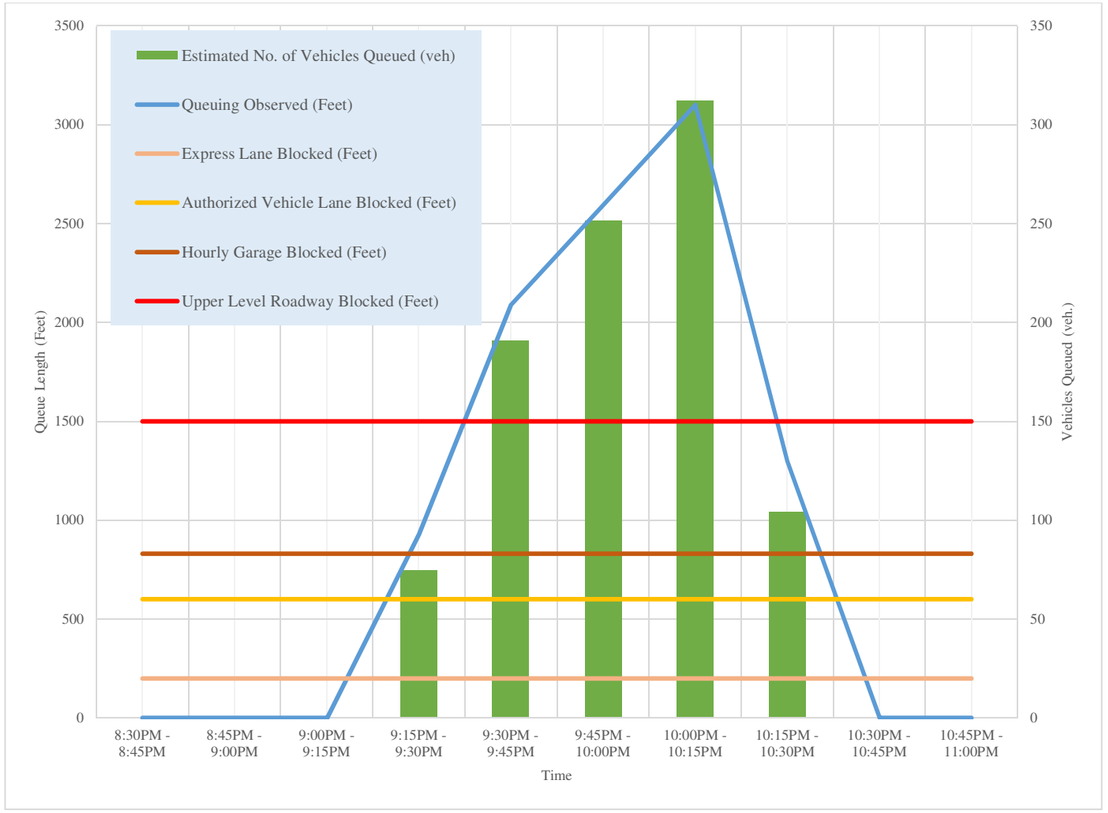


Figure 10: Observed Arrivals Roadway Queue Length and Approximate Number of Vehicles in Queue

Based on observations, vehicle queuing does not start until approximately 9:05PM and continues to propagate until it peaks between 10:00PM and 10:15PM (~3,100 feet) and finally dissipates by 10:40PM. The estimated number of vehicles queued along the inbound roadway during the maximum observed queue is approximately 312 vehicles. Although the vehicle counts for the *Arrivals Roadway* show an average of 169 vehicles per 15 minute count (676 veh/hr), the significant queuing propagation indicates a higher actual demand from both I-195 inbound and Terminal Return Road.

Figure 14 shows the time period when queuing from I-195 inbound and Terminal Return Road occurs and propagates. One notable observation is that the queuing on I-195 inbound dissipates before the queuing on Terminal Return Road at 10:30 PM. Observed vehicle queuing and dissipation behavior was also used for calibration in order to replicate existing driver behavior throughout the terminal roadway.

Figure 15 shows the correlation offset of observed queuing along the inbound roadway into BWI Marshall Airport to the number of flights arriving at the airport at 15 minute time intervals. The peak vehicle queues form approximately 45 to 60 minutes after the peak of arriving flights at the Terminal A/B Gates. This offset is expected as drivers seeking to pick up arriving flight passengers will anticipate additional time from when the aircraft lands to when the passenger exits the airport baggage claim area. (The number of flight arrivals at BWI Marshall Airport after 10:30PM are unavailable and are not included in Figure 15.)

Figure 11: 2014 August Friday Observed Queuing

Figure 12: 2014 August Friday Inbound Traffic Volumes

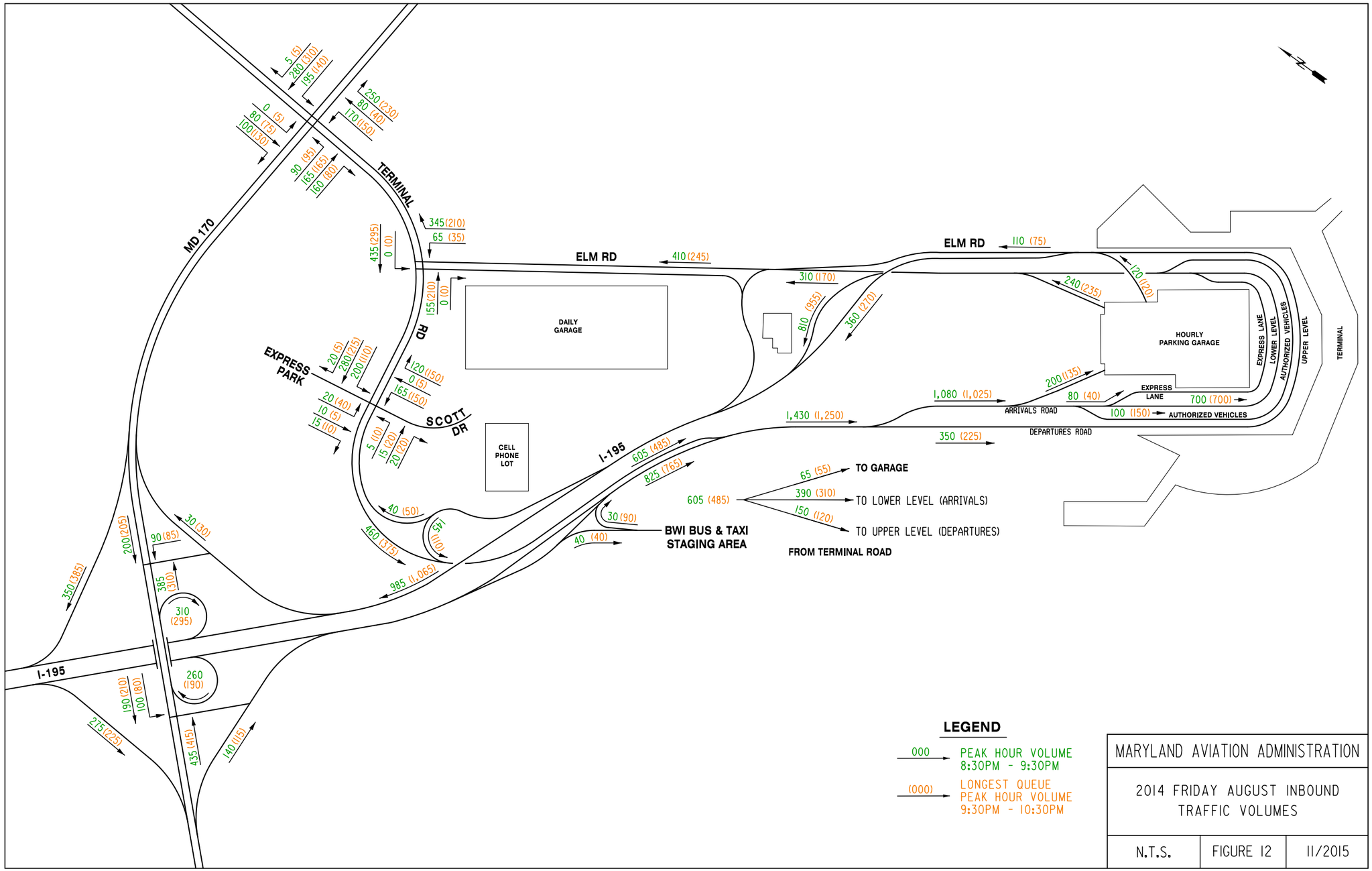
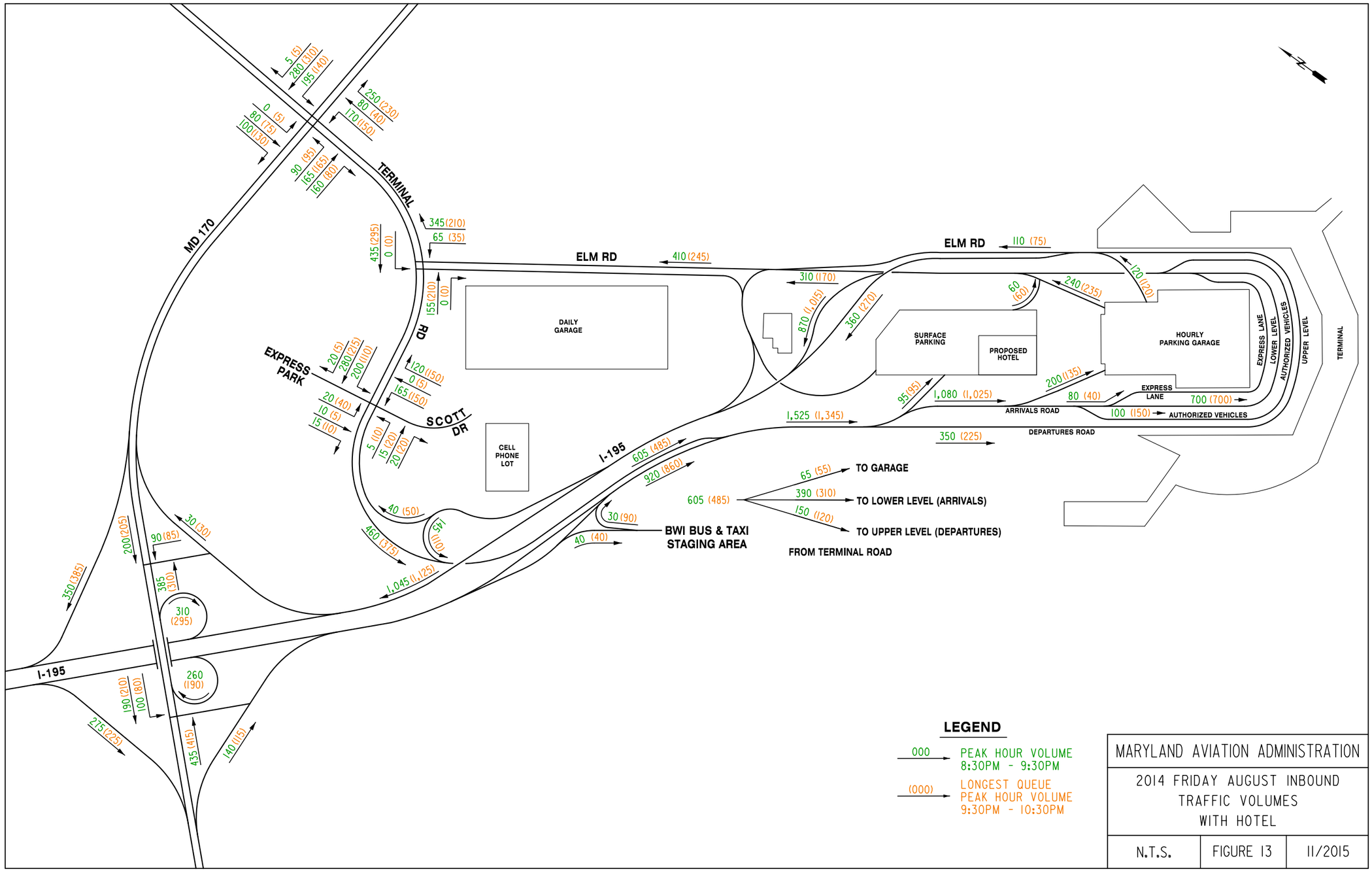


Figure 13: 2014 August Friday Inbound Traffic Volumes with Hotel



Time	Video Pictures	Comments
8:30PM 9:00PM		• No observable queue at 8:30PM to 9:00PM
9:24PM 9:30PM		• First signs of observable queuing begins at about 9:24PM • Significant queuing at 9:30PM
9:46PM 10:00PM		• Access to Departure Level blocked at 9:46PM to 10:00PM
10:15PM 10:25PM		• Queues still extend past I-195 and Terminal Return Road at 10:15PM • First sign of queues dissipating on I-195
10:30PM 10:31PM		• Queues on I-195 dissipated at 10:30PM while all observable queues dissipate at 10:31

Figure 14: Queuing Observations from Video Recording at Site 8 on August 1, 2014 (Week 2)

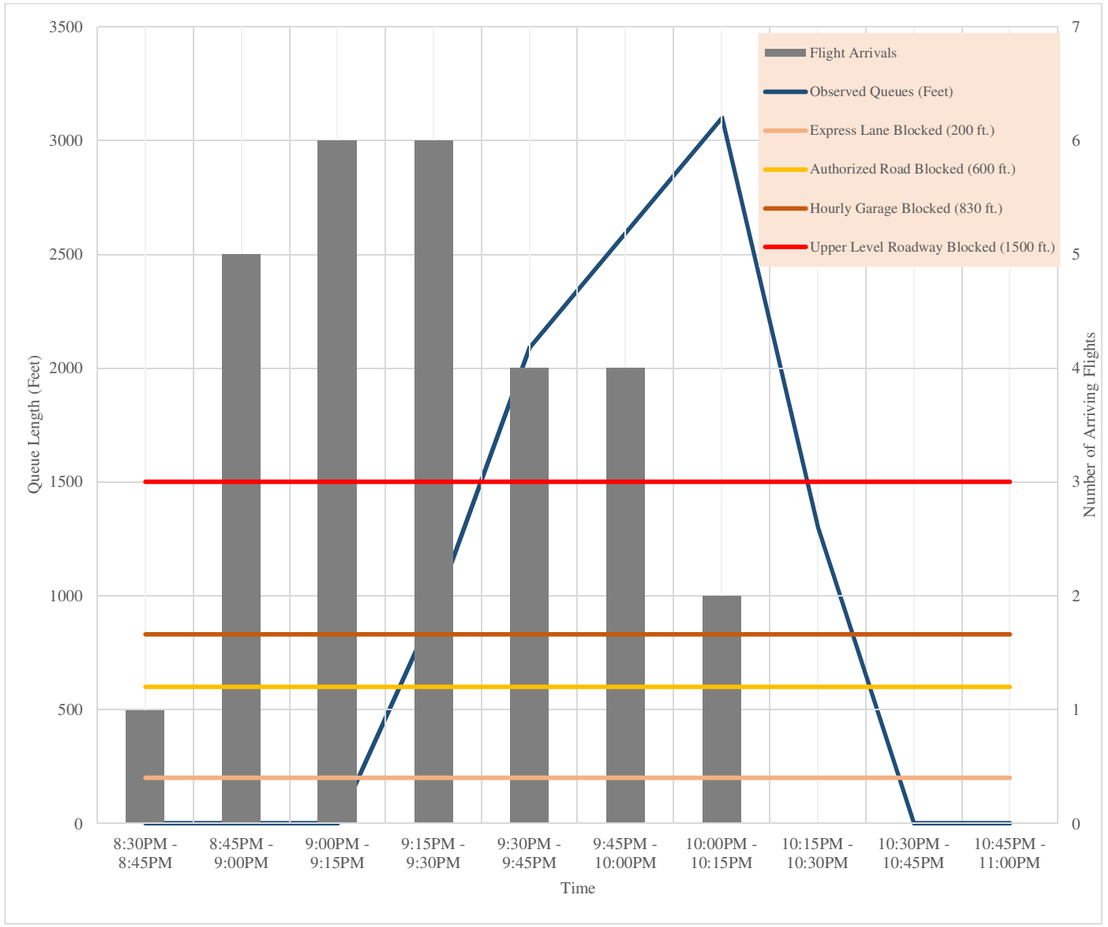


Figure 15: Observed Arrivals Roadway Queue Length and Flight Arrival Times on August 1, 2014

IV. VISSIM MODEL CALIBRATION

A. Observed Existing Saturation Flow Rate

Observations were made using video recordings of the BWI Lower Level Roadway. Throughout the peak hours, where queues were accumulating upstream, observations were made on the vehicle counts for the Arrivals Roadway at 15 minutes intervals for two hours. Table 5 shows the summarized results from the counts.

Table 5: Arrivals Roadway Friday (8:30PM-10:30PM) Counts

Arrivals Roadway						
Start Time	**Ending Time**	**Passenger Cars**	**Buses**	**Shuttles**	**Total* (veh/15 min)**	**Hourly Flow Rate (veh/hr)**
20:30	20:45	154	1	19	174	696
20:45	21:00	123	3	26	152	608
21:00	21:15	147	2	16	165	660
21:15	21:30	150	0	10	160	640
21:30	21:45	174	2	11	187	748
21:45	22:00	160	1	11	172	688
22:00	22:15	154	2	11	165	660
22:15	22:30	151	1	22	174	696
Total		1,213	12	126	1,351	-

* Actual Counts (15 Minute Interval)

Based on the results shown in Table 5 above, the total number of observed vehicles driving through the *Arrivals Roadway* during the 2 hours is 1,351 vehicles (~676 veh/hr). Under this observed flow rate, significant queuing was observed upstream, indicating the actual vehicle demand is higher. Thus, the observed flow rate from 8:30PM to 10:30PM should be used as a calibration target to replicate existing operations.

Vehicle flow rate from the base VISSIM model was measured at the Arrivals Roadway outbound location after all the curbside parking and compared to the observed inbound. Two calibration targets recommended by FHWA were used to determine if the model was within acceptable vehicle flow rate error:

1) Within 100 veh/hr of field flow
2) GEH Statistic less than value 5. The GEH Statistic is an empirical formula used primarily in traffic modeling to compare the modeled counts with traffic counts verified in the field. (Equation shown below)

$$GEH = \sqrt{\frac{2 * (E}{E}}$$

Where,

$GEH = GEH\ Statistic$
$E = model\ estimated\ volume$
$= field\ count$

1. Queuing

The first calibration factor considered is the queuing within the VISSIM model. The queuing should be within a 10% acceptable margin of error compared to the actual observed queuing from field observations. The following field observations were used as objective calibration targets:

1) Significant queuing should start after 9:00 PM
2) Maximum observed queuing between 9:45 PM to 10:15 PM
3) Inbound vehicle queues should dissipate by 11:00 PM

Figure 16 and Figure 17 show the individual queue observations for each unique simulation. The individual simulation runs are shown in grey with the average simulation in blue, while the observed queuing on August 1, 2014 is in red. The average simulated maximum queues along I-195 and along Terminal Road have an error of -0.7% and +8.4%, respectively. Both of these are within the desired ±10% margin of error.

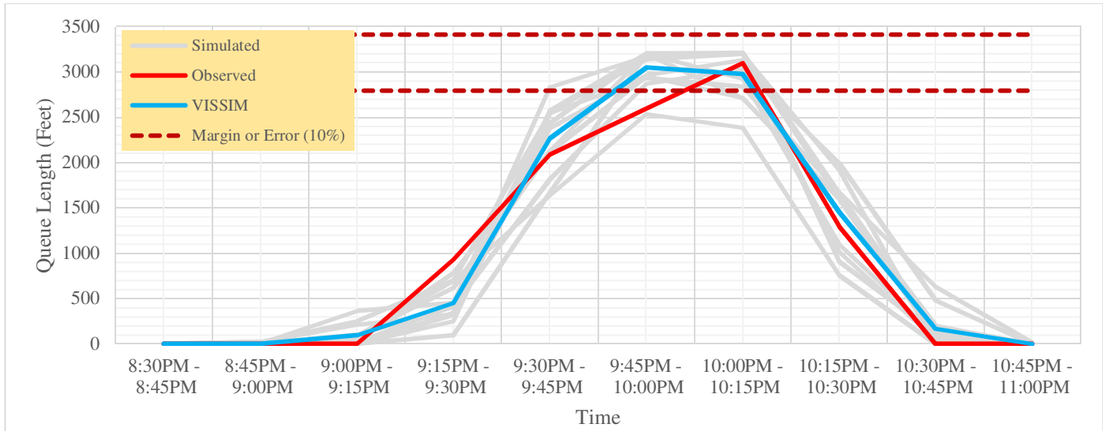


Figure 16: Observed Queuing (Red) versus Simulated Queuing (Grey) and Average (Blue) for I-195 Inbound

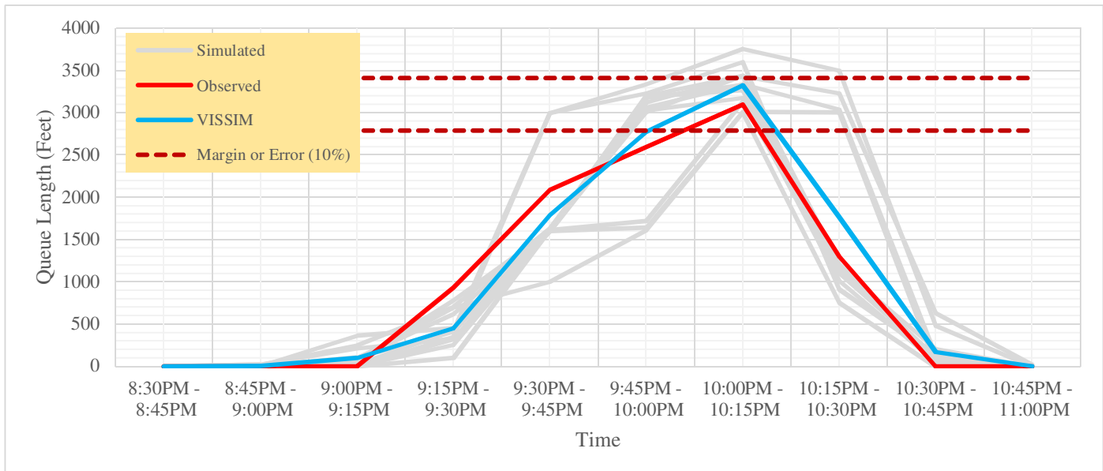


Figure 17: Observed Queuing (Red) versus Simulated Queuing (Grey) and Average (Blue) for Terminal Return Road

2. Output Volume

Another calibration target used is comparing the vehicle output volume of the actual video counts against VISSIM simulated vehicle counts for vehicles entering and exiting the *Arrivals Roadway*. Table 6 and Figure 18 compare the observed counts from August 1, 2014 against VISSIM simulated results.

Table 6: Arrivals Roadway Traffic Volume

Arrivals Roadway							
Start Time	Ending Time	Observed (V)	VISSIM Simulated			Difference Δ = |Obs. – Avg.|	GEH Statistic
			Average (E)	Minimum	Maximum		
20:30	20:45	174	187	170	209	13	3.26
20:45	21:00	152	176	148	187	24	
21:00	21:15	165	186	164	196	21	
21:15	21:30	160	188	174	211	28	
21:30	21:45	187	190	167	205	3	1.90
21:45	22:00	172	189	174	206	17	
22:00	22:15	165	184	163	194	19	
22:15	22:30	174	186	162	206	12	
Total		1351	1486	1322	1616	135	-

Figure 18 below shows a graphical representation of the averaged VISSIM results (blue) from each simulation run (grey) compared against the field observation counts (red) on August 1, 2014. Results are shown for vehicle throughput for every 15 minute interval.

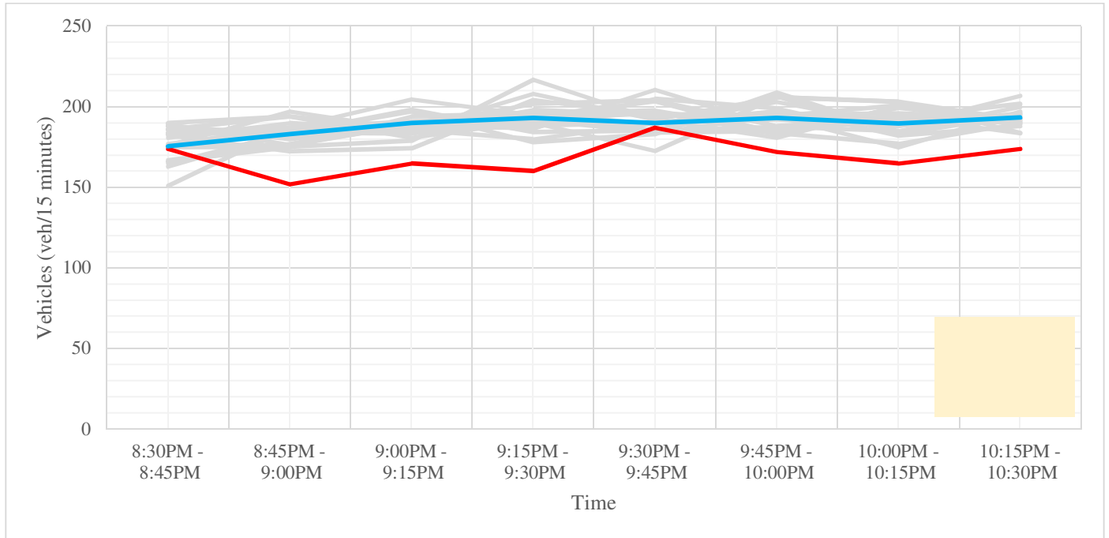


Figure 18: Arrivals Observed Volume (Red) versus Simulated Volume (Grey) and Average (Blue)

Calibration results do show the simulated vehicle throughput at the Arrivals lanes are within a ± 100 vehicles per hour (25 veh. / 15 minutes) acceptable error, and also within the recommended GEH Statistic of value 5 for low volume simulation.

3. Passenger Pick-Up Behavior

Visual inspection was performed to ensure pick-up behavior from the VISSIM simulation replicates the existing BWI Lower Level Arrivals Roadway pick-up behavior. The criteria used when defining how closely the existing simulation model matches existing pick-up behavior in order to minimize subjectivity when calibrating is as follows:

1) Standing vehicle density at each concourse (High at A, B, and B/C while Low at D and E)
2) Frequency of passenger cars pulling in and out of the curbside loading zone (Frequent at A, B, and B/C while less frequent at D and E)
3) Curbside availability at each concourse (Mostly unavailable at A, B, and B/C while mostly available at D and E)

In addition, driver behavior should change significantly to increase headway within the traffic stream passing the coned police cars. Another expected observation within the VISSIM simulation is for passenger cars to use the left side of the loading only lane as a travel lane if there are no other parked passenger cars blocking the lane.

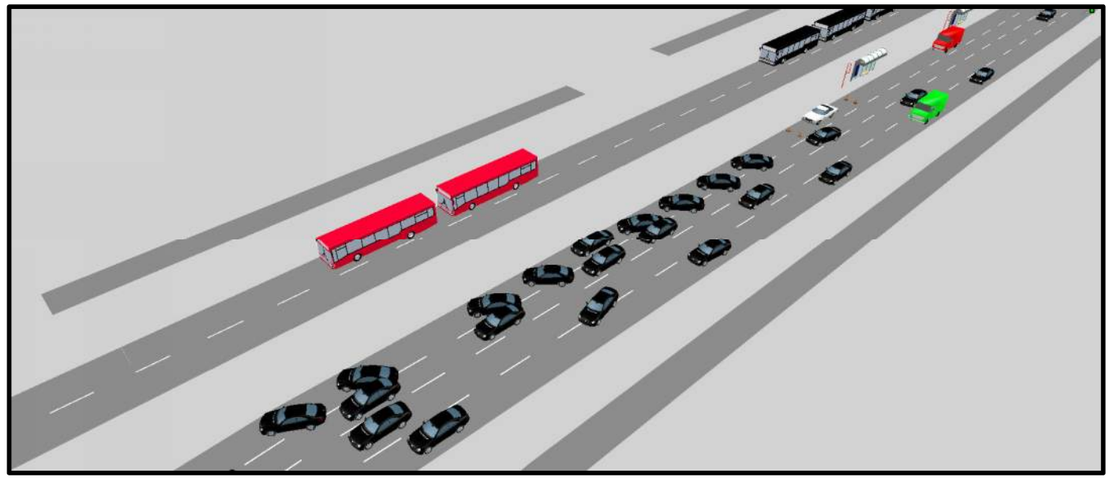


Figure 19: VISSIM Snapshot of BWI Lower Level along Concourse A and part of B

Vehicles traveling on the *Express Exit Lane* on the far left side of the Lower Level have a speed limit of 15 mph and are expected to yield to other vehicles exiting from the Arrivals Roadway before merging into the traffic stream.

4. Lower Level Authorized Vehicles Only Roadway

Based on the existing BWI shuttle bus recommended headways as shown in Table 2, the Lower Level *Authorized Vehicles Only* roadway is expected to have 53 BWI shuttle buses per hour throughout the peak hour analyzed. The BWI bus stop locations modeled are at their existing locations as shown in Appendix 4.

Other vehicles going through the Lower Level *Authorized Vehicles Only* roadway such as BWI taxis and super shuttles were also modeled to dwell at their appropriate locations as shown in Appendix 4. BWI taxis and super shuttles are both expected to maintain a minimum number of vehicles (10 to 12 BWI taxis and approximately 4 super shuttles) queuing before a call is placed by dispatchers for BWI taxis from the existing staging lot.

V. EXISTING CONDITION MEASURE OF EFFECTIVENESS (MOE)

A. Queue Length

The existing queue length on Friday evening from 8:30PM to 10:30PM is the focus of mediation for this study. Existing observed queue lengths extend as far as 3,100 feet toward both I-195 and Terminal Return Road inbound roadways. One of the primary concerns for the problems caused by extensive queuing along the inbound roadway is the possibility of intersection blockage at the signalized intersection of Terminal Road with Scott Drive and ramp blockage from MD 170 to I-195 southbound. The intersection is located approximately 3,800 feet upstream while the gore separation of the ramp from MD 170 to I-195 southbound is approximately 3,400 feet upstream, both measuring from the Departure Level concrete deck. Another queuing concern is if the queues along I-195 inbound extended any further, they may block access for BWI taxis trying to enter the BWI bus and taxi staging area. Table 7 below shows the BWI terminal facility access points and their associated block distance due to vehicle queuing as measured from the Departure Level overhead concrete deck.

Table 7: BWI Facility Access and Associated Block Distance due to Queuing

Blocked Access	Blocked Distance (feet)
Express Exit Roadway	200
Authorized Vehicle Roadway (Lower Level)	600
Hourly Garage Entrance	830
Departure Level Roadway*	1,500

* Access blocked for vehicles inbound from Terminal Return Road only

Alternatives proposed are aimed at reducing existing and anticipated queuing due to traffic growth along the inbound roadway on both I-195 and Terminal Return Road. Longer block distances for each facility will give vehicles destined for locations other than the *Arrivals Roadway* a better chance to exit from the inbound queuing, thus reducing queue lengths contributed by blocked vehicles.

B. Travel Time

Using travel time as a Measure of Effectiveness (MOE), two origins paired with four destinations were used to determine if there were any improvements. A total of 8 travel time combinations with 15 minute intervals were reported for the existing condition and used in the later section for improvement comparison. Table 8 lists the origin to destination pairs and their associated travel distances from start to end. VISSIM travel time results were averaged and classified into 15-minute bin intervals as shown in Figure 20.

Table 8: Paired Origin to Destination Travel Time Pair Distances (Feet)

Origin	Destination	Distance (ft.)
I-195 at MD 170 Underpass	Hourly Parking Garage	4,300
	Express Exit Lane	4,100
	Arrivals Roadway	4,200
	Departures Roadway	3,900
Terminal Road at Scott Drive	Hourly Parking Garage	4,100
	Express Exit Lane	3,700
	Arrivals Roadway	3,800
	Departures Roadway	3,600

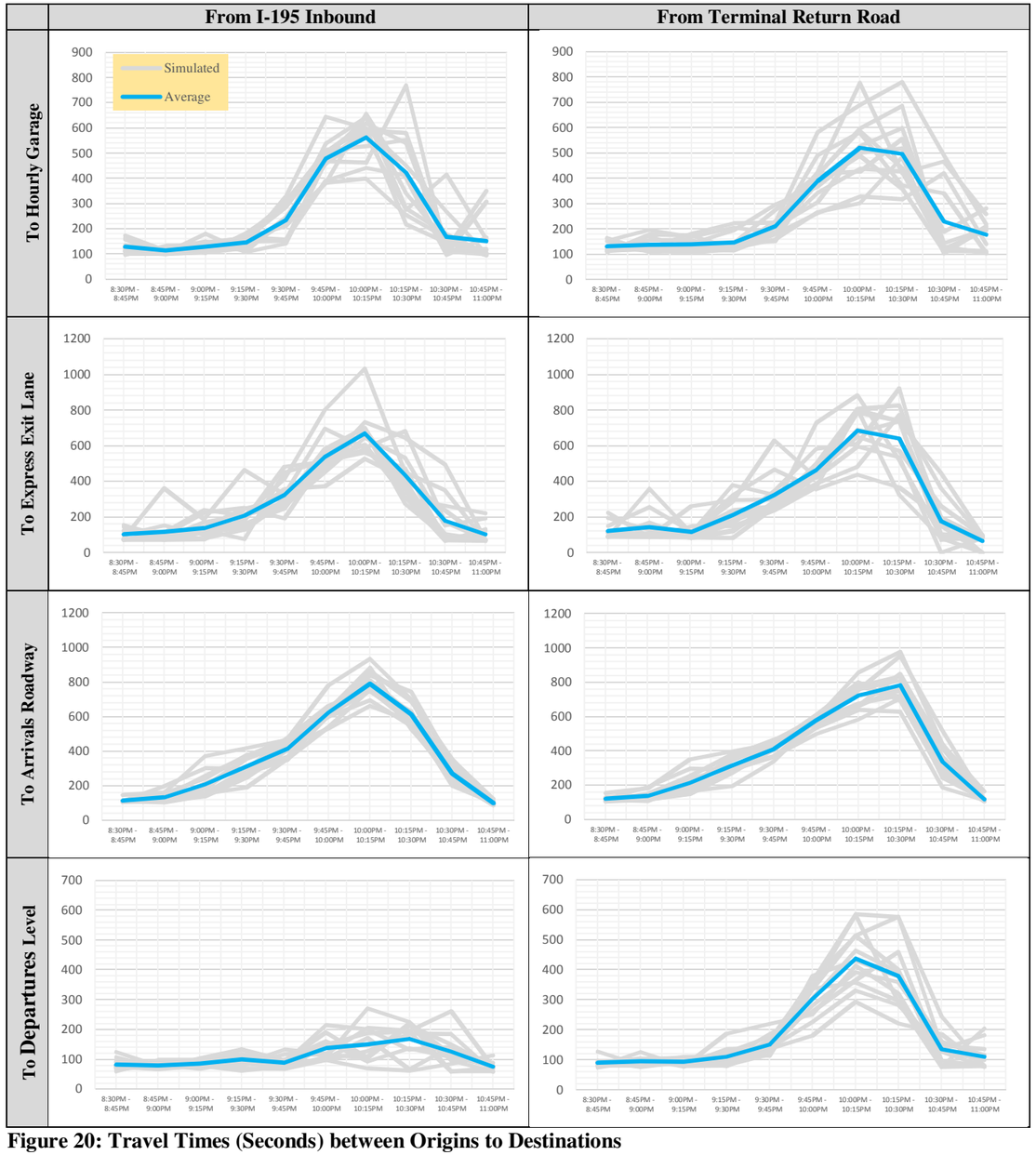


Figure 20: Travel Times (Seconds) between Origins to Destinations

Figure 20 shows travel times for I-195 and Terminal Return Road both approach peak for almost all destinations between 10:00 PM to 10:30 PM. Travel time from I-195 inbound to the *Departures Roadway* is observed to be unrestricted by the traffic queue. Vehicles from I-195 inbound are still able to reach the Departures Roadway in under 3 minutes (180 seconds).

Table 9 below shows the summary results for Figure 20, indicating the maximum travel times for each origin to destination pair. The results show the highest travel time is between 10:00PM to 10:30PM.

Table 9: Maximum Travel Time between Origins to Destinations

Origin	Destination	Travel Time (sec)	Max Travel Time Occurrence
I-195 at MD 170 Underpass	Hourly Parking Garage	539	10:00PM to 10:15PM
	Express Exit Lane	669	10:00PM to 10:15PM
	Arrivals Roadway	791	10:00PM to 10:15PM
	Departures Roadway	169	10:15PM to 10:30PM
Terminal Road at Scott Drive	Hourly Parking Garage	520	10:00PM to 10:15PM
	Express Exit Lane	686	10:00PM to 10:15PM
	Arrivals Roadway	785	10:15PM to 10:30PM
	Departures Roadway	437	10:00PM to 10:15PM

VI. PROPOSED HOTEL IMPROVEMENT

A. Location and Access

A hotel site is proposed to be located within part of the existing employee surface parking lot next to the Hourly Parking Garage. The hotel is proposed to have a patron entrance located approximately 450 feet upstream from the gore separating the Hourly Garage access and the Express Exit lane. The access is proposed to be a one lane entrance from the left side of the terminal inbound roadway.

The terminal inbound roadway upstream from the hotel access will be widened by one lane on the left side toward the existing employee surface parking lot.

B. Hotel Trip Generation

The proposed hotel is anticipated to have a peak of 250 *Occupied Rooms* with reference to the Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th edition. The proposed hotel site has an expected trip generation of 95 vehicles entering and 60 vehicles exiting during the peak hour of the inbound roadway. It is expected that all entering vehicles to the proposed hotel site will use the entrance at the inbound roadway into the terminal.

VII. PROPOSED ALTERNATIVES

Alternatives analyzed in this report will reevaluate the alternatives proposed in a prior report submitted on August 30, 2013 under contract number: AECOM Task No. 031 – MAA-AE-11-005. Four alternatives from that previous report were analyzed using updated traffic volumes, vehicle dwell times, and recent field observation calibration targets. All build conditions include the proposed hotel and hotel access.

A. Alternative 1

Widen the inbound roadway from the taxi/bus staging area to the departure level ramp to create three continuous lanes. The three lane merge segment from the BWI taxi and bus staging area will be extended by approximately 1,000 feet towards the terminal Departure Level. The third lane extension will connect to the right lane add on the terminal ramp to the Departure Level. The island located at the intersection road to I-195 entering/exiting the airport airside will be reduced in size to accommodate the additional third through lane.

The additional third through lane will primarily be used by authorized vehicles (BWI taxis, buses, and super shuttles) for access to the Departures Level. Unobstructed flow will be provided for authorized vehicles approaching the terminal from the I-195 inbound direction to the Departure Level. The alternative is shown in Figure 21.

B. Alternative 2 – Option 1

An auxiliary lane will be provided for the Terminal Return Road inbound roadway from the ramp extending to Friendship Road. The Terminal Return Road inbound ramp will remain as one lane and aligned to the Hourly Garage entrance. The inbound roadway from I-195 will be realigned so that both lanes will have access to the Lower Level Arrivals Roadway. The I-195 inbound right lane will be a choice lane providing access to both the Upper and Lower Level. Widening will occur toward the left side (employee parking direction) of the roadway.

Alternative 2 – Option 1 provides unobstructed access for vehicles from I-195 inbound to the Lower Level, but eliminates the even capacity distribution between I-195 and Terminal Return Road. Vehicles approaching from Terminal Return Road are required to make one additional lane change to access either the Upper or Lower Level. The number of lane changes required to access the Lower Level increases from zero to one while access to the Departure Level increases from one to two (~900 feet to make TWO lane changes to access the Departure Level). The alternative is shown in Figure 22.

C. Alternative 2 – Option 2

Alternative 2 – Option 2 eliminates the left lane drop from the Terminal Return Road inbound ramp by extending the existing left lane drop and connecting to the Hourly Garage entrance, creating an auxiliary lane. The roadway widening will occur toward the left side of the roadway. Alignment from the I-195 inbound roadway remains the same.

Vehicles approaching from the Terminal Return Road will have unobstructed access into the hourly garage by using the extended left lane (auxiliary lane). The alternative is shown in Figure 23.

D. Alternative 3

A portion of the median at the Hourly Garage access will be removed and restriped to provide extended access to the Express Exit Lane. The access block distance to the *Express Exit Lane* due to queuing on the Lower Level is extended by the length of the existing Hourly Garage access only lane (~800 feet) from approximately 200 feet to 1,000 feet. Restriping the Lower Level right lane to allow for an earlier right lane add for access to the authorized vehicles only roadway by approximately 150 feet. The alternative is shown in Figure 24.

E. Alternative 4

This alternative combines Alternative 2 – Option 2 with Alternative 3. The primary advantage of this alternative is to provide unobstructed circulation flow around the terminal for vehicles using the express exit roadway and reentering from Terminal Return Road. The Terminal Return Road inbound ramp will be two-lanes with the left lane connecting through to the Hourly Garage entrance.

Part of the median at the Hourly Garage access will be removed and restriped to provide extended access to the *Express Exit Lane*. The Lower Level right lane will be restriped to allow an earlier right lane add for access to the authorized vehicles only roadway. The alternative is shown in Figure 25.

F. Alternative 5

This alternative combines Alternative 1 and Alternative 4. This alternative provides unobstructed circulation flow around the terminal for vehicles using the *Express Exit Lane*. Additionally there is an additional lane access to the departure level to accommodate for potential traffic diversion to the departure level. The alternative is shown in Figure 26.

Figure 21: Alternative 1 with Proposed Hotel Access Road

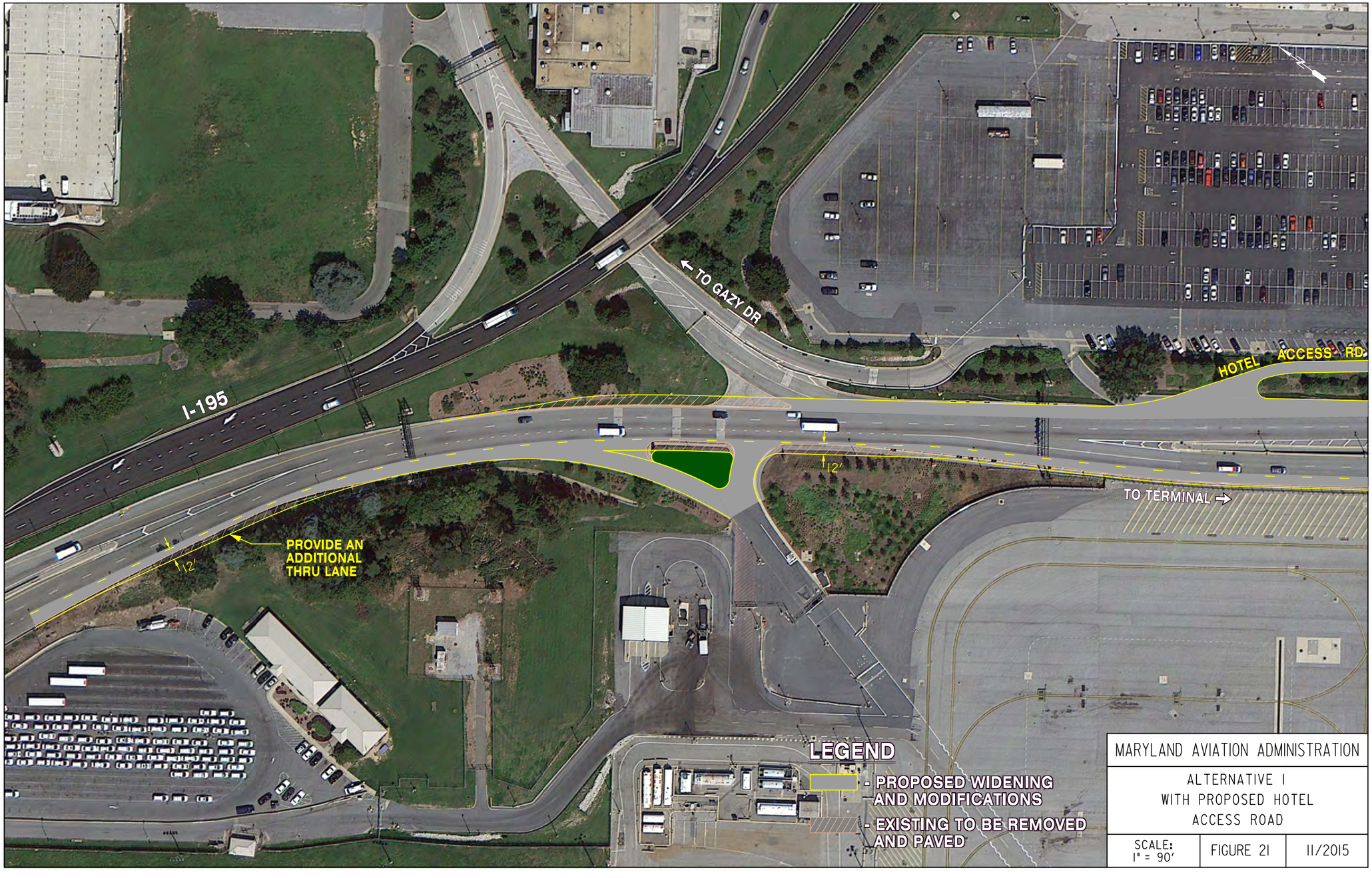


Figure 22: Alternative 2 Option 1 with Proposed Hotel Access Road

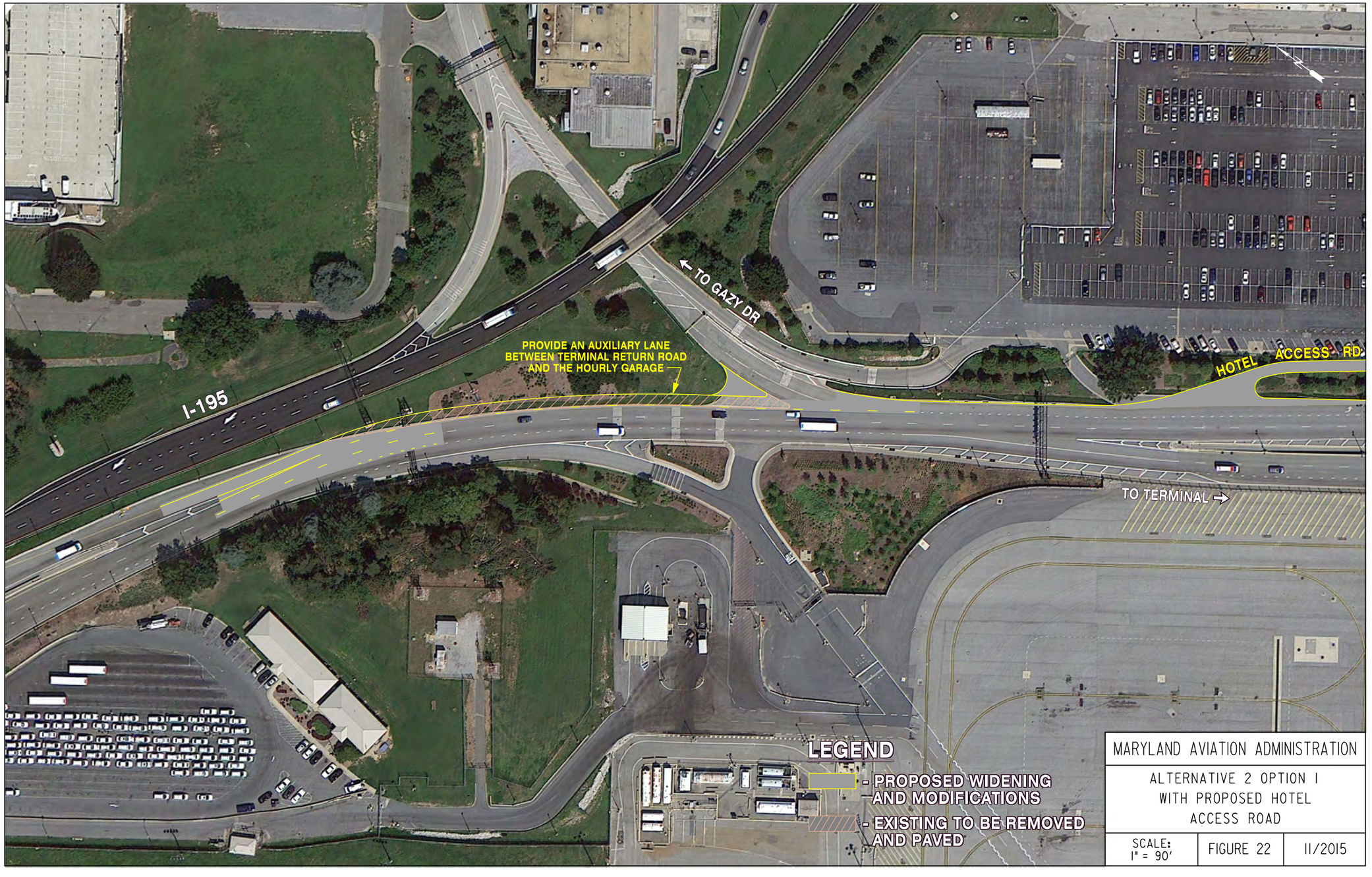


Figure 23: Alternative 2 Option 2 with Proposed Hotel Access Road

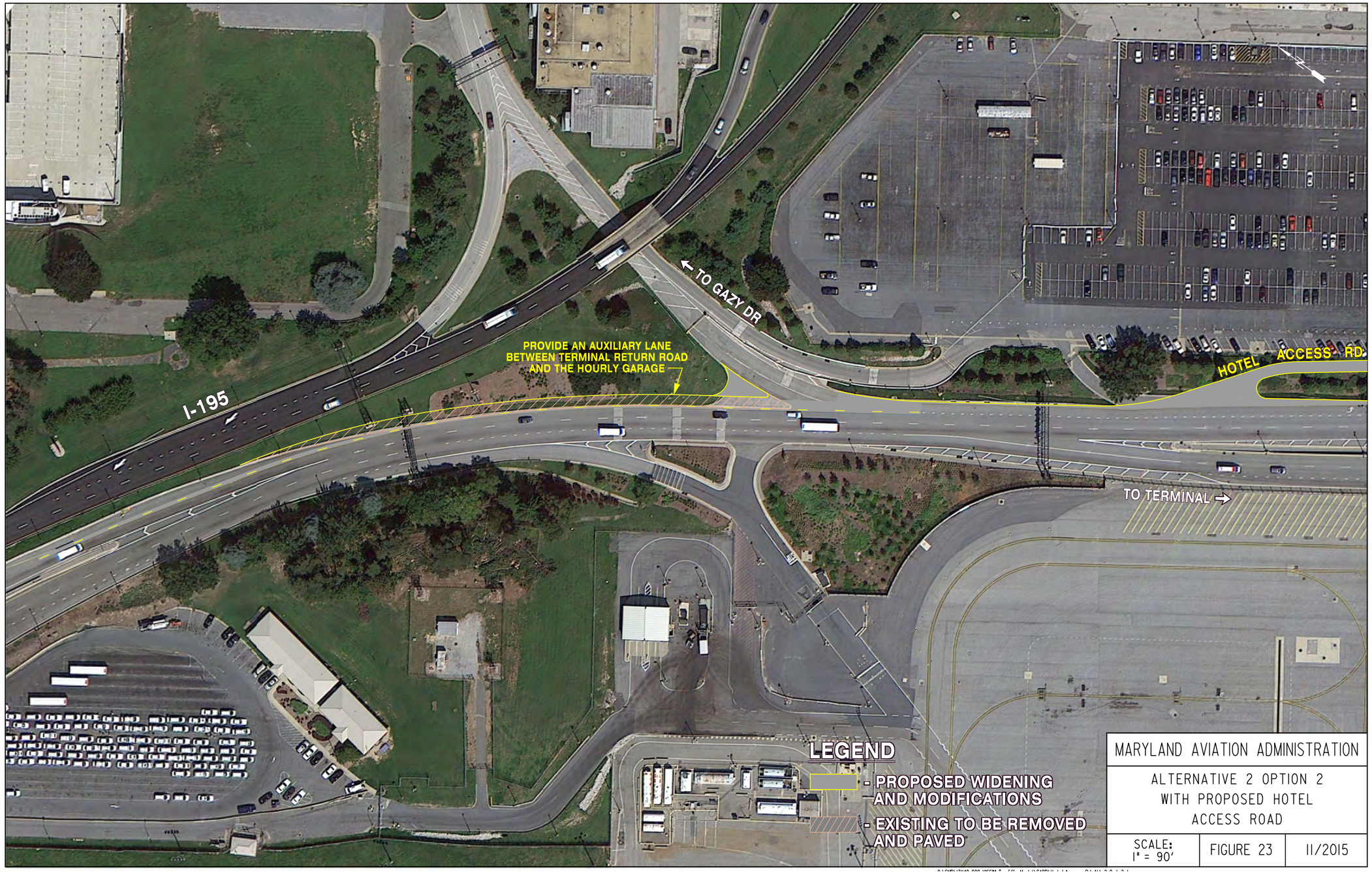


Figure 24: Alternative 3 with Proposed Hotel Access Road

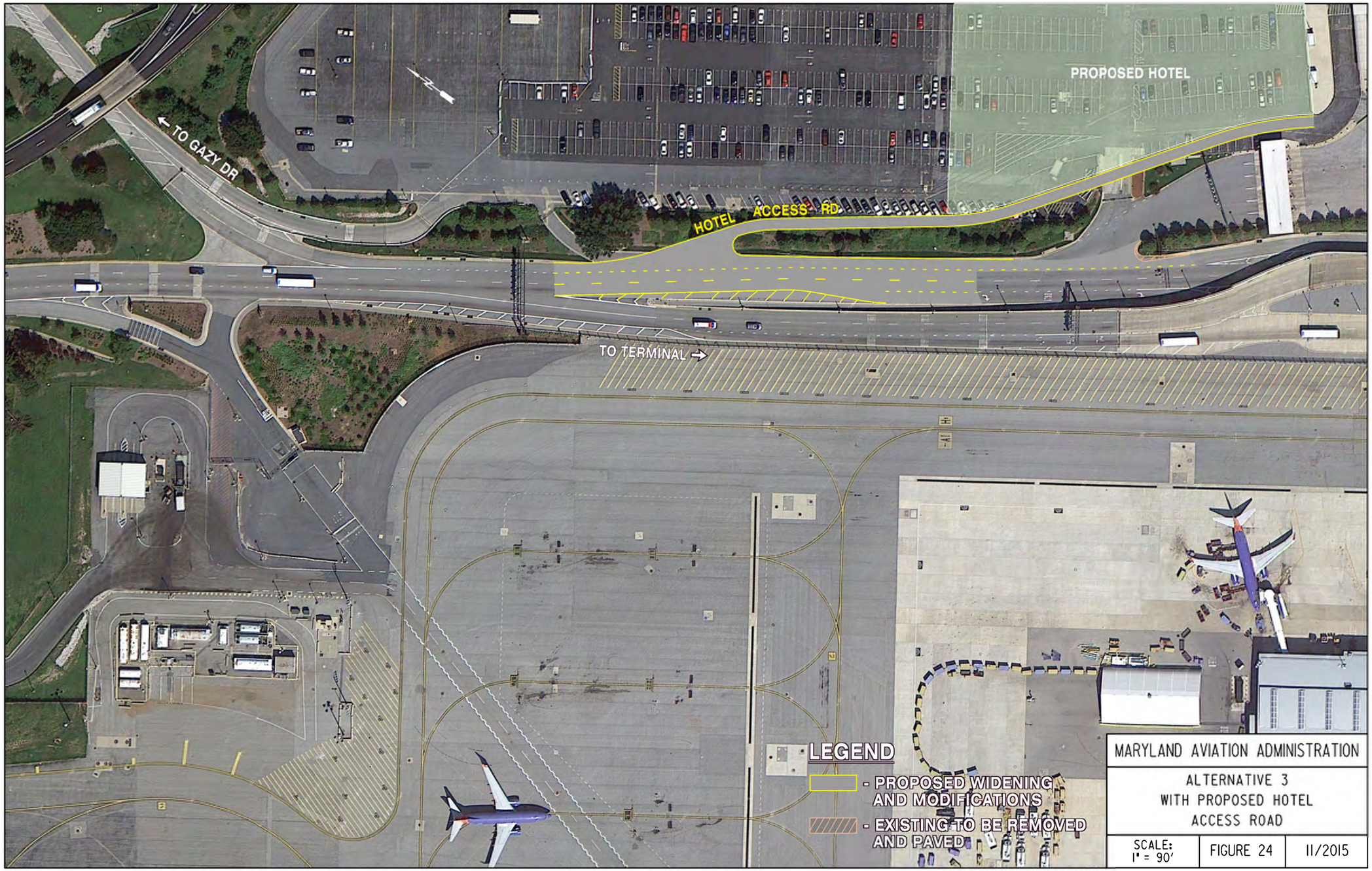


Figure 25: Alternative 4 with Proposed Hotel Access Road

Figure 26: Alternative 5 with Proposed Hotel Access Road

VIII. ALTERNATIVES MOE

The VISSIM model for assessing the proposed alternatives includes a *No Build* model with the generated traffic and entrance access for the proposed hotel site. Alternatives assessed also include the assumed hotel traffic and proposed entrance. Queue length and travel times, as mentioned in Section 4, are used for improvement comparisons between the *No Build* condition and the proposed alternatives.

A. Queue Length

The additional traffic generated by the proposed hotel site shows a small increase in reported queue length along both I-195 inbound and Terminal Return Road compared to the existing traffic without the hotel. VISSIM queuing analysis results for both I-195 and Terminal Return Road inbound roadways are shown in Figure 27 and Figure 28 respectively. Results for Alternative 2 – Option 1 show a significant reduction in queuing while Alternative 3 and Alternative 5 show slight improvements along I-195 inbound. Alternative 1 remains very similar to the *No Build* condition while Alternative 2 – Option 2 and Alternative 4 show a slight degradation with a slower queue dissipation rate.

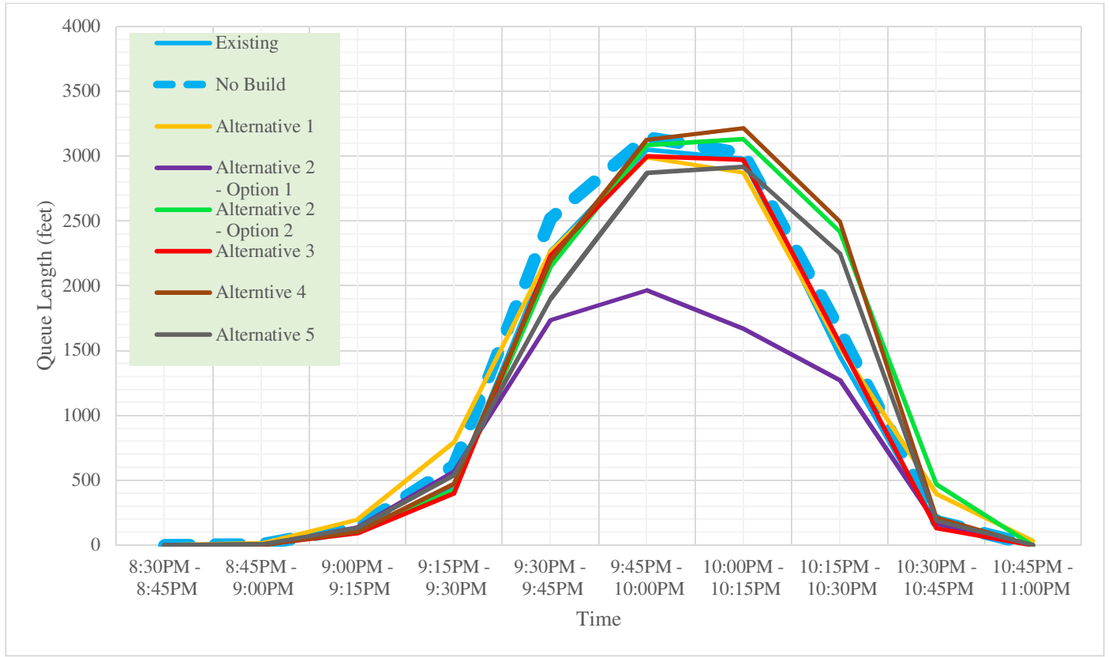


Figure 27: VISSIM Queue Length Reported for I-195 Inbound Roadway

Looking at the vehicle queuing along Terminal Return Road in Figure 28, only Alternative 2 – Option 1 shows some degradation due to an increase in queue length. Alternative 1 remains similar to the *No Build* condition. Alternative 3 shows slight improvements while Alternative 2 – Option 2, Alternative 4, and Alternative 5 show significant queue reduction.

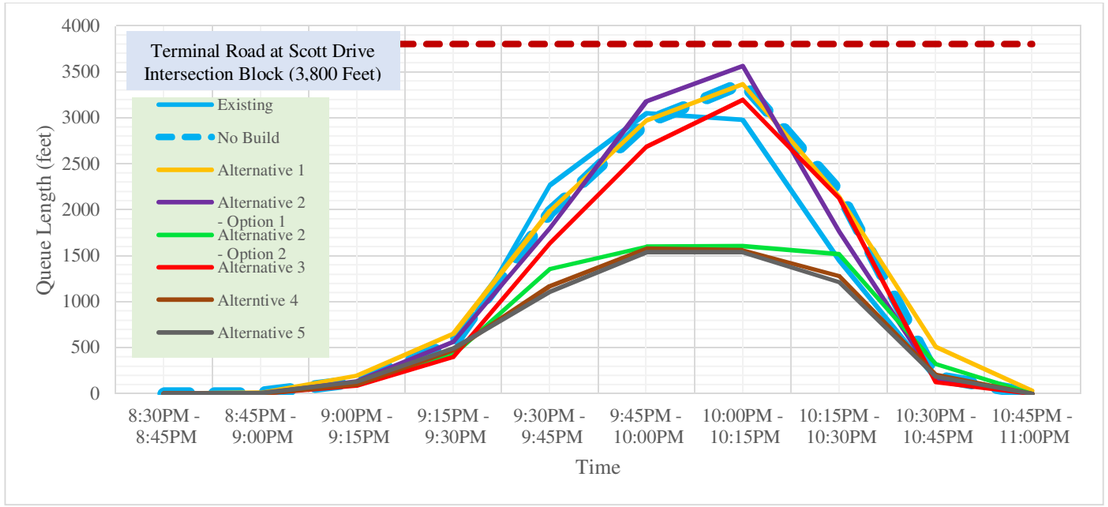


Figure 28: VISSIM Queue Length Reported for Terminal Return Road

Results from the VISSIM queuing analysis show that none of the alternatives cause unreasonable queuing. However, it should be noted that Alternative 2 – Option 1 has the highest risk of causing an intersection blockage at Terminal Road with Scott Drive.

An additional analysis was conducted to convert the reported queue length by approximate number of vehicles queued to observe any improvement in capacity shown in Figure 29. Several alternatives that include widening and/or lane realignment do not necessarily provide additional overall throughput capacity. Alternative 2 – Option 1 relocates the existing queue distributed over two lanes along I-195 inbound, while reducing capacity along Terminal Return Road. Alternative 2 – Option 2 and Alternative 4 relocate the existing queues over an additional lane due to the proposed widening towards the existing employee surface parking.

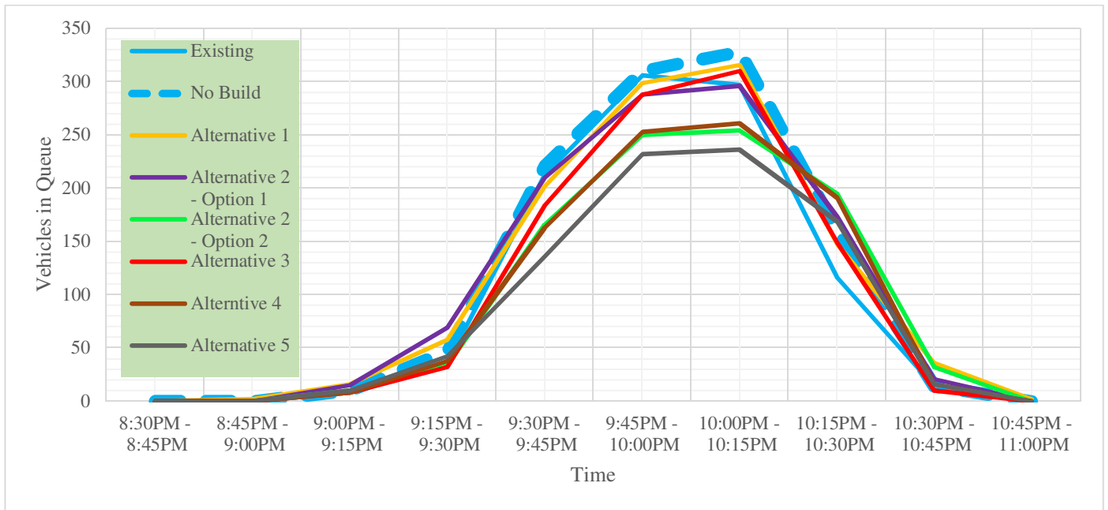


Figure 29: Approximate Number of Vehicles Queued along both I-195 and Terminal Return Road Inbound Roadway

Results from Figure 29 show an overall lower number of vehicles remaining queued along the inbound roadway for all the alternatives. Alternative 2 – Option 2 and Alternative 4 show the most improvement in reduction of vehicles in the queue. Improvements in vehicles queued is primarily due to earlier access to other BWI terminal facilities such as, the Hourly Garage, the *Express Exit Lane*, the *Authorized Vehicles Only* roadway, and the *Departures Roadway*, whereas capacity remains undersaturated throughout the inbound peak hour. Table 10 below lists the new queue distance that will block access to each BWI facility measured from the *Departures Roadway* concrete deck.

Table 10: New Access Block Distance for Each Proposed Alternative

Blocked Access	Blocked Distance (feet)						
	Existing	Alternative 1	Alternative 2 Option 1	Alternative 2 Option 2	Alternative 3	Alternative 4	Alternative 5
Express Exit Roadway	200	200	200	200	1,100	1,100	1,100
Authorized Vehicle Roadway (Lower Level)	600	600	600	600	680	680	680
Hourly Garage Entrance	830	830	1480	1,480	830	1,480	1,480
Departure Level Roadway*	1,500	1,500	1,500	1,500	1,500	1,500	1,500

* Access blocked for vehicles inbound from Terminal Return Road only

Table 11 below shows a summary result comparing the approximate maximum recorded vehicles queued for each condition associated with the time frame they were observed to occur. The difference in number of vehicles queued between the *No Build* condition against each alternatives was also calculated to compare the reduction in queued vehicles.

Table 11: Approximate Number of Queued Vehicles Recorded and Time of Occurrence

Condition	Maximum Number of Vehicles Queued	Vehicle Reduction No Build – Alt.	Time Occurrence
Existing	306	-	10:00PM to 10:15PM
No Build	328	-	10:15PM to 10:30PM
Alternative 1	316	12	10:15PM to 10:30PM
Alternative 2 – Option 1	296	32	10:15PM to 10:30PM
Alternative 2 – Option 2	254	74	10:15PM to 10:30PM
Alternative 3	310	18	10:15PM to 10:30PM
Alternative 4	261	67	10:15PM to 10:30PM
Alternative 5	236	92	10:15PM to 10:30PM

Results from Table 11 show that Alternative 2 – Option 2, Alternative 4, and Alternative 5 yields the most reduction in maximum vehicles queued by 74, 67, and 92 vehicles respectively.

B. Travel Time

Using the same travel time segments defined in Table 8 the travel time for every 15 minute interval was recorded for each condition to compare. The averaged results for each condition are summarized in Figure 30 and Figure 31.

	From I-195 Inbound	From Terminal Return Road
To Hourly Garage		
To Express Exit Lane		

Existing · No Build · Alternative 1 · Alternative 2 - Option 1 · Alternative 2 - Option 2 · Alternative 3 · Alternative 4 · Alternative 5

Figure 30: Travel Time between I-195 and Terminal Return Road to Hourly Garage and Express Exit Lane

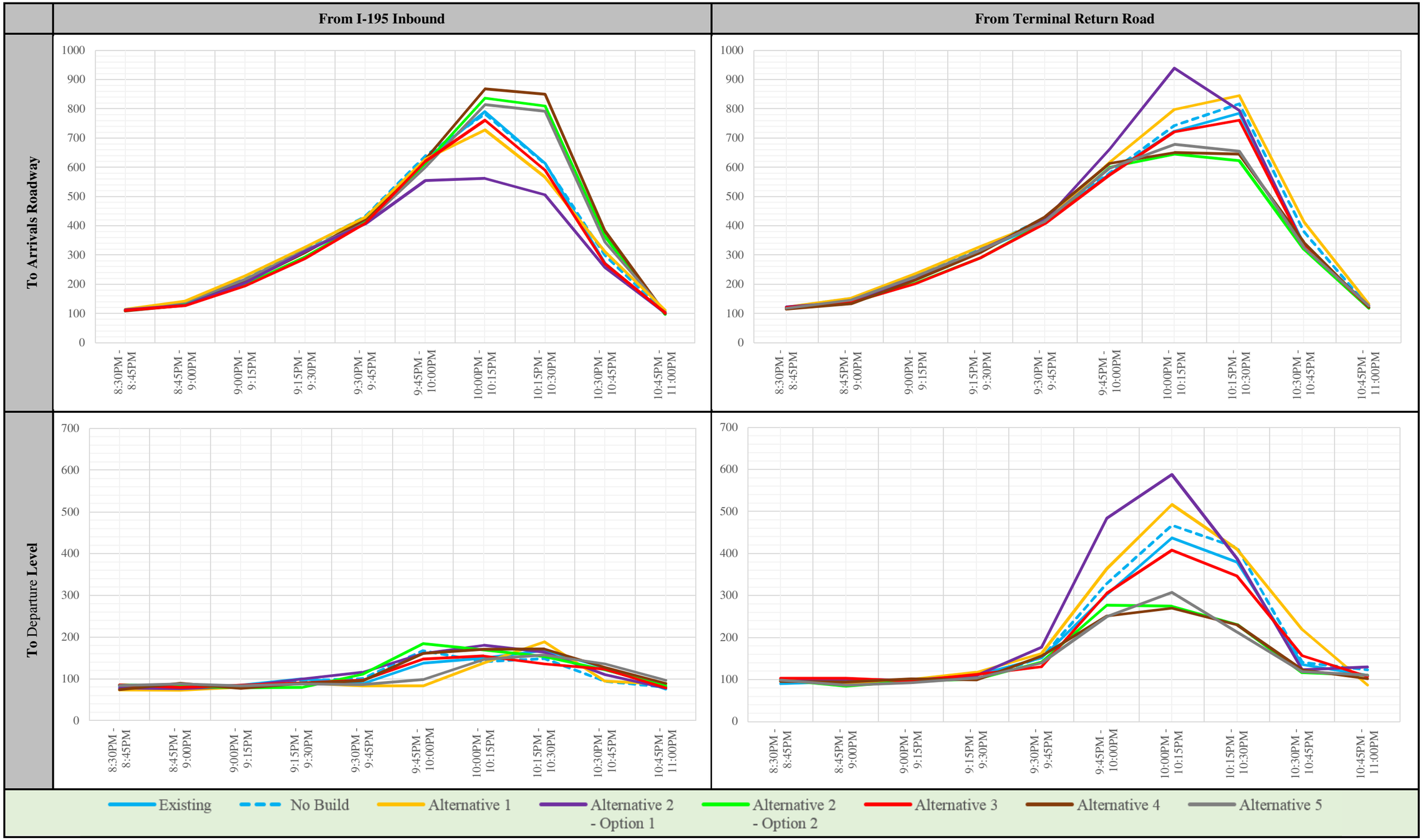


Figure 31: Travel Time between I-195 and Terminal Return Road to Arrivals Roadway and Departures Roadway

Results from both Figure 30 and Figure 31 are summarized from Table 12 through Table 19 to compare the maximum travel times from origin to destination pairs during the peak hour between the No Build condition and the proposed alternatives.

Table 12: Maximum Travel Time during Peak Hour from I-195 to Hourly Garage

Condition	Peak Hour Travel Time (Seconds)	Peak Hour Difference (Seconds) Alternative – No Build
Existing	539	-
No Build	562	-
Alternative 1	448	-114
Alternative 2 – Option 1	352	-210
Alternative 2 – Option 2	667	105
Alternative 3	508	-54
Alternative 4	682	120
Alternative 5	583	21

Table 13: Maximum Travel Time during Peak Hour from I-195 to Express Exit Lane

Condition	Peak Hour Travel Time (Seconds)	Peak Hour Difference (Seconds) Alternative – No Build
Existing	669	-
No Build	673	-
Alternative 1	557	-116
Alternative 2 – Option 1	487	-186
Alternative 2 – Option 2	698	25
Alternative 3	430	-243
Alternative 4	625	-48
Alternative 5	581	-92

Table 14: Maximum Travel Time during Peak Hour from I-195 to Arrivals Roadway

Condition	Peak Hour Travel Time (Seconds)	Peak Hour Difference (Seconds) Alternative – No Build
Existing	781	-
No Build	782	-
Alternative 1	728	-54
Alternative 2 – Option 1	592	-190
Alternative 2 – Option 2	837	55
Alternative 3	762	-20
Alternative 4	868	86
Alternative 5	814	32

Table 15: Maximum Travel Time during Peak Hour from I-195 to Departures Roadway

Condition	Peak Hour Travel Time (Seconds)	Peak Hour Difference (Seconds) Alternative – No Build
Existing	169	-
No Build	168	-
Alternative 1	189	21
Alternative 2 – Option 1	181	13
Alternative 2 – Option 2	184	16
Alternative 3	155	-13
Alternative 4	170	2
Alternative 5	158	-10

Table 16: Maximum Travel Time during Peak Hour from Terminal Return Road to Hourly Garage

Condition	Peak Hour Travel Time (Seconds)	Peak Hour Difference (Seconds) Alternative – No Build
Existing	520	-
No Build	520	-
Alternative 1	615	95
Alternative 2 – Option 1	650	130
Alternative 2 – Option 2	369	-151
Alternative 3	488	-32
Alternative 4	360	-160
Alternative 5	387	-133

Table 17: Maximum Travel Time during Peak Hour from Terminal Return Road to Express Exit Lane

Condition	Peak Hour Travel Time (Seconds)	Peak Hour Difference (Seconds) Alternative – No Build
Existing	686	-
No Build	656	-
Alternative 1	703	47
Alternative 2 – Option 1	809	153
Alternative 2 – Option 2	551	-105
Alternative 3	464	-192
Alternative 4	277	-379
Alternative 5	366	-290

Table 18: Maximum Travel Time during Peak Hour from Terminal Return Road to Arrivals Roadway

Condition	Peak Hour Travel Time (Seconds)	Peak Hour Difference (Seconds) Alternative – No Build
Existing	785	-
No Build	817	-
Alternative 1	846	29
Alternative 2 – Option 1	939	122
Alternative 2 – Option 2	646	-171
Alternative 3	762	-55
Alternative 4	651	-166
Alternative 5	679	-138

Table 19: Maximum Travel Time during Peak Hour from Terminal Return Road to Departures Roadway

Condition	Peak Hour Travel Time (Seconds)	Peak Hour Difference (Seconds) Alternative – No Build
Existing	437	-
No Build	467	-
Alternative 1	516	49
Alternative 2 – Option 1	588	121
Alternative 2 – Option 2	277	-190
Alternative 3	408	-59
Alternative 4	270	-197
Alternative 5	307	-160

The results from Table 12 through Table 19 were further summarized into Table 20 by matching each proposed alternative with the inbound roadways they favor by improving travel times from origin to destination pairs.

Table 20: Inbound Traffic Favored by Proposed Alternatives Based on Travel Times

Proposed Alternatives	I-195 Inbound	Terminal Return Road
Alternative 1	Favorable	Unfavorable
Alternative 2 – Option 1	Very Favorable	Very Unfavorable
Alternative 2 – Option 2	Unfavorable	Very Favorable
Alternative 3	Favorable	Favorable
Alternative 4	Unfavorable	Very Favorable
Alternative 5	Favorable	Very Favorable

The table above was determined based on weighted average of traffic volume against travel time saved or increased to ensure the results do not skew towards lower origin to destination pairs. The summary from Table 20 indicates that although one alternative reduces queue length and travel time for one inbound approach, it sacrifices operations on the other. Only Alternative 3 and Alternative 5 shows improvement for both I-195 inbound and the Terminal Return Road approach. Alternative 1 favors capacity along the I-195 inbound roadway by sacrificing Terminal Return Road. Alternative 2 – Option 1 significantly reduces queue length and travel time for the I-195 inbound roadway by distributing inbound traffic onto two lanes. Incoming traffic from Terminal Return Road are expected to make one right lane change to get to the Lower Level and two lane changes to get to the Departure Level. Queue length is significantly increased along Terminal Return Road and risks blocking the signalized intersection at Scott Drive. Alternative 2 – Option 2, Alternative 4, and Alternative 5 significantly increases capacity for vehicles approaching from Terminal Return Road by providing direct access to the Hourly Parking Garage. Alternative 4 and Alternative 5 also provides direct access to the Express Exit Lane.

IX. 30 MILLION ANNUAL PASSENGER TRAFFIC CONDITION

Additional analysis was performed for when traffic demand through the airport reaches 30 MAP. The analysis looks into the same MOE as the one performed for 22 MAP where the alternatives are compared to the *No Build* condition for both 22 and 30 MAP. Both queue lengths and travel times are again used for comparative analysis. Projected 30 MAP traffic volumes are shown in Figure 36.

A. Queuing Length

All the alternatives were analyzed using projected 30 MAP traffic volume demand including the volumes generated by the proposed hotel. VISSIM results are summarized in Figure 32 and Figure 33.

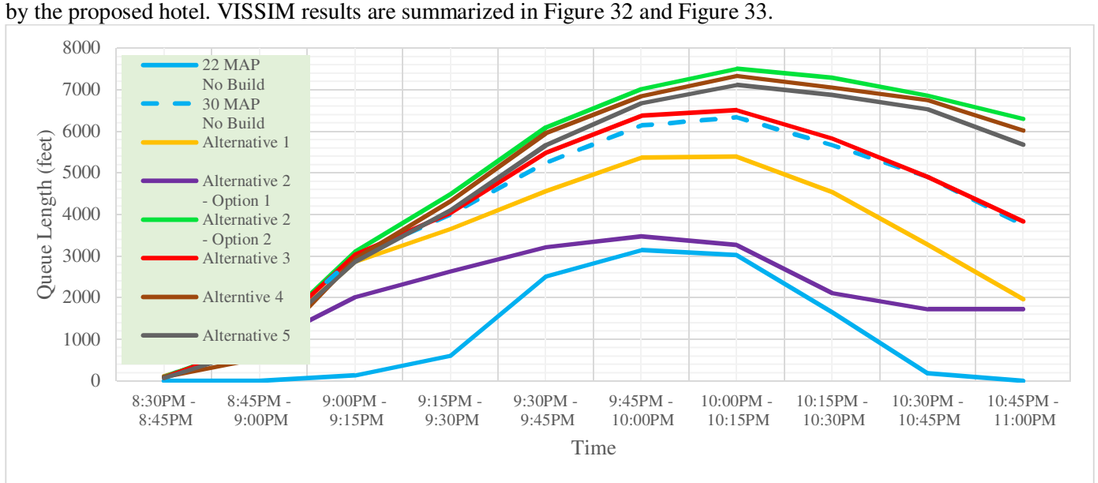


Figure 32: 30 MAP Projected Traffic Queuing for I-195 Inbound Roadway

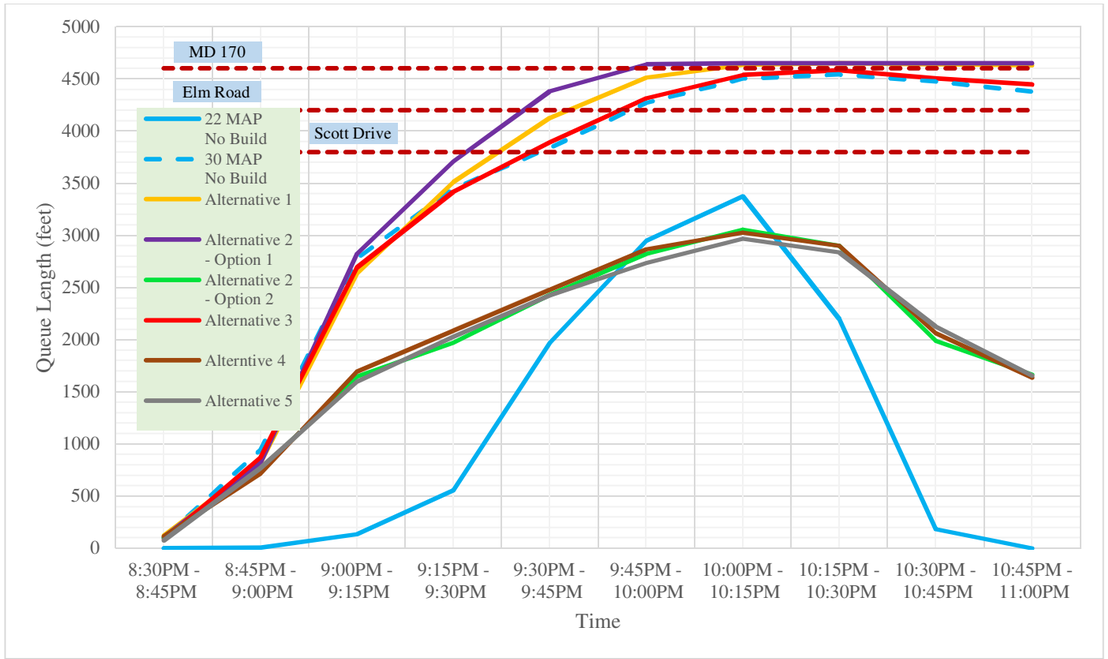


Figure 33: 30 MAP Projected Traffic Queuing for Terminal Return Road

Looking at Figure 33 for Terminal Return Road under 30 MAP traffic demands, the *No Build* – 30 MAP, Alternative 1, Alternative 2 – Option 1 and Alternative 3 show significant queuing until three intersections upstream (Scott Drive, Elm Road, and MD 170) were blocked. Actual queuing may be significantly longer than originally reported by VISSIM. Actual queuing reported only extends along Terminal Road to the intersection at MD170 and does not include vehicles blocked accessing from Cell Phone Lot left turn, Express Parking Lot right turn, Elm Road left turn, MD 170 eastbound right turn and MD 170 westbound left turn.

Results show that for 30 MAP traffic volume demand, the overall queuing does not dissipate by 11:00PM for the *No Build* or any of the Alternatives.

B. Travel Time

Travel time analysis was also performed using 30 MAP traffic demand using the same travel segments for Origin to Destination pairs as defined in Table 8. Results are summarized into Figure 34 and Figure 35.

Results show that Alternative 4 and Alternative 5 is relatively unaffected by the 30 MAP traffic volumes for vehicles originating from Terminal Return Road and destined for the Hourly Parking Garage, Express Exit Lane, and Departure Level compared to other conditions under 30 MAP traffic volumes. Travel Time for Alternative 2 – Option 2, Alternative 4, and Alternative 5 see slight increases from I-195 inbound. Alternative 2 – Option 1 shows significant degradation in travel time for vehicles originating from Terminal Return Road to all destinations.

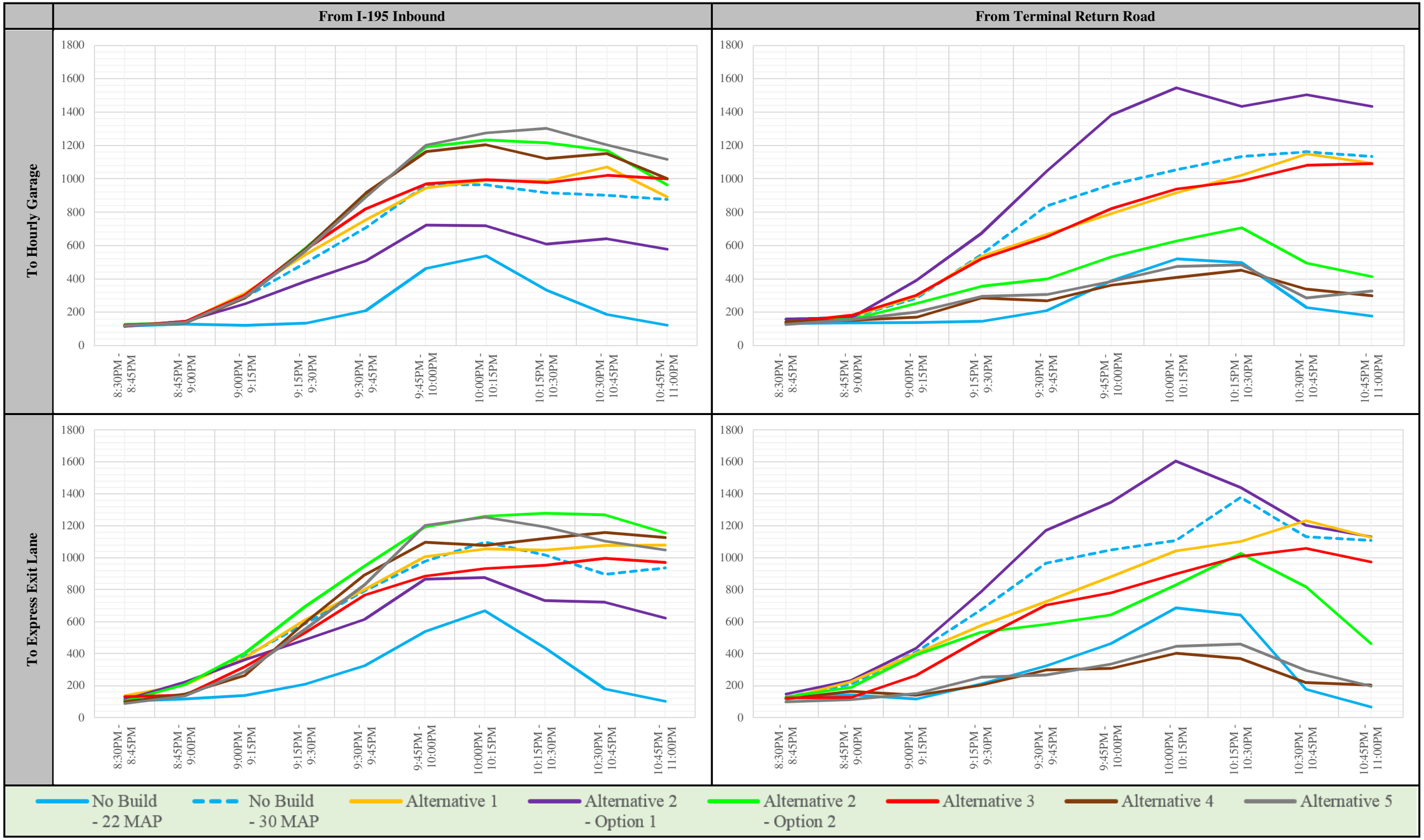


Figure 34: 30 MAP - Travel Time between I-195 and Terminal Return Road to Hourly Garage and Express Exit Lane

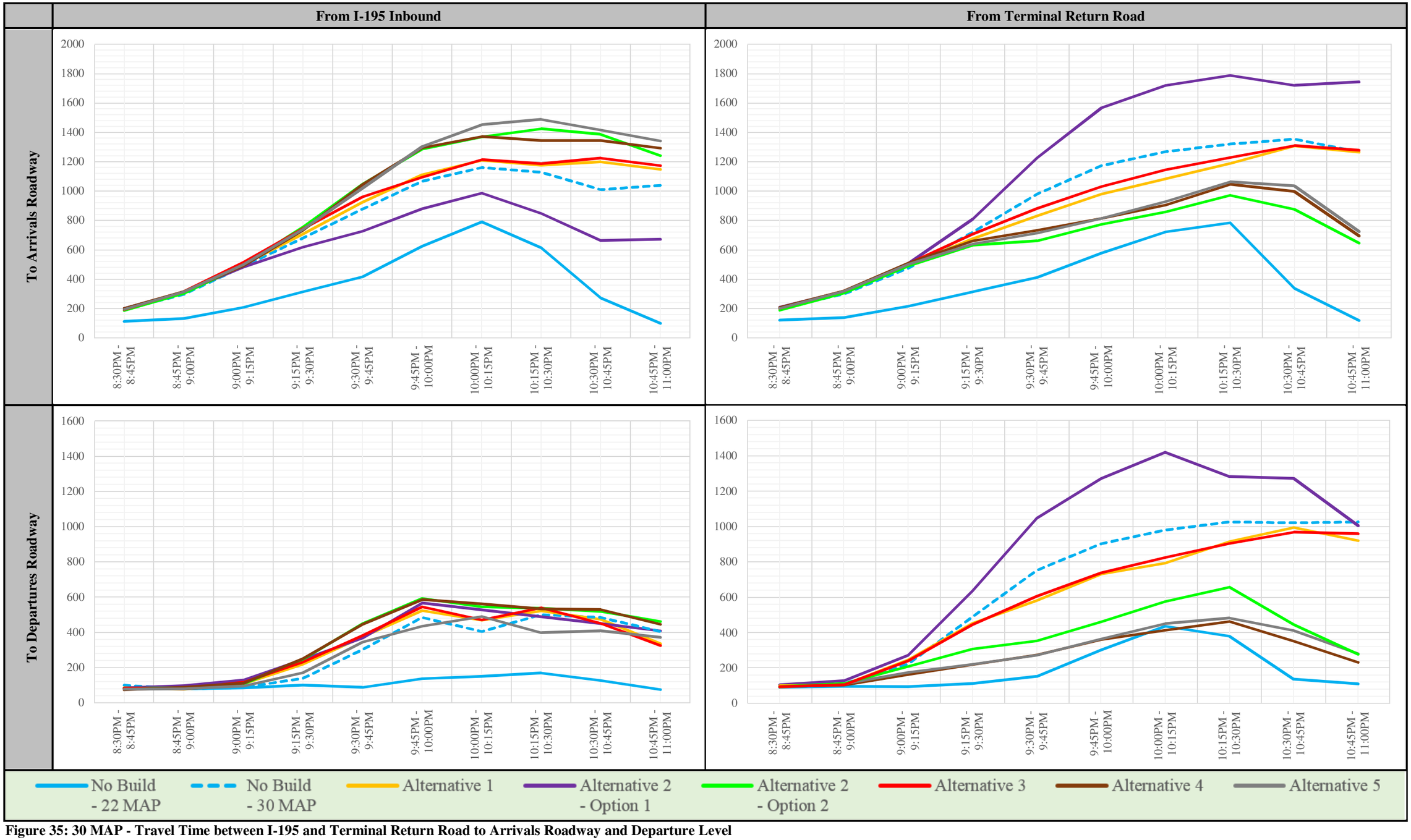
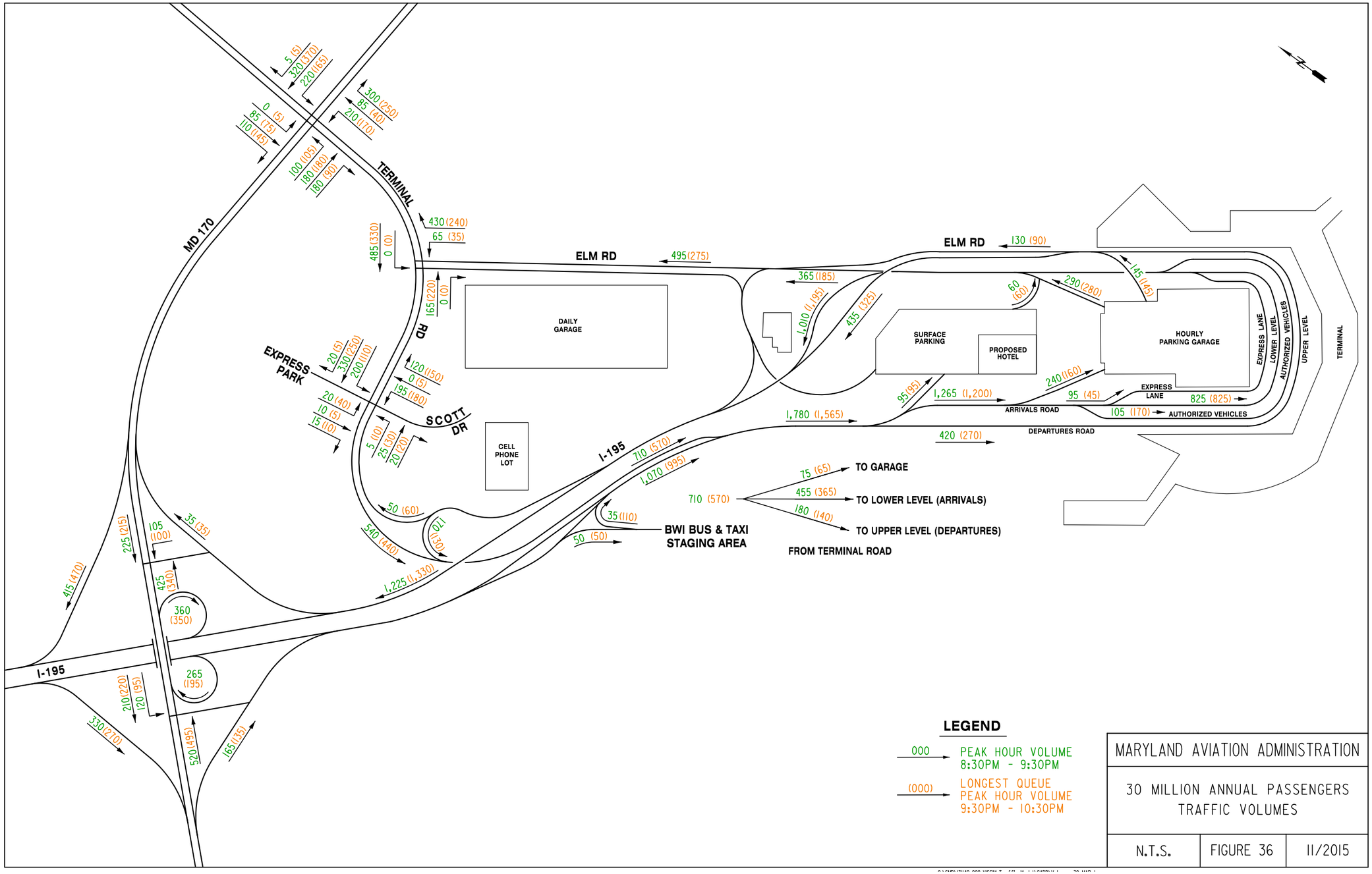


Figure 35: 30 MAP - Travel Time between I-195 and Terminal Return Road to Arrivals Roadway and Departure Level

Figure 36: 30 Million Annual Passengers Traffic Volume



X. OTHER ALTERNATIVES CONSIDERED AND DROPPED

During the course of analysis, several other alternatives were considered and dropped without conducting a full traffic analysis. These additional alternatives include:

- **Third Curbside** – This alternative involved converting the existing Express Exit Lane into a Third Curbside to be used by Non-MAA buses and shuttles. This third curbside would function as a GTC and could remove 75-100 vehicles from the curbside queue. Several options were developed in order to try to minimize the effects caused on the existing Hourly Garage. This study was dropped after it was decided that the existing Hourly Garage be removed and reconstructed with a first floor GTC.
- **Bypass Lane** – This alternative proposed to convert the existing Express Exit Lane into a Concourse A/B Bypass. This would allow vehicles headed towards the other Concourses to avoid the Concourse A/B bottleneck. The Bypass Lane alternative was created to have no impacts on the existing Hourly Garage. This option was dropped from consideration due to safety concerns caused by the merge/weave operation and the decision to rebuild the Hourly Garage with a first floor GTC.
- **Counter-flow or Contraflow** – This alternative proposed a reverse-flow lane going around the existing Hourly Garage that would have an additional curbside pick-up on the garage-side of the road. Pedestrians would then use the existing vertical circulation and skywalks to access the Concourses. This alternative was dropped due to safety concerns and the decision to rebuild the Hourly Garage with a first floor GTC.

XI. CURBSIDE DEMAND ANALYSIS

A separate deterministic methodology was developed to estimate the Arrivals Level curbside demand for each concourse. The maneuver time for each curbside LOS was estimated via an iterative process using traffic volumes and the dwell time study.

LOS C: 34 seconds
LOS D: 87 seconds
LOS E: 149 seconds
LOS F: 185 seconds

The maneuver time is based on evaluating the modeling efforts, although field observations are recommended for more detailed analysis. The average maneuver time for each LOS condition under existing 22 MAP travel demand was used to calculate the rate of queuing for unserved inbound vehicles to the Arrivals Roadway. Maneuver time for LOS F shows a rate of vehicle queuing similar to field observations. It is anticipated that a minimum of 190 to 205 vehicles per hour destined for the Arrivals roadway will need to be removed. If the peak curbside demand is expanded into Concourse C, it is anticipated that 90 to 115 vehicles will still need to be redistributed throughout the queue. This is expected to operate at a LOS C/D.

For 30 MAP traffic demand, curbside operations are expect to operate at LOS F without expansion into Concourse C, and a minimum of 330 to 355 vehicles per hour will need to be removed from the queue. If the peak curbside demand is expanded into Concourse C, it is anticipated that a minimum of 190 to 215 vehicles per hour will need to be removed from the queue. This is expected to operate at a LOS F.

The pickup area shortfall can be addressed by one of two options. The first option involves converting the 60 foot reserved police area and 75 foot coned off area into an additional 135 feet (approximately 10 spaces) of curbside parking. This will provide the additional parking supply to meet the vehicle demand based on the deterministic analysis. Expansion to the reserved police parking will provide addition parking spaces but may not be utilized because there are no terminal doors near the reserved police area. Video recordings indicate that the existing passenger car parking activity is significantly lower in these reserved areas then at the curbside region near door 3.

The second option to address the inadequate parking during 30 MAP is to divert passenger cars to the Departure Level. Based on the deterministic analysis, it is estimated that without curbside expansion into Concourse C, approximately 330 to 355 vehicles per hour need to be diverted away from Concourses A and B. If the peak curbside demand is expanded into Concourse C, approximately 190 to 215 vehicles per hour will need to be diverted.

XII. CONCLUSION

Upon analysis, all five of the roadway widening alternates analyzed were determined to provide only modest short term improvements. **The alternates presented can reduce the queue lengths for Terminal Return Road, the I-195 approach road, or both, but will not address the inbound bottleneck caused by inadequate curbside pickup length along Concourse A and B. Any reduced queue lengths from the alternates are gained by a redistribution of the queue. While the queue length may be shortened, the number of vehicles in the queue will not significantly change. Furthermore, the reduction of queue length that is shown in 22 MAP will no longer be viable at 30 MAP. All alternatives will break down at 30 MAP regardless of the queue distribution.**

Due to the minimal short term improvements and the lack of long term improvements for all five proposed alternates, this study recommends a different approach to the inbound queue challenge. We believe the Concourse A and B bottleneck can be improved by a wide range of traffic management techniques and comparatively minor construction.

The recommended improvements have been developed to help us achieve the following three goals:

1. **Reduce traffic volume destined for the lower level curb**;
2. **Spread the traffic from the A/B bag claim area to less used, but adjacent curbside areas**;
3. **Reduce the vehicle dwell time at the Terminal A/B curb areas**.

The recommended improvements that follow are grouped in two basic categories, **1. -Operational Improvements**; and **2. - Capital Improvements:**

<u>Operational Improvements:</u>

1. Reduce the number of taxis allowed to access the curb at one time. Approximate cost – Minimal for signage relocation. This is a contractual item between Operations and the Taxi Provider and no operational or capital construction costs are anticipated except for sign relocations.

2. Maintain improved lower level lighting – MAA Maintenance to verify all LED light bulbs are functioning properly. No additional cost beyond regular maintenance activities.

3. Reduce the length of the Terminal A lower level curb reserved for MTA buses, hotel shuttles, police staging and traffic cones to create a longer contiguous Terminal A/B public curbside – there is 410 feet of underutilized curb prior to vestibule door #2 that could be made more available for passenger pick-up to help alleviate the congestion across from doors #2, 3 and 4. Approximate cost of reducing length by relocating MTA Bus Stop is shown in Item Number 4.

4. Examine and consider the feasibility of relocating the MTA bus stop from the Terminal A curb to another lower level location – this would recapture almost 100 feet of curb to spread the congestion at doors #2, 3 and 4. **Approximate cost - $195,000 for bus shelter and signage relocation;**

5. Create a free cell phone application that shows flight arrival and baggage carousel arrival times. **Approximate cost - $100,000.***

   * Cost was estimated from experience with an app RFP that provided estimates from $50,000 - $75,000; this has been rounded to $100,000 based on integration of different data sources.

6. Install sequential column numbers on the lower level structural columns to encourage dispersion of passenger pickup, and install a sign in the cell phone lot indicating pick-up zones to increase public awareness of zone system – **approximate cost $195,000**. Also, install (easel type?) signs on top of bag claim belts 1 through 5 indicating column numbers where passengers should meet their vehicles to spread passengers along the curb, reduce congestion and shape passenger behavior - the goal being passengers will call their ride and say, "pick me up at column #__". Easel signs are produced in-house and would not have significant cost. Combined with passenger education, these measures would help spread lower level curbside congestion away from vestibule doors #2, 3 and 4;

7. Encourage all airline passengers with no bags to be picked up on the upper level. Encourage Southwest utilization of Bag Claim units 6 and 7 in the B/C zone to disperse Southwest arriving passenger vehicle pick-ups – this would help spread the vehicle congestion away from doors #2, 3 and 4. **Approximate cost – $230,000**. Cost includes 4 wayfinding VMS signs inside the terminal building, terminal announcements, website information, etc. to modify passenger behavior and reduce number of lower level pick-ups. Terminal announcements and website improvements are assumed to have no additional costs.

8. Increase curb dwell time enforcement (primarily between 8pm and 11pm) through MdTA and curbside management services– reduction in dwell time from an observed average of approximately 2.5 minutes to approximately 1.5 minutes or lower during peak evening arrivals should greatly reduce vehicle congestion on the terminal roadway approach. **Cost of contracted curbside management support could range between $500,000 - $1M annually, depending upon the service offerings engaged by MAA**.

9. Institute a per-trip fee for private commercial vehicle (hotel and off-site parking shuttles, etc.) curbside access – this could help reduce vehicle trips on the terminal approach roadway and lower level curb. Approximate cost assumed to be administered by BWI Marshall Ground Transportation and Parking hiring a third party vendor (curbside management services, as mentioned earlier) to finance and operate equipment as well as administer fee collection and enforcement. **Installation is expected to be cost-neutral assuming the contractor will be paid through the generated per-trip fees**.

Capital Improvements:

1. Restripe the existing "wide lane" adjacent to the lower level public curb to provide a dedicated lane for the curb, and enforce lane position and dwell time with resources identified in #2 above – this will reduce the number of vehicles that extend across more than one lane at the curb during passenger pick-up, and provide improved vehicular flow. **Approximate cost - $55,000**;

2. Construct lower level "commercial curb slot project" (currently in Design) – this will provide authorized vehicles (shuttle buses, taxis, etc.) with additional dedicated roadway length to access the lower level inner commercial curb. **Approximate cost - $410,000**;

3. Relocate cell phone lot to existing taxi staging area to provide more convenient access, and relocate taxis to another location. **Approximate cost – $1.2 Million** includes relocating taxi administration buildings with restrooms, paving and striping in both locations.

4. Install variable message signs in strategic locations to alert passenger vehicles of congestion, with alternate directions. See the **BWI Thurgood Marshall Airport Roadways Electronic Signage Replacement Study MAA–AE-14-003** for additional information. The design of this project is ongoing but not funded for construction. **Approximate cost - $1.9 Million to $5.0 Million;**

Additional measures to be considered after further evaluation:

1. Free 30 minute parking in the Hourly Garage between 8pm and 11pm to remove vehicles from lower level roadway congestion.

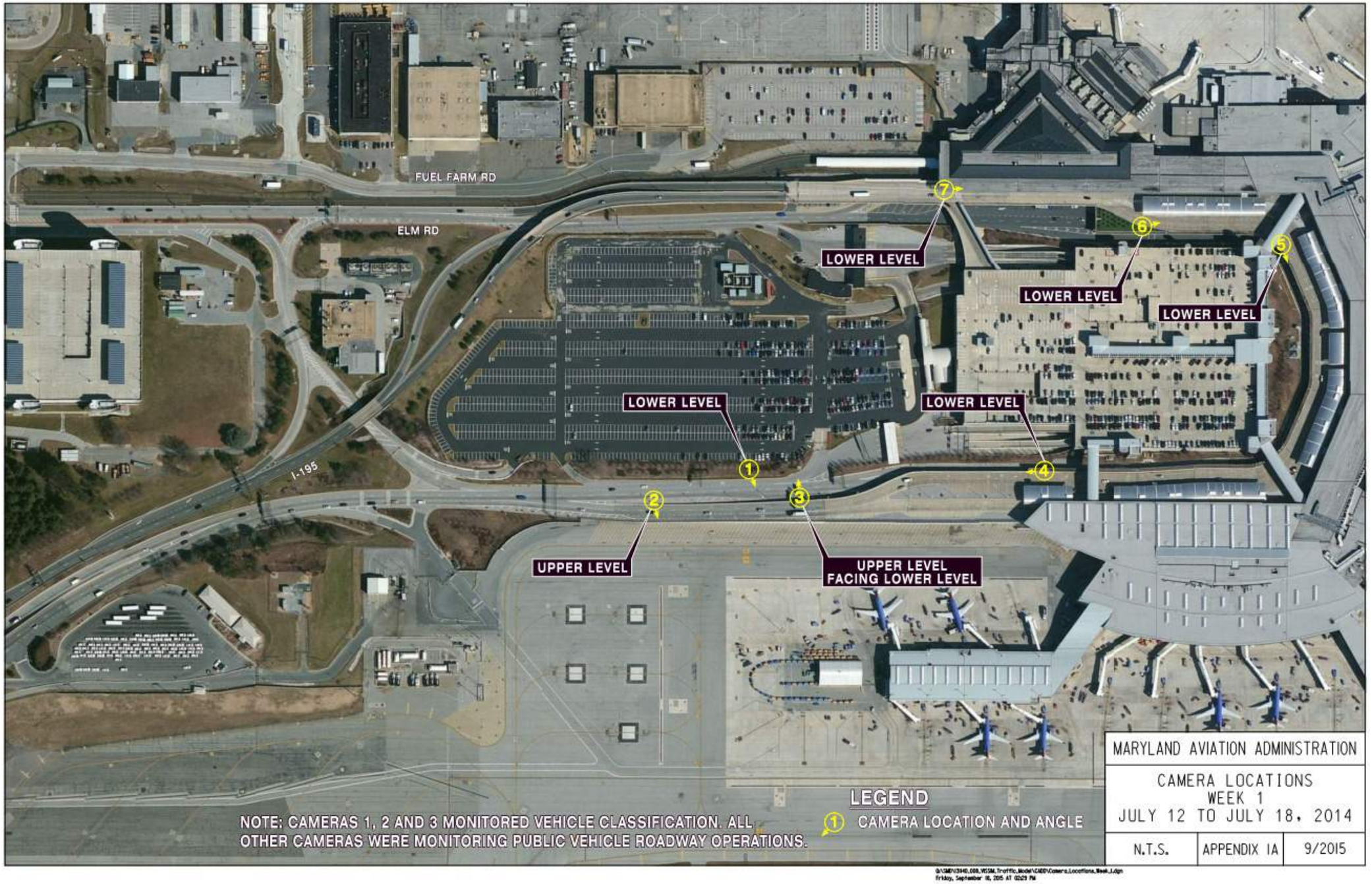
2. Tear down and reconstruct the Hourly Garage with a Ground Transportation Center on the first floor.

3. Construct a "Triple Curb" on the Lower Level to function as a Ground Transportation Center.

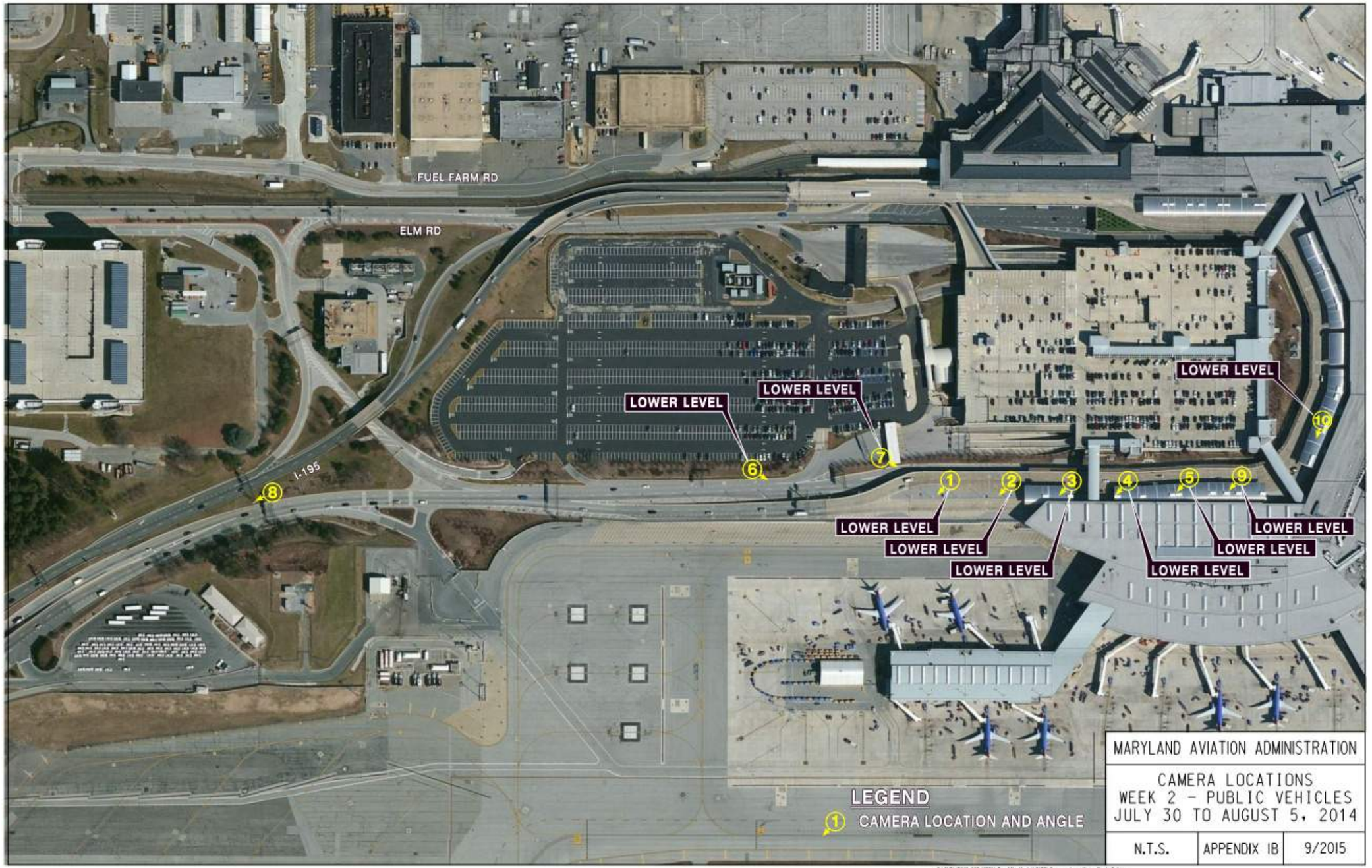
4. Construct an Automated People Mover system to reduce MAA bus trips to the curbside.

5. Provide separate roadway and curbside access to future Concourse F.

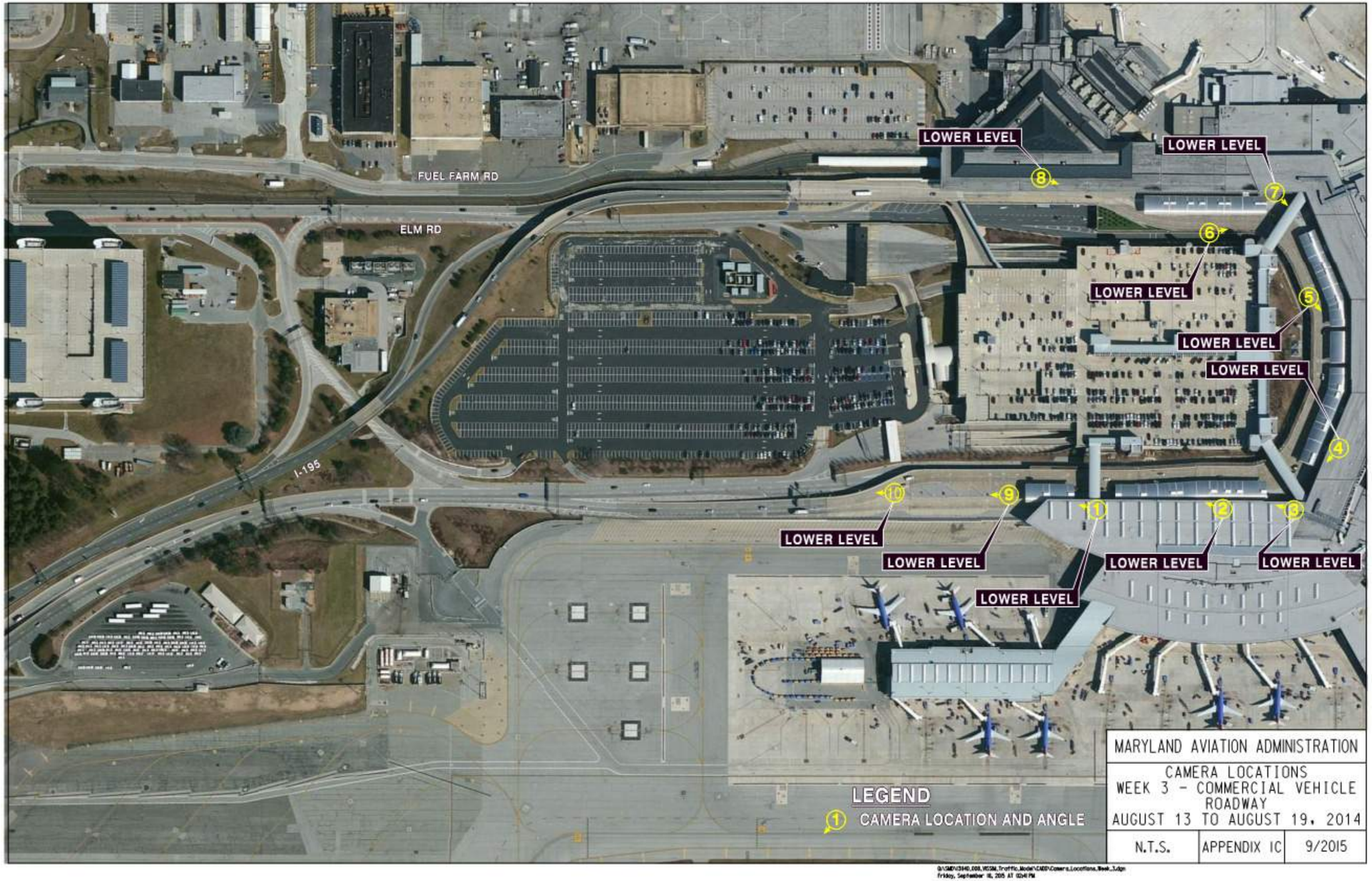
Appendix 1a: Camera Locations Week 1, July 11 to July 18, 2014



Appendix 1b: Camera Locations Week 2, July 30 to August 5, 2014



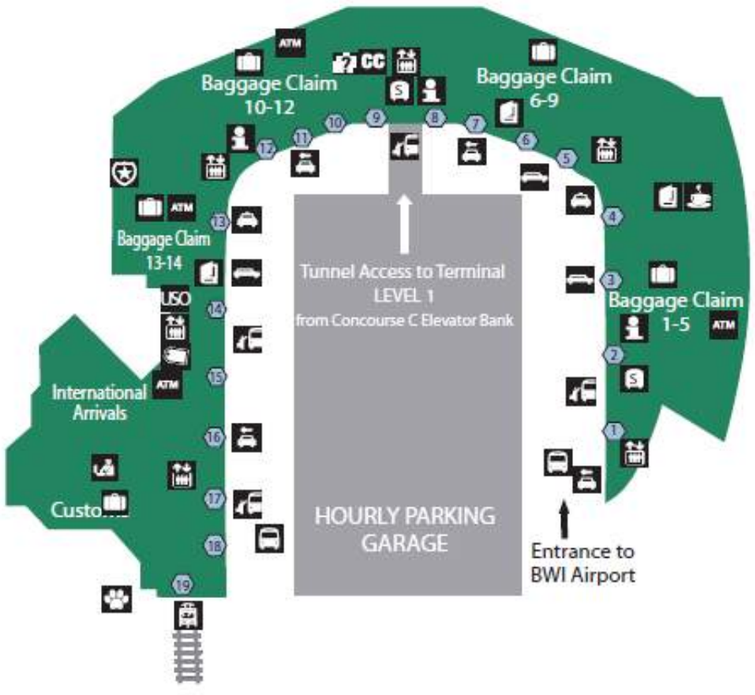
Appendix 1c: Camera Locations Week 3, August 13 to August 19, 2014



Appendix 2: Traffic Count (Tubes) Locations, Summer 2014

Appendix 3: BWI Marshall Airport Gate and Concourse Locations

Lower Level Terminal Map



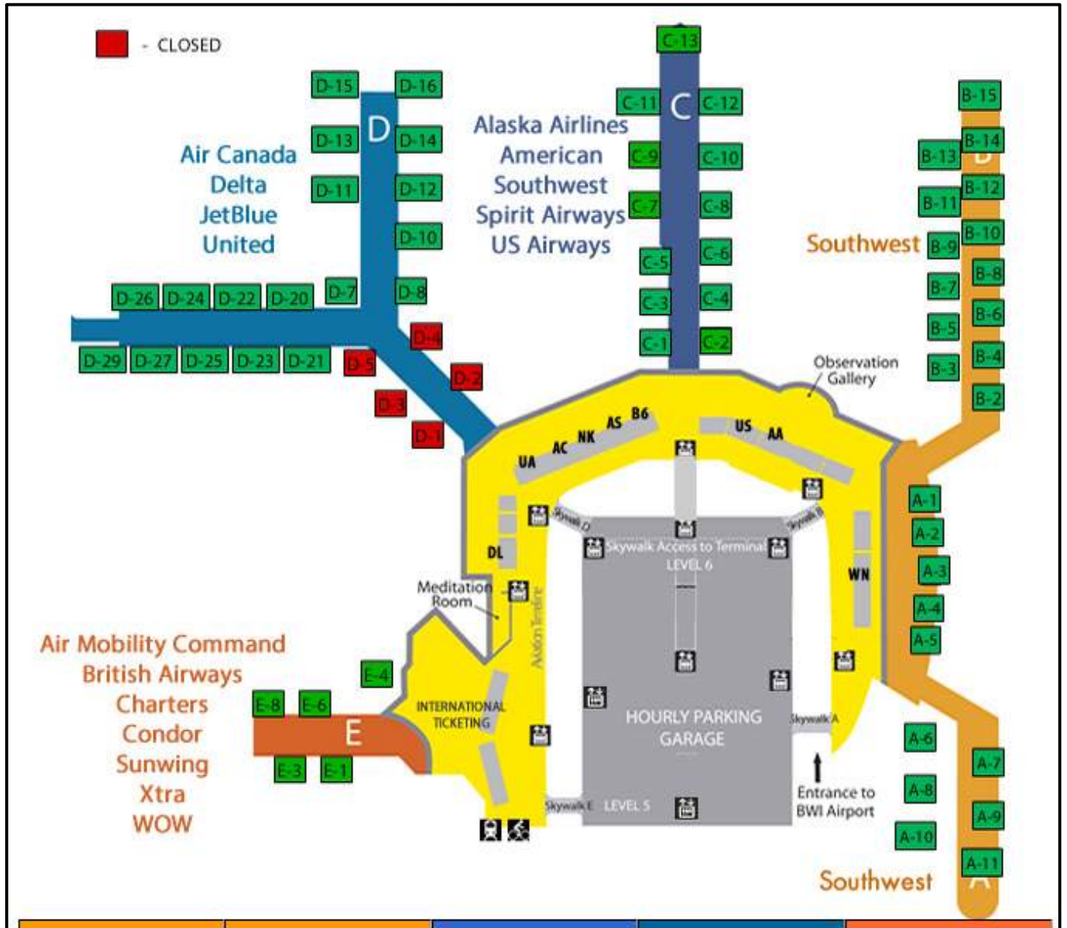
SERVICES

- Automatic Teller Machine
- Baggage Claim
- Best Buy Express by Zoom Systems
- Career Center
- Customs and Border Protection
- Elevator
- Euro Café
- Hudson News
- Information
- Pet Relief Area
- Police
- TSA Lost and Found
- United Service Organizations
- Door to roadway

GROUND TRANSPORTATION

- Light Rail
- Limousine
- Parking Shuttle/Amtrak-MARC
- Public Transit Regional Bus/MTA
- SuperShuttle and Airport Shuttle
- Taxi Stand
- Car Rental Shuttle

Appendix 4: BWI Marshall Airport Lower Level Bus and Taxi Stand/Stop with Door Locations



Concourse A	Concourse B	Concourse C	Concourse D	Concourse E
Use Skywalk A or B	*Use Skywalk B*	*Use Skywalk B or D, or Tunnel*	*Use Skywalk D*	*Use Skywalk E*
Southwest (WN)	Southwest (WN)	Alaska Airlines (AS)	Air Canada (AC)	Air Mobility Command (AMC)
		American (AA)	Delta (DL)	British Airways (BA)
		Southwest (WN)	JetBlue (B6)	Charters
		Spirit (NK)	United (UA)	Condor
		US Airways (US)		Sunwing (WG)
				Xtra (XP)
				WOW (WW)

Appendix 5a: Concourse A Passenger Cars Friday Evening Dwell Time

Dwell Time Data Collection (Passenger car)

Date & Day: 8/1/2014, Friday
Time: 4:30PM - 10:30 PM
Concourse: A
Comments: NA

Time Interval	Average Dwell time (H:MM:SS)	Standard Deviation (H:MM:SS)	Number of Observations	Minimum Time (H:MM:SS)	Maximum Time (H:MM:SS)
4:30 PM - 4:45 PM	0:06:52	0:11:09	19	0:00:27	0:38:33
4:45 PM - 5:00 PM	0:04:24	0:07:34	20	0:00:24	0:27:16
5:00 PM - 5:15 PM	0:05:35	0:12:25	12	0:00:11	0:43:16
5:15 PM - 5:30 PM	0:03:08	0:07:25	23	0:00:14	0:36:25
5:30 PM - 5:45 PM	0:06:15	0:11:11	18	0:00:43	0:46:35
5:45 PM - 6:00 PM	0:02:28	0:01:41	16	0:00:24	0:05:46
6:00 PM - 6:15 PM	0:05:21	0:07:00	15	0:00:35	0:22:34
6:15 PM - 6:30 PM	0:03:04	0:03:54	15	0:00:14	0:14:50
6:30 PM - 6:45 PM	0:02:49	0:02:44	20	0:00:16	0:09:46
6:45 PM - 7:00 PM	0:01:54	0:01:36	34	0:00:13	0:05:41
7:00 PM - 7:15 PM	0:05:49	0:09:31	20	0:00:16	0:32:35
7:15 PM - 7:30 PM	0:03:44	0:04:36	13	0:00:14	0:13:20
7:30 PM - 7:45 PM	0:02:44	0:03:27	25	0:00:12	0:12:36
7:45 PM - 8:00 PM	0:04:42	0:05:48	18	0:00:27	0:17:59
8:00 PM - 8:15 PM	0:02:59	0:05:43	27	0:00:09	0:21:40
8:15 PM - 8:30 PM	0:02:14	0:02:38	25	0:00:08	0:09:34
8:30 PM - 8:45 PM	0:01:58	0:02:02	29	0:00:12	0:07:40
8:45 PM - 9:00 PM	0:03:31	0:04:40	26	0:00:19	0:22:02
9:00 PM - 9:15 PM	0:03:21	0:03:23	22	0:00:17	0:12:47
9:15 PM - 9:30 PM	0:04:07	0:06:46	21	0:00:10	0:27:25
9:30 PM - 9:45 PM	0:05:48	0:06:48	11	0:00:35	0:19:52
9:45 PM - 10:00 PM	0:02:46	0:02:13	17	0:01:00	0:10:19
10:00 PM - 10:15 PM	0:02:13	0:01:32	27	0:00:19	0:05:03
10:15 PM - 10:30 PM	0:02:28	0:02:46	35	0:00:29	0:11:34

Peak Period Average (8:30 PM - 10:30 PM)	0:03:00
Peak Hour Average (9:00 PM - 10:00 PM)	0:03:49
Off Peak Average	0:03:47
Overall Average	0:03:30

Appendix 5b: Concourse B Passenger Cars Friday Evening Dwell Time

Dwell Time Data Summary (Passenger cars)

Date & Day: 8/1/2014, Friday
Time: 4:30PM - 10:30 PM
Concourse: B
Comments: NA

Time Interval	Average Dwell time (H:MM:SS)	Standard Deviation (H:MM:SS)	Number of Observations	Minimum Time (H:MM:SS)	Maximum Time (H:MM:SS)
4:30 PM - 4:45 PM	0:02:58	0:02:50	22	0:00:21	0:10:48
4:45 PM - 5:00 PM	0:02:07	0:02:27	23	0:00:07	0:11:50
5:00 PM - 5:15 PM	0:04:21	0:04:59	18	0:00:08	0:16:59
5:15 PM - 5:30 PM	0:03:50	0:08:03	29	0:00:08	0:36:49
5:30 PM - 5:45 PM	0:01:28	0:01:05	14	0:00:07	0:04:40
5:45 PM - 6:00 PM	0:02:31	0:02:37	15	0:00:15	0:08:53
6:00 PM - 6:15 PM	0:01:58	0:01:40	19	0:00:11	0:07:27
6:15 PM - 6:30 PM	0:02:33	0:03:52	14	0:00:16	0:14:51
6:30 PM - 6:45 PM	0:01:51	0:01:42	24	0:00:15	0:06:25
6:45 PM - 7:00 PM	0:01:54	0:01:46	25	0:00:16	0:07:06
7:00 PM - 7:15 PM	0:03:55	0:06:01	24	0:00:11	0:19:52
7:15 PM - 7:30 PM	0:02:11	0:02:51	21	0:00:12	0:12:04
7:30 PM - 7:45 PM	0:02:11	0:04:23	27	0:00:08	0:21:22
7:45 PM - 8:00 PM	0:02:09	0:02:55	22	0:00:08	0:10:51
8:00 PM - 8:15 PM	0:02:24	0:02:44	26	0:00:23	0:13:45
8:15 PM - 8:30 PM	0:02:03	0:02:09	33	0:00:13	0:08:48
8:30 PM - 8:45 PM	0:01:16	0:01:06	38	0:00:07	0:06:12
8:45 PM - 9:00 PM	0:04:18	0:07:26	19	0:00:20	0:30:25
9:00 PM - 9:15 PM	0:03:32	0:05:21	24	0:00:12	0:25:12
9:15 PM - 9:30 PM	0:02:46	0:04:40	27	0:00:05	0:21:45
9:30 PM - 9:45 PM	0:01:52	0:02:30	27	0:00:08	0:08:43
9:45 PM - 10:00 PM	0:00:59	0:00:41	30	0:00:14	0:02:44
10:00 PM - 10:15 PM	0:01:55	0:02:30	26	0:00:14	0:11:16
10:15 PM - 10:30 PM	0:02:06	0:02:09	34	0:00:08	0:09:58

Peak Period Average (8:30 PM - 10:30 PM)	0:02:11
Peak Hour Average (9:00 PM - 10:00 PM)	0:02:22
Off Peak Average	0:02:32
Overall Average	0:02:24

Appendix 5c: Concourse B/C Passenger Cars Friday Evening Dwell Time

Dwell Time Data Summary (Passenger cars)

Date & Day: 8/1/2014, Friday
Time: 4:30PM - 10:30 PM
Concourse: B/C
Comments: NA

Time Interval	Average Dwell time (H:MM:SS)	Standard Deviation (H:MM:SS)	Number of Observations	Minimum Time (H:MM:SS)	Maximum Time (H:MM:SS)
4:30 PM - 4:45 PM	0:05:04	0:03:44	6	0:01:42	0:10:10
4:45 PM - 5:00 PM	0:09:02	0:10:05	8	0:00:09	0:25:37
5:00 PM - 5:15 PM	0:05:51	0:05:25	7	0:00:10	0:13:24
5:15 PM - 5:30 PM	0:05:00	0:05:00	8	0:00:30	0:12:16
5:30 PM - 5:45 PM	0:06:13	0:04:34	3	0:02:44	0:11:23
5:45 PM - 6:00 PM	0:01:52	0:02:53	8	0:00:07	0:08:52
6:00 PM - 6:15 PM	0:05:25	0:06:54	9	0:00:09	0:22:23
6:15 PM - 6:30 PM	0:02:56	0:02:48	11	0:00:10	0:07:16
6:30 PM - 6:45 PM	0:02:20	0:01:51	14	0:00:08	0:06:28
6:45 PM - 7:00 PM	0:02:07	0:02:38	22	0:00:09	0:08:25
7:00 PM - 7:15 PM	0:05:20	0:06:44	9	0:00:11	0:18:56
7:15 PM - 7:30 PM	0:03:07	0:02:52	9	0:00:35	0:08:05
7:30 PM - 7:45 PM	0:04:20	0:06:52	17	0:00:34	0:22:52
7:45 PM - 8:00 PM	0:02:53	0:01:56	4	0:00:05	0:04:31
8:00 PM - 8:15 PM	0:04:20	0:07:17	14	0:00:26	0:21:27
8:15 PM - 8:30 PM	0:04:41	0:04:09	10	0:00:35	0:13:18
8:30 PM - 8:45 PM	0:01:35	0:01:27	18	0:00:24	0:06:16
8:45 PM - 9:00 PM	0:08:43	0:09:46	12	0:00:20	0:30:32
9:00 PM - 9:15 PM	0:07:52	0:10:16	8	0:00:36	0:31:27
9:15 PM - 9:30 PM	0:05:06	0:04:42	12	0:00:25	0:14:55
9:30 PM - 9:45 PM	0:02:25	0:03:13	19	0:00:10	0:12:23
9:45 PM - 10:00 PM	0:02:26	0:04:35	15	0:00:22	0:18:44
10:00 PM - 10:15 PM	0:02:43	0:04:16	21	0:00:10	0:17:03
10:15 PM - 10:30 PM	0:04:00	0:05:33	17	0:00:14	0:19:49

Peak Period Average (8:30 PM - 10:30 PM)	0:03:48
Peak Hour Average (9:00 PM - 10:00 PM)	0:03:49
Off Peak Average	0:04:04
Overall Average	0:03:57

Appendix 5d: Concourse D Passenger Cars Friday Evening Dwell Time

Dwell Time Data Summary (Passenger cars)

Date & Day: 7/18/2014, Friday
Time: 4:30PM - 10:30 PM
Concourse: D
Comments: NA

Time Interval	Average Dwell time (H:MM:SS)	Standard Deviation (H:MM:SS)	Number Of Observations	Minimum Time (H:MM:SS)	Maximum Time (H:MM:SS)
4:30 PM - 4:45 PM	0:01:45	0:02:27	16	0:00:17	0:10:31
4:45 PM - 5:00 PM	0:04:24	0:04:28	10	0:00:40	0:14:24
5:00 PM - 5:15 PM	0:02:46	0:03:13	13	0:00:20	0:09:48
5:15 PM - 5:30 PM	0:02:20	0:01:12	17	0:00:17	0:04:15
5:30 PM - 5:45 PM	0:02:12	0:01:50	19	0:00:11	0:06:45
5:45 PM - 6:00 PM	0:03:03	0:03:05	19	0:00:46	0:14:44
6:00 PM - 6:15 PM	0:06:22	0:09:00	8	0:00:27	0:27:44
6:15 PM - 6:30 PM	0:02:57	0:02:44	13	0:00:41	0:09:10
6:30 PM - 6:45 PM	0:07:01	0:07:29	11	0:01:09	0:25:05
6:45 PM - 7:00 PM	0:01:13	0:01:07	14	0:00:08	0:03:42
7:00 PM - 7:15 PM	0:01:28	0:01:10	28	0:00:16	0:06:11
7:15 PM - 7:30 PM	0:01:21	0:01:20	11	0:00:15	0:05:02
7:30 PM - 7:45 PM	0:05:03	0:06:12	13	0:00:14	0:22:49
7:45 PM - 8:00 PM	0:05:40	0:04:43	5	0:00:24	0:11:59
8:00 PM - 8:15 PM	0:03:31	0:03:51	10	0:00:06	0:11:18
8:15 PM - 8:30 PM	0:05:02	0:09:33	6	0:00:38	0:24:32
8:30 PM - 8:45 PM	0:08:43	0:05:50	7	0:02:08	0:14:57
8:45 PM - 9:00 PM	0:07:14	0:06:11	5	0:00:46	0:14:06
9:00 PM - 9:15 PM	0:04:22	0:03:35	9	0:00:19	0:10:38
9:15 PM - 9:30 PM	0:02:29	0:01:45	13	0:00:18	0:05:22
9:30 PM - 9:45 PM	0:03:08	0:07:25	18	0:00:11	0:32:17
9:45 PM - 10:00 PM	0:01:33	0:01:00	9	0:00:23	0:03:13
10:00 PM - 10:15 PM	0:10:26	0:10:26	6	0:00:31	0:20:48
10:15 PM - 10:30 PM	0:08:09	0:08:34	10	0:01:04	0:29:23

Peak Period Average (8:30 PM - 10:30 PM)	0:04:59
Peak Hour Average (9:00 PM - 10:00 PM)	0:02:54
Off Peak Average	0:03:02
Overall Average	0:03:33

Appendix 5e: Concourse E Passenger Cars Friday Evening Dwell Time

Dwell Time Data Summary (passenger cars)

Date & Day: 7/18/2014, Friday
Time: 4:30PM - 10:30 PM
Concourse: E
Comments: NA

Time Interval	Average Dwell time (H:MM:SS)	Standard Deviation (H:MM:SS)	Number of Observations	Minimum Time (H:MM:SS)	Maximum Time (H:MM:SS)
4:30 PM - 4:45 PM	0:01:15	0:00:54	3	0:00:26	0:02:12
4:45 PM - 5:00 PM	0:06:40	0:04:30	3	0:02:00	0:10:58
5:00 PM - 5:15 PM	0:02:54	0:04:35	4	0:00:21	0:09:46
5:15 PM - 5:30 PM	0:00:44	0:00:29	6	0:00:12	0:01:18
5:30 PM - 5:45 PM	0:01:46	0:01:09	7	0:00:20	0:03:37
5:45 PM - 6:00 PM	0:00:44	0:00:38	4	0:00:10	0:01:34
6:00 PM - 6:15 PM	0:04:02	0:03:11	3	0:00:22	0:05:58
6:15 PM - 6:30 PM	0:01:35	0:02:22	6	0:00:12	0:06:22
6:30 PM - 6:45 PM	0:01:37	0:01:02	8	0:00:12	0:03:30
6:45 PM - 7:00 PM	0:02:05	0:01:27	7	0:00:16	0:04:02
7:00 PM - 7:15 PM	0:05:53	0:09:50	9	0:00:18	0:31:27
7:15 PM - 7:30 PM	0:03:00	0:02:53	11	0:00:06	0:10:24
7:30 PM - 7:45 PM	0:02:06	0:00:49	7	0:00:49	0:03:01
7:45 PM - 8:00 PM	0:06:40	0:05:51	9	0:00:43	0:09:46
8:00 PM - 8:15 PM	0:11:07	0:11:33	10	0:00:13	0:29:56
8:15 PM - 8:30 PM	0:05:53	0:04:36	5	0:01:44	0:12:37
8:30 PM - 8:45 PM	0:06:58	0:10:35	3	0:00:31	0:19:11
8:45 PM - 9:00 PM	0:08:34	0:10:03	7	0:00:13	0:30:25
9:00 PM - 9:15 PM	0:03:15	0:01:57	11	0:00:31	0:06:13
9:15 PM - 9:30 PM	0:03:13	0:02:30	7	0:00:06	0:06:58
9:30 PM - 9:45 PM	0:01:27	0:01:00	6	0:00:22	0:02:57
9:45 PM - 10:00 PM	0:02:19	0:00:04	2	0:00:16	0:02:21
10:00 PM - 10:15 PM	0:04:04	0:05:58	7	0:00:09	0:16:49
10:15 PM - 10:30 PM	0:06:34	0:06:45	9	0:00:17	0:22:19

Peak Period Average (8:30 PM - 10:30 PM)	0:04:37
Peak Hour Average (9:00 PM - 10:00 PM)	0:02:45
Off Peak Average	0:03:58
Overall Average	0:04:11

OPERATIONAL IMPROVEMENTS

1. Reduce the Number of Taxis allowed Curb Access

From: Franz Ollerman <follerman1@bwiairport.com> Sent: Thu 12/10/2015 3:44 PM
To: Lookenbill, David; Wayne Schuster
Cc: AHara, Allan; Ray, Jennifer; Wolniak, Matthew; Stratmeyer, Robert; Gary, Sarah; Stewart, David
Subject: RE: DRAFT - lower level roadway/curb recommendations

Dave,

I talked with Ralign and we have the following responses:

Traffic Managers – he was planning on $13 per hour base level people. Expecting an annual budget of $750,000 for traffic managers.

B/C bag claim – no issues with what you have below.

Shorten taxi queue – no cost issues, it is not in their contract.

Trip Fee implementation – the plan is to hire a company to manage this function – they will supply their own equipment, a revenue positive operation.

Free garage parking – go ahead and estimate it.

Alex

From: Lookenbill, David [mailto:DLookenbill@jmt.com]
Sent: Thursday, December 10, 2015 7:55 AM
To: Wayne Schuster; Franz Ollerman
Cc: AHara, Allan; Ray, Jennifer; Wolniak, Matthew; Stratmeyer, Robert; Gary, Sarah; Stewart, David
Subject: RE: DRAFT - lower level roadway/curb recommendations

Wayne and Alex,

We will get on it right away. The following are some thoughts on the pricing that we need to coordinate and maybe get some clarification from you:

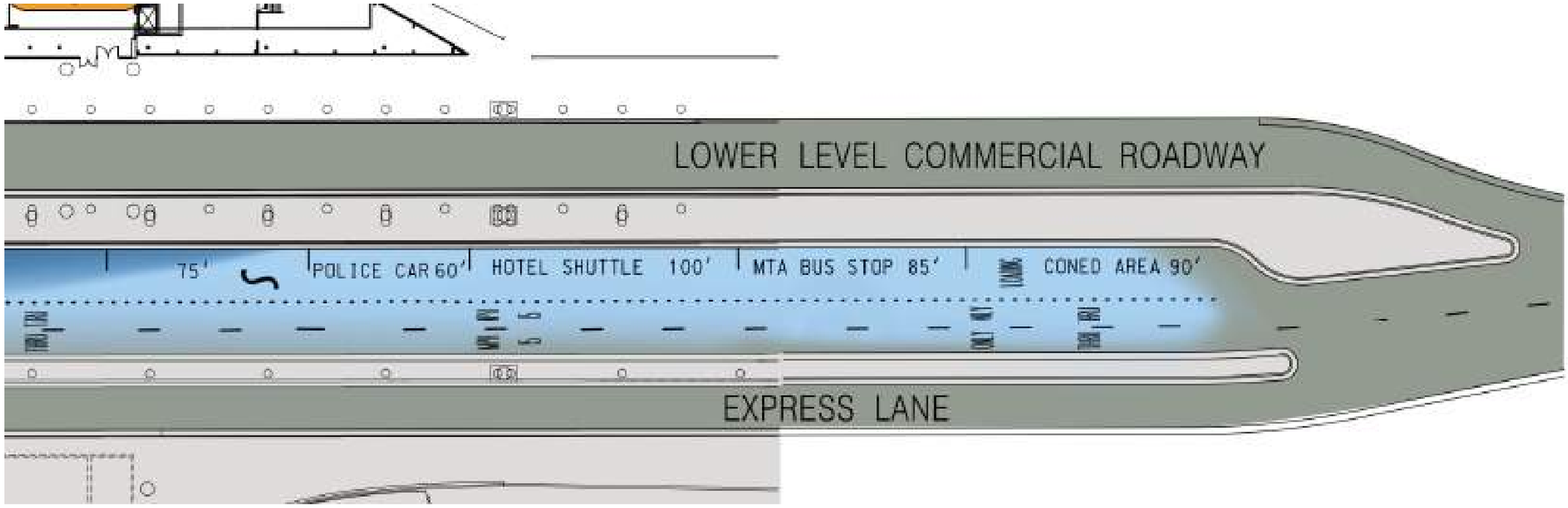
0-6 Month Items

Item 2: Traffic Managers - I wonder if the cost of Item 2 should come from Ralign since he is working on the issue. I also wonder if there is any reduced or offsetting of costs as we replace some MdTAP officers with private traffic managers. We can take a stab at this if you want us to but we don't have access to the MdTAP costs so all we would be able to estimate is the labor force we think we would need to manage traffic and we would base it on a single evening shift of say 5:30 PM – 2 AM.

Item 7: Use B/C bag claim - I don't think there is any cost associated with Item 7 if we encourage the C pier arrivals to use these claims because they will be walking past them to get to A/B. However, to facilitate encouragement of A/B arrivals to use these claims we will assume that we will need 4 interior VMS signs to function like the displays over the bag claims but also include directional arrows and bag claim numbers.

See more about: Franz Ollerman.

3. Reduce the Length of the Lower Level Curb Reserved for MTA Buses, Hotel Shuttles, Police Staging and Traffic Cones



4. Relocate MTA Bus Stop to another Lower Level Location

PROJECT COST ESTIMATE

TASK 013 - BWI MARSHALL - VISSIM TRAFFIC MODEL FOR LOWER LEVEL ROADWAY

MAA-AE-14-006

10/26/2015

ESTIMATING LEVEL : ☐ **Budget** ☐ **Cor** ☑ **t** ☐ **30%** ☐ **60%** ☐ **100%** ☐ **Bid**

DESCRIPTION		*UNIT*	*UNIT COST*	*QUANTITY*	*TOTAL*	*COMMENT*
MOBILIZATION		5.5%			$ 1,424	
MOT		5.5%			$ 1,424	
SQUARE PERFORATED TUBULAR STEEL SIGN POSTS		EA	$ 100	1	$ 100	
SHEET ALUMINUM SIGN		SF	$ 25	4	$ 100	
SQUARE TUBULAR STEEL ANCHOR BASE FOR SIGNAGE		EA	$ 80	1	$ 80	
MTA BUS SHELTER		EA	$ 8,537	3	$ 25,612	Unit cost is based on an MTA study developed in 2010.
WAYFINDING SIGNAGE WITHIN THE TERMINAL		EA	$ 26,667	4		Cost is based on a cost estimate provided as part of Task MAA-AE-14-003 and is fully loaded. Added directly to Subtotal G.
SUBTOTAL A					$ 28,741	
Special Systems	BAS (Metasys)					
	FAS (Honeywell)					
	CASS					
	CCTV					
	BGE					
	Verizon					
SUBTOTAL B					$ 28,741	
Miscellaneous Construction Allowance (5% to 10% of B)		10%			$ 2,874	
SUBTOTAL C					$ 31,615	
Design Contingency (15% to 25% of C)		25%			$ 7,904	
SUBTOTAL D					$ 39,518	
General Conditions X% of D (If not included in Unit Costs)		%				
Contractor O&P X% of D (If not included in Unit Costs)		10%			$ 3,952	
SUBTOTAL E					$ 43,470	
Construction Quality Control Plan (3% of E)		3%			$ 1,304	
SUBTOTAL F (Construction Cost Estimate)					$ 44,774	
Estimated Design Fee (8% to12% of E)					$ 20,000	
Estimated CMI Fee (8% to 12% of E)					$ 20,000	
SUBTOTAL G					$ 84,774	
Escalation Factor (if applicable)		%				
WAYFINDING SIGNAGE WITHIN THE TERMINAL		EA	$ 26,667	4	$ 106,667	
GRAND TOTAL **(Program Cost Estimate)**					***$ 191,441***	

Level of Accuracy	☐ Quantity Take-Off	☐ General Square Foot	☐ Comparison with other installations/facilities
List of Sole Source Items Included in this	1	3	5
Contract	2	4	6
List of Assumptions			

6. Install Sequential Column Numbers on the Structural Columns

PROJECT COST ESTIMATE

TASK 013 - BWI MARSHALL - VISSIM TRAFFIC MODEL FOR LOWER LEVEL ROADWAY

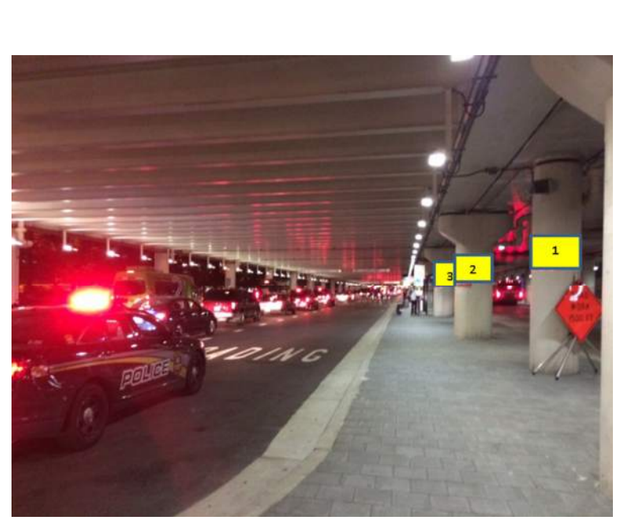
MAA-AE-14-006

10/26/2015

ESTIMATING LEVEL : ☐ **Budget** ☑ **Concept** ☐ **30%** ☐ **60%** ☐ **100%** ☐ **Bid**

DESCRIPTION		*UNIT*	*UNIT COST*	*QUANTITY*	*TOTAL*	*COMMENT*
MOBILIZATION		5.5%			$ 4,752	
MOT		5.5%			$ 4,752	
PAINT STRUCTURAL COLUMNS		EA	$ 600.00	144	$ 86,400	Assumed 4' Diameter Columns and 5' Tall Painted Numbers on 145 columns. Columns on each side of the non-commercial roadway will be painted. Columns along the Authorized Vehicles roadway will not be painted.
CUSTOMIZED SIGN POLES AND FOUNDATION		LS	$ 1,000	1	$ 1,000	
CUSTOMIZED SIGN IN CELL PHONE LOT		EA	$ 1,700	1	$ 1,700	Based on a 2010 estimate provided by Folia Alto.
SUBTOTAL A					$ 98,604	
Special Systems	BAS (Metasys)					
	FAS (Honeywell)					
	CASS					
	CCTV					
	BGE					
	Verizon					
SUBTOTAL B					$ 98,604	
Miscellaneous Construction Allowance (5% to 10% of B)		10%			$ 9,860	
SUBTOTAL C					$ 108,464	
Design Contingency (15% to 25% of C)		25%			$ 27,116	
SUBTOTAL D					$ 135,581	
General Conditions X% of D (If not included in Unit Costs)		%?				
Contractor O&P X% of D (If not included in Unit Costs)		10%			$ 13,558	
SUBTOTAL E					$ 149,139	
Construction Quality Control Plan (3% of E)		3%			$ 4,474	
SUBTOTAL F (Construction Cost Estimate)					$ 153,613	
Estimated Design Fee (8% to12% of E)					$ 20,000	
Estimated CMI Fee (8% to 12% of E)					$ 20,000	
SUBTOTAL G					$ 193,613	
Escalation Factor (if applicable)		%?				
***GRAND TOTAL* (Program Cost Estimate)**					***$ 193,613***	

Level of Accuracy	☐ Quantity Take-Off	☐ General Square Foot	☐ Comparison with other installations/facilities
List of Sole Source Items Included in this Contract	1	3	5
	2	4	6
List of Assumptions			



7. Combine Terminal Announcements, Signage in Concourses A and B, and Website Information to Reduce Lower Level Pick-ups

PROJECT COST ESTIMATE

TASK 013 - BWI MARSHALL - VISSIM TRAFFIC MODEL FOR LOWER LEVEL ROADWAY

MAA-AE-14-006

12/14/2015

ESTIMATING LEVEL : ☐ **Budget** ☑ **Concept** ☐ **30%** ☐ **60%** ☐ **100%** ☐ **Bid**

DESCRIPTION		*UNIT*	*UNIT COST*	*QUANTITY*	*TOTAL*	*COMMENT*
MOBILIZATION		5.5%			$ 5,867	
MOT		5.5%			$ 5,867	
WAYFINDING SIGNAGE WITHIN THE TERMINAL (VMS SIGNS)		EA	$ 26,667	4	$ 106,667	Unit cost is based on a cost estimate provided as part of Task MAA-AE-14-003.
SUBTOTAL A					$ 118,400	
Special Systems	BAS (Metasys)					
	FAS (Honeywell)					
	CASS					
	CCTV					
	BGE					
	Verizon					
SUBTOTAL B					$ 118,400	
Miscellaneous Construction Allowance (5% to 10% of B)		10%			$ 11,840	
SUBTOTAL C					$ 130,240	
Design Contingency (15% to 25% of C)		25%			$ 32,560	
SUBTOTAL D					$ 162,800	
General Conditions X% of D (If not included in Unit Costs)		%?				
Contractor O&P X% of D (If not included in Unit Costs)		10%			$ 16,280	
SUBTOTAL E					$ 179,080	
Construction Quality Control Plan (3% of E)		3%			$ 5,372	
SUBTOTAL F (Construction Cost Estimate)					$ 184,452	
Estimated Design Fee (8% to12% of E)		12%			$ 22,134	
Estimated CMI Fee (8% to 12% of E)		12%			$ 22,134	
SUBTOTAL G					$ 228,721	
Escalation Factor (if applicable)		%?				
GRAND TOTAL **(Program Cost Estimate)**					***$ 228,721***	

Level of Accuracy	☐ Quantity Take-Off	☐ General Square Foot	☐ Comparison with other installations/facilities
List of Sole Source Items Included in this Contract	1	3	5
	2	4	6
List of Assumptions			

8. Increase Curb Dwell Time Enforcement

From: Franz Ollerman <follerman1@bwiairport.com> Sent: Thu 12/10/2015 3:44 PM
To: Lookenbill, David; Wayne Schuster
Cc: AHara, Allan; Ray, Jennifer; Wolniak, Matthew; Stratmeyer, Robert; Gary, Sarah; Stewart, David
Subject: RE: DRAFT - lower level roadway/curb recommendations

Dave,

I talked with Ralign and we have the following responses:

Traffic Managers – he was planning on $13 per hour base level people. Expecting an annual budget of $750,000 for traffic managers.

B/C bag claim – no issues with what you have below.

Shorten taxi queue – no cost issues, it is not in their contract.

Trip Fee implementation – the plan is to hire a company to manage this function – they will supply their own equipment, a revenue positive operation.

Free garage parking – go ahead and estimate it.

Alex

From: Lookenbill, David [mailto:DLookenbill@jmt.com]
Sent: Thursday, December 10, 2015 7:55 AM
To: Wayne Schuster; Franz Ollerman
Cc: AHara, Allan; Ray, Jennifer; Wolniak, Matthew; Stratmeyer, Robert; Gary, Sarah; Stewart, David
Subject: RE: DRAFT - lower level roadway/curb recommendations

Wayne and Alex,

We will get on it right away. The following are some thoughts on the pricing that we need to coordinate and maybe get some clarification from you:

0-6 Month Items

Item 2: Traffic Managers - I wonder if the cost of Item 2 should come from Ralign since he is working on the issue. I also wonder if there is any reduced or offsetting of costs as we replace some MdTAP officers with private traffic managers. We can take a stab at this if you want us to but we don't have access to the MdTAP costs so all we would be able to estimate is the labor force we think we would need to manage traffic and we would base it on a single evening shift of say 5:30 PM – 2 AM.

Item 7: Use B/C bag claim - I don't think there is any cost associated with Item 7 if we encourage the C pier arrivals to use these claims because they will be walking past them to get to A/B. However, to facilitate encouragement of A/B arrivals to use these claims we will assume that we will need 4 interior VMS signs to function like the displays over the bag claims but also include directional arrows and bag claim numbers.

See more about: Franz Ollerman.

9. Institute a Per-Trip Fee for Private Commercial Vehicles

From: Franz Ollerman <follerman1@bwiairport.com> Sent: Thu 12/10/2015 3:44 PM
To: Lookenbill, David; Wayne Schuster
Cc: AHara, Allan; Ray, Jennifer; Wolniak, Matthew; Stratmeyer, Robert; Gary, Sarah; Stewart, David
Subject: RE: DRAFT - lower level roadway/curb recommendations

Dave,

I talked with Ralign and we have the following responses:

Traffic Managers – he was planning on $13 per hour base level people. Expecting an annual budget of $750,000 for traffic managers.

B/C bag claim – no issues with what you have below.

Shorten taxi queue – no cost issues, it is not in their contract.

Trip Fee implementation – the plan is to hire a company to manage this function – they will supply their own equipment, a revenue positive operation.

Free garage parking – go ahead and estimate it.

Alex

From: Lookenbill, David [mailto:DLookenbill@jmt.com]
Sent: Thursday, December 10, 2015 7:55 AM
To: Wayne Schuster; Franz Ollerman
Cc: AHara, Allan; Ray, Jennifer; Wolniak, Matthew; Stratmeyer, Robert; Gary, Sarah; Stewart, David
Subject: RE: DRAFT - lower level roadway/curb recommendations

Wayne and Alex,

We will get on it right away. The following are some thoughts on the pricing that we need to coordinate and maybe get some clarification from you:

0-6 Month Items

Item 2: Traffic Managers - I wonder if the cost of Item 2 should come from Ralign since he is working on the issue. I also wonder if there is any reduced or offsetting of costs as we replace some MdTAP officers with private traffic managers. We can take a stab at this if you want us to but we don't have access to the MdTAP costs so all we would be able to estimate is the labor force we think we would need to manage traffic and we would base it on a single evening shift of say 5:30 PM – 2 AM.

Item 7: Use B/C bag claim - I don't think there is any cost associated with Item 7 if we encourage the C pier arrivals to use these claims because they will be walking past them to get to A/B. However, to facilitate encouragement of A/B arrivals to use these claims we will assume that we will need 4 interior VMS signs to function like the displays over the bag claims but also include directional arrows and bag claim numbers.

See more about: Franz Ollerman.

CAPITAL IMPROVEMENTS

1. Restripe Lanes Adjacent to the Lower Level Curbside

PROJECT COST ESTIMATE

TASK 013 - BWI MARSHALL - VISSIM TRAFFIC MODEL FOR LOWER LEVEL ROADWAY

MAA-AE-14-006

10/26/2015

ESTIMATING LEVEL : ☐ **Budget** ☑ **Concept** ☐ **30%** ☐ **60%** ☐ **100%** ☐ **Bid**

DESCRIPTION		*UNIT*	*UNIT COST*	*QUANTITY*	*TOTAL*	*COMMENT*
MOBILIZATION		5.5%			$ 540	
MOT		5.5%			$ 540	
MARKING - ARROW MARKERS		SF	$ 1,050	8	$ 8,400	Assumed eight 5'x5' markings. (One per lane every 500')
STRIPING - LANE LINE		PER MILE	$ 2,772	0.5	$ 1,418	
SUBTOTAL A					$ 10,897	
Special Systems	BAS (Metasys)					
	FAS (Honeywell)					
	CASS					
	CCTV					
	BGE					
	Verizon					
SUBTOTAL B					$ 10,897	
Miscellaneous Construction Allowance (5% to 10% of B)		10%			$ 1,090	
SUBTOTAL C					$ 11,987	
Design Contingency (15% to 25% of C)		25%			$ 2,997	
SUBTOTAL D					$ 14,984	
General Conditions X% of D (If not included in Unit Costs)		%?				
Contractor O&P X% of D (If not included in Unit Costs)		%?				
SUBTOTAL E					$ 14,984	
Construction Quality Control Plan (3% of E)		3%			$ 450	
SUBTOTAL F (Construction Cost Estimate)					$ 15,433	
Estimated Design Fee (8% to12% of E)					$ 20,000	
Estimated CMI Fee (8% to 12% of E)					$ 20,000	
SUBTOTAL G					$ 55,433	
Escalation Factor (if applicable)		%				
***GRAND TOTAL* (Program Cost Estimate)**					***$ 55,433***	

Level of Accuracy	☐ Quantity Take-Off	☑ General Square Foot	☐ Comparison with other installations/facilities
List of Sole Source Items Included in this Contract	1	3	5
	2	4	6
List of Assumptions			

2. Construct Lower Level "Commercial Curb Slot Project"

PROJECT COST ESTIMATE

TASK 013 - BWI MARSHALL - VISSIM TRAFFIC MODEL FOR LOWER LEVEL ROADWAY

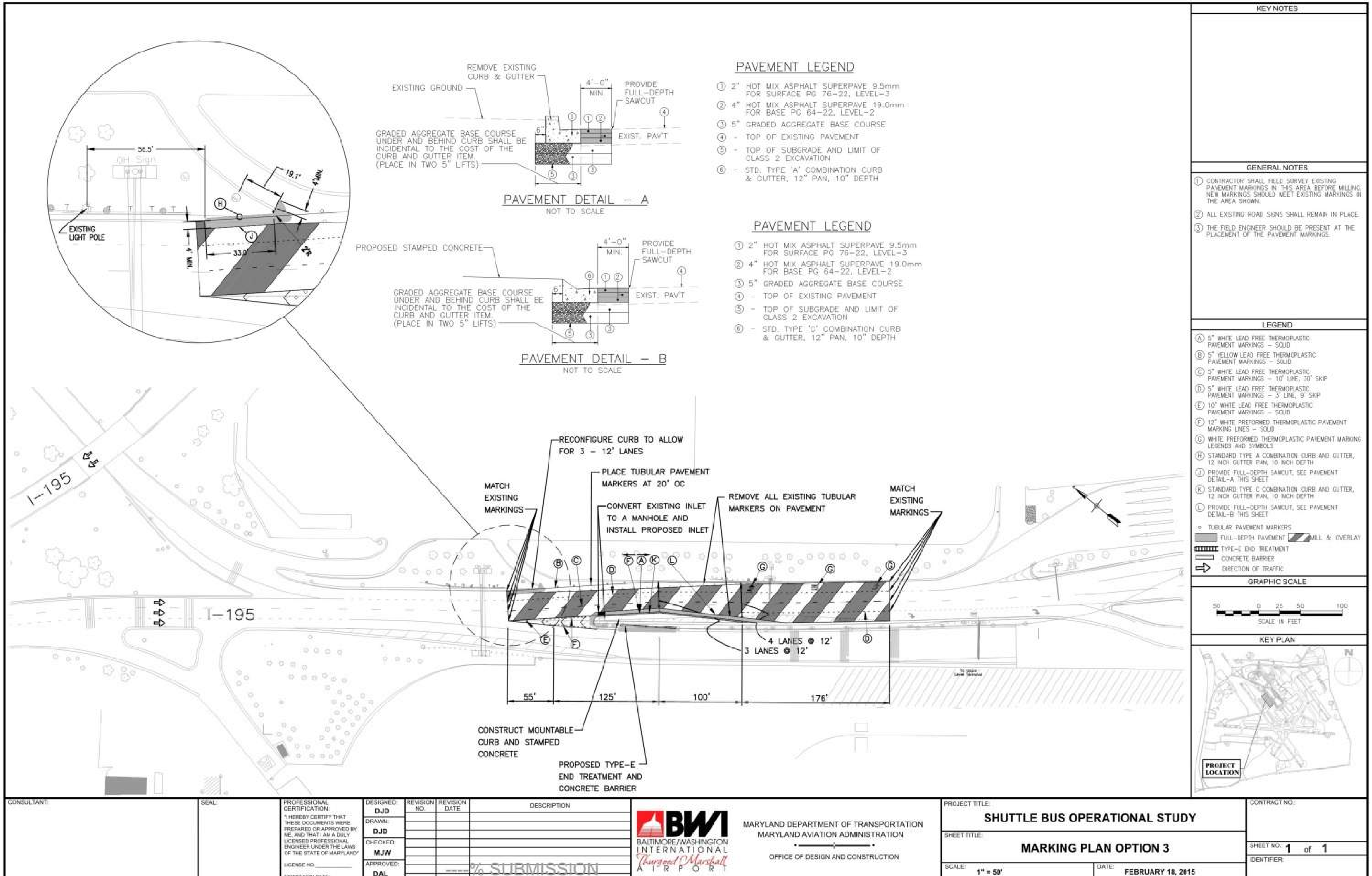
MAA-AE-14-006

10/26/2015

ESTIMATING LEVEL : ☐ **Budget** ☑ **Concept** ☐ **30%** ☐ **60%** ☐ **100%** ☐ **Bid**

DESCRIPTION		*UNIT*	*UNIT COST*	*QUANTITY*	*TOTAL*	*COMMENT*
MOBILIZATION		5.5%			$ 5,333	
MOT		5.5%			$ 5,333	
DRAINAGE		5%			$ 4,848	
UTILITY		8%			$ 7,756	
BRIDGE OVER ROADWAY		SF	$ 175		$ -	
MILL AND OVERLAY		LANE MILES	$ 200,000	0.4	$ 76,332	
NEW PAVING		LANE MILES	$ 1,600,000	0.003	$ 4,874	
TYPE A CURB AND GUTTER		LF	$ 35	379	$ 13,265	
STRIPING - EDGE LINE		PER MILE	$ 11,088	0.2	$ 1,833	
STRIPING - LANE LINE		PER MILE	$ 2,772	0.2	$ 652	
SUBTOTAL A					$ 120,226	
Special Systems	BAS (Metasys)					
	FAS (Honeywell)					
	CASS					
	CCTV					
	BGE					
	Verizon					
SUBTOTAL B					$ 120,226	
Miscellaneous Construction Allowance (5% to 10% of B)		10%			$ 12,023	
SUBTOTAL C					$ 132,248	
Design Contingency (15% to 25% of C)		25%			$ 33,062	
SUBTOTAL D					$ 165,310	
General Conditions X% of D (If not included in Unit Costs)		%?				
Contractor O&P X% of D (If not included in Unit Costs)		%?				
SUBTOTAL E					$ 165,310	
Construction Quality Control Plan (3% of E)		3%			$ 4,959	
SUBTOTAL F (Construction Cost Estimate)					$ 170,270	
Estimated Design Fee (8% to12% of E)		10%			$ 17,027	
Estimated CMI Fee (8% to 12% of E)		10%			$ 17,027	
SUBTOTAL G					$ 204,323	
Escalation Factor (if applicable)		%?				
GRAND TOTAL **(Program Cost Estimate)**					***$ 204,323***	

Level of Accuracy	☐ Quantity Take-Off	☐ General Square Foot	☐ Comparison with other installations/facilities
List of Sole Source Items Included in this Contract	1	3	5
	2	4	6
List of Assumptions			



KEY NOTES
GENERAL NOTES
1 CONTRACTOR SHALL FIELD SURVEY EXISTING PAVEMENT MARKINGS IN THIS AREA BEFORE MILLING. NEW MARKINGS SHOULD MEET EXISTING MARKINGS IN THE AREA SHOWN.
2 ALL EXISTING ROAD SIGNS SHALL REMAIN IN PLACE.
3 THE FIELD ENGINEER SHOULD BE PRESENT AT THE PLACEMENT OF THE PAVEMENT MARKINGS.
PAVEMENT LEGEND
1 2" HOT MIX ASPHALT SUPERPAVE 9.5mm FOR SURFACE PG 76-22, LEVEL-3
2 4" HOT MIX ASPHALT SUPERPAVE 19.0mm FOR BASE PG 64-22, LEVEL-2
3 5" GRADED AGGREGATE BASE COURSE
4 - TOP OF EXISTING PAVEMENT
5 - TOP OF SUBGRADE AND LIMIT OF CLASS 2 EXCAVATION
6 - STD. TYPE 'A' COMBINATION CURB & GUTTER, 12" PAN, 10" DEPTH
PAVEMENT DETAIL – A
NOT TO SCALE
PAVEMENT LEGEND
6 - STD. TYPE 'C' COMBINATION CURB & GUTTER, 12" PAN, 10" DEPTH
PAVEMENT DETAIL – B
NOT TO SCALE
REMOVE EXISTING CURB & GUTTER
EXISTING GROUND
PROVIDE FULL-DEPTH SAWCUT
EXIST. PAV'T
GRADED AGGREGATE BASE COURSE UNDER AND BEHIND CURB SHALL BE INCIDENTAL TO THE COST OF THE CURB AND GUTTER ITEM. (PLACE IN TWO 5" LIFTS)
PROPOSED STAMPED CONCRETE
EXISTING LIGHT POLE
LEGEND
RECONFIGURE CURB TO ALLOW FOR 3 – 12' LANES
PLACE TUBULAR PAVEMENT MARKERS AT 20' OC
MATCH EXISTING MARKINGS
CONVERT EXISTING INLET TO A MANHOLE AND INSTALL PROPOSED INLET
REMOVE ALL EXISTING TUBULAR MARKERS ON PAVEMENT
4 LANES @ 12'
3 LANES @ 12'
I-195
55'
125'
100'
176'
CONSTRUCT MOUNTABLE CURB AND STAMPED CONCRETE
PROPOSED TYPE-E END TREATMENT AND CONCRETE BARRIER
GRAPHIC SCALE
SCALE IN FEET
KEY PLAN
PROJECT LOCATION
MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION
OFFICE OF DESIGN AND CONSTRUCTION
PROJECT TITLE:
SHUTTLE BUS OPERATIONAL STUDY
SHEET TITLE:
MARKING PLAN OPTION 3
SCALE: 1" = 50'
DATE: FEBRUARY 18, 2015
SHEET NO.: 1 of 1
DESIGNED: DJD
DRAWN: DJD
CHECKED: MJW
APPROVED: DAL
% SUBMISSION

3. Relocate Cell Phone Lot to Existing Taxi Staging Area

PROJECT COST ESTIMATE

TASK 013 - BWI MARSHALL - VISSIM TRAFFIC MODEL FOR LOWER LEVEL ROADWAY

MAA-AE-14-006

12/15/2015

ESTIMATING LEVEL : ☐ **Budget** ☑ **Concept** ☐ **30%** ☐ **60%** ☐ **100%** ☐ **Bid**

DESCRIPTION		*UNIT*	*UNIT COST*	*QUANTITY*	*TOTAL*	*COMMENT*
MOBILIZATION		5.5%			$ 25,779	
MOT		5.5%			$ 25,779	
DRAINAGE		30%			$ 140,614	
UTILITIES		8%			$ 37,497	
Grinding Asphalt Pavement 0 to 2 Inch		SY	$ 5	8,178	$ 40,889	
Superpave Asphalt Mix 12.5MM for Surface, PG 64S-22, Level 2		TON	$ 150	920	$ 138,000	
Striping - Parking Line (Cell Phone Lot)		LF	$ 2	3,600	$ 7,200	
Slurry Seal Existing Striping (Taxi Staging Area)		GAL	$ 7	133	$ 996	Approximately 3,330 LF of striping will be sealed. Assumed 100 SF is equivalent to roughly 4 gallons of tar. Unit Cost is escalated from the January 2012 MDSHA Price Index.
Striping - Parking Line (Taxi Staging Area Lot)		LF	$ 2	2,200	$ 4,400	
New Building for Taxi Staging Area		EA	$ 277,229	1	$ 277,229	
SUBTOTAL A					$ 698,383	
Special Systems	BAS (Metasys)					
	FAS (Honeywell)					
	CASS					
	CCTV					
	BGE					
	Verizon					
SUBTOTAL B					$ 698,383	
Miscellaneous Construction Allowance (5% to 10% of B)		10%			$ 69,838	
SUBTOTAL C					$ 768,222	
Design Contingency (15% to 25% of C)		25%			$ 192,055	
SUBTOTAL D					$ 960,277	
General Conditions X% of D (If not included in Unit Costs)		%?				
Contractor O&P X% of D (If not included in Unit Costs)		%?				
SUBTOTAL E					$ 960,277	
Construction Quality Control Plan (3% of E)		3%			$ 28,808	
SUBTOTAL F (Construction Cost Estimate)					$ 989,085	
Estimated Design Fee (8% to12% of E)		10%			$ 98,909	
Estimated CMI Fee (8% to 12% of E)		10%			$ 98,909	
SUBTOTAL G					$ 1,186,903	
Escalation Factor (if applicable)		%?				
GRAND TOTAL **(Program Cost Estimate)**					***$ 1,186,903***	

Level of Accuracy	☐ Quantity Take-Off	☐ General Square Foot	☐ Comparison with other installations/facilities
List of Sole Source Items Included in this Contract	1	3	5
	2	4	6
List of Assumptions			

MODULAR GENIUS

SMART BUILDING

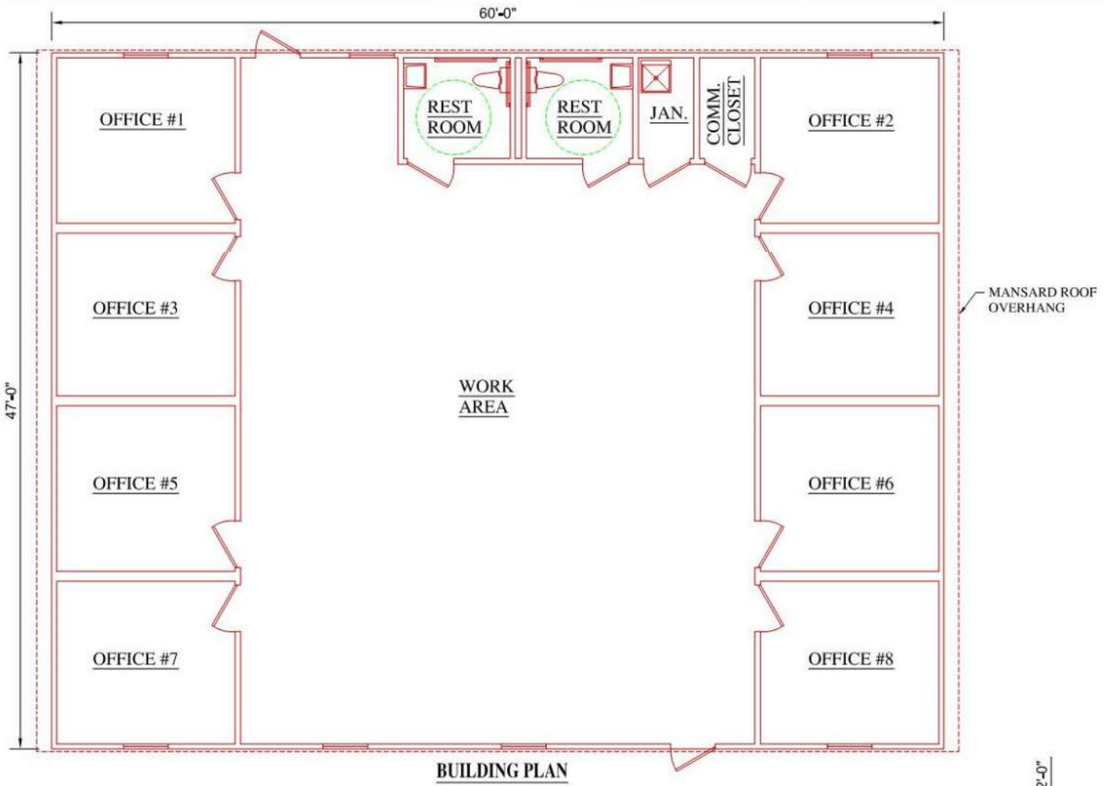
GENERAL BUILDILNG INFORMATION:

DRAWING NUMBER:	B4
NOMINAL BUILDING SIZE:	48'x60'
SQUARE FOOTAGE:	2880
BUILDING USE:	BUSINESS (B)

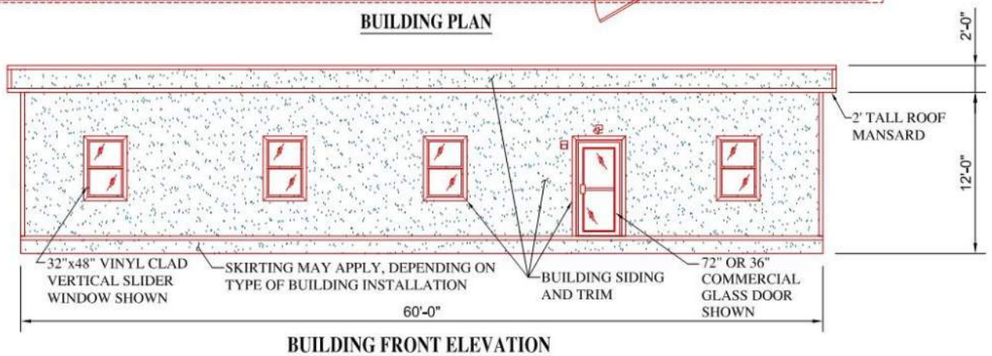
www.modulargenius.com
(888)420-1113

GENERAL CODE INFORMATION:

- THE MINIMUM AND MAXIMUM NUMBER OF WINDOWS AND DOORS CODE SHALL BE LIMITED. CONSIDERATION MAY BE TAKEN TO THE CODE REQUIREMENTS FOR EGRESS AND ENERGY CONSERVATION.
- REQUIRED PLUMBING FIXTURES ARE SUBJECT TO THE ADOPTED PLUMBING CODE. CONSIDERATION MAY BE TAKEN FOR EXISTING RESTROOMS ON SITE.
- THE BUILDING SQUARE FOOTAGE SHALL BE LIMITED TO THE REQUIREMENTS OF THE ADOPTED BUILDING CODE.
- THE BUILDING SHALL BE SET WITH A PERMANENT OR TEMPORARY FOUNDATION SYSTEM AND APPROVED BY THE LOCAL OFFICIAL HAVING JURISDICTION.
- THE FINAL LAYOUT IS SUBJECT TO REVIEW FOR COMPLIANCE WITH THE BUILDING CODE ENFORCED IN THE AREA THE BUILDLING WILL BE LOCATED.



BUILDING PLAN



BUILDING FRONT ELEVATION

GENERAL DESIGN NOTES:

BREAK ROOMS, CONFERENCE ROOMS, OFFICES, CLOSETS AND RESTROOMS CAN BE ADDED, DELETED, MOVED OR RESIZED TO MEET YOUR SPECIFIC SPACE REQUIRMENTS.

WINDOWS AND DOORS CAN BE ADDED OR REMOVED BASED ON YOUR SITE REQUIREMENTS.

MECHANICAL, ELECTRICAL AND PLUMBING WILL BE SIZED TO MEET THE USE AND OCCUPANCY REQUIREMENTS.

U.S. GREEN BUILDING COUNCIL MEMBER

MODULAR BUILDING INSTITUTE

ASK ABOUT GREEN, SUSTAINABLE BUILDING OPTIONS

From: jimmyhensley@modulargenius.com [mailto:jimmyhensley@modulargenius.com]
Sent: Tuesday, December 15, 2015 10:00 AM
To: Ray, Jennifer <JRay@jmt.com>
Subject: Jennifer Ray of JMT, Modular Genius, Inc. is pleased to provide Price Quote ID: QS1670

About | Floor Plans | Design Gallery | Government | News | Contact | FREE Quote

MODULAR GENIUS
SMART BUILDING

Dear Jennifer Ray,

Thank you for choosing **Modular Genius** as your modular building and space planning expert.

Below is a **budgetary** price quote based on the attached floor plan for your review, use and comment. Please keep in mind that this is simply a starting point.

The project sale price range is based on your following selections:

Quote ID: QS1670
Square Feet: 2880
Building Type: Business – Office / Administrative
Floor Plan Number: B4

Building Grade: Base Building
Services / Installation Type: Total Turnkey

Project Sale Price: $277,228.80

The scope of work for this budgetary price quote should be based on the information above and the following considerations:

- All pricing is budgetary and valid within the United States and should not be considered as a final offer by Modular Genius.
- Standard Modular Genius new building specifications (IBC - 5B Wood) and design construction are considered.
- Buildings include HVAC, plumbing, electric and excludes but is not limited to the following (fire suppression systems, final data and phone hard wiring, furniture and accessories.)
- Minimal site work is considered and excludes but is not limited to the following (site obstruction removals, new roadwork or parking lots, storm water management, taxes or fees)
- Utility connection estimates are considering sufficient capacities available on site within 10' of the modular building location.
- Longer term operating leases, Finance leases and other Purchase Options are available; however, they will require personal consultation by a Modular Genius.

A project of this size and type will require additional information and development meetings with Modular Genius. Please contact us via website, email, fax, phone or most importantly in person so we can sit down and discuss your project further.

Best Regards,

Jimmy Hensley
Business Development
Corporate Office / Central Estimating Modular Genius
(888)420-1113 phone
www.modulargenius.com

4. Install Variable Message Signs in Strategic Locations

Description	Construction Cost	Program Cost	1 Year of Maintenance Cost	10 Years Maintenance Cost	Total Program + 1 Year Maintenance	Total Program + 10 Years Maintenance
Base Package	$1,541,000	$1,886,000	$37,500	$375,000	$1,923,500	$2,261,000
Add Alternate 1 - Enhanced VMS on I-195	$1,708,000	$2,090,000	$0	$0	$2,090,000	$2,090,000
Add Alternate 2 - Arrivals Level VMS Signs	$65,000	$80,000	$1,500	$15,000	$81,500	$95,000
Add Alternate 3 - Additional VMS Sign	$450,000	$550,000	$3,000	$30,000	$553,000	$580,000
Total	**$3,764,000**	**$4,606,000**	**$42,000**	**$420,000**	**$4,648,000**	**$5,026,000**

MAA-AE-14-003
Task 4003 - BWI Thurgood Marshall Airport Roadways Electronic Signage Replacement Study
Base Project
October 27, 2015

ESTIMATING LEVEL: ☑ Budget ☐ Concept ☐ 30% ☐ 60% ☐ 100% ☐ Bid

ITEM	DESCRIPTION	UNIT	UNIT COST	QUANTITY	TOTAL	COMMENT
	CONSTRUCTION COST ESTIMATE					
1	MAINTENANCE OF TRAFFIC	LS	$ 80,000.00	1	$ 80,000.00	
2	EROSION AND SEDIMENT CONTROL	LS	$ 15,000.00	1	$ 15,000.00	
3	OPEN / CLOSED PANEL	EA	$ 12,000.00	21	$ 252,000.00	***See assumption 1 below.***
4	ELECTRONIC SIGN ALT #1	EA	$ 108,850.00	1	$ 108,850.00	***See assumption 2 below.***
5	ELECTRONIC SIGN ALT #2	EA	$ 108,850.00	1	$ 108,850.00	***See assumption 2 below.***
6	ELECTRONIC SIGN GM2	EA	$ 98,000.00	1	$ 98,000.00	
7	ELECTRONIC SIGN P4	EA	$ 82,500.00	1	$ 82,500.00	
8	ELECTRONIC SIGN P7	EA	$ 35,000.00	1	$ 35,000.00	
9	ELECTRONIC SIGN P8	EA	$ 82,500.00	1	$ 82,500.00	
10	OH-2 REPLACEMENT	LS	$ 80,000.00	1	$ 80,000.00	
11	OH-6 REPLACEMENT	LS	$ 141,000.00	1	$ 141,000.00	***See assumption 3 below.***
12	CABINET RETROFIT AND REPAIR	LS	$ 15,000.00	1	$ 15,000.00	
13	COMMUNICATIONS TO P7 (EXISTING HOTEL SIGN)	LS	$ 5,000.00	1	$ 5,000.00	
14	REMOVAL OF EXISTING ELECTRONIC SIGNS	LS	$ 11,500.00	1	$ 11,500.00	
15	FIBER MODULES	EA	$ 1,500.00	18	$ 27,000.00	
16	LABOR TO RECONFIGURE FIBER TO STAR TOPOLOGY	HR	$ 120.00	100	$ 12,000.00	
	Special Systems – BAS (Metasys)				$ -	
	Special Systems – FAS (Honeywell)				$ -	
	Special Systems – CASS				$ -	
	Special Systems – CCTV				$ -	
	Special Systems – BGE				$ -	
	Special Systems – Verizon				$ -	
	Special Systems – BHS (Baggage Handling Systems)				$ -	
	Special Systems – Other Systems (Specify)				$ -	
	SUBTOTAL A				**$ 1,154,200.00**	
	Design Contingency (15% to 25% of A)			20%	$ 230,840.00	
	SUBTOTAL B				**$ 1,385,040.00**	
	General Conditions X% of B (If not included in Unit Costs)			0%	$ -	
	Contractor O&P X% of B (if not included in Unit Costs)			0%	$ -	
	Construction Security Plan (X% of B)			0%	$ -	
	SUBTOTAL C				**$ 1,385,040.00**	
	Construction Quality Control Plan (3% of C)			3%	$ 41,551.20	
	SUBTOTAL D				**$ 1,426,591.20**	
	Miscellaneous Construction Allowance (5% to 10% of C)			8%	$ 110,803.20	
	Construction Quality Control Plan (3% of Misc. Construction Allowance)			3%	$ 3,324.10	
	TOTAL CONSTRUCTION COST ESTIMATE				**$ 1,540,718.50**	
	ADDITIONAL PROGRAM COSTS					
	Estimated Design Fee (6% to 12% of Construction Cost)			10%	$ 154,071.85	
	Estimated CMI Fee (8% to 12% of Construction Cost)			10%	$ 154,071.85	
	TOTAL CAPITAL PROGRAM COST ESTIMATE				**$ 1,848,862.20**	
	Escalation Factor (if applicable)			2%	$ 36,977.24	
	GRAND TOTAL				**$ 1,885,839.44**	

Level of Accuracy	☐ Quantity Take-Off	☐ General Square Foot	☑ Comparison with other installations/facilities
List of Sole Source Items Included in this Contract	1	3	5
	2	4	6

List of Assumptions	
	1 All existing ground mounted signs will remain, and only the electronic portion will be replaced.
	2 The existing pedestals for Alt #1 and Alt #2 will be re-used.
	3 The existing structure will remain for OH-6.
	4

MAA-AE-14-003
Task 4003 - BWI Thurgood Marshall Airport Roadways Electronic Signage Replacement Study
Add Alternate 1 - Enhanced VMS on I-195
October 27, 2015

ESTIMATING LEVEL: ☑ Budget ☐ Concept ☐ 30% ☐ 60% ☐ 100% ☐ Bid

ITEM	DESCRIPTION	UNIT	UNIT COST	QUANTITY	TOTAL	COMMENT
	CONSTRUCTION COST ESTIMATE					
1	MAINTENANCE OF TRAFFIC	LS	$ 100,000.00	1	$ 100,000.00	
2	OH-2 REPLACEMENT FROM BASE PROJECT	LS	$ (80,000.00)	1	$ (80,000.00)	***This is a reduction.***
3	OH-2 REPLACEMENT	LS	$ 350,000.00	1	$ 350,000.00	
4	STATIC SIGN GM-2a	EA	$ 9,000.00	1	$ 9,000.00	
5	STATIC SIGN GM-9	EA	$ 9,000.00	1	$ 9,000.00	
6	STATIC SIGN GM-13	EA	$ 18,500.00	1	$ 18,500.00	
7	STATIC SIGN GM-14	EA	$ 18,500.00	1	$ 18,500.00	
8	STATIC SIGN GM-17	EA	$ 9,000.00	1	$ 9,000.00	
9	STATIC SIGN GM-18	EA	$ 18,500.00	1	$ 18,500.00	
10	STATIC SIGN OH-5	EA	$ 7,500.00	1	$ 7,500.00	
11	STATIC/ELECTRONIC SIGN OH-6a	EA	$ 440,000.00	1	$ 440,000.00	***See assumption 1 below.***
12	STATIC SIGN OH-8	EA	$ 166,000.00	1	$ 166,000.00	
13	STATIC SIGN OH-11	EA	$ 198,500.00	1	$ 198,500.00	
14	REMOVAL OF EXISTING STATIC SIGNS AND STRUCTURES	LS	$ 15,000.00	1	$ 15,000.00	
	Special Systems – BAS (Metasys)				$ -	
	Special Systems – FAS (Honeywell)				$ -	
	Special Systems – CASS				$ -	
	Special Systems – CCTV				$ -	
	Special Systems – BGE				$ -	
	Special Systems – Verizon				$ -	
	Special Systems – BHS (Baggage Handling Systems)				$ -	
	Special Systems – Other Systems (Specify)				$ -	
	SUBTOTAL A				**$ 1,279,500.00**	
	Design Contingency (15% to 25% of A)			20%	$ 255,900.00	
	SUBTOTAL B				**$ 1,535,400.00**	
	General Conditions X% of B (If not included in Unit Costs)			0%	$ -	
	Contractor O&P X% of B (if not included in Unit Costs)			0%	$ -	
	Construction Security Plan (X% of B)			0%	$ -	
	SUBTOTAL C				**$ 1,535,400.00**	
	Construction Quality Control Plan (3% of C)			3%	$ 46,062.00	
	SUBTOTAL D				**$ 1,581,462.00**	
	Miscellaneous Construction Allowance (5% to 10% of C)			8%	$ 122,832.00	
	Construction Quality Control Plan (3% of Misc. Construction Allowance)			3%	$ 3,684.96	
	TOTAL CONSTRUCTION COST ESTIMATE				**$ 1,707,978.96**	
	ADDITIONAL PROGRAM COSTS					
	Estimated Design Fee (8% to 12% of Construction Cost)			10%	$ 170,797.90	
	Estimated CMI Fee (8% to 12% of Construction Cost)			10%	$ 170,797.90	
	TOTAL CAPITAL PROGRAM COST ESTIMATE				**$ 2,049,574.76**	
	Escalation Factor (if applicable)			2%	$ 40,991.50	
	GRAND TOTAL				**$ 2,090,566.26**	

Level of Accuracy: ☐ Quantity Take-Off ☐ General Square Foot ☑ Comparison with other installations/facilities

List of Sole Source Items Included in this Contract: 1, 2, 3, 4, 5, 6

List of Assumptions:
1 Existing structure will be replaced with two structures, one for each direction of I-195.
2
3
4

MAA-AE-14-003
Task 4003 - BWI Thurgood Marshall Airport Roadways Electronic Signage Replacement Study
Add Alternate 2 - Arrivals Level VMS Signs
October 27, 2015

ESTIMATING LEVEL: ☑ Budget ☐ Concept ☐ 30% ☐ 60% ☐ 100% ☐ Bid

ITEM	DESCRIPTION		UNIT	UNIT COST	QUANTITY	TOTAL	COMMENT
	CONSTRUCTION COST ESTIMATE						
1	MAINTENANCE OF TRAFFIC		LS	$ 2,000.00	1	$ 2,000.00	
2	SIGN AF-3200-16x144-8-RG		EA	$ 4,050.00	3	$ 12,150.00	
3	CONTROLLER		EA	$ 1,600.00	3	$ 4,800.00	
4	COMMUNICATIONS		LS	$ 25,000.00	1	$ 25,000.00	
5	MISC. HARDWARE FOR MOUNTING		LS	$ 5,000.00	1	$ 5,000.00	
	Special Systems	BAS (Metasys)				$ -	
		FAS (Honeywell)				$ -	
		CASS				$ -	
		CCTV				$ -	
		BGE				$ -	
		Verizon				$ -	
		BHS (Baggage Handling Systems)				$ -	
		Other Systems (Specify)				$ -	
	SUBTOTAL A					**$ 48,950.00**	
	Design Contingency (15% to 25% of A)				20%	$ 9,790.00	
	SUBTOTAL B					**$ 58,740.00**	
	General Conditions X% of B (If not included in Unit Costs)				0%	$ -	
	Contractor O&P X% of B (if not included in Unit Costs)				0%	$ -	
	Construction Security Plan (X% of B)				0%	$ -	
	SUBTOTAL C					**$ 58,740.00**	
	Construction Quality Control Plan (3% of C)				3%	$ 1,762.20	
	SUBTOTAL D					**$ 60,502.20**	
	Miscellaneous Construction Allowance (5% to 10% of C)				8%	$ 4,699.20	
	Construction Quality Control Plan (3% of Misc. Construction Allowance)				3%	$ 140.98	
	TOTAL CONSTRUCTION COST ESTIMATE					**$ 65,342.38**	
	ADDITIONAL PROGRAM COSTS						
	Estimated Design Fee (8% to 12% of Construction Cost)				10%	$ 6,534.24	
	Estimated CMI Fee (8% to 12% of Construction Cost)				10%	$ 6,534.24	
	TOTAL CAPITAL PROGRAM COST ESTIMATE					**$ 78,410.86**	
	Escalation Factor (if applicable)				2%	$ 1,568.22	
	GRAND TOTAL					**$ 79,979.08**	

Level of Accuracy	☐ Quantity Take-Off	☐ General Square Foot	☐ Comparison with other installations/facilities
List of Sole Source Items Included in this Contract	1	3	5
	2	4	6
List of Assumptions	1		
	2		
	3		
	4		

MAA-AE-14-003
Task 4003 - BWI Thurgood Marshall Airport Roadways Electronic Signage Replacement Study
Add Alternate 3 - Additional VMS Sign
October 27, 2015

ESTIMATING LEVEL: ☐ Budget ☐ Concept ☐ 30% ☐ 60% ☐ 100% ☐ Bid

ITEM	DESCRIPTION	UNIT	UNIT COST	QUANTITY	TOTAL	COMMENT
	CONSTRUCTION COST ESTIMATE					
1	MAINTENANCE OF TRAFFIC	LS	$ 24,880.00	1	$ 24,880.00	
2	EROSION AND SEDIMET CONTROL	EA	$ 5,000.00	1	$ 5,000.00	
2	SIGN VF-2020-27x125-66-A	EA	$ 140,597.80	1	$ 140,597.80	
3	STRUCTURE	EA	$ 141,000.00	1	$ 141,000.00	
4	COMMUNICATIONS AND CABINET	LS	$ 25,000.00	1	$ 25,000.00	
Special Systems	BAS (Metasys)				$ -	
	FAS (Honeywell)				$ -	
	CASS				$ -	
	CCTV				$ -	
	BGE				$ -	
	Verizon				$ -	
	BHS (Baggage Handling Systems)				$ -	
	Other Systems (Specify)				$ -	
SUBTOTAL A					**$ 336,477.80**	
Design Contingency (15% to 25% of A)				20%	$ 67,295.56	
SUBTOTAL B					**$ 403,773.36**	
General Conditions X% of B (If not included in Unit Costs)				0%	$ -	
Contractor O&P X% of B (if not included in Unit Costs)				0%	$ -	
Construction Security Plan (X% of B)				0%	$ -	
SUBTOTAL C					**$ 403,773.36**	
Construction Quality Control Plan (3% of C)				3%	$ 12,113.20	
SUBTOTAL D					**$ 415,886.56**	
Miscellaneous Construction Allowance (5% to 10% of C)				8%	$ 32,301.87	
Construction Quality Control Plan (3% of Misc. Construction Allowance)				3%	$ 969.06	
TOTAL CONSTRUCTION COST ESTIMATE					**$ 449,157.49**	
	ADDITIONAL PROGRAM COSTS					
Estimated Design Fee (8% to 12% of Construction Cost)				10%	$ 44,915.75	
Estimated CMI Fee (8% to 12% of Construction Cost)				10%	$ 44,915.75	
TOTAL CAPITAL PROGRAM COST ESTIMATE					**$ 538,988.99**	
Escalation Factor (if applicable)				2%	$ 10,779.78	
GRAND TOTAL					**$ 549,768.77**	

Level of Accuracy	☐ Quantity Take-Off	☐ General Square Foot	☑ Comparison with other installations/facilities
List of Sole Source Items Included in this Contract	1	3	5
	2	4	6

List of Assumptions	1
	2
	3
	4

5. Widen Terminal Approach Roadway Lanes

PROJECT COST ESTIMATE

TASK 013 - BWI MARSHALL - VISSIM TRAFFIC MODEL FOR LOWER LEVEL ROADWAY

MAA-AE-14-006

10/26/2015

ESTIMATING LEVEL : ☐ **Budget** ☑ **Concept** ☐ **30%** ☐ **60%** ☐ **100%** ☐ **Bid**

DESCRIPTION		*UNIT*	*UNIT COST*	*QUANTITY*	*TOTAL*	*COMMENT*
MOBILIZATION		5.5%			$ 105,174	
MOT		5.5%			$ 105,174	
DRAINAGE		30%			$ 573,678	
UTILITIES		8%			$ 152,981	
BRIDGE OVER ROADWAY		SF	$ 175		$ -	
MILL AND OVERLAY		LANE MILES	$ 200,000	0.8	$ 165,751	
NEW PAVING		LANE MILES	$ 1,600,000	0.4	$ 585,909	
TYPE A CURB AND GUTTER		LF	$ 35	3,960	$ 138,600	
STRIPING - EDGE LINE		PER MILE	$ 11,088	0.9	$ 10,057	
STRIPING - LANE LINE		PER MILE	$ 2,772	0.7	$ 1,943	
RELOCATE OVERHEAD SIGN		EACH	$ 500,000	2	$ 1,000,000	
LIGHTING - REMOVAL AND RELOCATION OF EXISTING LIGHTING STRUCTURE		EACH	$ 2,000	5	$ 10,000	
SUBTOTAL A					$ 2,849,267	
Special Systems	BAS (Metasys)					
	FAS (Honeywell)					
	CASS					
	CCTV					
	BGE					
	Verizon					
SUBTOTAL B					$ 2,849,267	
Miscellaneous Construction Allowance (5% to 10% of B)		10%			$ 284,927	
SUBTOTAL C					$ 3,134,194	
Design Contingency (15% to 25% of C)		25%			$ 783,548	
SUBTOTAL D					$ 3,917,742	
General Conditions X% of D (If not included in Unit Costs)		%?				
Contractor O&P X% of D (If not included in Unit Costs)		%?				
SUBTOTAL E					$ 3,917,742	
Construction Quality Control Plan (3% of E)		3%			$ 117,532	
SUBTOTAL F (Construction Cost Estimate)					$ 4,035,274	
Estimated Design Fee (8% to12% of E)		10%			$ 403,527	
Estimated CMI Fee (8% to 12% of E)		10%			$ 403,527	
SUBTOTAL G					$ 4,842,329	
Escalation Factor (if applicable)		%?				
***GRAND TOTAL* (Program Cost Estimate)**					$ ***4,842,329***	

Level of Accuracy	☐ Quantity Take-Off	☑ General Square Foot	☐ Comparison with other installations/facilities
List of Sole Source Items Included in this Contract	1	3	5
	2	4	6
List of Assumptions			

ALTERNATIVE 5 WITH PROPOSED ACCESS ROAD
I-195
TO GAZY DR
PROPOSED HOTEL
HOTEL ACCESS RD
TO TERMINAL
12'
PROVIDE AN ADDITIONAL THRU LANE
PROVIDE AN AUXILIARY LANE BETWEEN TERMINAL RETURN ROAD AND THE HOURLY GARAGE
22 MAP TRAFFIC VOLUME: 1,525 VEHICLES
30 MAP TRAFFIC VOLUME: 1,780 VEHICLES
22 MAP NO BUILD WEIGHTED AVG. MAX TRAVEL TIME: 10 MINUTES
22 MAP BUILD WEIGHTED AVG. MAX TRAVEL TIME: 10 MINUTES
30 MAP NO BUILD WEIGHTED AVG. MAX TRAVEL TIME: 18 MINUTES
30 MAP BUILD WEIGHTED AVG. MAX TRAVEL TIME: 17 MINUTES
COST ESTIMATE: $4-5 MILLION
LEGEND
- PROPOSED WIDENING AND MODIFICATIONS
- EXISTING TO BE REMOVED AND PAVED

ADDITIONAL MEASURES TO BE CONSIDERED FOR FURTHER EVALUATION

3.) Construct an Automated People Mover

BWI AIRPORT LANDSIDE IMPROVEMENTS
PEOPLEMOVER FEASIBILITY STUDY
Capitol Cost Estimates

	MINIMUM OPERABLE SEGMENT*	PREFERRED ALTERNATIVE**	FULL-BUILD***
CIVIL GUIDEWAY COSTS	$39,733,000	$63,716,517	$110,559,000
GUIDEWAY SURFACES AND EQUIPMENT	$18,635,000	$30,072,000	$59,041,000
TOTAL GUIDEWAY	**$58,368,000**	**$93,788,517**	**$169,600,000**
CIVIL STATION COSTS	$20,338,000	$23,068,127	$44,908,000
PEDESTRIAN BRIDGES AT CONC A & E	$16,120,000	$16,120,000	$16,120,000
MOVING SIDEWALKS AT CONC A & E	$2,900,000	$2,900,000	$2,900,000
STATION FACILITIES AND EQUIPMENT	$3,755,000	$4,374,000	$9,946,000
TOTAL STATIONS	**$43,113,000**	**$46,462,127**	**$73,874,000**
POWER DISTRIBUTION SYSTEM (PDS)	$9,769,000	$14,296,000	$34,028,000
COMMAND, CONTROL, AND COMMUNICATIONS	$16,525,000	$25,927,000	$47,494,000
UTILITY CONNECTIONS	$2,100,000	$4,200,000	$6,300,000
TOTAL POWER, CONTROL AND COMMUNICATIONS	**$28,394,000**	**$44,423,000**	**$87,822,000**
MAINTENANCE & STORAGE & CENTRAL CONTROL FACILITY	$12,125,000	$12,125,000	$12,125,000
MAINTENANCE & STORAGE & CENTRAL CONTROL SYSTEMS	$16,100,000	$16,100,000	$16,100,000
EXPENDABLE PARTS AND SPARE EQUIPMENT	$1,434,000	$1,911,000	$3,663,000
TOTAL MAINTENANCE & STORAGE	**$29,659,000**	**$30,136,000**	**$31,888,000**
RELOCATE AMTRAK HIGH POWERLINE	$300,000	$300,000	$300,000
UTILITY MODIFICATIONS	$4,417,000	$6,936,000	$11,814,000
ENVIRONMENTAL MITIGATION	$3,312,900	$5,202,000	$8,860,800
MAINTENANCE OF TRAFFIC	$1,933,000	$3,034,500	$5,169,000
TOTAL MISCELLANEOUS	**$9,962,900**	**$15,472,500**	**$26,143,800**
SUBTOTAL CIVIL CONSTRUCTION	**$100,878,900**	**$133,102,144**	**$212,455,800**
SUBTOTAL SYSTEMS	**$68,618,000**	**$97,180,000**	**$176,872,000**
FACILITY CONTINGENCY (40%)	$40,351,560	$53,240,858	$84,982,320
SYSTEMS CONTINGENCY (15%)	$10,292,700	$14,577,000	$26,530,800
TOTAL CONSTRUCTION CONTINGENCY	**$50,644,260**	**$67,817,858**	**$111,513,120**
SUBTOTAL CONSTRUCTION COST	**$220,141,160**	**$298,100,002**	**$500,840,920**
ADD-ONS (35%)	$77,049,406	$104,335,001	$175,294,322
(PE, Design, EA, PM, Agency, Startup)			
VEHICLES (10% CONTINGENCY)	$30,690,000	$40,920,000	$78,430,000
RIGHT-OF-WAY (50% CONTINGENCY)	$1,144,080	$1,504,080	$1,504,080
SUBTOTAL CONSTRUCTION COST	**$329,024,646**	**$444,859,083**	**$756,069,322**
SCOPE CONTINGENCY (20%)	$65,804,929	$88,971,816	$151,213,864
TOTAL (2000)	**$394,829,575**	**$533,830,899**	**$907,283,186**
COST PER MILE (2000)	$186,240,366	$158,878,244	$160,014,671
TOTAL ESCALATED (Min. Op. Seg. & Pref. Alt.: 2004; Full-build: 2008)	**$453,076,019**	**$612,583,235**	**$1,194,718,699**
TOTAL (2016)****	**$645,978,067**	**$873,397,216**	**$1,513,433,904**

*Minimum Operable Segment: Amtrak to Concourse E
**Preferred Alternative Consolidated Rental Car to Concourse E
***Full-build: Consolidated Rental Car to Satellite Green Lot
****Assumes a 3% annual cost escalation from 2004 (Minimum Operable and Preferred Alternative) or 2008 (Full-Build) to 2016 dollars.

BWI AIRPORT LANDSIDE IMPROVEMENTS
PEOPLEMOVER FEASIBILITY STUDY
Operating and Maintenance Costs

ITEM	DESCRIPTION	QUANTITY	PRICE
BID ESTIMATE SUMMARY			
30.1	MAINTENANCE & RECOVERY PERSONNELL	37	$2,634,000
30.2	OPERATIONS PERSONNEL	16	$1,089,000
30.3	ADMINISTRATIVE PERSONNEL	3	$224,000
30.4	ENGINEERING PERSONNEL	2	$246,000
	LABOR CONTINGENCY FACTOR	10.00%	$419,000
	LABOR SUBTOTAL	**58**	**$4,612,000**
31.1	UTILITIES & FUEL		$672,000
31.2	PARTS & CONSUMABLES		$463,000
31.3	OFFICE SUPPLIES & EQUIPMENT		$90,000
31.4	CONTRACT SERVICES		$230,000
31.5	INSURANCE		$150,000
31.6	OTHER		$57,000
	DIRECT COSTS SUBTOTAL		**$1,662,000**
	CONTINGENCY FACTOR	25.00%	$1,569,000
	TOTAL (2000)		**$7,843,000**
	TOTAL (2016) *		**$12,585,713**

*Assumes a 3% annual escalation since 2000.

BWI AIRPORT LANDSIDE IMPROVEMENTS
PEOPLEMOVER FEASIBILITY STUDY
Operating and Maintenance Costs

ITEM	DESCRIPTION	QUANTITY	PRICE
BID ESTIMATE SUMMARY			
30.1	MAINTENANCE & RECOVERY PERSONNELL	65	$4,813,000
30.2	OPERATIONS PERSONNEL	15	$1,013,000
30.3	ADMINISTRATIVE PERSONNEL	5	$334,000
30.4	ENGINEERING PERSONNEL	8	$817,000
	LABOR CONTINGENCY FACTOR	10.00%	$698,000
	LABOR SUBTOTAL	**93**	**$7,675,000**
31.1	UTILITIES & FUEL		$1,401,000
31.2	PARTS & CONSUMABLES		$1,060,000
31.3	OFFICE SUPPLIES & EQUIPMENT		$90,000
31.4	CONTRACT SERVICES		$246,000
31.5	INSURANCE		$150,000
31.6	OTHER		$90,000
	DIRECT COSTS SUBTOTAL		**$3,037,000**
	CONTINGENCY FACTOR	25.00%	$2,678,000
	TOTAL (2000)		**$13,390,000**
	TOTAL (2016) *		**$21,487,019**

*Assumes a 3% annual escalation since 2000.

4.) Provide Separate Access to Future Concourse F

TERMINAL F DIRECT ACCESS BWI ACCESS ROAD PLANNING STUDY Capitol Cost Estimates				
	OPTION 1A*	OPTION 2**	OPTION 3A***	OPTION 5****
ACCESS RAMP COSTS	$21,906,000	$93,645,624	$25,326,000	$7,974,000
UPPER LEVEL RE-ALIGNMENT COSTS	$65,414,500	$71,845,950	$65,314,500	$56,605,900
GARAGE REMOVAL	$0	$0	$0	$7,702,240
NEW 5,000 SPACE HOURLY GARAGE	$0	$0	$0	$107,370,000
EXISTING WALKWAY RECONSTRUCTION	$0	$0	$0	$4,596,100
PEDESTRIAN BRIDGE REMOVAL	$0	$0	$0	$267,750
TOTAL STRUCTURES	**$87,320,500**	**$165,491,574**	**$90,640,500**	**$184,515,990**
ROADWAY WIDENING	$11,760,000	$5,909,091	$10,977,273	$12,681,818
SIGNING	$79,298	$100,915	$90,402	$66,130
MARKING	$49,104	$62,490	$57,960	$40,950
LIGHTING	$401,016	$510,335	$457,170	$334,425
TOTAL ROADWAY	**$12,289,418**	**$6,582,831**	**$11,582,805**	**$13,123,323**
SUBTOTAL	**$99,609,918**	**$172,074,405**	**$102,223,305**	**$197,639,313**
PRELIMINARY ENGINEERING (45%)	$44,824,463	$77,433,482	$46,000,487	$88,937,691
DRAINAGE (30%)	$29,882,975	$51,622,322	$30,666,992	$59,291,794
UTILITIES (30%)	$29,882,975	$51,622,322	$30,666,992	$59,291,794
LANDSCAPING (7%)	$6,972,694	$12,045,208	$7,155,631	$13,834,752
SUBTOTAL A	**$211,173,026**	**$364,797,739**	**$216,713,407**	**$418,995,344**
Special Systems				
SUBTOTAL B	**$211,173,026**	**$364,797,739**	**$216,713,407**	**$418,995,344**
Miscellaneous Construction Allowance (5% to **10%** of B)	$21,117,303	$36,479,774	$21,671,341	$41,899,534
SUBTOTAL C	**$232,290,329**	**$401,277,512**	**$238,384,747**	**$460,894,878**
Design Contingency (15% to **25%** of C)	$58,072,582	$100,319,378	$59,596,187	$115,223,719
SUBTOTAL D	**$290,362,911**	**$501,596,891**	**$297,980,934**	**$576,118,597**
General Conditions X% of D (If not included in Unit Costs)	$0	$0	$0	$0
Contractor O&P X% of D (If not included in Unit Costs) (10%)	$29,036,291	$50,159,689	$29,798,093	$57,611,860
SUBTOTAL E	**$319,399,202**	**$551,756,580**	**$327,779,027**	**$633,730,457**
Construction Quality Control Plan (3% of E)	$9,581,976	$16,552,697	$9,833,371	$19,011,914
SUBTOTAL F (Construction Cost Estimate)	**$328,981,178**	**$568,309,277**	**$337,612,398**	**$652,742,371**
Estimated Design Fee (8% to **12%** of E)	$39,477,741	$68,197,113	$40,513,488	$78,329,085
Estimated CMI Fee (8% to **12%** of E)	$39,477,741	$68,197,113	$40,513,488	$78,329,085
SUBTOTAL G	**$407,936,661**	**$704,703,504**	**$418,639,374**	**$809,400,540**
Escalation Factor (if applicable)	3%	3%	3%	3%
GRAND TOTAL (Program Cost Estimate)	**$445,763,404**	**$770,048,545**	**$457,458,547**	**$884,453,824**
Level of Accuracy	☐ Quantity Take-Off	☑ General Square Foot	☐ Comparison with other installations / facilities	
List of Sole Source Items Included in this Contract	1	3	5	
	2	4	6	
List of Assumptions				

*Option 1A uses flyover ramps over the existing Upper and Lower Level Non-Commercial Lanes to provide direct curbside service to Terminal F.

**Option 2 uses a Cut & Cover Tunnel below the existing Upper and Lower Level Non-Commercial Lanes to provide direct curbside service to Terminal F.

***Option 3A will construct flyover ramps to both the north and south of the proposed hotel location to provide direct curbside service to Terminal F. This option has the benefit of keeping Terminal A-E and Terminal F traffic completely separated.

****Option 5 will demolish the existing Hourly Garage and replace it with a new, modern garage. The additional space gained by the modern garage will allow for a separated Terminal F roadway to fit in between the existing roadways and the garage. This will allow the project to be constructed with fewer flyover ramps.

Appendix 7: December 2015 MAA Presentation

CONGESTION RELIEF STUDY
FOR LOWER LEVEL ROADWAY

BWI MARSHALL TASK NO. 13

JMT BWI AECOM

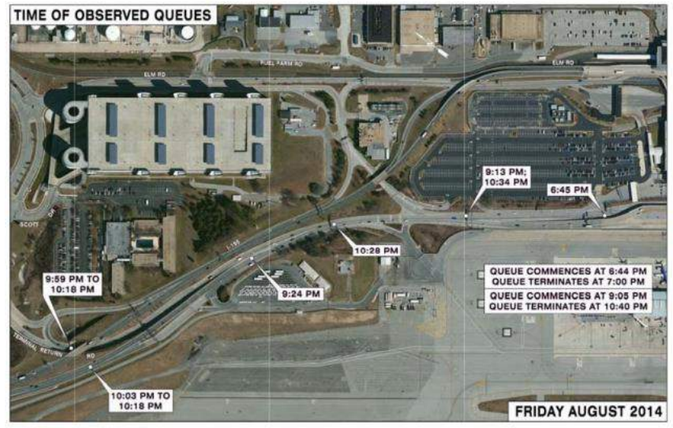
Goals / Objectives

Passenger Loading and Police Activity

Friday Evening I-195 and Terminal Road Inbound

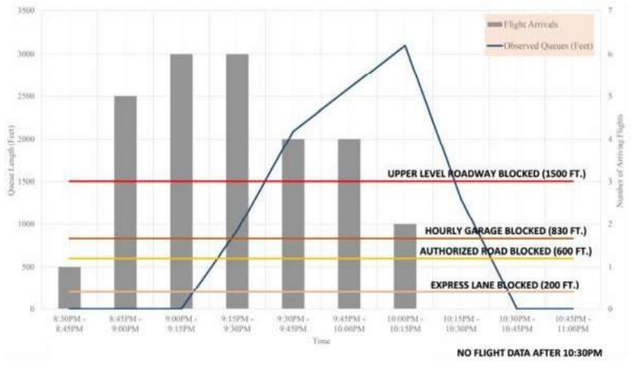
Friday Evening I-195 and Terminal Road Inbound

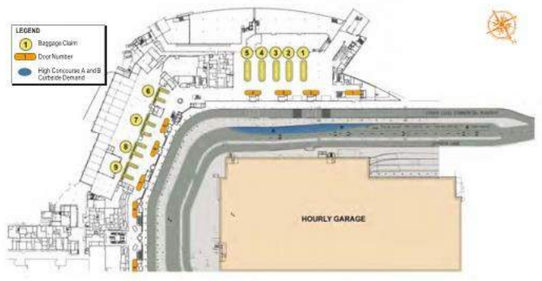
12/15/2015



Friday Evening I-195 and Terminal Road Inbound

Flight Arrivals Versus Inbound Vehicle Queue





CURBSIDE DEMAND

22 MAP
CURB A AND B: LOS F
CURB A, B, AND C: LOS C/D

TO ALLEVIATE DELAYS, 190 - 205 VEHICLES PER HOUR NEED TO BE REMOVED FROM THE LOWER LEVEL.

WITH OPENING CURBSIDE C, AN ADDITIONAL 90 - 115 VEHICLES WILL STILL NEED TO BE REMOVED.

30 MAP
CURB A AND B: LOS F
CURB A, B, AND C: LOS F

TO ALLEVIATE DELAYS, 330 - 355 VECHICLES PER HOUR NEED TO BE REMOVED

WITH OPENING CURBSIDE C, AN ADDITIONAL 190 - 215 VEHICLES WILL STILL NEED TO BE REMOVED.

Operational Improvements

Reduce Lower Level Curbside Traffic Volume

Recommended Improvements: Operational (0-6 Months)

- Utilize Hourly Garage for free parking during peak periods (8 PM – 11 PM) only for congestion
- Encourage Upper Level Pick-ups (no bags).
  - Request that Southwest Airlines flight attendants recommend alternative pick-up locations during congestion.
  - Show congestion updates on website and AM Radio 1610
  - Signage inside terminal directing those without bags being picked up by POV's
- ~~Consider increasing shuttle bus headways during peak hour.~~

Recommended Improvements: Operational (6+ Months)

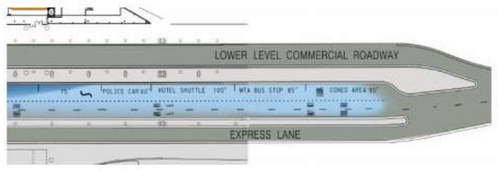
- Institute a per-trip fee for private commercial vehicle curbside service
- Encourage Upper Level Pick-ups (no bags).
  - Install PVMS on I-195 and in Concourses A/B

Operational Improvements

Spread Traffic Beyond Lower Level A/B Curb

Recommended Improvements: Operational (0-6 Months)

- Reduce the length of Terminal A Curbside reserved for MTA buses, hotel shuttles, police staging and traffic cones.
- Encourage a higher utilization of Baggage Claim/Curbside B-C for Southwest Pick-ups.
- Install sequential Column Numbers on the lower level structure for reference.
- Relocate MTA Bus Stop from Curbside A to ~~commercial roadway / Terminal C~~ another location / Upper Level.



12/15/2015

Operational Improvements

Reduce Curbside Dwell Time

Recommended Improvements: Operational (0-6 Months)

- Utilize more aggressive traffic management techniques to reduce dwell time ~~to a maximum of 2 minutes and 30 seconds~~ for all vehicles (including parking shuttles).

Recommended Improvements: Operational (0-6 Months)

- Utilize more aggressive traffic management techniques to reduce dwell time ~~to a maximum of 2 minutes and 30 seconds~~ for all vehicles (including parking shuttles).

22 MAP

Condition	Number of Vehicles Still Needed to Divert
No Build	200 – 225 veh/hr
3 Minute	150 – 175 veh/hr
2.5 Minute	125 – 150 veh/hr
2 Minute	115 – 140 veh/hr
1.5 Minute	90 – 115 veh/hr
1 Minute	75 – 100 veh/hr

30 MAP

Condition	Number of Vehicles Still Needed to Divert
No Build	340 – 365 veh/hr
3 Minute	290 – 315 veh/hr
2.5 Minute	265 – 290 veh/hr
2 Minute	255 – 280 veh/hr
1.5 Minute	230 – 255 veh/hr
1 Minute	215 – 240 veh/hr

Recommended Improvements: Operational (0-6 Months)

- Hire professional curbside management personnel
- Restripe innermost public curb single wide lane to provide 2 striped lanes.

Capital Improvements

Recommended Improvements: Capital (3-6 Months)

Extend Lower Level dedicated Commercial Vehicle Lane (Alternative 3 - 2015 Study) that removes Authorized Vehicles from the queue earlier – Currently in Design.

Recommended Improvements: Capital (Longer Term)

- Improve lower level lighting.
- Relocate Cell Phone lot to Taxi/Bus Staging Area for more convenient access.
- Install new Variable Message Signs.
- Create a free cell phone app/mobile platform for the website that shows baggage arrival times and flight arrival times.
- Install FIDS displays in Cell Phone lot showing Baggage Claim time for flights instead of "At Gate" arrival times.

Recommended Improvements: Capital (Longer Term)

- Construct Alternative 1 (Planning level Cost Estimate $1-1.5 Million)

Recommended Improvements: Capital (Longer Term)

- ~~Construct Alternative 2 Option 1 (Planning level Cost Estimate $3-4 Million)~~

Recommended Improvements: Capital (Longer Term)

- ~~Construct Alternative 2 Option 2 (Planning level Cost Estimate $3-4 Million)~~

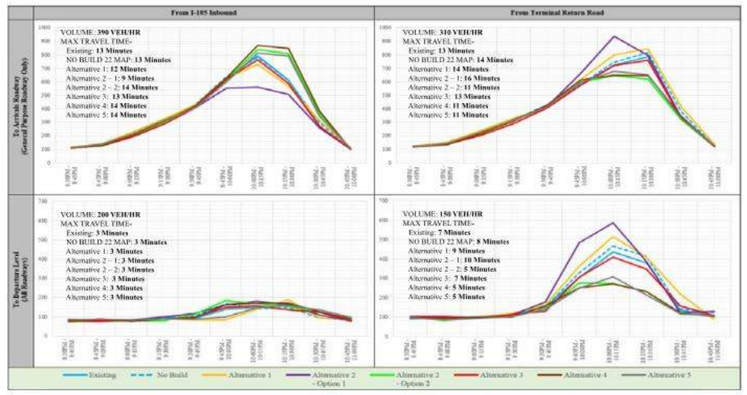
Recommended Improvements: Capital (Longer Term)

- Construct Alternative 4 (Planning level Cost Estimate $3-4 Million)

Recommended Improvements: Capital (Longer Term)

- Construct Alternative 5 (Planning level Cost Estimate $4-5 Million)

22 MAP Travel Time by Origin to Destination



Recommended Improvements: Capital (Longer Term)

- Underpin the first level of the Hourly Garage and lower the floor slab to create enough headroom for off-site hotel and parking shuttles to unload.
- Widen the lower level to accommodate additional lanes through Curbside A-B through partial demolition of the Hourly Garage.
- Demo the existing Hourly Garage and build a new garage with a first floor GTC.

Attachment 2:

Draft Traffic Analysis Study

BWI Marshall International Concourse Roadway Widening Study

(AECOM and JMT, MAA-AE-14-006)

July 29, 2016

Traffic Analysis Study – Draft Report

AECOM Task No.015

MAA-AE-14-006

BWI Marshall International Concourse Roadway Widening Study

BALTIMORE/WASHINGTON INTERNATIONAL BWI® THURGOOD MARSHALL AIRPORT

Prepared By:

AECOM

And

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®

MARYLAND DEPARTMENT OF TRANSPORTATION

MARYLAND AVIATION ADMINISTRATION

July 29, 2016

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Executive Summary

Alternatives were developed and capacity analysis was performed to evaluate potential roadway improvements associated with roadway widening at the Upper Level of the International Concourse Terminal. Two alternatives were developed and analyzed using traffic microsimulation modeling with existing traffic demand volume (22 MAP). The future travel demand forecast for 30 MAP was also analyzed for each alternative to determine their effectiveness with traffic growth. The two proposed alternatives are:

Alternative 2A – This alternative proposes a complete separation of vehicles entering the *Authorized Vehicles Roadway* from vehicles entering the General Purpose Roadway on the Upper Level roadway. Vehicles entering the Upper Level General Purpose Roadway will only be able to exit though a new proposed ramp leading from the Upper Level to the I-195 outbound roadway. No access to Elm Road from the Upper Level General Purpose Roadway is provided. Motorists in the commercial vehicle lanes will have access to both Elm Road and the I-195 ramp. The Lower Level Hourly Garage exit will be provided with a direct ramp to I-195. The Lower Level Hourly Garage exit merge will be realigned. The I-195 outbound weave segment will be converted from a two lane to four lane weave segment.

The Hourly Garage fifth floor exit to the Terminal Upper Level will also be relocated to exit at the Lower Level exit plaza via a ramp with a -7% grade.

The planning level cost estimate for **Alternative 2A** is **$40 -55 Million.**

Alternative 2A Extended to Concourse E/F – This alternative proposes the same improvement as Alternative 2A with an extension on both the Upper and Lower Level in order to provide additional curbside for the proposed Terminal E/F. The extension would provide approximately 200 feet more curbside. The proposed extension would require much of the existing ramps and structure on the Upper Level between Terminal F and I-195 Outbound to be reconstructed. This alternative aims to better accommodate the anticipated Terminal E/F expansion and further future airport growth.

The planning level cost estimate for **Alternative 2A Extended to Concourse E/F** is **$55 – $70 Million.** The approximate salvage value of that cost is anticipated to be **$20 – $25 Million**.

Alternative 2A Extended without Elm Road Ramp – This alternative proposes the same improvement as Alternative 2A Extended to Concourse E/F, with the exception of having no commercial vehicle access to Elm Road. The reconstruction of the Elm Road Ramp from the Upper Level is a major cost with minimal anticipated usage for Alternative 2A Extended.

The planning level cost estimate for **Alternative 2A Extended without Elm Road Ramp** is **$35 – $50 Million.** The approximate salvage value of that cost is anticipated to be **$20-25 Million**.

For all options, the pedestrian crossing from the Hourly Garage fifth floor to the Terminal Upper Level will be relocated to a proposed skywalk (see the Hotel Enabling Study for more information and an approximate cost estimate).

The results for the analysis show that all alternatives are able to operate acceptably, even under traffic growth at 30 MAP traffic demand. All weave segments and intersections operate at LOS ‘C’ or better. The weave segment at Elm Road and the Lower Level Hourly Garage exit sees improvement in weave operations due to the separation of Hourly Garage exit volumes. The weave segment along the I-195 outbound roadway sees improved LOS due to the additional lanes, but will slightly degrade as compared to the No Build due to the increased traffic and increased number of weave lanes.

It is recommended the signalized intersections along Terminal Road at Scott Drive and Elm Road be retimed to accommodate for a change in traffic pattern. Signing will need to be upgraded with these alternatives.

1. Introduction

Maryland Aviation Administration (MAA) has requested a study be performed to assess outbound performance during peak demand periods at Baltimore Washington Thurgood Marshall International Airport (BWI Marshall) with the proposed international concourse expansion. The emphasis of the study is on vehicle operations at the Terminal and to evaluate proposed alternative improvements using recent vehicle class counts. The primary objectives of this study are:

- Perform field observations and document any notable observed operational issues along the outbound roadway with emphasis on the weave segments between the Upper and Lower Level ramps to I-195 outbound and Terminal Return Road.
- Create a calibrated VISSIM model with 15 minute vehicle input resolution
- Analyze two alternatives to determine their feasibility
- Include proposed airport hotel site as part of the VISSIM model

Data collection for intersection turning movement counts, roadway tube counts, pedestrian counts, travel times, and origin to destination study was performed during the summer of 2015. This study includes improvements for the proposed hotel to be located at the existing employee surface parking adjacent to the Hourly Garage.

1.1. Existing Conditions

There are three major outbound roadways from BWI Marshall Airport:

- I-195 outbound
- Terminal Road
- Elm Road to Terminal Road

Figure 1 below shows the weave segment between Upper and Lower Level ramps towards I-195 outbound. Posted speed limit for the outbound roadway remains at 30 mph until the ramp diverges to Terminal Return Road where the posted speed limit increases to 45 mph.

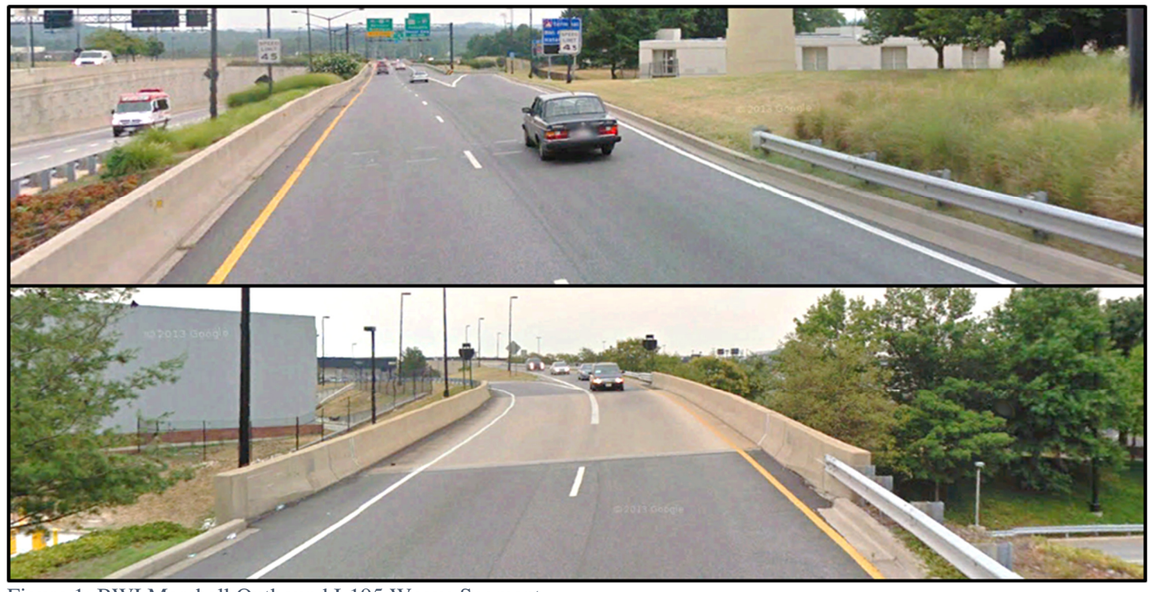


Figure 1: BWI Marshall Outbound I-195 Weave Segment

The outbound roadways along the Elm Road Lower Level weave segment have a posted speed limit of 30 MPH. The Elm Road weave segment has three lanes as shown in Figure 2 below.

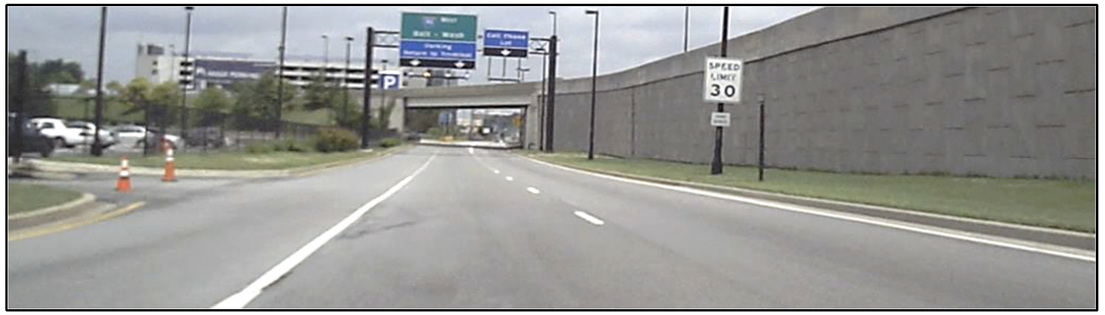


Figure 2: BWI Marshall Lower Level Elm Road Weave Segment

The inbound roadway to the BWI Terminal Upper Level is separated into the Authorized Airport Vehicles Only (commercial roadway) and General Purpose Roadway. The posted speed limit on the terminal Upper Level is 15 mph and the vehicle classification distribution use for each roadway is listed in Table 1.

Table 1: Upper Level Authorized Vehicles Only and General Purpose Roadway Vehicle Distribution

Authorized Vehicles Only	General Purpose Roadway
BWI Buses/Shuttles: - Long Term A - Long Term B - Express - Daily - AMTRAK - Employee Parking BWI Taxis & Limos Super Shuttles	Passenger Cars MTA Buses Hotel Shuttles Private Taxis Off-Site Parking Shuttles: - Preflight Parking Shuttles - Econopark Parking Shuttles - FastPark and FastPark 2 Parking Shuttles - Park N' Fly Parking Shuttles - Others

Along the Upper Level International Concourse there is a ramp access from the Hourly Garage fifth floor exit to the terminal Upper Level roadway near door 20 as shown in Figure 3. There is one pedestrian crosswalk from the Hourly Garage to the terminal that crosses the Upper Level roadway also shown in Figure 3.

Figure 3: BWI Marshall Hourly Parking Garage Exit Ramp to Terminal Upper Level

Another exit from the Hourly Garage is through the Lower Level exit ticket plaza which ties into the Lower Level outbound roadway along Elm Road between the Lower Level Authorized Vehicles Only merge and the split to I-195 outbound as shown in Figure 4. Based on vehicle counts performed during summer 2015, there were approximately 200 vehicles per hour exiting from the Hourly Garage Lower Level exit plaza. It should be noted the exit ticket facility to the Upper Level can have a maximum of three exit booths operating at any given moment while the Lower Level can have a maximum of eight at any given time (9th exit booth to Lower Level for Employee Parking Lot).

Figure 4: Hourly Garage Lower Level Exit Plaza

Shown in Figure 7 is a condition diagram showing the BWI Marshall terminal property existing conditions with the location of the proposed hotel site located near the Hourly Garage. A portion of the BWI onsite employee parking is within the proposed hotel site, located next to the Hourly Garage.

1.2. Outbound Traffic Observation

Field observations were conducted during peak weave hour on a summer Sunday. Outbound traffic along both weave segments at I-195 outbound and Elm Road towards Terminal Return Road were observed to have relatively unobstructed traffic flow and maneuvering. There were no observed queuing or slowing of traffic flow at either weave segments.

On average, vehicles were able to drive through the weave segment at the I-195 outbound roadway at relatively free-flow-speed (higher than speed limit). Existing vehicle counts indicate approximately 1,680 vehicles per hour weaving through the I-195 outbound weave segment from 5:00PM to 6:00PM. Vehicle counts also indicate approximately 1,020 vehicles per hour weaving through the Lower Level Elm Road weave segment from 5:00PM to 6:00PM.

There was no significant vehicle queuing observed at any of the intersections within BWI property. All vehicles stopped were able to clear at the following signal green phases. Vehicles are able to access Terminal Return Road with negligible impedance.

1.3. Inbound Traffic Observations

Based on vehicle count data and on origin to destination study performed during summer 2015, it was determined the worst outbound weave operation from between the Upper and Lower Level ramps to I-195 and Terminal Return Road split is on a Sunday from 5:00 PM to 6:00 PM. Throughout this peak outbound traffic operation, there was no observed queuing along the inbound roadway as shown in Figure 5 below, taken on a typical summer Sunday at 5:30 PM.

Figure 5: Inbound Traffic near the Hourly Garage Entrance (Left) and towards I-195 and Terminal Return Road Inbound (Right)

The lack of observed queuing along the inbound roadway indicates there are no capacity constraints along the Upper or Lower Level curbside parking during this peak hour.

1.4. Upper Level International Concourse Curbside Dwell Time

An Upper Level international concourse curbside dwell time study was performed on August 23, 2015 (Sunday) from 5:00 PM to 6:00 PM for the general purpose roadway. A summary of the results from the dwell time study are shown in Figure 6 below.

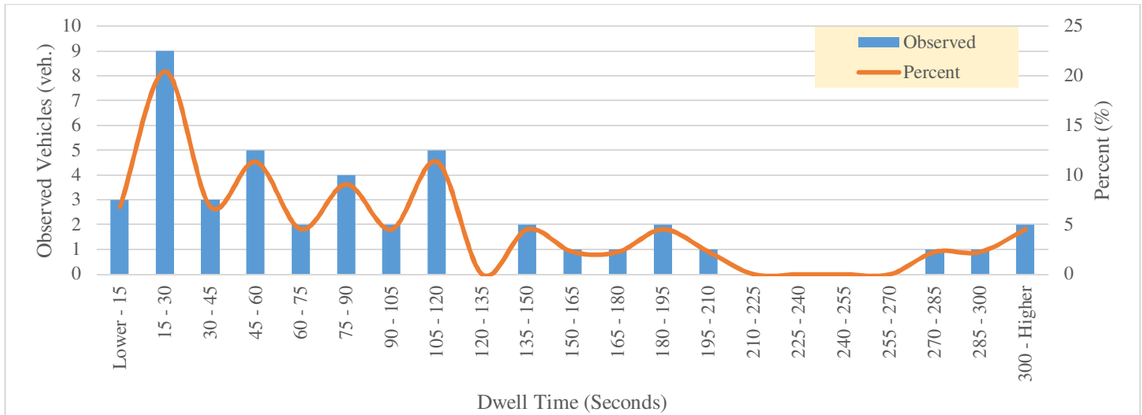


Figure 6: Passenger Cars Dwell Time Distribution by Counts (Left Axis) and Percent (Right Axis)

The results show that 45.5% of passenger cars dwell for less than 1 minute, 75% of passenger cars dwell for less than 2 minutes, and only 4.5% dwell for more than 5 minutes. The dwell time study considers the duration a vehicle spends at a complete stop along the curbside until the time the vehicle begins to move. The field data collection does not consider time for vehicles to maneuver to the curbside to dwell. Maneuvering time is considered minimal (less than 30 sec) due to vehicle density.

Figure 7: Existing Condition Diagram

2. Vehicle Class Observations

Vehicle types listed in Table 1 were considered and coded in VISSIM. Off-site private parking shuttles are typically considered their own vehicle class and separated from passenger cars due to the significant correlation between airline arrivals and departures with the parking shuttle arrival headways into the airport. The Upper Level general purpose roadway curbside does not have a marked location along the curbside reserved for the off-site private parking shuttles.

2.1. BWI Buses and Shuttles Headway

BWI buses were modeled according to their recommended headway by a study performed by Beckon Consulting submitted December 2013 and implemented in early 2014. Table 2 lists the existing BWI buses with their associated headways for how frequently they approach the terminal in an hour. The pathway for all BWI buses are simulated so that they start from their originating parking lots, approach the Upper Level Authorized Vehicles Only roadway, head towards Terminal Return Road, drive towards the Lower Level Authorized Vehicles Only roadway and dwell at their designated stops before finally circulating back to their parking lots.

Table 2: BWI Buses Headway Implemented Early 2014

Parking Lot	Headway (Minutes)	Buses/Hour to Upper or Lower Level	Buses/Hour Approaching Terminal
Long Term A	10	6	12
Long Term B	10	6	12
Express	8	8	16
Daily	5	12	24
AMTRAK/MARC	8	6	12
Rental Car Facility*	4	15	15
Employee Parking**	10	6	6
Total	-	-	97

* Lower Level Only ** Upper Level Only

It should be noted that based on Beckon Consulting's recommendations, rental car facility shuttles are destined directly to the Lower Level without first going through the Upper Level. Employee parking shuttles are destined for the Upper Level only and return directly to their parking lot without returning back to the Lower Level.

2.2. Vehicle Classes Inbound Origin to Destination

Vehicle class counts were performed to find their distribution from their inbound origin (from I-195 or Terminal Road) to their destination (Upper Level, Lower Level, or Hourly Garage) as shown in Table 3.

Table 3: Vehicle Class Origin to Destination Distribution (Sunday 5:00PM to 7:00PM – 2 Hours)

Origin	Destination	Passenger Cars	TAXIS		BUSES			SHUTTLES						
			BWI	PVT	BWI	MTA	Other	Hotel	Super	Pre Flight	Econo Park	Fast Park	Park & Fly	Other
I-195	Vehicle Counts	1625	186	66	112	9	1	24	11	14	12	0	4	17
	Hourly Parking Garage	15%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Lower Level	32%	100%	12%	41%	100%	100%	54%	18%	57%	58%	0%	50%	29%
	Upper Level	53%	0%	88%	59%	0%	0%	46%	82%	43%	42%	0%	50%	71%
Terminal Road	Vehicle Counts	829	0	8	152	8	2	70	27	10	6	74	31	23
	Hourly Parking Garage	14%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Lower Level	55%	0%	62%	70%	100%	50%	80%	100%	90%	100%	78%	77%	39%
	Upper Level	32%	0%	38%	30%	0%	50%	20%	0%	10%	0%	22%	23%	61%

The origin to destination distribution shown in Table 3 was developed using video recordings performed during August 2014 from 5:00 PM to 7:00 PM as part of the 2014 BWI Marshall Classification Study. See Figure 8, camera locations 6 and 8, for camera placement.

2.3. Vehicle Outbound Origin to Destination

A sample origin to destination study was performed on a Sunday in August 2015 during the peak hour to determine the vehicle distribution from origin to outbound destination. Three origins and four destinations were considered for the study and the results are summarized in Table 4.

Table 4: BWI Outbound Origin to Destination Distribution

Locations		Destination			
		I-195 Outbound	Terminal Return Road	Terminal Road	Elm Road
Origin	Hourly Parking Garage Lower Level Exit	67%	13%	3%	17%
	Terminal Lower Level	79%	3%	3%	15%
	Terminal Upper Level	73%	4%	3%	20%

The origin to destination distribution shown in Table 4 above considers non-BWI vehicles. All BWI owned vehicles have predefined and known paths and destinations with given headways (see Table 2). The above distribution was only applied to vehicles not owned or managed by BWI. Locations of the origin and destination of interest are shown in Figure 9.

2.4. Terminal Sunday Volumes with Hotel

The proposed hotel entrance and exit were included in the analysis to consider the hotel traffic impact to the BWI existing road network and proposed alternatives.

The proposed hotel is anticipated to have a peak of 250 occupied rooms with reference to the Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th edition. The proposed hotel site has an expected trip generation of 95 vehicles entering and 60 vehicles exiting during the peak hour of the inbound roadway. It is expected that all vehicles entering the proposed hotel site will use the entrance at the inbound roadway into the terminal.

It is expected that employees sharing the surface parking with the hotel patrons and hotel box truck deliveries will exit from the new proposed Gazy Drive exit. Approximately 10% of hotel patrons exiting are anticipated to exit using Gazy Drive, while the remaining are anticipated to use the closer exit at the Hourly Garage exit plaza. The employee surface parking lot is expected to accommodate 647 total parking spaces.

Using the origin to destination information shown in Table 3 and Table 4, vehicle counts done during summer 2015 at the locations shown in Figure 10, and BWI buses headway shown in Table 2, existing traffic volume and turning movements were developed as shown in Figure 11. The expected number of employees exiting from the Hourly Garage was estimated using the Employee Parking Relocation Study, by Ricondo & Associates, submitted to BWI and MAA on December 13, 2010. Projected traffic at the site with hotel generated traffic and forecasted 30 MAP traffic were developed and shown in Figure 12 and Figure 13.

Figure 8: Camera Locations from BWI Marshall Classification Study

Figure 9: Summer 2015 Origin to Destination Study

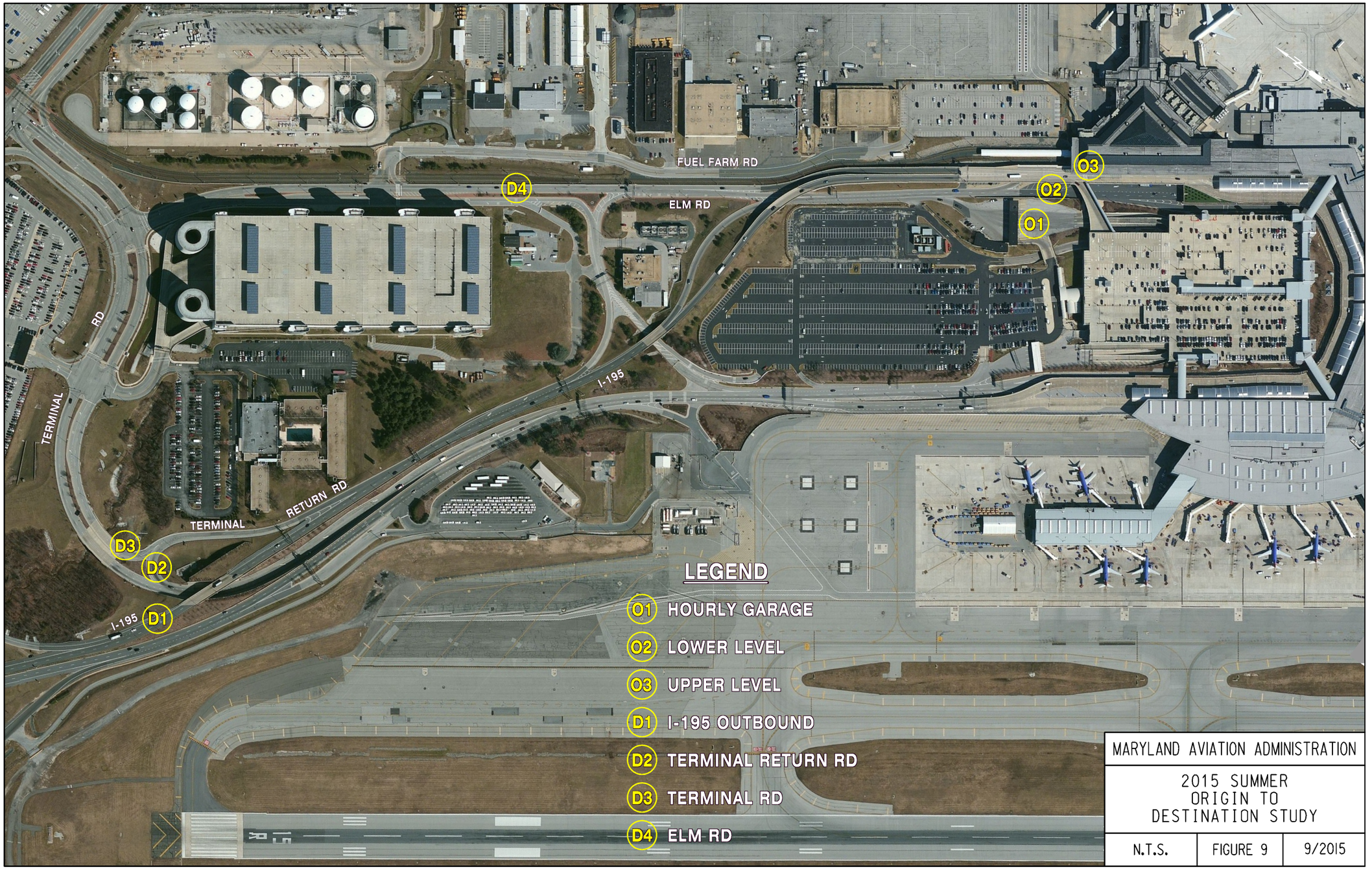


Figure 10: Summer 2015 Traffic Count Locations

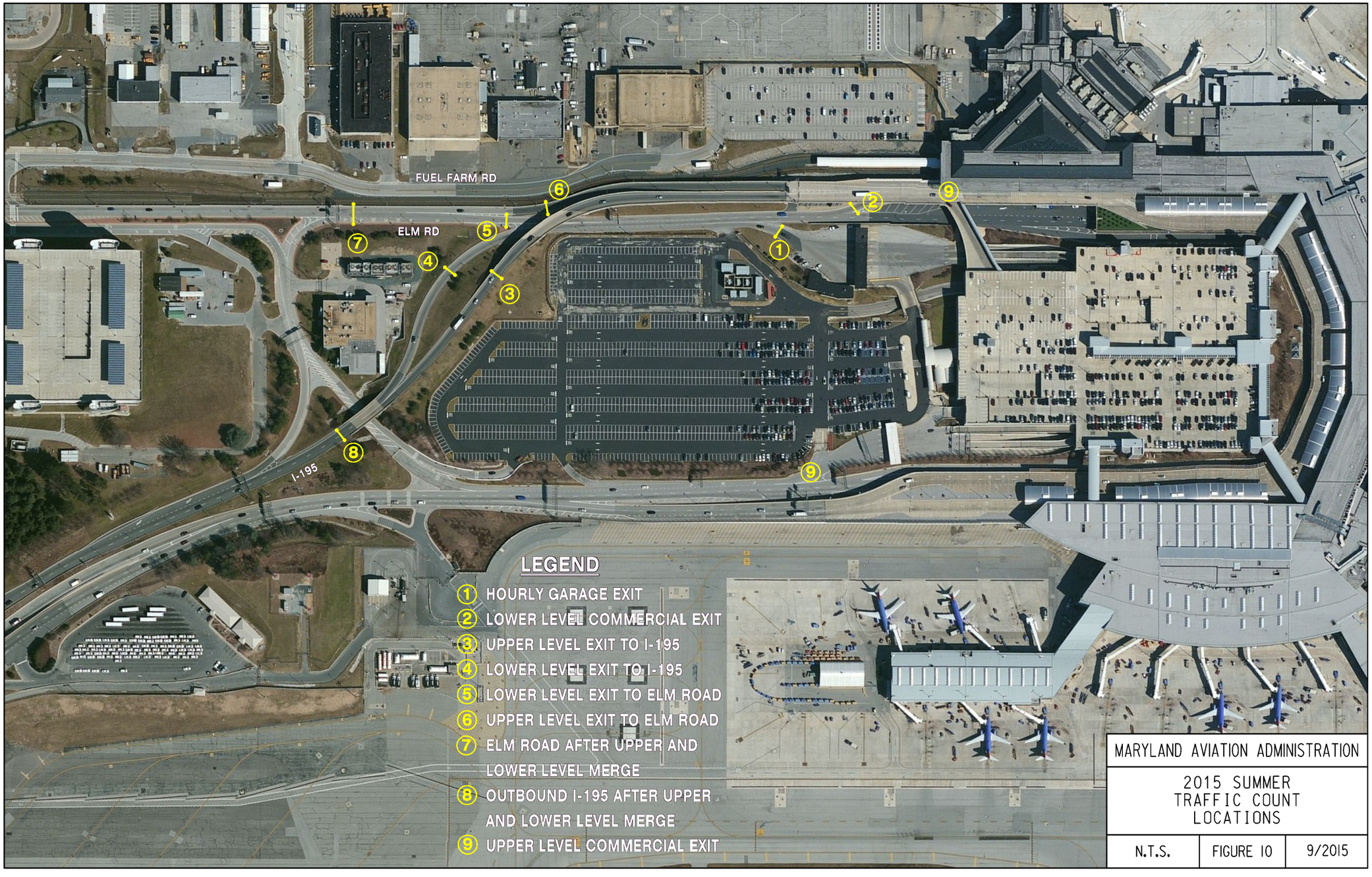


Figure 11: Sunday Existing Peak Weave and Elm Road Traffic

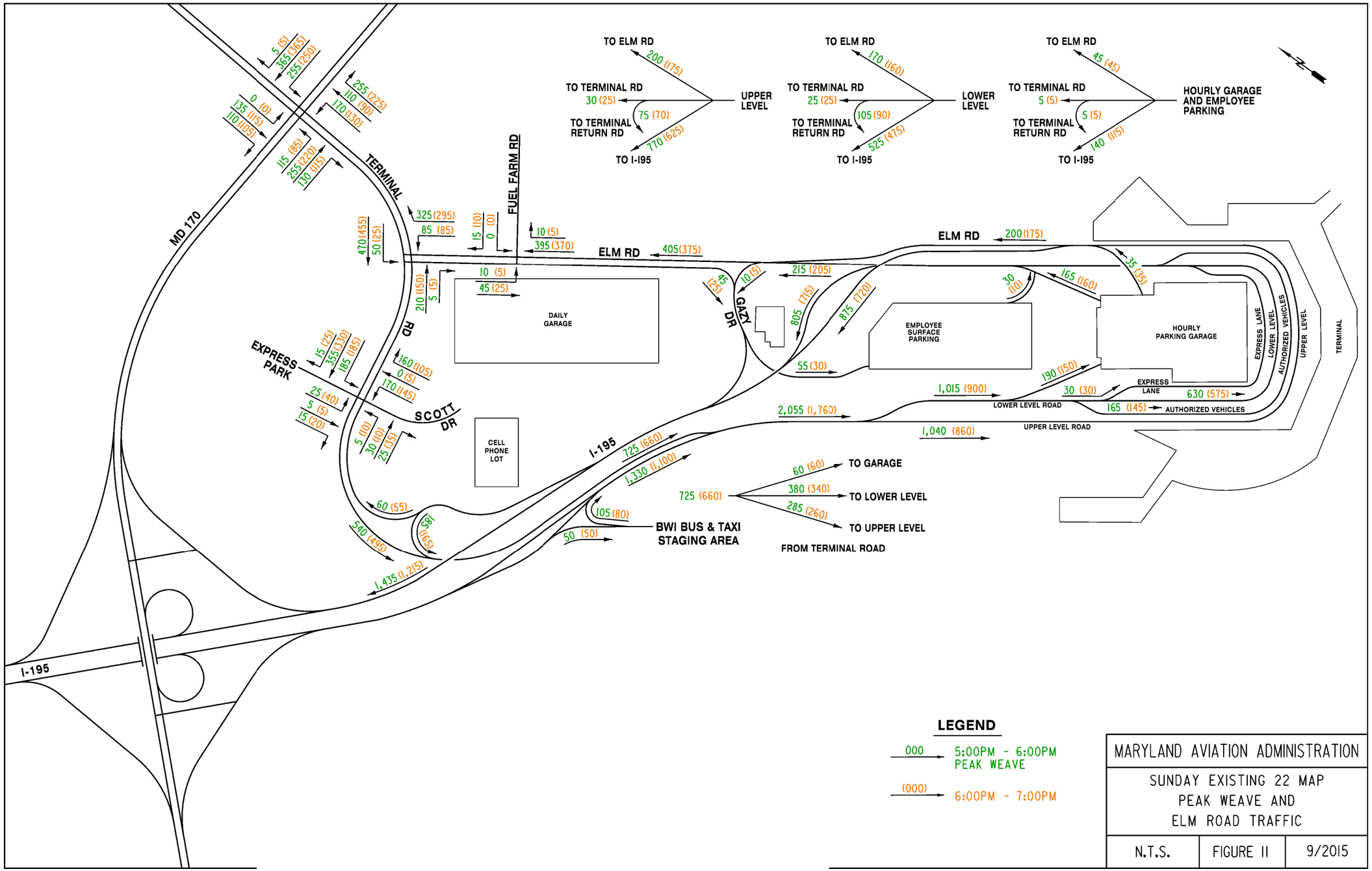


Figure 12: Sunday No Build with Hotel 22 MAP Peak Weave and Elm Road Traffic

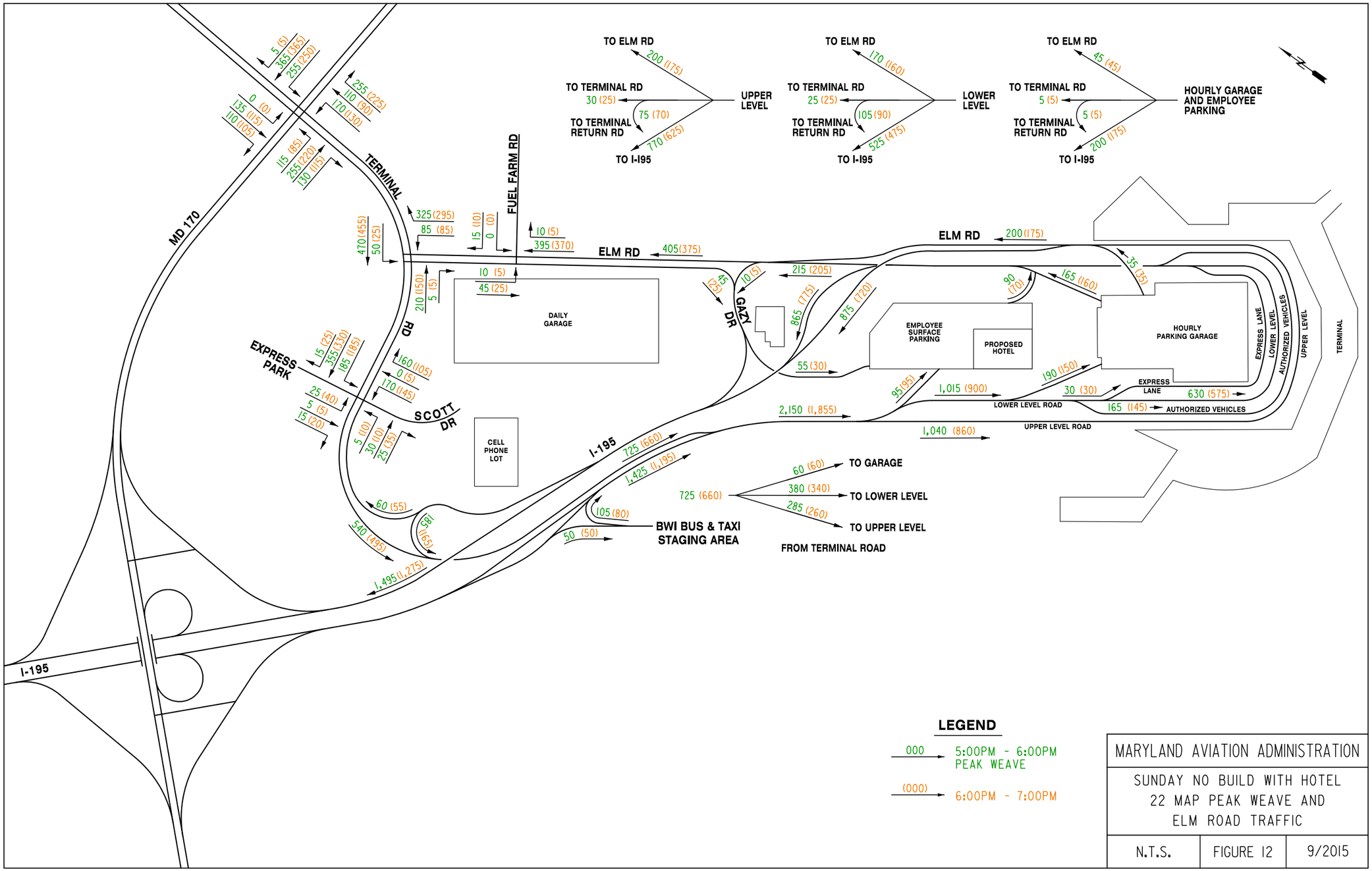
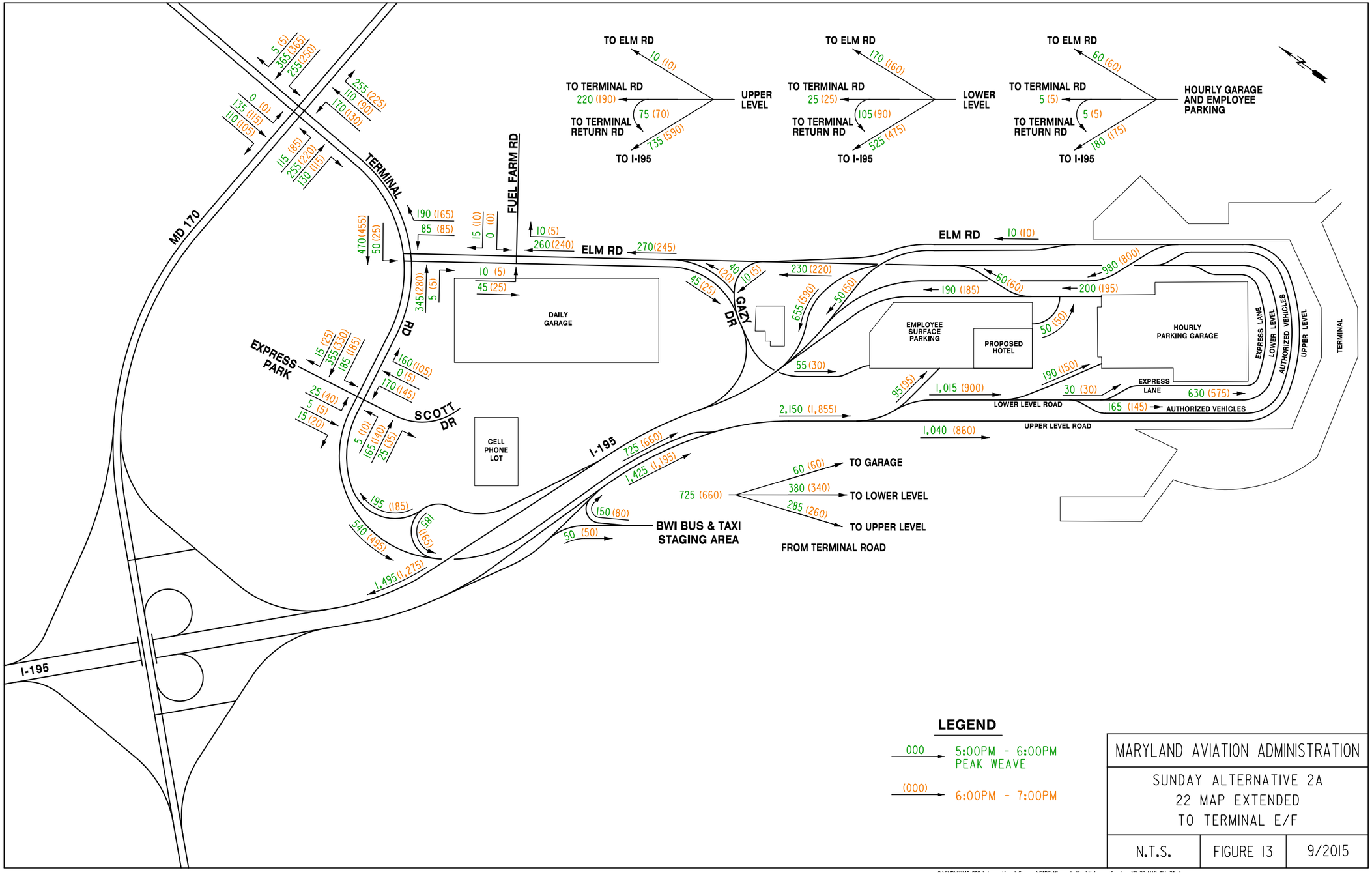


Figure 13: Sunday Alternative 2A and Extended to Concourse E/F 22 MAP Traffic



3. VISSIM Model Calibration

3.1. Observed Existing Vehicle Flow Rate

Using the vehicle counts from the summer of 2015 shown in Figure 10, the VISSIM model was calibrated to the acceptable margin of error using the GEH statistic recommended by FHWA shown below:

$$GEH = \sqrt{\frac{2 * (E}{E}}$$

Where,

$GEH = GEH\ Statistic$
$E = model\ estimated\ volume$
$= field\ count$Calibration Targets

Summarized results comparing field observed versus simulated vehicles are listed in Table 5 through 9 below. The results comparing the average simulated values are less than the GEH value of 5.Refer to Figure 10 for location reference numbers.

