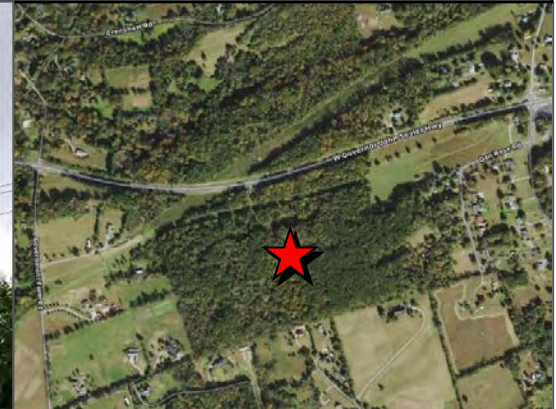


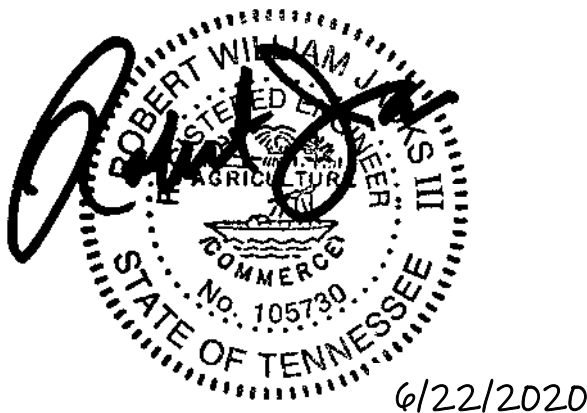


# Transportation Impact Study Perry Smith Development on Governor John Sevier Highway Knox County, Tennessee



Revised June 2020

Prepared for:  
Perry Smith Development, LLC  
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## EXECUTIVE SUMMARY

### **Preface:**

Perry Smith Development, LLC is proposing to construct a residential development adjacent to West Governor John Sevier Highway (SR 168) in South Knox County, TN. In this report, the name of this proposed residential development is referred to as “Perry Smith Development on Governor John Sevier Highway” and this development will consist of 177 single-family detached houses on 48.67± acres. This development is anticipated to be fully built-out and occupied by the year 2025. The primary purpose of this study is to determine and evaluate the potential impacts of the residential subdivision on the adjacent transportation system. The study includes a review of the operating characteristics of the existing transportation system that will provide access to the proposed development site. Recommendations and mitigation measures will be analyzed and offered where traffic operations have been projected to be below traffic engineering standards.

### **Study Results:**

The findings of this study include the following:

- At full build-out and occupancy in the year 2025, the residential subdivision with 177 single-family detached houses is estimated to generate 1,759 trips on an average weekday. 131 of these trips are estimated to occur during the AM peak hour and 176 trips in the PM peak hour at full build-out and occupancy.
- The two new proposed subdivision road entrances on West Governor John Sevier Highway (SR 168) are anticipated to operate adequately with respect to road capacity in the projected year 2025 conditions when coupled with the proposed recommendations.

### **Recommendations:**

The following recommendations are offered based on the study analyses:

- It is recommended that the Road “A” and Road “B” entrance approaches at West Governor John Sevier Highway (SR 168) be designed and constructed with a 24” white stop bar and a Stop Sign (R1-1). The continuous center two-way left-turn lane (TWLTL) of West Governor John Sevier Highway (SR 168) should be re-stripped to accommodate the new intersections with the new turning movements.
- It is recommended that a 250-foot right-turn lane with 180 feet of taper (15:1) be constructed on West Governor John Sevier Highway (SR 168) at the eastbound

approach of Road "A" and Road "B".

- Based on the highest observed and calculated 85<sup>th</sup> percentile speed of 55.7 mph on West Governor John Sevier Highway (SR 168), the required Intersection Sight Distance (ISD) is 655 feet and the Stopping Sight Distance (SSD) is 530 feet for westbound vehicles and 480 feet for eastbound vehicles. This should be verified in the design plans.
- It is recommended that the Road "A" and Road "B" entrances be constructed with a width of 30 feet.
- It is recommended that 25-mph Speed Limit Signs be posted on Road "A" and Road "B" for travel into the residential subdivision.
- Stop Signs (R1-1) and white stop bars should be installed internally on the new streets as shown in the report.
- Sight distance at the new intersections in the subdivision must not be impacted by new signage or future landscaping. For a posted speed limit of 25 mph, the intersection sight distance requirement is 250 feet. The stopping sight distance required is 155 feet for a level road grade. The road layout designer should ensure that these sight distance lengths are met, and they should be labeled on the plans.
- All drainage grates and covers for the residential development need to be pedestrian and bicycle safe.
- Sidewalks are not shown on the concept plan. If the development does install internal sidewalks, they should have appropriate ADA compliant curbed ramps at intersection corners and are recommended to be 5 feet minimum in width.
- The United States Postal Service (USPS) has recently implemented changes to its guidelines for delivery in new residential subdivisions. If directed by the local post office, the designer should include an area within the development with a parking area for a centralized mail delivery center.
- Traffic calming measures might be needed for this development. The proposed Road "A" horizontal alignment within the development has a very long and straight road segment. The possible need for traffic calming measures inside the development for Road "A" will need to be coordinated with Knox County Engineering and Public Works during the detailed design phase. Speed humps could be considered to lower speeds through this portion of the subdivision.
- All road grade and intersection elements internally and externally should be designed to AASHTO, TDOT, and Knox County specifications and guidelines to ensure proper operation.

## DESCRIPTION OF EXISTING CONDITIONS

### ■ STUDY AREA:

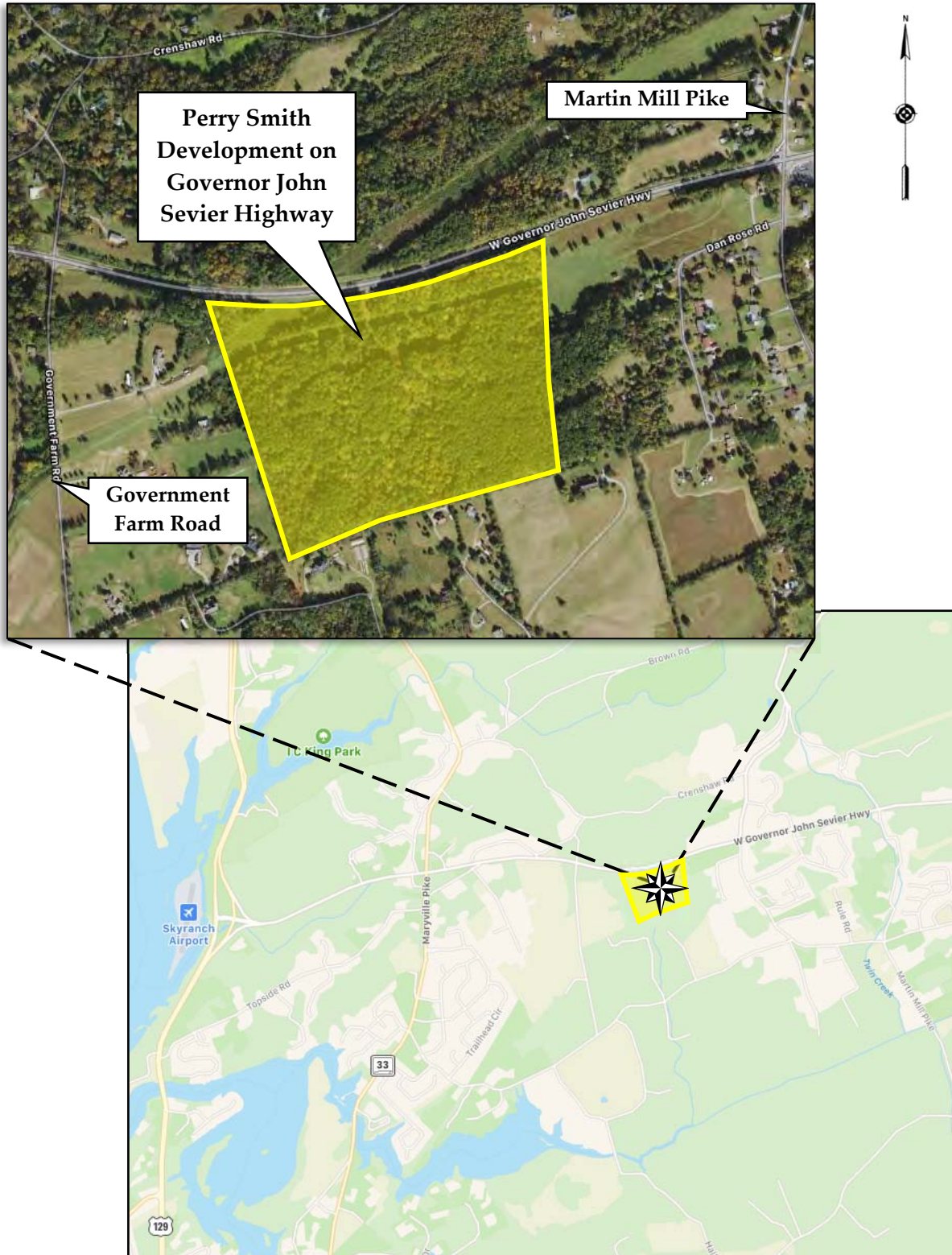
The proposed location of this new residential development is shown on a map in Figure 1. This proposed development will be located on the south side of West Governor John Sevier Highway (SR 168) in between Martin Mill Pike and Government Farm Road in South Knox County, TN. The outermost eastern and western boundaries of the development property at the highway are located approximately 1,350 feet to the west of the signalized intersection of West Governor John Sevier Highway (SR 168) and Martin Mill Pike and 950 feet to the east of Government Farm Road. This subdivision will be located 2.1 miles to the east of Alcoa Highway (US 129/SR 115) and 4.7 miles to the west of Chapman Highway (US 441/SR 71).

Subdivision road access will be limited to West Governor John Sevier Highway (SR 168) at two new road entrances spaced approximately 950 feet apart. The subdivision will be comprised of seven new paved streets and will contain a maximum of 177 single-family detached residential houses on approximately 48.67 acres. As requested by Knoxville/Knox County Planning, this report analyzes the two new entrance intersections at West Governor John Sevier Highway (SR 168).

In the study area, there are several other existing residential subdivisions, individual residences, and undeveloped properties. The proposed development property is currently unoccupied and consists completely of woodlands with small pockets of un-forested areas.

The site property for the residential subdivision currently consists of two separate parcels and is bounded by single-family homes and undeveloped properties to the south, east, and west and West Governor John Sevier Highway (SR 168) to the north. The northwest corner of the property is crossed by a 150' TVA transmission electric line and utility easement.





