

# **HEARTLAND DEVELOPMENT** **Knox County**

## **TRAFFIC IMPACT STUDY**

**Prepared For:**  
**BATSON, HIMES, NORVELL, & POE**

**Prepared By:**



**October 2008**

**HEARTLAND DEVELOPMENT**  
**KNOX COUNTY, TENNESSEE**

**TRAFFIC IMPACT STUDY**

Prepared for

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October 2008

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Project No. 103067

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## **INTRODUCTION**

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Wilbur Smith Associates (WSA) is pleased to submit this report to address the impact and access of a proposed residential development located on Highland View Road in Southeast Knox County. The basis for this study required the collection of traffic data, generation of anticipated traffic volumes from the proposed site and development of projected traffic volumes from normal growth and from the potential site. Analysis of the resulting traffic projections was conducted to determine the capacity and levels of service for the study intersections and site access. This study will develop measures necessary to mitigate traffic impacts including improved roadway geometrics and traffic control devices within the environs of the proposed residential development.

According to the Knoxville-Knox County Metropolitan Planning Commission's (MPC) Administrative Rules and Procedures, the proposed residential development site is identified for a Level 1 Traffic Impact Study. WSA discussed with Knox County Department of Engineering and Public Works and MPC to define the study area and address specific concerns relative to the proposed residential development. Therefore, this study will address the anticipated traffic impacts of the proposed residential development site access on Highland View Road and the intersections of Highland View Road and Simpson Road with Chapman Highway.

### **Project Description**

The proposed project is a residential development. The proposed site is approximately 119.80 acres zoned Planned Residential (PR). This tract is bounded by Highland View Road to the south. A proposed street for the development will intersect Highland View Road to the south. The proposed street would access 175 single-family units. Figure 1 shows the proposed site plan.

### **Site Location**

The location of the proposed residential development is on Highland View Road in southeast Knox County. The site is near the Sevier and Blount Counties. The proposed development is located west of the Highland View Road and Chapman Highway intersection. Figure 2 illustrates the site location relative to local and regional access.

**SITE PLAN**  
**Heartland Development**



**Figure 1**

# VICINITY MAP Heartland Development

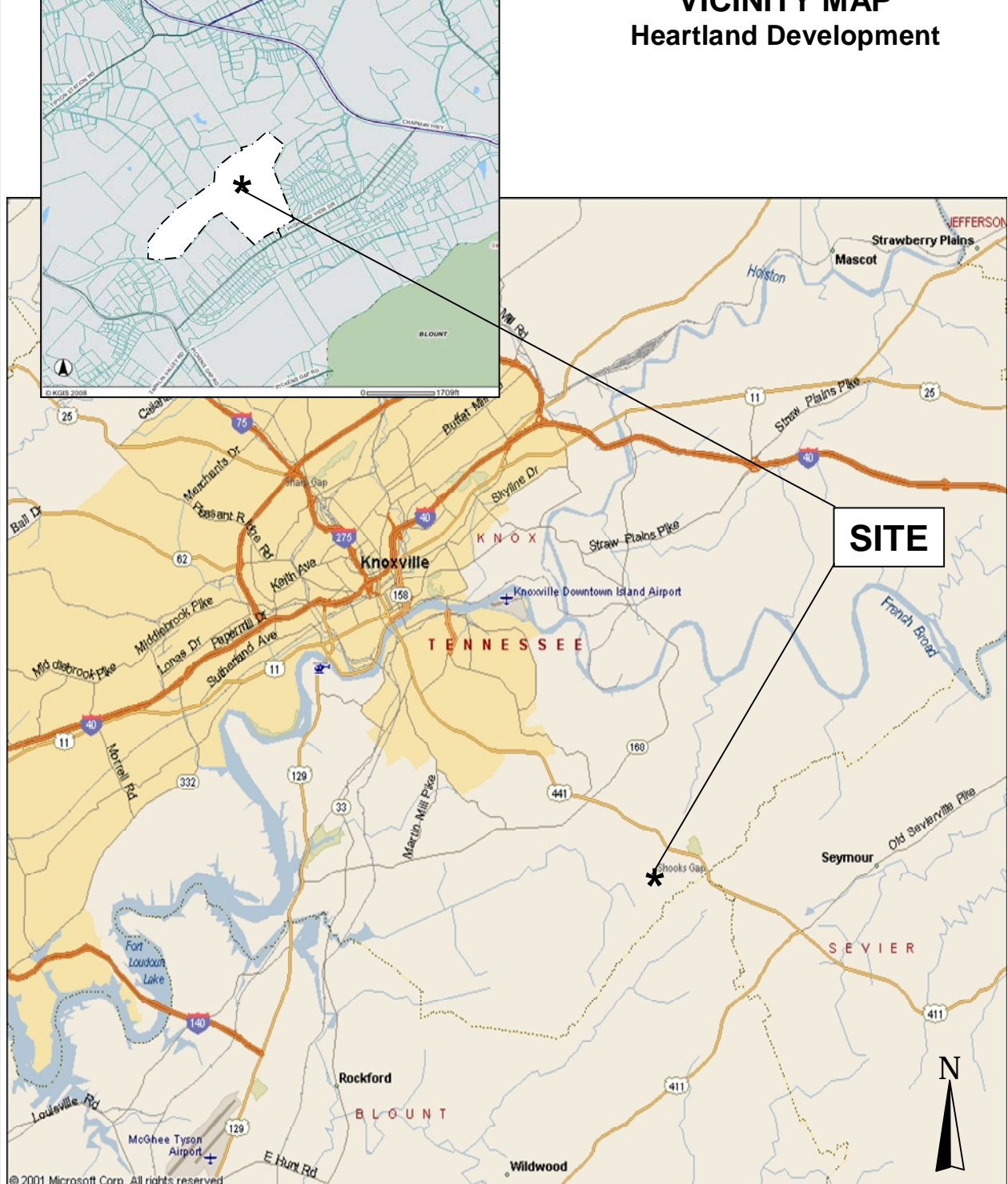


Figure 2



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## **LOCAL AND REGIONAL ACCESS**

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### **Local Access**

Highland View Road provides local access for the site and connects to the regional arterial of Chapman Highway (U.S. 441, S.R. 71) to the east. Highland View Road is a 2-lane classified minor collector with an approximate 19-foot width and no shoulders. Access to Chapman Highway is also provided by Simpson Road intersecting Highland View Road between the site and Chapman Highway.

### **Regional Access**

Chapman Highway, U.S. 441, is classified major arterial extending northwest into the Knoxville CBD and southeast towards the Sevier County line and Sevierville. Chapman Highway is a 5-lane section with shoulders at Highland View Road and a 4-lane section at Simpson Road. The 2008 average daily traffic on Chapman Highway is 28,795. Chapman Highway intersects Interstate 40 in the Knoxville CBD. Chapman Highway also intersects Governor John Sevier Highway (S.R. 168) to the northwest and has a junction with the Maryville Highway (U.S. 411) to the southeast. Governor John Sevier Highway extends between Interstate 40 east of the Knoxville CBD and Alcoa Highway (U.S. 129) south of Knoxville.

Interstate 40 provides significant east and west regional access throughout Tennessee. To the east, Interstate 40 connects to Interstate 81, which extends into the Tri-Cities area of Tennessee and Virginia. Westbound Interstate 40 connects to Interstate 75, providing north- and southbound connections into neighboring states such as Kentucky and Georgia, respectively. Interstate 40 provides significant east and west regional access throughout Tennessee.



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## EXISTING TRAFFIC CONDITIONS

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### Existing Traffic Control

The Highland View Road and Simpson Road approaches to Chapman Highway are STOP controlled. Highland View Road has a posted speed limit of 30mph. Simpson Road has STOP controlled approaches to Highland View Road.

### Existing Traffic Volumes

The 2008 average daily traffic on Chapman Highway is 28,795. Peak-hour turning movement counts (TMC) were conducted by WSA in October of 2008 for the intersections of Chapman Highway at Simpson Road and Highland View Road. A previous TMC for Chapman Highway and Highland View Road came from “Intersection Evaluation Part 1”, a Knox County study performed by WSA, and was collected in July 2002. The 2002 traffic data met traffic signal warrants. Figure 3 illustrates the resulting intersection turning movements for the 2008 AM and PM peaks. The peak hours were found between 7:00-8:15 AM and 5:00-6:00 PM.

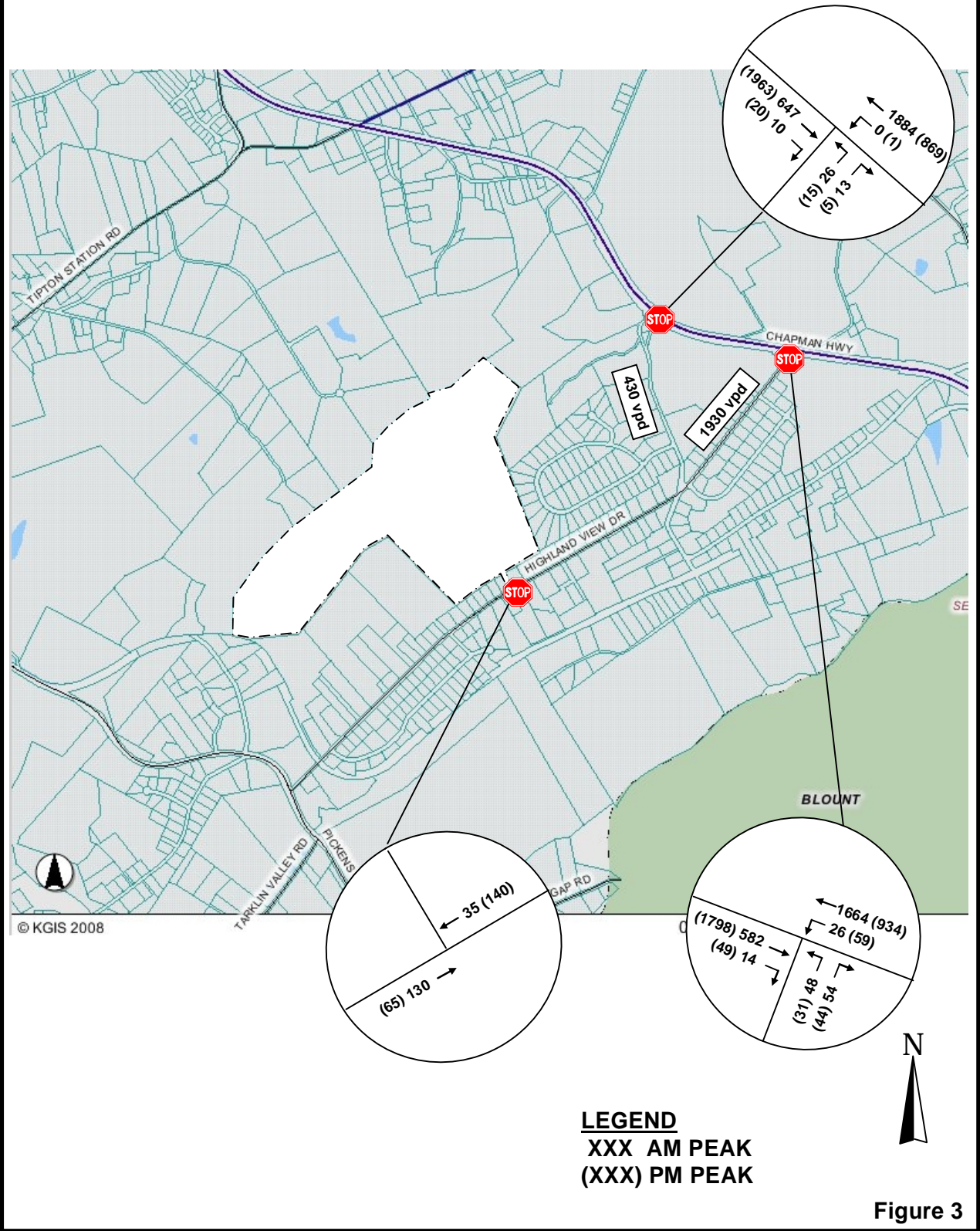
### Signal Warrant Analyses

For the study intersection of Chapman Highway and Highland View Road, an evaluation for a traffic control signal was conducted. There are eight warrants published in the **Manual on Uniform Traffic Control Devices, 2000 Edition**. For prevailing speeds in excess of 40mph on Chapman Highway, signal warrant volumes for each of the warrants can be reduced. Three traffic volume warrants were examined of which were the Eight-Hour Traffic Volume Warrant consisting of the Minimum Volume (Warrant 1A), Interruption to Continuous Traffic Flow (Warrant 1B), Combination (Warrant 1A & B); Four-Hour (Warrant 2); and Peak-Hour Volume (Warrant 3B). Any part of Warrant 1 must be met for a minimum of eight hours. Warrant 2 must be met for four hours, and one hour must be met for the Peak-Hour Warrant (Warrant 3B).

