

# UNIVERSITY COMMONS DEVELOPMENT *Knoxville, Tennessee*

## **TRAFFIC IMPACT STUDY**

*Prepared For:*  
University Commons LLC

*Prepared By:*



December 2011

**UNIVERSITY COMMONS  
KNOXVILLE, TENNESSEE  
TRAFFIC IMPACT STUDY**

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**December 2011**

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**Project No. 88620**

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## EXECUTIVE SUMMARY

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The study of the proposed University Commons site, located in Knoxville, Tennessee, addresses the traffic impacts identified of a 211,777 square-foot shopping center adjacent to the University of Tennessee and the Knoxville CBD. The study developed and evaluated existing, background, and project traffic conditions. Background traffic was determined using a 1.0-percent annual growth rate until the year 2015 and a diversion in traffic from Cumberland Avenue with its planned capacity reduction from a 4-lane section to a 3-lane section. It was assumed that 25-percent of the inbound traffic in the AM peak hour and outbound in the PM peak hour would divert to other routes. A reduction of 15-percent was assumed for their opposing flows. Traffic should divert to but not limited to Neyland Drive, Volunteer Boulevard, Joe Johnson Drive, 17<sup>th</sup> Street, and Western Avenue.

Traffic associated with the proposed development was generated and distributed to the site access and the adjacent study intersections. Capacity and level of service analyses were conducted, using the **2000 Highway Capacity Manual**, for the existing, background, and project projected traffic conditions.

The daily trip generation for the site is approximately 11,060 with an adjusted daily trip generation of 6,640 when considering pass-by and modal choice, including walking, bike, and transit use. The adjustment of the modal choice was based on other studies conducted for the commercial development on the Cumberland Strip which identified as much as 50-percent of the trips generated were from pedestrian and bicycle traffic. A 25-percent reduction in vehicle trips was assumed for this study due to this site being just on the perimeter of the Cumberland commercial strip. A 25-percent reduction may also represent nearly 5-percent of the approximate 60,000 daily trips generated by UT. The proposed site should reduce the trips off campus to similar uses at a greater distance that may require an automobile.

Analyses of the study intersections found that the study intersections should operate at acceptable levels of service with the exception of the Joe Johnson Drive intersection with Neyland Drive which is currently operating at an E LOS during the morning peak hour and at capacity for the PM peak hour. Improvements considered for the Neyland Drive and Joe Johnson Drive intersection included double left-turn lanes from Neyland Drive to Joe Johnson Drive to facilitate the very large traffic volume entering the UT campus during the AM peak hour and a separate left-turn lane from Joe Johnson Drive to Neyland Drive permitting a much more efficient right-turn movement from Joe Johnson Drive to Neyland Drive. The improvements to

the Joe Johnson Drive approach was found to be more practical and would be sufficient to mitigate the proposed development's impact.

With the following recommendations, the traffic impact can be minimized and should maintain the acceptable traffic conditions.

- ◆ Provide for separate left- and right-turn lanes from the proposed access to Cumberland Avenue at Metron Center Way.
- ◆ Reconstruct the traffic signal for the intersection of Cumberland Avenue and Metron Center Way with the proposed access.
- ◆ Remove the transverse striping on the southbound approach of Neyland Drive to Joe Johnson Drive providing for additional left-turn storage for the traffic turning from Neyland Drive to Joe Johnson Drive.
- ◆ Provide a separate left-turn lane for the Joe Johnson Drive approach to Neyland Drive. This lane should be constructed in a manner that also provides for a minimum left-turn lane to River Drive.
- ◆ Signalize the proposed site access to Joe Johnson Drive required for the inadequate line of sight to the east.
- ◆ Provide sidewalks and bike lanes to accommodate the modal choices of the community.
- ◆ Minimize landscaping and signing at the proposed development accesses so as not to restrict sight-distances to and from the site.
- ◆ Access design should conform to the recommended standards and practices of the American Association of State Highway and Transportation Officials, the Institute of Transportation Engineers and the requirements of the Tennessee Department of Transportation.

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## INTRODUCTION

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Wilbur Smith Associates (WSA) is pleased to submit this report to address the traffic impact and access requirements of the proposed retail development located in Knoxville, Tennessee, near to the City central business district and adjacent to the University of Tennessee. The study required the collection of traffic data, generation of anticipated traffic volumes for the proposed site and development of projected traffic volumes from normal growth that may occur in the vicinity of the site. This study also had to account for the planned changes for Cumberland Avenue

The traffic impact study follows guidelines and procedures as recommended by the Institute of Transportation Engineers. Analyses of the resulting traffic projections were conducted to determine the capacity and levels of service for the site accesses on the adjacent streets and for adjacent intersections including Cumberland Avenue at the Alcoa Highway interchange. And Volunteer Boulevard; Joe Johnson Drive at Volunteer Boulevard and Neyland Drive.

### **Project Description**

The project site is a proposed commercial retail development of 211,777 square feet, including a 120,437square-foot Walmart and a 49,000 square-foot Publix grocery store. Access would be from Cumberland Avenue at Metron Center Way and Joe Johnson Drive requiring a structure to connect to the existing bridge structure across the railroad. **Figure 1** illustrates the proposed site plan.

### **Site Location**

The proposed retail development is located in Knoxville, Tennessee, west of the City CBD and the University of Tennessee main campus. The site is in Knox County and located between Cumberland Avenue and Joe Johnson Drive, west of the railroad. **Figure 2** illustrates the site location relative to local and regional access.

# SITE PLAN

## University Commons

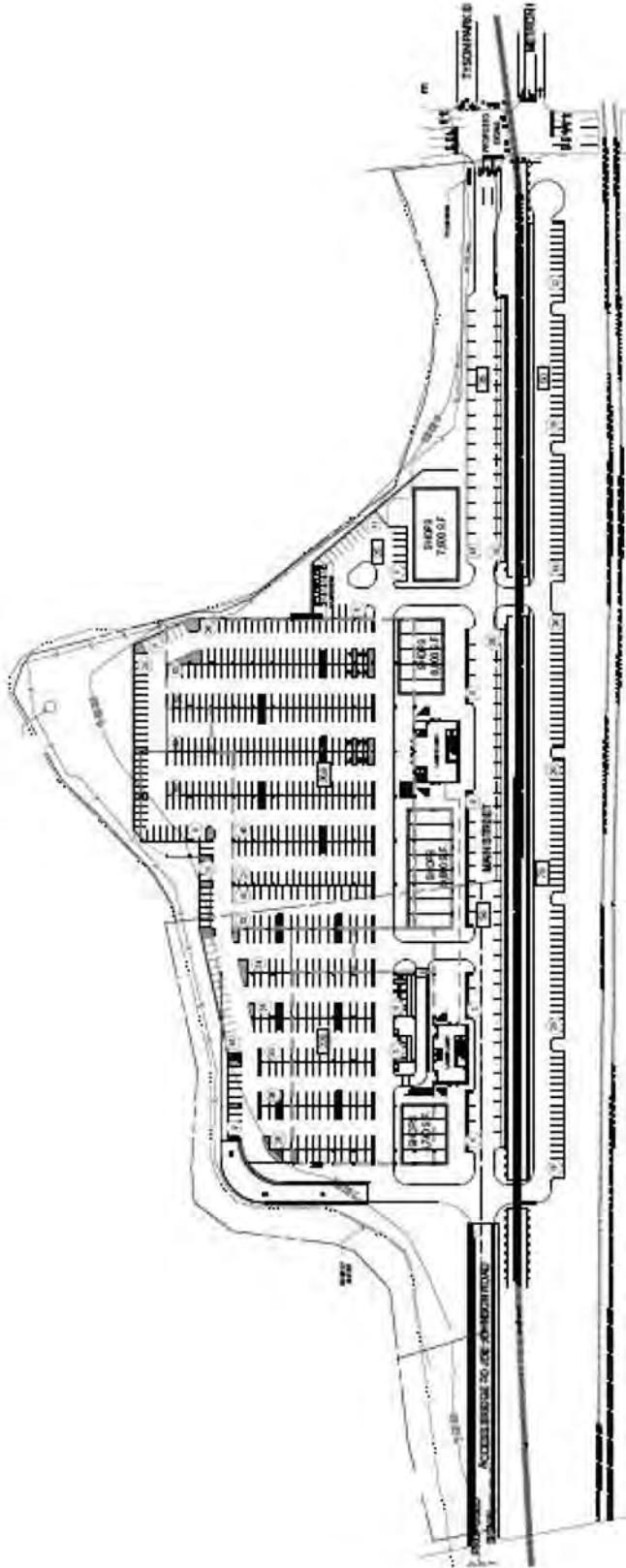


Figure 1





# VICINITY MAP

## University Commons

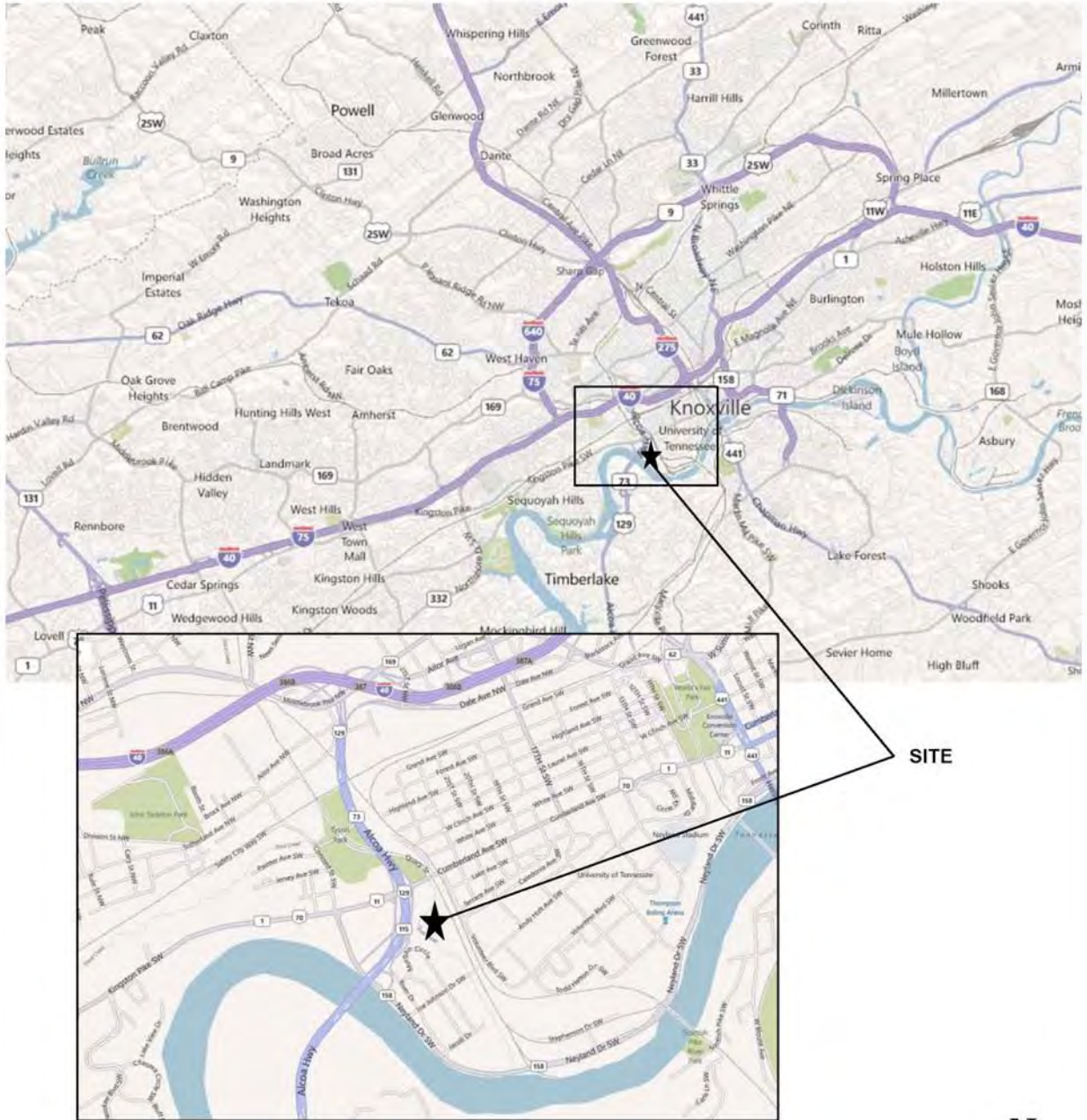


Figure 2

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## LOCAL AND REGIONAL ACCESS

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### Local Access

Local access will be from Cumberland Avenue (U.S. 11/70) to the north of the site and Joe Johnson Drive (S.R. 449) to the south of the site. Cumberland is an east-west 5-lane arterial with an annual average daily traffic of 36,430 in 2010 published by the Tennessee Department of Transportation (TDOT). To the east, Cumberland Avenue becomes a 4-lane arterial extending into the Knoxville CBD. The city of Knoxville is currently planning to reduce the Cumberland Avenue section from the 4-lane facility to a 3-lane facility into the CBD. To the west, Cumberland Avenue intersects with Alcoa Highway (U.S. 129) with an interchange and becomes Kingston Pike. In addition to providing a connection to the Knoxville CBD, Cumberland Avenue serves the University of Tennessee; adjacent commercial development the "Cumberland Strip;" Fort Sanders Regional and East Tennessee Children's Hospitals; and the Fort Sanders community.

The site will connect to Joe Johnson Drive with a structure intersecting the existing bridge structure crossing the railroad. Joe Johnson Drive facilitates traffic accessing the University of Tennessee through its Agriculture campus to the intersection of Volunteer Boulevard and Andy Holt Street intersection on the main campus. The TDOT 2010 AADT for Joe Johnson Drive is 6,915 west of EJ Chapman Drive. Joe Johnson Drive intersects Neyland Drive (S.R. 158) to the southwest.

Neyland Drive provides much local access and connects to numerous regional facilities including Kingston Pike and Alcoa Highway to the north of the Joe Johnson Drive intersection and to James White Parkway. Neyland Drive is a 4-lane arterial extending east and west along the Tennessee River and the south side of the UT campus and the Knoxville CBD. The 2010 TDOT AADT is 17,640.

To the east, Volunteer Boulevard is a 4-lane arterial serving the UT campus. It intersects Cumberland Avenue just east of the railroad overpass and again to the east at the 16<sup>th</sup> Street intersection.

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## **Regional Access**

Regional facilities in the proximity of the site include Kingston Pike and Interstate 40 to the north; Alcoa Highway to the west of the site and James White Parkway to the east. Access to the interstate can be from both Alcoa Highway and James White Parkway. Alcoa Highway extends north to Interstate 40 and south to the Maryville accessing U.S. 411, and Pellissippi Parkway (I-140). It provides a primary arterial for the Tyson-McGee (Knoxville) Airport, adjacent commercial development and many residential subdivisions located east and west of the highway. It terminates north with an interchange with I-40. Alcoa Highway is a limited access highway in the vicinity of the site with a 2010 TDOT AADT of 57,910 north of the site and 56,310 south of the site.

Neyland Drive extends to the east where it terminates to James White. Neyland Drive at James White Parkway has a 2010 TDOT AADT of 6,630. James White Parkway is a limited access facility terminating at its interchange with I-40 and has an AADT of 45,270 in 2010

Interstate 40 provides significant east and west regional access throughout Tennessee. North of the site, I-40 has a 2010 TDOT AADT of 127,990. To the east, Interstate 40 connects to I-275 in the Knoxville CBD which extends north to Kentucky and Interstate 81, which extends into the Tri-Cities area of Tennessee and Virginia. To the west, I-40 intersects I-75 and is shared ROW until I-75 turns south near Lenoir City extending to Georgia, through Chattanooga.

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## **EXISTING TRAFFIC CONDITIONS**

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### **Existing Traffic Control**

Adjacent to the site, Cumberland Avenue has signals for the Alcoa Highway (U.S. 129) interchange, Neyland Drive, current site access at Metron Center Way, and Volunteer Boulevard. The posted speed limit for Cumberland Avenue adjacent to the site is 35mph. Joe Johnson Drive has signalized intersections with Volunteer Boulevard and Neyland Drive. The Neyland Drive interchange with Alcoa Highway is also signalized. Neyland Drive has a posted speed limit of 45mph. The posted speed limit on Joe Johnson Drive is 25mph.

### **Existing Traffic Volumes**

Wilbur Smith Associates conducted turning movement counts for the study intersections in early October 2011. **Figure 3** illustrates the AM and PM peak-hour traffic volumes at all of the study intersections. Figure 4 illustrates the bike and pedestrians for the study intersections. The peak hours for the study intersections were found between 7:15 and 8:15AM and 2:45 and 3:45pm. A mechanical traffic count and speed survey was also conducted for the Joe Johnson Drive railroad overpass; its location was between the proposed site access and EJ Chapman Drive. The daily traffic volume on the bridge section was found to be approximately 3,500 and the critical speed was 33mph.

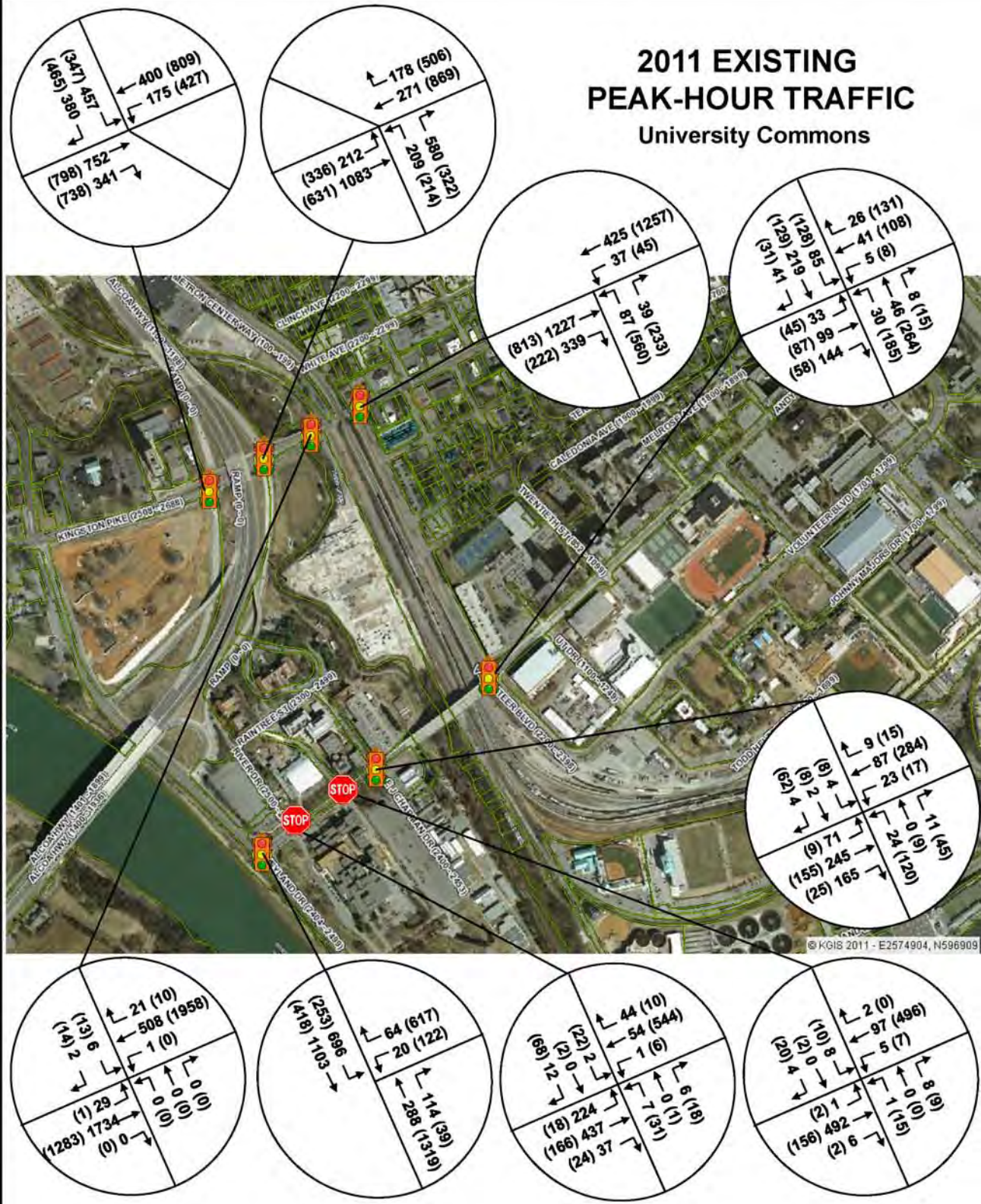
### **Existing Capacity and Level of Service**

In order to evaluate the current operations of the traffic control devices, capacity and level of service were calculated using the 2000 Highway Capacity Manual, Special Report 209 published by the Transportation Research Board (TRB). Signalized and unsignalized intersections are evaluated based on estimated intersection delays, which may be related to level of service (LOS).

Level of service and capacity are the measurements of an intersection's ability to accommodate traffic volumes. Levels of service for intersections range from A to F. LOS A is the best, and LOS F is failing. For signalized intersections, a LOS of A has an average estimated intersection delay of less than 10 seconds, and LOS F has an estimated delay of greater than 80 seconds. A LOS of C and D are typical design values. Within urban areas, a LOS D, delay between 35 and 55 seconds, is considered acceptable by the Institute of Transportation Engineers (ITE) for signalized intersections.

# 2011 EXISTING PEAK-HOUR TRAFFIC

## University Commons

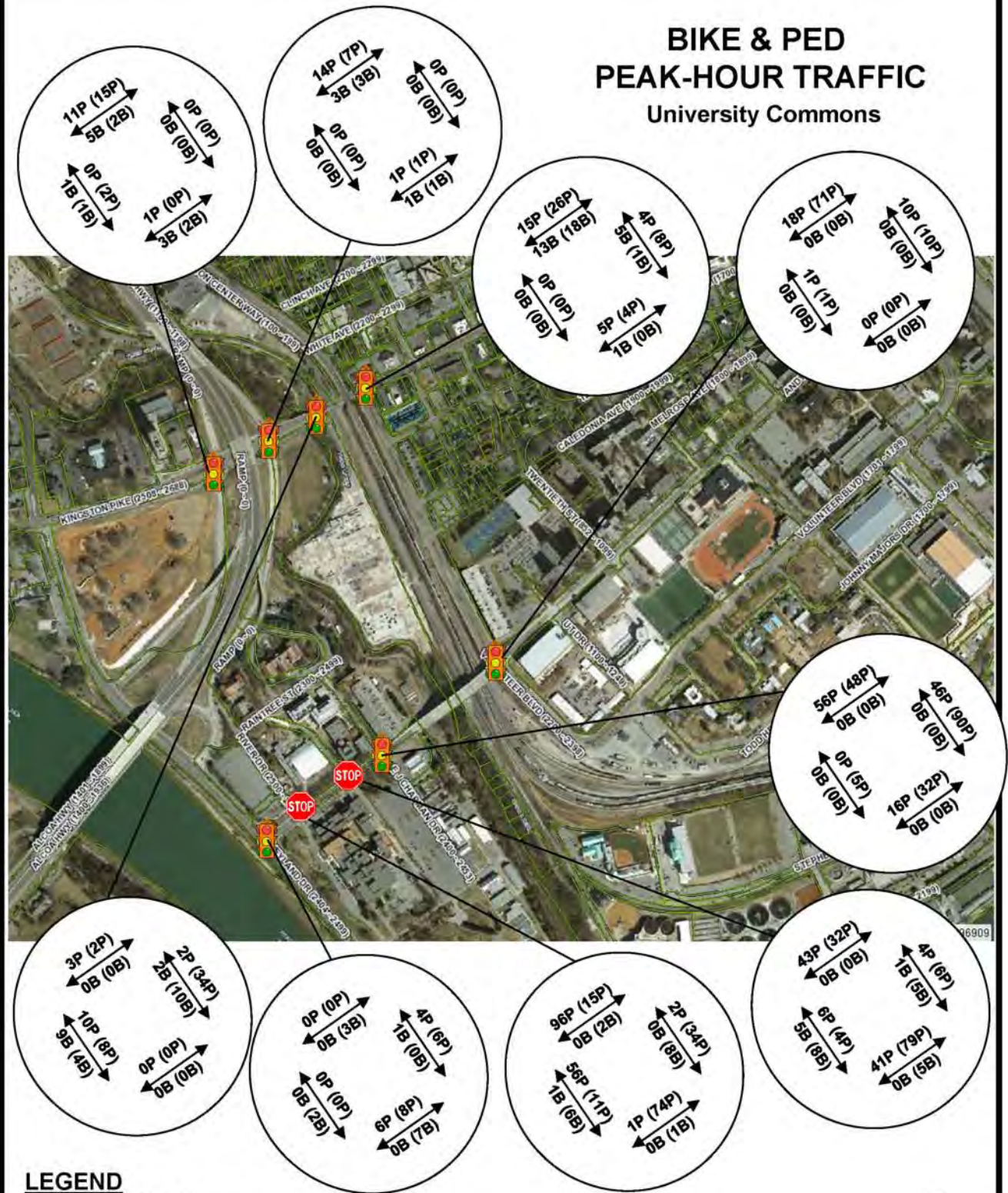


**LEGEND**  
 XXX AM PEAK  
 (XXX) PM PEAK


Figure 3

# BIKE & PED PEAK-HOUR TRAFFIC

## University Commons



**LEGEND**  
 XXX AM PEAK  
 (XXX) PM PEAK  
 P PEDESTRIAN TRAFFIC  
 B BIKE TRAFFIC

Figure 4 

Unsignalized intersection levels of service have lower thresholds of delays. A LOS of F exceeds estimated delays of 50 seconds. For urban arterials, minor approaches may frequently experience levels of service E. A full level of service description for an unsignalized and signalized intersection is presented in **Tables 1 and 2**, respectively.

**TABLE 1  
LEVEL-OF-SERVICE (LOS) DESCRIPTION  
FOR TWO-WAY STOP INTERSECTIONS**

Level of Service	Average Control Delay per Vehicle (seconds)
A	$\leq 10.0$
B	$> 10.0$ and $\leq 15.0$
C	$> 15.0$ and $\leq 25.0$
D	$> 25.0$ and $\leq 35.0$
E	$> 35.0$ and $\leq 50.0$
F	$> 50.0$

**SOURCE:** Highway Capacity Manual, TRB Special Report 209

**TABLE 2  
LEVEL-OF-SERVICE (LOS) DESCRIPTION  
FOR SIGNALIZED INTERSECTIONS**

LOS	Average Control Delay per Vehicle (seconds)	Description
A	$\leq 10.0$	Very low delay with extremely favorable progression. Most vehicles don't stop.
B	$> 10.0$ and $\leq 20.0$	Generally good progression. Increase number of stops from that described for LOS "A" resulting in higher delays
C	$> 20.0$ and $\leq 35.0$	Fair progression with increased delay. Number of stopping vehicles become significant; however, many still pass through the intersection without stopping. Stable flow.
D	$> 35.0$ and $\leq 55.0$	The influence of congestion becomes more noticeable. Longer delays resulting from unfavorable progression, longer cycles, or high V/C ratios. Approaching unstable flow.
E	$> 55.0$ and $\leq 80.0$	Limit of acceptable delay. Long delays associated with poor progression, long cycles, or high V/C ratios.
F	$> 80.0$	Unacceptable operation resulting from oversaturation (flow rates exceed capacity). Poor progression, long cycles, and high V/C ratios.

**SOURCE:** Highway Capacity Manual, TRB Special Report 209

Analyses of existing conditions were conducted using the Synchro Software, developed by Trafficware and the results are summarized in **Table 3**. Lane group levels of service are illustrated in **Figure 5A**. With identified mitigation, improved LOS is illustrated in **Figure 5B**.

**TABLE 3  
2011 EXISTING  
CAPACITY AND LEVEL OF SERVICE**

INTERSECTION	TRAFFIC CONTROL	PEAK PERIOD	V/C	DELAY	LOS
Cumberland Avenue at Volunteer Blvd	SIGNAL	AM	0.62	3.2	A
		PM	0.63	14.7	B
Cumberland Avenue at Metron Center Way	SIGNAL	AM	0.59	7.1	A
		PM	0.73	9.6	A
Cumberland Avenue at NB Alcoa Hwy Ramp	SIGNAL	AM	0.64	13.7	B
		PM	0.52	13.9	B
Cumberland Avenue at SB Alcoa Hwy Ramp	SIGNAL	AM	0.44	14.7	B
		PM	0.67	18.8	B
Joe Johnson Drive at Volunteer Blvd	SIGNAL	AM	0.36	27.6	C
		PM	0.45	23.8	C
Joe Johnson Drive at EJ Chapman Drive	SIGNAL	AM	0.24	2.8	A
		PM	0.33	14.9	B
Joe Johnson Drive at Service Drive	STOP NB/SB	AM	0.03 / 0.03	11.0 / 11.5	B / B
		PM	0.06 / 0.09	11.2 / 11.6	B / B
Joe Johnson Drive at River Drive	STOP NB/SB	AM	0.10 / 0.06	30.8 / 11.8	D / B
		PM	0.17 / 0.36	17.0 / 16.1	C / C
Joe Johnson Drive at Neyland Drive	SIGNAL	AM	0.76	58.5	E
		PM	1.00	49.5	D
Additional left-turn lane on SB Neyland Drive	SIGNAL	AM	0.73	42.4	D (1)
		PM	0.93	38.0	D (1)

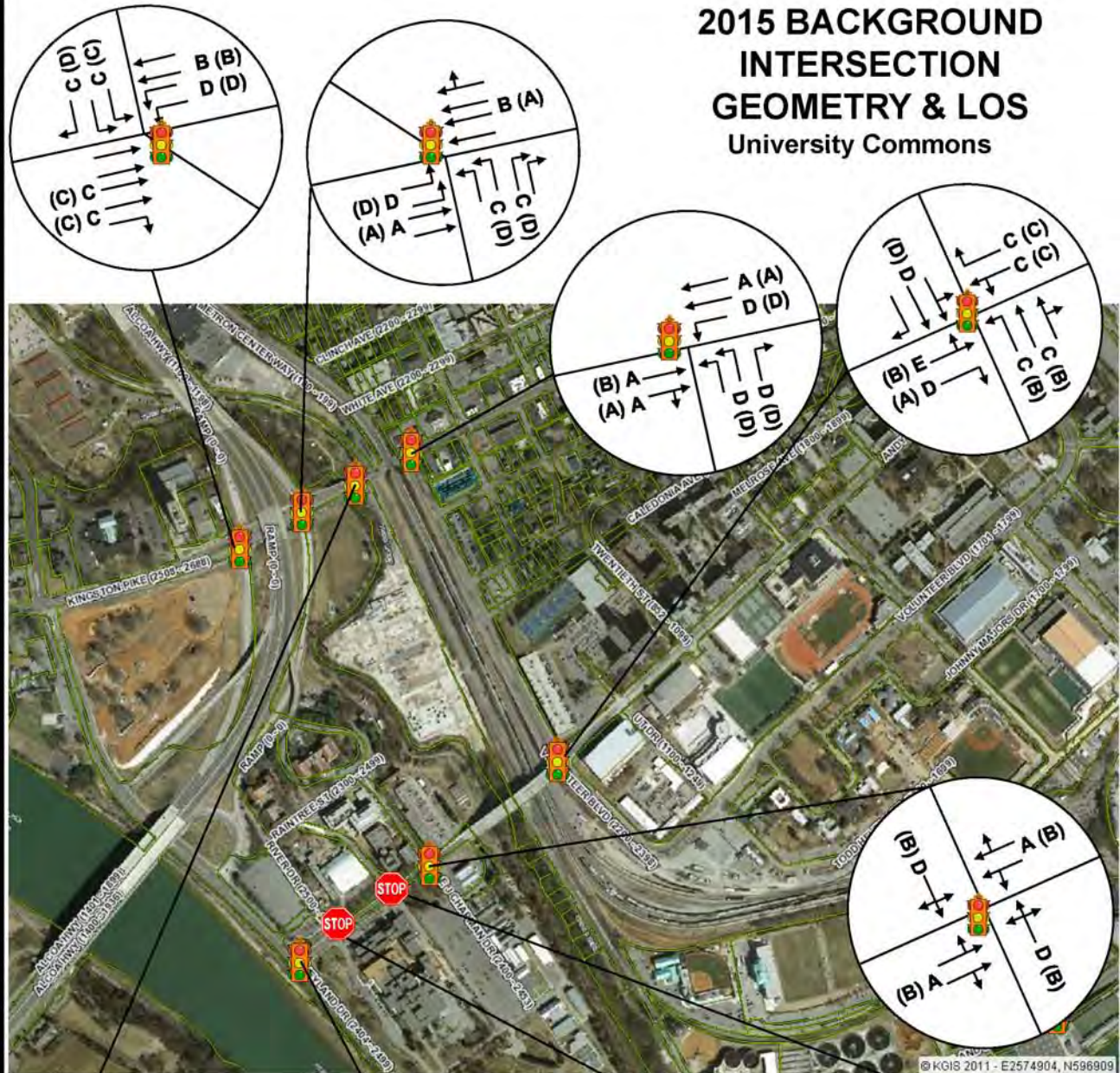
Note: Average vehicle delay estimated in seconds. STOP control analyses presented by total minor approaches.

(1) Mitigation is southbound dual left-turn lanes from Neyland Drive turning onto Joe Johnson Drive.



# 2015 BACKGROUND INTERSECTION GEOMETRY & LOS

## University Commons

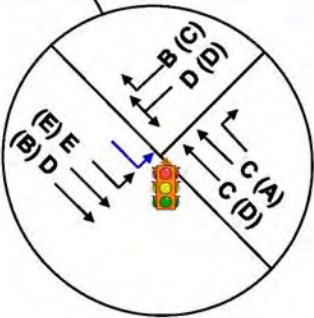


NOTE: LEVELS OF SERVICE SHOWN ARE BASED ON OPTIMIZED CYCLE, SPLITS, AND OFFSETS OF THE STUDY INTERSECTIONS.

Figure 7A



# 2015 BACKGROUND MITIGATED GEOMETRY & LOS University Commons



NOTE: LEVELS OF SERVICE SHOWN ARE BASED ON OPTIMIZED CYCLE, SPLITS, AND OFFSETS OF THE STUDY INTERSECTIONS.

  
**Figure 7B**

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The study intersections were found to be currently operating at acceptable levels of service with the exception that the signalized intersection of Neyland Drive and Joe Johnson Drive is operating at a LOS E during the AM peak hour and at capacity during the PM peak hour. The southbound Neyland Drive approach operates at a LOS E during the AM peak hour and the PM peak left-turn movement fails. The capacity ratio (V/C, vehicle/capacity) of 1.00 suggests unstable conditions. Capacity ratios in excess of 0.90 can result in significant increased delays with minimal increased traffic volumes and should be avoided with additional capacity when feasible. Ratios between 0.80 and 0.90 are stable intersections and suggest good and efficient utilization of an intersection's geometry. The southbound left-turn movement on Neyland Drive to Joe Johnson Drive is nearly 700 vehicle during the AM peak hour and spills over into the adjacent thru lane. Left-turn volumes in excess of 300 vehicle should consider double left-turn lanes and left-turn volumes in excess of 400 vehicle often requires double left-turn lanes. With a double left-turn movement from Neyland Drive to Joe Johnson Drive, the intersection LOS is improved to a D for the AM peak hour and increases the PM peak hour capacity though it remain unstable. Much of the center lane between Alcoa Highway and Neyland Drive is striped with transverse markings. At a minimum, additional southbound left-turn storage could be provided with the remarking of the approach and removing the transverse markings.

The Joe Johnson Drive approach, with a right-turn over-lap, is marked for a separate right turn and a shared left- and right-turn lane. The shared left- and right-turn lane is a very inefficient lane with the right-turn overlap; therefore, its approach should consider double right-lanes and a separate left-turn lane thereby increasing it efficiency. Two lanes entering is not necessary with a single southbound left- and northbound right-turn lanes.

Unsignalized intersections on Joe Johnson Drive were determined to operate with acceptable levels of service. Queues from the Neyland Drive signalized intersection, however, interfere with the access to Joe Johnson Drive resulting in congestion on the Joe Johnson Drive approach to Neyland Drive. Added capacity for the Joe Johnson and Neyland Drive intersection and more efficient geometry could mitigate much of the congestion that occurs during the peak hours.

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## **BACKGROUND TRAFFIC CONDITIONS**

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Background traffic is traffic that can be anticipated regardless of the proposed development. Traffic within the study area may grow due to other development as well as the continued growth through the study area. This background traffic must be analyzed and evaluated for the purpose of establishing a baseline. In addition, the background traffic reflects the historical traffic volumes in the area of the proposed development. In addition, any planned roadway projects must be considered. The planned reduction of the existing 4-lanesection to a 3-lane section must also be considered.

### **Background Traffic Volumes**

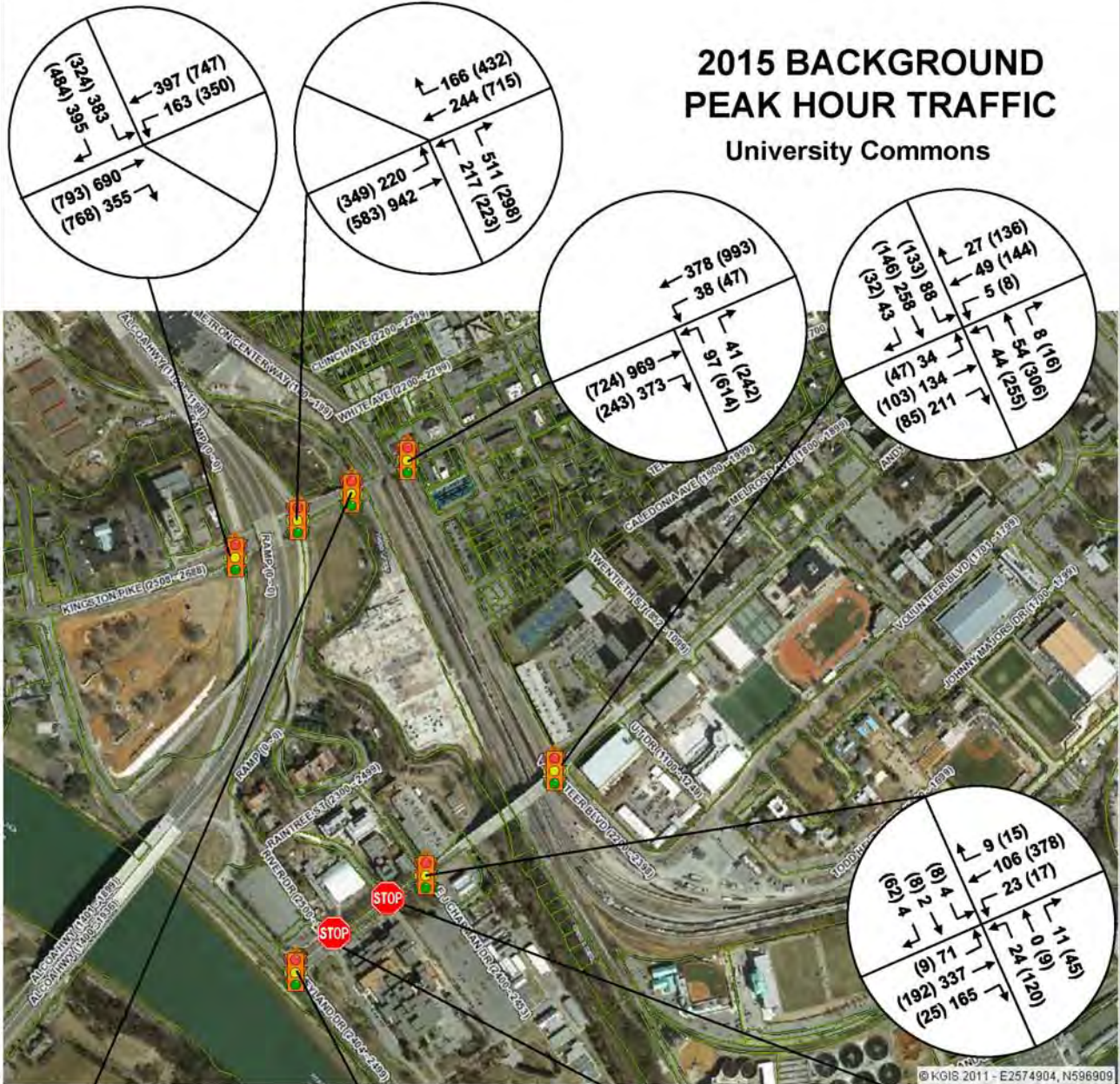
Historical TDOT traffic data indicated a reduction in traffic over the past 5 or 10 year period for the adjacent arterials; however, for the purpose of this traffic assessment, a 1.0-percent was assumed. The development is planned within the next two years, but a horizon year of 2015 was assumed to reflect both site build-out and the planned modifications of Cumberland Avenue. This horizon year results in a growth factor of 1.04

To reflect the Cumberland Avenue project, a lane capacity volume of 1000 was assumed for the primary flow of traffic. Traffic was reduced 25-percent for the inbound direction and 15-percent for the outbound during the AM peak. During the PM peak hour, the reduction was 25-percent outbound and 15-percent inbound. These reductions were then redistributed to the adjacent street network assuming 10-percent diverted to Volunteer Boulevard, 60-percent to Neyland Drive with 30-percent reassigned to Joe Johnson Drive and 30-percent continuing on Neyland Drive. The remaining 30-percent would divert to other streets outside this study's area including but not limited to 17<sup>th</sup> Street, Western Avenue, and James White Parkway.

Figure 6 illustrates the background traffic for the study which reflects the growth factor of 1.04 and a diversion in traffic as a result of the planned Cumberland Avenue project.

# 2015 BACKGROUND PEAK HOUR TRAFFIC

## University Commons



**LEGEND**  
 XXX AM PEAK  
 (XXX) PM PEAK

Figure 6



## Background Capacity and Level of Service

Analyses were performed background traffic and the results are presented in **Table 4**, and lane group levels of service are illustrated in **Figures 7A and 7B**. Detailed worksheets of the analysis are located in the appendix. Analyses of background traffic determined that the study intersections continue to operate at more than acceptable levels of service. With signal optimization and changes in the distribution of traffic over the peak hours, LOS can be maintained. Capacity ratios for many of the study signalized intersections are below 0.80 suggesting intersection reserve capacity.

**TABLE 4  
2015 BACKGROUND  
CAPACITY AND LEVEL OF SERVICE**

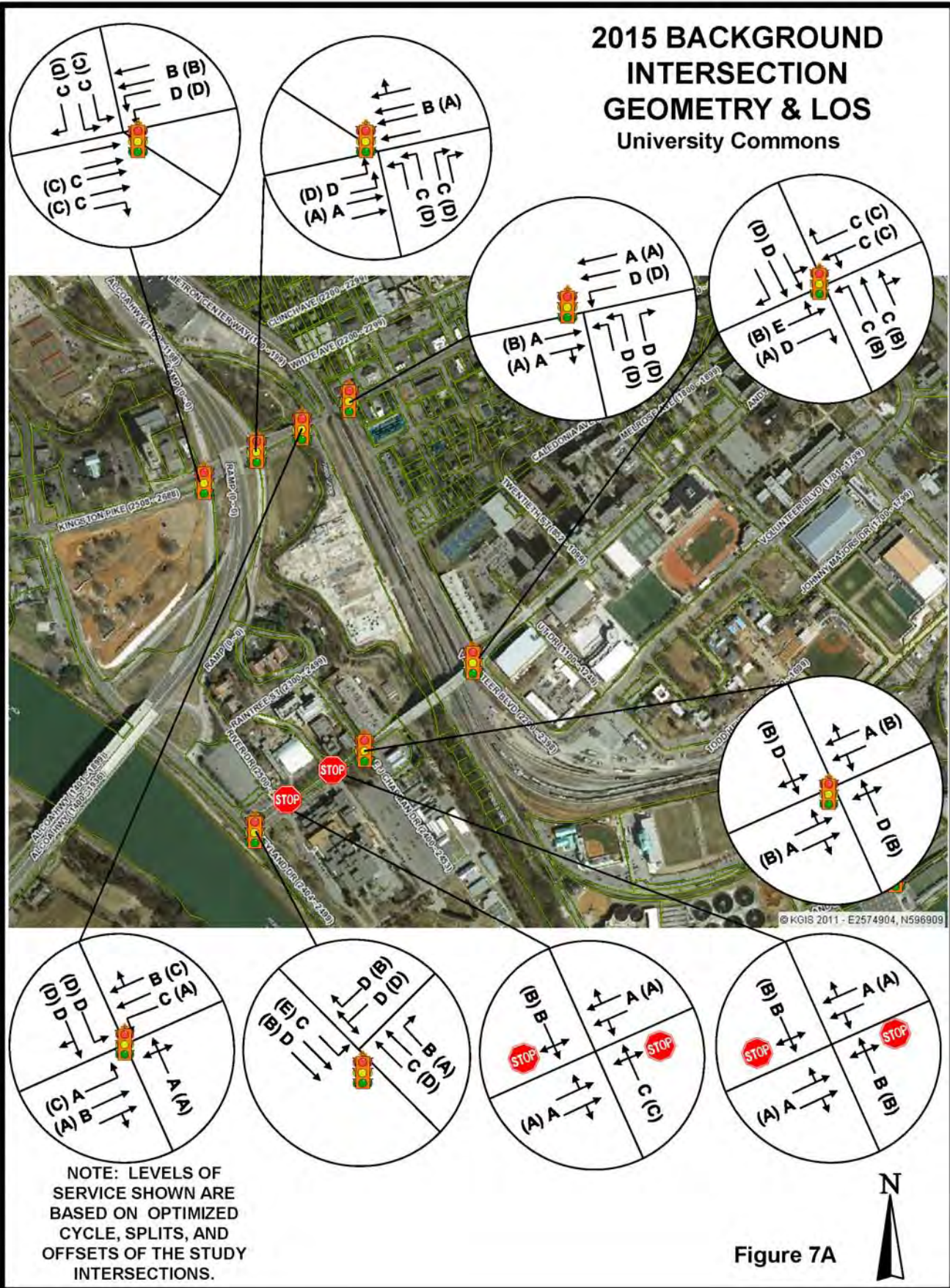
INTERSECTION	TRAFFIC CONTROL	PEAK PERIOD	V/C	DELAY	LOS
Cumberland Avenue at Volunteer Blvd	SIGNAL	AM	0.54	5.4	A
		PM	0.61	21.2	C
Cumberland Avenue at Metron Center Way	SIGNAL	AM	0.70	16.8	B
		PM	0.78	17.5	B
Cumberland Avenue at NB Alcoa Hwy Ramp	SIGNAL	AM	0.49	18.4	B
		PM	0.43	14.9	B
Cumberland Avenue at SB Alcoa Hwy Ramp	SIGNAL	AM	0.33	23.9	C
		PM	0.70	29.6	C
Joe Johnson Drive at Volunteer Blvd	SIGNAL	AM	0.32	42.5	D
		PM	0.49	23.0	C
Joe Johnson Drive at EJ Chapman Drive	SIGNAL	AM	0.23	4.8	A
		PM	0.30	14.3	B
Joe Johnson Drive at Service Drive	STOP NB/SB	AM	0.02 / 0.02	11.1 / 11.5	B / B
		PM	0.04 / 0.06	11.3 / 12.0	B / B
Joe Johnson Drive at River Drive	STOP NB/SB	AM	0.07 / 0.02	22.9 / 11.1	C / B
		PM	0.13 / 0.21	15.2 / 14.3	C / B
Joe Johnson Drive at Neyland Drive	SIGNAL	AM	0.77	37.7	D
		PM	0.95	38.4	D
Additional left-turn lane on SB Neyland Drive	SIGNAL	AM	0.72	45.8	D (1)
		PM	0.90	33.1	C (1)

Note: Average vehicle delay estimated in seconds. STOP control analyses presented by total minor approaches.

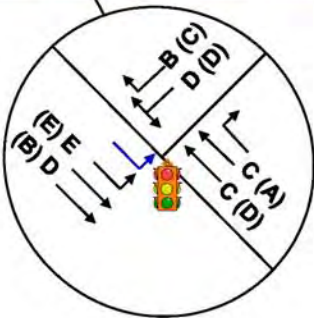
(1) Mitigation is southbound dual left-turn lanes from Neyland Drive turning onto Joe Johnson Drive.

# 2015 BACKGROUND INTERSECTION GEOMETRY & LOS

## University Commons



# 2015 BACKGROUND MITIGATED GEOMETRY & LOS University Commons



NOTE: LEVELS OF SERVICE SHOWN ARE BASED ON OPTIMIZED CYCLE, SPLITS, AND OFFSETS OF THE STUDY INTERSECTIONS.

Figure 7B



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The Neyland Drive and Joe Johnson Drive intersection, however, may continue to experience a capacity ratio in excess of 0.90 thereby unstable for the PM peak hour. Southbound double left-turn lanes for Neyland Drive would mitigate the PM peak capacity and provide an intersection C LOS. The left-turn movement from Neyland Drive may operate a LOS E with or without the double left-turn lanes.

Unsignalized intersections on Joe Johnson Drive were determined to operate with acceptable levels of service. Queues from the Neyland Drive signalized intersection, however, may continue to interfere with the access to Joe Johnson Drive thereby resulting in congestion.

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## PROJECT IMPACTS

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### Trip Generation

Project traffic was determined using the publication, **Trip Generation, 8th Edition**. This reference is published by the Institute of Transportation Engineers (ITE) and represents national data collected for many different land uses including industrial, residential and commercial uses. **Trip Generation** is an essential tool in calculating the traffic, which may be generated by a proposed development. The study generated traffic for the 211,777 square-foot shopping center development.

Some trip generation studies have included surveys addressing pass-by traffic. This is traffic already on the adjacent street that is attracted to the proposed development. Studies conducted for pass-by traffic have suggested that a percentage of the traffic generated by commercial retail, such as the land use at hand, may originate from the existing traffic flow; therefore, the project does not necessarily introduce all new traffic to the transportation system.

Pass-by traffic percentages differ relative to specific land uses and their densities. Some studies have shown varied results; however, the ITE publications, **Transportation and Land Development** by Virgil G. Stover and Frank J. Koepke, and **Trip Generation** have combined these studies to suggest uniform rates for given land uses. These rates range from 14-percent for hardware stores to 60-percent for neighborhood shopping centers, gross leasable area less than 100,000 square feet. Service stations and fast-food restaurants also exhibit high pass-by rates of 58-percent and 45-percent, respectively.

With the location of this development being next to the UT campus, the available sidewalks, and adjacent bike trails, trips generated may come from various modes including bicycles, pedestrians, and the UT campus bus service. Previous studies conducted by WSA for the Cumberland Strip, found that as much as 50-percent of the generated trips may be pedestrian or bike.

From the trip generation calculations, the proposed site may generate approximately 11,060 daily weekday trips. It is assumed that 25-percent of these trips may enter and exit the site by other than vehicular means; trips may be by means of bus, bike, walking. After the consideration of pass-by traffic, assumed 15-percent, approximately 6,640 daily trips may be generated for a typical weekday. **Table 5** presents the trip generation of this proposed site.

**TABLE 5  
TRIP GENERATION**

Land Use	Trip Type	LUC	Density	Daily	AM Peak Hour		PM Peak Hour	
					Enter	Exit	Enter	Exit
Shopping Center		820	211,777	11,060	146	94	515	536
	<i>Multi-Mode Trips</i>		25%	2,765	37	24	129	134
	<i>Primary</i>		60%	6,636	88	56	309	322
	<i>Pass-By</i>		15%	1,659	22	14	77	80

**Note:** Commercial trips generated using **Trip Generation, 8th Edition**, published by ITE.

**Trip Distribution and Assignment**

The proposed Walmart may have a community area of influence. The community significance of the proposed development, existing traffic patterns, and the development vicinity were considered in the development of the trip distribution and assignment. The distribution reflects more trips entering from Cumberland Avenue but should exit using Joe Johnson Drive due to less conflicts. The distribution, therefore assumes 20-percent for Cumberland Avenue from the east and 50-percent will for Kingston Pike from the west. Traffic from Kingston Pike will use both Cumberland Avenue access and the Joe Johnson Drive access. To the south, Alcoa Highway was assigned 10-percent and Neyland Drive was assigned 15-percent. Alcoa Highway, north of the site was assigned 5-percent. **Figure 8** illustrates the primary traffic distribution and assignment.

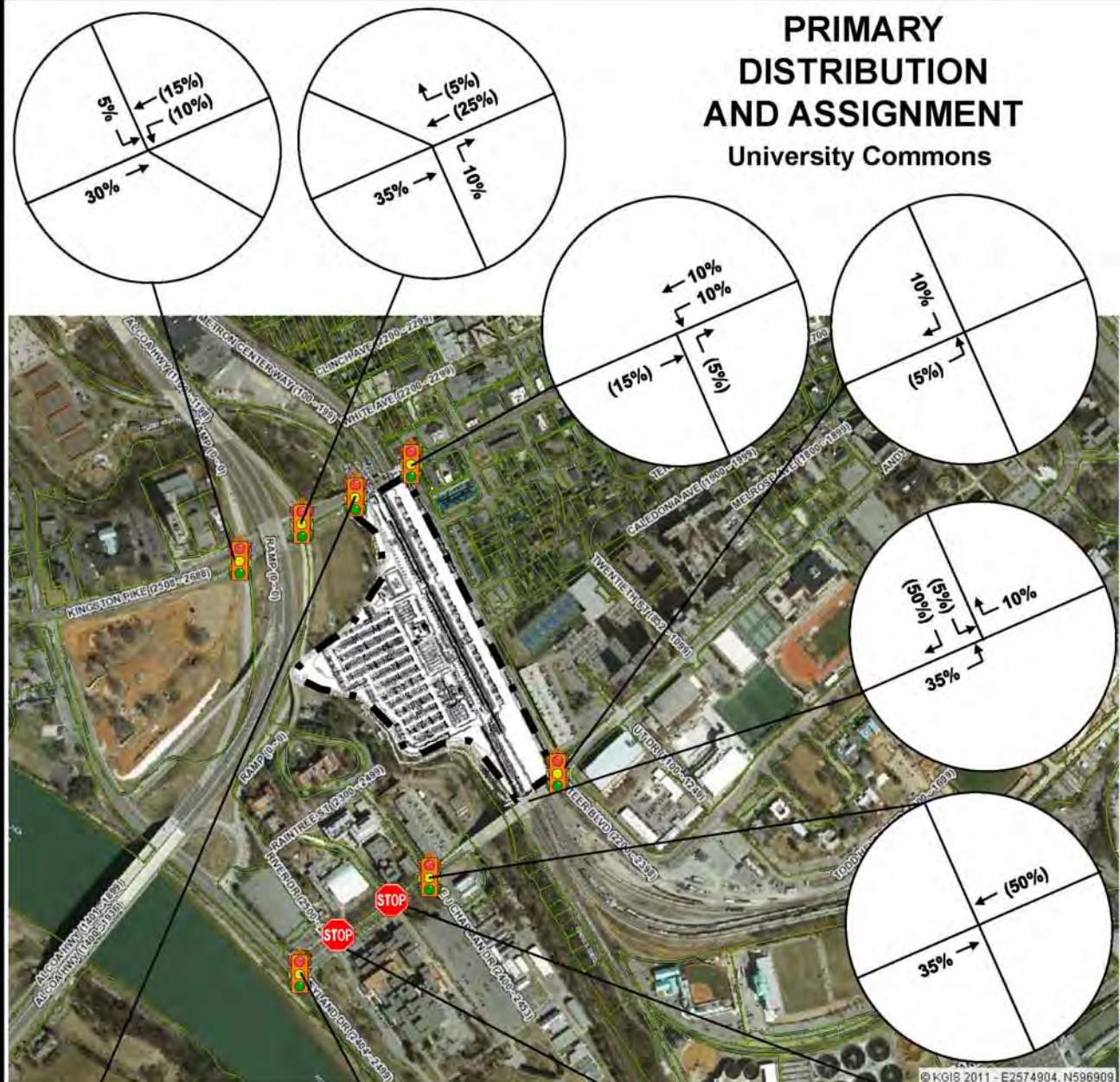
During the AM, the pass-by trips were assumed to 35- and 15-percent eastbound to the westbound on Cumberland Avenue, respectively. From Neyland Drive, pass-by trips were assumed 35- and 10-percent southbound and northbound, respectively. From Joe Johnson Drive, 5-percent pass-by was assumed.

From Cumberland Avenue, during the PM peak hour, pass-by was assumed 20- and 30-percent eastbound and westbound, respectively. Pass-by trips from Neyland Drive assumed 10- and 35-percent southbound and northbound, respectively. Five-percent was again assigned to Joe Johnson Drive.


**Figures 9A and 9B** illustrates the pass-by distribution and assignment for the AM and PM peak hours.

# PRIMARY DISTRIBUTION AND ASSIGNMENT

## University Commons

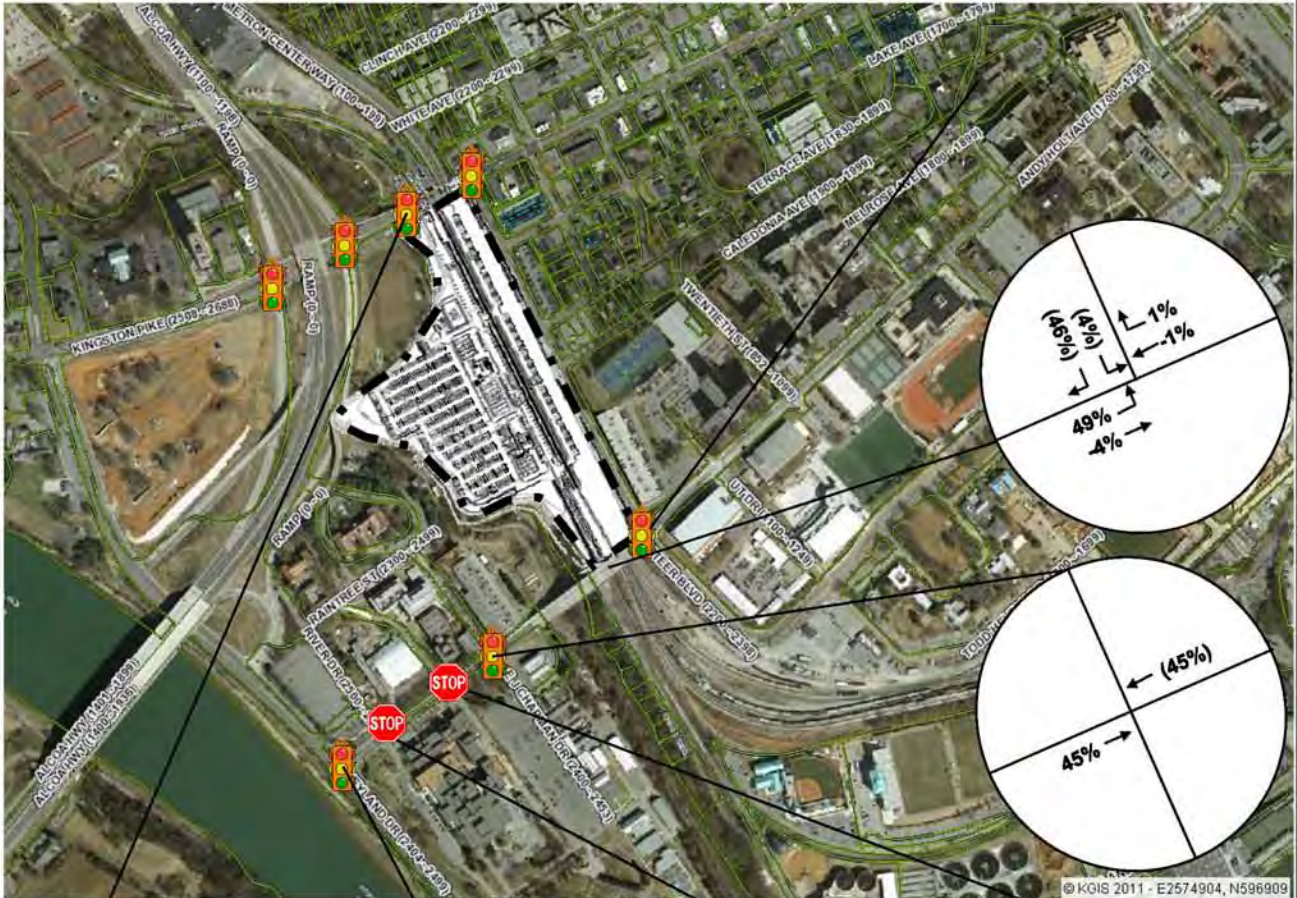


**LEGEND**  
 XXX ENTERING TRIPS  
 (XXX) EXITING TRIPS

Figure 8 

# AM PASS-BY DISTRIBUTION AND ASSIGNMENT

## University Commons



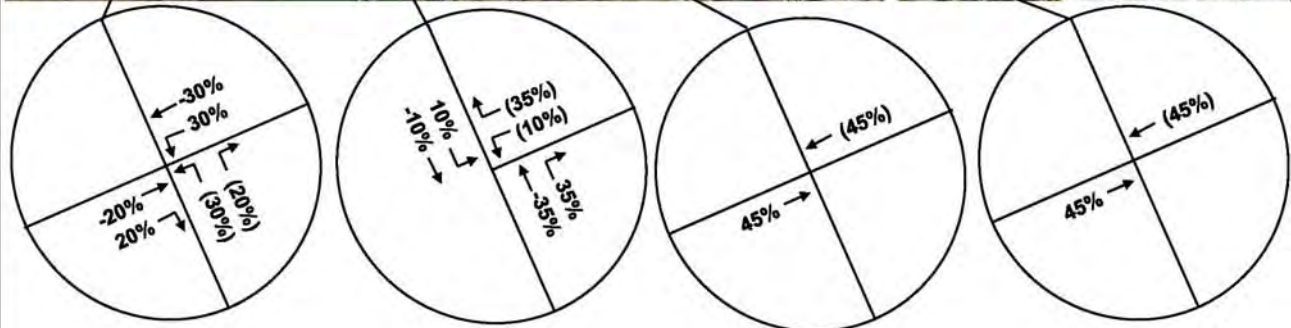
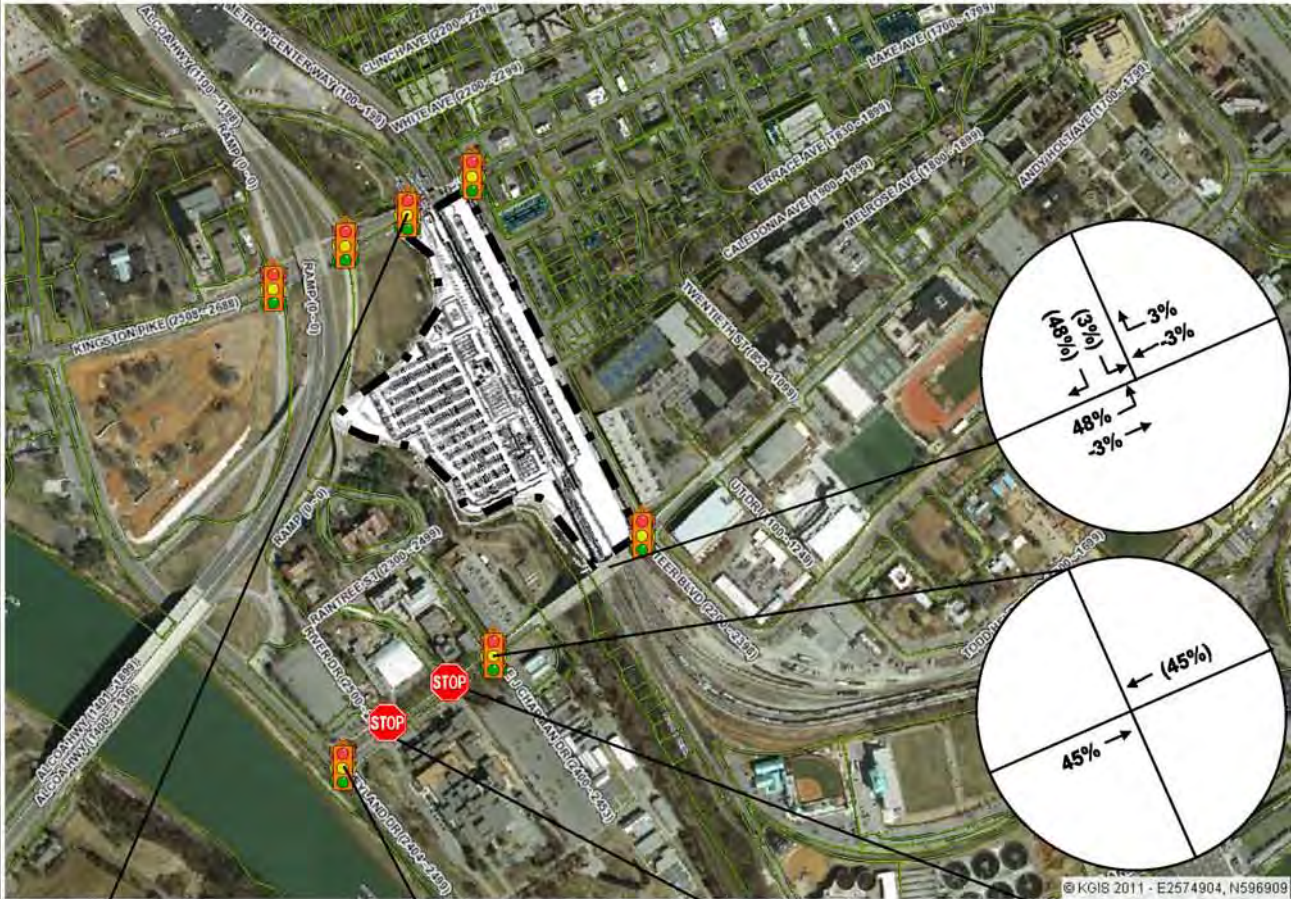
**LEGEND**  
 XXX ENTERING TRIPS  
 (XXX) EXITING TRIPS



Figure 9A

# PM PASS-BY DISTRIBUTION AND ASSIGNMENT

University Commons



**LEGEND**  
 XXX ENTERING TRIPS  
 (XXX) EXITING TRIPS

Figure 9B

---

It should be noted that past studies by WSA for the University identified approximately 60,000 trips are generated by the University. The proposed development should intercept some of these trips and keep them local and possibly a different modal choice. The adjustment for modes represents nearly 5-percent of the trips generated by UT. The proposed development will provide opportunities for the student and faculty population to reduce their trips to similar uses that may otherwise be an automobile generated trip.

### **Project Traffic Volumes**

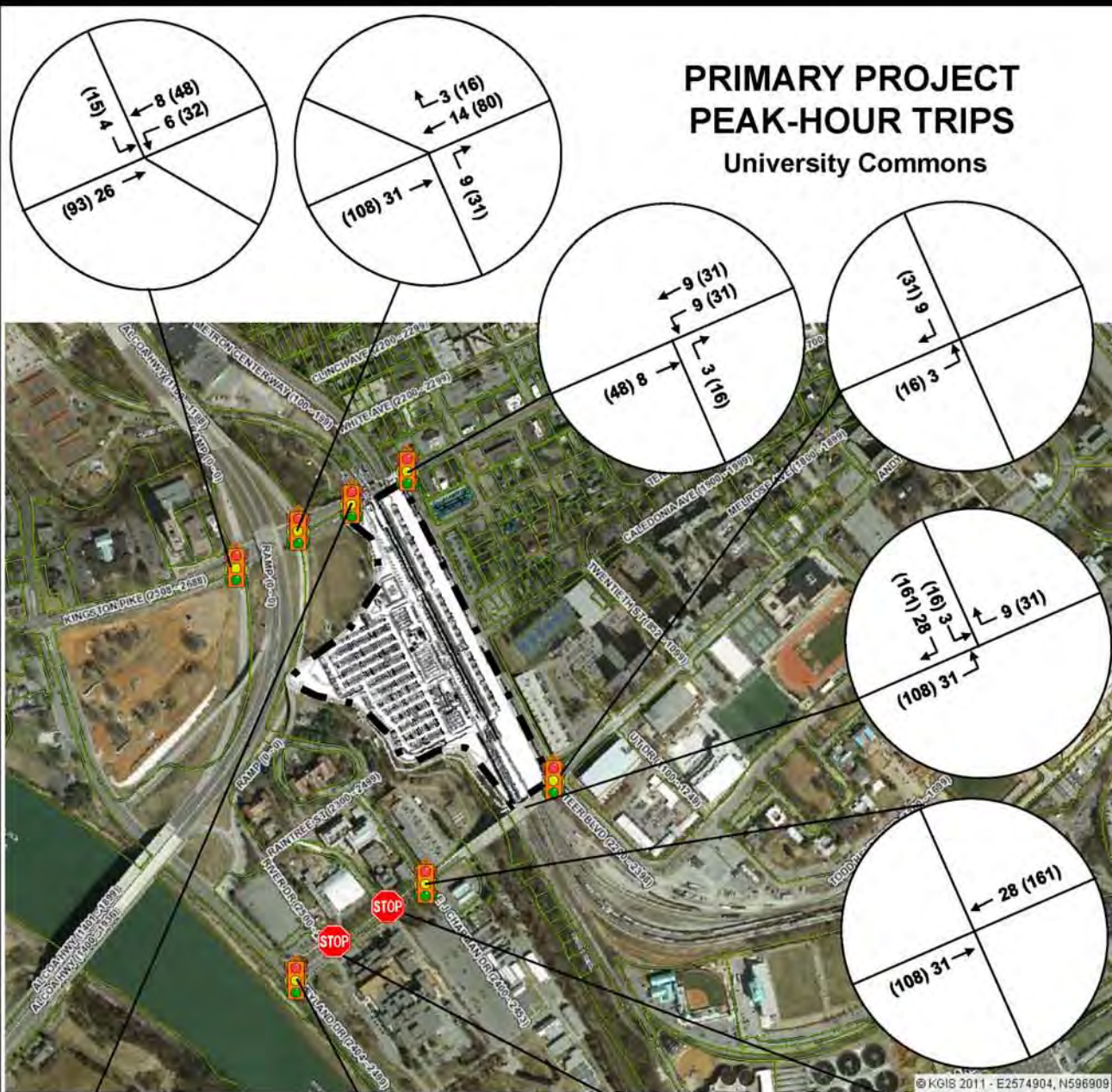
By multiplying the primary and pass-by trips generated entering and exiting by the respective distribution assignments, the project traffic volumes were determined for the AM and PM peak hours. **Figure 10A** illustrates the resulting University Commons's primary trips; **Figure 10B** illustrates the pass-by trips; and resulting total project trips are illustrated in **Figure 11**.

### **Total Projected Traffic Volumes**

Background traffic volumes and project trips volumes were added together to develop post-development traffic volumes for the year 2015. **Figure 12** illustrates the 2015 projections for the University Commons. Using these volume projections, mitigation measures including traffic control devices and roadway and intersection geometry can be evaluated.

# PRIMARY PROJECT PEAK-HOUR TRIPS

## University Commons



**LEGEND**  
 XXX AM PEAK  
 (XXX) PM PEAK

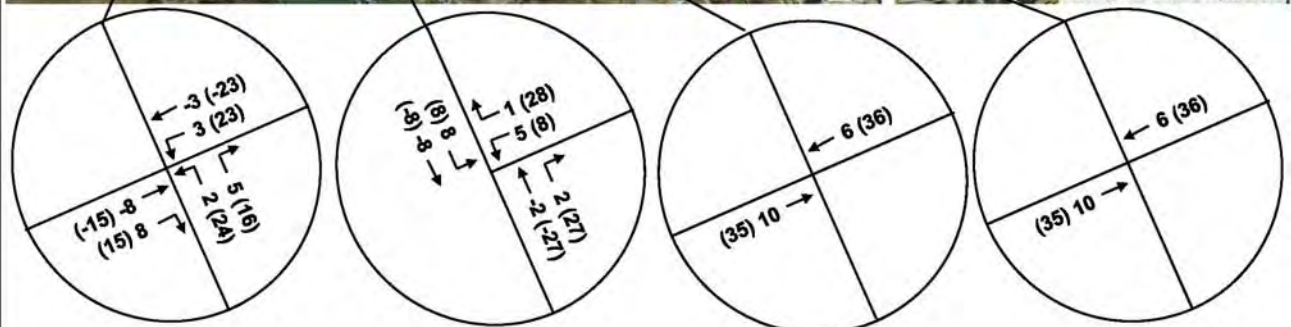
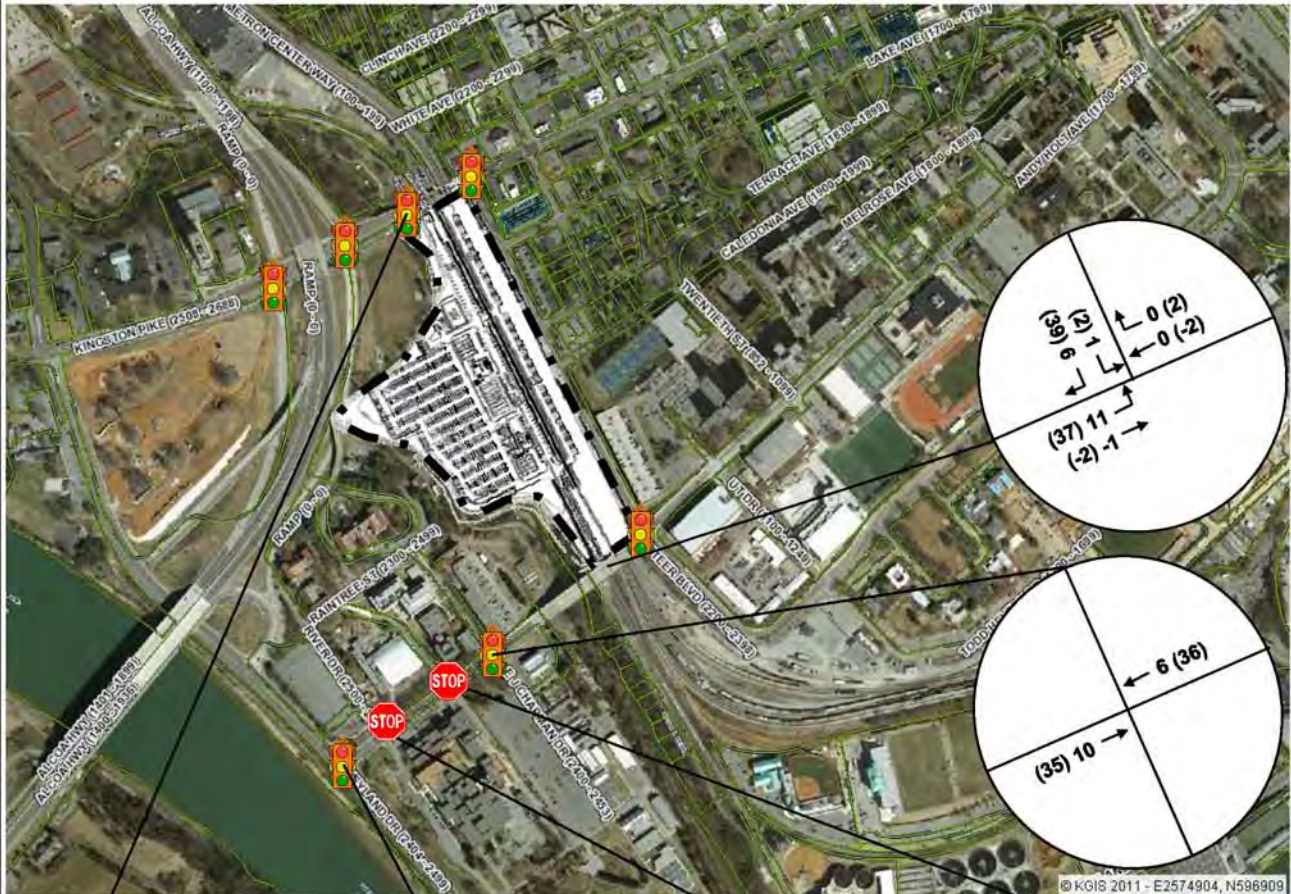


Figure 10A



# PASS-BY PROJECT PEAK HOUR TRIPS

## University Commons



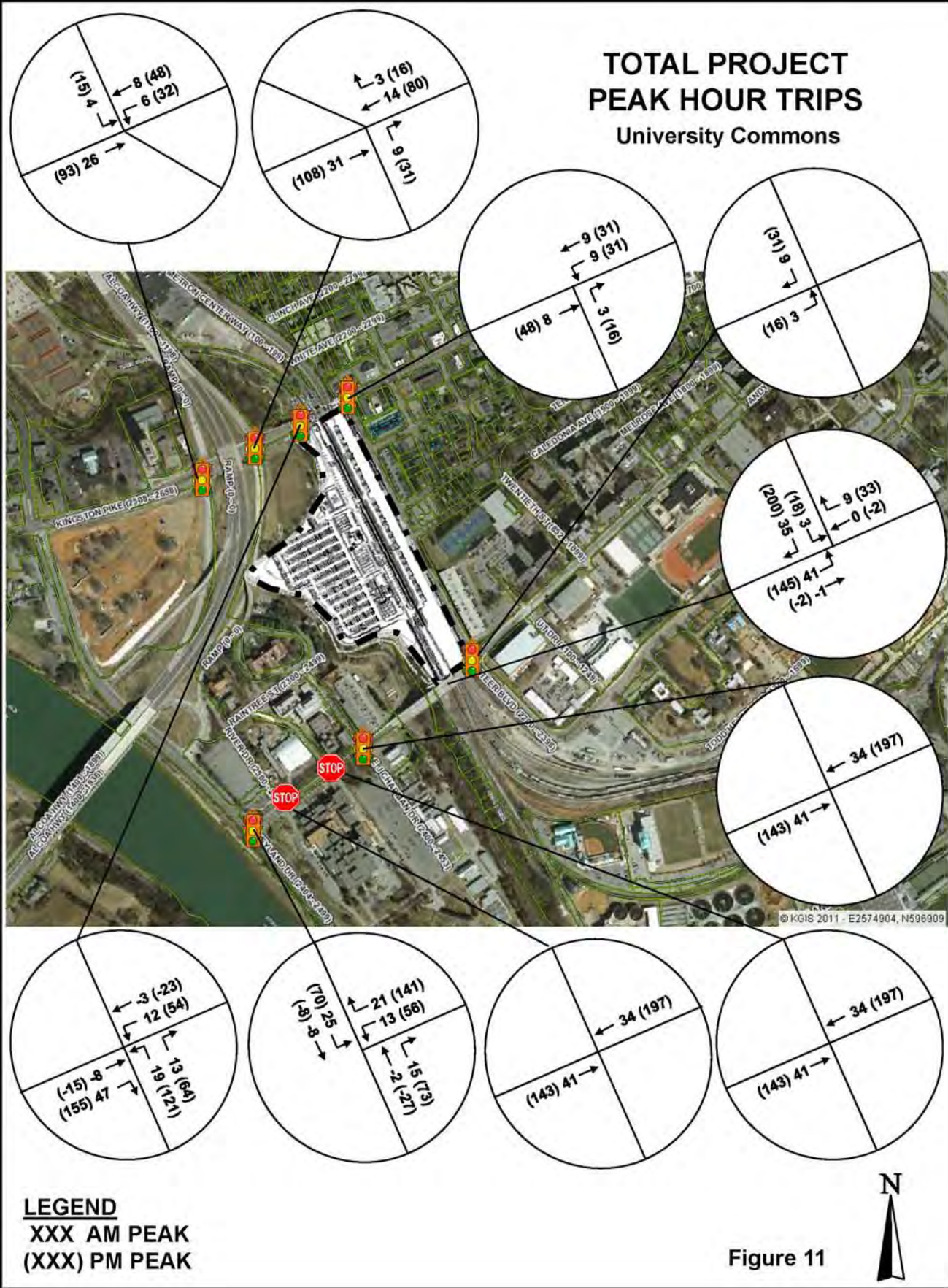
**LEGEND**  
 XXX AM PEAK  
 (XXX) PM PEAK

Figure 10B



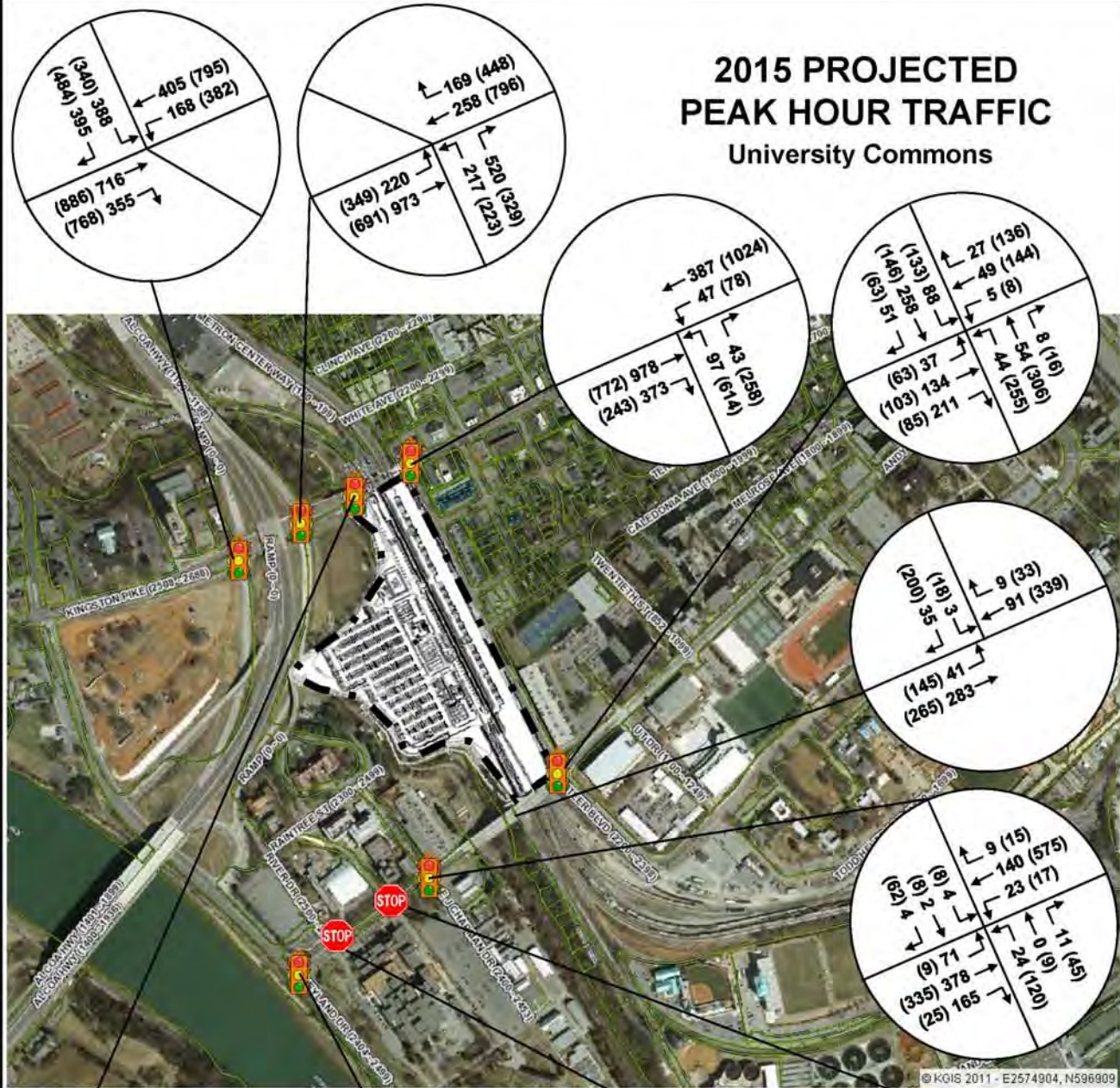
# TOTAL PROJECT PEAK HOUR TRIPS

## University Commons




# 2015 PROJECTED PEAK HOUR TRAFFIC

## University Commons



**LEGEND**  
 XXX AM PEAK  
 (XXX) PM PEAK

Figure 12 

**Projected Capacity Level of Service**

**Table 6** presents the analyses of the 2015 projected traffic volumes with the proposed development. **Table 7** presents the summary of the analyses conducted.

**TABLE 6  
2015 PROJECTED TRAFFIC  
CAPACITY AND LEVEL OF SERVICE**

INTERSECTION	TRAFFIC CONTROL	PEAK PERIOD	V/C	DELAY	LOS
Cumberland Avenue at Volunteer Blvd	SIGNAL	AM	0.54	5.4	A
		PM	0.63	22.5	C
Cumberland Avenue at Metron Center Way	SIGNAL	AM	0.62	19.3	B
		PM	0.73	23.7	C
Cumberland Avenue at NB Alcoa Hwy Ramp	SIGNAL	AM	0.51	18.0	B
		PM	0.45	15.4	B
Cumberland Avenue at SB Alcoa Hwy Ramp	SIGNAL	AM	0.35	24.3	C
		PM	0.72	30.7	C
Joe Johnson Drive at Volunteer Blvd	SIGNAL	AM	0.32	37.6	D
		PM	0.54	23.7	C
Joe Johnson Drive at Site Access	STOP SB/EB-L	AM	0.04 / 0.03	8.9 / 2.4	A / A
		PM	0.31 / 0.14	11.8 / 5.8	B / A
	SIGNAL	AM	0.19	6.0	A
		PM	0.25	14.5	B
Joe Johnson Drive at EJ Chapman Drive	SIGNAL	AM	0.25	4.7	A
		PM	0.37	12.5	B
Joe Johnson Drive at Service Drive	STOP NB/SB	AM	0.02 / 0.02	11.4 / 12.0	B / B
		PM	0.06 / 0.09	13.7 / 14.6	B / B
Joe Johnson Drive at River Drive	STOP NB/SB	AM	0.07 / 0.03	25.1 / 11.1	C / B
		PM	0.18 / 0.26	19.8 / 17.7	C / C
Joe Johnson Drive at Neyland Drive	SIGNAL	AM	0.80	38.2	D
		PM	1.08	60.2	E
Additional left-turn lane on SB Neyland Drive	SIGNAL	AM	0.73	42.7	D (1)
		PM	0.99	42.2	D (1)
Exclusive left-turn lane on Joe Johnson Drive	SIGNAL	AM	0.79	38.2	D (2)
		PM	0.91	29.0	C (2)
Combination of previous lane additions	SIGNAL	AM	0.73	42.3	D (3)
		PM	0.85	24.8	C (3)

Note: Average vehicle delay estimated in seconds. STOP control analyses presented by total minor approaches.

- (1) Mitigation is southbound dual left-turn lanes from Neyland Drive turning onto Joe Johnson Drive.
- (2) Mitigation is an exclusive left-turn lane from Joe Johnson Drive turning onto Neyland Drive.
- (3) Mitigation is southbound dual left-turn lanes from Neyland Drive turning onto Joe Johnson Drive and exclusive left-turn lane from Joe Johnson Drive turning onto Neyland Drive.

**TABLE 7  
CAPACITY AND LEVEL OF SERVICE SUMMARY**

INTERSECTION	TRAFFIC CONTROL	PEAK PERIOD	2011 TRAFFIC			2015 BACKGROUND			2015 PROJECTED		
			V/C	DELAY	LOS	V/C	DELAY	LOS	V/C	DELAY	LOS
Cumberland Avenue at Volunteer Blvd	SIGNAL	AM	0.62	3.2	A	0.54	5.4	A	0.54	5.4	A
		PM	0.63	14.7	B	0.61	21.2	C	0.63	22.5	C
Cumberland Avenue at Metron Center Way	SIGNAL	AM	0.59	7.1	A	0.70	16.8	B	0.62	19.3	B
		PM	0.73	9.6	A	0.78	17.5	B	0.73	23.7	C
Cumberland Avenue at NB Alcoa Hwy Ramp	SIGNAL	AM	0.64	13.7	B	0.49	18.4	B	0.51	18.0	B
		PM	0.52	13.9	B	0.43	14.9	B	0.45	15.4	B
Cumberland Avenue at SB Alcoa Hwy Ramp	SIGNAL	AM	0.44	14.7	B	0.33	23.9	C	0.35	24.3	C
		PM	0.67	18.8	B	0.70	29.6	C	0.72	30.7	C
Joe Johnson Drive at Volunteer Blvd	SIGNAL	AM	0.36	27.6	C	0.32	42.5	D	0.32	37.6	D
		PM	0.45	23.8	C	0.49	23.0	C	0.54	23.7	C
Joe Johnson Drive at Site Access	STOP SB/EB-L	AM							0.04 / 0.03	8.9 / 2.4	A / A
		PM							0.31 / 0.14	11.8 / 5.8	B / A
Joe Johnson Drive at EJ Chapman Drive	SIGNAL	AM	0.24	2.8	A	0.23	4.8	A	0.25	4.7	A
		PM	0.33	14.9	B	0.30	14.3	B	0.37	12.5	B
Joe Johnson Drive at Service Drive	STOP NB/SB	AM	0.03 / 0.03	11.0 / 11.5	B / B	0.02 / 0.02	11.1 / 11.5	B / B	0.02 / 0.02	11.4 / 12.0	B / B
		PM	0.06 / 0.09	11.2 / 11.6	B / B	0.04 / 0.06	11.3 / 12.0	B / B	0.06 / 0.09	13.7 / 14.6	B / B
Joe Johnson Drive at River Drive	STOP NB/SB	AM	0.10 / 0.06	30.8 / 11.8	D / B	0.07 / 0.02	22.9 / 11.1	C / B	0.07 / 0.03	25.1 / 11.1	C / B
		PM	0.17 / 0.36	17.0 / 16.1	C / C	0.13 / 0.21	15.2 / 14.3	C / B	0.18 / 0.26	19.8 / 17.7	C / C
Joe Johnson Drive at Neyland Drive	SIGNAL	AM	0.76	58.5	E	0.77	37.7	D	0.80	38.2	D
		PM	1.00	49.5	D	0.95	38.4	D	1.08	60.2	E
Additional left-turn lane on SB Neyland Drive	SIGNAL	AM	0.73	42.4	D (1)	0.72	45.8	D (1)	0.73	42.7	D (1)
		PM	0.93	38.0	D (1)	0.90	33.1	C (1)	0.99	42.2	D (1)
Exclusive left-turn lane on Joe Johnson Drive	SIGNAL	AM							0.79	38.2	D (2)
		PM							0.91	29.0	C (2)
Combination of previous lane additions	SIGNAL	AM							0.73	42.3	D (3)
		PM							0.85	24.8	C (3)

Note: Average vehicle delay estimated in seconds. STOP control analyses presented by total minor approaches.

(1) Mitigation is southbound dual left-turn lanes from Neyland Drive turning onto Joe Johnson Drive.

(2) Mitigation is an exclusive left-turn lane from Joe Johnson Drive turning onto Neyland Drive.

(3) Mitigation is southbound dual left-turn lanes from Neyland Drive turning onto Joe Johnson Drive and exclusive left-turn lane from Joe Johnson Drive turning onto Neyland Drive.