Table 5: Hourly Parking Garage Exit (Location 1) Simulated versus Observed

Time	Observed	VISSIM Simulated			Difference Δ = |Obs. – Avg.|	GEH Statistic
		Average	Minimum	Maximum		
5:00PM to 6:00PM	229	188	177	205	41	2.8
6:00PM to 7:00PM	206	168	155	183	38	2.8

Table 6: Upper Level Ramp to I-195 Outbound (Location 3) Simulated versus Observed

Time	Observed	VISSIM Simulated			Difference Δ = |Obs. – Avg.|	GEH Statistic
		Average	Minimum	Maximum		
5:00PM to 6:00PM	873	860	753	947	13	0.4
6:00PM to 7:00PM	722	747	661	869	25	0.9

Table 7: Lower Level Ramp to I-195 Outbound (Location 4) Simulated versus Observed

Time	Observed	VISSIM Simulated			Difference Δ = |Obs. – Avg.|	GEH Statistic
		Average	Minimum	Maximum		
5:00PM to 6:00PM	774	831	736	938	57	2.0
6:00PM to 7:00PM	719	761	672	860	42	1.5

Table 8: Lower Level to Elm Road (Location 5) Simulated versus Observed

Time	Observed	VISSIM Simulated			Difference Δ = |Obs. – Avg.|	GEH Statistic
		Average	Minimum	Maximum		
5:00PM to 6:00PM	256	208	164	250	48	3.2
6:00PM to 7:00PM	247	212	168	258	35	2.3

Table 9: Upper Level Ramp to Elm Road (Location 6) Simulated versus Observed

Time	Observed	VISSIM Simulated			Difference Δ = |Obs. – Avg.|	GEH Statistic
		Average	Minimum	Maximum		
5:00PM to 6:00PM	200	198	147	248	2	0.1
6:00PM to 7:00PM	172	142	103	183	30	2.4

4. Existing Conditions

Measure of Effectiveness (MOE) for weave segments and for intersection analysis was performed for the existing condition to compare with the proposed alternatives. The locations for weave segments and intersection analyses are shown in Figure 14.

4.1. Weave Segment Analysis

Weave analysis was performed at the following two weave segment locations:

- Lower Level merge with Hourly Garage exit to Elm Road and ramp diverge to I-195 (Weave 1)
- Upper and Lower Level ramp to I-195 merge to I-195 and ramp diverge to Terminal Road (Weave 2)

The result is reported in vehicle roadway density and compared against the Highway Capacity Manual 2010 level of service (LOS) standard as shown in Table 10 and Table 11.

Table 10: Existing Condition Weave Analysis (Weave Segment 1)

Time	Density (veh/mi/ln)	LOS
5:00PM to 6:00PM	13.6	B
6:00PM to 7:00PM	12.7	B

Table 11: Existing Condition Weave Analysis (Weave Segment 2)

Time	Density (veh/mi/ln)	LOS
5:00PM to 6:00PM	27.9	C
6:00PM to 7:00PM	24.8	C

Results show that Weave Segment 1 operates at LOS B for both analysis hours. The Weave Segment 2 existing condition operates at LOS C for both analysis hours.

4.2. Intersection Analysis

Intersection analysis was performed at four intersections; three are signalized and one is unsignalized. For the unsignalized intersection, only the controlled movement delay and LOS are reported. Intersection analysis was performed for the following locations:

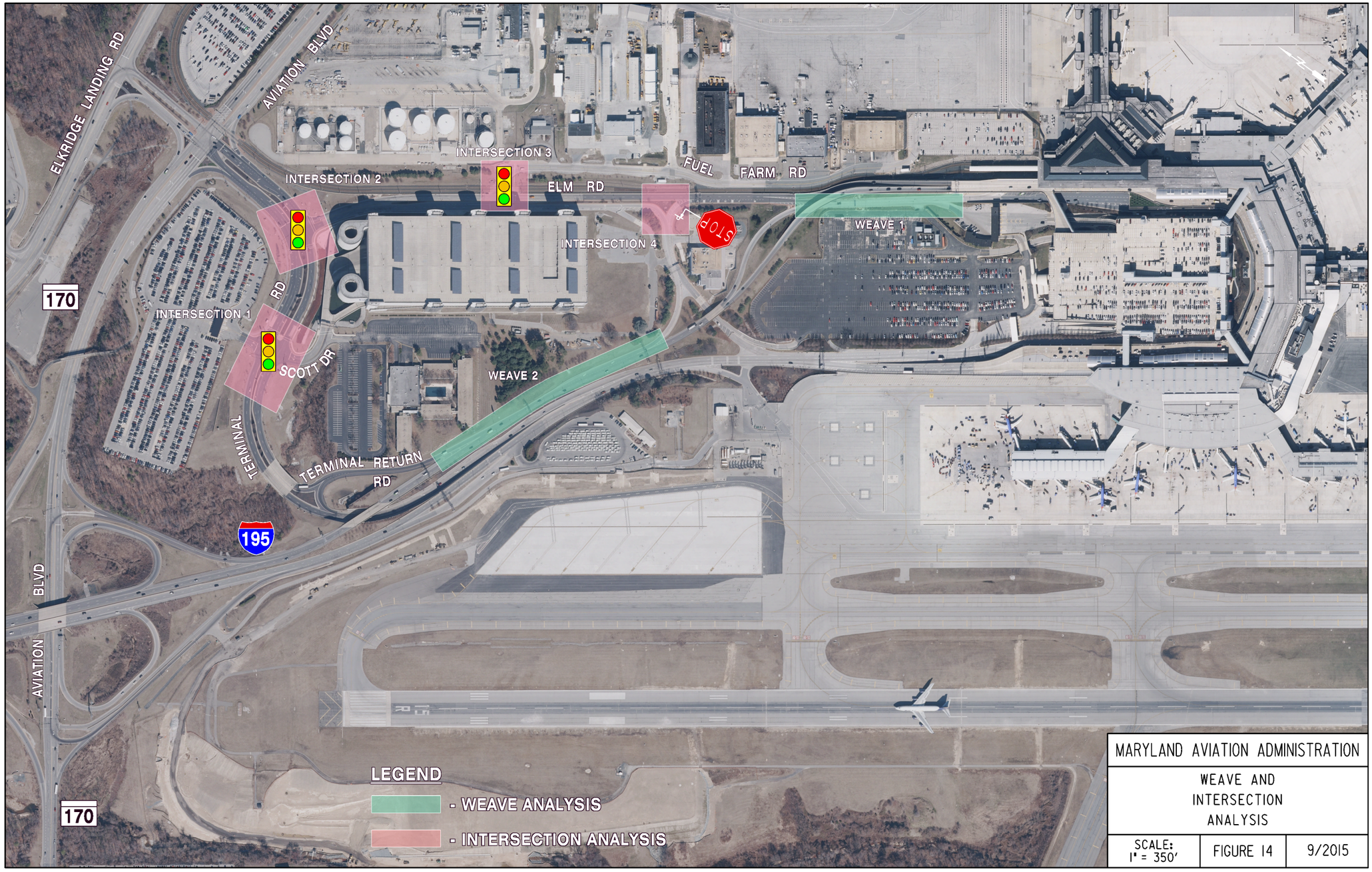
- Terminal Road at Scott Drive (Intersection 1)
- Terminal Road at Elm Road (Intersection 2)
- Elm Road at Fuel Farm Road (Intersection 3)
- Elm Road at Gazy Drive (Intersection 4, Unsignalized)

The results are reported in vehicle density and compared against the Highway Capacity Manual 2010 level of service (LOS) standard as shown Table 12.

Table 12: Existing Conditions Intersection Analysis

Intersection	Time	Delay (sec/veh)	LOS
Terminal Road at Scott Drive (Signalized)	5:00PM to 6:00PM	11.9	B
	6:00PM to 7:00PM	12.4	B
Terminal Road at Elm Road (Signalized)	5:00PM to 6:00PM	8.7	A
	6:00PM to 7:00PM	7.7	A
Elm Road at Fuel Farm Road (Signalized)	5:00PM to 6:00PM	1.4	A
	6:00PM to 7:00PM	1.0	A
Elm Road at Gazy Drive (Unsignalized)	5:00PM to 6:00PM	0.2	A
	6:00PM to 7:00PM	0.1	A

Figure 14: Weave and Intersection Analysis



5. Proposed Alternatives

5.1. Alternative 2A

This alternative looks at separating Upper Level traffic between the General Purpose Roadway from the Authorized Vehicles Only Roadway for the entire extent of the Upper Level deck. Upper Level General Purpose Roadway traffic that is currently taking Elm Road to Terminal Road are redirected to a new proposed ramp leading from the Upper Level and tying into the existing weave segment to I-195 and diverge ramp to Terminal Road. All traffic on the Upper Level General Purpose Roadway is required to use the new proposed ramp. The existing Hourly Garage fifth floor exit ramp to the Terminal Upper Level will be relocated to tie-in to the Lower Level Exit Plaza. On the Upper Level General Purpose Roadway, the four-lane General Purpose Roadway typical section will be extended by approximately 350 feet to the extent of the International Terminal. The four lanes will merge to one lane over a distance of 300 feet. The existing ramps from the Upper Level to Elm Road and I-195 outbound will only be accessible to Authorized Vehicles. The existing 5th floor Hourly Garage exit and pedestrian crosswalk between the Hourly Garage and the Terminal Upper Level will be removed. The 5th Floor exit will be relocated as a speed ramp to the existing Lower Level Hourly Garage exit with an approximate proposed grade of 7%. The pedestrian crosswalk will be replaced with a skywalk. See Figure 15 for pedestrian volumes at the crosswalk for both 22 MAP existing and 30 MAP No Build conditions.

The Lower Level Roadway one lane access to Elm Road will be restriped to two lanes with the left lane as a choice lane to either Elm Road or the ramp towards I-195 outbound roadway. The ramp to I-195 outbound roadway from the Lower Level will be widened from one lane to two lanes.

The existing access from the Hourly Garage Exit Plaza that is weaving against Lower Level traffic will be realigned and separated. Only traffic originating from the Hourly Garage Exit Plaza to Elm Road will weave against Lower Level traffic. Other traffic from the Hourly Garage Exit Plaza to I-195 outbound and Terminal Return Road are realigned onto a new proposed road that ties-in to where the Lower Level ramp to I-195 outbound, the Authorized Vehicles Only ramp to I-195 outbound, and the Upper Level General Purpose Roadway to I-195 outbound roadway all meet. The new weave segment between the location where the ramps meet and the separation to I-195 outbound and Terminal Road is proposed to be a four lane weave segment. I-195 outbound splits into a two lane off ramp to Terminal Return Road, while three lanes continue towards I-195. I-195 outbound then drops from three lanes to two lanes before the I-195 overpass at Terminal Return Road. The Upper Level Authorized Vehicles Only ramp to I-195 outbound will yield to traffic from the Upper Level General Purpose Roadway ramp to I-195 at the ramp merge point.

The existing intersection at Elm Road with Gazy Drive will be converted to a modified continuous green T-intersection. Vehicles accessing Gazy Drive from Elm Road northeastbound are required to yield to other traffic entering and exiting Gazy Drive. A new exit from the existing employee surface parking lot is proposed at the modified continuous green T-intersection. The exit from Gazy Drive to Elm Road will have an approximately 300 foot merge segment to Elm Road. This alternative is shown in Figure 16.

5.2. Alternative 2A – Extended to Concourse E/F

This alternative proposes an additional extension of approximately 200 feet for the Upper Level roadway widening at the ramp towards I-195 and ramp towards Elm Road. This extension aims is intended to accommodate additional BWI Upper Level curbside service at the proposed Concourse E/F. The existing gore will be relocated approximately 200 feet downstream to allow Authorized Vehicles the necessary distance to make a lane change. This extra distance is especially important for buses or shuttles dwelling along the curbside along concourse E/F and destined to the Upper Level ramp towards I-195. The existing ramp structure from the Upper Level to Elm Road will require reconstruction. This alternative is shown in Figure 17.

5.3. Alternative 2A – Without Ramp to Elm Road

This alternative is a modification of Alternative 2A where only the ramp from the Upper Level roadway to Elm Road will be removed. By removing the Upper Level access ramp to elm road, the weaving behavior between authorized vehicles accessing Elm Road and I-195 outbound roadway is eliminated. Vehicles accessing Elm Road from the Upper Level through the ramp will be redirected to Terminal Road. This alternative is shown in Figure 18.

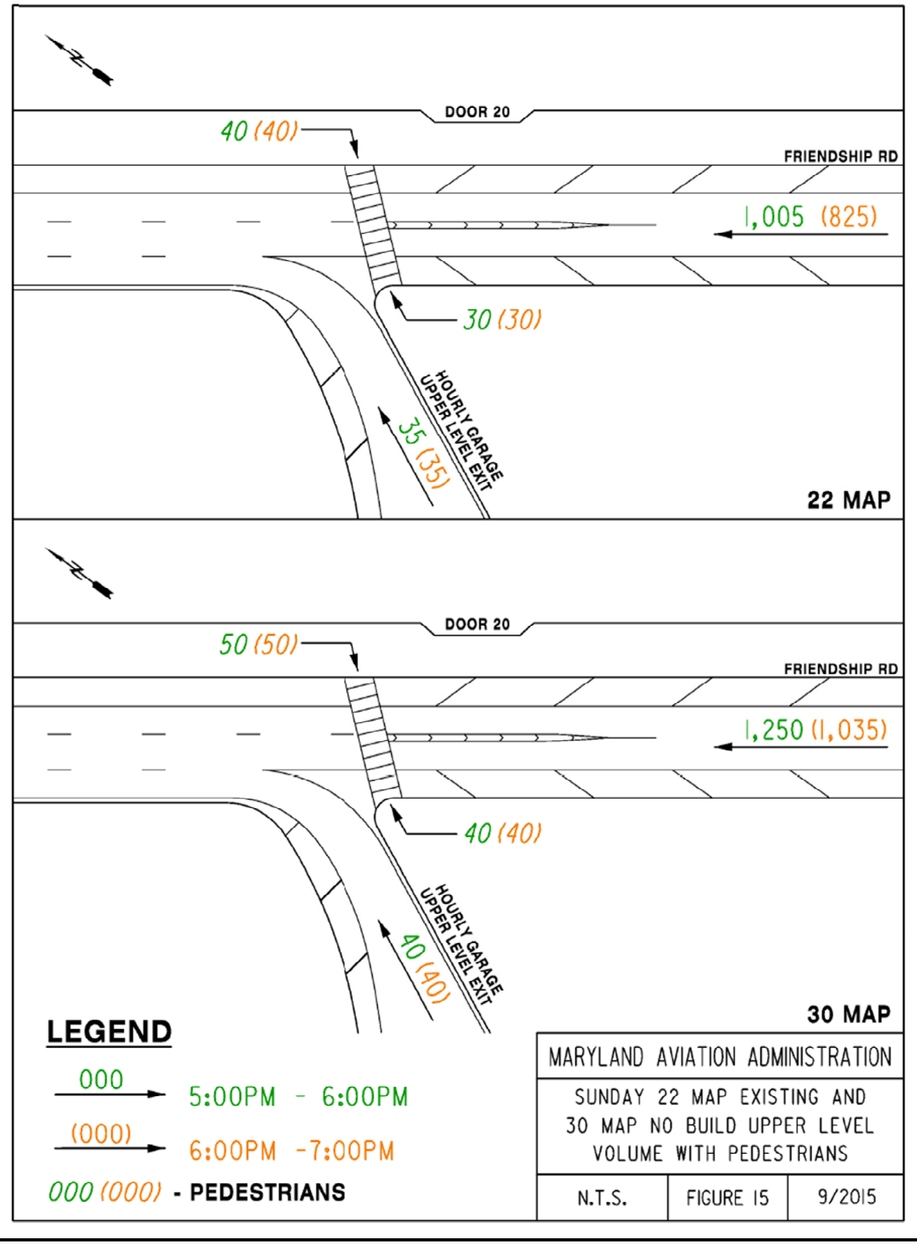


Figure 16: Alternative 2A

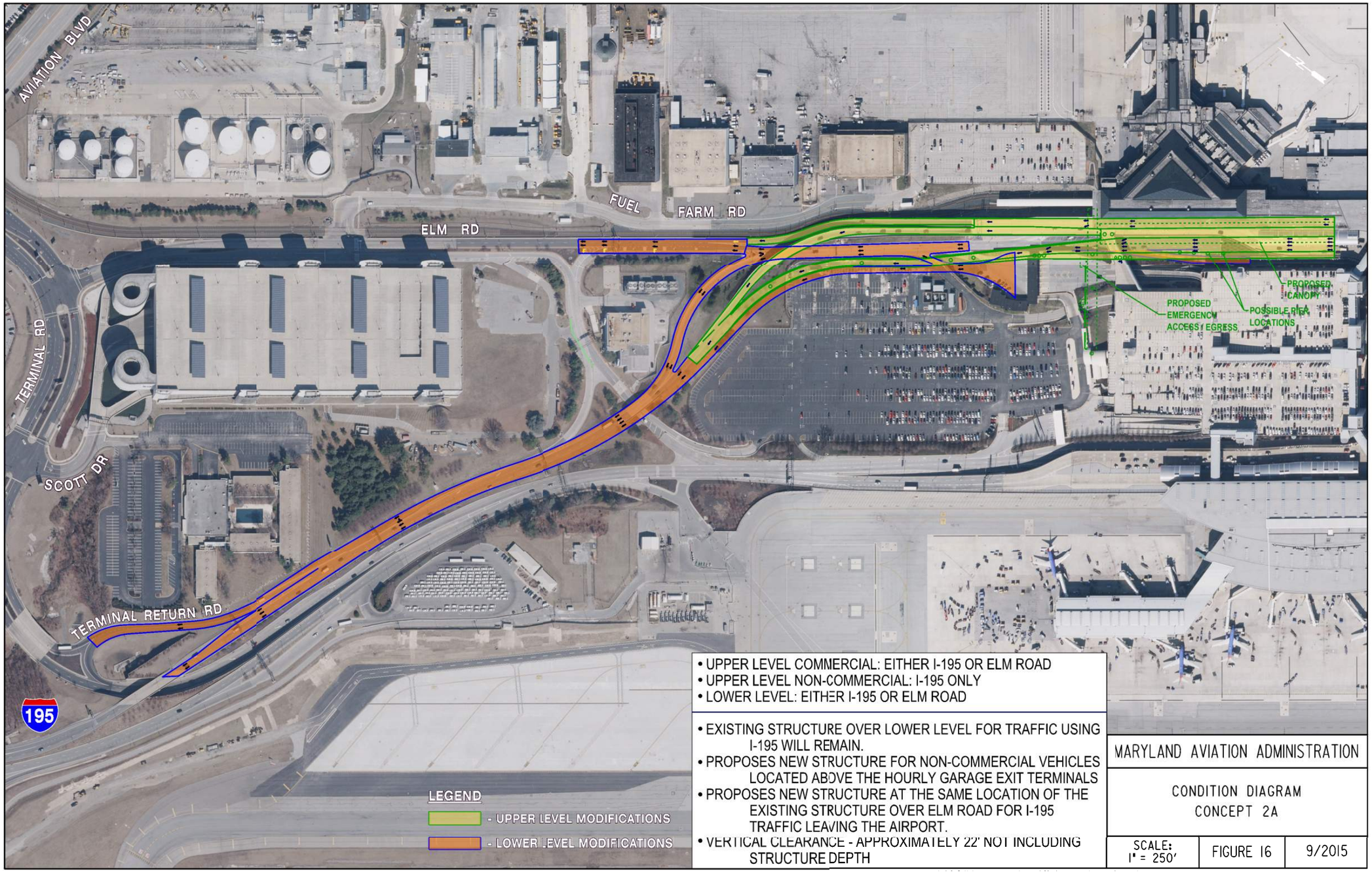


Figure 17: Alternative 2A – Extended to Concourse E/F

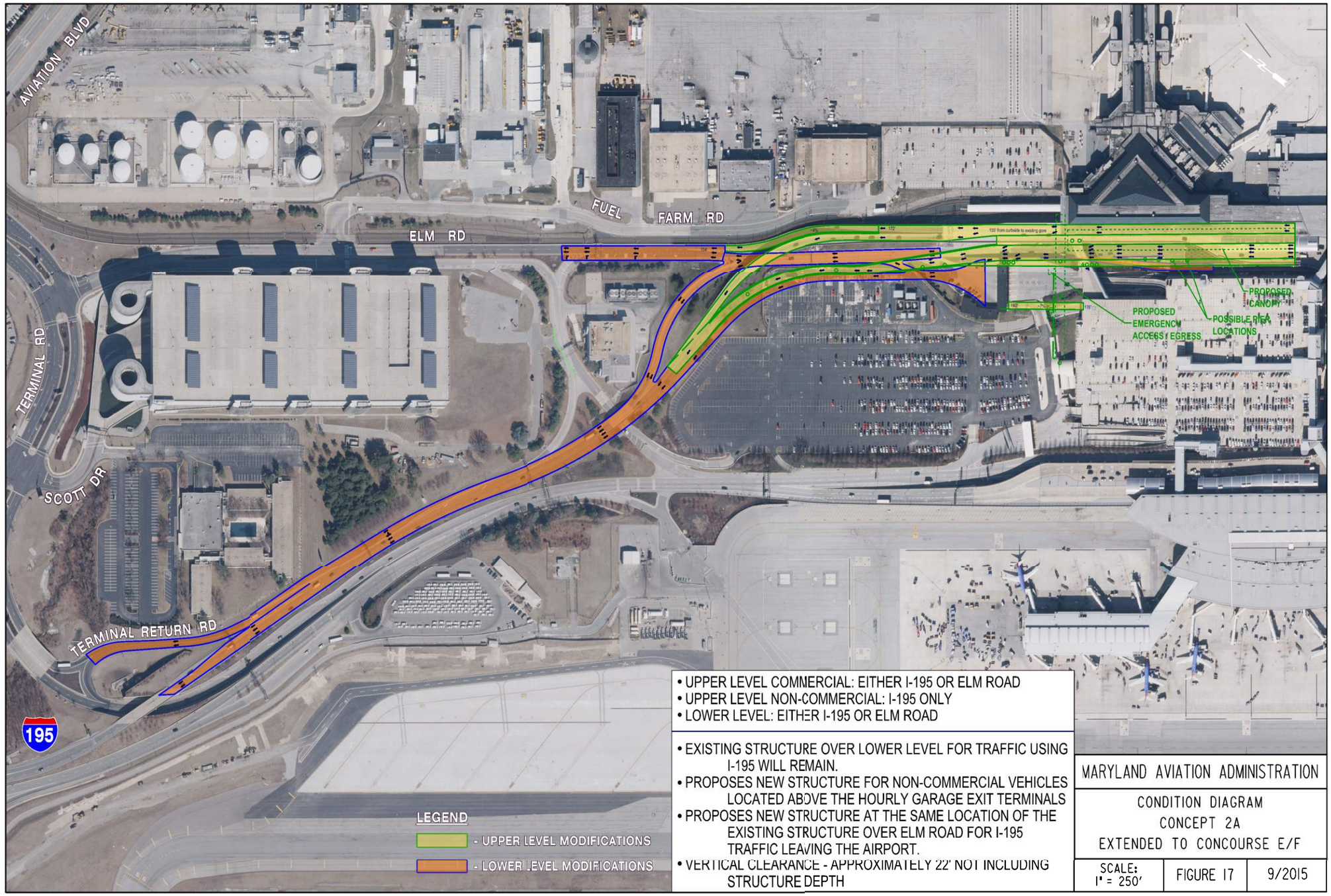


Figure 18: Alternative 2A – Without Ramp to Elm Road

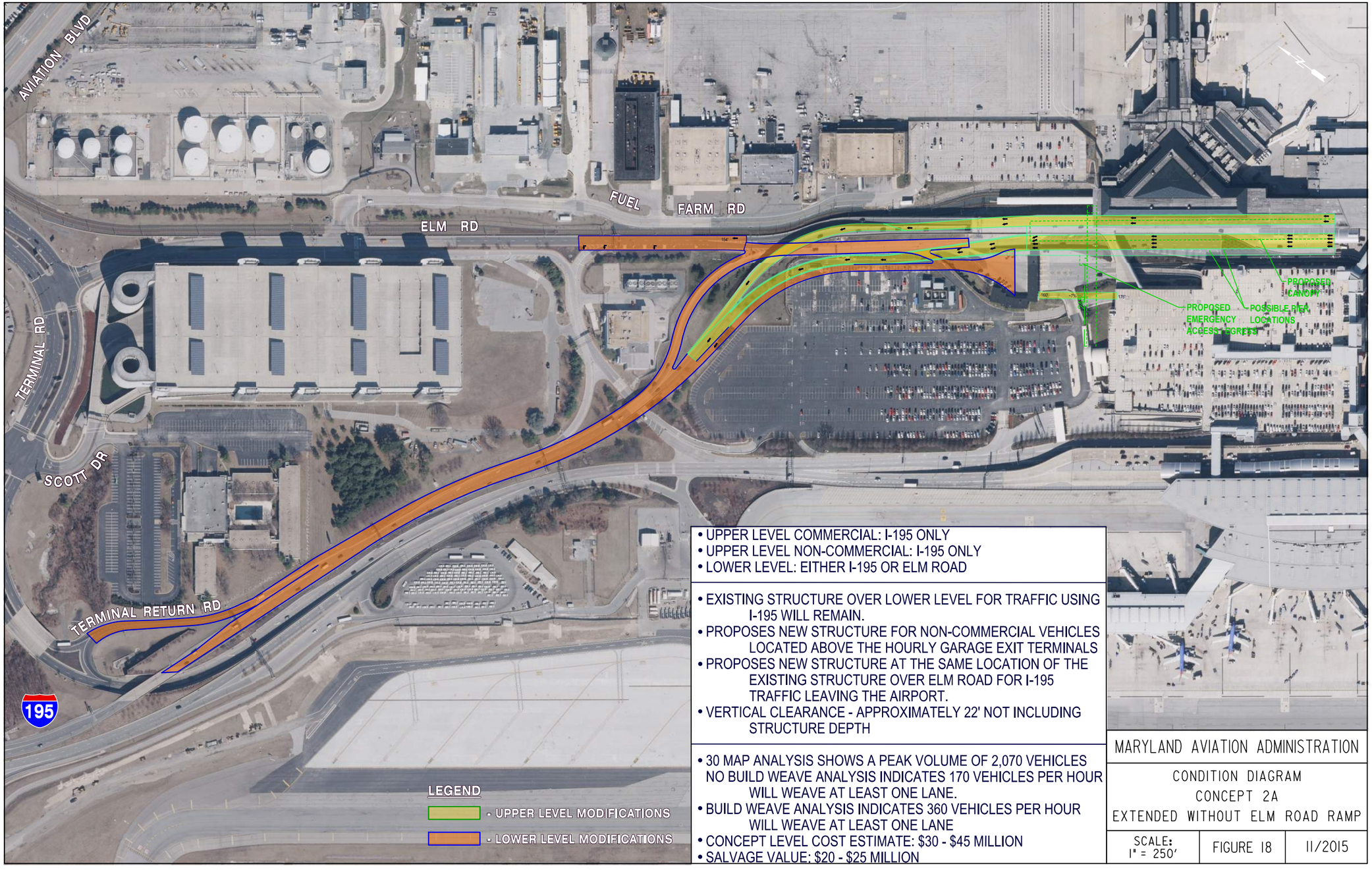


Figure 19: Sunday No Build 30 MAP Peak Weave and Elm Road Traffic

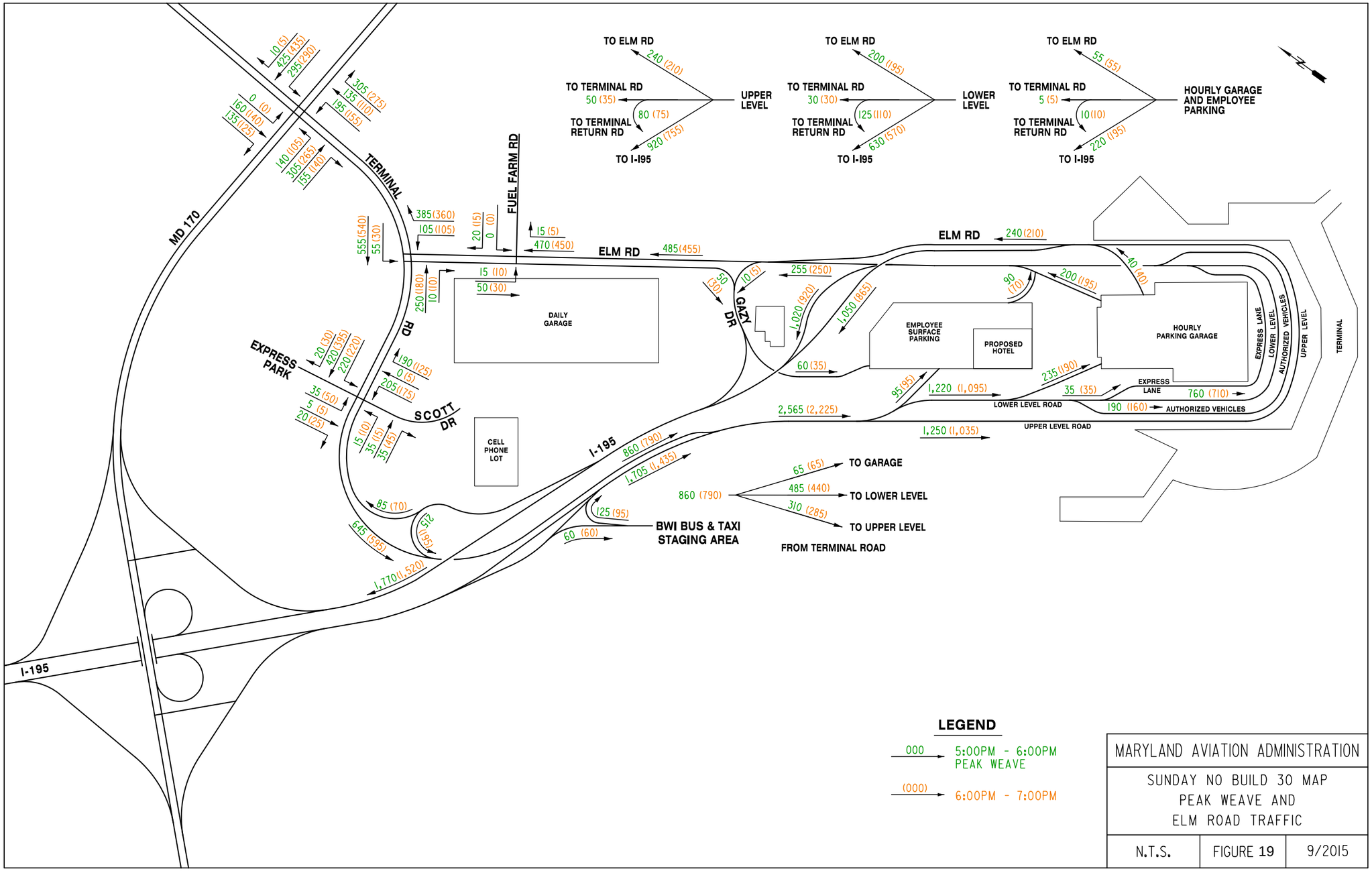
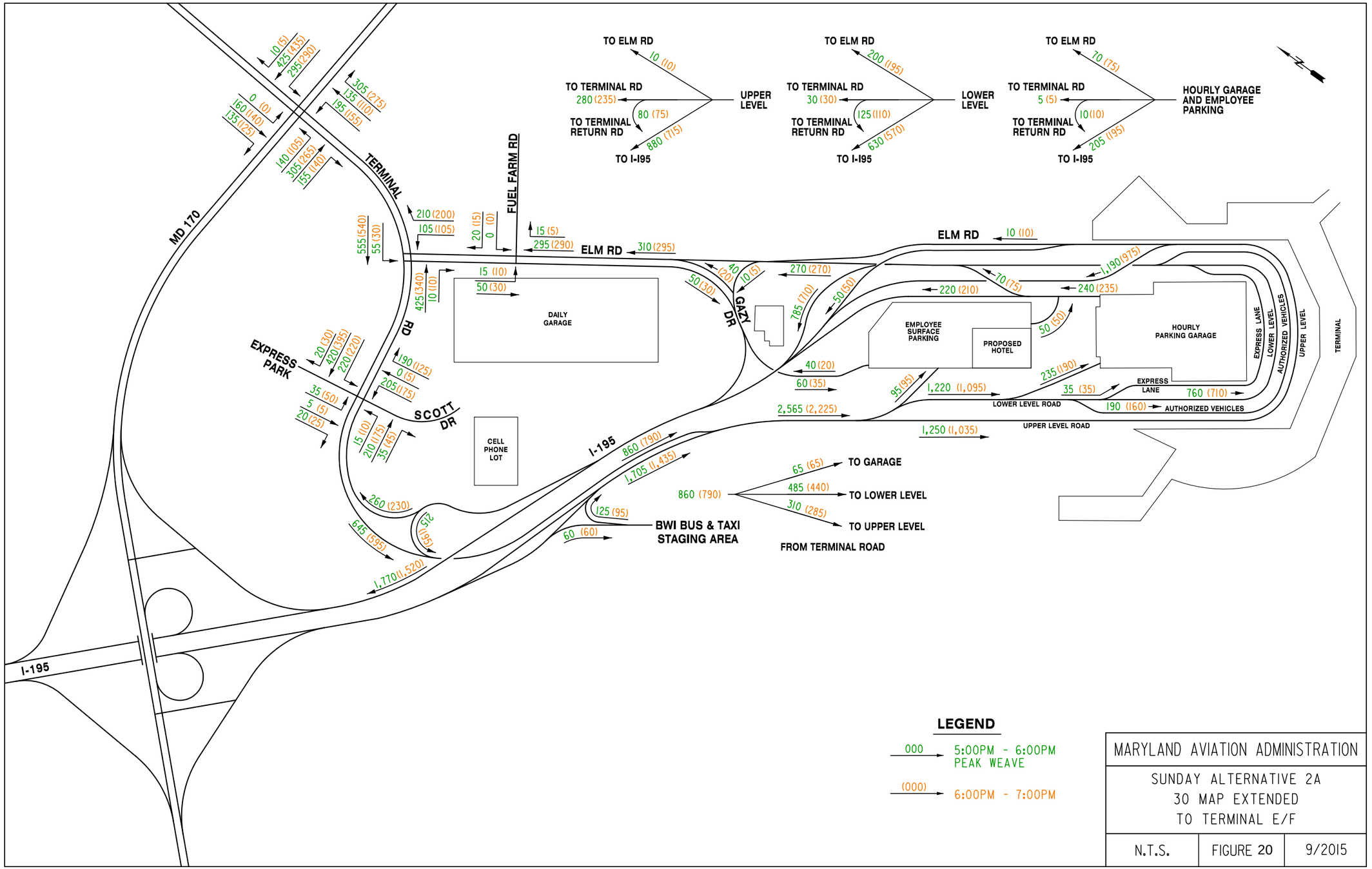
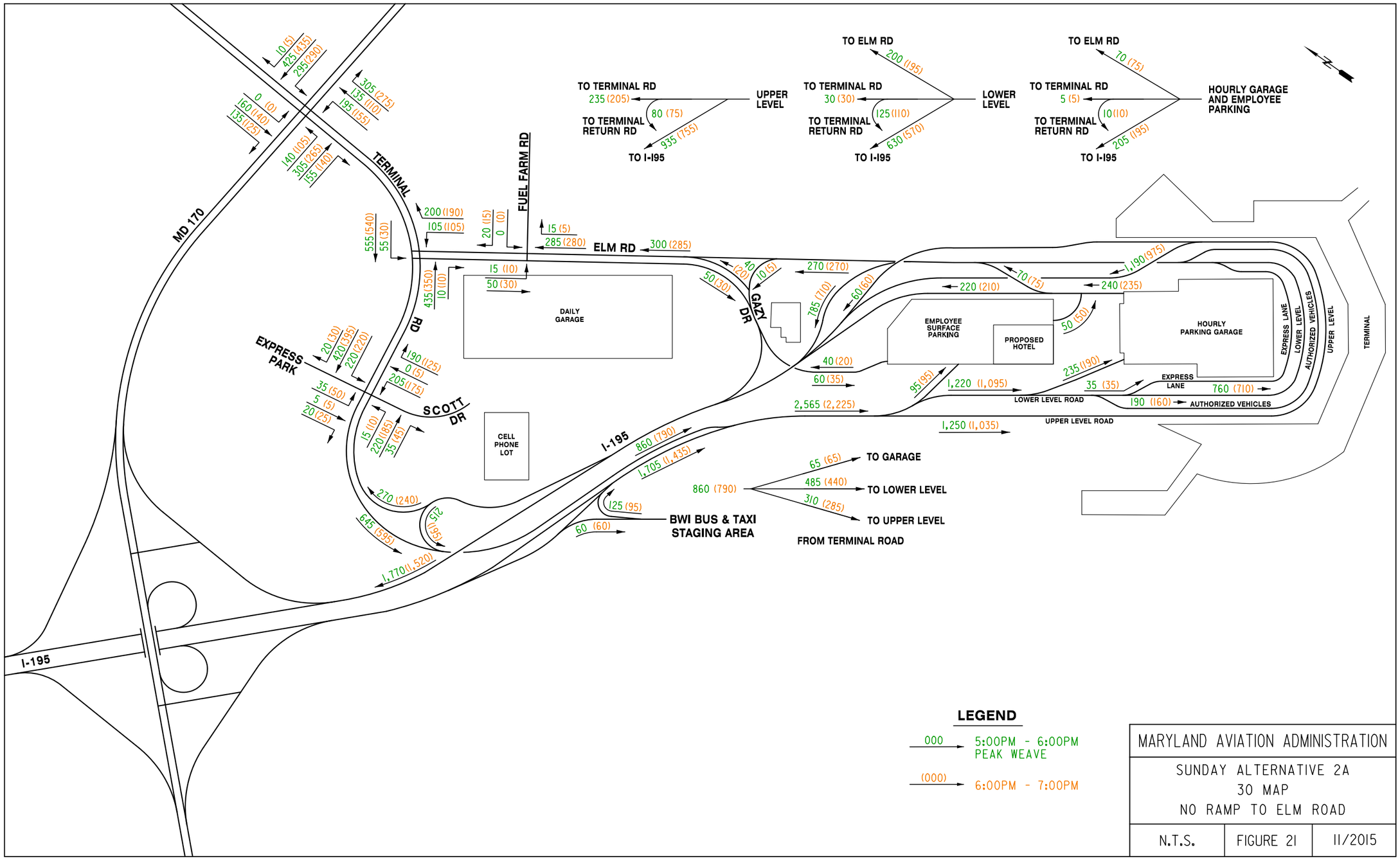


Figure 20: Sunday Alternative 2A and Extended to Concourse E/F 30 MAP Traffic



MARYLAND AVIATION ADMINISTRATION		
SUNDAY ALTERNATIVE 2A 30 MAP EXTENDED TO TERMINAL E/F		
N.T.S.	FIGURE 20	9/2015

Figure 21: Sunday Alternative 2A without Ramp to Elm Road 30 MAP Traffic



5. Proposed Alternatives

5.1. Alternative 2A

This alternative looks at separating Upper Level traffic between the General Purpose Roadway from the Authorized Vehicles Only Roadway for the entire extent of the Upper Level deck. Upper Level General Purpose Roadway traffic that is currently taking Elm Road to Terminal Road are redirected to a new proposed ramp leading from the Upper Level and tying into the existing weave segment to I-195 and diverge ramp to Terminal Road. All traffic on the Upper Level General Purpose Roadway is required to use the new proposed ramp. The existing Hourly Garage fifth floor exit ramp to the Terminal Upper Level will be relocated to tie-in to the Lower Level Exit Plaza. On the Upper Level General Purpose Roadway, the four-lane General Purpose Roadway typical section will be extended by approximately 350 feet to the extent of the International Terminal. The four lanes will merge to one lane over a distance of 300 feet. The existing ramps from the Upper Level to Elm Road and I-195 outbound will only be accessible to Authorized Vehicles. The existing 5th floor Hourly Garage exit and pedestrian crosswalk between the Hourly Garage and the Terminal Upper Level will be removed. The 5th Floor exit will be relocated as a speed ramp to the existing Lower Level Hourly Garage exit with an approximate proposed grade of 7%. The pedestrian crosswalk will be replaced with a skywalk. See Figure 15 for pedestrian volumes at the crosswalk for both 22 MAP existing and 30 MAP No Build conditions.

The Lower Level Roadway one lane access to Elm Road will be restriped to two lanes with the left lane as a choice lane to either Elm Road or the ramp towards I-195 outbound roadway. The ramp to I-195 outbound roadway from the Lower Level will be widened from one lane to two lanes.

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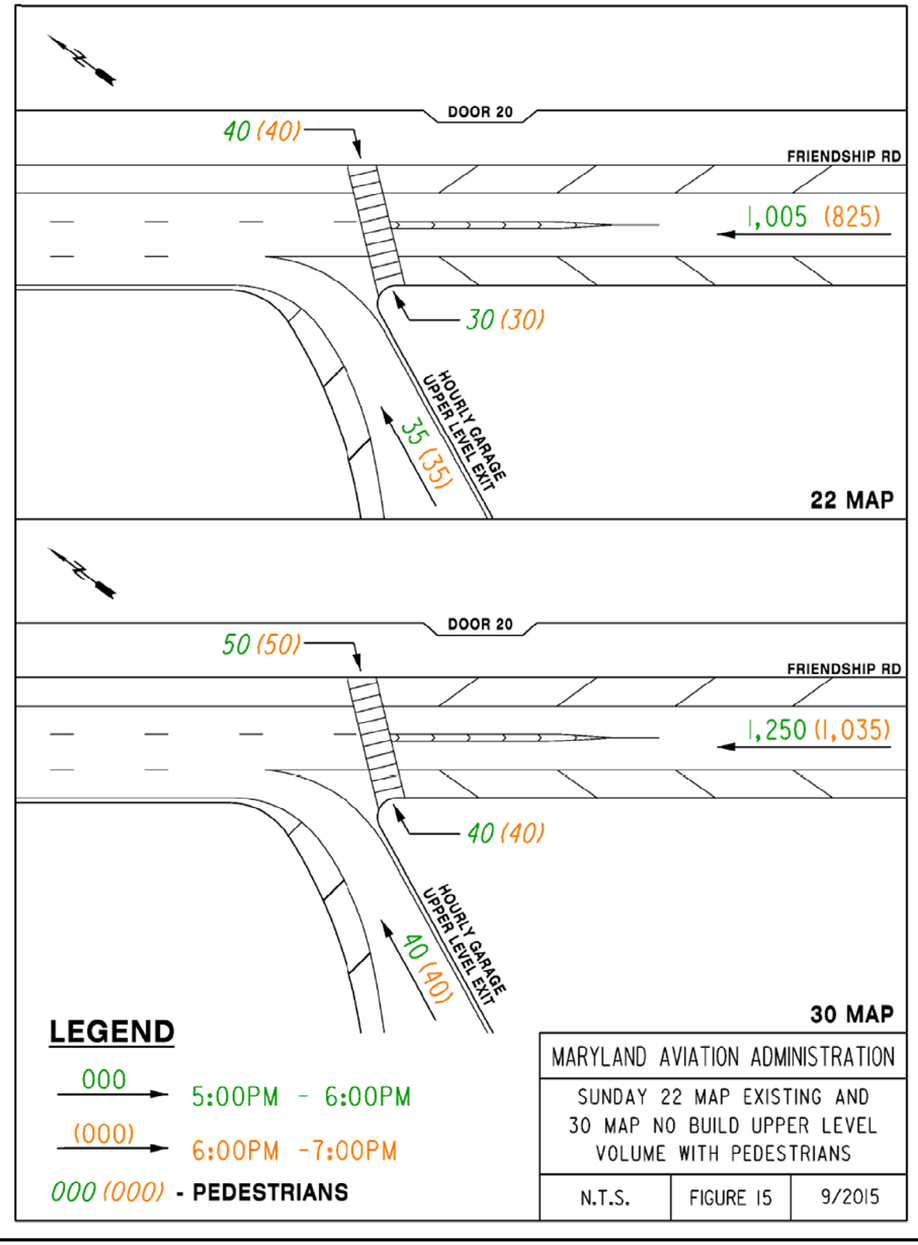
The existing intersection at Elm Road with Gazy Drive will be converted to a modified continuous green T-intersection. Vehicles accessing Gazy Drive from Elm Road northeastbound are required to yield to other traffic entering and exiting Gazy Drive. A new exit from the existing employee surface parking lot is proposed at the modified continuous green T-intersection. The exit from Gazy Drive to Elm Road will have an approximately 300 foot merge segment to Elm Road. This alternative is shown in Figure 16.

5.2. Alternative 2A – Extended to Terminal E/F

This alternative proposes an additional extension of approximately 200 feet for both the Upper and Lower Level roadway at the ramp towards I-195 and Elm Road. This extension is intended to accommodate additional BWI Upper and Lower Level curbside service at the proposed Terminal E/F. The existing gore will be relocated approximately 200 feet downstream to allow Authorized Vehicles the necessary distance to make a lane change. This extra distance is especially important for buses or shuttles dwelling along the curbside along Terminal E/F and destined to the Upper Level ramp towards I-195. The existing ramp structure from the Upper Level to Elm Road will require reconstruction. This alternative is shown in Figure 17.

5.3. Alternative 2A – Without Ramp to Elm Road

This alternative is a modification of Alternative 2A where only the ramp from the Upper Level roadway to Elm Road will be removed. By removing the Upper Level access ramp to elm road, the weaving behavior between authorized vehicles accessing Elm Road and I-195 outbound roadway is eliminated. Vehicles accessing Elm Road from the Upper Level through the ramp will be redirected to Terminal Road. This alternative is shown in Figure 18.



6. Build Conditions

The VISSIM model for assessing the proposed alternatives includes a No Build model with the generated traffic for the proposed hotel site entrance and exit, and the new exit from the employee surface parking lot. The alternatives assessed also include the generated traffic for the proposed hotel. Roadway density and intersection delay, as mentioned in Section 4, are used for comparison between the existing condition, the No Build condition, and the alternatives. The conditions analyzed also consider performance under 30 MAP traffic demand.

6.1. Weave Segment Analysis

Weave analysis results for each location (refer to Section 4 and Figure 14) are summarized in Table 13 and Table 14. Results were reported in density per lane (veh/mi/ln) and compared with HCM 2010 recommended LOS thresholds.

Table 13: Elm Road Lower Level Weave Segment 1 MOE, Density (veh/mi/ln) with LOS

Condition	Time			
	5:00PM to 6:00PM		6:00PM to 7:00PM	
	Density by lane (veh/mi/ln), LOS	Overall Density (veh/mi)	Density by lane (veh/mi/ln), LOS	Overall Density (veh/mi)
Existing (3 lanes)	13.6 (B)	40.8	12.7 (B)	38.1
22 MAP No Build with Hotel (3 lanes)	14.8 (B)	44.4	13.9 (B)	41.7
22 MAP Alternative 2A (3 lanes)	12.0 (A)	36.0	11.4 (A)	34.2
22 MAP Alternative 2A Extended to Concourse E/F (3 lanes)	12.0 (A)	36.0	11.4 (A)	34.2
30 MAP No Build with Hotel (3 lanes)	16.4 (B)	49.2	15.4 (B)	46.2
30 MAP Alternative 2A (3 lanes)	13.6 (B)	40.8	13.0 (B)	39.0
30 MAP Alternative 2A Extended to Concourse E/F (3 lanes)	13.6 (B)	40.8	12.9 (B)	38.7

Table 14: I-195 Outbound Weave Segment 2 MOE, Density (veh/mi/ln) with LOS

Condition	Time			
	5:00PM to 6:00PM		6:00PM to 7:00PM	
	Density by lane (veh/mi/ln), LOS	Overall Density (veh/mi)	Density by lane (veh/mi/ln), LOS	Overall Density (veh/mi)
Existing (2 lanes)	27.9 (C)	55.8	24.8 (C)	49.6
22 MAP No Build with Hotel (2 lanes)	28.8 (C)	57.6	26.0 (C)	52.0
22 MAP Alternative 2A (4 lanes)	15.4 (B)	61.6	13.5 (B)	54.0
22 MAP Alternative 2A Extended to Concourse E/F (4 lanes)	15.4 (B)	61.6	13.5 (B)	54.0
30 MAP (2 lanes) No Build with Hotel	33.2 (D)	66.4	29.8 (C)	59.6
30 MAP Alternative 2A (4 lanes)	17.9 (B)	71.6	15.8 (B)	63.2
30 MAP Alternative 2A Extended to Concourse E/F (4 lanes)	18.0 (B)	72.0	15.8 (B)	63.2

The weave analysis shows a small increase in vehicle roadway density for both Weave Segments 1 and 2 with the additional traffic generated by the hotel site. There were no observed significant improvements or changes between Alternative 2A and Alternative 2A Extended to Concourse E/F at both weave segments. Weave Segment 1 shows significant improvement in both 22 and 30 MAP for both alternatives compared to the No Build condition due to the separation of Hourly Garage exit traffic. Weave Segment 2 shows an improved vehicle roadway density following HCM 2010 procedure. However, an additional weave segment analysis, completed without normalizing the density over the number of lanes, indicates a small degradation in weave operations.

6.2. Intersection Analysis

Intersection analysis results for each location (refer to Section 4 and Figure 14) are summarized in Table 15 through Table 18. Results were reported in roadway density per lane (veh/mi/ln) and compared against HCM 2010 recommended LOS thresholds. Delay results for the Elm Road at Gazy Drive intersection only include the northeastbound left turn stop-controlled approach movement onto Gazy Drive.

Table 15: Terminal Road at Scott Drive (Intersection 1), Delay (sec/veh) with LOS

Condition	Time	
	5:00PM to 6:00PM Delay (sec/veh), LOS	6:00PM to 7:00PM Delay (sec/veh), LOS
Existing	11.9 (B)	12.4 (B)
22 MAP No Build with Hotel	12.0 (B)	12.3 (B)
22 MAP Alternative 2A	12.6 (B)	12.4 (B)
22 MAP Alternative 2A Extended to Concourse E/F	12.5 (B)	12.4 (B)
30 MAP No Build with Hotel	13.1 (B)	13.2 (B)
30 MAP Alternative 2A	13.8 (B)	13.6 (B)
30 MAP Alternative 2A Extended to Concourse E/F	13.9 (B)	13.6 (B)

Table 16: Terminal Road at Elm Road (Intersection 2), Delay (sec/veh) with LOS

Condition	Time	
	5:00PM to 6:00PM Delay (sec/veh), LOS	6:00PM to 7:00PM Delay (sec/veh), LOS
Existing	8.7 (A)	7.7 (A)
22 MAP No Build with Hotel	8.6 (A)	7.8 (A)
22 MAP Alternative 2A	8.9 (A)	8.1 (A)
22 MAP Alternative 2A Extended to Concourse E/F	9.0 (A)	8.0 (A)
30 MAP No Build with Hotel	9.2 (A)	8.1 (A)
30 MAP Alternative 2A	9.6 (A)	8.2 (A)
30 MAP Alternative 2A Extended to Concourse E/F	9.6 (A)	8.3 (A)

Table 17: Elm Road at Fuel Farm Road (Intersection 3), Delay (sec/veh) with LOS

Condition	Time	
	5:00PM to 6:00PM Delay (sec/veh), LOS	6:00PM to 7:00PM Delay (sec/veh), LOS
Existing	1.4 (A)	1.0 (A)
22 MAP No Build with Hotel	1.4 (A)	0.9 (A)
22 MAP Alternative 2A	1.3 (A)	0.9 (A)
22 MAP Alternative 2A Extended to Concourse E/F	1.4 (A)	0.9 (A)
30 MAP No Build with Hotel	1.6 (A)	1.1 (A)
30 MAP Alternative 2A	1.5 (A)	1.0 (A)
30 MAP Alternative 2A Extended to Concourse E/F	1.6 (A)	1.0 (A)

Table 18: Elm Road at Gazy Drive (Intersection 4), Delay (sec/veh) with LOS

Condition	Time	
	5:00PM to 6:00PM Delay (sec/veh), LOS	6:00PM to 7:00PM Delay (sec/veh), LOS
Existing	0.6 (A)	0.5 (A)
22 MAP No Build with Hotel	0.5 (A)	0.5 (A)
22 MAP Alternative 2A	5.7 (A)	5.3 (A)
22 MAP Alternative 2A Extended to Concourse E/F	5.7 (A)	5.5 (A)
30 MAP No Build with Hotel	0.5 (A)	0.5 (A)
30 MAP Alternative 2A	5.9 (A)	5.5 (A)
30 MAP Alternative 2A Extended to Concourse E/F	6.1 (A)	5.5 (A)

The intersections at Terminal Road with Scott Drive and Terminal Road with Elm Road degrade when either alternative is implemented due to diverted traffic from Elm Road. Traffic from the Upper Level General Purpose Roadway that could reach the MD 170 at Terminal Road intersection by using Elm Road is redirected onto I-195 outbound before taking the ramp to Terminal Road and passing the intersections with Scott Drive and Elm Road before finally reaching MD 170. The Terminal Road at Scott Drive intersection sees an increase of approximately 135 and 130 veh/hr at 5:00PM to 6:00PM and 6:00PM to 7:00PM respectively. Vehicles that were previously able to make a right turn on red at the Terminal Road with Elm Road intersection will now be expected to make a northbound through movement.

Additional analysis was performed to assess the modified continuous green T-intersection that is proposed at the Elm Road and Gazy Drive intersection to ensure adequate merge length for vehicles exiting from the surface parking, making a left turn, and merging onto Elm Road is provided. The result reports average speed for the merge segment and is compared with the HCM 2010 recommended LOS thresholds for urban facilities as shown in Table 19.

Table 19: Elm Road at Gazy Drive (Intersection 4), Average Speed (mph) and LOS

Condition	Time	
	5:00PM to 6:00PM Average Speed (mph), LOS	6:00PM to 7:00PM Average Speed (mph), LOS
Existing	-	-
22 MAP No Build with Hotel	-	-
22 MAP Alternative 2A	31.0 (A)	31.4 (A)
22 MAP Alternative 2A Extended to Concourse E/F	31.0 (A)	31.4 (A)
30 MAP No Build with Hotel	-	-
30 MAP Alternative 2A	31.0 (A)	31.4 (A)
30 MAP Alternative 2A Extended to Concourse E/F	30.9 (A)	31.4 (A)

The results show that the merge segment at the proposed modified continuous green T-intersection does provide adequate merge length for all alternatives and traffic conditions. The traffic flow is able to operate within 85% of the roadway's base free-flow-speed. There are significantly lower traffic volumes utilizing Elm Road because the roadway is no longer accessible from the Upper Level General Purpose Roadway.

An additional ramp analysis was performed for the Upper Level Ramp to I-195 outbound weave segment. The ramp volumes used are shown in Figure 12, Figure 13, Figure 18: Alternative 2A – Without Ramp to Elm Road

Figure 19, and Figure 20. The Upper Level General Purpose Roadway Ramp to I-195 outbound weave segment has a maximum capacity of 2,000 passenger cars per hour based on the 2013 addendum to the HCM 2010 for ramp capacity analysis. The ramp volumes were converted to passenger cars equivalent using HCM 2010 procedures and then capacity was analyzed and summarized in Table 20.

Table 20: Upper Level General Purpose Ramp to I-195 Outbound

Condition	Time	
	5:00PM to 6:00PM Volume to Capacity (v/c)	6:00PM to 7:00PM Volume to Capacity (v/c)
Existing	0.46	0.41
22 MAP No Build with Hotel	0.46	0.41
22 MAP* Alternative 2A & Extended	0.51	0.42
30 MAP No Build with Hotel	0.55	0.45
30 MAP* Alternative 2A & Extended	0.62	0.51

* With proposed new ramp alignment

7. Conclusion

Alternative 2A and **Alternative 2A Extended to Concourse E/F** both show improvement for the Elm Road Lower Level weave operation when compared to the No Build condition due to the relocation of the Hourly Garage exit traffic. Only traffic from the Hourly Garage exit plaza destined for Elm Road will be required to weave against the Lower Level traffic.

The HCM 2010 procedures are not considered an appropriate analysis tool for Weave Segment 2 due to the additional lanes affecting the vehicle roadway density. The additional weave analysis presented in this report shows that when the vehicle roadway density is not normalized for the additional lanes, the weave segment will degrade due to the increased number of vehicles diverted from Elm Road and the increased number of required lane changes.

Ramp capacity analysis shows that the proposed outbound ramp to I-195 has a volume to capacity ratio of 0.62 during 30 MAP projected traffic volumes. This indicates the proposed ramp capacity can accommodate increased traffic growth.

The intersections of Terminal Road at Scott Drive and Terminal Road at Elm Road do degrade slightly. Retiming these signalized intersections is recommended to accommodate for the diverted traffic. The proposed modified continuous green T-intersection will be able to accommodate peak hour Elm Road traffic with the proposed 300 foot low speed merge segment from Gazy Drive onto Elm Road.

In summary, Alternative 2A and Alternative 2A Extended to Concourse E/F show similar traffic operation changes throughout the BWI roadway network. Alternative 2A Extended to Concourse E/F is expected to provide better accommodation for future International Concourse expansion.

Attachment 3:

BWI Marshall Airport EA

Updated Draft Traffic Impact Study

(HNTB)

December 2018

Comparison of 2016 Traffic Volumes to 2018 Traffic Volumes

The EA traffic analysis was developed based on traffic counts obtained between 2014 and 2016 at 22 study intersections. Counts were adjusted to reflect existing year (2016) levels if needed (See *Section 2.1* of the traffic impact study) due to older traffic counts. Due to the extended time between the issuance of the Draft EA/Section 4(f) Determination in January 2018 and this Updated Draft EA/Section 4(f) Determination, the affected environment has been updated to consider the year 2018 as existing conditions. To review the viability of using the volumes used for 2016 existing conditions to represent 2018 existing conditions in the Updated Draft EA/Section 4(f) Determination, AM/PM peak hour data collected between 2017 and 2018 was obtained through MDOT-SHAs Continuous Count. These data were compared to the traffic volumes either counted or projected for the year 2016. As shown in the comparison tables below for example intersections around the Airport boundary, the peak hour volumes used in the January 2018 Draft EA analysis for the year 2016 were generally higher or comparable to the latest count data (2017/2018). Therefore, it is can be assumed that the volumes developed in 2016 to represent existing conditions now represent 2018 existing conditions. Additionally, it can be assumed that the growth rate used to grow traffic volumes for the years of analysis within the January 2018 Draft EA/Section 4(f) Determination traffic analysis remains valid.

MD 162-BETWEEN WILLIAMS RD & FERNDALE RD
(South of Intersection 14)

	AM Peak Hour		PM Peak Hour	
Volume Date	**NB**	**SB**	**NB**	**SB**
November 1, 2018	1143	558	858	1275
2016 EA Analysis	1384	552	833	1126
Increase (2018-2016)	-17.4%	1.1%	3.0%	13.2%

MD 170-.30 MI N OF MD 176
(Between Intersections 1 and 2)

	AM Peak Hour		PM Peak Hour	
Volume Date	**NB**	**SB**	**NB**	**SB**
June 1, 2017	1307	584	688	1378
2016 EA Analysis	1546	670	887	1700
Increase (2017-2016)	-15.5%	-12.8%	-22.4%	-18.9%

MD 170-.20 MI S OF I- 195
(Between Intersections 7 and 8)

	AM Peak Hour		PM Peak Hour	
Volume Date	**NB**	**SB**	**NB**	**SB**
November 1, 2018	1136	2144	2002	1378
2016 EA Analysis	1376	2028	2170	1620
Increase (2018-2016)	-17.4%	5.7%	-7.7%	-14.9%

Source: 2016 EA Traffic Impact Study, and 2017/2018 Volumes from MDOT-SHA Continuous Count Program.

Traffic Impact Study

UPDATED DRAFT

Prepared by:

HNTB

December 2018

Environmental Assessment for Proposed Improvements 2016-2020 at BWI Marshall Airport

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List of Acronyms and Abbreviations

BMC	Baltimore Metropolitan Council
BWI	Baltimore/Washington International Thurgood Marshall Airport
CLV	Critical Lane Volume
EA	Environmental Assessment
FBO	Fixed Based Operator
HCM	Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
MAA	Maryland Aviation Administration
MD	Maryland
NEMA	National Electrical Manufacturers Association
SHA	State Highway Administration
TIS	Traffic Impact Study
V/C	Volume to Capacity

1 Introduction

1.1 Overview

The Maryland Department of Transportation Maryland Aviation Administration (MDOT MAA) is completing an Environmental Assessment (EA) for Proposed Improvements 2016-2020 at Baltimore/Washington International Thurgood Marshall Airport (BWI Marshall Airport), located in Anne Arundel County (the County). As the proposed projects may affect local roadways and traffic conditions on the surrounding roadway network adjacent to BWI Marshall Airport, a Traffic Impact Study (TIS) is a required component of the EA. This TIS is conducted in accordance with Maryland State Highway Administration (SHA) guidelines[1] and the potential impacts of the proposed projects are analyzed. Any mitigation proposed would be such that local traffic operations will continue to be maintained at an acceptable level.

The study area, shown in **Figure 1**, includes 22 intersections on and adjacent to Aviation Blvd (MD 162/MD170) and Dorsey Rd (MD 176) that encircle BWI. The study area was developed through coordination meetings with MAA, the County and SHA. The study area also includes two intersections adjacent to the MD 170/I-195 Interchange that provide access to the Baltimore-Washington Parkway and Interstate 95 via Interstate 195. The study area intersections were agreed upon during meetings with Maryland SHA District 5 and with the County Department of Public Works.

The following intersections are included in the study area:

1. Aviation Blvd (MD 170) at Dorsey Rd (MD 176) - West
2. Aviation Blvd (MD 170) at Mathison Way
3. Aviation Blvd (MD 170) at Stoney Run Rd
4. Stoney Run Rd at Northrop Grumman Entrance
5. Stoney Run Rd at New Ridge Rd
6. Aviation Blvd (MD 170) at Amtrak Way (MD 995)
7. Aviation Blvd (MD 170) at Northrop Grumman Gate 1A
8. Aviation Blvd (MD 170) at SB I-195 Ramps
9. Aviation Blvd (MD 170) at NB I-195 Ramps
10. Elkridge Landing Rd at Terminal Rd
11. Aviation Blvd (MD 170) at Terminal Rd
12. Aviation Blvd (MD 170) at Air Cargo Dr
13. Aviation Blvd (MD 162) at Andover Rd
14. Aviation Blvd (MD 162) at Aaronson Dr (unsignalized)
15. Aviation Blvd (MD 162) at Allwood Dr

[1] State Highway Access Manual – Appendix E: Guidelines for Traffic Impact Reports/Studies; http://www.roads.maryland.gov/m/index.aspx?PageId=460 accessed in October2015

16. SB I-97 Ramps at Cromwell Park Dr
17. Aviation Blvd (MD 162) at Cromwell Park Dr
18. Aviation Blvd (MD 162) at Dorsey Rd (MD 176) - East
19. Dorsey Rd (MD 176) at Digiulian Blvd (unsignalized)
20. Aviation Blvd (MD 162) at Hollins Ferry Rd
21. Aviation Blvd (MN 170) at BWI Long Term Parking Lots
22. Aviation Blvd (MD 170) at S. Camp Meade Rd

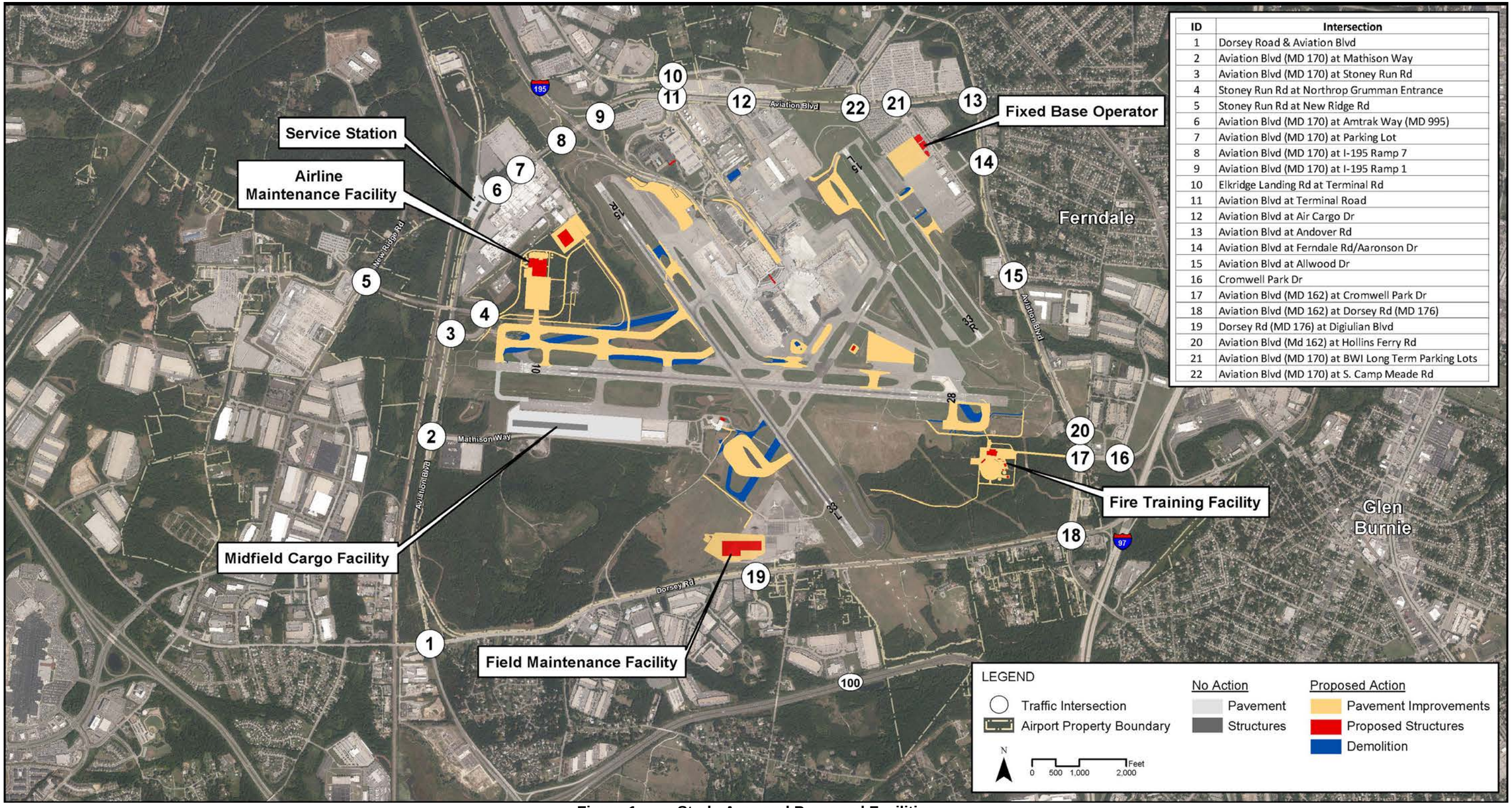
As shown in **Figure 1**, the primary components of the proposed improvements include an airline maintenance facility, a second Fixed Based Operator (FBO) facility, a relocated fire training facility, and a field maintenance storage facility. These facility improvements and their impacts on the surface traffic network are evaluated and discussed in *Section 4, Proposed Action Alternative (2022 and 2027)*. A service station will also be constructed but is considered as part of the No Action Alternative as it is a separate project and is being reviewed under a separate EA. The draft EA for the service station was issued to the public in January 2017.

1.2 Alternatives and Analysis Years

Existing traffic conditions were analyzed in 2016 and serve as a baseline for various future scenarios. Based on the feedback from MAA and the County, analysis years for this study are 2022 (i.e. opening year) and 2027. The future conditions scenarios analyzed are No Action Alternative, Proposed Action Alternative (i.e. constructing the proposed facilities with no road improvements), and Mitigated Proposed Action Alternative (if needed), as listed in **Table 1**. Each alternative was analyzed for the AM and PM peak hours of a typical weekday, as identified based on traffic counts.

Table 1
Alternatives and Analysis Years

Analysis Year	AM/PM	Existing Conditions	No Action Alternative	Proposed Action Alternative	Mitigated Proposed Action Alternative (if needed)
Existing (2016)	Weekday AM	X	-	-	-
	Weekday PM	X	-	-	-
Opening Year (2022)	Weekday AM	-	X	X	X
	Weekday PM	-	X	X	X
2027	Weekday AM	-	X	X	X
	Weekday PM	-	X	X	X



ID	Intersection
1	Dorsey Road & Aviation Blvd
2	Aviation Blvd (MD 170) at Mathison Way
3	Aviation Blvd (MD 170) at Stoney Run Rd
4	Stoney Run Rd at Northrop Grumman Entrance
5	Stoney Run Rd at New Ridge Rd
6	Aviation Blvd (MD 170) at Amtrak Way (MD 995)
7	Aviation Blvd (MD 170) at Parking Lot
8	Aviation Blvd (MD 170) at I-195 Ramp 7
9	Aviation Blvd (MD 170) at I-195 Ramp 1
10	Elkridge Landing Rd at Terminal Rd
11	Aviation Blvd at Terminal Road
12	Aviation Blvd at Air Cargo Dr
13	Aviation Blvd at Andover Rd
14	Aviation Blvd at Ferndale Rd/Aaronson Dr
15	Aviation Blvd at Allwood Dr
16	Cromwell Park Dr
17	Aviation Blvd (MD 162) at Cromwell Park Dr
18	Aviation Blvd (MD 162) at Dorsey Rd (MD 176)
19	Dorsey Rd (MD 176) at Digiulian Blvd
20	Aviation Blvd (Md 162) at Hollins Ferry Rd
21	Aviation Blvd (MD 170) at BWI Long Term Parking Lots
22	Aviation Blvd (MD 170) at S. Camp Meade Rd

Figure 1. Study Area and Proposed Facilities

2 Existing Conditions

HNTB conducted a field visit to the study area to confirm the existing lane configurations (shown in **Figure 2**) and traffic control types, as well as to observe and document intersection operational conditions for validating model results.

During the field visit, interaction between the vehicular and non-motorized traffic, such as bicycles and pedestrians, was observed along the BWI Trail that runs parallel to Aviation Blvd/MD 170/MD 162. Currently, BWI Trail users and vehicular traffic in the study area interact at seven study intersections. There are exclusive pedestrian phases[2] at two of these intersections: Intersection 4 (Stoney Run Rd at Northrop Grumman Entrance) and Intersection 10 (Elkridge Landing Rd at Terminal Rd).

2.1 Traffic Volumes and Peak Hour Determination

2.1.1 Traffic Volume Counts

Of the 22 study intersections, vehicle turning movement counts at nine intersections were available in the SHA traffic database[3]. HNTB collected turning movement counts at the remaining 13 intersections where counts were either not available in the SHA database or were collected prior to 2013. **Table 2** shows the source of traffic volumes at each study location. For the locations where HNTB conducted the counts, raw traffic counts are provided in **Appendix A**. These counts were conducted on typical weekdays (Tuesday – Thursday) in November 2015 (5th - 18th) and June 2016 (1st - 2nd) during the AM peak period (7:00 AM to 9:00 AM) and the PM peak period (4:00 PM to 6:00 PM). No counts were taken the week of Thanksgiving or on Veterans Day.

[2] An exclusive pedestrian phase stops all vehicular movement and allows pedestrians access to cross in any direction at the intersection.
[3] http://maps.roads.maryland.gov/itms_public/, November 2015, except for Intersection #22 May 2016.

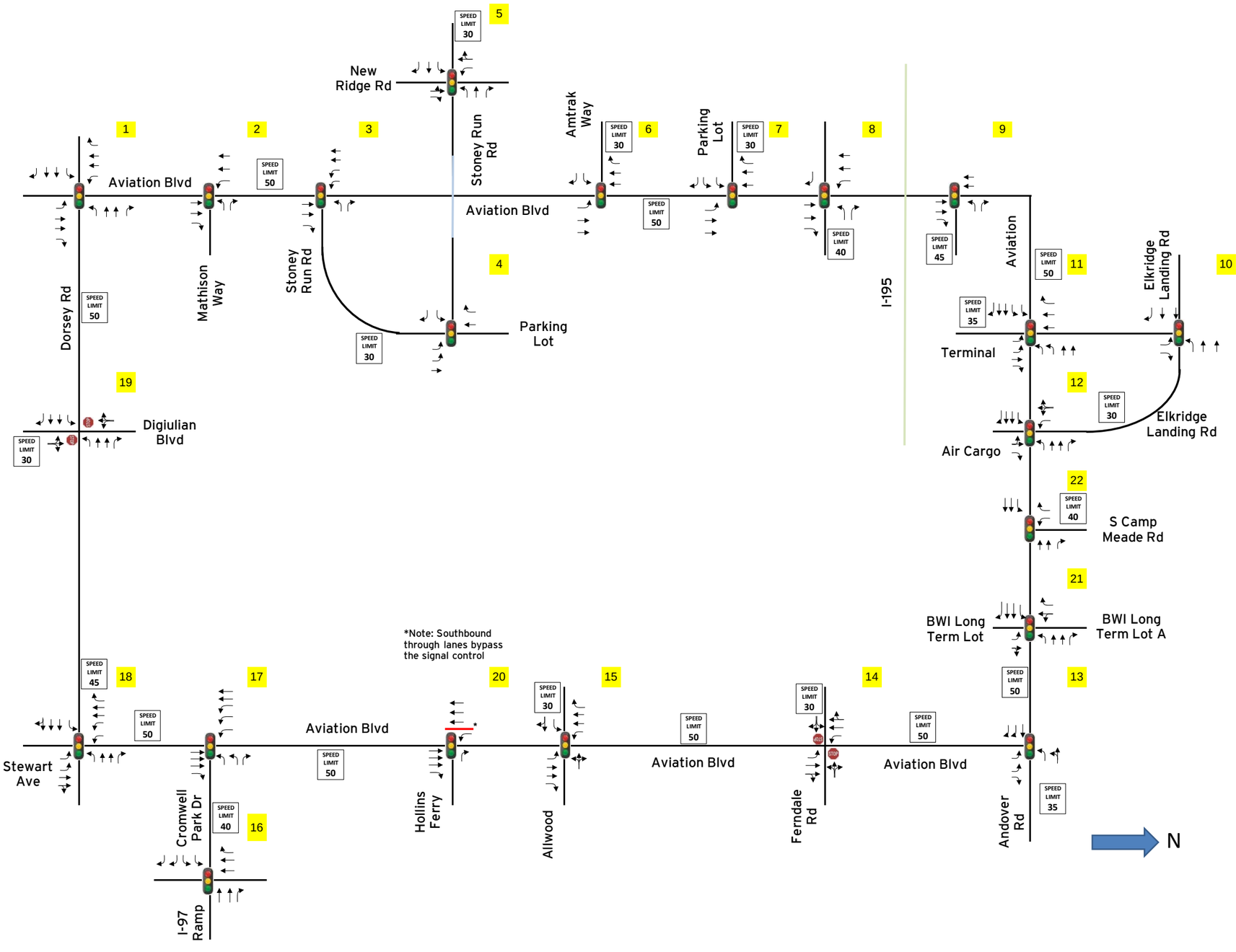


Figure 2. Existing Lane Configurations

Table 2
Traffic Count Sources and Date

Intersection		SHA Count Date	HNTB Count Date	
			AM	PM
1	Aviation Blvd at Dorsey Rd - West	7/8/2014	-	-
2	Aviation Blvd at Mathison Way	-	11/17/2015	11/4/2015
3	Aviation Blvd at Stoney Run Rd	7/8/2014	-	-
4	Stoney Run Rd at Northrop Grumman Entrance	-	11/5/2015	11/4/2015
5	Stoney Run Rd at New Ridge Rd	-	11/12/2015	11/12/2015
6	Aviation Blvd at Amtrak Way	7/10/2014	-	-
7	Aviation Blvd at Northrop Grumman Gate 1A	-	11/17/2015	11/5/2015
8	Aviation Blvd at SB I-195 Ramps	7/17/2014	-	-
9	Aviation Blvd at NB I-195 Ramps	7/22/2014	-	-
10	Elkridge Landing Rd at Terminal Rd	-	11/12/2015	11/5/2015
11	Aviation Blvd at Terminal Rd	7/17/2014	-	-
12	Aviation Blvd at Air Cargo Dr	-	11/17/2015	11/17/2015
13	Aviation Blvd at Andover Rd	7/9/2014	-	-
14	Aviation Blvd at Aaronson Dr (unsignalized)	-	11/17/2015	11/17/2015
15	Aviation Blvd at Allwood Dr	-	11/18/2015	11/18/2015
16	SB I-97 Ramps at Cromwell Park Dr	-	11/18/2015	11/18/2015
17	Aviation Blvd at Cromwell Park Dr	7/8/2014	-	-
18	Aviation Blvd at Dorsey Rd - East	-	6/1/2016	6/1/2016
19	Dorsey Rd at Digiulian Blvd (unsignalized)	-	11/12/2015	11/12/2015
20	Aviation Blvd at Hollins Ferry Rd	-	6/1/2016	6/2/2016
21	Aviation Blvd at BWI Long Term Parking Lots	-	6/2/2016	6/2/2016
22	Aviation Blvd at S. Camp Meade Rd	7/15/1014		

The AM and PM peak hours at the intersections were typically 7:00 AM to 8:00 AM and 4:30 PM to 5:30 PM, respectively. The hour with the highest volume during the peak periods at each intersection was used in the analysis to reflect a worst-case scenario.

2.1.2 Volume Development and Balancing

Per SHA guidelines, counts collected more than three years prior to the date the TIS is conducted cannot be used and new counts must be collected. In addition, counts conducted within the three-year period must be adjusted to reflect the year the study was conducted.

Traffic counts collected prior to 2016 were projected to represent 2016 activity by applying a growth factor. This process was completed so that all intersection volumes used a common base year for Existing Conditions. The compound annual growth factor was determined using the average population growth rate between 2010 and 2014 of 4.2% in Anne Arundel County as

reported by U.S. Census Bureau[4] . This four-year growth rate was used to calculate an annual compound growth rate of 1% per year. This annual growth rate was applied to the intersection counts collected between 2013 and 2015 (shown in **Table 2**) to generate 2016 volumes.

As the volumes from each intersection were collected on different dates, there were imbalances in approaching and departing volumes between adjacent intersections. To balance the volumes, the lower of the approaching or departing movements of adjacent intersections was adjusted so that the volumes would be balanced between those intersections. In some cases, there was a need to increase volumes across multiple intersections so that the corridor would be balanced. A sample is illustrated in **Figure 3**. In the southbound direction, the approaching volumes at Intersection 1 were increased by 10 vehicles to match the upstream volumes from Intersection 2. In the northbound direction, it was necessary to increase the through movement at Intersection 2 to balance between Intersections 2 and 3. This increase of volumes required further adjustments at Intersection 1. The network was considered to be balanced when the difference between approach and departure volumes was 1, 0, or -1 (rounding error).

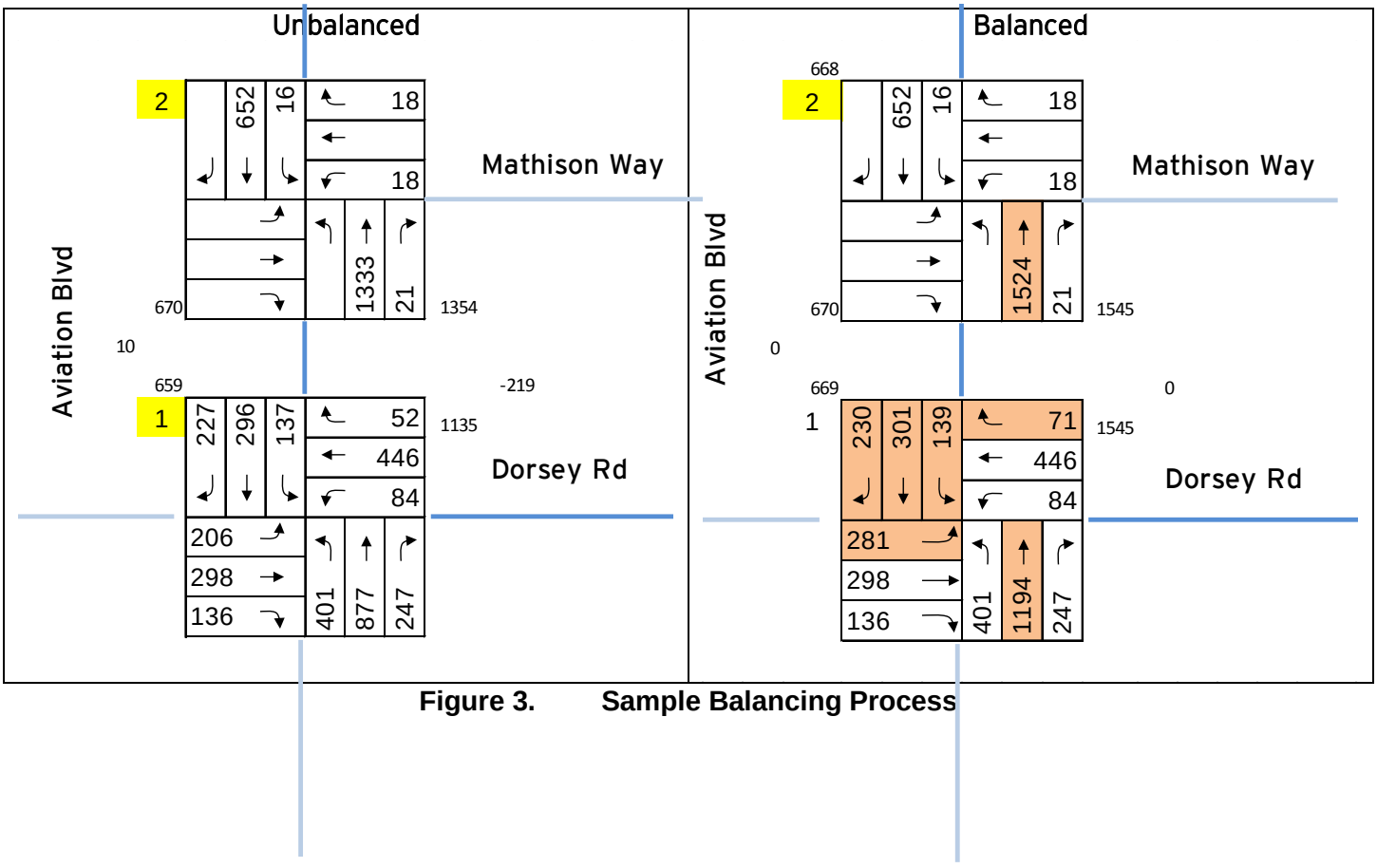


Figure 3. Sample Balancing Process

[4] http://quickfacts.census.gov/qfd/states/24/24003.html

Certain segments were not balanced due to the presence of minor intersections, driveways and/or parking lots that were not included in the study. For example, there are two residential street intersections—Maple Ave and Chaney Ln—along Aviation Blvd (MD 162) in between Andover Rd and Ferndale Rd not included in the study. Since vehicles are able to enter and exit the network through these access points, it is reasonable to have a volume imbalance along Aviation Blvd (MD 162) between Andover Rd and Ferndale Rd.

Adjusted and balanced AM and PM peak hour traffic volumes for the Existing Conditions, representing 2016, are presented in **Figure 4**.

2.1.3 Signal Timing

The existing signal timing plans for 17 signalized intersections were provided by SHA and the County in Synchro—a traffic analysis software. The Synchro network provided by the County did not include the five intersections listed below. Thus, lane configuration observations made during the field visits and signal timing information from the SHA and the County were used to complete the study network.

HNTB collected data on lane configurations and signal timing at the following intersections:

- Intersection 4: Stoney Run Rd at Northrop Grumman Entrance
- Intersection 5: Stoney Run Rd at New Ridge Rd
- Intersection 11: Aviation Blvd (MD 170) at Terminal Rd
- Intersection 14: Aviation Blvd (MD 162) at Aaronson Dr
- Intersection 19: Dorsey Rd (MD 176) at Digiulian Blvd

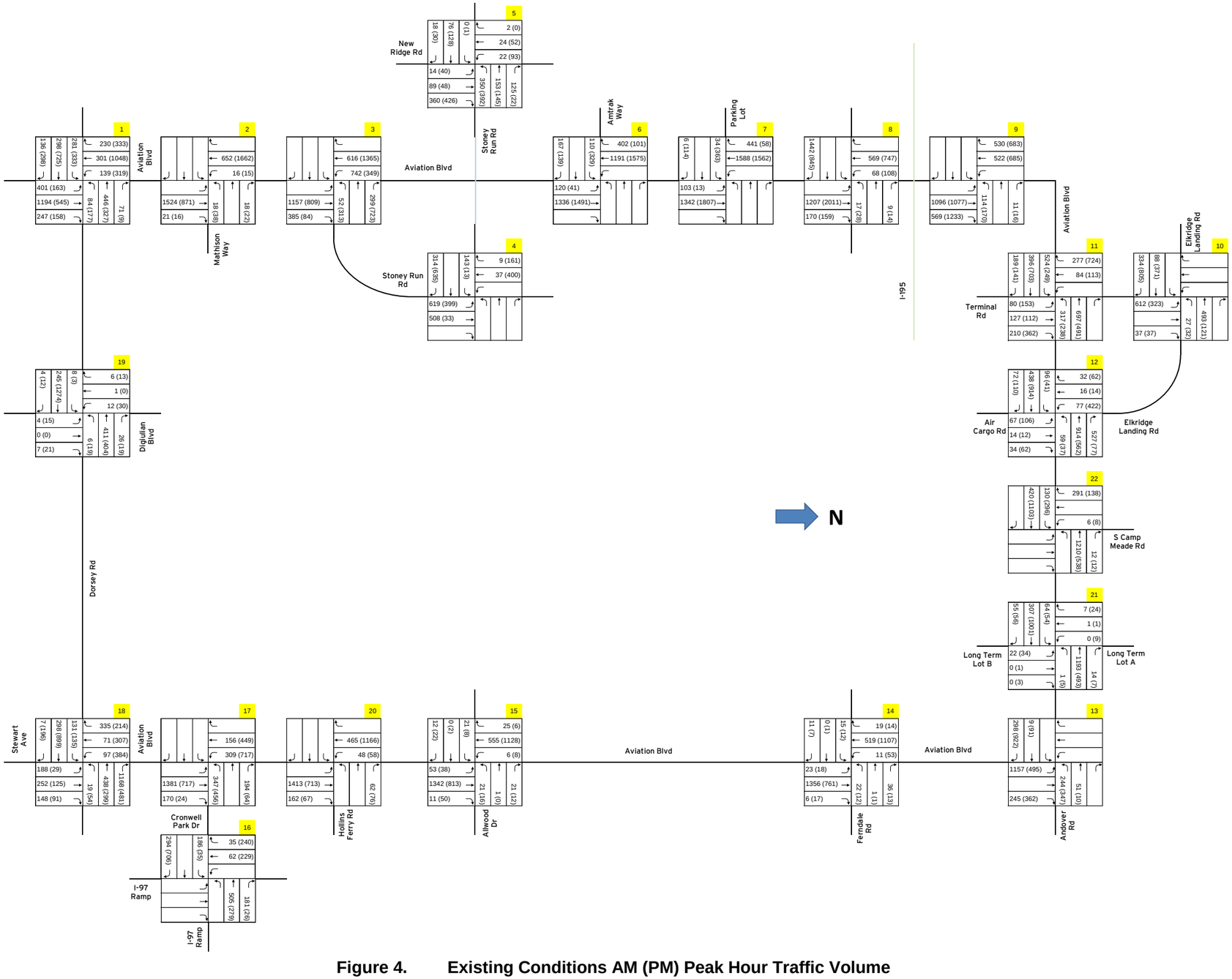


Figure 4. Existing Conditions AM (PM) Peak Hour Traffic Volume

2.2 Operational Analysis

2.2.1 Methodology

In order to analyze the intersections, peak hour traffic volumes were developed for all scenarios shown in **Table 1** and tested in Synchro (Version 9). Synchro is a traffic analysis software that supports the Highway Capacity Manual's 2000 and 2010 methodology for signalized intersections. The Critical Lane Volume (CLV) methodology was used to analyze peak hour traffic volumes.

Using the methodology outlined in Highway Capacity Manual (HCM), vehicular delay was used to measure traffic operations at the study intersections. The delay was categorized into Level of Service (LOS), which describes the overall operation of the intersection. **Table 3** lists the delay thresholds and associated LOS for signalized and unsignalized intersections.

HCM 2000 methodology was used for this TIS as the HCM 2010 component in Synchro does not generate results for intersections with non-National Electrical Manufacturers Association (NEMA) phasing.

Table 3
Intersection Delay Threshold for Level of Service

LOS	Signalized Delay (sec/veh)	Unsignalized Delay (sec/veh)	Description
A	0~10	0~10	Free-flow operations.
B	10~20	10~15	Free flow conditions with slightly lesser freedom to maneuver.
C	20~35	15~25	Might impact travel speeds with maneuverability affected by other vehicles.
D	35~55	25~35	Ability to maneuver is severely restricted due to traffic congestion.
E	55~80	35~50	Operations at or near capacity, often causing queues.
F	> 80	> 50	Forced or breakdown flow with demand exceeding the capacity.

Source: HCM 2000, Chapter 12.

The CLV technique was also used to analyze traffic, as outlined in the *SHA Highway Access Manual, Appendix E: Guidelines for Traffic Impact Reports/Studies.* The technique considers the critical movements that require maximum green time, the lane configuration for accommodating each movement, number of lanes, and lane utilization factors. The CLV technique is not defined for stop-controlled intersections. **Table 4** presents the CLV threshold for LOS.

Table 4
CLV Threshold for Level of Service

Volume	LOS
Less than 1,000	A
1,000-1,150	B
1,150-1,300	C
1,300-1,450	D
1,450-1,600	E
More than 1,600	F

Source: SHA.

If implementation of the proposed projects was found to degrade the traffic operations of any intersection's LOS to worse than "D"[5], potential improvements were proposed to mitigate the impacts.

2.2.2 Results and Findings

Synchro Analysis

Table 5 and **Table 6** show the AM and PM peak hour delay and LOS for the Existing Conditions. **Appendix B** presents detailed HCM reports from Synchro. The delay and LOS results obtained from the operational analysis were validated by the field observations.

The LOS presented for Intersection 8 (Aviation Blvd/MD 170 at I-195 SB Ramps) was calculated outside of Synchro. The software treats the eastbound right turn movement as part of the intersection even though it is actually outside the control of the traffic signal (i.e. a free-flow movement). The LOS for this intersection was recalculated using the thresholds presented in **Table 3** and excluding the eastbound right turn movement from the overall delay.

[5] State Highway Access Manual – Appendix E: Guidelines for Traffic Impact Reports/Studies; http://www.roads.maryland.gov/m/index.aspx?PageId=460 accessed in October 2015

Table 5
Existing Conditions AM Peak Hour Intersection LOS - Synchro

Intersection		Control	Delay (sec/veh)	Equivalent LOS
1	Aviation Blvd at Dorsey Rd - West	S	63.5	E
2	Aviation Blvd at Mathison Way	S	5.2	A
3	Aviation Blvd at Stoney Run Rd	S	25.2	C
4	Stoney Run Rd at Northrop Grumman Entrance	S	19.0	B
5	Stoney Run Rd at New Ridge Rd	S	37.5	D
6	Aviation Blvd at Amtrak Way	S	11.4	B
7	Aviation Blvd at Northrop Grumman Gate 1A	S	8.2	A
8	Aviation Blvd at SB I-195 Ramps	S	3.3	A
9	Aviation Blvd at NB I-195 Ramps	S	6.9	A
10	Elkridge Landing Rd at Terminal Rd	S	19.5	B
11	Aviation Blvd at Terminal Rd	S	26.3	C
12	Aviation Blvd at Air Cargo Dr	S	12.8	B
13	Aviation Blvd at Andover Rd	S	14.4	B
14	Aviation Blvd at Aaronson Dr	U	3.6	A
15	Aviation Blvd at Allwood Dr	S	6.9	A
16	SB I-97 Ramps at Cromwell Park Dr	S	15.6	B
17	Aviation Blvd at Cromwell Park Dr	S	21.7	C
18	Aviation Blvd at Dorsey Rd - East	S	21.3	C
19	Dorsey Rd at Digiulian Blvd	U	0.7	A
20	Aviation Blvd at Hollins Ferry Rd	S	2.3	A
21	Aviation Blvd at BWI Long Term Parking Lots	S	5.3	A
22	Aviation Blvd at S. Camp Meade Rd	S	3.7	A

Note: S = signalized; U = unsignalized

Source: HCM reports (in Appendix B) from HNTB's Synchro analysis of 2016 Existing Conditions.

Table 6
Existing Conditions PM Peak Hour Intersection LOS - Synchro

Intersection		Control	Delay (sec/veh)	Equivalent LOS
1	Aviation Blvd at Dorsey Rd - West	S	57.5	E
2	Aviation Blvd at Mathison Way	S	3.9	A
3	Aviation Blvd at Stoney Run Rd	S	20.0	B
4	Stoney Run Rd at Northrop Grumman Entrance	S	36.2	D
5	Stoney Run Rd at New Ridge Rd	S	47.8	D
6	Aviation Blvd at Amtrak Way	S	17.9	B
7	Aviation Blvd at Northrop Grumman Gate 1A	S	11.3	B
8	Aviation Blvd at SB I-195 Ramps	S	8.5	A
9	Aviation Blvd at NB I-195 Ramps	S	25.8	C
10	Elkridge Landing Rd at Terminal Rd	S	9.6	A
11	Aviation Blvd at Terminal Rd	S	18.7	B
12	Aviation Blvd at Air Cargo Dr	S	45.0	D
13	Aviation Blvd at Andover Rd	S	13.4	B
14	Aviation Blvd at Aaronson Dr	U	1.9	A
15	Aviation Blvd at Allwood Dr	S	3.6	A
16	SB I-97 Ramps at Cromwell Park Dr	S	28.1	C
17	Aviation Blvd at Cromwell Park Dr	S	30.4	C
18	Aviation Blvd at Dorsey Rd - East	S	27.3	C
19	Dorsey Rd at Digiulian Blvd	U	1.9	A
20	Aviation Blvd at Hollins Ferry Rd	S	1.4	A
21	Aviation Blvd at BWI Long Term Parking Lots	S	5.8	A
22	Aviation Blvd at S. Camp Meade Rd	S	6.6	A

Note: S = signalized; U = unsignalized

Source: HCM reports (in Appendix B) from HNTB's Synchro analysis of 2016 Existing Conditions.

Table 7 presents the list of movements where the 50th and/or 95th percentile queue lengths exceed the storage lengths of the respective turn bays for the 2016 Existing Conditions. **Appendix B** presents full queue tables as part of the Synchro Measures of Effectiveness (MOE) tables.

Table 7
2016 Turn Movement Queues Exceeding Storage Length

Intersection		Movement	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
AM Peak Hour					
1	Aviation Blvd at Dorsey Rd - West	NBL	455	-	630
		SBL	250	-	260
		EBL	175	317	#558
5	Stoney Run Rd at New Ridge Rd	WBL	300	423	423
13	Aviation Blvd at Andover Rd	SBL	175	-	187
PM Peak Hour					
1	Aviation Blvd at Dorsey Rd - West	SBL	250	364	#636
		SBR	175	210	368
		EBL	175	290	424
		EBR	225	-	301
		WBL	200	-	239
4	Stoney Run Rd at Northrop Grumman Entrance	SBR	85	-	163
5	Stoney Run Rd at New Ridge Rd	WBL	300	342	#593
13	Aviation Blvd at Andover Rd	SBL	175	-	214

Notes:
Queues that are within the turn bay storage length of the movement are excluded
m : Volume for the 95th percentile queue is metered by upstream signal
~ : Volume exceed capacity, queue is theoretically infinite
# : 95th percentile volume exceeds capacity, queue may be longer
- : Queues are within storage

CLV Analysis

Table 8 and **Table** 9 present the respective AM and PM peak hour CLV, equivalent LOS and Volume to Capacity (V/C) ratio.

Table 8
Existing Conditions AM Peak Hour Intersection LOS – CLV

Intersection		CLV	Equivalent LOS	V/C
1	Aviation Blvd at Dorsey Rd - West	1,289	C	0.81
2	Aviation Blvd at Mathison Way	842	A	0.53
3	Aviation Blvd at Stoney Run Rd	1,058	B	0.66
4	Stoney Run Rd at Northrop Grumman Entrance	689	A	0.43
5	Stoney Run Rd at New Ridge Rd	551	A	0.34
6	Aviation Blvd at Amtrak Way	862	A	0.54
7	Aviation Blvd at Northrop Grumman Parking	963	A	0.60
8	Aviation Blvd at I-195 SB Ramps	725	A	0.45
9	Aviation Blvd at I-195 NB Ramps	695	A	0.43
10	Elkridge Landing Rd at Terminal Rd	873	A	0.55
11	Aviation Blvd at Terminal Rd	773	A	0.48
12	Aviation Blvd at Air Cargo Rd	738	A	0.46
13	Aviation Blvd at Andover Rd	866	A	0.54
15	Aviation Blvd at Allwood Dr	782	A	0.49
16	I-97 SB Ramps at Cromwell Park Dr	399	A	0.25
17	Aviation Blvd at Cromwell Park Dr	809	A	0.51
18	Aviation Blvd at Dorsey Rd - East	779	A	0.49
20	Aviation Blvd at Hollins Ferry Rd	571	A	0.36
21	Aviation Blvd at BWI Long Term Parking Lots	719	A	0.45
22	Aviation Blvd at Camp Meade Rd	932	A	0.58

Source: HNTB's CLV analysis of 2016 Existing Conditions
Includes signalized intersections only

Table 9
Existing Conditions PM Peak Hour Intersection LOS - CLV

Intersection		CLV	Equivalent LOS	V/C
1	Aviation Blvd at Dorsey Rd - West	1,280	C	0.80
2	Aviation Blvd at Mathison Way	919	A	0.57
3	Aviation Blvd at Stoney Run Rd	1,036	B	0.65
4	Stoney Run Rd at Northrop Grumman Entrance	624	A	0.39
5	Stoney Run Rd at New Ridge Rd	702	A	0.44
6	Aviation Blvd at Amtrak Way	1,205	C	0.75
7	Aviation Blvd at Northrop Grumman Parking	1,150	C	0.72
8	Aviation Blvd at I-195 SB Ramps	1,201	C	0.75
9	Aviation Blvd at I-195 NB Ramps	741	A	0.46
10	Elkridge Landing Rd at Terminal Rd	551	A	0.34
11	Aviation Blvd at Terminal Rd	640	A	0.40
12	Aviation Blvd at Air Cargo Rd	1,061	B	0.66
13	Aviation Blvd at Andover Rd	836	A	0.52
15	Aviation Blvd at Allwood Dr	676	A	0.42
16	I-97 SB Ramps at Cromwell Park Dr	596	A	0.37
17	Aviation Blvd at Cromwell Park Dr	772	A	0.48
18	Aviation Blvd at Dorsey Rd - East	777	A	0.49
20	Aviation Blvd at Hollins Ferry Rd	322	A	0.20
21	Aviation Blvd at BWI Long Term Parking Lots	570	A	0.36
22	Aviation Blvd at Camp Meade Rd	592	A	0.37

Source: HNTB's CLV analysis of 2016 Existing Conditions
Includes signalized intersections only

Findings

Under Existing Conditions, the Synchro analysis indicates that Intersection 1 (Aviation Blvd/MD 170 at Dorsey Rd/MD 176 - West) operates at LOS E in the AM and PM peak hours. This is above (i.e. worse than) the acceptable thresholds defined by SHA[1], which is LOS D. Queues for turning movements are contained within the respective turn bays except for intersections:

- 1(Aviation Blvd/MD 170 at Dorsey Rd/MD 176 – West)
- 4 (Stoney Run Rd and Northrop Grumman Entrance)
- 5 (Stoney Run Rd at New Ridge Rd) and
- 13 (Aviation Blvd/MD 162 at Andover Rd).

All intersections based on the critical lane analysis operate at CLV LOS C or better during both peak periods. **Appendix C** presents detailed CLV reports.

There are intersections where the Synchro and CLV results vary by more than one LOS category/level. These differences can be generally attributed to long signal cycle lengths. The cycle lengths—which were provided by the SHA—were set to have long cycles to allow better progression of vehicles between adjacent intersections. If intersections were analyzed in isolation using Synchro, shorter cycle lengths—which would improve the individual intersection's LOS—would be chosen by Synchro's optimization feature.

3 No Action Alternative (2022 and 2027)

The No Action Alternative reflects the future baseline condition and assumes that the proposed projects at BWI are not built. It was used as the base to compare the results of the Proposed Action Alternative and identify any impacts resulting from the land-use change. The No Action Alternative was examined for the years 2022 and 2027.

A new vehicle service station is planned to be constructed adjacent to Intersection 6 (Aviation Blvd/MD 170 and Amtrak Way/MD 995). The proposed service station access point was assumed to be along Amtrak Way. The service station was analyzed as a separate project from this EA and will open by 2020. The Midfield Cargo Facility Improvements are planned to be constructed along Mathison Way and access will be Intersection 2 (Aviation Blvd/MD 170 and Mathison Way). The Midfield Cargo Facility Improvements were evaluated by a separate NEPA review from this EA and is expected to be open by 2020. As such, both the service station and the Midfield Cargo Facility Improvements were assumed to be part of the 2022 and 2027 analyses of the No Action Alternative. Additional approved, but not yet built, developments that generate trips into and out of the study area were also considered as part of the No Action Alternative.

3.1 No Action Volume Development

The 2022 No Action Alternative Volumes are a combination of Baseline Volume Growth, volume generated by the proposed BWI Service Station, the proposed and volume from other approved developments near BWI.

3.1.1 Baseline Volume Growth

An annual compound growth rate of 1% was used to convert the 2016 Existing Condition volumes into the 2022 baseline volume projections. This is based on historical growth rate as discussed in **Section 2.1.2**. This accounts for regional background traffic growth, separate from specific developments near BWI.

The Baltimore Metropolitan Council (BMC) travel demand model showed an annual growth rate of 1.2% per year to the year 2040. The BMC growth rate is in line with the 1% that was used in this study for the growth of regional trips. At the time of the study, the 2020 BMC model runs were not available for comparison.

Figure 5 shows the additional volume growth between 2016 and 2022 Baselines. **Figure 6** presents the 2022 Baseline volumes.

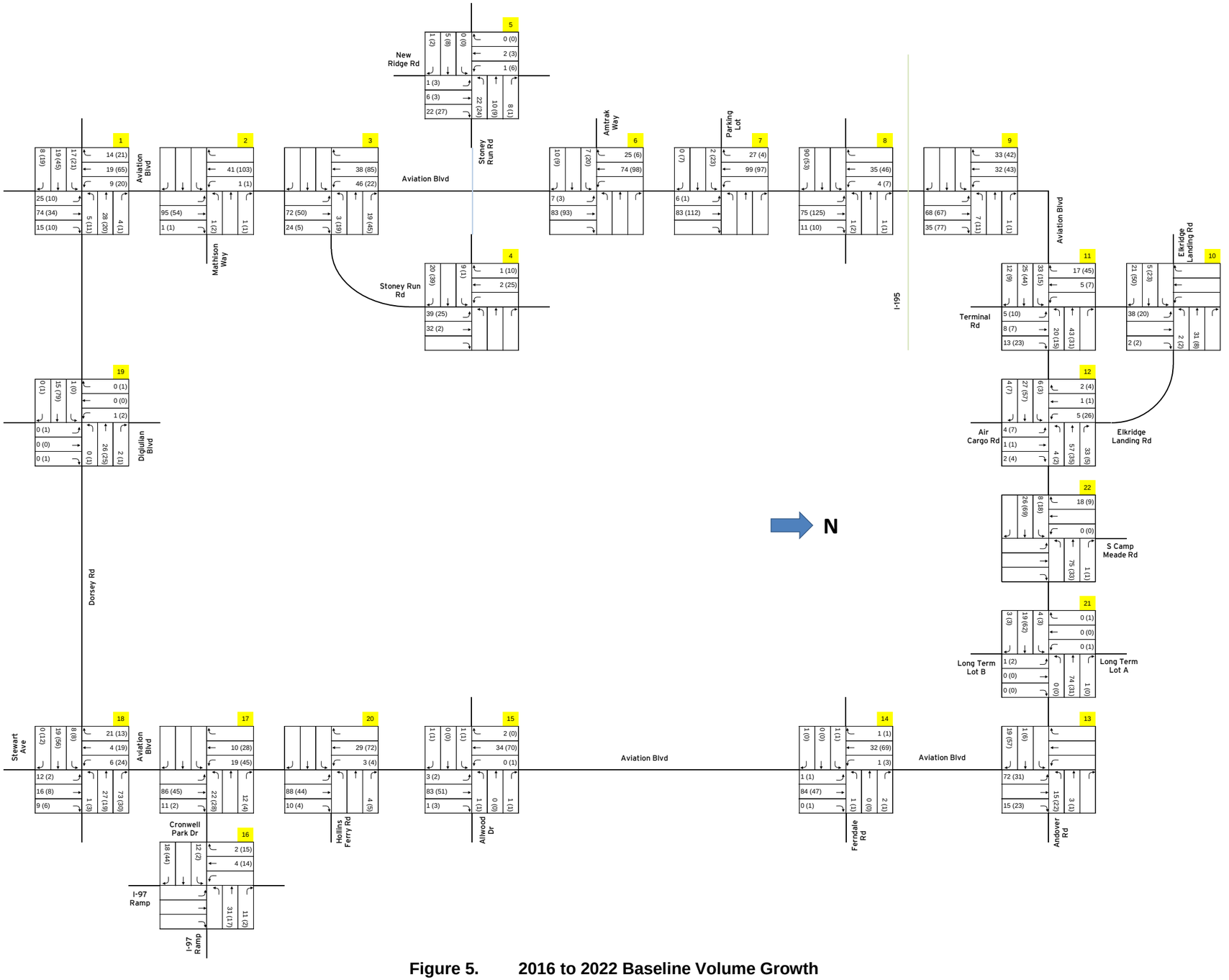


Figure 5. 2016 to 2022 Baseline Volume Growth

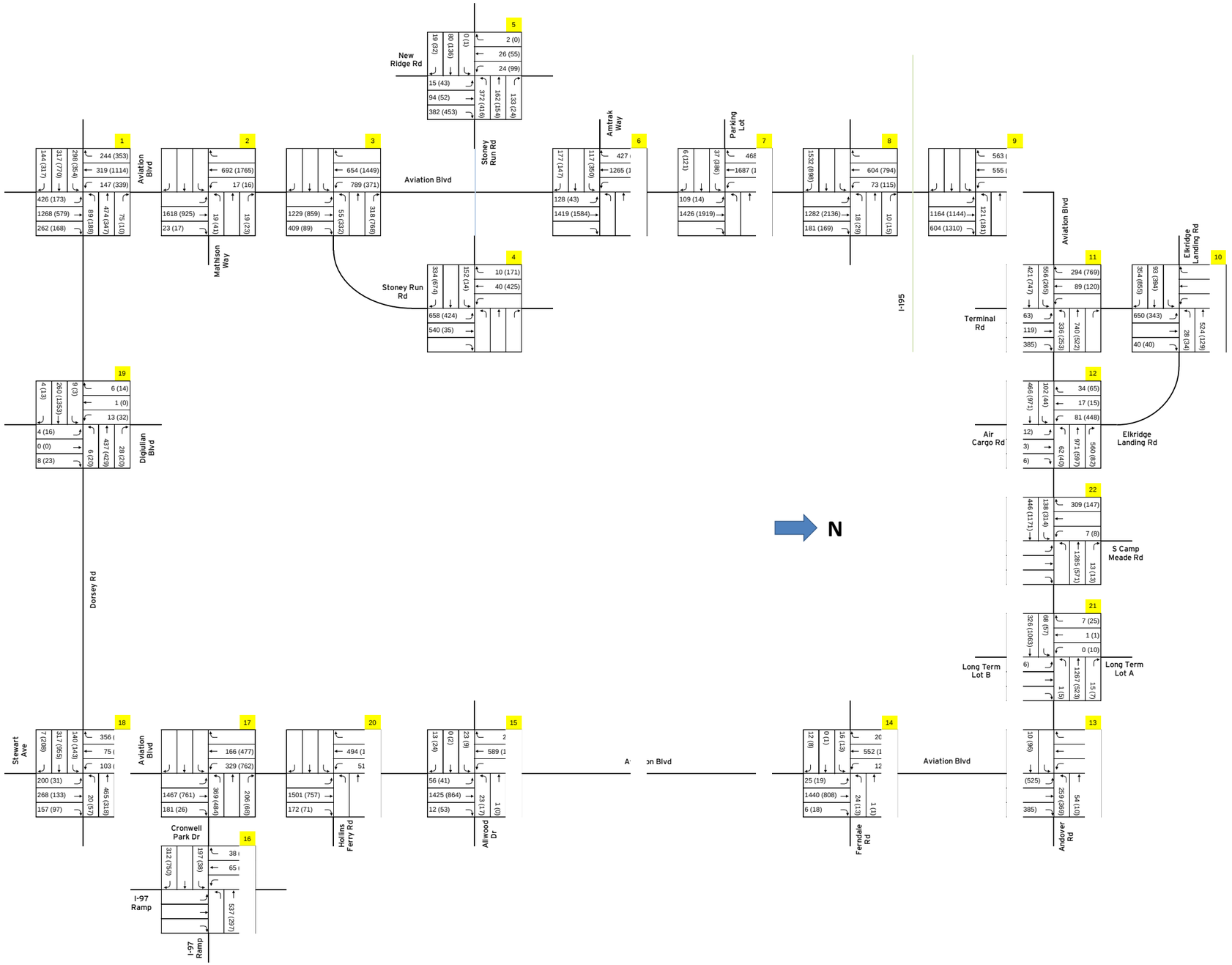
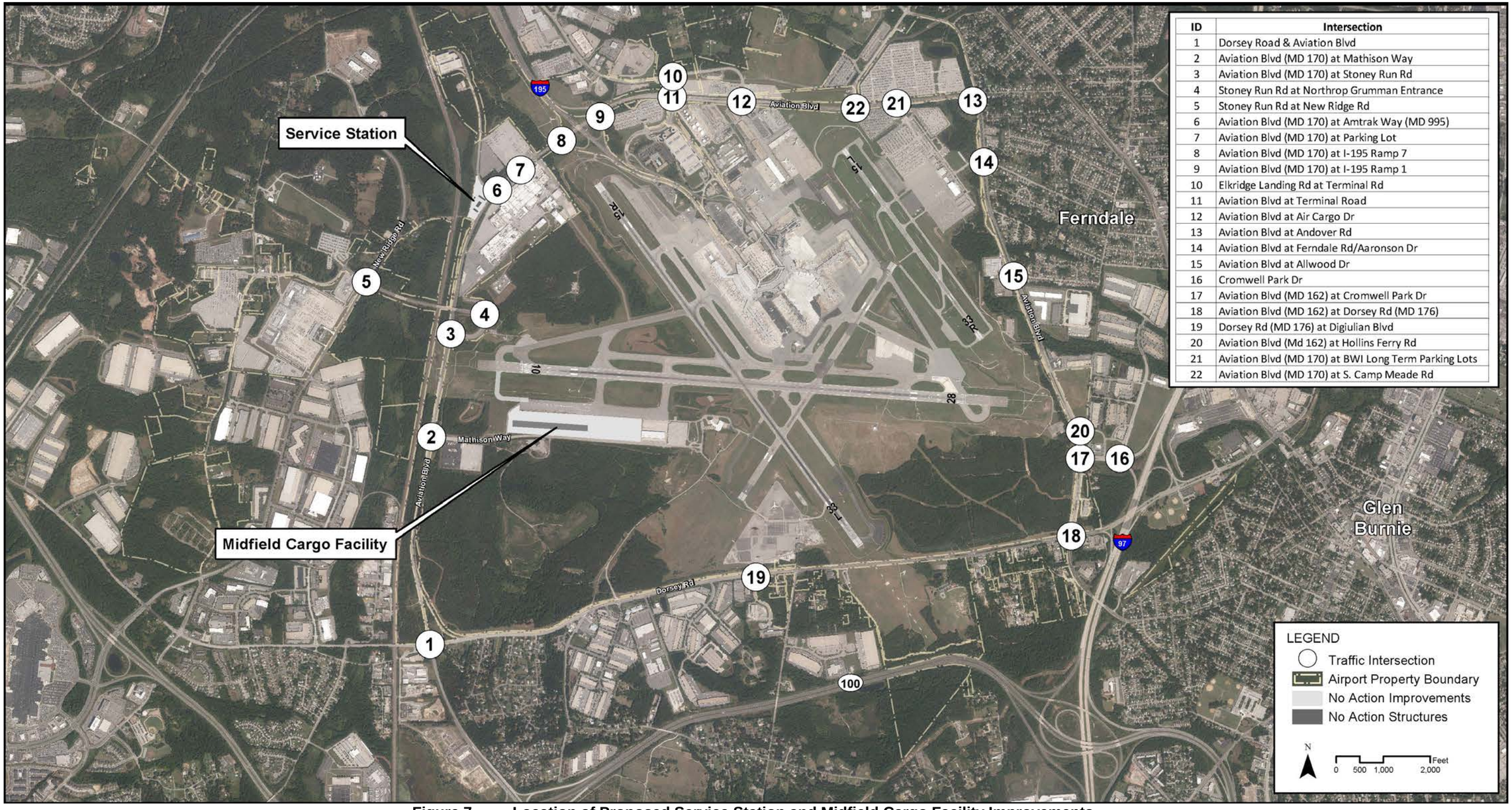


Figure 6. 2022 Baseline AM (PM) Peak Hour Trips



ID	Intersection
1	Dorsey Road & Aviation Blvd
2	Aviation Blvd (MD 170) at Mathison Way
3	Aviation Blvd (MD 170) at Stoney Run Rd
4	Stoney Run Rd at Northrop Grumman Entrance
5	Stoney Run Rd at New Ridge Rd
6	Aviation Blvd (MD 170) at Amtrak Way (MD 995)
7	Aviation Blvd (MD 170) at Parking Lot
8	Aviation Blvd (MD 170) at I-195 Ramp 7
9	Aviation Blvd (MD 170) at I-195 Ramp 1
10	Elkridge Landing Rd at Terminal Rd
11	Aviation Blvd at Terminal Road
12	Aviation Blvd at Air Cargo Dr
13	Aviation Blvd at Andover Rd
14	Aviation Blvd at Ferndale Rd/Aaronson Dr
15	Aviation Blvd at Allwood Dr
16	Cromwell Park Dr
17	Aviation Blvd (MD 162) at Cromwell Park Dr
18	Aviation Blvd (MD 162) at Dorsey Rd (MD 176)
19	Dorsey Rd (MD 176) at Digiulian Blvd
20	Aviation Blvd (Md 162) at Hollins Ferry Rd
21	Aviation Blvd (MD 170) at BWI Long Term Parking Lots
22	Aviation Blvd (MD 170) at S. Camp Meade Rd

Figure 7. Location of Proposed Service Station and Midfield Cargo Facility Improvements

3.1.2 BWI Background Developments

Service Station

A service station is proposed by BWI, but is considered separately from this TIS as it will be constructed prior to other projects, and as a result it is included as part of this study's No Action Alternative. The service station will be located at the intersection of Aviation Boulevard and Amtrak Way, as shown on **Figure 7**. To reflect a worst case scenario, it was assumed that all vehicles would need to access the facility via Amtrak Way. The facility is assumed to have a maximum of 16 fueling positions with a convenience store and a car wash. A 5,000 square foot casual dining restaurant and 1,500 square foot quick serve restaurant are also proposed at the site. Rates from the Institute of Transportation Engineers (ITE) Trip Generation Manual (9th Edition) were used to develop site specific trips.

Table 10 shows the combined trips for all the land uses associated with the service station. **Table 11** through **Table 13** identify the trip generation for each individual land use.

A passby rate of 50% was applied for the trip generation at this site. The ITE Trip Generation manual has a passby rate for land use 945 (Gas/Service Station with Convenience Market). The manual presents data for 10 studies for gas stations with 8 to 10 fueling stations. The AM rate listed was 62 percent and the PM rate was 56 percent. The proposed station will have 16 fueling stations. The gas station/convenience market would not induce significant new trips into the study area as other gas/convenience markets are located in other areas south and east of the airport. Most users are expected to stop to fuel their vehicles at a service station located along their normal routes. Some users will deviate slightly to access the station. Thus, a 50 percent assumption was chosen to be conservative and account for trips generated by the site. The specific ITE trip generation information is presented in **Appendix D**.

Table 10
Service Station Trip Generation – All Land Uses

	AM Peak Hour Trips		**PM Peak Hour Trips**	
	IN	**OUT**	**IN**	**OUT**
Trips Generated	166	145	163	148
Pass-by Trips	-83	-	-82	-
New Trips	83	-	82	-

Note: Numbers may not add up exactly due to rounding, values rounded up.

Table 11
Land Use 946 - Gasoline/Service Station with Convenience Market and Car Wash

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Trips per Fueling Position	11.84		13.86	
Directional Distribution	*51%*	*49%*	*51%*	*49%*
Trips per Direction	*6.0*	*5.8*	*7.1*	*6.8*
Fueling Positions	16			
Total Trips Generated	**97**	**93**	**113**	**109**
Assumed Passby Percentage	*50%*		*50%*	
Passby Trips	**-48**	**-**	**-57**	**-**
New Trips Generated	**49**	**-**	**56**	**-**

Note: Numbers may not add up exactly due to rounding, values rounded up.

Table 12
Land Use 932 - High Turnover (Sit-Down) Restaurant

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Trips per 1000 square feet	10.82		9.85	
Directional Distribution	*55%*	*46%*	*60%*	*40%*
Trips per Direction	*5.9*	*5.0*	*5.9*	*3.9*
Restaurant Area (square feet)	5,000		5,000	
Total Trips Generated	**30**	**25**	**30**	**20**
Assumed Passby Percentage	*50%*		*50%*	
Passby Trips	**-15**	**-**	**-15**	**-**
New Trips Generated	**15**	**-**	**15**	**-**

Note: Numbers may not add up exactly due to rounding, values rounded up.

Table 13
Land Use 933 – Fast-Food Restaurant without Drive-Through Window

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Trips per 1000 square feet	43.87		26.15	
Directional Distribution	*60%*	*40%*	*51%*	*49%*
Trips per Direction	*26.3*	*17.5*	*13.3*	*12.8*
Restaurant Area (square feet)	1,500		1,500	
Total Trips Generated	**40**	**27**	**20**	**20**
Assumed Passby Percentage	*50%*		*50%*	
Passby Trips	**-20**	**-**	**-10**	**-**
New Trips Generated	**20**	**-**	**10**	**-**

Note: Numbers may not add up exactly due to rounding, values rounded up.

Midfield Cargo Facility Improvements

The Midfield Cargo Facility Improvements are planned to be constructed by 2020,, but are considered separately from this TIS as it was reviewed under a separate NEPA document, and as a result it is included as part of this EA's No Action Alternative. This expanded facility will be located along Mathison Way and access will be Intersection 2 (Aviation Blvd/MD 170 and Mathison Way). The expanded facility will consist of a 200,000 square foot building for handling air cargo. The expanded facility includes additional support staff. Neither land-use exist in the ITE Trip Generation Manual. The land-use of the building for handling air cargo does not exist in the ITE trip Generation Manual, but it is similar to a high-cube parcel warehouse listed.

Table 14 shows the combined trips for all the land uses associated with the Midfield Cargo Facility Improvements.

Table 14
Midfield Cargo Facility Improvements Site Trip Generation – All Land Uses

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Cargo facility	60	116	89	53
Support staff	10	10	10	10
New Trips	**70**	**130**	**100**	**65**

Note: Numbers may not add up exactly due to rounding, values rounded up.

The expanded Midfield Cargo Facility Improvements cargo processing building is estimated to generate traffic as listed in **Table 15**. Several land-use codes similar to the proposed cargo building were considered for the analysis, as the ITE Trip Generation Manual does not provide an exact land-use code for the type of facility. The total volumes are conservatively estimated using the Land Use Code 156. The ITE Trip Generation Manual defines HCW as a building that typically

has at least 200,000 gross square feet of floor area and is used primarily for the storage and/or consolidation of manufactured goods prior to their distribution to retail locations or other warehouses.

Table 15
Land Use 156 – High Cube Warehouse

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Trips per 1000 square feet	0.88		0.71	
Trips per 1000 square feet	34%	66%	63%	37%
Floor Area (sq. ft.)	200,000			
New Trips Generated	**60**	**116**	**89**	**53**

The expanded facility is expected to generate support staff trips assumed to have an even distribution during AM and PM. The support staff is presumed to produce a total of 20 trips, which accounts for change of shifts in the AM and PM peak periods. The estimated support staff trips are listed in **Table 16**.

Table 16
Support Staff Trip Generation

Trip Generation Method	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
MAA input	10	10	10	10

Table 17 presents the trip distribution for the study area entry and exit points for the combined BWI background development. **Figure 9** shows the trip distribution for the combined BWI background development.

Table 17
Combined BWI Background Development Trip Distribution

Intersection		AM Peak		PM Peak	
		In	**Out**	**In**	**Out**
1	Aviation Blvd at Dorsey Rd – West	50%	50%	50%	50%
5	Stoney Run Rd at New Ridge Rd	0%	0%	5%	5%
8/9	Aviation Blvd at I-195	15%	10%	15%	5%
10	Elkridge Landing Rd at Terminal Rd	15%	15%	25%	15%
11	Aviation Blvd at Terminal Rd	0%	5%	0%	0%
13	Aviation Blvd at Andover Rd	5%	0%	0%	5%
18	Aviation Blvd at Dorsey Rd - East	0%	10%	0%	5%
19	Dorsey Rd at Digiulian Blvd	0%	0%	0%	0%
22	Aviation Blvd at S Camp Meade Rd	15%	10%	5%	15%
	TOTAL	100%	100%	100%	100%

3.1.3 Other Background Developments Near BWI

Trip generations into and out of the BWI study area from approved developments to the north were included as part of the 2022 No Action Alternative. Per correspondence with Anne Arundel County Planning and Zoning, there are nine such developments listed below. The locations are shown on **Figure 8**.

1. BWI Technology Park II
2. BWI Technology Park III
3. West Quest Technology, Lot 1
4. Concorde Circle Project
5. SMO, Inc. – Nursery Road
6. Jimmy John's
7. Airport Square, Parcel 221
8. Concorde Circle, Lots 6B-D
9. Andover Park (224 apartments, 109 townhomes)

Appendix F presents the specific ITE trip generation information for each type of land use.

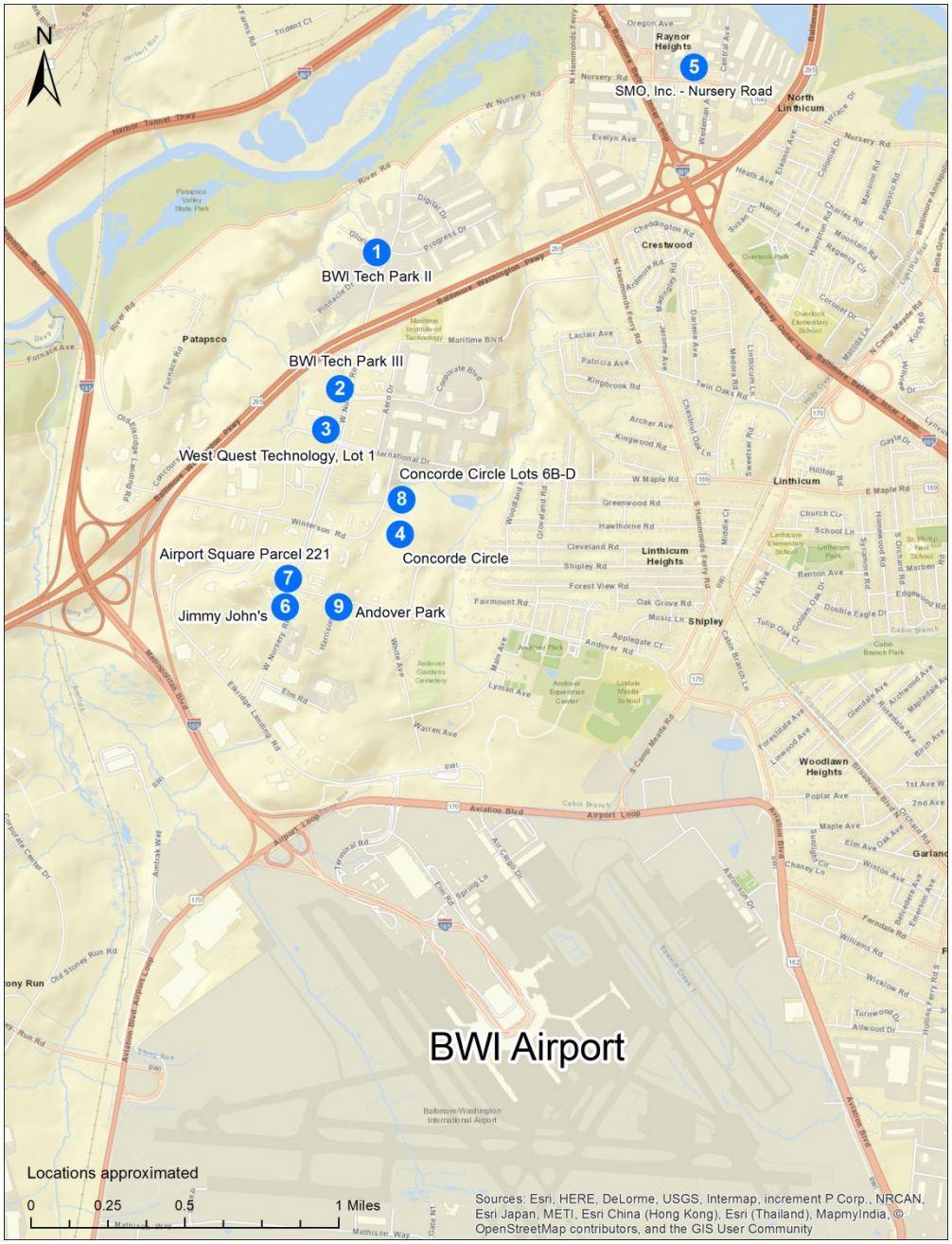


Figure 8. Other Background Developments

Trip Generation

This section discusses the trip generation for the nine developments north of the BWI study area.

BWI Technology Park II

The trip generation for the BWI Technology Park II was based on analysis documented in the *Airport Square Parcel 221 Traffic Impact Study (TIS), 2015* completed by Traffic Concepts Inc. The trip generation tables for the BWI Technology Park II development are presented in **Table 18** through **Table 21**.

Table 18
Land Use 770 – Business Park

	AM Peak Hour Trips		**PM Peak Hour Trips**	
	IN	**OUT**	**IN**	**OUT**
Trips per 1000 square feet	1.19	0.23	0.33	1.10
Floor Area (sq. ft.)	196,200			
Trips	**233**	**44**	**65**	**216**
Occupied Floor Area (sq. ft.)	17,000			
Less trips from occupied space	**-20**	**-4**	**-6**	**-19**
New Trips Generated	**213**	**40**	**59**	**197**

Source: Airport Square TIS[6].

Table 19
Land Use 710 – General Office

	AM Peak Hour Trips		**PM Peak Hour Trips**	
	IN	**OUT**	**IN**	**OUT**
Trips per 1000 square feet	1.36	0.19	0.25	1.24
Floor Area (sq. ft.)	61,200			
New Trips Generated	**296**	**52**	**74**	**273**

Source: Airport Square TIS.

[6] Airport Square Parcel 221 Traffic Impact Study, 2015 prepared by Traffic Concepts Inc.

Table 20
Land Use 814 – Specialty Retail

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Trips per 1000 square feet	3.28	3.56	2.81	2.21
Floor Area (sq. ft.)	13,325			
Trips	**44**	**47**	**37**	**29**
Occupied Floor Area (sq. ft.)	6,600			
Less trips from occupied space	***-22***	***-24***	***-19***	***-15***
New Trips Generated	**22**	**23**	**18**	**14**

Source: Airport Square TIS.

Table 21
Land Use 853 – Convenience Market

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Trips per 1000 square feet	21.95	21.95	29.85	29.85
Floor Area (sq. ft.)	5940			
Trips	**130**	**130**	**177**	**177**
Passby Percentage	*63%*		*66%*	
Passby trips	***-82***	***-82***	***-117***	***-117***
Trip Diversion %	*26%*		*18%*	
Diverted trips	**-34**	**-34**	**-32**	**-32**
New Trips Generated	**36**	**37**	**46**	**42**

Source: Airport Square TIS.

Note that the convenience market was identified in the *Concorde Circle Lots 6B-D Traffic Impact Study, 2016* conducted by Traffic Concepts Inc. as being in operation. However, it was opened after the traffic counts for this TIS were conducted in 2015. As counts for this convenience market would not have been included in the existing traffic counts collected, it was included as a background development in the No Action Alternative.

BWI Technology Park III

The trip generation for the BWI Technology Park III development was based on analysis documented in the *Airport Square Parcel 221 Traffic Impact Study (TIS), 2015* completed by Traffic Concepts Inc. **Table 22** through **Table 24** present the trip generation for this development.

Table 22
Land Use 710 – General Office

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Trips per 1000 square feet	1.59	0.22	0.30	1.47
Floor Area (sq. ft.)	120,848			
New Trips Generated	**192**	**26**	**36**	**178**

Source: Airport Square TIS.

Table 23
Land Use 912 – Drive-In Bank

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Trips per 1000 square feet	6.91	5.43	22.87	22.87
Floor Area (sq. ft.)	1,500			
Trips	**10**	**8**	**34**	**34**
Passby Percentage	*25%*		*25%*	
Passby trips	***-2***	***-2***	***-8***	***-8***
New Trips Generated	**8**	**6**	**26**	**26**

Source: Airport Square TIS.

Table 24
Land Use 715 – Single-Tenant Office

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Trips per 1000 square feet	1.60	0.20	0.26	1.47
Floor Area (sq. ft.)	4,500			
New Trips Generated	**7**	**1**	**1**	**7**

Source: Airport Square TIS.

West Quest Technology, Lot 1

The trip generation for the West Quest Technology, Lot 1 development was based on analysis documented in the *Airport Square Parcel 221 Traffic Impact Study (TIS), 2015* completed by Traffic Concepts Inc. **Table 25** and **Table 26** present the trip generation tables for this development.

Table 25
Land Use 826 – Specialty Retail

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Trips per 1000 square feet	3.28	3.56	2.81	2.21
Floor Area (sq. ft.)	3,200			
New Trips Generated	**10**	**12**	**9**	**7**

Source: Airport Square TIS.

Table 26
Land Use 934 – Fast Food with Drive-Thru

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Trips per 1000 square feet	23.16	22.26	16.98	15.67
Floor Area (sq. ft.)	1,600			
Trips	**37**	**36**	**27**	**25**
Passby Percentage	*50%*		*50%*	
Passby trips	***-18***	***-18***	***-14***	***-13***
New Trips Generated	**19**	**18**	**13**	**12**

Source: Airport Square TIS.

Concorde Circle Project

The trip generation for the Concorde Circle development was based on analysis documented in the *Airport Square Parcel 221 Traffic Impact Study (TIS), 2015* completed by Traffic Concepts Inc. Table **27** presents the trip generation for this development.

Table 27
Land Use 220 – Apartments

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Per Unit	0.10	0.40	0.39	0.21
Units	310			
New Trips Generated	**31**	**125**	**122**	**66**

Source: Airport Square TIS.

SMO, Inc. – Nursery Road

The SMO, Inc. development was determined not to contribute any trips to the BWI study area as it only generates 20 In and Out trips and it is located more than 2 miles away from the study area (see **Figure 8**). This determination is consistent with the Airport Square TIS. For reference

purposes, the trip generation for this development is presented in **Table 28**. The values were taken from the *Concorde Circle Lots 6B-D Traffic Impact Study, 2016* completed by Traffic Concepts Inc.

Table 28
Land Use 853 – Convenience Market

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Trips per 1000 square feet	20.46	20.46	25.46	25.46
Floor Area (sq. ft.)	2,580			
Trips	**53**	**53**	**66**	**65**
Passby Percentage	*60%*		*66%*	
Passby trips	***-33***	***-33***	***-44***	***-43***
New Trips Generated	**20**	**20**	**20**	**20**

Source: Concorde Circle Lots 6B-D TIS[7].

Jimmy John's

The trip generation for the Jimmy John's development was based on analysis documented in the *Airport Square Parcel 221 Traffic Impact Study (TIS), 2015*. The Jimmy John's restaurant on W. Nursery Rd is currently in operation but was opened after the traffic counts for this TIS were conducted in 2015. As counts for this restaurant would not have been included in the existing traffic counts collected, it was included as a background development in the No Action Alternative. **Table 29** presents the trip generation for this development.

Table 29
Land Use 934 – Fast Food with Drive-Thru

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Trips per 1000 square feet	0*	0*	16.98	15.67
Floor Area (sq. ft.)	2,095			
Trips	**0**	**0**	**36**	**32**
Passby Percentage			*50%*	
Passby trips	***0***	***0***	***-18***	***-16***
New Trips Generated	**0**	**0**	**18**	**16**

*does not operate during AM peak.
Source: Airport Square TIS.

[7] Concorde Circle – Lots 6B-D Traffic Impact Study (TIS), 2016 prepared by Traffic Concepts Inc.

Airport Square Parcel 221

The trip generation for the Airport Square Parcel 221 development was based on analysis documented in the *Airport Square Parcel 221 Traffic Impact Study (TIS), 2015* conducted by Traffic Concepts Inc. **Table 30** and **Table 31** present the trip generation tables for this development.

Table 30
Land Use 934 – Fast Food with Drive-Thru

	AM Peak Hour Trips		**PM Peak Hour Trips**	
	IN	**OUT**	**IN**	**OUT**
Trips per 1000 square feet	23.16	22.26	16.98	15.67
Floor Area (sq. ft.)	4,960			
Trips	**115**	**110**	**84**	**78**
Passby Percentage	*50%*			
Passby trips	***-56***	***-54***	***-42***	***-39***
New Trips Generated	**59**	**56**	**42**	**39**

Source: Airport Square TIS.

Table 31
Land Use 826 – Specialty Retail

	AM Peak Hour Trips		**PM Peak Hour Trips**	
	IN	**OUT**	**IN**	**OUT**
Trips per 1000 square feet	3.28	3.56	2.81	2.21
Floor Area (sq. ft.)	14,400			
New Trips Generated	**47**	**51**	**40**	**32**

Source: Airport Square TIS.

Concorde Circle Lots 6B-D

The trip generation for the Concorde Circle Lots 6B-D development was based on analysis documented in the *Concorde Circle Lots 6B-D Traffic Impact Study, 2016* conducted by Traffic Concepts Inc. **Table 32** presents the trip generation for this development.

Table 32
Land Use 220 – Apartments

	AM Peak Hour Trips		**PM Peak Hour Trips**	
	IN	**OUT**	**IN**	**OUT**
Per Unit	0.10	0.40	0.39	0.21
Units	394			
New Trips Generated	**39**	**158**	**152**	**82**

Source: Concorde Circle Lots 6B-D.

Andover Park

Table 33 and **Table 34** present the trip generation for Andover Park, which were developed using rates from ITE Trip Generation Manual (9th Edition).

Table 33
Land Use 220 – Apartments

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Per Unit	0.10	0.40	0.39	0.21
Units	224			
New Trips Generated	**22**	**90**	**87**	**47**

Source: HNTB computation of trip generation based on ITE Trip Generation Manual 9th edition

Table 34
Land Use 230 – Residential Condominium/Townhouse

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Per Unit	0.07	0.37	0.35	0.17
Units	109			
New Trips Generated	**8**	**40**	**38**	**19**

Source: HNTB computation of trip generation based on ITE Trip Generation Manual 9th edition

Trip Distribution

The Airport Square and Concorde Circle Lots 6B-D TISs showed trip distributions outside of the BWI study area for eight of the identified "Other Background Developments Near BWI", except for Andover Park. The trip distributions used in these TISs were used to determine the number of trips that are expected to enter and exit the BWI study area. These two studies indicated that 20% of the proposed developments trips travel to/from the south (i.e., into and out of the BWI study area), the remaining 80% of trips travel to/from the north (i.e., Baltimore-Washington Parkway). The same 20% of trips into the BWI study area was applied to the Andover Park development. **Table 35** summarizes the total number of trips into and out of the BWI study area from these nine "Other Background Developments Near BWI" to the north.

Table 35
Other Developments – Trips To/From BWI Study Area

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Trips Generated	125	145	160	132

The trips generated by the other background developments were distributed through the BWI study area based on the location of work centers and major access routes. **Figure 10** illustrates how the additional trips were re-distributed through the BWI study area.

3.1.4 2022 No Action Alternative Volumes

The 2022 No Action AM and PM total peak hour volumes were developed by layering the AM and PM peak hour volumes from the 2022 Baseline, the BWI Service Station, and the Other Background Development. **Figure 11** presents the resulting 2022 No Action AM and PM total peak hour volumes for the study area intersections.

3.1.5 2027 No Action Alternative Volumes

An annual compound growth rate of 1% was used to scale the 2022 No Action Alternative volumes to 2027 No Action Alternative volumes. This is based on historical growth rate as discussed in **Section 2.1.2**. **Figure 13** presents the 2027 No Action AM and PM total peak hour volumes for the study area intersections.

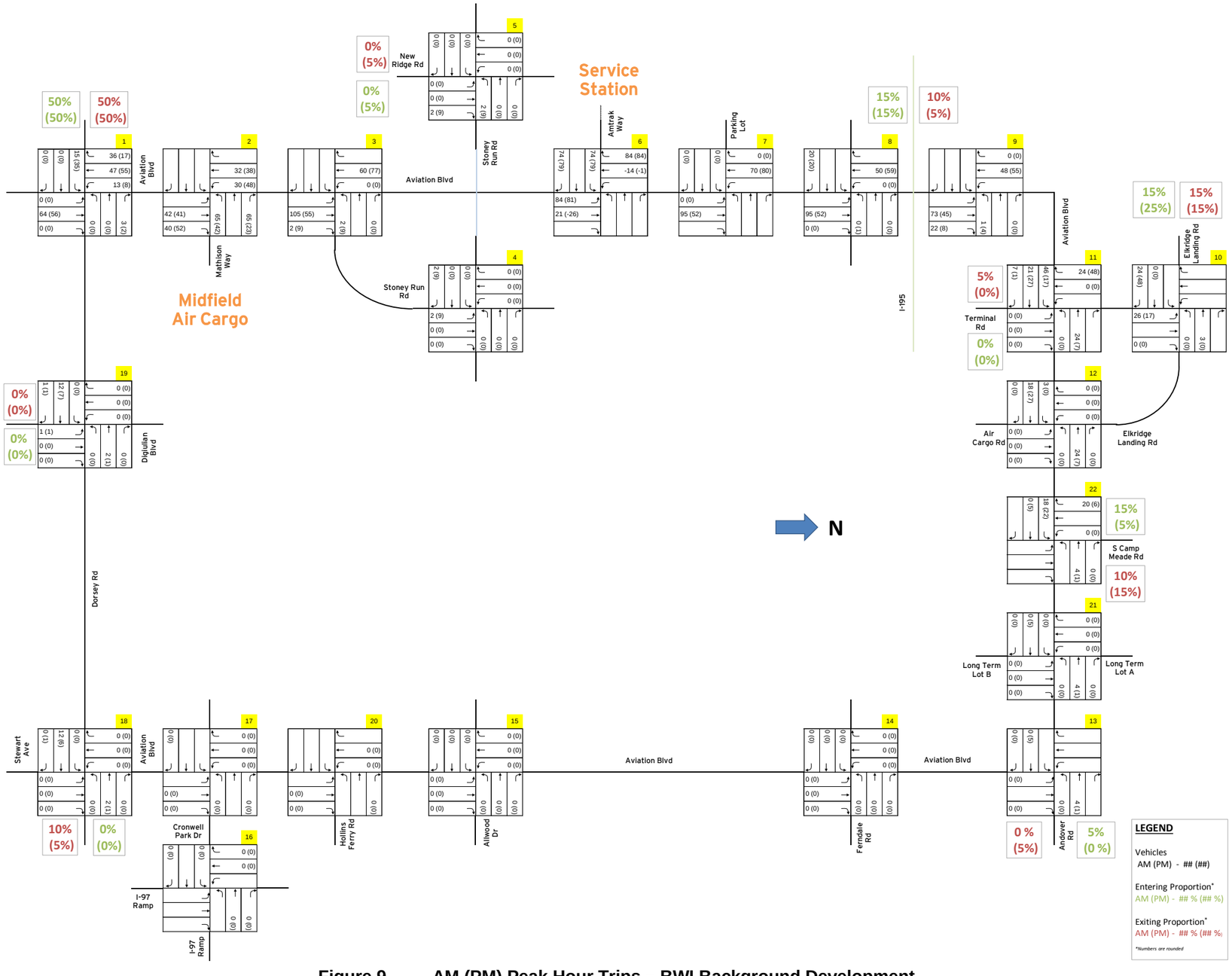


Figure 9. AM (PM) Peak Hour Trips – BWI Background Development

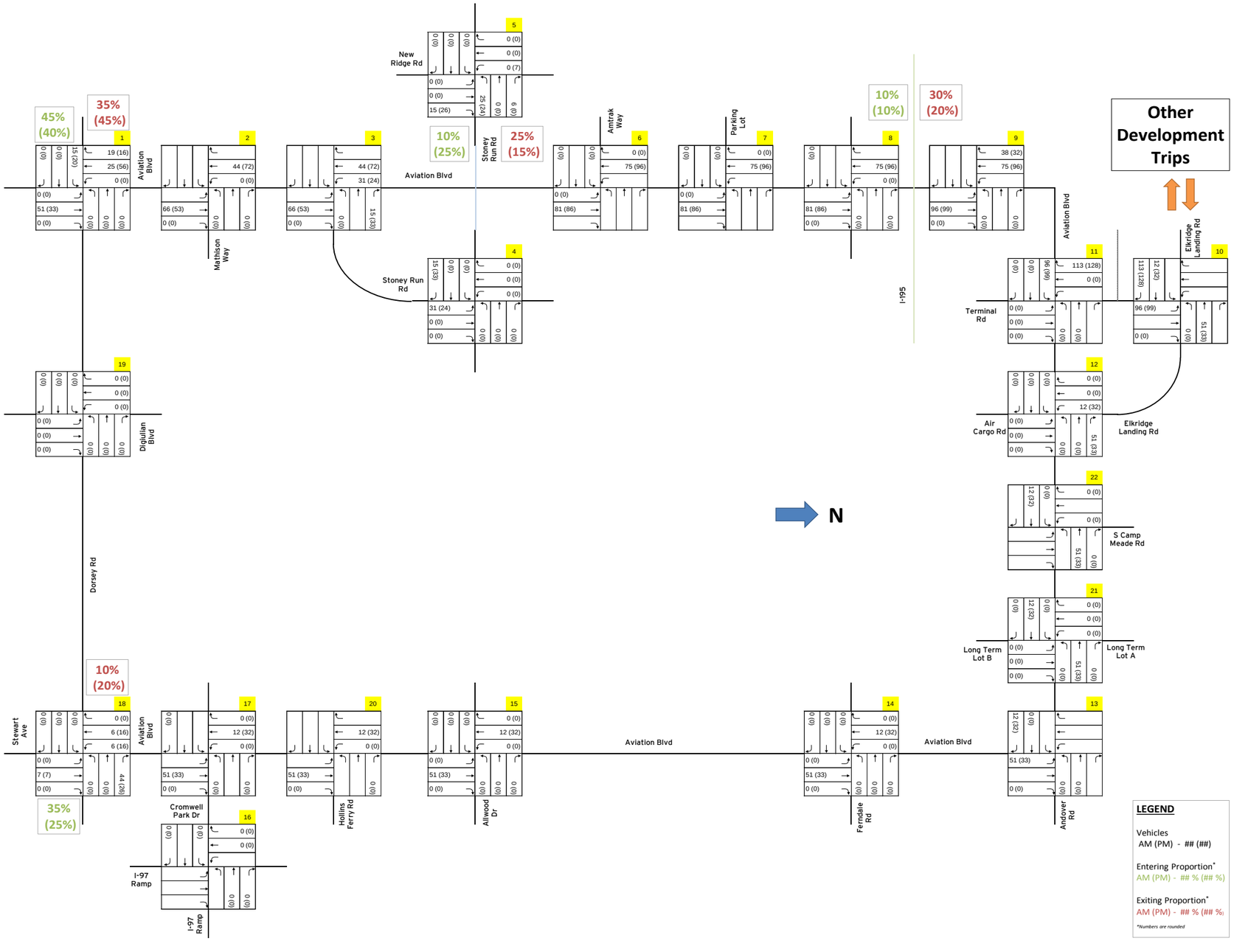


Figure 10. AM (PM) Peak Hour – Other Background Developments Trips

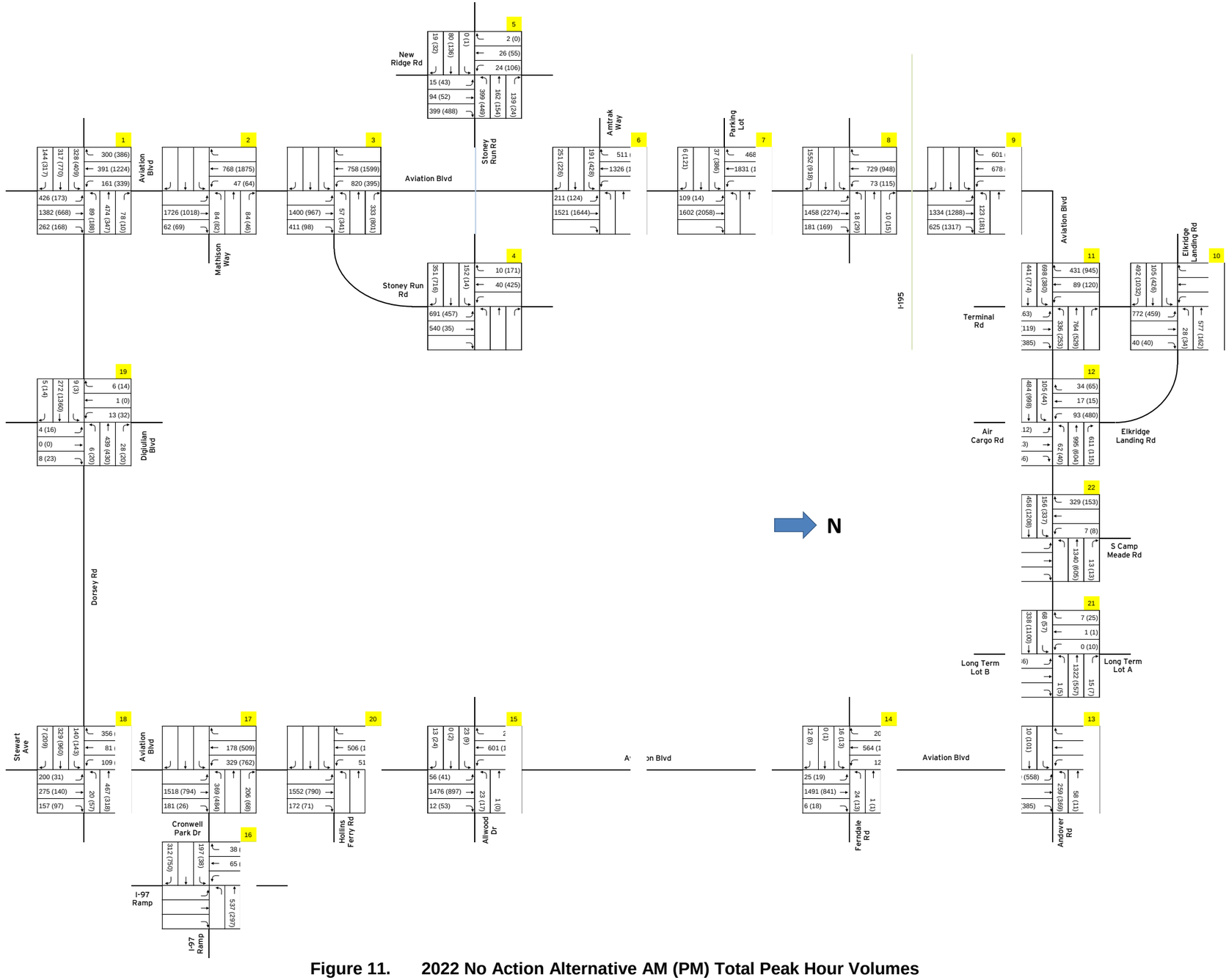


Figure 11. 2022 No Action Alternative AM (PM) Total Peak Hour Volumes

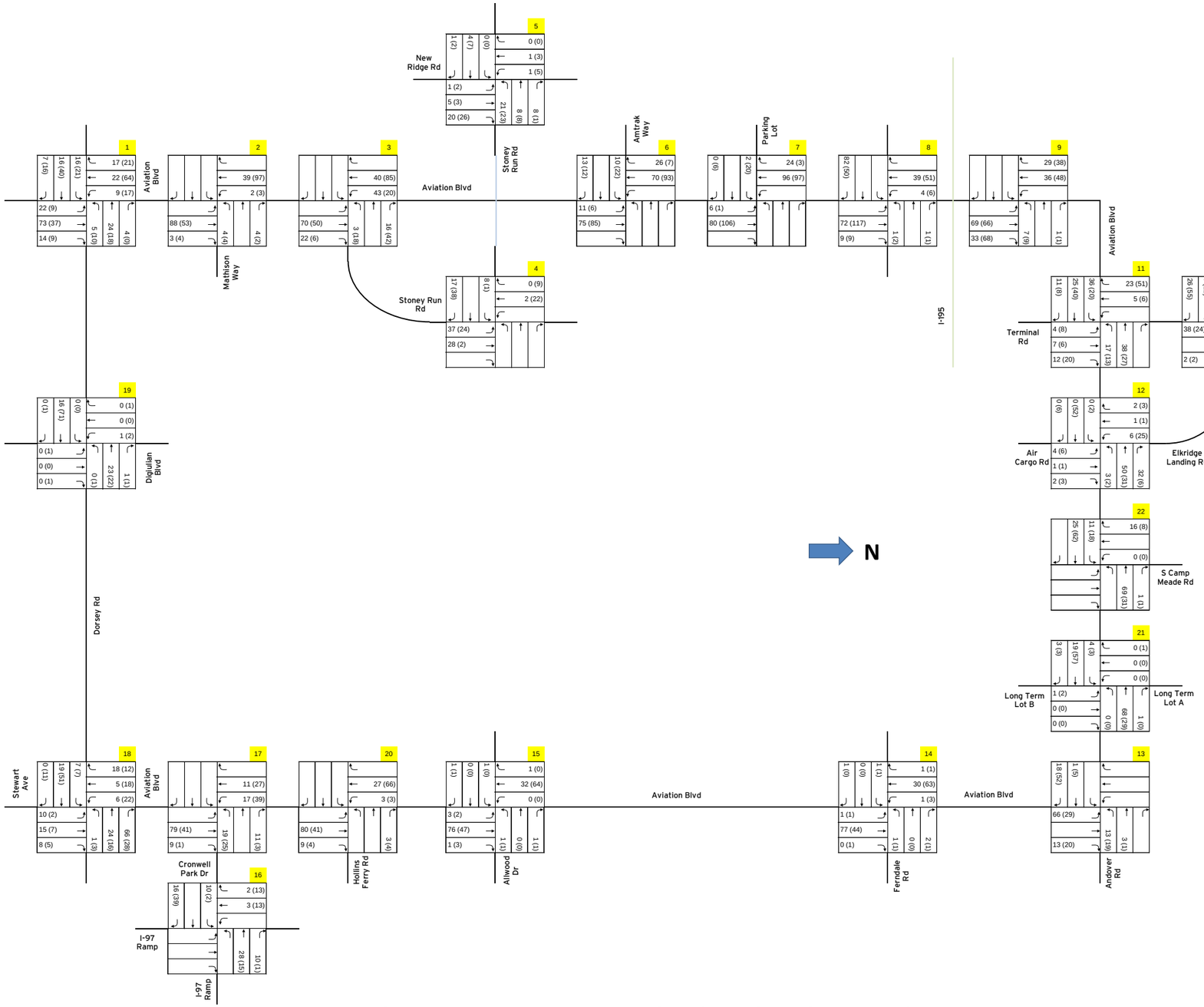


Figure 12. 2022 to 2027 No Action Alternative Volume Growth

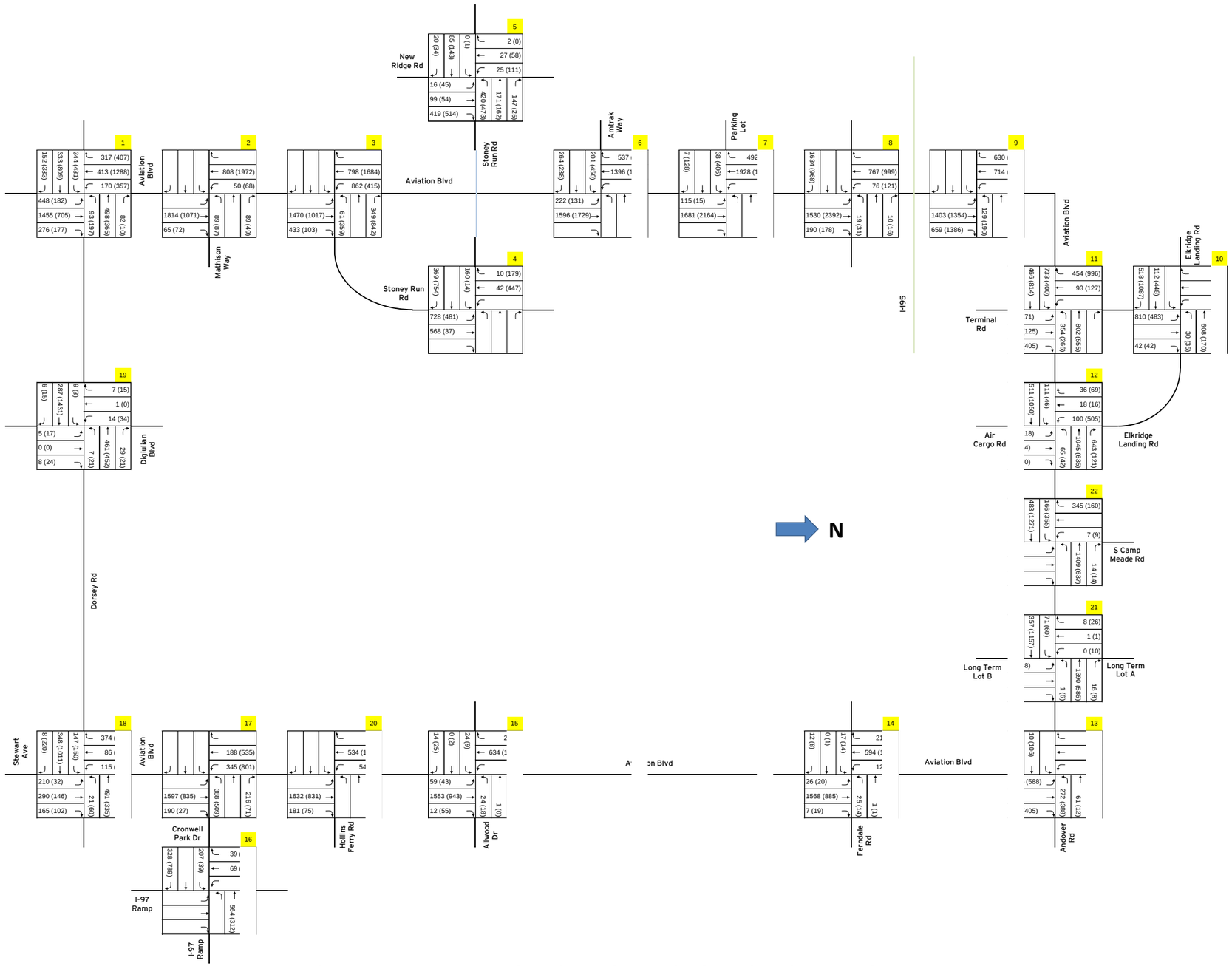


Figure 13. 2027 No Action Alternative AM (PM) Total Peak Hour Volumes

3.2 2022 No Action Alternative Operational Analysis

This section presents the results and findings of the 2022 No Action Alternative operational analyses, consistent with the methodology used for the Existing Conditions, as discussed in **Section 2.2.1**.

Synchro Analysis

Table 36 and **Table 37** show the AM and PM peak hour delay and LOS for the 2022 No Action Condition. **Appendix B** presents detailed HCM reports from Synchro. Consistent with the Existing Conditions methodology discussed in **Section 2.2.2,** the LOS for Intersection 8 (Aviation Blvd at I-195 SB Ramps) was calculated outside of Synchro.

Table 36
2022 No Action Alternative AM Peak Hour Intersection LOS - Synchro

Intersection		Control	Delay (sec/veh)	Equivalent LOS
1	Aviation Blvd at Dorsey Rd - West	S	85.4	F
2	Aviation Blvd at Mathison Way	S	13.4	B
3	Aviation Blvd at Stoney Run Rd	S	35.5	D
4	Stoney Run Rd at Northrop Grumman Entrance	S	19.8	B
5	Stoney Run Rd at New Ridge Rd	S	39.3	D
6	Aviation Blvd at Amtrak Way	S	17.1	B
7	Aviation Blvd at Northrop Grumman Gate 1A	S	9.6	A
8	Aviation Blvd at SB I-195 Ramps	S	4.5	A
9	Aviation Blvd at NB I-195 Ramps	S	6.8	A
10	Elkridge Landing Rd at Terminal Rd	S	23.1	C
11	Aviation Blvd at Terminal Rd	S	28.0	C
12	Aviation Blvd at Air Cargo Dr	S	14.0	B
13	Aviation Blvd at Andover Rd	S	15.3	B
14	Aviation Blvd at Aaronson Dr	U	6.7	A
15	Aviation Blvd at Allwood Dr	S	6.5	A
16	SB I-97 Ramps at Cromwell Park Dr	S	15.8	B
17	Aviation Blvd at Cromwell Park Dr	S	24.3	C
18	Aviation Blvd at Dorsey Rd - East	S	24.0	C
19	Dorsey Rd at Digiulian Blvd	U	0.7	A
20	Aviation Blvd at Hollins Ferry Rd	S	2.3	A
21	Aviation Blvd at BWI Long Term Parking Lots	S	5.7	A
22	Aviation Blvd at S. Camp Meade Rd	S	3.8	A

Note: S = signalized; U = unsignalized

Source: HCM reports (in Appendix B) from HNTB's Synchro analysis of 2022 No Action Conditions.

Table 37
2022 No Action Alternative PM Peak Hour Intersection LOS - Synchro

Intersection		Control	Delay (sec/veh)	Equivalent LOS
1	Aviation Blvd at Dorsey Rd - West	S	72.6	E
2	Aviation Blvd at Mathison Way	S	6.6	A
3	Aviation Blvd at Stoney Run Rd	S	24.6	C
4	Stoney Run Rd at Northrop Grumman Entrance	S	40.1	D
5	Stoney Run Rd at New Ridge Rd	S	52.4	D
6	Aviation Blvd at Amtrak Way	S	48.7	D
7	Aviation Blvd at Northrop Grumman Gate 1A	S	13.7	B
8	Aviation Blvd at SB I-195 Ramps	S	14.2	B
9	Aviation Blvd at NB I-195 Ramps	S	31.2	C
10	Elkridge Landing Rd at Terminal Rd	S	12.7	B
11	Aviation Blvd at Terminal Rd	S	19.7	B
12	Aviation Blvd at Air Cargo Dr	S	53.8	D
13	Aviation Blvd at Andover Rd	S	14.3	B
14	Aviation Blvd at Aaronson Dr	U	2.1	A
15	Aviation Blvd at Allwood Dr	S	3.8	A
16	SB I-97 Ramps at Cromwell Park Dr	S	26.6	C
17	Aviation Blvd at Cromwell Park Dr	S	30.8	C
18	Aviation Blvd at Dorsey Rd - East	S	29.3	C
19	Dorsey Rd at Digiulian Blvd	U	2.4	A
20	Aviation Blvd at Hollins Ferry Rd	S	1.5	A
21	Aviation Blvd at BWI Long Term Parking Lots	S	6.9	A
22	Aviation Blvd at S. Camp Meade Rd	S	6.9	A

Note: S = signalized; U = unsignalized

Source: HCM reports (in Appendix B) from HNTB's Synchro analysis of 2022 No Action Conditions.

Table 38 presents the list of movements where the 50th and/or 95th percentile queue lengths exceed the storage lengths of the respective turn bays for the 2022 No Action Alternative. **Appendix B** presents full queue tables as part of the Synchro MOE tables.

Table 38
2022 No Action Turn Movement Queues Exceeding Storage Length

Intersection		Movement	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
AM Peak Hour					
1	Aviation Blvd at Dorsey Rd - West	NBL	455	503	#753
		NBR	250	-	268
		SBL	250	-	308
		EBL	175	~447	#753
5	Stoney Run Rd at New Ridge Rd	WBL	300	328	#519
13	Aviation Blvd at Andover Rd	SBL	175	-	198
PM Peak Hour					
1	Aviation Blvd at Dorsey Rd - West	SBL	250	403	#711
		SBR	175	285	475
		EBL	175	397	#698
		EBR	225	-	346
		WBL	200	-	250
4	Stoney Run Rd at Northrop Grumman Entrance	SBR	85	-	175
5	Stoney Run Rd at New Ridge Rd	WBL	300	422	#753
13	Aviation Blvd at Andover Rd	SBL	175	-	223

Notes:
Queues that are within the turn bay storage length of the movement are excluded
m : Volume for the 95th percentile queue is metered by upstream signal
~ : Volume exceed capacity, queue is theoretically infinite
# : 95th percentile volume exceeds capacity, queue may be longer
- : Queues are within storage

CLV Analysis

Table 39 and **Table 40** present the CLV, equivalent LOS and V/C ratio for the AM and PM peak hours respectively. The **Appendix C** details CLV analysis.

Table 39
2022 No Action Alternative AM Peak Hour Intersection LOS - CLV

Intersection		CLV	Equivalent LOS	V/C
1	Aviation Blvd at Dorsey Rd - West	1,473	E	0.92
2	Aviation Blvd at Mathison Way	1,047	B	0.65
3	Aviation Blvd at Stoney Run Rd	1,234	C	0.77
4	Stoney Run Rd at Northrop Grumman Entrance	732	A	0.46
5	Stoney Run Rd at New Ridge Rd	612	A	0.38
6	Aviation Blvd at Amtrak Way	1,105	B	0.69
7	Aviation Blvd at Northrop Grumman Parking	1,100	B	0.69
8	Aviation Blvd at I-195 SB Ramps	864	A	0.54
9	Aviation Blvd at I-195 NB Ramps	830	A	0.52
10	Elkridge Landing Rd at Terminal Rd	1,078	B	0.67
11	Aviation Blvd at Terminal Rd	909	A	0.57
12	Aviation Blvd at Air Cargo Rd	812	A	0.51
13	Aviation Blvd at Andover Rd	947	A	0.59
15	Aviation Blvd at Allwood Dr	857	A	0.54
16	I-97 SB Ramps at Cromwell Park Dr	424	A	0.26
17	Aviation Blvd at Cromwell Park Dr	879	A	0.55
18	Aviation Blvd at Dorsey Rd - East	833	A	0.52
20	Aviation Blvd at Hollins Ferry Rd	625	A	0.39
21	Aviation Blvd at BWI Long Term Parking Lots	793	A	0.50
22	Aviation Blvd at Camp Meade Rd	1,039	B	0.65

Source: HNTB's CLV analysis of 2022 No Action Conditions
Includes signalized intersections only

Table 40
2022 No Action Alternative PM Peak Hour Intersection LOS – CLV

Intersection		CLV	Equivalent LOS	V/C
1	Aviation Blvd at Dorsey Rd - West	1,418	D	0.89
2	Aviation Blvd at Mathison Way	1,076	B	0.67
3	Aviation Blvd at Stoney Run Rd	1,188	C	0.74
4	Stoney Run Rd at Northrop Grumman Entrance	681	A	0.43
5	Stoney Run Rd at New Ridge Rd	786	A	0.49
6	Aviation Blvd at Amtrak Way	1,489	E	0.93
7	Aviation Blvd at Northrop Grumman Parking	1,295	C	0.81
8	Aviation Blvd at I-195 SB Ramps	1,350	D	0.84
9	Aviation Blvd at I-195 NB Ramps	864	A	0.54
10	Elkridge Landing Rd at Terminal Rd	718	A	0.45
11	Aviation Blvd at Terminal Rd	694	A	0.43
12	Aviation Blvd at Air Cargo Rd	1,174	C	0.73
13	Aviation Blvd at Andover Rd	905	A	0.57
15	Aviation Blvd at Allwood Dr	735	A	0.46
16	I-97 SB Ramps at Cromwell Park Dr	633	A	0.40
17	Aviation Blvd at Cromwell Park Dr	832	A	0.52
18	Aviation Blvd at Dorsey Rd - East	770	A	0.48
20	Aviation Blvd at Hollins Ferry Rd	354	A	0.22
21	Aviation Blvd at BWI Long Term Parking Lots	625	A	0.39
22	Aviation Blvd at Camp Meade Rd	666	A	0.42

Source: HNTB's CLV analysis of 2022 No Action Conditions
Includes signalized intersections only

Findings

The Synchro analysis indicates that minimal changes to intersection LOS are expected under the 2022 No Action Alternative. Except for Intersection 1 (Aviation Blvd at Dorsey Rd - West), all other intersections operate at LOS D or better during both peak periods. Intersection 1 operates at LOS F and E in the AM and PM peaks respectively. Queues for turning movements are contained within the respective turn bays except for intersections:

- 1 (Aviation Blvd/MD 170 at Dorsey Rd/MD 176 – West)
- 4 (Stoney Run Rd at Northrop Grumman Entrance)
- 5 (Stoney Run Rd at New Ridge Rd) and
- 13 (Aviation Blvd/MD 162 at Andover Rd)

Based on the CLV methodology, all locations operate at LOS D or better during both peak periods, except the two intersections below, which degrade to LOS E:

- 1 (Aviation Blvd/MD 170 at Dorsey Rd/MD 176 – West) in the AM peak
- 6 (Aviation Blvd/MD 170 at Amtrak Way/MD 955) in the PM peak

There are intersections where the Synchro and CLV results vary by more than one LOS category/level. As discussed in **Section 2.2.2,** these differences can be generally attributed to long signal cycle lengths.

3.3 2027 No Action Alternative Operational Analysis

This section presents the results and findings of the 2027 No Action Alternative operational analyses, consistent with the methodology used for the Existing Conditions, as discussed in **Section 2.2.1**.

Synchro Analysis

Table 41 and **Table 42** present the respective AM and PM peak hour delay and LOS for the 2027 No Action Conditions. **Appendix B** presents detailed HCM reports from Synchro. Consistent with the Existing Conditions discussed in **Section 2.2.2,** the LOS for Intersection 8 (Aviation Blvd/MD 170 at I-195 SB Ramps) was calculated outside of Synchro.

Table 41
2027 No Action Alternative AM Peak Hour Intersection LOS - Synchro

Intersection		Control	Delay (sec/veh)	Equivalent LOS
1	Aviation Blvd at Dorsey Rd - West	S	96.6	F
2	Aviation Blvd at Mathison Way	S	14.5	B
3	Aviation Blvd at Stoney Run Rd	S	45.9	D
4	Stoney Run Rd at Northrop Grumman Entrance	S	20.5	C
5	Stoney Run Rd at New Ridge Rd	S	39.7	D
6	Aviation Blvd at Amtrak Way	S	18.0	B
7	Aviation Blvd at Northrop Grumman Gate 1A	S	10.4	B
8	Aviation Blvd at SB I-195 Ramps	S	5.3	A
9	Aviation Blvd at NB I-195 Ramps	S	6.9	A
10	Elkridge Landing Rd at Terminal Rd	S	25.1	C
11	Aviation Blvd at Terminal Rd	S	29.0	C
12	Aviation Blvd at Air Cargo Dr	S	15.0	B
13	Aviation Blvd at Andover Rd	S	15.9	B
14	Aviation Blvd at Aaronson Dr	U	9.6	A
15	Aviation Blvd at Allwood Dr	S	6.8	A
16	SB I-97 Ramps at Cromwell Park Dr	S	16.0	B
17	Aviation Blvd at Cromwell Park Dr	S	26.1	C
18	Aviation Blvd at Dorsey Rd - East	S	27.2	C
19	Dorsey Rd at Digiulian Blvd	U	0.7	A
20	Aviation Blvd at Hollins Ferry Rd	S	2.4	A
21	Aviation Blvd at BWI Long Term Parking Lots	S	5.9	A
22	Aviation Blvd at S. Camp Meade Rd	S	4.1	A

Note: S = signalized; U = unsignalized

Source: HCM reports (in Appendix B) from HNTB's Synchro analysis of 2027 No Action Conditions.

Table 42
2027 No Action Alternative PM Peak Hour Intersection LOS - Synchro

Intersection		Control	Delay (sec/veh)	Equivalent LOS
1	Aviation Blvd at Dorsey Rd - West	S	85.4	F
2	Aviation Blvd at Mathison Way	S	6.9	A
3	Aviation Blvd at Stoney Run Rd	S	26.5	C
4	Stoney Run Rd at Northrop Grumman Entrance	S	50.0	D
5	Stoney Run Rd at New Ridge Rd	S	56.0	E
6	Aviation Blvd at Amtrak Way	S	65.3	E
7	Aviation Blvd at Northrop Grumman Gate 1A	S	16.1	B
8	Aviation Blvd at SB I-195 Ramps	S	22.1	C
9	Aviation Blvd at NB I-195 Ramps	S	39.4	D
10	Elkridge Landing Rd at Terminal Rd	S	13.4	B
11	Aviation Blvd at Terminal Rd	S	20.1	C
12	Aviation Blvd at Air Cargo Dr	S	58.6	E
13	Aviation Blvd at Andover Rd	S	15.0	B
14	Aviation Blvd at Aaronson Dr	U	3.5	A
15	Aviation Blvd at Allwood Dr	S	3.6	A
16	SB I-97 Ramps at Cromwell Park Dr	S	25.9	C
17	Aviation Blvd at Cromwell Park Dr	S	31.5	C
18	Aviation Blvd at Dorsey Rd - East	S	31.2	C
19	Dorsey Rd at Digiulian Blvd	U	3.0	A
20	Aviation Blvd at Hollins Ferry Rd	S	1.5	A
21	Aviation Blvd at BWI Long Term Parking Lots	S	8.0	A
22	Aviation Blvd at S. Camp Meade Rd	S	7.5	A

Note: S = signalized; U = unsignalized

Source: HCM reports (in Appendix B) from HNTB's Synchro analysis of 2027 No Action Conditions.

Table 43 presents the list of movements where the 50th and/or 95th percentile queue lengths exceed the storage lengths of the respective turn bays for the 2027 No Action Alternative. **Appendix B** presents full queue tables as part of the Synchro MOE tables.

Table 43
2027 No Action Turn Movement Queues Exceeding Storage Length

	Intersection	Movement	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
AM Peak Hour					
1	Aviation Blvd at Dorsey Rd - West	NBL	455	555	#831
		NBR	250	-	292
		SBL	250	-	324
		EBL	175	~513	#810
5	Stoney Run Rd at New Ridge Rd	WBL	300	354	#588
11	Aviation Blvd at Terminal Rd	EBL	445	-	#487
13	Aviation Blvd at Andover Rd	SBL	175	-	204
PM Peak Hour					
1	Aviation Blvd at Dorsey Rd - West	SBL	250	~462	#782
		SBR	175	321	527
		EBL	175	~473	#785
		EBR	225	-	381
		WBL	200	-	270
4	Stoney Run Rd at Northrop Grumman Entrance	SBR	85	-	185
5	Stoney Run Rd at New Ridge Rd	WBL	300	460	#822
13	Aviation Blvd at Andover Rd	SBL	175	-	231

Notes:
Queues that are within the turn bay storage length of the movement are excluded
m : Volume for the 95th percentile queue is metered by upstream signal
~ : Volume exceed capacity, queue is theoretically infinite
# : 95th percentile volume exceeds capacity, queue may be longer
- : Queues are within storage

CLV Analysis

Table 44 and **Table 45** show the respective AM and PM peak hour CLV, equivalent LOS and V/C ratio. **Appendix C** presents the detailed CLV analysis.

Table 44
2027 No Action Alternative AM Peak Hour Intersection LOS - CLV

Intersection		CLV	Equivalent LOS	V/C
1	Aviation Blvd at Dorsey Rd - West	1,550	E	0.97
2	Aviation Blvd at Mathison Way	1,100	B	0.69
3	Aviation Blvd at Stoney Run Rd	1,296	C	0.81
4	Stoney Run Rd at Northrop Grumman Entrance	770	A	0.48
5	Stoney Run Rd at New Ridge Rd	644	A	0.40
6	Aviation Blvd at Amtrak Way	1,163	C	0.73
7	Aviation Blvd at Northrop Grumman Parking	1,157	C	0.72
8	Aviation Blvd at I-195 SB Ramps	906	A	0.57
9	Aviation Blvd at I-195 NB Ramps	873	A	0.55
10	Elkridge Landing Rd at Terminal Rd	1,132	B	0.71
11	Aviation Blvd at Terminal Rd	955	A	0.60
12	Aviation Blvd at Air Cargo Rd	855	A	0.53
13	Aviation Blvd at Andover Rd	996	A	0.62
15	Aviation Blvd at Allwood Dr	902	A	0.56
16	I-97 SB Ramps at Cromwell Park Dr	445	A	0.28
17	Aviation Blvd at Cromwell Park Dr	924	A	0.58
18	Aviation Blvd at Dorsey Rd - East	876	A	0.55
20	Aviation Blvd at Hollins Ferry Rd	658	A	0.41
21	Aviation Blvd at BWI Long Term Parking Lots	834	A	0.52
22	Aviation Blvd at Camp Meade Rd	1,092	B	0.68

Source: HNTB's CLV analysis of 2027 No Action Conditions
Includes signalized intersections only

Table 45
2027 No Action Alternative PM Peak Hour Intersection LOS - CLV

Intersection		CLV	Equivalent LOS	V/C
1	Aviation Blvd at Dorsey Rd - West	1,492	E	0.93
2	Aviation Blvd at Mathison Way	1,132	B	0.71
3	Aviation Blvd at Stoney Run Rd	1,252	C	0.78
4	Stoney Run Rd at Northrop Grumman Entrance	716	A	0.45
5	Stoney Run Rd at New Ridge Rd	826	A	0.52
6	Aviation Blvd at Amtrak Way	1,567	E	0.98
7	Aviation Blvd at Northrop Grumman Parking	1,362	D	0.85
8	Aviation Blvd at I-195 SB Ramps	1,419	D	0.89
9	Aviation Blvd at I-195 NB Ramps	908	A	0.57
10	Elkridge Landing Rd at Terminal Rd	756	A	0.47
11	Aviation Blvd at Terminal Rd	730	A	0.46
12	Aviation Blvd at Air Cargo Rd	1,235	C	0.77
13	Aviation Blvd at Andover Rd	952	A	0.59
15	Aviation Blvd at Allwood Dr	774	A	0.48
16	I-97 SB Ramps at Cromwell Park Dr	666	A	0.42
17	Aviation Blvd at Cromwell Park Dr	875	A	0.55
18	Aviation Blvd at Dorsey Rd - East	809	A	0.51
20	Aviation Blvd at Hollins Ferry Rd	372	A	0.23
21	Aviation Blvd at BWI Long Term Parking Lots	658	A	0.41
22	Aviation Blvd at Camp Meade Rd	701	A	0.44

Source: HNTB's CLV analysis of 2027 No Action Conditions
Includes signalized intersections only

Findings

The Synchro analysis indicates that Intersection 1 (Aviation Blvd/MD 170 at Dorsey Rd/MD 176 – West) operates at LOS F during both peak periods. Three intersections operate at LOS E in the PM peak period: Intersection 5 (Stoney Run Rd at New Ridge Rd), Intersection 6 (Aviation Blvd/MD 170 at Amtrak Way/MD 995), and Intersection 12 (Aviation Blvd at Air Cargo Dr). All other intersections operate at LOS D or better during both peak periods. Queues for turning movements are contained within the respective turn bays except for intersections:

- 1 (Aviation Blvd/MD 170 at Dorsey Rd/ MD 176 – West)
- 4 (Stoney Run Rd at Northrop Grumman Entrance)
- 5 (Stoney Run Rd at New Ridge Rd)
- 11(Aviation Blvd/MD 170 at Terminal Rd) and
- 13 (Aviation Blvd/MD 162 at Andover Rd).

Based on the CLV methodology, all locations operate at LOS D or better during both peak periods, except the two intersections below, which degrade to LOS E:

- 1 (Aviation Blvd/MD 170 at Dorsey Rd/MD 176 – West) during both peak periods
- 6 (Aviation Blvd/MD 170 at Amtrak Way/MD 955) in the PM peak

There are intersections where the Synchro and CLV results vary by more than one LOS category/level. As discussed in **Section 2.2.2,** these differences can be generally attributed to long signal cycle lengths.

4 Proposed Action Alternative (2022 and 2027)

The primary components of the proposed improvements include a new airline maintenance facility, second Fixed Based Operator (FBO) facility, relocated fire training facility, and new field maintenance storage facility. The location of these facilities are as follows:

- Airline Maintenance Facility: East of Intersection 4 (Stoney Run at Northrop Grumman Entrance).
- Second FBO: Along Aaronson Dr. This site is presently part of Long Term Parking Lot B.
- Fire Training Facility: West of Intersection 17 (Aviation Blvd/MD 162 at Cromwell Park Dr).
- Field Maintenance Facility: North of Intersection 19 (Dorsey Rd/MD 176 at Digiulian Blvd).

Figure 1 shows the locations of the proposed facilities. It also presents the study area intersections (with intersection ID) selected in coordination with MD SHA.

4.1 Volume Development

4.1.1 Trip Generation and Distribution

New trips anticipated to be generated by the four planned facilities were developed based on the ITE Trip Generation Manual, 9th Edition and specific input provided by MAA regarding the planned use of airport development. The specific ITE trip generation information is presented in **Appendix F**. **Table 46** summarizes the resulting trip generation in the AM and PM peak hours for the new facilities and the primary source of information used to estimate trips generated by each proposed development. Trips were generated independently for each facility. The specific trip generation assumptions and methodologies used for each facility are discussed in further detail below. As identified in the Existing Conditions analysis, the AM and PM peak hours for the study area are 7:00 AM to 8:00 AM and 4:30 PM to 5:30 PM, respectively.

Table 46
Trip Generation Summary

Facility	Trip Generation Method	AM Peak Hour Trips		PM Peak Hour Trips	
		IN	OUT	IN	OUT
Airline Maintenance	MAA Input, Industry Assumptions	10	85	10	10
Fixed Base Operator	ITE Manual	11	10	13	13
Fire Training	MAA Input	1	1	1	1
Field Maintenance	MAA Input	10	10	10	10
TOTAL		**32**	**106**	**34**	**34**

Study area entry and exit points were chosen for each facility based on coordination with MAA concerning future plans and engineering judgment. The main consideration for selecting entry and exit points was access to major highways around the airport. Trips were distributed to these points in proportion to the 2022 No Action Alternative volumes exiting the respective intersections.

Airline Maintenance Facility

Based on cursory research of a sampling of other U.S. airline maintenance facilities, the following assumptions were made for BWI's proposed 550,000 square foot airline maintenance facility. The facility is estimated to employ 150 workers over three shifts. The first and main shift would be from 10:00 PM to 7:00 AM to provide overnight maintenance during hours when aircrafts are not scheduled to fly. A secondary shift would occur from 2:00 PM to 11:00 PM. Some workers will be on-hand between the primary and secondary shifts. Thirty personnel (20 percent of the employees) are assumed to be off-duty each day to allow for the facility to be operational seven days per week. Deliveries would generally be scheduled in the off-peak hours. However, it is assumed that a total of 10 trips for deliveries and visitors would occur in each peak hour. **Table 47** presents the trip generation for the facility.

Table 47
Airline Maintenance Facility Trip Generation – Shifts

Shift	Time	Employees	AM Peak Hour Trips		PM Peak Hour Trips	
			IN	OUT	IN	OUT
A	10:00 PM to 7:00 AM	75	0	75	0	0
B	6:00 AM to 3:00 PM	15	0	0	0	0
C	2:00 PM to 11:00 PM	30	0	0	0	0
Deliveries			10	10	10	10
TOTAL			**10**	**85**	**10**	**10**

The new Airline Maintenance Facility will be located east of Intersection 4 (Stoney Run Rd at Northrop Grumman Entrance), and this intersection will provide access to the facility. **Table 48** and **Figure 15** present the trip distribution for the study area entry and exit points.

Table 48
Airline Maintenance Facility Trip Distribution

Intersection		AM Peak		PM Peak	
		In	Out	In	Out
1	Aviation Blvd at Dorsey Rd – West	20%	10%	10%	20%
5	Stoney Run at New Ridge Rd	20%	20%	30%	30%
8/9	Aviation Blvd at I-195	40%	30%	30%	30%
10	Elkridge Landing Rd at Terminal Rd	10%	35%	20%	10%
22	Aviation Blvd at S Camp Meade Rd	10%	5%	10%	10%
	TOTAL	100%	100%	100%	100%

Second Fixed Based Operator Facility

The proposed second fixed based operator (FBO) facility is planned, per MAA, to house a maximum of 50 general aviation aircraft. The FBO will provide facilities for general aviation pilots and house their aircraft when not in use. It will also provide facilities for itinerant aircraft which are based at other facilities, when their pilots fly into BWI. As such, *Land Use 022: General Aviation Airport* from the ITE Trip Generation Manual was utilized to forecast new trips for the new FBO facility. Trip generation for the second FBO facility is shown in **Table 49**.

Table 49
Fixed Base Operator Trip Generation

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	OUT	IN	OUT
Trips per Based Aircraft	0.41		0.52	
Directional Distribution	*50%*	*50%*	*55%*	*45%*
Trips per Direction	*0.21*	*0.21*	*0.29*	*0.23*
Based Aircraft	50		50	
Total Trips Generated	**11**	**10**	**15**	**11**

The new FBO will be located along Aaronson Dr. This site is presently a part of Long Term Parking Lot B. As such, vehicles will access this facility at Intersection 14 (Aviation Blvd/MD 162 at Aaronson Dr), the same as the access to the existing FBO. **Table 50** and **Figure 16** present the trip distribution to study area entry and exit points for the facility.

Table 50
Second FBO Trip Distribution

Intersection		AM Peak		PM Peak	
		In	Out	In	Out
8/9	Aviation Blvd at I-195	25%	30%	15%	45%
13	Aviation Blvd at Andover Rd	20%	10%	15%	25%
18	Aviation Blvd at Dorsey Rd – East	20%	30%	25%	15%
8/9	Aviation Blvd at I-195	35%	30%	45%	15%
☐	**TOTAL**	100%	100%	100%	100%

To accommodate the new facility, all parking spaces within Section B3 will be removed from Long Term Parking Lot B as shown on **Figure 14**. These removed spaces will not be replaced. As such, trips in and out of Long Term Parking Lot B will be redistributed to Parking Lot A in proportion to the area that will be removed as presented in **Table 51**. Parking Lot A's primary access is located on Aviation Blvd/MD 162 opposite Parking Lot B. As such, trips will remain on Aviation Blvd/MD 162. It was assumed that the same amount of traffic would access the long-term parking lots with the primary difference being the turning volume at Intersection 21 (Aviation Blvd/MD 170 at BWI Long Term Parking Lots). This change is accounted for in the intersection analysis.

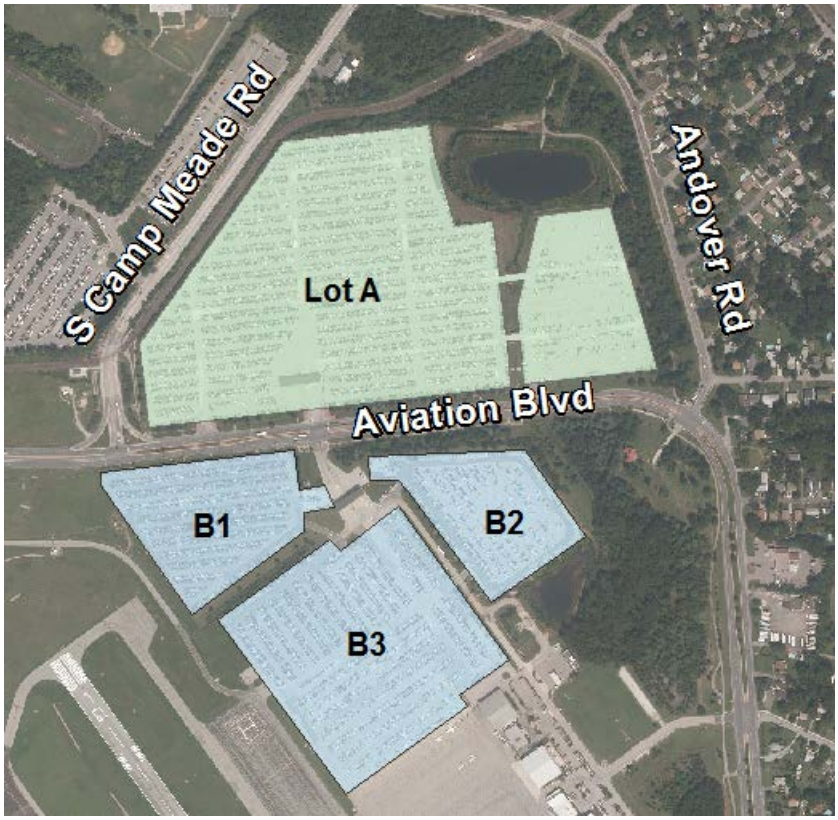


Figure 14. BWI Long Term Parking Lots

Table 51
BWI Long Term Parking – Breakout of Lot B

Section	Area (square feet)	Area Distribution
B1	388,500	25%
B2	326,700	21%
B3	816,400	53%
TOTAL	**1,531,600**	**100%**

Note: Numbers may not add up to 100% due to rounding.

Relocated Fire Training Facility

The facility is expected to be used on an as-needed, infrequent basis for fire training during the workday. Aside from a patrol car checking external access points once per hour, the facility is not expected to generate additional peak-hour trips. **Table 52** presents the trip generation for this facility.

Table 52
Fire Training Facility Trip Generation

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Patrol Car	1	1	1	1

The relocated fire training facility will be situated east of Intersection 17 (Aviation Blvd/MD 162 at Cromwell Park Dr). Its current location is along Mathison Way east of Intersection 2 (Aviation Blvd/MD 170 at Mathison Way). External access to the new facility will be provided through Intersection 17 (Aviation Blvd/MD 162 at Cromwell Park Dr). It was assumed that the patrol car would visit this facility as part of its regular rounds traversing the exterior of the airport. Therefore, the facility does not generate trips along other parts of the network during the peak hours. **Figure 17** presents the trip distribution for this facility is presented**..**

Field Maintenance Facility

The field maintenance facility will be used primarily to store snow removal equipment and as a result will primarily be accessed internally to the airport from the airside. It was assumed that street side access by employees would not exceed 10 inbound and 10 outbound trips during each peak period. The trip generation for this facility is presented in **Table 53**.

Table 53
Field Maintenance Facility Trip Generation

	AM Peak Hour Trips		PM Peak Hour Trips	
	IN	**OUT**	**IN**	**OUT**
Employees	10	10	10	10

The field maintenance facility will be located at the northern end of Digiulian Blvd. As such, vehicles are expected to access the facility using Intersection 19 (Dorsey Rd/MD 176 at Digiulian Blvd). **Table 54** and **Figure 18** presents the trip distribution to study area entry and exit points for the facility.

Table 54
Field Maintenance Facility Trip Distribution

Intersection		AM Peak		PM Peak	
		In	Out	In	Out
1	Aviation at Dorsey Rd - West	30%	30%	10%	30%
16	SB I-97 Ramps at Cromwell Park Dr	30%	-	40%	-
18	Aviation Blvd at Dorsey Rd – East	40%	70%	50%	70%
	TOTAL	100%	100%	100%	100%

4.1.2 2022 Traffic Volumes

Figure 19 presents the combined trip distribution for the four planned facilities. The 2022 Proposed Action Alternative traffic volumes were projected by layering the site-specific trips generated by the proposed facilities onto the 2022 No Action volumes. **Figure 20** presents the trip distribution for the 2022 Proposed Action Alternative.

4.1.3 2027 Traffic Volumes

The 2022 volumes from four planned developments were layered onto the 2027 No Action Alternative volumes to produce the 2027 Proposed Action Alternative volume projections. It was assumed the trip generations are dependent on facility employment/size and are independent of population growth. Thus, the 2022 volumes from the planned developments were not adjusted. **Figure 21** presents the traffic volumes for the 2027 Proposed Action Alternative.

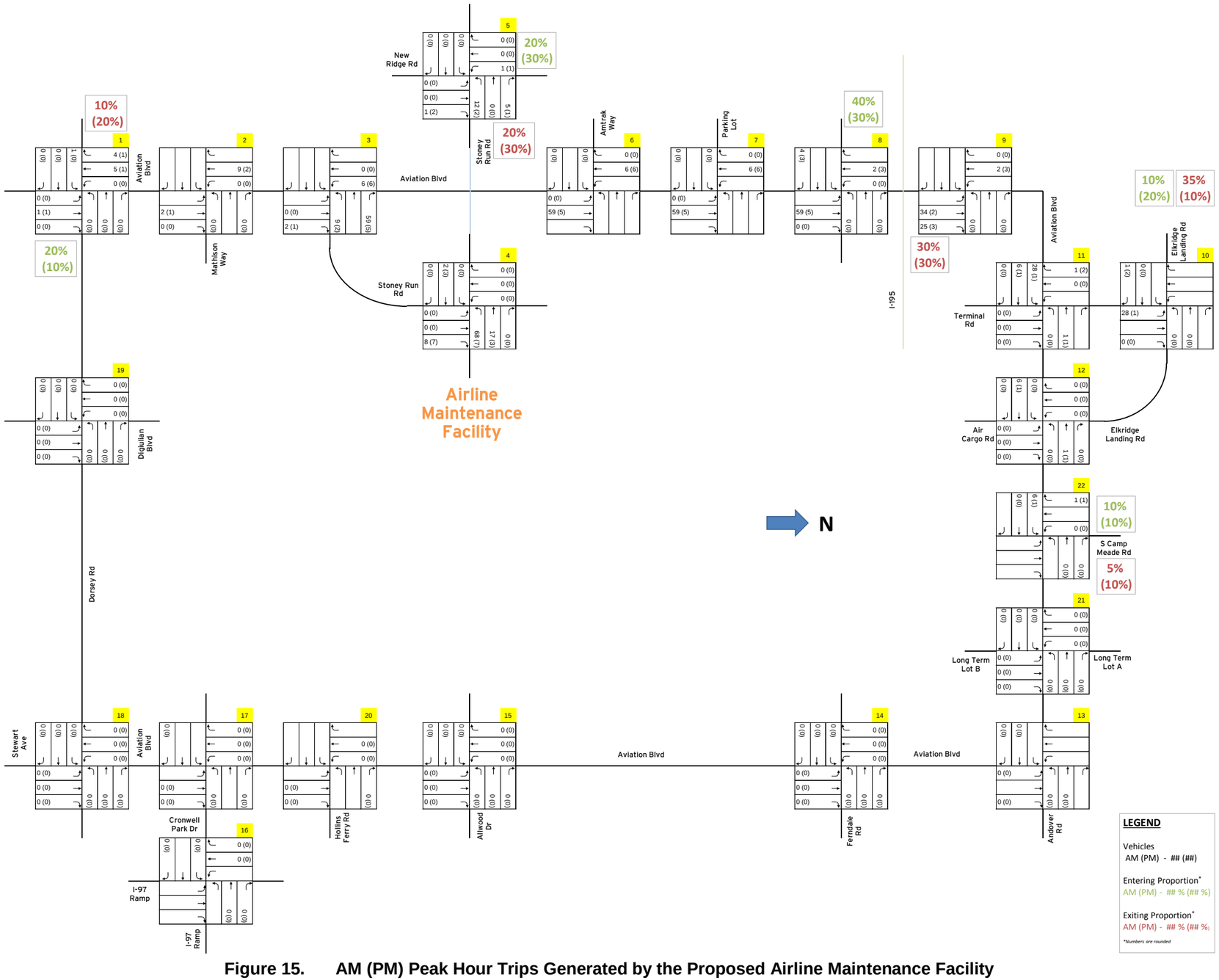


Figure 15. AM (PM) Peak Hour Trips Generated by the Proposed Airline Maintenance Facility

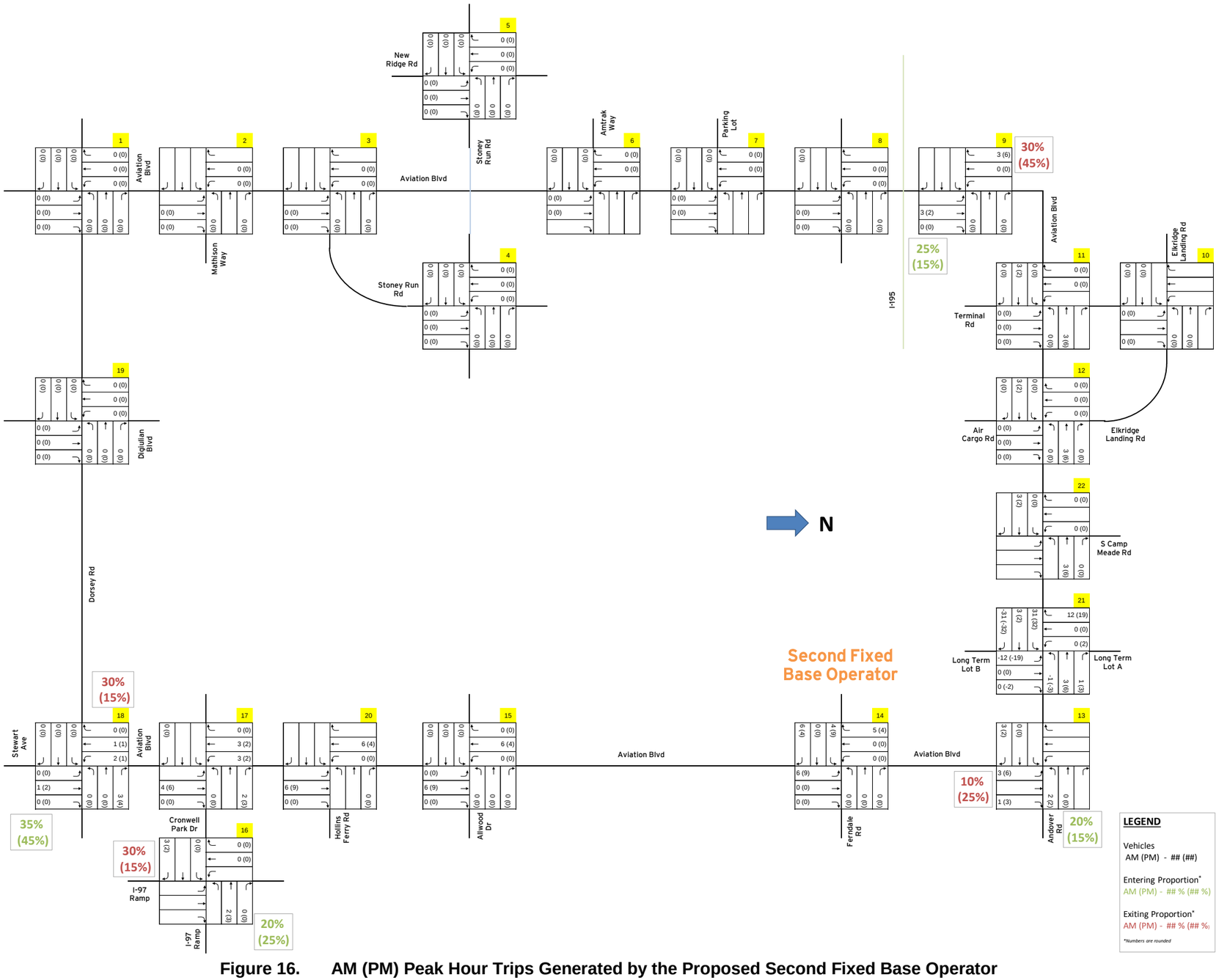


Figure 16. AM (PM) Peak Hour Trips Generated by the Proposed Second Fixed Base Operator

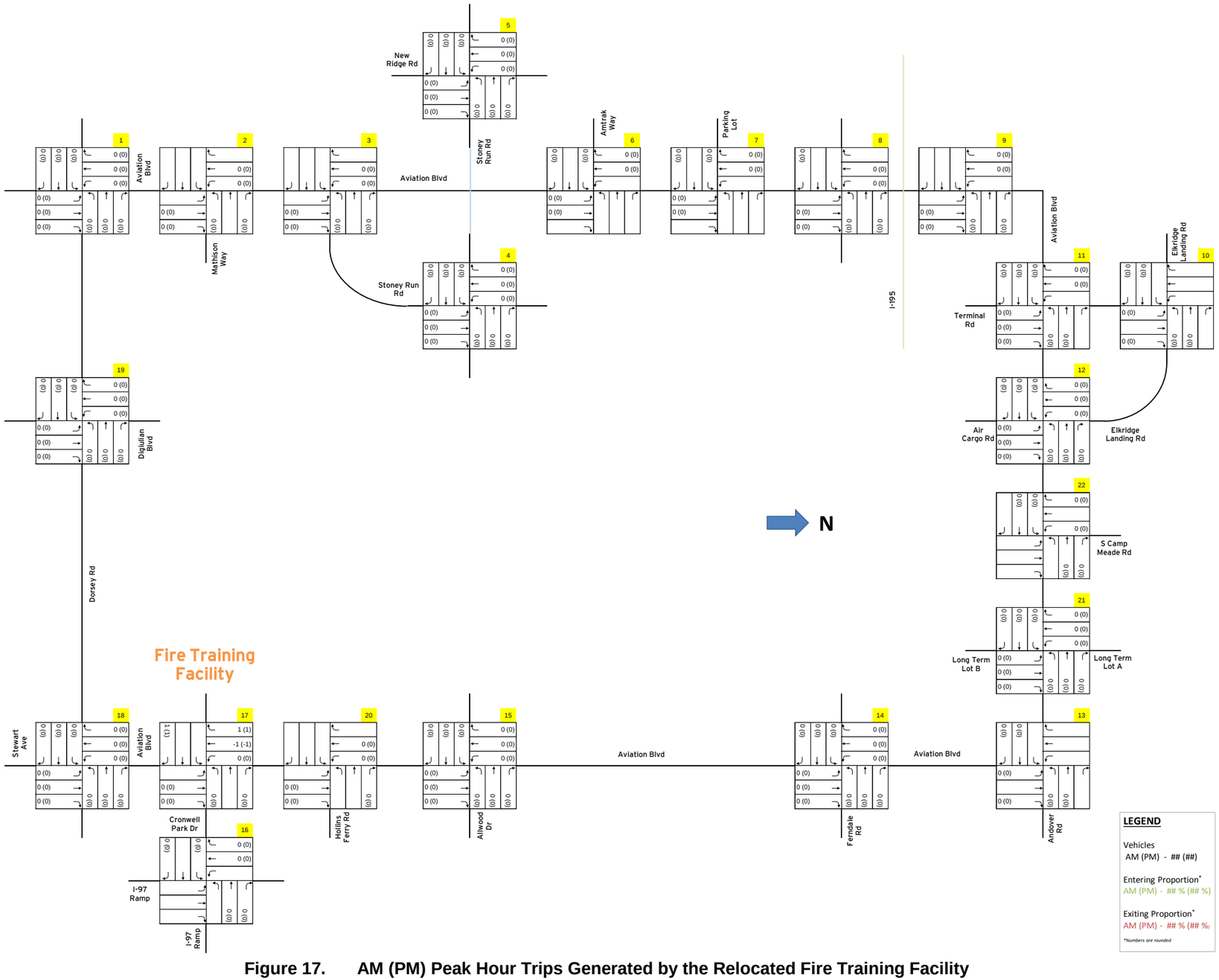


Figure 17. AM (PM) Peak Hour Trips Generated by the Relocated Fire Training Facility

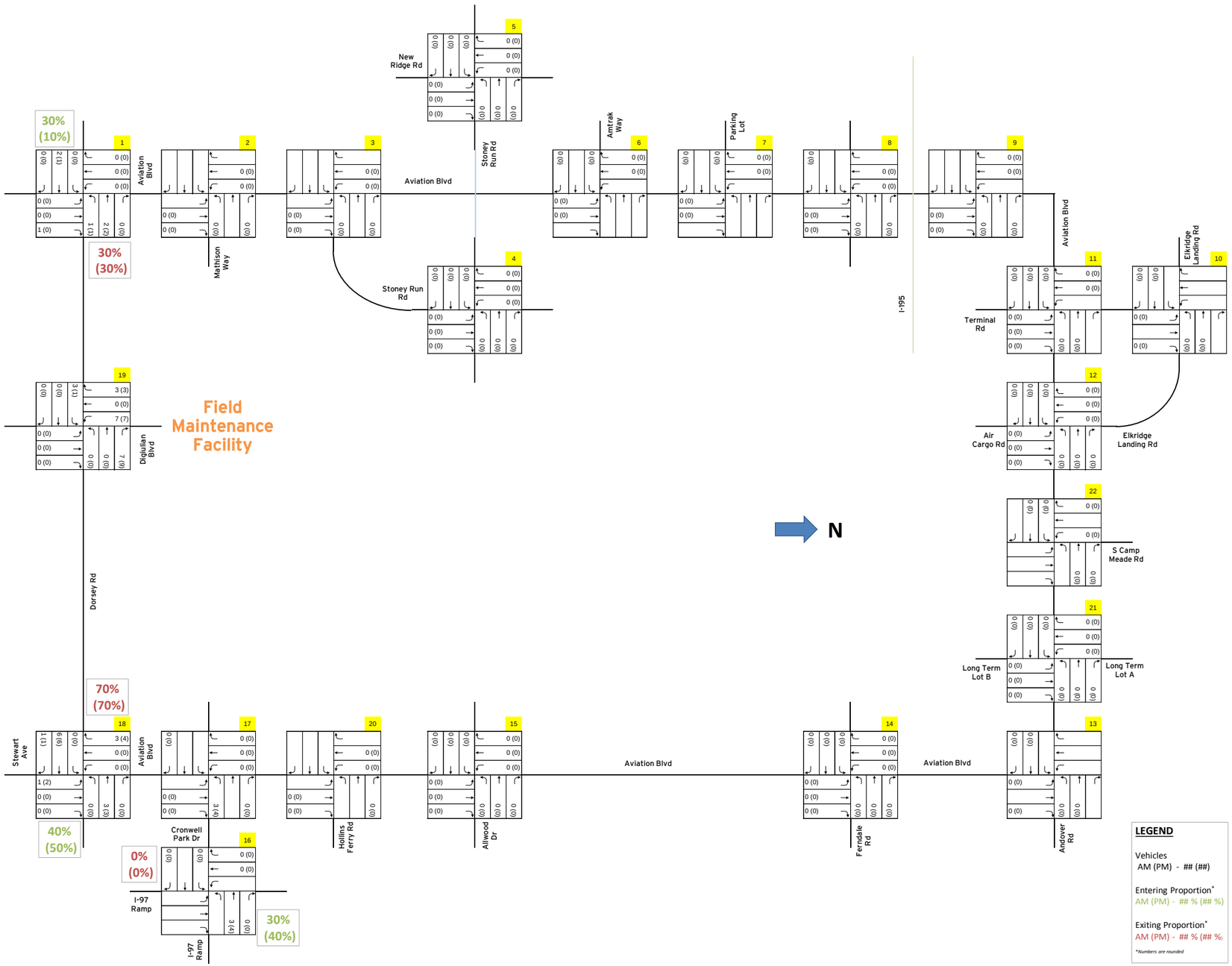


Figure 18. AM (PM) Peak Hour Trips Generated by Proposed Field Maintenance Facility

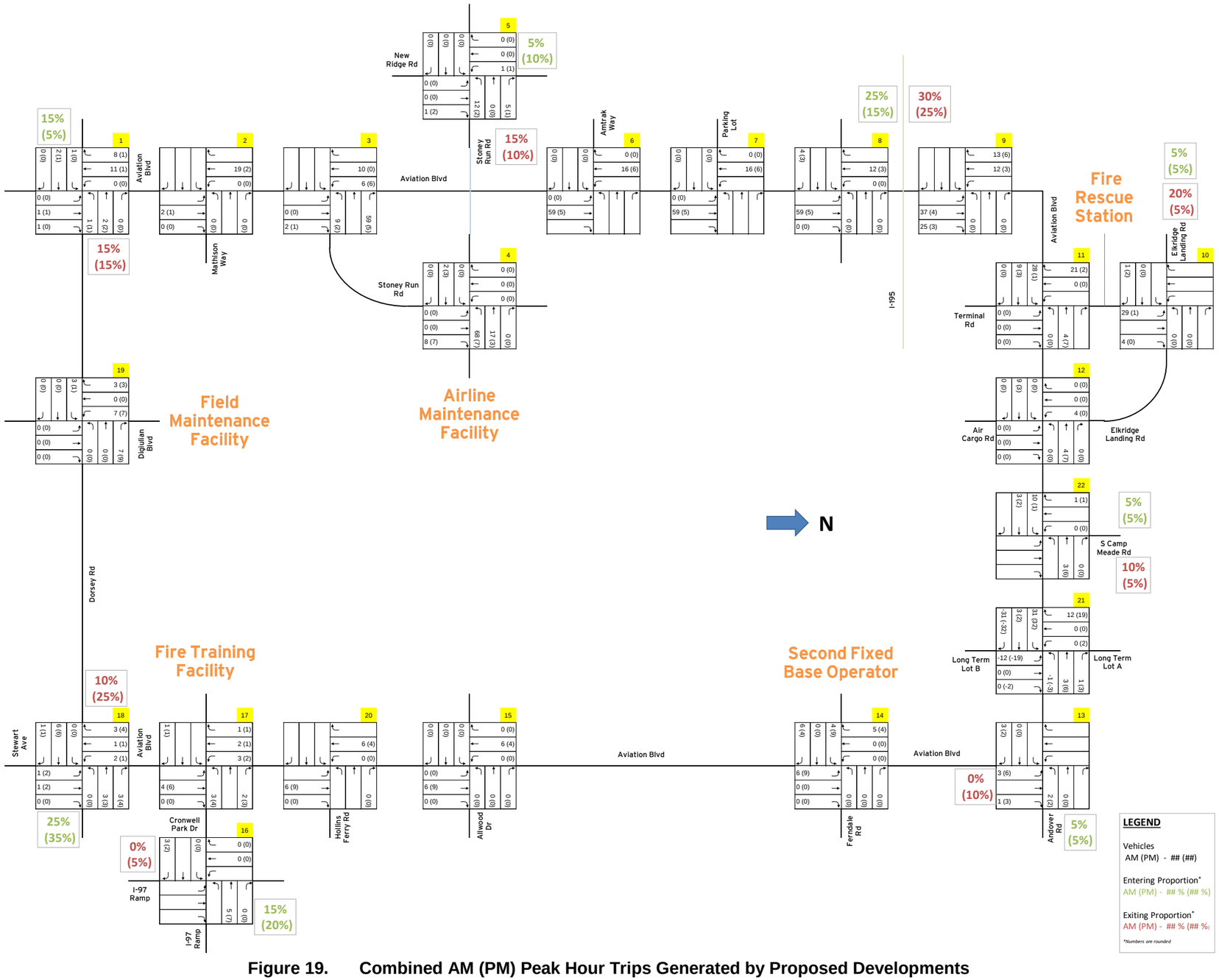


Figure 19. Combined AM (PM) Peak Hour Trips Generated by Proposed Developments

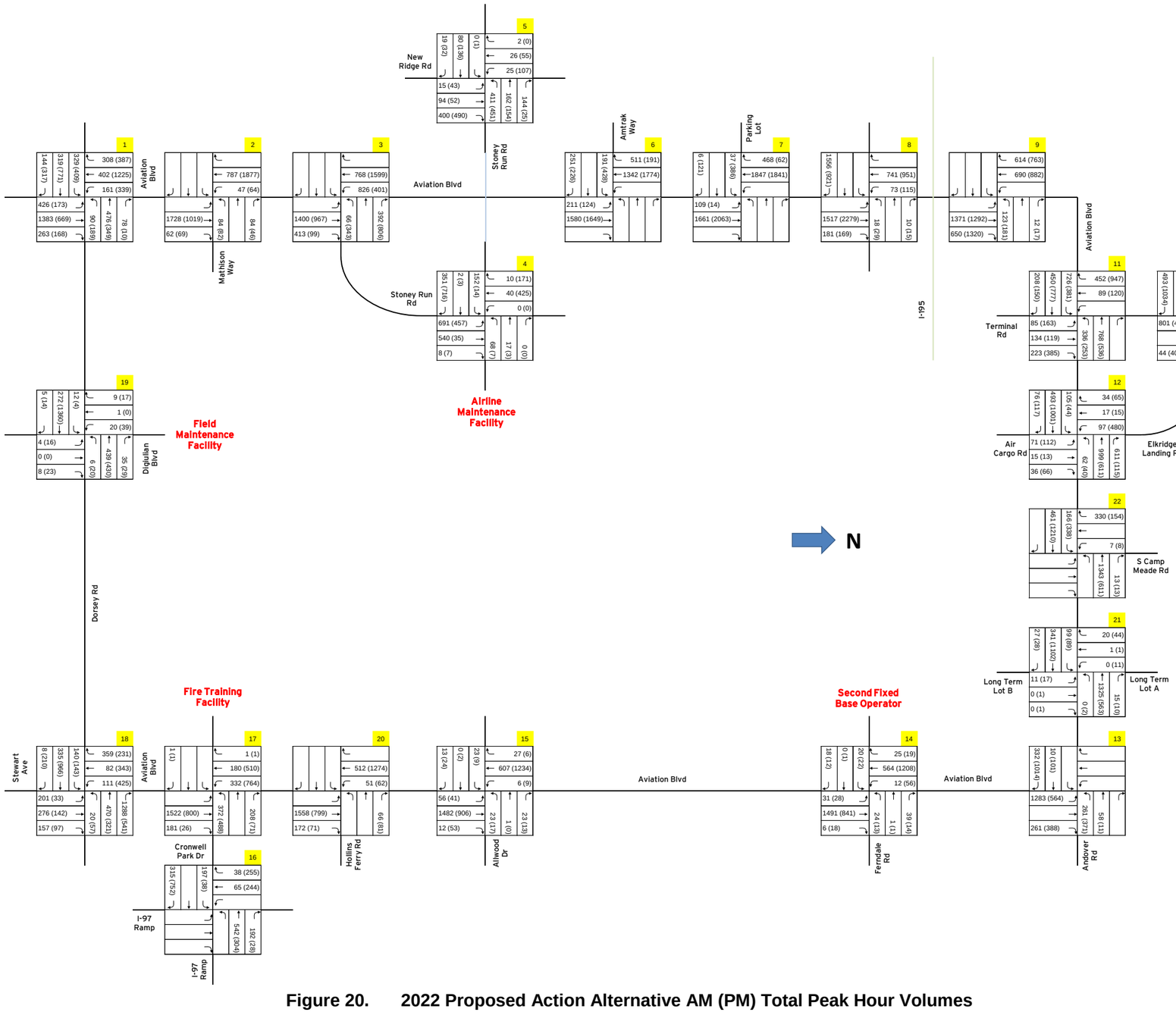


Figure 20. 2022 Proposed Action Alternative AM (PM) Total Peak Hour Volumes

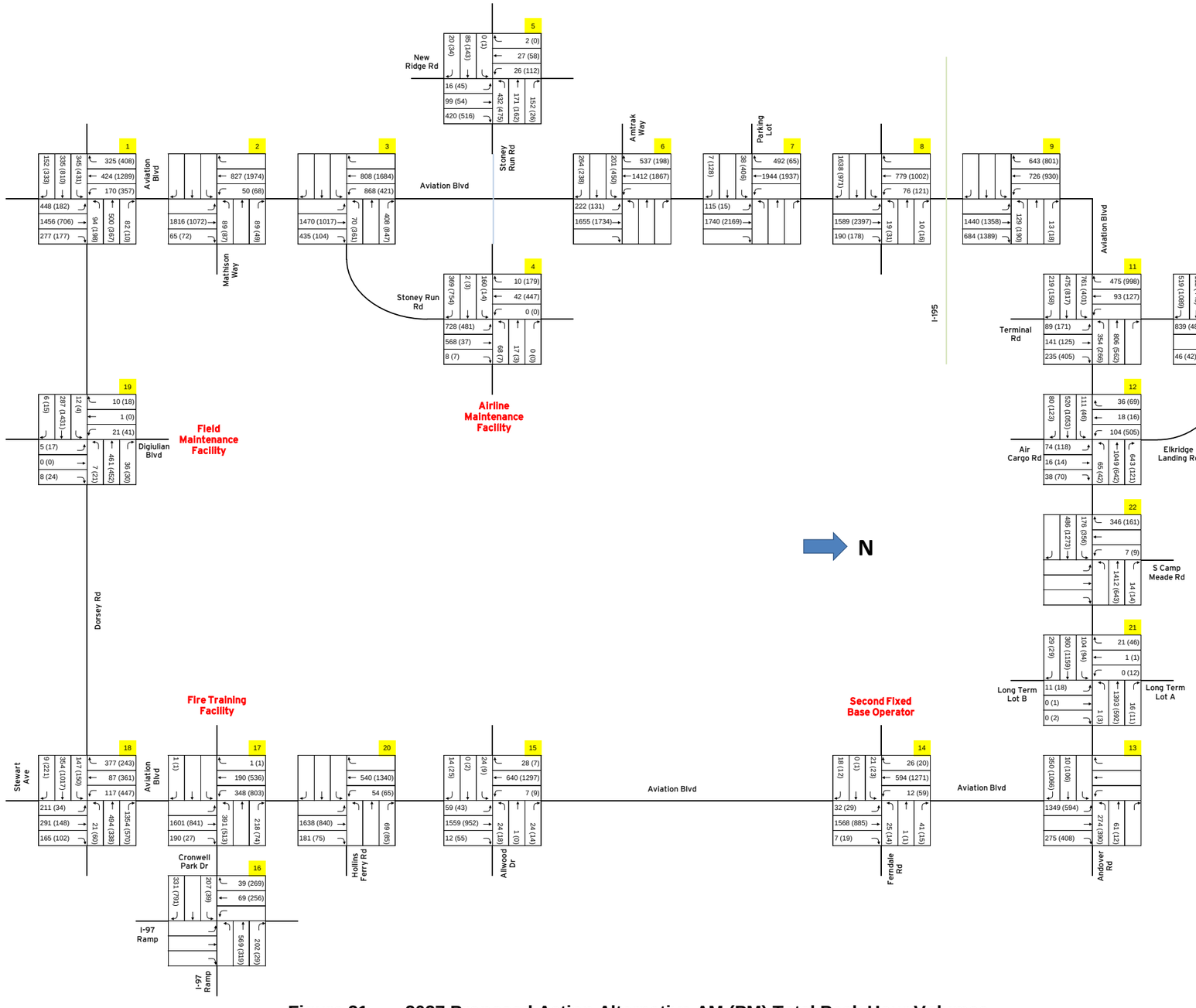


Figure 21. 2027 Proposed Action Alternative AM (PM) Total Peak Hour Volumes

4.2 2022 Proposed Action Alternative Operational Analysis

This section presents the results and findings of the 2022 Proposed Action Alternative operational analyses, consistent with the methodology used for the Existing Conditions, as discussed in **Section 2.2.1**.

Synchro Analysis

Table 55 and **Table 56** present the respective AM and PM peak hour delay and LOS for the 2022 Proposed Action Alternative. **Appendix B** presents detailed HCM reports from Synchro. Consistent with the Existing Conditions as discussed in **Section 2.2.2,** the LOS for Intersection 8 (Aviation Blvd/MD 170 at I-195 SB Ramps) was calculated outside of Synchro.

Table 55
2022 Proposed Action Alternative AM Peak Hour Intersection LOS - Synchro

Intersection		Control	Delay (sec/veh)	Equivalent LOS
1	Aviation Blvd at Dorsey Rd - West	S	85.4	F
2	Aviation Blvd at Mathison Way	S	13.4	B
3	Aviation Blvd at Stoney Run Rd	S	36.6	D
4	Stoney Run Rd at Northrop Grumman Entrance	S	18.8	B
5	Stoney Run Rd at New Ridge Rd	S	39.4	D
6	Aviation Blvd at Amtrak Way	S	17.2	B
7	Aviation Blvd at Northrop Grumman Gate 1A	S	9.6	A
8	Aviation Blvd at SB I-195 Ramps	S	4.8	A
9	Aviation Blvd at NB I-195 Ramps	S	6.8	A
10	Elkridge Landing Rd at Terminal Rd	S	24.5	C
11	Aviation Blvd at Terminal Rd	S	28.6	C
12	Aviation Blvd at Air Cargo Dr	S	13.8	B
13	Aviation Blvd at Andover Rd	S	15.7	B
14	Aviation Blvd at Aaronson Dr	U	7.6	A
15	Aviation Blvd at Allwood Dr	S	6.6	A
16	SB I-97 Ramps at Cromwell Park Dr	S	15.8	B
17	Aviation Blvd at Cromwell Park Dr	S	24.8	C
18	Aviation Blvd at Dorsey Rd - East	S	24.1	C
19	Dorsey Rd at Digiulian Blvd	U	0.9	A
20	Aviation Blvd at Hollins Ferry Rd	S	2.3	A
21	Aviation Blvd at BWI Long Term Parking Lots	S	4.9	A
22	Aviation Blvd at S. Camp Meade Rd	S	4.8	A

Note: S = signalized; U = unsignalized

Source: HCM reports (in Appendix B) from HNTB's Synchro analysis of 2022 Proposed Action Alternative Conditions.

Table 56
2022 Proposed Action Alternative PM Peak Hour Intersection LOS - Synchro

	Intersection	Control	Delay (sec/veh)	Equivalent LOS
1	Aviation Blvd at Dorsey Rd - West	S	72.9	E
2	Aviation Blvd at Mathison Way	S	6.6	A
3	Aviation Blvd at Stoney Run Rd	S	24.7	C
4	Stoney Run Rd at Northrop Grumman Entrance	S	42.0	D
5	Stoney Run Rd at New Ridge Rd	S	52.6	D
6	Aviation Blvd at Amtrak Way	S	49.3	D
7	Aviation Blvd at Northrop Grumman Gate 1A	S	13.8	B
8	Aviation Blvd at SB I-195 Ramps	S	14.3	B
9	Aviation Blvd at NB I-195 Ramps	S	31.4	C
10	Elkridge Landing Rd at Terminal Rd	S	12.7	B
11	Aviation Blvd at Terminal Rd	S	19.7	B
12	Aviation Blvd at Air Cargo Dr	S	53.8	D
13	Aviation Blvd at Andover Rd	S	14.9	B
14	Aviation Blvd at Aaronson Dr	U	4.9	A
15	Aviation Blvd at Allwood Dr	S	3.8	A
16	SB I-97 Ramps at Cromwell Park Dr	S	26.6	C
17	Aviation Blvd at Cromwell Park Dr	S	30.9	C
18	Aviation Blvd at Dorsey Rd - East	S	29.5	C
19	Dorsey Rd at Digiulian Blvd	U	2.8	A
20	Aviation Blvd at Hollins Ferry Rd	S	1.5	A
21	Aviation Blvd at BWI Long Term Parking Lots	S	4.8	A
22	Aviation Blvd at S. Camp Meade Rd	S	7.0	A

Note: S = signalized; U = unsignalized

Source: HCM reports (in Appendix B) from HNTB's Synchro analysis of 2022 Proposed Action Alternative Conditions.

Table 57 presents the list of movements where the 50th and/or 95th percentile queue lengths exceed the storage lengths of the respective turn bays for the 2022 Proposed Action Alternative. **Appendix B** presents full queue tables as part of the Synchro MOE tables.

Table 57
2022 Proposed Action Alternative Turn Movement Queues Exceeding Storage Length

Intersection		Movement	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
AM Peak Hour					
1	Aviation Blvd at Dorsey Rd - West	NBL	455	508	#760
		NBR	250	-	268
		SBL	250	-	309
		SBR	175	-	187
		EBL	175	~456	#761
5	Stoney Run Rd at New Ridge Rd	WBL	300	341	#560
11	Aviation Blvd at Terminal Rd	EBL	445	-	#472
13	Aviation Blvd at Andover Rd	SBL	175	-	197
PM Peak Hour					
1	Aviation Blvd at Dorsey Rd - West	SBL	250	403	#712
		SBR	175	286	477
		EBL	175	398	#701
		EBR	225	-	346
		WBL	200	-	252
4	Stoney Run Rd at Northrop Grumman Entrance	SBR	85	-	130
5	Stoney Run Rd at New Ridge Rd	WBL	300	426	#761
13	Aviation Blvd at Andover Rd	SBL	175	-	225

Notes:
Queues that are within the turn bay storage length of the movement are excluded
m : Volume for the 95th percentile queue is metered by upstream signal
~ : Volume exceed capacity, queue is theoretically infinite
# : 95th percentile volume exceeds capacity, queue may be longer
- : Queues are within storage

CLV Analysis

Table 58 and **Table 59** show the respective AM and PM peak hour CLV, equivalent LOS and V/C ratio. **Appendix C** presents the detailed CLV analysis.

Table 58
2022 Proposed Action Alternative AM Peak Hour Intersection LOS - CLV

	Intersection	CLV	Equivalent LOS	V/C
1	Aviation Blvd at Dorsey Rd - West	1,476	E	0.92
2	Aviation Blvd at Mathison Way	1,048	B	0.65
3	Aviation Blvd at Stoney Run Rd	1,246	C	0.78
4	Stoney Run Rd at Northrop Grumman Entrance	749	A	0.47
5	Stoney Run Rd at New Ridge Rd	625	A	0.39
6	Aviation Blvd at Amtrak Way	1,114	B	0.70
7	Aviation Blvd at Northrop Grumman Parking	1,108	B	0.69
8	Aviation Blvd at I-195 SB Ramps	895	A	0.56
9	Aviation Blvd at I-195 NB Ramps	849	A	0.53
10	Elkridge Landing Rd at Terminal Rd	1,107	B	0.69
11	Aviation Blvd at Terminal Rd	926	A	0.58
12	Aviation Blvd at Air Cargo Rd	818	A	0.51
13	Aviation Blvd at Andover Rd	951	A	0.59
15	Aviation Blvd at Allwood Dr	861	A	0.54
16	I-97 SB Ramps at Cromwell Park Dr	426	A	0.27
17	Aviation Blvd at Cromwell Park Dr	884	A	0.55
18	Aviation Blvd at Dorsey Rd - East	838	A	0.52
20	Aviation Blvd at Hollins Ferry Rd	627	A	0.39
21	Aviation Blvd at BWI Long Term Parking Lots	813	A	0.51
22	Aviation Blvd at Camp Meade Rd	1,042	B	0.65

Source: HNTB's CLV analysis of 2022 Proposed Action Alternative Conditions
Includes signalized intersections only

Table 59
2022 Proposed Action Alternative PM Peak Hour Intersection LOS - CLV

Intersection		CLV	Equivalent LOS	V/C
1	Aviation Blvd at Dorsey Rd - West	1,420	D	0.89
2	Aviation Blvd at Mathison Way	1,077	B	0.67
3	Aviation Blvd at Stoney Run Rd	1,190	C	0.74
4	Stoney Run Rd at Northrop Grumman Entrance	684	A	0.43
5	Stoney Run Rd at New Ridge Rd	789	A	0.49
6	Aviation Blvd at Amtrak Way	1,493	E	0.93
7	Aviation Blvd at Northrop Grumman Parking	1,298	C	0.81
8	Aviation Blvd at I-195 SB Ramps	1,352	D	0.85
9	Aviation Blvd at I-195 NB Ramps	866	A	0.54
10	Elkridge Landing Rd at Terminal Rd	719	A	0.45
11	Aviation Blvd at Terminal Rd	696	A	0.43
12	Aviation Blvd at Air Cargo Rd	1,175	C	0.73
13	Aviation Blvd at Andover Rd	908	A	0.57
15	Aviation Blvd at Allwood Dr	738	A	0.46
16	I-97 SB Ramps at Cromwell Park Dr	634	A	0.40
17	Aviation Blvd at Cromwell Park Dr	838	A	0.52
18	Aviation Blvd at Dorsey Rd - East	772	A	0.48
20	Aviation Blvd at Hollins Ferry Rd	357	A	0.22
21	Aviation Blvd at BWI Long Term Parking Lots	604	A	0.38
22	Aviation Blvd at Camp Meade Rd	670	A	0.42

Source: HNTB's CLV analysis of 2022 Proposed Action Alternative Conditions
Includes signalized intersections only

Findings

There are some minor changes in intersection delay, but no expected changes to LOS during either peak period when comparing the Synchro analysis for 2022 No Action and 2022 Proposed Action Alternatives.

Queues for turning movements are contained within the respective turn bays except for intersections:

- 1 (Aviation Blvd/MD 170 at Dorsey Rd/MD 176 – West)
- 4 (Stoney Run Rd at Northrop Grumman Entrance)
- 5 (Stoney Run Rd at New Ridge Rd)
- 11 (Aviation Blvd at Terminal Rd) and
- 13 (Aviation Blvd/MD 162 at Andover Rd)

The expected queues for Intersection 4 (Stoney Run Rd at Northrop Grumman Entrance) are lower for the Proposed Action Alternative than for the No Action Alternative. This is due to the fourth leg added to the intersection as part of the Proposed Action and the corresponding change to the signal timing plan.

Based on the CLV methodology, all locations operate at LOS D or better during both peak periods, except the two intersections below, which degrade to LOS E:

- 1 (Aviation Blvd/MD 170 at Dorsey Rd/MD 176 – West) in the AM peak
- 6 (Aviation Blvd/MD 170 at Amtrak Way/MD 955) in the PM peak

4.3 2027 Proposed Action Alternative Operational Analysis

This section presents the results and findings of the 2027 Proposed Action Alternative operational analyses, consistent with the methodology used for the Existing Conditions, as discussed in **Section 2.2.1**.

Synchro Analysis

Table 60 and **Table 61** present the respective AM and PM peak hour delay and LOS for the 2027 Proposed Action Alternative. **Appendix B** presents detailed HCM reports from Synchro. Consistent with the Existing Conditions as discussed in **Section 2.2.2,** the LOS for Intersection 8 (Aviation Blvd at I-195 SB Ramps) was calculated outside of Synchro.

Table 60
2027 Proposed Action Alternative AM Peak Hour Intersection LOS - Synchro

Intersection		Control	Delay (sec/veh)	Equivalent LOS
1	Aviation Blvd at Dorsey Rd - West	S	96.6	F
2	Aviation Blvd at Mathison Way	S	14.5	B
3	Aviation Blvd at Stoney Run Rd	S	47.7	D
4	Stoney Run Rd at Northrop Grumman Entrance	S	19.7	B
5	Stoney Run Rd at New Ridge Rd	S	39.9	D
6	Aviation Blvd at Amtrak Way	S	18.2	B
7	Aviation Blvd at Northrop Grumman Gate 1A	S	10.5	B
8	Aviation Blvd at SB I-195 Ramps	S	5.6	A
9	Aviation Blvd at NB I-195 Ramps	S	6.8	A
10	Elkridge Landing Rd at Terminal Rd	S	27.4	C
11	Aviation Blvd at Terminal Rd	S	29.9	C
12	Aviation Blvd at Air Cargo Dr	S	14.7	B
13	Aviation Blvd at Andover Rd	S	16.2	B
14	Aviation Blvd at Aaronson Dr	U	10.9	B
15	Aviation Blvd at Allwood Dr	S	6.8	A
16	SB I-97 Ramps at Cromwell Park Dr	S	15.9	B
17	Aviation Blvd at Cromwell Park Dr	S	26.3	C
18	Aviation Blvd at Dorsey Rd - East	S	27.5	C
19	Dorsey Rd at Digiulian Blvd	U	0.9	A
20	Aviation Blvd at Hollins Ferry Rd	S	2.4	A
21	Aviation Blvd at BWI Long Term Parking Lots	S	6.1	A
22	Aviation Blvd at S. Camp Meade Rd	S	5.2	A

Note: S = signalized; U = unsignalized

Source: HCM reports (in Appendix B) from HNTB's Synchro analysis of 2027 Proposed Action Alternative Conditions.

Table 61
2027 Proposed Action Alternative PM Peak Hour Intersection LOS - Synchro

Intersection		Control	Delay (sec/veh)	Equivalent LOS
1	Aviation Blvd at Dorsey Rd - West	S	85.6	F
2	Aviation Blvd at Mathison Way	S	6.9	A
3	Aviation Blvd at Stoney Run Rd	S	26.7	C
4	Stoney Run Rd at Northrop Grumman Entrance	S	51.6	D
5	Stoney Run Rd at New Ridge Rd	S	56.3	E
6	Aviation Blvd at Amtrak Way	S	66.0	E
7	Aviation Blvd at Northrop Grumman Gate 1A	S	16.2	B
8	Aviation Blvd at SB I-195 Ramps	S	22.4	C
9	Aviation Blvd at NB I-195 Ramps	S	39.6	D
10	Elkridge Landing Rd at Terminal Rd	S	13.4	B
11	Aviation Blvd at Terminal Rd	S	20.1	C
12	Aviation Blvd at Air Cargo Dr	S	58.6	E
13	Aviation Blvd at Andover Rd	S	15.6	B
14	Aviation Blvd at Aaronson Dr	U	6.9	A
15	Aviation Blvd at Allwood Dr	S	3.6	A
16	SB I-97 Ramps at Cromwell Park Dr	S	25.8	C
17	Aviation Blvd at Cromwell Park Dr	S	31.6	C
18	Aviation Blvd at Dorsey Rd - East	S	31.5	C
19	Dorsey Rd at Digiulian Blvd	U	3.5	A
20	Aviation Blvd at Hollins Ferry Rd	S	1.5	A
21	Aviation Blvd at BWI Long Term Parking Lots	S	6.1	A
22	Aviation Blvd at S. Camp Meade Rd	S	7.6	A

Note: S = signalized; U = unsignalized

Source: HCM reports (in Appendix B) from HNTB's Synchro analysis of 2027 Proposed Action Alternative Conditions.

Table 62 presents the list of movements where the 50th and/or 95th percentile queue lengths exceed the storage lengths of the respective turn bays for the 2027 Proposed Action Alternative. **Appendix B** presents full queue tables as part of the Synchro MOE tables.

Table 62
2027 Proposed Action Alternative Turn Movement Queues Exceeding Storage Length

Intersection		Movement	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
AM Peak Hour					
1	Aviation Blvd at Dorsey Rd - West	NBL	455	560	#847
		NBR	250	-	294
		SBL	250	-	327
		SBR	175	-	217
		EBL	175	~520	#824
		WBL	200	-	202
5	Stoney Run Rd at New Ridge Rd	WBL	300	369	#615
11	Aviation Blvd at Terminal Rd	EBL	445	-	#514
13	Aviation Blvd at Andover Rd	SBL	175	-	205
PM Peak Hour					
1	Aviation Blvd at Dorsey Rd - West	SBL	250	~463	#782
		SBR	175	322	529
		EBL	175	~474	#787
		EBR	225	-	381
		WBL	200	-	271
4	Stoney Run Rd at Northrop Grumman Entrance	SBR	85	-	139
5	Stoney Run Rd at New Ridge Rd	WBL	300	463	#829
13	Aviation Blvd at Andover Rd	SBL	175	-	233

Notes:
Queues that are within the turn bay storage length of the movement are excluded
m : Volume for the 95th percentile queue is metered by upstream signal
~ : Volume exceed capacity, queue is theoretically infinite
# : 95th percentile volume exceeds capacity, queue may be longer
- : Queues are within storage

CLV Analysis

Table 63 and **Table 64** show the respective AM and PM peak hour CLV, equivalent LOS and V/C ratio. **Appendix C** presents the detailed CLV analysis.

Table 63
2027 Proposed Action Alternative AM Peak Hour Intersection LOS - CLV

	Intersection	CLV	Equivalent LOS	V/C
1	Aviation Blvd at Dorsey Rd - West	1,552	E	0.97
2	Aviation Blvd at Mathison Way	1,101	B	0.69
3	Aviation Blvd at Stoney Run Rd	1,309	D	0.82
4	Stoney Run Rd at Northrop Grumman Entrance	787	A	0.49
5	Stoney Run Rd at New Ridge Rd	657	A	0.41
6	Aviation Blvd at Amtrak Way	1,172	C	0.73
7	Aviation Blvd at Northrop Grumman Parking	1,166	C	0.73
8	Aviation Blvd at I-195 SB Ramps	938	A	0.59
9	Aviation Blvd at I-195 NB Ramps	893	A	0.56
10	Elkridge Landing Rd at Terminal Rd	1,161	C	0.73
11	Aviation Blvd at Terminal Rd	972	A	0.61
12	Aviation Blvd at Air Cargo Rd	861	A	0.54
13	Aviation Blvd at Andover Rd	1,000	A	0.62
15	Aviation Blvd at Allwood Dr	905	A	0.57
16	I-97 SB Ramps at Cromwell Park Dr	448	A	0.28
17	Aviation Blvd at Cromwell Park Dr	929	A	0.58
18	Aviation Blvd at Dorsey Rd - East	881	A	0.55
20	Aviation Blvd at Hollins Ferry Rd	660	A	0.41
21	Aviation Blvd at BWI Long Term Parking Lots	855	A	0.53
22	Aviation Blvd at Camp Meade Rd	1,094	B	0.68

Source: HNTB's CLV analysis of 2027 Proposed Action Alternative Conditions
Includes signalized intersections only

Table 64
2027 Proposed Action Alternative PM Peak Hour Intersection LOS - CLV

Intersection		CLV	Equivalent LOS	V/C
1	Aviation Blvd at Dorsey Rd - West	1,494	E	0.93
2	Aviation Blvd at Mathison Way	1,133	B	0.71
3	Aviation Blvd at Stoney Run Rd	1,254	C	0.78
4	Stoney Run Rd at Northrop Grumman Entrance	719	A	0.45
5	Stoney Run Rd at New Ridge Rd	829	A	0.52
6	Aviation Blvd at Amtrak Way	1,571	E	0.98
7	Aviation Blvd at Northrop Grumman Parking	1,365	D	0.85
8	Aviation Blvd at I-195 SB Ramps	1,422	D	0.89
9	Aviation Blvd at I-195 NB Ramps	910	A	0.57
10	Elkridge Landing Rd at Terminal Rd	757	A	0.47
11	Aviation Blvd at Terminal Rd	732	A	0.46
12	Aviation Blvd at Air Cargo Rd	1,236	C	0.77
13	Aviation Blvd at Andover Rd	955	A	0.60
15	Aviation Blvd at Allwood Dr	776	A	0.48
16	I-97 SB Ramps at Cromwell Park Dr	667	A	0.42
17	Aviation Blvd at Cromwell Park Dr	881	A	0.55
18	Aviation Blvd at Dorsey Rd - East	811	A	0.51
20	Aviation Blvd at Hollins Ferry Rd	376	A	0.23
21	Aviation Blvd at BWI Long Term Parking Lots	636	A	0.40
22	Aviation Blvd at Camp Meade Rd	705	A	0.44

Source: HNTB's CLV analysis of 2025 Proposed Action Alternative Conditions
Includes signalized intersections only

Findings

Table 65 compares the results of the Synchro analysis for the 2027 No Action and Proposed Action Alternatives. The analysis indicates that:

- Intersection 1 (Aviation Blvd/MD 170 at Dorsey Rd/MD 176 – West) operates at LOS F during both peak periods under the 2027 Proposed Action Alternative. This is the same LOS as the 2027 No Action Alternative and there is minimal difference in overall intersection delay.
- Three intersections remain at LOS E compared to the No Action Alternative in the PM peak: Intersection 5 (Stoney Run Rd at New Ridge Rd), Intersection 6 (Aviation Blvd/MD 170 at Amtrak Way/MD 995), and Intersection 12 (Aviation Blvd/MD 170 at Air Cargo Dr).
- The delay at Intersection 12 is slightly better (14.7 sec) compared to the No Action Alternative's delay (15.0 sec) in the AM Peak. This improvement is due to additional

through vehicles along the mainline (Aviation Blvd/MD 170/MD 162) and their progression through the intersections.

- All other intersections operate at LOS D or better during both peak periods.

Queues for turning movements are contained within the respective turn bays except for intersections:

- 1 (Aviation Blvd/MD 170 at Dorsey Rd/MD 176 – West)
- 4 (Stoney Run Rd at Northrop Grumman Entrance)
- 5 (Stoney Run Rd at New Ridge Rd)
- 11 (Aviation Blvd/MD 170 at Terminal Rd) and
- 13 (Aviation Blvd/MD 162 at Andover Rd).

Table 66 and **Table 67** compare the 95th percentile queues for the 2027 AM and PM peaks respectively at locations where the queue lengths exceed the storage capacity. Based on this comparison, the Proposed Action has no material impact on queue length/distance. There are only two turn bays (WBL at Stoney Run Rd and New Ridge Rd and the EBL at Aviation Blvd and at Terminal Rd) where the queue lengths increase by 25-30 feet, equivalent to one car length. As such, no additional mitigations are proposed.

Table 68 compares the results of the CLV analysis for the 2027 No Action and Proposed Action Alternatives. With the exception of Intersection 3 (Aviation Blvd/MD 170 at Stoney Run Rd) and Intersection 10 (Elkridge Landing Rd at Terminal Rd), there are no changes to LOS between the 2027 No Action and 2027 Proposed Action Alternatives. At Intersection 3, the AM peak CLV for the 2027 No Action Alternative is 1,296 which corresponds to an LOS equivalent of C. In the 2027 Proposed Action Alternative, the CLV is 1,309 which is at the LOS threshold of D. At Intersection 10, the AM peak CLV slightly increases from 1,132 (LOS B) in the 2027 No Action Alternative to 1,161 (LOS C) in the 2027 Proposed Action Alternative.

Table 65
2027 Synchro Analysis Comparison: No Action versus Proposed Action

			No Action		Proposed Action	
	Intersection	**Control**	**AM Peak Delay/ LOS**	**PM Peak Delay/ LOS**	**AM Peak Delay/ LOS**	**PM Peak Delay/ LOS**
1	Aviation Blvd at Dorsey Rd - West	S	96.6 / F	85.4 / F	96.6 / F	85.6 / F
2	Aviation Blvd at Mathison Way	S	14.5 / B	6.9 / A	14.5 / B	6.9 / A
3	Aviation Blvd at Stoney Run Rd	S	45.9 / D	26.5 / C	47.7 / D	26.7 / C
4	Stoney Run Rd at Northrop Grumman Entrance	S	20.5 / C	50.0 / D	19.7 / B	51.6 / D
5	Stoney Run Rd at New Ridge Rd	S	39.7 / D	56.0 / E	39.9 / D	56.3 / E
6	Aviation Blvd at Amtrak Way	S	18.0 / B	65.3 / E	18.2 / B	66.0 / E
7	Aviation Blvd at Northrop Grumman Gate 1A	S	10.4 / B	16.1 / B	10.5 / B	16.2 / B
8	Aviation Blvd at SB I-195 Ramps	S	5.3 / A	22.1 / C	5.6 / A	22.4 / C
9	Aviation Blvd at NB I-195 Ramps	S	6.9 / A	39.4 / D	6.8 / A	39.6 / D
10	Elkridge Landing Rd at Terminal Rd	S	25.1 / C	13.4 / B	27.4 / C	13.4 / B
11	Aviation Blvd at Terminal Rd	S	29 / C	20.1 / C	29.9 / C	20.1 / C
12	Aviation Blvd at Air Cargo Dr	S	15.0 / B	58.6 / E	14.7 / B	58.6 / E
13	Aviation Blvd at Andover Rd	S	15.9 / B	15.0 / B	16.2 / B	15.6 / B
14	Aviation Blvd at Aaronson Dr (unsignalized)	U	9.6 / A	3.5 / A	10.9 / B	6.9 / A
15	Aviation Blvd at Allwood Dr	S	6.8 / A	3.6 / A	6.8 / A	3.6 / A
16	SB I-97 Ramps at Cromwell Park Dr	S	16.0 / B	25.9 / C	15.9 / B	25.8 / C
17	Aviation Blvd at Cromwell Park Dr	S	26.1 / C	31.5 / C	26.3 / C	31.6 / C
18	Aviation Blvd at Dorsey Rd - East	S	27.2 / C	31.2 / C	27.5 / C	31.5 / C
19	Dorsey Rd at Digiulian Blvd (unsignalized)	U	0.7 / A	3.0 / A	0.9 / A	3.5 / A
20	Aviation Blvd at Hollins Ferry Rd	S	2.4 / A	1.5 / A	2.4 / A	1.5 / A
21	Aviation Blvd at BWI Long Term Parking Lots	S	5.9 / A	8.0 / A	6.1 / A	6.1 / A
22	Aviation Blvd at S. Camp Meade Rd	S	4.1 / A	7.5 / A	5.2 / A	7.6 / A

Note: S = signalized; U = unsignalized

Table 66
95th Percentile Queue Length Comparison – 2027 AM Peak

Node	Intersection	Movement	Storage Length (ft)	No Action Queue (ft)	Proposed Action Queue (ft)	Change in Queue Length (ft)
1	Aviation Blvd (MD 170) at Dorsey Rd (MD 176) - West	NBL	455	#831	#847	16
		NBR	250	292	294	2
		SBL	250	324	327	3
		SBR	175	203	217	14
		EBL	175	#810	#824	14
		EBR	225	66	66	n/a
		WBL	200	199	202	3
4	Stoney Run Rd at Northrop Grumman Entrance	SBR	85	17	0	n/a
5	Stoney Run Rd at New Ridge Rd	WBL	300	#588	#615	27
11	Aviation Blvd (MD 170) at Terminal Rd	EBL	445	#487	#514	27
13	Aviation Blvd (MD 162) at Andover Rd	SBL	175	204	205	1

Notes:
Queues that are within the turn bay storage length of the movement are excluded
m : Volume for the 95th percentile queue is metered by upstream signal
~ : Volume exceed capacity, queue is theoretically infinite
# : 95th percentile volume exceeds capacity, queue may be longer

Table 67
95th Percentile Queue Length Comparison – 2027 PM Peak

Node	Intersection	Movement	Storage Length (ft)	No Action Queue (ft)	Proposed Action Queue (ft)	Change in Queue Length (ft)
1	Aviation Blvd (MD 170) at Dorsey Rd (MD 176) - West	NBL	455	318	318	n/a
		NBR	250	109	109	n/a
		SBL	250	#782	#782	0
		SBR	175	527	529	2
		EBL	175	#785	#787	2
		EBR	225	381	381	0
		WBL	200	270	271	1
4	Stoney Run Rd at Northrop Grumman Entrance	SBR	85	185	139	-46
5	Stoney Run Rd at New Ridge Rd	WBL	300	#822	#829	7
11	Aviation Blvd (MD 170) at Terminal Rd	EBL	445	212	213	n/a
13	Aviation Blvd (MD 162) at Andover Rd	SBL	175	231	233	2

Notes:
Queues that are within the turn bay storage length of the movement are excluded
m : Volume for the 95th percentile queue is metered by upstream signal
~ : Volume exceed capacity, queue is theoretically infinite
# : 95th percentile volume exceeds capacity, queue may be longer

Table 68
2027 CLV Analysis Comparison: No Action versus Proposed Action

Intersection		No Action		Proposed Action	
		AM Peak CLV / LOS	PM Peak CLV / LOS	AM Peak CLV / LOS	PM Peak CLV / LOS
1	Aviation Blvd at Dorsey Rd - West	1,550 / E	1,492 / E	1,552 / E	1,494 / E
2	Aviation Blvd at Mathison Way	1,100 / B	1,132 / B	1,101 / B	1,133 / B
3	Aviation Blvd at Stoney Run Rd	1,296 / C	1,252 / C	1,309 / D	1,254 / C
4	Stoney Run Rd at Northrop Grumman Entrance	770 / A	716 / A	787 / A	719 / A
5	Stoney Run Rd at New Ridge Rd	644 / A	826 / A	657 / A	829 / A
6	Aviation Blvd at Amtrak Way	1,163 / C	1,567 / E	1,172 / C	1,571 / E
7	Aviation Blvd at Northrop Grumman Gate 1A	1,157 / C	1,362 / D	1,166 / C	1,365 / D
8	Aviation Blvd at SB I-195 Ramps	906 / A	1,419 / D	938 / A	1,422 / D
9	Aviation Blvd at NB I-195 Ramps	873 / A	908 / A	893 / A	910 / A
10	Elkridge Landing Rd at Terminal Rd	1,132 / B	756 / A	1,161 / C	757 / A
11	Aviation Blvd at Terminal Rd	955 / A	730 / A	972 / A	732 / A
12	Aviation Blvd at Air Cargo Dr	855 / A	1,235 / C	861 / A	1,236 / C
13	Aviation Blvd at Andover Rd	996 / A	952 / A	1,000 / A	955 / A
15	Aviation Blvd at Allwood Dr	902 / A	774 / A	905 / A	776 / A
16	SB I-97 Ramps at Cromwell Park Dr	445 / A	666 / A	448 / A	667 / A
17	Aviation Blvd at Cromwell Park Dr	924 / A	875 / A	929 / A	881 / A
18	Aviation Blvd at Dorsey Rd - East	876 / A	809 / A	881 / A	811 / A
20	Aviation Blvd at Hollins Ferry Rd	658 / A	372 / A	660 / A	376 / A
21	Aviation Blvd at BWI Long Term Parking Lots	834 / A	658 / A	855 / A	636 / A
22	Aviation Blvd at S. Camp Meade Rd	1,092 / B	701 / A	1,094 / B	705 / A

4.4 2022 and 2027 Mitigated Proposed Action Alternative

The traffic operations associated with the Proposed Action Alternative were reviewed relative to the thresholds set in the SHA guidelines to determine if any mitigation measures may be warranted. Per SHA guidelines the results of the Synchro and CLV analysis which yielded the greatest impact were used to determine the potential need for mitigation measures based on the following criteria:

- Intersections where the background conditions operate at an acceptable LOS of D or better but were degraded to an unacceptable LOS (LOS E or F) under the Proposed Action Alternative require mitigation to an acceptable LOS D or better.
- Intersections where the background conditions operate at an unacceptable LOS worse than D and have degraded further due to the proposed development require mitigation of the impact of the proposed development.

There are four locations identified operating at an unacceptable LOS in the 2022 and 2027 No Action Alternatives:

- Intersection 1 (Aviation Blvd/MD 170 at Dorsey Rd/MD 176 – West): Synchro analysis indicated that this intersection operates at LOS F in the AM peak hour and LOS E or F in the PM peak hour for both the No Action and Proposed Action Alternatives.
- Intersection 5 (Stoney Run Rd at New Ridge Rd): Synchro analysis indicated that this intersection operates at LOS E during the PM peak period for both the No Action and Proposed Action Alternatives.
- Intersection 6 (Aviation Blvd/MD 170 at Amtrak Way/MD 995): Both Synchro and CLV analyses indicated that this intersection operates at LOS E during the PM peak period for both the No Action and Proposed Action Alternatives.
- Intersection 12 (Aviation Blvd/MD 170 at Air Cargo Rd): Synchro analysis indicated that this intersection operates at LOS E during the PM peak period for both the No Action and Proposed Action Alternatives.

The analysis showed that the proposed EA development at BWI Marshall Airport would cause virtually no impacts to the roadway network. Various mitigation measures were considered to improve operations at the four intersections listed above. These include signal split optimization, cycle length adjustment (with split optimization) and lane channelization reconfiguration which are all considered feasible to implement.

Intersection 1

Intersection 1 (Aviation Boulevard/MD 170 at Dorsey Road/MD 176 - West) operates below the SHA guideline thresholds per the Synchro analysis for all future scenarios. Furthermore, it does not meet CLV guidelines for all future scenarios except for PM peak hour under the 2022 No Action and Proposed Action Alternatives. **Table 69** presents the volumes and their effect of the CLV LOS. This location is failing under both the 2022 and 2027 No Action scenarios, indicating the need for improvement is not driven by the proposed action at BWI, but rather regional growth. As shown below, the Proposed Action increases volumes by less than 1%.

Table 69
Intersection 1 Volumes and CLV Summary

	2022		**2027**	
	AM	**PM**	**AM**	**PM**
No Action Total Volumes	4,275	4,989	4,499	5,252
Proposed Action increase in volumes	27	7	27	7
Percent increase	0.63%	0.14%	0.60%	0.13%
Change of CLV score	+3	+2	+2	+2
Change of CLV's LOS	**No change**	**No change**	**No change**	**No change**

The Proposed Action Alternative was analyzed for potential mitigation as it is similar to the No Action Alternative (maximum 0.2 second increase in delay, CLV increase of 3). A possible mitigation option, optimized cycle length with split optimization, was analyzed to evaluate operational improvements at this location. The Synchro analysis results for this mitigation option are presented in **Table 70**.

Table 70
Intersection 1 Mitigation – Synchro Intersection LOS

Intersection		Time Period	No Action Alternative (delay/LOS)	Proposed Action Alternative (delay / LOS)	Mitigated Proposed Action Alternative (delay / LOS)
2022 AM / PM Peak Hour					
1	Aviation Blvd at Dorsey Rd - West	AM	85.4 / F	85.4 / F	60.8 / E
		PM	72.6 / E	72.6 / E	56.2 / E
2027 AM / PM Peak Hour					
1	Aviation Blvd at Dorsey Rd - West	AM	96.6 / F	96.6 / F	69.6 / E
		PM	85.4 / F	85.6 / F	63.0 / E

The analysis of the proposed mitigation for the 2022 AM peak indicated that the LOS improves to LOS E from LOS F. The delays for the 2022 PM peak improves but LOS remains at LOS E. In the 2027 analysis, the LOS improved to LOS E from LOS F in the No Action and Proposed Alternatives. Note that results for the proposed mitigation are shown as signal timing modifications and do not affect CLV.

Intersection 5

Intersection 5 (Stoney Run Rd at New Ridge Rd) operates below the SHA guideline thresholds per the Synchro methodology for 2027 in the PM peak for both the No Action and Proposed Action Alternatives. The Proposed Action Alternative was analyzed for potential mitigation as it is similar to the No Action Alternative (maximum 0.3 second increase in delay). Possible mitigation includes signal split optimization which improves LOS from E to D in the PM peak period. The AM peak hour operates at LOS D under the Proposed Action Alternative and does not require mitigation. Table **71** presents the Synchro LOS for the PM peak hour without and with mitigations.

Table 71
Intersection 5 Mitigation – 2027 Synchro Intersection LOS

Intersection		Time Period	No Action Alternative (delay / LOS)	Proposed Action Alternative (delay / LOS)	Mitigated Proposed Action Alternative (delay / LOS)
5	Stoney Run Rd at New Ridge Rd	AM	39.7 / D	39.9 / D	39.9 / D
		PM	56.0 / E	56.3 / E	53.8 / D

Intersection 6

Intersection 6 (Aviation Boulevard/MD 170 at Amtrak Way/MD 995) operates below the SHA guideline thresholds per the CLV methodology during the PM peak period for both the No Action and Proposed Action Alternatives. The Proposed Action Alternative increases delay by a maximum of 0.7 seconds per vehicle and adds 9 seconds to the CLV. If mitigation is desired to improve operations, modifying the eastbound approach lane-use from a left-only lane and a right-only lane to a left-only lane and shared left-right lane improves results. Analysis of the proposed mitigation indicates that restriping the roadway produces acceptable LOS in both the AM and PM peak periods. Intersection 6 queues for the Mitigated Proposed Action are contained within the available storage length. The results are presented in **Table 72** and **Table 73** for the CLV and Synchro respectively. It should be noted that the AM peak hour was also analyzed as the lane configuration changed.

Table 72
Intersection 6 Mitigation – CLV LOS

Intersection		Time Period	No Action Alternative (CLV/LOS)	Proposed Action Alternative (CLV / LOS)	Mitigated Proposed Action Alternative (CLV / LOS)
2022 AM / PM Peak Hour					
6	Aviation Blvd (MD 170) at Amtrak Way (MD 995)	AM	1,105 / B	1,114 / B	1,174 / C
		PM	1,489 / E	1,493 / E	1,291 / C
2027 AM / PM Peak Hour					
6	Aviation Blvd (MD 170) at Amtrak Way (MD 995)	AM	1,163 / C	1,172 / C	1,235 / C
		PM	1,567 / E	1,571 / E	1,359 / D

Table 73
Intersection 6 Mitigation – Synchro Intersection LOS

	Intersection	Time Period	No Action Alternative (delay/LOS)	Proposed Action Alternative (delay / LOS)	Mitigated Proposed Action Alternative (delay / LOS)
2022 AM / PM Peak Hour					
6	Aviation Blvd (MD 170) at Amtrak Way (MD 995)	AM	17.1 / B	17.2 / B	16.2 / B
		PM	48.7 / D	49.3 / D	29.7 / C
2027 AM / PM Peak Hour					
6	Aviation Blvd (MD 170) at Amtrak Way (MD 995)	AM	18.0 / B	18.2 / B	17.2 / B
		PM	65.3 / E	66.0 / E	43.2 / D

Intersection 12

Intersection 12 (Aviation Blvd/MD 170 at Air Cargo Dr) operates below the SHA guideline thresholds per the Synchro methodology for 2027 in the PM peak for both the No Action and Proposed Action Alternatives. The Proposed Action Alternative causes no change in the delay at the intersection versus the No Action Alternative. Possible mitigation includes signal split optimization which improves LOS from E to D in the PM peak period. The AM peak hour operates at LOS B under the Proposed Action Alternative and does not require mitigation. Intersection 12 queues for the Mitigated Proposed Action are contained within the available storage length. **Table 74** presents the Synchro LOS for the PM peak hour without and with mitigations.

Table 74
Intersection 12 Mitigation – 2027 Synchro Intersection LOS

	Intersection	Time Period	No Action Alternative (delay / LOS)	Proposed Action Alternative (delay / LOS)	Mitigated Proposed Action Alternative (delay / LOS)
12	Aviation Blvd (MD 170) at Air Cargo Dr	AM	15.0 / B	14.7 / B	14.2 / B
		PM	58.6 / E	58.6 / E	40.6 / D

5 Conclusions and Findings

HCM results from Synchro indicate that the increase of traffic volumes in the Proposed Action Alternative will result in virtually no changes versus the No Action Alternative for either 2022 or 2027 conditions.