For the existing traffic conditions, The Peak-Hour Volume warrant (Warrant 3B) is met for the Highland View Road intersection with Chapman Highway. The analyses are summarized as follows:

		Hours <u>100% Satisfied</u>	Hours <u>90% Satisfied</u>
Warrant 1A	Minimum Volume	0 hours	
Warrant 1B	Interruption to Continuous Traffic Flow	2 hour	1 hour
Warrant 1C	Combination of Parts A & B	0 hours	
Warrant 2	Four Hour	0 hours	
Warrant 3B	Peak-hour Volume	1 hour	

# 2008 EXISTING TRAFFIC Heartland Development



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### **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.

Unsignalized intersections 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 unsignalized and signalized intersections is presented in Tables 1 and 2, respectively.

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

<b>Level of Service</b>	<b>Average Control Delay per Vehicle (seconds)</b>
A	≤ 10.0
B	> 10.0 and ≤ 15.0
C	> 15.0 and ≤ 25.0
D	> 25.0 and ≤ 35.0
E	> 35.0 and ≤ 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 were conducted using the Synchro Software, developed by Trafficware. Table 2 presents the unsignalized analyses of the study intersections. Current conditions show that the Simpson Road and Highland View Road at Chapman Highway have less than acceptable LOS's. Both AM and PM fail for the Simpson Road approach, and is a LOS E for the Highland View Road approach to Chapman Highway during the PM peak hour. Ideally, connecting the end of new 5-lane section in Seymour, TN, to the section of just south of Governor John Sevier Highway would provide a two-way left-turn lane through the intersection with Highland View Road and Simpson Road. The LOS would be better due to the available two-stage movement when making a left-turn from Simpson Road. Signalization of Chapman Highway at Highland View Road was identified in the **Knox County's Intersection Evaluation, Part 1**, study prepared by Wilbur Smith Associate in 2002 and results in a very good LOS. Signalization of Chapman Highway and Highland View Road should also create some gaps in the traffic flow at Simpson Road.

**TABLE 3  
2008 TRAFFIC  
CAPACITY AND LEVEL OF SERVICE**

<b>INTERSECTION</b>	<b>TRAFFIC CONTROL</b>	<b>PEAK PERIOD</b>	<b>V/C</b>	<b>DELAY</b>	<b>LOS</b>
Chapman Hwy & Simpson Rd	STOP	AM	0.18	19.20	C
	NB	PM	0.39	83.4	F
Chapman Hwy & Highland View Rd	STOP	AM	0.33	19.0	C
	NB	PM	0.57	59.1	F

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

### **BACKGROUND TRAFFIC CONDITIONS**

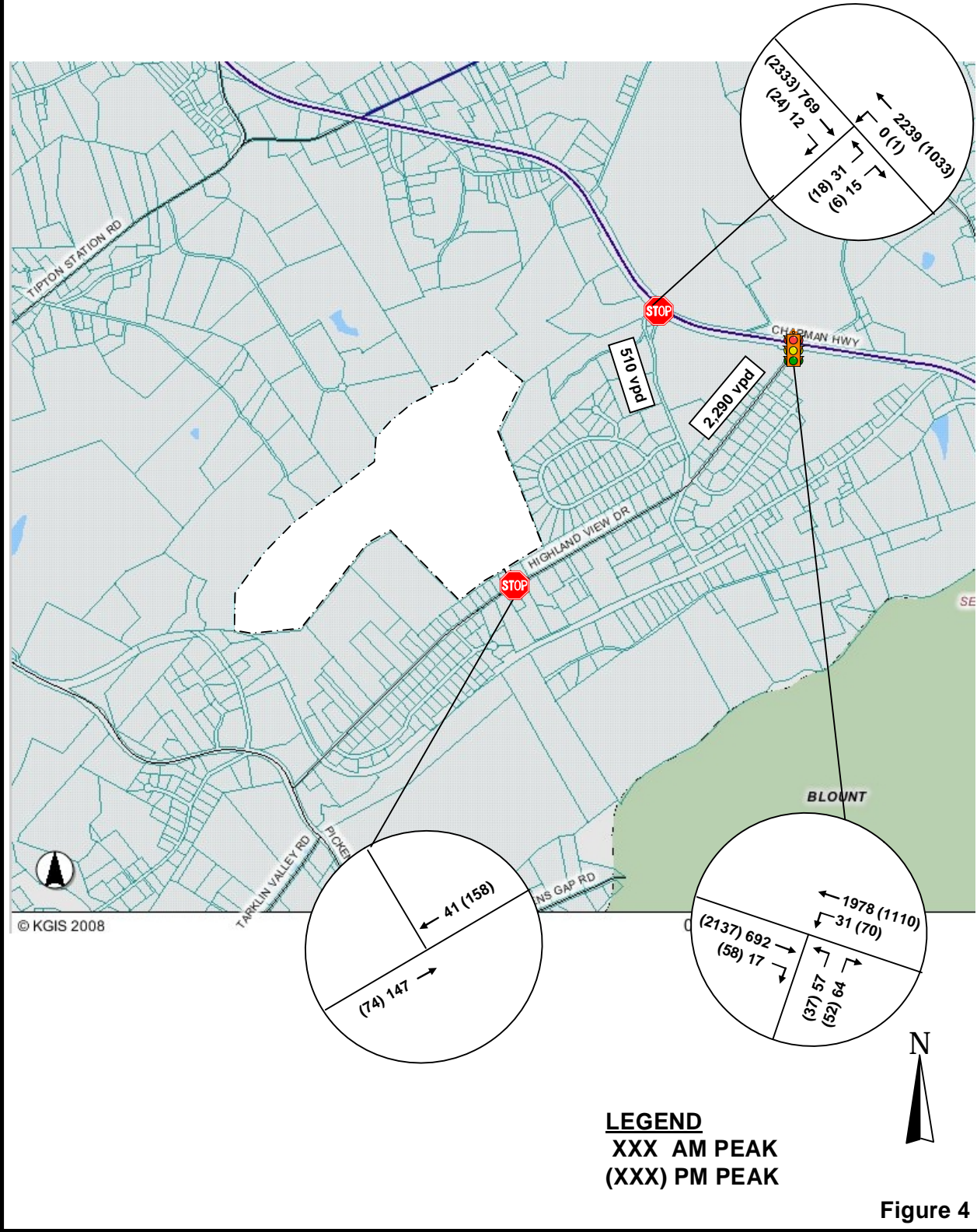
Background traffic is traffic that can be anticipated regardless of the proposed development. Traffic within the study area should continue to grow due to other developments as well as the continued growth within the surrounding area. This background traffic must be analyzed and evaluated for the purpose of establishing a baseline. In addition, the background traffic reflects the historical traffic volumes in the area of the proposed development.

#### **Background Traffic Volumes**

An average growth rate was determined using historical ADT traffic data from the Tennessee Department of Transportation (TDOT) count station on Chapman Highway. The increased ADT between 1998 and 2008 indicates an annual average growth rate of 1.44-percent for the area. However, for study purposes, a horizon year of 2015 was analyzed using a 2.5-percent compounded growth rate. The study intersections, therefore, reflects an 18.9-percent growth. Figure 4 illustrates the traffic volumes with the applied growth factor.



# 2015 BACKGROUND TRAFFIC Heartland Development



**Background Signal Warrant Analyses**

For the background traffic conditions, Warrant 3B continues to be satisfied for the northbound approach of Highland View Road at Chapman Highway and the Interruption Warrant (1B) is approached with nearly 6 hours satisfied. The analyses are summarized as follows:

		Hours <u>100% Satisfied</u>	Hours <u>90% Satisfied</u>
Warrant 1A	Minimum Volume	0 hours	
Warrant 1B	Interruption to Continuous Traffic Flow	4 hours	2 hours
Warrant 1C	Combination of Parts A & B	1 hour	
Warrant 2	Four Hour	2 hour	2 hours
Warrant 3B	Peak-hour Volume	1 hour	1 hour

**Background Capacity and Level of Service**

Analysis was performed with the grown traffic volumes and is displayed in Table 4. The levels of service are measured to be unacceptable with a LOS F for the unsignalized intersections of Chapman Highway at Highland View Road and Simpson Road with background conditions and no improvements to Chapman Highway. Signalization is required to mitigate the unacceptable LOS.

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

<b>INTERSECTION</b>	<b>TRAFFIC CONTROL</b>	<b>PEAK PERIOD</b>	<b>V/C</b>	<b>DELAY</b>	<b>LOS</b>
Chapman Hwy & Simpson Rd	STOP	AM	0.27	24.9	C
	NB	PM	0.81	230.5	F
Chapman Hwy & Highland View Rd	STOP	AM	0.48	26.3	D
	NB	PM	1.03	182.6	F
	<i>SIGNAL</i>	<i>AM</i>	<i>0.74</i>	<i>7.5</i>	<i>A</i>
		<i>PM</i>	<i>0.80</i>	<i>8.2</i>	<i>A</i>

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



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## PROJECT IMPACTS

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Project conditions are developed by generating traffic based on the proposed land uses, distributing the trips to the transportation network, and again conducting analyses for capacity and level of service.

### Trip Generation

Project traffic was determined using the publication, **Trip Generation, 7th 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 will generate traffic for 119.80 acres for Planned Residential. This development is a total of 175 single-family units. From the trip generation calculations, the proposed site may generate approximately 1,740 daily trips. Table 5 presents the trip generation of this proposed site.

**TABLE 5  
TRIP GENERATION**

Land Use	Land-Use Code	Units	Daily Trips	AM Peak-Hour Trips		PM Peak-Hour Trips	
				Enter	Exit	Enter	Exit
Single-Family	210	175	1,740	33	99	114	64

**Reference: Trip Generation, 7th Edition**

The proposed density for this development will exceed the 150 units which County policy typically requires multiple accesses.

### Trip Distribution and Assignment

Using the turning-movement counts for the study intersections, trips are distributed to the adjacent streets with 70-percent of the generated trips distributed northwest and 25-percent assigned southeast on Chapman Highway. Highland View Road, southwest of the site, was assigned 5-percent of the generated trips. Figure 5 illustrates the traffic distribution and assignment.

County policy requires multiple accesses for residential densities in excess of 150 units. The property has only the very limited frontage to Highland View Road, therefore, it may require consideration of a future connection to the adjacent property for increased access and the permitting of further distribution of traffic.