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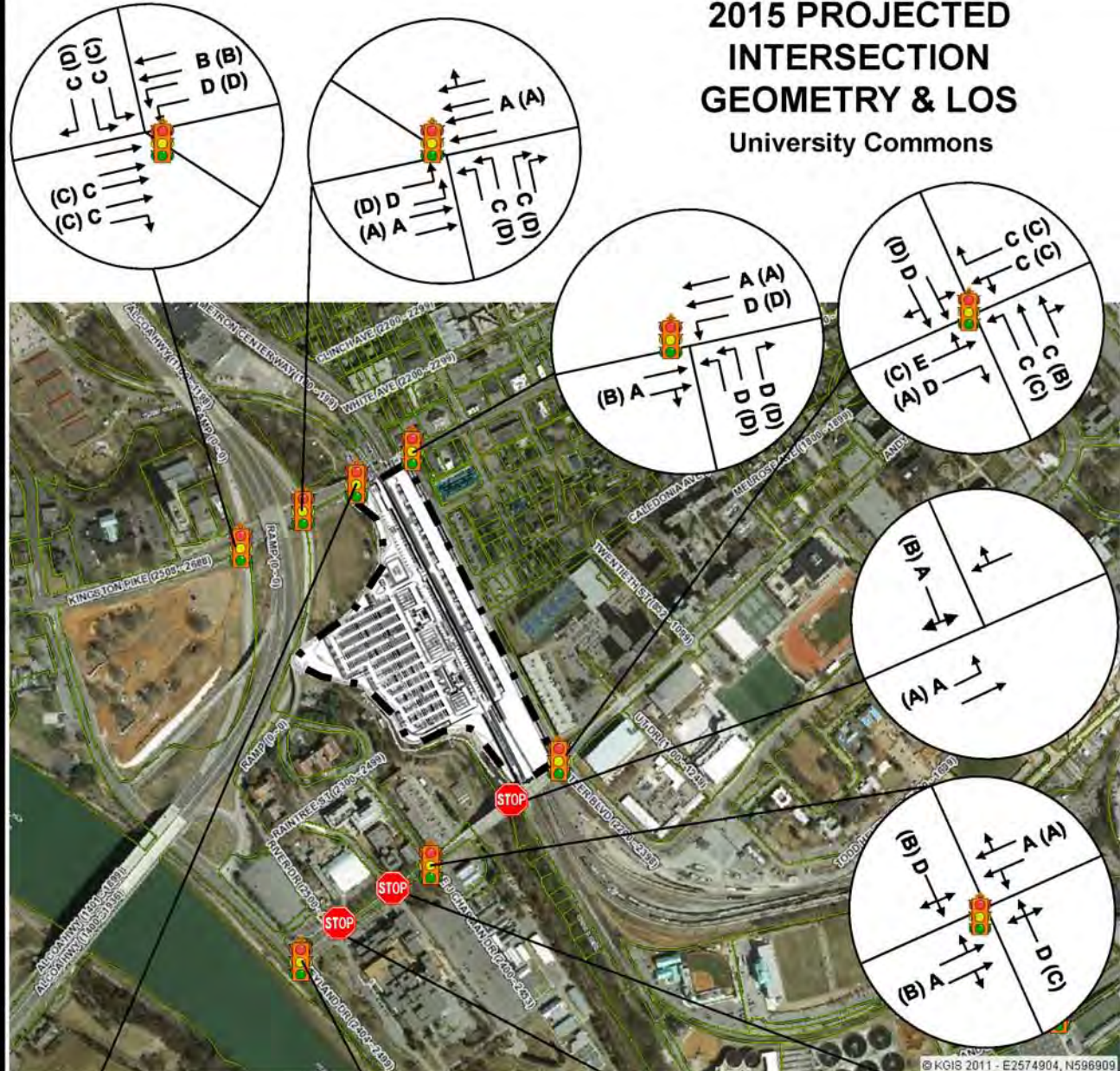
With the development of the University Commons, levels of service should remain acceptable with minimal changes in average intersection delays. Capacity ratios remain less than 0.80 for many of the study signalized intersections. Unsignalized study intersections continue to operate at acceptable levels of service. The proposed University Commons will have further impact on the Neyland Drive and Joe Johnson Drive intersection with the traffic volumes exceeding the intersection capacity. The intersection may fall to LOS E and the left-turn movement may fail during the PM peak hour. Both southbound double left-turn lanes for Neyland Drive and a separate left-turn lane for the Joe Johnson Drive approach were analyzed to evaluate and determine the most effective mitigation of the site impact on the intersection. Projected and mitigated geometry and LOS are illustrated in **Figures 13 and 14**, respectively. It was found that the southbound double left-turn lane on Neyland Drive would result in the good levels of service for the AM and PM peak hours, but the PM peak hour may still operate at capacity with a ratio of 0.99. The double left-turns may be restricted by R.O.W and the slope to the Tennessee River.

The provision of a separate left-turn lane for the Joe Johnson Drive approach to Neyland Drive does provide for a more efficient lane distribution and intersection operation. The left-turn lane may be provided using one of the entering lanes which is not necessary with single left- and right-turn movements from Neyland Drive. This improvement results in good levels of service during the peak hours and lowers the capacity ratio to 0.91 during the PM peak hour which is an improvement over the background condition. Both the southbound double left-turn lanes and the Joe Johnson Drive approach improvements results in acceptable levels of service and good capacity ratios. Both improvements, however, would impact the R.O.W.; the double left-turn movement may be limited by the slope to the river and would require two entering lanes on Joe Johnson Drive prohibiting an entering lane to be use for the separate left-turn lane from Joe Johnson Drive or would require another lane to be provided on Joe Johnson Drive, three lanes exiting and two lanes entering.

With improved efficiency for the Joe Johnson Drive approach, its mitigation of the site impact, and its least impact on the R.O.W., the separate left-turn lane for the Joe Johnson Drive approach is the more practical improvement. The Joe Johnson improvement provides for good intersection level of service, decreases the capacity ratio from that calculated for background conditions, and improves the left-turn movement LOS from the F to an E during the PM peak hour.

# 2015 PROJECTED INTERSECTION GEOMETRY & LOS

## University Commons



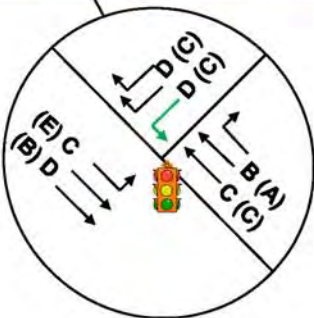
NOTE: LEVELS OF SERVICE SHOWN ARE BASED ON OPTIMIZED CYCLE, SPLITS, AND OFFSETS OF THE STUDY INTERSECTIONS.

Figure 13A



# 2015 RECOMMENDED MITIGATED GEOMETRY & LOS

University Commons



NOTE: LEVELS OF SERVICE SHOWN ARE BASED ON OPTIMIZED CYCLE, SPLITS, AND OFFSETS OF THE STUDY INTERSECTIONS.

Figure 13B



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## RECOMMENDATIONS

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The analysis conducted and the review of the traffic volumes identified that impacts for this development were manageable. The following recommendations will provide for acceptable access to and from the site:

- ◆ Provide for separate left- and right-turn lanes from the proposed access to Cumberland Avenue at Metron Center Way.
- ◆ Reconstruct the traffic signal for the intersection of Cumberland Avenue and Metron Center Way with the proposed access.
- ◆ Remove the transverse striping on the southbound approach of Neyland Drive to Joe Johnson Drive providing for additional left-turn storage for the traffic turning from Neyland Drive to Joe Johnson Drive.
- ◆ Provide a separate left-turn lane for the Joe Johnson Drive approach to Neyland Drive. This lane should be constructed in a manner that also provides for a minimum left-turn lane to River Drive.
- ◆ Signalize the proposed site access to Joe Johnson Drive required for the inadequate line of sight to the east.
- ◆ Provide sidewalks and bike lanes to accommodate the modal choices of the community.
- ◆ Minimize landscaping and signing at the proposed development accesses so as not to restrict sight-distances to and from the site.
- ◆ Access design should conform to the recommended standards and practices of the American Association of State Highway and Transportation Officials, the Institute of Transportation Engineers and the requirements of the Tennessee Department of Transportation.

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## CONCLUSIONS

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The study of the proposed University Commons site, located in Knoxville, Tennessee, addresses the traffic impacts identified of a 211,777 square-foot shopping center adjacent to the University of Tennessee and the Knoxville CBD. The study developed and evaluated existing, background, and project traffic conditions. Background traffic was determined using a 1.0-percent annual growth rate until the year 2015 and a diversion in traffic from Cumberland Avenue with its planned capacity reduction from a 4-lane section to a 3-lane section. It was assumed that 25-percent of the inbound traffic in the AM peak hour and outbound in the PM peak hour would divert to other routes. A reduction of 15-percent was assumed for their opposing flows. Traffic should divert to but not limited to Neyland Drive, Volunteer Boulevard, Joe Johnson Drive, 17<sup>th</sup> Street, and Western Avenue.

Traffic associated with the proposed development was generated and distributed to the site access and the adjacent study intersections. Capacity and level of service analyses were conducted, using the **2000 Highway Capacity Manual**, for the existing, background, and project projected traffic conditions.

The daily trip generation for the site is approximately 11,060 with an adjusted daily trip generation of 6,640 when considering pass-by and modal choice, including walking, bike, and transit use. The adjustment of the modal choice was based on other studies conducted for the commercial development on the Cumberland Strip which identified as much as 50-percent of the trips generated were from pedestrian and bicycle traffic. A 25-percent reduction in vehicle trips was assumed for this study due to this site being just on the perimeter of the Cumberland commercial strip. A 25-percent reduction may also represent nearly 5-percent of the approximate 60,000 daily trips generated by UT. The proposed site should reduce the trips off campus to similar uses at a greater distance that may require an automobile.

Analyses of the study intersections found that the study intersections should operate at acceptable levels of service with the exception of the Joe Johnson Drive intersection with Neyland Drive which is currently operating at an E LOS during the morning peak hour and at capacity for the PM peak hour. Improvements considered for the Neyland Drive and Joe Johnson Drive intersection included double left-turn lanes from Neyland Drive to Joe Johnson Drive to facilitate the very large traffic volume entering the UT campus during the AM peak hour and a separate left-turn lane from Joe Johnson Drive to Neyland Drive permitting a much more efficient right-turn movement from Joe Johnson Drive to Neyland Drive. The improvements to

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the Joe Johnson Drive approach was found to be more practical and would be sufficient to mitigate the proposed development's impact.

With the recommendations of this report, the traffic impact can be minimized and should maintain the acceptable traffic conditions.

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## APPENDIX

Trip Generation

Synchro Analyses

Traffic Count Data

# APPENDIX



# **TRIP GENERATION**

### TRIP GENERATION

29-Dec-11

			AVERAGE						
LAND USE	L.U.C	SIZE	DAILY		AM PEAK		PM PEAK		
			TRAFFIC	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
SHOPPING CENTER	820	211,777	9,094	129	83	212	387	403	790
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
			9,094	129	83	212	387	403	790

			REGRESSION						
LAND USE	L.U.C	SIZE	DAILY		AM PEAK		PM PEAK		
			TRAFFIC	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
SHOPPING CENTER	820	211,777	11,060	146	94	240	515	536	1,052
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
			11,060	146	94	240	515	536	1,052

			SATURDAY				SUNDAY			
LAND USE	L.U.C	SIZE	DAILY		PEAK		DAILY		PEAK	
			TRAFFIC	ENTER	EXIT	TOTAL	TRAFFIC	ENTER	EXIT	TOTAL
SHOPPING CENTER	820	211,777	14,824	726	670	1,396	7,525	324	337	661
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
			14,824	726	670	1,396	7,525	324	337	661



# **SYNCHRO ANALYSES**



**2010 AM  
EXISTING  
PEAK HOUR  
TRAFFIC VOLUMES**

Queues

1: Cumberland Ave. & Metron Center Way

2011 AM Peak Hr

University Commons TIS



Lane Group	EBL	EBT	WBL	WBT	SBL	SBT
Lane Group Flow (vph)	30	1734	1	608	9	3
v/c Ratio	0.06	0.82	0.01	0.29	0.03	0.00
Control Delay	3.0	7.8	5.0	6.0	19.0	0.0
Queue Delay	0.0	0.0	0.0	0.6	0.0	0.0
Total Delay	3.0	7.8	5.0	6.6	19.0	0.0
Queue Length 50th (ft)	3	145	0	50	3	0
Queue Length 95th (ft)	m4	180	m1	65	10	0
Internal Link Dist (ft)		164		115		278
Turn Bay Length (ft)	50		50			
Base Capacity (vph)	464	2123	115	2115	347	623
Starvation Cap Reductn	0	13	0	1064	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	0.82	0.01	0.58	0.03	0.00

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
1: Cumberland Ave. & Metron Center Way

2011 AM Peak Hr  
University Commons TIS



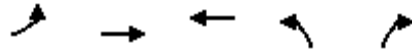
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	1734	0	1	508	21	0	0	0	6	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0					5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95					1.00	1.00	
Frt	1.00	1.00		1.00	0.99					1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00					0.95	1.00	
Satd. Flow (prot)	1770	3539		1770	3518					1770	1583	
Flt Permitted	0.42	1.00		0.10	1.00					0.76	1.00	
Satd. Flow (perm)	773	3539		191	3518					1410	1583	
Peak-hour factor, PHF	0.96	1.00	0.96	0.87	0.87	0.87	0.92	0.92	0.92	0.67	0.67	0.67
Adj. Flow (vph)	30	1734	0	1	584	24	0	0	0	9	0	3
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	0	0	2	0
Lane Group Flow (vph)	30	1734	0	1	604	0	0	0	0	9	1	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	2			6			8			8		4
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	39.0	39.0		39.0	39.0					16.0	16.0	
Effective Green, g (s)	39.0	39.0		39.0	39.0					16.0	16.0	
Actuated g/C Ratio	0.60	0.60		0.60	0.60					0.25	0.25	
Clearance Time (s)	5.0	5.0		5.0	5.0					5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)	464	2123		115	2111					347	390	
v/s Ratio Prot		c0.49			0.17							0.00
v/s Ratio Perm	0.04			0.01						c0.01		
v/c Ratio	0.06	0.82		0.01	0.29					0.03	0.00	
Uniform Delay, d1	5.4	10.2		5.2	6.3					18.6	18.5	
Progression Factor	0.49	0.47		0.88	0.91					1.00	1.00	
Incremental Delay, d2	0.2	2.8		0.1	0.3					0.1	0.0	
Delay (s)	2.8	7.5		4.7	6.1					18.7	18.5	
Level of Service	A	A		A	A					B	B	
Approach Delay (s)		7.4			6.1			0.0			18.7	
Approach LOS		A			A			A			B	

Intersection Summary

HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues  
11: Cumberland Ave. & NB Alcoa Hwy Ramp

2011 AM Peak Hr  
University Commons TIS



Lane Group	EBL	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	228	1165	568	240	667
v/c Ratio	0.55	0.63	0.27	0.22	0.69
Control Delay	28.4	10.2	3.0	16.7	20.7
Queue Delay	0.0	0.3	0.0	0.0	0.0
Total Delay	28.4	10.6	3.0	16.7	20.7
Queue Length 50th (ft)	47	170	3	35	109
Queue Length 95th (ft)	79	216	5	57	160
Internal Link Dist (ft)		254	156		
Turn Bay Length (ft)					
Base Capacity (vph)	423	1851	2118	1109	966
Starvation Cap Reductn	0	217	0	0	0
Spillback Cap Reductn	0	12	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.54	0.71	0.27	0.22	0.69

Intersection Summary

HCM Signalized Intersection Capacity Analysis  
 11: Cumberland Ave. & NB Alcoa Hwy Ramp

2011 AM Peak Hr  
 University Commons TIS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖↗	↕↕			↖↗↘		↖↗		↖↗				
Volume (vph)	212	1083	0	0	271	178	209	0	580	0	0	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	0.97	0.95			0.86		0.97		0.88				
Frt	1.00	1.00			0.94		1.00		0.85				
Flt Protected	0.95	1.00			1.00		0.95		1.00				
Satd. Flow (prot)	3433	3539			6027		3433		2787				
Flt Permitted	0.95	1.00			1.00		0.95		1.00				
Satd. Flow (perm)	3433	3539			6027		3433		2787				
Peak-hour factor, PHF	0.93	0.93	0.93	0.79	0.79	0.79	0.87	0.87	0.87	0.92	0.92	0.92	
Adj. Flow (vph)	228	1165	0	0	343	225	240	0	667	0	0	0	
RTOR Reduction (vph)	0	0	0	0	152	0	0	0	66	0	0	0	
Lane Group Flow (vph)	228	1165	0	0	416	0	240	0	601	0	0	0	
Turn Type	Prot							custom		custom			
Protected Phases	5	2						6					
Permitted Phases								8		8			
Actuated Green, G (s)	7.8	34.0						21.2	21.0	21.0			
Effective Green, g (s)	7.8	34.0						21.2	21.0	21.0			
Actuated g/C Ratio	0.12	0.52						0.33	0.32	0.32			
Clearance Time (s)	5.0	5.0						5.0	5.0	5.0			
Vehicle Extension (s)	3.0	3.0						3.0	3.0	3.0			
Lane Grp Cap (vph)	412	1851						1966	1109	900			
v/s Ratio Prot	0.07	c0.33						0.07					
v/s Ratio Perm								0.07		c0.22			
v/c Ratio	0.55	0.63						0.21	0.22	0.67			
Uniform Delay, d1	27.0	11.0						15.9	16.0	19.0			
Progression Factor	0.86	0.77						0.28	1.00	1.00			
Incremental Delay, d2	1.5	1.5						0.2	0.4	3.9			
Delay (s)	24.8	10.0						4.7	16.5	22.9			
Level of Service	C	B						A	B	C			
Approach Delay (s)								4.7		21.2			0.0
Approach LOS								A		C			A

**Intersection Summary**

HCM Average Control Delay	13.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues  
15: Cumberland Ave. & SB Alcoa Hwy Ramp

2011 AM Peak Hr  
University Commons TIS



Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	845	383	213	488	491	409
v/c Ratio	0.40	0.24	0.52	0.26	0.44	0.56
Control Delay	17.7	0.4	34.1	6.6	18.9	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.7	0.4	34.1	6.6	19.0	7.7
Queue Length 50th (ft)	74	0	44	49	77	23
Queue Length 95th (ft)	98	0	69	67	116	91
Internal Link Dist (ft)	447		254			
Turn Bay Length (ft)						
Base Capacity (vph)	2094	1583	423	1851	1109	731
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	18	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.24	0.50	0.26	0.45	0.56

Intersection Summary



HCM Signalized Intersection Capacity Analysis  
 15: Cumberland Ave. & SB Alcoa Hwy Ramp

2011 AM Peak Hr  
 University Commons TIS




















Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗	↘	↑↑					↖		↗
Volume (vph)	0	752	341	175	400	0	0	0	0	457	0	380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	4.0	5.0	5.0					5.0		5.0
Lane Util. Factor		0.86	1.00	0.97	0.95					0.97		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)		6408	1583	3433	3539					3433		1583
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		6408	1583	3433	3539					3433		1583
Peak-hour factor, PHF	0.89	0.89	0.89	0.82	0.82	0.82	0.92	0.92	0.92	0.93	0.93	0.93
Adj. Flow (vph)	0	845	383	213	488	0	0	0	0	491	0	409
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	220
Lane Group Flow (vph)	0	845	383	213	488	0	0	0	0	491	0	189
Turn Type			Free	Prot						custom		custom
Protected Phases		4		3	8							
Permitted Phases			Free							6		6
Actuated Green, G (s)		21.2	65.0	7.8	34.0					21.0		21.0
Effective Green, g (s)		21.2	65.0	7.8	34.0					21.0		21.0
Actuated g/C Ratio		0.33	1.00	0.12	0.52					0.32		0.32
Clearance Time (s)		5.0		5.0	5.0					5.0		5.0
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		2090	1583	412	1851					1109		511
v/s Ratio Prot		c0.13		c0.06	0.14							
v/s Ratio Perm			0.24							c0.14		0.12
v/c Ratio		0.40	0.24	0.52	0.26					0.44		0.37
Uniform Delay, d1		17.0	0.0	26.8	8.6					17.4		16.9
Progression Factor		1.00	1.00	1.09	0.72					1.00		1.00
Incremental Delay, d2		0.6	0.4	1.1	0.3					1.3		2.1
Delay (s)		17.6	0.4	30.3	6.5					18.7		19.0
Level of Service		B	A	C	A					B		B
Approach Delay (s)		12.2			13.7			0.0			18.8	
Approach LOS		B			B			A			B	

Intersection Summary		
HCM Average Control Delay	14.7	HCM Level of Service B
HCM Volume to Capacity ratio	0.44	
Actuated Cycle Length (s)	65.0	Sum of lost time (s) 15.0
Intersection Capacity Utilization	58.6%	ICU Level of Service B
Analysis Period (min)	15	
c Critical Lane Group		

HCM Unsignalized Intersection Capacity Analysis  
24: River Dr & Andy Holt Ave.

2011 AM Peak Hr  
University Commons TIS

													
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR	
Lane Configurations													
Volume (veh/h)	2	0	12	7	0	6	224	437	37	1	54	44	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.44	0.44	0.44	0.81	0.81	0.81	0.72	0.72	0.72	0.83	0.83	0.83	
Hourly flow rate (vph)	5	0	27	9	0	7	311	607	51	1	65	53	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type								None			None		
Median storage (veh)													
Upstream signal (ft)								233			648		
pX, platoon unblocked													
vC, conflicting volume	1027	1375	59	1317	1375	329	118			658			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	1027	1375	59	1317	1375	329	118			658			
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 %	97	100	97	91	100	99	79			100			
cM capacity (veh/h)	156	114	994	94	113	667	1468			925			
Direction, Lane #	SE 1	NW 1	NE 1	NE 2	SW 1	SW 2							
Volume Total	32	16	615	355	34	86							
Volume Left	5	9	311	0	1	0							
Volume Right	27	7	0	51	0	53							
cSH	562	155	1468	1700	925	1700							
Volume to Capacity	0.06	0.10	0.21	0.21	0.00	0.05							
Queue Length 95th (ft)	4	8	20	0	0	0							
Control Delay (s)	11.8	30.8	5.1	0.0	0.3	0.0							
Lane LOS	B	D	A		A								
Approach Delay (s)	11.8	30.8	3.3		0.1								
Approach LOS	B	D											
Intersection Summary													
Average Delay			3.6										
Intersection Capacity Utilization			33.1%	ICU Level of Service	A								
Analysis Period (min)			15										

Queues  
28: EJ Chapman Dr & Andy Holt Ave.

2011 AM Peak Hr  
University Commons TIS



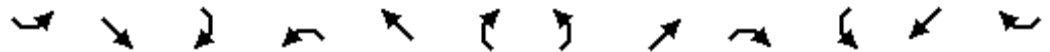
Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	12	60	624	144
v/c Ratio	0.03	0.15	0.33	0.08
Control Delay	19.9	19.9	0.3	2.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	19.9	19.9	0.3	2.3
Queue Length 50th (ft)	3	18	0	11
Queue Length 95th (ft)	15	27	m0	2
Internal Link Dist (ft)	276	290	190	445
Turn Bay Length (ft)				
Base Capacity (vph)	441	410	1908	1803
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	0.03	0.15	0.33	0.08

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
28: EJ Chapman Dr & Andy Holt Ave.

2011 AM Peak Hr  
University Commons TIS



















Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	4	2	4	24	0	11	71	245	165	23	87	9
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	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.94			0.96			0.95			0.99	
Flt Protected		0.98			0.97			0.99			0.99	
Satd. Flow (prot)		1722			1724			3333			3465	
Flt Permitted		0.93			0.83			0.88			0.83	
Satd. Flow (perm)		1639			1485			2944			2891	
Peak-hour factor, PHF	0.83	0.83	0.83	0.58	0.58	0.58	0.77	0.77	0.77	0.83	0.83	0.83
Adj. Flow (vph)	5	2	5	41	0	19	92	318	214	28	105	11
RTOR Reduction (vph)	0	4	0	0	14	0	0	75	0	0	4	0
Lane Group Flow (vph)	0	8	0	0	46	0	0	549	0	0	140	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		24.0			24.0			56.0			56.0	
Effective Green, g (s)		24.0			24.0			56.0			56.0	
Actuated g/C Ratio		0.27			0.27			0.62			0.62	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		437			396			1832			1799	
v/s Ratio Prot												
v/s Ratio Perm		0.01			c0.03			c0.19			0.05	
v/c Ratio		0.02			0.12			0.30			0.08	
Uniform Delay, d1		24.3			25.0			7.9			6.7	
Progression Factor		1.00			1.00			0.02			0.35	
Incremental Delay, d2		0.1			0.6			0.2			0.1	
Delay (s)		24.4			25.6			0.3			2.4	
Level of Service		C			C			A			A	
Approach Delay (s)		24.4			25.6			0.3			2.4	
Approach LOS		C			C			A			A	

Intersection Summary

HCM Average Control Delay	2.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	31.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
43: Service Dr & Andy Holt Ave.

2011 AM Peak Hr  
University Commons TIS

													
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR	
Lane Configurations													
Volume (veh/h)	8	0	4	1	0	8	1	492	6	5	97	2	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.75	0.75	0.75	0.56	0.56	0.56	0.83	0.83	0.83	0.74	0.74	0.74	
Hourly flow rate (vph)	11	0	5	2	0	14	1	593	7	7	131	3	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type						None			None				
Median storage (veh)													
Upstream signal (ft)						611			270				
pX, platoon unblocked													
vC, conflicting volume	459	748	67	683	746	300	134				600		
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	459	748	67	683	746	300	134				600		
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 %	98	100	99	99	100	98	100				99		
cM capacity (veh/h)	473	337	983	331	338	696	1449				973		
Direction, Lane #	SE 1	NW 1	NE 1	NE 2	SW 1	SW 2							
Volume Total	16	16	298	304	72	68							
Volume Left	11	2	1	0	7	0							
Volume Right	5	14	0	7	0	3							
cSH	571	620	1449	1700	973	1700							
Volume to Capacity	0.03	0.03	0.00	0.18	0.01	0.04							
Queue Length 95th (ft)	2	2	0	0	1	0							
Control Delay (s)	11.5	11.0	0.0	0.0	0.9	0.0							
Lane LOS	B	B	A		A								
Approach Delay (s)	11.5	11.0	0.0		0.4								
Approach LOS	B	B											
Intersection Summary													
Average Delay			0.6										
Intersection Capacity Utilization			24.5%		ICU Level of Service								A
Analysis Period (min)			15										

Queues

101: Cumberland Ave. & Volunteer Blvd.

2011 AM Peak Hr

University Commons TIS



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	28	1740	40	462	121	54
v/c Ratio	0.04	0.64	0.26	0.17	0.26	0.22
Control Delay	0.1	1.0	8.4	2.6	26.3	13.4
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	0.1	1.1	8.4	2.6	26.3	13.4
Queue Length 50th (ft)	0	2	4	21	22	4
Queue Length 95th (ft)	m0	0	20	37	33	22
Internal Link Dist (ft)		115		2380		
Turn Bay Length (ft)	50		100			270
Base Capacity (vph)	714	2708	152	2792	1056	516
Starvation Cap Reductn	0	201	0	0	0	0
Spillback Cap Reductn	0	0	0	9	8	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.69	0.26	0.17	0.12	0.10

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
101: Cumberland Ave. & Volunteer Blvd.

2011 AM Peak Hr  
University Commons TIS

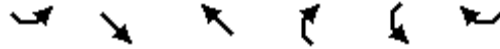


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗			
Volume (vph)	25	1227	339	37	425	0	87	0	39	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0		4.0			
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97		1.00			
Frbp, 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	0.97		1.00	1.00		1.00		0.85			
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00			
Satd. Flow (prot)	1770	3409		1769	3539		3433		1583			
Flt Permitted	0.49	1.00		0.10	1.00		0.95		1.00			
Satd. Flow (perm)	906	3409		191	3539		3433		1583			
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.72	0.72	0.72	0.92	0.92	0.92
Adj. Flow (vph)	28	1363	377	40	462	0	121	0	54	0	0	0
RTOR Reduction (vph)	0	21	0	0	0	0	0	0	37	0	0	0
Lane Group Flow (vph)	28	1719	0	40	462	0	121	0	17	0	0	0
Confl. Peds. (#/hr)			9	9								
Turn Type	Perm			Perm			Prot		custom			
Protected Phases		6			6		4					
Permitted Phases	6			6					4			
Actuated Green, G (s)	48.5	48.5		48.5	48.5		6.5		6.5			
Effective Green, g (s)	49.5	49.5		49.5	49.5		7.5		7.5			
Actuated g/C Ratio	0.76	0.76		0.76	0.76		0.12		0.12			
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0		5.0			
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)	690	2596		145	2695		396		183			
v/s Ratio Prot		c0.50			0.13		c0.04					
v/s Ratio Perm	0.03			0.21					0.01			
v/c Ratio	0.04	0.66		0.28	0.17		0.31		0.09			
Uniform Delay, d1	1.9	3.7		2.3	2.1		26.4		25.7			
Progression Factor	0.02	0.08		1.00	1.00		1.00		1.00			
Incremental Delay, d2	0.1	0.8		4.7	0.1		0.4		0.2			
Delay (s)	0.1	1.1		7.0	2.3		26.8		25.9			
Level of Service	A	A		A	A		C		C			
Approach Delay (s)		1.0			2.6			26.5			0.0	
Approach LOS		A			A			C			A	

Intersection Summary

HCM Average Control Delay	3.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Group Flow (vph)	859	1362	320	127	56	52
v/c Ratio	1.08	1.05	0.25	0.12	0.12	0.06
Control Delay	72.9	68.3	20.5	2.4	16.2	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.9	68.3	20.5	2.4	16.2	2.4
Queue Length 50th (ft)	~328	~448	65	7	10	0
Queue Length 95th (ft)	#425	#481	97	25	33	8
Internal Link Dist (ft)		1006	2213		153	
Turn Bay Length (ft)	130			110		
Base Capacity (vph)	792	1298	1298	1084	450	843
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	1.08	1.05	0.25	0.12	0.12	0.06

**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.



HCM Signalized Intersection Capacity Analysis  
 106: Neyland Dr. & Andy Holt Ave.

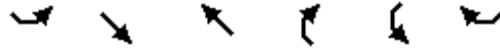
2011 AM Peak Hr  
 University Commons TIS



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	696	1103	288	114	20	64
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	0.95
Frt	1.00	1.00	1.00	0.85	0.92	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.98	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1674	1504
Flt Permitted	0.53	1.00	1.00	1.00	0.98	1.00
Satd. Flow (perm)	980	3539	3539	1583	1674	1504
Peak-hour factor, PHF	0.81	0.81	0.90	0.90	0.78	0.78
Adj. Flow (vph)	859	1362	320	127	26	82
RTOR Reduction (vph)	0	0	0	32	22	26
Lane Group Flow (vph)	859	1362	320	95	34	26
Turn Type	pm+pt			pm+ov		pm+ov
Protected Phases	1	2	2	4	4	1
Permitted Phases	2			2		4
Actuated Green, G (s)	53.0	32.0	32.0	54.0	22.0	43.0
Effective Green, g (s)	55.0	33.0	33.0	56.0	23.0	45.0
Actuated g/C Ratio	0.61	0.37	0.37	0.62	0.26	0.50
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	792	1298	1298	1055	428	819
v/s Ratio Prot	c0.27	0.38	0.09	c0.02	0.02	0.01
v/s Ratio Perm	c0.40			0.04		0.01
v/c Ratio	1.08	1.05	0.25	0.09	0.08	0.03
Uniform Delay, d1	13.9	28.5	19.8	6.8	25.5	11.4
Progression Factor	1.00	1.00	1.00	1.00	1.04	0.76
Incremental Delay, d2	57.4	39.0	0.1	0.0	0.4	0.0
Delay (s)	71.3	67.5	19.9	6.8	26.8	8.8
Level of Service	E	E	B	A	C	A
Approach Delay (s)		69.0	16.2		18.1	
Approach LOS		E	B		B	

**Intersection Summary**

HCM Average Control Delay	58.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Group Flow (vph)	859	1362	320	127	56	52
v/c Ratio	0.94	0.99	0.23	0.12	0.15	0.06
Control Delay	51.6	50.4	19.0	5.9	19.3	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.6	50.4	19.0	5.9	19.3	2.5
Queue Length 50th (ft)	246	396	63	22	12	0
Queue Length 95th (ft)	#298	#456	93	43	36	8
Internal Link Dist (ft)		1006	2213		153	
Turn Bay Length (ft)	130			110		
Base Capacity (vph)	915	1376	1376	1025	377	810
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	0.94	0.99	0.23	0.12	0.15	0.06

**Intersection Summary**

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
 106: Neyland Dr. & Andy Holt Ave.

2011 MIT AM Peak Hr  
 University Commons TIS



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	696	1103	288	114	20	64
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	0.95	0.95	1.00	1.00	0.95
Frt	1.00	1.00	1.00	0.85	0.92	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.98	1.00
Satd. Flow (prot)	3433	3539	3539	1583	1674	1504
Flt Permitted	0.95	1.00	1.00	1.00	0.98	1.00
Satd. Flow (perm)	3433	3539	3539	1583	1674	1504
Peak-hour factor, PHF	0.81	0.81	0.90	0.90	0.78	0.78
Adj. Flow (vph)	859	1362	320	127	26	82
RTOR Reduction (vph)	0	0	0	5	24	27
Lane Group Flow (vph)	859	1362	320	122	32	25
Turn Type	Prot			pm+ov		pm+ov
Protected Phases	1	2	2	4	4	1
Permitted Phases				2		4
Actuated Green, G (s)	23.0	34.0	34.0	52.0	18.0	41.0
Effective Green, g (s)	24.0	35.0	35.0	54.0	19.0	43.0
Actuated g/C Ratio	0.27	0.39	0.39	0.60	0.21	0.48
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	915	1376	1376	1020	353	785
v/s Ratio Prot	c0.25	c0.38	0.09	c0.03	0.02	0.01
v/s Ratio Perm				0.05		0.01
v/c Ratio	0.94	0.99	0.23	0.12	0.09	0.03
Uniform Delay, d1	32.3	27.3	18.5	7.8	28.6	12.5
Progression Factor	1.00	1.00	1.00	1.00	1.09	0.71
Incremental Delay, d2	16.7	21.6	0.1	0.1	0.5	0.0
Delay (s)	49.0	48.9	18.6	7.8	31.7	8.9
Level of Service	D	D	B	A	C	A
Approach Delay (s)		48.9	15.5		20.7	
Approach LOS		D	B		C	

**Intersection Summary**

HCM Average Control Delay	42.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues  
108: Volunteer Blvd. & Andy Holt Ave.

2011 AM Peak Hr  
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Lane Group	SET	NWL	NWT	NET	NER	SWT	SWR
Lane Group Flow (vph)	443	37	67	203	222	56	32
v/c Ratio	0.52	0.11	0.05	0.63	0.49	0.09	0.06
Control Delay	30.0	19.4	16.3	39.2	7.4	23.6	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	19.4	16.3	39.2	7.4	23.6	9.1
Queue Length 50th (ft)	115	13	11	106	17	22	0
Queue Length 95th (ft)	139	30	21	111	21	48	18
Internal Link Dist (ft)	1799		1002	276		906	
Turn Bay Length (ft)		150					150
Base Capacity (vph)	854	332	1268	409	518	600	515
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	0.52	0.11	0.05	0.50	0.43	0.09	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis  
108: Volunteer Blvd. & Andy Holt Ave.

2011 AM Peak Hr  
University Commons TIS



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕↕		↕	↕↕			↕	↕		↕	↕
Volume (vph)	85	219	41	30	46	8	33	99	144	5	41	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
Lane Util. Factor		0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frbp, ped/bikes		1.00		1.00	0.99			1.00	0.98		1.00	0.96
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt		0.98		1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected		0.99		0.95	1.00			0.99	1.00		0.99	1.00
Satd. Flow (prot)		3412		1769	3440			1840	1551		1853	1522
Flt Permitted		0.85		0.34	1.00			0.99	1.00		0.99	1.00
Satd. Flow (perm)		2942		627	3440			1840	1551		1853	1522
Peak-hour factor, PHF	0.78	0.78	0.78	0.81	0.81	0.81	0.65	0.65	0.65	0.82	0.82	0.82
Adj. Flow (vph)	109	281	53	37	57	10	51	152	222	6	50	32
RTOR Reduction (vph)	0	11	0	0	6	0	0	0	183	0	0	22
Lane Group Flow (vph)	0	432	0	37	61	0	0	203	39	0	56	10
Confl. Peds. (#/hr)	7		3	3		7	20		5	5		20
Turn Type	Perm			pm+pt			Split		Perm	Split		Perm
Protected Phases		2		1	6		3	3		4	4	
Permitted Phases	2			6					3			4
Actuated Green, G (s)		23.8		33.4	33.4			13.8	13.8		24.8	24.8
Effective Green, g (s)		25.8		35.4	35.4			15.8	15.8		26.8	26.8
Actuated g/C Ratio		0.29		0.39	0.39			0.18	0.18		0.30	0.30
Clearance Time (s)		6.0		6.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)		2.0		2.0	2.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		843		318	1353			323	272		552	453
v/s Ratio Prot				c0.01	0.02			c0.11			c0.03	
v/s Ratio Perm		c0.15		0.04					0.03			0.01
v/c Ratio		0.51		0.12	0.05			0.63	0.14		0.10	0.02
Uniform Delay, d1		26.8		17.4	16.9			34.4	31.4		22.9	22.3
Progression Factor		1.00		1.00	1.00			0.90	0.82		1.00	1.00
Incremental Delay, d2		2.2		0.1	0.1			2.7	0.1		0.4	0.1
Delay (s)		29.1		17.5	16.9			33.7	25.7		23.2	22.4
Level of Service		C		B	B			C	C		C	C
Approach Delay (s)		29.1			17.1			29.6			22.9	
Approach LOS		C			B			C			C	

Intersection Summary

HCM Average Control Delay	27.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



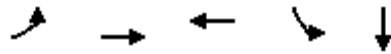
**2010 PM  
EXISTING  
PEAK HOUR  
TRAFFIC VOLUMES**

Queues

2011 PM Peak Hr

1: Cumberland Ave. & Metron Center Way

University Commons TIS



Lane Group	EBL	EBT	WBT	SBL	SBT
Lane Group Flow (vph)	1	1410	2211	23	25
v/c Ratio	0.01	0.57	0.90	0.09	0.08
Control Delay	2.0	4.6	13.2	29.5	19.1
Queue Delay	0.0	0.2	3.4	0.0	0.0
Total Delay	2.0	4.9	16.6	29.5	19.1
Queue Length 50th (ft)	0	71	343	10	5
Queue Length 95th (ft)	m0	69	396	18	13
Internal Link Dist (ft)		164	115		278
Turn Bay Length (ft)	50				
Base Capacity (vph)	88	2456	2455	265	309
Starvation Cap Reductn	0	249	172	0	0
Spillback Cap Reductn	0	354	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.01	0.67	0.97	0.09	0.08

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis  
 1: Cumberland Ave. & Metron Center Way

2011 PM Peak Hr  
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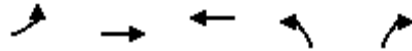
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕		↖	↗	
Volume (vph)	1	1283	0	0	1958	10	0	0	0	13	0	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0					5.0	5.0	
Lane Util. Factor	1.00	0.95			0.95					1.00	1.00	
Frt	1.00	1.00			1.00					1.00	0.85	
Flt Protected	0.95	1.00			1.00					0.95	1.00	
Satd. Flow (prot)	1770	3539			3537					1770	1583	
Flt Permitted	0.07	1.00			1.00					0.76	1.00	
Satd. Flow (perm)	126	3539			3537					1410	1583	
Peak-hour factor, PHF	0.91	0.91	0.91	0.89	0.89	0.89	0.92	0.92	0.92	0.56	0.56	0.56
Adj. Flow (vph)	1	1410	0	0	2200	11	0	0	0	23	0	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	11	0
Lane Group Flow (vph)	1	1410	0	0	2211	0	0	0	0	23	14	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	59.0	59.0			59.0					16.0	16.0	
Effective Green, g (s)	59.0	59.0			59.0					16.0	16.0	
Actuated g/C Ratio	0.69	0.69			0.69					0.19	0.19	
Clearance Time (s)	5.0	5.0			5.0					5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Lane Grp Cap (vph)	87	2456			2455					265	298	
v/s Ratio Prot		0.40			c0.63						0.01	
v/s Ratio Perm	0.01									c0.02		
v/c Ratio	0.01	0.57			0.90					0.09	0.05	
Uniform Delay, d1	4.0	6.6			10.6					28.5	28.2	
Progression Factor	0.50	0.54			0.69					1.00	1.00	
Incremental Delay, d2	0.2	1.0			5.1					0.6	0.3	
Delay (s)	2.2	4.5			12.4					29.1	28.5	
Level of Service	A	A			B					C	C	
Approach Delay (s)		4.5			12.4			0.0			28.8	
Approach LOS		A			B			A			C	

Intersection Summary

HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues  
11: Cumberland Ave. & NB Alcoa Hwy Ramp

2011 PM Peak Hr  
University Commons TIS


























Lane Group	EBL	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	378	709	1563	282	424
v/c Ratio	0.65	0.30	0.56	0.39	0.46
Control Delay	20.2	11.3	6.6	30.6	4.8
Queue Delay	0.0	0.7	0.0	0.0	0.0
Total Delay	20.2	12.0	6.6	30.6	4.8
Queue Length 50th (ft)	89	150	110	67	0
Queue Length 95th (ft)	123	199	m136	85	15
Internal Link Dist (ft)		254	156		
Turn Bay Length (ft)					
Base Capacity (vph)	727	2373	2791	727	924
Starvation Cap Reductn	0	1244	0	0	0
Spillback Cap Reductn	0	0	26	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.52	0.63	0.57	0.39	0.46

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
 11: Cumberland Ave. & NB Alcoa Hwy Ramp

2011 PM Peak Hr  
 University Commons TIS

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			  		 		 			
Volume (vph)	336	631	0	0	869	506	214	0	322	0	0	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	0.97	0.95			0.86		0.97		0.88			
Frt	1.00	1.00			0.94		1.00		0.85			
Flt Protected	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (prot)	3433	3539			6054		3433		2787			
Flt Permitted	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (perm)	3433	3539			6054		3433		2787			
Peak-hour factor, PHF	0.89	0.89	0.89	0.88	0.88	0.88	0.76	0.76	0.76	0.92	0.92	0.92
Adj. Flow (vph)	378	709	0	0	988	575	282	0	424	0	0	0
RTOR Reduction (vph)	0	0	0	0	115	0	0	0	334	0	0	0
Lane Group Flow (vph)	378	709	0	0	1448	0	282	0	90	0	0	0
Turn Type	Prot						custom		custom			
Protected Phases	5	2					6					
Permitted Phases							8		8			
Actuated Green, G (s)	14.4	57.0					37.6		18.0		18.0	
Effective Green, g (s)	14.4	57.0					37.6		18.0		18.0	
Actuated g/C Ratio	0.17	0.67					0.44		0.21		0.21	
Clearance Time (s)	5.0	5.0					5.0		5.0		5.0	
Vehicle Extension (s)	3.0	3.0					3.0		3.0		3.0	
Lane Grp Cap (vph)	582	2373					2678		727		590	
v/s Ratio Prot	c0.11	0.20					c0.24					
v/s Ratio Perm									c0.08		0.03	
v/c Ratio	0.65	0.30					0.54		0.39		0.15	
Uniform Delay, d1	32.9	5.8					17.4		28.8		27.3	
Progression Factor	0.47	1.88					0.40		1.00		1.00	
Incremental Delay, d2	2.2	0.3					0.3		1.6		0.5	
Delay (s)	17.8	11.2					7.4		30.3		27.8	
Level of Service	B	B					A		C		C	
Approach Delay (s)	13.5						7.4		28.8		0.0	
Approach LOS	B						A		C		A	
<b>Intersection Summary</b>												
HCM Average Control Delay			13.9		HCM Level of Service				B			
HCM Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			85.0		Sum of lost time (s)				15.0			
Intersection Capacity Utilization			59.5%		ICU Level of Service				B			
Analysis Period (min)			15									
c	Critical Lane Group											

Queues  
15: Cumberland Ave. & SB Alcoa Hwy Ramp

2011 PM Peak Hr  
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Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	849	785	491	930	394	528
v/c Ratio	0.62	0.50	0.77	0.57	0.27	0.74
Control Delay	32.9	1.1	33.8	11.4	16.6	25.2
Queue Delay	0.0	0.0	0.0	1.2	0.0	0.0
Total Delay	32.9	1.1	33.8	12.6	16.6	25.2
Queue Length 50th (ft)	122	0	125	186	68	199
Queue Length 95th (ft)	156	0	169	207	97	314
Internal Link Dist (ft)	447			254		
Turn Bay Length (ft)						
Base Capacity (vph)	1369	1583	687	1624	1454	713
Starvation Cap Reductn	0	0	0	437	0	0
Spillback Cap Reductn	0	0	0	0	5	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.50	0.71	0.78	0.27	0.74

Intersection Summary

HCM Signalized Intersection Capacity Analysis  
 15: Cumberland Ave. & SB Alcoa Hwy Ramp

2011 PM Peak Hr  
 University Commons TIS



















Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗	↘	↑↑					↖		↗
Volume (vph)	0	798	738	427	809	0	0	0	0	347	0	465
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	4.0	5.0	5.0					5.0		5.0
Lane Util. Factor		0.86	1.00	0.97	0.95					0.97		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)		6408	1583	3433	3539					3433		1583
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		6408	1583	3433	3539					3433		1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.87	0.87	0.87	0.92	0.92	0.92	0.88	0.88	0.88
Adj. Flow (vph)	0	849	785	491	930	0	0	0	0	394	0	528
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	42
Lane Group Flow (vph)	0	849	785	491	930	0	0	0	0	394	0	486
Turn Type			Free	Prot						custom		custom
Protected Phases		4		3	8							
Permitted Phases			Free							6		6
Actuated Green, G (s)		18.2	85.0	15.8	39.0					36.0		36.0
Effective Green, g (s)		18.2	85.0	15.8	39.0					36.0		36.0
Actuated g/C Ratio		0.21	1.00	0.19	0.46					0.42		0.42
Clearance Time (s)		5.0		5.0	5.0					5.0		5.0
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		1372	1583	638	1624					1454		670
v/s Ratio Prot		0.13		c0.14	c0.26							
v/s Ratio Perm			0.50							0.11		c0.31
v/c Ratio		0.62	0.50	0.77	0.57					0.27		0.73
Uniform Delay, d1		30.3	0.0	32.9	16.9					16.0		20.4
Progression Factor		1.00	1.00	0.79	0.59					1.00		1.00
Incremental Delay, d2		2.1	1.1	5.0	1.3					0.5		6.7
Delay (s)		32.4	1.1	31.1	11.2					16.4		27.1
Level of Service		C	A	C	B					B		C
Approach Delay (s)		17.3			18.1			0.0			22.5	
Approach LOS		B			B			A			C	

Intersection Summary		
HCM Average Control Delay	18.8	HCM Level of Service B
HCM Volume to Capacity ratio	0.67	
Actuated Cycle Length (s)	85.0	Sum of lost time (s) 10.0
Intersection Capacity Utilization	59.5%	ICU Level of Service B
Analysis Period (min)	15	
c	Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis  
24: River Dr & Andy Holt Ave.

2011 PM Peak Hr  
University Commons TIS

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	22	2	68	31	1	18	18	166	24	6	544	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.51	0.51	0.51	0.83	0.83	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	4	133	37	1	22	20	180	26	7	591	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)								233			648	
pX, platoon unblocked												
vC, conflicting volume	761	855	301	677	848	103	602			207		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	761	855	301	677	848	103	602			207		
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 %	85	99	81	86	100	98	98			100		
cM capacity (veh/h)	281	287	695	266	290	932	971			1362		
<b>Direction, Lane #</b>	<b>SE 1</b>	<b>NW 1</b>	<b>NE 1</b>	<b>NE 2</b>	<b>SW 1</b>	<b>SW 2</b>						
Volume Total	180	60	110	116	302	307						
Volume Left	43	37	20	0	7	0						
Volume Right	133	22	0	26	0	11						
cSH	503	359	971	1700	1362	1700						
Volume to Capacity	0.36	0.17	0.02	0.07	0.00	0.18						
Queue Length 95th (ft)	40	15	2	0	0	0						
Control Delay (s)	16.1	17.0	1.7	0.0	0.2	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	16.1	17.0	0.8		0.1							
Approach LOS	C	C										
<b>Intersection Summary</b>												
Average Delay			3.9									
Intersection Capacity Utilization			32.7%		ICU Level of Service					A		
Analysis Period (min)			15									



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	139	245	226	395
v/c Ratio	0.16	0.35	0.19	0.33
Control Delay	3.8	12.8	20.5	12.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	3.8	12.8	20.5	12.7
Queue Length 50th (ft)	7	67	49	47
Queue Length 95th (ft)	9	85	m60	57
Internal Link Dist (ft)	276	290	190	445
Turn Bay Length (ft)				
Base Capacity (vph)	891	692	1199	1205
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	0.16	0.35	0.19	0.33

**Intersection Summary**

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
28: EJ Chapman Dr & Andy Holt Ave.

2011 PM Peak Hr  
University Commons TIS



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	8	8	62	120	9	45	9	155	25	17	284	15
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	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.89			0.97			0.98			0.99	
Flt Protected		0.99			0.97			1.00			1.00	
Satd. Flow (prot)		1654			1738			3460			3504	
Flt Permitted		0.97			0.72			0.93			0.93	
Satd. Flow (perm)		1606			1299			3233			3274	
Peak-hour factor, PHF	0.56	0.56	0.56	0.71	0.71	0.71	0.84	0.84	0.84	0.80	0.80	0.80
Adj. Flow (vph)	14	14	111	169	13	63	11	185	30	21	355	19
RTOR Reduction (vph)	0	53	0	0	14	0	0	13	0	0	4	0
Lane Group Flow (vph)	0	86	0	0	231	0	0	213	0	0	391	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		47.0			47.0			33.0			33.0	
Effective Green, g (s)		47.0			47.0			33.0			33.0	
Actuated g/C Ratio		0.52			0.52			0.37			0.37	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		839			678			1185			1200	
v/s Ratio Prot												
v/s Ratio Perm		0.05			c0.18			0.07			c0.12	
v/c Ratio		0.10			0.34			0.18			0.33	
Uniform Delay, d1		10.9			12.5			19.3			20.5	
Progression Factor		1.00			1.00			1.14			0.59	
Incremental Delay, d2		0.2			1.4			0.3			0.7	
Delay (s)		11.1			13.9			22.3			12.7	
Level of Service		B			B			C			B	
Approach Delay (s)		11.1			13.9			22.3			12.7	
Approach LOS		B			B			C			B	

















Intersection Summary

HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



HCM Unsignalized Intersection Capacity Analysis  
43: Service Dr & Andy Holt Ave.

2011 PM Peak Hr  
University Commons TIS

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	10	2	20	15	0	9	2	156	2	7	496	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.62	0.62	0.62	0.60	0.60	0.60	0.91	0.91	0.91	0.93	0.93	0.93
Hourly flow rate (vph)	16	3	32	25	0	15	2	171	2	8	533	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)							611			270		
pX, platoon unblocked	0.95	0.95	0.95	0.95	0.95		0.95					
vC, conflicting volume	653	726	267	493	725	87	533	174				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	530	607	123	360	605	87	403	174				
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 %	96	99	96	95	100	98	100	99				
cM capacity (veh/h)	402	386	860	515	387	954	1094	1400				
Direction, Lane #	SE 1	NW 1	NE 1	NE 2	SW 1	SW 2						
Volume Total	52	40	88	88	274	267						
Volume Left	16	25	2	0	8	0						
Volume Right	32	15	0	2	0	0						
cSH	600	623	1094	1700	1400	1700						
Volume to Capacity	0.09	0.06	0.00	0.05	0.01	0.16						
Queue Length 95th (ft)	7	5	0	0	0	0						
Control Delay (s)	11.6	11.2	0.2	0.0	0.3	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	11.6	11.2	0.1		0.1							
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.4									
Intersection Capacity Utilization			28.7%		ICU Level of Service			A				
Analysis Period (min)			15									

Queues  
101: Cumberland Ave. & Volunteer Blvd.

2011 PM Peak Hr  
University Commons TIS



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	27	1101	46	1296	700	291
v/c Ratio	0.16	0.52	0.20	0.60	0.70	0.52
Control Delay	7.5	7.7	11.3	12.0	30.5	15.6
Queue Delay	0.0	1.0	0.0	0.1	4.8	0.0
Total Delay	7.5	8.7	11.3	12.2	35.3	15.6
Queue Length 50th (ft)	4	90	10	202	170	63
Queue Length 95th (ft)	m9	306	32	299	182	102
Internal Link Dist (ft)		115		2380		
Turn Bay Length (ft)	50		100			270
Base Capacity (vph)	170	2122	231	2175	1171	632
Starvation Cap Reductn	0	699	0	0	0	0
Spillback Cap Reductn	0	0	0	159	392	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.77	0.20	0.64	0.90	0.46

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
101: Cumberland Ave. & Volunteer Blvd.

2011 PM Peak Hr  
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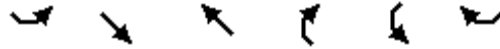


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗↘		↖	↗↘		↖↗		↖			
Volume (vph)	25	813	222	45	1257	0	560	0	233	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0		4.0			
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97		1.00			
Frbp, 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	0.97		1.00	1.00		1.00		0.85			
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00			
Satd. Flow (prot)	1770	3409		1767	3539		3433		1583			
Flt Permitted	0.15	1.00		0.20	1.00		0.95		1.00			
Satd. Flow (perm)	275	3409		375	3539		3433		1583			
Peak-hour factor, PHF	0.94	0.94	0.94	0.97	0.97	0.97	0.80	0.80	0.80	0.92	0.92	0.92
Adj. Flow (vph)	27	865	236	46	1296	0	700	0	291	0	0	0
RTOR Reduction (vph)	0	26	0	0	0	0	0	0	98	0	0	0
Lane Group Flow (vph)	27	1075	0	46	1296	0	700	0	193	0	0	0
Confl. Peds. (#/hr)			9	9								
Turn Type	Perm			Perm			Prot		custom			
Protected Phases		6			6		4					
Permitted Phases	6			6					4			
Actuated Green, G (s)	51.2	51.2		51.2	51.2		23.8		23.8			
Effective Green, g (s)	52.2	52.2		52.2	52.2		24.8		24.8			
Actuated g/C Ratio	0.61	0.61		0.61	0.61		0.29		0.29			
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0		5.0			
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)	169	2094		230	2173		1002		462			
v/s Ratio Prot		0.32			c0.37		c0.20					
v/s Ratio Perm	0.10			0.12					0.12			
v/c Ratio	0.16	0.51		0.20	0.60		0.70		0.42			
Uniform Delay, d1	7.0	9.2		7.2	10.0		26.8		24.3			
Progression Factor	0.63	0.74		1.00	1.00		1.00		1.00			
Incremental Delay, d2	1.7	0.8		1.9	1.2		2.1		0.6			
Delay (s)	6.1	7.6		9.2	11.2		28.9		24.9			
Level of Service	A	A		A	B		C		C			
Approach Delay (s)		7.6			11.1			27.7			0.0	
Approach LOS		A			B			C			A	

Intersection Summary

HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Group Flow (vph)	347	573	1782	53	421	409
v/c Ratio	1.09	0.34	1.05	0.04	0.84	0.62
Control Delay	102.0	15.4	62.3	0.8	33.6	20.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	102.0	15.4	62.3	0.8	33.6	20.6
Queue Length 50th (ft)	~173	102	~588	0	114	129
Queue Length 95th (ft)	#232	108	460	4	#298	194
Internal Link Dist (ft)		1006	2213		153	
Turn Bay Length (ft)	130			110		
Base Capacity (vph)	319	1691	1691	1243	504	655
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	1.09	0.34	1.05	0.04	0.84	0.62

**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.

HCM Signalized Intersection Capacity Analysis  
 106: Neyland Dr. & Andy Holt Ave.

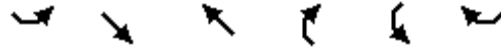
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Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	253	418	1319	39	122	617
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	0.95
Frt	1.00	1.00	1.00	0.85	0.90	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.98	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1647	1504
Flt Permitted	0.09	1.00	1.00	1.00	0.98	1.00
Satd. Flow (perm)	173	3539	3539	1583	1647	1504
Peak-hour factor, PHF	0.73	0.73	0.74	0.74	0.89	0.89
Adj. Flow (vph)	347	573	1782	53	137	693
RTOR Reduction (vph)	0	0	0	14	83	4
Lane Group Flow (vph)	347	573	1782	39	338	405
Turn Type	pm+pt			pm+ov		pm+ov
Protected Phases	1	2	2	4	4	1
Permitted Phases	2			2		4
Actuated Green, G (s)	53.0	42.0	42.0	64.0	22.0	33.0
Effective Green, g (s)	55.0	43.0	43.0	66.0	23.0	35.0
Actuated g/C Ratio	0.61	0.48	0.48	0.73	0.26	0.39
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	319	1691	1691	1231	421	652
v/s Ratio Prot	c0.15	0.16	0.50	0.01	c0.21	0.08
v/s Ratio Perm	c0.52			0.02		0.19
v/c Ratio	1.09	0.34	1.05	0.03	0.80	0.62
Uniform Delay, d1	27.8	14.6	23.5	3.3	31.4	22.2
Progression Factor	1.00	1.00	1.00	1.00	0.74	0.80
Incremental Delay, d2	75.9	0.1	37.6	0.0	14.9	1.8
Delay (s)	103.7	14.8	61.1	3.3	38.0	19.6
Level of Service	F	B	E	A	D	B
Approach Delay (s)		48.3	59.5		29.0	
Approach LOS		D	E		C	

Intersection Summary

HCM Average Control Delay	49.5	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Group Flow (vph)	347	573	1782	53	421	409
v/c Ratio	0.91	0.32	1.01	0.04	0.84	0.66
Control Delay	69.4	14.1	46.7	1.5	33.6	22.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.4	14.1	46.7	1.5	33.6	22.7
Queue Length 50th (ft)	102	97	~520	3	114	134
Queue Length 95th (ft)	#125	103	438	7	#298	240
Internal Link Dist (ft)		1006	2213		153	
Turn Bay Length (ft)	130			110		
Base Capacity (vph)	381	1770	1770	1269	504	623
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	0.32	1.01	0.04	0.84	0.66

**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.

HCM Signalized Intersection Capacity Analysis  
 106: Neyland Dr. & Andy Holt Ave.

2011 MIT PM Peak Hr  
 University Commons TIS



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	253	418	1319	39	122	617
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	0.95	0.95	1.00	1.00	0.95
Frt	1.00	1.00	1.00	0.85	0.90	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.98	1.00
Satd. Flow (prot)	3433	3539	3539	1583	1647	1504
Flt Permitted	0.95	1.00	1.00	1.00	0.98	1.00
Satd. Flow (perm)	3433	3539	3539	1583	1647	1504
Peak-hour factor, PHF	0.73	0.73	0.74	0.74	0.89	0.89
Adj. Flow (vph)	347	573	1782	53	137	693
RTOR Reduction (vph)	0	0	0	4	83	5
Lane Group Flow (vph)	347	573	1782	49	338	404
Turn Type	Prot			pm+ov		pm+ov
Protected Phases	1	2	2	4	4	1
Permitted Phases				2		4
Actuated Green, G (s)	9.0	44.0	44.0	66.0	22.0	31.0
Effective Green, g (s)	10.0	45.0	45.0	68.0	23.0	33.0
Actuated g/C Ratio	0.11	0.50	0.50	0.76	0.26	0.37
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	381	1770	1770	1266	421	618
v/s Ratio Prot	c0.10	0.16	c0.50	0.01	c0.21	0.07
v/s Ratio Perm				0.02		0.20
v/c Ratio	0.91	0.32	1.01	0.04	0.80	0.65
Uniform Delay, d1	39.6	13.4	22.5	2.8	31.4	23.7
Progression Factor	1.00	1.00	1.00	1.00	0.74	0.80
Incremental Delay, d2	25.3	0.1	23.0	0.0	14.9	2.5
Delay (s)	64.9	13.5	45.5	2.8	38.0	21.5
Level of Service	E	B	D	A	D	C
Approach Delay (s)		32.9	44.3		29.9	
Approach LOS		C	D		C	

**Intersection Summary**

HCM Average Control Delay	38.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues  
108: Volunteer Blvd. & Andy Holt Ave.

2011 PM Peak Hr  
University Commons TIS



Lane Group	SET	NWL	NWT	NET	NER	SWT	SWR
Lane Group Flow (vph)	351	228	345	150	66	140	158
v/c Ratio	0.63	0.55	0.25	0.53	0.22	0.24	0.27
Control Delay	36.3	24.3	18.1	27.1	3.3	25.5	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	24.3	18.1	27.1	3.3	25.5	5.7
Queue Length 50th (ft)	92	87	65	40	1	59	0
Queue Length 95th (ft)	124	126	85	59	5	103	36
Internal Link Dist (ft)	1799		1002	276		906	
Turn Bay Length (ft)		150					150
Base Capacity (vph)	555	417	1406	366	363	581	585
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	0.63	0.55	0.25	0.41	0.18	0.24	0.27

Intersection Summary



HCM Signalized Intersection Capacity Analysis  
108: Volunteer Blvd. & Andy Holt Ave.

2011 PM Peak Hr  
University Commons TIS



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕↕		↕	↕↕			↕	↕		↕	↕
Volume (vph)	128	129	31	185	264	15	45	87	58	8	108	131
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
Lane Util. Factor		0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frbp, ped/bikes		1.00		1.00	1.00			1.00	0.98		1.00	0.96
Flpb, ped/bikes		0.99		1.00	1.00			1.00	1.00		1.00	1.00
Frt		0.98		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected		0.98		0.95	1.00			0.98	1.00		1.00	1.00
Satd. Flow (prot)		3383		1768	3503			1832	1549		1856	1522
Flt Permitted		0.70		0.36	1.00			0.98	1.00		1.00	1.00
Satd. Flow (perm)		2405		679	3503			1832	1549		1856	1522
Peak-hour factor, PHF	0.82	0.82	0.82	0.81	0.81	0.81	0.88	0.88	0.88	0.83	0.83	0.83
Adj. Flow (vph)	156	157	38	228	326	19	51	99	66	10	130	158
RTOR Reduction (vph)	0	10	0	0	5	0	0	0	56	0	0	108
Lane Group Flow (vph)	0	341	0	228	340	0	0	150	10	0	140	50
Confl. Peds. (#/hr)	7		3	3		7	20		5	5		20
Turn Type	Perm			pm+pt			Split		Perm	Split		Perm
Protected Phases		2		1	6		3	3		4	4	
Permitted Phases	2			6					3			4
Actuated Green, G (s)		18.4		34.0	34.0			11.8	11.8		26.2	26.2
Effective Green, g (s)		20.4		36.0	36.0			13.8	13.8		28.2	28.2
Actuated g/C Ratio		0.23		0.40	0.40			0.15	0.15		0.31	0.31
Clearance Time (s)		6.0		6.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)		2.0		2.0	2.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		545		412	1401			281	238		582	477
v/s Ratio Prot				c0.07	0.10			c0.08			c0.08	
v/s Ratio Perm		c0.14		0.15					0.01			0.03
v/c Ratio		0.63		0.55	0.24			0.53	0.04		0.24	0.10
Uniform Delay, d1		31.4		19.1	17.9			35.1	32.5		22.9	21.9
Progression Factor		1.00		1.00	1.00			0.58	0.18		1.00	1.00
Incremental Delay, d2		5.3		0.9	0.4			1.0	0.0		1.0	0.4
Delay (s)		36.7		20.0	18.4			21.4	5.8		23.9	22.4
Level of Service		D		B	B			C	A		C	C
Approach Delay (s)		36.7			19.0			16.6			23.1	
Approach LOS		D			B			B			C	

Intersection Summary

HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



**2015 AM  
BACKGROUND  
TRAFFIC VOLUMES**

Queues

1: Cumberland Ave. & Metron Center Way



Lane Group	EBL	EBT	WBL	WBT	SBL	SBT
Lane Group Flow (vph)	32	1660	1	535	7	2
v/c Ratio	0.06	0.75	0.01	0.25	0.05	0.00
Control Delay	8.7	14.9	13.0	14.3	49.0	0.0
Queue Delay	0.0	0.0	0.0	0.8	0.0	0.0
Total Delay	8.7	14.9	13.0	15.1	49.0	0.0
Queue Length 50th (ft)	7	221	0	130	5	0
Queue Length 95th (ft)	m17	659	m3	185	20	0
Internal Link Dist (ft)		170		134		537
Turn Bay Length (ft)	50		50			
Base Capacity (vph)	559	2209	156	2101	154	618
Starvation Cap Reductn	0	0	0	1204	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	0.75	0.01	0.60	0.05	0.00

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
 1: Cumberland Ave. & Metron Center Way

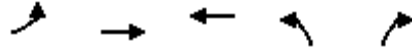
2015 Background AM PK HR  
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	29	1527	0	1	471	21	0	0	0	6	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0					5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95					1.00	1.00	
Frt	1.00	1.00		1.00	0.99					1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00					0.95	1.00	
Satd. Flow (prot)	1770	3539		1770	3516					1770	1583	
Flt Permitted	0.45	1.00		0.06	1.00					0.95	1.00	
Satd. Flow (perm)	844	3539		118	3516					1770	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)	32	1660	0	1	512	23	0	0	0	7	0	2
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	2	0
Lane Group Flow (vph)	32	1660	0	1	532	0	0	0	0	7	0	0
Turn Type	pm+pt			pm+pt			Split			Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2			6								
Actuated Green, G (s)	67.8	67.8		64.6	64.6					10.0	10.0	
Effective Green, g (s)	67.8	67.8		64.6	64.6					10.0	10.0	
Actuated g/C Ratio	0.59	0.59		0.56	0.56					0.09	0.09	
Clearance Time (s)	5.0	5.0		5.0	5.0					5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)	533	2086		84	1975					154	138	
v/s Ratio Prot	0.00	c0.47		0.00	c0.15					c0.00	0.00	
v/s Ratio Perm	0.03			0.01								
v/c Ratio	0.06	0.80		0.01	0.27					0.05	0.00	
Uniform Delay, d1	10.1	18.2		19.7	13.0					48.1	47.9	
Progression Factor	0.85	0.77		1.18	1.22					1.00	1.00	
Incremental Delay, d2	0.0	2.9		0.1	0.3					0.6	0.0	
Delay (s)	8.6	17.0		23.2	16.1					48.7	48.0	
Level of Service	A	B		C	B					D	D	
Approach Delay (s)	16.9			16.2			0.0			48.5		
Approach LOS	B			B			A			D		

Intersection Summary			
HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	36.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues  
11: Cumberland Ave. & NB Alcoa Hwy Ramp



Lane Group	EBL	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	239	1024	445	236	555
v/c Ratio	0.60	0.52	0.18	0.19	0.50
Control Delay	43.7	9.1	6.8	26.1	21.5
Queue Delay	0.0	0.5	0.0	0.0	0.0
Total Delay	43.7	9.5	6.8	26.1	21.5
Queue Length 50th (ft)	60	244	45	61	125
Queue Length 95th (ft)	74	295	89	91	183
Internal Link Dist (ft)		241	156		
Turn Bay Length (ft)					
Base Capacity (vph)	567	1970	2490	1224	1101
Starvation Cap Reductn	0	471	0	0	0
Spillback Cap Reductn	0	45	0	0	2
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.42	0.68	0.18	0.19	0.51

Intersection Summary

HCM Signalized Intersection Capacity Analysis  
 11: Cumberland Ave. & NB Alcoa Hwy Ramp

2015 Background AM PK HR  
 University Commons TIS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑			↑↑↑		↖↗		↖↗			
Volume (vph)	220	942	0	0	244	166	217	0	511	0	0	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	0.97	0.95			0.86		0.97		0.88			
Frt	1.00	1.00			0.94		1.00		0.85			
Flt Protected	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (prot)	3433	3539			6019		3433		2787			
Flt Permitted	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (perm)	3433	3539			6019		3433		2787			
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)	239	1024	0	0	265	180	236	0	555	0	0	0
RTOR Reduction (vph)	0	0	0	0	98	0	0	0	107	0	0	0
Lane Group Flow (vph)	239	1024	0	0	347	0	236	0	448	0	0	0
Turn Type	Prot							Prot		custom		
Protected Phases	5	2			6		8					
Permitted Phases									8			
Actuated Green, G (s)	13.3	64.0			45.7		41.0		41.0			
Effective Green, g (s)	13.3	64.0			45.7		41.0		41.0			
Actuated g/C Ratio	0.12	0.56			0.40		0.36		0.36			
Clearance Time (s)	5.0	5.0			5.0		5.0		5.0			
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	397	1970			2392		1224		994			
v/s Ratio Prot	0.07	c0.29			0.06		0.07					
v/s Ratio Perm									c0.16			
v/c Ratio	0.60	0.52			0.14		0.19		0.45			
Uniform Delay, d1	48.3	15.9			22.2		25.6		28.4			
Progression Factor	0.78	0.50			0.46		1.00		1.00			
Incremental Delay, d2	2.5	1.0			0.1		0.4		1.5			
Delay (s)	40.0	8.9			10.3		25.9		29.8			
Level of Service	D	A			B		C		C			
Approach Delay (s)		14.8			10.3		28.7				0.0	
Approach LOS		B			B		C				A	

Intersection Summary

HCM Average Control Delay	18.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues  
15: Cumberland Ave. & SB Alcoa Hwy Ramp



Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	750	386	177	432	376	429
v/c Ratio	0.29	0.45	0.53	0.23	0.29	0.51
Control Delay	24.3	4.2	45.5	11.8	26.1	6.2
Queue Delay	0.0	0.0	0.0	0.9	0.0	0.0
Total Delay	24.3	4.2	45.5	12.6	26.1	6.2
Queue Length 50th (ft)	108	0	67	96	100	19
Queue Length 95th (ft)	140	62	103	127	138	96
Internal Link Dist (ft)	426			241		
Turn Bay Length (ft)						
Base Capacity (vph)	2551	862	448	1908	1284	835
Starvation Cap Reductn	0	0	0	1151	0	0
Spillback Cap Reductn	231	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.45	0.40	0.57	0.29	0.51
<b>Intersection Summary</b>						



HCM Signalized Intersection Capacity Analysis  
 15: Cumberland Ave. & SB Alcoa Hwy Ramp

2015 Background AM PK HR  
 University Commons TIS



















Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗	↘	↑↑					↘		↗
Volume (vph)	0	690	355	163	397	0	0	0	0	346	0	395
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		0.86	1.00	0.97	0.95					0.97		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)		6408	1583	3433	3539					3433		1583
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		6408	1583	3433	3539					3433		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)	0	750	386	177	432	0	0	0	0	376	0	429
RTOR Reduction (vph)	0	0	232	0	0	0	0	0	0	0	0	243
Lane Group Flow (vph)	0	750	154	177	432	0	0	0	0	376	0	186
Turn Type			Perm	Prot						Prot		custom
Protected Phases		2		1	6					4		
Permitted Phases			2									4
Actuated Green, G (s)		45.8	45.8	11.2	62.0					43.0		43.0
Effective Green, g (s)		45.8	45.8	11.2	62.0					43.0		43.0
Actuated g/C Ratio		0.40	0.40	0.10	0.54					0.37		0.37
Clearance Time (s)		5.0	5.0	5.0	5.0					5.0		5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		2552	630	334	1908					1284		592
v/s Ratio Prot		c0.12		c0.05	0.12					0.11		
v/s Ratio Perm			0.10									c0.12
v/c Ratio		0.29	0.24	0.53	0.23					0.29		0.31
Uniform Delay, d1		23.6	23.1	49.4	13.9					25.3		25.5
Progression Factor		1.00	1.00	0.81	0.82					1.00		1.00
Incremental Delay, d2		0.3	0.9	1.5	0.3					0.6		1.4
Delay (s)		23.9	24.0	41.5	11.7					25.9		26.9
Level of Service		C	C	D	B					C		C
Approach Delay (s)		23.9			20.4			0.0			26.4	
Approach LOS		C			C			A			C	

Intersection Summary		
HCM Average Control Delay	23.9	HCM Level of Service C
HCM Volume to Capacity ratio	0.33	
Actuated Cycle Length (s)	115.0	Sum of lost time (s) 15.0
Intersection Capacity Utilization	52.2%	ICU Level of Service A
Analysis Period (min)	15	
c Critical Lane Group		

HCM Unsignalized Intersection Capacity Analysis  
 24: River Dr & Joe Johnson Dr.

2015 Background AM PK HR  
 University Commons TIS

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	2	0	10	7	0	6	224	529	37	1	73	44
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)	2	0	11	8	0	7	243	575	40	1	79	48
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								238			681	
pX, platoon unblocked												
vC, conflicting volume	886	1208	64	1135	1211	308	127			615		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	886	1208	64	1135	1211	308	127			615		
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 %	99	100	99	94	100	99	83			100		
cM capacity (veh/h)	206	151	988	135	150	688	1457			960		
Direction, Lane #	SE 1	NW 1	NE 1	NE 2	SW 1	SW 2						
Volume Total	13	14	531	328	41	88						
Volume Left	2	8	243	0	1	0						
Volume Right	11	7	0	40	0	48						
cSH	605	215	1457	1700	960	1700						
Volume to Capacity	0.02	0.07	0.17	0.19	0.00	0.05						
Queue Length 95th (ft)	2	5	15	0	0	0						
Control Delay (s)	11.1	22.9	4.5	0.0	0.2	0.0						
Lane LOS	B	C	A		A							
Approach Delay (s)	11.1	22.9	2.8		0.1							
Approach LOS	B	C										
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization			35.6%		ICU Level of Service				A			
Analysis Period (min)			15									



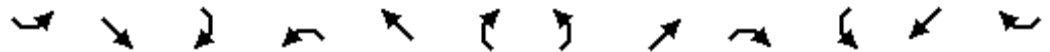
Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	10	38	622	150
v/c Ratio	0.03	0.11	0.29	0.07
Control Delay	33.9	34.2	1.2	5.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	33.9	34.2	1.2	5.7
Queue Length 50th (ft)	4	19	18	18
Queue Length 95th (ft)	21	52	m21	28
Internal Link Dist (ft)	276	290	167	472
Turn Bay Length (ft)				
Base Capacity (vph)	358	332	2168	2065
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	0.03	0.11	0.29	0.07

**Intersection Summary**

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
28: EJ Chapman Dr & Joe Johnson Dr.

2015 Background AM PK HR  
University Commons TIS



















Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	4	2	4	24	0	11	71	337	165	23	106	9
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	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.95			0.96			0.96			0.99	
Flt Protected		0.98			0.97			0.99			0.99	
Satd. Flow (prot)		1728			1724			3366			3475	
Flt Permitted		0.94			0.84			0.88			0.82	
Satd. Flow (perm)		1658			1503			2990			2889	
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)	4	2	4	26	0	12	77	366	179	25	115	10
RTOR Reduction (vph)	0	3	0	0	9	0	0	31	0	0	3	0
Lane Group Flow (vph)	0	7	0	0	29	0	0	591	0	0	147	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		30.0			30.0			100.0			100.0	
Effective Green, g (s)		30.0			30.0			100.0			100.0	
Actuated g/C Ratio		0.21			0.21			0.71			0.71	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		355			322			2136			2064	
v/s Ratio Prot												
v/s Ratio Perm		0.00			0.02			0.20			0.05	
v/c Ratio		0.02			0.09			0.28			0.07	
Uniform Delay, d1		43.4			44.1			7.1			6.0	
Progression Factor		1.00			1.00			0.17			1.00	
Incremental Delay, d2		0.1			0.5			0.2			0.1	
Delay (s)		43.5			44.6			1.5			6.1	
Level of Service		D			D			A			A	
Approach Delay (s)		43.5			44.6			1.5			6.1	
Approach LOS		D			D			A			A	

Intersection Summary

HCM Average Control Delay	4.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	31.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
43: Service Dr & Joe Johnson Dr.

2015 Background AM PK HR  
University Commons TIS

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	8	0	4	1	0	8	1	584	6	5	116	2
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)	9	0	4	1	0	9	1	635	7	5	126	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								672			247	
pX, platoon unblocked												
vC, conflicting volume	466	782	64	718	779	321	128			641		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	466	782	64	718	779	321	128			641		
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 %	98	100	100	100	100	99	100			99		
cM capacity (veh/h)	471	322	987	313	323	675	1455			939		
Direction, Lane #	SE 1	NW 1	NE 1	NE 2	SW 1	SW 2						
Volume Total	13	10	318	324	68	65						
Volume Left	9	1	1	0	5	0						
Volume Right	4	9	0	7	0	2						
cSH	570	598	1455	1700	939	1700						
Volume to Capacity	0.02	0.02	0.00	0.19	0.01	0.04						
Queue Length 95th (ft)	2	1	0	0	0	0						
Control Delay (s)	11.5	11.1	0.0	0.0	0.8	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	11.5	11.1	0.0		0.4							
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			27.0%	ICU Level of Service	A							
Analysis Period (min)			15									

Queues  
101: Cumberland Ave. & Volunteer Blvd.



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1458	41	411	105	45
v/c Ratio	0.57	0.29	0.14	0.35	0.27
Control Delay	0.7	47.3	1.3	52.5	18.2
Queue Delay	0.3	0.0	0.0	0.2	0.0
Total Delay	1.0	47.3	1.4	52.6	18.2
Queue Length 50th (ft)	0	29	14	38	0
Queue Length 95th (ft)	0	m38	m25	65	36
Internal Link Dist (ft)	134		270	1800	
Turn Bay Length (ft)		100			270
Base Capacity (vph)	2545	152	2988	597	176
Starvation Cap Reductn	457	0	0	0	0
Spillback Cap Reductn	48	0	192	136	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.70	0.27	0.15	0.23	0.26

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
 101: Cumberland Ave. & Volunteer Blvd.

2015 Background AM PK HR  
 University Commons TIS

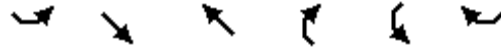


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵↵	↵
Volume (vph)	969	373	38	378	97	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	0.97	1.00
Frbp, ped/bikes	0.99		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.96		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3367		1770	3539	3433	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3367		1770	3539	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1053	405	41	411	105	45
RTOR Reduction (vph)	25	0	0	0	0	42
Lane Group Flow (vph)	1433	0	41	411	105	3
Confl. Peds. (#/hr)		9	9			
Turn Type			Prot			Over
Protected Phases	2		1	6	4	1
Permitted Phases						
Actuated Green, G (s)	84.1		7.0	96.1	8.9	7.0
Effective Green, g (s)	85.1		8.0	97.1	9.9	8.0
Actuated g/C Ratio	0.74		0.07	0.84	0.09	0.07
Clearance Time (s)	5.0		5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2492		123	2988	296	110
v/s Ratio Prot	c0.43		c0.02	0.12	c0.03	0.00
v/s Ratio Perm						
v/c Ratio	0.57		0.33	0.14	0.35	0.03
Uniform Delay, d1	6.8		51.0	1.6	49.5	49.9
Progression Factor	0.02		0.89	0.77	1.00	1.00
Incremental Delay, d2	0.6		1.0	0.1	0.7	0.1
Delay (s)	0.7		46.6	1.3	50.3	50.0
Level of Service	A		D	A	D	D
Approach Delay (s)	0.7			5.4	50.2	
Approach LOS	A			A	D	

**Intersection Summary**

HCM Average Control Delay	5.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	115.0	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



Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Group Flow (vph)	887	1363	350	129	47	45
v/c Ratio	0.94	0.93	0.24	0.12	0.15	0.06
Control Delay	29.8	50.6	27.0	2.2	31.4	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	50.6	27.0	2.2	31.4	11.7
Queue Length 50th (ft)	342	615	107	1	18	0
Queue Length 95th (ft)	#656	#766	144	27	57	29
Internal Link Dist (ft)		976	2233		158	
Turn Bay Length (ft)	150			110		
Base Capacity (vph)	961	1482	1482	1034	321	827
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	0.92	0.24	0.12	0.15	0.05

**Intersection Summary**

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



HCM Signalized Intersection Capacity Analysis  
 106: Neyland Dr. & Joe Johnson Dr.

2015 Background AM PK HR  
 University Commons TIS



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	816	1254	322	119	20	64
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	0.95
Frt	1.00	1.00	1.00	0.85	0.92	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.98	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1675	1504
Flt Permitted	0.49	1.00	1.00	1.00	0.98	1.00
Satd. Flow (perm)	917	3539	3539	1583	1675	1504
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	887	1363	350	129	22	70
RTOR Reduction (vph)	0	0	0	51	21	23
Lane Group Flow (vph)	887	1363	350	78	26	22
Turn Type	pm+pt			pm+ov		pm+ov
Protected Phases	1	2	2	4	4	1
Permitted Phases	2			2		4
Actuated Green, G (s)	100.9	57.2	57.2	81.3	24.1	67.8
Effective Green, g (s)	102.9	58.2	58.2	83.3	25.1	69.8
Actuated g/C Ratio	0.74	0.42	0.42	0.59	0.18	0.50
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	946	1471	1471	987	300	793
v/s Ratio Prot	c0.30	0.39	0.10	0.01	c0.02	0.01
v/s Ratio Perm	c0.39			0.04		0.01
v/c Ratio	0.94	0.93	0.24	0.08	0.09	0.03
Uniform Delay, d1	10.7	38.9	26.5	12.0	47.9	17.9
Progression Factor	1.00	1.00	1.00	1.00	1.09	2.64
Incremental Delay, d2	16.1	10.3	0.1	0.0	0.6	0.0
Delay (s)	26.8	49.1	26.6	12.1	52.6	47.1
Level of Service	C	D	C	B	D	D
Approach Delay (s)		40.3	22.7		49.9	
Approach LOS		D	C		D	

**Intersection Summary**

HCM Average Control Delay	37.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Group Flow (vph)	887	1363	350	129	47	45
v/c Ratio	0.93	0.95	0.24	0.12	0.13	0.06
Control Delay	58.0	47.1	33.6	19.8	22.3	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.0	47.1	33.6	19.8	22.3	2.9
Queue Length 50th (ft)	329	502	141	62	14	0
Queue Length 95th (ft)	#451	#657	186	153	45	13
Internal Link Dist (ft)		976	2233		158	
Turn Bay Length (ft)	150			110		
Base Capacity (vph)	955	1446	1446	1040	373	810
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	0.93	0.94	0.24	0.12	0.13	0.06

**Intersection Summary**

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	816	1254	322	119	20	64
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	0.95	0.95	1.00	1.00	0.95
Frt	1.00	1.00	1.00	0.85	0.92	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.98	1.00
Satd. Flow (prot)	3433	3539	3539	1583	1675	1504
Flt Permitted	0.95	1.00	1.00	1.00	0.98	1.00
Satd. Flow (perm)	3433	3539	3539	1583	1675	1504
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	887	1363	350	129	22	70
RTOR Reduction (vph)	0	0	0	5	20	23
Lane Group Flow (vph)	887	1363	350	124	27	22
Turn Type	Prot			pm+ov		pm+ov
Protected Phases	1	2	2	4	4	1
Permitted Phases				2		4
Actuated Green, G (s)	30.8	45.9	45.9	69.2	23.3	54.1
Effective Green, g (s)	31.8	46.9	46.9	71.2	24.3	56.1
Actuated g/C Ratio	0.28	0.41	0.41	0.62	0.21	0.49
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	949	1443	1443	1035	354	786
v/s Ratio Prot	c0.26	c0.39	0.10	c0.03	0.02	0.01
v/s Ratio Perm				0.05		0.01
v/c Ratio	0.93	0.94	0.24	0.12	0.08	0.03
Uniform Delay, d1	40.6	32.8	22.4	9.0	36.4	15.3
Progression Factor	1.00	1.00	1.48	2.87	1.00	0.68
Incremental Delay, d2	15.7	12.7	0.1	0.0	0.4	0.0
Delay (s)	56.3	45.5	33.1	25.9	36.9	10.5
Level of Service	E	D	C	C	D	B
Approach Delay (s)		49.8	31.2		24.0	
Approach LOS		D	C		C	

**Intersection Summary**

HCM Average Control Delay	45.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	SET	NWL	NWT	NET	NER	SWT	SWR
Lane Group Flow (vph)	423	48	68	183	229	58	29
v/c Ratio	0.41	0.13	0.05	0.68	0.54	0.09	0.05
Control Delay	36.5	25.1	20.9	69.2	10.9	33.3	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.5	25.1	20.9	69.2	10.9	33.3	11.3
Queue Length 50th (ft)	154	26	16	160	0	36	0
Queue Length 95th (ft)	211	52	32	231	73	75	25
Internal Link Dist (ft)	1800		1076	269		889	
Turn Bay Length (ft)		150					150
Base Capacity (vph)	1027	389	1457	514	599	644	540
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	0.41	0.12	0.05	0.36	0.38	0.09	0.05

Intersection Summary

HCM Signalized Intersection Capacity Analysis  
108: Volunteer Blvd. & Andy Holt Ave.

2015 Background AM PK HR  
University Commons TIS



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕↕		↕	↕↕			↕	↕		↕	↕
Volume (vph)	88	258	43	44	54	8	34	134	211	5	49	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
Lane Util. Factor		0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frbp, ped/bikes		1.00		1.00	0.99			1.00	0.98		1.00	0.95
Flpb, ped/bikes		0.99		1.00	1.00			1.00	1.00		1.00	1.00
Frt		0.98		1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected		0.99		0.95	1.00			0.99	1.00		1.00	1.00
Satd. Flow (prot)		3413		1768	3447			1844	1548		1855	1499
Flt Permitted		0.86		0.38	1.00			0.99	1.00		1.00	1.00
Satd. Flow (perm)		2954		708	3447			1844	1548		1855	1499
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)	96	280	47	48	59	9	37	146	229	5	53	29
RTOR Reduction (vph)	0	7	0	0	5	0	0	0	196	0	0	19
Lane Group Flow (vph)	0	416	0	48	63	0	0	183	33	0	58	10
Confl. Peds. (#/hr)	7		3	3		7	20		5	5		20
Turn Type	Perm			pm+pt			Split		Perm	Split		Perm
Protected Phases		2		1	6		3	3		4	4	
Permitted Phases	2			6					3			4
Actuated Green, G (s)		46.4		58.2	58.2			18.4	18.4		45.4	45.4
Effective Green, g (s)		48.4		60.2	60.2			20.4	20.4		47.4	47.4
Actuated g/C Ratio		0.35		0.43	0.43			0.15	0.15		0.34	0.34
Clearance Time (s)		6.0		6.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)		2.0		2.0	2.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1021		363	1482			269	226		628	508
v/s Ratio Prot				c0.01	0.02			c0.10			c0.03	
v/s Ratio Perm		c0.14		0.05					0.02			0.01
v/c Ratio		0.41		0.13	0.04			0.68	0.15		0.09	0.02
Uniform Delay, d1		34.9		24.0	23.2			56.7	52.2		31.6	30.8
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2		1.2		0.1	0.1			5.5	0.1		0.3	0.1
Delay (s)		36.1		24.1	23.2			62.2	52.3		31.9	30.9
Level of Service		D		C	C			E	D		C	C
Approach Delay (s)		36.1			23.6			56.7			31.6	
Approach LOS		D			C			E			C	

Intersection Summary

HCM Average Control Delay	42.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	B
Analysis Period (min)	15		

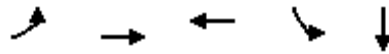
c Critical Lane Group



**2015 PM  
BACKGROUND  
TRAFFIC VOLUMES**

Queues

1: Cumberland Ave. & Metron Center Way



Lane Group	EBL	EBT	WBT	SBL	SBT
Lane Group Flow (vph)	1	1332	1916	14	15
v/c Ratio	0.01	0.58	0.86	0.09	0.04
Control Delay	6.0	8.3	19.4	49.9	0.2
Queue Delay	0.0	0.4	2.0	1.7	0.0
Total Delay	6.0	8.7	21.4	51.6	0.2
Queue Length 50th (ft)	0	124	358	10	0
Queue Length 95th (ft)	m1	206	#868	30	0
Internal Link Dist (ft)		170	134		537
Turn Bay Length (ft)	50				
Base Capacity (vph)	124	2277	2221	154	394
Starvation Cap Reductn	0	411	178	0	0
Spillback Cap Reductn	0	52	0	86	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.01	0.71	0.94	0.21	0.04

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.