Four intersections operate at LOS E or F during the AM and PM peak hours in the 2027 No Action Alternative. These intersections are along Aviation Blvd/MD 170 at Dorsey Rd/MD 176 – West, Amtrak Way/MD 995 and Air Cargo Dr, and Stoney Run Rd at New Ridge Rd. Intersection 1 (Aviation Blvd/MD 170 at Dorsey Rd/MD 176 – West) also operates at LOS E or F in the 2022 No Action Alternative. The resulting site traffic from the four proposed EA developments at BWI would not further deteriorate traffic operations at the four intersections as shown in **Table 75**. To address the LOS at the four intersections, mitigations measures such as signal split optimization and restriping of an approach could be implemented. The improvements by intersection are recommended as follows:

- Intersection 1 (Aviation Blvd/MD 170 at Dorsey Rd/MD 176 – West): Recommend cycle length and signal split optimization, which reduces delays at this intersection.
- Intersection 5 (Stoney Run Rd at New Ridge Rd): Recommend signal split optimization, which reduces delays at this intersection.
- Intersection 6 (Aviation Blvd/MD 170 at Amtrak Way/MD 176): Recommend restriping of the eastbound approach from a left-only lane and a right-only lane to a left-only lane and shared left-right lane. With this restriping, the CLV analysis indicates that operations result in acceptable LOS.
- Intersection 12 (Aviation Blvd/MD 170 at Air Cargo Rd): Recommend signal split optimization, which reduces delays at this intersection.

All other intersections operate within acceptable thresholds, meaning all intersections perform at an acceptable LOS D or better. The Synchro analysis indicates that as traffic volumes grow within the corridor, even under the No Action Alternative conditions, signal optimization is necessary to reduce delays for some movements. This better manages traffic delays by shifting green time to those congested movements with poor LOS. These signal timing improvements are considered as low-cost with no impact to the surrounding infrastructure, and as such are feasible to implement.

Table 75
Summary of Intersections Operating at Undesirable LOS

Intersection		No Action				Proposed Action			
		Synchro (delay/LOS)		CLV (CLV/LOS)		Synchro (delay/LOS)		CLV (CLV/LOS)	
		AM	PM	AM	PM	AM	PM	AM	PM
2022 AM / PM Peak Hour									
1	Aviation Blvd at Dorsey Rd - West	85.4 F	72.6 E	1,473 E	1,418 D	85.4 F	72.9 E	1,476 E	1,379 D
2027 AM / PM Peak Hour									
1	Aviation Blvd at Dorsey Rd - West	96.6 F	85.4 F	1,550 E	1,492 E	96.6 F	85.6 F	1,552 E	1,494 E
5	Stoney Run Rd at New Ridge Rd	39.7 D	56.0 E	644 A	826 A	39.9 D	56.3 E	657 A	829 A
6	Aviation Blvd at Amtrak Way	18.0 B	65.3 E	1,163 C	1,567 E	18.2 B	66.0 E	1,172 C	1,571 E
12	Aviation Blvd at Air Cargo Dr	15.0 B	58.6 E	855 A	1,235 C	14.7 B	58.6 E	861 A	1,236 C

Appendix A: Traffic Counts

File Name: Aviation&Mathison
Start Date: 11/17/2015
Start Time: 7:00:00 AM
Site Code: 00000002
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	Aviation Blvd From North				Mathison Way From East				Aviation Blvd From South				N/A From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
07:00 AM	0	151	4	0	3	0	5	0	6	311	0	0	0	0	0	0
07:15 AM	0	163	2	0	6	0	6	0	7	344	0	0	0	0	0	0
07:30 AM	0	159	3	0	7	0	4	0	3	339	0	0	0	0	0	0
07:45 AM	0	172	7	0	2	0	3	0	5	325	0	0	0	0	0	0
08:00 AM	0	133	6	0	5	0	5	0	7	298	0	0	0	0	0	0
08:15 AM	0	125	3	0	5	0	0	0	6	291	0	0	0	0	0	0
08:30 AM	0	130	6	0	6	0	3	0	4	234	0	0	0	0	0	0
08:45 AM	0	116	2	0	6	3	1	0	9	196	0	1	0	3	0	0

File Name: Aviation&Mathison
Start Date: 11/4/2015
Start Time: 4:00:00 PM
Site Code: 00000002
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	Aviation Blvd From North				Mathison Way From East				Aviation Blvd From South				N/A From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
04:00 PM	0	303	4	0	5	0	3	0	4	133	0	0	0	0	0	0
04:15 PM	0	317	2	0	4	0	5	0	6	174	0	0	0	0	0	0
04:30 PM	0	331	5	0	0	0	3	0	3	155	0	0	0	0	0	0
04:45 PM	0	373	4	0	4	0	4	0	5	142	0	0	0	0	0	0
05:00 PM	0	379	3	0	4	0	7	0	6	145	0	0	0	0	0	0
05:15 PM	0	384	5	0	5	0	15	0	4	161	0	0	0	0	0	0
05:30 PM	0	408	2	0	2	0	12	0	1	155	0	0	0	0	0	0
05:45 PM	0	285	3	0	1	0	4	0	2	121	0	0	0	0	0	0

File Name: StoneyRun&NorthropGrumman
Start Date: 11/4/2015
Start Time: 8:15:00 PM
Site Code: 00000041
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	Stoney Run Road EB				Northrup Grumman Entrance SB				Closed Gate / No Access				Jughandle			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
7:00 AM	68	0	41	0	0	4	0	0	0	0	0	0	10	148	122	0
7:15 AM	83	0	38	0	0	14	0	0	0	0	0	0	1	145	114	0
7:30 AM	70	0	39	0	6	8	0	0	0	0	0	0	0	126	172	0
7:45 AM	65	0	35	0	2	12	0	0	0	0	0	0	1	120	159	0
8:00 AM	93	0	30	0	1	3	0	0	0	0	0	0	0	112	168	0
8:15 AM	93	0	24	0	2	17	0	0	0	0	0	0	0	113	133	0
8:30 AM	48	0	15	0	4	10	0	0	0	0	0	0	0	74	116	0
8:45 AM	62	0	15	0	3	12	0	0	0	0	0	0	0	61	76	0

File Name: StoneyRun&NorthropGrumman
Start Date: 11/4/2015
Start Time: 4:45:00 AM
Site Code: 00000004
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	Stoney Run Road EB				Northrup Grumman Entrance SB				Closed Gate / No Access				Jughandle			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	120	0	0	0	22	84	0	0	0	0	0	0	0	11	103	0
4:15 PM	114	0	2	0	13	90	0	0	0	0	0	0	0	15	108	0
4:30 PM	154	0	2	0	20	105	0	0	0	0	0	0	0	15	89	0
4:45 PM	117	0	3	0	30	95	0	0	0	0	0	0	0	4	81	0
5:00 PM	156	0	6	0	49	91	0	0	0	0	0	0	0	6	118	0
5:15 PM	117	0	0	0	60	105	0	0	0	0	0	0	0	8	107	0
5:30 PM	108	0	2	0	60	101	0	0	0	0	0	0	0	6	87	0
5:45 PM	89	0	1	0	40	83	0	0	0	0	0	0	0	3	65	0

File Name: StoneyRun&NewRidge
Start Date: 11/12/2015
Start Time: 7:00:00 AM
Site Code: 00000051
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	Corporate Center Drive SB				Stoney Run Road WB				New Ridge Road NB				Stoney Run Road EB			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
07:00 AM	1	0	4	0	9	40	69	0	56	10	10	0	5	17	0	0
07:15 AM	0	1	2	0	18	39	63	0	57	7	8	0	0	25	0	0
07:30 AM	2	3	2	0	15	29	57	0	63	12	5	0	11	17	0	0
07:45 AM	0	5	7	0	20	26	77	0	87	15	4	0	5	23	0	0
08:00 AM	0	3	0	0	31	38	74	0	71	17	2	0	5	23	0	0
08:15 AM	0	7	6	0	34	26	82	0	66	19	2	0	6	15	0	0
08:30 AM	2	3	3	0	12	28	73	0	104	29	3	0	4	21	0	0
08:45 AM	0	11	10	0	23	30	50	0	109	23	7	0	3	13	0	0

File Name: StoneyRun&NewRidge
Start Date: 11/12/2015
Start Time: 4:00:00 PM
Site Code: 00000052
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	Corporate Center Drive SB				Stoney Run Road WB				New Ridge Road NB				Stoney Run Road EB			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
04:00 PM	0	16	16	0	6	25	100	0	80	8	12	0	12	33	0	0
04:15 PM	0	15	15	0	7	28	116	0	66	13	11	0	8	23	0	0
04:30 PM	0	11	22	0	3	30	100	0	112	13	9	0	10	31	1	0
04:45 PM	0	16	17	0	3	41	96	0	88	13	9	0	10	25	0	0
05:00 PM	0	12	31	0	6	35	115	0	115	9	13	0	4	43	0	0
05:15 PM	0	12	22	0	10	33	77	0	107	13	9	0	6	28	0	0
05:30 PM	1	15	19	0	5	35	82	0	97	9	6	0	10	31	1	0
05:45 PM	0	14	14	0	1	43	77	0	76	8	7	0	10	21	0	0

File Name: Aviation&ParkingLot
Start Date: 11/17/2015
Start Time: 7:00:00 AM
Site Code: 00000071
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	Aviation Blvd SB				WB				Aviation Blvd NB				Parking Lot EB			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
07:00 AM	97	411	0	0	0	0	1	0	0	226	22	0	2	0	2	0
07:15 AM	89	420	0	3	0	0	0	0	0	275	25	0	0	0	3	0
07:30 AM	88	368	0	0	0	0	0	0	0	273	32	0	1	0	12	0
07:45 AM	133	268	16	11	0	0	0	0	0	161	23	0	0	0	7	0
08:00 AM	94	281	0	9	0	0	0	0	0	212	25	0	1	0	5	0
08:15 AM	118	210	0	17	0	0	0	0	0	193	21	0	2	0	5	0
08:30 AM	86	214	0	6	0	0	0	1	0	191	14	0	1	2	7	0
08:45 AM	73	259	0	0	0	0	0	0	0	221	14	0	1	0	4	0

File Name: Aviation&ParkingLot
Start Date: 11/5/2015
Start Time: 4:00:00 PM
Site Code: 00000072
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	Airport Drive SB				N/A				Airport Drive NB				Parking Lot EB			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
04:00 PM	10	323	0	1	0	0	0	0	0	430	4	0	31	0	74	0
04:15 PM	19	342	0	0	0	0	0	0	0	309	5	0	28	0	67	0
04:30 PM	17	303	0	0	0	0	0	0	0	364	4	0	21	0	112	0
04:45 PM	13	323	0	0	0	0	0	0	0	441	4	0	22	0	69	0
05:00 PM	8	344	0	0	0	0	0	0	0	444	5	0	28	0	72	0
05:15 PM	10	319	0	0	0	0	0	0	0	402	0	0	42	0	79	0
05:30 PM	7	309	0	0	0	0	0	0	0	343	2	0	21	0	100	0
05:45 PM	8	302	0	0	0	0	0	0	0	393	6	0	20	0	70	0

	EBT (15)
7:00-7:15AM	26
7:15-7:30AM	18
7:30-7:45AM	14
7:45-8:00AM	29
8:00-8:15AM	21
8:15-8:30AM	29
8:30-8:45AM	25
8:45-9:00AM	23

	EBR (14)
7:00-7:15AM	85
7:15-7:30AM	72
7:30-7:45AM	82
7:45-8:00AM	61
8:00-8:15AM	73
8:15-8:30AM	81
8:30-8:45AM	73
8:45-9:00AM	81

	NBL (12)		NBR (10)
7:00-7:15AM	142	7:00-7:15AM	12
7:15-7:30AM	149	7:15-7:30AM	11
7:30-7:45AM	153	7:30-7:45AM	5
7:45-8:00AM	154	7:45-8:00AM	6
8:00-8:15AM	124	8:00-8:15AM	10
8:15-8:30AM	113	8:15-8:30AM	14
8:30-8:45AM	141	8:30-8:45AM	4
8:45-9:00AM	156	8:45-9:00AM	10

	WBT (7)
7:00-7:15AM	107
7:15-7:30AM	109
7:30-7:45AM	123
7:45-8:00AM	149
8:00-8:15AM	128
8:15-8:30AM	97
8:30-8:45AM	78
8:45-9:00AM	84

	WBL (8)
7:00-7:15AM	3
7:15-7:30AM	9
7:30-7:45AM	5
7:45-8:00AM	7
8:00-8:15AM	2
8:15-8:30AM	5
8:30-8:45AM	3
8:45-9:00AM	10

File Name: ElkridgeLanding&Terminal
Start Date: 11/5/2015
Start Time: 5:00:00 AM
Site Code: 00000102
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	Terminal Road SB				Elkridge Road WB				Terminal Road NB				Elkridge Road EB			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	0	0	0	0	0	34	8	0	11	0	80	0	223	110	0	1
4:15 PM	0	0	0	0	0	31	8	0	8	0	72	0	177	81	0	0
4:30 PM	0	0	0	0	0	22	8	0	9	0	85	0	173	96	0	0
4:45 PM	0	0	0	0	0	33	5	0	9	0	80	0	167	80	0	0
5:00 PM	0	0	0	0	0	17	11	0	11	0	93	0	169	91	0	0
5:15 PM	0	0	0	0	0	29	4	0	12	0	81	0	143	69	0	0
5:30 PM	0	0	0	0	0	23	5	0	4	0	72	0	122	87	0	0
5:45 PM	0	0	0	0	0	31	4	0	5	0	48	0	101	49	0	0

File Name: Aviation&AirCargo
Start Date: 11/17/2015
Start Time: 7:00:00 AM
Site Code: 00000121
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	Elkridge Landing SB				Aviation Drive WB				All Cargo Drive NB				Aviation Drive EB			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
07:00 AM	16	4	9	0	118	213	10	0	5	4	21	0	10	96	16	0
07:15 AM	8	4	15	0	146	200	18	0	2	3	17	0	14	98	18	0
07:30 AM	5	4	11	0	118	231	11	0	8	3	12	0	11	85	19	0
07:45 AM	10	7	28	0	148	231	12	0	4	4	21	0	15	65	20	0
08:00 AM	9	1	14	0	110	243	17	0	16	4	16	0	13	75	14	0
08:15 AM	8	3	18	0	104	176	16	0	7	3	15	0	25	92	10	0
08:30 AM	4	2	13	0	85	176	6	0	12	6	16	0	15	88	5	0
08:45 AM	8	3	18	0	79	174	12	0	3	4	20	0	32	103	9	3

File Name: Aviation&AirCargo
Start Date: 11/17/2015
Start Time: 4:00:00 PM
Site Code: 00000122
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	Elkridge Landing SB				Aviation Drive WB				All Cargo Drive NB				Aviation Drive EB			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
04:00 PM	20	8	105	0	20	121	9	0	6	2	23	0	23	160	3	0
04:15 PM	11	2	116	0	30	97	13	0	4	1	33	0	27	145	6	0
04:30 PM	25	4	99	0	20	127	10	0	15	5	28	0	27	182	13	0
04:45 PM	11	7	98	0	15	128	10	0	13	3	27	0	27	224	7	0
05:00 PM	12	3	90	0	24	145	8	0	14	3	26	0	21	178	7	0
05:15 PM	11	0	78	0	17	138	9	0	12	1	20	0	15	207	7	0
05:30 PM	6	0	75	0	22	113	14	0	6	0	20	0	11	203	3	0
05:45 PM	9	7	63	0	23	99	10	0	3	2	20	0	18	174	2	0

File Name: Aviation&Ferndale-Aaronson
Start Date: 11/17/2015
Start Time: 7:00:00 AM
Site Code: 00000141
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	Aviation Boulevard SB				Ferndale Road WB				Aviation Boulevard NB				Aaronson Drive EB			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
07:00 AM	1	122	2	0	9	0	2	0	3	315	6	0	1	0	2	0
07:15 AM	7	134	3	0	10	0	3	0	0	332	7	0	0	0	4	0
07:30 AM	6	128	2	0	11	1	8	0	2	337	3	0	5	0	2	0
07:45 AM	5	130	4	0	6	0	9	0	1	358	7	0	5	0	7	0
08:00 AM	4	114	4	0	9	0	6	0	2	291	3	0	2	0	3	0
08:15 AM	4	118	4	0	5	1	1	0	0	274	6	0	3	0	5	0
08:30 AM	3	120	2	0	3	0	2	0	2	245	4	0	0	0	2	0
08:45 AM	5	110	3	0	4	0	3	0	0	225	7	0	2	0	2	0

File Name: Aviation&Ferndale-Aaronson
Start Date: 11/17/2015
Start Time: 4:00:00 PM
Site Code: 00000142
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	Aviation Boulevard SB				Ferndale Road WB				Aviation Boulevard NB				Aaronson Drive EB			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
04:00 PM	5	248	12	0	3	0	5	0	5	173	6	0	6	0	4	0
04:15 PM	3	256	11	0	6	0	3	0	5	159	5	0	6	0	4	0
04:30 PM	2	262	10	0	4	0	4	0	7	194	2	0	1	0	3	0
04:45 PM	4	282	13	0	1	0	3	0	5	185	6	0	3	0	1	0
05:00 PM	4	261	17	0	6	0	3	0	2	213	5	0	2	0	5	0
05:15 PM	4	291	12	0	2	1	2	0	3	161	5	0	1	1	3	0
05:30 PM	2	218	16	0	3	0	3	0	5	164	4	0	1	0	4	0
05:45 PM	1	197	18	0	1	0	3	0	4	128	1	0	1	0	8	0

File Name: Aviation&Allwood
Start Date: 11/18/2015
Start Time: 7:00:00 AM
Site Code: 00000151
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	Aviation Boulevard SB				Allwood Drive WB				Aviation Boulevard NB				MAA Entrance EB			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
07:00 AM	3	137	1	0	7	0	6	0	3	250	20	0	7	0	3	0
07:15 AM	7	135	1	0	4	0	5	0	6	309	19	0	3	0	8	0
07:30 AM	6	149	0	0	4	1	3	0	3	355	13	0	1	0	1	0
07:45 AM	8	143	1	0	8	0	9	0	1	359	13	0	1	0	2	0
08:00 AM	4	122	4	0	5	0	4	0	1	305	7	0	7	0	10	0
08:15 AM	5	122	2	0	2	1	5	0	2	277	10	0	4	0	6	0
08:30 AM	3	112	1	0	2	0	8	0	2	246	6	0	3	0	7	0
08:45 AM	3	117	0	0	1	0	6	0	3	258	10	0	1	0	5	0

File Name: Aviation&Allwood
Start Date: 11/18/2015
Start Time: 4:00:00 PM
Site Code: 00000152
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	Aviation Boulevard SB				Allwood Drive WB				Aviation Boulevard NB				MAA Entrance EB			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
04:00 PM	3	260	4	0	1	0	5	0	10	193	4	0	20	0	7	0
04:15 PM	2	275	1	0	2	0	1	0	4	210	5	0	3	0	5	0
04:30 PM	1	269	1	0	3	0	3	0	6	193	7	0	6	0	4	0
04:45 PM	2	285	2	0	2	0	8	0	13	175	9	0	5	0	2	0
05:00 PM	1	274	3	0	5	0	3	0	21	227	14	0	8	1	2	0
05:15 PM	2	288	2	0	2	0	2	0	9	210	8	0	3	1	0	0
05:30 PM	1	281	3	0	2	0	3	0	9	176	12	0	0	0	4	0
05:45 PM	1	217	2	0	2	0	7	0	8	160	1	0	0	0	1	0

File Name: CromwellPark
Start Date: 11/18/2015
Start Time: 7:00:00 AM
Site Code: 00000016
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	Cromwell Park Drive SB				97 Off-Ramp WB				N/A				Cromwell Park EB			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
07:00 AM	6	16	0	0	23	93	0	0	0	0	0	0	84	0	33	0
07:15 AM	11	12	1	0	34	101	0	0	0	0	0	0	70	0	23	0
07:30 AM	4	15	1	0	37	128	0	0	0	0	0	0	83	0	27	0
07:45 AM	5	14	0	0	45	141	0	0	0	0	0	0	61	0	57	0
08:00 AM	14	14	0	0	44	114	0	1	0	0	0	0	73	0	43	0
08:15 AM	12	18	1	0	53	117	0	0	0	0	0	0	52	0	43	0
08:30 AM	10	9	1	0	42	101	0	0	0	0	0	0	70	1	42	0
08:45 AM	9	18	1	0	38	80	0	0	0	0	0	0	59	0	29	0

File Name: CromwellPark
Start Date: 11/18/2015
Start Time: 4:00:00 PM
Site Code: 00000016
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	Cromwell Park Drive SB				97 Off-Ramp WB				N/A				Cromwell Park EB			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
04:00 PM	32	26	6	0	6	48	0	0	0	0	0	0	167	1	12	0
04:15 PM	38	50	3	0	7	51	0	0	0	0	0	0	180	0	5	0
04:30 PM	43	50	0	0	7	39	0	0	0	0	0	0	170	0	7	0
04:45 PM	30	36	0	0	6	62	0	0	0	0	0	0	195	0	12	0
05:00 PM	62	91	0	0	6	49	0	0	0	0	0	0	154	0	11	0
05:15 PM	25	48	0	0	10	36	0	0	0	0	0	0	171	0	6	0
05:30 PM	20	24	3	0	4	47	0	0	0	0	0	0	145	31	8	0
05:45 PM	18	28	8	0	3	33	0	0	0	0	0	0	121	1	10	0

File Name: Dorsey&Digiulian
Start Date: 11/12/2015
Start Time: 7:00:00 AM
Site Code: 00000191
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	BWI Post 10 SB				Dorsey Road WB				Digiulian Road NB				Dorsey Road EB			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
07:00 AM	6	0	20	0	3	130	1	0	0	0	0	0	2	53	8	0
07:15 AM	2	0	4	0	1	98	3	0	3	0	1	0	3	45	5	0
07:30 AM	0	0	5	0	2	123	2	0	2	0	0	0	2	39	3	0
07:45 AM	0	0	0	0	4	85	1	0	0	0	1	0	3	35	2	0
08:00 AM	2	0	5	0	8	64	3	0	2	0	3	0	2	48	5	0
08:15 AM	2	0	1	0	7	88	0	0	1	0	1	0	0	45	1	0
08:30 AM	2	1	5	0	5	101	2	0	3	0	0	0	0	59	2	0
08:45 AM	0	0	1	0	6	154	1	0	1	0	0	0	2	90	0	0

File Name: Dorsey&Digiulian
Start Date: 11/12/2015
Start Time: 4:00:00 PM
Site Code: 00000192
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	BWI Post 10 SB				Dorsey Road WB				Digiulian Road NB				Dorsey Road EB			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
04:00 PM	0	0	9	0	0	91	4	0	8	0	6	0	10	246	0	0
04:15 PM	3	0	6	0	7	91	0	0	6	0	5	0	4	226	0	0
04:30 PM	2	0	6	0	2	100	5	0	6	0	5	0	6	288	0	0
04:45 PM	4	0	2	0	5	98	4	0	7	0	2	0	3	284	0	0
05:00 PM	4	0	6	0	9	116	5	0	5	0	6	0	2	346	0	0
05:15 PM	3	0	16	0	3	86	5	0	3	0	2	0	1	343	3	0
05:30 PM	8	0	2	0	8	78	3	0	5	0	2	0	1	269	1	0
05:45 PM	6	0	9	0	10	81	5	0	6	0	4	0	4	212	3	0

File Name: Aviation & Dorsey - East
Start Date: 6/1/2016
Start Time: 7:00:00 AM
Site Code: 00000181
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	From North				From East				From South				From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
07:00 AM	79	16	13	0	226	87	10	0	40	45	25	0	4	73	16	4
07:15 AM	84	14	15	0	216	72	4	0	45	52	42	0	2	77	38	0
07:30 AM	78	24	33	0	305	150	7	0	42	73	39	0	5	74	27	2
07:45 AM	86	19	28	0	294	117	8	0	31	64	58	0	0	92	36	0
08:00 AM	87	14	21	0	314	99	0	0	30	55	49	0	0	55	26	0
08:15 AM	54	14	23	0	260	98	5	0	25	30	36	0	4	76	17	2
08:30 AM	56	19	33	0	230	86	3	2	32	28	29	0	9	71	22	1
08:45 AM	78	30	37	0	225	105	4	0	24	25	28	0	4	77	33	3

File Name: Aviation & Dorsey - East
Start Date: 6/1/2016
Start Time: 4:00:00 PM
Site Code: 00000182
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	From North				From East				From South				From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
04:00 PM	50	57	70	0	117	87	12	0	34	35	15	0	24	190	28	4
04:15 PM	34	61	77	0	128	72	11	0	18	14	12	0	23	165	28	5
04:30 PM	43	62	85	0	100	72	11	0	25	26	11	0	40	217	30	4
04:45 PM	54	44	67	0	123	67	14	0	23	39	11	0	29	188	34	13
05:00 PM	51	84	139	1	107	76	9	0	12	25	7	0	56	253	32	11
05:15 PM	61	96	97	0	107	77	15	0	31	26	4	0	60	238	24	5
05:30 PM	48	83	81	0	99	79	16	0	25	23	7	0	51	220	32	13
05:45 PM	50	70	61	0	104	67	9	0	25	26	19	0	38	164	24	34

File Name: Aviation & Hollins Ferry
Start Date: 6/1/2016
Start Time: 7:00:00 AM
Site Code: 201
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	From North				From East				From South				From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
07:00 AM	0	0	15	0	8	0	0	0	30	292	0	0	0	0	0	0
07:15 AM	0	0	9	0	20	0	0	0	37	305	0	0	0	0	0	0
07:30 AM	0	0	16	0	19	0	0	0	41	381	0	0	0	0	0	0
07:45 AM	0	0	9	0	8	0	0	0	43	386	0	0	0	0	0	0
08:00 AM	0	0	14	0	15	0	0	0	41	341	0	0	0	0	0	0
08:15 AM	0	0	14	0	15	0	0	0	33	269	0	0	0	0	0	0
08:30 AM	0	0	12	0	16	0	0	0	32	256	0	0	0	0	0	0
08:45 AM	0	0	11	0	9	0	0	0	29	254	0	0	0	0	0	0

File Name: Aviation & Hollins Ferry
Start Date: 6/2/2016
Start Time: 4:00:00 PM
Site Code: 00000202
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	From North				From East				From South				From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
04:00 PM	0	0	16	0	18	0	0	0	22	138	0	0	0	0	0	0
04:15 PM	0	0	14	0	16	0	0	0	31	158	0	2	0	0	0	0
04:30 PM	0	0	10	0	18	0	0	0	23	121	0	0	0	0	0	0
04:45 PM	0	0	8	0	17	0	0	0	24	199	0	0	0	0	0	0
05:00 PM	0	0	17	0	26	0	0	0	21	181	0	0	0	0	0	0
05:15 PM	0	0	15	0	19	0	0	0	14	191	0	0	0	0	0	0
05:30 PM	0	0	18	0	14	0	0	0	8	142	0	0	0	0	0	0
05:45 PM	0	0	8	0	16	0	0	0	19	200	0	0	0	0	0	0

File Name: Aviation and Long Term Lot
Start Date: 6/2/2016
Start Time: 7:00:00 AM
Site Code: 00000211
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	From North				From East				From South				From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
07:00 AM	1	1	0	0	4	212	1	0	0	1	8	0	16	70	15	0
07:15 AM	1	0	0	0	4	225	0	0	0	0	4	0	13	61	14	0
07:30 AM	1	0	0	0	3	262	1	0	0	0	5	0	11	55	14	0
07:45 AM	4	1	0	0	5	254	0	0	0	0	2	0	18	104	19	0
08:00 AM	0	0	0	0	2	255	0	1	0	0	8	0	13	70	17	0
08:15 AM	4	0	0	0	3	185	2	0	0	0	7	0	15	81	20	0
08:30 AM	0	0	0	0	5	198	1	0	0	0	2	0	12	61	8	0
08:45 AM	1	0	0	0	5	152	0	0	0	0	5	0	16	80	17	0

File Name: Aviation & Long Term Parking
Start Date: 6/2/2016
Start Time: 4:00:00 PM
Site Code: 00000212
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	From North				From East				From South				From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
04:00 PM	7	0	0	0	1	93	2	0	0	1	4	0	13	217	10	0
04:15 PM	6	0	0	0	5	64	3	0	0	1	5	0	10	191	10	0
04:30 PM	9	0	6	0	3	78	3	0	0	1	8	0	7	226	14	0
04:45 PM	6	0	1	0	2	105	1	0	0	0	2	0	10	276	16	0
05:00 PM	7	0	3	0	1	99	2	0	0	0	12	0	20	255	9	0
05:15 PM	4	1	2	0	3	124	0	0	0	1	8	0	13	245	15	0
05:30 PM	4	0	3	0	1	110	2	0	3	0	8	0	13	225	14	0
05:45 PM	2	0	1	0	2	87	0	0	1	0	6	0	13	239	19	0

Appendix B: Traffic Operations Reports – HCM 2000

BWI TIA MOE Table - 2016 AM

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
1	Aviation Blvd (MD 170) at Dorsey Rd (MD 176) - West	Signalized	NBL	401	67.8	E	65.5	E	63.5	E	455	440	630
			NBT	1,194	70.5	E					-	741	#1031
			NBR	247	37.9	D					250	117	225
			SBL	139	78.7	E	61.8	E			250	159	260
			SBT	301	59.1	E					-	168	249
			SBR	230	55.1	E					175	0	88
			EBL	281	73.9	E	55.1	E			175	317	#558
			EBT	298	43.9	D					-	140	215
			EBR	136	41.0	D					225	0	59
			WBL	84	77.6	E	69.8	E			200	96	175
			WBT	446	68.4	E					-	263	360
			WBR	0	-	-					-	-	-
2	Aviation Blvd (MD 170) at Mathison Way	Signalized	NBT	1,524	5.7	A	5.7	A	5.2	A	-	151	397
			NBR	21	2.5	A					450	0	7
			SBL	16	2.6	A	1.4	A			375	1	3
			SBT	652	1.3	A					-	24	29
			WBL	18	54.6	D	53.5	D			450	14	39
			WBR	18	52.5	D					-	0	24
3	Aviation Blvd (MD 170) at Stoney Run Rd	Signalized	NBT	1,157	39.0	D	29.4	C	25.2	C	-	416	84
			NBR	385	0.4	A					-	0	0
			SBL	147	43.6	D	24.8	C			575	157	192
			SBT	616	2.1	A					-	84	38
			WBL	52	53.7	D	8.3	A			-	42	83
			WBR	299	0.3	A					-	0	0
4	Stoney Run Rd at Northrop Grumman Entrance	Signalized	NBL	619	12.5	B	14.4	B	19.0	B	-	76	254
			NBT	509	16.6	B					-	140	#562
			SBT	37	36.1	D	35.5	D			-	15	59
			SBR	9	33.1	C					85	0	16
			EBL	143	31.3	C	28.8	C			-	58	160
			EBR	314	27.7	C					550	0	80
5	Stoney Run Rd at New Ridge Rd	Signalized	NBL	14	52.3	D	48.6	D	37.5	D	-	82	159
			NBT	89							-		
			NBR	360	47.6	D					-	0	104
			SBL	22	58.1	E	47.3	D			-	18	53
			SBT	24	38.1	D					-	16	45
			SBR	2							-		
			EBL	0	-	-	21.9	C			-	0	0
			EBT	76	22.1	C					-	41	96
			EBR	18	20.9	C					125	0	0
			WBL	350	51.3	D	31.0	C			300	423	423
			WBT	153	5.4	A					-	77	77
			WBR	125	5.2	A					150	21	21
6	Aviation Blvd (MD 170) at Amtrak Way (MD 995)	Signalized	NBL	120	76.8	E	8.0	A	11.4	B	225	106	m146
			NBT	1,336	1.8	A					-	21	55
			SBT	1,191	8.6	A	7.8	A			-	100	140
			SBR	402	5.6	A					-	14	23
			EBL	110	51.3	D	49.3	D			-	88	144
			EBR	167	48.0	D					185	0	65
7	Aviation Blvd (MD 170) at Northrup Grumman Gate 1A	Signalized	NBL	103	60.7	E	5.0	A	8.2	A	225	92	152
			NBT	1,342	0.7	A					-	6	16
			SBT	1,588	10.1	B	9.7	A			-	391	m486
			SBR	441	8.0	A					-	53	m44
			EBL	34	56.1	E	47.2	D			-	14	31
			EBR	6	0.0	A					-	0	0
8	Aviation Blvd (MD 170) at SB I-195 Ramps	Signalized	NBT	1,207	4.0	A	3.5	A	3.3	A	-	87	178
			NBR	170	0.1	A					50	0	0
			SBL	68	3.2	A	1.5	A			350	1	15
			SBT	569	1.3	A					-	17	44
			WBL	17	53.6	D	34.5	C			-	13	37
			WBR	9	0.0	A					-	0	0
9	Aviation Blvd (MD 170) at NB I-195 Ramps	Signalized	NBT	1,096	3.6	A	5.3	A	6.9	A	-	65	120
			NBR	569	8.8	A					-	0	45
			SBT	522	2.2	A	2.2	A			-	41	54
			WBL	114	51.5	D	51.5	D			-	90	146
10	Terminal Rd at Elkridge Landing Rd	Signalized	NBL	612	30.1	C	29.2	C	19.5	B	-	326	491
			NBR	37	13.0	B					-	1	17
			EBT	88	22.5	C	5.0	A			-	22	52
			EBR	334	0.4	A					-	0	0
			WBL	27	16.2	B	19.3	B			150	10	33
			WBT	493	19.4	B					-	112	203

BWI TIA MOE Table - 2016 AM

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
11	Aviation Blvd (MD 170) at Terminal Rd	Signalized	NBL	80	51.9	D	22.6	C	26.3	C	300	32	58
			NBT	127	41.3	D					-	92	147
			NBR	210	0.2	A					400	0	0
			SBT	84	51.8	D	12.2	B			-	35	61
			SBR	277	0.3	A					-	0	0
			EBL	524	49.9	D	28.0	C			445	211	294
			EBT	396	12.3	B					-	50	84
			EBR	189	0.2	A					445	0	0
			WBL	317	54.7	D	30.8	C			615	91	152
			WBT	697	19.9	B					-	260	303
			WBR	0	-	-					-	-	-
12	Aviation Blvd (MD 170) at Air Cargo Dr	Signalized	NBL	67	51.6	D	50.4	D	12.8	B	-	65	114
			NBT	14							-		
			NBR	34	47.5	D					-	0	0
			SBL	77	53.6	D	52.4	D			-	54	101
			SBT	16	51.2	D					-	23	67
			SBR	32							-		
			EBL	96	18.7	B	15.7	B			275	33	110
			EBT	438	17.6	B					-	110	210
			EBR	72	0.1	A					-	0	0
			WBL	59	3.1	A	5.5	A			375	8	8
			WBT	914	8.5	A					-	177	196
			WBR	527	0.6	A					475	0	0
13	Aviation Blvd (MD 162) at Andover Rd	Signalized	WBT	1,157	9.2	A	9.4	A	14.4	B	-	196	473
			WBR	245	10.7	B					200	21	127
			EBL	9	3.2	A	48.3	D			415	3	0
			EBT	298	4.5	A					-	57	0
			SBL	244	50.9	D	4.5	A			175	124	187
			SBR	51	45.6	D					-	60	122
14	Aviation Blvd (MD 162) at Aaronson Dr	Unsignalized	NBL	23	8.7	A	0.1	A	3.6	A	-	4	0
			NBT	1,356	-	-					-	-	-
			NBR	6							-		
			SBL	11	13.2	B	0.3	A			-	-	-
			SBT	519	-	-					-	-	-
			SBR	19							-		
			EBL	15	40.1	E	40.1	E			-	-	-
			EBT	0							-		
			EBR	11							-		
			WBL	22	101.0	F	101.0	F			-	-	-
			WBT	1							-		
			WBR	36							-		
15	Aviation Blvd (MD 162) at Allwood Dr	Signalized	NBL	53	1.8	A	4.5	A	6.9	A	300	5	13
			NBT	1,342	4.7	A					-	111	287
			NBR	11	2.3	A					100	0	0
			SBL	6	5.6	A	6.5	A			225	1	m1
			SBT	555	6.7	A					-	94	126
			SBR	25	3.1	A					225	0	8
			EBL	21	53.1	D	52.4	D			-	17	43
			EBT	0	51.2	D					-	0	0
			EBR	12							-		
			WBL	21	53.3	D	53.3	D			-	18	56
			WBT	1							-		
			WBR	21							-		
16	SB I-97 Ramps at Cromwell Park Dr	Signalized	SBT	62	45.2	D	44.6	D	15.6	B	-	21	43
			SBR	35	43.6	D					-	0	0
			EBL	186	42.8	D	18.5	B			420	53	98
			EBR	294	3.1	A					-	0	10
			WBT	505	9.8	A	9.6	A			-	85	130
			WBR	181	8.9	A					600	0	32
17	Aviation Blvd (MD 162) at Cromwell Park Dr	Signalized	NBT	1,381	18.1	B	17.5	B	21.7	C	-	232	350
			NBR	170	13.1	B					1000	0	36
			SBL	309	37.4	D	26.3	C			425	67	122
			SBT	156	4.5	A					-	14	31
			WBL	347	35.4	D	29.7	C			-	108	192
			WBR	194	19.7	B					600	80	170

BWI TIA MOE Table - 2016 AM

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
18	Aviation Blvd (MD 162) at Dorsey Rd (MD 176) - East	Signalized	NBL	252	34.0	C	37.0	D	21.3	C	350	50	106
			NBT	148	38.4	D					-	103	200
			NBR	97							-		
			SBL	71	38.4	D	38.5	D			490	27	65
			SBT	335	37.9	D					-	21	52
			SBR	131	38.6	D					300	0	95
			EBL	298	13.7	B	16.2	B			350	41	99
			EBT	7	17.3	B					-	35	86
			EBR	19							-		
			WBL	438	21.8	C	11.6	B			425	6	22
			WBT	1,168	27.9	C					-	117	221
			WBR	188	5.3	A					-	0	0
19	Dorsey Rd (MD 176) at Digiulian Blvd	Unsignalized	NBL	4	10.6	B	10.6	B	0.7	A	-	-	-
			NBT	0							-		
			NBR	7							-		
			SBL	12	13.6	B	13.6	B			-	-	-
			SBT	1							-		
			SBR	6							-		
			EBL	8	8.4	A	0.3	A			-	-	-
			EBT	245	-	-					-	-	-
			EBR	4	-	-					-	-	-
			WBL	6	7.8	A	0.1	A			-	-	-
			WBT	411	-	-					-	-	-
			WBR	26	-	-					-	-	-
20	Aviation Blvd (MD 162) at Hollins Ferry Rd	Signalized	NBT	1,413	2.6	A	2.4	A	2.3	A	-	58	90
			NBR	162	0.2	A					485	0	0
			SBL	48	23.3	C	2.2	A			575	16	40
			SBT	465	0.0	A					-	0	0
			WBR	62	0.1	A	0.1	A			-	0	0
21	Aviation Blvd (MD 170) at Long Term Parking Lots	Signalized	NBL	22	55.7	E	55.7	E	5.3	A	-	18	45
			NBT	0	-	-					-	0	0
			NBR	0		-					-		
			SBL	0	-	-	5.9	A			-	1	6
			SBT	1		-					-		
			SBR	7	0.0	A					-	0	0
			EBL	64	4.6	A	5.2	A			250	24	1
			EBT	307	4.6	A					-	62	130
			EBR	55	9.3	A					350	6	42
			WBL	1	4.1	A	4.2	A			235	0	m0
			WBT	1,193	4.2	A					-	107	187
			WBR	14	2.7	A					375	0	m0
22	Aviation Blvd (MD 162) at S Camp Meade Rd (MD 170)	Signalized	SBL	6	58.3	E	1.6	A	3.7	A	-	5	21
			SBR	291	0.3	A					600	0	0
			EBL	130	21.3	C	5.2	A			600	15	88
			EBT	420	0.2	A					-	0	8
			WBT	1,210	3.5	A	2.5	A			-	1	200
			WBR	12	0.0	A					-	0	m0

Notes

m Volume for 95th percentile queue is metered by upstream signal.

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	305	324	148	91	485	436	1298	268	151	327	250
v/c Ratio	0.80	0.29	0.25	0.57	0.73	0.84	0.97	0.40	0.69	0.45	0.48
Control Delay	79.9	46.1	7.3	88.9	71.8	70.7	70.7	23.5	87.5	62.9	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.9	46.1	7.3	88.9	71.8	70.7	70.7	23.5	87.5	62.9	9.8
Queue Length 50th (ft)	317	140	0	96	263	440	741	117	159	168	0
Queue Length 95th (ft)	#558	215	59	175	360	630	#1031	225	260	249	88
Internal Link Dist (ft)		640			713		584			1313	
Turn Bay Length (ft)	175		225	200		455		250	250		175
Base Capacity (vph)	381	1105	596	381	868	646	1822	873	381	1292	736
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.29	0.25	0.24	0.56	0.67	0.71	0.31	0.40	0.25	0.34

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	281	298	136	84	446	0	401	1194	247	139	301	230
Future Volume (vph)	281	298	136	84	446	0	401	1194	247	139	301	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	305	324	148	91	485	0	436	1298	268	151	327	250
RTOR Reduction (vph)	0	0	102	0	0	0	0	0	75	0	0	198
Lane Group Flow (vph)	305	324	46	91	485	0	436	1298	193	151	327	52
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4						6			2
Actuated Green, G (s)	35.2	49.4	49.4	14.3	28.5		48.5	60.2	60.2	20.0	31.7	31.7
Effective Green, g (s)	36.2	52.4	52.4	15.3	31.5		49.5	63.2	63.2	21.0	34.7	34.7
Actuated g/C Ratio	0.22	0.31	0.31	0.09	0.19		0.29	0.38	0.38	0.13	0.21	0.21
Clearance Time (s)	5.0	7.0	7.0	5.0	7.0		5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	381	1104	494	161	663		521	1332	595	221	731	327
v/s Ratio Prot	c0.17	0.09		0.05	c0.14		c0.25	c0.37		0.09	0.09	
v/s Ratio Perm			0.03						0.12			0.03
v/c Ratio	0.80	0.29	0.09	0.57	0.73		0.84	0.97	0.32	0.68	0.45	0.16
Uniform Delay, d1	62.4	43.7	40.9	73.1	64.2		55.4	51.6	37.2	70.3	58.2	54.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.4	0.1	0.1	4.5	4.2		12.4	18.9	0.7	8.4	0.9	0.5
Delay (s)	73.9	43.9	41.0	77.6	68.4		67.8	70.5	37.9	78.7	59.1	55.1
Level of Service	E	D	D	E	E		E	E	D	E	E	E
Approach Delay (s)		55.1			69.8			65.5			61.8	
Approach LOS		E			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	63.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	167.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	20	20	1657	23	17	709
v/c Ratio	0.13	0.13	0.56	0.02	0.06	0.23
Control Delay	51.4	21.1	5.9	1.9	1.4	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.4	21.1	5.9	1.9	1.4	1.4
Queue Length 50th (ft)	14	0	151	0	1	24
Queue Length 95th (ft)	39	24	397	7	3	29
Internal Link Dist (ft)	716		2236			2190
Turn Bay Length (ft)	450			450	375	
Base Capacity (vph)	456	422	2934	1316	433	3082
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.05	0.56	0.02	0.04	0.23

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	18	18	1524	21	16	652
Future Volume (vph)	18	18	1524	21	16	652
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1531	3421	1531	1711	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.11	1.00
Satd. Flow (perm)	1711	1531	3421	1531	204	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	20	1657	23	17	709
RTOR Reduction (vph)	0	19	0	5	0	0
Lane Group Flow (vph)	20	1	1657	18	17	709
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Actuated Green, G (s)	5.9	5.9	92.9	92.9	101.1	101.1
Effective Green, g (s)	7.9	7.9	95.9	95.9	102.1	104.1
Actuated g/C Ratio	0.07	0.07	0.80	0.80	0.85	0.87
Clearance Time (s)	6.0	6.0	7.0	7.0	5.0	7.0
Vehicle Extension (s)	5.0	5.0	6.0	6.0	5.0	6.0
Lane Grp Cap (vph)	112	100	2733	1223	226	2967
v/s Ratio Prot	c0.01		c0.48		0.00	c0.21
v/s Ratio Perm		0.00		0.01	0.06	
v/c Ratio	0.18	0.01	0.61	0.02	0.08	0.24
Uniform Delay, d1	53.0	52.4	4.7	2.4	3.6	1.3
Progression Factor	1.00	1.00	1.00	1.00	0.64	0.85
Incremental Delay, d2	1.6	0.1	1.0	0.0	0.3	0.2
Delay (s)	54.6	52.5	5.7	2.5	2.6	1.3
Level of Service	D	D	A	A	A	A
Approach Delay (s)	53.5		5.7			1.4
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay	5.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	57	325	1258	418	807	670
v/c Ratio	0.35	0.21	0.76	0.27	0.78	0.23
Control Delay	56.1	0.3	40.6	0.4	31.5	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.1	0.3	40.6	0.4	31.5	3.0
Queue Length 50th (ft)	42	0	416	0	157	84
Queue Length 95th (ft)	83	0	#684	0	192	38
Internal Link Dist (ft)	319		2190			575
Turn Bay Length (ft)					575	
Base Capacity (vph)	285	1531	1661	1531	1294	2958
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.21	0.76	0.27	0.62	0.23

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	52	299	1157	385	742	616
Future Volume (vph)	52	299	1157	385	742	616
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1531	3421	1531	3319	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1711	1531	3421	1531	3319	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	325	1258	418	807	670
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	57	325	1258	418	807	670
Turn Type	Prot	Free	NA	Free	Prot	NA
Protected Phases	4		6		5 7	2 5 7
Permitted Phases		Free		Free		
Actuated Green, G (s)	8.2	120.0	54.1	120.0	34.2	100.3
Effective Green, g (s)	10.2	120.0	57.1	120.0	36.2	103.3
Actuated g/C Ratio	0.08	1.00	0.48	1.00	0.30	0.86
Clearance Time (s)	6.0		7.0			
Vehicle Extension (s)	3.0		5.0			
Lane Grp Cap (vph)	145	1531	1627	1531	1001	2944
v/s Ratio Prot	c0.03		c0.37		c0.24	0.20
v/s Ratio Perm		0.21		0.27		
v/c Ratio	0.39	0.21	0.77	0.27	0.81	0.23
Uniform Delay, d1	52.0	0.0	26.1	0.0	38.7	1.4
Progression Factor	1.00	1.00	1.38	1.00	1.02	1.46
Incremental Delay, d2	1.8	0.3	3.1	0.4	4.1	0.0
Delay (s)	53.7	0.3	39.0	0.4	43.6	2.1
Level of Service	D	A	D	A	D	A
Approach Delay (s)	8.3		29.4			24.8
Approach LOS	A		C			C

Intersection Summary			
HCM 2000 Control Delay	25.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	155	341	673	552	40	10
v/c Ratio	0.52	0.62	0.38	0.57	0.21	0.06
Control Delay	35.8	9.6	14.5	19.5	37.0	21.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.8	9.6	14.5	19.5	37.0	21.3
Queue Length 50th (ft)	58	0	76	140	15	0
Queue Length 95th (ft)	160	80	254	#562	59	16
Internal Link Dist (ft)	968			398	150	
Turn Bay Length (ft)		550				85
Base Capacity (vph)	792	892	1793	973	695	597
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.38	0.38	0.57	0.06	0.02

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	143	314	619	508	37	9
Future Volume (vph)	143	314	619	508	37	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	5.0	5.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1711	1531	3319	1801	1801	1531
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1711	1531	3319	1801	1801	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	155	341	673	552	40	10
RTOR Reduction (vph)	0	286	0	0	0	9
Lane Group Flow (vph)	155	55	673	552	40	1
Turn Type	Prot	Prot	Split	NA	NA	Prot
Protected Phases	3	3	2	2	1	1
Permitted Phases						
Actuated Green, G (s)	12.1	12.1	37.3	37.3	4.4	4.4
Effective Green, g (s)	12.1	12.1	37.3	37.3	4.4	4.4
Actuated g/C Ratio	0.16	0.16	0.50	0.50	0.06	0.06
Clearance Time (s)	4.0	4.0	5.0	5.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	5.0	5.0	3.0	3.0
Lane Grp Cap (vph)	277	247	1657	899	106	90
v/s Ratio Prot	c0.09	0.04	0.20	c0.31	c0.02	0.00
v/s Ratio Perm						
v/c Ratio	0.56	0.22	0.41	0.61	0.38	0.01
Uniform Delay, d1	28.8	27.2	11.7	13.5	33.8	33.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	0.5	0.7	3.1	2.2	0.0
Delay (s)	31.3	27.7	12.5	16.6	36.1	33.1
Level of Service	C	C	B	B	D	C
Approach Delay (s)	28.8			14.4	35.5	
Approach LOS	C			B	D	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	74.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	83	20	380	166	136	112	391	24	28
v/c Ratio	0.11	0.03	0.81	0.13	0.12	0.56	0.75	0.22	0.09
Control Delay	27.7	0.1	54.0	6.3	1.4	62.0	14.8	62.3	37.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.7	0.1	54.0	6.3	1.4	62.0	14.8	62.3	37.7
Queue Length 50th (ft)	41	0	272	38	0	82	0	18	16
Queue Length 95th (ft)	96	0	423	77	21	159	104	53	45
Internal Link Dist (ft)	269			383		290			249
Turn Bay Length (ft)		125	300		150				
Base Capacity (vph)	733	670	696	1520	1313	546	751	309	967
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.03	0.55	0.11	0.10	0.21	0.52	0.08	0.03

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	76	18	350	153	125	14	89	360	22	24	2
Future Volume (vph)	0	76	18	350	153	125	14	89	360	22	24	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.99	
Flt Protected		1.00	1.00	0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)		1801	1531	1711	1801	1531		1789	1531	1711	1781	
Flt Permitted		1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (perm)		1801	1531	1711	1801	1531		1725	1531	1711	1781	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	83	20	380	166	136	15	97	391	24	26	2
RTOR Reduction (vph)	0	0	12	0	0	39	0	0	346	0	2	0
Lane Group Flow (vph)	0	83	8	380	166	97	0	112	45	24	26	0
Turn Type	Perm	NA	Perm	Prot	NA	Prot	Perm	NA	Prot	Prot	NA	
Protected Phases		6		5	2	2		8	8	7	4	
Permitted Phases	6		6				8					
Actuated Green, G (s)		46.5	46.5	31.2	82.7	82.7		13.3	13.3	4.4	22.7	
Effective Green, g (s)		46.5	46.5	31.2	82.7	82.7		13.3	13.3	4.4	22.7	
Actuated g/C Ratio		0.40	0.40	0.27	0.71	0.71		0.11	0.11	0.04	0.20	
Clearance Time (s)		5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		5.0	5.0	3.0	5.0	5.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		722	614	460	1285	1092		197	175	64	348	
v/s Ratio Prot		0.05		c0.22	c0.09	0.06			0.03	c0.01	0.01	
v/s Ratio Perm			0.01					c0.06				
v/c Ratio		0.11	0.01	0.83	0.13	0.09		0.57	0.26	0.38	0.08	
Uniform Delay, d1		21.8	20.9	39.8	5.2	5.1		48.6	46.8	54.4	38.0	
Progression Factor		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.3	0.0	11.5	0.2	0.2		3.7	0.8	3.7	0.1	
Delay (s)		22.1	20.9	51.3	5.4	5.2		52.3	47.6	58.1	38.1	
Level of Service		C	C	D	A	A		D	D	E	D	
Approach Delay (s)		21.9			31.0			48.6			47.3	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	37.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	115.9	Sum of lost time (s)	20.5
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Group Flow (vph)	120	182	130	1452	1295	437
v/c Ratio	0.54	0.54	0.60	0.53	0.59	0.38
Control Delay	56.9	12.9	81.2	2.0	9.5	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.9	12.9	81.2	2.0	9.5	1.4
Queue Length 50th (ft)	88	0	106	21	100	14
Queue Length 95th (ft)	144	65	m146	55	140	23
Internal Link Dist (ft)	755			2381	681	
Turn Bay Length (ft)		185	225			
Base Capacity (vph)	370	451	287	2744	2192	1138
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.40	0.45	0.53	0.59	0.38

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	110	167	120	1336	1191	402
Future Volume (vph)	110	167	120	1336	1191	402
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1711	1531	1711	3421	3421	1531
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1711	1531	1711	3421	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	182	130	1452	1295	437
RTOR Reduction (vph)	0	161	0	0	0	157
Lane Group Flow (vph)	120	21	130	1452	1295	280
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		1	6	2	
Permitted Phases	4	4				2
Actuated Green, G (s)	13.7	13.7	14.4	94.8	75.4	75.4
Effective Green, g (s)	15.7	13.7	15.4	96.3	76.9	76.9
Actuated g/C Ratio	0.13	0.11	0.13	0.80	0.64	0.64
Clearance Time (s)	6.0	6.0	5.0	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	6.0
Lane Grp Cap (vph)	223	174	219	2745	2192	981
v/s Ratio Prot	c0.07		c0.08	0.42	c0.38	
v/s Ratio Perm		0.01				0.18
v/c Ratio	0.54	0.12	0.59	0.53	0.59	0.29
Uniform Delay, d1	48.8	47.7	49.3	4.1	12.5	9.5
Progression Factor	1.00	1.00	1.49	0.32	0.62	0.53
Incremental Delay, d2	2.5	0.3	3.3	0.6	0.9	0.5
Delay (s)	51.3	48.0	76.8	1.8	8.6	5.6
Level of Service	D	D	E	A	A	A
Approach Delay (s)	49.3			8.0	7.8	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	112	1459	1726	479	37	7
v/c Ratio	0.56	0.46	0.67	0.38	0.17	0.00
Control Delay	66.2	0.7	11.1	2.4	54.4	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.2	0.7	11.1	2.4	54.4	0.0
Queue Length 50th (ft)	92	6	391	23	14	0
Queue Length 95th (ft)	152	16	m486	m44	31	0
Internal Link Dist (ft)		681	1012		359	
Turn Bay Length (ft)	225					
Base Capacity (vph)	285	3138	2575	1252	553	1531
Starvation Cap Reductn	0	96	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.48	0.67	0.38	0.07	0.00

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	103	1342	1588	441	34	6
Future Volume (vph)	103	1342	1588	441	34	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	3319	1531
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1711	3421	3421	1531	3319	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	112	1459	1726	479	37	7
RTOR Reduction (vph)	0	0	0	106	0	0
Lane Group Flow (vph)	112	1459	1726	373	37	7
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	1	6	2		4	
Permitted Phases				2		Free
Actuated Green, G (s)	13.1	105.0	86.9	86.9	4.5	120.0
Effective Green, g (s)	14.1	106.5	88.4	88.4	5.5	120.0
Actuated g/C Ratio	0.12	0.89	0.74	0.74	0.05	1.00
Clearance Time (s)	5.0	5.5	5.5	5.5	5.0	
Vehicle Extension (s)	3.0	0.2	0.2	0.2	3.0	
Lane Grp Cap (vph)	201	3036	2520	1127	152	1531
v/s Ratio Prot	c0.07	0.43	c0.50		c0.01	
v/s Ratio Perm				0.24		0.00
v/c Ratio	0.56	0.48	0.68	0.33	0.24	0.00
Uniform Delay, d1	50.0	1.3	8.4	5.5	55.2	0.0
Progression Factor	1.16	0.18	1.09	1.36	1.00	1.00
Incremental Delay, d2	2.9	0.5	0.9	0.5	0.8	0.0
Delay (s)	60.7	0.7	10.1	8.0	56.1	0.0
Level of Service	E	A	B	A	E	A
Approach Delay (s)		5.0	9.7		47.2	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	8.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	SBR	NWL	NWR2
Lane Group Flow (vph)	1312	185	74	618	1567	18	10
v/c Ratio	0.48	0.12	0.21	0.21	1.01	0.16	0.01
Control Delay	4.2	0.1	2.7	1.4	27.4	55.6	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.2	0.1	2.7	1.4	27.4	55.6	0.0
Queue Length 50th (ft)	87	0	4	17	~15	13	0
Queue Length 95th (ft)	178	0	15	44	#280	37	0
Internal Link Dist (ft)	1012			765		262	
Turn Bay Length (ft)		50	350				
Base Capacity (vph)	2720	1531	577	2968	1558	285	1531
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.12	0.13	0.21	1.01	0.06	0.01

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2
Lane Configurations											
Traffic Volume (vph)	0	1207	170	68	569	0	0	1442	17	0	9
Future Volume (vph)	0	1207	170	68	569	0	0	1442	17	0	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0			4.0	4.0		4.0
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00		1.00
Frt		1.00	0.85	1.00	1.00			0.86	1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00			1.00	0.95		1.00
Satd. Flow (prot)		3421	1531	1711	3421			1558	1711		1531
Flt Permitted		1.00	1.00	0.18	1.00			1.00	0.95		1.00
Satd. Flow (perm)		3421	1531	316	3421			1558	1711		1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1312	185	74	618	0	0	1567	18	0	10
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1312	185	74	618	0	0	1567	18	0	10
Turn Type		NA	Free	pm+pt	NA			Free	Prot		Free
Protected Phases		6		5	2				4		
Permitted Phases			Free	2				Free			Free
Actuated Green, G (s)		93.0	120.0	102.6	102.6			120.0	6.9		120.0
Effective Green, g (s)		94.5	120.0	103.1	104.1			120.0	7.9		120.0
Actuated g/C Ratio		0.79	1.00	0.86	0.87			1.00	0.07		1.00
Clearance Time (s)		5.5		4.5	5.5				5.0		
Vehicle Extension (s)		5.0		3.0	5.0				3.0		
Lane Grp Cap (vph)		2694	1531	336	2967			1558	112		1531
v/s Ratio Prot		0.38		0.01	0.18				0.01		
v/s Ratio Perm			0.12	0.18				c1.01			0.01
v/c Ratio		0.49	0.12	0.22	0.21			1.01	0.16		0.01
Uniform Delay, d1		4.4	0.0	2.5	1.3			60.0	52.9		0.0
Progression Factor		0.78	1.00	1.11	0.91			1.00	1.00		1.00
Incremental Delay, d2		0.6	0.1	0.3	0.2			24.2	0.7		0.0
Delay (s)		4.0	0.1	3.2	1.3			84.2	53.6		0.0
Level of Service		A	A	A	A			F	D		A
Approach Delay (s)		3.5			1.5		84.2		34.5		
Approach LOS		A			A		F		C		

Intersection Summary			
HCM 2000 Control Delay	36.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	NWL
Lane Group Flow (vph)	1191	618	567	124
v/c Ratio	0.44	0.46	0.21	0.52
Control Delay	3.9	1.8	2.4	54.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	3.9	1.8	2.4	54.7
Queue Length 50th (ft)	65	0	41	90
Queue Length 95th (ft)	120	45	54	146
Internal Link Dist (ft)	765		418	135
Turn Bay Length (ft)				
Base Capacity (vph)	2711	1330	2711	456
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.44	0.46	0.21	0.27

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	1096	569	0	522	114	0
Future Volume (vph)	1096	569	0	522	114	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5		4.0	4.0	
Lane Util. Factor	0.95	1.00		0.95	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	1.00	1.00		1.00	0.95	
Satd. Flow (prot)	3421	1531		3421	1711	
Flt Permitted	1.00	1.00		1.00	0.95	
Satd. Flow (perm)	3421	1531		3421	1711	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1191	618	0	567	124	0
RTOR Reduction (vph)	0	136	0	0	0	0
Lane Group Flow (vph)	1191	482	0	567	124	0
Turn Type	NA	Perm		NA	Prot	
Protected Phases	6			2	4	
Permitted Phases		6				
Actuated Green, G (s)	93.6	93.6		93.6	15.9	
Effective Green, g (s)	95.1	93.6		95.1	16.9	
Actuated g/C Ratio	0.79	0.78		0.79	0.14	
Clearance Time (s)	5.5	5.5		5.5	5.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	2711	1194		2711	240	
v/s Ratio Prot	c0.35			0.17	c0.07	
v/s Ratio Perm		0.31				
v/c Ratio	0.44	0.40		0.21	0.52	
Uniform Delay, d1	4.0	4.2		3.1	47.8	
Progression Factor	0.77	1.85		0.66	1.00	
Incremental Delay, d2	0.5	1.0		0.2	3.7	
Delay (s)	3.6	8.8		2.2	51.5	
Level of Service	A	A		A	D	
Approach Delay (s)	5.3			2.2	51.5	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	96	363	29	536	665	40
v/c Ratio	0.09	0.24	0.06	0.41	0.83	0.05
Control Delay	28.7	0.4	20.4	22.3	29.9	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.7	0.4	20.4	22.3	29.9	4.6
Queue Length 50th (ft)	22	0	10	112	326	1
Queue Length 95th (ft)	52	0	33	203	491	17
Internal Link Dist (ft)	475			893	211	
Turn Bay Length (ft)			150			
Base Capacity (vph)	1043	1531	576	2087	1252	1131
Starvation Cap Reductn	0	0	0	0	8	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.24	0.05	0.26	0.53	0.04

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	88	334	27	493	612	37
Future Volume (vph)	88	334	27	493	612	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	4.0	5.0	6.0	6.0	6.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3421	1531	1711	3421	1711	1531
Flt Permitted	1.00	1.00	0.58	1.00	0.95	1.00
Satd. Flow (perm)	3421	1531	1047	3421	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	363	29	536	665	40
RTOR Reduction (vph)	0	0	0	0	0	21
Lane Group Flow (vph)	96	363	29	536	665	19
Turn Type	NA	Free	pm+pt	NA	Prot	Prot
Protected Phases	6		5	2	4	4
Permitted Phases		Free	2			
Actuated Green, G (s)	26.4	88.2	35.6	35.6	40.6	40.6
Effective Green, g (s)	26.4	88.2	35.6	35.6	40.6	40.6
Actuated g/C Ratio	0.30	1.00	0.40	0.40	0.46	0.46
Clearance Time (s)	6.0		5.0	6.0	6.0	6.0
Vehicle Extension (s)	3.5		3.5	3.5	5.0	5.0
Lane Grp Cap (vph)	1023	1531	454	1380	787	704
v/s Ratio Prot	0.03		0.00	c0.16	c0.39	0.01
v/s Ratio Perm		0.24	0.02			
v/c Ratio	0.09	0.24	0.06	0.39	0.84	0.03
Uniform Delay, d1	22.3	0.0	16.1	18.6	21.0	13.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.4	0.1	0.8	9.1	0.0
Delay (s)	22.5	0.4	16.2	19.4	30.1	13.0
Level of Service	C	A	B	B	C	B
Approach Delay (s)	5.0			19.3	29.2	
Approach LOS	A			B	C	

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	88.2	Sum of lost time (s)	17.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	570	430	205	345	758	87	138	228	91	301
v/c Ratio	0.63	0.24	0.13	0.64	0.53	0.30	0.37	0.15	0.30	0.20
Control Delay	53.1	13.1	0.2	57.3	20.1	53.5	42.8	0.2	53.4	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.1	13.1	0.2	57.3	20.1	53.5	42.8	0.2	53.4	0.3
Queue Length 50th (ft)	211	50	0	91	260	32	92	0	35	0
Queue Length 95th (ft)	294	84	0	152	303	58	147	0	61	0
Internal Link Dist (ft)		871			1398		1013		384	
Turn Bay Length (ft)	445		445	615		300		400		
Base Capacity (vph)	909	1810	1531	536	1425	553	660	1531	570	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.24	0.13	0.64	0.53	0.16	0.21	0.15	0.16	0.20

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	524	396	189	317	697	0	80	127	210	0	84	277
Future Volume (vph)	524	396	189	317	697	0	80	127	210	0	84	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		0.97	1.00	1.00		0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (perm)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	570	430	205	345	758	0	87	138	228	0	91	301
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	570	430	205	345	758	0	87	138	228	0	91	301
Turn Type	Prot	NA	Free	Prot	NA		Prot	NA	Free		NA	Free
Protected Phases	1	6		5	2		7	4			8	
Permitted Phases			Free						Free			Free
Actuated Green, G (s)	31.9	61.5	120.0	18.4	48.0		8.5	23.1	120.0		8.6	120.0
Effective Green, g (s)	32.9	63.5	120.0	19.4	50.0		10.5	25.1	120.0		10.6	120.0
Actuated g/C Ratio	0.27	0.53	1.00	0.16	0.42		0.09	0.21	1.00		0.09	1.00
Clearance Time (s)	5.0	6.0		5.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	909	1810	1531	536	1425		290	376	1531		302	1531
v/s Ratio Prot	c0.17	0.13		0.10	c0.22		0.03	c0.08			0.03	
v/s Ratio Perm			0.13						0.15			0.20
v/c Ratio	0.63	0.24	0.13	0.64	0.53		0.30	0.37	0.15		0.30	0.20
Uniform Delay, d1	38.2	15.2	0.0	47.1	26.2		51.3	40.6	0.0		51.2	0.0
Progression Factor	1.28	0.79	1.00	1.11	0.71		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.2	0.3	0.2	2.4	1.3		0.6	0.6	0.2		0.6	0.3
Delay (s)	49.9	12.3	0.2	54.7	19.9		51.9	41.3	0.2		51.8	0.3
Level of Service	D	B	A	D	B		D	D	A		D	A
Approach Delay (s)		28.0			30.8			22.6			12.2	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

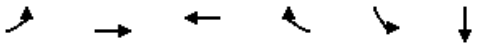
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	104	476	78	64	993	573	88	37	70	66
v/c Ratio	0.29	0.22	0.05	0.10	0.49	0.37	0.46	0.13	0.41	0.34
Control Delay	17.7	20.0	0.1	3.2	9.3	0.6	56.7	0.9	56.8	31.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.7	20.0	0.1	3.2	9.3	0.6	56.7	0.9	56.8	31.0
Queue Length 50th (ft)	33	110	0	8	177	0	65	0	54	23
Queue Length 95th (ft)	110	210	0	8	196	0	114	0	101	67
Internal Link Dist (ft)		1398			1719		314			276
Turn Bay Length (ft)	275			375		475				
Base Capacity (vph)	425	2125	1531	693	2036	1531	288	361	270	288
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.22	0.05	0.09	0.49	0.37	0.31	0.10	0.26	0.23

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	438	72	59	914	527	67	14	34	77	16	32
Future Volume (vph)	96	438	72	59	914	527	67	14	34	77	16	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	0.95	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.99	
Satd. Flow (prot)	1711	3421	1531	1711	3421	1531		1729	1531	1625	1558	
Flt Permitted	0.21	1.00	1.00	0.47	1.00	1.00		0.96	1.00	0.95	0.99	
Satd. Flow (perm)	385	3421	1531	844	3421	1531		1729	1531	1625	1558	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	104	476	78	64	993	573	73	15	37	84	17	35
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	33	0	32	0
Lane Group Flow (vph)	104	476	78	64	993	573	0	88	4	70	34	0
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Split	NA	Perm	Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6		Free	2		Free			3			
Actuated Green, G (s)	78.4	70.3	120.0	74.2	68.2	120.0		11.4	11.4	9.3	9.3	
Effective Green, g (s)	80.4	72.3	120.0	76.2	70.2	120.0		13.4	13.4	11.3	11.3	
Actuated g/C Ratio	0.67	0.60	1.00	0.64	0.59	1.00		0.11	0.11	0.09	0.09	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	358	2061	1531	586	2001	1531		193	170	153	146	
v/s Ratio Prot	0.02	0.14		0.01	c0.29			0.05		0.04	0.02	
v/s Ratio Perm	0.17		0.05	0.06		c0.37			0.00			
v/c Ratio	0.29	0.23	0.05	0.11	0.50	0.37		0.46	0.02	0.46	0.23	
Uniform Delay, d1	8.7	11.0	0.0	8.3	14.6	0.0		49.9	47.5	51.4	50.3	
Progression Factor	2.09	1.57	1.00	0.37	0.53	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	0.3	0.1	0.1	0.8	0.6		1.7	0.1	2.2	0.8	
Delay (s)	18.7	17.6	0.1	3.1	8.5	0.6		51.6	47.5	53.6	51.2	
Level of Service	B	B	A	A	A	A		D	D	D	D	
Approach Delay (s)		15.7			5.5			50.4			52.4	
Approach LOS		B			A			D			D	

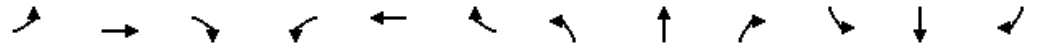
Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBT
Lane Group Flow (vph)	10	324	1258	266	164	156
v/c Ratio	0.04	0.12	0.48	0.22	0.59	0.47
Control Delay	4.4	5.1	10.2	4.2	53.8	27.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.4	5.1	10.2	4.2	53.8	27.5
Queue Length 50th (ft)	3	57	196	21	124	60
Queue Length 95th (ft)	0	0	473	127	187	122
Internal Link Dist (ft)		1633	378			130
Turn Bay Length (ft)	415			200	175	
Base Capacity (vph)	262	2607	2607	1213	595	621
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.12	0.48	0.22	0.28	0.25

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	298	0	0	1157	245	0	0	0	244	0	51
Future Volume (vph)	9	298	0	0	1157	245	0	0	0	244	0	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95	1.00				0.95	0.95	
Frt	1.00	1.00			1.00	0.85				1.00	0.95	
Flt Protected	0.95	1.00			1.00	1.00				0.95	0.97	
Satd. Flow (prot)	1711	3421			3421	1531				1625	1569	
Flt Permitted	0.19	1.00			1.00	1.00				0.95	0.97	
Satd. Flow (perm)	344	3421			3421	1531				1625	1569	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	324	0	0	1258	266	0	0	0	265	0	55
RTOR Reduction (vph)	0	0	0	0	0	47	0	0	0	0	61	0
Lane Group Flow (vph)	10	324	0	0	1258	219	0	0	0	164	95	0
Turn Type	Perm	NA		Perm	NA	Perm				Split	NA	
Protected Phases		6			2		3	3		4	4	
Permitted Phases	6	6		2	2	2						
Actuated Green, G (s)	89.5	89.5			89.5	89.5				19.5	19.5	
Effective Green, g (s)	91.5	91.5			91.5	91.5				20.5	20.5	
Actuated g/C Ratio	0.76	0.76			0.76	0.76				0.17	0.17	
Clearance Time (s)	6.0	6.0			6.0	6.0				5.0	5.0	
Vehicle Extension (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Lane Grp Cap (vph)	262	2608			2608	1167				277	268	
v/s Ratio Prot		0.09			c0.37					c0.10	0.06	
v/s Ratio Perm	0.03					0.14						
v/c Ratio	0.04	0.12			0.48	0.19				0.59	0.36	
Uniform Delay, d1	3.5	3.7			5.4	4.0				45.9	43.9	
Progression Factor	0.84	1.18			1.61	2.62				1.00	1.00	
Incremental Delay, d2	0.3	0.1			0.6	0.3				5.0	1.7	
Delay (s)	3.2	4.5			9.2	10.7				50.9	45.6	
Level of Service	A	A			A	B				D	D	
Approach Delay (s)		4.5			9.4			0.0			48.3	
Approach LOS		A			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	0	11	22	1	36	23	1356	6	11	519	19
Future Volume (Veh/h)	15	0	11	22	1	36	23	1356	6	11	519	19
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	0	12	24	1	39	25	1474	7	12	564	21
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1425	2130	292	1846	2136	740	585			1481		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1425	2130	292	1846	2136	740	585			1481		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	80	100	98	45	98	89	97			97		
cM capacity (veh/h)	81	47	704	44	46	359	986			450		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	28	64	25	983	498	12	376	209
Volume Left	16	24	25	0	0	12	0	0
Volume Right	12	39	0	0	7	0	0	21
cSH	130	94	986	1700	1700	450	1700	1700
Volume to Capacity	0.22	0.68	0.03	0.58	0.29	0.03	0.22	0.12
Queue Length 95th (ft)	19	84	2	0	0	2	0	0
Control Delay (s)	40.1	101.0	8.7	0.0	0.0	13.2	0.0	0.0
Lane LOS	E	F	A			B		
Approach Delay (s)	40.1	101.0	0.1			0.3		
Approach LOS	E	F						

Intersection Summary					
Average Delay	3.6				
Intersection Capacity Utilization	48.1%	ICU Level of Service		A	
Analysis Period (min)	15				

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	23	13	47	58	1459	12	7	603	27
v/c Ratio	0.18	0.02	0.32	0.09	0.50	0.01	0.02	0.22	0.02
Control Delay	53.6	0.1	36.5	1.9	4.1	0.0	1.0	4.4	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.6	0.1	36.5	1.9	4.1	0.0	1.0	4.4	1.2
Queue Length 50th (ft)	17	0	18	5	111	0	1	94	0
Queue Length 95th (ft)	43	0	56	13	287	0	m1	126	8
Internal Link Dist (ft)		254	405		1830			1619	
Turn Bay Length (ft)				300		100	225		225
Base Capacity (vph)	299	679	323	790	2927	1321	488	2740	1240
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.02	0.15	0.07	0.50	0.01	0.01	0.22	0.02

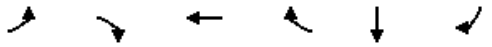
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	0	12	21	1	21	53	1342	11	6	555	25
Future Volume (vph)	21	0	12	21	1	21	53	1342	11	6	555	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.85			0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1711	1531			1642		1711	3421	1531	1711	3421	1531
Flt Permitted	0.77	1.00			0.84		0.40	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)	1382	1531			1410		721	3421	1531	291	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	0	13	23	1	23	58	1459	12	7	603	27
RTOR Reduction (vph)	0	12	0	0	21	0	0	0	2	0	0	6
Lane Group Flow (vph)	23	1	0	0	26	0	58	1459	10	7	603	21
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			6		6	2		2
Actuated Green, G (s)	7.2	7.2			7.2		98.8	94.2	94.2	91.8	90.7	90.7
Effective Green, g (s)	9.2	9.2			9.2		100.8	96.7	96.7	93.8	93.2	93.2
Actuated g/C Ratio	0.08	0.08			0.08		0.84	0.81	0.81	0.78	0.78	0.78
Clearance Time (s)	6.0	6.0			6.0		5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0			3.0		2.5	5.0	5.0	2.5	5.0	5.0
Lane Grp Cap (vph)	105	117			108		651	2756	1233	252	2656	1189
v/s Ratio Prot		0.00					c0.00	c0.43		0.00	0.18	
v/s Ratio Perm	0.02				c0.02		0.07		0.01	0.02		0.01
v/c Ratio	0.22	0.01			0.24		0.09	0.53	0.01	0.03	0.23	0.02
Uniform Delay, d1	52.0	51.2			52.1		1.7	3.9	2.3	3.3	3.6	3.0
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	0.47	1.05	1.00
Incremental Delay, d2	1.1	0.0			1.1		0.0	0.7	0.0	0.0	0.2	0.0
Delay (s)	53.1	51.2			53.3		1.8	4.7	2.3	1.6	4.0	3.1
Level of Service	D	D			D		A	A	A	A	A	A
Approach Delay (s)		52.4			53.3			4.5			3.9	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBR	WBT	WBR	SBT	SBR
Lane Group Flow (vph)	202	320	549	197	67	38
v/c Ratio	0.53	0.14	0.27	0.20	0.26	0.18
Control Delay	46.0	0.6	10.7	2.1	45.9	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.0	0.6	10.7	2.1	45.9	1.9
Queue Length 50th (ft)	63	0	85	0	21	0
Queue Length 95th (ft)	98	10	130	32	43	0
Internal Link Dist (ft)			782		297	
Turn Bay Length (ft)	420			600		
Base Capacity (vph)	1035	2320	2060	1000	1067	547
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.14	0.27	0.20	0.06	0.07

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	186	0	294	0	505	181	0	0	0	0	62	35
Future Volume (vph)	186	0	294	0	505	181	0	0	0	0	62	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		9.0		9.0	9.0					8.0	8.0
Lane Util. Factor	0.97		0.88		0.95	1.00					0.95	1.00
Frt	1.00		0.85		1.00	0.85					1.00	0.85
Flt Protected	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (prot)	3319		2694		3421	1531					3421	1531
Flt Permitted	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (perm)	3319		2694		3421	1531					3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	0	320	0	549	197	0	0	0	0	67	38
RTOR Reduction (vph)	0	0	75	0	0	80	0	0	0	0	0	36
Lane Group Flow (vph)	202	0	245	0	549	117	0	0	0	0	67	2
Turn Type	Prot		Prot		NA	Perm					NA	Perm
Protected Phases	1		6		2						4	
Permitted Phases						2						4
Actuated Green, G (s)	11.1		75.4		58.3	58.3					6.0	6.0
Effective Green, g (s)	11.1		75.4		58.3	58.3					6.0	6.0
Actuated g/C Ratio	0.11		0.77		0.59	0.59					0.06	0.06
Clearance Time (s)	6.0		9.0		9.0	9.0					8.0	8.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0					3.0	3.0
Lane Grp Cap (vph)	374		2064		2026	907					208	93
v/s Ratio Prot	c0.06		0.09		c0.16						c0.02	
v/s Ratio Perm						0.08						0.00
v/c Ratio	0.54		0.12		0.27	0.13					0.32	0.02
Uniform Delay, d1	41.2		3.0		9.7	8.8					44.3	43.4
Progression Factor	1.00		1.00		1.00	1.00					1.00	1.00
Incremental Delay, d2	1.6		0.1		0.1	0.1					0.9	0.1
Delay (s)	42.8		3.1		9.8	8.9					45.2	43.6
Level of Service	D		A		A	A					D	D
Approach Delay (s)		18.5			9.6			0.0			44.6	
Approach LOS		B			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	98.4	Sum of lost time (s)	23.0
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	377	211	1501	185	336	170
v/c Ratio	0.54	0.33	0.61	0.22	0.43	0.07
Control Delay	39.8	21.2	19.2	2.8	41.5	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.8	21.2	19.2	2.8	41.5	4.8
Queue Length 50th (ft)	108	80	232	0	67	14
Queue Length 95th (ft)	192	170	350	36	122	31
Internal Link Dist (ft)	751		1519			448
Turn Bay Length (ft)		600		1000	425	
Base Capacity (vph)	1076	1281	4530	1425	2827	3421
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.16	0.33	0.13	0.12	0.05

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	347	194	1381	170	309	156
Future Volume (vph)	347	194	1381	170	309	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.91	1.00	0.94	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3319	1531	4916	1531	4824	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3319	1531	4916	1531	4824	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	377	211	1501	185	336	170
RTOR Reduction (vph)	0	10	0	92	0	0
Lane Group Flow (vph)	377	201	1501	93	336	170
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	4	4 5	6		5	2
Permitted Phases				6		
Actuated Green, G (s)	18.8	38.9	46.6	46.6	14.1	66.7
Effective Green, g (s)	20.8	40.9	49.6	49.6	16.1	69.7
Actuated g/C Ratio	0.21	0.42	0.50	0.50	0.16	0.71
Clearance Time (s)	6.0		7.0	7.0	6.0	7.0
Vehicle Extension (s)	3.0		5.0	5.0	3.0	5.0
Lane Grp Cap (vph)	700	635	2475	770	788	2420
v/s Ratio Prot	c0.11	0.13	c0.31		c0.07	0.05
v/s Ratio Perm				0.06		
v/c Ratio	0.54	0.32	0.61	0.12	0.43	0.07
Uniform Delay, d1	34.6	19.4	17.5	12.9	37.0	4.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.3	0.6	0.1	0.4	0.0
Delay (s)	35.4	19.7	18.1	13.1	37.4	4.5
Level of Service	D	B	B	B	D	A
Approach Delay (s)	29.7		17.5			26.3
Approach LOS	C		B			C

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	98.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	142	332	21	476	1270	204	435	105	77	364
v/c Ratio	0.30	0.16	0.05	0.51	0.83	0.32	0.65	0.25	0.18	0.71
Control Delay	15.4	18.0	14.8	31.7	5.3	35.1	36.2	41.5	41.2	13.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.4	18.0	14.8	31.7	5.3	35.1	36.2	41.5	41.2	13.4
Queue Length 50th (ft)	41	35	6	117	0	50	103	27	21	0
Queue Length 95th (ft)	99	86	22	221	0	106	200	65	52	95
Internal Link Dist (ft)		1548		585			1389		1519	
Turn Bay Length (ft)	350		425			350		490		300
Base Capacity (vph)	669	3275	728	2288	1531	1461	1452	1683	1735	956
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.10	0.03	0.21	0.83	0.14	0.30	0.06	0.04	0.38

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	298	7	19	438	1168	188	252	148	97	71	335
Future Volume (vph)	131	298	7	19	438	1168	188	252	148	97	71	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	7.0		5.5	7.0	4.0	5.5	5.5		5.5	5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	0.95		0.97	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	4898		1711	3421	1531	3319	3231		3319	3421	1531
Flt Permitted	0.35	1.00		0.54	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	633	4898		979	3421	1531	3319	3231		3319	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	142	324	8	21	476	1270	204	274	161	105	77	364
RTOR Reduction (vph)	0	1	0	0	0	0	0	44	0	0	0	320
Lane Group Flow (vph)	142	331	0	21	476	1270	204	391	0	105	77	44
Turn Type	pm+pt	NA		pm+pt	NA	Free	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases	2			6		Free						4
Actuated Green, G (s)	48.1	40.2		31.5	29.1	95.5	17.8	17.8		11.6	11.6	11.6
Effective Green, g (s)	48.1	40.2		31.5	29.1	95.5	17.8	17.8		11.6	11.6	11.6
Actuated g/C Ratio	0.50	0.42		0.33	0.30	1.00	0.19	0.19		0.12	0.12	0.12
Clearance Time (s)	5.5	7.0		5.5	7.0		5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	3.0	7.0		3.0	7.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	471	2061		341	1042	1531	618	602		403	415	185
v/s Ratio Prot	0.04	0.07		0.00	0.14		0.06	0.12		0.03	0.02	
v/s Ratio Perm	0.11			0.02		c0.83						0.03
v/c Ratio	0.30	0.16		0.06	0.46	0.83	0.33	0.65		0.26	0.19	0.24
Uniform Delay, d1	13.4	17.2		21.7	26.8	0.0	33.7	36.0		38.1	37.7	38.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	0.1		0.1	1.1	5.3	0.3	2.4		0.3	0.2	0.7
Delay (s)	13.7	17.3		21.8	27.9	5.3	34.0	38.4		38.4	37.9	38.6
Level of Service	B	B		C	C	A	C	D		D	D	D
Approach Delay (s)		16.2			11.6			37.0			38.5	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	95.5	Sum of lost time (s)	23.5
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	245	4	6	411	26	4	0	7	12	1	6
Future Volume (Veh/h)	8	245	4	6	411	26	4	0	7	12	1	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	266	4	7	447	28	4	0	8	13	1	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		650			625							
pX, platoon unblocked												
vC, conflicting volume	475			270			529	773	133	620	749	224
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	475			270			529	773	133	620	749	224
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			99	100	99	96	100	99
cM capacity (veh/h)	1083			1290			423	324	892	365	334	780

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	9	133	133	4	7	224	224	28	12	21
Volume Left	9	0	0	0	7	0	0	0	4	13
Volume Right	0	0	0	4	0	0	0	28	8	7
cSH	1083	1700	1700	1700	1290	1700	1700	1700	651	441
Volume to Capacity	0.01	0.08	0.08	0.00	0.01	0.13	0.13	0.02	0.02	0.05
Queue Length 95th (ft)	1	0	0	0	0	0	0	0	1	4
Control Delay (s)	8.4	0.0	0.0	0.0	7.8	0.0	0.0	0.0	10.6	13.6
Lane LOS	A				A				B	B
Approach Delay (s)	0.3				0.1				10.6	13.6
Approach LOS									B	B

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	21.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	67	1536	176	52	505
v/c Ratio	0.04	0.38	0.11	0.19	0.10
Control Delay	0.0	3.1	0.2	21.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	0.0	3.1	0.2	21.5	0.0
Queue Length 50th (ft)	0	58	0	16	0
Queue Length 95th (ft)	0	90	0	40	0
Internal Link Dist (ft)		448			480
Turn Bay Length (ft)			485	575	
Base Capacity (vph)	1558	4916	1531	870	4916
Starvation Cap Reductn	0	192	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.04	0.33	0.11	0.06	0.10

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑			↑↑↑
Traffic Volume (vph)	0	62	1413	162	48	465
Future Volume (vph)	0	62	1413	162	48	465
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	0.91	1.00	1.00	0.91
Frt		0.86	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1558	4916	1531	1711	4916
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1558	4916	1531	1711	4916
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	67	1536	176	52	505
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	67	1536	176	52	505
Turn Type		Free	NA	Free	Prot	NA
Protected Phases			2		1	Free
Permitted Phases		Free		Free		
Actuated Green, G (s)		53.8	38.3	53.8	4.5	53.8
Effective Green, g (s)		53.8	40.3	53.8	5.5	53.8
Actuated g/C Ratio		1.00	0.75	1.00	0.10	1.00
Clearance Time (s)			6.0		5.0	
Vehicle Extension (s)			5.0		3.0	
Lane Grp Cap (vph)		1558	3682	1531	174	4916
v/s Ratio Prot			c0.31		c0.03	0.10
v/s Ratio Perm		0.04		0.11		
v/c Ratio		0.04	0.42	0.11	0.30	0.10
Uniform Delay, d1		0.0	2.5	0.0	22.4	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	0.2	0.2	1.0	0.0
Delay (s)		0.1	2.6	0.2	23.3	0.0
Level of Service		A	A	A	C	A
Approach Delay (s)	0.1		2.4			2.2
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	2.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	53.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	SBT	SBR
Lane Group Flow (vph)	70	334	60	1	1297	15	24	1	8
v/c Ratio	0.19	0.11	0.04	0.00	0.46	0.01	0.20	0.01	0.01
Control Delay	3.7	4.3	3.4	3.0	4.5	0.2	54.5	49.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.7	4.3	3.4	3.0	4.5	0.2	54.5	49.0	0.0
Queue Length 50th (ft)	24	62	6	0	107	0	18	1	0
Queue Length 95th (ft)	1	130	42	m0	187	m0	45	6	0
Internal Link Dist (ft)		712			1633			157	
Turn Bay Length (ft)	250		350	235		375			
Base Capacity (vph)	518	3037	1367	1002	2821	1274	295	390	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.11	0.04	0.00	0.46	0.01	0.08	0.00	0.01

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	307	55	1	1193	14	22	0	0	0	1	7
Future Volume (vph)	64	307	55	1	1193	14	22	0	0	0	1	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0				4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00				1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00				1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95				1.00	1.00
Satd. Flow (prot)	1711	3421	1531	1711	3421	1531	1711				1801	1531
Flt Permitted	0.18	1.00	1.00	0.55	1.00	1.00	0.76				1.00	1.00
Satd. Flow (perm)	323	3421	1531	991	3421	1531	1363				1801	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	70	334	60	1	1297	15	24	0	0	0	1	8
RTOR Reduction (vph)	0	0	11	0	0	3	0	0	0	0	0	0
Lane Group Flow (vph)	70	334	50	1	1297	12	24	0	0	0	1	8
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm				NA	Free
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8			4		Free
Actuated Green, G (s)	102.2	97.0	97.0	94.0	92.9	92.9	5.4				5.4	120.0
Effective Green, g (s)	103.1	99.0	99.0	95.0	94.9	94.9	7.4				7.4	120.0
Actuated g/C Ratio	0.86	0.82	0.82	0.79	0.79	0.79	0.06				0.06	1.00
Clearance Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	6.0				6.0	
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0				3.0	
Lane Grp Cap (vph)	343	2822	1263	794	2705	1210	84				111	1531
v/s Ratio Prot	c0.01	0.10		0.00	c0.38						0.00	
v/s Ratio Perm	0.17		0.03	0.00		0.01	c0.02					0.01
v/c Ratio	0.20	0.12	0.04	0.00	0.48	0.01	0.29				0.01	0.01
Uniform Delay, d1	2.4	2.0	1.9	2.6	4.2	2.6	53.8				52.9	0.0
Progression Factor	1.77	2.21	4.89	1.58	0.87	1.00	1.00				1.00	1.00
Incremental Delay, d2	0.3	0.1	0.1	0.0	0.5	0.0	1.9				0.0	0.0
Delay (s)	4.6	4.6	9.3	4.1	4.2	2.7	55.7				52.9	0.0
Level of Service	A	A	A	A	A	A	E				D	A
Approach Delay (s)		5.2			4.2			55.7			5.9	
Approach LOS		A			A			E			A	

Intersection Summary			
HCM 2000 Control Delay	5.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	141	457	1315	13	7	316
v/c Ratio	0.32	0.14	0.48	0.01	0.06	0.21
Control Delay	7.3	0.2	2.7	0.0	53.2	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	0.2	2.7	0.0	53.2	0.3
Queue Length 50th (ft)	15	0	1	0	5	0
Queue Length 95th (ft)	88	8	200	m0	21	0
Internal Link Dist (ft)		605	712		887	
Turn Bay Length (ft)	600					600
Base Capacity (vph)	678	3323	2748	1531	285	1531
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.14	0.48	0.01	0.02	0.21

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	130	420	1210	12	6	291
Future Volume (vph)	130	420	1210	12	6	291
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	1711	1531
Flt Permitted	0.18	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	320	3421	3421	1531	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	457	1315	13	7	316
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	141	457	1315	13	7	316
Turn Type	pm+pt	NA	NA	Free	Prot	Free
Protected Phases	1	1 6	2		4	
Permitted Phases	1 6			Free		Free
Actuated Green, G (s)	100.6	106.6	89.7	120.0	1.4	120.0
Effective Green, g (s)	104.6	108.6	91.7	120.0	3.4	120.0
Actuated g/C Ratio	0.87	0.90	0.76	1.00	0.03	1.00
Clearance Time (s)	6.0		6.0		6.0	
Vehicle Extension (s)	3.0		5.0		3.0	
Lane Grp Cap (vph)	428	3096	2614	1531	48	1531
v/s Ratio Prot	c0.04	0.13	c0.38		0.00	
v/s Ratio Perm	0.25			0.01		c0.21
v/c Ratio	0.33	0.15	0.50	0.01	0.15	0.21
Uniform Delay, d1	5.6	0.6	5.4	0.0	56.9	0.0
Progression Factor	3.71	0.35	0.43	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.0	0.6	0.0	1.4	0.3
Delay (s)	21.3	0.2	2.9	0.0	58.3	0.3
Level of Service	C	A	A	A	E	A
Approach Delay (s)		5.2	2.9		1.6	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	3.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

BWI TIA MOE Table - 2016 PM

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
1	Aviation Blvd (MD 170) at Dorsey Rd (MD 176) - West	Signalized	NBL	163	73.7	E	52.0	D	57.5	E	455	182	282
			NBT	545	48.7	D					-	280	365
			NBR	158	41.3	D					250	2	61
			SBL	319	82.6	F	56.6	E			250	364	#636
			SBT	1048	53.8	D					-	592	#383
			SBR	333	40.7	D					175	210	368
			EBL	333	49.9	D	61.2	E			175	290	424
			EBT	725	69.5	E					-	431	#636
			EBR	298	53.7	D					225	156	301
			WBL	177	56.3	E	60.2	E			200	147	239
			WBT	327	62.4	E					-	188	261
			WBR	0	-	-					-	0	0
2	Aviation Blvd (MD 170) at Mathison Way	Signalized	NBT	871	4.6	A	4.6	A	3.9	A	-	67	180
			NBR	16	3.1	A					450	0	7
			SBL	15	1.0	A	1.9	A			375	1	m1
			SBT	1,662	1.9	A					-	107	95
			WBL	38	52.9	D	51.8	D			450	30	64
			WBR	22	49.9	D					-	0	26
3	Aviation Blvd (MD 170) at Stoney Run Rd	Signalized	NBT	809	38.0	D	34.4	C	20.0	B	-	254	402
			NBR	84	0.1	A					-	0	0
			SBL	349	52.3	D	14.1	B			575	105	m150
			SBT	1,385	4.5	A					-	240	15
			WBL	313	54.7	D	17.4	B			-	423	#402
			WBR	723	1.2	A					-	0	0
4	Stoney Run Rd at Northrop Grumman Entrance	Signalized	NBL	399	21.3	C	21.0	C	36.2	D	-	68	211
			NBT	33	18.4	B					-	10	51
			SBT	400	48.9	D	42.8	D			-	192	#667
			SBR	161	27.6	C					85	41	163
			EBL	13	37.3	D	40.7	D			-	7	27
			EBR	635	40.8	D					550	0	129
5	Stoney Run Rd at New Ridge Rd	Signalized	NBL	40	61.5	E	56.5	E	47.8	D	-	81	149
			NBT	48									
			NBR	426	55.5	E					-	0	118
			SBL	93	62.2	E	53.8	D			-	86	162
			SBT	52	38.9	D					-	39	77
			SBR	0									
			EBL	1	28.6	C	31.3	C			-	1	6
			EBT	128	31.8	C					-	87	171
			EBR	30	28.9	C					125	0	0
			WBL	392	57.9	E	43.0	D			300	342	#593
			WBT	145	8	A					-	44	100
			WBR	22	7.2	A					150	0	4
6	Aviation Blvd (MD 170) at Amtrak Way (MD 995)	Signalized	NBL	41	17.1	B	13.3	B	17.9	B	225	5	m13
			NBT	1,491	13.2	B					-	585	729
			SBT	1,575	15.7	B	14.9	B			-	598	#937
			SBR	101	2.3	A					-	6	m18
			EBL	329	47.6	D	43.6	D			-	255	328
			EBR	139	34.2	C					185	0	46
7	Aviation Blvd (MD 170) at Northrup Grumman Gate 1A	Signalized	NBL	13	43.8	D	4.7	A	11.3	B	225	11	0
			NBT	1,807	4.4	A					-	167	215
			SBT	1,562	11.0	B	10.7	B			-	256	445
			SBR	58	3.3	A					-	1	m13
			EBL	363	50.4	D	38.4	D			-	150	193
			EBR	114	0.1	A					-	0	0
8	Aviation Blvd (MD 170) at SB I-195 Ramps	Signalized	NBT	2,011	8.8	A	8.2	A	8.5	A	-	255	643
			NBR	159	0.1	A					50	0	m0
			SBL	108	56.6	E	7.8	A			350	27	108
			SBT	747	0.8	A					-	14	22
			WBL	28	53.7	D	35.8	D			-	22	53
			WBR	14	0.0	A					-	0	0
9	Aviation Blvd (MD 170) at NB I-195 Ramps	Signalized	NBT	1,077	1.0	A	29.1	C	25.8	C	-	13	19
			NBR	1,233	53.7	D					-	1063	#1324
			SBT	685	8.2	A	8.2	A			-	120	201
			WBL	170	51.1	D	51.1	D			-	134	198
10	Terminal Rd at Elkridge Landing Rd	Signalized	NBL	323	23.9	C	23.1	C	9.6	A	-	95	220
			NBR	37	15.9	B					-	0	19
			EBT	371	14.4	B	5.6	A			-	44	121
			EBR	805	1.6	A					-	0	0
			WBL	32	8.4	A	8.4	A			150	6	23
			WBT	121	8.4	A					-	13	32

BWI TIA MOE Table - 2016 PM

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
11	Aviation Blvd (MD 170) at Terminal Rd	Signalized	NBL	153	50.9	D	19.4	B	18.7	B	300	62	96
			NBT	112	37.5	D					-	77	125
			NBR	362	0.4	A					400	0	0
			SBT	113	51.4	D	8.0	A			-	47	77
			SBR	724	1.2	A					-	0	0
			EBL	249	51.0	D	21.7	C			445	99	134
			EBT	703	15.6	B					-	194	290
			EBR	141	0.1	A					445	0	0
			WBL	238	29.8	C	25.9	C			615	108	m126
			WBT	491	24.0	C					-	177	m227
			WBR	0	-	-					-	0	
12	Aviation Blvd (MD 170) at Air Cargo Dr	Signalized	NBL	106	51.3	D	48.1	D	45.0	D	-	94	151
			NBT	12									
			NBR	62	42.0	D					-	0	0
			SBL	422	109.6	F	102.5	F			-	~231	#418
			SBT	14	95.1	F					-	208	#391
			SBR	62									
			EBL	41	15.3	B	29.8	C			275	25	50
			EBT	914	34.0	C					-	392	474
			EBR	110	0.1	A					-	0	0
			WBL	37	21.3	C	25.7	C			375	18	41
			WBT	562	29.5	C					-	243	309
			WBR	77	0.1	A					475	0	0
13	Aviation Blvd (MD 162) at Andover Rd	Signalized	WBT	495	5.1	A	6.0	A	13.4	B	-	57	106
			WBR	362	7.1	A					200	0	38
			EBL	91	5.0	A	7.6	A			415	39	46
			EBT	922	7.9	A					-	216	479
			SBL	347	50.3	D	47.5	D			175	148	214
			SBR	10	44.7	D					-	86	152
14	Aviation Blvd (MD 162) at Aaronson Dr	Unsignalized	NBL	18	11.6	B	0.3	A	1.9	A	-	-	-
			NBT	761	-	-					-	-	-
			NBR	17									
			SBL	53	9.9	A	0.5	A			-	-	-
			SBT	1,107	-	-					-	-	-
			SBR	14									
			EBL	12	85.7	F	85.7	F			-	-	-
			EBT	1									
			EBR	7									
			WBL	12	49.3	E	49.3	E			-	-	-
			WBT	1									
			WBR	13									
15	Aviation Blvd (MD 162) at Allwood Dr	Signalized	NBL	38	2.1	A	2.7	A	3.6	A	300	4	8
			NBT	813	2.8	A					-	52	123
			NBR	50	1.9	A					100	0	6
			SBL	8	0.4	A	1.8	A			225	1	m0
			SBT	1,128	1.8	A					-	78	26
			SBR	6	2.5	A					225	0	m0
			EBL	8	54.1	D	53.7	D			-	7	24
			EBT	2	53.6	D					-	1	30
			EBR	22									
			WBL	16	53.5	D	53.5	D			-	0	0
			WBT	0									
			WBR	12									
16	SB I-97 Ramps at Cromwell Park Dr	Signalized	SBT	229	53.1	D	50.5	D	28.1	C	-	97	136
			SBR	240	48.1	D					-	0	77
			EBL	35	88.9	F	22.7	C			420	15	0
			EBR	706	19.4	B					-	165	187
			WBT	279	6.4	A	6.4	A			-	40	68
			WBR	26	5.9	A					600	0	0
17	Aviation Blvd (MD 162) at Cromwell Park Dr	Signalized	NBT	717	21.1	C	21.0	C	30.4	C	-	138	201
			NBR	24	17.6	B					1000	0	19
			SBL	717	44.6	D	29.5	C			425	197	228
			SBT	449	5.5	A					-	56	89
			WBL	456	50.1	D	45.8	D			-	201	223
			WBR	64	15.3	B					600	12	24

BWI TIA MOE Table - 2016 PM

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
18	Aviation Blvd (MD 162) at Dorsey Rd (MD 176) - East	Signalized	NBL	29	47.2	D	49.9	D	27.3	C	350	11	30
			NBT	125	50.2	D					-	58	114
			NBR	91									
			SBL	384	45.2	D	42.7	D			490	154	234
			SBT	307	42.2	D					-	122	190
			SBR	214	38.9	D					300	0	71
			EBL	135	13.4	B	23.1	C			350	49	102
			EBT	899	24.3	C					-	231	341
			EBR	196									
			WBL	54	19.3	B	10.1	B			425	19	47
			WBT	299	23.8	C					-	82	144
			WBR	481	0.6	A					-	0	0
19	Dorsey Rd (MD 176) at Digiulian Blvd	Unsignalized	NBL	15	49.1	E	49.1	E	1.9	A	-	-	-
			NBT	0									
			NBR	21									
			SBL	30	34.2	D	34.2	D			-	-	-
			SBT	0									
			SBR	13									
			EBL	3	8.3	A	0.0	A			-	-	-
			EBT	1,274	-	-					-	-	-
			EBR	12	-	-					-	-	-
			WBL	19	12.8	B	0.6	A			-	-	-
			WBT	404	-	-					-	-	-
			WBR	19	-	-					-	-	-
20	Aviation Blvd (MD 162) at Hollins Ferry Rd	Signalized	NBT	713	2.3	A	2.1	A	1.4	A	-	24	39
			NBR	67	0.1	A					485	0	0
			SBL	58	20.6	C	1.1	A			575	17	36
			SBT	1,166	0.1	A					-	0	0
			WBR	76	0.1	A	0.1	A			-	0	0
21	Aviation Blvd (MD 170) at Long Term Parking Lots	Signalized	NBL	34	56.2	E	55.8	E	6.6	A	-	27	61
			NBT	1	52.1	D					-	1	12
			NBR	3							-		
			SBL	9	15.8	B	15.8	B			-	0	0
			SBT	1							-		
			SBR	24	0.0	A					-	0	0
			EBL	54	2.7	A	6.6	A			250	13	15
			EBT	1,001	6.9	A					-	215	351
			EBR	56	4.7	A					350	7	5
			WBL	5	2.3	A	2.2	A			235	0	m2
			WBT	493	2.2	A					-	27	35
			WBR	7	2.8	A					375	0	m0
22	Aviation Blvd (MD 162) at S Camp Meade Rd (MD 170)	Signalized	SBL	8	58.7	E	3.4	A	5.8	A	-	7	24
			SBR	138	0.1	A					600	0	0
			EBL	296	11.9	B	9.4	A			600	21	m96
			EBT	1,103	2.7	A					-	0	m268
			WBT	538	9.6	A	4.6	A			-	99	187
			WBR	12	0.0	A					-	0	0

Notes

m Volume for 95th percentile queue is metered by upstream signal.

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	362	788	324	192	355	177	592	172	347	1139	362
v/c Ratio	0.80	0.89	0.62	0.71	0.56	0.66	0.55	0.29	0.89	0.86	0.55
Control Delay	51.6	72.2	33.6	55.6	66.3	78.7	50.1	7.0	87.0	56.0	32.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.6	72.2	33.6	55.6	66.3	78.7	50.1	7.0	87.0	56.0	32.0
Queue Length 50th (ft)	290	431	156	147	188	182	280	2	364	592	210
Queue Length 95th (ft)	424	#636	301	239	261	282	365	61	#636	#838	368
Internal Link Dist (ft)		640			713		584			1313	
Turn Bay Length (ft)	175		225	200		455		250	250		175
Base Capacity (vph)	482	889	519	436	889	661	1865	914	390	1323	662
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.89	0.62	0.44	0.40	0.27	0.32	0.19	0.89	0.86	0.55

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	333	725	298	177	327	0	163	545	158	319	1048	333
Future Volume (vph)	333	725	298	177	327	0	163	545	158	319	1048	333
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539		1770	3539	1583	1770	3539	1583
Flt Permitted	0.27	1.00	1.00	0.15	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	507	3539	1583	272	3539		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	362	788	324	192	355	0	177	592	172	347	1139	362
RTOR Reduction (vph)	0	0	121	0	0	0	0	0	118	0	0	71
Lane Group Flow (vph)	362	788	203	192	355	0	177	592	54	347	1139	291
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)	62.8	38.2	38.2	46.0	26.4		23.7	46.8	46.8	35.2	58.3	58.3
Effective Green, g (s)	63.8	41.2	41.2	48.0	29.4		24.7	49.8	49.8	36.2	61.3	61.3
Actuated g/C Ratio	0.39	0.25	0.25	0.29	0.18		0.15	0.30	0.30	0.22	0.37	0.37
Clearance Time (s)	5.0	7.0	7.0	5.0	7.0		5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	447	890	398	268	635		266	1075	481	391	1324	592
v/s Ratio Prot	c0.16	c0.22		0.09	0.10		0.10	0.17		c0.20	c0.32	
v/s Ratio Perm	0.16		0.13	0.12					0.03			0.18
v/c Ratio	0.81	0.89	0.51	0.72	0.56		0.67	0.55	0.11	0.89	0.86	0.49
Uniform Delay, d1	39.5	59.0	52.6	47.5	61.3		65.6	47.6	41.1	61.8	47.3	39.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.4	10.5	1.0	8.8	1.1		8.1	1.0	0.2	20.8	6.5	1.3
Delay (s)	49.9	69.5	53.7	56.3	62.4		73.7	48.7	41.3	82.6	53.8	40.7
Level of Service	D	E	D	E	E		E	D	D	F	D	D
Approach Delay (s)		61.2			60.2			52.0			56.6	
Approach LOS		E			E			D			E	

Intersection Summary			
HCM 2000 Control Delay	57.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	163.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	41	24	947	17	16	1807
v/c Ratio	0.23	0.13	0.34	0.01	0.03	0.61
Control Delay	52.0	18.9	4.8	2.3	0.9	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.0	18.9	4.8	2.3	0.9	2.0
Queue Length 50th (ft)	30	0	67	0	1	107
Queue Length 95th (ft)	64	26	180	7	m1	95
Internal Link Dist (ft)	716		2236			2190
Turn Bay Length (ft)	450			450	375	
Base Capacity (vph)	456	425	2794	1253	617	2942
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.06	0.34	0.01	0.03	0.61

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	38	22	871	16	15	1662
Future Volume (vph)	38	22	871	16	15	1662
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1531	3421	1531	1711	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.27	1.00
Satd. Flow (perm)	1711	1531	3421	1531	485	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	24	947	17	16	1807
RTOR Reduction (vph)	0	22	0	4	0	0
Lane Group Flow (vph)	41	2	947	13	16	1807
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Actuated Green, G (s)	8.8	8.8	90.0	90.0	98.2	98.2
Effective Green, g (s)	10.8	10.8	93.0	93.0	99.2	101.2
Actuated g/C Ratio	0.09	0.09	0.78	0.78	0.83	0.84
Clearance Time (s)	6.0	6.0	7.0	7.0	5.0	7.0
Vehicle Extension (s)	5.0	5.0	6.0	6.0	5.0	6.0
Lane Grp Cap (vph)	153	137	2651	1186	443	2885
v/s Ratio Prot	c0.02		0.28		0.00	c0.53
v/s Ratio Perm		0.00		0.01	0.03	
v/c Ratio	0.27	0.02	0.36	0.01	0.04	0.63
Uniform Delay, d1	50.9	49.8	4.2	3.1	2.3	3.1
Progression Factor	1.00	1.00	1.00	1.00	0.40	0.36
Incremental Delay, d2	2.0	0.1	0.4	0.0	0.1	0.8
Delay (s)	52.9	49.9	4.6	3.1	1.0	1.9
Level of Service	D	D	A	A	A	A
Approach Delay (s)	51.8		4.6			1.9
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay	3.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	340	786	879	91	379	1505
v/c Ratio	0.82	0.51	0.64	0.06	0.52	0.64
Control Delay	59.6	1.2	39.3	0.1	27.9	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.6	1.2	39.3	0.1	27.9	5.4
Queue Length 50th (ft)	243	0	254	0	105	240
Queue Length 95th (ft)	#402	0	402	0	m150	15
Internal Link Dist (ft)	319		2190			575
Turn Bay Length (ft)					575	
Base Capacity (vph)	418	1531	1374	1531	1272	2360
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.51	0.64	0.06	0.30	0.64

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	313	723	809	84	349	1385
Future Volume (vph)	313	723	809	84	349	1385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1531	3421	1531	3319	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1711	1531	3421	1531	3319	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	340	786	879	91	379	1505
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	340	786	879	91	379	1505
Turn Type	Prot	Free	NA	Free	Prot	NA
Protected Phases	4		6		5 7	2 5 7
Permitted Phases		Free		Free		
Actuated Green, G (s)	27.2	120.0	45.2	120.0	24.1	81.3
Effective Green, g (s)	29.2	120.0	48.2	120.0	26.1	84.3
Actuated g/C Ratio	0.24	1.00	0.40	1.00	0.22	0.70
Clearance Time (s)	6.0		7.0			
Vehicle Extension (s)	3.0		5.0			
Lane Grp Cap (vph)	416	1531	1374	1531	721	2403
v/s Ratio Prot	c0.20		0.26		0.11	c0.44
v/s Ratio Perm		0.51		0.06		
v/c Ratio	0.82	0.51	0.64	0.06	0.53	0.63
Uniform Delay, d1	42.9	0.0	28.9	0.0	41.5	9.5
Progression Factor	1.00	1.00	1.24	1.00	1.25	0.44
Incremental Delay, d2	11.8	1.2	2.2	0.1	0.5	0.3
Delay (s)	54.7	1.2	38.0	0.1	52.3	4.5
Level of Service	D	A	D	A	D	A
Approach Delay (s)	17.4		34.4			14.1
Approach LOS	B		C			B

Intersection Summary			
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	14	690	434	36	435	175
v/c Ratio	0.07	0.87	0.33	0.05	0.84	0.36
Control Delay	36.2	16.1	23.0	23.5	49.0	22.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.2	16.1	23.0	23.5	49.0	22.7
Queue Length 50th (ft)	7	0	68	10	192	41
Queue Length 95th (ft)	27	129	211	51	#667	163
Internal Link Dist (ft)	968			398	150	
Turn Bay Length (ft)		550				85
Base Capacity (vph)	588	979	1332	722	516	482
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.70	0.33	0.05	0.84	0.36

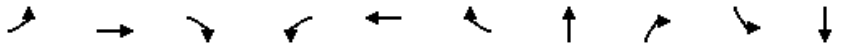
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	13	635	399	33	400	161
Future Volume (vph)	13	635	399	33	400	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	5.0	5.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1711	1531	3319	1801	1801	1531
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1711	1531	3319	1801	1801	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	690	434	36	435	175
RTOR Reduction (vph)	0	610	0	0	0	44
Lane Group Flow (vph)	14	80	434	36	435	131
Turn Type	Prot	Prot	Split	NA	NA	Prot
Protected Phases	3	3	2	2	1	1
Permitted Phases						
Actuated Green, G (s)	11.0	11.0	36.4	36.4	26.0	26.0
Effective Green, g (s)	11.0	11.0	36.4	36.4	26.0	26.0
Actuated g/C Ratio	0.12	0.12	0.39	0.39	0.28	0.28
Clearance Time (s)	4.0	4.0	5.0	5.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	5.0	5.0	3.0	3.0
Lane Grp Cap (vph)	199	178	1278	693	495	421
v/s Ratio Prot	0.01	c0.05	c0.13	0.02	c0.24	0.09
v/s Ratio Perm						
v/c Ratio	0.07	0.45	0.34	0.05	0.88	0.31
Uniform Delay, d1	37.2	38.9	20.5	18.2	32.7	27.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	1.8	0.7	0.1	16.1	0.4
Delay (s)	37.3	40.8	21.3	18.4	48.9	27.6
Level of Service	D	D	C	B	D	C
Approach Delay (s)	40.7			21.0	42.8	
Approach LOS	D			C	D	

Intersection Summary			
HCM 2000 Control Delay	36.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	94.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	139	33	426	158	24	95	463	101	57
v/c Ratio	0.00	0.23	0.06	0.86	0.13	0.02	0.59	0.80	0.59	0.13
Control Delay	37.0	36.1	0.2	62.7	9.4	0.8	73.1	16.2	73.7	39.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.0	36.1	0.2	62.7	9.4	0.8	73.1	16.2	73.7	39.8
Queue Length 50th (ft)	1	87	0	342	44	0	81	0	86	39
Queue Length 95th (ft)	6	171	0	#593	100	4	149	118	162	77
Internal Link Dist (ft)		269			383		290			249
Turn Bay Length (ft)	175		125	300		150				
Base Capacity (vph)	405	617	577	586	1304	1121	397	747	260	823
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.23	0.06	0.73	0.12	0.02	0.24	0.62	0.39	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	128	30	392	145	22	40	48	426	93	52	0
Future Volume (vph)	1	128	30	392	145	22	40	48	426	93	52	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1711	1801	1531	1711	1801	1531		1761	1531	1711	1801	
Flt Permitted	0.66	1.00	1.00	0.95	1.00	1.00		0.83	1.00	0.95	1.00	
Satd. Flow (perm)	1183	1801	1531	1711	1801	1531		1489	1531	1711	1801	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	139	33	426	158	24	43	52	463	101	57	0
RTOR Reduction (vph)	0	0	22	0	0	8	0	0	412	0	0	0
Lane Group Flow (vph)	1	139	11	426	158	16	0	95	51	101	57	0
Turn Type	Perm	NA	Perm	Prot	NA	Prot	Perm	NA	Prot	Prot	NA	
Protected Phases		6		5	2	2		8	8	7	4	
Permitted Phases	6		6				8					
Actuated Green, G (s)	45.7	45.7	45.7	38.7	89.4	89.4		14.6	14.6	13.4	33.0	
Effective Green, g (s)	45.7	45.7	45.7	38.7	89.4	89.4		14.6	14.6	13.4	33.0	
Actuated g/C Ratio	0.34	0.34	0.34	0.29	0.67	0.67		0.11	0.11	0.10	0.25	
Clearance Time (s)	5.5	5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	3.0	5.0	5.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	406	619	526	498	1211	1029		163	168	172	447	
v/s Ratio Prot		c0.08		c0.25	0.09	0.01			0.03	c0.06	0.03	
v/s Ratio Perm	0.00		0.01					c0.06				
v/c Ratio	0.00	0.22	0.02	0.86	0.13	0.02		0.58	0.30	0.59	0.13	
Uniform Delay, d1	28.6	31.0	28.8	44.5	7.8	7.2		56.3	54.5	57.1	38.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.8	0.1	13.5	0.2	0.0		5.2	1.0	5.0	0.1	
Delay (s)	28.6	31.8	28.9	57.9	8.0	7.2		61.5	55.5	62.2	38.9	
Level of Service	C	C	C	E	A	A		E	E	E	D	
Approach Delay (s)		31.3			43.0			56.5			53.8	
Approach LOS		C			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	47.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	132.9	Sum of lost time (s)	20.5
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Group Flow (vph)	358	151	45	1621	1712	110
v/c Ratio	0.77	0.30	0.27	0.72	0.86	0.12
Control Delay	50.8	6.2	10.5	14.6	17.7	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.8	6.2	10.5	14.6	17.7	1.4
Queue Length 50th (ft)	255	0	5	585	598	6
Queue Length 95th (ft)	328	46	m13	729	#937	m18
Internal Link Dist (ft)	755			2381	681	
Turn Bay Length (ft)		185	225			
Base Capacity (vph)	627	634	199	2259	1985	919
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.24	0.23	0.72	0.86	0.12

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	329	139	41	1491	1575	101
Future Volume (vph)	329	139	41	1491	1575	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1711	1531	1711	3421	3421	1531
Flt Permitted	0.95	1.00	0.06	1.00	1.00	1.00
Satd. Flow (perm)	1711	1531	100	3421	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	358	151	45	1621	1712	110
RTOR Reduction (vph)	0	112	0	0	0	31
Lane Group Flow (vph)	358	39	45	1621	1712	79
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		1	6	2	
Permitted Phases	4	4	6			2
Actuated Green, G (s)	30.7	30.7	77.8	77.8	67.2	67.2
Effective Green, g (s)	32.7	30.7	78.8	79.3	68.7	68.7
Actuated g/C Ratio	0.27	0.26	0.66	0.66	0.57	0.57
Clearance Time (s)	6.0	6.0	5.0	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	6.0
Lane Grp Cap (vph)	466	391	154	2260	1958	876
v/s Ratio Prot	c0.21		0.02	c0.47	c0.50	
v/s Ratio Perm		0.03	0.18			0.05
v/c Ratio	0.77	0.10	0.29	0.72	0.87	0.09
Uniform Delay, d1	40.2	34.1	19.9	13.1	22.0	11.6
Progression Factor	1.00	1.00	0.81	0.88	0.52	0.19
Incremental Delay, d2	7.5	0.1	0.9	1.6	4.4	0.2
Delay (s)	47.6	34.2	17.1	13.2	15.7	2.3
Level of Service	D	C	B	B	B	A
Approach Delay (s)	43.6			13.3	14.9	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	14	1964	1698	63	395	124
v/c Ratio	0.10	0.75	0.71	0.06	0.69	0.08
Control Delay	39.8	4.7	11.7	2.1	53.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.8	4.7	11.7	2.1	53.2	0.1
Queue Length 50th (ft)	11	167	256	1	150	0
Queue Length 95th (ft)	m13	215	445	m13	193	0
Internal Link Dist (ft)		681	1012		359	
Turn Bay Length (ft)	225					
Base Capacity (vph)	199	2606	2400	1088	885	1531
Starvation Cap Reductn	0	11	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.76	0.71	0.06	0.45	0.08

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	13	1807	1562	58	363	114
Future Volume (vph)	13	1807	1562	58	363	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	3319	1531
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1711	3421	3421	1531	3319	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	1964	1698	63	395	124
RTOR Reduction (vph)	0	0	0	16	0	0
Lane Group Flow (vph)	14	1964	1698	47	395	124
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	1	6	2		4	
Permitted Phases				2		Free
Actuated Green, G (s)	5.2	89.9	79.7	79.7	19.6	120.0
Effective Green, g (s)	6.2	91.4	81.2	81.2	20.6	120.0
Actuated g/C Ratio	0.05	0.76	0.68	0.68	0.17	1.00
Clearance Time (s)	5.0	5.5	5.5	5.5	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	88	2605	2314	1035	569	1531
v/s Ratio Prot	0.01	c0.57	0.50		c0.12	
v/s Ratio Perm				0.03		0.08
v/c Ratio	0.16	0.75	0.73	0.05	0.69	0.08
Uniform Delay, d1	54.4	8.0	12.5	6.5	46.7	0.0
Progression Factor	0.79	0.36	0.73	0.50	1.00	1.00
Incremental Delay, d2	0.6	1.5	1.9	0.1	3.7	0.1
Delay (s)	43.8	4.4	11.0	3.3	50.4	0.1
Level of Service	D	A	B	A	D	A
Approach Delay (s)		4.7	10.7		38.4	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	SBR	NWL	NWR2
Lane Group Flow (vph)	2186	173	117	812	918	30	15
v/c Ratio	0.85	0.11	0.63	0.28	0.59	0.25	0.01
Control Delay	10.1	0.1	48.7	0.9	1.6	56.8	0.0
Queue Delay	0.6	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.7	0.1	48.7	0.9	1.6	56.8	0.0
Queue Length 50th (ft)	255	0	27	14	0	22	0
Queue Length 95th (ft)	643	m0	108	22	0	53	0
Internal Link Dist (ft)	1012			765		262	
Turn Bay Length (ft)		50	350				
Base Capacity (vph)	2583	1531	420	2947	1558	285	1531
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	135	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.11	0.28	0.28	0.59	0.11	0.01

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2
Lane Configurations		↑↑	↱	↰	↑↑			↱	↰		↱
Traffic Volume (vph)	0	2011	159	108	747	0	0	845	28	0	14
Future Volume (vph)	0	2011	159	108	747	0	0	845	28	0	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0			4.0	4.0		4.0
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00		1.00
Frt		1.00	0.85	1.00	1.00			0.86	1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00			1.00	0.95		1.00
Satd. Flow (prot)		3421	1531	1711	3421			1558	1711		1531
Flt Permitted		1.00	1.00	0.04	1.00			1.00	0.95		1.00
Satd. Flow (perm)		3421	1531	77	3421			1558	1711		1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2186	173	117	812	0	0	918	30	0	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2186	173	117	812	0	0	918	30	0	15
Turn Type		NA	Free	pm+pt	NA			Free	Prot		Free
Protected Phases		6		5	2				4		
Permitted Phases			Free	2				Free			Free
Actuated Green, G (s)		89.2	120.0	101.9	101.9			120.0	7.6		120.0
Effective Green, g (s)		90.7	120.0	102.4	103.4			120.0	8.6		120.0
Actuated g/C Ratio		0.76	1.00	0.85	0.86			1.00	0.07		1.00
Clearance Time (s)		5.5		4.5	5.5				5.0		
Vehicle Extension (s)		5.0		3.0	5.0				3.0		
Lane Grp Cap (vph)		2585	1531	184	2947			1558	122		1531
v/s Ratio Prot		c0.64		0.05	0.24				0.02		
v/s Ratio Perm			0.11	0.50				c0.59			0.01
v/c Ratio		0.85	0.11	0.64	0.28			0.59	0.25		0.01
Uniform Delay, d1		9.9	0.0	32.6	1.5			0.0	52.6		0.0
Progression Factor		0.63	1.00	1.53	0.39			1.00	1.00		1.00
Incremental Delay, d2		2.6	0.1	6.8	0.2			1.6	1.1		0.0
Delay (s)		8.8	0.1	56.6	0.8			1.6	53.7		0.0
Level of Service		A	A	E	A			A	D		A
Approach Delay (s)		8.2			7.8		1.6		35.8		
Approach LOS		A			A		A		D		

Intersection Summary			
HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	NWL
Lane Group Flow (vph)	1171	1340	745	185
v/c Ratio	0.45	0.94	0.29	0.62
Control Delay	1.1	19.3	9.1	54.0
Queue Delay	0.0	44.2	0.0	0.0
Total Delay	1.1	63.5	9.1	54.0
Queue Length 50th (ft)	13	1063	120	134
Queue Length 95th (ft)	19	#1324	201	198
Internal Link Dist (ft)	765		418	135
Turn Bay Length (ft)				
Base Capacity (vph)	2591	1418	2591	541
Starvation Cap Reductn	0	236	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.45	1.13	0.29	0.34

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	1077	1233	0	685	170	0
Future Volume (vph)	1077	1233	0	685	170	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5		4.0	4.0	
Lane Util. Factor	0.95	1.00		0.95	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	1.00	1.00		1.00	0.95	
Satd. Flow (prot)	3421	1531		3421	1711	
Flt Permitted	1.00	1.00		1.00	0.95	
Satd. Flow (perm)	3421	1531		3421	1711	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1171	1340	0	745	185	0
RTOR Reduction (vph)	0	278	0	0	0	0
Lane Group Flow (vph)	1171	1062	0	745	185	0
Turn Type	NA	Perm		NA	Prot	
Protected Phases	6			2	4	
Permitted Phases		6				
Actuated Green, G (s)	89.4	89.4		89.4	20.1	
Effective Green, g (s)	90.9	89.4		90.9	21.1	
Actuated g/C Ratio	0.76	0.75		0.76	0.18	
Clearance Time (s)	5.5	5.5		5.5	5.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	2591	1140		2591	300	
v/s Ratio Prot	0.34			0.22	c0.11	
v/s Ratio Perm		c0.69				
v/c Ratio	0.45	0.93		0.29	0.62	
Uniform Delay, d1	5.4	12.7		4.5	45.7	
Progression Factor	0.12	3.39		1.77	1.00	
Incremental Delay, d2	0.4	10.5		0.3	5.4	
Delay (s)	1.0	53.7		8.2	51.1	
Level of Service	A	D		A	D	
Approach Delay (s)	29.1			8.2	51.1	
Approach LOS	C			A	D	

Intersection Summary			
HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	403	875	35	132	351	40
v/c Ratio	0.29	0.57	0.07	0.08	0.63	0.08
Control Delay	16.0	1.6	9.9	10.1	24.5	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.0	1.6	9.9	10.1	24.5	6.4
Queue Length 50th (ft)	44	0	6	13	95	0
Queue Length 95th (ft)	121	0	23	32	220	19
Internal Link Dist (ft)	475			893	211	
Turn Bay Length (ft)			150			
Base Capacity (vph)	1403	1531	691	2806	1559	1398
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.57	0.05	0.05	0.23	0.03

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	371	805	32	121	323	37
Future Volume (vph)	371	805	32	121	323	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	4.0	5.0	6.0	6.0	6.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3421	1531	1711	3421	1711	1531
Flt Permitted	1.00	1.00	0.43	1.00	0.95	1.00
Satd. Flow (perm)	3421	1531	777	3421	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	403	875	35	132	351	40
RTOR Reduction (vph)	0	0	0	0	0	28
Lane Group Flow (vph)	403	875	35	132	351	12
Turn Type	NA	Free	pm+pt	NA	Prot	Prot
Protected Phases	6		5	2	4	4
Permitted Phases		Free	2			
Actuated Green, G (s)	25.9	66.1	33.6	33.6	20.5	20.5
Effective Green, g (s)	25.9	66.1	33.6	33.6	20.5	20.5
Actuated g/C Ratio	0.39	1.00	0.51	0.51	0.31	0.31
Clearance Time (s)	6.0		5.0	6.0	6.0	6.0
Vehicle Extension (s)	3.5		3.5	3.5	5.0	5.0
Lane Grp Cap (vph)	1340	1531	433	1738	530	474
v/s Ratio Prot	0.12		0.00	0.04	0.21	0.01
v/s Ratio Perm		c0.57	0.04			
v/c Ratio	0.30	0.57	0.08	0.08	0.66	0.03
Uniform Delay, d1	13.9	0.0	8.4	8.3	19.8	15.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	1.6	0.1	0.1	4.1	0.0
Delay (s)	14.4	1.6	8.4	8.4	23.9	15.9
Level of Service	B	A	A	A	C	B
Approach Delay (s)	5.6			8.4	23.1	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	66.1	Sum of lost time (s)	17.0
Intersection Capacity Utilization	48.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	271	764	153	259	534	166	122	393	123	787
v/c Ratio	0.61	0.42	0.10	0.60	0.30	0.46	0.28	0.26	0.37	0.51
Control Delay	53.9	16.7	0.1	33.1	25.9	53.7	37.9	0.4	53.4	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.9	16.7	0.1	33.1	25.9	53.7	37.9	0.4	53.4	1.2
Queue Length 50th (ft)	99	194	0	108	177	62	77	0	47	0
Queue Length 95th (ft)	134	290	0	m126	m227	96	125	0	77	0
Internal Link Dist (ft)		871			1398		1013		384	
Turn Bay Length (ft)	445		445	615		300		400		
Base Capacity (vph)	580	1810	1531	580	1799	442	540	1531	456	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.42	0.10	0.45	0.30	0.38	0.23	0.26	0.27	0.51

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	249	703	141	238	491	0	153	112	362	0	113	724
Future Volume (vph)	249	703	141	238	491	0	153	112	362	0	113	724
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		0.97	1.00	1.00		0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (perm)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	271	764	153	259	534	0	166	122	393	0	123	787
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	271	764	153	259	534	0	166	122	393	0	123	787
Turn Type	Prot	NA	Free	Prot	NA		Prot	NA	Free		NA	Free
Protected Phases	1	6		5	2		7	4			8	
Permitted Phases			Free						Free			Free
Actuated Green, G (s)	15.0	61.5	120.0	14.6	61.1		11.2	26.9	120.0		9.7	120.0
Effective Green, g (s)	16.0	63.5	120.0	15.6	63.1		13.2	28.9	120.0		11.7	120.0
Actuated g/C Ratio	0.13	0.53	1.00	0.13	0.53		0.11	0.24	1.00		0.10	1.00
Clearance Time (s)	5.0	6.0		5.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	442	1810	1531	431	1798		365	433	1531		333	1531
v/s Ratio Prot	0.08	0.22		0.08	0.16		0.05	0.07			0.04	
v/s Ratio Perm			0.10						0.26			c0.51
v/c Ratio	0.61	0.42	0.10	0.60	0.30		0.45	0.28	0.26		0.37	0.51
Uniform Delay, d1	49.1	17.1	0.0	49.3	16.0		50.0	37.1	0.0		50.7	0.0
Progression Factor	0.99	0.87	1.00	0.56	1.48		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.3	0.7	0.1	2.2	0.4		0.9	0.4	0.4		0.7	1.2
Delay (s)	51.0	15.6	0.1	29.8	24.0		50.9	37.5	0.4		51.4	1.2
Level of Service	D	B	A	C	C		D	D	A		D	A
Approach Delay (s)		21.7			25.9			19.4			8.0	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	45	993	120	40	611	84	128	67	275	266
v/c Ratio	0.10	0.56	0.08	0.14	0.35	0.05	0.55	0.19	1.02	0.97
Control Delay	14.3	35.7	0.1	18.1	31.1	0.1	56.7	1.1	109.3	94.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.3	35.7	0.1	18.1	31.1	0.1	56.7	1.1	109.3	94.5
Queue Length 50th (ft)	25	392	0	18	243	0	94	0	~231	208
Queue Length 95th (ft)	50	474	0	41	309	0	151	0	#418	#391
Internal Link Dist (ft)		1398			1719		314			276
Turn Bay Length (ft)	275			375		475				
Base Capacity (vph)	443	1772	1531	293	1766	1531	430	361	270	275
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.56	0.08	0.14	0.35	0.05	0.30	0.19	1.02	0.97

Intersection Summary

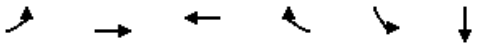
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	914	110	37	562	77	106	12	62	422	14	62
Future Volume (vph)	41	914	110	37	562	77	106	12	62	422	14	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	0.95	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.97	
Satd. Flow (prot)	1711	3421	1531	1711	3421	1531		1723	1531	1625	1591	
Flt Permitted	0.36	1.00	1.00	0.19	1.00	1.00		0.96	1.00	0.95	0.97	
Satd. Flow (perm)	644	3421	1531	348	3421	1531		1723	1531	1625	1591	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	993	120	40	611	84	115	13	67	459	15	67
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	56	0	10	0
Lane Group Flow (vph)	45	993	120	40	611	84	0	128	11	275	256	0
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Split	NA	custom	Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases	6		Free	2		Free			3			
Actuated Green, G (s)	65.0	59.2	120.0	64.6	59.0	120.0		14.2	18.0	18.0	18.0	
Effective Green, g (s)	67.0	61.2	120.0	66.6	61.0	120.0		16.2	20.0	20.0	20.0	
Actuated g/C Ratio	0.56	0.51	1.00	0.55	0.51	1.00		0.13	0.17	0.17	0.17	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	420	1744	1531	268	1739	1531		232	255	270	265	
v/s Ratio Prot	0.01	c0.29		c0.01	0.18			c0.07		c0.17	0.16	
v/s Ratio Perm	0.05		c0.08	0.07		0.05			0.01			
v/c Ratio	0.11	0.57	0.08	0.15	0.35	0.05		0.55	0.04	1.02	0.97	
Uniform Delay, d1	12.4	20.3	0.0	13.9	17.7	0.0		48.5	42.0	50.0	49.7	
Progression Factor	1.23	1.61	1.00	1.51	1.64	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.3	0.1	0.3	0.6	0.1		2.8	0.1	59.6	45.5	
Delay (s)	15.3	34.0	0.1	21.3	29.5	0.1		51.3	42.0	109.6	95.1	
Level of Service	B	C	A	C	C	A		D	D	F	F	
Approach Delay (s)		29.8			25.7			48.1			102.5	
Approach LOS		C			C			D			F	

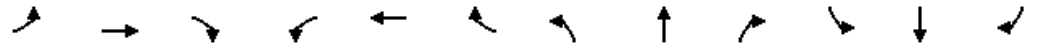
Intersection Summary			
HCM 2000 Control Delay	45.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBT
Lane Group Flow (vph)	99	1002	538	393	196	192
v/c Ratio	0.17	0.40	0.21	0.32	0.63	0.52
Control Delay	6.1	8.7	5.7	1.5	53.0	30.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.1	8.7	5.7	1.5	53.0	30.6
Queue Length 50th (ft)	39	216	57	0	148	86
Queue Length 95th (ft)	46	479	106	38	214	152
Internal Link Dist (ft)		1633	378			130
Turn Bay Length (ft)	415			200	175	
Base Capacity (vph)	591	2536	2536	1236	568	614
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.40	0.21	0.32	0.35	0.31

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	922	0	0	495	362	0	0	0	347	0	10
Future Volume (vph)	91	922	0	0	495	362	0	0	0	347	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95	1.00				0.95	0.95	
Frt	1.00	1.00			1.00	0.85				1.00	0.99	
Flt Protected	0.95	1.00			1.00	1.00				0.95	0.95	
Satd. Flow (prot)	1711	3421			3421	1531				1625	1620	
Flt Permitted	0.44	1.00			1.00	1.00				0.95	0.95	
Satd. Flow (perm)	797	3421			3421	1531				1625	1620	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	1002	0	0	538	393	0	0	0	377	0	11
RTOR Reduction (vph)	0	0	0	0	0	102	0	0	0	0	59	0
Lane Group Flow (vph)	99	1002	0	0	538	291	0	0	0	196	133	0
Turn Type	Perm	NA		Perm	NA	Perm				Split	NA	
Protected Phases		6			2		3	3		4	4	
Permitted Phases	6	6		2	2	2						
Actuated Green, G (s)	87.0	87.0			87.0	87.0				22.0	22.0	
Effective Green, g (s)	89.0	89.0			89.0	89.0				23.0	23.0	
Actuated g/C Ratio	0.74	0.74			0.74	0.74				0.19	0.19	
Clearance Time (s)	6.0	6.0			6.0	6.0				5.0	5.0	
Vehicle Extension (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Lane Grp Cap (vph)	591	2537			2537	1135				311	310	
v/s Ratio Prot		c0.29			0.16					c0.12	0.08	
v/s Ratio Perm	0.12					0.19						
v/c Ratio	0.17	0.39			0.21	0.26				0.63	0.43	
Uniform Delay, d1	4.6	5.7			4.8	4.9				44.6	42.7	
Progression Factor	0.96	1.31			1.04	1.32				1.00	1.00	
Incremental Delay, d2	0.6	0.4			0.2	0.5				5.7	2.0	
Delay (s)	5.0	7.9			5.1	7.1				50.3	44.7	
Level of Service	A	A			A	A				D	D	
Approach Delay (s)		7.6			6.0			0.0			47.5	
Approach LOS		A			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	1	7	12	1	13	18	761	17	53	1107	14
Future Volume (Veh/h)	12	1	7	12	1	13	18	761	17	53	1107	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	1	8	13	1	14	20	827	18	58	1203	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1794	2212	609	1602	2210	422	1218			845		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1794	2212	609	1602	2210	422	1218			845		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	71	97	98	79	97	98	96			93		
cM capacity (veh/h)	44	39	438	62	39	580	568			787		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	22	28	20	551	294	58	802	416
Volume Left	13	13	20	0	0	58	0	0
Volume Right	8	14	0	0	18	0	0	15
cSH	65	109	568	1700	1700	787	1700	1700
Volume to Capacity	0.34	0.26	0.04	0.32	0.17	0.07	0.47	0.24
Queue Length 95th (ft)	31	24	3	0	0	6	0	0
Control Delay (s)	85.7	49.3	11.6	0.0	0.0	9.9	0.0	0.0
Lane LOS	F	E	B			A		
Approach Delay (s)	85.7	49.3	0.3			0.5		
Approach LOS	F	E						

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	47.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	9	26	30	41	884	54	9	1226	7
v/c Ratio	0.07	0.17	0.16	0.11	0.29	0.04	0.02	0.43	0.01
Control Delay	51.9	23.2	1.9	1.8	2.3	0.5	0.2	1.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.9	23.2	1.9	1.8	2.3	0.5	0.2	1.8	0.0
Queue Length 50th (ft)	7	1	0	4	52	0	1	78	0
Queue Length 95th (ft)	24	30	0	8	123	6	m0	26	m0
Internal Link Dist (ft)		254	405		1830			1619	
Turn Bay Length (ft)				300		100	225		225
Base Capacity (vph)	428	431	422	545	3052	1374	706	2849	1287
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.06	0.07	0.08	0.29	0.04	0.01	0.43	0.01

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	2	22	16	0	12	38	813	50	8	1128	6
Future Volume (vph)	8	2	22	16	0	12	38	813	50	8	1128	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.86			0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1711	1551			1649		1711	3421	1531	1711	3421	1531
Flt Permitted	0.89	1.00			0.81		0.20	1.00	1.00	0.32	1.00	1.00
Satd. Flow (perm)	1608	1551			1373		357	3421	1531	579	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	2	24	17	0	13	41	884	54	9	1226	7
RTOR Reduction (vph)	0	23	0	0	28	0	0	0	9	0	0	1
Lane Group Flow (vph)	9	3	0	0	2	0	41	884	45	9	1226	6
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			6		6	2		2
Actuated Green, G (s)	4.9	4.9			4.9		100.9	96.5	96.5	94.3	93.2	93.2
Effective Green, g (s)	6.9	6.9			6.9		102.9	99.0	99.0	96.3	95.7	95.7
Actuated g/C Ratio	0.06	0.06			0.06		0.86	0.82	0.82	0.80	0.80	0.80
Clearance Time (s)	6.0	6.0			6.0		5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0			3.0		2.5	5.0	5.0	2.5	5.0	5.0
Lane Grp Cap (vph)	92	89			78		367	2822	1263	484	2728	1220
v/s Ratio Prot		0.00					c0.01	c0.26		0.00	c0.36	
v/s Ratio Perm	c0.01				0.00		0.09		0.03	0.01		0.00
v/c Ratio	0.10	0.04			0.02		0.11	0.31	0.04	0.02	0.45	0.00
Uniform Delay, d1	53.6	53.4			53.4		2.0	2.5	1.9	2.4	3.8	2.5
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	0.16	0.33	1.00
Incremental Delay, d2	0.5	0.2			0.1		0.1	0.3	0.1	0.0	0.5	0.0
Delay (s)	54.1	53.6			53.5		2.1	2.8	1.9	0.4	1.8	2.5
Level of Service	D	D			D		A	A	A	A	A	A
Approach Delay (s)		53.7			53.5			2.7			1.8	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	3.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	WBT	WBR	SBT	SBR
Lane Group Flow (vph)	38	767	303	28	249	261
v/c Ratio	0.20	0.35	0.13	0.03	0.61	0.64
Control Delay	85.7	7.1	7.0	0.0	56.6	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.7	7.1	7.0	0.0	56.6	13.0
Queue Length 50th (ft)	15	165	40	0	97	0
Queue Length 95th (ft)	m31	187	68	0	136	77
Internal Link Dist (ft)			782		297	
Turn Bay Length (ft)	420			600		
Base Capacity (vph)	691	2187	2416	1105	826	567
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.35	0.13	0.03	0.30	0.46

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	0	706	0	279	26	0	0	0	0	229	240
Future Volume (vph)	35	0	706	0	279	26	0	0	0	0	229	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		6.5		6.5	6.5					7.0	7.0
Lane Util. Factor	0.97		0.88		0.95	1.00					0.95	1.00
Frt	1.00		0.85		1.00	0.85					1.00	0.85
Flt Protected	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (prot)	3319		2694		3421	1531					3421	1531
Flt Permitted	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (perm)	3319		2694		3421	1531					3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	0	767	0	303	28	0	0	0	0	249	261
RTOR Reduction (vph)	0	0	116	0	0	9	0	0	0	0	0	230
Lane Group Flow (vph)	38	0	651	0	303	19	0	0	0	0	249	31
Turn Type	Prot		Prot		NA	Perm					NA	Perm
Protected Phases	1		6		2						4	
Permitted Phases						2						4
Actuated Green, G (s)	4.5		92.3		82.8	82.8					14.2	14.2
Effective Green, g (s)	4.5		92.3		82.8	82.8					14.2	14.2
Actuated g/C Ratio	0.04		0.77		0.69	0.69					0.12	0.12
Clearance Time (s)	5.0		6.5		6.5	6.5					7.0	7.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0					3.0	3.0
Lane Grp Cap (vph)	124		2072		2360	1056					404	181
v/s Ratio Prot	0.01		c0.24		0.09						c0.07	
v/s Ratio Perm						0.01						0.02
v/c Ratio	0.31		0.31		0.13	0.02					0.62	0.17
Uniform Delay, d1	56.2		4.2		6.3	5.8					50.3	47.6
Progression Factor	1.56		4.53		1.00	1.00					1.00	1.00
Incremental Delay, d2	1.2		0.4		0.1	0.0					2.8	0.4
Delay (s)	88.9		19.4		6.4	5.9					53.1	48.1
Level of Service	F		B		A	A					D	D
Approach Delay (s)		22.7			6.4			0.0			50.5	
Approach LOS		C			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	496	70	779	26	779	488
v/c Ratio	0.71	0.09	0.34	0.04	0.70	0.20
Control Delay	52.3	6.6	22.5	8.5	45.9	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.3	6.6	22.5	8.5	45.9	5.9
Queue Length 50th (ft)	201	12	138	0	197	56
Queue Length 95th (ft)	223	24	201	19	228	89
Internal Link Dist (ft)	751		1519			448
Turn Bay Length (ft)		600		1000	425	
Base Capacity (vph)	885	873	2268	720	1527	2476
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.08	0.34	0.04	0.51	0.20

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	456	64	717	24	717	449
Future Volume (vph)	456	64	717	24	717	449
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.91	1.00	0.94	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3319	1531	4916	1531	4824	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3319	1531	4916	1531	4824	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	496	70	779	26	779	488
RTOR Reduction (vph)	0	21	0	14	0	0
Lane Group Flow (vph)	496	49	779	12	779	488
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	4	4 5	6		5	2
Permitted Phases				6		
Actuated Green, G (s)	23.1	54.6	52.4	52.4	25.5	83.9
Effective Green, g (s)	25.1	56.6	55.4	55.4	27.5	86.9
Actuated g/C Ratio	0.21	0.47	0.46	0.46	0.23	0.72
Clearance Time (s)	6.0		7.0	7.0	6.0	7.0
Vehicle Extension (s)	3.0		5.0	5.0	3.0	5.0
Lane Grp Cap (vph)	694	722	2269	706	1105	2477
v/s Ratio Prot	c0.15	0.03	c0.16		c0.16	0.14
v/s Ratio Perm				0.01		
v/c Ratio	0.71	0.07	0.34	0.02	0.70	0.20
Uniform Delay, d1	44.1	17.3	20.7	17.5	42.5	5.3
Progression Factor	1.06	0.88	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.4	0.0	0.4	0.0	2.1	0.2
Delay (s)	50.1	15.3	21.1	17.6	44.6	5.5
Level of Service	D	B	C	B	D	A
Approach Delay (s)	45.8		21.0			29.5
Approach LOS	D		C			C

Intersection Summary			
HCM 2000 Control Delay	30.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	147	1190	59	325	523	32	235	417	334	233
v/c Ratio	0.26	0.55	0.24	0.25	0.34	0.09	0.58	0.64	0.50	0.48
Control Delay	14.5	24.9	15.7	25.2	0.6	53.2	39.9	49.6	46.2	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	24.9	15.7	25.2	0.6	53.2	39.9	49.6	46.2	9.1
Queue Length 50th (ft)	49	231	19	82	0	11	58	154	122	0
Queue Length 95th (ft)	102	341	47	144	0	30	114	234	190	71
Internal Link Dist (ft)		1548		585			1389		1519	
Turn Bay Length (ft)	350		425			350		490		300
Base Capacity (vph)	708	2605	553	1854	1531	1185	1198	1334	1375	755
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.46	0.11	0.18	0.34	0.03	0.20	0.31	0.24	0.31

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	899	196	54	299	481	29	125	91	384	307	214
Future Volume (vph)	135	899	196	54	299	481	29	125	91	384	307	214
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	7.0		5.5	7.0	4.0	5.5	5.5		5.5	5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	0.95		0.97	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	4784		1711	3421	1531	3319	3205		3319	3421	1531
Flt Permitted	0.49	1.00		0.19	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	885	4784		340	3421	1531	3319	3205		3319	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	147	977	213	59	325	523	32	136	99	417	334	233
RTOR Reduction (vph)	0	14	0	0	0	0	0	75	0	0	0	188
Lane Group Flow (vph)	147	1176	0	59	325	523	32	160	0	417	334	45
Turn Type	pm+pt	NA		pm+pt	NA	Free	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases	2			6		Free						4
Actuated Green, G (s)	63.4	51.8		51.8	45.7	115.9	11.9	11.9		22.6	22.6	22.6
Effective Green, g (s)	63.4	51.8		51.8	45.7	115.9	11.9	11.9		22.6	22.6	22.6
Actuated g/C Ratio	0.55	0.45		0.45	0.39	1.00	0.10	0.10		0.19	0.19	0.19
Clearance Time (s)	5.5	7.0		5.5	7.0		5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	3.0	7.0		3.0	7.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	571	2138		224	1348	1531	340	329		647	667	298
v/s Ratio Prot	0.03	c0.25		0.01	0.09		0.01	0.05		c0.13	0.10	
v/s Ratio Perm	0.11			0.10		c0.34						0.03
v/c Ratio	0.26	0.55		0.26	0.24	0.34	0.09	0.49		0.64	0.50	0.15
Uniform Delay, d1	13.2	23.5		18.6	23.5	0.0	47.1	49.1		43.0	41.6	38.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	0.8		0.6	0.3	0.6	0.1	1.1		2.2	0.6	0.2
Delay (s)	13.4	24.3		19.3	23.8	0.6	47.2	50.2		45.2	42.2	38.9
Level of Service	B	C		B	C	A	D	D		D	D	D
Approach Delay (s)		23.1			10.1			49.9			42.7	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	115.9	Sum of lost time (s)	23.5
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	1274	12	19	404	19	15	0	21	30	0	13
Future Volume (Veh/h)	3	1274	12	19	404	19	15	0	21	30	0	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	1385	13	21	439	21	16	0	23	33	0	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		650			625							
pX, platoon unblocked												
vC, conflicting volume	460			1398			1666	1893	692	1202	1885	220
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	460			1398			1666	1893	692	1202	1885	220
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			73	100	94	74	100	98
cM capacity (veh/h)	1097			485			60	66	386	127	67	785

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	3	692	692	13	21	220	220	21	39	47
Volume Left	3	0	0	0	21	0	0	0	16	33
Volume Right	0	0	0	13	0	0	0	21	23	14
cSH	1097	1700	1700	1700	485	1700	1700	1700	119	169
Volume to Capacity	0.00	0.41	0.41	0.01	0.04	0.13	0.13	0.01	0.33	0.28
Queue Length 95th (ft)	0	0	0	0	3	0	0	0	32	27
Control Delay (s)	8.3	0.0	0.0	0.0	12.8	0.0	0.0	0.0	49.1	34.2
Lane LOS	A				B				E	D
Approach Delay (s)	0.0				0.6				49.1	34.2
Approach LOS									E	D

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	45.9%	ICU Level of Service	A	
Analysis Period (min)	15			

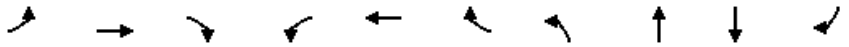
Lane Group	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	83	775	73	63	1267
v/c Ratio	0.05	0.20	0.05	0.21	0.26
Control Delay	0.1	2.8	0.1	17.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	0.1	2.8	0.1	17.5	0.1
Queue Length 50th (ft)	0	24	0	17	0
Queue Length 95th (ft)	0	39	0	36	0
Internal Link Dist (ft)		448			480
Turn Bay Length (ft)			485	575	
Base Capacity (vph)	1558	4916	1531	962	4916
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.16	0.05	0.07	0.26

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	76	713	67	58	1166
Future Volume (vph)	0	76	713	67	58	1166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	0.91	1.00	1.00	0.91
Frt		0.86	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1558	4916	1531	1711	4916
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1558	4916	1531	1711	4916
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	83	775	73	63	1267
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	83	775	73	63	1267
Turn Type		Free	NA	Free	Prot	NA
Protected Phases			2		1	Free
Permitted Phases		Free		Free		
Actuated Green, G (s)		48.4	32.8	48.4	4.6	48.4
Effective Green, g (s)		48.4	34.8	48.4	5.6	48.4
Actuated g/C Ratio		1.00	0.72	1.00	0.12	1.00
Clearance Time (s)			6.0		5.0	
Vehicle Extension (s)			5.0		3.0	
Lane Grp Cap (vph)		1558	3534	1531	197	4916
v/s Ratio Prot			0.16		0.04	0.26
v/s Ratio Perm		0.05		0.05		
v/c Ratio		0.05	0.22	0.05	0.32	0.26
Uniform Delay, d1		0.0	2.3	0.0	19.7	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	0.1	0.1	0.9	0.1
Delay (s)		0.1	2.3	0.1	20.6	0.1
Level of Service		A	A	A	C	A
Approach Delay (s)	0.1		2.1			1.1
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	1.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	48.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	31.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	59	1088	61	5	536	8	37	4	11	26
v/c Ratio	0.08	0.36	0.04	0.01	0.19	0.01	0.29	0.03	0.09	0.02
Control Delay	3.2	6.4	1.9	1.8	2.4	0.0	55.7	34.5	49.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.2	6.4	1.9	1.8	2.4	0.0	55.7	34.5	49.9	0.0
Queue Length 50th (ft)	13	215	7	0	27	0	27	1	8	0
Queue Length 95th (ft)	15	351	5	m2	35	m0	61	12	26	0
Internal Link Dist (ft)		712			1633			152	157	
Turn Bay Length (ft)	250		350	235		375				
Base Capacity (vph)	841	3013	1356	615	2802	1266	292	348	290	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.36	0.04	0.01	0.19	0.01	0.13	0.01	0.04	0.02

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	1001	56	5	493	7	34	1	3	9	1	24
Future Volume (vph)	54	1001	56	5	493	7	34	1	3	9	1	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)	1711	3421	1531	1711	3421	1531	1711	1598			1722	1531
Flt Permitted	0.43	1.00	1.00	0.26	1.00	1.00	0.75	1.00			0.75	1.00
Satd. Flow (perm)	775	3421	1531	461	3421	1531	1351	1598			1343	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	1088	61	5	536	8	37	1	3	10	1	26
RTOR Reduction (vph)	0	0	11	0	0	2	0	3	0	0	0	0
Lane Group Flow (vph)	59	1088	50	5	536	6	37	1	0	0	11	26
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Free
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8			4		Free
Actuated Green, G (s)	101.1	96.1	96.1	93.3	92.2	92.2	6.3	6.3			6.3	120.0
Effective Green, g (s)	102.1	98.1	98.1	94.3	94.2	94.2	8.3	8.3			8.3	120.0
Actuated g/C Ratio	0.85	0.82	0.82	0.79	0.79	0.79	0.07	0.07			0.07	1.00
Clearance Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0			3.0	
Lane Grp Cap (vph)	702	2796	1251	378	2685	1201	93	110			92	1531
v/s Ratio Prot	c0.00	c0.32		0.00	0.16			0.00				
v/s Ratio Perm	0.07		0.03	0.01		0.00	c0.03				0.01	0.02
v/c Ratio	0.08	0.39	0.04	0.01	0.20	0.01	0.40	0.01			0.12	0.02
Uniform Delay, d1	1.5	2.9	2.1	2.8	3.3	2.8	53.5	52.0			52.4	0.0
Progression Factor	1.80	2.23	2.23	0.82	0.62	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.0	0.4	0.1	0.0	0.2	0.0	2.8	0.0			0.6	0.0
Delay (s)	2.7	6.9	4.7	2.3	2.2	2.8	56.2	52.1			53.0	0.0
Level of Service	A	A	A	A	A	A	E	D			D	A
Approach Delay (s)		6.6			2.2			55.8			15.8	
Approach LOS		A			A			E			B	

Intersection Summary			
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	322	1199	585	13	9	150
v/c Ratio	0.37	0.36	0.24	0.01	0.08	0.10
Control Delay	5.5	1.9	9.4	0.0	53.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.5	1.9	9.4	0.0	53.2	0.1
Queue Length 50th (ft)	21	0	99	0	7	0
Queue Length 95th (ft)	m96	m268	187	0	24	0
Internal Link Dist (ft)		605	712		887	
Turn Bay Length (ft)	600					600
Base Capacity (vph)	1167	3321	2452	1531	285	1531
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.36	0.24	0.01	0.03	0.10

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	296	1103	538	12	8	138
Future Volume (vph)	296	1103	538	12	8	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	1711	1531
Flt Permitted	0.41	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	738	3421	3421	1531	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	322	1199	585	13	9	150
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	322	1199	585	13	9	150
Turn Type	pm+pt	NA	NA	Free	Prot	Free
Protected Phases	1	1 6	2		4	
Permitted Phases	1 6			Free		Free
Actuated Green, G (s)	100.5	106.5	79.2	120.0	1.5	120.0
Effective Green, g (s)	104.5	108.5	81.2	120.0	3.5	120.0
Actuated g/C Ratio	0.87	0.90	0.68	1.00	0.03	1.00
Clearance Time (s)	6.0		6.0		6.0	
Vehicle Extension (s)	3.0		5.0		3.0	
Lane Grp Cap (vph)	831	3093	2314	1531	49	1531
v/s Ratio Prot	0.08	c0.35	0.17		0.01	
v/s Ratio Perm	0.26			0.01		c0.10
v/c Ratio	0.39	0.39	0.25	0.01	0.18	0.10
Uniform Delay, d1	2.7	0.8	7.6	0.0	56.9	0.0
Progression Factor	4.32	3.11	1.23	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1	0.3	0.0	1.8	0.1
Delay (s)	11.9	2.7	9.6	0.0	58.7	0.1
Level of Service	B	A	A	A	E	A
Approach Delay (s)		4.6	9.4		3.4	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	5.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

BWI TIA MOE Table - 2022 AM No Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
1	Aviation Blvd (MD 170) at Dorsey Rd (MD 176) - West	Signalized	NBL	426	71.4	E	99.7	F	85.4	F	455	503	#753
			NBT	1382	119.7	F					-	~1058	#1351
			NBR	262	40.5	D					250	149	268
			SBL	161	84.2	F	67.3	E			250	204	308
			SBT	391	65	E					-	247	324
			SBR	300	61.1	E					175	55	173
			EBL	328	114.4	F	74.9	E			175	~447	#753
			EBT	317	47.9	D					-	169	244
			EBR	144	44.5	D					225	0	64
			WBL	89	83.4	F	74.8	E			200	113	191
			WBT	474	73.2	E					-	310	403
			WBR	0	-	-					-	-	-
2	Aviation Blvd (MD 170) at Mathison Way	Signalized	NBT	1,726	14.1	B	13.8	B	13.4	B	-	467	672
			NBR	62	5.5	A					450	0	16
			SBL	47	25.8	C	5.2	A			375	3	16
			SBT	768	3.9	A					-	82	126
			WBL	84	50.5	D	48.3	D			450	66	114
			WBR	84	46.0	D					-	0	46
3	Aviation Blvd (MD 170) at Stoney Run Rd	Signalized	NBT	1,400	67.2	E	52.0	D	35.5	D	-	~687	#963
			NBR	411	0.3	A					-	0	0
			SBL	820	44.3	D	23.3	C			575	211	221
			SBT	758	0.5	A					-	6	7
			WBL	57	53.7	D	8.2	A			-	46	88
			WBR	333	0.4	A					-	0	0
4	Stoney Run Rd at Northrop Grumman Entrance	Signalized	NBL	691	13.3	B	15.4	B	19.8	B	-	89	298
			NBT	540	18.1	B					-	156	#635
			SBT	40	36.7	D	36.0	D			-	16	63
			SBR	10	33.4	C					85	0	18
			EBL	152	31.7	C	29.0	C			-	62	168
			EBR	351	27.8	C					550	0	83
5	Stoney Run Rd at New Ridge Rd	Signalized	NBL	15	56.5	E	52.0	D	39.3	D	-	95	167
			NBT	94									
			NBR	399	50.8	D					-	0	109
			SBL	24	62.4	E	50.9	D			-	21	56
			SBT	26	40.9	D					-	19	47
			SBR	2									
			EBL	0	-	-	25.4	C			175	0	0
			EBT	80	25.7	C					-	49	103
			EBR	19	24.3	C					125	0	0
			WBL	399	50.7	D	31.3	C			300	328	#519
			WBT	162	5.5	A					-	42	87
			WBR	139	5.3	A					150	0	23
6	Aviation Blvd (MD 170) at Amtrak Way (MD 995)	Signalized	NBL	211	80.6	F	13.2	B	17.1	B	225	175	m207
			NBT	1,521	3.8	A					-	30	m149
			SBT	1,326	15.4	B	13.4	B			-	456	343
			SBR	511	8.0	A					-	21	50
			EBL	191	52.7	D	47.7	D			-	152	226
			EBR	251	43.9	D					185	0	74
7	Aviation Blvd (MD 170) at Northrup Grumman Gate 1A	Signalized	NBL	109	56.7	E	4.8	A	9.6	A	225	93	m149
			NBT	1,602	1.3	A					-	8	113
			SBT	1,831	13.5	B	12.5	B			-	517	m584
			SBR	468	8.5	A					-	48	m60
			EBL	37	54.6	D	46.5	D			-	15	33
			EBR	6	0.0	A					-	0	0
8	Aviation Blvd (MD 170) at SB I-195 Ramps	Signalized	NBT	1,458	5.5	A	4.9	A	4.5	A	-	108	366
			NBR	181	0.1	A					50	0	0
			SBL	73	10.7	B	2.6	A			350	4	30
			SBT	729	1.8	A					-	25	78
			WBL	18	53.6	D	34.6	C			-	15	40
			WBR	10	0.0	A					-	0	0
9	Aviation Blvd (MD 170) at NB I-195 Ramps	Signalized	NBT	1,334	4.1	A	5.5	A	6.8	A	-	121	131
			NBR	625	8.5	A					-	27	33
			SBT	678	2.5	A	2.5	A			-	55	72
			WBL	123	51.4	D	51.4	D			-	97	155
10	Terminal Rd at Elkridge Landing Rd	Signalized	NBL	772	30.6	C	29.6	C	23.1	C	-	497	#805
			NBR	40	10.6	B					-	3	20
			EBT	105	32.2	C	6.2	A			-	33	60
			EBR	492	0.6	A					-	0	0
			WBL	28	24.5	C	30.9	C			150	14	34
			WBT	577	31.2	C					-	185	241

BWI TIA MOE Table - 2022 AM No Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
11	Aviation Blvd (MD 170) at Terminal Rd	Signalized	NBL	85	51.8	D	22.6	C	28.0	C	300	35	60
			NBT	134	41.1	D					-	98	153
			NBR	223	0.2	A					400	0	0
			SBT	89	51.7	D	9.3	A			-	37	64
			SBR	431	0.5	A					-	0	0
			EBL	698	57.9	E	35.1	D			445	287	#444
			EBT	441	15.4	B					-	67	123
			EBR	208	0.2	A					445	0	0
			WBL	336	56.0	E	30.2	C			615	100	170
			WBT	764	18.9	B					-	293	322
			WBR	0	-	-					-	-	-
12	Aviation Blvd (MD 170) at Air Cargo Dr	Signalized	NBL	71	51.4	D	50.2	D	14.0	B	-	68	119
			NBT	15									
			NBR	36	47.2	D					-	0	0
			SBL	93	51.8	D	50.8	D			-	62	111
			SBT	17	49.8	D					-	31	80
			SBR	34									
			EBL	105	24.1	C	18.8	B			275	48	126
			EBT	484	20.7	C					-	124	246
			EBR	76	0.1	A					-	0	0
			WBL	62	3.3	A	6.3	A			375	7	m9
			WBT	995	9.8	A					-	191	256
			WBR	611	0.8	A					475	0	0
13	Aviation Blvd (MD 162) at Andover Rd	Signalized	WBT	1,280	10.8	B	10.8	B	15.3	B	-	254	567
			WBR	260	10.6	B					200	30	145
			EBL	10	4.2	A	5.4	A			415	4	18
			EBT	329	5.4	A					-	68	148
			SBL	259	50.6	D	47.9	D			175	135	198
			SBR	58	45.1	D					-	67	131
14	Aviation Blvd (MD 162) at Aaronson Dr	Unsignalized	NBL	25	8.9	A	0.1	A	6.7	A	-	-	-
			NBT	1,491	0.0	A					-	-	-
			NBR	6									
			SBL	12	14.4	B	0.3	A			-	-	-
			SBT	564	0.0	A					-	-	-
			SBR	20									
			EBL	16	54.3	F	54.3	F			-	-	-
			EBT	0									
			EBR	12									
			WBL	24	202.3	F	202.3	F			-	-	-
			WBT	1									
			WBR	39									
15	Aviation Blvd (MD 162) at Allwood Dr	Signalized	NBL	56	1.8	A	5.1	A	6.5	A	300	5	14
			NBT	1476	5.2	A					-	132	346
			NBR	12	2.3	A					100	0	0
			SBL	6	2.0	A	4.0	A			225	1	m1
			SBT	601	4.1	A					-	102	136
			SBR	27	3.1	A					225	2	7
			EBL	23	53.1	D	52.4	D			-	18	46
			EBT	0	51.0	D					-	0	0
			EBR	13									
			WBL	23	53.2	D	53.2	D			-	19	58
			WBT	1									
			WBR	23									
16	SB I-97 Ramps at Cromwell Park Dr	Signalized	SBT	65	45.2	D	44.6	D	15.8	B	-	22	45
			SBR	38	43.5	D					-	0	0
			EBL	197	42.8	D	18.5	B			420	67	102
			EBR	312	3.1	A					-	0	10
			WBT	537	10.2	B	9.9	A			-	93	140
			WBR	192	9.2	A					600	0	33
17	Aviation Blvd (MD 162) at Cromwell Park Dr	Signalized	NBT	1,518	19.5	B	18.9	B	24.3	C	-	294	431
			NBR	181	13.6	B					1000	0	37
			SBL	329	43.5	D	29.9	C			425	83	147
			SBT	178	4.6	A					-	18	36
			WBL	369	41.5	D	35.2	D			-	134	236
			WBR	206	23.9	C					600	105	215

BWI TIA MOE Table - 2022 AM No Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
18	Aviation Blvd (MD 162) at Dorsey Rd (MD 176) - East	Signalized	NBL	200	35.2	D	38.8	D	24.0	C	350	56	119
			NBT	275	40.5	D					-	120	234
			NBR	157									
			SBL	109	41.2	D	41.2	D			490	33	77
			SBT	81	40.6	D					-	25	62
			SBR	356	41.3	D					300	1	102
			EBL	140	14.6	B	17.0	B			350	46	112
			EBT	329	18.0	B					-	41	100
			EBR	7									
			WBL	20	23.0	C	15.2	B			425	6	24
			WBT	467	29.8	C					-	133	253
			WBR	1,285	9.8	A					-	0	#23
19	Dorsey Rd (MD 176) at Digiulian Blvd	Unsignalized	NBL	4	10.8	B	10.8	B	0.7	A	-	-	-
			NBT	0									
			NBR	8									
			SBL	13	14.4	B	14.4	B			-	-	-
			SBT	1									
			SBR	6									
			EBL	9	8.4	A	0.3	A			-	-	-
			EBT	272	0.0	A					-	-	-
			EBR	5	0.0	A					-	-	-
			WBL	6	7.9	A	0.1	A			-	-	-
			WBT	439	0.0	A					-	-	-
			WBR	28	0.0	A					-	-	-
20	Aviation Blvd (MD 162) at Hollins Ferry Rd	Signalized	NBT	1,552	2.6	A	2.4	A	2.3	A	-	70	106
			NBR	172	0.2	A					485	0	0
			SBL	51	25.3	C	2.3	A			575	19	47
			SBT	506	0.0	A					-	0	0
			WBR	66	0.1	A	0.1	A			-	0	0
21	Aviation Blvd (MD 170) at Long Term Parking Lots	Signalized	NBL	23	55.7	E	55.7	E	5.7	A	-	18	47
			NBT	0	-	-					-	0	0
			NBR	0							-		
			SBL	0	52.8	D	5.9	A			-	1	6
			SBT	1							-		
			SBR	7	0.0	A					-	0	0
			EBL	68	4.8	A	4.5	A			250	24	1
			EBT	338	4.0	A					-	72	135
			EBR	58	6.6	A					350	9	32
			WBL	1	5.2	A	5.2	A			235	0	m1
			WBT	1,322	5.2	A					-	119	265
			WBR	15	2.9	A					375	0	m0
22	Aviation Blvd (MD 162) at S Camp Meade Rd (MD 170)	Signalized	SBL	7	58.4	E	1.6	A	3.8	A	-	6	22
			SBR	329	0.4	A					600	0	0
			EBL	156	17.7	B	4.7	A			600	29	125
			EBT	458	0.2	A					-	0	9
			WBT	1,340	3.9	A	3.9	A			-	1	286
			WBR	13	0.0	A					-	0	m0

Notes

m Volume for 95th percentile queue is metered by upstream signal

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	357	345	157	97	515	463	1502	285	175	425	326
v/c Ratio	0.99	0.32	0.27	0.60	0.76	0.86	1.12	0.43	0.73	0.58	0.60
Control Delay	113.4	50.8	7.8	95.0	76.9	74.6	114.7	27.3	92.7	68.2	17.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	113.4	50.8	7.8	95.0	76.9	74.6	114.7	27.3	92.7	68.2	17.5
Queue Length 50th (ft)	~447	169	0	113	310	503	~1058	149	204	247	55
Queue Length 95th (ft)	#753	244	64	191	403	#753	#1351	268	308	324	173
Internal Link Dist (ft)		640			713		584			1313	
Turn Bay Length (ft)	175		225	200		455		250	250		175
Base Capacity (vph)	361	1073	589	361	822	612	1726	828	361	1224	725
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.32	0.27	0.27	0.63	0.76	0.87	0.34	0.48	0.35	0.45

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	328	317	144	89	474	0	426	1382	262	161	391	300
Future Volume (vph)	328	317	144	89	474	0	426	1382	262	161	391	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	357	345	157	97	515	0	463	1502	285	175	425	326
RTOR Reduction (vph)	0	0	109	0	0	0	0	0	69	0	0	215
Lane Group Flow (vph)	357	345	48	97	515	0	463	1502	216	175	425	111
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4						6			2
Actuated Green, G (s)	35.3	50.9	50.9	15.3	30.9		53.4	64.3	64.3	23.1	34.0	34.0
Effective Green, g (s)	36.3	53.9	53.9	16.3	33.9		54.4	67.3	67.3	24.1	37.0	37.0
Actuated g/C Ratio	0.20	0.30	0.30	0.09	0.19		0.31	0.38	0.38	0.14	0.21	0.21
Clearance Time (s)	5.0	7.0	7.0	5.0	7.0		5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	361	1074	480	162	675		542	1341	599	240	737	329
v/s Ratio Prot	c0.20	0.10		0.05	c0.15		c0.26	c0.42		0.10	0.12	
v/s Ratio Perm			0.03						0.14			0.07
v/c Ratio	0.99	0.32	0.10	0.60	0.76		0.85	1.12	0.36	0.73	0.58	0.34
Uniform Delay, d1	70.4	47.7	44.4	77.5	68.0		57.9	55.1	39.7	73.6	63.3	59.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	43.9	0.2	0.1	5.8	5.1		13.6	64.5	0.8	10.6	1.7	1.3
Delay (s)	114.4	47.9	44.5	83.4	73.2		71.4	119.7	40.5	84.2	65.0	61.1
Level of Service	F	D	D	F	E		E	F	D	F	E	E
Approach Delay (s)		74.9			74.8			99.7			67.3	
Approach LOS		E			E			F			E	

Intersection Summary			
HCM 2000 Control Delay	85.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	177.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	91	91	1876	67	51	835
v/c Ratio	0.41	0.33	0.77	0.06	0.24	0.30
Control Delay	52.6	12.2	15.4	1.9	8.1	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.6	12.2	15.4	1.9	8.1	4.3
Queue Length 50th (ft)	66	0	467	0	3	82
Queue Length 95th (ft)	114	46	672	16	16	126
Internal Link Dist (ft)	716		2236			2190
Turn Bay Length (ft)	450			450	375	
Base Capacity (vph)	456	475	2439	1110	352	2747
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.19	0.77	0.06	0.14	0.30

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	84	84	1726	62	47	768
Future Volume (vph)	84	84	1726	62	47	768
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1531	3421	1531	1711	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.06	1.00
Satd. Flow (perm)	1711	1531	3421	1531	107	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	91	1876	67	51	835
RTOR Reduction (vph)	0	79	0	20	0	0
Lane Group Flow (vph)	91	12	1876	47	51	835
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Actuated Green, G (s)	13.6	13.6	81.6	81.6	93.4	93.4
Effective Green, g (s)	15.6	15.6	84.6	84.6	94.4	96.4
Actuated g/C Ratio	0.13	0.13	0.70	0.70	0.79	0.80
Clearance Time (s)	6.0	6.0	7.0	7.0	5.0	7.0
Vehicle Extension (s)	5.0	5.0	6.0	6.0	5.0	6.0
Lane Grp Cap (vph)	222	199	2411	1079	188	2748
v/s Ratio Prot	c0.05		c0.55		0.02	c0.24
v/s Ratio Perm		0.01		0.03	0.20	
v/c Ratio	0.41	0.06	0.78	0.04	0.27	0.30
Uniform Delay, d1	48.0	45.8	11.6	5.4	13.0	3.1
Progression Factor	1.00	1.00	1.00	1.00	1.87	1.19
Incremental Delay, d2	2.6	0.3	2.6	0.1	1.6	0.3
Delay (s)	50.5	46.0	14.1	5.5	25.8	3.9
Level of Service	D	D	B	A	C	A
Approach Delay (s)	48.3		13.8			5.2
Approach LOS	D		B			A

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	62	362	1522	447	891	824
v/c Ratio	0.37	0.24	0.98	0.29	0.79	0.28
Control Delay	56.2	0.4	60.1	0.3	31.9	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.2	0.4	60.1	0.3	31.9	0.7
Queue Length 50th (ft)	46	0	~687	0	211	6
Queue Length 95th (ft)	88	0	#963	0	221	7
Internal Link Dist (ft)	319		2190			575
Turn Bay Length (ft)					575	
Base Capacity (vph)	285	1531	1559	1531	1301	2950
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.24	0.98	0.29	0.68	0.28

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	57	333	1400	411	820	758
Future Volume (vph)	57	333	1400	411	820	758
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1531	3421	1531	3319	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1711	1531	3421	1531	3319	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	62	362	1522	447	891	824
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	62	362	1522	447	891	824
Turn Type	Prot	Free	NA	Free	Prot	NA
Protected Phases	4		6		5 7	2 5 7
Permitted Phases		Free		Free		
Actuated Green, G (s)	8.5	120.0	50.5	120.0	37.5	100.0
Effective Green, g (s)	10.5	120.0	53.5	120.0	39.5	103.0
Actuated g/C Ratio	0.09	1.00	0.45	1.00	0.33	0.86
Clearance Time (s)	6.0		7.0			
Vehicle Extension (s)	3.0		5.0			
Lane Grp Cap (vph)	149	1531	1525	1531	1092	2936
v/s Ratio Prot	c0.04		c0.44		c0.27	0.24
v/s Ratio Perm		0.24		0.29		
v/c Ratio	0.42	0.24	1.00	0.29	0.82	0.28
Uniform Delay, d1	51.8	0.0	33.2	0.0	36.9	1.6
Progression Factor	1.00	1.00	1.48	1.00	1.11	0.28
Incremental Delay, d2	1.9	0.4	18.1	0.3	3.4	0.0
Delay (s)	53.7	0.4	67.2	0.3	44.3	0.5
Level of Service	D	A	E	A	D	A
Approach Delay (s)	8.2		52.0			23.3
Approach LOS	A		D			C

Intersection Summary			
HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	165	382	751	587	43	11
v/c Ratio	0.53	0.65	0.42	0.61	0.22	0.06
Control Delay	35.7	9.5	15.5	20.8	37.6	21.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.7	9.5	15.5	20.8	37.6	21.3
Queue Length 50th (ft)	62	0	89	156	16	0
Queue Length 95th (ft)	168	83	298	#635	63	18
Internal Link Dist (ft)	968			398	150	
Turn Bay Length (ft)		550				85
Base Capacity (vph)	785	909	1777	964	688	592
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.42	0.42	0.61	0.06	0.02

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	152	351	691	540	40	10
Future Volume (vph)	152	351	691	540	40	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	5.0	5.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1711	1531	3319	1801	1801	1531
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1711	1531	3319	1801	1801	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	165	382	751	587	43	11
RTOR Reduction (vph)	0	318	0	0	0	10
Lane Group Flow (vph)	165	64	751	587	43	1
Turn Type	Prot	Prot	Split	NA	NA	Prot
Protected Phases	3	3	2	2	1	1
Permitted Phases						
Actuated Green, G (s)	12.7	12.7	37.4	37.4	4.5	4.5
Effective Green, g (s)	12.7	12.7	37.4	37.4	4.5	4.5
Actuated g/C Ratio	0.17	0.17	0.50	0.50	0.06	0.06
Clearance Time (s)	4.0	4.0	5.0	5.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	5.0	5.0	3.0	3.0
Lane Grp Cap (vph)	287	257	1644	892	107	91
v/s Ratio Prot	c0.10	0.04	0.23	c0.33	c0.02	0.00
v/s Ratio Perm						
v/c Ratio	0.57	0.25	0.46	0.66	0.40	0.01
Uniform Delay, d1	28.9	27.3	12.4	14.3	34.2	33.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	0.5	0.9	3.8	2.5	0.0
Delay (s)	31.7	27.8	13.3	18.1	36.7	33.4
Level of Service	C	C	B	B	D	C
Approach Delay (s)	29.0			15.4	36.0	
Approach LOS	C			B	D	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	75.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	87	21	434	176	151	118	434	26	30
v/c Ratio	0.13	0.03	0.82	0.13	0.13	0.58	0.77	0.25	0.09
Control Delay	30.6	0.1	53.2	6.5	1.4	65.3	15.0	66.1	39.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.6	0.1	53.2	6.5	1.4	65.3	15.0	66.1	39.5
Queue Length 50th (ft)	49	0	328	42	0	95	0	21	19
Queue Length 95th (ft)	103	0	#519	87	23	167	109	56	47
Internal Link Dist (ft)	269			383		290			249
Turn Bay Length (ft)		125	300		150				
Base Capacity (vph)	684	630	650	1445	1258	509	758	288	904
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.03	0.67	0.12	0.12	0.23	0.57	0.09	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	80	19	399	162	139	15	94	399	24	26	2
Future Volume (vph)	0	80	19	399	162	139	15	94	399	24	26	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.99	
Flt Protected		1.00	1.00	0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)		1801	1531	1711	1801	1531		1789	1531	1711	1783	
Flt Permitted		1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (perm)		1801	1531	1711	1801	1531		1724	1531	1711	1783	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	87	21	434	176	151	16	102	434	26	28	2
RTOR Reduction (vph)	0	0	13	0	0	42	0	0	384	0	2	0
Lane Group Flow (vph)	0	87	8	434	176	109	0	118	50	26	28	0
Turn Type	Perm	NA	Perm	Prot	NA	Prot	Perm	NA	Prot	Prot	NA	
Protected Phases		6		5	2	2		8	8	7	4	
Permitted Phases	6		6				8					
Actuated Green, G (s)		46.3	46.3	37.7	89.0	89.0		14.3	14.3	4.6	23.9	
Effective Green, g (s)		46.3	46.3	37.7	89.0	89.0		14.3	14.3	4.6	23.9	
Actuated g/C Ratio		0.38	0.38	0.31	0.72	0.72		0.12	0.12	0.04	0.19	
Clearance Time (s)		5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		5.0	5.0	3.0	5.0	5.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		675	574	522	1298	1104		199	177	63	345	
v/s Ratio Prot		0.05		c0.25	c0.10	0.07			0.03	c0.02	0.02	
v/s Ratio Perm			0.01					c0.07				
v/c Ratio		0.13	0.01	0.83	0.14	0.10		0.59	0.28	0.41	0.08	
Uniform Delay, d1		25.3	24.2	39.9	5.3	5.2		51.8	49.9	58.1	40.8	
Progression Factor		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.4	0.0	10.8	0.2	0.2		4.7	0.9	4.3	0.1	
Delay (s)		25.7	24.3	50.7	5.5	5.3		56.5	50.8	62.4	40.9	
Level of Service		C	C	D	A	A		E	D	E	D	
Approach Delay (s)		25.4			31.3			52.0			50.9	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	123.4	Sum of lost time (s)	20.5
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Group Flow (vph)	208	273	229	1653	1441	555
v/c Ratio	0.69	0.58	0.80	0.64	0.76	0.52
Control Delay	57.9	10.1	83.1	4.2	16.5	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0
Total Delay	57.9	10.1	83.1	4.2	16.6	2.2
Queue Length 50th (ft)	152	0	175	30	456	21
Queue Length 95th (ft)	226	74	m207	m149	343	50
Internal Link Dist (ft)	755			2381	681	
Turn Bay Length (ft)		185	225			
Base Capacity (vph)	370	524	297	2588	1902	1073
Starvation Cap Reductn	0	0	0	0	47	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.52	0.77	0.64	0.78	0.52

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	191	251	211	1521	1326	511
Future Volume (vph)	191	251	211	1521	1326	511
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1711	1531	1711	3421	3421	1531
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1711	1531	1711	3421	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	208	273	229	1653	1441	555
RTOR Reduction (vph)	0	229	0	0	0	222
Lane Group Flow (vph)	208	44	229	1653	1441	333
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		1	6	2	
Permitted Phases	4	4				2
Actuated Green, G (s)	19.2	19.2	19.0	89.3	65.3	65.3
Effective Green, g (s)	21.2	19.2	20.0	90.8	66.8	66.8
Actuated g/C Ratio	0.18	0.16	0.17	0.76	0.56	0.56
Clearance Time (s)	6.0	6.0	5.0	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	6.0
Lane Grp Cap (vph)	302	244	285	2588	1904	852
v/s Ratio Prot	c0.12		c0.13	0.48	c0.42	
v/s Ratio Perm		0.03				0.22
v/c Ratio	0.69	0.18	0.80	0.64	0.76	0.39
Uniform Delay, d1	46.3	43.6	48.1	6.9	20.4	15.1
Progression Factor	1.00	1.00	1.50	0.46	0.68	0.48
Incremental Delay, d2	6.4	0.4	8.4	0.6	1.7	0.8
Delay (s)	52.7	43.9	80.6	3.8	15.4	8.0
Level of Service	D	D	F	A	B	A
Approach Delay (s)	47.7			13.2	13.4	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	118	1741	1990	509	40	7
v/c Ratio	0.57	0.57	0.80	0.42	0.18	0.00
Control Delay	61.4	1.3	15.1	3.2	54.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.4	1.4	15.1	3.2	54.5	0.0
Queue Length 50th (ft)	93	8	517	48	15	0
Queue Length 95th (ft)	m149	113	m584	m60	33	0
Internal Link Dist (ft)		681	1012		359	
Turn Bay Length (ft)	225					
Base Capacity (vph)	285	3050	2499	1218	553	1531
Starvation Cap Reductn	0	87	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.59	0.80	0.42	0.07	0.00

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	109	1602	1831	468	37	6
Future Volume (vph)	109	1602	1831	468	37	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	3319	1531
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1711	3421	3421	1531	3319	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	118	1741	1990	509	40	7
RTOR Reduction (vph)	0	0	0	103	0	0
Lane Group Flow (vph)	118	1741	1990	406	40	7
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	1	6	2		4	
Permitted Phases				2		Free
Actuated Green, G (s)	13.5	103.7	85.2	85.2	5.8	120.0
Effective Green, g (s)	14.5	105.2	86.7	86.7	6.8	120.0
Actuated g/C Ratio	0.12	0.88	0.72	0.72	0.06	1.00
Clearance Time (s)	5.0	5.5	5.5	5.5	5.0	
Vehicle Extension (s)	3.0	0.2	0.2	0.2	3.0	
Lane Grp Cap (vph)	206	2999	2471	1106	188	1531
v/s Ratio Prot	0.07	c0.51	c0.58		c0.01	
v/s Ratio Perm				0.27		0.00
v/c Ratio	0.57	0.58	0.81	0.37	0.21	0.00
Uniform Delay, d1	49.8	1.9	11.0	6.3	54.0	0.0
Progression Factor	1.08	0.36	1.07	1.27	1.00	1.00
Incremental Delay, d2	3.0	0.6	1.6	0.5	0.6	0.0
Delay (s)	56.7	1.3	13.5	8.5	54.6	0.0
Level of Service	E	A	B	A	D	A
Approach Delay (s)		4.8	12.5		46.5	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	SBR	NWL	NWR2
Lane Group Flow (vph)	1585	197	79	792	1687	20	11
v/c Ratio	0.59	0.13	0.28	0.27	1.08	0.18	0.01
Control Delay	5.8	0.1	5.4	1.8	54.1	55.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	0.1	5.4	1.8	54.1	55.8	0.0
Queue Length 50th (ft)	108	0	4	25	~208	15	0
Queue Length 95th (ft)	366	0	30	78	#472	40	0
Internal Link Dist (ft)	1012			765		262	
Turn Bay Length (ft)		50	350				
Base Capacity (vph)	2707	1531	513	2965	1558	285	1531
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.13	0.15	0.27	1.08	0.07	0.01

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2
Lane Configurations		↑↑	↱	↰	↑↑			↱	↰		↱
Traffic Volume (vph)	0	1458	181	73	729	0	0	1552	18	0	10
Future Volume (vph)	0	1458	181	73	729	0	0	1552	18	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0			4.0	4.0		4.0
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00		1.00
Frt		1.00	0.85	1.00	1.00			0.86	1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00			1.00	0.95		1.00
Satd. Flow (prot)		3421	1531	1711	3421			1558	1711		1531
Flt Permitted		1.00	1.00	0.12	1.00			1.00	0.95		1.00
Satd. Flow (perm)		3421	1531	220	3421			1558	1711		1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1585	197	79	792	0	0	1687	20	0	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1585	197	79	792	0	0	1687	20	0	11
Turn Type		NA	Free	pm+pt	NA			Free	Prot		Free
Protected Phases		6		5	2				4		
Permitted Phases			Free	2				Free			Free
Actuated Green, G (s)		92.5	120.0	102.5	102.5			120.0	7.0		120.0
Effective Green, g (s)		94.0	120.0	103.0	104.0			120.0	8.0		120.0
Actuated g/C Ratio		0.78	1.00	0.86	0.87			1.00	0.07		1.00
Clearance Time (s)		5.5		4.5	5.5				5.0		
Vehicle Extension (s)		5.0		3.0	5.0				3.0		
Lane Grp Cap (vph)		2679	1531	263	2964			1558	114		1531
v/s Ratio Prot		0.46		0.02	0.23				0.01		
v/s Ratio Perm			0.13	0.24				c1.08			0.01
v/c Ratio		0.59	0.13	0.30	0.27			1.08	0.18		0.01
Uniform Delay, d1		5.2	0.0	4.2	1.4			60.0	52.9		0.0
Progression Factor		0.89	1.00	2.42	1.11			1.00	1.00		1.00
Incremental Delay, d2		0.8	0.1	0.6	0.2			48.8	0.7		0.0
Delay (s)		5.5	0.1	10.7	1.8			108.8	53.6		0.0
Level of Service		A	A	B	A			F	D		A
Approach Delay (s)		4.9			2.6		108.8		34.6		
Approach LOS		A			A		F		C		

Intersection Summary			
HCM 2000 Control Delay	44.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	NWL
Lane Group Flow (vph)	1450	679	737	134
v/c Ratio	0.54	0.51	0.27	0.54
Control Delay	4.5	1.9	2.8	54.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.5	1.9	2.8	54.7
Queue Length 50th (ft)	121	27	55	97
Queue Length 95th (ft)	131	33	72	155
Internal Link Dist (ft)	765		418	135
Turn Bay Length (ft)				
Base Capacity (vph)	2692	1338	2692	456
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.54	0.51	0.27	0.29

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	1334	625	0	678	123	0
Future Volume (vph)	1334	625	0	678	123	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5		4.0	4.0	
Lane Util. Factor	0.95	1.00		0.95	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	1.00	1.00		1.00	0.95	
Satd. Flow (prot)	3421	1531		3421	1711	
Flt Permitted	1.00	1.00		1.00	0.95	
Satd. Flow (perm)	3421	1531		3421	1711	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1450	679	0	737	134	0
RTOR Reduction (vph)	0	153	0	0	0	0
Lane Group Flow (vph)	1450	526	0	737	134	0
Turn Type	NA	Perm		NA	Prot	
Protected Phases	6			2	4	
Permitted Phases		6				
Actuated Green, G (s)	92.9	92.9		92.9	16.6	
Effective Green, g (s)	94.4	92.9		94.4	17.6	
Actuated g/C Ratio	0.79	0.77		0.79	0.15	
Clearance Time (s)	5.5	5.5		5.5	5.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	2691	1185		2691	250	
v/s Ratio Prot	c0.42			0.22	c0.08	
v/s Ratio Perm		0.34				
v/c Ratio	0.54	0.44		0.27	0.54	
Uniform Delay, d1	4.7	4.7		3.5	47.4	
Progression Factor	0.72	1.60		0.66	1.00	
Incremental Delay, d2	0.7	1.1		0.2	4.0	
Delay (s)	4.1	8.5		2.5	51.4	
Level of Service	A	A		A	D	
Approach Delay (s)	5.5			2.5	51.4	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	114	535	30	627	839	43
v/c Ratio	0.14	0.35	0.08	0.58	0.86	0.05
Control Delay	33.5	0.6	24.1	32.1	31.4	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.5	0.0
Total Delay	33.5	0.6	24.1	32.1	31.9	5.5
Queue Length 50th (ft)	33	0	14	185	497	3
Queue Length 95th (ft)	60	0	34	241	#805	20
Internal Link Dist (ft)	475			893	211	
Turn Bay Length (ft)			150			
Base Capacity (vph)	828	1531	465	1656	994	903
Starvation Cap Reductn	0	0	0	0	23	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.35	0.06	0.38	0.86	0.05

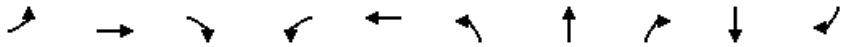
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	105	492	28	577	772	40
Future Volume (vph)	105	492	28	577	772	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	4.0	5.0	6.0	6.0	6.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3421	1531	1711	3421	1711	1531
Flt Permitted	1.00	1.00	0.57	1.00	0.95	1.00
Satd. Flow (perm)	3421	1531	1022	3421	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	114	535	30	627	839	43
RTOR Reduction (vph)	0	0	0	0	0	15
Lane Group Flow (vph)	114	535	30	627	839	28
Turn Type	NA	Free	pm+pt	NA	Prot	Prot
Protected Phases	6		5	2	4	4
Permitted Phases		Free	2			
Actuated Green, G (s)	25.2	106.0	34.9	34.9	59.1	59.1
Effective Green, g (s)	25.2	106.0	34.9	34.9	59.1	59.1
Actuated g/C Ratio	0.24	1.00	0.33	0.33	0.56	0.56
Clearance Time (s)	6.0		5.0	6.0	6.0	6.0
Vehicle Extension (s)	3.5		3.5	3.5	5.0	5.0
Lane Grp Cap (vph)	813	1531	367	1126	953	853
v/s Ratio Prot	0.03		0.00	c0.18	c0.49	0.02
v/s Ratio Perm		0.35	0.02			
v/c Ratio	0.14	0.35	0.08	0.56	0.88	0.03
Uniform Delay, d1	31.9	0.0	24.4	29.2	20.4	10.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.6	0.1	2.0	10.2	0.0
Delay (s)	32.2	0.6	24.5	31.2	30.6	10.6
Level of Service	C	A	C	C	C	B
Approach Delay (s)	6.2			30.9	29.6	
Approach LOS	A			C	C	

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	759	479	226	365	830	92	146	242	97	468
v/c Ratio	0.84	0.27	0.15	0.64	0.58	0.31	0.38	0.16	0.32	0.31
Control Delay	60.3	16.4	0.2	58.3	19.1	53.5	42.9	0.2	53.5	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.3	16.4	0.2	58.3	19.1	53.5	42.9	0.2	53.5	0.5
Queue Length 50th (ft)	287	67	0	100	293	35	98	0	37	0
Queue Length 95th (ft)	#444	123	0	170	322	60	153	0	64	0
Internal Link Dist (ft)		871			1398		1013		384	
Turn Bay Length (ft)	445		445	615		300		400		
Base Capacity (vph)	899	1765	1531	570	1425	553	660	1531	570	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.27	0.15	0.64	0.58	0.17	0.22	0.16	0.17	0.31

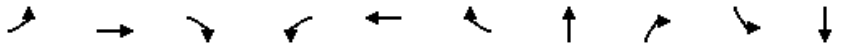
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	698	441	208	336	764	0	85	134	223	0	89	431
Future Volume (vph)	698	441	208	336	764	0	85	134	223	0	89	431
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		0.97	1.00	1.00		0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (perm)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	759	479	226	365	830	0	92	146	242	0	97	468
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	759	479	226	365	830	0	92	146	242	0	97	468
Turn Type	Prot	NA	Free	Prot	NA		Prot	NA	Free		NA	Free
Protected Phases	1	6		5	2		7	4			8	
Permitted Phases			Free						Free			Free
Actuated Green, G (s)	31.5	59.9	120.0	19.6	48.0		8.7	23.5	120.0		8.8	120.0
Effective Green, g (s)	32.5	61.9	120.0	20.6	50.0		10.7	25.5	120.0		10.8	120.0
Actuated g/C Ratio	0.27	0.52	1.00	0.17	0.42		0.09	0.21	1.00		0.09	1.00
Clearance Time (s)	5.0	6.0		5.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	898	1764	1531	569	1425		295	382	1531		307	1531
v/s Ratio Prot	c0.23	0.14		0.11	c0.24		0.03	c0.08			0.03	
v/s Ratio Perm			0.15						0.16			0.31
v/c Ratio	0.85	0.27	0.15	0.64	0.58		0.31	0.38	0.16		0.32	0.31
Uniform Delay, d1	41.4	16.4	0.0	46.3	27.0		51.2	40.5	0.0		51.1	0.0
Progression Factor	1.25	0.92	1.00	1.16	0.65		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.4	0.3	0.2	2.1	1.5		0.6	0.6	0.2		0.6	0.5
Delay (s)	57.9	15.4	0.2	56.0	18.9		51.8	41.1	0.2		51.7	0.5
Level of Service	E	B	A	E	B		D	D	A		D	A
Approach Delay (s)		35.1			30.2			22.6			9.3	
Approach LOS		D			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	114	526	83	67	1082	664	93	39	80	76
v/c Ratio	0.36	0.26	0.05	0.12	0.56	0.43	0.47	0.14	0.45	0.38
Control Delay	21.1	23.0	0.1	3.2	10.8	0.8	56.7	1.0	57.0	34.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.1	23.0	0.1	3.2	10.8	0.8	56.7	1.0	57.0	34.0
Queue Length 50th (ft)	48	124	0	7	191	0	68	0	62	31
Queue Length 95th (ft)	126	246	0	m9	256	0	119	0	111	80
Internal Link Dist (ft)		1398			1719		314			276
Turn Bay Length (ft)	275			375		475				
Base Capacity (vph)	376	2020	1531	636	1918	1531	288	361	270	289
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.26	0.05	0.11	0.56	0.43	0.32	0.11	0.30	0.26

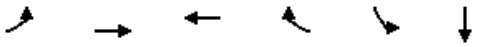
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	484	76	62	995	611	71	15	36	93	17	34
Future Volume (vph)	105	484	76	62	995	611	71	15	36	93	17	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	0.95	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.99	
Satd. Flow (prot)	1711	3421	1531	1711	3421	1531		1729	1531	1625	1564	
Flt Permitted	0.18	1.00	1.00	0.44	1.00	1.00		0.96	1.00	0.95	0.99	
Satd. Flow (perm)	317	3421	1531	792	3421	1531		1729	1531	1625	1564	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	114	526	83	67	1082	664	77	16	39	101	18	37
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	35	0	30	0
Lane Group Flow (vph)	114	526	83	67	1082	664	0	93	4	80	46	0
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Split	NA	Perm	Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6		Free	2		Free			3			
Actuated Green, G (s)	76.6	67.9	120.0	71.4	65.3	120.0		11.8	11.8	11.2	11.2	
Effective Green, g (s)	78.6	69.9	120.0	73.4	67.3	120.0		13.8	13.8	13.2	13.2	
Actuated g/C Ratio	0.65	0.58	1.00	0.61	0.56	1.00		0.12	0.12	0.11	0.11	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	320	1992	1531	538	1918	1531		198	176	178	172	
v/s Ratio Prot	0.03	0.15		0.01	c0.32			0.05		0.05	0.03	
v/s Ratio Perm	0.20		0.05	0.07		c0.43			0.00			
v/c Ratio	0.36	0.26	0.05	0.12	0.56	0.43		0.47	0.03	0.45	0.27	
Uniform Delay, d1	10.5	12.4	0.0	9.4	16.9	0.0		49.7	47.1	50.0	49.0	
Progression Factor	2.22	1.65	1.00	0.34	0.52	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.3	0.1	0.1	1.1	0.8		1.8	0.1	1.8	0.8	
Delay (s)	24.1	20.7	0.1	3.3	9.8	0.8		51.4	47.2	51.8	49.8	
Level of Service	C	C	A	A	A	A		D	D	D	D	
Approach Delay (s)		18.8			6.3			50.2			50.8	
Approach LOS		B			A			D			D	

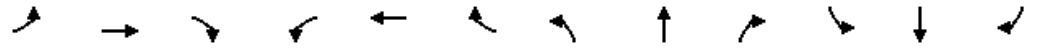
Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBT
Lane Group Flow (vph)	11	358	1391	283	178	167
v/c Ratio	0.05	0.14	0.54	0.24	0.61	0.49
Control Delay	5.8	6.1	12.0	4.8	53.6	28.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	6.1	12.0	4.8	53.6	28.3
Queue Length 50th (ft)	4	68	254	30	135	67
Queue Length 95th (ft)	18	148	567	145	198	131
Internal Link Dist (ft)		1633	378			130
Turn Bay Length (ft)	415			200	175	
Base Capacity (vph)	215	2577	2577	1200	595	620
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.14	0.54	0.24	0.30	0.27

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	329	0	0	1280	260	0	0	0	259	0	58
Future Volume (vph)	10	329	0	0	1280	260	0	0	0	259	0	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95	1.00				0.95	0.95	
Frt	1.00	1.00			1.00	0.85				1.00	0.94	
Flt Protected	0.95	1.00			1.00	1.00				0.95	0.97	
Satd. Flow (prot)	1711	3421			3421	1531				1625	1565	
Flt Permitted	0.16	1.00			1.00	1.00				0.95	0.97	
Satd. Flow (perm)	286	3421			3421	1531				1625	1565	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	358	0	0	1391	283	0	0	0	282	0	63
RTOR Reduction (vph)	0	0	0	0	0	47	0	0	0	0	60	0
Lane Group Flow (vph)	11	358	0	0	1391	236	0	0	0	178	107	0
Turn Type	Perm	NA		Perm	NA	Perm				Split	NA	
Protected Phases		6			2		3	3		4	4	
Permitted Phases	6	6		2	2	2						
Actuated Green, G (s)	88.4	88.4			88.4	88.4				20.6	20.6	
Effective Green, g (s)	90.4	90.4			90.4	90.4				21.6	21.6	
Actuated g/C Ratio	0.75	0.75			0.75	0.75				0.18	0.18	
Clearance Time (s)	6.0	6.0			6.0	6.0				5.0	5.0	
Vehicle Extension (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Lane Grp Cap (vph)	215	2577			2577	1153				292	281	
v/s Ratio Prot		0.10			c0.41					c0.11	0.07	
v/s Ratio Perm	0.04					0.15						
v/c Ratio	0.05	0.14			0.54	0.20				0.61	0.38	
Uniform Delay, d1	3.8	4.1			6.2	4.3				45.3	43.3	
Progression Factor	0.99	1.30			1.64	2.37				1.00	1.00	
Incremental Delay, d2	0.4	0.1			0.7	0.3				5.2	1.8	
Delay (s)	4.2	5.4			10.8	10.6				50.6	45.1	
Level of Service	A	A			B	B				D	D	
Approach Delay (s)		5.4			10.8			0.0			47.9	
Approach LOS		A			B			A			D	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	0	12	24	1	39	25	1491	6	12	564	20
Future Volume (Veh/h)	16	0	12	24	1	39	25	1491	6	12	564	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	0	13	26	1	42	27	1621	7	13	613	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1557	2332	318	2024	2340	814	635			1628		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1557	2332	318	2024	2340	814	635			1628		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	73	100	98	18	97	87	97			97		
cM capacity (veh/h)	62	34	678	32	34	321	944			395		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	30	69	27	1081	547	13	409	226
Volume Left	17	26	27	0	0	13	0	0
Volume Right	13	42	0	0	7	0	0	22
cSH	102	70	944	1700	1700	395	1700	1700
Volume to Capacity	0.29	0.98	0.03	0.64	0.32	0.03	0.24	0.13
Queue Length 95th (ft)	28	125	2	0	0	3	0	0
Control Delay (s)	54.3	202.3	8.9	0.0	0.0	14.4	0.0	0.0
Lane LOS	F	F	A			B		
Approach Delay (s)	54.3	202.3	0.1			0.3		
Approach LOS	F	F						

Intersection Summary					
Average Delay	6.7				
Intersection Capacity Utilization	52.2%	ICU Level of Service		A	
Analysis Period (min)	15				

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	25	14	51	61	1604	13	7	653	29
v/c Ratio	0.20	0.03	0.34	0.09	0.55	0.01	0.03	0.24	0.02
Control Delay	54.0	0.1	36.5	2.0	4.6	0.0	1.2	4.4	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	0.1	36.5	2.0	4.6	0.0	1.2	4.4	1.1
Queue Length 50th (ft)	18	0	19	5	132	0	1	102	2
Queue Length 95th (ft)	46	0	58	14	346	0	m1	136	7
Internal Link Dist (ft)		254	405		1830			1619	
Turn Bay Length (ft)				300		100	225		225
Base Capacity (vph)	291	662	324	760	2924	1319	453	2735	1238
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.02	0.16	0.08	0.55	0.01	0.02	0.24	0.02

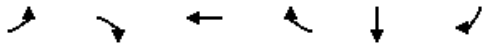
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	0	13	23	1	23	56	1476	12	6	601	27
Future Volume (vph)	23	0	13	23	1	23	56	1476	12	6	601	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.85			0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1711	1531			1641		1711	3421	1531	1711	3421	1531
Flt Permitted	0.75	1.00			0.84		0.38	1.00	1.00	0.13	1.00	1.00
Satd. Flow (perm)	1346	1531			1408		681	3421	1531	240	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	0	14	25	1	25	61	1604	13	7	653	29
RTOR Reduction (vph)	0	13	0	0	23	0	0	0	3	0	0	7
Lane Group Flow (vph)	25	1	0	0	28	0	61	1604	10	7	653	22
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			6		6	2		2
Actuated Green, G (s)	7.4	7.4			7.4		98.7	94.0	94.0	91.5	90.4	90.4
Effective Green, g (s)	9.4	9.4			9.4		100.7	96.5	96.5	93.5	92.9	92.9
Actuated g/C Ratio	0.08	0.08			0.08		0.84	0.80	0.80	0.78	0.77	0.77
Clearance Time (s)	6.0	6.0			6.0		5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0			3.0		2.5	5.0	5.0	2.5	5.0	5.0
Lane Grp Cap (vph)	105	119			110		620	2751	1231	212	2648	1185
v/s Ratio Prot		0.00					c0.00	c0.47		0.00	0.19	
v/s Ratio Perm	0.02				c0.02		0.08		0.01	0.03		0.01
v/c Ratio	0.24	0.01			0.25		0.10	0.58	0.01	0.03	0.25	0.02
Uniform Delay, d1	51.9	51.0			52.0		1.8	4.3	2.3	3.7	3.8	3.1
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	0.53	1.01	1.00
Incremental Delay, d2	1.2	0.0			1.2		0.1	0.9	0.0	0.0	0.2	0.0
Delay (s)	53.1	51.0			53.2		1.8	5.2	2.3	2.0	4.1	3.1
Level of Service	D	D			D		A	A	A	A	A	A
Approach Delay (s)		52.4			53.2			5.1			4.0	
Approach LOS		D			D			A			A	

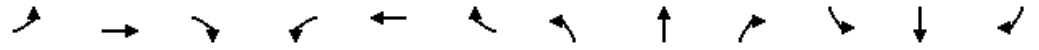
Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBR	WBT	WBR	SBT	SBR
Lane Group Flow (vph)	214	339	584	209	71	41
v/c Ratio	0.54	0.15	0.29	0.21	0.27	0.19
Control Delay	46.1	0.6	11.1	2.2	46.0	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.1	0.6	11.1	2.2	46.0	2.1
Queue Length 50th (ft)	67	0	93	0	22	0
Queue Length 95th (ft)	102	10	140	33	45	0
Internal Link Dist (ft)			782		297	
Turn Bay Length (ft)	420			600		
Base Capacity (vph)	1034	2321	2047	1000	1066	547
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.15	0.29	0.21	0.07	0.07

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	197	0	312	0	537	192	0	0	0	0	65	38
Future Volume (vph)	197	0	312	0	537	192	0	0	0	0	65	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		9.0		9.0	9.0					8.0	8.0
Lane Util. Factor	0.97		0.88		0.95	1.00					0.95	1.00
Frt	1.00		0.85		1.00	0.85					1.00	0.85
Flt Protected	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (prot)	3319		2694		3421	1531					3421	1531
Flt Permitted	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (perm)	3319		2694		3421	1531					3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	214	0	339	0	584	209	0	0	0	0	71	41
RTOR Reduction (vph)	0	0	80	0	0	86	0	0	0	0	0	38
Lane Group Flow (vph)	214	0	259	0	584	123	0	0	0	0	71	3
Turn Type	Prot		Prot		NA	Perm					NA	Perm
Protected Phases	1		6		2						4	
Permitted Phases						2						4
Actuated Green, G (s)	11.5		75.4		57.9	57.9					6.1	6.1
Effective Green, g (s)	11.5		75.4		57.9	57.9					6.1	6.1
Actuated g/C Ratio	0.12		0.77		0.59	0.59					0.06	0.06
Clearance Time (s)	6.0		9.0		9.0	9.0					8.0	8.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0					3.0	3.0
Lane Grp Cap (vph)	387		2062		2010	899					211	94
v/s Ratio Prot	c0.06		0.10		c0.17						c0.02	
v/s Ratio Perm						0.08						0.00
v/c Ratio	0.55		0.13		0.29	0.14					0.34	0.03
Uniform Delay, d1	41.1		3.0		10.1	9.1					44.3	43.4
Progression Factor	1.00		1.00		1.00	1.00					1.00	1.00
Incremental Delay, d2	1.7		0.1		0.1	0.1					0.9	0.1
Delay (s)	42.8		3.1		10.2	9.2					45.2	43.5
Level of Service	D		A		B	A					D	D
Approach Delay (s)		18.5			9.9			0.0			44.6	
Approach LOS		B			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	98.5	Sum of lost time (s)	23.0
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	401	224	1650	197	358	193
v/c Ratio	0.59	0.36	0.64	0.22	0.47	0.08
Control Delay	46.5	26.3	20.7	2.7	47.9	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.5	26.3	20.7	2.7	47.9	4.9
Queue Length 50th (ft)	134	105	294	0	83	18
Queue Length 95th (ft)	236	215	431	37	147	36
Internal Link Dist (ft)	751		1519			448
Turn Bay Length (ft)		600		1000	425	
Base Capacity (vph)	947	1163	4184	1332	2486	3421
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.19	0.39	0.15	0.14	0.06

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	369	206	1518	181	329	178
Future Volume (vph)	369	206	1518	181	329	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.91	1.00	0.94	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3319	1531	4916	1531	4824	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3319	1531	4916	1531	4824	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	401	224	1650	197	358	193
RTOR Reduction (vph)	0	7	0	93	0	0
Lane Group Flow (vph)	401	217	1650	104	358	193
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	4	4 5	6		5	2
Permitted Phases				6		
Actuated Green, G (s)	21.2	43.0	56.4	56.4	15.8	78.2
Effective Green, g (s)	23.2	45.0	59.4	59.4	17.8	81.2
Actuated g/C Ratio	0.21	0.40	0.53	0.53	0.16	0.72
Clearance Time (s)	6.0		7.0	7.0	6.0	7.0
Vehicle Extension (s)	3.0		5.0	5.0	3.0	5.0
Lane Grp Cap (vph)	685	612	2597	809	763	2471
v/s Ratio Prot	c0.12	0.14	c0.34		c0.07	0.06
v/s Ratio Perm				0.07		
v/c Ratio	0.59	0.36	0.64	0.13	0.47	0.08
Uniform Delay, d1	40.3	23.6	18.8	13.4	43.0	4.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.4	0.7	0.2	0.5	0.0
Delay (s)	41.5	23.9	19.5	13.6	43.5	4.6
Level of Service	D	C	B	B	D	A
Approach Delay (s)	35.2		18.9			29.9
Approach LOS	D		B			C

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	112.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	152	366	22	508	1397	217	470	118	88	387
v/c Ratio	0.33	0.17	0.06	0.54	0.91	0.32	0.68	0.29	0.21	0.74
Control Delay	16.5	18.7	15.8	33.8	10.8	36.6	38.7	44.9	44.3	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.5	18.7	15.8	33.8	10.8	36.6	38.7	44.9	44.3	14.2
Queue Length 50th (ft)	46	41	6	133	0	56	120	33	25	1
Queue Length 95th (ft)	112	100	24	253	#23	119	234	77	62	102
Internal Link Dist (ft)		1548		585			1389		1519	
Turn Bay Length (ft)	350		425			350		490		300
Base Capacity (vph)	645	3105	712	2167	1531	1384	1377	1594	1643	935
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.12	0.03	0.23	0.91	0.16	0.34	0.07	0.05	0.41

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	329	7	20	467	1285	200	275	157	109	81	356
Future Volume (vph)	140	329	7	20	467	1285	200	275	157	109	81	356
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	7.0		5.5	7.0	4.0	5.5	5.5		5.5	5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	0.95		0.97	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	4900		1711	3421	1531	3319	3235		3319	3421	1531
Flt Permitted	0.33	1.00		0.53	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	592	4900		946	3421	1531	3319	3235		3319	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	358	8	22	508	1397	217	299	171	118	88	387
RTOR Reduction (vph)	0	1	0	0	0	0	0	41	0	0	0	340
Lane Group Flow (vph)	152	365	0	22	508	1397	217	429	0	118	88	47
Turn Type	pm+pt	NA		pm+pt	NA	Free	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases	2			6		Free						4
Actuated Green, G (s)	51.3	43.4		33.5	31.1	101.2	19.9	19.9		12.0	12.0	12.0
Effective Green, g (s)	51.3	43.4		33.5	31.1	101.2	19.9	19.9		12.0	12.0	12.0
Actuated g/C Ratio	0.51	0.43		0.33	0.31	1.00	0.20	0.20		0.12	0.12	0.12
Clearance Time (s)	5.5	7.0		5.5	7.0		5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	3.0	7.0		3.0	7.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	462	2101		331	1051	1531	652	636		393	405	181
v/s Ratio Prot	0.05	0.07		0.00	0.15		0.07	0.13		0.04	0.03	
v/s Ratio Perm	0.12			0.02		c0.91						0.03
v/c Ratio	0.33	0.17		0.07	0.48	0.91	0.33	0.67		0.30	0.22	0.26
Uniform Delay, d1	14.2	17.8		22.9	28.5	0.0	34.9	37.7		40.8	40.4	40.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	0.1		0.1	1.2	9.8	0.3	2.8		0.4	0.3	0.8
Delay (s)	14.6	18.0		23.0	29.8	9.8	35.2	40.5		41.2	40.6	41.3
Level of Service	B	B		C	C	A	D	D		D	D	D
Approach Delay (s)		17.0			15.2			38.8			41.2	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	101.2	Sum of lost time (s)	23.5
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	272	5	6	439	28	4	0	8	13	1	6
Future Volume (Veh/h)	9	272	5	6	439	28	4	0	8	13	1	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	296	5	7	477	30	4	0	9	14	1	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		650			625							
pX, platoon unblocked												
vC, conflicting volume	507			301			576	837	148	668	812	238
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	507			301			576	837	148	668	812	238
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			99	100	99	96	100	99
cM capacity (veh/h)	1054			1257			391	297	872	336	307	763

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	10	148	148	5	7	238	238	30	13	22
Volume Left	10	0	0	0	7	0	0	0	4	14
Volume Right	0	0	0	5	0	0	0	30	9	7
cSH	1054	1700	1700	1700	1257	1700	1700	1700	633	407
Volume to Capacity	0.01	0.09	0.09	0.00	0.01	0.14	0.14	0.02	0.02	0.05
Queue Length 95th (ft)	1	0	0	0	0	0	0	0	2	4
Control Delay (s)	8.4	0.0	0.0	0.0	7.9	0.0	0.0	0.0	10.8	14.4
Lane LOS	A				A				B	B
Approach Delay (s)	0.3				0.1				10.8	14.4
Approach LOS									B	B

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	22.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	72	1687	187	55	550
v/c Ratio	0.05	0.41	0.12	0.21	0.11
Control Delay	0.1	3.1	0.2	24.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	0.1	3.1	0.2	24.3	0.0
Queue Length 50th (ft)	0	70	0	19	0
Queue Length 95th (ft)	0	106	0	47	0
Internal Link Dist (ft)		448			480
Turn Bay Length (ft)			485	575	
Base Capacity (vph)	1558	4916	1531	823	4916
Starvation Cap Reductn	0	431	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.38	0.12	0.07	0.11

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	66	1552	172	51	506
Future Volume (vph)	0	66	1552	172	51	506
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	0.91	1.00	1.00	0.91
Frt		0.86	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1558	4916	1531	1711	4916
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1558	4916	1531	1711	4916
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	72	1687	187	55	550
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	72	1687	187	55	550
Turn Type		Free	NA	Free	Prot	NA
Protected Phases			2		1	Free
Permitted Phases		Free		Free		
Actuated Green, G (s)		57.4	41.8	57.4	4.6	57.4
Effective Green, g (s)		57.4	43.8	57.4	5.6	57.4
Actuated g/C Ratio		1.00	0.76	1.00	0.10	1.00
Clearance Time (s)			6.0		5.0	
Vehicle Extension (s)			5.0		3.0	
Lane Grp Cap (vph)		1558	3751	1531	166	4916
v/s Ratio Prot			c0.34		c0.03	0.11
v/s Ratio Perm		0.05		0.12		
v/c Ratio		0.05	0.45	0.12	0.33	0.11
Uniform Delay, d1		0.0	2.5	0.0	24.2	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	0.2	0.2	1.2	0.0
Delay (s)		0.1	2.6	0.2	25.3	0.0
Level of Service		A	A	A	C	A
Approach Delay (s)	0.1		2.4			2.3
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	2.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	SBT	SBR
Lane Group Flow (vph)	74	367	63	1	1437	16	25	1	8
v/c Ratio	0.22	0.12	0.05	0.00	0.51	0.01	0.21	0.01	0.01
Control Delay	3.5	3.7	2.6	4.0	5.7	0.5	54.6	49.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.5	3.7	2.6	4.0	5.7	0.5	54.6	49.0	0.0
Queue Length 50th (ft)	24	72	9	0	119	0	18	1	0
Queue Length 95th (ft)	1	135	32	m1	265	m0	47	6	0
Internal Link Dist (ft)		712			1633			157	
Turn Bay Length (ft)	250		350	235		375			
Base Capacity (vph)	479	3036	1366	980	2797	1264	295	390	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.12	0.05	0.00	0.51	0.01	0.08	0.00	0.01

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	338	58	1	1322	15	23	0	0	0	1	7
Future Volume (vph)	68	338	58	1	1322	15	23	0	0	0	1	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0				4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00				1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00				1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95				1.00	1.00
Satd. Flow (prot)	1711	3421	1531	1711	3421	1531	1711				1801	1531
Flt Permitted	0.15	1.00	1.00	0.53	1.00	1.00	0.76				1.00	1.00
Satd. Flow (perm)	268	3421	1531	960	3421	1531	1363				1801	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	367	63	1	1437	16	25	0	0	0	1	8
RTOR Reduction (vph)	0	0	11	0	0	3	0	0	0	0	0	0
Lane Group Flow (vph)	74	367	52	1	1437	13	25	0	0	0	1	8
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm				NA	Free
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8			4		Free
Actuated Green, G (s)	102.5	96.9	96.9	93.1	92.0	92.0	5.5				5.5	120.0
Effective Green, g (s)	103.0	98.9	98.9	94.1	94.0	94.0	7.5				7.5	120.0
Actuated g/C Ratio	0.86	0.82	0.82	0.78	0.78	0.78	0.06				0.06	1.00
Clearance Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	6.0				6.0	
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0				3.0	
Lane Grp Cap (vph)	308	2819	1261	762	2679	1199	85				112	1531
v/s Ratio Prot	c0.01	0.11		0.00	c0.42						0.00	
v/s Ratio Perm	0.19		0.03	0.00		0.01	c0.02					0.01
v/c Ratio	0.24	0.13	0.04	0.00	0.54	0.01	0.29				0.01	0.01
Uniform Delay, d1	3.2	2.1	1.9	2.8	4.9	2.8	53.7				52.8	0.0
Progression Factor	1.41	1.89	3.40	1.87	0.94	1.00	1.00				1.00	1.00
Incremental Delay, d2	0.4	0.1	0.1	0.0	0.7	0.0	1.9				0.0	0.0
Delay (s)	4.8	4.0	6.6	5.2	5.2	2.9	55.7				52.8	0.0
Level of Service	A	A	A	A	A	A	E				D	A
Approach Delay (s)		4.5			5.2			55.7			5.9	
Approach LOS		A			A			E			A	

Intersection Summary					
HCM 2000 Control Delay	5.7	HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.50				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	58.7%	ICU Level of Service		B	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	170	498	1457	14	8	358
v/c Ratio	0.41	0.15	0.54	0.01	0.07	0.23
Control Delay	10.4	0.2	3.6	0.0	53.1	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.4	0.2	3.6	0.0	53.1	0.4
Queue Length 50th (ft)	29	0	1	0	6	0
Queue Length 95th (ft)	125	9	286	m0	22	0
Internal Link Dist (ft)		605	712		887	
Turn Bay Length (ft)	600					600
Base Capacity (vph)	633	3322	2686	1531	285	1531
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.15	0.54	0.01	0.03	0.23

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	156	458	1340	13	7	329
Future Volume (vph)	156	458	1340	13	7	329
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	1711	1531
Flt Permitted	0.14	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	258	3421	3421	1531	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	170	498	1457	14	8	358
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	170	498	1457	14	8	358
Turn Type	pm+pt	NA	NA	Free	Prot	Free
Protected Phases	1	1 6	2		4	
Permitted Phases	1 6			Free		Free
Actuated Green, G (s)	100.5	106.5	87.4	120.0	1.5	120.0
Effective Green, g (s)	104.5	108.5	89.4	120.0	3.5	120.0
Actuated g/C Ratio	0.87	0.90	0.75	1.00	0.03	1.00
Clearance Time (s)	6.0		6.0		6.0	
Vehicle Extension (s)	3.0		5.0		3.0	
Lane Grp Cap (vph)	407	3093	2548	1531	49	1531
v/s Ratio Prot	c0.05	0.15	c0.43		0.00	
v/s Ratio Perm	0.31			0.01		c0.23
v/c Ratio	0.42	0.16	0.57	0.01	0.16	0.23
Uniform Delay, d1	10.2	0.6	6.8	0.0	56.8	0.0
Progression Factor	1.67	0.32	0.46	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.0	0.8	0.0	1.6	0.4
Delay (s)	17.7	0.2	3.9	0.0	58.4	0.4
Level of Service	B	A	A	A	E	A
Approach Delay (s)		4.7	3.9		1.6	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

BWI TIA MOE Table - 2022 PM No Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
1	Aviation Blvd (MD 170) at Dorsey Rd (MD 176) - West	Signalized	NBL	173	74.6	E	54.7	D	72.6	E	455	197	302
			NBT	668	52.6	D					-	366	466
			NBR	168	42.6	D					250	28	96
			SBL	339	101.2	F	80.2	F			250	403	#711
			SBT	1224	85.2	F					-	~813	#1118
			SBR	386	45.8	D					175	285	475
			EBL	409	81.9	F	77.7	E			175	397	#698
			EBT	770	83.7	F					-	480	#724
			EBR	317	57.4	E					225	186	346
			WBL	188	58.5	E	64.6	E			200	158	250
			WBT	347	67.9	E					-	205	280
			WBR	0	-	-					-	-	-
2	Aviation Blvd (MD 170) at Mathison Way	Signalized	NBT	1,018	8.4	A	8.2	A	6.6	A	-	185	269
			NBR	69	5.5	A					450	0	17
			SBL	64	2.0	A	2.9	A			375	5	m7
			SBT	1,875	2.9	A					-	133	161
			WBL	82	50.5	D	48.8	D			450	64	113
			WBR	46	45.8	D					-	0	36
3	Aviation Blvd (MD 170) at Stoney Run Rd	Signalized	NBT	967	56.4	E	51.2	D	24.6	C	-	412	530
			NBR	98	0.1	A					-	0	0
			SBL	395	56.0	E	13.9	B			575	147	m136
			SBT	1,599	3.6	A					-	21	m16
			WBL	341	57.7	E	18.3	B			-	275	#473
			WBR	801	1.5	A					-	0	0
4	Stoney Run Rd at Northrop Grumman Entrance	Signalized	NBL	457	22.6	C	22.3	C	40.1	D	-	83	243
			NBT	35	18.9	B					-	11	53
			SBT	425	62.1	E	52.5	D			-	216	#718
			SBR	171	28.5	C					85	47	175
			EBL	14	36.7	D	41.9	D			-	7	29
			EBR	716	42.1	D					550	3	158
5	Stoney Run Rd at New Ridge Rd	Signalized	NBL	43	66.1	E	60.2	E	52.4	D	-	93	162
			NBT	52									
			NBR	488	59.1	E					-	0	126
			SBL	106	69.8	E	60.0	E			-	102	184
			SBT	55	41.1	D					-	43	80
			SBR	0									
			EBL	1	32.8	C	36.1	D			-	1	6
			EBT	136	36.8	D					-	100	186
			EBR	32	33.1	C					125	0	0
			WBL	449	63.1	E	47.6	D			300	422	#753
			WBT	154	8.5	A					-	50	111
			WBR	24	7.6	A					150	0	5
6	Aviation Blvd (MD 170) at Amtrak Way (MD 995)	Signalized	NBL	124	38.9	D	21.7	C	48.7	D	225	35	m91
			NBT	1,644	20.4	C					-	726	#840
			SBT	1,768	82.4	F	74.9	E			-	~961	#1152
			SBR	191	5.3	A					-	29	m35
			EBL	428	48.8	D	43.0	D			-	326	441
			EBR	226	31.9	C					185	47	112
7	Aviation Blvd (MD 170) at Northrup Grumman Gate 1A	Signalized	NBL	14	43.8	D	6.6	A	13.7	B	225	10	m12
			NBT	2,058	6.4	A					-	186	308
			SBT	1,835	15.3	B	14.9	B			-	306	#1010
			SBR	62	3.8	A					-	2	m15
			EBL	386	50.1	D	38.2	D			-	159	204
			EBR	121	0.1	A					-	0	0
8	Aviation Blvd (MD 170) at SB I-195 Ramps	Signalized	NBT	2,274	17.7	B	16.4	B	14.2	B	-	635	#1230
			NBR	169	0.1	A					50	0	m0
			SBL	115	65.3	E	7.9	A			350	40	117
			SBT	948	1.0	A					-	22	33
			WBL	29	53.7	D	35.8	D			-	24	56
			WBR	15	0.0	A					-	0	0
9	Aviation Blvd (MD 170) at NB I-195 Ramps	Signalized	NBT	1,288	1.1	A	37.3	D	31.2	C	-	16	m22
			NBR	1,317	72.6	E					-	~1162	m#1326
			SBT	879	9.3	A	9.3	A			-	194	269
			WBL	181	50.8	D	50.8	D			-	142	207
10	Terminal Rd at Elkridge Landing Rd	Signalized	NBL	459	27.4	C	26.4	C	12.7	B	-	212	335
			NBR	40	14.9	B					-	0	18
			EBT	426	20.1	C	8.1	A			-	94	175
			EBR	1,032	3.1	A					-	0	0
			WBL	34	11.7	B	11.7	B			150	9	32
			WBT	162	11.7	B					-	24	55

BWI TIA MOE Table - 2022 PM No Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
11	Aviation Blvd (MD 170) at Terminal Rd	Signalized	NBL	163	50.9	D	19.3	B	19.7	B	300	67	102
			NBT	119	37.2	D					-	81	130
			NBR	385	0.4	A					400	0	0
			SBT	120	51.3	D	7.9	A			-	50	81
			SBR	945	2.4	A					-	0	0
			EBL	380	50.6	D	24.3	C			445	148	199
			EBT	774	16.1	B					-	226	338
			EBR	150	0.1	A					445	0	0
			WBL	253	18	B	28.3	C			615	115	m121
			WBT	529	18.5	B					-	194	m243
			WBR	0	-	-					-	-	-
12	Aviation Blvd (MD 170) at Air Cargo Dr	Signalized	NBL	112	51.2	D	48.0	D	53.8	D	-	100	158
			NBT	13									
			NBR	66	42.1	D					-	0	4
			SBL	480	148.2	F	141.7	F			-	~292	#481
			SBT	15	135.1	F					-	~270	#460
			SBR	65									
			EBL	44	14.5	B	30.8	C			275	26	49
			EBT	998	35.1	D					-	435	521
			EBR	117	0.1	A					-	0	0
			WBL	40	19.9	B	25.4	C			375	19	45
			WBT	604	30.6	C					-	264	331
			WBR	115	0.1	A					475	0	0
13	Aviation Blvd (MD 162) at Andover Rd	Signalized	WBT	558	6.0	A	7.7	A	14.3	B	-	69	138
			WBR	385	10.3	B					200	0	55
			EBL	101	5.8	A	8.8	A			415	46	63
			EBT	1,012	9.1	A					-	251	532
			SBL	369	49.5	D	46.8	D			175	157	223
			SBR	11	44.1	D					-	95	162
14	Aviation Blvd (MD 162) at Aaronson Dr	Unsignalized	NBL	19	11.1	B	0.2	A	2.1	A	-	-	-
			NBT	841	0.0	A					-	-	-
			NBR	18									
			SBL	56	10.4	B	0.5	A			-	-	-
			SBT	1,208	0.0	A					-	-	-
			SBR	15									
			EBL	13	82.3	F	82.3	F			-	-	-
			EBT	1									
			EBR	8									
			WBL	13	56.2	F	56.2	F			-	-	-
			WBT	1									
			WBR	14									
15	Aviation Blvd (MD 162) at Allwood Dr	Signalized	NBL	41	2.5	A	2.8	A	3.8	A	300	4	9
			NBT	897	2.9	A					-	60	141
			NBR	53	2.0	A					100	0	7
			SBL	9	0.7	A	2.0	A			225	1	m1
			SBT	1230	2.0	A					-	84	41
			SBR	6	2.5	A					225	0	m0
			EBL	9	54.2	D	53.8	D			-	7	25
			EBT	2	53.6	D					-	1	31
			EBR	24									
			WBL	17	53.5	D	53.5	D			-	0	0
			WBT	0									
			WBR	13									
16	SB I-97 Ramps at Cromwell Park Dr	Signalized	SBT	244	52.9	D	50.2	D	26.6	C	-	104	143
			SBR	255	47.6	D					-	0	78
			EBL	38	83.2	F	19.8	B			420	17	m32
			EBR	750	16.6	B					-	176	197
			WBT	297	7.2	A	7.1	A			-	44	74
			WBR	28	6.5	A					600	0	0
17	Aviation Blvd (MD 162) at Cromwell Park Dr	Signalized	NBT	794	23.2	C	23.0	C	30.8	C	-	162	234
			NBR	26	18.9	B					1000	0	21
			SBL	762	44.1	D	28.9	C			425	209	240
			SBT	509	6.0	A					-	67	106
			WBL	484	51.1	D	46.7	D			-	213	263
			WBR	68	14.9	B					600	19	30

BWI TIA MOE Table - 2022 PM No Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
18	Aviation Blvd (MD 162) at Dorsey Rd (MD 176) - East	Signalized	NBL	31	50.0	D	53.7	D	29.3	C	350	13	32
			NBT	140	54.2	D					-	75	132
			NBR	97									
			SBL	424	48.5	D	45.5	D			490	188	264
			SBT	342	44.9	D					-	150	215
			SBR	227	40.8	D					300	0	74
			EBL	143	14.6	B	25.2	C			350	58	115
			EBT	960	26.5	C					-	274	398
			EBR	209									
			WBL	57	20.9	C	10.6	B			425	22	52
			WBT	318	25.4	C					-	95	163
			WBR	537	0.7	A					-	0	0
19	Dorsey Rd (MD 176) at Digiulian Blvd	Unsignalized	NBL	16	63.8	F	63.8	F	2.4	A	-	-	-
			NBT	0									
			NBR	23									
			SBL	32	41.4	E	41.4	E			-	-	-
			SBT	0									
			SBR	14									
			EBL	3	8.4	A	0.0	A			-	-	-
			EBT	1,360	0.0	A					-	-	-
			EBR	14	0.0	A					-	-	-
			WBL	20	13.5	B	0.6	A			-	-	-
			WBT	430	0.0	A					-	-	-
			WBR	20	0.0	A					-	-	-
20	Aviation Blvd (MD 162) at Hollins Ferry Rd	Signalized	NBT	790	2.4	A	2.2	A	1.5	A	-	27	44
			NBR	71	0.1	A					485	0	0
			SBL	62	20.4	C	1.1	A			575	17	38
			SBT	1,270	0.1	A					-	0	0
			WBR	81	0.1	A	0.1	A			-	0	0
21	Aviation Blvd (MD 170) at Long Term Parking Lots	Signalized	NBL	36	56.4	E	56.0	E	6.9	A	-	29	63
			NBT	1	52.0	D					-	1	12
			NBR	3							-		
			SBL	10	53.0	D	16.3	B			-	9	28
			SBT	1							-		
			SBR	25	0.0	A					-	0	0
			EBL	57	2.8	A	7.1	A			250	12	22
			EBT	1,100	7.5	A					-	252	486
			EBR	59	5.1	A					350	6	11
			WBL	5	2.4	A	2.3	A			235	0	m2
			WBT	557	2.3	A					-	31	40
			WBR	7	2.8	A					375	0	m0
22	Aviation Blvd (MD 162) at S Camp Meade Rd (MD 170)	Signalized	SBL	8	58.7	E	3.2	A	6.9	A	-	7	24
			SBR	153	0.1	A					600	0	0
			EBL	337	15.5	B	5.3	A			600	31	m100
			EBT	1,208	2.4	A					-	0	m252
			WBT	605	12.3	B	12.0	B			-	128	216
			WBR	13	0.0	A					-	0	0

Notes

m Volume for 95th percentile queue is metered by upstream signal

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	445	837	345	204	377	188	726	183	368	1330	420
v/c Ratio	0.97	0.96	0.68	0.72	0.65	0.68	0.67	0.31	0.96	1.03	0.65
Control Delay	77.6	84.2	38.2	55.2	71.4	79.7	54.1	11.9	101.9	82.9	38.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.6	84.2	38.2	55.2	71.4	79.7	54.1	11.9	101.9	82.9	38.5
Queue Length 50th (ft)	397	480	186	158	205	197	366	28	403	~813	285
Queue Length 95th (ft)	#698	#724	346	250	280	302	466	96	#711	#1118	475
Internal Link Dist (ft)		640			713		584			1313	
Turn Bay Length (ft)	175		225	200		455		250	250		175
Base Capacity (vph)	458	870	511	430	870	647	1825	887	382	1296	650
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.97	0.96	0.68	0.47	0.43	0.29	0.40	0.21	0.96	1.03	0.65

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	409	770	317	188	347	0	173	668	168	339	1224	386
Future Volume (vph)	409	770	317	188	347	0	173	668	168	339	1224	386
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539		1770	3539	1583	1770	3539	1583
Flt Permitted	0.22	1.00	1.00	0.16	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	406	3539	1583	292	3539		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	445	837	345	204	377	0	188	726	183	368	1330	420
RTOR Reduction (vph)	0	0	122	0	0	0	0	0	102	0	0	71
Lane Group Flow (vph)	445	837	223	204	377	0	188	726	81	368	1330	349
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)	64.7	38.2	38.2	46.0	24.5		25.4	48.5	48.5	35.2	58.3	58.3
Effective Green, g (s)	65.7	41.2	41.2	48.0	27.5		26.4	51.5	51.5	36.2	61.3	61.3
Actuated g/C Ratio	0.39	0.25	0.25	0.29	0.16		0.16	0.31	0.31	0.22	0.37	0.37
Clearance Time (s)	5.0	7.0	7.0	5.0	7.0		5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	454	871	389	282	581		279	1088	487	382	1295	579
v/s Ratio Prot	c0.21	c0.24		0.10	0.11		0.11	0.21		c0.21	c0.38	
v/s Ratio Perm	0.17		0.14	0.11					0.05			0.22
v/c Ratio	0.98	0.96	0.57	0.72	0.65		0.67	0.67	0.17	0.96	1.03	0.60
Uniform Delay, d1	45.0	62.3	55.4	49.7	65.4		66.4	50.5	42.3	64.9	53.1	43.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	36.9	21.4	2.0	8.9	2.5		8.1	2.1	0.3	36.3	32.1	2.6
Delay (s)	81.9	83.7	57.4	58.5	67.9		74.6	52.6	42.6	101.2	85.2	45.8
Level of Service	F	F	E	E	E		E	D	D	F	F	D
Approach Delay (s)		77.7			64.6			54.7			80.2	
Approach LOS		E			E			D			F	

Intersection Summary			
HCM 2000 Control Delay	72.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	167.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	89	50	1107	75	70	2038
v/c Ratio	0.40	0.21	0.45	0.07	0.17	0.74
Control Delay	52.7	14.1	9.1	1.9	1.7	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	14.1	9.1	1.9	1.7	3.1
Queue Length 50th (ft)	64	0	185	0	5	133
Queue Length 95th (ft)	113	36	269	17	m7	161
Internal Link Dist (ft)	716		2236			2190
Turn Bay Length (ft)	450			450	375	
Base Capacity (vph)	456	444	2437	1087	522	2751
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.11	0.45	0.07	0.13	0.74

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	82	46	1018	69	64	1875
Future Volume (vph)	82	46	1018	69	64	1875
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1531	3421	1501	1711	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.21	1.00
Satd. Flow (perm)	1711	1531	3421	1501	373	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	89	50	1107	75	70	2038
RTOR Reduction (vph)	0	44	0	22	0	0
Lane Group Flow (vph)	89	6	1107	53	70	2038
Confl. Peds. (#/hr)				17		
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Actuated Green, G (s)	13.5	13.5	81.5	81.5	93.5	93.5
Effective Green, g (s)	15.5	15.5	84.5	84.5	94.5	96.5
Actuated g/C Ratio	0.13	0.13	0.70	0.70	0.79	0.80
Clearance Time (s)	6.0	6.0	7.0	7.0	5.0	7.0
Vehicle Extension (s)	5.0	5.0	6.0	6.0	5.0	6.0
Lane Grp Cap (vph)	221	197	2408	1056	382	2751
v/s Ratio Prot	c0.05		0.32		0.01	c0.60
v/s Ratio Perm		0.00		0.04	0.13	
v/c Ratio	0.40	0.03	0.46	0.05	0.18	0.74
Uniform Delay, d1	48.0	45.7	7.8	5.4	4.2	5.7
Progression Factor	1.00	1.00	1.00	1.00	0.41	0.31
Incremental Delay, d2	2.5	0.1	0.6	0.1	0.3	1.1
Delay (s)	50.5	45.8	8.4	5.5	2.0	2.9
Level of Service	D	D	A	A	A	A
Approach Delay (s)	48.8		8.2			2.9
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	371	871	1051	107	429	1738
v/c Ratio	0.85	0.57	0.81	0.07	0.55	0.75
Control Delay	62.7	1.5	57.3	0.1	28.4	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.7	1.5	57.3	0.1	28.4	4.0
Queue Length 50th (ft)	275	0	412	0	147	21
Queue Length 95th (ft)	#473	0	530	0	m136	m16
Internal Link Dist (ft)	319		2190			575
Turn Bay Length (ft)					575	
Base Capacity (vph)	434	1531	1293	1531	1272	2323
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.57	0.81	0.07	0.34	0.75

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	341	801	967	98	395	1599
Future Volume (vph)	341	801	967	98	395	1599
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1531	3421	1531	3319	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1711	1531	3421	1531	3319	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	371	871	1051	107	429	1738
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	371	871	1051	107	429	1738
Turn Type	Prot	Free	NA	Free	Prot	NA
Protected Phases	4		6		5 7	2 5 7
Permitted Phases		Free		Free		
Actuated Green, G (s)	28.5	120.0	42.4	120.0	25.6	80.0
Effective Green, g (s)	30.5	120.0	45.4	120.0	27.6	83.0
Actuated g/C Ratio	0.25	1.00	0.38	1.00	0.23	0.69
Clearance Time (s)	6.0		7.0			
Vehicle Extension (s)	3.0		5.0			
Lane Grp Cap (vph)	434	1531	1294	1531	763	2366
v/s Ratio Prot	c0.22		c0.31		0.13	c0.51
v/s Ratio Perm		0.57		0.07		
v/c Ratio	0.85	0.57	0.81	0.07	0.56	0.73
Uniform Delay, d1	42.6	0.0	33.5	0.0	40.9	11.6
Progression Factor	1.00	1.00	1.53	1.00	1.37	0.30
Incremental Delay, d2	15.1	1.5	5.2	0.1	0.1	0.1
Delay (s)	57.7	1.5	56.4	0.1	56.0	3.6
Level of Service	E	A	E	A	E	A
Approach Delay (s)	18.3		51.2			13.9
Approach LOS	B		D			B

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	15	778	497	38	462	186
v/c Ratio	0.07	0.89	0.38	0.05	0.91	0.39
Control Delay	35.7	16.9	24.2	24.2	57.8	24.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.7	16.9	24.2	24.2	57.8	24.1
Queue Length 50th (ft)	7	3	83	11	216	47
Queue Length 95th (ft)	29	158	243	53	#718	175
Internal Link Dist (ft)	968			398	150	
Turn Bay Length (ft)		550				85
Base Capacity (vph)	579	1028	1311	711	508	475
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.76	0.38	0.05	0.91	0.39

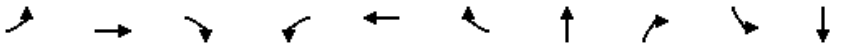
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	14	716	457	35	425	171
Future Volume (vph)	14	716	457	35	425	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	5.0	5.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1711	1531	3319	1801	1801	1531
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1711	1531	3319	1801	1801	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	778	497	38	462	186
RTOR Reduction (vph)	0	672	0	0	0	44
Lane Group Flow (vph)	15	106	497	38	462	142
Turn Type	Prot	Prot	Split	NA	NA	Prot
Protected Phases	3	3	2	2	1	1
Permitted Phases						
Actuated Green, G (s)	12.3	12.3	36.3	36.3	25.9	25.9
Effective Green, g (s)	12.3	12.3	36.3	36.3	25.9	25.9
Actuated g/C Ratio	0.13	0.13	0.38	0.38	0.27	0.27
Clearance Time (s)	4.0	4.0	5.0	5.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	5.0	5.0	3.0	3.0
Lane Grp Cap (vph)	220	196	1260	683	487	414
v/s Ratio Prot	0.01	c0.07	c0.15	0.02	c0.26	0.09
v/s Ratio Perm						
v/c Ratio	0.07	0.54	0.39	0.06	0.95	0.34
Uniform Delay, d1	36.6	39.0	21.6	18.8	34.2	28.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	3.0	0.9	0.2	27.9	0.5
Delay (s)	36.7	42.1	22.6	18.9	62.1	28.5
Level of Service	D	D	C	B	E	C
Approach Delay (s)	41.9			22.3	52.5	
Approach LOS	D			C	D	

Intersection Summary			
HCM 2000 Control Delay	40.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	95.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	148	35	488	167	26	104	530	115	60
v/c Ratio	0.00	0.26	0.06	0.90	0.14	0.02	0.62	0.82	0.66	0.13
Control Delay	38.0	39.4	0.2	66.9	10.2	1.1	75.7	16.1	80.3	40.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.0	39.4	0.2	66.9	10.2	1.1	75.7	16.1	80.3	40.2
Queue Length 50th (ft)	1	100	0	422	50	0	93	0	102	43
Queue Length 95th (ft)	6	186	0	#753	111	5	162	126	184	80
Internal Link Dist (ft)		269			383		290			249
Turn Bay Length (ft)	175		125	300		150				
Base Capacity (vph)	374	574	542	545	1213	1046	368	778	242	766
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.26	0.06	0.90	0.14	0.02	0.28	0.68	0.48	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	136	32	449	154	24	43	52	488	106	55	0
Future Volume (vph)	1	136	32	449	154	24	43	52	488	106	55	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1711	1801	1531	1711	1801	1531		1761	1531	1711	1801	
Flt Permitted	0.65	1.00	1.00	0.95	1.00	1.00		0.83	1.00	0.95	1.00	
Satd. Flow (perm)	1173	1801	1531	1711	1801	1531		1487	1531	1711	1801	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	148	35	488	167	26	47	57	530	115	60	0
RTOR Reduction (vph)	0	0	24	0	0	8	0	0	469	0	0	0
Lane Group Flow (vph)	1	148	11	488	167	18	0	104	61	115	60	0
Turn Type	Perm	NA	Perm	Prot	NA	Prot	Perm	NA	Prot	Prot	NA	
Protected Phases		6		5	2	2		8	8	7	4	
Permitted Phases	6		6				8					
Actuated Green, G (s)	45.3	45.3	45.3	45.2	95.5	95.5		16.2	16.2	14.5	35.7	
Effective Green, g (s)	45.3	45.3	45.3	45.2	95.5	95.5		16.2	16.2	14.5	35.7	
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.67	0.67		0.11	0.11	0.10	0.25	
Clearance Time (s)	5.5	5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	3.0	5.0	5.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	374	575	489	545	1213	1031		170	175	175	453	
v/s Ratio Prot		c0.08		c0.29	0.09	0.01			0.04	c0.07	0.03	
v/s Ratio Perm	0.00		0.01					c0.07				
v/c Ratio	0.00	0.26	0.02	0.90	0.14	0.02		0.61	0.35	0.66	0.13	
Uniform Delay, d1	32.8	35.7	33.0	46.0	8.3	7.6		59.8	57.9	61.2	41.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	1.1	0.1	17.1	0.2	0.0		6.4	1.2	8.6	0.1	
Delay (s)	32.8	36.8	33.1	63.1	8.5	7.6		66.1	59.1	69.8	41.1	
Level of Service	C	D	C	E	A	A		E	E	E	D	
Approach Delay (s)		36.1			47.6			60.2			60.0	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	52.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	141.7	Sum of lost time (s)	20.5
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Group Flow (vph)	465	246	135	1787	1922	208
v/c Ratio	0.84	0.42	0.68	0.86	1.13	0.25
Control Delay	51.7	12.9	36.8	22.1	86.2	2.8
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	51.7	12.9	36.8	22.3	86.2	2.8
Queue Length 50th (ft)	326	47	35	726	~961	29
Queue Length 95th (ft)	441	112	m91	#840	#1152	m35
Internal Link Dist (ft)	755			2381	681	
Turn Bay Length (ft)		185	225			
Base Capacity (vph)	627	641	205	2086	1695	820
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	29	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.38	0.66	0.87	1.13	0.25

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	428	226	124	1644	1768	191
Future Volume (vph)	428	226	124	1644	1768	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1711	1531	1711	3421	3421	1531
Flt Permitted	0.95	1.00	0.06	1.00	1.00	1.00
Satd. Flow (perm)	1711	1531	114	3421	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	465	246	135	1787	1922	208
RTOR Reduction (vph)	0	112	0	0	0	62
Lane Group Flow (vph)	465	134	135	1787	1922	146
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		1	6	2	
Permitted Phases	4	4	6			2
Actuated Green, G (s)	36.8	36.8	71.7	71.7	58.0	58.0
Effective Green, g (s)	38.8	36.8	72.7	73.2	59.5	59.5
Actuated g/C Ratio	0.32	0.31	0.61	0.61	0.50	0.50
Clearance Time (s)	6.0	6.0	5.0	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	6.0
Lane Grp Cap (vph)	553	469	198	2086	1696	759
v/s Ratio Prot	c0.27		0.06	c0.52	c0.56	
v/s Ratio Perm		0.09	0.36			0.10
v/c Ratio	0.84	0.29	0.68	0.86	1.13	0.19
Uniform Delay, d1	37.7	31.6	29.9	19.1	30.2	16.9
Progression Factor	1.00	1.00	1.08	0.89	0.58	0.29
Incremental Delay, d2	11.1	0.3	6.6	3.4	64.8	0.3
Delay (s)	48.8	31.9	38.9	20.4	82.4	5.3
Level of Service	D	C	D	C	F	A
Approach Delay (s)	43.0			21.7	74.9	
Approach LOS	D			C	E	

Intersection Summary			
HCM 2000 Control Delay	48.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	15	2237	1995	67	420	132
v/c Ratio	0.11	0.87	0.84	0.06	0.71	0.09
Control Delay	39.9	7.4	16.0	2.6	52.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.9	7.5	16.0	2.6	52.9	0.1
Queue Length 50th (ft)	10	186	306	2	159	0
Queue Length 95th (ft)	m12	308	#1010	m15	204	0
Internal Link Dist (ft)		681	1012		359	
Turn Bay Length (ft)	225					
Base Capacity (vph)	199	2580	2375	1076	885	1531
Starvation Cap Reductn	0	10	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.87	0.84	0.06	0.47	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	14	2058	1835	62	386	121
Future Volume (vph)	14	2058	1835	62	386	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	3319	1531
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1711	3421	3421	1531	3319	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	2237	1995	67	420	132
RTOR Reduction (vph)	0	0	0	15	0	0
Lane Group Flow (vph)	15	2237	1995	52	420	132
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	1	6	2		4	
Permitted Phases				2		Free
Actuated Green, G (s)	5.2	89.0	78.8	78.8	20.5	120.0
Effective Green, g (s)	6.2	90.5	80.3	80.3	21.5	120.0
Actuated g/C Ratio	0.05	0.75	0.67	0.67	0.18	1.00
Clearance Time (s)	5.0	5.5	5.5	5.5	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	88	2580	2289	1024	594	1531
v/s Ratio Prot	0.01	c0.65	0.58		c0.13	
v/s Ratio Perm				0.03		0.09
v/c Ratio	0.17	0.87	0.87	0.05	0.71	0.09
Uniform Delay, d1	54.4	10.5	15.8	6.8	46.3	0.0
Progression Factor	0.80	0.39	0.69	0.54	1.00	1.00
Incremental Delay, d2	0.5	2.3	4.4	0.1	3.8	0.1
Delay (s)	43.8	6.4	15.3	3.8	50.1	0.1
Level of Service	D	A	B	A	D	A
Approach Delay (s)		6.6	14.9		38.2	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	SBR	NWL	NWR2
Lane Group Flow (vph)	2472	184	125	1030	998	32	16
v/c Ratio	0.96	0.12	0.65	0.35	0.64	0.26	0.01
Control Delay	19.5	0.1	49.6	1.0	2.0	56.9	0.0
Queue Delay	14.7	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.2	0.1	49.6	1.0	2.0	56.9	0.0
Queue Length 50th (ft)	635	0	40	22	0	24	0
Queue Length 95th (ft)	#1230	m0	117	33	0	56	0
Internal Link Dist (ft)	1012			765		262	
Turn Bay Length (ft)		50	350				
Base Capacity (vph)	2568	1531	420	2943	1558	285	1531
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	168	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.12	0.30	0.35	0.64	0.11	0.01

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2
Lane Configurations		↑↑	↱	↰	↑↑			↱	↰		↱
Traffic Volume (vph)	0	2274	169	115	948	0	0	918	29	0	15
Future Volume (vph)	0	2274	169	115	948	0	0	918	29	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0			4.0	4.0		4.0
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00		1.00
Frt		1.00	0.85	1.00	1.00			0.86	1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00			1.00	0.95		1.00
Satd. Flow (prot)		3421	1531	1711	3421			1558	1711		1531
Flt Permitted		1.00	1.00	0.04	1.00			1.00	0.95		1.00
Satd. Flow (perm)		3421	1531	77	3421			1558	1711		1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2472	184	125	1030	0	0	998	32	0	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2472	184	125	1030	0	0	998	32	0	16
Turn Type		NA	Free	pm+pt	NA			Free	Prot		Free
Protected Phases		6		5	2				4		
Permitted Phases			Free	2				Free			Free
Actuated Green, G (s)		88.6	120.0	101.8	101.8			120.0	7.7		120.0
Effective Green, g (s)		90.1	120.0	102.3	103.3			120.0	8.7		120.0
Actuated g/C Ratio		0.75	1.00	0.85	0.86			1.00	0.07		1.00
Clearance Time (s)		5.5		4.5	5.5				5.0		
Vehicle Extension (s)		5.0		3.0	5.0				3.0		
Lane Grp Cap (vph)		2568	1531	190	2944			1558	124		1531
v/s Ratio Prot		c0.72		0.05	0.30				0.02		
v/s Ratio Perm			0.12	0.51				c0.64			0.01
v/c Ratio		0.96	0.12	0.66	0.35			0.64	0.26		0.01
Uniform Delay, d1		13.4	0.0	39.9	1.7			0.0	52.6		0.0
Progression Factor		0.78	1.00	1.44	0.39			1.00	1.00		1.00
Incremental Delay, d2		7.2	0.1	7.6	0.3			2.0	1.1		0.0
Delay (s)		17.7	0.1	65.3	1.0			2.0	53.7		0.0
Level of Service		B	A	E	A			A	D		A
Approach Delay (s)		16.4			7.9		2.0		35.8		
Approach LOS		B			A		A		D		

Intersection Summary			
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	NWL
Lane Group Flow (vph)	1400	1432	955	197
v/c Ratio	0.55	1.01	0.37	0.63
Control Delay	1.2	31.8	10.2	53.7
Queue Delay	0.0	33.4	0.0	0.0
Total Delay	1.2	65.2	10.2	53.7
Queue Length 50th (ft)	16	~1162	194	142
Queue Length 95th (ft)	m22	m#1326	269	207
Internal Link Dist (ft)	765		418	135
Turn Bay Length (ft)				
Base Capacity (vph)	2566	1415	2566	541
Starvation Cap Reductn	0	240	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.55	1.22	0.37	0.36

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	1288	1317	0	879	181	0
Future Volume (vph)	1288	1317	0	879	181	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5		4.0	4.0	
Lane Util. Factor	0.95	1.00		0.95	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	1.00	1.00		1.00	0.95	
Satd. Flow (prot)	3421	1531		3421	1711	
Flt Permitted	1.00	1.00		1.00	0.95	
Satd. Flow (perm)	3421	1531		3421	1711	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1400	1432	0	955	197	0
RTOR Reduction (vph)	0	286	0	0	0	0
Lane Group Flow (vph)	1400	1146	0	955	197	0
Turn Type	NA	Perm		NA	Prot	
Protected Phases	6			2	4	
Permitted Phases		6				
Actuated Green, G (s)	88.5	88.5		88.5	21.0	
Effective Green, g (s)	90.0	88.5		90.0	22.0	
Actuated g/C Ratio	0.75	0.74		0.75	0.18	
Clearance Time (s)	5.5	5.5		5.5	5.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	2565	1129		2565	313	
v/s Ratio Prot	0.41			0.28	c0.12	
v/s Ratio Perm		c0.75				
v/c Ratio	0.55	1.01		0.37	0.63	
Uniform Delay, d1	6.3	15.8		5.2	45.2	
Progression Factor	0.11	3.15		1.72	1.00	
Incremental Delay, d2	0.4	22.9		0.4	5.5	
Delay (s)	1.1	72.6		9.3	50.8	
Level of Service	A	E		A	D	
Approach Delay (s)	37.3			9.3	50.8	
Approach LOS	D			A	D	

Intersection Summary			
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

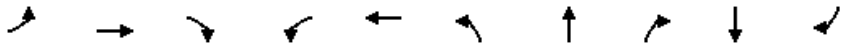
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	463	1122	37	176	499	43
v/c Ratio	0.39	0.73	0.09	0.12	0.75	0.07
Control Delay	23.1	3.1	14.4	14.1	28.0	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.1	3.1	14.4	14.1	28.0	5.2
Queue Length 50th (ft)	94	0	9	24	212	0
Queue Length 95th (ft)	175	0	32	55	335	18
Internal Link Dist (ft)	475			893	211	
Turn Bay Length (ft)			150			
Base Capacity (vph)	1200	1531	600	2401	1399	1260
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.73	0.06	0.07	0.36	0.03

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	426	1032	34	162	459	40
Future Volume (vph)	426	1032	34	162	459	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	4.0	5.0	6.0	6.0	6.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3421	1531	1711	3421	1711	1531
Flt Permitted	1.00	1.00	0.38	1.00	0.95	1.00
Satd. Flow (perm)	3421	1531	682	3421	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	463	1122	37	176	499	43
RTOR Reduction (vph)	0	0	0	0	0	27
Lane Group Flow (vph)	463	1122	37	176	499	16
Turn Type	NA	Free	pm+pt	NA	Prot	Prot
Protected Phases	6		5	2	4	4
Permitted Phases		Free	2			
Actuated Green, G (s)	26.2	76.5	35.5	35.5	29.0	29.0
Effective Green, g (s)	26.2	76.5	35.5	35.5	29.0	29.0
Actuated g/C Ratio	0.34	1.00	0.46	0.46	0.38	0.38
Clearance Time (s)	6.0		5.0	6.0	6.0	6.0
Vehicle Extension (s)	3.5		3.5	3.5	5.0	5.0
Lane Grp Cap (vph)	1171	1531	374	1587	648	580
v/s Ratio Prot	0.14		0.01	0.05	0.29	0.01
v/s Ratio Perm		c0.73	0.04			
v/c Ratio	0.40	0.73	0.10	0.11	0.77	0.03
Uniform Delay, d1	19.1	0.0	11.6	11.6	20.8	14.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	3.1	0.1	0.1	6.6	0.0
Delay (s)	20.1	3.1	11.7	11.7	27.4	14.9
Level of Service	C	A	B	B	C	B
Approach Delay (s)	8.1			11.7	26.4	
Approach LOS	A			B	C	

Intersection Summary			
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	76.5	Sum of lost time (s)	17.0
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	413	841	163	275	575	177	129	418	130	1027
v/c Ratio	0.74	0.47	0.11	0.61	0.35	0.47	0.29	0.27	0.38	0.67
Control Delay	53.4	17.2	0.1	31.2	30.3	53.9	37.7	0.4	53.5	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.4	17.2	0.1	31.2	30.3	53.9	37.7	0.4	53.5	2.4
Queue Length 50th (ft)	148	226	0	115	194	67	81	0	50	0
Queue Length 95th (ft)	199	338	0	m121	m243	102	130	0	81	0
Internal Link Dist (ft)		871			1398		1013		384	
Turn Bay Length (ft)	445		445	615		300		400		
Base Capacity (vph)	599	1779	1531	580	1662	442	540	1531	456	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.47	0.11	0.47	0.35	0.40	0.24	0.27	0.29	0.67

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	380	774	150	253	529	0	163	119	385	0	120	945
Future Volume (vph)	380	774	150	253	529	0	163	119	385	0	120	945
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		0.97	1.00	1.00		0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (perm)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	413	841	163	275	575	0	177	129	418	0	130	1027
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	413	841	163	275	575	0	177	129	418	0	130	1027
Turn Type	Prot	NA	Free	Prot	NA		Prot	NA	Free		NA	Free
Protected Phases	1	6		5	2		7	4			8	
Permitted Phases			Free						Free			Free
Actuated Green, G (s)	19.3	60.4	120.0	15.2	56.3		11.5	27.4	120.0		9.9	120.0
Effective Green, g (s)	20.3	62.4	120.0	16.2	58.3		13.5	29.4	120.0		11.9	120.0
Actuated g/C Ratio	0.17	0.52	1.00	0.13	0.49		0.11	0.24	1.00		0.10	1.00
Clearance Time (s)	5.0	6.0		5.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	561	1778	1531	448	1662		373	441	1531		339	1531
v/s Ratio Prot	0.12	0.25		0.08	0.17		0.05	0.07			0.04	
v/s Ratio Perm			0.11						0.27			c0.67
v/c Ratio	0.74	0.47	0.11	0.61	0.35		0.47	0.29	0.27		0.38	0.67
Uniform Delay, d1	47.3	18.3	0.0	48.9	19.1		49.9	36.8	0.0		50.6	0.0
Progression Factor	0.98	0.83	1.00	0.53	1.47		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.3	0.8	0.1	2.3	0.5		1.0	0.4	0.4		0.7	2.4
Delay (s)	50.6	16.1	0.1	28.0	28.5		50.9	37.2	0.4		51.3	2.4
Level of Service	D	B	A	C	C		D	D	A		D	A
Approach Delay (s)		24.3			28.3			19.3			7.9	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	48	1085	127	43	657	125	136	72	308	301
v/c Ratio	0.12	0.62	0.08	0.17	0.38	0.08	0.57	0.20	1.14	1.09
Control Delay	13.6	36.8	0.1	16.6	32.2	0.1	56.7	1.8	143.2	127.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	36.8	0.1	16.6	32.2	0.1	56.7	1.8	143.2	127.0
Queue Length 50th (ft)	26	435	0	19	264	0	100	0	~292	~270
Queue Length 95th (ft)	49	521	0	45	331	0	158	4	#481	#460
Internal Link Dist (ft)		1398			1719		314			276
Turn Bay Length (ft)	275			375		475				
Base Capacity (vph)	419	1753	1531	261	1749	1531	430	361	270	275
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.62	0.08	0.16	0.38	0.08	0.32	0.20	1.14	1.09

Intersection Summary

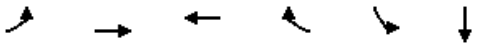
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	998	117	40	604	115	112	13	66	480	15	65
Future Volume (vph)	44	998	117	40	604	115	112	13	66	480	15	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	0.95	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.97	
Satd. Flow (prot)	1711	3421	1531	1711	3421	1531		1723	1531	1625	1593	
Flt Permitted	0.33	1.00	1.00	0.16	1.00	1.00		0.96	1.00	0.95	0.97	
Satd. Flow (perm)	597	3421	1531	287	3421	1531		1723	1531	1625	1593	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	1085	127	43	657	125	122	14	72	522	16	71
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	60	0	9	0
Lane Group Flow (vph)	48	1085	127	43	657	125	0	136	12	308	292	0
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Split	NA	custom	Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases	6		Free	2		Free			3			
Actuated Green, G (s)	64.4	58.5	120.0	64.0	58.3	120.0		14.8	18.0	18.0	18.0	
Effective Green, g (s)	66.4	60.5	120.0	66.0	60.3	120.0		16.8	20.0	20.0	20.0	
Actuated g/C Ratio	0.55	0.50	1.00	0.55	0.50	1.00		0.14	0.17	0.17	0.17	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	394	1724	1531	237	1719	1531		241	255	270	265	
v/s Ratio Prot	0.01	c0.32		c0.01	0.19			c0.08		c0.19	0.18	
v/s Ratio Perm	0.06		c0.08	0.09		0.08			0.01			
v/c Ratio	0.12	0.63	0.08	0.18	0.38	0.08		0.56	0.05	1.14	1.10	
Uniform Delay, d1	12.8	21.6	0.0	15.0	18.4	0.0		48.2	42.0	50.0	50.0	
Progression Factor	1.12	1.55	1.00	1.30	1.63	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.6	0.1	0.4	0.6	0.1		3.0	0.1	98.2	85.1	
Delay (s)	14.5	35.1	0.1	19.9	30.6	0.1		51.2	42.1	148.2	135.1	
Level of Service	B	D	A	B	C	A		D	D	F	F	
Approach Delay (s)		30.8			25.4			48.0			141.7	
Approach LOS		C			C			D			F	

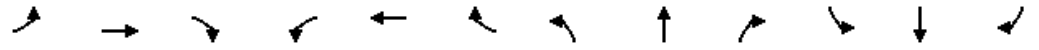
Intersection Summary			
HCM 2000 Control Delay	53.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBT
Lane Group Flow (vph)	110	1100	607	418	209	204
v/c Ratio	0.20	0.44	0.24	0.34	0.64	0.53
Control Delay	7.2	10.1	6.7	2.0	52.2	31.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	10.1	6.7	2.0	52.2	31.1
Queue Length 50th (ft)	46	251	69	0	157	95
Queue Length 95th (ft)	63	532	138	55	223	162
Internal Link Dist (ft)		1633	378			130
Turn Bay Length (ft)	415			200	175	
Base Capacity (vph)	537	2504	2504	1232	568	614
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.44	0.24	0.34	0.37	0.33