# DISTRIBUTION AND ASSIGNMENT Heartland Development

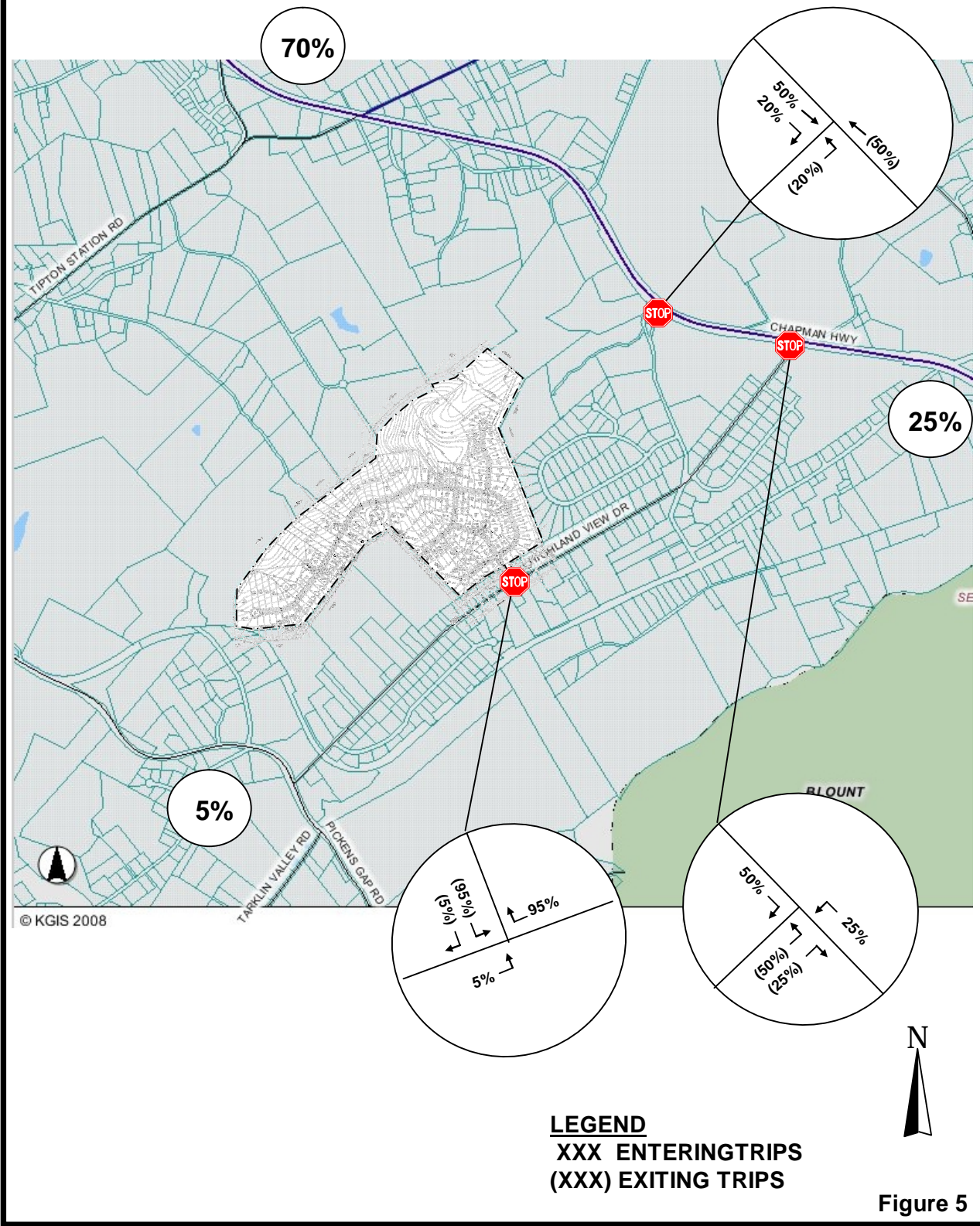


Figure 5

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### **Project Traffic Volumes**

By multiplying the trips generated by the distribution percentages, the project traffic volumes were determined. Figure 6 illustrates the resulting project traffic volumes associated with the proposed project.

### **Total Projected Traffic Volumes**

Background and project traffic volumes were added together to develop post-development traffic volumes for the year 2015. Figure 7 illustrates this 2015 projection. Using this projection, mitigation measures including traffic control devices and roadway and intersection geometry can be evaluated. The projected ADT for Highland View Road and Simpson Road are approximately 3,595 and 860, respectively.

A review of the Knox County's turn lane requirements provided in the County's Access Control and Driveway Design Policy determined that neither left- or right-turn lanes are required for Highland View Road at the proposed Heartland site access.

### **Projected Signal Warrant Analyses**

For the projected traffic conditions, Warrants 1B, 2 and 3B are satisfied for the Highland View Road intersection with Chapman Highway. The analyses are summarized as follows:

		Hours <u>100% Satisfied</u>	Hours <u>90% Satisfied</u>
Warrant 1A	Minimum Volume	1 hour	1 hour
Warrant 1B	Interruption to Continuous Traffic Flow	11 hours	0 hours
Warrant 1C	Combination of Parts A & B	3 hour	
Warrant 2	Four Hour	11 hours	0 hours
Warrant 3B	Peak-hour Volume	5 hours	2 hours

### **Projected Capacity and Level of Service**

The development traffic from the site was analyzed to project the impact the unsignalized intersections. The projected levels of service are shown in Table 6. The unsignalized LOS continue to fail without the improvements to Chapman Highway. An acceptable LOS may be achieved for Chapman Highway and Highland View Road intersection with signalization, and signalization of Chapman Highway at Highland View Road should also create some gaps in traffic flow improving the ability of drivers to turn left from Simpson Road. The traffic volumes generated by the proposed development during the AM and PM peak hours are minimal for the Simpson Road approach to Chapman Highway and can be accommodated on Highland View Road if insufficient gaps are available for traffic approaching on Simpson Road. Table 7 summaries the volume to capacity ratio, delay and LOS measured and projected for this development.



# PROJECT TRIPS Heartland Development

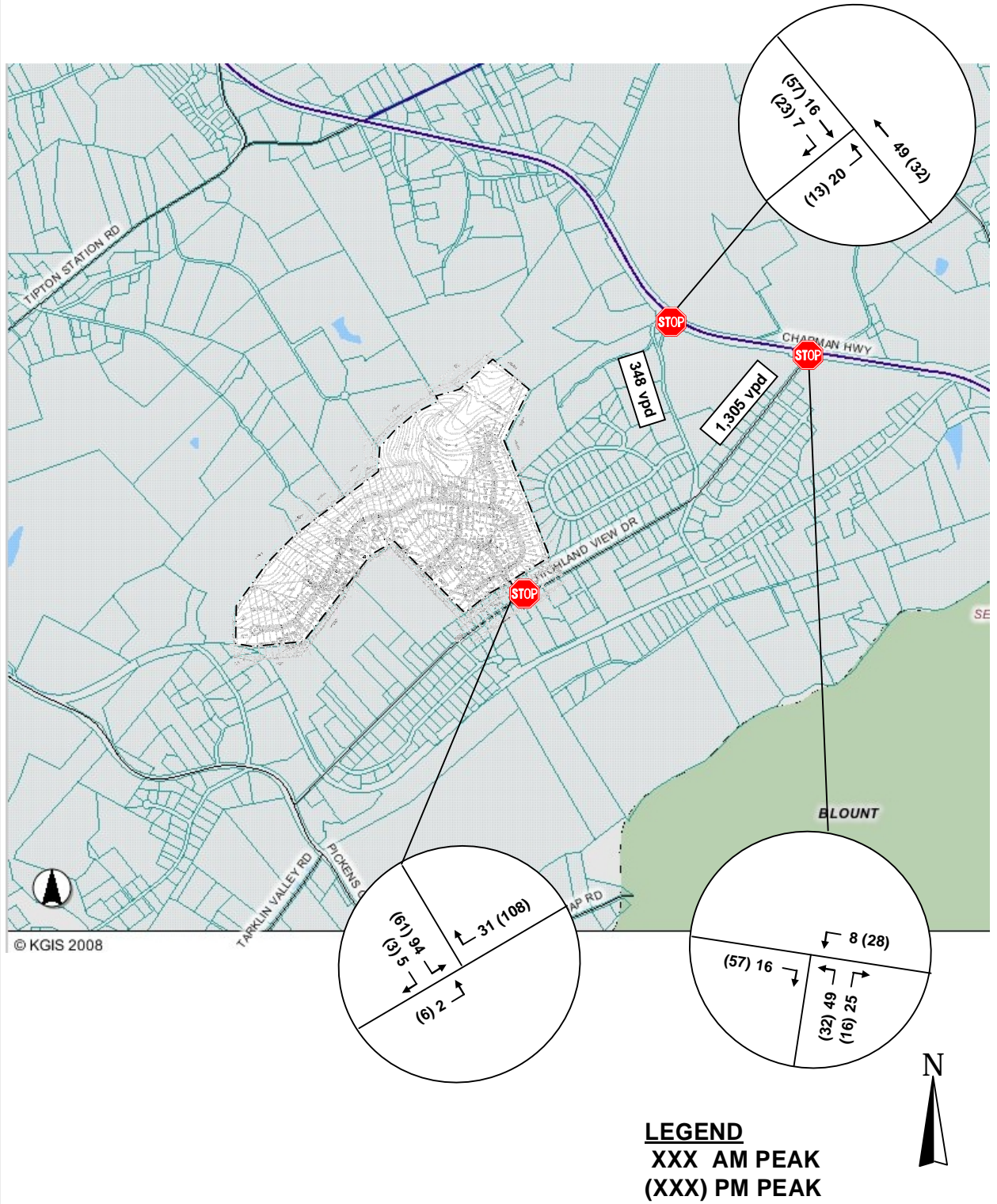
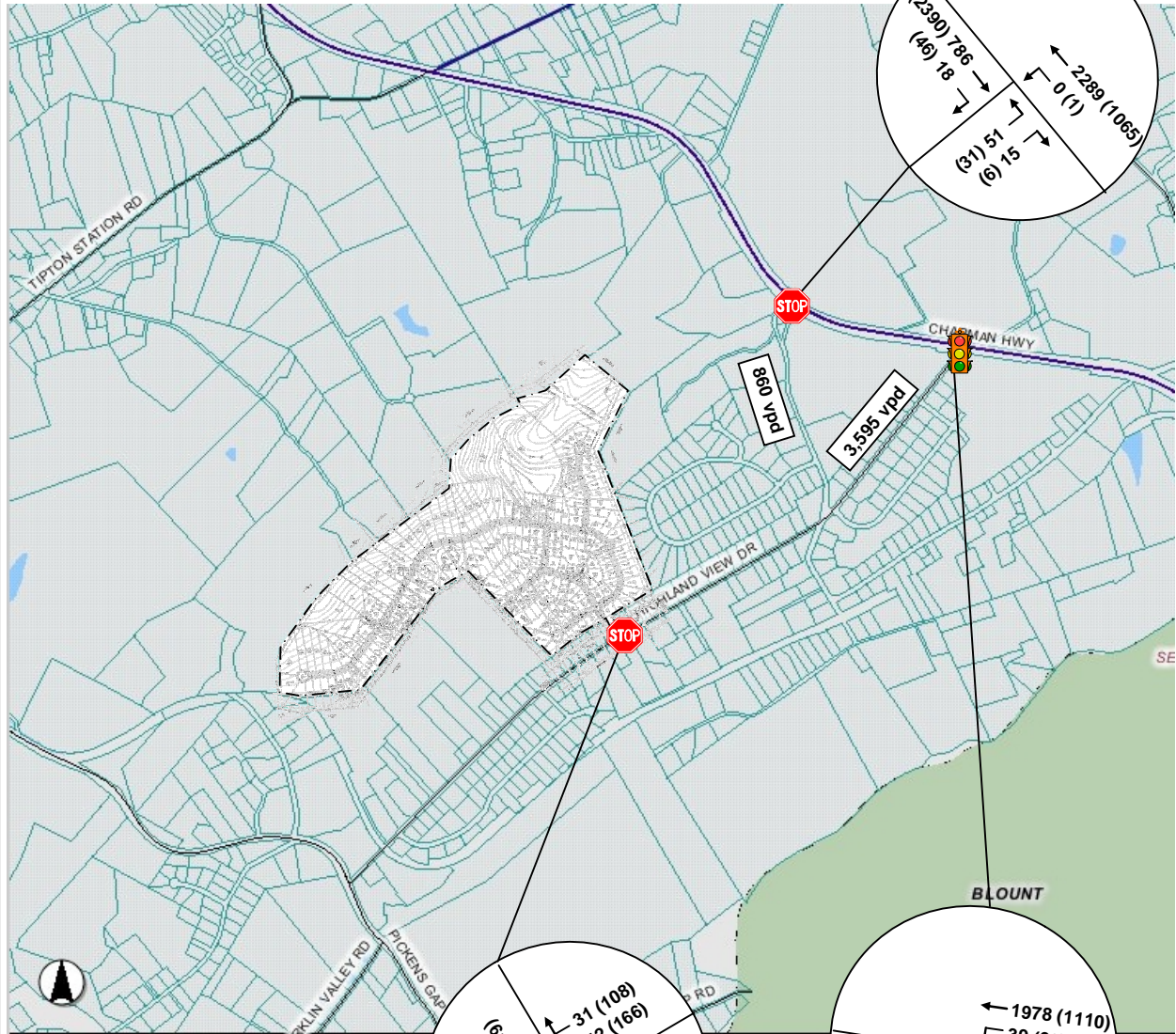