**Figure 1**  
**Location Map**

■ **EXISTING ROADWAYS:**

Table 1 provides the characteristics of the key existing roadway adjacent to the development property and included in the study:

**TABLE 1  
STUDY CORRIDOR CHARACTERISTICS**

NAME	CLASSIFICATION <sup>1</sup>	SPEED LIMIT	LANES	ROAD WIDTH <sup>2</sup>	TRANSIT <sup>3</sup>	PEDESTRIAN FACILITIES	BICYCLE FACILITIES
West Governor John Sevier Highway (SR 168)	Major Arterial	50 mph	2 (with center turn lane)	46 feet	None	No sidewalks along roadway	No bike lanes

<sup>1</sup> 2018 Major Road Plan by Knoxville/Knox County Planning

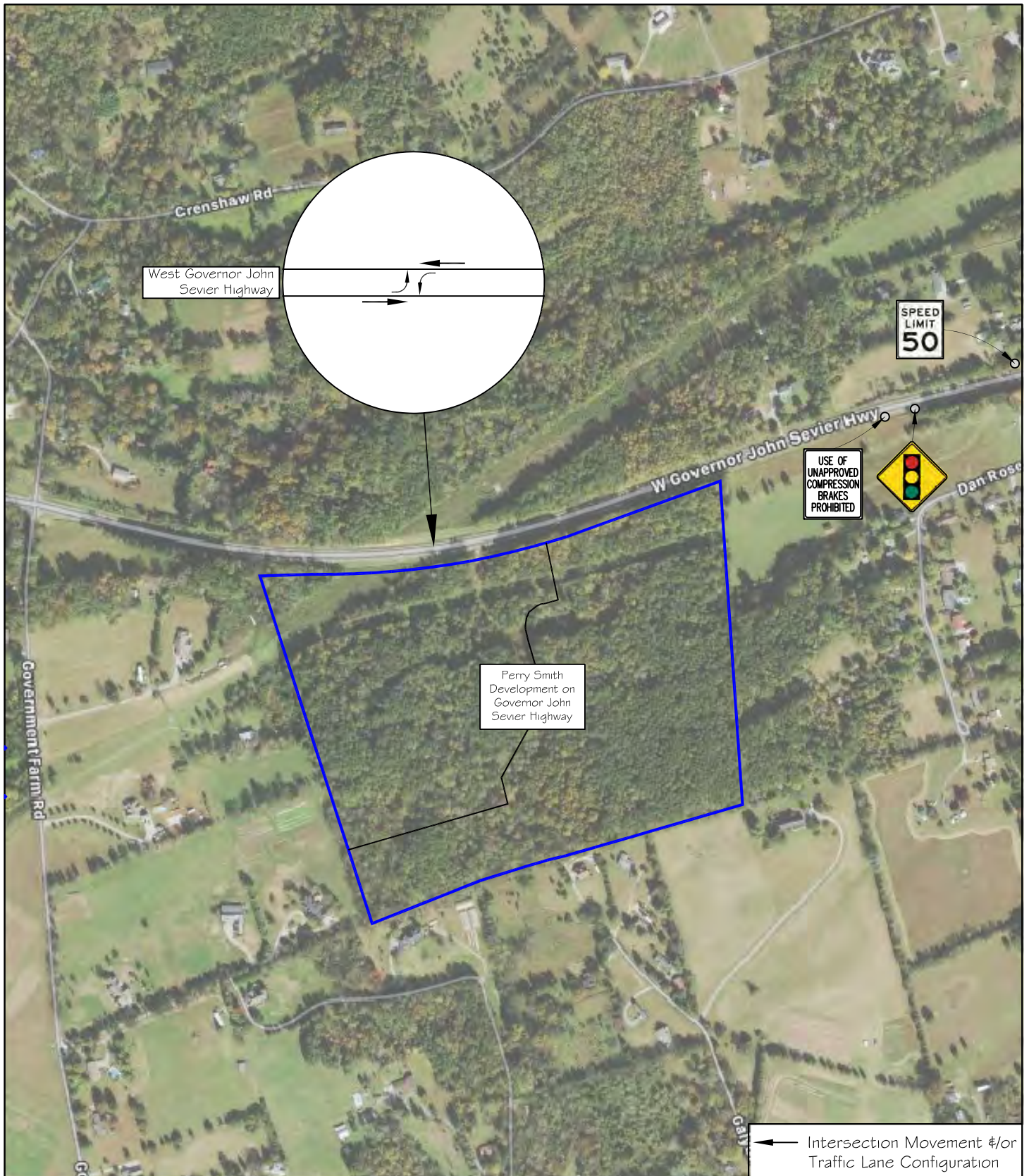
<sup>2</sup> Edge of curb to edge of curb or edge of pavements near project site

<sup>3</sup> According to Knoxville Area Transit System Map

**West Governor John Sevier Highway (SR 168)** is classified as a Major Arterial and traverses in a generally east-west direction in the study area but turns into a general north-south direction further to the east (east of Chapman Highway/US 441/SR 71). On its southwest end, West Governor John Sevier Highway (SR 168) begins at the interchange with Alcoa Highway (US 129/SR 115) and on its northeast side, East Governor John Sevier Highway (SR 168) terminates at the intersection with Asheville Highway (US 11E/US 25/US 70/SR 9) for a total length of 18.1 miles. The delineation of the East/West designation of Governor John Sevier Highway occurs at the intersection with Chapman Highway (US 441/SR 71).

West Governor John Sevier Highway (SR 168) at the project site currently consists of a 2-lane pavement section with a continuous center two-way left-turn lane (TWLTL) and the pavement is approximately 46 feet in total width. The lanes are 12 feet in width with a 5-foot paved surface outside the white edge line. Grass side slopes are located immediately outside of the 5-foot paved shoulders. Utility streetlights are not provided on West Governor John Sevier Highway (SR 168) at the project site. The highway speed limit is posted at 50 mph.

Figure 3 on the following page shows the lane configurations on West Governor John Sevier Highway (SR 168) and traffic signage in the study area. The pages following Figure 3 provide an overview of the site study area with photographs.



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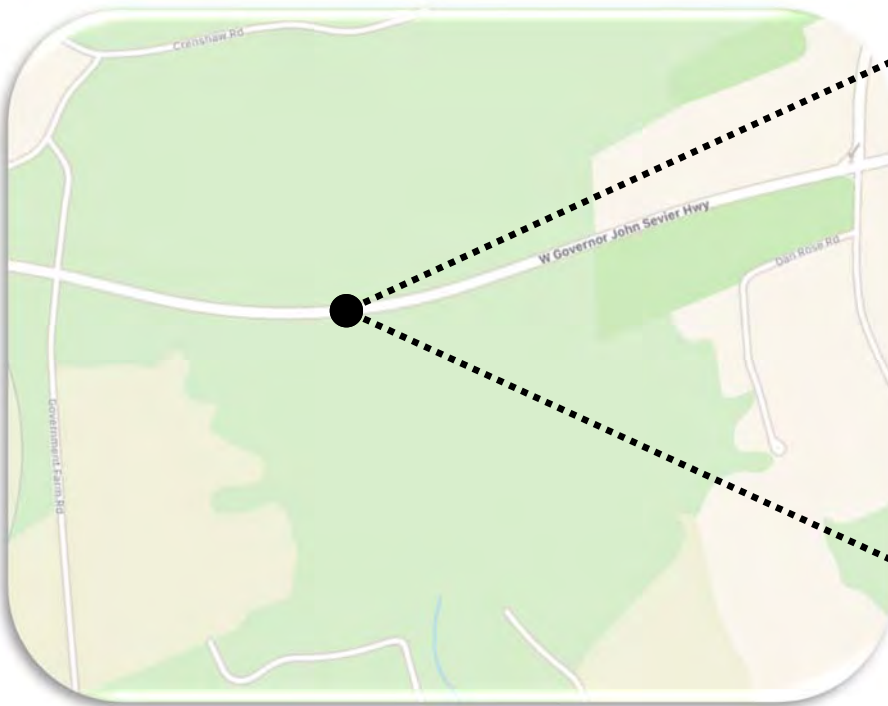


FIGURE 2

Perry Smith Development on Governor John Sevier Highway

Traffic Signage & Existing Lane Configurations

PHOTO EXHIBITS



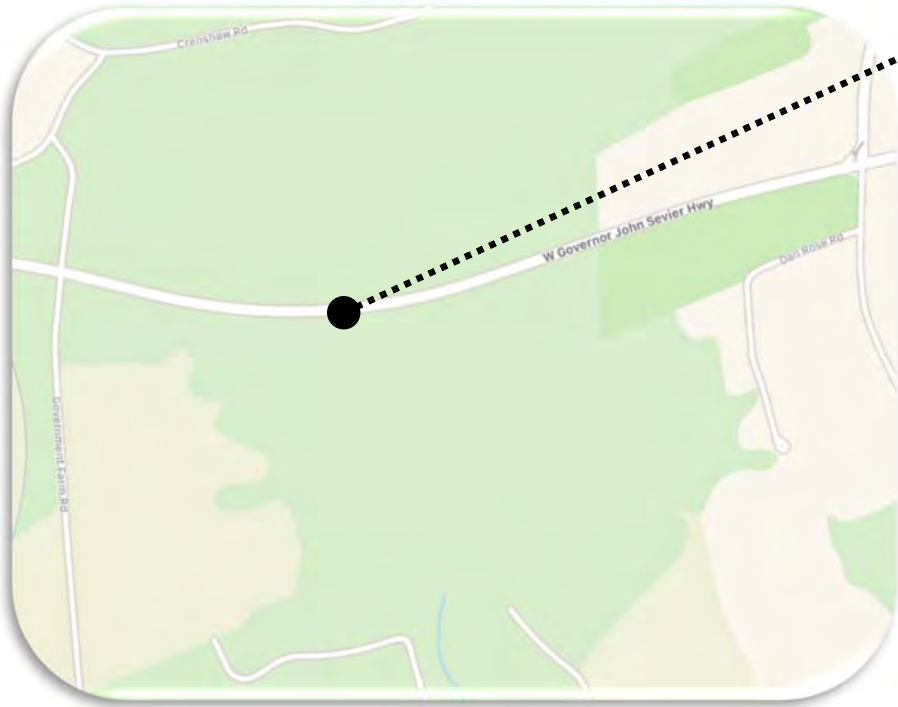
West Governor John Sevier Highway (SR 168)



View of West Governor John Sevier Highway (SR 168)  
(Looking Northeast)



View of West Governor John Sevier Highway (SR 168)  
(Looking Southwest)