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	1012	0	0	558	385	0	0	0	369	0	11
Future Volume (vph)	101	1012	0	0	558	385	0	0	0	369	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95	1.00				0.95	0.95	
Frt	1.00	1.00			1.00	0.85				1.00	0.99	
Flt Protected	0.95	1.00			1.00	1.00				0.95	0.96	
Satd. Flow (prot)	1711	3421			3421	1531				1625	1619	
Flt Permitted	0.41	1.00			1.00	1.00				0.95	0.96	
Satd. Flow (perm)	735	3421			3421	1531				1625	1619	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	110	1100	0	0	607	418	0	0	0	401	0	12
RTOR Reduction (vph)	0	0	0	0	0	112	0	0	0	0	58	0
Lane Group Flow (vph)	110	1100	0	0	607	306	0	0	0	209	146	0
Turn Type	Perm	NA		Perm	NA	Perm				Split	NA	
Protected Phases		6			2		3	3		4	4	
Permitted Phases	6	6		2	2	2						
Actuated Green, G (s)	85.8	85.8			85.8	85.8				23.2	23.2	
Effective Green, g (s)	87.8	87.8			87.8	87.8				24.2	24.2	
Actuated g/C Ratio	0.73	0.73			0.73	0.73				0.20	0.20	
Clearance Time (s)	6.0	6.0			6.0	6.0				5.0	5.0	
Vehicle Extension (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Lane Grp Cap (vph)	537	2503			2503	1120				327	326	
v/s Ratio Prot		c0.32			0.18					c0.13	0.09	
v/s Ratio Perm	0.15					0.20						
v/c Ratio	0.20	0.44			0.24	0.27				0.64	0.45	
Uniform Delay, d1	5.1	6.4			5.3	5.4				43.9	42.0	
Progression Factor	0.99	1.35			1.10	1.79				1.00	1.00	
Incremental Delay, d2	0.8	0.5			0.2	0.6				5.6	2.0	
Delay (s)	5.8	9.1			6.0	10.3				49.5	44.1	
Level of Service	A	A			A	B				D	D	
Approach Delay (s)		8.8			7.7			0.0			46.8	
Approach LOS		A			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	1	8	13	1	14	19	841	18	56	1028	15
Future Volume (Veh/h)	13	1	8	13	1	14	19	841	18	56	1028	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	1	9	14	1	15	21	914	20	61	1117	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1762	2223	566	1656	2221	467	1133			934		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1762	2223	566	1656	2221	467	1133			934		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	70	97	98	75	97	97	97			92		
cM capacity (veh/h)	47	38	467	56	38	542	612			729		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	24	30	21	609	325	61	745	388
Volume Left	14	14	21	0	0	61	0	0
Volume Right	9	15	0	0	20	0	0	16
cSH	69	99	612	1700	1700	729	1700	1700
Volume to Capacity	0.35	0.30	0.03	0.36	0.19	0.08	0.44	0.23
Queue Length 95th (ft)	32	29	3	0	0	7	0	0
Control Delay (s)	82.3	56.2	11.1	0.0	0.0	10.4	0.0	0.0
Lane LOS	F	F	B			B		
Approach Delay (s)	82.3	56.2	0.2			0.5		
Approach LOS	F	F						

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	45.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	10	28	32	45	975	58	10	1337	7
v/c Ratio	0.08	0.18	0.17	0.13	0.32	0.04	0.02	0.47	0.01
Control Delay	52.0	22.5	2.0	2.0	2.4	0.5	0.4	2.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.0	22.5	2.0	2.0	2.4	0.5	0.4	2.0	0.0
Queue Length 50th (ft)	7	1	0	4	60	0	1	84	0
Queue Length 95th (ft)	25	31	0	9	141	7	m1	41	m0
Internal Link Dist (ft)		254	405		1830			1619	
Turn Bay Length (ft)				300		100	225		225
Base Capacity (vph)	421	432	422	512	3051	1373	667	2842	1284
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.06	0.08	0.09	0.32	0.04	0.01	0.47	0.01

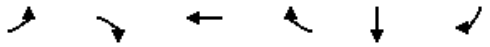
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	2	24	17	0	13	41	897	53	9	1230	6
Future Volume (vph)	9	2	24	17	0	13	41	897	53	9	1230	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.86			0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1711	1550			1648		1711	3421	1531	1711	3421	1531
Flt Permitted	0.88	1.00			0.81		0.17	1.00	1.00	0.29	1.00	1.00
Satd. Flow (perm)	1581	1550			1372		311	3421	1531	524	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	2	26	18	0	14	45	975	58	10	1337	7
RTOR Reduction (vph)	0	25	0	0	30	0	0	0	10	0	0	1
Lane Group Flow (vph)	10	3	0	0	2	0	45	975	48	10	1337	6
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			6		6	2		2
Actuated Green, G (s)	4.9	4.9			4.9		101.1	96.5	96.5	94.1	93.0	93.0
Effective Green, g (s)	6.9	6.9			6.9		103.1	99.0	99.0	96.1	95.5	95.5
Actuated g/C Ratio	0.06	0.06			0.06		0.86	0.82	0.82	0.80	0.80	0.80
Clearance Time (s)	6.0	6.0			6.0		5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0			3.0		2.5	5.0	5.0	2.5	5.0	5.0
Lane Grp Cap (vph)	90	89			78		332	2822	1263	440	2722	1218
v/s Ratio Prot		0.00					c0.01	c0.28		0.00	c0.39	
v/s Ratio Perm	c0.01				0.00		0.11		0.03	0.02		0.00
v/c Ratio	0.11	0.04			0.02		0.14	0.35	0.04	0.02	0.49	0.00
Uniform Delay, d1	53.6	53.4			53.4		2.3	2.6	1.9	2.4	4.1	2.5
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	0.28	0.35	1.00
Incremental Delay, d2	0.5	0.2			0.1		0.1	0.3	0.1	0.0	0.6	0.0
Delay (s)	54.2	53.6			53.5		2.5	2.9	2.0	0.7	2.0	2.5
Level of Service	D	D			D		A	A	A	A	A	A
Approach Delay (s)		53.8			53.5			2.8			2.0	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

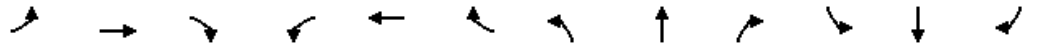
c Critical Lane Group



Lane Group	EBL	EBR	WBT	WBR	SBT	SBR
Lane Group Flow (vph)	41	815	323	30	265	277
v/c Ratio	0.21	0.38	0.14	0.03	0.63	0.64
Control Delay	82.5	7.5	7.8	0.0	56.4	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.5	7.5	7.8	0.0	56.4	12.7
Queue Length 50th (ft)	17	176	44	0	104	0
Queue Length 95th (ft)	m32	197	74	0	143	78
Internal Link Dist (ft)			782		297	
Turn Bay Length (ft)	420			600		
Base Capacity (vph)	691	2166	2333	1070	826	580
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.38	0.14	0.03	0.32	0.48

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	0	750	0	297	28	0	0	0	0	244	255
Future Volume (vph)	38	0	750	0	297	28	0	0	0	0	244	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		6.5		6.5	6.5					7.0	7.0
Lane Util. Factor	0.97		0.88		0.95	1.00					0.95	1.00
Frt	1.00		0.85		1.00	0.85					1.00	0.85
Flt Protected	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (prot)	3319		2694		3421	1531					3421	1531
Flt Permitted	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (perm)	3319		2694		3421	1531					3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	0	815	0	323	30	0	0	0	0	265	277
RTOR Reduction (vph)	0	0	108	0	0	10	0	0	0	0	0	243
Lane Group Flow (vph)	41	0	707	0	323	20	0	0	0	0	265	34
Turn Type	Prot		Prot		NA	Perm					NA	Perm
Protected Phases	1		6		2						4	
Permitted Phases						2						4
Actuated Green, G (s)	5.8		91.7		80.9	80.9					14.8	14.8
Effective Green, g (s)	5.8		91.7		80.9	80.9					14.8	14.8
Actuated g/C Ratio	0.05		0.76		0.67	0.67					0.12	0.12
Clearance Time (s)	5.0		6.5		6.5	6.5					7.0	7.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0					3.0	3.0
Lane Grp Cap (vph)	160		2058		2306	1032					421	188
v/s Ratio Prot	0.01		c0.26		0.09						c0.08	
v/s Ratio Perm						0.01						0.02
v/c Ratio	0.26		0.34		0.14	0.02					0.63	0.18
Uniform Delay, d1	55.0		4.5		7.0	6.5					50.0	47.2
Progression Factor	1.50		3.58		1.00	1.00					1.00	1.00
Incremental Delay, d2	0.7		0.4		0.1	0.0					2.9	0.5
Delay (s)	83.2		16.6		7.2	6.5					52.9	47.6
Level of Service	F		B		A	A					D	D
Approach Delay (s)		19.8			7.1			0.0			50.2	
Approach LOS		B			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	526	74	863	28	828	553
v/c Ratio	0.73	0.10	0.40	0.04	0.72	0.23
Control Delay	53.3	8.6	24.6	8.7	45.4	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.3	8.6	24.6	8.7	45.4	6.4
Queue Length 50th (ft)	213	19	162	0	209	67
Queue Length 95th (ft)	263	30	234	21	240	106
Internal Link Dist (ft)	751		1519			448
Turn Bay Length (ft)		600		1000	425	
Base Capacity (vph)	885	881	2175	692	1527	2447
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.08	0.40	0.04	0.54	0.23

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	484	68	794	26	762	509
Future Volume (vph)	484	68	794	26	762	509
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.91	1.00	0.94	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3319	1531	4916	1531	4824	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3319	1531	4916	1531	4824	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	526	74	863	28	828	553
RTOR Reduction (vph)	0	14	0	16	0	0
Lane Group Flow (vph)	526	60	863	12	828	553
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	4	4 5	6		5	2
Permitted Phases				6		
Actuated Green, G (s)	24.2	56.9	50.1	50.1	26.7	82.8
Effective Green, g (s)	26.2	58.9	53.1	53.1	28.7	85.8
Actuated g/C Ratio	0.22	0.49	0.44	0.44	0.24	0.71
Clearance Time (s)	6.0		7.0	7.0	6.0	7.0
Vehicle Extension (s)	3.0		5.0	5.0	3.0	5.0
Lane Grp Cap (vph)	724	751	2175	677	1153	2446
v/s Ratio Prot	c0.16	0.04	c0.18		c0.17	0.16
v/s Ratio Perm				0.01		
v/c Ratio	0.73	0.08	0.40	0.02	0.72	0.23
Uniform Delay, d1	43.6	16.2	22.6	18.8	41.9	5.8
Progression Factor	1.09	0.92	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.5	0.0	0.5	0.0	2.2	0.2
Delay (s)	51.1	14.9	23.2	18.9	44.1	6.0
Level of Service	D	B	C	B	D	A
Approach Delay (s)	46.7		23.0			28.9
Approach LOS	D		C			C

Intersection Summary			
HCM 2000 Control Delay	30.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	155	1270	62	346	584	34	257	461	372	247
v/c Ratio	0.28	0.58	0.27	0.26	0.38	0.10	0.62	0.68	0.53	0.48
Control Delay	15.9	27.4	17.7	27.1	0.7	55.1	44.9	52.5	48.5	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	27.4	17.7	27.1	0.7	55.1	44.9	52.5	48.5	8.8
Queue Length 50th (ft)	58	274	22	95	0	13	75	188	150	0
Queue Length 95th (ft)	115	398	52	163	0	32	132	264	215	74
Internal Link Dist (ft)		1548		585			1389		1519	
Turn Bay Length (ft)	350		425			350		490		300
Base Capacity (vph)	681	2419	512	1721	1531	1099	1117	1238	1276	726
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.53	0.12	0.20	0.38	0.03	0.23	0.37	0.29	0.34

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	960	209	57	318	537	31	140	97	424	342	227
Future Volume (vph)	143	960	209	57	318	537	31	140	97	424	342	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	7.0		5.5	7.0	4.0	5.5	5.5		5.5	5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	0.95		0.97	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	4784		1711	3421	1531	3319	3212		3319	3421	1531
Flt Permitted	0.48	1.00		0.16	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	856	4784		293	3421	1531	3319	3212		3319	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	155	1043	227	62	346	584	34	152	105	461	372	247
RTOR Reduction (vph)	0	14	0	0	0	0	0	71	0	0	0	197
Lane Group Flow (vph)	155	1256	0	62	346	584	34	186	0	461	372	50
Turn Type	pm+pt	NA		pm+pt	NA	Free	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases	2			6		Free						4
Actuated Green, G (s)	67.4	55.5		55.6	49.2	123.8	13.2	13.2		25.2	25.2	25.2
Effective Green, g (s)	67.4	55.5		55.6	49.2	123.8	13.2	13.2		25.2	25.2	25.2
Actuated g/C Ratio	0.54	0.45		0.45	0.40	1.00	0.11	0.11		0.20	0.20	0.20
Clearance Time (s)	5.5	7.0		5.5	7.0		5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	3.0	7.0		3.0	7.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	553	2144		204	1359	1531	353	342		675	696	311
v/s Ratio Prot	0.03	c0.26		0.02	0.10		0.01	c0.06		c0.14	0.11	
v/s Ratio Perm	0.12			0.12		c0.38						0.03
v/c Ratio	0.28	0.59		0.30	0.25	0.38	0.10	0.54		0.68	0.53	0.16
Uniform Delay, d1	14.4	25.6		20.0	25.0	0.0	49.9	52.4		45.6	44.1	40.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	0.9		0.8	0.4	0.7	0.1	1.8		2.9	0.8	0.2
Delay (s)	14.6	26.5		20.9	25.4	0.7	50.0	54.2		48.5	44.9	40.8
Level of Service	B	C		C	C	A	D	D		D	D	D
Approach Delay (s)		25.2			10.6			53.7			45.5	
Approach LOS		C			B			D			D	

Intersection Summary				
HCM 2000 Control Delay	29.3	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	123.8	Sum of lost time (s)	23.5	
Intersection Capacity Utilization	66.0%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	1360	14	20	430	20	16	0	23	32	0	14
Future Volume (Veh/h)	3	1360	14	20	430	20	16	0	23	32	0	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	1478	15	22	467	22	17	0	25	35	0	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		650			625							
pX, platoon unblocked												
vC, conflicting volume	489			1493			1776	2017	739	1281	2010	234
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	489			1493			1776	2017	739	1281	2010	234
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			65	100	93	68	100	98
cM capacity (veh/h)	1070			446			49	55	360	110	55	768

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	3	739	739	15	22	234	234	22	42	50
Volume Left	3	0	0	0	22	0	0	0	17	35
Volume Right	0	0	0	15	0	0	0	22	25	15
cSH	1070	1700	1700	1700	446	1700	1700	1700	101	147
Volume to Capacity	0.00	0.43	0.43	0.01	0.05	0.14	0.14	0.01	0.42	0.34
Queue Length 95th (ft)	0	0	0	0	4	0	0	0	43	35
Control Delay (s)	8.4	0.0	0.0	0.0	13.5	0.0	0.0	0.0	63.8	41.4
Lane LOS	A				B				F	E
Approach Delay (s)	0.0				0.6				63.8	41.4
Approach LOS									F	E

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	48.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	88	859	77	67	1380
v/c Ratio	0.06	0.22	0.05	0.22	0.28
Control Delay	0.1	2.9	0.1	17.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	0.1	2.9	0.1	17.4	0.1
Queue Length 50th (ft)	0	27	0	17	0
Queue Length 95th (ft)	0	44	0	38	0
Internal Link Dist (ft)		448			480
Turn Bay Length (ft)			485	575	
Base Capacity (vph)	1558	4916	1531	969	4916
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.06	0.17	0.05	0.07	0.28

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	81	790	71	62	1270
Future Volume (vph)	0	81	790	71	62	1270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	0.91	1.00	1.00	0.91
Frt		0.86	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1558	4916	1531	1711	4916
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1558	4916	1531	1711	4916
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	88	859	77	67	1380
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	88	859	77	67	1380
Turn Type		Free	NA	Free	Prot	NA
Protected Phases			2		1	Free
Permitted Phases		Free		Free		
Actuated Green, G (s)		48.0	32.3	48.0	4.7	48.0
Effective Green, g (s)		48.0	34.3	48.0	5.7	48.0
Actuated g/C Ratio		1.00	0.71	1.00	0.12	1.00
Clearance Time (s)			6.0		5.0	
Vehicle Extension (s)			5.0		3.0	
Lane Grp Cap (vph)		1558	3512	1531	203	4916
v/s Ratio Prot			0.17		0.04	0.28
v/s Ratio Perm		0.06		0.05		
v/c Ratio		0.06	0.24	0.05	0.33	0.28
Uniform Delay, d1		0.0	2.4	0.0	19.4	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	0.1	0.1	1.0	0.1
Delay (s)		0.1	2.4	0.1	20.4	0.1
Level of Service		A	A	A	C	A
Approach Delay (s)	0.1		2.2			1.1
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	1.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	48.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	31.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	62	1196	64	5	605	8	39	4	12	27
v/c Ratio	0.09	0.40	0.05	0.01	0.22	0.01	0.30	0.03	0.09	0.02
Control Delay	3.3	7.0	2.1	1.8	2.5	0.0	55.9	34.2	49.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.3	7.0	2.1	1.8	2.5	0.0	55.9	34.2	49.9	0.0
Queue Length 50th (ft)	12	252	6	0	31	0	29	1	9	0
Queue Length 95th (ft)	22	486	11	m2	40	m0	63	12	28	0
Internal Link Dist (ft)		712			1633			152	157	
Turn Bay Length (ft)	250		350	235		375				
Base Capacity (vph)	799	3010	1355	576	2798	1264	292	348	289	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.40	0.05	0.01	0.22	0.01	0.13	0.01	0.04	0.02

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	1100	59	5	557	7	36	1	3	10	1	25
Future Volume (vph)	57	1100	59	5	557	7	36	1	3	10	1	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)	1711	3421	1531	1711	3421	1531	1711	1598			1722	1531
Flt Permitted	0.40	1.00	1.00	0.23	1.00	1.00	0.75	1.00			0.74	1.00
Satd. Flow (perm)	718	3421	1531	407	3421	1531	1350	1598			1337	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	62	1196	64	5	605	8	39	1	3	11	1	27
RTOR Reduction (vph)	0	0	12	0	0	2	0	3	0	0	0	0
Lane Group Flow (vph)	62	1196	52	5	605	6	39	1	0	0	12	27
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Free
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8			4		Free
Actuated Green, G (s)	101.1	96.0	96.0	93.1	92.0	92.0	6.4	6.4			6.4	120.0
Effective Green, g (s)	102.1	98.0	98.0	94.1	94.0	94.0	8.4	8.4			8.4	120.0
Actuated g/C Ratio	0.85	0.82	0.82	0.78	0.78	0.78	0.07	0.07			0.07	1.00
Clearance Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0			3.0	
Lane Grp Cap (vph)	657	2793	1250	336	2679	1199	94	111			93	1531
v/s Ratio Prot	c0.00	c0.35		0.00	0.18			0.00				
v/s Ratio Perm	0.08		0.03	0.01		0.00	c0.03				0.01	0.02
v/c Ratio	0.09	0.43	0.04	0.01	0.23	0.01	0.41	0.01			0.13	0.02
Uniform Delay, d1	1.5	3.1	2.1	2.9	3.4	2.8	53.4	51.9			52.4	0.0
Progression Factor	1.79	2.27	2.40	0.84	0.61	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.1	0.5	0.1	0.0	0.2	0.0	3.0	0.0			0.6	0.0
Delay (s)	2.8	7.5	5.1	2.4	2.3	2.8	56.4	52.0			53.0	0.0
Level of Service	A	A	A	A	A	A	E	D			D	A
Approach Delay (s)		7.1			2.3			56.0			16.3	
Approach LOS		A			A			E			B	

Intersection Summary					
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.42				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	53.2%	ICU Level of Service		A	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	366	1313	658	14	9	166
v/c Ratio	0.43	0.40	0.29	0.01	0.08	0.11
Control Delay	7.1	1.7	12.1	0.0	53.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.1	1.7	12.1	0.0	53.2	0.1
Queue Length 50th (ft)	31	0	128	0	7	0
Queue Length 95th (ft)	m100	m252	216	0	24	0
Internal Link Dist (ft)		605	712		887	
Turn Bay Length (ft)	600					600
Base Capacity (vph)	1129	3321	2307	1531	285	1531
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.40	0.29	0.01	0.03	0.11

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	337	1208	605	13	8	153
Future Volume (vph)	337	1208	605	13	8	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	1711	1531
Flt Permitted	0.37	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	662	3421	3421	1531	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	366	1313	658	14	9	166
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	366	1313	658	14	9	166
Turn Type	pm+pt	NA	NA	Free	Prot	Free
Protected Phases	1	1 6	2		4	
Permitted Phases	1 6			Free		Free
Actuated Green, G (s)	100.5	106.5	74.2	120.0	1.5	120.0
Effective Green, g (s)	104.5	108.5	76.2	120.0	3.5	120.0
Actuated g/C Ratio	0.87	0.90	0.64	1.00	0.03	1.00
Clearance Time (s)	6.0		6.0		6.0	
Vehicle Extension (s)	3.0		5.0		3.0	
Lane Grp Cap (vph)	823	3093	2172	1531	49	1531
v/s Ratio Prot	0.10	c0.38	0.19		0.01	
v/s Ratio Perm	c0.28			0.01		c0.11
v/c Ratio	0.44	0.42	0.30	0.01	0.18	0.11
Uniform Delay, d1	4.1	0.9	9.9	0.0	56.9	0.0
Progression Factor	3.77	2.66	1.20	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1	0.4	0.0	1.8	0.1
Delay (s)	15.5	2.4	12.3	0.0	58.7	0.1
Level of Service	B	A	B	A	E	A
Approach Delay (s)		5.3	12.0		3.2	
Approach LOS		A	B		A	

Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

BWI TIA MOE Table - 2027 AM No Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
1	Aviation Blvd (MD 170) at Dorsey Rd (MD 176) - West	Signalized	NBL	448	72.3	E	115.8	F	96.6	F	455	555	#831
			NBT	1455	143.3	F					-	~1196	#1482
			NBR	276	41.9	D					250	170	292
			SBL	170	87.8	F	71.4	E			250	221	324
			SBT	413	69.4	E					-	269	342
			SBR	317	65.2	E					175	77	203
			EBL	344	140.8	F	87.1	F			175	~513	#810
			EBT	333	50.1	D					-	183	261
			EBR	152	46.4	D					225	0	66
			WBL	93	86.7	F	77.7	E			200	121	199
			WBT	498	76	E					-	335	430
			WBR	0	-	-					-	-	-
2	Aviation Blvd (MD 170) at Mathison Way	Signalized	NBT	1,814	15.9	B	15.6	B	14.5	B	-	531	768
			NBR	65	5.6	A					450	0	16
			SBL	50	27.8	C	5.3	A			375	3	23
			SBT	808	3.9	A					-	76	137
			WBL	89	50.4	D	48.1	D			450	70	120
			WBR	89	45.7	D					-	0	48
3	Aviation Blvd (MD 170) at Stoney Run Rd	Signalized	NBT	1,470	95.9	F	74.1	E	45.9	D	-	~776	#1054
			NBR	433	0.3	A					-	0	m0
			SBL	862	43.7	D	22.9	C			575	228	226
			SBT	798	0.4	A					-	7	7
			WBL	61	53.6	D	8.3	A			-	49	92
			WBR	349	0.4	A					-	0	0
4	Stoney Run Rd at Northrop Grumman Entrance	Signalized	NBL	728	13.9	B	16.3	B	20.5	C	-	97	322
			NBT	568	19.4	B					-	172	#693
			SBT	42	37.2	D	36.5	D			-	18	67
			SBR	10	33.6	C					85	0	17
			EBL	160	32.2	C	29.2	C			-	66	177
			EBR	369	27.8	C					550	0	86
5	Stoney Run Rd at New Ridge Rd	Signalized	NBL	16	59.8	E	54.1	D	39.7	D	-	105	175
			NBT	99									
			NBR	419	52.6	D					-	0	113
			SBL	25	64.6	E	52.7	D			-	23	58
			SBT	27	42.4	D					-	20	48
			SBR	2									
			EBL	0	0.0	A	27.9	C			175	55	0
			EBT	85	28.2	C					-	0	109
			EBR	20	26.5	C					125	0	0
			WBL	420	48.5	D	30.0	C			300	354	#588
			WBT	171	5.6	A					-	46	94
			WBR	147	5.4	A					150	0	25
6	Aviation Blvd (MD 170) at Amtrak Way (MD 995)	Signalized	NBL	222	80.2	F	14.6	B	18.0	B	225	185	m205
			NBT	1,596	5.5	A					-	48	m162
			SBT	1,396	16.5	B	14.0	B			-	495	392
			SBR	537	7.5	A					-	24	m52
			EBL	201	53.3	D	48.0	D			-	159	237
			EBR	264	44.0	D					185	7	86
7	Aviation Blvd (MD 170) at Northrup Grumman Gate 1A	Signalized	NBL	115	56.3	E	4.9	A	10.4	B	225	99	m150
			NBT	1,681	1.3	A					-	8	114
			SBT	1,928	15.2	B	13.9	B			-	582	m614
			SBR	492	8.8	A					-	56	m64
			EBL	38	54.6	D	45.7	D			-	15	34
			EBR	7	0.0	A					-	0	0
8	Aviation Blvd (MD 170) at SB I-195 Ramps	Signalized	NBT	1,530	6.4	A	5.7	A	5.3	A	-	153	371
			NBR	190	1.0	A					50	0	0
			SBL	76	16.8	B	3.4	A			350	6	37
			SBT	767	2.0	A					-	34	95
			WBL	19	53.6	D	35.2	D			-	16	42
			WBR	10	0.0	A					-	0	0
9	Aviation Blvd (MD 170) at NB I-195 Ramps	Signalized	NBT	1,403	4.3	A	5.6	A	6.9	A	-	124	135
			NBR	659	8.3	A					-	25	30
			SBT	714	2.7	A	2.7	A			-	58	76
			WBL	129	51.4	D	51.4	D			-	102	160
10	Terminal Rd at Elkridge Landing Rd	Signalized	NBL	810	35.0	C	33.8	C	25.1	C	-	549	#870
			NBR	42	10.6	B					-	4	22
			EBT	112	33.0	C	6.4	A			-	36	63
			EBR	518	0.7	A					-	0	0
			WBL	30	25.0	C	32.1	C			150	15	37
			WBT	608	32.5	C					-	197	256

BWI TIA MOE Table - 2027 AM No Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
11	Aviation Blvd (MD 170) at Terminal Rd	Signalized	NBL	89	51.7	D	22.5	C	29.0	C	300	37	63
			NBT	141	41.1	D					-	102	159
			NBR	235	0.2	A					400	0	0
			SBT	93	51.7	D	9.3	A			-	39	66
			SBR	454	0.6	A					-	0	0
			EBL	733	62.7	E	37.9	D			445	306	#487
			EBT	466	16.7	B					-	75	135
			EBR	219	0.2	A					445	0	0
			WBL	354	56.4	E	30.0	C			615	108	185
			WBT	802	18.3	B					-	312	288
			WBR	0	0.0	A					-	0	0
12	Aviation Blvd (MD 170) at Air Cargo Dr	Signalized	NBL	74	51.4	D	50.1	D	15.0	B	-	71	122
			NBT	16									
			NBR	38	47.0	D					-	0	0
			SBL	100	51.6	D	50.6	D			-	66	117
			SBT	18	49.7	D					-	36	87
			SBR	36									
			EBL	111	28.0	C	20.9	C			275	59	135
			EBT	511	22.7	C					-	138	268
			EBR	80	0.1	A					-	0	0
			WBL	65	3.6	A	6.9	A			375	8	m9
			WBT	1045	10.8	B					-	200	336
			WBR	643	0.9	A					475	0	0
13	Aviation Blvd (MD 162) at Andover Rd	Signalized	WBT	1,346	11.7	B	11.5	B	15.9	B	-	289	622
			WBR	274	10.6	B					200	36	149
			EBL	10	4.9	A	5.9	A			415	4	23
			EBT	347	5.9	A					-	82	160
			SBL	272	50.2	D	47.7	D			175	140	204
			SBR	61	45.1	D					-	75	141
14	Aviation Blvd (MD 162) at Aaronson Dr	Unsignalized	NBL	26	9.0	A	0.1	A	9.6	A	-	-	-
			NBT	1,568	0.0	A					-	-	-
			NBR	7									
			SBL	12	15.2	C	0.3	A			-	-	-
			SBT	594	0.0	A					-	-	-
			SBR	21									
			EBL	17	69.6	F	69.6	F			-	-	-
			EBT	0									
			EBR	12									
			WBL	25	297.8	F	297.8	F			-	-	-
			WBT	1									
			WBR	41									
15	Aviation Blvd (MD 162) at Allwood Dr	Signalized	NBL	59	1.9	A	5.4	A	6.8	A	300	6	14
			NBT	1553	5.6	A					-	146	386
			NBR	12	2.3	A					100	0	0
			SBL	7	2.4	A	4.1	A			225	1	m1
			SBT	634	4.2	A					-	108	149
			SBR	28	3.1	A					225	0	8
			EBL	24	53.3	D	52.4	D			-	19	48
			EBT	0	51.0	D					-	0	0
			EBR	14									
			WBL	24	53.3	D	53.3	D			-	20	60
			WBT	1									
			WBR	24									
16	SB I-97 Ramps at Cromwell Park Dr	Signalized	SBT	69	45.2	D	44.6	D	16.0	B	-	24	47
			SBR	39	43.5	D					-	0	0
			EBL	207	42.8	D	18.5	B			420	70	107
			EBR	328	3.2	A					-	0	10
			WBT	564	10.5	B	10.2	B			-	100	150
			WBR	202	9.4	A					600	0	34
17	Aviation Blvd (MD 162) at Cromwell Park Dr	Signalized	NBT	1,597	20.5	C	19.8	B	26.1	C	-	339	466
			NBR	190	13.9	B					1000	0	37
			SBL	345	47.7	D	32.5	C			425	96	164
			SBT	188	4.8	A					-	21	37
			WBL	388	45.8	D	39.0	D			-	155	268
			WBR	216	26.8	C					600	125	251

BWI TIA MOE Table - 2027 AM No Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
18	Aviation Blvd (MD 162) at Dorsey Rd (MD 176) - East	Signalized	NBL	210	36.4	D	40.4	D	27.2	C	350	61	135
			NBT	290	42.3	D					-	133	269
			NBR	165									
			SBL	115	42.4	D	43.4	D			490	37	85
			SBT	86	41.8	D					-	27	68
			SBR	374	44.1	D					300	19	146
			EBL	147	16.0	B	18.9	B			350	50	131
			EBT	348	20.1	C					-	57	115
			EBR	8									
			WBL	21	23.8	C	19.7	B			425	7	28
			WBT	491	32.2	C					-	144	292
			WBR	1,351	15.1	B					-	0	#141
19	Dorsey Rd (MD 176) at Digiulian Blvd	Unsignalized	NBL	5	11.3	B	11.3	B	0.7	A	-	-	-
			NBT	0									
			NBR	8									
			SBL	14	14.8	B	14.8	B			-	-	-
			SBT	1									
			SBR	7									
			EBL	9	8.5	A	0.3	A			-	-	-
			EBT	287	0.0	A					-	-	-
			EBR	6	0.0	A					-	-	-
			WBL	7	7.9	A	0.1	A			-	-	-
			WBT	461	0.0	A					-	-	-
			WBR	29	0.0	A					-	-	-
20	Aviation Blvd (MD 162) at Hollins Ferry Rd	Signalized	NBT	1,632	2.7	A	2.5	A	2.4	A	-	76	119
			NBR	181	0.2	A					485	0	0
			SBL	54	26.3	C	2.5	A			575	21	53
			SBT	534	0.0	A					-	0	0
			WBR	69	0.1	A	0.1	A			-	0	0
21	Aviation Blvd (MD 170) at Long Term Parking Lots	Signalized	NBL	25	55.8	E	55.8	E	5.9	A	-	19	48
			NBT	0	0.0	A					-	0	0
			NBR	0							-		
			SBL	0	52.7	D	5.3	A			-	1	6
			SBT	1							-		
			SBR	8	0.0	A					-	0	0
			EBL	71	5.6	A	4.2	A			250	23	3
			EBT	357	3.7	A					-	74	130
			EBR	61	5.3	A					350	10	30
			WBL	1	5.2	A	5.6	A			235	0	m1
			WBT	1,390	5.6	A					-	122	292
			WBR	16	2.9	A					375	0	m0
22	Aviation Blvd (MD 162) at S Camp Meade Rd (MD 170)	Signalized	SBL	7	58.4	E	1.6	A	4.1	A	-	6	22
			SBR	345	0.4	A					600	0	0
			EBL	166	20.2	C	5.3	A			600	40	143
			EBT	483	0.2	A					-	0	9
			WBT	1,409	4.3	A	4.2	A			-	1	325
			WBR	14	0.0	A					-	0	m0

Notes

m Volume for 95th percentile queue is metered by upstream signal

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	374	362	165	101	541	487	1582	300	185	449	345
v/c Ratio	1.07	0.34	0.28	0.62	0.79	0.86	1.18	0.45	0.75	0.63	0.64
Control Delay	133.7	53.0	7.8	98.1	80.0	75.4	135.5	29.2	95.6	71.9	20.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	133.7	53.0	7.8	98.1	80.0	75.4	135.5	29.2	95.6	71.9	20.9
Queue Length 50th (ft)	~513	183	0	121	335	555	~1196	170	221	269	77
Queue Length 95th (ft)	#810	261	66	199	430	#831	#1482	292	324	342	203
Internal Link Dist (ft)		640			713		584			1313	
Turn Bay Length (ft)	175		225	200		455		250	250		175
Base Capacity (vph)	350	1060	589	350	798	593	1674	807	350	1187	712
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.07	0.34	0.28	0.29	0.68	0.82	0.95	0.37	0.53	0.38	0.48

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	344	333	152	93	498	0	448	1455	276	170	413	317
Future Volume (vph)	344	333	152	93	498	0	448	1455	276	170	413	317
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	374	362	165	101	541	0	487	1582	300	185	449	345
RTOR Reduction (vph)	0	0	116	0	0	0	0	0	69	0	0	218
Lane Group Flow (vph)	374	362	49	101	541	0	487	1582	231	185	449	127
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4						6			2
Actuated Green, G (s)	35.2	51.8	51.8	15.9	32.5		57.4	66.6	66.6	24.5	33.7	33.7
Effective Green, g (s)	36.2	54.8	54.8	16.9	35.5		58.4	69.6	69.6	25.5	36.7	36.7
Actuated g/C Ratio	0.20	0.30	0.30	0.09	0.19		0.32	0.38	0.38	0.14	0.20	0.20
Clearance Time (s)	5.0	7.0	7.0	5.0	7.0		5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	350	1060	474	163	687		565	1347	602	246	710	317
v/s Ratio Prot	c0.21	0.10		0.06	c0.15		c0.28	c0.45		0.10	0.13	
v/s Ratio Perm			0.03						0.15			0.08
v/c Ratio	1.07	0.34	0.10	0.62	0.79		0.86	1.17	0.38	0.75	0.63	0.40
Uniform Delay, d1	73.3	49.9	46.3	79.9	70.1		58.4	56.6	41.1	75.6	66.9	63.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	67.5	0.2	0.1	6.8	6.0		13.9	86.7	0.9	12.2	2.6	1.7
Delay (s)	140.8	50.1	46.4	86.7	76.0		72.3	143.3	41.9	87.8	69.4	65.2
Level of Service	F	D	D	F	E		E	F	D	F	E	E
Approach Delay (s)		87.1			77.7			115.8			71.4	
Approach LOS		F			E			F			E	

Intersection Summary			
HCM 2000 Control Delay	96.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	182.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	95.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	97	97	1972	71	54	878
v/c Ratio	0.43	0.34	0.81	0.06	0.28	0.32
Control Delay	52.7	11.8	17.3	1.9	14.4	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	11.8	17.3	1.9	14.4	4.2
Queue Length 50th (ft)	70	0	531	0	3	76
Queue Length 95th (ft)	120	48	768	16	23	137
Internal Link Dist (ft)	716		2236			2190
Turn Bay Length (ft)	450			450	375	
Base Capacity (vph)	456	479	2428	1107	337	2736
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.20	0.81	0.06	0.16	0.32

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	89	89	1814	65	50	808
Future Volume (vph)	89	89	1814	65	50	808
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1531	3421	1531	1711	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.05	1.00
Satd. Flow (perm)	1711	1531	3421	1531	84	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	97	1972	71	54	878
RTOR Reduction (vph)	0	84	0	21	0	0
Lane Group Flow (vph)	97	13	1972	50	54	878
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Actuated Green, G (s)	14.0	14.0	81.2	81.2	93.0	93.0
Effective Green, g (s)	16.0	16.0	84.2	84.2	94.0	96.0
Actuated g/C Ratio	0.13	0.13	0.70	0.70	0.78	0.80
Clearance Time (s)	6.0	6.0	7.0	7.0	5.0	7.0
Vehicle Extension (s)	5.0	5.0	6.0	6.0	5.0	6.0
Lane Grp Cap (vph)	228	204	2400	1074	171	2736
v/s Ratio Prot	c0.06		c0.58		0.02	c0.26
v/s Ratio Perm		0.01		0.03	0.23	
v/c Ratio	0.43	0.06	0.82	0.05	0.32	0.32
Uniform Delay, d1	47.8	45.5	12.6	5.5	16.7	3.2
Progression Factor	1.00	1.00	1.00	1.00	1.53	1.11
Incremental Delay, d2	2.7	0.3	3.3	0.1	2.2	0.3
Delay (s)	50.4	45.7	15.9	5.6	27.8	3.9
Level of Service	D	D	B	A	C	A
Approach Delay (s)	48.1		15.6			5.3
Approach LOS	D		B			A

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	66	379	1598	471	937	867
v/c Ratio	0.39	0.25	1.06	0.31	0.80	0.29
Control Delay	56.3	0.4	82.0	0.3	31.4	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.3	0.4	82.0	0.3	31.4	0.7
Queue Length 50th (ft)	49	0	~776	0	228	7
Queue Length 95th (ft)	92	0	#1054	m0	226	7
Internal Link Dist (ft)	319		2190			575
Turn Bay Length (ft)					575	
Base Capacity (vph)	285	1531	1505	1531	1309	2942
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.25	1.06	0.31	0.72	0.29

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	61	349	1470	433	862	798
Future Volume (vph)	61	349	1470	433	862	798
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1531	3421	1531	3319	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1711	1531	3421	1531	3319	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	66	379	1598	471	937	867
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	66	379	1598	471	937	867
Turn Type	Prot	Free	NA	Free	Prot	NA
Protected Phases	4		6		5 7	2 5 7
Permitted Phases		Free		Free		
Actuated Green, G (s)	8.8	120.0	48.6	120.0	39.1	99.7
Effective Green, g (s)	10.8	120.0	51.6	120.0	41.1	102.7
Actuated g/C Ratio	0.09	1.00	0.43	1.00	0.34	0.86
Clearance Time (s)	6.0		7.0			
Vehicle Extension (s)	3.0		5.0			
Lane Grp Cap (vph)	153	1531	1471	1531	1136	2927
v/s Ratio Prot	c0.04		c0.47		c0.28	0.25
v/s Ratio Perm		0.25		0.31		
v/c Ratio	0.43	0.25	1.09	0.31	0.82	0.30
Uniform Delay, d1	51.7	0.0	34.2	0.0	36.2	1.7
Progression Factor	1.00	1.00	1.44	1.00	1.12	0.23
Incremental Delay, d2	1.9	0.4	46.5	0.3	3.2	0.0
Delay (s)	53.6	0.4	95.9	0.3	43.7	0.4
Level of Service	D	A	F	A	D	A
Approach Delay (s)	8.3		74.1			22.9
Approach LOS	A		E			C

Intersection Summary			
HCM 2000 Control Delay	45.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	174	401	791	617	46	11
v/c Ratio	0.55	0.66	0.45	0.64	0.23	0.06
Control Delay	35.9	9.4	16.1	22.0	37.9	20.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.9	9.4	16.1	22.0	37.9	20.9
Queue Length 50th (ft)	66	0	97	172	18	0
Queue Length 95th (ft)	177	86	322	#693	67	17
Internal Link Dist (ft)	968			398	150	
Turn Bay Length (ft)		550				85
Base Capacity (vph)	780	916	1765	957	684	588
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.44	0.45	0.64	0.07	0.02

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	160	369	728	568	42	10
Future Volume (vph)	160	369	728	568	42	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	5.0	5.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1711	1531	3319	1801	1801	1531
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1711	1531	3319	1801	1801	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	401	791	617	46	11
RTOR Reduction (vph)	0	332	0	0	0	10
Lane Group Flow (vph)	174	69	791	617	46	1
Turn Type	Prot	Prot	Split	NA	NA	Prot
Protected Phases	3	3	2	2	1	1
Permitted Phases						
Actuated Green, G (s)	13.1	13.1	37.5	37.5	4.6	4.6
Effective Green, g (s)	13.1	13.1	37.5	37.5	4.6	4.6
Actuated g/C Ratio	0.17	0.17	0.49	0.49	0.06	0.06
Clearance Time (s)	4.0	4.0	5.0	5.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	5.0	5.0	3.0	3.0
Lane Grp Cap (vph)	294	263	1635	887	108	92
v/s Ratio Prot	c0.10	0.05	0.24	c0.34	c0.03	0.00
v/s Ratio Perm						
v/c Ratio	0.59	0.26	0.48	0.70	0.43	0.01
Uniform Delay, d1	29.0	27.3	12.9	14.9	34.5	33.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.2	0.5	1.0	4.5	2.7	0.0
Delay (s)	32.2	27.8	13.9	19.4	37.2	33.6
Level of Service	C	C	B	B	D	C
Approach Delay (s)	29.2			16.3	36.5	
Approach LOS	C			B	D	

Intersection Summary			
HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	76.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	92	22	457	186	160	125	455	27	31
v/c Ratio	0.14	0.04	0.80	0.14	0.14	0.61	0.78	0.26	0.10
Control Delay	31.8	0.1	51.8	6.7	1.4	67.6	15.0	67.6	40.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.8	0.1	51.8	6.7	1.4	67.6	15.0	67.6	40.0
Queue Length 50th (ft)	55	0	354	46	0	105	0	23	20
Queue Length 95th (ft)	109	0	#588	94	25	175	113	58	48
Internal Link Dist (ft)	269			383		290			249
Turn Bay Length (ft)		125	300		150				
Base Capacity (vph)	655	607	622	1382	1212	487	759	276	865
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.04	0.73	0.13	0.13	0.26	0.60	0.10	0.04

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	85	20	420	171	147	16	99	419	25	27	2
Future Volume (vph)	0	85	20	420	171	147	16	99	419	25	27	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.99	
Flt Protected		1.00	1.00	0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)		1801	1531	1711	1801	1531		1788	1531	1711	1783	
Flt Permitted		1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (perm)		1801	1531	1711	1801	1531		1722	1531	1711	1783	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	92	22	457	186	160	17	108	455	27	29	2
RTOR Reduction (vph)	0	0	14	0	0	44	0	0	402	0	2	0
Lane Group Flow (vph)	0	92	8	457	186	116	0	125	53	27	29	0
Turn Type	Perm	NA	Perm	Prot	NA	Prot	Perm	NA	Prot	Prot	NA	
Protected Phases		6		5	2	2		8	8	7	4	
Permitted Phases	6		6				8					
Actuated Green, G (s)		45.8	45.8	41.8	92.6	92.6		14.9	14.9	4.8	24.7	
Effective Green, g (s)		45.8	45.8	41.8	92.6	92.6		14.9	14.9	4.8	24.7	
Actuated g/C Ratio		0.36	0.36	0.33	0.72	0.72		0.12	0.12	0.04	0.19	
Clearance Time (s)		5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		5.0	5.0	3.0	5.0	5.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		645	548	559	1304	1109		200	178	64	344	
v/s Ratio Prot		0.05		c0.27	c0.10	0.08			0.03	c0.02	0.02	
v/s Ratio Perm			0.01					c0.07				
v/c Ratio		0.14	0.01	0.82	0.14	0.10		0.62	0.30	0.42	0.09	
Uniform Delay, d1		27.7	26.4	39.5	5.4	5.2		53.8	51.7	60.1	42.3	
Progression Factor		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.5	0.0	9.0	0.2	0.2		6.0	0.9	4.4	0.1	
Delay (s)		28.2	26.5	48.5	5.6	5.4		59.8	52.6	64.6	42.4	
Level of Service		C	C	D	A	A		E	D	E	D	
Approach Delay (s)		27.9			30.0			54.1			52.7	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	127.8	Sum of lost time (s)	20.5
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Group Flow (vph)	218	287	241	1735	1517	584
v/c Ratio	0.71	0.60	0.82	0.67	0.81	0.55
Control Delay	58.4	11.2	81.8	6.0	17.6	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0
Total Delay	58.4	11.2	81.8	6.0	17.8	2.3
Queue Length 50th (ft)	159	7	185	48	495	24
Queue Length 95th (ft)	237	86	m205	m162	392	m52
Internal Link Dist (ft)	755			2381	681	
Turn Bay Length (ft)		185	225			
Base Capacity (vph)	370	527	301	2573	1874	1064
Starvation Cap Reductn	0	0	0	0	40	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.54	0.80	0.67	0.83	0.55

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	201	264	222	1596	1396	537
Future Volume (vph)	201	264	222	1596	1396	537
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1711	1531	1711	3421	3421	1531
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1711	1531	1711	3421	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	218	287	241	1735	1517	584
RTOR Reduction (vph)	0	231	0	0	0	226
Lane Group Flow (vph)	218	56	241	1735	1517	358
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		1	6	2	
Permitted Phases	4	4				2
Actuated Green, G (s)	19.7	19.7	19.5	88.8	64.3	64.3
Effective Green, g (s)	21.7	19.7	20.5	90.3	65.8	65.8
Actuated g/C Ratio	0.18	0.16	0.17	0.75	0.55	0.55
Clearance Time (s)	6.0	6.0	5.0	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	6.0
Lane Grp Cap (vph)	309	251	292	2574	1875	839
v/s Ratio Prot	c0.13		c0.14	0.51	c0.44	
v/s Ratio Perm		0.04				0.23
v/c Ratio	0.71	0.22	0.83	0.67	0.81	0.43
Uniform Delay, d1	46.1	43.5	48.0	7.5	22.0	16.0
Progression Factor	1.00	1.00	1.51	0.66	0.66	0.42
Incremental Delay, d2	7.1	0.5	7.6	0.6	2.0	0.8
Delay (s)	53.3	44.0	80.2	5.5	16.5	7.5
Level of Service	D	D	F	A	B	A
Approach Delay (s)	48.0			14.6	14.0	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	125	1827	2096	535	41	8
v/c Ratio	0.59	0.60	0.84	0.44	0.19	0.01
Control Delay	60.9	1.4	16.9	3.6	54.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.9	1.4	17.0	3.6	54.5	0.0
Queue Length 50th (ft)	99	8	582	56	15	0
Queue Length 95th (ft)	m150	114	m614	m64	34	0
Internal Link Dist (ft)		681	1012		359	
Turn Bay Length (ft)	225					
Base Capacity (vph)	286	3049	2484	1213	553	1531
Starvation Cap Reductn	0	87	0	0	0	0
Spillback Cap Reductn	0	0	14	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.62	0.85	0.44	0.07	0.01

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	115	1681	1928	492	38	7
Future Volume (vph)	115	1681	1928	492	38	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	3319	1531
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1711	3421	3421	1531	3319	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	1827	2096	535	41	8
RTOR Reduction (vph)	0	0	0	104	0	0
Lane Group Flow (vph)	125	1827	2096	431	41	8
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	1	6	2		4	
Permitted Phases				2		Free
Actuated Green, G (s)	14.0	103.7	84.7	84.7	5.8	120.0
Effective Green, g (s)	15.0	105.2	86.2	86.2	6.8	120.0
Actuated g/C Ratio	0.12	0.88	0.72	0.72	0.06	1.00
Clearance Time (s)	5.0	5.5	5.5	5.5	5.0	
Vehicle Extension (s)	3.0	0.2	0.2	0.2	3.0	
Lane Grp Cap (vph)	213	2999	2457	1099	188	1531
v/s Ratio Prot	0.07	c0.53	c0.61		c0.01	
v/s Ratio Perm				0.28		0.01
v/c Ratio	0.59	0.61	0.85	0.39	0.22	0.01
Uniform Delay, d1	49.6	2.0	12.3	6.6	54.1	0.0
Progression Factor	1.07	0.33	1.07	1.25	1.00	1.00
Incremental Delay, d2	3.0	0.7	2.0	0.5	0.6	0.0
Delay (s)	56.3	1.3	15.2	8.8	54.6	0.0
Level of Service	E	A	B	A	D	A
Approach Delay (s)		4.9	13.9		45.7	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	SBR	NWL	NWR2
Lane Group Flow (vph)	1663	207	83	834	1776	21	11
v/c Ratio	0.62	0.14	0.32	0.28	1.14	0.18	0.01
Control Delay	6.9	0.1	7.1	2.1	78.2	55.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.9	0.1	7.1	2.1	78.2	55.9	0.0
Queue Length 50th (ft)	153	0	6	34	~351	16	0
Queue Length 95th (ft)	371	0	37	95	#616	42	0
Internal Link Dist (ft)	1012			765		262	
Turn Bay Length (ft)		50	350				
Base Capacity (vph)	2699	1531	497	2963	1558	285	1531
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.14	0.17	0.28	1.14	0.07	0.01

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2
Lane Configurations		↑↑	↱	↰	↑↑			↱	↰		↱
Traffic Volume (vph)	0	1530	190	76	767	0	0	1634	19	0	10
Future Volume (vph)	0	1530	190	76	767	0	0	1634	19	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0			4.0	4.0		4.0
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00		1.00
Frt		1.00	0.85	1.00	1.00			0.86	1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00			1.00	0.95		1.00
Satd. Flow (prot)		3421	1531	1711	3421			1558	1711		1531
Flt Permitted		1.00	1.00	0.11	1.00			1.00	0.95		1.00
Satd. Flow (perm)		3421	1531	197	3421			1558	1711		1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1663	207	83	834	0	0	1776	21	0	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1663	207	83	834	0	0	1776	21	0	11
Turn Type		NA	Free	pm+pt	NA			Free	Prot		Free
Protected Phases		6		5	2				4		
Permitted Phases			Free	2				Free			Free
Actuated Green, G (s)		92.3	120.0	102.4	102.4			120.0	7.1		120.0
Effective Green, g (s)		93.8	120.0	102.9	103.9			120.0	8.1		120.0
Actuated g/C Ratio		0.78	1.00	0.86	0.87			1.00	0.07		1.00
Clearance Time (s)		5.5		4.5	5.5				5.0		
Vehicle Extension (s)		5.0		3.0	5.0				3.0		
Lane Grp Cap (vph)		2674	1531	245	2962			1558	115		1531
v/s Ratio Prot		0.49		0.02	0.24				0.01		
v/s Ratio Perm			0.14	0.27				c1.14			0.01
v/c Ratio		0.62	0.14	0.34	0.28			1.14	0.18		0.01
Uniform Delay, d1		5.6	0.0	5.0	1.4			60.0	52.8		0.0
Progression Factor		1.00	1.00	3.20	1.25			1.00	1.00		1.00
Incremental Delay, d2		0.9	0.1	0.8	0.2			71.3	0.8		0.0
Delay (s)		6.4	0.1	16.8	2.0			131.3	53.6		0.0
Level of Service		A	A	B	A			F	D		A
Approach Delay (s)		5.7			3.4		131.3		35.2		
Approach LOS		A			A		F		D		

Intersection Summary			
HCM 2000 Control Delay	54.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.27		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	NWL
Lane Group Flow (vph)	1525	716	776	140
v/c Ratio	0.57	0.53	0.29	0.55
Control Delay	4.7	1.9	2.9	54.7
Queue Delay	0.1	0.1	0.0	0.0
Total Delay	4.8	2.1	2.9	54.7
Queue Length 50th (ft)	124	25	58	102
Queue Length 95th (ft)	135	30	76	160
Internal Link Dist (ft)	765		418	135
Turn Bay Length (ft)				
Base Capacity (vph)	2681	1344	2681	456
Starvation Cap Reductn	163	105	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.61	0.58	0.29	0.31

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	1403	659	0	714	129	0
Future Volume (vph)	1403	659	0	714	129	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5		4.0	4.0	
Lane Util. Factor	0.95	1.00		0.95	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	1.00	1.00		1.00	0.95	
Satd. Flow (prot)	3421	1531		3421	1711	
Flt Permitted	1.00	1.00		1.00	0.95	
Satd. Flow (perm)	3421	1531		3421	1711	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1525	716	0	776	140	0
RTOR Reduction (vph)	0	164	0	0	0	0
Lane Group Flow (vph)	1525	552	0	776	140	0
Turn Type	NA	Perm		NA	Prot	
Protected Phases	6			2	4	
Permitted Phases		6				
Actuated Green, G (s)	92.5	92.5		92.5	17.0	
Effective Green, g (s)	94.0	92.5		94.0	18.0	
Actuated g/C Ratio	0.78	0.77		0.78	0.15	
Clearance Time (s)	5.5	5.5		5.5	5.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	2679	1180		2679	256	
v/s Ratio Prot	c0.45			0.23	c0.08	
v/s Ratio Perm		0.36				
v/c Ratio	0.57	0.47		0.29	0.55	
Uniform Delay, d1	5.1	4.9		3.6	47.2	
Progression Factor	0.69	1.44		0.66	1.00	
Incremental Delay, d2	0.8	1.2		0.2	4.2	
Delay (s)	4.3	8.3		2.7	51.4	
Level of Service	A	A		A	D	
Approach Delay (s)	5.6			2.7	51.4	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	122	563	33	661	880	46
v/c Ratio	0.15	0.37	0.09	0.62	0.90	0.05
Control Delay	33.7	0.7	24.2	33.3	35.1	5.8
Queue Delay	0.0	0.0	0.0	0.0	1.1	0.0
Total Delay	33.7	0.7	24.2	33.3	36.2	5.8
Queue Length 50th (ft)	36	0	15	197	549	4
Queue Length 95th (ft)	63	0	37	256	#870	22
Internal Link Dist (ft)	475			893	211	
Turn Bay Length (ft)			150			
Base Capacity (vph)	816	1531	459	1633	980	891
Starvation Cap Reductn	0	0	0	0	22	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.37	0.07	0.40	0.92	0.05

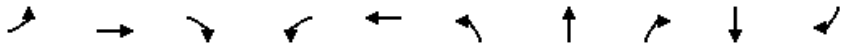
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	112	518	30	608	810	42
Future Volume (vph)	112	518	30	608	810	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	4.0	5.0	6.0	6.0	6.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3421	1531	1711	3421	1711	1531
Flt Permitted	1.00	1.00	0.56	1.00	0.95	1.00
Satd. Flow (perm)	3421	1531	1013	3421	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	122	563	33	661	880	46
RTOR Reduction (vph)	0	0	0	0	0	14
Lane Group Flow (vph)	122	563	33	661	880	32
Turn Type	NA	Free	pm+pt	NA	Prot	Prot
Protected Phases	6		5	2	4	4
Permitted Phases		Free	2			
Actuated Green, G (s)	25.1	107.2	35.0	35.0	60.2	60.2
Effective Green, g (s)	25.1	107.2	35.0	35.0	60.2	60.2
Actuated g/C Ratio	0.23	1.00	0.33	0.33	0.56	0.56
Clearance Time (s)	6.0		5.0	6.0	6.0	6.0
Vehicle Extension (s)	3.5		3.5	3.5	5.0	5.0
Lane Grp Cap (vph)	800	1531	362	1116	960	859
v/s Ratio Prot	0.04		0.00	c0.19	c0.51	0.02
v/s Ratio Perm		0.37	0.03			
v/c Ratio	0.15	0.37	0.09	0.59	0.92	0.04
Uniform Delay, d1	32.6	0.0	24.9	30.1	21.2	10.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.7	0.1	2.3	13.7	0.0
Delay (s)	33.0	0.7	25.0	32.5	35.0	10.6
Level of Service	C	A	C	C	C	B
Approach Delay (s)	6.4			32.1	33.8	
Approach LOS	A			C	C	

Intersection Summary			
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	107.2	Sum of lost time (s)	17.0
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	797	507	238	385	872	97	153	255	101	493
v/c Ratio	0.90	0.30	0.16	0.63	0.61	0.32	0.40	0.17	0.32	0.32
Control Delay	64.5	17.6	0.2	58.8	18.5	53.5	42.9	0.2	53.4	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.5	17.6	0.2	58.8	18.5	53.5	42.9	0.2	53.4	0.6
Queue Length 50th (ft)	306	75	0	108	312	37	102	0	39	0
Queue Length 95th (ft)	#487	135	0	185	288	63	159	0	66	0
Internal Link Dist (ft)		871			1398		1013		384	
Turn Bay Length (ft)	445		445	615		300		400		
Base Capacity (vph)	890	1711	1531	613	1425	553	660	1531	570	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.30	0.16	0.63	0.61	0.18	0.23	0.17	0.18	0.32

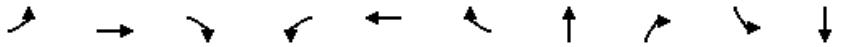
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	733	466	219	354	802	0	89	141	235	0	93	454
Future Volume (vph)	733	466	219	354	802	0	89	141	235	0	93	454
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		0.97	1.00	1.00		0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (perm)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	797	507	238	385	872	0	97	153	255	0	101	493
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	797	507	238	385	872	0	97	153	255	0	101	493
Turn Type	Prot	NA	Free	Prot	NA		Prot	NA	Free		NA	Free
Protected Phases	1	6		5	2		7	4			8	
Permitted Phases			Free						Free			Free
Actuated Green, G (s)	31.2	58.0	120.0	21.2	48.0		8.9	23.8	120.0		8.9	120.0
Effective Green, g (s)	32.2	60.0	120.0	22.2	50.0		10.9	25.8	120.0		10.9	120.0
Actuated g/C Ratio	0.27	0.50	1.00	0.18	0.42		0.09	0.22	1.00		0.09	1.00
Clearance Time (s)	5.0	6.0		5.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	890	1710	1531	614	1425		301	387	1531		310	1531
v/s Ratio Prot	c0.24	0.15		0.12	c0.25		0.03	c0.08			0.03	
v/s Ratio Perm			0.16						0.17			0.32
v/c Ratio	0.90	0.30	0.16	0.63	0.61		0.32	0.40	0.17		0.33	0.32
Uniform Delay, d1	42.3	17.6	0.0	45.1	27.4		51.1	40.4	0.0		51.1	0.0
Progression Factor	1.25	0.93	1.00	1.21	0.61		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	9.8	0.4	0.2	1.7	1.6		0.6	0.7	0.2		0.6	0.6
Delay (s)	62.7	16.7	0.2	56.4	18.3		51.7	41.1	0.2		51.7	0.6
Level of Service	E	B	A	E	B		D	D	A		D	A
Approach Delay (s)		37.9			30.0			22.5			9.3	
Approach LOS		D			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	29.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	121	555	87	71	1136	699	97	41	86	82
v/c Ratio	0.39	0.28	0.06	0.13	0.61	0.46	0.48	0.14	0.47	0.40
Control Delay	23.4	25.2	0.1	3.4	11.9	0.9	56.9	1.0	57.2	35.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.4	25.2	0.1	3.4	11.9	0.9	56.9	1.0	57.2	35.7
Queue Length 50th (ft)	59	138	0	8	200	0	71	0	66	36
Queue Length 95th (ft)	135	268	0	m9	336	0	122	0	117	87
Internal Link Dist (ft)		1398			1719		314			276
Turn Bay Length (ft)	275			375		475				
Base Capacity (vph)	355	1998	1531	615	1875	1531	288	361	270	288
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.28	0.06	0.12	0.61	0.46	0.34	0.11	0.32	0.28

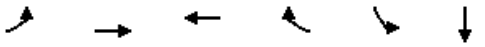
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	511	80	65	1045	643	74	16	38	100	18	36
Future Volume (vph)	111	511	80	65	1045	643	74	16	38	100	18	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	0.95	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.99	
Satd. Flow (prot)	1711	3421	1531	1711	3421	1531		1729	1531	1625	1567	
Flt Permitted	0.15	1.00	1.00	0.43	1.00	1.00		0.96	1.00	0.95	0.99	
Satd. Flow (perm)	277	3421	1531	768	3421	1531		1729	1531	1625	1567	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	121	555	87	71	1136	699	80	17	41	109	20	39
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	36	0	29	0
Lane Group Flow (vph)	121	555	87	71	1136	699	0	97	5	86	53	0
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Split	NA	Perm	Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6		Free	2		Free			3			
Actuated Green, G (s)	76.6	67.1	120.0	70.0	63.8	120.0		12.0	12.0	11.7	11.7	
Effective Green, g (s)	78.6	69.1	120.0	72.0	65.8	120.0		14.0	14.0	13.7	13.7	
Actuated g/C Ratio	0.65	0.58	1.00	0.60	0.55	1.00		0.12	0.12	0.11	0.11	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	306	1969	1531	517	1875	1531		201	178	185	178	
v/s Ratio Prot	0.03	0.16		0.01	c0.33			0.06		0.05	0.03	
v/s Ratio Perm	0.22		0.06	0.07		c0.46			0.00			
v/c Ratio	0.40	0.28	0.06	0.14	0.61	0.46		0.48	0.03	0.46	0.30	
Uniform Delay, d1	11.6	12.9	0.0	10.0	18.3	0.0		49.6	47.0	49.7	48.7	
Progression Factor	2.34	1.73	1.00	0.35	0.52	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.4	0.1	0.1	1.3	0.9		1.8	0.1	1.8	0.9	
Delay (s)	28.0	22.7	0.1	3.6	10.8	0.9		51.4	47.0	51.6	49.7	
Level of Service	C	C	A	A	B	A		D	D	D	D	
Approach Delay (s)		20.9			6.9			50.1			50.6	
Approach LOS		C			A			D			D	

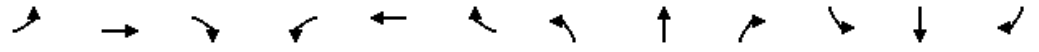
Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBT
Lane Group Flow (vph)	11	377	1463	298	184	178
v/c Ratio	0.06	0.15	0.57	0.25	0.61	0.51
Control Delay	6.8	6.7	13.1	5.1	53.0	29.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.8	6.7	13.1	5.1	53.0	29.6
Queue Length 50th (ft)	4	82	289	36	140	75
Queue Length 95th (ft)	23	160	622	149	204	141
Internal Link Dist (ft)		1633	378			130
Turn Bay Length (ft)	415			200	175	
Base Capacity (vph)	192	2560	2560	1193	595	620
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.15	0.57	0.25	0.31	0.29

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	347	0	0	1346	274	0	0	0	272	0	61
Future Volume (vph)	10	347	0	0	1346	274	0	0	0	272	0	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95	1.00				0.95	0.95	
Frt	1.00	1.00			1.00	0.85				1.00	0.94	
Flt Protected	0.95	1.00			1.00	1.00				0.95	0.97	
Satd. Flow (prot)	1711	3421			3421	1531				1625	1566	
Flt Permitted	0.14	1.00			1.00	1.00				0.95	0.97	
Satd. Flow (perm)	257	3421			3421	1531				1625	1566	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	377	0	0	1463	298	0	0	0	296	0	66
RTOR Reduction (vph)	0	0	0	0	0	48	0	0	0	0	59	0
Lane Group Flow (vph)	11	377	0	0	1463	250	0	0	0	184	119	0
Turn Type	Perm	NA		Perm	NA	Perm				Split	NA	
Protected Phases		6			2		3	3		4	4	
Permitted Phases	6	6		2	2	2						
Actuated Green, G (s)	87.8	87.8			87.8	87.8				21.2	21.2	
Effective Green, g (s)	89.8	89.8			89.8	89.8				22.2	22.2	
Actuated g/C Ratio	0.75	0.75			0.75	0.75				0.18	0.18	
Clearance Time (s)	6.0	6.0			6.0	6.0				5.0	5.0	
Vehicle Extension (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Lane Grp Cap (vph)	192	2560			2560	1145				300	289	
v/s Ratio Prot		0.11			c0.43					c0.11	0.08	
v/s Ratio Perm	0.04					0.16						
v/c Ratio	0.06	0.15			0.57	0.22				0.61	0.41	
Uniform Delay, d1	4.0	4.3			6.6	4.5				45.0	43.1	
Progression Factor	1.08	1.36			1.64	2.24				1.00	1.00	
Incremental Delay, d2	0.6	0.1			0.8	0.4				5.3	2.0	
Delay (s)	4.9	5.9			11.7	10.6				50.2	45.1	
Level of Service	A	A			B	B				D	D	
Approach Delay (s)		5.9			11.5			0.0			47.7	
Approach LOS		A			B			A			D	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	0	12	25	1	41	26	1568	7	12	594	21
Future Volume (Veh/h)	17	0	12	25	1	41	26	1568	7	12	594	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	0	13	27	1	45	28	1704	8	13	646	23
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1637	2452	334	2126	2459	856	669			1712		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1637	2452	334	2126	2459	856	669			1712		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	66	100	98	0	96	85	97			96		
cM capacity (veh/h)	52	29	661	26	28	301	917			367		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	31	73	28	1136	576	13	431	238
Volume Left	18	27	28	0	0	13	0	0
Volume Right	13	45	0	0	8	0	0	23
cSH	85	60	917	1700	1700	367	1700	1700
Volume to Capacity	0.36	1.21	0.03	0.67	0.34	0.04	0.25	0.14
Queue Length 95th (ft)	35	152	2	0	0	3	0	0
Control Delay (s)	69.6	297.8	9.0	0.0	0.0	15.2	0.0	0.0
Lane LOS	F	F	A			C		
Approach Delay (s)	69.6	297.8	0.1			0.3		
Approach LOS	F	F						

Intersection Summary				
Average Delay	9.6			
Intersection Capacity Utilization	54.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	26	15	53	64	1688	13	8	689	30
v/c Ratio	0.21	0.03	0.35	0.10	0.58	0.01	0.03	0.25	0.02
Control Delay	54.2	0.1	36.4	2.1	4.9	0.0	1.4	4.6	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.2	0.1	36.4	2.1	4.9	0.0	1.4	4.6	1.1
Queue Length 50th (ft)	19	0	20	6	146	0	1	108	0
Queue Length 95th (ft)	48	0	60	14	386	0	m1	149	8
Internal Link Dist (ft)		254	405		1830			1619	
Turn Bay Length (ft)				300		100	225		225
Base Capacity (vph)	287	651	325	741	2922	1318	434	2732	1237
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.02	0.16	0.09	0.58	0.01	0.02	0.25	0.02

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

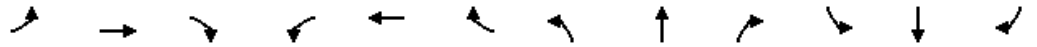
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	0	14	24	1	24	59	1553	12	7	634	28
Future Volume (vph)	24	0	14	24	1	24	59	1553	12	7	634	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.85			0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1711	1531			1641		1711	3421	1531	1711	3421	1531
Flt Permitted	0.74	1.00			0.84		0.36	1.00	1.00	0.12	1.00	1.00
Satd. Flow (perm)	1329	1531			1407		654	3421	1531	215	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	0	15	26	1	26	64	1688	13	8	689	30
RTOR Reduction (vph)	0	14	0	0	24	0	0	0	3	0	0	7
Lane Group Flow (vph)	26	1	0	0	29	0	64	1688	10	8	689	23
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			6		6	2		2
Actuated Green, G (s)	7.4	7.4			7.4		98.7	94.0	94.0	91.5	90.4	90.4
Effective Green, g (s)	9.4	9.4			9.4		100.7	96.5	96.5	93.5	92.9	92.9
Actuated g/C Ratio	0.08	0.08			0.08		0.84	0.80	0.80	0.78	0.77	0.77
Clearance Time (s)	6.0	6.0			6.0		5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0			3.0		2.5	5.0	5.0	2.5	5.0	5.0
Lane Grp Cap (vph)	104	119			110		599	2751	1231	193	2648	1185
v/s Ratio Prot		0.00					c0.01	c0.49		0.00	0.20	
v/s Ratio Perm	0.02				c0.02		0.08		0.01	0.03		0.02
v/c Ratio	0.25	0.01			0.26		0.11	0.61	0.01	0.04	0.26	0.02
Uniform Delay, d1	52.0	51.0			52.0		1.8	4.5	2.3	3.9	3.8	3.1
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	0.60	1.03	1.00
Incremental Delay, d2	1.3	0.0			1.3		0.1	1.0	0.0	0.1	0.2	0.0
Delay (s)	53.3	51.0			53.3		1.9	5.6	2.3	2.4	4.2	3.1
Level of Service	D	D			D		A	A	A	A	A	A
Approach Delay (s)		52.4			53.3			5.4			4.1	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	WBT	WBR	SBT	SBR
Lane Group Flow (vph)	225	357	613	220	75	42
v/c Ratio	0.56	0.16	0.30	0.22	0.28	0.20
Control Delay	46.1	0.6	11.4	2.2	46.1	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.1	0.6	11.4	2.2	46.1	2.1
Queue Length 50th (ft)	70	0	100	0	24	0
Queue Length 95th (ft)	107	10	150	34	47	0
Internal Link Dist (ft)			782		297	
Turn Bay Length (ft)	420			600		
Base Capacity (vph)	1033	2321	2033	999	1065	547
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.15	0.30	0.22	0.07	0.08

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	207	0	328	0	564	202	0	0	0	0	69	39
Future Volume (vph)	207	0	328	0	564	202	0	0	0	0	69	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		9.0		9.0	9.0					8.0	8.0
Lane Util. Factor	0.97		0.88		0.95	1.00					0.95	1.00
Frt	1.00		0.85		1.00	0.85					1.00	0.85
Flt Protected	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (prot)	3319		2694		3421	1531					3421	1531
Flt Permitted	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (perm)	3319		2694		3421	1531					3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	225	0	357	0	613	220	0	0	0	0	75	42
RTOR Reduction (vph)	0	0	84	0	0	91	0	0	0	0	0	39
Lane Group Flow (vph)	225	0	273	0	613	129	0	0	0	0	75	3
Turn Type	Prot		Prot		NA	Perm					NA	Perm
Protected Phases	1		6		2						4	
Permitted Phases						2						4
Actuated Green, G (s)	11.8		75.4		57.6	57.6					6.2	6.2
Effective Green, g (s)	11.8		75.4		57.6	57.6					6.2	6.2
Actuated g/C Ratio	0.12		0.76		0.58	0.58					0.06	0.06
Clearance Time (s)	6.0		9.0		9.0	9.0					8.0	8.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0					3.0	3.0
Lane Grp Cap (vph)	397		2060		1998	894					215	96
v/s Ratio Prot	c0.07		0.10		c0.18						c0.02	
v/s Ratio Perm						0.08						0.00
v/c Ratio	0.57		0.13		0.31	0.14					0.35	0.03
Uniform Delay, d1	41.0		3.0		10.4	9.3					44.3	43.4
Progression Factor	1.00		1.00		1.00	1.00					1.00	1.00
Incremental Delay, d2	1.9		0.1		0.1	0.1					1.0	0.1
Delay (s)	42.8		3.2		10.5	9.4					45.2	43.5
Level of Service	D		A		B	A					D	D
Approach Delay (s)		18.5			10.2			0.0			44.6	
Approach LOS		B			B			A			D	

Intersection Summary			
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	23.0
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	422	235	1736	207	375	204
v/c Ratio	0.62	0.39	0.66	0.23	0.50	0.08
Control Delay	51.1	30.0	21.6	2.5	52.5	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.1	30.0	21.6	2.5	52.5	5.0
Queue Length 50th (ft)	155	125	339	0	96	21
Queue Length 95th (ft)	268	251	466	37	164	37
Internal Link Dist (ft)	751		1519			448
Turn Bay Length (ft)		600		1000	425	
Base Capacity (vph)	875	1097	3940	1268	2297	3417
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.21	0.44	0.16	0.16	0.06

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	388	216	1597	190	345	188
Future Volume (vph)	388	216	1597	190	345	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.91	1.00	0.94	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3319	1531	4916	1531	4824	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3319	1531	4916	1531	4824	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	422	235	1736	207	375	204
RTOR Reduction (vph)	0	5	0	95	0	0
Lane Group Flow (vph)	422	230	1736	112	375	204
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	4	4 5	6		5	2
Permitted Phases				6		
Actuated Green, G (s)	22.9	45.7	62.9	62.9	16.8	85.7
Effective Green, g (s)	24.9	47.7	65.9	65.9	18.8	88.7
Actuated g/C Ratio	0.20	0.39	0.54	0.54	0.15	0.73
Clearance Time (s)	6.0		7.0	7.0	6.0	7.0
Vehicle Extension (s)	3.0		5.0	5.0	3.0	5.0
Lane Grp Cap (vph)	679	600	2664	829	745	2495
v/s Ratio Prot	c0.13	0.15	c0.35		c0.08	0.06
v/s Ratio Perm				0.07		
v/c Ratio	0.62	0.38	0.65	0.14	0.50	0.08
Uniform Delay, d1	44.1	26.4	19.7	13.8	47.1	4.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.4	0.8	0.2	0.5	0.0
Delay (s)	45.8	26.8	20.5	13.9	47.7	4.8
Level of Service	D	C	C	B	D	A
Approach Delay (s)	39.0		19.8			32.5
Approach LOS	D		B			C

Intersection Summary			
HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	121.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	160	387	23	534	1468	228	494	125	93	407
v/c Ratio	0.36	0.19	0.06	0.56	0.96	0.33	0.70	0.29	0.21	0.78
Control Delay	18.3	21.7	17.5	36.5	17.0	38.9	41.6	46.5	46.0	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	21.7	17.5	36.5	17.0	38.9	41.6	46.5	46.0	18.6
Queue Length 50th (ft)	50	57	7	144	0	61	133	37	27	19
Queue Length 95th (ft)	131	115	28	292	#141	135	269	85	68	146
Internal Link Dist (ft)		1548		585			1389		1519	
Turn Bay Length (ft)	350		425			350		490		300
Base Capacity (vph)	618	2958	693	2064	1531	1318	1315	1518	1565	903
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.13	0.03	0.26	0.96	0.17	0.38	0.08	0.06	0.45

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	348	8	21	491	1351	210	290	165	115	86	374
Future Volume (vph)	147	348	8	21	491	1351	210	290	165	115	86	374
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	7.0		5.5	7.0	4.0	5.5	5.5		5.5	5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	0.95		0.97	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	4899		1711	3421	1531	3319	3235		3319	3421	1531
Flt Permitted	0.31	1.00		0.51	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	549	4899		926	3421	1531	3319	3235		3319	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	160	378	9	23	534	1468	228	315	179	125	93	407
RTOR Reduction (vph)	0	1	0	0	0	0	0	40	0	0	0	326
Lane Group Flow (vph)	160	386	0	23	534	1468	228	454	0	125	93	81
Turn Type	pm+pt	NA		pm+pt	NA	Free	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases	2			6		Free						4
Actuated Green, G (s)	53.0	43.7		35.7	31.9	106.1	21.6	21.6		13.5	13.5	13.5
Effective Green, g (s)	53.0	43.7		35.7	31.9	106.1	21.6	21.6		13.5	13.5	13.5
Actuated g/C Ratio	0.50	0.41		0.34	0.30	1.00	0.20	0.20		0.13	0.13	0.13
Clearance Time (s)	5.5	7.0		5.5	7.0		5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	3.0	7.0		3.0	7.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	445	2017		339	1028	1531	675	658		422	435	194
v/s Ratio Prot	0.05	0.08		0.00	0.16		0.07	0.14		0.04	0.03	
v/s Ratio Perm	0.13			0.02		c0.96						0.05
v/c Ratio	0.36	0.19		0.07	0.52	0.96	0.34	0.69		0.30	0.21	0.42
Uniform Delay, d1	15.5	19.9		23.7	30.7	0.0	36.1	39.2		42.0	41.5	42.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.2		0.1	1.5	15.1	0.3	3.1		0.4	0.2	1.4
Delay (s)	16.0	20.1		23.8	32.2	15.1	36.4	42.3		42.4	41.8	44.1
Level of Service	B	C		C	C	B	D	D		D	D	D
Approach Delay (s)		18.9			19.7			40.4			43.4	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	106.1	Sum of lost time (s)	23.5
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	287	6	7	461	29	5	0	8	14	1	7
Future Volume (Veh/h)	9	287	6	7	461	29	5	0	8	14	1	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	312	7	8	501	32	5	0	9	15	1	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		650			625							
pX, platoon unblocked												
vC, conflicting volume	533			319			607	881	156	702	856	250
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	533			319			607	881	156	702	856	250
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			99	100	99	95	100	99
cM capacity (veh/h)	1031			1238			371	279	862	318	289	749

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	10	156	156	7	8	250	250	32	14	24
Volume Left	10	0	0	0	8	0	0	0	5	15
Volume Right	0	0	0	7	0	0	0	32	9	8
cSH	1031	1700	1700	1700	1238	1700	1700	1700	585	391
Volume to Capacity	0.01	0.09	0.09	0.00	0.01	0.15	0.15	0.02	0.02	0.06
Queue Length 95th (ft)	1	0	0	0	0	0	0	0	2	5
Control Delay (s)	8.5	0.0	0.0	0.0	7.9	0.0	0.0	0.0	11.3	14.8
Lane LOS	A				A				B	B
Approach Delay (s)	0.3				0.1				11.3	14.8
Approach LOS									B	B

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	22.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	75	1774	197	59	580
v/c Ratio	0.05	0.43	0.13	0.22	0.12
Control Delay	0.1	3.2	0.2	25.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	0.1	3.2	0.2	25.8	0.0
Queue Length 50th (ft)	0	76	0	21	0
Queue Length 95th (ft)	0	119	0	53	0
Internal Link Dist (ft)		448			480
Turn Bay Length (ft)			485	575	
Base Capacity (vph)	1558	4916	1531	796	4916
Starvation Cap Reductn	0	476	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.40	0.13	0.07	0.12

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	69	1632	181	54	534
Future Volume (vph)	0	69	1632	181	54	534
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	0.91	1.00	1.00	0.91
Frt		0.86	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1558	4916	1531	1711	4916
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1558	4916	1531	1711	4916
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	75	1774	197	59	580
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	75	1774	197	59	580
Turn Type		Free	NA	Free	Prot	NA
Protected Phases			2		1	Free
Permitted Phases		Free		Free		
Actuated Green, G (s)		59.4	43.6	59.4	4.8	59.4
Effective Green, g (s)		59.4	45.6	59.4	5.8	59.4
Actuated g/C Ratio		1.00	0.77	1.00	0.10	1.00
Clearance Time (s)			6.0		5.0	
Vehicle Extension (s)			5.0		3.0	
Lane Grp Cap (vph)		1558	3773	1531	167	4916
v/s Ratio Prot			c0.36		c0.03	0.12
v/s Ratio Perm		0.05		0.13		
v/c Ratio		0.05	0.47	0.13	0.35	0.12
Uniform Delay, d1		0.0	2.5	0.0	25.0	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	0.2	0.2	1.3	0.0
Delay (s)		0.1	2.7	0.2	26.3	0.0
Level of Service		A	A	A	C	A
Approach Delay (s)	0.1		2.5			2.5
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	2.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	59.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	SBT	SBR
Lane Group Flow (vph)	77	388	66	1	1511	17	27	1	9
v/c Ratio	0.25	0.13	0.05	0.00	0.54	0.01	0.22	0.01	0.01
Control Delay	3.9	3.5	2.2	4.0	6.3	0.8	54.8	49.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.9	3.5	2.2	4.0	6.3	0.8	54.8	49.0	0.0
Queue Length 50th (ft)	21	79	12	0	125	0	20	1	0
Queue Length 95th (ft)	6	122	28	m1	307	m0	50	6	0
Internal Link Dist (ft)		712			1633			157	
Turn Bay Length (ft)	250		350	235		375			
Base Capacity (vph)	459	3033	1365	965	2788	1260	295	390	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.13	0.05	0.00	0.54	0.01	0.09	0.00	0.01

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	357	61	1	1390	16	25	0	0	0	1	8
Future Volume (vph)	71	357	61	1	1390	16	25	0	0	0	1	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0				4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00				1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00				1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95				1.00	1.00
Satd. Flow (prot)	1711	3421	1531	1711	3421	1531	1711				1801	1531
Flt Permitted	0.13	1.00	1.00	0.52	1.00	1.00	0.76				1.00	1.00
Satd. Flow (perm)	242	3421	1531	941	3421	1531	1363				1801	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	77	388	66	1	1511	17	27	0	0	0	1	9
RTOR Reduction (vph)	0	0	12	0	0	4	0	0	0	0	0	0
Lane Group Flow (vph)	77	388	54	1	1511	13	27	0	0	0	1	9
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm				NA	Free
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8			4		Free
Actuated Green, G (s)	102.4	96.8	96.8	92.8	91.7	91.7	5.6				5.6	120.0
Effective Green, g (s)	102.9	98.8	98.8	93.8	93.7	93.7	7.6				7.6	120.0
Actuated g/C Ratio	0.86	0.82	0.82	0.78	0.78	0.78	0.06				0.06	1.00
Clearance Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	6.0				6.0	
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0				3.0	
Lane Grp Cap (vph)	289	2816	1260	745	2671	1195	86				114	1531
v/s Ratio Prot	c0.01	0.11		0.00	c0.44						0.00	
v/s Ratio Perm	0.21		0.04	0.00		0.01	c0.02					0.01
v/c Ratio	0.27	0.14	0.04	0.00	0.57	0.01	0.31				0.01	0.01
Uniform Delay, d1	3.7	2.1	1.9	2.9	5.2	2.9	53.7				52.7	0.0
Progression Factor	1.38	1.70	2.71	1.82	0.95	1.00	1.00				1.00	1.00
Incremental Delay, d2	0.5	0.1	0.1	0.0	0.7	0.0	2.1				0.0	0.0
Delay (s)	5.6	3.7	5.3	5.2	5.6	2.9	55.8				52.7	0.0
Level of Service	A	A	A	A	A	A	E				D	A
Approach Delay (s)		4.2			5.6			55.8			5.3	
Approach LOS		A			A			E			A	

Intersection Summary			
HCM 2000 Control Delay	5.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	180	525	1532	15	8	375
v/c Ratio	0.45	0.16	0.57	0.01	0.07	0.24
Control Delay	11.8	0.2	3.9	0.0	53.1	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	0.2	3.9	0.0	53.1	0.4
Queue Length 50th (ft)	40	0	1	0	6	0
Queue Length 95th (ft)	143	9	325	m0	22	0
Internal Link Dist (ft)		605	712		887	
Turn Bay Length (ft)	600					600
Base Capacity (vph)	613	3322	2666	1531	285	1531
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.16	0.57	0.01	0.03	0.24

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	166	483	1409	14	7	345
Future Volume (vph)	166	483	1409	14	7	345
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	1711	1531
Flt Permitted	0.13	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	229	3421	3421	1531	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	180	525	1532	15	8	375
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	180	525	1532	15	8	375
Turn Type	pm+pt	NA	NA	Free	Prot	Free
Protected Phases	1	1 6	2		4	
Permitted Phases	1 6			Free		Free
Actuated Green, G (s)	100.5	106.5	86.7	120.0	1.5	120.0
Effective Green, g (s)	104.5	108.5	88.7	120.0	3.5	120.0
Actuated g/C Ratio	0.87	0.90	0.74	1.00	0.03	1.00
Clearance Time (s)	6.0		6.0		6.0	
Vehicle Extension (s)	3.0		5.0		3.0	
Lane Grp Cap (vph)	394	3093	2528	1531	49	1531
v/s Ratio Prot	c0.06	0.15	c0.45		0.00	
v/s Ratio Perm	0.34			0.01		c0.25
v/c Ratio	0.46	0.17	0.61	0.01	0.16	0.24
Uniform Delay, d1	14.0	0.7	7.4	0.0	56.8	0.0
Progression Factor	1.38	0.28	0.45	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.0	0.9	0.0	1.6	0.4
Delay (s)	20.2	0.2	4.3	0.0	58.4	0.4
Level of Service	C	A	A	A	E	A
Approach Delay (s)		5.3	4.2		1.6	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

BWI TIA MOE Table - 2027 PM No Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
1	Aviation Blvd (MD 170) at Dorsey Rd (MD 176) - West	Signalized	NBL	182	75.6	E	55.9	E	85.4	F	455	211	318
			NBT	705	54	D					-	396	502
			NBR	177	43.3	D					250	37	109
			SBL	357	121.8	F	100.2	F			250	~462	#782
			SBT	1288	110.5	F					-	~927	#1242
			SBR	407	48.9	D					175	321	527
			EBL	431	103.2	F	93.1	F			175	~473	#785
			EBT	809	101.1	F					-	~548	#799
			EBR	333	60.5	E					225	213	381
			WBL	197	58.9	E	65.4	E			200	172	270
			WBT	365	68.8	E					-	220	297
			WBR	0	-	-					-	-	-
2	Aviation Blvd (MD 170) at Mathison Way	Signalized	NBT	1,071	8.9	A	8.7	A	6.9	A	-	202	295
			NBR	72	5.7	A					450	0	17
			SBL	68	2.2	A	3.1	A			375	5	m7
			SBT	1,972	3.1	A					-	133	182
			WBL	87	50.4	D	48.7	D			450	69	119
			WBR	49	45.5	D					-	0	36
3	Aviation Blvd (MD 170) at Stoney Run Rd	Signalized	NBT	1,017	59.9	E	54.4	D	26.5	C	-	441	#568
			NBR	103	0.1	A					-	0	0
			SBL	415	56.7	E	14.7	B			575	161	m132
			SBT	1,684	4.3	A					-	61	m16
			WBL	359	66.3	E	21.0	C			-	294	#511
			WBR	842	1.7	A					-	0	0
4	Stoney Run Rd at Northrop Grumman Entrance	Signalized	NBL	481	25.3	C	25.0	C	50.0	D	-	104	257
			NBT	37	21.0	C					-	13	56
			SBT	447	91.0	F	73.8	E			-	263	#763
			SBR	179	31.0	C					85	58	185
			EBL	14	35.0	C	47.4	D			-	7	29
			EBR	754	47.6	D					550	25	#322
5	Stoney Run Rd at New Ridge Rd	Signalized	NBL	45	66.6	E	60.5	E	56.0	E	-	97	166
			NBT	54									
			NBR	514	59.3	E					-	0	130
			SBL	111	71.5	E	61.0	E			-	108	194
			SBT	58	40.9	D					-	45	83
			SBR	0									
			EBL	1	33.3	C	36.8	D			175	1	6
			EBT	143	37.5	D					-	106	196
			EBR	34	33.6	C					125	0	0
			WBL	473	74.3	E	55.7	E			300	460	#822
			WBT	162	8.9	A					-	54	119
			WBR	25	7.9	A					150	0	6
6	Aviation Blvd (MD 170) at Amtrak Way (MD 995)	Signalized	NBL	131	39.8	D	25.4	C	65.3	E	225	41	m90
			NBT	1,729	24.3	C					-	783	#929
			SBT	1,861	119.4	F	108.4	F			-	~1078	#1240
			SBR	198	5.2	A					-	31	m33
			EBL	450	50.3	D	43.8	D			-	341	471
			EBR	238	31.6	C					185	54	124
7	Aviation Blvd (MD 170) at Northrup Grumman Gate 1A	Signalized	NBL	15	44.8	D	8.5	A	16.1	B	225	11	m121
			NBT	2,164	8.3	A					-	250	#1094
			SBT	1,931	19.0	B	18.5	B			-	334	#1111
			SBR	65	4.0	A					-	2	m17
			EBL	406	50.0	D	38.0	D			-	167	211
			EBR	128	0.1	A					-	0	0
8	Aviation Blvd (MD 170) at SB I-195 Ramps	Signalized	NBT	2,392	29.9	C	27.8	C	22.1	C	-	~726	#1347
			NBR	178	0.1	A					50	0	m0
			SBL	121	68.5	E	8.3	A			350	44	124
			SBT	999	1.0	A					-	24	36
			WBL	31	53.6	D	35.8	D			-	25	58
			WBR	16	0.0	A					-	0	0
9	Aviation Blvd (MD 170) at NB I-195 Ramps	Signalized	NBT	1,354	1.2	A	48.5	D	39.4	D	-	17	m23
			NBR	1,386	94.8	F					-	~1302	m#1333
			SBT	927	10.0	A	10.0	A			-	210	294
			WBL	190	50.7	D	50.7	D			-	149	216
10	Terminal Rd at Elkridge Landing Rd	Signalized	NBL	483	27.9	C	26.8	C	13.4	B	-	228	358
			NBR	42	14.7	B					-	0	19
			EBT	448	21.2	C	8.9	A			-	103	192
			EBR	1,087	3.8	A					-	0	0
			WBL	35	12.4	B	12.4	B			150	10	34
			WBT	170	12.4	B					-	26	58

BWI TIA MOE Table - 2027 PM No Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
11	Aviation Blvd (MD 170) at Terminal Rd	Signalized	NBL	171	50.9	D	19.3	B	20.1	C	300	70	106
			NBT	125	37	D					-	86	135
			NBR	405	0.5	A					400	0	0
			SBT	127	51.2	D	8.3	A			-	53	85
			SBR	996	2.8	A					-	0	0
			EBL	400	50.9	D	24.9	C			445	158	212
			EBT	814	16.8	B					-	244	372
			EBR	158	0.1	A					445	0	0
			WBL	266	27.4	C	28.8	C			615	118	m121
			WBT	555	29.5	C					-	204	m254
			WBR	0	0	A					-	0	0
12	Aviation Blvd (MD 170) at Air Cargo Dr	Signalized	NBL	118	51.2	D	48.0	D	58.6	E	-	105	164
			NBT	14									
			NBR	70	42.1	D					-	0	9
			SBL	505	170.0	F	163.2	F			-	~320	#511
			SBT	16	156.2	F					-	~297	#490
			SBR	69									
			EBL	46	14.1	B	31.4	C			275	26	m47
			EBT	1050	35.8	D					-	462	549
			EBR	123	0.1	A					-	0	0
			WBL	42	19.4	B	25.7	C			375	21	44
			WBT	635	31.0	C					-	278	347
			WBR	121	0.1	A					475	0	0
13	Aviation Blvd (MD 162) at Andover Rd	Signalized	WBT	588	6.4	A	8.6	A	15.0	B	-	75	155
			WBR	405	11.8	B					200	0	62
			EBL	106	6.0	A	9.4	A			415	50	69
			EBT	1,064	9.7	A					-	273	564
			SBL	388	49.7	D	46.9	D			175	165	231
			SBR	12	44.1	D					-	104	171
14	Aviation Blvd (MD 162) at Aaronson Dr	Unsignalized	NBL	20	12.8	B	0.3	A	3.5	A	-	-	-
			NBT	885	0.0	A					-	-	-
			NBR	19									
			SBL	59	10.7	B	0.5	A			-	-	-
			SBT	1,271	0.0	A					-	-	-
			SBR	16									
			EBL	14	191.8	F	191.8	F			-	-	-
			EBT	1									
			EBR	8									
			WBL	14	93.5	F	93.5	F			-	-	-
			WBT	1									
			WBR	15									
15	Aviation Blvd (MD 162) at Allwood Dr	Signalized	NBL	43	2.7	A	2.9	A	3.6	A	300	4	9
			NBT	943	3.0	A					-	64	150
			NBR	55	2.0	A					100	0	7
			SBL	9	0.3	A	1.5	A			225	1	m0
			SBT	1293	1.5	A					-	70	16
			SBR	7	2.5	A					225	0	m0
			EBL	9	54.2	D	53.8	D			-	7	25
			EBT	2	53.6	D					-	1	32
			EBR	25									
			WBL	18	53.5	D	53.5	D			-	0	2
			WBT	0									
			WBR	14									
16	SB I-97 Ramps at Cromwell Park Dr	Signalized	SBT	256	53.1	D	50.2	D	25.9	C	-	109	148
			SBR	269	47.4	D					-	0	80
			EBL	39	79.5	E	18.3	B			420	18	m31
			EBR	789	15.3	B					-	186	206
			WBT	312	7.4	A	7.3	A			-	47	78
			WBR	29	6.7	A					600	0	0
17	Aviation Blvd (MD 162) at Cromwell Park Dr	Signalized	NBT	835	25.1	C	24.9	C	31.5	C	-	178	256
			NBR	27	20.1	C					1000	0	22
			SBL	801	43.5	D	28.7	C			425	220	251
			SBT	535	6.5	A					-	74	116
			WBL	509	52.3	D	47.6	D			-	224	281
			WBR	71	14.0	B					600	21	31

BWI TIA MOE Table - 2027 PM No Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
18	Aviation Blvd (MD 162) at Dorsey Rd (MD 176) - East	Signalized	NBL	32	52.6	D	57.0	E	31.2	C	350	14	34
			NBT	146	57.6	E					-	82	142
			NBR	102									
			SBL	446	51.8	D	48.3	D			490	202	282
			SBT	360	47.5	D					-	160	230
			SBR	239	42.9	D					300	0	75
			EBL	150	15.4	B	27.4	C			350	63	125
			EBT	1,011	28.8	C					-	304	443
			EBR	220									
			WBL	60	20.7	C	10.7	B			425	24	57
			WBT	335	25.7	C					-	104	177
			WBR	566	0.8	A					-	0	0
19	Dorsey Rd (MD 176) at Digiulian Blvd	Unsignalized	NBL	17	83.7	F	83.7	F	3.0	A	-	-	-
			NBT	0									
			NBR	24									
			SBL	34	49.8	E	49.8	E			-	-	-
			SBT	0									
			SBR	15									
			EBL	3	8.4	A	0.0	A			-	-	-
			EBT	1,431	0.0	A					-	-	-
			EBR	15	0.0	A					-	-	-
			WBL	21	14.2	B	0.6	A			-	-	-
			WBT	452	0.0	A					-	-	-
			WBR	21	0.0	A					-	-	-
20	Aviation Blvd (MD 162) at Hollins Ferry Rd	Signalized	NBT	831	2.5	A	2.3	A	1.5	A	-	28	47
			NBR	75	0.1	A					485	0	0
			SBL	65	20.1	C	1.1	A			575	17	40
			SBT	1,336	0.2	A					-	0	0
			WBR	85	0.1	A	0.1	A			-	0	0
21	Aviation Blvd (MD 170) at Long Term Parking Lots	Signalized	NBL	38	53.9	D	53.6	D	8.0	A	-	30	64
			NBT	1	50.4	D					-	1	12
			NBR	3							-		
			SBL	10	51.2	D	15.4	B			-	9	28
			SBT	1							-		
			SBR	26	0.0	A					-	0	0
			EBL	60	3.4	A	8.7	A			250	13	26
			EBT	1,157	9.1	A					-	277	472
			EBR	63	6.1	A					350	6	13
			WBL	6	2.7	A	2.8	A			235	1	m2
			WBT	586	2.8	A					-	33	42
			WBR	8	3.2	A					375	0	m0
22	Aviation Blvd (MD 162) at S Camp Meade Rd (MD 170)	Signalized	SBL	9	59.0	E	3.3	A	7.5	A	-	7	25
			SBR	160	0.2	A					600	0	0
			EBL	355	16.0	B	5.6	A			600	36	m104
			EBT	1,271	2.7	A					-	0	m256
			WBT	637	13.5	B	13.2	B			-	144	230
			WBR	14	0.0	A					-	0	0

Notes

m Volume for 95th percentile queue is metered by upstream signal

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	468	879	362	214	397	198	766	192	388	1400	442
v/c Ratio	1.04	1.02	0.72	0.73	0.66	0.69	0.70	0.32	1.03	1.10	0.69
Control Delay	95.7	98.5	42.1	57.4	72.1	80.4	55.7	13.5	117.9	105.7	41.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	95.7	98.5	42.1	57.4	72.1	80.4	55.7	13.5	117.9	105.7	41.9
Queue Length 50th (ft)	~473	~548	213	172	220	211	396	37	~462	~927	321
Queue Length 95th (ft)	#785	#799	381	270	297	318	502	109	#782	#1242	527
Internal Link Dist (ft)		640			713		584			1313	
Turn Bay Length (ft)	175		225	200		455		250	250		175
Base Capacity (vph)	450	858	506	423	857	638	1798	876	376	1275	642
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.04	1.02	0.72	0.51	0.46	0.31	0.43	0.22	1.03	1.10	0.69

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	431	809	333	197	365	0	182	705	177	357	1288	407
Future Volume (vph)	431	809	333	197	365	0	182	705	177	357	1288	407
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539		1770	3539	1583	1770	3539	1583
Flt Permitted	0.21	1.00	1.00	0.15	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	384	3539	1583	278	3539		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	468	879	362	214	397	0	198	766	192	388	1400	442
RTOR Reduction (vph)	0	0	123	0	0	0	0	0	101	0	0	72
Lane Group Flow (vph)	468	879	239	214	397	0	198	766	91	388	1400	370
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)	66.0	38.3	38.3	48.5	25.8		26.7	49.8	49.8	35.2	58.3	58.3
Effective Green, g (s)	67.0	41.3	41.3	50.5	28.8		27.7	52.8	52.8	36.2	61.3	61.3
Actuated g/C Ratio	0.39	0.24	0.24	0.30	0.17		0.16	0.31	0.31	0.21	0.36	0.36
Clearance Time (s)	5.0	7.0	7.0	5.0	7.0		5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	446	859	384	290	599		288	1099	491	376	1276	570
v/s Ratio Prot	c0.22	c0.25		0.10	0.11		0.11	0.22		c0.22	c0.40	
v/s Ratio Perm	0.19		0.15	0.12					0.06			0.23
v/c Ratio	1.05	1.02	0.62	0.74	0.66		0.69	0.70	0.19	1.03	1.10	0.65
Uniform Delay, d1	47.0	64.3	57.4	49.5	66.1		67.1	51.6	42.9	66.9	54.4	45.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	56.1	36.7	3.1	9.4	2.8		8.5	2.5	0.4	54.9	56.1	3.5
Delay (s)	103.2	101.1	60.5	58.9	68.8		75.6	54.0	43.3	121.8	110.5	48.9
Level of Service	F	F	E	E	E		E	D	D	F	F	D
Approach Delay (s)		93.1			65.4			55.9			100.2	
Approach LOS		F			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	85.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	93.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	95	53	1164	78	74	2143
v/c Ratio	0.42	0.21	0.48	0.07	0.19	0.78
Control Delay	52.7	13.7	9.6	1.8	1.8	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	13.7	9.6	1.8	1.8	3.4
Queue Length 50th (ft)	69	0	202	0	5	133
Queue Length 95th (ft)	119	36	295	17	m7	182
Internal Link Dist (ft)	716		2236			2190
Turn Bay Length (ft)	450			450	375	
Base Capacity (vph)	456	447	2423	1107	503	2739
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.12	0.48	0.07	0.15	0.78

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	87	49	1071	72	68	1972
Future Volume (vph)	87	49	1071	72	68	1972
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1531	3421	1531	1711	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.19	1.00
Satd. Flow (perm)	1711	1531	3421	1531	344	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	95	53	1164	78	74	2143
RTOR Reduction (vph)	0	46	0	23	0	0
Lane Group Flow (vph)	95	7	1164	55	74	2143
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Actuated Green, G (s)	13.9	13.9	81.0	81.0	93.1	93.1
Effective Green, g (s)	15.9	15.9	84.0	84.0	94.1	96.1
Actuated g/C Ratio	0.13	0.13	0.70	0.70	0.78	0.80
Clearance Time (s)	6.0	6.0	7.0	7.0	5.0	7.0
Vehicle Extension (s)	5.0	5.0	6.0	6.0	5.0	6.0
Lane Grp Cap (vph)	226	202	2394	1071	362	2739
v/s Ratio Prot	c0.06		0.34		0.01	c0.63
v/s Ratio Perm		0.00		0.04	0.15	
v/c Ratio	0.42	0.03	0.49	0.05	0.20	0.78
Uniform Delay, d1	47.8	45.4	8.2	5.6	4.7	6.4
Progression Factor	1.00	1.00	1.00	1.00	0.39	0.28
Incremental Delay, d2	2.6	0.1	0.7	0.1	0.3	1.3
Delay (s)	50.4	45.5	8.9	5.7	2.2	3.1
Level of Service	D	D	A	A	A	A
Approach Delay (s)	48.7		8.7			3.1
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	390	915	1105	112	451	1830
v/c Ratio	0.91	0.60	0.86	0.07	0.57	0.78
Control Delay	70.5	1.7	60.4	0.1	28.8	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.5	1.7	60.4	0.1	28.8	4.8
Queue Length 50th (ft)	294	0	441	0	161	61
Queue Length 95th (ft)	#511	0	#568	0	m132	m16
Internal Link Dist (ft)	319		2190			575
Turn Bay Length (ft)					575	
Base Capacity (vph)	429	1531	1285	1531	1272	2334
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.91	0.60	0.86	0.07	0.35	0.78

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	359	842	1017	103	415	1684
Future Volume (vph)	359	842	1017	103	415	1684
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1531	3421	1531	3319	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1711	1531	3421	1531	3319	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	390	915	1105	112	451	1830
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	390	915	1105	112	451	1830
Turn Type	Prot	Free	NA	Free	Prot	NA
Protected Phases	4		6		5 7	2 5 7
Permitted Phases		Free		Free		
Actuated Green, G (s)	28.1	120.0	42.1	120.0	26.3	80.4
Effective Green, g (s)	30.1	120.0	45.1	120.0	28.3	83.4
Actuated g/C Ratio	0.25	1.00	0.38	1.00	0.24	0.70
Clearance Time (s)	6.0		7.0			
Vehicle Extension (s)	3.0		5.0			
Lane Grp Cap (vph)	429	1531	1285	1531	782	2377
v/s Ratio Prot	c0.23		c0.32		0.14	c0.53
v/s Ratio Perm		0.60		0.07		
v/c Ratio	0.91	0.60	0.86	0.07	0.58	0.77
Uniform Delay, d1	43.6	0.0	34.5	0.0	40.6	12.0
Progression Factor	1.00	1.00	1.53	1.00	1.40	0.35
Incremental Delay, d2	22.7	1.7	7.0	0.1	0.1	0.1
Delay (s)	66.3	1.7	59.9	0.1	56.7	4.3
Level of Service	E	A	E	A	E	A
Approach Delay (s)	21.0		54.4			14.7
Approach LOS	C		D			B

Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	15	820	523	40	486	195
v/c Ratio	0.05	0.91	0.42	0.06	1.01	0.43
Control Delay	34.2	19.5	26.7	26.0	80.1	26.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.2	19.5	26.7	26.0	80.1	26.6
Queue Length 50th (ft)	7	25	104	13	263	58
Queue Length 95th (ft)	29	#322	257	56	#763	185
Internal Link Dist (ft)	968			398	150	
Turn Bay Length (ft)		550				85
Base Capacity (vph)	551	1014	1248	677	483	455
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.81	0.42	0.06	1.01	0.43

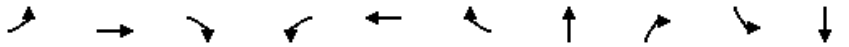
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	14	754	481	37	447	179
Future Volume (vph)	14	754	481	37	447	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	5.0	5.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1711	1531	3319	1801	1801	1531
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1711	1531	3319	1801	1801	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	820	523	40	486	195
RTOR Reduction (vph)	0	640	0	0	0	45
Lane Group Flow (vph)	15	180	523	40	486	150
Turn Type	Prot	Prot	Split	NA	NA	Prot
Protected Phases	3	3	2	2	1	1
Permitted Phases						
Actuated Green, G (s)	16.7	16.7	36.1	36.1	25.8	25.8
Effective Green, g (s)	16.7	16.7	36.1	36.1	25.8	25.8
Actuated g/C Ratio	0.17	0.17	0.36	0.36	0.26	0.26
Clearance Time (s)	4.0	4.0	5.0	5.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	5.0	5.0	3.0	3.0
Lane Grp Cap (vph)	286	256	1200	651	465	395
v/s Ratio Prot	0.01	c0.12	c0.16	0.02	c0.27	0.10
v/s Ratio Perm						
v/c Ratio	0.05	0.70	0.44	0.06	1.05	0.38
Uniform Delay, d1	34.9	39.2	24.1	20.8	37.0	30.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	8.4	1.2	0.2	54.0	0.6
Delay (s)	35.0	47.6	25.3	21.0	91.0	31.0
Level of Service	C	D	C	C	F	C
Approach Delay (s)	47.4			25.0	73.8	
Approach LOS	D			C	E	

Intersection Summary			
HCM 2000 Control Delay	50.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	99.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	155	37	514	176	27	108	559	121	63
v/c Ratio	0.00	0.27	0.07	0.95	0.15	0.03	0.62	0.83	0.68	0.14
Control Delay	39.0	40.2	0.2	76.1	10.6	1.3	75.9	16.0	81.9	40.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.0	40.2	0.2	76.1	10.6	1.3	75.9	16.0	81.9	40.0
Queue Length 50th (ft)	1	106	0	460	54	0	97	0	108	45
Queue Length 95th (ft)	6	196	0	#822	119	6	166	130	194	83
Internal Link Dist (ft)		269			383		290			249
Turn Bay Length (ft)	175		125	300		150				
Base Capacity (vph)	368	570	539	542	1204	1039	365	798	240	760
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.27	0.07	0.95	0.15	0.03	0.30	0.70	0.50	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	143	34	473	162	25	45	54	514	111	58	0
Future Volume (vph)	1	143	34	473	162	25	45	54	514	111	58	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1711	1801	1531	1711	1801	1531		1761	1531	1711	1801	
Flt Permitted	0.65	1.00	1.00	0.95	1.00	1.00		0.82	1.00	0.95	1.00	
Satd. Flow (perm)	1163	1801	1531	1711	1801	1531		1484	1531	1711	1801	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	155	37	514	176	27	49	59	559	121	63	0
RTOR Reduction (vph)	0	0	25	0	0	9	0	0	493	0	0	0
Lane Group Flow (vph)	1	155	12	514	176	18	0	108	66	121	63	0
Turn Type	Perm	NA	Perm	Prot	NA	Prot	Perm	NA	Prot	Prot	NA	
Protected Phases		6		5	2	2		8	8	7	4	
Permitted Phases	6		6				8					
Actuated Green, G (s)	45.3	45.3	45.3	45.2	95.5	95.5		16.8	16.8	14.9	36.7	
Effective Green, g (s)	45.3	45.3	45.3	45.2	95.5	95.5		16.8	16.8	14.9	36.7	
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.67	0.67		0.12	0.12	0.10	0.26	
Clearance Time (s)	5.5	5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	3.0	5.0	5.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	369	571	486	541	1205	1024		174	180	178	463	
v/s Ratio Prot		c0.09		c0.30	0.10	0.01			0.04	c0.07	0.03	
v/s Ratio Perm	0.00		0.01					c0.07				
v/c Ratio	0.00	0.27	0.02	0.95	0.15	0.02		0.62	0.37	0.68	0.14	
Uniform Delay, d1	33.3	36.4	33.5	47.6	8.7	7.9		59.9	58.0	61.6	40.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	1.2	0.1	26.6	0.3	0.0		6.7	1.3	9.9	0.1	
Delay (s)	33.3	37.5	33.6	74.3	8.9	7.9		66.6	59.3	71.5	40.9	
Level of Service	C	D	C	E	A	A		E	E	E	D	
Approach Delay (s)		36.8			55.7			60.5			61.0	
Approach LOS		D			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	56.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	142.7	Sum of lost time (s)	20.5
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Group Flow (vph)	489	259	142	1879	2023	215
v/c Ratio	0.86	0.44	0.70	0.91	1.22	0.27
Control Delay	53.1	13.8	37.1	25.9	123.5	2.9
Queue Delay	0.0	0.0	0.0	1.2	0.0	0.0
Total Delay	53.1	13.8	37.1	27.1	123.5	2.9
Queue Length 50th (ft)	341	54	41	783	~1078	31
Queue Length 95th (ft)	471	124	m90	#929	#1240	m33
Internal Link Dist (ft)	755			2381	681	
Turn Bay Length (ft)		185	225			
Base Capacity (vph)	627	640	208	2057	1657	804
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	60	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.40	0.68	0.94	1.22	0.27

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	450	238	131	1729	1861	198
Future Volume (vph)	450	238	131	1729	1861	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1711	1531	1711	3421	3421	1531
Flt Permitted	0.95	1.00	0.06	1.00	1.00	1.00
Satd. Flow (perm)	1711	1531	117	3421	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	489	259	142	1879	2023	215
RTOR Reduction (vph)	0	110	0	0	0	62
Lane Group Flow (vph)	489	149	142	1879	2023	153
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		1	6	2	
Permitted Phases	4	4	6			2
Actuated Green, G (s)	37.8	37.8	70.7	70.7	56.7	56.7
Effective Green, g (s)	39.8	37.8	71.7	72.2	58.2	58.2
Actuated g/C Ratio	0.33	0.31	0.60	0.60	0.49	0.49
Clearance Time (s)	6.0	6.0	5.0	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	6.0
Lane Grp Cap (vph)	567	482	202	2058	1659	742
v/s Ratio Prot	c0.29		0.06	c0.55	c0.59	
v/s Ratio Perm		0.10	0.36			0.10
v/c Ratio	0.86	0.31	0.70	0.91	1.22	0.21
Uniform Delay, d1	37.5	31.2	30.5	21.1	30.9	17.7
Progression Factor	1.00	1.00	1.08	0.90	0.57	0.28
Incremental Delay, d2	12.8	0.4	7.1	5.3	101.7	0.3
Delay (s)	50.3	31.6	39.8	24.3	119.4	5.2
Level of Service	D	C	D	C	F	A
Approach Delay (s)	43.8			25.4	108.4	
Approach LOS	D			C	F	

Intersection Summary			
HCM 2000 Control Delay	65.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	16	2352	2099	71	441	139
v/c Ratio	0.12	0.92	0.89	0.07	0.72	0.09
Control Delay	40.7	9.8	18.8	2.8	52.6	0.1
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	40.7	9.9	18.8	2.8	52.6	0.1
Queue Length 50th (ft)	11	250	334	2	167	0
Queue Length 95th (ft)	m12	#1094	#1111	m17	211	0
Internal Link Dist (ft)		681	1012		359	
Turn Bay Length (ft)	225					
Base Capacity (vph)	199	2559	2354	1067	885	1531
Starvation Cap Reductn	0	9	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.92	0.89	0.07	0.50	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	15	2164	1931	65	406	128
Future Volume (vph)	15	2164	1931	65	406	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	3319	1531
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1711	3421	3421	1531	3319	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	2352	2099	71	441	139
RTOR Reduction (vph)	0	0	0	15	0	0
Lane Group Flow (vph)	16	2352	2099	56	441	139
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	1	6	2		4	
Permitted Phases				2		Free
Actuated Green, G (s)	5.2	88.3	78.1	78.1	21.2	120.0
Effective Green, g (s)	6.2	89.8	79.6	79.6	22.2	120.0
Actuated g/C Ratio	0.05	0.75	0.66	0.66	0.18	1.00
Clearance Time (s)	5.0	5.5	5.5	5.5	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	88	2560	2269	1015	614	1531
v/s Ratio Prot	0.01	c0.69	0.61		c0.13	
v/s Ratio Perm				0.04		0.09
v/c Ratio	0.18	0.92	0.93	0.06	0.72	0.09
Uniform Delay, d1	54.5	12.2	17.6	7.1	46.0	0.0
Progression Factor	0.81	0.42	0.68	0.55	1.00	1.00
Incremental Delay, d2	0.4	3.2	7.0	0.1	4.0	0.1
Delay (s)	44.8	8.3	19.0	4.0	50.0	0.1
Level of Service	D	A	B	A	D	A
Approach Delay (s)		8.5	18.5		38.0	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	SBR	NWL	NWR2
Lane Group Flow (vph)	2600	193	132	1086	1052	34	17
v/c Ratio	1.02	0.13	0.67	0.37	0.68	0.27	0.01
Control Delay	31.6	0.1	50.8	1.0	2.4	57.0	0.0
Queue Delay	32.6	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.2	0.1	50.8	1.0	2.4	57.0	0.0
Queue Length 50th (ft)	~726	0	44	24	0	25	0
Queue Length 95th (ft)	#1347	m0	124	36	0	58	0
Internal Link Dist (ft)	1012			765		262	
Turn Bay Length (ft)		50	350				
Base Capacity (vph)	2553	1531	420	2939	1558	285	1531
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	192	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.10	0.13	0.31	0.37	0.68	0.12	0.01

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2
Lane Configurations		↑↑	↱	↰	↑↑			↱	↰		↱
Traffic Volume (vph)	0	2392	178	121	999	0	0	968	31	0	16
Future Volume (vph)	0	2392	178	121	999	0	0	968	31	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0			4.0	4.0		4.0
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00		1.00
Frt		1.00	0.85	1.00	1.00			0.86	1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00			1.00	0.95		1.00
Satd. Flow (prot)		3421	1531	1711	3421			1558	1711		1531
Flt Permitted		1.00	1.00	0.04	1.00			1.00	0.95		1.00
Satd. Flow (perm)		3421	1531	78	3421			1558	1711		1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2600	193	132	1086	0	0	1052	34	0	17
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2600	193	132	1086	0	0	1052	34	0	17
Turn Type		NA	Free	pm+pt	NA			Free	Prot		Free
Protected Phases		6		5	2				4		
Permitted Phases			Free	2				Free			Free
Actuated Green, G (s)		88.0	120.0	101.6	101.6			120.0	7.9		120.0
Effective Green, g (s)		89.5	120.0	102.1	103.1			120.0	8.9		120.0
Actuated g/C Ratio		0.75	1.00	0.85	0.86			1.00	0.07		1.00
Clearance Time (s)		5.5		4.5	5.5				5.0		
Vehicle Extension (s)		5.0		3.0	5.0				3.0		
Lane Grp Cap (vph)		2551	1531	197	2939			1558	126		1531
v/s Ratio Prot		c0.76		0.05	0.32				0.02		
v/s Ratio Perm			0.13	0.52				c0.68			0.01
v/c Ratio		1.02	0.13	0.67	0.37			0.68	0.27		0.01
Uniform Delay, d1		15.2	0.0	42.8	1.7			0.0	52.5		0.0
Progression Factor		0.80	1.00	1.41	0.38			1.00	1.00		1.00
Incremental Delay, d2		17.7	0.1	8.1	0.3			2.4	1.2		0.0
Delay (s)		29.9	0.1	68.5	1.0			2.4	53.6		0.0
Level of Service		C	A	E	A			A	D		A
Approach Delay (s)		27.8			8.3		2.4		35.8		
Approach LOS		C			A		A		D		

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	NWL
Lane Group Flow (vph)	1472	1507	1008	207
v/c Ratio	0.58	1.07	0.40	0.64
Control Delay	1.3	50.3	10.9	53.6
Queue Delay	0.2	14.2	0.0	0.0
Total Delay	1.4	64.4	10.9	53.6
Queue Length 50th (ft)	17	~1302	210	149
Queue Length 95th (ft)	m23	m#1333	294	216
Internal Link Dist (ft)	765		418	135
Turn Bay Length (ft)				
Base Capacity (vph)	2546	1412	2546	541
Starvation Cap Reductn	337	243	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.67	1.29	0.40	0.38

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	1354	1386	0	927	190	0
Future Volume (vph)	1354	1386	0	927	190	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5		4.0	4.0	
Lane Util. Factor	0.95	1.00		0.95	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	1.00	1.00		1.00	0.95	
Satd. Flow (prot)	3421	1531		3421	1711	
Flt Permitted	1.00	1.00		1.00	0.95	
Satd. Flow (perm)	3421	1531		3421	1711	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1472	1507	0	1008	207	0
RTOR Reduction (vph)	0	293	0	0	0	0
Lane Group Flow (vph)	1472	1214	0	1008	207	0
Turn Type	NA	Perm		NA	Prot	
Protected Phases	6			2	4	
Permitted Phases		6				
Actuated Green, G (s)	87.8	87.8		87.8	21.7	
Effective Green, g (s)	89.3	87.8		89.3	22.7	
Actuated g/C Ratio	0.74	0.73		0.74	0.19	
Clearance Time (s)	5.5	5.5		5.5	5.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	2545	1120		2545	323	
v/s Ratio Prot	0.43			0.29	c0.12	
v/s Ratio Perm		c0.79				
v/c Ratio	0.58	1.08		0.40	0.64	
Uniform Delay, d1	6.9	16.1		5.6	44.9	
Progression Factor	0.11	3.07		1.72	1.00	
Incremental Delay, d2	0.4	45.4		0.4	5.8	
Delay (s)	1.2	94.8		10.0	50.7	
Level of Service	A	F		A	D	
Approach Delay (s)	48.5			10.0	50.7	
Approach LOS	D			A	D	

Intersection Summary			
HCM 2000 Control Delay	39.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	487	1182	38	185	525	46
v/c Ratio	0.41	0.77	0.10	0.12	0.77	0.07
Control Delay	24.4	3.8	15.3	14.9	28.4	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.4	3.8	15.3	14.9	28.4	4.9
Queue Length 50th (ft)	103	0	10	26	228	0
Queue Length 95th (ft)	192	0	34	60	358	19
Internal Link Dist (ft)	475			893	211	
Turn Bay Length (ft)			150			
Base Capacity (vph)	1176	1531	582	2351	1382	1245
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.77	0.07	0.08	0.38	0.04

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	448	1087	35	170	483	42
Future Volume (vph)	448	1087	35	170	483	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	4.0	5.0	6.0	6.0	6.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3421	1531	1711	3421	1711	1531
Flt Permitted	1.00	1.00	0.36	1.00	0.95	1.00
Satd. Flow (perm)	3421	1531	647	3421	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	487	1182	38	185	525	46
RTOR Reduction (vph)	0	0	0	0	0	28
Lane Group Flow (vph)	487	1182	38	185	525	18
Turn Type	NA	Free	pm+pt	NA	Prot	Prot
Protected Phases	6		5	2	4	4
Permitted Phases		Free	2			
Actuated Green, G (s)	26.3	78.2	35.6	35.6	30.6	30.6
Effective Green, g (s)	26.3	78.2	35.6	35.6	30.6	30.6
Actuated g/C Ratio	0.34	1.00	0.46	0.46	0.39	0.39
Clearance Time (s)	6.0		5.0	6.0	6.0	6.0
Vehicle Extension (s)	3.5		3.5	3.5	5.0	5.0
Lane Grp Cap (vph)	1150	1531	353	1557	669	599
v/s Ratio Prot	0.14		0.01	0.05	0.31	0.01
v/s Ratio Perm		c0.77	0.04			
v/c Ratio	0.42	0.77	0.11	0.12	0.78	0.03
Uniform Delay, d1	20.1	0.0	12.3	12.3	20.9	14.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	3.8	0.2	0.2	7.0	0.0
Delay (s)	21.2	3.8	12.4	12.4	27.9	14.7
Level of Service	C	A	B	B	C	B
Approach Delay (s)	8.9			12.4	26.8	
Approach LOS	A			B	C	

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	78.2	Sum of lost time (s)	17.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	435	885	172	289	603	186	136	440	138	1083
v/c Ratio	0.76	0.51	0.11	0.63	0.37	0.49	0.30	0.29	0.40	0.71
Control Delay	53.7	18.0	0.1	30.6	31.3	54.1	37.5	0.5	53.5	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.7	18.0	0.1	30.6	31.3	54.1	37.5	0.5	53.5	2.8
Queue Length 50th (ft)	158	244	0	118	204	70	86	0	53	0
Queue Length 95th (ft)	212	372	0	m121	m254	106	135	0	85	0
Internal Link Dist (ft)		871			1398		1013		384	
Turn Bay Length (ft)	445		445	615		300		400		
Base Capacity (vph)	606	1751	1531	580	1633	442	540	1531	456	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.51	0.11	0.50	0.37	0.42	0.25	0.29	0.30	0.71

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	400	814	158	266	555	0	171	125	405	0	127	996
Future Volume (vph)	400	814	158	266	555	0	171	125	405	0	127	996
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		0.97	1.00	1.00		0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (perm)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	435	885	172	289	603	0	186	136	440	0	138	1083
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	435	885	172	289	603	0	186	136	440	0	138	1083
Turn Type	Prot	NA	Free	Prot	NA		Prot	NA	Free		NA	Free
Protected Phases	1	6		5	2		7	4			8	
Permitted Phases			Free						Free			Free
Actuated Green, G (s)	19.8	59.4	120.0	15.7	55.3		11.7	27.9	120.0		10.2	120.0
Effective Green, g (s)	20.8	61.4	120.0	16.7	57.3		13.7	29.9	120.0		12.2	120.0
Actuated g/C Ratio	0.17	0.51	1.00	0.14	0.48		0.11	0.25	1.00		0.10	1.00
Clearance Time (s)	5.0	6.0		5.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	575	1750	1531	461	1633		378	448	1531		347	1531
v/s Ratio Prot	0.13	0.26		0.09	0.18		0.06	0.08			0.04	
v/s Ratio Perm			0.11						0.29			c0.71
v/c Ratio	0.76	0.51	0.11	0.63	0.37		0.49	0.30	0.29		0.40	0.71
Uniform Delay, d1	47.2	19.3	0.0	48.7	19.9		49.9	36.6	0.0		50.5	0.0
Progression Factor	0.98	0.83	1.00	0.51	1.45		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.7	0.9	0.1	2.4	0.6		1.0	0.4	0.5		0.8	2.8
Delay (s)	50.9	16.8	0.1	27.4	29.5		50.9	37.0	0.5		51.2	2.8
Level of Service	D	B	A	C	C		D	D	A		D	A
Approach Delay (s)		24.9			28.8			19.3			8.3	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	50	1141	134	46	690	132	143	76	324	317
v/c Ratio	0.13	0.66	0.09	0.19	0.40	0.09	0.58	0.21	1.20	1.15
Control Delay	13.2	37.5	0.1	16.0	32.6	0.1	56.7	2.4	163.1	145.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.2	37.5	0.1	16.0	32.6	0.1	56.7	2.4	163.1	145.2
Queue Length 50th (ft)	26	462	0	21	278	0	105	0	~320	~297
Queue Length 95th (ft)	m47	549	0	44	347	0	164	9	#511	#490
Internal Link Dist (ft)		1398			1719		314			276
Turn Bay Length (ft)	275			375		475				
Base Capacity (vph)	400	1736	1531	243	1732	1531	430	361	270	275
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.66	0.09	0.19	0.40	0.09	0.33	0.21	1.20	1.15

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

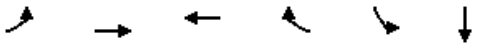
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	1050	123	42	635	121	118	14	70	505	16	69
Future Volume (vph)	46	1050	123	42	635	121	118	14	70	505	16	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	0.95	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.97	
Satd. Flow (prot)	1711	3421	1531	1711	3421	1531		1724	1531	1625	1593	
Flt Permitted	0.31	1.00	1.00	0.14	1.00	1.00		0.96	1.00	0.95	0.97	
Satd. Flow (perm)	565	3421	1531	251	3421	1531		1724	1531	1625	1593	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	1141	134	46	690	132	128	15	76	549	17	75
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	63	0	9	0
Lane Group Flow (vph)	50	1141	134	46	690	132	0	143	13	324	308	0
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Split	NA	custom	Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases	6		Free	2		Free			3			
Actuated Green, G (s)	63.9	57.9	120.0	63.5	57.7	120.0		15.3	18.0	18.0	18.0	
Effective Green, g (s)	65.9	59.9	120.0	65.5	59.7	120.0		17.3	20.0	20.0	20.0	
Actuated g/C Ratio	0.55	0.50	1.00	0.55	0.50	1.00		0.14	0.17	0.17	0.17	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	377	1707	1531	219	1701	1531		248	255	270	265	
v/s Ratio Prot	0.01	c0.33		c0.01	0.20			c0.08		c0.20	0.19	
v/s Ratio Perm	0.07		c0.09	0.10		0.09			0.01			
v/c Ratio	0.13	0.67	0.09	0.21	0.41	0.09		0.58	0.05	1.20	1.16	
Uniform Delay, d1	13.1	22.6	0.0	15.8	19.0	0.0		47.9	42.0	50.0	50.0	
Progression Factor	1.06	1.50	1.00	1.20	1.60	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.9	0.1	0.5	0.7	0.1		3.2	0.1	120.0	106.2	
Delay (s)	14.1	35.8	0.1	19.4	31.0	0.1		51.2	42.1	170.0	156.2	
Level of Service	B	D	A	B	C	A		D	D	F	F	
Approach Delay (s)		31.4			25.7			48.0			163.2	
Approach LOS		C			C			D			F	

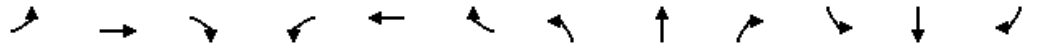
Intersection Summary			
HCM 2000 Control Delay	58.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBT
Lane Group Flow (vph)	115	1157	639	440	219	216
v/c Ratio	0.22	0.47	0.26	0.36	0.65	0.55
Control Delay	7.4	10.9	7.2	2.2	52.0	32.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.4	10.9	7.2	2.2	52.0	32.0
Queue Length 50th (ft)	50	273	75	0	165	104
Queue Length 95th (ft)	69	564	155	62	231	171
Internal Link Dist (ft)		1633	378			130
Turn Bay Length (ft)	415			200	175	
Base Capacity (vph)	514	2484	2484	1232	568	614
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.47	0.26	0.36	0.39	0.35

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	1064	0	0	588	405	0	0	0	388	0	12
Future Volume (vph)	106	1064	0	0	588	405	0	0	0	388	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95	1.00				0.95	0.95	
Frt	1.00	1.00			1.00	0.85				1.00	0.99	
Flt Protected	0.95	1.00			1.00	1.00				0.95	0.96	
Satd. Flow (prot)	1711	3421			3421	1531				1625	1619	
Flt Permitted	0.39	1.00			1.00	1.00				0.95	0.96	
Satd. Flow (perm)	707	3421			3421	1531				1625	1619	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	115	1157	0	0	639	440	0	0	0	422	0	13
RTOR Reduction (vph)	0	0	0	0	0	120	0	0	0	0	58	0
Lane Group Flow (vph)	115	1157	0	0	639	320	0	0	0	219	158	0
Turn Type	Perm	NA		Perm	NA	Perm				Split	NA	
Protected Phases		6			2		3	3		4	4	
Permitted Phases	6	6		2	2	2						
Actuated Green, G (s)	85.2	85.2			85.2	85.2				23.8	23.8	
Effective Green, g (s)	87.2	87.2			87.2	87.2				24.8	24.8	
Actuated g/C Ratio	0.73	0.73			0.73	0.73				0.21	0.21	
Clearance Time (s)	6.0	6.0			6.0	6.0				5.0	5.0	
Vehicle Extension (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Lane Grp Cap (vph)	513	2485			2485	1112				335	334	
v/s Ratio Prot		c0.34			0.19					c0.13	0.10	
v/s Ratio Perm	0.16					0.21						
v/c Ratio	0.22	0.47			0.26	0.29				0.65	0.47	
Uniform Delay, d1	5.4	6.8			5.5	5.7				43.7	41.9	
Progression Factor	0.94	1.35			1.12	1.98				1.00	1.00	
Incremental Delay, d2	0.9	0.6			0.2	0.6				6.1	2.2	
Delay (s)	6.0	9.7			6.4	11.8				49.7	44.1	
Level of Service	A	A			A	B				D	D	
Approach Delay (s)		9.4			8.6			0.0			46.9	
Approach LOS		A			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	1	8	14	1	15	20	885	19	59	1271	16
Future Volume (Veh/h)	14	1	8	14	1	15	20	885	19	59	1271	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	1	9	15	1	16	22	962	21	64	1382	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2060	2546	700	1845	2544	492	1399			983		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2060	2546	700	1845	2544	492	1399			983		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	44	96	98	62	96	97	95			91		
cM capacity (veh/h)	27	23	382	39	23	523	484			698		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	25	32	22	641	342	64	921	478
Volume Left	15	15	22	0	0	64	0	0
Volume Right	9	16	0	0	21	0	0	17
cSH	40	70	484	1700	1700	698	1700	1700
Volume to Capacity	0.63	0.46	0.05	0.38	0.20	0.09	0.54	0.28
Queue Length 95th (ft)	57	45	4	0	0	8	0	0
Control Delay (s)	191.8	93.5	12.8	0.0	0.0	10.7	0.0	0.0
Lane LOS	F	F	B			B		
Approach Delay (s)	191.8	93.5	0.3			0.5		
Approach LOS	F	F						

Intersection Summary				
Average Delay	3.5			
Intersection Capacity Utilization	52.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	10	29	35	47	1025	60	10	1405	8
v/c Ratio	0.08	0.19	0.19	0.14	0.34	0.04	0.02	0.49	0.01
Control Delay	52.1	22.3	2.2	2.2	2.4	0.6	0.2	1.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.1	22.3	2.2	2.2	2.4	0.6	0.2	1.5	0.0
Queue Length 50th (ft)	7	1	0	4	64	0	1	70	0
Queue Length 95th (ft)	25	32	2	9	150	7	m0	16	m0
Internal Link Dist (ft)		254	405		1830			1619	
Turn Bay Length (ft)				300		100	225		225
Base Capacity (vph)	410	432	421	492	3051	1373	646	2839	1283
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.07	0.08	0.10	0.34	0.04	0.02	0.49	0.01

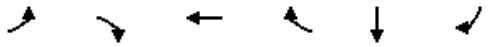
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	2	25	18	0	14	43	943	55	9	1293	7
Future Volume (vph)	9	2	25	18	0	14	43	943	55	9	1293	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.86			0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1711	1549			1649		1711	3421	1531	1711	3421	1531
Flt Permitted	0.85	1.00			0.81		0.16	1.00	1.00	0.28	1.00	1.00
Satd. Flow (perm)	1539	1549			1369		285	3421	1531	496	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	2	27	20	0	15	47	1025	60	10	1405	8
RTOR Reduction (vph)	0	25	0	0	33	0	0	0	11	0	0	2
Lane Group Flow (vph)	10	4	0	0	2	0	47	1025	50	10	1405	6
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			6		6	2		2
Actuated Green, G (s)	4.9	4.9			4.9		101.2	96.5	96.5	94.0	92.9	92.9
Effective Green, g (s)	6.9	6.9			6.9		103.2	99.0	99.0	96.0	95.4	95.4
Actuated g/C Ratio	0.06	0.06			0.06		0.86	0.82	0.82	0.80	0.80	0.80
Clearance Time (s)	6.0	6.0			6.0		5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0			3.0		2.5	5.0	5.0	2.5	5.0	5.0
Lane Grp Cap (vph)	88	89			78		312	2822	1263	418	2719	1217
v/s Ratio Prot		0.00					c0.01	c0.30		0.00	c0.41	
v/s Ratio Perm	c0.01				0.00		0.12		0.03	0.02		0.00
v/c Ratio	0.11	0.04			0.03		0.15	0.36	0.04	0.02	0.52	0.01
Uniform Delay, d1	53.6	53.4			53.4		2.6	2.6	1.9	2.4	4.3	2.5
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	0.13	0.21	1.00
Incremental Delay, d2	0.6	0.2			0.1		0.2	0.4	0.1	0.0	0.6	0.0
Delay (s)	54.2	53.6			53.5		2.7	3.0	2.0	0.3	1.5	2.5
Level of Service	D	D			D		A	A	A	A	A	A
Approach Delay (s)		53.8			53.5			2.9			1.5	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	3.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

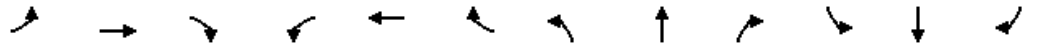
c Critical Lane Group



Lane Group	EBL	EBR	WBT	WBR	SBT	SBR
Lane Group Flow (vph)	42	858	339	32	278	292
v/c Ratio	0.22	0.40	0.15	0.03	0.64	0.65
Control Delay	78.9	7.9	8.0	0.1	56.3	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.9	7.9	8.0	0.1	56.3	12.5
Queue Length 50th (ft)	18	186	47	0	109	0
Queue Length 95th (ft)	m31	206	78	0	148	80
Internal Link Dist (ft)			782		297	
Turn Bay Length (ft)	420			600		
Base Capacity (vph)	691	2151	2319	1064	826	591
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.40	0.15	0.03	0.34	0.49

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	0	789	0	312	29	0	0	0	0	256	269
Future Volume (vph)	39	0	789	0	312	29	0	0	0	0	256	269
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		6.5		6.5	6.5					7.0	7.0
Lane Util. Factor	0.97		0.88		0.95	1.00					0.95	1.00
Frt	1.00		0.85		1.00	0.85					1.00	0.85
Flt Protected	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (prot)	3319		2694		3421	1531					3421	1531
Flt Permitted	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (perm)	3319		2694		3421	1531					3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	0	858	0	339	32	0	0	0	0	278	292
RTOR Reduction (vph)	0	0	102	0	0	11	0	0	0	0	0	255
Lane Group Flow (vph)	42	0	756	0	339	21	0	0	0	0	278	37
Turn Type	Prot		Prot		NA	Perm					NA	Perm
Protected Phases	1		6		2						4	
Permitted Phases						2						4
Actuated Green, G (s)	5.9		91.3		80.4	80.4					15.2	15.2
Effective Green, g (s)	5.9		91.3		80.4	80.4					15.2	15.2
Actuated g/C Ratio	0.05		0.76		0.67	0.67					0.13	0.13
Clearance Time (s)	5.0		6.5		6.5	6.5					7.0	7.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0					3.0	3.0
Lane Grp Cap (vph)	163		2049		2292	1025					433	193
v/s Ratio Prot	0.01		c0.28		0.10						c0.08	
v/s Ratio Perm						0.01						0.02
v/c Ratio	0.26		0.37		0.15	0.02					0.64	0.19
Uniform Delay, d1	54.9		4.8		7.3	6.6					49.8	46.9
Progression Factor	1.43		3.11		1.00	1.00					1.00	1.00
Incremental Delay, d2	0.7		0.4		0.1	0.0					3.2	0.5
Delay (s)	79.5		15.3		7.4	6.7					53.1	47.4
Level of Service	E		B		A	A					D	D
Approach Delay (s)		18.3			7.3			0.0			50.2	
Approach LOS		B			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	25.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	553	77	908	29	871	582
v/c Ratio	0.74	0.10	0.44	0.04	0.73	0.24
Control Delay	54.3	8.8	26.7	9.2	44.8	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.3	8.8	26.7	9.2	44.8	6.9
Queue Length 50th (ft)	224	21	178	0	220	74
Queue Length 95th (ft)	281	31	256	22	251	116
Internal Link Dist (ft)	751		1519			448
Turn Bay Length (ft)		600		1000	425	
Base Capacity (vph)	892	892	2085	666	1527	2424
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.09	0.44	0.04	0.57	0.24

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	509	71	835	27	801	535
Future Volume (vph)	509	71	835	27	801	535
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.91	1.00	0.94	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3319	1531	4916	1531	4824	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3319	1531	4916	1531	4824	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	553	77	908	29	871	582
RTOR Reduction (vph)	0	11	0	17	0	0
Lane Group Flow (vph)	553	66	908	12	871	582
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	4	4 5	6		5	2
Permitted Phases				6		
Actuated Green, G (s)	25.2	59.1	47.9	47.9	27.9	81.8
Effective Green, g (s)	27.2	61.1	50.9	50.9	29.9	84.8
Actuated g/C Ratio	0.23	0.51	0.42	0.42	0.25	0.71
Clearance Time (s)	6.0		7.0	7.0	6.0	7.0
Vehicle Extension (s)	3.0		5.0	5.0	3.0	5.0
Lane Grp Cap (vph)	752	779	2085	649	1201	2417
v/s Ratio Prot	c0.17	0.04	c0.18		c0.18	0.17
v/s Ratio Perm				0.01		
v/c Ratio	0.74	0.08	0.44	0.02	0.73	0.24
Uniform Delay, d1	43.1	15.1	24.4	20.1	41.3	6.2
Progression Factor	1.13	0.93	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.6	0.0	0.7	0.1	2.2	0.2
Delay (s)	52.3	14.0	25.1	20.1	43.5	6.5
Level of Service	D	B	C	C	D	A
Approach Delay (s)	47.6		24.9			28.7
Approach LOS	D		C			C

Intersection Summary			
HCM 2000 Control Delay	31.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	163	1338	65	364	615	35	270	485	391	260
v/c Ratio	0.29	0.63	0.31	0.26	0.40	0.10	0.65	0.72	0.56	0.50
Control Delay	16.7	30.1	19.3	27.9	0.8	56.2	47.7	55.7	50.7	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	30.1	19.3	27.9	0.8	56.2	47.7	55.7	50.7	8.7
Queue Length 50th (ft)	63	304	24	104	0	14	82	202	160	0
Queue Length 95th (ft)	125	443	57	177	0	34	142	282	230	75
Internal Link Dist (ft)		1548		585			1389		1519	
Turn Bay Length (ft)	350		425			350		490		300
Base Capacity (vph)	675	2245	474	1596	1531	1019	1042	1148	1183	699
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.60	0.14	0.23	0.40	0.03	0.26	0.42	0.33	0.37

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	1011	220	60	335	566	32	146	102	446	360	239
Future Volume (vph)	150	1011	220	60	335	566	32	146	102	446	360	239
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	7.0		5.5	7.0	4.0	5.5	5.5		5.5	5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	0.95		0.97	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	4784		1711	3421	1531	3319	3210		3319	3421	1531
Flt Permitted	0.47	1.00		0.14	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	851	4784		246	3421	1531	3319	3210		3319	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	1099	239	65	364	615	35	159	111	485	391	260
RTOR Reduction (vph)	0	14	0	0	0	0	0	73	0	0	0	207
Lane Group Flow (vph)	163	1324	0	65	364	615	35	197	0	485	391	53
Turn Type	pm+pt	NA		pm+pt	NA	Free	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases	2			6		Free						4
Actuated Green, G (s)	70.7	57.8		61.5	53.2	129.9	13.8	13.8		26.5	26.5	26.5
Effective Green, g (s)	70.7	57.8		61.5	53.2	129.9	13.8	13.8		26.5	26.5	26.5
Actuated g/C Ratio	0.54	0.44		0.47	0.41	1.00	0.11	0.11		0.20	0.20	0.20
Clearance Time (s)	5.5	7.0		5.5	7.0		5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	3.0	7.0		3.0	7.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	548	2128		210	1401	1531	352	341		677	697	312
v/s Ratio Prot	0.03	c0.28		0.02	0.11		0.01	c0.06		c0.15	0.11	
v/s Ratio Perm	0.13			0.13		c0.40						0.03
v/c Ratio	0.30	0.62		0.31	0.26	0.40	0.10	0.58		0.72	0.56	0.17
Uniform Delay, d1	15.1	27.7		19.8	25.3	0.0	52.4	55.3		48.2	46.5	42.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	1.1		0.8	0.4	0.8	0.1	2.4		3.6	1.0	0.3
Delay (s)	15.4	28.8		20.7	25.7	0.8	52.6	57.6		51.8	47.5	42.9
Level of Service	B	C		C	C	A	D	E		D	D	D
Approach Delay (s)		27.4			10.7			57.0			48.3	
Approach LOS		C			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	129.9	Sum of lost time (s)	23.5
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	1431	15	21	452	21	17	0	24	34	0	15
Future Volume (Veh/h)	3	1431	15	21	452	21	17	0	24	34	0	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	1555	16	23	491	23	18	0	26	37	0	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		650			625							
pX, platoon unblocked												
vC, conflicting volume	514			1571			1868	2121	778	1346	2114	246
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	514			1571			1868	2121	778	1346	2114	246
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			94			57	100	92	62	100	98
cM capacity (veh/h)	1048			416			42	47	339	97	47	755

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	3	778	778	16	23	246	246	23	44	53
Volume Left	3	0	0	0	23	0	0	0	18	37
Volume Right	0	0	0	16	0	0	0	23	26	16
cSH	1048	1700	1700	1700	416	1700	1700	1700	86	131
Volume to Capacity	0.00	0.46	0.46	0.01	0.06	0.14	0.14	0.01	0.51	0.40
Queue Length 95th (ft)	0	0	0	0	4	0	0	0	55	43
Control Delay (s)	8.4	0.0	0.0	0.0	14.2	0.0	0.0	0.0	83.7	49.8
Lane LOS	A				B				F	E
Approach Delay (s)	0.0				0.6				83.7	49.8
Approach LOS									F	E

Intersection Summary				
Average Delay	3.0			
Intersection Capacity Utilization	50.8%	ICU Level of Service	A	
Analysis Period (min)	15			

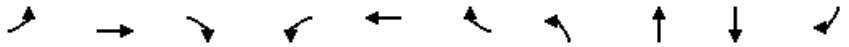
Lane Group	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	92	903	82	71	1452
v/c Ratio	0.06	0.24	0.05	0.23	0.30
Control Delay	0.1	3.0	0.1	17.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	0.1	3.0	0.1	17.3	0.2
Queue Length 50th (ft)	0	28	0	17	0
Queue Length 95th (ft)	0	47	0	40	0
Internal Link Dist (ft)		448			480
Turn Bay Length (ft)			485	575	
Base Capacity (vph)	1558	4916	1531	976	4916
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.06	0.18	0.05	0.07	0.30

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑			↑↑↑
Traffic Volume (vph)	0	85	831	75	65	1336
Future Volume (vph)	0	85	831	75	65	1336
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	0.91	1.00	1.00	0.91
Frt		0.86	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1558	4916	1531	1711	4916
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1558	4916	1531	1711	4916
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	92	903	82	71	1452
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	92	903	82	71	1452
Turn Type		Free	NA	Free	Prot	NA
Protected Phases			2		1	Free
Permitted Phases		Free		Free		
Actuated Green, G (s)		47.6	31.8	47.6	4.8	47.6
Effective Green, g (s)		47.6	33.8	47.6	5.8	47.6
Actuated g/C Ratio		1.00	0.71	1.00	0.12	1.00
Clearance Time (s)			6.0		5.0	
Vehicle Extension (s)			5.0		3.0	
Lane Grp Cap (vph)		1558	3490	1531	208	4916
v/s Ratio Prot			0.18		0.04	0.30
v/s Ratio Perm		0.06		0.05		
v/c Ratio		0.06	0.26	0.05	0.34	0.30
Uniform Delay, d1		0.0	2.5	0.0	19.1	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	0.1	0.1	1.0	0.2
Delay (s)		0.1	2.5	0.1	20.1	0.2
Level of Service		A	A	A	C	A
Approach Delay (s)	0.1		2.3			1.1
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	1.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	47.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	31.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	65	1258	68	7	637	9	41	4	12	28
v/c Ratio	0.10	0.43	0.05	0.02	0.23	0.01	0.31	0.03	0.09	0.02
Control Delay	3.7	8.4	2.4	1.8	3.1	0.0	56.1	34.2	49.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.7	8.4	2.4	1.8	3.1	0.0	56.1	34.2	49.5	0.0
Queue Length 50th (ft)	13	277	6	1	33	0	30	1	9	0
Queue Length 95th (ft)	26	472	13	m2	42	m0	66	12	28	0
Internal Link Dist (ft)		712			1633			152	157	
Turn Bay Length (ft)	250		350	235		375				
Base Capacity (vph)	761	2902	1309	543	2711	1227	292	348	300	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.43	0.05	0.01	0.23	0.01	0.14	0.01	0.04	0.02

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	1157	63	6	586	8	38	1	3	10	1	26
Future Volume (vph)	60	1157	63	6	586	8	38	1	3	10	1	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.89			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)	1711	3421	1531	1711	3421	1531	1711	1598			1722	1531
Flt Permitted	0.38	1.00	1.00	0.21	1.00	1.00	0.75	1.00			0.77	1.00
Satd. Flow (perm)	689	3421	1531	373	3421	1531	1350	1598			1387	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	1258	68	7	637	9	41	1	3	11	1	28
RTOR Reduction (vph)	0	0	13	0	0	2	0	3	0	0	0	0
Lane Group Flow (vph)	65	1258	55	7	637	7	41	1	0	0	12	28
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Free
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8			4		Free
Actuated Green, G (s)	99.4	94.2	94.2	91.4	90.2	90.2	8.1	8.1			8.1	120.0
Effective Green, g (s)	100.4	96.2	96.2	92.4	92.2	92.2	10.1	10.1			10.1	120.0
Actuated g/C Ratio	0.84	0.80	0.80	0.77	0.77	0.77	0.08	0.08			0.08	1.00
Clearance Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0			3.0	
Lane Grp Cap (vph)	625	2742	1227	306	2628	1176	113	134			116	1531
v/s Ratio Prot	c0.00	c0.37		0.00	0.19			0.00				
v/s Ratio Perm	0.08		0.04	0.02		0.00	c0.03				0.01	0.02
v/c Ratio	0.10	0.46	0.04	0.02	0.24	0.01	0.36	0.01			0.10	0.02
Uniform Delay, d1	1.8	3.7	2.4	3.3	4.0	3.2	51.9	50.4			50.8	0.0
Progression Factor	1.81	2.31	2.45	0.80	0.65	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.1	0.5	0.1	0.0	0.2	0.0	2.0	0.0			0.4	0.0
Delay (s)	3.4	9.1	6.1	2.7	2.8	3.2	53.9	50.4			51.2	0.0
Level of Service	A	A	A	A	A	A	D	D			D	A
Approach Delay (s)		8.7			2.8			53.6			15.4	
Approach LOS		A			A			D			B	

Intersection Summary					
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.45				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	54.9%	ICU Level of Service		A	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	386	1382	692	15	10	174
v/c Ratio	0.46	0.42	0.31	0.01	0.08	0.11
Control Delay	8.0	1.9	13.3	0.0	53.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.0	1.9	13.3	0.0	53.4	0.1
Queue Length 50th (ft)	36	0	144	0	7	0
Queue Length 95th (ft)	m104	m256	230	0	25	0
Internal Link Dist (ft)		605	712		887	
Turn Bay Length (ft)	600					600
Base Capacity (vph)	1108	3321	2243	1531	285	1531
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.42	0.31	0.01	0.04	0.11

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	355	1271	637	14	9	160
Future Volume (vph)	355	1271	637	14	9	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	1711	1531
Flt Permitted	0.35	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	627	3421	3421	1531	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	386	1382	692	15	10	174
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	386	1382	692	15	10	174
Turn Type	pm+pt	NA	NA	Free	Prot	Free
Protected Phases	1	1 6	2		4	
Permitted Phases	1 6			Free		Free
Actuated Green, G (s)	100.5	106.5	71.9	120.0	1.5	120.0
Effective Green, g (s)	104.5	108.5	73.9	120.0	3.5	120.0
Actuated g/C Ratio	0.87	0.90	0.62	1.00	0.03	1.00
Clearance Time (s)	6.0		6.0		6.0	
Vehicle Extension (s)	3.0		5.0		3.0	
Lane Grp Cap (vph)	822	3093	2106	1531	49	1531
v/s Ratio Prot	0.12	c0.40	0.20		0.01	
v/s Ratio Perm	c0.29			0.01		c0.11
v/c Ratio	0.47	0.45	0.33	0.01	0.20	0.11
Uniform Delay, d1	5.0	0.9	11.1	0.0	56.9	0.0
Progression Factor	3.16	2.87	1.18	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1	0.4	0.0	2.1	0.2
Delay (s)	16.0	2.7	13.5	0.0	59.0	0.2
Level of Service	B	A	B	A	E	A
Approach Delay (s)		5.6	13.2		3.3	
Approach LOS		A	B		A	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

BWI TIA MOE Table - 2022 AM Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
1	Aviation Blvd (MD 170) at Dorsey Rd (MD 176) - West	Signalized	NBL	426	72.2	E	99.0	F	85.4	F	455	508	#760
			NBT	1383	118.4	F					-	~1062	#1354
			NBR	263	40.5	D					250	151	268
			SBL	161	85.0	F	67.6	E			250	205	309
			SBT	402	65.3	E					-	257	333
			SBR	308	61.6	E					175	64	187
			EBL	329	117.5	F	76.5	E			175	~456	#761
			EBT	319	48.4	D					-	172	247
			EBR	144	44.9	D					225	0	64
			WBL	90	84.0	F	75.2	E			200	115	193
			WBT	476	73.6	E					-	314	406
			WBR	-	-	-					-	-	-
2	Aviation Blvd (MD 170) at Mathison Way	Signalized	NBT	1,728	14.1	B	13.8	B	13.4	B	-	468	674
			NBR	62	5.5	A					450	0	16
			SBL	47	25.4	C	5.3	A			375	3	16
			SBT	787	4.1	A					-	91	136
			WBL	84	50.5	D	48.3	D			450	66	114
			WBR	84	46.0	D					-	0	46
3	Aviation Blvd (MD 170) at Stoney Run Rd	Signalized	NBT	1,400	72.2	E	55.8	E	36.6	D	-	~699	#977
			NBR	413	0.3	A					-	0	0
			SBL	826	43.7	D	22.9	C			575	208	217
			SBT	768	0.6	A					-	7	16
			WBL	66	53.7	D	8.1	A			-	53	98
			WBR	392	0.5	A					-	0	0
4	Stoney Run Rd at Northrop Grumman Entrance	Signalized	NBL	691	16.8	B	19.7	B	18.8	B	-	145	294
			NBT	540	23.3	C					-	260	#646
			NBR	8									
			SBL	0	41.8	D	41.1	-			-	21	63
			SBT	40									
			SBR	10	37.9	D					85	0	0
			EBL	152	36.8	D	11.5	B			-	82	171
			EBT	2									
			EBR	351	0.4	A					550	0	0
			WBL	68	37.0	D	36.5	D			250	36	83
			WBT	17	34.5	C					-	9	30
			WBR	-	-	-					-	-	-
5	Stoney Run Rd at New Ridge Rd	Signalized	NBL	15	57.9	E	53.0	D	39.4	D	-	98	167
			NBT	94									
			NBR	400	51.7	D					-	0	110
			SBL	25	63.4	E	52.0	D			-	22	58
			SBT	26	41.7	D					-	19	47
			SBR	2									
			EBL	-	-	-	26.5	C			-	-	-
			EBT	80	26.8	C					175	51	103
			EBR	19	25.3	C					125	0	0
			WBL	411	49.3	D	30.6	C			300	341	#560
			WBT	162	5.5	A					-	42	88
			WBR	144	5.3	A					150	0	24
6	Aviation Blvd (MD 170) at Amtrak Way (MD 995)	Signalized	NBL	211	80.5	F	13.7	B	17.2	B	225	177	m207
			NBT	1,580	4.7	A					-	36	m170
			SBT	1,342	15.6	B	13.4	B			-	462	356
			SBR	511	7.8	A					-	22	51
			EBL	191	52.7	D	47.7	D			-	152	226
			EBR	251	43.9	D					185	0	74
7	Aviation Blvd (MD 170) at Northrup Grumman Gate 1A	Signalized	NBL	109	56.8	E	4.7	A	9.6	A	225	93	m144
			NBT	1,661	1.3	A					-	11	113
			SBT	1,847	13.7	B	12.7	B			-	526	m592
			SBR	468	8.5	A					-	48	m60
			EBL	37	54.6	D	46.5	D			-	15	33
			EBR	6	0.0	A					-	0	0
8	Aviation Blvd (MD 170) at SB I-195 Ramps	Signalized	NBT	1,517	5.8	A	5.2	A	4.8	A	-	131	368
			NBR	181	0.1	A					50	0	0
			SBL	73	14.5	B	2.9	A			350	5	32
			SBT	741	1.8	A					-	27	81
			WBL	18	53.6	D	34.6	C			-	15	40
			WBR	10	0.0	A					-	0	0
9	Aviation Blvd (MD 170) at NB I-195 Ramps	Signalized	NBT	1,371	4.1	A	5.5	A	6.8	A	-	121	131
			NBR	650	8.3	A					-	26	32
			SBT	690	2.5	A	2.5	A			-	56	73
			WBL	123	51.4	D	51.4	D			-	97	155
10	Terminal Rd at Elkridge Landing Rd	Signalized	NBL	801	33.5	C	32.3	C	24.5	C	-	536	#854
			NBR	44	10.5	B					-	4	22
			EBT	105	32.8	C	6.3	A			-	33	60
			EBR	493	0.6	A					-	0	0
			WBL	28	25.0	C	31.5	C			150	14	34
			WBT	577	31.9	C					-	185	241

BWI TIA MOE Table - 2022 AM Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
11	Aviation Blvd (MD 170) at Terminal Rd	Signalized	NBL	85	51.8	D	22.6	C	28.6	C	300	35	60
			NBT	134	41.1	D					-	98	153
			NBR	223	0.2	A					400	0	0
			SBT	89	51.7	D	9.0	A			-	37	64
			SBR	452	0.6	A					-	0	0
			EBL	726	60.4	E	36.8	D			445	299	#472
			EBT	450	15.7	B					-	71	127
			EBR	208	0.2	A					445	0	0
			WBL	336	56.4	E	30.3	C			615	101	172
			WBT	768	18.9	B					-	294	324
			WBR	0	0.0	A					-	0	0
12	Aviation Blvd (MD 170) at Air Cargo Dr	Signalized	NBL	71	51.4	D	50.2	D	13.8	B	-	68	119
			NBT	15									
			NBR	36	47.2	D					-	0	0
			SBL	97	51.7	D	50.8	D			-	63	114
			SBT	17	49.8	D					-	34	83
			SBR	34									
			EBL	105	24.4	C	19.1	B			275	49	127
			EBT	493	20.9	C					-	127	251
			EBR	76	0.1	A					-	0	0
			WBL	62	2.7	A	5.8	A			375	6	m7
			WBT	999	9.0	A					-	188	254
			WBR	611	0.8	A					475	0	0
13	Aviation Blvd (MD 162) at Andover Rd	Signalized	WBT	1,283	10.7	B	10.6	B	15.7	B	-	256	568
			WBR	261	10.4	B					200	31	144
			EBL	10	7.8	A	8.3	A			415	4	22
			EBT	332	8.4	A					-	70	150
			SBL	261	50.7	D	48.2	D			175	133	197
			SBR	58	45.5	D					-	71	135
14	Aviation Blvd (MD 162) at Aaronson Dr	Unsignalized	NBL	31	9.0	A	0.2	A	7.6	A	-	-	-
			NBT	1,491	0.0	A					-	-	-
			NBR	6									
			SBL	12	14.4	B	0.3	A			-	-	-
			SBT	564	0.0	A					-	-	-
			SBR	25									
			EBL	20	60.0	F	60.0	F			-	-	-
			EBT	0									
			EBR	18									
			WBL	24	222.3	F	222.3	F			-	-	-
			WBT	1									
			WBR	39									
15	Aviation Blvd (MD 162) at Allwood Dr	Signalized	NBL	56	1.8	A	5.1	A	6.6	A	300	5	14
			NBT	1482	5.3	A					-	134	350
			NBR	12	2.3	A					100	0	0
			SBL	6	2.1	A	4.0	A			225	1	m1
			SBT	607	4.1	A					-	103	138
			SBR	27	3.1	A					225	0	8
			EBL	23	53.1	D	52.4	D			-	18	46
			EBT	0	51.0	D					-	0	0
			EBR	13									
			WBL	23	53.2	D	53.2	D			-	19	58
			WBT	1									
			WBR	23									
16	SB I-97 Ramps at Cromwell Park Dr	Signalized	SBT	65	45.2	D	44.6	D	15.8	B	-	22	45
			SBR	38	43.5	D					-	0	0
			EBL	197	42.8	D	18.4	B			420	67	102
			EBR	315	3.1	A					-	0	10
			WBT	542	10.2	B	9.9	A			-	94	141
			WBR	192	9.2	A					600	0	33
17	Aviation Blvd (MD 162) at Cromwell Park Dr	Signalized	NBT	1,522	19.7	B	19.1	B	24.8	C	-	309	444
			NBR	181	13.5	B					1000	0	37
			SBL	332	45.1	D	30.8	C			425	87	152
			SBT	180	4.6	A					-	19	36
			SBR	1									
			EBR	1	38.2	D	38.2	D			-	0	0
			WBL	372	43.1	D	36.6	D			-	140	245
			WBR	208	25.0	C					600	104	217

BWI TIA MOE Table - 2022 AM Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
18	Aviation Blvd (MD 162) at Dorsey Rd (MD 176) - East	Signalized	NBL	201	35.4	D	39.0	D	24.1	C	350	57	120
			NBT	276	40.7	D					-	121	237
			NBR	157									
			SBL	111	41.4	D	41.4	D			490	34	79
			SBT	82	40.7	D					-	25	63
			SBR	359	41.6	D					300	3	107
			EBL	140	14.7	B	17.1	B			350	46	114
			EBT	335	18.1	B					-	41	102
			EBR	8									
			WBL	20	23.1	C	15.4	B			425	6	25
			WBT	470	29.8	C					-	134	257
			WBR	1,288	10.0	A					-	0	#27
19	Dorsey Rd (MD 176) at Digiulian Blvd	Unsignalized	NBL	4	10.9	B	10.9	B	0.9	A	-	-	-
			NBT	0									
			NBR	8									
			SBL	20	14.8	B	14.8	B			-	-	-
			SBT	1									
			SBR	9									
			EBL	12	8.5	A	0.4	A			-	-	-
			EBT	272	0.0	A					-	-	-
			EBR	5	0.0	A					-	-	-
			WBL	6	7.9	A	0.1	A			-	-	-
			WBT	439	0.0	A					-	-	-
			WBR	35	0.0	A					-	-	-
20	Aviation Blvd (MD 162) at Hollins Ferry Rd	Signalized	NBT	1,558	2.6	A	2.4	A	2.3	A	-	70	107
			NBR	172	0.2	A					485	0	0
			SBL	51	25.3	C	2.3	A			575	19	47
			SBT	512	0.0	A					-	0	0
			WBR	66	0.1	A	0.1	A			-	0	0
21	Aviation Blvd (MD 170) at Long Term Parking Lots	Signalized	NBL	11	58.7	E	58.7	E	4.9	A	-	9	29
			NBT	0	0.0	A					-	0	0
			NBR	0									
			SBL	0	56.5	E	2.5	A			-	1	7
			SBT	1									
			SBR	20	0.0	A					-	0	0
			EBL	99	7.1	A	1.7	A			250	1	1
			EBT	341	0.2	A					-	0	1
			EBR	27	0.6	A					350	0	0
			WBL	0	0.0	A	5.6	A			235	0	0
			WBT	1,325	5.6	A					-	92	265
			WBR	15	2.7	A					375	0	m0
22	Aviation Blvd (MD 162) at S Camp Meade Rd (MD 170)	Signalized	SBL	7	58.4	E	1.6	A	4.8	A	-	6	22
			SBR	330	0.4	A					600	0	0
			EBL	166	18.9	B	5.2	A			600	34	134
			EBT	461	0.2	A					-	0	9
			WBT	1,343	5.4	A	5.3	A			-	123	290
			WBR	13	0.0	A					-	0	m0

Notes

m Volume for 95th percentile queue is metered by upstream signal

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	358	347	157	98	517	463	1503	286	175	437	335
v/c Ratio	1.00	0.32	0.27	0.60	0.77	0.86	1.12	0.43	0.73	0.59	0.61
Control Delay	115.7	51.3	7.8	95.6	77.5	75.3	113.7	27.4	93.2	68.4	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	115.7	51.3	7.8	95.6	77.5	75.3	113.7	27.4	93.2	68.4	18.8
Queue Length 50th (ft)	~456	172	0	115	314	508	~1062	151	205	257	64
Queue Length 95th (ft)	#761	247	64	193	406	#760	#1354	268	309	333	187
Internal Link Dist (ft)		640			713		584			1313	
Turn Bay Length (ft)	175		225	200		455		250	250		175
Base Capacity (vph)	359	1068	587	359	819	609	1718	825	359	1218	723
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.32	0.27	0.27	0.63	0.76	0.87	0.35	0.49	0.36	0.46

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	329	319	144	90	476	0	426	1383	263	161	402	308
Future Volume (vph)	329	319	144	90	476	0	426	1383	263	161	402	308
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	358	347	157	98	517	0	463	1503	286	175	437	335
RTOR Reduction (vph)	0	0	110	0	0	0	0	0	69	0	0	215
Lane Group Flow (vph)	358	347	47	98	517	0	463	1503	217	175	437	120
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4						6			2
Actuated Green, G (s)	35.3	50.9	50.9	15.5	31.1		53.5	64.9	64.9	23.2	34.6	34.6
Effective Green, g (s)	36.3	53.9	53.9	16.5	34.1		54.5	67.9	67.9	24.2	37.6	37.6
Actuated g/C Ratio	0.20	0.30	0.30	0.09	0.19		0.31	0.38	0.38	0.14	0.21	0.21
Clearance Time (s)	5.0	7.0	7.0	5.0	7.0		5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	359	1068	478	163	676		540	1346	602	239	745	333
v/s Ratio Prot	c0.20	0.10		0.06	c0.15		c0.26	c0.42		0.10	0.12	
v/s Ratio Perm			0.03						0.14			0.08
v/c Ratio	1.00	0.32	0.10	0.60	0.76		0.86	1.12	0.36	0.73	0.59	0.36
Uniform Delay, d1	71.0	48.2	44.8	77.8	68.4		58.3	55.3	39.7	74.0	63.4	60.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	46.4	0.2	0.1	6.1	5.2		13.8	63.1	0.8	11.0	1.8	1.4
Delay (s)	117.5	48.4	44.9	84.0	73.6		72.2	118.4	40.5	85.0	65.3	61.6
Level of Service	F	D	D	F	E		E	F	D	F	E	E
Approach Delay (s)		76.5			75.2			99.0			67.6	
Approach LOS		E			E			F			E	

Intersection Summary			
HCM 2000 Control Delay	85.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	178.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	91.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	91	91	1878	67	51	855
v/c Ratio	0.41	0.33	0.77	0.06	0.24	0.31
Control Delay	52.6	12.2	15.4	1.9	8.0	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.6	12.2	15.4	1.9	8.0	4.4
Queue Length 50th (ft)	66	0	468	0	3	91
Queue Length 95th (ft)	114	46	674	16	16	136
Internal Link Dist (ft)	716		2236			2190
Turn Bay Length (ft)	450			450	375	
Base Capacity (vph)	456	475	2439	1110	352	2747
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.19	0.77	0.06	0.14	0.31

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	84	84	1728	62	47	787
Future Volume (vph)	84	84	1728	62	47	787
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1531	3421	1531	1711	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.06	1.00
Satd. Flow (perm)	1711	1531	3421	1531	106	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	91	1878	67	51	855
RTOR Reduction (vph)	0	79	0	20	0	0
Lane Group Flow (vph)	91	12	1878	47	51	855
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Actuated Green, G (s)	13.6	13.6	81.6	81.6	93.4	93.4
Effective Green, g (s)	15.6	15.6	84.6	84.6	94.4	96.4
Actuated g/C Ratio	0.13	0.13	0.70	0.70	0.79	0.80
Clearance Time (s)	6.0	6.0	7.0	7.0	5.0	7.0
Vehicle Extension (s)	5.0	5.0	6.0	6.0	5.0	6.0
Lane Grp Cap (vph)	222	199	2411	1079	187	2748
v/s Ratio Prot	c0.05		c0.55		0.02	c0.25
v/s Ratio Perm		0.01		0.03	0.20	
v/c Ratio	0.41	0.06	0.78	0.04	0.27	0.31
Uniform Delay, d1	48.0	45.8	11.6	5.4	13.0	3.1
Progression Factor	1.00	1.00	1.00	1.00	1.83	1.23
Incremental Delay, d2	2.6	0.3	2.6	0.1	1.6	0.3
Delay (s)	50.5	46.0	14.1	5.5	25.4	4.1
Level of Service	D	D	B	A	C	A
Approach Delay (s)	48.3		13.8			5.3
Approach LOS	D		B			A

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	72	426	1522	449	898	835
v/c Ratio	0.41	0.28	0.99	0.29	0.79	0.28
Control Delay	56.5	0.5	63.9	0.3	31.1	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.5	0.5	63.9	0.3	31.1	0.9
Queue Length 50th (ft)	53	0	~699	0	208	7
Queue Length 95th (ft)	98	0	#977	0	217	16
Internal Link Dist (ft)	319		2190			575
Turn Bay Length (ft)					575	
Base Capacity (vph)	285	1531	1533	1531	1302	2932
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.28	0.99	0.29	0.69	0.28

Intersection Summary

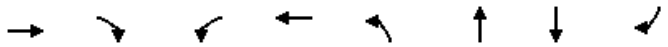
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	66	392	1400	413	826	768
Future Volume (vph)	66	392	1400	413	826	768
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1531	3421	1531	3319	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1711	1531	3421	1531	3319	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	426	1522	449	898	835
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	72	426	1522	449	898	835
Turn Type	Prot	Free	NA	Free	Prot	NA
Protected Phases	4		6		5 7	2 5 7
Permitted Phases		Free		Free		
Actuated Green, G (s)	9.1	120.0	49.6	120.0	37.8	99.4
Effective Green, g (s)	11.1	120.0	52.6	120.0	39.8	102.4
Actuated g/C Ratio	0.09	1.00	0.44	1.00	0.33	0.85
Clearance Time (s)	6.0		7.0			
Vehicle Extension (s)	3.0		5.0			
Lane Grp Cap (vph)	158	1531	1499	1531	1100	2919
v/s Ratio Prot	c0.04		c0.44		c0.27	0.24
v/s Ratio Perm		0.28		0.29		
v/c Ratio	0.46	0.28	1.02	0.29	0.82	0.29
Uniform Delay, d1	51.6	0.0	33.7	0.0	36.8	1.7
Progression Factor	1.00	1.00	1.47	1.00	1.10	0.31
Incremental Delay, d2	2.1	0.5	22.7	0.3	3.3	0.0
Delay (s)	53.7	0.5	72.2	0.3	43.7	0.6
Level of Service	D	A	E	A	D	A
Approach Delay (s)	8.1		55.8			22.9
Approach LOS	A		E			C

Intersection Summary			
HCM 2000 Control Delay	36.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	167	382	74	18	751	596	43	11
v/c Ratio	0.59	0.25	0.33	0.08	0.47	0.69	0.26	0.05
Control Delay	42.6	0.4	38.8	34.8	20.3	28.0	43.1	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.6	0.4	38.8	34.8	20.3	28.0	43.1	0.4
Queue Length 50th (ft)	82	0	36	9	145	260	21	0
Queue Length 95th (ft)	171	0	83	30	294	#646	63	0
Internal Link Dist (ft)	968			347		398	150	
Turn Bay Length (ft)		550	250					85
Base Capacity (vph)	645	1531	472	497	1593	862	564	543
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.25	0.16	0.04	0.47	0.69	0.08	0.02

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	152	2	351	68	17	0	691	540	8	0	40	10
Future Volume (vph)	152	2	351	68	17	0	691	540	8	0	40	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	5.0	5.0		5.0	5.0			4.0	4.0
Lane Util. Factor		1.00	1.00	1.00	1.00		0.97	1.00			1.00	1.00
Frt		1.00	0.85	1.00	1.00		1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00	0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1716	1531	1711	1801		3319	1797			1801	1531
Flt Permitted		0.95	1.00	0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (perm)		1716	1531	1711	1801		3319	1797			1801	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	165	2	382	74	18	0	751	587	9	0	43	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	1	0	0	0	10
Lane Group Flow (vph)	0	167	382	74	18	0	751	595	0	0	43	1
Turn Type	Split	NA	Free	Split	NA		Split	NA			NA	Prot
Protected Phases	3	3		4	4		2	2			1	1
Permitted Phases			Free							1		
Actuated Green, G (s)		13.7	84.9	9.0	9.0		39.5	39.5			4.7	4.7
Effective Green, g (s)		13.7	84.9	9.0	9.0		39.5	39.5			4.7	4.7
Actuated g/C Ratio		0.16	1.00	0.11	0.11		0.47	0.47			0.06	0.06
Clearance Time (s)		4.0		5.0	5.0		5.0	5.0			4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0		5.0	5.0			3.0	3.0
Lane Grp Cap (vph)		276	1531	181	190		1544	836			99	84
v/s Ratio Prot		c0.10		c0.04	0.01		0.23	c0.33			0.02	0.00
v/s Ratio Perm			c0.25									
v/c Ratio		0.61	0.25	0.41	0.09		0.49	0.71			0.43	0.01
Uniform Delay, d1		33.1	0.0	35.5	34.3		15.7	18.2			38.8	37.9
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		3.7	0.4	1.5	0.2		1.1	5.1			3.0	0.0
Delay (s)		36.8	0.4	37.0	34.5		16.8	23.3			41.8	37.9
Level of Service		D	A	D	C		B	C			D	D
Approach Delay (s)		11.5			36.5			19.7			41.1	
Approach LOS		B			D			B			D	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	84.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	87	21	447	176	157	118	435	27	30
v/c Ratio	0.13	0.03	0.81	0.13	0.13	0.59	0.77	0.26	0.09
Control Delay	31.2	0.1	52.3	6.5	1.4	66.4	15.1	66.8	39.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	0.1	52.3	6.5	1.4	66.4	15.1	66.8	39.8
Queue Length 50th (ft)	51	0	341	42	0	98	0	22	19
Queue Length 95th (ft)	103	0	#560	88	24	167	110	58	47
Internal Link Dist (ft)	269			383		290			249
Turn Bay Length (ft)		125	300		150				
Base Capacity (vph)	670	619	637	1415	1237	499	752	283	886
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.03	0.70	0.12	0.13	0.24	0.58	0.10	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	80	19	411	162	144	15	94	400	25	26	2
Future Volume (vph)	0	80	19	411	162	144	15	94	400	25	26	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.99	
Flt Protected		1.00	1.00	0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)		1801	1531	1711	1801	1531		1789	1531	1711	1783	
Flt Permitted		1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (perm)		1801	1531	1711	1801	1531		1723	1531	1711	1783	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	87	21	447	176	157	16	102	435	27	28	2
RTOR Reduction (vph)	0	0	13	0	0	43	0	0	385	0	2	0
Lane Group Flow (vph)	0	87	8	447	176	114	0	118	50	27	28	0
Turn Type	Perm	NA	Perm	Prot	NA	Prot	Perm	NA	Prot	Prot	NA	
Protected Phases		6		5	2	2		8	8	7	4	
Permitted Phases	6		6				8					
Actuated Green, G (s)		46.0	46.0	39.8	90.8	90.8		14.3	14.3	4.7	24.0	
Effective Green, g (s)		46.0	46.0	39.8	90.8	90.8		14.3	14.3	4.7	24.0	
Actuated g/C Ratio		0.37	0.37	0.32	0.72	0.72		0.11	0.11	0.04	0.19	
Clearance Time (s)		5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		5.0	5.0	3.0	5.0	5.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		661	562	543	1305	1109		196	174	64	341	
v/s Ratio Prot		0.05		c0.26	c0.10	0.07			0.03	c0.02	0.02	
v/s Ratio Perm			0.01					c0.07				
v/c Ratio		0.13	0.01	0.82	0.13	0.10		0.60	0.29	0.42	0.08	
Uniform Delay, d1		26.4	25.2	39.5	5.3	5.1		52.8	50.8	59.0	41.6	
Progression Factor		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.4	0.0	9.8	0.2	0.2		5.1	0.9	4.4	0.1	
Delay (s)		26.8	25.3	49.3	5.5	5.3		57.9	51.7	63.4	41.7	
Level of Service		C	C	D	A	A		E	D	E	D	
Approach Delay (s)		26.5			30.6			53.0			52.0	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	125.3	Sum of lost time (s)	20.5
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Group Flow (vph)	208	273	229	1717	1459	555
v/c Ratio	0.69	0.58	0.80	0.66	0.77	0.52
Control Delay	57.9	10.1	83.0	5.2	16.7	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0
Total Delay	57.9	10.1	83.0	5.2	16.8	2.2
Queue Length 50th (ft)	152	0	177	36	462	22
Queue Length 95th (ft)	226	74	m207	m170	356	51
Internal Link Dist (ft)	755			2381	681	
Turn Bay Length (ft)		185	225			
Base Capacity (vph)	370	524	297	2588	1902	1070
Starvation Cap Reductn	0	0	0	0	46	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.52	0.77	0.66	0.79	0.52

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	191	251	211	1580	1342	511
Future Volume (vph)	191	251	211	1580	1342	511
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1711	1531	1711	3421	3421	1531
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1711	1531	1711	3421	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	208	273	229	1717	1459	555
RTOR Reduction (vph)	0	229	0	0	0	219
Lane Group Flow (vph)	208	44	229	1717	1459	336
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		1	6	2	
Permitted Phases	4	4				2
Actuated Green, G (s)	19.2	19.2	19.0	89.3	65.3	65.3
Effective Green, g (s)	21.2	19.2	20.0	90.8	66.8	66.8
Actuated g/C Ratio	0.18	0.16	0.17	0.76	0.56	0.56
Clearance Time (s)	6.0	6.0	5.0	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	6.0
Lane Grp Cap (vph)	302	244	285	2588	1904	852
v/s Ratio Prot	c0.12		c0.13	0.50	c0.43	
v/s Ratio Perm		0.03				0.22
v/c Ratio	0.69	0.18	0.80	0.66	0.77	0.39
Uniform Delay, d1	46.3	43.6	48.1	7.1	20.6	15.1
Progression Factor	1.00	1.00	1.50	0.57	0.67	0.46
Incremental Delay, d2	6.4	0.4	8.3	0.7	1.7	0.8
Delay (s)	52.7	43.9	80.5	4.7	15.6	7.8
Level of Service	D	D	F	A	B	A
Approach Delay (s)	47.7			13.7	13.4	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	118	1805	2008	509	40	7
v/c Ratio	0.57	0.59	0.80	0.42	0.18	0.00
Control Delay	61.4	1.4	15.4	3.3	54.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.4	1.4	15.4	3.3	54.5	0.0
Queue Length 50th (ft)	93	11	526	48	15	0
Queue Length 95th (ft)	m144	113	m592	m60	33	0
Internal Link Dist (ft)		681	1012		359	
Turn Bay Length (ft)	225					
Base Capacity (vph)	285	3050	2499	1217	553	1531
Starvation Cap Reductn	0	84	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.61	0.80	0.42	0.07	0.00

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	109	1661	1847	468	37	6
Future Volume (vph)	109	1661	1847	468	37	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	3319	1531
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1711	3421	3421	1531	3319	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	118	1805	2008	509	40	7
RTOR Reduction (vph)	0	0	0	102	0	0
Lane Group Flow (vph)	118	1805	2008	407	40	7
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	1	6	2		4	
Permitted Phases				2		Free
Actuated Green, G (s)	13.5	103.7	85.2	85.2	5.8	120.0
Effective Green, g (s)	14.5	105.2	86.7	86.7	6.8	120.0
Actuated g/C Ratio	0.12	0.88	0.72	0.72	0.06	1.00
Clearance Time (s)	5.0	5.5	5.5	5.5	5.0	
Vehicle Extension (s)	3.0	0.2	0.2	0.2	3.0	
Lane Grp Cap (vph)	206	2999	2471	1106	188	1531
v/s Ratio Prot	0.07	c0.53	c0.59		c0.01	
v/s Ratio Perm				0.27		0.00
v/c Ratio	0.57	0.60	0.81	0.37	0.21	0.00
Uniform Delay, d1	49.8	1.9	11.2	6.3	54.0	0.0
Progression Factor	1.08	0.34	1.07	1.26	1.00	1.00
Incremental Delay, d2	2.9	0.7	1.7	0.5	0.6	0.0
Delay (s)	56.8	1.3	13.7	8.5	54.6	0.0
Level of Service	E	A	B	A	D	A
Approach Delay (s)		4.7	12.7		46.5	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	SBR	NWL	NWR2
Lane Group Flow (vph)	1649	197	79	805	1691	20	11
v/c Ratio	0.61	0.13	0.30	0.27	1.09	0.18	0.01
Control Delay	6.2	0.1	6.4	1.9	55.1	55.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.2	0.1	6.4	1.9	55.1	55.8	0.0
Queue Length 50th (ft)	131	0	5	27	~214	15	0
Queue Length 95th (ft)	368	0	32	81	#480	40	0
Internal Link Dist (ft)	1012			765		262	
Turn Bay Length (ft)		50	350				
Base Capacity (vph)	2707	1531	501	2965	1558	285	1531
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.13	0.16	0.27	1.09	0.07	0.01

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2
Lane Configurations		↑↑	↱	↰	↑↑			↱	↰		↱
Traffic Volume (vph)	0	1517	181	73	741	0	0	1556	18	0	10
Future Volume (vph)	0	1517	181	73	741	0	0	1556	18	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0			4.0	4.0		4.0
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00		1.00
Frt		1.00	0.85	1.00	1.00			0.86	1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00			1.00	0.95		1.00
Satd. Flow (prot)		3421	1531	1711	3421			1558	1711		1531
Flt Permitted		1.00	1.00	0.11	1.00			1.00	0.95		1.00
Satd. Flow (perm)		3421	1531	201	3421			1558	1711		1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1649	197	79	805	0	0	1691	20	0	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1649	197	79	805	0	0	1691	20	0	11
Turn Type		NA	Free	pm+pt	NA			Free	Prot		Free
Protected Phases		6		5	2				4		
Permitted Phases			Free	2				Free			Free
Actuated Green, G (s)		92.5	120.0	102.5	102.5			120.0	7.0		120.0
Effective Green, g (s)		94.0	120.0	103.0	104.0			120.0	8.0		120.0
Actuated g/C Ratio		0.78	1.00	0.86	0.87			1.00	0.07		1.00
Clearance Time (s)		5.5		4.5	5.5				5.0		
Vehicle Extension (s)		5.0		3.0	5.0				3.0		
Lane Grp Cap (vph)		2679	1531	248	2964			1558	114		1531
v/s Ratio Prot		0.48		0.02	0.24				0.01		
v/s Ratio Perm			0.13	0.26				c1.09			0.01
v/c Ratio		0.62	0.13	0.32	0.27			1.09	0.18		0.01
Uniform Delay, d1		5.4	0.0	4.7	1.4			60.0	52.9		0.0
Progression Factor		0.91	1.00	2.91	1.12			1.00	1.00		1.00
Incremental Delay, d2		0.9	0.1	0.7	0.2			49.8	0.7		0.0
Delay (s)		5.8	0.1	14.5	1.8			109.8	53.6		0.0
Level of Service		A	A	B	A			F	D		A
Approach Delay (s)		5.2			2.9		109.8		34.6		
Approach LOS		A			A		F		C		

Intersection Summary			
HCM 2000 Control Delay	44.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	NWL
Lane Group Flow (vph)	1490	707	750	134
v/c Ratio	0.55	0.53	0.28	0.54
Control Delay	4.5	1.9	2.8	54.7
Queue Delay	0.1	0.1	0.0	0.0
Total Delay	4.6	2.0	2.8	54.7
Queue Length 50th (ft)	121	26	56	97
Queue Length 95th (ft)	131	32	73	155
Internal Link Dist (ft)	765		418	135
Turn Bay Length (ft)				
Base Capacity (vph)	2692	1345	2692	456
Starvation Cap Reductn	172	105	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.59	0.57	0.28	0.29

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	1371	650	0	690	123	0
Future Volume (vph)	1371	650	0	690	123	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5		4.0	4.0	
Lane Util. Factor	0.95	1.00		0.95	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	1.00	1.00		1.00	0.95	
Satd. Flow (prot)	3421	1531		3421	1711	
Flt Permitted	1.00	1.00		1.00	0.95	
Satd. Flow (perm)	3421	1531		3421	1711	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1490	707	0	750	134	0
RTOR Reduction (vph)	0	160	0	0	0	0
Lane Group Flow (vph)	1490	547	0	750	134	0
Turn Type	NA	Perm		NA	Prot	
Protected Phases	6			2	4	
Permitted Phases		6				
Actuated Green, G (s)	92.9	92.9		92.9	16.6	
Effective Green, g (s)	94.4	92.9		94.4	17.6	
Actuated g/C Ratio	0.79	0.77		0.79	0.15	
Clearance Time (s)	5.5	5.5		5.5	5.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	2691	1185		2691	250	
v/s Ratio Prot	c0.44			0.22	c0.08	
v/s Ratio Perm		0.36				
v/c Ratio	0.55	0.46		0.28	0.54	
Uniform Delay, d1	4.8	4.8		3.5	47.4	
Progression Factor	0.70	1.50		0.66	1.00	
Incremental Delay, d2	0.7	1.2		0.2	4.0	
Delay (s)	4.1	8.3		2.5	51.4	
Level of Service	A	A		A	D	
Approach Delay (s)	5.5			2.5	51.4	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	114	536	30	627	871	48
v/c Ratio	0.14	0.35	0.08	0.59	0.89	0.05
Control Delay	33.6	0.6	24.1	32.6	33.9	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.9	0.0
Total Delay	33.6	0.6	24.1	32.6	34.8	5.6
Queue Length 50th (ft)	33	0	14	185	536	4
Queue Length 95th (ft)	60	0	34	241	#854	22
Internal Link Dist (ft)	475			893	211	
Turn Bay Length (ft)			150			
Base Capacity (vph)	817	1531	459	1635	981	893
Starvation Cap Reductn	0	0	0	0	22	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.35	0.07	0.38	0.91	0.05

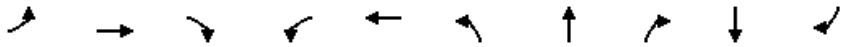
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	105	493	28	577	801	44
Future Volume (vph)	105	493	28	577	801	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	4.0	5.0	6.0	6.0	6.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3421	1531	1711	3421	1711	1531
Flt Permitted	1.00	1.00	0.57	1.00	0.95	1.00
Satd. Flow (perm)	3421	1531	1021	3421	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	114	536	30	627	871	48
RTOR Reduction (vph)	0	0	0	0	0	15
Lane Group Flow (vph)	114	536	30	627	871	33
Turn Type	NA	Free	pm+pt	NA	Prot	Prot
Protected Phases	6		5	2	4	4
Permitted Phases		Free	2			
Actuated Green, G (s)	25.1	107.1	34.9	34.9	60.2	60.2
Effective Green, g (s)	25.1	107.1	34.9	34.9	60.2	60.2
Actuated g/C Ratio	0.23	1.00	0.33	0.33	0.56	0.56
Clearance Time (s)	6.0		5.0	6.0	6.0	6.0
Vehicle Extension (s)	3.5		3.5	3.5	5.0	5.0
Lane Grp Cap (vph)	801	1531	363	1114	961	860
v/s Ratio Prot	0.03		0.00	c0.18	c0.51	0.02
v/s Ratio Perm		0.35	0.02			
v/c Ratio	0.14	0.35	0.08	0.56	0.91	0.04
Uniform Delay, d1	32.5	0.0	24.9	29.8	20.9	10.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.6	0.1	2.1	12.6	0.0
Delay (s)	32.8	0.6	25.0	31.9	33.5	10.5
Level of Service	C	A	C	C	C	B
Approach Delay (s)	6.3			31.5	32.3	
Approach LOS	A			C	C	

Intersection Summary			
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	107.1	Sum of lost time (s)	17.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	789	489	226	365	835	92	146	242	97	491
v/c Ratio	0.88	0.28	0.15	0.64	0.59	0.31	0.38	0.16	0.32	0.32
Control Delay	62.4	16.7	0.2	58.6	19.1	53.5	42.9	0.2	53.5	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.4	16.7	0.2	58.6	19.1	53.5	42.9	0.2	53.5	0.6
Queue Length 50th (ft)	299	71	0	101	294	35	98	0	37	0
Queue Length 95th (ft)	#472	127	0	172	324	60	153	0	64	0
Internal Link Dist (ft)		871			1398		1013		384	
Turn Bay Length (ft)	445		445	615		300		400		
Base Capacity (vph)	899	1765	1531	570	1425	553	660	1531	570	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.28	0.15	0.64	0.59	0.17	0.22	0.16	0.17	0.32

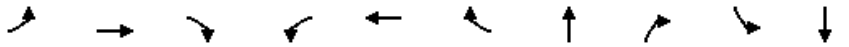
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	726	450	208	336	768	0	85	134	223	0	89	452
Future Volume (vph)	726	450	208	336	768	0	85	134	223	0	89	452
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		0.97	1.00	1.00		0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (perm)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	789	489	226	365	835	0	92	146	242	0	97	491
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	789	489	226	365	835	0	92	146	242	0	97	491
Turn Type	Prot	NA	Free	Prot	NA		Prot	NA	Free		NA	Free
Protected Phases	1	6		5	2		7	4			8	
Permitted Phases			Free						Free			Free
Actuated Green, G (s)	31.5	59.9	120.0	19.6	48.0		8.7	23.5	120.0		8.8	120.0
Effective Green, g (s)	32.5	61.9	120.0	20.6	50.0		10.7	25.5	120.0		10.8	120.0
Actuated g/C Ratio	0.27	0.52	1.00	0.17	0.42		0.09	0.21	1.00		0.09	1.00
Clearance Time (s)	5.0	6.0		5.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	898	1764	1531	569	1425		295	382	1531		307	1531
v/s Ratio Prot	c0.24	0.14		0.11	c0.24		0.03	c0.08			0.03	
v/s Ratio Perm			0.15						0.16			c0.32
v/c Ratio	0.88	0.28	0.15	0.64	0.59		0.31	0.38	0.16		0.32	0.32
Uniform Delay, d1	41.9	16.4	0.0	46.3	27.0		51.2	40.5	0.0		51.1	0.0
Progression Factor	1.24	0.94	1.00	1.17	0.65		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	8.4	0.3	0.2	2.1	1.5		0.6	0.6	0.2		0.6	0.6
Delay (s)	60.4	15.7	0.2	56.4	18.9		51.8	41.1	0.2		51.7	0.6
Level of Service	E	B	A	E	B		D	D	A		D	A
Approach Delay (s)		36.8			30.3			22.6			9.0	
Approach LOS		D			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	28.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	114	536	83	67	1086	664	93	39	82	78
v/c Ratio	0.36	0.27	0.05	0.12	0.57	0.43	0.47	0.14	0.45	0.39
Control Delay	21.3	23.2	0.1	2.7	9.9	0.8	56.7	1.0	57.1	35.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.3	23.2	0.1	2.7	9.9	0.8	56.7	1.0	57.1	35.5
Queue Length 50th (ft)	49	127	0	6	188	0	68	0	63	34
Queue Length 95th (ft)	127	251	0	m7	254	0	119	0	114	83
Internal Link Dist (ft)		1398			1719		314			276
Turn Bay Length (ft)	275			375		475				
Base Capacity (vph)	373	2016	1531	629	1912	1531	288	361	270	287
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.27	0.05	0.11	0.57	0.43	0.32	0.11	0.30	0.27

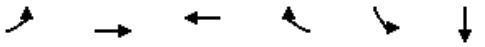
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	493	76	62	999	611	71	15	36	97	17	34
Future Volume (vph)	105	493	76	62	999	611	71	15	36	97	17	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	0.95	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.99	
Satd. Flow (prot)	1711	3421	1531	1711	3421	1531		1729	1531	1625	1566	
Flt Permitted	0.17	1.00	1.00	0.43	1.00	1.00		0.96	1.00	0.95	0.99	
Satd. Flow (perm)	313	3421	1531	782	3421	1531		1729	1531	1625	1566	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	114	536	83	67	1086	664	77	16	39	105	18	37
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	35	0	28	0
Lane Group Flow (vph)	114	536	83	67	1086	664	0	93	4	82	50	0
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Split	NA	Perm	Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6		Free	2		Free			3			
Actuated Green, G (s)	76.5	67.7	120.0	71.1	65.0	120.0		11.8	11.8	11.4	11.4	
Effective Green, g (s)	78.5	69.7	120.0	73.1	67.0	120.0		13.8	13.8	13.4	13.4	
Actuated g/C Ratio	0.65	0.58	1.00	0.61	0.56	1.00		0.12	0.12	0.11	0.11	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	318	1987	1531	531	1910	1531		198	176	181	174	
v/s Ratio Prot	0.03	0.16		0.01	c0.32			0.05		0.05	0.03	
v/s Ratio Perm	0.20		0.05	0.07		c0.43			0.00			
v/c Ratio	0.36	0.27	0.05	0.13	0.57	0.43		0.47	0.03	0.45	0.28	
Uniform Delay, d1	10.7	12.5	0.0	9.6	17.1	0.0		49.7	47.1	49.9	48.9	
Progression Factor	2.22	1.65	1.00	0.27	0.46	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.3	0.1	0.1	1.1	0.8		1.8	0.1	1.8	0.9	
Delay (s)	24.4	20.9	0.1	2.7	9.0	0.8		51.4	47.2	51.7	49.8	
Level of Service	C	C	A	A	A	A		D	D	D	D	
Approach Delay (s)		19.1			5.8			50.2			50.8	
Approach LOS		B			A			D			D	

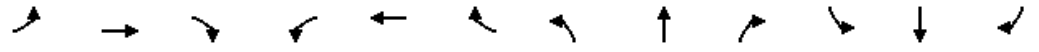
Intersection Summary			
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBT
Lane Group Flow (vph)	11	361	1395	284	176	171
v/c Ratio	0.05	0.14	0.54	0.24	0.61	0.50
Control Delay	11.1	9.5	11.9	4.8	53.6	29.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.1	9.5	11.9	4.8	53.6	29.2
Queue Length 50th (ft)	4	70	256	31	133	71
Queue Length 95th (ft)	22	150	568	144	197	135
Internal Link Dist (ft)		1633	378			130
Turn Bay Length (ft)	415			200	175	
Base Capacity (vph)	215	2581	2581	1201	595	620
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.14	0.54	0.24	0.30	0.28

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	332	0	0	1283	261	0	0	0	261	0	58
Future Volume (vph)	10	332	0	0	1283	261	0	0	0	261	0	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95	1.00				0.95	0.95	
Frt	1.00	1.00			1.00	0.85				1.00	0.94	
Flt Protected	0.95	1.00			1.00	1.00				0.95	0.97	
Satd. Flow (prot)	1711	3421			3421	1531				1625	1567	
Flt Permitted	0.16	1.00			1.00	1.00				0.95	0.97	
Satd. Flow (perm)	285	3421			3421	1531				1625	1567	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	361	0	0	1395	284	0	0	0	284	0	63
RTOR Reduction (vph)	0	0	0	0	0	47	0	0	0	0	60	0
Lane Group Flow (vph)	11	361	0	0	1395	237	0	0	0	176	111	0
Turn Type	Perm	NA		Perm	NA	Perm				Split	NA	
Protected Phases		6			2		3	3		4	4	
Permitted Phases	6	6		2	2	2						
Actuated Green, G (s)	88.6	88.6			88.6	88.6				20.4	20.4	
Effective Green, g (s)	90.6	90.6			90.6	90.6				21.4	21.4	
Actuated g/C Ratio	0.75	0.75			0.75	0.75				0.18	0.18	
Clearance Time (s)	6.0	6.0			6.0	6.0				5.0	5.0	
Vehicle Extension (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Lane Grp Cap (vph)	215	2582			2582	1155				289	279	
v/s Ratio Prot		0.11			c0.41					c0.11	0.07	
v/s Ratio Perm	0.04					0.16						
v/c Ratio	0.05	0.14			0.54	0.21				0.61	0.40	
Uniform Delay, d1	3.7	4.0			6.1	4.3				45.4	43.6	
Progression Factor	1.97	2.05			1.64	2.36				1.00	1.00	
Incremental Delay, d2	0.4	0.1			0.7	0.3				5.3	1.9	
Delay (s)	7.8	8.4			10.7	10.4				50.7	45.5	
Level of Service	A	A			B	B				D	D	
Approach Delay (s)		8.3			10.6			0.0			48.2	
Approach LOS		A			B			A			D	

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	0	18	24	1	39	31	1491	6	12	564	25
Future Volume (Veh/h)	20	0	18	24	1	39	31	1491	6	12	564	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	0	20	26	1	42	34	1621	7	13	613	27
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1574	2348	320	2045	2358	814	640			1628		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1574	2348	320	2045	2358	814	640			1628		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	63	100	97	13	97	87	96			97		
cM capacity (veh/h)	60	33	676	30	33	321	940			395		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	42	69	34	1081	547	13	409	231
Volume Left	22	26	34	0	0	13	0	0
Volume Right	20	42	0	0	7	0	0	27
cSH	106	67	940	1700	1700	395	1700	1700
Volume to Capacity	0.40	1.03	0.04	0.64	0.32	0.03	0.24	0.14
Queue Length 95th (ft)	41	130	3	0	0	3	0	0
Control Delay (s)	60.0	222.3	9.0	0.0	0.0	14.4	0.0	0.0
Lane LOS	F	F	A			B		
Approach Delay (s)	60.0	222.3	0.2			0.3		
Approach LOS	F	F						

Intersection Summary				
Average Delay	7.6			
Intersection Capacity Utilization	52.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	25	14	51	61	1611	13	7	660	29
v/c Ratio	0.20	0.03	0.34	0.10	0.55	0.01	0.03	0.24	0.02
Control Delay	54.0	0.1	36.5	2.0	4.6	0.0	1.2	4.5	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	0.1	36.5	2.0	4.6	0.0	1.2	4.5	1.1
Queue Length 50th (ft)	18	0	19	5	134	0	1	103	0
Queue Length 95th (ft)	46	0	58	14	350	0	m1	138	8
Internal Link Dist (ft)		254	405		1830			1619	
Turn Bay Length (ft)				300		100	225		225
Base Capacity (vph)	291	659	324	756	2924	1319	451	2735	1238
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.02	0.16	0.08	0.55	0.01	0.02	0.24	0.02

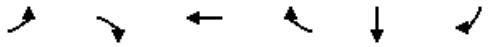
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	0	13	23	1	23	56	1482	12	6	607	27
Future Volume (vph)	23	0	13	23	1	23	56	1482	12	6	607	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.85			0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1711	1531			1641		1711	3421	1531	1711	3421	1531
Flt Permitted	0.75	1.00			0.84		0.38	1.00	1.00	0.13	1.00	1.00
Satd. Flow (perm)	1346	1531			1408		676	3421	1531	238	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	0	14	25	1	25	61	1611	13	7	660	29
RTOR Reduction (vph)	0	13	0	0	23	0	0	0	3	0	0	7
Lane Group Flow (vph)	25	1	0	0	28	0	61	1611	10	7	660	22
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			6		6	2		2
Actuated Green, G (s)	7.4	7.4			7.4		98.7	94.0	94.0	91.5	90.4	90.4
Effective Green, g (s)	9.4	9.4			9.4		100.7	96.5	96.5	93.5	92.9	92.9
Actuated g/C Ratio	0.08	0.08			0.08		0.84	0.80	0.80	0.78	0.77	0.77
Clearance Time (s)	6.0	6.0			6.0		5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0			3.0		2.5	5.0	5.0	2.5	5.0	5.0
Lane Grp Cap (vph)	105	119			110		616	2751	1231	211	2648	1185
v/s Ratio Prot		0.00					c0.00	c0.47		0.00	0.19	
v/s Ratio Perm	0.02				c0.02		0.08		0.01	0.03		0.01
v/c Ratio	0.24	0.01			0.25		0.10	0.59	0.01	0.03	0.25	0.02
Uniform Delay, d1	51.9	51.0			52.0		1.8	4.3	2.3	3.7	3.8	3.1
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	0.54	1.02	1.00
Incremental Delay, d2	1.2	0.0			1.2		0.1	0.9	0.0	0.0	0.2	0.0
Delay (s)	53.1	51.0			53.2		1.8	5.3	2.3	2.1	4.1	3.1
Level of Service	D	D			D		A	A	A	A	A	A
Approach Delay (s)		52.4			53.2			5.1			4.0	
Approach LOS		D			D			A			A	

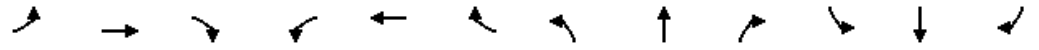
Intersection Summary			
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBR	WBT	WBR	SBT	SBR
Lane Group Flow (vph)	214	342	589	209	71	41
v/c Ratio	0.54	0.15	0.29	0.21	0.27	0.19
Control Delay	46.1	0.6	11.1	2.2	46.0	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.1	0.6	11.1	2.2	46.0	2.1
Queue Length 50th (ft)	67	0	94	0	22	0
Queue Length 95th (ft)	102	10	141	33	45	0
Internal Link Dist (ft)			782		297	
Turn Bay Length (ft)	420			600		
Base Capacity (vph)	1034	2321	2047	1000	1066	547
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.15	0.29	0.21	0.07	0.07

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	197	0	315	0	542	192	0	0	0	0	65	38
Future Volume (vph)	197	0	315	0	542	192	0	0	0	0	65	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		9.0		9.0	9.0					8.0	8.0
Lane Util. Factor	0.97		0.88		0.95	1.00					0.95	1.00
Frt	1.00		0.85		1.00	0.85					1.00	0.85
Flt Protected	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (prot)	3319		2694		3421	1531					3421	1531
Flt Permitted	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (perm)	3319		2694		3421	1531					3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	214	0	342	0	589	209	0	0	0	0	71	41
RTOR Reduction (vph)	0	0	80	0	0	86	0	0	0	0	0	38
Lane Group Flow (vph)	214	0	262	0	589	123	0	0	0	0	71	3
Turn Type	Prot		Prot		NA	Perm					NA	Perm
Protected Phases	1		6		2						4	
Permitted Phases						2						4
Actuated Green, G (s)	11.5		75.4		57.9	57.9					6.1	6.1
Effective Green, g (s)	11.5		75.4		57.9	57.9					6.1	6.1
Actuated g/C Ratio	0.12		0.77		0.59	0.59					0.06	0.06
Clearance Time (s)	6.0		9.0		9.0	9.0					8.0	8.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0					3.0	3.0
Lane Grp Cap (vph)	387		2062		2010	899					211	94
v/s Ratio Prot	c0.06		0.10		c0.17						c0.02	
v/s Ratio Perm						0.08						0.00
v/c Ratio	0.55		0.13		0.29	0.14					0.34	0.03
Uniform Delay, d1	41.1		3.0		10.1	9.1					44.3	43.4
Progression Factor	1.00		1.00		1.00	1.00					1.00	1.00
Incremental Delay, d2	1.7		0.1		0.1	0.1					0.9	0.1
Delay (s)	42.8		3.1		10.2	9.2					45.2	43.5
Level of Service	D		A		B	A					D	D
Approach Delay (s)		18.4			9.9			0.0			44.6	
Approach LOS		B			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	98.5	Sum of lost time (s)	23.0
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	404	226	1687	197	361	197
v/c Ratio	0.00	0.60	0.37	0.65	0.22	0.48	0.08
Control Delay	0.0	48.2	26.2	20.9	2.6	49.6	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	0.0	48.2	26.2	20.9	2.6	49.6	4.9
Queue Length 50th (ft)	0	140	104	309	0	87	19
Queue Length 95th (ft)	0	245	217	444	37	152	36
Internal Link Dist (ft)				1519			448
Turn Bay Length (ft)			600		1000	425	
Base Capacity (vph)	996	922	1142	4088	1306	2421	3418
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.44	0.20	0.41	0.15	0.15	0.06

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	1	372	0	208	0	1552	181	332	180	1
Future Volume (vph)	0	0	1	372	0	208	0	1552	181	332	180	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	4.0		4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor			1.00	0.97		1.00		0.91	1.00	0.94	0.95	
Frt			0.86	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected			1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			1558	3319		1531		4916	1531	4824	3419	
Flt Permitted			1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)			1558	3319		1531		4916	1531	4824	3419	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1	404	0	226	0	1687	197	361	196	1
RTOR Reduction (vph)	0	0	1	0	0	13	0	0	91	0	0	0
Lane Group Flow (vph)	0	0	0	404	0	213	0	1687	106	361	197	0
Turn Type			Perm	Prot		pt+ov		NA	Perm	Prot	NA	
Protected Phases				4		4 5		6		5	2	
Permitted Phases			4						6			
Actuated Green, G (s)			21.7	21.7		43.7		59.0	59.0	16.0	81.0	
Effective Green, g (s)			21.7	23.7		45.7		62.0	62.0	18.0	84.0	
Actuated g/C Ratio			0.19	0.20		0.39		0.54	0.54	0.16	0.73	
Clearance Time (s)			6.0	6.0				7.0	7.0	6.0	7.0	
Vehicle Extension (s)			3.0	3.0				5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)			292	679		604		2634	820	750	2482	
v/s Ratio Prot				c0.12		0.14		c0.34		c0.07	0.06	
v/s Ratio Perm			0.00						0.07			
v/c Ratio			0.00	0.59		0.35		0.64	0.13	0.48	0.08	
Uniform Delay, d1			38.2	41.7		24.6		19.0	13.4	44.6	4.6	
Progression Factor			1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2			0.0	1.4		0.4		0.7	0.1	0.5	0.0	
Delay (s)			38.2	43.1		25.0		19.7	13.5	45.1	4.6	
Level of Service			D	D		C		B	B	D	A	
Approach Delay (s)		38.2			36.6			19.1			30.8	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	115.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	152	373	22	511	1400	218	471	121	89	390
v/c Ratio	0.33	0.17	0.06	0.54	0.91	0.32	0.68	0.30	0.21	0.74
Control Delay	16.6	18.9	15.9	34.0	11.0	36.8	39.0	45.0	44.4	14.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	18.9	15.9	34.0	11.0	36.8	39.0	45.0	44.4	14.7
Queue Length 50th (ft)	46	41	6	134	0	57	121	34	25	3
Queue Length 95th (ft)	114	102	25	257	#27	120	237	79	63	107
Internal Link Dist (ft)		1548		585			1389		1519	
Turn Bay Length (ft)	350		425			350		490		300
Base Capacity (vph)	642	3091	709	2159	1531	1379	1373	1588	1637	933
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.12	0.03	0.24	0.91	0.16	0.34	0.08	0.05	0.42

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	335	8	20	470	1288	201	276	157	111	82	359
Future Volume (vph)	140	335	8	20	470	1288	201	276	157	111	82	359
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	7.0		5.5	7.0	4.0	5.5	5.5		5.5	5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	0.95		0.97	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	4898		1711	3421	1531	3319	3235		3319	3421	1531
Flt Permitted	0.33	1.00		0.52	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	589	4898		939	3421	1531	3319	3235		3319	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	364	9	22	511	1400	218	300	171	121	89	390
RTOR Reduction (vph)	0	1	0	0	0	0	0	40	0	0	0	339
Lane Group Flow (vph)	152	372	0	22	511	1400	218	431	0	121	89	51
Turn Type	pm+pt	NA		pm+pt	NA	Free	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases	2			6		Free						4
Actuated Green, G (s)	51.5	43.6		33.7	31.3	101.6	20.0	20.0		12.1	12.1	12.1
Effective Green, g (s)	51.5	43.6		33.7	31.3	101.6	20.0	20.0		12.1	12.1	12.1
Actuated g/C Ratio	0.51	0.43		0.33	0.31	1.00	0.20	0.20		0.12	0.12	0.12
Clearance Time (s)	5.5	7.0		5.5	7.0		5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	3.0	7.0		3.0	7.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	460	2101		329	1053	1531	653	636		395	407	182
v/s Ratio Prot	0.05	0.08		0.00	0.15		0.07	0.13		0.04	0.03	
v/s Ratio Perm	0.12			0.02		c0.91						0.03
v/c Ratio	0.33	0.18		0.07	0.49	0.91	0.33	0.68		0.31	0.22	0.28
Uniform Delay, d1	14.3	17.9		23.0	28.6	0.0	35.1	37.8		40.9	40.5	40.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	0.1		0.1	1.3	10.0	0.3	2.9		0.4	0.3	0.8
Delay (s)	14.7	18.1		23.1	29.8	10.0	35.4	40.7		41.4	40.7	41.6
Level of Service	B	B		C	C	A	D	D		D	D	D
Approach Delay (s)		17.1			15.4			39.0			41.4	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	101.6	Sum of lost time (s)	23.5
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	272	5	6	439	35	4	0	8	20	1	9
Future Volume (Veh/h)	12	272	5	6	439	35	4	0	8	20	1	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	296	5	7	477	38	4	0	9	22	1	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		650			625							
pX, platoon unblocked												
vC, conflicting volume	515			301			585	851	148	674	818	238
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	515			301			585	851	148	674	818	238
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			99	100	99	93	100	99
cM capacity (veh/h)	1047			1257			383	290	872	332	304	763

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	13	148	148	5	7	238	238	38	13	33
Volume Left	13	0	0	0	7	0	0	0	4	22
Volume Right	0	0	0	5	0	0	0	38	9	10
cSH	1047	1700	1700	1700	1257	1700	1700	1700	626	399
Volume to Capacity	0.01	0.09	0.09	0.00	0.01	0.14	0.14	0.02	0.02	0.08
Queue Length 95th (ft)	1	0	0	0	0	0	0	0	2	7
Control Delay (s)	8.5	0.0	0.0	0.0	7.9	0.0	0.0	0.0	10.9	14.8
Lane LOS	A				A				B	B
Approach Delay (s)	0.4				0.1				10.9	14.8
Approach LOS									B	B

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	22.1%	ICU Level of Service	A	
Analysis Period (min)	15			

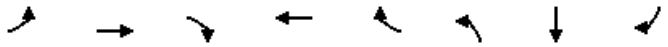
Lane Group	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	72	1693	187	55	557
v/c Ratio	0.05	0.42	0.12	0.21	0.11
Control Delay	0.1	3.1	0.2	24.4	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	0.1	3.1	0.2	24.4	0.0
Queue Length 50th (ft)	0	70	0	19	0
Queue Length 95th (ft)	0	107	0	47	0
Internal Link Dist (ft)		448			480
Turn Bay Length (ft)			485	575	
Base Capacity (vph)	1558	4916	1531	822	4916
Starvation Cap Reductn	0	436	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.38	0.12	0.07	0.11

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑			↑↑↑
Traffic Volume (vph)	0	66	1558	172	51	512
Future Volume (vph)	0	66	1558	172	51	512
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	0.91	1.00	1.00	0.91
Frt		0.86	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1558	4916	1531	1711	4916
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1558	4916	1531	1711	4916
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	72	1693	187	55	557
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	72	1693	187	55	557
Turn Type		Free	NA	Free	Prot	NA
Protected Phases			2		1	Free
Permitted Phases		Free		Free		
Actuated Green, G (s)		57.4	41.8	57.4	4.6	57.4
Effective Green, g (s)		57.4	43.8	57.4	5.6	57.4
Actuated g/C Ratio		1.00	0.76	1.00	0.10	1.00
Clearance Time (s)			6.0		5.0	
Vehicle Extension (s)			5.0		3.0	
Lane Grp Cap (vph)		1558	3751	1531	166	4916
v/s Ratio Prot			c0.34		c0.03	0.11
v/s Ratio Perm		0.05		0.12		
v/c Ratio		0.05	0.45	0.12	0.33	0.11
Uniform Delay, d1		0.0	2.5	0.0	24.2	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	0.2	0.2	1.2	0.0
Delay (s)		0.1	2.6	0.2	25.3	0.0
Level of Service		A	A	A	C	A
Approach Delay (s)	0.1		2.4			2.3
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	2.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	SBT	SBR
Lane Group Flow (vph)	108	371	29	1440	16	12	1	22
v/c Ratio	0.29	0.11	0.02	0.51	0.01	0.08	0.01	0.01
Control Delay	3.4	0.1	0.0	5.0	0.5	51.9	50.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.4	0.1	0.0	5.0	0.5	51.9	50.0	0.0
Queue Length 50th (ft)	1	0	0	92	0	9	1	0
Queue Length 95th (ft)	1	1	0	265	m0	29	7	0
Internal Link Dist (ft)		712		1633			157	
Turn Bay Length (ft)	250		350		375			
Base Capacity (vph)	494	3315	1486	2842	1283	390	390	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.11	0.02	0.51	0.01	0.03	0.00	0.01

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	341	27	0	1325	15	11	0	0	0	1	20
Future Volume (vph)	99	341	27	0	1325	15	11	0	0	0	1	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0				4.0	4.0
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	1.00				1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00				1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95				1.00	1.00
Satd. Flow (prot)	1711	3421	1531		3421	1531	1711				1801	1531
Flt Permitted	0.15	1.00	1.00		1.00	1.00	1.00				1.00	1.00
Satd. Flow (perm)	270	3421	1531		3421	1531	1801				1801	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	108	371	29	0	1440	16	12	0	0	0	1	22
RTOR Reduction (vph)	0	0	3	0	0	3	0	0	0	0	0	0
Lane Group Flow (vph)	108	371	26	0	1440	13	12	0	0	0	1	22
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm				NA	Free
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8			4		Free
Actuated Green, G (s)	106.3	106.3	106.3		92.9	92.9	1.7				1.7	120.0
Effective Green, g (s)	106.8	108.3	108.3		94.9	94.9	3.7				3.7	120.0
Actuated g/C Ratio	0.89	0.90	0.90		0.79	0.79	0.03				0.03	1.00
Clearance Time (s)	4.5	6.0	6.0		6.0	6.0	6.0				6.0	
Vehicle Extension (s)	3.0	5.0	5.0		5.0	5.0	3.0				3.0	
Lane Grp Cap (vph)	353	3087	1381		2705	1210	55				55	1531
v/s Ratio Prot	c0.02	0.11			c0.42						0.00	
v/s Ratio Perm	0.25		0.02			0.01	c0.01					0.01
v/c Ratio	0.31	0.12	0.02		0.53	0.01	0.22				0.02	0.01
Uniform Delay, d1	2.8	0.6	0.6		4.5	2.6	56.7				56.4	0.0
Progression Factor	2.34	0.16	1.00		1.09	1.00	1.00				1.00	1.00
Incremental Delay, d2	0.5	0.1	0.0		0.6	0.0	2.0				0.1	0.0
Delay (s)	7.1	0.2	0.6		5.6	2.7	58.7				56.5	0.0
Level of Service	A	A	A		A	A	E				E	A
Approach Delay (s)		1.7			5.6			58.7			2.5	
Approach LOS		A			A			E			A	

Intersection Summary			
HCM 2000 Control Delay	4.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	180	501	1460	14	8	359
v/c Ratio	0.43	0.15	0.55	0.01	0.07	0.23
Control Delay	11.0	0.2	5.0	0.0	53.1	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.0	0.2	5.0	0.0	53.1	0.4
Queue Length 50th (ft)	34	0	123	0	6	0
Queue Length 95th (ft)	134	9	290	m0	22	0
Internal Link Dist (ft)		605	712		887	
Turn Bay Length (ft)	600					600
Base Capacity (vph)	631	3322	2666	1531	285	1531
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.15	0.55	0.01	0.03	0.23

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	166	461	1343	13	7	330
Future Volume (vph)	166	461	1343	13	7	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	1711	1531
Flt Permitted	0.14	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	254	3421	3421	1531	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	180	501	1460	14	8	359
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	180	501	1460	14	8	359
Turn Type	pm+pt	NA	NA	Free	Prot	Free
Protected Phases	1	1 6	2		4	
Permitted Phases	1 6			Free		Free
Actuated Green, G (s)	100.5	106.5	86.7	120.0	1.5	120.0
Effective Green, g (s)	104.5	108.5	88.7	120.0	3.5	120.0
Actuated g/C Ratio	0.87	0.90	0.74	1.00	0.03	1.00
Clearance Time (s)	6.0		6.0		6.0	
Vehicle Extension (s)	3.0		5.0		3.0	
Lane Grp Cap (vph)	413	3093	2528	1531	49	1531
v/s Ratio Prot	c0.06	0.15	c0.43		0.00	
v/s Ratio Perm	0.32			0.01		c0.23
v/c Ratio	0.44	0.16	0.58	0.01	0.16	0.23
Uniform Delay, d1	11.3	0.6	7.1	0.0	56.8	0.0
Progression Factor	1.60	0.32	0.64	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.0	0.9	0.0	1.6	0.4
Delay (s)	18.9	0.2	5.4	0.0	58.4	0.4
Level of Service	B	A	A	A	E	A
Approach Delay (s)		5.2	5.3		1.6	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	4.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

BWI TIA MOE Table - 2022 PM Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
1	Aviation Blvd (MD 170) at Dorsey Rd (MD 176) - West	Signalized	NBL	173	74.8	E	54.7	D	72.9	E	455	197	302
			NBT	669	52.6	D					-	367	467
			NBR	168	42.7	D					250	28	96
			SBL	339	101.3	F	80.3	F			250	403	#712
			SBT	1225	85.5	F					-	~817	#1122
			SBR	387	45.8	D					175	286	477
			EBL	409	82.7	F	78.3	E			175	398	#701
			EBT	771	84.5	F					-	481	#727
			EBR	317	57.5	E					225	187	346
			WBL	189	58.5	E	64.7	E			200	159	252
			WBT	349	68.1	E					-	206	282
			WBR	-	-	-					-	-	-
2	Aviation Blvd (MD 170) at Mathison Way	Signalized	NBT	1,019	8.4	A	8.2	A	6.6	A	-	185	270
			NBR	69	5.5	A					450	0	17
			SBL	64	2.0	A	2.9	A			375	5	m7
			SBT	1,877	2.9	A					-	131	163
			WBL	82	50.5	D	48.8	D			450	64	113
			WBR	46	45.8	D					-	0	36
3	Aviation Blvd (MD 170) at Stoney Run Rd	Signalized	NBT	967	56.5	E	51.3	D	24.7	C	-	412	530
			NBR	99	0.1	A					-	0	0
			SBL	401	55.9	E	14.1	B			575	150	m137
			SBT	1,599	3.6	A					-	21	m16
			WBL	343	58.8	E	18.6	B			-	277	#477
			WBR	806	1.6	A					-	0	0
4	Stoney Run Rd at Northrop Grumman Entrance	Signalized	NBL	457	23.8	C	23.4	C	42.0	D	-	92	207
			NBT	35	20.0	B					-	12	48
			NBR	7									
			SBL	0	70.0	E	58.2	E			-	233	#616
			SBT	425									
			SBR	171	28.9	C					85	38	130
			EBL	14	34.9	C	41.5	D			-	9	29
			EBT	3									
			EBR	716	41.6	D					550	11	167
			WBL	7	48.6	D	48.1	D			250	4	22
			WBT	3	46.9	D					-	2	12
			WBR	0	0.0	A					-	-	-
5	Stoney Run Rd at New Ridge Rd	Signalized	NBL	43	66.3	E	60.3	E	52.6	D	-	93	162
			NBT	52									
			NBR	490	59.2	E					-	0	126
			SBL	107	69.8	E	60.0	E			-	103	185
			SBT	55	41.1	D					-	43	80
			SBR	0									
			EBL	1	32.9	C	36.1	D			175	1	6
			EBT	136	36.9	D					-	100	186
			EBR	32	33.2	C					125	0	0
			WBL	451	63.6	E	48.0	D			300	426	#761
			WBT	154	8.6	A					-	50	111
			WBR	25	7.7	A					150	0	6
6	Aviation Blvd (MD 170) at Amtrak Way (MD 995)	Signalized	NBL	124	38.9	D	21.8	C	49.3	D	225	35	m89
			NBT	1,649	20.5	C					-	729	#852
			SBT	1,774	83.9	F	76.2	E			-	~967	#1158
			SBR	191	5.2	A					-	29	m35
			EBL	428	48.8	D	43.0	D			-	326	441
			EBR	226	31.9	C					185	47	112
7	Aviation Blvd (MD 170) at Northrup Grumman Gate 1A	Signalized	NBL	14	43.9	D	6.7	A	13.8	B	225	11	m11
			NBT	2,063	6.4	A					-	186	307
			SBT	1,841	15.4	B	15.0	B			-	307	#1016
			SBR	62	3.8	A					-	1	m16
			EBL	386	50.1	D	38.2	D			-	159	204
			EBR	121	0.1	A					-	0	0
8	Aviation Blvd (MD 170) at SB I-195 Ramps	Signalized	NBT	2,279	17.9	B	16.7	B	14.3	B	-	638	#1234
			NBR	169	0.1	A					50	0	m0
			SBL	115	65.4	E	7.9	A			350	40	117
			SBT	951	1.0	A					-	22	33
			WBL	29	53.7	D	35.8	D			-	24	56
			WBR	15	0.0	A					-	0	0
9	Aviation Blvd (MD 170) at NB I-195 Ramps	Signalized	NBT	1,292	1.1	A	37.5	D	31.4	C	-	16	m22
			NBR	1,320	73.2	E					-	~1168	m#1327
			SBT	882	9.4	A	9.4	A			-	196	272
			WBL	181	50.8	D	50.8	D			-	142	207
10	Terminal Rd at Elkridge Landing Rd	Signalized	NBL	460	27.2	C	26.3	C	12.7	B	-	212	335
			NBR	40	14.9	B					-	0	18
			EBT	426	20.2	C	8.1	A			-	94	175
			EBR	1,034	3.2	A					-	0	0
			WBL	34	11.7	B	11.8	B			150	9	32
			WBT	162	11.8	B					-	24	55

BWI TIA MOE Table - 2022 PM Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
11	Aviation Blvd (MD 170) at Terminal Rd	Signalized	NBL	163	50.9	D	19.3	B	19.7	B	300	67	102
			NBT	119	37.2	D					-	81	130
			NBR	385	0.4	A					400	0	0
			SBT	120	51.3	D	7.9	A			-	50	81
			SBR	947	2.4	A					-	0	0
			EBL	381	50.6	D	24.3	C			445	149	200
			EBT	777	16.1	B					-	228	341
			EBR	150	0.1	A					445	0	0
			WBL	253	27.9	C	28.4	C			615	114	m119
			WBT	536	28.6	C					-	197	m247
			WBR	0	0.0	A					-	0	0
12	Aviation Blvd (MD 170) at Air Cargo Dr	Signalized	NBL	112	51.2	D	48.0	D	53.8	D	-	100	158
			NBT	13									
			NBR	66	42.1	D					-	0	4
			SBL	480	148.2	F	141.7	F			-	~292	#481
			SBT	15	135.1	F					-	~270	#460
			SBR	65									
			EBL	44	14.5	B	30.9	C			275	26	49
			EBT	1001	35.2	D					-	436	522
			EBR	117	0.1	A					-	0	0
			WBL	40	20.0	B	25.6	C			375	22	44
			WBT	611	30.8	C					-	266	334
			WBR	115	0.1	A					475	0	0
13	Aviation Blvd (MD 162) at Andover Rd	Signalized	WBT	564	6.0	A	7.8	A	14.9	B	-	70	141
			WBR	388	10.4	B					200	0	56
			EBL	101	7.1	A	9.9	A			415	35	87
			EBT	1,014	10.2	B					-	193	533
			SBL	371	49.7	D	47.0	D			175	158	225
			SBR	11	44.1	D					-	95	162
14	Aviation Blvd (MD 162) at Aaronson Dr	Unsignalized	NBL	28	12.5	B	0.4	A	4.9	A	-	-	-
			NBT	841	0.0	A					-	-	-
			NBR	18									
			SBL	56	10.4	B	0.5	A			-	-	-
			SBT	1,208	0.0	A					-	-	-
			SBR	19									
			EBL	22	227.0	F	227.0	F			-	-	-
			EBT	1									
			EBR	12									
			WBL	13	77.1	F	77.1	F			-	-	-
			WBT	1									
			WBR	14									
15	Aviation Blvd (MD 162) at Allwood Dr	Signalized	NBL	41	2.5	A	2.9	A	3.8	A	300	4	9
			NBT	906	2.9	A					-	60	142
			NBR	53	2.0	A					100	0	7
			SBL	9	0.4	A	2.0	A			225	1	m0
			SBT	1234	2.0	A					-	210	22
			SBR	6	2.5	A					225	0	m0
			EBL	9	54.2	D	53.8	D			-	7	25
			EBT	2	53.6	D					-	1	31
			EBR	24									
			WBL	17	53.5	D	53.5	D			-	0	0
			WBT	0									
			WBR	13									
16	SB I-97 Ramps at Cromwell Park Dr	Signalized	SBT	244	52.9	D	50.2	D	26.6	C	-	104	143
			SBR	255	47.6	D					-	0	78
			EBL	38	81.5	F	19.7	B			420	17	m32
			EBR	752	16.7	B					-	176	201
			WBT	304	7.2	A	7.1	A			-	45	75
			WBR	28	6.5	A					600	0	0
17	Aviation Blvd (MD 162) at Cromwell Park Dr	Signalized	NBT	800	23.4	C	23.3	C	30.9	C	-	164	239
			NBR	26	19.0	B					1000	0	0
			SBL	764	44.0	D	28.8	C			425	210	241
			SBT	510	6.1	A					-	68	109
			SBR	1									
			EBR	1	38.1	D	38.1	D			-	0	0
			WBL	488	51.6	D	46.9	D			-	215	270
			WBR	71	14.5	B					600	16	27

BWI TIA MOE Table - 2022 PM Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
18	Aviation Blvd (MD 162) at Dorsey Rd (MD 176) - East	Signalized	NBL	33	50.1	D	54.0	D	29.5	C	350	14	34
			NBT	142	54.5	D					-	78	135
			NBR	97									
			SBL	425	48.7	D	45.7	D			490	189	265
			SBT	343	45.0	D					-	151	217
			SBR	231	41.0	D					300	0	74
			EBL	143	14.7	B	25.5	C			350	58	116
			EBT	966	26.8	C					-	278	403
			EBR	210									
			WBL	57	21.0	C	10.6	B			425	22	53
			WBT	321	25.5	C					-	96	165
			WBR	541	0.7	A					-	0	0
19	Dorsey Rd (MD 176) at Digiulian Blvd	Unsignalized	NBL	16	66.2	F	66.2	F	2.8	A	-	-	-
			NBT	0									
			NBR	23									
			SBL	39	46.4	E	46.4	E			-	-	-
			SBT	0									
			SBR	17									
			EBL	4	8.4	A	0.0	A			-	-	-
			EBT	1,360	0.0	A					-	-	-
			EBR	14	0.0	A					-	-	-
			WBL	20	13.6	B	0.6	A			-	-	-
			WBT	430	0.0	A					-	-	-
			WBR	29	0.0	A					-	-	-
20	Aviation Blvd (MD 162) at Hollins Ferry Rd	Signalized	NBT	799	2.5	A	2.3	A	1.5	A	-	27	44
			NBR	71	0.1	A					485	0	0
			SBL	62	20.4	C	1.1	A			575	17	38
			SBT	1,274	0.1	A					-	0	0
			WBR	81	0.1	A	0.1	A			-	0	0
21	Aviation Blvd (MD 170) at Long Term Parking Lots	Signalized	NBL	17	58.1	E	57.7	E	4.8	A	-	13	37
			NBT	1	54.7	D					-	1	9
			NBR	1									
			SBL	11	56.9	E	12.2	B			-	10	30
			SBT	1									
			SBR	44	0.0	A					-	0	0
			EBL	89	2.1	A	5.0	A			250	0	32
			EBT	1,102	5.3	A					-	0	233
			EBR	28	1.6	A					350	0	4
			WBL	2	2.3	A	2.2	A			235	0	m1
			WBT	563	2.2	A					-	22	40
			WBR	10	2.5	A					375	0	m0
22	Aviation Blvd (MD 162) at S Camp Meade Rd (MD 170)	Signalized	SBL	8	58.7	E	3.1	A	7.0	A	-	7	24
			SBR	154	0.1	A					600	0	0
			EBL	338	15.6	B	5.3	A			600	32	m101
			EBT	1,210	2.4	A					-	0	m251
			WBT	611	12.6	B	12.4	B			-	134	214
			WBR	13	0.0	A					-	0	0

Notes

m Volume for 95th percentile queue is metered by upstream signal

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	445	838	345	205	379	188	727	183	368	1332	421
v/c Ratio	0.97	0.96	0.68	0.72	0.65	0.68	0.67	0.31	0.97	1.03	0.65
Control Delay	78.2	84.6	38.3	55.3	71.4	79.8	54.2	11.9	102.1	83.7	38.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.2	84.6	38.3	55.3	71.4	79.8	54.2	11.9	102.1	83.7	38.6
Queue Length 50th (ft)	398	481	187	159	206	197	367	28	403	~817	286
Queue Length 95th (ft)	#701	#727	346	252	282	302	467	96	#712	#1122	477
Internal Link Dist (ft)		640			713		584			1313	
Turn Bay Length (ft)	175		225	200		455		250	250		175
Base Capacity (vph)	457	870	511	430	869	647	1824	887	381	1295	650
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.97	0.96	0.68	0.48	0.44	0.29	0.40	0.21	0.97	1.03	0.65

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	409	771	317	189	349	0	173	669	168	339	1225	387
Future Volume (vph)	409	771	317	189	349	0	173	669	168	339	1225	387
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539		1770	3539	1583	1770	3539	1583
Flt Permitted	0.22	1.00	1.00	0.16	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	403	3539	1583	291	3539		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	445	838	345	205	379	0	188	727	183	368	1332	421
RTOR Reduction (vph)	0	0	122	0	0	0	0	0	102	0	0	71
Lane Group Flow (vph)	445	838	223	205	379	0	188	727	81	368	1332	350
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)	64.8	38.2	38.2	46.2	24.6		25.4	48.6	48.6	35.2	58.4	58.4
Effective Green, g (s)	65.8	41.2	41.2	48.2	27.6		26.4	51.6	51.6	36.2	61.4	61.4
Actuated g/C Ratio	0.39	0.25	0.25	0.29	0.16		0.16	0.31	0.31	0.22	0.37	0.37
Clearance Time (s)	5.0	7.0	7.0	5.0	7.0		5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	453	869	389	283	582		278	1089	487	382	1296	579
v/s Ratio Prot	c0.21	c0.24		0.10	0.11		0.11	0.21		c0.21	c0.38	
v/s Ratio Perm	0.17		0.14	0.11					0.05			0.22
v/c Ratio	0.98	0.96	0.57	0.72	0.65		0.68	0.67	0.17	0.96	1.03	0.60
Uniform Delay, d1	45.2	62.5	55.5	49.7	65.5		66.6	50.5	42.3	65.0	53.1	43.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	37.5	22.1	2.0	8.9	2.6		8.2	2.1	0.3	36.3	32.4	2.6
Delay (s)	82.7	84.5	57.5	58.5	68.1		74.8	52.6	42.7	101.3	85.5	45.8
Level of Service	F	F	E	E	E		E	D	D	F	F	D
Approach Delay (s)		78.3			64.7			54.7			80.3	
Approach LOS		E			E			D			F	

Intersection Summary			
HCM 2000 Control Delay	72.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	167.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	89	50	1108	75	70	2040
v/c Ratio	0.40	0.21	0.45	0.07	0.17	0.74
Control Delay	52.7	14.1	9.1	1.8	1.7	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	14.1	9.1	1.8	1.7	3.1
Queue Length 50th (ft)	64	0	185	0	5	131
Queue Length 95th (ft)	113	36	270	17	m7	163
Internal Link Dist (ft)	716		2236			2190
Turn Bay Length (ft)	450			450	375	
Base Capacity (vph)	456	444	2437	1112	522	2751
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.11	0.45	0.07	0.13	0.74

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	82	46	1019	69	64	1877
Future Volume (vph)	82	46	1019	69	64	1877
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1531	3421	1531	1711	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.21	1.00
Satd. Flow (perm)	1711	1531	3421	1531	372	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	89	50	1108	75	70	2040
RTOR Reduction (vph)	0	44	0	22	0	0
Lane Group Flow (vph)	89	6	1108	53	70	2040
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Actuated Green, G (s)	13.5	13.5	81.5	81.5	93.5	93.5
Effective Green, g (s)	15.5	15.5	84.5	84.5	94.5	96.5
Actuated g/C Ratio	0.13	0.13	0.70	0.70	0.79	0.80
Clearance Time (s)	6.0	6.0	7.0	7.0	5.0	7.0
Vehicle Extension (s)	5.0	5.0	6.0	6.0	5.0	6.0
Lane Grp Cap (vph)	221	197	2408	1078	382	2751
v/s Ratio Prot	c0.05		0.32		0.01	c0.60
v/s Ratio Perm		0.00		0.03	0.13	
v/c Ratio	0.40	0.03	0.46	0.05	0.18	0.74
Uniform Delay, d1	48.0	45.7	7.8	5.4	4.2	5.7
Progression Factor	1.00	1.00	1.00	1.00	0.40	0.31
Incremental Delay, d2	2.5	0.1	0.6	0.1	0.3	1.1
Delay (s)	50.5	45.8	8.4	5.5	2.0	2.9
Level of Service	D	D	A	A	A	A
Approach Delay (s)	48.8		8.2			2.9
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	373	876	1051	108	436	1738
v/c Ratio	0.86	0.57	0.81	0.07	0.56	0.75
Control Delay	63.7	1.6	57.4	0.1	28.3	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.7	1.6	57.4	0.1	28.3	4.0
Queue Length 50th (ft)	277	0	412	0	150	21
Queue Length 95th (ft)	#477	0	530	0	m137	m16
Internal Link Dist (ft)	319		2190			575
Turn Bay Length (ft)					575	
Base Capacity (vph)	433	1531	1290	1531	1272	2326
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.57	0.81	0.07	0.34	0.75

Intersection Summary

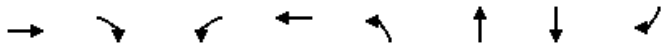
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	343	806	967	99	401	1599
Future Volume (vph)	343	806	967	99	401	1599
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1531	3421	1531	3319	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1711	1531	3421	1531	3319	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	373	876	1051	108	436	1738
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	373	876	1051	108	436	1738
Turn Type	Prot	Free	NA	Free	Prot	NA
Protected Phases	4		6		5 7	2 5 7
Permitted Phases		Free		Free		
Actuated Green, G (s)	28.4	120.0	42.3	120.0	25.8	80.1
Effective Green, g (s)	30.4	120.0	45.3	120.0	27.8	83.1
Actuated g/C Ratio	0.25	1.00	0.38	1.00	0.23	0.69
Clearance Time (s)	6.0		7.0			
Vehicle Extension (s)	3.0		5.0			
Lane Grp Cap (vph)	433	1531	1291	1531	768	2369
v/s Ratio Prot	c0.22		c0.31		0.13	c0.51
v/s Ratio Perm		0.57		0.07		
v/c Ratio	0.86	0.57	0.81	0.07	0.57	0.73
Uniform Delay, d1	42.8	0.0	33.6	0.0	40.8	11.5
Progression Factor	1.00	1.00	1.53	1.00	1.37	0.30
Incremental Delay, d2	16.0	1.6	5.3	0.1	0.1	0.1
Delay (s)	58.8	1.6	56.5	0.1	55.9	3.6
Level of Service	E	A	E	A	E	A
Approach Delay (s)	18.6		51.3			14.1
Approach LOS	B		D			B

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		

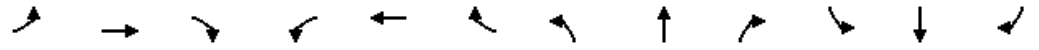
c Critical Lane Group



Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	18	778	8	3	497	46	462	186
v/c Ratio	0.06	0.88	0.06	0.02	0.39	0.07	0.94	0.39
Control Delay	33.2	16.3	48.9	48.3	25.0	21.1	66.1	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	16.3	48.9	48.3	25.0	21.1	66.1	19.6
Queue Length 50th (ft)	9	11	4	2	92	12	233	38
Queue Length 95th (ft)	29	167	22	12	207	48	#616	130
Internal Link Dist (ft)	968			347		398	150	
Turn Bay Length (ft)		550	250					85
Base Capacity (vph)	563	1007	409	430	1262	672	489	483
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.77	0.02	0.01	0.39	0.07	0.94	0.39

Intersection Summary

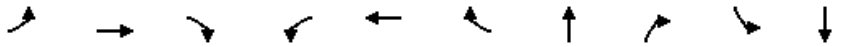
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	3	716	7	3	0	457	35	7	0	425	171
Future Volume (vph)	14	3	716	7	3	0	457	35	7	0	425	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	5.0	5.0		5.0	5.0			4.0	4.0
Lane Util. Factor		1.00	1.00	1.00	1.00		0.97	1.00			1.00	1.00
Frt		1.00	0.85	1.00	1.00		1.00	0.97			1.00	0.85
Flt Protected		0.96	1.00	0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1729	1531	1711	1801		3319	1754			1801	1531
Flt Permitted		0.96	1.00	0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (perm)		1729	1531	1711	1801		3319	1754			1801	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	3	778	8	3	0	497	38	8	0	462	186
RTOR Reduction (vph)	0	0	636	0	0	0	0	5	0	0	0	68
Lane Group Flow (vph)	0	18	142	8	3	0	497	41	0	0	462	118
Turn Type	Split	NA	Prot	Split	NA		Split	NA			NA	Prot
Protected Phases	3	3	3	4	4		2	2			1	1
Permitted Phases										1		
Actuated Green, G (s)		15.3	15.3	2.4	2.4		35.8	35.8			25.6	25.6
Effective Green, g (s)		15.3	15.3	2.4	2.4		35.8	35.8			25.6	25.6
Actuated g/C Ratio		0.16	0.16	0.02	0.02		0.37	0.37			0.26	0.26
Clearance Time (s)		4.0	4.0	5.0	5.0		5.0	5.0			4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0		5.0	5.0			3.0	3.0
Lane Grp Cap (vph)		272	241	42	44		1223	646			474	403
v/s Ratio Prot		0.01	c0.09	c0.00	0.00		c0.15	0.02			c0.26	0.08
v/s Ratio Perm												
v/c Ratio		0.07	0.59	0.19	0.07		0.41	0.06			0.97	0.29
Uniform Delay, d1		34.8	38.0	46.4	46.3		22.8	19.8			35.4	28.5
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		0.1	3.7	2.2	0.7		1.0	0.2			34.5	0.4
Delay (s)		34.9	41.6	48.6	46.9		23.8	20.0			70.0	28.9
Level of Service		C	D	D	D		C	C			E	C
Approach Delay (s)		41.5			48.1			23.4			58.2	
Approach LOS		D			D			C			E	

Intersection Summary					
HCM 2000 Control Delay	42.0	HCM 2000 Level of Service	D		
HCM 2000 Volume to Capacity ratio	0.62				
Actuated Cycle Length (s)	97.1	Sum of lost time (s)	18.0		
Intersection Capacity Utilization	83.4%	ICU Level of Service	E		
Analysis Period (min)	15				

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	148	35	490	167	27	104	533	116	60
v/c Ratio	0.00	0.26	0.06	0.90	0.14	0.03	0.62	0.82	0.66	0.13
Control Delay	38.0	39.5	0.2	67.5	10.2	1.2	75.6	16.1	80.4	40.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.0	39.5	0.2	67.5	10.2	1.2	75.6	16.1	80.4	40.1
Queue Length 50th (ft)	1	100	0	426	50	0	93	0	103	43
Queue Length 95th (ft)	6	186	0	#761	111	6	162	126	185	80
Internal Link Dist (ft)		269			383		290			249
Turn Bay Length (ft)	175		125	300		150				
Base Capacity (vph)	373	574	541	545	1212	1045	368	780	242	765
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.26	0.06	0.90	0.14	0.03	0.28	0.68	0.48	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	136	32	451	154	25	43	52	490	107	55	0
Future Volume (vph)	1	136	32	451	154	25	43	52	490	107	55	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1711	1801	1531	1711	1801	1531		1761	1531	1711	1801	
Flt Permitted	0.65	1.00	1.00	0.95	1.00	1.00		0.83	1.00	0.95	1.00	
Satd. Flow (perm)	1173	1801	1531	1711	1801	1531		1487	1531	1711	1801	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	148	35	490	167	27	47	57	533	116	60	0
RTOR Reduction (vph)	0	0	24	0	0	9	0	0	472	0	0	0
Lane Group Flow (vph)	1	148	11	490	167	18	0	104	61	116	60	0
Turn Type	Perm	NA	Perm	Prot	NA	Prot	Perm	NA	Prot	Prot	NA	
Protected Phases		6		5	2	2		8	8	7	4	
Permitted Phases	6		6				8					
Actuated Green, G (s)	45.3	45.3	45.3	45.2	95.5	95.5		16.2	16.2	14.6	35.8	
Effective Green, g (s)	45.3	45.3	45.3	45.2	95.5	95.5		16.2	16.2	14.6	35.8	
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.67	0.67		0.11	0.11	0.10	0.25	
Clearance Time (s)	5.5	5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	3.0	5.0	5.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	374	575	489	545	1212	1031		169	174	176	454	
v/s Ratio Prot		c0.08		c0.29	0.09	0.01			0.04	c0.07	0.03	
v/s Ratio Perm	0.00		0.01					c0.07				
v/c Ratio	0.00	0.26	0.02	0.90	0.14	0.02		0.62	0.35	0.66	0.13	
Uniform Delay, d1	32.9	35.8	33.1	46.1	8.3	7.6		59.8	57.9	61.2	41.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	1.1	0.1	17.5	0.2	0.0		6.5	1.2	8.6	0.1	
Delay (s)	32.9	36.9	33.2	63.6	8.6	7.7		66.3	59.2	69.8	41.1	
Level of Service	C	D	C	E	A	A		E	E	E	D	
Approach Delay (s)		36.1			48.0			60.3			60.0	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	52.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	141.8	Sum of lost time (s)	20.5
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Group Flow (vph)	465	246	135	1792	1928	208
v/c Ratio	0.84	0.42	0.68	0.86	1.14	0.25
Control Delay	51.7	12.9	36.8	22.2	87.7	2.8
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	51.7	12.9	36.8	22.3	87.7	2.8
Queue Length 50th (ft)	326	47	35	729	~967	29
Queue Length 95th (ft)	441	112	m89	#852	#1158	m35
Internal Link Dist (ft)	755			2381	681	
Turn Bay Length (ft)		185	225			
Base Capacity (vph)	627	641	205	2086	1695	820
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	29	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.38	0.66	0.87	1.14	0.25

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	428	226	124	1649	1774	191
Future Volume (vph)	428	226	124	1649	1774	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1711	1531	1711	3421	3421	1531
Flt Permitted	0.95	1.00	0.06	1.00	1.00	1.00
Satd. Flow (perm)	1711	1531	114	3421	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	465	246	135	1792	1928	208
RTOR Reduction (vph)	0	112	0	0	0	62
Lane Group Flow (vph)	465	134	135	1792	1928	146
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		1	6	2	
Permitted Phases	4	4	6			2
Actuated Green, G (s)	36.8	36.8	71.7	71.7	58.0	58.0
Effective Green, g (s)	38.8	36.8	72.7	73.2	59.5	59.5
Actuated g/C Ratio	0.32	0.31	0.61	0.61	0.50	0.50
Clearance Time (s)	6.0	6.0	5.0	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	6.0
Lane Grp Cap (vph)	553	469	198	2086	1696	759
v/s Ratio Prot	c0.27		0.06	c0.52	c0.56	
v/s Ratio Perm		0.09	0.36			0.10
v/c Ratio	0.84	0.29	0.68	0.86	1.14	0.19
Uniform Delay, d1	37.7	31.6	29.9	19.2	30.2	16.9
Progression Factor	1.00	1.00	1.08	0.89	0.58	0.29
Incremental Delay, d2	11.1	0.3	6.6	3.5	66.3	0.3
Delay (s)	48.8	31.9	38.9	20.5	83.9	5.2
Level of Service	D	C	D	C	F	A
Approach Delay (s)	43.0			21.8	76.2	
Approach LOS	D			C	E	

Intersection Summary			
HCM 2000 Control Delay	49.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	15	2242	2001	67	420	132
v/c Ratio	0.11	0.87	0.84	0.06	0.71	0.09
Control Delay	39.9	7.4	16.1	2.7	52.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.9	7.5	16.1	2.7	52.9	0.1
Queue Length 50th (ft)	11	186	307	1	159	0
Queue Length 95th (ft)	m11	307	#1016	m16	204	0
Internal Link Dist (ft)		681	1012		359	
Turn Bay Length (ft)	225					
Base Capacity (vph)	199	2580	2375	1076	885	1531
Starvation Cap Reductn	0	10	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.87	0.84	0.06	0.47	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	14	2063	1841	62	386	121
Future Volume (vph)	14	2063	1841	62	386	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	3319	1531
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1711	3421	3421	1531	3319	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	2242	2001	67	420	132
RTOR Reduction (vph)	0	0	0	14	0	0
Lane Group Flow (vph)	15	2242	2001	53	420	132
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	1	6	2		4	
Permitted Phases				2		Free
Actuated Green, G (s)	5.2	89.0	78.8	78.8	20.5	120.0
Effective Green, g (s)	6.2	90.5	80.3	80.3	21.5	120.0
Actuated g/C Ratio	0.05	0.75	0.67	0.67	0.18	1.00
Clearance Time (s)	5.0	5.5	5.5	5.5	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	88	2580	2289	1024	594	1531
v/s Ratio Prot	0.01	c0.66	0.58		c0.13	
v/s Ratio Perm				0.03		0.09
v/c Ratio	0.17	0.87	0.87	0.05	0.71	0.09
Uniform Delay, d1	54.4	10.5	15.8	6.8	46.3	0.0
Progression Factor	0.80	0.39	0.69	0.55	1.00	1.00
Incremental Delay, d2	0.5	2.3	4.5	0.1	3.8	0.1
Delay (s)	43.9	6.4	15.4	3.8	50.1	0.1
Level of Service	D	A	B	A	D	A
Approach Delay (s)		6.7	15.0		38.2	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	SBR	NWL	NWR2
Lane Group Flow (vph)	2477	184	125	1034	1001	32	16
v/c Ratio	0.96	0.12	0.65	0.35	0.64	0.26	0.01
Control Delay	19.8	0.1	49.5	1.0	2.0	56.9	0.0
Queue Delay	15.4	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.2	0.1	49.5	1.0	2.0	56.9	0.0
Queue Length 50th (ft)	638	0	40	22	0	24	0
Queue Length 95th (ft)	#1234	m0	117	33	0	56	0
Internal Link Dist (ft)	1012			765		262	
Turn Bay Length (ft)		50	350				
Base Capacity (vph)	2568	1531	420	2943	1558	285	1531
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	169	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.12	0.30	0.35	0.64	0.11	0.01

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2
Lane Configurations		↑↑	↱	↰	↑↑			↱	↰		↱
Traffic Volume (vph)	0	2279	169	115	951	0	0	921	29	0	15
Future Volume (vph)	0	2279	169	115	951	0	0	921	29	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0			4.0	4.0		4.0
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00		1.00
Frt		1.00	0.85	1.00	1.00			0.86	1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00			1.00	0.95		1.00
Satd. Flow (prot)		3421	1531	1711	3421			1558	1711		1531
Flt Permitted		1.00	1.00	0.04	1.00			1.00	0.95		1.00
Satd. Flow (perm)		3421	1531	77	3421			1558	1711		1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2477	184	125	1034	0	0	1001	32	0	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2477	184	125	1034	0	0	1001	32	0	16
Turn Type		NA	Free	pm+pt	NA			Free	Prot		Free
Protected Phases		6		5	2				4		
Permitted Phases			Free	2				Free			Free
Actuated Green, G (s)		88.6	120.0	101.8	101.8			120.0	7.7		120.0
Effective Green, g (s)		90.1	120.0	102.3	103.3			120.0	8.7		120.0
Actuated g/C Ratio		0.75	1.00	0.85	0.86			1.00	0.07		1.00
Clearance Time (s)		5.5		4.5	5.5				5.0		
Vehicle Extension (s)		5.0		3.0	5.0				3.0		
Lane Grp Cap (vph)		2568	1531	190	2944			1558	124		1531
v/s Ratio Prot		c0.72		0.05	0.30				0.02		
v/s Ratio Perm			0.12	0.51				c0.64			0.01
v/c Ratio		0.96	0.12	0.66	0.35			0.64	0.26		0.01
Uniform Delay, d1		13.5	0.0	40.1	1.7			0.0	52.6		0.0
Progression Factor		0.78	1.00	1.44	0.39			1.00	1.00		1.00
Incremental Delay, d2		7.4	0.1	7.6	0.3			2.1	1.1		0.0
Delay (s)		17.9	0.1	65.4	1.0			2.1	53.7		0.0
Level of Service		B	A	E	A			A	D		A
Approach Delay (s)		16.7			7.9		2.1		35.8		
Approach LOS		B			A		A		D		

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	NWL
Lane Group Flow (vph)	1404	1435	959	197
v/c Ratio	0.55	1.01	0.37	0.63
Control Delay	1.2	32.4	10.3	53.7
Queue Delay	0.0	32.8	0.0	0.0
Total Delay	1.2	65.2	10.3	53.7
Queue Length 50th (ft)	16	~1168	196	142
Queue Length 95th (ft)	m22	m#1327	272	207
Internal Link Dist (ft)	765		418	135
Turn Bay Length (ft)				
Base Capacity (vph)	2566	1415	2566	541
Starvation Cap Reductn	0	239	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.55	1.22	0.37	0.36

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	1292	1320	0	882	181	0
Future Volume (vph)	1292	1320	0	882	181	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5		4.0	4.0	
Lane Util. Factor	0.95	1.00		0.95	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	1.00	1.00		1.00	0.95	
Satd. Flow (prot)	3421	1531		3421	1711	
Flt Permitted	1.00	1.00		1.00	0.95	
Satd. Flow (perm)	3421	1531		3421	1711	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1404	1435	0	959	197	0
RTOR Reduction (vph)	0	286	0	0	0	0
Lane Group Flow (vph)	1404	1149	0	959	197	0
Turn Type	NA	Perm		NA	Prot	
Protected Phases	6			2	4	
Permitted Phases		6				
Actuated Green, G (s)	88.5	88.5		88.5	21.0	
Effective Green, g (s)	90.0	88.5		90.0	22.0	
Actuated g/C Ratio	0.75	0.74		0.75	0.18	
Clearance Time (s)	5.5	5.5		5.5	5.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	2565	1129		2565	313	
v/s Ratio Prot	0.41			0.28	c0.12	
v/s Ratio Perm		c0.75				
v/c Ratio	0.55	1.02		0.37	0.63	
Uniform Delay, d1	6.4	15.8		5.2	45.2	
Progression Factor	0.11	3.15		1.73	1.00	
Incremental Delay, d2	0.4	23.6		0.4	5.5	
Delay (s)	1.1	73.2		9.4	50.8	
Level of Service	A	E		A	D	
Approach Delay (s)	37.5			9.4	50.8	
Approach LOS	D			A	D	

Intersection Summary			
HCM 2000 Control Delay	31.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	463	1124	37	176	500	43
v/c Ratio	0.39	0.73	0.09	0.12	0.75	0.07
Control Delay	23.1	3.2	14.4	14.1	28.0	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.1	3.2	14.4	14.1	28.0	5.1
Queue Length 50th (ft)	94	0	9	24	212	0
Queue Length 95th (ft)	175	0	32	55	335	18
Internal Link Dist (ft)	475			893	211	
Turn Bay Length (ft)			150			
Base Capacity (vph)	1199	1531	600	2399	1398	1259
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.73	0.06	0.07	0.36	0.03

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	426	1034	34	162	460	40
Future Volume (vph)	426	1034	34	162	460	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	4.0	5.0	6.0	6.0	6.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3421	1531	1711	3421	1711	1531
Flt Permitted	1.00	1.00	0.38	1.00	0.95	1.00
Satd. Flow (perm)	3421	1531	682	3421	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	463	1124	37	176	500	43
RTOR Reduction (vph)	0	0	0	0	0	27
Lane Group Flow (vph)	463	1124	37	176	500	16
Turn Type	NA	Free	pm+pt	NA	Prot	Prot
Protected Phases	6		5	2	4	4
Permitted Phases		Free	2			
Actuated Green, G (s)	26.2	76.6	35.5	35.5	29.1	29.1
Effective Green, g (s)	26.2	76.6	35.5	35.5	29.1	29.1
Actuated g/C Ratio	0.34	1.00	0.46	0.46	0.38	0.38
Clearance Time (s)	6.0		5.0	6.0	6.0	6.0
Vehicle Extension (s)	3.5		3.5	3.5	5.0	5.0
Lane Grp Cap (vph)	1170	1531	373	1585	650	581
v/s Ratio Prot	0.14		0.01	0.05	0.29	0.01
v/s Ratio Perm		c0.73	0.04			
v/c Ratio	0.40	0.73	0.10	0.11	0.77	0.03
Uniform Delay, d1	19.2	0.0	11.6	11.6	20.8	14.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	3.2	0.1	0.1	6.4	0.0
Delay (s)	20.2	3.2	11.7	11.8	27.2	14.9
Level of Service	C	A	B	B	C	B
Approach Delay (s)	8.1			11.8	26.3	
Approach LOS	A			B	C	

Intersection Summary			
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	76.6	Sum of lost time (s)	17.0
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	414	845	163	275	583	177	129	418	130	1029
v/c Ratio	0.74	0.47	0.11	0.61	0.35	0.47	0.29	0.27	0.38	0.67
Control Delay	53.4	17.2	0.1	31.1	30.5	53.9	37.7	0.4	53.5	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.4	17.2	0.1	31.1	30.5	53.9	37.7	0.4	53.5	2.4
Queue Length 50th (ft)	149	228	0	114	197	67	81	0	50	0
Queue Length 95th (ft)	200	341	0	m119	m247	102	130	0	81	0
Internal Link Dist (ft)		871			1398		1013		384	
Turn Bay Length (ft)	445		445	615		300		400		
Base Capacity (vph)	599	1779	1531	580	1661	442	540	1531	456	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.47	0.11	0.47	0.35	0.40	0.24	0.27	0.29	0.67

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	381	777	150	253	536	0	163	119	385	0	120	947
Future Volume (vph)	381	777	150	253	536	0	163	119	385	0	120	947
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		0.97	1.00	1.00		0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (perm)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	414	845	163	275	583	0	177	129	418	0	130	1029
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	414	845	163	275	583	0	177	129	418	0	130	1029
Turn Type	Prot	NA	Free	Prot	NA		Prot	NA	Free		NA	Free
Protected Phases	1	6		5	2		7	4			8	
Permitted Phases			Free						Free			Free
Actuated Green, G (s)	19.3	60.4	120.0	15.2	56.3		11.5	27.4	120.0		9.9	120.0
Effective Green, g (s)	20.3	62.4	120.0	16.2	58.3		13.5	29.4	120.0		11.9	120.0
Actuated g/C Ratio	0.17	0.52	1.00	0.13	0.49		0.11	0.24	1.00		0.10	1.00
Clearance Time (s)	5.0	6.0		5.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	561	1778	1531	448	1662		373	441	1531		339	1531
v/s Ratio Prot	0.12	0.25		0.08	0.17		0.05	0.07			0.04	
v/s Ratio Perm			0.11						0.27			c0.67
v/c Ratio	0.74	0.48	0.11	0.61	0.35		0.47	0.29	0.27		0.38	0.67
Uniform Delay, d1	47.3	18.4	0.0	48.9	19.1		49.9	36.8	0.0		50.6	0.0
Progression Factor	0.98	0.83	1.00	0.52	1.47		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.3	0.8	0.1	2.3	0.5		1.0	0.4	0.4		0.7	2.4
Delay (s)	50.6	16.1	0.1	27.9	28.6		50.9	37.2	0.4		51.3	2.4
Level of Service	D	B	A	C	C		D	D	A		D	A
Approach Delay (s)		24.3			28.4			19.3			7.9	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	48	1088	127	43	664	125	136	72	308	301
v/c Ratio	0.12	0.62	0.08	0.17	0.38	0.08	0.57	0.20	1.14	1.09
Control Delay	13.5	36.8	0.1	16.6	32.4	0.1	56.7	1.8	143.2	127.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.5	36.8	0.1	16.6	32.4	0.1	56.7	1.8	143.2	127.0
Queue Length 50th (ft)	26	436	0	22	266	0	100	0	~292	~270
Queue Length 95th (ft)	49	522	0	44	334	0	158	4	#481	#460
Internal Link Dist (ft)		1398			1719		314			276
Turn Bay Length (ft)	275			375		475				
Base Capacity (vph)	415	1753	1531	261	1749	1531	430	361	270	275
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.62	0.08	0.16	0.38	0.08	0.32	0.20	1.14	1.09

Intersection Summary

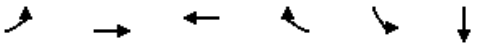
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	1001	117	40	611	115	112	13	66	480	15	65
Future Volume (vph)	44	1001	117	40	611	115	112	13	66	480	15	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	0.95	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.97	
Satd. Flow (prot)	1711	3421	1531	1711	3421	1531		1723	1531	1625	1593	
Flt Permitted	0.33	1.00	1.00	0.16	1.00	1.00		0.96	1.00	0.95	0.97	
Satd. Flow (perm)	591	3421	1531	285	3421	1531		1723	1531	1625	1593	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	1088	127	43	664	125	122	14	72	522	16	71
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	60	0	9	0
Lane Group Flow (vph)	48	1088	127	43	664	125	0	136	12	308	292	0
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Split	NA	custom	Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases	6		Free	2		Free			3			
Actuated Green, G (s)	64.4	58.5	120.0	64.0	58.3	120.0		14.8	18.0	18.0	18.0	
Effective Green, g (s)	66.4	60.5	120.0	66.0	60.3	120.0		16.8	20.0	20.0	20.0	
Actuated g/C Ratio	0.55	0.50	1.00	0.55	0.50	1.00		0.14	0.17	0.17	0.17	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	391	1724	1531	236	1719	1531		241	255	270	265	
v/s Ratio Prot	0.01	c0.32		c0.01	0.19			c0.08		c0.19	0.18	
v/s Ratio Perm	0.06		c0.08	0.09		0.08			0.01			
v/c Ratio	0.12	0.63	0.08	0.18	0.39	0.08		0.56	0.05	1.14	1.10	
Uniform Delay, d1	12.8	21.6	0.0	15.0	18.4	0.0		48.2	42.0	50.0	50.0	
Progression Factor	1.12	1.55	1.00	1.31	1.64	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.6	0.1	0.4	0.6	0.1		3.0	0.1	98.2	85.1	
Delay (s)	14.5	35.2	0.1	20.0	30.8	0.1		51.2	42.1	148.2	135.1	
Level of Service	B	D	A	C	C	A		D	D	F	F	
Approach Delay (s)		30.9			25.6			48.0			141.7	
Approach LOS		C			C			D			F	

Intersection Summary			
HCM 2000 Control Delay	53.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBT
Lane Group Flow (vph)	110	1102	613	422	210	205
v/c Ratio	0.21	0.44	0.24	0.34	0.64	0.53
Control Delay	8.8	11.4	6.7	2.0	52.3	31.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.8	11.4	6.7	2.0	52.3	31.2
Queue Length 50th (ft)	35	193	70	0	158	95
Queue Length 95th (ft)	87	533	141	56	225	162
Internal Link Dist (ft)		1633	378			130
Turn Bay Length (ft)	415			200	175	
Base Capacity (vph)	533	2504	2504	1233	568	614
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.44	0.24	0.34	0.37	0.33

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	1014	0	0	564	388	0	0	0	371	0	11
Future Volume (vph)	101	1014	0	0	564	388	0	0	0	371	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95	1.00				0.95	0.95	
Frt	1.00	1.00			1.00	0.85				1.00	0.99	
Flt Protected	0.95	1.00			1.00	1.00				0.95	0.96	
Satd. Flow (prot)	1711	3421			3421	1531				1625	1619	
Flt Permitted	0.41	1.00			1.00	1.00				0.95	0.96	
Satd. Flow (perm)	730	3421			3421	1531				1625	1619	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	110	1102	0	0	613	422	0	0	0	403	0	12
RTOR Reduction (vph)	0	0	0	0	0	113	0	0	0	0	58	0
Lane Group Flow (vph)	110	1102	0	0	613	309	0	0	0	210	147	0
Turn Type	Perm	NA		Perm	NA	Perm				Split	NA	
Protected Phases		6			2		3	3		4	4	
Permitted Phases	6	6		2	2	2						
Actuated Green, G (s)	85.8	85.8			85.8	85.8				23.2	23.2	
Effective Green, g (s)	87.8	87.8			87.8	87.8				24.2	24.2	
Actuated g/C Ratio	0.73	0.73			0.73	0.73				0.20	0.20	
Clearance Time (s)	6.0	6.0			6.0	6.0				5.0	5.0	
Vehicle Extension (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Lane Grp Cap (vph)	534	2503			2503	1120				327	326	
v/s Ratio Prot		c0.32			0.18					c0.13	0.09	
v/s Ratio Perm	0.15					0.20						
v/c Ratio	0.21	0.44			0.24	0.28				0.64	0.45	
Uniform Delay, d1	5.1	6.4			5.3	5.4				43.9	42.1	
Progression Factor	1.24	1.52			1.10	1.82				1.00	1.00	
Incremental Delay, d2	0.8	0.5			0.2	0.6				5.8	2.1	
Delay (s)	7.1	10.2			6.0	10.4				49.7	44.1	
Level of Service	A	B			A	B				D	D	
Approach Delay (s)		9.9			7.8			0.0			47.0	
Approach LOS		A			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	1	12	13	1	14	28	841	18	56	1208	19
Future Volume (Veh/h)	22	1	12	13	1	14	28	841	18	56	1208	19
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	1	13	14	1	15	30	914	20	61	1313	21
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1978	2440	667	1776	2440	467	1334			934		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1978	2440	667	1776	2440	467	1334			934		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	23	96	97	68	96	97	94			92		
cM capacity (veh/h)	31	27	401	44	27	542	513			729		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	38	30	30	609	325	61	875	459
Volume Left	24	14	30	0	0	61	0	0
Volume Right	13	15	0	0	20	0	0	21
cSH	45	78	513	1700	1700	729	1700	1700
Volume to Capacity	0.84	0.38	0.06	0.36	0.19	0.08	0.51	0.27
Queue Length 95th (ft)	84	37	5	0	0	7	0	0
Control Delay (s)	227.0	77.1	12.5	0.0	0.0	10.4	0.0	0.0
Lane LOS	F	F	B			B		
Approach Delay (s)	227.0	77.1	0.4			0.5		
Approach LOS	F	F						