HCM Signalized Intersection Capacity Analysis  
1: Cumberland Ave. & Metron Center Way

2015 Background PM PK HR  
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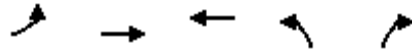


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	1	1225	0	0	1753	10	0	0	0	13	0	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0					5.0	5.0	
Lane Util. Factor	1.00	0.95			0.95					1.00	1.00	
Frt	1.00	1.00			1.00					1.00	0.85	
Flt Protected	0.95	1.00			1.00					0.95	1.00	
Satd. Flow (prot)	1770	3539			3536					1770	1583	
Flt Permitted	0.05	1.00			1.00					0.95	1.00	
Satd. Flow (perm)	102	3539			3536					1770	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)	1	1332	0	0	1905	11	0	0	0	14	0	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	14	0
Lane Group Flow (vph)	1	1332	0	0	1916	0	0	0	0	14	1	0
Turn Type	pm+pt		pm+pt		Split		Split					
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2			6								
Actuated Green, G (s)	74.0	74.0			68.2					10.0	10.0	
Effective Green, g (s)	74.0	74.0			68.2					10.0	10.0	
Actuated g/C Ratio	0.64	0.64			0.59					0.09	0.09	
Clearance Time (s)	5.0	5.0			5.0					5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0					3.0	3.0	
Lane Grp Cap (vph)	77	2277			2097					154	138	
v/s Ratio Prot	0.00	c0.38			c0.54					c0.01	0.00	
v/s Ratio Perm	0.01											
v/c Ratio	0.01	0.58			0.91					0.09	0.01	
Uniform Delay, d1	39.9	11.7			20.8					48.3	48.0	
Progression Factor	0.75	0.61			0.80					1.00	1.00	
Incremental Delay, d2	0.1	1.1			6.8					1.2	0.1	
Delay (s)	29.9	8.2			23.5					49.5	48.1	
Level of Service	C	A			C					D	D	
Approach Delay (s)		8.2			23.5			0.0			48.8	
Approach LOS		A			C			A			D	

Intersection Summary

HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	31.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues  
11: Cumberland Ave. & NB Alcoa Hwy Ramp



Lane Group	EBL	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	379	634	1247	242	324
v/c Ratio	0.71	0.25	0.40	0.34	0.39
Control Delay	39.8	1.1	4.1	40.3	5.6
Queue Delay	0.0	0.2	0.0	0.1	0.0
Total Delay	39.8	1.3	4.1	40.4	5.6
Queue Length 50th (ft)	77	8	34	79	0
Queue Length 95th (ft)	96	10	57	117	40
Internal Link Dist (ft)		241	156		
Turn Bay Length (ft)					
Base Capacity (vph)	866	2493	3129	716	838
Starvation Cap Reductn	21	1051	0	0	0
Spillback Cap Reductn	0	67	3	63	6
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.45	0.44	0.40	0.37	0.39

Intersection Summary

HCM Signalized Intersection Capacity Analysis  
 11: Cumberland Ave. & NB Alcoa Hwy Ramp

2015 Background PM PK HR  
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	349	583	0	0	715	432	223	0	298	0	0	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	0.97	0.95			0.86		0.97		0.88			
Frt	1.00	1.00			0.94		1.00		0.85			
Flt Protected	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (prot)	3433	3539			6046		3433		2787			
Flt Permitted	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (perm)	3433	3539			6046		3433		2787			
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)	379	634	0	0	777	470	242	0	324	0	0	0
RTOR Reduction (vph)	0	0	0	0	80	0	0	0	256	0	0	0
Lane Group Flow (vph)	379	634	0	0	1167	0	242	0	68	0	0	0
Turn Type	Prot							Prot		custom		
Protected Phases	5	2			6		8					
Permitted Phases									8			
Actuated Green, G (s)	18.0	81.0			58.0		24.0		24.0			
Effective Green, g (s)	18.0	81.0			58.0		24.0		24.0			
Actuated g/C Ratio	0.16	0.70			0.50		0.21		0.21			
Clearance Time (s)	5.0	5.0			5.0		5.0		5.0			
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	537	2493			3049		716		582			
v/s Ratio Prot	c0.11	0.18			c0.19		c0.07					
v/s Ratio Perm									0.02			
v/c Ratio	0.71	0.25			0.38		0.34		0.12			
Uniform Delay, d1	46.0	6.1			17.5		38.7		36.9			
Progression Factor	0.71	0.14			0.25		1.00		1.00			
Incremental Delay, d2	4.1	0.2			0.2		1.3		0.4			
Delay (s)	36.8	1.1			4.6		40.0		37.3			
Level of Service	D	A			A		D		D			
Approach Delay (s)		14.5			4.6			38.5			0.0	
Approach LOS		B			A			D			A	

Intersection Summary

HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues  
15: Cumberland Ave. & SB Alcoa Hwy Ramp



Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	862	835	380	812	352	526
v/c Ratio	0.33	0.76	0.82	0.39	0.32	0.83
Control Delay	23.4	8.0	52.7	15.3	30.5	36.4
Queue Delay	0.0	0.0	0.0	2.7	0.0	0.0
Total Delay	23.4	8.0	52.7	18.0	30.5	36.4
Queue Length 50th (ft)	124	29	134	205	101	248
Queue Length 95th (ft)	151	169	#212	283	141	#439
Internal Link Dist (ft)	426			241		
Turn Bay Length (ft)						
Base Capacity (vph)	2646	1105	478	2093	1105	631
Starvation Cap Reductn	0	0	0	1127	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	0.76	0.79	0.84	0.32	0.83

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
 15: Cumberland Ave. & SB Alcoa Hwy Ramp

2015 Background PM PK HR  
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗	↘	↑↑					↖		↗
Volume (vph)	0	793	768	350	747	0	0	0	0	324	0	484
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		0.86	1.00	0.97	0.95					0.97		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)		6408	1583	3433	3539					3433		1583
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		6408	1583	3433	3539					3433		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)	0	862	835	380	812	0	0	0	0	352	0	526
RTOR Reduction (vph)	0	0	452	0	0	0	0	0	0	0	0	122
Lane Group Flow (vph)	0	862	383	380	812	0	0	0	0	352	0	404
Turn Type			Perm	Prot						Prot		custom
Protected Phases		2		1	6					4		
Permitted Phases			2									4
Actuated Green, G (s)		47.5	47.5	15.5	68.0					37.0		37.0
Effective Green, g (s)		47.5	47.5	15.5	68.0					37.0		37.0
Actuated g/C Ratio		0.41	0.41	0.13	0.59					0.32		0.32
Clearance Time (s)		5.0	5.0	5.0	5.0					5.0		5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		2647	654	463	2093					1105		509
v/s Ratio Prot		0.13		c0.11	0.23					0.10		
v/s Ratio Perm			c0.24									c0.26
v/c Ratio		0.33	0.59	0.82	0.39					0.32		0.79
Uniform Delay, d1		22.9	26.1	48.4	12.5					29.5		35.5
Progression Factor		1.00	1.00	0.78	1.17					1.00		1.00
Incremental Delay, d2		0.3	3.8	10.7	0.5					0.8		12.0
Delay (s)		23.2	29.9	48.6	15.1					30.2		47.6
Level of Service		C	C	D	B					C		D
Approach Delay (s)		26.5			25.8			0.0			40.6	
Approach LOS		C			C			A			D	

**Intersection Summary**

HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
 24: River Dr & Joe Johnson Dr.

2015 Background PM PK HR  
 University Commons TIS

													
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR	
Lane Configurations													
Volume (veh/h)	22	2	68	31	1	18	18	203	24	6	638	10	
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	2	74	34	1	20	20	221	26	7	693	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)						238			681				
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96	0.96							
vC, conflicting volume	882	998	352	708	990	123	704				247		
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	804	925	256	624	917	123	621				247		
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 %	91	99	90	89	100	98	98				100		
cM capacity (veh/h)	253	251	717	312	254	904	922				1316		
Direction, Lane #	SE 1	NW 1	NE 1	NE 2	SW 1	SW 2							
Volume Total	100	54	130	136	353	358							
Volume Left	24	34	20	0	7	0							
Volume Right	74	20	0	26	0	11							
cSH	485	405	922	1700	1316	1700							
Volume to Capacity	0.21	0.13	0.02	0.08	0.00	0.21							
Queue Length 95th (ft)	19	11	2	0	0	0							
Control Delay (s)	14.3	15.2	1.5	0.0	0.2	0.0							
Lane LOS	B	C	A		A								
Approach Delay (s)	14.3	15.2	0.7		0.1								
Approach LOS	B	C											
Intersection Summary													
Average Delay			2.2										
Intersection Capacity Utilization			35.3%		ICU Level of Service			A					
Analysis Period (min)			15										



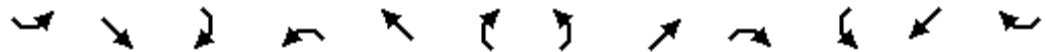
Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	85	189	246	445
v/c Ratio	0.11	0.29	0.18	0.32
Control Delay	5.3	14.2	18.4	10.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.3	14.2	18.4	10.8
Queue Length 50th (ft)	5	54	55	49
Queue Length 95th (ft)	30	101	m68	78
Internal Link Dist (ft)	276	290	167	472
Turn Bay Length (ft)				
Base Capacity (vph)	792	646	1385	1397
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	0.11	0.29	0.18	0.32

**Intersection Summary**

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
28: EJ Chapman Dr & Joe Johnson Dr.

2015 Background PM PK HR  
University Commons TIS



















Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	8	8	62	120	9	45	9	192	25	17	378	15
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	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.89			0.96			0.98			0.99	
Flt Protected		0.99			0.97			1.00			1.00	
Satd. Flow (prot)		1656			1738			3474			3513	
Flt Permitted		0.97			0.75			0.94			0.94	
Satd. Flow (perm)		1619			1355			3256			3302	
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	9	67	130	10	49	10	209	27	18	411	16
RTOR Reduction (vph)	0	36	0	0	14	0	0	10	0	0	3	0
Lane Group Flow (vph)	0	49	0	0	175	0	0	236	0	0	442	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		42.0			42.0			38.0			38.0	
Effective Green, g (s)		42.0			42.0			38.0			38.0	
Actuated g/C Ratio		0.47			0.47			0.42			0.42	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		756			632			1375			1394	
v/s Ratio Prot												
v/s Ratio Perm		0.03			0.13			0.07			0.13	
v/c Ratio		0.07			0.28			0.17			0.32	
Uniform Delay, d1		13.2			14.7			16.2			17.3	
Progression Factor		1.00			1.00			1.20			0.59	
Incremental Delay, d2		0.2			1.1			0.2			0.5	
Delay (s)		13.4			15.8			19.7			10.8	
Level of Service		B			B			B			B	
Approach Delay (s)		13.4			15.8			19.7			10.8	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



HCM Unsignalized Intersection Capacity Analysis  
43: Service Dr & Joe Johnson Dr.

2015 Background PM PK HR  
University Commons TIS

													
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR	
Lane Configurations													
Volume (veh/h)	10	2	20	15	0	9	2	193	2	7	590	0	
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)	11	2	22	16	0	10	2	210	2	8	641	0	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type						None			None				
Median storage (veh)													
Upstream signal (ft)						672			247				
pX, platoon unblocked	0.93	0.93	0.93	0.93	0.93		0.93						
vC, conflicting volume	776	873	321	574	872	106	641	212					
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	601	706	110	384	705	106	456	212					
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 %	97	99	97	97	100	99	100	99					
cM capacity (veh/h)	350	330	855	491	331	928	1021	1356					
Direction, Lane #	SE 1	NW 1	NE 1	NE 2	SW 1	SW 2							
Volume Total	35	26	107	107	328	321							
Volume Left	11	16	2	0	8	0							
Volume Right	22	10	0	2	0	0							
cSH	552	596	1021	1700	1356	1700							
Volume to Capacity	0.06	0.04	0.00	0.06	0.01	0.19							
Queue Length 95th (ft)	5	3	0	0	0	0							
Control Delay (s)	12.0	11.3	0.2	0.0	0.2	0.0							
Lane LOS	B	B	A		A								
Approach Delay (s)	12.0	11.3	0.1		0.1								
Approach LOS	B	B											
Intersection Summary													
Average Delay			0.9										
Intersection Capacity Utilization			31.2%		ICU Level of Service				A				
Analysis Period (min)			15										

Queues  
101: Cumberland Ave. & Volunteer Blvd.



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1051	51	1079	667	263
v/c Ratio	0.55	0.32	0.45	0.78	0.69
Control Delay	11.9	51.3	8.1	47.2	15.6
Queue Delay	1.0	0.0	1.2	0.6	0.0
Total Delay	12.9	51.3	9.3	47.8	15.6
Queue Length 50th (ft)	140	38	141	236	0
Queue Length 95th (ft)	138	m48	233	291	76
Internal Link Dist (ft)	134		270	1800	
Turn Bay Length (ft)		100			270
Base Capacity (vph)	1909	308	2416	985	493
Starvation Cap Reductn	553	0	976	0	0
Spillback Cap Reductn	56	0	1031	90	4
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.78	0.17	0.78	0.75	0.54

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
 101: Cumberland Ave. & Volunteer Blvd.

2015 Background PM PK HR  
 University Commons TIS

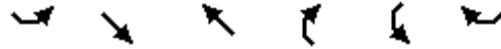


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵↵	↵
Volume (vph)	724	243	47	993	614	242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	0.97	1.00
Frbp, ped/bikes	0.99		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.96		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3384		1770	3539	3433	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3384		1770	3539	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	787	264	51	1079	667	263
RTOR Reduction (vph)	23	0	0	0	0	239
Lane Group Flow (vph)	1028	0	51	1079	667	24
Confl. Peds. (#/hr)		9	9			
Turn Type			Prot			Over
Protected Phases	2		1	6	4	1
Permitted Phases						
Actuated Green, G (s)	63.1		9.4	77.5	27.5	9.4
Effective Green, g (s)	64.1		10.4	78.5	28.5	10.4
Actuated g/C Ratio	0.56		0.09	0.68	0.25	0.09
Clearance Time (s)	5.0		5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1886		160	2416	851	143
v/s Ratio Prot	c0.30		0.03	c0.30	c0.19	0.02
v/s Ratio Perm						
v/c Ratio	0.55		0.32	0.45	0.78	0.17
Uniform Delay, d1	16.2		49.0	8.3	40.4	48.3
Progression Factor	0.65		1.01	0.87	1.00	1.00
Incremental Delay, d2	0.9		0.7	0.4	4.8	0.6
Delay (s)	11.5		50.1	7.7	45.1	48.8
Level of Service	B		D	A	D	D
Approach Delay (s)	11.5			9.6	46.2	
Approach LOS	B			A	D	

**Intersection Summary**

HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Group Flow (vph)	326	518	1611	45	474	464
v/c Ratio	0.96	0.32	1.00	0.04	0.89	0.67
Control Delay	65.4	16.3	47.9	0.9	35.9	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.4	16.3	47.9	0.9	35.9	19.3
Queue Length 50th (ft)	133	95	464	0	108	126
Queue Length 95th (ft)	#302	132	#641	6	#352	347
Internal Link Dist (ft)		976	2233		158	
Turn Bay Length (ft)	150			110		
Base Capacity (vph)	339	1612	1612	1224	535	690
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	0.96	0.32	1.00	0.04	0.89	0.67

**Intersection Summary**

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
 106: Neyland Dr. & Joe Johnson Dr.

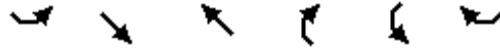
2015 Background PM PK HR  
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Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	300	477	1482	41	127	736
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	0.95
Frt	1.00	1.00	1.00	0.85	0.89	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.99	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1641	1504
Flt Permitted	0.10	1.00	1.00	1.00	0.99	1.00
Satd. Flow (perm)	182	3539	3539	1583	1641	1504
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	326	518	1611	45	138	800
RTOR Reduction (vph)	0	0	0	13	98	5
Lane Group Flow (vph)	326	518	1611	33	376	459
Turn Type	pm+pt			pm+ov		pm+ov
Protected Phases	1	2	2	4	4	1
Permitted Phases	2			2		4
Actuated Green, G (s)	52.0	40.0	40.0	63.0	23.0	35.0
Effective Green, g (s)	54.0	41.0	41.0	65.0	24.0	37.0
Actuated g/C Ratio	0.60	0.46	0.46	0.72	0.27	0.41
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	339	1612	1612	1214	438	685
v/s Ratio Prot	c0.14	0.15	c0.46	0.01	c0.23	0.10
v/s Ratio Perm	0.44			0.01		0.21
v/c Ratio	0.96	0.32	1.00	0.03	0.86	0.67
Uniform Delay, d1	27.0	15.6	24.5	3.5	31.4	21.5
Progression Factor	1.00	1.00	1.00	1.00	0.66	0.72
Incremental Delay, d2	38.5	0.1	22.1	0.0	19.1	2.6
Delay (s)	65.5	15.7	46.6	3.5	39.7	18.1
Level of Service	E	B	D	A	D	B
Approach Delay (s)		35.0	45.4		29.0	
Approach LOS		C	D		C	

Intersection Summary

HCM Average Control Delay	38.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Group Flow (vph)	326	518	1611	45	474	464
v/c Ratio	0.90	0.31	0.97	0.04	0.84	0.70
Control Delay	66.7	14.6	38.7	1.3	31.0	23.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.7	14.6	38.7	1.3	31.0	23.0
Queue Length 50th (ft)	90	86	422	2	180	211
Queue Length 95th (ft)	#165	121	#595	7	#338	329
Internal Link Dist (ft)		976	2233		158	
Turn Bay Length (ft)	150			110		
Base Capacity (vph)	363	1665	1665	1270	567	660
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	0.90	0.31	0.97	0.04	0.84	0.70

**Intersection Summary**

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	300	477	1482	41	127	736
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	0.95	0.95	1.00	1.00	0.95
Frt	1.00	1.00	1.00	0.85	0.89	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.99	1.00
Satd. Flow (prot)	3433	3539	3539	1583	1641	1504
Flt Permitted	0.95	1.00	1.00	1.00	0.99	1.00
Satd. Flow (perm)	3433	3539	3539	1583	1641	1504
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	326	518	1611	45	138	800
RTOR Reduction (vph)	0	0	0	4	103	6
Lane Group Flow (vph)	326	518	1611	41	371	458
Turn Type	Prot			pm+ov		pm+ov
Protected Phases	1	2	2	4	4	1
Permitted Phases				2		4
Actuated Green, G (s)	8.0	39.0	39.0	62.0	23.0	31.0
Effective Green, g (s)	9.0	40.0	40.0	64.0	24.0	33.0
Actuated g/C Ratio	0.11	0.47	0.47	0.75	0.28	0.39
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	363	1665	1665	1266	463	655
v/s Ratio Prot	c0.09	0.15	c0.46	0.01	c0.23	0.07
v/s Ratio Perm				0.02		0.23
v/c Ratio	0.90	0.31	0.97	0.03	0.80	0.70
Uniform Delay, d1	37.5	14.0	21.9	2.7	28.3	21.8
Progression Factor	1.00	1.00	1.00	1.00	0.80	0.85
Incremental Delay, d2	23.7	0.1	14.9	0.0	13.5	3.2
Delay (s)	61.3	14.1	36.8	2.7	36.2	21.7
Level of Service	E	B	D	A	D	C
Approach Delay (s)		32.3	35.9		29.1	
Approach LOS		C	D		C	

Intersection Summary			
HCM Average Control Delay	33.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	SET	NWL	NWT	NET	NER	SWT	SWR
Lane Group Flow (vph)	339	277	349	163	92	166	148
v/c Ratio	0.62	0.60	0.24	0.56	0.29	0.31	0.27
Control Delay	36.5	24.0	16.9	25.7	2.7	28.2	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.5	24.0	16.9	25.7	2.7	28.2	6.3
Queue Length 50th (ft)	90	105	63	36	0	74	0
Queue Length 95th (ft)	137	168	94	54	4	136	46
Internal Link Dist (ft)	1800		1076	269		889	
Turn Bay Length (ft)		150					150
Base Capacity (vph)	548	472	1485	367	384	533	542
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	0.59	0.24	0.44	0.24	0.31	0.27

Intersection Summary



HCM Signalized Intersection Capacity Analysis  
 108: Volunteer Blvd. & Andy Holt Ave.

2015 Background PM PK HR  
 University Commons TIS



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕↕		↕	↕↕			↕	↕		↕	↕
Volume (vph)	133	146	32	255	306	15	47	103	85	8	144	136
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
Lane Util. Factor		0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frbp, ped/bikes		1.00		1.00	1.00			1.00	0.98		1.00	0.96
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt		0.98		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected		0.98		0.95	1.00			0.98	1.00		1.00	1.00
Satd. Flow (prot)		3389		1768	3509			1834	1550		1858	1522
Flt Permitted		0.70		0.37	1.00			0.98	1.00		1.00	1.00
Satd. Flow (perm)		2421		692	3509			1834	1550		1858	1522
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)	145	159	35	277	333	16	51	112	92	9	157	148
RTOR Reduction (vph)	0	9	0	0	4	0	0	0	77	0	0	106
Lane Group Flow (vph)	0	330	0	277	345	0	0	163	15	0	166	42
Confl. Peds. (#/hr)	7		3	3		7	20		5	5		20
Turn Type	Perm			pm+pt			Split		Perm	Split		Perm
Protected Phases		2		1	6		3	3		4	4	
Permitted Phases	2			6					3			4
Actuated Green, G (s)		18.0		36.0	36.0			12.2	12.2		23.8	23.8
Effective Green, g (s)		20.0		38.0	38.0			14.2	14.2		25.8	25.8
Actuated g/C Ratio		0.22		0.42	0.42			0.16	0.16		0.29	0.29
Clearance Time (s)		6.0		6.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)		2.0		2.0	2.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		538		460	1482			289	245		533	436
v/s Ratio Prot				c0.09	0.10			c0.09			c0.09	
v/s Ratio Perm		0.14		c0.16					0.01			0.03
v/c Ratio		0.61		0.60	0.23			0.56	0.06		0.31	0.10
Uniform Delay, d1		31.5		18.3	16.7			35.0	32.2		25.1	23.6
Progression Factor		1.00		1.00	1.00			0.52	0.07		1.00	1.00
Incremental Delay, d2		5.1		1.5	0.4			1.5	0.0		1.5	0.4
Delay (s)		36.7		19.8	17.0			19.7	2.4		26.7	24.0
Level of Service		D		B	B			B	A		C	C
Approach Delay (s)		36.7			18.3			13.5			25.4	
Approach LOS		D			B			B			C	

Intersection Summary

HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	90.0	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



**2015 AM  
BUILDOUT  
TRAFFIC VOLUMES**

Queues  
1: Cumberland Ave. & Metron Center Way

2015 Buildout AM  
University Commons TIS



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	32	1703	14	532	20	14	7	2
v/c Ratio	0.06	0.80	0.09	0.25	0.08	0.03	0.05	0.00
Control Delay	9.9	18.4	14.2	14.6	44.2	0.2	49.0	0.0
Queue Delay	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0
Total Delay	9.9	18.4	14.2	15.4	44.2	0.2	49.0	0.0
Queue Length 50th (ft)	7	226	5	128	13	0	5	0
Queue Length 95th (ft)	m17	678	16	184	37	0	20	0
Internal Link Dist (ft)		170		134		574		537
Turn Bay Length (ft)	50		50					
Base Capacity (vph)	545	2135	156	2101	246	423	154	586
Starvation Cap Reductn	0	0	0	1204	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	0.06	0.80	0.09	0.59	0.08	0.03	0.05	0.00

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
1: Cumberland Ave. & Metron Center Way

2015 Buildout AM  
University Commons TIS



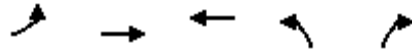
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	1520	47	13	468	21	18	0	13	6	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3523		1770	3516		1770	1583		1770	1583	
Flt Permitted	0.45	1.00		0.06	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	846	3523		118	3516		1770	1583		1770	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)	32	1652	51	14	509	23	20	0	14	7	0	2
RTOR Reduction (vph)	0	2	0	0	3	0	0	12	0	0	2	0
Lane Group Flow (vph)	32	1701	0	14	529	0	20	2	0	7	0	0
Turn Type	pm+pt			pm+pt			Split			Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2			6								
Actuated Green, G (s)	66.6	66.6		65.6	65.6		16.0	16.0		10.0	10.0	
Effective Green, g (s)	66.6	66.6		65.6	65.6		16.0	16.0		10.0	10.0	
Actuated g/C Ratio	0.58	0.58		0.57	0.57		0.14	0.14		0.09	0.09	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	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)	517	2040		102	2006		246	220		154	138	
v/s Ratio Prot	0.00	c0.48		0.00	c0.15		c0.01	0.00		c0.00	0.00	
v/s Ratio Perm	0.03			0.08								
v/c Ratio	0.06	0.83		0.14	0.26		0.08	0.01		0.05	0.00	
Uniform Delay, d1	10.6	19.7		21.0	12.5		43.1	42.7		48.1	47.9	
Progression Factor	0.86	0.82		1.20	1.24		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	3.7		0.6	0.3		0.6	0.1		0.6	0.0	
Delay (s)	9.2	19.9		25.8	15.8		43.7	42.7		48.7	48.0	
Level of Service	A	B		C	B		D	D		D	D	
Approach Delay (s)	19.7			16.1			43.3			48.5		
Approach LOS	B			B			D			D		

Intersection Summary

HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	115.0	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			

Queues  
11: Cumberland Ave. & NB Alcoa Hwy Ramp

2015 Buildout AM  
University Commons TIS



Lane Group	EBL	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	239	1058	464	236	565
v/c Ratio	0.60	0.54	0.19	0.19	0.52
Control Delay	43.1	8.6	6.6	26.1	22.6
Queue Delay	0.0	0.4	0.0	0.0	0.0
Total Delay	43.1	9.0	6.6	26.1	22.6
Queue Length 50th (ft)	54	251	45	61	133
Queue Length 95th (ft)	74	302	88	91	193
Internal Link Dist (ft)		241	156		
Turn Bay Length (ft)					
Base Capacity (vph)	567	1970	2492	1224	1093
Starvation Cap Reductn	0	412	0	0	0
Spillback Cap Reductn	0	72	0	0	3
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.42	0.68	0.19	0.19	0.52

Intersection Summary

HCM Signalized Intersection Capacity Analysis  
 11: Cumberland Ave. & NB Alcoa Hwy Ramp

2015 Buildout AM  
 University Commons TIS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑			↑↑↑		↔↔		↔↔			
Volume (vph)	220	973	0	0	258	169	217	0	520	0	0	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	0.97	0.95			0.86		0.97		0.88			
Frt	1.00	1.00			0.94		1.00		0.85			
Flt Protected	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (prot)	3433	3539			6027		3433		2787			
Flt Permitted	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (perm)	3433	3539			6027		3433		2787			
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)	239	1058	0	0	280	184	236	0	565	0	0	0
RTOR Reduction (vph)	0	0	0	0	95	0	0	0	99	0	0	0
Lane Group Flow (vph)	239	1058	0	0	369	0	236	0	466	0	0	0
Turn Type	Prot							Prot		custom		
Protected Phases	5	2			6		8					
Permitted Phases									8			
Actuated Green, G (s)	13.3	64.0			45.7		41.0		41.0			
Effective Green, g (s)	13.3	64.0			45.7		41.0		41.0			
Actuated g/C Ratio	0.12	0.56			0.40		0.36		0.36			
Clearance Time (s)	5.0	5.0			5.0		5.0		5.0			
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	397	1970			2395		1224		994			
v/s Ratio Prot	0.07	c0.30			0.06		0.07					
v/s Ratio Perm									c0.17			
v/c Ratio	0.60	0.54			0.15		0.19		0.47			
Uniform Delay, d1	48.3	16.1			22.2		25.6		28.6			
Progression Factor	0.76	0.46			0.43		1.00		1.00			
Incremental Delay, d2	2.5	1.0			0.1		0.4		1.6			
Delay (s)	39.4	8.5			9.7		25.9		30.2			
Level of Service	D	A			A		C		C			
Approach Delay (s)		14.2			9.7			28.9			0.0	
Approach LOS		B			A			C			A	

**Intersection Summary**

HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues  
15: Cumberland Ave. & SB Alcoa Hwy Ramp

2015 Buildout AM  
University Commons TIS



Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	778	386	183	440	422	429
v/c Ratio	0.31	0.45	0.54	0.23	0.32	0.51
Control Delay	25.3	4.4	46.9	12.0	25.8	6.7
Queue Delay	0.0	0.0	0.0	0.9	0.0	0.0
Total Delay	25.3	4.4	46.9	12.9	25.8	6.7
Queue Length 50th (ft)	115	0	69	96	111	26
Queue Length 95th (ft)	148	63	106	127	152	105
Internal Link Dist (ft)	426			241		
Turn Bay Length (ft)						
Base Capacity (vph)	2484	850	448	1877	1313	836
Starvation Cap Reductn	0	0	0	1126	0	0
Spillback Cap Reductn	253	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.45	0.41	0.59	0.32	0.51

Intersection Summary



HCM Signalized Intersection Capacity Analysis  
 15: Cumberland Ave. & SB Alcoa Hwy Ramp

2015 Buildout AM  
 University Commons TIS

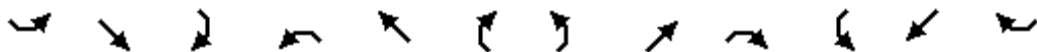


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗	↘	↑↑					↖		↗
Volume (vph)	0	716	355	168	405	0	0	0	0	388	0	395
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0					5.0		5.0
Lane Util. Factor		0.86	1.00	0.97	0.95					0.97		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)		6408	1583	3433	3539					3433		1583
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		6408	1583	3433	3539					3433		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)	0	778	386	183	440	0	0	0	0	422	0	429
RTOR Reduction (vph)	0	0	236	0	0	0	0	0	0	0	0	230
Lane Group Flow (vph)	0	778	150	183	440	0	0	0	0	422	0	199
Turn Type			Perm	Prot						Prot		custom
Protected Phases		2		1	6					4		
Permitted Phases			2									4
Actuated Green, G (s)		44.6	44.6	11.4	61.0					44.0		44.0
Effective Green, g (s)		44.6	44.6	11.4	61.0					44.0		44.0
Actuated g/C Ratio		0.39	0.39	0.10	0.53					0.38		0.38
Clearance Time (s)		5.0	5.0	5.0	5.0					5.0		5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		2485	614	340	1877					1313		606
v/s Ratio Prot		c0.12		c0.05	0.12					0.12		
v/s Ratio Perm			0.09									c0.13
v/c Ratio		0.31	0.24	0.54	0.23					0.32		0.33
Uniform Delay, d1		24.5	23.8	49.3	14.5					25.0		25.1
Progression Factor		1.00	1.00	0.84	0.80					1.00		1.00
Incremental Delay, d2		0.3	0.9	1.6	0.3					0.6		1.4
Delay (s)		24.9	24.7	43.0	11.9					25.6		26.5
Level of Service		C	C	D	B					C		C
Approach Delay (s)		24.8			21.0			0.0			26.1	
Approach LOS		C			C			A			C	

Intersection Summary		
HCM Average Control Delay	24.3	HCM Level of Service C
HCM Volume to Capacity ratio	0.35	
Actuated Cycle Length (s)	115.0	Sum of lost time (s) 15.0
Intersection Capacity Utilization	53.4%	ICU Level of Service A
Analysis Period (min)	15	
c Critical Lane Group		

HCM Unsignalized Intersection Capacity Analysis  
 24: River Dr & Joe Johnson Dr.

2015 Buildout AM  
 University Commons TIS



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	2	0	12	7	0	6	224	570	37	1	107	44
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)	2	0	13	8	0	7	243	620	40	1	116	48
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								238			681	
pX, platoon unblocked												
vC, conflicting volume	946	1289	82	1200	1293	330	164			660		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	946	1289	82	1200	1293	330	164			660		
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 %	99	100	99	94	100	99	83			100		
cM capacity (veh/h)	186	134	961	120	134	666	1412			924		

Direction, Lane #	SE 1	NW 1	NE 1	NE 2	SW 1	SW 2
Volume Total	15	14	553	350	59	106
Volume Left	2	8	243	0	1	0
Volume Right	13	7	0	40	0	48
cSH	602	193	1412	1700	924	1700
Volume to Capacity	0.03	0.07	0.17	0.21	0.00	0.06
Queue Length 95th (ft)	2	6	16	0	0	0
Control Delay (s)	11.1	25.1	4.5	0.0	0.2	0.0
Lane LOS	B	D	A		A	
Approach Delay (s)	11.1	25.1	2.8		0.1	
Approach LOS	B	D				

Intersection Summary		
Average Delay		2.8
Intersection Capacity Utilization	41.2%	ICU Level of Service
Analysis Period (min)		15
		A



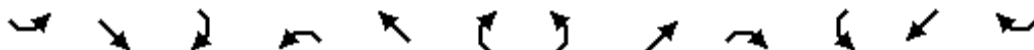
Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	10	38	667	187
v/c Ratio	0.03	0.12	0.30	0.09
Control Delay	35.1	35.5	1.5	4.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	35.1	35.5	1.5	4.1
Queue Length 50th (ft)	4	20	14	22
Queue Length 95th (ft)	21	52	m16	33
Internal Link Dist (ft)	276	290	167	472
Turn Bay Length (ft)				
Base Capacity (vph)	334	309	2205	2139
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	0.03	0.12	0.30	0.09

**Intersection Summary**

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
28: EJ Chapman Dr & Joe Johnson Dr.

2015 Buildout AM  
University Commons TIS



















Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	4	2	4	24	0	11	71	378	165	23	140	9
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	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.95			0.96			0.96			0.99	
Flt Protected		0.98			0.97			0.99			0.99	
Satd. Flow (prot)		1728			1724			3377			3488	
Flt Permitted		0.94			0.84			0.88			0.84	
Satd. Flow (perm)		1655			1499			2989			2932	
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)	4	2	4	26	0	12	77	411	179	25	152	10
RTOR Reduction (vph)	0	3	0	0	10	0	0	27	0	0	3	0
Lane Group Flow (vph)	0	7	0	0	28	0	0	640	0	0	184	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		28.0			28.0			102.0			102.0	
Effective Green, g (s)		28.0			28.0			102.0			102.0	
Actuated g/C Ratio		0.20			0.20			0.73			0.73	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		331			300			2178			2136	
v/s Ratio Prot												
v/s Ratio Perm		0.00			c0.02			c0.21			0.06	
v/c Ratio		0.02			0.09			0.29			0.09	
Uniform Delay, d1		45.0			45.7			6.6			5.5	
Progression Factor		1.00			1.00			0.24			0.77	
Incremental Delay, d2		0.1			0.6			0.2			0.1	
Delay (s)		45.1			46.3			1.8			4.3	
Level of Service		D			D			A			A	
Approach Delay (s)		45.1			46.3			1.8			4.3	
Approach LOS		D			D			A			A	

Intersection Summary

HCM Average Control Delay	4.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
43: Service Dr & Joe Johnson Dr.

2015 Buildout AM  
University Commons TIS

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	8	0	4	1	0	8	1	625	6	5	150	2
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)	9	0	4	1	0	9	1	679	7	5	163	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								672			247	
pX, platoon unblocked												
vC, conflicting volume	526	863	83	782	861	343	165			686		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	526	863	83	782	861	343	165			686		
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 %	98	100	100	100	100	99	100			99		
cM capacity (veh/h)	427	289	960	282	290	653	1410			904		
Direction, Lane #	SE 1	NW 1	NE 1	NE 2	SW 1	SW 2						
Volume Total	13	10	341	346	87	84						
Volume Left	9	1	1	0	5	0						
Volume Right	4	9	0	7	0	2						
cSH	524	570	1410	1700	904	1700						
Volume to Capacity	0.02	0.02	0.00	0.20	0.01	0.05						
Queue Length 95th (ft)	2	1	0	0	0	0						
Control Delay (s)	12.0	11.4	0.0	0.0	0.6	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	12.0	11.4	0.0		0.3							
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			28.2%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis  
 53: Site Access & Joe Johnson Dr.

2015 Buildout AM  
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Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Volume (veh/h)	3	35	41	283	91	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	38	45	308	99	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage veh					2	
Upstream signal (ft)				552	349	
pX, platoon unblocked						
vC, conflicting volume	347	54	109			
vC1, stage 1 conf vol	104					
vC2, stage 2 conf vol	243					
vCu, unblocked vol	347	54	109			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	97			
cM capacity (veh/h)	714	1001	1480			
Direction, Lane #	SB 1	NE 1	NE 2	SW 1	SW 2	
Volume Total	41	147	205	66	43	
Volume Left	3	45	0	0	0	
Volume Right	38	0	0	0	10	
cSH	970	1480	1700	1700	1700	
Volume to Capacity	0.04	0.03	0.12	0.04	0.03	
Queue Length 95th (ft)	3	2	0	0	0	
Control Delay (s)	8.9	2.4	0.0	0.0	0.0	
Lane LOS	A	A				
Approach Delay (s)	8.9	1.0		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			22.3%	ICU Level of Service	A	
Analysis Period (min)			15			



Lane Group	SBL	NEL	NET	SWT
Lane Group Flow (vph)	41	45	308	109
v/c Ratio	0.10	0.05	0.24	0.06
Control Delay	13.2	1.7	2.1	7.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.2	1.7	2.1	7.3
Queue Length 50th (ft)	2	3	19	13
Queue Length 95th (ft)	32	6	29	23
Internal Link Dist (ft)	484		472	269
Turn Bay Length (ft)				
Base Capacity (vph)	395	938	1289	1976
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	0.10	0.05	0.24	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis  
 53: Site Access & Joe Johnson Dr.

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Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Volume (vph)	3	35	41	283	91	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frt	0.87		1.00	1.00	0.99	
Flt Protected	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	1624		1770	1863	3491	
Flt Permitted	1.00		0.68	1.00	1.00	
Satd. Flow (perm)	1624		1273	1863	3491	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	38	45	308	99	10
RTOR Reduction (vph)	29	0	0	0	4	0
Lane Group Flow (vph)	12	0	45	308	105	0
Turn Type			pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	27.0		83.0	83.0	66.8	
Effective Green, g (s)	27.0		83.0	83.0	66.8	
Actuated g/C Ratio	0.22		0.69	0.69	0.56	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	365		927	1289	1943	
v/s Ratio Prot	c0.01		0.00	c0.17	0.03	
v/s Ratio Perm			0.03			
v/c Ratio	0.03		0.05	0.24	0.05	
Uniform Delay, d1	36.3		5.9	6.8	12.2	
Progression Factor	1.00		0.27	0.24	0.61	
Incremental Delay, d2	0.2		0.0	0.4	0.1	
Delay (s)	36.5		1.6	2.0	7.5	
Level of Service	D		A	A	A	
Approach Delay (s)	36.5			2.0	7.5	
Approach LOS	D			A	A	

**Intersection Summary**

HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.19		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	26.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Queues  
101: Cumberland Ave. & Volunteer Blvd.



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1468	51	421	105	47
v/c Ratio	0.58	0.34	0.14	0.35	0.27
Control Delay	0.6	47.2	1.4	52.5	17.3
Queue Delay	0.3	0.0	0.3	0.1	0.0
Total Delay	0.9	47.2	1.7	52.6	17.3
Queue Length 50th (ft)	0	35	12	38	0
Queue Length 95th (ft)	0	m46	m28	65	36
Internal Link Dist (ft)	134		270	1800	
Turn Bay Length (ft)		100			270
Base Capacity (vph)	2529	166	2988	597	191
Starvation Cap Reductn	441	0	1957	0	0
Spillback Cap Reductn	42	0	164	102	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.70	0.31	0.41	0.21	0.25

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
101: Cumberland Ave. & Volunteer Blvd.

2015 Buildout AM  
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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵↵	↵
Volume (vph)	978	373	47	387	97	43
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	0.95		1.00	0.95	0.97	1.00
Frbp, ped/bikes	0.99		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.96		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3369		1770	3539	3433	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3369		1770	3539	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1063	405	51	421	105	47
RTOR Reduction (vph)	25	0	0	0	0	43
Lane Group Flow (vph)	1443	0	51	421	105	4
Confl. Peds. (#/hr)		9	9			
Turn Type			Prot			Over
Protected Phases	2		1	6	4	1
Permitted Phases						
Actuated Green, G (s)	83.5		7.6	96.1	8.9	7.6
Effective Green, g (s)	84.5		8.6	97.1	9.9	8.6
Actuated g/C Ratio	0.73		0.07	0.84	0.09	0.07
Clearance Time (s)	5.0		5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2475		132	2988	296	118
v/s Ratio Prot	c0.43		c0.03	0.12	c0.03	0.00
v/s Ratio Perm						
v/c Ratio	0.58		0.39	0.14	0.35	0.03
Uniform Delay, d1	7.1		50.7	1.6	49.5	49.3
Progression Factor	0.00		0.89	0.80	1.00	1.00
Incremental Delay, d2	0.6		1.2	0.1	0.7	0.1
Delay (s)	0.6		46.1	1.3	50.3	49.4
Level of Service	A		D	A	D	D
Approach Delay (s)	0.6			6.2	50.0	
Approach LOS	A			A	D	

Intersection Summary

HCM Average Control Delay	5.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Group Flow (vph)	914	1355	348	146	79	74
v/c Ratio	0.94	0.93	0.24	0.14	0.25	0.09
Control Delay	30.9	52.1	27.6	3.2	34.5	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	52.1	27.6	3.2	34.5	5.1
Queue Length 50th (ft)	370	617	108	8	35	2
Queue Length 95th (ft)	#696	#771	146	37	88	23
Internal Link Dist (ft)		976	2233		158	
Turn Bay Length (ft)	150			110		
Base Capacity (vph)	982	1458	1458	1011	313	848
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	0.93	0.93	0.24	0.14	0.25	0.09

**Intersection Summary**

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
 106: Neyland Dr. & Joe Johnson Dr.

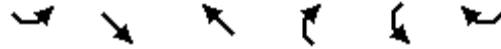
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Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	841	1247	320	134	34	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	0.95
Frt	1.00	1.00	1.00	0.85	0.92	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.98	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1675	1504
Flt Permitted	0.49	1.00	1.00	1.00	0.98	1.00
Satd. Flow (perm)	917	3539	3539	1583	1675	1504
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	914	1355	348	146	37	116
RTOR Reduction (vph)	0	0	0	52	29	37
Lane Group Flow (vph)	914	1355	348	94	50	37
Turn Type	pm+pt			pm+ov		pm+ov
Protected Phases	1	2	2	4	4	1
Permitted Phases	2			2		4
Actuated Green, G (s)	102.2	56.4	56.4	79.2	22.8	68.6
Effective Green, g (s)	104.2	57.4	57.4	81.2	23.8	70.6
Actuated g/C Ratio	0.74	0.41	0.41	0.58	0.17	0.50
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	968	1451	1451	963	285	801
v/s Ratio Prot	c0.32	0.38	0.10	0.02	c0.03	0.02
v/s Ratio Perm	c0.39			0.04		0.01
v/c Ratio	0.94	0.93	0.24	0.10	0.18	0.05
Uniform Delay, d1	10.5	39.5	27.0	13.1	49.7	17.6
Progression Factor	1.00	1.00	1.00	1.00	1.07	1.46
Incremental Delay, d2	17.0	11.3	0.1	0.0	1.3	0.0
Delay (s)	27.5	50.8	27.1	13.1	54.7	25.7
Level of Service	C	D	C	B	D	C
Approach Delay (s)		41.4	23.0		40.7	
Approach LOS		D	C		D	

Intersection Summary

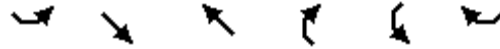
HCM Average Control Delay	38.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Group Flow (vph)	914	1355	348	146	79	74
v/c Ratio	0.93	0.93	0.24	0.14	0.21	0.09
Control Delay	57.1	45.6	23.4	7.9	25.6	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.1	45.6	23.4	7.9	25.6	4.5
Queue Length 50th (ft)	352	513	90	37	29	3
Queue Length 95th (ft)	#470	#662	124	64	71	23
Internal Link Dist (ft)		976	2233		158	
Turn Bay Length (ft)	350			110		
Base Capacity (vph)	1001	1475	1475	1027	368	824
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	0.92	0.24	0.14	0.21	0.09

**Intersection Summary**

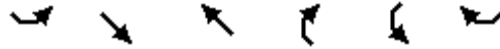
# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	841	1247	320	134	34	107
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	0.95	0.95	1.00	1.00	0.95
Frt	1.00	1.00	1.00	0.85	0.92	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.98	1.00
Satd. Flow (prot)	3433	3539	3539	1583	1675	1504
Flt Permitted	0.95	1.00	1.00	1.00	0.98	1.00
Satd. Flow (perm)	3433	3539	3539	1583	1675	1504
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	914	1355	348	146	37	116
RTOR Reduction (vph)	0	0	0	6	34	38
Lane Group Flow (vph)	914	1355	348	140	45	36
Turn Type	Prot			pm+ov		pm+ov
Protected Phases	1	2	2	4	4	1
Permitted Phases				2		4
Actuated Green, G (s)	33.6	48.5	48.5	71.4	22.9	56.5
Effective Green, g (s)	34.6	49.5	49.5	73.4	23.9	58.5
Actuated g/C Ratio	0.29	0.41	0.41	0.61	0.20	0.49
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	990	1460	1460	1021	334	783
v/s Ratio Prot	c0.27	c0.38	0.10	c0.03	0.03	0.01
v/s Ratio Perm				0.06		0.01
v/c Ratio	0.92	0.93	0.24	0.14	0.14	0.05
Uniform Delay, d1	41.4	33.6	23.0	9.9	39.5	16.1
Progression Factor	1.00	1.00	1.00	1.00	1.11	1.28
Incremental Delay, d2	13.7	10.5	0.1	0.1	0.8	0.0
Delay (s)	55.1	44.0	23.1	9.9	44.9	20.7
Level of Service	E	D	C	A	D	C
Approach Delay (s)		48.5	19.2		33.2	
Approach LOS		D	B		C	

**Intersection Summary**

HCM Average Control Delay	42.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

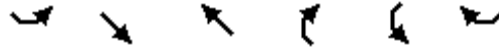


Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Group Flow (vph)	914	1355	348	146	37	116
v/c Ratio	0.93	0.93	0.24	0.14	0.10	0.08
Control Delay	57.1	45.6	23.4	7.9	42.2	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.1	45.6	23.4	7.9	42.2	3.8
Queue Length 50th (ft)	352	513	90	37	25	2
Queue Length 95th (ft)	#470	#662	124	64	57	15
Internal Link Dist (ft)		976	2233		158	
Turn Bay Length (ft)	350			110	70	
Base Capacity (vph)	1001	1475	1475	1027	353	1517
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	0.92	0.24	0.14	0.10	0.08

**Intersection Summary**

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
 106: Neyland Dr. & Joe Johnson Dr.



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	841	1247	320	134	34	107
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	0.95	0.95	1.00	1.00	0.88
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)	3433	3539	3539	1583	1770	2787
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	3539	3539	1583	1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	914	1355	348	146	37	116
RTOR Reduction (vph)	0	0	0	6	0	56
Lane Group Flow (vph)	914	1355	348	140	37	60
Turn Type	Prot			pm+ov		pt+ov
Protected Phases	1	2	2	4	4	4 1
Permitted Phases				2		
Actuated Green, G (s)	33.6	48.5	48.5	71.4	22.9	61.5
Effective Green, g (s)	34.6	49.5	49.5	73.4	23.9	62.5
Actuated g/C Ratio	0.29	0.41	0.41	0.61	0.20	0.52
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	990	1460	1460	1021	353	1452
v/s Ratio Prot	c0.27	c0.38	0.10	c0.03	0.02	0.02
v/s Ratio Perm				0.06		
v/c Ratio	0.92	0.93	0.24	0.14	0.10	0.04
Uniform Delay, d1	41.4	33.6	23.0	9.9	39.3	14.1
Progression Factor	1.00	1.00	1.00	1.00	1.03	1.41
Incremental Delay, d2	13.7	10.5	0.1	0.1	0.6	0.0
Delay (s)	55.1	44.0	23.1	9.9	41.0	19.8
Level of Service	E	D	C	A	D	B
Approach Delay (s)		48.5	19.2		24.9	
Approach LOS		D	B		C	

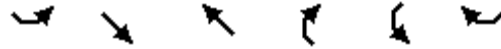
**Intersection Summary**

HCM Average Control Delay	42.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Queues

106: Neyland Dr. & Joe Johnson Dr.



Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Group Flow (vph)	914	1355	348	146	37	116
v/c Ratio	0.94	0.93	0.24	0.14	0.12	0.08
Control Delay	30.9	52.1	27.6	3.2	51.7	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	52.1	27.6	3.2	51.7	6.2
Queue Length 50th (ft)	370	617	108	8	29	0
Queue Length 95th (ft)	#696	#771	146	37	68	19
Internal Link Dist (ft)		976	2233		158	
Turn Bay Length (ft)	350			110	70	
Base Capacity (vph)	982	1458	1458	1011	301	1562
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	0.93	0.93	0.24	0.14	0.12	0.07

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
 106: Neyland Dr. & Joe Johnson Dr.

2015 PROJECTED AM MIT3  
 University Commons TIS



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations	↶	↷	↷	↷	↶	↷
Volume (vph)	841	1247	320	134	34	107
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	0.88
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)	1770	3539	3539	1583	1770	2787
Flt Permitted	0.49	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	917	3539	3539	1583	1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	914	1355	348	146	37	116
RTOR Reduction (vph)	0	0	0	52	0	54
Lane Group Flow (vph)	914	1355	348	94	37	62
Turn Type	pm+pt			pm+ov		pt+ov
Protected Phases	1	2	2	4	4	4 1
Permitted Phases	2			2		
Actuated Green, G (s)	102.2	56.4	56.4	79.2	22.8	73.6
Effective Green, g (s)	104.2	57.4	57.4	81.2	23.8	74.6
Actuated g/C Ratio	0.74	0.41	0.41	0.58	0.17	0.53
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	968	1451	1451	963	301	1485
v/s Ratio Prot	c0.32	0.38	0.10	0.02	c0.02	0.02
v/s Ratio Perm	c0.39			0.04		
v/c Ratio	0.94	0.93	0.24	0.10	0.12	0.04
Uniform Delay, d1	10.5	39.5	27.0	13.1	49.3	15.6
Progression Factor	1.00	1.00	1.00	1.00	1.01	2.31
Incremental Delay, d2	17.0	11.3	0.1	0.0	0.8	0.0
Delay (s)	27.5	50.8	27.1	13.1	50.4	36.1
Level of Service	C	D	C	B	D	D
Approach Delay (s)		41.4	23.0		39.6	
Approach LOS		D	C		D	

**Intersection Summary**

HCM Average Control Delay	38.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	SET	NWL	NWT	NET	NER	SWT	SWR
Lane Group Flow (vph)	431	48	68	186	229	58	29
v/c Ratio	0.41	0.13	0.05	0.68	0.54	0.09	0.06
Control Delay	35.7	24.5	20.4	63.2	8.8	34.3	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.7	24.5	20.4	63.2	8.8	34.3	11.6
Queue Length 50th (ft)	155	25	16	154	21	36	0
Queue Length 95th (ft)	211	52	32	220	46	76	25
Internal Link Dist (ft)	1800		1076	269		889	
Turn Bay Length (ft)		150					150
Base Capacity (vph)	1049	393	1482	513	599	628	526
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	0.41	0.12	0.05	0.36	0.38	0.09	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis  
 108: Volunteer Blvd. & Andy Holt Ave.

2015 Buildout AM  
 University Commons TIS



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕↕		↕	↕↕			↕	↕		↕	↕
Volume (vph)	88	258	51	44	54	8	37	134	211	5	49	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
Lane Util. Factor		0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frbp, ped/bikes		1.00		1.00	0.99			1.00	0.98		1.00	0.95
Flpb, ped/bikes		0.99		1.00	1.00			1.00	1.00		1.00	1.00
Frt		0.98		1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected		0.99		0.95	1.00			0.99	1.00		1.00	1.00
Satd. Flow (prot)		3405		1768	3447			1843	1549		1855	1499
Flt Permitted		0.86		0.38	1.00			0.99	1.00		1.00	1.00
Satd. Flow (perm)		2951		704	3447			1843	1549		1855	1499
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)	96	280	55	48	59	9	40	146	229	5	53	29
RTOR Reduction (vph)	0	8	0	0	5	0	0	0	195	0	0	19
Lane Group Flow (vph)	0	423	0	48	63	0	0	186	34	0	58	10
Confl. Peds. (#/hr)	7		3	3		7	20		5	5		20
Turn Type	Perm			pm+pt			Split		Perm	Split		Perm
Protected Phases		2		1	6		3	3		4	4	
Permitted Phases	2			6					3			4
Actuated Green, G (s)		47.4		59.2	59.2			18.6	18.6		44.2	44.2
Effective Green, g (s)		49.4		61.2	61.2			20.6	20.6		46.2	46.2
Actuated g/C Ratio		0.35		0.44	0.44			0.15	0.15		0.33	0.33
Clearance Time (s)		6.0		6.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)		2.0		2.0	2.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1041		367	1507			271	228		612	495
v/s Ratio Prot				c0.01	0.02			c0.10			c0.03	
v/s Ratio Perm		c0.14		0.05					0.02			0.01
v/c Ratio		0.41		0.13	0.04			0.69	0.15		0.09	0.02
Uniform Delay, d1		34.2		23.4	22.6			56.6	52.0		32.4	31.6
Progression Factor		1.00		1.00	1.00			0.90	0.68		1.00	1.00
Incremental Delay, d2		1.2		0.1	0.1			5.6	0.1		0.3	0.1
Delay (s)		35.4		23.5	22.6			56.5	35.6		32.7	31.7
Level of Service		D		C	C			E	D		C	C
Approach Delay (s)		35.4			23.0			45.0			32.4	
Approach LOS		D			C			D			C	

Intersection Summary

HCM Average Control Delay	37.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

**2015 PM  
BUILDOUT  
TRAFFIC VOLUMES**

Queues  
1: Cumberland Ave. & Metron Center Way

2015 Buildout PM  
University Commons TIS



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	1	1482	59	1891	132	70	14	15
v/c Ratio	0.01	0.75	0.36	0.85	0.54	0.16	0.09	0.06
Control Delay	9.0	16.5	16.7	21.6	54.9	0.8	49.9	0.4
Queue Delay	0.0	0.6	0.0	2.0	0.0	0.7	0.0	0.0
Total Delay	9.0	17.0	16.7	23.6	54.9	1.5	49.9	0.4
Queue Length 50th (ft)	0	410	16	407	92	0	10	0
Queue Length 95th (ft)	m1	541	m47	#849	157	0	30	0
Internal Link Dist (ft)		170		134		574		537
Turn Bay Length (ft)	50		50					
Base Capacity (vph)	124	1980	165	2221	246	429	154	254
Starvation Cap Reductn	0	185	0	194	0	0	0	0
Spillback Cap Reductn	0	150	0	0	0	192	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.83	0.36	0.93	0.54	0.30	0.09	0.06

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.

HCM Signalized Intersection Capacity Analysis  
1: Cumberland Ave. & Metron Center Way

2015 Buildout PM  
University Commons TIS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	1	1209	155	54	1730	10	121	0	64	13	0	14
Ideal Flow (vphp)	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		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3479		1770	3536		1770	1583		1770	1583	
Flt Permitted	0.06	1.00		0.07	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	118	3479		127	3536		1770	1583		1770	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)	1	1314	168	59	1880	11	132	0	70	14	0	15
RTOR Reduction (vph)	0	8	0	0	0	0	0	60	0	0	14	0
Lane Group Flow (vph)	1	1474	0	59	1891	0	132	10	0	14	1	0
Turn Type	pm+pt			pm+pt			Split			Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2			6								
Actuated Green, G (s)	64.2	64.2		68.2	68.2		16.0	16.0		10.0	10.0	
Effective Green, g (s)	64.2	64.2		68.2	68.2		16.0	16.0		10.0	10.0	
Actuated g/C Ratio	0.56	0.56		0.59	0.59		0.14	0.14		0.09	0.09	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	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)	77	1942		144	2097		246	220		154	138	
v/s Ratio Prot	0.00	c0.42		0.02	c0.53		c0.07	0.01		c0.01	0.00	
v/s Ratio Perm	0.01			0.23								
v/c Ratio	0.01	0.76		0.41	0.90		0.54	0.04		0.09	0.01	
Uniform Delay, d1	38.4	19.5		17.8	20.5		46.1	42.9		48.3	48.0	
Progression Factor	0.72	0.71		1.26	0.97		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	2.8		1.7	6.1		8.2	0.4		1.2	0.1	
Delay (s)	27.8	16.7		24.1	25.9		54.2	43.3		49.5	48.1	
Level of Service	C	B		C	C		D	D		D	D	
Approach Delay (s)		16.7			25.9			50.4			48.8	
Approach LOS		B			C			D			D	

Intersection Summary

HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues  
 11: Cumberland Ave. & NB Alcoa Hwy Ramp



Lane Group	EBL	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	379	751	1352	242	358
v/c Ratio	0.71	0.30	0.43	0.34	0.41
Control Delay	39.0	1.2	6.7	40.3	5.5
Queue Delay	0.0	0.2	0.0	0.1	0.0
Total Delay	39.0	1.4	6.7	40.4	5.6
Queue Length 50th (ft)	75	8	84	79	0
Queue Length 95th (ft)	93	10	95	117	42
Internal Link Dist (ft)		241	156		
Turn Bay Length (ft)					
Base Capacity (vph)	866	2493	3132	716	865
Starvation Cap Reductn	20	887	0	0	0
Spillback Cap Reductn	0	281	31	74	28
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.45	0.47	0.44	0.38	0.43

Intersection Summary



HCM Signalized Intersection Capacity Analysis  
 11: Cumberland Ave. & NB Alcoa Hwy Ramp

2015 Buildout PM  
 University Commons TIS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	349	691	0	0	796	448	223	0	329	0	0	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	0.97	0.95			0.86		0.97		0.88			
Frt	1.00	1.00			0.95		1.00		0.85			
Flt Protected	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (prot)	3433	3539			6062		3433		2787			
Flt Permitted	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (perm)	3433	3539			6062		3433		2787			
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)	379	751	0	0	865	487	242	0	358	0	0	0
RTOR Reduction (vph)	0	0	0	0	74	0	0	0	283	0	0	0
Lane Group Flow (vph)	379	751	0	0	1278	0	242	0	75	0	0	0
Turn Type	Prot							Prot		custom		
Protected Phases	5	2			6		8					
Permitted Phases									8			
Actuated Green, G (s)	18.0	81.0			58.0		24.0		24.0			
Effective Green, g (s)	18.0	81.0			58.0		24.0		24.0			
Actuated g/C Ratio	0.16	0.70			0.50		0.21		0.21			
Clearance Time (s)	5.0	5.0			5.0		5.0		5.0			
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	537	2493			3057		716		582			
v/s Ratio Prot	c0.11	0.21			c0.21		c0.07					
v/s Ratio Perm									0.03			
v/c Ratio	0.71	0.30			0.42		0.34		0.13			
Uniform Delay, d1	46.0	6.4			17.9		38.7		37.0			
Progression Factor	0.70	0.14			0.40		1.00		1.00			
Incremental Delay, d2	4.0	0.3			0.2		1.3		0.5			
Delay (s)	36.0	1.2			7.4		40.0		37.5			
Level of Service	D	A			A		D		D			
Approach Delay (s)		12.9			7.4			38.5			0.0	
Approach LOS		B			A			D			A	

**Intersection Summary**

HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues  
 15: Cumberland Ave. & SB Alcoa Hwy Ramp



Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	963	835	415	864	370	526
v/c Ratio	0.37	0.77	0.84	0.41	0.33	0.85
Control Delay	24.6	8.8	55.2	16.2	30.7	39.6
Queue Delay	0.0	0.0	0.0	3.6	0.0	0.0
Total Delay	24.6	8.8	55.2	19.8	30.7	39.6
Queue Length 50th (ft)	144	37	149	205	106	264
Queue Length 95th (ft)	173	193	#233	312	147	#461
Internal Link Dist (ft)	426			241		
Turn Bay Length (ft)						
Base Capacity (vph)	2589	1089	507	2093	1105	618
Starvation Cap Reductn	0	0	0	1112	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.77	0.82	0.88	0.33	0.85

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
 15: Cumberland Ave. & SB Alcoa Hwy Ramp

2015 Buildout PM  
 University Commons TIS



















Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗	↘	↑↑					↖		↗
Volume (vph)	0	886	768	382	795	0	0	0	0	340	0	484
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		0.86	1.00	0.97	0.95					0.97		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)		6408	1583	3433	3539					3433		1583
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		6408	1583	3433	3539					3433		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)	0	963	835	415	864	0	0	0	0	370	0	526
RTOR Reduction (vph)	0	0	450	0	0	0	0	0	0	0	0	109
Lane Group Flow (vph)	0	963	385	415	864	0	0	0	0	370	0	417
Turn Type			Perm	Prot						Prot		custom
Protected Phases		2		1	6					4		
Permitted Phases			2									4
Actuated Green, G (s)		46.5	46.5	16.5	68.0					37.0		37.0
Effective Green, g (s)		46.5	46.5	16.5	68.0					37.0		37.0
Actuated g/C Ratio		0.40	0.40	0.14	0.59					0.32		0.32
Clearance Time (s)		5.0	5.0	5.0	5.0					5.0		5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		2591	640	493	2093					1105		509
v/s Ratio Prot		0.15		c0.12	0.24					0.11		
v/s Ratio Perm			c0.24									c0.26
v/c Ratio		0.37	0.60	0.84	0.41					0.33		0.82
Uniform Delay, d1		24.0	27.0	48.0	12.7					29.6		35.9
Progression Factor		1.00	1.00	0.82	1.21					1.00		1.00
Incremental Delay, d2		0.4	4.2	11.8	0.6					0.8		13.8
Delay (s)		24.4	31.1	51.3	16.0					30.5		49.7
Level of Service		C	C	D	B					C		D
Approach Delay (s)		27.5			27.5			0.0			41.8	
Approach LOS		C			C			A			D	

**Intersection Summary**

HCM Average Control Delay	30.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
 24: River Dr & Joe Johnson Dr.

2015 Buildout PM  
 University Commons TIS

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	22	2	68	31	1	18	18	346	24	6	835	10
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	2	74	34	1	20	20	376	26	7	908	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)								238			681	
pX, platoon unblocked	0.92	0.92	0.92	0.92	0.92		0.92					
vC, conflicting volume	1173	1367	459	970	1360	201	918			402		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1015	1226	239	794	1218	201	738			402		
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 %	86	99	89	85	99	98	98			99		
cM capacity (veh/h)	168	158	701	222	160	806	795			1153		
<b>Direction, Lane #</b>	<b>SE 1</b>	<b>NW 1</b>	<b>NE 1</b>	<b>NE 2</b>	<b>SW 1</b>	<b>SW 2</b>						
Volume Total	100	54	208	214	460	465						
Volume Left	24	34	20	0	7	0						
Volume Right	74	20	0	26	0	11						
cSH	382	297	795	1700	1153	1700						
Volume to Capacity	0.26	0.18	0.02	0.13	0.01	0.27						
Queue Length 95th (ft)	26	16	2	0	0	0						
Control Delay (s)	17.7	19.8	1.2	0.0	0.2	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	17.7	19.8	0.6		0.1							
Approach LOS	C	C										
<b>Intersection Summary</b>												
Average Delay			2.1									
Intersection Capacity Utilization			40.7%		ICU Level of Service					A		
Analysis Period (min)			15									



Lane Group	SET	NWT	NET	SWT
Lane Group Flow (vph)	85	189	401	659
v/c Ratio	0.13	0.36	0.24	0.39
Control Delay	7.0	19.0	11.6	9.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	7.0	19.0	11.6	9.9
Queue Length 50th (ft)	6	61	81	81
Queue Length 95th (ft)	35	116	m91	106
Internal Link Dist (ft)	276	290	167	472
Turn Bay Length (ft)				
Base Capacity (vph)	651	521	1669	1676
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	0.13	0.36	0.24	0.39

**Intersection Summary**

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
 28: EJ Chapman Dr & Joe Johnson Dr.

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Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	8	8	62	120	9	45	9	335	25	17	575	15
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	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.89			0.96			0.99			1.00	
Flt Protected		0.99			0.97			1.00			1.00	
Satd. Flow (prot)		1656			1738			3499			3522	
Flt Permitted		0.97			0.75			0.94			0.94	
Satd. Flow (perm)		1616			1342			3286			3312	
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	9	67	130	10	49	10	364	27	18	625	16
RTOR Reduction (vph)	0	42	0	0	15	0	0	6	0	0	2	0
Lane Group Flow (vph)	0	43	0	0	174	0	0	395	0	0	657	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		32.0			32.0			43.0			43.0	
Effective Green, g (s)		32.0			32.0			43.0			43.0	
Actuated g/C Ratio		0.38			0.38			0.51			0.51	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		608			505			1662			1675	
v/s Ratio Prot												
v/s Ratio Perm		0.03			0.13			0.12			0.20	
v/c Ratio		0.07			0.34			0.24			0.39	
Uniform Delay, d1		17.0			19.0			11.8			12.9	
Progression Factor		1.00			1.00			0.98			0.71	
Incremental Delay, d2		0.2			1.9			0.2			0.7	
Delay (s)		17.2			20.8			11.9			9.9	
Level of Service		B			C			B			A	
Approach Delay (s)		17.2			20.8			11.9			9.9	
Approach LOS		B			C			B			A	

Intersection Summary

HCM Average Control Delay	12.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
43: Service Dr & Joe Johnson Dr.

2015 Buildout PM  
University Commons TIS

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	10	2	20	15	0	9	2	336	2	7	787	0
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)	11	2	22	16	0	10	2	365	2	8	855	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)							672			247		
pX, platoon unblocked	0.89	0.89	0.89	0.89	0.89		0.89					
vC, conflicting volume	1067	1242	428	836	1241	184	855	367				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	836	1032	120	578	1031	184	599	367				
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 %	95	99	97	95	100	99	100	99				
cM capacity (veh/h)	228	205	812	342	205	827	870	1188				
Direction, Lane #	SE 1	NW 1	NE 1	NE 2	SW 1	SW 2						
Volume Total	35	26	185	185	435	428						
Volume Left	11	16	2	0	8	0						
Volume Right	22	10	0	2	0	0						
cSH	409	438	870	1700	1188	1700						
Volume to Capacity	0.09	0.06	0.00	0.11	0.01	0.25						
Queue Length 95th (ft)	7	5	0	0	0	0						
Control Delay (s)	14.6	13.7	0.1	0.0	0.2	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	14.6	13.7	0.1		0.1							
Approach LOS	B	B										
Intersection Summary												
Average Delay			0.8									
Intersection Capacity Utilization			36.7%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis  
 53: Site Access & Joe Johnson Dr.

2015 Buildout PM  
 University Commons TIS



Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Volume (veh/h)	18	200	145	265	339	33
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	217	158	288	368	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	TWLT	
Median storage (veh)					2	
Upstream signal (ft)				552	349	
pX, platoon unblocked	0.97					
vC, conflicting volume	846	202	404			
vC1, stage 1 conf vol	386					
vC2, stage 2 conf vol	459					
vCu, unblocked vol	777	202	404			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	73	86			
cM capacity (veh/h)	478	805	1151			
Direction, Lane #	SB 1	NE 1	NE 2	SW 1	SW 2	
Volume Total	237	254	192	246	159	
Volume Left	20	158	0	0	0	
Volume Right	217	0	0	0	36	
cSH	762	1151	1700	1700	1700	
Volume to Capacity	0.31	0.14	0.11	0.14	0.09	
Queue Length 95th (ft)	33	12	0	0	0	
Control Delay (s)	11.8	5.8	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	11.8	3.3		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			3.9			
Intersection Capacity Utilization			45.3%	ICU Level of Service	A	
Analysis Period (min)			15			



Queues

53: Site Access & Joe Johnson Dr.



Lane Group	SBL	NEL	NET	SWT
Lane Group Flow (vph)	237	158	288	404
v/c Ratio	0.34	0.24	0.27	0.35
Control Delay	6.0	6.9	5.3	17.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	6.0	6.9	5.3	17.2
Queue Length 50th (ft)	9	18	33	59
Queue Length 95th (ft)	63	33	48	87
Internal Link Dist (ft)	484		472	269
Turn Bay Length (ft)				
Base Capacity (vph)	703	652	1050	1150
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	0.34	0.24	0.27	0.35

Intersection Summary

HCM Signalized Intersection Capacity Analysis  
 53: Site Access & Joe Johnson Dr.

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Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Volume (vph)	18	200	145	265	339	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	1.00	0.95	
Frt	0.88		1.00	1.00	0.99	
Flt Protected	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	1626		1770	1863	3492	
Flt Permitted	1.00		0.45	1.00	1.00	
Satd. Flow (perm)	1626		843	1863	3492	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	217	158	288	368	36
RTOR Reduction (vph)	142	0	0	0	7	0
Lane Group Flow (vph)	95	0	158	288	397	0
Turn Type			pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases			2			
Actuated Green, G (s)	38.0		62.0	62.0	36.0	
Effective Green, g (s)	38.0		62.0	62.0	36.0	
Actuated g/C Ratio	0.35		0.56	0.56	0.33	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	562		652	1050	1143	
v/s Ratio Prot	c0.06		0.05	c0.15	c0.11	
v/s Ratio Perm			0.09			
v/c Ratio	0.17		0.24	0.27	0.35	
Uniform Delay, d1	25.0		15.2	12.4	28.1	
Progression Factor	1.00		0.45	0.37	0.60	
Incremental Delay, d2	0.7		0.2	0.6	0.8	
Delay (s)	25.7		7.1	5.2	17.5	
Level of Service	C		A	A	B	
Approach Delay (s)	25.7			5.9	17.5	
Approach LOS	C			A	B	

Intersection Summary			
HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues  
101: Cumberland Ave. & Volunteer Blvd.



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1103	85	1113	667	280
v/c Ratio	0.59	0.46	0.46	0.79	0.67
Control Delay	15.6	54.0	8.1	47.9	14.0
Queue Delay	4.3	0.0	1.0	1.7	0.0
Total Delay	19.9	54.0	9.1	49.6	14.0
Queue Length 50th (ft)	136	65	145	236	0
Queue Length 95th (ft)	216	m82	239	294	79
Internal Link Dist (ft)	134		270	1800	
Turn Bay Length (ft)		100			270
Base Capacity (vph)	1872	308	2424	955	507
Starvation Cap Reductn	676	0	962	0	0
Spillback Cap Reductn	34	0	938	147	2
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.92	0.28	0.76	0.83	0.55

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
 101: Cumberland Ave. & Volunteer Blvd.

2015 Buildout PM  
 University Commons TIS

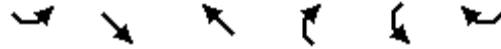


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵↵	↵
Volume (vph)	772	243	78	1024	614	258
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	0.97	1.00
Frbp, ped/bikes	0.99		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.96		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3391		1770	3539	3433	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3391		1770	3539	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	839	264	85	1113	667	280
RTOR Reduction (vph)	21	0	0	0	0	251
Lane Group Flow (vph)	1082	0	85	1113	667	29
Confl. Peds. (#/hr)		9	9			
Turn Type			Prot			Over
Protected Phases	2		1	6	4	1
Permitted Phases						
Actuated Green, G (s)	61.8		11.0	77.8	27.2	11.0
Effective Green, g (s)	62.8		12.0	78.8	28.2	12.0
Actuated g/C Ratio	0.55		0.10	0.69	0.25	0.10
Clearance Time (s)	5.0		5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1852		185	2425	842	165
v/s Ratio Prot	c0.32		0.05	c0.31	c0.19	0.02
v/s Ratio Perm						
v/c Ratio	0.58		0.46	0.46	0.79	0.18
Uniform Delay, d1	17.4		48.4	8.3	40.7	47.0
Progression Factor	0.81		1.03	0.87	1.00	1.00
Incremental Delay, d2	0.9		1.1	0.4	5.1	0.5
Delay (s)	15.0		51.0	7.6	45.8	47.5
Level of Service	B		D	A	D	D
Approach Delay (s)	15.0			10.7	46.3	
Approach LOS	B			B	D	

**Intersection Summary**

HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Group Flow (vph)	401	511	1582	124	590	562
v/c Ratio	1.06	0.35	1.09	0.10	1.07	0.75
Control Delay	87.4	18.1	76.6	1.3	80.9	19.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.4	18.1	76.6	1.3	80.9	19.9
Queue Length 50th (ft)	~187	96	~505	4	~309	254
Queue Length 95th (ft)	#364	134	#638	16	#511	386
Internal Link Dist (ft)		976	2233		158	
Turn Bay Length (ft)	150			110		
Base Capacity (vph)	379	1457	1457	1197	549	746
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	1.06	0.35	1.09	0.10	1.07	0.75

**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.

HCM Signalized Intersection Capacity Analysis  
 106: Neyland Dr. & Joe Johnson Dr.

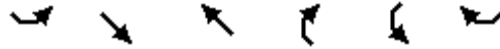
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Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	369	470	1455	114	183	877
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	0.95
Frt	1.00	1.00	1.00	0.85	0.90	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.98	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1650	1504
Flt Permitted	0.11	1.00	1.00	1.00	0.98	1.00
Satd. Flow (perm)	213	3539	3539	1583	1650	1504
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	401	511	1582	124	199	953
RTOR Reduction (vph)	0	0	0	28	83	3
Lane Group Flow (vph)	401	511	1582	96	507	559
Turn Type	pm+pt			pm+ov		pm+ov
Protected Phases	1	2	2	4	4	1
Permitted Phases	2			2		4
Actuated Green, G (s)	47.0	34.0	34.0	57.0	23.0	36.0
Effective Green, g (s)	49.0	35.0	35.0	59.0	24.0	38.0
Actuated g/C Ratio	0.58	0.41	0.41	0.69	0.28	0.45
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	379	1457	1457	1173	466	743
v/s Ratio Prot	c0.17	0.14	c0.45	0.02	c0.31	0.12
v/s Ratio Perm	0.44			0.04		0.25
v/c Ratio	1.06	0.35	1.09	0.08	1.09	0.75
Uniform Delay, d1	25.1	17.2	25.0	4.2	30.5	19.6
Progression Factor	1.00	1.00	1.00	1.00	0.73	0.71
Incremental Delay, d2	62.4	0.1	50.5	0.0	67.0	4.2
Delay (s)	87.5	17.3	75.5	4.2	89.4	18.2
Level of Service	F	B	E	A	F	B
Approach Delay (s)		48.2	70.4		54.6	
Approach LOS		D	E		D	

Intersection Summary

HCM Average Control Delay	60.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	98.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Group Flow (vph)	401	511	1582	124	590	562
v/c Ratio	0.92	0.32	1.00	0.10	1.00	0.77
Control Delay	74.8	20.5	46.2	1.3	59.7	22.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.8	20.5	46.2	1.3	59.7	22.6
Queue Length 50th (ft)	146	120	~578	7	~190	164
Queue Length 95th (ft)	#236	160	#746	12	#582	515
Internal Link Dist (ft)		976	2233		158	
Turn Bay Length (ft)	350			110		
Base Capacity (vph)	437	1576	1576	1269	589	729
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	0.32	1.00	0.10	1.00	0.77

**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.

HCM Signalized Intersection Capacity Analysis  
 106: Neyland Dr. & Joe Johnson Dr.

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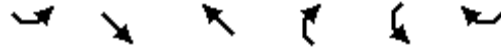


Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	369	470	1455	114	183	877
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	0.95
Frt	1.00	1.00	1.00	0.85	0.90	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.98	1.00
Satd. Flow (prot)	3433	3539	3539	1583	1650	1504
Flt Permitted	0.95	1.00	1.00	1.00	0.98	1.00
Satd. Flow (perm)	3433	3539	3539	1583	1650	1504
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	401	511	1582	124	199	953
RTOR Reduction (vph)	0	0	0	4	64	4
Lane Group Flow (vph)	401	511	1582	120	526	558
Turn Type	Prot			pm+ov		pm+ov
Protected Phases	1	2	2	4	4	1
Permitted Phases				2		4
Actuated Green, G (s)	13.0	48.0	48.0	82.0	34.0	47.0
Effective Green, g (s)	14.0	49.0	49.0	84.0	35.0	49.0
Actuated g/C Ratio	0.13	0.45	0.45	0.76	0.32	0.45
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	437	1576	1576	1266	525	725
v/s Ratio Prot	c0.12	0.14	c0.45	0.03	c0.32	0.10
v/s Ratio Perm				0.05		0.27
v/c Ratio	0.92	0.32	1.00	0.10	1.00	0.77
Uniform Delay, d1	47.4	19.8	30.5	3.3	37.5	25.7
Progression Factor	1.00	1.00	0.70	0.53	0.64	0.62
Incremental Delay, d2	23.9	0.1	23.5	0.0	39.3	4.8
Delay (s)	71.3	19.9	44.8	1.8	63.3	20.8
Level of Service	E	B	D	A	E	C
Approach Delay (s)		42.5	41.7		42.5	
Approach LOS		D	D		D	

**Intersection Summary**

HCM Average Control Delay	42.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			





Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Group Flow (vph)	401	511	1582	124	199	953
v/c Ratio	0.80	0.29	0.90	0.10	0.45	0.78
Control Delay	58.9	16.9	25.0	1.3	28.9	22.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.9	16.9	25.0	1.3	28.9	22.9
Queue Length 50th (ft)	143	106	512	6	77	325
Queue Length 95th (ft)	#212	143	283	12	128	431
Internal Link Dist (ft)		976	2233		158	
Turn Bay Length (ft)	350			110	70	
Base Capacity (vph)	499	1770	1770	1243	443	1220
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	0.80	0.29	0.89	0.10	0.45	0.78

**Intersection Summary**

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
 106: Neyland Dr. & Joe Johnson Dr.



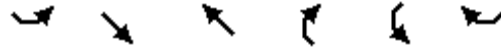
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	369	470	1455	114	183	877
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	0.88
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	3539	3539	1583	1770	2787
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	3539	3539	1583	1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	401	511	1582	124	199	953
RTOR Reduction (vph)	0	0	0	7	0	14
Lane Group Flow (vph)	401	511	1582	117	199	939
Turn Type	Prot			pm+ov		pt+ov
Protected Phases	1	2	2	4	4	4 1
Permitted Phases				2		
Actuated Green, G (s)	15.0	53.4	53.4	80.0	26.6	46.6
Effective Green, g (s)	16.0	54.4	54.4	82.0	27.6	47.6
Actuated g/C Ratio	0.15	0.49	0.49	0.75	0.25	0.43
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	499	1750	1750	1238	444	1206
v/s Ratio Prot	0.12	0.14	c0.45	0.02	0.11	c0.34
v/s Ratio Perm				0.05		
v/c Ratio	0.80	0.29	0.90	0.09	0.45	0.78
Uniform Delay, d1	45.5	16.4	25.4	3.8	34.8	26.7
Progression Factor	1.00	1.00	0.65	0.49	0.72	0.67
Incremental Delay, d2	9.1	0.1	7.0	0.0	3.2	3.2
Delay (s)	54.6	16.5	23.4	1.9	28.3	21.1
Level of Service	D	B	C	A	C	C
Approach Delay (s)		33.3	21.8		22.4	
Approach LOS		C	C		C	

**Intersection Summary**

HCM Average Control Delay	24.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

106: Neyland Dr. & Joe Johnson Dr.



Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Group Flow (vph)	401	511	1582	124	199	953
v/c Ratio	0.95	0.31	0.95	0.11	0.52	0.75
Control Delay	65.8	18.5	31.9	0.4	35.4	21.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.8	18.5	31.9	0.4	35.4	21.6
Queue Length 50th (ft)	229	113	543	0	85	217
Queue Length 95th (ft)	#422	152	#716	4	151	419
Internal Link Dist (ft)		976	2233		158	
Turn Bay Length (ft)	350			110	70	
Base Capacity (vph)	422	1673	1673	1177	386	1277
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	0.95	0.31	0.95	0.11	0.52	0.75

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (vph)	369	470	1455	114	183	877
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	0.88
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)	1770	3539	3539	1583	1770	2787
Flt Permitted	0.08	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	143	3539	3539	1583	1770	2787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	401	511	1582	124	199	953
RTOR Reduction (vph)	0	0	0	30	0	10
Lane Group Flow (vph)	401	511	1582	94	199	943
Turn Type	pm+pt			pm+ov		pt+ov
Protected Phases	1	2	2	4	4	4 1
Permitted Phases	2			2		
Actuated Green, G (s)	72.0	51.0	51.0	74.0	23.0	49.0
Effective Green, g (s)	74.0	52.0	52.0	76.0	24.0	50.0
Actuated g/C Ratio	0.67	0.47	0.47	0.69	0.22	0.45
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	422	1673	1673	1151	386	1267
v/s Ratio Prot	c0.19	0.14	0.45	0.02	0.11	c0.34
v/s Ratio Perm	c0.45			0.04		
v/c Ratio	0.95	0.31	0.95	0.08	0.52	0.74
Uniform Delay, d1	35.0	17.9	27.7	5.6	37.9	24.7
Progression Factor	1.00	1.00	0.67	0.13	0.80	0.72
Incremental Delay, d2	31.3	0.1	11.4	0.0	4.8	2.4
Delay (s)	66.3	18.0	30.0	0.8	34.9	20.1
Level of Service	E	B	C	A	C	C
Approach Delay (s)		39.2	27.9		22.6	
Approach LOS		D	C		C	

**Intersection Summary**

HCM Average Control Delay	29.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues  
108: Volunteer Blvd. & Andy Holt Ave.



Lane Group	SET	NWL	NWT	NET	NER	SWT	SWR
Lane Group Flow (vph)	372	277	350	180	92	166	148
v/c Ratio	0.66	0.73	0.26	0.58	0.27	0.30	0.26
Control Delay	33.9	32.1	17.9	26.2	2.3	25.7	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.9	32.1	17.9	26.2	2.3	25.7	5.9
Queue Length 50th (ft)	87	105	63	39	0	68	0
Queue Length 95th (ft)	136	#190	95	70	2	127	43
Internal Link Dist (ft)	1800		1076	269		889	
Turn Bay Length (ft)		150					150
Base Capacity (vph)	567	382	1366	387	401	559	562
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	0.66	0.73	0.26	0.47	0.23	0.30	0.26

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
108: Volunteer Blvd. & Andy Holt Ave.