**West Governor John Sevier Highway (SR 168)**



**View of Site Property  
(Looking South)**

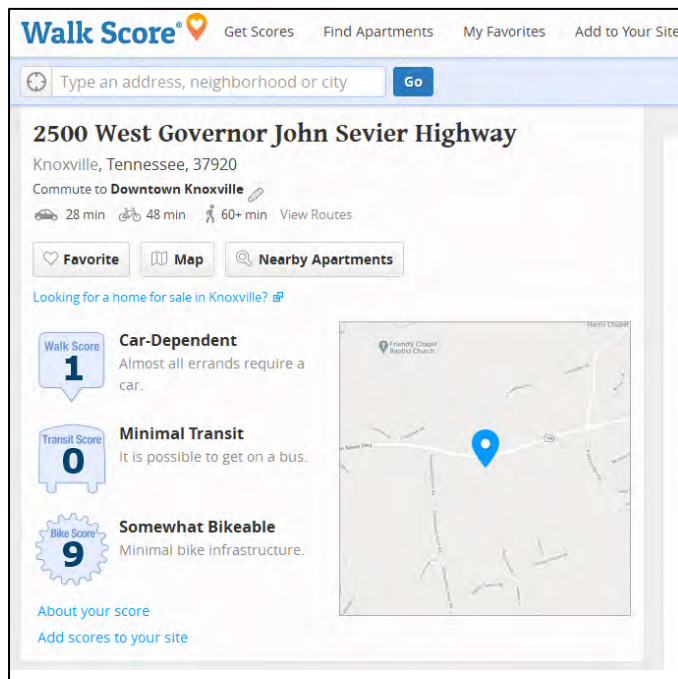
■ **EXISTING TRANSPORTATION VOLUMES PER MODE:**

There is one permanent vehicular traffic count location near to this project site. Counts at this location are conducted by the Tennessee Department of Transportation (TDOT) every year. The traffic count location data is the following:

- Average Daily Traffic (ADT) on West Governor John Sevier Highway (SR 168) to the east of Martin Mill Pike was reported by the TDOT at 16,521 vehicles per day in 2018. From 2008 – 2018, this count station has indicated a +0.7% average annual growth rate. The historical traffic count data for this location can be viewed in Appendix A.

Bicycle facilities (lanes) and pedestrian sidewalks are not currently available within the project site study area along West Governor John Sevier Highway (SR 168). The average daily pedestrian and bicycle traffic along the study corridor is unknown.

■ **WALK SCORE:**



A private company offers an online website at [walkscore.com](http://walkscore.com) that grades and gives scores to locations within the United States based on “walkability”, “bikeability”, and transit availability. According to the website, the numerical values assigned for the Walk Score and the Bike Score are based on the distance to the closest amenity in various relevant categories (businesses, schools, parks, etc.) and are graded from 0 to 100. The Transit Score measures how well a location is served by public transit based on distance and type of nearby transit. The Transit Score is also graded from 0 to 100.

Appendix B shows maps and other information for the Walk Score, Bike Score, and Transit Score at 2500 West Governor John Sevier Highway (SR 168). Based on the project location, the location is given a Walk Score of 1. This Walk Score indicates that the site is completely dependent on vehicles for errands and travel. The site is given a Bike Score of 9, which means that there is minimal bike infrastructure but is somewhat bikeable. Also, based on the project location, the site is given a Transit Score of 0 due to no existing nearby public transportation options.

■ **TRANSIT SERVICES:**

The City of Knoxville has a network of public transit opportunities offered by Knoxville Area Transit (KAT). Bus service is not available in this area of Knox County. The overall KAT bus system map is in Appendix C. The closest public transit bus service is 4.7 miles away to the east (by roadway) at the Lowe's Home Improvement shopping center at Chapman Highway. This KAT service is Route 41 "Chapman Highway". It operates on weekdays and weekends and this route map is also included in Appendix C. Other transit services include the East Tennessee Human Resource Agency (ETHRA) and the Community Action Committee (CAC) which provides transportation services when requested along with private taxis, and ride-sharing opportunities (Uber, etc.).

## PROJECT DESCRIPTION

### ■ LOCATION AND SITE PLAN:

The proposed plan layout given by Batson, Himes, Norvell, & Poe is shown in Figure 3. As can be seen in the figure, seven new streets will be constructed and two of them will terminate at cul-de-sacs. Two main streets, Road "A" and Road "B", will intersect West Governor John Sevier Highway (SR 168) and will be the two entrances for the development. The total length of new streets in the subdivision will be approximately 7,575 feet (1.44 miles). The residential development will incorporate a portion of the total 48.67 acres with two areas for detention ponds and common areas. The largest of these areas will be on the northwest side of the property and will be located within the 150' TVA transmission line easement. The size of the single-family detached lots will average approximately 7,000 square feet (.17 acre) to 12,000 square feet (.27 acre) in size with a handful of lots near 1/2 acre. Each home will have a garage and driveway.

The schedule for completion of this new residential development is dependent on economic factors and construction timelines. This project is also contingent on permitting, design, and other issues. However, for this study, it was assumed that the total construction build-out of the development and full occupancy will occur within the next 5 years (2025).





**Figure 3**  
**Proposed Plan Layout**  
**Perry Smith Development on Governor John Sevier**

■ **PROPOSED USES AND ZONING REQUIREMENTS:**

The property for the proposed development is within the Knox County limits and is zoned as Planned Residential (PR) with a density of <5 units per acre. The development property currently exists of two separate parcels. The current zoning map is provided in Appendix D. The existing adjacent surrounding land uses are the following:

- The development property is bounded by West Governor John Sevier Highway (SR 168) to the north. One large parcel is on the other side of the highway and is zoned as Agricultural (A) and consists of undeveloped property.
- All the properties to the west and south of the proposed development property are zoned as Agricultural (A) and they currently consist of several single-family residences, farm properties, and undeveloped properties.
- All the properties to the east of the proposed development property are zoned as Low Density Residential (RA) and they currently consist of several single-family residences with woodlands in between the houses and the eastern site development property line.

The Planned Residential (PR) zone allows for a variety of land uses primarily within the residential realm. Uses permitted in this zone include single-family dwellings, duplexes, and multi-dwelling structures and developments.

■ **DEVELOPMENT DENSITY:**

The proposed density for the residential subdivision is based on a maximum of 177 houses on 48.67 acres. These numbers compute to 3.63 dwelling units per acre which is less than the current zoning that allows up to 5 units per acre.

■ **ON-SITE CIRCULATION:**

The total length of the seven new streets within the development will be just over 7,575 feet (1.44 miles) in length and will be designed and constructed to Knox County, TN specifications. The new streets shown in Figure 3 are labeled Road "A" thru Road "G". The internal roadways for the development will be paved with asphalt, include 8" extruded concrete curbs, and the lane widths will be 13 feet for a total of 26-foot pavement width. The street right-of-way within the

development will be 50 feet. Based on the typical section show on the concept plan, concrete sidewalks are not being proposed. After construction, Knox County will maintain the streets in the subdivision.

■ **SERVICE AND DELIVERY VEHICLE ACCESS AND CIRCULATION:**

Besides residential passenger vehicles, the new streets will also provide access for service, delivery, maintenance, and fire protection/rescue vehicles. It is not expected that any of these other types of vehicles will impact roadway operations other than when they occasionally enter and exit the development. It is expected that curbside garbage collection services will be available for this residential subdivision. Concerning fire protection and rescue vehicles, the new roads will be designed and constructed to Knox County specifications and thus expected to be adequate in size. The internal roadways in the subdivision are expected to be able to accommodate these larger types of vehicles along with standard passenger vehicles.

## TRAFFIC ANALYSIS OF EXISTING AND PROJECTED CONDITIONS

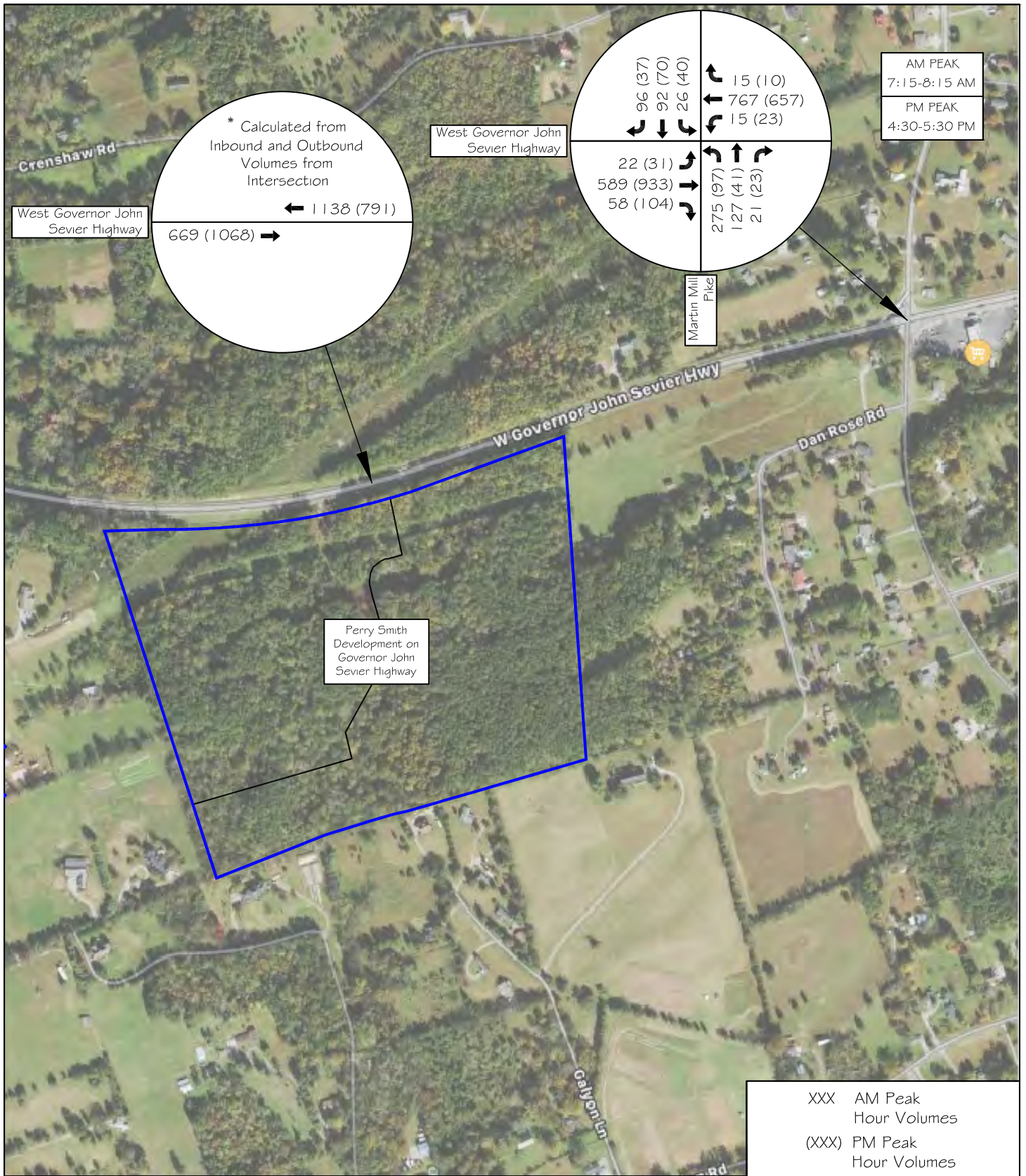
### ■ EXISTING TRAFFIC CONDITIONS:

Due to the current worldwide coronavirus pandemic, usable traffic count data is not able to be collected. The pandemic has not only closed schools and eliminated school-related traffic, but overall general traffic has also been affected due to stay-at-home orders, work furloughs, job losses, and general anxiety with travel outside the home. Because traffic counts conducted at this time would not yield accurate data, previous traffic count data was used for this study. The most recent traffic count data adjacent to the project site was obtained from Knox County Engineering. This previous traffic count was conducted on April 22, 2016, by CDM Smith Inc. at the signalized intersection of West Governor John Sevier Highway (SR 168) at Martin Mill Pike. The individual traffic movements at this intersection from this previous count were used to determine the inbound and outbound thru volumes on West Governor John Sevier Highway (SR 168). Since there is only one residential driveway in between the proposed site and the signalized intersection, it is assumed that these inbound and outbound volumes at the intersection were a realistic representation of the thru volumes on the highway in front of the development property at the time the counts were conducted.