Figure 6



# 2015 PROJECTED TRAFFIC Heartland Development



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

**Figure 7**

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

<b>INTERSECTION</b>	<b>TRAFFIC CONTROL</b>	<b>PEAK PERIOD</b>	<b>V/C</b>	<b>DELAY</b>	<b>LOS</b>
Chapman Hwy & Simpson Rd	STOP	AM	0.43	33.2	D
	NB	PM	1.50	507.8	F
Chapman Hwy & Highland View Rd	STOP	AM	0.85	59.7	F
	NB	PM	1.88	527.5	F
	<i>SIGNAL</i>	<i>AM</i>	<i>0.80</i>	<i>17.9</i>	<i>B</i>
	<i>Mitigation</i>	<i>PM</i>	<i>0.88</i>	<i>16.8</i>	<i>B</i>
Highland View Rd & Site Access	STOP	AM	0.14	10.5	B
	SB	PM	0.11	11.1	B

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

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

<b>INTERSECTION</b>	<b>TRAFFIC CONTROL</b>	<b>PEAK PERIOD</b>	<b>2008 TRAFFIC</b>			<b>2015 BACKGROUND</b>			<b>2015 PROJECTED</b>		
			<b>V/C</b>	<b>DELAY</b>	<b>LOS</b>	<b>V/C</b>	<b>DELAY</b>	<b>LOS</b>	<b>V/C</b>	<b>DELAY</b>	<b>LOS</b>
Chapman Hwy & Simpson Rd	STOP	AM	0.18	19.2	C	0.27	24.9	C	0.43	33.2	D
	NB	PM	0.39	83.4	F	0.81	230.5	F	1.50	507.8	F
Chapman Hwy & Highland View Rd	STOP	AM	0.33	19.0	C	0.48	26.3	D	0.85	59.7	F
	NB	PM	0.57	59.1	F	1.03	182.6	F	1.88	527.5	F
	<i>SIGNAL</i>	<i>AM</i>	<i>0.64</i>	<i>6.2</i>	<i>A</i>	<i>0.74</i>	<i>7.5</i>	<i>A</i>	<i>0.80</i>	<i>17.9</i>	<i>B</i>
	<i>Mitigation</i>	<i>PM</i>	<i>0.72</i>	<i>6.8</i>	<i>A</i>	<i>0.80</i>	<i>8.2</i>	<i>A</i>	<i>0.88</i>	<i>16.8</i>	<i>B</i>
Highland View Rd & Site Access	STOP	AM	-	-	-	-	-	-	0.14	10.5	B
	SB	PM	-	-	-	-	-	-	0.11	11.1	B

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

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### **Sight Distance**

The project is proposed to access Highland View Road. The road's speed limit is currently posted for 30mph adjacent to the site. Stopping 10-foot from the edge of pavement, measured sight distance for the proposed subdivision street access is approximately 570 feet looking left and right. Sight-distance is limited by a tree to the east and a utility box to the west when sight-distance is measured 15-feet back of the edge of pavement. The required distance is 200 feet to meet the minimum stopping sight-distance for American Association of State Highway and Transportation Officials (AASHTO) and 300 feet to meet the Knox County minimum corner sight-distance standard. The proposed site access, therefore, meets both criteria to be acceptable for safe operations.



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## RECOMMENDATIONS

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The analyses conducted and the review of the traffic volumes identified the following recommendations:

- Chapman Highway at Highland View should be improved with signalization as identified in the recommendations of **Knox County's Intersection Evaluation Part 1** study.
- Minimize landscaping, using low growing vegetation, and signing at the proposed street accesses to insure that safe sight distance is maintained.
- Use a minimum intersection radius of 30-foot for the efficient and safe ingress and egress of the site.
- Post the proposed streets with a STOP sign (R1-1) at Highland View Road.
- Provide for a future connection to the adjacent property for a secondary access when that property develops.
- Intersection 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 Knox County Department of Engineering and Public Works.

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## CONCLUSION

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The study of this proposed residential development evaluated the projected traffic conditions. Background traffic was determined using a 2.5-percent annual compounded growth rate until the year 2015. Traffic associated with the proposed project was then generated and distributed to the proposed site access. Using the identified turning movements for the projected traffic conditions, unsignalized and signalized capacity and level of service analyses were conducted using the **2000 Highway Capacity Manual**. Unsignalized levels of service were found to be unacceptable for the existing traffic conditions and would further deteriorate for background with and without the proposed development for the intersection of Chapman Highway at Simpson Road and Highland View Road. This LOS may be acceptable with Chapman Highway signalization per **Knox County's Intersection Evaluation, Part 1**. The sight distance for the driveway will be adequate based on field measurements for a posted speed limit of 30-mph. With the recommendations of this report, the efficient and safe flow of traffic should be maintained.

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## APPENDIX

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Trip Generation

Signal Warrants

HCS Unsignalized Analyses

HCS Signalized Analyses

Average Daily Traffic History

Traffic Counts



MUTCD 2000-Signal Warrant Analysis

INTERSECTION:	<b>Chapman Hwy (US 441) &amp; Highland View Road ( YR 2008)</b>
JOB NUMBER:	<b>103067</b>
DATE:	10/09/2008

85TH PERCENTILE SPEED:	45	PEDESTRIANS GAPS/HOUR :	28
POPULATION:	350,000	SCHOOL CROSSING, 20 Xing (YES/NO):	NO
NUMBER OF APPROACHES:	3	NEAREST SIGNALIZED INTERSECTION:	0
LANES ON MAIN STREET:	2	IMPROVE PROGRESSION (YES/NO):	NO
LANES ON MINOR STREET:	2	MAJOR ROUTES (YES/NO):	NO
		WARRANTS IN 5 YRS (YES/NO):	NO
		ALTERNATIVES TO A SIGNAL EXPLORED:	YES
		NUMBER OF ACCIDENTS:	0
		PEAK HOUR DELAY (VEH-HR):	0

HOUR	MAIN STREET			MINOR STREET									
	MAIN STREET VOLUME	PERCENT OF WARRANT 1A	PERCENT OF WARRANT 1B	MINOR STREET VOLUME	MINIMUM VOLUME WARRANT 1A		INTERRUPTION WARRANT 1B		COMBINATION WARRANT A&B	4-HOUR WARRANT 2		PEAK PEAK HOUR WARRANT 3B	
		420	630		140	70	70	70		WARRANT 2	WARRANT 3B		
24-1	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
1-2	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
2-3	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
3-4	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
4-5	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
5-6	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
6-7	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
7-8	2,286	544%	363%	102	73%	NO	146%	YES	NO	128%	YES	102%	YES
8-9	1,679	400%	267%	54	39%	NO	77%	NO	NO	68%	NO	54%	NO
9-10	1,374	327%	218%	52	37%	NO	74%	NO	NO	65%	NO	52%	NO
10-11	1,414	337%	224%	50	36%	NO	71%	NO	NO	63%	NO	50%	NO
11-12	1,551	369%	246%	48	34%	NO	69%	NO	NO	60%	NO	48%	NO
12-13	1,665	396%	264%	45	32%	NO	64%	NO	NO	56%	NO	45%	NO
13-14	1,715	408%	272%	50	36%	NO	71%	NO	NO	63%	NO	50%	NO
14-15	1,768	421%	281%	57	41%	NO	81%	NO	NO	71%	NO	57%	NO
15-16	2,151	512%	341%	63	45%	NO	90%	YES/NO	NO	79%	NO	63%	NO
16-17	2,540	605%	403%	61	44%	NO	87%	NO	NO	76%	NO	61%	NO
17-18	2,842	677%	451%	77	55%	NO	110%	YES	NO	96%	YES/NO	77%	NO
18-19	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
19-20	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
20-21	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
21-22	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
22-23	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
23-24	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO

WARRANT	WARRANT DESCRIPTION	WARRANT OBTAINED?	HOURS	>=90% HOURS	PRIORITY POINTS
1	A	MINIMUM VOLUME:	NO	0	0
	B	INTERRUPTION:	NO	2	18
	A & B	COMBINATION:	NO	0	N/A
2		FOUR-HOUR:	NO	1	14
3	A	PEAK HOUR DELAY:	NO	N/A	0
	B	PEAK HOUR VOLUME:	YES	1	0
4	(No data collected)	MINIMUM PED. VOLUMES:	N/A	N/A	N/A
5		SCHOOL CROSSING:	NO	N/A	0
6		CORD. SIGNAL SYSTEM:	NO	N/A	0
7		ACCIDENT EXPERIENCE:	NO	5	0
8		ROADWAY NETWORK:	NO	11	0
<b>PRIORITY VALUE</b>					<b>80</b>

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MUTCD 2000-Signal Warrant Analysis

INTERSECTION: **Chapman Hwy (US 441) & Highland View Road ( YR 2015)**  
 JOB NUMBER: **103067**  
 DATE: **10/09/2008**

85TH PERCENTILE SPEED: 45	PEDESTRIANS GAPS/HOUR : 28
POPULATION: 350,000	SCHOOL CROSSING, 20 Xing (YES/NO): NO
NUMBER OF APPROACHES: 3	NEAREST SIGNALIZED INTERSECTION: 0
LANES ON MAIN STREET: 2	IMPROVE PROGRESSION (YES/NO): NO
LANES ON MINOR STREET: 2	MAJOR ROUTES (YES/NO): NO
	WARRANTS IN 5 YRS (YES/NO): NO
	ALTERNATIVES TO A SIGNAL EXPLORED: YES
	NUMBER OF ACCIDENTS: 0
	PEAK HOUR DELAY (VEH-HR): 0

HOUR	MAIN STREET			MINOR STREET									
	MAIN STREET VOLUME	PERCENT OF WARRANT 1A	PERCENT OF WARRANT 1B	MINOR STREET VOLUME	MINIMUM VOLUME WARRANT 1A	INTERRUPTION WARRANT 1B	COMBINATION WARRANT A&B	4-HOUR WARRANT 2	PEAK PEAK HOUR WARRANT 3B				
		420	630		140	70							
24-1	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
1-2	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
2-3	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
3-4	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
4-5	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
5-6	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
6-7	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
7-8	2,718	647%	431%	121	87%	NO	173%	YES	YES	152%	YES	121%	YES
8-9	1,996	475%	317%	64	46%	NO	92%	YES/NO	NO	80%	NO	64%	NO
9-10	1,634	389%	259%	62	44%	NO	88%	NO	NO	77%	NO	62%	NO
10-11	1,681	400%	267%	59	42%	NO	85%	NO	NO	74%	NO	59%	NO
11-12	1,844	439%	293%	57	41%	NO	82%	NO	NO	71%	NO	57%	NO
12-13	1,980	471%	314%	54	38%	NO	76%	NO	NO	67%	NO	54%	NO
13-14	2,039	486%	324%	59	42%	NO	85%	NO	NO	74%	NO	59%	NO
14-15	2,102	501%	334%	68	48%	NO	97%	YES/NO	NO	85%	NO	68%	NO
15-16	2,558	609%	406%	75	54%	NO	107%	YES	NO	94%	YES/NO	75%	NO
16-17	3,020	719%	479%	73	52%	NO	104%	YES	NO	91%	YES/NO	73%	NO
17-18	3,379	805%	536%	92	65%	NO	131%	YES	NO	114%	YES	92%	YES/NO
18-19	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
19-20	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
20-21	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
21-22	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
22-23	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
23-24	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO

WARRANT	WARRANT DESCRIPTION	WARRANT OBTAINED?	HOURS	>=90% HOURS	PRIORITY POINTS
B	INTERUPTION:	NO	4	2	36
A & B	COMBINATION:	NO	1	N/A	8
2	FOUR-HOUR:	NO	2	2	28
3 A	PEAK HOUR DELAY:	NO	N/A	N/A	0
B	PEAK HOUR VOLUME:	YES	1	1	48
4	(No data collected) MINIMUM PED. VOLUMES:	N/A	N/A	N/A	N/A
5	SCHOOL CROSSING:	NO	N/A	N/A	0
6	CORD. SIGNAL SYSTEM:	NO	N/A	N/A	0
7	ACCIDENT EXPERIENCE:	NO	10	N/A	0
8	ROADWAY NETWORK:	NO	11	N/A	0
<b>PRIORITY VALUE</b>					<b>120</b>

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MUTCD 2000-Signal Warrant Analysis

INTERSECTION: **Chapman Hwy (US 441) & Highland View Road ( YR 2015 w Dev.)**  
 JOB NUMBER: **103067**  
 DATE: **10/09/2008**