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Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕↕		↕	↕↕			↕	↕		↕	↕
Volume (vph)	133	146	63	255	306	16	63	103	85	8	144	136
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
Lane Util. Factor		0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frbp, ped/bikes		1.00		1.00	1.00			1.00	0.98		1.00	0.96
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt		0.97		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected		0.98		0.95	1.00			0.98	1.00		1.00	1.00
Satd. Flow (prot)		3352		1768	3507			1828	1551		1858	1525
Flt Permitted		0.71		0.34	1.00			0.98	1.00		1.00	1.00
Satd. Flow (perm)		2432		642	3507			1828	1551		1858	1525
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)	145	159	68	277	333	17	68	112	92	9	157	148
RTOR Reduction (vph)	0	23	0	0	4	0	0	0	76	0	0	103
Lane Group Flow (vph)	0	349	0	277	346	0	0	180	16	0	166	45
Confl. Peds. (#/hr)	7		3	3		7	20		5	5		20
Turn Type	Perm			pm+pt			Split		Perm	Split		Perm
Protected Phases		2		1	6		3	3		4	4	
Permitted Phases	2			6					3			4
Actuated Green, G (s)		17.0		31.0	31.0			12.4	12.4		23.6	23.6
Effective Green, g (s)		19.0		33.0	33.0			14.4	14.4		25.6	25.6
Actuated g/C Ratio		0.22		0.39	0.39			0.17	0.17		0.30	0.30
Clearance Time (s)		6.0		6.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)		2.0		2.0	2.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		544		382	1362			310	263		560	459
v/s Ratio Prot				c0.09	0.10			c0.10			c0.09	
v/s Ratio Perm		0.14		c0.20					0.01			0.03
v/c Ratio		0.64		0.73	0.25			0.58	0.06		0.30	0.10
Uniform Delay, d1		29.9		19.4	17.6			32.5	29.6		22.8	21.4
Progression Factor		1.00		1.00	1.00			0.58	0.05		1.00	1.00
Incremental Delay, d2		5.7		5.7	0.4			1.8	0.0		1.3	0.4
Delay (s)		35.7		25.1	18.1			20.6	1.6		24.1	21.8
Level of Service		D		C	B			C	A		C	C
Approach Delay (s)		35.7			21.2			14.2			23.0	
Approach LOS		D			C			B			C	

Intersection Summary

HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

# **TRAFFIC COUNT DATA**

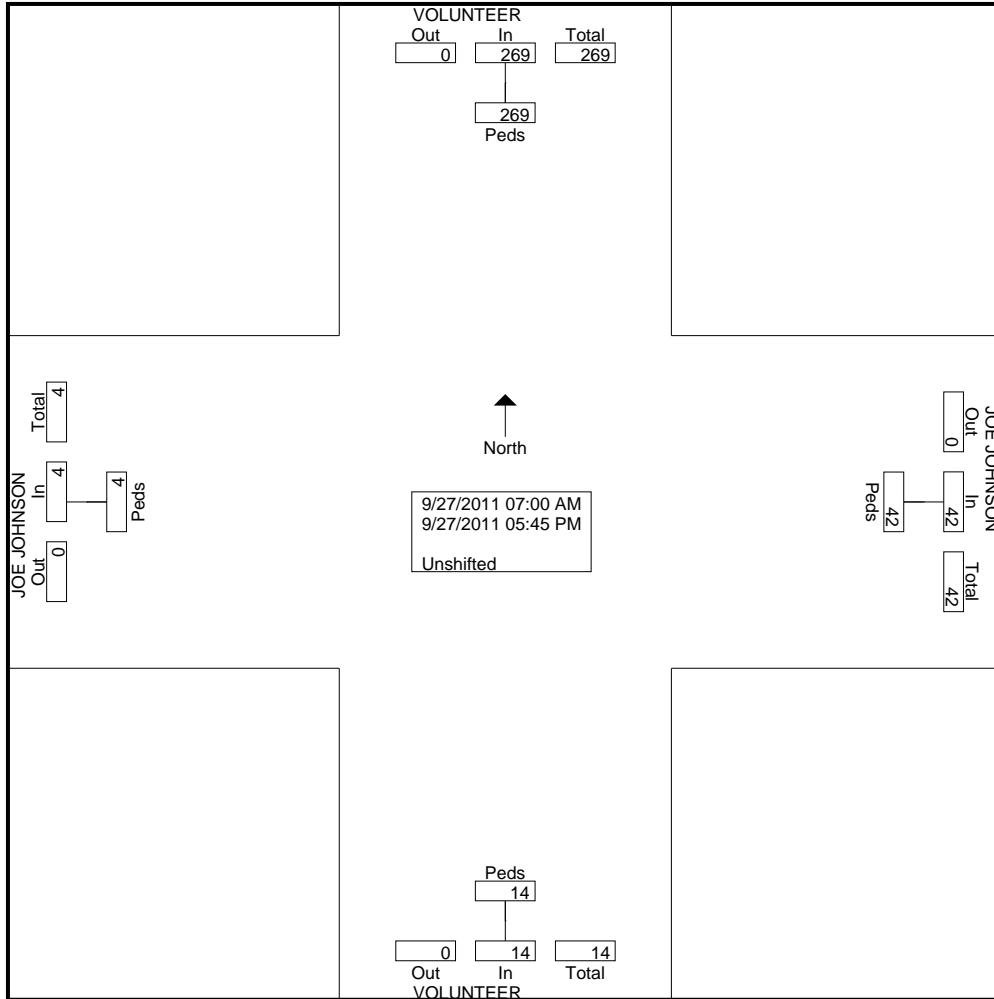
WILBUR SMITH ASSOCIATES  
 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : Joe Johnson Volunteer  
 Site Code : 00000004  
 Start Date : 9/27/2011  
 Page No : 1

**Groups Printed- Unshifted**

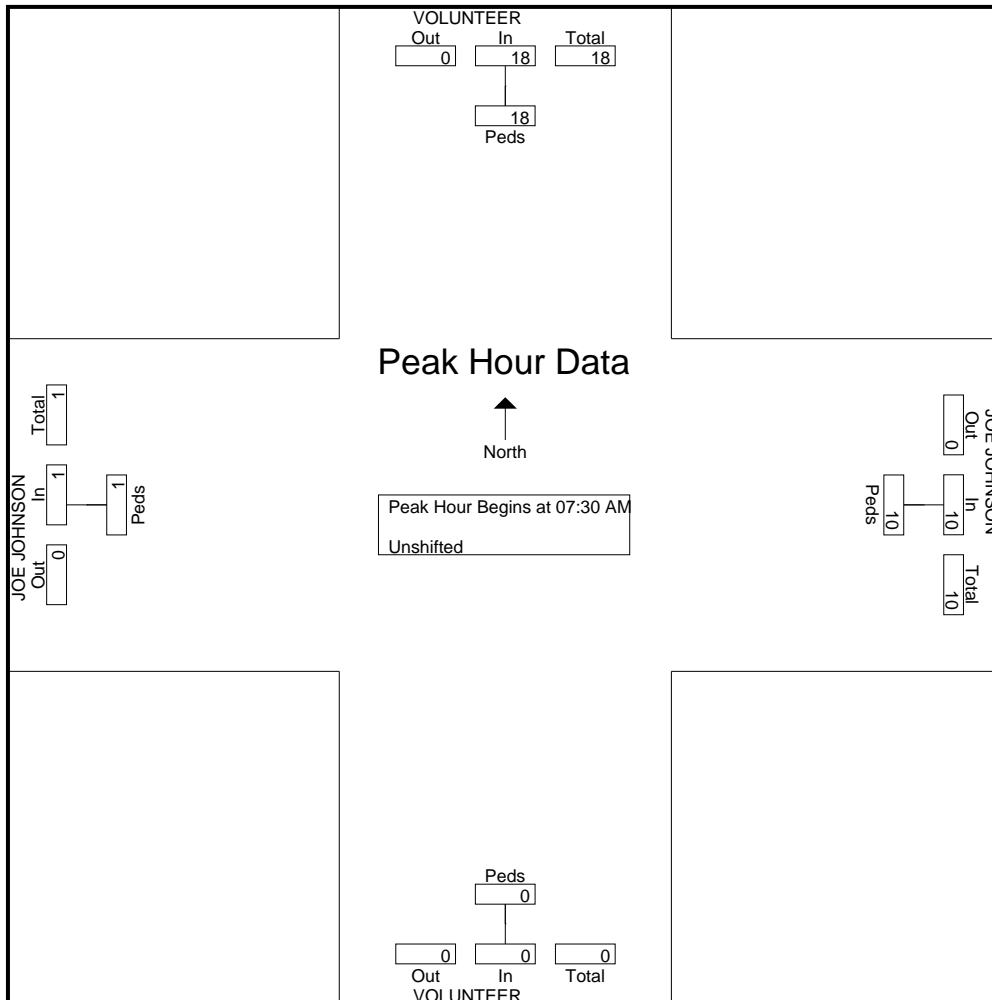
Start Time	VOLUNTEER Southbound		JOE JOHNSON Westbound		VOLUNTEER Northbound		JOE JOHNSON Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:00 AM	1	1	3	3	0	0	0	0	4
07:15 AM	1	1	0	0	0	0	0	0	1
07:30 AM	4	4	3	3	0	0	0	0	7
07:45 AM	10	10	5	5	0	0	0	0	15
Total	16	16	11	11	0	0	0	0	27
08:00 AM	1	1	2	2	0	0	0	0	3
08:15 AM	3	3	0	0	0	0	1	1	4
08:30 AM	3	3	1	1	0	0	0	0	4
08:45 AM	3	3	1	1	0	0	0	0	4
Total	10	10	4	4	0	0	1	1	15
*** BREAK ***									
11:00 AM	11	11	0	0	1	1	0	0	12
11:15 AM	5	5	0	0	0	0	0	0	5
11:30 AM	3	3	0	0	1	1	0	0	4
11:45 AM	6	6	3	3	2	2	0	0	11
Total	25	25	3	3	4	4	0	0	32
12:00 PM	16	16	0	0	4	4	0	0	20
12:15 PM	18	18	3	3	0	0	0	0	21
12:30 PM	12	12	4	4	0	0	1	1	17
12:45 PM	7	7	2	2	3	3	0	0	12
Total	53	53	9	9	7	7	1	1	70
*** BREAK ***									
02:00 PM	10	10	1	1	0	0	0	0	11
02:15 PM	6	6	0	0	0	0	0	0	6
02:30 PM	9	9	0	0	0	0	1	1	10
02:45 PM	2	2	0	0	0	0	0	0	2
Total	27	27	1	1	0	0	1	1	29
03:00 PM	5	5	0	0	1	1	0	0	6
03:15 PM	17	17	3	3	1	1	0	0	21
03:30 PM	15	15	1	1	0	0	0	0	16
03:45 PM	3	3	0	0	0	0	0	0	3
Total	40	40	4	4	2	2	0	0	46
04:00 PM	5	5	0	0	0	0	0	0	5
04:15 PM	15	15	1	1	0	0	0	0	16
04:30 PM	8	8	0	0	0	0	0	0	8
04:45 PM	32	32	0	0	0	0	1	1	33
Total	60	60	1	1	0	0	1	1	62
05:00 PM	16	16	9	9	0	0	0	0	25
05:15 PM	14	14	0	0	1	1	0	0	15
05:30 PM	5	5	0	0	0	0	0	0	5
05:45 PM	3	3	0	0	0	0	0	0	3
Total	38	38	9	9	1	1	0	0	48
Grand Total	269	269	42	42	14	14	4	4	329
Apprch %	100		100		100		100		
Total %	81.8	81.8	12.8	12.8	4.3	4.3	1.2	1.2	





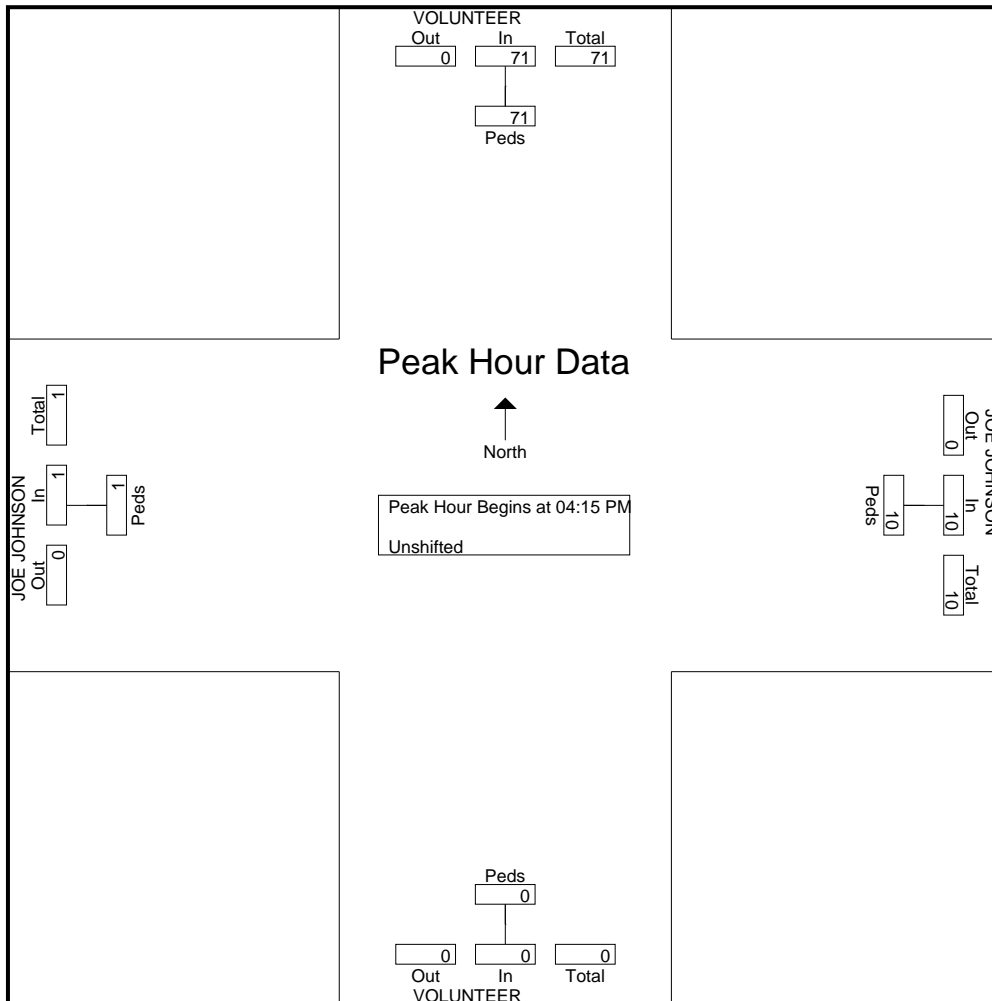
Start Time	VOLUNTEER Southbound		JOE JOHNSON Westbound		VOLUNTEER Northbound		JOE JOHNSON Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:30 AM	4	4	3	3	0	0	0	0	7
07:45 AM	10	10	5	5	0	0	0	0	15
08:00 AM	1	1	2	2	0	0	0	0	3
08:15 AM	3	3	0	0	0	0	1	1	4
Total Volume	18	18	10	10	0	0	1	1	29
% App. Total	100		100		0		100		
PHF	.450	.450	.500	.500	.000	.000	.250	.250	.483

Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 07:30 AM

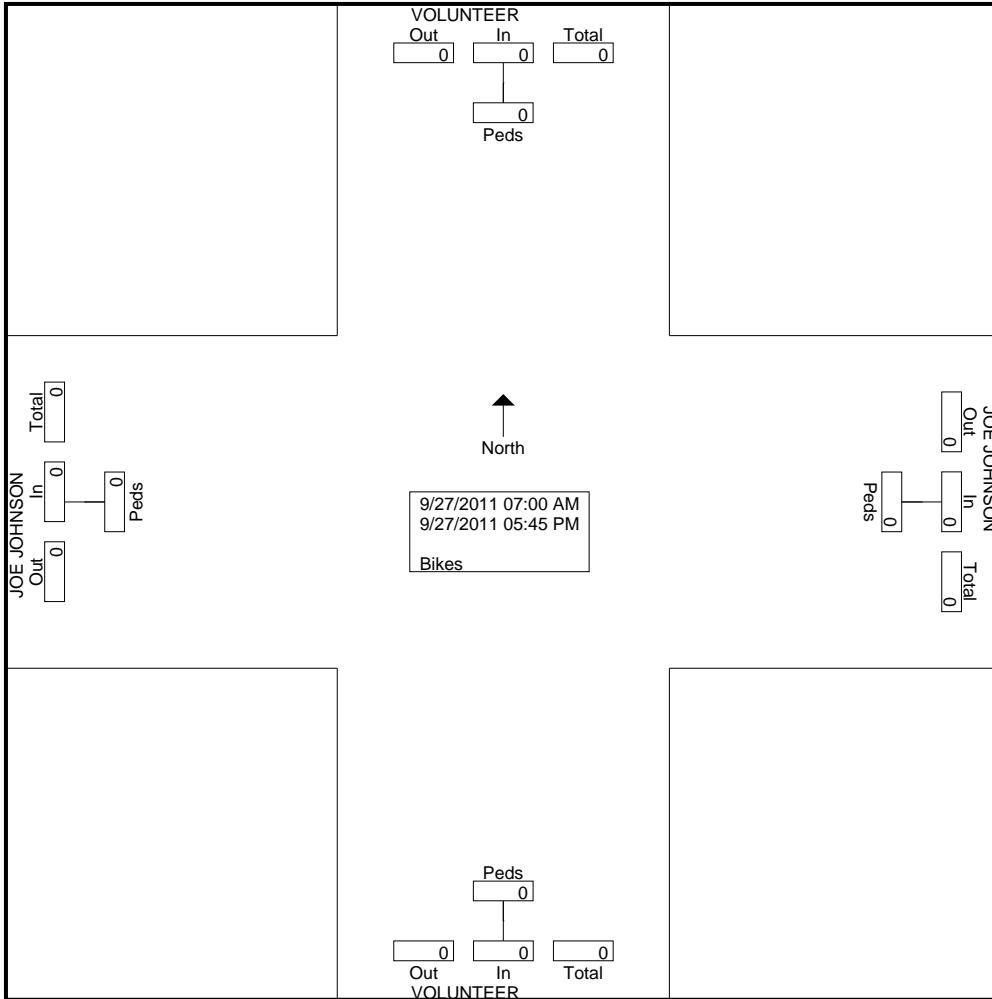


Start Time	VOLUNTEER Southbound		JOE JOHNSON Westbound		VOLUNTEER Northbound		JOE JOHNSON Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
04:15 PM	15	15	1	1	0	0	0	0	16
04:30 PM	8	8	0	0	0	0	0	0	8
04:45 PM	32	32	0	0	0	0	1	1	33
05:00 PM	16	16	9	9	0	0	0	0	25
Total Volume	71	71	10	10	0	0	1	1	82
% App. Total	100		100		0		100		
PHF	.555	.555	.278	.278	.000	.000	.250	.250	.621

Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 04:15 PM

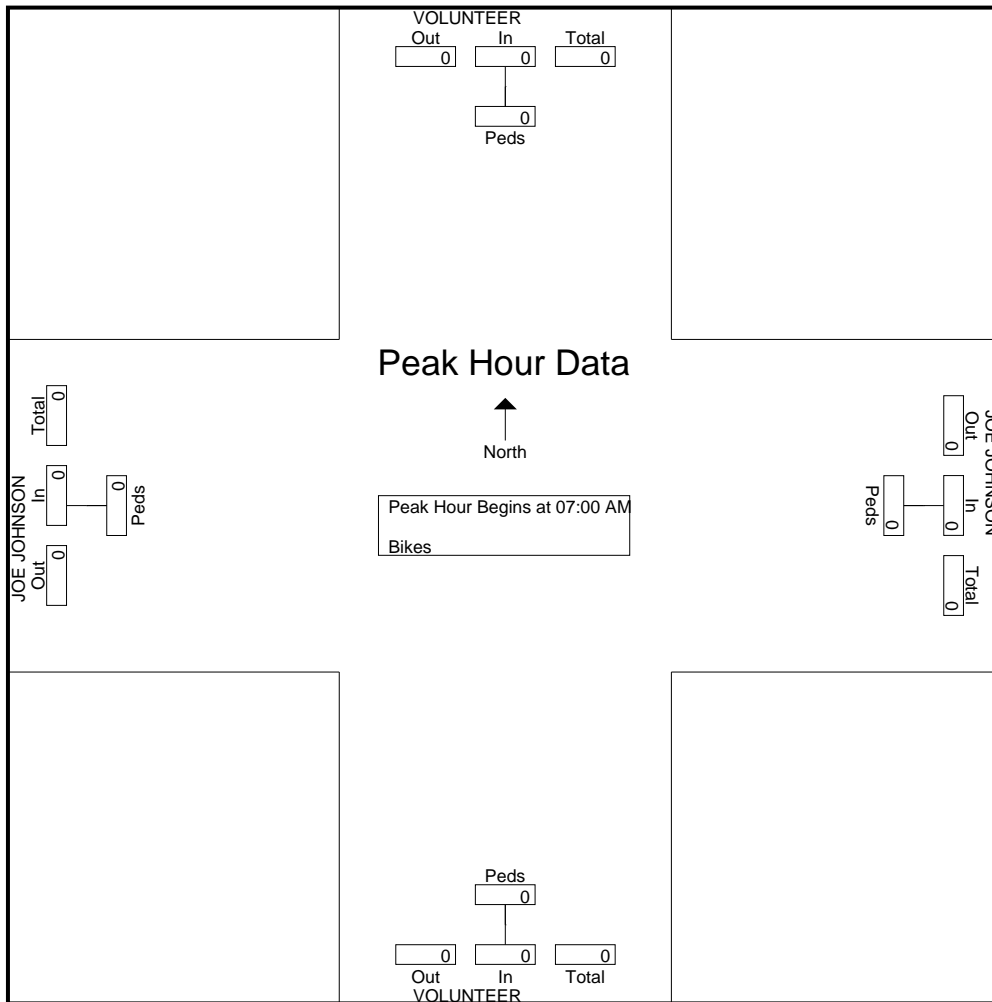






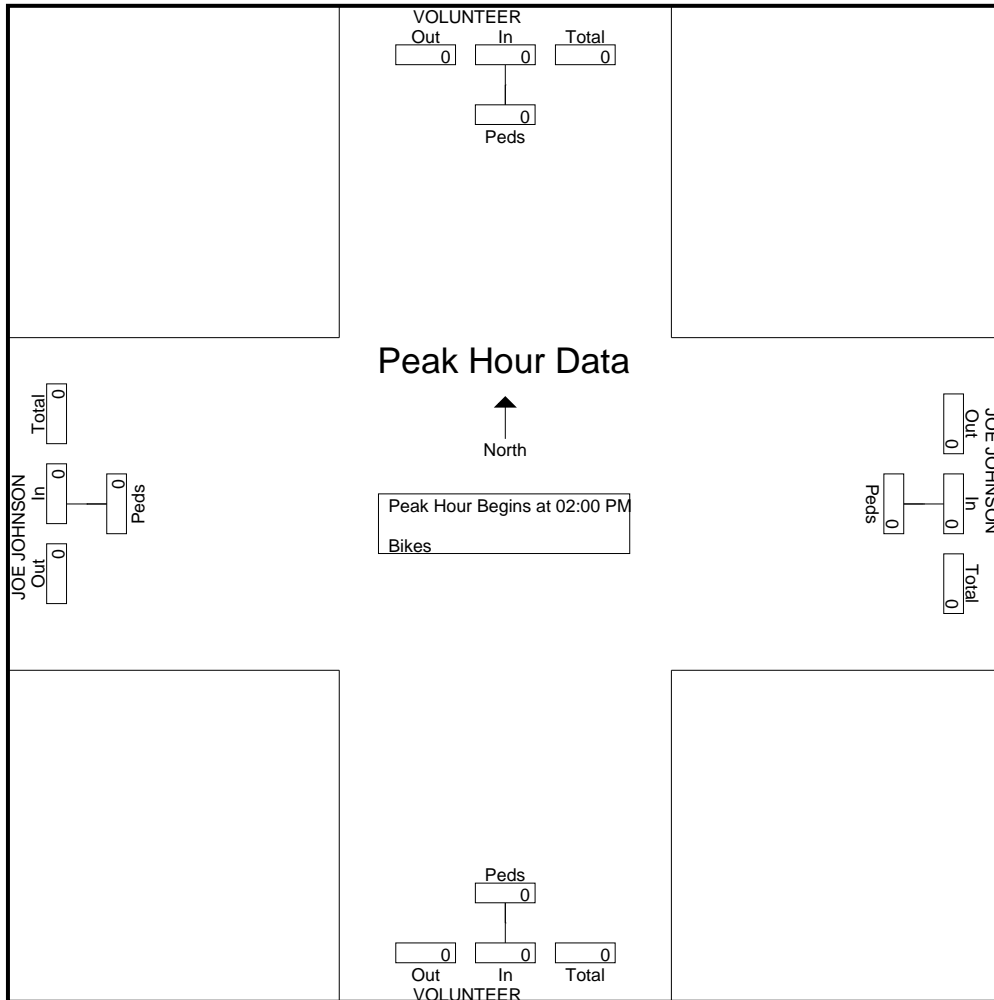
Start Time	VOLUNTEER Southbound		JOE JOHNSON Westbound		VOLUNTEER Northbound		JOE JOHNSON Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:00 AM	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0
% App. Total	0		0		0		0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000

Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 07:00 AM



Start Time	VOLUNTEER Southbound		JOE JOHNSON Westbound		VOLUNTEER Northbound		JOE JOHNSON Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
02:00 PM	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0
% App. Total	0		0		0		0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000

Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 02:00 PM



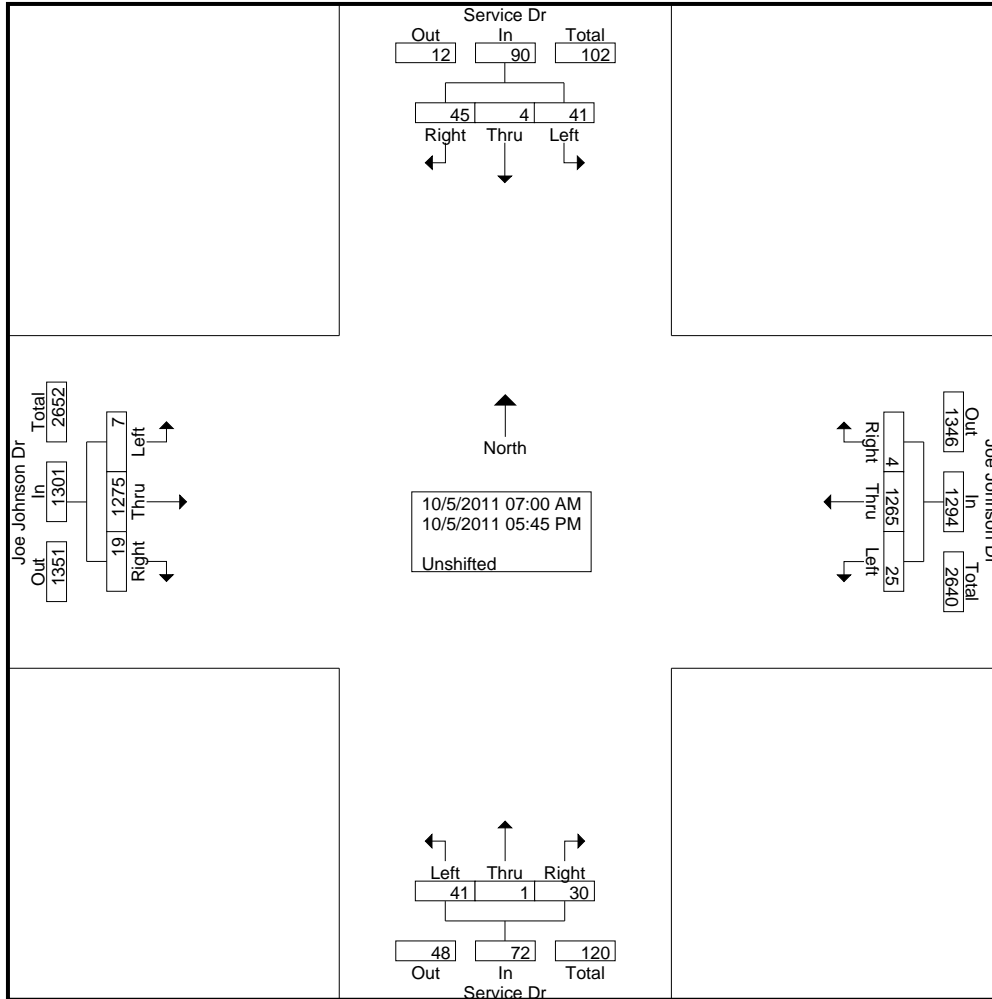
WILBUR SMITH ASSOCIATES  
 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : Joe Johnson Service Dr  
 Site Code : 00000006  
 Start Date : 10/5/2011  
 Page No : 1

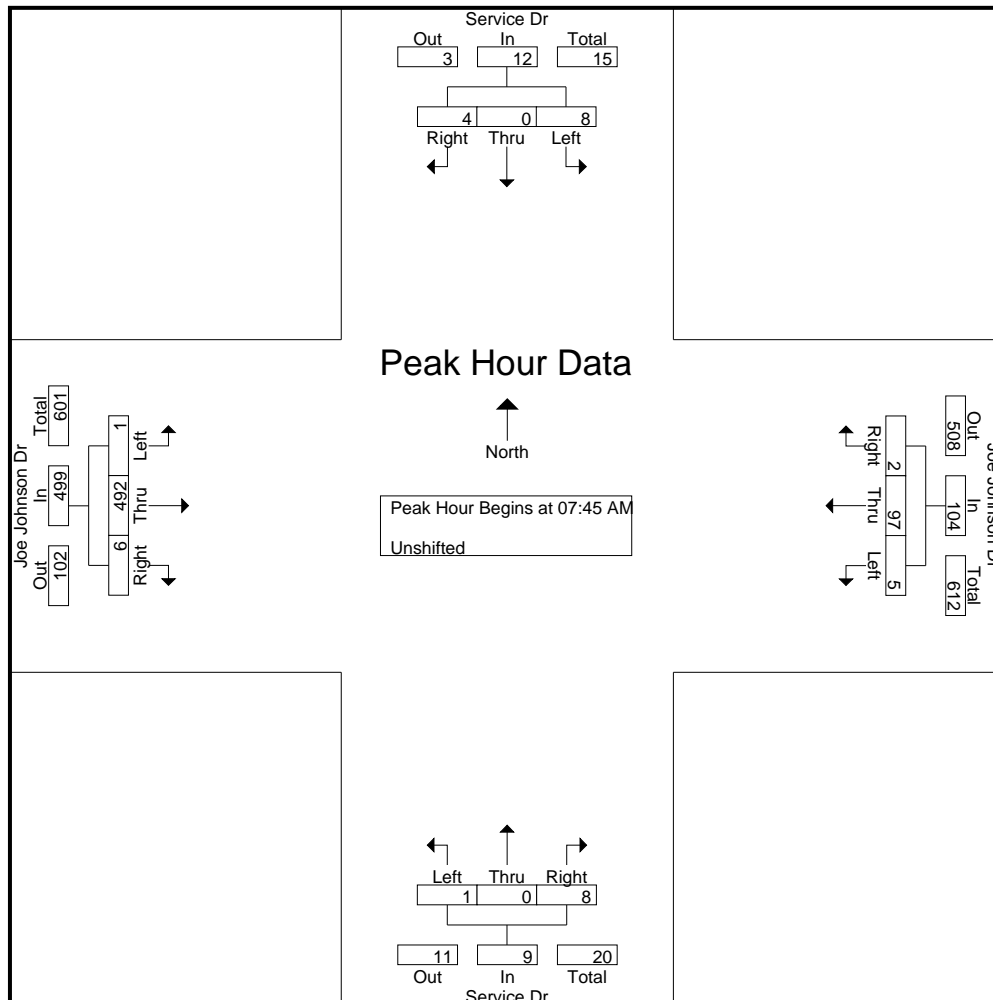
**Groups Printed- Unshifted**

Start Time	Service Dr Southbound				Joe Johnson Dr Westbound				Service Dr Northbound				Joe Johnson Dr Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	2	0	0	2	1	7	0	8	0	0	0	0	1	58	2	61	71
07:15 AM	2	0	0	2	0	9	1	10	0	0	0	0	2	65	2	69	81
07:30 AM	1	0	1	2	0	31	0	31	2	0	1	3	1	99	3	103	139
07:45 AM	1	0	1	2	1	24	1	26	0	0	4	4	1	149	1	151	183
Total	6	0	2	8	2	71	2	75	2	0	5	7	5	371	8	384	474
08:00 AM	1	0	1	2	2	14	0	16	0	0	3	3	0	134	2	136	157
08:15 AM	3	0	1	4	0	27	0	27	1	0	0	1	0	111	0	111	143
08:30 AM	3	0	1	4	2	32	1	35	0	0	1	1	0	98	3	101	141
08:45 AM	3	0	0	3	2	32	0	34	1	0	2	3	0	88	1	89	129
Total	10	0	3	13	6	105	1	112	2	0	6	8	0	431	6	437	570
*** BREAK ***																	
03:00 PM	1	0	1	2	2	62	0	64	0	0	3	3	0	42	0	42	111
03:15 PM	3	0	0	3	2	73	1	76	2	0	2	4	0	41	1	42	125
03:30 PM	0	0	3	3	1	69	0	70	5	0	2	7	0	40	0	40	120
03:45 PM	2	0	2	4	0	79	0	79	3	0	1	4	0	45	0	45	132
Total	6	0	6	12	5	283	1	289	10	0	8	18	0	168	1	169	488
04:00 PM	2	1	2	5	1	60	0	61	6	1	1	8	0	34	0	34	108
04:15 PM	4	1	1	6	0	55	0	55	2	0	0	2	0	38	0	38	101
04:30 PM	3	1	9	13	1	120	0	121	2	0	0	2	0	33	0	33	169
04:45 PM	5	1	2	8	1	109	0	110	1	0	1	2	0	43	0	43	163
Total	14	4	14	32	3	344	0	347	11	1	2	14	0	148	0	148	541
05:00 PM	1	0	8	9	4	132	0	136	7	0	3	10	1	43	0	44	199
05:15 PM	1	0	1	2	1	135	0	136	5	0	5	10	1	37	2	40	188
05:30 PM	3	0	9	12	4	104	0	108	4	0	0	4	0	44	1	45	169
05:45 PM	0	0	2	2	0	91	0	91	0	0	1	1	0	33	1	34	128
Total	5	0	20	25	9	462	0	471	16	0	9	25	2	157	4	163	684
Grand Total	41	4	45	90	25	1265	4	1294	41	1	30	72	7	1275	19	1301	2757
Apprch %	45.6	4.4	50		1.9	97.8	0.3		56.9	1.4	41.7		0.5	98	1.5		
Total %	1.5	0.1	1.6	3.3	0.9	45.9	0.1	46.9	1.5	0	1.1	2.6	0.3	46.2	0.7	47.2	

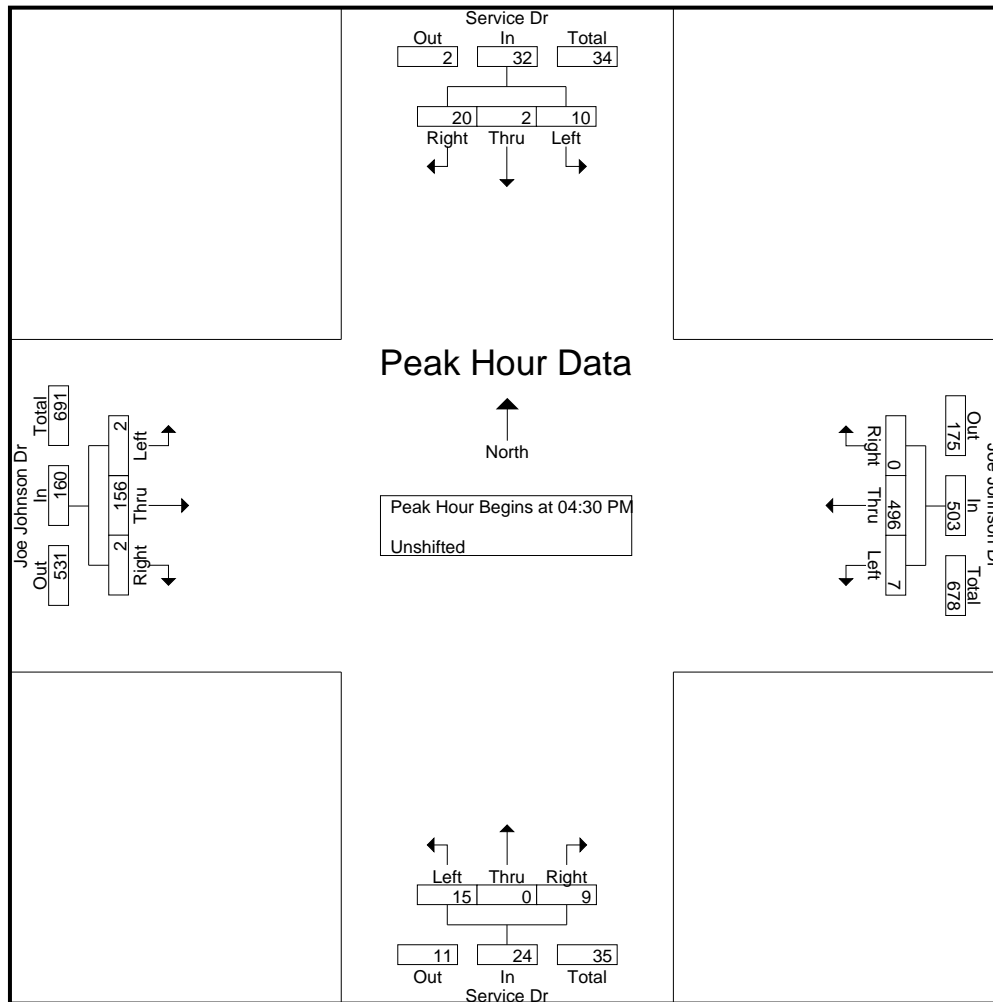




Start Time	Service Dr Southbound				Joe Johnson Dr Westbound				Service Dr Northbound				Joe Johnson Dr Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	1	0	1	2	1	24	1	26	0	0	4	4	1	149	1	151	183
08:00 AM	1	0	1	2	2	14	0	16	0	0	3	3	0	134	2	136	157
08:15 AM	3	0	1	4	0	27	0	27	1	0	0	1	0	111	0	111	143
08:30 AM	3	0	1	4	2	32	1	35	0	0	1	1	0	98	3	101	141
Total Volume	8	0	4	12	5	97	2	104	1	0	8	9	1	492	6	499	624
% App. Total	66.7	0	33.3		4.8	93.3	1.9		11.1	0	88.9		0.2	98.6	1.2		
PHF	.667	.000	1.000	.750	.625	.758	.500	.743	.250	.000	.500	.563	.250	.826	.500	.826	.852



Start Time	Service Dr Southbound				Joe Johnson Dr Westbound				Service Dr Northbound				Joe Johnson Dr Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	3	1	9	13	1	120	0	121	2	0	0	2	0	33	0	33	169
04:45 PM	5	1	2	8	1	109	0	110	1	0	1	2	0	43	0	43	163
05:00 PM	1	0	8	9	4	132	0	136	7	0	3	10	1	43	0	44	199
05:15 PM	1	0	1	2	1	135	0	136	5	0	5	10	1	37	2	40	188
Total Volume	10	2	20	32	7	496	0	503	15	0	9	24	2	156	2	160	719
% App. Total	31.2	6.2	62.5		1.4	98.6	0		62.5	0	37.5		1.2	97.5	1.2		
PHF	.500	.500	.556	.615	.438	.919	.000	.925	.536	.000	.450	.600	.500	.907	.250	.909	.903

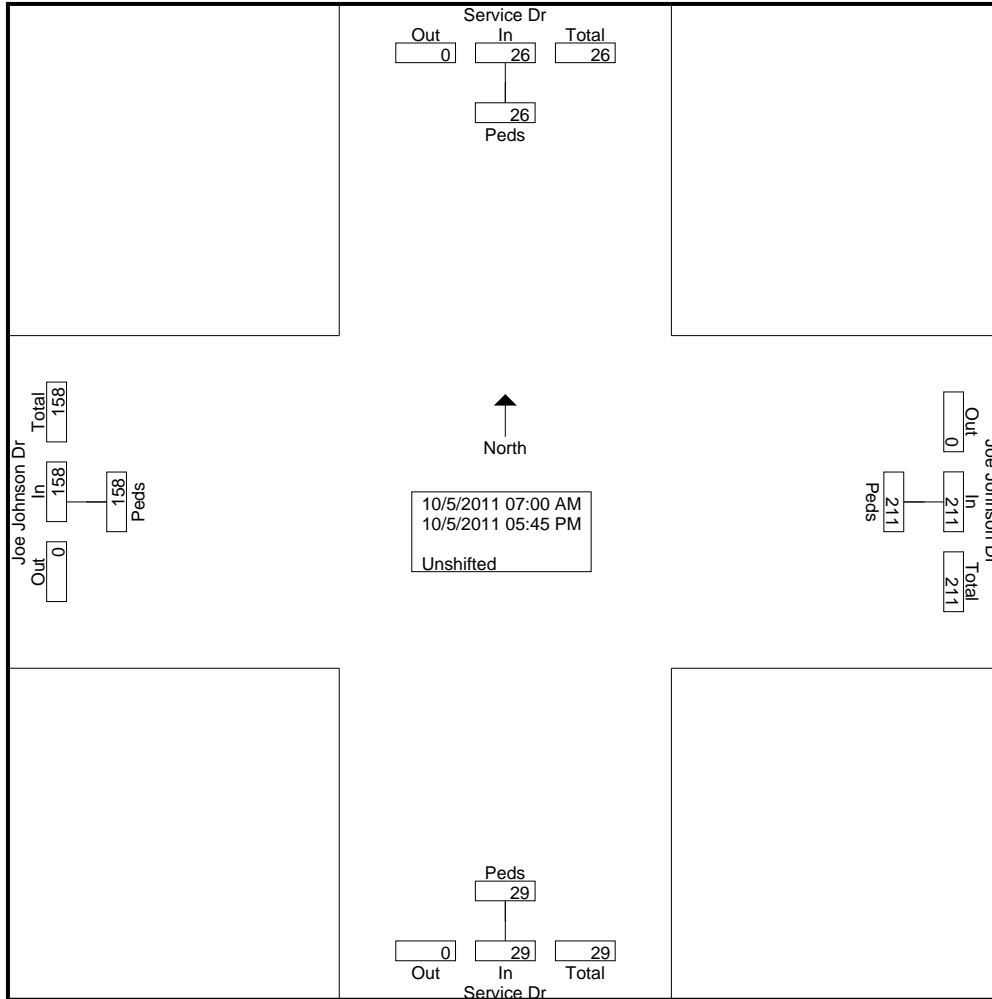


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 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : Joe Johnson Service Dr  
 Site Code : 00000006  
 Start Date : 10/5/2011  
 Page No : 1

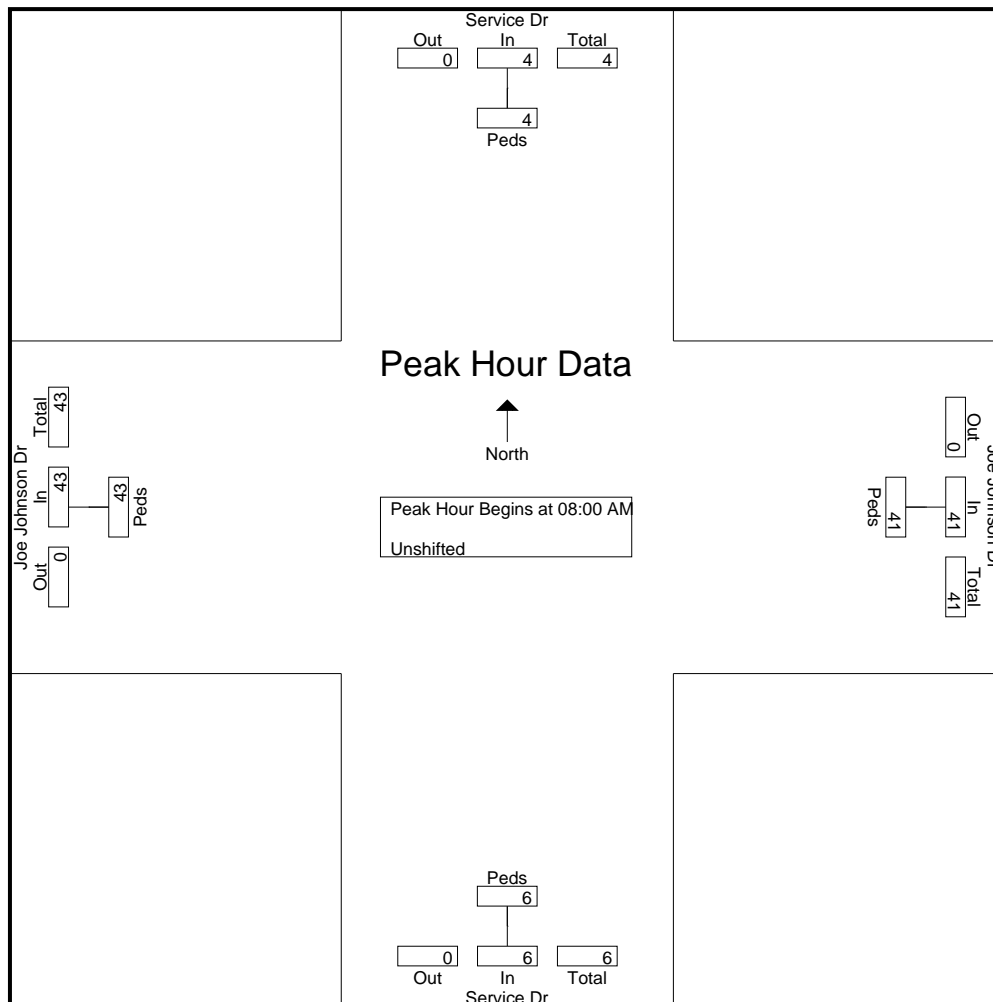
**Groups Printed- Unshifted**

Start Time	Service Dr Southbound		Joe Johnson Dr Westbound		Service Dr Northbound		Joe Johnson Dr Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:00 AM	0	0	6	6	0	0	4	4	10
07:15 AM	0	0	5	5	0	0	4	4	9
07:30 AM	0	0	0	0	1	1	7	7	8
07:45 AM	1	1	3	3	6	6	34	34	44
Total	1	1	14	14	7	7	49	49	71
08:00 AM	0	0	3	3	1	1	13	13	17
08:15 AM	0	0	1	1	1	1	4	4	6
08:30 AM	0	0	11	11	0	0	5	5	16
08:45 AM	4	4	26	26	4	4	21	21	55
Total	4	4	41	41	6	6	43	43	94
*** BREAK ***									
03:00 PM	2	2	19	19	0	0	10	10	31
03:15 PM	2	2	45	45	1	1	12	12	60
03:30 PM	1	1	9	9	3	3	6	6	19
03:45 PM	1	1	6	6	0	0	4	4	11
Total	6	6	79	79	4	4	32	32	121
04:00 PM	5	5	6	6	1	1	3	3	15
04:15 PM	0	0	2	2	0	0	3	3	5
04:30 PM	2	2	12	12	9	9	7	7	30
04:45 PM	2	2	13	13	0	0	9	9	24
Total	9	9	33	33	10	10	22	22	74
05:00 PM	1	1	7	7	1	1	0	0	9
05:15 PM	2	2	7	7	1	1	3	3	13
05:30 PM	1	1	16	16	0	0	3	3	20
05:45 PM	2	2	14	14	0	0	6	6	22
Total	6	6	44	44	2	2	12	12	64
Grand Total	26	26	211	211	29	29	158	158	424
Apprch %	100		100		100		100		
Total %	6.1	6.1	49.8	49.8	6.8	6.8	37.3	37.3	

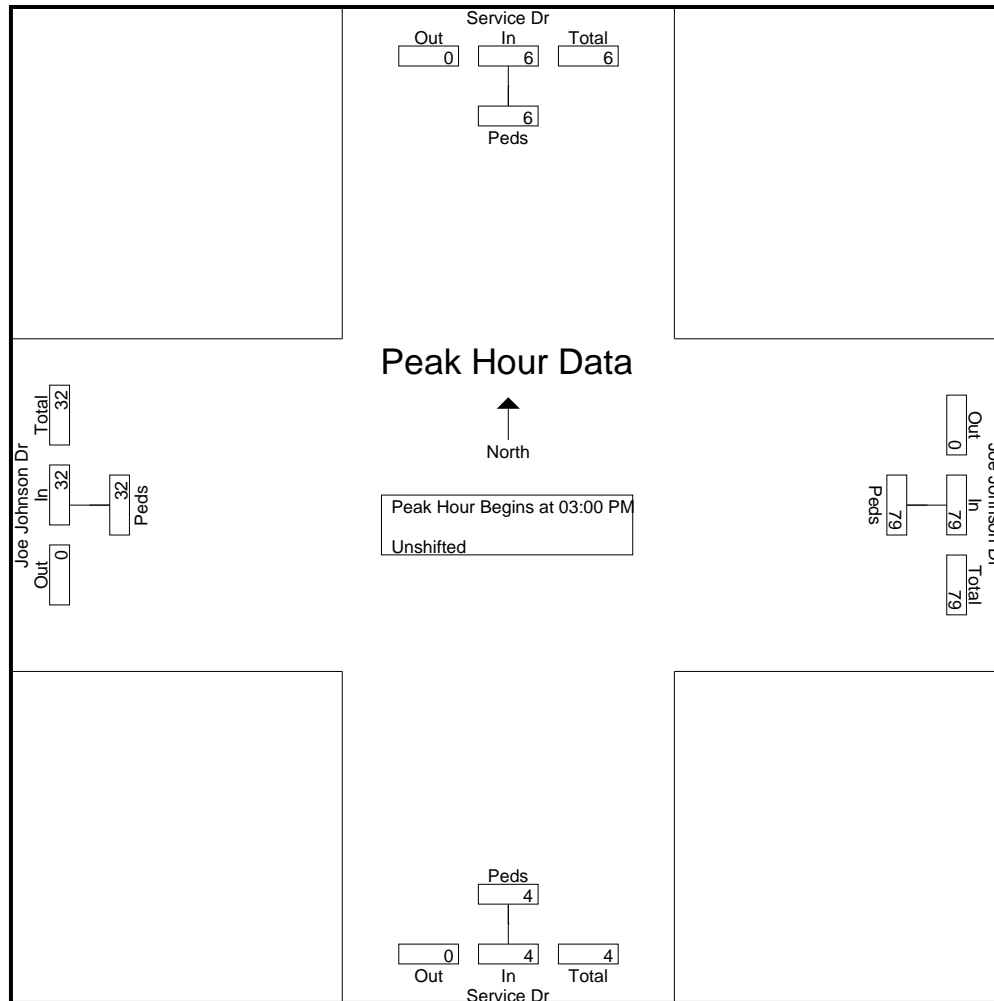


Start Time	Service Dr Southbound		Joe Johnson Dr Westbound		Service Dr Northbound		Joe Johnson Dr Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
08:00 AM	0	0	3	3	1	1	13	13	17
08:15 AM	0	0	1	1	1	1	4	4	6
08:30 AM	0	0	11	11	0	0	5	5	16
08:45 AM	4	4	26	26	4	4	21	21	55
Total Volume	4	4	41	41	6	6	43	43	94
% App. Total	100		100		100		100		
PHF	.250	.250	.394	.394	.375	.375	.512	.512	.427

Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 08:00 AM



Start Time	Service Dr Southbound		Joe Johnson Dr Westbound		Service Dr Northbound		Joe Johnson Dr Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1									
Peak Hour for Entire Intersection Begins at 03:00 PM									
03:00 PM	2	2	19	19	0	0	10	10	31
03:15 PM	2	2	45	45	1	1	12	12	60
03:30 PM	1	1	9	9	3	3	6	6	19
03:45 PM	1	1	6	6	0	0	4	4	11
Total Volume	6	6	79	79	4	4	32	32	121
% App. Total	100		100		100		100		
PHF	.750	.750	.439	.439	.333	.333	.667	.667	.504



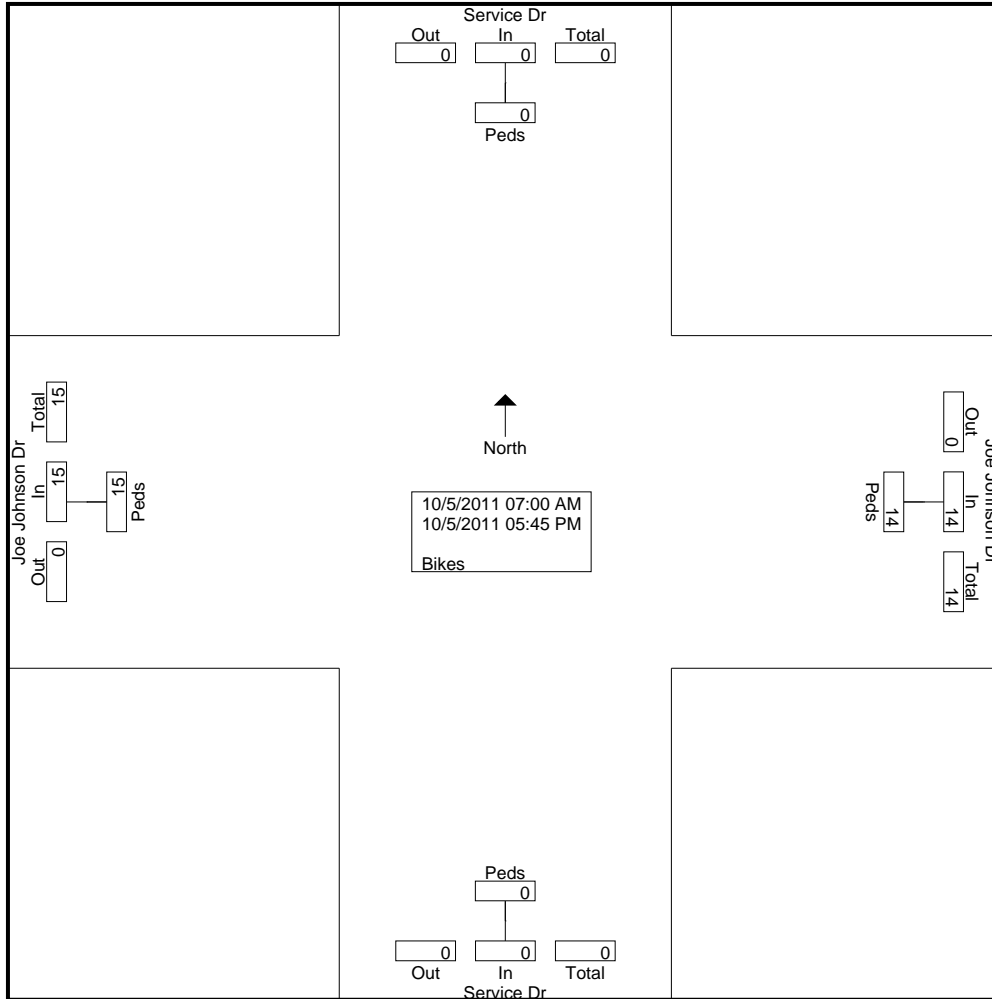
WILBUR SMITH ASSOCIATES  
 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : Joe Johnson Service Dr  
 Site Code : 00000006  
 Start Date : 10/5/2011  
 Page No : 1

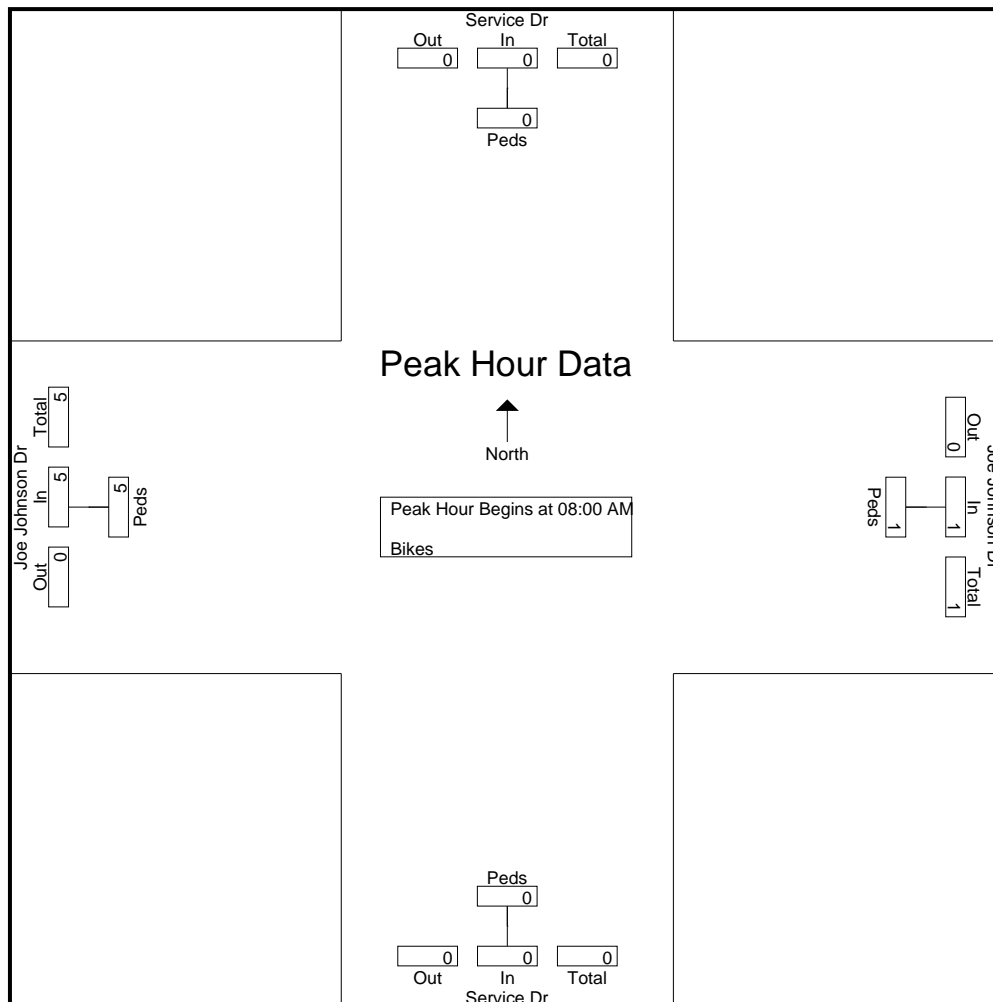
Groups Printed- Bikes

Start Time	Service Dr Southbound		Joe Johnson Dr Westbound		Service Dr Northbound		Joe Johnson Dr Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
*** BREAK ***									
07:45 AM	0	0	2	2	0	0	0	0	2
Total	0	0	2	2	0	0	0	0	2
08:00 AM	0	0	0	0	0	0	1	1	1
*** BREAK ***									
08:30 AM	0	0	0	0	0	0	1	1	1
08:45 AM	0	0	1	1	0	0	3	3	4
Total	0	0	1	1	0	0	5	5	6
*** BREAK ***									
03:00 PM	0	0	1	1	0	0	1	1	2
03:15 PM	0	0	0	0	0	0	1	1	1
*** BREAK ***									
03:45 PM	0	0	1	1	0	0	0	0	1
Total	0	0	2	2	0	0	2	2	4
04:00 PM	0	0	3	3	0	0	0	0	3
*** BREAK ***									
04:30 PM	0	0	1	1	0	0	0	0	1
*** BREAK ***									
Total	0	0	4	4	0	0	0	0	4
05:00 PM	0	0	0	0	0	0	2	2	2
05:15 PM	0	0	2	2	0	0	1	1	3
05:30 PM	0	0	2	2	0	0	3	3	5
05:45 PM	0	0	1	1	0	0	2	2	3
Total	0	0	5	5	0	0	8	8	13
Grand Total	0	0	14	14	0	0	15	15	29
Apprch %	0		100		0		100		
Total %	0	0	48.3	48.3	0	0	51.7	51.7	

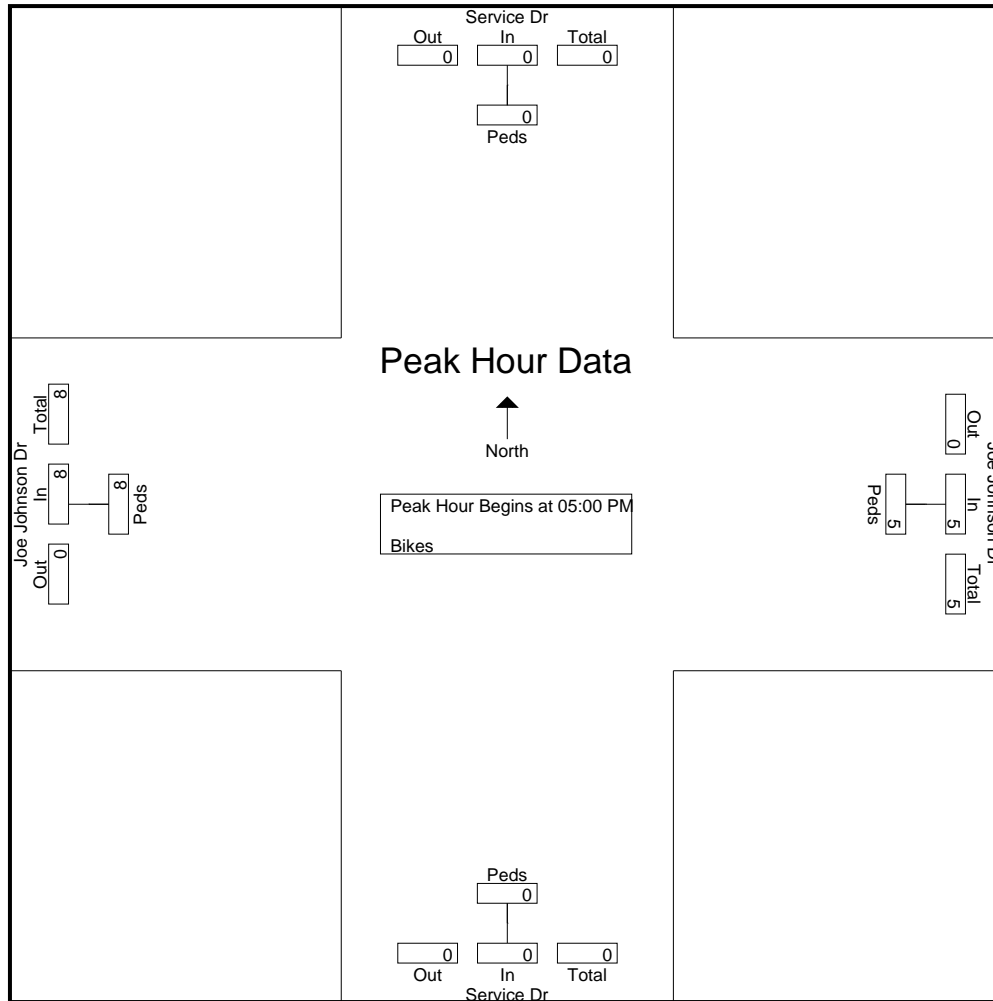




Start Time	Service Dr Southbound		Joe Johnson Dr Westbound		Service Dr Northbound		Joe Johnson Dr Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1									
Peak Hour for Entire Intersection Begins at 08:00 AM									
08:00 AM	0	0	0	0	0	0	1	1	1
08:15 AM	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	1	1	1
08:45 AM	0	0	1	1	0	0	3	3	4
Total Volume	0	0	1	1	0	0	5	5	6
% App. Total	0		100		0		100		
PHF	.000	.000	.250	.250	.000	.000	.417	.417	.375



Start Time	Service Dr Southbound		Joe Johnson Dr Westbound		Service Dr Northbound		Joe Johnson Dr Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1									
Peak Hour for Entire Intersection Begins at 05:00 PM									
05:00 PM	0	0	0	0	0	0	2	2	2
05:15 PM	0	0	2	2	0	0	1	1	3
05:30 PM	0	0	2	2	0	0	3	3	5
05:45 PM	0	0	1	1	0	0	2	2	3
Total Volume	0	0	5	5	0	0	8	8	13
% App. Total	0		100		0		100		
PHF	.000	.000	.625	.625	.000	.000	.667	.667	.650

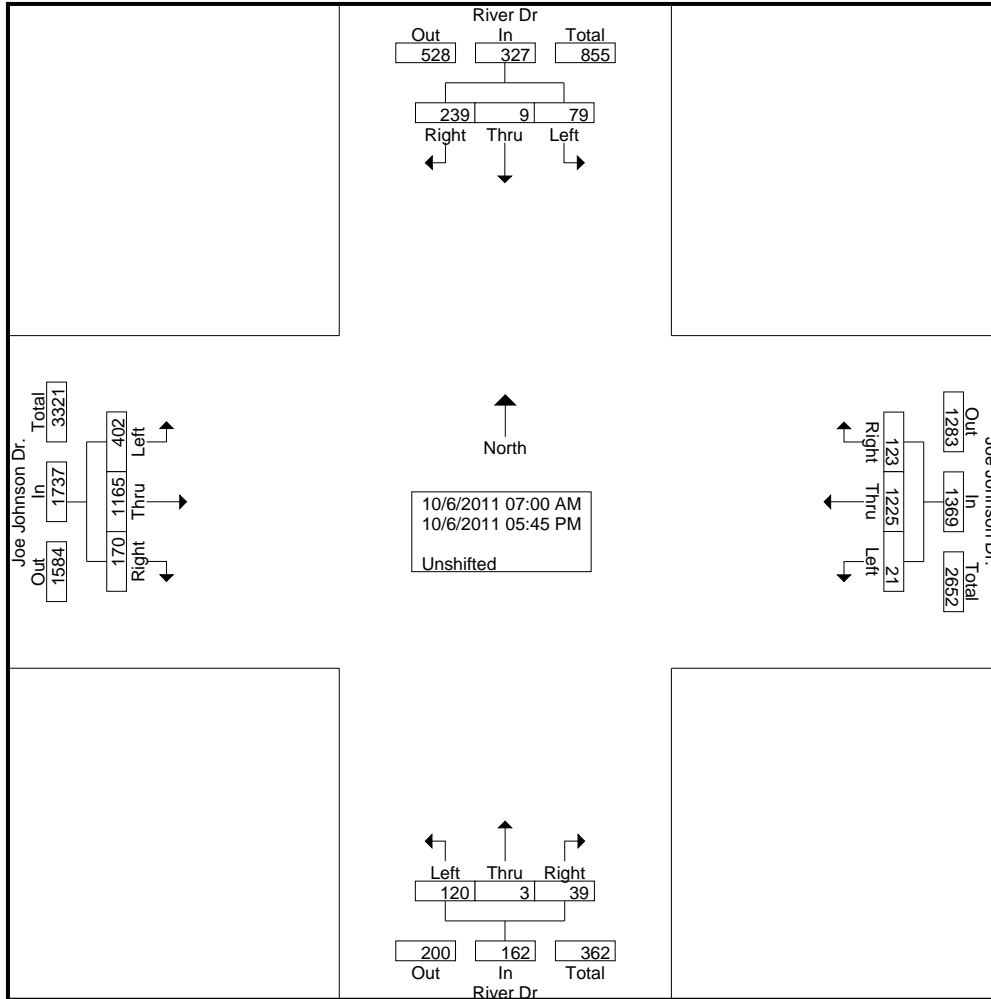


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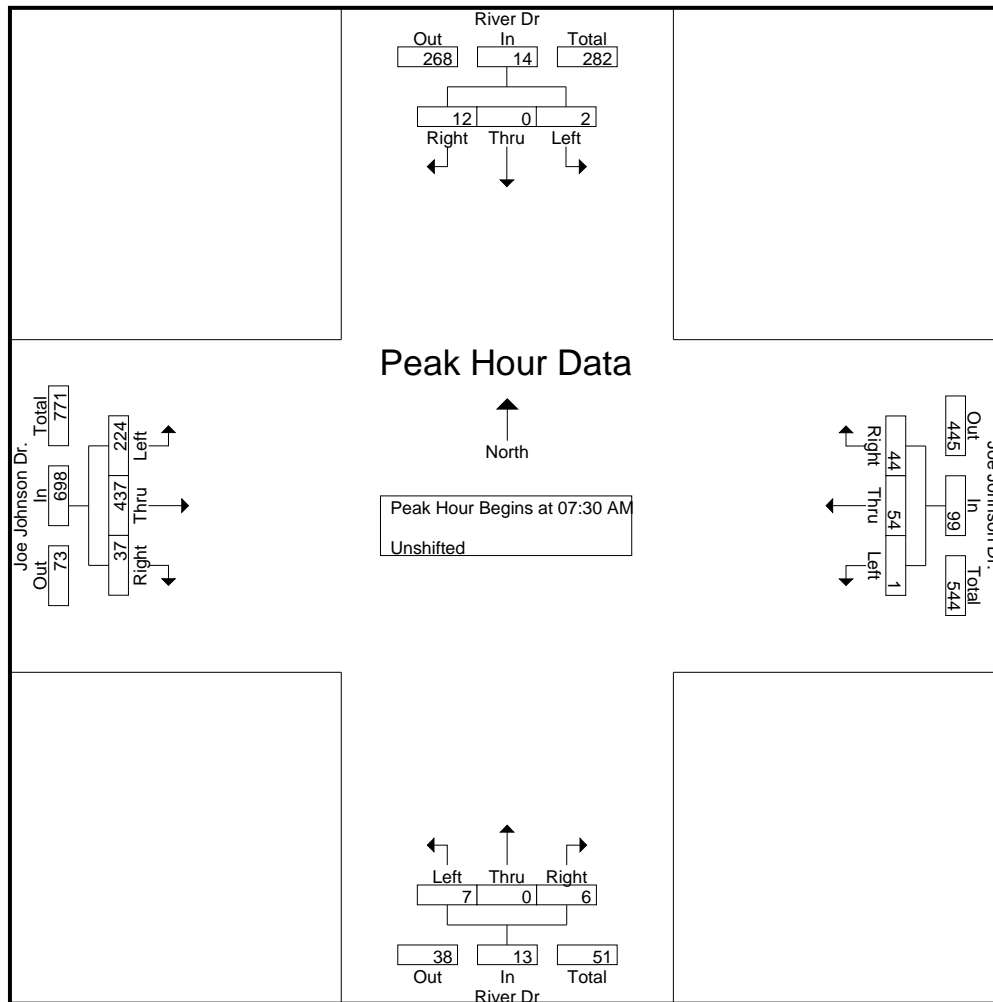
File Name : Joe Johnson River Dr  
 Site Code : 00004507  
 Start Date : 10/6/2011  
 Page No : 1

**Groups Printed- Unshifted**

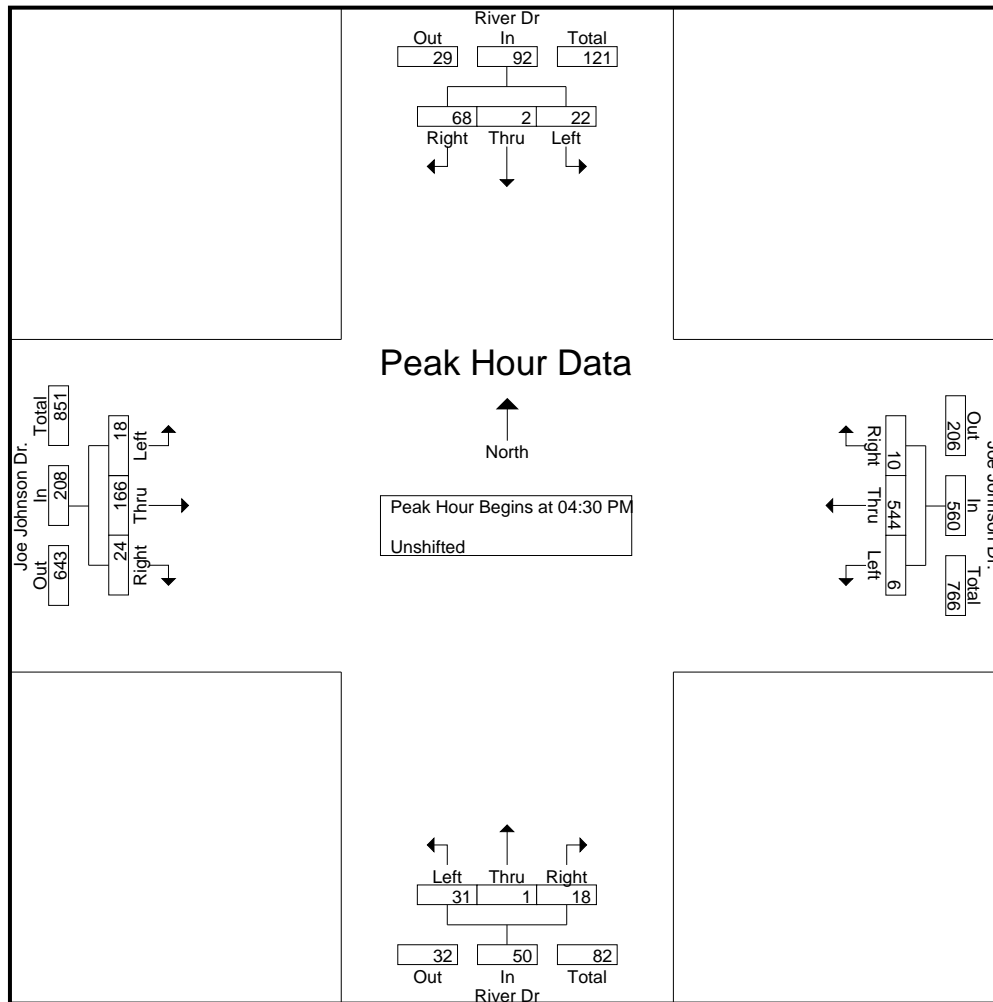
Start Time	River Dr Southbound				Joe Johnson Dr. Westbound				River Dr Northbound				Joe Johnson Dr. Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	0	0	0	0	0	5	2	7	3	0	0	3	14	39	11	64	74
07:15 AM	0	0	2	2	0	12	6	18	1	1	2	4	21	74	12	107	131
07:30 AM	0	0	1	1	0	12	5	17	2	0	2	4	52	92	7	151	173
07:45 AM	0	0	3	3	1	10	18	29	3	0	1	4	99	133	9	241	277
Total	0	0	6	6	1	39	31	71	9	1	5	15	186	338	39	563	655
08:00 AM	0	0	2	2	0	15	15	30	0	0	2	2	43	125	10	178	212
08:15 AM	2	0	6	8	0	17	6	23	2	0	1	3	30	87	11	128	162
08:30 AM	2	0	4	6	0	19	8	27	7	0	5	12	32	69	13	114	159
08:45 AM	4	1	4	9	2	21	16	39	0	0	2	2	43	62	12	117	167
Total	8	1	16	25	2	72	45	119	9	0	10	19	148	343	46	537	700
*** BREAK ***																	
03:00 PM	10	0	19	29	1	38	1	40	5	0	0	5	6	39	7	52	126
03:15 PM	8	2	23	33	0	52	8	60	9	0	2	11	2	41	5	48	152
03:30 PM	15	0	20	35	3	99	3	105	12	0	1	13	8	31	12	51	204
03:45 PM	6	2	16	24	3	87	4	94	9	0	1	10	7	35	6	48	176
Total	39	4	78	121	7	276	16	299	35	0	4	39	23	146	30	199	658
04:00 PM	3	0	24	27	1	56	6	63	7	0	0	7	10	30	7	47	144
04:15 PM	3	1	18	22	1	66	6	73	13	0	0	13	6	35	8	49	157
04:30 PM	5	0	16	21	2	125	3	130	8	0	2	10	4	35	6	45	206
04:45 PM	13	1	31	45	2	102	4	108	8	0	7	15	7	52	8	67	235
Total	24	2	89	115	6	349	19	374	36	0	9	45	27	152	29	208	742
05:00 PM	3	1	15	19	1	161	2	164	9	0	4	13	2	35	6	43	239
05:15 PM	1	0	6	7	1	156	1	158	6	1	5	12	5	44	4	53	230
05:30 PM	1	1	13	15	1	107	5	113	9	0	1	10	5	53	7	65	203
05:45 PM	3	0	16	19	2	65	4	71	7	1	1	9	6	54	9	69	168
Total	8	2	50	60	5	489	12	506	31	2	11	44	18	186	26	230	840
Grand Total	79	9	239	327	21	1225	123	1369	120	3	39	162	402	1165	170	1737	3595
Apprch %	24.2	2.8	73.1		1.5	89.5	9		74.1	1.9	24.1		23.1	67.1	9.8		
Total %	2.2	0.3	6.6	9.1	0.6	34.1	3.4	38.1	3.3	0.1	1.1	4.5	11.2	32.4	4.7	48.3	



Start Time	River Dr Southbound				Joe Johnson Dr. Westbound				River Dr Northbound				Joe Johnson Dr. Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	1	1	0	12	5	17	2	0	2	4	52	92	7	151	173
07:45 AM	0	0	3	3	1	10	18	29	3	0	1	4	99	133	9	241	277
08:00 AM	0	0	2	2	0	15	15	30	0	0	2	2	43	125	10	178	212
08:15 AM	2	0	6	8	0	17	6	23	2	0	1	3	30	87	11	128	162
Total Volume	2	0	12	14	1	54	44	99	7	0	6	13	224	437	37	698	824
% App. Total	14.3	0	85.7		1	54.5	44.4		53.8	0	46.2		32.1	62.6	5.3		
PHF	.250	.000	.500	.438	.250	.794	.611	.825	.583	.000	.750	.813	.566	.821	.841	.724	.744



Start Time	River Dr Southbound				Joe Johnson Dr. Westbound				River Dr Northbound				Joe Johnson Dr. Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	5	0	16	21	2	125	3	130	8	0	2	10	4	35	6	45	206
04:45 PM	13	1	31	45	2	102	4	108	8	0	7	15	7	52	8	67	235
05:00 PM	3	1	15	19	1	161	2	164	9	0	4	13	2	35	6	43	239
05:15 PM	1	0	6	7	1	156	1	158	6	1	5	12	5	44	4	53	230
Total Volume	22	2	68	92	6	544	10	560	31	1	18	50	18	166	24	208	910
% App. Total	23.9	2.2	73.9		1.1	97.1	1.8		62	2	36		8.7	79.8	11.5		
PHF	.423	.500	.548	.511	.750	.845	.625	.854	.861	.250	.643	.833	.643	.798	.750	.776	.952



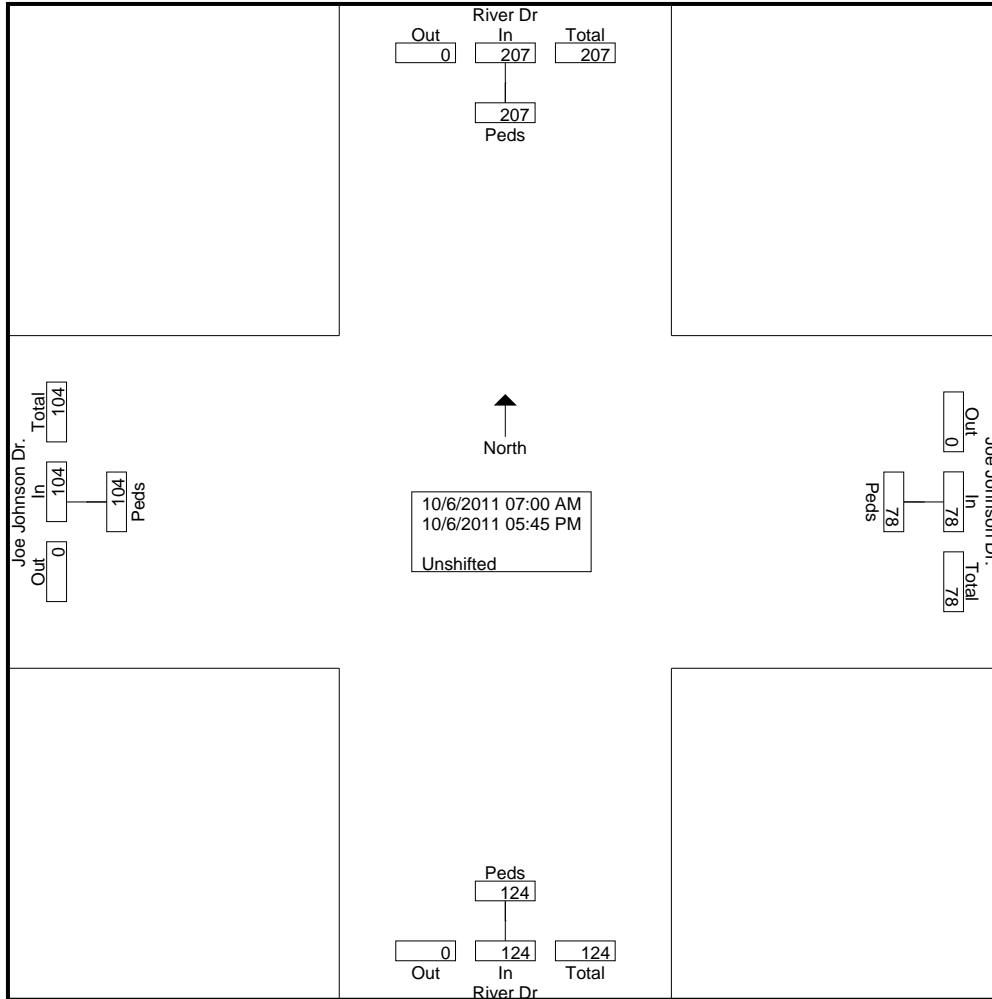
WILBUR SMITH ASSOCIATES  
 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : Joe Johnson River Dr  
 Site Code : 00004507  
 Start Date : 10/6/2011  
 Page No : 1

**Groups Printed- Unshifted**

Start Time	River Dr Southbound		Joe Johnson Dr. Westbound		River Dr Northbound		Joe Johnson Dr. Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:00 AM	1	1	2	2	0	0	1	1	4
07:15 AM	11	11	1	1	0	0	1	1	13
07:30 AM	20	20	0	0	0	0	9	9	29
07:45 AM	51	51	0	0	0	0	25	25	76
Total	83	83	3	3	0	0	36	36	122
08:00 AM	16	16	0	0	0	0	10	10	26
08:15 AM	9	9	2	2	1	1	12	12	24
08:30 AM	15	15	1	1	0	0	12	12	28
08:45 AM	48	48	0	0	1	1	8	8	57
Total	88	88	3	3	2	2	42	42	135
*** BREAK ***									
03:00 PM	3	3	7	7	21	21	4	4	35
03:15 PM	7	7	10	10	12	12	1	1	30
03:30 PM	4	4	11	11	29	29	5	5	49
03:45 PM	1	1	6	6	12	12	1	1	20
Total	15	15	34	34	74	74	11	11	134
04:00 PM	3	3	2	2	6	6	2	2	13
04:15 PM	8	8	9	9	6	6	2	2	25
04:30 PM	1	1	3	3	3	3	1	1	8
04:45 PM	2	2	5	5	13	13	1	1	21
Total	14	14	19	19	28	28	6	6	67
05:00 PM	2	2	2	2	4	4	2	2	10
05:15 PM	3	3	1	1	6	6	2	2	12
05:30 PM	0	0	1	1	5	5	2	2	8
05:45 PM	2	2	15	15	5	5	3	3	25
Total	7	7	19	19	20	20	9	9	55
Grand Total	207	207	78	78	124	124	104	104	513
Apprch %	100		100		100		100		
Total %	40.4	40.4	15.2	15.2	24.2	24.2	20.3	20.3	



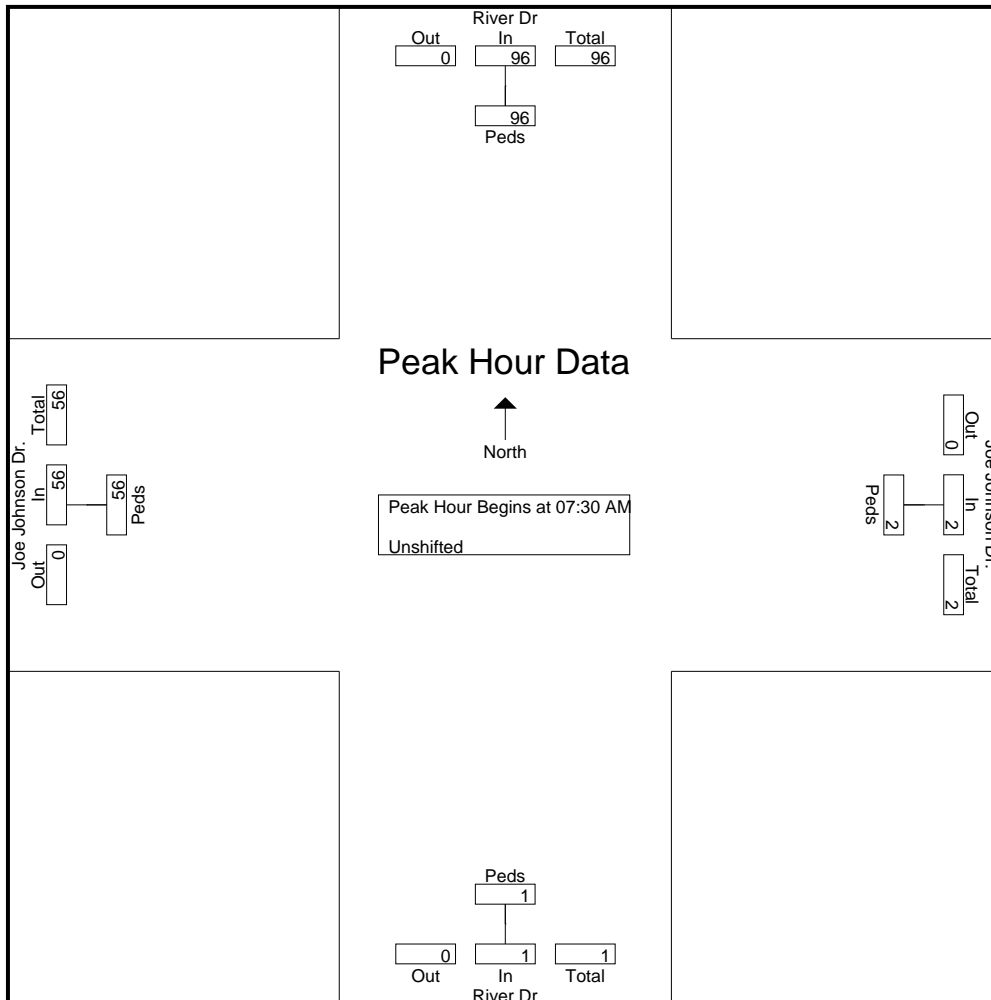


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 KNOXVILLE, TN 37921  
 865-963-4300

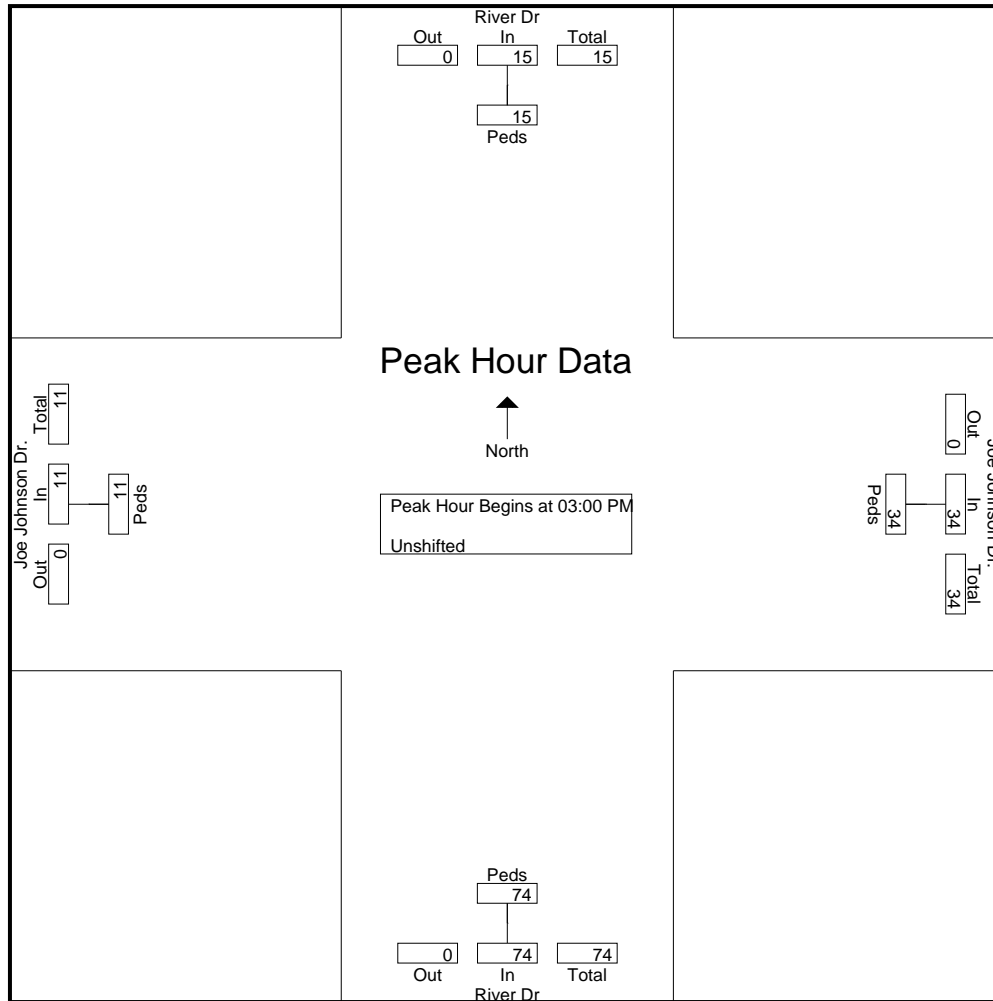
File Name : Joe Johnson River Dr  
 Site Code : 00004507  
 Start Date : 10/6/2011  
 Page No : 3

Start Time	River Dr Southbound		Joe Johnson Dr. Westbound		River Dr Northbound		Joe Johnson Dr. Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:30 AM	20	20	0	0	0	0	9	9	29
07:45 AM	<b>51</b>	<b>51</b>	0	0	0	0	<b>25</b>	<b>25</b>	<b>76</b>
08:00 AM	16	16	0	0	0	0	10	10	26
08:15 AM	9	9	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	12	12	24
Total Volume	96	96	2	2	1	1	56	56	155
% App. Total	100		100		100		100		
PHF	.471	.471	.250	.250	.250	.250	.560	.560	.510

Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 07:30 AM



Start Time	River Dr Southbound		Joe Johnson Dr. Westbound		River Dr Northbound		Joe Johnson Dr. Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1									
Peak Hour for Entire Intersection Begins at 03:00 PM									
03:00 PM	3	3	7	7	21	21	4	4	35
03:15 PM	7	7	10	10	12	12	1	1	30
03:30 PM	4	4	11	11	29	29	5	5	49
03:45 PM	1	1	6	6	12	12	1	1	20
Total Volume	15	15	34	34	74	74	11	11	134
% App. Total	100		100		100		100		
PHF	.536	.536	.773	.773	.638	.638	.550	.550	.684

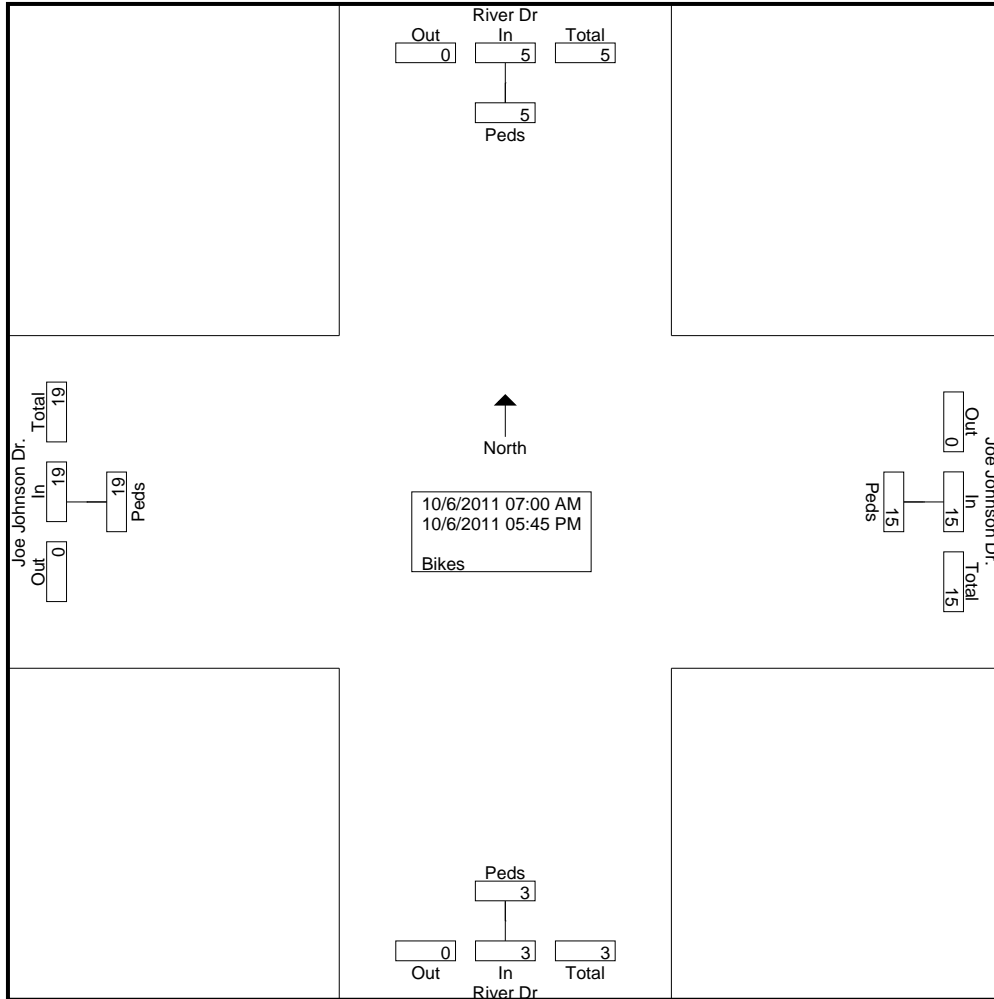


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 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : Joe Johnson River Dr  
 Site Code : 00004507  
 Start Date : 10/6/2011  
 Page No : 1

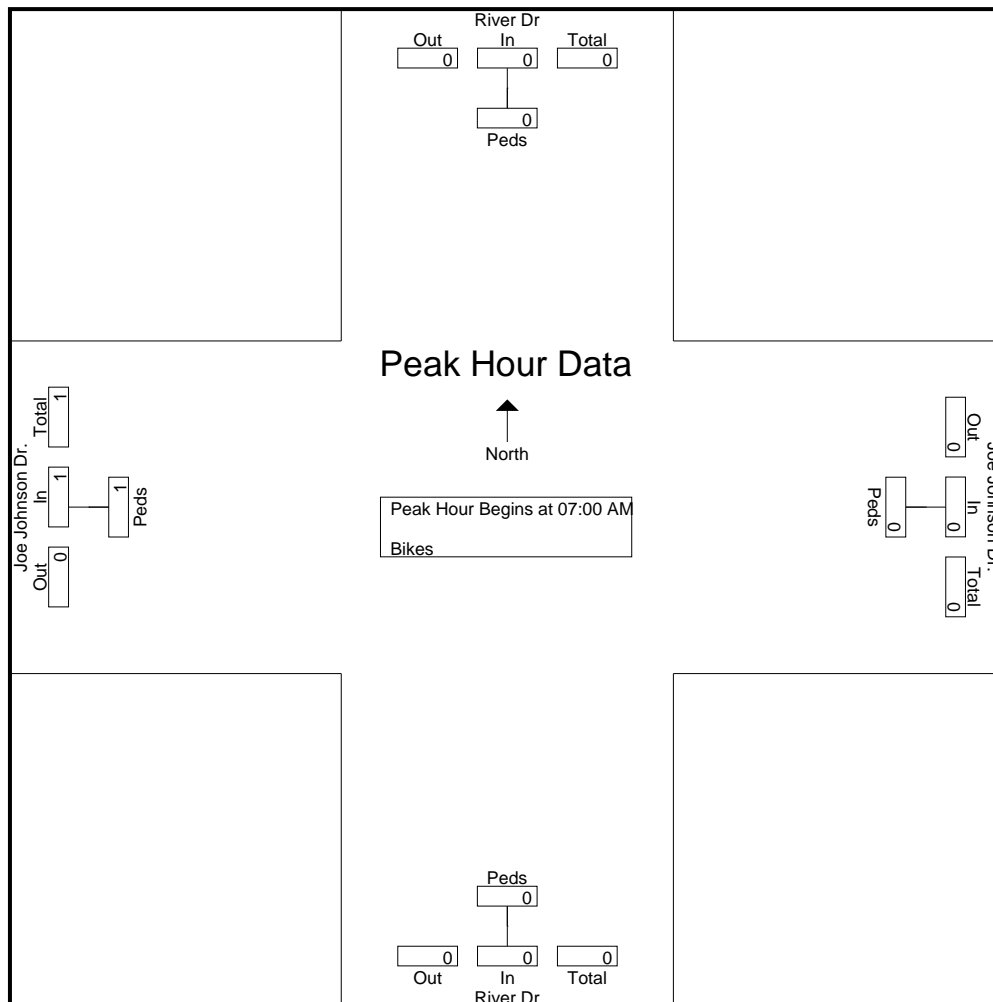
Groups Printed- Bikes

Start Time	River Dr Southbound		Joe Johnson Dr. Westbound		River Dr Northbound		Joe Johnson Dr. Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
*** BREAK ***									
07:45 AM	0	0	0	0	0	0	1	1	1
Total	0	0	0	0	0	0	1	1	1
*** BREAK ***									
03:00 PM	0	0	1	1	1	1	1	1	3
03:15 PM	2	2	1	1	0	0	4	4	7
03:30 PM	1	1	0	0	0	0	1	1	2
03:45 PM	0	0	1	1	0	0	2	2	3
Total	3	3	3	3	1	1	8	8	15
04:00 PM	0	0	2	2	1	1	1	1	4
04:15 PM	0	0	0	0	0	0	1	1	1
04:30 PM	2	2	2	2	1	1	3	3	8
04:45 PM	0	0	3	3	0	0	0	0	3
Total	2	2	7	7	2	2	5	5	16
05:00 PM	0	0	2	2	0	0	0	0	2
05:15 PM	0	0	1	1	0	0	3	3	4
05:30 PM	0	0	1	1	0	0	2	2	3
05:45 PM	0	0	1	1	0	0	0	0	1
Total	0	0	5	5	0	0	5	5	10
Grand Total	5	5	15	15	3	3	19	19	42
Apprch %	100		100		100		100		
Total %	11.9	11.9	35.7	35.7	7.1	7.1	45.2	45.2	

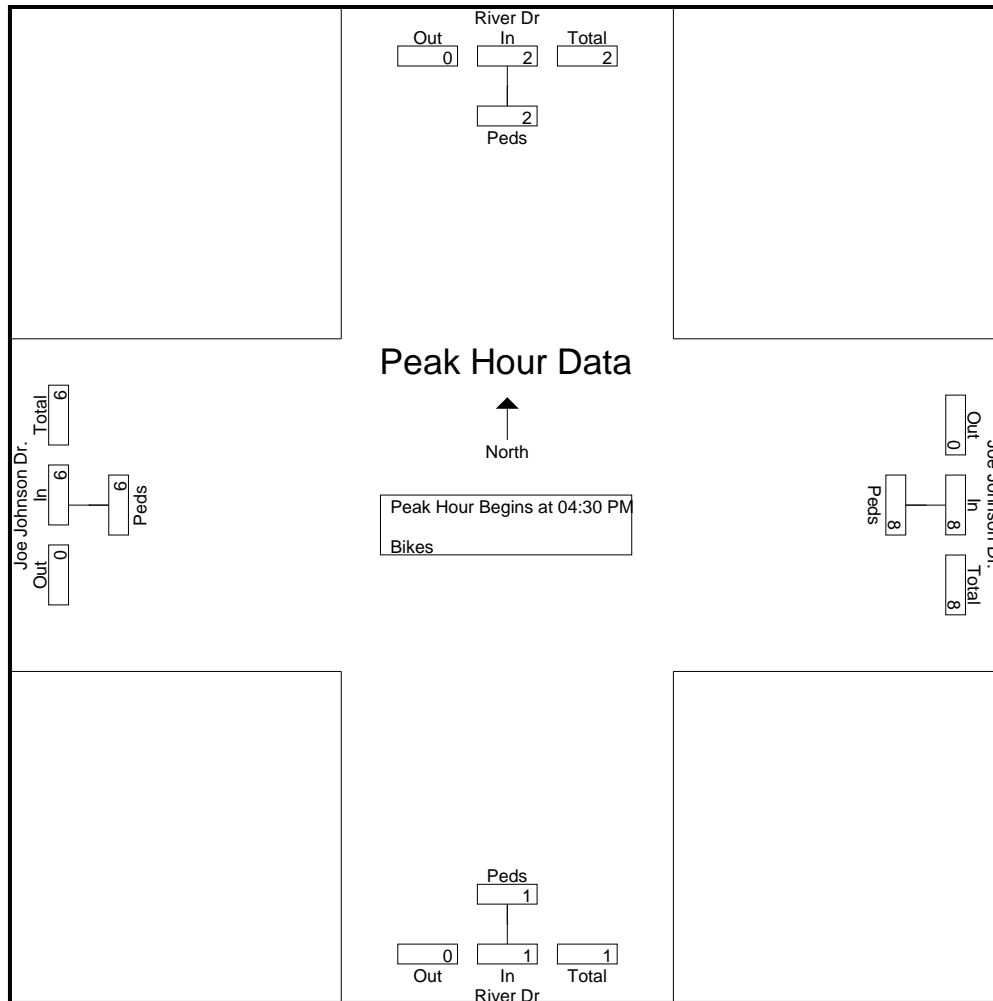


Start Time	River Dr Southbound		Joe Johnson Dr. Westbound		River Dr Northbound		Joe Johnson Dr. Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:00 AM	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	1	1	1
Total Volume	0	0	0	0	0	0	1	1	1
% App. Total	0		0		0		100		
PHF	.000	.000	.000	.000	.000	.000	.250	.250	.250

Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 07:00 AM



Start Time	River Dr Southbound		Joe Johnson Dr. Westbound		River Dr Northbound		Joe Johnson Dr. Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1									
Peak Hour for Entire Intersection Begins at 04:30 PM									
04:30 PM	2	2	2	2	1	1	3	3	8
04:45 PM	0	0	3	3	0	0	0	0	3
05:00 PM	0	0	2	2	0	0	0	0	2
05:15 PM	0	0	1	1	0	0	3	3	4
Total Volume	2	2	8	8	1	1	6	6	17
% App. Total	100		100		100		100		
PHF	.250	.250	.667	.667	.250	.250	.500	.500	.531



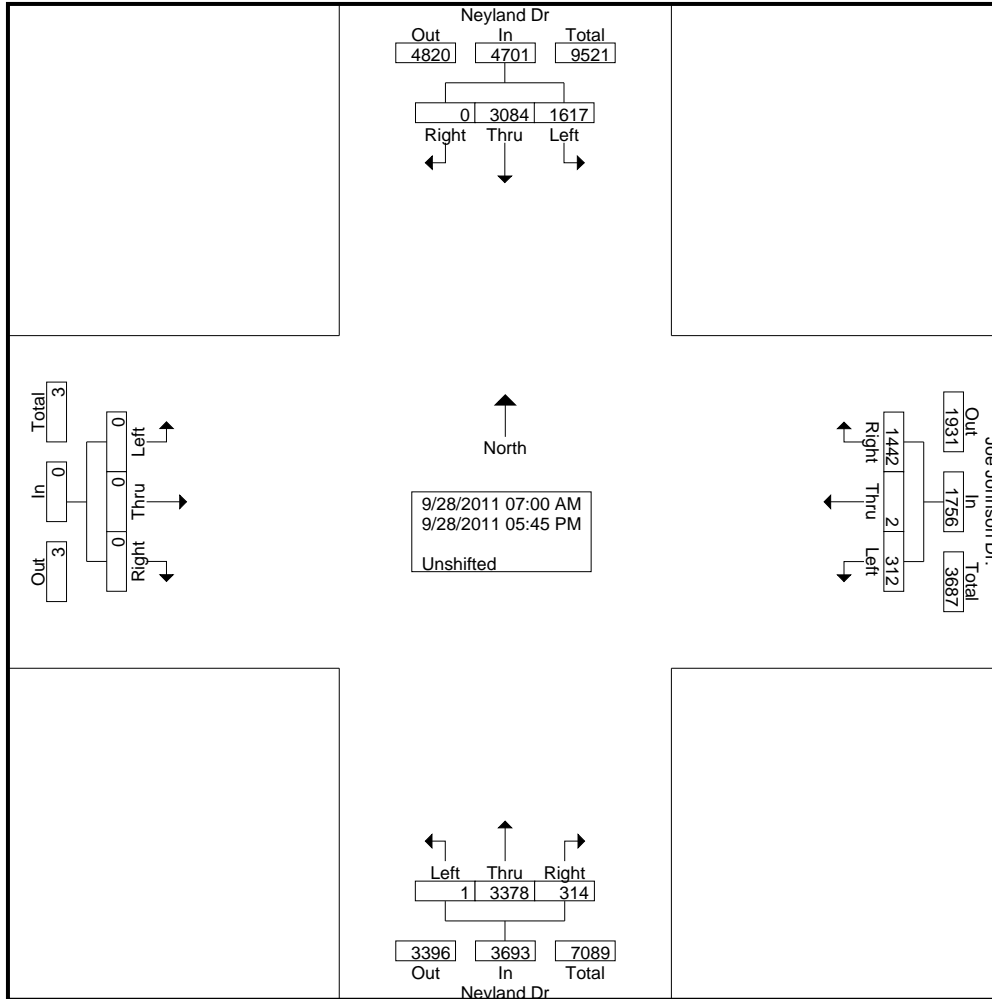
WILBUR SMITH ASSOCIATES  
 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : Joe Johnson Neyland  
 Site Code : 00000008  
 Start Date : 9/28/2011  
 Page No : 1

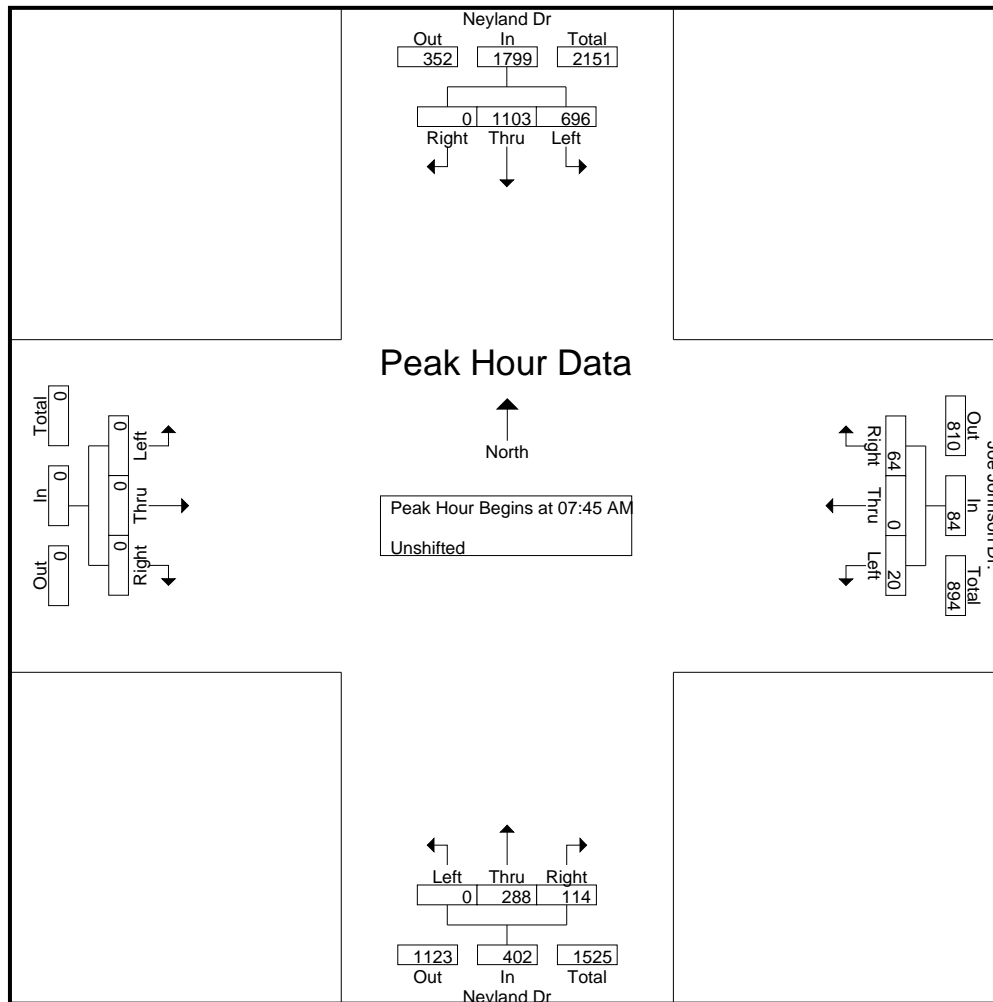
**Groups Printed- Unshifted**

Start Time	Neyland Dr Southbound				Joe Johnson Dr. Westbound				Neyland Dr Northbound				Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	57	89	0	146	0	0	4	4	1	27	16	44	0	0	0	0	194
07:15 AM	65	121	0	186	1	0	8	9	0	39	9	48	0	0	0	0	243
07:30 AM	110	197	0	307	6	0	13	19	0	59	22	81	0	0	0	0	407
07:45 AM	210	347	0	557	5	0	20	25	0	72	24	96	0	0	0	0	678
Total	442	754	0	1196	12	0	45	57	1	197	71	269	0	0	0	0	1522
08:00 AM	240	304	0	544	6	0	21	27	0	76	36	112	0	0	0	0	683
08:15 AM	131	215	0	346	4	0	10	14	0	72	22	94	0	0	0	0	454
08:30 AM	115	237	0	352	5	0	13	18	0	68	32	100	0	0	0	0	470
08:45 AM	149	304	0	453	8	0	30	38	0	54	18	72	0	0	0	0	563
Total	635	1060	0	1695	23	0	74	97	0	270	108	378	0	0	0	0	2170
*** BREAK ***																	
03:00 PM	39	147	0	186	15	0	56	71	0	177	9	186	0	0	0	0	443
03:15 PM	47	113	0	160	18	0	91	109	0	248	13	261	0	0	0	0	530
03:30 PM	35	96	0	131	22	0	76	98	0	235	18	253	0	0	0	0	482
03:45 PM	34	103	0	137	15	0	82	97	0	168	12	180	0	0	0	0	414
Total	155	459	0	614	70	0	305	375	0	828	52	880	0	0	0	0	1869
04:00 PM	35	93	0	128	13	0	80	93	0	158	17	175	0	0	0	0	396
04:15 PM	32	118	0	150	31	0	127	158	0	190	10	200	0	0	0	0	508
04:30 PM	87	143	0	230	28	0	158	186	0	291	12	303	0	0	0	0	719
04:45 PM	65	76	0	141	53	2	153	208	0	321	11	332	0	0	0	0	681
Total	219	430	0	649	125	2	518	645	0	960	50	1010	0	0	0	0	2304
05:00 PM	52	103	0	155	22	0	140	162	0	449	10	459	0	0	0	0	776
05:15 PM	49	96	0	145	19	0	166	185	0	258	6	264	0	0	0	0	594
05:30 PM	36	92	0	128	24	0	133	157	0	230	10	240	0	0	0	0	525
05:45 PM	29	90	0	119	17	0	61	78	0	186	7	193	0	0	0	0	390
Total	166	381	0	547	82	0	500	582	0	1123	33	1156	0	0	0	0	2285
Grand Total	1617	3084	0	4701	312	2	1442	1756	1	3378	314	3693	0	0	0	0	10150
Apprch %	34.4	65.6	0		17.8	0.1	82.1		0	91.5	8.5		0	0	0		
Total %	15.9	30.4	0	46.3	3.1	0	14.2	17.3	0	33.3	3.1	36.4	0	0	0	0	

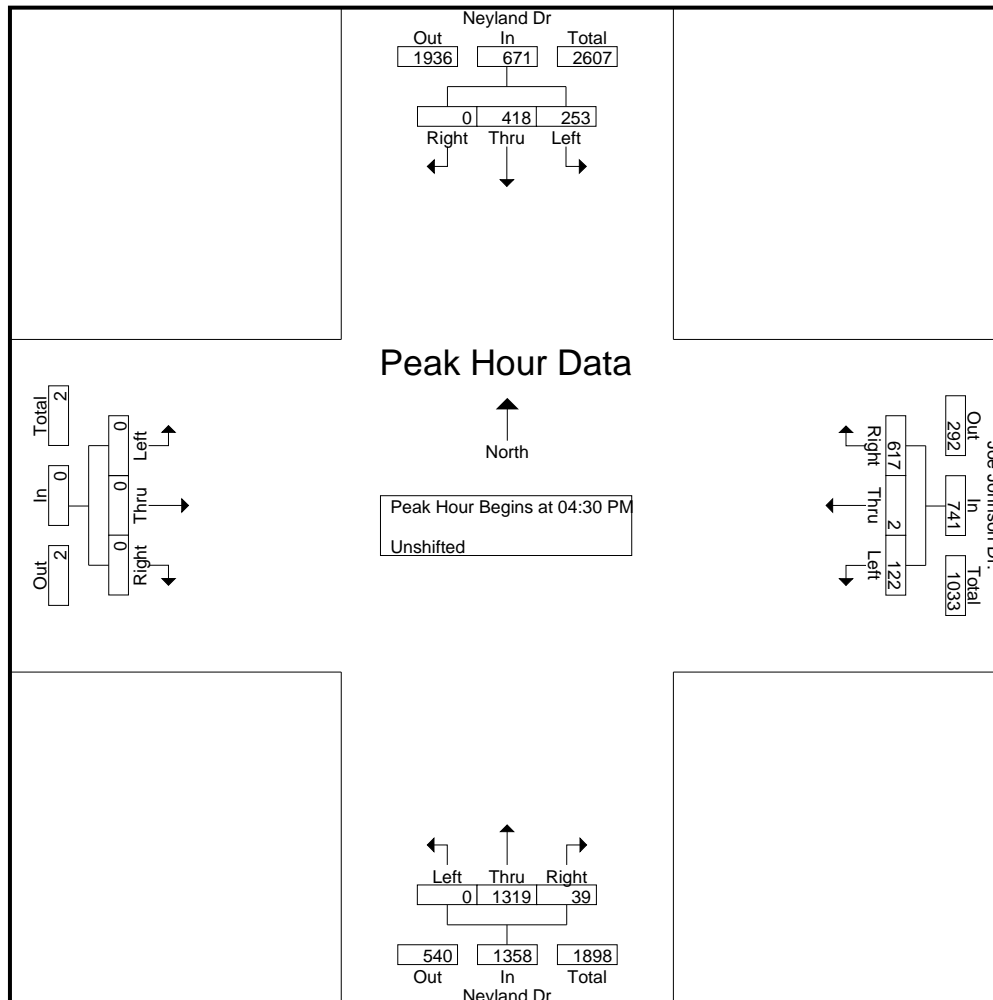




Start Time	Neyland Dr Southbound				Joe Johnson Dr. Westbound				Neyland Dr Northbound				Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	210	347	0	557	5	0	20	25	0	72	24	96	0	0	0	0	678
08:00 AM	240	304	0	544	6	0	21	27	0	76	36	112	0	0	0	0	683
08:15 AM	131	215	0	346	4	0	10	14	0	72	22	94	0	0	0	0	454
08:30 AM	115	237	0	352	5	0	13	18	0	68	32	100	0	0	0	0	470
Total Volume	696	1103	0	1799	20	0	64	84	0	288	114	402	0	0	0	0	2285
% App. Total	38.7	61.3	0		23.8	0	76.2		0	71.6	28.4		0	0	0		
PHF	.725	.795	.000	.807	.833	.000	.762	.778	.000	.947	.792	.897	.000	.000	.000	.000	.836



Start Time	Neyland Dr Southbound				Joe Johnson Dr. Westbound				Neyland Dr Northbound				Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	87	143	0	230	28	0	158	186	0	291	12	303	0	0	0	0	719
04:45 PM	65	76	0	141	53	2	153	208	0	321	11	332	0	0	0	0	681
05:00 PM	52	103	0	155	22	0	140	162	0	449	10	459	0	0	0	0	776
05:15 PM	49	96	0	145	19	0	166	185	0	258	6	264	0	0	0	0	594
Total Volume	253	418	0	671	122	2	617	741	0	1319	39	1358	0	0	0	0	2770
% App. Total	37.7	62.3	0		16.5	0.3	83.3		0	97.1	2.9		0	0	0		
PHF	.727	.731	.000	.729	.575	.250	.929	.891	.000	.734	.813	.740	.000	.000	.000	.000	.892

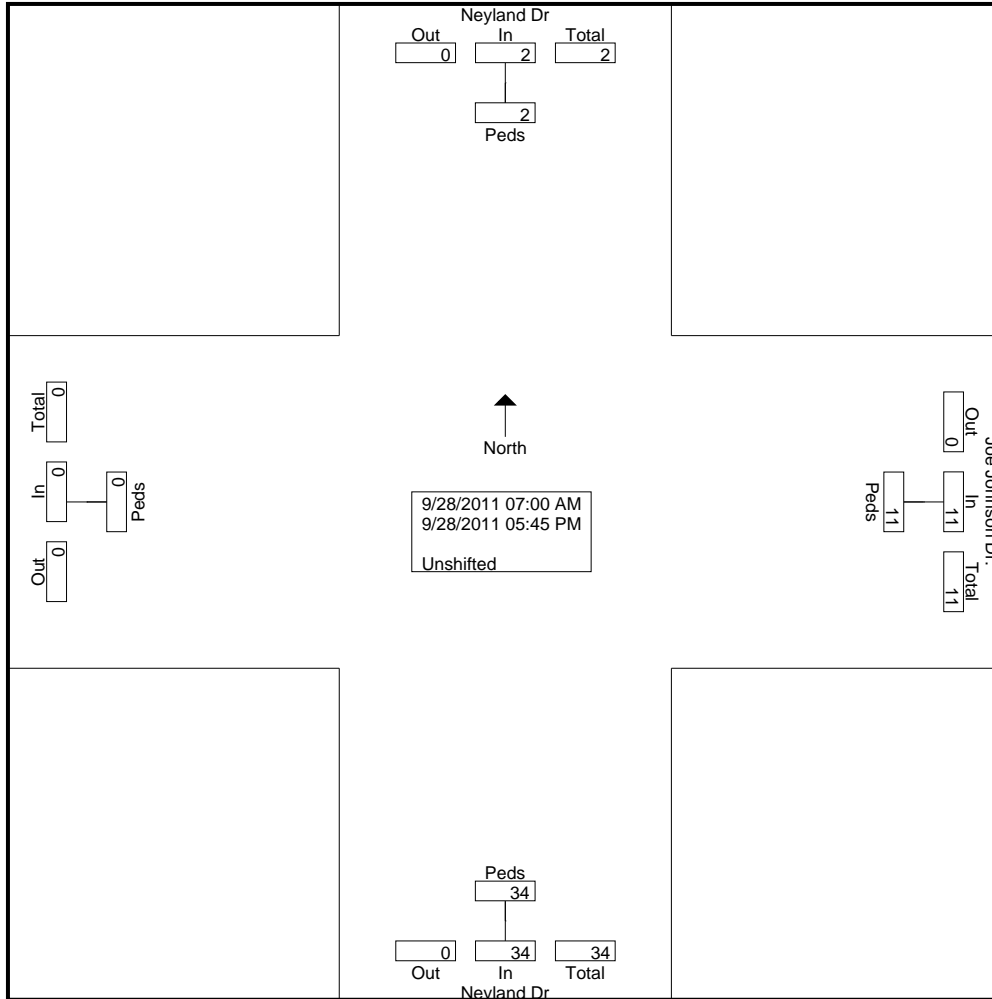


WILBUR SMITH ASSOCIATES  
 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : Joe Johnson Neyland  
 Site Code : 00000008  
 Start Date : 9/28/2011  
 Page No : 1

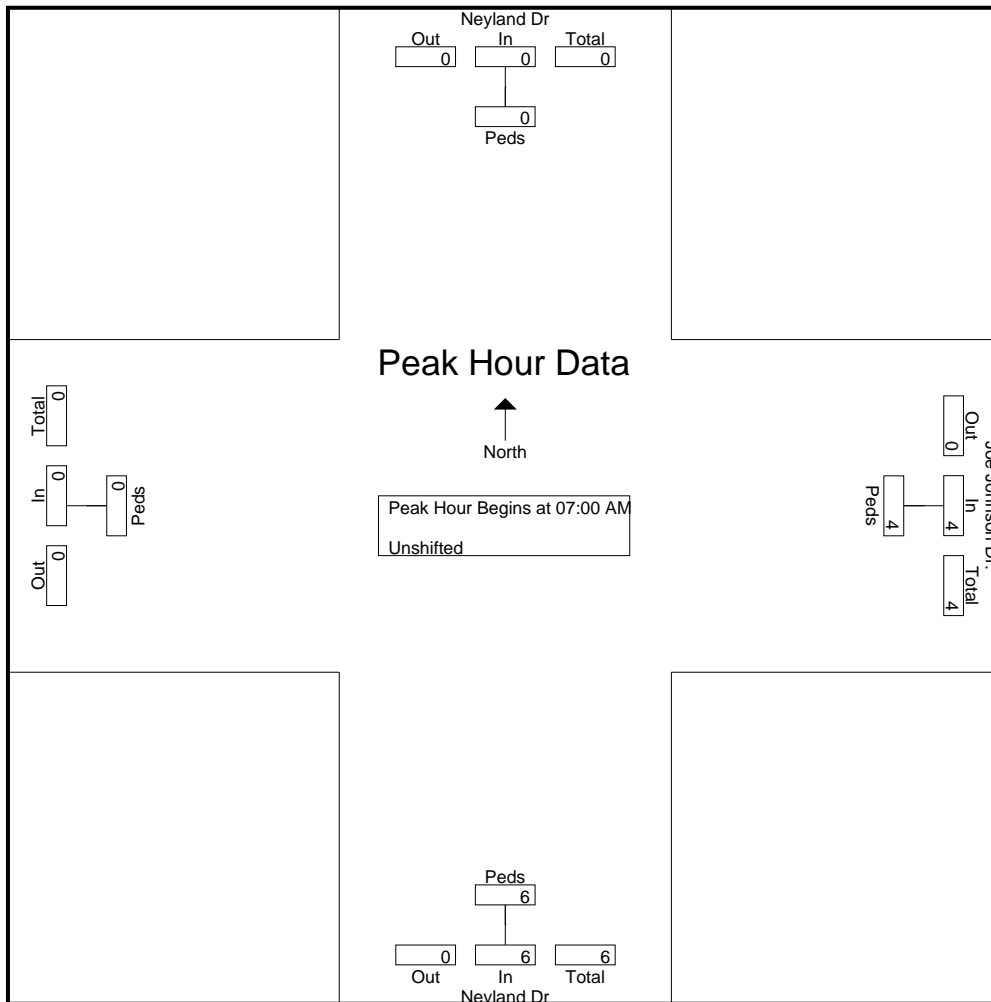
**Groups Printed- Unshifted**

Start Time	Neyland Dr Southbound		Joe Johnson Dr. Westbound		Neyland Dr Northbound		Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:00 AM	0	0	0	0	5	5	0	0	5
07:15 AM	0	0	0	0	1	1	0	0	1
*** BREAK ***									
07:45 AM	0	0	4	4	0	0	0	0	4
Total	0	0	4	4	6	6	0	0	10
08:00 AM	0	0	0	0	1	1	0	0	1
08:15 AM	0	0	1	1	2	2	0	0	3
*** BREAK ***									
08:45 AM	0	0	0	0	1	1	0	0	1
Total	0	0	1	1	4	4	0	0	5
*** BREAK ***									
03:00 PM	0	0	3	3	1	1	0	0	4
03:15 PM	0	0	3	3	4	4	0	0	7
*** BREAK ***									
03:45 PM	0	0	0	0	3	3	0	0	3
Total	0	0	6	6	8	8	0	0	14
04:00 PM	0	0	0	0	4	4	0	0	4
*** BREAK ***									
04:45 PM	1	1	0	0	3	3	0	0	4
Total	1	1	0	0	7	7	0	0	8
05:00 PM	0	0	0	0	2	2	0	0	2
05:15 PM	0	0	0	0	2	2	0	0	2
05:30 PM	1	1	0	0	3	3	0	0	4
05:45 PM	0	0	0	0	2	2	0	0	2
Total	1	1	0	0	9	9	0	0	10
Grand Total	2	2	11	11	34	34	0	0	47
Apprch %	100		100		100		0		
Total %	4.3	4.3	23.4	23.4	72.3	72.3	0	0	



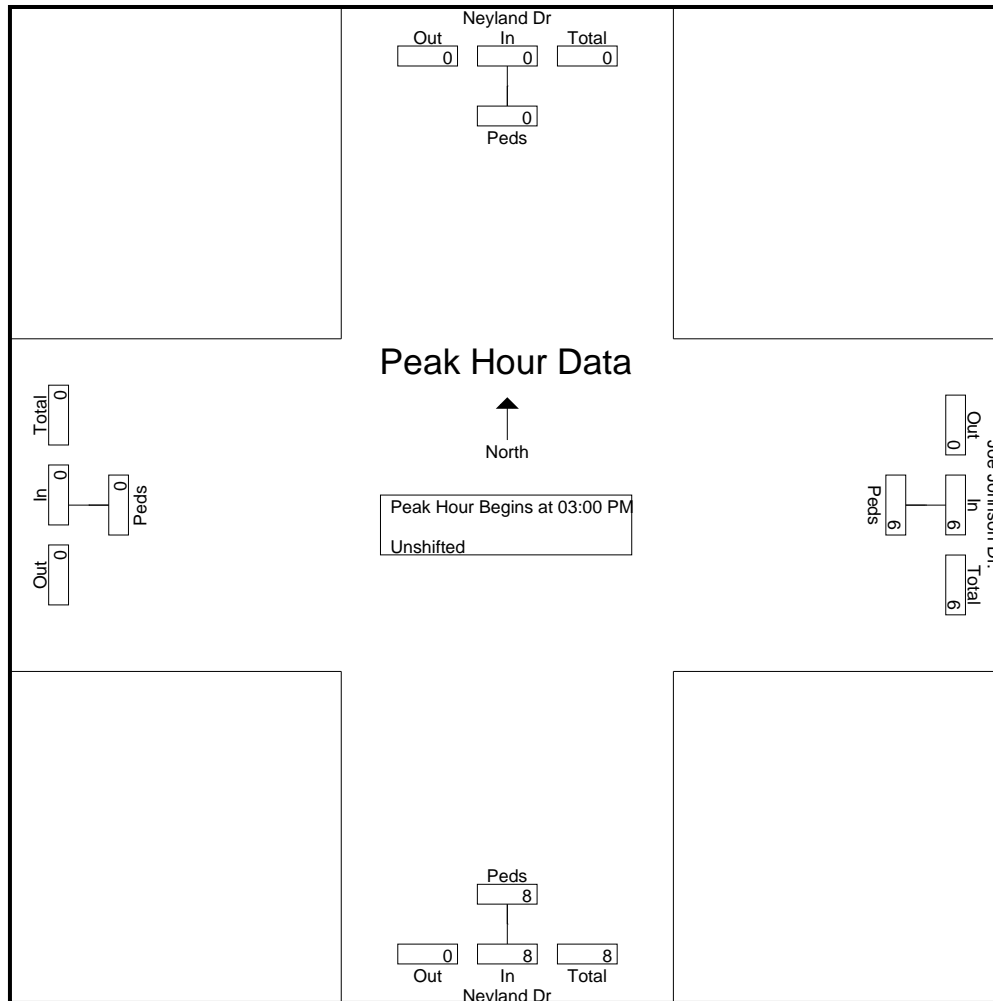
Start Time	Neyland Dr Southbound		Joe Johnson Dr. Westbound		Neyland Dr Northbound		Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:00 AM	0	0	0	0	5	5	0	0	5
07:15 AM	0	0	0	0	1	1	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	4	4	0	0	0	0	4
Total Volume	0	0	4	4	6	6	0	0	10
% App. Total	0		100		100		0		
PHF	.000	.000	.250	.250	.300	.300	.000	.000	.500

Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 07:00 AM



Start Time	Neyland Dr Southbound		Joe Johnson Dr. Westbound		Neyland Dr Northbound		Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
03:00 PM	0	0	3	3	1	1	0	0	4
03:15 PM	0	0	3	3	4	4	0	0	7
03:30 PM	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	3	3	0	0	3
Total Volume	0	0	6	6	8	8	0	0	14
% App. Total	0		100		100		0		
PHF	.000	.000	.500	.500	.500	.500	.000	.000	.500

Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 03:00 PM



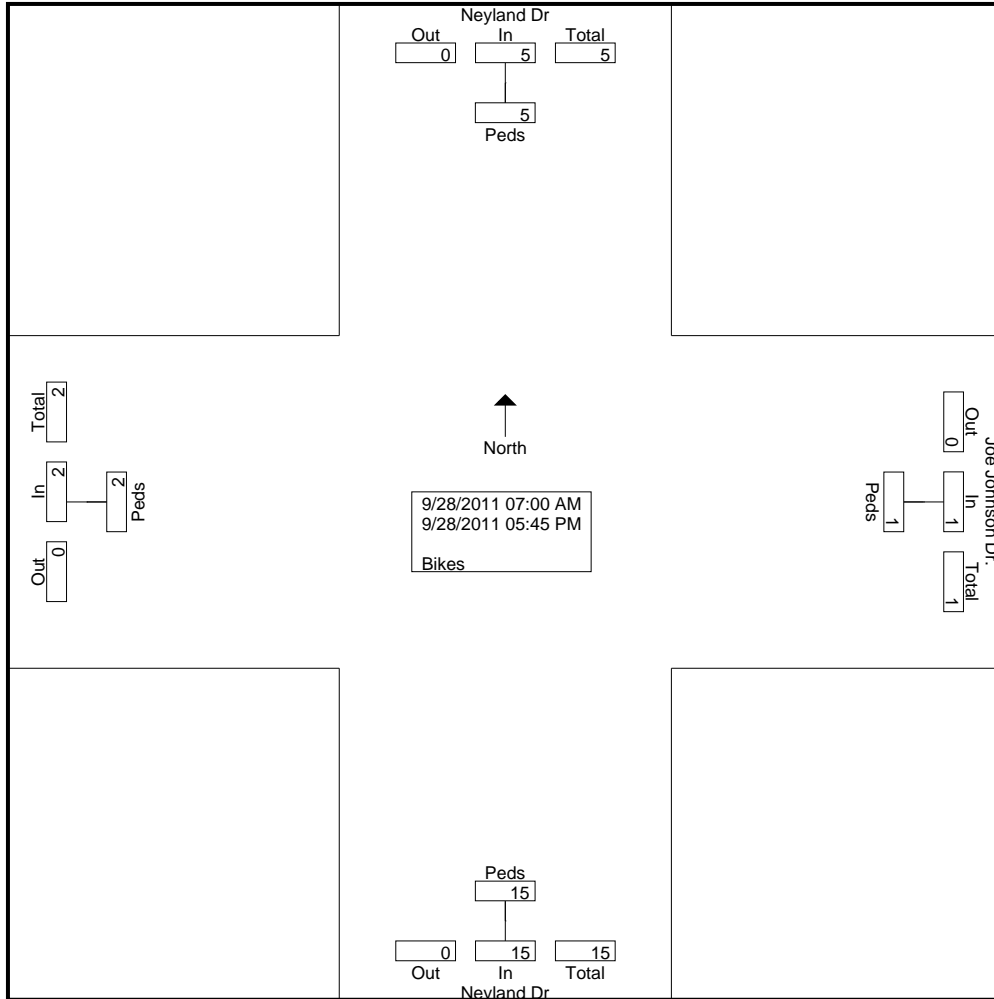
WILBUR SMITH ASSOCIATES  
 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : Joe Johnson Neyland  
 Site Code : 00000008  
 Start Date : 9/28/2011  
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Groups Printed- Bikes

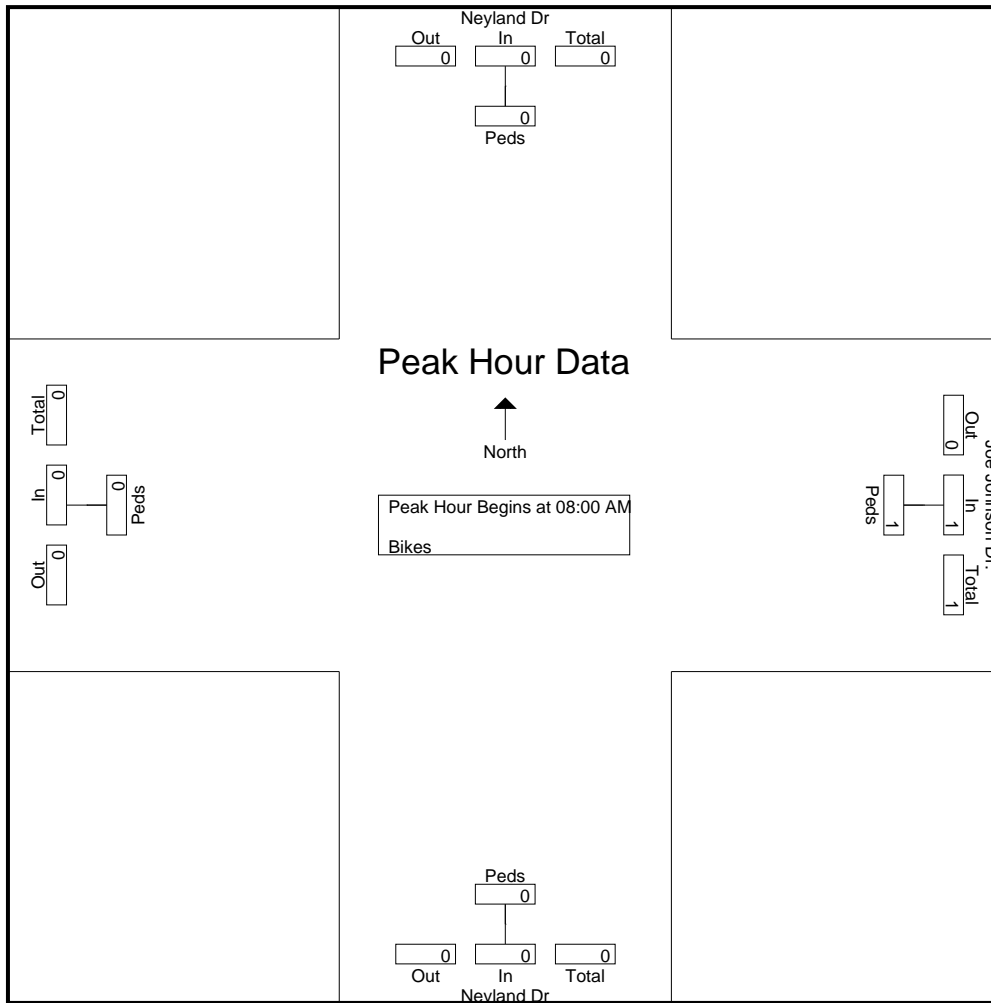
Start Time	Neyland Dr Southbound		Joe Johnson Dr. Westbound		Neyland Dr Northbound		Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
*** BREAK ***									
08:45 AM	0	0	1	1	0	0	0	0	1
Total	0	0	1	1	0	0	0	0	1
*** BREAK ***									
03:00 PM	2	2	0	0	0	0	0	0	2
*** BREAK ***									
03:30 PM	0	0	0	0	1	1	0	0	1
03:45 PM	0	0	0	0	1	1	0	0	1
Total	2	2	0	0	2	2	0	0	4
*** BREAK ***									
04:15 PM	0	0	0	0	3	3	0	0	3
*** BREAK ***									
04:45 PM	0	0	0	0	3	3	2	2	5
Total	0	0	0	0	6	6	2	2	8
05:00 PM	0	0	0	0	1	1	0	0	1
05:15 PM	3	3	0	0	3	3	0	0	6
*** BREAK ***									
05:45 PM	0	0	0	0	3	3	0	0	3
Total	3	3	0	0	7	7	0	0	10
Grand Total	5	5	1	1	15	15	2	2	23
Apprch %	100		100		100		100		
Total %	21.7	21.7	4.3	4.3	65.2	65.2	8.7	8.7	





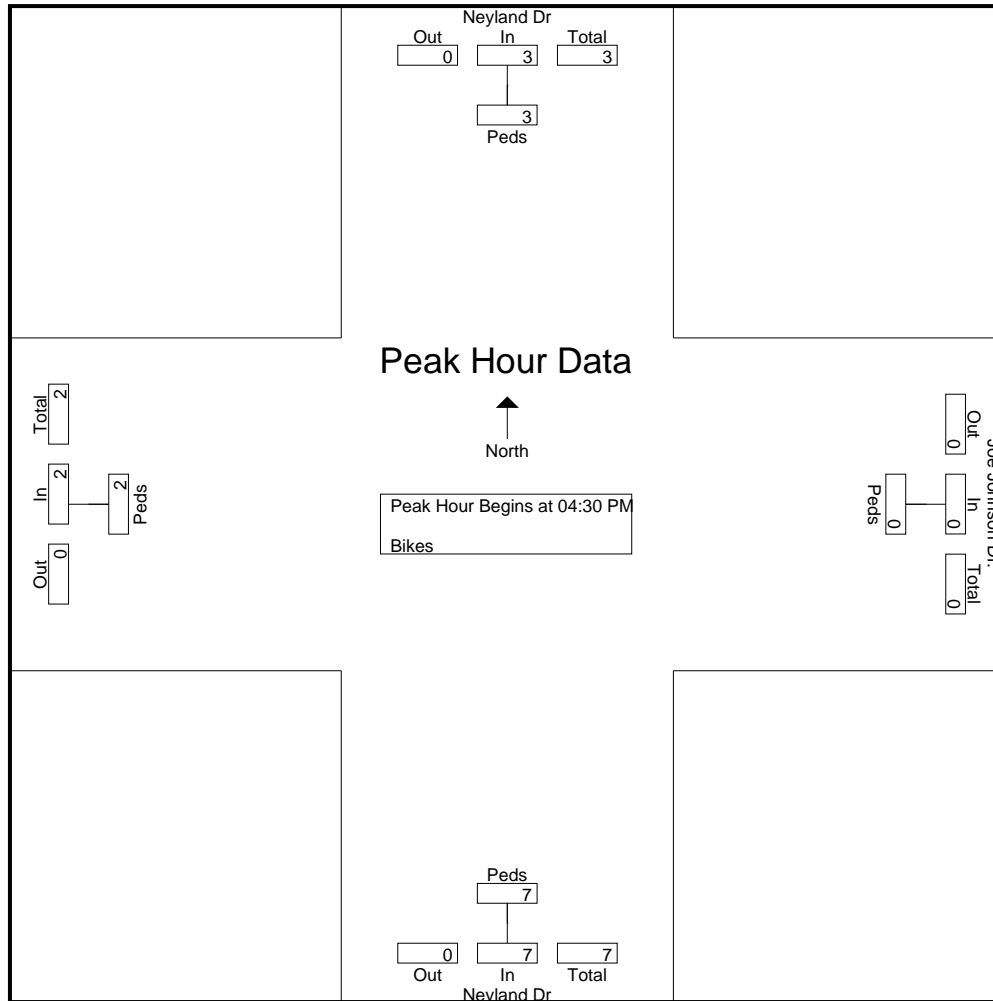
Start Time	Neyland Dr Southbound		Joe Johnson Dr. Westbound		Neyland Dr Northbound		Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
08:00 AM	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	1	1	0	0	0	0	1
Total Volume	0	0	1	1	0	0	0	0	1
% App. Total	0		100		0		0		
PHF	.000	.000	.250	.250	.000	.000	.000	.000	.250

Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 08:00 AM



Start Time	Neyland Dr Southbound		Joe Johnson Dr. Westbound		Neyland Dr Northbound		Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
04:30 PM	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	3	3	2	2	5
05:00 PM	0	0	0	0	1	1	0	0	1
05:15 PM	3	3	0	0	3	3	0	0	6
Total Volume	3	3	0	0	7	7	2	2	12
% App. Total	100		0		100		100		
PHF	.250	.250	.000	.000	.583	.583	.250	.250	.500

Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 04:30 PM

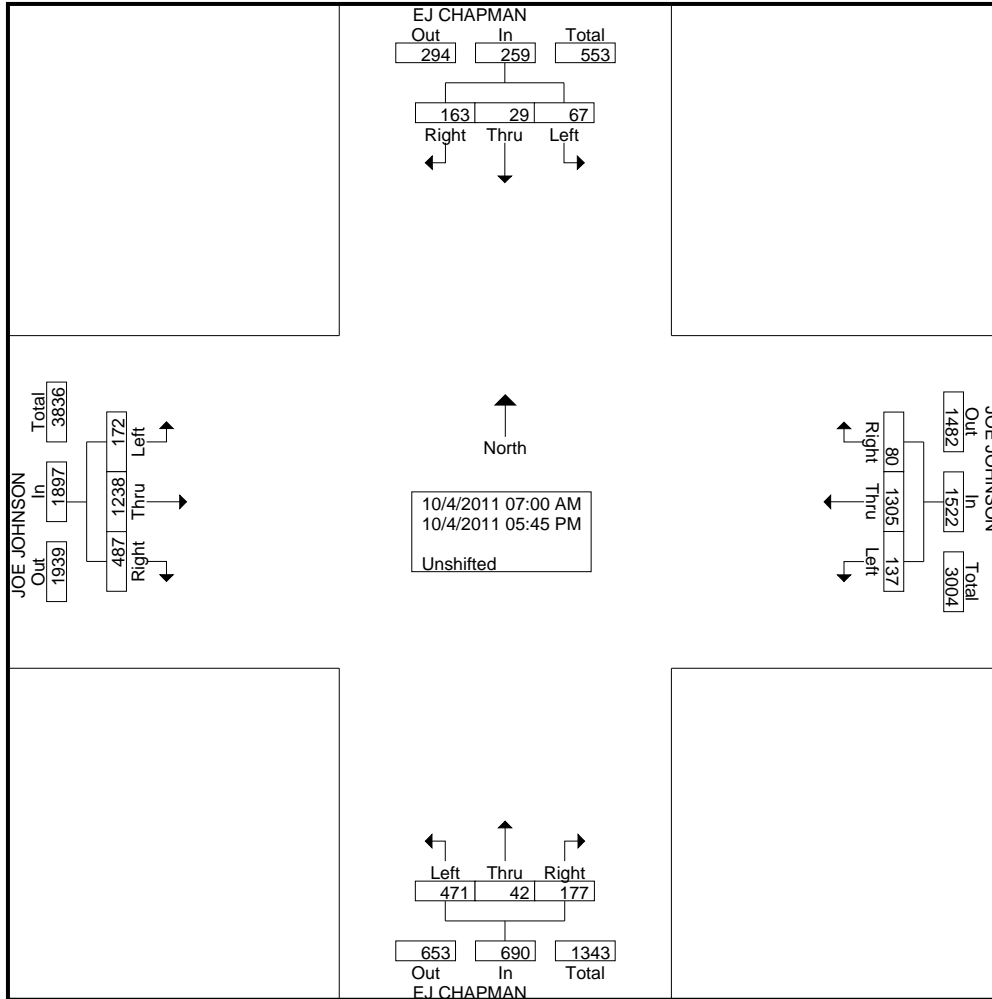


WILBUR SMITH ASSOCIATES  
 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : Joe Johnson EJChapman  
 Site Code : 00000005  
 Start Date : 10/4/2011  
 Page No : 1

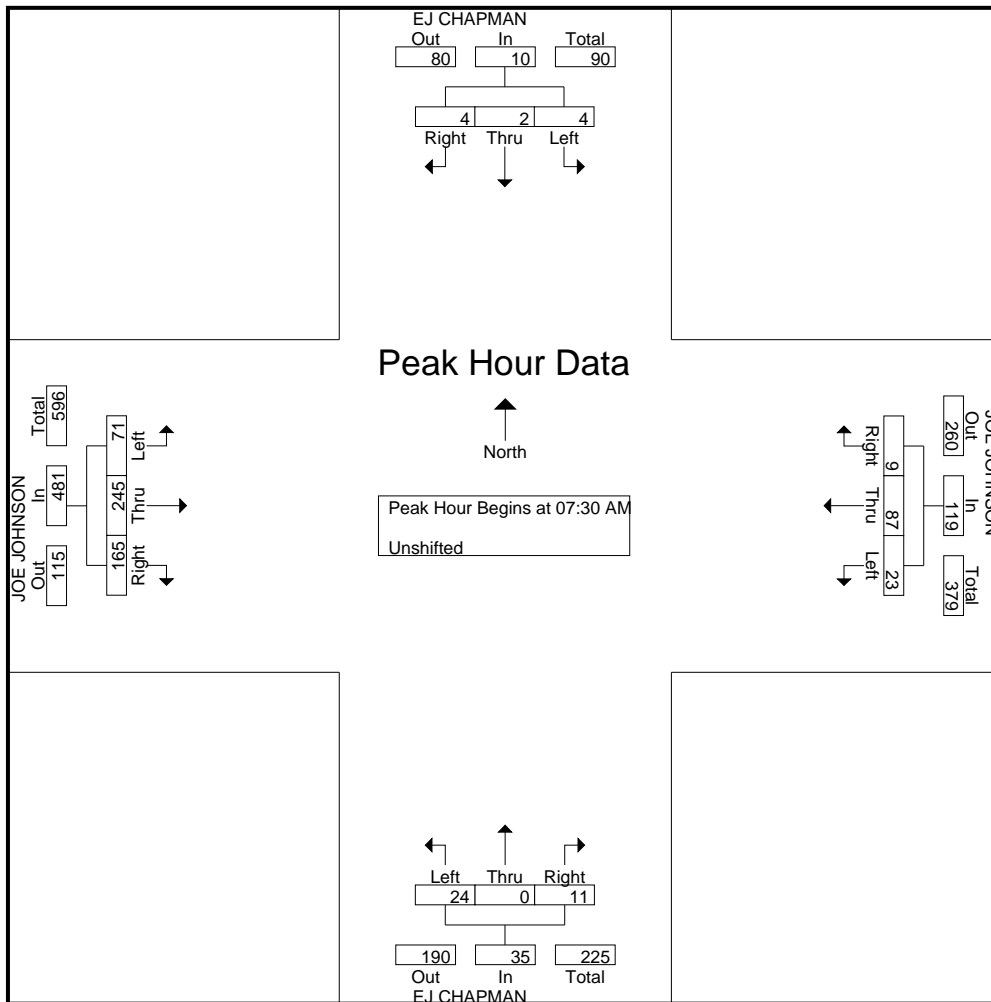
**Groups Printed- Unshifted**

Start Time	EJ CHAPMAN Southbound				JOE JOHNSON Westbound				EJ CHAPMAN Northbound				JOE JOHNSON Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	0	0	1	1	3	13	0	16	3	0	0	3	5	25	22	52	72
07:15 AM	2	0	0	2	3	12	3	18	2	1	1	4	6	34	34	74	98
07:30 AM	0	1	0	1	8	16	2	26	3	0	3	6	14	59	38	111	144
07:45 AM	1	0	2	3	9	34	2	45	3	0	5	8	17	71	37	125	181
Total	3	1	3	7	23	75	7	105	11	1	9	21	42	189	131	362	495
08:00 AM	2	0	1	3	3	21	1	25	12	0	3	15	28	69	59	156	199
08:15 AM	1	1	1	3	3	16	4	23	6	0	0	6	12	46	31	89	121
08:30 AM	1	0	4	5	4	27	0	31	2	1	2	5	6	34	29	69	110
08:45 AM	2	1	1	4	4	20	2	26	11	3	3	17	10	39	37	86	133
Total	6	2	7	15	14	84	7	105	31	4	8	43	56	188	156	400	563
*** BREAK ***																	
11:00 AM	1	1	3	5	5	39	0	44	8	1	8	17	4	37	8	49	115
11:15 AM	4	2	2	8	4	36	3	43	15	2	8	25	3	35	8	46	122
11:30 AM	6	0	5	11	4	32	2	38	18	2	6	26	2	37	4	43	118
11:45 AM	2	0	4	6	5	41	2	48	21	1	15	37	5	38	9	52	143
Total	13	3	14	30	18	148	7	173	62	6	37	105	14	147	29	190	498
12:00 PM	4	2	6	12	3	32	1	36	15	2	11	28	3	43	7	53	129
12:15 PM	2	0	7	9	11	41	1	53	13	2	11	26	6	42	15	63	151
12:30 PM	1	0	4	5	11	59	8	78	7	0	4	11	7	30	12	49	143
12:45 PM	1	2	3	6	6	37	4	47	14	0	4	18	7	33	15	55	126
Total	8	4	20	32	31	169	14	214	49	4	30	83	23	148	49	220	549
*** BREAK ***																	
02:00 PM	2	1	2	5	6	50	3	59	12	2	5	19	3	36	10	49	132
02:15 PM	2	1	3	6	2	45	0	47	11	1	6	18	3	39	10	52	123
02:30 PM	0	0	4	4	2	33	0	35	12	0	4	16	2	23	5	30	85
02:45 PM	1	2	3	6	2	32	5	39	20	2	6	28	2	39	13	54	127
Total	5	4	12	21	12	160	8	180	55	5	21	81	10	137	38	185	467
03:00 PM	2	0	6	8	0	28	3	31	15	0	2	17	2	27	1	30	86
03:15 PM	3	1	2	6	5	40	4	49	21	3	4	28	2	36	8	46	129
03:30 PM	5	1	1	7	1	79	1	81	11	1	5	17	1	36	5	42	147
03:45 PM	3	0	2	5	4	51	2	57	10	2	6	18	2	34	2	38	118
Total	13	2	11	26	10	198	10	218	57	6	17	80	7	133	16	156	480
04:00 PM	5	1	10	16	6	47	4	57	25	4	4	33	2	39	7	48	154
04:15 PM	3	2	11	16	0	43	4	47	22	1	0	23	3	39	7	49	135
04:30 PM	1	3	13	17	3	92	4	99	18	4	10	32	2	43	9	54	202
04:45 PM	0	3	14	17	2	56	2	60	30	2	14	46	3	49	4	56	179
Total	9	9	48	66	11	238	14	263	95	11	28	134	10	170	27	207	670
05:00 PM	4	2	29	35	7	77	6	90	43	1	17	61	2	30	7	39	225
05:15 PM	3	0	6	9	5	59	3	67	29	2	4	35	2	33	5	40	151
05:30 PM	2	1	8	11	2	57	3	62	20	1	3	24	3	32	14	49	146
05:45 PM	1	1	5	7	4	40	1	45	19	1	3	23	3	31	15	49	124
Total	10	4	48	62	18	233	13	264	111	5	27	143	10	126	41	177	646
Grand Total	67	29	163	259	137	1305	80	1522	471	42	177	690	172	1238	487	1897	4368
Apprch %	25.9	11.2	62.9		9	85.7	5.3		68.3	6.1	25.7		9.1	65.3	25.7		
Total %	1.5	0.7	3.7	5.9	3.1	29.9	1.8	34.8	10.8	1	4.1	15.8	3.9	28.3	11.1	43.4	

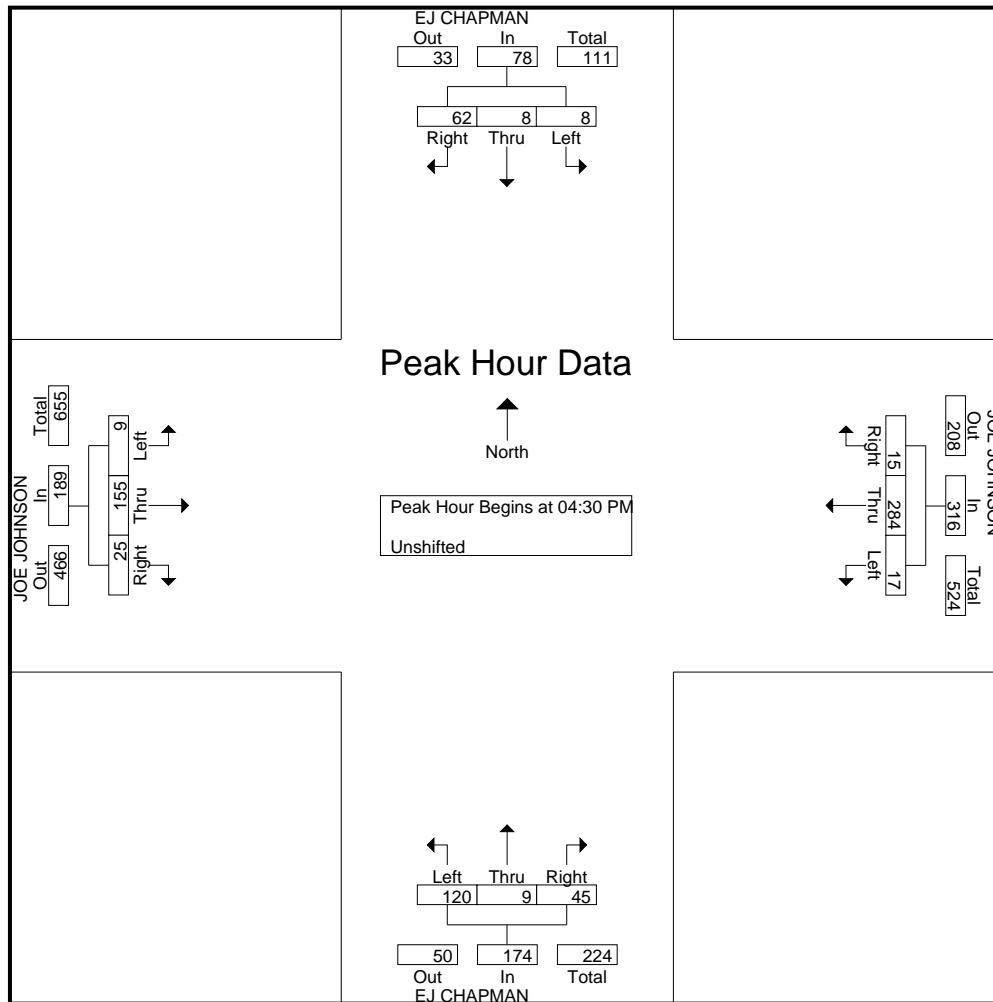


Start Time	EJ CHAPMAN Southbound				JOE JOHNSON Westbound				EJ CHAPMAN Northbound				JOE JOHNSON Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:30 AM	0	1	0	1	8	16	2	26	3	0	3	6	14	59	38	111	144
07:45 AM	1	0	2	3	9	34	2	45	3	0	5	8	17	71	37	125	181
08:00 AM	2	0	1	3	3	21	1	25	12	0	3	15	28	69	59	156	199
08:15 AM	1	1	1	3	3	16	4	23	6	0	0	6	12	46	31	89	121
Total Volume	4	2	4	10	23	87	9	119	24	0	11	35	71	245	165	481	645
% App. Total	40	20	40		19.3	73.1	7.6		68.6	0	31.4		14.8	50.9	34.3		
PHF	.500	.500	.500	.833	.639	.640	.563	.661	.500	.000	.550	.583	.634	.863	.699	.771	.810

Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 07:30 AM



Start Time	EJ CHAPMAN Southbound				JOE JOHNSON Westbound				EJ CHAPMAN Northbound				JOE JOHNSON Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	1	3	13	17	3	92	4	99	18	4	10	32	2	43	9	54	202
04:45 PM	0	3	14	17	2	56	2	60	30	2	14	46	3	49	4	56	179
05:00 PM	4	2	29	35	7	77	6	90	43	1	17	61	2	30	7	39	225
05:15 PM	3	0	6	9	5	59	3	67	29	2	4	35	2	33	5	40	151
Total Volume	8	8	62	78	17	284	15	316	120	9	45	174	9	155	25	189	757
% App. Total	10.3	10.3	79.5		5.4	89.9	4.7		69	5.2	25.9		4.8	82	13.2		
PHF	.500	.667	.534	.557	.607	.772	.625	.798	.698	.563	.662	.713	.750	.791	.694	.844	.841



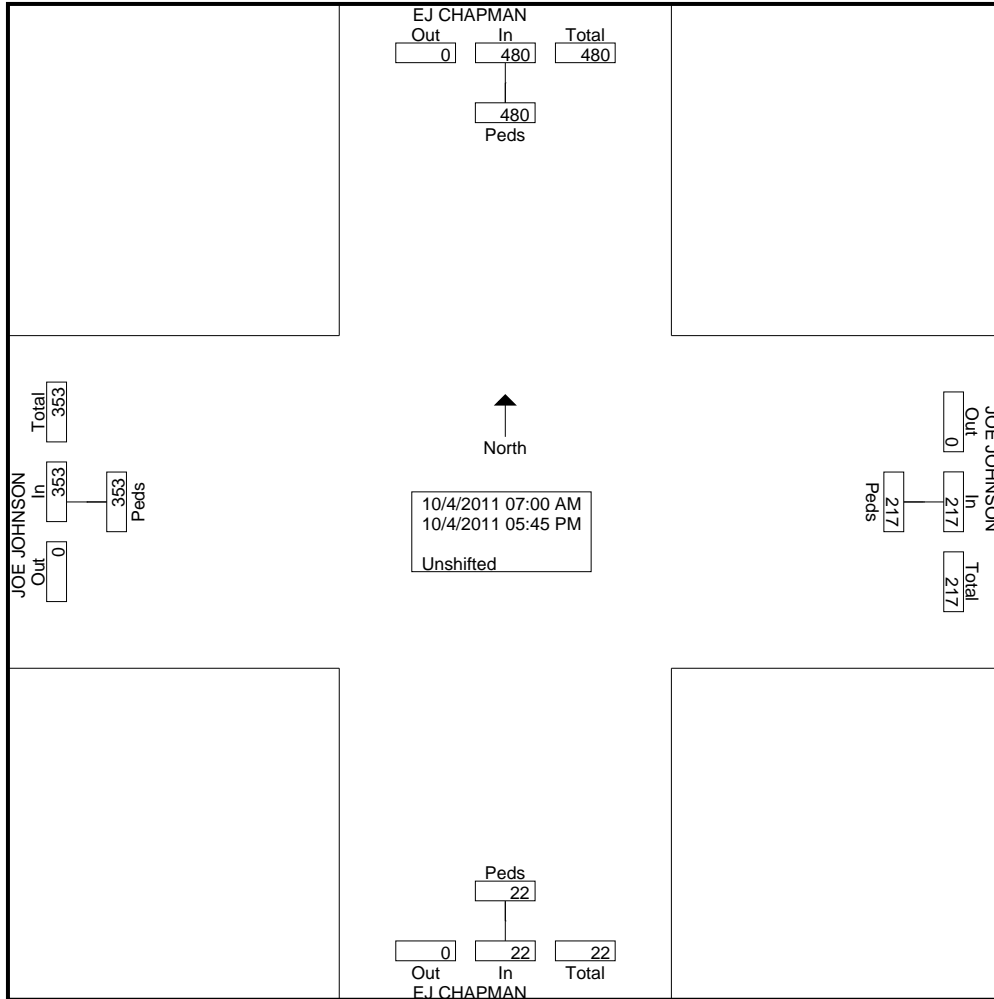
WILBUR SMITH ASSOCIATES  
 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : Joe Johnson EJChapman  
 Site Code : 00000005  
 Start Date : 10/4/2011  
 Page No : 1

**Groups Printed- Unshifted**

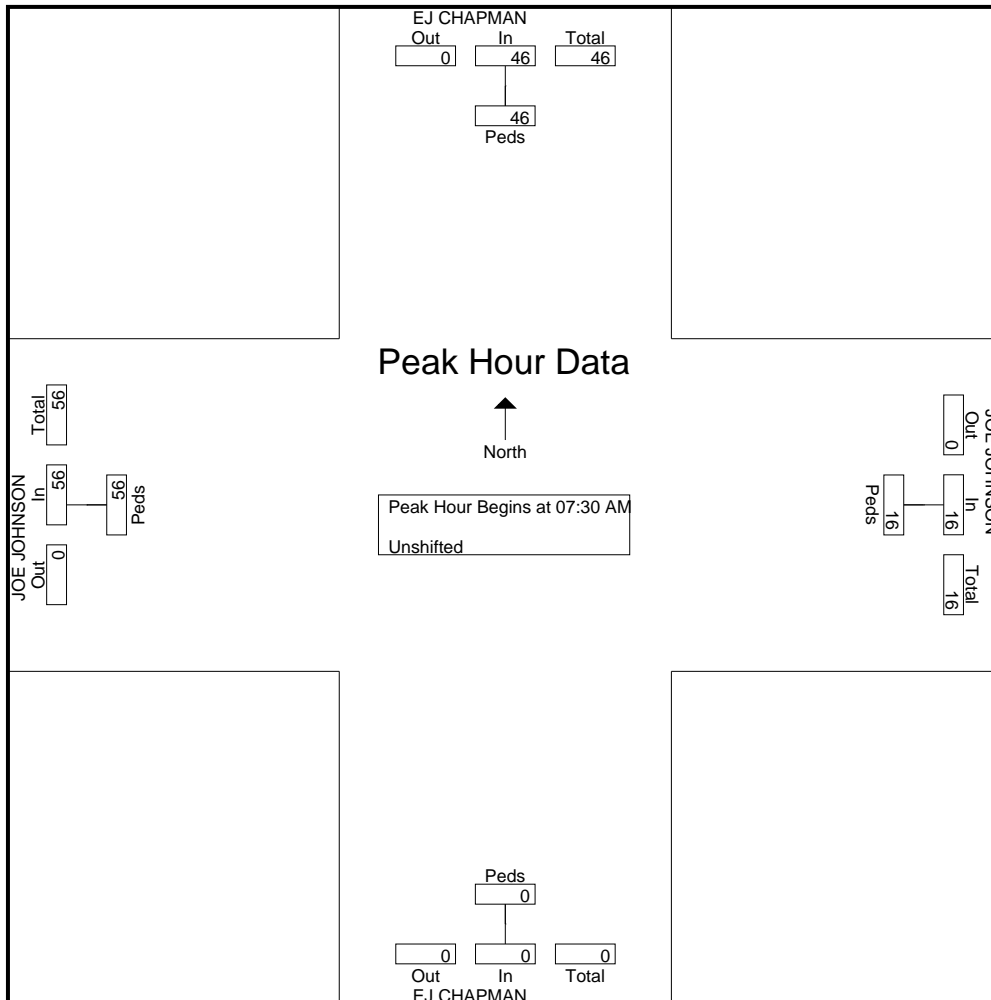
Start Time	EJ CHAPMAN Southbound		JOE JOHNSON Westbound		EJ CHAPMAN Northbound		JOE JOHNSON Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:00 AM	5	5	3	3	1	1	0	0	9
07:15 AM	4	4	1	1	0	0	0	0	5
07:30 AM	6	6	2	2	0	0	9	9	17
07:45 AM	16	16	3	3	0	0	17	17	36
Total	31	31	9	9	1	1	26	26	67
08:00 AM	18	18	8	8	0	0	16	16	42
08:15 AM	6	6	3	3	0	0	14	14	23
08:30 AM	3	3	2	2	0	0	7	7	12
08:45 AM	11	11	10	10	1	1	13	13	35
Total	38	38	23	23	1	1	50	50	112
*** BREAK ***									
11:00 AM	29	29	19	19	0	0	9	9	57
11:15 AM	10	10	7	7	0	0	5	5	22
11:30 AM	5	5	2	2	1	1	9	9	17
11:45 AM	11	11	4	4	1	1	13	13	29
Total	55	55	32	32	2	2	36	36	125
12:00 PM	19	19	9	9	0	0	23	23	51
12:15 PM	24	24	13	13	0	0	13	13	50
12:30 PM	31	31	15	15	1	1	10	10	57
12:45 PM	11	11	11	11	1	1	15	15	38
Total	85	85	48	48	2	2	61	61	196
*** BREAK ***									
02:00 PM	36	36	11	11	2	2	16	16	65
02:15 PM	8	8	2	2	0	0	14	14	24
02:30 PM	14	14	4	4	1	1	10	10	29
02:45 PM	32	32	15	15	2	2	8	8	57
Total	90	90	32	32	5	5	48	48	175
03:00 PM	9	9	4	4	1	1	5	5	19
03:15 PM	40	40	7	7	1	1	3	3	51
03:30 PM	21	21	7	7	0	0	6	6	34
03:45 PM	13	13	2	2	1	1	1	1	17
Total	83	83	20	20	3	3	15	15	121
04:00 PM	13	13	3	3	1	1	10	10	27
04:15 PM	24	24	4	4	1	1	6	6	35
04:30 PM	17	17	14	14	1	1	5	5	37
04:45 PM	10	10	5	5	0	0	23	23	38
Total	64	64	26	26	3	3	44	44	137
05:00 PM	9	9	12	12	2	2	16	16	39
05:15 PM	14	14	5	5	2	2	23	23	44
05:30 PM	4	4	8	8	0	0	8	8	20
05:45 PM	7	7	2	2	1	1	26	26	36
Total	34	34	27	27	5	5	73	73	139
Grand Total	480	480	217	217	22	22	353	353	1072
Apprch %	100		100		100		100		
Total %	44.8	44.8	20.2	20.2	2.1	2.1	32.9	32.9	





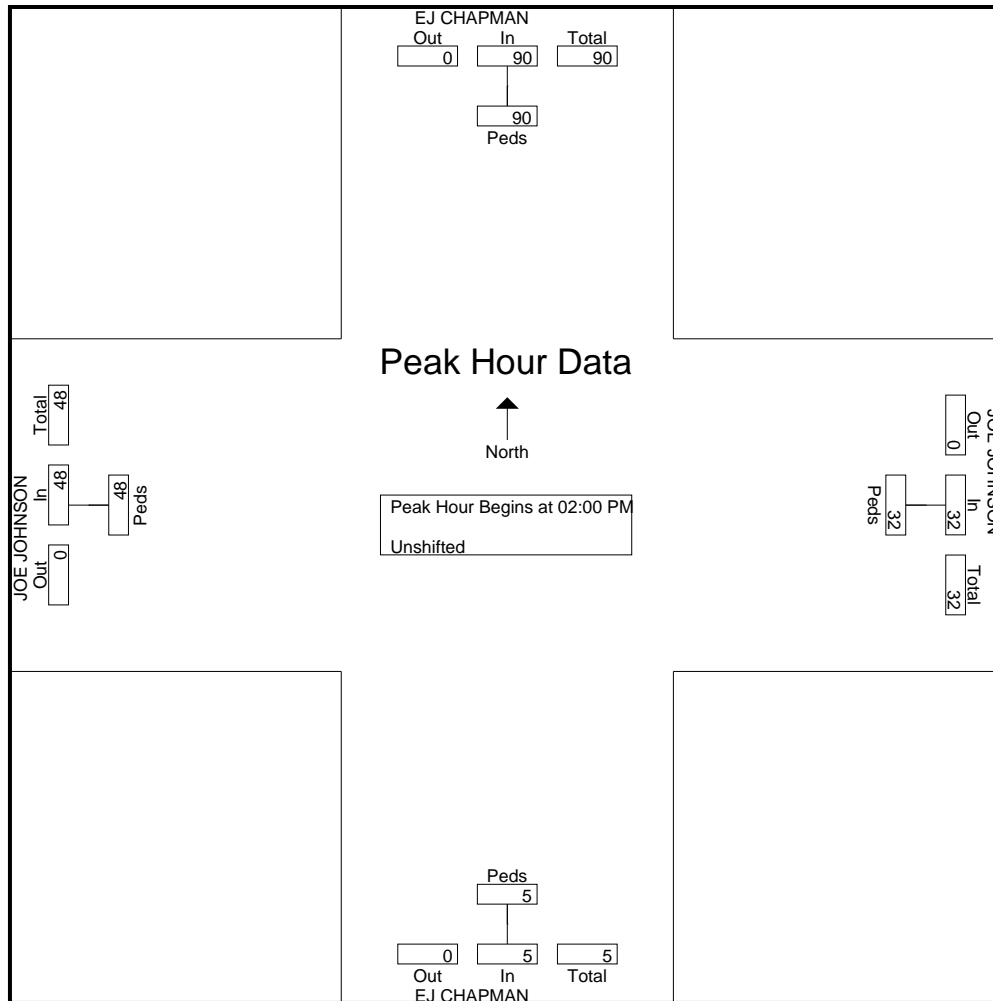
Start Time	EJ CHAPMAN Southbound		JOE JOHNSON Westbound		EJ CHAPMAN Northbound		JOE JOHNSON Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:30 AM	6	6	2	2	0	0	9	9	17
07:45 AM	16	16	3	3	0	0	17	17	36
08:00 AM	<b>18</b>	<b>18</b>	<b>8</b>	<b>8</b>	0	0	16	16	<b>42</b>
08:15 AM	6	6	3	3	0	0	14	14	23
Total Volume	46	46	16	16	0	0	56	56	118
% App. Total	100		100		0		100		
PHF	.639	.639	.500	.500	.000	.000	.824	.824	.702

Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 07:30 AM

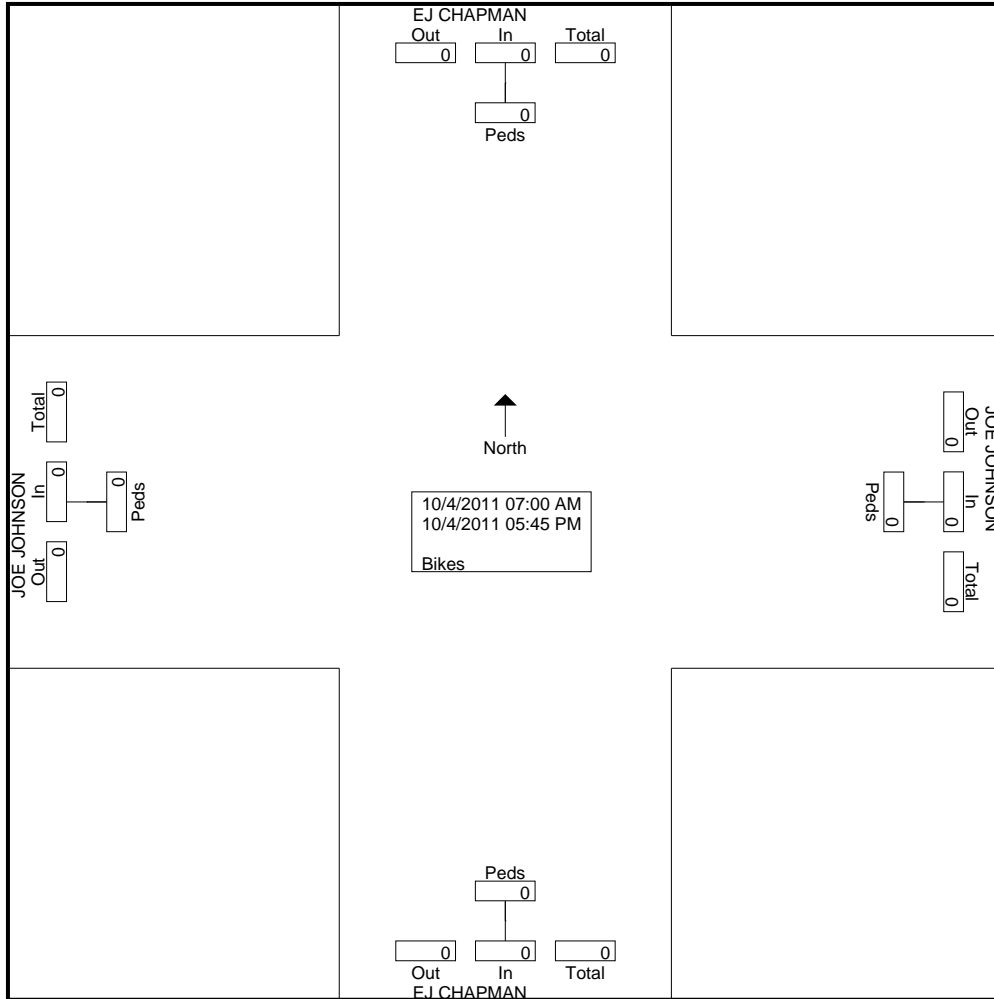


Start Time	EJ CHAPMAN Southbound		JOE JOHNSON Westbound		EJ CHAPMAN Northbound		JOE JOHNSON Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
02:00 PM	36	36	11	11	2	2	16	16	65
02:15 PM	8	8	2	2	0	0	14	14	24
02:30 PM	14	14	4	4	1	1	10	10	29
02:45 PM	32	32	15	15	2	2	8	8	57
Total Volume	90	90	32	32	5	5	48	48	175
% App. Total	100		100		100		100		
PHF	.625	.625	.533	.533	.625	.625	.750	.750	.673

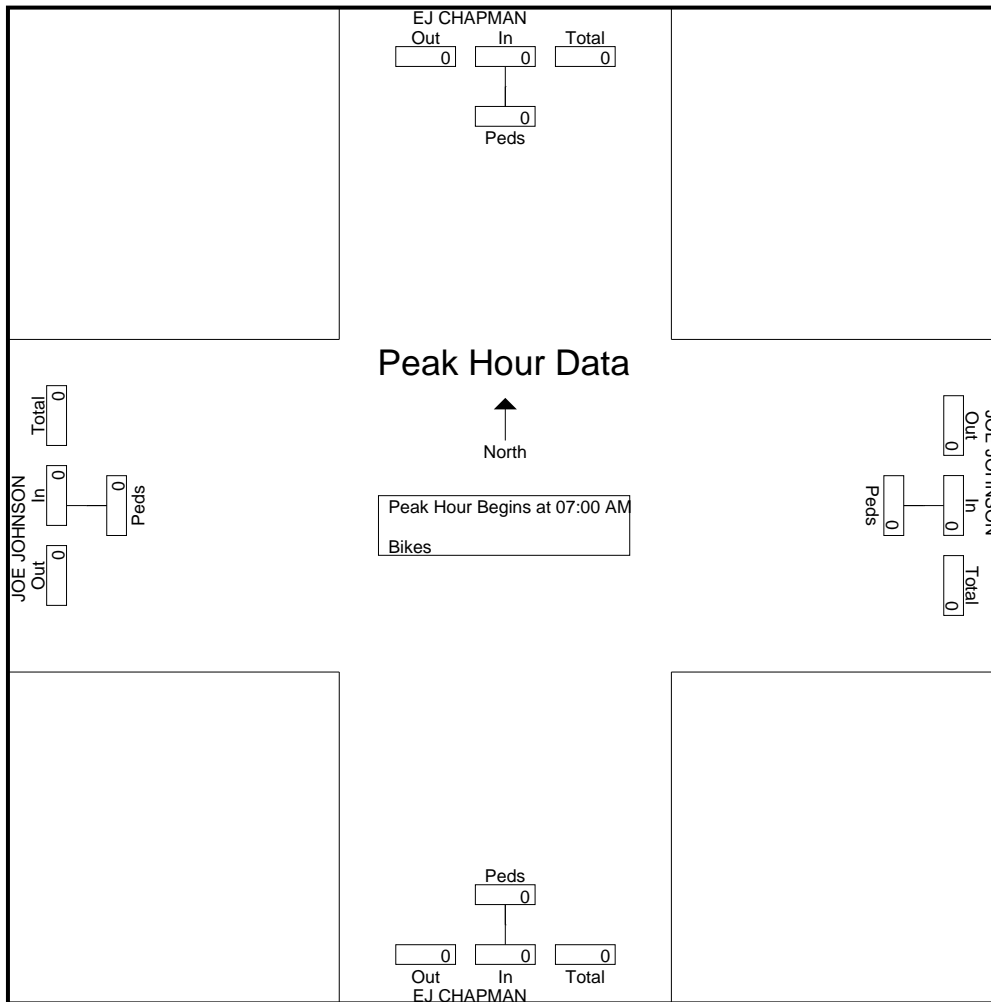
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 02:00 PM





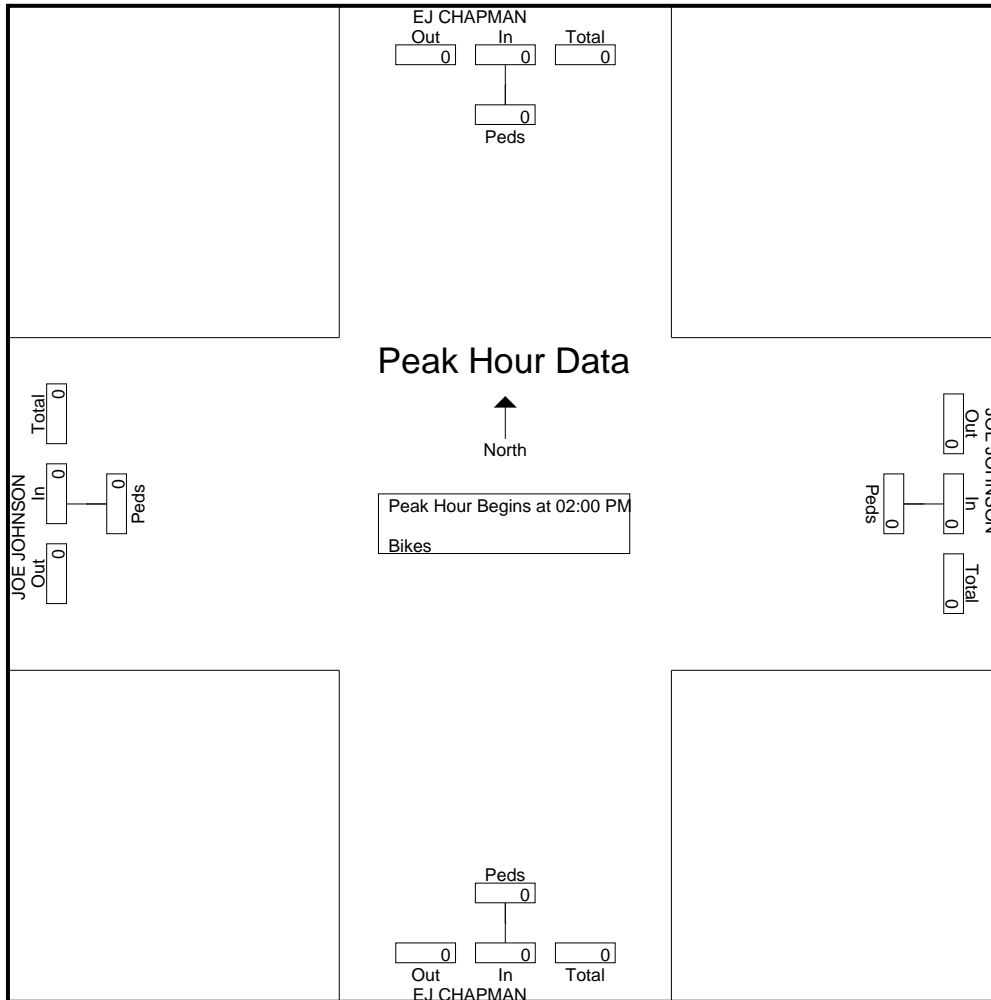


Start Time	EJ CHAPMAN Southbound		JOE JOHNSON Westbound		EJ CHAPMAN Northbound		JOE JOHNSON Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1									
Peak Hour for Entire Intersection Begins at 07:00 AM									
07:00 AM	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0
% App. Total	0		0		0		0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000



Start Time	EJ CHAPMAN Southbound		JOE JOHNSON Westbound		EJ CHAPMAN Northbound		JOE JOHNSON Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
02:00 PM	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0
% App. Total	0		0		0		0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000

Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 02:00 PM



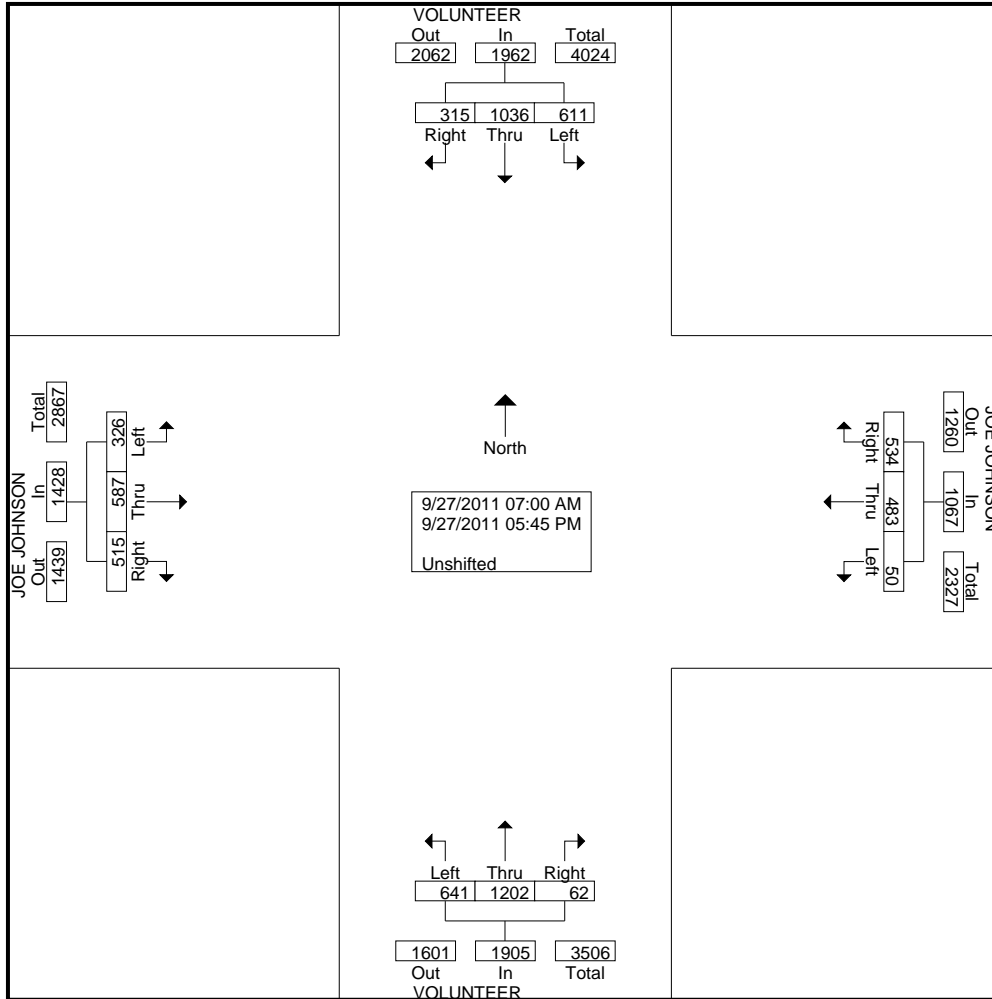
WILBUR SMITH ASSOCIATES  
 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : Joe Johnson Volunteer  
 Site Code : 00000004  
 Start Date : 9/27/2011  
 Page No : 1

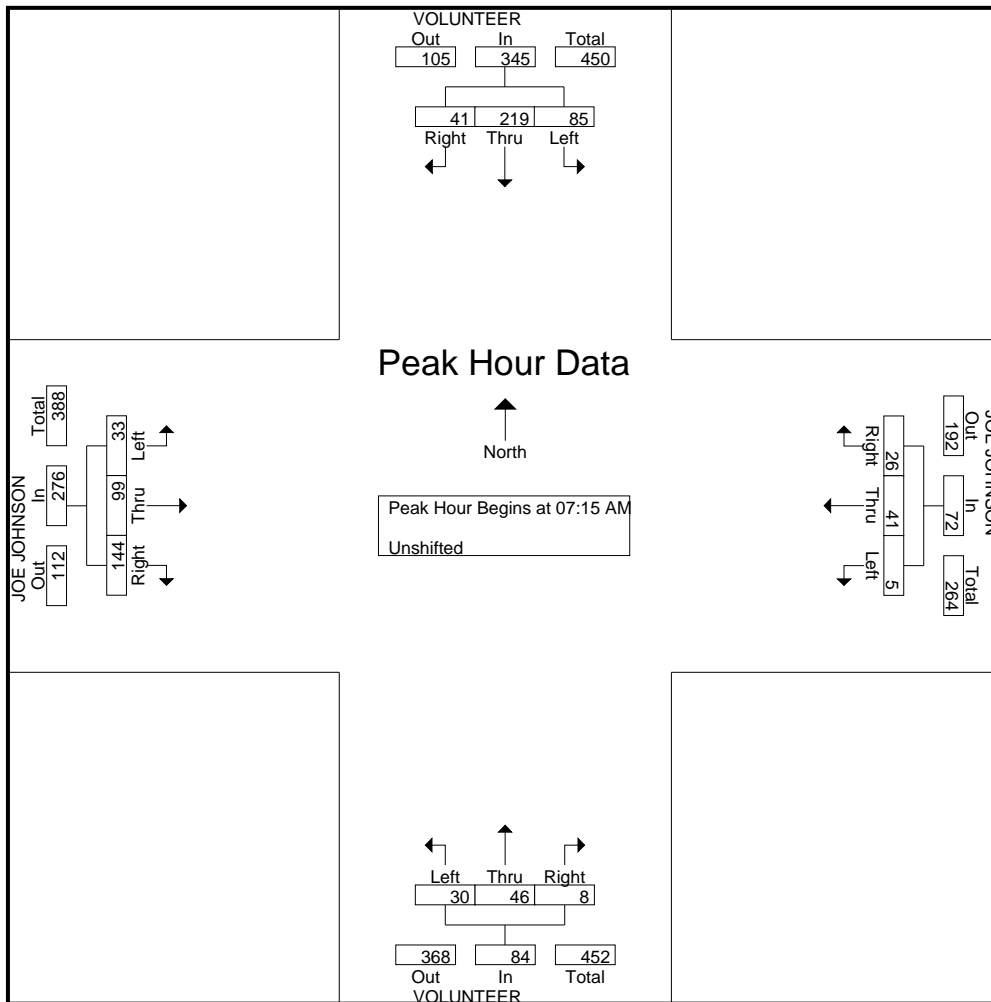
**Groups Printed- Unshifted**

Start Time	VOLUNTEER Southbound				JOE JOHNSON Westbound				VOLUNTEER Northbound				JOE JOHNSON Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	13	27	10	50	0	3	1	4	10	12	0	22	3	13	13	29	105
07:15 AM	19	38	3	60	1	6	5	12	2	10	0	12	6	20	24	50	134
07:30 AM	27	59	14	100	2	13	3	18	14	7	1	22	5	17	39	61	201
07:45 AM	22	73	15	110	1	10	9	20	10	13	3	26	11	42	53	106	262
Total	81	197	42	320	4	32	18	54	36	42	4	82	25	92	129	246	702
08:00 AM	17	49	9	75	1	12	9	22	4	16	4	24	11	20	28	59	180
08:15 AM	9	27	6	42	1	10	3	14	5	10	1	16	8	24	17	49	121
08:30 AM	21	30	3	54	2	6	7	15	13	11	1	25	9	22	25	56	150
08:45 AM	13	42	13	68	1	11	5	17	8	16	2	26	9	19	14	42	153
Total	60	148	31	239	5	39	24	68	30	53	8	91	37	85	84	206	604
*** BREAK ***																	
11:00 AM	22	31	6	59	1	14	14	29	19	64	3	86	18	12	21	51	225
11:15 AM	10	20	4	34	3	10	11	24	14	31	1	46	8	8	6	22	126
11:30 AM	12	19	7	38	0	10	9	19	13	19	2	34	13	12	14	39	130
11:45 AM	17	33	11	61	1	18	15	34	16	42	2	60	18	25	12	55	210
Total	61	103	28	192	5	52	49	106	62	156	8	226	57	57	53	167	691
12:00 PM	16	47	11	74	1	13	24	38	14	44	1	59	31	21	15	67	238
12:15 PM	17	50	23	90	0	17	20	37	17	50	1	68	12	8	12	32	227
12:30 PM	13	32	29	74	2	18	21	41	26	61	2	89	20	14	12	46	250
12:45 PM	15	30	9	54	0	15	12	27	21	42	3	66	3	17	10	30	177
Total	61	159	72	292	3	63	77	143	78	197	7	282	66	60	49	175	892
*** BREAK ***																	
02:00 PM	20	26	10	56	4	13	30	47	25	53	1	79	9	15	13	37	219
02:15 PM	17	25	9	51	3	10	20	33	17	40	0	57	9	10	9	28	169
02:30 PM	18	26	6	50	3	18	19	40	13	26	4	43	6	24	8	38	171
02:45 PM	8	17	9	34	3	18	10	31	9	28	1	38	8	14	13	35	138
Total	63	94	34	191	13	59	79	151	64	147	6	217	32	63	43	138	697
03:00 PM	10	28	6	44	2	11	11	24	16	36	3	55	4	9	12	25	148
03:15 PM	14	34	7	55	0	17	18	35	27	51	0	78	11	19	12	42	210
03:30 PM	13	34	25	72	0	19	17	36	45	74	2	121	13	19	12	44	273
03:45 PM	22	19	12	53	3	24	26	53	16	29	3	48	9	27	21	57	211
Total	59	115	50	224	5	71	72	148	104	190	8	302	37	74	57	168	842
04:00 PM	24	30	12	66	4	16	21	41	26	49	1	76	11	16	12	39	222
04:15 PM	26	46	8	80	1	24	17	42	13	38	1	52	10	18	17	45	219
04:30 PM	31	38	5	74	5	36	33	74	65	60	4	129	10	19	20	49	326
04:45 PM	32	49	7	88	1	15	35	51	29	63	2	94	9	22	15	46	279
Total	113	163	32	308	11	91	106	208	133	210	8	351	40	75	64	179	1046
05:00 PM	43	16	7	66	0	24	27	51	55	86	2	143	14	30	10	54	314
05:15 PM	22	26	12	60	2	33	36	71	36	55	7	98	12	16	13	41	270
05:30 PM	33	7	4	44	0	14	26	40	23	33	1	57	2	26	7	35	176
05:45 PM	15	8	3	26	2	5	20	27	20	33	3	56	4	9	6	19	128
Total	113	57	26	196	4	76	109	189	134	207	13	354	32	81	36	149	888
Grand Total	611	1036	315	1962	50	483	534	1067	641	1202	62	1905	326	587	515	1428	6362
Apprch %	31.1	52.8	16.1		4.7	45.3	50		33.6	63.1	3.3		22.8	41.1	36.1		
Total %	9.6	16.3	5	30.8	0.8	7.6	8.4	16.8	10.1	18.9	1	29.9	5.1	9.2	8.1	22.4	

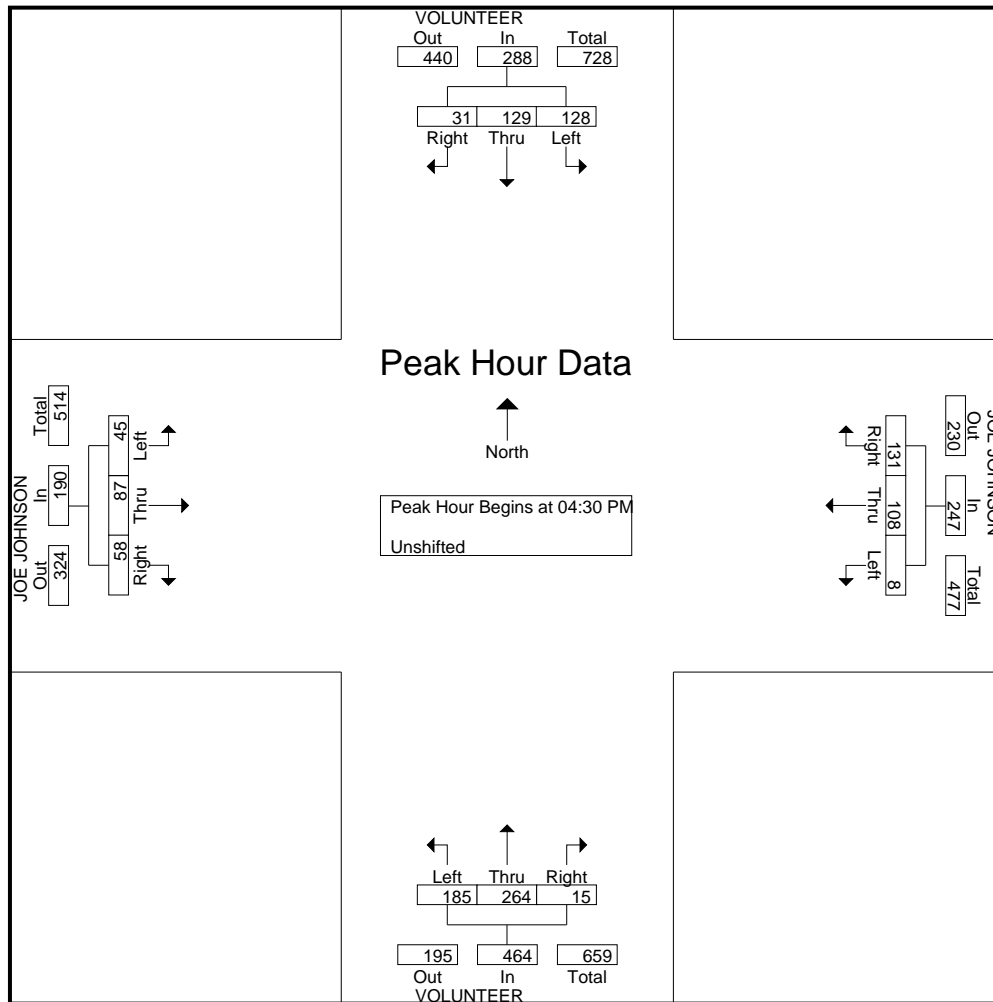




Start Time	VOLUNTEER Southbound				JOE JOHNSON Westbound				VOLUNTEER Northbound				JOE JOHNSON Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	19	38	3	60	1	6	5	12	2	10	0	12	6	20	24	50	134
07:30 AM	27	59	14	100	2	13	3	18	14	7	1	22	5	17	39	61	201
07:45 AM	22	73	15	110	1	10	9	20	10	13	3	26	11	42	53	106	262
08:00 AM	17	49	9	75	1	12	9	22	4	16	4	24	11	20	28	59	180
Total Volume	85	219	41	345	5	41	26	72	30	46	8	84	33	99	144	276	777
% App. Total	24.6	63.5	11.9		6.9	56.9	36.1		35.7	54.8	9.5		12	35.9	52.2		
PHF	.787	.750	.683	.784	.625	.788	.722	.818	.536	.719	.500	.808	.750	.589	.679	.651	.741