Based on the previous traffic volumes counted at the signalized intersection, the AM and PM peak hour of traffic was observed on West Governor John Sevier Highway (SR 168) at Martin Mill Pike at 7:15 – 8:15 AM and 4:30 – 5:30 PM.

The 2016 manual tabulated traffic counts from CDM Smith, Inc. can be reviewed in Appendix E. In Figure 4a, the volumes shown are from the existing traffic counts during the AM and PM peak hours observed at the intersection and the subsequent tabulation of the thru volumes in front of the proposed development site on West Governor John Sevier Highway (SR 168) from the inbound and outbound volumes at the intersection.

The following figure, Figure 4b, shows the thru volumes on West Governor John Sevier Highway (SR 168) in front of the development property for the current year, 2020. This conversion of the traffic volumes from 2016 to 2020 was accomplished by applying a +0.7% annual growth rate for 4 years. A +0.7% annual growth rate was used based on the 10-year historical data shown in Appendix A from TDOT.



**AJAX ENGINEERING**

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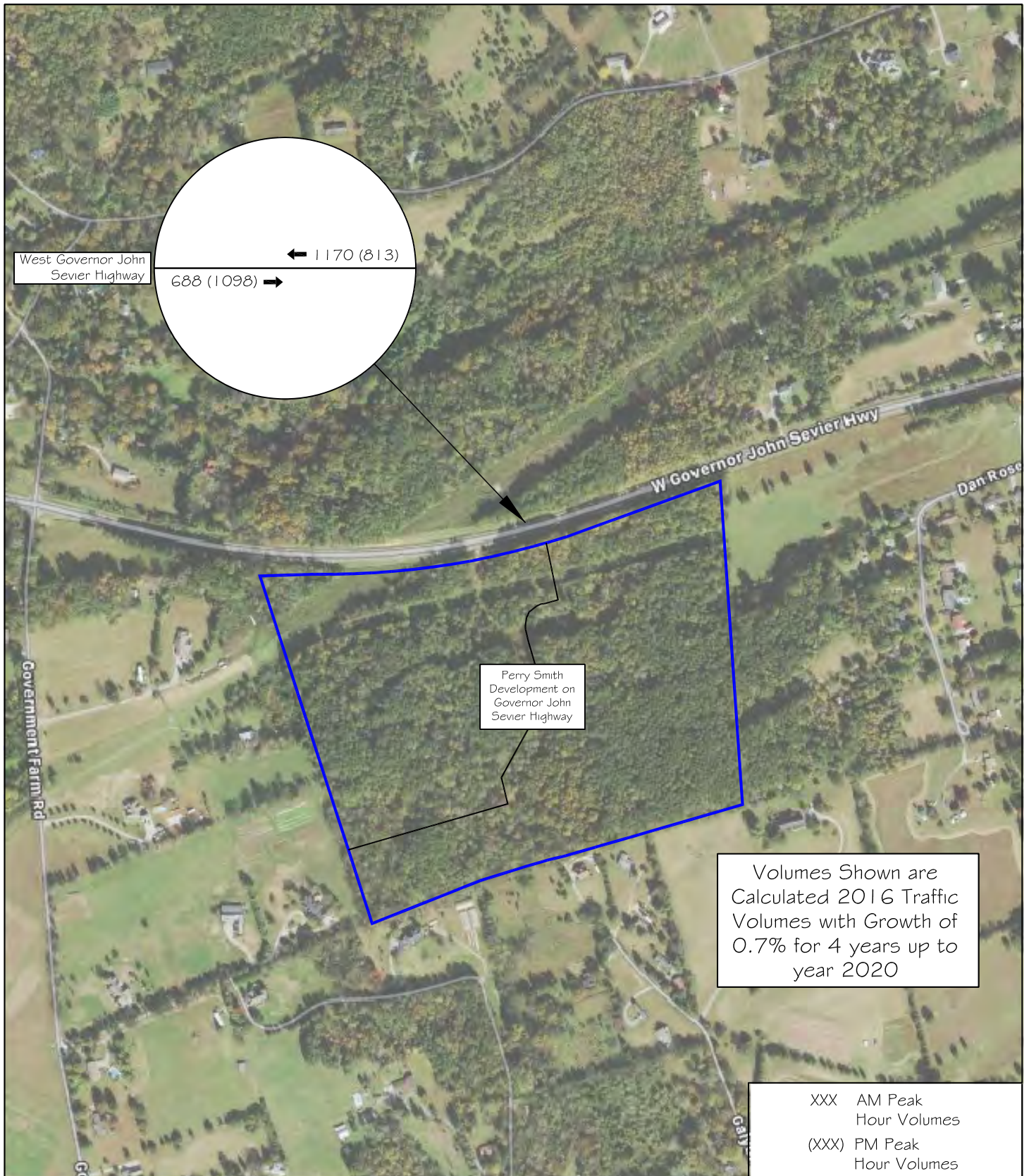
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**NORTH**

FIGURE 4a

Perry Smith Development on Governor John Sevier Highway

2016 Peak Hour Traffic Volumes  
(from CDM Smith Inc. 4/22/2016)



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FIGURE 4b

Perry Smith Development on Governor John Sevier Highway

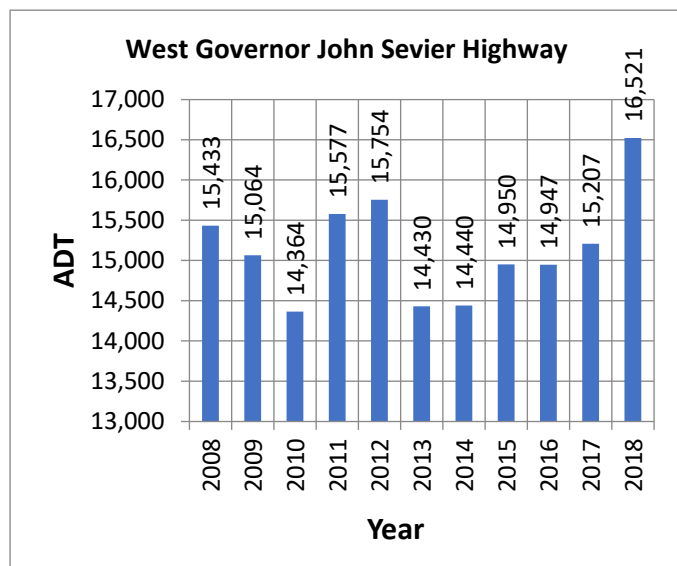
2020 Peak Hour Traffic Volumes - CALCULATED (0.7% GROWTH)

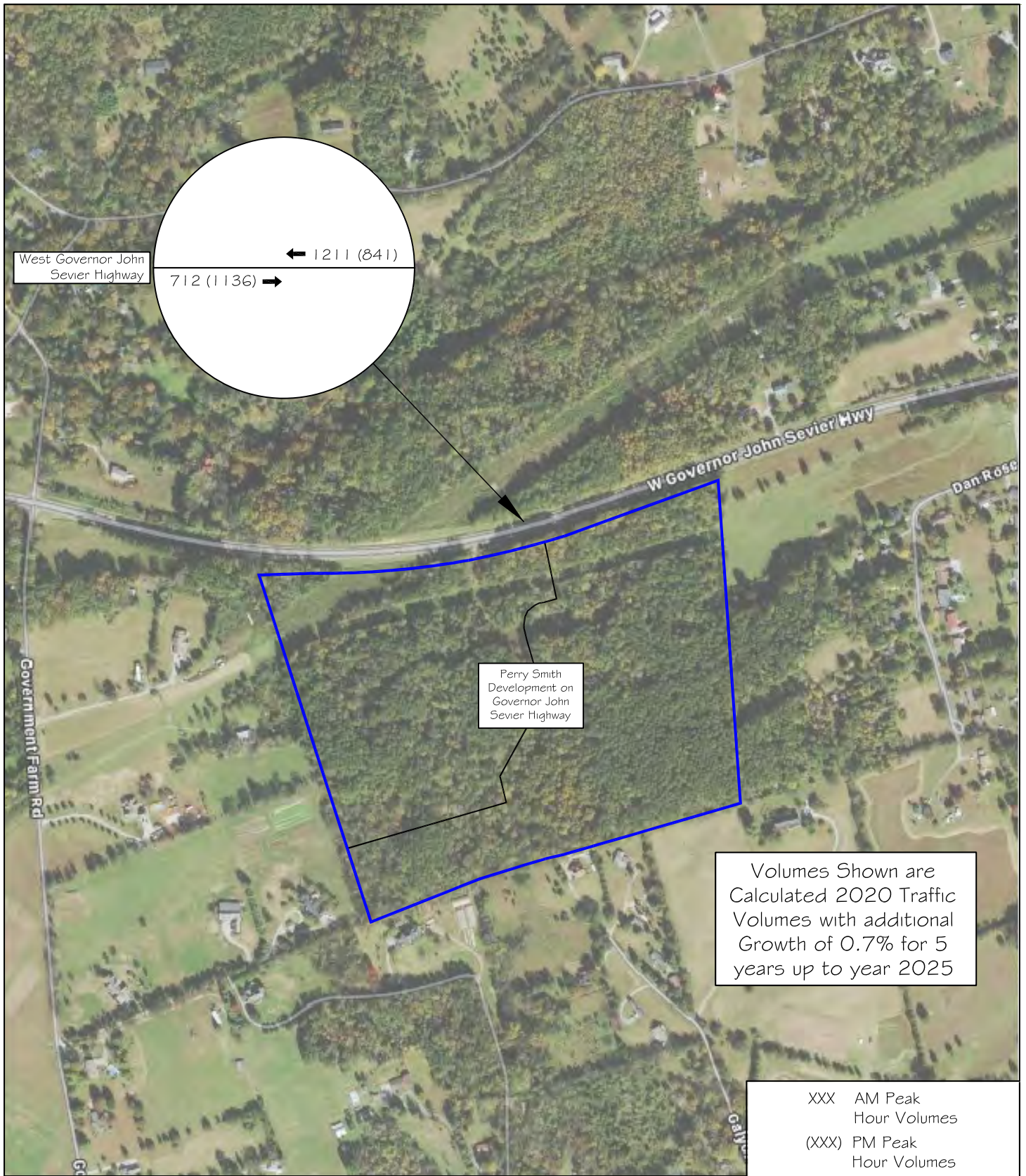
■ **OPENING YEAR TRAFFIC CONDITIONS (WITHOUT PROJECT):**

Opening year traffic volume estimates represent the future condition the proposed study area is potentially subject to even without the proposed project being developed (no-build option). As previously stated, the build-out and full occupancy for this proposed new residential development is assumed to occur in the year 2025. This corresponds to five years for the development to reach full capacity and occupancy.