Intersection Summary				
Average Delay	4.9			
Intersection Capacity Utilization	50.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	10	28	32	45	985	58	10	1341	7
v/c Ratio	0.08	0.18	0.17	0.13	0.32	0.04	0.02	0.47	0.01
Control Delay	52.0	22.5	2.0	2.0	2.4	0.5	0.3	2.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.0	22.5	2.0	2.0	2.4	0.5	0.3	2.0	0.0
Queue Length 50th (ft)	7	1	0	4	60	0	1	210	0
Queue Length 95th (ft)	25	31	0	9	142	7	m0	22	m0
Internal Link Dist (ft)		254	405		1830			1619	
Turn Bay Length (ft)				300		100	225		225
Base Capacity (vph)	421	432	422	511	3051	1373	663	2842	1284
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.06	0.08	0.09	0.32	0.04	0.02	0.47	0.01

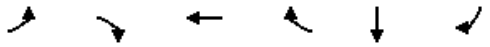
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	2	24	17	0	13	41	906	53	9	1234	6
Future Volume (vph)	9	2	24	17	0	13	41	906	53	9	1234	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.86			0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1711	1550			1648		1711	3421	1531	1711	3421	1531
Flt Permitted	0.88	1.00			0.81		0.17	1.00	1.00	0.29	1.00	1.00
Satd. Flow (perm)	1581	1550			1372		309	3421	1531	518	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	2	26	18	0	14	45	985	58	10	1341	7
RTOR Reduction (vph)	0	25	0	0	30	0	0	0	10	0	0	1
Lane Group Flow (vph)	10	3	0	0	2	0	45	985	48	10	1341	6
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			6		6	2		2
Actuated Green, G (s)	4.9	4.9			4.9		101.1	96.5	96.5	94.1	93.0	93.0
Effective Green, g (s)	6.9	6.9			6.9		103.1	99.0	99.0	96.1	95.5	95.5
Actuated g/C Ratio	0.06	0.06			0.06		0.86	0.82	0.82	0.80	0.80	0.80
Clearance Time (s)	6.0	6.0			6.0		5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0			3.0		2.5	5.0	5.0	2.5	5.0	5.0
Lane Grp Cap (vph)	90	89			78		330	2822	1263	435	2722	1218
v/s Ratio Prot		0.00					c0.01	c0.29		0.00	c0.39	
v/s Ratio Perm	c0.01				0.00		0.11		0.03	0.02		0.00
v/c Ratio	0.11	0.04			0.02		0.14	0.35	0.04	0.02	0.49	0.00
Uniform Delay, d1	53.6	53.4			53.4		2.3	2.6	1.9	2.4	4.1	2.5
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	0.16	0.34	1.00
Incremental Delay, d2	0.5	0.2			0.1		0.1	0.3	0.1	0.0	0.6	0.0
Delay (s)	54.2	53.6			53.5		2.5	2.9	2.0	0.4	2.0	2.5
Level of Service	D	D			D		A	A	A	A	A	A
Approach Delay (s)		53.8			53.5			2.9			2.0	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		

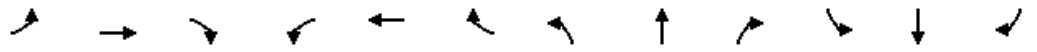
c Critical Lane Group



Lane Group	EBL	EBR	WBT	WBR	SBT	SBR
Lane Group Flow (vph)	41	817	330	30	265	277
v/c Ratio	0.21	0.38	0.14	0.03	0.63	0.64
Control Delay	80.8	7.6	7.8	0.0	56.4	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.8	7.6	7.8	0.0	56.4	12.7
Queue Length 50th (ft)	17	176	45	0	104	0
Queue Length 95th (ft)	m32	201	75	0	143	78
Internal Link Dist (ft)			782		297	
Turn Bay Length (ft)	420			600		
Base Capacity (vph)	691	2166	2333	1070	826	580
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.38	0.14	0.03	0.32	0.48

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	0	752	0	304	28	0	0	0	0	244	255
Future Volume (vph)	38	0	752	0	304	28	0	0	0	0	244	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		6.5		6.5	6.5					7.0	7.0
Lane Util. Factor	0.97		0.88		0.95	1.00					0.95	1.00
Frt	1.00		0.85		1.00	0.85					1.00	0.85
Flt Protected	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (prot)	3319		2694		3421	1531					3421	1531
Flt Permitted	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (perm)	3319		2694		3421	1531					3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	0	817	0	330	30	0	0	0	0	265	277
RTOR Reduction (vph)	0	0	108	0	0	10	0	0	0	0	0	243
Lane Group Flow (vph)	41	0	709	0	330	20	0	0	0	0	265	34
Turn Type	Prot		Prot		NA	Perm					NA	Perm
Protected Phases	1		6		2						4	
Permitted Phases						2						4
Actuated Green, G (s)	5.8		91.7		80.9	80.9					14.8	14.8
Effective Green, g (s)	5.8		91.7		80.9	80.9					14.8	14.8
Actuated g/C Ratio	0.05		0.76		0.67	0.67					0.12	0.12
Clearance Time (s)	5.0		6.5		6.5	6.5					7.0	7.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0					3.0	3.0
Lane Grp Cap (vph)	160		2058		2306	1032					421	188
v/s Ratio Prot	0.01		c0.26		0.10						c0.08	
v/s Ratio Perm						0.01						0.02
v/c Ratio	0.26		0.34		0.14	0.02					0.63	0.18
Uniform Delay, d1	55.0		4.5		7.1	6.5					50.0	47.2
Progression Factor	1.47		3.59		1.00	1.00					1.00	1.00
Incremental Delay, d2	0.7		0.4		0.1	0.0					2.9	0.5
Delay (s)	81.5		16.7		7.2	6.5					52.9	47.6
Level of Service	F		B		A	A					D	D
Approach Delay (s)		19.7			7.1			0.0			50.2	
Approach LOS		B			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	530	77	870	28	830	555
v/c Ratio	0.00	0.73	0.10	0.40	0.04	0.72	0.23
Control Delay	0.0	53.6	7.2	24.9	0.1	45.4	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	0.0	53.6	7.2	24.9	0.1	45.4	6.6
Queue Length 50th (ft)	0	215	16	164	0	210	68
Queue Length 95th (ft)	0	270	27	239	0	241	109
Internal Link Dist (ft)				1519			448
Turn Bay Length (ft)			600		1000	425	
Base Capacity (vph)	670	888	888	2163	719	1527	2442
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.60	0.09	0.40	0.04	0.54	0.23

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	1	488	0	71	0	800	26	764	510	1
Future Volume (vph)	0	0	1	488	0	71	0	800	26	764	510	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	4.0		4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor			1.00	0.97		1.00		0.91	1.00	0.94	0.95	
Frt			0.86	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected			1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			1558	3319		1531		4916	1531	4824	3420	
Flt Permitted			1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)			1558	3319		1531		4916	1531	4824	3420	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1	530	0	77	0	870	28	830	554	1
RTOR Reduction (vph)	0	0	1	0	0	18	0	0	16	0	0	0
Lane Group Flow (vph)	0	0	0	530	0	59	0	870	12	830	555	0
Turn Type			Perm	Prot		pt+ov		NA	Perm	Prot	NA	
Protected Phases				4		4 5		6		5	2	
Permitted Phases			4						6			
Actuated Green, G (s)			24.4	24.4		57.2		49.8	49.8	26.8	82.6	
Effective Green, g (s)			24.4	26.4		59.2		52.8	52.8	28.8	85.6	
Actuated g/C Ratio			0.20	0.22		0.49		0.44	0.44	0.24	0.71	
Clearance Time (s)			6.0	6.0				7.0	7.0	6.0	7.0	
Vehicle Extension (s)			3.0	3.0				5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)			316	730		755		2163	673	1157	2439	
v/s Ratio Prot				c0.16		0.04		c0.18		c0.17	0.16	
v/s Ratio Perm			0.00						0.01			
v/c Ratio			0.00	0.73		0.08		0.40	0.02	0.72	0.23	
Uniform Delay, d1			38.1	43.4		16.0		22.9	19.0	41.9	5.9	
Progression Factor			1.00	1.11		0.90		1.00	1.00	1.00	1.00	
Incremental Delay, d2			0.0	3.5		0.0		0.6	0.0	2.2	0.2	
Delay (s)			38.1	51.6		14.5		23.4	19.0	44.0	6.1	
Level of Service			D	D		B		C	B	D	A	
Approach Delay (s)		38.1			46.9			23.3			28.8	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	155	1278	62	349	588	36	259	462	373	251
v/c Ratio	0.28	0.59	0.27	0.26	0.38	0.10	0.62	0.68	0.53	0.49
Control Delay	16.1	27.7	17.9	27.2	0.7	55.1	45.7	52.7	48.6	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.1	27.7	17.9	27.2	0.7	55.1	45.7	52.7	48.6	8.8
Queue Length 50th (ft)	58	278	22	96	0	14	78	189	151	0
Queue Length 95th (ft)	116	403	53	165	0	34	135	265	217	74
Internal Link Dist (ft)		1548		585			1389		1519	
Turn Bay Length (ft)	350		425			350		490		300
Base Capacity (vph)	679	2409	508	1714	1531	1094	1111	1233	1271	726
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.53	0.12	0.20	0.38	0.03	0.23	0.37	0.29	0.35

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	966	210	57	321	541	33	142	97	425	343	231
Future Volume (vph)	143	966	210	57	321	541	33	142	97	425	343	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	7.0		5.5	7.0	4.0	5.5	5.5		5.5	5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	0.95		0.97	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	4784		1711	3421	1531	3319	3213		3319	3421	1531
Flt Permitted	0.47	1.00		0.16	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	852	4784		287	3421	1531	3319	3213		3319	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	155	1050	228	62	349	588	36	154	105	462	373	251
RTOR Reduction (vph)	0	14	0	0	0	0	0	69	0	0	0	200
Lane Group Flow (vph)	155	1264	0	62	349	588	36	190	0	462	373	51
Turn Type	pm+pt	NA		pm+pt	NA	Free	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases	2			6		Free						4
Actuated Green, G (s)	67.6	55.6		55.9	49.4	124.3	13.4	13.4		25.3	25.3	25.3
Effective Green, g (s)	67.6	55.6		55.9	49.4	124.3	13.4	13.4		25.3	25.3	25.3
Actuated g/C Ratio	0.54	0.45		0.45	0.40	1.00	0.11	0.11		0.20	0.20	0.20
Clearance Time (s)	5.5	7.0		5.5	7.0		5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	3.0	7.0		3.0	7.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	551	2139		203	1359	1531	357	346		675	696	311
v/s Ratio Prot	0.03	c0.26		0.02	0.10		0.01	c0.06		c0.14	0.11	
v/s Ratio Perm	0.12			0.12		c0.38						0.03
v/c Ratio	0.28	0.59		0.31	0.26	0.38	0.10	0.55		0.68	0.54	0.16
Uniform Delay, d1	14.5	25.8		20.1	25.1	0.0	50.0	52.6		45.8	44.3	40.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	1.0		0.9	0.4	0.7	0.1	1.9		2.9	0.8	0.3
Delay (s)	14.7	26.8		21.0	25.5	0.7	50.1	54.5		48.7	45.0	41.0
Level of Service	B	C		C	C	A	D	D		D	D	D
Approach Delay (s)		25.5			10.6			54.0			45.7	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	29.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	124.3	Sum of lost time (s)	23.5
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	1360	14	23	430	29	16	0	23	39	0	17
Future Volume (Veh/h)	4	1360	14	23	430	29	16	0	23	39	0	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	1478	15	25	467	32	17	0	25	42	0	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		650			625							
pX, platoon unblocked												
vC, conflicting volume	499			1493			1788	2035	739	1289	2018	234
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	499			1493			1788	2035	739	1289	2018	234
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			94			64	100	93	61	100	98
cM capacity (veh/h)	1061			446			48	53	360	107	54	768

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	4	739	739	15	25	234	234	32	42	60
Volume Left	4	0	0	0	25	0	0	0	17	42
Volume Right	0	0	0	15	0	0	0	32	25	18
cSH	1061	1700	1700	1700	446	1700	1700	1700	99	145
Volume to Capacity	0.00	0.43	0.43	0.01	0.06	0.14	0.14	0.02	0.43	0.41
Queue Length 95th (ft)	0	0	0	0	4	0	0	0	44	45
Control Delay (s)	8.4	0.0	0.0	0.0	13.6	0.0	0.0	0.0	66.2	46.4
Lane LOS	A				B				F	E
Approach Delay (s)	0.0				0.6				66.2	46.4
Approach LOS									F	E

Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	49.6%	ICU Level of Service	A	
Analysis Period (min)	15			

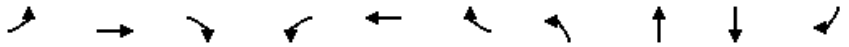
Lane Group	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	88	868	77	67	1385
v/c Ratio	0.06	0.23	0.05	0.22	0.28
Control Delay	0.1	2.9	0.1	17.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	0.1	2.9	0.1	17.4	0.1
Queue Length 50th (ft)	0	27	0	17	0
Queue Length 95th (ft)	0	44	0	38	0
Internal Link Dist (ft)		448			480
Turn Bay Length (ft)			485	575	
Base Capacity (vph)	1558	4916	1531	969	4916
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.06	0.18	0.05	0.07	0.28

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	81	799	71	62	1274
Future Volume (vph)	0	81	799	71	62	1274
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	0.91	1.00	1.00	0.91
Frt		0.86	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1558	4916	1531	1711	4916
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1558	4916	1531	1711	4916
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	88	868	77	67	1385
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	88	868	77	67	1385
Turn Type		Free	NA	Free	Prot	NA
Protected Phases			2		1	Free
Permitted Phases		Free		Free		
Actuated Green, G (s)		48.0	32.3	48.0	4.7	48.0
Effective Green, g (s)		48.0	34.3	48.0	5.7	48.0
Actuated g/C Ratio		1.00	0.71	1.00	0.12	1.00
Clearance Time (s)			6.0		5.0	
Vehicle Extension (s)			5.0		3.0	
Lane Grp Cap (vph)		1558	3512	1531	203	4916
v/s Ratio Prot			0.18		0.04	0.28
v/s Ratio Perm		0.06		0.05		
v/c Ratio		0.06	0.25	0.05	0.33	0.28
Uniform Delay, d1		0.0	2.4	0.0	19.4	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	0.1	0.1	1.0	0.1
Delay (s)		0.1	2.5	0.1	20.4	0.1
Level of Service		A	A	A	C	A
Approach Delay (s)	0.1		2.3			1.1
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	1.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	48.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	31.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	97	1198	30	2	612	11	18	2	13	48
v/c Ratio	0.14	0.38	0.02	0.00	0.22	0.01	0.16	0.01	0.11	0.03
Control Delay	2.2	4.5	0.8	1.5	2.1	0.0	53.8	42.5	52.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.2	4.5	0.8	1.5	2.1	0.0	53.8	42.5	52.7	0.0
Queue Length 50th (ft)	0	0	0	0	22	0	13	1	10	0
Queue Length 95th (ft)	32	233	4	m1	40	m0	37	9	30	0
Internal Link Dist (ft)		712			1633			152	157	
Turn Bay Length (ft)	250		350	235		375				
Base Capacity (vph)	823	3148	1414	598	2831	1278	292	361	289	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.38	0.02	0.00	0.22	0.01	0.06	0.01	0.04	0.03

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	89	1102	28	2	563	10	17	1	1	11	1	44
Future Volume (vph)	89	1102	28	2	563	10	17	1	1	11	1	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)	1711	3421	1531	1711	3421	1531	1711	1666			1721	1531
Flt Permitted	0.40	1.00	1.00	0.23	1.00	1.00	0.75	1.00			0.74	1.00
Satd. Flow (perm)	716	3421	1531	419	3421	1531	1349	1666			1335	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	1198	30	2	612	11	18	1	1	12	1	48
RTOR Reduction (vph)	0	0	5	0	0	2	0	1	0	0	0	0
Lane Group Flow (vph)	97	1198	25	2	612	9	18	1	0	0	13	48
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Free
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8			4		Free
Actuated Green, G (s)	104.5	98.9	98.9	94.8	93.7	93.7	3.5	3.5			3.5	120.0
Effective Green, g (s)	105.0	100.9	100.9	95.8	95.7	95.7	5.5	5.5			5.5	120.0
Actuated g/C Ratio	0.88	0.84	0.84	0.80	0.80	0.80	0.05	0.05			0.05	1.00
Clearance Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0			3.0	
Lane Grp Cap (vph)	682	2876	1287	351	2728	1220	61	76			61	1531
v/s Ratio Prot	c0.01	c0.35		0.00	0.18			0.00				
v/s Ratio Perm	0.12		0.02	0.00		0.01	c0.01				0.01	0.03
v/c Ratio	0.14	0.42	0.02	0.01	0.22	0.01	0.30	0.01			0.21	0.03
Uniform Delay, d1	1.1	2.3	1.5	2.4	3.0	2.5	55.4	54.7			55.2	0.0
Progression Factor	1.81	2.08	1.00	0.93	0.66	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.1	0.4	0.0	0.0	0.2	0.0	2.7	0.1			1.7	0.0
Delay (s)	2.1	5.3	1.6	2.3	2.2	2.5	58.1	54.7			56.9	0.0
Level of Service	A	A	A	A	A	A	E	D			E	A
Approach Delay (s)		5.0			2.2			57.7			12.2	
Approach LOS		A			A			E			B	

Intersection Summary					
HCM 2000 Control Delay	4.8	HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.41				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	52.2%	ICU Level of Service		A	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	367	1315	664	14	9	167
v/c Ratio	0.43	0.40	0.29	0.01	0.08	0.11
Control Delay	7.2	1.7	12.5	0.0	53.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	1.7	12.5	0.0	53.2	0.1
Queue Length 50th (ft)	32	0	134	0	7	0
Queue Length 95th (ft)	m101	m251	214	0	24	0
Internal Link Dist (ft)		605	712		887	
Turn Bay Length (ft)	600					600
Base Capacity (vph)	1125	3321	2302	1531	285	1531
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.40	0.29	0.01	0.03	0.11

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	338	1210	611	13	8	154
Future Volume (vph)	338	1210	611	13	8	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	1711	1531
Flt Permitted	0.36	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	657	3421	3421	1531	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	367	1315	664	14	9	167
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	367	1315	664	14	9	167
Turn Type	pm+pt	NA	NA	Free	Prot	Free
Protected Phases	1	1 6	2		4	
Permitted Phases	1 6			Free		Free
Actuated Green, G (s)	100.5	106.5	74.0	120.0	1.5	120.0
Effective Green, g (s)	104.5	108.5	76.0	120.0	3.5	120.0
Actuated g/C Ratio	0.87	0.90	0.63	1.00	0.03	1.00
Clearance Time (s)	6.0		6.0		6.0	
Vehicle Extension (s)	3.0		5.0		3.0	
Lane Grp Cap (vph)	822	3093	2166	1531	49	1531
v/s Ratio Prot	0.11	c0.38	0.19		0.01	
v/s Ratio Perm	c0.28			0.01		c0.11
v/c Ratio	0.45	0.43	0.31	0.01	0.18	0.11
Uniform Delay, d1	4.2	0.9	10.0	0.0	56.9	0.0
Progression Factor	3.68	2.64	1.23	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1	0.4	0.0	1.8	0.1
Delay (s)	15.6	2.4	12.6	0.0	58.7	0.1
Level of Service	B	A	B	A	E	A
Approach Delay (s)		5.3	12.4		3.1	
Approach LOS		A	B		A	

Intersection Summary			
HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

BWI TIA MOE Table - 2027 AM Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
1	Aviation Blvd (MD 170) at Dorsey Rd (MD 176) - West	Signalized	NBL	448	73.2	E	114.7	F	96.6	F	455	560	#847
			NBT	1456	141.2	F					-	~1201	#1485
			NBR	277	42.0	D					250	171	294
			SBL	170	88.4	F	71.7	E			250	223	327
			SBT	424	69.7	E					-	278	351
			SBR	325	65.7	E					175	89	217
			EBL	345	145.6	F	89.4	F			175	~520	#824
			EBT	335	50.8	D					-	186	265
			EBR	152	46.9	D					225	0	66
			WBL	94	87.6	F	78.5	E			200	123	202
			WBT	500	76.8	E					-	338	436
			WBR	-	-	-					-	-	-
2	Aviation Blvd (MD 170) at Mathison Way	Signalized	NBT	1,816	16.0	B	15.6	B	14.5	B	-	532	770
			NBR	65	5.6	A					450	0	16
			SBL	50	27.3	C	5.3	A			375	4	23
			SBT	827	4.0	A					-	84	149
			WBL	89	50.4	D	48.1	D			450	70	120
			WBR	89	45.7	D					-	0	48
3	Aviation Blvd (MD 170) at Stoney Run Rd	Signalized	NBT	1,470	103.2	F	79.7	E	47.7	D	-	~787	#1070
			NBR	435	0.3	A					-	0	m0
			SBL	868	43.0	D	22.5	C			575	225	218
			SBT	808	0.5	A					-	7	21
			WBL	70	53.6	D	8.3	A			-	56	103
			WBR	408	0.5	A					-	0	0
4	Stoney Run Rd at Northrop Grumman Entrance	Signalized	NBL	728	17.5	B	20.9	C	19.7	B	-	158	318
			NBT	568	25.3	C					-	284	#704
			NBR	8									
			SBL	0	42.2	D	41.4	D			-	23	67
			SBT	42									
			SBR	10	38.0	D					85	0	0
			EBL	160	37.3	D	11.7	B			-	87	179
			EBT	2									
			EBR	369	0.4	A					550	0	0
			WBL	68	37.1	D	36.7	D			250	37	84
			WBT	17	34.6	C					-	9	30
			WBR	0	-	-					-	-	-
5	Stoney Run Rd at New Ridge Rd	Signalized	NBL	16	61.3	E	55.3	E	39.9	D	-	105	175
			NBT	99									
			NBR	420	53.7	D					-	0	114
			SBL	26	66.0	E	54.1	D			-	24	60
			SBT	27	43.4	D					-	20	48
			SBR	2									
			EBL	0	0.0	A	29.1	C			175	0	0
			EBT	85	29.5	C					-	55	109
			EBR	20	27.7	C					125	0	0
			WBL	432	47.3	D	29.4	C			300	369	#615
			WBT	171	5.6	A					-	46	94
			WBR	152	5.4	A					150	0	25
6	Aviation Blvd (MD 170) at Amtrak Way (MD 995)	Signalized	NBL	222	79.5	E	15.0	B	18.2	B	225	187	m204
			NBT	1,655	6.4	A					-	75	m185
			SBT	1,412	16.7	B	14.1	B			-	505	411
			SBR	537	7.3	A					-	24	m52
			EBL	201	53.3	D	48.0	D			-	159	237
			EBR	264	44.0	D					185	8	87
7	Aviation Blvd (MD 170) at Northrup Grumman Gate 1A	Signalized	NBL	115	56.4	E	4.9	A	10.5	B	225	99	m144
			NBT	1,740	1.5	A					-	11	114
			SBT	1,944	15.5	B	14.1	B			-	591	m623
			SBR	492	8.8	A					-	57	m65
			EBL	38	54.6	D	45.7	D			-	15	34
			EBR	7	0.0	A					-	0	0
8	Aviation Blvd (MD 170) at SB I-195 Ramps	Signalized	NBT	1,589	6.7	A	6.0	A	5.6	A	-	176	373
			NBR	190	0.1	A					50	0	0
			SBL	76	22.4	C	3.9	A			350	8	38
			SBT	779	2.0	A					-	36	97
			WBL	19	53.6	D	35.2	D			-	16	42
			WBR	10	0.0	A					-	0	0
9	Aviation Blvd (MD 170) at NB I-195 Ramps	Signalized	NBT	1,440	4.3	A	5.5	A	6.8	A	-	124	135
			NBR	684	8.0	A					-	24	29
			SBT	726	2.7	A	2.7	A			-	60	79
			WBL	129	51.4	D	51.4	D			-	102	160
10	Terminal Rd at Elkridge Landing Rd	Signalized	NBL	839	40.5	D	38.9	D	27.4	C	-	592	#921
			NBR	46	10.6	B					-	5	23
			EBT	112	33.0	C	6.4	A			-	36	63
			EBR	519	0.7	A					-	0	0
			WBL	30	25.0	C	32.1	C			150	15	37
			WBT	608	32.5	C					-	197	256

BWI TIA MOE Table - 2027 AM Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
11	Aviation Blvd (MD 170) at Terminal Rd	Signalized	NBL	89	51.7	D	22.5	C	29.9	C	300	37	63
			NBT	141	41.1	D					-	102	159
			NBR	235	0.2	A					400	0	0
			SBT	93	51.7	D	9.0	A			-	39	66
			SBR	475	0.6	A					-	0	0
			EBL	761	66.8	E	40.5	D			445	318	#514
			EBT	475	16.8	B					-	77	134
			EBR	219	0.2	A					445	0	0
			WBL	354	56.6	E	30.0	C			615	108	186
			WBT	806	18.3	B					-	313	282
			WBR	0	-	-					-	-	-
12	Aviation Blvd (MD 170) at Air Cargo Dr	Signalized	NBL	74	51.4	D	50.1	D	14.7	B	-	71	122
			NBT	16									
			NBR	38	47.0	D					-	0	0
			SBL	104	51.6	D	50.7	D			-	68	120
			SBT	18	49.8	D					-	40	90
			SBR	36									
			EBL	111	28.3	C	21.2	C			275	59	135
			EBT	520	22.9	C					-	142	273
			EBR	80	0.1	A					-	0	0
			WBL	65	2.9	A	6.3	A			375	6	m7
			WBT	1049	9.9	A					-	197	342
			WBR	643	0.9	A					475	0	0
13	Aviation Blvd (MD 162) at Andover Rd	Signalized	WBT	1,349	11.7	B	11.5	B	16.2	B	-	292	626
			WBR	275	10.5	B					200	36	149
			EBL	10	6.6	A	7.7	A			415	5	23
			EBT	350	7.7	A					-	84	161
			SBL	274	50.3	D	47.8	D			175	141	205
			SBR	61	45.2	D					-	76	143
14	Aviation Blvd (MD 162) at Aaronson Dr	Unsignalized	NBL	32	9.1	A	0.2	A	10.9	B	-	-	-
			NBT	1,568	0.0	A					-	-	-
			NBR	7									
			SBL	12	15.2	C	0.3	A			-	-	-
			SBT	594	0.0	A					-	-	-
			SBR	26									
			EBL	21	79.2	F	79.2	F			-	-	-
			EBT	0									
			EBR	18									
			WBL	25	325.7	F	325.7	F			-	-	-
			WBT	1									
			WBR	41									
15	Aviation Blvd (MD 162) at Allwood Dr	Signalized	NBL	59	1.9	A	5.4	A	6.8	A	300	6	14
			NBT	1559	5.6	A					-	147	388
			NBR	12	2.3	A					100	0	0
			SBL	7	2.5	A	4.1	A			225	1	m1
			SBT	640	4.2	A					-	109	150
			SBR	28	3.1	A					225	0	7
			EBL	24	53.3	D	52.4	D			-	19	48
			EBT	0	51.0	D					-	0	0
			EBR	14									
			WBL	24	53.3	D	53.3	D			-	20	60
			WBT	1									
			WBR	24									
16	SB I-97 Ramps at Cromwell Park Dr	Signalized	SBT	69	45.2	D	44.6	D	15.9	B	-	24	47
			SBR	39	43.5	D					-	0	0
			EBL	207	42.8	D	18.4	B			420	70	107
			EBR	331	3.2	A					-	0	10
			WBT	569	10.5	B	10.2	B			-	101	151
			WBR	202	9.4	A					600	0	34
17	Aviation Blvd (MD 162) at Cromwell Park Dr	Signalized	NBT	1,601	20.6	C	19.9	B	26.3	C	-	343	468
			NBR	190	14.0	B					1000	0	37
			SBL	348	48.0	D	32.7	C			425	97	166
			SBT	190	4.8	A					-	22	37
			SBR	1									
			EBR	1	40.2	D	40.2	D			-	0	0
			WBL	391	46.1	D	39.2	D			-	157	273
			WBR	218	26.8	C					600	118	244

BWI TIA MOE Table - 2027 AM Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
18	Aviation Blvd (MD 162) at Dorsey Rd (MD 176) - East	Signalized	NBL	211	36.6	D	40.5	D	27.5	C	350	61	137
			NBT	291	42.3	D					-	133	273
			NBR	165									
			SBL	117	42.5	D	43.7	D			490	38	86
			SBT	87	41.9	D					-	28	70
			SBR	377	44.5	D					300	21	152
			EBL	147	16.2	B	19.1	B			350	50	133
			EBT	354	20.3	C					-	58	119
			EBR	9									
			WBL	21	23.9	C	20.1	C			425	7	28
			WBT	494	32.4	C					-	145	298
			WBR	1,354	15.5	B					-	0	#149
19	Dorsey Rd (MD 176) at Digiulian Blvd	Unsignalized	NBL	5	11.4	B	11.4	B	0.9	A	-	-	-
			NBT	0									
			NBR	8									
			SBL	21	15.4	C	15.4	C			-	-	-
			SBT	1									
			SBR	10									
			EBL	12	8.6	A	0.3	A			-	-	-
			EBT	287	0.0	A					-	-	-
			EBR	6	0.0	A					-	-	-
			WBL	7	7.9	A	0.1	A			-	-	-
			WBT	461	0.0	A					-	-	-
			WBR	36	0.0	A					-	-	-
20	Aviation Blvd (MD 162) at Hollins Ferry Rd	Signalized	NBT	1,638	2.7	A	2.4	A	2.4	A	-	76	120
			NBR	181	0.2	A					485	0	0
			SBL	54	26.6	C	2.5	A			575	21	54
			SBT	540	0.0	A					-	0	0
			WBR	69	0.1	A	0.1	A			-	0	0
21	Aviation Blvd (MD 170) at Long Term Parking Lots	Signalized	NBL	11	58.7	E	58.7	E	6.1	A	-	9	29
			NBT	0	-	-					-	-	-
			NBR	0									
			SBL	0	56.5	E	2.4	A			-	1	7
			SBT	1									
			SBR	21	0.0	A					-	0	0
			EBL	104	14.6	B	4.9	A			250	1	8
			EBT	360	1.7	A					-	0	80
			EBR	29	10.1	B					350	0	8
			WBL	1	4.8	A	6.1	A			235	0	m1
			WBT	1,393	6.2	A					-	104	312
			WBR	16	2.7	A					375	0	m0
22	Aviation Blvd (MD 162) at S Camp Meade Rd (MD 170)	Signalized	SBL	7	58.4	E	1.6	A	5.2	A	-	6	22
			SBR	346	0.4	A					600	0	0
			EBL	176	20.7	C	5.6	A			600	47	152
			EBT	486	0.2	A					-	0	9
			WBT	1,412	5.9	A	5.8	A			-	130	334
			WBR	14	0.0	A					-	0	m0

Notes

m Volume for 95th percentile queue is metered by upstream signal

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	375	364	165	102	543	487	1583	301	185	461	353
v/c Ratio	1.08	0.35	0.28	0.62	0.79	0.87	1.17	0.45	0.75	0.64	0.65
Control Delay	137.1	53.7	7.9	98.8	80.7	76.4	133.3	29.2	96.4	72.0	22.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	137.1	53.7	7.9	98.8	80.7	76.4	133.3	29.2	96.4	72.0	22.2
Queue Length 50th (ft)	~520	186	0	123	338	560	~1201	171	223	278	89
Queue Length 95th (ft)	#824	265	66	202	436	#847	#1485	294	327	351	217
Internal Link Dist (ft)		640			713		584			1313	
Turn Bay Length (ft)	175		225	200		455		250	250		175
Base Capacity (vph)	348	1053	587	348	792	589	1662	802	348	1178	708
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.08	0.35	0.28	0.29	0.69	0.83	0.95	0.38	0.53	0.39	0.50

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	345	335	152	94	500	0	448	1456	277	170	424	325
Future Volume (vph)	345	335	152	94	500	0	448	1456	277	170	424	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	375	364	165	102	543	0	487	1583	301	185	461	353
RTOR Reduction (vph)	0	0	116	0	0	0	0	0	69	0	0	216
Lane Group Flow (vph)	375	364	49	102	543	0	487	1583	232	185	461	137
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4						6			2
Actuated Green, G (s)	35.2	51.9	51.9	16.1	32.8		57.6	67.5	67.5	24.7	34.6	34.6
Effective Green, g (s)	36.2	54.9	54.9	17.1	35.8		58.6	70.5	70.5	25.7	37.6	37.6
Actuated g/C Ratio	0.20	0.30	0.30	0.09	0.19		0.32	0.38	0.38	0.14	0.20	0.20
Clearance Time (s)	5.0	7.0	7.0	5.0	7.0		5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	347	1054	471	164	687		563	1354	605	246	722	323
v/s Ratio Prot	c0.21	0.10		0.06	c0.15		c0.28	c0.45		0.10	0.13	
v/s Ratio Perm			0.03						0.15			0.09
v/c Ratio	1.08	0.35	0.10	0.62	0.79		0.87	1.17	0.38	0.75	0.64	0.42
Uniform Delay, d1	74.0	50.6	46.8	80.4	70.6		59.1	56.8	41.1	76.2	67.1	63.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	71.6	0.2	0.1	7.1	6.2		14.2	84.4	0.9	12.2	2.6	1.9
Delay (s)	145.6	50.8	46.9	87.6	76.8		73.2	141.2	42.0	88.4	69.7	65.7
Level of Service	F	D	D	F	E		E	F	D	F	E	E
Approach Delay (s)		89.4			78.5			114.7			71.7	
Approach LOS		F			E			F			E	

Intersection Summary			
HCM 2000 Control Delay	96.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	184.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

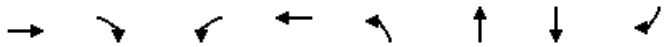
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	97	97	1974	71	54	899
v/c Ratio	0.43	0.34	0.81	0.06	0.28	0.33
Control Delay	52.7	11.8	17.3	1.9	14.2	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	11.8	17.3	1.9	14.2	4.3
Queue Length 50th (ft)	70	0	532	0	4	84
Queue Length 95th (ft)	120	48	770	16	23	149
Internal Link Dist (ft)	716		2236			2190
Turn Bay Length (ft)	450			450	375	
Base Capacity (vph)	456	479	2428	1107	337	2736
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.20	0.81	0.06	0.16	0.33

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	89	89	1816	65	50	827
Future Volume (vph)	89	89	1816	65	50	827
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1531	3421	1531	1711	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.05	1.00
Satd. Flow (perm)	1711	1531	3421	1531	84	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	97	1974	71	54	899
RTOR Reduction (vph)	0	84	0	21	0	0
Lane Group Flow (vph)	97	13	1974	50	54	899
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Actuated Green, G (s)	14.0	14.0	81.2	81.2	93.0	93.0
Effective Green, g (s)	16.0	16.0	84.2	84.2	94.0	96.0
Actuated g/C Ratio	0.13	0.13	0.70	0.70	0.78	0.80
Clearance Time (s)	6.0	6.0	7.0	7.0	5.0	7.0
Vehicle Extension (s)	5.0	5.0	6.0	6.0	5.0	6.0
Lane Grp Cap (vph)	228	204	2400	1074	171	2736
v/s Ratio Prot	c0.06		c0.58		0.02	c0.26
v/s Ratio Perm		0.01		0.03	0.23	
v/c Ratio	0.43	0.06	0.82	0.05	0.32	0.33
Uniform Delay, d1	47.8	45.5	12.6	5.5	16.7	3.3
Progression Factor	1.00	1.00	1.00	1.00	1.50	1.14
Incremental Delay, d2	2.7	0.3	3.3	0.1	2.2	0.3
Delay (s)	50.4	45.7	16.0	5.6	27.3	4.0
Level of Service	D	D	B	A	C	A
Approach Delay (s)	48.1		15.6			5.3
Approach LOS	D		B			A

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	176	401	74	18	791	626	46	11
v/c Ratio	0.60	0.26	0.33	0.08	0.50	0.73	0.27	0.05
Control Delay	42.8	0.4	39.2	35.2	21.2	29.9	43.7	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.8	0.4	39.2	35.2	21.2	29.9	43.7	0.4
Queue Length 50th (ft)	87	0	37	9	158	284	23	0
Queue Length 95th (ft)	179	0	84	30	318	#704	67	0
Internal Link Dist (ft)	968			347		398	150	
Turn Bay Length (ft)		550	250					85
Base Capacity (vph)	645	1531	471	496	1578	854	564	542
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.26	0.16	0.04	0.50	0.73	0.08	0.02

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	2	369	68	17	0	728	568	8	0	42	10
Future Volume (vph)	160	2	369	68	17	0	728	568	8	0	42	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	5.0	5.0		5.0	5.0			4.0	4.0
Lane Util. Factor		1.00	1.00	1.00	1.00		0.97	1.00			1.00	1.00
Frpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85	1.00	1.00		1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00	0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1716	1531	1711	1801		3319	1797			1801	1531
Flt Permitted		0.95	1.00	0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (perm)		1716	1531	1711	1801		3319	1797			1801	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	2	401	74	18	0	791	617	9	0	46	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	1	0	0	0	10
Lane Group Flow (vph)	0	176	401	74	18	0	791	625	0	0	46	1
Confl. Peds. (#/hr)	3											
Turn Type	Split	NA	Free	Split	NA		Split	NA			NA	Prot
Protected Phases	3	3		4	4		2	2			1	1
Permitted Phases			Free							1		
Actuated Green, G (s)		14.1	85.2	9.0	9.0		39.3	39.3			4.8	4.8
Effective Green, g (s)		14.1	85.2	9.0	9.0		39.3	39.3			4.8	4.8
Actuated g/C Ratio		0.17	1.00	0.11	0.11		0.46	0.46			0.06	0.06
Clearance Time (s)		4.0		5.0	5.0		5.0	5.0			4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0		5.0	5.0			3.0	3.0
Lane Grp Cap (vph)		283	1531	180	190		1530	828			101	86
v/s Ratio Prot		c0.10		c0.04	0.01		0.24	c0.35			0.03	0.00
v/s Ratio Perm			c0.26									
v/c Ratio		0.62	0.26	0.41	0.09		0.52	0.76			0.46	0.01
Uniform Delay, d1		33.1	0.0	35.6	34.4		16.2	19.0			38.9	38.0
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		4.2	0.4	1.5	0.2		1.3	6.3			3.2	0.0
Delay (s)		37.3	0.4	37.1	34.6		17.5	25.3			42.2	38.0
Level of Service		D	A	D	C		B	C			D	D
Approach Delay (s)		11.7			36.7			20.9			41.4	
Approach LOS		B			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	85.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	92	22	470	186	165	125	457	28	31
v/c Ratio	0.14	0.04	0.80	0.14	0.14	0.62	0.79	0.27	0.10
Control Delay	32.2	0.1	50.9	6.7	1.4	68.9	15.2	68.1	40.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	0.1	50.9	6.7	1.4	68.9	15.2	68.1	40.1
Queue Length 50th (ft)	55	0	369	46	0	105	0	24	20
Queue Length 95th (ft)	109	0	#615	94	25	175	114	60	48
Internal Link Dist (ft)	269			383		290			249
Turn Bay Length (ft)		125	300		150				
Base Capacity (vph)	639	594	607	1350	1189	475	753	270	845
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.04	0.77	0.14	0.14	0.26	0.61	0.10	0.04

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	85	20	432	171	152	16	99	420	26	27	2
Future Volume (vph)	0	85	20	432	171	152	16	99	420	26	27	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.99	
Flt Protected		1.00	1.00	0.95	1.00	1.00		0.99	1.00	0.95	1.00	
Satd. Flow (prot)		1801	1531	1711	1801	1531		1788	1531	1711	1783	
Flt Permitted		1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (perm)		1801	1531	1711	1801	1531		1722	1531	1711	1783	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	92	22	470	186	165	17	108	457	28	29	2
RTOR Reduction (vph)	0	0	14	0	0	45	0	0	404	0	2	0
Lane Group Flow (vph)	0	92	8	470	186	120	0	125	53	28	29	0
Turn Type	Perm	NA	Perm	Prot	NA	Prot	Perm	NA	Prot	Prot	NA	
Protected Phases		6		5	2	2		8	8	7	4	
Permitted Phases	6		6				8					
Actuated Green, G (s)		45.5	45.5	44.2	94.7	94.7		15.0	15.0	4.9	24.9	
Effective Green, g (s)		45.5	45.5	44.2	94.7	94.7		15.0	15.0	4.9	24.9	
Actuated g/C Ratio		0.35	0.35	0.34	0.73	0.73		0.12	0.12	0.04	0.19	
Clearance Time (s)		5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		5.0	5.0	3.0	5.0	5.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		629	535	581	1310	1114		198	176	64	341	
v/s Ratio Prot		0.05		c0.27	c0.10	0.08			0.03	c0.02	0.02	
v/s Ratio Perm			0.01					c0.07				
v/c Ratio		0.15	0.01	0.81	0.14	0.11		0.63	0.30	0.44	0.09	
Uniform Delay, d1		29.0	27.6	39.1	5.4	5.2		54.9	52.7	61.3	43.2	
Progression Factor		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.5	0.0	8.1	0.2	0.2		6.4	1.0	4.7	0.1	
Delay (s)		29.5	27.7	47.3	5.6	5.4		61.3	53.7	66.0	43.4	
Level of Service		C	C	D	A	A		E	D	E	D	
Approach Delay (s)		29.1			29.4			55.3			54.1	
Approach LOS		C			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	39.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	130.1	Sum of lost time (s)	20.5
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Group Flow (vph)	218	287	241	1799	1535	584
v/c Ratio	0.71	0.60	0.82	0.70	0.82	0.55
Control Delay	58.4	11.4	81.2	7.0	17.8	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0
Total Delay	58.4	11.4	81.2	7.0	18.0	2.3
Queue Length 50th (ft)	159	8	187	75	505	24
Queue Length 95th (ft)	237	87	m204	m185	411	m52
Internal Link Dist (ft)	755			2381	681	
Turn Bay Length (ft)		185	225			
Base Capacity (vph)	370	526	301	2573	1874	1061
Starvation Cap Reductn	0	0	0	0	40	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.55	0.80	0.70	0.84	0.55

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	201	264	222	1655	1412	537
Future Volume (vph)	201	264	222	1655	1412	537
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1711	1531	1711	3421	3421	1531
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1711	1531	1711	3421	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	218	287	241	1799	1535	584
RTOR Reduction (vph)	0	230	0	0	0	223
Lane Group Flow (vph)	218	57	241	1799	1535	361
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		1	6	2	
Permitted Phases	4	4				2
Actuated Green, G (s)	19.7	19.7	19.5	88.8	64.3	64.3
Effective Green, g (s)	21.7	19.7	20.5	90.3	65.8	65.8
Actuated g/C Ratio	0.18	0.16	0.17	0.75	0.55	0.55
Clearance Time (s)	6.0	6.0	5.0	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	6.0
Lane Grp Cap (vph)	309	251	292	2574	1875	839
v/s Ratio Prot	c0.13		c0.14	0.53	c0.45	
v/s Ratio Perm		0.04				0.24
v/c Ratio	0.71	0.23	0.83	0.70	0.82	0.43
Uniform Delay, d1	46.1	43.5	48.0	7.8	22.2	16.0
Progression Factor	1.00	1.00	1.50	0.74	0.66	0.41
Incremental Delay, d2	7.1	0.5	7.6	0.6	2.1	0.8
Delay (s)	53.3	44.0	79.5	6.4	16.7	7.3
Level of Service	D	D	E	A	B	A
Approach Delay (s)	48.0			15.0	14.1	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	125	1891	2113	535	41	8
v/c Ratio	0.59	0.62	0.85	0.44	0.19	0.01
Control Delay	60.7	1.5	17.2	3.7	54.5	0.0
Queue Delay	0.0	0.0	0.1	0.0	0.0	0.0
Total Delay	60.7	1.5	17.2	3.7	54.5	0.0
Queue Length 50th (ft)	99	11	591	57	15	0
Queue Length 95th (ft)	m144	114	m623	m65	34	0
Internal Link Dist (ft)		681	1012		359	
Turn Bay Length (ft)	225					
Base Capacity (vph)	286	3049	2484	1212	553	1531
Starvation Cap Reductn	0	84	0	0	0	0
Spillback Cap Reductn	0	0	19	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.64	0.86	0.44	0.07	0.01

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	115	1740	1944	492	38	7
Future Volume (vph)	115	1740	1944	492	38	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	3319	1531
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1711	3421	3421	1531	3319	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	1891	2113	535	41	8
RTOR Reduction (vph)	0	0	0	103	0	0
Lane Group Flow (vph)	125	1891	2113	432	41	8
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	1	6	2		4	
Permitted Phases				2		Free
Actuated Green, G (s)	14.0	103.7	84.7	84.7	5.8	120.0
Effective Green, g (s)	15.0	105.2	86.2	86.2	6.8	120.0
Actuated g/C Ratio	0.12	0.88	0.72	0.72	0.06	1.00
Clearance Time (s)	5.0	5.5	5.5	5.5	5.0	
Vehicle Extension (s)	3.0	0.2	0.2	0.2	3.0	
Lane Grp Cap (vph)	213	2999	2457	1099	188	1531
v/s Ratio Prot	0.07	c0.55	c0.62		c0.01	
v/s Ratio Perm				0.28		0.01
v/c Ratio	0.59	0.63	0.86	0.39	0.22	0.01
Uniform Delay, d1	49.6	2.0	12.5	6.6	54.1	0.0
Progression Factor	1.08	0.36	1.07	1.25	1.00	1.00
Incremental Delay, d2	2.9	0.7	2.1	0.5	0.6	0.0
Delay (s)	56.4	1.5	15.5	8.8	54.6	0.0
Level of Service	E	A	B	A	D	A
Approach Delay (s)		4.9	14.1		45.7	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	SBR	NWL	NWR2
Lane Group Flow (vph)	1727	207	83	847	1780	21	11
v/c Ratio	0.64	0.14	0.33	0.29	1.14	0.18	0.01
Control Delay	7.2	0.1	8.2	2.1	79.3	55.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	0.1	8.2	2.1	79.3	55.9	0.0
Queue Length 50th (ft)	176	0	8	36	~358	16	0
Queue Length 95th (ft)	373	0	38	97	#622	42	0
Internal Link Dist (ft)	1012			765		262	
Turn Bay Length (ft)		50	350				
Base Capacity (vph)	2699	1531	487	2963	1558	285	1531
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.14	0.17	0.29	1.14	0.07	0.01

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2
Lane Configurations		↑↑	↱	↰	↑↑			↱	↰		↱
Traffic Volume (vph)	0	1589	190	76	779	0	0	1638	19	0	10
Future Volume (vph)	0	1589	190	76	779	0	0	1638	19	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0			4.0	4.0		4.0
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00		1.00
Frt		1.00	0.85	1.00	1.00			0.86	1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00			1.00	0.95		1.00
Satd. Flow (prot)		3421	1531	1711	3421			1558	1711		1531
Flt Permitted		1.00	1.00	0.10	1.00			1.00	0.95		1.00
Satd. Flow (perm)		3421	1531	179	3421			1558	1711		1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1727	207	83	847	0	0	1780	21	0	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1727	207	83	847	0	0	1780	21	0	11
Turn Type		NA	Free	pm+pt	NA			Free	Prot		Free
Protected Phases		6		5	2				4		
Permitted Phases			Free	2				Free			Free
Actuated Green, G (s)		92.3	120.0	102.4	102.4			120.0	7.1		120.0
Effective Green, g (s)		93.8	120.0	102.9	103.9			120.0	8.1		120.0
Actuated g/C Ratio		0.78	1.00	0.86	0.87			1.00	0.07		1.00
Clearance Time (s)		5.5		4.5	5.5				5.0		
Vehicle Extension (s)		5.0		3.0	5.0				3.0		
Lane Grp Cap (vph)		2674	1531	231	2962			1558	115		1531
v/s Ratio Prot		0.50		0.02	0.25				0.01		
v/s Ratio Perm			0.14	0.29				c1.14			0.01
v/c Ratio		0.65	0.14	0.36	0.29			1.14	0.18		0.01
Uniform Delay, d1		5.8	0.0	5.8	1.4			60.0	52.8		0.0
Progression Factor		0.99	1.00	3.73	1.26			1.00	1.00		1.00
Incremental Delay, d2		1.0	0.1	0.9	0.2			72.3	0.8		0.0
Delay (s)		6.7	0.1	22.4	2.0			132.3	53.6		0.0
Level of Service		A	A	C	A			F	D		A
Approach Delay (s)		6.0			3.9		132.3		35.2		
Approach LOS		A			A		F		D		

Intersection Summary			
HCM 2000 Control Delay	53.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.27		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	NWL
Lane Group Flow (vph)	1565	743	789	140
v/c Ratio	0.58	0.55	0.29	0.55
Control Delay	4.7	2.0	2.9	54.7
Queue Delay	0.1	0.2	0.0	0.0
Total Delay	4.7	2.1	2.9	54.7
Queue Length 50th (ft)	124	24	60	102
Queue Length 95th (ft)	135	29	79	160
Internal Link Dist (ft)	765		418	135
Turn Bay Length (ft)				
Base Capacity (vph)	2681	1350	2681	456
Starvation Cap Reductn	165	107	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.62	0.60	0.29	0.31

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	1440	684	0	726	129	0
Future Volume (vph)	1440	684	0	726	129	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5		4.0	4.0	
Lane Util. Factor	0.95	1.00		0.95	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	1.00	1.00		1.00	0.95	
Satd. Flow (prot)	3421	1531		3421	1711	
Flt Permitted	1.00	1.00		1.00	0.95	
Satd. Flow (perm)	3421	1531		3421	1711	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1565	743	0	789	140	0
RTOR Reduction (vph)	0	170	0	0	0	0
Lane Group Flow (vph)	1565	573	0	789	140	0
Turn Type	NA	Perm		NA	Prot	
Protected Phases	6			2	4	
Permitted Phases		6				
Actuated Green, G (s)	92.5	92.5		92.5	17.0	
Effective Green, g (s)	94.0	92.5		94.0	18.0	
Actuated g/C Ratio	0.78	0.77		0.78	0.15	
Clearance Time (s)	5.5	5.5		5.5	5.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	2679	1180		2679	256	
v/s Ratio Prot	c0.46			0.23	c0.08	
v/s Ratio Perm		0.37				
v/c Ratio	0.58	0.49		0.29	0.55	
Uniform Delay, d1	5.2	5.0		3.7	47.2	
Progression Factor	0.66	1.33		0.66	1.00	
Incremental Delay, d2	0.8	1.3		0.2	4.2	
Delay (s)	4.3	8.0		2.7	51.4	
Level of Service	A	A		A	D	
Approach Delay (s)	5.5			2.7	51.4	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	122	564	33	661	912	50
v/c Ratio	0.15	0.37	0.09	0.62	0.93	0.06
Control Delay	33.7	0.7	24.2	33.3	39.4	5.8
Queue Delay	0.0	0.0	0.0	0.0	1.8	0.0
Total Delay	33.7	0.7	24.2	33.3	41.2	5.8
Queue Length 50th (ft)	36	0	15	197	592	5
Queue Length 95th (ft)	63	0	37	256	#921	23
Internal Link Dist (ft)	475			893	211	
Turn Bay Length (ft)			150			
Base Capacity (vph)	816	1531	459	1633	980	892
Starvation Cap Reductn	0	0	0	0	21	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.37	0.07	0.40	0.95	0.06

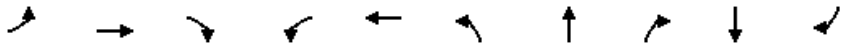
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	112	519	30	608	839	46
Future Volume (vph)	112	519	30	608	839	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	4.0	5.0	6.0	6.0	6.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3421	1531	1711	3421	1711	1531
Flt Permitted	1.00	1.00	0.56	1.00	0.95	1.00
Satd. Flow (perm)	3421	1531	1013	3421	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	122	564	33	661	912	50
RTOR Reduction (vph)	0	0	0	0	0	15
Lane Group Flow (vph)	122	564	33	661	912	35
Turn Type	NA	Free	pm+pt	NA	Prot	Prot
Protected Phases	6		5	2	4	4
Permitted Phases		Free	2			
Actuated Green, G (s)	25.1	107.2	35.0	35.0	60.2	60.2
Effective Green, g (s)	25.1	107.2	35.0	35.0	60.2	60.2
Actuated g/C Ratio	0.23	1.00	0.33	0.33	0.56	0.56
Clearance Time (s)	6.0		5.0	6.0	6.0	6.0
Vehicle Extension (s)	3.5		3.5	3.5	5.0	5.0
Lane Grp Cap (vph)	800	1531	362	1116	960	859
v/s Ratio Prot	0.04		0.00	c0.19	c0.53	0.02
v/s Ratio Perm		0.37	0.03			
v/c Ratio	0.15	0.37	0.09	0.59	0.95	0.04
Uniform Delay, d1	32.6	0.0	24.9	30.1	22.1	10.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.7	0.1	2.3	18.4	0.0
Delay (s)	33.0	0.7	25.0	32.5	40.5	10.6
Level of Service	C	A	C	C	D	B
Approach Delay (s)	6.4			32.1	38.9	
Approach LOS	A			C	D	

Intersection Summary			
HCM 2000 Control Delay	27.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	107.2	Sum of lost time (s)	17.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	827	516	238	385	876	97	153	255	101	516
v/c Ratio	0.93	0.30	0.16	0.63	0.61	0.32	0.40	0.17	0.32	0.34
Control Delay	68.0	17.7	0.2	59.0	18.5	53.5	42.9	0.2	53.4	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.0	17.7	0.2	59.0	18.5	53.5	42.9	0.2	53.4	0.6
Queue Length 50th (ft)	318	77	0	108	313	37	102	0	39	0
Queue Length 95th (ft)	#514	134	0	186	282	63	159	0	66	0
Internal Link Dist (ft)		871			1398		1013		384	
Turn Bay Length (ft)	445		445	615		300		400		
Base Capacity (vph)	890	1711	1531	613	1425	553	660	1531	570	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.30	0.16	0.63	0.61	0.18	0.23	0.17	0.18	0.34

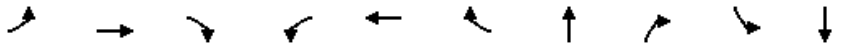
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	761	475	219	354	806	0	89	141	235	0	93	475
Future Volume (vph)	761	475	219	354	806	0	89	141	235	0	93	475
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		0.97	1.00	1.00		0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (perm)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	827	516	238	385	876	0	97	153	255	0	101	516
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	827	516	238	385	876	0	97	153	255	0	101	516
Turn Type	Prot	NA	Free	Prot	NA		Prot	NA	Free		NA	Free
Protected Phases	1	6		5	2		7	4			8	
Permitted Phases			Free						Free			Free
Actuated Green, G (s)	31.2	58.0	120.0	21.2	48.0		8.9	23.8	120.0		8.9	120.0
Effective Green, g (s)	32.2	60.0	120.0	22.2	50.0		10.9	25.8	120.0		10.9	120.0
Actuated g/C Ratio	0.27	0.50	1.00	0.18	0.42		0.09	0.22	1.00		0.09	1.00
Clearance Time (s)	5.0	6.0		5.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	890	1710	1531	614	1425		301	387	1531		310	1531
v/s Ratio Prot	c0.25	0.15		0.12	c0.26		0.03	c0.08			0.03	
v/s Ratio Perm			0.16						0.17			c0.34
v/c Ratio	0.93	0.30	0.16	0.63	0.61		0.32	0.40	0.17		0.33	0.34
Uniform Delay, d1	42.8	17.7	0.0	45.1	27.4		51.1	40.4	0.0		51.1	0.0
Progression Factor	1.25	0.93	1.00	1.22	0.61		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	13.4	0.4	0.2	1.6	1.6		0.6	0.7	0.2		0.6	0.6
Delay (s)	66.8	16.8	0.2	56.6	18.3		51.7	41.1	0.2		51.7	0.6
Level of Service	E	B	A	E	B		D	D	A		D	A
Approach Delay (s)		40.5			30.0			22.5			9.0	
Approach LOS		D			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	29.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	121	565	87	71	1140	699	97	41	88	84
v/c Ratio	0.40	0.28	0.06	0.13	0.61	0.46	0.48	0.14	0.47	0.40
Control Delay	23.7	25.6	0.1	2.9	10.9	0.9	56.9	1.0	57.2	37.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.7	25.6	0.1	2.9	10.9	0.9	56.9	1.0	57.2	37.0
Queue Length 50th (ft)	59	142	0	6	197	0	71	0	68	40
Queue Length 95th (ft)	135	273	0	m7	342	0	122	0	120	90
Internal Link Dist (ft)		1398			1719		314			276
Turn Bay Length (ft)	275			375		475				
Base Capacity (vph)	353	1993	1531	608	1871	1531	288	361	270	287
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.28	0.06	0.12	0.61	0.46	0.34	0.11	0.33	0.29

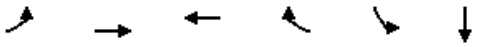
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	520	80	65	1049	643	74	16	38	104	18	36
Future Volume (vph)	111	520	80	65	1049	643	74	16	38	104	18	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	0.95	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.99	
Satd. Flow (prot)	1711	3421	1531	1711	3421	1531		1729	1531	1625	1568	
Flt Permitted	0.15	1.00	1.00	0.42	1.00	1.00		0.96	1.00	0.95	0.99	
Satd. Flow (perm)	274	3421	1531	758	3421	1531		1729	1531	1625	1568	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	121	565	87	71	1140	699	80	17	41	113	20	39
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	36	0	27	0
Lane Group Flow (vph)	121	565	87	71	1140	699	0	97	5	88	57	0
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Split	NA	Perm	Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6		Free	2		Free			3			
Actuated Green, G (s)	76.5	67.0	120.0	69.9	63.7	120.0		12.0	12.0	11.8	11.8	
Effective Green, g (s)	78.5	69.0	120.0	71.9	65.7	120.0		14.0	14.0	13.8	13.8	
Actuated g/C Ratio	0.65	0.58	1.00	0.60	0.55	1.00		0.12	0.12	0.12	0.12	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	304	1967	1531	511	1872	1531		201	178	186	180	
v/s Ratio Prot	0.03	0.17		0.01	c0.33			0.06		0.05	0.04	
v/s Ratio Perm	0.22		0.06	0.07		c0.46			0.00			
v/c Ratio	0.40	0.29	0.06	0.14	0.61	0.46		0.48	0.03	0.47	0.31	
Uniform Delay, d1	11.7	13.0	0.0	10.1	18.4	0.0		49.6	47.0	49.7	48.8	
Progression Factor	2.34	1.74	1.00	0.28	0.47	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.4	0.1	0.1	1.3	0.9		1.8	0.1	1.9	1.0	
Delay (s)	28.3	22.9	0.1	2.9	9.9	0.9		51.4	47.0	51.6	49.8	
Level of Service	C	C	A	A	A	A		D	D	D	D	
Approach Delay (s)		21.2			6.3			50.1			50.7	
Approach LOS		C			A			D			D	

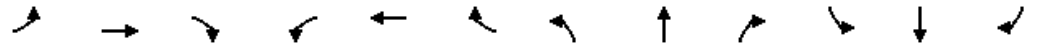
Intersection Summary			
HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBT
Lane Group Flow (vph)	11	380	1466	299	185	179
v/c Ratio	0.06	0.15	0.57	0.25	0.62	0.51
Control Delay	9.4	8.7	13.1	5.1	53.1	29.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.4	8.7	13.1	5.1	53.1	29.8
Queue Length 50th (ft)	5	84	292	36	141	76
Queue Length 95th (ft)	23	161	626	149	205	143
Internal Link Dist (ft)		1633	378			130
Turn Bay Length (ft)	415			200	175	
Base Capacity (vph)	191	2559	2559	1193	595	620
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.15	0.57	0.25	0.31	0.29

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	350	0	0	1349	275	0	0	0	274	0	61
Future Volume (vph)	10	350	0	0	1349	275	0	0	0	274	0	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95	1.00				0.95	0.95	
Frt	1.00	1.00			1.00	0.85				1.00	0.94	
Flt Protected	0.95	1.00			1.00	1.00				0.95	0.97	
Satd. Flow (prot)	1711	3421			3421	1531				1625	1567	
Flt Permitted	0.14	1.00			1.00	1.00				0.95	0.97	
Satd. Flow (perm)	256	3421			3421	1531				1625	1567	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	380	0	0	1466	299	0	0	0	298	0	66
RTOR Reduction (vph)	0	0	0	0	0	48	0	0	0	0	59	0
Lane Group Flow (vph)	11	380	0	0	1466	251	0	0	0	185	120	0
Turn Type	Perm	NA		Perm	NA	Perm				Split	NA	
Protected Phases		6			2		3	3		4	4	
Permitted Phases	6	6		2	2	2						
Actuated Green, G (s)	87.8	87.8			87.8	87.8				21.2	21.2	
Effective Green, g (s)	89.8	89.8			89.8	89.8				22.2	22.2	
Actuated g/C Ratio	0.75	0.75			0.75	0.75				0.18	0.18	
Clearance Time (s)	6.0	6.0			6.0	6.0				5.0	5.0	
Vehicle Extension (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Lane Grp Cap (vph)	191	2560			2560	1145				300	289	
v/s Ratio Prot		0.11			c0.43					c0.11	0.08	
v/s Ratio Perm	0.04					0.16						
v/c Ratio	0.06	0.15			0.57	0.22				0.62	0.41	
Uniform Delay, d1	4.0	4.3			6.6	4.5				45.0	43.2	
Progression Factor	1.53	1.77			1.64	2.23				1.00	1.00	
Incremental Delay, d2	0.6	0.1			0.8	0.4				5.4	2.0	
Delay (s)	6.6	7.7			11.7	10.5				50.3	45.2	
Level of Service	A	A			B	B				D	D	
Approach Delay (s)		7.7			11.5			0.0			47.8	
Approach LOS		A			B			A			D	

Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	0	18	25	1	41	32	1568	7	12	594	26
Future Volume (Veh/h)	21	0	18	25	1	41	32	1568	7	12	594	26
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	0	20	27	1	45	35	1704	8	13	646	28
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1654	2468	337	2147	2478	856	674			1712		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1654	2468	337	2147	2478	856	674			1712		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	54	100	97	0	96	85	96			96		
cM capacity (veh/h)	50	28	659	25	27	301	913			367		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	43	73	35	1136	576	13	431	243
Volume Left	23	27	35	0	0	13	0	0
Volume Right	20	45	0	0	8	0	0	28
cSH	89	58	913	1700	1700	367	1700	1700
Volume to Capacity	0.49	1.27	0.04	0.67	0.34	0.04	0.25	0.14
Queue Length 95th (ft)	52	157	3	0	0	3	0	0
Control Delay (s)	79.2	325.7	9.1	0.0	0.0	15.2	0.0	0.0
Lane LOS	F	F	A			C		
Approach Delay (s)	79.2	325.7	0.2			0.3		
Approach LOS	F	F						

Intersection Summary				
Average Delay	10.9			
Intersection Capacity Utilization	54.6%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	26	15	53	64	1695	13	8	696	30
v/c Ratio	0.21	0.03	0.35	0.10	0.58	0.01	0.03	0.25	0.02
Control Delay	54.2	0.1	36.4	2.1	4.9	0.0	1.4	4.6	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.2	0.1	36.4	2.1	4.9	0.0	1.4	4.6	1.1
Queue Length 50th (ft)	19	0	20	6	147	0	1	109	0
Queue Length 95th (ft)	48	0	60	14	388	0	m1	150	7
Internal Link Dist (ft)		254	405		1830			1619	
Turn Bay Length (ft)				300		100	225		225
Base Capacity (vph)	287	649	325	737	2922	1318	433	2732	1237
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.02	0.16	0.09	0.58	0.01	0.02	0.25	0.02

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

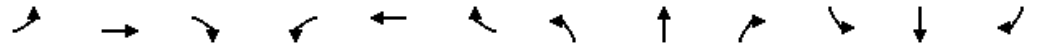
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	0	14	24	1	24	59	1559	12	7	640	28
Future Volume (vph)	24	0	14	24	1	24	59	1559	12	7	640	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.85			0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1711	1531			1641		1711	3421	1531	1711	3421	1531
Flt Permitted	0.74	1.00			0.84		0.36	1.00	1.00	0.12	1.00	1.00
Satd. Flow (perm)	1329	1531			1407		649	3421	1531	213	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	0	15	26	1	26	64	1695	13	8	696	30
RTOR Reduction (vph)	0	14	0	0	24	0	0	0	3	0	0	7
Lane Group Flow (vph)	26	1	0	0	29	0	64	1695	10	8	696	23
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			6		6	2		2
Actuated Green, G (s)	7.4	7.4			7.4		98.7	94.0	94.0	91.5	90.4	90.4
Effective Green, g (s)	9.4	9.4			9.4		100.7	96.5	96.5	93.5	92.9	92.9
Actuated g/C Ratio	0.08	0.08			0.08		0.84	0.80	0.80	0.78	0.77	0.77
Clearance Time (s)	6.0	6.0			6.0		5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0			3.0		2.5	5.0	5.0	2.5	5.0	5.0
Lane Grp Cap (vph)	104	119			110		595	2751	1231	192	2648	1185
v/s Ratio Prot		0.00					c0.01	c0.50		0.00	0.20	
v/s Ratio Perm	0.02				c0.02		0.09		0.01	0.03		0.02
v/c Ratio	0.25	0.01			0.26		0.11	0.62	0.01	0.04	0.26	0.02
Uniform Delay, d1	52.0	51.0			52.0		1.8	4.6	2.3	4.0	3.8	3.1
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	0.61	1.03	1.00
Incremental Delay, d2	1.3	0.0			1.3		0.1	1.0	0.0	0.1	0.2	0.0
Delay (s)	53.3	51.0			53.3		1.9	5.6	2.3	2.5	4.2	3.1
Level of Service	D	D			D		A	A	A	A	A	A
Approach Delay (s)		52.4			53.3			5.4			4.1	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	WBT	WBR	SBT	SBR
Lane Group Flow (vph)	225	360	618	220	75	42
v/c Ratio	0.56	0.16	0.30	0.22	0.28	0.20
Control Delay	46.1	0.6	11.5	2.2	46.1	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.1	0.6	11.5	2.2	46.1	2.1
Queue Length 50th (ft)	70	0	101	0	24	0
Queue Length 95th (ft)	107	10	151	34	47	0
Internal Link Dist (ft)			782		297	
Turn Bay Length (ft)	420			600		
Base Capacity (vph)	1033	2322	2033	999	1065	547
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.16	0.30	0.22	0.07	0.08

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	207	0	331	0	569	202	0	0	0	0	69	39
Future Volume (vph)	207	0	331	0	569	202	0	0	0	0	69	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		9.0		9.0	9.0					8.0	8.0
Lane Util. Factor	0.97		0.88		0.95	1.00					0.95	1.00
Frt	1.00		0.85		1.00	0.85					1.00	0.85
Flt Protected	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (prot)	3319		2694		3421	1531					3421	1531
Flt Permitted	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (perm)	3319		2694		3421	1531					3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	225	0	360	0	618	220	0	0	0	0	75	42
RTOR Reduction (vph)	0	0	85	0	0	91	0	0	0	0	0	39
Lane Group Flow (vph)	225	0	275	0	618	129	0	0	0	0	75	3
Turn Type	Prot		Prot		NA	Perm					NA	Perm
Protected Phases	1		6		2						4	
Permitted Phases						2						4
Actuated Green, G (s)	11.8		75.4		57.6	57.6					6.2	6.2
Effective Green, g (s)	11.8		75.4		57.6	57.6					6.2	6.2
Actuated g/C Ratio	0.12		0.76		0.58	0.58					0.06	0.06
Clearance Time (s)	6.0		9.0		9.0	9.0					8.0	8.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0					3.0	3.0
Lane Grp Cap (vph)	397		2060		1998	894					215	96
v/s Ratio Prot	c0.07		0.10		c0.18						c0.02	
v/s Ratio Perm						0.08						0.00
v/c Ratio	0.57		0.13		0.31	0.14					0.35	0.03
Uniform Delay, d1	41.0		3.0		10.4	9.3					44.3	43.4
Progression Factor	1.00		1.00		1.00	1.00					1.00	1.00
Incremental Delay, d2	1.9		0.1		0.1	0.1					1.0	0.1
Delay (s)	42.8		3.2		10.5	9.4					45.2	43.5
Level of Service	D		A		B	A					D	D
Approach Delay (s)		18.4			10.2			0.0			44.6	
Approach LOS		B			B			A			D	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	23.0
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	425	237	1740	207	378	208
v/c Ratio	0.00	0.62	0.39	0.66	0.23	0.51	0.08
Control Delay	0.0	51.4	28.3	21.7	2.5	52.8	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	0.0	51.4	28.3	21.7	2.5	52.8	5.0
Queue Length 50th (ft)	0	157	118	343	0	97	22
Queue Length 95th (ft)	0	273	244	468	37	166	37
Internal Link Dist (ft)				1519			448
Turn Bay Length (ft)			600		1000	425	
Base Capacity (vph)	974	869	1097	3922	1263	2284	3408
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.49	0.22	0.44	0.16	0.17	0.06

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	1	391	0	218	0	1601	190	348	190	1
Future Volume (vph)	0	0	1	391	0	218	0	1601	190	348	190	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	4.0		4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor			1.00	0.97		1.00		0.91	1.00	0.94	0.95	
Frt			0.86	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected			1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			1558	3319		1531		4916	1531	4824	3419	
Flt Permitted			1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)			1558	3319		1531		4916	1531	4824	3419	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1	425	0	237	0	1740	207	378	207	1
RTOR Reduction (vph)	0	0	1	0	0	13	0	0	95	0	0	0
Lane Group Flow (vph)	0	0	0	425	0	224	0	1740	112	378	208	0
Turn Type			Perm	Prot		pt+ov		NA	Perm	Prot	NA	
Protected Phases				4		4 5		6		5	2	
Permitted Phases			4						6			
Actuated Green, G (s)			23.1	23.1		46.0		63.3	63.3	16.9	86.2	
Effective Green, g (s)			23.1	25.1		48.0		66.3	66.3	18.9	89.2	
Actuated g/C Ratio			0.19	0.21		0.39		0.54	0.54	0.15	0.73	
Clearance Time (s)			6.0	6.0				7.0	7.0	6.0	7.0	
Vehicle Extension (s)			3.0	3.0				5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)			294	681		600		2665	829	745	2493	
v/s Ratio Prot				c0.13		0.15		c0.35		c0.08	0.06	
v/s Ratio Perm			0.00						0.07			
v/c Ratio			0.00	0.62		0.37		0.65	0.14	0.51	0.08	
Uniform Delay, d1			40.2	44.3		26.4		19.8	13.8	47.4	4.8	
Progression Factor			1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2			0.0	1.8		0.4		0.8	0.2	0.5	0.0	
Delay (s)			40.2	46.1		26.8		20.6	14.0	48.0	4.8	
Level of Service			D	D		C		C	B	D	A	
Approach Delay (s)		40.2			39.2			19.9			32.7	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	122.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	160	395	23	537	1472	229	495	127	95	410
v/c Ratio	0.36	0.19	0.06	0.56	0.96	0.33	0.70	0.29	0.21	0.78
Control Delay	18.5	21.9	17.8	36.8	17.5	39.2	41.9	46.7	46.1	19.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.5	21.9	17.8	36.8	17.5	39.2	41.9	46.7	46.1	19.1
Queue Length 50th (ft)	50	58	7	145	0	61	133	38	28	21
Queue Length 95th (ft)	133	119	28	298	#149	137	273	86	70	152
Internal Link Dist (ft)		1548		585			1389		1519	
Turn Bay Length (ft)	350		425			350		490		300
Base Capacity (vph)	615	2941	690	2055	1531	1312	1310	1512	1558	900
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.13	0.03	0.26	0.96	0.17	0.38	0.08	0.06	0.46

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	354	9	21	494	1354	211	291	165	117	87	377
Future Volume (vph)	147	354	9	21	494	1354	211	291	165	117	87	377
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	7.0		5.5	7.0	4.0	5.5	5.5		5.5	5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	0.95		0.97	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	4897		1711	3421	1531	3319	3236		3319	3421	1531
Flt Permitted	0.30	1.00		0.51	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	546	4897		919	3421	1531	3319	3236		3319	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	160	385	10	23	537	1472	229	316	179	127	95	410
RTOR Reduction (vph)	0	1	0	0	0	0	0	40	0	0	0	325
Lane Group Flow (vph)	160	394	0	23	537	1472	229	455	0	127	95	85
Turn Type	pm+pt	NA		pm+pt	NA	Free	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases	2			6		Free						4
Actuated Green, G (s)	53.2	43.9		35.9	32.1	106.7	21.8	21.8		13.7	13.7	13.7
Effective Green, g (s)	53.2	43.9		35.9	32.1	106.7	21.8	21.8		13.7	13.7	13.7
Actuated g/C Ratio	0.50	0.41		0.34	0.30	1.00	0.20	0.20		0.13	0.13	0.13
Clearance Time (s)	5.5	7.0		5.5	7.0		5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	3.0	7.0		3.0	7.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	442	2014		337	1029	1531	678	661		426	439	196
v/s Ratio Prot	0.05	0.08		0.00	0.16		0.07	0.14		0.04	0.03	
v/s Ratio Perm	0.13			0.02		c0.96						0.06
v/c Ratio	0.36	0.20		0.07	0.52	0.96	0.34	0.69		0.30	0.22	0.43
Uniform Delay, d1	15.7	20.1		23.8	30.9	0.0	36.3	39.3		42.1	41.7	42.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.2		0.1	1.5	15.5	0.3	3.0		0.4	0.2	1.5
Delay (s)	16.2	20.3		23.9	32.4	15.5	36.6	42.3		42.5	41.9	44.5
Level of Service	B	C		C	C	B	D	D		D	D	D
Approach Delay (s)		19.1			20.1			40.5			43.7	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	27.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	106.7	Sum of lost time (s)	23.5
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	287	6	7	461	36	5	0	8	21	1	10
Future Volume (Veh/h)	12	287	6	7	461	36	5	0	8	21	1	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	312	7	8	501	39	5	0	9	23	1	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		650			625							
pX, platoon unblocked												
vC, conflicting volume	540			319			616	894	156	708	862	250
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	540			319			616	894	156	708	862	250
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			99	100	99	93	100	99
cM capacity (veh/h)	1025			1238			363	274	862	314	286	749

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	13	156	156	7	8	250	250	39	14	35
Volume Left	13	0	0	0	8	0	0	0	5	23
Volume Right	0	0	0	7	0	0	0	39	9	11
cSH	1025	1700	1700	1700	1238	1700	1700	1700	578	383
Volume to Capacity	0.01	0.09	0.09	0.00	0.01	0.15	0.15	0.02	0.02	0.09
Queue Length 95th (ft)	1	0	0	0	0	0	0	0	2	8
Control Delay (s)	8.6	0.0	0.0	0.0	7.9	0.0	0.0	0.0	11.4	15.4
Lane LOS	A				A				B	C
Approach Delay (s)	0.3				0.1				11.4	15.4
Approach LOS									B	C

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	22.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	75	1780	197	59	587
v/c Ratio	0.05	0.43	0.13	0.23	0.12
Control Delay	0.1	3.2	0.2	26.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	0.1	3.2	0.2	26.2	0.1
Queue Length 50th (ft)	0	76	0	21	0
Queue Length 95th (ft)	0	120	0	54	0
Internal Link Dist (ft)		448			480
Turn Bay Length (ft)			485	575	
Base Capacity (vph)	1558	4916	1531	790	4916
Starvation Cap Reductn	0	489	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.40	0.13	0.07	0.12

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	69	1638	181	54	540
Future Volume (vph)	0	69	1638	181	54	540
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	0.91	1.00	1.00	0.91
Frt		0.86	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1558	4916	1531	1711	4916
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1558	4916	1531	1711	4916
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	75	1780	197	59	587
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	75	1780	197	59	587
Turn Type		Free	NA	Free	Prot	NA
Protected Phases			2		1	Free
Permitted Phases		Free		Free		
Actuated Green, G (s)		59.9	44.1	59.9	4.8	59.9
Effective Green, g (s)		59.9	46.1	59.9	5.8	59.9
Actuated g/C Ratio		1.00	0.77	1.00	0.10	1.00
Clearance Time (s)			6.0		5.0	
Vehicle Extension (s)			5.0		3.0	
Lane Grp Cap (vph)		1558	3783	1531	165	4916
v/s Ratio Prot			c0.36		c0.03	0.12
v/s Ratio Perm		0.05		0.13		
v/c Ratio		0.05	0.47	0.13	0.36	0.12
Uniform Delay, d1		0.0	2.5	0.0	25.3	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	0.2	0.2	1.3	0.0
Delay (s)		0.1	2.7	0.2	26.6	0.0
Level of Service		A	A	A	C	A
Approach Delay (s)	0.1		2.4			2.5
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	2.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	59.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	SBT	SBR
Lane Group Flow (vph)	113	391	32	1	1514	17	12	1	23
v/c Ratio	0.32	0.12	0.02	0.00	0.53	0.01	0.08	0.01	0.02
Control Delay	4.8	1.3	0.7	3.0	5.6	0.8	51.9	50.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	1.3	0.7	3.0	5.6	0.8	51.9	50.0	0.0
Queue Length 50th (ft)	1	0	0	0	104	0	9	1	0
Queue Length 95th (ft)	8	80	8	m1	312	m0	29	7	0
Internal Link Dist (ft)		712			1633			157	
Turn Bay Length (ft)	250		350	235		375			
Base Capacity (vph)	473	3258	1461	1012	2830	1278	390	390	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.12	0.02	0.00	0.53	0.01	0.03	0.00	0.02

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	104	360	29	1	1393	16	11	0	0	0	1	21
Future Volume (vph)	104	360	29	1	1393	16	11	0	0	0	1	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0				4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00				1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00				1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95				1.00	1.00
Satd. Flow (prot)	1711	3421	1531	1711	3421	1531	1711				1801	1531
Flt Permitted	0.14	1.00	1.00	0.52	1.00	1.00	1.00				1.00	1.00
Satd. Flow (perm)	244	3421	1531	938	3421	1531	1801				1801	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	113	391	32	1	1514	17	12	0	0	0	1	23
RTOR Reduction (vph)	0	0	5	0	0	4	0	0	0	0	0	0
Lane Group Flow (vph)	113	391	27	1	1514	13	12	0	0	0	1	23
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm				NA	Free
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8			4		Free
Actuated Green, G (s)	106.3	100.7	100.7	93.6	92.5	92.5	1.7				1.7	120.0
Effective Green, g (s)	106.8	102.7	102.7	94.6	94.5	94.5	3.7				3.7	120.0
Actuated g/C Ratio	0.89	0.86	0.86	0.79	0.79	0.79	0.03				0.03	1.00
Clearance Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	6.0				6.0	
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0				3.0	
Lane Grp Cap (vph)	336	2927	1310	749	2694	1205	55				55	1531
v/s Ratio Prot	c0.03	0.11		0.00	c0.44						0.00	
v/s Ratio Perm	0.27		0.02	0.00		0.01	c0.01					0.02
v/c Ratio	0.34	0.13	0.02	0.00	0.56	0.01	0.22				0.02	0.02
Uniform Delay, d1	3.5	1.4	1.3	2.7	4.9	2.7	56.7				56.4	0.0
Progression Factor	4.01	1.11	7.95	1.78	1.12	1.00	1.00				1.00	1.00
Incremental Delay, d2	0.6	0.1	0.0	0.0	0.7	0.0	2.0				0.1	0.0
Delay (s)	14.6	1.7	10.1	4.8	6.2	2.7	58.7				56.5	0.0
Level of Service	B	A	B	A	A	A	E				E	A
Approach Delay (s)		4.9			6.1			58.7			2.4	
Approach LOS		A			A			E			A	

Intersection Summary			
HCM 2000 Control Delay	6.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	191	528	1535	15	8	376
v/c Ratio	0.47	0.16	0.58	0.01	0.07	0.25
Control Delay	12.5	0.2	5.4	0.0	53.1	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	0.2	5.4	0.0	53.1	0.4
Queue Length 50th (ft)	47	0	130	0	6	0
Queue Length 95th (ft)	152	9	334	m0	22	0
Internal Link Dist (ft)		605	712		887	
Turn Bay Length (ft)	600					600
Base Capacity (vph)	610	3322	2643	1531	285	1531
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.16	0.58	0.01	0.03	0.25

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	176	486	1412	14	7	346
Future Volume (vph)	176	486	1412	14	7	346
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	1711	1531
Flt Permitted	0.13	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	225	3421	3421	1531	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	191	528	1535	15	8	376
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	191	528	1535	15	8	376
Turn Type	pm+pt	NA	NA	Free	Prot	Free
Protected Phases	1	1 6	2		4	
Permitted Phases	1 6			Free		Free
Actuated Green, G (s)	100.5	106.5	85.9	120.0	1.5	120.0
Effective Green, g (s)	104.5	108.5	87.9	120.0	3.5	120.0
Actuated g/C Ratio	0.87	0.90	0.73	1.00	0.03	1.00
Clearance Time (s)	6.0		6.0		6.0	
Vehicle Extension (s)	3.0		5.0		3.0	
Lane Grp Cap (vph)	401	3093	2505	1531	49	1531
v/s Ratio Prot	c0.07	0.15	c0.45		0.00	
v/s Ratio Perm	0.35			0.01		c0.25
v/c Ratio	0.48	0.17	0.61	0.01	0.16	0.25
Uniform Delay, d1	16.1	0.7	7.8	0.0	56.8	0.0
Progression Factor	1.23	0.27	0.63	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.0	1.0	0.0	1.6	0.4
Delay (s)	20.7	0.2	5.9	0.0	58.4	0.4
Level of Service	C	A	A	A	E	A
Approach Delay (s)		5.6	5.8		1.6	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	5.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

BWI TIA MOE Table - 2027 PM Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
1	Aviation Blvd (MD 170) at Dorsey Rd (MD 176) - West	Signalized	NBL	182	75.6	E	56.0	E	85.6	F	455	211	318
			NBT	706	54.1	D					-	397	503
			NBR	177	43.3	D					250	37	109
			SBL	357	121.8	F	100.7	F			250	~463	#782
			SBT	1289	111.2	F					-	~930	#1244
			SBR	408	49.1	D					175	322	529
			EBL	431	103.3	F	93.3	F			175	~474	#787
			EBT	810	101.5	F					-	~550	#801
			EBR	333	60.6	E					225	213	381
			WBL	198	58.9	E	65.3	E			200	173	271
			WBT	367	68.8	E					-	221	298
			WBR	-	-	-					-	-	-
2	Aviation Blvd (MD 170) at Mathison Way	Signalized	NBT	1,072	8.9	A	8.7	A	6.9	A	-	203	296
			NBR	72	5.7	A					450	0	17
			SBL	68	2.1	A	3.1	A			375	5	m7
			SBT	1,974	3.1	A					-	132	183
			WBL	87	50.4	D	48.7	D			450	69	119
			WBR	49	45.5	D					-	0	36
3	Aviation Blvd (MD 170) at Stoney Run Rd	Signalized	NBT	1,017	60.1	E	54.6	D	26.7	C	-	441	#569
			NBR	104	0.1	A					-	0	0
			SBL	421	56.7	E	14.8	B			575	163	m134
			SBT	1,684	4.3	A					-	61	m15
			WBL	361	68.1	E	21.6	C			-	297	#517
			WBR	847	1.8	A					-	0	0
4	Stoney Run Rd at Northrop Grumman Entrance	Signalized	NBL	481	26.0	C	25.7	C	51.6	D	-	114	219
			NBT	37	21.6	C					-	15	51
			NBR	7									
			SBL	0	98.4	F	79.1	E			-	284	#656
			SBT	447									
			SBR	179	31.1	C					85	47	139
			EBL	14	33.6	C	47.0	D			-	9	29
			EBT	3									
			EBR	754	47.3	D					550	33	#324
			WBL	7	50.7	D	50.2	D			250	4	22
			WBT	3	48.8	D					-	2	12
			WBR	0	-	-					-	-	-
5	Stoney Run Rd at New Ridge Rd	Signalized	NBL	45	66.7	E	60.5	E	56.3	E	-	97	166
			NBT	54									
			NBR	516	59.4	E					-	0	128
			SBL	112	71.8	E	61.3	E			-	109	195
			SBT	58	40.9	D					-	45	83
			SBR	0									
			EBL	1	33.3	C	36.8	D			175	1	6
			EBT	143	37.6	D					-	106	196
			EBR	34	33.6	C					125	0	0
			WBL	475	75.1	E	56.3	E			300	463	#829
			WBT	162	8.9	A					-	55	120
			WBR	26	8.0	A					150	0	7
6	Aviation Blvd (MD 170) at Amtrak Way (MD 995)	Signalized	NBL	131	40.0	D	25.5	C	66.0	E	225	41	m91
			NBT	1,734	24.5	C					-	786	#933
			SBT	1,867	121.0	F	109.9	F			-	~1083	#1246
			SBR	198	5.2	A					-	31	m33
			EBL	450	50.3	D	43.8	D			-	341	471
			EBR	238	31.6	C					185	54	124
7	Aviation Blvd (MD 170) at Northrup Grumman Gate 1A	Signalized	NBL	15	44.9	D	8.6	A	16.2	B	225	11	m12
			NBT	2,169	8.4	A					-	254	#1098
			SBT	1,937	19.2	B	18.7	B			-	335	#1116
			SBR	65	4.0	A					-	2	m17
			EBL	406	50.0	D	38.0	D			-	167	211
			EBR	128	0.1	A					-	0	0
8	Aviation Blvd (MD 170) at SB I-195 Ramps	Signalized	NBT	2,397	30.4	C	28.4	C	22.4	C	-	~731	#1353
			NBR	178	0.1	A					50	0	m0
			SBL	121	68.5	E	8.3	A			350	44	124
			SBT	1,002	1.0	A					-	24	36
			WBL	31	53.6	D	35.8	D			-	25	58
			WBR	16	0.0	A					-	0	0
9	Aviation Blvd (MD 170) at NB I-195 Ramps	Signalized	NBT	1,358	1.2	A	48.9	D	39.6	D	-	17	m23
			NBR	1,389	95.5	F					-	~1306	m#1334
			SBT	930	10.0	A	10.0	A			-	212	296
			WBL	190	50.7	D	50.7	D			-	149	216
10	Terminal Rd at Elkridge Landing Rd	Signalized	NBL	484	27.9	C	26.9	C	13.4	B	-	229	359
			NBR	42	14.7	B					-	0	19
			EBT	448	21.2	C	8.9	A			-	103	192
			EBR	1,089	3.9	A					-	0	0
			WBL	35	12.4	B	12.4	B			150	10	34
			WBT	170	12.4	B					-	26	60

BWI TIA MOE Table - 2027 PM Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
11	Aviation Blvd (MD 170) at Terminal Rd	Signalized	NBL	171	50.9	D	19.3	B	20.1	C	300	70	106
			NBT	125	37.0	D					-	86	135
			NBR	405	0.5	A					400	0	0
			SBT	127	51.2	D	8.3	A			-	53	85
			SBR	998	2.8	A					-	0	0
			EBL	401	51.0	D	24.9	C			445	158	213
			EBT	817	16.9	B					-	246	374
			EBR	158	0.1	A					445	0	0
			WBL	266	27.2	C	28.8	C			615	117	m119
			WBT	562	29.6	C					-	208	m258
			WBR	0	-	-					-	-	-
12	Aviation Blvd (MD 170) at Air Cargo Dr	Signalized	NBL	118	51.2	D	48.0	D	58.6	E	-	105	164
			NBT	14									
			NBR	70	42.1	D					-	0	9
			SBL	505	170.0	F	163.2	F			-	~320	#511
			SBT	16	156.2	F					-	~297	#490
			SBR	69									
			EBL	46	14.1	B	31.4	C			275	27	m47
			EBT	1053	35.8	D					-	463	551
			EBR	123	0.1	A					-	0	0
			WBL	42	19.4	B	26.0	C			375	20	44
			WBT	642	31.3	C					-	281	351
			WBR	121	0.1	A					475	0	0
13	Aviation Blvd (MD 162) at Andover Rd	Signalized	WBT	594	6.6	A	8.9	A	15.6	B	-	79	159
			WBR	408	12.3	B					200	0	64
			EBL	106	7.4	A	10.7	B			415	50	95
			EBT	1,066	11.0	B					-	286	562
			SBL	390	49.2	D	46.5	D			175	165	233
			SBR	12	43.8	D					-	104	172
14	Aviation Blvd (MD 162) at Aaronson Dr	Unsignalized	NBL	29	13.0	B	0.4	A	6.9	A	-	-	-
			NBT	885	0.0	A					-	-	-
			NBR	19									
			SBL	59	10.7	B	0.5	A			-	-	-
			SBT	1,271	0.0	A					-	-	-
			SBR	20									
			EBL	23	337.9	F	337.9	F			-	-	-
			EBT	1									
			EBR	12									
			WBL	14	103.3	F	103.3	F			-	-	-
			WBT	1									
			WBR	15									
15	Aviation Blvd (MD 162) at Allwood Dr	Signalized	NBL	43	2.7	A	2.9	A	3.6	A	300	4	9
			NBT	952	3.0	A					-	65	152
			NBR	55	2.0	A					100	0	7
			SBL	9	0.3	A	1.6	A			225	1	m0
			SBT	1297	1.6	A					-	74	19
			SBR	7	2.5	A					225	0	m0
			EBL	9	54.2	D	53.8	D			-	7	25
			EBT	2	53.6	D					-	1	32
			EBR	25									
			WBL	18	53.5	D	53.5	D			-	0	2
			WBT	0									
			WBR	14									
16	SB I-97 Ramps at Cromwell Park Dr	Signalized	SBT	256	53.1	D	50.2	D	25.8	C	-	109	148
			SBR	269	47.4	D					-	0	80
			EBL	39	78.6	E	18.3	B			420	18	m31
			EBR	791	15.3	B					-	186	209
			WBT	319	7.4	A	7.3	A			-	48	80
			WBR	29	6.7	A					600	0	0
17	Aviation Blvd (MD 162) at Cromwell Park Dr	Signalized	NBT	841	25.2	C	25.0	C	31.6	C	-	180	257
			NBR	27	20.2	C					1000	0	0
			SBL	803	43.5	D	28.7	C			425	220	252
			SBT	536	6.5	A					-	75	116
			SBR	1									
			EBR	1	37.4	D	37.4	D			-	0	0
			WBL	513	52.6	D	47.7	D			-	226	284
			WBR	74	13.8	B					600	17	28

BWI TIA MOE Table - 2027 PM Build

Node	Intersection	Control	Movement	Peak Hour Volume (veh/hr)	Movement Delay (sec/veh)	Movement Equivalent LOS	Approach Delay (sec/veh)	Approach Equivalent LOS	Intersection Delay (sec/veh)	Intersection Equivalent LOS	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile
18	Aviation Blvd (MD 162) at Dorsey Rd (MD 176) - East	Signalized	NBL	34	52.8	D	57.5	E	31.5	C	350	14	35
			NBT	148	58.1	E					-	84	145
			NBR	102									
			SBL	447	52.0	D	48.4	D			490	202	284
			SBT	361	47.6	D					-	161	231
			SBR	243	43.1	D					300	0	75
			EBL	150	15.6	B	27.7	C			350	64	128
			EBT	1,017	29.2	C					-	308	453
			EBR	221									
			WBL	60	20.9	C	10.8	B			425	24	58
			WBT	338	26.0	C					-	105	182
			WBR	570	0.8	A					-	0	0
19	Dorsey Rd (MD 176) at Digiulian Blvd	Unsignalized	NBL	17	85.7	F	85.7	F	3.5	A	-	-	-
			NBT	0									
			NBR	24									
			SBL	41	56.4	F	56.4	F			-	-	-
			SBT	0									
			SBR	18									
			EBL	4	8.5	A	0.0	A			-	-	-
			EBT	1,431	0.0	A					-	-	-
			EBR	15	0.0	A					-	-	-
			WBL	21	14.2	B	0.6	A			-	-	-
			WBT	452	0.0	A					-	-	-
			WBR	30	0.0	A					-	-	-
20	Aviation Blvd (MD 162) at Hollins Ferry Rd	Signalized	NBT	840	2.5	A	2.3	A	1.5	A	-	29	47
			NBR	75	0.1	A					485	0	0
			SBL	65	20.1	C	1.1	A			575	17	40
			SBT	1,340	0.2	A					-	0	0
			WBR	85	0.1	A	0.1	A			-	0	0
21	Aviation Blvd (MD 170) at Long Term Parking Lots	Signalized	NBL	18	55.5	E	55.2	E	6.1	A	-	15	40
			NBT	1	53.1	D					-	1	11
			NBR	2									
			SBL	12	54.7	D	12.0	B			-	10	32
			SBT	1									
			SBR	46	0.0	A					-	0	0
			EBL	94	2.7	A	6.8	A			250	19	33
			EBT	1,159	6.8	A					-	277	211
			EBR	29	18.8	B					350	0	5
			WBL	3	2.7	A	2.4	A			235	0	m1
			WBT	592	2.4	A					-	33	42
			WBR	11	2.9	A					375	0	m0
22	Aviation Blvd (MD 162) at S Camp Meade Rd (MD 170)	Signalized	SBL	9	59.0	E	3.3	A	7.6	A	-	7	25
			SBR	161	0.2	A					600	0	0
			EBL	356	16.2	B	5.7	A			600	37	m106
			EBT	1,273	2.7	A					-	0	m256
			WBT	643	13.9	B	13.6	B			-	150	228
			WBR	14	0.0	A					-	0	0

Notes

m Volume for 95th percentile queue is metered by upstream signal

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	468	880	362	215	399	198	767	192	388	1401	443
v/c Ratio	1.04	1.03	0.72	0.73	0.67	0.69	0.70	0.32	1.03	1.10	0.69
Control Delay	96.2	99.0	42.1	57.4	72.2	80.5	55.8	13.6	118.1	106.4	42.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	96.2	99.0	42.1	57.4	72.2	80.5	55.8	13.6	118.1	106.4	42.1
Queue Length 50th (ft)	~474	~550	213	173	221	211	397	37	~463	~930	322
Queue Length 95th (ft)	#787	#801	381	271	298	318	503	109	#782	#1244	529
Internal Link Dist (ft)		640			713		584			1313	
Turn Bay Length (ft)	175		225	200		455		250	250		175
Base Capacity (vph)	450	858	506	423	856	637	1797	875	376	1274	641
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.04	1.03	0.72	0.51	0.47	0.31	0.43	0.22	1.03	1.10	0.69

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	431	810	333	198	367	0	182	706	177	357	1289	408
Future Volume (vph)	431	810	333	198	367	0	182	706	177	357	1289	408
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539		1770	3539	1583	1770	3539	1583
Flt Permitted	0.20	1.00	1.00	0.15	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	382	3539	1583	277	3539		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	468	880	362	215	399	0	198	767	192	388	1401	443
RTOR Reduction (vph)	0	0	123	0	0	0	0	0	101	0	0	72
Lane Group Flow (vph)	468	880	239	215	399	0	198	767	91	388	1401	371
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)	66.1	38.3	38.3	48.7	25.9		26.7	49.8	49.8	35.2	58.3	58.3
Effective Green, g (s)	67.1	41.3	41.3	50.7	28.9		27.7	52.8	52.8	36.2	61.3	61.3
Actuated g/C Ratio	0.39	0.24	0.24	0.30	0.17		0.16	0.31	0.31	0.21	0.36	0.36
Clearance Time (s)	5.0	7.0	7.0	5.0	7.0		5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	446	859	384	291	601		288	1098	491	376	1275	570
v/s Ratio Prot	c0.22	c0.25		0.10	0.11		0.11	0.22		c0.22	c0.40	
v/s Ratio Perm	0.19		0.15	0.12					0.06			0.23
v/c Ratio	1.05	1.02	0.62	0.74	0.66		0.69	0.70	0.19	1.03	1.10	0.65
Uniform Delay, d1	47.2	64.4	57.5	49.4	66.1		67.1	51.6	42.9	66.9	54.4	45.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	56.1	37.1	3.1	9.4	2.8		8.5	2.5	0.4	54.9	56.8	3.6
Delay (s)	103.3	101.5	60.6	58.9	68.8		75.6	54.1	43.3	121.8	111.2	49.1
Level of Service	F	F	E	E	E		E	D	D	F	F	D
Approach Delay (s)		93.3			65.3			56.0			100.7	
Approach LOS		F			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	85.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	170.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	93.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	95	53	1165	78	74	2146
v/c Ratio	0.42	0.21	0.48	0.07	0.19	0.78
Control Delay	52.7	13.7	9.6	1.8	1.8	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	13.7	9.6	1.8	1.8	3.4
Queue Length 50th (ft)	69	0	203	0	5	132
Queue Length 95th (ft)	119	36	296	17	m7	183
Internal Link Dist (ft)	716		2236			2190
Turn Bay Length (ft)	450			450	375	
Base Capacity (vph)	456	447	2423	1107	503	2739
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.12	0.48	0.07	0.15	0.78

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	87	49	1072	72	68	1974
Future Volume (vph)	87	49	1072	72	68	1974
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1531	3421	1531	1711	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.19	1.00
Satd. Flow (perm)	1711	1531	3421	1531	343	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	95	53	1165	78	74	2146
RTOR Reduction (vph)	0	46	0	23	0	0
Lane Group Flow (vph)	95	7	1165	55	74	2146
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	4		6		5	2
Permitted Phases		4		6	2	
Actuated Green, G (s)	13.9	13.9	81.0	81.0	93.1	93.1
Effective Green, g (s)	15.9	15.9	84.0	84.0	94.1	96.1
Actuated g/C Ratio	0.13	0.13	0.70	0.70	0.78	0.80
Clearance Time (s)	6.0	6.0	7.0	7.0	5.0	7.0
Vehicle Extension (s)	5.0	5.0	6.0	6.0	5.0	6.0
Lane Grp Cap (vph)	226	202	2394	1071	361	2739
v/s Ratio Prot	c0.06		0.34		0.01	c0.63
v/s Ratio Perm		0.00		0.04	0.15	
v/c Ratio	0.42	0.03	0.49	0.05	0.20	0.78
Uniform Delay, d1	47.8	45.4	8.2	5.6	4.7	6.4
Progression Factor	1.00	1.00	1.00	1.00	0.39	0.28
Incremental Delay, d2	2.6	0.1	0.7	0.1	0.3	1.3
Delay (s)	50.4	45.5	8.9	5.7	2.1	3.1
Level of Service	D	D	A	A	A	A
Approach Delay (s)	48.7		8.7			3.1
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	392	921	1105	113	458	1830
v/c Ratio	0.92	0.60	0.86	0.07	0.57	0.78
Control Delay	72.1	1.8	60.5	0.1	28.8	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.1	1.8	60.5	0.1	28.8	4.8
Queue Length 50th (ft)	297	0	441	0	163	61
Queue Length 95th (ft)	#517	0	#569	0	m134	m15
Internal Link Dist (ft)	319		2190			575
Turn Bay Length (ft)					575	
Base Capacity (vph)	427	1531	1282	1531	1272	2338
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.60	0.86	0.07	0.36	0.78

Intersection Summary

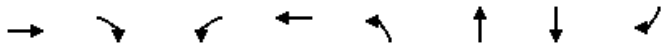
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	361	847	1017	104	421	1684
Future Volume (vph)	361	847	1017	104	421	1684
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	1531	3421	1531	3319	3421
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1711	1531	3421	1531	3319	3421
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	392	921	1105	113	458	1830
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	392	921	1105	113	458	1830
Turn Type	Prot	Free	NA	Free	Prot	NA
Protected Phases	4		6		5 7	2 5 7
Permitted Phases		Free		Free		
Actuated Green, G (s)	28.0	120.0	42.0	120.0	26.5	80.5
Effective Green, g (s)	30.0	120.0	45.0	120.0	28.5	83.5
Actuated g/C Ratio	0.25	1.00	0.38	1.00	0.24	0.70
Clearance Time (s)	6.0		7.0			
Vehicle Extension (s)	3.0		5.0			
Lane Grp Cap (vph)	427	1531	1282	1531	788	2380
v/s Ratio Prot	c0.23		c0.32		0.14	c0.53
v/s Ratio Perm		0.60		0.07		
v/c Ratio	0.92	0.60	0.86	0.07	0.58	0.77
Uniform Delay, d1	43.8	0.0	34.6	0.0	40.5	11.9
Progression Factor	1.00	1.00	1.53	1.00	1.40	0.35
Incremental Delay, d2	24.3	1.8	7.1	0.1	0.1	0.1
Delay (s)	68.1	1.8	60.1	0.1	56.7	4.3
Level of Service	E	A	E	A	E	A
Approach Delay (s)	21.6		54.6			14.8
Approach LOS	C		D			B

Intersection Summary			
HCM 2000 Control Delay	26.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	18	820	8	3	523	48	486	195
v/c Ratio	0.05	0.91	0.06	0.02	0.43	0.07	1.03	0.42
Control Delay	31.9	19.7	50.6	50.0	27.3	22.6	88.7	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.9	19.7	50.6	50.0	27.3	22.6	88.7	21.5
Queue Length 50th (ft)	9	33	4	2	114	15	284	47
Queue Length 95th (ft)	29	#324	22	12	219	51	#656	139
Internal Link Dist (ft)	968			347		398	150	
Turn Bay Length (ft)		550	250					85
Base Capacity (vph)	542	996	393	413	1214	647	470	468
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.82	0.02	0.01	0.43	0.07	1.03	0.42

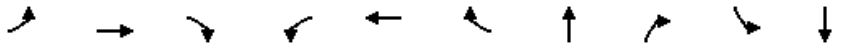
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	3	754	7	3	0	481	37	7	0	447	179
Future Volume (vph)	14	3	754	7	3	0	481	37	7	0	447	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	5.0	5.0		5.0	5.0			4.0	4.0
Lane Util. Factor		1.00	1.00	1.00	1.00		0.97	1.00			1.00	1.00
Frt		1.00	0.85	1.00	1.00		1.00	0.97			1.00	0.85
Flt Protected		0.96	1.00	0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1729	1531	1711	1801		3319	1756			1801	1531
Flt Permitted		0.96	1.00	0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (perm)		1729	1531	1711	1801		3319	1756			1801	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	3	820	8	3	0	523	40	8	0	486	195
RTOR Reduction (vph)	0	0	610	0	0	0	0	5	0	0	0	69
Lane Group Flow (vph)	0	18	210	8	3	0	523	43	0	0	486	126
Turn Type	Split	NA	Prot	Split	NA		Split	NA			NA	Prot
Protected Phases	3	3	3	4	4		2	2			1	1
Permitted Phases										1		
Actuated Green, G (s)		19.0	19.0	2.4	2.4		35.8	35.8			25.5	25.5
Effective Green, g (s)		19.0	19.0	2.4	2.4		35.8	35.8			25.5	25.5
Actuated g/C Ratio		0.19	0.19	0.02	0.02		0.36	0.36			0.25	0.25
Clearance Time (s)		4.0	4.0	5.0	5.0		5.0	5.0			4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0		5.0	5.0			3.0	3.0
Lane Grp Cap (vph)		326	288	40	42		1179	624			456	387
v/s Ratio Prot		0.01	c0.14	c0.00	0.00		c0.16	0.02			c0.27	0.08
v/s Ratio Perm												
v/c Ratio		0.06	0.73	0.20	0.07		0.44	0.07			1.07	0.33
Uniform Delay, d1		33.5	38.4	48.2	48.1		24.8	21.4			37.6	30.6
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		0.1	8.9	2.5	0.7		1.2	0.2			60.8	0.5
Delay (s)		33.6	47.3	50.7	48.8		26.0	21.6			98.4	31.1
Level of Service		C	D	D	D		C	C			F	C
Approach Delay (s)		47.0			50.2			25.7			79.1	
Approach LOS		D			D			C			E	

Intersection Summary			
HCM 2000 Control Delay	51.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	100.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	155	37	516	176	28	108	561	122	63
v/c Ratio	0.00	0.27	0.07	0.95	0.15	0.03	0.62	0.83	0.68	0.14
Control Delay	39.0	40.3	0.2	77.0	10.6	1.3	75.7	16.0	82.0	39.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.0	40.3	0.2	77.0	10.6	1.3	75.7	16.0	82.0	39.9
Queue Length 50th (ft)	1	106	0	463	55	0	97	0	109	45
Queue Length 95th (ft)	6	196	0	#829	120	7	166	128	195	83
Internal Link Dist (ft)		269			383		290			249
Turn Bay Length (ft)	175		125	300		150				
Base Capacity (vph)	368	570	538	541	1203	1038	365	799	240	760
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.27	0.07	0.95	0.15	0.03	0.30	0.70	0.51	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	143	34	475	162	26	45	54	516	112	58	0
Future Volume (vph)	1	143	34	475	162	26	45	54	516	112	58	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1711	1801	1531	1711	1801	1531		1761	1531	1711	1801	
Flt Permitted	0.65	1.00	1.00	0.95	1.00	1.00		0.82	1.00	0.95	1.00	
Satd. Flow (perm)	1163	1801	1531	1711	1801	1531		1484	1531	1711	1801	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	155	37	516	176	28	49	59	561	122	63	0
RTOR Reduction (vph)	0	0	25	0	0	9	0	0	495	0	0	0
Lane Group Flow (vph)	1	155	12	516	176	19	0	108	66	122	63	0
Turn Type	Perm	NA	Perm	Prot	NA	Prot	Perm	NA	Prot	Prot	NA	
Protected Phases		6		5	2	2		8	8	7	4	
Permitted Phases	6		6				8					
Actuated Green, G (s)	45.3	45.3	45.3	45.2	95.5	95.5		16.8	16.8	15.0	36.8	
Effective Green, g (s)	45.3	45.3	45.3	45.2	95.5	95.5		16.8	16.8	15.0	36.8	
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.67	0.67		0.12	0.12	0.11	0.26	
Clearance Time (s)	5.5	5.5	5.5	5.0	5.5	5.5		5.0	5.0	5.0	5.0	
Vehicle Extension (s)	5.0	5.0	5.0	3.0	5.0	5.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	368	571	485	541	1204	1023		174	180	179	464	
v/s Ratio Prot		c0.09		c0.30	0.10	0.01			0.04	c0.07	0.03	
v/s Ratio Perm	0.00		0.01					c0.07				
v/c Ratio	0.00	0.27	0.02	0.95	0.15	0.02		0.62	0.37	0.68	0.14	
Uniform Delay, d1	33.3	36.4	33.5	47.8	8.7	7.9		60.0	58.1	61.6	40.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	1.2	0.1	27.3	0.3	0.0		6.7	1.3	10.2	0.1	
Delay (s)	33.3	37.6	33.6	75.1	8.9	8.0		66.7	59.4	71.8	40.9	
Level of Service	C	D	C	E	A	A		E	E	E	D	
Approach Delay (s)		36.8			56.3			60.5			61.3	
Approach LOS		D			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	56.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	142.8	Sum of lost time (s)	20.5
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Group Flow (vph)	489	259	142	1885	2029	215
v/c Ratio	0.86	0.44	0.70	0.92	1.22	0.27
Control Delay	53.1	13.8	37.2	26.1	125.1	2.9
Queue Delay	0.0	0.0	0.0	1.3	0.0	0.0
Total Delay	53.1	13.8	37.2	27.4	125.1	2.9
Queue Length 50th (ft)	341	54	41	786	~1083	31
Queue Length 95th (ft)	471	124	m91	#933	#1246	m33
Internal Link Dist (ft)	755			2381	681	
Turn Bay Length (ft)		185	225			
Base Capacity (vph)	627	640	208	2057	1657	804
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	60	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.40	0.68	0.94	1.22	0.27

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	450	238	131	1734	1867	198
Future Volume (vph)	450	238	131	1734	1867	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1711	1531	1711	3421	3421	1531
Flt Permitted	0.95	1.00	0.06	1.00	1.00	1.00
Satd. Flow (perm)	1711	1531	117	3421	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	489	259	142	1885	2029	215
RTOR Reduction (vph)	0	110	0	0	0	62
Lane Group Flow (vph)	489	149	142	1885	2029	153
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		1	6	2	
Permitted Phases	4	4	6			2
Actuated Green, G (s)	37.8	37.8	70.7	70.7	56.7	56.7
Effective Green, g (s)	39.8	37.8	71.7	72.2	58.2	58.2
Actuated g/C Ratio	0.33	0.31	0.60	0.60	0.49	0.49
Clearance Time (s)	6.0	6.0	5.0	5.5	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	6.0	6.0	6.0
Lane Grp Cap (vph)	567	482	202	2058	1659	742
v/s Ratio Prot	c0.29		0.06	c0.55	c0.59	
v/s Ratio Perm		0.10	0.36			0.10
v/c Ratio	0.86	0.31	0.70	0.92	1.22	0.21
Uniform Delay, d1	37.5	31.2	30.5	21.2	30.9	17.7
Progression Factor	1.00	1.00	1.08	0.90	0.57	0.28
Incremental Delay, d2	12.8	0.4	7.0	5.4	103.3	0.3
Delay (s)	50.3	31.6	40.0	24.5	121.0	5.2
Level of Service	D	C	D	C	F	A
Approach Delay (s)	43.8			25.5	109.9	
Approach LOS	D			C	F	

Intersection Summary			
HCM 2000 Control Delay	66.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	16	2358	2105	71	441	139
v/c Ratio	0.12	0.92	0.89	0.07	0.72	0.09
Control Delay	40.7	9.9	19.0	2.8	52.6	0.1
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	40.7	10.0	19.0	2.8	52.6	0.1
Queue Length 50th (ft)	11	254	335	2	167	0
Queue Length 95th (ft)	m12	#1098	#1116	m17	211	0
Internal Link Dist (ft)		681	1012		359	
Turn Bay Length (ft)	225					
Base Capacity (vph)	199	2559	2354	1067	885	1531
Starvation Cap Reductn	0	9	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.92	0.89	0.07	0.50	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	15	2169	1937	65	406	128
Future Volume (vph)	15	2169	1937	65	406	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	3319	1531
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1711	3421	3421	1531	3319	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	2358	2105	71	441	139
RTOR Reduction (vph)	0	0	0	15	0	0
Lane Group Flow (vph)	16	2358	2105	56	441	139
Turn Type	Prot	NA	NA	Perm	Prot	Free
Protected Phases	1	6	2		4	
Permitted Phases				2		Free
Actuated Green, G (s)	5.2	88.3	78.1	78.1	21.2	120.0
Effective Green, g (s)	6.2	89.8	79.6	79.6	22.2	120.0
Actuated g/C Ratio	0.05	0.75	0.66	0.66	0.18	1.00
Clearance Time (s)	5.0	5.5	5.5	5.5	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	88	2560	2269	1015	614	1531
v/s Ratio Prot	0.01	c0.69	0.62		c0.13	
v/s Ratio Perm				0.04		0.09
v/c Ratio	0.18	0.92	0.93	0.06	0.72	0.09
Uniform Delay, d1	54.5	12.2	17.7	7.1	46.0	0.0
Progression Factor	0.82	0.42	0.68	0.55	1.00	1.00
Incremental Delay, d2	0.4	3.3	7.2	0.1	4.0	0.1
Delay (s)	44.9	8.4	19.2	4.0	50.0	0.1
Level of Service	D	A	B	A	D	A
Approach Delay (s)		8.6	18.7		38.0	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	SBR	NWL	NWR2
Lane Group Flow (vph)	2605	193	132	1089	1055	34	17
v/c Ratio	1.02	0.13	0.67	0.37	0.68	0.27	0.01
Control Delay	32.2	0.1	50.9	1.0	2.4	57.0	0.0
Queue Delay	31.9	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.2	0.1	50.9	1.0	2.4	57.0	0.0
Queue Length 50th (ft)	~731	0	44	24	0	25	0
Queue Length 95th (ft)	#1353	m0	124	36	0	58	0
Internal Link Dist (ft)	1012			765		262	
Turn Bay Length (ft)		50	350				
Base Capacity (vph)	2553	1531	420	2939	1558	285	1531
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	193	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.10	0.13	0.31	0.37	0.68	0.12	0.01

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR	NWR2
Lane Configurations											
Traffic Volume (vph)	0	2397	178	121	1002	0	0	971	31	0	16
Future Volume (vph)	0	2397	178	121	1002	0	0	971	31	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0			4.0	4.0		4.0
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00		1.00
Frt		1.00	0.85	1.00	1.00			0.86	1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00			1.00	0.95		1.00
Satd. Flow (prot)		3421	1531	1711	3421			1558	1711		1531
Flt Permitted		1.00	1.00	0.04	1.00			1.00	0.95		1.00
Satd. Flow (perm)		3421	1531	78	3421			1558	1711		1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2605	193	132	1089	0	0	1055	34	0	17
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2605	193	132	1089	0	0	1055	34	0	17
Turn Type		NA	Free	pm+pt	NA			Free	Prot		Free
Protected Phases		6		5	2				4		
Permitted Phases			Free	2				Free			Free
Actuated Green, G (s)		88.0	120.0	101.6	101.6			120.0	7.9		120.0
Effective Green, g (s)		89.5	120.0	102.1	103.1			120.0	8.9		120.0
Actuated g/C Ratio		0.75	1.00	0.85	0.86			1.00	0.07		1.00
Clearance Time (s)		5.5		4.5	5.5				5.0		
Vehicle Extension (s)		5.0		3.0	5.0				3.0		
Lane Grp Cap (vph)		2551	1531	197	2939			1558	126		1531
v/s Ratio Prot		c0.76		0.05	0.32				0.02		
v/s Ratio Perm			0.13	0.52				c0.68			0.01
v/c Ratio		1.02	0.13	0.67	0.37			0.68	0.27		0.01
Uniform Delay, d1		15.2	0.0	42.8	1.7			0.0	52.5		0.0
Progression Factor		0.80	1.00	1.41	0.38			1.00	1.00		1.00
Incremental Delay, d2		18.2	0.1	8.1	0.3			2.4	1.2		0.0
Delay (s)		30.4	0.1	68.5	1.0			2.4	53.6		0.0
Level of Service		C	A	E	A			A	D		A
Approach Delay (s)		28.4			8.3		2.4		35.8		
Approach LOS		C			A		A		D		

Intersection Summary			
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	NWL
Lane Group Flow (vph)	1476	1510	1011	207
v/c Ratio	0.58	1.07	0.40	0.64
Control Delay	1.3	51.1	11.0	53.6
Queue Delay	0.2	13.3	0.0	0.0
Total Delay	1.5	64.4	11.0	53.6
Queue Length 50th (ft)	17	~1306	212	149
Queue Length 95th (ft)	m23	m#1334	296	216
Internal Link Dist (ft)	765		418	135
Turn Bay Length (ft)				
Base Capacity (vph)	2546	1412	2546	541
Starvation Cap Reductn	336	242	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.67	1.29	0.40	0.38

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	1358	1389	0	930	190	0
Future Volume (vph)	1358	1389	0	930	190	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5		4.0	4.0	
Lane Util. Factor	0.95	1.00		0.95	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	1.00	1.00		1.00	0.95	
Satd. Flow (prot)	3421	1531		3421	1711	
Flt Permitted	1.00	1.00		1.00	0.95	
Satd. Flow (perm)	3421	1531		3421	1711	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1476	1510	0	1011	207	0
RTOR Reduction (vph)	0	293	0	0	0	0
Lane Group Flow (vph)	1476	1217	0	1011	207	0
Turn Type	NA	Perm		NA	Prot	
Protected Phases	6			2	4	
Permitted Phases		6				
Actuated Green, G (s)	87.8	87.8		87.8	21.7	
Effective Green, g (s)	89.3	87.8		89.3	22.7	
Actuated g/C Ratio	0.74	0.73		0.74	0.19	
Clearance Time (s)	5.5	5.5		5.5	5.0	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	2545	1120		2545	323	
v/s Ratio Prot	0.43			0.30	c0.12	
v/s Ratio Perm		c0.80				
v/c Ratio	0.58	1.09		0.40	0.64	
Uniform Delay, d1	6.9	16.1		5.6	44.9	
Progression Factor	0.11	3.05		1.73	1.00	
Incremental Delay, d2	0.4	46.4		0.4	5.8	
Delay (s)	1.2	95.5		10.0	50.7	
Level of Service	A	F		B	D	
Approach Delay (s)	48.9			10.0	50.7	
Approach LOS	D			B	D	

Intersection Summary			
HCM 2000 Control Delay	39.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	487	1184	38	185	526	46
v/c Ratio	0.41	0.77	0.10	0.12	0.77	0.07
Control Delay	24.4	3.9	15.3	14.9	28.4	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.4	3.9	15.3	14.9	28.4	4.9
Queue Length 50th (ft)	103	0	10	26	229	0
Queue Length 95th (ft)	192	0	34	60	359	19
Internal Link Dist (ft)	475			893	211	
Turn Bay Length (ft)			150			
Base Capacity (vph)	1175	1531	582	2350	1381	1244
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.77	0.07	0.08	0.38	0.04

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	448	1089	35	170	484	42
Future Volume (vph)	448	1089	35	170	484	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	4.0	5.0	6.0	6.0	6.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3421	1531	1710	3421	1711	1531
Flt Permitted	1.00	1.00	0.36	1.00	0.95	1.00
Satd. Flow (perm)	3421	1531	646	3421	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	487	1184	38	185	526	46
RTOR Reduction (vph)	0	0	0	0	0	28
Lane Group Flow (vph)	487	1184	38	185	526	18
Confl. Peds. (#/hr)			3			
Turn Type	NA	Free	pm+pt	NA	Prot	Prot
Protected Phases	6		5	2	4	4
Permitted Phases		Free	2			
Actuated Green, G (s)	26.3	78.2	35.6	35.6	30.6	30.6
Effective Green, g (s)	26.3	78.2	35.6	35.6	30.6	30.6
Actuated g/C Ratio	0.34	1.00	0.46	0.46	0.39	0.39
Clearance Time (s)	6.0		5.0	6.0	6.0	6.0
Vehicle Extension (s)	3.5		3.5	3.5	5.0	5.0
Lane Grp Cap (vph)	1150	1531	352	1557	669	599
v/s Ratio Prot	0.14		0.01	0.05	0.31	0.01
v/s Ratio Perm		c0.77	0.04			
v/c Ratio	0.42	0.77	0.11	0.12	0.79	0.03
Uniform Delay, d1	20.1	0.0	12.3	12.3	20.9	14.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	3.9	0.2	0.2	7.0	0.0
Delay (s)	21.2	3.9	12.4	12.4	27.9	14.7
Level of Service	C	A	B	B	C	B
Approach Delay (s)	8.9			12.4	26.9	
Approach LOS	A			B	C	

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	78.2	Sum of lost time (s)	17.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	436	888	172	289	611	186	136	440	138	1085
v/c Ratio	0.76	0.51	0.11	0.63	0.37	0.49	0.30	0.29	0.40	0.71
Control Delay	53.7	18.1	0.1	30.3	31.4	54.1	37.5	0.5	53.5	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.7	18.1	0.1	30.3	31.4	54.1	37.5	0.5	53.5	2.8
Queue Length 50th (ft)	158	246	0	117	208	70	86	0	53	0
Queue Length 95th (ft)	213	374	0	m119	m258	106	135	0	85	0
Internal Link Dist (ft)		871			1398		1013		384	
Turn Bay Length (ft)	445		445	615		300		400		
Base Capacity (vph)	606	1751	1531	580	1632	442	540	1531	456	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.51	0.11	0.50	0.37	0.42	0.25	0.29	0.30	0.71

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	401	817	158	266	562	0	171	125	405	0	127	998
Future Volume (vph)	401	817	158	266	562	0	171	125	405	0	127	998
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		0.97	1.00	1.00		0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (perm)	3319	3421	1531	3319	3421		3319	1801	1531		3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	436	888	172	289	611	0	186	136	440	0	138	1085
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	436	888	172	289	611	0	186	136	440	0	138	1085
Turn Type	Prot	NA	Free	Prot	NA		Prot	NA	Free		NA	Free
Protected Phases	1	6		5	2		7	4			8	
Permitted Phases			Free						Free			Free
Actuated Green, G (s)	19.8	59.4	120.0	15.7	55.3		11.7	27.9	120.0		10.2	120.0
Effective Green, g (s)	20.8	61.4	120.0	16.7	57.3		13.7	29.9	120.0		12.2	120.0
Actuated g/C Ratio	0.17	0.51	1.00	0.14	0.48		0.11	0.25	1.00		0.10	1.00
Clearance Time (s)	5.0	6.0		5.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	575	1750	1531	461	1633		378	448	1531		347	1531
v/s Ratio Prot	0.13	0.26		0.09	0.18		0.06	0.08			0.04	
v/s Ratio Perm			0.11						0.29			c0.71
v/c Ratio	0.76	0.51	0.11	0.63	0.37		0.49	0.30	0.29		0.40	0.71
Uniform Delay, d1	47.2	19.3	0.0	48.7	19.9		49.9	36.6	0.0		50.5	0.0
Progression Factor	0.98	0.83	1.00	0.51	1.45		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.7	0.9	0.1	2.4	0.6		1.0	0.4	0.5		0.8	2.8
Delay (s)	51.0	16.9	0.1	27.2	29.6		50.9	37.0	0.5		51.2	2.8
Level of Service	D	B	A	C	C		D	D	A		D	A
Approach Delay (s)		24.9			28.8			19.3			8.3	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	50	1145	134	46	698	132	143	76	324	317
v/c Ratio	0.13	0.66	0.09	0.20	0.40	0.09	0.58	0.21	1.20	1.15
Control Delay	13.2	37.5	0.1	16.0	32.9	0.1	56.7	2.4	163.1	145.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.2	37.5	0.1	16.0	32.9	0.1	56.7	2.4	163.1	145.2
Queue Length 50th (ft)	27	463	0	20	281	0	105	0	~320	~297
Queue Length 95th (ft)	m47	551	0	44	351	0	164	9	#511	#490
Internal Link Dist (ft)		1398			1719		314			276
Turn Bay Length (ft)	275			375		475				
Base Capacity (vph)	397	1736	1531	242	1732	1531	430	361	270	275
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.66	0.09	0.19	0.40	0.09	0.33	0.21	1.20	1.15

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

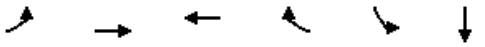
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	1053	123	42	642	121	118	14	70	505	16	69
Future Volume (vph)	46	1053	123	42	642	121	118	14	70	505	16	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00	0.95	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.97	
Satd. Flow (prot)	1711	3421	1531	1711	3421	1531		1724	1531	1625	1593	
Flt Permitted	0.31	1.00	1.00	0.14	1.00	1.00		0.96	1.00	0.95	0.97	
Satd. Flow (perm)	558	3421	1531	248	3421	1531		1724	1531	1625	1593	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	1145	134	46	698	132	128	15	76	549	17	75
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	63	0	9	0
Lane Group Flow (vph)	50	1145	134	46	698	132	0	143	13	324	308	0
Turn Type	pm+pt	NA	Free	pm+pt	NA	Free	Split	NA	custom	Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases	6		Free	2		Free			3			
Actuated Green, G (s)	63.9	57.9	120.0	63.5	57.7	120.0		15.3	18.0	18.0	18.0	
Effective Green, g (s)	65.9	59.9	120.0	65.5	59.7	120.0		17.3	20.0	20.0	20.0	
Actuated g/C Ratio	0.55	0.50	1.00	0.55	0.50	1.00		0.14	0.17	0.17	0.17	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	373	1707	1531	218	1701	1531		248	255	270	265	
v/s Ratio Prot	0.01	c0.33		c0.01	0.20			c0.08		c0.20	0.19	
v/s Ratio Perm	0.07		c0.09	0.10		0.09			0.01			
v/c Ratio	0.13	0.67	0.09	0.21	0.41	0.09		0.58	0.05	1.20	1.16	
Uniform Delay, d1	13.2	22.6	0.0	15.9	19.0	0.0		47.9	42.0	50.0	50.0	
Progression Factor	1.06	1.50	1.00	1.19	1.61	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	1.9	0.1	0.5	0.7	0.1		3.2	0.1	120.0	106.2	
Delay (s)	14.1	35.8	0.1	19.4	31.3	0.1		51.2	42.1	170.0	156.2	
Level of Service	B	D	A	B	C	A		D	D	F	F	
Approach Delay (s)		31.4			26.0			48.0			163.2	
Approach LOS		C			C			D			F	

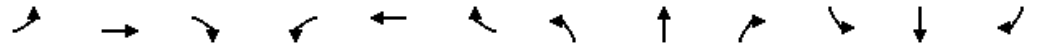
Intersection Summary			
HCM 2000 Control Delay	58.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBT
Lane Group Flow (vph)	115	1159	646	443	220	217
v/c Ratio	0.23	0.47	0.26	0.36	0.65	0.55
Control Delay	9.1	12.3	7.3	2.2	51.7	31.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	12.3	7.3	2.2	51.7	31.9
Queue Length 50th (ft)	50	286	79	0	165	104
Queue Length 95th (ft)	95	562	159	64	233	172
Internal Link Dist (ft)		1633	378			130
Turn Bay Length (ft)	415			200	175	
Base Capacity (vph)	507	2477	2477	1231	568	614
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.47	0.26	0.36	0.39	0.35

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	1066	0	0	594	408	0	0	0	390	0	12
Future Volume (vph)	106	1066	0	0	594	408	0	0	0	390	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95	1.00				0.95	0.95	
Frt	1.00	1.00			1.00	0.85				1.00	0.99	
Flt Protected	0.95	1.00			1.00	1.00				0.95	0.96	
Satd. Flow (prot)	1711	3421			3421	1531				1625	1619	
Flt Permitted	0.39	1.00			1.00	1.00				0.95	0.96	
Satd. Flow (perm)	701	3421			3421	1531				1625	1619	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	115	1159	0	0	646	443	0	0	0	424	0	13
RTOR Reduction (vph)	0	0	0	0	0	122	0	0	0	0	58	0
Lane Group Flow (vph)	115	1159	0	0	646	321	0	0	0	220	159	0
Turn Type	Perm	NA		Perm	NA	Perm				Split	NA	
Protected Phases		6			2		3	3		4	4	
Permitted Phases	6	6		2	2	2						
Actuated Green, G (s)	84.9	84.9			84.9	84.9				24.1	24.1	
Effective Green, g (s)	86.9	86.9			86.9	86.9				25.1	25.1	
Actuated g/C Ratio	0.72	0.72			0.72	0.72				0.21	0.21	
Clearance Time (s)	6.0	6.0			6.0	6.0				5.0	5.0	
Vehicle Extension (s)	5.0	5.0			5.0	5.0				5.0	5.0	
Lane Grp Cap (vph)	507	2477			2477	1108				339	338	
v/s Ratio Prot		c0.34			0.19					c0.14	0.10	
v/s Ratio Perm	0.16					0.21						
v/c Ratio	0.23	0.47			0.26	0.29				0.65	0.47	
Uniform Delay, d1	5.5	6.9			5.6	5.8				43.4	41.6	
Progression Factor	1.18	1.51			1.12	2.02				1.00	1.00	
Incremental Delay, d2	1.0	0.6			0.2	0.6				5.8	2.2	
Delay (s)	7.4	11.0			6.6	12.3				49.2	43.8	
Level of Service	A	B			A	B				D	D	
Approach Delay (s)		10.7			8.9			0.0			46.5	
Approach LOS		B			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	1	12	14	1	15	29	885	19	59	1271	20
Future Volume (Veh/h)	23	1	12	14	1	15	29	885	19	59	1271	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	1	13	15	1	16	32	962	21	64	1382	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2082	2568	702	1869	2568	492	1404			983		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2082	2568	702	1869	2568	492	1404			983		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	1	95	97	59	95	97	93			91		
cM capacity (veh/h)	25	22	381	37	22	523	482			698		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	39	32	32	641	342	64	921	483
Volume Left	25	15	32	0	0	64	0	0
Volume Right	13	16	0	0	21	0	0	22
cSH	36	66	482	1700	1700	698	1700	1700
Volume to Capacity	1.07	0.49	0.07	0.38	0.20	0.09	0.54	0.28
Queue Length 95th (ft)	100	49	5	0	0	8	0	0
Control Delay (s)	337.9	103.3	13.0	0.0	0.0	10.7	0.0	0.0
Lane LOS	F	F	B			B		
Approach Delay (s)	337.9	103.3	0.4			0.5		
Approach LOS	F	F						

Intersection Summary				
Average Delay	6.9			
Intersection Capacity Utilization	52.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	10	29	35	47	1035	60	10	1410	8
v/c Ratio	0.08	0.19	0.19	0.14	0.34	0.04	0.02	0.50	0.01
Control Delay	52.1	22.3	2.2	2.2	2.5	0.6	0.2	1.6	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.1	22.3	2.2	2.2	2.5	0.6	0.2	1.6	0.0
Queue Length 50th (ft)	7	1	0	4	65	0	1	74	0
Queue Length 95th (ft)	25	32	2	9	152	7	m0	19	m0
Internal Link Dist (ft)		254	405		1830			1619	
Turn Bay Length (ft)				300		100	225		225
Base Capacity (vph)	410	432	421	491	3051	1373	642	2839	1283
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.07	0.08	0.10	0.34	0.04	0.02	0.50	0.01

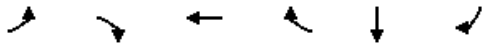
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	2	25	18	0	14	43	952	55	9	1297	7
Future Volume (vph)	9	2	25	18	0	14	43	952	55	9	1297	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.86			0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1711	1549			1649		1711	3421	1531	1711	3421	1531
Flt Permitted	0.85	1.00			0.81		0.16	1.00	1.00	0.27	1.00	1.00
Satd. Flow (perm)	1539	1549			1369		283	3421	1531	490	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	2	27	20	0	15	47	1035	60	10	1410	8
RTOR Reduction (vph)	0	25	0	0	33	0	0	0	11	0	0	2
Lane Group Flow (vph)	10	4	0	0	2	0	47	1035	50	10	1410	6
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			6		6	2		2
Actuated Green, G (s)	4.9	4.9			4.9		101.2	96.5	96.5	94.0	92.9	92.9
Effective Green, g (s)	6.9	6.9			6.9		103.2	99.0	99.0	96.0	95.4	95.4
Actuated g/C Ratio	0.06	0.06			0.06		0.86	0.82	0.82	0.80	0.80	0.80
Clearance Time (s)	6.0	6.0			6.0		5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0			3.0		2.5	5.0	5.0	2.5	5.0	5.0
Lane Grp Cap (vph)	88	89			78		311	2822	1263	413	2719	1217
v/s Ratio Prot		0.00					c0.01	c0.30		0.00	c0.41	
v/s Ratio Perm	c0.01				0.00		0.12		0.03	0.02		0.00
v/c Ratio	0.11	0.04			0.03		0.15	0.37	0.04	0.02	0.52	0.01
Uniform Delay, d1	53.6	53.4			53.4		2.6	2.6	1.9	2.4	4.3	2.5
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	0.13	0.22	1.00
Incremental Delay, d2	0.6	0.2			0.1		0.2	0.4	0.1	0.0	0.7	0.0
Delay (s)	54.2	53.6			53.5		2.7	3.0	2.0	0.3	1.6	2.5
Level of Service	D	D			D		A	A	A	A	A	A
Approach Delay (s)		53.8			53.5			2.9			1.6	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	3.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBR	WBT	WBR	SBT	SBR
Lane Group Flow (vph)	42	860	347	32	278	292
v/c Ratio	0.22	0.40	0.15	0.03	0.64	0.65
Control Delay	78.1	8.0	8.1	0.1	56.3	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.1	8.0	8.1	0.1	56.3	12.5
Queue Length 50th (ft)	18	186	48	0	109	0
Queue Length 95th (ft)	m31	209	80	0	148	80
Internal Link Dist (ft)			782		297	
Turn Bay Length (ft)	420			600		
Base Capacity (vph)	691	2151	2319	1064	826	591
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.40	0.15	0.03	0.34	0.49

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	0	791	0	319	29	0	0	0	0	256	269
Future Volume (vph)	39	0	791	0	319	29	0	0	0	0	256	269
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		6.5		6.5	6.5					7.0	7.0
Lane Util. Factor	0.97		0.88		0.95	1.00					0.95	1.00
Frt	1.00		0.85		1.00	0.85					1.00	0.85
Flt Protected	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (prot)	3319		2694		3421	1531					3421	1531
Flt Permitted	0.95		1.00		1.00	1.00					1.00	1.00
Satd. Flow (perm)	3319		2694		3421	1531					3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	0	860	0	347	32	0	0	0	0	278	292
RTOR Reduction (vph)	0	0	102	0	0	11	0	0	0	0	0	255
Lane Group Flow (vph)	42	0	758	0	347	21	0	0	0	0	278	37
Turn Type	Prot		Prot		NA	Perm					NA	Perm
Protected Phases	1		6		2						4	
Permitted Phases						2						4
Actuated Green, G (s)	5.9		91.3		80.4	80.4					15.2	15.2
Effective Green, g (s)	5.9		91.3		80.4	80.4					15.2	15.2
Actuated g/C Ratio	0.05		0.76		0.67	0.67					0.13	0.13
Clearance Time (s)	5.0		6.5		6.5	6.5					7.0	7.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0					3.0	3.0
Lane Grp Cap (vph)	163		2049		2292	1025					433	193
v/s Ratio Prot	0.01		c0.28		0.10						c0.08	
v/s Ratio Perm						0.01						0.02
v/c Ratio	0.26		0.37		0.15	0.02					0.64	0.19
Uniform Delay, d1	54.9		4.8		7.3	6.6					49.8	46.9
Progression Factor	1.42		3.11		1.00	1.00					1.00	1.00
Incremental Delay, d2	0.7		0.4		0.1	0.0					3.2	0.5
Delay (s)	78.6		15.3		7.4	6.7					53.1	47.4
Level of Service	E		B		A	A					D	D
Approach Delay (s)		18.3			7.3			0.0			50.2	
Approach LOS		B			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	558	80	914	29	873	584
v/c Ratio	0.00	0.74	0.10	0.44	0.04	0.73	0.24
Control Delay	0.0	54.8	6.9	26.7	0.1	44.8	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	0.0	54.8	6.9	26.7	0.1	44.8	6.9
Queue Length 50th (ft)	0	226	17	180	0	220	75
Queue Length 95th (ft)	0	284	28	257	0	252	116
Internal Link Dist (ft)				1519			448
Turn Bay Length (ft)			600		1000	425	
Base Capacity (vph)	654	890	899	2081	695	1527	2421
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.63	0.09	0.44	0.04	0.57	0.24

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	1	513	0	74	0	841	27	803	536	1
Future Volume (vph)	0	0	1	513	0	74	0	841	27	803	536	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	4.0		4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor			1.00	0.97		1.00		0.91	1.00	0.94	0.95	
Frt			0.86	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected			1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			1558	3319		1531		4916	1531	4824	3420	
Flt Permitted			1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)			1558	3319		1531		4916	1531	4824	3420	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1	558	0	80	0	914	29	873	583	1
RTOR Reduction (vph)	0	0	1	0	0	18	0	0	17	0	0	0
Lane Group Flow (vph)	0	0	0	558	0	62	0	914	12	873	584	0
Turn Type			Perm	Prot		pt+ov		NA	Perm	Prot	NA	
Protected Phases				4		4 5		6		5	2	
Permitted Phases			4						6			
Actuated Green, G (s)			25.3	25.3		59.2		47.8	47.8	27.9	81.7	
Effective Green, g (s)			25.3	27.3		61.2		50.8	50.8	29.9	84.7	
Actuated g/C Ratio			0.21	0.23		0.51		0.42	0.42	0.25	0.71	
Clearance Time (s)			6.0	6.0				7.0	7.0	6.0	7.0	
Vehicle Extension (s)			3.0	3.0				5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)			328	755		780		2081	648	1201	2413	
v/s Ratio Prot				c0.17		0.04		c0.19		c0.18	0.17	
v/s Ratio Perm			0.00						0.01			
v/c Ratio			0.00	0.74		0.08		0.44	0.02	0.73	0.24	
Uniform Delay, d1			37.4	43.0		15.0		24.5	20.1	41.3	6.3	
Progression Factor			1.00	1.14		0.91		1.00	1.00	1.00	1.00	
Incremental Delay, d2			0.0	3.7		0.0		0.7	0.1	2.2	0.2	
Delay (s)			37.4	52.6		13.8		25.2	20.2	43.5	6.5	
Level of Service			D	D		B		C	C	D	A	
Approach Delay (s)		37.4			47.7			25.0			28.7	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	31.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	163	1345	65	367	620	37	272	486	392	264
v/c Ratio	0.30	0.63	0.31	0.26	0.40	0.10	0.66	0.72	0.56	0.51
Control Delay	16.9	30.5	19.6	28.2	0.8	56.4	48.7	55.8	50.8	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.9	30.5	19.6	28.2	0.8	56.4	48.7	55.8	50.8	8.7
Queue Length 50th (ft)	64	308	24	105	0	14	84	202	161	0
Queue Length 95th (ft)	128	453	58	182	0	35	145	284	231	75
Internal Link Dist (ft)		1548		585			1389		1519	
Turn Bay Length (ft)	350		425			350		490		300
Base Capacity (vph)	672	2233	471	1588	1531	1014	1036	1142	1177	700
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.60	0.14	0.23	0.40	0.04	0.26	0.43	0.33	0.38

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	1017	221	60	338	570	34	148	102	447	361	243
Future Volume (vph)	150	1017	221	60	338	570	34	148	102	447	361	243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	7.0		5.5	7.0	4.0	5.5	5.5		5.5	5.5	5.5
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	0.97	0.95		0.97	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	4784		1711	3421	1531	3319	3212		3319	3421	1531
Flt Permitted	0.47	1.00		0.13	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	846	4784		242	3421	1531	3319	3212		3319	3421	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	1105	240	65	367	620	37	161	111	486	392	264
RTOR Reduction (vph)	0	14	0	0	0	0	0	71	0	0	0	210
Lane Group Flow (vph)	163	1331	0	65	367	620	37	201	0	486	392	54
Turn Type	pm+pt	NA		pm+pt	NA	Free	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases	2			6		Free						4
Actuated Green, G (s)	71.0	58.0		61.8	53.4	130.7	14.0	14.0		26.8	26.8	26.8
Effective Green, g (s)	71.0	58.0		61.8	53.4	130.7	14.0	14.0		26.8	26.8	26.8
Actuated g/C Ratio	0.54	0.44		0.47	0.41	1.00	0.11	0.11		0.21	0.21	0.21
Clearance Time (s)	5.5	7.0		5.5	7.0		5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	3.0	7.0		3.0	7.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	545	2122		208	1397	1531	355	344		680	701	313
v/s Ratio Prot	0.03	c0.28		0.02	0.11		0.01	c0.06		c0.15	0.11	
v/s Ratio Perm	0.13			0.13		c0.41						0.04
v/c Ratio	0.30	0.63		0.31	0.26	0.40	0.10	0.59		0.71	0.56	0.17
Uniform Delay, d1	15.3	28.0		20.1	25.6	0.0	52.7	55.6		48.4	46.6	42.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	1.2		0.9	0.4	0.8	0.1	2.5		3.6	1.0	0.3
Delay (s)	15.6	29.2		20.9	26.0	0.8	52.8	58.1		52.0	47.6	43.1
Level of Service	B	C		C	C	A	D	E		D	D	D
Approach Delay (s)		27.7			10.8			57.5			48.4	
Approach LOS		C			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	31.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	130.7	Sum of lost time (s)	23.5
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	1431	15	21	452	30	17	0	24	41	0	18
Future Volume (Veh/h)	4	1431	15	21	452	30	17	0	24	41	0	18
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	1555	16	23	491	33	18	0	26	45	0	20
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		650			625							
pX, platoon unblocked												
vC, conflicting volume	524			1571			1874	2133	778	1348	2116	246
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	524			1571			1874	2133	778	1348	2116	246
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			94			56	100	92	53	100	97
cM capacity (veh/h)	1039			416			41	46	339	96	47	755

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	4	778	778	16	23	246	246	33	44	65
Volume Left	4	0	0	0	23	0	0	0	18	45
Volume Right	0	0	0	16	0	0	0	33	26	20
cSH	1039	1700	1700	1700	416	1700	1700	1700	85	132
Volume to Capacity	0.00	0.46	0.46	0.01	0.06	0.14	0.14	0.02	0.52	0.49
Queue Length 95th (ft)	0	0	0	0	4	0	0	0	56	57
Control Delay (s)	8.5	0.0	0.0	0.0	14.2	0.0	0.0	0.0	85.7	56.4
Lane LOS	A				B				F	F
Approach Delay (s)	0.0				0.6				85.7	56.4
Approach LOS									F	F

Intersection Summary				
Average Delay	3.5			
Intersection Capacity Utilization	51.8%	ICU Level of Service	A	
Analysis Period (min)	15			

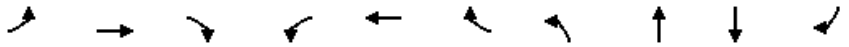
Lane Group	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	92	913	82	71	1457
v/c Ratio	0.06	0.24	0.05	0.23	0.30
Control Delay	0.1	3.0	0.1	17.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	0.1	3.0	0.1	17.3	0.2
Queue Length 50th (ft)	0	29	0	17	0
Queue Length 95th (ft)	0	47	0	40	0
Internal Link Dist (ft)		448			480
Turn Bay Length (ft)			485	575	
Base Capacity (vph)	1558	4916	1531	976	4916
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.06	0.19	0.05	0.07	0.30

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	85	840	75	65	1340
Future Volume (vph)	0	85	840	75	65	1340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	0.91	1.00	1.00	0.91
Frt		0.86	1.00	0.85	1.00	1.00
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1558	4916	1531	1711	4916
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		1558	4916	1531	1711	4916
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	92	913	82	71	1457
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	92	913	82	71	1457
Turn Type		Free	NA	Free	Prot	NA
Protected Phases			2		1	Free
Permitted Phases		Free		Free		
Actuated Green, G (s)		47.6	31.8	47.6	4.8	47.6
Effective Green, g (s)		47.6	33.8	47.6	5.8	47.6
Actuated g/C Ratio		1.00	0.71	1.00	0.12	1.00
Clearance Time (s)			6.0		5.0	
Vehicle Extension (s)			5.0		3.0	
Lane Grp Cap (vph)		1558	3490	1531	208	4916
v/s Ratio Prot			0.19		0.04	0.30
v/s Ratio Perm		0.06		0.05		
v/c Ratio		0.06	0.26	0.05	0.34	0.30
Uniform Delay, d1		0.0	2.5	0.0	19.1	0.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	0.1	0.1	1.0	0.2
Delay (s)		0.1	2.5	0.1	20.1	0.2
Level of Service		A	A	A	C	A
Approach Delay (s)	0.1		2.3			1.1
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	1.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	47.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	31.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	102	1260	32	3	643	12	20	3	14	50
v/c Ratio	0.15	0.41	0.02	0.01	0.23	0.01	0.17	0.02	0.12	0.03
Control Delay	2.9	6.0	0.9	1.7	2.5	0.0	54.1	38.3	52.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.9	6.0	0.9	1.7	2.5	0.0	54.1	38.3	52.8	0.0
Queue Length 50th (ft)	19	277	0	0	33	0	15	1	10	0
Queue Length 95th (ft)	33	211	5	m1	42	m0	40	11	32	0
Internal Link Dist (ft)		712			1633			152	157	
Turn Bay Length (ft)	250		350	235		375				
Base Capacity (vph)	784	3043	1369	565	2741	1240	291	352	288	1531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.41	0.02	0.01	0.23	0.01	0.07	0.01	0.05	0.03

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	1159	29	3	592	11	18	1	2	12	1	46
Future Volume (vph)	94	1159	29	3	592	11	18	1	2	12	1	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.96	1.00
Satd. Flow (prot)	1711	3421	1531	1711	3421	1531	1711	1621			1721	1531
Flt Permitted	0.38	1.00	1.00	0.21	1.00	1.00	0.75	1.00			0.74	1.00
Satd. Flow (perm)	688	3421	1531	386	3421	1531	1348	1621			1331	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	102	1260	32	3	643	12	20	1	2	13	1	50
RTOR Reduction (vph)	0	0	6	0	0	3	0	2	0	0	0	0
Lane Group Flow (vph)	102	1260	26	3	643	9	20	1	0	0	14	50
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Free
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8			4		Free
Actuated Green, G (s)	102.8	97.2	97.2	92.9	91.8	91.8	5.2	5.2			5.2	120.0
Effective Green, g (s)	103.3	99.2	99.2	93.9	93.8	93.8	7.2	7.2			7.2	120.0
Actuated g/C Ratio	0.86	0.83	0.83	0.78	0.78	0.78	0.06	0.06			0.06	1.00
Clearance Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0			3.0	
Lane Grp Cap (vph)	651	2828	1265	319	2674	1196	80	97			79	1531
v/s Ratio Prot	c0.01	c0.37		0.00	0.19			0.00				
v/s Ratio Perm	0.13		0.02	0.01		0.01	c0.01				0.01	0.03
v/c Ratio	0.16	0.45	0.02	0.01	0.24	0.01	0.25	0.01			0.18	0.03
Uniform Delay, d1	1.4	2.9	1.8	2.9	3.5	2.9	53.8	53.1			53.6	0.0
Progression Factor	1.86	2.23	10.25	0.95	0.63	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.1	0.5	0.0	0.0	0.2	0.0	1.6	0.0			1.1	0.0
Delay (s)	2.7	6.8	18.8	2.7	2.4	2.9	55.5	53.1			54.7	0.0
Level of Service	A	A	B	A	A	A	E	D			D	A
Approach Delay (s)		6.8			2.4			55.2			12.0	
Approach LOS		A			A			E			B	

Intersection Summary					
HCM 2000 Control Delay	6.1	HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.43				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	53.9%	ICU Level of Service		A	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	387	1384	699	15	10	175
v/c Ratio	0.46	0.42	0.31	0.01	0.08	0.11
Control Delay	8.1	1.9	13.7	0.0	53.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.1	1.9	13.7	0.0	53.4	0.1
Queue Length 50th (ft)	37	0	150	0	7	0
Queue Length 95th (ft)	m106	m256	228	0	25	0
Internal Link Dist (ft)		605	712		887	
Turn Bay Length (ft)	600					600
Base Capacity (vph)	1105	3321	2236	1531	285	1531
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.42	0.31	0.01	0.04	0.11

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	356	1273	643	14	9	161
Future Volume (vph)	356	1273	643	14	9	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1711	3421	3421	1531	1711	1531
Flt Permitted	0.34	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	620	3421	3421	1531	1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	387	1384	699	15	10	175
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	387	1384	699	15	10	175
Turn Type	pm+pt	NA	NA	Free	Prot	Free
Protected Phases	1	1 6	2		4	
Permitted Phases	1 6			Free		Free
Actuated Green, G (s)	100.5	106.5	71.7	120.0	1.5	120.0
Effective Green, g (s)	104.5	108.5	73.7	120.0	3.5	120.0
Actuated g/C Ratio	0.87	0.90	0.61	1.00	0.03	1.00
Clearance Time (s)	6.0		6.0		6.0	
Vehicle Extension (s)	3.0		5.0		3.0	
Lane Grp Cap (vph)	819	3093	2101	1531	49	1531
v/s Ratio Prot	0.12	c0.40	0.20		0.01	
v/s Ratio Perm	c0.29			0.01		c0.11
v/c Ratio	0.47	0.45	0.33	0.01	0.20	0.11
Uniform Delay, d1	5.1	0.9	11.2	0.0	56.9	0.0
Progression Factor	3.11	2.87	1.20	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1	0.4	0.0	2.1	0.2
Delay (s)	16.2	2.7	13.9	0.0	59.0	0.2
Level of Service	B	A	B	A	E	A
Approach Delay (s)		5.7	13.6		3.3	
Approach LOS		A	B		A	

Intersection Summary			
HCM 2000 Control Delay	7.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Appendix C: Critical Lane Volume Analysis

2016 AM Existing Conditions Critical Lane Volume (CLV) Analysis

Node	Intersection	CLV	Equivalent LOS	V/C
1	Aviation Blvd and Dorsey Rd	1,289	C	0.81
2	Aviation Blvd and Mathison Way	842	A	0.53
3	Aviation Blvd and Stoney Run Rd	1,058	B	0.66
4	Northrop Grumman and Stoney Run Rd	689	A	0.43
5	New Ridge Rd and Stoney Run Rd	551	A	0.34
6	Aviation Blvd and Amtrak Way	862	A	0.54
7	Aviation Blvd and Northrop Grumman Parking	963	A	0.60
8	Aviation Blvd and I-195 SB Ramps	725	A	0.45
9	Aviation Blvd and I-195 NB Ramps	695	A	0.43
10	Elkridge Landing Rd and Terminal Rd	873	A	0.55
11	Aviation Blvd and Terminal Rd	773	A	0.48
12	Aviation Blvd and Air Cargo Road/Elkridge Landing	738	A	0.46
13	Aviation Blvd and Andover Rd	866	A	0.54
15	Aviation Blvd and Allwood Dr	782	A	0.49
16	I-97 SB Ramps and Cromwell Park Dr	399	A	0.25
17	Aviation Blvd and Cromwell Park Dr	809	A	0.51
18	Aviation Blvd and Dorsey Rd	779	A	0.49
20	Aviation Blvd and Hollins Ferry Rd	571	A	0.36
21	Aviation Blvd and BWI Long Term Parking	719	A	0.45
22	Aviation Blvd and Camp Meade Rd (MD170)	932	A	0.58

Source: HNTB's CLV analysis of 2016 Existing Conditions.

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2016 Base Case
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

R	Right	Thru	Left	
	230	301	139	VPH
	1	2	1	# Lanes

Signal Phasing

N-S Split Phase?	no
E-W Split Phase?	no

Dorsey Rd

	VPH	# Lanes
Left	281	1
Thru	298	2
Right	136	1
R		

Intersection CLV:	**1,289**
CLV Standard:	**1,600**
Intersection LOS:	**C**
Better Than CLV Standard	

# Lanes	VPH	R
0		Right
2	446	Thru
1	84	Left

Dorsey Rd

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	1	2	1	
VPH	401	1,194	247	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	242
CLV (WB)	517
CLV (NB)	771
CLV (SB)	560
CLV (N-S)	771
CLV (E-W)	517

V/C=0.81

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Mathison Way
Scenario: 2016 Base Case
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		652	16	VPH
Policy Area: NA	0	2	1	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:	842
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	
1	18	Right
0		Thru
1	18	Left

Mathison Way

Organization: HNTB
Date of Analysis: 6/16/2016

	Left	Thru	Right	
# Lanes	0	2	1	
VPH		1,524	21	R

Aviation Blvd

CLV (EB)	18
CLV (WB)	2
CLV (NB)	824
CLV (SB)	345
CLV (N-S)	824
CLV (E-W)	18

V/C=0.53

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Stoney Run Rd
Scenario: 2016 Base Case
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		616	742	VPH
Policy Area: NA	0	2	2	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

	# Lanes	VPH	
	0		Right
	0		Thru
	1	52	Left

Stoney Run Rd

Intersection CLV:	**1,058**
CLV Standard:	**1,600**
Intersection LOS:	**B**
Better Than CLV Standard	

# Lanes	0	2	0	
VPH		1,157		
	Left	Thru	Right	R

Aviation Blvd

Organization: HNTB
Date of Analysis: 6/16/2016

CLV (EB)	52
CLV (WB)	-
CLV (NB)	1,007
CLV (SB)	326
CLV (N-S)	1,007
CLV (E-W)	52

V/C=0.66

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Northrop Grumman and Stoney Run Rd
Scenario: 2016 Base Case
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Northrop Grumman

	Right	Thru	Left	
R	9	37		VPH
	1	1	0	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Stoney Run Rd

	VPH	# Lanes
Left	143	1
Thru		0
Right		0
R		

Intersection CLV:	**689**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	
0		R
0		Right
0		Thru
		Left

Not Applicable

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	2	1	0	
VPH	619	508	0	
	Left	Thru	Right	R

Stoney Run Rd

CLV (EB)	-
CLV (WB)	143
CLV (NB)	508
CLV (SB)	37
CLV (N-S)	546
CLV (E-W)	143

V/C=0.43

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: New Ridge Rd and Stoney Run Rd
Scenario: 2016 Base Case
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

New Ridge Rd

R	Right	Thru	Left	
	2	24	22	VPH
	0	1	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Stoney Run Rd

	VPH	# Lanes
Left	0	1
Thru	76	1
Right	18	1
R		

Intersection CLV:	**551**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	R
1	125	Right
1	153	Thru
1	350	Left

Stoney Run Rd

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	0	1	1	
VPH	14	89	360	
	Left	Thru	Right	R

New Ridge Rd

CLV (EB)	426
CLV (WB)	153
CLV (NB)	125
CLV (SB)	40
CLV (N-S)	125
CLV (E-W)	426

V/C=0.34

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Amtrak Way
Scenario: 2016 Base Case
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R		1,191		VPH
	0	2	0	# Lanes

Signal Phasing

N-S Split Phase?	no
E-W Split Phase?	no

Amtrak Way

	VPH	# Lanes
Left	110	1
Thru		0
Right	167	1
R		

Intersection CLV:	**862**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
0		Right
0		Thru
0		Left

Not Applicable

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	1	2	0	
VPH	120	1,336	0	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	-
CLV (WB)	110
CLV (NB)	708
CLV (SB)	752
CLV (N-S)	752
CLV (E-W)	110

V/C=0.54

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Northrop Grumman Parking
Scenario: 2016 Base Case
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		1,588		VPH
	0	2	0	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Northrop Grumman Parking

	VPH	# Lanes
Left	34	2
Thru		0
Right		0
R		

Intersection CLV:	**963**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	
0		R
0		Right
0		Thru
		Left

Not Applicable

# Lanes	1	2	0	
VPH	103	1,342	0	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	-
CLV (WB)	18
CLV (NB)	712
CLV (SB)	945
CLV (N-S)	945
CLV (E-W)	18

Organization: HNTB
Date of Analysis: 6/16/2016

V/C=0.6

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 SB Ramps
Scenario: 2016 Base Case
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		569	68	VPH
	0	2	1	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

I-195 SB Ramps

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:		**725**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	
0		Right
0		Thru
1	17	Left
		R

I195 SB Ramps

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	0	2	1	
VPH		1,207	170	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	17
CLV (WB)	-
CLV (NB)	708
CLV (SB)	301
CLV (N-S)	708
CLV (E-W)	17

V/C=0.45

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 NB Ramps
Scenario: 2016 Base Case
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
		522		VPH
	0	2	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:	**695**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	R
0		Right
0		Thru
1	114	Left

I195 NB Ramps

Organization: HNTB
Date of Analysis: 6/16/2016

	Left	Thru	Right	R
# Lanes	0	2	0	
VPH		1,096		

Aviation Blvd

CLV (EB)	114
CLV (WB)	-
CLV (NB)	581
CLV (SB)	277
CLV (N-S)	581
CLV (E-W)	114

V/C=0.43

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Elkridge Landing Rd and Terminal Rd
Scenario: 2016 Base Case
Time Period: AM Peak

Not Applicable

	Right	Thru	Left	
				VPH
	0	0	0	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Elkridge Landing Rd

	VPH	# Lanes
Left		0
Thru	88	2
Right		0
R		

Intersection CLV:	873
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	
0		Right
2	493	Thru
1	27	Left

Elkridge Landing Rd

	Left	Thru	Right	
# Lanes	1	0	1	
VPH	612		37	
				R

Terminal Rd

Organization: HNTB
Date of Analysis: 6/16/2016

CLV (EB)	73
CLV (WB)	261
CLV (NB)	-
CLV (SB)	612
CLV (N-S)	612
CLV (E-W)	261

V/C=0.55

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Terminal Rd
Scenario: 2016 Base Case
Time Period: AM Peak

Terminal Rd

	Right	Thru	Left	
		84		VPH
R	0	2	0	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	524	2
Thru	396	2
Right		0
R		

Intersection CLV:		**773**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	
0		Right
2	697	Thru
2	317	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 6/16/2016

	Left	Thru	Right	
# Lanes	2	1	0	
VPH	80	127		R

Terminal Rd

CLV (EB)	378
CLV (WB)	647
CLV (NB)	127
CLV (SB)	87
CLV (N-S)	127
CLV (E-W)	647

V/C=0.48

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Air Cargo Road/Elkridge Landi
Scenario: 2016 Base Case
Time Period: AM Peak

Elkridge Landing

	Right	Thru	Left	
R	32	16	77	VPH
	0	1	1	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	96	1
Thru	438	2
Right	72	1
R		

Intersection CLV:	**738**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
1	527	Right
2	914	Thru
1	59	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 6/16/2016

	Left	Thru	Right	
# Lanes	0	1	1	
VPH	67	14	34	R

Air Cargo Rd

CLV (EB)	291
CLV (WB)	581
CLV (NB)	81
CLV (SB)	77
CLV (N-S)	158
CLV (E-W)	581

V/C=0.46

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Camp Meade Rd (MD170)
Scenario: 2016 Base Case
Time Period: AM Peak

Camp Meade Rd

	Right	Thru	Left	
R	291		6	VPH
	1	0	1	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	130	1
Thru	420	2
Right		0
R		

Intersection CLV:	932
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	R
1	12	Right
2	1,210	Thru
0		Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 6/16/2016

	Left	Thru	Right	R
# Lanes	0	0	0	
VPH				

Not Applicable

CLV (EB)	222
CLV (WB)	771
CLV (NB)	6
CLV (SB)	161
CLV (N-S)	161
CLV (E-W)	771

V/C=0.58

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and BWI Long Term Parking
Scenario: 2016 Base Case
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Andover Rd

	Right	Thru	Left	
R	7	1	0	VPH
	1	1	0	# Lanes

Signal Phasing

N-S Split Phase?	no
E-W Split Phase?	no

Aviation Blvd

	VPH	# Lanes
Left	64	1
Thru	307	2
Right	55	1
R		

Intersection CLV:	**719**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
1	14	Right
2	1,193	Thru
1	1	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 6/16/2016

	Left	Thru	Right	
# Lanes	1	1	0	
VPH	22	0	0	R

Long Term Lot B

CLV (EB)	164
CLV (WB)	696
CLV (NB)	-
CLV (SB)	23
CLV (N-S)	23
CLV (E-W)	696

V/C=0.45

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Andover Rd
Scenario: 2016 Base Case
Time Period: AM Peak

Andover Rd

	R	Right	Thru	Left	
		51		244	VPH
Policy Area: NA		0	1	1	# Lanes
CLV Standard: 1,600					

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	9	1
Thru	298	2
Right	0	0
R		

Intersection CLV:		**866**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	R
1	245	
2	1,157	
1	0	

Aviation Blvd

Organization: HNTB
Date of Analysis: 6/16/2016

	Left	Thru	Right	R
# Lanes	0	1	0	
VPH		0		

Hammond House

CLV (EB)	158
CLV (WB)	622
CLV (NB)	-
CLV (SB)	244
CLV (N-S)	244
CLV (E-W)	622

V/C=0.54

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Allwood Dr
Scenario: 2016 Base Case
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R	25	555	6	VPH
	1	2	1	# Lanes

Signal Phasing

N-S Split Phase?	no
E-W Split Phase?	no

Allwood Dr

	VPH	# Lanes
Left	21	1
Thru	0	1
Right	12	0
R		

Intersection CLV:	**782**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
0	21	R
1	1	
0	21	

Allwood Dr

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	1	2	1	
VPH	53	1,342	11	R
	Left	Thru	Right	

Aviation Blvd

CLV (EB)	33
CLV (WB)	65
CLV (NB)	717
CLV (SB)	347
CLV (N-S)	717
CLV (E-W)	65

V/C=0.49

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Hollins Ferry Rd
Scenario: 2016 Base Case
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
R			48	VPH
Policy Area: NA				
CLV Standard: 1,600	0	0	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:	571
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	R
0		
0		
0		

Hollins Ferry Rd

Organization: HNTB
Date of Analysis: 6/16/2016

	Left	Thru	Right	
# Lanes	0	3	0	
VPH		1,413		R

Aviation Blvd

CLV (EB)	-
CLV (WB)	-
CLV (NB)	571
CLV (SB)	-
CLV (N-S)	571
CLV (E-W)	-

V/C=0.36

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Cromwell Park Dr
Scenario: 2016 Base Case
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
R		156	309	VPH
	0	2	3	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:	**809**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

	# Lanes	VPH	
	1	194	R
	0		
	2	347	

Cromwell Park Dr

# Lanes	0	3	0	
VPH		1,381		
	Left	Thru	Right	R

Aviation Blvd

Organization: HNTB
Date of Analysis: 6/16/2016

CLV (EB)	184
CLV (WB)	79
CLV (NB)	626
CLV (SB)	83
CLV (N-S)	626
CLV (E-W)	184

V/C=0.51

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: I-97 SB Ramps and Cromwell Park Dr
Scenario: 2016 Base Case
Time Period: AM Peak

I-97 SB Ramps

	Right	Thru	Left	
R	35	62		VPH
	1	2	0	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Cromwell Park Dr

	VPH	# Lanes
Left	186	2
Thru		0
Right	294	2
R		

Intersection CLV:	399
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	
0		
2	505	
0		R

Cromwell Park Dr

	Left	Thru	Right	
# Lanes	0	0	0	
VPH				R

Not Applicable

Organization: HNTB
Date of Analysis: 6/16/2016

CLV (EB)	156
CLV (WB)	366
CLV (NB)	-
CLV (SB)	33
CLV (N-S)	33
CLV (E-W)	366

V/C=0.25

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2016 Base Case
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviaition Blvd

	Right	Thru	Left	
R	335	71	97	VPH
	1	2	2	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Dorsey Rd

	VPH	# Lanes
Left	131	1
Thru	298	3
Right	7	0
R		

Intersection CLV:	779
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	
0		R
2	438	
1	19	

Dorsey Rd

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	2	2	0	
VPH	188	252	148	R
	Left	Thru	Right	

Aviaition Blvd

CLV (EB)	132
CLV (WB)	364
CLV (NB)	212
CLV (SB)	204
CLV (N-S)	416
CLV (E-W)	364

V/C=0.49

2016 PM Existing Conditions Critical Lane Volume (CLV) Analysis

Node	Intersection	CLV	Equivalent LOS	V/C
1	Aviation Blvd and Dorsey Rd	1,280	C	0.80
2	Aviation Blvd and Mathison Way	919	A	0.57
3	Aviation Blvd and Stoney Run Rd	1,036	B	0.65
4	Northrop Grumman and Stoney Run Rd	624	A	0.39
5	New Ridge Rd and Stoney Run Rd	702	A	0.44
6	Aviation Blvd and Amtrak Way	1,205	C	0.75
7	Aviation Blvd and Northrop Grumman Parking	1,150	C	0.72
8	Aviation Blvd and I-195 SB Ramps	1,201	C	0.75
9	Aviation Blvd and I-195 NB Ramps	741	A	0.46
10	Elkridge Landing Rd and Terminal Rd	551	A	0.34
11	Aviation Blvd and Terminal Rd	640	A	0.40
12	Aviation Blvd and Air Cargo Road/Elkridge Landing	1,061	B	0.66
13	Aviation Blvd and Andover Rd	836	A	0.52
15	Aviation Blvd and Allwood Dr	676	A	0.42
16	I-97 SB Ramps and Cromwell Park Dr	596	A	0.37
17	Aviation Blvd and Cromwell Park Dr	772	A	0.48
18	Aviation Blvd and Dorsey Rd	777	A	0.49
20	Aviation Blvd and Hollins Ferry Rd	322	A	0.20
21	Aviation Blvd and BWI Long Term Parking	570	A	0.36
22	Aviation Blvd and Camp Meade Rd (MD170)	592	A	0.37

Source: HNTB's CLV analysis of 2016 Existing Conditions.

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2016 Base Case
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

R	Right	Thru	Left	
	333	1,048	319	VPH
	1	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Dorsey Rd

	VPH	# Lanes
Left	333	1
Thru	725	2
Right	298	1
R		

Intersection CLV:	**1,280**
CLV Standard:	**1,600**
Intersection LOS:	**C**
Better Than CLV Standard	

# Lanes	VPH	R
0		Right
2	327	Thru
1	177	Left

Dorsey Rd

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	1	2	1	
VPH	163	545	158	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	561
CLV (WB)	506
CLV (NB)	608
CLV (SB)	719
CLV (N-S)	719
CLV (E-W)	561

V/C=0.8

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Mathison Way
Scenario: 2016 Base Case
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		1,662	15	VPH
Policy Area: NA	0	2	1	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:		**919**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	R
1	22	Right
0		Thru
1	38	Left

Mathison Way

Organization: HNTB
Date of Analysis: 6/16/2016

	Left	Thru	Right	R
# Lanes	0	2	1	
VPH		871	16	

Aviation Blvd

CLV (EB)	38
CLV (WB)	-
CLV (NB)	477
CLV (SB)	881
CLV (N-S)	881
CLV (E-W)	38

V/C=0.57

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Stoney Run Rd
Scenario: 2016 Base Case
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		1,365	349	VPH
Policy Area: NA	0	2	2	# Lanes
CLV Standard: 1,600				

Signal Phasing

N-S Split Phase?	no
E-W Split Phase?	no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:	**1,036**
CLV Standard:	**1,600**
Intersection LOS:	**B**
Better Than CLV Standard	

# Lanes	VPH	R
0		Right
0		Thru
1	313	Left

Stoney Run Rd

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	0	2	0	
VPH		809		
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	313
CLV (WB)	-
CLV (NB)	614
CLV (SB)	723
CLV (N-S)	723
CLV (E-W)	313

V/C=0.65

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Northrop Grumman and Stoney Run Rd
Scenario: 2016 Base Case
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Northrop Grumman

	Right	Thru	Left	
R	161	400		VPH
	1	1	0	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Stoney Run Rd

	VPH	# Lanes
Left	13	1
Thru		0
Right		0
R		

Intersection CLV:	**624**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	
0		R
0		Right
0		Thru
		Left

Not Applicable

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	2	1	0	
VPH	399	33	0	
	Left	Thru	Right	R

Stoney Run Rd

CLV (EB)	-
CLV (WB)	13
CLV (NB)	212
CLV (SB)	400
CLV (N-S)	612
CLV (E-W)	13

V/C=0.39

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: New Ridge Rd and Stoney Run Rd
Scenario: 2016 Base Case
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

New Ridge Rd

R	Right	Thru	Left	
	0	52	93	VPH
	0	1	1	# Lanes

Signal Phasing

N-S Split Phase?	no
E-W Split Phase?	no

Stoney Run Rd

	VPH	# Lanes
Left	1	1
Thru	128	1
Right	30	1
R		

Intersection CLV:	702
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	R
1	22	Right
1	145	Thru
1	392	Left

Stoney Run Rd

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	0	1	1	
VPH	40	48	426	R
	Left	Thru	Right	

New Ridge Rd

CLV (EB)	520
CLV (WB)	146
CLV (NB)	182
CLV (SB)	92
CLV (N-S)	182
CLV (E-W)	520

V/C=0.44

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Amtrak Way
Scenario: 2016 Base Case
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		1,575		VPH
R	0	2	0	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Amtrak Way

	VPH	# Lanes
Left	329	1
Thru		0
Right	139	1
R		

Intersection CLV:	1,205
CLV Standard:	1,600
Intersection LOS:	C
Better Than CLV Standard	

# Lanes	VPH	
0		Right
0		Thru
0		Left

Not Applicable

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	1	2	0	
VPH	41	1,491	0	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	98
CLV (WB)	329
CLV (NB)	790
CLV (SB)	876
CLV (N-S)	876
CLV (E-W)	329

V/C=0.75

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Northrop Grumman Parking
Scenario: 2016 Base Case
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		1,562		VPH
	0	2	0	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Northrop Grumman Parking

	VPH	# Lanes
Left	363	2
Thru		0
Right		0
R		

Intersection CLV:	**1,150**
CLV Standard:	**1,600**
Intersection LOS:	**C**
Better Than CLV Standard	

# Lanes	VPH	
0		R
0		Right
0		Thru
		Left

Not Applicable

# Lanes	1	2	0	
VPH	13	1,807	0	
	Left	Thru	Right	R

Aviation Blvd

Organization: HNTB
Date of Analysis: 6/16/2016

CLV (EB)	-
CLV (WB)	193
CLV (NB)	958
CLV (SB)	841
CLV (N-S)	958
CLV (E-W)	193

V/C=0.72

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 SB Ramps
Scenario: 2016 Base Case
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
		747	108	VPH
	0	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

I-195 SB Ramps

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:	**1,201**
CLV Standard:	**1,600**
Intersection LOS:	**C**
Better Than CLV Standard	

# Lanes	VPH	
0		R
0		Right
1	28	Thru
		Left

I195 SB Ramps

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	0	2	1	
VPH		2,011	159	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	28
CLV (WB)	-
CLV (NB)	1,174
CLV (SB)	396
CLV (N-S)	1,174
CLV (E-W)	28

V/C=0.75

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 NB Ramps
Scenario: 2016 Base Case
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		685		VPH
	0	2	0	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:		**741**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	
0		Right
0		Thru
1	170	Left

I195 NB Ramps

# Lanes	0	2	0	
VPH		1,077		
	Left	Thru	Right	R

Aviation Blvd

Organization: HNTB
Date of Analysis: 6/16/2016

CLV (EB)	170
CLV (WB)	-
CLV (NB)	571
CLV (SB)	363
CLV (N-S)	571
CLV (E-W)	170

V/C=0.46

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Elkridge Landing Rd and Terminal Rd
Scenario: 2016 Base Case
Time Period: PM Peak

Not Applicable

	Right	Thru	Left	
				VPH
	0	0	0	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Elkridge Landing Rd

	VPH	# Lanes
Left		0
Thru	371	2
Right		0
R		

Intersection CLV:	**551**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
0		Right
2	121	Thru
1	32	Left

Elkridge Landing Rd

# Lanes	1	0	1	
VPH	323		37	
	Left	Thru	Right	R

Terminal Rd

Organization: HNTB
Date of Analysis: 6/16/2016

CLV (EB)	228
CLV (WB)	64
CLV (NB)	6
CLV (SB)	323
CLV (N-S)	323
CLV (E-W)	228

V/C=0.34

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Terminal Rd
Scenario: 2016 Base Case
Time Period: PM Peak

Terminal Rd

	Right	Thru	Left	
		113		VPH
	0	2	0	# Lanes

R

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	249	2
Thru	703	2
Right		0

R

Intersection CLV:	**640**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
0		Right
2	491	Thru
2	238	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 6/16/2016

	Left	Thru	Right
# Lanes	2	1	0
VPH	153	112	

R

Terminal Rd

CLV (EB)	499
CLV (WB)	392
CLV (NB)	112
CLV (SB)	141
CLV (N-S)	141
CLV (E-W)	499

V/C=0.4

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Air Cargo Road/Elkridge Landi
Scenario: 2016 Base Case
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Elkridge Landing

R	Right	Thru	Left	
	62	14	422	VPH
	0	1	1	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	41	1
Thru	914	2
Right	110	1
R		

Intersection CLV:	1,061
CLV Standard:	1,600
Intersection LOS:	B
Better Than CLV Standard	

# Lanes	VPH	R
1	77	Right
2	562	Thru
1	37	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	0	1	1	
VPH	106	12	62	
	Left	Thru	Right	R

Air Cargo Rd

CLV (EB)	522
CLV (WB)	339
CLV (NB)	118
CLV (SB)	422
CLV (N-S)	540
CLV (E-W)	522

V/C=0.66

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Camp Meade Rd (MD170)
Scenario: 2016 Base Case
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Camp Meade Rd

	Right	Thru	Left	
R	138		8	VPH
	1	0	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	296	1
Thru	1,103	2
Right		0
R		

	# Lanes	VPH	R
	1	12	Right
	2	538	Thru
	0		Left

Aviation Blvd

Intersection CLV:	**592**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	0	0	0	
VPH				
	Left	Thru	Right	R

Not Applicable

CLV (EB)	585
CLV (WB)	581
CLV (NB)	8
CLV (SB)	-
CLV (N-S)	8
CLV (E-W)	585

V/C=0.37

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and BWI Long Term Parking
Scenario: 2016 Base Case
Time Period: PM Peak

Andover Rd

	R	Right	Thru	Left	
Policy Area: NA		24	1	0	VPH
CLV Standard: 1,600		1	1	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	54	1
Thru	1,001	2
Right	56	1
R		

Intersection CLV:	**570**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	R
1	7	Right
2	493	Thru
1	5	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	1	1	0	
VPH	34	1	3	R
	Left	Thru	Right	

Long Term Lot B

CLV (EB)	536
CLV (WB)	315
CLV (NB)	4
CLV (SB)	35
CLV (N-S)	35
CLV (E-W)	536

V/C=0.36

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Andover Rd
Scenario: 2016 Base Case
Time Period: PM Peak

Andover Rd

	Right	Thru	Left	
R	10		347	VPH
	0	1	1	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	91	1
Thru	922	2
Right	0	0
R		

Intersection CLV:	**836**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	
1	362	R
2	495	
1	0	

Aviation Blvd

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	0	1	0	
VPH		0		
	Left	Thru	Right	R

Hammond House

CLV (EB)	489
CLV (WB)	353
CLV (NB)	-
CLV (SB)	347
CLV (N-S)	347
CLV (E-W)	489

V/C=0.52

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Allwood Dr
Scenario: 2016 Base Case
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

R	Right	Thru	Left	
	6	1,128	8	VPH
	1	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Allwood Dr

	VPH	# Lanes
Left	8	1
Thru	2	1
Right	22	0
R		

Intersection CLV:	676
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	R
0	12	
1	0	
0	16	

Allwood Dr

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	1	2	1	
VPH	38	813	50	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	40
CLV (WB)	36
CLV (NB)	439
CLV (SB)	636
CLV (N-S)	636
CLV (E-W)	40

V/C=0.42

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Hollins Ferry Rd
Scenario: 2016 Base Case
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
R			58	VPH
	0	0	1	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:		**322**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	
0		R
0		
0		

Hollins Ferry Rd

Organization: HNTB
Date of Analysis: 6/16/2016

	Left	Thru	Right	
# Lanes	0	3	0	
VPH		713		R

Aviation Blvd

CLV (EB)	-
CLV (WB)	-
CLV (NB)	322
CLV (SB)	-
CLV (N-S)	322
CLV (E-W)	-

V/C=0.2

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Cromwell Park Dr
Scenario: 2016 Base Case
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
R		449	717	VPH
Policy Area: NA	0	2	3	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:	772
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	R
1	64	
0		
2	456	

Cromwell Park Dr

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	0	3	0	
VPH		717		
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	242
CLV (WB)	-
CLV (NB)	530
CLV (SB)	238
CLV (N-S)	530
CLV (E-W)	242

V/C=0.48

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: I-97 SB Ramps and Cromwell Park Dr
Scenario: 2016 Base Case
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

I-97 SB Ramps

R	Right	Thru	Left	
	240	229		VPH
	1	2	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Cromwell Park Dr

	VPH	# Lanes
Left	35	2
Thru		0
Right	706	2
R		

Intersection CLV:	596
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	R
0		
2	279	
0		

Cromwell Park Dr

Organization: HNTB
Date of Analysis: 6/16/2016

	Left	Thru	Right	R
# Lanes	0	0	0	
VPH				

Not Applicable

CLV (EB)	374
CLV (WB)	167
CLV (NB)	-
CLV (SB)	222
CLV (N-S)	222
CLV (E-W)	374

V/C=0.37

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2016 Base Case
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviaition Blvd

	Right	Thru	Left	
R	214	307	384	VPH
	1	2	2	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Dorsey Rd

	VPH	# Lanes
Left	135	1
Thru	899	3
Right	196	0
R		

	Intersection CLV:	777
	CLV Standard:	1,600
	Intersection LOS:	A
	Better Than CLV Standard	

# Lanes	VPH	
0		R
2	299	
1	54	

Dorsey Rd

Organization: HNTB
Date of Analysis: 6/16/2016

# Lanes	2	2	0	
VPH	29	125	91	R
	Left	Thru	Right	

Aviaition Blvd

CLV (EB)	459
CLV (WB)	293
CLV (NB)	114
CLV (SB)	204
CLV (N-S)	318
CLV (E-W)	459

V/C=0.49

2022 AM No Action Alternative Critical Lane Volume (CLV) Analysis

Node	Intersection	CLV	Equivalent LOS	V/C
1	Aviation Blvd and Dorsey Rd	1,473	E	0.92
2	Aviation Blvd and Mathison Way	1,047	B	0.65
3	Aviation Blvd and Stoney Run Rd	1,234	C	0.77
4	Northrop Grumman and Stoney Run Rd	732	A	0.46
5	New Ridge Rd and Stoney Run Rd	612	A	0.38
6	Aviation Blvd and Amtrak Way	1,105	B	0.69
7	Aviation Blvd and Northrop Grumman Parking	1,100	B	0.69
8	Aviation Blvd and I-195 SB Ramps	864	A	0.54
9	Aviation Blvd and I-195 NB Ramps	830	A	0.52
10	Elkridge Landing Rd and Terminal Rd	1,078	B	0.67
11	Aviation Blvd and Terminal Rd	909	A	0.57
12	Aviation Blvd and Air Cargo Road/Elkridge Landing	812	A	0.51
13	Aviation Blvd and Andover Rd	947	A	0.59
15	Aviation Blvd and Allwood Dr	857	A	0.54
16	I-97 SB Ramps and Cromwell Park Dr	424	A	0.26
17	Aviation Blvd and Cromwell Park Dr	879	A	0.55
18	Aviation Blvd and Dorsey Rd	833	A	0.52
20	Aviation Blvd and Hollins Ferry Rd	625	A	0.39
21	Aviation Blvd and BWI Long Term Parking	793	A	0.50
22	Aviation Blvd and Camp Meade Rd (MD170)	1,039	B	0.65

Source: HNTB's CLV analysis of 2022 No Action Alternative

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2022 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R	300	391	161	VPH
	1	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Dorsey Rd

	VPH	# Lanes
Left	328	1
Thru	317	2
Right	144	1
R		

Intersection CLV:	**1,473**
CLV Standard:	**1,600**
Intersection LOS:	**E**
Better Than CLV Standard	

# Lanes	VPH	R
0		Right
2	474	Thru
1	89	Left

Dorsey Rd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	2	1	
VPH	426	1,382	262	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	257
CLV (WB)	579
CLV (NB)	894
CLV (SB)	634
CLV (N-S)	894
CLV (E-W)	579

V/C=0.92

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Mathison Way
Scenario: 2022 No Action Alternative
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		768	47	VPH
Policy Area: NA				
CLV Standard: 1,600	0	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:	**1,047**
CLV Standard:	**1,600**
Intersection LOS:	**B**
Better Than CLV Standard	

# Lanes	VPH	R
1	84	Right
0		Thru
1	84	Left

Mathison Way

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	2	1	
VPH		1,726	62	

Aviation Blvd

CLV (EB)	84
CLV (WB)	37
CLV (NB)	962
CLV (SB)	407
CLV (N-S)	962
CLV (E-W)	84

V/C=0.65

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Stoney Run Rd
Scenario: 2022 No Action Alternative
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		758	820	VPH
Policy Area: NA				
CLV Standard: 1,600	0	2	2	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:	**1,234**
CLV Standard:	**1,600**
Intersection LOS:	**C**
Better Than CLV Standard	

# Lanes	VPH	R
0		Right
0		Thru
1	57	Left

Stoney Run Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	2	0	
VPH		1,400		

Aviation Blvd

CLV (EB)	57
CLV (WB)	-
CLV (NB)	1,176
CLV (SB)	402
CLV (N-S)	1,176
CLV (E-W)	57

V/C=0.77

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Northrop Grumman and Stoney Run Rd
Scenario: 2022 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Northrop Grumman

	Right	Thru	Left	
R	10	40		VPH
	1	1	0	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Stoney Run Rd

	VPH	# Lanes
Left	152	1
Thru		0
Right		0
R		

Intersection CLV:	**732**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

	# Lanes	VPH	R
	0		Right
	0		Thru
	0		Left

Not Applicable

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	2	1	0	
VPH	691	540	0	
	Left	Thru	Right	R

Stoney Run Rd

CLV (EB)	-
CLV (WB)	152
CLV (NB)	540
CLV (SB)	40
CLV (N-S)	580
CLV (E-W)	152

V/C=0.46

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: New Ridge Rd and Stoney Run Rd
Scenario: 2022 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

New Ridge Rd

	Right	Thru	Left	
R	2	26	24	VPH
	0	1	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Stoney Run Rd

	VPH	# Lanes
Left	0	1
Thru	80	1
Right	19	1
R		

Intersection CLV:		**612**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	R
1	139	Right
1	162	Thru
1	399	Left

Stoney Run Rd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	1	1	
VPH	15	94	399	
	Left	Thru	Right	R

New Ridge Rd

CLV (EB)	479
CLV (WB)	162
CLV (NB)	133
CLV (SB)	43
CLV (N-S)	133
CLV (E-W)	479

V/C=0.38

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Amtrak Way
Scenario: 2022 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R		1,326		VPH
	0	2	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Amtrak Way

	VPH	# Lanes
Left	191	1
Thru		0
Right	251	1
R		

Intersection CLV:	**1,105**
CLV Standard:	**1,600**
Intersection LOS:	**B**
Better Than CLV Standard	

# Lanes	VPH	
0		Right
0		Thru
0		Left

Not Applicable

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	2	0	
VPH	211	1,521	0	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	-
CLV (WB)	191
CLV (NB)	806
CLV (SB)	914
CLV (N-S)	914
CLV (E-W)	191

V/C=0.69

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Northrop Grumman Parking
Scenario: 2022 No Action Alternative
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		1,831		VPH
Policy Area: NA				
CLV Standard: 1,600	0	2	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Northrop Grumman Parking

	VPH	# Lanes
Left	37	2
Thru		0
Right		0
R		

Intersection CLV:	**1,100**
CLV Standard:	**1,600**
Intersection LOS:	**B**
Better Than CLV Standard	

# Lanes	VPH	
0		R
0		Right
0		Thru
		Left

Not Applicable

# Lanes	1	2	0	
VPH	109	1,602	0	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	-
CLV (WB)	19
CLV (NB)	849
CLV (SB)	1,080
CLV (N-S)	1,080
CLV (E-W)	19

V/C=0.69

Organization: HNTB
Date of Analysis: 12/19/2018

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 SB Ramps
Scenario: 2022 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
		729	73	VPH
	0	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

I-195 SB Ramps

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:	**864**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
0		Right
0		Thru
1	18	Left

I195 SB Ramps

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	2	1	
VPH		1,458	181	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	18
CLV (WB)	-
CLV (NB)	845
CLV (SB)	386
CLV (N-S)	845
CLV (E-W)	18

V/C=0.54

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 NB Ramps
Scenario: 2022 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
		678		VPH
	0	2	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:		**830**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	
0		Right
0		Thru
1	123	Left

I195 NB Ramps

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	2	0	
VPH		1,334		
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	123
CLV (WB)	-
CLV (NB)	707
CLV (SB)	359
CLV (N-S)	707
CLV (E-W)	123

V/C=0.52

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Elkridge Landing Rd and Terminal Rd
Scenario: 2022 No Action Alternative
Time Period: AM Peak

Not Applicable

	Right	Thru	Left
VPH			
# Lanes	0	0	0

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Elkridge Landing Rd

	VPH	# Lanes
Left		0
Thru	105	2
Right		0
R		

Intersection CLV:	**1,078**
CLV Standard:	**1,600**
Intersection LOS:	**B**
Better Than CLV Standard	

# Lanes	VPH	
0		Right
2	577	Thru
1	28	Left

Elkridge Landing Rd

	Left	Thru	Right	
# Lanes	1	0	1	
VPH	772		40	R

Terminal Rd

CLV (EB)	84
CLV (WB)	306
CLV (NB)	-
CLV (SB)	772
CLV (N-S)	772
CLV (E-W)	306

V/C=0.67

Organization: HNTB
Date of Analysis: 12/19/2018

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Terminal Rd
Scenario: 2022 No Action Alternative
Time Period: AM Peak

Terminal Rd

	Right	Thru	Left	
R		89		VPH
Policy Area: NA	0	2	0	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	698	2
Thru	441	2
Right		0
R		

Intersection CLV:	**909**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
0		Right
2	764	Thru
2	336	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	2	1	0	
VPH	85	134		
	Left	Thru	Right	R

Terminal Rd

CLV (EB)	412
CLV (WB)	775
CLV (NB)	134
CLV (SB)	92
CLV (N-S)	134
CLV (E-W)	775

V/C=0.57

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Air Cargo Road/Elkridge Land
Scenario: 2022 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Elkridge Landing

	Right	Thru	Left	
R	34	17	93	VPH
	0	1	1	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	105	1
Thru	484	2
Right	76	1
R		

Intersection CLV:	**812**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
1	611	Right
2	995	Thru
1	62	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	1	1	
VPH	71	15	36	
	Left	Thru	Right	R

Air Cargo Rd

CLV (EB)	319
CLV (WB)	632
CLV (NB)	86
CLV (SB)	93
CLV (N-S)	179
CLV (E-W)	632

V/C=0.51

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Camp Meade Rd (MD170)
Scenario: 2022 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Camp Meade Rd

	Right	Thru	Left	
R	329		7	VPH
	1	0	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	156	1
Thru	458	2
Right		0
R		

Intersection CLV:	1,039
CLV Standard:	1,600
Intersection LOS:	B
Better Than CLV Standard	

# Lanes	VPH	R
1	13	Right
2	1,340	Thru
0		Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	0	0	
VPH				
	Left	Thru	Right	R

Not Applicable

CLV (EB)	243
CLV (WB)	866
CLV (NB)	7
CLV (SB)	173
CLV (N-S)	173
CLV (E-W)	866

V/C=0.65

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and BWI Long Term Parking
Scenario: 2022 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Andover Rd

	R	Right	Thru	Left	
		7	1	0	VPH
		1	1	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	68	1
Thru	338	2
Right	58	1
R		

Intersection CLV:	**793**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R	
1	15	Right	
2	1,322	Thru	
1	1	Left	

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	1	0	
VPH	23	0	0	R
	Left	Thru	Right	

Long Term Lot B

CLV (EB)	180
CLV (WB)	769
CLV (NB)	-
CLV (SB)	24
CLV (N-S)	24
CLV (E-W)	769

V/C=0.5

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Andover Rd
Scenario: 2022 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Andover Rd

	Right	Thru	Left	
R				
	58		259	VPH
	0	1	1	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	10	1
Thru	329	2
Right	0	0
R		

Intersection CLV:	**947**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	
1	260	R
2	1,280	
1	0	

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	0	1	0	
VPH		0		R

Hammond House

CLV (EB)	174
CLV (WB)	688
CLV (NB)	-
CLV (SB)	259
CLV (N-S)	259
CLV (E-W)	688

V/C=0.59

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Allwood Dr
Scenario: 2022 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R	27	601	6	VPH
	1	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Allwood Dr

	VPH	# Lanes
Left	23	1
Thru	0	1
Right	13	0
R		

Intersection CLV:	**857**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	R
0	23	
1	1	
0	23	

Allwood Dr

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	1	2	1	
VPH	56	1,476	12	R

Aviation Blvd

CLV (EB)	35
CLV (WB)	69
CLV (NB)	789
CLV (SB)	374
CLV (N-S)	789
CLV (E-W)	69

V/C=0.54

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Hollins Ferry Rd
Scenario: 2022 No Action Alternative
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
R			51	VPH
Policy Area: NA	0	0	1	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:	**625**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
0		R
0		
0		

Hollins Ferry Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	0	3	0	
VPH		1,552		R

Aviation Blvd

CLV (EB)	-
CLV (WB)	-
CLV (NB)	625
CLV (SB)	-
CLV (N-S)	625
CLV (E-W)	-

V/C=0.39

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Cromwell Park Dr
Scenario: 2022 No Action Alternative
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
R		178	329	VPH
Policy Area: NA	0	2	3	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:	879
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	
1	206	R
0		
2	369	

Cromwell Park Dr

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	0	3	0	
VPH		1,518		R

Aviation Blvd

CLV (EB)	195
CLV (WB)	84
CLV (NB)	683
CLV (SB)	94
CLV (N-S)	683
CLV (E-W)	195

V/C=0.55

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: I-97 SB Ramps and Cromwell Park Dr
Scenario: 2022 No Action Alternative
Time Period: AM Peak

I-97 SB Ramps

	Right	Thru	Left	
R	38	65		VPH
	1	2	0	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Cromwell Park Dr

	VPH	# Lanes
Left	197	2
Thru		0
Right	312	2
R		

Intersection CLV:	424
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	
0		
2	537	
0		R

Cromwell Park Dr

	Left	Thru	Right	
# Lanes	0	0	0	
VPH				R

Not Applicable

CLV (EB)	165
CLV (WB)	389
CLV (NB)	-
CLV (SB)	35
CLV (N-S)	35
CLV (E-W)	389

V/C=0.26

Organization: HNTB
Date of Analysis: 12/19/2018

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2022 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviaition Blvd

	Right	Thru	Left	
R	356	81	109	VPH
	1	2	2	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Dorsey Rd

	VPH	# Lanes
Left	140	1
Thru	317	3
Right	7	0
R		

Intersection CLV:	**833**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	R
0		
2	467	
1	20	

Dorsey Rd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	2	2	0	
VPH	200	275	157	
	Left	Thru	Right	R

Aviaition Blvd

CLV (EB)	140
CLV (WB)	387
CLV (NB)	229
CLV (SB)	216
CLV (N-S)	445
CLV (E-W)	387

V/C=0.52

2022 PM No Action Alternative Critical Lane Volume (CLV) Analysis

Node	Intersection	CLV	Equivalent LOS	V/C
1	Aviation Blvd and Dorsey Rd	1,418	D	0.89
2	Aviation Blvd and Mathison Way	1,076	B	0.67
3	Aviation Blvd and Stoney Run Rd	1,188	C	0.74
4	Northrop Grumman and Stoney Run Rd	681	A	0.43
5	New Ridge Rd and Stoney Run Rd	786	A	0.49
6	Aviation Blvd and Amtrak Way	1,489	E	0.93
7	Aviation Blvd and Northrop Grumman Parking	1,295	C	0.81
8	Aviation Blvd and I-195 SB Ramps	1,350	D	0.84
9	Aviation Blvd and I-195 NB Ramps	864	A	0.54
10	Elkridge Landing Rd and Terminal Rd	718	A	0.45
11	Aviation Blvd and Terminal Rd	694	A	0.43
12	Aviation Blvd and Air Cargo Road/Elkridge Landing	1,174	C	0.73
13	Aviation Blvd and Andover Rd	905	A	0.57
15	Aviation Blvd and Allwood Dr	735	A	0.46
16	I-97 SB Ramps and Cromwell Park Dr	633	A	0.40
17	Aviation Blvd and Cromwell Park Dr	832	A	0.52
18	Aviation Blvd and Dorsey Rd	770	A	0.48
20	Aviation Blvd and Hollins Ferry Rd	354	A	0.22
21	Aviation Blvd and BWI Long Term Parking	625	A	0.39
22	Aviation Blvd and Camp Meade Rd (MD170)	666	A	0.42

Source: HNTB's CLV analysis of 2022 No Action Alternative

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2022 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R				
	386	1224	339	VPH
	1	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Dorsey Rd

	VPH	# Lanes
Left	409	1
Thru	770	2
Right	317	1
R		

Intersection CLV:	**1,418**
CLV Standard:	**1,600**
Intersection LOS:	**D**
Better Than CLV Standard	

# Lanes	VPH	R
0		Right
2	347	Thru
1	188	Left

Dorsey Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	1	2	1	
VPH	173	668	168	
				R

Aviation Blvd

CLV (EB)	596
CLV (WB)	593
CLV (NB)	693
CLV (SB)	822
CLV (N-S)	822
CLV (E-W)	596

V/C=0.89

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Mathison Way
Scenario: 2022 No Action Alternative
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		1875	64	VPH
Policy Area: NA	0	2	1	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:		**1,076**
CLV Standard:		**1,600**
Intersection LOS:		**B**
Better Than CLV Standard		

# Lanes	VPH	R
1	46	Right
0		Thru
1	82	Left

Mathison Way

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	2	1	
VPH		1018	69	

Aviation Blvd

CLV (EB)	82
CLV (WB)	-
CLV (NB)	604
CLV (SB)	994
CLV (N-S)	994
CLV (E-W)	82

V/C=0.67

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Stoney Run Rd
Scenario: 2022 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
		1599	395	VPH
	0	2	2	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:		**1,188**
CLV Standard:		**1,600**
Intersection LOS:		**C**
Better Than CLV Standard		

# Lanes	VPH	R
0		Right
0		Thru
1	341	Left

Stoney Run Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	2	0	
VPH		967		

Aviation Blvd

CLV (EB)	341
CLV (WB)	-
CLV (NB)	722
CLV (SB)	847
CLV (N-S)	847
CLV (E-W)	341

V/C=0.74

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Northrop Grumman and Stoney Run Rd
Scenario: 2022 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Northrop Grumman

	Right	Thru	Left	
R				
	171	425		VPH
	1	1	0	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Stoney Run Rd

	VPH	# Lanes
Left	14	1
Thru		0
Right		0
R		

Intersection CLV:	**681**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
0		R
0		Right
0		Thru
		Left

Not Applicable

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	2	1	0	
VPH	457	35	0	
	Left	Thru	Right	R

Stoney Run Rd

CLV (EB)	-
CLV (WB)	14
CLV (NB)	242
CLV (SB)	425
CLV (N-S)	667
CLV (E-W)	14

V/C=0.43

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: New Ridge Rd and Stoney Run Rd
Scenario: 2022 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

New Ridge Rd

	Right	Thru	Left	
R				
	0	55	106	VPH
	0	1	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Stoney Run Rd

	VPH	# Lanes
Left	1	1
Thru	136	1
Right	32	1
R		

	# Lanes	VPH	
R			
Right	1	24	
Thru	1	154	
Left	1	449	

Stoney Run Rd

Intersection CLV:	**786**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	0	1	1	
VPH	43	52	488	R

New Ridge Rd

CLV (EB)	586
CLV (WB)	156
CLV (NB)	200
CLV (SB)	98
CLV (N-S)	200
CLV (E-W)	586

V/C=0.49

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Amtrak Way
Scenario: 2022 No Action Alternative
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		1768		VPH
R	0	2	0	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Amtrak Way

	VPH	# Lanes
Left	428	1
Thru		0
Right	226	1
R		

Intersection CLV:		**1,489**
CLV Standard:		**1,600**
Intersection LOS:		**E**
Better Than CLV Standard		

# Lanes	VPH	
0		Right
0		Thru
0		Left

Not Applicable

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	2	0	
VPH	124	1644	0	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	102
CLV (WB)	428
CLV (NB)	871
CLV (SB)	1,061
CLV (N-S)	1,061
CLV (E-W)	428

V/C=0.93

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Northrop Grumman Parking
Scenario: 2022 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
		1835		VPH
	0	2	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Northrop Grumman Parking

	VPH	# Lanes
Left	386	2
Thru		0
Right		0
R		

Intersection CLV:	**1,295**
CLV Standard:	**1,600**
Intersection LOS:	**C**
Better Than CLV Standard	

# Lanes	VPH	
0		R
0		Right
0		Thru
		Left

Not Applicable

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	2	0	
VPH	14	2058	0	R
	Left	Thru	Right	

Aviation Blvd

CLV (EB)	-
CLV (WB)	205
CLV (NB)	1,091
CLV (SB)	986
CLV (N-S)	1,091
CLV (E-W)	205

V/C=0.81

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 SB Ramps
Scenario: 2022 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
		948	115	VPH
	0	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

I-195 SB Ramps

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:	**1,350**		
CLV Standard:	**1,600**		
Intersection LOS:	**D**		
Better Than CLV Standard			

# Lanes	VPH	R
0		Right
0		Thru
1	29	Left

I195 SB Ramps

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	2	1	
VPH		2274	169	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	29
CLV (WB)	-
CLV (NB)	1,320
CLV (SB)	503
CLV (N-S)	1,320
CLV (E-W)	29

V/C=0.84

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 NB Ramps
Scenario: 2022 No Action Alternative
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		879		VPH
Policy Area: NA	0	2	0	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:		**864**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	R
0		Right
0		Thru
1	181	Left

I195 NB Ramps

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	2	0	
VPH		1288		

Aviation Blvd

CLV (EB)	181
CLV (WB)	-
CLV (NB)	683
CLV (SB)	466
CLV (N-S)	683
CLV (E-W)	181

V/C=0.54

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Elkridge Landing Rd and Terminal Rd
Scenario: 2022 No Action Alternative
Time Period: PM Peak

Not Applicable

Policy Area: NA
CLV Standard: 1,600

	Right	Thru	Left
VPH			
# Lanes	0	0	0

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Elkridge Landing Rd

	VPH	# Lanes
Left		0
Thru	426	2
Right		0
R		

	Intersection CLV:	718
	CLV Standard:	1,600
	Intersection LOS:	A
	Better Than CLV Standard	

# Lanes	VPH	
0		Right
2	162	Thru
1	34	Left

Elkridge Landing Rd

	Left	Thru	Right	
# Lanes	1	0	1	
VPH	459		40	R

Terminal Rd

CLV (EB)	259
CLV (WB)	86
CLV (NB)	6
CLV (SB)	459
CLV (N-S)	459
CLV (E-W)	259

V/C=0.45

Organization: HNTB
Date of Analysis: 12/19/2018

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Terminal Rd
Scenario: 2022 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Terminal Rd

	Right	Thru	Left	
	120			VPH
R	0	2	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	380	2
Thru	774	2
Right		0
R		

Intersection CLV:	**694**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	
0		Right
2	529	Thru
2	253	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	2	1	0	
VPH	163	119		R

Terminal Rd

CLV (EB)	544
CLV (WB)	482
CLV (NB)	119
CLV (SB)	150
CLV (N-S)	150
CLV (E-W)	544

V/C=0.43

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Air Cargo Road/Elkridge Land
Scenario: 2022 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Elkridge Landing

	R	Right	Thru	Left	
		65	15	480	VPH
		0	1	1	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	44	1
Thru	998	2
Right	117	1
R		

Intersection CLV:	**1,174**
CLV Standard:	**1,600**
Intersection LOS:	**C**
Better Than CLV Standard	

# Lanes	VPH	R
1	115	Right
2	604	Thru
1	40	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	1	1	
VPH	112	13	66	
	Left	Thru	Right	R

Air Cargo Rd

CLV (EB)	569
CLV (WB)	364
CLV (NB)	125
CLV (SB)	480
CLV (N-S)	605
CLV (E-W)	569

V/C=0.73

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Camp Meade Rd (MD170)
Scenario: 2022 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Camp Meade Rd

R	Right	Thru	Left	
	153		8	VPH
	1	0	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	337	1
Thru	1208	2
Right		0
R		

Intersection CLV:	666
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	R
1	13	Right
2	605	Thru
0		Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	0	0	
VPH				
	Left	Thru	Right	R

Not Applicable

CLV (EB)	640
CLV (WB)	657
CLV (NB)	8
CLV (SB)	-
CLV (N-S)	8
CLV (E-W)	657

V/C=0.42

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and BWI Long Term Parking
Scenario: 2022 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Andover Rd

	Right	Thru	Left	
R				
	25	1	0	VPH
	1	1	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	57	1
Thru	1100	2
Right	59	1
R		

Intersection CLV:	**625**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
1	7	Right
2	557	Thru
1	5	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	1	1	0	
VPH	36	1	3	

Long Term Lot B

CLV (EB)	588
CLV (WB)	353
CLV (NB)	4
CLV (SB)	37
CLV (N-S)	37
CLV (E-W)	588

V/C=0.39

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Andover Rd
Scenario: 2022 No Action Alternative
Time Period: PM Peak

Andover Rd

	Right	Thru	Left	
R				
	11		369	VPH
	0	1	1	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	101	1
Thru	1012	2
Right	0	0
R		

Intersection CLV:	**905**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
1	385	
2	558	
1	0	

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	1	0	
VPH		0		

Hammond House

CLV (EB)	536
CLV (WB)	397
CLV (NB)	-
CLV (SB)	369
CLV (N-S)	369
CLV (E-W)	536

V/C=0.57

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Allwood Dr
Scenario: 2022 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R				
	6	1230	9	VPH
	1	2	1	# Lanes

Signal Phasing

N-S Split Phase?	no
E-W Split Phase?	no

Allwood Dr

	VPH	# Lanes
Left	9	1
Thru	2	1
Right	24	0
R		

Intersection CLV:	**735**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

	# Lanes	VPH	
	0	13	R
	1	0	
	0	17	

Allwood Dr

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	1	2	1	
VPH	41	897	53	R

Aviation Blvd

CLV (EB)	43
CLV (WB)	39
CLV (NB)	484
CLV (SB)	692
CLV (N-S)	692
CLV (E-W)	43

V/C=0.46

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Hollins Ferry Rd
Scenario: 2022 No Action Alternative
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
R			62	VPH
Policy Area: NA	0	0	1	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:	**354**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
0		R
0		
0		

Hollins Ferry Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	0	3	0	
VPH		790		R

Aviation Blvd

CLV (EB)	-
CLV (WB)	-
CLV (NB)	354
CLV (SB)	-
CLV (N-S)	354
CLV (E-W)	-

V/C=0.22

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Cromwell Park Dr
Scenario: 2022 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R		509	762	VPH
	0	2	3	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:	**832**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	
1	68	R
0		
2	484	

Cromwell Park Dr

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	0	3	0	
VPH		794		R

Aviation Blvd

CLV (EB)	257
CLV (WB)	-
CLV (NB)	576
CLV (SB)	270
CLV (N-S)	576
CLV (E-W)	257

V/C=0.52

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: I-97 SB Ramps and Cromwell Park Dr
Scenario: 2022 No Action Alternative
Time Period: PM Peak

I-97 SB Ramps

	R	Right	Thru	Left	
		255	244		VPH
Policy Area: NA		1	2	0	# Lanes
CLV Standard: 1,600					

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Cromwell Park Dr

	VPH	# Lanes
Left	38	2
Thru		0
Right	750	2
R		

Intersection CLV:	633
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	R
0		
2	297	
0		

Cromwell Park Dr

	Left	Thru	Right	R
# Lanes	0	0	0	
VPH				

Not Applicable

CLV (EB)	398
CLV (WB)	177
CLV (NB)	-
CLV (SB)	236
CLV (N-S)	236
CLV (E-W)	398

V/C=0.4

Organization: HNTB
Date of Analysis: 12/19/2018

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2022 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviaition Blvd

	Right	Thru	Left	
R	227	342	424	VPH
	1	2	2	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Dorsey Rd

	VPH	# Lanes
Left	143	1
Thru	770	3
Right	209	0
R		

Intersection CLV:	**770**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
0		
2	318	
1	57	

Dorsey Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	2	2	0	
VPH	31	140	97	R

Aviaition Blvd

CLV (EB)	420
CLV (WB)	312
CLV (NB)	125
CLV (SB)	225
CLV (N-S)	350
CLV (E-W)	420

V/C=0.48

2027 AM No Action Alternative Critical Lane Volume (CLV) Analysis

Node	Intersection	CLV	Equivalent LOS	V/C
1	Aviation Blvd and Dorsey Rd	1,550	E	0.97
2	Aviation Blvd and Mathison Way	1,100	B	0.69
3	Aviation Blvd and Stoney Run Rd	1,296	C	0.81
4	Northrop Grumman and Stoney Run Rd	770	A	0.48
5	New Ridge Rd and Stoney Run Rd	644	A	0.40
6	Aviation Blvd and Amtrak Way	1,163	C	0.73
7	Aviation Blvd and Northrop Grumman Parking	1,157	C	0.72
8	Aviation Blvd and I-195 SB Ramps	906	A	0.57
9	Aviation Blvd and I-195 NB Ramps	873	A	0.55
10	Elkridge Landing Rd and Terminal Rd	1,132	B	0.71
11	Aviation Blvd and Terminal Rd	955	A	0.60
12	Aviation Blvd and Air Cargo Road/Elkridge Landing	855	A	0.53
13	Aviation Blvd and Andover Rd	996	A	0.62
15	Aviation Blvd and Allwood Dr	902	A	0.56
16	I-97 SB Ramps and Cromwell Park Dr	445	A	0.28
17	Aviation Blvd and Cromwell Park Dr	924	A	0.58
18	Aviation Blvd and Dorsey Rd	876	A	0.55
20	Aviation Blvd and Hollins Ferry Rd	658	A	0.41
21	Aviation Blvd and BWI Long Term Parking	834	A	0.52
22	Aviation Blvd and Camp Meade Rd (MD170)	1,092	B	0.68

Source: HNTB's CLV analysis of 2027 No Action Alternative

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2027 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R				
	317	413	170	VPH
	1	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Dorsey Rd

	VPH	# Lanes
Left	344	1
Thru	333	2
Right	152	1
R		

Intersection CLV:	**1,550**
CLV Standard:	**1,600**
Intersection LOS:	**E**
Better Than CLV Standard	

# Lanes	VPH	R
0		Right
2	498	Thru
1	93	Left

Dorsey Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	1	2	1	
VPH	448	1455	276	
				R

Aviation Blvd

CLV (EB)	270
CLV (WB)	609
CLV (NB)	941
CLV (SB)	667
CLV (N-S)	941
CLV (E-W)	609

V/C=0.97

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Mathison Way
Scenario: 2027 No Action Alternative
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		808	50	VPH
Policy Area: NA	0	2	1	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:		**1,100**
CLV Standard:		**1,600**
Intersection LOS:		**B**
Better Than CLV Standard		

# Lanes	VPH	
1	89	Right
0		Thru
1	89	Left

R

Mathison Way

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	0	2	1	
VPH		1814	65	R

Aviation Blvd

CLV (EB)	89
CLV (WB)	39
CLV (NB)	1,011
CLV (SB)	428
CLV (N-S)	1,011
CLV (E-W)	89

V/C=0.69

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Stoney Run Rd
Scenario: 2027 No Action Alternative
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		798	862	VPH
Policy Area: NA	0	2	2	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:		**1,296**
CLV Standard:		**1,600**
Intersection LOS:		**C**
Better Than CLV Standard		

# Lanes	VPH	
0		Right
0		Thru
1	61	Left

Stoney Run Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	0	2	0	
VPH		1470		R

Aviation Blvd

CLV (EB)	61
CLV (WB)	-
CLV (NB)	1,236
CLV (SB)	423
CLV (N-S)	1,236
CLV (E-W)	61

V/C=0.81

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Northrop Grumman and Stoney Run Rd
Scenario: 2027 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Northrop Grumman

	Right	Thru	Left	
R				
	10	42		VPH
	1	1	0	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Stoney Run Rd

	VPH	# Lanes
Left	160	1
Thru		0
Right		0
R		

Intersection CLV:	**770**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

	# Lanes	VPH	
	0		R
	0		Right
	0		Thru
			Left

Not Applicable

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	2	1	0	
VPH	728	568	0	
	Left	Thru	Right	R

Stoney Run Rd

CLV (EB)	-
CLV (WB)	160
CLV (NB)	568
CLV (SB)	42
CLV (N-S)	609
CLV (E-W)	160

V/C=0.48

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: New Ridge Rd and Stoney Run Rd
Scenario: 2027 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

New Ridge Rd

	Right	Thru	Left	
R				
	2	27	25	VPH
	0	1	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Stoney Run Rd

	VPH	# Lanes
Left	0	1
Thru	85	1
Right	20	1
R		

Intersection CLV:	**644**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	R
1	147	Right
1	171	Thru
1	420	Left

Stoney Run Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	1	1	
VPH	16	99	419	

New Ridge Rd

CLV (EB)	504
CLV (WB)	171
CLV (NB)	140
CLV (SB)	45
CLV (N-S)	140
CLV (E-W)	504

V/C=0.4

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Amtrak Way
Scenario: 2027 No Action Alternative
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		1396		VPH
Policy Area: NA	0	2	0	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Amtrak Way

	VPH	# Lanes
Left	201	1
Thru		0
Right	264	1
R		

Intersection CLV:	**1,163**
CLV Standard:	**1,600**
Intersection LOS:	**C**
Better Than CLV Standard	

# Lanes	VPH	
0		Right
0		Thru
0		Left

Not Applicable

	Left	Thru	Right	
# Lanes	1	2	0	
VPH	222	1596	0	R

Aviation Blvd

CLV (EB)	-
CLV (WB)	201
CLV (NB)	846
CLV (SB)	962
CLV (N-S)	962
CLV (E-W)	201

V/C=0.73

Organization: HNTB
Date of Analysis: 12/19/2018

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Northrop Grumman Parking
Scenario: 2027 No Action Alternative
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		1928		VPH
	0	2	0	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Northrop Grumman Parking

	VPH	# Lanes
Left	38	2
Thru		0
Right		0
R		

Intersection CLV:	**1,157**
CLV Standard:	**1,600**
Intersection LOS:	**C**
Better Than CLV Standard	

# Lanes	VPH	
0		R
0		Right
0		Thru
		Left

Not Applicable

	Left	Thru	Right	
# Lanes	1	2	0	
VPH	115	1681	0	R

Aviation Blvd

CLV (EB)	-
CLV (WB)	20
CLV (NB)	891
CLV (SB)	1,137
CLV (N-S)	1,137
CLV (E-W)	20

V/C=0.72

Organization: HNTB
Date of Analysis: 12/19/2018

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 SB Ramps
Scenario: 2027 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
		767	76	VPH
	0	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

I-195 SB Ramps

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:	**906**		
CLV Standard:	**1,600**		
Intersection LOS:	**A**		
Better Than CLV Standard			

# Lanes	VPH	
0		Right
0		Thru
1	19	Left
		R

I195 SB Ramps

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	2	1	
VPH		1530	190	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	19
CLV (WB)	-
CLV (NB)	887
CLV (SB)	407
CLV (N-S)	887
CLV (E-W)	19

V/C=0.57

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 NB Ramps
Scenario: 2027 No Action Alternative
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
	714			VPH
Policy Area: NA	0	2	0	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:	**873**		
CLV Standard:	**1,600**		
Intersection LOS:	**A**		
Better Than CLV Standard			

# Lanes	VPH	R
0		Right
0		Thru
1	129	Left

I195 NB Ramps

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	2	0	
VPH		1403		

Aviation Blvd

CLV (EB)	129
CLV (WB)	-
CLV (NB)	743
CLV (SB)	378
CLV (N-S)	743
CLV (E-W)	129

V/C=0.55

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Elkridge Landing Rd and Terminal Rd
Scenario: 2027 No Action Alternative
Time Period: AM Peak

Not Applicable

	Right	Thru	Left
VPH			
# Lanes	0	0	0

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Elkridge Landing Rd

	VPH	# Lanes
Left		0
Thru	112	2
Right		0
R		

Intersection CLV:	**1,132**
CLV Standard:	**1,600**
Intersection LOS:	**B**
Better Than CLV Standard	

	# Lanes	VPH	
	0		Right
	2	608	Thru
	1	30	Left

Elkridge Landing Rd

	Left	Thru	Right	R
# Lanes	1	0	1	
VPH	810		42	

Terminal Rd

CLV (EB)	89
CLV (WB)	322
CLV (NB)	-
CLV (SB)	810
CLV (N-S)	810
CLV (E-W)	322

V/C=0.71

Organization: HNTB
Date of Analysis: 12/19/2018

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Terminal Rd
Scenario: 2027 No Action Alternative
Time Period: AM Peak

Terminal Rd

	Right	Thru	Left	
	93			VPH
	0	2	0	# Lanes

R

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	733	2
Thru	466	2
Right		0

R

Intersection CLV:	**955**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
0		Right
2	802	Thru
2	354	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	2	1	0	
VPH	89	141		R

Terminal Rd

CLV (EB)	435
CLV (WB)	814
CLV (NB)	141
CLV (SB)	97
CLV (N-S)	141
CLV (E-W)	814

V/C=0.6

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Air Cargo Road/Elkridge Land
Scenario: 2027 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Elkridge Landing

R	Right	Thru	Left	
	36	18	100	VPH
	0	1	1	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	111	1
Thru	511	2
Right	80	1
R		

Intersection CLV:	855
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	R
1	643	Right
2	1045	Thru
1	65	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	1	1	
VPH	74	16	38	
	Left	Thru	Right	R

Air Cargo Rd

CLV (EB)	336
CLV (WB)	665
CLV (NB)	90
CLV (SB)	100
CLV (N-S)	190
CLV (E-W)	665

V/C=0.53

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Camp Meade Rd (MD170)
Scenario: 2027 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Camp Meade Rd

R	Right	Thru	Left	
	345		7	VPH
	1	0	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	166	1
Thru	483	2
Right		0
R		

	Intersection CLV:	1,092
	CLV Standard:	1,600
	Intersection LOS:	B
	Better Than CLV Standard	

# Lanes	VPH	R	
1	14	Right	
2	1409	Thru	
0		Left	

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	0	0	
VPH				
	Left	Thru	Right	R

Not Applicable

CLV (EB)	256
CLV (WB)	913
CLV (NB)	7
CLV (SB)	178
CLV (N-S)	178
CLV (E-W)	913

V/C=0.68

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and BWI Long Term Parking
Scenario: 2027 No Action Alternative
Time Period: AM Peak

Andover Rd

	Right	Thru	Left	
R	8	1	0	VPH
	1	1	0	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	71	1
Thru	357	2
Right	61	1
R		

Intersection CLV:	**834**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
1	16	Right
2	1390	Thru
1	1	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	1	1	0	
VPH	25	0	0	

Long Term Lot B

CLV (EB)	190
CLV (WB)	808
CLV (NB)	-
CLV (SB)	26
CLV (N-S)	26
CLV (E-W)	808

V/C=0.52

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Andover Rd
Scenario: 2027 No Action Alternative
Time Period: AM Peak

Andover Rd

	R	Right	Thru	Left	
		61		272	VPH
Policy Area: NA		0	1	1	# Lanes
CLV Standard: 1,600					

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	10	1
Thru	347	2
Right	0	0
R		

Intersection CLV:		**996**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	R
1	274	
2	1346	
1	0	

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	1	0	
VPH		0		

Hammond House

CLV (EB)	184
CLV (WB)	724
CLV (NB)	-
CLV (SB)	272
CLV (N-S)	272
CLV (E-W)	724

V/C=0.62

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Allwood Dr
Scenario: 2027 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R				
	28	634	7	VPH
	1	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Allwood Dr

	VPH	# Lanes
Left	24	1
Thru	0	1
Right	14	0
R		

Intersection CLV:	**902**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	
0	24	R
1	1	
0	24	

Allwood Dr

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	1	2	1	
VPH	59	1553	12	R

Aviation Blvd

CLV (EB)	37
CLV (WB)	72
CLV (NB)	830
CLV (SB)	394
CLV (N-S)	830
CLV (E-W)	72

V/C=0.56

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Hollins Ferry Rd
Scenario: 2027 No Action Alternative
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
R			54	VPH
Policy Area: NA	0	0	1	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:	**658**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
0		R
0		
0		

Hollins Ferry Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	0	3	0	
VPH		1632		R

Aviation Blvd

CLV (EB)	-
CLV (WB)	-
CLV (NB)	658
CLV (SB)	-
CLV (N-S)	658
CLV (E-W)	-

V/C=0.41

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Cromwell Park Dr
Scenario: 2027 No Action Alternative
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
R		188	345	VPH
	0	2	3	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:	**924**		
CLV Standard:	**1,600**		
Intersection LOS:	**A**		
Better Than CLV Standard			

# Lanes	VPH	
1	216	R
0		
2	388	

Cromwell Park Dr

# Lanes	0	3	0
VPH		1597	
	Left	Thru	Right

R

Aviation Blvd

CLV (EB)	205
CLV (WB)	89
CLV (NB)	719
CLV (SB)	100
CLV (N-S)	719
CLV (E-W)	205

V/C=0.58

Organization: HNTB
Date of Analysis: 12/19/2018

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: I-97 SB Ramps and Cromwell Park Dr
Scenario: 2027 No Action Alternative
Time Period: AM Peak

I-97 SB Ramps

	Right	Thru	Left	
R				
	39	69		VPH
	1	2	0	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Cromwell Park Dr

	VPH	# Lanes
Left	207	2
Thru		0
Right	328	2
R		

Intersection CLV:	**445**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
0		
2	564	
0		R

Cromwell Park Dr

	Left	Thru	Right	
# Lanes	0	0	0	
VPH				R

Not Applicable

CLV (EB)	174
CLV (WB)	409
CLV (NB)	-
CLV (SB)	36
CLV (N-S)	36
CLV (E-W)	409

V/C=0.28

Organization: HNTB
Date of Analysis: 12/19/2018

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2027 No Action Alternative
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviaition Blvd

	Right	Thru	Left	
R	374	86	115	VPH
	1	2	2	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Dorsey Rd

	VPH	# Lanes
Left	147	1
Thru	333	3
Right	8	0
R		

Intersection CLV:		**876**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	R
0		
2	491	
1	21	

Dorsey Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	2	2	0	
VPH	210	290	165	R

Aviaition Blvd

CLV (EB)	147
CLV (WB)	407
CLV (NB)	241
CLV (SB)	227
CLV (N-S)	469
CLV (E-W)	407

V/C=0.55

2027 PM No Action Alternative Critical Lane Volume (CLV) Analysis

Node	Intersection	CLV	Equivalent LOS	V/C
1	Aviation Blvd and Dorsey Rd	1,492	E	0.93
2	Aviation Blvd and Mathison Way	1,132	B	0.71
3	Aviation Blvd and Stoney Run Rd	1,252	C	0.78
4	Northrop Grumman and Stoney Run Rd	716	A	0.45
5	New Ridge Rd and Stoney Run Rd	826	A	0.52
6	Aviation Blvd and Amtrak Way	1,567	E	0.98
7	Aviation Blvd and Northrop Grumman Parking	1,362	D	0.85
8	Aviation Blvd and I-195 SB Ramps	1,419	D	0.89
9	Aviation Blvd and I-195 NB Ramps	908	A	0.57
10	Elkridge Landing Rd and Terminal Rd	756	A	0.47
11	Aviation Blvd and Terminal Rd	730	A	0.46
12	Aviation Blvd and Air Cargo Road/Elkridge Landing	1,235	C	0.77
13	Aviation Blvd and Andover Rd	952	A	0.59
15	Aviation Blvd and Allwood Dr	774	A	0.48
16	I-97 SB Ramps and Cromwell Park Dr	666	A	0.42
17	Aviation Blvd and Cromwell Park Dr	875	A	0.55
18	Aviation Blvd and Dorsey Rd	809	A	0.51
20	Aviation Blvd and Hollins Ferry Rd	372	A	0.23
21	Aviation Blvd and BWI Long Term Parking	658	A	0.41
22	Aviation Blvd and Camp Meade Rd (MD170)	701	A	0.44

Source: HNTB's CLV analysis of 2027 No Action Alternative

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2027 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R				
	407	1288	357	VPH
	1	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Dorsey Rd

	VPH	# Lanes
Left	431	1
Thru	809	2
Right	333	1
R		

Intersection CLV:	**1,492**
CLV Standard:	**1,600**
Intersection LOS:	**E**
Better Than CLV Standard	

# Lanes	VPH	R
0		Right
2	365	Thru
1	197	Left

Dorsey Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	1	2	1	
VPH	182	705	177	
				R

Aviation Blvd

CLV (EB)	626
CLV (WB)	624
CLV (NB)	730
CLV (SB)	865
CLV (N-S)	865
CLV (E-W)	626

V/C=0.93

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Mathison Way
Scenario: 2027 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
		1972	68	VPH
	0	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:	**1,132**
CLV Standard:	**1,600**
Intersection LOS:	**B**
Better Than CLV Standard	

# Lanes	VPH	R
1	49	Right
0		Thru
1	87	Left

Mathison Way

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	2	1	
VPH		1071	72	

Aviation Blvd

CLV (EB)	87
CLV (WB)	-
CLV (NB)	635
CLV (SB)	1,045
CLV (N-S)	1,045
CLV (E-W)	87

V/C=0.71

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Stoney Run Rd
Scenario: 2027 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
		1684	415	VPH
	0	2	2	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:		**1,252**
CLV Standard:		**1,600**
Intersection LOS:		**C**
Better Than CLV Standard		

# Lanes	VPH	R
0		Right
0		Thru
1	359	Left

Stoney Run Rd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	2	0	
VPH		1017		
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	359
CLV (WB)	-
CLV (NB)	759
CLV (SB)	892
CLV (N-S)	892
CLV (E-W)	359

V/C=0.78

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Northrop Grumman and Stoney Run Rd
Scenario: 2027 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Northrop Grumman

	R	Right	Thru	Left	
		179	447		VPH
		1	1	0	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Stoney Run Rd

	VPH	# Lanes
Left	14	1
Thru		0
Right		0
R		

Intersection CLV:	**716**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
0		Right
0		Thru
0		Left

Not Applicable

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	2	1	0	
VPH	481	37	0	

Stoney Run Rd

CLV (EB)	-
CLV (WB)	14
CLV (NB)	255
CLV (SB)	447
CLV (N-S)	702
CLV (E-W)	14

V/C=0.45

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: New Ridge Rd and Stoney Run Rd
Scenario: 2027 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

New Ridge Rd

	Right	Thru	Left	
R				
	0	58	111	VPH
	0	1	1	# Lanes

Signal Phasing

N-S Split Phase?	no
E-W Split Phase?	no

Stoney Run Rd

	VPH	# Lanes
Left	1	1
Thru	143	1
Right	34	1
R		

Intersection CLV:	**826**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R	
1	25	Right	
1	162	Thru	
1	473	Left	

Stoney Run Rd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	1	1	
VPH	45	54	514	R
	Left	Thru	Right	

New Ridge Rd

CLV (EB)	616
CLV (WB)	164
CLV (NB)	210
CLV (SB)	103
CLV (N-S)	210
CLV (E-W)	616

V/C=0.52

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Amtrak Way
Scenario: 2027 No Action Alternative
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		1861		VPH
Policy Area: NA	0	2	0	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Amtrak Way

	VPH	# Lanes
Left	450	1
Thru		0
Right	238	1

R

Intersection CLV:	**1,567**
CLV Standard:	**1,600**
Intersection LOS:	**E**
Better Than CLV Standard	

	# Lanes	VPH	
	0		Right
	0		Thru
	0		Left

Not Applicable

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	2	0	
VPH	131	1729	0	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	107
CLV (WB)	450
CLV (NB)	916
CLV (SB)	1,117
CLV (N-S)	1,117
CLV (E-W)	450

V/C=0.98

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Northrop Grumman Parking
Scenario: 2027 No Action Alternative
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		1931		VPH
	0	2	0	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Northrop Grumman Parking

	VPH	# Lanes
Left	406	2
Thru		0
Right		0
R		

Intersection CLV:	**1,362**
CLV Standard:	**1,600**
Intersection LOS:	**D**
Better Than CLV Standard	

# Lanes	VPH	
0		Right
0		Thru
0		Left

R

Not Applicable

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	1	2	0	
VPH	15	2164	0	

Aviation Blvd

CLV (EB)	-
CLV (WB)	215
CLV (NB)	1,147
CLV (SB)	1,038
CLV (N-S)	1,147
CLV (E-W)	215

V/C=0.85

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 SB Ramps
Scenario: 2027 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
		999	121	VPH
	0	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

I-195 SB Ramps

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:		**1,419**
CLV Standard:		**1,600**
Intersection LOS:		**D**
Better Than CLV Standard		

# Lanes	VPH	R
0		Right
0		Thru
1	31	Left

I195 SB Ramps

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	2	1	
VPH		2392	178	R
	Left	Thru	Right	

Aviation Blvd

CLV (EB)	31
CLV (WB)	-
CLV (NB)	1,388
CLV (SB)	530
CLV (N-S)	1,388
CLV (E-W)	31

V/C=0.89

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 NB Ramps
Scenario: 2027 No Action Alternative
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		927		VPH
Policy Area: NA	0	2	0	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:	**908**		
CLV Standard:	**1,600**		
Intersection LOS:	**A**		
Better Than CLV Standard			

# Lanes	VPH	R
0		Right
0		Thru
1	190	Left

I195 NB Ramps

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	2	0	
VPH		1354		

Aviation Blvd

CLV (EB)	190
CLV (WB)	-
CLV (NB)	718
CLV (SB)	491
CLV (N-S)	718
CLV (E-W)	190

V/C=0.57

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Elkridge Landing Rd and Terminal Rd
Scenario: 2027 No Action Alternative
Time Period: PM Peak

Not Applicable

	Right	Thru	Left
VPH			
# Lanes	0	0	0

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Elkridge Landing Rd

	VPH	# Lanes
Left		0
Thru	448	2
Right		0
R		

Intersection CLV:	**756**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

	# Lanes	VPH	
	0		Right
	2	170	Thru
	1	35	Left

Elkridge Landing Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	1	0	1	
VPH	483		42	

Terminal Rd

CLV (EB)	273
CLV (WB)	90
CLV (NB)	7
CLV (SB)	483
CLV (N-S)	483
CLV (E-W)	273

V/C=0.47

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Terminal Rd
Scenario: 2027 No Action Alternative
Time Period: PM Peak

Terminal Rd

	Right	Thru	Left	
	127			VPH
R	0	2	0	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	400	2
Thru	814	2
Right		0
R		

Intersection CLV:		**730**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	
0		Right
2	555	Thru
2	266	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	2	1	0	
VPH	171	125		
	Left	Thru	Right	R

Terminal Rd

CLV (EB)	572
CLV (WB)	506
CLV (NB)	125
CLV (SB)	158
CLV (N-S)	158
CLV (E-W)	572

V/C=0.46

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Air Cargo Road/Elkridge Land
Scenario: 2027 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Elkridge Landing

	R	Right	Thru	Left	
		69	16	505	VPH
		0	1	1	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	46	1
Thru	1050	2
Right	123	1
R		

Intersection CLV:	**1,235**
CLV Standard:	**1,600**
Intersection LOS:	**C**
Better Than CLV Standard	

# Lanes	VPH	R	
1	121	Right	
2	635	Thru	
1	42	Left	

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	1	1	
VPH	118	14	70	
	Left	Thru	Right	R

Air Cargo Rd

CLV (EB)	598
CLV (WB)	383
CLV (NB)	131
CLV (SB)	505
CLV (N-S)	637
CLV (E-W)	598

V/C=0.77

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Camp Meade Rd (MD170)
Scenario: 2027 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Camp Meade Rd

R	Right	Thru	Left	
	160		9	VPH
	1	0	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	355	1
Thru	1271	2
Right		0
R		

Intersection CLV:	701
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	R
1	14	Right
2	637	Thru
0		Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	0	0	
VPH				
	Left	Thru	Right	R

Not Applicable

CLV (EB)	674
CLV (WB)	692
CLV (NB)	9
CLV (SB)	-
CLV (N-S)	9
CLV (E-W)	692

V/C=0.44

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and BWI Long Term Parking
Scenario: 2027 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Andover Rd

	Right	Thru	Left	
R				
	26	1	0	VPH
	1	1	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	60	1
Thru	1157	2
Right	63	1
R		

Intersection CLV:	**658**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R	
1	8	Right	
2	586	Thru	
1	6	Left	

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	1	1	0	
VPH	38	1	3	

Long Term Lot B

CLV (EB)	619
CLV (WB)	371
CLV (NB)	4
CLV (SB)	39
CLV (N-S)	39
CLV (E-W)	619

V/C=0.41

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Andover Rd
Scenario: 2027 No Action Alternative
Time Period: PM Peak

Andover Rd

	R	Right	Thru	Left	
		12		388	VPH
Policy Area: NA		0	1	1	# Lanes
CLV Standard: 1,600					

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	106	1
Thru	1064	2
Right	0	0
R		

Intersection CLV:		**952**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	R
1	405	
2	588	
1	0	

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	1	0	
VPH		0		

Hammond House

CLV (EB)	564
CLV (WB)	418
CLV (NB)	-
CLV (SB)	388
CLV (N-S)	388
CLV (E-W)	564

V/C=0.59

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Allwood Dr
Scenario: 2027 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	R	Right	Thru	Left	
		7	1293	9	VPH
		1	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Allwood Dr

	VPH	# Lanes
Left	9	1
Thru	2	1
Right	25	0
R		

Intersection CLV:	**774**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	R
0	14	
1	0	
0	18	

Allwood Dr

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	2	1	
VPH	43	943	55	R
	Left	Thru	Right	

Aviation Blvd

CLV (EB)	45
CLV (WB)	41
CLV (NB)	509
CLV (SB)	728
CLV (N-S)	728
CLV (E-W)	45

V/C=0.48

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Hollins Ferry Rd
Scenario: 2027 No Action Alternative
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
R			65	VPH
Policy Area: NA	0	0	1	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:	**372**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
0		R
0		
0		

Hollins Ferry Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	0	3	0	
VPH		831		R

Aviation Blvd

CLV (EB)	-
CLV (WB)	-
CLV (NB)	372
CLV (SB)	-
CLV (N-S)	372
CLV (E-W)	-

V/C=0.23

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Cromwell Park Dr
Scenario: 2027 No Action Alternative
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		535	801	VPH
R	0	2	3	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:		**875**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	
1	71	R
0		
2	509	

Cromwell Park Dr

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	3	0	
VPH		835		
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	270
CLV (WB)	-
CLV (NB)	605
CLV (SB)	284
CLV (N-S)	605
CLV (E-W)	270

V/C=0.55

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: I-97 SB Ramps and Cromwell Park Dr
Scenario: 2027 No Action Alternative
Time Period: PM Peak

I-97 SB Ramps

	R	Right	Thru	Left	
		269	256		VPH
Policy Area: NA		1	2	0	# Lanes
CLV Standard: 1,600					

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Cromwell Park Dr

	VPH	# Lanes
Left	39	2
Thru		0
Right	789	2
R		

Intersection CLV:	666
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	R
0		
2	312	
0		

Cromwell Park Dr

# Lanes	0	0	0	
VPH				
	Left	Thru	Right	R

Not Applicable

CLV (EB)	418
CLV (WB)	186
CLV (NB)	-
CLV (SB)	248
CLV (N-S)	248
CLV (E-W)	418

V/C=0.42

Organization: HNTB
Date of Analysis: 12/19/2018

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2027 No Action Alternative
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviaition Blvd

	Right	Thru	Left	
R	239	360	446	VPH
	1	2	2	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Dorsey Rd

	VPH	# Lanes
Left	150	1
Thru	809	3
Right	220	0
R		

Intersection CLV:	**809**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	R
0		
2	335	
1	60	

Dorsey Rd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	2	2	0	
VPH	32	146	102	R
	Left	Thru	Right	

Aviaition Blvd

CLV (EB)	441
CLV (WB)	328
CLV (NB)	131
CLV (SB)	236
CLV (N-S)	368
CLV (E-W)	441

V/C=0.51

2022 AM Build Critical Lane Volume (CLV) Analysis

Node	Intersection	CLV	Equivalent LOS	V/C
1	Aviation Blvd and Dorsey Rd	1,476	E	0.92
2	Aviation Blvd and Mathison Way	1,048	B	0.65
3	Aviation Blvd and Stoney Run Rd	1,246	C	0.78
4	Northrop Grumman and Stoney Run Rd	749	A	0.47
5	New Ridge Rd and Stoney Run Rd	625	A	0.39
6	Aviation Blvd and Amtrak Way	1,114	B	0.70
7	Aviation Blvd and Northrop Grumman Parking	1,108	B	0.69
8	Aviation Blvd and I-195 SB Ramps	895	A	0.56
9	Aviation Blvd and I-195 NB Ramps	849	A	0.53
10	Elkridge Landing Rd and Terminal Rd	1,107	B	0.69
11	Aviation Blvd and Terminal Rd	926	A	0.58
12	Aviation Blvd and Air Cargo Road/Elkridge Landing	818	A	0.51
13	Aviation Blvd and Andover Rd	951	A	0.59
15	Aviation Blvd and Allwood Dr	861	A	0.54
16	I-97 SB Ramps and Cromwell Park Dr	426	A	0.27
17	Aviation Blvd and Cromwell Park Dr	884	A	0.55
18	Aviation Blvd and Dorsey Rd	838	A	0.52
20	Aviation Blvd and Hollins Ferry Rd	627	A	0.39
21	Aviation Blvd and BWI Long Term Parking	813	A	0.51
22	Aviation Blvd and Camp Meade Rd (MD170)	1,042	B	0.65

Source: HNTB's CLV analysis of 2022 Build Conditions

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2022 Build
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

R	Right	Thru	Left	
	308	402	161	VPH
	1	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Dorsey Rd

	VPH	# Lanes
Left	329	1
Thru	319	2
Right	144	1
R		

Intersection CLV:	1,476
CLV Standard:	1,600
Intersection LOS:	E
Better Than CLV Standard	

# Lanes	VPH	R
0		Right
2	476	Thru
1	90	Left

Dorsey Rd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	2	1	
VPH	426	1,383	263	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	259
CLV (WB)	582
CLV (NB)	894
CLV (SB)	639
CLV (N-S)	894
CLV (E-W)	582

V/C=0.92

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Mathison Way
Scenario: 2022 Build
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		787	47	VPH
Policy Area: NA	0	2	1	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:		**1,048**
CLV Standard:		**1,600**
Intersection LOS:		**B**
Better Than CLV Standard		

# Lanes	VPH	R
1	84	Right
0		Thru
1	84	Left

Mathison Way

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	2	1	
VPH		1,728	62	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	84
CLV (WB)	37
CLV (NB)	963
CLV (SB)	417
CLV (N-S)	963
CLV (E-W)	84

V/C=0.65

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Stoney Run Rd
Scenario: 2022 Build
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		768	826	VPH
Policy Area: NA	0	2	2	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

	# Lanes	VPH	R
	0		Right
	0		Thru
	1	66	Left

Stoney Run Rd

Intersection CLV:	**1,246**
CLV Standard:	**1,600**
Intersection LOS:	**C**
Better Than CLV Standard	

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	2	0	
VPH		1,400		
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	66
CLV (WB)	-
CLV (NB)	1,179
CLV (SB)	407
CLV (N-S)	1,179
CLV (E-W)	66

V/C=0.78

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Northrop Grumman and Stoney Run Rd
Scenario: 2022 Build
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Northrop Grumman

	Right	Thru	Left	
R	10	40		VPH
	1	1	0	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Stoney Run Rd

	VPH	# Lanes
Left	152	1
Thru		0
Right		0
R		

Intersection CLV:	**749**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
0	0	Right
1	17	Thru
1	68	Left

Not Applicable

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	2	1	0	
VPH	691	540	0	
	Left	Thru	Right	R

Stoney Run Rd

CLV (EB)	68
CLV (WB)	169
CLV (NB)	540
CLV (SB)	40
CLV (N-S)	580
CLV (E-W)	169

V/C=0.47

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: New Ridge Rd and Stoney Run Rd
Scenario: 2022 Build
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

New Ridge Rd

	Right	Thru	Left	
R	2	26	25	VPH
	0	1	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Stoney Run Rd

	VPH	# Lanes
Left	0	1
Thru	80	1
Right	19	1
R		

Intersection CLV:	**625**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
1	144	Right
1	162	Thru
1	411	Left

Stoney Run Rd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	1	1	
VPH	15	94	400	
	Left	Thru	Right	R

New Ridge Rd

CLV (EB)	491
CLV (WB)	162
CLV (NB)	134
CLV (SB)	43
CLV (N-S)	134
CLV (E-W)	491

V/C=0.39

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Amtrak Way
Scenario: 2022 Build
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		1,342		VPH
Policy Area: NA	0	2	0	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Amtrak Way

	VPH	# Lanes
Left	191	1
Thru		0
Right	251	1
R		

Intersection CLV:	**1,114**
CLV Standard:	**1,600**
Intersection LOS:	**B**
Better Than CLV Standard	

# Lanes	VPH	
0		Right
0		Thru
0		Left

Not Applicable

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	2	0	
VPH	211	1,580	0	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	-
CLV (WB)	191
CLV (NB)	837
CLV (SB)	923
CLV (N-S)	923
CLV (E-W)	191

V/C=0.7

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Northrop Grumman Parking
Scenario: 2022 Build
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		1,847		VPH
Policy Area: NA	0	2	0	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Northrop Grumman Parking

	VPH	# Lanes
Left	37	2
Thru		0
Right		0
R		

Intersection CLV:	**1,108**
CLV Standard:	**1,600**
Intersection LOS:	**B**
Better Than CLV Standard	

# Lanes	VPH	R
0		Right
0		Thru
0		Left

Not Applicable

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	1	2	0	
VPH	109	1,661	0	

Aviation Blvd

CLV (EB)	-
CLV (WB)	19
CLV (NB)	880
CLV (SB)	1,089
CLV (N-S)	1,089
CLV (E-W)	19

V/C=0.69

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 SB Ramps
Scenario: 2022 Build
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		741	73	VPH
Policy Area: NA	0	2	1	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

I-195 SB Ramps

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:		**895**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	R
0		Right
0		Thru
1	18	Left

I195 SB Ramps

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	2	1	
VPH		1,517	181	

Aviation Blvd

CLV (EB)	18
CLV (WB)	-
CLV (NB)	876
CLV (SB)	393
CLV (N-S)	876
CLV (E-W)	18

V/C=0.56

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 NB Ramps
Scenario: 2022 Build
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		690		VPH
Policy Area: NA	0	2	0	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:	**849**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
0		Right
0		Thru
1	123	Left

I195 NB Ramps

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	2	0	
VPH		1,371		R
	Left	Thru	Right	

Aviation Blvd

CLV (EB)	123
CLV (WB)	-
CLV (NB)	727
CLV (SB)	366
CLV (N-S)	727
CLV (E-W)	123

V/C=0.53

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Elkridge Landing Rd and Terminal Rd
Scenario: 2022 Build
Time Period: AM Peak

Not Applicable

Policy Area: NA
CLV Standard: 1,600

	Right	Thru	Left	
	0	0	0	VPH
				# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Elkridge Landing Rd

	VPH	# Lanes
Left		0
Thru	105	2
Right		0
R		

Intersection CLV:	1,107
CLV Standard:	1,600
Intersection LOS:	B
Better Than CLV Standard	

# Lanes	VPH	
0		Right
2	577	Thru
1	28	Left

Elkridge Landing Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	1	0	1	
VPH	801		44	R

Terminal Rd

CLV (EB)	84
CLV (WB)	306
CLV (NB)	-
CLV (SB)	801
CLV (N-S)	801
CLV (E-W)	306

V/C=0.69

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Terminal Rd
Scenario: 2022 Build
Time Period: AM Peak

Terminal Rd

	Right	Thru	Left	
		89		VPH
	0	2	0	# Lanes

R

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	726	2
Thru	450	2
Right		0

R

Intersection CLV:	**926**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
0		Right
2	768	Thru
2	336	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	2	1	0	
VPH	85	134		
	Left	Thru	Right	R

Terminal Rd

CLV (EB)	417
CLV (WB)	792
CLV (NB)	134
CLV (SB)	92
CLV (N-S)	134
CLV (E-W)	792

V/C=0.58

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Air Cargo Road/Elkridge Land
Scenario: 2022 Build
Time Period: AM Peak

Elkridge Landing

	Right	Thru	Left	
R	34	17	97	VPH
	0	1	1	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	105	1
Thru	493	2
Right	76	1
R		

Intersection CLV:	**818**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
1	611	Right
2	999	Thru
1	62	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	1	1	
VPH	71	15	36	
	Left	Thru	Right	R

Air Cargo Rd

CLV (EB)	323
CLV (WB)	635
CLV (NB)	86
CLV (SB)	97
CLV (N-S)	183
CLV (E-W)	635

V/C=0.51

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Camp Meade Rd (MD170)
Scenario: 2022 Build
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Camp Meade Rd

R	Right	Thru	Left	
	330		7	VPH
	1	0	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	166	1
Thru	461	2
Right		0
R		

Intersection CLV:	1,042
CLV Standard:	1,600
Intersection LOS:	B
Better Than CLV Standard	

# Lanes	VPH	R
1	13	Right
2	1,343	Thru
0		Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	0	0	
VPH				
	Left	Thru	Right	R

Not Applicable

CLV (EB)	244
CLV (WB)	878
CLV (NB)	7
CLV (SB)	164
CLV (N-S)	164
CLV (E-W)	878

V/C=0.65

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and BWI Long Term Parking
Scenario: 2022 Build
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Andover Rd

	Right	Thru	Left	
R	20	1	0	VPH
	1	1	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	99	1
Thru	341	2
Right	27	1
R		

Intersection CLV:	**813**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
1	15	Right
2	1,325	Thru
1	0	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	1	0	
VPH	11	0	0	
	Left	Thru	Right	R

Long Term Lot B

CLV (EB)	181
CLV (WB)	801
CLV (NB)	-
CLV (SB)	12
CLV (N-S)	12
CLV (E-W)	801

V/C=0.51

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Andover Rd
Scenario: 2022 Build
Time Period: AM Peak

Andover Rd

	R	Right	Thru	Left	
		58		261	VPH
Policy Area: NA		0	1	1	# Lanes
CLV Standard: 1,600					

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	10	1
Thru	332	2
Right	0	0
R		

Intersection CLV:	**951**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
1	261	
2	1,283	
1	0	

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	1	0	
VPH		0		
	Left	Thru	Right	R

Hammond House

CLV (EB)	176
CLV (WB)	690
CLV (NB)	-
CLV (SB)	261
CLV (N-S)	261
CLV (E-W)	690

V/C=0.59

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Allwood Dr
Scenario: 2022 Build
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R	27	607	6	VPH
	1	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Allwood Dr

	VPH	# Lanes
Left	23	1
Thru	0	1
Right	13	0
R		

Intersection CLV:	**861**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
0	23	R
1	1	
0	23	

Allwood Dr

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	1	2	1	
VPH	56	1,482	12	R

Aviation Blvd

CLV (EB)	35
CLV (WB)	69
CLV (NB)	792
CLV (SB)	378
CLV (N-S)	792
CLV (E-W)	69

V/C=0.54

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Hollins Ferry Rd
Scenario: 2022 Build
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
R			51	VPH
Policy Area: NA				
CLV Standard: 1,600	0	0	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:	627
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	R
0		
0		
0		

Hollins Ferry Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	3	0	
VPH		1,558		

Aviation Blvd

CLV (EB)	-
CLV (WB)	-
CLV (NB)	627
CLV (SB)	-
CLV (N-S)	627
CLV (E-W)	-

V/C=0.39

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Cromwell Park Dr
Scenario: 2022 Build
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R	1	180	332	VPH
	0	2	3	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left	0	0
Thru	0	1
Right	1	0
R		

Intersection CLV:	**884**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	
1	208	R
0		
2	372	

Cromwell Park Dr

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	0	3	0	
VPH		1,522		R

Aviation Blvd

CLV (EB)	198
CLV (WB)	85
CLV (NB)	686
CLV (SB)	96
CLV (N-S)	686
CLV (E-W)	198

V/C=0.55

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: I-97 SB Ramps and Cromwell Park Dr
Scenario: 2022 Build
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

I-97 SB Ramps

	Right	Thru	Left	
R	38	65		VPH
	1	2	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Cromwell Park Dr

	VPH	# Lanes
Left	197	2
Thru		0
Right	315	2
R		

Intersection CLV:	426
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	
0		
2	542	
0		R

Cromwell Park Dr

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	0	0	
VPH				
	Left	Thru	Right	R

Not Applicable

CLV (EB)	167
CLV (WB)	392
CLV (NB)	-
CLV (SB)	35
CLV (N-S)	35
CLV (E-W)	392

V/C=0.27

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2022 Build
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviaition Blvd

	Right	Thru	Left	
R	359	82	111	VPH
	1	2	2	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Dorsey Rd

	VPH	# Lanes
Left	140	1
Thru	319	3
Right	8	0
R		

Intersection CLV:		**838**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	R
0		
2	470	
1	20	

Dorsey Rd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	2	2	0	
VPH	201	276	157	R
	Left	Thru	Right	

Aviaition Blvd

CLV (EB)	141
CLV (WB)	389
CLV (NB)	230
CLV (SB)	219
CLV (N-S)	449
CLV (E-W)	389

V/C=0.52

2022 PM Build Critical Lane Volume (CLV) Analysis

Node	Intersection	CLV	Equivalent LOS	V/C
1	Aviation Blvd and Dorsey Rd	1,420	D	0.89
2	Aviation Blvd and Mathison Way	1,077	B	0.67
3	Aviation Blvd and Stoney Run Rd	1,190	C	0.74
4	Northrop Grumman and Stoney Run Rd	684	A	0.43
5	New Ridge Rd and Stoney Run Rd	789	A	0.49
6	Aviation Blvd and Amtrak Way	1,493	E	0.93
7	Aviation Blvd and Northrop Grumman Parking	1,298	C	0.81
8	Aviation Blvd and I-195 SB Ramps	1,352	D	0.85
9	Aviation Blvd and I-195 NB Ramps	866	A	0.54
10	Elkridge Landing Rd and Terminal Rd	719	A	0.45
11	Aviation Blvd and Terminal Rd	696	A	0.43
12	Aviation Blvd and Air Cargo Road/Elkridge Landing	1,175	C	0.73
13	Aviation Blvd and Andover Rd	908	A	0.57
15	Aviation Blvd and Allwood Dr	738	A	0.46
16	I-97 SB Ramps and Cromwell Park Dr	634	A	0.40
17	Aviation Blvd and Cromwell Park Dr	838	A	0.52
18	Aviation Blvd and Dorsey Rd	772	A	0.48
20	Aviation Blvd and Hollins Ferry Rd	357	A	0.22
21	Aviation Blvd and BWI Long Term Parking	604	A	0.38
22	Aviation Blvd and Camp Meade Rd (MD170)	670	A	0.42

Source: HNTB's CLV analysis of 2022 Build Conditions

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2022 Build
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R	387	1,225	339	VPH
	1	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Dorsey Rd

	VPH	# Lanes
Left	409	1
Thru	771	2
Right	317	1
R		

Intersection CLV:	**1,420**
CLV Standard:	**1,600**
Intersection LOS:	**D**
Better Than CLV Standard	

# Lanes	VPH	R
0		Right
2	349	Thru
1	189	Left

Dorsey Rd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	2	1	
VPH	173	669	168	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	597
CLV (WB)	594
CLV (NB)	694
CLV (SB)	823
CLV (N-S)	823
CLV (E-W)	597

V/C=0.89

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Mathison Way
Scenario: 2022 Build
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		1,877	64	VPH
Policy Area: NA	0	2	1	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:		**1,077**
CLV Standard:		**1,600**
Intersection LOS:		**B**
Better Than CLV Standard		

# Lanes	VPH	R
1	46	Right
0		Thru
1	82	Left

Mathison Way

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	2	1	
VPH		1,019	69	

Aviation Blvd

CLV (EB)	82
CLV (WB)	-
CLV (NB)	605
CLV (SB)	995
CLV (N-S)	995
CLV (E-W)	82

V/C=0.67

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Stoney Run Rd
Scenario: 2022 Build
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		1,599	401	VPH
Policy Area: NA	0	2	2	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

	# Lanes	VPH	
	0		Right
	0		Thru
R	1	343	Left

Stoney Run Rd

Intersection CLV:	**1,190**
CLV Standard:	**1,600**
Intersection LOS:	**C**
Better Than CLV Standard	

# Lanes	0	2	0	
VPH		967		
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	343
CLV (WB)	-
CLV (NB)	725
CLV (SB)	847
CLV (N-S)	847
CLV (E-W)	343

V/C=0.74

Organization: HNTB
Date of Analysis: 12/19/2018

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Northrop Grumman and Stoney Run Rd
Scenario: 2022 Build
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Northrop Grumman

	Right	Thru	Left	
R	171	425		VPH
	1	1	0	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Stoney Run Rd

	VPH	# Lanes
Left	14	1
Thru		0
Right		0
R		

Intersection CLV:	**684**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
0	0	Right
1	3	Thru
1	7	Left

Not Applicable

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	2	1	0	
VPH	457	35	0	

Stoney Run Rd

CLV (EB)	7
CLV (WB)	17
CLV (NB)	242
CLV (SB)	425
CLV (N-S)	667
CLV (E-W)	17

V/C=0.43

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: New Ridge Rd and Stoney Run Rd
Scenario: 2022 Build
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

New Ridge Rd

	Right	Thru	Left	
R	0	55	107	VPH
	0	1	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Stoney Run Rd

	VPH	# Lanes
Left	1	1
Thru	136	1
Right	32	1
R		

Intersection CLV:	**789**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
1	25	Right
1	154	Thru
1	451	Left

Stoney Run Rd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	1	1	
VPH	43	52	490	R
	Left	Thru	Right	

New Ridge Rd

CLV (EB)	588
CLV (WB)	156
CLV (NB)	201
CLV (SB)	98
CLV (N-S)	201
CLV (E-W)	588

V/C=0.49

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Amtrak Way
Scenario: 2022 Build
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R		1,774		VPH
	0	2	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Amtrak Way

	VPH	# Lanes
Left	428	1
Thru		0
Right	226	1
R		

Intersection CLV:	**1,493**
CLV Standard:	**1,600**
Intersection LOS:	**E**
Better Than CLV Standard	

# Lanes	VPH	
0		Right
0		Thru
0		Left

Not Applicable

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	2	0	
VPH	124	1,649	0	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	102
CLV (WB)	428
CLV (NB)	874
CLV (SB)	1,064
CLV (N-S)	1,064
CLV (E-W)	428

V/C=0.93

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Northrop Grumman Parking
Scenario: 2022 Build
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
		1,841		VPH
	0	2	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Northrop Grumman Parking

	VPH	# Lanes
Left	386	2
Thru		0
Right		0
R		

Intersection CLV:	**1,298**
CLV Standard:	**1,600**
Intersection LOS:	**C**
Better Than CLV Standard	

# Lanes	VPH	
0		Right
0		Thru
0		Left

R

Not Applicable

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	2	0	
VPH	14	2,063	0	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	-
CLV (WB)	205
CLV (NB)	1,093
CLV (SB)	989
CLV (N-S)	1,093
CLV (E-W)	205

V/C=0.81

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 SB Ramps
Scenario: 2022 Build
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		951	115	VPH
Policy Area: NA	0	2	1	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

I-195 SB Ramps

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:	**1,352**
CLV Standard:	**1,600**
Intersection LOS:	**D**
Better Than CLV Standard	

# Lanes	VPH	R
0		Right
0		Thru
1	29	Left

I195 SB Ramps

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	2	1	
VPH		2,279	169	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	29
CLV (WB)	-
CLV (NB)	1,323
CLV (SB)	504
CLV (N-S)	1,323
CLV (E-W)	29

V/C=0.85

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 NB Ramps
Scenario: 2022 Build
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		882		VPH
Policy Area: NA	0	2	0	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:	**866**		
CLV Standard:	**1,600**		
Intersection LOS:	**A**		
Better Than CLV Standard			

# Lanes	VPH	R
0		Right
0		Thru
1	181	Left

I195 NB Ramps

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	2	0	
VPH		1,292		

Aviation Blvd

CLV (EB)	181
CLV (WB)	-
CLV (NB)	685
CLV (SB)	467
CLV (N-S)	685
CLV (E-W)	181

V/C=0.54

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Elkridge Landing Rd and Terminal Rd
Scenario: 2022 Build
Time Period: PM Peak

Not Applicable

	Right	Thru	Left
VPH			
# Lanes	0	0	0

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Elkridge Landing Rd

	VPH	# Lanes
Left		0
Thru	426	2
Right		0
R		

Intersection CLV:	**719**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

	# Lanes	VPH	
	0		Right
	2	162	Thru
	1	34	Left

Elkridge Landing Rd

	Left	Thru	Right	
# Lanes	1	0	1	
VPH	460		40	R

Terminal Rd

CLV (EB)	259
CLV (WB)	86
CLV (NB)	6
CLV (SB)	460
CLV (N-S)	460
CLV (E-W)	259

V/C=0.45

Organization: HNTB
Date of Analysis: 12/19/2018

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Terminal Rd
Scenario: 2022 Build
Time Period: PM Peak

Terminal Rd

	Right	Thru	Left	
		120		VPH
	0	2	0	# Lanes

R

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	381	2
Thru	777	2
Right		0

R

Intersection CLV:	**696**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
0		Right
2	536	Thru
2	253	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right
# Lanes	2	1	0
VPH	163	119	

R

Terminal Rd

CLV (EB)	546
CLV (WB)	486
CLV (NB)	119
CLV (SB)	150
CLV (N-S)	150
CLV (E-W)	546

V/C=0.43

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Air Cargo Road/Elkridge Land
Scenario: 2022 Build
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Elkridge Landing

	Right	Thru	Left	
R	65	15	480	VPH
	0	1	1	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	44	1
Thru	1,001	2
Right	117	1
R		

Intersection CLV:	**1,175**
CLV Standard:	**1,600**
Intersection LOS:	**C**
Better Than CLV Standard	

# Lanes	VPH	R
1	115	Right
2	611	Thru
1	40	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	1	1	
VPH	112	13	66	
	Left	Thru	Right	R

Air Cargo Rd

CLV (EB)	570
CLV (WB)	368
CLV (NB)	125
CLV (SB)	480
CLV (N-S)	605
CLV (E-W)	570

V/C=0.73

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Camp Meade Rd (MD170)
Scenario: 2022 Build
Time Period: PM Peak

Camp Meade Rd

	Right	Thru	Left	
R	154		8	VPH
	1	0	1	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	338	1
Thru	1,210	2
Right		0
R		

Intersection CLV:		**670**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	R
1	13	Right
2	611	Thru
0		Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	0	0	
VPH				
	Left	Thru	Right	R

Not Applicable

CLV (EB)	642
CLV (WB)	662
CLV (NB)	8
CLV (SB)	-
CLV (N-S)	8
CLV (E-W)	662

V/C=0.42

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and BWI Long Term Parking
Scenario: 2022 Build
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Andover Rd

	R	Right	Thru	Left	
		44	1	0	VPH
		1	1	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	89	1
Thru	1,102	2
Right	28	1
R		

Intersection CLV:	**604**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
1	10	Right
2	563	Thru
1	2	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	1	0	
VPH	17	1	1	R
	Left	Thru	Right	

Long Term Lot B

CLV (EB)	587
CLV (WB)	388
CLV (NB)	3
CLV (SB)	18
CLV (N-S)	18
CLV (E-W)	587

V/C=0.38

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Andover Rd
Scenario: 2022 Build
Time Period: PM Peak

Andover Rd

	Right	Thru	Left	
R	11		371	VPH
	0	1	1	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	101	1
Thru	1,014	2
Right	0	0
R		

Intersection CLV:	**908**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
1	388	R
2	564	
1	0	

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	1	0	
VPH		0		
	Left	Thru	Right	R

Hammond House

CLV (EB)	537
CLV (WB)	401
CLV (NB)	-
CLV (SB)	371
CLV (N-S)	371
CLV (E-W)	537

V/C=0.57

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Allwood Dr
Scenario: 2022 Build
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R	6	1,234	9	VPH
	1	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Allwood Dr

	VPH	# Lanes
Left	9	1
Thru	2	1
Right	24	0
R		

Intersection CLV:	**738**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
0	13	R
1	0	
0	17	

Allwood Dr

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	2	1	
VPH	41	906	53	R
	Left	Thru	Right	

Aviation Blvd

CLV (EB)	43
CLV (WB)	39
CLV (NB)	489
CLV (SB)	695
CLV (N-S)	695
CLV (E-W)	43

V/C=0.46

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Hollins Ferry Rd
Scenario: 2022 Build
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
R			62	VPH
Policy Area: NA				
CLV Standard: 1,600	0	0	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:		**357**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	
0		R
0		
0		

Hollins Ferry Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	0	3	0	
VPH		799		R

Aviation Blvd

CLV (EB)	-
CLV (WB)	-
CLV (NB)	357
CLV (SB)	-
CLV (N-S)	357
CLV (E-W)	-

V/C=0.22

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Cromwell Park Dr
Scenario: 2022 Build
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
R	1	510	764	VPH
	0	2	3	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left	0	0
Thru	0	1
Right	1	0
R		

Intersection CLV:		**838**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	
1	71	R
0		
2	488	

Cromwell Park Dr

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	3	0	
VPH		800		
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	260
CLV (WB)	-
CLV (NB)	579
CLV (SB)	271
CLV (N-S)	579
CLV (E-W)	260

V/C=0.52

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: I-97 SB Ramps and Cromwell Park Dr
Scenario: 2022 Build
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

I-97 SB Ramps

	Right	Thru	Left	
R	255	244		VPH
	1	2	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Cromwell Park Dr

	VPH	# Lanes
Left	38	2
Thru		0
Right	752	2
R		

Intersection CLV:	634
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	
0		
2	304	
0		R

Cromwell Park Dr

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	0	0	
VPH				
	Left	Thru	Right	R

Not Applicable

CLV (EB)	399
CLV (WB)	181
CLV (NB)	-
CLV (SB)	236
CLV (N-S)	236
CLV (E-W)	399

V/C=0.4

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2022 Build
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviaition Blvd

	Right	Thru	Left	
R	231	343	425	VPH
	1	2	2	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Dorsey Rd

	VPH	# Lanes
Left	143	1
Thru	771	3
Right	210	0
R		

Intersection CLV:		**772**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	R
0		
2	321	
1	57	

Dorsey Rd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	2	2	0	
VPH	33	142	97	R
	Left	Thru	Right	

Aviaition Blvd

CLV (EB)	420
CLV (WB)	313
CLV (NB)	126
CLV (SB)	225
CLV (N-S)	351
CLV (E-W)	420

V/C=0.48

2027 AM Build Critical Lane Volume (CLV) Analysis

Node	Intersection	CLV	Equivalent LOS	V/C
1	Aviation Blvd and Dorsey Rd	1,552	E	0.97
2	Aviation Blvd and Mathison Way	1,101	B	0.69
3	Aviation Blvd and Stoney Run Rd	1,309	D	0.82
4	Northrop Grumman and Stoney Run Rd	787	A	0.49
5	New Ridge Rd and Stoney Run Rd	657	A	0.41
6	Aviation Blvd and Amtrak Way	1,172	C	0.73
7	Aviation Blvd and Northrop Grumman Parking	1,166	C	0.73
8	Aviation Blvd and I-195 SB Ramps	938	A	0.59
9	Aviation Blvd and I-195 NB Ramps	893	A	0.56
10	Elkridge Landing Rd and Terminal Rd	1,161	C	0.73
11	Aviation Blvd and Terminal Rd	972	A	0.61
12	Aviation Blvd and Air Cargo Road/Elkridge Landing	861	A	0.54
13	Aviation Blvd and Andover Rd	1,000	A	0.62
15	Aviation Blvd and Allwood Dr	905	A	0.57
16	I-97 SB Ramps and Cromwell Park Dr	448	A	0.28
17	Aviation Blvd and Cromwell Park Dr	929	A	0.58
18	Aviation Blvd and Dorsey Rd	881	A	0.55
20	Aviation Blvd and Hollins Ferry Rd	660	A	0.41
21	Aviation Blvd and BWI Long Term Parking	855	A	0.53
22	Aviation Blvd and Camp Meade Rd (MD170)	1,094	B	0.68

Source: HNTB's CLV analysis of 2027 Build Conditions

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2027 Build
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R	325	424	170	VPH
	1	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Dorsey Rd

	VPH	# Lanes
Left	345	1
Thru	335	2
Right	152	1
R		

Intersection CLV:	**1,552**
CLV Standard:	**1,600**
Intersection LOS:	**E**
Better Than CLV Standard	

# Lanes	VPH	R
0		Right
2	500	Thru
1	94	Left

Dorsey Rd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	2	1	
VPH	448	1,456	277	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	272
CLV (WB)	611
CLV (NB)	942
CLV (SB)	673
CLV (N-S)	942
CLV (E-W)	611

V/C=0.97

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Mathison Way
Scenario: 2027 Build
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		827	50	VPH
Policy Area: NA	0	2	1	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

	# Lanes	VPH	R
	1	89	Right
	0		Thru
	1	89	Left

Mathison Way

Intersection CLV:	**1,101**
CLV Standard:	**1,600**
Intersection LOS:	**B**
Better Than CLV Standard	

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	2	1	
VPH		1,816	65	

Aviation Blvd

CLV (EB)	89
CLV (WB)	39
CLV (NB)	1,012
CLV (SB)	438
CLV (N-S)	1,012
CLV (E-W)	89

V/C=0.69

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Stoney Run Rd
Scenario: 2027 Build
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		808	868	VPH
Policy Area: NA	0	2	2	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

	# Lanes	VPH	
	0		Right
	0		Thru
R	1	70	Left

Stoney Run Rd

Intersection CLV:	**1,309**
CLV Standard:	**1,600**
Intersection LOS:	**D**
Better Than CLV Standard	

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	2	0	
VPH		1,470		R
	Left	Thru	Right	

Aviation Blvd

CLV (EB)	70
CLV (WB)	-
CLV (NB)	1,239
CLV (SB)	428
CLV (N-S)	1,239
CLV (E-W)	70

V/C=0.82

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Northrop Grumman and Stoney Run Rd
Scenario: 2027 Build
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Northrop Grumman

	Right	Thru	Left	
R	10	42		VPH
	1	1	0	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Stoney Run Rd

	VPH	# Lanes
Left	160	1
Thru		0
Right		0
R		

Intersection CLV:	**787**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
0	0	Right
1	17	Thru
1	68	Left

Not Applicable

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	2	1	0	
VPH	728	568	0	

Stoney Run Rd

CLV (EB)	68
CLV (WB)	177
CLV (NB)	568
CLV (SB)	42
CLV (N-S)	609
CLV (E-W)	177

V/C=0.49

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: New Ridge Rd and Stoney Run Rd
Scenario: 2027 Build
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

New Ridge Rd

	Right	Thru	Left	
R	2	27	26	VPH
	0	1	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Stoney Run Rd

	VPH	# Lanes
Left	0	1
Thru	85	1
Right	20	1
R		

Intersection CLV:	**657**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	R
1	152	Right
1	171	Thru
1	432	Left

Stoney Run Rd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	1	1	
VPH	16	99	420	
	Left	Thru	Right	R

New Ridge Rd

CLV (EB)	516
CLV (WB)	171
CLV (NB)	141
CLV (SB)	45
CLV (N-S)	141
CLV (E-W)	516

V/C=0.41

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Amtrak Way
Scenario: 2027 Build
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
R		1,412		VPH
Policy Area: NA	0	2	0	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Amtrak Way

	VPH	# Lanes
Left	201	1
Thru		0
Right	264	1
R		

Intersection CLV:		**1,172**
CLV Standard:		**1,600**
Intersection LOS:		**C**
Better Than CLV Standard		

# Lanes	VPH	
0		Right
0		Thru
0		Left

Not Applicable

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	2	0	
VPH	222	1,655	0	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	-
CLV (WB)	201
CLV (NB)	877
CLV (SB)	971
CLV (N-S)	971
CLV (E-W)	201

V/C=0.73

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Northrop Grumman Parking
Scenario: 2027 Build
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		1,944		VPH
Policy Area: NA	0	2	0	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Northrop Grumman Parking

	VPH	# Lanes
Left	38	2
Thru		0
Right		0
R		

Intersection CLV:	**1,166**
CLV Standard:	**1,600**
Intersection LOS:	**C**
Better Than CLV Standard	

# Lanes	VPH	R
0		Right
0		Thru
0		Left

Not Applicable

# Lanes	1	2	0	
VPH	115	1,740	0	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	-
CLV (WB)	20
CLV (NB)	922
CLV (SB)	1,145
CLV (N-S)	1,145
CLV (E-W)	20

V/C=0.73

Organization: HNTB
Date of Analysis: 12/19/2018

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 SB Ramps
Scenario: 2027 Build
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		779	76	VPH
Policy Area: NA	0	2	1	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

I-195 SB Ramps

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:		**938**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	R
0		Right
0		Thru
1	19	Left

I195 SB Ramps

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	2	1	
VPH		1,589	190	R
	Left	Thru	Right	

Aviation Blvd

CLV (EB)	19
CLV (WB)	-
CLV (NB)	918
CLV (SB)	413
CLV (N-S)	918
CLV (E-W)	19

V/C=0.59

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 NB Ramps
Scenario: 2027 Build
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
		726		VPH
Policy Area: NA	0	2	0	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:	**893**		
CLV Standard:	**1,600**		
Intersection LOS:	**A**		
Better Than CLV Standard			

# Lanes	VPH	R
0		Right
0		Thru
1	129	Left

I195 NB Ramps

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	2	0	
VPH		1,440		

Aviation Blvd

CLV (EB)	129
CLV (WB)	-
CLV (NB)	763
CLV (SB)	385
CLV (N-S)	763
CLV (E-W)	129

V/C=0.56

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Elkridge Landing Rd and Terminal Rd
Scenario: 2027 Build
Time Period: AM Peak

Not Applicable

	Right	Thru	Left	
				VPH
Policy Area: NA	0	0	0	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Elkridge Landing Rd

	VPH	# Lanes
Left		0
Thru	112	2
Right		0
R		

	Intersection CLV:	1,161
	CLV Standard:	1,600
	Intersection LOS:	C
	Better Than CLV Standard	

# Lanes	VPH	
0		Right
2	608	Thru
1	30	Left

Elkridge Landing Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	1	0	1	
VPH	839		46	R

Terminal Rd

CLV (EB)	89
CLV (WB)	322
CLV (NB)	-
CLV (SB)	839
CLV (N-S)	839
CLV (E-W)	322

V/C=0.73

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Terminal Rd
Scenario: 2027 Build
Time Period: AM Peak

Terminal Rd

	Right	Thru	Left	
		93		VPH
Policy Area: NA	0	2	0	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	761	2
Thru	475	2
Right		0

R

Intersection CLV:	**972**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
0		Right
2	806	Thru
2	354	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right
# Lanes	2	1	0
VPH	89	141	

R

Terminal Rd

CLV (EB)	439
CLV (WB)	831
CLV (NB)	141
CLV (SB)	97
CLV (N-S)	141
CLV (E-W)	831

V/C=0.61

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Air Cargo Road/Elkridge Land
Scenario: 2027 Build
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Elkridge Landing

	Right	Thru	Left	
R	36	18	104	VPH
	0	1	1	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	111	1
Thru	520	2
Right	80	1
R		

Intersection CLV:	**861**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
1	643	Right
2	1,049	Thru
1	65	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	1	1	
VPH	74	16	38	
	Left	Thru	Right	R

Air Cargo Rd

CLV (EB)	341
CLV (WB)	667
CLV (NB)	90
CLV (SB)	104
CLV (N-S)	194
CLV (E-W)	667

V/C=0.54

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Camp Meade Rd (MD170)
Scenario: 2027 Build
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Camp Meade Rd

R	Right	Thru	Left	
	346		7	VPH
	1	0	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	176	1
Thru	486	2
Right		0
R		

Intersection CLV:	1,094
CLV Standard:	1,600
Intersection LOS:	B
Better Than CLV Standard	

# Lanes	VPH	R
1	14	Right
2	1,412	Thru
0		Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	0	0	
VPH				
	Left	Thru	Right	R

Not Applicable

CLV (EB)	257
CLV (WB)	925
CLV (NB)	7
CLV (SB)	169
CLV (N-S)	169
CLV (E-W)	925

V/C=0.68

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and BWI Long Term Parking
Scenario: 2027 Build
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Andover Rd

	R	Right	Thru	Left	
		21	1	0	VPH
		1	1	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	104	1
Thru	360	2
Right	29	1
R		

Intersection CLV:	**855**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R	
1	16	Right	
2	1,393	Thru	
1	1	Left	

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	1	0	
VPH	11	0	0	R
	Left	Thru	Right	

Long Term Lot B

CLV (EB)	191
CLV (WB)	843
CLV (NB)	-
CLV (SB)	13
CLV (N-S)	13
CLV (E-W)	843

V/C=0.53

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Andover Rd
Scenario: 2027 Build
Time Period: AM Peak

Andover Rd

	R	Right	Thru	Left	
		61		274	VPH
		0	1	1	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	10	1
Thru	350	2
Right	0	0
R		

Intersection CLV:	**1,000**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	R
1	275	
2	1,349	
1	0	

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	1	0	
VPH		0		
	Left	Thru	Right	R

Hammond House

CLV (EB)	185
CLV (WB)	725
CLV (NB)	-
CLV (SB)	274
CLV (N-S)	274
CLV (E-W)	725

V/C=0.62

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Allwood Dr
Scenario: 2027 Build
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R	28	640	7	VPH
	1	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Allwood Dr

	VPH	# Lanes
Left	24	1
Thru	0	1
Right	14	0
R		

Intersection CLV:	**905**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	
0	24	R
1	1	
0	24	

Allwood Dr

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	2	1	
VPH	59	1,559	12	R
	Left	Thru	Right	

Aviation Blvd

CLV (EB)	37
CLV (WB)	72
CLV (NB)	833
CLV (SB)	398
CLV (N-S)	833
CLV (E-W)	72

V/C=0.57

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Hollins Ferry Rd
Scenario: 2027 Build
Time Period: AM Peak

Aviation Blvd

	Right	Thru	Left	
R			54	VPH
Policy Area: NA				
CLV Standard: 1,600	0	0	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:	**660**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
0		R
0		
0		

Hollins Ferry Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	0	3	0	
VPH		1,638		R

Aviation Blvd

CLV (EB)	-
CLV (WB)	-
CLV (NB)	660
CLV (SB)	-
CLV (N-S)	660
CLV (E-W)	-

V/C=0.41

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Cromwell Park Dr
Scenario: 2027 Build
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R	1	190	348	VPH
	0	2	3	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left	0	0
Thru	0	1
Right	1	0
R		

Intersection CLV:	**929**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	
1	218	R
0		
2	391	

Cromwell Park Dr

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	0	3	0	
VPH		1,601		R

Aviation Blvd

CLV (EB)	208
CLV (WB)	89
CLV (NB)	721
CLV (SB)	101
CLV (N-S)	721
CLV (E-W)	208

V/C=0.58

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: I-97 SB Ramps and Cromwell Park Dr
Scenario: 2027 Build
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

I-97 SB Ramps

	Right	Thru	Left	
R	39	69		VPH
	1	2	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Cromwell Park Dr

	VPH	# Lanes
Left	207	2
Thru		0
Right	331	2
R		

Intersection CLV:	448
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	
0		
2	569	
0		R

Cromwell Park Dr

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	0	0	
VPH				
	Left	Thru	Right	R

Not Applicable

CLV (EB)	176
CLV (WB)	412
CLV (NB)	-
CLV (SB)	36
CLV (N-S)	36
CLV (E-W)	412

V/C=0.28

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2027 Build
Time Period: AM Peak

Policy Area: NA
CLV Standard: 1,600

Aviaition Blvd

	Right	Thru	Left	
R	377	87	117	VPH
	1	2	2	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Dorsey Rd

	VPH	# Lanes
Left	147	1
Thru	335	3
Right	9	0
R		

Intersection CLV:		**881**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	R
0		
2	494	
1	21	

Dorsey Rd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	2	2	0	
VPH	211	291	165	R
	Left	Thru	Right	

Aviaition Blvd

CLV (EB)	148
CLV (WB)	409
CLV (NB)	242
CLV (SB)	230
CLV (N-S)	472
CLV (E-W)	409

V/C=0.55

2027 PM Build Critical Lane Volume (CLV) Analysis

Node	Intersection	CLV	Equivalent LOS	V/C
1	Aviation Blvd and Dorsey Rd	1,494	E	0.93
2	Aviation Blvd and Mathison Way	1,133	B	0.71
3	Aviation Blvd and Stoney Run Rd	1,254	C	0.78
4	Northrop Grumman and Stoney Run Rd	719	A	0.45
5	New Ridge Rd and Stoney Run Rd	829	A	0.52
6	Aviation Blvd and Amtrak Way	1,571	E	0.98
7	Aviation Blvd and Northrop Grumman Parking	1,365	D	0.85
8	Aviation Blvd and I-195 SB Ramps	1,422	D	0.89
9	Aviation Blvd and I-195 NB Ramps	910	A	0.57
10	Elkridge Landing Rd and Terminal Rd	757	A	0.47
11	Aviation Blvd and Terminal Rd	732	A	0.46
12	Aviation Blvd and Air Cargo Road/Elkridge Landing	1,236	C	0.77
13	Aviation Blvd and Andover Rd	955	A	0.60
15	Aviation Blvd and Allwood Dr	776	A	0.48
16	I-97 SB Ramps and Cromwell Park Dr	667	A	0.42
17	Aviation Blvd and Cromwell Park Dr	881	A	0.55
18	Aviation Blvd and Dorsey Rd	811	A	0.51
20	Aviation Blvd and Hollins Ferry Rd	376	A	0.23
21	Aviation Blvd and BWI Long Term Parking	636	A	0.40
22	Aviation Blvd and Camp Meade Rd (MD170)	705	A	0.44

Source: HNTB's CLV analysis of 2027 Build Conditions

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2027 Build
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R	408	1,289	357	VPH
	1	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Dorsey Rd

	VPH	# Lanes
Left	431	1
Thru	810	2
Right	333	1
R		

Intersection CLV:	**1,494**
CLV Standard:	**1,600**
Intersection LOS:	**E**
Better Than CLV Standard	

# Lanes	VPH	R
0		Right
2	367	Thru
1	198	Left

Dorsey Rd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	2	1	
VPH	182	706	177	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	628
CLV (WB)	625
CLV (NB)	731
CLV (SB)	866
CLV (N-S)	866
CLV (E-W)	628

V/C=0.93

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Mathison Way
Scenario: 2027 Build
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		1,974	68	VPH
Policy Area: NA	0	2	1	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:		**1,133**
CLV Standard:		**1,600**
Intersection LOS:		**B**
Better Than CLV Standard		

# Lanes	VPH	R
1	49	Right
0		Thru
1	87	Left

Mathison Way

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	2	1	
VPH		1,072	72	

Aviation Blvd

CLV (EB)	87
CLV (WB)	-
CLV (NB)	636
CLV (SB)	1,046
CLV (N-S)	1,046
CLV (E-W)	87

V/C=0.71

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Stoney Run Rd
Scenario: 2027 Build
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		1,684	421	VPH
Policy Area: NA	0	2	2	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

	# Lanes	VPH	
	0		Right
	0		Thru
R	1	361	Left

Stoney Run Rd

Intersection CLV:	**1,254**
CLV Standard:	**1,600**
Intersection LOS:	**C**
Better Than CLV Standard	

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	2	0	
VPH		1,017		
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	361
CLV (WB)	-
CLV (NB)	762
CLV (SB)	892
CLV (N-S)	892
CLV (E-W)	361

V/C=0.78

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Northrop Grumman and Stoney Run Rd
Scenario: 2027 Build
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Northrop Grumman

R	Right	Thru	Left	
	179	447		VPH
	1	1	0	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Stoney Run Rd

	VPH	# Lanes
Left	14	1
Thru		0
Right		0
R		

Intersection CLV:	**719**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
0	0	Right
1	3	Thru
1	7	Left

Not Applicable

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	2	1	0	
VPH	481	37	0	
	Left	Thru	Right	R

Stoney Run Rd

CLV (EB)	7
CLV (WB)	17
CLV (NB)	255
CLV (SB)	447
CLV (N-S)	702
CLV (E-W)	17

V/C=0.45

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: New Ridge Rd and Stoney Run Rd
Scenario: 2027 Build
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

New Ridge Rd

	Right	Thru	Left	
R	0	58	112	VPH
	0	1	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Stoney Run Rd

	VPH	# Lanes
Left	1	1
Thru	143	1
Right	34	1
R		

Intersection CLV:	**829**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
1	26	Right
1	162	Thru
1	475	Left

Stoney Run Rd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	1	1	
VPH	45	54	516	R
	Left	Thru	Right	

New Ridge Rd

CLV (EB)	618
CLV (WB)	164
CLV (NB)	211
CLV (SB)	103
CLV (N-S)	211
CLV (E-W)	618

V/C=0.52

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Amtrak Way
Scenario: 2027 Build
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R		1,867		VPH
	0	2	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Amtrak Way

	VPH	# Lanes
Left	450	1
Thru		0
Right	238	1
R		

Intersection CLV:	**1,571**	
CLV Standard:	**1,600**	
Intersection LOS:	**E**	
Better Than CLV Standard		

# Lanes	VPH	
0		Right
0		Thru
0		Left

Not Applicable

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	2	0	
VPH	131	1,734	0	R
	Left	Thru	Right	

Aviation Blvd

CLV (EB)	107
CLV (WB)	450
CLV (NB)	919
CLV (SB)	1,120
CLV (N-S)	1,120
CLV (E-W)	450

V/C=0.98

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Northrop Grumman Parking
Scenario: 2027 Build
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		1,937		VPH
Policy Area: NA	0	2	0	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Northrop Grumman Parking

	VPH	# Lanes
Left	406	2
Thru		0
Right		0
R		

Intersection CLV:	**1,365**
CLV Standard:	**1,600**
Intersection LOS:	**D**
Better Than CLV Standard	

# Lanes	VPH	
0		R
0		Right
0		Thru
		Left

Not Applicable

# Lanes	1	2	0	
VPH	15	2,169	0	
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	-
CLV (WB)	215
CLV (NB)	1,150
CLV (SB)	1,041
CLV (N-S)	1,150
CLV (E-W)	215

V/C=0.85

Organization: HNTB
Date of Analysis: 12/19/2018

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 SB Ramps
Scenario: 2027 Build
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		1,002	121	VPH
Policy Area: NA	0	2	1	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

I-195 SB Ramps

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:	**1,422**
CLV Standard:	**1,600**
Intersection LOS:	**D**
Better Than CLV Standard	

# Lanes	VPH	
0		Right
0		Thru
1	31	Left

R

I195 SB Ramps

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	2	1	
VPH		2,397	178	

Aviation Blvd

CLV (EB)	31
CLV (WB)	-
CLV (NB)	1,391
CLV (SB)	531
CLV (N-S)	1,391
CLV (E-W)	31

V/C=0.89

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and I-195 NB Ramps
Scenario: 2027 Build
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
		930		VPH
Policy Area: NA	0	2	0	# Lanes
CLV Standard: 1,600				

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0

Intersection CLV:	**910**		
CLV Standard:	**1,600**		
Intersection LOS:	**A**		
Better Than CLV Standard			

# Lanes	VPH	R
0		Right
0		Thru
1	190	Left

I195 NB Ramps

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	2	0	
VPH		1,358		

Aviation Blvd

CLV (EB)	190
CLV (WB)	-
CLV (NB)	720
CLV (SB)	493
CLV (N-S)	720
CLV (E-W)	190

V/C=0.57

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Elkridge Landing Rd and Terminal Rd
Scenario: 2027 Build
Time Period: PM Peak

Not Applicable

	Right	Thru	Left
VPH			
# Lanes	0	0	0

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Elkridge Landing Rd

	VPH	# Lanes
Left		0
Thru	448	2
Right		0
R		

Intersection CLV:	**757**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

	# Lanes	VPH	
	0		Right
	2	170	Thru
	1	35	Left

Elkridge Landing Rd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	
# Lanes	1	0	1	
VPH	484		42	R

Terminal Rd

CLV (EB)	273
CLV (WB)	90
CLV (NB)	7
CLV (SB)	484
CLV (N-S)	484
CLV (E-W)	273

V/C=0.47

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Terminal Rd
Scenario: 2027 Build
Time Period: PM Peak

Terminal Rd

	Right	Thru	Left	
		127		VPH
	0	2	0	# Lanes

R

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	401	2
Thru	817	2
Right		0

R

Intersection CLV:	**732**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	
0		Right
2	562	Thru
2	266	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right
# Lanes	2	1	0
VPH	171	125	

R

Terminal Rd

CLV (EB)	574
CLV (WB)	511
CLV (NB)	125
CLV (SB)	158
CLV (N-S)	158
CLV (E-W)	574

V/C=0.46

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Air Cargo Road/Elkridge Land
Scenario: 2027 Build
Time Period: PM Peak

Elkridge Landing

	Right	Thru	Left	
R	69	16	505	VPH
	0	1	1	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	46	1
Thru	1,053	2
Right	123	1
R		

Intersection CLV:	**1,236**
CLV Standard:	**1,600**
Intersection LOS:	**C**
Better Than CLV Standard	

# Lanes	VPH	R
1	121	Right
2	642	Thru
1	42	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	1	1	
VPH	118	14	70	
	Left	Thru	Right	R

Air Cargo Rd

CLV (EB)	600
CLV (WB)	386
CLV (NB)	131
CLV (SB)	505
CLV (N-S)	637
CLV (E-W)	600

V/C=0.77

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Camp Meade Rd (MD170)
Scenario: 2027 Build
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Camp Meade Rd

	Right	Thru	Left	
R	161		9	VPH
	1	0	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	356	1
Thru	1,273	2
Right		0
R		

	# Lanes	VPH	
R	1	14	Right
	2	643	Thru
	0		Left

Aviation Blvd

Intersection CLV:	**705**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	0	0	0	
VPH				
	Left	Thru	Right	R

Not Applicable

CLV (EB)	675
CLV (WB)	696
CLV (NB)	9
CLV (SB)	-
CLV (N-S)	9
CLV (E-W)	696

V/C=0.44

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and BWI Long Term Parking
Scenario: 2027 Build
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Andover Rd

	R	Right	Thru	Left	
		46	1	0	VPH
		1	1	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	94	1
Thru	1,159	2
Right	29	1
R		

Intersection CLV:	**636**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

# Lanes	VPH	R
1	11	Right
2	592	Thru
1	3	Left

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	1	0	
VPH	18	1	2	
	Left	Thru	Right	R

Long Term Lot B

CLV (EB)	617
CLV (WB)	408
CLV (NB)	3
CLV (SB)	19
CLV (N-S)	19
CLV (E-W)	617

V/C=0.4

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Andover Rd
Scenario: 2027 Build
Time Period: PM Peak

Andover Rd

	Right	Thru	Left	
R	12		390	VPH
	0	1	1	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Aviation Blvd

	VPH	# Lanes
Left	106	1
Thru	1,066	2
Right	0	0
R		

Intersection CLV:	**955**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	R
1	408	
2	594	
1	0	

Aviation Blvd

Organization: HNTB
Date of Analysis: 12/19/2018

	Left	Thru	Right	R
# Lanes	0	1	0	
VPH		0		

Hammond House

CLV (EB)	565
CLV (WB)	421
CLV (NB)	-
CLV (SB)	390
CLV (N-S)	390
CLV (E-W)	565

V/C=0.6

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Allwood Dr
Scenario: 2027 Build
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviation Blvd

	Right	Thru	Left	
R	7	1,297	9	VPH
	1	2	1	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Allwood Dr

	VPH	# Lanes
Left	9	1
Thru	2	1
Right	25	0
R		

Intersection CLV:	**776**
CLV Standard:	**1,600**
Intersection LOS:	**A**
Better Than CLV Standard	

	# Lanes	VPH	
	0	14	R
	1	0	
	0	18	

Allwood Dr

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	1	2	1	
VPH	43	952	55	R
	Left	Thru	Right	

Aviation Blvd

CLV (EB)	45
CLV (WB)	41
CLV (NB)	514
CLV (SB)	730
CLV (N-S)	730
CLV (E-W)	45

V/C=0.48

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Hollins Ferry Rd
Scenario: 2027 Build
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
R			65	VPH
	0	0	1	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left		0
Thru		0
Right		0
R		

Intersection CLV:		**376**
CLV Standard:		**1,600**
Intersection LOS:		**A**
Better Than CLV Standard		

# Lanes	VPH	
0		R
0		
0		

Hollins Ferry Rd

# Lanes	0	3	0	
VPH		840		
	Left	Thru	Right	R

Aviation Blvd

CLV (EB)	-
CLV (WB)	-
CLV (NB)	376
CLV (SB)	-
CLV (N-S)	376
CLV (E-W)	-

V/C=0.23

Organization: HNTB
Date of Analysis: 12/19/2018

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Cromwell Park Dr
Scenario: 2027 Build
Time Period: PM Peak

Aviation Blvd

	Right	Thru	Left	
R	1	536	803	VPH
	0	2	3	# Lanes

Policy Area: NA
CLV Standard: 1,600

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Not Applicable

	VPH	# Lanes
Left	0	0
Thru	0	1
Right	1	0
R		

Intersection CLV:	**881**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	
1	74	R
0		
2	513	

Cromwell Park Dr

# Lanes	0	3	0
VPH		841	
	Left	Thru	Right

R

Aviation Blvd

CLV (EB)	273
CLV (WB)	-
CLV (NB)	608
CLV (SB)	285
CLV (N-S)	608
CLV (E-W)	273

V/C=0.55

Organization: HNTB
Date of Analysis: 12/19/2018

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: I-97 SB Ramps and Cromwell Park Dr
Scenario: 2027 Build
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

I-97 SB Ramps

	Right	Thru	Left	
R	269	256		VPH
	1	2	0	# Lanes

Signal Phasing
N-S Split Phase? no
E-W Split Phase? no

Cromwell Park Dr

	VPH	# Lanes
Left	39	2
Thru		0
Right	791	2
R		

Intersection CLV:	**667**	
CLV Standard:	**1,600**	
Intersection LOS:	**A**	
Better Than CLV Standard		

# Lanes	VPH	
0		R
2	319	
0		

Cromwell Park Dr

	Left	Thru	Right	
# Lanes	0	0	0	
VPH				R

Not Applicable

CLV (EB)	419
CLV (WB)	190
CLV (NB)	-
CLV (SB)	248
CLV (N-S)	248
CLV (E-W)	419

V/C=0.42

Organization: HNTB
Date of Analysis: 12/19/2018

Critical Lane Volume (CLV)

Project: BWI Traffic Analysis
Intersection: Aviation Blvd and Dorsey Rd
Scenario: 2027 Build
Time Period: PM Peak

Policy Area: NA
CLV Standard: 1,600

Aviaition Blvd

	Right	Thru	Left	
R	243	361	447	VPH
	1	2	2	# Lanes

Signal Phasing
N-S Split Phase? yes
E-W Split Phase? no

Dorsey Rd

	VPH	# Lanes
Left	150	1
Thru	810	3
Right	221	0
R		

Intersection CLV:	811
CLV Standard:	1,600
Intersection LOS:	A
Better Than CLV Standard	

# Lanes	VPH	
0		R
2	338	
1	60	

Dorsey Rd

Organization: HNTB
Date of Analysis: 12/19/2018

# Lanes	2	2	0	
VPH	34	148	102	R
	Left	Thru	Right	

Aviaition Blvd

CLV (EB)	442
CLV (WB)	329
CLV (NB)	133
CLV (SB)	237
CLV (N-S)	369
CLV (E-W)	442

V/C=0.51

Appendix D: Land Use for BWI Background Development

Quality Restaurant
(931)

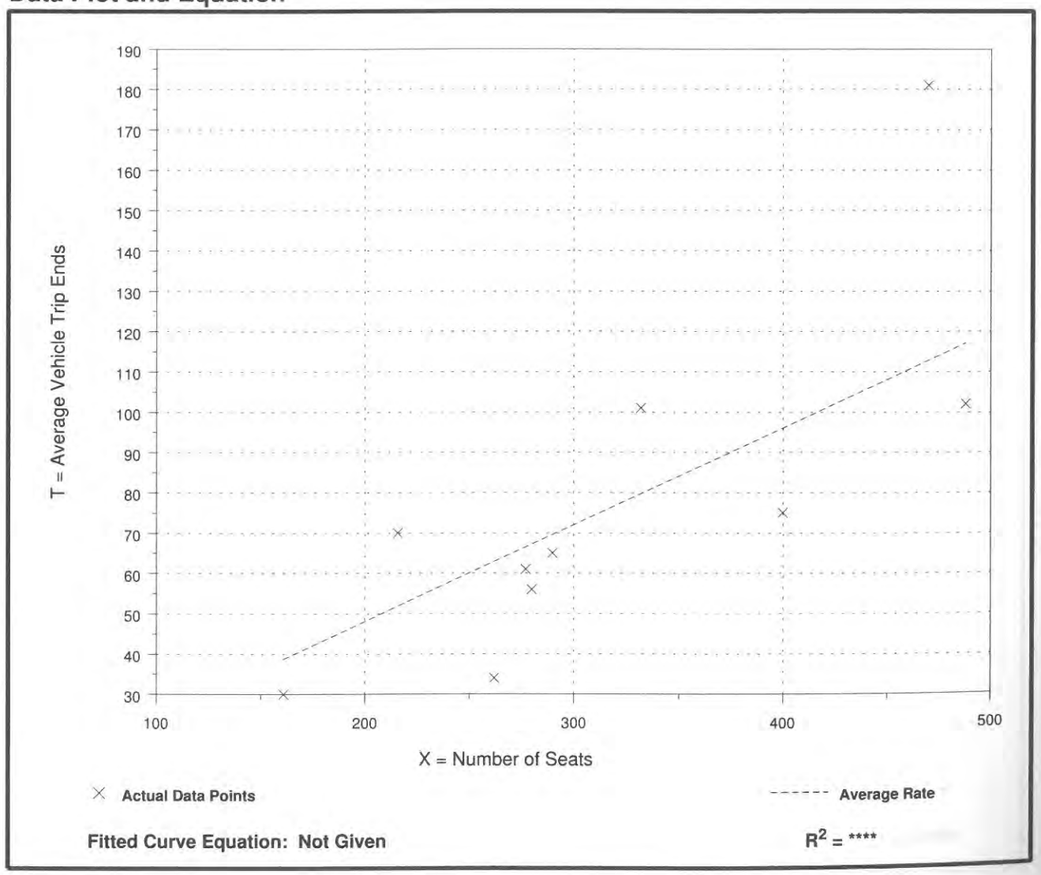
Average Vehicle Trip Ends vs: Seats
On a: Sunday,
Peak Hour of Generator

Number of Studies: 10
Average Number of Seats: 318
Directional Distribution: 63% entering, 37% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
0.24	0.13 - 0.39	0.50

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2 = ****

Land Use: 932
High-Turnover (Sit-Down) Restaurant

Description

This land use consists of sit-down, full-service eating establishments with typical duration of stay of approximately one hour. This type of restaurant is usually moderately priced and frequently belongs to a restaurant chain. Generally, these restaurants serve lunch and dinner; they may also be open for breakfast and are sometimes open 24 hours per day. These restaurants typically do not take reservations. Patrons commonly wait to be seated, are served by a waiter/waitress, order from menus and pay for their meal after they eat. Some facilities contained within this land use may also contain a bar area for serving food and alcoholic drinks. Quality restaurant (Land Use 931), fast-food restaurant without drive-through window (Land Use 933), fast-food restaurant with drive-through window (Land Use 934) and fast-food restaurant with drive-through window and no indoor seating (Land Use 935) are related uses.