Start Time	VOLUNTEER Southbound				JOE JOHNSON Westbound				VOLUNTEER Northbound				JOE JOHNSON Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	31	38	5	74	5	36	33	74	65	60	4	129	10	19	20	49	326
04:45 PM	32	49	7	88	1	15	35	51	29	63	2	94	9	22	15	46	279
05:00 PM	43	16	7	66	0	24	27	51	55	86	2	143	14	30	10	54	314
05:15 PM	22	26	12	60	2	33	36	71	36	55	7	98	12	16	13	41	270
Total Volume	128	129	31	288	8	108	131	247	185	264	15	464	45	87	58	190	1189
% App. Total	44.4	44.8	10.8		3.2	43.7	53		39.9	56.9	3.2		23.7	45.8	30.5		
PHF	.744	.658	.646	.818	.400	.750	.910	.834	.712	.767	.536	.811	.804	.725	.725	.880	.912

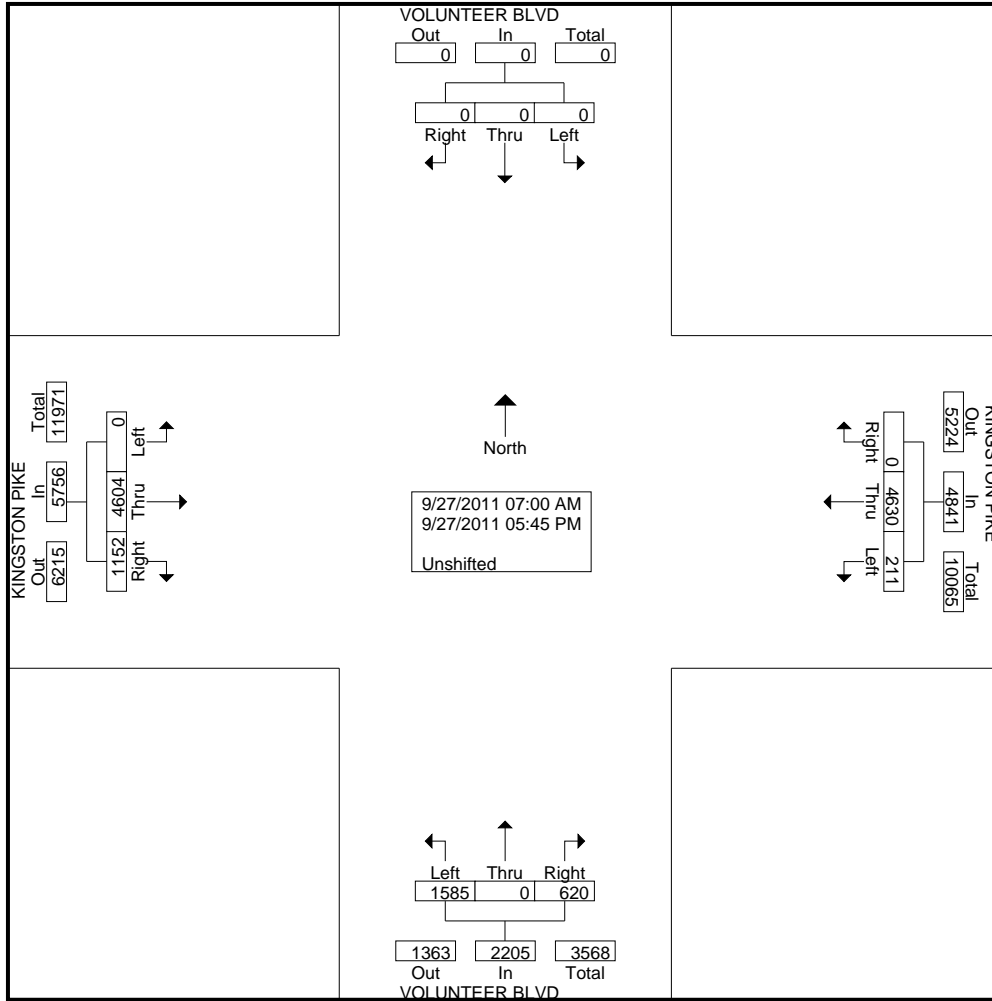


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 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

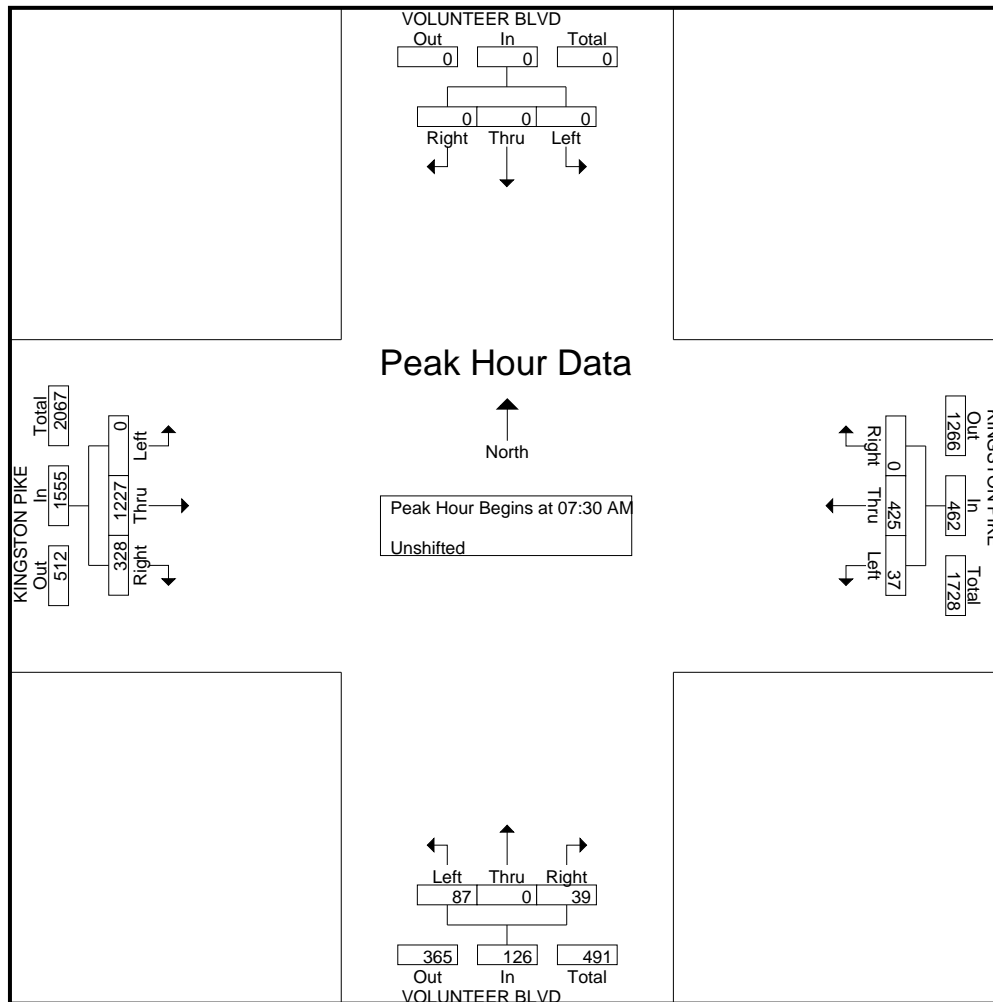
File Name : KP at Volunteer blvd  
 Site Code : 00000002  
 Start Date : 9/27/2011  
 Page No : 1

**Groups Printed- Unshifted**

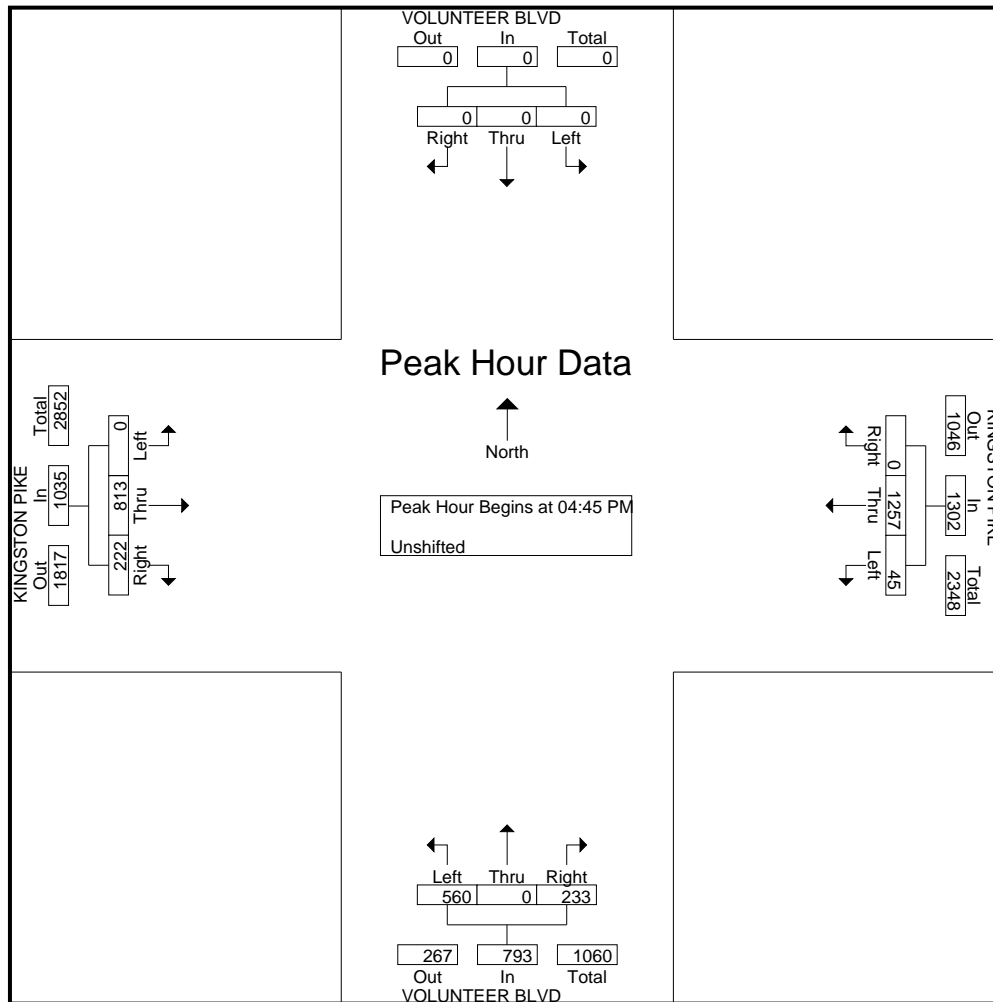
Start Time	VOLUNTEER BLVD Southbound				KINGSTON PIKE Westbound				VOLUNTEER BLVD Northbound				KINGSTON PIKE Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	0	0	0	0	10	72	0	82	8	0	6	14	0	167	40	207	303
07:15 AM	0	0	0	0	5	96	0	101	15	0	7	22	0	237	66	303	426
07:30 AM	0	0	0	0	10	94	0	104	13	0	5	18	0	293	101	394	516
07:45 AM	0	0	0	0	16	105	0	121	24	0	7	31	0	300	91	391	543
Total	0	0	0	0	41	367	0	408	60	0	25	85	0	997	298	1295	1788
08:00 AM	0	0	0	0	4	108	0	112	26	0	18	44	0	354	78	432	588
08:15 AM	0	0	0	0	7	118	0	125	24	0	9	33	0	280	58	338	496
08:30 AM	0	0	0	0	10	105	0	115	30	0	13	43	0	265	67	332	490
08:45 AM	0	0	0	0	7	132	0	139	28	0	16	44	0	255	75	330	513
Total	0	0	0	0	28	463	0	491	108	0	56	164	0	1154	278	1432	2087
*** BREAK ***																	
03:00 PM	0	0	0	0	12	314	0	326	69	0	37	106	0	218	31	249	681
03:15 PM	0	0	0	0	12	307	0	319	120	0	33	153	0	208	38	246	718
03:30 PM	0	0	0	0	18	344	0	362	137	0	51	188	0	204	35	239	789
03:45 PM	0	0	0	0	14	319	0	333	131	0	37	168	0	177	35	212	713
Total	0	0	0	0	56	1284	0	1340	457	0	158	615	0	807	139	946	2901
04:00 PM	0	0	0	0	14	328	0	342	88	0	33	121	0	208	52	260	723
04:15 PM	0	0	0	0	14	330	0	344	86	0	44	130	0	203	60	263	737
04:30 PM	0	0	0	0	8	319	0	327	119	0	44	163	0	200	69	269	759
04:45 PM	0	0	0	0	9	315	0	324	145	0	52	197	0	206	64	270	791
Total	0	0	0	0	45	1292	0	1337	438	0	173	611	0	817	245	1062	3010
05:00 PM	0	0	0	0	17	314	0	331	124	0	65	189	0	207	68	275	795
05:15 PM	0	0	0	0	9	302	0	311	175	0	74	249	0	179	44	223	783
05:30 PM	0	0	0	0	10	326	0	336	116	0	42	158	0	221	46	267	761
05:45 PM	0	0	0	0	5	282	0	287	107	0	27	134	0	222	34	256	677
Total	0	0	0	0	41	1224	0	1265	522	0	208	730	0	829	192	1021	3016
Grand Total	0	0	0	0	211	4630	0	4841	1585	0	620	2205	0	4604	1152	5756	12802
Apprch %	0	0	0		4.4	95.6	0		71.9	0	28.1		0	80	20		
Total %	0	0	0		1.6	36.2	0	37.8	12.4	0	4.8	17.2	0	36	9	45	



Start Time	VOLUNTEER BLVD Southbound				KINGSTON PIKE Westbound				VOLUNTEER BLVD Northbound				KINGSTON PIKE Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	10	94	0	104	13	0	5	18	0	293	<b>101</b>	394	516
07:45 AM	0	0	0	0	<b>16</b>	105	0	121	24	0	7	31	0	300	91	391	543
08:00 AM	0	0	0	0	4	108	0	112	<b>26</b>	0	<b>18</b>	<b>44</b>	0	<b>354</b>	78	<b>432</b>	<b>588</b>
08:15 AM	0	0	0	0	7	<b>118</b>	0	<b>125</b>	24	0	9	33	0	280	58	338	496
Total Volume	0	0	0	0	37	425	0	462	87	0	39	126	0	1227	328	1555	2143
% App. Total	0	0	0	0	8	92	0	924	69	0	31	716	0	867	21.1	900	911
PHF	.000	.000	.000	.000	.578	.900	.000	.924	.837	.000	.542	.716	.000	.867	.812	.900	.911



Start Time	VOLUNTEER BLVD Southbound				KINGSTON PIKE Westbound				VOLUNTEER BLVD Northbound				KINGSTON PIKE Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	9	315	0	324	145	0	52	197	0	206	64	270	791
05:00 PM	0	0	0	0	17	314	0	331	124	0	65	189	0	207	68	275	795
05:15 PM	0	0	0	0	9	302	0	311	175	0	74	249	0	179	44	223	783
05:30 PM	0	0	0	0	10	326	0	336	116	0	42	158	0	221	46	267	761
Total Volume	0	0	0	0	45	1257	0	1302	560	0	233	793	0	813	222	1035	3130
% App. Total	0	0	0	0	3.5	96.5	0		70.6	0	29.4		0	78.6	21.4		
PHF	.000	.000	.000	.000	.662	.964	.000	.969	.800	.000	.787	.796	.000	.920	.816	.941	.984



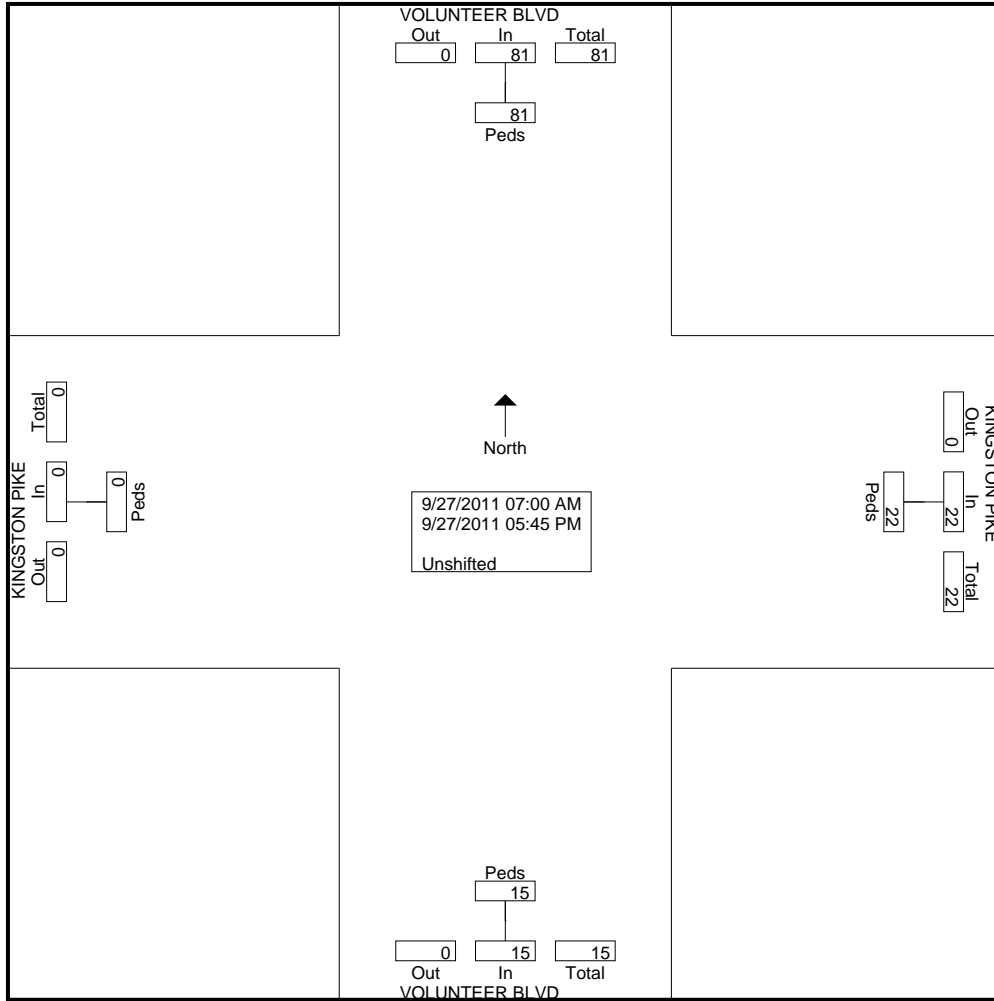
WILBUR SMITH ASSOCIATES  
 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : KP at Volunteer blvd  
 Site Code : 00000002  
 Start Date : 9/27/2011  
 Page No : 1

Groups Printed- Unshifted

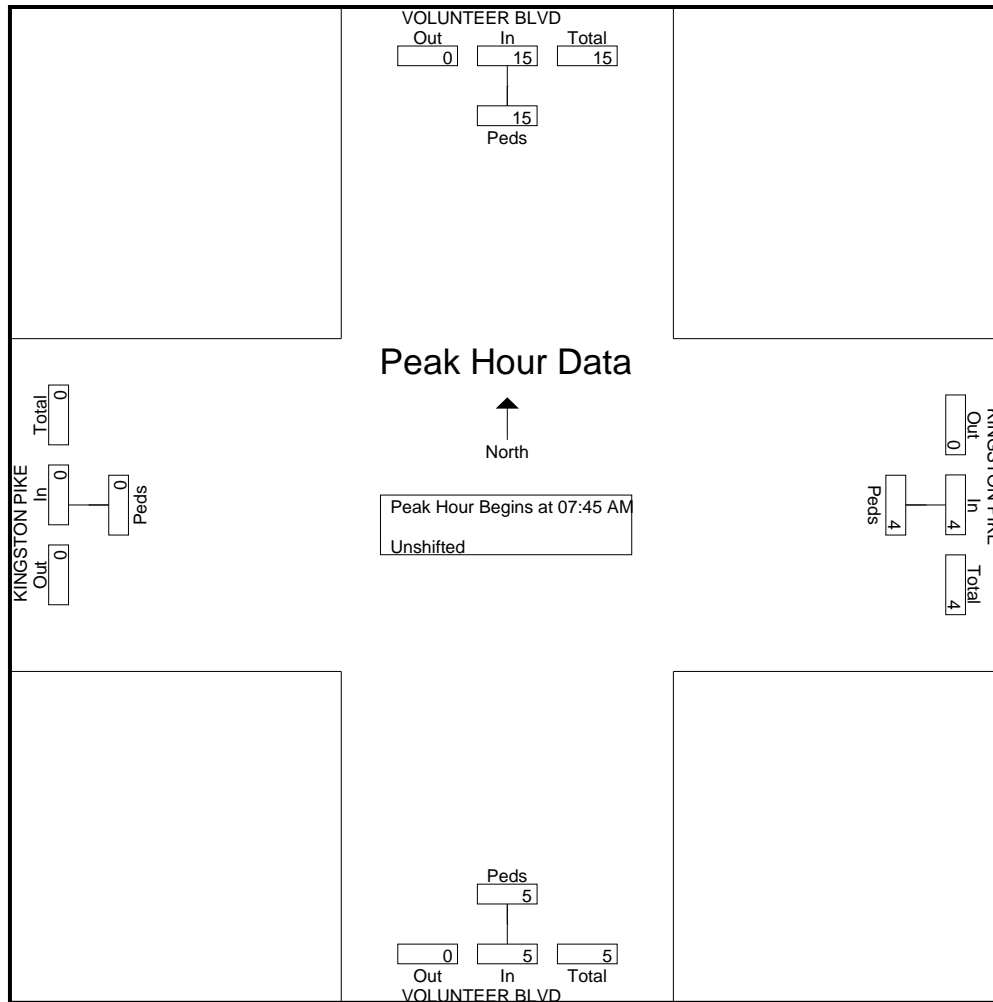
Start Time	VOLUNTEER BLVD Southbound		KINGSTON PIKE Westbound		VOLUNTEER BLVD Northbound		KINGSTON PIKE Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
*** BREAK ***									
07:15 AM	2	2	1	1	0	0	0	0	3
07:30 AM	2	2	1	1	0	0	0	0	3
07:45 AM	3	3	0	0	4	4	0	0	7
Total	7	7	2	2	4	4	0	0	13
08:00 AM	4	4	0	0	1	1	0	0	5
08:15 AM	2	2	3	3	0	0	0	0	5
08:30 AM	6	6	1	1	0	0	0	0	7
08:45 AM	4	4	2	2	0	0	0	0	6
Total	16	16	6	6	1	1	0	0	23
*** BREAK ***									
03:00 PM	5	5	0	0	3	3	0	0	8
03:15 PM	4	4	1	1	0	0	0	0	5
03:30 PM	4	4	1	1	0	0	0	0	5
03:45 PM	2	2	0	0	1	1	0	0	3
Total	15	15	2	2	4	4	0	0	21
04:00 PM	6	6	1	1	1	1	0	0	8
04:15 PM	4	4	0	0	1	1	0	0	5
04:30 PM	8	8	1	1	2	2	0	0	11
04:45 PM	8	8	2	2	0	0	0	0	10
Total	26	26	4	4	4	4	0	0	34
05:00 PM	5	5	2	2	0	0	0	0	7
05:15 PM	5	5	3	3	2	2	0	0	10
05:30 PM	5	5	1	1	0	0	0	0	6
05:45 PM	2	2	2	2	0	0	0	0	4
Total	17	17	8	8	2	2	0	0	27
Grand Total	81	81	22	22	15	15	0	0	118
Apprch %	100		100		100		0		
Total %	68.6	68.6	18.6	18.6	12.7	12.7	0	0	





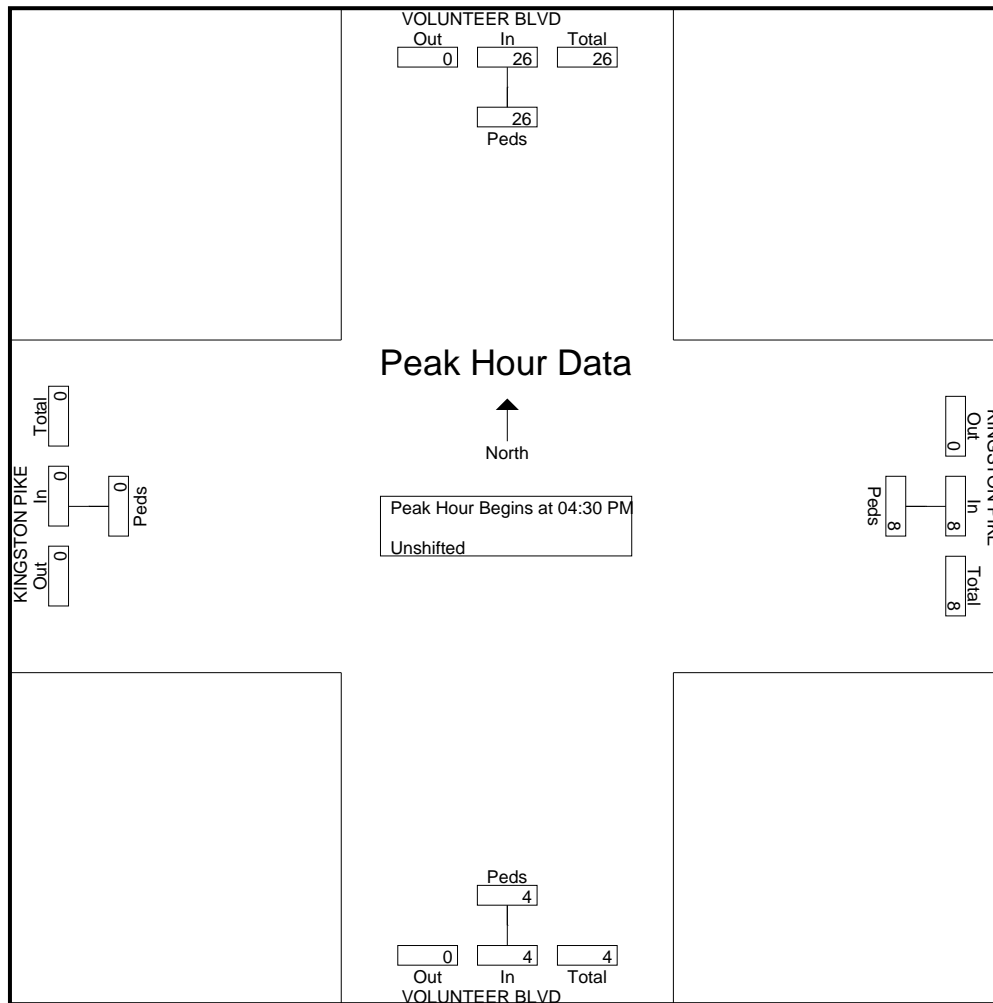
Start Time	VOLUNTEER BLVD Southbound		KINGSTON PIKE Westbound		VOLUNTEER BLVD Northbound		KINGSTON PIKE Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:45 AM	3	3	0	0	4	4	0	0	7
08:00 AM	4	4	0	0	1	1	0	0	5
08:15 AM	2	2	3	3	0	0	0	0	5
08:30 AM	6	6	1	1	0	0	0	0	7
Total Volume	15	15	4	4	5	5	0	0	24
% App. Total	100		100		100		0		
PHF	.625	.625	.333	.333	.313	.313	.000	.000	.857

Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 07:45 AM



Start Time	VOLUNTEER BLVD Southbound		KINGSTON PIKE Westbound		VOLUNTEER BLVD Northbound		KINGSTON PIKE Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
04:30 PM	8	8	1	1	2	2	0	0	11
04:45 PM	8	8	2	2	0	0	0	0	10
05:00 PM	5	5	2	2	0	0	0	0	7
05:15 PM	5	5	3	3	2	2	0	0	10
Total Volume	26	26	8	8	4	4	0	0	38
% App. Total	100		100		100		0		
PHF	.813	.813	.667	.667	.500	.500	.000	.000	.864

Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 04:30 PM

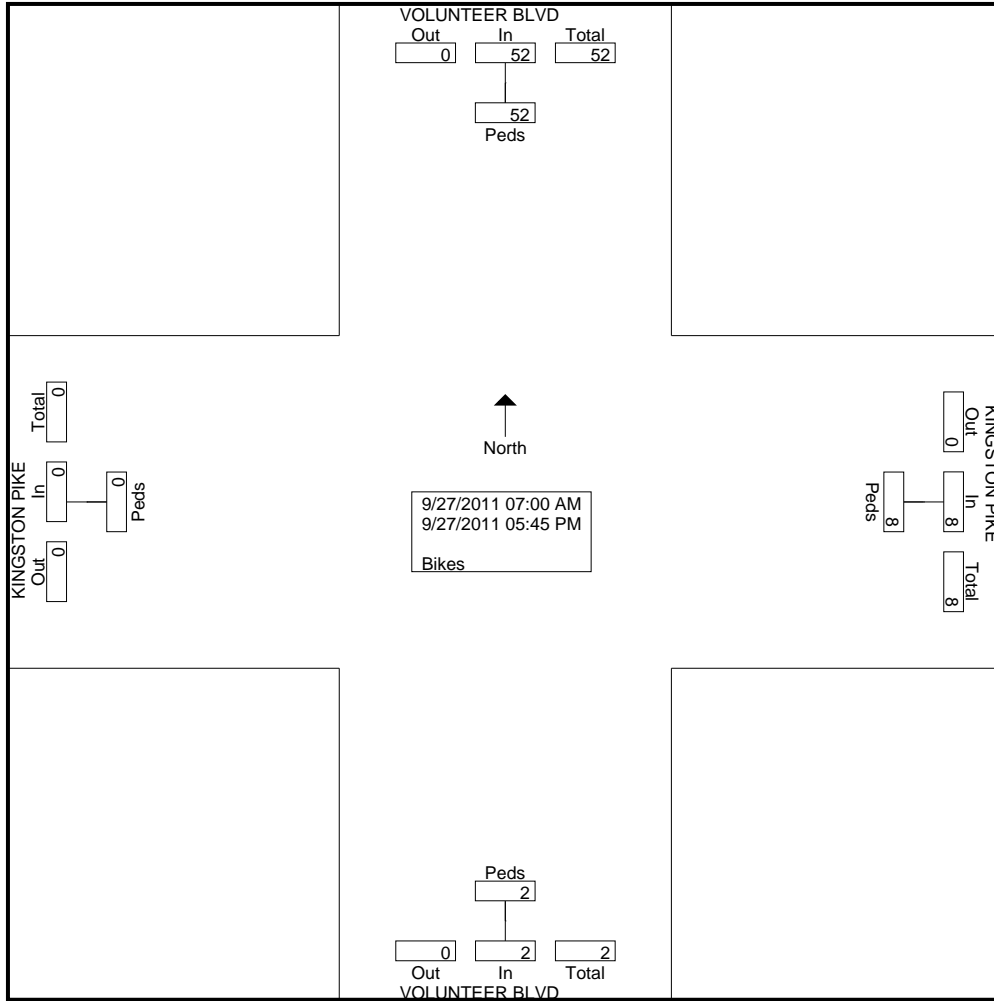


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 KNOXVILLE, TN 37921  
 865-963-4300

File Name : KP at Volunteer blvd  
 Site Code : 00000002  
 Start Date : 9/27/2011  
 Page No : 1

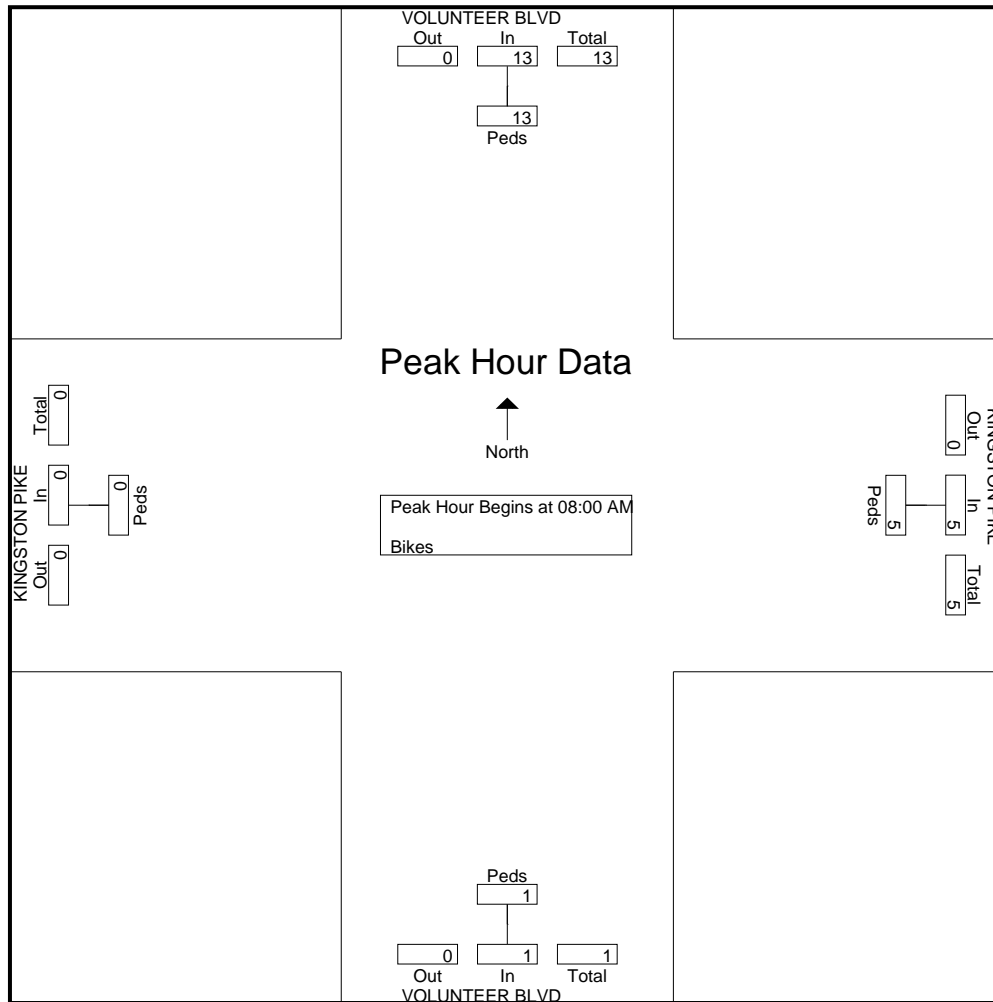
Groups Printed- Bikes

Start Time	VOLUNTEER BLVD Southbound		KINGSTON PIKE Westbound		VOLUNTEER BLVD Northbound		KINGSTON PIKE Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:00 AM	2	2	0	0	0	0	0	0	2
07:15 AM	2	2	0	0	1	1	0	0	3
07:30 AM	1	1	0	0	0	0	0	0	1
07:45 AM	5	5	1	1	0	0	0	0	6
Total	10	10	1	1	1	1	0	0	12
08:00 AM	3	3	0	0	0	0	0	0	3
08:15 AM	1	1	1	1	0	0	0	0	2
08:30 AM	4	4	3	3	0	0	0	0	7
08:45 AM	5	5	1	1	1	1	0	0	7
Total	13	13	5	5	1	1	0	0	19
*** BREAK ***									
03:15 PM	5	5	1	1	0	0	0	0	6
03:30 PM	1	1	0	0	0	0	0	0	1
*** BREAK ***									
Total	6	6	1	1	0	0	0	0	7
04:00 PM	1	1	0	0	0	0	0	0	1
04:15 PM	2	2	0	0	0	0	0	0	2
*** BREAK ***									
04:45 PM	2	2	0	0	0	0	0	0	2
Total	5	5	0	0	0	0	0	0	5
05:00 PM	4	4	1	1	0	0	0	0	5
05:15 PM	5	5	0	0	0	0	0	0	5
05:30 PM	4	4	0	0	0	0	0	0	4
05:45 PM	5	5	0	0	0	0	0	0	5
Total	18	18	1	1	0	0	0	0	19
Grand Total	52	52	8	8	2	2	0	0	62
Apprch %	100		100		100		0		
Total %	83.9	83.9	12.9	12.9	3.2	3.2	0	0	



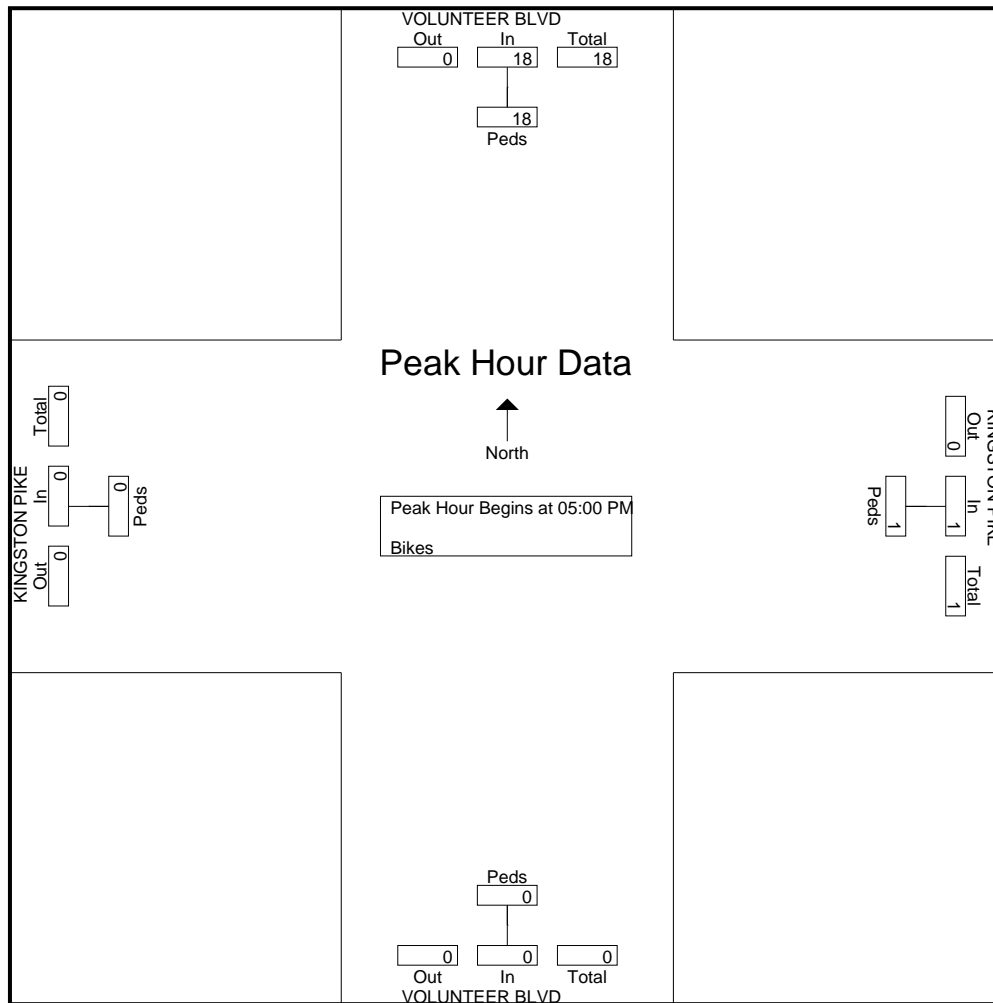
Start Time	VOLUNTEER BLVD Southbound		KINGSTON PIKE Westbound		VOLUNTEER BLVD Northbound		KINGSTON PIKE Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
08:00 AM	3	3	0	0	0	0	0	0	3
08:15 AM	1	1	1	1	0	0	0	0	2
08:30 AM	4	4	3	3	0	0	0	0	7
08:45 AM	5	5	1	1	1	1	0	0	7
Total Volume	13	13	5	5	1	1	0	0	19
% App. Total	100		100		100		0		
PHF	.650	.650	.417	.417	.250	.250	.000	.000	.679

Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 08:00 AM



Start Time	VOLUNTEER BLVD Southbound		KINGSTON PIKE Westbound		VOLUNTEER BLVD Northbound		KINGSTON PIKE Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
05:00 PM	4	4	1	1	0	0	0	0	5
05:15 PM	5	5	0	0	0	0	0	0	5
05:30 PM	4	4	0	0	0	0	0	0	4
05:45 PM	5	5	0	0	0	0	0	0	5
Total Volume	18	18	1	1	0	0	0	0	19
% App. Total	100		100		0		0		
PHF	.900	.900	.250	.250	.000	.000	.000	.000	.950

Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 05:00 PM



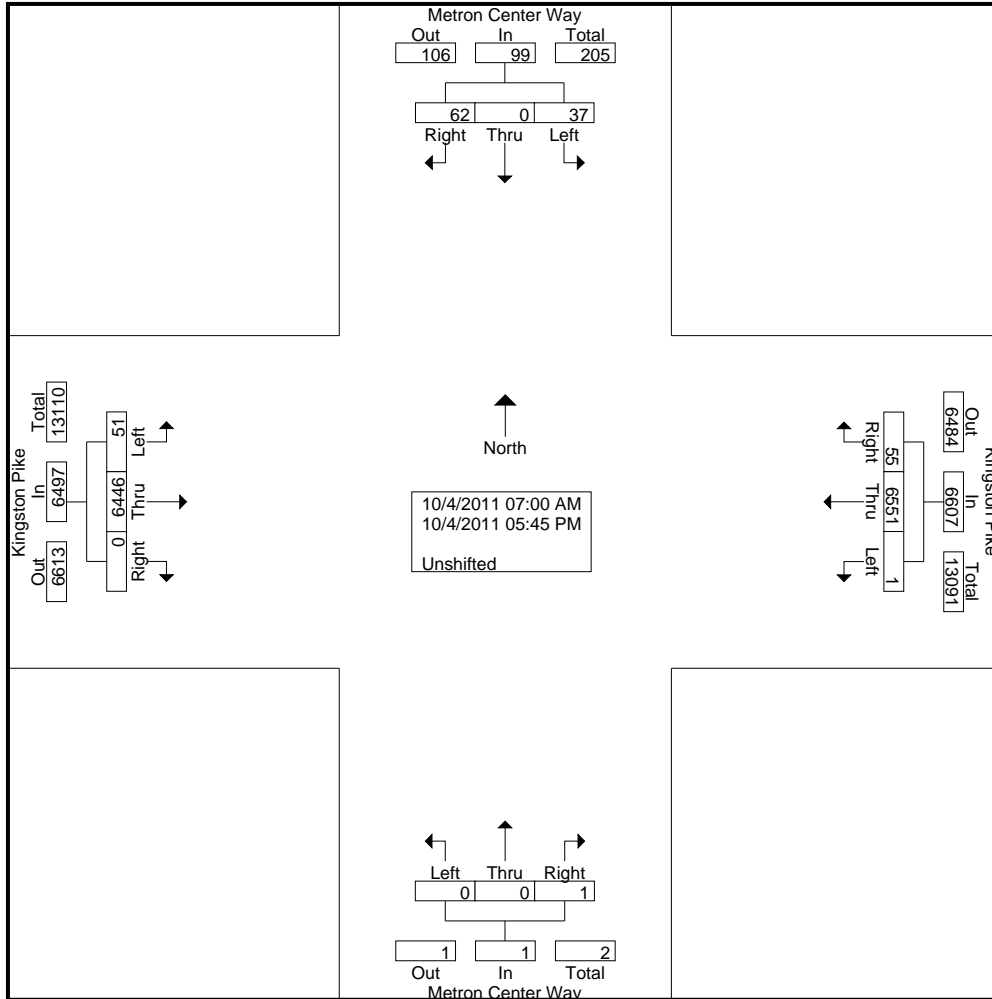
WILBUR SMITH ASSOCIATES  
 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : KP at Metron Center Way  
 Site Code : 00000003  
 Start Date : 10/4/2011  
 Page No : 1

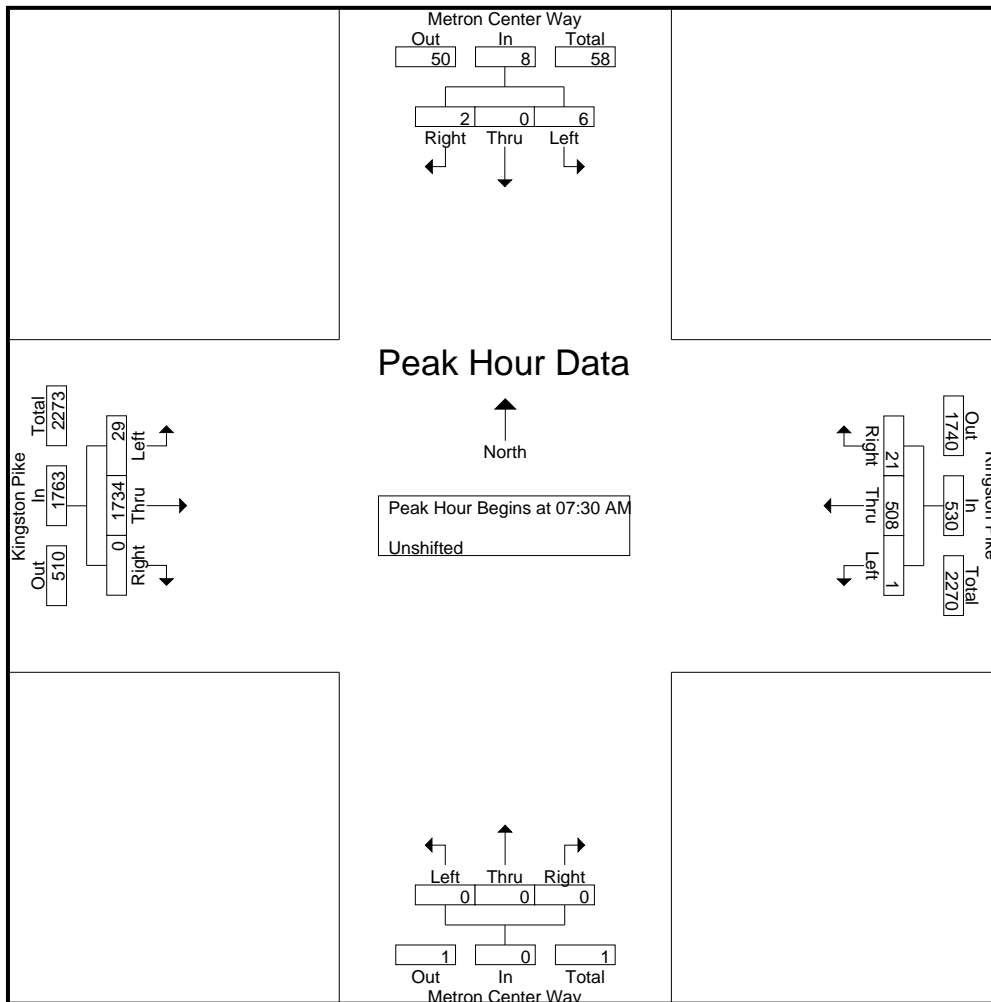
**Groups Printed- Unshifted**

Start Time	Metron Center Way Southbound				Kingston Pike Westbound				Metron Center Way Northbound				Kingston Pike Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	1	0	1	2	0	99	2	101	0	0	0	0	4	199	0	203	306
07:15 AM	0	0	0	0	0	95	2	97	0	0	0	0	6	281	0	287	384
07:30 AM	0	0	0	0	0	100	1	101	0	0	0	0	9	383	0	392	493
07:45 AM	3	0	0	3	1	116	8	125	0	0	0	0	4	452	0	456	584
Total	4	0	1	5	1	410	13	424	0	0	0	0	23	1315	0	1338	1767
08:00 AM	2	0	0	2	0	145	8	153	0	0	0	0	6	450	0	456	611
08:15 AM	1	0	2	3	0	147	4	151	0	0	0	0	10	449	0	459	613
08:30 AM	0	0	1	1	0	150	8	158	0	0	0	0	2	325	0	327	486
08:45 AM	2	0	0	2	0	132	3	135	0	0	0	0	4	357	0	361	498
Total	5	0	3	8	0	574	23	597	0	0	0	0	22	1581	0	1603	2208
*** BREAK ***																	
03:00 PM	1	0	1	2	0	410	2	412	0	0	0	0	2	261	0	263	677
03:15 PM	1	0	1	2	0	413	2	415	0	0	0	0	1	353	0	354	771
03:30 PM	1	0	1	2	0	527	1	528	0	0	0	0	0	317	0	317	847
03:45 PM	4	0	7	11	0	548	5	553	0	0	0	0	0	294	0	294	858
Total	7	0	10	17	0	1898	10	1908	0	0	0	0	3	1225	0	1228	3153
04:00 PM	7	0	5	12	0	470	2	472	0	0	0	0	0	319	0	319	803
04:15 PM	4	0	5	9	0	432	2	434	0	0	0	0	2	271	0	273	716
04:30 PM	3	0	8	11	0	420	1	421	0	0	0	0	1	261	0	262	694
04:45 PM	0	0	11	11	0	543	2	545	0	0	0	0	0	349	0	349	905
Total	14	0	29	43	0	1865	7	1872	0	0	0	0	3	1200	0	1203	3118
05:00 PM	2	0	9	11	0	480	0	480	0	0	1	1	0	295	0	295	787
05:15 PM	3	0	5	8	0	491	0	491	0	0	0	0	0	312	0	312	811
05:30 PM	1	0	2	3	0	495	1	496	0	0	0	0	0	277	0	277	776
05:45 PM	1	0	3	4	0	338	1	339	0	0	0	0	0	241	0	241	584
Total	7	0	19	26	0	1804	2	1806	0	0	1	1	0	1125	0	1125	2958
Grand Total	37	0	62	99	1	6551	55	6607	0	0	1	1	51	6446	0	6497	13204
Apprch %	37.4	0	62.6		0	99.2	0.8		0	0	100		0.8	99.2	0		
Total %	0.3	0	0.5	0.7	0	49.6	0.4	50	0	0	0	0	0.4	48.8	0	49.2	

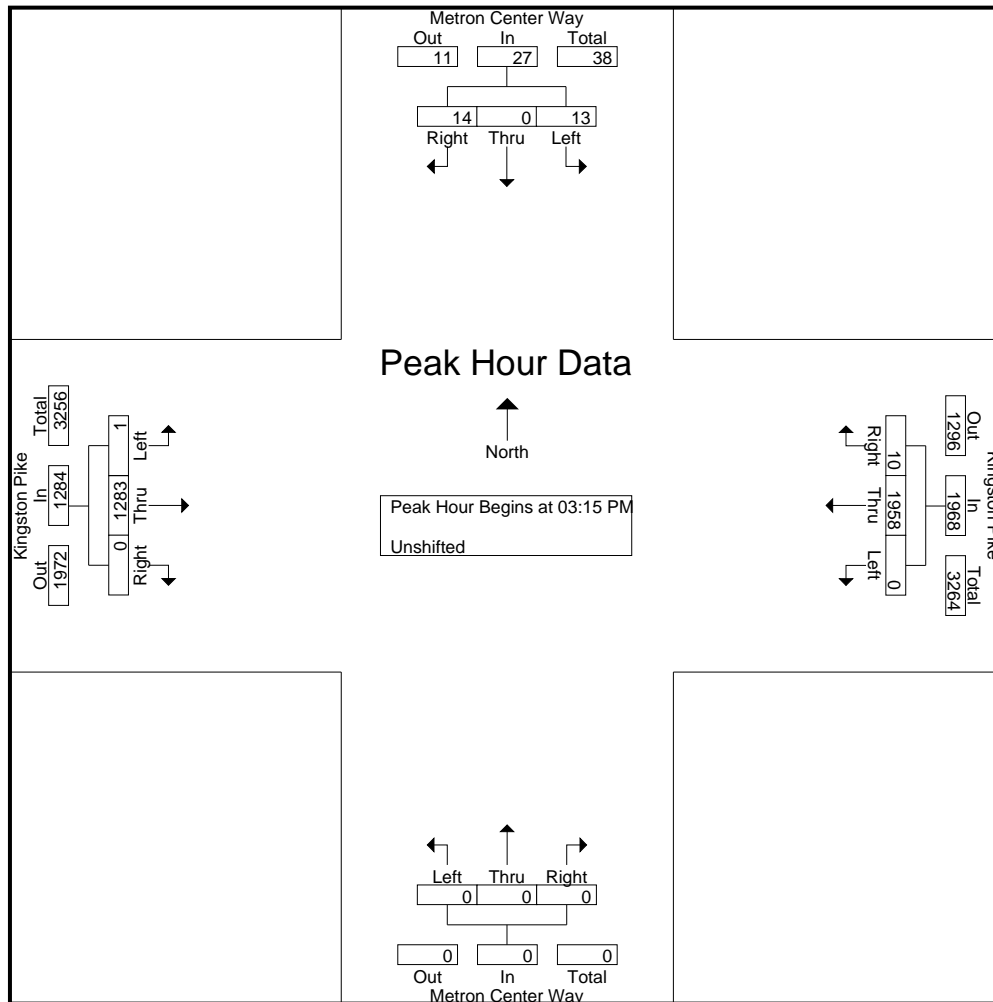




Start Time	Metron Center Way Southbound				Kingston Pike Westbound				Metron Center Way Northbound				Kingston Pike Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	100	1	101	0	0	0	0	9	383	0	392	493
07:45 AM	3	0	0	3	1	116	8	125	0	0	0	0	4	452	0	456	584
08:00 AM	2	0	0	2	0	145	8	153	0	0	0	0	6	450	0	456	611
08:15 AM	1	0	2	3	0	147	4	151	0	0	0	0	10	449	0	459	613
Total Volume	6	0	2	8	1	508	21	530	0	0	0	0	29	1734	0	1763	2301
% App. Total	75	0	25		0.2	95.8	4		0	0	0		1.6	98.4	0		
PHF	.500	.000	.250	.667	.250	.864	.656	.866	.000	.000	.000	.000	.725	.959	.000	.960	.938

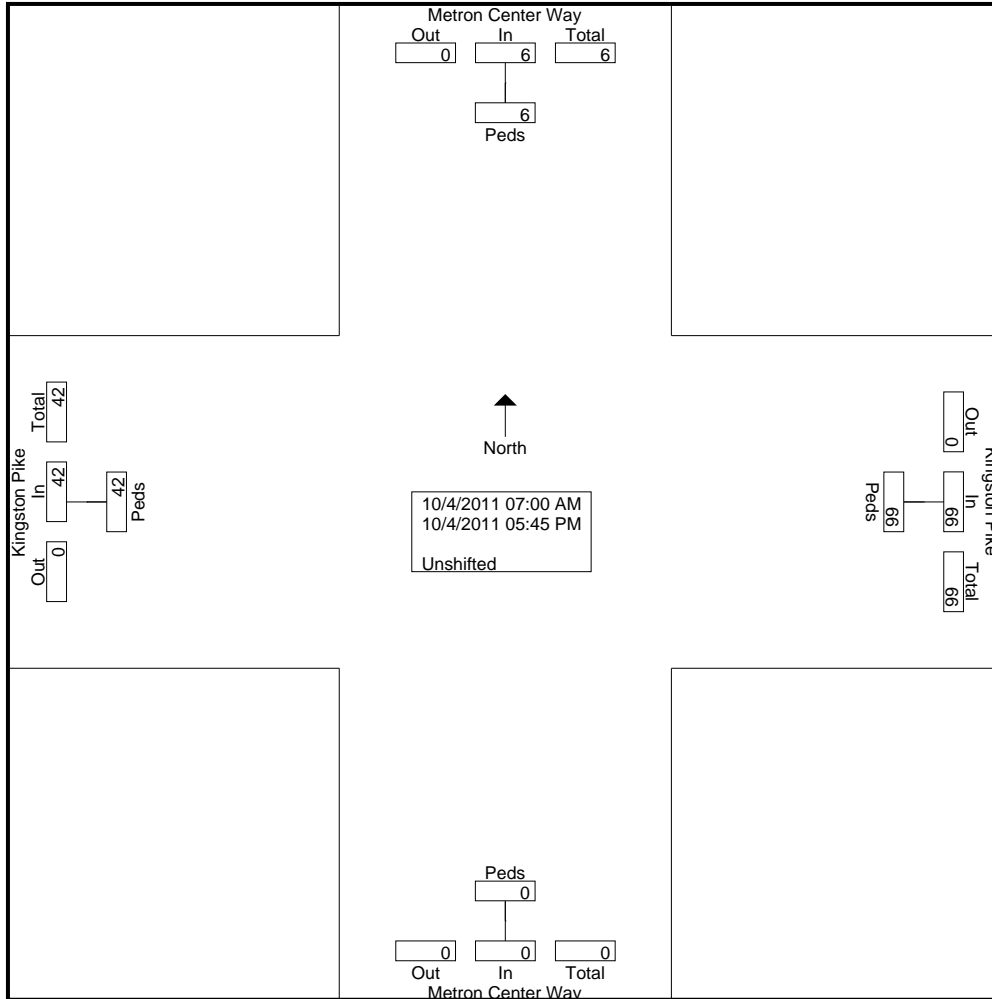


Start Time	Metron Center Way Southbound				Kingston Pike Westbound				Metron Center Way Northbound				Kingston Pike Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:15 PM																	
03:15 PM	1	0	1	2	0	413	2	415	0	0	0	0	1	353	0	354	771
03:30 PM	1	0	1	2	0	527	1	528	0	0	0	0	0	317	0	317	847
03:45 PM	4	0	7	11	0	548	5	553	0	0	0	0	0	294	0	294	858
04:00 PM	7	0	5	12	0	470	2	472	0	0	0	0	0	319	0	319	803
Total Volume	13	0	14	27	0	1958	10	1968	0	0	0	0	1	1283	0	1284	3279
% App. Total	48.1	0	51.9		0	99.5	0.5		0	0	0		0.1	99.9	0		
PHF	.464	.000	.500	.563	.000	.893	.500	.890	.000	.000	.000	.000	.250	.909	.000	.907	.955



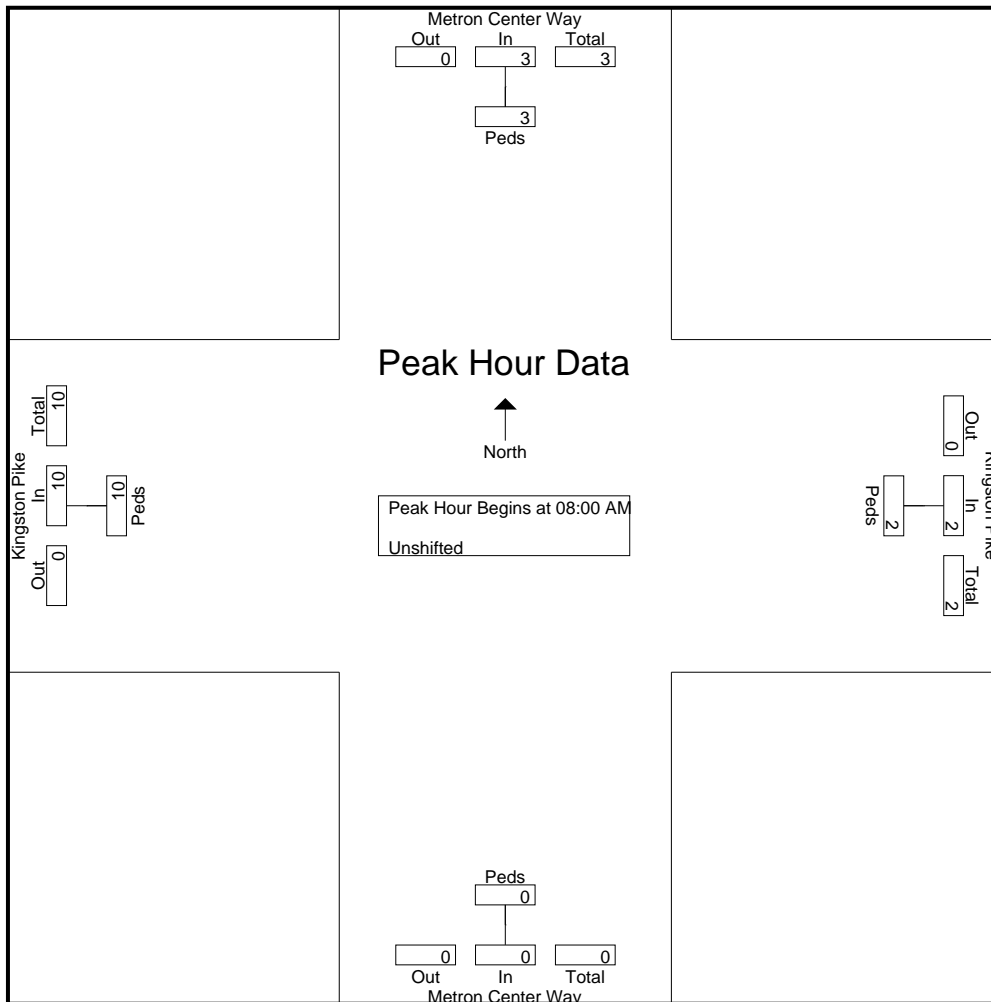
**Groups Printed- Unshifted**

Start Time	Metron Center Way Southbound		Kingston Pike Westbound		Metron Center Way Northbound		Kingston Pike Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:00 AM	0	0	0	0	0	0	2	2	2
07:15 AM	0	0	0	0	0	0	3	3	3
07:30 AM	0	0	0	0	0	0	5	5	5
07:45 AM	0	0	1	1	0	0	1	1	2
Total	0	0	1	1	0	0	11	11	12
08:00 AM	0	0	1	1	0	0	2	2	3
08:15 AM	0	0	1	1	0	0	3	3	4
08:30 AM	2	2	0	0	0	0	2	2	4
08:45 AM	1	1	0	0	0	0	3	3	4
Total	3	3	2	2	0	0	10	10	15
*** BREAK ***									
03:00 PM	0	0	1	1	0	0	1	1	2
03:15 PM	0	0	5	5	0	0	0	0	5
03:30 PM	0	0	5	5	0	0	0	0	5
03:45 PM	1	1	10	10	0	0	3	3	14
Total	1	1	21	21	0	0	4	4	26
04:00 PM	0	0	3	3	0	0	0	0	3
04:15 PM	0	0	12	12	0	0	2	2	14
04:30 PM	1	1	9	9	0	0	3	3	13
04:45 PM	0	0	4	4	0	0	3	3	7
Total	1	1	28	28	0	0	8	8	37
05:00 PM	1	1	3	3	0	0	3	3	7
05:15 PM	0	0	6	6	0	0	2	2	8
05:30 PM	0	0	5	5	0	0	2	2	7
05:45 PM	0	0	0	0	0	0	2	2	2
Total	1	1	14	14	0	0	9	9	24
Grand Total	6	6	66	66	0	0	42	42	114
Apprch %	100		100		0		100		
Total %	5.3	5.3	57.9	57.9	0	0	36.8	36.8	

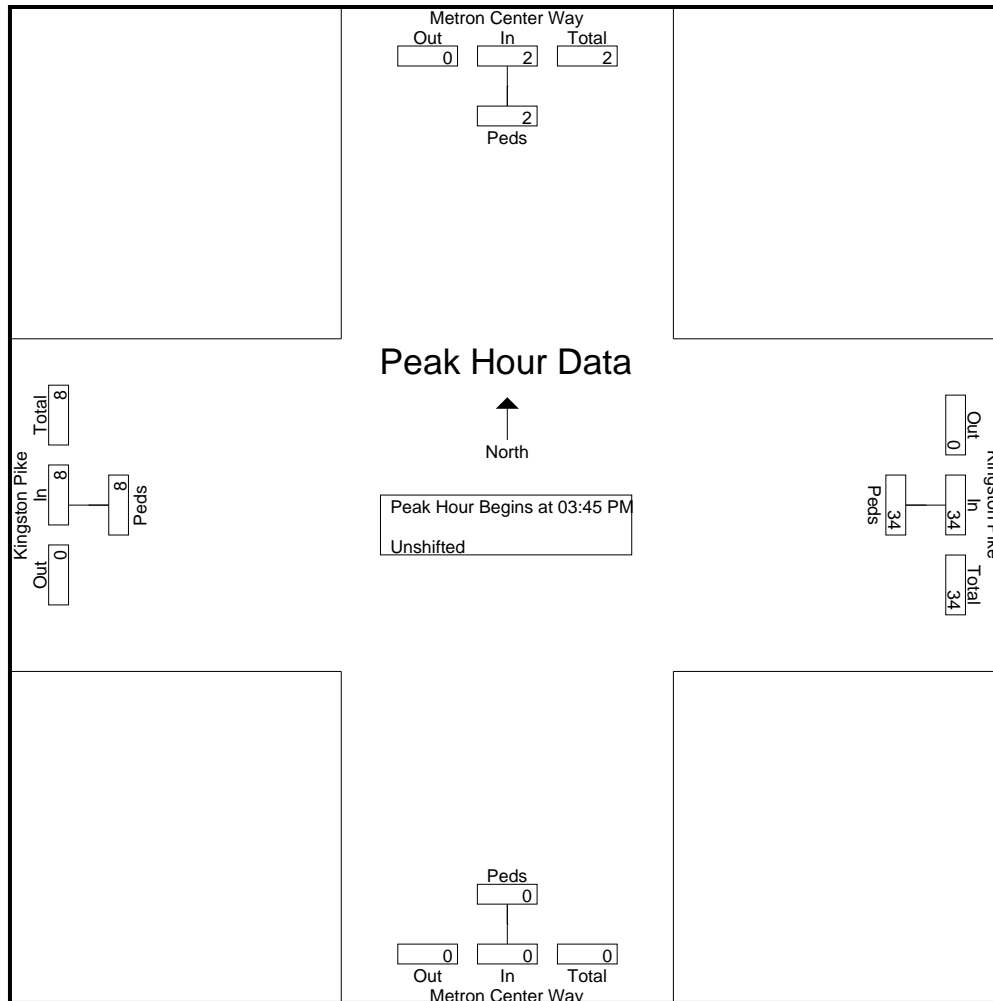


Start Time	Metron Center Way Southbound		Kingston Pike Westbound		Metron Center Way Northbound		Kingston Pike Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
08:00 AM	0	0	1	1	0	0	2	2	3
08:15 AM	0	0	1	1	0	0	3	3	4
08:30 AM	2	2	0	0	0	0	2	2	4
08:45 AM	1	1	0	0	0	0	3	3	4
Total Volume	3	3	2	2	0	0	10	10	15
% App. Total	100		100		0		100		
PHF	.375	.375	.500	.500	.000	.000	.833	.833	.938

Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 08:00 AM



Start Time	Metron Center Way Southbound		Kingston Pike Westbound		Metron Center Way Northbound		Kingston Pike Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1									
Peak Hour for Entire Intersection Begins at 03:45 PM									
03:45 PM	1	1	10	10	0	0	3	3	14
04:00 PM	0	0	3	3	0	0	0	0	3
04:15 PM	0	0	12	12	0	0	2	2	14
04:30 PM	1	1	9	9	0	0	3	3	13
Total Volume	2	2	34	34	0	0	8	8	44
% App. Total	100		100		0		100		
PHF	.500	.500	.708	.708	.000	.000	.667	.667	.786



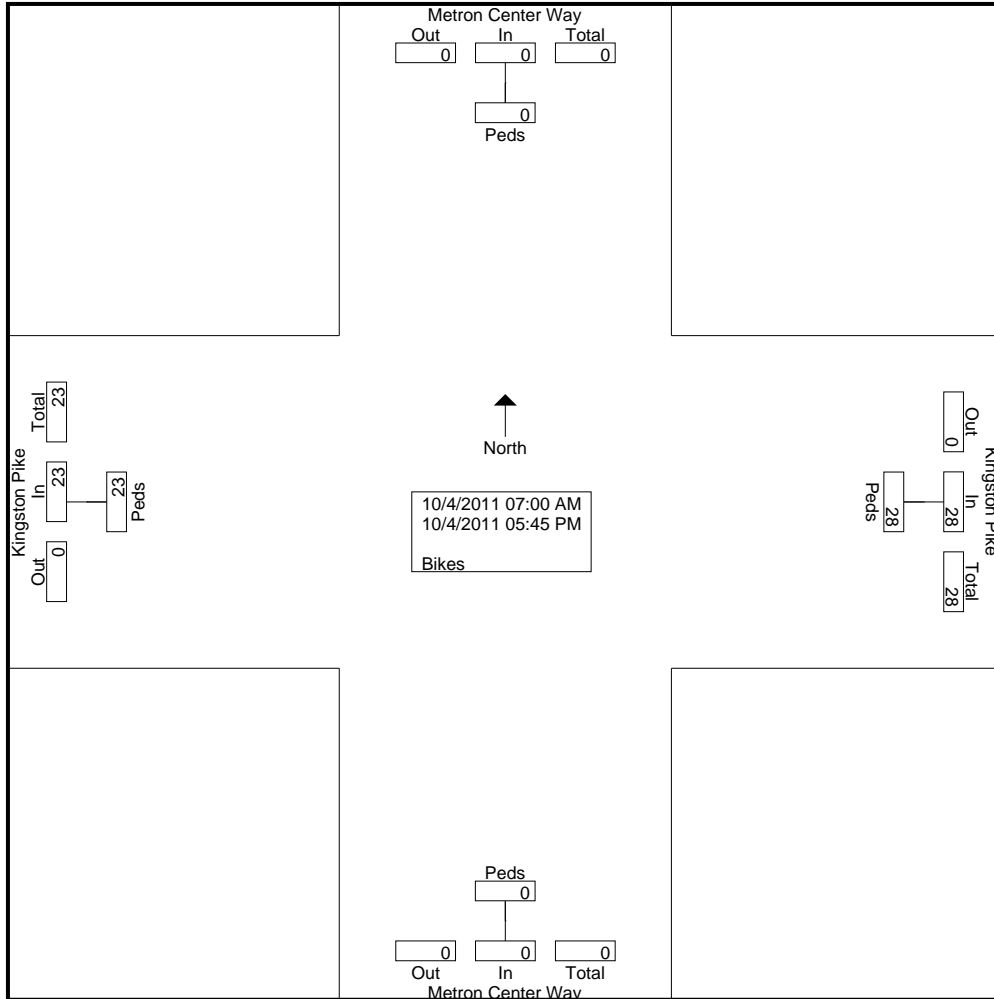
WILBUR SMITH ASSOCIATES  
 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : KP at Metron Center Way  
 Site Code : 00000003  
 Start Date : 10/4/2011  
 Page No : 1

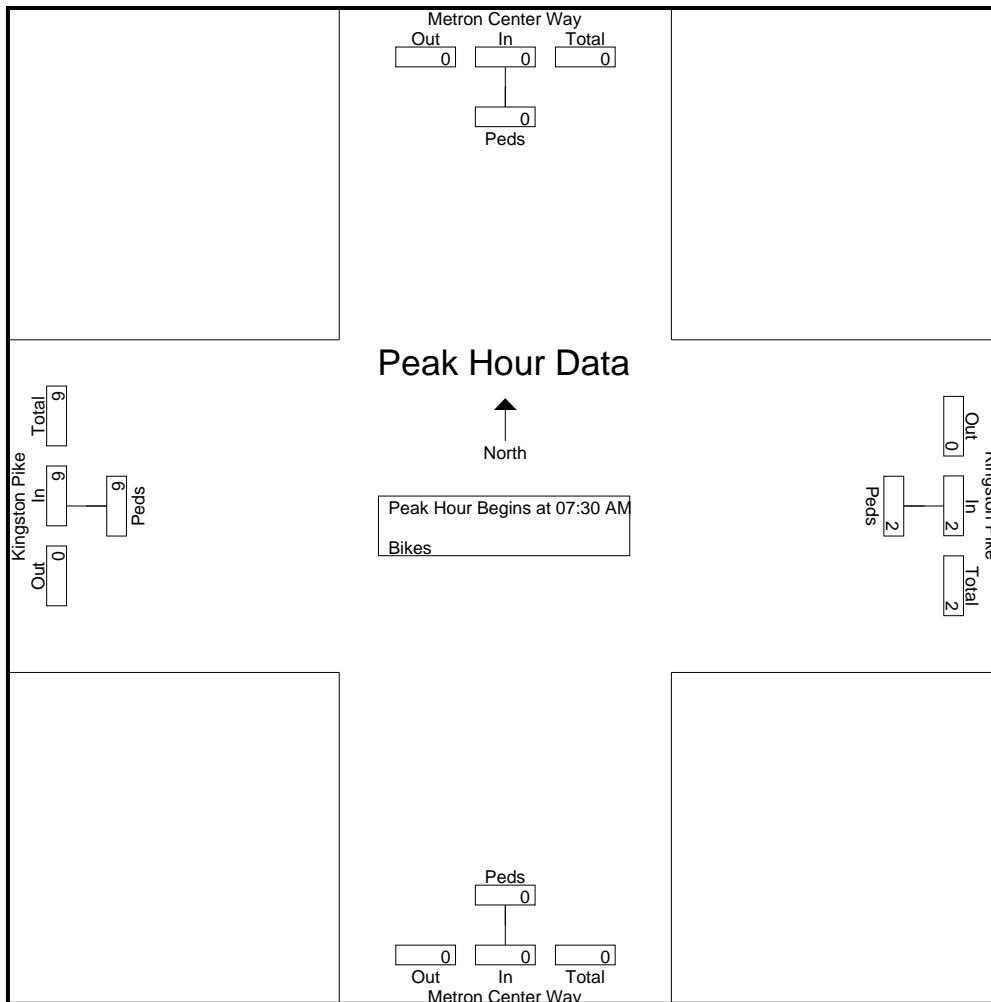
Groups Printed- Bikes

Start Time	Metron Center Way Southbound		Kingston Pike Westbound		Metron Center Way Northbound		Kingston Pike Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:00 AM	0	0	1	1	0	0	2	2	3
*** BREAK ***									
07:30 AM	0	0	0	0	0	0	1	1	1
07:45 AM	0	0	0	0	0	0	3	3	3
Total	0	0	1	1	0	0	6	6	7
08:00 AM	0	0	1	1	0	0	4	4	5
08:15 AM	0	0	1	1	0	0	1	1	2
08:30 AM	0	0	1	1	0	0	0	0	1
08:45 AM	0	0	1	1	0	0	1	1	2
Total	0	0	4	4	0	0	6	6	10
*** BREAK ***									
03:00 PM	0	0	1	1	0	0	1	1	2
03:15 PM	0	0	2	2	0	0	1	1	3
03:30 PM	0	0	2	2	0	0	0	0	2
03:45 PM	0	0	4	4	0	0	0	0	4
Total	0	0	9	9	0	0	2	2	11
*** BREAK ***									
04:15 PM	0	0	0	0	0	0	1	1	1
04:30 PM	0	0	2	2	0	0	4	4	6
04:45 PM	0	0	2	2	0	0	0	0	2
Total	0	0	4	4	0	0	5	5	9
05:00 PM	0	0	3	3	0	0	0	0	3
05:15 PM	0	0	1	1	0	0	0	0	1
05:30 PM	0	0	3	3	0	0	1	1	4
05:45 PM	0	0	3	3	0	0	3	3	6
Total	0	0	10	10	0	0	4	4	14
Grand Total	0	0	28	28	0	0	23	23	51
Apprch %	0		100		0		100		
Total %	0	0	54.9	54.9	0	0	45.1	45.1	



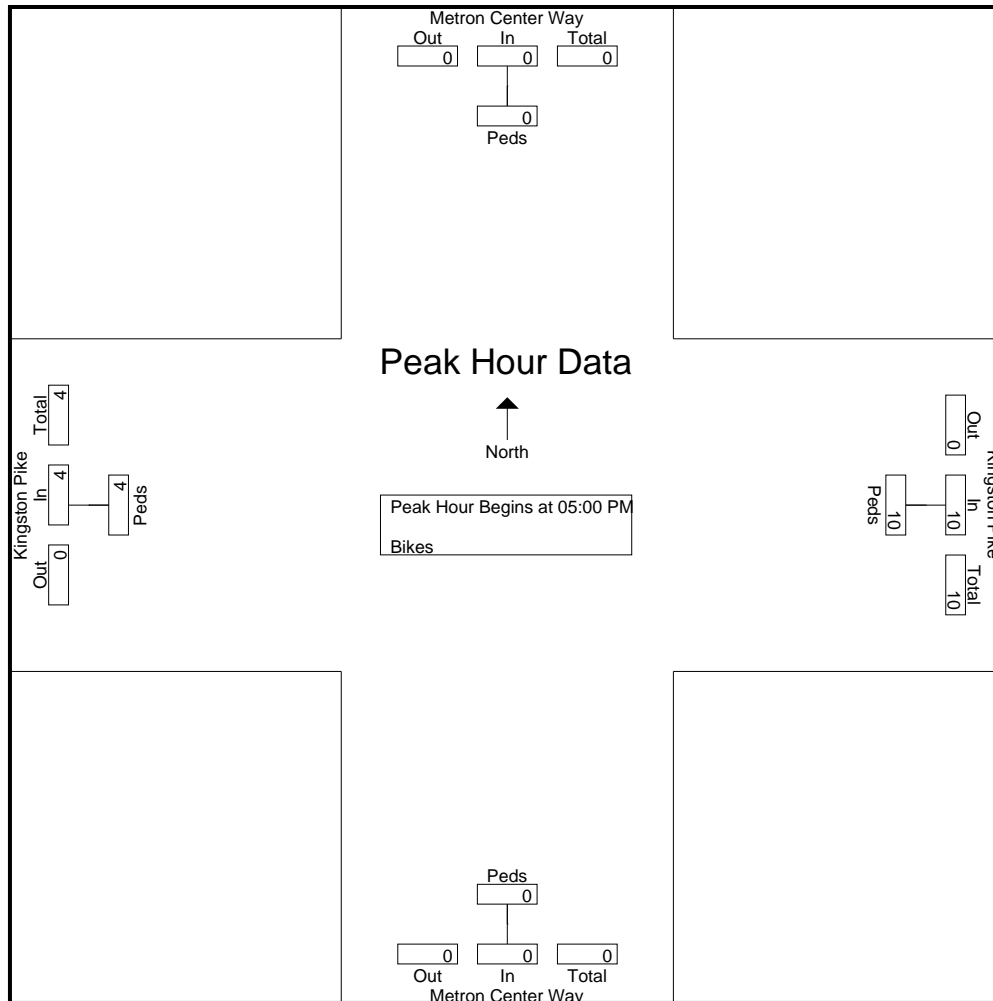


Start Time	Metron Center Way Southbound		Kingston Pike Westbound		Metron Center Way Northbound		Kingston Pike Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1									
Peak Hour for Entire Intersection Begins at 07:30 AM									
07:30 AM	0	0	0	0	0	0	1	1	1
07:45 AM	0	0	0	0	0	0	3	3	3
08:00 AM	0	0	1	1	0	0	4	4	5
08:15 AM	0	0	1	1	0	0	1	1	2
Total Volume	0	0	2	2	0	0	9	9	11
% App. Total	0		100		0		100		
PHF	.000	.000	.500	.500	.000	.000	.563	.563	.550



Start Time	Metron Center Way Southbound		Kingston Pike Westbound		Metron Center Way Northbound		Kingston Pike Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
05:00 PM	0	0	3	3	0	0	0	0	3
05:15 PM	0	0	1	1	0	0	0	0	1
05:30 PM	0	0	3	3	0	0	1	1	4
05:45 PM	0	0	3	3	0	0	3	3	6
Total Volume	0	0	10	10	0	0	4	4	14
% App. Total	0		100		0		100		
PHF	.000	.000	.833	.833	.000	.000	.333	.333	.583

Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 05:00 PM

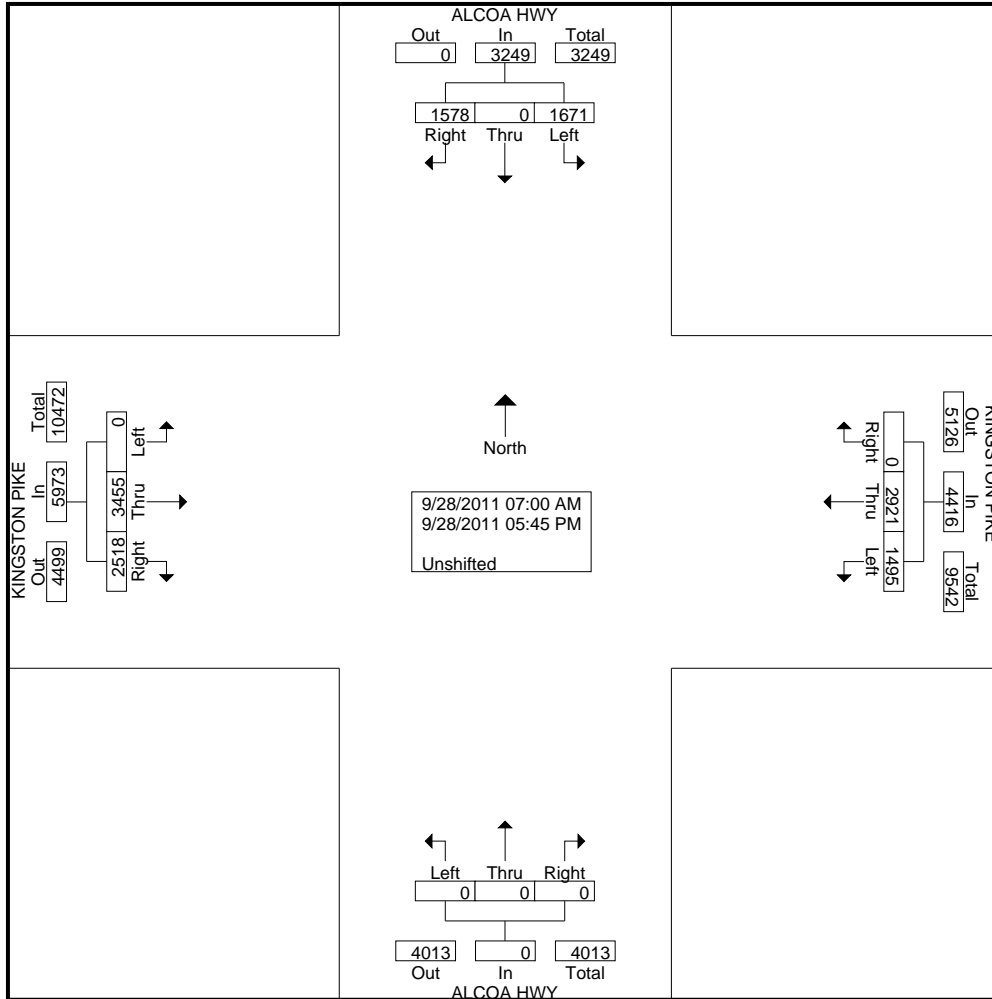


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 KNOXVILLE, TN 37921  
 865-963-4300

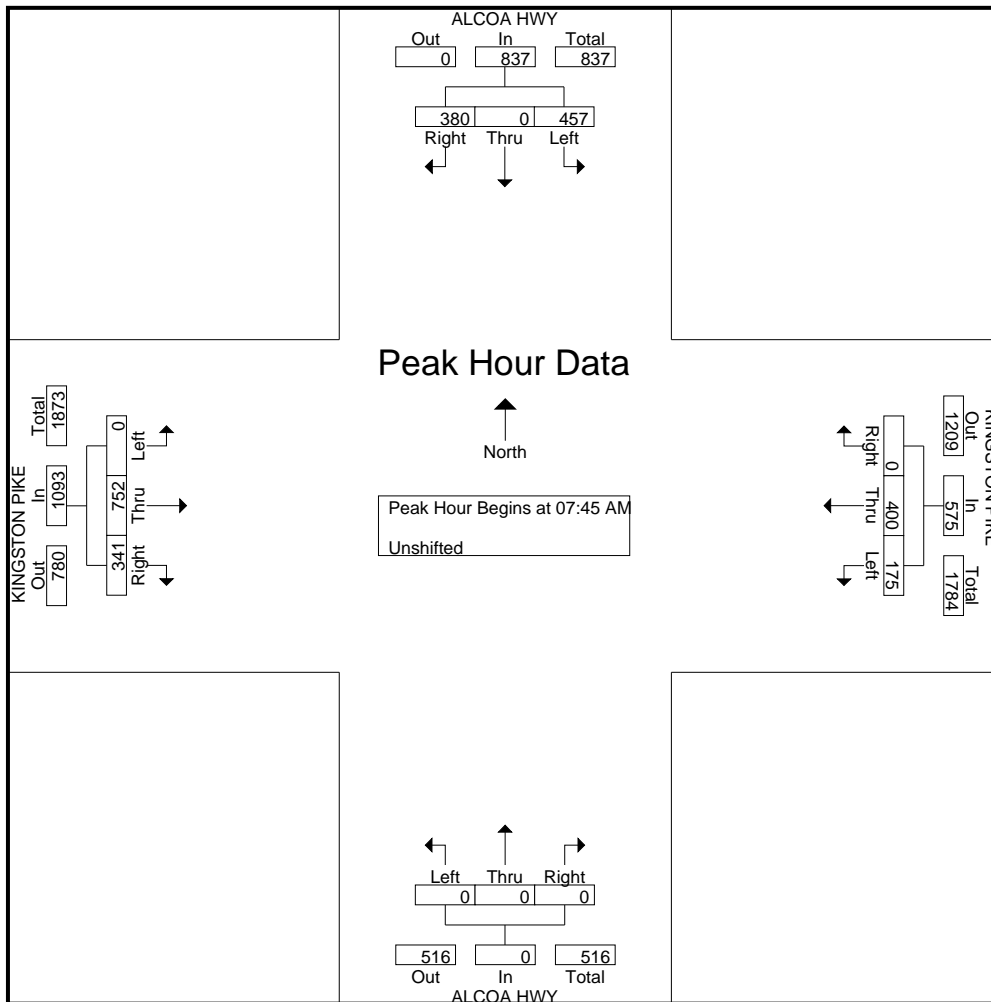
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 Site Code : 000001A  
 Start Date : 9/28/2011  
 Page No : 1

**Groups Printed- Unshifted**

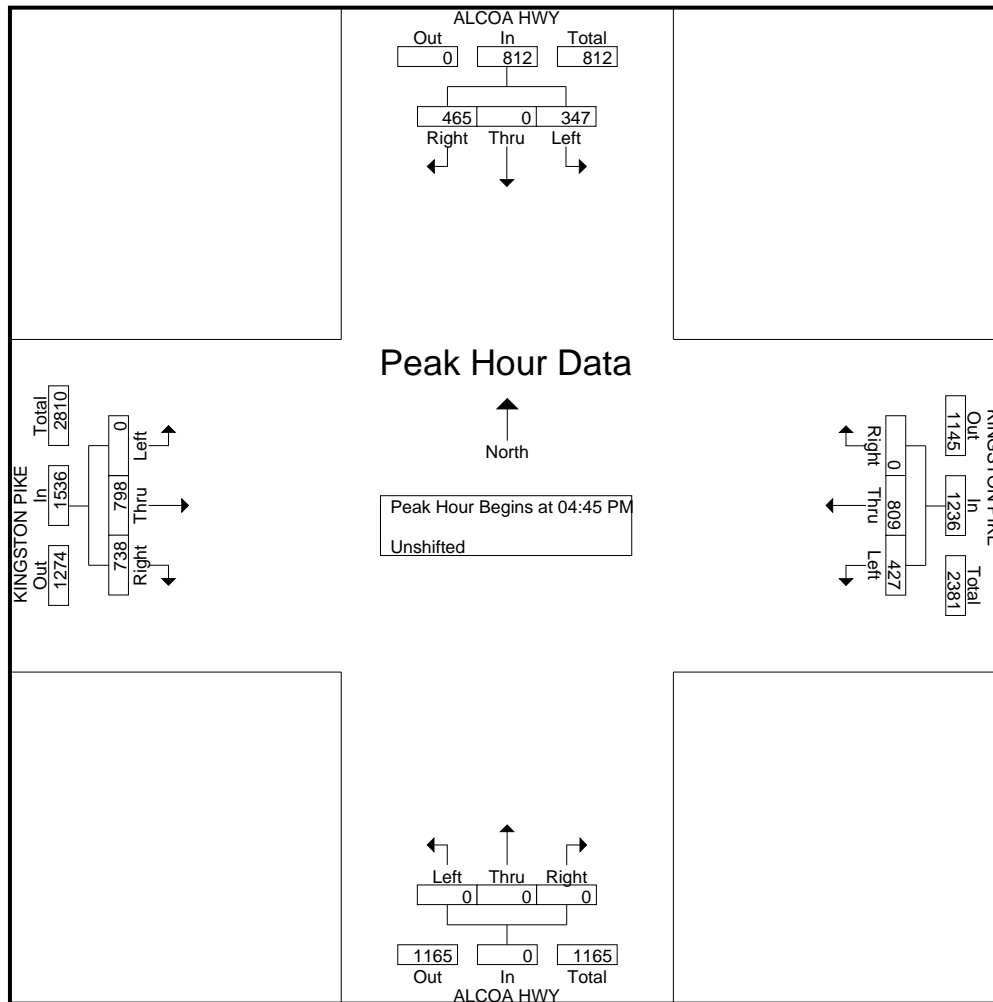
Start Time	ALCOA HWY Southbound				KINGSTON PIKE Westbound				ALCOA HWY Northbound				KINGSTON PIKE Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	50	0	41	91	12	45	0	57	0	0	0	0	0	86	46	132	280
07:15 AM	91	0	57	148	22	75	0	97	0	0	0	0	0	116	57	173	418
07:30 AM	133	0	88	221	30	97	0	127	0	0	0	0	0	176	63	239	587
07:45 AM	131	0	87	218	38	98	0	136	0	0	0	0	0	211	95	306	660
Total	405	0	273	678	102	315	0	417	0	0	0	0	0	589	261	850	1945
08:00 AM	105	0	95	200	55	120	0	175	0	0	0	0	0	165	81	246	621
08:15 AM	108	0	86	194	47	82	0	129	0	0	0	0	0	183	85	268	591
08:30 AM	113	0	112	225	35	100	0	135	0	0	0	0	0	193	80	273	633
08:45 AM	95	0	102	197	36	93	0	129	0	0	0	0	0	153	76	229	555
Total	421	0	395	816	173	395	0	568	0	0	0	0	0	694	322	1016	2400
*** BREAK ***																	
03:00 PM	75	0	52	127	80	154	0	234	0	0	0	0	0	177	120	297	658
03:15 PM	53	0	43	96	116	167	0	283	0	0	0	0	0	183	118	301	680
03:30 PM	67	0	41	108	93	210	0	303	0	0	0	0	0	161	149	310	721
03:45 PM	66	0	53	119	114	159	0	273	0	0	0	0	0	129	100	229	621
Total	261	0	189	450	403	690	0	1093	0	0	0	0	0	650	487	1137	2680
04:00 PM	57	0	52	109	88	140	0	228	0	0	0	0	0	169	138	307	644
04:15 PM	64	0	65	129	87	177	0	264	0	0	0	0	0	185	173	358	751
04:30 PM	76	0	60	136	124	173	0	297	0	0	0	0	0	193	241	434	867
04:45 PM	73	0	158	231	102	192	0	294	0	0	0	0	0	207	133	340	865
Total	270	0	335	605	401	682	0	1083	0	0	0	0	0	754	685	1439	3127
05:00 PM	120	0	106	226	87	168	0	255	0	0	0	0	0	224	184	408	889
05:15 PM	63	0	105	168	116	217	0	333	0	0	0	0	0	171	228	399	900
05:30 PM	91	0	96	187	122	232	0	354	0	0	0	0	0	196	193	389	930
05:45 PM	40	0	79	119	91	222	0	313	0	0	0	0	0	177	158	335	767
Total	314	0	386	700	416	839	0	1255	0	0	0	0	0	768	763	1531	3486
Grand Total	1671	0	1578	3249	1495	2921	0	4416	0	0	0	0	0	3455	2518	5973	13638
Apprch %	51.4	0	48.6		33.9	66.1	0		0	0	0		0	57.8	42.2		
Total %	12.3	0	11.6	23.8	11	21.4	0	32.4	0	0	0	0	0	25.3	18.5	43.8	