Average Daily Traffic (ADT) on West Governor John Sevier Highway (SR 168) was reported by the TDOT at 16,521 vehicles per day in 2018 (historical traffic data is shown in Appendix A). From 2008 – 2018, this count station has indicated a +0.7% average annual growth rate.


To ensure a reasonable estimate for this study, the +0.7% annual growth rate calculated from the TDOT data was used to consider any future development in the area and potential rising travel volumes. Figure 5 shows the projected opening year traffic volumes for the year 2025 during the AM and PM peak hours based on an assumed annual growth rate of +0.7%. The volumes shown in Figure 5 could potentially exist in the future even if the proposed residential project is not constructed and developed.






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NORTH

FIGURE 5  
 Perry Smith Development on Governor John Sevier Highway  
 2025 Peak Hour Traffic Volumes - OPENING YEAR TRAFFIC (WITHOUT PROJECT)



■ **TRIP GENERATION:**

The estimated amount of traffic that will be generated by the proposed residential development was calculated based upon rates and equations for peak hour trips provided by Trip Generation Manual, 10th Edition, a publication of the Institute of Transportation Engineers (ITE). A generated trip is a single or one-direction vehicle movement that is either entering or exiting the study site. The Trip Generation Manual is the traditional and most popular resource for determining trip generation rates when traffic impact studies are produced. The Manual lists and includes data for a variety of land uses and correlates trips generated based on different variables such as dwelling units, square footage, etc. The data from ITE for the proposed land use is shown in Appendix F. A summary of this information is presented in the following table:

**TABLE 2**  
**TRIP GENERATION FOR PERRY SMITH DEVELOPMENT ON GOVERNOR JOHN SEVIER HIGHWAY**  
**177 Single-Family Detached Houses**

ITE LAND USE CODE	LAND USE DESCRIPTION	UNITS	GENERATED DAILY TRAFFIC	GENERATED TRAFFIC AM PEAK HOUR			GENERATED TRAFFIC PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
#210	Single-Family Detached Housing	177 Houses	1,759	25%	75%		63%	37%	
				33	98	131	111	65	176
Total New Volume Site Trips			1,759	33	98	131	111	65	176

ITE Trip Generation Manual, 10th Edition

Trips calculated by using Fitted Curve Equation

For the proposed residential subdivision, with a maximum of 177 single-family detached houses, it is estimated that 33 vehicles will enter and 98 will exit, for a total of 131 generated trips during the AM Peak Hour in the year 2025. Similarly, it is estimated that 111 vehicles will enter and 65 will exit, for a total of 176 generated trips during the PM Peak Hour in the year 2025. The calculated trips generated for an average weekday could be expected to be approximately 1,759 vehicles for the proposed development in the year 2025. No trip reductions were included in the analysis.

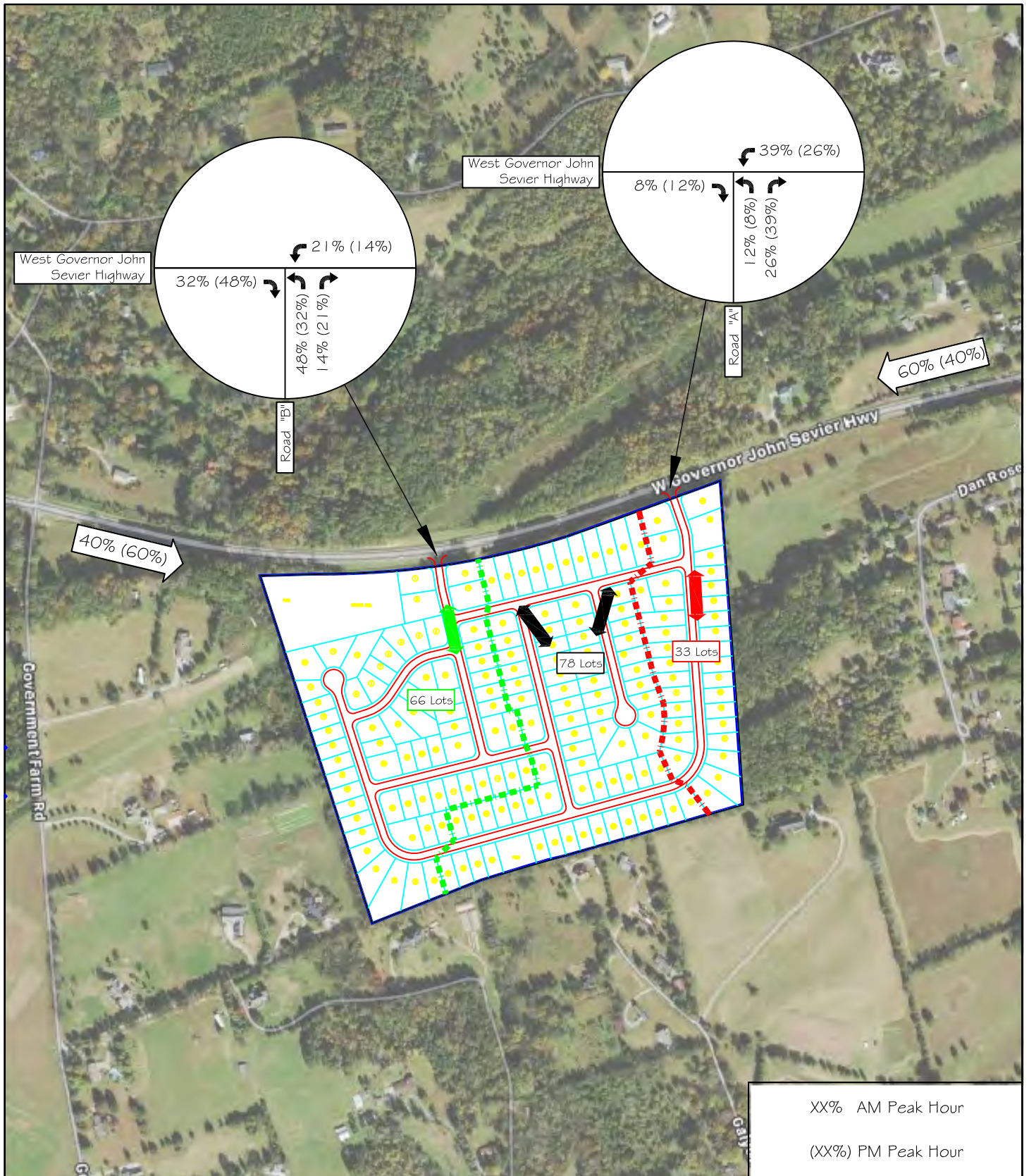
■ **TRIP DISTRIBUTION AND ASSIGNMENT:**

Figure 6 shows the projected distribution for traffic entering and exiting at the two entrances for the subdivision at West Governor John Sevier Highway (SR 168). The percentages that are shown pertain to the trips generated by the new proposed residential dwellings in the development that were calculated from the ITE Trip Generation Manual.

Based on the existing traffic counts, the projected distribution for future generated traffic by the residential development is assumed to be a 60/40 split. The existing traffic count data from CDM Smith Inc. showed that approximately 60% of thru traffic during the AM peak hour traveled westbound on West Governor John Sevier Highway (SR 168) and 40% of thru traffic traveled eastbound. The reverse occurred during the PM peak hour. To determine the percentages at each proposed entrance, an additional factor was assumed for determining the projected trip distribution. This factor was based on the internal roadway distances for the residences in the subdivision based on the proposed layout of the subdivision. As shown in Figure 6; 33 residences are assumed will utilize the Road "A" entrance exclusively for travel eastbound and westbound on West Governor John Sevier Highway (SR 168), 66 residences will utilize the Road "B" entrance exclusively for travel eastbound and westbound, and the remaining 78 lots will utilize either the Road "A" or Road "B" entrance dependent on which direction of travel is desired.

There are a variety of nearby developments that will potentially "attract" the projected generated traffic to and from the residential subdivisions. All these large "attractors" are located by traveling eastbound and westbound via West Governor John Sevier Highway (SR 168). In addition to employment centers and commercial development, some traffic will travel to and from a variety of public and private elementary, middle, and high schools. This site development property is currently zoned for Bonnie Kate Elementary School, South-Doyle Middle School, and South-Doyle High School. These schools are located to the northeast and southeast of the proposed residential development and suggest there would be some residential traffic to and from the east on Governor John Sevier Highway (SR 168) for those who do not utilize public school bus transportation.

Figure 7 shows the Traffic Assignment of the computed trips that will be generated by the subdivision (from Table 2) and applied to the intersection movements based on the assumed distribution of trips shown in Figure 6.