Additional Data

Users should exercise caution when applying statistics during the A.M. peak periods, as the sites contained in the database for this land use may or may not be open for breakfast. In cases where it was confirmed that the sites were not open for breakfast, data for the A.M. peak hour of the adjacent street traffic were removed from the database.

Information on approximate hourly variation in high-turnover (sit-down) restaurant traffic is shown in the following table. It should be noted, however, that the information contained in this table is based on a limited sample size. Therefore, caution should be exercised when applying the data. Also, some information provided in the table may conflict with the results obtained by applying the average rate or regression equations. When this occurs, it is suggested that the results from the average rate or regression equations be used, as they are based on a larger number of studies.

Hourly Variation in High-Turnover (Sit-Down) Restaurant Traffic						
	Average Weekday[a]		Average Saturday[b]		Average Sunday[c]	
Time	Percent of 24-Hour Entering Traffic	Percent of 24-Hour Exiting Traffic	Percent of 24-Hour Entering Traffic	Percent of 24-Hour Exiting Traffic	Percent of 24-Hour Entering Traffic	Percent of 24-Hour Exiting Traffic
6 a.m.–7 a.m.	1.5	0.8	0.9	0.6	0.1	0.4
7 a.m.–8 a.m.	3.0	1.7	2.2	1.0	0.9	1.3
8 a.m.–9 a.m.	3.6	2.3	4.1	2.8	1.7	0.1
9 a.m.–10 a.m.	4.1	2.7	4.1	3.5	1.4	1.2
10 a.m.–11 a.m.	3.3	3.2	4.6	3.7	2.3	4.2
11 a.m.–12 p.m.	7.4	3.8	4.6	4.0	5.5	2.6
12 p.m.–1 p.m.	8.6	6.6	5.1	3.6	8.8	3.9
1 p.m.–2 p.m.	4.8	8.6	4.4	4.3	6.6	8.2
2 p.m.–3 p.m.	3.2	5.5	3.8	4.3	5.9	5.1
3 p.m.–4 p.m.	3.0	4.0	3.6	3.5	8.7	7.2
4 p.m.–5 p.m.	5.6	4.5	4.5	4.0	10.0	8.4
5 p.m.–6 p.m.	9.7	4.6	7.1	4.3	12.4	10.5
6 p.m.–7 p.m.	10.7	7.9	9.9	6.7	11.3	10.0
7 p.m.–8 p.m.	9.5	9.0	8.5	7.3	8.7	9.3
8 p.m.–9 p.m.	7.7	9.0	8.1	8.5	5.9	8.0
9 p.m.–10 p.m.	4.9	8.6	6.5	7.3	4.2	7.5
10 p.m.–6 a.m.	9.4	17.2	18.0	30.6	5.6	12.1

Sites ranged in size from 4,500 to 21,000 square feet gross floor area
[a] Source numbers – 13, 88,126, 507 and The Traffic Group, Inc.; based on seven studies
[b] Source numbers – 13, 88,126 and The Traffic Group, Inc.; based on five studies
[c] Source numbers – 13, 88 and 126; based on three studies

Vehicle occupancy ranged from 1.39 to 1.69 persons per automobile on an average weekday. The average for the sites surveyed was approximately 1.52.

Five sites submitted for inclusion in this land use indicated the presence of an on-site pick-up window. From the limited data sample, it does not appear that the presence of a pick-up window had a significant impact on trip generation.

The outdoor seating area is not included in the overall gross floor area. Therefore, the number of seats may be a more reliable independent variable on which to establish trip generation rates for facilities having significant outdoor seating.

The sites were surveyed between the 1960s and the 2000s throughout the United States.

Source Numbers

2, 4, 5, 72, 90, 100, 126, 269, 275, 280, 300, 301, 305, 338, 340, 341, 358, 384, 424, 432, 437, 438, 444, 507, 555, 577, 589, 617, 618, 728

High-Turnover (Sit-Down) Restaurant
(932)

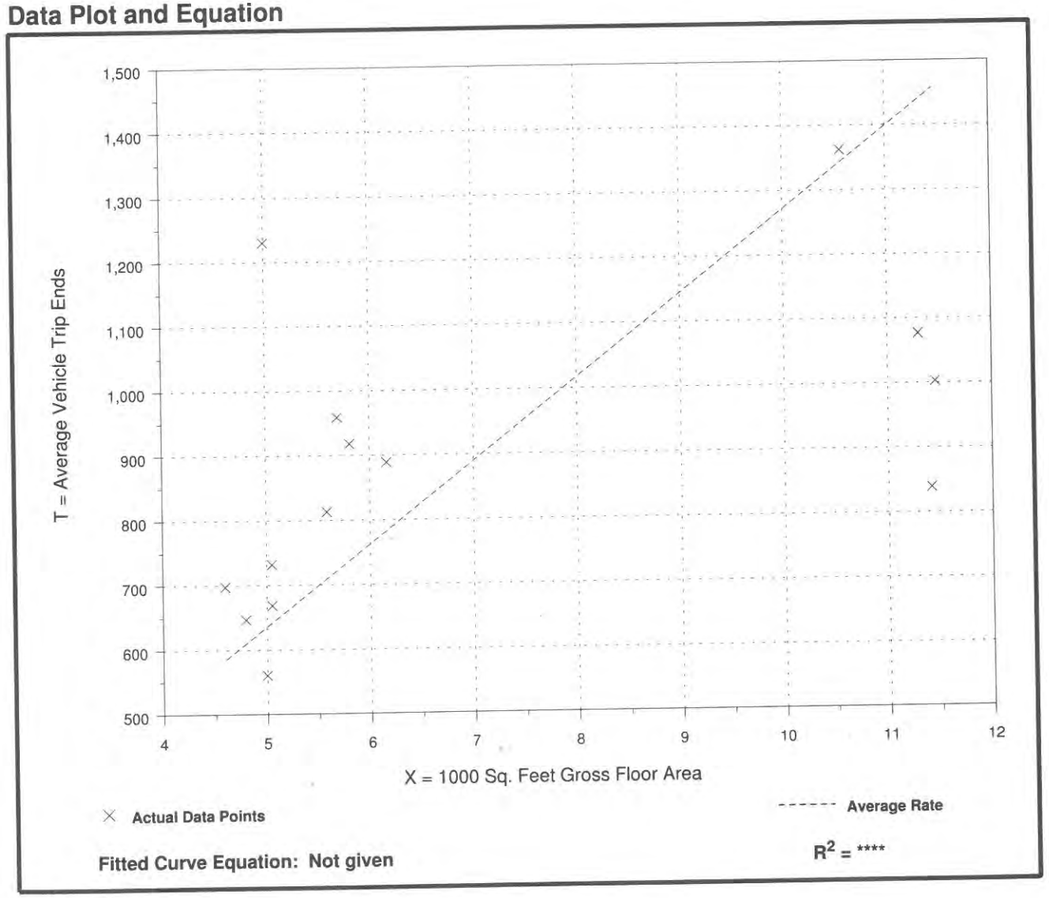
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday

Number of Studies: 14
Average 1000 Sq. Feet GFA: 7
Directional Distribution: 50% entering, 50% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
127.15	73.51 - 246.00	41.77

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

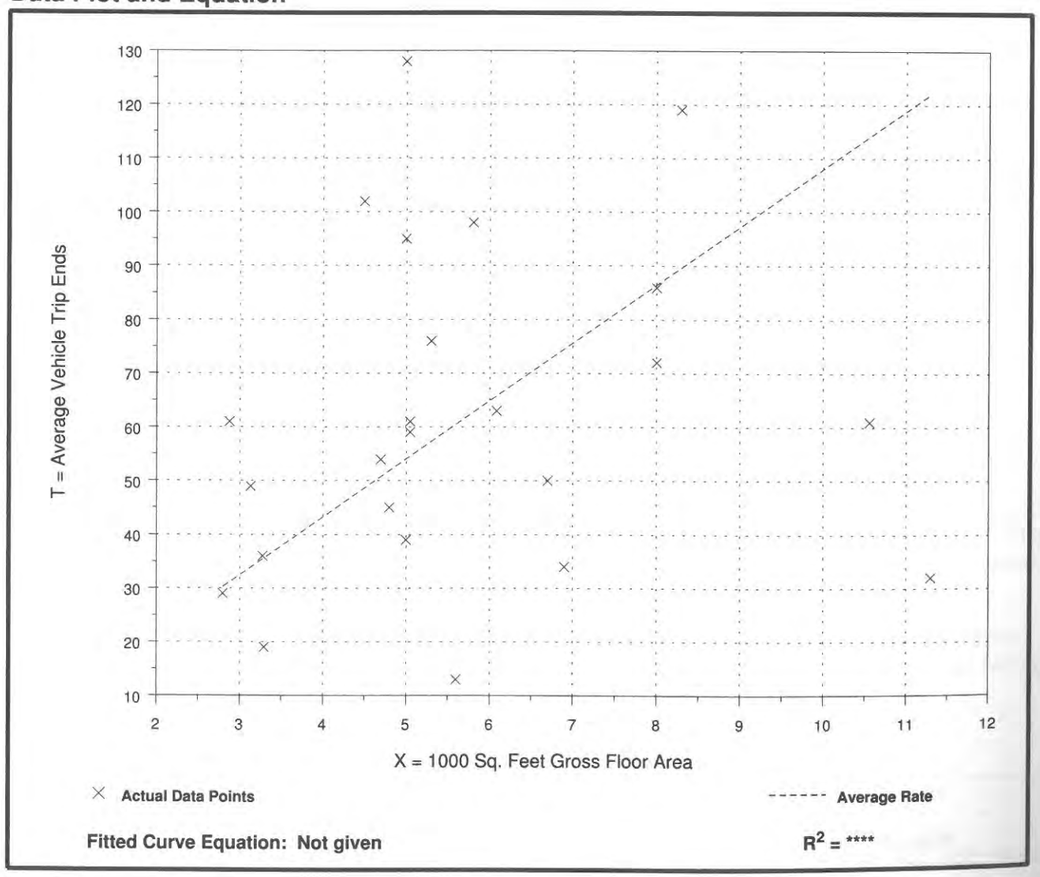
Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 24
Average 1000 Sq. Feet GFA: 6
Directional Distribution: 55% entering, 45% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
10.81	2.32 - 25.60	6.59

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

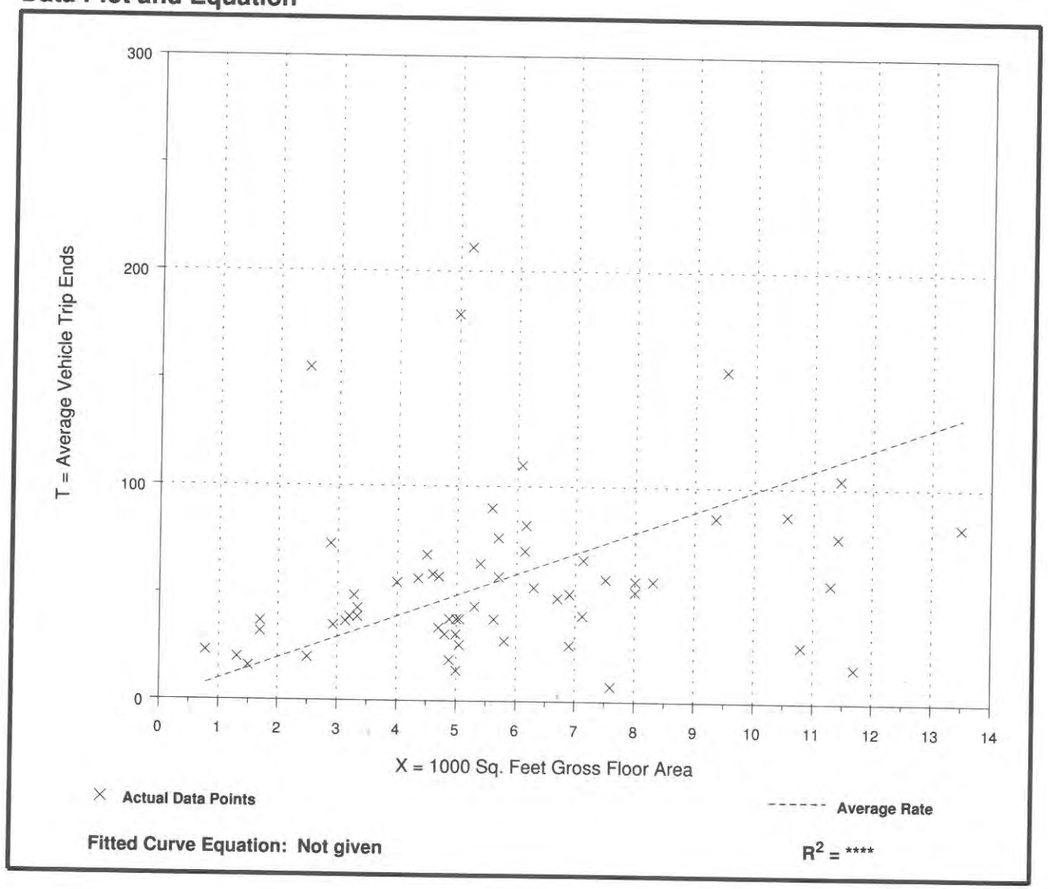
Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 60
Average 1000 Sq. Feet GFA: 6
Directional Distribution: 60% entering, 40% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
9.85	0.92 - 62.00	8.54

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

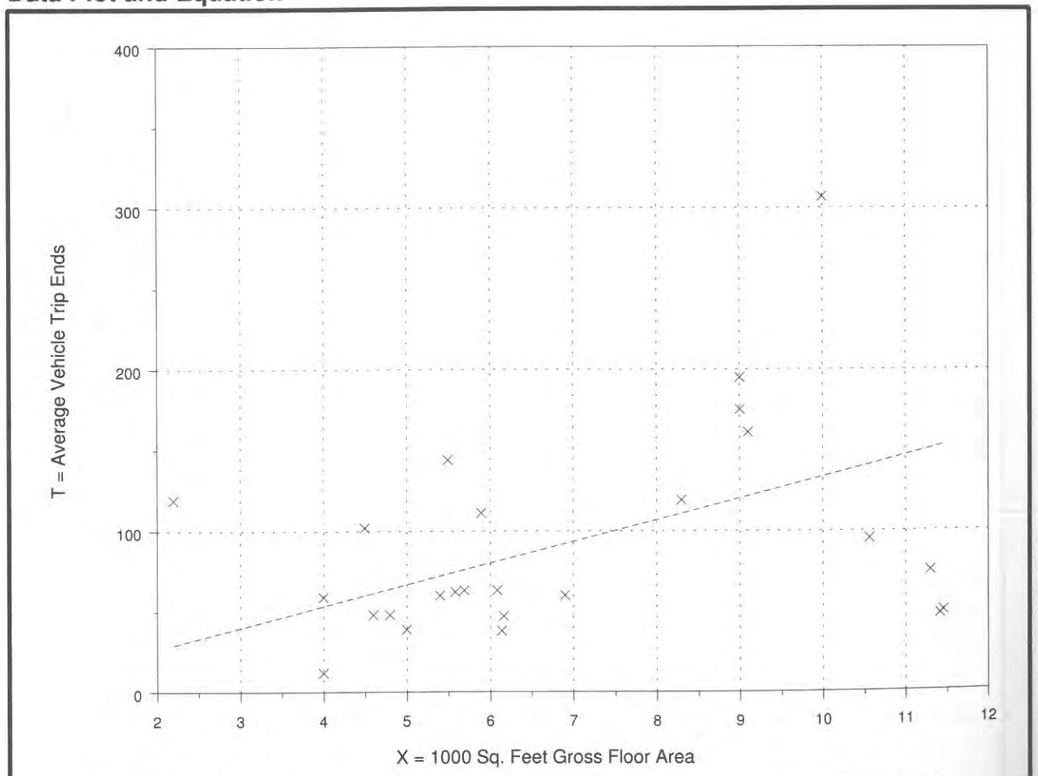
Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Weekday,**
A.M. Peak Hour of Generator

Number of Studies: 25
Average 1000 Sq. Feet GFA: 7
Directional Distribution: 53% entering, 47% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
13.33	3.00 - 54.09	9.44

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

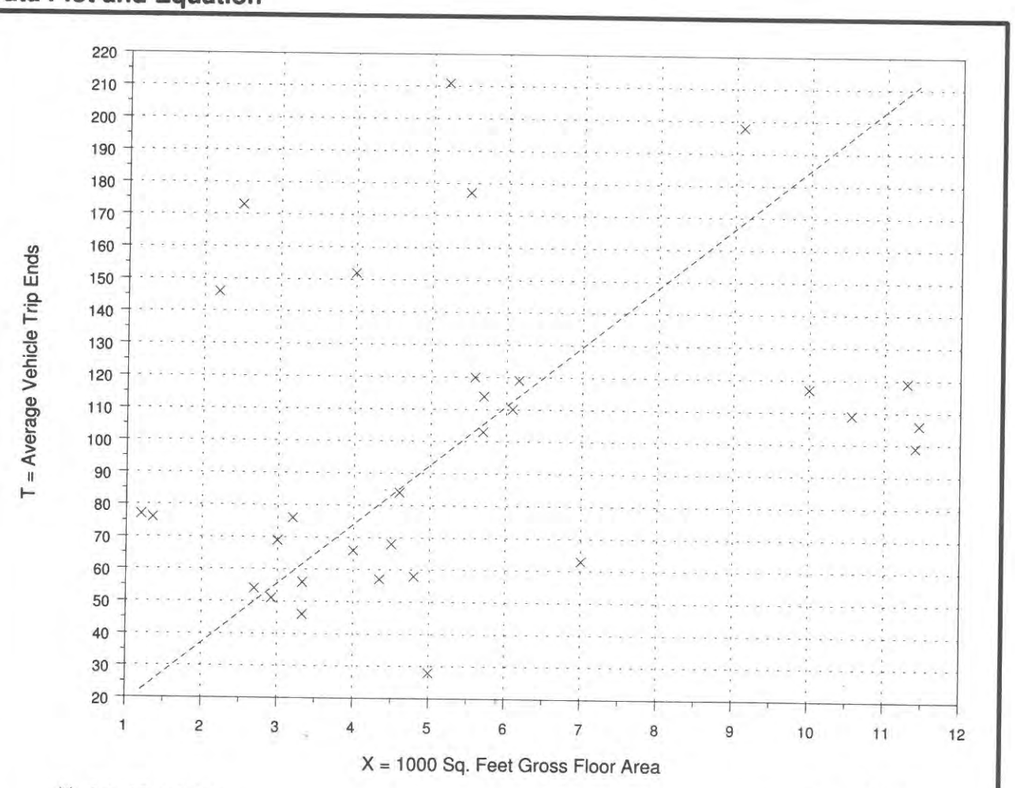
Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Weekday,**
P.M. Peak Hour of Generator

Number of Studies: 31
Average 1000 Sq. Feet GFA: 5
Directional Distribution: 54% entering, 46% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
18.49	5.60 - 69.20	13.32

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Saturday**

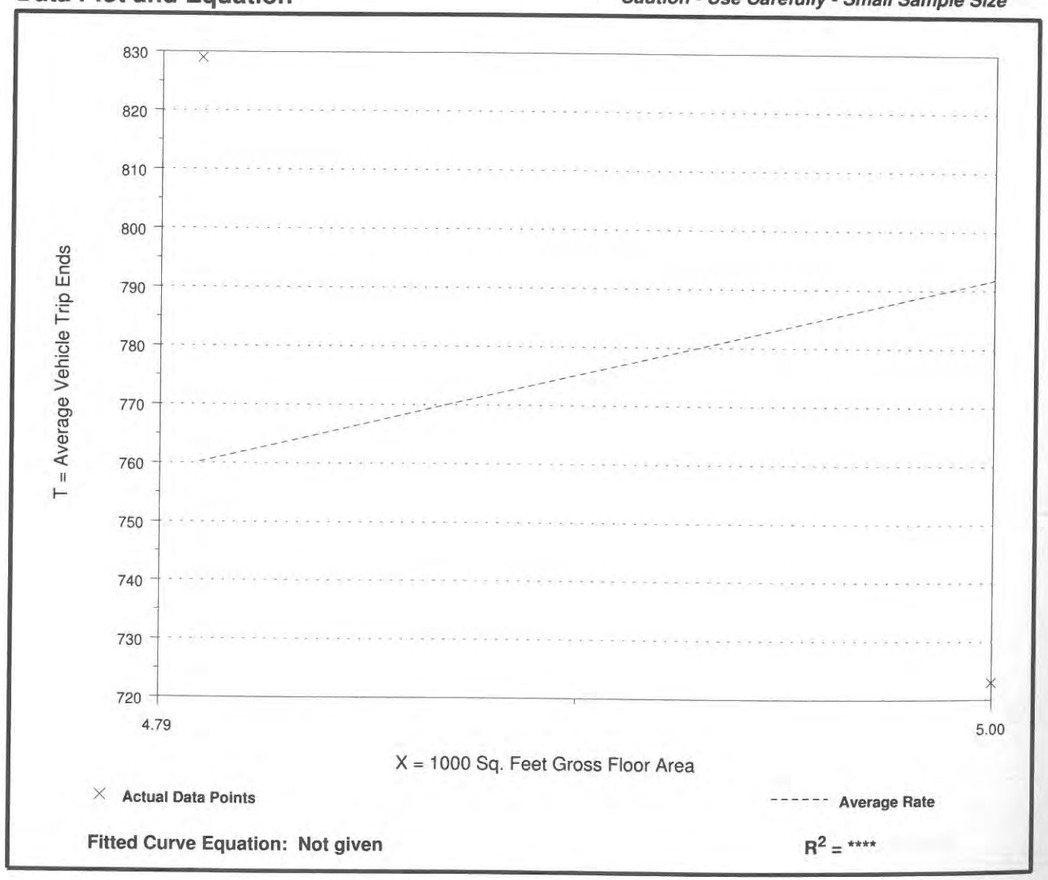
Number of Studies: 2
Average 1000 Sq. Feet GFA: 5
Directional Distribution: 50% entering, 50% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
158.37	144.60 - 172.71	*

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

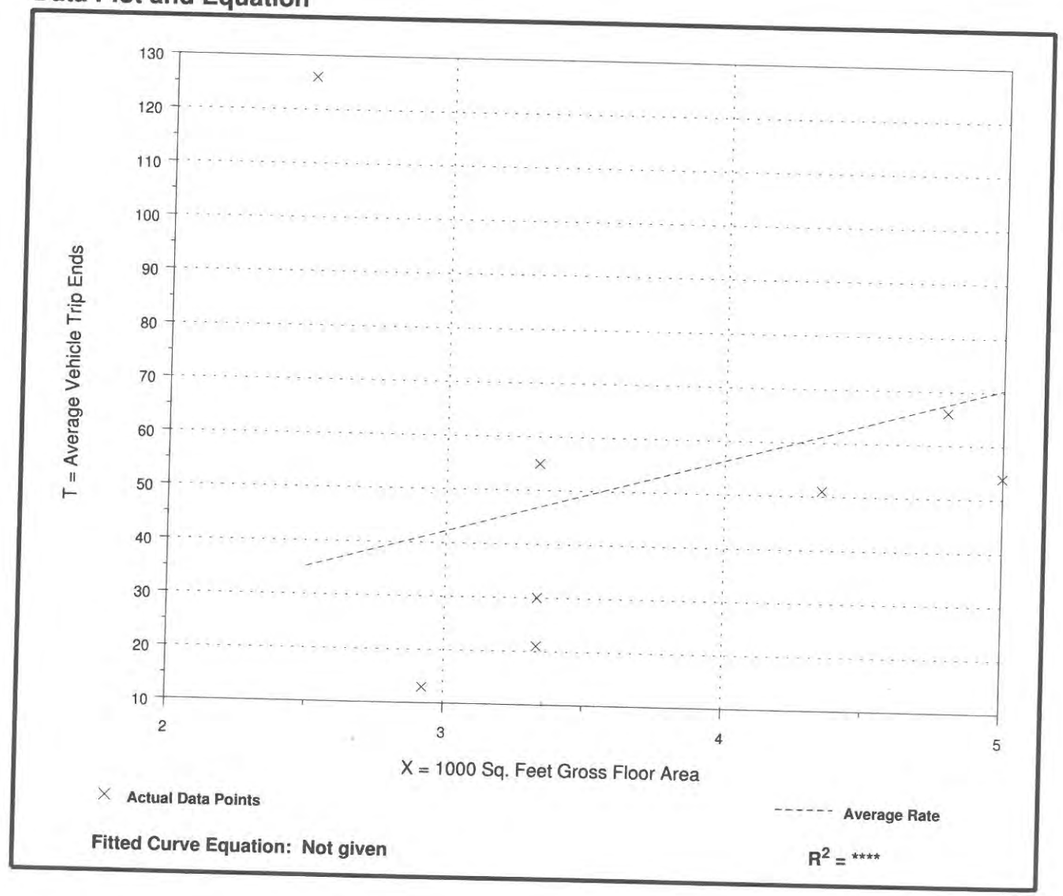
Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Saturday,**
Peak Hour of Generator

Number of Studies: 8
Average 1000 Sq. Feet GFA: 4
Directional Distribution: 53% entering, 47% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
14.07	4.44 - 50.40	12.19

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Sunday

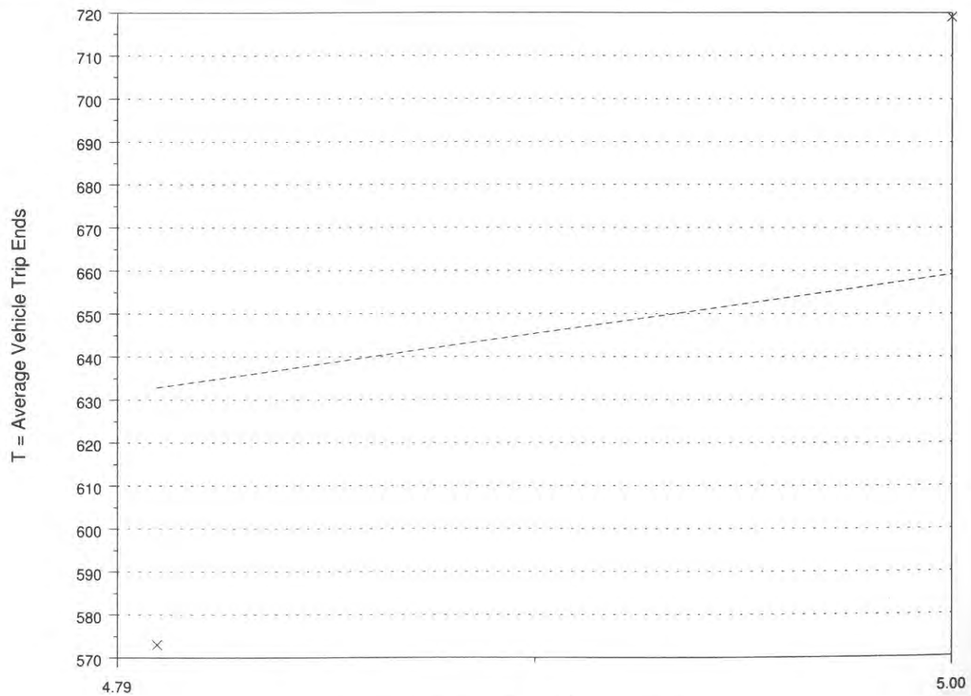
Number of Studies: 2
Average 1000 Sq. Feet GFA: 5
Directional Distribution: 50% entering, 50% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
131.84	119.38 - 143.80	*

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Sunday,
Peak Hour of Generator

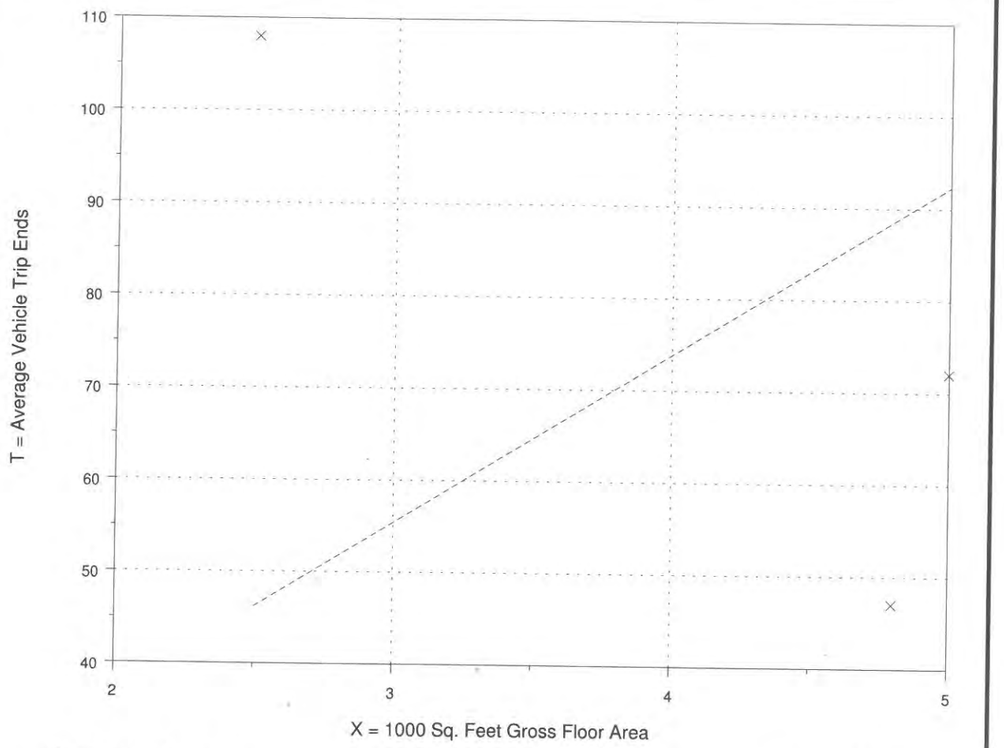
Number of Studies: 3
Average 1000 Sq. Feet GFA: 4
Directional Distribution: 55% entering, 45% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
18.46	9.79 - 43.20	13.74

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

Average Vehicle Trip Ends vs: **Seats**
On a: **Weekday**

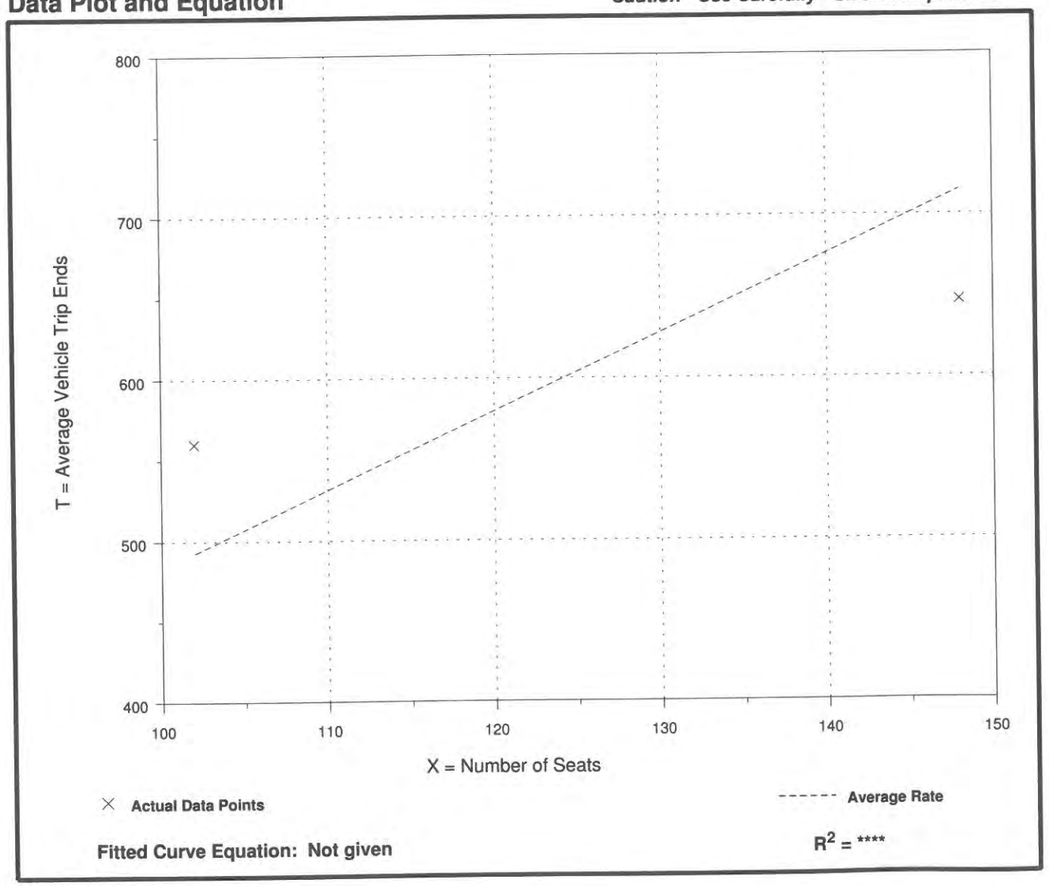
Number of Studies: 2
Average Number of Seats: 125
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
4.83	4.37 - 5.49	*

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

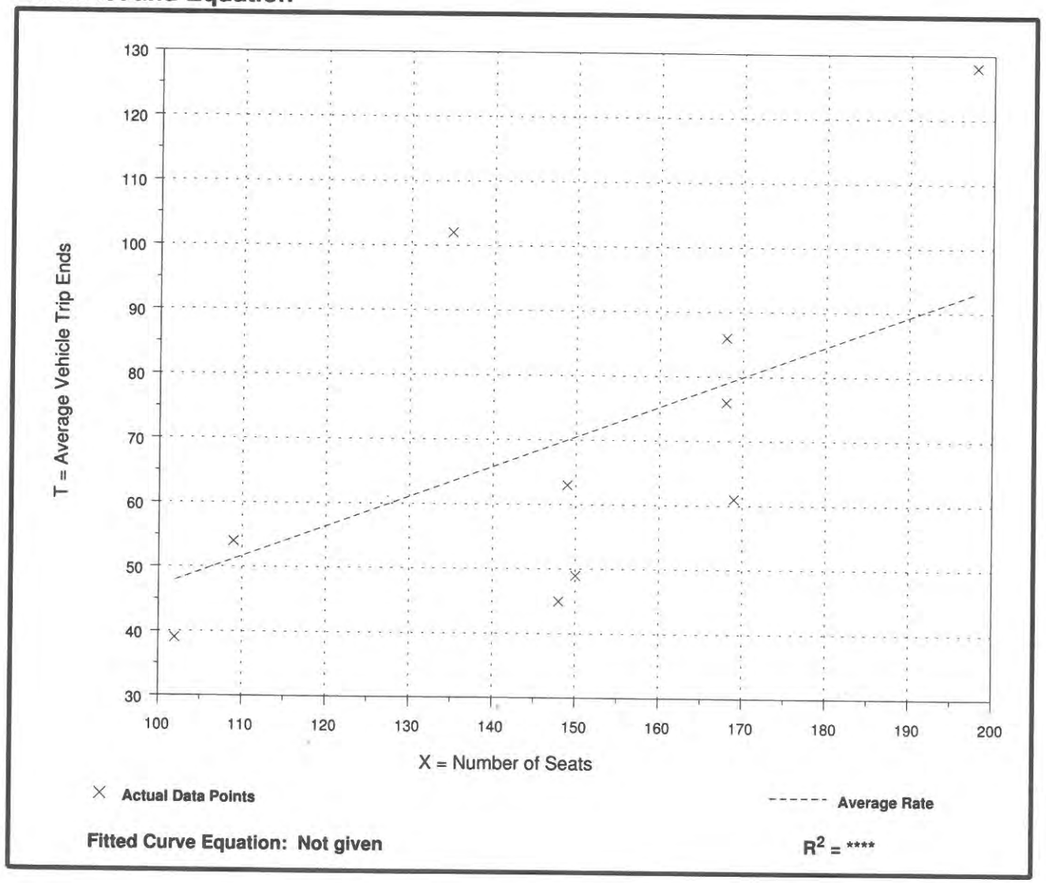
Average Vehicle Trip Ends vs: **Seats**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 10
Average Number of Seats: 150
Directional Distribution: 52% entering, 48% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
0.47	0.30 - 0.76	0.70

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

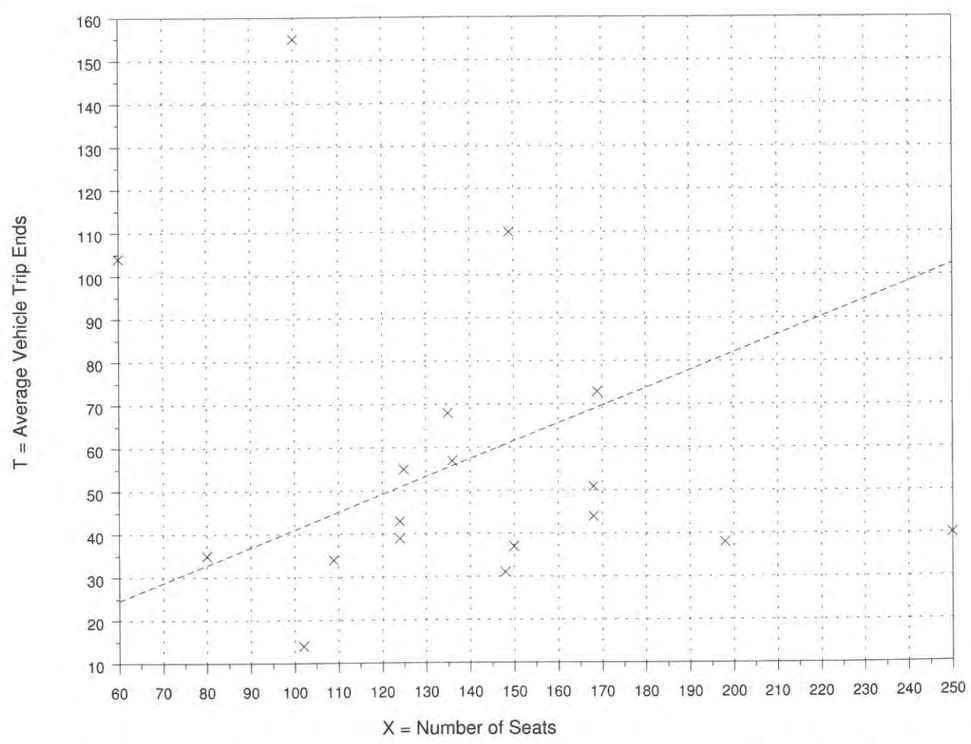
Average Vehicle Trip Ends vs: **Seats**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 18
Average Number of Seats: 139
Directional Distribution: 57% entering, 43% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
0.41	0.14 - 1.73	0.73

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

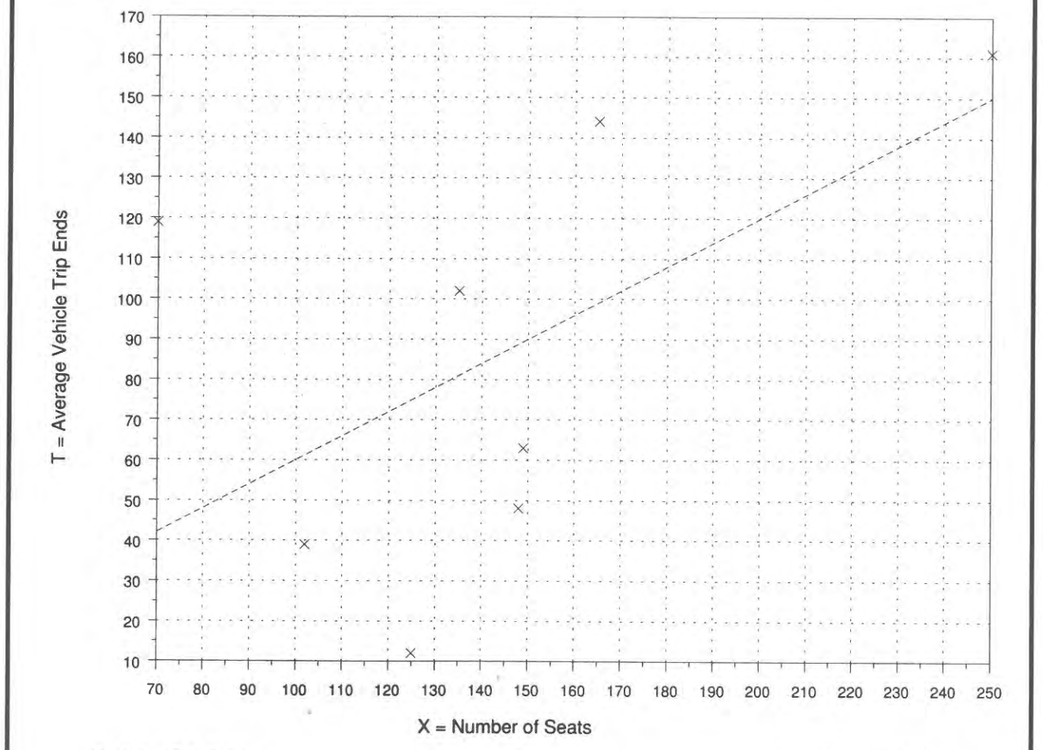
Average Vehicle Trip Ends vs: **Seats**
On a: **Weekday,**
A.M. Peak Hour of Generator

Number of Studies: 8
Average Number of Seats: 143
Directional Distribution: 58% entering, 42% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
0.60	0.10 - 1.70	0.86

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

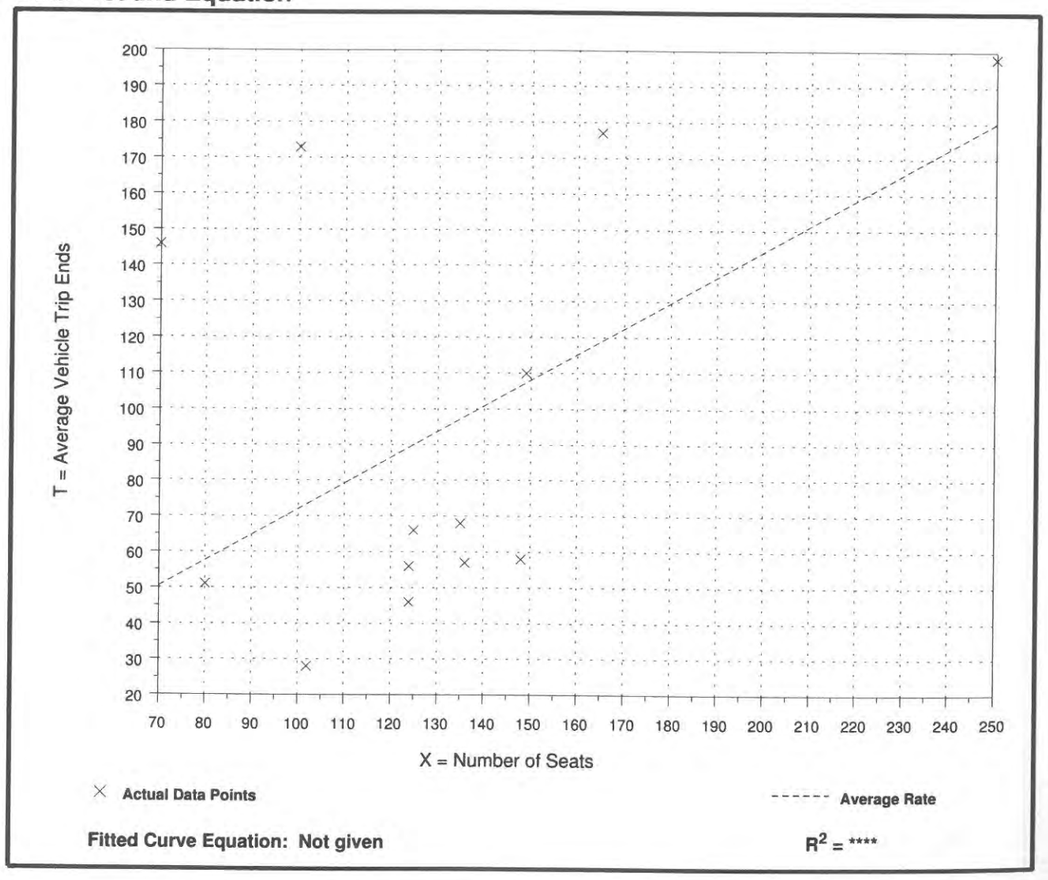
Average Vehicle Trip Ends vs: **Seats**
On a: **Weekday,**
P.M. Peak Hour of Generator

Number of Studies: 13
Average Number of Seats: 131
Directional Distribution: 52% entering, 48% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
0.72	0.27 - 2.09	0.96

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

Average Vehicle Trip Ends vs: **Seats**
On a: **Saturday**

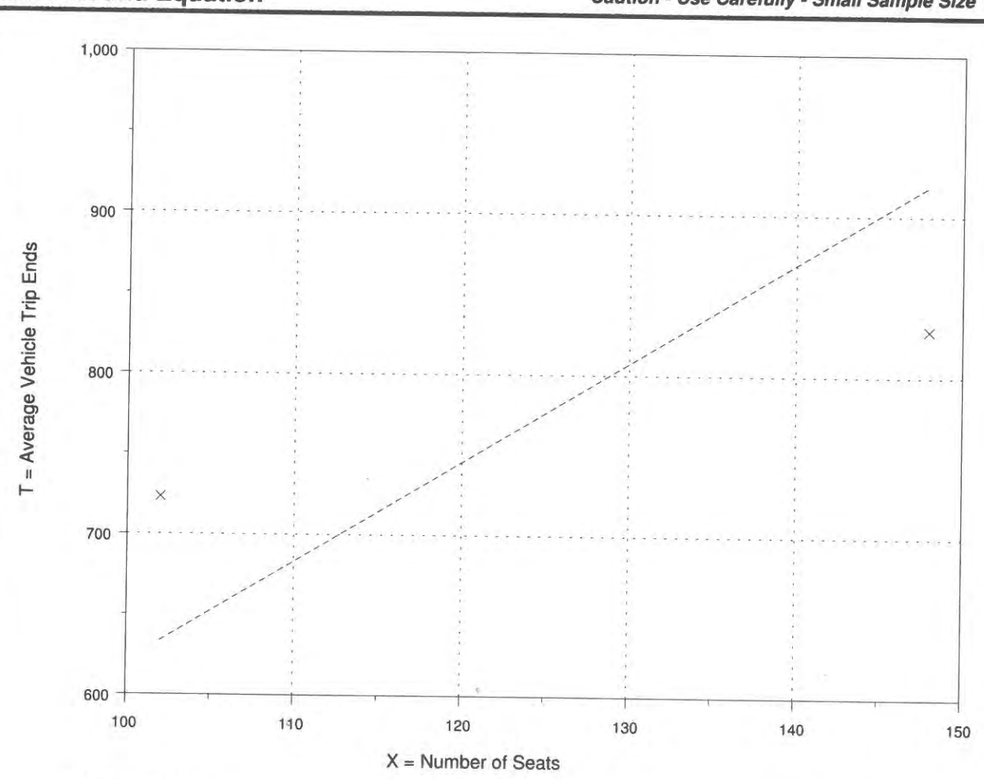
Number of Studies: 2
Average Number of Seats: 125
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
6.21	5.60 - 7.09	*

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

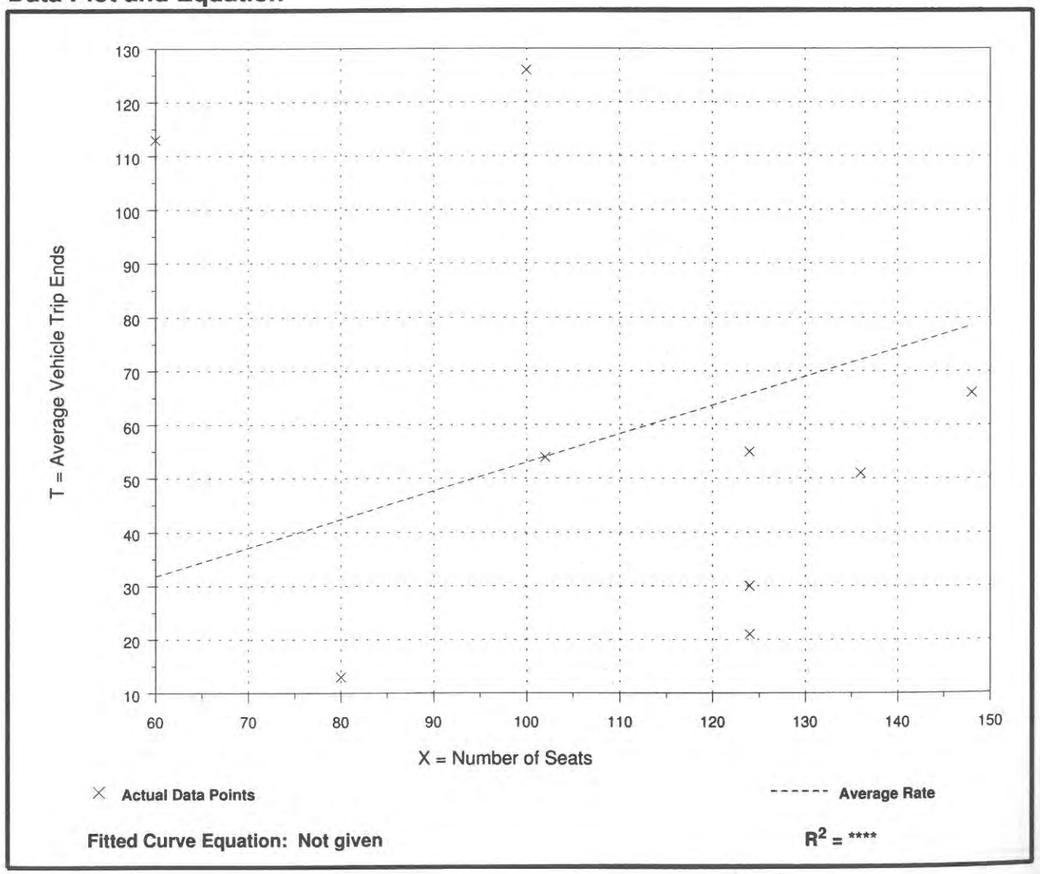
Average Vehicle Trip Ends vs: Seats
On a: Saturday,
Peak Hour of Generator

Number of Studies: 9
Average Number of Seats: 111
Directional Distribution: 53% entering, 47% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
0.53	0.16 - 1.88	0.86

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

Average Vehicle Trip Ends vs: Seats
On a: Sunday

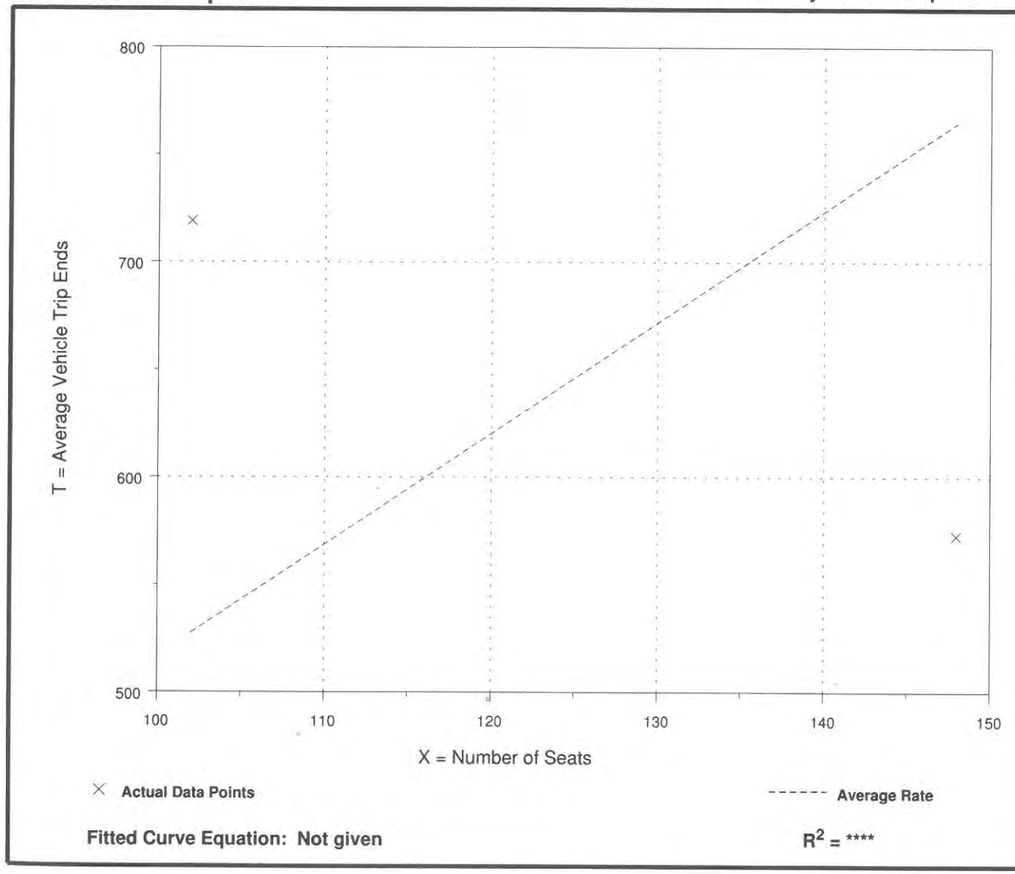
Number of Studies: 2
Average Number of Seats: 125
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
5.17	3.87 - 7.05	*

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

Average Vehicle Trip Ends vs: **Seats**
On a: **Sunday,**
Peak Hour of Generator

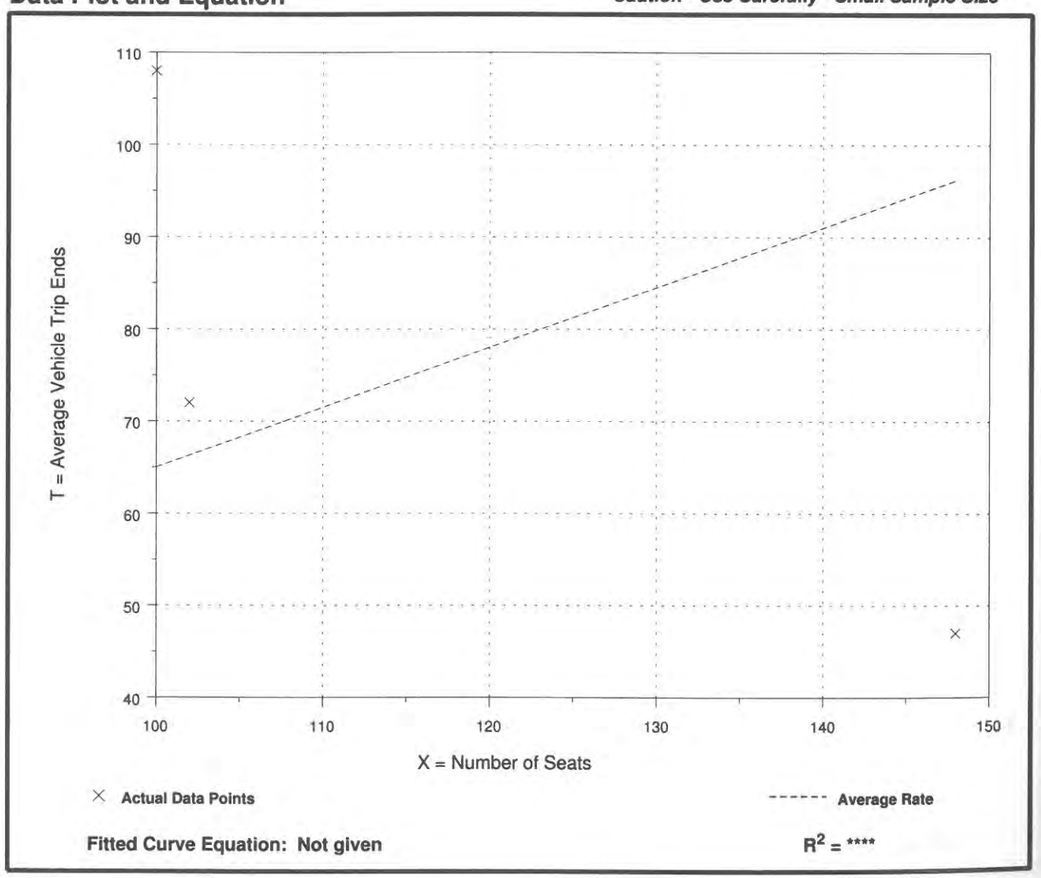
Number of Studies: 3
Average Number of Seats: 117
Directional Distribution: 55% entering, 45% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
0.65	0.32 - 1.08	0.86

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Land Use: 933
Fast-Food Restaurant without Drive-Through Window

Description

This land use includes fast-food restaurants without drive-through windows. This type of restaurant is characterized by a large carry-out clientele, long hours of service (some are open for breakfast, all are open for lunch and dinner, some are open late at night or 24 hours per day) and high turnover rates for eat-in customers. These limited-service eating establishments do not provide table service. Patrons generally order at a cash register and pay before they eat. High-turnover (sit-down) restaurant (Land Use 932), fast-food restaurant with drive-through window (Land Use 934) and fast-food restaurant with drive-through window and no indoor seating (Land Use 935) are related uses.

Additional Data

Although the facilities in this land use may or may not be open for breakfast, it was confirmed that the data provided during the A.M. peak periods were strictly for facilities that were open during this time frame.

The outdoor seating area is not included in the overall gross floor area. Therefore, the number of seats may be a more reliable independent variable on which to establish trip generation rates for facilities having significant outdoor seating.

The sites were surveyed between the 1980s and the 2000s throughout the United States.

It has been speculated that hamburger restaurants may generate trips at a higher rate than other types of fast-food restaurants. The database was tested in an attempt to verify this assumption; the data neither verified nor disproved it. Future research is needed in this area.

Specialized Land Use Data

Current industry trends have resulted in the emergence of several new fast-food restaurants without drive-through windows that specialize in the sale of very specific food items. The trip generation characteristics of these facilities differ from the facilities typically contained in this land use; their sizes, trip generation rates and peak hour of service vary considerably. Another notable difference in these land uses is that they are typically not stand-alone facilities; these restaurants are generally located in small shopping centers. Therefore, the information collected for these facilities is presented in the following table and was excluded from the data plots.

Table: Yogurt Shop

Independent Variable	Trip Generation Rate	Size of Independent Variable	Number of Studies	Directional Distribution
1,000 Square Feet Gross Floor Area				
Weekday P.M. Peak Hour of Street Adjacent Traffic	15.12	0.86	1	38% entering, 62% exiting
Weekday P.M. Peak Hour of Generator	18.60	0.86	1	50% entering, 50% exiting

Source: 414

Source Numbers

163, 247, 278, 319, 342, 414

Land Use: 933
Fast-Food Restaurant without Drive-Through Window

Independent Variables with One Observation

The following trip generation data are for independent variables with only one observation. This information is shown in this table only; there are no related plots for these data.

Users are cautioned to use data with care because of the small sample size.

Independent Variable	Trip Generation Rate	Size of Independent Variable	Number of Studies	Directional Distribution
1,000 Square Feet Gross Floor Area				
Weekday	716	1	1	50% entering, 50% exiting
Saturday	696	1	1	50% entering, 50% exiting
Saturday Peak Hour of Generator	54.55	5	1	49% entering, 51% exiting
Sunday	500	1	1	50% entering, 50% exiting
Seats				
Weekday	42.12	17	1	50% entering, 50% exiting
Weekday P.M. Peak Hour of Adjacent Street Traffic	2.13	30	1	64% entering, 36% exiting
Weekday P.M. Peak Hour of Generator	6.59	17	1	52% entering, 48% exiting
Saturday	40.94	17	1	50% entering, 50% exiting
Sunday	29.41	17	1	50% entering, 50% exiting

Fast-Food Restaurant without Drive-Through Window
(933)

Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

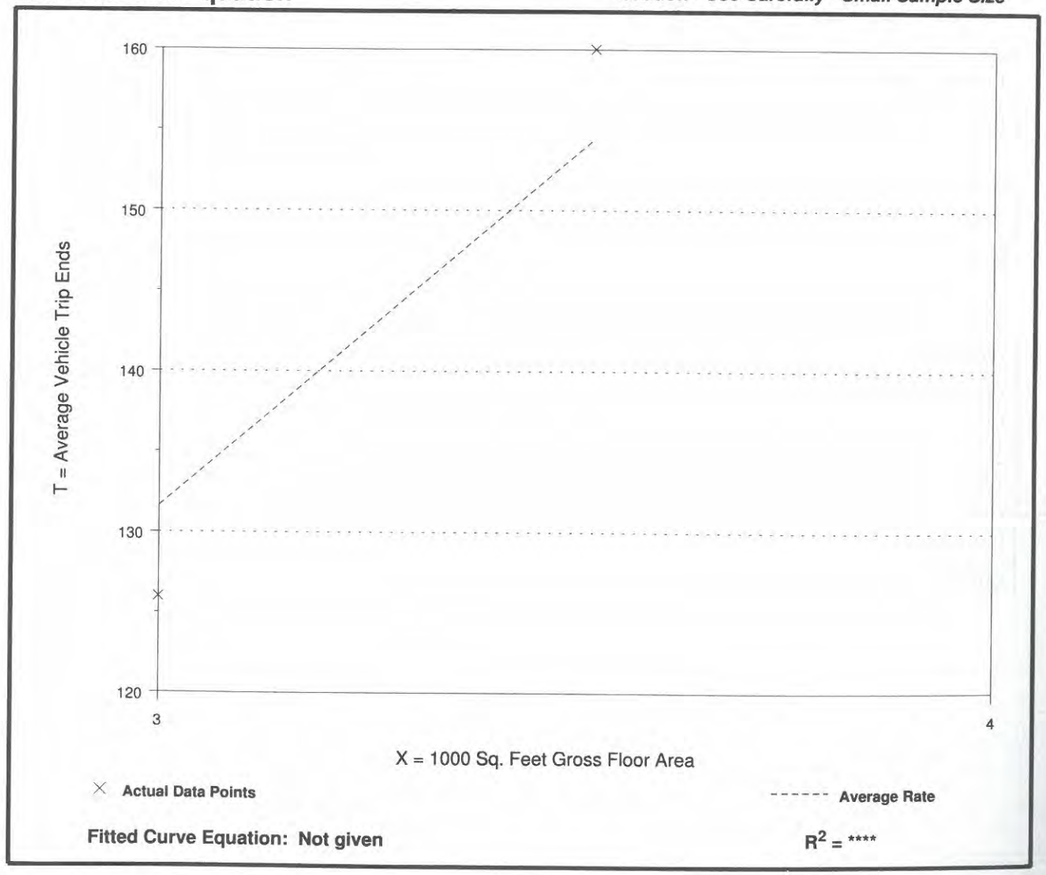
Number of Studies: 2
Average 1000 Sq. Feet GFA: 3
Directional Distribution: 60% entering, 40% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
43.87	42.00 - 45.45	*

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Fast-Food Restaurant without Drive-Through Window
(933)

Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

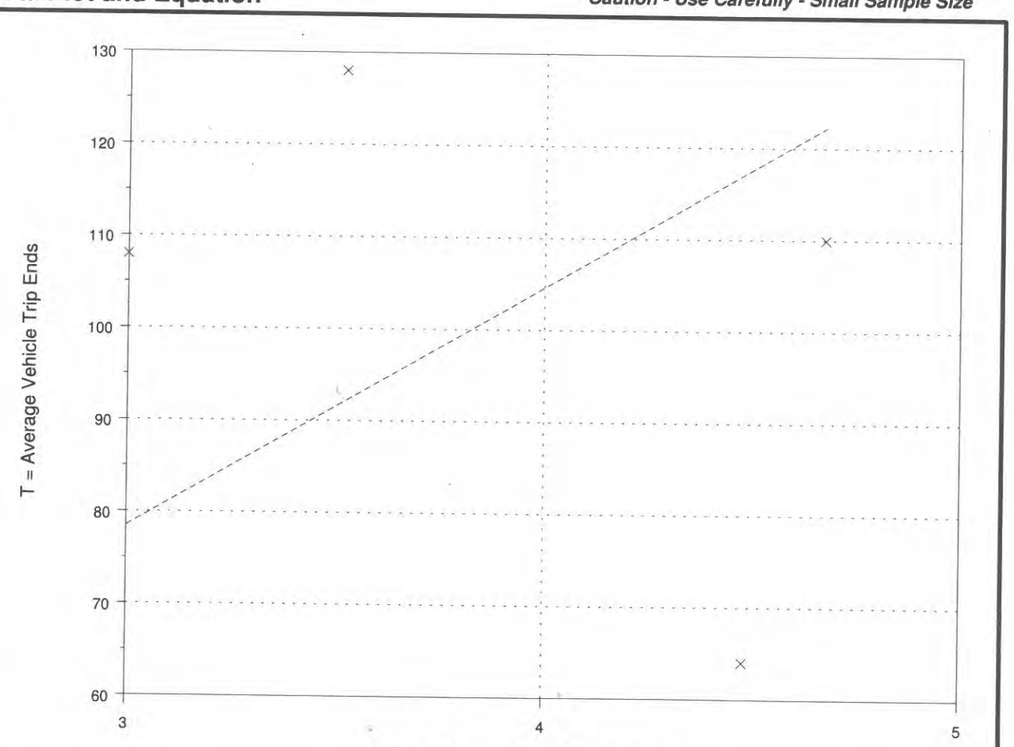
Number of Studies: 4
Average 1000 Sq. Feet GFA: 4
Directional Distribution: 51% entering, 49% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
26.15	14.28 - 36.36	10.51

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Fast-Food Restaurant without Drive-Through Window
(933)

Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday,
A.M. Peak Hour of Generator

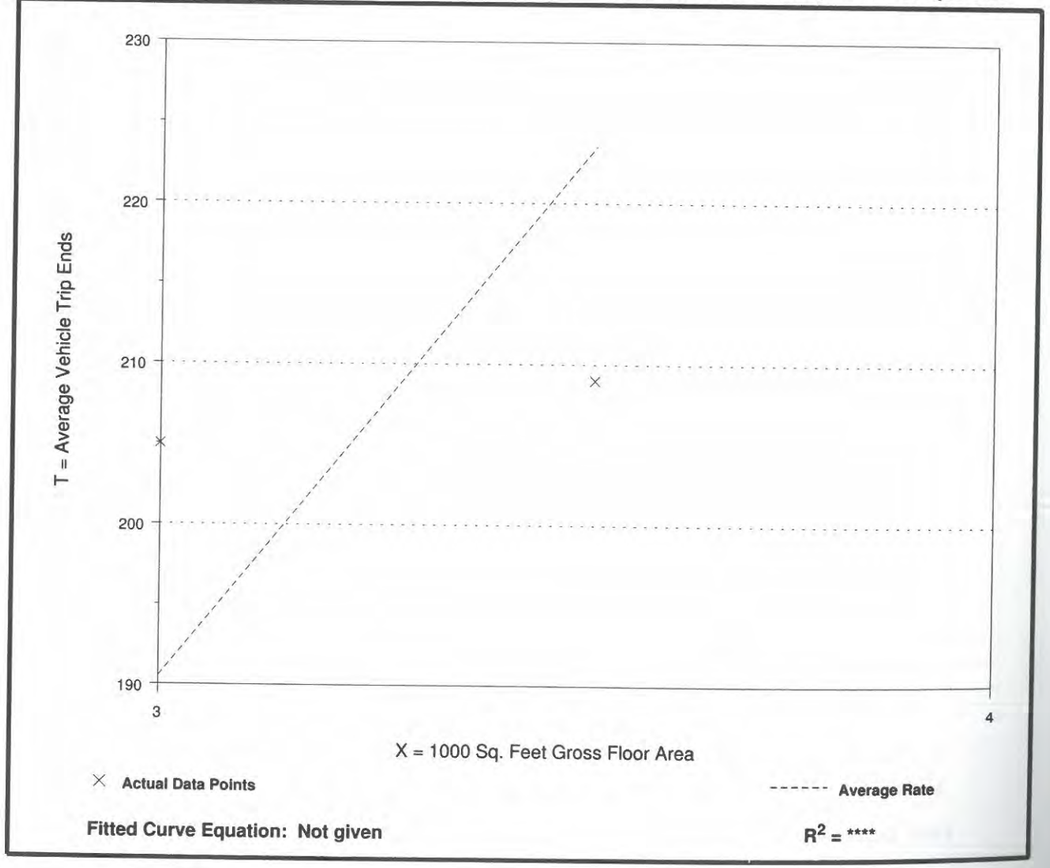
Number of Studies: 2
Average 1000 Sq. Feet GFA: 3
Directional Distribution: 52% entering, 48% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
63.50	59.38 - 68.33	*

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Fast-Food Restaurant without Drive-Through Window
(933)

Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday,
P.M. Peak Hour of Generator

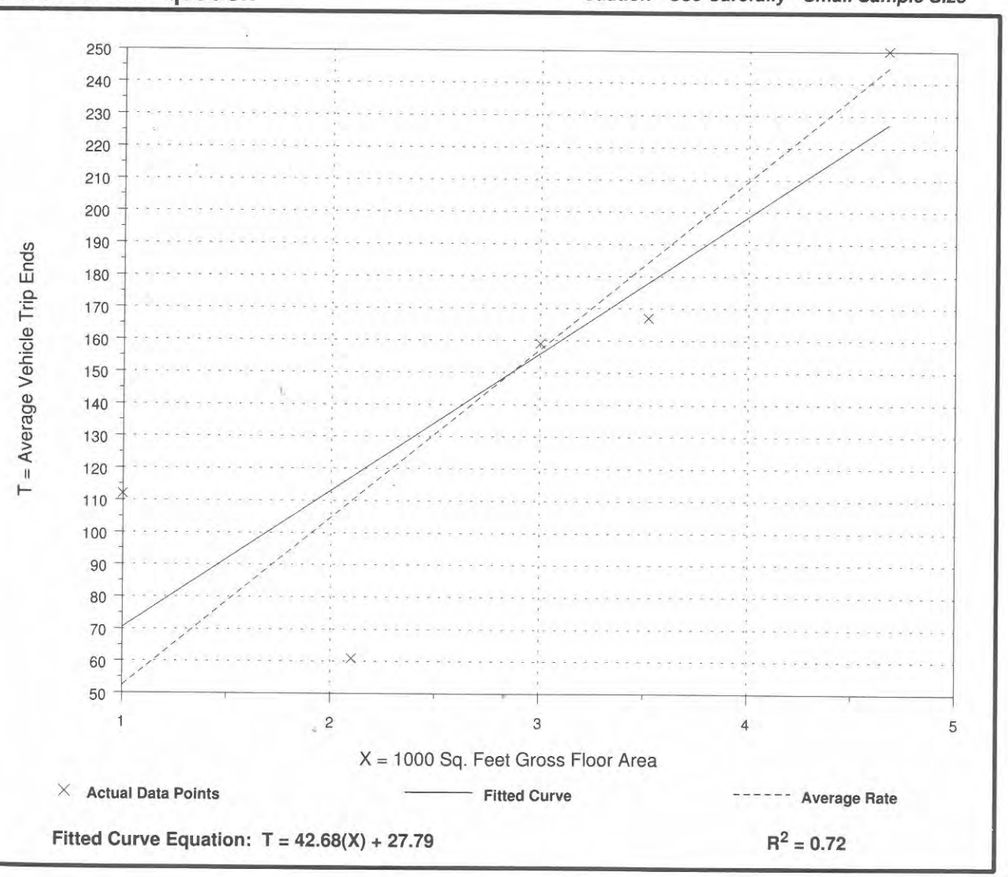
Number of Studies: 5
Average 1000 Sq. Feet GFA: 3
Directional Distribution: 51% entering, 49% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
52.40	29.05 - 112.00	19.86

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: T = 42.68(X) + 27.79

R^2 = 0.72

Gasoline/Service Station with Convenience Market
(945)

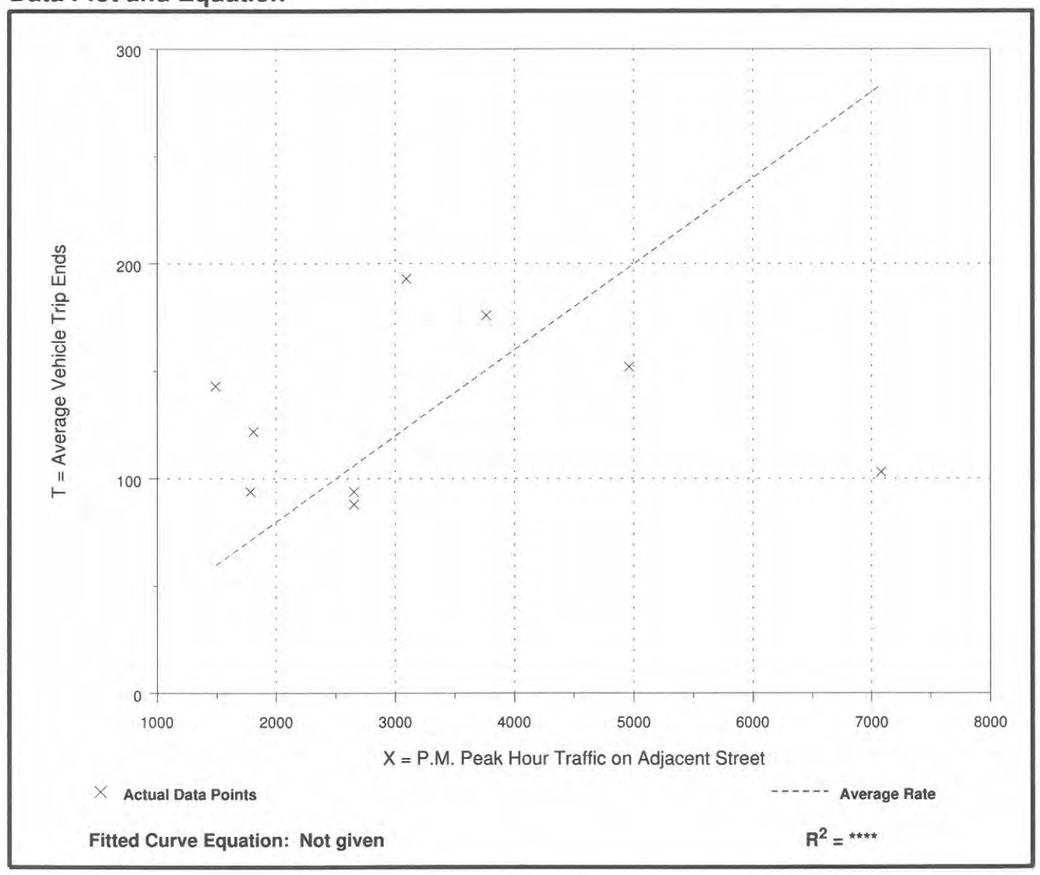
Average Vehicle Trip Ends vs: **P.M. Peak Hour Traffic on Adjacent Street**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 9
Avg. P.M. Peak Hr. Traf. on Adj. Street: 3,257
Directional Distribution: 51% entering, 49% exiting

Trip Generation per P.M. Peak Hour Traffic on Adjacent Street

Average Rate	Range of Rates	Standard Deviation
0.04	0.01 - 0.10	0.20

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

Land Use: 946
Gasoline/Service Station with Convenience Market and Car Wash

Description

This land use includes gasoline/service stations with convenience markets and car washes where the primary business is the fueling of motor vehicles. They may also have ancillary facilities for servicing and repairing motor vehicles. These service stations are generally located at intersections or interchanges. Convenience market (open 24 hours) (Land Use 851), convenience market (open 15-16 hours) (Land Use 852), convenience market with gasoline pumps (Land Use 853), gasoline/service station (Land Use 944) and gasoline/service station with convenience market (Land Use 945) are related uses.

Additional Data

For the purpose of this land use, the independent variable, vehicle fueling positions, is defined as the maximum number of vehicles that can be fueled simultaneously.

Gasoline/service stations in this land use include "pay-at-the-pump" and traditional fueling stations.

The sites were surveyed between the late 1980s and the 2000s throughout the United States.

Source Numbers

334, 340, 347, 348, 355, 385, 440, 445, 540, 580, 586, 617

oline/Service Station with Convenience Market and Car Wash
(946)

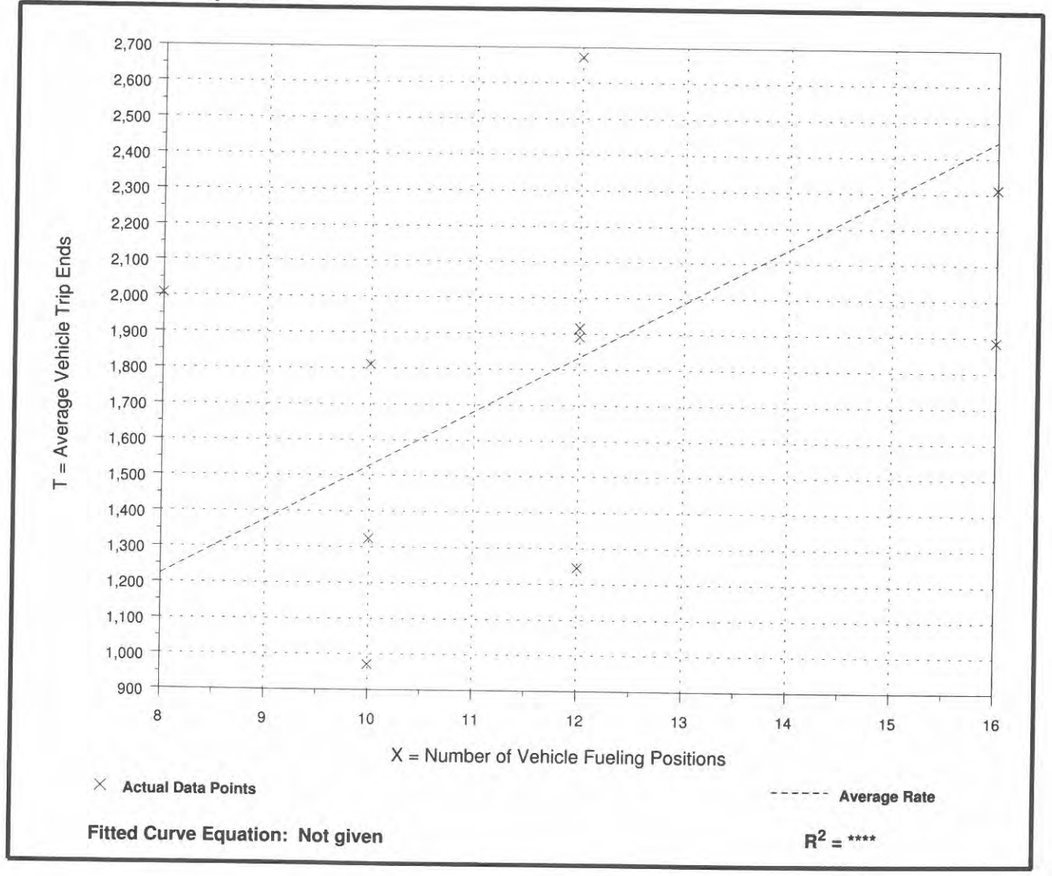
Average Vehicle Trip Ends vs: Vehicle Fueling Positions
On a: Weekday

Number of Studies: 10
Average Vehicle Fueling Positions: 12
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
152.84	97.20 - 250.88	45.80

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

Gasoline/Service Station with Convenience Market and Car Wash
(946)

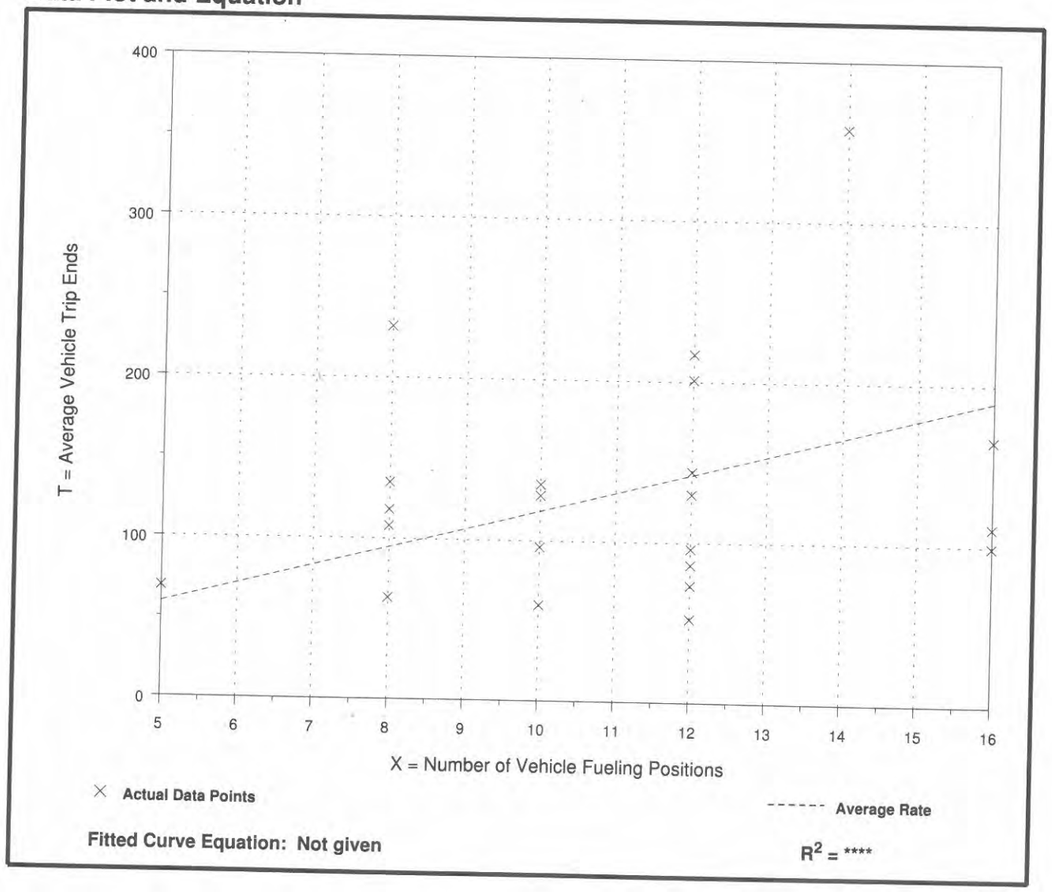
Average Vehicle Trip Ends vs: Vehicle Fueling Positions
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 22
Average Vehicle Fueling Positions: 11
Directional Distribution: 51% entering, 49% exiting

Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
11.84	4.33 - 29.00	6.95

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

Gasoline/Service Station with Convenience Market and Car Wash
(946)

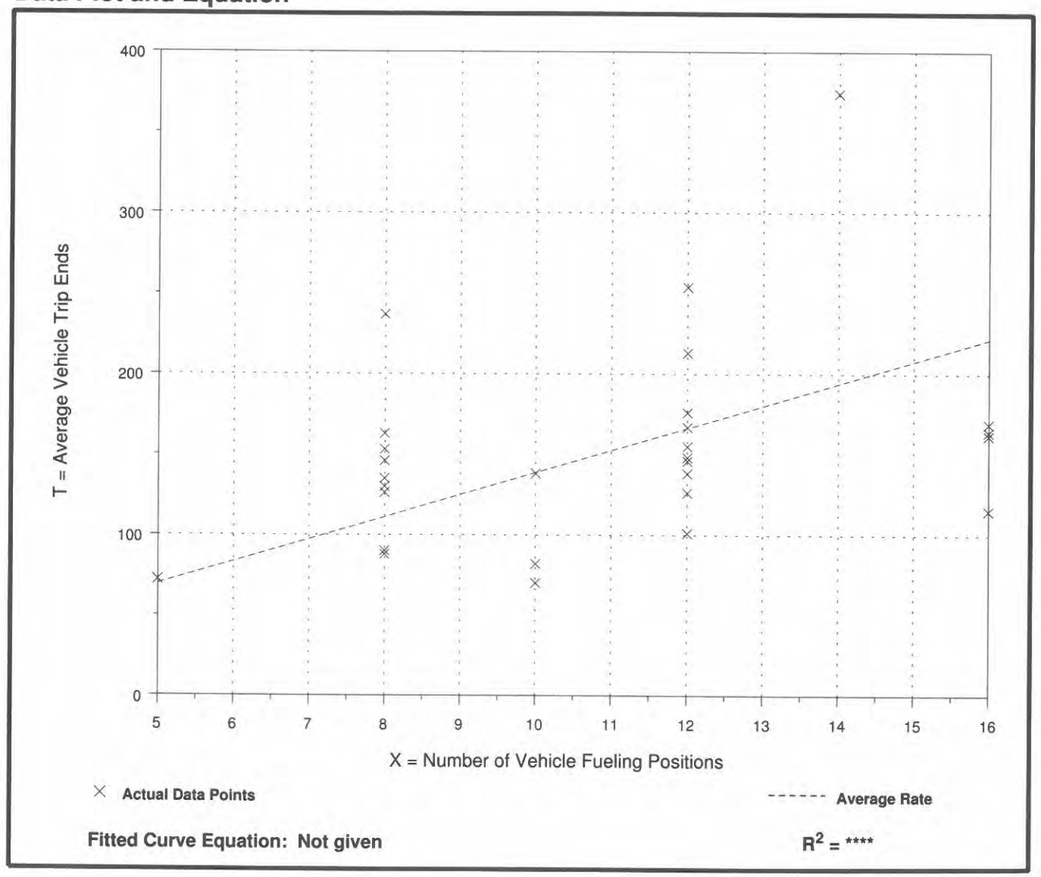
Average Vehicle Trip Ends vs: Vehicle Fueling Positions
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 30
Average Vehicle Fueling Positions: 11
Directional Distribution: 51% entering, 49% exiting

Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
13.86	7.00 - 29.63	6.31

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

Gasoline/Service Station with Convenience Market and Car Wash
(946)

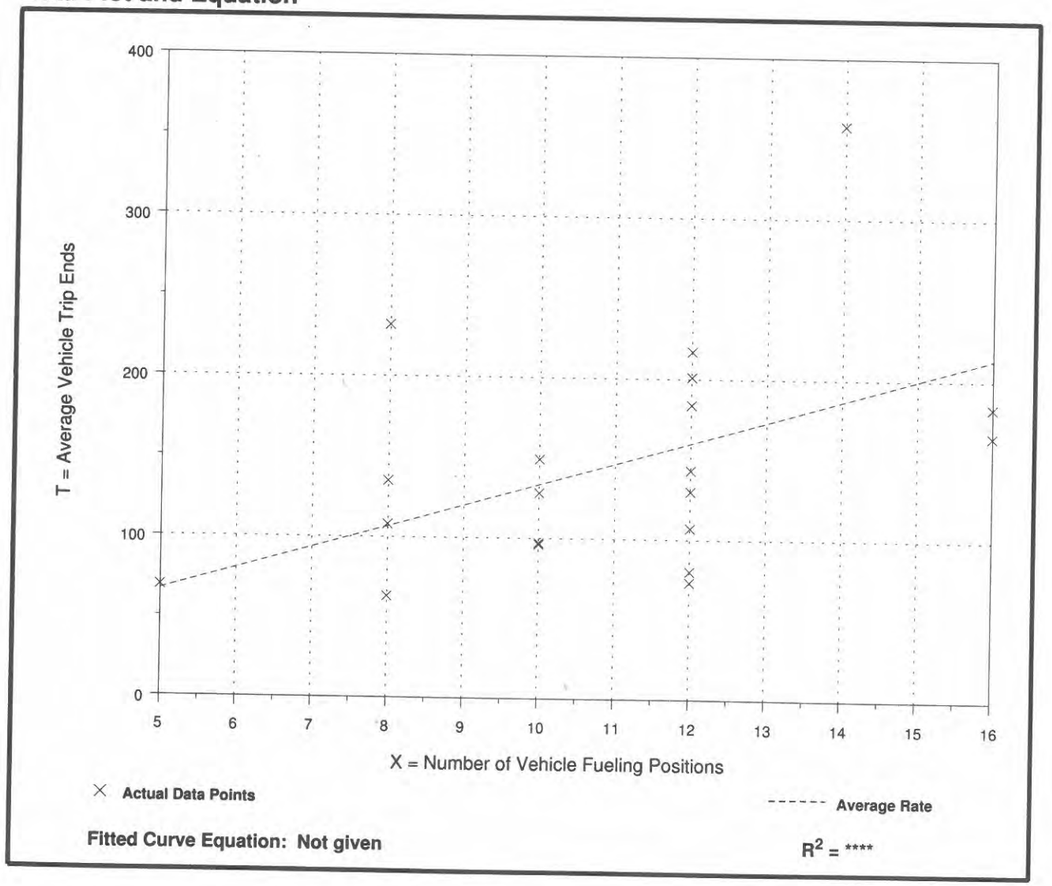
Average Vehicle Trip Ends vs: Vehicle Fueling Positions
On a: Weekday,
A.M. Peak Hour of Generator

Number of Studies: 20
Average Vehicle Fueling Positions: 11
Directional Distribution: 51% entering, 49% exiting

Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
13.32	6.08 - 29.00	6.60

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

Gasoline/Service Station with Convenience Market and Car Wash
(946)

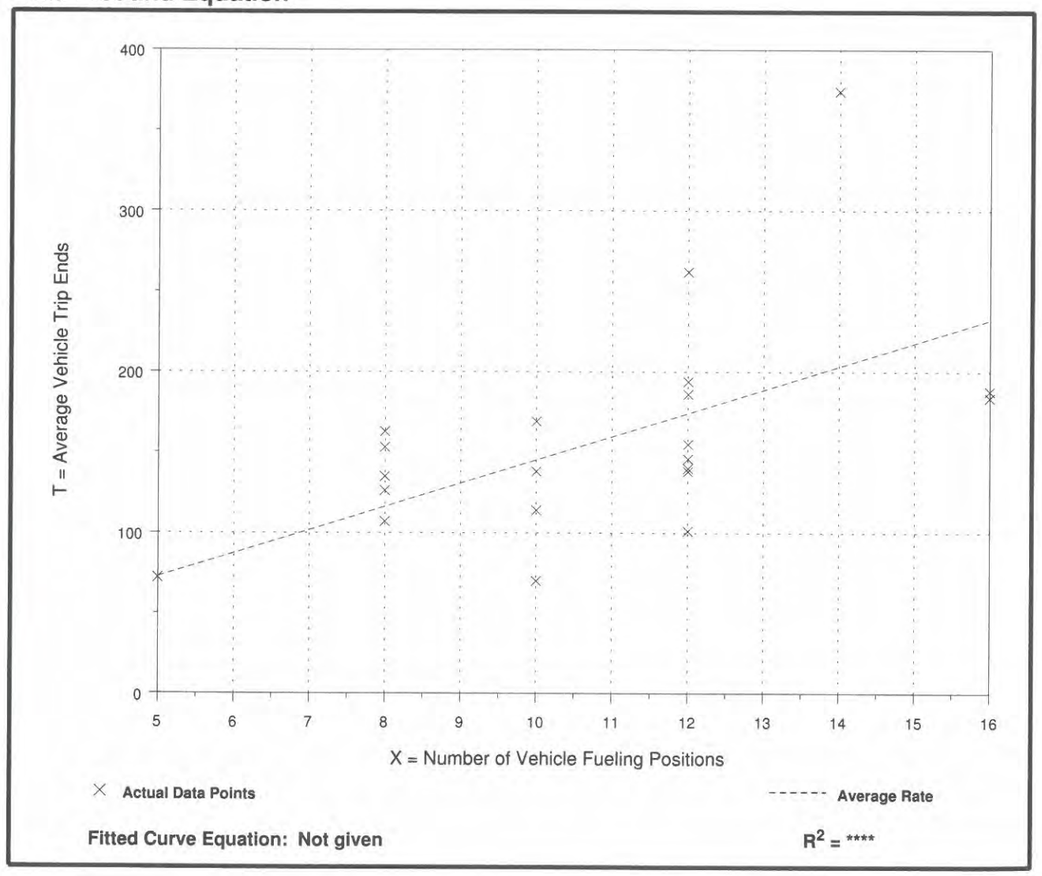
Average Vehicle Trip Ends vs: Vehicle Fueling Positions
On a: Weekday,
P.M. Peak Hour of Generator

Number of Studies: 22
Average Vehicle Fueling Positions: 11
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
14.52	7.00 - 26.71	5.87

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

Gasoline/Service Station with Convenience Market and Car Wash
(946)

Average Vehicle Trip Ends vs: Vehicle Fueling Positions
On a: Saturday,
Peak Hour of Generator

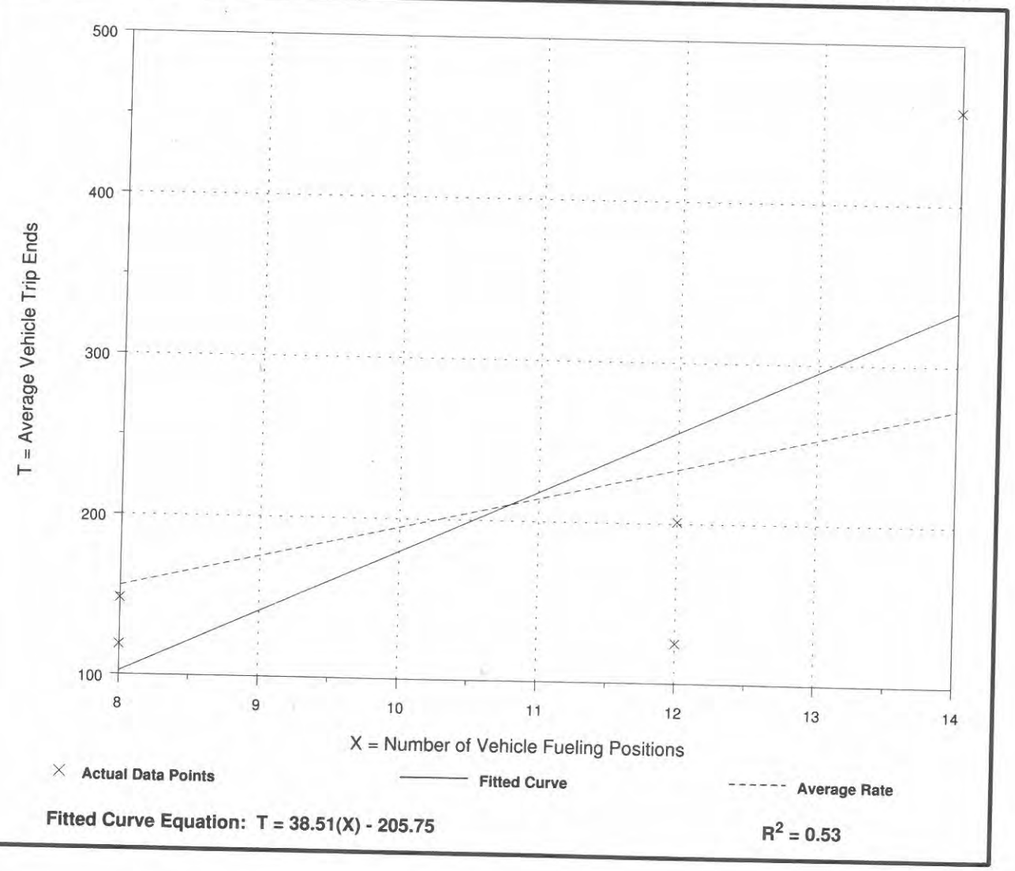
Number of Studies: 5
Average Vehicle Fueling Positions: 11
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
19.46	10.42 - 32.71	9.38

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: T = 38.51(X) - 205.75

R^2 = 0.53

Table 5.29
Pass-By Trips and Diverted Linked Trips
Weekday, a.m. Peak Period

Land Use 945—Gasoline/Service Station with Convenience Market

SIZE (1,000 SQ. FT. GFA)	VEHICLE FUELING POSITIONS	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PRIMARY TRIP (%)	NON-PASS-BY TRIP (%)	DIVERTED LINKED TRIP (%)	PASS-BY TRIP (%)	ADJ. STREET PEAK HOUR VOLUME	SOURCE
0.8	8	Louisville area, KY	1993	61	7:00–9:00 a.m.	15	—	25	60	4,000	Barton-Aschman Assoc.
0.6	8	Louisville, KY	1993	48	7:00–9:00 a.m.	13	—	19	68	1,307	Barton-Aschman Assoc.
0.7	10	Louisville, KY	1993	47	7:00–9:00 a.m.	11	—	22	67	1,105	Barton-Aschman Assoc.
0.7	8	Louisville area, KY	1993	n/a	7:00–9:00 a.m.	22	—	22	56	1,211	Barton-Aschman Assoc.
0.7	10	Louisville area, KY	1993	n/a	7:00–9:00 a.m.	31	—	12	46	1,211	Barton-Aschman Assoc.
0.3	n/a	Louisville area, KY	1993	75	7:00–9:00 a.m.	15	—	13	72	n/a	Barton-Aschman Assoc.
0.8	8	Silver Spring, MD	1992	36	7:00–9:00 a.m.	14	—	39	47	3,095	RBA
0.4	8	Derwood, MD	1992	46	7:00–9:00 a.m.	0	—	25	75	3,770	RBA
2.2	8	Kensington, MD	1992	31	7:00–9:00 a.m.	34	—	19	47	1,785	RBA
1	8	Silver Spring, MD	1992	35	7:00–9:00 a.m.	9	—	13	78	7,080	RBA

Average Pass-By Trip Percentage: 62

Figure 5.15 Gasoline/Service Station with Convenience Market (945)

Average Pass-By Trip Percentage vs: 1,000 Sq. Feet Gross Floor Area
On a: Weekday, a.m. Peak Period
Number of Studies: 10
Average 1,000 Sq. Feet GFA: 0.8

Data Plot

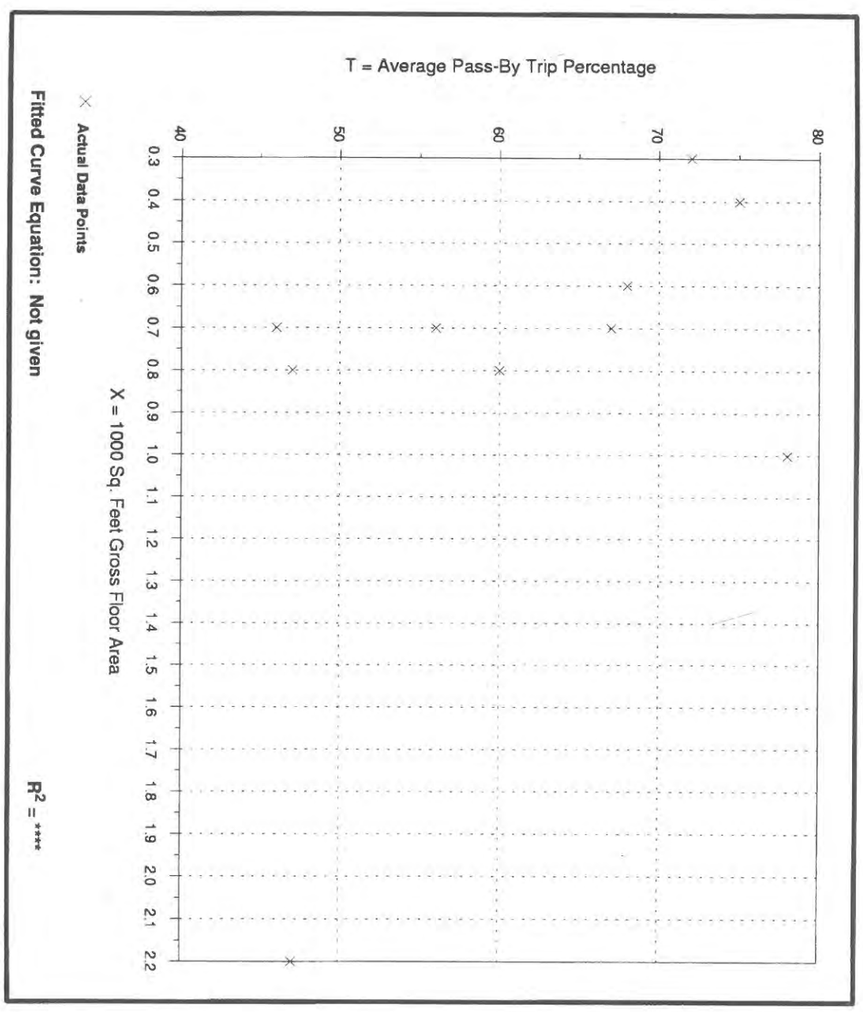


Table 5.30
Pass-By Trips and Diverted Linked Trips
Weekday, p.m. Peak Period

Land Use 945—Gasoline/Service Station with Convenience Market

SIZE (1,000 SQ. FT. GFA)	VEHICLE FUELING POSITIONS	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PRIMARY TRIP (%)	NON-PASS-BY TRIP (%)	DIVERTED LINKED TRIP (%)	PASS-BY TRIP (%)	ADJ. STREET PEAK HOUR VOLUME	SOURCE
0.8	8	Louisville area, KY	1993	83	4:00–6:00 p.m.	8	—	40	52	4,965	Barton-Aschman Assoc.
0.6	8	Louisville, KY	1993	60	4:00–6:00 p.m.	20	—	27	53	1,491	Barton-Aschman Assoc.
0.7	10	Louisville, KY	1993	n/a	4:00–6:00 p.m.	19	—	24	57	1,812	Barton-Aschman Assoc.
0.7	8	Louisville area, KY	1993	n/a	4:00–6:00 p.m.	7	—	21	72	2,657	Barton-Aschman Assoc.
0.7	10	Louisville area, KY	1993	n/a	4:00–6:00 p.m.	16	—	29	55	2,657	Barton-Aschman Assoc.
0.8	8	Silver Spring, MD	1992	36	4:00–6:00 p.m.	14	—	19	67	3,095	RBA
0.4	8	Derwood, MD	1992	46	4:00–6:00 p.m.	11	—	43	46	3,770	RBA
2.1	8	Kensington, MD	1992	31	4:00–6:00 p.m.	13	—	35	52	1,785	RBA
1	8	Silver Spring, MD	1992	35	4:00–6:00 p.m.	3	—	43	54	7,080	RBA

Average Pass-By Trip Percentage: 56

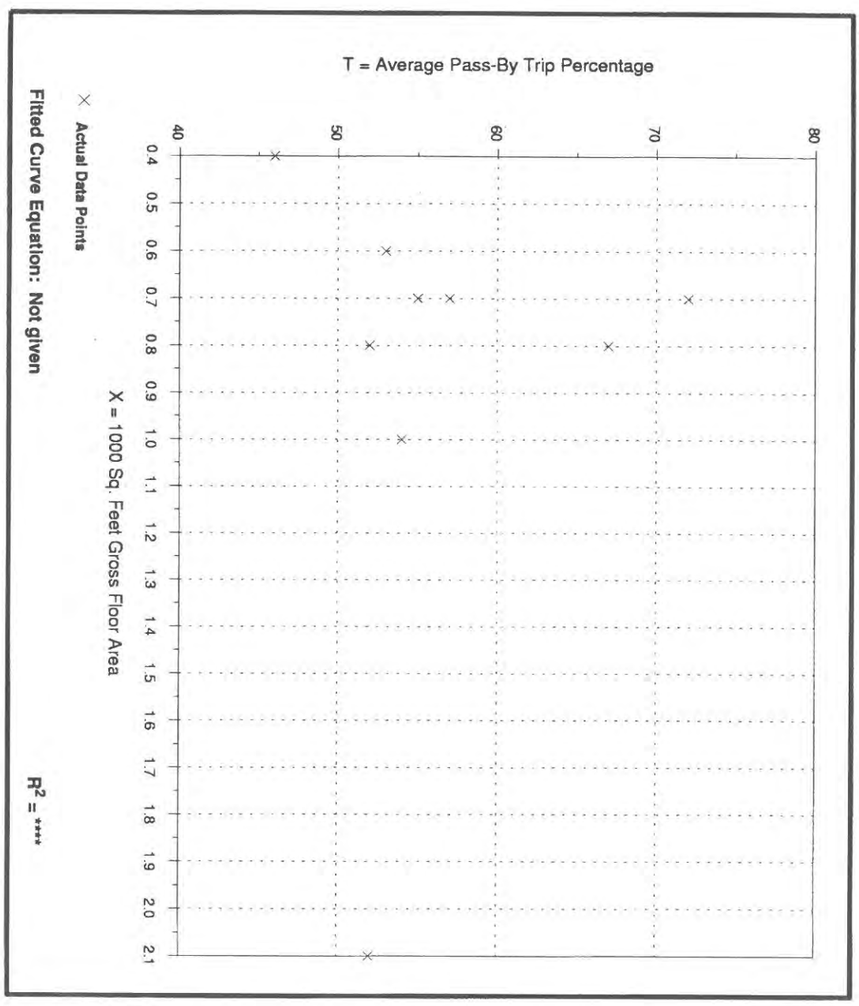


Figure 5.16 Gasoline/Service Station with Convenience Market (945)

Average Pass-By Trip Percentage vs: 1,000 Sq. Feet Gross Floor Area
On a: Weekday, p.m. Peak Period
Number of Studies: 9
Average 1,000 Sq. Feet GFA: 0.9

5.5 A Guide for Establishing Pass-By Trip-Making Estimates

Presented below is a guide for establishing an estimate for pass-by trip-making. The analyst has two basic options: (1) derive a pass-by estimate from Tables 5.2–5.30 and Figures 5.3–5.16 presented on the preceding pages, or (2) collect relevant local data on pass-by trip-making. If the latter is chosen, surveys should be conducted at similar existing developments (on the same major roadways if feasible). Pass-by trips should be surveyed for the desired analysis hours. Adjacent street traffic volumes should also be determined for these hours. Section 5.6 provides guidance on desirable sample sizes and the survey instrument.

The guidance provided in this section deals directly with pass-by trip estimation. A similar procedure can be used for estimating diverted linked trips and primary trips.

If a regression curve is provided, the equation should be used as a starting point for pass-by trip estimation. Consideration should then be given to the data scatter at the size of the independent variable in question.

If a regression equation is not provided, the average rate derived from the pass-by data presented in Section 5.4 should be considered as

The level of accuracy in estimating pass-by percentages is typically not as great as that available for estimating overall trip generation.

a starting point for estimating pass-by trip-making if the following criteria are met:

- Sample consists of three or more data points; and
- Size of the proposed development (in terms of the independent variable unit of measurement) is within the range of the data points provided in the table or the figure.

The analyst should start with the average rate listed in the pertinent table and make appropriate refinements, if circumstances dictate. For example, a review of the data or of the data plot might indicate that the development site in question could be expected to have a slightly higher or lower pass-by rate due to its size, location, or proximity to through-traffic.

If the above criteria are not met for the data provided in this handbook, it is recommended that local data be collected to supplement the existing database. The analyst should also recognize that the pass-by survey results are presented in the tables and the figures regardless of the survey sample size and its effect on potential error in estimating the pass-by trips for the surveyed site.

5.6 Recommended Data Collection Procedures

Additional studies are still desired in all land use categories characterized by a significant number of pass-by trips. Transportation professionals, developers and others are encouraged to collect and submit pass-by data for these land uses. These additional studies will help in the future refinement of pass-by trip estimation procedures and will enable analysts to produce more accurate forecasts.

Need For Additional Data to

- **Broaden database on observed pass-by percentages**
- **Identify and evaluate more independent variables against which to correlate pass-by percentages**
- **Validate the percentages shown in this handbook**
- **Add data for new land use classifications**

The following text describes the data needed for a pass-by study, potential independent variables, a suggested approach for collecting pass-by trip information (including a preferred survey instrument and a recommended sample size) and the data that should be submitted to ITE to refine the pass-by trip database.

Table 5.31 Minimum Sample Size for Pass-By Trip Surveys (95% level of confidence)

MAXIMUM ERROR IN MEAN	EXPECTED PERCENT PASS-BY TRIPS						
	20%	30%	40%	50%	60%	70%	Unknown
10%	61	81	92	96	92	81	96
15%	27	36	41	43	41	36	43

Pass-By Survey Sample Size

The number of pass-by interviews should meet the minimum sample size requirements listed in Table 5.31. The analyst should make an initial estimate of the expected percentage of pass-by trips. Figures 5.3 through 5.16 and Tables 5.2 through 5.30 can be used to derive this initial estimate. For example, for a 95 percent level of confidence and maximum error of 10 percent, a shopping center would require a minimum of 96 usable interviews if the expected pass-by trip percentage is 50 percent. If the expected pass-by percentage is 20 percent, the minimum sample size is 61 usable interviews.

It is suggested that this number of interviews be conducted on all sides of the site with access in order to not favor one roadway or one area of the site over another. If different driveways are anticipated to exhibit significantly different pass-by percentages, the minimum sample size should be met for each.

Survey Instrument

A sample form for conducting the pass-by survey is presented in Figure 5.17. Interviewers should intercept persons as they exit the site. Motorists can be interviewed quickly as they walk to their vehicle, or an interview station can be set up near the parking lot exit.

A survey response of "yes" to Question 2 should be counted as a **primary trip**. A survey response of "yes" to Question 3 should be counted as a **pass-by trip**. The remainder of the trips should be considered **diverted linked trips.**

Data Submittal

The pass-by trip survey results (as well as the site trip generation data) should be summarized in a format similar to that presented in Figure 5.18. A report that presents the site-specific information and the survey results is also an invaluable reference. At the minimum, include the following information:

- Name, address and location (city, state/province, metropolitan area) of development (note: ITE will keep the identity of the site confidential);
- Land use classification (shopping center, bank, fast-food restaurant, etc.) especially if it varies from the existing ITE land use code description;
- ITE land use code;
- Survey date and day of the week;
- Time period during which the pass-by survey was conducted;
- Number of interviews conducted;
- Volume of traffic on adjacent streets that have full or partial access to the site (hourly volume during survey period);
- Size of the development measured in the same units as specified in *Trip Generation;* and
- Size of the development in terms of other independent variables that could be collected and forecast and that might correlate to pass-by trip-making.

Data will be accepted and sources cited in subsequent editions of *Trip Generation.* The identity of specific sites will be kept confidential. Data should be transmitted to:

Institute of Transportation Engineers
1099 14th Street, NW, Suite 300W
Washington, DC 20005-3438
Tel: +1 202-289-0222
Fax: +1 202-289-7722

High-Cube Parcel Hub Warehouse
(156)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
AM Peak Hour of Generator

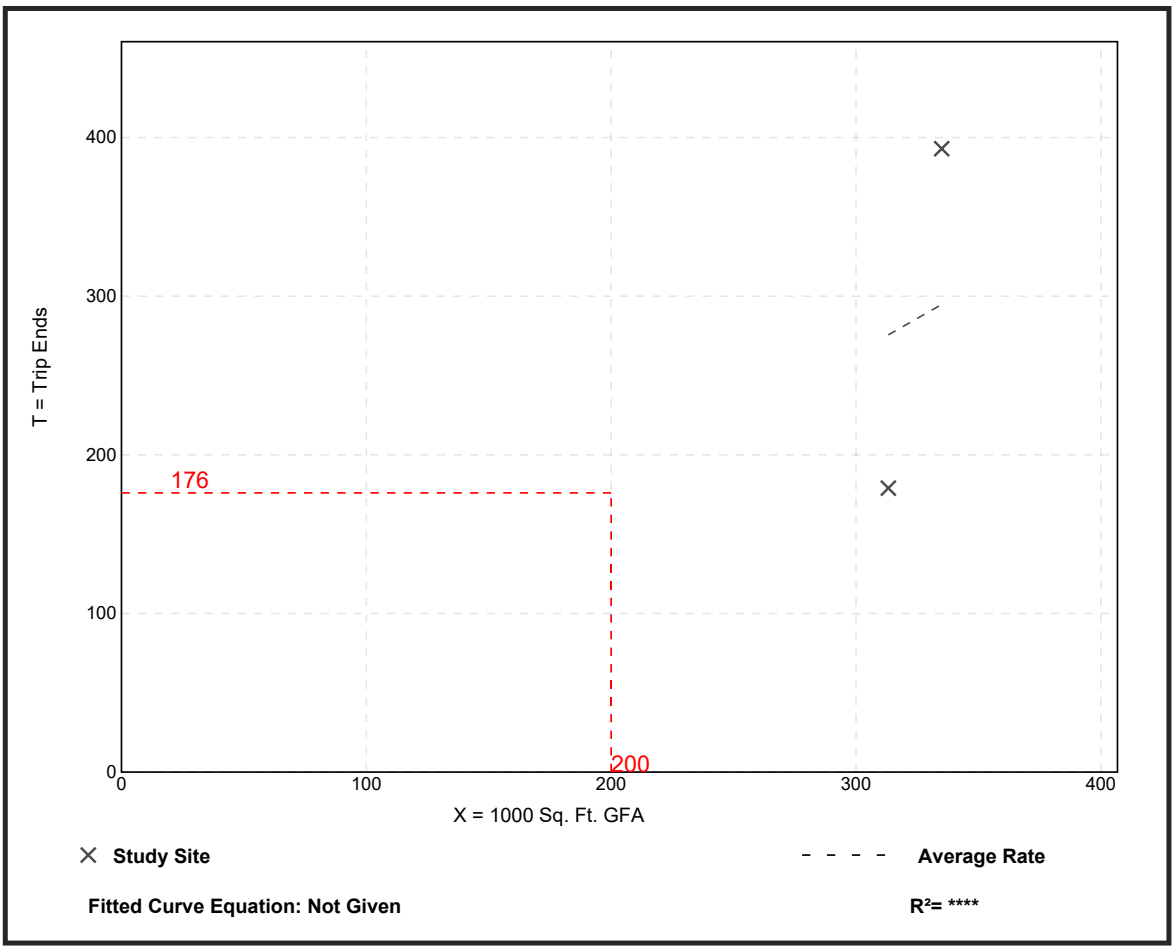
Setting/Location: **General Urban/Suburban**
Number of Studies: 2
Avg. 1000 Sq. Ft. GFA: 324
Directional Distribution: 34% entering, 66% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.88	0.57 - 1.17	*

Data Plot and Equation

Caution – Small Sample Size



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High-Cube Parcel Hub Warehouse
(156)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
PM Peak Hour of Generator

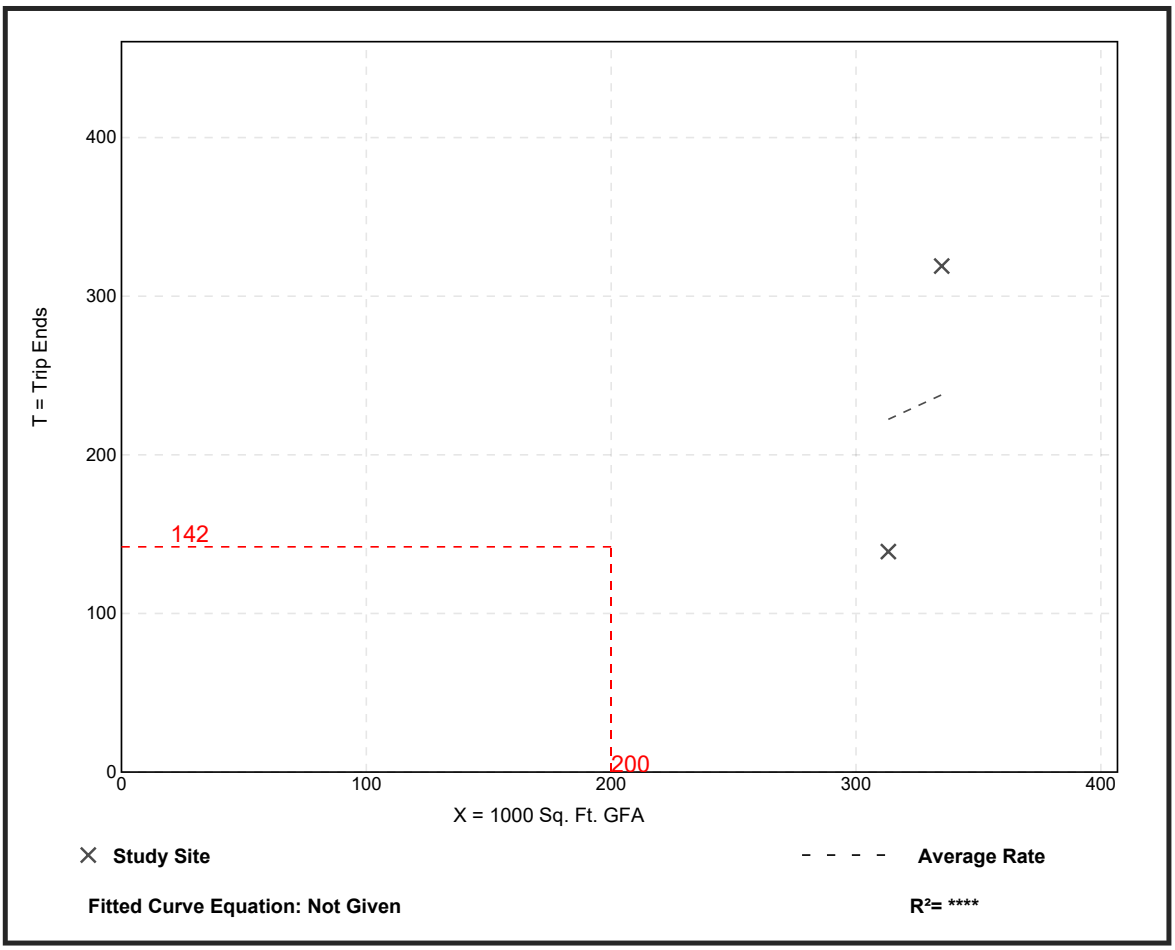
Setting/Location: **General Urban/Suburban**
Number of Studies: 2
Avg. 1000 Sq. Ft. GFA: 324
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.71	0.44 - 0.95	*

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= **

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Appendix E: Land Use for Other Background Developments Near BWI

TRAFFIC IMPACT STUDY

AIRPORT SQUARE PARCEL 221

Nursery Road
Anne Arundel County, Maryland

August, 2015

Prepared for:
Corporate Office Properties Trust

Prepared By:

TRAFFIC CONCEPTS, INC.
7525 Connelley Drive
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APPENDIX VI	SYNCHRO

INTRODUCTION

Traffic Concepts, Inc. has been asked to prepare a traffic impact study to analyze the vehicle impact for the proposed Airport Square Parcel 221 Redevelopment. The parcel currently contains a 57,000 gross square foot office building. The office building will be replaced with two (2) specialty retail buildings consisting of 7,200 gross square feet each, and a 4,960 gross square foot fast food restaurant with drive thru (Chick-fil-A). The project is located between West Nursery Road and Elkridge Landing Road, south of Winterson Road. The site will have a full-movement access and a right-in/right out access to W. Nursery Road and will also have a full-movement access to Elkridge Landing Road. (See Exhibit 1 for site location.)

As indicated in the approved scoping letter (a copy can be found in Appendix V of this report), the following intersections and road sections were determined to be key, and will be analyzed during the AM and PM peak periods:

Key Intersections

- W. Nursery Road @ the SB MD 295 Ramps
- W. Nursery Road @ the NB MD 295 Ramps
- W. Nursery Road @ Corporate Boulevard
- W. Nursery Road @ International Drive
- W. Nursery Road @ Winterson Road
- W. Nursery Road @ Andover Road
- W. Nursery Road @ Site Access "A"
- W. Nursery Road @ Site Access "B"
- W. Nursery Road @ Elkridge Landing Road
- Winterson Road @ Elkridge Landing Road
- Elkridge Landing Road @ Site Access

Road Sections

- W. Nursery Road from Elkridge Landing Road to MD 295
- Elkridge Landing Road from W. Nursery Road to Winterson Road
- Winterson Road from W. Nursery Road to Elkridge Landing Road

The study will analyze the key intersections under existing, background and future conditions utilizing the Critical Lane Analysis. We will also analyze the key road sections under future traffic conditions utilizing the Anne Arundel County Road Rating System.

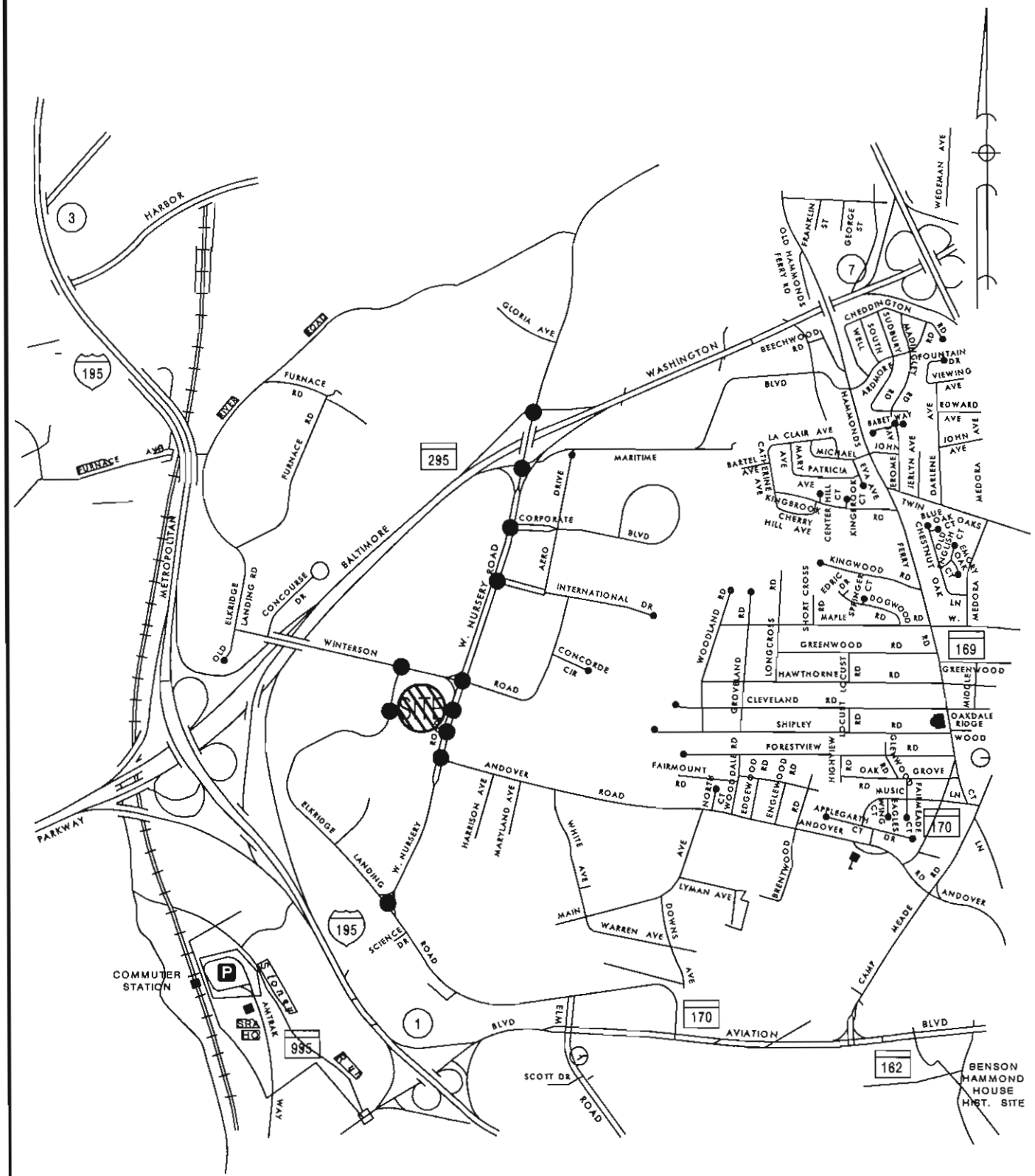

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EXHIBIT 1
Site Location

EXISTING CONDITION

The lane configurations at the key intersections are shown on Exhibit 2. Detailed intersection configuration sketches can be found in the appendix section of this report.

Peak hour turning movement counts were performed at the key intersections. Peak hour volumes were determined and are displayed on Exhibit 3. Details of the traffic count data can be found in Appendix IV of this report.

Using the existing traffic volumes, a critical lane analysis was conducted at the key intersections with the following results. Details of the calculations can be found in Appendix I.

CRITICAL LANE ANALYSIS

	AM CLV(LOS)	PM CLV(LOS)
W. Nursery Road @ the SB MD 295 Ramps	1128(B)	1117(B)
W. Nursery Road @ the NB MD 295 Ramps	1221(C)	1052(B)
W. Nursery Road @ Corporate Boulevard	803(A)	1067(B)
W. Nursery Road @ International Drive	842(A)	866(A)
W. Nursery Road @ Winterson Road	777(A)	805(A)
W. Nursery Road @ Andover Road	631(A)	652(A)
W. Nursery Road @ Elkridge Landing Road	556(A)	557(A)
W. Nursery Road @ Site Access "A"	541(A)	424(A)
W. Nursery Road @ Site Access "B"	will be analyzed under future conditions	
Winterson Road @ Elkridge Landing Road	672(A)	733(A)
Elkridge Landing Road @ Site Access	225(A)	157(A)

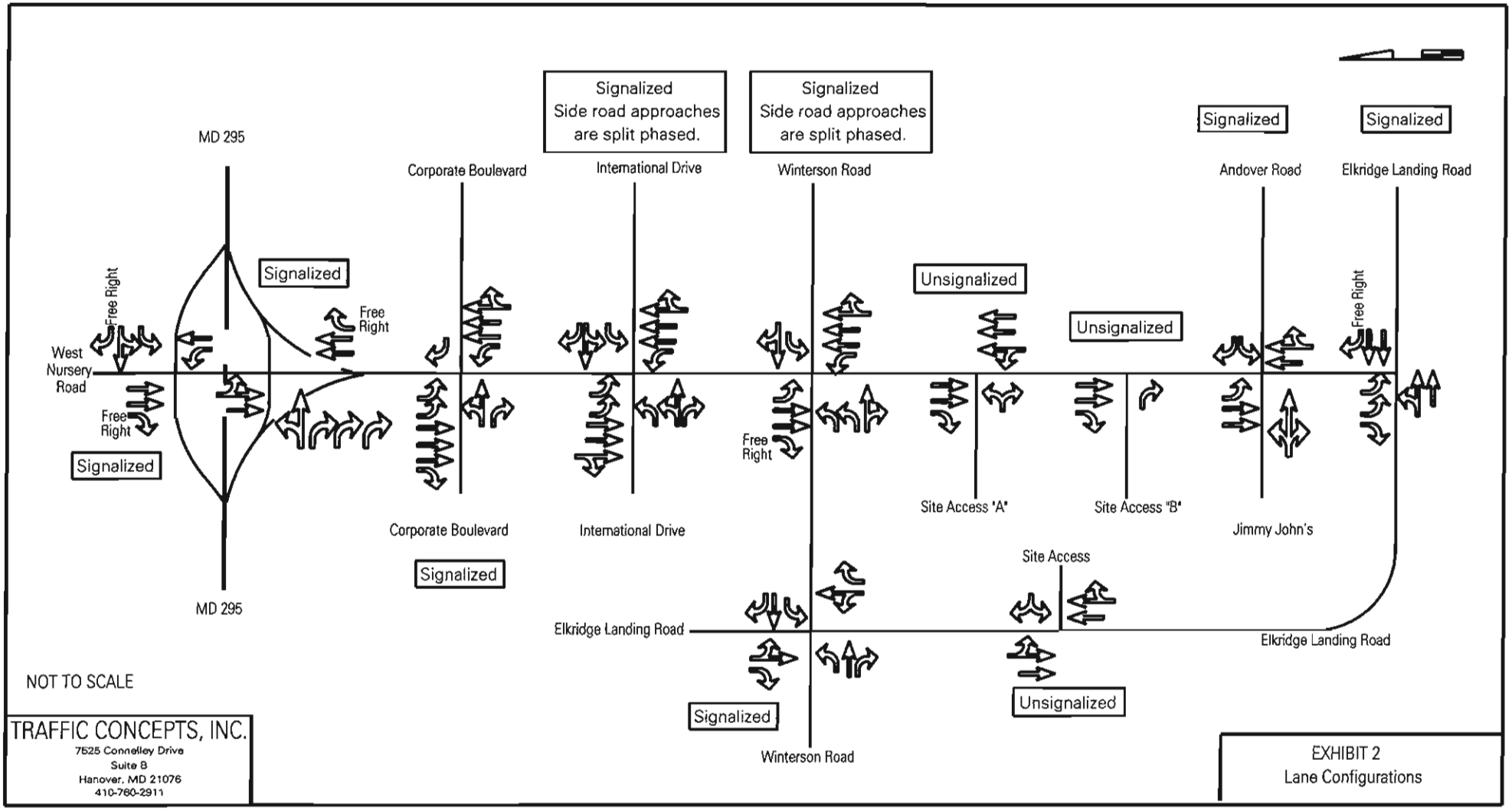

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EXHIBIT 2
Lane Configurations

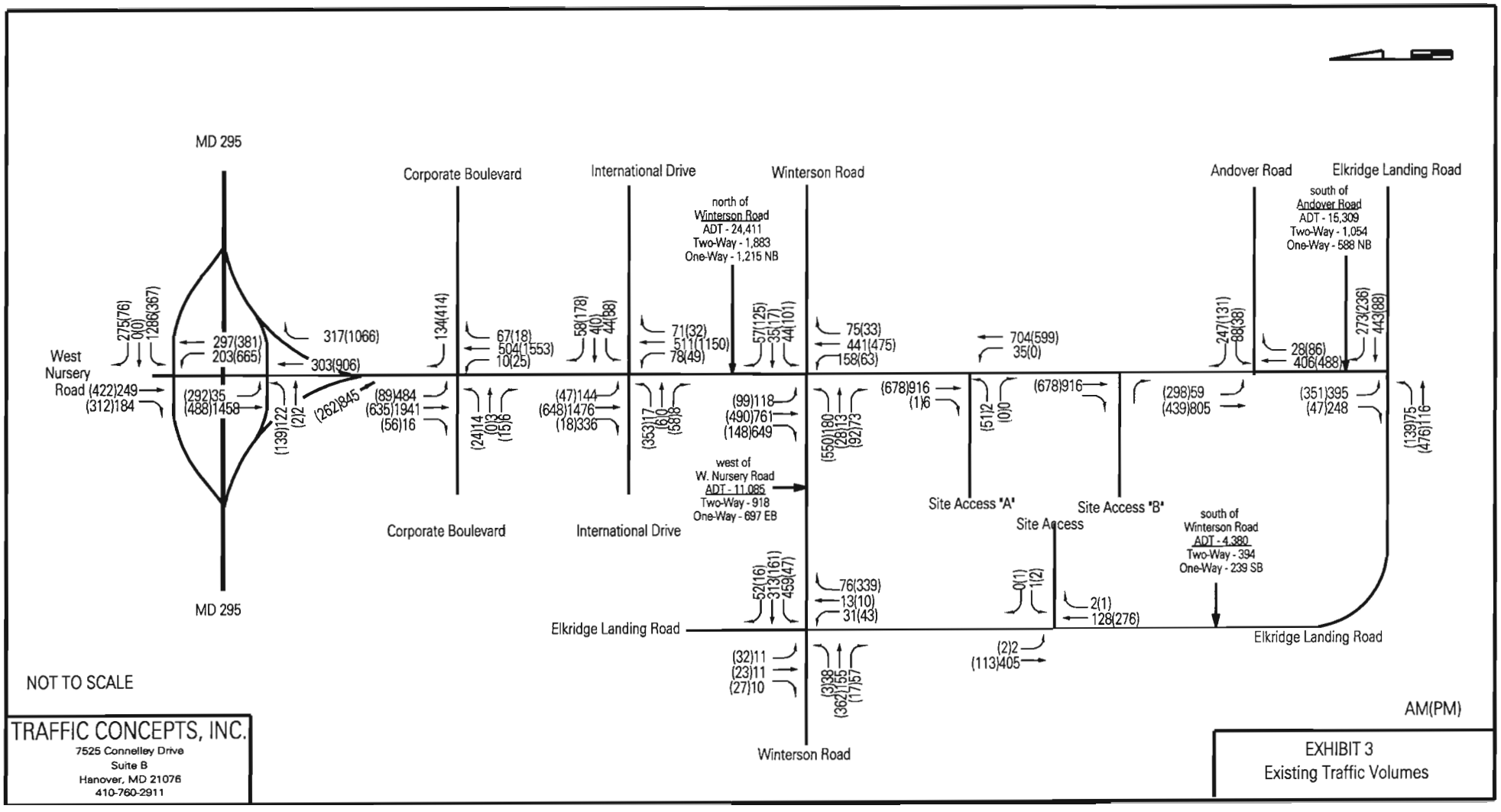

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EXHIBIT 3
Existing Traffic Volumes

BACKGROUND CONDITION

This stage of our analysis will evaluate the impact of previously approved, but not yet built, developments on the study network. As indicated in the approved scoping letter (Appendix V), there are seven (7) such developments. Locations of these developments are shown on Exhibit 4. Using the Institute of Transportation Engineers', Trip Generation Manual, 9th Edition, generation rates were determined for each development. These are listed on the following pages.

We have distributed the traffic generated by each background development through the study area based on location of work centers and major access routes. Exhibit 5 shows the combined impact from the developments. Details of each individual development can be found in Appendix II of this report.

We combined existing traffic volumes with background traffic volumes to arrive at total background traffic volumes as shown on Exhibit 6. Using these volumes, a critical lane analysis was conducted at the key intersections with the results shown on the following page. Details of the calculations can be found in Appendix I.

	AM CLV(LOS)	PM CLV(LOS)
W. Nursery Road @ the SB MD 295 Ramps	1251(C)	1307(D)
W. Nursery Road @ the NB MD 295 Ramps	1338(D)	1404(D)
W. Nursery Road @ Corporate Boulevard	887(A)	1269(C)
W. Nursery Road @ International Drive	872(A)	931(A)
W. Nursery Road @ Winterson Road	794(A)	864(A)
W. Nursery Road @ Andover Road	656(A)	704(A)
W. Nursery Road @ Elkridge Landing Road	584(A)	627(A)
W. Nursery Road @ Site Access "A"	566(A)	493(A)
W. Nursery Road @ Site Access "B"	will be analyzed under future conditions	
Winterson Road @ Elkridge Landing Road	673(A)	741(A)
Elkridge Landing Road @ Site Access	225(A)	157(A)

BACKGROUND DEVELOPMENTS

		AM		PM		
		IN	OUT	IN	OUT	ADT
1.	BWI Technology Park II					
	NOTE: Rates taken directly from approved TIS for this project.					
	ITE Land Use Code 770					
	Business Park					
	Per ksf	1.19	0.23	0.33	1.10	14.56
	196,200 gsf	233	44	65	216	2857
	less 17,000 gsf occupied	- 20	- 4	- 6	- 19	- 248
	179,200 gsf	213	40	59	197	2609
	ITE Land Use Code 710					
	General Office					
	Per ksf	1.36	0.19	0.25	1.24	11.01
	61,200 gsf	83	12	15	76	674
	Total Office Trips:	**296**	**52**	**74**	**273**	**3283**
	ITE Land Use Code 814					
	Specialty Retail					
	Per ksf *	3.28*	3.56*	2.81*	2.21*	44.32
	13,325 gsf	44	47	37	29	591
	less 6,660 gsf occupied	- 22	- 24	- 19	- 15	- 295
	6,665 gsf	22	23	18	14	296
	ITE Land Use Code 853					
	Convenience Market					
	Per ksf	21.95	21.95	29.85	29.85	845.60
	5,940 gsf	130	130	177	177	5023
	less 63%(AM), 66%(PM)Passby	- 82	- 82	-117	-117	- 3315
	less 26%(AM), 18%(PM)Diverted	- 34	- 34	- 32	- 32	- 904
	Net New Trips	14	14	28	28	804
	Total New Trips Retail & Convenience Market	**36**	**37**	**46**	**42**	**1100**

* In order to create a worst-case scenario, we have used AM and PM peak hour of the generator rates.

BACKGROUND DEVELOPMENTS (Continued)

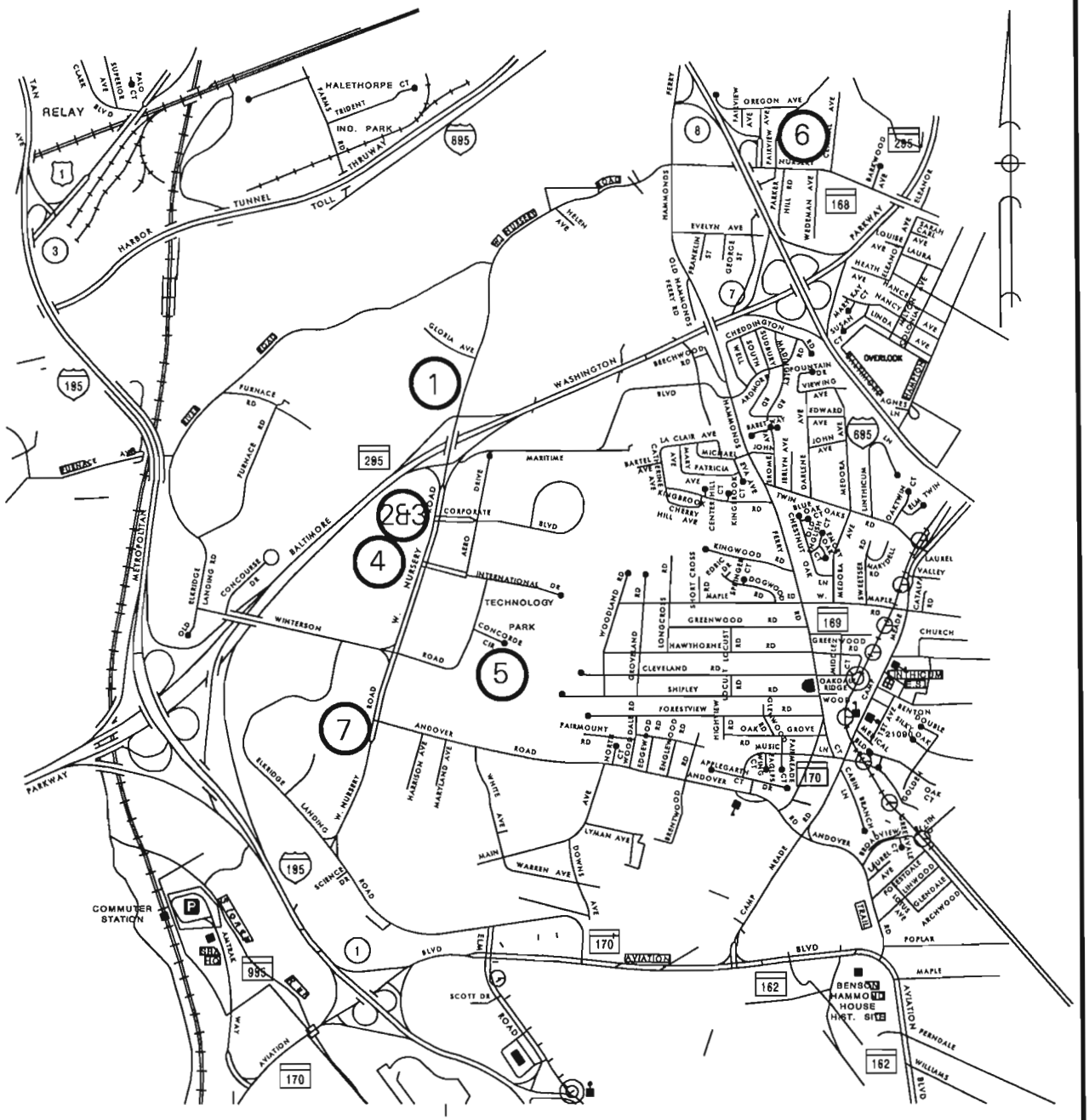
	AM		PM		
	IN	OUT	IN	OUT	ADT
2. BWI Technology Park III					
NOTE: Rates taken directly from approved TIS for this project.					
ITE Land Use Code 710					
General Office					
Per ksf	1.59	0.22	0.30	1.47	12.77
120,848 gsf	192	26	36	178	1543
ITE Land Use Code 912					
Drive-In Bank					
Per ksf	6.91	5.43	22.87	22.87	246.49
1,500 gsf	10	8	34	34	370
less 25% passby	- 2	- 2	- 8	- 8	- 92
Net New Trips	8	6	26	26	278
ITE Land Use Code 715					
Single-Tenant Office					
Per ksf	1.60	0.20	0.26	1.47	11.57
4,500 gsf	7	1	1	7	52
Total New Trips	**207**	**33**	**63**	**211**	**1873**
3. Cracker Barrel Restaurant					
At BWI Technology Park III		**BUILT OUT**			
4. West Quest Technology, Lot 1					
ITE Land Use Code 826		**INACTIVE PROJECT**			
Specialty Retail					
Per ksf *	3.28*	3.56*	2.81*	2.21*	44.32
3,200 gsf	10	12	9	7	142
ITE Land Use Code 934					
Fast Food with Drive-Thru					
Per ksf	23.16	22.26	16.98	15.67	496.12
1,600 gsf	37	36	27	25	794
Less Passby	- 18	- 18	- 14	- 13	- 397
Net New Trips	19	18	13	12	397

* In order to create a worst-case scenario, we have used PM peak hour of the generator rates.

BACKGROUND DEVELOPMENTS (Continued)

		AM		PM		
		IN	OUT	IN	OUT	ADT
5.	Concorde Circle Project					
	ITE Land Use Code 220					
	Apartments					
	Per unit	0.10	0.40	0.39	0.21	6.46
	310 units	**31**	**125**	**122**	**66**	**2002**
6.	SMO, Inc. – Nursery Road	DOES NOT AFFECT KEY INTERSECTIONS				
	ITE Land Use Code 853					
	Per ksf					
	2,580 gsf					
	Less passby per ITE					
	New Trips					
7.	Jimmy John's					
	ITE Land Use Code 934					
	Per ksf	0.00*	0.00*	16.98	15.67	496.12
	2,095 gsf	0	0	36	32	1039
	Less passby Trips per ITE	- 0	- 0	- 18	- 16	- 519
	Net New Trips	**0**	**0**	**18**	**16**	**520**

* Jimmy John's does not operate during the AM peak.



1. BWI Tech Park II
2. BWI Tech Park III
3. Cracker Barrel
4. West Quest Technology
5. Concorde Circle Project
6.SMO - Nursery Road
7. Jimmy John's

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EXHIBIT 4
Background Development Locations

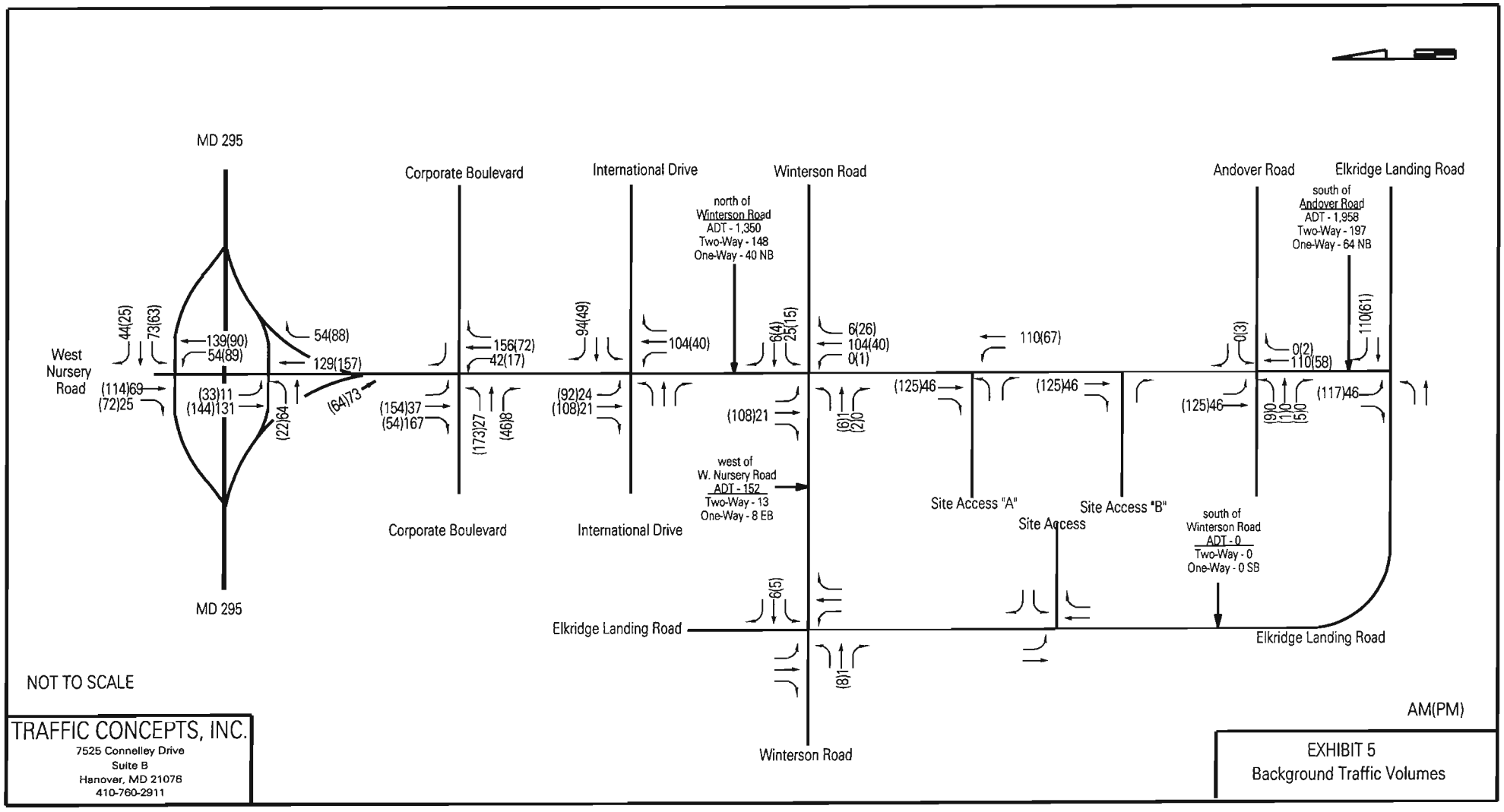

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EXHIBIT 5
Background Traffic Volumes

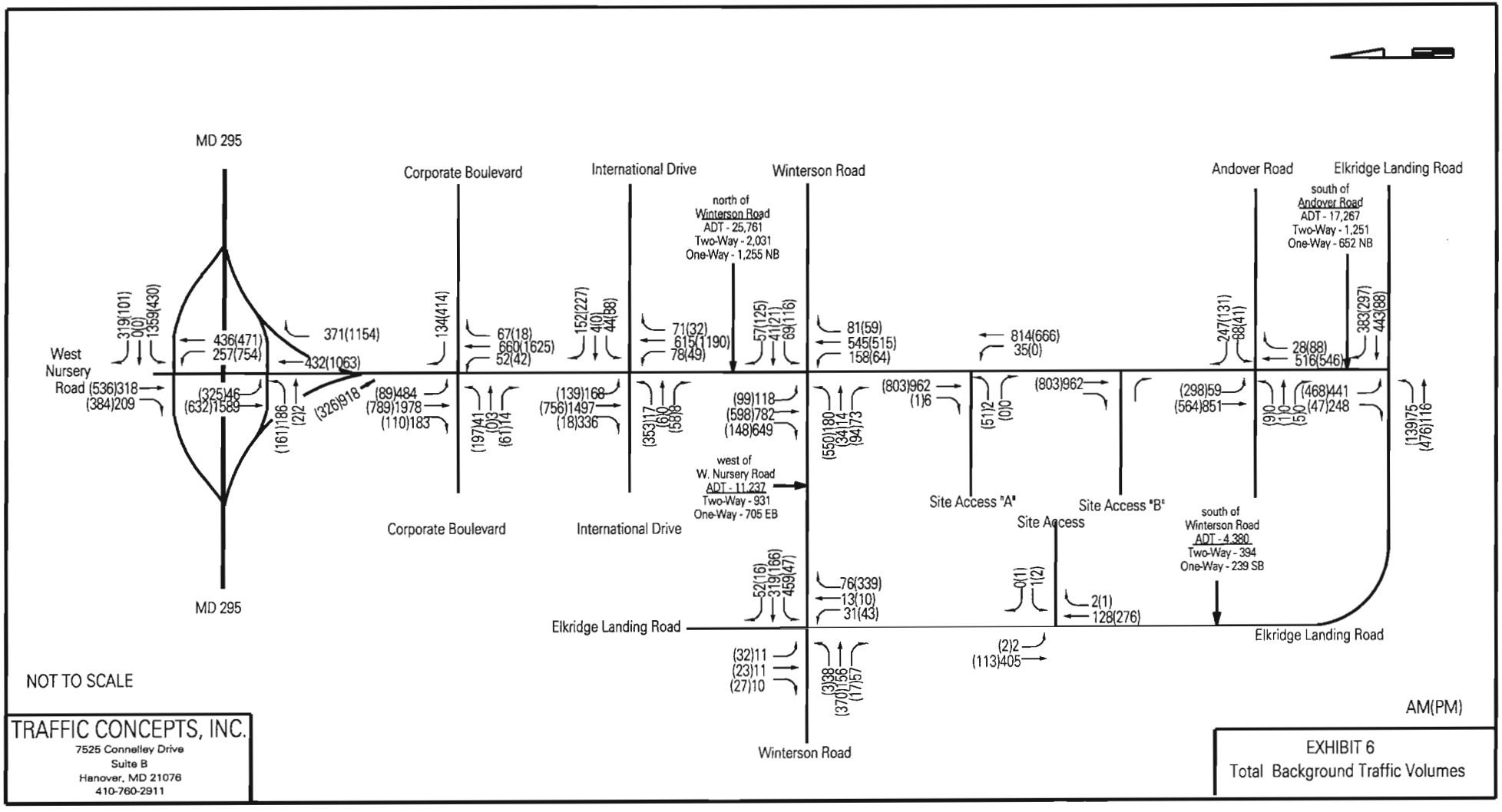

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EXHIBIT 6
Total Background Traffic Volumes

FUTURE CONDITION

We will, at this time, determine the vehicle impact the proposed development will have on the key intersections and the resulting levels of service. As mentioned previously, the proposed Airport Square Parcel 221 redevelopment will create two (2) specialty retail buildings consisting of 7,200 gross square feet each, and a 4,960 gross square foot fast food restaurant with drive thru (Chick-fil-A). We have consulted the Institute of Transportation Engineers', Trip Generation Manual, 9th Edition to determine trip generation rates for this development. The results are as follows:

	AM		PM		
	IN	**OUT**	**IN**	**OUT**	**ADT**
ITE Land Use Code 934					
Per ksf	23.16	22.26	16.98	15.67	496.12
4,960 gsf	115	110	84	78	2461
Less passby Trips per ITE	- 56	- 54	- 42	- 39	- 1230
Net New Trips	**59**	**56**	**42**	**39**	**1231**
ITE Land Use Code 826					
Per ksf	3.28	3.56	2.81	2.21	44.32
14,400 gsf	**47**	**51**	**40**	**32**	**638**

Based on housing concentration and our knowledge of the study area, distribution patterns were established as shown on Exhibits 7-9. By adding the site generated trips to total background traffic volumes, we obtain total future traffic volumes (See Exhibit 10).

Using these volumes, a critical lane analysis was performed at the key intersections with the results shown on the following page. Details of the calculations can be found in Appendix I of this report.

	AM CLV(LOS)	PM CLV(LOS)
W. Nursery Road @ the SB MD 295 Ramps	1279(C)	1328(D)
W. Nursery Road @ the NB MD 295 Ramps	1360(D)	1418(D)
W. Nursery Road @ Corporate Boulevard	904(A)	1280(C)
W. Nursery Road @ International Drive	889(A)	942(A)
W. Nursery Road @ Winterson Road	823(A)	891(A)
W. Nursery Road @ Andover Road	635(A)	744(A)
W. Nursery Road @ Elkridge Landing Road	595(A)	635(A)
W. Nursery Road @ Site Access "A"	713(A)	598(A)
W. Nursery Road @ Site Access "B"	590(A)	482(A)
Winterson Road @ Elkridge Landing Road	685(A)	745(A)
Elkridge Landing Road @ Site Access	238(A)	170(A)

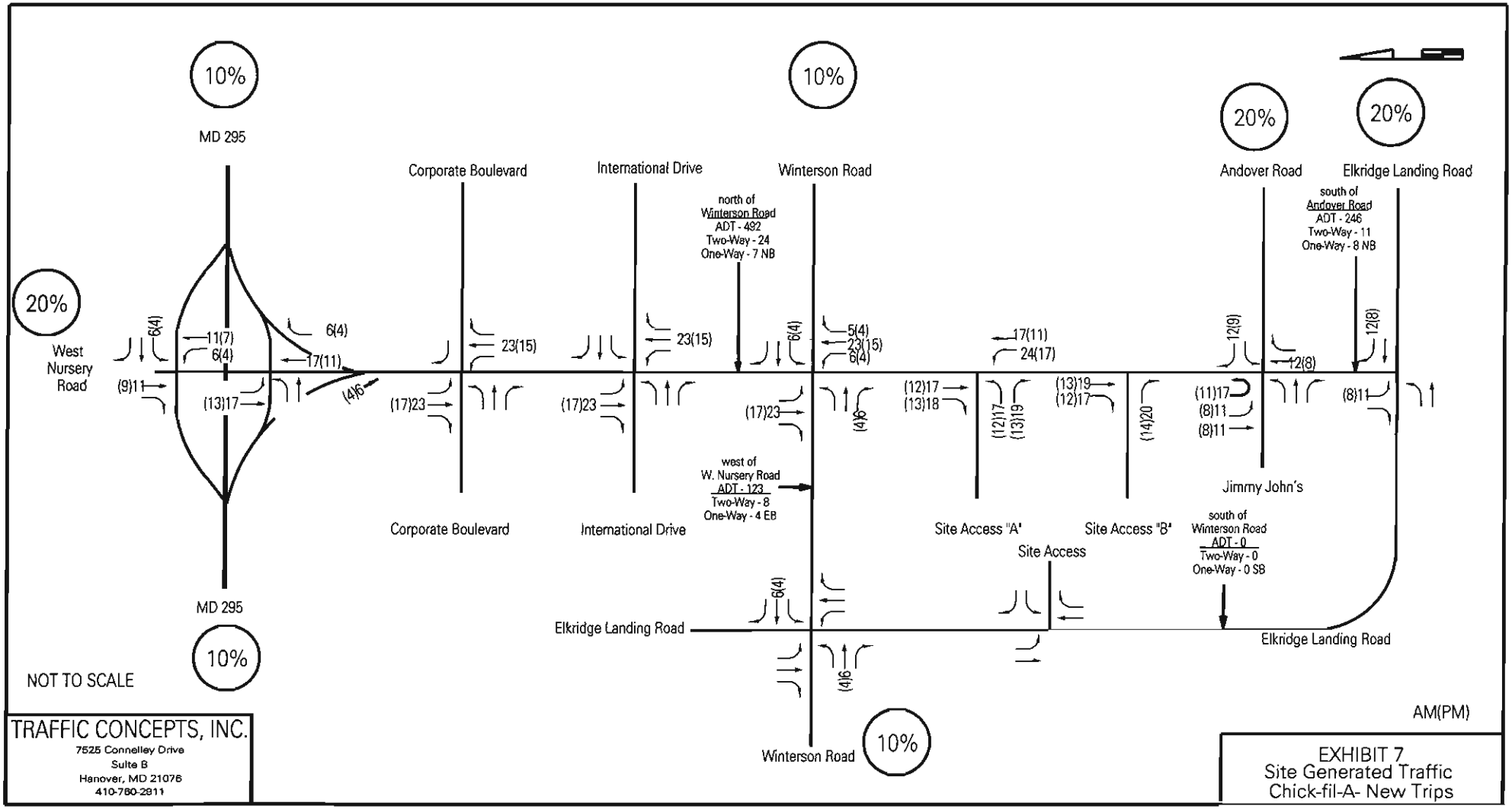

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EXHIBIT 7
Site Generated Traffic
Chick-fil-A- New Trips

Detailed Average Rate Trip Calculations
For 4.960 Th.Sq.Ft. GFA of Fast-Food Restaurant with Drive-Thru(934) - [R]

Project: Airport Square
Phase:

Open Date:
Analysis Date:

Description:

	Average Rate	Standard Deviation	Adjustment Factor	Driveway Volume
Avg. Weekday 2-Way Volume	496.12	242.52	1.00	2461
7-9 AM Peak Hour Enter	23.16	0.00	1.00	115
7-9 AM Peak Hour Exit	22.26	0.00	1.00	110
7-9 AM Peak Hour Total	45.42	28.63	1.00	225
4-6 PM Peak Hour Enter	16.98	0.00	1.00	84
4-6 PM Peak Hour Exit	15.67	0.00	1.00	78
4-6 PM Peak Hour Total	32.65	19.73	1.00	162
AM Pk Hr, Generator, Enter	27.34	0.00	1.00	136
AM Pk Hr, Generator, Exit	26.27	0.00	1.00	130
AM Pk Hr, Generator, Total	53.61	26.27	1.00	266
PM Pk Hr, Generator, Enter	24.60	0.00	1.00	122
PM Pk Hr, Generator, Exit	22.70	0.00	1.00	113
PM Pk Hr, Generator, Total	47.30	25.52	1.00	235
Saturday 2-Way Volume	722.03	295.62	1.00	3581
Saturday Peak Hour Enter	30.09	0.00	1.00	149
Saturday Peak Hour Exit	28.91	0.00	1.00	144
Saturday Peak Hour Total	59.00	22.89	1.00	293
Sunday 2-Way Volume	542.72	206.86	1.00	2692
Sunday Peak Hour Enter	34.92	0.00	1.00	173
Sunday Peak Hour Exit	37.82	0.00	1.00	188
Sunday Peak Hour Total	72.74	11.95	1.00	361

Note: A zero indicates no data available.
Source: Institute of Transportation Engineers
Trip Generation Manual, 9th Edition, 2012

TRIP GENERATION 2013, TRAFFICWARE, LLC

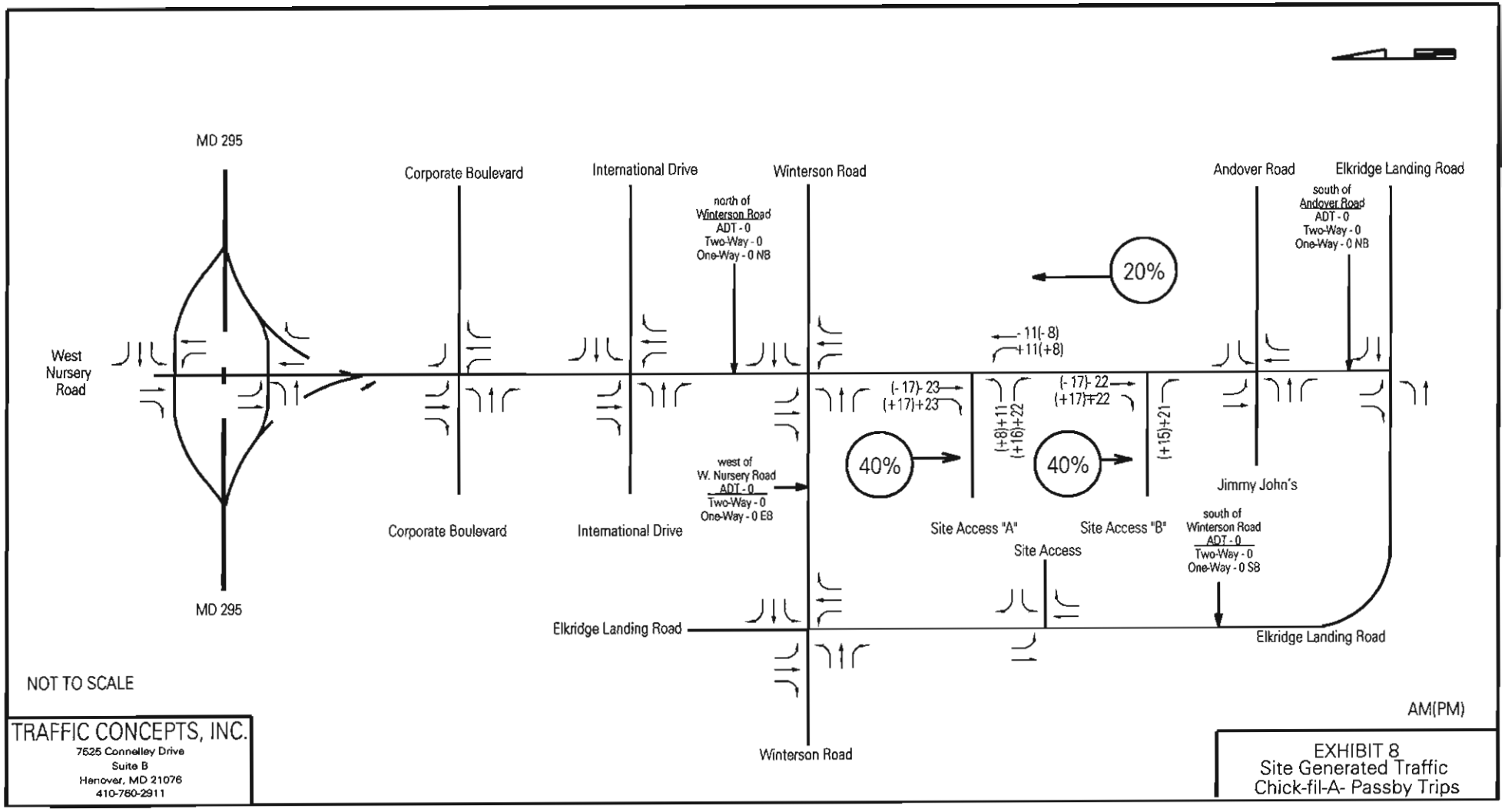

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EXHIBIT 8
Site Generated Traffic
Chick-fil-A- Passby Trips

Summary of Pass-By Trips
For 4.960 Th.Sq.Ft. GFA of Fast-Food Restaurant with Drive-Thru(934) - [R]

Project: Airport Square
Phase:

Open Date:
Analysis Date:

Description:

	Driveway Volume	Pass-By Trips	Volume Added to Adjacent Streets
Average Weekday			
7-9 AM Peak Hour Enter	115	56	59
7-9 AM Peak Hour Exit	110	54	56
7-9 AM Peak Hour Total	225	110	115
4-6 PM Peak Hour Enter	84	42	42
4-6 PM Peak Hour Exit	78	39	39
4-6 PM Peak Hour Total	162	81	81
Saturday			
Saturday Peak Hour Enter	149	0	149
Saturday Peak Hour Exit	144	0	144
Saturday Peak Hour Total	293	0	293

Pass-By Trips were calculated on the basis of the following:

Weekday A.M. Peak Period Average Pass-By Trip Percentage = 49
Weekday P.M. Peak Period Average Pass-By Trip Percentage = 50
Saturday Midday Pk. Pd. Average Pass-By Trip Percentage = 0

Number of Pass-By Studies:6 for Weekday AM PK PD and 18 for PM PK PD.

Note: A zero indicates no data available.
Source: Institute of Transportation Engineers
Trip Generation Manual, 9th Edition, 2012

TRIP GENERATION 2013, TRAFFICWARE, LLC

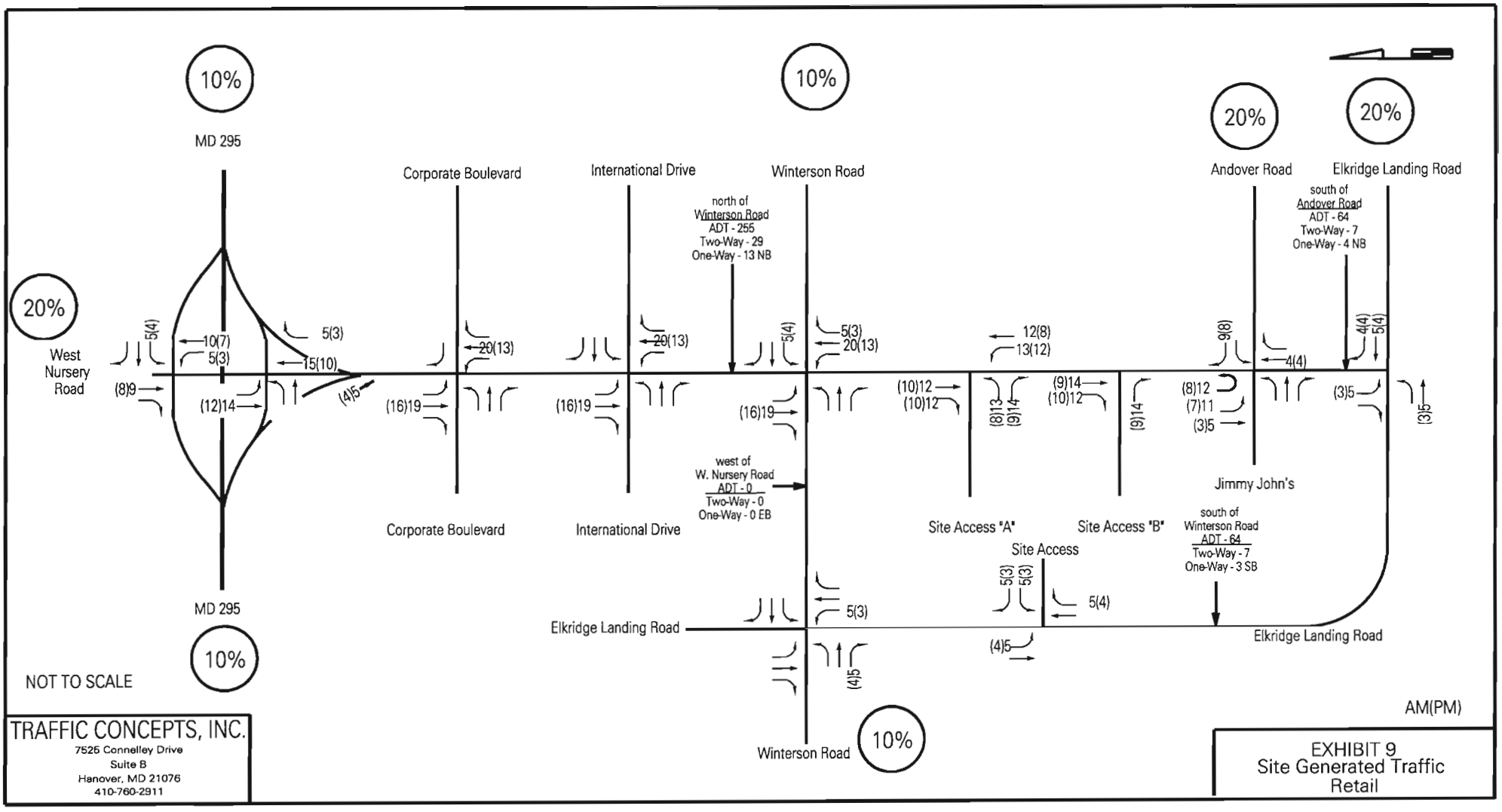

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EXHIBIT 9
Site Generated Traffic
Retail

Detailed Average Rate Trip Calculations
For 14.400 Th.Sq.Ft. GFA of Specialty Retail Center(826) - [R]

Project: Airport Square
Phase:

Open Date:
Analysis Date:

Description:

	Average Rate	Standard Deviation	Adjustment Factor	Driveway Volume
Avg. Weekday 2-Way Volume	44.32	15.52	1.00	638
7-9 AM Peak Hour Enter	0.00	0.00	1.00	0
7-9 AM Peak Hour Exit	0.00	0.00	1.00	0
7-9 AM Peak Hour Total	0.00	0.00	1.00	0
4-6 PM Peak Hour Enter	1.19	0.00	1.00	17
4-6 PM Peak Hour Exit	1.52	0.00	1.00	22
4-6 PM Peak Hour Total	2.71	1.83	1.00	39
AM Pk Hr, Generator, Enter	3.28	0.00	1.00	47
AM Pk Hr, Generator, Exit	3.56	0.00	1.00	51
AM Pk Hr, Generator, Total	6.84	3.55	1.00	98
PM Pk Hr, Generator, Enter	2.81	0.00	1.00	40
PM Pk Hr, Generator, Exit	2.21	0.00	1.00	32
PM Pk Hr, Generator, Total	5.02	2.31	1.00	72
Saturday 2-Way Volume	42.04	13.97	1.00	605
Saturday Peak Hour Enter	0.00	0.00	1.00	0
Saturday Peak Hour Exit	0.00	0.00	1.00	0
Saturday Peak Hour Total	0.00	0.00	1.00	0
Sunday 2-Way Volume	20.43	10.27	1.00	294
Sunday Peak Hour Enter	0.00	0.00	1.00	0
Sunday Peak Hour Exit	0.00	0.00	1.00	0
Sunday Peak Hour Total	0.00	0.00	1.00	0

Note: A zero indicates no data available.
Source: Institute of Transportation Engineers
Trip Generation Manual, 9th Edition, 2012

TRIP GENERATION 2013, TRAFFICWARE, LLC

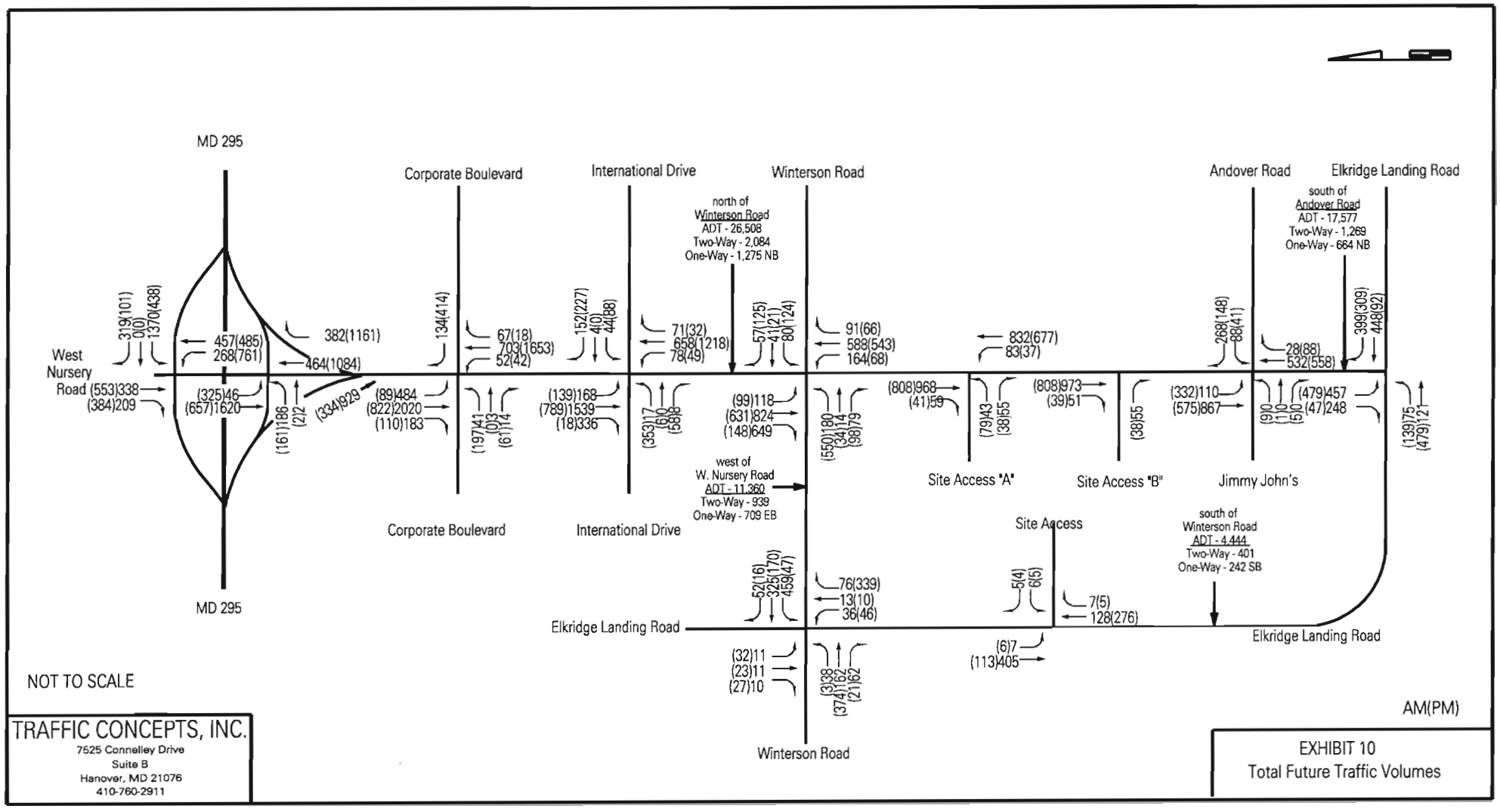

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EXHIBIT 10
Total Future Traffic Volumes

LINK ANALYSIS

As per Anne Arundel County Adequate Public Facilities Law, the road link between key intersections must be shown to operate at acceptable levels of service. The following road sections will be analyzed:

- W. Nursery Road between Elkridge Landing Road and MD 295 will be analyzed using the Anne Arundel County Road Rating System.
- Elkridge Landing Road between W. Nursery Road and Winterson Road will be analyzed using the Anne Arundel County Road Rating System.
- Winterson Road between W. Nursery Road and Elkridge Landing Road will be analyzed using the Anne Arundel County Road Rating System.

Using total future traffic volumes, the link analyses have shown the following. Details of the calculations can be found in Appendix III of this report. Exhibit 11 shows the location of each road section.

	Road Rating
Elkridge Landing Road	
Section 1 From W. Nursery Road to Hampton Inn Access	82
Section 2 From Hampton Inn Access to Winterson Road	84
Winterson Road	
Section 1 From W. Nursery Road to Elkridge Landing Road	90

	Road Rating
W. Nursery Road	
Section 1	
From Elkridge Landing Road to 50' north of Marriott	82
Section 2	
From 50' north of Marriott to Andover Road	
As open section	97
As closed section	88
Section 3	
From Andover Road to Winterson Road	
As open section	90
As closed section	85
Section 4	
From Winterson Road to beginning of closed section	90
Section 5	
From beginning of closed section to International Drive	
As open section	90
As closed section	92
Section 6	
From International Drive to MD 295	90

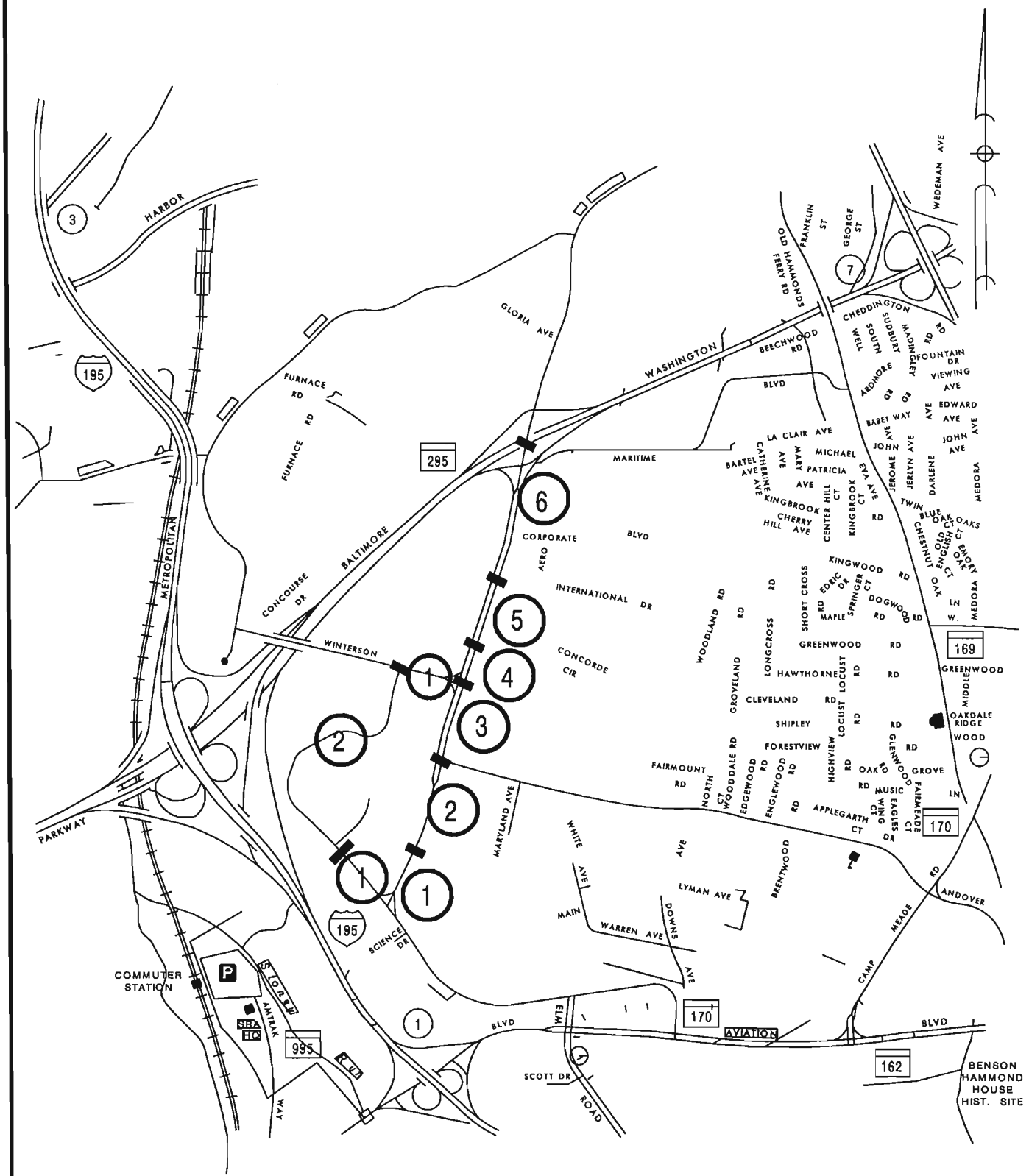

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EXHIBIT 11
Road Rating Sections

SYNCHRO ANALYSIS

As requesting during the scoping letter review process, a SYNCHRO analysis has been prepared for the West Nursery Road corridor. We note that all key intersections are projected to operate at acceptable levels of service utilizing the critical lane analysis methodology and therefore, meet the Anne Arundel County Adequate Public Facilities Law. Therefore, the additional SYNCHRO analysis is included for informational purposes only. The results (HCM 2000) of the analysis are shown in the chart below. Please note that HCM 2010 results cannot be obtained due to lack of strict NEMA phasing in the SYNCHRO model. Detailed calculations and notes can be found in the appendix section of this report. Also, attached to this report is a CD containing the SYNCHRO files.

BACKGROUND TRAFFIC CONDITIONS

Intersection West Nursery Road @	AM Peak Delay (LOS)	PM Peak Delay (LOS)
MD 295 Southbound Ramps	29.8(C)	38.3(D)
MD 295 Northbound Ramps	24.6(C)	39.5(D)
Corporate Blvd/BWI Tech III Access	14.8(B)	19.0(B)
International Drive	19.0(B)	25.2(C)
Winterson Road	25.9(C)	24.4(C)
Andover Road	26.0(C)	9.3(A)
Elkridge Landing Road	8.5(A)	8.8(A)

FUTURE TRAFFIC CONDITIONS

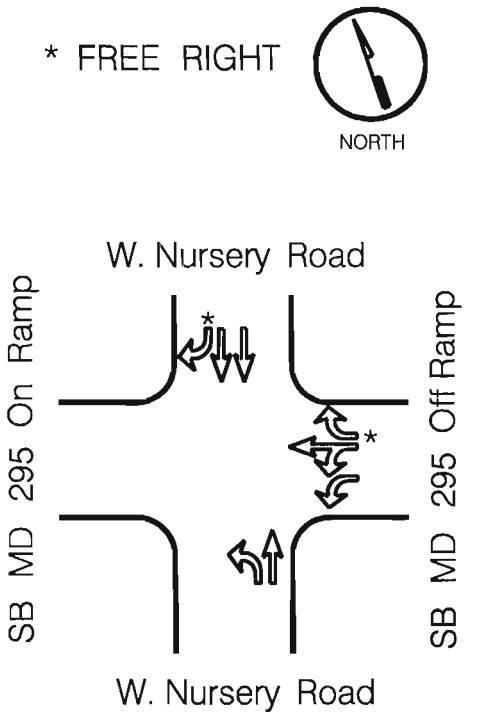
Intersection West Nursery Road @	AM Peak Delay (LOS)	PM Peak Delay (LOS)
MD 295 Southbound Ramps	31.2(C)	39.2(D)
MD 295 Northbound Ramps	25.8(C)	44.3(D)
Corporate Blvd/BWI Tech III Access	14.8(B)	19.4(B)
International Drive	18.9(B)	24.9(C)
Winterson Road	24.6(C)	24.9(C)
Andover Road	25.9(C)	9.8(A)
Elkridge Landing Road	8.6(A)	8.9(A)

CONCLUSIONS

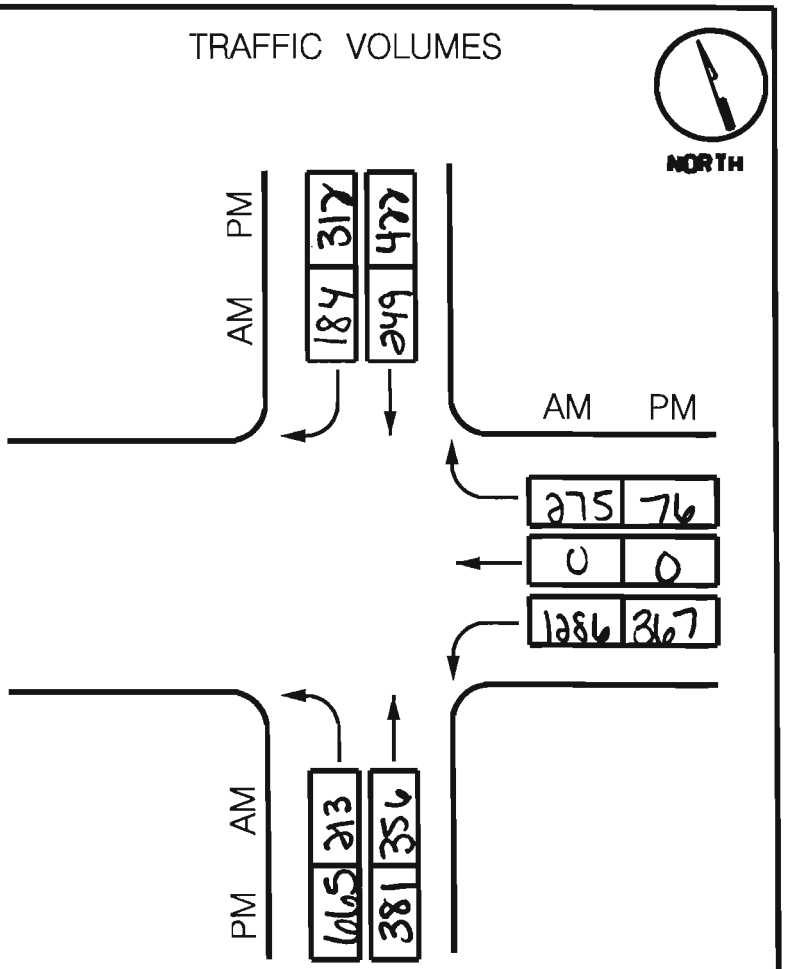
The analysis has shown that the key intersections and road sections will continue to operate at satisfactory levels of service under future conditions. Therefore, we respectfully request that your office approve this development from a traffic impact standpoint.