85TH PERCENTILE SPEED: 45	PEDESTRIANS GAPS/HOUR : 28
POPULATION: 350,000	SCHOOL CROSSING, 20 Xing (YES/NO): NO
NUMBER OF APPROACHES: 3	NEAREST SIGNALIZED INTERSECTION: 0
LANES ON MAIN STREET: 2	IMPROVE PROGRESSION (YES/NO): NO
LANES ON MINOR STREET: 2	MAJOR ROUTES (YES/NO): NO
	WARRANTS IN 5 YRS (YES/NO): NO
	ALTERNATIVES TO A SIGNAL EXPLORED: YES
	NUMBER OF ACCIDENTS: 0
	PEAK HOUR DELAY (VEH-HR): 0

HOUR	MAIN STREET			MINOR STREET									
	MAIN STREET VOLUME	PERCENT OF WARRANT 1A	PERCENT OF WARRANT 1B	MINOR STREET VOLUME	MINIMUM VOLUME WARRANT 1A	INTERRUPTION WARRANT 1B	COMBINATION WARRANT A&B	4-HOUR WARRANT 2	PEAK PEAK HOUR WARRANT 3B				
		420	630		140	70							
24-1	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
1-2	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
2-3	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
3-4	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
4-5	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
5-6	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
6-7	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
7-8	2,738	652%	435%	197	141%	YES	281%	YES	YES	246%	YES	197%	YES
8-9	2,014	480%	320%	118	85%	NO	169%	YES	YES	148%	YES	118%	YES
9-10	1,653	394%	262%	97	69%	NO	139%	YES	NO	121%	YES	97%	YES/NO
10-11	1,701	405%	270%	87	62%	NO	124%	YES	NO	109%	YES	87%	NO
11-12	1,870	445%	297%	84	60%	NO	121%	YES	NO	106%	YES	84%	NO
12-13	2,009	478%	319%	83	59%	NO	118%	YES	NO	104%	YES	83%	NO
13-14	2,068	492%	328%	89	63%	NO	127%	YES	NO	111%	YES	89%	NO
14-15	2,130	507%	338%	97	69%	NO	139%	YES	NO	121%	YES	97%	YES/NO
15-16	2,593	617%	412%	104	74%	NO	149%	YES	NO	130%	YES	104%	YES
16-17	3,067	730%	487%	104	74%	NO	148%	YES	NO	130%	YES	104%	YES
17-18	3,453	822%	548%	134	96%	YES/NO	191%	YES	YES	167%	YES	134%	YES
18-19	66	16%	10%	52	37%	NO	75%	NO	NO	13%	NO	10%	NO
19-20	57	14%	9%	42	30%	NO	61%	NO	NO	10%	NO	8%	NO
20-21	51	12%	8%	31	22%	NO	45%	NO	NO	8%	NO	6%	NO
21-22	43	10%	7%	25	18%	NO	36%	NO	NO	6%	NO	5%	NO
22-23	35	8%	6%	20	14%	NO	28%	NO	NO	5%	NO	3%	NO
23-24	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO

WARRANT	WARRANT DESCRIPTION	WARRANT OBTAINED?	HOURS	>=90% HOURS	PRIORITY POINTS
B	INTERRUPTION:	YES	11	0	99
A & B	COMBINATION:	NO	3	N/A	24
2	FOUR-HOUR:	YES	11	0	154
3 A	PEAK HOUR DELAY:	NO	N/A	N/A	0
B	PEAK HOUR VOLUME:	YES	5	2	240
4	(No data collected) MINIMUM PED. VOLUMES:	N/A	N/A	N/A	N/A
5	SCHOOL CROSSING:	NO	N/A	N/A	0
6	CORD. SIGNAL SYSTEM:	NO	N/A	N/A	0
7	ACCIDENT EXPERIENCE:	NO	11	N/A	0
8	ROADWAY NETWORK:	NO	11	N/A	0
<b>PRIORITY VALUE</b>					<b>527</b>

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MUTCD 2000-Signal Warrant Analysis

INTERSECTION: **Chapman Hwy (US 441) & Highland View Road ( YR 2008 w Dev.)**  
 JOB NUMBER: **103067**  
 DATE: **10/09/2008**

85TH PERCENTILE SPEED: 45  
 POPULATION: 350,000

NUMBER OF APPROACHES: 3  
 LANES ON MAIN STREET: 2  
 LANES ON MINOR STREET: 2

PEDESTRIANS GAPS/HOUR : 28  
 SCHOOL CROSSING, 20 Xing (YES/NO): NO  
 NEAREST SIGNALIZED INTERSECTION: 0  
 IMPROVE PROGRESSION (YES/NO): NO

MAJOR ROUTES (YES/NO): NO  
 WARRANTS IN 5 YRS (YES/NO): NO

ALTERNATIVES TO A SIGNAL EXPLORED: YES  
 NUMBER OF ACCIDENTS: 0  
 PEAK HOUR DELAY (VEH-HR): 0

HOUR	MAIN STREET			MINOR STREET									
	MAIN STREET VOLUME	PERCENT OF WARRANT 1A	PERCENT OF WARRANT 1B	MINOR STREET VOLUME	MINIMUM VOLUME WARRANT 1A		INTERRUPTION WARRANT 1B		COMBINATION WARRANT A&B	4-HOUR WARRANT 2		PEAK PEAK HOUR WARRANT 3B	
		420	630		140	70							
24-1	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
1-2	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
2-3	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
3-4	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
4-5	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
5-6	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
6-7	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO
7-8	2,306	549%	366%	178	127%	YES	254%	YES	YES	222%	YES	178%	YES
8-9	1,697	404%	269%	108	77%	NO	155%	YES	NO	135%	YES	108%	YES
9-10	1,394	332%	221%	87	62%	NO	125%	YES	NO	109%	YES	87%	NO
10-11	1,434	341%	228%	77	55%	NO	111%	YES	NO	97%	YES/NO	77%	NO
11-12	1,576	375%	250%	75	54%	NO	108%	YES	NO	94%	YES/NO	75%	NO
12-13	1,694	403%	269%	74	53%	NO	106%	YES	NO	93%	YES/NO	74%	NO
13-14	1,744	415%	277%	79	57%	NO	113%	YES	NO	99%	YES/NO	79%	NO
14-15	1,795	427%	285%	86	62%	NO	123%	YES	NO	108%	YES	86%	NO
15-16	2,186	521%	347%	92	66%	NO	132%	YES	NO	115%	YES	92%	YES/NO
16-17	2,587	616%	411%	92	66%	NO	132%	YES	NO	115%	YES	92%	YES/NO
17-18	2,916	694%	463%	119	85%	NO	171%	YES	YES	149%	YES	119%	YES
18-19	66	16%	10%	52	37%	NO	75%	NO	NO	13%	NO	10%	NO
19-20	57	14%	9%	42	30%	NO	61%	NO	NO	10%	NO	8%	NO
20-21	51	12%	8%	31	22%	NO	45%	NO	NO	8%	NO	6%	NO
21-22	43	10%	7%	25	18%	NO	36%	NO	NO	6%	NO	5%	NO
22-23	35	8%	6%	20	14%	NO	28%	NO	NO	5%	NO	3%	NO
23-24	0	0%	0%	0	0%	NO	0%	NO	NO	0%	NO	0%	NO

WARRANT	WARRANT DESCRIPTION	WARRANT OBTAINED?	HOURS	>=90% HOURS	PRIORITY POINTS	
S U M M A R Y	1 A	MINIMUM VOLUME:	NO	1	0	10
	B	INTERRUPTION:	YES	11	0	99
	A & B	COMBINATION:	NO	2	N/A	16
	2	FOUR-HOUR:	YES	7	4	98
	3 A	PEAK HOUR DELAY:	NO	N/A	N/A	0
	B	PEAK HOUR VOLUME:	YES	3	2	144
	4 (No data collected)	MINIMUM PED. VOLUMES:	N/A	N/A	N/A	N/A
	5	SCHOOL CROSSING:	NO	N/A	N/A	0
	6	CORD. SIGNAL SYSTEM:	NO	N/A	N/A	0
	7	ACCIDENT EXPERIENCE:	NO	11	N/A	0
	8	ROADWAY NETWORK:	NO	11	N/A	0
<b>PRIORITY VALUE</b>					<b>367</b>	

# HCM Unsignalized Intersection Capacity Analysis

## 3: Chapman Hwy & Simpson Rd

2008 AM  
Existing



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	
Volume (veh/h)	647	10	0	1884	26	13
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.90	0.90	0.70	0.70
Hourly flow rate (vph)	752	12	0	2093	37	19
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)						
pX, platoon unblocked						
vC, conflicting volume			764	1805	382	
vC1, stage 1 conf vol				758		
vC2, stage 2 conf vol				1047		
vCu, unblocked vol			764	1805	382	
tC, single (s)			4.1	6.8	6.9	
tC, 2 stage (s)				5.8		
tF (s)			2.2	3.5	3.3	
p0 queue free %			100	85	97	
cM capacity (veh/h)			845	247	616	

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	502	262	698	1396	56
Volume Left	0	0	0	0	37
Volume Right	0	12	0	0	19
cSH	1700	1700	845	1700	308
Volume to Capacity	0.30	0.15	0.00	0.82	0.18
Queue Length 95th (ft)	0	0	0	0	16
Control Delay (s)	0.0	0.0	0.0	0.0	19.2
Lane LOS					C
Approach Delay (s)	0.0		0.0		19.2
Approach LOS					C

Intersection Summary					
Average Delay			0.4		
Intersection Capacity Utilization			62.1%	ICU Level of Service	B
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis  
6: Chapman Hwy & Highland View Rd

2008 AM  
Existing



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↘	
Volume (veh/h)	582	14	26	1664	48	54
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.97	0.97	0.80	0.80
Hourly flow rate (vph)	756	18	27	1715	60	68
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage (veh)	2		2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			774		1676	387
vC1, stage 1 conf vol					765	
vC2, stage 2 conf vol					911	
vCu, unblocked vol			774		1676	387
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			97		78	89
cM capacity (veh/h)			837		270	611

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	504	270	27	858	858	128
Volume Left	0	0	27	0	0	60
Volume Right	0	18	0	0	0	68
cSH	1700	1700	837	1700	1700	384
Volume to Capacity	0.30	0.16	0.03	0.50	0.50	0.33
Queue Length 95th (ft)	0	0	2	0	0	36
Control Delay (s)	0.0	0.0	9.4	0.0	0.0	19.0
Lane LOS	A			C		
Approach Delay (s)	0.0		0.1			19.0
Approach LOS				C		

Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			58.6%	ICU Level of Service	B	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 3: Chapman Hwy & Simpson Rd

2008 PM  
Existing



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	
Volume (veh/h)	1963	20	0	869	15	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.90	0.90	0.70	0.70
Hourly flow rate (vph)	2283	23	0	966	21	7
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)						
pX, platoon unblocked						
vC, conflicting volume			2306		2777	1153
vC1, stage 1 conf vol					2294	
vC2, stage 2 conf vol					483	
vCu, unblocked vol			2306		2777	1153
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		64	96
cM capacity (veh/h)			214		60	191

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	1522	784	322	644	29
Volume Left	0	0	0	0	21
Volume Right	0	23	0	0	7
cSH	1700	1700	214	1700	73
Volume to Capacity	0.90	0.46	0.00	0.38	0.39
Queue Length 95th (ft)	0	0	0	0	38
Control Delay (s)	0.0	0.0	0.0	0.0	83.4
Lane LOS					F
Approach Delay (s)	0.0		0.0		83.4
Approach LOS					F

Intersection Summary					
Average Delay			0.7		
Intersection Capacity Utilization			64.9%	ICU Level of Service	C
Analysis Period (min)	15				