11812 Black Road  
 Knoxville, TN 37932  
 Phone: (865) 556-0042  
 Email: ajaxengineering@gmail.com

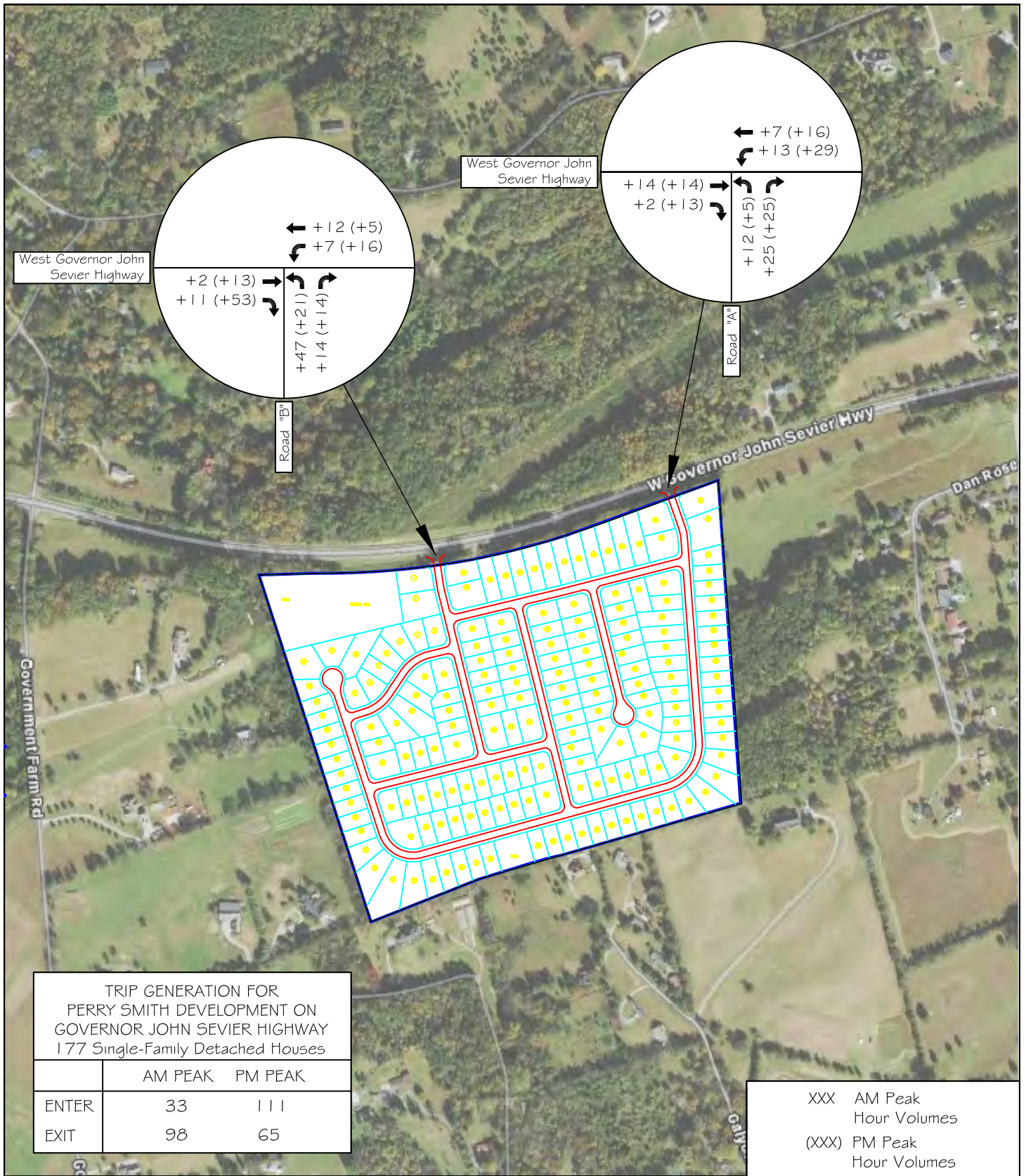
NOT TO SCALE



FIGURE 6

Perry Smith Development on Governor John Sevier Highway

Directional Distribution of Generated Traffic during AM and PM Peak Hour



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Email: ajaxengineering@gmail.com

NOT TO SCALE



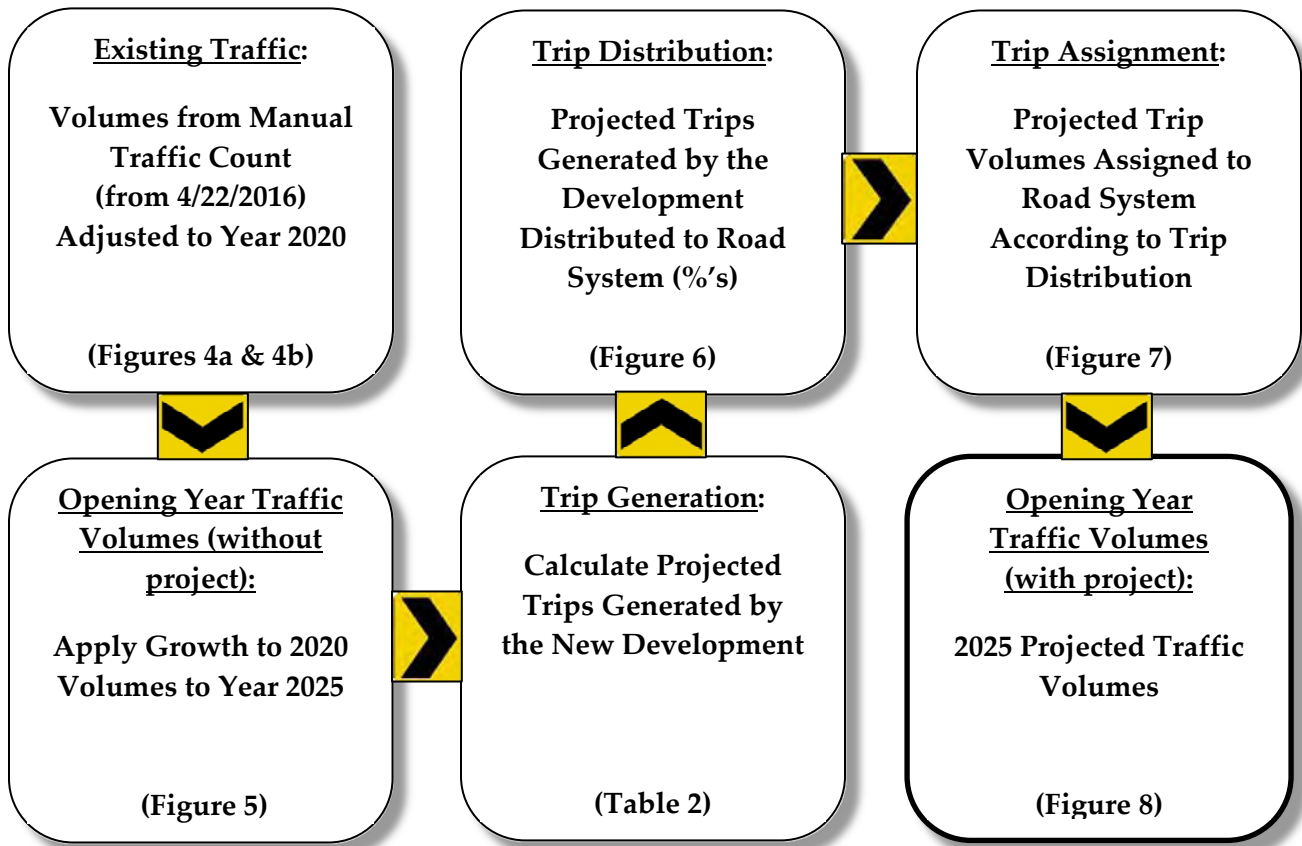
FIGURE 7

Perry Smith Development on Governor John Sevier Highway

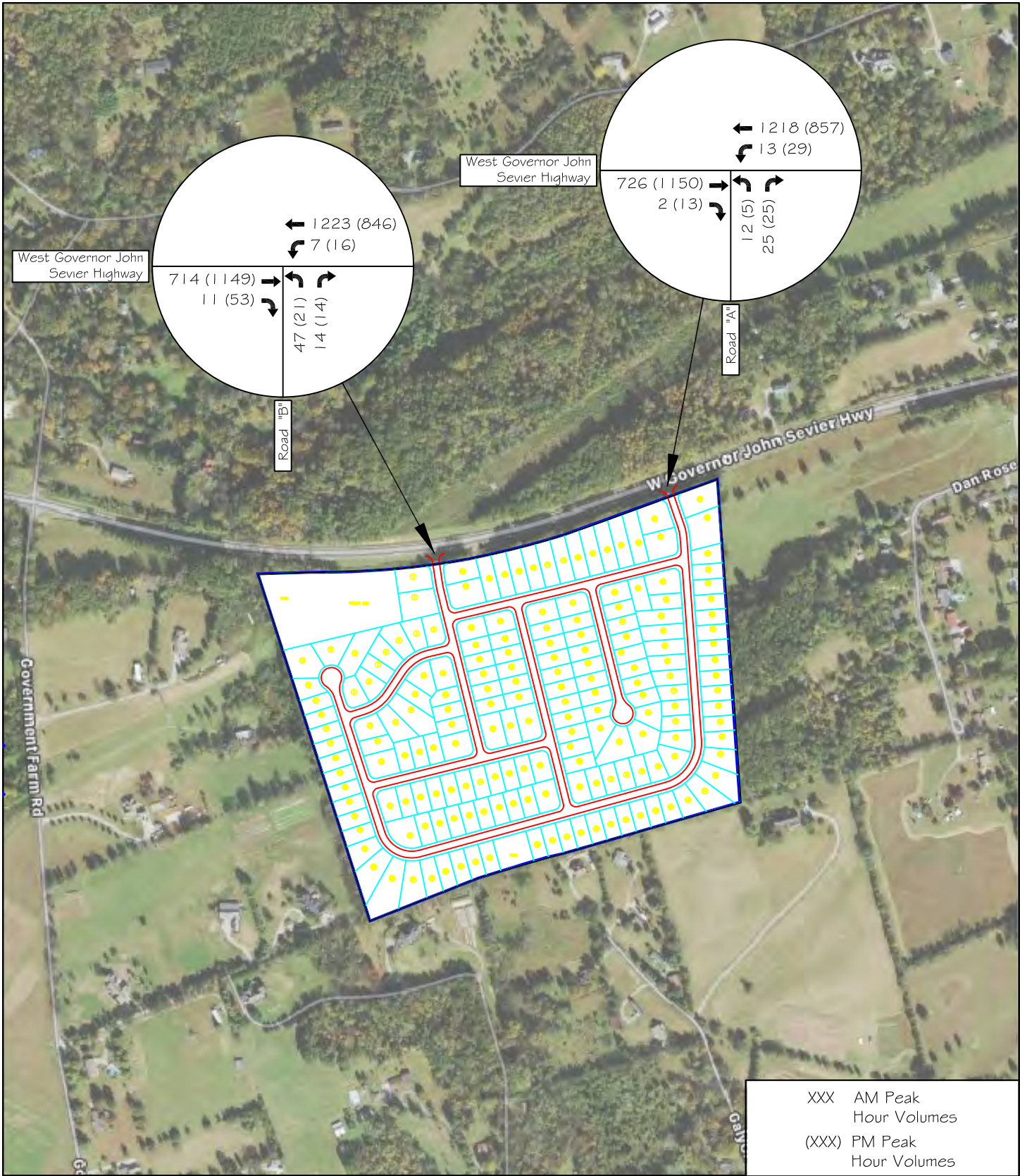
Traffic Assignment of Generated Traffic during AM and PM Peak Hour

■ **OPENING YEAR TRAFFIC CONDITIONS (WITH PROJECT):**

Overall, several additive steps were taken to estimate the total opening year projected traffic volumes at the studied entrance intersections at Governor John Sevier Highway (SR 168) when the residential development is fully constructed and occupied by the year 2025. The steps are illustrated below for clarity:



To calculate the total future projected traffic volumes at the studied entrance intersections, the calculated peak hour traffic (from ITE Trip Generation) generated by the new proposed residential development was added to the 2025 opening year traffic (shown in Figure 5) by following the predicted directional distributions and assignments (shown in Figures 6 and 7). This procedure was necessary to obtain the total projected traffic volumes at the time the development is fully built-out. Figure 8 shows the projected AM and PM peak hour volumes at the studied entrance intersections for the year 2025.