Start Time	ALCOA HWY Southbound				KINGSTON PIKE Westbound				ALCOA HWY Northbound				KINGSTON PIKE Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	131	0	87	218	38	98	0	136	0	0	0	0	0	211	95	306	660
08:00 AM	105	0	95	200	55	120	0	175	0	0	0	0	0	165	81	246	621
08:15 AM	108	0	86	194	47	82	0	129	0	0	0	0	0	183	85	268	591
08:30 AM	113	0	112	225	35	100	0	135	0	0	0	0	0	193	80	273	633
Total Volume	457	0	380	837	175	400	0	575	0	0	0	0	0	752	341	1093	2505
% App. Total	54.6	0	45.4		30.4	69.6	0		0	0	0		0	68.8	31.2		
PHF	.872	.000	.848	.930	.795	.833	.000	.821	.000	.000	.000	.000	.000	.891	.897	.893	.949



Start Time	ALCOA HWY Southbound				KINGSTON PIKE Westbound				ALCOA HWY Northbound				KINGSTON PIKE Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	73	0	158	231	102	192	0	294	0	0	0	0	0	207	133	340	865
05:00 PM	120	0	106	226	87	168	0	255	0	0	0	0	0	224	184	408	889
05:15 PM	63	0	105	168	116	217	0	333	0	0	0	0	0	171	228	399	900
05:30 PM	91	0	96	187	122	232	0	354	0	0	0	0	0	196	193	389	930
Total Volume	347	0	465	812	427	809	0	1236	0	0	0	0	0	798	738	1536	3584
% App. Total	42.7	0	57.3		34.5	65.5	0		0	0	0	0	0	52	48		
PHF	.723	.000	.736	.879	.875	.872	.000	.873	.000	.000	.000	.000	.000	.891	.809	.941	.963



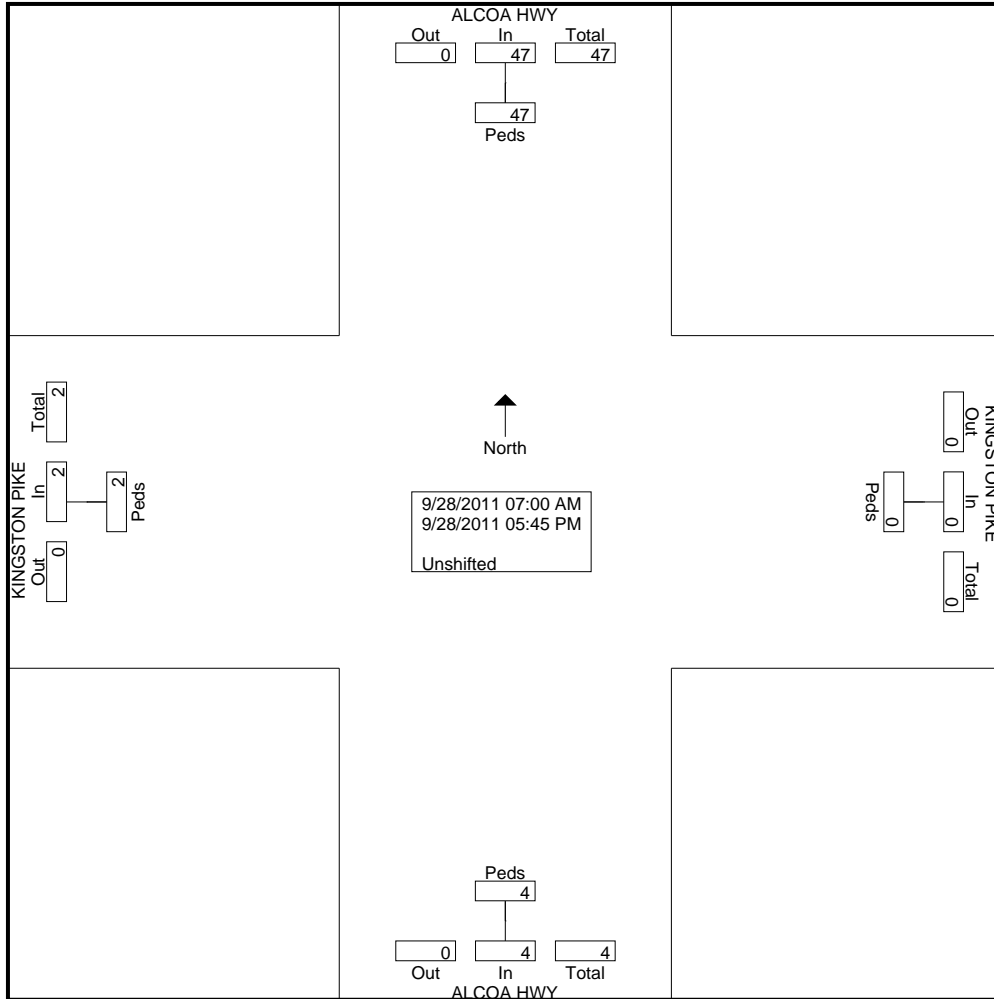
WILBUR SMITH ASSOCIATES  
 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : kp at alcoa hwy sb ramp  
 Site Code : 0000001A  
 Start Date : 9/28/2011  
 Page No : 1

**Groups Printed- Unshifted**

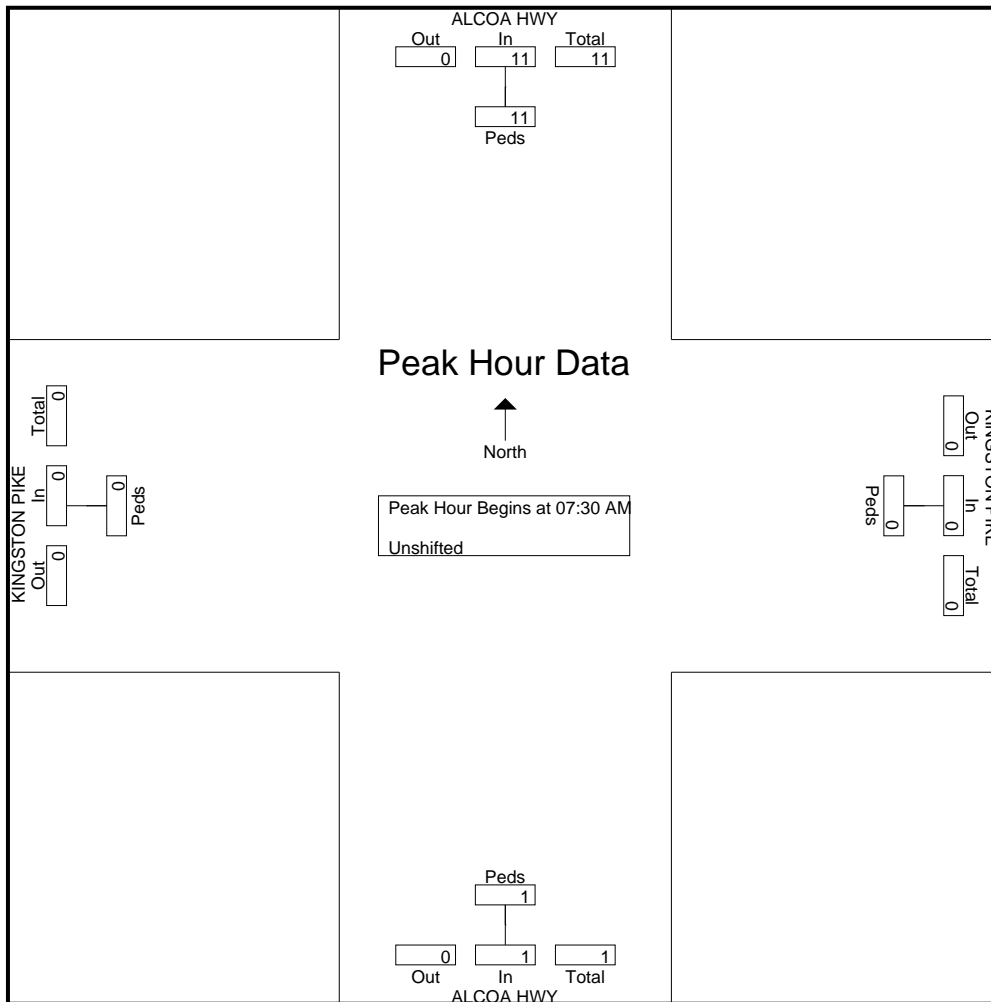
Start Time	ALCOA HWY Southbound		KINGSTON PIKE Westbound		ALCOA HWY Northbound		KINGSTON PIKE Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:00 AM	1	1	0	0	0	0	0	0	1
*** BREAK ***									
07:30 AM	4	4	0	0	1	1	0	0	5
07:45 AM	2	2	0	0	0	0	0	0	2
Total	7	7	0	0	1	1	0	0	8
08:00 AM	3	3	0	0	0	0	0	0	3
08:15 AM	2	2	0	0	0	0	0	0	2
08:30 AM	3	3	0	0	0	0	0	0	3
08:45 AM	2	2	0	0	0	0	0	0	2
Total	10	10	0	0	0	0	0	0	10
*** BREAK ***									
03:00 PM	3	3	0	0	0	0	0	0	3
03:15 PM	2	2	0	0	0	0	0	0	2
03:30 PM	1	1	0	0	2	2	0	0	3
03:45 PM	2	2	0	0	0	0	2	2	4
Total	8	8	0	0	2	2	2	2	12
04:00 PM	2	2	0	0	0	0	0	0	2
04:15 PM	4	4	0	0	0	0	0	0	4
04:30 PM	7	7	0	0	0	0	0	0	7
04:45 PM	4	4	0	0	0	0	0	0	4
Total	17	17	0	0	0	0	0	0	17
05:00 PM	1	1	0	0	0	0	0	0	1
05:15 PM	3	3	0	0	1	1	0	0	4
05:30 PM	1	1	0	0	0	0	0	0	1
*** BREAK ***									
Total	5	5	0	0	1	1	0	0	6
Grand Total	47	47	0	0	4	4	2	2	53
Apprch %	100		0		100		100		
Total %	88.7	88.7	0	0	7.5	7.5	3.8	3.8	





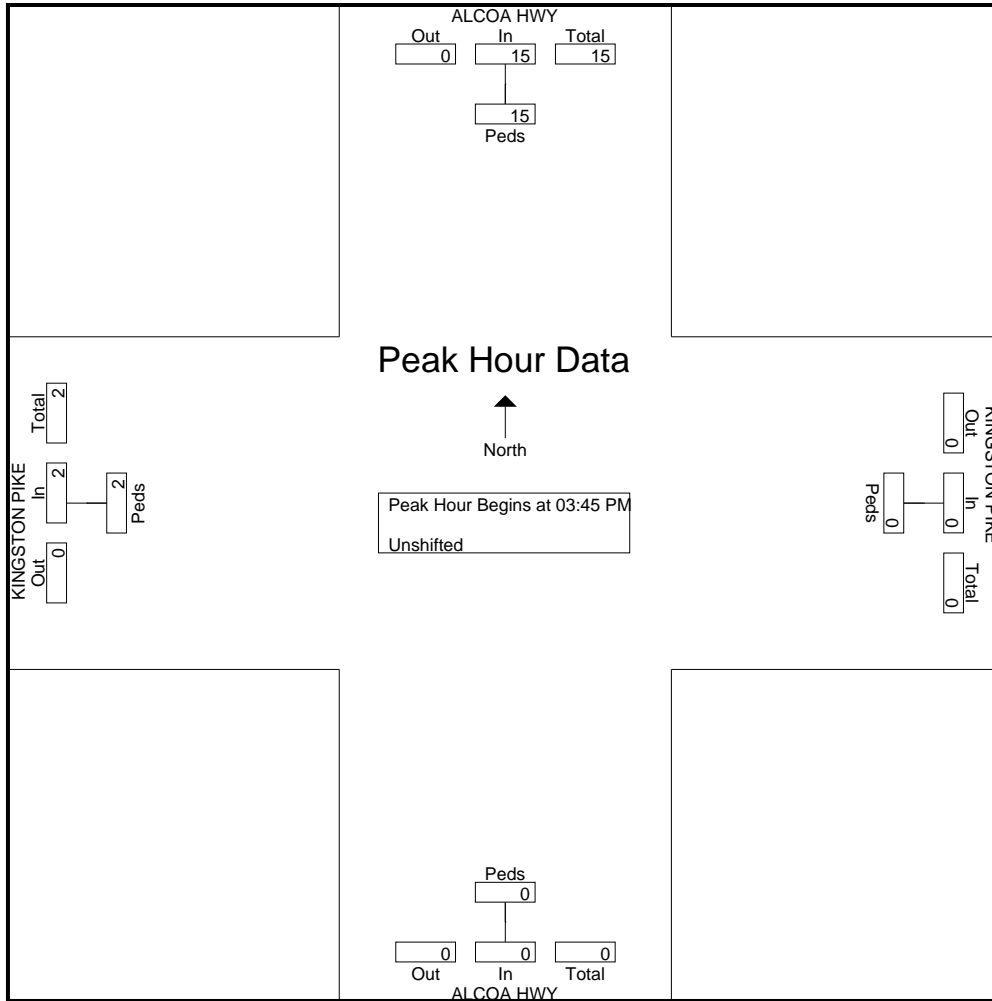
Start Time	ALCOA HWY Southbound		KINGSTON PIKE Westbound		ALCOA HWY Northbound		KINGSTON PIKE Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:30 AM	4	4	0	0	1	1	0	0	5
07:45 AM	2	2	0	0	0	0	0	0	2
08:00 AM	3	3	0	0	0	0	0	0	3
08:15 AM	2	2	0	0	0	0	0	0	2
Total Volume	11	11	0	0	1	1	0	0	12
% App. Total	100		0		100		0		
PHF	.688	.688	.000	.000	.250	.250	.000	.000	.600

Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 07:30 AM



Start Time	ALCOA HWY Southbound		KINGSTON PIKE Westbound		ALCOA HWY Northbound		KINGSTON PIKE Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
03:45 PM	2	2	0	0	0	0	2	2	4
04:00 PM	2	2	0	0	0	0	0	0	2
04:15 PM	4	4	0	0	0	0	0	0	4
04:30 PM	7	7	0	0	0	0	0	0	7
Total Volume	15	15	0	0	0	0	2	2	17
% App. Total	100		0		0		100		
PHF	.536	.536	.000	.000	.000	.000	.250	.250	.607

Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 03:45 PM

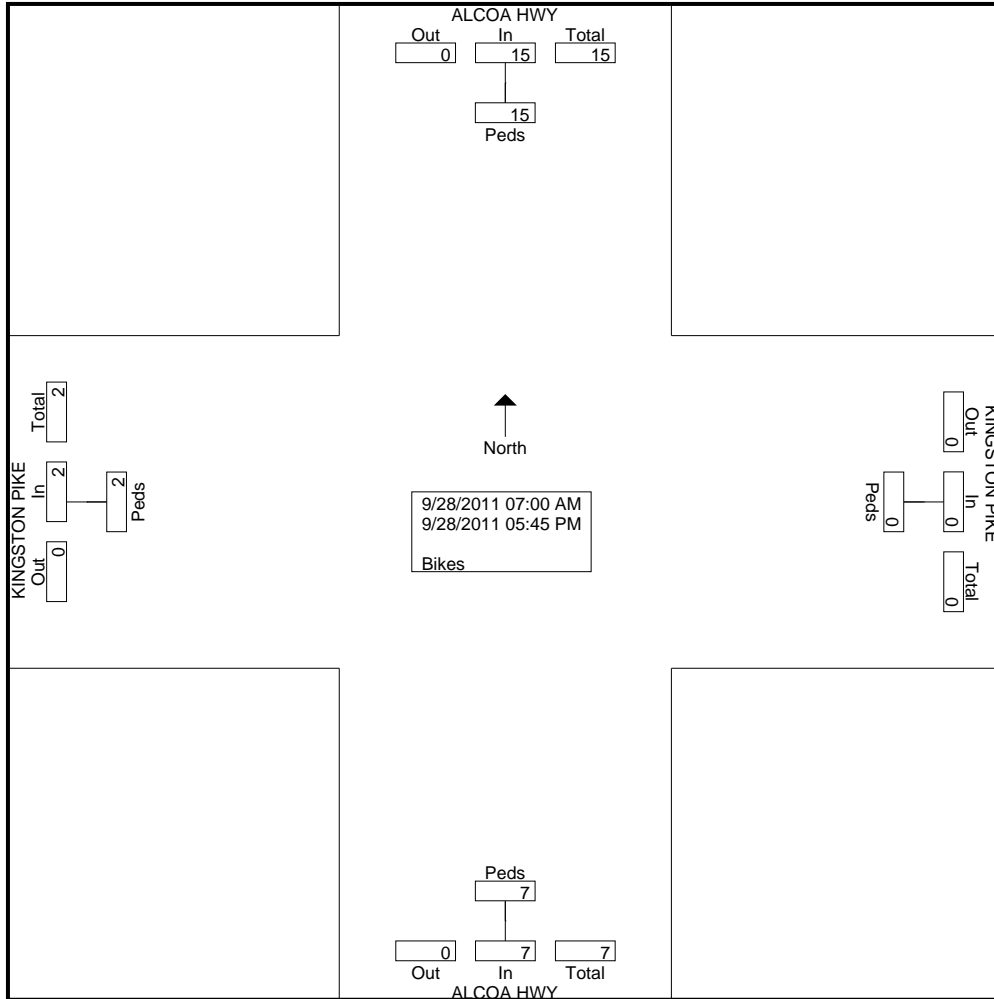


WILBUR SMITH ASSOCIATES  
 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : kp at alcoa hwy sb ramp  
 Site Code : 0000001A  
 Start Date : 9/28/2011  
 Page No : 1

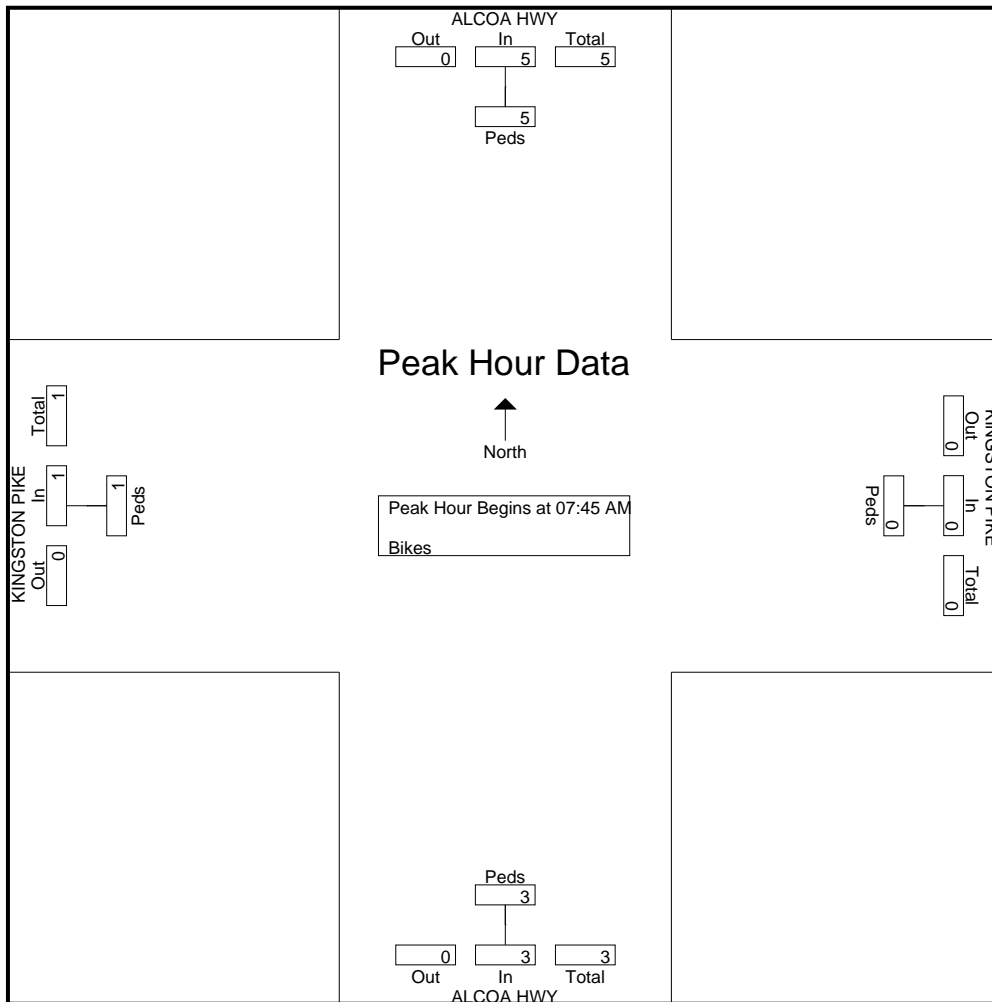
Groups Printed- Bikes

Start Time	ALCOA HWY Southbound		KINGSTON PIKE Westbound		ALCOA HWY Northbound		KINGSTON PIKE Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
*** BREAK ***									
07:30 AM	2	2	0	0	1	1	0	0	3
07:45 AM	2	2	0	0	0	0	0	0	2
Total	4	4	0	0	1	1	0	0	5
08:00 AM	0	0	0	0	1	1	0	0	1
08:15 AM	1	1	0	0	0	0	0	0	1
08:30 AM	2	2	0	0	2	2	1	1	5
08:45 AM	1	1	0	0	1	1	0	0	2
Total	4	4	0	0	4	4	1	1	9
*** BREAK ***									
03:15 PM	1	1	0	0	0	0	0	0	1
03:30 PM	2	2	0	0	0	0	0	0	2
*** BREAK ***									
Total	3	3	0	0	0	0	0	0	3
04:00 PM	1	1	0	0	0	0	0	0	1
*** BREAK ***									
04:30 PM	1	1	0	0	1	1	1	1	3
04:45 PM	0	0	0	0	1	1	0	0	1
Total	2	2	0	0	2	2	1	1	5
05:00 PM	1	1	0	0	0	0	0	0	1
*** BREAK ***									
05:30 PM	1	1	0	0	0	0	0	0	1
*** BREAK ***									
Total	2	2	0	0	0	0	0	0	2
Grand Total	15	15	0	0	7	7	2	2	24
Apprch %	100		0		100		100		
Total %	62.5	62.5	0	0	29.2	29.2	8.3	8.3	

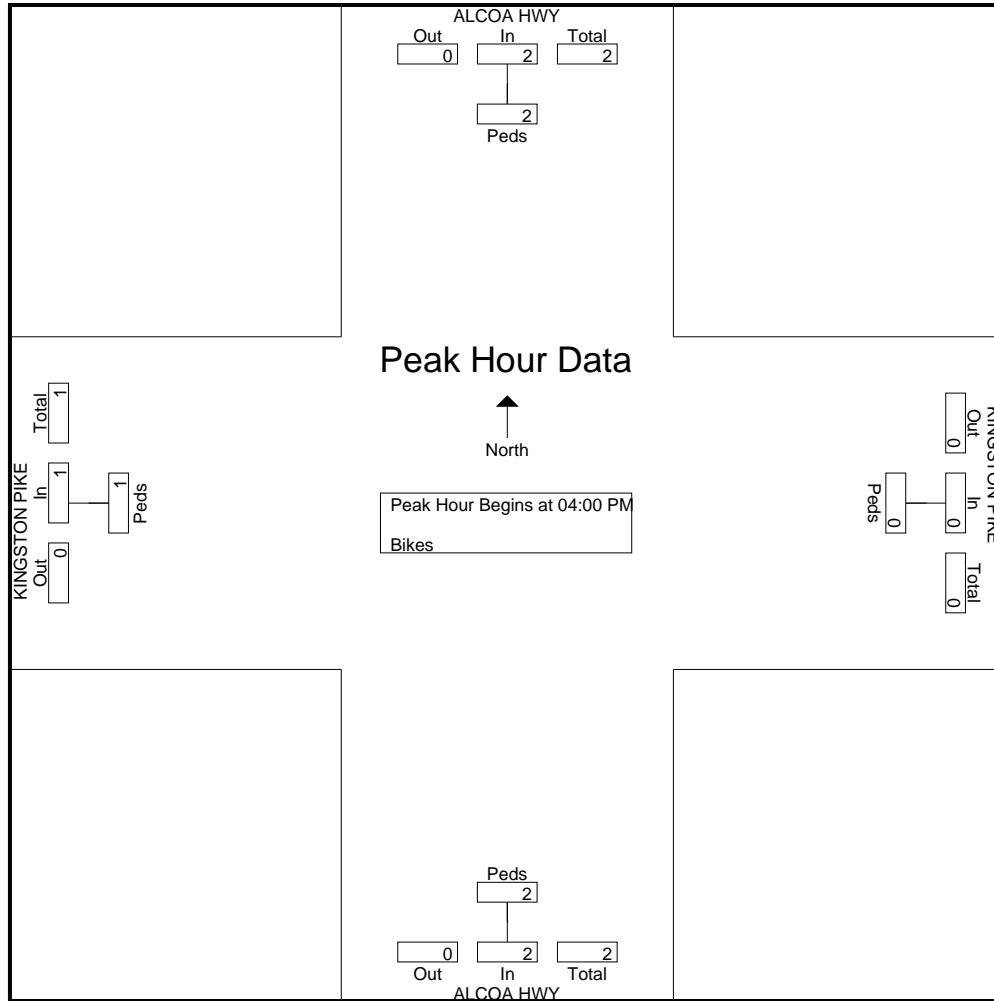


Start Time	ALCOA HWY Southbound		KINGSTON PIKE Westbound		ALCOA HWY Northbound		KINGSTON PIKE Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:45 AM	2	2	0	0	0	0	0	0	2
08:00 AM	0	0	0	0	1	1	0	0	1
08:15 AM	1	1	0	0	0	0	0	0	1
08:30 AM	2	2	0	0	2	2	1	1	5
Total Volume	5	5	0	0	3	3	1	1	9
% App. Total	100		0		100		100		
PHF	.625	.625	.000	.000	.375	.375	.250	.250	.450

Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 07:45 AM



Start Time	ALCOA HWY Southbound		KINGSTON PIKE Westbound		ALCOA HWY Northbound		KINGSTON PIKE Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1									
Peak Hour for Entire Intersection Begins at 04:00 PM									
04:00 PM	1	1	0	0	0	0	0	0	1
04:15 PM	0	0	0	0	0	0	0	0	0
04:30 PM	1	1	0	0	1	1	1	1	3
04:45 PM	0	0	0	0	1	1	0	0	1
Total Volume	2	2	0	0	2	2	1	1	5
% App. Total	100		0		100		100		
PHF	.500	.500	.000	.000	.500	.500	.250	.250	.417



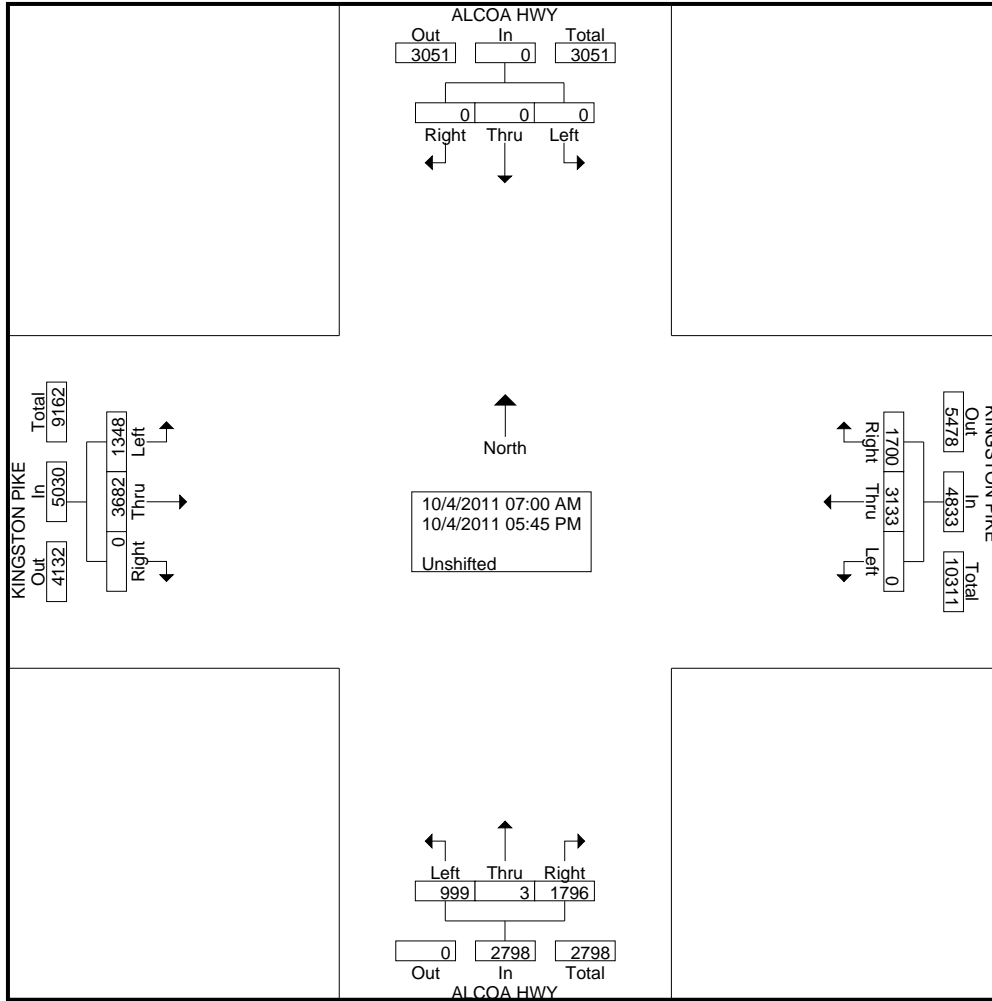
WILBUR SMITH ASSOCIATES  
 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : KP at Alcoa Hwy NB ramp  
 Site Code : 000001B  
 Start Date : 10/4/2011  
 Page No : 1

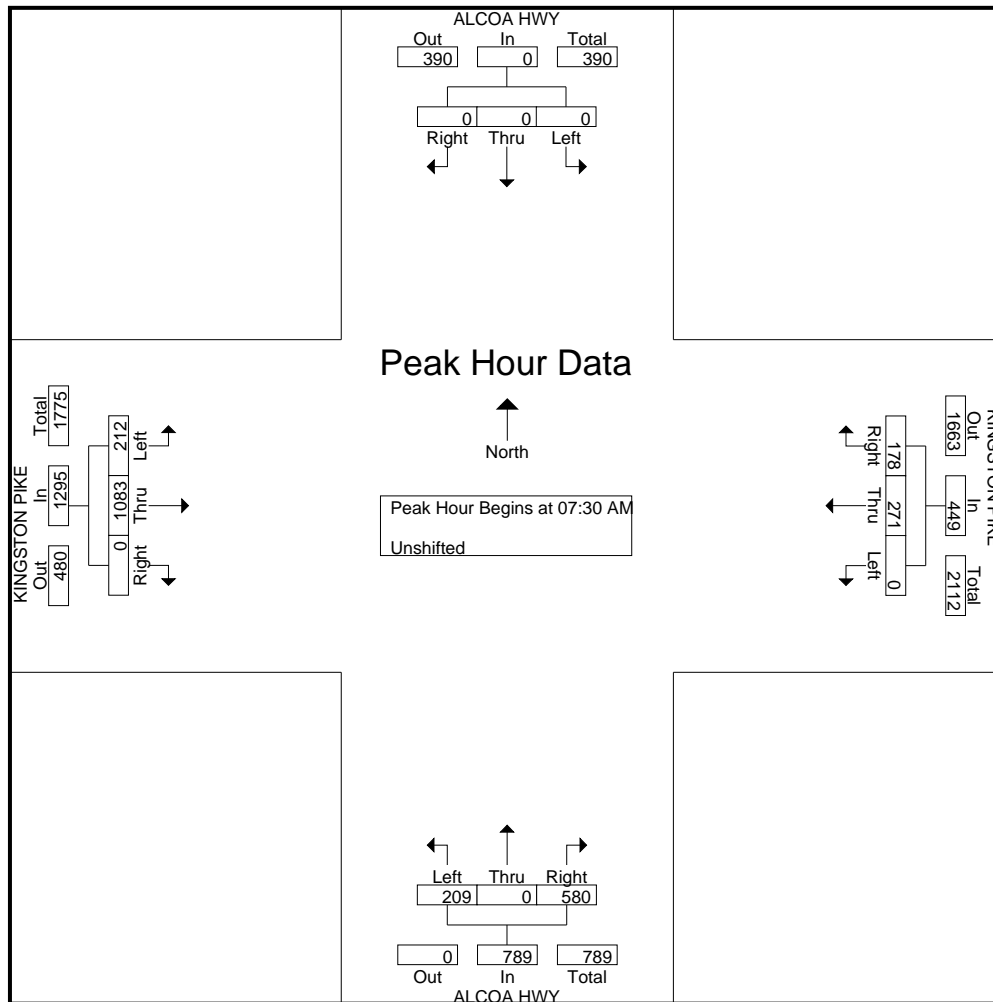
**Groups Printed- Unshifted**

Start Time	ALCOA HWY Southbound				KINGSTON PIKE Westbound				ALCOA HWY Northbound				KINGSTON PIKE Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	0	0	0	0	0	50	50	100	27	0	81	108	15	138	0	153	361
07:15 AM	0	0	0	0	0	53	50	103	18	3	94	115	29	212	0	241	459
07:30 AM	0	0	0	0	0	58	55	113	42	0	163	205	43	301	0	344	662
07:45 AM	0	0	0	0	0	59	35	94	56	0	170	226	58	292	0	350	670
Total	0	0	0	0	0	220	190	410	143	3	508	654	145	943	0	1088	2152
08:00 AM	0	0	0	0	0	61	38	99	55	0	110	165	70	245	0	315	579
08:15 AM	0	0	0	0	0	93	50	143	56	0	137	193	41	245	0	286	622
08:30 AM	0	0	0	0	0	114	46	160	50	0	104	154	46	204	0	250	564
08:45 AM	0	0	0	0	0	99	34	133	41	0	96	137	39	232	0	271	541
Total	0	0	0	0	0	367	168	535	202	0	447	649	196	926	0	1122	2306
*** BREAK ***																	
03:00 PM	0	0	0	0	0	147	141	288	43	0	80	123	80	158	0	238	649
03:15 PM	0	0	0	0	0	179	112	291	55	0	122	177	80	193	0	273	741
03:30 PM	0	0	0	0	0	201	162	363	46	0	73	119	87	153	0	240	722
03:45 PM	0	0	0	0	0	276	115	391	46	0	62	108	90	170	0	260	759
Total	0	0	0	0	0	803	530	1333	190	0	337	527	337	674	0	1011	2871
04:00 PM	0	0	0	0	0	213	117	330	67	0	65	132	79	115	0	194	656
04:15 PM	0	0	0	0	0	266	120	386	48	0	41	89	53	113	0	166	641
04:30 PM	0	0	0	0	0	186	92	278	51	0	55	106	95	140	0	235	619
04:45 PM	0	0	0	0	0	178	131	309	45	0	69	114	84	152	0	236	659
Total	0	0	0	0	0	843	460	1303	211	0	230	441	311	520	0	831	2575
05:00 PM	0	0	0	0	0	215	98	313	72	0	72	144	112	151	0	263	720
05:15 PM	0	0	0	0	0	267	84	351	73	0	57	130	88	136	0	224	705
05:30 PM	0	0	0	0	0	226	60	286	58	0	71	129	91	156	0	247	662
05:45 PM	0	0	0	0	0	192	110	302	50	0	74	124	68	176	0	244	670
Total	0	0	0	0	0	900	352	1252	253	0	274	527	359	619	0	978	2757
Grand Total	0	0	0	0	0	3133	1700	4833	999	3	1796	2798	1348	3682	0	5030	12661
Apprch %	0	0	0	0	0	64.8	35.2		35.7	0.1	64.2		26.8	73.2	0		
Total %	0	0	0	0	0	24.7	13.4	38.2	7.9	0	14.2	22.1	10.6	29.1	0	39.7	

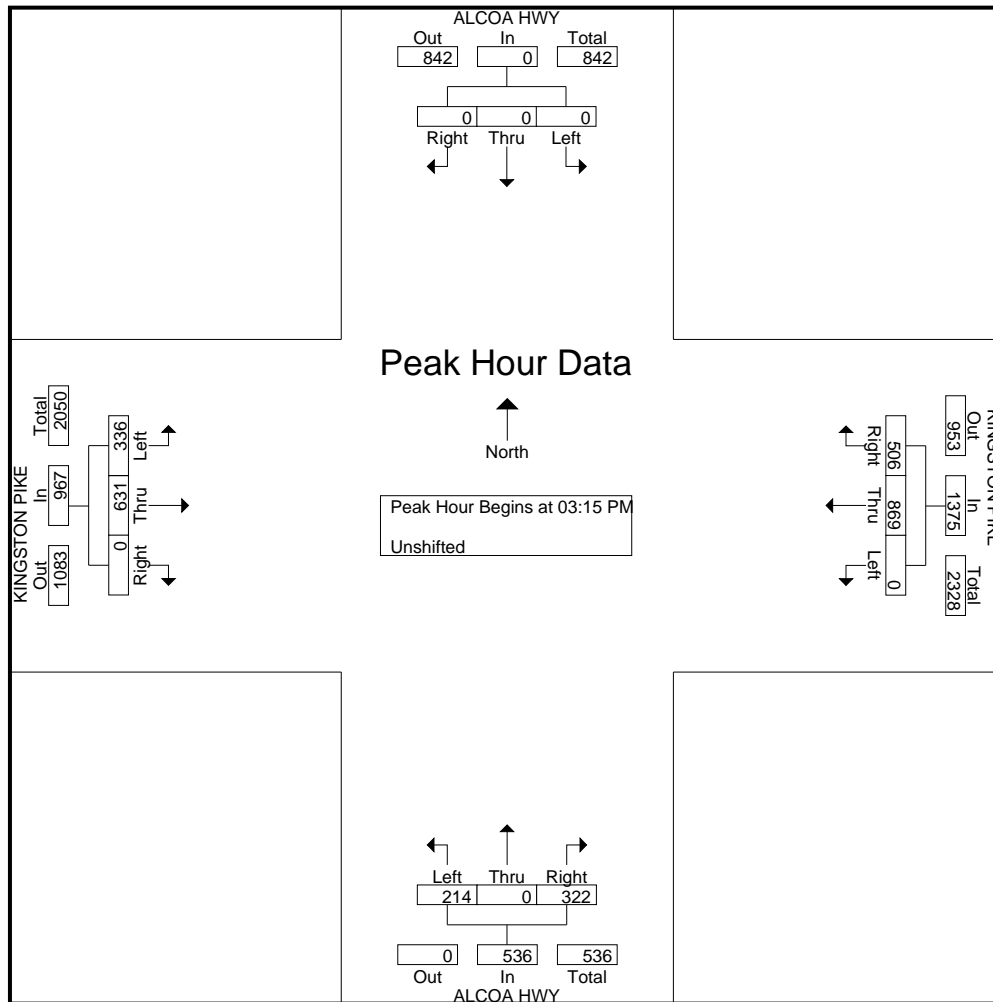




Start Time	ALCOA HWY Southbound				KINGSTON PIKE Westbound				ALCOA HWY Northbound				KINGSTON PIKE Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	58	55	113	42	0	163	205	43	301	0	344	662
07:45 AM	0	0	0	0	0	59	35	94	56	0	170	226	58	292	0	350	670
08:00 AM	0	0	0	0	0	61	38	99	55	0	110	165	70	245	0	315	579
08:15 AM	0	0	0	0	0	93	50	143	56	0	137	193	41	245	0	286	622
Total Volume	0	0	0	0	0	271	178	449	209	0	580	789	212	1083	0	1295	2533
% App. Total	0	0	0	0	0	60.4	39.6		26.5	0	73.5		16.4	83.6	0		
PHF	.000	.000	.000	.000	.000	.728	.809	.785	.933	.000	.853	.873	.757	.900	.000	.925	.945



Start Time	ALCOA HWY Southbound				KINGSTON PIKE Westbound				ALCOA HWY Northbound				KINGSTON PIKE Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:15 PM																	
03:15 PM	0	0	0	0	0	179	112	291	55	0	122	177	80	193	0	273	741
03:30 PM	0	0	0	0	0	201	162	363	46	0	73	119	87	153	0	240	722
03:45 PM	0	0	0	0	0	276	115	391	46	0	62	108	90	170	0	260	759
04:00 PM	0	0	0	0	0	213	117	330	67	0	65	132	79	115	0	194	656
Total Volume	0	0	0	0	0	869	506	1375	214	0	322	536	336	631	0	967	2878
% App. Total	0	0	0	0	0	63.2	36.8		39.9	0	60.1		34.7	65.3	0		
PHF	.000	.000	.000	.000	.000	.787	.781	.879	.799	.000	.660	.757	.933	.817	.000	.886	.948

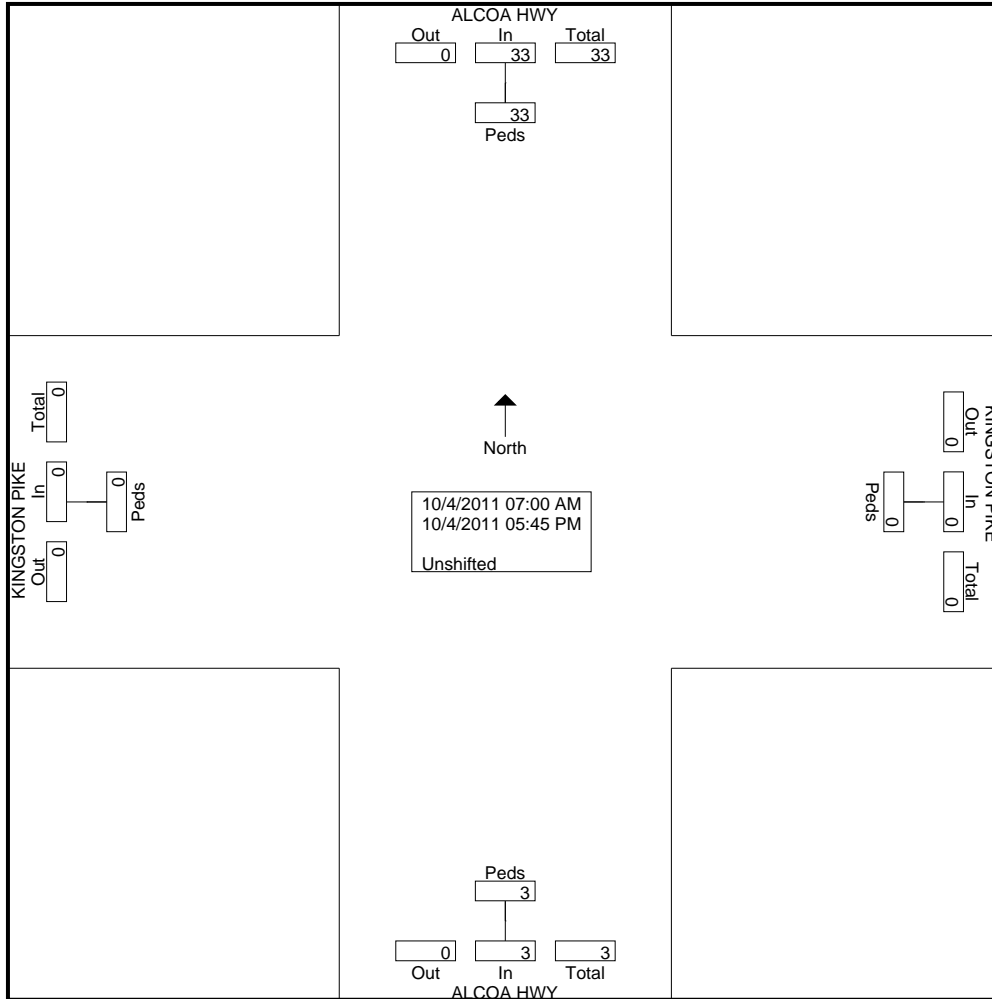


WILBUR SMITH ASSOCIATES  
 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : KP at Alcoa Hwy NB ramp  
 Site Code : 000001B  
 Start Date : 10/4/2011  
 Page No : 1

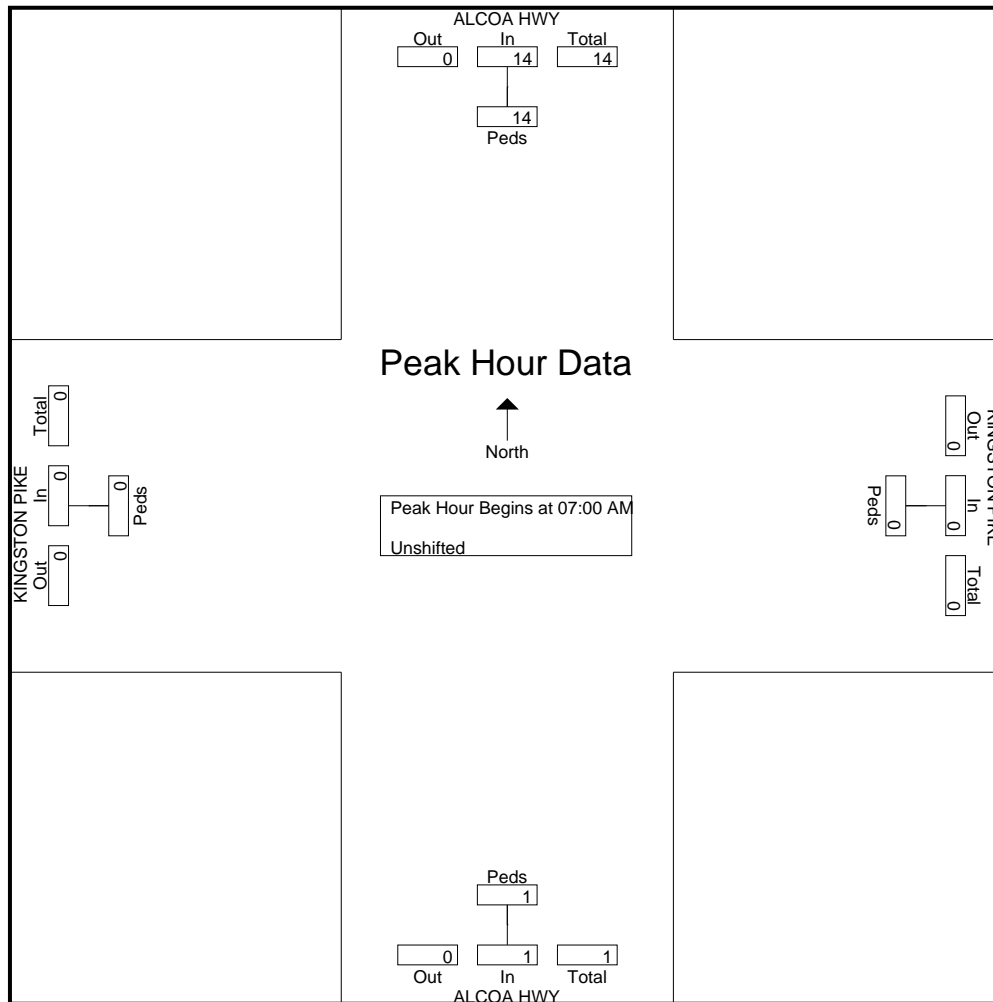
Groups Printed- Unshifted

Start Time	ALCOA HWY Southbound		KINGSTON PIKE Westbound		ALCOA HWY Northbound		KINGSTON PIKE Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:00 AM	1	1	0	0	1	1	0	0	2
07:15 AM	3	3	0	0	0	0	0	0	3
07:30 AM	6	6	0	0	0	0	0	0	6
07:45 AM	4	4	0	0	0	0	0	0	4
Total	14	14	0	0	1	1	0	0	15
08:00 AM	2	2	0	0	0	0	0	0	2
*** BREAK ***									
08:30 AM	1	1	0	0	0	0	0	0	1
08:45 AM	2	2	0	0	0	0	0	0	2
Total	5	5	0	0	0	0	0	0	5
*** BREAK ***									
03:00 PM	1	1	0	0	0	0	0	0	1
03:15 PM	2	2	0	0	0	0	0	0	2
*** BREAK ***									
03:45 PM	2	2	0	0	1	1	0	0	3
Total	5	5	0	0	1	1	0	0	6
*** BREAK ***									
04:15 PM	1	1	0	0	0	0	0	0	1
04:30 PM	1	1	0	0	0	0	0	0	1
04:45 PM	1	1	0	0	0	0	0	0	1
Total	3	3	0	0	0	0	0	0	3
05:00 PM	1	1	0	0	0	0	0	0	1
05:15 PM	2	2	0	0	0	0	0	0	2
05:30 PM	3	3	0	0	1	1	0	0	4
*** BREAK ***									
Total	6	6	0	0	1	1	0	0	7
Grand Total	33	33	0	0	3	3	0	0	36
Apprch %	100		0		100		0		
Total %	91.7	91.7	0	0	8.3	8.3	0	0	



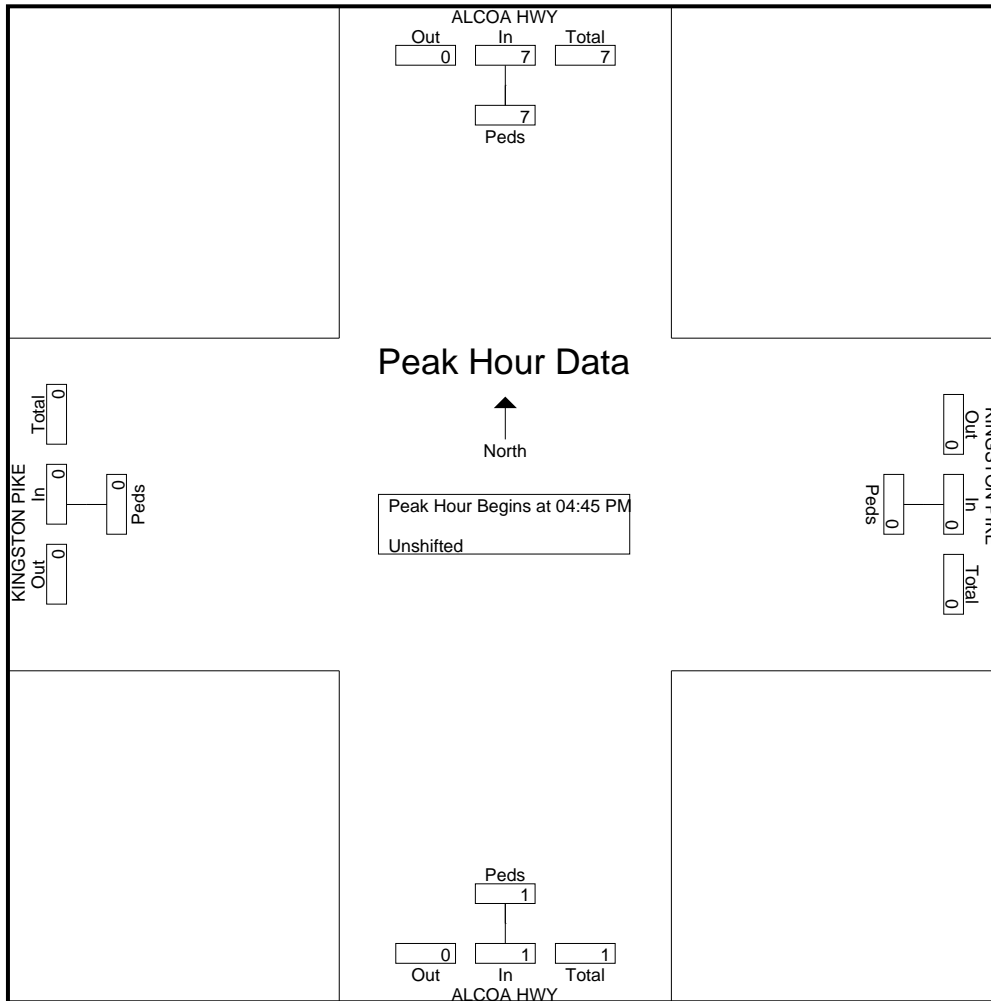
Start Time	ALCOA HWY Southbound		KINGSTON PIKE Westbound		ALCOA HWY Northbound		KINGSTON PIKE Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:00 AM	1	1	0	0	1	1	0	0	2
07:15 AM	3	3	0	0	0	0	0	0	3
07:30 AM	6	6	0	0	0	0	0	0	6
07:45 AM	4	4	0	0	0	0	0	0	4
Total Volume	14	14	0	0	1	1	0	0	15
% App. Total	100		0		100		0		
PHF	.583	.583	.000	.000	.250	.250	.000	.000	.625

Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 07:00 AM



Start Time	ALCOA HWY Southbound		KINGSTON PIKE Westbound		ALCOA HWY Northbound		KINGSTON PIKE Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
04:45 PM	1	1	0	0	0	0	0	0	1
05:00 PM	1	1	0	0	0	0	0	0	1
05:15 PM	2	2	0	0	0	0	0	0	2
05:30 PM	3	3	0	0	1	1	0	0	4
Total Volume	7	7	0	0	1	1	0	0	8
% App. Total	100		0		100		0		
PHF	.583	.583	.000	.000	.250	.250	.000	.000	.500

Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 04:45 PM



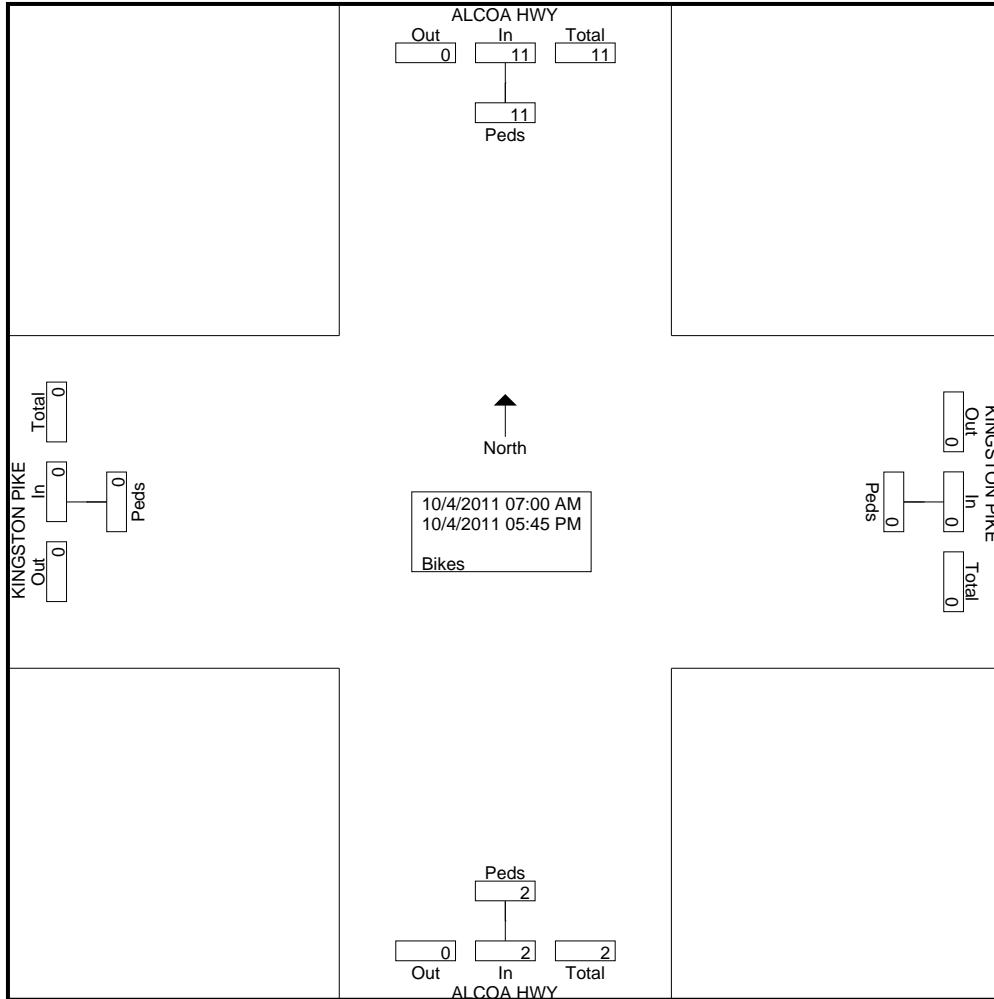
WILBUR SMITH ASSOCIATES  
 1100 MARION STREET, SUITE 200  
 KNOXVILLE, TN 37921  
 865-963-4300

File Name : KP at Alcoa Hwy NB ramp  
 Site Code : 000001B  
 Start Date : 10/4/2011  
 Page No : 1

Groups Printed- Bikes

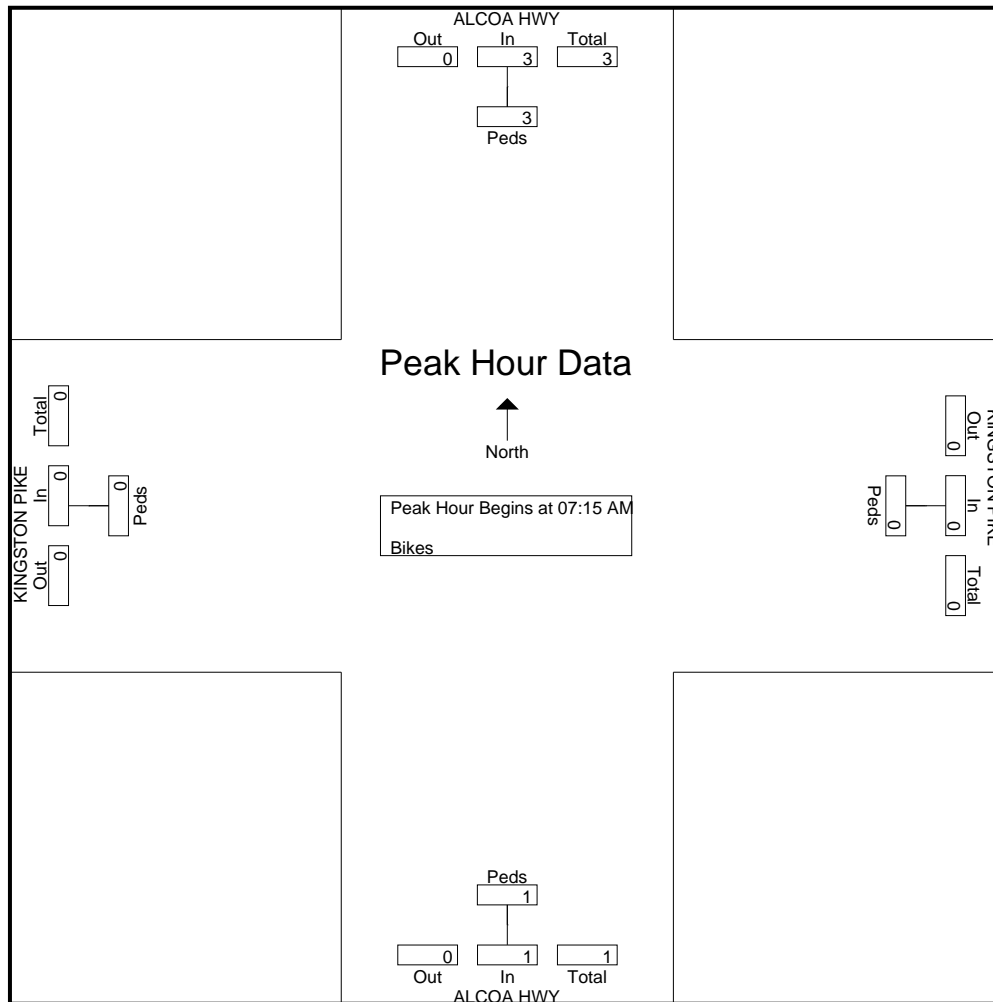
Start Time	ALCOA HWY Southbound		KINGSTON PIKE Westbound		ALCOA HWY Northbound		KINGSTON PIKE Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:00 AM	1	1	0	0	0	0	0	0	1
07:15 AM	1	1	0	0	0	0	0	0	1
*** BREAK ***									
07:45 AM	1	1	0	0	0	0	0	0	1
Total	3	3	0	0	0	0	0	0	3
08:00 AM	1	1	0	0	1	1	0	0	2
*** BREAK ***									
08:45 AM	1	1	0	0	0	0	0	0	1
Total	2	2	0	0	1	1	0	0	3
*** BREAK ***									
03:00 PM	1	1	0	0	0	0	0	0	1
03:15 PM	0	0	0	0	1	1	0	0	1
03:30 PM	1	1	0	0	0	0	0	0	1
03:45 PM	1	1	0	0	0	0	0	0	1
Total	3	3	0	0	1	1	0	0	4
*** BREAK ***									
04:45 PM	1	1	0	0	0	0	0	0	1
Total	1	1	0	0	0	0	0	0	1
*** BREAK ***									
05:15 PM	1	1	0	0	0	0	0	0	1
*** BREAK ***									
05:45 PM	1	1	0	0	0	0	0	0	1
Total	2	2	0	0	0	0	0	0	2
Grand Total	11	11	0	0	2	2	0	0	13
Apprch %	100		0		100		0		
Total %	84.6	84.6	0	0	15.4	15.4	0	0	





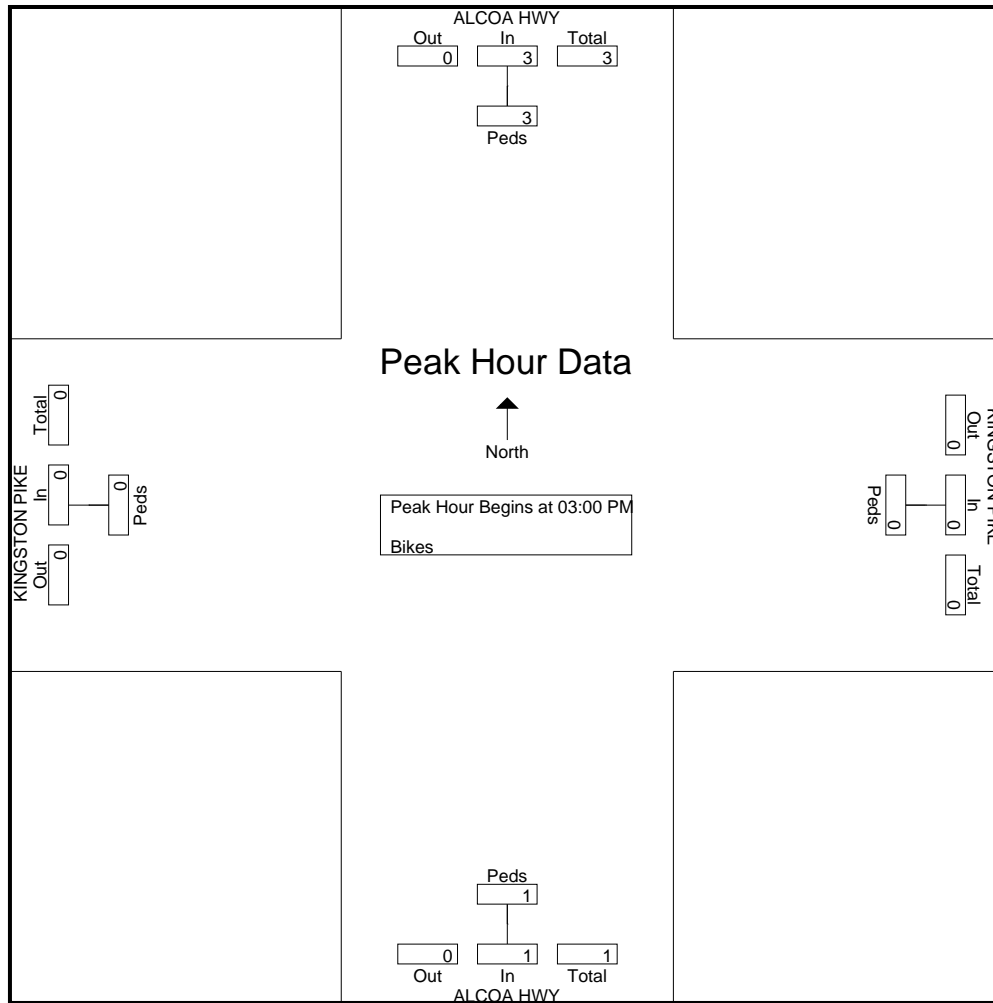
Start Time	ALCOA HWY Southbound		KINGSTON PIKE Westbound		ALCOA HWY Northbound		KINGSTON PIKE Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
07:15 AM	1	1	0	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	0
07:45 AM	1	1	0	0	0	0	0	0	1
08:00 AM	1	1	0	0	1	1	0	0	2
Total Volume	3	3	0	0	1	1	0	0	4
% App. Total	100		0		100		0		
PHF	.750	.750	.000	.000	.250	.250	.000	.000	.500

Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 07:15 AM



Start Time	ALCOA HWY Southbound		KINGSTON PIKE Westbound		ALCOA HWY Northbound		KINGSTON PIKE Eastbound		Int. Total
	Peds	App. Total	Peds	App. Total	Peds	App. Total	Peds	App. Total	
03:00 PM	1	1	0	0	0	0	0	0	1
03:15 PM	0	0	0	0	1	1	0	0	1
03:30 PM	1	1	0	0	0	0	0	0	1
03:45 PM	1	1	0	0	0	0	0	0	1
Total Volume	3	3	0	0	1	1	0	0	4
% App. Total	100		0		100		0		
PHF	.750	.750	.000	.000	.250	.250	.000	.000	1.000

Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1  
 Peak Hour for Entire Intersection Begins at 03:00 PM



**Wilbur Smith Associates**  
Knoxville, TN

Site Code: AG  
Station ID:

Latitude: 0' 0.000 South

Start Time	04-Oct-11 Tue	EB JOE JOHNSON		Hour Totals		WB JOE JOHNSON		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		2	40			10	59				
12:15		2	56			6	64				
12:30		2	38			11	70				
12:45		0	49	6	183	4	56	31	249	37	432
01:00		3	38			1	48				
01:15		1	50			3	42				
01:30		3	48			9	49				
01:45		2	55	9	191	2	58	15	197	24	388
02:00		0	48			0	75				
02:15		0	42			2	59				
02:30		0	26			2	56				
02:45		0	48	0	164	1	60	5	250	5	414
03:00		2	26			0	56				
03:15		3	40			1	69				
03:30		1	41			0	90				
03:45		1	35	7	142	0	72	1	287	8	429
04:00		0	41			0	91				
04:15		3	45			1	82				
04:30		1	55			0	132				
04:45		3	50	7	191	1	105	2	410	9	601
05:00		1	39			0	126				
05:15		4	35			0	97				
05:30		13	45			3	84				
05:45		26	46	44	165	4	71	7	378	51	543
06:00		17	43			2	64				
06:15		25	63			0	70				
06:30		30	52			7	83				
06:45		44	46	116	204	12	79	21	296	137	500
07:00		52	36			18	56				
07:15		68	20			12	56				
07:30		105	25			25	62				
07:45		127	17	352	98	36	59	91	233	443	331
08:00		138	21			40	50				
08:15		86	29			27	36				
08:30		62	19			38	28				
08:45		85	13	371	82	48	32	153	146	524	228
09:00		63	22			31	37				
09:15		78	18			41	32				
09:30		55	11			47	19				
09:45		43	7	239	58	38	19	157	107	396	165
10:00		43	4			31	17				
10:15		47	8			31	12				
10:30		42	6			43	11				
10:45		41	3	173	21	41	15	146	55	319	76
11:00		41	1			57	12				
11:15		38	2			51	3				
11:30		39	6			52	8				
11:45		46	5	164	14	68	8	228	31	392	45
Total		1488	1513			857	2639			2345	4152
Percent		49.6%	50.4%			24.5%	75.5%			36.1%	63.9%

**Wilbur Smith Associates**  
Knoxville, TN

Site Code: AG  
Station ID:

Latitude: 0' 0.000 South

Start Time	05-Oct-11 Wed	EB JOE JOHNSON		Hour Totals		WB JOE JOHNSON		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		5	49			8	66				
12:15		5	43			6	75				
12:30		3	45			11	62				
12:45		1	69	14	206	7	48	32	251	46	457
01:00		2	57			2	72				
01:15		3	52			2	57				
01:30		0	45			15	56				
01:45		3	30	8	184	6	41	25	226	33	410
02:00		2	44			4	55				
02:15		1	44			0	63				
02:30		0	33			4	80				
02:45		1	43	4	164	5	66	13	264	17	428
03:00		2	53			0	72				
03:15		1	47			0	92				
03:30		0	37			1	91				
03:45		2	43	5	180	8	82	9	337	14	517
04:00		5	34			1	66				
04:15		2	50			0	74				
04:30		0	46			1	139				
04:45		3	52	10	182	1	101	3	380	13	562
05:00		5	41			0	160				
05:15		10	43			2	119				
05:30		9	48			3	112				
05:45		18	42	42	174	3	87	8	478	50	652
06:00		14	44			1	91				
06:15		26	47			5	59				
06:30		24	43			8	65				
06:45		49	33	113	167	15	51	29	266	142	433
07:00		52	29			12	38				
07:15		66	29			16	55				
07:30		94	23			51	68				
07:45		134	18	346	99	39	44	118	205	464	304
08:00		41	14			74	38				
08:15		0	15			101	34				
08:30		0	11			98	38				
08:45		84	6	125	46	46	33	319	143	444	189
09:00		62	10			44	42				
09:15		49	12			37	28				
09:30		62	12			33	21				
09:45		60	8	233	42	39	20	153	111	386	153
10:00		59	9			42	18				
10:15		33	9			35	12				
10:30		43	7			33	9				
10:45		52	6	187	31	43	14	153	53	340	84
11:00		43	4			51	12				
11:15		35	6			53	7				
11:30		45	4			70	4				
11:45		58	3	181	17	60	3	234	26	415	43
Total		1268	1492			1096	2740			2364	4232
Percent		45.9%	54.1%			28.6%	71.4%			35.8%	64.2%

**Wilbur Smith Associates**  
Knoxville, TN

Site Code: AG  
Station ID:

Latitude: 0' 0.000 South

Start Time	06-Oct-11 Thu	EB JOE JOHNSON		Hour Totals		WB JOE JOHNSON		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		4	60			7	69				
12:15		3	58			6	69				
12:30		5	39			9	82				
12:45		2	48	14	205	2	63	24	283	38	488
01:00		5	51			1	63				
01:15		2	62			1	48				
01:30		0	49			15	70				
01:45		0	57	7	219	4	52	21	233	28	452
02:00		1	20			1	61				
02:15		0	45			0	62				
02:30		1	30			2	54				
02:45		1	44	3	139	0	54	3	231	6	370
03:00		0	53			0	58				
03:15		0	55			0	74				
03:30		1	48			2	121				
03:45		1	36	2	192	0	95	2	348	4	540
04:00		0	33			2	69				
04:15		3	36			0	76				
04:30		1	46			0	135				
04:45		2	66	6	181	0	110	2	390	8	571
05:00		2	43			2	122				
05:15		4	44			0	132				
05:30		14	55			0	88				
05:45		16	55	36	197	3	80	5	422	41	619
06:00		8	68			0	85				
06:15		25	56			1	57				
06:30		40	49			10	63				
06:45		36	45	109	218	10	58	21	263	130	481
07:00		53	51			8	56				
07:15		76	25			22	66				
07:30		119	44			28	56				
07:45		127	32	375	152	43	65	101	243	476	395
08:00		116	24			37	53				
08:15		86	26			29	35				
08:30		78	21			45	36				
08:45		72	19	352	90	49	39	160	163	512	253
09:00		67	26			42	47				
09:15		70	22			35	42				
09:30		53	11			50	17				
09:45		45	15	235	74	44	15	171	121	406	195
10:00		47	16			40	27				
10:15		42	29			24	32				
10:30		39	27			37	76				
10:45		52	24	180	96	33	25	134	160	314	256
11:00		37	4			56	11				
11:15		32	6			60	11				
11:30		44	7			57	11				
11:45		29	4	142	21	59	5	232	38	374	59
Total		1461	1784			876	2895			2337	4679
Percent		45.0%	55.0%			23.2%	76.8%			33.3%	66.7%

**Wilbur Smith Associates**  
Knoxville, TN

Site Code: AG  
Station ID:

Latitude: 0' 0.000 South

Start Time	07-Oct-11 Fri	EB JOE JOHNSON		Hour Totals		WB JOE JOHNSON		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		6	52			5	78				
12:15		4	55			7	66				
12:30		4	40			5	63				
12:45		0	57	14	204	6	54	23	261	37	465
01:00		3	50			3	82				
01:15		2	59			1	67				
01:30		1	52			11	76				
01:45		0	47	6	208	5	64	20	289	26	497
02:00		2	56			9	73				
02:15		2	51			1	53				
02:30		2	45			2	86				
02:45		7	39	13	191	2	60	14	272	27	463
03:00		1	39			3	69				
03:15		0	53			1	92				
03:30		2	45			2	112				
03:45		2	48	5	185	1	69	7	342	12	527
04:00		0	55			2	83				
04:15		1	37			0	87				
04:30		1	50			3	144				
04:45		2	41	4	183	1	114	6	428	10	611
05:00		1	47			0	151				
05:15		14	34			0	123				
05:30		12	38			5	96				
05:45		16	21	43	140	2	84	7	454	50	594
06:00		13	32			3	63				
06:15		27	27			3	56				
06:30		23	30			10	44				
06:45		30	34	93	123	16	42	32	205	125	328
07:00		49	31			9	51				
07:15		74	16			27	35				
07:30		90	13			29	30				
07:45		124	26	337	86	36	22	101	138	438	224
08:00		85	8			31	20				
08:15		84	15			30	28				
08:30		66	15			36	32				
08:45		85	14	320	52	44	24	141	104	461	156
09:00		44	15			41	8				
09:15		45	28			36	14				
09:30		59	23			40	24				
09:45		72	18	220	84	40	12	157	58	377	142
10:00		42	11			44	10				
10:15		39	22			50	11				
10:30		32	9			36	13				
10:45		45	11	158	53	55	25	185	59	343	112
11:00		70	9			57	17				
11:15		42	10			61	12				
11:30		41	9			58	8				
11:45		45	12	198	40	70	9	246	46	444	86
Total		1411	1549			939	2656			2350	4205
Percent		47.7%	52.3%			26.1%	73.9%			35.9%	64.1%
Grand Total		5628	6338			3768	10930			9396	17268
Percent		47.0%	53.0%			25.6%	74.4%			35.2%	64.8%
ADT		ADT 6,666				AADT 6,666					

# Wilbur Smith Associates Knoxville, TN

Site Code: AG  
Station ID:

Latitude: 0' 0.000 South

EB JOE JOHNSON		15	16	20	21	26	31	36	41	46	51	56	61	66	71	76	999	Total	Pace	Number	
Start	Time	15	16	20	21	26	31	36	41	46	51	56	61	66	71	76	999	Total	Speed	in Pace	
10/03/11		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00		<b>2</b>	<b>0</b>	<b>4</b>	<b>5</b>	<b>5</b>	<b>6</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>22</b>	<b>22-31</b>	<b>11</b>	<b>11</b>	
23:00		<b>1</b>	<b>2</b>	<b>2</b>	<b>8</b>	<b>8</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>14</b>	<b>22-31</b>	<b>11</b>	<b>11</b>	
Total		3	2	6	13	13	7	5	0	0	0	0	0	0	0	0	36				
Percent		8.3%	5.6%	16.7%	36.1%	36.1%	19.4%	13.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				

AM Peak		22:00	23:00	23:00	23:00	22:00	22:00	22:00	22:00
Vol.		2	2	8	8	6	6	5	5

PM Peak		22:00	22:00
Vol.		2	22



# Wilbur Smith Associates Knoxville, TN

Site Code: AG  
Station ID:

Latitude: 0' 0.000 South

EB JOE JOHNSON		1	16	21	26	31	36	41	46	51	56	61	66	71	76	76	999	Total	Pace	Number				
Start	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95		Speed	in Pace				
Time	10/04/11	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12 PM	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
	1	0	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	6	18-27	3				
	0	2	3	2	1	0	0	1	0	0	0	0	0	0	0	0	0	9	18-27	7				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*				
	0	0	1	2	3	2	1	0	0	0	0	0	0	0	0	0	0	7	24-33	6				
	0	0	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	7	23-32	6				
	0	1	7	19	13	3	1	1	0	0	0	0	0	0	0	0	0	44	24-33	32				
	6	10	25	39	26	8	2	0	0	0	0	0	0	0	0	0	116	22-31	65					
	36	52	112	103	43	5	0	1	0	0	0	0	0	0	0	0	352	21-30	215					
	37	48	136	108	36	6	0	0	0	0	0	0	0	0	0	0	371	21-30	244					
	25	12	39	86	61	12	4	0	0	0	0	0	0	0	0	0	239	26-35	147					
	17	14	47	63	27	4	1	0	0	0	0	0	0	0	0	0	173	21-30	110					
	26	10	48	49	25	5	1	0	0	0	0	0	0	0	0	0	164	21-30	97					
	23	22	36	55	34	11	2	0	0	0	0	0	0	0	0	0	183	21-30	91					
	9	16	62	64	31	8	1	0	0	0	0	0	0	0	0	0	191	21-30	126					
	16	19	37	64	21	5	2	0	0	0	0	0	0	0	0	0	164	21-30	101					
	20	2	20	50	37	10	2	1	0	0	0	0	0	0	0	0	142	26-35	87					
	29	12	32	69	38	9	2	0	0	0	0	0	0	0	0	0	191	24-33	107					
	28	12	42	50	32	1	0	0	0	0	0	0	0	0	0	0	165	21-30	92					
	17	14	48	64	41	15	4	0	0	0	0	0	0	0	0	0	204	21-30	112					
	4	4	17	37	27	8	1	0	0	0	0	0	0	0	0	0	98	26-35	64					
	6	4	19	25	22	6	0	0	0	0	0	0	0	0	0	0	82	23-32	47					
	2	3	6	20	19	6	1	1	0	0	0	0	0	0	0	0	58	26-35	39					
	0	1	3	6	9	1	1	0	0	0	0	0	0	0	0	0	21	25-34	15					
	1	2	4	3	2	2	0	0	0	0	0	0	0	0	0	0	14	19-28	9					
	303	260	747	982	551	127	27	4	0	0	0	0	0	0	0	0	3001							
Percent	10.1%	8.7%	24.9%	32.7%	18.4%	4.2%	0.9%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%							
AM Peak	08:00	07:00	08:00	08:00	09:00	09:00	09:00	07:00									08:00							
Vol.	37	52	136	108	61	12	4	1								371								
PM Peak	16:00	12:00	13:00	16:00	18:00	18:00	18:00	15:00									18:00							
Vol.	29	22	62	69	41	15	4	1								204								

**Wilbur Smith Associates**  
Knoxville, TN

Site Code: AG  
Station ID:

Latitude: 0' 0.000 South

Start Time	15	16	20	21	25	26	30	31	35	36	40	41	45	46	50	51	55	56	60	61	65	66	70	71	75	76	999	Total	Pace Speed	Number in Pace
10/05/11	2	0	0	1	1	5	5	5	5	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	25-34	10	
01:00	0	2	0	3	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	18-27	7	
02:00	1	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	18-27	3		
03:00	0	0	0	2	2	0	1	1	1	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	5	13-22	2	
04:00	2	2	2	1	2	2	1	1	1	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	10	8-17	4		
05:00	1	2	2	9	9	14	11	11	11	3	3	3	3	1	1	0	0	0	0	0	0	0	0	0	0	42	22-31	25		
06:00	7	8	8	25	25	43	43	21	21	4	4	5	5	0	0	0	0	0	0	0	0	0	0	0	0	113	21-30	68		
07:00	<b>24</b>	<b>53</b>	<b>113</b>	<b>113</b>	<b>113</b>	<b>112</b>	<b>40</b>	<b>40</b>	<b>40</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>346</b>	21-30	225		
08:00	6	12	46	46	46	45	13	13	13	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	125	21-30	91		
09:00	19	21	59	77	46	46	46	46	46	9	9	2	2	0	0	0	0	0	0	0	0	0	0	0	0	233	21-30	136		
10:00	11	19	43	43	43	76	30	30	30	8	8	8	8	0	0	0	0	0	0	0	0	0	0	0	0	187	21-30	119		
11:00	22	29	53	49	49	49	26	26	26	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	181	21-30	102		
12 PM	22	<b>23</b>	<b>65</b>	<b>65</b>	<b>65</b>	<b>72</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>5</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>206</b>	21-30	137		
13:00	21	18	54	54	54	59	25	25	25	6	6	1	1	0	0	0	0	0	0	0	0	0	0	0	0	184	21-30	113		
14:00	19	23	43	43	43	58	20	20	20	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	164	21-30	101		
15:00	22	17	43	43	43	64	25	25	25	8	8	1	1	0	0	0	0	0	0	0	0	0	0	0	0	180	21-30	107		
16:00	34	21	41	41	41	61	21	21	21	4	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	182	21-30	102		
17:00	<b>43</b>	11	35	35	35	56	21	21	21	7	7	1	1	0	0	0	0	0	0	0	0	0	0	0	0	174	21-30	91		
18:00	13	8	31	31	31	54	48	48	48	<b>11</b>	<b>11</b>	1	1	1	1	0	0	0	0	0	0	0	0	0	0	167	26-35	102		
19:00	4	8	17	17	17	35	24	24	24	10	10	1	1	0	0	0	0	0	0	0	0	0	0	0	0	99	25-34	59		
20:00	3	2	5	5	5	12	22	22	22	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	26-35	34		
21:00	4	0	5	5	5	16	17	17	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	26-35	33		
22:00	0	0	7	7	7	10	13	13	13	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	24-33	23		
23:00	1	0	5	5	5	5	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	21-30	10		
Total	281	279	707	929	929	452	17	17	17	92	92	17	17	3	3	0	0	0	0	0	0	0	0	0	0	2760				
Percent	10.2%	10.1%	25.6%	33.7%	33.7%	16.4%	0.6%	0.6%	0.6%	3.3%	3.3%	0.6%	0.6%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
AM Peak	07:00	07:00	07:00	07:00	07:00	09:00	06:00	06:00	06:00	09:00	09:00	06:00	06:00	05:00	05:00												07:00			
Vol.	24	53	113	112	112	46	5	46	46	9	9	5	5	1	1												346			
PM Peak	17:00	12:00	12:00	12:00	12:00	18:00	13:00	13:00	13:00	18:00	18:00	13:00	13:00	12:00	12:00												12:00			
Vol.	43	23	65	72	72	48	1	48	48	11	11	1	1	1	1												206			

Site Code: AG  
Station ID:

Latitude: 0' 0.000 South

Start Time	15	16	20	21	25	26	30	31	35	36	40	41	45	46	50	51	55	56	60	61	65	66	70	71	75	76	999	Total	Pace Speed	Number in Pace
10/06/11	0	3	1	1	1	7	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	14	21-30	8
01:00	1	1	1	0	0	4	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	20-29	4
02:00	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	12-21	3	
03:00	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	22-31	2	
04:00	0	1	1	1	1	1	1	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	28-37	4	
05:00	0	0	4	4	4	6	19	7	7	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	28-37	27	
06:00	4	14	16	16	16	42	24	24	9	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	109	25-34	66	
07:00	26	47	140	114	114	114	42	42	6	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	375	21-30	254	
08:00	31	44	137	41	41	92	41	41	6	6	6	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	352	21-30	229	
09:00	20	19	47	48	48	92	48	48	8	8	8	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	235	24-33	142	
10:00	19	18	46	46	46	60	26	26	11	11	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	180	21-30	106	
11:00	11	15	44	44	44	46	20	20	5	5	5	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	142	21-30	90	
12 PM	32	27	45	45	45	55	38	38	8	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	205	21-30	100	
13:00	24	16	56	56	56	89	24	24	7	7	7	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	219	21-30	145	
14:00	10	4	40	40	40	50	32	32	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	139	21-30	90	
15:00	21	12	48	48	48	68	36	36	7	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	192	21-30	116	
16:00	32	6	48	48	48	65	23	23	6	6	6	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	181	21-30	113	
17:00	52	12	45	45	45	58	22	22	8	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	197	21-30	103	
18:00	15	11	49	49	49	75	44	44	19	19	19	4	4	1	1	0	0	0	0	0	0	0	0	0	0	0	218	21-30	124	
19:00	16	8	26	26	26	54	32	32	12	12	12	3	3	1	1	0	0	0	0	0	0	0	0	0	0	0	152	25-34	86	
20:00	2	4	19	19	19	37	23	23	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	24-33	60	
21:00	4	5	16	16	16	17	24	24	7	7	7	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	74	25-34	41	
22:00	7	4	25	25	25	29	22	22	8	8	8	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	96	21-30	54	
23:00	0	2	5	5	5	8	5	5	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	19-28	13	
Total	328	274	859	1070	548	146	18	18	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3245			
Percent	10.1%	8.4%	26.5%	33.0%	16.9%	4.5%	0.6%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	07:00			
AM Peak Vol.	08:00	07:00	07:00	07:00	09:00	10:00	00:00																					375		
PM Peak Vol.	17:00	12:00	13:00	13:00	18:00	18:00	18:00	18:00	18:00	18:00	18:00	18:00	18:00	18:00	18:00	18:00	18:00	18:00	18:00	18:00	18:00	18:00	18:00	18:00	18:00	18:00	13:00			
	52	27	56	89	44	19	11	11	4	4	4	4	4	1	1	1	1	1	1	1	1	1	1	1	1	1	219			

# Wilbur Smith Associates Knoxville, TN

Site Code: AG  
Station ID:

Latitude: 0' 0.000 South

EB JOE JOHNSON		15	16	21	26	31	36	41	46	51	56	61	66	71	75	76	999	Total	Pace	Number	
Start	1	20	21	25	30	35	40	45	50	55	60	65	70	75	999				Speed	in Pace	
Time	10/07/11	0	2	1	6	4	1	0	0	0	0	0	0	0	0	0	14	24-33	11		
01:00	2	0	1	1	1	2	0	0	0	0	0	0	0	0	0	0	6	23-32	4		
02:00	3	2	1	4	2	2	0	0	1	0	0	0	0	0	0	0	13	23-32	7		
03:00	1	0	1	1	0	2	1	0	0	0	0	0	0	0	0	0	5	27-36	3		
04:00	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	4	19-28	3		
05:00	2	3	3	9	9	16	6	3	1	0	0	0	0	0	0	0	43	27-36	26		
06:00	5	9	17	33	24	24	5	0	0	0	0	0	0	0	0	0	93	25-34	57		
07:00	21	28	116	123	45	45	4	0	0	0	0	0	0	0	0	0	337	21-30	239		
08:00	24	33	103	104	43	43	10	3	0	0	0	0	0	0	0	0	320	21-30	207		
09:00	20	11	39	74	60	60	15	1	0	0	0	0	0	0	0	0	220	26-35	134		
10:00	14	11	31	64	31	31	6	1	0	0	0	0	0	0	0	0	158	22-31	96		
11:00	28	21	40	63	37	37	7	2	0	0	0	0	0	0	0	0	198	21-30	103		
12 PM	25	24	54	62	35	35	4	0	0	0	0	0	0	0	0	0	204	21-30	116		
13:00	28	21	51	77	29	29	2	0	0	0	0	0	0	0	0	0	208	21-30	128		
14:00	20	13	45	65	32	32	15	1	0	0	0	0	0	0	0	0	191	21-30	110		
15:00	19	22	37	56	42	42	8	1	0	0	0	0	0	0	0	0	185	24-33	98		
16:00	27	19	42	53	30	30	7	5	0	0	0	0	0	0	0	0	183	21-30	95		
17:00	17	16	30	37	27	27	13	0	0	0	0	0	0	0	0	0	140	21-30	67		
18:00	10	11	23	42	27	27	10	0	0	0	0	0	0	0	0	0	123	23-32	69		
19:00	3	3	21	30	20	20	7	2	0	0	0	0	0	0	0	0	86	21-30	51		
20:00	1	0	16	16	14	14	4	1	0	0	0	0	0	0	0	0	52	21-30	32		
21:00	3	7	20	34	16	16	2	2	0	0	0	0	0	0	0	0	84	21-30	54		
22:00	0	3	6	15	23	23	5	1	0	0	0	0	0	0	0	0	53	26-35	38		
23:00	1	2	6	14	12	12	5	0	0	0	0	0	0	0	0	0	40	25-34	26		
Total	275	260	705	985	573	573	137	23	2	0	0	0	0	0	0	0	2960				
Percent	9.3%	8.8%	23.8%	33.3%	19.4%	19.4%	4.6%	0.8%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%					
AM Peak	11:00	08:00	07:00	07:00	09:00	09:00	09:00	05:00	02:00								07:00				
Vol.	28	33	116	123	60	60	15	3	1								337				
PM Peak	13:00	12:00	12:00	13:00	15:00	15:00	14:00	16:00									13:00				
Vol.	28	24	54	77	42	42	15	5									208				
Total	1190	1075	3024	3979	2131	2131	507	85	11	0	0	0	0	0	0	0	12002				
Percent	9.9%	9.0%	25.2%	33.2%	17.8%	17.8%	4.2%	0.7%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%					