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION



TRAFFIC VOLUMES



		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	356 * 1.0	356	
	SB	249 * .55 + 213 * 1.0	350	
	EB	—	—	B
	WB	(1286 + 0) * .6	778	1128
PM	NB	381 * 1.0	381	
	SB	427 * .55 + 665 * 1.0	897	
	EB	—	—	B
	WB	(367 + 0) * .6	280	1117

CRITICAL LANE ANALYSIS

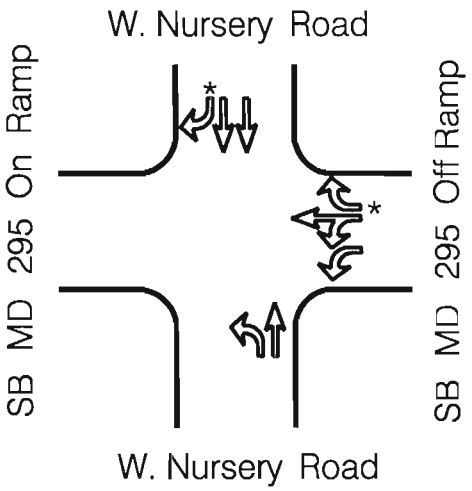
Prepared By: C. ATKINSON Condition: EXISTING

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION

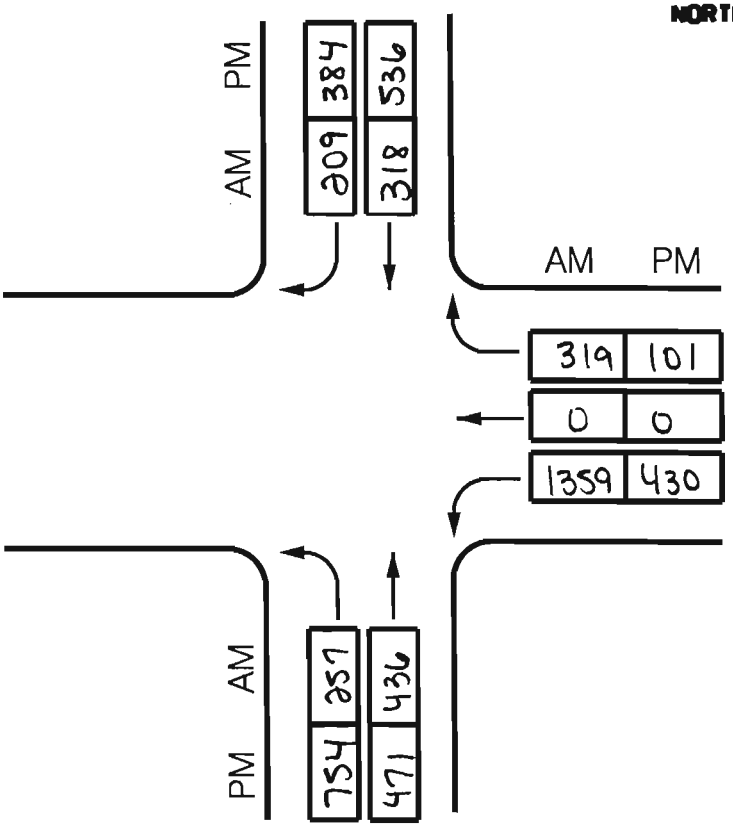
* FREE RIGHT

NORTH



TRAFFIC VOLUMES

NORTH



		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	436 x 1.0	436*	
	SB	318 x .55 + 257 x 1.0	438	
	EB	—	—	C
	WB	(1359 + 0) x .6	815*	1251
PM	NB	471 x 1.0	471	
	SB	536 x .55 + 754 x 1.0	1049*	
	EB	—	—	D
	WB	(430 + 0) x .6	258*	1307

CRITICAL LANE ANALYSIS

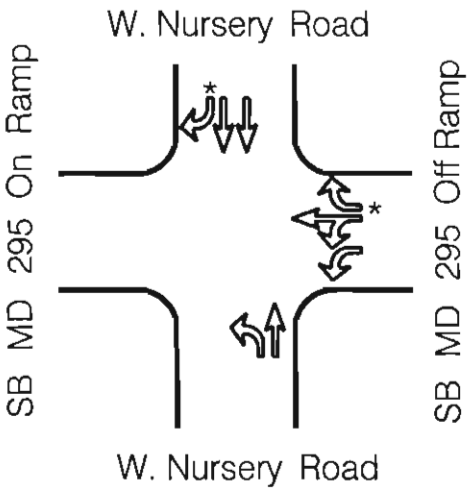
Prepared By: C. ATKINSON Condition: BACKGROUND

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION

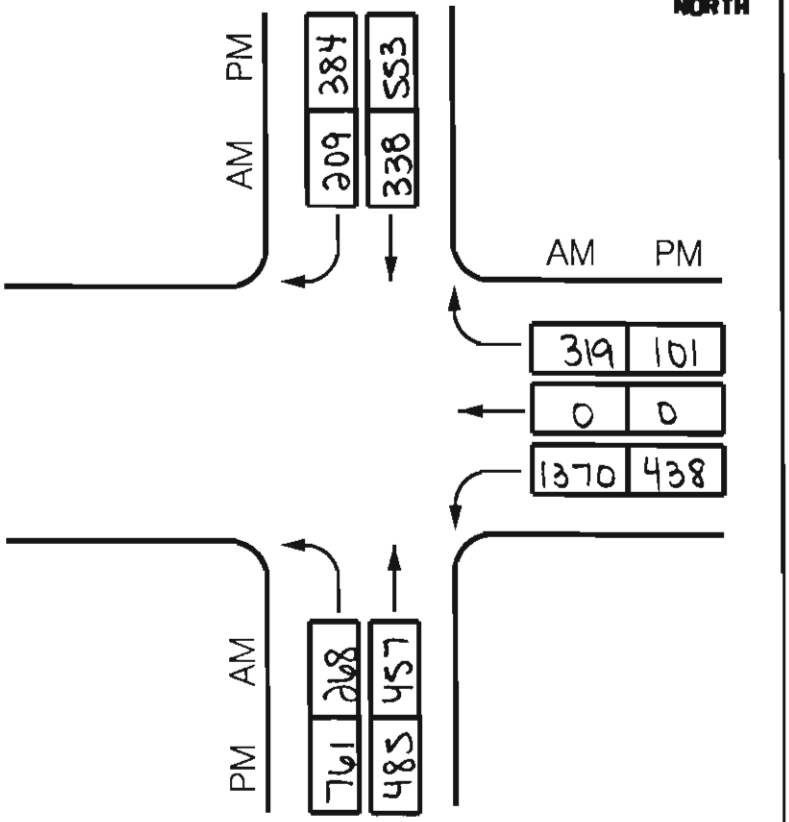
* FREE RIGHT

NORTH



TRAFFIC VOLUMES

NORTH



		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	457 * 1.0	457*	
	SB	338 * .55 + 268 * 1.0	454	
	EB	—	—	C
	WB	(1370 + 0) * .6	822*	1379
PM	NB	485 * 1.0	485	
	SB	553 * .55 + 761 * 1.0	1065*	
	EB	—	—	D
	WB	(438 + 0) * .6	263*	1328

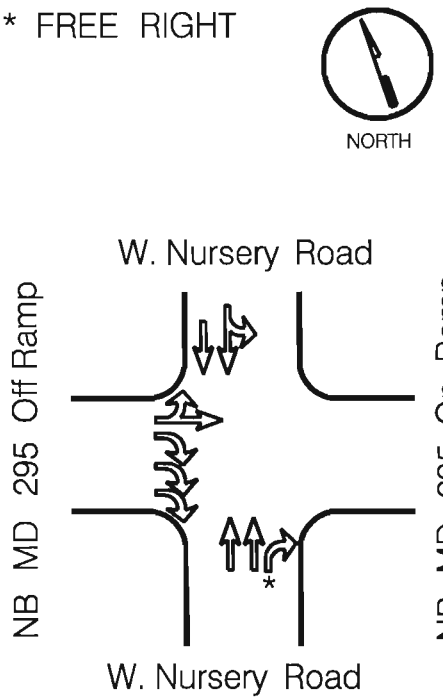
CRITICAL LANE ANALYSIS

Prepared By: C. ATKINSON Condition: FUTURE

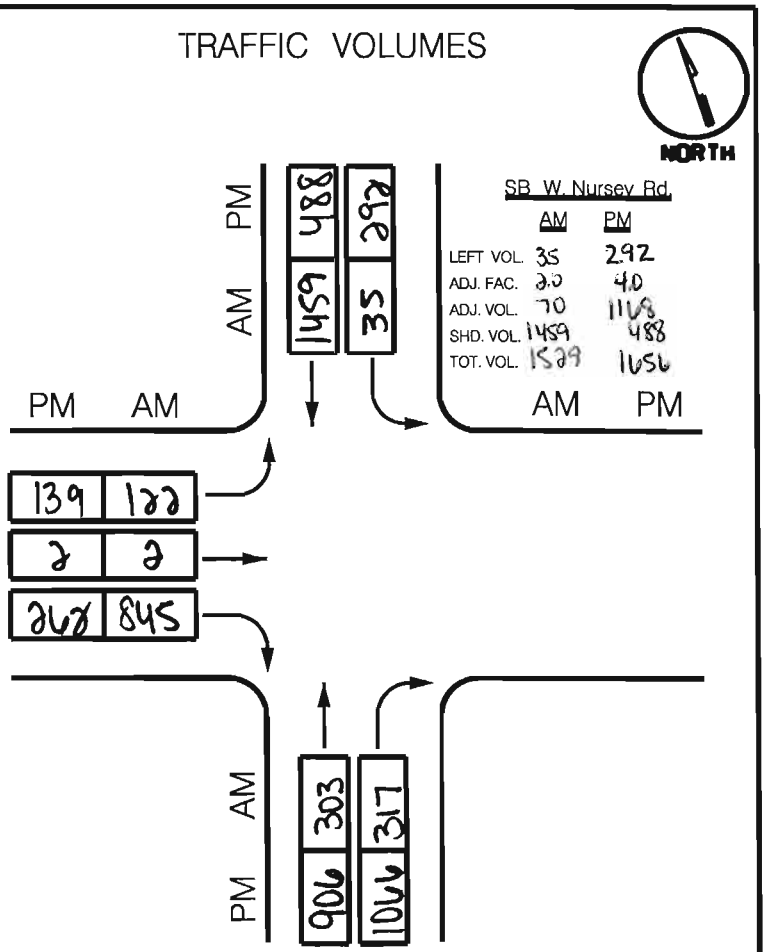
TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION

* FREE RIGHT



TRAFFIC VOLUMES



		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	303 * .55 + 35 * 1.0	202	
	SB	1529 * .55	841	
	EB	845 * .45	380	C
	WB	—	—	1221
PM	NB	906 * .55 + 292 * 1.0	790	
	SB	1656 * .55	911	
	EB	(139 + 2) * 1.0	141	B
	WB	—	—	1058

CRITICAL LANE ANALYSIS

Prepared By: C. ATKINSON Condition: EXISTING

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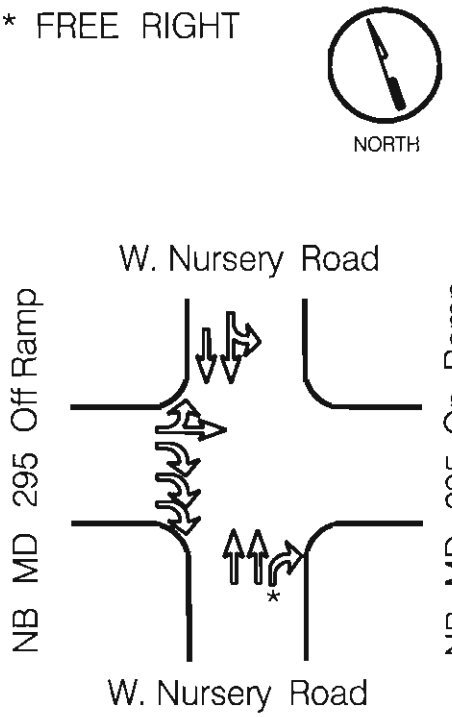
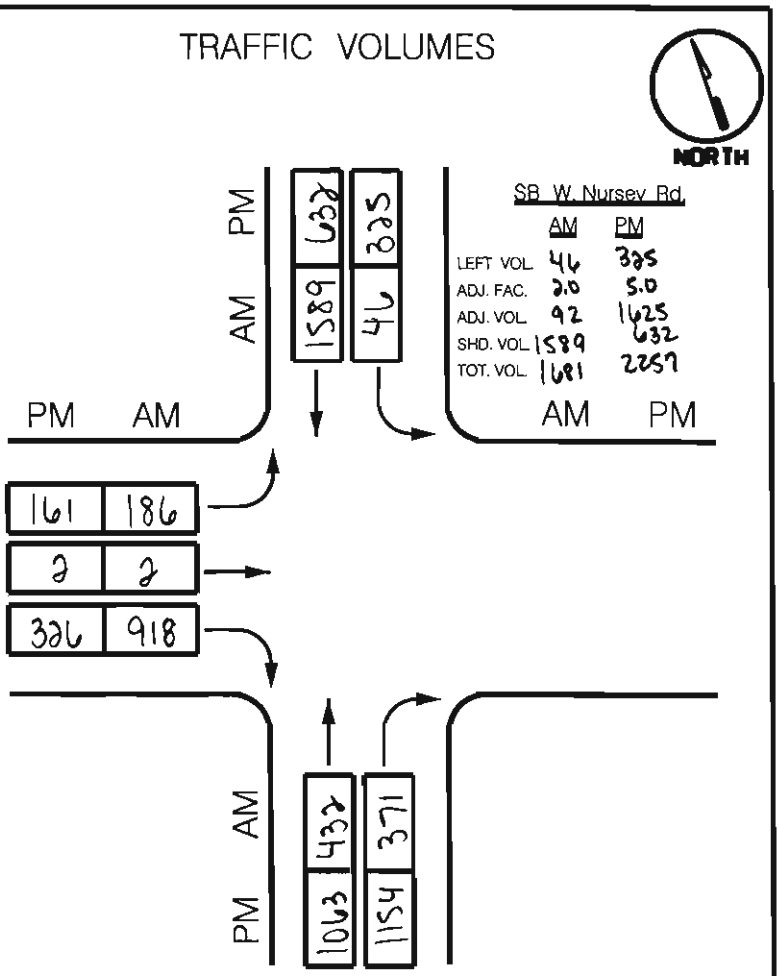
LANE CONFIGURATION

* FREE RIGHT



TRAFFIC VOLUMES



		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	432 x.55 + 46 x1.0	284	
	SB	1681 x.55	925*	
	EB	918 x.45	413*	D
	WB	—	—	1338
PM	NB	1063 x.55 + 325 x 1.0	910	
	SB	2257 x.55	1241*	
	EB	(161 + 2) x1.0	163*	D
	WB	—	—	1404

CRITICAL LANE ANALYSIS

Prepared By: C. ATKINSON Condition: BACKGROUND

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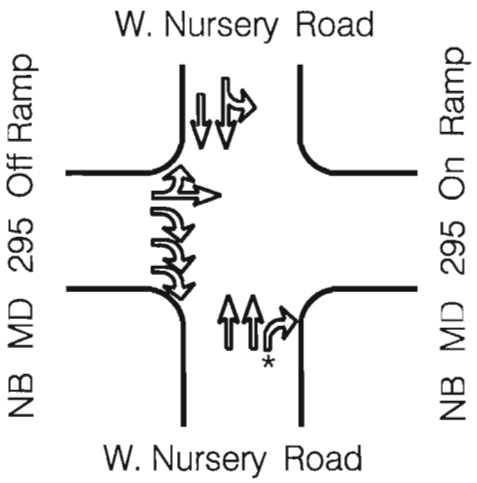
LANE CONFIGURATION

* FREE RIGHT



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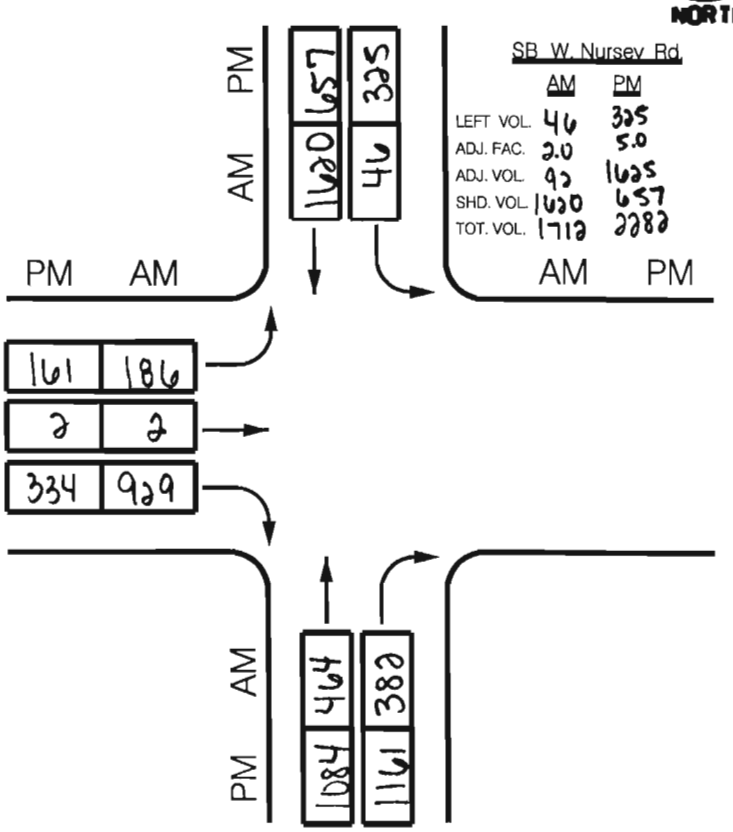


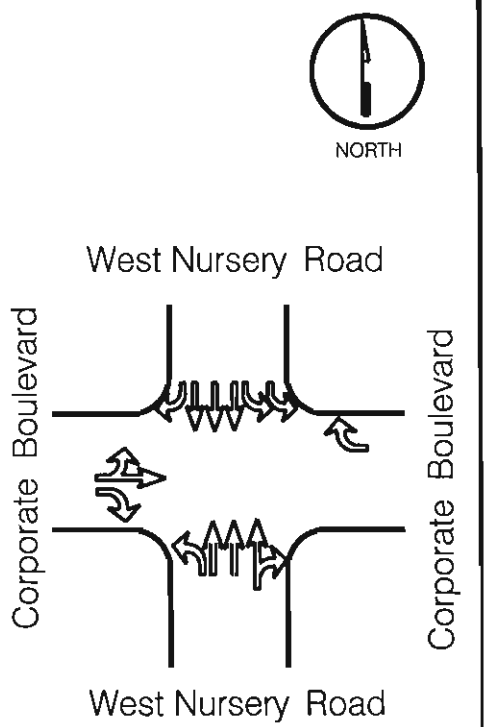
		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	464 *.55 + 46 *1.0	301	
	SB	1712 *.55	942*	
	EB	929 *.45	418*	D
	WB	—	—	1360
PM	NB	1084 *.55 + 325 *1.0	921	
	SB	2282 *.55	1255*	
	EB	(161 + 2) *1.0	163*	D
	WB	—	—	1418

CRITICAL LANE ANALYSIS

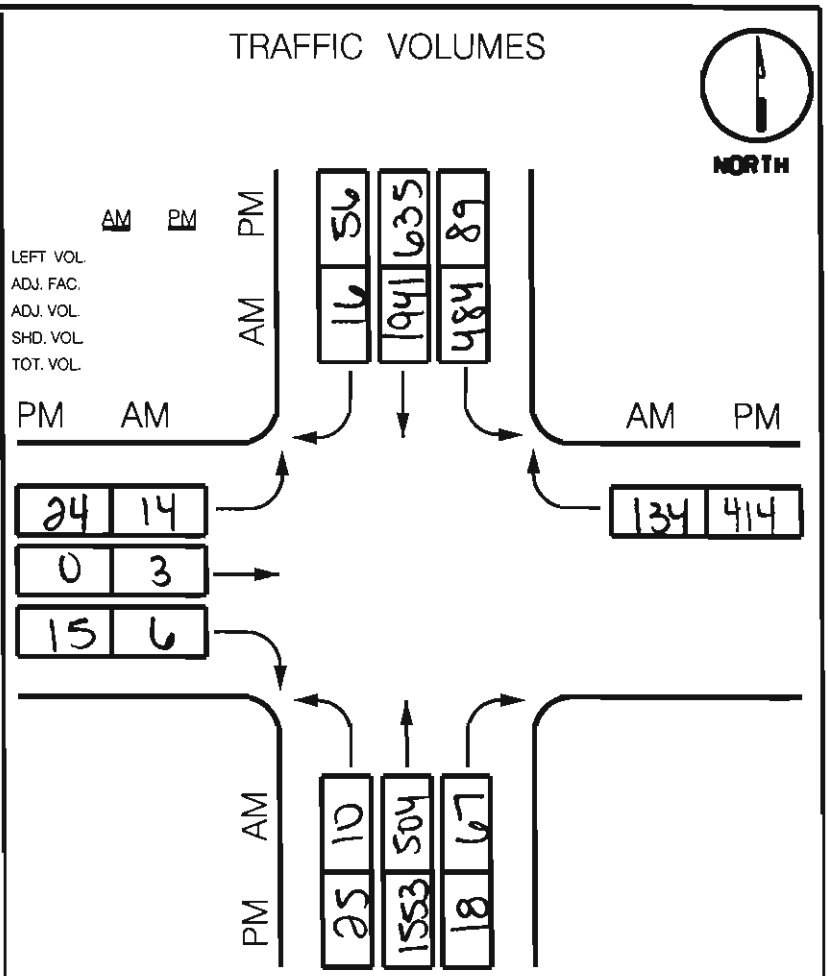
Prepared By: C. ATKINSON Condition: FUTURE

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION



TRAFFIC VOLUMES



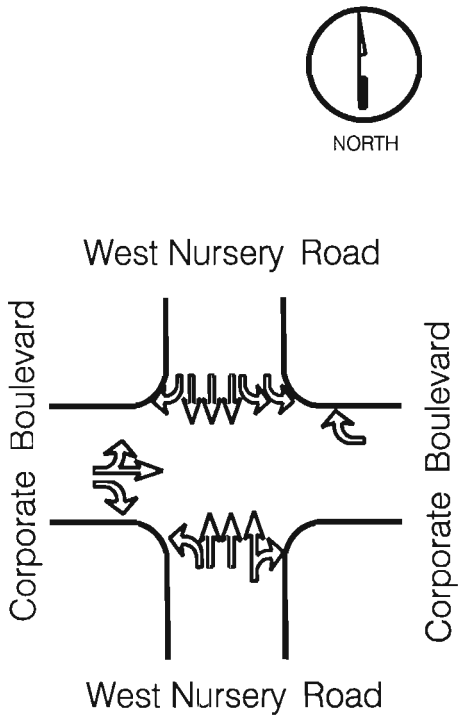
		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	(504 + 67) x.4 + 484 x.6	519	
	SB	1941 x.4 + 10 x1.0	786*	
	EB	(14 + 3) x1.0	17*	A
	WB	(134 x1.0) - (484 x.6) + 14 x1.0	14	803
PM	NB	(1553 + 18) x.4 + 89 x.6	688*	
	SB	1635 x.4 + 25 x1.0	679	
	EB	(0 + 24) x1.0	24	B
	WB	(414 x1.0) - (89 x.6) + 24 x1.0	385*	1067

CRITICAL LANE ANALYSIS

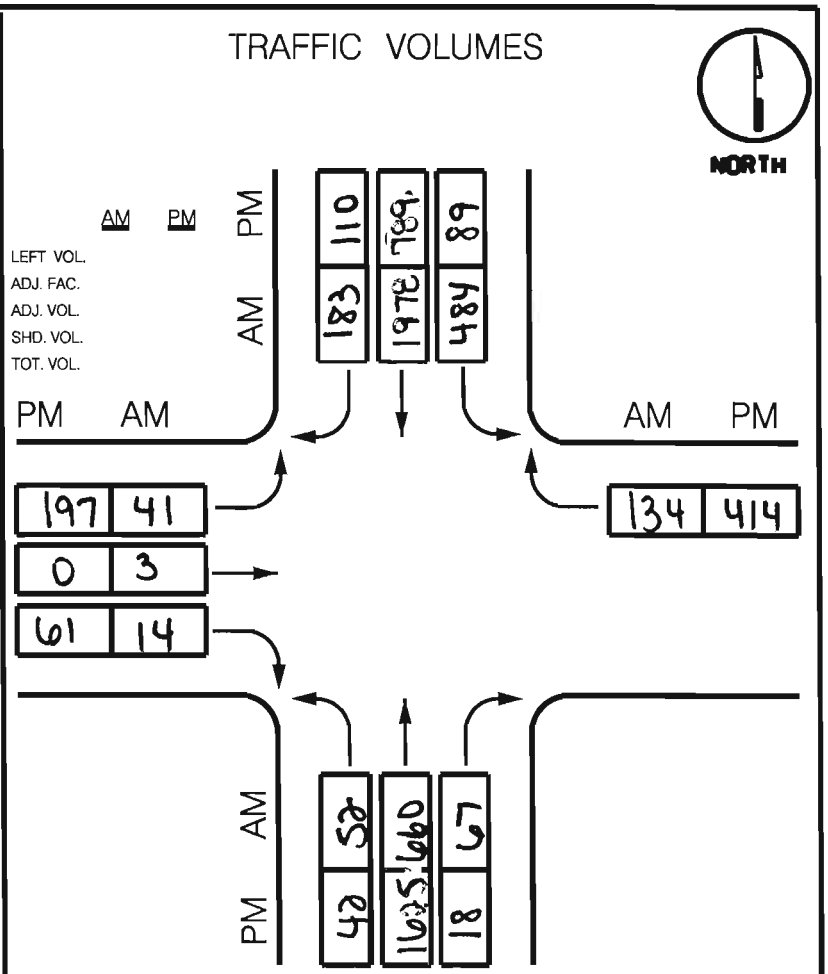
Prepared By: C. ATKINSON Condition: EXISTING

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION



TRAFFIC VOLUMES



		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	(1660 + 67) x.4 + 484 x.6	581	
	SB	1978 x.4 + 52 x1.0	843*	
	EB	(41 + 3) x1.0	44*	A
	WB	(134 x1.0) - (484 x.6) + 41 x1.0	41	887
PM	NB	(1625 + 18) x.4 + 89 x.6	711*	
	SB	789 x.4 + 42 x1.0	358	
	EB	(197 + 0) x1.0	197	C
	WB	(414 x1.0) - (89 x.6) + 197 x1.0	558*	1269

CRITICAL LANE ANALYSIS

Prepared By: C. ATKINSON Condition: BACKGROUND

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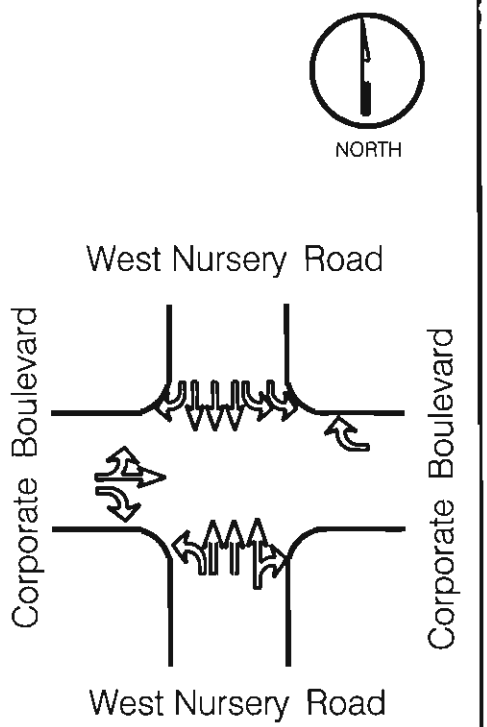
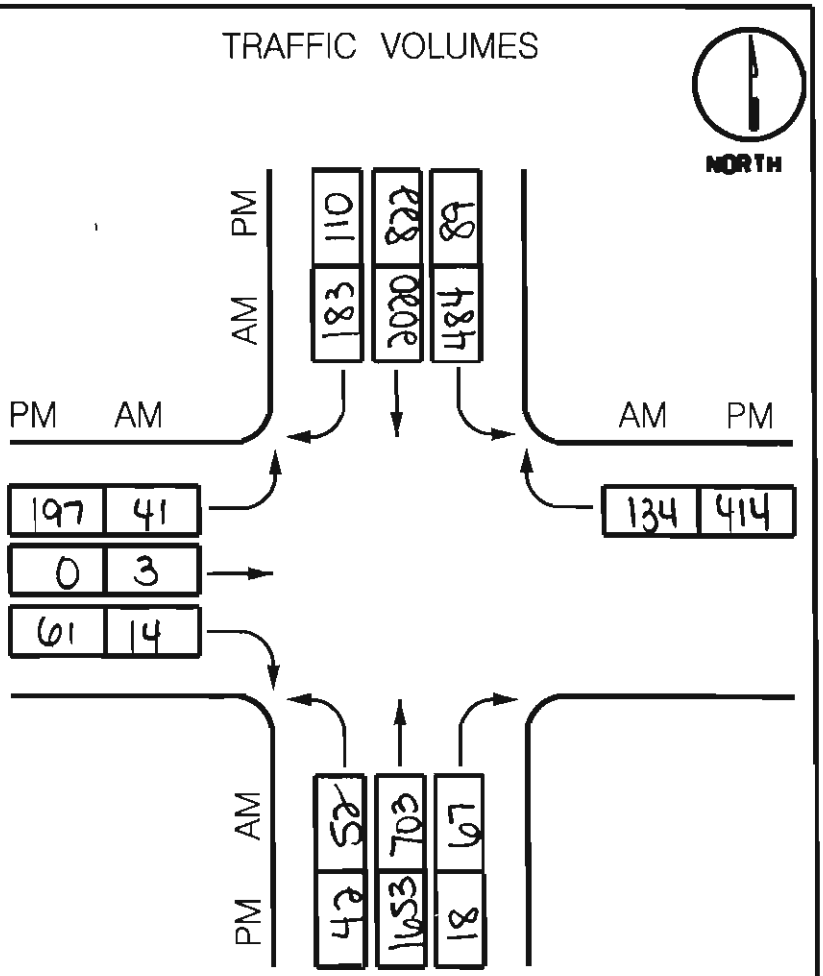
LANE CONFIGURATION



TRAFFIC VOLUMES



		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	(703 + 67) *1.4 + 484 *1.6	598	
	SB	2020 *1.4 + 52 *1.0	810*	
	EB	(41 + 3) *1.0	44*	A
	WB	(134 *1.0) - (484 *.6) + 41 *1.0	41	904
PM	NB	(1653 + 18) *.4 + 89 *.6	722*	
	SB	822 *.4 + 42 *1.0	371	
	EB	(197 + 0) *1.0	197	C
	WB	(414 *1.0) - (89 *.6) + 197 *1.0	558*	1280

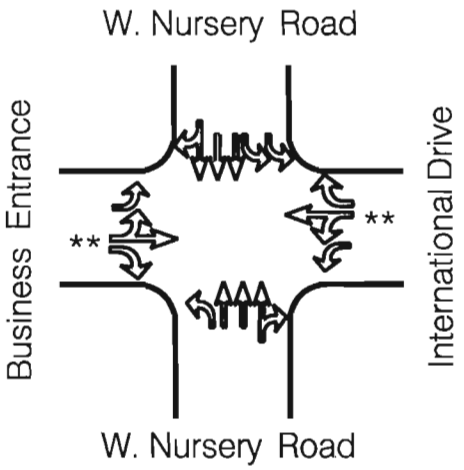
CRITICAL LANE ANALYSIS

Prepared By: C. ATKINSON Condition: FUTURE

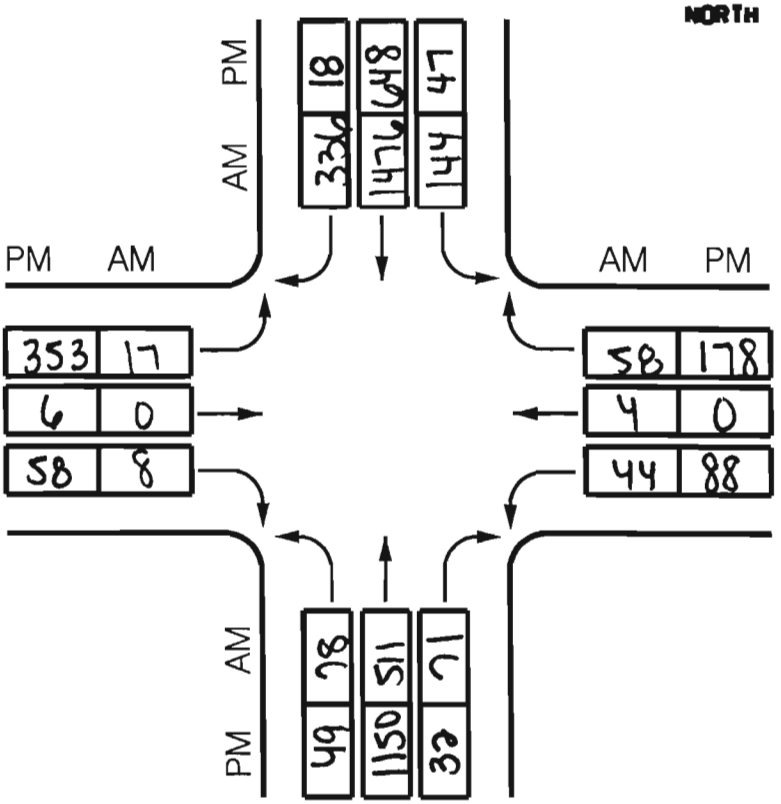
TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION

** SPLIT PHASED



TRAFFIC VOLUMES



		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	(511 + 71) *.4 + 144 *.6	319	A 842
	SB	(1476 + 336) *.4 + 78 *1.0	803*	
	EB	(17 + 0) *.6	10*	
	WB	(44 + 4) *.6	29*	
PM	NB	(1150 + 32) *.4 + 47 *.6	501*	A 866
	SB	(648 + 18) *.4 + 49 *1.0	315	
	EB	(353 + 6) *.6	215*	
	WB	(178 *1.0) - (47 *.6)	150*	

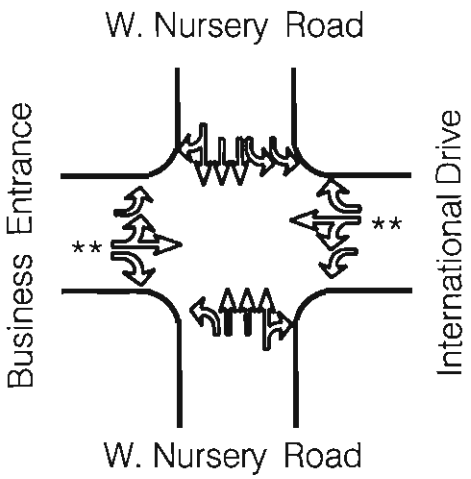
CRITICAL LANE ANALYSIS

Prepared By: C. ATKINSON Condition: EXISTING

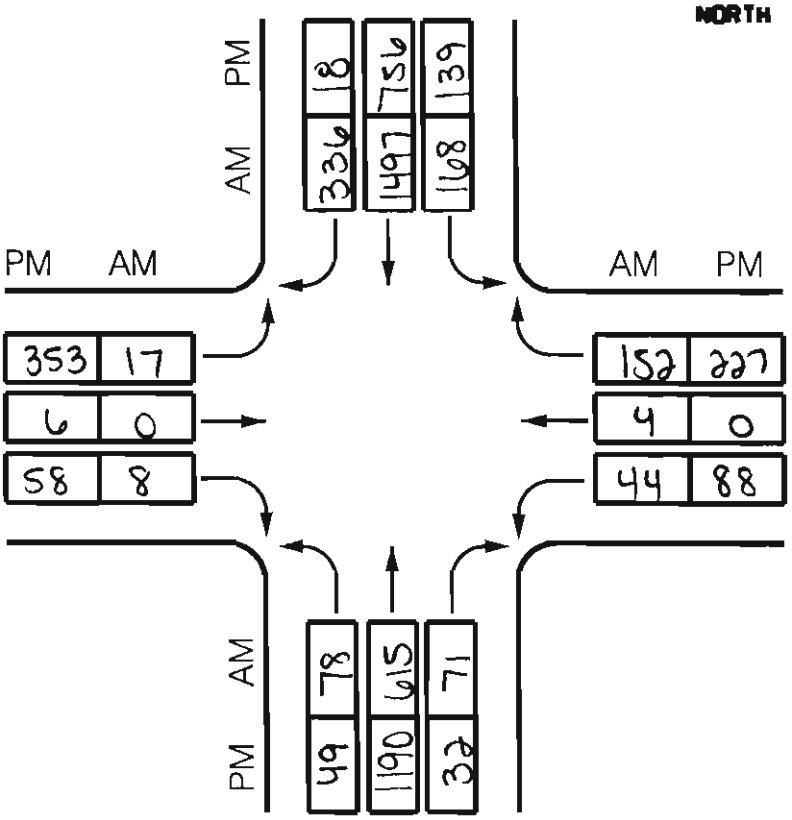
TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION

** SPLIT PHASED



TRAFFIC VOLUMES



		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	(615 + 71) x.4 + 168 x.6	375	
	SB	(1497 + 336) x.4 + 78 x 1.0	811*	
	EB	(17 + 0) x.6	10*	A
	WB	(152 x 1.0) - (168 x.6)	51*	872
PM	NB	(1190 + 32) x.4 + 139 x.6	572*	
	SB	(756 + 18) x.4 + 49 x 1.0	359	
	EB	(353 + 6) x.6	215*	A
	WB	(227 x 1.0) - (139 x.6)	144*	931

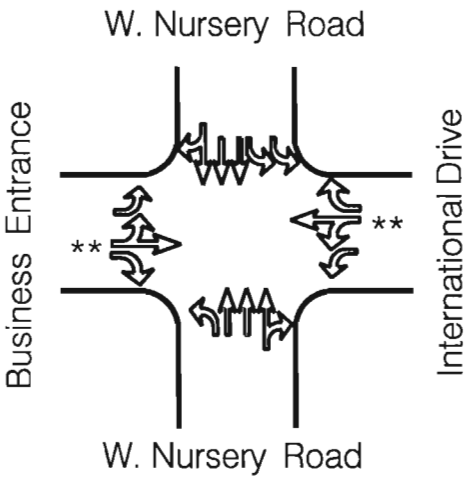
CRITICAL LANE ANALYSIS

Prepared By: C. ATKINSON Condition: BACKGROUND

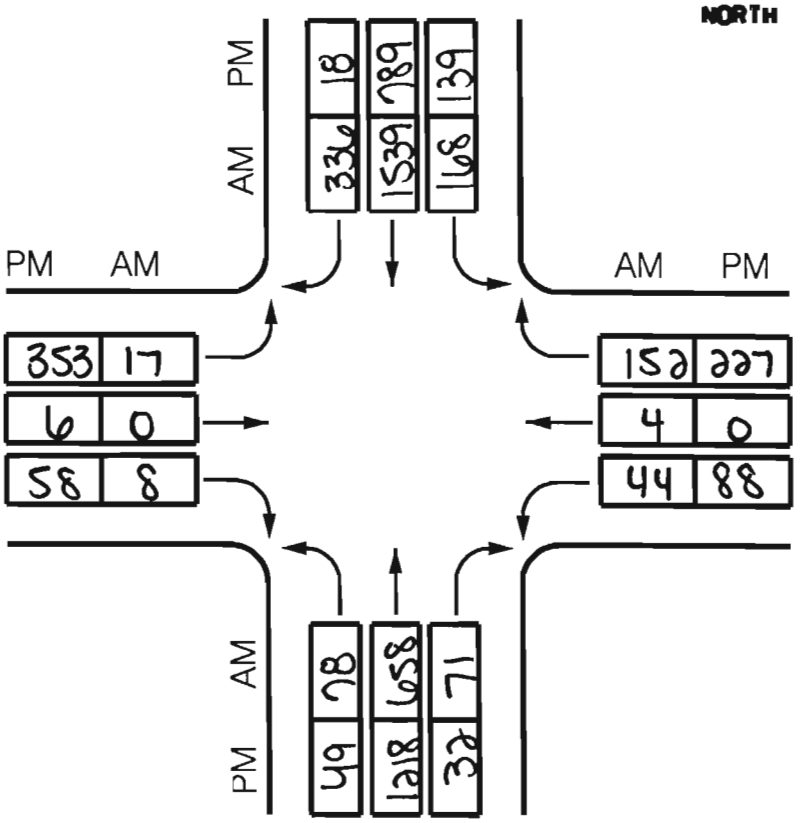
TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION

** SPLIT PHASED



TRAFFIC VOLUMES



		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	(658 + 71) *.4 + 168 *.6	392	
	SB	(1539 + 336) *.4 + 78 * 1.0	828#	
	EB	(17 + 0) *.6	10*	A
	WB	(152 *1.0) - (168 *.6)	51*	889
PM	NB	(1218 + 32) *.4 + 139 *.6	583#	
	SB	(789 + 18) *.4 + 49 *1.0	372	
	EB	(353 + 6) *.6	215*	A
	WB	(227 *1.0) - (139 *.6)	144*	942

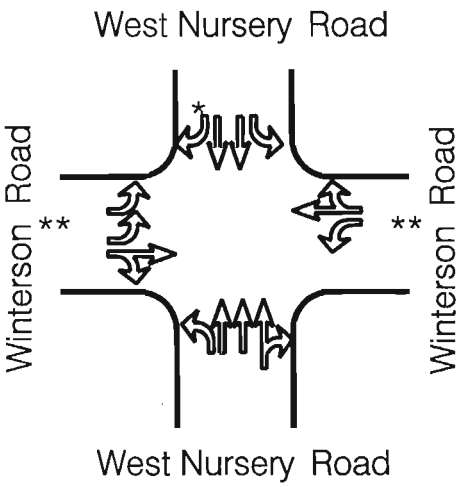
CRITICAL LANE ANALYSIS

Prepared By: C. ATKINSON Condition: FUTURE

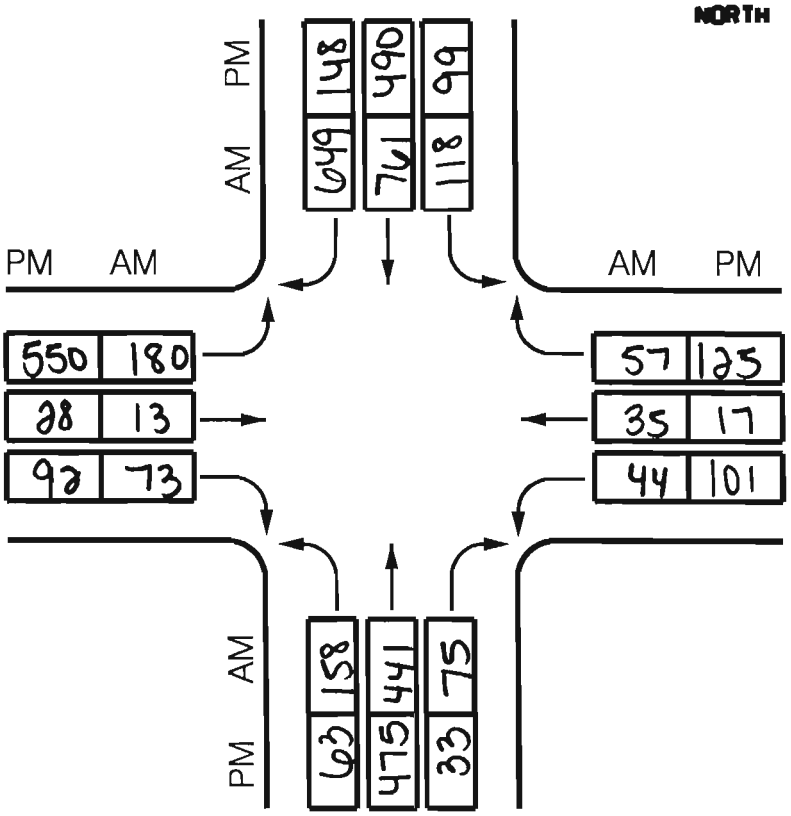
TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION

* FREE RIGHT
** SPLIT PHASED



TRAFFIC VOLUMES



		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	(441 + 75) *.4 + 118 *1.0	324	
	SB	761 *.55 + 158 *1.0	577*	
	EB	180 *.6	108*	A
	WB	(35 + 57) *1.0	92*	777
PM	NB	(475 + 33) *.4 + 99 *1.0	307	
	SB	490 *.55 + 63 *1.0	333*	
	EB	550 *.6	330*	A
	WB	(125 + 17) *1.0	142*	805

CRITICAL LANE ANALYSIS

Prepared By: C. ATKINSON Condition: EXISTING

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION

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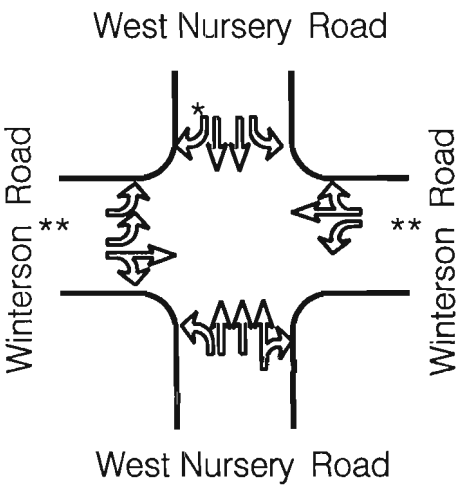
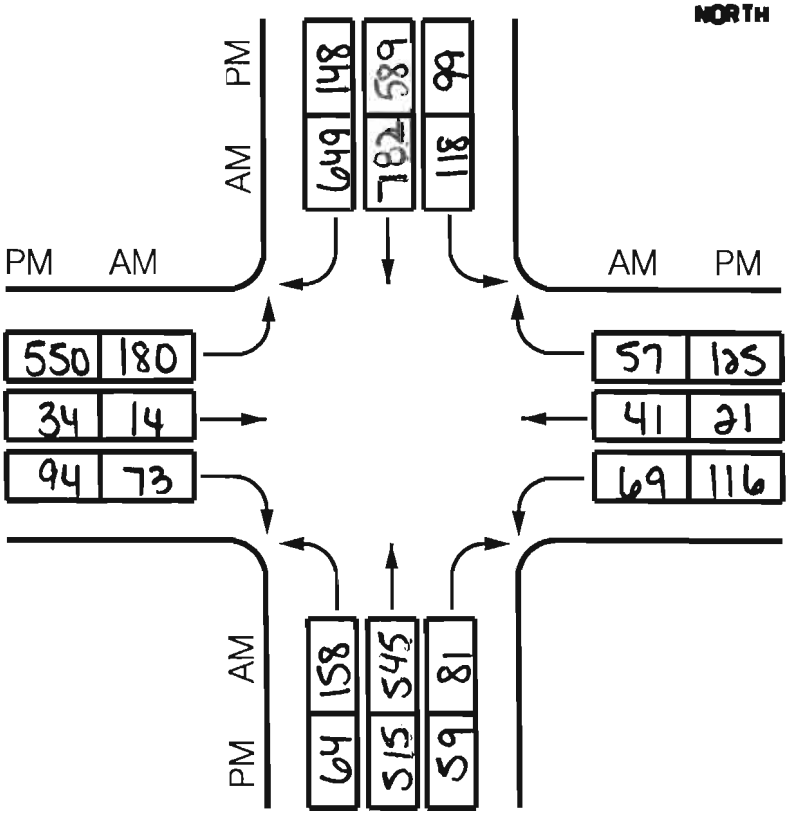
** SPLIT PHASED



TRAFFIC VOLUMES



		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	(545 + 81) *.4 + 118 *1.0	368	
	SB	782 *.55 + 158 *1.0	588*	
	EB	180 *.6	108*	A
	WB	(41 + 57) *1.0	98*	794
PM	NB	(515 + 59) *.4 + 99 *1.0	329	
	SB	589 *.55 + 64 *1.0	388*	
	EB	550 *.6	330*	A
	WB	(21 + 125) *1.0	146*	864

CRITICAL LANE ANALYSIS

Prepared By: C. ATKINSON Condition: BACKGROUND

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION

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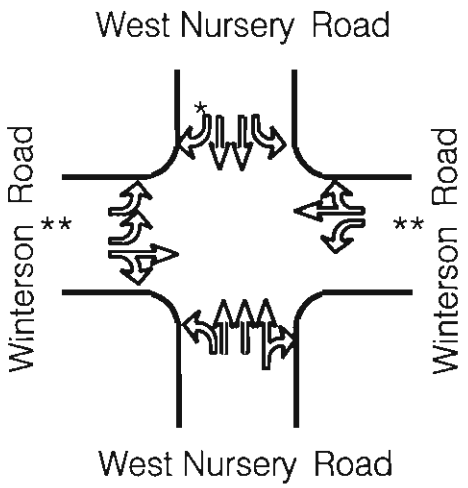
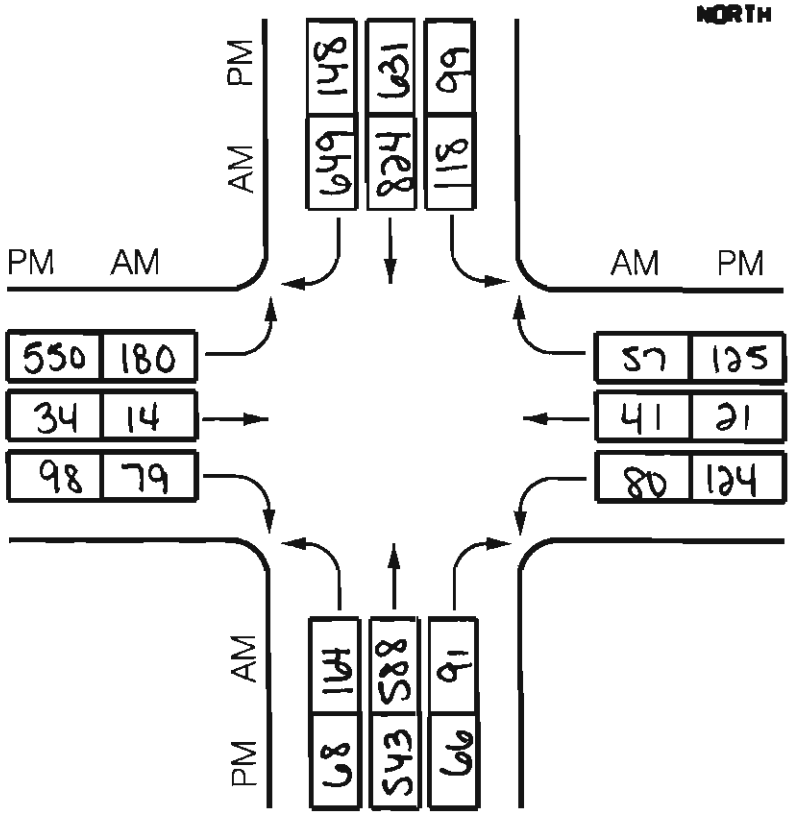
** SPLIT PHASED



TRAFFIC VOLUMES



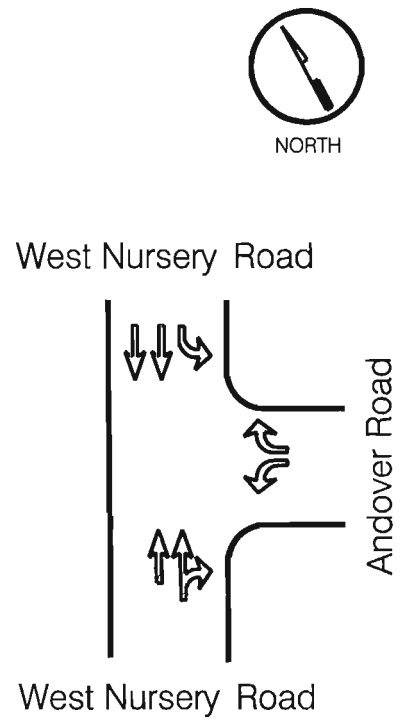
		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	(588 + 91) x.4 + 118 x 1.0	390	
	SB	824 x.55 + 164 x 1.0	617*	
	EB	180 x.6	108*	A
	WB	(57 + 41) x1.0	98*	823
PM	NB	(543 + 66) x.4 + 99 x 1.0	343	
	SB	631 x.55 + 68 x 1.0	415*	
	EB	550 x.6	330*	A
	WB	(21 + 125) x1.0	146*	891

CRITICAL LANE ANALYSIS

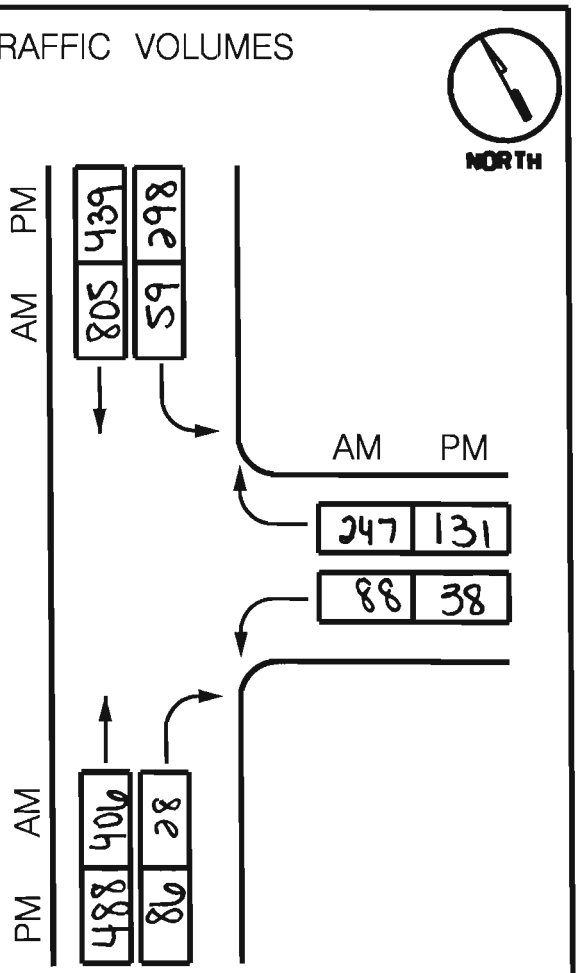
Prepared By: C. ATKINSON Condition: FUTURE

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION



TRAFFIC VOLUMES



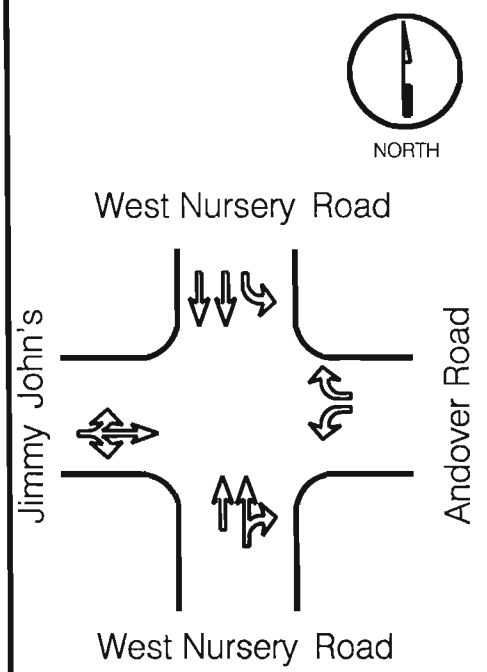
		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	(406 + 28) * .55 + 59 * 1.0	298	
	SB	805 * .55	443*	
	EB	—	—	A
	WB	(247 - 59) * 1.0	188*	631
PM	NB	(488 + 86) * .55 + 298 * 1.0	614*	
	SB	439 * .55	241	
	EB	—	—	A
	WB	38 * 1.0	38*	652

CRITICAL LANE ANALYSIS

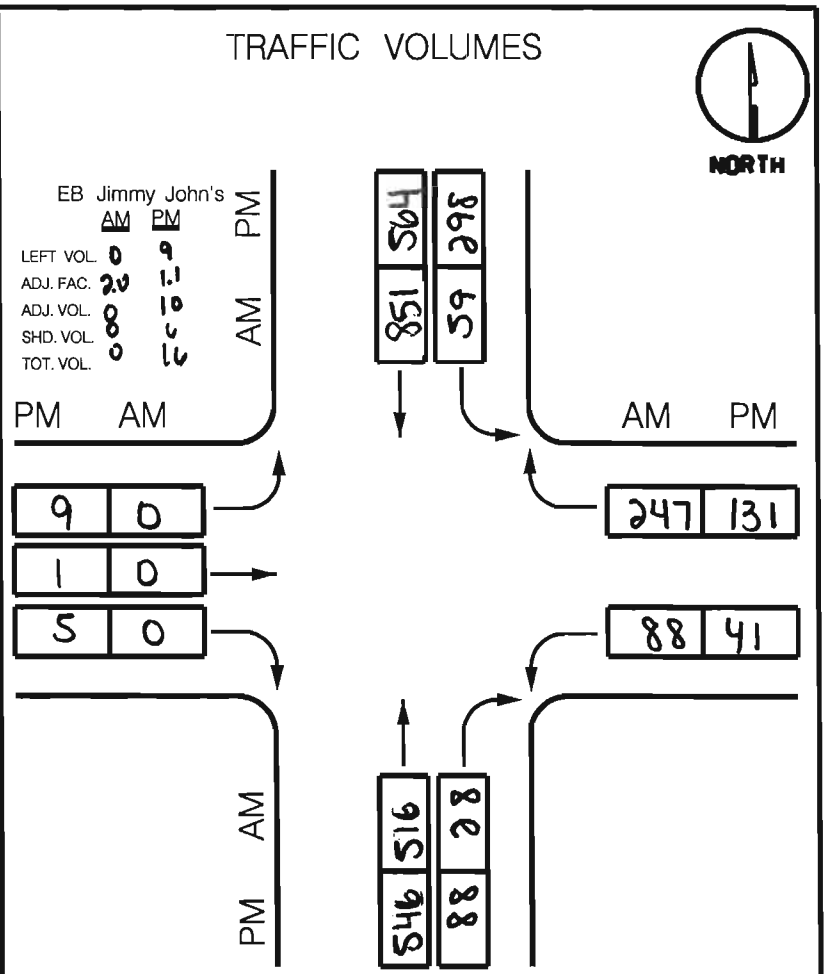
Prepared By: C. ATKINSON Condition: EXISTING

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION



TRAFFIC VOLUMES



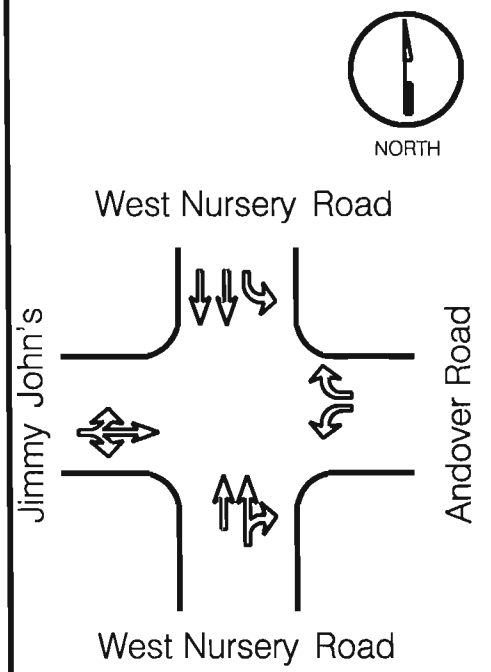
		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	(516 + 28) *.55 + 59 *1.0	358	
	SB	851 *.55	468*	
	EB	0 *1.0 + 88 *1.0	88	A
	WB	(247-59) *1.0 + 0 *1.0	188*	656
PM	NB	(546 + 88) *.55 + 298 *1.0	647*	
	SB	564 *.55	310	
	EB	16 *1.0 + 41 *1.0	57*	A
	WB	(131-298) *1.0 + 9 *1.0	9	704

CRITICAL LANE ANALYSIS

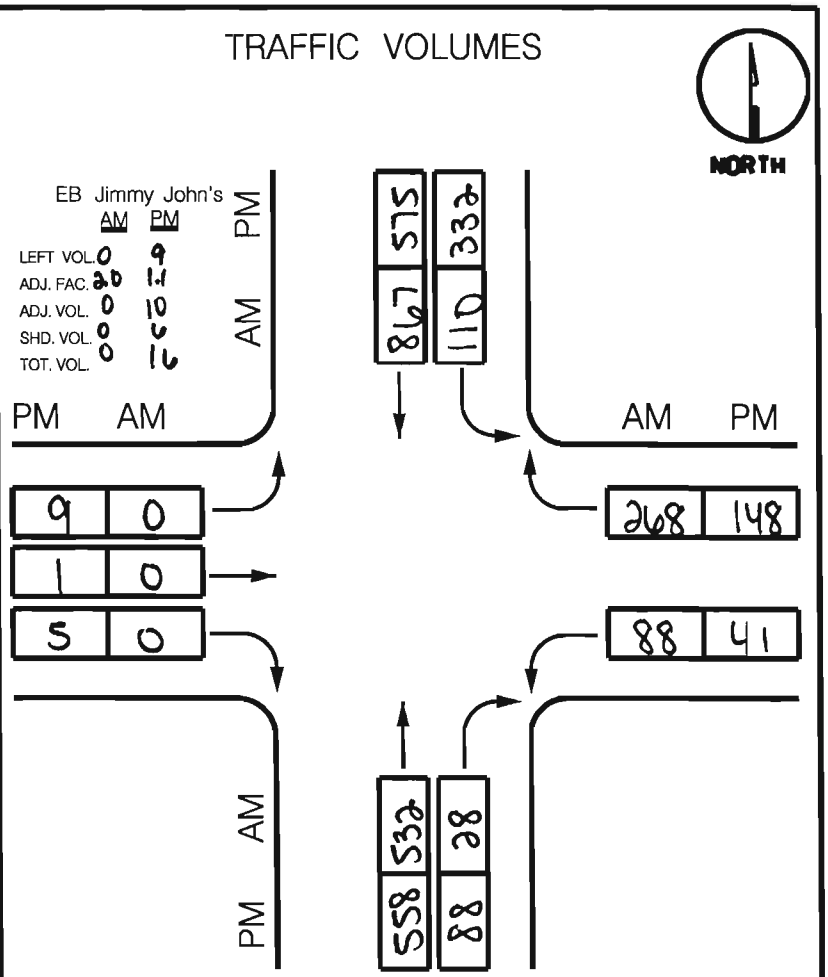
Prepared By: C. ATKINSON Condition: BACKGROUND

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION



TRAFFIC VOLUMES



		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	(532 + 28) * .55 + 110 * 1.0	418	
	SB	867 * .55	477*	
	EB	0 * 1.0 + 88 * 1.0	88	A
	WB	(268 - 110) * 1.0 + 0 * 1.0	158*	1635
PM	NB	(558 + 88) * .55 + 332 * 1.0	687*	
	SB	575 * .55	316	
	EB	16 * 1.0 + 41 * 1.0	57*	A
	WB	(148 - 332) * 1.0 + 9 * 1.0	9	744

CRITICAL LANE ANALYSIS

Prepared By: C. ATKINSON Condition: FUTURE

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION

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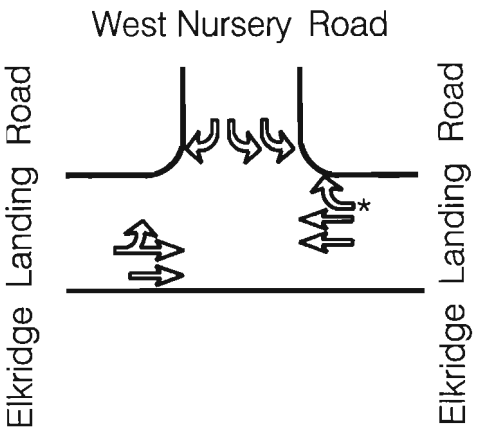
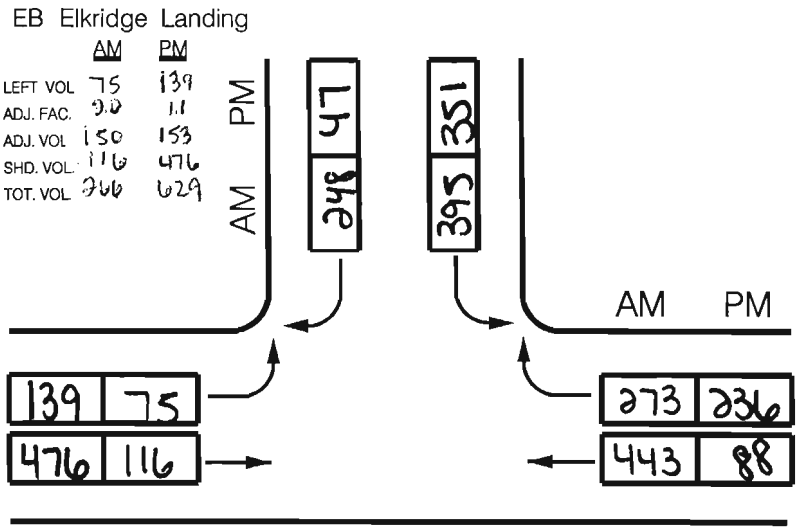


TRAFFIC VOLUMES



		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	—	—	
	SB	395 * .6	237	
	EB	266 * .55	146	A
	WB	443 * .55 + 75 * 1.0	319	556
PM	NB	—	—	
	SB	351 * .6	211	
	EB	629 * .55	346	A
	WB	88 * .55 + 139 * 1.0	187	557

CRITICAL LANE ANALYSIS

Prepared By: C. ATKINSON Condition: EXISTING

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION

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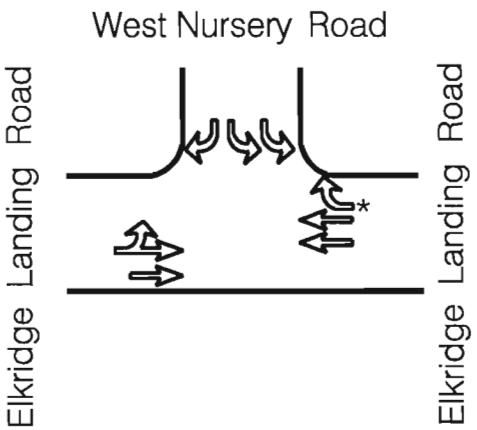
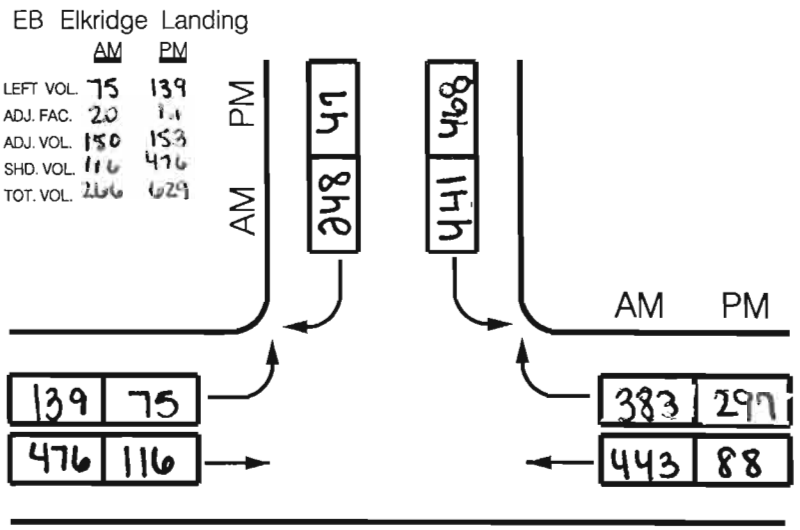


TRAFFIC VOLUMES



		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	—	—	
	SB	441 *.6	265*	
	EB	266 *.55	146	A
	WB	443 *.55 + 75 *1.0	319*	584
PM	NB	—	—	
	SB	468 *.6	281*	
	EB	629 *.55	346*	A
	WB	88 *.55 + 139 *1.0	187	627

CRITICAL LANE ANALYSIS

Prepared By: C. ATKINSON Condition: BACKGROUND

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION

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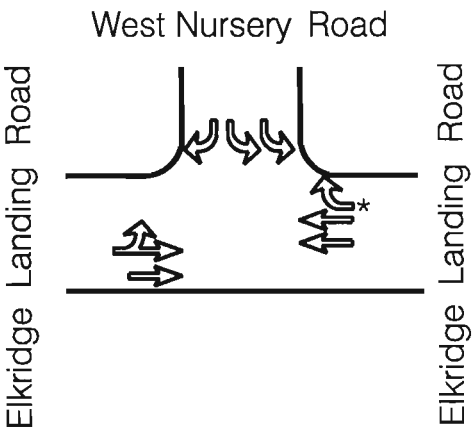
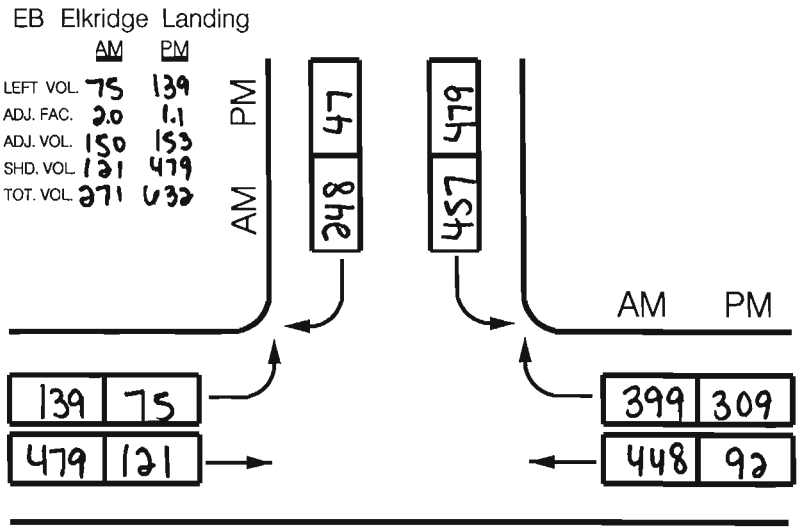


TRAFFIC VOLUMES



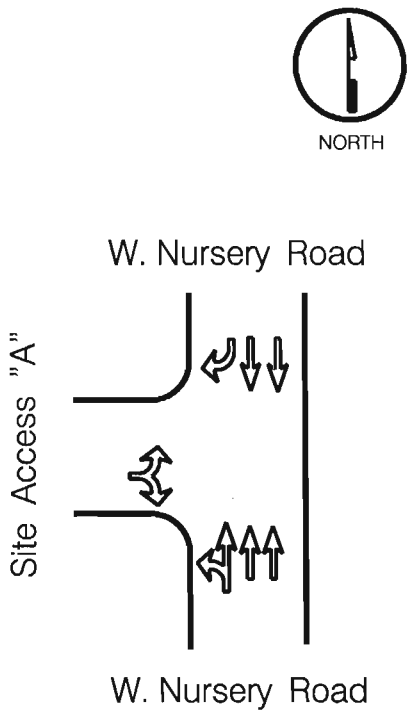
	TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB ——	——	
	SB 457 *.6	274*	
	EB 271 *.55	149	A
	WB 448 *.55 + 75 *1.0	321*	595
PM	NB ——	——	
	SB 479 *.6	287*	
	EB 632 *.55	348*	A
	WB 92 *.55 + 139 *1.0	190	635

CRITICAL LANE ANALYSIS

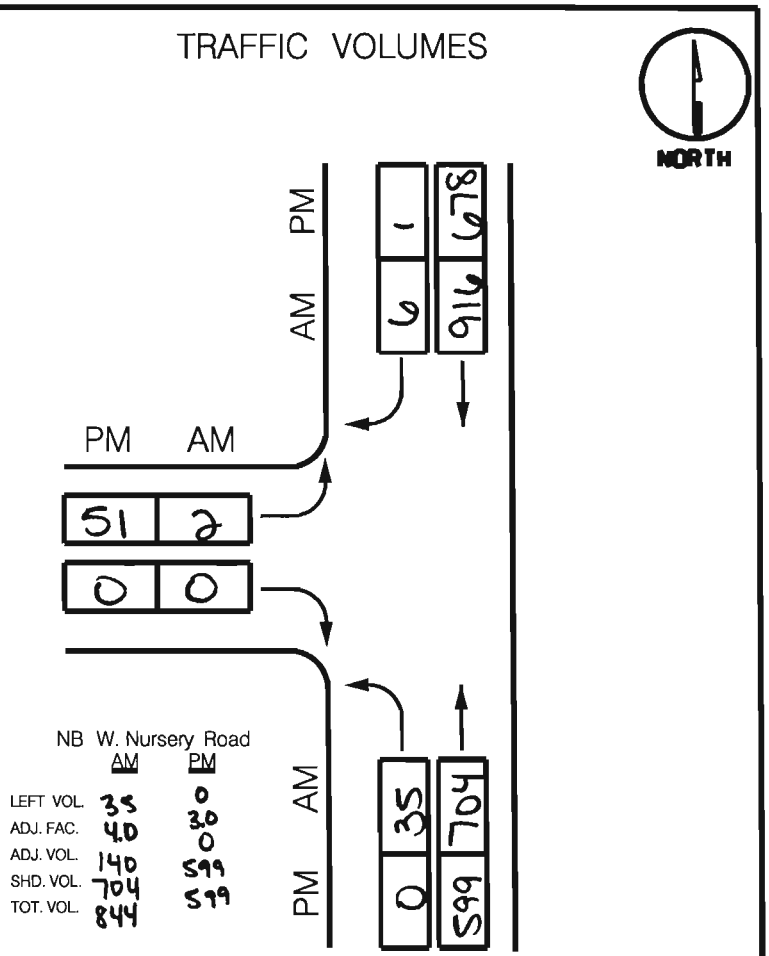
Prepared By: C. ATKINSON Condition: FUTURE

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION



TRAFFIC VOLUMES



NB W. Nursery Road

	AM	PM
LEFT VOL.	35	0
ADJ. FAC.	4.0	3.0
ADJ. VOL.	140	0
SHD. VOL.	704	599
TOT. VOL.	844	599

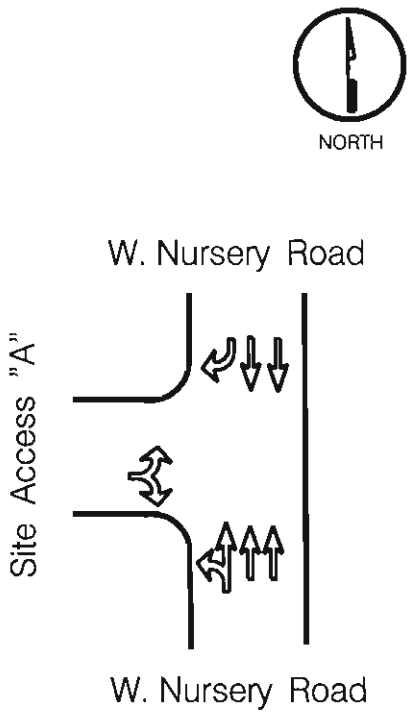
		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	844 * .4	338	
	SB	916 * .55 + 35 * 1.0	539*	
	EB	(2 + 0) * 1.0	2 *	A
	WB	—	—	541
PM	NB	599 * .4	240	
	SB	(678 * .55 + 0 * 1.0	373*	
	EB	(51 + 0) * 1.0	51 *	A
	WB	—	—	424

CRITICAL LANE ANALYSIS

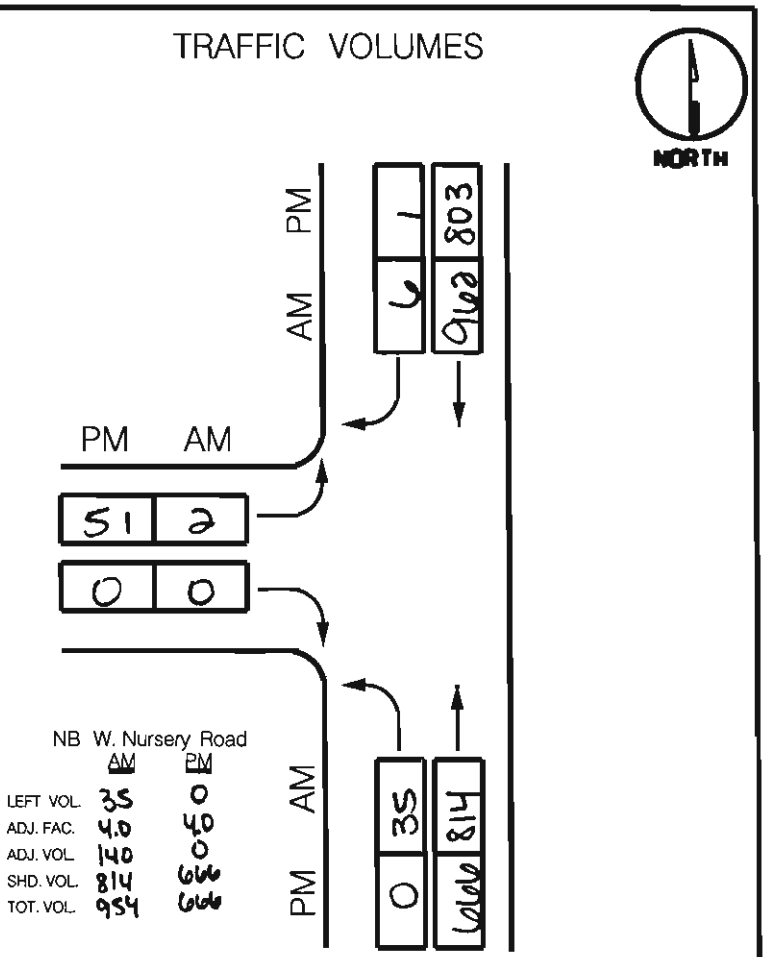
Prepared By: C. ATKINSON Condition: EXISTING

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION



TRAFFIC VOLUMES



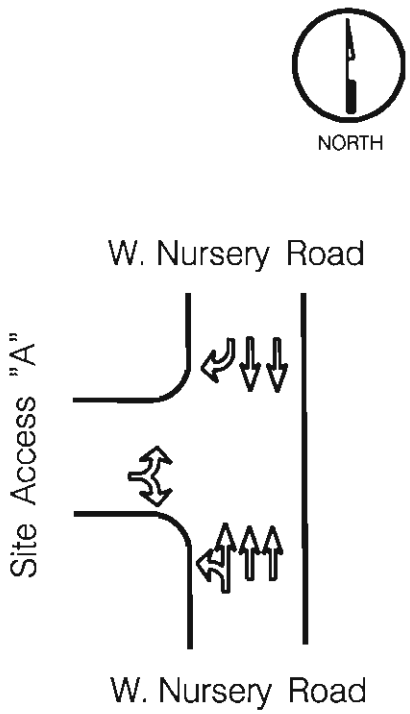
		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	954 * .4	382	
	SB	962 * .55 + 35 * 1.0	564*	
	EB	(2 + 0) * 1.0	2 *	A
	WB	—	—	564
PM	NB	666 * .4	266	
	SB	803 * .55 + 0 * 1.0	442*	
	EB	(51 + 0) * 1.0	51 *	A
	WB	—	—	493

CRITICAL LANE ANALYSIS

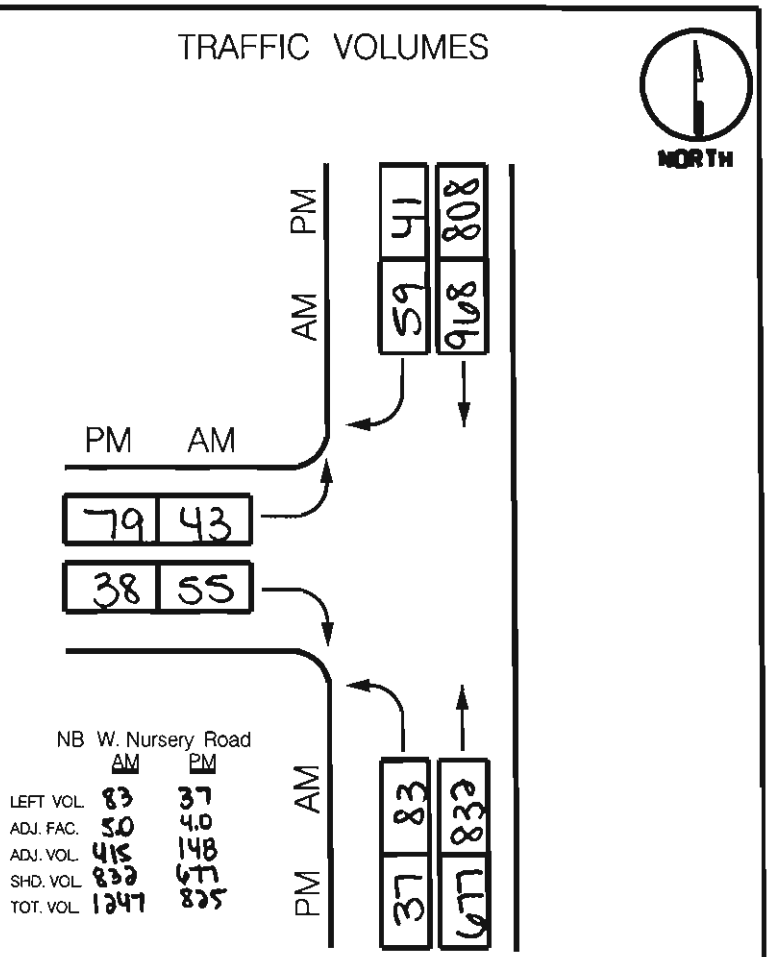
Prepared By: C. ATKINSON Condition: BACKGROUND

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION



TRAFFIC VOLUMES



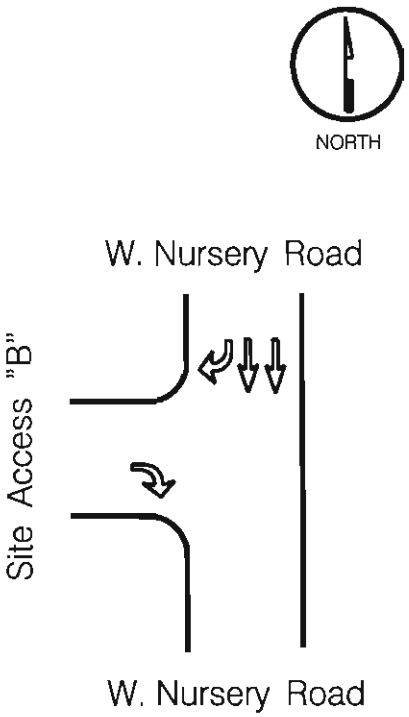
		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	1247 * .4	499	
	SB	968 * .55 + 83 * 1.0	615*	
	EB	(43 + 55) * 1.0	98*	A 713
	WB	—	—	
PM	NB	825 * .4	330	
	SB	808 * .55 + 37 * 1.0	481*	
	EB	(79 + 38) * 1.0	117*	A 598
	WB	—	—	

CRITICAL LANE ANALYSIS

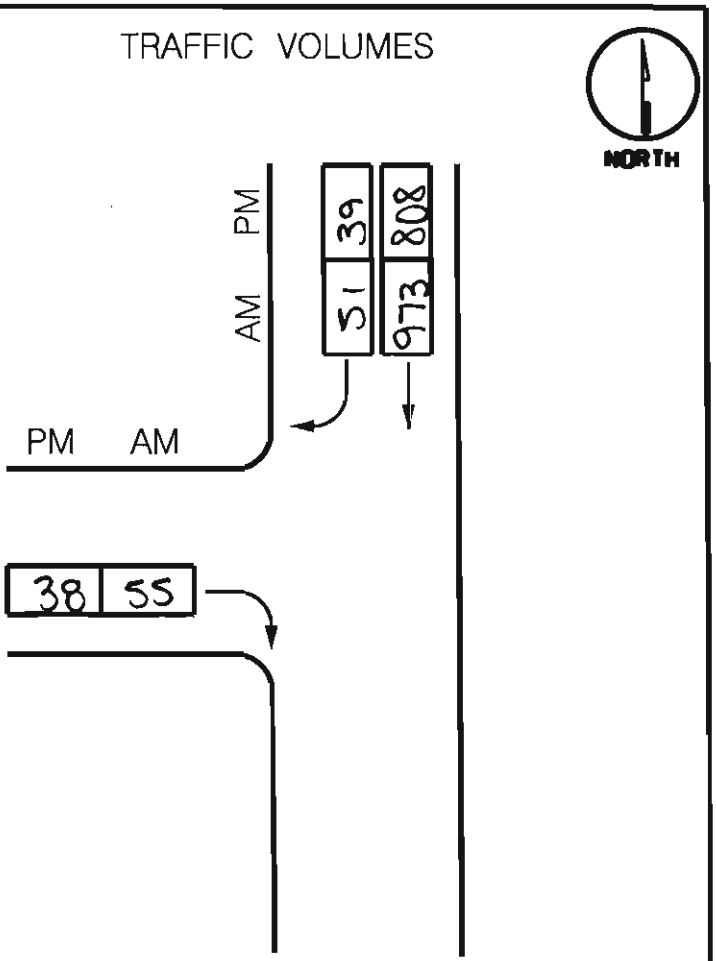
Prepared By: C. ATKINSON Condition: FUTURE

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION



TRAFFIC VOLUMES



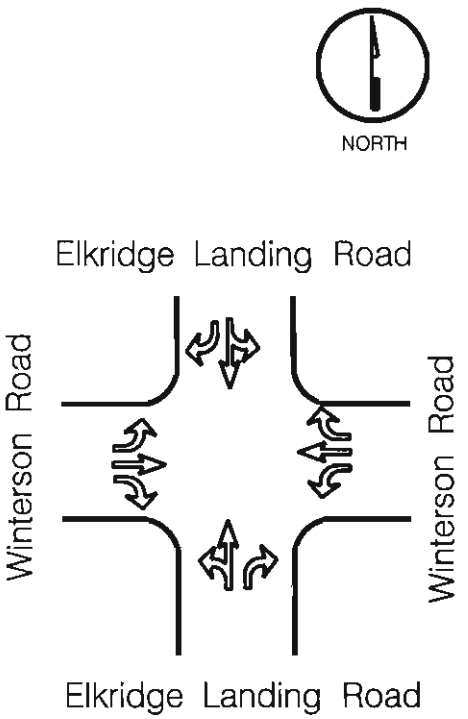
		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	—	—	
	SB	973 * .55	535*	
	EB	55 * 1.0	55*	A 590
	WB	—	—	
PM	NB	—	—	
	SB	808 * .55	444*	
	EB	38 * 1.0	38*	A 482
	WB	—	—	

CRITICAL LANE ANALYSIS

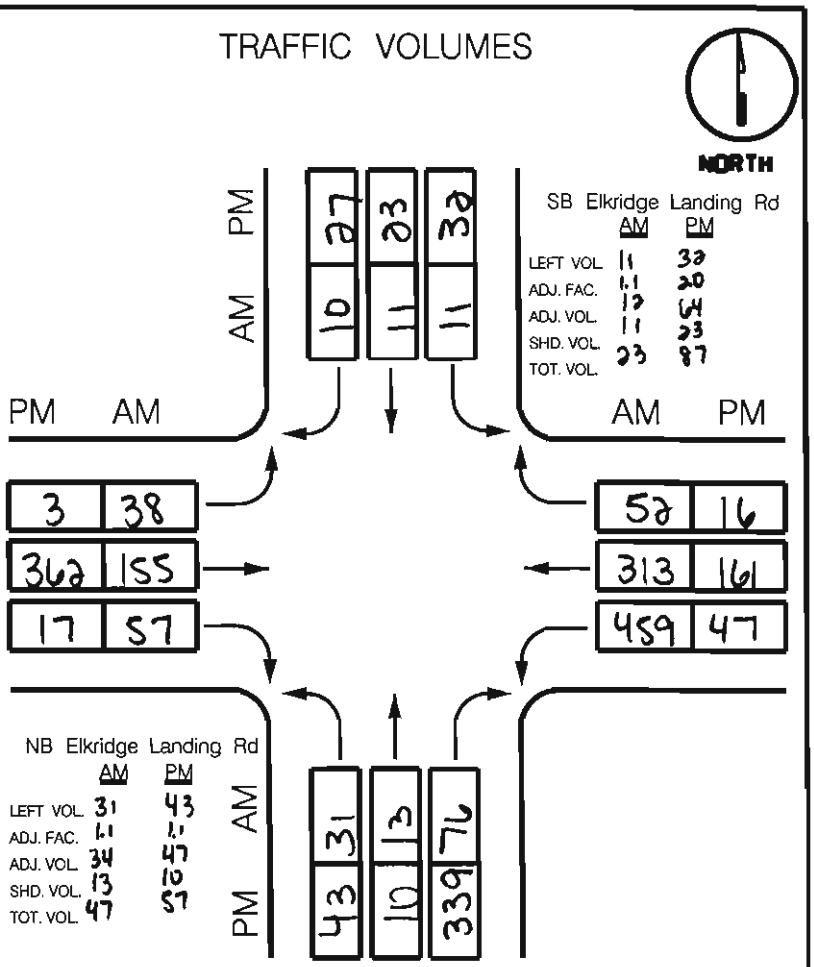
Prepared By: C. ATKINSON Condition: FUTURE

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION



TRAFFIC VOLUMES



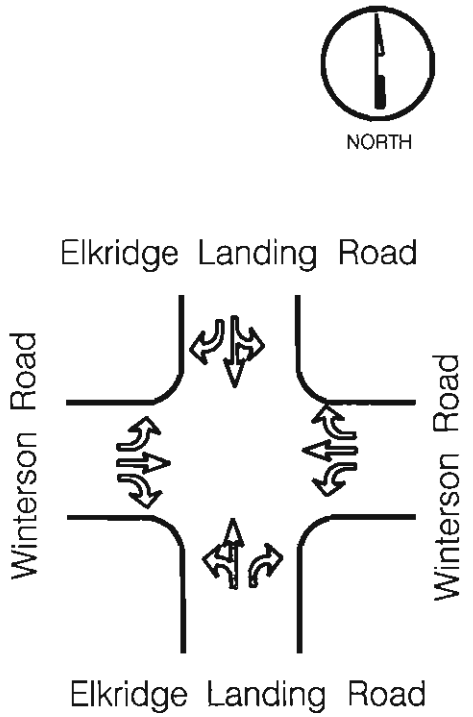
		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	47 * 1.0 + 11 * 1.0	58*	
	SB	23 * 1.0 + 31 * 1.0	54	
	EB	155 * 1.0 + 459 * 1.0	614*	A
	WB	313 * 1.0 + 38 * 1.0	351	672
PM	NB	(339-47) * 1.0 + 32 * 1.0	324*	
	SB	87 * 1.0 + 43 * 1.0	130	
	EB	362 * 1.0 + 47 * 1.0	409*	A
	WB	161 * 1.0 + 3 * 1.0	164	733

CRITICAL LANE ANALYSIS

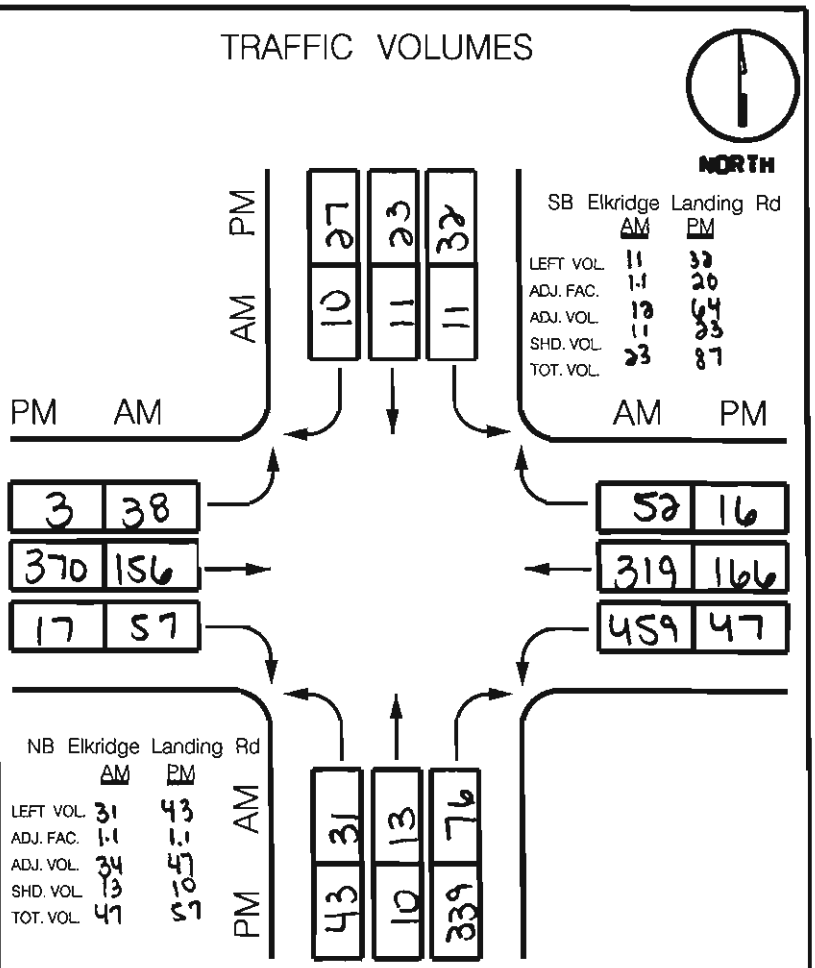
Prepared By: C. ATKINSON Condition: EXISTING

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION



TRAFFIC VOLUMES



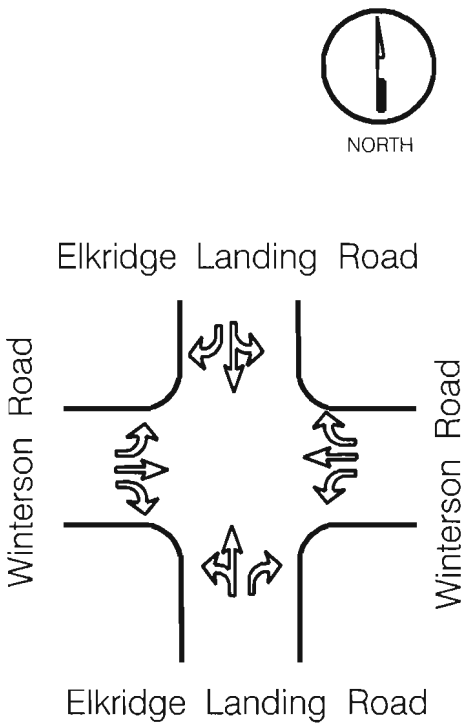
		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	47 * 1.0 + 11 * 1.0	58 *	
	SB	23 * 1.0 + 31 * 1.0	54	
	EB	156 * 1.0 + 459 * 1.0	615*	A
	WB	319 * 1.0 + 38 * 1.0	357	673
PM	NB	(339 - 47) * 1.0 + 32 * 1.0	324*	
	SB	87 * 1.0 + 43 * 1.0	130	
	EB	370 * 1.0 + 47 * 1.0	417*	A
	WB	166 * 1.0 + 3 * 1.0	169	741

CRITICAL LANE ANALYSIS

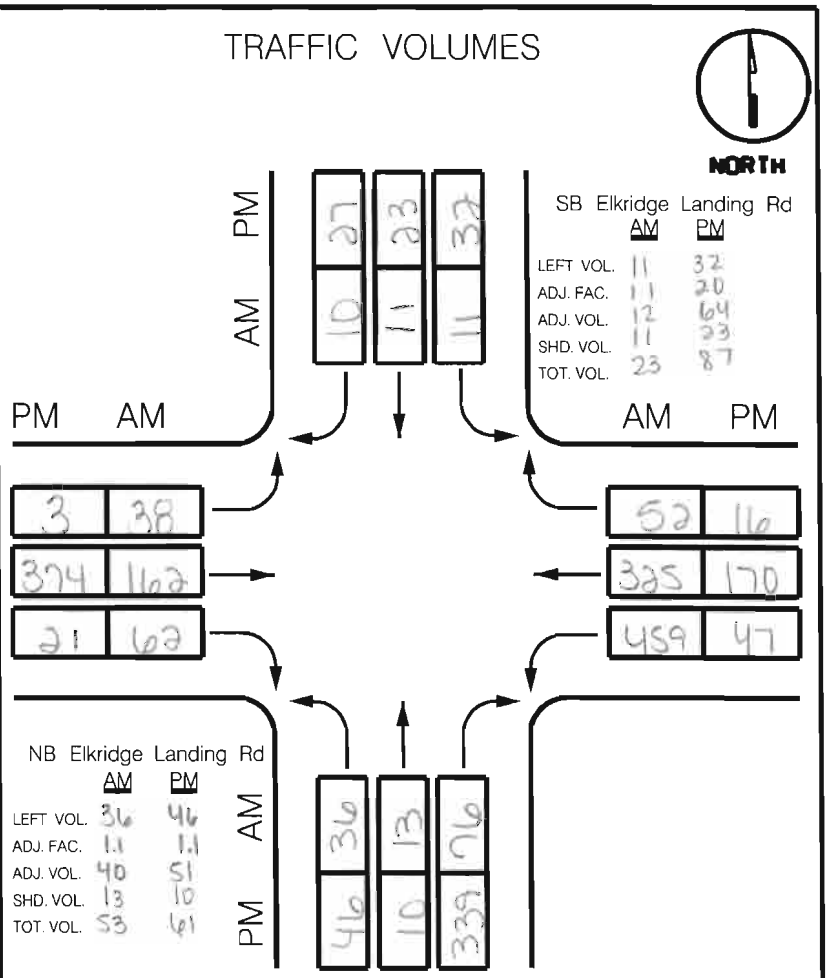
Prepared By: C. ATKINSON Condition: BACKGROUND

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION



TRAFFIC VOLUMES



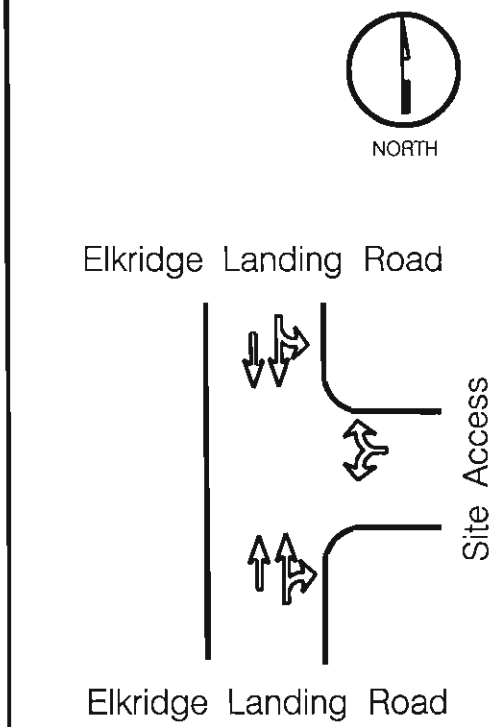
		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	53 *1.0 + 11 *1.0	64 *	
	SB	23 *1.0 + 36 *1.0	59	
	EB	162 *1.0 + 459 *1.0	621 *	A
	WB	325 *1.0 + 38 *1.0	363	685
PM	NB	(339-47) *1.0 + 32 *1.0	324 *	
	SB	87 *1.0 + 46 *1.0	133	
	EB	324 *1.0 + 47 *1.0	421 *	A
	WB	170 *1.0 + 3 *1.0	173	745

CRITICAL LANE ANALYSIS

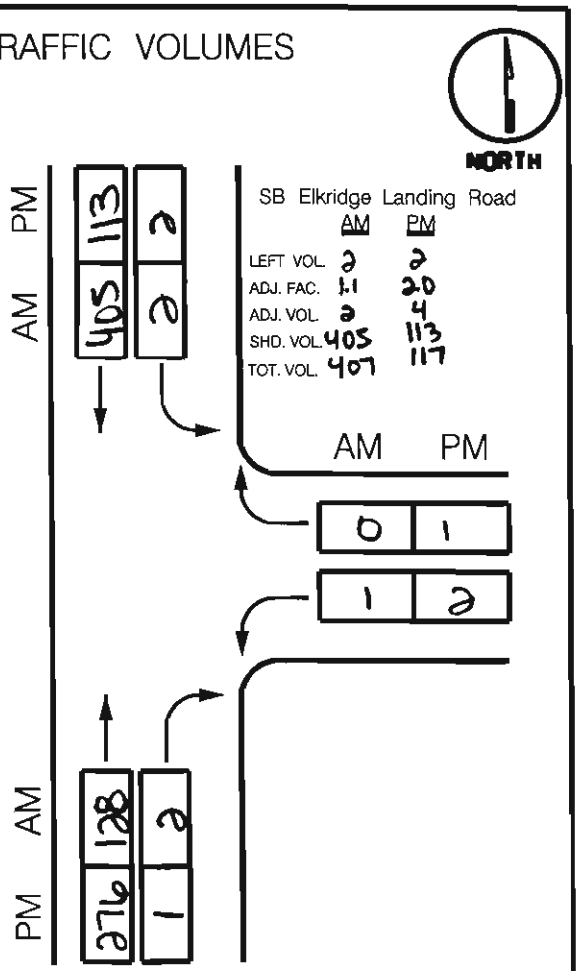
Prepared By: C. ATKINSON Condition: FUTURE

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION



TRAFFIC VOLUMES



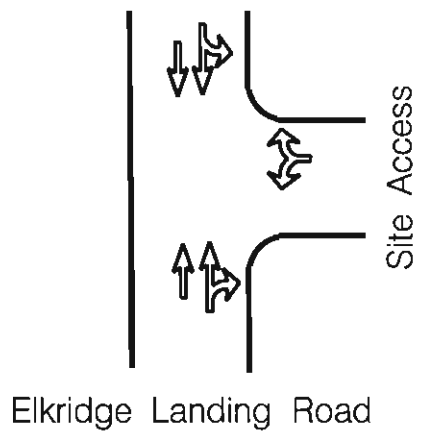
		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	(128 + 2) x .55 + 2 x 1.0	74	
	SB	407 x .55	224*	
	EB	—	—	A
	WB	(0 + 1) x 1.0	1*	225
PM	NB	(276 + 1) x .55 + 2 x 1.0	154*	
	SB	117 x .55	64	
	EB	—	—	A
	WB	(1 + 2) x 1.0	3*	157

CRITICAL LANE ANALYSIS

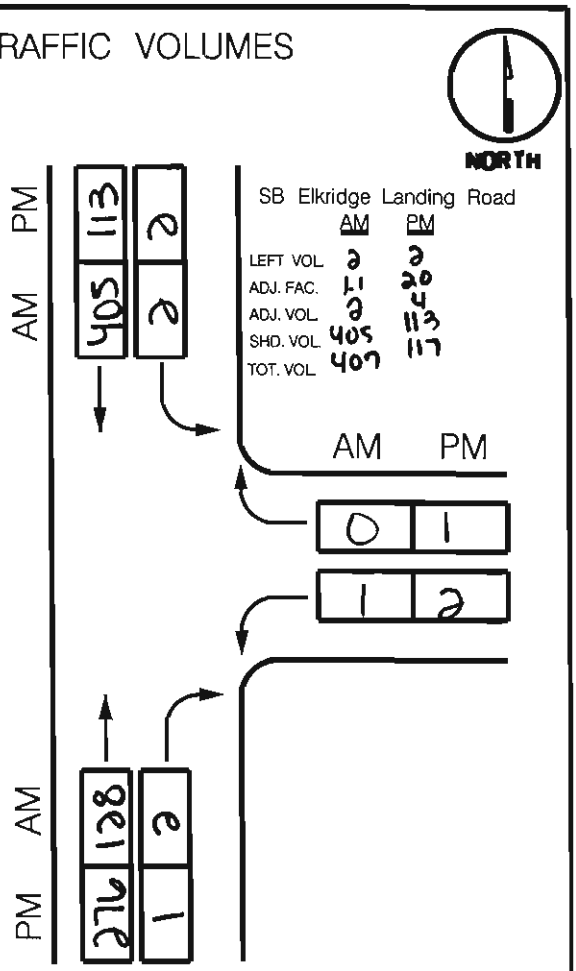
Prepared By: C. ATKINSON Condition: EXISTING

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION



TRAFFIC VOLUMES



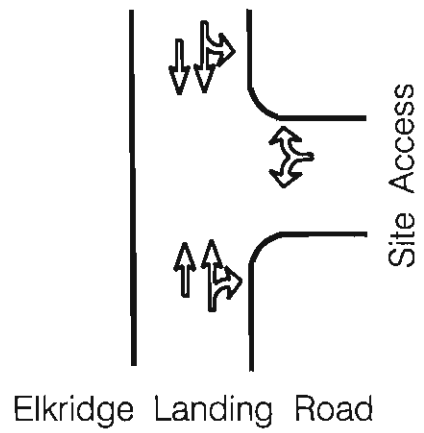
		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	(128 + 2) *.55 + 2 *1.0	74	
	SB	407 *.55	224	
	EB	—	—	A
	WB	(0 + 1) *1.0	1	225
PM	NB	(276 + 1) *.55 + 2 *1.0	154	
	SB	117 *.55	64	
	EB	—	—	A
	WB	(1 + 2) *1.0	3	157

CRITICAL LANE ANALYSIS

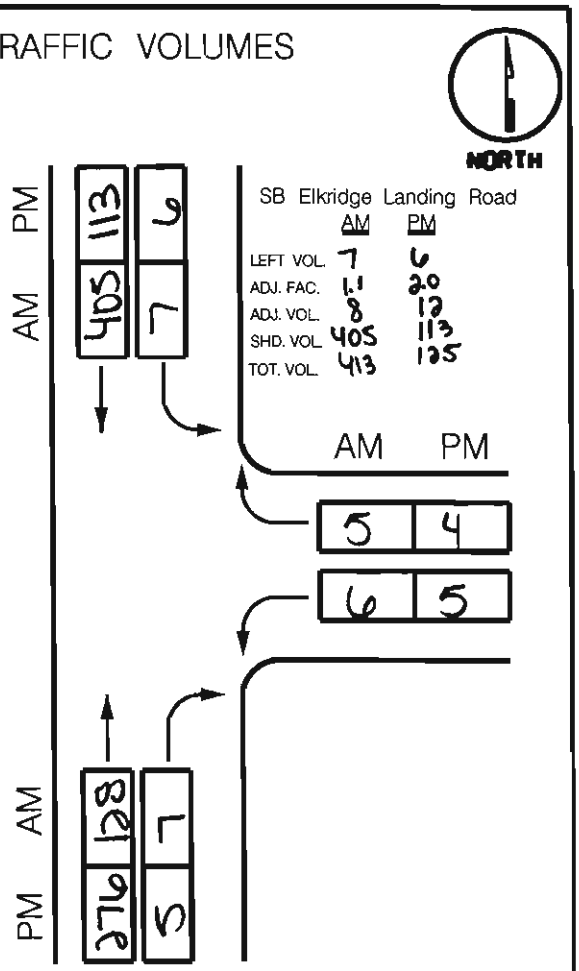
Prepared By: C. ATKINSON Condition: BACKGROUND

TRAFFIC CONCEPTS, Inc.

LANE CONFIGURATION



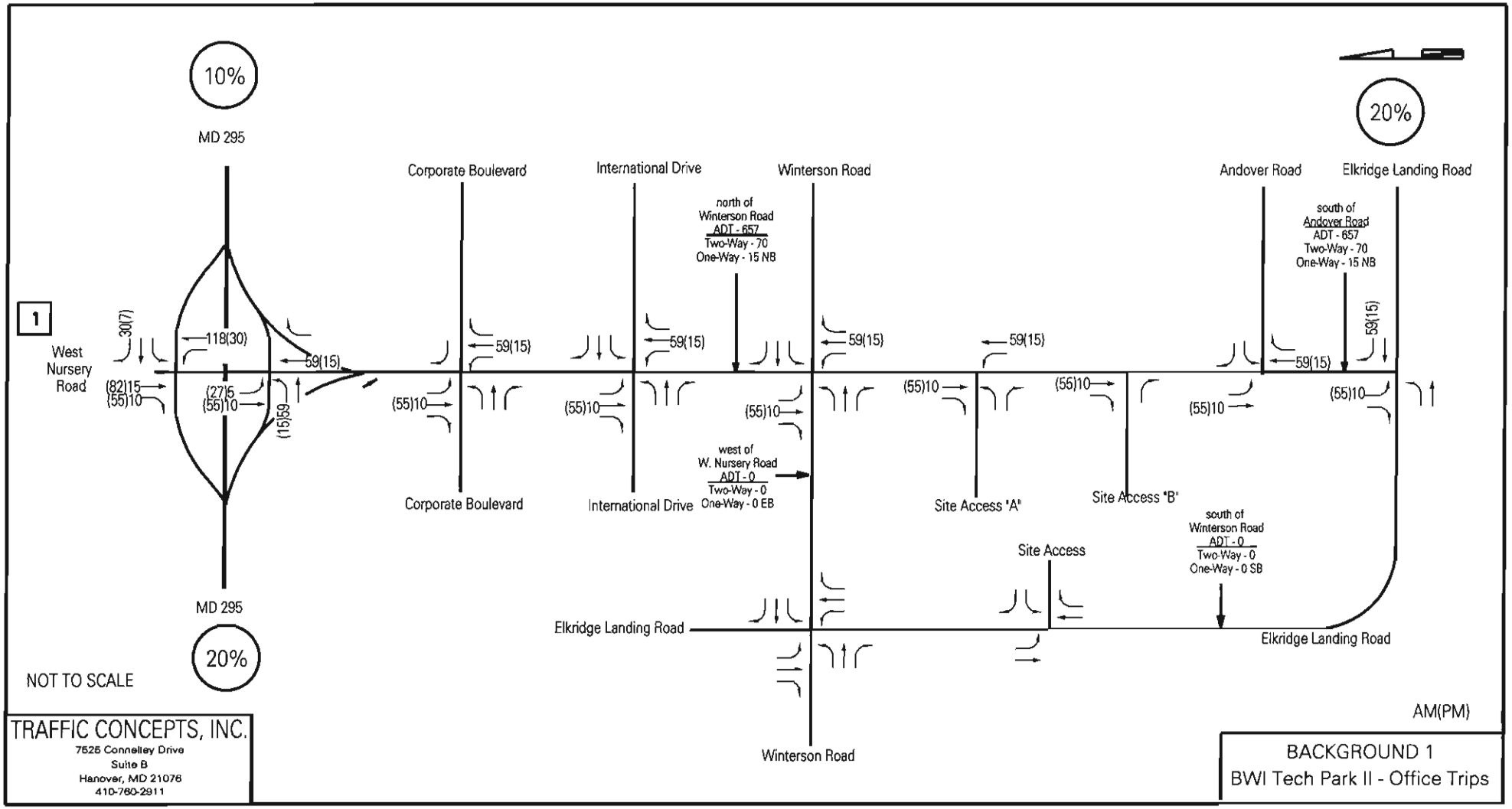
TRAFFIC VOLUMES



		TOTAL VOLUME * LUF + OPPOSING LEFTS * LUF =	CRITICAL LANE VOLUME	LEVEL OF SERVICE
AM	NB	(128 + 7) *.55 + 7 *1.0	81	
	SB	413 *.55	227*	
	EB	—	—	A
	WB	(5 + 6) *1.0	11*	238
PM	NB	(276 + 5) *.55 + 6 *1.0	161*	
	SB	125 *.55	69	
	EB	—	—	A
	WB	(4 + 5) *1.0	9*	170

CRITICAL LANE ANALYSIS

Prepared By: C. ATKINSON Condition: FUTURE



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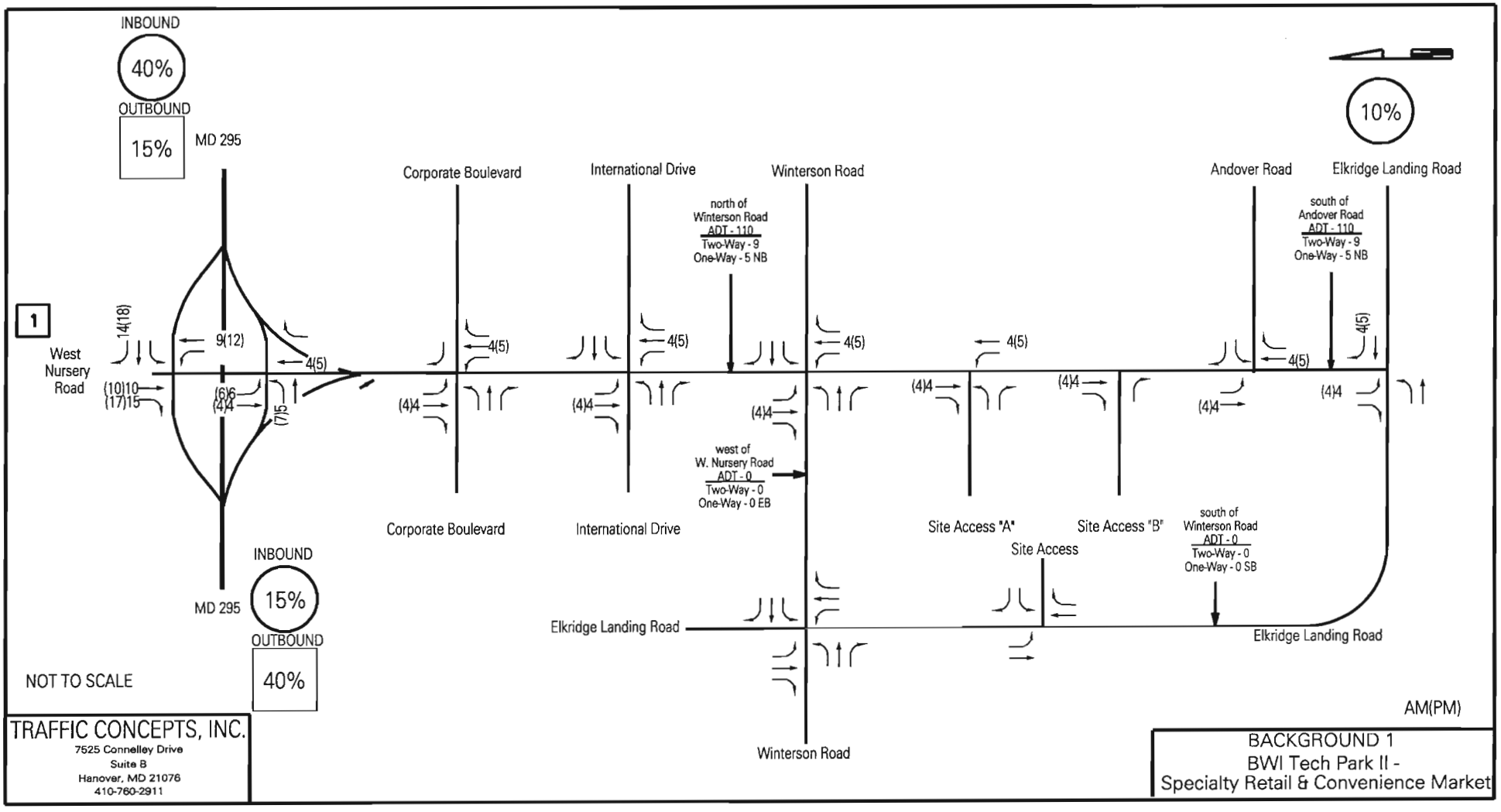
7525 Connelley Drive
Suite B
Hanover, MD 21076
410-760-2911

BACKGROUND 1
BWI Tech Park II - Office Trips



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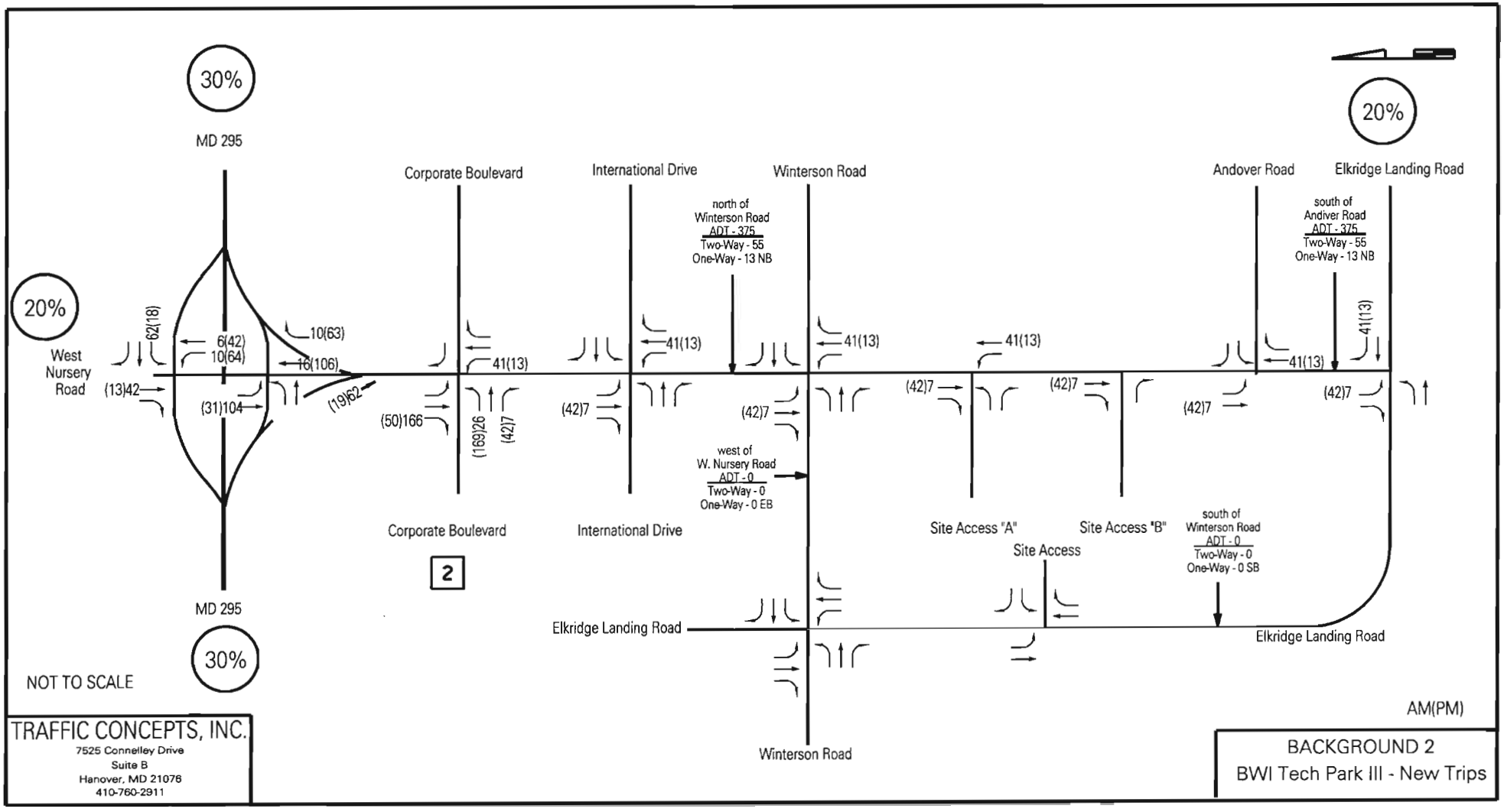
410-760-2911

BACKGROUND 1
BWI Tech Park II -
Specialty Retail & Convenience Market



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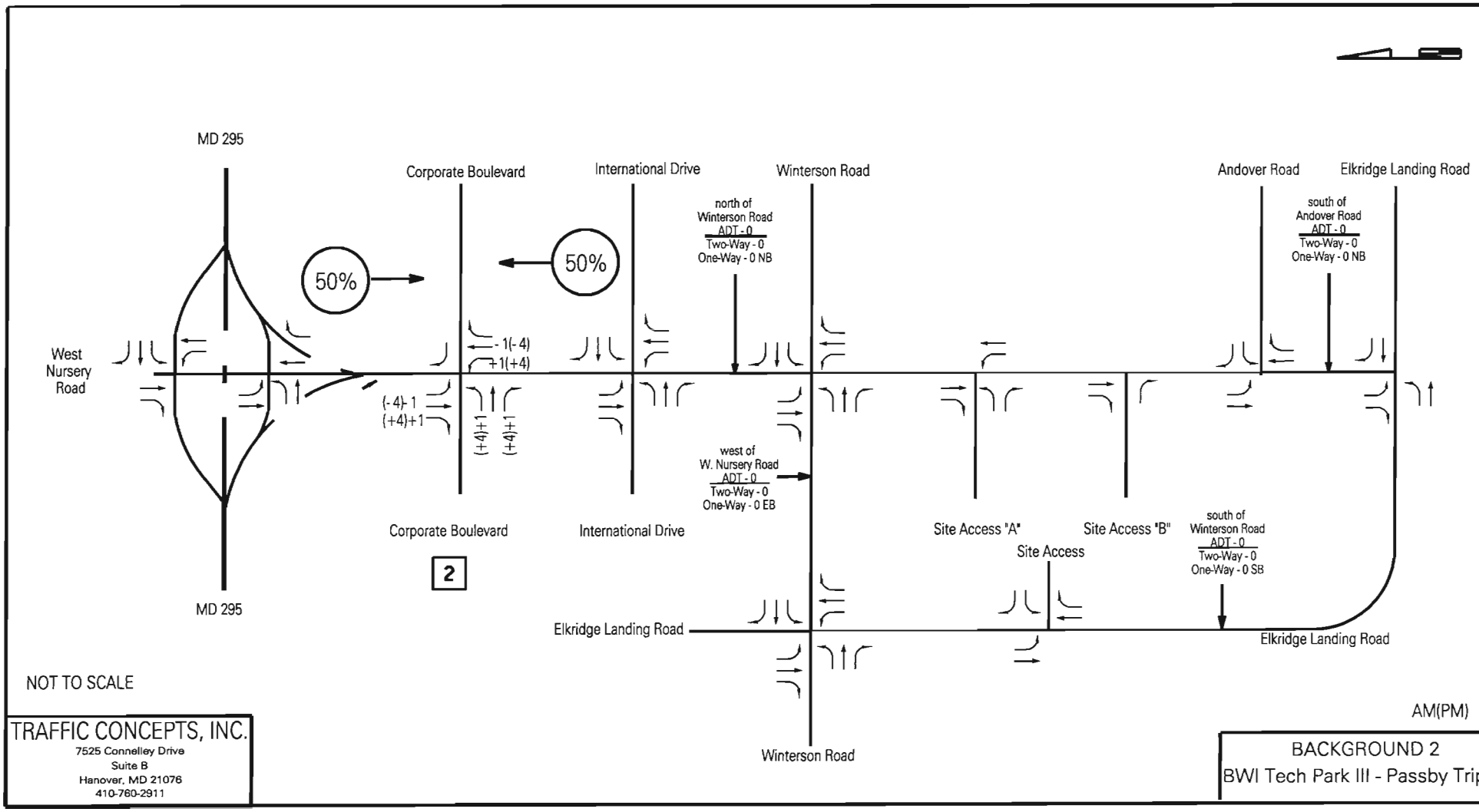
Hanover, MD 21076
410-760-2911

BACKGROUND 2
BWI Tech Park III - New Trips



NOT TO SCALE

AM(PM)

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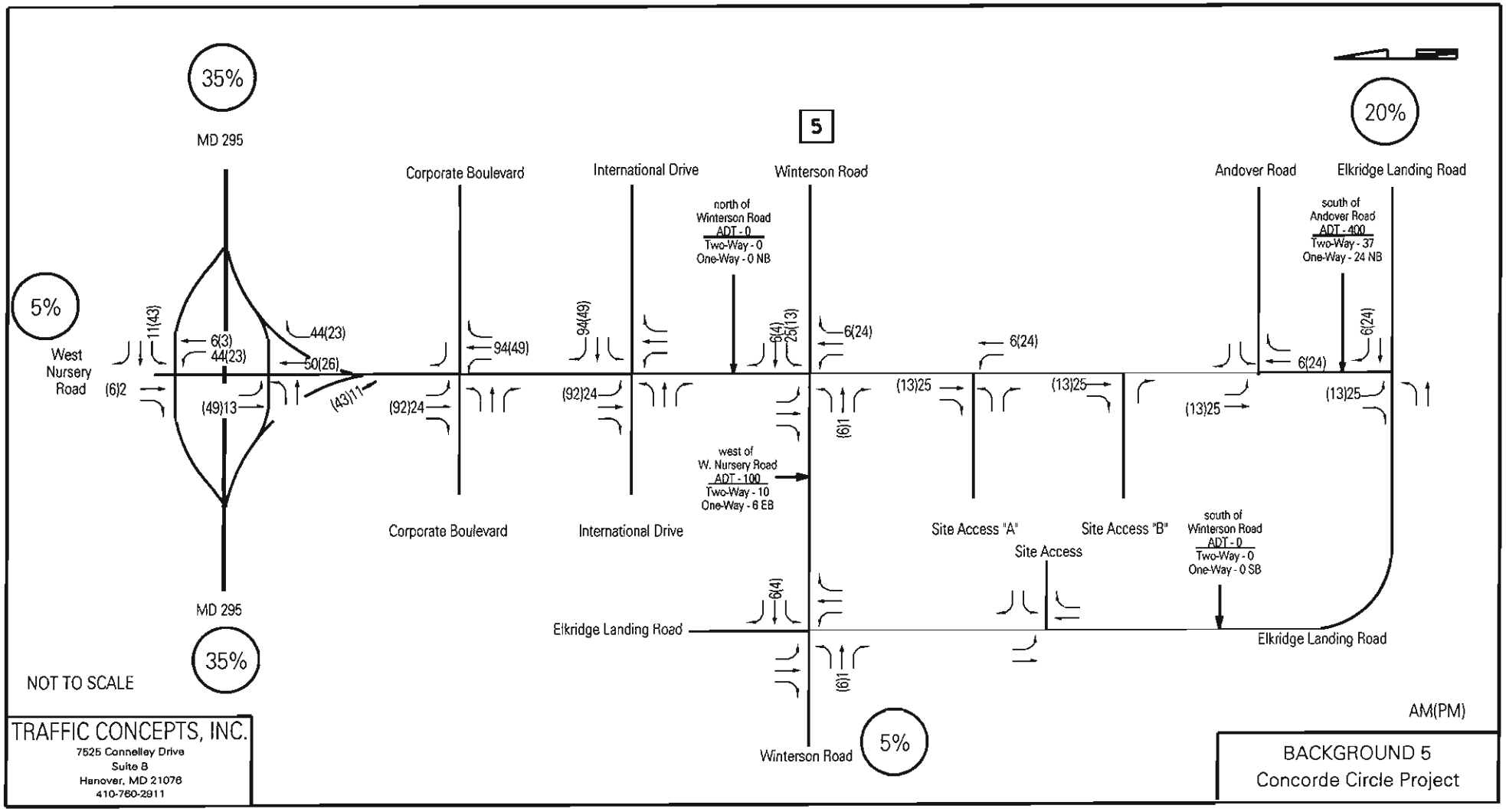
BACKGROUND 2
BWI Tech Park III - Passby Trips



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BACKGROUND 5
Concorde Circle Project

Detailed Average Rate Trip Calculations
For 310 Dwelling Units of Apartments(220) - [E]

Project: Concorde Circle Project
Phase:

Open Date:
Analysis Date:

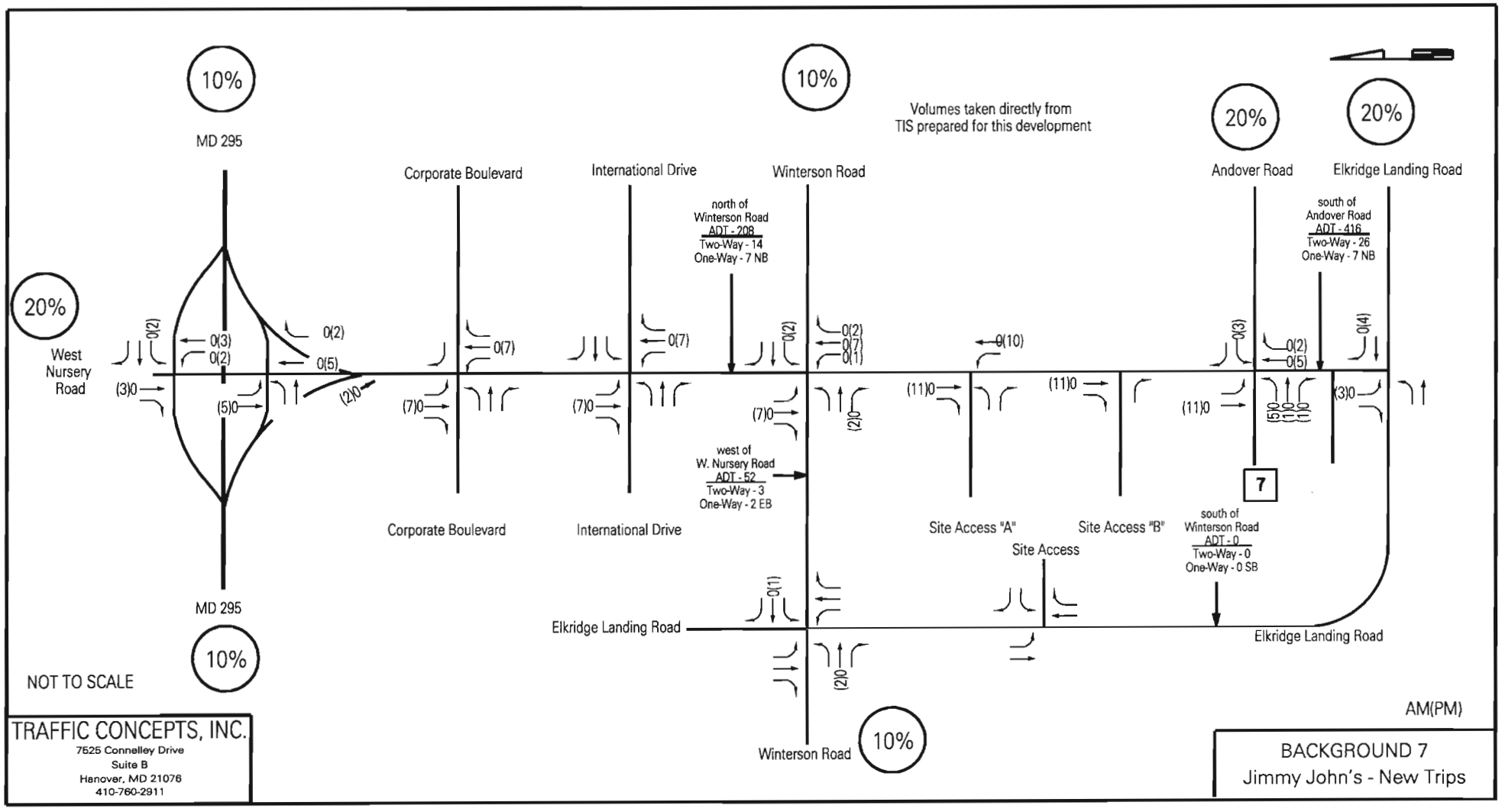
Description:

	Average Rate	Standard Deviation	Adjustment Factor	Driveway Volume
Avg. Weekday 2-Way Volume	6.46	0.00	1.00	2002
7-9 AM Peak Hour Enter	0.10	0.00	1.00	31
7-9 AM Peak Hour Exit	0.40	0.00	1.00	125
7-9 AM Peak Hour Total	0.50	0.00	1.00	156
4-6 PM Peak Hour Enter	0.39	0.00	1.00	122
4-6 PM Peak Hour Exit	0.21	0.00	1.00	66
4-6 PM Peak Hour Total	0.61	0.00	1.00	188
AM Pk Hr, Generator, Enter	0.16	0.00	1.00	49
AM Pk Hr, Generator, Exit	0.39	0.00	1.00	121
AM Pk Hr, Generator, Total	0.55	0.00	1.00	170
PM Pk Hr, Generator, Enter	0.40	0.00	1.00	123
PM Pk Hr, Generator, Exit	0.25	0.00	1.00	78
PM Pk Hr, Generator, Total	0.65	0.00	1.00	201
Saturday 2-Way Volume	7.02	0.00	1.00	2177
Saturday Peak Hour Enter	0.00	0.00	1.00	0
Saturday Peak Hour Exit	0.00	0.00	1.00	0
Saturday Peak Hour Total	0.47	0.00	1.00	146
Sunday 2-Way Volume	6.09	0.00	1.00	1889
Sunday Peak Hour Enter	0.00	0.00	1.00	0
Sunday Peak Hour Exit	0.00	0.00	1.00	0
Sunday Peak Hour Total	0.00	0.00	1.00	0

The above rates were calculated from these equations:

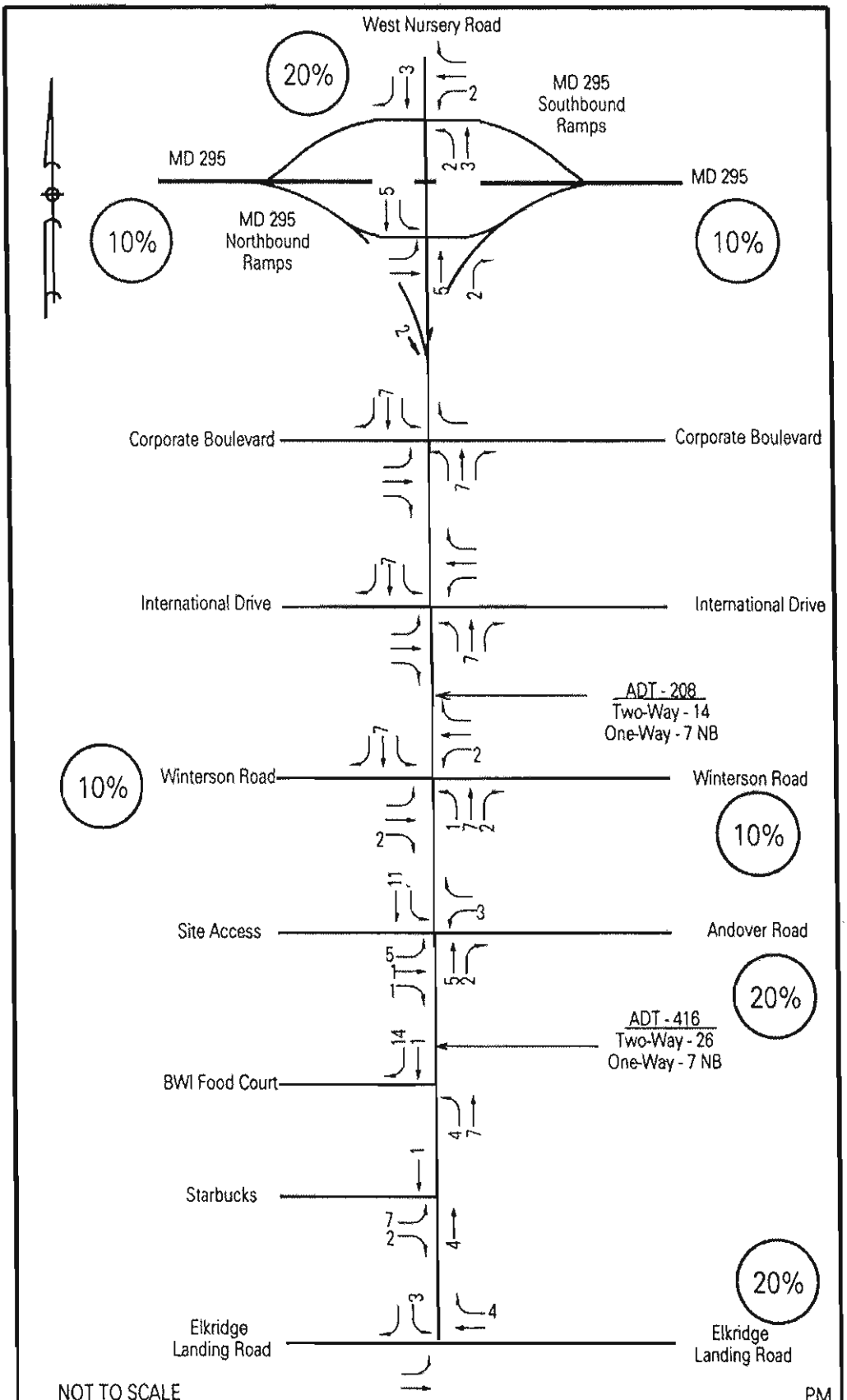
24-Hr. 2-Way Volume:	T = 6.06(X) + 123.56, R^2 = 0.87
7-9 AM Peak Hr. Total:	T = .49(X) + 3.73
	R^2 = 0.83 , 0.2 Enter, 0.8 Exit
4-6 PM Peak Hr. Total:	T = .55(X) + 17.65
	R^2 = 0.77 , 0.65 Enter, 0.35 Exit
AM Gen Pk Hr. Total:	T = .54(X) + 2.45
	R^2 = 0.82 , 0.29 Enter, 0.71 Exit
PM Gen Pk Hr. Total:	T = .6(X) + 14.91
	R^2 = 0.8 , 0.61 Enter, 0.39 Exit
Sat. 2-Way Volume:	T = 7.85(X) + -256.19, R^2 = 0.85
Sat. Pk Hr. Total:	T = .41(X) + 19.23
	R^2 = 0.56 , 0 Enter, 0 Exit
Sun. 2-Way Volume:	T = 6.42(X) + -101.12, R^2 = 0.82
Sun. Pk Hr. Total:	0
	R^2 = 0 , 0 Enter, 0 Exit

Note: A zero indicates no data available.
Source: Institute of Transportation Engineers
Trip Generation Manual, 9th Edition, 2012



TRAFFIC CONCEPTS, INC.
7525 Connelley Drive
Suite B
Hanover, MD 21076
410-760-2911

BACKGROUND 7
Jimmy John's - New Trips



TRAFFIC CONCEPTS, INC. 7525 Connelley Drive Suite B Hanover, Maryland 21076 410-760-2911	EXHIBIT 7 Site Generated Traffic - New Trips

Detailed Average Rate Trip Calculations
For 2.095 Th.Sq.Ft. GFA of Fast-Food Restaurant with Drive-Thru(934) - [R]

Project: Jimmy John's
Phase:

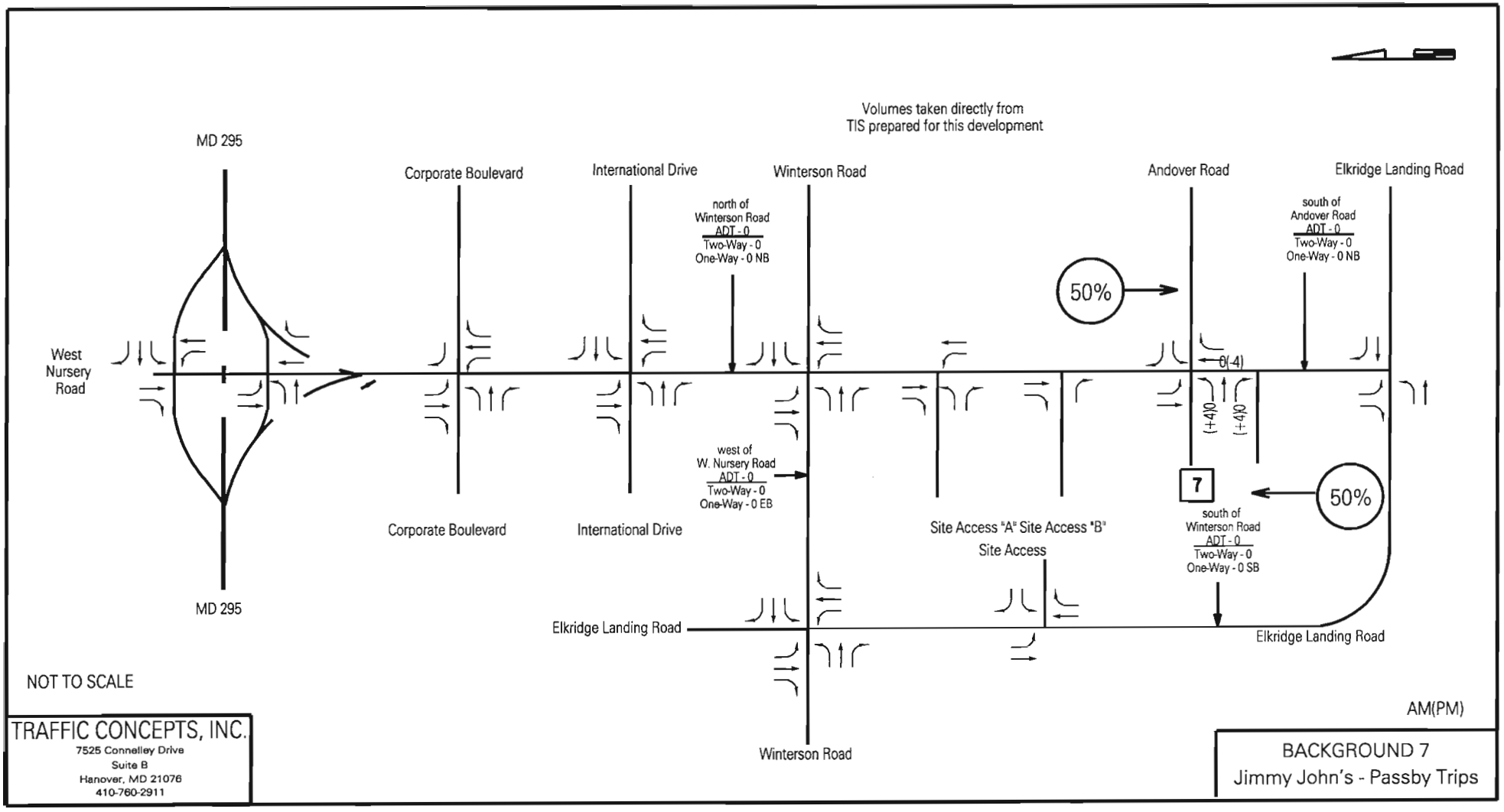
Open Date:
Analysis Date:

Description:

	Average Rate	Standard Deviation	Adjustment Factor	Driveway Volume
Avg. Weekday 2-Way Volume	496.12	242.52	1.00	1039
7-9 AM Peak Hour Enter	23.16	0.00	1.00	49
7-9 AM Peak Hour Exit	22.26	0.00	1.00	46
7-9 AM Peak Hour Total	45.42	28.63	1.00	95
4-6 PM Peak Hour Enter	16.98	0.00	1.00	36
4-6 PM Peak Hour Exit	15.67	0.00	1.00	32
4-6 PM Peak Hour Total	32.65	19.73	1.00	68
AM Pk Hr, Generator, Enter	27.34	0.00	1.00	57
AM Pk Hr, Generator, Exit	26.27	0.00	1.00	55
AM Pk Hr, Generator, Total	53.61	26.27	1.00	112
PM Pk Hr, Generator, Enter	24.60	0.00	1.00	52
PM Pk Hr, Generator, Exit	22.70	0.00	1.00	47
PM Pk Hr, Generator, Total	47.30	25.52	1.00	99
Saturday 2-Way Volume	722.03	295.62	1.00	1513
Saturday Peak Hour Enter	30.09	0.00	1.00	63
Saturday Peak Hour Exit	28.91	0.00	1.00	61
Saturday Peak Hour Total	59.00	22.89	1.00	124
Sunday 2-Way Volume	542.72	206.86	1.00	1137
Sunday Peak Hour Enter	34.92	0.00	1.00	73
Sunday Peak Hour Exit	37.82	0.00	1.00	79
Sunday Peak Hour Total	72.74	11.95	1.00	152

Note: A zero indicates no data available.
Source: Institute of Transportation Engineers
Trip Generation Manual, 9th Edition, 2012

TRIP GENERATION 2013, TRAFFICWARE, LLC



TRAFFIC CONCEPTS, INC.
7525 Connelley Drive
Suite B
Hanover, MD 21076
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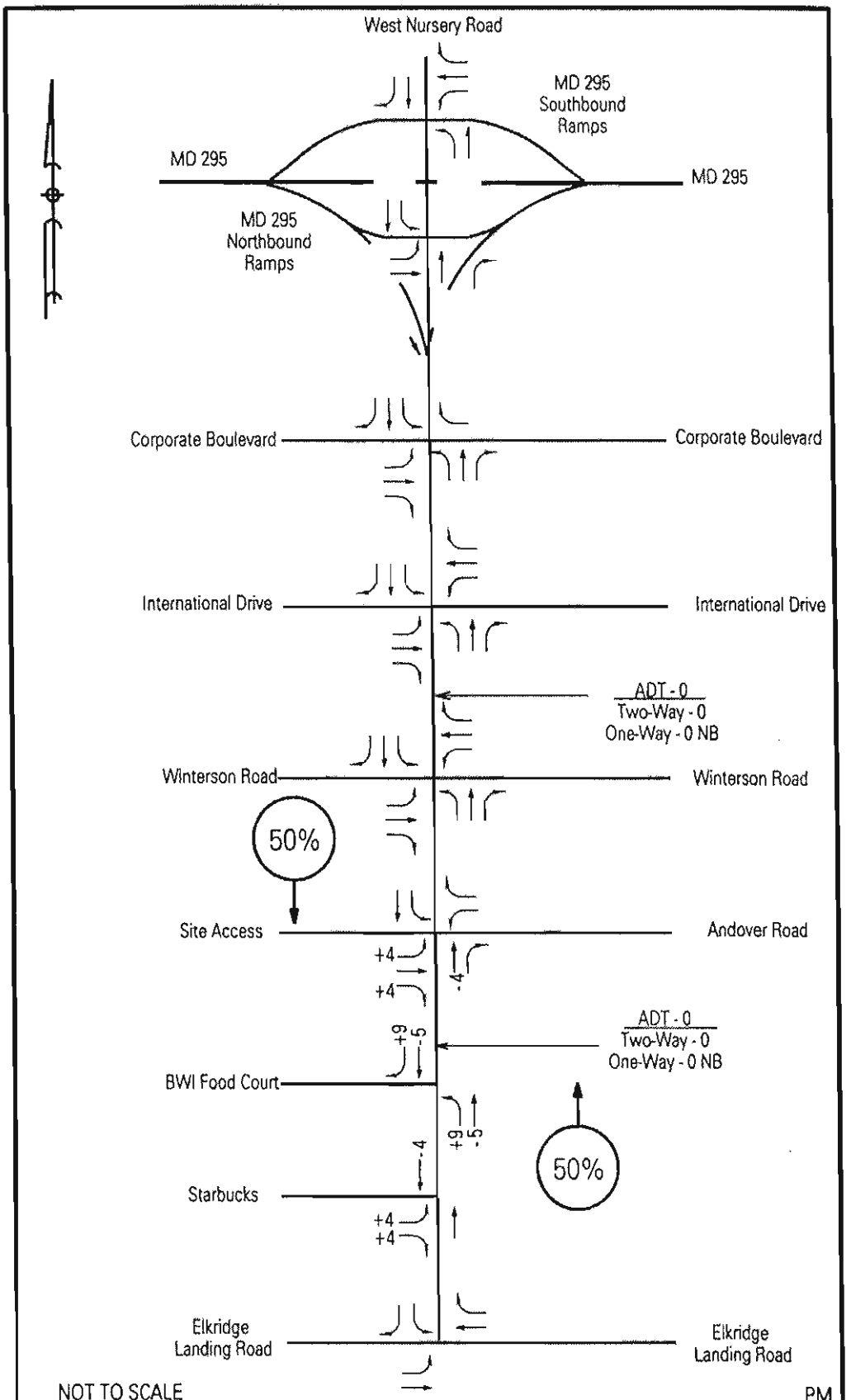
BACKGROUND 7
Jimmy John's - Passby Trips



TRAFFIC CONCEPTS, INC. 7525 Connelley Drive Suite B Hanover, Maryland 21076 410-760-2911	EXHIBIT 8 Site Generated Traffic - Passby Trips

Summary of Pass-By Trips
For 2.095 Th.Sq.Ft. GFA of Fast-Food Restaurant with Drive-Thru(934) - [R]

Project: Jimmy John's
Phase:

Open Date:
Analysis Date:

Description:

	Driveway Volume	Pass-By Trips	Volume Added to Adjacent Streets
Average Weekday			
7-9 AM Peak Hour Enter	49	24	25
7-9 AM Peak Hour Exit	46	23	23
7-9 AM Peak Hour Total	95	47	48
4-6 PM Peak Hour Enter	36	18	18
4-6 PM Peak Hour Exit	32	16	16
4-6 PM Peak Hour Total	68	34	34
Saturday			
Saturday Peak Hour Enter	63	0	63
Saturday Peak Hour Exit	61	0	61
Saturday Peak Hour Total	124	0	124

Pass-By Trips were calculated on the basis of the following:

Weekday A.M. Peak Period Average Pass-By Trip Percentage = 49
Weekday P.M. Peak Period Average Pass-By Trip Percentage = 50
Saturday Midday Pk. Pd. Average Pass-By Trip Percentage = 0

Number of Pass-By Studies:6 for Weekday AM PK PD and 18 for PM PK PD.

Note: A zero indicates no data available.
Source: Institute of Transportation Engineers
Trip Generation Manual, 9th Edition, 2012

ANNE ARUNDEL COUNTY ROAD RATING SYSTEM

IDENTIFYING INFORMATION:

ROAD NAME:	Elkridge Landing Road
SEGMENT LIMITS FROM:	Nursery Road
TO:	Hampton Inn Access
CONDITION OF ANALYSIS:	Future
TODAY'S DATE:	August 13, 2015
TECHNICIAN NAME:	KWS
SEGMENT LENGTH (x.xx miles):	0.17
SECTION TYPE (open or closed):	closed
SEGMENT ADT:	4444
SEGMENT PEAK HOUR VOLUME (two-way):	401
SEGMENT PEAK HOUR VOLUME (one-way):	242
ROADWAY CLASSIFICATION:	CLASS 3
POSTED SPEED LIMIT (mph):	30
TWO-WAY LEFT TURN LANE (yes/no):	no

ANALYSIS:

ELEMENT NAME	DATA INPUT	RATING POINTS	NORMALIZED WEIGHTING	ELEMENT SCORE
MINIMUM LANE WIDTH (x.x feet)	12	10	1.311	13.1
MIN. OUTSIDE SHOULDER WIDTH (x.x feet)	0	1	0.164	0.2
MINIMUM PAVEMENT CONDITION	good	8.5	1.148	9.8
MINIMUM SIGHT DISTANCE (feet)	1000	12	1.639	19.7
MIN.INTERSECTION SIGHT DISTANCE (feet)	n/a	10	1.475	14.8
NTERSECTING ROAD POSTED SPEED (mph)	n/a			
ROADSIDE FRICTION	fair	7	0.984	6.9
SIDEWALKS	very poor	1	1.475	1.5
FREQUENCY OF ACCESS (feet per segment)	110	7	0.656	4.6
ACCESS CONVERSION (feet per mile)	647			
TRAFFIC SERVICE:		10	1.148	11.5
NUMBER OF LANES (one-way)	2			
PEAK HOUR VOLUME (one-way)	242			
COMPUTED "V/C" RATIO	0.37			

********** ****** ROAD RATING = TOTAL: 82

ANNE ARUNDEL COUNTY ROAD RATING SYSTEM

IDENTIFYING INFORMATION:

ROAD NAME:	Elkridge Landing Road	
SEGMENT LIMITS	FROM:	Hampton Inn Access
	TO:	Winterson Road
CONDITION OF ANALYSIS:	Future	
TODAY'S DATE:	August 13, 2015	
TECHNICIAN NAME:	KWS	
SEGMENT LENGTH (x.xx miles):	0.75	
SECTION TYPE (open or closed):	closed	
SEGMENT ADT:	4444	
SEGMENT PEAK HOUR VOLUME (two-way):	401	
SEGMENT PEAK HOUR VOLUME (one-way):	242	
ROADWAY CLASSIFICATION:	CLASS 3	
POSTED SPEED LIMIT (mph):	30	
TWO-WAY LEFT TURN LANE (yes/no):	no	

ANALYSIS:

ELEMENT NAME	DATA INPUT	RATING POINTS	NORMALIZED WEIGHTING	ELEMENT SCORE
MINIMUM LANE WIDTH (x.x feet)	12	10	1.311	13.1
MIN. OUTSIDE SHOULDER WIDTH (x.x feet)	0	1	0.164	0.2
MINIMUM PAVEMENT CONDITION	good	8.5	1.148	9.8
MINIMUM SIGHT DISTANCE (feet)	375	7	1.639	11.5
MIN.INTERSECTION SIGHT DISTANCE (feet)	n/a	10	1.475	14.8
NTERSECTING ROAD POSTED SPEED (mph)	n/a			
ROADSIDE FRICTION	fair	7	0.984	6.9
SIDEWALKS	fair	7	1.475	10.3
FREQUENCY OF ACCESS (feet per segment)	290	8.5	0.656	5.6
ACCESS CONVERSION (feet per mile)	387			
TRAFFIC SERVICE:		10	1.148	11.5
NUMBER OF LANES (one-way)	2			
PEAK HOUR VOLUME (one-way)	242			
COMPUTED "V/C" RATIO	0.37			

********** ****** ROAD RATING = TOTAL: 84

ANNE ARUNDEL COUNTY ROAD RATING SYSTEM

IDENTIFYING INFORMATION:

ROAD NAME:	Winterson Road
SEGMENT LIMITS FROM:	Nursery Road
TO:	Elkridge Landing Road
CONDITION OF ANALYSIS:	Future
TODAY'S DATE:	August 13, 2015
TECHNICIAN NAME:	KWS
SEGMENT LENGTH (x.xx miles):	0.17
SECTION TYPE (open or closed):	closed
SEGMENT ADT:	11360
SEGMENT PEAK HOUR VOLUME (two-way):	939
SEGMENT PEAK HOUR VOLUME (one-way):	709
ROADWAY CLASSIFICATION:	CLASS 5
POSTED SPEED LIMIT (mph):	30
TWO-WAY LEFT TURN LANE (yes/no):	yes

ANALYSIS:

ELEMENT NAME	DATA INPUT	RATING POINTS	NORMALIZED WEIGHTING	ELEMENT SCORE
MINIMUM LANE WIDTH (x.x feet)	12	10	1.449	14.5
MIN. OUTSIDE SHOULDER WIDTH (x.x feet)	0	1	0.145	0.1
MINIMUM PAVEMENT CONDITION	good	8.5	1.159	9.9
MINIMUM SIGHT DISTANCE (feet)	1000	12	1.449	17.4
MIN.INTERSECTION SIGHT DISTANCE (feet)	n/a	10	1.304	13.0
NTERSECTING ROAD POSTED SPEED (mph)	n/a			
ROADSIDE FRICTION	fair	7	1.159	8.1
SIDEWALKS	fair	7	1.159	8.1
FREQUENCY OF ACCESS (feet per segment)	110	4	0.870	3.5
ACCESS CONVERSION (feet per mile)	647			
TRAFFIC SERVICE:		12	1.304	15.7
NUMBER OF LANES (one-way)	2			
PEAK HOUR VOLUME (one-way)	709			
COMPUTED "V/C" RATIO	0.28			

********** ****** ROAD RATING = TOTAL: 90

ANNE ARUNDEL COUNTY ROAD RATING SYSTEM

IDENTIFYING INFORMATION:

ROAD NAME:	W. Nursery Road
SEGMENT LIMITS FROM:	Elkridge Landing Road
TO:	50' north of Marriott
CONDITION OF ANALYSIS:	Future
TODAY'S DATE:	August 13, 2015
TECHNICIAN NAME:	KWS
SEGMENT LENGTH (x.xx miles):	0.15
SECTION TYPE (open or closed):	closed
SEGMENT ADT:	17577
SEGMENT PEAK HOUR VOLUME (two-way):	1269
SEGMENT PEAK HOUR VOLUME (one-way):	664
ROADWAY CLASSIFICATION:	CLASS 5
POSTED SPEED LIMIT (mph):	40
TWO-WAY LEFT TURN LANE (yes/no):	no

ANALYSIS:

ELEMENT NAME	DATA INPUT	RATING POINTS	NORMALIZED WEIGHTING	ELEMENT SCORE
MINIMUM LANE WIDTH (x.x feet)	12	10	1.449	14.5
MIN. OUTSIDE SHOULDER WIDTH (x.x feet)	0	1	0.145	0.1
MINIMUM PAVEMENT CONDITION	fair	7	1.159	8.1
MINIMUM SIGHT DISTANCE (feet)	1200	12	1.449	17.4
MIN.INTERSECTION SIGHT DISTANCE (feet)	n/a	10	1.304	13.0
NTERSECTING ROAD POSTED SPEED (mph)	n/a			
ROADSIDE FRICTION	fair	7	1.159	8.1
SIDEWALKS	very poor	1	1.159	1.2
FREQUENCY OF ACCESS (feet per segment)	90	7	0.870	6.1
ACCESS CONVERSION (feet per mile)	600			
TRAFFIC SERVICE:		10	1.304	13.0
NUMBER OF LANES (one-way)	2			
PEAK HOUR VOLUME (one-way)	664			
COMPUTED "V/C" RATIO	0.27			

********** ****** ROAD RATING = TOTAL: 82

ANNE ARUNDEL COUNTY ROAD RATING SYSTEM

IDENTIFYING INFORMATION:

ROAD NAME:	W. Nursery Road
SEGMENT LIMITS FROM:	50' north of Marriott
TO:	Andover Road
CONDITION OF ANALYSIS:	Future
TODAY'S DATE:	August 15, 2015
TECHNICIAN NAME:	KWS
SEGMENT LENGTH (x.xx miles):	0.25
SECTION TYPE (open or closed):	open
SEGMENT ADT:	17577
SEGMENT PEAK HOUR VOLUME (two-way):	1269
SEGMENT PEAK HOUR VOLUME (one-way):	664
ROADWAY CLASSIFICATION:	CLASS 5
POSTED SPEED LIMIT (mph):	40
TWO-WAY LEFT TURN LANE (yes/no):	no

ANALYSIS:

ELEMENT NAME	DATA INPUT	RATING POINTS	NORMALIZED WEIGHTING	ELEMENT SCORE
MINIMUM LANE WIDTH (x.x feet)	12	10	1.216	12.2
MIN. OUTSIDE SHOULDER WIDTH (x.x feet)	12	10	1.216	12.2
MINIMUM PAVEMENT CONDITION	good	8.5	1.081	9.2
MINIMUM SIGHT DISTANCE (feet)	800	12	1.351	16.2
MIN.INTERSECTION SIGHT DISTANCE (feet)	n/a	10	1.216	12.2
NTERSECTING ROAD POSTED SPEED (mph)	n/a			
ROADSIDE FRICTION	fair	7	1.081	7.6
SIDEWALKS	very poor	7	0.811	5.7
FREQUENCY OF ACCESS (feet per segment)	30	12	0.811	9.7
ACCESS CONVERSION (feet per mile)	120			
TRAFFIC SERVICE:		10	1.216	12.2
NUMBER OF LANES (one-way)	2			
PEAK HOUR VOLUME (one-way)	664			
COMPUTED "V/C" RATIO	0.27			

********** ****** ROAD RATING = TOTAL: 97

ANNE ARUNDEL COUNTY ROAD RATING SYSTEM

IDENTIFYING INFORMATION:

ROAD NAME:	W. Nursery Road
SEGMENT LIMITS FROM:	50' north of Marriott
TO:	Andover Road
CONDITION OF ANALYSIS:	Future
TODAY'S DATE:	August 13, 2015
TECHNICIAN NAME:	KWS
SEGMENT LENGTH (x.xx miles):	0.25
SECTION TYPE (open or closed):	closed
SEGMENT ADT:	17577
SEGMENT PEAK HOUR VOLUME (two-way):	1269
SEGMENT PEAK HOUR VOLUME (one-way):	664
ROADWAY CLASSIFICATION:	CLASS 5
POSTED SPEED LIMIT (mph):	40
TWO-WAY LEFT TURN LANE (yes/no):	no

ANALYSIS:

ELEMENT NAME	DATA INPUT	RATING POINTS	NORMALIZED WEIGHTING	ELEMENT SCORE
MINIMUM LANE WIDTH (x.x feet)	12	10	1.449	14.5
MIN. OUTSIDE SHOULDER WIDTH (x.x feet)	0	1	0.145	0.1
MINIMUM PAVEMENT CONDITION	good	8.5	1.159	9.9
MINIMUM SIGHT DISTANCE (feet)	800	12	1.449	17.4
MIN.INTERSECTION SIGHT DISTANCE (feet)	n/a	10	1.304	13.0
NTERSECTING ROAD POSTED SPEED (mph)	n/a			
ROADSIDE FRICTION	fair	7	1.159	8.1
SIDEWALKS	very poor	1	1.159	1.2
FREQUENCY OF ACCESS (feet per segment)	30	12	0.870	10.4
ACCESS CONVERSION (feet per mile)	120			
TRAFFIC SERVICE:		10	1.304	13.0
NUMBER OF LANES (one-way)	2			
PEAK HOUR VOLUME (one-way)	664			
COMPUTED "V/C" RATIO	0.27			

********** ****** ROAD RATING = TOTAL: 88

ANNE ARUNDEL COUNTY ROAD RATING SYSTEM

IDENTIFYING INFORMATION:

ROAD NAME:	W. Nursery Road
SEGMENT LIMITS FROM:	Andover Road
TO:	Winterson Road
CONDITION OF ANALYSIS:	Future
TODAY'S DATE:	August 13, 2015
TECHNICIAN NAME:	KWS
SEGMENT LENGTH (x.xx miles):	0.20
SECTION TYPE (open or closed):	open
SEGMENT ADT:	26508
SEGMENT PEAK HOUR VOLUME (two-way):	2084
SEGMENT PEAK HOUR VOLUME (one-way):	1275
ROADWAY CLASSIFICATION:	CLASS 6
POSTED SPEED LIMIT (mph):	40
TWO-WAY LEFT TURN LANE (yes/no):	yes

ANALYSIS:

ELEMENT NAME	DATA INPUT	RATING POINTS	NORMALIZED WEIGHTING	ELEMENT SCORE
MINIMUM LANE WIDTH (x.x feet)	12	10	1.184	11.8
MIN. OUTSIDE SHOULDER WIDTH (x.x feet)	10	7	1.184	8.3
MINIMUM PAVEMENT CONDITION	good	8.5	1.053	8.9
MINIMUM SIGHT DISTANCE (feet)	1000	10	1.316	13.2
MIN.INTERSECTION SIGHT DISTANCE (feet)	n/a	10	1.184	11.8
NTERSECTING ROAD POSTED SPEED (mph)	n/a			
ROADSIDE FRICTION	good	8.5	1.184	10.1
SIDEWALKS	very poor	7	0.658	4.6
FREQUENCY OF ACCESS (feet per segment)	50	8.5	0.921	7.8
ACCESS CONVERSION (feet per mile)	250			
TRAFFIC SERVICE:		10	1.316	13.2
NUMBER OF LANES (one-way)	2			
PEAK HOUR VOLUME (one-way)	1275			
COMPUTED "V/C" RATIO	0.49			

********** ****** ROAD RATING = TOTAL: 90

ANNE ARUNDEL COUNTY ROAD RATING SYSTEM

IDENTIFYING INFORMATION:

ROAD NAME:	W. Nursery Road
SEGMENT LIMITS FROM:	Andover Road
TO:	Winterson Road
CONDITION OF ANALYSIS:	Future
TODAY'S DATE:	August 13, 2015
TECHNICIAN NAME:	KWS
SEGMENT LENGTH (x.xx miles):	0.20
SECTION TYPE (open or closed):	closed
SEGMENT ADT:	26508
SEGMENT PEAK HOUR VOLUME (two-way):	2084
SEGMENT PEAK HOUR VOLUME (one-way):	1275
ROADWAY CLASSIFICATION:	CLASS 6
POSTED SPEED LIMIT (mph):	40
TWO-WAY LEFT TURN LANE (yes/no):	yes

ANALYSIS:

ELEMENT NAME	DATA INPUT	RATING POINTS	NORMALIZED WEIGHTING	ELEMENT SCORE
MINIMUM LANE WIDTH (x.x feet)	12	10	1.389	13.9
MIN. OUTSIDE SHOULDER WIDTH (x.x feet)	0	1	0.139	0.1
MINIMUM PAVEMENT CONDITION	good	8.5	1.111	9.4
MINIMUM SIGHT DISTANCE (feet)	1000	10	1.389	13.9
MIN.INTERSECTION SIGHT DISTANCE (feet)	n/a	10	1.250	12.5
NTERSECTING ROAD POSTED SPEED (mph)	n/a			
ROADSIDE FRICTION	good	8.5	1.250	10.6
SIDEWALKS	very poor	1	1.111	1.1
FREQUENCY OF ACCESS (feet per segment)	40	10	0.972	9.7
ACCESS CONVERSION (feet per mile)	200			
TRAFFIC SERVICE:		10	1.389	13.9
NUMBER OF LANES (one-way)	2			
PEAK HOUR VOLUME (one-way)	1275			
COMPUTED "V/C" RATIO	0.49			

********** ****** ROAD RATING = TOTAL: 85

ANNE ARUNDEL COUNTY ROAD RATING SYSTEM

IDENTIFYING INFORMATION:

ROAD NAME:	W. Nursery Road
SEGMENT LIMITS FROM:	Winterson Road
TO:	beginning of closed section
CONDITION OF ANALYSIS:	Future
TODAY'S DATE:	August 13, 2015
TECHNICIAN NAME:	KWS
SEGMENT LENGTH (x.xx miles):	0.11
SECTION TYPE (open or closed):	open
SEGMENT ADT:	26508
SEGMENT PEAK HOUR VOLUME (two-way):	2084
SEGMENT PEAK HOUR VOLUME (one-way):	1275
ROADWAY CLASSIFICATION:	CLASS 6
POSTED SPEED LIMIT (mph):	40
TWO-WAY LEFT TURN LANE (yes/no):	yes

ANALYSIS:

ELEMENT NAME	DATA INPUT	RATING POINTS	NORMALIZED WEIGHTING	ELEMENT SCORE
MINIMUM LANE WIDTH (x.x feet)	11	8.5	1.184	10.1
MIN. OUTSIDE SHOULDER WIDTH (x.x feet)	10	7	1.184	8.3
MINIMUM PAVEMENT CONDITION	fair	7	1.053	7.4
MINIMUM SIGHT DISTANCE (feet)	1000	10	1.316	13.2
MIN.INTERSECTION SIGHT DISTANCE (feet)	n/a	10	1.184	11.8
NTERSECTING ROAD POSTED SPEED (mph)	n/a			
ROADSIDE FRICTION	good	8.5	1.184	10.1
SIDEWALKS	very poor	7	0.658	4.6
FREQUENCY OF ACCESS (feet per segment)	20	10	0.921	9.2
ACCESS CONVERSION (feet per mile)	182			
TRAFFIC SERVICE:		12	1.316	15.8
NUMBER OF LANES (one-way)	3			
PEAK HOUR VOLUME (one-way)	1275			
COMPUTED "V/C" RATIO	0.33			

********** ****** ROAD RATING = TOTAL: 90

ANNE ARUNDEL COUNTY ROAD RATING SYSTEM

IDENTIFYING INFORMATION:

ROAD NAME:	W. Nursery Road
SEGMENT LIMITS FROM:	beginning of closed section
TO:	International Drive
CONDITION OF ANALYSIS:	Future
TODAY'S DATE:	August 13, 2015
TECHNICIAN NAME:	KWS
SEGMENT LENGTH (x.xx miles):	0.20
SECTION TYPE (open or closed):	open
SEGMENT ADT:	26508
SEGMENT PEAK HOUR VOLUME (two-way):	2084
SEGMENT PEAK HOUR VOLUME (one-way):	1275
ROADWAY CLASSIFICATION:	CLASS 6
POSTED SPEED LIMIT (mph):	40
TWO-WAY LEFT TURN LANE (yes/no):	yes

ANALYSIS:

ELEMENT NAME	DATA INPUT	RATING POINTS	NORMALIZED WEIGHTING	ELEMENT SCORE
MINIMUM LANE WIDTH (x.x feet)	11	8.5	1.184	10.1
MIN. OUTSIDE SHOULDER WIDTH (x.x feet)	10	7	1.184	8.3
MINIMUM PAVEMENT CONDITION	fair	7	1.053	7.4
MINIMUM SIGHT DISTANCE (feet)	800	10	1.316	13.2
MIN.INTERSECTION SIGHT DISTANCE (feet)	n/a	10	1.184	11.8
NTERSECTING ROAD POSTED SPEED (mph)	n/a			
ROADSIDE FRICTION	good	8.5	1.184	10.1
SIDEWALKS	very poor	7	0.658	4.6
FREQUENCY OF ACCESS (feet per segment)	20	10	0.921	9.2
ACCESS CONVERSION (feet per mile)	100			
TRAFFIC SERVICE:		12	1.316	15.8
NUMBER OF LANES (one-way)	3			
PEAK HOUR VOLUME (one-way)	1275			
COMPUTED "V/C" RATIO	0.33			

********** ****** ROAD RATING = TOTAL: 90

ANNE ARUNDEL COUNTY ROAD RATING SYSTEM

IDENTIFYING INFORMATION:

ROAD NAME:		W. Nursery Road
SEGMENT LIMITS	FROM:	beginning of closed section
	TO:	International Drive
CONDITION OF ANALYSIS:		Future
TODAY'S DATE:		August 15, 2015
TECHNICIAN NAME:		KWS
SEGMENT LENGTH (x.xx miles):		0.20
SECTION TYPE (open or closed):		closed
SEGMENT ADT:		26508
SEGMENT PEAK HOUR VOLUME (two-way):		2084
SEGMENT PEAK HOUR VOLUME (one-way):		1275
ROADWAY CLASSIFICATION:		CLASS 6
POSTED SPEED LIMIT (mph):		40
TWO-WAY LEFT TURN LANE (yes/no):		yes

ANALYSIS:

ELEMENT NAME	DATA INPUT	RATING POINTS	NORMALIZED WEIGHTING	ELEMENT SCORE
MINIMUM LANE WIDTH (x.x feet)	11	8.5	1.389	11.8
MIN. OUTSIDE SHOULDER WIDTH (x.x feet)	10	7	0.139	1.0
MINIMUM PAVEMENT CONDITION	fair	7	1.111	7.8
MINIMUM SIGHT DISTANCE (feet)	800	10	1.389	13.9
MIN.INTERSECTION SIGHT DISTANCE (feet)	n/a	10	1.250	12.5
NTERSECTING ROAD POSTED SPEED (mph)	n/a			
ROADSIDE FRICTION	good	8.5	1.250	10.6
SIDEWALKS	fair	7	1.111	7.8
FREQUENCY OF ACCESS (feet per segment)	40	10	0.972	9.7
ACCESS CONVERSION (feet per mile)	200			
TRAFFIC SERVICE:		12	1.389	16.7
NUMBER OF LANES (one-way)	3			
PEAK HOUR VOLUME (one-way)	1275			
COMPUTED "V/C" RATIO	0.33			

********** ****** ROAD RATING = TOTAL: 92

ANNE ARUNDEL COUNTY ROAD RATING SYSTEM

IDENTIFYING INFORMATION:

ROAD NAME:	W. Nursery Road
SEGMENT LIMITS FROM:	International Drive
TO:	MD 295
CONDITION OF ANALYSIS:	Future
TODAY'S DATE:	August 15, 2015
TECHNICIAN NAME:	KWS
SEGMENT LENGTH (x.xx miles):	0.25
SECTION TYPE (open or closed):	open
SEGMENT ADT:	26508
SEGMENT PEAK HOUR VOLUME (two-way):	2084
SEGMENT PEAK HOUR VOLUME (one-way):	1275
ROADWAY CLASSIFICATION:	CLASS 6
POSTED SPEED LIMIT (mph):	40
TWO-WAY LEFT TURN LANE (yes/no):	yes

ANALYSIS:

ELEMENT NAME	DATA INPUT	RATING POINTS	NORMALIZED WEIGHTING	ELEMENT SCORE
MINIMUM LANE WIDTH (x.x feet)	11	8.5	1.184	10.1
MIN. OUTSIDE SHOULDER WIDTH (x.x feet)	10	7	1.184	8.3
MINIMUM PAVEMENT CONDITION	fair	7	1.053	7.4
MINIMUM SIGHT DISTANCE (feet)	1000	10	1.316	13.2
MIN.INTERSECTION SIGHT DISTANCE (feet)	n/a	10	1.184	11.8
NTERSECTING ROAD POSTED SPEED (mph)	n/a			
ROADSIDE FRICTION	good	8.5	1.184	10.1
SIDEWALKS	very poor	7	0.658	4.6
FREQUENCY OF ACCESS (feet per segment)	40	10	0.921	9.2
ACCESS CONVERSION (feet per mile)	160			
TRAFFIC SERVICE:		12	1.316	15.8
NUMBER OF LANES (one-way)	3			
PEAK HOUR VOLUME (one-way)	1275			
COMPUTED "V/C" RATIO	0.33			

********** ****** ROAD RATING = TOTAL: 90

PEAK HOUR TURNING MOVEMENT COUNT

INTERSECTION: WEST NURSERY ROAD @ MD 295 SB RAMPS **COUNTY:** ANNE ARUNDEL

COUNT BY: S. HUNTER / J. BRASHEARS **DATE:** AUGUST 4, 2015

WEATHER: CLEAR **DAY:** TUESDAY

	W. NURSERY RD. NORTHBOUND			**W. NURSERY RD.** SOUTHBOUND			EASTBOUND			**MD 295 SB OFF RAMP** WESTBOUND			
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	TOTAL
AM													
7:00-7:15	58	56			47	32				249	0	34	476
7:15-7:30	46	47			59	32				300	0	38	522
7:30-7:45	49	46			69	43				313	0	32	552
7:45-8:00	53	74			75	37				314	0	72	625
8:00-8:15	48	91			42	44				384	0	68	677
8:15-8:30	53	86			63	60				275	0	103	640
8:30-8:45	61	74			42	34				249	0	82	542
8:45-9:00	46	82			56	39				245	0	100	568
PEAK HR 7:30-8:30 TOTALS	**203**	**297**			**249**	**184**				**1286**	**0**	**275**	**PHF 0.92**

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PEAK HOUR TURNING MOVEMENT COUNT

INTERSECTION: WEST NURSERY ROAD @ MD 295 SB RAMPS **COUNTY:** ANNE ARUNDEL

COUNT BY: S. TAYLOR / P. PIRMANN **DATE:** OCTOBER 8, 2014

WEATHER: CLEAR **DAY:** WEDNESDAY

	W NURSERY ROAD NORTHBOUND			**W NURSERY ROAD** SOUTHBOUND			EASTBOUND			**MD 295 SB OFF RAMP** WESTBOUND			
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	TOTAL
PM													
4:00-4:15	189	75			70	60				66	1	19	480
4:15-4:30	177	69			74	43				88	1	24	476
4:30-4:45	172	92			108	77				91	0	22	562
4:45-5:00	149	87			98	62				96	0	13	505
5:00-5:15	152	110			125	99				92	0	18	596
5:15-5:30	192	92			91	74				88	0	23	560
5:30-5:45	156	96			97	68				93	0	25	535
5:45-6:00	120	100			104	63				87	0	25	499
PEAK HR 4:30-5:30 TOTALS	**665**	**381**			**422**	**312**				**367**	**0**	**76**	**PHF 0.93**

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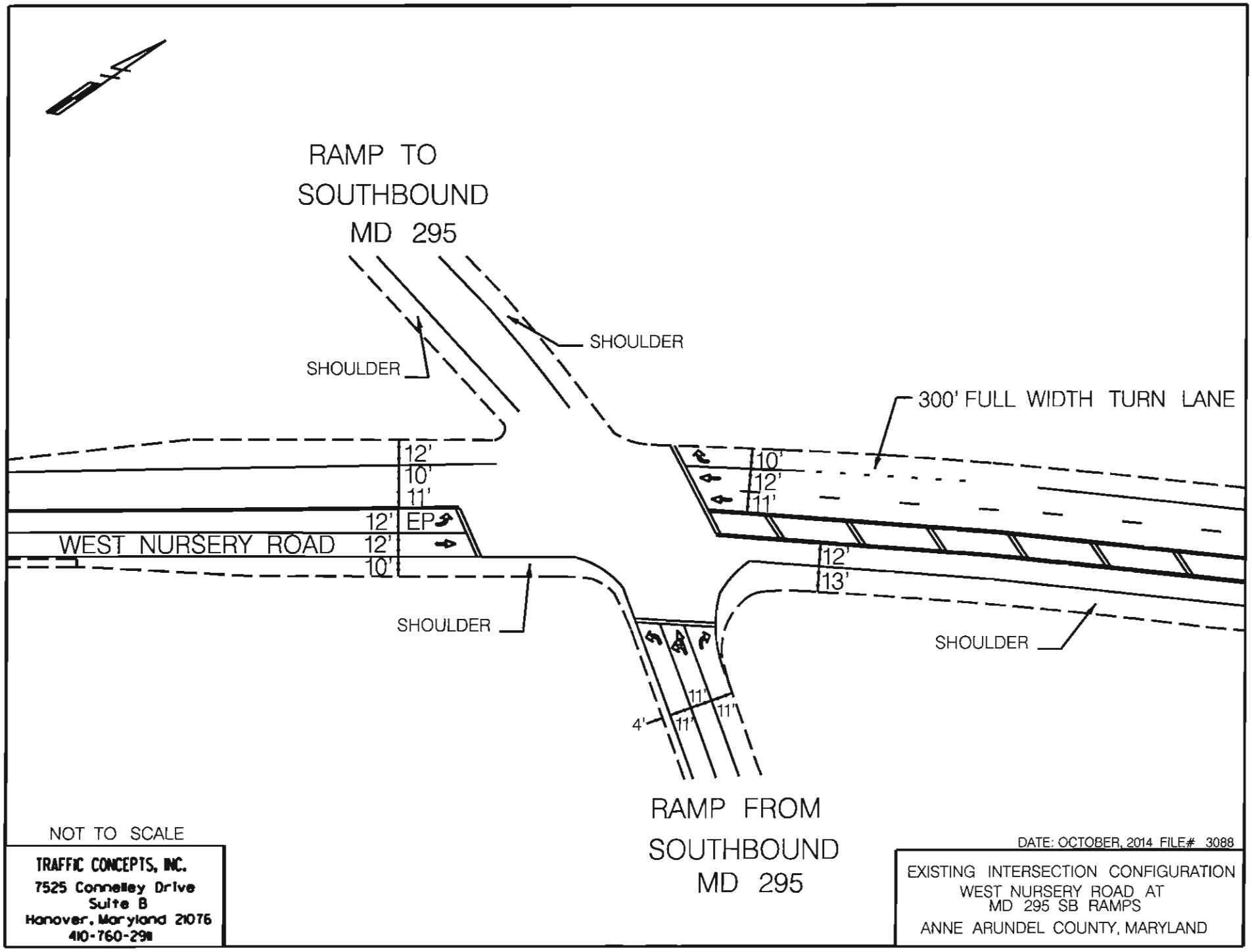

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TRAFFIC CONCEPTS, INC.
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DATE: OCTOBER, 2014 FILE# 3088

EXISTING INTERSECTION CONFIGURATION
WEST NURSERY ROAD AT
MD 295 SB RAMPS
ANNE ARUNDEL COUNTY, MARYLAND

PEAK HOUR TURNING MOVEMENT COUNT

INTERSECTION: WEST NURSERY ROAD @ MD 295 NB RAMPS **COUNTY:** ANNE ARUNDEL

COUNT BY: B. PAGE / A. NEUSE **DATE:** AUGUST 4, 2015

WEATHER: CLEAR **DAY:** TUESDAY

	W NURSERY ROAD NORTHBOUND			**W NURSERY ROAD** SOUTHBOUND			**MD 295 NB OFF RAMP** EASTBOUND			WESTBOUND			
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	TOTAL
AM													
7:00-7:15		79	60	10	287		22	0	197				655
7:15-7:30		66	81	9	315		22	0	182				675
7:30-7:45		63	76	11	379		25	1	210				765
7:45-8:00		88	90	8	375		32	0	279				872
8:00-8:15		86	70	7	389		43	1	174				770
8:15-8:30		83	56	8	290		39	0	176				652
8:30-8:45		82	84	13	249		30	0	139				597
8:45-9:00		70	64	9	287		44	0	132				606
PEAK HR 7:15-8:15 TOTALS		**303**	**317**	**35**	**1458**		**122**	**2**	**845**				**PHF 0.88**

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PEAK HOUR TURNING MOVEMENT COUNT

INTERSECTION: WEST NURSERY ROAD @ MD 295 NB RAMPS **COUNTY:** ANNE ARUNDEL

COUNT BY: B. PAGE / A. NEUSE **DATE:** OCTOBER 8, 2014

WEATHER: CLEAR **DAY:** WEDNESDAY

	W NURSERY ROAD NORTHBOUND			**W NURSERY ROAD** SOUTHBOUND			**MD 295 NB OFF RAMP** EASTBOUND			WESTBOUND			
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	TOTAL
PM													
4:00-4:15		231	265	30	105		27	0	54				712
4:15-4:30		218	219	43	122		30	0	55				687
4:30-4:45		231	283	76	128		32	0	68				818
4:45-5:00		202	223	72	121		37	1	66				722
5:00-5:15		222	294	78	118		34	1	68				815
5:15-5:30		251	266	66	121		36	0	60				800
5:30-5:45		216	273	77	108		41	0	66				781
5:45-6:00		193	227	73	121		36	1	65				716
PEAK HR 4:30-5:30 TOTALS		**906**	**1066**	**292**	**488**		**139**	**2**	**262**				**PHF 0.96**

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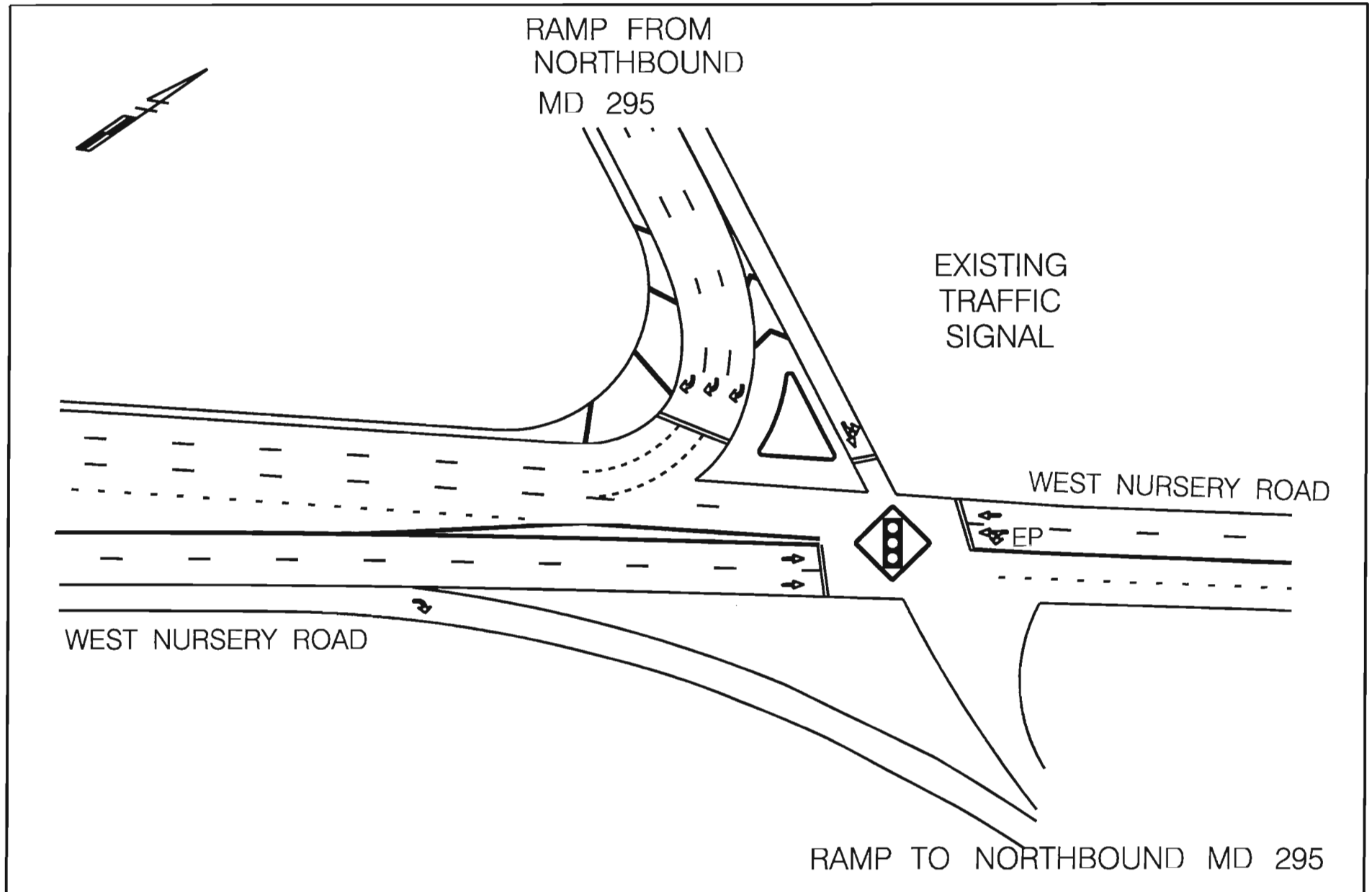

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TRAFFIC CONCEPTS, INC.
7525 Connelley Drive
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410-760-2911

DATE: OCTOBER, 2014 FILE# 3088

EXISTING INTERSECTION CONFIGURATION
NURSERY ROAD AT MD 295 NB RAMPS
ANNE ARUNDEL COUNTY, MARYLAND

PEAK HOUR TURNING MOVEMENT COUNT

INTERSECTION: W. NURSERY ROAD @ CORPORATE BOULEVARD **COUNTY:** ANNE ARUNDEL

COUNT BY: J. BRASHEARS / S. HUNTER **DATE:** JULY 28, 2015

WEATHER: CLEAR **DAY:** TUESDAY

	W NURSERY ROAD NORTHBOUND			W NURSERY ROAD SOUTHBOUND			CORPORATE BLVD EASTBOUND			CORPORATE BLVD WESTBOUND			
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	TOTAL
AM													
7:00-7:15	3	120	9	101	446	4	1	1	0			41	726
7:15-7:30	3	129	21	89	469	2	5	0	1			37	756
7:30-7:45	2	133	10	148	518	2	3	0	1			21	838
7:45-8:00	2	122	27	146	508	8	5	2	4			35	859
8:00-8:15	9	130	15	116	389	6	2	0	4			29	700
8:15-8:30	5	104	16	94	406	7	5	1	1			31	670
8:30-8:45	0	122	14	79	352	12	7	0	4			37	627
8:45-9:00	4	90	8	64	349	21	3	1	5			36	581
PEAK HR 7:00-8:00 TOTALS	**10**	**504**	**67**	**484**	**1941**	**16**	**14**	**3**	**6**			**134**	**PHF 0.93**

TRAFFIC CONCEPTS, INC.
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PEAK HOUR TURNING MOVEMENT COUNT

INTERSECTION: W. NURSERY ROAD @ CORPORATE BOULEVARD **COUNTY:** ANNE ARUNDEL

COUNT BY: A. NEUSE / B. PAGE **DATE:** OCTOBER 9, 2014

WEATHER: CLEAR **DAY:** THURSDAY

	W NURSERY ROAD NORTHBOUND			W NURSERY ROAD SOUTHBOUND			CORPORATE BLVD EASTBOUND			CORPORATE BLVD WESTBOUND			
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	TOTAL
PM													
4:00-4:15	6	385	2	27	118	15	10	1	8			123	695
4:15-4:30	5	361	5	32	138	8	11	0	1			62	623
4:30-4:45	5	427	4	21	143	16	6	0	2			108	732
4:45-5:00	5	358	9	26	167	16	6	0	3			67	657
5:00-5:15	6	423	5	21	154	11	9	0	3			157	789
5:15-5:30	9	345	0	21	171	13	3	0	7			82	651
5:30-5:45	9	318	3	25	137	14	3	1	9			121	640
5:45-6:00	7	308	5	26	174	21	16	0	11			68	636
PEAK HR 4:30-5:30 TOTALS	**25**	**1553**	**18**	**89**	**635**	**56**	**24**	**0**	**15**			**414**	**PHF 0.90**

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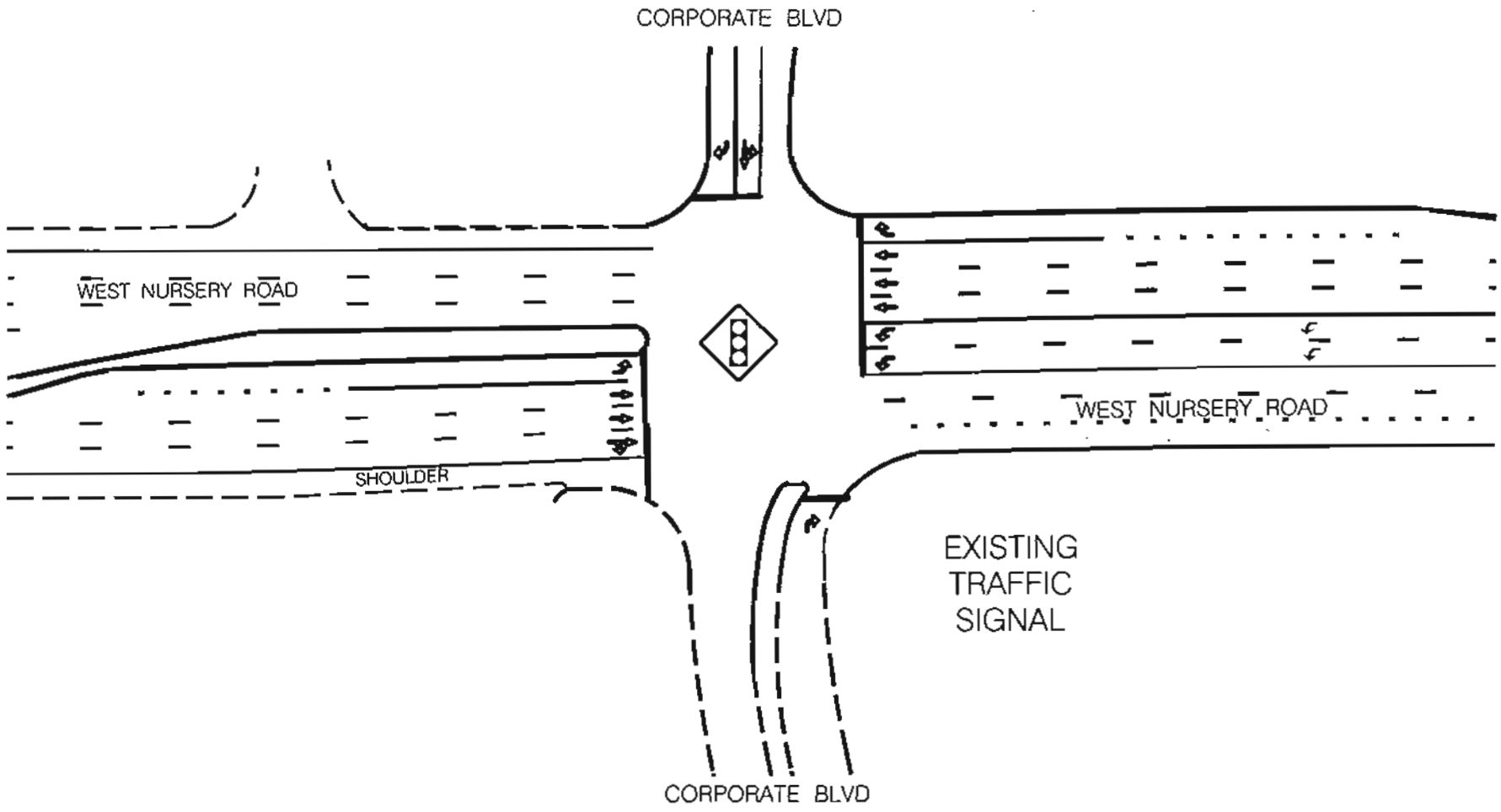

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Suite B
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410-760-2911

DATE: OCTOBER, 2014 FILE# 3088

EXISTING INTERSECTION CONFIGURATION
WEST NURSURY ROAD AT
CORPRATE BOULEVARD
ANNE ARUNDEL COUNTY, MARYLAND

PEAK HOUR TURNING MOVEMENT COUNT

INTERSECTION: W. NURSERY ROAD @ INTERNATIONAL DRIVE **COUNTY:** ANNE ARUNDEL

COUNT BY: B. PAGE / A. NEUSE **DATE:** JULY 28, 2015

WEATHER: CLEAR **DAY:** TUESDAY

	W NURSERY ROAD NORTHBOUND				**W NURSERY ROAD** SOUTHBOUND				**INTERNATIONAL DR** EASTBOUND			**INTERNATIONAL DR** WESTBOUND			
TIME	LEFT	THRU	RIGHT	UTRN	LEFT	THRU	RIGHT	UTRN	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	TOTAL
AM															
7:00-7:15	5	120	15	6	23	326	71	0	8	0	4	15	1	15	609
7:15-7:30	11	135	22	9	40	369	94	1	1	0	1	19	1	14	717
7:30-7:45	10	127	15	9	45	396	81	0	4	0	0	5	1	19	712
7:45-8:00	17	129	19	11	34	385	90	1	4	0	3	5	1	10	709
8:00-8:15	14	140	16	7	31	249	95	1	6	0	2	8	3	15	587
8:15-8:30	9	102	9	8	24	281	106	2	3	0	2	5	0	5	556
8:30-8:45	11	109	6	5	20	237	75	4	5	1	2	7	0	15	497
8:45-9:00	14	92	15	8	23	255	81	0	6	1	4	7	2	10	518
PEAK HR 7:00-8:00 TOTALS	**43**	**511**	**71**	**35**	**142**	**1476**	**336**	**2**	**17**	**0**	**8**	**44**	**4**	**58**	**PHF 0.96**

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PEAK HOUR TURNING MOVEMENT COUNT

INTERSECTION: W. NURSERY ROAD @ INTERNATIONAL DRIVE **COUNTY:** ANNE ARUNDEL

COUNT BY: S. TAYLOR / P. PIRMANN **DATE:** OCTOBER 21, 2014

WEATHER: CLEAR **DAY:** TUESDAY

	W NURSERY ROAD NORTHBOUND				W NURSERY ROAD SOUTHBOUND			INTERNATIONAL DR EASTBOUND			INTERNATIONAL DR WESTBOUND			
TIME	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	TOTAL
PM														
4:00-4:15	4	324	10	4	9	155	7	61	2	9	25	1	36	647
4:15-4:30	3	288	18	8	17	148	13	65	0	9	26	0	32	627
4:30-4:45	4	284	8	4	18	133	5	79	2	15	20	0	57	629
4:45-5:00	4	257	10	8	13	171	6	69	3	10	19	0	30	600
5:00-5:15	2	320	6	8	4	165	4	111	1	13	27	0	36	697
5:15-5:30	6	289	8	13	12	179	3	94	0	20	22	0	55	701
5:30-5:45	3	260	13	6	17	152	4	99	1	11	14	0	32	612
5:45-6:00	1	235	7	4	25	159	3	89	1	15	11	0	30	580
PEAK HR 4:30-5:30 TOTALS	**16**	**1150**	**32**	**33**	**47**	**648**	**18**	**353**	**6**	**58**	**88**	**0**	**178**	**PHF 0.94**

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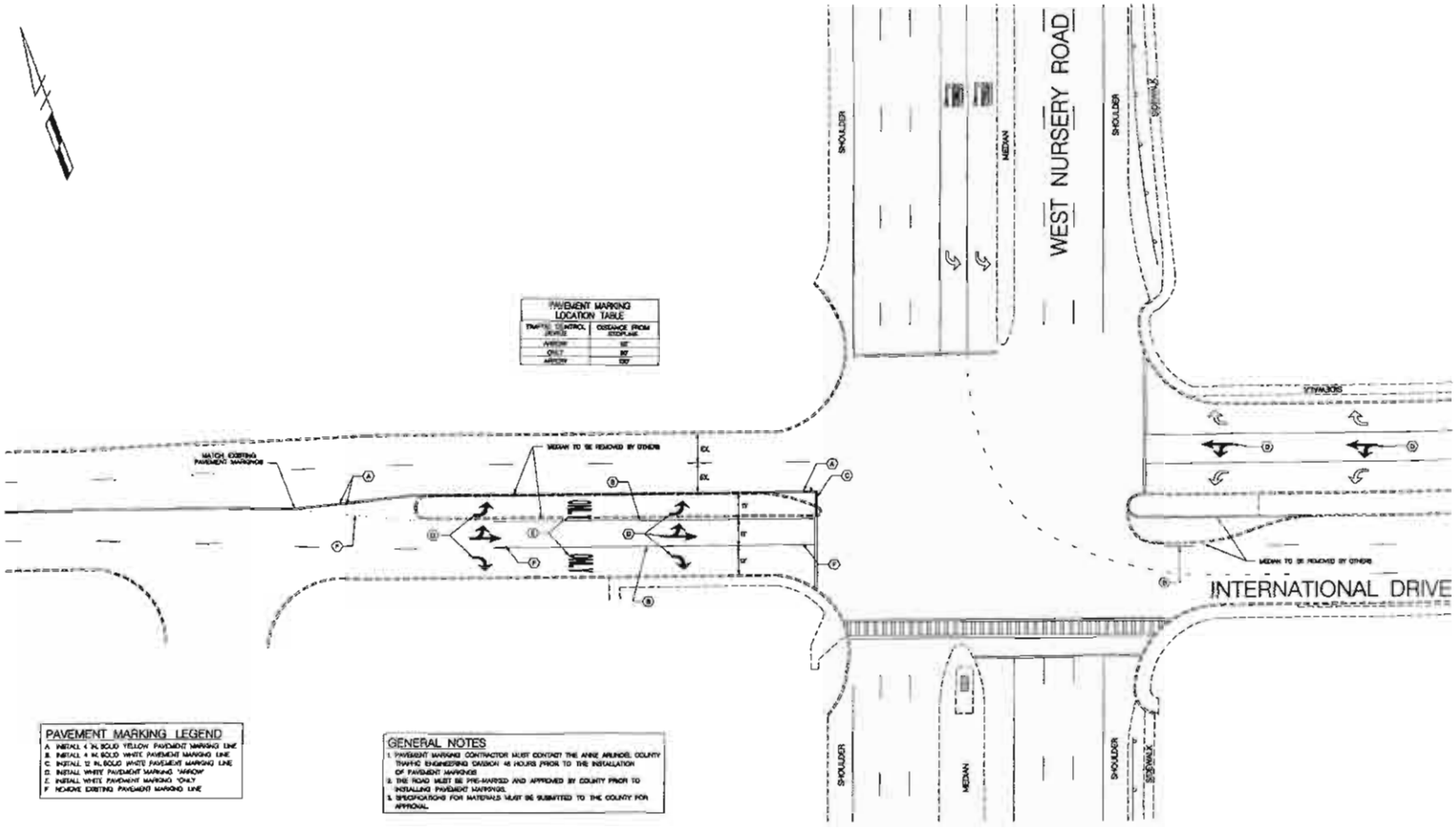

PAVEMENT MARKING LOCATION TABLE	
TRAFFIC CONTROL DEVICE	DISTANCE FROM STOPLINE
AHEAD	50'
ONLY	30'
ARROW	100'

PAVEMENT MARKING LEGEND

A INSTALL 4 IN. SOLID YELLOW PAVEMENT MARKING LINE
B INSTALL 4 IN. SOLID WHITE PAVEMENT MARKING LINE
C INSTALL 12 IN. SOLID WHITE PAVEMENT MARKING LINE
D INSTALL WHITE PAVEMENT MARKING "ARROW"
E INSTALL WHITE PAVEMENT MARKING "ONLY"
F REMOVE EXISTING PAVEMENT MARKING LINE

GENERAL NOTES

1. PAVEMENT MARKING CONTRACTOR MUST CONTACT THE ANNE ARUNDEL COUNTY TRAFFIC ENGINEERING DIVISION 48 HOURS PRIOR TO THE INSTALLATION OF PAVEMENT MARKINGS.
2. THE ROAD MUST BE PRE-MARKED AND APPROVED BY COUNTY PRIOR TO INSTALLING PAVEMENT MARKINGS.
3. SPECIFICATIONS FOR MATERIALS MUST BE SUBMITTED TO THE COUNTY FOR APPROVAL.

LEGEND OF UTILITIES

Revision	Approved	Date

TRAFFIC CONCEPTS, INC
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Suite E
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(410) 923-7101
FAX (410) 923-6473
EMAIL TRAFFIC@TRAFFIC-CONCEPTS.COM

RIGHT-OF-WAY ACQUIRED

ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

APPROVED
BUREAU OF HIGHWAYS — DATE
APPROVED
CHIEF, TRAFFIC ENGINEERING DIVISION — DATE

DRAWN BY: T. ZAYDEL
CHECKED BY: K. BOHMD
DESIGN ENGINEER

SCALE: 1" = 30'
SHEET NO. OF
PROJECT NO.
ACCT. NO.
PROPOSAL NO.

PAVEMENT MARKING PLAN

WEST NURSERY ROAD AT INTERNATIONAL DRIVE

PEAK HOUR TURNING MOVEMENT COUNT

INTERSECTION: W. NURSERY ROAD @ ELKRIDGE LANDING ROAD **COUNTY:** ANNE ARUNDEL

COUNT BY: A. NEUSE **DATE:** AUGUST 5, 2015

WEATHER: CLEAR **DAY:** WEDNESDAY

	NORTHBOUND			W. NURSERY RD SOUTHBOUND			ELKRIDGE LANDING RD EASTBOUND			ELKRIDGE LANDING RD WESTBOUND			
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	TOTAL
AM													
7:00-7:15				99		87	9	25			96	52	368
7:15-7:30				91		88	15	20			97	74	385
7:30-7:45				106		76	17	22			126	59	406
7:45-8:00				100		51	24	32			110	68	385
8:00-8:15				98		33	19	42			110	72	374
8:15-8:30				67		39	7	33			99	53	298
8:30-8:45				83		27	28	20			73	39	270
8:45-9:00				68		28	17	41			72	32	258
PEAK HR 7:15-8:15 TOTALS				**395**		**248**	**75**	**116**			**443**	**273**	**PHF 0.95**

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PEAK HOUR TURNING MOVEMENT COUNT

INTERSECTION: W. NURSERY ROAD @ ELKRIDGE LANDING ROAD **COUNTY:** ANNE ARUNDEL

COUNT BY: P. PIRMANN **DATE:** OCTOBER 9, 2014

WEATHER: CLEAR **DAY:** THURSDAY

	NORTHBOUND			W NURSERY ROAD SOUTHBOUND			ELKRIDGE LANDING RD EASTBOUND			ELKRIDGE LANDING RD WESTBOUND			
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	TOTAL
PM													
4:00-4:15				75		11	51	123			26	50	336
4:15-4:30				75		12	41	140			20	62	350
4:30-4:45				109		11	36	119			16	74	365
4:45-5:00				86		12	25	90			20	47	280
5:00-5:15				81		12	37	127			32	53	342
5:15-5:30				72		10	23	89			35	59	288
5:30-5:45				80		9	23	91			23	61	287
5:45-6:00				76		11	23	69			18	65	262
PEAK HR 4:15-5:15 TOTALS				**351**		**47**	**139**	**476**			**88**	**236**	**PHF 0.92**

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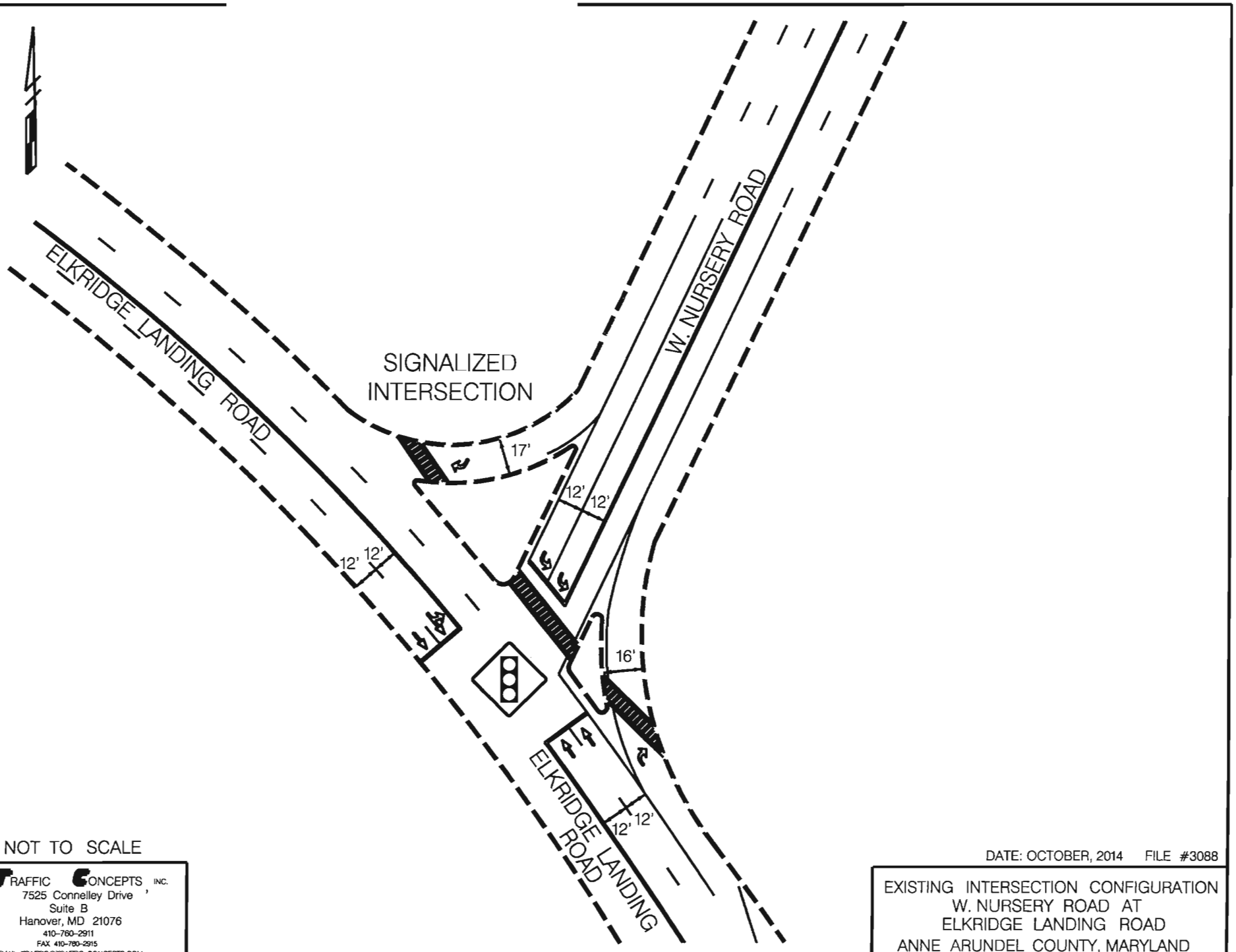

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DATE: OCTOBER, 2014 FILE #3088

EXISTING INTERSECTION CONFIGURATION
W. NURSERY ROAD AT
ELKRIDGE LANDING ROAD
ANNE ARUNDEL COUNTY, MARYLAND

PEAK HOUR TURNING MOVEMENT COUNT

INTERSECTION: W. NURSERY ROAD @ ANDOVER ROAD **COUNTY:** ANNE ARUNDEL

COUNT BY: J. BRASHEARS **DATE:** JULY 30, 2015

WEATHER: CLEAR **DAY:** THURSDAY

	W. NURSERY ROAD NORTHBOUND			**W. NURSERY ROAD** SOUTHBOUND			EASTBOUND			**ANDOVOER ROAD** WESTBOUND			
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	TOTAL
AM													
7:00-7:15		76	3	16	202					20		55	372
7:15-7:30		94	16	11	201					22		61	405
7:30-7:45		120	6	18	220					29		64	457
7:45-8:00		116	3	14	182					17		67	399
8:00-8:15		82	6	16	158					24		62	348
8:15-8:30		100	3	10	152					16		58	339
8:30-8:45		102	6	16	115					9		50	298
8:45-9:00		117	5	12	144					8		44	330
PEAK HR 7:00-8:00 TOTALS		**406**	**28**	**59**	**805**					**88**		**247**	**PHF 0.89**

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PEAK HOUR TURNING MOVEMENT COUNT

INTERSECTION: W. NURSERY ROAD @ ANDOVER ROAD **COUNTY:** ANNE ARUNDEL

COUNT BY: E. CAPPS **DATE:** OCTOBER 21, 2014

WEATHER: CLEAR **DAY:** TUESDAY

	W NURSERY ROAD NORTHBOUND			**W NURSERY ROAD** SOUTHBOUND			EASTBOUND			**ANDOVER ROAD** WESTBOUND			
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	TOTAL
PM													
4:00-4:15		163	17	50	104					2		16	352
4:15-4:30		118	13	57	109					9		27	333
4:30-4:45		123	18	63	107					8		27	346
4:45-5:00		107	23	61	114					17		30	352
5:00-5:15		132	25	81	97					5		33	373
5:15-5:30		126	20	93	121					8		41	409
5:30-5:45		109	15	75	86					14		23	322
5:45-6:00		106	15	75	95					14		27	332
PEAK HR 4:30-5:30 TOTALS		**488**	**86**	**298**	**439**					**38**		**131**	**PHF 0.90**

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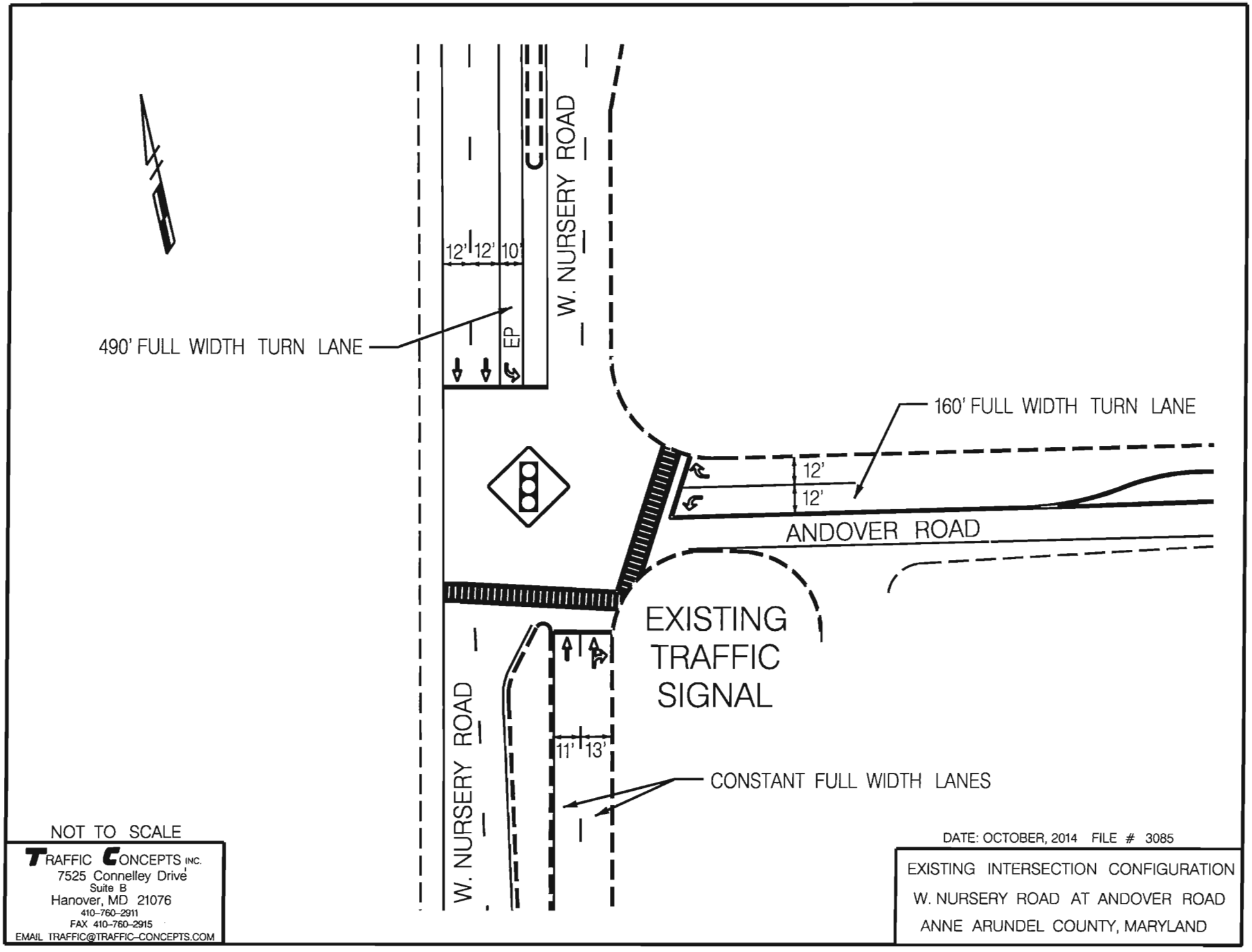

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DATE: OCTOBER, 2014 FILE # 3085

EXISTING INTERSECTION CONFIGURATION
W. NURSERY ROAD AT ANDOVER ROAD
ANNE ARUNDEL COUNTY, MARYLAND

PEAK HOUR TURNING MOVEMENT COUNT

INTERSECTION: W. NURSERY ROAD @ WINTERSON ROAD

COUNTY: ANNE ARUNDEL

COUNT BY: A. NEUSE / B. PAGE

DATE: JULY 30, 2015

WEATHER: CLEAR

DAY: THURSDAY

	W. NURSERY ROAD NORTHBOUND				W. NURSERY ROAD SOUTHBOUND				WINTERSON ROAD EASTBOUND			WINTERSON ROAD WESTBOUND			
TIME	LEFT	THRU	RIGHT	UTRN	LEFT	THRU	RIGHT	UTRN	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	TOTAL
AM															
7:00-7:15	26	71	15	1	31	197	103	6	58	3	19	9	5	14	558
7:15-7:30	39	107	19	1	12	223	134	8	39	2	20	8	7	16	635
7:30-7:45	41	117	20	0	27	204	163	5	57	1	19	9	9	17	689
7:45-8:00	36	132	25	3	30	180	209	8	40	5	14	13	13	11	719
8:00-8:15	36	85	11	2	22	154	143	6	44	5	20	14	6	13	561
8:15-8:30	29	124	18	0	19	164	144	4	43	2	10	2	5	15	579
8:30-8:45	31	118	12	0	17	106	116	11	38	2	18	11	7	23	510
8:45-9:00	29	110	15	0	11	148	134	7	36	5	13	6	6	16	536
PEAK HR 7:15-8:15 TOTALS	**152**	**441**	**75**	**6**	**91**	**761**	**649**	**27**	**180**	**13**	**73**	**44**	**35**	**57**	**PHF 0.91**

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PEAK HOUR TURNING MOVEMENT COUNT

INTERSECTION: W. NURSERY ROAD @ WINTERSON ROAD **COUNTY:** ANNE ARUNDEL

COUNT BY: E. CAPPS / T. KING **DATE:** OCTOBER 9, 2014

WEATHER: CLEAR **DAY:** THURSDAY

	W NURSERY ROAD NORTHBOUND			W NURSERY ROAD SOUTHBOUND				WINTERSON ROAD EASTBOUND			WINTERSON ROAD WESTBOUND			
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	TOTAL
PM														
4:00-4:15	7	124	14	5	107	27	4	118	4	18	28	3	39	498
4:15-4:30	4	108	17	11	91	43	6	134	9	21	41	6	30	521
4:30-4:45	14	129	11	24	101	34	10	157	6	19	33	6	39	583
4:45-5:00	22	115	8	17	112	47	7	120	7	26	21	3	18	523
5:00-5:15	10	117	6	12	150	33	8	152	8	29	21	3	38	587
5:15-5:30	17	114	8	8	127	34	13	121	7	18	26	5	30	528
5:30-5:45	13	139	7	17	111	39	9	111	3	23	18	8	23	521
5:45-6:00	15	100	8	10	116	44	8	76	4	27	13	3	34	458
PEAK HR 4:30-5:30 TOTALS	**63**	**475**	**33**	**61**	**490**	**148**	**38**	**550**	**28**	**92**	**101**	**17**	**125**	**PHF 0.95**

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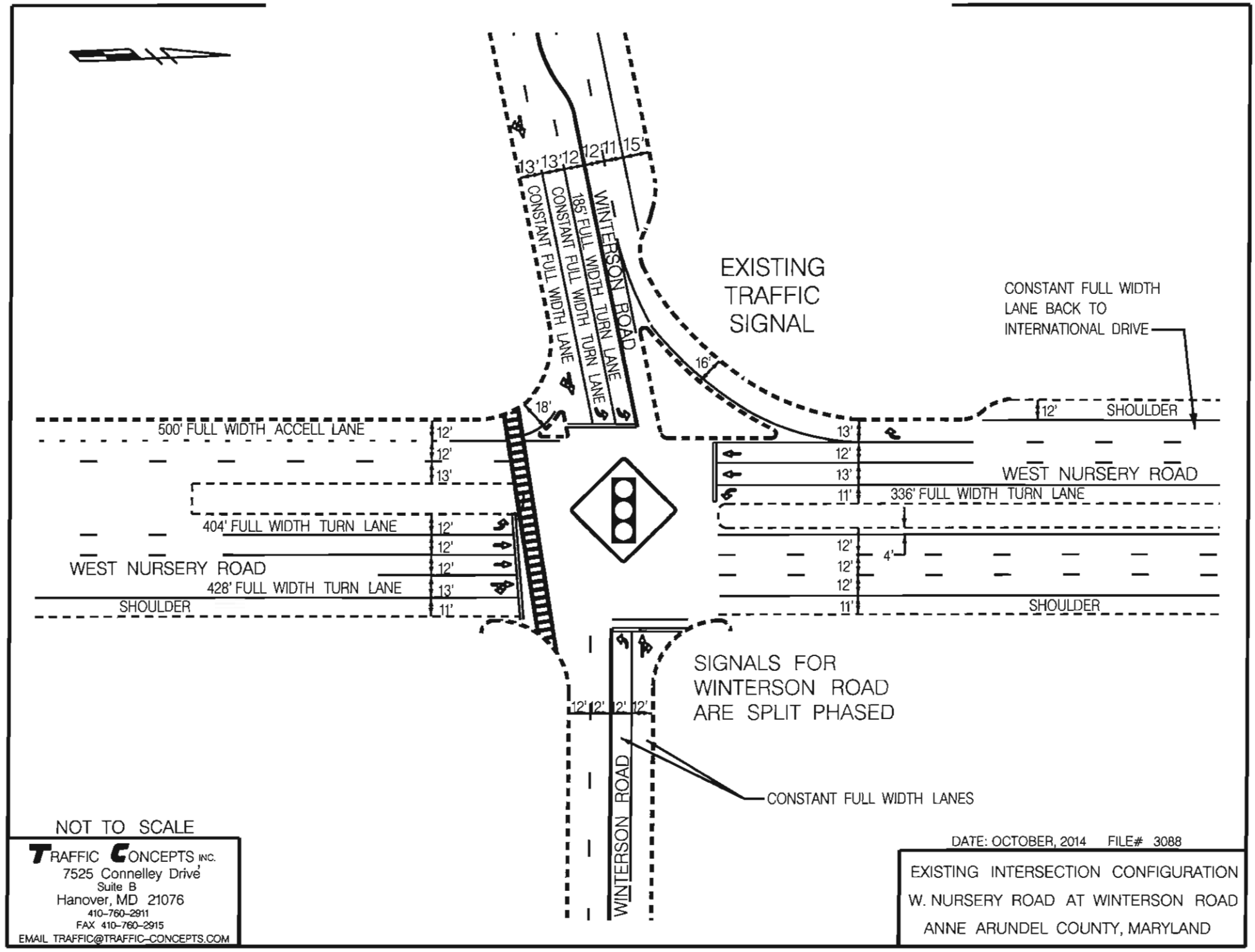

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DATE: OCTOBER, 2014 FILE# 3088

EXISTING INTERSECTION CONFIGURATION
W. NURSERY ROAD AT WINTERSON ROAD
ANNE ARUNDEL COUNTY, MARYLAND

PEAK HOUR TURNING MOVEMENT COUNT

INTERSECTION: ELKRIDGE LANDING RD @ WINTERSON RD **COUNTY:** ANNE ARUNDEL

COUNT BY: B. PAGE **DATE:** JULY 29, 2015

WEATHER: CLEAR **DAY:** WEDNESDAY

	ELKRIDGE LANDING RD NORTHBOUND			NORTHROP GRUMMAN SOUTHBOUND			WINTERSON RD EASTBOUND			WINTERSON RD WESTBOUND			
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	TOTAL
AM													
7:00-7:15	5	3	10	1	2	0	3	55	10	80	59	10	238
7:15-7:30	4	6	21	0	5	4	8	54	10	95	48	10	265
7:30-7:45	6	2	15	6	4	4	9	52	16	139	76	16	345
7:45-8:00	7	4	19	4	0	0	12	27	17	153	93	15	351
8:00-8:15	6	3	13	1	0	2	9	43	11	94	70	10	262
8:15-8:30	12	4	29	0	7	4	8	33	13	73	74	11	268
8:30-8:45	6	3	21	4	0	8	5	35	6	71	61	10	230
8:45-9:00	6	10	18	1	3	7	7	31	13	85	68	9	258
PEAK HR 7:30-8:30 TOTALS	**31**	**13**	**76**	**11**	**11**	**10**	**38**	**155**	**57**	**459**	**313**	**52**	**PHF 0.87**
PM													
4:00-4:15	8	2	92	7	9	4	2	69	5	20	42	3	263
4:15-4:30	2	3	67	4	4	3	2	77	4	15	40	6	227
4:30-4:45	17	0	90	6	6	5	1	101	7	12	40	2	287
4:45-5:00	11	2	96	7	7	5	0	81	4	9	43	5	270
5:00-5:15	13	5	86	15	6	14	0	103	2	11	38	3	296
5:15-5:30	9	3	74	8	7	7	0	59	3	8	35	5	218
5:30-5:45	5	3	81	5	4	7	1	72	7	8	40	4	237
5:45-6:00	6	1	54	7	2	8	0	50	7	10	30	4	179
PEAK HR 4:15-5:15 TOTALS	**43**	**10**	**339**	**32**	**23**	**27**	**3**	**362**	**17**	**47**	**161**	**16**	**PHF 0.91**

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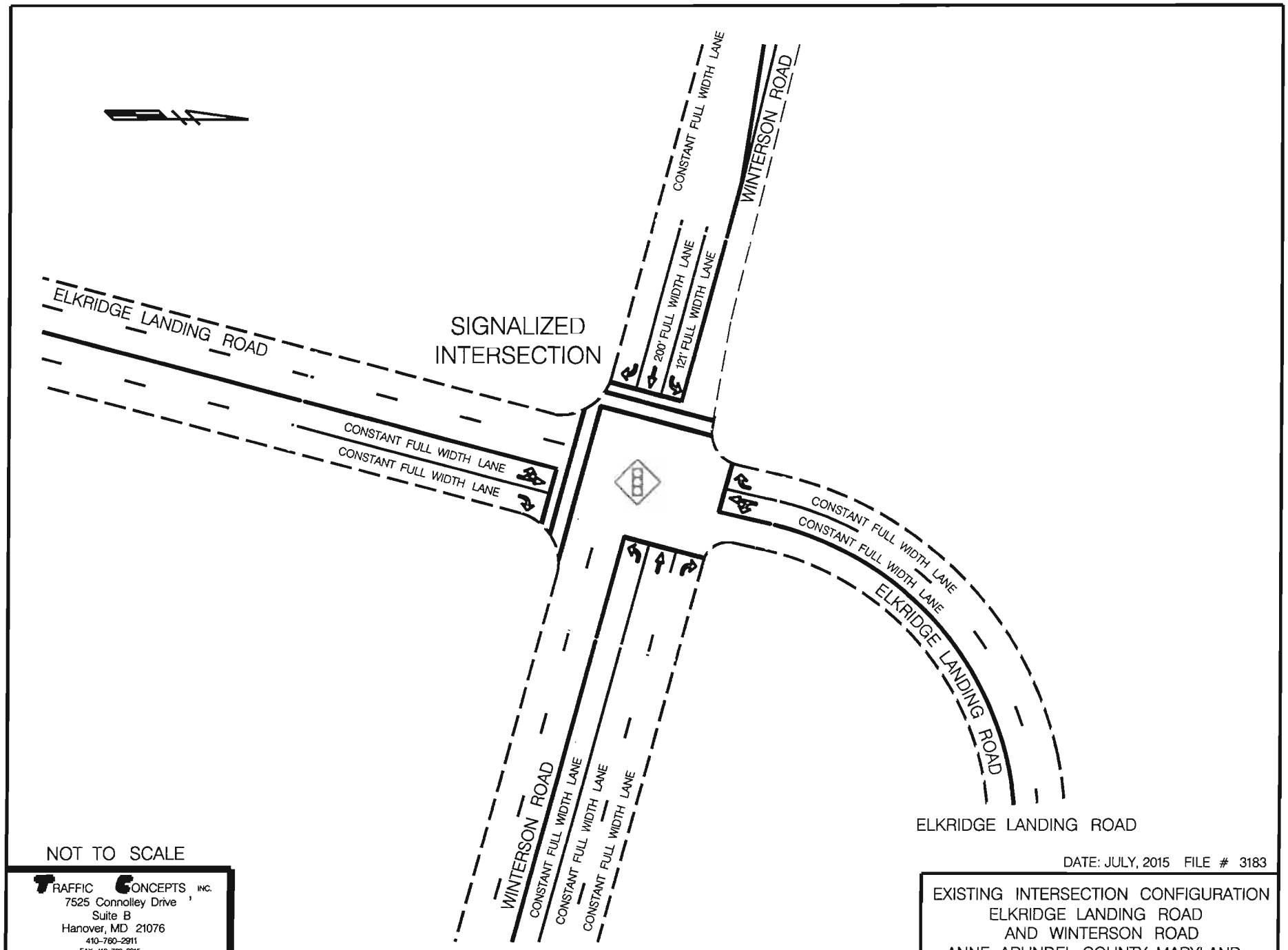

NOT TO SCALE

TRAFFIC CONCEPTS, INC.
7525 Connolley Drive
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EMAIL REAFFIC@TRAFFIC-CONCEPTS.COM

DATE: JULY, 2015 FILE # 3183

EXISTING INTERSECTION CONFIGURATION
ELKRIDGE LANDING ROAD
AND WINTERSON ROAD
ANNE ARUNDEL COUNTY, MARYLAND

PEAK HOUR TURNING MOVEMENT COUNT

INTERSECTION: W. NURSERY ROAD @ CIENA (SITE ACCESS) **COUNTY:** ANNE ARUNDEL

COUNT BY: S. HUNTER **DATE:** JULY 30, 2015

WEATHER: CLEAR **DAY:** THURSDAY

	W. NURSERY ROAD NORTHBOUND				W. NURSERY ROAD SOUTHBOUND			CIENA EASTBOUND			WESTBOUND			
TIME	LEFT	THRU	RIGHT	UTRN	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	TOTAL
AM														
7:00-7:15	8	165		1		256	2	0		0				432
7:15-7:30	8	122		1		243	2	1		0				377
7:30-7:45	4	168		2		263	0	0		0				437
7:45-8:00	8	204		2		196	0	0		0				410
8:00-8:15	9	210		1		214	4	1		0				439
8:15-8:30	3	179		2		170	1	0		0				355
8:30-8:45	4	174		1		150	0	1		1				331
8:45-9:00	3	165		1		161	1	1		1				333
PEAK HR 7:15-8:15 TOTALS	**29**	**704**		**6**		**916**	**6**	**2**		**0**				**PHF 0.95**
PM														
4:00-4:15	0	161		0		160	1	21		0				343
4:15-4:30	0	163		0		166	0	10		0				339
4:30-4:45	0	138		0		182	0	8		0				328
4:45-5:00	0	137		0		170	0	12		0				319
5:00-5:15	0	130		0		178	0	11		0				319
5:15-5:30	0	161		0		176	0	6		0				343
5:30-5:45	0	103		0		162	0	3		0				268
5:45-6:00	1	108		0		132	0	3		0				244
PEAK HR 4:00-5:00 TOTALS	**0**	**599**		**0**		**678**	**1**	**51**		**0**				**PHF 0.97**

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M:\3183

PEAK HOUR TURNING MOVEMENT COUNT

INTERSECTION: ELKRIDGE LANDING ROAD @ SITE ACCESS **COUNTY:** ANNE ARUNDEL

COUNT BY: A. NEUSE **DATE:** JULY 29, 2015

WEATHER: CLEAR **DAY:** WEDNESDAY

	ELKRIDGE LANDING RD NORTHBOUND			ELKRIDGE LANDING RD SOUTHBOUND			EASTBOUND			SITE ACCESS WESTBOUND			
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	TOTAL
AM													
7:00-7:15		22	0	0	77					0		0	99
7:15-7:30		38	2	1	79					0		0	120
7:30-7:45		36	0	0	127					0		0	163
7:45-8:00		32	0	1	122					1		0	156
8:00-8:15		29	1	0	69					0		0	99
8:15-8:30		46	0	0	69					0		0	115
8:30-8:45		35	0	0	52					0		0	87
8:45-9:00		39	0	1	69					0		0	109
PEAK HR 7:00-8:00 TOTALS		**128**	**2**	**2**	**405**					**1**		**0**	**PHF 0.83**
PM													
4:00-4:15		88	1	0	35					1		0	125
4:15-4:30		52	0	0	25					0		0	77
4:30-4:45		68	0	1	31					1		1	102
4:45-5:00		68	0	1	22					0		0	91
5:00-5:15		66	0	0	32					0		1	99
5:15-5:30		57	1	0	18					0		0	76
5:30-5:45		65	0	0	22					0		0	87
5:45-6:00		41	0	0	17					0		0	58
PEAK HR 4:00-5:00 TOTALS		**276**	**1**	**2**	**113**					**2**		**1**	**PHF 0.79**

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7525 Connelley Drive - Suite B
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WEST NURSERY ROAD
SOUTH OF ANDOVER ROAD

Start	06-Oct-14		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
12:00 AM	-	-	62	83	51	78	54	60	61	83	-	-	-	-	57	76
01:00	-	-	21	42	19	39	27	56	37	77	-	-	-	-	26	54
02:00	-	-	30	38	34	31	23	29	20	48	-	-	-	-	27	36
03:00	-	-	40	16	39	15	41	26	46	29	-	-	-	-	42	22
04:00	-	-	131	39	134	44	145	35	141	48	-	-	-	-	138	42
05:00	-	-	369	90	348	94	346	93	334	105	-	-	-	-	349	96
06:00	-	-	682	216	708	191	724	211	668	172	-	-	-	-	696	198
07:00	-	-	**843**	451	**859**	455	**860**	**479**	**761**	**399**	-	-	-	-	**831**	**446**
08:00	-	-	657	**452**	610	**491**	650	432	574	354	-	-	-	-	623	432
09:00	-	-	461	325	442	356	458	344	454	364	-	-	-	-	454	347
10:00	-	-	308	260	334	425	382	283	-	-	-	-	-	-	335	323
11:00	-	-	389	394	429	441	391	424	-	-	-	-	-	-	403	420
12:00 PM	-	-	**509**	457	**552**	481	**555**	492	-	-	-	-	-	-	**539**	477
01:00	**446**	387	426	416	439	458	428	437	-	-	-	-	-	-	435	424
02:00	420	476	374	**641**	386	**559**	444	536	-	-	-	-	-	-	406	553
03:00	366	476	412	601	405	523	463	**650**	-	-	-	-	-	-	412	**562**
04:00	406	**564**	405	551	494	525	466	588	-	-	-	-	-	-	443	557
05:00	444	468	468	512	465	503	470	507	-	-	-	-	-	-	462	498
06:00	316	395	340	448	403	428	386	438	-	-	-	-	-	-	361	427
07:00	247	316	255	319	285	362	269	314	-	-	-	-	-	-	264	328
08:00	215	216	224	235	259	299	236	270	-	-	-	-	-	-	234	255
09:00	203	216	194	223	220	286	201	218	-	-	-	-	-	-	204	236
10:00	108	158	128	162	110	175	146	215	-	-	-	-	-	-	123	178
11:00	78	113	84	112	80	118	108	160	-	-	-	-	-	-	88	126
Lane	3249	3785	7812	7083	8105	7377	8253	7297	3096	1679	0	0	0	0	7952	7113
Day	7034		14895		15482		15550		4775		0		0		15065	
AM Peak	-	-	07:00	08:00	07:00	08:00	07:00	07:00	07:00	07:00	-	-	-	-	07:00	07:00
Vol.	-	-	843	452	859	491	860	479	761	399	-	-	-	-	831	446
PM Peak	13:00	16:00	12:00	14:00	12:00	14:00	12:00	15:00	-	-	-	-	-	-	12:00	15:00
Vol.	446	564	509	641	552	559	555	650	-	-	-	-	-	-	539	562

Comb. Total	7034	14895	15482	15550	4775	0	0	15065

ADT ADT 15,034 AADT 15,034

ADT - 15309
Two-Way - 1054
One-Way - 588 NB

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WEST NURSERY ROAD
NORTH OF WINTERSON ROAD

Start Time	06-Oct-14 NB	SB	Tue NB	SB	Wed NB	SB	Thu NB	SB	Fri NB	SB	Sat NB	SB	Sun NB	SB	Week Average NB	SB
12:00 AM	-	-	99	103	101	75	121	85	139	104	-	-	-	-	115	92
01:00	-	-	75	55	69	49	51	59	63	56	-	-	-	-	64	55
02:00	-	-	43	38	41	34	34	36	52	50	-	-	-	-	42	40
03:00	-	-	30	47	31	52	45	49	44	63	-	-	-	-	38	53
04:00	-	-	45	125	47	138	43	149	64	140	-	-	-	-	50	138
05:00	-	-	129	438	131	431	123	443	137	418	-	-	-	-	130	432
06:00	-	-	334	923	349	956	360	912	281	821	-	-	-	-	331	903
07:00	-	-	655	**1350**	645	**1404**	**664**	**1310**	**583**	**1232**	-	-	-	-	637	**1324**
08:00	-	-	589	1288	581	1306	627	1265	571	1060	-	-	-	-	592	1230
09:00	-	-	500	804	502	790	495	834	0	0	-	-	-	-	374	607
10:00	-	-	489	530	516	515	446	520	-	-	-	-	-	-	484	522
11:00	-	-	**671**	565	**684**	640	**691**	588	-	-	-	-	-	-	**682**	598
12:00 PM	-	-	742	**759**	847	720	783	781	-	-	-	-	-	-	791	**753**
01:00	-	-	675	656	638	636	694	653	-	-	-	-	-	-	669	648
02:00	793	555	854	499	822	568	901	610	-	-	-	-	-	-	842	558
03:00	987	600	1088	549	1023	650	**1164**	690	-	-	-	-	-	-	1066	622
04:00	**1098**	589	**1215**	614	**1198**	563	1126	681	-	-	-	-	-	-	**1159**	612
05:00	970	**688**	1033	650	1007	**761**	1051	**832**	-	-	-	-	-	-	1015	**733**
06:00	729	530	765	526	768	537	774	671	-	-	-	-	-	-	759	566
07:00	482	449	530	438	571	455	605	551	-	-	-	-	-	-	547	473
08:00	342	411	355	399	385	417	450	402	-	-	-	-	-	-	383	407
09:00	247	333	283	334	285	329	543	398	-	-	-	-	-	-	340	348
10:00	206	265	270	267	247	271	349	275	-	-	-	-	-	-	268	270
11:00	162	140	201	149	200	134	233	172	-	-	-	-	-	-	199	149
Lane	6016	4560	11670	12106	11688	12431	12373	12966	1934	3944	0	0	0	0	11577	12133
Day	10576		23776		24119		25339		5878		0		0		23710	
AM Peak	-	-	11:00	07:00	11:00	07:00	11:00	07:00	07:00	07:00	-	-	-	-	11:00	07:00
Vol.	-	-	671	1350	684	1404	691	1310	583	1232	-	-	-	-	682	1324
PM Peak	16:00	17:00	16:00	12:00	16:00	17:00	15:00	17:00	-	-	-	-	-	-	16:00	12:00
Vol.	1098	688	1215	759	1198	761	1164	832	-	-	-	-	-	-	1159	753

Comb. Total	10576	23776	24119	25339	5878	0	0	23710

ADT - 24411
Two-Way - 1883
One-Way - 1215 NB

Traffic Concepts, Inc.
7525 Connelley Drive - Suite B
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410-760-2911

WINTERSON ROAD
WEST OF WEST NURSERY ROAD

Start	20-Jul-15		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB
12:00 AM	*	*	43	36	28	34	34	29	36	36	*	*	*	*	35	34
01:00	*	*	19	19	18	20	14	19	25	17	*	*	*	*	19	19
02:00	*	*	19	20	22	18	14	13	16	17	*	*	*	*	18	17
03:00	*	*	12	13	13	16	12	8	11	13	*	*	*	*	12	12
04:00	*	*	39	16	36	20	41	24	38	25	*	*	*	*	38	21
05:00	*	*	125	62	123	61	137	84	98	58	*	*	*	*	121	66
06:00	*	*	365	164	331	186	335	177	297	174	*	*	*	*	332	175
07:00	*	*	755	234	760	280	741	260	603	218	*	*	*	*	715	248
08:00	*	*	721	217	724	233	677	230	523	198	*	*	*	*	661	220
09:00	*	*	381	188	407	200	455	192	357	208	*	*	*	*	400	197
10:00	*	*	235	237	236	206	237	227	*	*	*	*	*	*	236	223
11:00	227	353	269	372	290	350	290	377	*	*	*	*	*	*	269	363
12:00 PM	343	353	332	414	384	443	393	422	*	*	*	*	*	*	363	408
01:00	291	279	349	277	329	307	345	298	*	*	*	*	*	*	328	290
02:00	212	383	227	353	247	414	269	432	*	*	*	*	*	*	239	396
03:00	189	504	184	541	239	587	197	599	*	*	*	*	*	*	202	558
04:00	180	638	208	697	240	678	218	697	*	*	*	*	*	*	212	678
05:00	215	591	239	662	242	645	208	629	*	*	*	*	*	*	226	632
06:00	179	338	201	360	188	387	206	357	*	*	*	*	*	*	194	360
07:00	163	191	139	212	160	255	147	199	*	*	*	*	*	*	152	214
08:00	150	148	167	139	163	144	163	151	*	*	*	*	*	*	161	146
09:00	137	100	142	76	150	101	152	119	*	*	*	*	*	*	145	99
10:00	101	76	99	68	118	87	137	85	*	*	*	*	*	*	114	79
11:00	74	68	56	71	62	73	85	90	*	*	*	*	*	*	69	76
Lane	2461	4022	5326	5448	5510	5745	5507	5718	2004	964	0	0	0	0	5261	5531
Day	6483		10774		11255		11225		2968		0		0		10792	
AM Peak	11:00	11:00	07:00	11:00	07:00	11:00	07:00	11:00	07:00	07:00	-	-	-	-	07:00	11:00
Vol.	227	353	755	372	760	350	741	377	603	218	-	-	-	-	715	363
PM Peak	12:00	16:00	13:00	16:00	12:00	16:00	12:00	16:00	-	-	-	-	-	-	12:00	16:00
Vol.	343	638	349	697	384	678	393	697	-	-	-	-	-	-	363	678

Comb. Total	6483	10774	11255	11225	2968	0	0	10792
ADT	ADT 10,766	AADT 10,766						

ADT - 11085
Two-Way - 918
One-Way - 697 EB

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ELKRIDGE LANDING ROAD
SOUTH OF WINTERSON ROAD

Start	20-Jul-15		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
12:00 AM	*	*	22	25	12	16	12	12	14	16	*	*	*	*	15	17
01:00	*	*	13	10	5	11	11	13	9	11	*	*	*	*	10	11
02:00	*	*	10	9	10	11	6	3	7	4	*	*	*	*	8	7
03:00	*	*	10	7	6	8	8	8	9	10	*	*	*	*	8	8
04:00	*	*	22	11	22	11	16	11	16	15	*	*	*	*	19	12
05:00	*	*	46	51	37	41	36	42	37	45	*	*	*	*	39	45
06:00	*	*	90	102	94	105	91	87	80	70	*	*	*	*	89	91
07:00	*	*	142	298	120	326	118	298	102	210	*	*	*	*	120	283
08:00	*	*	111	278	114	277	117	253	92	183	*	*	*	*	108	248
09:00	*	*	92	172	92	152	88	125	*	*	*	*	*	*	91	150
10:00	92	107	94	84	99	99	103	102	*	*	*	*	*	*	97	98
11:00	133	121	132	108	161	121	152	126	*	*	*	*	*	*	144	119
12:00 PM	138	145	181	162	155	156	145	170	*	*	*	*	*	*	155	158
01:00	104	135	125	151	106	143	104	155	*	*	*	*	*	*	110	146
02:00	132	120	121	159	152	153	147	135	*	*	*	*	*	*	138	142
03:00	157	144	204	152	187	162	195	157	*	*	*	*	*	*	186	154
04:00	202	151	239	155	236	132	227	146	*	*	*	*	*	*	226	146
05:00	186	119	211	123	201	113	193	116	*	*	*	*	*	*	198	118
06:00	92	70	118	79	107	81	102	98	*	*	*	*	*	*	105	82
07:00	51	63	50	54	60	65	40	48	*	*	*	*	*	*	50	58
08:00	51	63	46	56	30	46	46	46	*	*	*	*	*	*	43	53
09:00	41	33	25	26	30	37	24	33	*	*	*	*	*	*	30	32
10:00	24	34	22	21	19	31	31	31	*	*	*	*	*	*	24	29
11:00	27	32	16	21	22	34	23	27	*	*	*	*	*	*	22	28
Lane	1430	1337	2142	2314	2077	2331	2035	2242	366	564	0	0	0	0	2035	2235
Day	2767		4456		4408		4277		930		0		0		4270	
AM Peak	11:00	11:00	07:00	07:00	11:00	07:00	11:00	07:00	07:00	07:00	-	-	-	-	11:00	07:00
Vol.	133	121	142	298	161	326	152	298	102	210	-	-	-	-	144	283
PM Peak	16:00	16:00	16:00	12:00	16:00	15:00	16:00	12:00	-	-	-	-	-	-	16:00	12:00
Vol.	202	151	239	162	236	162	227	170	-	-	-	-	-	-	226	158

Comb. Total	2767	4456	4408	4277	930	0	0	4270
ADT	ADT 4,263	AADT 4,263						

ADT - 4380
Two-Way - 394
One-Way - 239 SB

Gmail by Google

Jackie Hohman <jhohman@traffic-concepts.com>

Airport Square Parcel 221 Redevelopment - Scoping Letter

David Braun <pzbrau93@aacounty.org> Wed, Jul 22, 2015 at 9:30 AM
To: Jackie Hohman <jhohman@traffic-concepts.com>
Cc: "Arzu-McIntosh, Martha" <PZARZU68@aacounty.org>, "Cook, Kirsten" <pzcook77@aacounty.org>, "Fowler, Sarah" <pzfowl22@aacounty.org>, "Lea, Monet" <pzlea123@aacounty.org>, "Mettle, Michael" <PZMETT00@aacounty.org>, "Soldano, Chris" <PZSOLD00@aacounty.org>, "Ulrich, Brian" <PZULRI44@aacounty.org>, Thomas Fahs <thomas.fahs@copt.com>, Marilee Tortorelli <mtortorelli@mragta.com>

Jackie,

The scoping letter for Airport Square Parcel 221 is acceptable as submitted. However, the full volume of the trips proposed by the new uses must be added to the future condition, as the existing office building will not be providing any trips to the counts that are done at this time.

Please note that we are concerned with the operation of the existing access points to West Nursery Road, from both a safety and operational perspective. Based on the assumptions and results provided in the TIS, and the future Site Plan review, we may have comments on the acceptable movements at each of those locations prior to Site Plan approval.

David

On Fri, Jul 17, 2015 at 3:19 PM, Jackie Hohman <jhohman@traffic-concepts.com> wrote:
[Quoted text hidden]

TRAFFIC CONCEPTS, INC.

Traffic Impact Studies • Feasibility • Traffic Signal Design • Traffic Counts •Expert Testimony

July 17, 2015

Mr. David Braun
Anne Arundel County
Office of Planning and Zoning
2664 Riva Road
Annapolis, MD 21401

RE: Airport Square, Parcel 221 - Proposed Redevelopment
Traffic Impact Study Scoping Letter

Dear Mr. Braun:

The Airport Square, Parcel 221 project is located between West Nursery Road and Elkridge Landing Road, south of Winterson Road. The parcel currently contains a 57,000 gross square foot office building. The office building will be replaced with two (2) specialty retail buildings consisting of 7,200 gross square feet each, and a 4,960 gross square foot fast food restaurant with drive thru (Chick-fil-A). The development has access to both West Nursery Road and Elkridge Landing Road. Attached is an aerial photo showing the location of the project and the proposed study limits. Also attached is a copy of the proposed concept plan.

According to *The Institute of Transportation Engineers', Trip Generation Manual, 9th Edition*, the project will generate the following vehicle trips:

	AM		PM		SAT		
	IN	OUT	IN	OUT	IN	OUT	ADT
Specialty Retail 14,400 gsf*	47	51	40	32	47	51	638
Fast Food 4,960 gsf	115	110	84	78	149	144	2461
Less Passby	- 56	- 54	- 42	- 39	- 0	- 0	-1230
Net New Trips	59	56	42	39	149	144	1231
Less Existing Use Office Building 57,000 gsf	-107	- 15	- 24	-118	- 12	- 12	- 856
Net New Trips to Road Network	**- 1**	**92**	**58**	**- 47**	**184**	**183**	**1013**

*Use AM & PM peak hour of the generator rates, and AM peak hour of the generator rates for Saturday.

7525 Connelley Drive • Suite B • Hanover, MD 21076 • Phone (410) 760-2911 • Fax (410) 760-2915

Attached are traffic counts along West Nursery Road (on the MD 295 Overpass) for weekday evening and Saturday peaks. As indicated on the counts, the Saturday peak time (6 PM) volume is 973 vehicles. The evening peak period (4:30 PM) volume is 1835. Since the traffic volumes along Nursery Road are likely one-half of the weekday volume, we would request that a Saturday analysis not be required for this project. We would note that Saturday analyses have not been required for other projects along this corridor, including the Cracker Barrel restaurant.

We propose to analyze the following intersections and road sections during the weekday AM and weekday PM peak periods as part of the traffic impact study:

Intersections

- West Nursery Road @ the site accesses (see locations on attached site plan)
- Elkridge Landing Road @ the site access (see location on attached site plan)
- West Nursery Road @ Elkridge Landing Road
- West Nursery Road @ Andover Road
- West Nursery Road @ Winterson Road
- West Nursery Road @ International Drive
- West Nursery Road @ Corporate Boulevard
- West Nursery Road @ MD 295 NB Ramps
- West Nursery Road @ MD 295 SB Ramps
- Winterson Road @ Elkridge Landing Road

Road Sections

- West Nursery Road from MD 295 to Elkridge Landing Road
- Elkridge Landing Road from West Nursery Road to Winterson Road
- Winterson Road from West Nursery Road to Elkridge Landing Road

We would request that, due to the timing of this project, summer traffic counts be allowed along this corridor. The Nursery Road corridor is mainly office and retail users, with very little residential development. We do not believe that school session traffic counts would be necessary in this area.

We will include a Synchro analysis of the West Nursery Road corridor as well as critical lane analyses of all intersections.

Also, we have attached a list and map showing the background developments that we intend to include in the study. This list was recently approved for the Jimmy Johns project on Nursery Road. Please review and provide any comments.

Please provide our office with any Capital Improvement Projects that may affect the proposed study area, as well as any approved mitigation proposals for the background developments listed.

We respectfully request that your office review and approve the study limits as well as the background development list for this project. If you have any questions or require additional information, please do not hesitate to contact our office at your convenience.

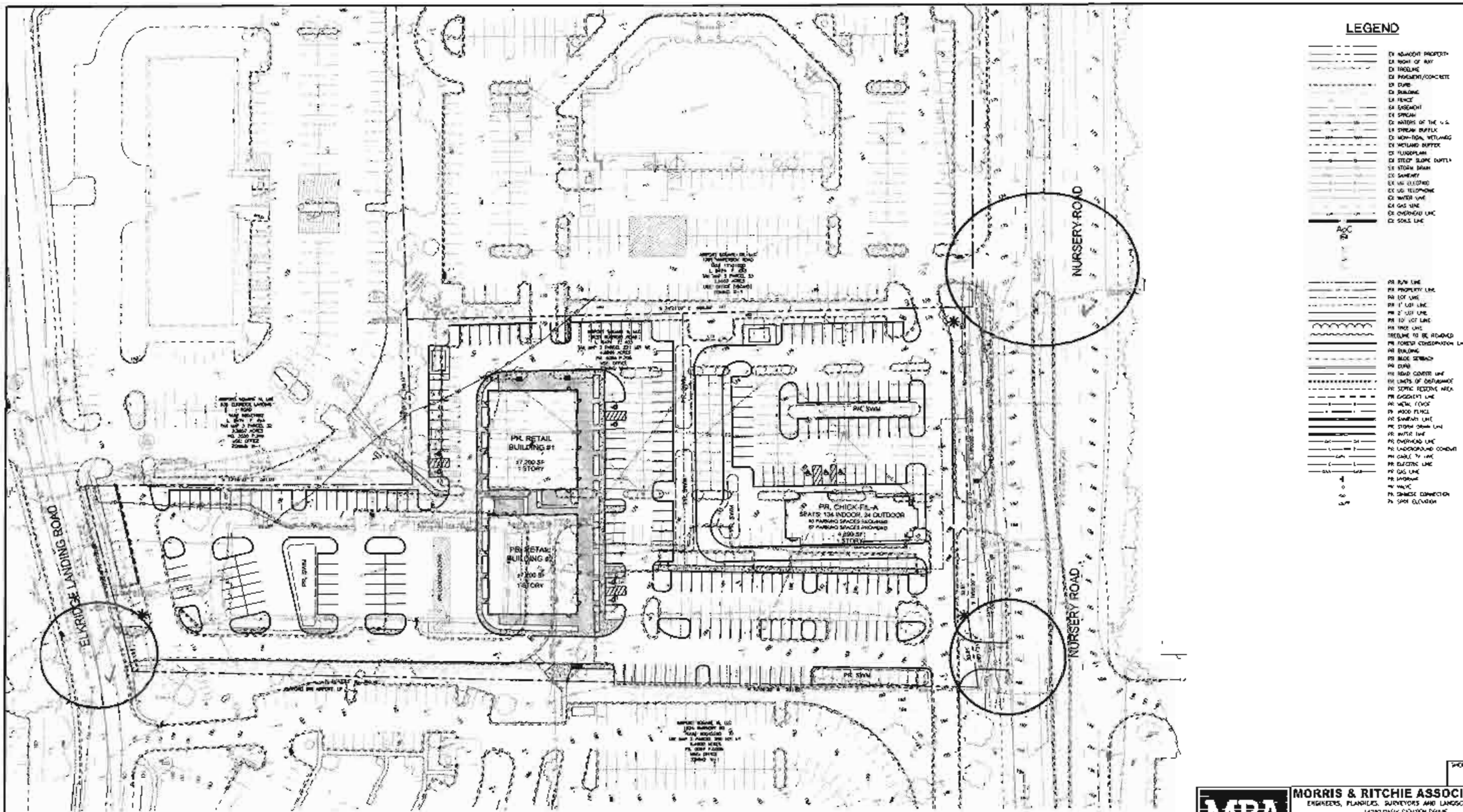
Sincerely,

TRAFFIC CONCEPTS, INC.

Jackie L. Hohman

By: Jackie L. Hohman

River Rd
Skidmore Dr
Maritime Blvd
Catherine Ave
Michael Ave
Patricia Ave
295
Corporate Blvd
Old Elkridge Landing Rd
Furnace Rd
W Nursery Road
International Dr
N Longcross Rd
Winterson Rd
Greenwood Rd
Groveland Rd
Hawthorne Rd
Locust Ln
Baltimore-Washington Pkwy
SITE
Cleveland Rd
Shipley Rd
Forest View Rd
Fairmount Rd
Buck Cavey Ln
Andover Rd
Harrison Ave
Maryland Ave
White Ave
195
W Nursery Road
Main Ave
Lyman Ave
Downs Ave
Metropolitan Blvd
1817 ft
© 2013 Google
Intersection to be analyzed
Road link to be analyzed
Imagery Date 8/29/2010
39°12'16.22" N 76°40'41.40" W elev 0 ft
Eye alt 7856 ft



PLAN VIEW

SCALE: 1" = 40'

Indicates site access intersection to be analyzed

SHEET: PP-04

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
14280 PARK CENTER DRIVE
LAUREL, MD 20707
(410) 792-9792 / (301) 776-1690
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AIRPORT SQUARE

PARCEL 221
PRELIMINARY PLAN
DEVELOPMENT CONCEPT PLAN

DATE	REVISIONS

Detailed Average Rate Trip Calculations
For 14.4 Th.Sq.Ft. GFA of Specialty Retail Center(826) - [R]

Project: Open Date:
Phase: Analysis Date:

Description:

	Average Rate	Standard Deviation	Adjustment Factor	Driveway Volume
Avg. Weekday 2-Way Volume	44.32	15.52	1.00	638
7-9 AM Peak Hour Enter	0.00	0.00	1.00	0
7-9 AM Peak Hour Exit	0.00	0.00	1.00	0
7-9 AM Peak Hour Total	0.00	0.00	1.00	0
4-6 PM Peak Hour Enter	1.19	0.00	1.00	17
4-6 PM Peak Hour Exit	1.52	0.00	1.00	22
4-6 PM Peak Hour Total	2.71	1.83	1.00	39
AM Pk Hr, Generator, Enter	3.28	0.00	1.00	47
AM Pk Hr, Generator, Exit	3.56	0.00	1.00	51
AM Pk Hr, Generator, Total	6.84	3.55	1.00	98
PM Pk Hr, Generator, Enter	2.81	0.00	1.00	40
PM Pk Hr, Generator, Exit	2.21	0.00	1.00	32
PM Pk Hr, Generator, Total	5.02	2.31	1.00	72
Saturday 2-Way Volume	42.04	13.97	1.00	605
Saturday Peak Hour Enter	0.00	0.00	1.00	0
Saturday Peak Hour Exit	0.00	0.00	1.00	0
Saturday Peak Hour Total	0.00	0.00	1.00	0
Sunday 2-Way Volume	20.43	10.27	1.00	294
Sunday Peak Hour Enter	0.00	0.00	1.00	0
Sunday Peak Hour Exit	0.00	0.00	1.00	0
Sunday Peak Hour Total	0.00	0.00	1.00	0

Note: A zero indicates no data available.
Source: Institute of Transportation Engineers
Trip Generation Manual, 9th Edition, 2012

Detailed Average Rate Trip Calculations
For 4.96 Th.Sq.Ft. GFA of Fast-Food Restaurant with Drive-Thru(934) - [R]

Project: Open Date:
Phase: Analysis Date:

Description:

	Average Rate	Standard Deviation	Adjustment Factor	Driveway Volume
Avg. Weekday 2-Way Volume	496.12	242.52	1.00	2461
7-9 AM Peak Hour Enter	23.16	0.00	1.00	115
7-9 AM Peak Hour Exit	22.26	0.00	1.00	110
7-9 AM Peak Hour Total	45.42	28.63	1.00	225
4-6 PM Peak Hour Enter	16.98	0.00	1.00	84
4-6 PM Peak Hour Exit	15.67	0.00	1.00	78
4-6 PM Peak Hour Total	32.65	19.73	1.00	162
AM Pk Hr, Generator, Enter	27.34	0.00	1.00	136
AM Pk Hr, Generator, Exit	26.27	0.00	1.00	130
AM Pk Hr, Generator, Total	53.61	26.27	1.00	266
PM Pk Hr, Generator, Enter	24.60	0.00	1.00	122
PM Pk Hr, Generator, Exit	22.70	0.00	1.00	113
PM Pk Hr, Generator, Total	47.30	25.52	1.00	235
Saturday 2-Way Volume	722.03	295.62	1.00	3581
Saturday Peak Hour Enter	30.09	0.00	1.00	149
Saturday Peak Hour Exit	28.91	0.00	1.00	144
Saturday Peak Hour Total	59.00	22.89	1.00	293
Sunday 2-Way Volume	542.72	206.86	1.00	2692
Sunday Peak Hour Enter	34.92	0.00	1.00	173
Sunday Peak Hour Exit	37.82	0.00	1.00	188
Sunday Peak Hour Total	72.74	11.95	1.00	361

Note: A zero indicates no data available.
Source: Institute of Transportation Engineers
Trip Generation Manual, 9th Edition, 2012

Summary of Pass-By Trips
For 4.96 Th.Sq.Ft. GFA of Fast-Food Restaurant with Drive-Thru(934) - [R]

Project: Open Date:
Phase: Analysis Date:

Description:

	Driveway Volume	Pass-By Trips	Volume Added to Adjacent Streets
Average Weekday			
7-9 AM Peak Hour Enter	115	56	59
7-9 AM Peak Hour Exit	110	54	56
7-9 AM Peak Hour Total	225	110	115
4-6 PM Peak Hour Enter	84	42	42
4-6 PM Peak Hour Exit	78	39	39
4-6 PM Peak Hour Total	162	81	81
Saturday			
Saturday Peak Hour Enter	149	0	149
Saturday Peak Hour Exit	144	0	144
Saturday Peak Hour Total	293	0	293

Pass-By Trips were calculated on the basis of the following:

Weekday A.M. Peak Period Average Pass-By Trip Percentage = 49
Weekday P.M. Peak Period Average Pass-By Trip Percentage = 50
Saturday Midday Pk. Pd. Average Pass-By Trip Percentage = 0

Number of Pass-By Studies:6 for Weekday AM PK PD and 18 for PM PK PD.

Note: A zero indicates no data available.
Source: Institute of Transportation Engineers
Trip Generation Manual, 9th Edition, 2012

Detailed Average Rate Trip Calculations
For 57 Th.Sq.Ft. GFA of General Office Building(710) - [E]

Project: Open Date:
Phase: Analysis Date:

Description:

	Average Rate	Standard Deviation	Adjustment Factor	Driveway Volume
Avg. Weekday 2-Way Volume	15.02	0.00	1.00	856
7-9 AM Peak Hour Enter	1.88	0.00	1.00	107
7-9 AM Peak Hour Exit	0.26	0.00	1.00	15
7-9 AM Peak Hour Total	2.14	0.00	1.00	122
4-6 PM Peak Hour Enter	0.42	0.00	1.00	24
4-6 PM Peak Hour Exit	2.07	0.00	1.00	118
4-6 PM Peak Hour Total	2.50	0.00	1.00	142
AM Pk Hr, Generator, Enter	0.00	0.00	1.00	0
AM Pk Hr, Generator, Exit	0.00	0.00	1.00	0
AM Pk Hr, Generator, Total	0.00	0.00	1.00	0
PM Pk Hr, Generator, Enter	0.00	0.00	1.00	0
PM Pk Hr, Generator, Exit	0.00	0.00	1.00	0
PM Pk Hr, Generator, Total	0.00	0.00	1.00	0
Saturday 2-Way Volume	2.59	0.00	1.00	147
Saturday Peak Hour Enter	0.00	0.00	1.00	0 12
Saturday Peak Hour Exit	0.00	0.00	1.00	0 12
Saturday Peak Hour Total	0.00	0.00	1.00	0 24 *
Sunday 2-Way Volume	0.00	0.00	1.00	0
Sunday Peak Hour Enter	0.00	0.00	1.00	0
Sunday Peak Hour Exit	0.00	0.00	1.00	0
Sunday Peak Hour Total	0.00	0.00	1.00	0

The above rates were calculated from these equations:

24-Hr. 2-Way Volume:	LN(T) = .76LN(X) + 3.68, R^2 = 0.81
7-9 AM Peak Hr. Total:	LN(T) = .8LN(X) + 1.57
	R^2 = 0.83 , 0.88 Enter, 0.12 Exit
4-6 PM Peak Hr. Total:	T = 1.12(X) + 78.45
	R^2 = 0.82 , 0.17 Enter, 0.83 Exit
AM Gen Pk Hr. Total:	0
	R^2 = 0 , 0 Enter, 0 Exit
PM Gen Pk Hr. Total:	0
	R^2 = 0 , 0 Enter, 0 Exit
Sat. 2-Way Volume:	T = 2.03(X) + 31.75, R^2 = 0.64
Sat. Pk Hr. Total:	0
	R^2 = 0 , 0 Enter, 0 Exit
Sun. 2-Way Volume:	0, R^2 = 0
Sun. Pk Hr. Total:	0
	R^2 = 0 , 0 Enter, 0 Exit

* same % as PM peak of ADT

Note: A zero indicates no data available.
Source: Institute of Transportation Engineers
Trip Generation Manual, 9th Edition, 2012

Maryland Department of Transportation
State Highway Administration
Highway Information Services Division

Volume Count Detail Report

Location ID : S2008020022

Location : W NURSERY RD over MD 295 Structure #2014

Date Range: 03/05/2011 **to** 03/06/2011 Saturday

Date: 3/6/2011 ***** Summary of Total Report *****

Beginning Hour	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Daily Avg	Weekday Avg	Weekend Avg
0: 00	242	0	0	0	0	0	222	232	0	232
1: 00	156	0	0	0	0	0	185	171	0	171
2: 00	141	0	0	0	0	0	140	141	0	141
3: 00	95	0	0	0	0	0	132	114	0	114
4: 00	92	0	0	0	0	0	151	122	0	122
5: 00	157	0	0	0	0	0	263	210	0	210
6: 00	246	0	0	0	0	0	380	313	0	313
7: 00	279	0	0	0	0	0	423	351	0	351
8: 00	403	0	0	0	0	0	545	474	0	474
9: 00	390	0	0	0	0	0	459	425	0	425
10: 00	460	0	0	0	0	0	455	458	0	458
11: 00	562	0	0	0	0	0	539	551	0	551
12: 00	769	0	0	0	0	0	635	702	0	702
13: 00	736	0	0	0	0	0	704	720	0	720
14: 00	556	0	0	0	0	0	682	619	0	619
15: 00	708	0	0	0	0	0	858	783	0	783
16: 00	595	0	0	0	0	0	792	694	0	694
17: 00	612	0	0	0	0	0	830	721	0	721
18: 00	615	0	0	0	0	0	973	794	0	794
19: 00	516	0	0	0	0	0	710	613	0	613
20: 00	388	0	0	0	0	0	661	525	0	525
21: 00	430	0	0	0	0	0	685	558	0	558
22: 00	298	0	0	0	0	0	507	403	0	403
23: 00	179	0	0	0	0	0	441	310	0	310
Total:	9,625	0	0	0	0	0	12,372	10,999	0	10,999

AMPeak Period HR.:	**8:00**	**8:00**
6AM to 12PM CT.:	**403**	**545**
PMPeak Period HR.	**15:00**	**18:00**

PEAK HOUR TURNING MOVEMENT COUNT

INTERSECTION: WEST NURSERY ROAD @ MD 295 SB RAMPS **COUNTY:** ANNE ARUNDEL

COUNT BY: S. TAYLOR / P. PIRMANN **DATE:** OCTOBER 8, 2014

WEATHER: CLEAR **DAY:** WEDNESDAY

	W NURSERY ROAD NORTHBOUND			**W NURSERY ROAD** SOUTHBOUND			EASTBOUND			**MD 295 SB OFF RAMP** WESTBOUND			
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	TOTAL
PM													
4:00-4:15	189	75			70	60				66	1	19	480
4:15-4:30	177	69			74	43				88	1	24	476
4:30-4:45	172	92			108	77				91	0	22	562
4:45-5:00	149	87			98	62				96	0	13	505
5:00-5:15	152	110			125	99				92	0	18	596
5:15-5:30	192	92			91	74				88	0	23	560
5:30-5:45	156	96			97	68				93	0	25	535
5:45-6:00	120	100			104	63				87	0	25	499
PEAK HR 4:30-5:30 TOTALS	**665**	**381**			**422**	**312**				**367**	**0**	**76**	**PHF 0.93**

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HANOVER, MARYLAND 21076
410-760-2911 FAX 410-760-2915
E-MAIL TRAFFIC@TRAFFIC-CONCEPTS.COM

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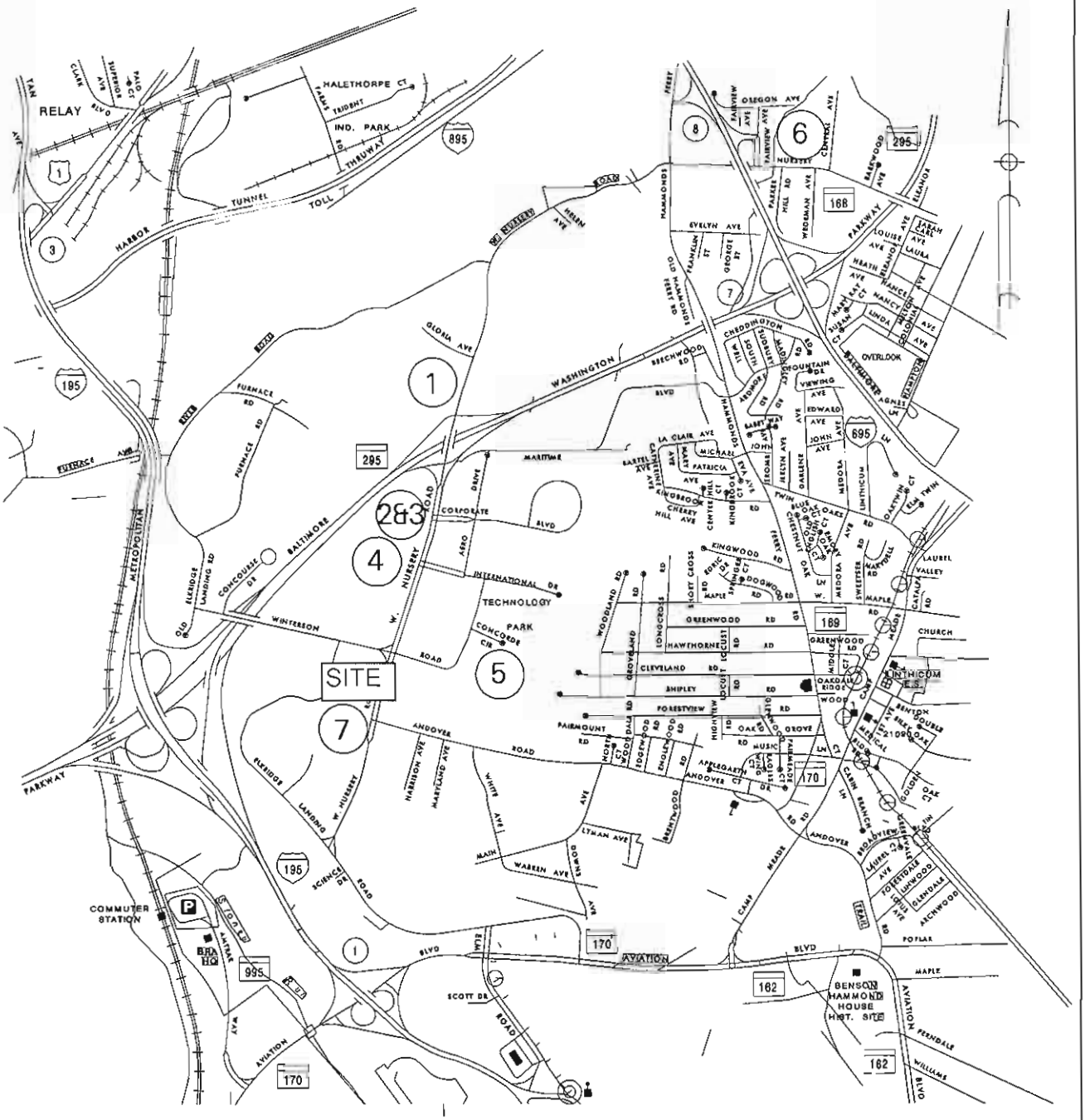


1. BWI Tech Park II
2. BWI Tech Park III
3. Cracker Barrel
4. West Quest Technology
5. Concorde Circle Project
6. SMO - Nursery Road
7. Jimmy John's

TRAFFIC CONCEPTS, INC.
7525 Connelley Drive
Suite B
Hanover, Maryland 21076
410-760-2911

EXHIBIT 4

Background Development Locations

BACKGROUND DEVELOPMENTS

	PM IN	PM OUT	ADT
1. BWI Technology Park II			
NOTE: Rates taken directly from approved TIS for this project.			
ITE Land Use Code 770			
Business Park			
Per ksf	0.33	1.10	14.56
196,200 gsf	65	216	2857
ITE Land Use Code 710			
General Office			
Per ksf	0.25	1.24	11.01
61,200 gsf	15	76	674
Total Office Trips:	**80**	**292**	**3531**
ITE Land Use Code 814			
Specialty Retail			
Per ksf *	2.81*	2.21*	44.32
13,325 gsf	37	29	591
ITE Land Use Code 853			
Convenience Market			
Per ksf	29.85	29.85	845.60
5,940 gsf	177	177	5023
66%(PM)Passby	-117	-117	- 3315
18%(PM)Diverted	- 32	- 32	- 904
Net New Trips	28	28	804
Total New Trips			
Retail & Convenience Market	**65**	**57**	**1395**

* In order to create a worst-case scenario, we have used PM peak hour of the generator rates.

BACKGROUND DEVELOPMENTS (Continued)

		PM IN	PM OUT	ADT
2.	BWI Technology Park III			
	NOTE: Rates taken directly from approved TIS for this project.			
	ITE Land Use Code 710			
	General Office			
	Per ksf	0.30	1.47	12.77
	120,848 gsf	36	178	1543
	ITE Land Use Code 912			
	Drive-In Bank			
	Per ksf	22.87	22.87	246.49
	1,500 gsf	34	34	370
	less 25% passby	- 8	- 8	- 92
	Net New Trips	26	26	278
	ITE Land Use Code 715			
	Single-Tenant Office			
	Per ksf	0.26	1.47	11.57
	4,500 gsf	1	7	52
3.	Cracker Barrel Restaurant			
	At BWI Technology Park III	**BUILT OUT**		
4.	West Quest Technology, Lot 1			
	ITE Land Use Code 826			
	Specialty Retail			
	Per ksf *	2.81*	2.21*	44.32
	3,200 gsf	9	7	142
	ITE Land Use Code 934			
	Fast Food with Drive-Thru			
	Per ksf	16.98	15.67	496.12
	1,600 gsf	27	25	794
	Less Passby	- 14	- 13	- 397
	Net New Trips	13	12	397

* In order to create a worst-case scenario, we have used PM peak hour of the generator rates.