# HCM Unsignalized Intersection Capacity Analysis

## 6: Chapman Hwy & Highland View Rd

2008 PM  
Existing



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Volume (veh/h)	1798	49	59	934	31	44
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.89	0.89	0.92	0.92
Hourly flow rate (vph)	1933	53	66	1049	34	48
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage veh	2		2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1986		2617	993
vC1, stage 1 conf vol					1960	
vC2, stage 2 conf vol					657	
vCu, unblocked vol			1986		2617	993
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			77		63	80
cM capacity (veh/h)			287		90	244
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	1289	697	66	525	525	82
Volume Left	0	0	66	0	0	34
Volume Right	0	53	0	0	0	48
cSH	1700	1700	287	1700	1700	143
Volume to Capacity	0.76	0.41	0.23	0.31	0.31	0.57
Queue Length 95th (ft)	0	0	22	0	0	72
Control Delay (s)	0.0	0.0	21.3	0.0	0.0	59.1
Lane LOS	C			F		
Approach Delay (s)	0.0		1.3			59.1
Approach LOS				F		
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			62.3%	ICU Level of Service	B	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 3: Chapman Hwy & Simpson Rd

2015 AM  
Background



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	
Volume (veh/h)	769	12	0	2239	31	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.90	0.90	0.70	0.70
Hourly flow rate (vph)	894	14	0	2488	44	21
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)						
pX, platoon unblocked						
vC, conflicting volume			908		2145	454
vC1, stage 1 conf vol					901	
vC2, stage 2 conf vol					1244	
vCu, unblocked vol			908		2145	454
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		77	96
cM capacity (veh/h)			745		194	553

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	596	312	829	1659	66
Volume Left	0	0	0	0	44
Volume Right	0	14	0	0	21
cSH	1700	1700	745	1700	246
Volume to Capacity	0.35	0.18	0.00	0.98	0.27
Queue Length 95th (ft)	0	0	0	0	26
Control Delay (s)	0.0	0.0	0.0	0.0	24.9
Lane LOS					C
Approach Delay (s)	0.0		0.0		24.9
Approach LOS					C

Intersection Summary					
Average Delay			0.5		
Intersection Capacity Utilization			71.9%	ICU Level of Service	C
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis  
6: Chapman Hwy & Highland View Rd

2015 AM  
Background



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↘	
Volume (veh/h)	692	17	31	1978	57	64
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.97	0.97	0.80	0.80
Hourly flow rate (vph)	899	22	32	2039	71	80
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage veh	2		2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			921		1993	460
vC1, stage 1 conf vol					910	
vC2, stage 2 conf vol					1084	
vCu, unblocked vol			921		1993	460
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			96		67	85
cM capacity (veh/h)			737		215	548
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	599	322	32	1020	1020	151
Volume Left	0	0	32	0	0	71
Volume Right	0	22	0	0	0	80
cSH	1700	1700	737	1700	1700	317
Volume to Capacity	0.35	0.19	0.04	0.60	0.60	0.48
Queue Length 95th (ft)	0	0	3	0	0	61
Control Delay (s)	0.0	0.0	10.1	0.0	0.0	26.3
Lane LOS			B			D
Approach Delay (s)	0.0		0.2			26.3
Approach LOS						D
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			68.4%	ICU Level of Service	C	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 3: Chapman Hwy & Simpson Rd

2015 PM  
 Background



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Volume (veh/h)	2333	24	0	1033	18	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.90	0.90	0.70	0.70
Hourly flow rate (vph)	2713	28	0	1148	26	9
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)						
pX, platoon unblocked						
vC, conflicting volume			2741		3301	1370
vC1, stage 1 conf vol					2727	
vC2, stage 2 conf vol					574	
vCu, unblocked vol			2741		3301	1370
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		25	94
cM capacity (veh/h)			144		34	136

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	1809	932	383	765	34
Volume Left	0	0	0	0	26
Volume Right	0	28	0	0	9
cSH	1700	1700	144	1700	42
Volume to Capacity	1.06	0.55	0.00	0.45	0.81
Queue Length 95th (ft)	0	0	0	0	78
Control Delay (s)	0.0	0.0	0.0	0.0	230.5
Lane LOS	F				
Approach Delay (s)	0.0		0.0		230.5
Approach LOS	F				

Intersection Summary					
Average Delay			2.0		
Intersection Capacity Utilization			75.3%	ICU Level of Service	D
Analysis Period (min)			15		



HCM Unsignalized Intersection Capacity Analysis  
6: Chapman Hwy & Highland View Rd

2015 PM  
Background



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Volume (veh/h)	2137	58	70	1110	37	52
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.89	0.89	0.92	0.92
Hourly flow rate (vph)	2298	62	79	1247	40	57
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage veh	2		2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			2360		3110	1180
vC1, stage 1 conf vol					2329	
vC2, stage 2 conf vol					781	
vCu, unblocked vol			2360		3110	1180
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			61		28	69
cM capacity (veh/h)			204		56	183

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	1532	828	79	624	624	97
Volume Left	0	0	79	0	0	40
Volume Right	0	62	0	0	0	57
cSH	1700	1700	204	1700	1700	94
Volume to Capacity	0.90	0.49	0.39	0.37	0.37	1.03
Queue Length 95th (ft)	0	0	42	0	0	155
Control Delay (s)	0.0	0.0	33.3	0.0	0.0	182.6
Lane LOS	D			F		
Approach Delay (s)	0.0		2.0			182.6
Approach LOS				F		

Intersection Summary						
Average Delay			5.4			
Intersection Capacity Utilization			72.8%	ICU Level of Service	C	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 3: Chapman Hwy & Simpson Rd

2015 AM  
Buildout



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	
Volume (veh/h)	786	18	0	2289	51	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.90	0.90	0.70	0.70
Hourly flow rate (vph)	914	21	0	2543	73	21
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)						
pX, platoon unblocked						
vC, conflicting volume			935		2196	467
vC1, stage 1 conf vol					924	
vC2, stage 2 conf vol					1272	
vCu, unblocked vol			935		2196	467
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		61	96
cM capacity (veh/h)			728		187	542

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	609	326	848	1696	94
Volume Left	0	0	0	0	73
Volume Right	0	21	0	0	21
cSH	1700	1700	728	1700	220
Volume to Capacity	0.36	0.19	0.00	1.00	0.43
Queue Length 95th (ft)	0	0	0	0	50
Control Delay (s)	0.0	0.0	0.0	0.0	33.2
Lane LOS					D
Approach Delay (s)	0.0		0.0		33.2
Approach LOS					D

Intersection Summary					
Average Delay			0.9		
Intersection Capacity Utilization			73.7%	ICU Level of Service	D
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis  
6: Chapman Hwy & Highland View Rd

2015 AM  
Buildout



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Volume (veh/h)	692	33	39	1978	107	89
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.77	0.77	0.97	0.97	0.80	0.80
Hourly flow rate (vph)	899	43	40	2039	134	111
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage veh	2		2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			942		2020	471
vC1, stage 1 conf vol					920	
vC2, stage 2 conf vol					1100	
vCu, unblocked vol			942		2020	471
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			94		36	79
cM capacity (veh/h)			724		209	539

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	599	342	40	1020	1020	245
Volume Left	0	0	40	0	0	134
Volume Right	0	43	0	0	0	111
cSH	1700	1700	724	1700	1700	290
Volume to Capacity	0.35	0.20	0.06	0.60	0.60	0.85
Queue Length 95th (ft)	0	0	4	0	0	180
Control Delay (s)	0.0	0.0	10.3	0.0	0.0	59.7
Lane LOS	B			F		
Approach Delay (s)	0.0		0.2			59.7
Approach LOS				F		

Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization			72.7%	ICU Level of Service	C	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 10: Highland View Rd & Site Access

2015 AM  
 Buildout



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Volume (veh/h)	2	155	42	31	94	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	168	46	34	102	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	79				235	62
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	79				235	62
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				86	99
cM capacity (veh/h)	1519				752	1002

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	171	79	108
Volume Left	2	0	102
Volume Right	0	34	5
cSH	1519	1700	761
Volume to Capacity	0.00	0.05	0.14
Queue Length 95th (ft)	0	0	12
Control Delay (s)	0.1	0.0	10.5
Lane LOS	A		B
Approach Delay (s)	0.1	0.0	10.5
Approach LOS			B

Intersection Summary			
Average Delay		3.2	
Intersection Capacity Utilization		21.9%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis  
3: Chapman Hwy & Simpson Rd

2015 PM  
Buildout



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Volume (veh/h)	2390	46	0	1065	31	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.90	0.90	0.70	0.70
Hourly flow rate (vph)	2779	53	0	1183	44	9
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)						
pX, platoon unblocked						
vC, conflicting volume			2833		3397	1416
vC1, stage 1 conf vol					2806	
vC2, stage 2 conf vol					592	
vCu, unblocked vol			2833		3397	1416
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		0	93
cM capacity (veh/h)			132		31	127

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	1853	980	394	789	53
Volume Left	0	0	0	0	44
Volume Right	0	53	0	0	9
cSH	1700	1700	132	1700	35
Volume to Capacity	1.09	0.58	0.00	0.46	1.50
Queue Length 95th (ft)	0	0	0	0	142
Control Delay (s)	0.0	0.0	0.0	0.0	507.8
Lane LOS					F
Approach Delay (s)	0.0		0.0		507.8
Approach LOS					F

Intersection Summary					
Average Delay			6.6		
Intersection Capacity Utilization			77.5%	ICU Level of Service	D
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis  
6: Chapman Hwy & Highland View Rd

2015 PM  
Buildout



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↘	
Volume (veh/h)	2137	115	99	1110	69	68
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.89	0.89	0.92	0.92
Hourly flow rate (vph)	2298	124	111	1247	75	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage veh	2		2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			2422		3206	1211
vC1, stage 1 conf vol					2360	
vC2, stage 2 conf vol					846	
vCu, unblocked vol			2422		3206	1211
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			42		0	58
cM capacity (veh/h)			193		51	174
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	1532	890	111	624	624	149
Volume Left	0	0	111	0	0	75
Volume Right	0	124	0	0	0	74
cSH	1700	1700	193	1700	1700	79
Volume to Capacity	0.90	0.52	0.58	0.37	0.37	1.88
Queue Length 95th (ft)	0	0	78	0	0	325
Control Delay (s)	0.0	0.0	46.4	0.0	0.0	527.5
Lane LOS	E			F		
Approach Delay (s)	0.0		3.8		527.5	
Approach LOS				F		
Intersection Summary						
Average Delay			21.3			
Intersection Capacity Utilization			86.2%		ICU Level of Service E	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 10: Highland View Rd & Site Access

2015 PM  
 Buildout



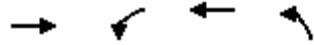
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Volume (veh/h)	6	77	166	108	61	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	84	180	117	66	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	298				336	239
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	298				336	239
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				90	100
cM capacity (veh/h)	1263				656	800

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	90	298	70
Volume Left	7	0	66
Volume Right	0	117	3
cSH	1263	1700	662
Volume to Capacity	0.01	0.18	0.11
Queue Length 95th (ft)	0	0	9
Control Delay (s)	0.6	0.0	11.1
Lane LOS	A		B
Approach Delay (s)	0.6	0.0	11.1
Approach LOS			B

Intersection Summary			
Average Delay		1.8	
Intersection Capacity Utilization		25.6%	ICU Level of Service A
Analysis Period (min)		15	

Queues  
6: Chapman Hwy & Highland View Rd

2015 AM MIT  
Buildout (Signalized HighVwRd)



Lane Group	EBT	WBL	WBT	NBL
Lane Group Flow (vph)	942	40	2039	245
v/c Ratio	0.45	0.14	0.96	0.49
Control Delay	7.3	6.7	25.4	17.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	7.3	6.7	25.4	17.0
Queue Length 50th (ft)	83	6	317	52
Queue Length 95th (ft)	93	18	#528	92
Internal Link Dist (ft)	1847		774	2621
Turn Bay Length (ft)		100		
Base Capacity (vph)	2114	290	2123	504
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	0.45	0.14	0.96	0.49

Intersection Summary

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



# HCM Signalized Intersection Capacity Analysis

## 6: Chapman Hwy & Highland View Rd

2015 AM MIT  
Buildout (Signalized HighVwRd)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Volume (vph)	692	33	39	1978	107	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frt	0.99		1.00	1.00	0.94	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3515		1770	3539	1702	
Flt Permitted	1.00		0.26	1.00	0.97	
Satd. Flow (perm)	3515		485	3539	1702	
Peak-hour factor, PHF	0.77	0.77	0.97	0.97	0.80	0.80
Adj. Flow (vph)	899	43	40	2039	134	111
RTOR Reduction (vph)	6	0	0	0	50	0
Lane Group Flow (vph)	936	0	40	2039	195	0
Turn Type			Perm			
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	36.0		36.0	36.0	16.0	
Effective Green, g (s)	36.0		36.0	36.0	16.0	
Actuated g/C Ratio	0.60		0.60	0.60	0.27	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	2109		291	2123	454	
v/s Ratio Prot	0.27			c0.58	c0.11	
v/s Ratio Perm			0.08			
v/c Ratio	0.44		0.14	0.96	0.43	
Uniform Delay, d1	6.5		5.2	11.3	18.2	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1		0.2	11.6	3.0	
Delay (s)	6.7		5.4	23.0	21.2	
Level of Service	A		A	C	C	
Approach Delay (s)	6.7			22.6	21.2	
Approach LOS	A			C	C	