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NOT TO SCALE



FIGURE 8

Perry Smith Development on Governor John Sevier Highway

2025 Peak Hour Traffic Volumes - OPENING YEAR TRAFFIC (WITH PROJECT)

Capacity analyses were undertaken to determine the projected Level of Service (LOS) for the entrance intersections at West Governor John Sevier Highway (SR 168) for vehicular traffic. The capacity analyses were calculated by following the methods outlined in the Highway Capacity Manual (HCM) and using Synchro Traffic Software (Version 8).

Methodology:

LOS is a qualitative measurement developed by the transportation profession to express how well an intersection or roadway performs based on a driver's perception. LOS designations include LOS A through LOS F. The designation of LOS A signifies a roadway or intersection operating at best, while LOS F signifies road operations at worst. This grading system provides a reliable straightforward means to communicate road operations to the public. The HCM lists level of service criteria for unsignalized intersections and signalized intersections.



LOS is defined by delay per vehicle (seconds) and roadway facilities are also characterized by the volume-to-capacity ratio (v/c). For example, a delay of 20 seconds at an unsignalized intersection would indicate LOS C and this delay would represent the additional delay a motorist would experience traveling through the intersection. Also, for example, a v/c ratio of 0.75 for an approach at an unsignalized intersection would indicate that the approach at the intersection is operating at 75% of its available capacity. The designations for LOS, which are based on delay, are reported differently for unsignalized and signalized intersections. This is primarily due to motorists having different expectations between the two road facilities. Generally, for most instances, the boundary of LOS D / LOS E is considered the upper limit of acceptable delay during peak periods in urban and suburban areas.

For unsignalized intersections, LOS is measured in terms of delay (in seconds). This measure is an attempt to quantify delay that includes travel time, driver discomfort, and fuel consumption. For unsignalized intersections, the analysis assumes that the mainline

thru and right-turn traffic does not stop and is not affected by the traffic on the minor side streets. Thus, the LOS for a two-way stop (or yield) controlled intersection is defined by the delay for each minor approach and major street left-turn movements. Table 3 lists the level of service criteria for unsignalized intersections. The analysis results of unsignalized intersections using the HCM methodologies are conservative due to the larger vehicle gap parameters used in the methodology. More often in normal road conditions, drivers are more willing to accept smaller gaps in traffic than what is modeled using the HCM methodology. The unsignalized intersection methodology also does not account for larger gaps sometimes produced by nearby upstream and downstream signalized intersections. For unsignalized intersections, in most instances, the upper limit of acceptable delay during peak hours is the LOS D/E boundary at 35 seconds.

From the capacity calculations, the results from the projected peak hour vehicular traffic can be seen in Tables 4 and 5 for the intersections. The intersections in the table are shown with a LOS designation, delay (in seconds), and v/c ratio (volume/capacity) for the AM and PM peak hours. Appendix G includes the worksheets from the capacity analyses for the projected peak hour vehicular traffic. As can be seen in Tables 4 and 5, the studied intersections are calculated to operate at good levels (low vehicle delays) during the projected AM and PM peak hours for the entering traffic and average to below-average levels for exiting vehicles.

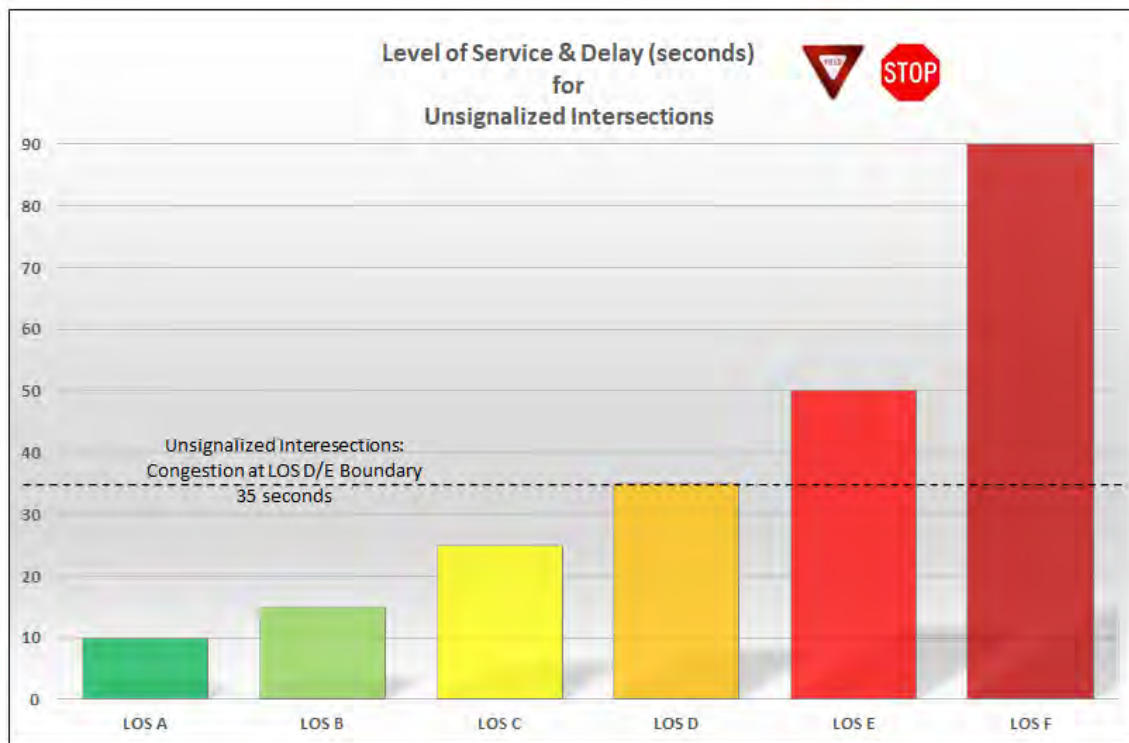


**TABLE 3**  
**LEVEL OF SERVICE AND DELAY FOR UNSIGNALIZED INTERSECTIONS**




LEVEL OF SERVICE	DESCRIPTION	CONTROL DELAY (seconds/vehicle)
A	Little or no delay	0 - 10
B	Short Traffic Delays	>10 -15
C	Average Traffic Delays	>15 - 25
D	Long Traffic Delays	>25 - 35
E	Very Long Traffic Delays	>35 - 50
F	Extreme Traffic Delays	>50

Source: Highway Capacity Manual, 6th Edition

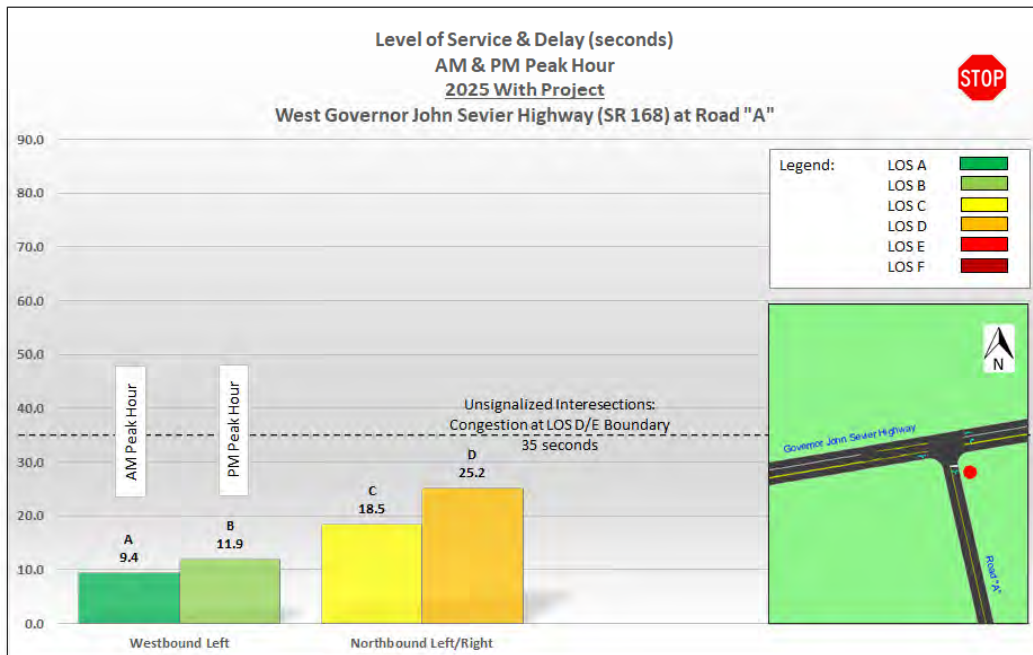


**TABLE 4**  
**2025 INTERSECTION CAPACITY ANALYSIS RESULTS -**  
**WEST GOVERNOR JOHN SEVIER HIGHWAY (SR 168) AT ROAD "A"**  
**OPENING YEAR (WITH PROJECT)**


INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS	DELAY (seconds)	V/C	LOS	DELAY (seconds)	V/C
West Governor John Sevier Highway (SR 168) at Road "A"	 Unsignalized	Westbound Left	A	9.4	0.020	B	11.9	0.060
		Northbound Left/Right	C	18.5	0.130	D	25.2	0.150

Note: All analyses were calculated in Synchro 8 software and reported using HCM 2000 intersection methodology

- <sup>a</sup> Level of Service
- <sup>b</sup> Average Delay (sec/vehicle)
- <sup>c</sup> Volume-to-Capacity Ratio



**TABLE 5**  
**2025 INTERSECTION CAPACITY ANALYSIS RESULTS -**  
**WEST GOVERNOR JOHN SEVIER HIGHWAY (SR 168) AT ROAD "B"**  
**OPENING YEAR (WITH PROJECT)**