BACKGROUND DEVELOPMENTS (Continued)

		PM IN	PM OUT	ADT
5.	Concorde Circle Project			
	ITE Land Use Code 220			
	Apartments			
	Per unit	0.39	0.21	6.46
	310 units	**122**	**66**	**2002**
6.	SMO, Inc. – Nursery Road	DOES NOT AFFECT KEY INTERSECTIONS		
	ITE Land Use Code 853			
	Per ksf	25.46	25.46	845.60
	2,580 gsf	66	65	2182
	Less passby per ITE	- 44	- 43	- 1440
	New Trips	22	22	742
7.	Jimmy John's			
	ITE Land Use Code 934			
	Per ksf	16.98	15.67	496.12
	2,095 gsf	36	32	1039
	Less passby Trips per ITE	- 18	- 16	- 519
	Net New Trips	**18**	**16**	**520**

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1359	0	319	257	436	0	0	318	209
Future Volume (vph)	0	0	0	1359	0	319	257	436	0	0	318	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	5.0			5.0	5.0
Lane Util. Factor				0.95	0.95	1.00	1.00	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1649	1649	1553	1736	1827			3471	1553
Flt Permitted				0.95	0.95	1.00	0.31	1.00			1.00	1.00
Satd. Flow (perm)				1649	1649	1553	557	1827			3471	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1477	0	347	279	474	0	0	346	227
RTOR Reduction (vph)	0	0	0	0	0	82	0	0	0	0	0	188
Lane Group Flow (vph)	0	0	0	738	739	265	279	474	0	0	346	39
Turn Type				Split	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8	2					6
Actuated Green, G (s)				67.0	67.0	67.0	42.0	42.0			20.5	20.5
Effective Green, g (s)				67.0	67.0	67.0	42.0	42.0			20.5	20.5
Actuated g/C Ratio				0.56	0.56	0.56	0.35	0.35			0.17	0.17
Clearance Time (s)				6.0	6.0	6.0	5.0	5.0			5.0	5.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	5.0			5.0	5.0
Lane Grp Cap (vph)				920	920	867	357	639			592	265
v/s Ratio Prot				0.45	c0.45		0.11	c0.26			0.10	
v/s Ratio Perm						0.17	c0.17					0.02
v/c Ratio				0.80	0.80	0.31	0.78	0.74			0.58	0.15
Uniform Delay, d1				21.2	21.2	14.1	30.9	34.2			45.8	42.3
Progression Factor				1.00	1.00	1.00	0.69	0.48			1.00	1.00
Incremental Delay, d2				7.3	7.4	0.9	10.6	7.5			2.3	0.5
Delay (s)				28.5	28.6	15.0	31.8	23.9			48.1	42.8
Level of Service				C	C	B	C	C			D	D
Approach Delay (s)		0.0			26.0			26.8			46.0	
Approach LOS		A			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	29.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	186	2	918	0	0	0	0	432	371	46	1589	0
Future Volume (vph)	186	2	918	0	0	0	0	432	371	46	1589	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0					5.0	5.0		5.0	
Lane Util. Factor		1.00	0.76					0.95	1.00		0.95	
Frt		1.00	0.85					1.00	0.85		1.00	
Flt Protected		0.95	1.00					1.00	1.00		1.00	
Satd. Flow (prot)		1741	3541					3471	1553		3466	
Flt Permitted		0.95	1.00					1.00	1.00		0.92	
Satd. Flow (perm)		1741	3541					3471	1553		3196	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	2	998	0	0	0	0	470	403	50	1727	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	155	0	0	0
Lane Group Flow (vph)	0	204	998	0	0	0	0	470	248	0	1777	0
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)		36.3	36.3					73.7	73.7		73.7	
Effective Green, g (s)		36.3	36.3					73.7	73.7		73.7	
Actuated g/C Ratio		0.30	0.30					0.61	0.61		0.61	
Clearance Time (s)		5.0	5.0					5.0	5.0		5.0	
Vehicle Extension (s)		3.0	3.0					5.0	5.0		5.0	
Lane Grp Cap (vph)		526	1071					2131	953		1962	
v/s Ratio Prot								0.14				
v/s Ratio Perm		0.12	c0.28						0.16		c0.56	
v/c Ratio		0.39	0.93					0.22	0.26		0.91	
Uniform Delay, d1		33.1	40.6					10.3	10.6		20.1	
Progression Factor		1.00	1.00					0.17	3.23		0.31	
Incremental Delay, d2		0.5	14.0					0.1	0.3		4.2	
Delay (s)		33.5	54.7					1.9	34.7		10.5	
Level of Service		C	D					A	C		B	
Approach Delay (s)		51.1			0.0			17.0			10.5	
Approach LOS		D			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	91.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	3	14	0	0	134	52	660	67	484	1978	183
Future Volume (vph)	41	3	14	0	0	134	52	660	67	484	1978	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0			4.0	4.0	4.0		5.0	5.0	5.0
Lane Util. Factor		1.00	1.00			1.00	1.00	0.91		0.97	0.91	1.00
Frt		1.00	0.85			0.86	1.00	0.99		1.00	1.00	0.85
Flt Protected		0.96	1.00			1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1745	1553			1580	1736	4918		3367	4988	1553
Flt Permitted		0.96	1.00			1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1745	1553			1580	1736	4918		3367	4988	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	3	15	0	0	146	57	717	73	526	2150	199
RTOR Reduction (vph)	0	0	14	0	0	135	0	16	0	0	0	49
Lane Group Flow (vph)	0	48	1	0	0	11	57	774	0	526	2150	150
Turn Type	Perm	NA	Perm			Perm	Prot	NA		Prot	NA	Perm
Protected Phases		4					5	2		1	6	
Permitted Phases	4		4			8						6
Actuated Green, G (s)		8.8	8.8			8.8	8.0	22.9		75.3	90.2	90.2
Effective Green, g (s)		8.8	8.8			8.8	8.0	22.9		75.3	90.2	90.2
Actuated g/C Ratio		0.07	0.07			0.07	0.07	0.19		0.63	0.75	0.75
Clearance Time (s)		4.0	4.0			4.0	4.0	4.0		5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		127	113			115	115	938		2112	3749	1167
v/s Ratio Prot							0.03	c0.16		0.16	c0.43	
v/s Ratio Perm		0.03	0.00			0.01						0.10
v/c Ratio		0.38	0.01			0.09	0.50	0.82		0.25	0.57	0.13
Uniform Delay, d1		53.0	51.6			51.9	54.1	46.6		9.9	6.5	4.1
Progression Factor		1.00	1.00			1.00	1.04	0.58		1.17	0.73	0.56
Incremental Delay, d2		1.9	0.0			0.4	3.2	5.8		0.2	0.3	0.1
Delay (s)		54.9	51.6			52.2	59.3	33.0		11.7	5.1	2.4
Level of Service		D	D			D	E	C		B	A	A
Approach Delay (s)		54.1			52.2			34.8			6.1	
Approach LOS		D			D			C			A	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	0	8	44	4	152	78	615	71	168	1497	336
Future Volume (vph)	17	0	8	44	4	152	78	615	71	168	1497	336
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	10	12	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.91		0.97	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected	0.95	0.95	1.00	0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1649	1649	1553	1649	1665	1553	1736	4910		3367	4850	
Flt Permitted	0.95	0.95	1.00	0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1649	1649	1553	1649	1665	1553	1736	4910		3367	4850	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	18	0	9	48	4	165	85	668	77	183	1627	365
RTOR Reduction (vph)	0	0	9	0	0	152	0	15	0	0	24	0
Lane Group Flow (vph)	9	9	0	26	26	13	85	730	0	183	1968	0
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	3.4	3.4	3.4	9.2	9.2	9.2	9.0	49.5		37.9	78.4	
Effective Green, g (s)	3.4	3.4	3.4	9.2	9.2	9.2	9.0	49.5		37.9	78.4	
Actuated g/C Ratio	0.03	0.03	0.03	0.08	0.08	0.08	0.08	0.41		0.32	0.65	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	46	46	44	126	127	119	130	2025		1063	3168	
v/s Ratio Prot	c0.01	0.01		c0.02	0.02		c0.05	0.15		0.05	c0.41	
v/s Ratio Perm			0.00			0.01						
v/c Ratio	0.20	0.20	0.01	0.21	0.20	0.11	0.65	0.36		0.17	0.62	
Uniform Delay, d1	57.0	57.0	56.7	52.0	52.0	51.6	54.0	24.3		29.7	12.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.82	1.30		0.86	0.58	
Incremental Delay, d2	2.8	2.8	0.1	1.1	1.1	0.5	10.7	0.2		0.3	0.8	
Delay (s)	59.8	59.8	56.7	53.1	53.1	52.1	55.1	31.9		26.0	7.8	
Level of Service	E	E	E	D	D	D	E	C		C	A	
Approach Delay (s)		58.8			52.3			34.2			9.4	
Approach LOS		E			D			C			A	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	61.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	14	73	69	41	57	158	545	81	118	782	649
Future Volume (vph)	180	14	73	69	41	57	158	545	81	118	782	649
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.87		1.00	0.91		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3367	1597		1736	1668		1736	4891		1736	3471	1553
Flt Permitted	0.95	1.00		0.95	1.00		0.33	1.00		0.24	1.00	1.00
Satd. Flow (perm)	3367	1597		1736	1668		608	4891		440	3471	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	15	79	75	45	62	172	592	88	128	850	705
RTOR Reduction (vph)	0	71	0	0	42	0	0	23	0	0	0	340
Lane Group Flow (vph)	196	23	0	75	65	0	172	657	0	128	850	365
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	12.6	12.6		11.4	11.4		42.0	32.2		78.0	62.2	62.2
Effective Green, g (s)	12.6	12.6		11.4	11.4		42.0	32.2		78.0	62.2	62.2
Actuated g/C Ratio	0.10	0.10		0.10	0.10		0.35	0.27		0.65	0.52	0.52
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	353	167		164	158		304	1312		715	1799	804
v/s Ratio Prot	c0.06	0.01		c0.04	0.04		c0.05	0.13		0.06	c0.24	
v/s Ratio Perm							c0.15			0.06		0.24
v/c Ratio	0.56	0.14		0.46	0.41		0.57	0.50		0.18	0.47	0.45
Uniform Delay, d1	51.0	48.8		51.4	51.2		28.1	37.1		8.9	18.4	18.2
Progression Factor	1.00	1.00		1.00	1.00		0.80	0.44		0.58	0.52	2.08
Incremental Delay, d2	1.9	0.4		2.0	1.8		2.3	0.6		0.4	0.7	1.5
Delay (s)	52.9	49.2		53.4	52.9		24.7	17.1		5.6	10.3	39.4
Level of Service	D	D		D	D		C	B		A	B	D
Approach Delay (s)		51.7			53.1			18.6			22.1	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	25.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	88	247	516	28	59	851
Future Volume (vph)	88	247	516	28	59	851
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1736	1553	3445		1736	3471
Flt Permitted	0.95	1.00	1.00		0.22	1.00
Satd. Flow (perm)	1736	1553	3445		401	3471
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	268	561	30	64	925
RTOR Reduction (vph)	0	238	5	0	0	0
Lane Group Flow (vph)	96	30	586	0	64	925
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Actuated Green, G (s)	13.3	13.3	25.3		96.7	96.7
Effective Green, g (s)	13.3	13.3	25.3		96.7	96.7
Actuated g/C Ratio	0.11	0.11	0.21		0.81	0.81
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	4.0	4.0	5.0		4.0	5.0
Lane Grp Cap (vph)	192	172	726		1061	2797
v/s Ratio Prot	c0.06		c0.17		0.03	c0.27
v/s Ratio Perm		0.02			0.02	
v/c Ratio	0.50	0.17	0.81		0.06	0.33
Uniform Delay, d1	50.2	48.4	45.0		6.6	3.1
Progression Factor	1.00	1.00	1.00		0.32	0.32
Incremental Delay, d2	2.8	0.7	7.5		0.1	0.3
Delay (s)	53.0	49.0	52.5		2.2	1.3
Level of Service	D	D	D		A	A
Approach Delay (s)	50.1		52.5			1.3
Approach LOS	D		D			A

Intersection Summary			
HCM 2000 Control Delay	26.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	40.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	75	116	443	383	441	248
Future Volume (vph)	75	116	443	383	441	248
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0	5.0
Lane Util. Factor		0.95	0.95	1.00	0.97	1.00
Frt		1.00	1.00	0.85	1.00	0.85
Flt Protected		0.98	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3404	3471	1553	3367	1553
Flt Permitted		0.73	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2533	3471	1553	3367	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	126	482	416	479	270
RTOR Reduction (vph)	0	0	0	220	0	190
Lane Group Flow (vph)	0	208	482	196	479	80
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)		17.4	17.4	17.4	9.6	9.6
Effective Green, g (s)		17.4	17.4	17.4	9.6	9.6
Actuated g/C Ratio		0.47	0.47	0.47	0.26	0.26
Clearance Time (s)		5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		5.0	5.0	5.0	3.0	3.0
Lane Grp Cap (vph)		1191	1632	730	873	402
v/s Ratio Prot			c0.14		c0.14	
v/s Ratio Perm		0.08		0.13		0.05
v/c Ratio		0.17	0.30	0.27	0.55	0.20
Uniform Delay, d1		5.7	6.0	5.9	11.8	10.7
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	0.2	0.4	0.7	0.2
Delay (s)		5.8	6.2	6.4	12.5	10.9
Level of Service		A	A	A	B	B
Approach Delay (s)		5.8	6.3		12.0	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	37.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	430	0	101	754	471	0	0	536	384
Future Volume (vph)	0	0	0	430	0	101	754	471	0	0	536	384
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	5.0			5.0	5.0
Lane Util. Factor				0.95	0.95	1.00	1.00	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1649	1649	1553	1736	1827			3471	1553
Flt Permitted				0.95	0.95	1.00	0.20	1.00			1.00	1.00
Satd. Flow (perm)				1649	1649	1553	371	1827			3471	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	467	0	110	820	512	0	0	583	417
RTOR Reduction (vph)	0	0	0	0	0	92	0	0	0	0	0	321
Lane Group Flow (vph)	0	0	0	233	234	18	820	512	0	0	583	96
Turn Type				Split	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8	2					6
Actuated Green, G (s)				19.7	19.7	19.7	89.3	89.3			23.1	23.1
Effective Green, g (s)				19.7	19.7	19.7	89.3	89.3			23.1	23.1
Actuated g/C Ratio				0.16	0.16	0.16	0.74	0.74			0.19	0.19
Clearance Time (s)				6.0	6.0	6.0	5.0	5.0			5.0	5.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	5.0			5.0	5.0
Lane Grp Cap (vph)				270	270	254	972	1359			668	298
v/s Ratio Prot				0.14	c0.14		c0.43	0.28			0.17	
v/s Ratio Perm						0.01	c0.20					0.06
v/c Ratio				0.86	0.87	0.07	0.84	0.38			0.87	0.32
Uniform Delay, d1				48.8	48.9	42.4	19.2	5.5			47.0	41.7
Progression Factor				1.00	1.00	1.00	0.73	0.60			1.00	1.00
Incremental Delay, d2				23.6	24.0	0.1	7.9	0.6			13.0	1.3
Delay (s)				72.4	72.9	42.5	21.9	3.9			60.0	43.0
Level of Service				E	E	D	C	A			E	D
Approach Delay (s)		0.0			66.9			15.0			53.0	
Approach LOS		A			E			B			D	

Intersection Summary			
HCM 2000 Control Delay	38.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	111.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	2	326	0	0	0	0	1063	1154	325	632	0
Future Volume (vph)	161	2	326	0	0	0	0	1063	1154	325	632	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0					5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00	0.76					0.95	1.00	1.00	1.00	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1741	3541					3471	1553	1736	1827	
Flt Permitted		0.95	1.00					1.00	1.00	0.18	1.00	
Satd. Flow (perm)		1741	3541					3471	1553	337	1827	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	175	2	354	0	0	0	0	1155	1254	353	687	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	210	0	0	0
Lane Group Flow (vph)	0	177	354	0	0	0	0	1155	1044	353	687	0
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)		13.0	13.0					79.0	79.0	97.0	97.0	
Effective Green, g (s)		13.0	13.0					79.0	79.0	97.0	97.0	
Actuated g/C Ratio		0.11	0.11					0.66	0.66	0.81	0.81	
Clearance Time (s)		5.0	5.0					5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0	3.0					5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)		188	383					2285	1022	423	1476	
v/s Ratio Prot								0.33		c0.09	0.38	
v/s Ratio Perm		0.10	0.10						c0.67	0.58		
v/c Ratio		0.94	0.92					0.51	1.02	0.83	0.47	
Uniform Delay, d1		53.1	53.0					10.5	20.5	12.0	3.5	
Progression Factor		1.00	1.00					1.00	1.00	2.37	6.68	
Incremental Delay, d2		48.8	27.6					0.8	33.8	8.2	0.3	
Delay (s)		101.9	80.6					11.3	54.3	36.7	23.9	
Level of Service		F	F					B	D	D	C	
Approach Delay (s)		87.7			0.0			33.7			28.2	
Approach LOS		F			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	39.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	111.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	197	0	61	0	0	414	42	1625	18	89	789	110
Future Volume (vph)	197	0	61	0	0	414	42	1625	18	89	789	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0			4.0	4.0	4.0		5.0	5.0	5.0
Lane Util. Factor		1.00	1.00			1.00	1.00	0.91		0.97	0.91	1.00
Frt		1.00	0.85			0.86	1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00			1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1736	1553			1580	1736	4979		3367	4988	1553
Flt Permitted		0.95	1.00			1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1736	1553			1580	1736	4979		3367	4988	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	214	0	66	0	0	450	46	1766	20	97	858	120
RTOR Reduction (vph)	0	0	49	0	0	108	0	1	0	0	0	67
Lane Group Flow (vph)	0	214	17	0	0	342	46	1785	0	97	858	53
Turn Type	Perm	NA	Perm			Perm	Prot	NA		Prot	NA	Perm
Protected Phases		4					5	2		1	6	
Permitted Phases	4		4			8						6
Actuated Green, G (s)		26.3	26.3			26.3	16.9	54.5		6.2	43.8	43.8
Effective Green, g (s)		26.3	26.3			26.3	16.9	54.5		6.2	43.8	43.8
Actuated g/C Ratio		0.26	0.26			0.26	0.17	0.54		0.06	0.44	0.44
Clearance Time (s)		4.0	4.0			4.0	4.0	4.0		5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		456	408			415	293	2713		208	2184	680
v/s Ratio Prot							0.03	c0.36		0.03	c0.17	
v/s Ratio Perm		0.12	0.01			c0.22						0.03
v/c Ratio		0.47	0.04			0.83	0.16	0.66		0.47	0.39	0.08
Uniform Delay, d1		31.0	27.5			34.7	35.5	16.1		45.3	19.1	16.3
Progression Factor		1.00	1.00			1.00	0.59	0.47		1.00	1.00	1.00
Incremental Delay, d2		0.8	0.0			12.6	0.2	1.0		1.7	0.1	0.0
Delay (s)		31.7	27.5			47.2	21.0	8.5		47.0	19.2	16.4
Level of Service		C	C			D	C	A		D	B	B
Approach Delay (s)		30.7			47.2			8.8			21.4	
Approach LOS		C			D			A			C	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	353	6	58	88	0	227	49	1190	32	139	756	18
Future Volume (vph)	353	6	58	88	0	227	49	1190	32	139	756	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	10	12	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.91		0.97	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1649	1656	1553	1649	1649	1553	1736	4968		3367	4970	
Flt Permitted	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1649	1656	1553	1649	1649	1553	1736	4968		3367	4970	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	384	7	63	96	0	247	53	1293	35	151	822	20
RTOR Reduction (vph)	0	0	53	0	0	134	0	2	0	0	2	0
Lane Group Flow (vph)	196	195	10	48	48	113	53	1326	0	151	840	0
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	16.6	16.6	16.6	12.9	12.9	12.9	11.6	41.2		9.3	38.9	
Effective Green, g (s)	16.6	16.6	16.6	12.9	12.9	12.9	11.6	41.2		9.3	38.9	
Actuated g/C Ratio	0.17	0.17	0.17	0.13	0.13	0.13	0.12	0.41		0.09	0.39	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	273	274	257	212	212	200	201	2046		313	1933	
v/s Ratio Prot	c0.12	0.12		0.03	0.03		0.03	c0.27		c0.04	0.17	
v/s Ratio Perm			0.01			c0.07						
v/c Ratio	0.72	0.71	0.04	0.23	0.23	0.56	0.26	0.65		0.48	0.43	
Uniform Delay, d1	39.5	39.4	35.0	39.1	39.1	40.9	40.3	23.6		43.1	22.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.76	0.96		0.81	0.24	
Incremental Delay, d2	9.3	9.0	0.1	0.7	0.7	4.4	0.6	1.4		1.1	0.3	
Delay (s)	48.8	48.4	35.1	39.8	39.8	45.3	31.2	23.9		35.8	5.6	
Level of Service	D	D	D	D	D	D	C	C		D	A	
Approach Delay (s)		46.7			43.8			24.2			10.2	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	25.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	550	34	94	116	21	125	64	515	59	99	598	148
Future Volume (vph)	550	34	94	116	21	125	64	515	59	99	598	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.89		1.00	0.87		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3367	1626		1736	1593		1736	4911		1736	3471	1553
Flt Permitted	0.95	1.00		0.95	1.00		0.19	1.00		0.40	1.00	1.00
Satd. Flow (perm)	3367	1626		1736	1593		341	4911		739	3471	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	598	37	102	126	23	136	70	560	64	108	650	161
RTOR Reduction (vph)	0	79	0	0	119	0	0	14	0	0	0	105
Lane Group Flow (vph)	598	60	0	126	40	0	70	610	0	108	650	56
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	22.5	22.5		12.3	12.3		28.0	28.0		34.6	34.6	34.6
Effective Green, g (s)	22.5	22.5		12.3	12.3		28.0	28.0		34.6	34.6	34.6
Actuated g/C Ratio	0.22	0.22		0.12	0.12		0.28	0.28		0.35	0.35	0.35
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	757	365		213	195		187	1375		387	1200	537
v/s Ratio Prot	c0.18	0.04		c0.07	0.02		0.02	c0.12		0.04	c0.19	
v/s Ratio Perm							0.08			0.06		0.04
v/c Ratio	0.79	0.16		0.59	0.20		0.37	0.44		0.28	0.54	0.10
Uniform Delay, d1	36.5	31.2		41.5	39.4		28.3	29.6		25.0	26.3	22.2
Progression Factor	1.00	1.00		1.00	1.00		0.77	0.78		0.22	0.26	0.08
Incremental Delay, d2	5.5	0.2		4.4	0.5		1.2	1.0		0.4	0.8	0.2
Delay (s)	42.0	31.4		45.8	40.0		22.9	24.1		6.0	7.6	2.0
Level of Service	D	C		D	D		C	C		A	A	A
Approach Delay (s)		40.0			42.6			24.0			6.4	
Approach LOS		D			D			C			A	

Intersection Summary			
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	41	131	546	88	298	564
Future Volume (vph)	41	131	546	88	298	564
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1736	1553	3399		1736	3471
Flt Permitted	0.95	1.00	1.00		0.33	1.00
Satd. Flow (perm)	1736	1553	3399		612	3471
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	142	593	96	324	613
RTOR Reduction (vph)	0	129	8	0	0	0
Lane Group Flow (vph)	45	13	681	0	324	613
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Actuated Green, G (s)	9.3	9.3	62.4		80.7	80.7
Effective Green, g (s)	9.3	9.3	62.4		80.7	80.7
Actuated g/C Ratio	0.09	0.09	0.62		0.81	0.81
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	4.0	4.0	5.0		4.0	5.0
Lane Grp Cap (vph)	161	144	2120		643	2801
v/s Ratio Prot	c0.03		0.20		c0.07	0.18
v/s Ratio Perm		0.01			c0.34	
v/c Ratio	0.28	0.09	0.32		0.50	0.22
Uniform Delay, d1	42.2	41.5	8.8		3.1	2.3
Progression Factor	1.00	1.00	1.00		1.02	0.85
Incremental Delay, d2	1.3	0.4	0.4		0.8	0.1
Delay (s)	43.5	41.9	9.2		3.9	2.0
Level of Service	D	D	A		A	A
Approach Delay (s)	42.3		9.2			2.7
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay	9.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	139	476	88	297	468	47
Future Volume (vph)	139	476	88	297	468	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0	5.0
Lane Util. Factor		0.95	0.95	1.00	0.97	1.00
Frt		1.00	1.00	0.85	1.00	0.85
Flt Protected		0.99	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3432	3471	1553	3367	1553
Flt Permitted		0.86	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2969	3471	1553	3367	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	151	517	96	323	509	51
RTOR Reduction (vph)	0	0	0	169	0	38
Lane Group Flow (vph)	0	668	96	154	509	13
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)		17.8	17.8	17.8	9.5	9.5
Effective Green, g (s)		17.8	17.8	17.8	9.5	9.5
Actuated g/C Ratio		0.48	0.48	0.48	0.25	0.25
Clearance Time (s)		5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		5.0	5.0	5.0	3.0	3.0
Lane Grp Cap (vph)		1416	1656	741	857	395
v/s Ratio Prot			0.03		c0.15	
v/s Ratio Perm		c0.23		0.10		0.01
v/c Ratio		0.47	0.06	0.21	0.59	0.03
Uniform Delay, d1		6.6	5.2	5.7	12.2	10.4
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.5	0.0	0.3	1.1	0.0
Delay (s)		7.1	5.3	6.0	13.3	10.5
Level of Service		A	A	A	B	B
Approach Delay (s)		7.1	5.8		13.1	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	37.3	Sum of lost time (s)	10.0
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1370	0	319	268	457	0	0	338	209
Future Volume (vph)	0	0	0	1370	0	319	268	457	0	0	338	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	5.0			5.0	5.0
Lane Util. Factor				0.95	0.95	1.00	1.00	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1649	1649	1553	1736	1827			3471	1553
Flt Permitted				0.95	0.95	1.00	0.29	1.00			1.00	1.00
Satd. Flow (perm)				1649	1649	1553	528	1827			3471	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1489	0	347	291	497	0	0	367	227
RTOR Reduction (vph)	0	0	0	0	0	84	0	0	0	0	0	187
Lane Group Flow (vph)	0	0	0	744	745	263	291	497	0	0	367	40
Turn Type				Split	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8	2					6
Actuated Green, G (s)				65.0	65.0	65.0	44.0	44.0			21.0	21.0
Effective Green, g (s)				65.0	65.0	65.0	44.0	44.0			21.0	21.0
Actuated g/C Ratio				0.54	0.54	0.54	0.37	0.37			0.18	0.18
Clearance Time (s)				6.0	6.0	6.0	5.0	5.0			5.0	5.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	5.0			5.0	5.0
Lane Grp Cap (vph)				893	893	841	374	669			607	271
v/s Ratio Prot				0.45	c0.45		0.12	c0.27			0.11	
v/s Ratio Perm						0.17	c0.17					0.03
v/c Ratio				0.83	0.83	0.31	0.78	0.74			0.60	0.15
Uniform Delay, d1				23.0	23.0	15.2	29.8	33.1			45.7	41.9
Progression Factor				1.00	1.00	1.00	0.68	0.47			1.00	1.00
Incremental Delay, d2				9.0	9.0	1.0	9.7	7.2			2.5	0.5
Delay (s)				32.0	32.0	16.1	29.8	22.7			48.2	42.4
Level of Service				C	C	B	C	C			D	D
Approach Delay (s)		0.0			29.0			25.3			46.0	
Approach LOS		A			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	186	2	929	0	0	0	0	464	382	46	1620	0
Future Volume (vph)	186	2	929	0	0	0	0	464	382	46	1620	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0					5.0	5.0		5.0	
Lane Util. Factor		1.00	0.76					0.95	1.00		0.95	
Frt		1.00	0.85					1.00	0.85		1.00	
Flt Protected		0.95	1.00					1.00	1.00		1.00	
Satd. Flow (prot)		1741	3541					3471	1553		3466	
Flt Permitted		0.95	1.00					1.00	1.00		0.92	
Satd. Flow (perm)		1741	3541					3471	1553		3190	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	2	1010	0	0	0	0	504	415	50	1761	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	158	0	0	0
Lane Group Flow (vph)	0	204	1010	0	0	0	0	504	257	0	1811	0
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)		35.8	35.8					74.2	74.2		74.2	
Effective Green, g (s)		35.8	35.8					74.2	74.2		74.2	
Actuated g/C Ratio		0.30	0.30					0.62	0.62		0.62	
Clearance Time (s)		5.0	5.0					5.0	5.0		5.0	
Vehicle Extension (s)		3.0	3.0					5.0	5.0		5.0	
Lane Grp Cap (vph)		519	1056					2146	960		1972	
v/s Ratio Prot								0.15				
v/s Ratio Perm		0.12	c0.29						0.17		c0.57	
v/c Ratio		0.39	0.96					0.23	0.27		0.92	
Uniform Delay, d1		33.5	41.3					10.2	10.5		20.2	
Progression Factor		1.00	1.00					0.16	3.82		0.25	
Incremental Delay, d2		0.5	18.0					0.1	0.3		4.6	
Delay (s)		34.0	59.3					1.7	40.3		9.6	
Level of Service		C	E					A	D		A	
Approach Delay (s)		55.0			0.0			19.1			9.6	
Approach LOS		E			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	92.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	3	14	0	0	134	52	703	67	484	2020	183
Future Volume (vph)	41	3	14	0	0	134	52	703	67	484	2020	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0			4.0	4.0	4.0		5.0	5.0	5.0
Lane Util. Factor		1.00	1.00			1.00	1.00	0.91		0.97	0.91	1.00
Frt		1.00	0.85			0.86	1.00	0.99		1.00	1.00	0.85
Flt Protected		0.96	1.00			1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1745	1553			1580	1736	4922		3367	4988	1553
Flt Permitted		0.96	1.00			1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1745	1553			1580	1736	4922		3367	4988	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	3	15	0	0	146	57	764	73	526	2196	199
RTOR Reduction (vph)	0	0	14	0	0	136	0	15	0	0	0	49
Lane Group Flow (vph)	0	48	1	0	0	10	57	822	0	526	2196	150
Turn Type	Perm	NA	Perm			Perm	Prot	NA		Prot	NA	Perm
Protected Phases		4					5	2		1	6	
Permitted Phases	4		4			8						6
Actuated Green, G (s)		8.6	8.6			8.6	8.0	24.4		74.0	90.4	90.4
Effective Green, g (s)		8.6	8.6			8.6	8.0	24.4		74.0	90.4	90.4
Actuated g/C Ratio		0.07	0.07			0.07	0.07	0.20		0.62	0.75	0.75
Clearance Time (s)		4.0	4.0			4.0	4.0	4.0		5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		125	111			113	115	1000		2076	3757	1169
v/s Ratio Prot							0.03	c0.17		0.16	c0.44	
v/s Ratio Perm		0.03	0.00			0.01						0.10
v/c Ratio		0.38	0.01			0.09	0.50	0.82		0.25	0.58	0.13
Uniform Delay, d1		53.2	51.7			52.1	54.1	45.7		10.4	6.5	4.0
Progression Factor		1.00	1.00			1.00	0.88	0.60		1.22	0.71	0.56
Incremental Delay, d2		2.0	0.0			0.4	3.2	5.3		0.2	0.3	0.1
Delay (s)		55.1	51.8			52.4	50.6	32.8		12.9	5.0	2.4
Level of Service		E	D			D	D	C		B	A	A
Approach Delay (s)		54.3			52.4			33.9			6.2	
Approach LOS		D			D			C			A	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	0	8	44	4	152	78	658	71	168	1539	336
Future Volume (vph)	17	0	8	44	4	152	78	658	71	168	1539	336
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	10	12	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.91		0.97	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	0.95	1.00	0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1649	1649	1553	1649	1665	1553	1736	4915		3367	4854	
Flt Permitted	0.95	0.95	1.00	0.95	0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1649	1649	1553	1649	1665	1553	1736	4915		3367	4854	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	18	0	9	48	4	165	85	715	77	183	1673	365
RTOR Reduction (vph)	0	0	9	0	0	152	0	13	0	0	23	0
Lane Group Flow (vph)	9	9	0	26	26	13	85	779	0	183	2015	0
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	3.4	3.4	3.4	9.2	9.2	9.2	9.0	50.1		37.3	78.4	
Effective Green, g (s)	3.4	3.4	3.4	9.2	9.2	9.2	9.0	50.1		37.3	78.4	
Actuated g/C Ratio	0.03	0.03	0.03	0.08	0.08	0.08	0.08	0.42		0.31	0.65	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	46	46	44	126	127	119	130	2052		1046	3171	
v/s Ratio Prot	c0.01	0.01		c0.02	0.02		c0.05	0.16		0.05	c0.42	
v/s Ratio Perm			0.00			0.01						
v/c Ratio	0.20	0.20	0.01	0.21	0.20	0.11	0.65	0.38		0.17	0.64	
Uniform Delay, d1	57.0	57.0	56.7	52.0	52.0	51.6	54.0	24.2		30.1	12.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.84	1.31		0.88	0.54	
Incremental Delay, d2	2.8	2.8	0.1	1.1	1.1	0.5	10.6	0.2		0.3	0.8	
Delay (s)	59.8	59.8	56.7	53.1	53.1	52.1	55.9	32.0		26.7	7.4	
Level of Service	E	E	E	D	D	D	E	C		C	A	
Approach Delay (s)		58.8			52.3			34.3			9.0	
Approach LOS		E			D			C			A	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	14	79	80	41	57	164	588	91	118	824	649
Future Volume (vph)	180	14	79	80	41	57	164	588	91	118	824	649
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.87		1.00	0.91		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3367	1594		1736	1668		1736	4887		1736	3471	1553
Flt Permitted	0.95	1.00		0.95	1.00		0.32	1.00		0.24	1.00	1.00
Satd. Flow (perm)	3367	1594		1736	1668		581	4887		431	3471	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	15	86	87	45	62	178	639	99	128	896	705
RTOR Reduction (vph)	0	77	0	0	42	0	0	24	0	0	0	339
Lane Group Flow (vph)	196	24	0	87	65	0	178	714	0	128	896	366
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	12.1	12.1		11.5	11.5		46.8	36.7		78.4	62.3	62.3
Effective Green, g (s)	12.1	12.1		11.5	11.5		46.8	36.7		78.4	62.3	62.3
Actuated g/C Ratio	0.10	0.10		0.10	0.10		0.39	0.31		0.65	0.52	0.52
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	339	160		166	159		323	1494		669	1802	806
v/s Ratio Prot	c0.06	0.01		c0.05	0.04		c0.05	0.15		0.06	c0.26	
v/s Ratio Perm							c0.17			0.07		0.24
v/c Ratio	0.58	0.15		0.52	0.41		0.55	0.48		0.19	0.50	0.45
Uniform Delay, d1	51.5	49.2		51.6	51.1		24.9	33.9		8.9	18.7	18.2
Progression Factor	1.00	1.00		1.00	1.00		0.76	0.48		0.61	0.50	1.89
Incremental Delay, d2	2.4	0.4		3.0	1.7		1.9	0.5		0.5	0.8	1.5
Delay (s)	53.9	49.7		54.6	52.8		20.9	16.6		6.0	10.2	35.8
Level of Service	D	D		D	D		C	B		A	B	D
Approach Delay (s)		52.5			53.6			17.4			20.3	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	88	268	532	28	110	867
Future Volume (vph)	88	268	532	28	110	867
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1736	1553	3445		1736	3471
Flt Permitted	0.95	1.00	1.00		0.21	1.00
Satd. Flow (perm)	1736	1553	3445		384	3471
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	291	578	30	120	942
RTOR Reduction (vph)	0	259	4	0	0	0
Lane Group Flow (vph)	96	32	604	0	120	942
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Actuated Green, G (s)	13.3	13.3	25.7		96.7	96.7
Effective Green, g (s)	13.3	13.3	25.7		96.7	96.7
Actuated g/C Ratio	0.11	0.11	0.21		0.81	0.81
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	4.0	4.0	5.0		4.0	5.0
Lane Grp Cap (vph)	192	172	737		1053	2797
v/s Ratio Prot	c0.06		c0.18		0.06	c0.27
v/s Ratio Perm		0.02			0.03	
v/c Ratio	0.50	0.19	0.82		0.11	0.34
Uniform Delay, d1	50.2	48.4	44.9		7.4	3.1
Progression Factor	1.00	1.00	1.00		0.35	0.39
Incremental Delay, d2	2.8	0.7	8.0		0.2	0.3
Delay (s)	53.0	49.2	52.9		2.8	1.5
Level of Service	D	D	D		A	A
Approach Delay (s)	50.1		52.9			1.6
Approach LOS	D		D			A

Intersection Summary			
HCM 2000 Control Delay	25.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	41.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	75	121	448	399	457	248
Future Volume (vph)	75	121	448	399	457	248
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0	5.0
Lane Util. Factor		0.95	0.95	1.00	0.97	1.00
Frt		1.00	1.00	0.85	1.00	0.85
Flt Protected		0.98	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3406	3471	1553	3367	1553
Flt Permitted		0.73	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2539	3471	1553	3367	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	132	487	434	497	270
RTOR Reduction (vph)	0	0	0	230	0	197
Lane Group Flow (vph)	0	214	487	204	497	73
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)		17.5	17.5	17.5	9.7	9.7
Effective Green, g (s)		17.5	17.5	17.5	9.7	9.7
Actuated g/C Ratio		0.47	0.47	0.47	0.26	0.26
Clearance Time (s)		5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		5.0	5.0	5.0	3.0	3.0
Lane Grp Cap (vph)		1194	1632	730	877	404
v/s Ratio Prot			c0.14		c0.15	
v/s Ratio Perm		0.08		0.13		0.05
v/c Ratio		0.18	0.30	0.28	0.57	0.18
Uniform Delay, d1		5.7	6.1	6.0	11.9	10.7
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2	0.2	0.4	0.8	0.2
Delay (s)		5.8	6.3	6.4	12.8	10.9
Level of Service		A	A	A	B	B
Approach Delay (s)		5.8	6.4		12.1	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	37.2	Sum of lost time (s)	10.0
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	438	0	101	761	485	0	0	553	384
Future Volume (vph)	0	0	0	438	0	101	761	485	0	0	553	384
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	5.0			5.0	5.0
Lane Util. Factor				0.95	0.95	1.00	1.00	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1649	1649	1553	1736	1827			3471	1553
Flt Permitted				0.95	0.95	1.00	0.19	1.00			1.00	1.00
Satd. Flow (perm)				1649	1649	1553	346	1827			3471	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	476	0	110	827	527	0	0	601	417
RTOR Reduction (vph)	0	0	0	0	0	91	0	0	0	0	0	324
Lane Group Flow (vph)	0	0	0	238	238	19	827	527	0	0	601	93
Turn Type				Split	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8	2					6
Actuated Green, G (s)				20.3	20.3	20.3	88.7	88.7			23.2	23.2
Effective Green, g (s)				20.3	20.3	20.3	88.7	88.7			23.2	23.2
Actuated g/C Ratio				0.17	0.17	0.17	0.74	0.74			0.19	0.19
Clearance Time (s)				6.0	6.0	6.0	5.0	5.0			5.0	5.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	5.0			5.0	5.0
Lane Grp Cap (vph)				278	278	262	956	1350			671	300
v/s Ratio Prot				c0.14	0.14		c0.44	0.29			0.17	
v/s Ratio Perm						0.01	c0.20					0.06
v/c Ratio				0.86	0.86	0.07	0.87	0.39			0.90	0.31
Uniform Delay, d1				48.4	48.4	41.9	20.3	5.7			47.2	41.5
Progression Factor				1.00	1.00	1.00	0.60	1.48			1.00	1.00
Incremental Delay, d2				21.9	21.9	0.1	9.2	0.6			15.4	1.2
Delay (s)				70.3	70.3	42.0	21.3	9.1			62.6	42.8
Level of Service				E	E	D	C	A			E	D
Approach Delay (s)		0.0			65.0			16.6			54.5	
Approach LOS		A			E			B			D	

Intersection Summary			
HCM 2000 Control Delay	39.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	111.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	2	334	0	0	0	0	1084	1161	325	657	0
Future Volume (vph)	161	2	334	0	0	0	0	1084	1161	325	657	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0					5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00	0.76					0.95	1.00	1.00	1.00	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1741	3541					3471	1553	1736	1827	
Flt Permitted		0.95	1.00					1.00	1.00	0.18	1.00	
Satd. Flow (perm)		1741	3541					3471	1553	330	1827	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	175	2	363	0	0	0	0	1178	1262	353	714	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	198	0	0	0
Lane Group Flow (vph)	0	177	363	0	0	0	0	1178	1064	353	714	0
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)		12.0	12.0					80.0	80.0	98.0	98.0	
Effective Green, g (s)		12.0	12.0					80.0	80.0	98.0	98.0	
Actuated g/C Ratio		0.10	0.10					0.67	0.67	0.82	0.82	
Clearance Time (s)		5.0	5.0					5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0	3.0					5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)		174	354					2314	1035	421	1492	
v/s Ratio Prot								0.34		c0.09	0.39	
v/s Ratio Perm		0.10	c0.10						c0.68	0.59		
v/c Ratio		1.02	1.03					0.51	1.03	0.84	0.48	
Uniform Delay, d1		54.0	54.0					10.1	20.0	12.8	3.3	
Progression Factor		1.00	1.00					1.00	1.00	6.17	1.71	
Incremental Delay, d2		72.8	54.5					0.8	35.3	7.8	0.3	
Delay (s)		126.8	108.5					10.9	55.3	86.5	5.9	
Level of Service		F	F					B	E	F	A	
Approach Delay (s)		114.5			0.0			33.8			32.6	
Approach LOS		F			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	44.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	111.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	197	0	61	0	0	414	42	1653	18	89	822	110
Future Volume (vph)	197	0	61	0	0	414	42	1653	18	89	822	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0			4.0	4.0	4.0		5.0	5.0	5.0
Lane Util. Factor		1.00	1.00			1.00	1.00	0.91		0.97	0.91	1.00
Frt		1.00	0.85			0.86	1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00			1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1736	1553			1580	1736	4979		3367	4988	1553
Flt Permitted		0.95	1.00			1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1736	1553			1580	1736	4979		3367	4988	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	214	0	66	0	0	450	46	1797	20	97	893	120
RTOR Reduction (vph)	0	0	49	0	0	108	0	1	0	0	0	67
Lane Group Flow (vph)	0	214	17	0	0	342	46	1816	0	97	893	53
Turn Type	Perm	NA	Perm			Perm	Prot	NA		Prot	NA	Perm
Protected Phases		4					5	2		1	6	
Permitted Phases	4		4			8						6
Actuated Green, G (s)		26.3	26.3			26.3	16.3	54.5		6.2	44.4	44.4
Effective Green, g (s)		26.3	26.3			26.3	16.3	54.5		6.2	44.4	44.4
Actuated g/C Ratio		0.26	0.26			0.26	0.16	0.54		0.06	0.44	0.44
Clearance Time (s)		4.0	4.0			4.0	4.0	4.0		5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		456	408			415	282	2713		208	2214	689
v/s Ratio Prot							0.03	c0.36		0.03	c0.18	
v/s Ratio Perm		0.12	0.01			c0.22						0.03
v/c Ratio		0.47	0.04			0.83	0.16	0.67		0.47	0.40	0.08
Uniform Delay, d1		31.0	27.5			34.7	36.0	16.3		45.3	18.8	16.0
Progression Factor		1.00	1.00			1.00	0.64	0.53		1.00	1.00	1.00
Incremental Delay, d2		0.8	0.0			12.6	0.2	1.0		1.7	0.1	0.0
Delay (s)		31.7	27.5			47.2	23.2	9.6		47.0	18.9	16.1
Level of Service		C	C			D	C	A		D	B	B
Approach Delay (s)		30.7			47.2			9.9			21.1	
Approach LOS		C			D			A			C	

Intersection Summary			
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	353	6	58	88	0	227	49	1218	32	139	789	18
Future Volume (vph)	353	6	58	88	0	227	49	1218	32	139	789	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	10	12	12	12
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.91		0.97	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1649	1656	1553	1649	1649	1553	1736	4968		3367	4970	
Flt Permitted	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1649	1656	1553	1649	1649	1553	1736	4968		3367	4970	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	384	7	63	96	0	247	53	1324	35	151	858	20
RTOR Reduction (vph)	0	0	53	0	0	127	0	2	0	0	2	0
Lane Group Flow (vph)	196	195	10	48	48	120	53	1357	0	151	876	0
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	16.3	16.3	16.3	13.0	13.0	13.0	13.0	41.6		9.1	37.7	
Effective Green, g (s)	16.3	16.3	16.3	13.0	13.0	13.0	13.0	41.6		9.1	37.7	
Actuated g/C Ratio	0.16	0.16	0.16	0.13	0.13	0.13	0.13	0.42		0.09	0.38	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	268	269	253	214	214	201	225	2066		306	1873	
v/s Ratio Prot	c0.12	0.12		0.03	0.03		c0.03	c0.27		c0.04	0.18	
v/s Ratio Perm			0.01			c0.08						
v/c Ratio	0.73	0.72	0.04	0.22	0.22	0.60	0.24	0.66		0.49	0.47	
Uniform Delay, d1	39.8	39.7	35.3	39.0	39.0	41.0	39.0	23.5		43.3	23.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.75	0.90		0.80	0.27	
Incremental Delay, d2	10.5	9.9	0.1	0.7	0.7	5.5	0.5	1.4		1.2	0.4	
Delay (s)	50.2	49.6	35.4	39.7	39.7	46.5	29.8	22.5		36.0	6.7	
Level of Service	D	D	D	D	D	D	C	C		D	A	
Approach Delay (s)		47.9			44.6			22.7			11.0	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	550	34	98	124	21	125	68	543	66	99	631	148
Future Volume (vph)	550	34	98	124	21	125	68	543	66	99	631	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.97	1.00		1.00	1.00		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.89		1.00	0.87		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3367	1623		1736	1593		1736	4906		1736	3471	1553
Flt Permitted	0.95	1.00		0.95	1.00		0.19	1.00		0.39	1.00	1.00
Satd. Flow (perm)	3367	1623		1736	1593		341	4906		710	3471	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	598	37	107	135	23	136	74	590	72	108	686	161
RTOR Reduction (vph)	0	83	0	0	118	0	0	15	0	0	0	105
Lane Group Flow (vph)	598	61	0	135	41	0	74	647	0	108	686	56
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	22.5	22.5		12.9	12.9		27.5	27.5		34.5	34.5	34.5
Effective Green, g (s)	22.5	22.5		12.9	12.9		27.5	27.5		34.5	34.5	34.5
Actuated g/C Ratio	0.22	0.22		0.13	0.13		0.28	0.28		0.34	0.34	0.34
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	757	365		223	205		178	1349		379	1197	535
v/s Ratio Prot	c0.18	0.04		c0.08	0.03		0.03	c0.13		0.04	c0.20	
v/s Ratio Perm							0.09			0.06		0.04
v/c Ratio	0.79	0.17		0.61	0.20		0.42	0.48		0.28	0.57	0.10
Uniform Delay, d1	36.5	31.2		41.1	38.9		28.9	30.3		25.3	26.7	22.2
Progression Factor	1.00	1.00		1.00	1.00		0.76	0.78		0.29	0.30	0.14
Incremental Delay, d2	5.5	0.2		4.6	0.5		1.5	1.2		0.4	1.0	0.2
Delay (s)	42.0	31.4		45.7	39.4		23.3	24.7		7.8	9.1	3.3
Level of Service	D	C		D	D		C	C		A	A	A
Approach Delay (s)		40.0			42.3			24.5			8.0	
Approach LOS		D			D			C			A	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	41	148	558	88	332	575
Future Volume (vph)	41	148	558	88	332	575
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1736	1553	3400		1736	3471
Flt Permitted	0.95	1.00	1.00		0.32	1.00
Satd. Flow (perm)	1736	1553	3400		593	3471
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	161	607	96	361	625
RTOR Reduction (vph)	0	146	8	0	0	0
Lane Group Flow (vph)	45	15	695	0	361	625
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Actuated Green, G (s)	9.4	9.4	60.6		80.6	80.6
Effective Green, g (s)	9.4	9.4	60.6		80.6	80.6
Actuated g/C Ratio	0.09	0.09	0.61		0.81	0.81
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	4.0	4.0	5.0		4.0	5.0
Lane Grp Cap (vph)	163	145	2060		649	2797
v/s Ratio Prot	c0.03		0.20		c0.08	0.18
v/s Ratio Perm		0.01			c0.36	
v/c Ratio	0.28	0.10	0.34		0.56	0.22
Uniform Delay, d1	42.1	41.4	9.8		3.4	2.3
Progression Factor	1.00	1.00	1.00		0.95	0.73
Incremental Delay, d2	1.3	0.4	0.4		1.2	0.1
Delay (s)	43.4	41.9	10.2		4.4	1.8
Level of Service	D	D	B		A	A
Approach Delay (s)	42.2		10.2			2.7
Approach LOS	D		B			A

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	139	479	92	309	479	47
Future Volume (vph)	139	479	92	309	479	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0	5.0
Lane Util. Factor		0.95	0.95	1.00	0.97	1.00
Frt		1.00	1.00	0.85	1.00	0.85
Flt Protected		0.99	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3433	3471	1553	3367	1553
Flt Permitted		0.85	1.00	1.00	0.95	1.00
Satd. Flow (perm)		2966	3471	1553	3367	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	151	521	100	336	521	51
RTOR Reduction (vph)	0	0	0	177	0	38
Lane Group Flow (vph)	0	672	100	159	521	13
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)		17.8	17.8	17.8	9.7	9.7
Effective Green, g (s)		17.8	17.8	17.8	9.7	9.7
Actuated g/C Ratio		0.47	0.47	0.47	0.26	0.26
Clearance Time (s)		5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		5.0	5.0	5.0	3.0	3.0
Lane Grp Cap (vph)		1407	1647	737	870	401
v/s Ratio Prot			0.03		c0.15	
v/s Ratio Perm		c0.23		0.10		0.01
v/c Ratio		0.48	0.06	0.22	0.60	0.03
Uniform Delay, d1		6.7	5.3	5.8	12.2	10.4
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.5	0.0	0.3	1.1	0.0
Delay (s)		7.2	5.4	6.1	13.3	10.4
Level of Service		A	A	A	B	B
Approach Delay (s)		7.2	5.9		13.1	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	37.5	Sum of lost time (s)	10.0
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Appendix F: Land Use for Proposed Developments at BWI

Land Use: 022
General Aviation Airport

Description

General aviation airports are designed primarily for use by small private and corporate aircraft, not for commercial passenger service. They are usually characterized by short runways, few or no terminal facilities and many small aircraft. Commercial airport (Land Use 021) is a related use.

Additional Data

Truck trips accounted for 3 to 5 percent of the weekday traffic at the airports surveyed.

Vehicle occupancy ranged from 1.2 to 1.7 persons per automobile on an average weekday.

Peak hours of the generator—

The weekday P.M. peak hour was between 12:00 p.m. and 6:00 p.m. The Saturday peak hour was between 12:00 p.m. and 6:00 p.m. Sunday was the peak day; the peak hour was between 12:00 p.m. and 7:00 p.m.

Most of the sites were surveyed between 1967 and 1972 in California, many in the San Francisco Bay Area or southern California.

Source Numbers

8, 9, 11, 12, 13, 18

Land Use: 022
General Aviation Airport
Independent Variables with One Observation

The following trip generation data are for independent variables with only one observation. This information is shown in this table only; there are no related plots for these data.

Users are cautioned to use data with care because of the small sample size.

Independent Variable	Trip Generation Rate	Size of Independent Variable	Number of Studies	Directional Distribution
Employees				
Weekday A.M. Peak Hour of Adjacent Street Traffic	0.69	140	1	83% entering, 17% exiting
Weekday P.M. Peak Hour of Adjacent Street Traffic	1.03	140	1	45% entering, 55% exiting
Based Aircraft				
Weekday A.M. Peak Hour of Adjacent Street Traffic	0.24	394	1	83% entering, 17% exiting
Weekday P.M. Peak Hour of Adjacent Street Traffic	0.37	394	1	45% entering, 55% exiting

General Aviation Airport
(022)

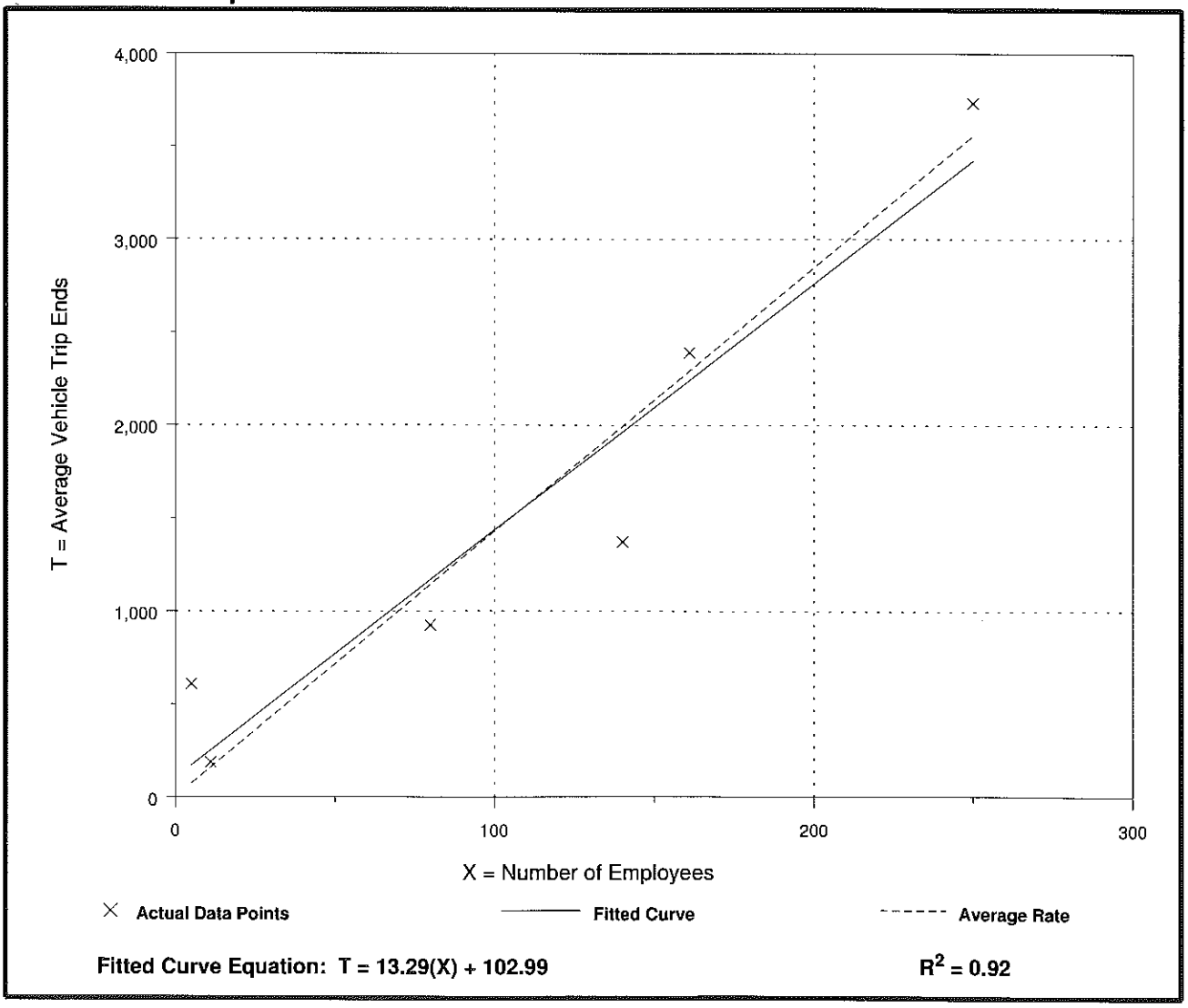
Average Vehicle Trip Ends vs: Employees
On a: Weekday

Number of Studies: 6
Avg. Number of Employees: 108
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
14.24	9.79 - 122.00	10.46

Data Plot and Equation



Fitted Curve Equation: T = 13.29(X) + 102.99

R^2 = 0.92

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: Employees
On a: Weekday,
A.M. Peak Hour of Generator

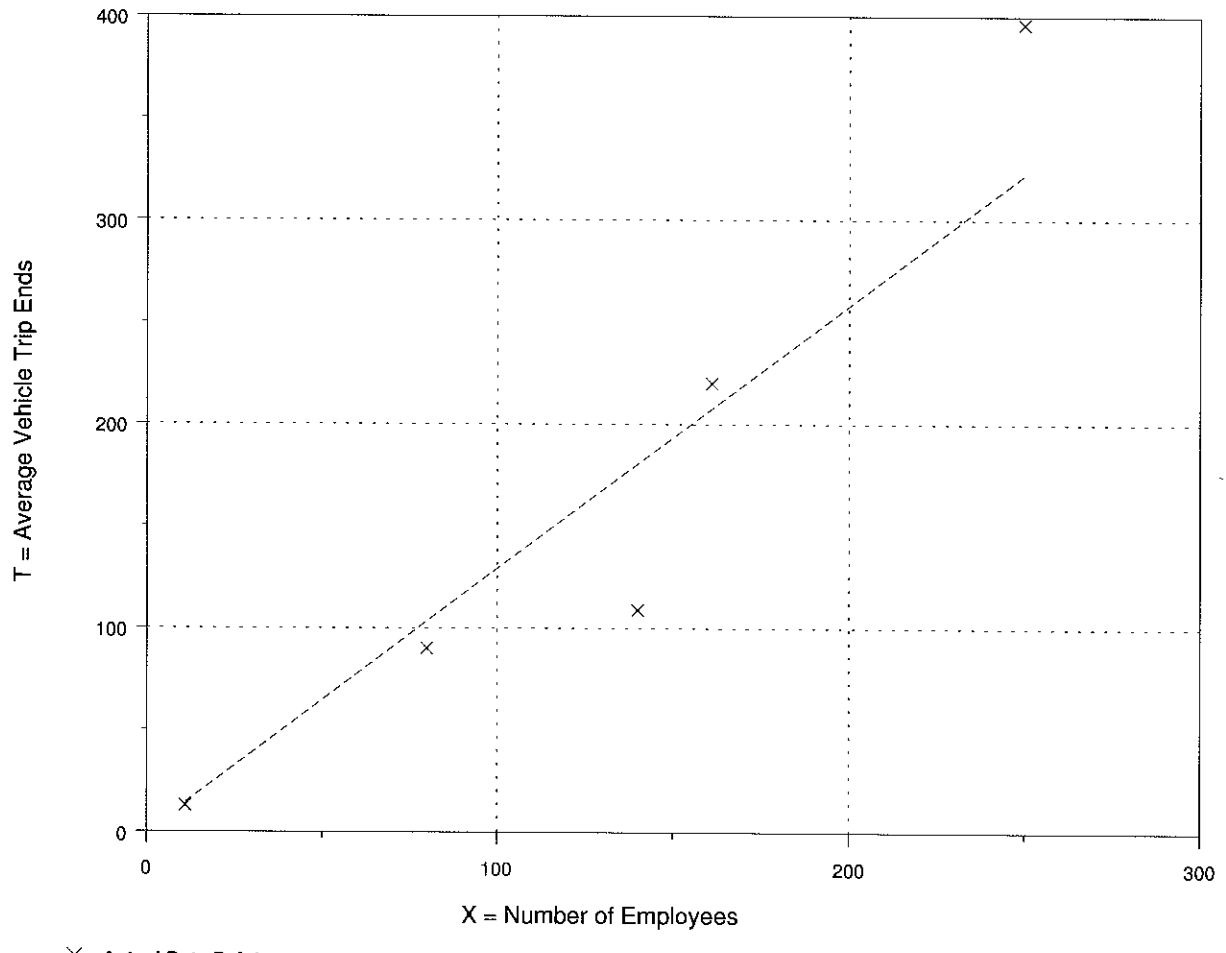
Number of Studies: 5
Avg. Number of Employees: 128
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
1.29	0.78 - 1.58	1.17

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not Given

R^2 = ****

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: Employees
On a: Weekday,
P.M. Peak Hour of Generator

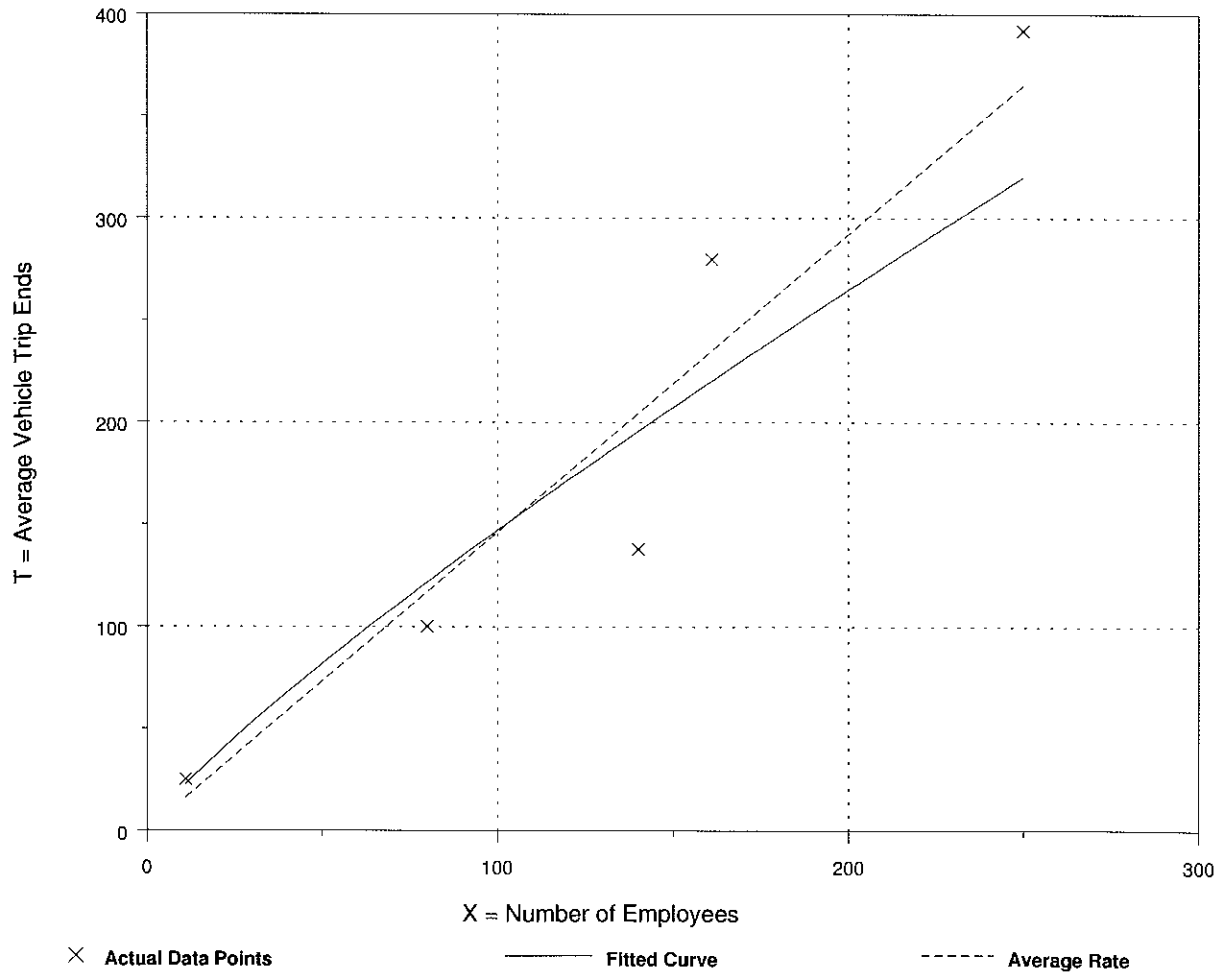
Number of Studies: 5
Avg. Number of Employees: 128
Directional Distribution: 55% entering, 45% exiting

Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
1.46	0.99 - 2.27	1.24

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Ln(T) = 0.85 Ln(X) + 1.08

R^2 = 0.94

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: Employees
On a: Saturday

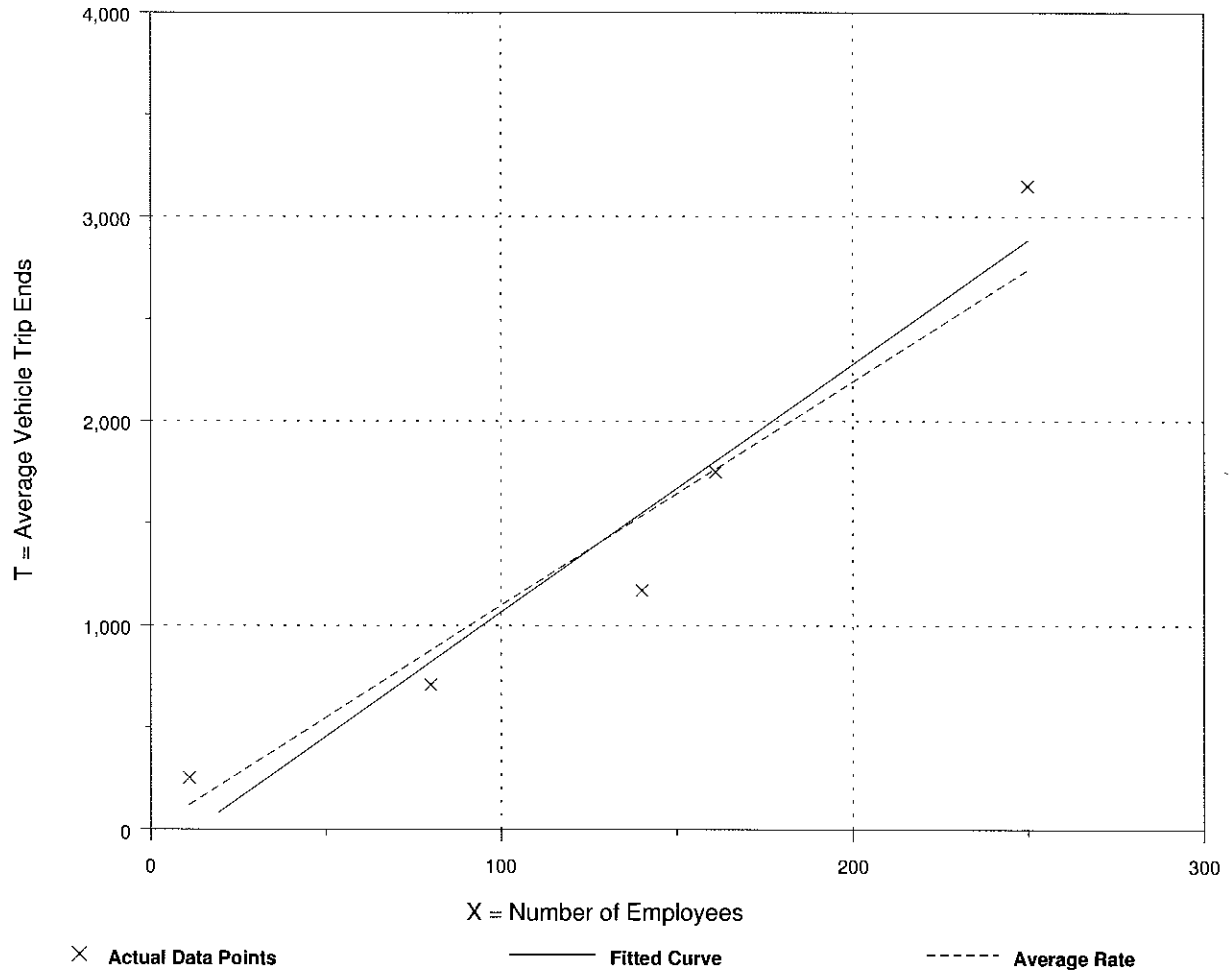
Number of Studies: 5
Avg. Number of Employees: 128
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
10.96	8.36 - 23.09	4.06

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: T = 12.14(X) - 151.24

R^2 = 0.94

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: **Employees**
On a: **Saturday,**
Peak Hour of Generator

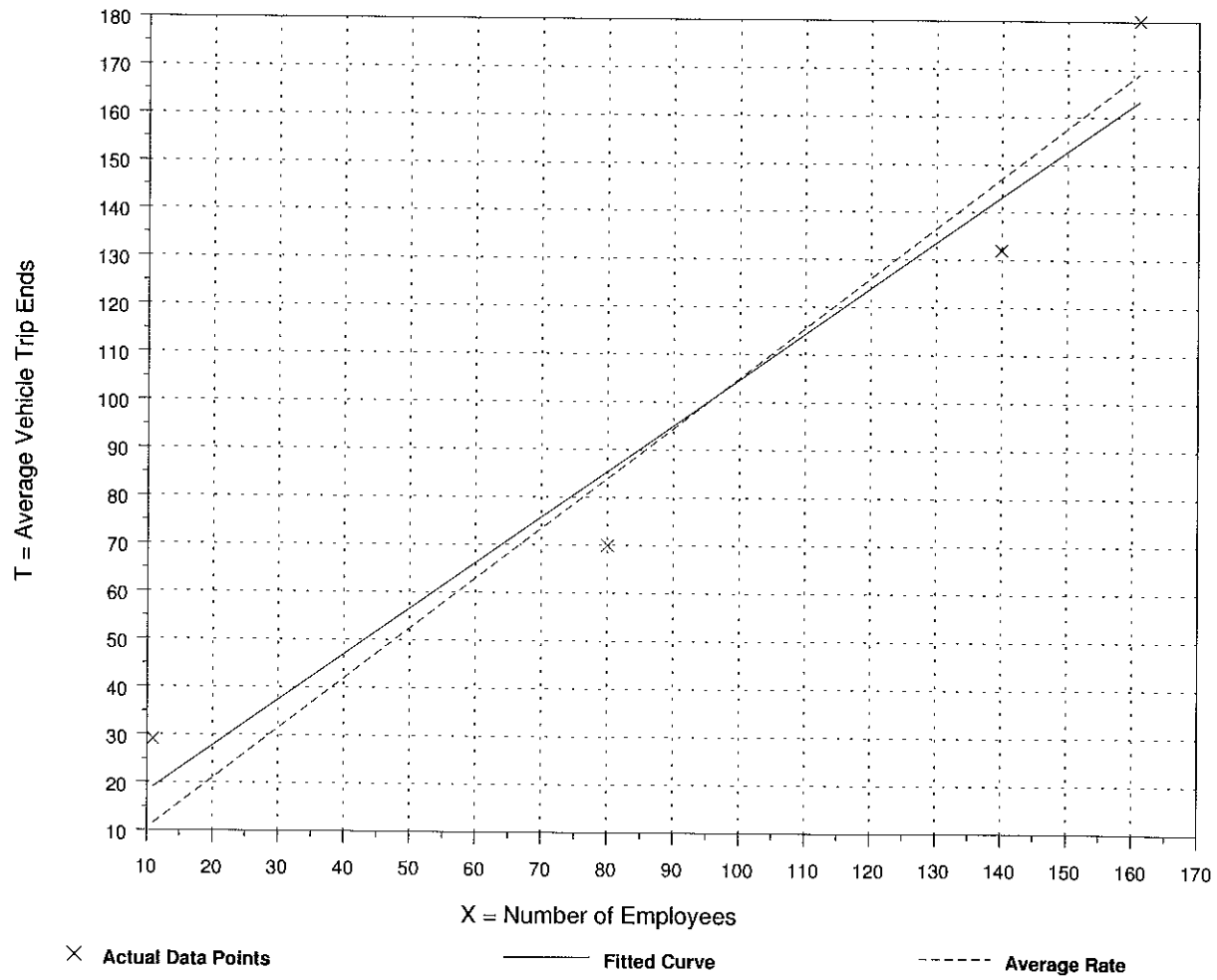
Number of Studies: 4
Avg. Number of Employees: 98
Directional Distribution: 61% entering, 39% exiting

Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
1.05	0.88 - 2.64	1.06

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: T = 0.96(X) + 8.53

R^2 = 0.94

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: Employees
On a: Sunday

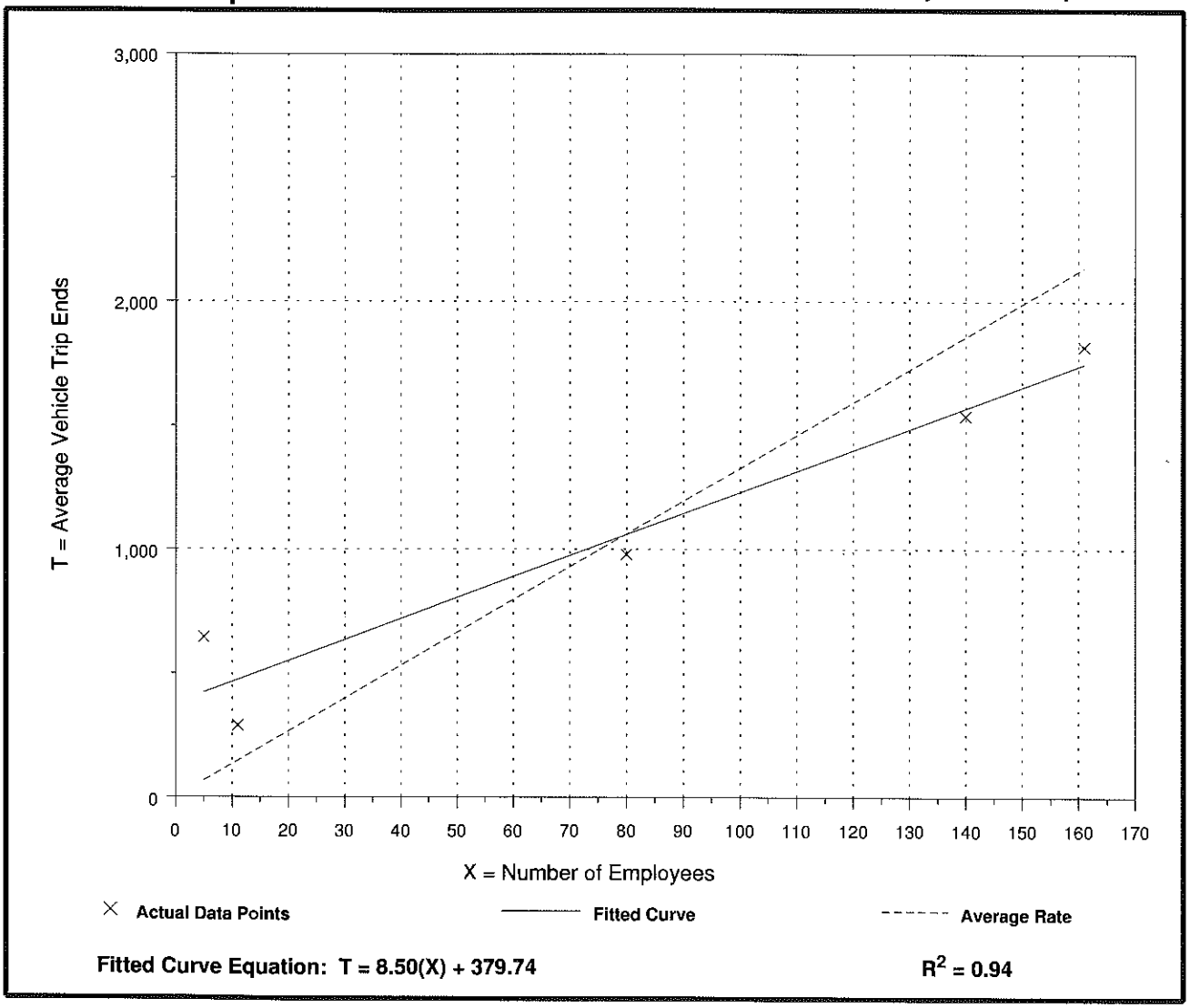
Number of Studies: 5
Avg. Number of Employees: 79
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
13.28	11.00 - 128.80	13.77

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: T = 8.50(X) + 379.74

R^2 = 0.94

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: Employees
On a: Sunday,
Peak Hour of Generator

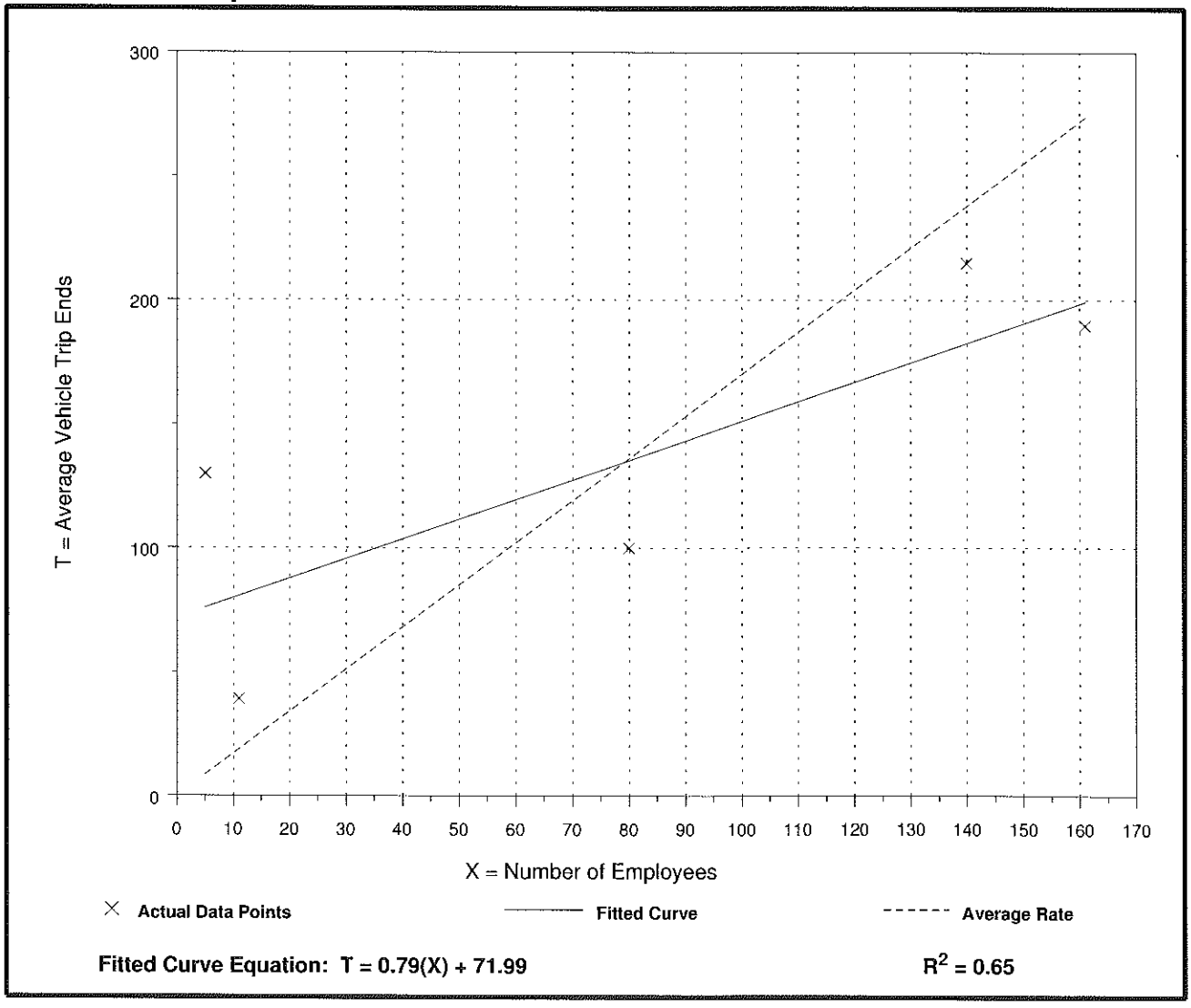
Number of Studies: 5
Avg. Number of Employees: 79
Directional Distribution: 55% entering, 45% exiting

Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
1.70	1.18 - 26.00	3.05

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: T = 0.79(X) + 71.99

R^2 = 0.65

General Aviation Airport
(022)

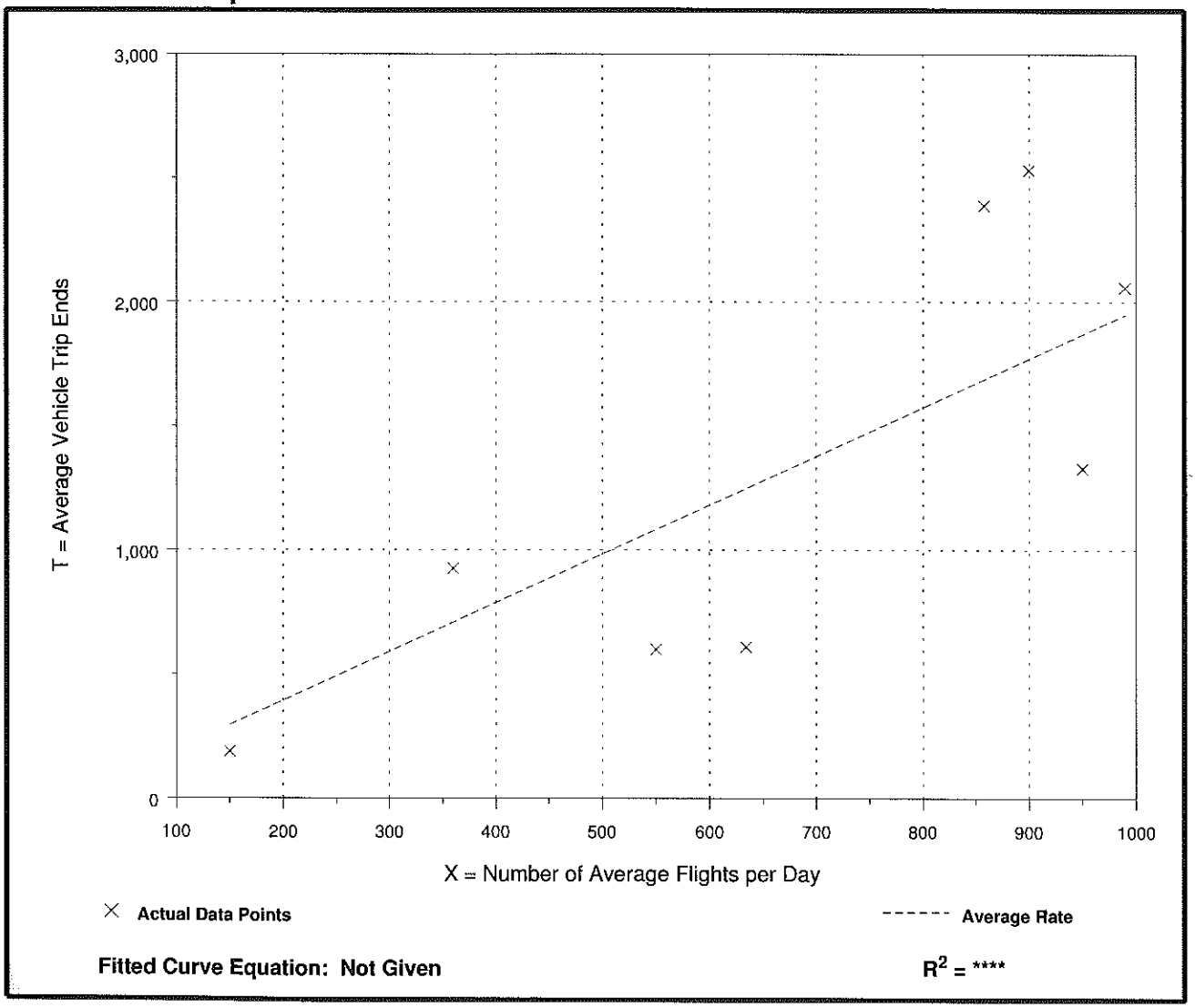
Average Vehicle Trip Ends vs: Average Flights per Day
On a: Weekday

Number of Studies: 8
Average Number of Flights per Day: 674
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Flight

Average Rate	Range of Rates	Standard Deviation
1.97	0.96 - 2.81	1.58

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2 = ****

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: Average Flights per Day
On a: Weekday,
A.M. Peak Hour of Generator

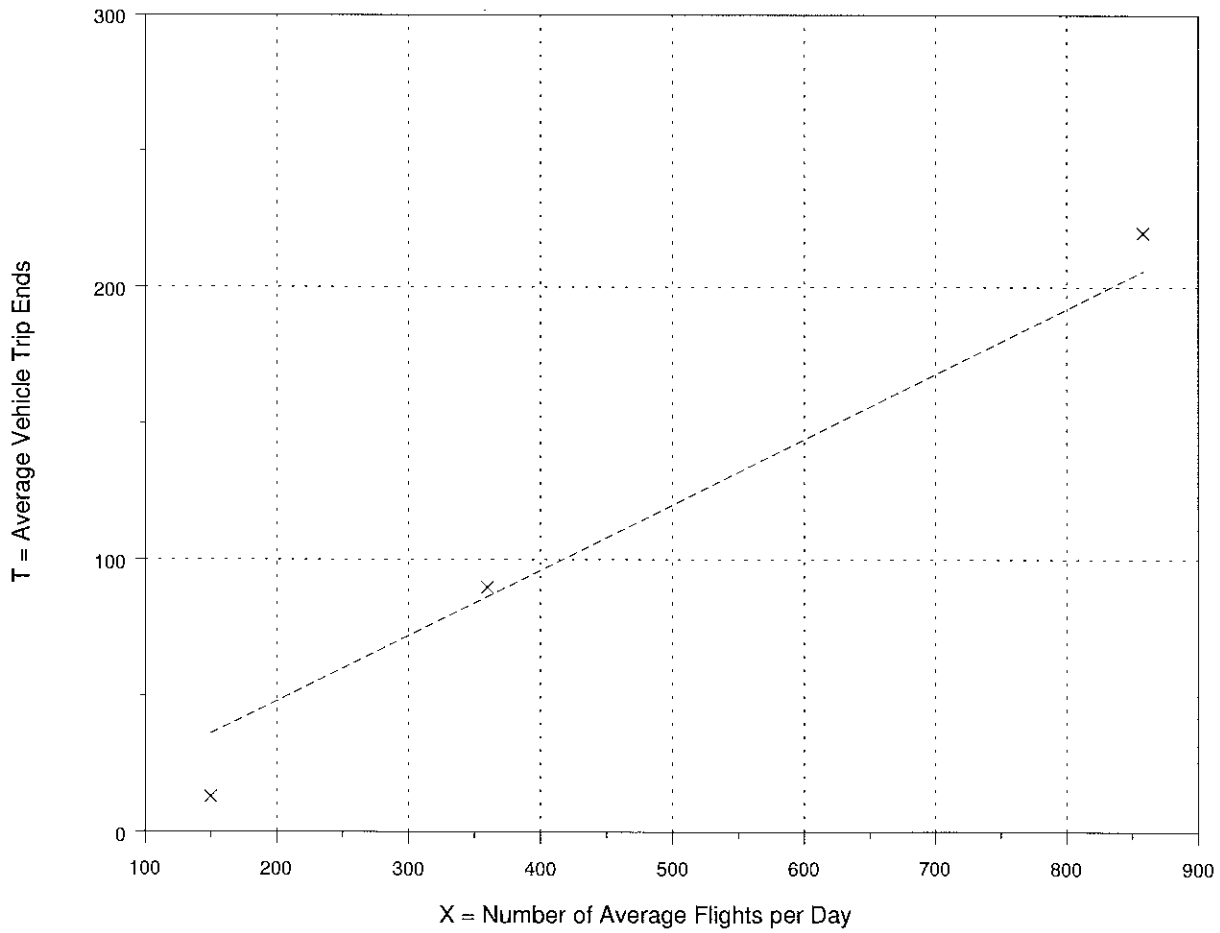
Number of Studies: 3
Average Number of Flights per Day: 456
Directional Distribution: Not available

Trip Generation per Flight

Average Rate	Range of Rates	Standard Deviation
0.24	0.09 - 0.26	0.49

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: Average Flights per Day
On a: Weekday,
P.M. Peak Hour of Generator

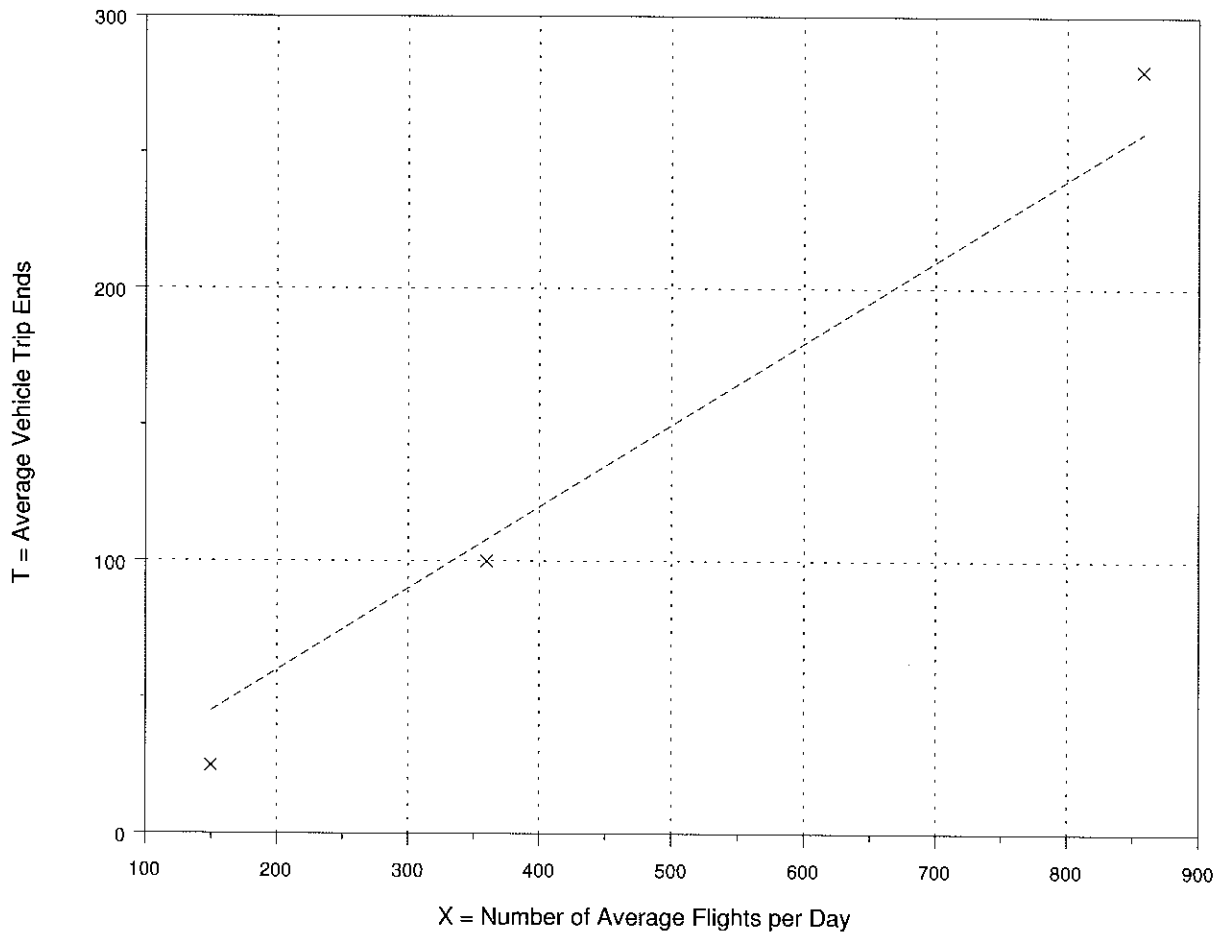
Number of Studies: 3
Average Number of Flights per Day: 456
Directional Distribution: Not available

Trip Generation per Flight

Average Rate	Range of Rates	Standard Deviation
0.30	0.17 - 0.33	0.55

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: Average Flights per Day
On a: Saturday

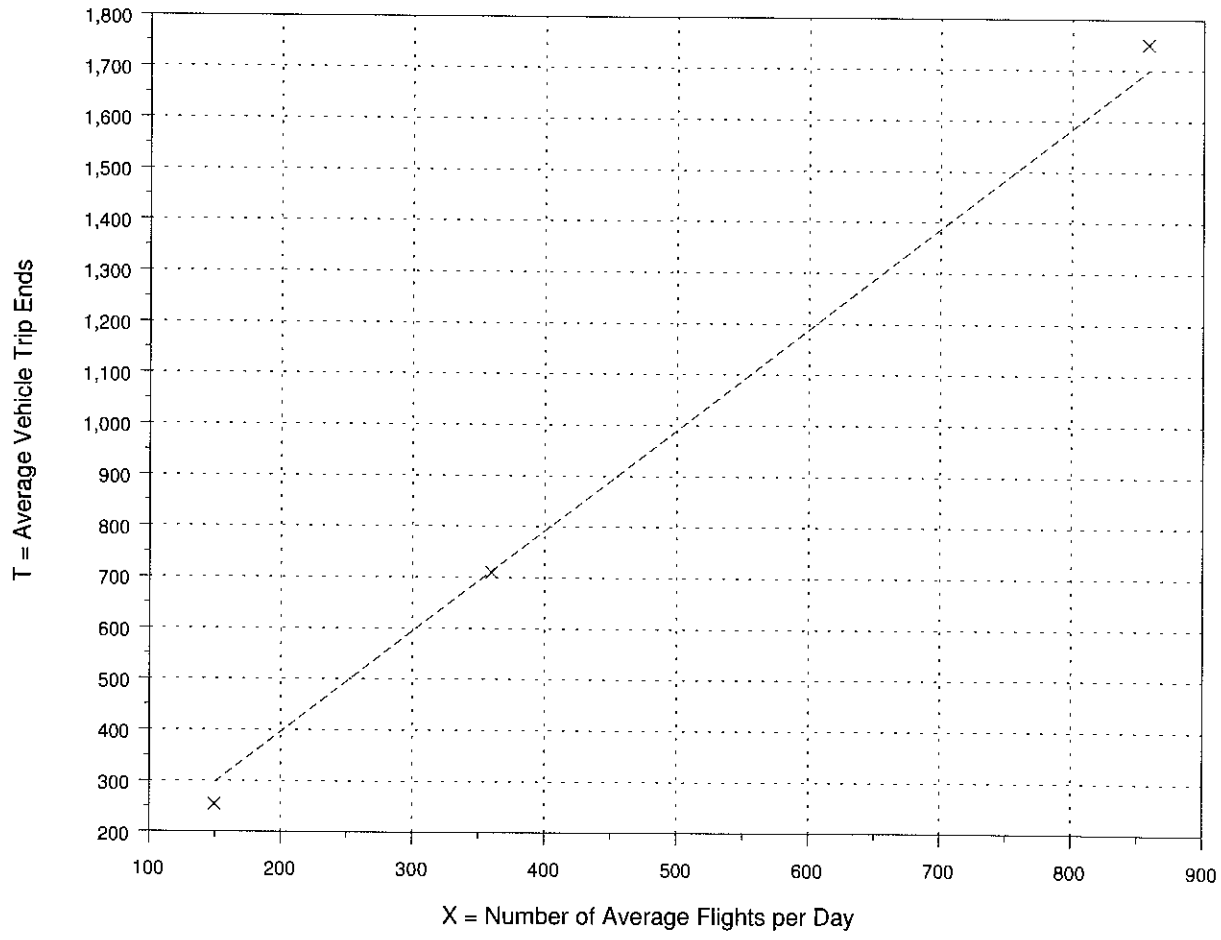
Number of Studies: 3
Average Number of Flights per Day: 456
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Flight

Average Rate	Range of Rates	Standard Deviation
1.98	1.69 - 2.04	1.41

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: Average Flights per Day
On a: Saturday,
Peak Hour of Generator

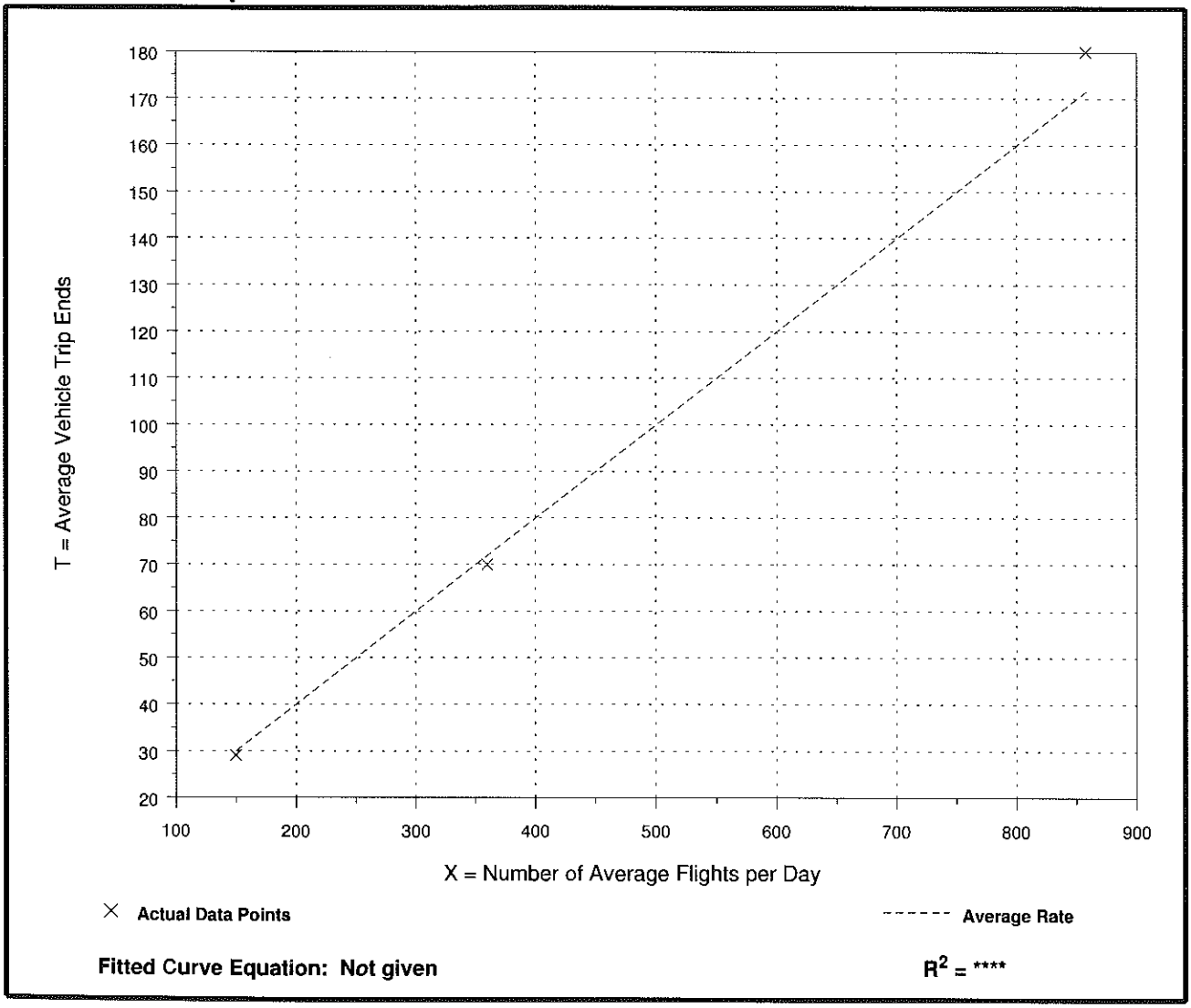
Number of Studies: 3
Average Number of Flights per Day: 456
Directional Distribution: Not available

Trip Generation per Flight

Average Rate	Range of Rates	Standard Deviation
0.20	0.19 - 0.21	0.45

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: Average Flights per Day
On a: Sunday

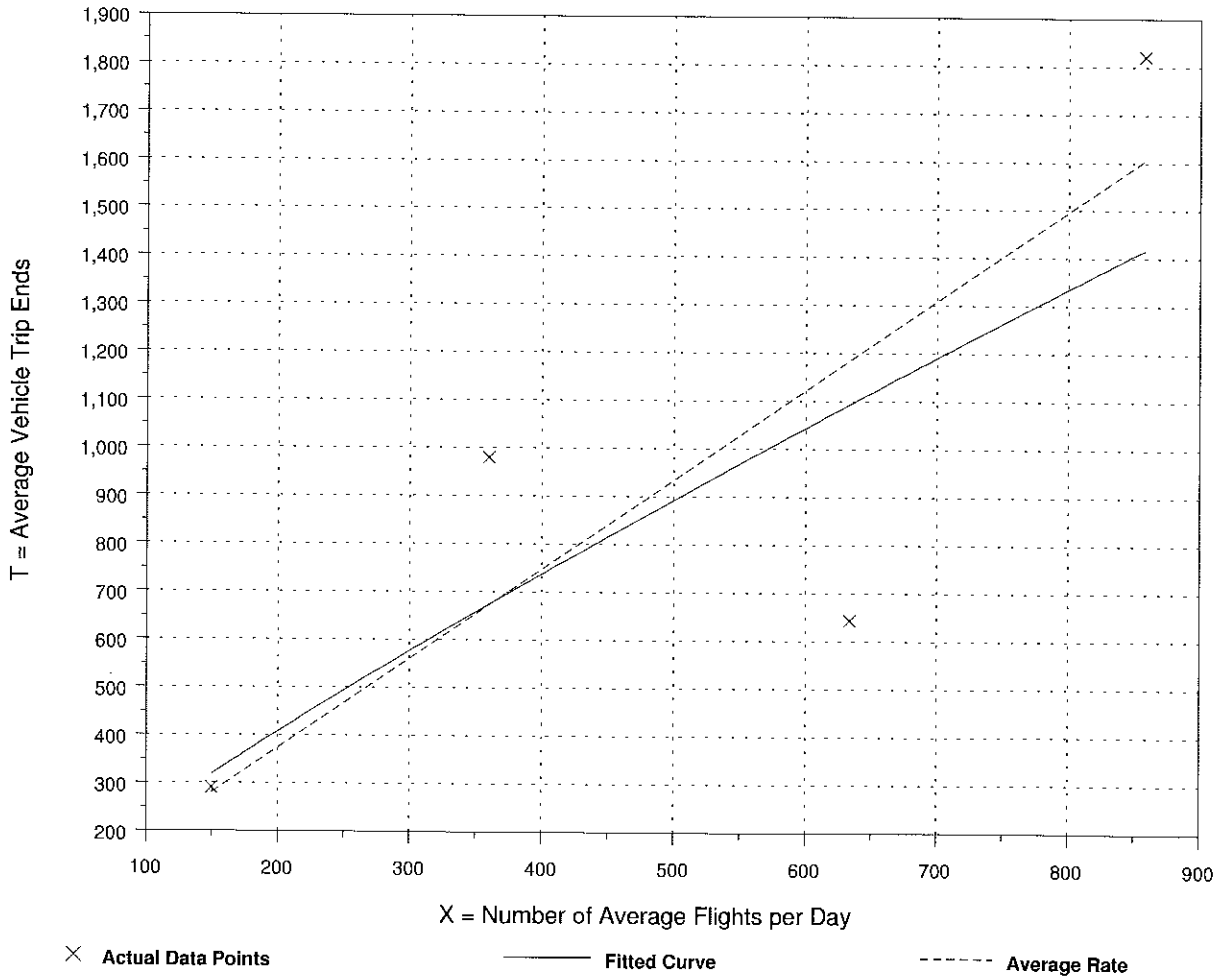
Number of Studies: 4
Average Number of Flights per Day: 501
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Flight

Average Rate	Range of Rates	Standard Deviation
1.87	1.02 - 2.72	1.50

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Ln(T) = 0.86 Ln(X) + 1.48

R^2 = 0.72

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: Average Flights per Day
On a: Sunday,
Peak Hour of Generator

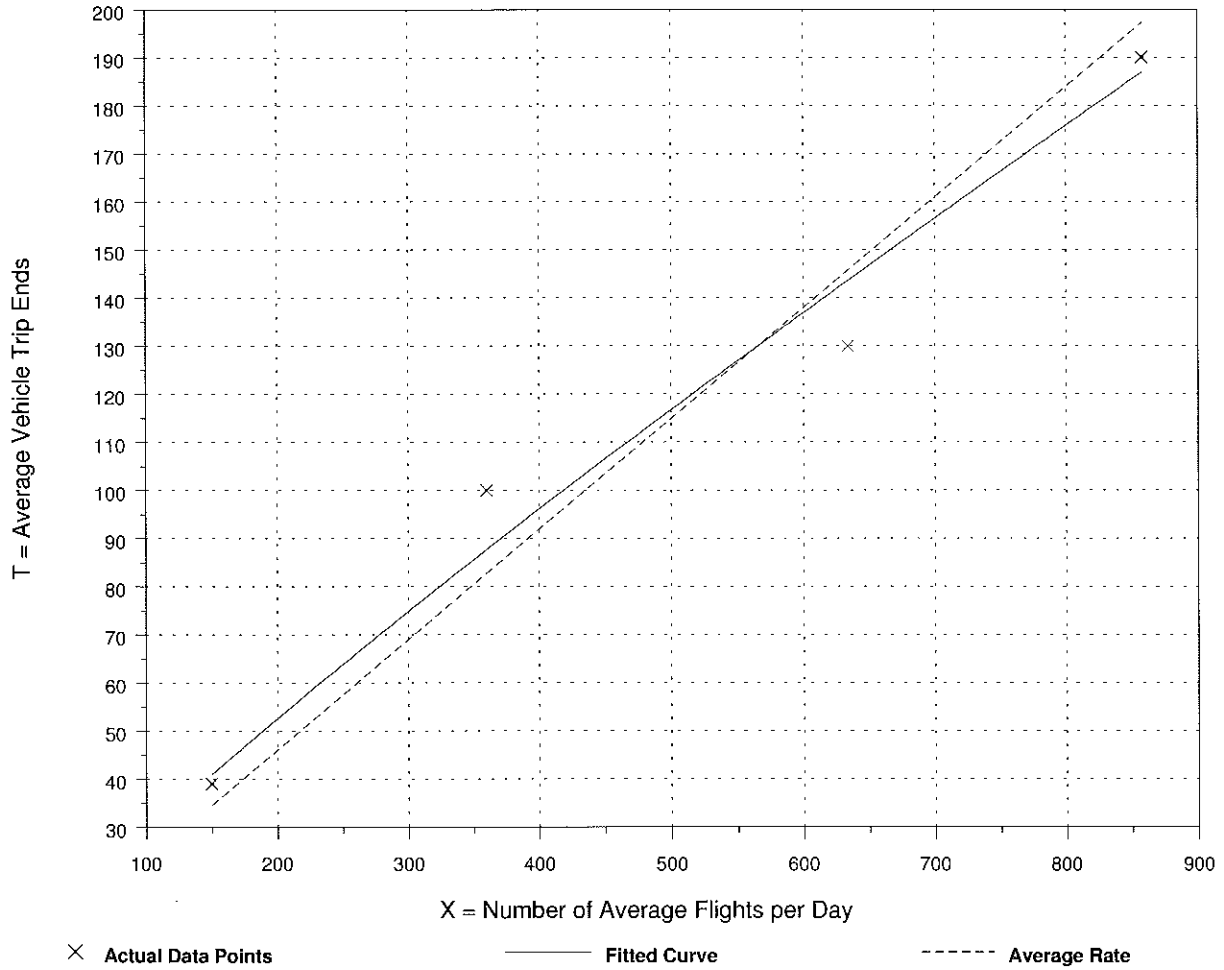
Number of Studies: 4
Average Number of Flights per Day: 501
Directional Distribution: 54% entering, 46% exiting

Trip Generation per Flight

Average Rate	Range of Rates	Standard Deviation
0.23	0.21 - 0.28	0.48

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Ln(T) = 0.87 Ln(X) - 0.65

R^2 = 0.98

General Aviation Airport
(022)

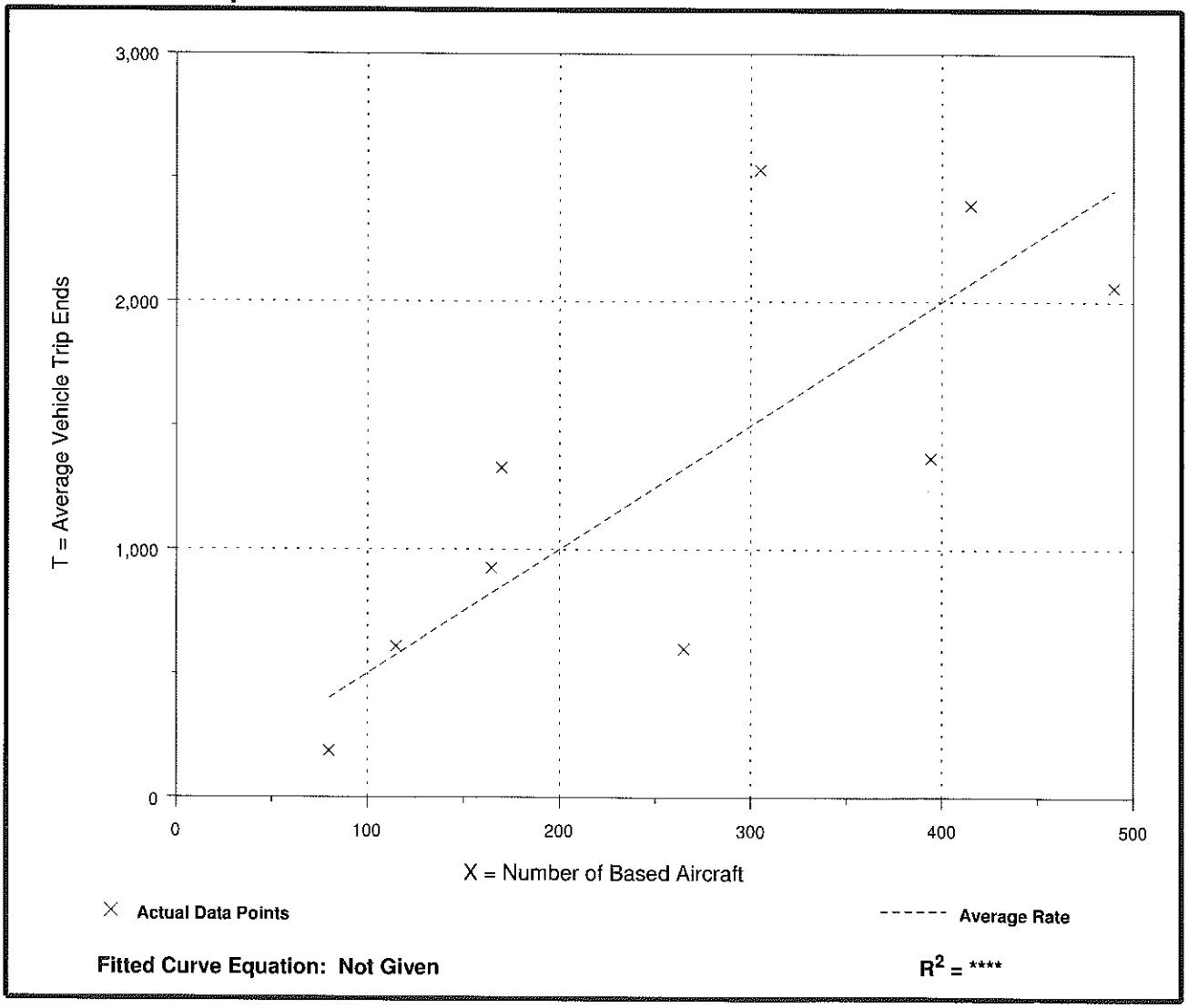
Average Vehicle Trip Ends vs: Based Aircraft
On a: Weekday

Number of Studies: 9
Average Number of Based Aircraft: 267
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Based Aircraft

Average Rate	Range of Rates	Standard Deviation
5.00	2.26 - 8.30	2.94

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2 = ****

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: Based Aircraft
On a: Weekday,
A.M. Peak Hour of Generator

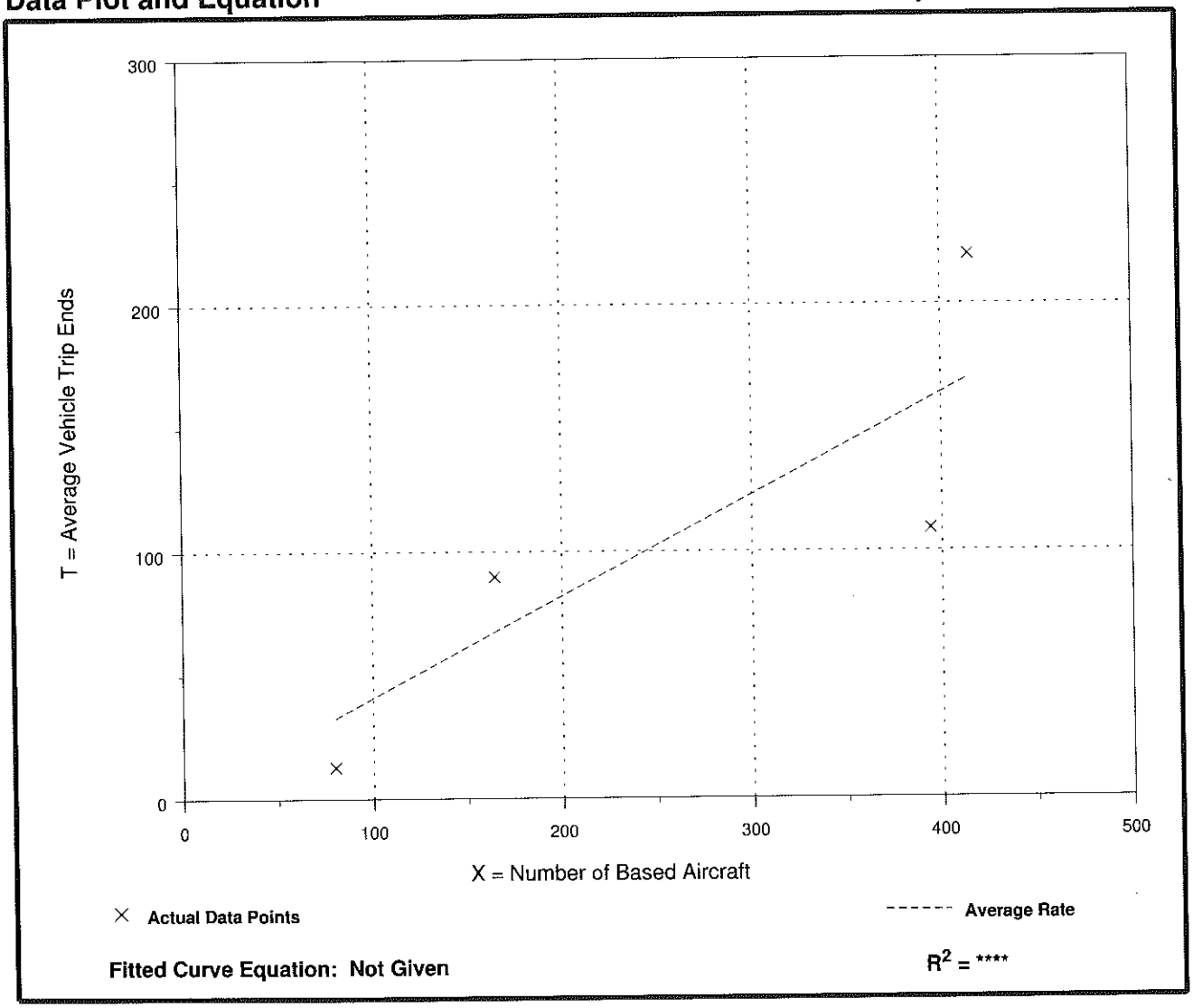
Number of Studies: 4
Average Number of Based Aircraft: 264
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Based Aircraft

Average Rate	Range of Rates	Standard Deviation
0.41	0.16 - 0.55	0.65

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not Given

R^2 = ****

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: Based Aircraft
On a: Weekday,
P.M. Peak Hour of Generator

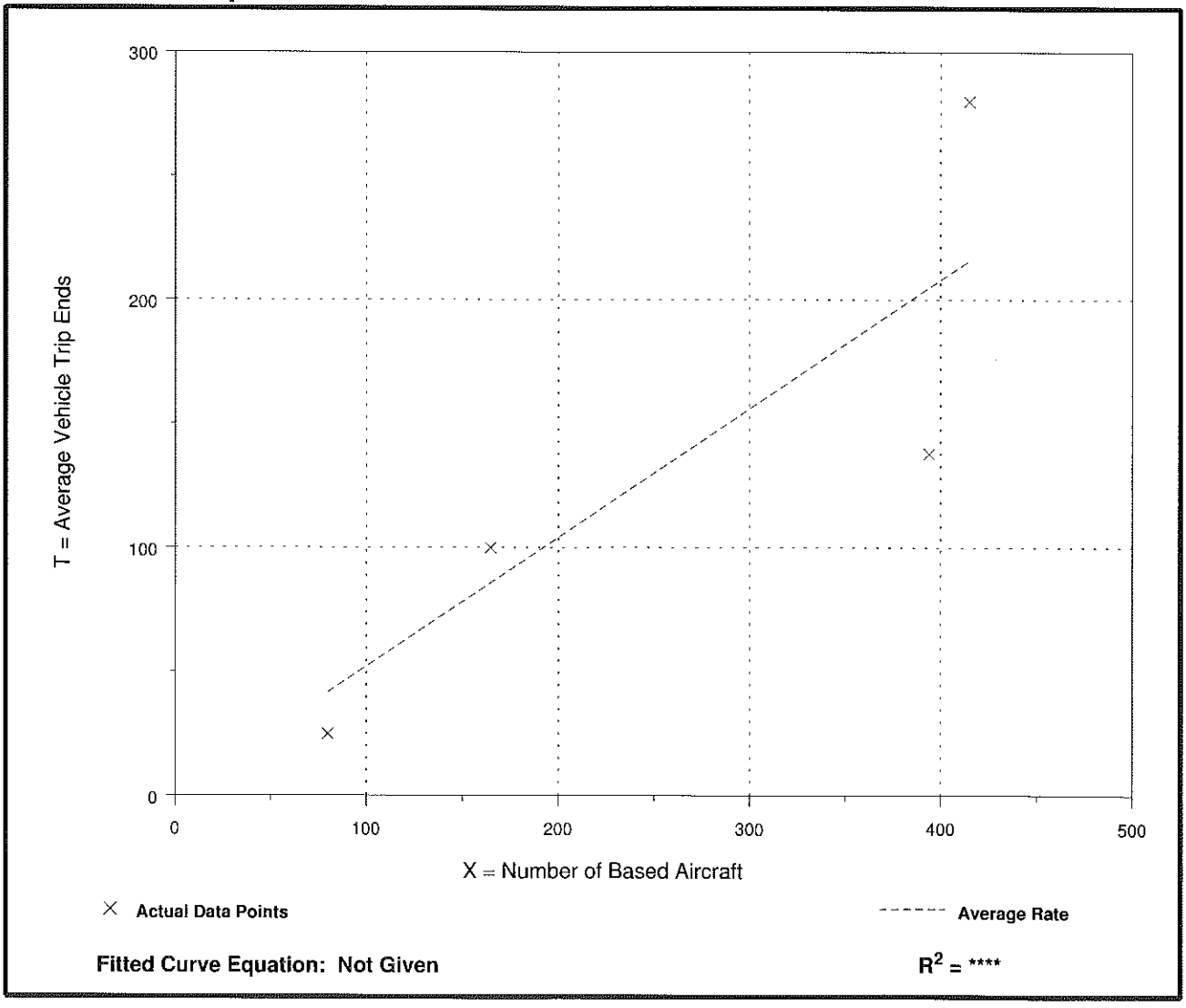
Number of Studies: 4
Average Number of Based Aircraft: 264
Directional Distribution: 55% entering, 45% exiting

Trip Generation per Based Aircraft

Average Rate	Range of Rates	Standard Deviation
0.52	0.31 - 0.67	0.73

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not Given

R^2 = ****

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: Based Aircraft
On a: Saturday

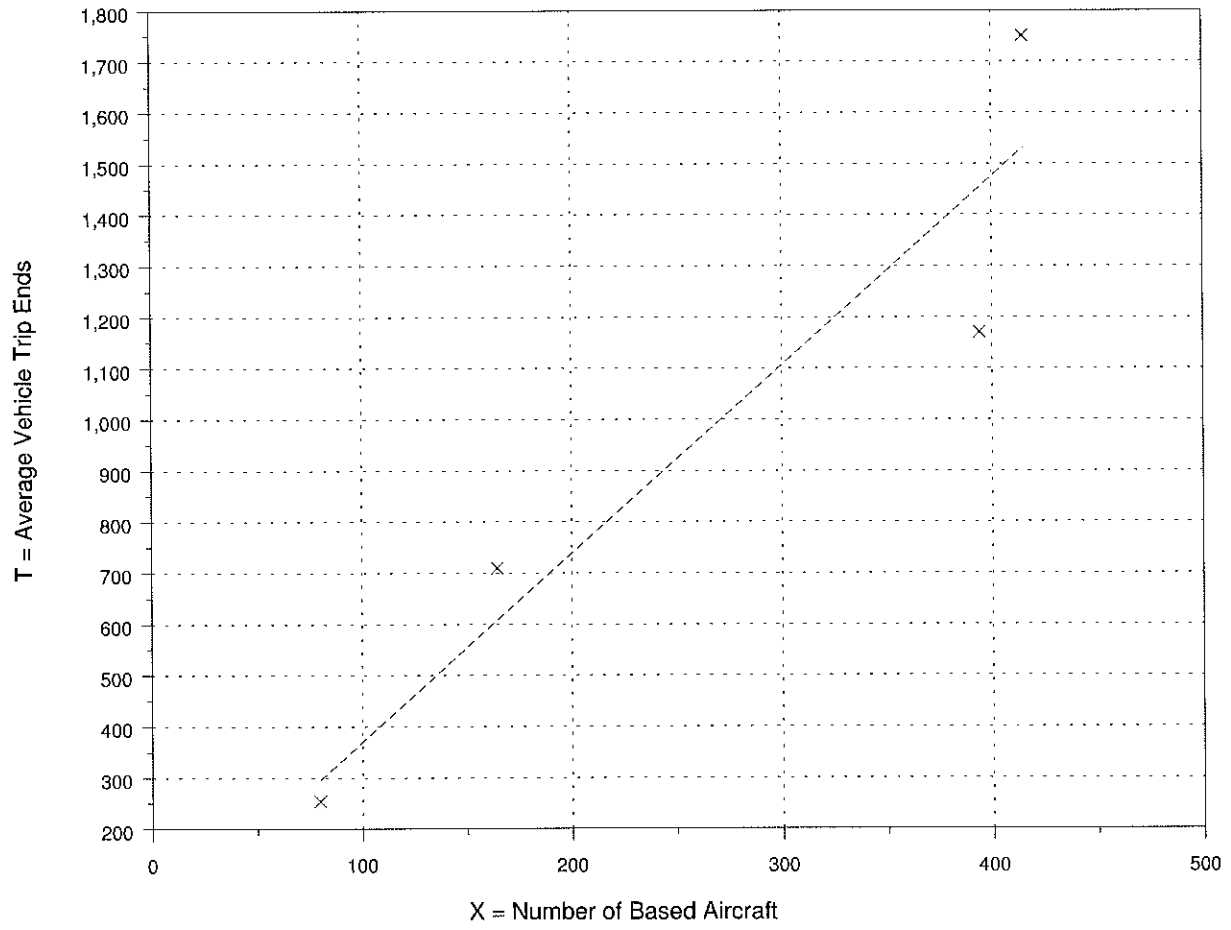
Number of Studies: 4
Average Number of Based Aircraft: 264
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Based Aircraft

Average Rate	Range of Rates	Standard Deviation
3.69	2.97 - 4.30	2.01

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not Given

R^2 = ****

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: Based Aircraft
On a: Saturday,
Peak Hour of Generator

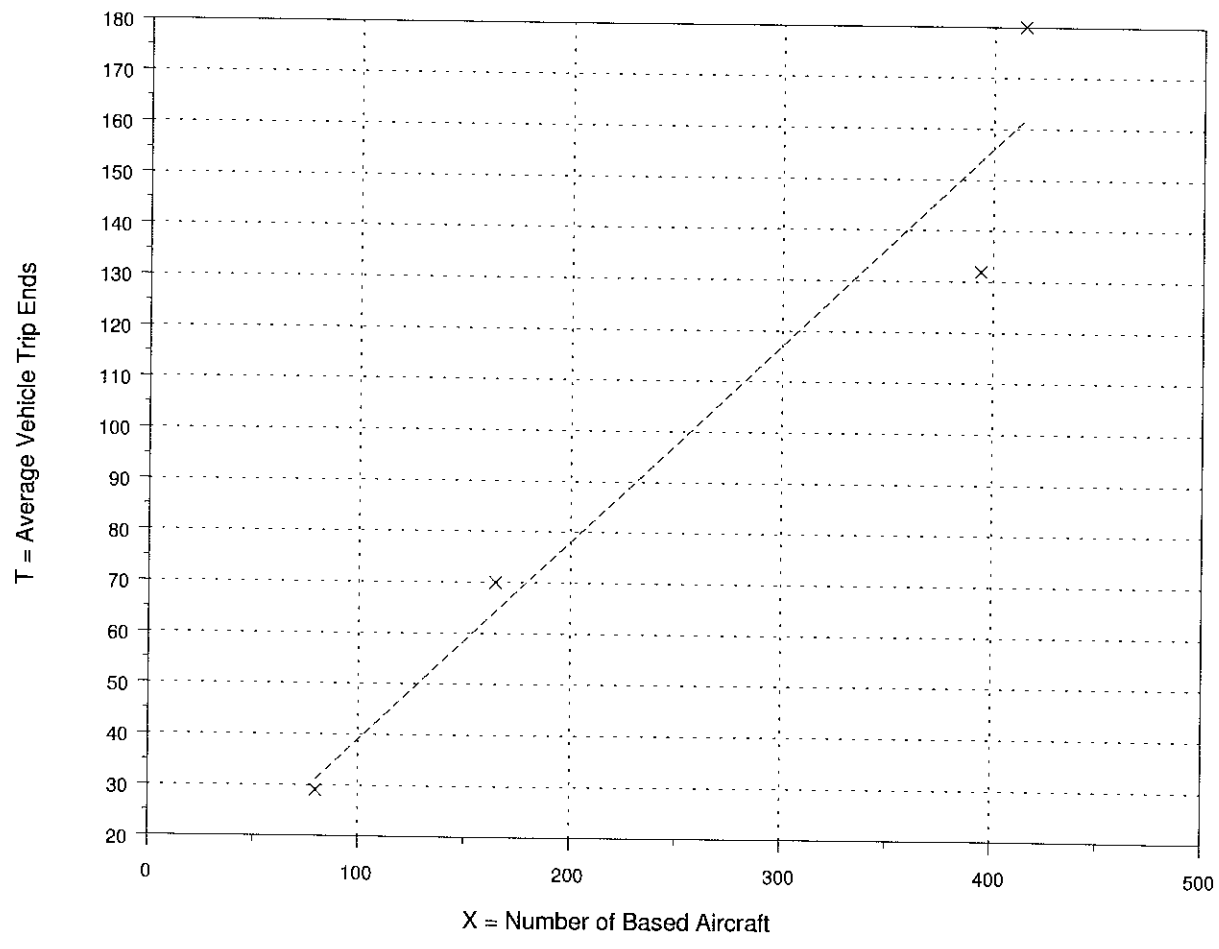
Number of Studies: 4
Average Number of Based Aircraft: 264
Directional Distribution: 61% entering, 39% exiting

Trip Generation per Based Aircraft

Average Rate	Range of Rates	Standard Deviation
0.39	0.34 - 0.43	0.63

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not Given

R^2 = ****

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: Based Aircraft
On a: Sunday

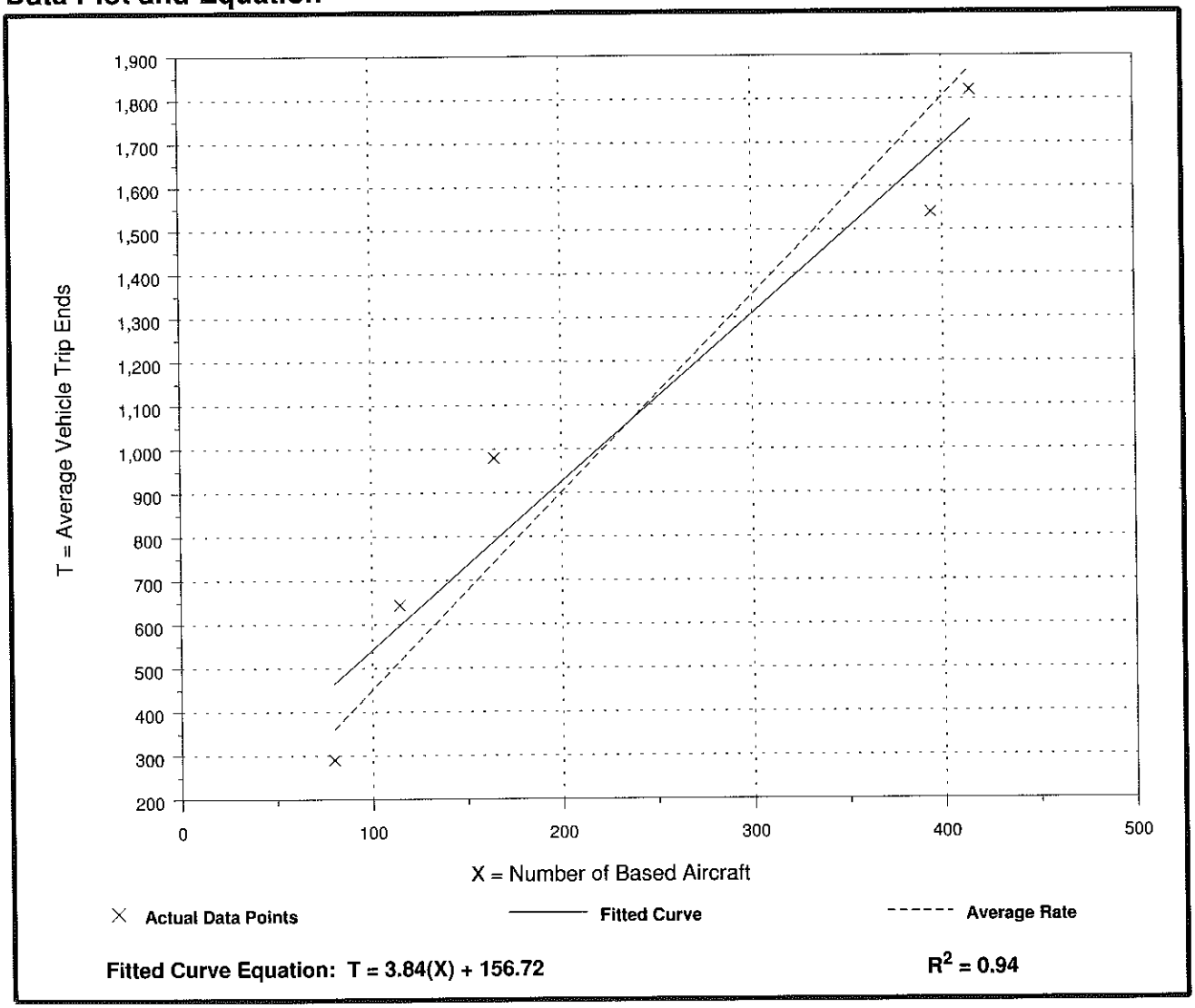
Number of Studies: 5
Average Number of Based Aircraft: 234
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Based Aircraft

Average Rate	Range of Rates	Standard Deviation
4.51	3.63 - 5.94	2.25

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: T = 3.84(X) + 156.72

R^2 = 0.94

General Aviation Airport
(022)

Average Vehicle Trip Ends vs: Based Aircraft
On a: Sunday,
Peak Hour of Generator

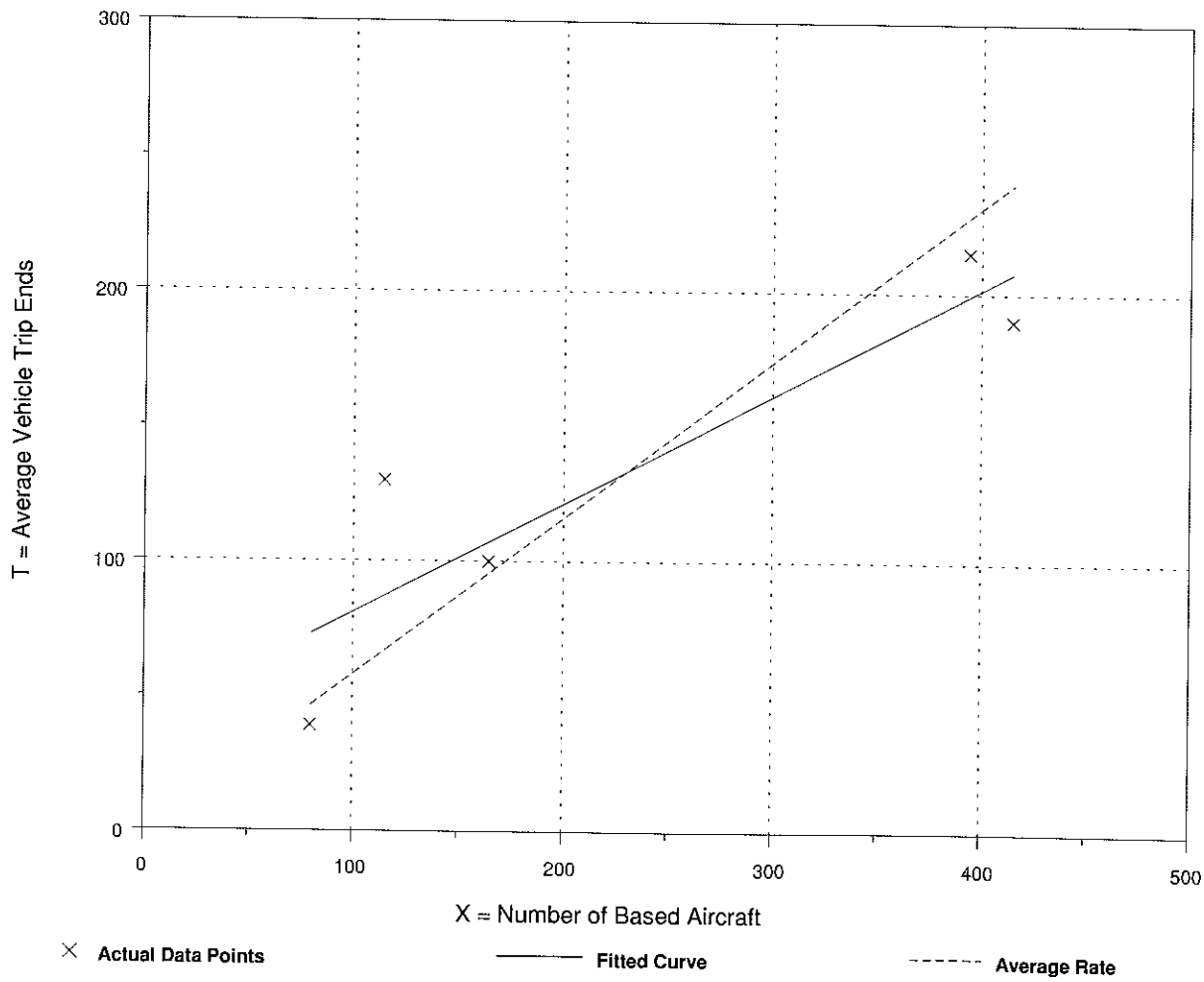
Number of Studies: 5
Average Number of Based Aircraft: 234
Directional Distribution: 55% entering, 45% exiting

Trip Generation per Based Aircraft

Average Rate	Range of Rates	Standard Deviation
0.58	0.46 - 1.13	0.78

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: T = 0.40(X) + 40.93

R^2 = 0.82

Land Use: 932
High-Turnover (Sit-Down) Restaurant

Description

This land use consists of sit-down, full-service eating establishments with turnover rates of approximately one hour or less. This type of restaurant is usually moderately priced and frequently belongs to a restaurant chain. Generally, these restaurants serve lunch and dinner; they may also be open for breakfast and are sometimes open 24 hours per day. These restaurants typically do not take reservations. Patrons commonly wait to be seated, are served by a waiter/waitress, order from menus and pay for their meal after they eat. Some facilities contained within this land use may also contain a bar area for serving food and alcoholic drinks. Quality restaurant (Land Use 931), fast-food restaurant without drive-through window (Land Use 933), fast-food restaurant with drive-through window (Land Use 934) and fast-food restaurant with drive-through window and no indoor seating (Land Use 935) are related uses.

Additional Data

Users should exercise caution when applying statistics during the a.m. peak periods, as the sites contained in the database for this land use may or may not be open for breakfast. In cases where it was confirmed that the sites were not open for breakfast, data for the a.m. peak hour of the adjacent street traffic were removed from the database.

Vehicle occupancy ranged from 1.39 to 1.69 persons per automobile on an average weekday. The average for the sites surveyed was approximately 1.52.

Five sites submitted for inclusion in this land use indicated the presence of an on-site pick-up window. From the limited data sample, it does not appear that the presence of a pick-up window had a significant impact on trip generation.

The outdoor seating area is not included in the overall gross floor area. Therefore, the number of seats may be a more reliable independent variable on which to establish trip generation rates for facilities having significant outdoor seating.

The sites were surveyed between the 1960s and the 2000s throughout the United States.

Source Numbers

2, 4, 5, 72, 90, 100, 126, 269, 275, 280, 300, 301, 305, 338, 340, 341, 358, 384, 424, 432, 437, 438, 444, 507, 555, 577, 589, 617, 618

High-Turnover (Sit-Down) Restaurant
(932)

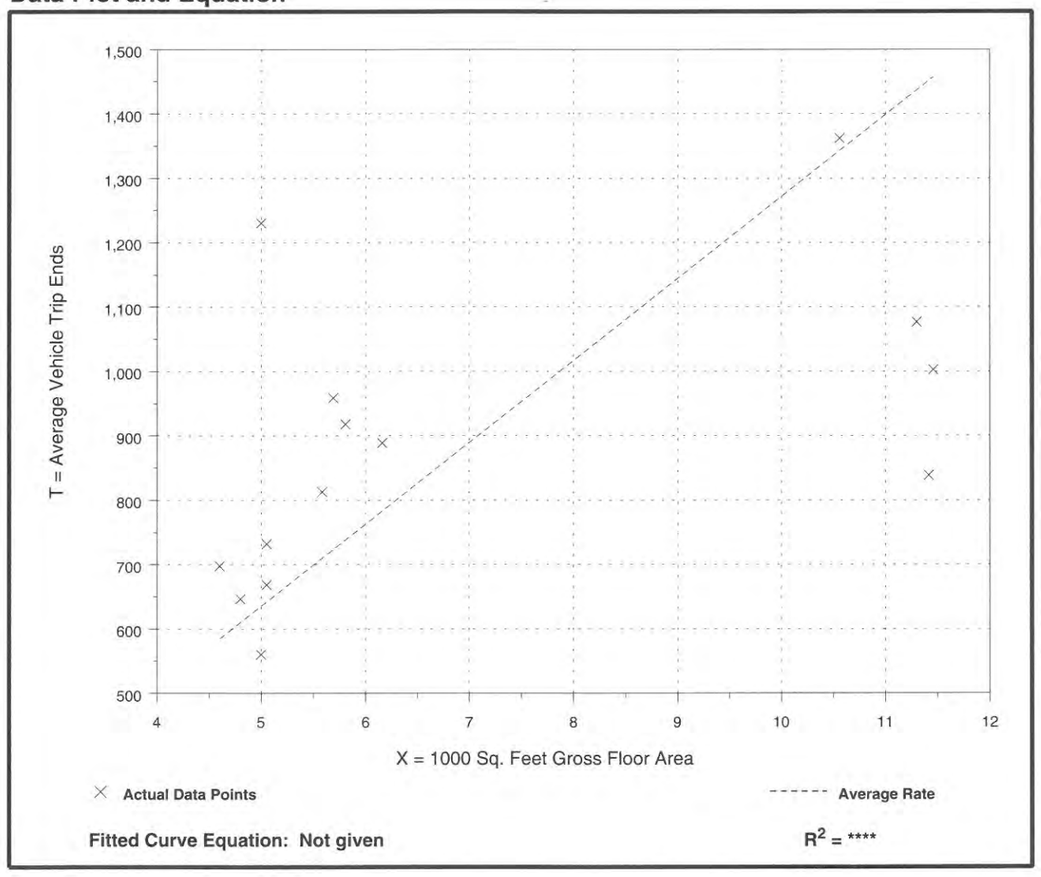
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday

Number of Studies: 14
Average 1000 Sq. Feet GFA: 7
Directional Distribution: 50% entering, 50% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
127.15	73.51 - 246.00	41.77

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

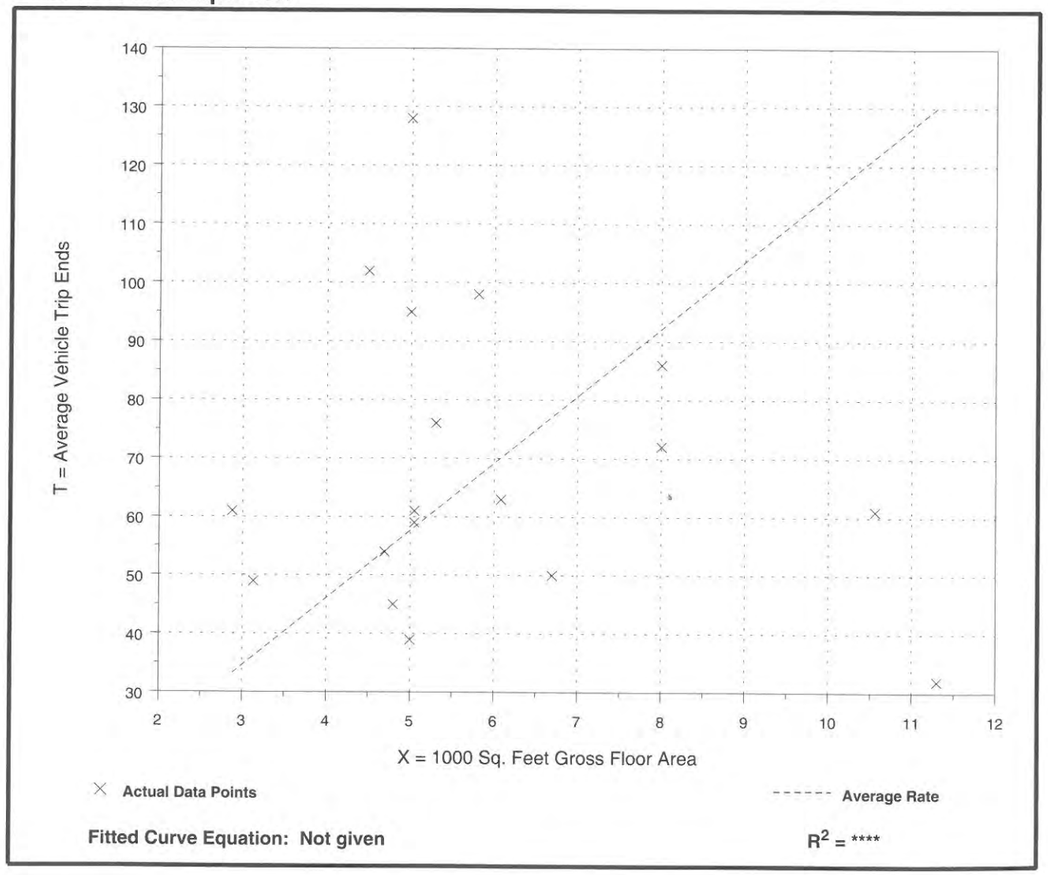
Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 18
Average 1000 Sq. Feet GFA: 6
Directional Distribution: 52% entering, 48% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
11.52	2.83 - 25.60	6.75

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

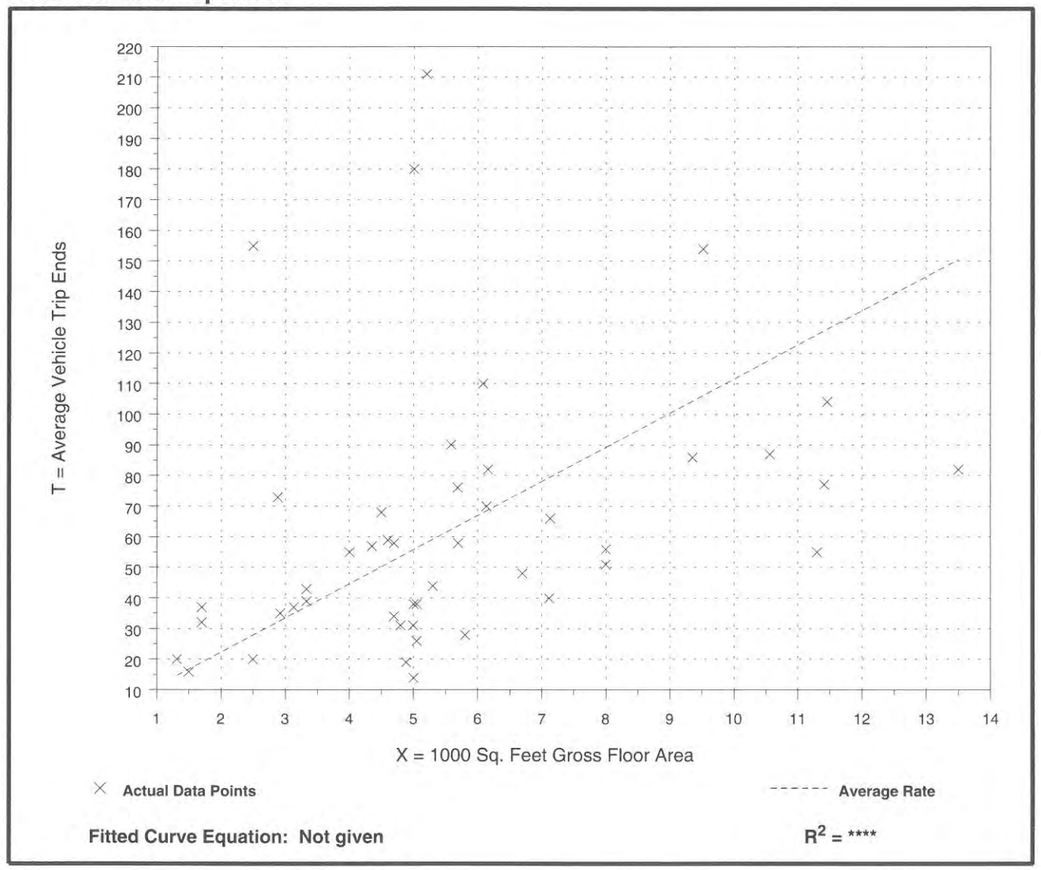
Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 46
Average 1000 Sq. Feet GFA: 6
Directional Distribution: 59% entering, 41% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
11.15	2.80 - 62.00	9.13

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

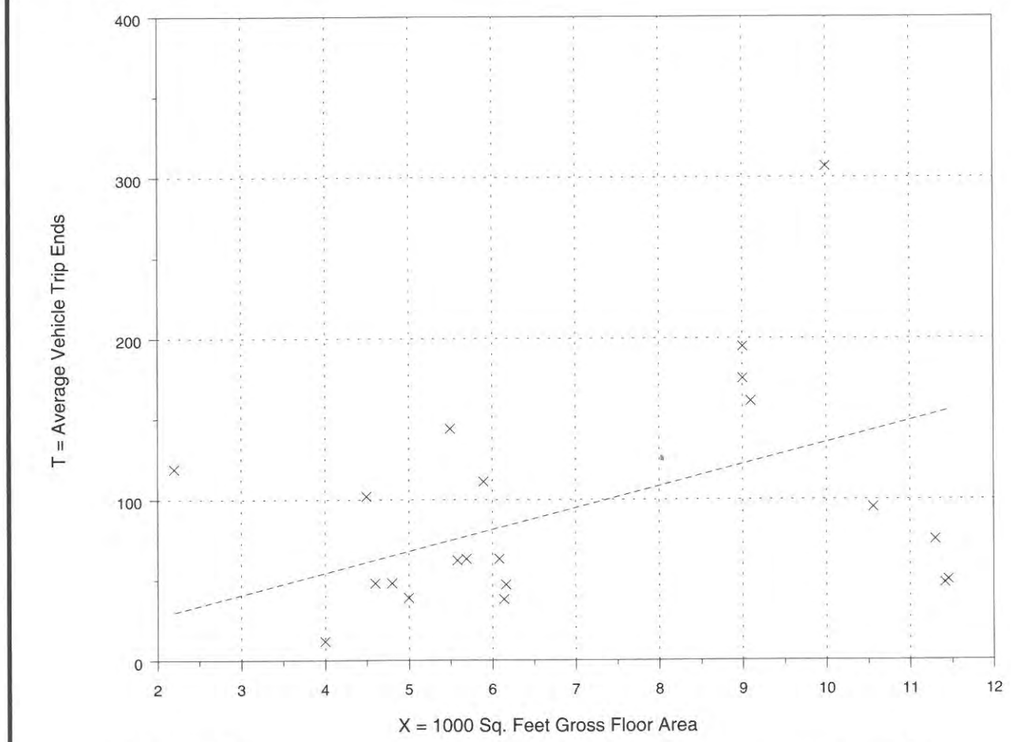
Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Weekday,**
A.M. Peak Hour of Generator

Number of Studies: 21
Average 1000 Sq. Feet GFA: 7
Directional Distribution: 52% entering, 48% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
13.53	3.00 - 54.09	10.05

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

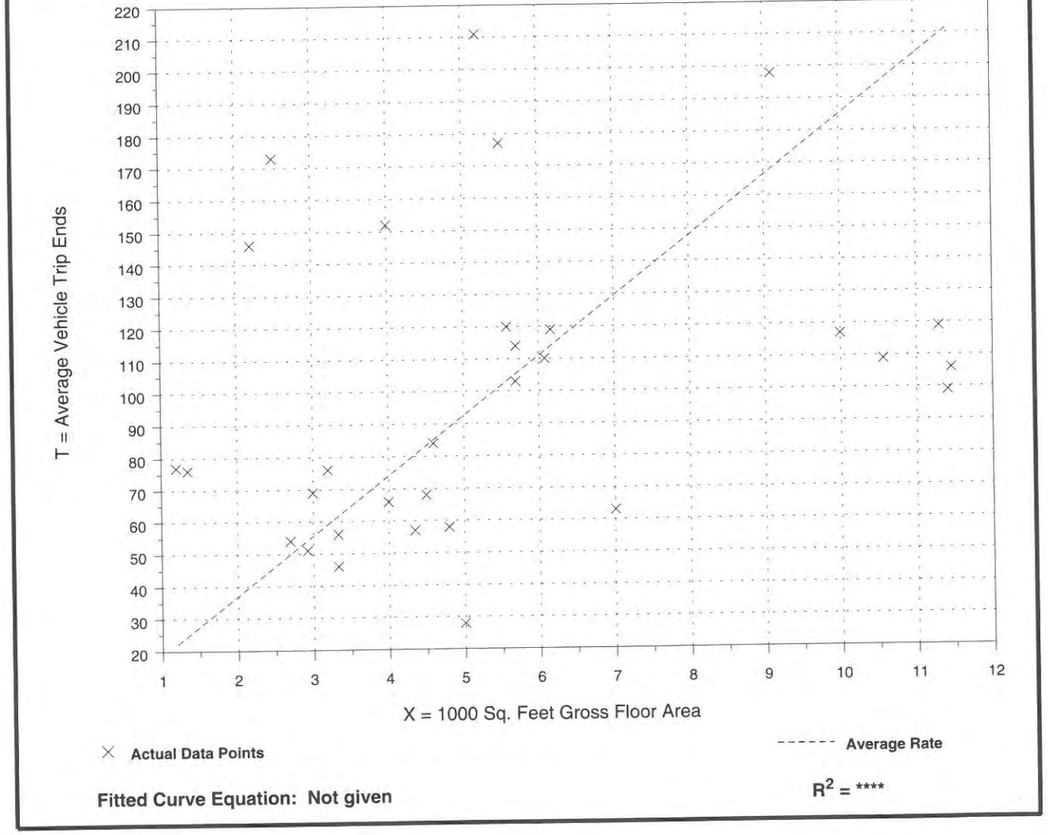
Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Weekday,**
P.M. Peak Hour of Generator

Number of Studies: 31
Average 1000 Sq. Feet GFA: 5
Directional Distribution: 54% entering, 46% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
18.49	5.60 - 69.20	13.32

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Saturday

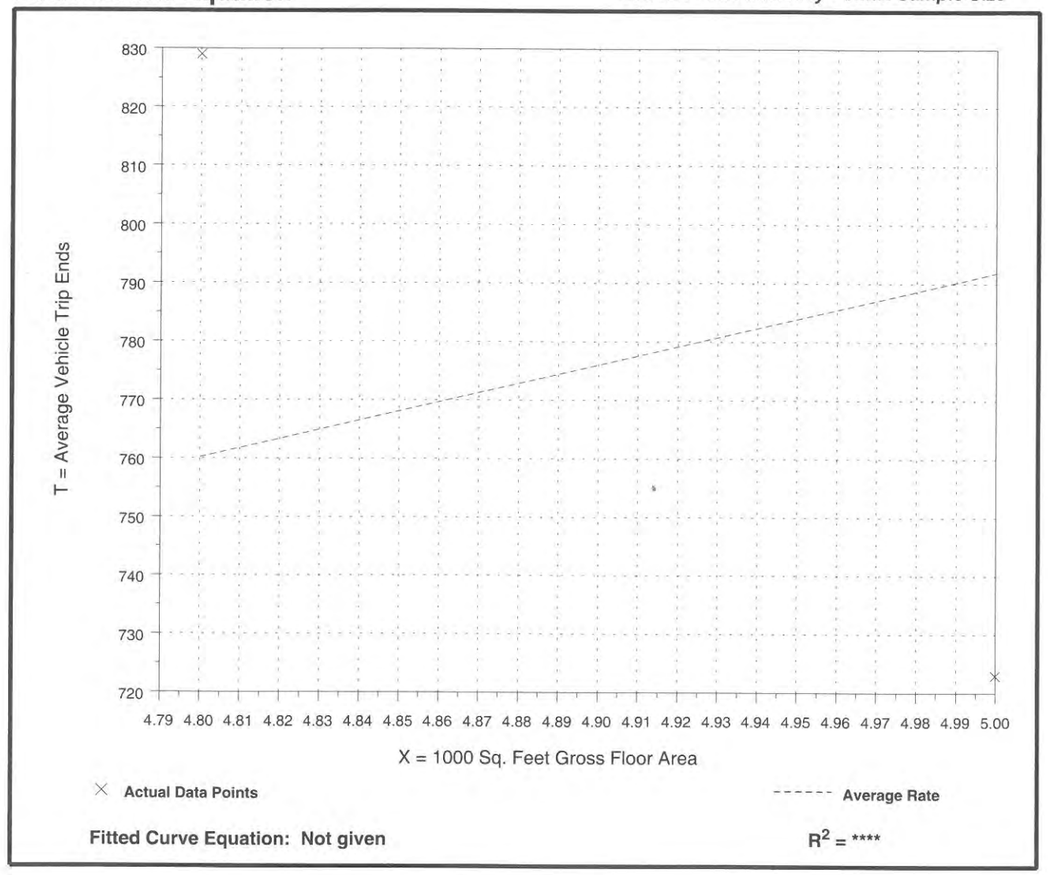
Number of Studies: 2
Average 1000 Sq. Feet GFA: 5
Directional Distribution: 50% entering, 50% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
158.37	144.60 - 172.71	*

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

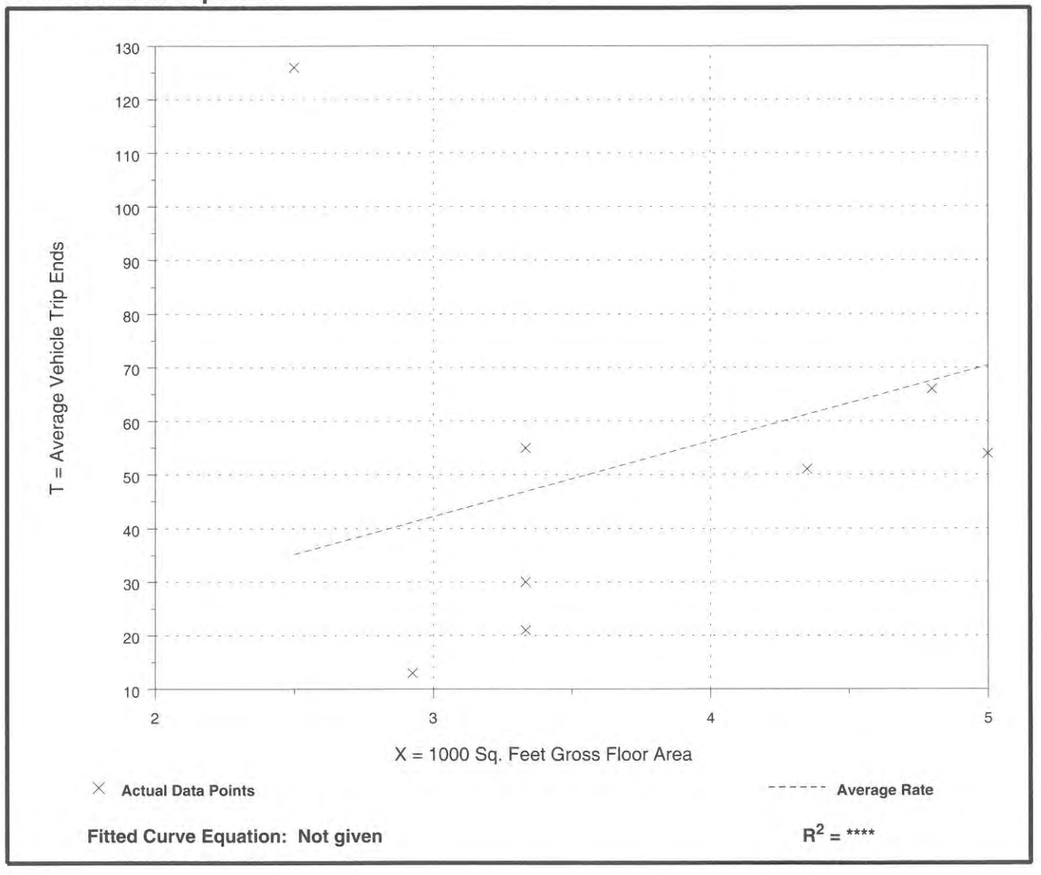
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Saturday,
Peak Hour of Generator

Number of Studies: 8
Average 1000 Sq. Feet GFA: 4
Directional Distribution: 53% entering, 47% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
14.07	4.44 - 50.40	12.19

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Sunday**

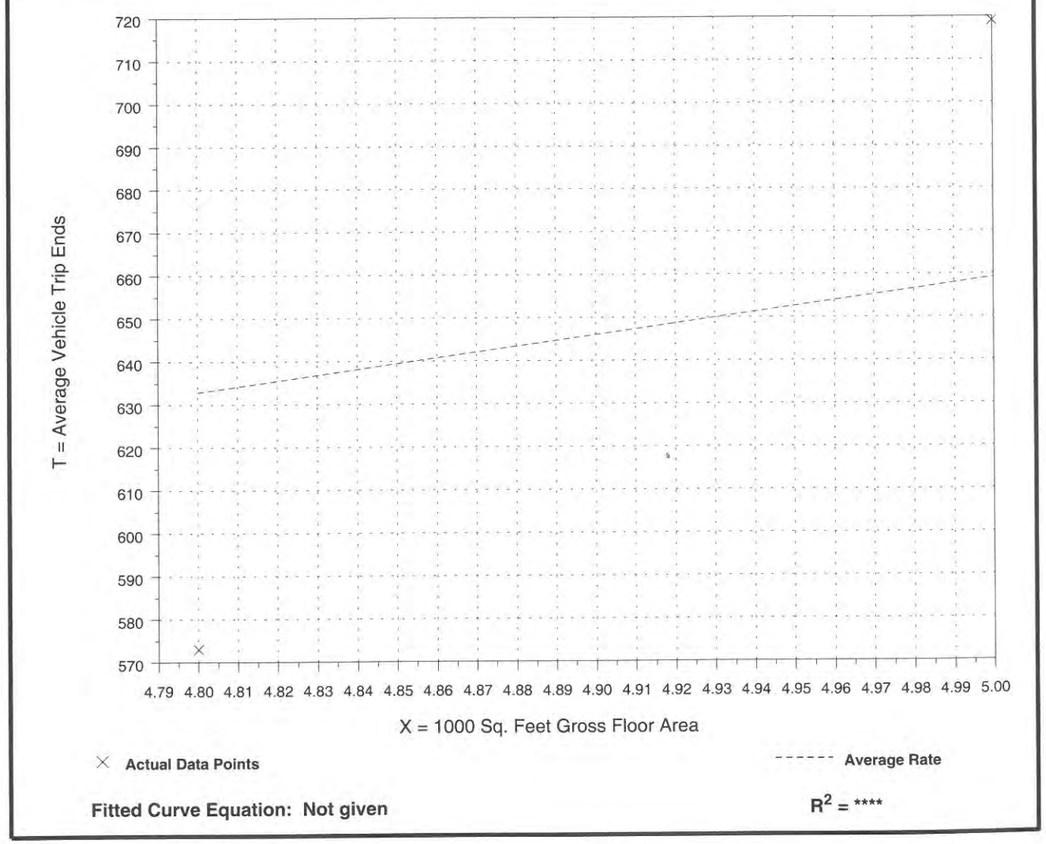
Number of Studies: 2
Average 1000 Sq. Feet GFA: 5
Directional Distribution: 50% entering, 50% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
131.84	119.38 - 143.80	*

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Sunday,**
Peak Hour of Generator

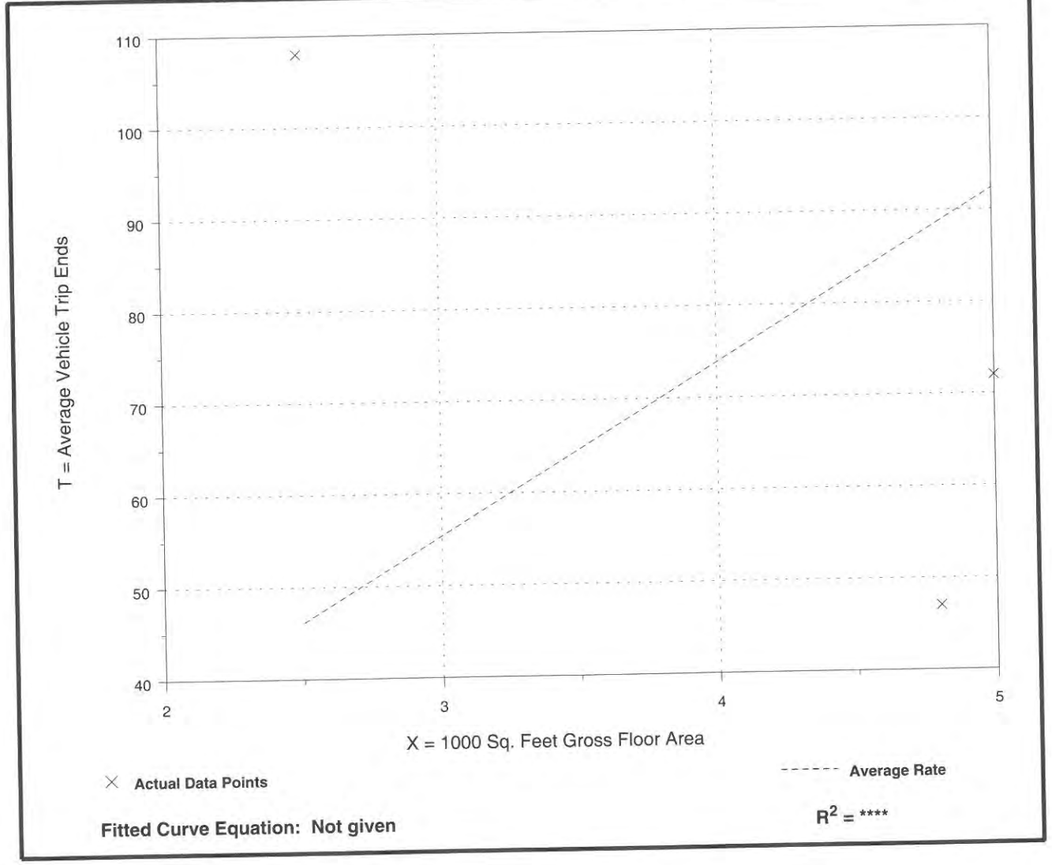
Number of Studies: 3
Average 1000 Sq. Feet GFA: 4
Directional Distribution: 55% entering, 45% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
18.46	9.79 - 43.20	13.74

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

Average Vehicle Trip Ends vs: **Seats**
On a: **Weekday**

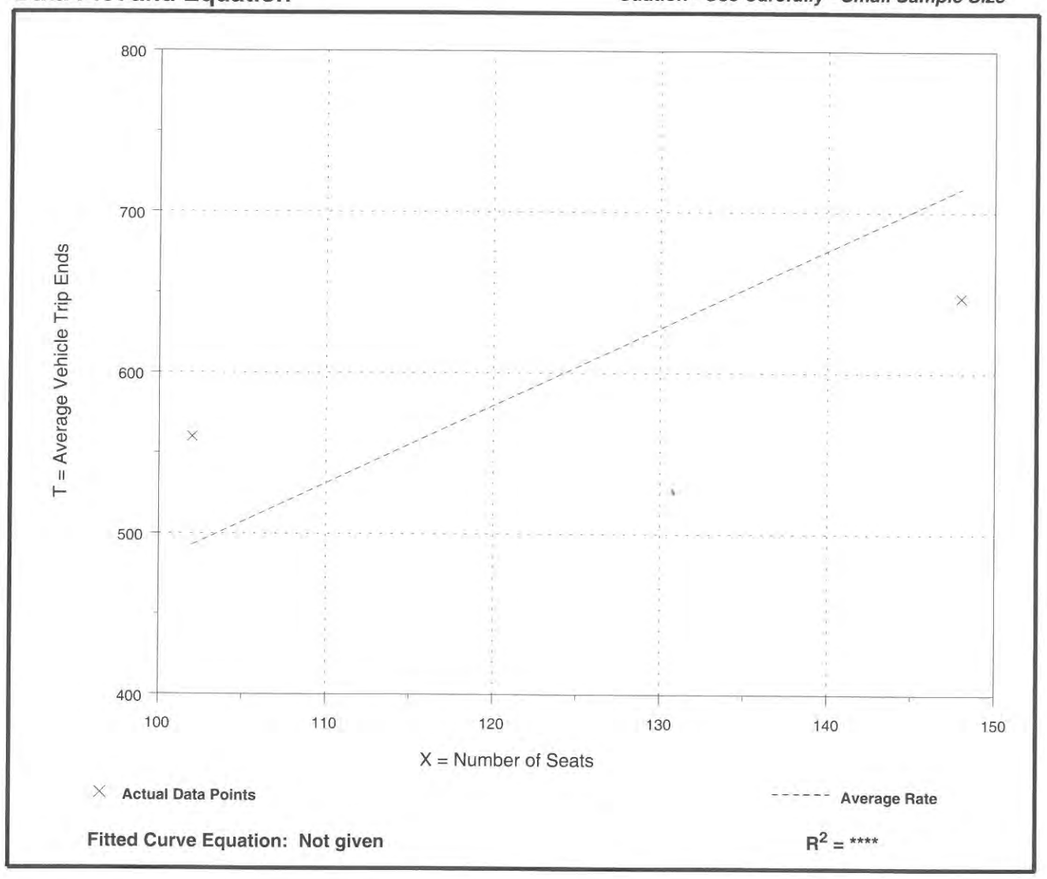
Number of Studies: 2
Average Number of Seats: 125
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
4.83	4.37 - 5.49	*

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

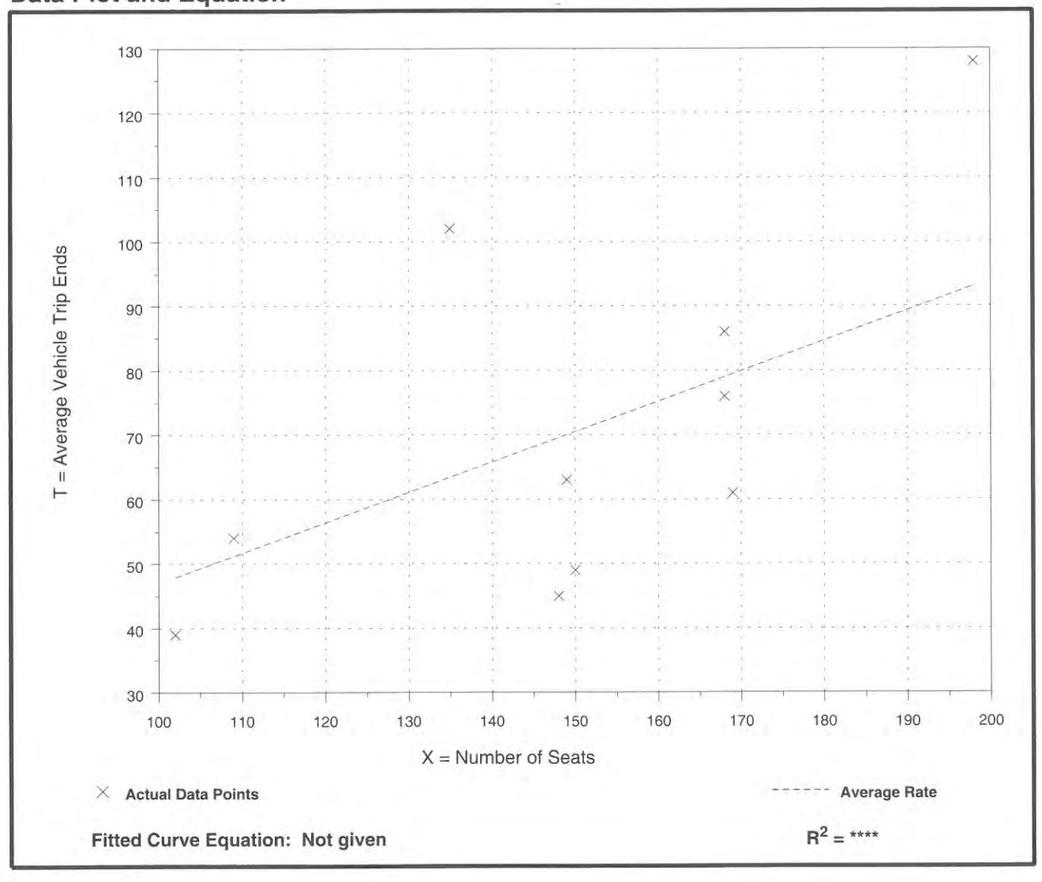
Average Vehicle Trip Ends vs: **Seats**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 10
Average Number of Seats: 150
Directional Distribution: 52% entering, 48% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
0.47	0.30 - 0.76	0.70

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

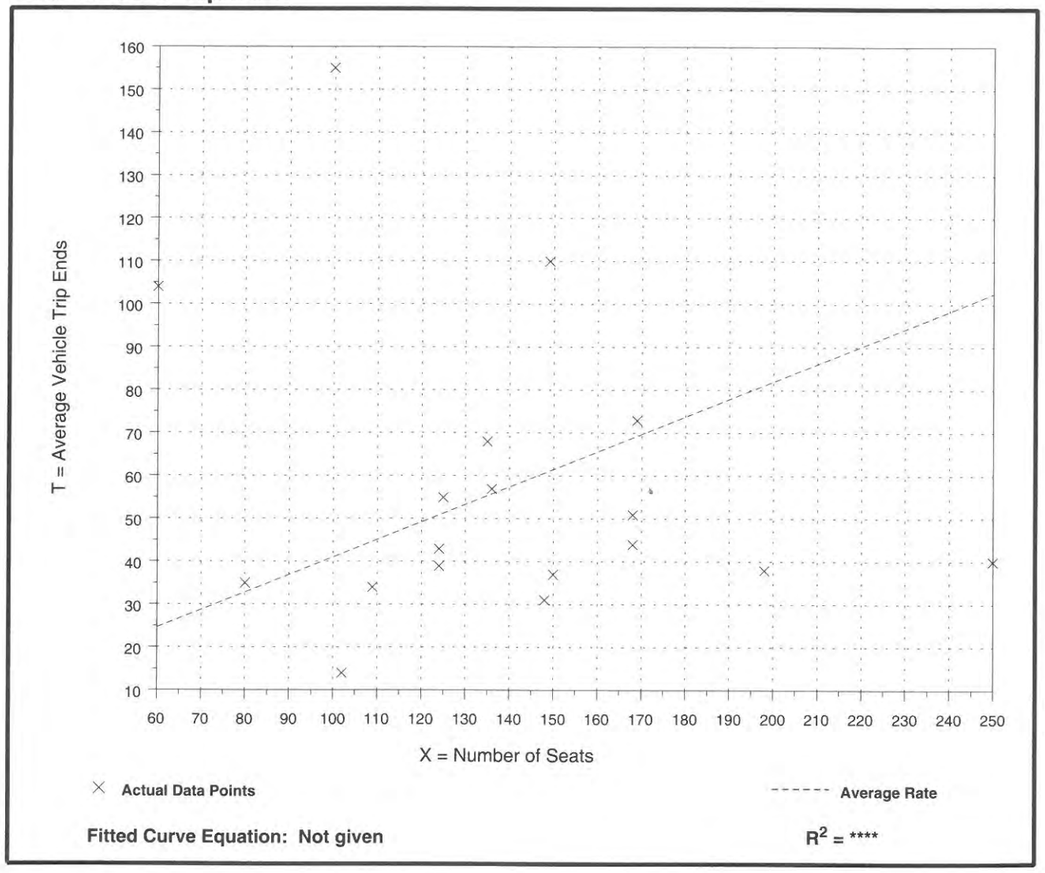
Average Vehicle Trip Ends vs: **Seats**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 18
Average Number of Seats: 139
Directional Distribution: 57% entering, 43% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
0.41	0.14 - 1.73	0.73

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

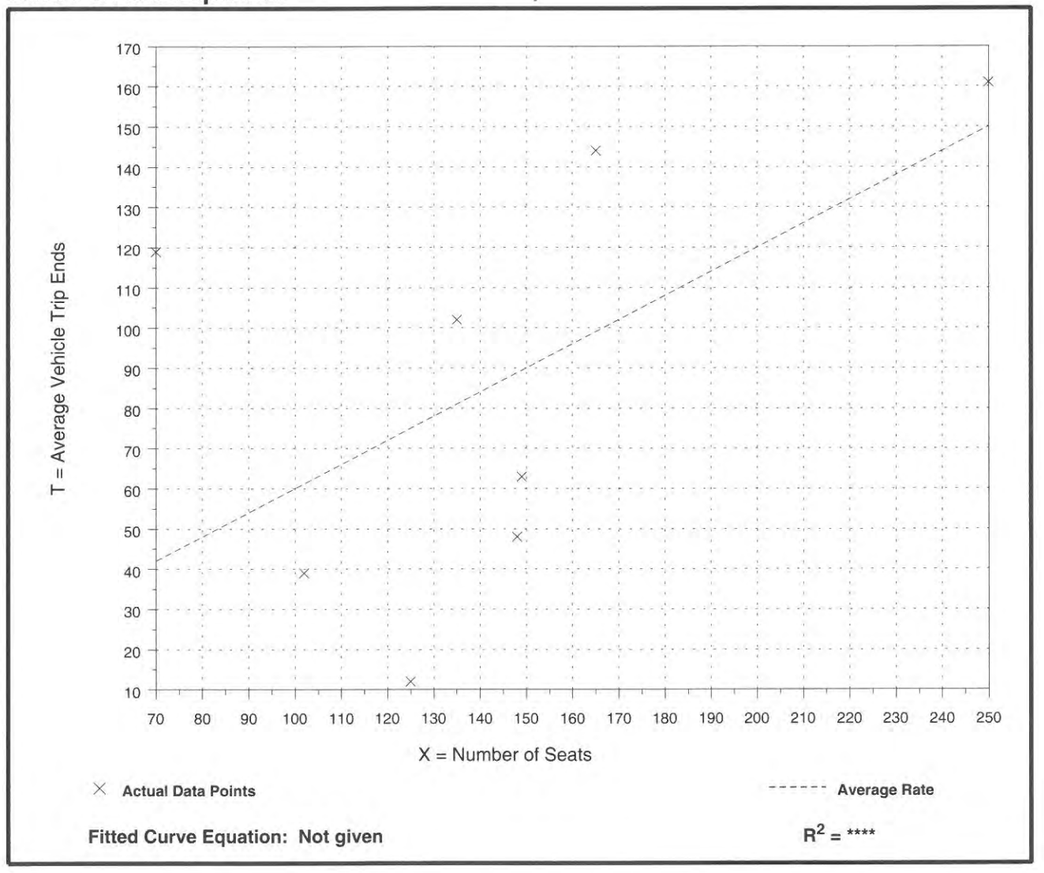
Average Vehicle Trip Ends vs: **Seats**
On a: **Weekday,**
A.M. Peak Hour of Generator

Number of Studies: 8
Average Number of Seats: 143
Directional Distribution: 58% entering, 42% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
0.60	0.10 - 1.70	0.86

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

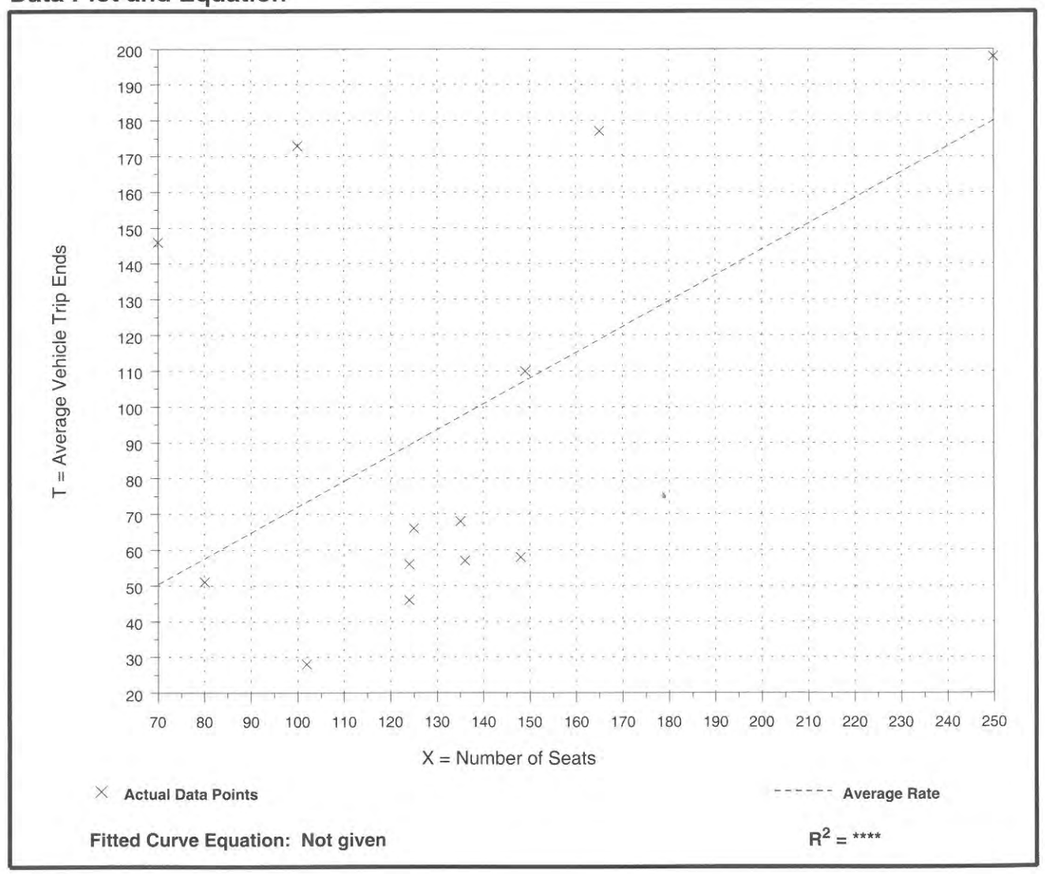
Average Vehicle Trip Ends vs: Seats
On a: Weekday,
P.M. Peak Hour of Generator

Number of Studies: 13
Average Number of Seats: 131
Directional Distribution: 52% entering, 48% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
0.72	0.27 - 2.09	0.96

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

Average Vehicle Trip Ends vs: Seats
On a: Saturday

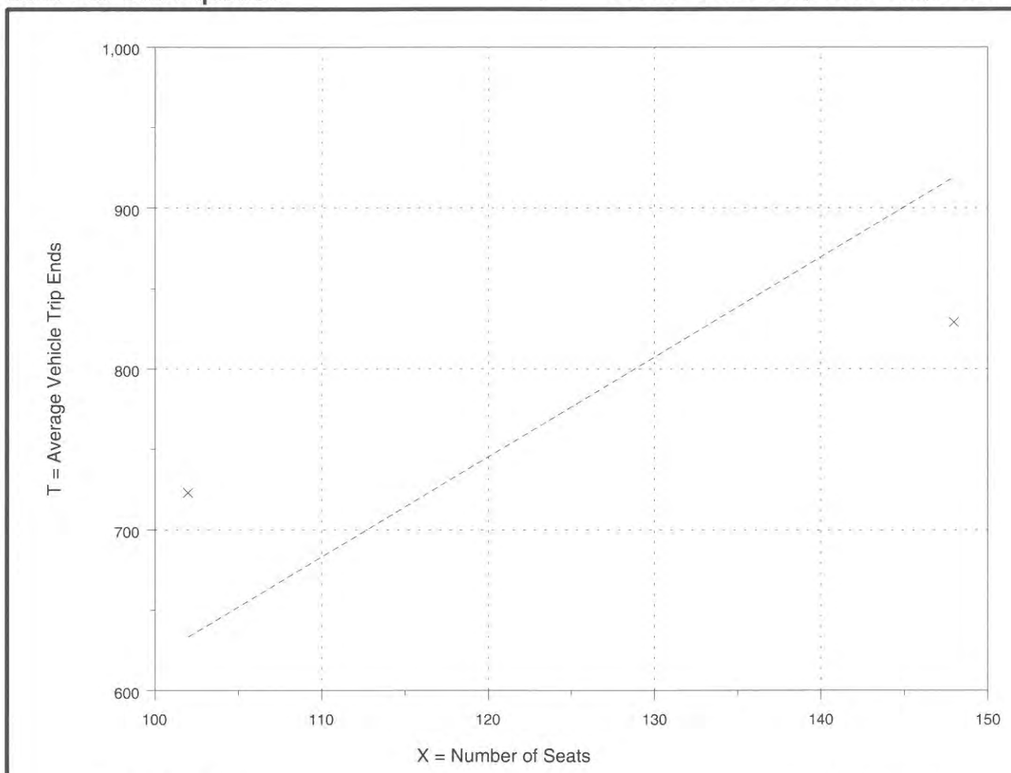
Number of Studies: 2
Average Number of Seats: 125
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
6.21	5.60 - 7.09	*

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

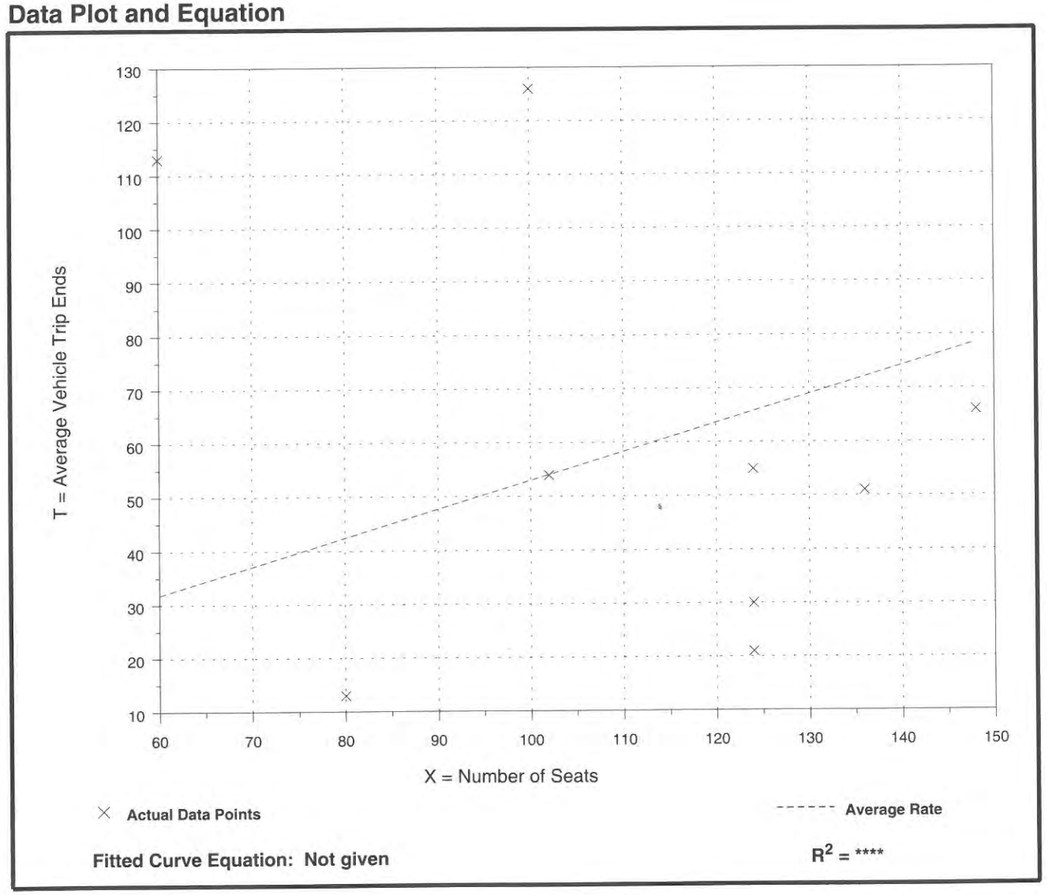
Average Vehicle Trip Ends vs: **Seats**
On a: **Saturday,**
Peak Hour of Generator

Number of Studies: 9
Average Number of Seats: 111
Directional Distribution: 53% entering, 47% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
0.53	0.16 - 1.88	0.86

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

Average Vehicle Trip Ends vs: **Seats**
On a: **Sunday**

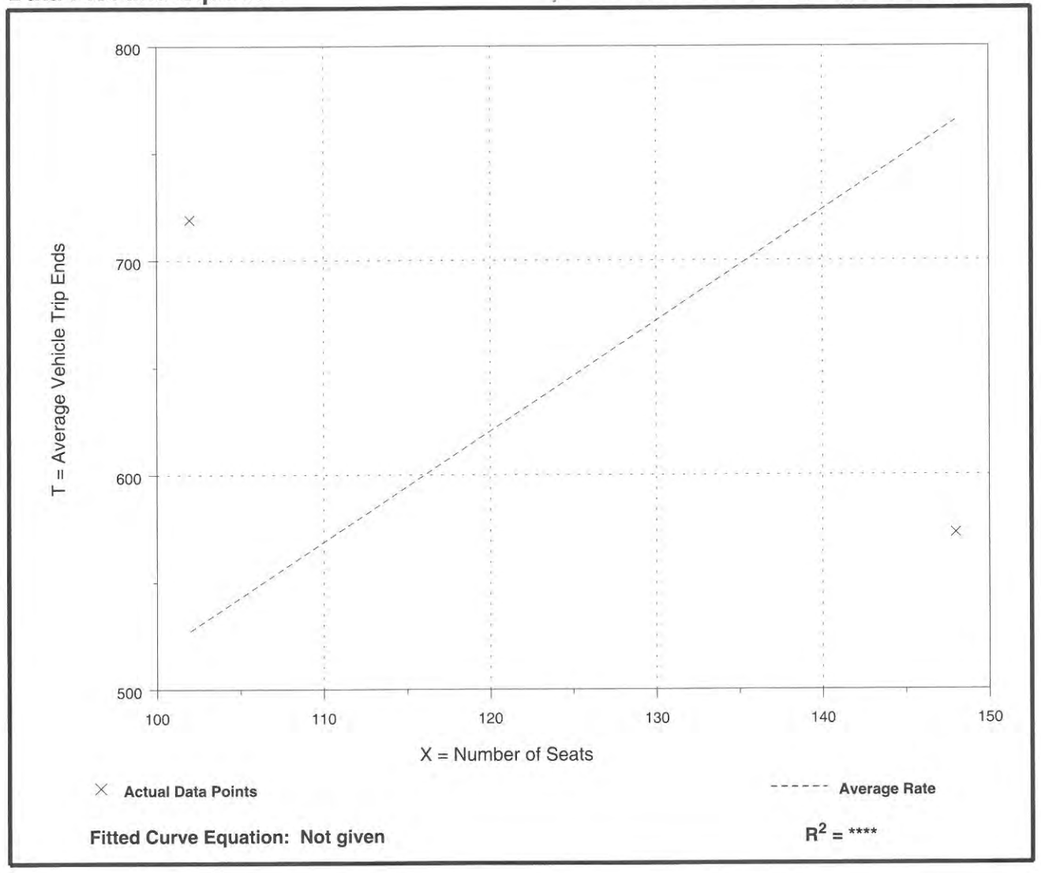
Number of Studies: 2
Average Number of Seats: 125
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
5.17	3.87 - 7.05	*

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

High-Turnover (Sit-Down) Restaurant
(932)

Average Vehicle Trip Ends vs: **Seats**
On a: **Sunday,**
Peak Hour of Generator

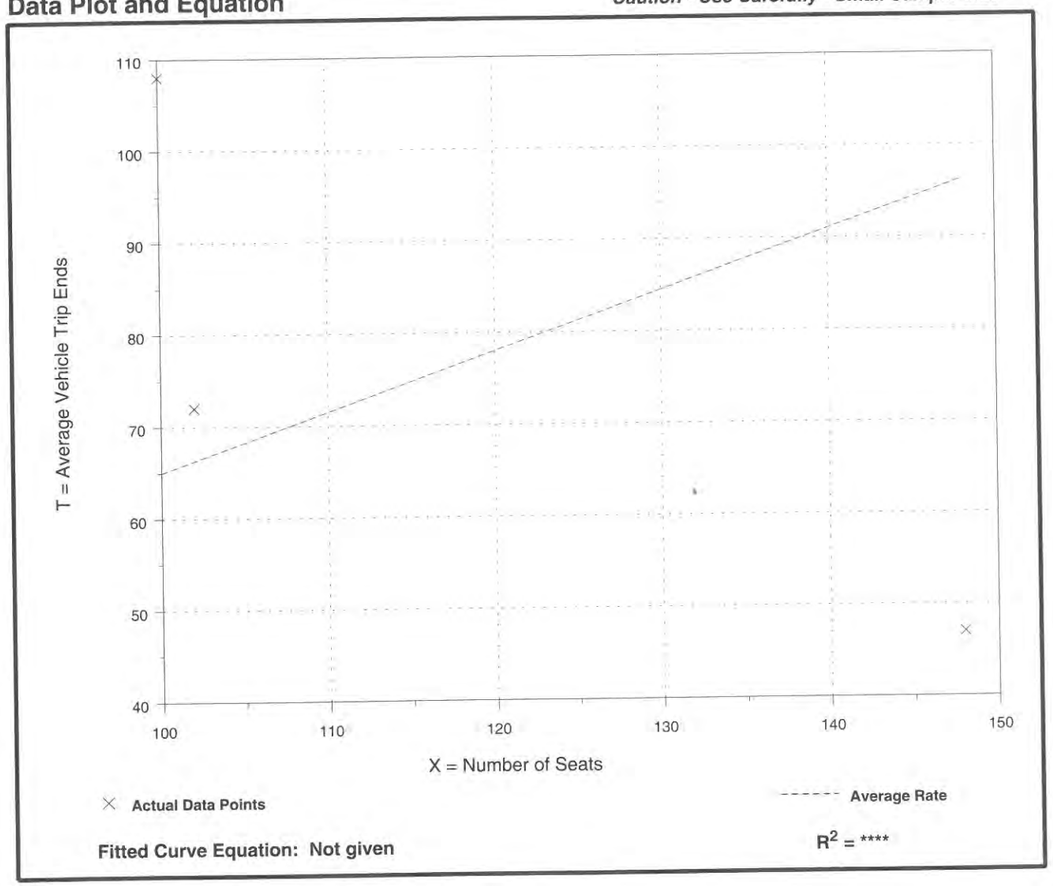
Number of Studies: 3
Average Number of Seats: 117
Directional Distribution: 55% entering, 45% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
0.65	0.32 - 1.08	0.86

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Land Use: 933
Fast-Food Restaurant without Drive-Through Window

Description

This land use includes fast-food restaurants without drive-through windows. This type of restaurant is characterized by a large carry-out clientele; long hours of service (some are open for breakfast, all are open for lunch and dinner, some are open late at night or 24 hours per day); and high turnover rates for eat-in customers. These limited-service eating establishments do not provide table service. Patrons generally order at a cash register and pay before they eat. High-turnover (sit-down) restaurant (Land Use 932), fast-food restaurant with drive-through window (Land Use 934) and fast-food restaurant with drive-through window and no indoor seating (Land Use 935) are related uses.

Additional Data

Although the facilities in this land use may or may not be open for breakfast, it was confirmed that the data provided during the a.m. peak periods were strictly for facilities that were open during this time frame.

The outdoor seating area is not included in the overall gross floor area. Therefore, the number of seats may be a more reliable independent variable on which to establish trip generation rates for facilities having significant outdoor seating.

The sites were surveyed between the 1980s and the 2000s throughout the United States.

It has been speculated that hamburger restaurants may generate trips at a higher rate than other types of fast-food restaurants. The database was tested in an attempt to verify this assumption; the data neither verified nor disproved it. Future research is needed in this area.

Specialized Land Use Data

Current industry trends have resulted in the emergence of several new fast-food restaurants without drive-through windows that specialize in the sale of very specific food items. The trip generation characteristics of these facilities differ from the facilities typically contained in this land use; their sizes, trip generation rates and peak hour of service vary considerably. Another notable difference in these land uses is that they are typically not stand-alone facilities; these restaurants are generally located in small shopping centers. Therefore, the information collected for these facilities is presented in the following table and was excluded from the data plots.

High-Turnover (Sit-Down) Restaurant
(932)

Average Vehicle Trip Ends vs: **Seats**
On a: **Sunday,**
Peak Hour of Generator

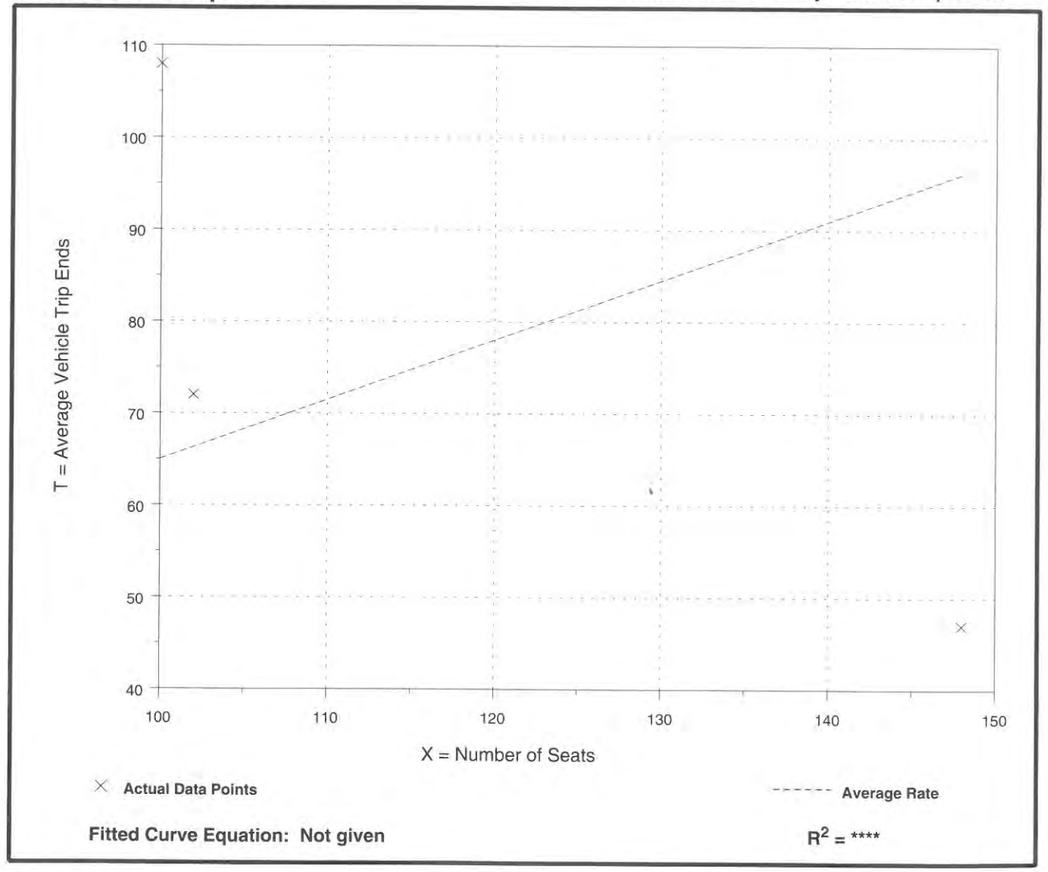
Number of Studies: 3
Average Number of Seats: 117
Directional Distribution: 55% entering, 45% exiting

Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
0.65	0.32 - 1.08	0.86

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Land Use: 933
Fast-Food Restaurant without Drive-Through Window

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Additional Data

Although the facilities in this land use may or may not be open for breakfast, it was confirmed that the data provided during the a.m. peak periods were strictly for facilities that were open during this time frame.

The outdoor seating area is not included in the overall gross floor area. Therefore, the number of seats may be a more reliable independent variable on which to establish trip generation rates for facilities having significant outdoor seating.

The sites were surveyed between the 1980s and the 2000s throughout the United States.

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Specialized Land Use Data

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Table 1: Yogurt Shop

1,000 Square Feet Gross Floor Area

Day/Time Period	Trip Generation Rate	Size of Independent Variable	Number of Studies	Directional Distribution
Weekday p.m. Peak Hour of Street Adjacent Traffic	15.12	0.86	1	38% entering, 62% exiting
Weekday p.m. Peak Hour of Generator	18.60	0.86	1	50% entering, 50% exiting

Source: 414

Source Numbers

163, 247, 278, 319, 342, 414

Land Use: 933
Fast-Food Restaurant without Drive-Through Window

Independent Variables with One Observation

The following trip generation data are for independent variables with only one observation. This information is shown in this table only; there are no related plots for these data.

Users are cautioned to use data with care because of the small sample size.

Independent Variable	Trip Generation Rate	Size of Independent Variable	Number of Studies	Directional Distribution
1,000 Square Feet Gross Floor Area				
Weekday	716	1	1	50% entering, 50% exiting
Saturday	696	1	1	50% entering, 50% exiting
Saturday Peak Hour of Generator	54.55	5	1	49% entering, 51% exiting
Sunday	500	1	1	50% entering, 50% exiting
Seats				
Weekday	42.12	17	1	50% entering, 50% exiting
Weekday p.m. Peak Hour of Adjacent Street Traffic	2.13	30	1	64% entering, 36% exiting
Weekday p.m. Peak Hour of Generator	6.59	17	1	52% entering, 48% exiting
Saturday	40.94	17	1	50% entering, 50% exiting
Sunday	29.41	17	1	50% entering, 50% exiting

Fast-Food Restaurant without Drive-Through Window
(933)

Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

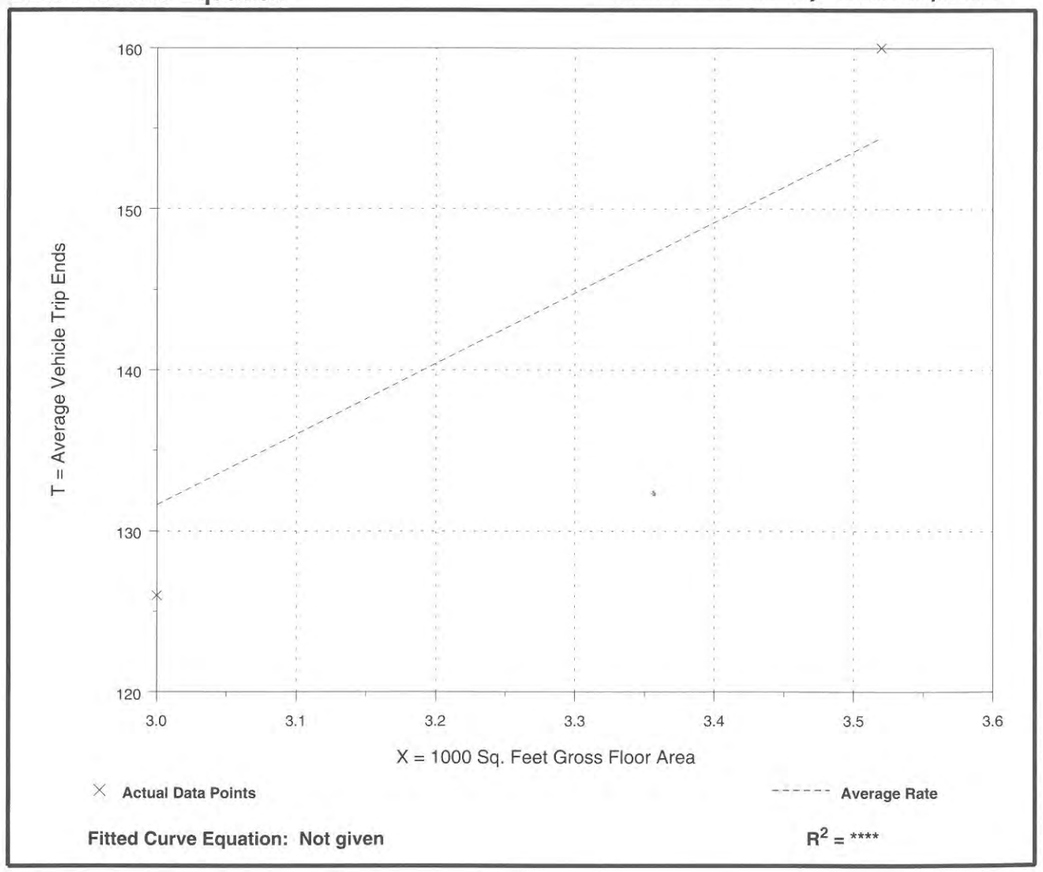
Number of Studies: 2
Average 1000 Sq. Feet GFA: 3
Directional Distribution: 60% entering, 40% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
43.87	42.00 - 45.45	*

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Fast-Food Restaurant without Drive-Through Window
(933)

Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

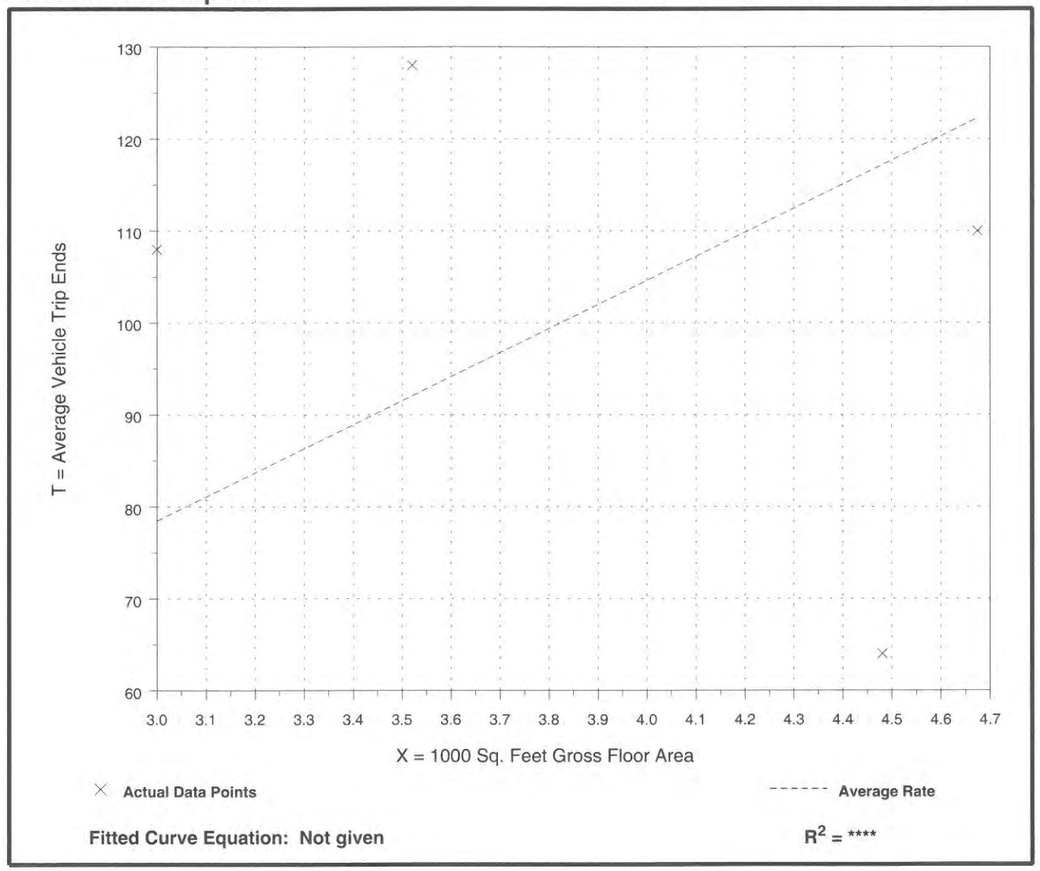
Number of Studies: 4
Average 1000 Sq. Feet GFA: 4
Directional Distribution: 51% entering, 49% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
26.15	14.28 - 36.36	10.51

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Fast-Food Restaurant without Drive-Through Window
(933)

Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Weekday,**
A.M. Peak Hour of Generator

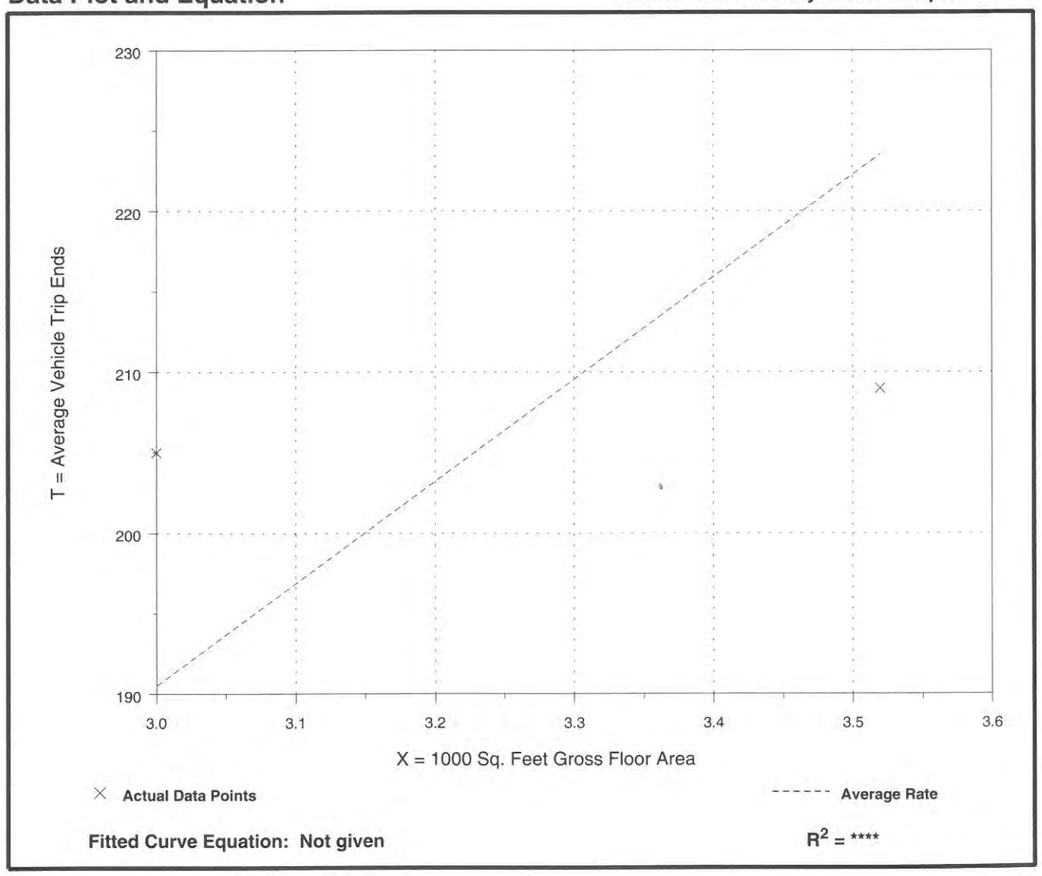
Number of Studies: 2
Average 1000 Sq. Feet GFA: 3
Directional Distribution: 52% entering, 48% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
63.50	59.38 - 68.33	*

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Fast-Food Restaurant without Drive-Through Window
(933)

Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Weekday,**
P.M. Peak Hour of Generator

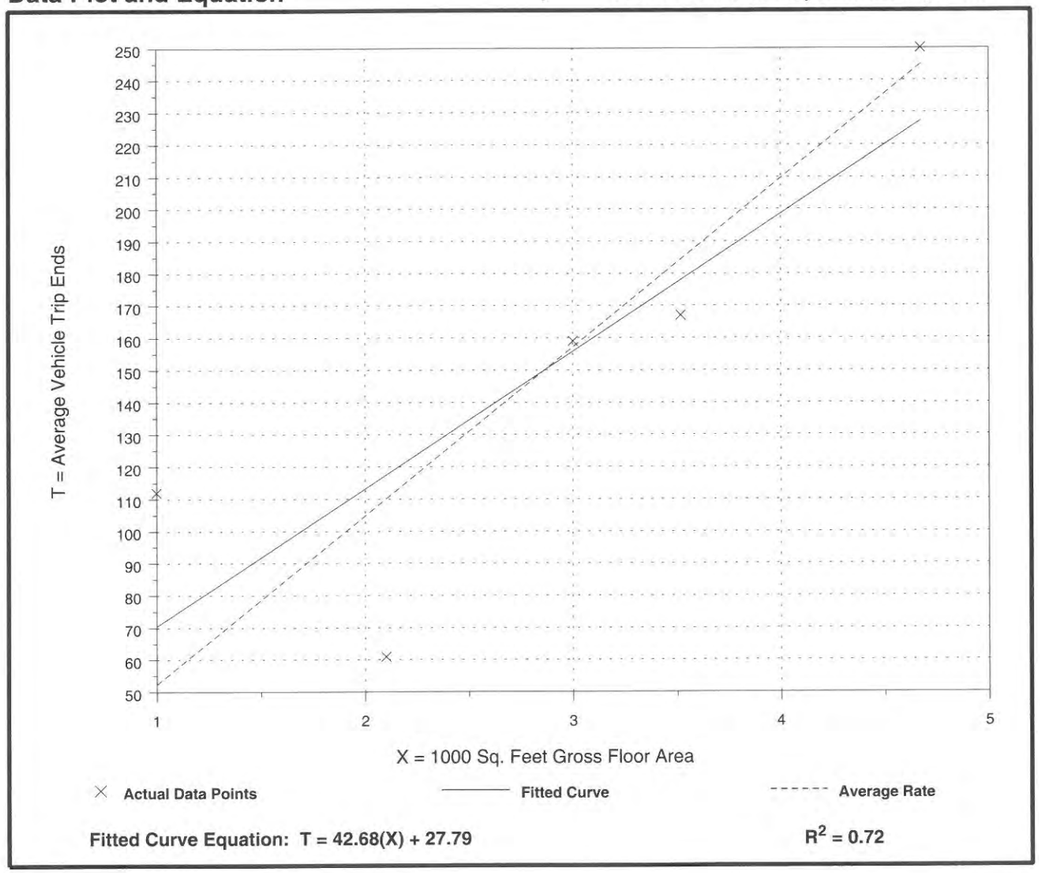
Number of Studies: 5
Average 1000 Sq. Feet GFA: 3
Directional Distribution: 51% entering, 49% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
52.40	29.05 - 112.00	19.86

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: T = 42.68(X) + 27.79

R^2 = 0.72

Land Use: 946
Gasoline/Service Station with Convenience Market and Car Wash

Description

This land use includes gasoline/service stations with convenience markets and car washes where the primary business is the fueling of motor vehicles. They may also have ancillary facilities for servicing and repairing motor vehicles. These service stations are generally located at intersections or interchanges. Convenience market (open 24 hours) (Land Use 851), convenience market (open 15-16 hours) (Land Use 852), convenience market with gasoline pumps (Land Use 853), gasoline/service station (Land Use 944) and gasoline/service station with convenience market (Land Use 945) are related uses.

Additional Data

The independent variable, vehicle fueling position, is defined as the maximum number of vehicles that can be fueled simultaneously.

Gasoline/service stations in this land use include "pay-at-the-pump" and traditional fueling stations.

The sites were surveyed between the late 1980s and the 2000s throughout the United States.

Source Numbers

334, 340, 347, 348, 355, 385, 440, 445, 540, 580, 586, 617

Gasoline/Service Station with Convenience Market and Car Wash
(946)

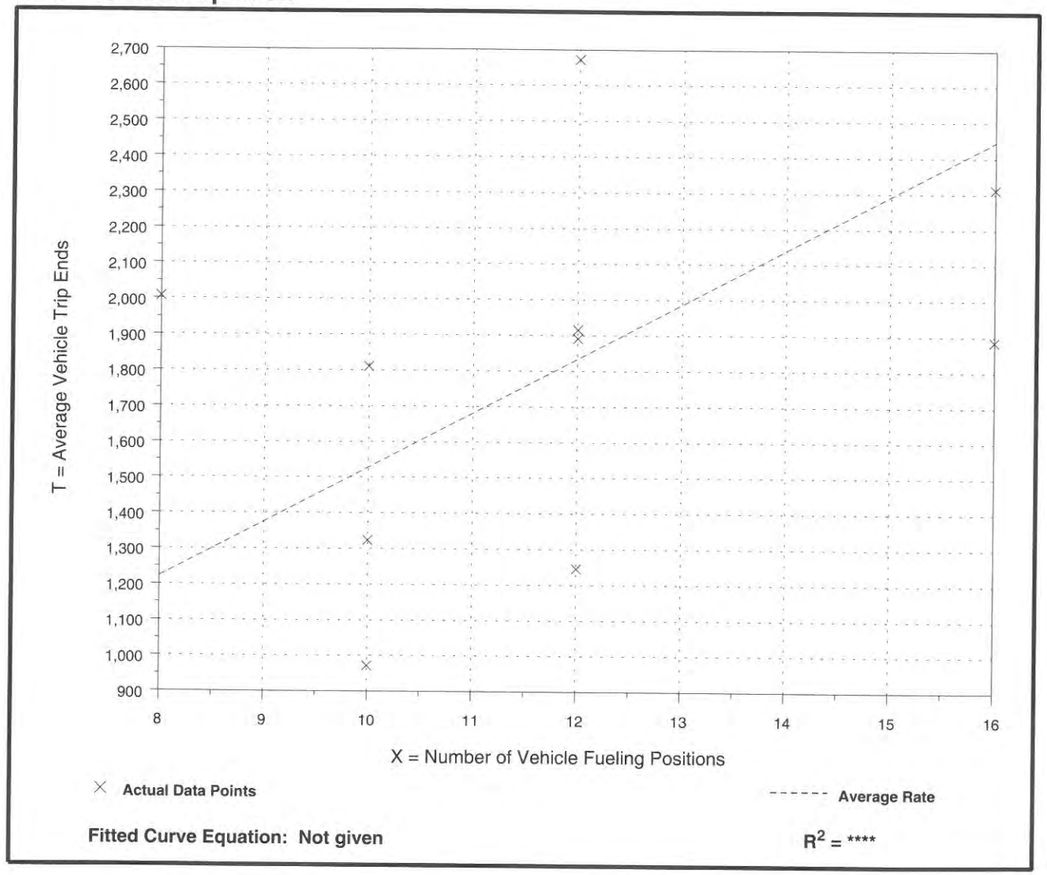
Average Vehicle Trip Ends vs: Vehicle Fueling Positions
On a: Weekday

Number of Studies: 10
Average Vehicle Fueling Positions: 12
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
152.84	97.20 - 250.88	45.80

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

Gasoline/Service Station with Convenience Market and Car Wash
(946)

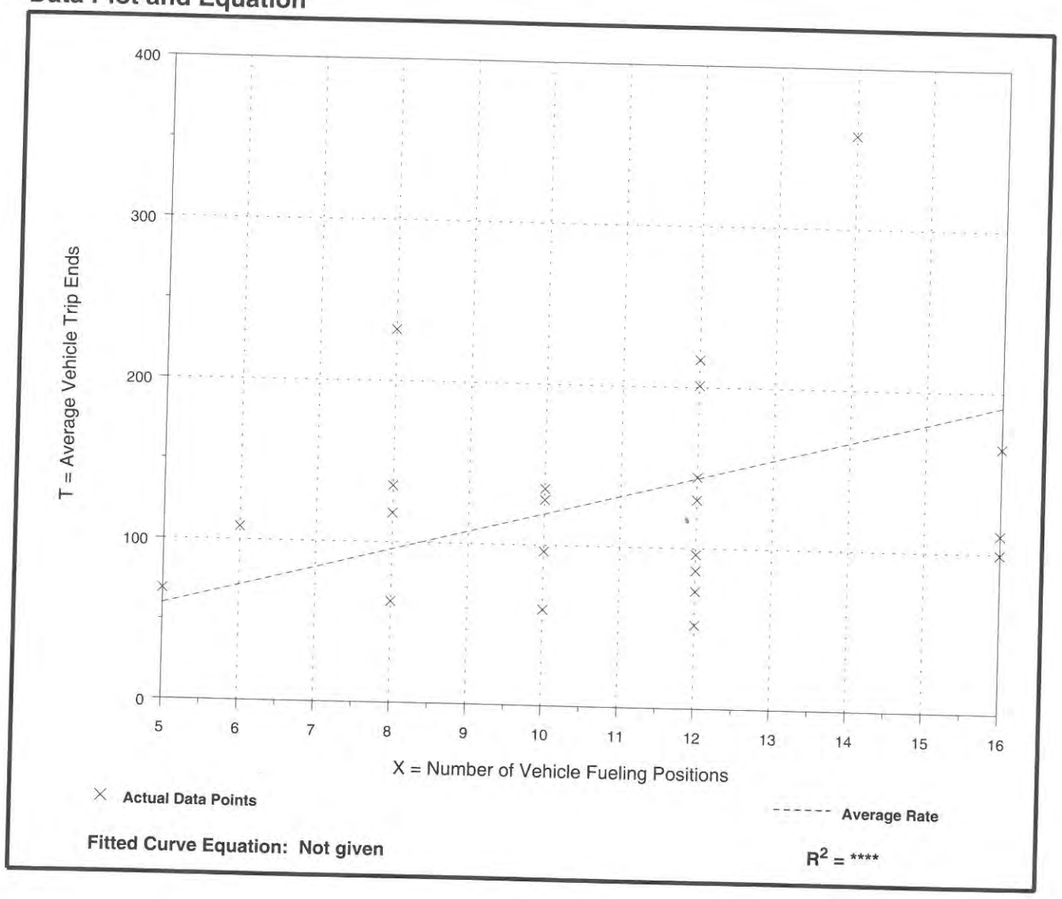
Average Vehicle Trip Ends vs: Vehicle Fueling Positions
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 22
Average Vehicle Fueling Positions: 11
Directional Distribution: 51% entering, 49% exiting

Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
11.93	4.33 - 29.00	7.04

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

Gasoline/Service Station with Convenience Market and Car Wash
(946)

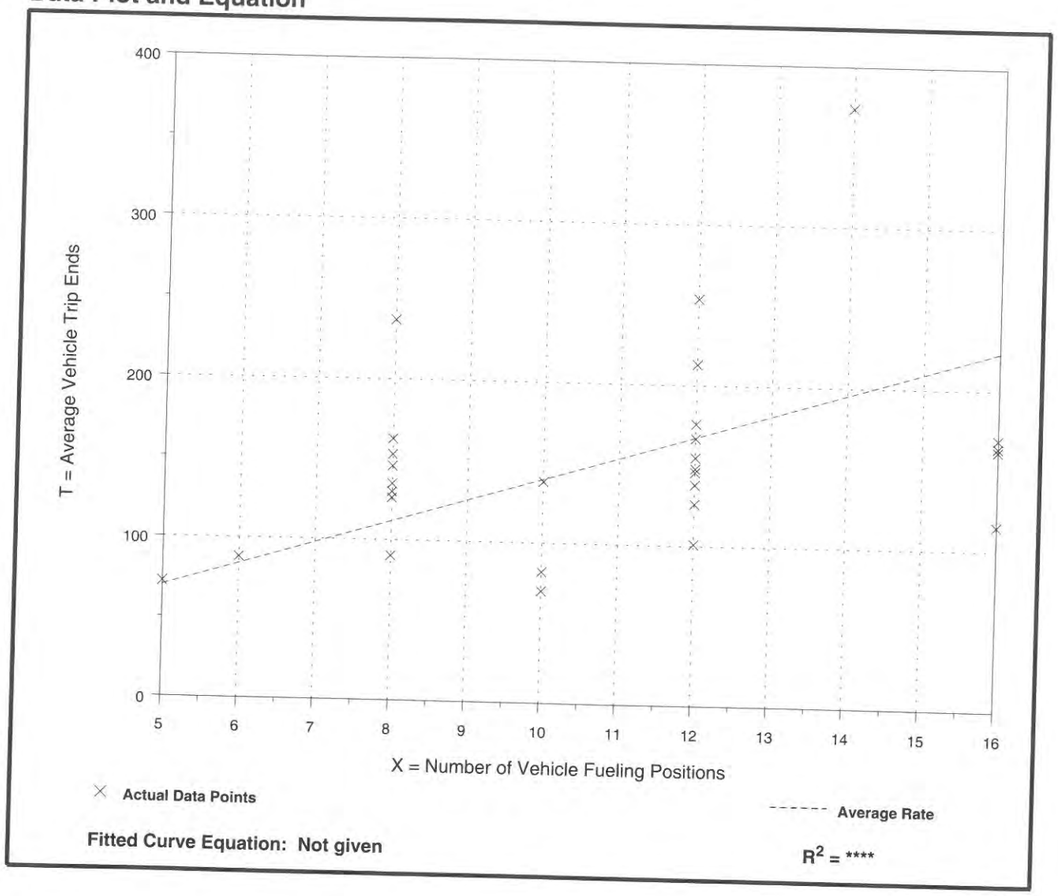
Average Vehicle Trip Ends vs: Vehicle Fueling Positions
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 30
Average Vehicle Fueling Positions: 11
Directional Distribution: 51% entering, 49% exiting

Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
13.94	7.00 - 29.63	6.31

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

Gasoline/Service Station with Convenience Market and Car Wash
(946)

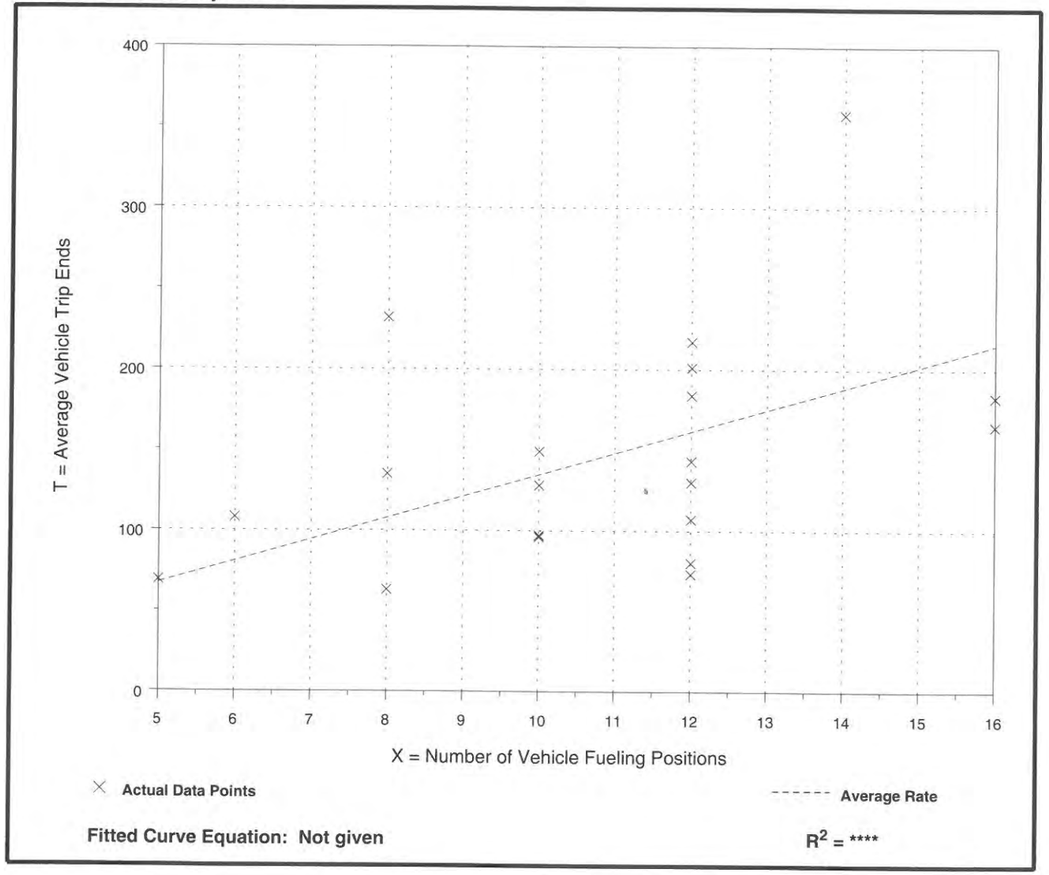
Average Vehicle Trip Ends vs: Vehicle Fueling Positions
On a: Weekday,
A.M. Peak Hour of Generator

Number of Studies: 20
Average Vehicle Fueling Positions: 11
Directional Distribution: 51% entering, 49% exiting

Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
13.45	6.08 - 29.00	6.68

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

Gasoline/Service Station with Convenience Market and Car Wash
(946)

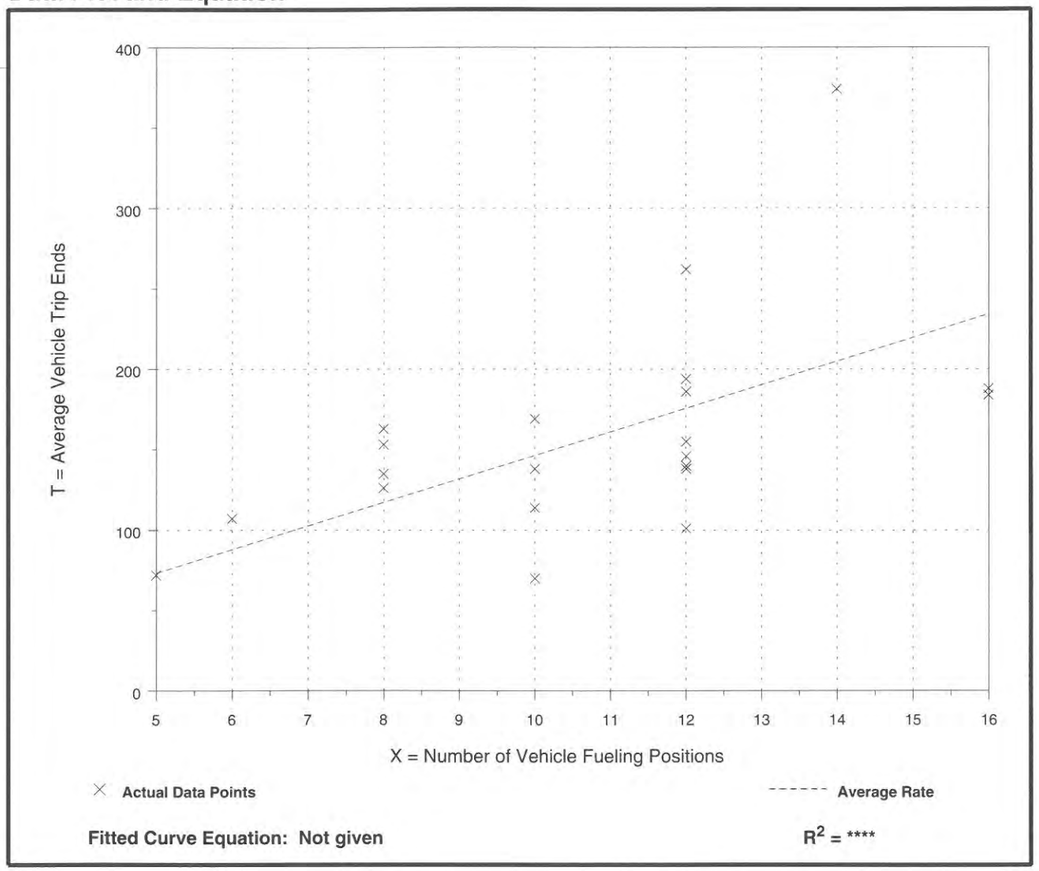
Average Vehicle Trip Ends vs: Vehicle Fueling Positions
On a: Weekday,
P.M. Peak Hour of Generator

Number of Studies: 22
Average Vehicle Fueling Positions: 11
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
14.64	7.00 - 26.71	5.91

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

Gasoline/Service Station with Convenience Market and Car Wash
(946)

Average Vehicle Trip Ends vs: Vehicle Fueling Positions
On a: Saturday,
Peak Hour of Generator

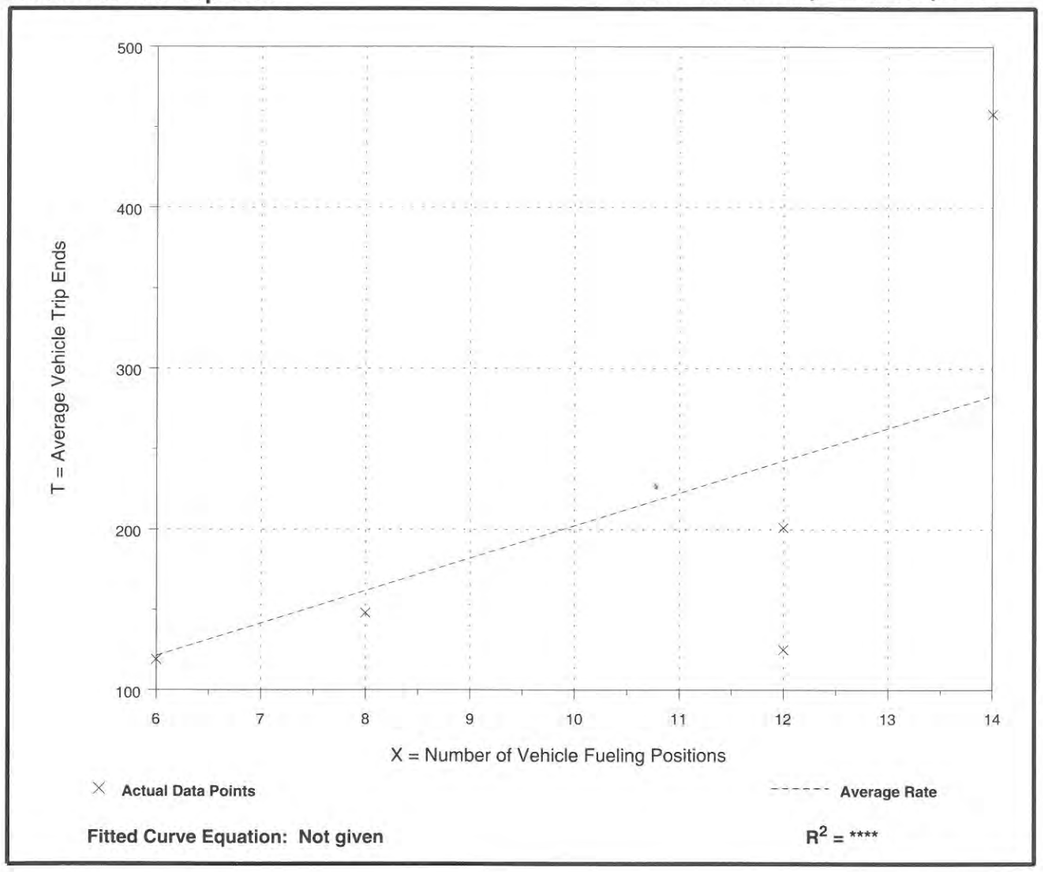
Number of Studies: 5
Average Vehicle Fueling Positions: 10
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
20.21	10.42 - 32.71	9.35

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: Not given

R^2 = ****

Land Use: 947
Self-Service Car Wash

Description

Self-service car washes allow manual cleaning of vehicles by providing stalls to park and wash vehicles. Automated car wash (Land Use 948) is a related use.

Additional Data

The sites were surveyed between the late 1960s and the 2000s in Colorado, New Jersey and South Dakota.

Source Numbers

171, 178, 358, 359, 550

Attachment 4:

Maryland State Highway Administration (SHA) and

Anne Arundel County Correspondence

(Meeting Minutes, Comments, and Responses)

Maryland Aviation Administration (MAA)

Anne Arundel County Traffic Analysis Requirements to Support BWI Marshall Proposed Improvements 2016-2020

(HNTB MAA-AE-11-001)

July 16, 2015
(11:00 AM-12:00 PM)
Meeting Minutes

Participants:

Robin Bowie, MAA
Wayne Schuster, MAA
Alex Ollerman, MAA
Daniel Anderson, AA County-DPW
Jon Mayer, AA County-OPZ
Martha Arzu-McIntosh, AA County-OPZ
Margaret Kaii-Ziegler, AA County-OPZ
David Braun, AA County-OPZ
Courtney Wilson, AA County-OPZ
Larry Tom, AA County-OPZ
Lynn Miller, AA County-OPZ
Matt Wolniak, JMT
Kim Hughes, HNTB

Purpose: The meeting was held to introduce proposed projects associated with the Airport Layout Plan (ALP) for Baltimore Washington Thurgood Marshall International Airport (BWI Marshall) to the planning staff at Anne Arundel County (County). Additionally, the meeting was held to receive initial thoughts on the necessary traffic analysis requirements to meet the County's needs.

Discussions: Mr. Schuster advised the group that MAA would be starting, likely in the fall of 2015, an Environmental Assessment for projects shown as Phase 1 (2016-2020) on the ALP. Mr. Schuster indicated that an EA is required by the Federal Aviation Administration (FAA) in order to move forward with design and construction of the ALP projects. This meeting is in advance of the EA process. Once the EA is initiated, MAA will have formal agency scoping meetings. Mr. Schuster described the proposed projects that MAA identified that may influence vehicular traffic, which included: a new terminal response fire rescue station; a second Fixed Base Operator, relocating the fire training facility; a vehicular service center; and a new aircraft maintenance facility.

The following summarizes those discussions:

- Mr. Braun advised that a traffic impact assessment is warranted if the proposed improvement either induces vehicular traffic and/or it impacts travel paths/patterns. The proposed improvements are likely to induce vehicular traffic, (although not extensively) and potentially change traffic patterns and thus it is assumed that a traffic impact assessment will be needed.

- Mr. Mayer asked about the need to move the hiker/biker trail that is currently located west of Runway 10/28. Mr. Schuster advised that with the likely improvements necessary if a new aircraft maintenance facility off of Stoney Run Road is constructed the hiker/biker path will be moved. The MAA is considering options for this relocation. It was also noted that only one new aircraft maintenance facility will be developed but that MAA will be considering both locations in the forthcoming EA.
- Ms. Arzu-McIntosh asked about improvements to Elm Road. Mr. Schuster advised that the ALP does include improvements to Elm Road but that they are beyond the horizon of the upcoming EA.
- Mr. Tom advised that for specific approvals they expect the EA to be completed and then site plan approval through his group will be necessary prior to construction. Mr. Schuster advised that once the EA starts it will like take two years therefore there will not be the need for site plan approval in the near future.
- Signal modifications will be necessary for the new fire rescue training facility opposite the I-97 ramps.
- Ms. Bowie advised that recent previous County generated comments on NEPA documents issued by MAA have typically focused on potential traffic impacts. For the hotel development EA, the County commented on the potential economic effect of adding another hotel in the BWI Marshall general area.
- The proposed Hanover Road/MD 295 interchange will likely be a concern in the future but the development is still more than five years away. See *Other Discussions* for additional discussion of Hanover Road improvements.
- The group reviewed the potential intersections for traffic impact analysis and determined that two proposed intersections should be eliminated (1. The intersection of Aviation Blvd and Aaronson Drive and 2. The intersection of Aviation Blvd and Hollins Ferry Road) and that four intersections should be added (1. The intersection of Stoney Run Road and New Ridge Road; 2. The intersection of Stoney Run Road and the entrance to Northrop Grumman, 3. The intersection of Elkridge Landing Road at Terminal Road; and 4. The intersection of Dorsey Road and Aviation Blvd). The attached map provides all the intersection locations agreed to with the County.
- Mr. Braun advised that the Study Area of the traffic impact assessment should be defined by extending out one arterial road from the intersections being analyzed. The County would like to review the proposed Study Area before any analysis is started.
- The group agreed that the years of analysis needed by the FAA (i.e. existing condition, 2020, and 2025) would meet the County's needs.
- Mr. Braun indicated that the County could provide a list of background development once the Study Area is defined. Application of a roadway network

growth rate is not required by the County since background development should account for any growth in traffic.

- Mr. Braun will be the County point of contact for meetings with the Maryland State Highway Administration (SHA). Mr. Braun advised that meetings with SHA should be scheduled as needed with invitations extended to the County. The County will assign staff to attend.
- The County and SHA have quarterly coordination meetings. The next meeting is scheduled for August 2015 and the County will include a discussion of the BWI Marshall study on the agenda.
- Synchro is an acceptable model for the traffic impact assessment. Mr. Wolniak asked if road ratings should be developed. Ms. Kaii-Ziegler advised that the use of Synchro should fulfill all of the County's needs.

Other discussions included:

- The County is starting a study on Ridge Road and will be in touch with MAA to understand MAA's future needs for this road.
- Hanover Road right-of-way is presently being dedicated. There is a land owner near the intersection of Ridge Road and Hanover Road that is working on design plans for the property. The County will be in touch with MAA about the potential to use MAA property for stormwater management required for the development. Ms. Bowie advised that the properties in that general area were purchased under the BWI Marshall's voluntary noise acquisition program and that if the County wants to use the land MAA will need to release (sell) it as the land was purchased using FAA funding. The County should know if land is needed to meet the developer's stormwater needs within six months. Ms. Bowie advised that the County should direct questions about purchase of the land in question to Ellen Sample.

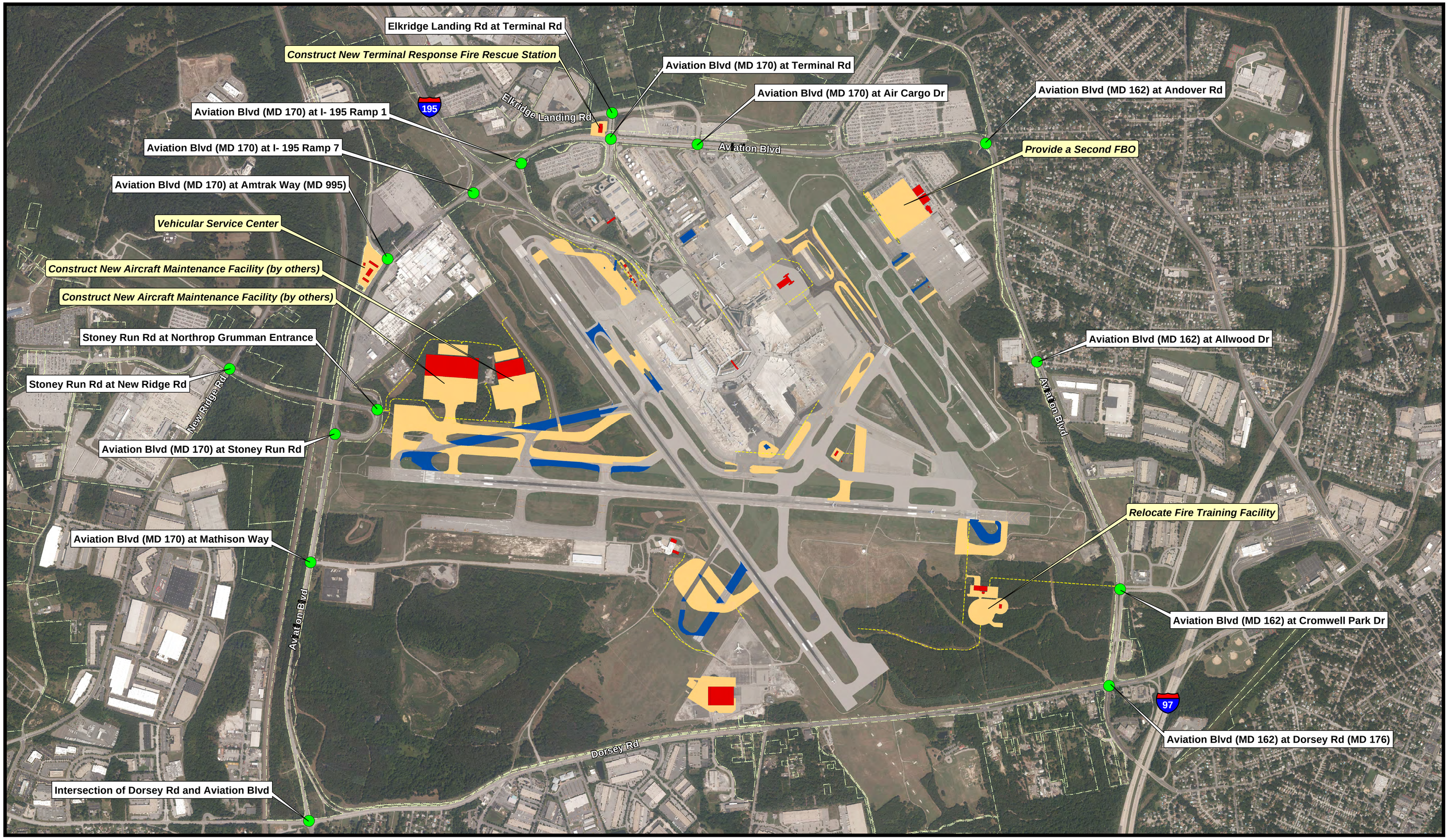
Action Items:

- Update mapping of potential intersection for analysis figure (completed and attached).
- Develop Study Area mapping and submit to the County for review prior to initiating analysis.

This is our understanding of items discussed and decisions reached.

Submitted by, Kim Hughes, PE.

BWI Marshall Proposed Improvements 2016-2020



LEGEND

- Airport Property Boundary
- Pavement Improvements
- Proposed Structures
- Demolition
- Vehicle Roadway Improvements

Potential Intersections for Analysis

N

0 350 700 1,400 Feet

HNTB

BWI MARSHALL AIRPORT

TRAFFIC ANALYSIS REQUIREMENTS TO SUPPORT 2016-2020 IMPROVEMENTS – INITIAL DISCUSSIONS

SIGN-IN SHEET

Name	Organization	E-mail Address
WAYNE SCHUSTER	MAA	wschuster@bwiairport.com
DANIEL ANDERSON	AA Co DPW	DWANDE85@AACOUNTY.ORG
KIM HUGHES	HNTB	khughes@hntb.com
Alex Ollerman	MAA	folleman1@bwiairport.com
MATT WOHNIAK	JMT	mwohniak@jmt.com
ROBIN M. BOWIE	MAA	RBOWIE@BWIAIRPORT.COM
JON MAYER	AA COUNTY/OPZ	PZMAYE98@AACOUNTY.ORG
Martha Arzu-McIntosh	AA County/OPZ	pzarzu68@aacounty.org
Margaret Kaji-Ziegler		mziegler@AAcounty.org

July 16, 2015 11:00 AM

Anne Arundel County Office of Planning and Zoning, Annapolis, Maryland

BWI MARSHALL AIRPORT

TRAFFIC ANALYSIS REQUIREMENTS TO SUPPORT 2016-2020 IMPROVEMENTS – INITIAL DISCUSSIONS

SIGN-IN SHEET

Name	Organization	E-mail Address
David Braun	AA Co OPZ	PZBRAU93@AACOUNTY.ORG
Courtney Wilson	AA OPZ	pzwils39@aacounty.org
LARRY TOM	AA OPZ	pztom264@aacounty.org
Lynn Miller	AA OPZ	pzmill03@ ----

July 16, 2015 11:00 AM
Anne Arundel County Office of Planning and Zoning, Annapolis, Maryland

Maryland Aviation Administration (MAA)

SHA Traffic Analysis Requirements to Support BWI Marshall Proposed Improvements 2016-2020
(HNTB MAA-AE-11-001)

September 4, 2015
(1:00-2:00 PM)
Meeting Minutes

Participants:

Robin Bowie, MAA
Wayne Schuster, MAA
Alex Ollerman, MAA
Tara Penders, SHA–Regional Planning
Will Cowan, SHA–District 5 Traffic
Eric Beckett, SHA–Regional Planning
Tyson Byrne, MDOT TSO OPCP
Mike Bailey, SHA–District 5 Access Management
Matt Wolniak, JMT
Kim Hughes, HNTB

Purpose: The meeting was held to introduce proposed projects associated with the Airport Layout Plan (ALP) for Baltimore Washington Thurgood Marshall International Airport (BWI Marshall) to Maryland State Highway Administration (SHA) staff. Additionally, the meeting was held to receive initial thoughts on the necessary traffic analysis requirements to meet SHA's needs.

Discussions: Mr. Schuster advised the group that MAA would be starting, likely in the fall of 2015, an Environmental Assessment for projects shown as Phase 1 (2016-2020) on the ALP. Mr. Schuster indicated that an EA is required by the Federal Aviation Administration (FAA) in order to move forward with design and construction of the ALP projects. This meeting is in advance of the EA process and is meant to be a fact finding mission. Once the EA is initiated, MAA will have formal agency scoping meetings but since the scope for the EA has not yet been approved by the FAA information provided in this meeting should not be publicly disseminated.

Mr. Wolniak oriented the group by highlighting the roads around BWI Marshall Airport. Mr. Schuster described the proposed projects that MAA identified that may influence vehicular traffic, which included: a new terminal response fire rescue station; a second Fixed Base Operator, relocating the fire training facility; a vehicular service center; and a new aircraft maintenance facility. Mr. Schuster also discussed briefly the field maintenance storage facility which will be used to store snow equipment.

The following summarizes those discussions for individual projects:

Aircraft Maintenance Facilities

- Mr. Schuster advised that the MAA does not have a complete understanding of the traffic volumes to be expected for the new aircraft maintenance facility but that staff is coordinating with other airports to determine trip generation and timing of operations (i.e., potential shift work).
- Mr. Beckett asked where the access point would be for the facility. Access to the new facility is expected to occur from MD 170 Ramps/Northrop Grumman Entrance at Stoney Run Road. Mr. Wolniak advised that a fourth leg to the entrance would be added. Mr. Ollerman advised that the MAA would not develop a project that would cause traffic back-ups.
- Ms. Bowie advised that it is likely that only one of the facilities shown on the map would be built but that from an environmental perspective the MAA is going to review both locations.
- Mr. Byrne inquired about accessing the facility through Mathison Way. Mr. Schuster advised that the facility will require a secure entrance and Mathison Way is not a secure access point.
- SHA would like the traffic analysis to review the ramps near the proposed facility including reviewing queues at MD 170 and Stoney Run Road ramps.
- Currently MAA is studying the potential for eliminating the double taxiway which could aid in some grading challenges close to the ramp.
- Mr. Byrne asked if access to the facility could be granted from Northrop Grumman. Mr. Schuster advised that this would likely cause extensive queuing at their security gate if shifts for Northrop Grumman occurred during the same time as the aircraft maintenance facility.

New Vehicular Service Center

- This facility will be developed by others; MAA will likely solicit interested developers through a Request for Proposal process.
- Discussion was held on traffic patterns into and out of the proposed Center. Currently MAA is considering a right-turn in and right-turn out on MD 170 and full access on Amtrak Way. Mr. Bailey asked if two right-in/right-outs would be considered to allow adequately provide internal circulation for tanker trucks. Mr. Schuster indicated that MAA will complete any necessary analysis that the SHA deems appropriate, including an analysis of turning radii needed for gas tanker trucks entering the site from southbound MD 170. It should be noted that a new WAWA on MD 45 near Industry Lane is provided with only one right-in/right-out on MD 45.
- Mr. Cowan advised that he would provide guidance to the group on how many intersections beyond the Center need to be analyzed.

- SHA requested that an additional intersection at the parking lot entrance from Northrop Grumman on MD 170 be analyzed.

New Terminal Response Fire Rescue Station

- Mr. Schuster advised that there is delay getting from the current fire station to the terminal because the current route requires crossing the airfield. Mr. Ollerman informed the group that the current station is fully complaint for airfield fires but that providing another station would improve the level of service for potential terminal responses. The proposed access point for the station is on Terminal Road.
- Mr. Beckett asked about potential access form Elkridge Landing Road. MAA will be considering both access points and it could be that two access points are provided.
- Mr. Schuster advised that, in consideration of the location proposed for the Station, it may not be possible to design a pull through facility. MAA is still not sure about the type of vehicles needed by the Station but there is thought that a ladder truck may not be needed.
- Mr. Cowan advised that SHA would need to review the facility impact on the intersection of MD 170 and Terminal Road.
- Mr. Bryne asked that the bike trail be reviewed in this area as well.

Second FBO

- A second FBO to provide competition for Signature has been considered for many years. General aviation operations are down at BWI Marshall and it may not make economic sense to develop a second FBO within the next five years but MAA wants to be ready if a developer wants to move forward.
- SHA requested that the intersection of Aviation Boulevard and Aaronson Drive be analyzed. Mr. Cowan advised that if there are 50 vehicles/hour or less in the peak hour, there is no need for a traffic impact study (TIS).

Relocated Fire Training Facility

- The current facility is undersized and there are existing environmental concerns. The new access would occur off of MD 162 (Aviation Boulevard) at Cromwell Park Drive. The facility is planned to be a mutual aid facility meaning that other non-airport fire department units could come to the facility to train.
- Mr. Beckett advised that coordination with Federal Highway Administration may be necessary to gain interstate access point approval. Signal modifications will be necessary for the new fire rescue training facility opposite the I-97 ramps.

- SHA advised that the TIS should consider a left turn lane from Aviation Boulevard and an additional intersection on Cromwell Park Drive.
- The ramps on-to and off-of I-97 were designed for the future build-out of the existing industrial park but queuing on the ramps should still be reviewed. Mr. Cowan advised that the geometrics should be checked in the field because he thought that Google Earth maps may be outdated in this area.

New Field Maintenance Storage Facility

- The facility would largely be used to store snow removal equipment. MAA does not expect that it would generate external road traffic since most of the equipment is not roadway approved.
- Mr. Cowan asked if there was access currently available. Mr. Ollerman advised that the entrance off of MD 176 (Dorsey Road) provides access currently.
- Mr. Ollerman further advised that sometimes this area is used for construction staging which might continue in the future but mostly the facility traffic will be seasonal.
- SHA requested that the intersection of Dorsey Road and Digiulian Boulevard be analyzed.

Other topics discussed:

- The SHA only requires of analysis of baseline (existing) and opening day operations. Ms. Hughes explained that the FAA requires an existing condition, a project implementation date (opening day), as well as five-years into the future beyond implementation. The group agreed that the years of analysis needed by the FAA (i.e. existing condition, 2020, and 2025) would meet the SHA's needs.
- Background development for the TIS should be collected from Anne Arundel County as they have more complete data than the SHA. Mr. Cowan advised that while the SHA has sector plans for this area anything older than three years old should be considered too old for analysis. Mr. Wolniak asked if the development that includes MDOT's facility should be included.
- Mr. Bailey indicated that typically SHA is asked to review the traffic intersections and study area once the consultant submits a formal request for review. Mr. Schuster advised that the MAA understands that once the projects are ready for formal design a detailed traffic analysis will be completed and the SHA will be consulted. This meeting is only the first in the process, with hopes that the SHA could provide guidance for conceptual lever review.
- MD 295/Hanover Road interchange improvements are beyond the 2020 time frame.

- Mr. Cowan or Mr. Bailey will be the SHA point of contact for data and meetings with the SHA.
- Mr. Cowan advised that the traffic analysis will be accomplished using the Critical-Lane- Volume Method and the Highway Capacity Manuel results from Synchro/SimTraffic for a traffic impact analysis study. Mr. Wolniak advised that a Synchro model has been developed for the area and he expected that the model would be used for this analysis.
- Mr. Wolniak asked if the SHA traffic counts that were completed just over a year ago can be applied to this study. Mr. Cowan indicated that he would confirm that they could be used.

Action Items:

- Update mapping of potential intersection for analysis figure (completed and attached).
- Mr. Cowan will provide guidance on study area definition (e.g. how many intersections to model beyond the initial intersection) and ability to use SHA traffic counts that are a little over a year old. Mr. Cowan confirmed on 9/9/15 that the available SHA traffic counts would be acceptable but that a factor using the AADT in the area should be applied.
- Mr. Cowan will confirm that the use of 2025 has year of analysis will be acceptable to SHA. Note: Mr. Cowan confirmed the use of 2025 on 9/9/15.
- Mr. Schuster will deliver meeting minutes within two weeks.

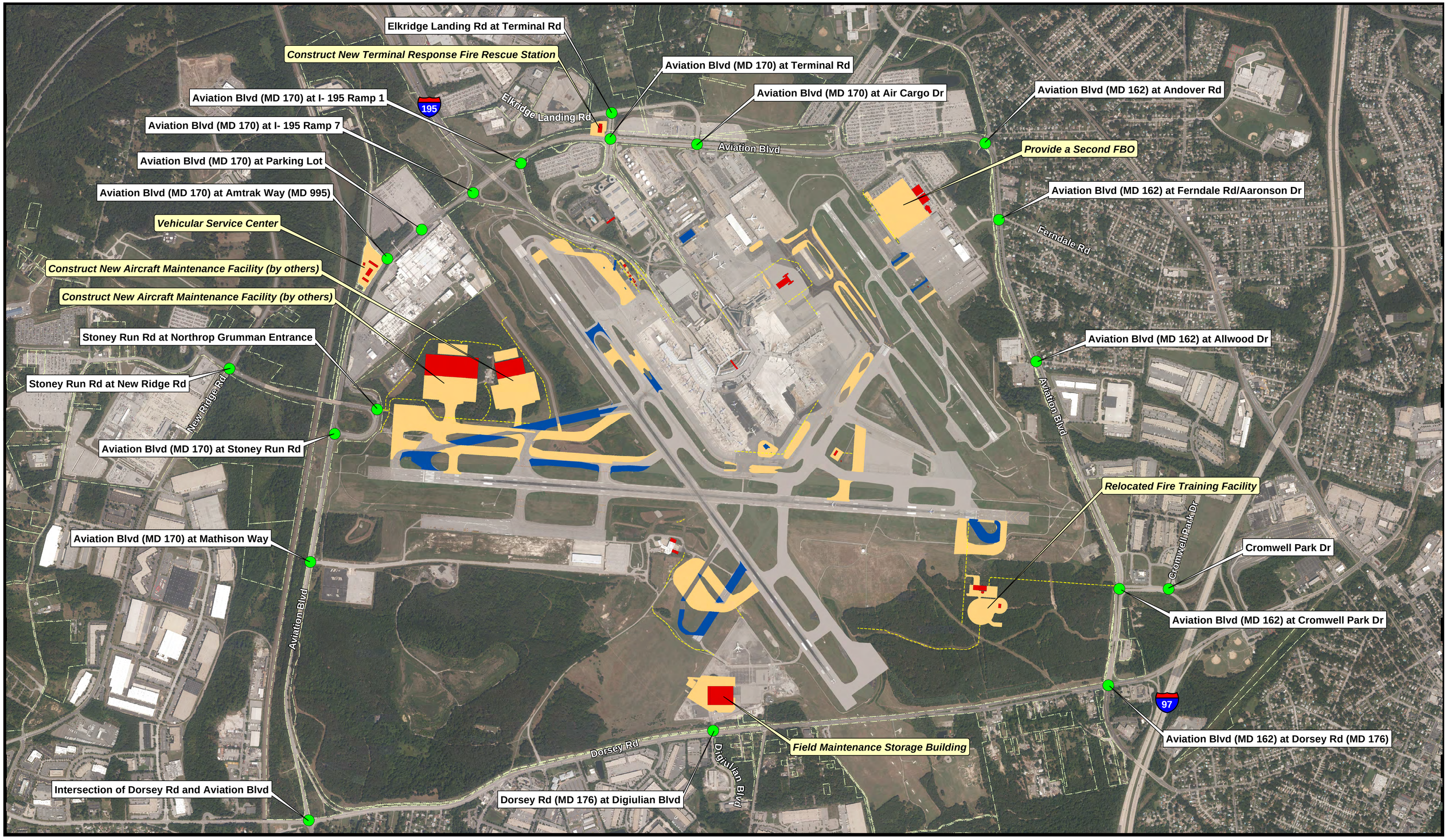
Additional Follow-Up

- Mr. Cowan advised by email on 9/9/15 that the intersections discussed in the 9/4/15 meeting are acceptable to SHA but he recommended contacting David Braun of Anne Arundel County to make sure that the County does not require additional intersections. Mr. Braun typically deals with scoping for Traffic Impact Studies and his email is pzbrau93@aacounty.org.

This is our understanding of items discussed and decisions reached.

Submitted by, Kim Hughes, PE.

BWI Marshall Proposed Improvements 2016-2020



LEGEND

- Airport Property Boundary
- Pavement Improvements
- Proposed Structures
- Demolition
- Vehicle Roadway Improvements

Potential Intersections for Analysis

N

0 350 700 1,400 Feet

Maryland Aviation Administration

BALTIMORE/WASHINGTON INTERNATIONAL Thurgood Marshall AIRPORT

Please sign in:

SUBJECT:	**DATE**
SHA District 5 Traffic and MAA Enviro Assessment Team	Friday, Sept. 4, 2015 @ 1pm (SHA District 5 Office-Annapolis)

	Name/Title	Organization	Phone	Email
1.	**Wayne Schuster/Director OPES**	**MAA**	**410-859-7787**	**wschuster@bwiairport.com**
2.	**Robin Bowie/Manager Environmental Planning**	**MAA**	**410-859-7103**	**Rbowie@bwiairport.com** RWB
3.	**Alex Ollerman/Manager Landside Planning**	**MAA**	**410-859-7090**	**Follerman1@bwiairport.com** AAO
4.	KIM HUGHES / PROJECT MANAGER	HNTB	703.253.5856	khughes@hntb.com
5.	MATTHEW WOLNIAK	JMT	410 316-2278	mwolniak@jmt.com
6.	TARA PENDERS	SHA REGIONAL PLANNING	4105458941	tpenders@sha.state.md.us
7.	WILL COWAN	SHA D5-TRAFFIC	410 841-1021	wcowan@sha.state.md.us
8.	ERIC BECKETT	SHA - RIPD	410 545-5662	ebeckett@sha.state.md.us
9.	Tyson Byrne	MDOT TSO OPCP	410 865-1284	tbyrne@mdot.state.md.us
10.	MIKE BAILEY	SHA D5 ACCESS MANAGEMENT	410 841 1057	mbailey@sha.state.md.us
11.				
12.				
13.				
14.				

From:	Eric Sideras
To:	Tara Penders
Cc:	Elisa Mitchell; Lisa Shemer; Kimberly Tran; William Stroud; William Cowan; Rola Daher
Subject:	BWI Marshall Environmental Assessment Traffic Analysis - Existing Conditions Report Comments
Date:	Monday, February 29, 2016 4:51:22 PM

DSED #: 16-02-053

MD 170
Traffic Analysis to Support BWI Marshall Proposed Improvements 2016-2020: Environmental Assessment – Existing Conditions Report
By: HNTB
Dated: January 13, 2016

Hello Tara,

Travel Forecasting has reviewed the Traffic Analysis for the Environmental Assessment for the subject site. The primary components of the proposed developments include an aircraft maintenance facility, a fire training facility, a snow removal equipment storage building, a second FBO facility, a new terminal response fire rescue station, and a new vehicular service center, to be located in the vicinity of Baltimore-Washington International Thurgood Marshall Airport (BWI) in Anne Arundel County. Our comments are as follows:

- Please provide a summary of each proposed development within the Traffic Impact Study, including the geographic location of each proposed development, the ITE land use code for each proposed development, how each development site is expected to access the local/State roadway network, as well as the size of each development. Such information is important in determining the extent of the study area to be included in the traffic analysis, as well as the level of analysis necessary.

- There appear to be several signalized intersections along MD 176 (Dorsey Road) and MD 162 that are not included in the analysis, but fall between other identified study intersections. Examples include:

    - MD 176 at Connelley Drive,
    - MD 176 at McCormick Drive,
    - MD 176 at WB&A Road,
    - MD 162 at Hollins Ferry Road,
    - MD 162 at BWI Long-Term Lots,
    - MD 162 at MD 170.

    It is recommended that these intersections also be included as part of the study area network. Background and other proposed future developments may continue to affect intersection operations of these signalized intersections, regardless of whether a proposed site directly accesses these intersections.

- The Existing Conditions Lane Configurations shown in Figure 2 appear somewhat unclear. Please provide a figure that includes arrow delineations for lane configurations for each study intersection, by approach, in addition to Figure 2.

- The Existing Conditions AM and PM Peak Hour Traffic Volumes shown in Figure 3 appear to have volume imbalances of approximately 100 to several hundred vehicles between several adjacent intersections during the AM and/or PM peak hours. It is recommended that AM and PM peak hours show volume balances throughout the study network.

- Please provide a CLV analysis for all study intersections, in addition to the HCM analysis already provided.

- Please note that the comments provided above pertain to the Existing Conditions portion of the Traffic Analysis. DSED reserves its comments for Background and Future Conditions, as well as any proposed mitigation needs, for when those portions of the Study are completed. As of now, only the Existing Conditions portion of the Study has been provided for our review.

Please let me know if you have any questions.

Thanks,

Eric Sideras
Office of Planning and Preliminary Engineering
Maryland State Highway Administration
Phone: 410-545-5643
E-mail: esideras@sha.state.md.us

From: Franz Ollerman
To: Robin Bowie; Kim Hughes
Subject: FW: BWI Environmental Assessment
Date: Thursday, March 03, 2016 12:22:16 PM

From: Derek Voight
Sent: Thursday, March 03, 2016 11:41 AM
To: Franz Ollerman
Cc: Erich Florence; Scott Sumner; William Cowan
Subject: BWI Environmental Assessment

Alex,

We have completed our review of the February 16, 2016 submission of the BWI Marshall Environmental Assessment – Existing Conditions Report and we have the following comments to offer in response.

1. We currently understand that the Environmental Assessment document aims to provide a conceptual scope of overall mitigation which may be required to construct six proposed facilities (an aircraft maintenance facility, a fire training facility, snow removal equipment storage, an FBO facility, a fire rescue station and a vehicular service center) on the BWI Marshall premises. Further, should any of these proposed facilities generate more than 50 peak hour trips, each facility will have a site specific traffic impact study developed and submitted via the typical SHA/Anne Arundel County development review process. If this understanding is incorrect, please indicate such.

2. As described in the State Highway Access Manual, all traffic impact studies should conduct intersection analyses using the critical lane technique (critical lane volume or CLV). Please provide this analysis for all study intersections while maintaining the HCM results currently provided.

3. It is understood that at the September 4, 2015 meeting, it was discussed that MAA should apply the development scoping method followed by Anne Arundel County. This methodology requires analysis of the first signalized intersection beyond the site access in each direction. Based on the proposed site map provided at the meeting, it appears that MD 176 @ Connelley Dr and MD 176 @ WB&A Rd would need to be considered as study intersections (for the proposed Field Maintenance Storage Building as labeled on that map).

4. As this Existing Condition Report contained only the existing conditions, comments are withheld on the background development and future conditions until such time as they are made available for comment.

Please do not hesitate to contact me should you have any questions or require any additional information on this matter.

Thank you,
Derek

Derek M. Voight
Consultant Transportation Engineer
Anne Arundel County Team

Maryland State Highway Administration
District 5 Traffic
138 Defense Highway
Annapolis, Maryland 21401
Phone 410-841-1023
Fax 410-841-5309

dvoight@sha.state.md.us

[http://www.roads.maryland.gov/OCImages/511_logo_sm.JPG]Maryland now features 511 traveler information! Call 511 or visit: www.md511.org<http://www.md511.org/>

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The HNTB Companies

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Arlington, VA 22206

Telephone (703) 824-5100
Facsimile (703) 671-6210
www.hntb.com

Date
July 11, 2017

To
Robin Bowie
Alex Ollerman

From
Jessica Wyatt
Rob Brander

PROJECT CORRESPONDENCE

Subject
Traffic Analysis to Support BWI Marshall Proposed Improvements 2016-2020 EA
SHA Tracking No. 17APAA006XX

The following summarizes HNTB's responses to comments from the Maryland State Highway Administration and from Anne Arundel County on the Traffic Impact Study (existing, no-action and proposed action) for the Traffic Analysis to Support BWI Marshall Proposed Improvements 2016-2020 Environmental Assessment.

Anne Arundel County comments provided March 24, 2017

3.1.1 Baseline Volume Growth

The Study grew traffic at 1% to convert 2016 counts to 2020 volumes. There should have been at least a comparison made with the BMC Travel Demand Model volumes for 2020 & 2025 (or the closest model year runs) to validate this assumption.

HNTB Response: A comparison is difficult to make for a growth rate between the BMC model and the growth rate utilized in this report. This is due to the actual growth rate in the report not only includes the 1% background growth but also all of the background developments. The BMC growth rate varies between the links. We reviewed the BMC model growth out to 2040 (2020 was not part of the conformity runs) and this showed an annual growth rate on average of 1.2% per year. Taking into account the report includes the background developments, the 1% background growth rate appears to be acceptable.

3.1.3 Other Background Developments Near BWI

The list of background developments only includes projects north of the airport, there are numerous projects west and south of the project that were not included. Likewise, there are more projects proposed currently, OPZ Development or I&P Traffic should verify the list was current at the time of submittal.

HNTB Response: HNTB utilized the list of proposed development provided by the County on October 6 and 10, 2016 from David Braun and Brian Ulrich, respectively. HNTB reviewed the list of provided projects and compared against other obtained data (such as the Ridge Road traffic analysis, Airport Square TIS and Concorde Circle TIS). The background developments utilized focused on developments within a mile of roadways surrounding BWI, noting the following:

- TIAs have been prepared for developments along Ridge Road and New Ridge Road. However, they indicate that traffic generated by the developments would be travelling north/south to/from the developments and not to the east, so these developments would not impact Aviation Blvd.
- The provided material included developments south of MD 100, but it was determined that these would not have bearing on Aviation Blvd or Dorsey Road; as traffic would utilize MD 100.

Proposed Mitigation/Conclusions

HCM Analysis: The recommendations only include signal time and other non infrastructure related improvements (restriping) at only 2 intersections despite the fact that Queue lengths (both 50th and 95th percentile) exceed existing storage on multiple legs at 4 intersections in both the AM and PM peaks (5 in the 2025 analysis). Those improvements should be made, or at least the additional storage required due to the proposed development which had an impact on each of the substandard storages identified in the existing conditions and created some additional ones.

HNTB Response: HNTB reviewed the queues exceeding available storage lengths, refer to attached table. At each location in which the queues exceed storage; the storage is exceeded in both the No-Action and Action scenarios. From this comparison, it can be concluded that the Proposed Action has no material impact on queue length/distance. There are only two turn bays (WBL at Stoney Run Rd and New Ridge Rd and the EBL at Aviation Blvd and at Terminal Rd) where the queue lengths increase by 25-30 feet, equivalent to one car length.

CLV Analysis: Additionally, 2 intersections went from passing CLV's to failing CLV's. While the Aviation Blvd/Amtrak Way intersection mitigation proposed restriping to address the failing CLV, the intersection of Aviation Blvd and Dorsey Road West was not mitigated with physical improvements to improve the CLV to background conditions (CLV cannot be improved with signal timing).

HNTB Response: Note that this location is failing under the no-action scenario, indicating the need for improvement is not driven by the proposed action at BWI, but rather regional growth. As shown below, the proposed Action increases volumes by less than 1%.

BWI - Intersection 1 Volumes: Aviation Blvd / Dorsey Rd				
	2020		2025	
	AM	PM	AM	PM
No-Action Total Volumes	4,167	4,821	4,381	5,070
Proposed Action increase in volumes	27	7	27	7
Percent increase	0.65%	0.15%	0.62%	0.14%
Change of CLV score	+3	+2	+2	+2
Change of CLV's LOS	No change	No change	No change	From D to D/E

As the change of volumes and the change to CLV is very minor with respect to the proposed action, MAA is not proposing any physical improvements to the report.

The County's concerns are that either County or State Transportation Improvement money will need to be spent here to specifically deal with the impacts of the proposed action that may come at the cost of needed improvements at other intersections with similar need despite the fact that the proposed actions deleterious impacts to the intersections have been demonstrated by the traffic study.

Please note as described in the response to the comment above, the deficient intersections are deficient in both the no-action and proposed action scenario indicating the deficient operations are due to the regional growth, rather than the proposed action at BWI. Improvements are needed even in in the no-action conditions.

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State Highway Administration (SHA) comments provided April 14, 2017

1. Page 16
    a. LOS 'D' is the acceptable threshold for operations in the study corridor. The document references LOS 'E' as this threshold.

HNTB Response: Concur, the findings on Page 16 was updated for intersection 1 to specify it is above LOS D threshold. Note that Page 11 and 75/75 correctly indicate LOS is D is the acceptable threshold.

2. Page 17
    a. Please clarify the expected access location to/from the background service station. It appears that access is expected exclusively via Amtrak Way.

HNTB Response: For the purpose of the analysis, it was assumed that the access was off Amtrak Way which represents a worst-case operational scenario, as discussed on page 22. To assist the readers on subsequent versions, duplicate text was added on page 17.

    b. Please clarify the reasoning behind the service station being considered a background development, rather than part of the Proposed Action Alternative. The report cites that the station will be constructed prior to other projects, which is not necessarily a valid reason not to include it as part of the proposed action. If the station is part of a phased development for BWI, it should be included as part of the proposed action. If this development is not part of the BWI proposed improvements/developments, then it should be included as a background development.

HNTB Response: A separate TIA was prepared for the service station and included with the Proposed Service Station Plaza at Baltimore/Washington International Thurgood Marshall Airport EA (FONSI issued May 2017) to ensure that the service station plaza could be constructed in advance of the projects being considered in the on-going BWI Marshall Airport EA for Proposed Improvements 2016-2020. As such, the service station was considered as part of the background development in this TIA for the on-going BWI Marshall Airport EA for Proposed Improvements 2016-2020. Specific recommendations for impacts resulting from the service station were included in the associated TIA and the additional traffic generated by the development in this subject EA are not determined to compound any impacts at the surrounding intersections. That TIA included recommendation to restriping the eastbound approach from a left only and right only lanes (L + R) to a left only and shared left/right turn lane (L + shared LR).

3. Page 21
    a. The 9th Edition of the ITE Trip Generation Manual does not have passby trips listed for land use 946 (Gas/Service Station with Convenience Market and Car Wash) or land use 933 (Fast-food Restaurant without Drive Through). Please clarify the methodology used to determine the 50% passby trip percentages assumed in the report.

HNTB Response: The ITE Trip Generation manual does not have pass-by trips listed specifically for the two land-use as the commenter noted above. It does however have a passby rate for land use 945 (Gas/Service Station with Convenience Market). The manual presents data for 10 studies for gas stations with 8 to 10 fueling stations. The AM rate listed was 62 percent and the PM rate was 56 percent. The proposed station will have 16 fueling stations. The gas station/convenience market would not induce significant new trips into the study area as other gas/convenience markets are located in other areas south and east of the airport. Most users are expected to stop to fuel their vehicles at a service station located along their normal routes. As some users will deviate slightly to access the station a 50% assumption was chosen to be conservative and ensure impacts from trips generated by the site are accounted for.

4. Please note that the peak hour trip rates cited in this report do not appear to match the values found in the 9th Edition of the ITE Manual. Please verify that all values are using the 9th edition, and update any discrepancies. Appendix D appears to reference the 8th edition of the manual.

HNTB Response: This TIA and report was updated to reflect the 9th edition. Of the proposed projects, only the Second FBO uses ITE rates, the remaining projects types are specific and unique to the airport operations and rates/assumed traffic are based on MAA provided information which are based on knowledge of aviation activity associated with the Proposed Action.

5. Page 34 – Figure 10 shows a trip distribution for trips to and from 1-195 (varying from 10% to 30%), but the actual corresponding volumes for several movements to and from 1-195 show a value of 0. Please address any discrepancy, or justify why no volumes were distributed to/from 1-195.

HNTB Response: Only signalized intersections/ramps are shown on the volume diagram. Trips from I-195 are assumed but were not quantified for the map as the non-signalized ramps were not included in the analysis. The ramp from I-195 is not part of a signalized intersection, but rather a separate loop ramp to the north of intersection 8. The right turn illustrated on the figure at intersection 8 is the return movement from the bus/taxi storage and staging area. By comparing the northbound volumes at intersection 8 and intersection 9, it can be seen that northbound volumes increase by 10% (from 81 AM / 86 PM at intersection 8 but 96 AM / 99 PM at intersection 9) which the difference is traffic from I-195. Note that southbound movement to I-195 is shown as the southbound right turn movement at intersection 9.

6. Page 52 – Please justify how the directional distributions in Table 45 were established.

HNTB Response: Directional distribution percentages were calculated using a ratio of exiting trips at those locations.

7. Page 80 – It does not appear that any queuing analysis was performed at intersections where signal timing or lane configuration changes were proposed. Any proposed improvements should also not significantly exacerbate queues that already exceed available storage for turning movements at these intersections. Please provide a summary of expected 95th percentile queues for turning movements at Intersections 1, 6, and 12 with the proposed improvements in place.

HNTB Response: HNTB has updated the report to provide a queueing discussion.

8. No Synchro files appear to be provided as back-up that shows the evaluation of signal splits and lane configurations proposed as mitigation for this study area. Please provide this back up if available.

HNTB Response: Synchro files were provided to MD SHA on 2/15/17 (Caroline Pecker TFAD (OPPE)) when previously requested.

9. There are some inconsistencies with the CLV computations/tables. Some of the intersections are left out while others have incorrect computations.

HNTB Response: It is presumed the comment references Table 63. Table 63 inadvertently listed unsignalized intersections which CLV analysis does not apply, the table has been updated in report.

10. All reported queue lengths for Aviation Blvd (MD 162) at Andover Rd intersection are for SBL and not WBL as indicated.

HNTB Response: The report has been updated to read SBL matching the synchro output reports.

11. Please include queuing analyses results showing the effect of the mitigation proposals on all intersection movements that exceeded available storage length in this report.

HNTB Response: HNTB has updated the report to provide a queueing discussion.

				2020 No-Action AM		2020 Prop. Action AM			2020 No-Action PM		2020 Prop. Action PM		
Node	Intersection	Movement	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile	95th Percentile Change	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile	95th Percentile Change
1	Aviation Blvd (MD 170) at Dorsey Rd (MD 176) - West	NBL	455	471	695	475	699	4	192	296	192	296	N/A
		NBR	250	137	251	138	252	1	19	84	20	85	N/A
		SBL	250	175	278	176	279	1	389	#687	389	#688	1
		SBR	175	24	127	32	139	N/A	261	441	262	445	4
		EBL	175	387	#692	392	#699	7	351	#614	352	#616	2
		EBR	225	0	62	0	61	N/A	175	331	175	331	0
		WBL	200	105	186	108	188	N/A	152	242	153	244	2
4	Stoney Run Rd at Northrop Grumman Entrance	SBR	85	0	17	0	0	N/A	45	171	33	126	-45
5	Stoney Run Rd at New Ridge Rd	WBL	300	316	493	330	#523	30	398	#707	401	#712	5
13	Aviation Blvd (MD 162) at Andover Rd	SBL	175	132	196	130	193	-3	154	220	155	221	1

Notes

m	Volume for 95th percentile queue is metered by upstream signal
~	Volume exceeds capacity, queue is theoretically infinite.
	Queue shown is maximum after two cycles.
#	95th percentile volume exceeds capacity, queue may be longer
	Queue shown is maximum after two cycles.

				2025 No-Action AM		2025 Prop. Action AM			2025 No-Action PM		2025 Prop. Action PM		
Node	Intersection	Movement	Turn Bay Length (ft)	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile	95th Percentile Change	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile	Queue Length (ft) 50th Percentile	Queue Length (ft) 95th Percentile	95th Percentile Change
1	Aviation Blvd (MD 170) at Dorsey Rd (MD 176) - West	NBL	455	523	#777	528	#790	13	206	312	206	313	n/a
		NBR	250	155	274	158	275	1	27	96	27	96	n/a
		SBL	250	193	290	194	293	3	~424	#754	~425	#755	1
		SBR	175	40	149	49	163	n/a	293	491	294	492	1
		EBL	175	~457	#748	~464	#758	10	393	#692	394	#694	2
		EBR	225	0	64	0	64	n/a	200	366	201	366	0
		WBL	200	117	195	119	198	n/a	166	262	167	262	0
4	Stoney Run Rd at Northrop Grumman Entrance	SBR	85	0	17	0	0	n/a	52	181	42	135	-46
5	Stoney Run Rd at New Ridge Rd	WBL	300	340	#558	354	#587	29	432	#767	430	#765	-2
11	Aviation Blvd	EBL	445	287	#450	300	#477	27	154	208	155	208	n/a
13	Aviation Blvd (MD 162) at Andover Rd	SBL	175	138	204	137	202	-2	163	228	163	229	1

Notes

m Volume for 95th percentile queue is metered by upstream signal

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer
Queue shown is maximum after two cycles.