### Intersection Summary

HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues  
6: Chapman Hwy & Highland View Rd

2015 PM MIT  
Background (Signalized HighVwRd)



Lane Group	EBT	WBL	WBT	NBL
Lane Group Flow (vph)	2360	79	1247	97
v/c Ratio	0.85	0.86	0.45	0.47
Control Delay	10.5	80.1	3.7	37.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.5	80.1	3.7	37.2
Queue Length 50th (ft)	297	19	80	41
Queue Length 95th (ft)	555	#79	140	87
Internal Link Dist (ft)	1847		774	2621
Turn Bay Length (ft)		100		
Base Capacity (vph)	2911	97	2921	349
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	0.81	0.81	0.43	0.28

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis  
6: Chapman Hwy & Highland View Rd

2015 PM MIT  
Background (Signalized HighVwRd)



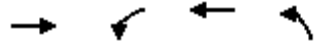
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Volume (vph)	2137	58	70	1110	37	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frt	1.00		1.00	1.00	0.92	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	3525		1770	3539	1680	
Flt Permitted	1.00		0.06	1.00	0.98	
Satd. Flow (perm)	3525		118	3539	1680	
Peak-hour factor, PHF	0.93	0.93	0.89	0.89	0.92	0.92
Adj. Flow (vph)	2298	62	79	1247	40	57
RTOR Reduction (vph)	2	0	0	0	13	0
Lane Group Flow (vph)	2358	0	79	1247	84	0
Turn Type			Perm			
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	63.3		63.3	63.3	9.3	
Effective Green, g (s)	63.3		63.3	63.3	9.3	
Actuated g/C Ratio	0.79		0.79	0.79	0.12	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	2768		93	2779	194	
v/s Ratio Prot	0.67			0.35	c0.05	
v/s Ratio Perm			c0.67			
v/c Ratio	0.85		0.85	0.45	0.43	
Uniform Delay, d1	5.6		5.6	2.9	33.2	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	2.7		47.7	0.1	1.5	
Delay (s)	8.3		53.3	3.0	34.7	
Level of Service	A		D	A	C	
Approach Delay (s)	8.3			6.0	34.7	
Approach LOS	A			A	C	

Intersection Summary

HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	80.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues  
6: Chapman Hwy & Highland View Rd

2015 AM MIT  
Buildout (Signalized HighVwRd)



Lane Group	EBT	WBL	WBT	NBL
Lane Group Flow (vph)	942	40	2039	245
v/c Ratio	0.45	0.14	0.96	0.49
Control Delay	7.3	6.7	25.4	17.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	7.3	6.7	25.4	17.0
Queue Length 50th (ft)	83	6	317	52
Queue Length 95th (ft)	93	18	#528	92
Internal Link Dist (ft)	1847		774	2621
Turn Bay Length (ft)		100		
Base Capacity (vph)	2114	290	2123	504
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	0.45	0.14	0.96	0.49

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis  
6: Chapman Hwy & Highland View Rd

2015 AM MIT  
Buildout (Signalized HighVwRd)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↘	
Volume (vph)	692	33	39	1978	107	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frt	0.99		1.00	1.00	0.94	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3515		1770	3539	1702	
Flt Permitted	1.00		0.26	1.00	0.97	
Satd. Flow (perm)	3515		485	3539	1702	
Peak-hour factor, PHF	0.77	0.77	0.97	0.97	0.80	0.80
Adj. Flow (vph)	899	43	40	2039	134	111
RTOR Reduction (vph)	6	0	0	0	50	0
Lane Group Flow (vph)	936	0	40	2039	195	0
Turn Type			Perm			
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	36.0		36.0	36.0	16.0	
Effective Green, g (s)	36.0		36.0	36.0	16.0	
Actuated g/C Ratio	0.60		0.60	0.60	0.27	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	2109		291	2123	454	
v/s Ratio Prot	0.27			c0.58	c0.11	
v/s Ratio Perm			0.08			
v/c Ratio	0.44		0.14	0.96	0.43	
Uniform Delay, d1	6.5		5.2	11.3	18.2	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1		0.2	11.6	3.0	
Delay (s)	6.7		5.4	23.0	21.2	
Level of Service	A		A	C	C	
Approach Delay (s)	6.7			22.6	21.2	
Approach LOS	A			C	C	

Intersection Summary			
HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues  
6: Chapman Hwy & Highland View Rd

2015 PM MIT  
Buildout (Signalized HighVwRd)



Lane Group	EBT	WBL	WBT	NBL
Lane Group Flow (vph)	2422	111	1247	149
v/c Ratio	0.97	0.97	0.49	0.52
Control Delay	23.0	96.6	5.4	29.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.0	96.6	5.4	29.8
Queue Length 50th (ft)	357	31	88	51
Queue Length 95th (ft)	#740	#98	162	101
Internal Link Dist (ft)	1847		774	2621
Turn Bay Length (ft)		100		
Base Capacity (vph)	2505	115	2520	426
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	0.97	0.97	0.49	0.35

Intersection Summary

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



HCM Signalized Intersection Capacity Analysis  
6: Chapman Hwy & Highland View Rd

2015 PM MIT  
Buildout (Signalized HighVwRd)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Volume (vph)	2137	115	99	1110	69	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frt	0.99		1.00	1.00	0.93	
Flt Protected	1.00		0.95	1.00	0.98	
Satd. Flow (prot)	3512		1770	3539	1695	
Flt Permitted	1.00		0.09	1.00	0.98	
Satd. Flow (perm)	3512		162	3539	1695	
Peak-hour factor, PHF	0.93	0.93	0.89	0.89	0.92	0.92
Adj. Flow (vph)	2298	124	111	1247	75	74
RTOR Reduction (vph)	5	0	0	0	8	0
Lane Group Flow (vph)	2417	0	111	1247	141	0
Turn Type			Perm			
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	46.1		46.1	46.1	10.6	
Effective Green, g (s)	46.1		46.1	46.1	10.6	
Actuated g/C Ratio	0.71		0.71	0.71	0.16	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	2502		115	2522	278	
v/s Ratio Prot	c0.69			0.35	c0.08	
v/s Ratio Perm			0.69			
v/c Ratio	0.97		0.97	0.49	0.51	
Uniform Delay, d1	8.6		8.6	4.1	24.7	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	11.1		72.3	0.2	1.5	
Delay (s)	19.7		80.9	4.3	26.1	
Level of Service	B		F	A	C	
Approach Delay (s)	19.7			10.5	26.1	
Approach LOS	B			B	C	

Intersection Summary

HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	64.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

## Traffic Stations

Rec	Station Number	County	Location	Year	Annual Average Daily Count	Route Number
1	000104	Knox	SOUTHEAST NEWBERTS	2008	28795	SR071
2	000104	Knox	SOUTHEAST NEWBERTS	2007	28599	SR071
3	000104	Knox	SOUTHEAST NEWBERTS	2006	28668	SR071
4	000104	Knox	SOUTHEAST NEWBERTS	2005	27579	SR071
5	000104	Knox	SOUTHEAST NEWBERTS	2004	25937	SR071
6	000104	Knox	SOUTHEAST NEWBERTS	2003	27265	SR071
7	000104	Knox	SOUTHEAST NEWBERTS	2002	27056	SR071
8	000104	Knox	SOUTHEAST NEWBERTS	2001	26452	SR071
9	000104	Knox	SOUTHEAST NEWBERTS	2000	28132	SR071
10	000104	Knox	SOUTHEAST NEWBERTS	1999	24758	SR071
11	000104	Knox	SOUTHEAST NEWBERTS	1998	25166	SR071
12	000104	Knox	SOUTHEAST NEWBERTS	1997	23134	SR071
13	000104	Knox	SOUTHEAST NEWBERTS	1996	22513	SR071
14	000104	Knox	SOUTHEAST NEWBERTS	1995	23358	SR071
15	000104	Knox	SOUTHEAST NEWBERTS	1994	20715	SR071
16	000104	Knox	SOUTHEAST NEWBERTS	1993	21753	SR071
17	000104	Knox	SOUTHEAST NEWBERTS	1992	22336	SR071
18	000104	Knox	SOUTHEAST NEWBERTS	1991	25886	SR071
19	000104	Knox	SOUTHEAST NEWBERTS	1990	22478	SR071
20	000104	Knox	SOUTHEAST NEWBERTS	1989	18940	SR071
21	000104	Knox	SOUTHEAST NEWBERTS	1988	17404	SR071
22	000104	Knox	SOUTHEAST NEWBERTS	1987	18765	SR071
23	000104	Knox	SOUTHEAST NEWBERTS	1986	17694	SR071
24	000104	Knox	SOUTHEAST NEWBERTS	1985	17157	SR071