15th Percentile : 18 MPH  
 50th Percentile : 26 MPH  
 85th Percentile : 33 MPH  
 95th Percentile : 36 MPH

10 MPH Pace Speed : 21-30 MPH  
 Number in Pace : 7003  
 Percent in Pace : 58.3%  
 Number of Vehicles > 30 MPH : 2734  
 Percent of Vehicles > 30 MPH : 22.8%  
 Mean Speed(Average) : 25 MPH



# Wilbur Smith Associates Knoxville, TN

Site Code: AG  
Station ID:

Latitude: 0' 0.000 South

WB JOE JOHNSON	1	16	21	26	31	36	41	46	51	56	61	66	71	76	Pace	Number	
Start	15	20	25	30	35	40	45	50	55	60	65	70	75	999	Speed	in Pace	
Time	10/04/11	1	2	9	14	4	0	0	0	0	0	0	0	0	26-35	23	
01:00	0	0	1	8	5	1	0	0	0	0	0	0	0	0	15	25-34	13
02:00	1	2	0	1	1	0	0	0	0	0	0	0	0	5	8-17	3	
03:00	0	0	0	1	0	0	0	0	0	0	0	0	0	1	17-26	1	
04:00	1	0	0	0	1	0	0	0	0	0	0	0	0	2	*	1	
05:00	0	1	1	3	2	0	0	0	0	0	0	0	0	7	23-32	6	
06:00	4	5	4	2	4	2	0	0	0	0	0	0	0	21	12-21	10	
07:00	24	11	18	24	13	1	0	0	0	0	0	0	0	91	21-30	42	
08:00	40	21	37	32	19	3	1	0	0	0	0	0	0	153	21-30	69	
09:00	33	26	31	36	24	7	0	0	0	0	0	0	0	157	21-30	67	
10:00	31	31	33	30	17	4	0	0	0	0	0	0	0	146	16-25	64	
11:00	44	25	43	65	44	7	0	0	0	0	0	0	0	228	23-32	110	
12 PM	50	28	53	84	26	8	0	0	0	0	0	0	0	249	21-30	137	
13:00	34	34	44	43	32	8	2	0	0	0	0	0	0	197	21-30	87	
14:00	49	32	43	65	43	13	4	1	0	0	0	0	0	250	23-32	110	
15:00	40	21	64	90	45	22	3	1	1	0	0	0	0	287	21-30	154	
16:00	45	47	80	165	60	13	0	0	0	0	0	0	0	410	21-30	245	
17:00	127	50	59	90	29	20	3	0	0	0	0	0	0	378	21-30	149	
18:00	17	15	50	114	82	17	1	0	0	0	0	0	0	296	26-35	196	
19:00	6	9	38	86	65	23	5	1	0	0	0	0	0	233	26-35	151	
20:00	4	5	15	59	47	15	1	0	0	0	0	0	0	146	26-35	106	
21:00	4	3	8	35	32	19	5	1	0	0	0	0	0	107	26-35	67	
22:00	3	1	1	12	25	8	5	0	0	0	0	0	0	55	26-35	37	
23:00	5	1	1	7	10	6	1	0	0	0	0	0	0	31	27-36	18	
Total	563	369	626	1061	640	201	31	4	1	0	0	0	0	3496			
Percent	16.1%	10.6%	17.9%	30.3%	18.3%	5.7%	0.9%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	11:00	10:00	11:00	11:00	11:00	09:00	08:00							11:00			
Vol.	44	31	43	65	44	7	1							228			
PM Peak	17:00	17:00	16:00	16:00	18:00	19:00	19:00	14:00	15:00					16:00			
Vol.	127	50	80	165	82	23	5	1	1					410			

# Wilbur Smith Associates Knoxville, TN

Site Code: AG  
Station ID:

Latitude: 0' 0.000 South

WB JOE JOHNSON		16	21	26	31	36	41	46	51	56	61	66	71	76	76	999	Total	Pace	Number					
Start	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90		Speed	in Pace					
Time	10/05/11	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
	4	2	2	7	11	4	1	0	1	0	0	0	0	0	0	0	32	26-35	18					
	1	1	0	11	5	5	1	0	0	0	0	0	0	0	0	0	25	25-34	16					
	2	2	0	0	6	3	0	0	0	0	0	0	0	0	0	13	29-38	9						
	3	2	3	1	0	0	0	0	0	0	0	0	0	0	0	9	17-26	6						
	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	*	2						
	1	0	0	3	4	0	0	0	0	0	0	0	0	0	0	8	25-34	7						
	3	6	2	4	8	5	1	0	0	0	0	0	0	0	0	29	27-36	13						
	29	10	20	37	14	6	2	0	0	0	0	0	0	0	0	118	21-30	57						
	<b>283</b>	7	7	12	9	1	0	0	0	0	0	0	0	0	0	<b>319</b>	1-10	190						
	38	14	47	37	16	3	1	0	0	0	0	0	0	0	0	153	21-30	84						
	34	27	25	46	16	3	1	1	0	0	0	0	0	0	0	153	21-30	71						
	53	28	<b>54</b>	<b>64</b>	<b>29</b>	6	1	0	0	0	0	0	0	0	0	234	21-30	118						
	42	26	45	81	30	2	0	0	0	0	0	0	0	0	0	251	21-30	122						
	49	27	61	65	48	11	3	0	0	0	0	0	0	0	0	226	21-30	126						
	41	32	66	119	59	16	4	0	0	0	0	0	0	0	0	264	21-30	126						
	53	45	97	115	56	13	1	0	0	0	0	0	0	0	0	337	21-30	185						
	<b>100</b>	<b>66</b>	<b>116</b>	<b>128</b>	47	18	2	0	0	0	0	0	0	0	0	380	21-30	212						
	16	16	38	86	<b>84</b>	18	<b>7</b>	1	0	0	0	0	0	0	0	<b>478</b>	21-30	244						
	10	1	28	72	70	<b>22</b>	2	0	0	0	0	0	0	0	0	266	26-35	170						
	1	8	21	65	35	10	3	0	0	0	0	0	0	0	0	205	26-35	142						
	2	1	16	39	43	8	1	1	0	0	0	0	0	0	0	143	26-35	100						
	1	3	4	16	19	7	3	0	0	0	0	0	0	0	0	111	26-35	82						
	1	1	1	11	7	5	0	0	0	0	0	0	0	0	0	53	26-35	35						
	821	353	713	1083	654	174	33	3	2	0	0	0	0	0	0	26	25-34	18						
Total	21.4%	9.2%	18.6%	28.2%	17.0%	4.5%	0.9%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3836								
AM Peak	08:00	11:00	11:00	11:00	11:00	07:00	07:00	10:00	00:00							08:00								
Vol.	283	28	54	64	29	6	2	1	1							319								
PM Peak	17:00	17:00	17:00	17:00	18:00	19:00	18:00	18:00	17:00							17:00								
Vol.	100	66	116	128	84	22	7	1	1							478								





# Wilbur Smith Associates Knoxville, TN

Site Code: AG  
Station ID:

Latitude: 0' 0.000 South

WB JOE JOHNSON		15	16	21	26	31	36	41	46	51	56	61	66	71	76	Total	Pace	Number
Start	1	20	0	1	6	12	4	0	0	0	0	0	0	0	0	23	Speed	in Pace
Time	15	0	1	0	6	10	1	1	0	0	0	0	0	0	0	20	26-35	18
10/07/11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26-35	16
01:00	1	1	0	0	6	10	1	1	0	0	0	0	0	0	0	20	26-35	16
02:00	0	0	0	0	4	5	1	3	0	0	0	0	0	0	0	14	25-34	9
03:00	3	1	1	0	0	2	0	0	0	0	0	0	0	0	0	7	*	3
04:00	5	0	0	0	1	0	0	0	0	0	0	0	0	0	0	6	*	5
05:00	2	0	0	0	1	1	2	0	0	0	0	0	0	0	0	7	28-37	4
06:00	3	4	5	10	10	7	3	0	0	0	0	0	0	0	0	32	23-32	17
07:00	27	11	18	24	24	17	3	1	0	0	0	0	0	0	0	101	23-32	44
08:00	32	17	23	42	42	22	4	1	0	0	0	0	0	0	0	141	23-32	67
09:00	43	17	28	41	41	22	5	1	0	0	0	0	0	0	0	157	21-30	69
10:00	44	16	40	44	44	33	8	0	0	0	0	0	0	0	0	185	21-30	84
11:00	47	28	52	74	74	31	11	3	0	0	0	0	0	0	0	246	21-30	126
12 PM	39	29	62	72	72	46	11	2	0	0	0	0	0	0	0	261	21-30	134
13:00	53	31	61	78	78	47	12	6	1	0	0	0	0	0	0	289	21-30	139
14:00	35	23	66	83	83	47	15	3	0	0	0	0	0	0	0	272	21-30	149
15:00	42	37	74	103	103	59	21	6	0	0	0	0	0	0	0	342	21-30	177
16:00	38	28	86	143	143	100	29	2	2	0	0	0	0	0	0	428	26-35	243
17:00	89	42	86	132	132	82	19	4	0	0	0	0	0	0	0	454	21-30	218
18:00	12	11	27	68	68	61	20	6	0	0	0	0	0	0	0	205	26-35	129
19:00	4	2	16	48	48	48	12	8	0	0	0	0	0	0	0	138	26-35	96
20:00	3	1	11	35	37	37	16	1	0	0	0	0	0	0	0	104	26-35	72
21:00	2	3	9	16	19	19	8	1	0	0	0	0	0	0	0	58	26-35	35
22:00	1	1	4	23	18	18	8	4	0	0	0	0	0	0	0	59	26-35	41
23:00	3	3	3	17	14	14	3	3	0	0	0	0	0	0	0	46	26-35	31
Total	528	306	675	1071	1071	740	216	56	3	0	0	0	0	0	0	3595		
Percent	14.7%	8.5%	18.8%	29.8%	29.8%	20.6%	6.0%	1.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	11:00	11:00	11:00	11:00	11:00	10:00	11:00	02:00								11:00		
Vol.	47	28	52	74	74	33	11	3								246		
PM Peak	17:00	17:00	16:00	16:00	16:00	16:00	16:00	19:00	16:00							17:00		
Vol.	89	42	86	143	143	100	29	8	2							454		
Total	2572	1397	2705	4344	4344	2752	837	158	16	3	1	0	0	0	0	14785		
Percent	17.4%	9.4%	18.3%	29.4%	29.4%	18.6%	5.7%	1.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

Stats	10 MPH Pace Speed :	26-35 MPH
Number in Pace :	7096	
Percent in Pace :	48.0%	
Number of Vehicles > 30 MPH :	3767	
Percent of Vehicles > 30 MPH :	25.5%	
Mean Speed(Average) :	24 MPH	

# Wilbur Smith Associates Knoxville, TN

Site Code: AG  
Station ID:

Latitude: 0' 0.000 South

EB JOE JOHNSON, WB JOE JOHNSON		15	16	20	21	25	26	30	31	35	36	40	41	45	46	50	51	55	56	60	61	65	66	70	71	75	76	999	Total	Pace Speed	Number in Pace		
Start	1																																
Time	15	20	16	20	21	25	26	30	31	35	36	40	41	45	46	50	51	55	56	60	61	65	66	70	71	75	76						
10/03/11	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	<b>2</b>	<b>2</b>	<b>5</b>	<b>18</b>	<b>34</b>	<b>19</b>	<b>2</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>82</b>	<b>28-37</b>	<b>54</b>	
23:00	<b>2</b>	<b>6</b>	<b>5</b>	<b>15</b>	<b>6</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>41</b>	<b>26-35</b>	<b>21</b>		
Total	4	8	10	33	40	26	2	2	1.6%	21.1%	2	2	1.6%	2	0	0	0	0	0	0	0	0	0	0	0	0	0	123					
Percent	3.3%	6.5%	8.1%	26.8%	32.5%	21.1%	1.6%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

AM Peak Vol. 22:00 2 23:00 6 22:00 5 22:00 18 22:00 34 22:00 19 22:00 2

PM Peak Vol. 22:00 2 23:00 6 22:00 5 22:00 18 22:00 34 22:00 19 22:00 2

# Wilbur Smith Associates Knoxville, TN

Site Code: AG  
Station ID:

Latitude: 0' 0.000 South

EB JOE JOHNSON, WB JOE JOHNSON		15	16	20	21	25	26	31	36	41	46	51	56	61	66	71	75	76	76	999	Total	Pace	Number
Start	Time	1	2	3	4	10	11	15	5	0	0	0	0	0	0	0	0	0	0	0	0	Speed	in Pace
10/04/11	01:00	0	2	0	2	0	10	6	1	1	0	0	0	0	0	0	0	0	0	0	37	26-35	26
	02:00	1	2	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	24	22-31	16
	03:00	0	0	0	1	3	3	3	0	1	0	0	0	0	0	0	0	0	0	0	8	8-17	3
	04:00	1	0	0	2	2	2	3	1	0	0	0	0	0	0	0	0	0	0	0	9	24-33	7
	05:00	0	2	8	2	8	22	15	3	1	0	0	0	0	0	0	0	0	0	0	51	26-35	37
	06:00	10	15	29	41	30	41	30	10	2	0	0	0	0	0	0	0	0	0	0	137	22-31	71
	07:00	60	63	130	127	56	140	56	6	0	1	0	0	0	0	0	0	0	0	0	443	21-30	257
	08:00	<b>77</b>	<b>69</b>	<b>173</b>	<b>140</b>	<b>55</b>	<b>9</b>	<b>55</b>	<b>9</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>524</b>	21-30	313	
	09:00	58	38	70	122	<b>85</b>	<b>19</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>396</b>	26-35	207	
	10:00	48	45	80	93	44	8	44	8	1	0	0	0	0	0	0	0	0	0	0	319	21-30	173
	11:00	70	35	91	114	69	12	11	0	1	0	0	0	0	0	0	0	0	0	0	392	21-30	205
	12 PM	73	50	89	139	60	19	60	19	2	0	0	0	0	0	0	0	0	0	0	432	21-30	228
	13:00	43	50	106	107	63	16	63	16	3	0	0	0	0	0	0	0	0	0	0	388	21-30	213
	14:00	65	51	80	129	64	18	64	18	<b>6</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>414</b>	21-30	209	
	15:00	60	23	84	140	82	<b>32</b>	82	<b>2</b>	<b>5</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>429</b>	22-31	225	
	16:00	74	59	<b>112</b>	<b>234</b>	98	22	98	22	2	0	0	0	0	0	0	0	0	0	0	<b>601</b>	21-30	346
	17:00	<b>155</b>	<b>62</b>	101	140	61	21	61	21	3	0	0	0	0	0	0	0	0	0	0	543	21-30	241
	18:00	34	29	98	178	<b>123</b>	32	<b>123</b>	32	5	1	0	0	0	0	0	0	0	0	0	500	26-35	301
	19:00	10	13	55	123	92	31	92	31	6	1	0	0	0	0	0	0	0	0	0	331	26-35	215
	20:00	10	9	34	84	69	21	69	21	1	0	0	0	0	0	0	0	0	0	0	228	26-35	153
	21:00	6	6	14	55	51	25	51	25	6	2	0	0	0	0	0	0	0	0	0	165	26-35	106
	22:00	3	2	4	18	34	9	34	9	6	0	0	0	0	0	0	0	0	0	0	76	26-35	52
	23:00	6	3	5	10	12	8	12	8	1	0	0	0	0	0	0	0	0	0	0	45	26-35	22
	Total	866	629	1373	2043	1191	328	58	328	58	8	1	0	0	0	0	0	0	0	0	6497		
	Percent	13.3%	9.7%	21.1%	31.4%	18.3%	5.0%	0.9%	0.1%	0.9%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
	AM Peak	08:00	08:00	08:00	08:00	09:00	09:00	09:00	09:00	09:00	07:00										08:00		
	Vol.	77	69	173	140	85	19	4	19	4	1										524		
	PM Peak	17:00	17:00	16:00	16:00	18:00	15:00	14:00	15:00	14:00	15:00	15:00									16:00		
	Vol.	155	62	112	234	123	32	6	32	6	2	1									601		

# Wilbur Smith Associates Knoxville, TN

Site Code: AG  
Station ID:

Latitude: 0' 0.000 South

EB JOE JOHNSON, WB JOE JOHNSON		15	16	20	21	25	26	30	31	35	36	40	41	45	46	50	51	55	56	60	61	65	66	70	71	75	76	999	Total	Pace Speed	Number in Pace
Start Time	10/05/11	1	6	2	3	4	12	13	16	16	5	5	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	46	26-35	28
	01:00	1	3	2	1	2	6	6	6	6	5	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	22-31	19	
	02:00	3	2	2	1	2	6	6	6	6	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	29-38	11		
	03:00	3	2	2	5	5	1	1	1	1	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	14	16-25	7		
	04:00	4	2	2	1	3	3	3	1	1	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	13	22-31	5		
	05:00	2	2	2	9	9	17	17	15	15	3	3	1	1	1	1	0	0	0	0	0	0	0	0	0	0	50	26-35	32		
	06:00	10	14	14	27	27	47	47	29	29	9	9	6	6	0	0	0	0	0	0	0	0	0	0	0	0	142	24-33	77		
	07:00	53	<b>63</b>	<b>63</b>	<b>133</b>	<b>133</b>	<b>149</b>	<b>149</b>	54	54	10	10	2	2	0	0	0	0	0	0	0	0	0	0	0	0	<b>464</b>	21-30	282		
	08:00	<b>289</b>	19	35	106	106	57	57	22	22	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	444	1-10	194		
	09:00	57	45	46	68	68	114	114	62	62	10	10	2	2	0	0	0	0	0	0	0	0	0	0	0	0	386	21-30	220		
	10:00	74	75	51	107	107	113	113	46	46	11	11	1	1	1	1	0	0	0	0	0	0	0	0	0	0	340	21-30	190		
	11:00	74	75	51	107	107	113	113	55	55	8	8	1	1	0	0	0	0	0	0	0	0	0	0	0	0	415	21-30	220		
	12 PM	75	63	44	99	99	124	124	56	56	15	15	0	0	1	1	0	0	0	0	0	0	0	0	0	0	457	21-30	259		
	13:00	63	63	44	99	99	140	140	55	55	8	8	1	1	0	0	0	0	0	0	0	0	0	0	0	0	410	21-30	239		
	14:00	68	50	50	104	104	123	123	68	68	12	12	3	3	0	0	0	0	0	0	0	0	0	0	0	0	428	21-30	227		
	15:00	68	63	49	109	109	183	183	84	84	24	24	5	5	0	0	0	0	0	0	0	0	0	0	0	0	517	21-30	292		
	16:00	87	66	66	138	138	176	176	77	77	17	17	1	1	0	0	0	0	0	0	0	0	0	0	0	0	562	21-30	314		
	17:00	<b>143</b>	<b>77</b>	<b>77</b>	<b>151</b>	<b>151</b>	<b>184</b>	<b>184</b>	68	68	25	25	3	3	0	0	1	0	0	0	0	0	0	0	0	0	<b>652</b>	21-30	335		
	18:00	29	24	24	69	69	140	140	132	132	29	29	8	8	2	2	0	0	0	0	0	0	0	0	0	0	433	26-35	272		
	19:00	14	9	9	45	45	107	107	94	94	32	32	3	3	0	0	0	0	0	0	0	0	0	0	0	0	304	26-35	201		
	20:00	4	4	10	26	26	77	77	57	57	12	12	3	3	0	0	0	0	0	0	0	0	0	0	0	0	189	26-35	134		
	21:00	6	1	1	21	21	55	55	60	60	8	8	1	1	1	1	0	0	0	0	0	0	0	0	0	0	153	26-35	115		
	22:00	1	3	3	11	11	26	26	32	32	8	8	3	3	0	0	0	0	0	0	0	0	0	0	0	0	84	26-35	58		
	23:00	2	1	1	6	6	16	16	10	10	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43	25-34	26		
Total	1102	632	1420	2012	1106	266	50	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6596				
Percent	16.7%	9.6%	21.5%	30.5%	16.8%	4.0%	0.8%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
AM Peak	08:00	07:00	07:00	07:00	09:00	10:00	06:00	05:00	00:00	00:00	05:00	06:00	06:00	06:00	05:00	05:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	07:00			
Vol.	289	63	133	149	62	11	6	1	1	1	11	6	6	6	1	1	1	1	1	1	1	1	1	1	1	1	464				
PM Peak	17:00	17:00	17:00	17:00	18:00	19:00	18:00	18:00	17:00	17:00	18:00	19:00	18:00	18:00	18:00	18:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00			
Vol.	143	77	151	184	132	32	8	2	1	1	32	32	8	8	2	2	1	1	1	1	1	1	1	1	1	1	652				

# Wilbur Smith Associates Knoxville, TN

Site Code: AG  
Station ID:

Latitude: 0' 0.000 South

EB JOE JOHNSON, WB JOE JOHNSON		15	16	21	26	31	36	41	46	51	56	61	66	71	75	76	999	Total	Pace	Number
Start	Time	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90		Speed	in Pace
10/06/11		2	5	1	11	12	6	1	1	0	0	0	0	0	0	0	0	38	26-35	23
01:00		1	1	0	12	6	6	1	1	0	0	0	0	0	0	0	0	28	26-35	18
02:00		2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	6	22-31	3	3
03:00		0	2	0	1	1	0	0	0	0	0	0	0	0	0	0	4	8-17	2	2
04:00		0	1	1	1	1	2	2	0	0	0	0	0	0	0	0	8	33-42	5	5
05:00		0	0	5	9	20	7	0	0	0	0	0	0	0	0	0	41	27-36	30	30
06:00		7	15	20	48	27	12	1	0	0	0	0	0	0	0	0	130	26-35	75	75
07:00		50	61	159	134	63	8	1	0	0	0	0	0	0	0	0	476	21-30	293	293
08:00		<b>73</b>	<b>77</b>	<b>162</b>	128	62	9	1	0	0	0	0	0	0	0	0	<b>512</b>	21-30	290	290
09:00		62	40	78	<b>139</b>	<b>72</b>	14	1	0	0	0	0	0	0	0	0	406	21-30	217	217
10:00		49	38	86	85	40	<b>16</b>	0	0	0	0	0	0	0	0	0	314	21-30	171	171
11:00		63	47	95	108	53	7	1	0	0	0	0	0	0	0	0	374	21-30	203	203
12 PM		87	<b>73</b>	112	126	73	16	1	0	0	0	0	0	0	0	0	488	21-30	238	238
13:00		66	43	112	157	54	16	4	0	0	0	0	0	0	0	0	452	21-30	269	269
14:00		46	26	82	116	76	19	3	1	0	<b>1</b>	0	0	0	0	0	370	21-30	198	198
15:00		77	51	<b>140</b>	168	80	22	2	0	0	0	0	0	0	0	0	540	21-30	308	308
16:00		81	34	130	<b>208</b>	95	20	3	0	0	0	0	0	0	0	0	571	21-30	338	338
17:00		<b>225</b>	60	107	144	66	17	0	0	0	0	0	0	0	0	0	<b>619</b>	21-30	251	251
18:00		34	15	86	170	<b>117</b>	<b>47</b>	<b>9</b>	<b>3</b>	0	0	0	0	0	0	0	481	26-35	287	287
19:00		24	15	49	139	115	46	6	1	0	0	0	0	0	0	0	395	26-35	254	254
20:00		10	10	45	96	62	24	6	0	0	0	0	0	0	0	0	253	26-35	158	158
21:00		10	9	35	64	55	16	6	0	0	0	0	0	0	0	0	195	26-35	119	119
22:00		14	10	33	97	64	32	5	1	0	0	0	0	0	0	0	256	26-35	161	161
23:00		4	3	7	17	18	9	0	1	0	0	0	0	0	0	0	59	26-35	35	35
Total		987	637	1546	2179	1233	371	54	8	0	1	0	0	0	0	0	7016			
Percent		14.1%	9.1%	22.0%	31.1%	17.6%	5.3%	0.8%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
AM Peak		08:00	08:00	08:00	09:00	09:00	10:00	04:00	01:00								08:00			
Vol.		73	77	162	139	72	16	2	1								512			
PM Peak		17:00	12:00	15:00	16:00	18:00	18:00	18:00	18:00	14:00							17:00			
Vol.		225	73	140	208	117	47	9	3	1							619			

**Wilbur Smith Associates**  
Knoxville, TN

Site Code: AG  
Station ID:

Latitude: 0' 0.000 South

Start Time	15	16	21	26	31	36	41	46	51	56	61	66	71	75	76	999	Total	Pace Speed	Number in Pace
10/07/11	1	0	3	12	16	5	0	0	0	0	0	0	0	0	0	0	37	26-35	28
01:00	3	1	1	7	12	1	1	0	0	0	0	0	0	0	0	0	26	26-35	19
02:00	3	2	2	8	7	1	3	1	0	0	0	0	0	0	0	0	27	24-33	15
03:00	4	1	2	0	4	1	0	0	0	0	0	0	0	0	0	0	12	27-36	5
04:00	5	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	10	*	5
05:00	4	3	4	10	17	8	3	1	0	0	0	0	0	0	0	0	50	26-35	27
06:00	8	13	22	43	31	8	0	0	0	0	0	0	0	0	0	0	125	26-35	74
07:00	48	39	<b>134</b>	<b>147</b>	62	7	1	0	0	0	0	0	0	0	0	0	438	21-30	281
08:00	56	<b>50</b>	126	146	65	14	4	0	0	0	0	0	0	0	0	0	<b>461</b>	21-30	272
09:00	63	28	67	115	<b>82</b>	<b>20</b>	2	0	0	0	0	0	0	0	0	0	377	26-35	197
10:00	58	27	71	108	64	14	1	0	0	0	0	0	0	0	0	0	343	21-30	179
11:00	<b>75</b>	49	92	137	68	18	<b>5</b>	0	0	0	0	0	0	0	0	0	444	21-30	229
12 PM	64	53	116	134	81	15	2	0	0	0	0	0	0	0	0	0	465	21-30	250
13:00	81	52	112	155	76	14	6	1	0	0	0	0	0	0	0	0	497	21-30	267
14:00	55	36	111	148	79	30	4	0	0	0	0	0	0	0	0	0	463	21-30	259
15:00	61	<b>59</b>	111	159	101	29	7	0	0	0	0	0	0	0	0	0	527	21-30	270
16:00	65	47	<b>128</b>	<b>196</b>	<b>130</b>	<b>36</b>	7	2	0	0	0	0	0	0	0	0	<b>611</b>	23-32	326
17:00	<b>106</b>	58	116	169	109	32	4	0	0	0	0	0	0	0	0	0	594	21-30	285
18:00	22	22	50	110	88	30	6	0	0	0	0	0	0	0	0	0	328	26-35	198
19:00	7	5	37	78	68	19	<b>10</b>	0	0	0	0	0	0	0	0	0	224	26-35	146
20:00	4	1	27	51	51	20	2	0	0	0	0	0	0	0	0	0	156	26-35	102
21:00	5	10	29	50	35	10	3	0	0	0	0	0	0	0	0	0	142	26-35	85
22:00	1	4	10	38	41	13	5	0	0	0	0	0	0	0	0	0	112	26-35	79
23:00	4	5	9	31	26	8	3	0	0	0	0	0	0	0	0	0	86	26-35	57
Total	803	566	1380	2056	1313	353	79	5	0	0	0	0	0	0	0	0	6555		
Percent	12.3%	8.6%	21.1%	31.4%	20.0%	5.4%	1.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	11:00	08:00	07:00	07:00	09:00	09:00	11:00	02:00									08:00		
Vol.	75	50	134	147	82	20	5	1									461		
PM Peak	17:00	15:00	16:00	16:00	16:00	16:00	19:00	16:00									16:00		
Vol.	106	59	128	196	130	36	10	2									611		
Total	3762	2472	5729	8323	4883	1344	243	27	3	1	0	0	0	0	0	0	26787		
Percent	14.0%	9.2%	21.4%	31.1%	18.2%	5.0%	0.9%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

Stats

10 MPH Pace Speed : 21-30 MPH  
 Number in Pace : 14052  
 Percent in Pace : 52.5%  
 Number of Vehicles > 30 MPH : 6501  
 Percent of Vehicles > 30 MPH : 24.3%  
 Mean Speed(Average) : 25 MPH

15th Percentile : 16 MPH  
 50th Percentile : 26 MPH  
 85th Percentile : 33 MPH  
 95th Percentile : 37 MPH

# Wilbur Smith Associates Knoxville, TN

Site Code: BRIDGE  
Station ID:

Latitude: 0' 0.000 Undefined

EB Joe Johnson		15	16	21	26	31	36	41	46	51	56	61	66	71	76	76	999	Total	Pace	Number
Start	Time	1	2	3	4	1	4	1	0	0	0	0	0	0	0	0	0	8	25-34	in Pace
10/04/11	01:00	1	2	3	4	1	4	1	0	0	0	0	0	0	0	0	0	8	25-34	6
	02:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	13	19-28	8
	03:00	0	0	0	2	3	2	0	0	0	0	0	0	0	0	0	0	1	12-21	1
	04:00	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	0	7	28-37	7
	05:00	0	0	3	12	19	4	1	0	0	0	0	0	0	0	0	0	7	28-37	6
	06:00	1	1	12	33	29	13	0	0	0	0	0	0	0	0	0	0	39	26-35	31
	07:00	8	8	23	77	66	17	0	1	0	0	0	0	0	0	0	0	89	26-35	62
	08:00	7	4	20	73	78	23	3	0	0	0	0	0	0	0	0	0	200	26-35	143
	09:00	8	6	33	60	68	25	8	0	1	0	0	0	0	0	0	0	208	26-35	151
	10:00	5	6	41	55	37	12	2	1	0	0	0	0	0	0	0	0	209	26-35	128
	11:00	13	14	28	73	55	13	2	0	0	0	0	0	0	0	0	0	159	21-30	96
	12 PM	9	4	32	65	59	18	3	0	0	0	0	0	0	0	0	0	198	26-35	128
	13:00	11	14	42	56	45	16	1	0	0	0	0	0	0	0	0	0	190	26-35	124
	14:00	10	12	29	61	39	12	1	0	0	0	0	0	0	0	0	0	185	24-33	101
	15:00	7	8	27	56	51	16	1	1	0	0	0	0	0	0	0	0	164	26-35	100
	16:00	10	10	34	70	64	22	1	0	0	0	0	0	0	0	0	0	167	26-35	107
	17:00	15	2	29	69	42	13	2	0	0	0	0	0	0	0	0	0	211	26-35	134
	18:00	17	3	19	64	75	15	5	0	0	0	0	0	0	0	0	0	172	26-35	111
	19:00	6	0	16	45	35	7	0	0	1	0	0	0	0	0	0	0	199	26-35	139
	20:00	3	3	13	36	32	7	1	0	0	0	0	0	0	0	0	0	109	26-35	80
	21:00	1	1	6	35	21	6	1	0	0	0	0	0	0	0	0	0	95	26-35	68
	22:00	1	0	5	15	9	3	0	0	0	0	0	0	0	0	0	0	71	26-35	56
	23:00	1	0	2	9	4	1	0	0	0	0	0	0	0	0	0	0	33	25-34	24
	Total	136	99	420	973	838	248	32	3	2	0	0	0	0	0	0	0	2751		14
	Percent	4.9%	3.6%	15.3%	35.4%	30.5%	9.0%	1.2%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
	AM Peak	11:00	11:00	10:00	07:00	08:00	09:00	09:00	07:00	09:00	09:00	09:00	09:00	09:00	09:00	09:00	09:00	09:00		
	Vol.	13	14	41	77	78	25	8	1	1	1	1	1	1	1	1	1	209		
	PM Peak	18:00	13:00	13:00	16:00	18:00	16:00	18:00	15:00	18:00	18:00	18:00	18:00	18:00	18:00	18:00	18:00	16:00		
	Vol.	17	14	42	70	75	22	5	1	1	1	1	1	1	1	1	1	211		

# Wilbur Smith Associates Knoxville, TN

Site Code: BRIDGE  
Station ID:

Latitude: 0' 0.000 Undefined

EB Joe Johnson		1	16	21	26	31	36	41	46	51	56	61	66	71	75	76	999	Total	Pace	Number
Start	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95		Speed	in Pace
Time	0	1	3	5	1	1	0	0	0	0	0	0	0	0	0	0	0	15	23-32	10
10/05/11	0	1	3	5	1	1	0	0	0	0	0	0	0	0	0	0	0	0	15	23-32
01:00	0	1	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	7	15-24	5
02:00	0	1	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	5	22-31	4
03:00	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	3	32-41	2
04:00	0	3	1	3	1	1	1	0	0	0	0	0	0	0	0	0	0	10	16-25	4
05:00	0	2	5	14	14	3	1	0	0	0	0	0	0	0	0	0	0	39	26-35	28
06:00	2	0	11	29	20	10	5	0	0	0	0	0	0	0	0	0	0	77	26-35	49
07:00	9	4	31	58	71	15	1	0	0	0	0	0	0	0	0	0	0	189	26-35	129
08:00	8	3	25	84	77	24	3	0	0	0	0	0	0	0	0	0	0	224	26-35	161
09:00	4	6	31	47	52	31	2	0	0	0	0	0	0	0	0	0	0	173	26-35	99
10:00	14	3	21	57	49	19	0	0	0	0	0	0	0	0	0	0	0	163	26-35	106
11:00	7	16	36	69	50	13	1	0	0	0	0	0	0	0	0	0	0	192	26-35	119
12 PM	17	8	36	71	43	17	2	0	0	0	0	0	1	0	0	0	0	195	25-34	114
13:00	9	9	27	66	44	11	2	1	0	0	0	0	0	0	0	0	0	169	26-35	110
14:00	13	9	37	52	49	11	1	0	0	0	0	0	0	0	0	0	0	172	26-35	101
15:00	15	12	30	64	52	13	1	0	0	0	0	0	0	0	0	0	0	187	26-35	116
16:00	18	5	39	66	58	10	2	1	0	0	0	0	0	0	0	0	0	199	26-35	124
17:00	18	8	34	71	42	16	2	0	0	0	0	0	0	0	0	0	0	191	26-35	113
18:00	9	2	25	59	50	16	3	0	0	0	0	0	0	0	0	0	0	164	26-35	109
19:00	4	3	17	43	41	8	1	0	0	0	0	0	0	0	0	0	0	117	26-35	84
20:00	2	0	12	19	20	0	0	0	0	0	0	0	0	0	0	0	0	53	26-35	39
21:00	3	0	4	24	18	2	1	0	0	0	0	0	0	0	0	0	0	52	26-35	42
22:00	1	0	5	15	13	1	0	0	0	0	0	0	0	0	0	0	0	35	26-35	28
23:00	0	0	3	7	7	3	1	0	0	0	0	0	0	0	0	0	0	21	23-32	14
Total	153	96	437	928	778	226	31	2	0	0	0	0	1	0	0	0	0	2652		
Percent	5.8%	3.6%	16.5%	35.0%	29.3%	8.5%	1.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	10:00	11:00	11:00	08:00	08:00	09:00	06:00											08:00		
Vol.	14	16	36	84	77	31	5											224		
PM Peak	16:00	15:00	16:00	12:00	16:00	12:00	18:00	13:00										16:00		
Vol.	18	12	39	71	58	17	3	1										199		



Site Code: BRIDGE  
Station ID:

Latitude: 0' 0.000 Undefined

EB Joe Johnson	1	16	21	26	31	36	41	46	51	56	61	66	71	76	Pace	Number	
Start	15	20	25	30	35	40	45	50	55	60	65	70	75	999	Total	Speed	in Pace
Time	10/06/11	1	2	4	3	2	0	1	0	0	0	0	0	0	14	24-33	9
01:00	0	0	1	4	2	1	0	1	0	0	0	0	0	0	9	23-32	7
02:00	0	0	1	0	0	1	0	0	0	0	0	0	0	2	12-21	1	1
03:00	0	0	0	2	1	0	0	0	0	0	0	0	0	3	22-31	3	3
04:00	0	0	0	2	2	1	1	0	0	0	0	0	0	6	23-32	4	4
05:00	0	1	5	11	13	6	1	0	0	0	0	0	0	37	26-35	24	24
06:00	0	1	5	25	31	8	1	0	0	0	0	0	0	71	26-35	56	56
07:00	4	8	29	81	62	19	1	0	0	0	0	0	0	<b>204</b>	26-35	143	143
08:00	7	4	31	46	83	19	1	0	0	0	0	0	0	191	26-35	129	129
09:00	12	7	26	55	64	21	9	0	0	0	0	0	0	194	26-35	119	119
10:00	6	9	34	64	50	10	6	0	0	0	0	0	0	179	26-35	114	114
11:00	10	7	31	57	63	13	1	0	0	0	0	0	0	182	26-35	120	120
12 PM	17	13	40	76	58	14	0	0	0	0	0	0	0	218	26-35	134	134
13:00	9	10	33	84	50	13	1	0	0	0	0	0	0	200	26-35	134	134
14:00	9	7	31	56	47	6	1	0	0	0	0	0	0	157	26-35	103	103
15:00	14	16	23	73	67	16	2	0	0	0	0	0	0	211	26-35	140	140
16:00	21	7	27	72	57	19	1	1	0	0	0	0	0	205	26-35	129	129
17:00	24	3	30	70	71	17	6	0	0	0	0	0	0	<b>221</b>	26-35	141	141
18:00	14	1	18	67	69	20	3	2	0	0	0	0	0	194	26-35	136	136
19:00	6	5	20	52	57	9	4	1	0	0	0	0	0	154	26-35	109	109
20:00	7	2	11	47	29	6	1	0	0	0	0	0	0	103	26-35	76	76
21:00	1	1	8	44	33	7	1	1	0	0	0	0	0	96	26-35	77	77
22:00	7	2	10	42	41	7	1	0	0	0	0	0	0	110	26-35	83	83
23:00	1	0	2	10	7	1	0	0	0	0	0	0	0	21	24-33	17	17
Total	170	106	418	1044	960	236	42	6	0	0	0	0	0	2982			
Percent	5.7%	3.6%	14.0%	35.0%	32.2%	7.9%	1.4%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	09:00	10:00	10:00	07:00	08:00	09:00	09:00	01:00						07:00			
Vol.	12	9	34	81	83	21	9	1						204			
PM Peak	17:00	15:00	12:00	13:00	17:00	18:00	17:00	18:00						17:00			
Vol.	24	16	40	84	71	20	6	2						221			

# Wilbur Smith Associates Knoxville, TN

Site Code: BRIDGE  
Station ID:

Latitude: 0' 0.000 Undefined

EB_Joe Johnson	1	16	21	26	31	36	41	46	51	56	61	66	71	75	76	999	Total	Pace Speed	Number in Pace
Start Time	15	20	25	30	35	40	45	50	55	60	65	70	75	76	999	Total	Pace Speed	Number in Pace	
10/07/11	0	0	6	6	3	0	0	1	0	0	0	0	0	0	0	16	21-30	12	
01:00	0	0	3	0	1	1	0	0	0	0	0	0	0	0	0	5	14-23	3	
02:00	0	1	2	3	2	0	0	1	0	0	0	0	0	0	0	9	23-32	7	
03:00	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	3	27-36	3	
04:00	0	0	1	0	0	4	0	0	0	0	0	0	0	0	0	5	30-39	4	
05:00	1	0	1	12	19	9	2	0	0	0	0	0	0	0	0	44	26-35	31	
06:00	1	4	8	16	26	12	0	0	0	0	0	0	0	0	0	67	26-35	42	
07:00	6	8	25	60	60	19	3	0	0	0	0	0	0	0	0	181	26-35	120	
08:00	9	6	21	60	71	24	2	1	0	0	0	0	0	0	0	194	26-35	131	
09:00	11	10	27	63	56	20	6	2	0	0	0	0	0	0	0	195	26-35	119	
10:00	6	10	23	45	47	25	3	0	0	0	0	0	0	0	0	159	26-35	92	
11:00	9	11	36	74	71	21	2	1	0	0	0	0	0	0	0	225	26-35	145	
12 PM	13	6	46	72	50	14	3	2	0	0	0	0	0	0	0	206	25-34	122	
13:00	12	9	30	66	57	19	2	0	0	0	0	0	0	0	0	195	26-35	123	
14:00	14	10	40	59	56	20	2	0	0	0	0	0	0	0	0	201	26-35	115	
15:00	14	8	40	75	55	14	3	0	0	0	0	0	0	0	0	209	26-35	130	
16:00	15	6	26	65	56	19	6	0	0	0	0	0	0	0	0	193	26-35	121	
17:00	9	1	28	59	44	12	1	0	0	0	0	0	0	0	0	154	26-35	103	
18:00	10	4	15	42	43	14	2	0	0	0	0	0	0	0	0	130	26-35	85	
19:00	3	1	16	41	30	8	3	0	0	0	0	0	0	0	0	102	26-35	71	
20:00	3	0	4	24	28	2	0	0	0	0	0	0	0	0	0	61	26-35	52	
21:00	2	2	8	40	31	4	0	0	0	0	0	0	0	0	0	87	26-35	71	
22:00	2	1	2	24	24	6	2	0	1	0	0	0	0	0	0	62	26-35	48	
23:00	0	0	5	18	19	7	1	0	0	0	0	0	0	0	0	50	26-35	37	
Total	140	98	413	925	850	275	43	8	1	0	0	0	0	0	0	2753			
Percent	5.1%	3.6%	15.0%	33.6%	30.9%	10.0%	1.6%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
AM Peak	09:00	11:00	11:00	11:00	08:00	10:00	09:00	09:00	09:00	09:00	09:00	09:00	09:00	09:00	11:00				
Vol.	11	11	36	74	71	25	6	2	2	2	2	2	2	2	225				
PM Peak	16:00	14:00	12:00	15:00	13:00	14:00	16:00	12:00	22:00	22:00	22:00	22:00	22:00	22:00	15:00				
Vol.	15	10	46	75	57	20	6	2	1	1	1	1	1	1	209				
Total	599	399	1688	3870	3426	985	148	19	3	0	0	1	0	0	11138				
Percent	5.4%	3.6%	15.2%	34.7%	30.8%	8.8%	1.3%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%					

Stats	10 MPH Pace Speed :	26-35 MPH
Number in Pace :	7296	
Percent in Pace :	65.5%	
Number of Vehicles > 30 MPH :	4582	
Percent of Vehicles > 30 MPH :	41.1%	
Mean Speed(Average) :	28 MPH	

# Wilbur Smith Associates Knoxville, TN

Site Code: BRIDGE  
Station ID:

Latitude: 0' 0.000 Undefined

WB Joe Johnson		1	16	21	26	31	36	41	46	51	56	61	66	71	76	76	999	Total	Pace	Number				
Start	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95		Speed	in				
Time	10/04/11	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12 PM	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
	2	0	2	9	10	4	0	0	0	0	0	0	0	0	0	0	0	27	26-35	19				
	0	0	2	8	5	1	0	0	0	0	0	0	0	0	0	0	0	16	24-33	13				
	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	3	22-31	3				
	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	*	1				
	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	17-26	1				
	0	0	2	4	2	0	0	0	0	0	0	0	0	0	0	0	0	8	23-32	8				
	1	1	3	6	7	0	0	0	0	0	0	0	0	0	0	0	0	18	23-32	13				
	<b>12</b>	4	11	49	24	2	0	0	0	0	0	0	0	0	0	0	102	26-35	73					
	9	2	15	33	38	3	1	0	0	0	0	0	0	0	0	0	101	26-35	71					
	10	1	10	<b>61</b>	31	5	0	0	0	0	0	0	0	0	0	0	118	26-35	92					
	3	3	25	40	18	4	0	0	0	0	0	0	0	0	0	0	93	21-30	65					
	8	<b>7</b>	<b>26</b>	56	<b>53</b>	<b>7</b>	1	0	0	0	0	0	0	0	0	0	<b>158</b>	26-35	109					
	10	4	19	80	61	11	0	0	0	0	0	0	0	0	0	0	185	26-35	141					
	8	2	14	61	53	6	0	0	0	0	0	0	0	0	0	0	144	26-35	114					
	13	<b>7</b>	22	65	44	<b>18</b>	1	0	0	0	0	0	0	0	0	0	170	26-35	109					
	9	2	<b>29</b>	75	72	14	<b>2</b>	0	0	0	0	0	0	0	0	0	203	26-35	147					
	<b>18</b>	1	23	<b>122</b>	55	16	0	0	0	0	0	0	0	0	0	0	<b>235</b>	26-35	177					
	13	4	26	85	<b>85</b>	18	1	0	0	0	0	0	0	0	0	0	232	26-35	170					
	17	3	17	83	70	14	2	0	0	0	0	0	0	0	0	0	206	26-35	153					
	7	0	13	80	62	12	1	0	0	0	0	0	0	0	0	0	175	26-35	142					
	3	0	11	50	47	8	1	0	0	0	0	0	0	0	0	0	120	26-35	97					
	2	0	2	38	27	8	1	0	0	0	0	0	0	0	0	0	78	26-35	65					
	1	0	1	18	26	8	0	0	0	0	0	0	0	0	0	0	54	26-35	44					
	0	0	4	4	12	5	0	0	0	0	0	0	0	0	0	0	25	27-36	17					
Total	147	41	278	1030	803	164	11	0	0	0	0	0	0	0	0	0	2474							
Percent	5.9%	1.7%	11.2%	41.6%	32.5%	6.6%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%							
AM Peak	07:00	11:00	11:00	09:00	11:00	11:00	08:00										11:00							
Vol.	12	7	26	61	53	7	1									158								
PM Peak	16:00	14:00	15:00	16:00	17:00	14:00	15:00									16:00								
Vol.	18	7	29	122	85	18	2								235									

# Wilbur Smith Associates Knoxville, TN

Site Code: BRIDGE  
Station ID:

Latitude: 0' 0.000 Undefined

WB Joe Johnson		1	16	21	26	31	36	41	46	51	56	61	66	71	76	76	999	Total	Pace	Number				
Start	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95		Speed	in Pace				
Time	10/05/11	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12 PM	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
	0	0	2	11	16	1	0	0	0	0	0	0	0	0	0	0	0	30	26-35	27				
	0	0	4	13	5	1	0	0	0	0	0	0	0	0	0	0	0	23	22-31	18				
	0	0	0	3	3	2	0	0	0	0	0	0	0	0	0	0	0	8	28-37	8				
	0	0	0	4	3	1	2	1	0	0	0	0	0	0	0	0	0	11	24-33	7				
	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	4	26-35	3				
	1	0	2	3	0	1	0	0	0	0	0	0	0	0	0	0	0	7	19-28	5				
	0	0	2	9	7	1	0	0	0	0	0	0	0	0	0	0	0	19	24-33	16				
	5	3	14	42	30	6	0	1	0	0	0	0	0	0	0	0	0	101	26-35	72				
	8	1	23	41	27	8	2	0	0	0	0	0	0	0	0	0	0	110	23-32	68				
	5	2	14	40	31	1	0	0	0	0	0	0	0	0	0	0	0	93	26-35	71				
	3	4	22	49	29	5	0	1	0	0	0	0	0	0	0	0	0	113	25-34	78				
	9	7	24	51	40	5	2	0	0	0	0	0	0	0	0	0	0	138	26-35	91				
	13	3	20	88	55	10	0	0	0	0	0	0	0	0	0	0	0	189	26-35	143				
	17	6	25	63	47	9	0	0	0	0	0	0	0	0	0	0	0	167	26-35	110				
	12	5	25	60	51	12	0	0	0	0	0	0	0	0	0	0	0	165	26-35	111				
	15	4	35	93	48	15	1	0	0	0	0	0	0	0	0	0	0	211	26-35	141				
	16	7	35	93	89	9	0	0	0	0	0	0	0	0	0	0	0	249	26-35	182				
	16	4	31	112	88	15	0	0	2	0	0	0	0	0	0	0	0	268	26-35	200				
	13	0	14	73	73	18	0	0	0	0	0	0	0	0	0	0	0	191	26-35	146				
	5	0	6	60	56	7	0	0	0	0	0	0	0	0	0	0	0	134	26-35	116				
	8	0	8	52	42	5	0	0	0	0	0	0	0	0	0	0	0	115	26-35	94				
	3	0	1	20	33	5	0	0	0	0	0	0	0	0	0	0	0	62	26-35	53				
	2	0	2	12	24	3	1	0	0	0	0	0	0	0	0	0	0	44	26-35	36				
	0	0	1	12	9	3	0	0	0	0	0	0	0	0	0	0	0	25	25-34	21				
	151	46	310	1006	807	144	8	5	0	0	0	0	0	0	0	0	0	2477						
Percent	6.1%	1.9%	12.5%	40.6%	32.6%	5.8%	0.3%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%							
AM Peak	11:00	11:00	11:00	11:00	11:00	08:00	03:00	03:00	03:00	03:00	03:00	03:00	03:00	03:00	03:00	03:00	03:00	11:00						
Vol.	9	7	24	51	40	8	2	1	1	1	1	1	1	1	1	1	1	138						
PM Peak	13:00	16:00	15:00	17:00	16:00	18:00	15:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00						
Vol.	17	7	35	112	89	18	1	2	2	2	2	2	2	2	2	2	2	268						

# Wilbur Smith Associates Knoxville, TN

Site Code: BRIDGE  
Station ID:

Latitude: 0' 0.000 Undefined

WB Joe Johnson	1	16	21	26	31	36	41	46	51	56	61	66	71	76	Pace	Number	
Start	15	20	25	30	35	40	45	50	55	60	65	70	75	999	Speed	in Pace	
Time	10/06/11	0	1	2	11	2	1	0	0	0	0	0	0	0	17	28-37	15
01:00	0	0	0	7	11	3	2	0	0	0	0	0	0	0	23	26-35	18
02:00	0	0	0	1	2	0	0	0	0	0	0	0	0	0	3	23-32	3
03:00	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2	*	1
04:00	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2	22-31	1
05:00	0	0	1	5	1	0	0	0	0	0	0	0	0	0	7	22-31	7
06:00	1	0	1	6	10	3	0	0	0	0	0	0	0	0	21	26-35	16
07:00	11	2	14	35	21	3	1	0	0	0	0	0	0	0	87	26-35	56
08:00	3	5	17	50	41	3	0	0	0	0	0	0	0	0	119	26-35	91
09:00	7	1	16	57	26	5	1	0	0	0	0	0	0	0	113	26-35	83
10:00	6	4	17	39	25	5	1	0	0	0	0	0	0	0	97	26-35	64
11:00	8	2	27	58	37	5	1	0	0	0	0	0	0	0	138	26-35	95
12 PM	17	9	27	86	50	11	0	0	0	0	0	0	0	0	200	26-35	136
13:00	11	2	23	77	49	10	0	0	0	0	0	0	0	0	172	26-35	126
14:00	7	2	22	66	56	9	0	0	0	0	0	0	0	0	162	26-35	122
15:00	15	4	32	85	59	10	3	0	1	0	0	0	0	0	209	26-35	144
16:00	11	1	20	81	45	9	1	0	0	0	0	0	0	0	168	26-35	126
17:00	24	2	29	112	77	14	1	0	0	0	0	0	0	0	259	26-35	189
18:00	18	1	7	61	82	9	0	0	0	0	0	0	0	0	178	26-35	143
19:00	8	1	3	36	43	5	1	0	0	0	0	0	0	0	97	26-35	79
20:00	2	0	6	43	42	8	0	0	0	0	0	0	0	0	101	26-35	85
21:00	3	0	3	27	28	1	0	0	0	0	0	0	0	0	62	26-35	55
22:00	7	1	4	62	52	12	0	0	0	0	0	0	0	0	138	26-35	114
23:00	2	0	4	11	12	5	1	0	0	0	0	0	0	0	35	26-35	23
Total	162	37	274	1007	782	132	15	0	1	0	0	0	0	0	2410		
Percent	6.7%	1.5%	11.4%	41.8%	32.4%	5.5%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	07:00	08:00	11:00	11:00	08:00	09:00	01:00								11:00		
Vol.	11	5	27	58	41	5	2								138		
PM Peak	17:00	12:00	15:00	17:00	18:00	17:00	15:00		15:00						17:00		
Vol.	24	9	32	112	82	14	3		1						259		



# Wilbur Smith Associates Knoxville, TN

Site Code: BRIDGE  
Station ID:

Latitude: 0' 0.000 Undefined

EB Joe Johnson, WB Joe Johnson		16	21	26	31	36	41	46	51	56	61	66	71	76	Pace	Number
Start	1	16	21	26	31	36	41	46	51	56	61	66	71	76	Speed	in Pace
Time	15	20	25	30	35	40	45	50	55	60	65	70	75	999	Total	
10/04/11	3	1	3	10	14	4	0	0	0	0	0	0	0	0	35	26-35 24
01:00	2	2	5	12	6	2	0	0	0	0	0	0	0	0	29	22-31 18
02:00	0	0	2	1	1	0	0	0	0	0	0	0	0	0	4	21-30 3
03:00	1	0	0	3	3	2	0	0	0	0	0	0	0	0	9	28-37 8
04:00	0	0	1	3	2	2	0	0	0	0	0	0	0	0	8	25-34 5
05:00	0	0	5	16	21	4	1	0	0	0	0	0	0	0	47	26-35 37
06:00	2	2	15	39	36	13	0	0	0	0	0	0	0	0	107	26-35 75
07:00	20	12	34	126	90	19	0	1	0	0	0	0	0	0	302	26-35 216
08:00	16	6	35	106	116	26	4	0	0	0	0	0	0	0	309	26-35 222
09:00	18	7	43	121	99	30	8	0	1	0	0	0	0	0	327	26-35 220
10:00	8	9	66	95	55	16	2	1	0	0	0	0	0	0	252	21-30 161
11:00	21	21	54	129	108	20	3	0	0	0	0	0	0	0	356	26-35 237
12 PM	19	8	51	145	120	29	3	0	0	0	0	0	0	0	375	26-35 265
13:00	19	16	56	117	98	22	1	0	0	0	0	0	0	0	329	26-35 215
14:00	23	19	51	126	83	30	2	0	0	0	0	0	0	0	334	26-35 209
15:00	16	10	56	131	123	30	3	1	0	0	0	0	0	0	370	26-35 254
16:00	28	11	57	192	119	38	1	0	0	0	0	0	0	0	446	26-35 311
17:00	28	6	55	154	127	31	3	0	0	0	0	0	0	0	404	26-35 281
18:00	34	6	36	147	145	29	7	0	1	0	0	0	0	0	405	26-35 292
19:00	13	0	29	125	97	19	1	0	0	0	0	0	0	0	284	26-35 222
20:00	6	3	24	86	79	15	2	0	0	0	0	0	0	0	215	26-35 165
21:00	3	1	8	73	48	14	2	0	0	0	0	0	0	0	149	26-35 121
22:00	2	0	6	33	35	11	0	0	0	0	0	0	0	0	87	26-35 68
23:00	1	0	6	13	16	6	0	0	0	0	0	0	0	0	42	26-35 29
Total	283	140	698	2003	1641	412	43	3	2	0	0	0	0	0	5225	
Percent	5.4%	2.7%	13.4%	38.3%	31.4%	7.9%	0.8%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
AM Peak	11:00	11:00	10:00	11:00	08:00	09:00	09:00	07:00	09:00	0.0%	0.0%	0.0%	0.0%	0.0%	11:00	
Vol.	21	21	66	129	116	30	8	1	1						356	
PM Peak	18:00	14:00	16:00	16:00	18:00	16:00	18:00	15:00	18:00						16:00	
Vol.	34	19	57	192	145	38	7	1	1						446	

Site Code: BRIDGE  
Station ID:

Latitude: 0' 0.000 Undefined

Start Time	15	16	20	21	25	26	30	31	35	36	40	41	45	46	50	51	55	56	60	61	65	66	70	71	75	76	999	Total	Pace Speed	Number in Pace
10/05/11	0	1	1	5	8	16	14	21	6	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	26-35	37	
01:00	0	1	1	8	14	16	14	21	6	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	22-31	23	
02:00	0	1	1	0	6	14	6	4	4	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	25-34	10		
03:00	0	0	0	0	5	5	5	3	3	2	2	3	3	1	0	0	0	0	0	0	0	0	0	0	0	14	24-33	8		
04:00	0	3	3	1	5	5	5	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	14	25-34	7		
05:00	1	2	2	7	7	17	14	14	4	4	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	46	25-34	31		
06:00	2	0	0	13	38	38	27	11	11	11	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	96	26-35	65		
07:00	14	7	7	45	100	100	101	21	21	21	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	290	26-35	201		
08:00	16	4	4	48	125	125	104	32	32	32	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	334	26-35	229		
09:00	9	8	8	45	87	87	83	32	32	32	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	266	26-35	170		
10:00	17	7	7	43	106	106	78	24	24	24	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	276	26-35	184		
11:00	16	23	23	60	120	120	90	18	18	18	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	330	26-35	210		
12 PM	30	11	11	56	159	159	98	27	27	27	2	2	2	0	0	0	0	0	0	0	0	1	1	0	0	384	26-35	257		
13:00	26	15	15	52	129	129	91	20	20	20	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	336	26-35	220		
14:00	25	14	14	62	112	112	100	23	23	23	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	337	26-35	212		
15:00	30	16	16	65	157	157	100	28	28	28	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	398	26-35	257		
16:00	34	12	12	74	159	159	147	19	19	19	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	448	26-35	306		
17:00	34	12	12	65	183	183	130	31	31	31	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	459	26-35	313		
18:00	22	2	2	39	132	132	123	34	34	34	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	355	26-35	255		
19:00	9	3	3	23	103	103	97	15	15	15	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	251	26-35	200		
20:00	10	0	0	20	71	71	62	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	168	26-35	133		
21:00	6	0	0	5	44	44	51	7	7	7	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	114	26-35	95		
22:00	3	0	0	7	27	27	37	4	4	4	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	79	26-35	64		
23:00	0	0	0	4	19	19	16	6	6	6	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	46	26-35	35		
Total	304	142	142	747	1934	1934	1585	370	39	39	7	7	7	0	0	0	0	0	0	0	0	0	0	0	0	5129				
Percent	5.9%	2.8%	2.8%	14.6%	37.7%	37.7%	30.9%	7.2%	0.8%	0.8%	0.1%	0.1%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	10:00	11:00	11:00	11:00	08:00	08:00	08:00	08:00	06:00	06:00	03:00																08:00			
Vol.	17	23	23	60	125	125	104	32	5	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	334			
PM Peak	16:00	15:00	15:00	16:00	17:00	17:00	16:00	18:00	18:00	18:00	17:00	17:00	18:00	18:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00			
Vol.	34	16	16	74	183	183	147	34	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	459			





# Wilbur Smith Associates Knoxville, TN

Site Code: BRIDGE  
Station ID:

Latitude: 0' 0.000 Undefined

Start Time	15	16	21	26	31	36	41	46	51	56	61	66	71	76	Pace Speed	Number in Pace
10/07/11	0	0	9	15	12	2	0	1	0	0	0	0	0	0	23-32	27
01:00	0	0	3	8	8	3	0	0	0	0	0	0	0	0	24-33	16
02:00	0	1	2	6	9	1	0	1	0	0	0	0	0	0	25-34	15
03:00	0	0	2	5	1	1	0	0	0	0	0	0	0	0	21-30	7
04:00	0	0	1	2	0	4	0	0	0	0	0	0	0	0	30-39	4
05:00	1	0	1	15	22	10	2	0	0	0	0	0	0	0	26-35	37
06:00	2	5	10	26	41	15	0	0	0	0	0	0	0	0	26-35	67
07:00	10	10	40	97	86	25	3	0	0	0	0	0	0	0	26-35	183
08:00	17	8	36	94	103	31	2	1	0	0	0	0	0	0	26-35	197
09:00	14	14	41	107	92	28	7	2	0	0	0	0	0	0	26-35	199
10:00	9	12	42	94	81	31	3	0	0	0	0	0	0	0	26-35	175
11:00	17	16	53	129	112	35	5	1	0	0	0	0	0	0	26-35	241
12 PM	26	10	69	138	120	24	3	2	0	0	0	0	0	0	26-35	258
13:00	27	13	65	155	120	36	4	0	0	0	0	0	0	0	26-35	275
14:00	20	11	61	135	125	30	3	0	0	0	0	0	0	0	26-35	260
15:00	26	13	58	160	141	27	3	0	0	0	0	0	0	0	26-35	301
16:00	42	8	54	161	145	37	6	0	0	0	0	0	0	0	26-35	306
17:00	31	2	41	170	118	24	6	0	0	0	0	0	0	0	26-35	288
18:00	14	4	24	98	101	28	6	1	0	1	0	0	0	0	26-35	199
19:00	7	1	24	85	80	15	3	0	0	0	0	0	0	0	26-35	165
20:00	6	0	8	56	70	13	0	0	0	0	0	0	0	0	26-35	126
21:00	4	3	13	62	53	11	0	0	0	0	0	0	0	0	26-35	115
22:00	2	2	3	55	49	14	4	0	1	0	0	0	0	0	26-35	104
23:00	0	0	9	35	34	12	2	0	0	0	0	0	0	0	26-35	69
Total	277	133	669	1908	1723	457	62	9	1	1	0	0	0	0		5240
Percent	5.3%	2.5%	12.8%	36.4%	32.9%	8.7%	1.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
AM Peak	08:00	11:00	11:00	11:00	11:00	11:00	09:00	09:00								11:00
Vol.	17	16	53	129	112	35	7	2								368
PM Peak	16:00	13:00	12:00	17:00	16:00	16:00	16:00	12:00	22:00	18:00						16:00
Vol.	42	13	69	170	145	37	6	2	1	1						453
Total	1196	558	2806	7896	6691	1607	201	25	4	1	0	1	0	0		20986
Percent	5.7%	2.7%	13.4%	37.6%	31.9%	7.7%	1.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		

Stats

10 MPH Pace Speed : 26-35 MPH  
 Number in Pace : 14587  
 Percent in Pace : 69.5%  
 Number of Vehicles > 30 MPH : 8530  
 Percent of Vehicles > 30 MPH : 40.6%  
 Mean Speed(Average) : 28 MPH

**Wilbur Smith Associates**  
Knoxville, TN

Site Code: bridge  
Station ID:

Latitude: 0' 0.000 Undefined

Start Time	04-Oct-11 Tue	EB JOE JOHNSON		Hour Totals		WB JOE JOHNSON		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		3	58			10	35				
12:15		2	55			3	49				
12:30		1	33			11	63				
12:45		2	44	8	190	3	38	27	185	35	375
01:00		5	33			1	32				
01:15		2	40			4	22				
01:30		4	52			9	35				
01:45		2	60	13	185	2	55	16	144	29	329
02:00		1	50			0	60				
02:15		0	43			2	39				
02:30		0	26			1	35				
02:45		0	45	1	164	0	36	3	170	4	334
03:00		2	31			0	26				
03:15		3	42			2	47				
03:30		1	50			0	79				
03:45		1	44	7	167	0	51	2	203	9	370
04:00		0	47			0	52				
04:15		2	43			0	41				
04:30		2	55			0	84				
04:45		3	66	7	211	1	58	1	235	8	446
05:00		1	58			1	84				
05:15		3	44			0	65				
05:30		12	41			2	50				
05:45		23	29	39	172	5	33	8	232	47	404
06:00		15	44			2	38				
06:15		16	58			2	45				
06:30		29	50			9	59				
06:45		29	47	89	199	5	64	18	206	107	405
07:00		24	40			17	43				
07:15		38	20			17	37				
07:30		63	29			26	53				
07:45		75	20	200	109	42	42	102	175	302	284
08:00		74	28			22	42				
08:15		49	33			22	25				
08:30		39	20			32	24				
08:45		46	14	208	95	25	29	101	120	309	215
09:00		56	25			18	26				
09:15		58	21			26	21				
09:30		54	15			49	14				
09:45		41	10	209	71	25	17	118	78	327	149
10:00		36	7			21	15				
10:15		33	9			23	11				
10:30		44	9			31	14				
10:45		46	8	159	33	18	14	93	54	252	87
11:00		41	5			45	9				
11:15		47	2			36	4				
11:30		59	6			28	5				
11:45		51	4	198	17	49	7	158	25	356	42
Total		1138	1613			647	1827			1785	3440
Percent		41.4%	58.6%			26.2%	73.8%			34.2%	65.8%

**Wilbur Smith Associates**  
Knoxville, TN

Site Code: bridge  
Station ID:

Latitude: 0' 0.000 Undefined

Start Time	05-Oct-11 Wed	EB JOE JOHNSON		Hour Totals		WB JOE JOHNSON		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		7	61			9	45				
12:15		4	40			6	55				
12:30		2	42			9	48				
12:45		2	52	15	195	6	41	30	189	45	384
01:00		3	48			1	48				
01:15		3	52			2	47				
01:30		0	38			17	38				
01:45		1	31	7	169	3	34	23	167	30	336
02:00		3	49			3	39				
02:15		1	31			0	41				
02:30		0	33			3	57				
02:45		1	59	5	172	2	28	8	165	13	337
03:00		1	50			1	46				
03:15		1	51			0	54				
03:30		0	42			0	60				
03:45		1	44	3	187	10	51	11	211	14	398
04:00		4	41			3	48				
04:15		2	49			0	53				
04:30		1	55			0	91				
04:45		3	54	10	199	1	57	4	249	14	448
05:00		3	66			0	90				
05:15		12	44			1	68				
05:30		8	43			5	52				
05:45		16	38	39	191	1	58	7	268	46	459
06:00		12	49			1	49				
06:15		16	45			1	45				
06:30		17	36			7	46				
06:45		32	34	77	164	10	51	19	191	96	355
07:00		22	33			14	21				
07:15		39	31			15	36				
07:30		48	29			35	54				
07:45		80	24	189	117	37	23	101	134	290	251
08:00		44	16			22	30				
08:15		57	15			26	27				
08:30		56	15			35	35				
08:45		67	7	224	53	27	23	110	115	334	168
09:00		33	15			25	19				
09:15		39	12			24	15				
09:30		41	15			20	12				
09:45		60	10	173	52	24	16	93	62	266	114
10:00		41	10			36	16				
10:15		37	11			26	7				
10:30		33	9			26	8				
10:45		52	5	163	35	25	13	113	44	276	79
11:00		50	3			33	11				
11:15		36	9			32	7				
11:30		52	5			38	3				
11:45		54	4	192	21	35	4	138	25	330	46
Total		1097	1555			657	1820			1754	3375
Percent		41.4%	58.6%			26.5%	73.5%			34.2%	65.8%

**Wilbur Smith Associates**  
Knoxville, TN

Site Code: bridge  
Station ID:

Latitude: 0' 0.000 Undefined

Start Time	06-Oct-11 Thu	EB JOE JOHNSON		Hour Totals		WB JOE JOHNSON		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		4	61			5	40				
12:15		3	56			5	43				
12:30		5	58			6	72				
12:45		2	43	14	218	1	45	17	200	31	418
01:00		4	42			2	41				
01:15		3	50			2	42				
01:30		1	48			15	49				
01:45		1	60	9	200	4	40	23	172	32	372
02:00		0	28			2	51				
02:15		1	43			0	40				
02:30		0	35			1	33				
02:45		1	51	2	157	0	38	3	162	5	319
03:00		0	49			1	37				
03:15		1	49			1	42				
03:30		1	59			0	89				
03:45		1	54	3	211	0	41	2	209	5	420
04:00		1	44			2	21				
04:15		2	39			0	34				
04:30		1	52			0	70				
04:45		2	70	6	205	0	43	2	168	8	373
05:00		1	74			2	86				
05:15		5	56			0	77				
05:30		15	47			0	50				
05:45		16	44	37	221	5	46	7	259	44	480
06:00		6	55			1	55				
06:15		17	52			1	42				
06:30		28	45			8	38				
06:45		20	42	71	194	11	43	21	178	92	372
07:00		26	52			7	22				
07:15		38	32			22	22				
07:30		72	39			27	22				
07:45		68	31	204	154	31	31	87	97	291	251
08:00		56	27			37	20				
08:15		45	33			25	28				
08:30		47	20			34	22				
08:45		43	23	191	103	23	31	119	101	310	204
09:00		49	40			24	13				
09:15		64	26			24	29				
09:30		46	13			38	8				
09:45		35	17	194	96	27	12	113	62	307	158
10:00		46	16			32	19				
10:15		39	33			13	31				
10:30		33	34			22	63				
10:45		61	27	179	110	30	25	97	138	276	248
11:00		47	4			40	11				
11:15		40	8			33	11				
11:30		49	5			30	11				
11:45		46	4	182	21	35	2	138	35	320	56
Total		1092	1890			629	1781			1721	3671
Percent		36.6%	63.4%			26.1%	73.9%			31.9%	68.1%

**Wilbur Smith Associates**  
Knoxville, TN

Site Code: bridge  
Station ID:

Latitude: 0' 0.000 Undefined

Start Time	07-Oct-11 Fri	EB JOE JOHNSON		Hour Totals		WB JOE JOHNSON		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		6	60			5	45				
12:15		6	54			8	47				
12:30		3	46			5	50				
12:45		1	46	16	206	7	44	25	186	41	392
01:00		3	50			2	69				
01:15		0	52			0	55				
01:30		2	46			10	56				
01:45		0	47	5	195	5	45	17	225	22	420
02:00		2	54			7	44				
02:15		2	58			2	35				
02:30		2	44			1	60				
02:45		3	45	9	201	1	45	11	184	20	385
03:00		1	47			2	39				
03:15		0	59			1	58				
03:30		1	47			2	74				
03:45		1	56	3	209	1	48	6	219	9	428
04:00		1	55			1	48				
04:15		1	38			0	48				
04:30		0	53			0	79				
04:45		3	47	5	193	1	85	2	260	7	453
05:00		1	50			1	76				
05:15		14	40			0	56				
05:30		11	37			3	54				
05:45		18	27	44	154	3	52	7	238	51	392
06:00		12	35			4	45				
06:15		19	24			6	34				
06:30		17	35			10	33				
06:45		19	36	67	130	12	35	32	147	99	277
07:00		22	37			12	42				
07:15		38	20			20	26				
07:30		52	20			22	24				
07:45		69	25	181	102	36	21	90	113	271	215
08:00		39	7			20	17				
08:15		40	16			20	25				
08:30		43	20			28	27				
08:45		72	18	194	61	30	23	98	92	292	153
09:00		44	14			33	12				
09:15		42	29			26	12				
09:30		46	23			24	25				
09:45		63	21	195	87	27	10	110	59	305	146
10:00		40	11			26	14				
10:15		37	24			33	14				
10:30		38	14			25	18				
10:45		44	13	159	62	29	22	113	68	272	130
11:00		64	13			34	14				
11:15		55	14			39	12				
11:30		53	12			36	9				
11:45		53	11	225	50	34	7	143	42	368	92
Total		1103	1650			654	1833			1757	3483
Percent		40.1%	59.9%			26.3%	73.7%			33.5%	66.5%
Grand Total		4430	6708			2587	7261			7017	13969
Percent		39.8%	60.2%			26.3%	73.7%			33.4%	66.6%
ADT		ADT 5,246				AADT 5,246					



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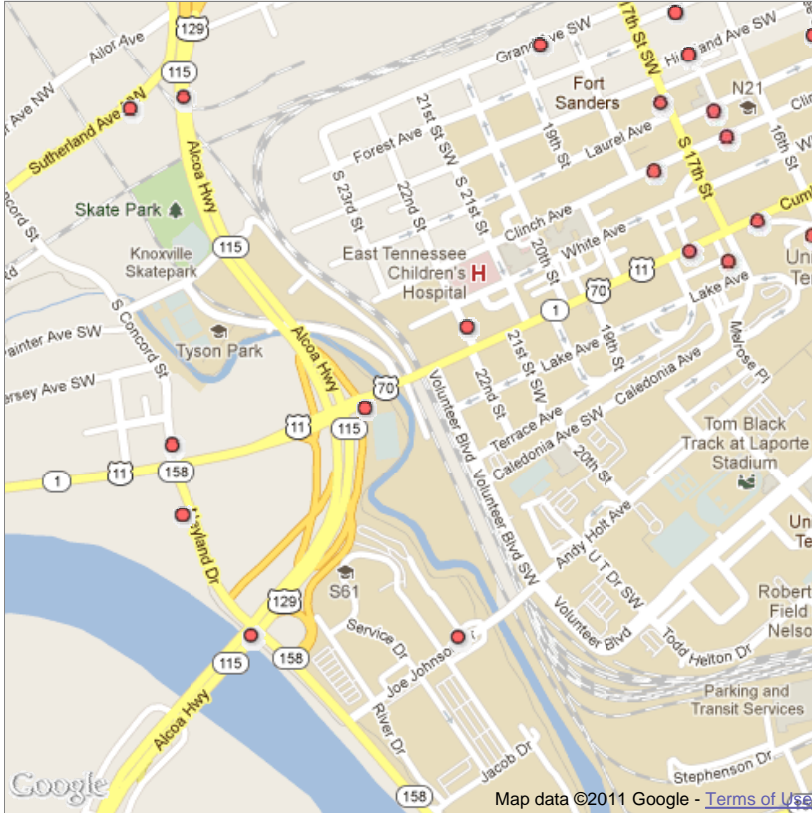
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View stations on map:

Non-Map Record Search:

Station Number:



Station Information	
Station	000171
Route	SR115
Location	BETWEEN SR-1 & I-40 -CBD
County	Knox
2010	57914
2009	51231
2008	59692
2007	55516
2006	53899
2005	60256
2004	55509
2003	50189
2002	57288
2001	52315
2000	52979
1999	53819
1998	51412
1997	54029
1996	55630
1995	53178
1994	55422
1993	59087
1992	62938
1991	50279
1990	61304

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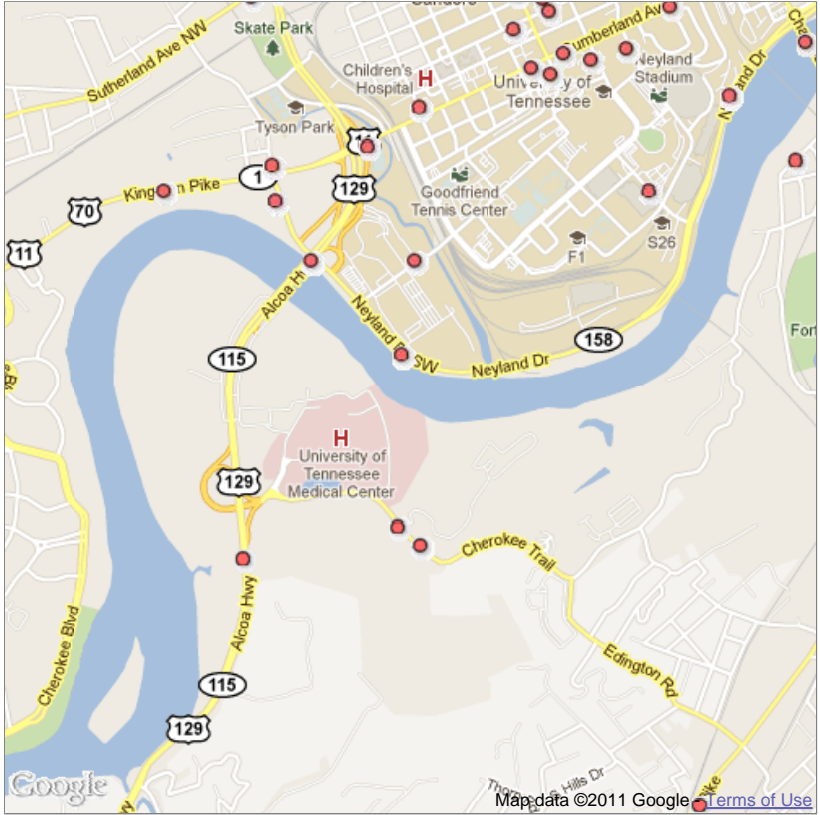
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View stations on map:  Non-Map Record Search:  Station Number:



Station Information	
Station	000157
Route	SR001
Location	CUMBERLAND AVE-CBD
County	Knox
2010	36431
2009	32675
2008	37144
2007	32852
2006	34597
2005	37388
2004	36735
2003	41005
2002	41002
2001	40949
2000	40895
1999	39070
1998	35106
1997	37913
1996	46153
1995	42808
1994	39588
1993	40246
1992	46947
1991	41865
1990	43795

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Station Information	
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1997	37913
1996	46153
1995	42808
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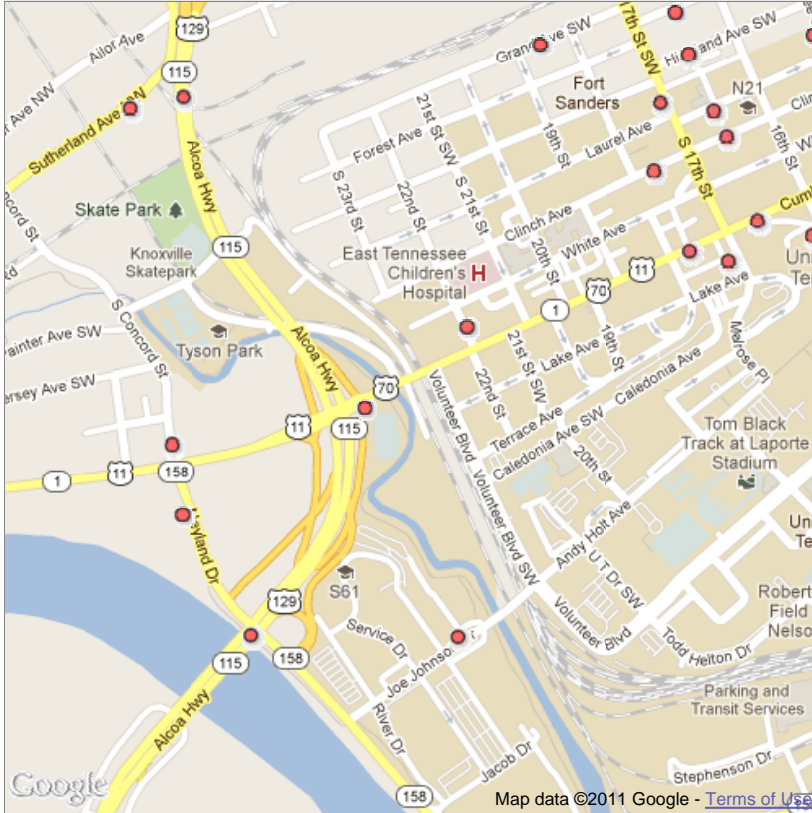
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View stations on map:

Non-Map Record Search:

Station Number:



Station Information	
Station	000142
Route	SR115
Location	SOUTH KNOXVILLE-CBD
County	Knox
2010	56312
2009	58660
2008	57414
2007	55619
2006	52578
2005	55397
2004	55311
2003	54175
2002	55074
2001	56104
2000	52142
1999	57520
1998	54350
1997	57788
1996	60986
1995	53310
1994	48752
1993	55358
1992	65720
1991	63243
1990	60500

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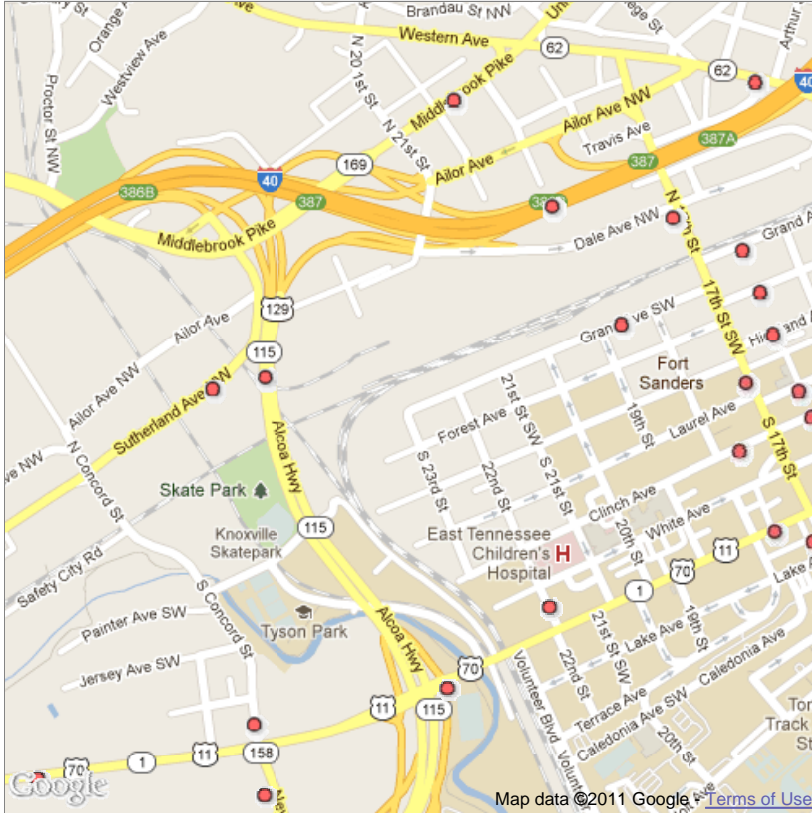
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View stations on map:

Non-Map Record Search:

Station Number:



**Station Information**

Station	000255
Route	10040
Location	KNOXVILLE
County	Knox
2010	127987
2009	127588
2008	122693
2007	120284
2006	114819
2005	108425
2004	105739
2003	101284
2002	112647
2001	122106
2000	108942
1999	126719
1998	130785
1997	103587
1996	104278
1995	119676
1994	79100
1993	76100
1992	90000
1991	89000
1990	87479

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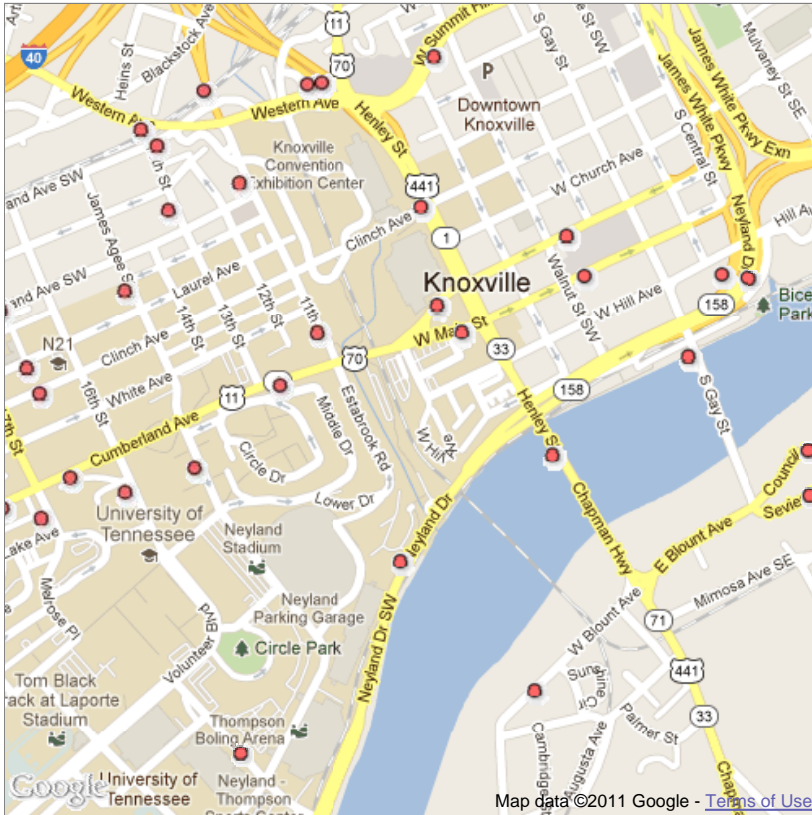
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View stations on map:  Non-Map Record Search:  Station Number:



Station Information	
Station	000422
Route	SR158
Location	KNOXVILLE
County	Knox
2010	6628
2009	6527
2008	7564
2007	7344
2006	7130
2005	7829
2004	8226
2003	8181
2002	8199
2001	7151
2000	6485
1999	8000
1998	NA
1997	NA
1996	NA
1995	NA
1994	NA
1993	NA
1992	NA
1991	NA
1990	NA

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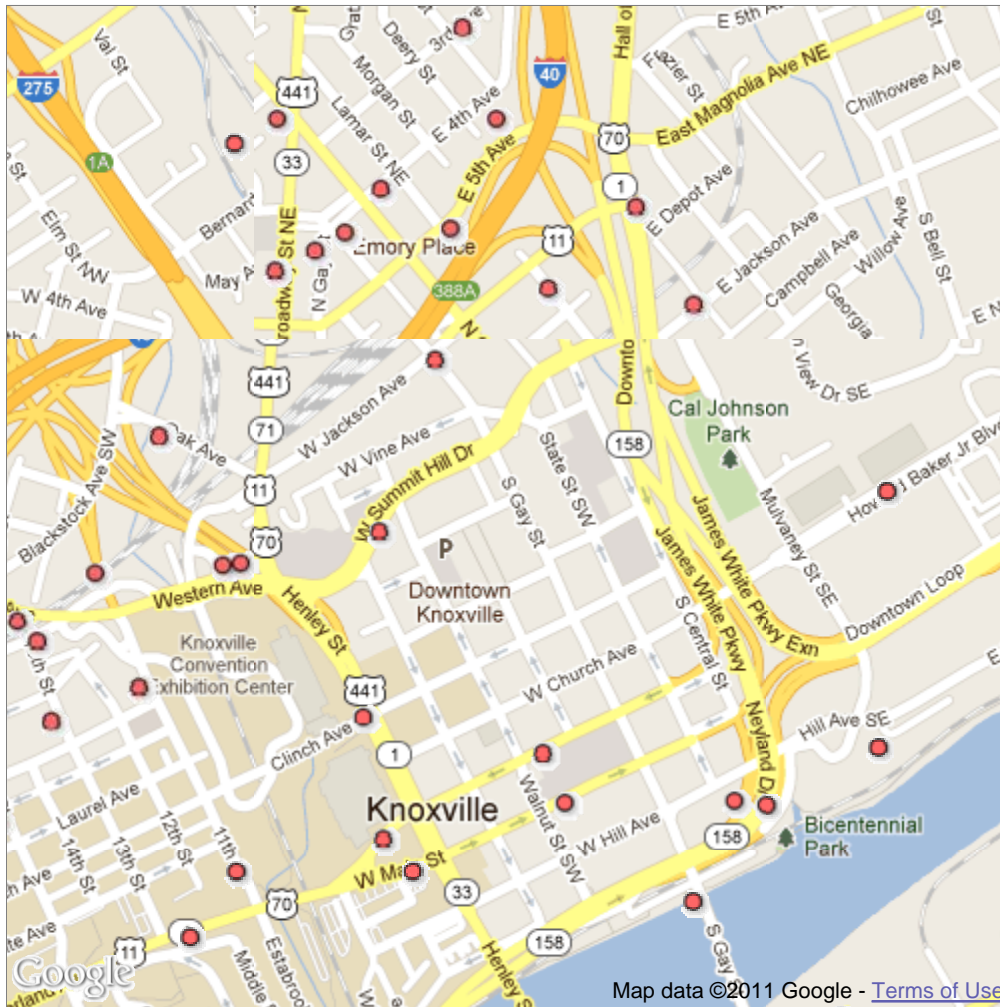
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View stations on map:  Non-Map Record Search:  Station Number:



Station Info	
Station	000270
Route	SR158
Location	NEAR RAILR
County	Knox
2010	45274
2009	44869
2008	44206
2007	42384
2006	42919
2005	42273
2004	41055
2003	44959
2002	44490
2001	44244
2000	40435
1999	48330
1998	44000
1997	43039
1996	53001
1995	43565
1994	59945
1993	55773
1992	48404
1991	51614
1990	63600

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View stations on map:  Non-Map Record Search:  Station Number:



Station Info	
Station	000449
Route	NA
Location	CENTER DRI
County	Knox
2010	6915
2009	6714
2008	6518
2007	7516
2006	5246
2005	3502
2004	NA
2003	NA
2002	NA
2001	NA
2000	NA
1999	NA
1998	NA
1997	NA
1996	NA
1995	NA
1994	NA
1993	NA
1992	NA
1991	NA
1990	NA

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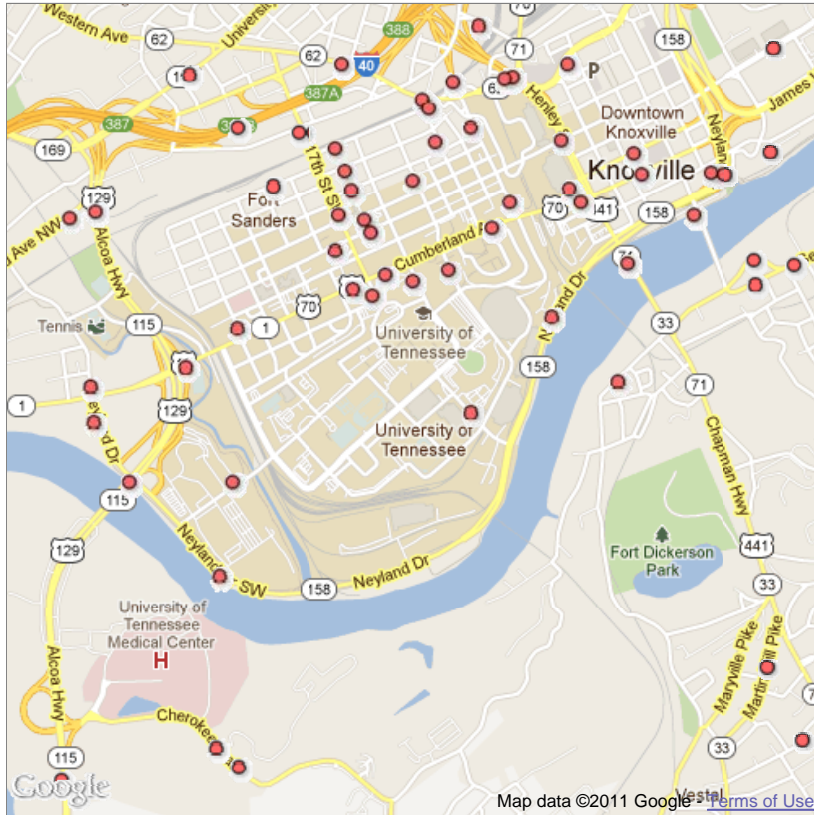
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View stations on map:  Non-Map Record Search:  Station Number:



Station Information	
Station	000413
Route	SR158
Location	CBD
County	Knox
2010	17642
2009	17129
2008	17726
2007	19729
2006	19154
2005	19293
2004	19483
2003	17315
2002	19780
2001	21474
2000	22993
1999	21256
1998	17206
1997	18943
1996	25728
1995	20346
1994	20428
1993	19903
1992	20147
1991	11577
1990	NA

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