# WILBUR SMITH ASSOCIATES

1100 Marion Street  
Suite 200  
Knoxville, TN 37921

*Intersection Turning Movement Count*

File Name : Highland View & Chapman Hwy

Site Code : 00000002

Start Date : 10/8/2008

Page No : 1

Groups Printed- Unshifted

Start Time	Southbound				Westbound				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	0	98	1	99	0	0	0	0	4	432	0	436	10	0	12	22	557
07:15 AM	0	157	4	161	0	0	0	0	4	429	0	433	17	0	15	32	626
07:30 AM	0	190	4	194	0	0	0	0	9	419	0	428	15	0	11	26	648
07:45 AM	0	137	5	142	0	0	0	0	9	384	0	393	6	0	16	22	557
<b>Total</b>	<b>0</b>	<b>582</b>	<b>14</b>	<b>596</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>26</b>	<b>1664</b>	<b>0</b>	<b>1690</b>	<b>48</b>	<b>0</b>	<b>54</b>	<b>102</b>	<b>2388</b>
08:00 AM	0	118	5	123	0	0	1	1	9	372	0	381	6	0	8	14	519
08:15 AM	0	123	2	125	0	0	0	0	10	273	0	283	12	0	6	18	426
08:30 AM	0	133	5	138	0	0	0	0	6	254	0	260	6	0	6	12	410
08:45 AM	0	130	4	134	0	0	0	0	11	224	0	235	2	0	8	10	379
<b>Total</b>	<b>0</b>	<b>504</b>	<b>16</b>	<b>520</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>36</b>	<b>1123</b>	<b>0</b>	<b>1159</b>	<b>26</b>	<b>0</b>	<b>28</b>	<b>54</b>	<b>1734</b>
09:00 AM	0	130	7	137	0	0	0	0	4	160	0	164	8	1	6	15	316
09:15 AM	1	98	5	104	0	0	0	0	13	205	1	219	2	0	6	8	331
09:30 AM	0	145	5	150	0	0	0	0	4	203	0	207	9	0	6	15	372
09:45 AM	0	165	8	173	0	0	0	0	3	217	0	220	7	0	7	14	407
<b>Total</b>	<b>1</b>	<b>538</b>	<b>25</b>	<b>564</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>24</b>	<b>785</b>	<b>1</b>	<b>810</b>	<b>26</b>	<b>1</b>	<b>25</b>	<b>52</b>	<b>1426</b>
11:00 AM	0	164	3	167	0	0	0	0	6	190	0	196	2	0	6	8	371
11:15 AM	1	164	5	170	0	0	0	0	5	221	0	226	8	0	3	11	407
11:30 AM	0	173	3	176	0	0	0	0	1	207	0	208	4	0	9	13	397
11:45 AM	0	184	7	191	0	0	0	0	9	208	0	217	7	0	9	16	424
<b>Total</b>	<b>1</b>	<b>685</b>	<b>18</b>	<b>704</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>21</b>	<b>826</b>	<b>0</b>	<b>847</b>	<b>21</b>	<b>0</b>	<b>27</b>	<b>48</b>	<b>1599</b>
12:00 PM	1	174	9	184	0	0	0	0	9	179	0	188	6	0	10	16	388
12:15 PM	0	204	4	208	0	0	0	0	9	226	0	235	6	0	5	11	454
12:30 PM	0	203	4	207	0	0	0	0	7	193	0	200	5	0	7	12	419
12:45 PM	0	225	11	236	0	0	0	0	8	199	0	207	2	0	4	6	449
<b>Total</b>	<b>1</b>	<b>806</b>	<b>28</b>	<b>835</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>33</b>	<b>797</b>	<b>0</b>	<b>830</b>	<b>19</b>	<b>0</b>	<b>26</b>	<b>45</b>	<b>1710</b>
02:00 PM	0	228	8	236	0	0	0	0	8	212	0	220	7	0	5	12	468
02:15 PM	0	228	7	235	0	0	0	0	5	184	1	190	3	0	7	10	435
02:30 PM	0	214	8	222	0	0	0	0	14	208	0	222	4	0	7	11	455
02:45 PM	0	238	4	242	0	0	0	0	8	193	0	201	16	0	8	24	467
<b>Total</b>	<b>0</b>	<b>908</b>	<b>27</b>	<b>935</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>35</b>	<b>797</b>	<b>1</b>	<b>833</b>	<b>30</b>	<b>0</b>	<b>27</b>	<b>57</b>	<b>1825</b>
03:00 PM	0	264	8	272	0	0	0	0	14	208	0	222	5	0	10	15	509
03:15 PM	0	291	10	301	0	0	0	0	12	223	0	235	5	0	6	11	547
03:30 PM	0	295	8	303	0	0	0	0	12	238	0	250	7	0	8	15	568
03:45 PM	0	337	6	343	0	0	0	0	9	216	0	225	5	0	17	22	590
<b>Total</b>	<b>0</b>	<b>1187</b>	<b>32</b>	<b>1219</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>47</b>	<b>885</b>	<b>0</b>	<b>932</b>	<b>22</b>	<b>0</b>	<b>41</b>	<b>63</b>	<b>2214</b>
04:00 PM	0	394	9	403	0	0	0	0	13	176	0	189	6	0	8	14	606
04:15 PM	0	345	9	354	0	0	0	0	14	247	0	261	4	0	11	15	630
04:30 PM	0	412	11	423	0	0	0	0	11	253	0	264	1	1	13	15	702
04:45 PM	0	383	14	397	0	0	0	0	15	232	2	249	4	0	13	17	663
<b>Total</b>	<b>0</b>	<b>1534</b>	<b>43</b>	<b>1577</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>53</b>	<b>908</b>	<b>2</b>	<b>963</b>	<b>15</b>	<b>1</b>	<b>45</b>	<b>61</b>	<b>2601</b>
05:00 PM	0	440	11	451	0	0	0	0	11	234	2	247	7	0	13	20	718
05:15 PM	0	424	13	437	0	0	0	0	15	224	0	239	10	0	10	20	696
05:30 PM	0	445	17	462	0	0	0	0	15	215	0	230	5	0	11	16	708
05:45 PM	0	489	8	497	0	1	0	1	18	261	0	279	9	2	10	21	798
<b>Total</b>	<b>0</b>	<b>1798</b>	<b>49</b>	<b>1847</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>59</b>	<b>934</b>	<b>2</b>	<b>995</b>	<b>31</b>	<b>2</b>	<b>44</b>	<b>77</b>	<b>2920</b>
<b>Grand Total</b>	<b>3</b>	<b>8542</b>	<b>252</b>	<b>8797</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>334</b>	<b>8719</b>	<b>6</b>	<b>9059</b>	<b>238</b>	<b>4</b>	<b>317</b>	<b>559</b>	<b>18417</b>
Apprch %	0	97.1	2.9		0	50	50		3.7	96.2	0.1		42.6	0.7	56.7		
Total %	0	46.4	1.4	47.8	0	0	0	0	1.8	47.3	0	49.2	1.3	0	1.7	3	

# WILBUR SMITH ASSOCIATES

1100 Marion Street

Suite 200

Knoxville, TN 37921

*Intersection Turning Movement Count*

File Name : Highland View & Chapman Hwy

Site Code : 00000002

Start Date : 10/8/2008

Page No : 2

Start Time	Southbound				Westbound				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 07:00 AM																	
07:00 AM	0	98	1	99	0	0	0	0	4	<b>432</b>	0	<b>436</b>	10	0	12	22	557
07:15 AM	0	157	4	161	0	0	0	0	4	429	0	433	<b>17</b>	0	15	<b>32</b>	626
07:30 AM	0	<b>190</b>	4	<b>194</b>	0	0	0	0	<b>9</b>	419	0	428	15	0	11	26	<b>648</b>
07:45 AM	0	137	<b>5</b>	142	0	0	0	0	9	384	0	393	6	0	<b>16</b>	22	557
Total Volume	0	582	14	596	0	0	0	0	26	1664	0	1690	48	0	54	102	2388
% App. Total	0	97.7	2.3		0	0	0		1.5	98.5	0		47.1	0	52.9		
PHF	.000	.766	.700	.768	.000	.000	.000	.000	.722	.963	.000	.969	.706	.000	.844	.797	.921

Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	<b>1</b>	174	9	184	0	0	0	0	<b>9</b>	179	0	188	<b>6</b>	0	<b>10</b>	<b>16</b>	388
12:15 PM	0	204	4	208	0	0	0	0	9	<b>226</b>	0	<b>235</b>	6	0	5	11	<b>454</b>
12:30 PM	0	203	4	207	0	0	0	0	7	193	0	200	5	0	7	12	419
12:45 PM	0	<b>225</b>	<b>11</b>	<b>236</b>	0	0	0	0	8	199	0	207	2	0	4	6	449
Total Volume	1	806	28	835	0	0	0	0	33	797	0	830	19	0	26	45	1710
% App. Total	0.1	96.5	3.4		0	0	0		4	96	0		42.2	0	57.8		
PHF	.250	.896	.636	.885	.000	.000	.000	.000	.917	.882	.000	.883	.792	.000	.650	.703	.942

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	440	11	451	0	0	0	0	11	234	<b>2</b>	247	7	0	<b>13</b>	20	718
05:15 PM	0	424	13	437	0	0	0	0	15	224	0	239	<b>10</b>	0	10	20	696
05:30 PM	0	445	<b>17</b>	462	0	0	0	0	15	215	0	230	5	0	11	16	708
05:45 PM	0	<b>489</b>	8	<b>497</b>	0	<b>1</b>	0	<b>1</b>	<b>18</b>	<b>261</b>	0	<b>279</b>	9	<b>2</b>	10	<b>21</b>	<b>798</b>
Total Volume	0	1798	49	1847	0	1	0	1	59	934	2	995	31	2	44	77	2920
% App. Total	0	97.3	2.7		0	100	0		5.9	93.9	0.2		40.3	2.6	57.1		
PHF	.000	.919	.721	.929	.000	.250	.000	.250	.819	.895	.250	.892	.775	.250	.846	.917	.915

# WILBUR SMITH ASSOCIATES

1100 Marion Street  
Suite 200  
Knoxville, TN 37921

*Intersection Turning Movement Count*

File Name : Simpson & Chapman Hwy

Site Code : 00000001

Start Date : 10/8/2008

Page No : 1

### Groups Printed- Unshifted

Start Time	Southbound				Westbound				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	0	90	1	91	0	0	0	0	0	336	0	336	7	0	1	8	435
07:15 AM	0	146	0	146	0	0	0	0	0	526	0	526	4	0	4	8	680
07:30 AM	0	189	3	192	0	0	0	0	0	524	0	524	6	0	6	12	728
07:45 AM	0	179	3	182	0	0	0	0	0	418	0	418	12	0	2	14	614
<b>Total</b>	0	604	7	611	0	0	0	0	0	1804	0	1804	29	0	13	42	2457
08:00 AM	0	133	4	137	0	0	0	0	0	416	0	416	4	0	1	5	558
08:15 AM	0	115	1	116	0	0	0	0	0	372	0	372	3	0	1	4	492
08:30 AM	0	141	2	143	0	0	0	0	0	272	0	272	5	0	1	6	421
08:45 AM	0	142	1	143	0	0	0	0	0	259	0	259	0	0	0	0	402
<b>Total</b>	0	531	8	539	0	0	0	0	0	1319	0	1319	12	0	3	15	1873
03:00 PM	0	270	3	273	0	0	0	0	0	196	0	196	0	0	0	0	469
03:15 PM	0	314	2	316	0	0	0	0	0	220	0	220	3	0	4	7	543
03:30 PM	0	327	2	329	0	0	0	0	0	245	0	245	5	0	0	5	579
03:45 PM	0	299	0	299	0	0	0	0	0	216	0	216	1	0	0	1	516
<b>Total</b>	0	1210	7	1217	0	0	0	0	0	877	0	877	9	0	4	13	2107
04:00 PM	0	393	3	396	0	0	0	0	0	190	0	190	1	0	0	1	587
04:15 PM	0	375	2	377	0	0	0	0	0	209	0	209	2	0	1	3	589
04:30 PM	0	456	6	462	0	0	0	0	0	224	0	224	0	0	1	1	687
04:45 PM	0	427	2	429	0	0	0	0	0	248	0	248	0	0	0	0	677
<b>Total</b>	0	1651	13	1664	0	0	0	0	0	871	0	871	3	0	2	5	2540
05:00 PM	0	463	2	465	0	0	0	0	0	230	0	230	5	0	1	6	701
05:15 PM	0	448	1	449	0	0	0	0	0	234	0	234	9	0	0	9	692
05:30 PM	0	513	11	524	0	0	0	0	0	194	0	194	0	0	0	0	718
05:45 PM	0	539	6	545	0	0	0	0	1	211	0	212	1	0	4	5	762
<b>Total</b>	0	1963	20	1983	0	0	0	0	1	869	0	870	15	0	5	20	2873
<b>Grand Total</b>	0	5959	55	6014	0	0	0	0	1	5740	0	5741	68	0	27	95	11850
Apprch %	0	99.1	0.9		0	0	0		0	100	0		71.6	0	28.4		
Total %	0	50.3	0.5	50.8	0	0	0	0	0	48.4	0	48.4	0.6	0	0.2	0.8	

Start Time	Southbound				Westbound				Northbound				Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
<b>Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1</b>																	
<b>Peak Hour for Entire Intersection Begins at 07:15 AM</b>																	
07:15 AM	0	146	0	146	0	0	0	0	0	<b>526</b>	0	<b>526</b>	4	0	4	8	680
07:30 AM	0	<b>189</b>	3	<b>192</b>	0	0	0	0	0	524	0	524	6	0	<b>6</b>	12	<b>728</b>
07:45 AM	0	179	3	182	0	0	0	0	0	418	0	418	<b>12</b>	0	2	<b>14</b>	614
08:00 AM	0	133	<b>4</b>	137	0	0	0	0	0	416	0	416	4	0	1	5	558
<b>Total Volume</b>	0	647	10	657	0	0	0	0	0	1884	0	1884	26	0	13	39	2580
<b>% App. Total</b>	0	98.5	1.5		0	0	0		0	100	0		66.7	0	33.3		
PHF	.000	.856	.625	.855	.000	.000	.000	.000	.000	.895	.000	.895	.542	.000	.542	.696	.886

<b>Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1</b>																	
<b>Peak Hour for Entire Intersection Begins at 05:00 PM</b>																	
05:00 PM	0	463	2	465	0	0	0	0	0	230	0	230	5	0	1	6	701
05:15 PM	0	448	1	449	0	0	0	0	0	<b>234</b>	0	<b>234</b>	<b>9</b>	0	0	<b>9</b>	692
05:30 PM	0	513	<b>11</b>	524	0	0	0	0	0	194	0	194	0	0	0	0	718
05:45 PM	0	<b>539</b>	6	<b>545</b>	0	0	0	0	<b>1</b>	211	0	212	1	0	<b>4</b>	5	<b>762</b>
<b>Total Volume</b>	0	1963	20	1983	0	0	0	0	1	869	0	870	15	0	5	20	2873
<b>% App. Total</b>	0	99	1		0	0	0		0.1	99.9	0		75	0	25		
PHF	.000	.910	.455	.910	.000	.000	.000	.000	.250	.928	.000	.929	.417	.000	.313	.556	.943