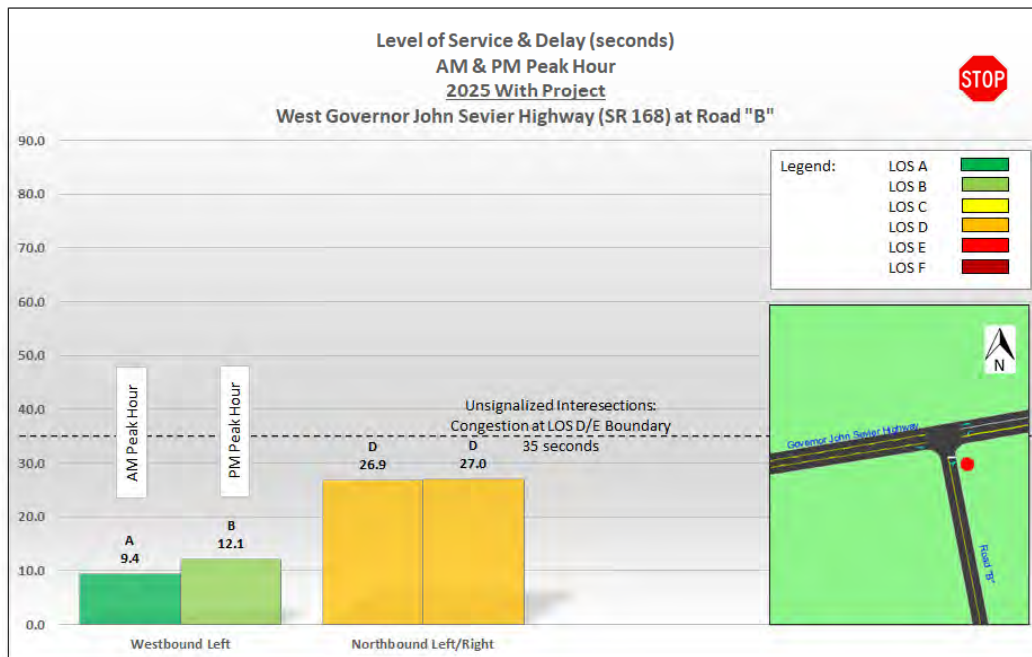
INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS	DELAY (seconds)	V/C	LOS	DELAY (seconds)	V/C
West Governor John Sevier Highway (SR 168) at Road "B"	 Unsignalized	Westbound Left	A	9.4	0.010	B	12.1	0.030
		Northbound Left/Right	D	26.9	0.290	D	27.0	0.190

Note: All analyses were calculated in Synchro 8 software and reported using HCM 2000 intersection methodology

<sup>a</sup> Level of Service

<sup>b</sup> Average Delay (sec/vehicle)

<sup>c</sup> Volume-to-Capacity Ratio



▪ **POTENTIAL SAFETY ISSUES:**

The study area was investigated for potential existing and future safety issues. A couple of features of the adjacent transportation system are discussed in the following pages.

■ **SPOT SPEED STUDY**

A spot speed study was conducted on West Governor John Sevier Highway (SR 168) to sample and tabulate the existing vehicle speeds along the road in the vicinity of the proposed development. The equipment used for the speed study was a Bushnell Speedster III Radar Speed Gun. The vehicles that were tabulated for the spot speed study were both the eastbound and westbound motorists along the highway next to the proposed site development property.

As expected, the results of the study indicate that most of the traffic along West Governor John Sevier Highway (SR 168) travels at a higher speed than the posted speed limit. The posted speed limit on West Governor John Sevier Highway (SR 168) is 50 mph. The results of the spot speed study indicate that the observed 85<sup>th</sup> percentile speed was 55.7 mph for eastbound traffic and 55.0 mph for westbound traffic. The spot speed field observations are provided in Appendix H.

■ **EVALUATION OF TURN LANE THRESHOLDS**

The West Governor John Sevier Highway (SR 168) at Road "A" and Road "B" intersections were evaluated for the need for separate right-turn lanes for entering vehicles into the development in the year 2025. Since a continuous center two-way left-turn lane (TWLTL) is already provided on West Governor John Sevier Highway (SR 168), an analysis for separate left-turn lanes was not conducted. The design policy that was used for these turn lane evaluations is based on "Knox County's Access Control and Driveway Design Policy". This design policy by Knox County relates vehicle volume thresholds based on prevailing speeds for two-lane and four-lane roadways. This Knox County policy is based on TDOT and nationally accepted guidelines for unsignalized intersections. Using these criteria, a determination was made whether turn lanes are warranted.

Based on the projected 2025 traffic volumes at the proposed intersections on West Governor John Sevier Highway (SR 168) and according to "Knox County's Access Control and Driveway Design Policy", a separate eastbound right-turn lane will be warranted on West Governor John Sevier

Highway (SR 168) for vehicles turning onto Road “B”. A separate right-turn lane at Road “A” is not warranted; however, after reviewing this study, the TDOT has recommended that a separate right-turn lane also be constructed at Road “A”. The Knox County turn lane policy worksheets are in Appendix I.

The speed classification that was chosen for this evaluation was based on the spot speed study on West Governor John Sevier Highway (SR 168) that showed the 85th percentile speed was 55.7 mph for eastbound traffic and 55.0 mph for westbound traffic. Therefore, to ensure a conservative result, and since the results of the speed study are right at the classification boundary, this study evaluation used the Knox County classification for speeds of 56 mph and greater with the calculated projected volumes.

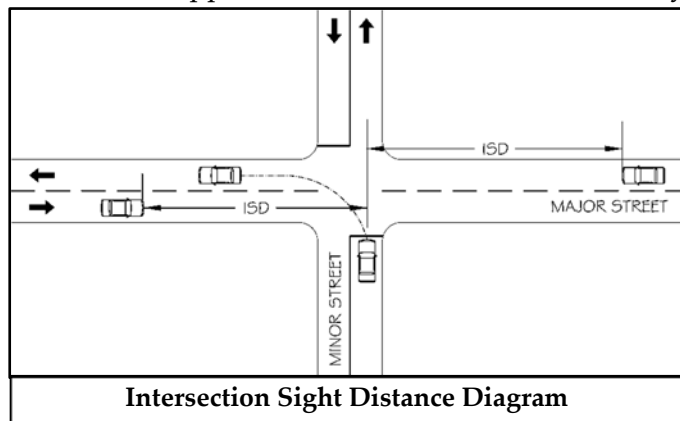
### ➤ EVALUATION OF SIGHT DISTANCE

For evaluating intersections, sight distance evaluations can be categorized into two categories: Stopping Sight Distance (SSD) and Intersection Sight Distance (ISD).

#### Methodology:

SSD is the distance required for a motorist to perceive, react, and for their vehicle to come to a complete stop before colliding with an object in the road. For evaluating intersections, this object would be another vehicle entering the intersection from a minor street. SSD can be considered the minimum visibility distance standard for evaluating the safety of an intersection.

ISD is based on the time required to perceive, react, and complete the desired traffic maneuver once a motorist on a minor street decides to perform a traffic maneuver. Three traffic maneuvers are available for vehicles stopped on a minor street at a 4-way intersection: left-turn from the minor road, right-turn from the minor road, and a crossing maneuver from the minor road across the major road. For turns from the minor street, ISD is needed to allow a stopped motorist on a minor street to turn



Intersection Sight Distance Diagram

onto a major street without being overtaken by an approaching vehicle. The most critical (longest) ISD is for left-turns from the minor street. The ISD for this maneuver includes the time to turn left and to clear half of the intersection without conflicting with the oncoming traffic from the left and to accelerate to the operating speed of the road without causing approaching vehicles from the right to substantially reduce their speed. SSD can be considered the desirable visibility distance standard for evaluating the safety of an intersection. In general, SSD is generally more important than ISD; however, the ISD must be at least the same distance or greater than SSD to provide safe operations at an intersection.

Based on the highest observed and calculated 85<sup>th</sup> percentile speed of 55.7 mph on West Governor John Sevier Highway (SR 168); the ISD would be 655 feet looking each direction at Road “A” and Road “B” based on the guidelines outlined in A Policy on Geometric Design of Highway and Streets by AASHTO (American Association of State Highway and Transportation Officials). Based on an observed and calculated 85<sup>th</sup> percentile speed of 55.7 mph on West Governor John Sevier Highway (SR 168) and a 3% grade, the SSD is calculated to be 530 feet for westbound vehicles (-3%) and 480 feet for eastbound vehicles (+3%).

A cursory examination of the sight distances on West Governor John Sevier Highway (SR 168) was undertaken. Based on visual observation, it appears that the intersection sight distance from the Road “A” and Road “B” locations at West Governor John Sevier Highway (SR 168) looking to the east and west is adequate. Using a Nikon Laser Rangefinder at the proposed location of the intersections, the intersection sight distances were estimated to be more than 999+ feet (limit of Nikon Rangefinder) to both the east and west.



**View of Sight Distance on West Governor John Sevier Highway (SR 168) at Road "A" Proposed Location (Looking West)**



**View of Sight Distance on West Governor John Sevier Highway (SR 168) at Road "A" Proposed Location (Looking East)**



**View of Sight Distance on West Governor John Sevier Highway (SR 168) at Road "B" Proposed Location (Looking West)**



**View of Sight Distance on West Governor John Sevier Highway (SR 168) at Road "B" Proposed Location (Looking East)**

## CONCLUSIONS & RECOMMENDATIONS

The following is an overview of recommendations to minimize the traffic impacts of the proposed development on the adjacent road system while attempting to achieve an acceptable level of traffic flow and safety.



### West Governor John Sevier Highway (SR 168) at Road "A":

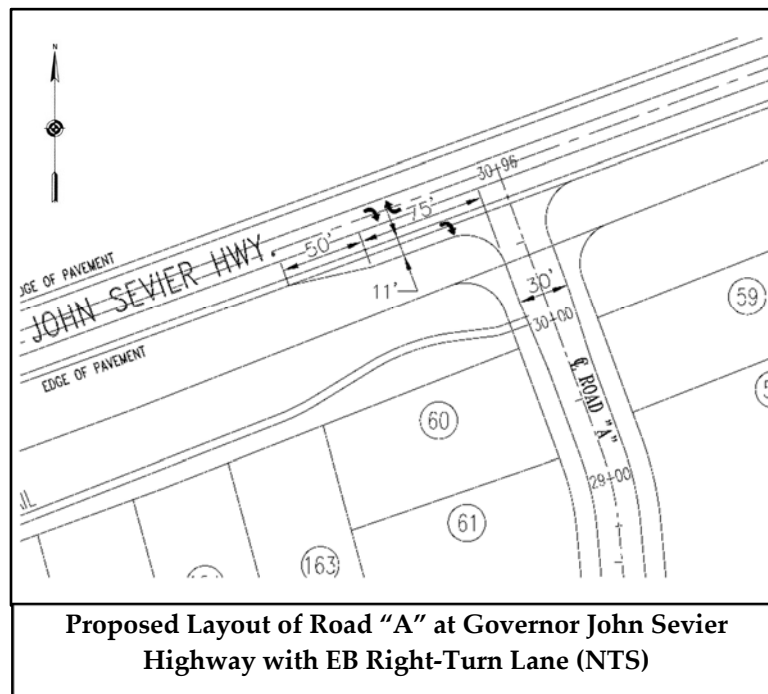
- 1a) From the capacity calculations, it has been shown (Table 4) that westbound left-turns from West Governor John Sevier into the development at Road "A" should operate very well during the AM and PM peak periods once the development becomes fully occupied. The level of service for exiting vehicles at Road "A" with a single lane will operate at a reduced level. For the AM and PM peak periods, northbound exiting vehicles will operate at LOS C and D, respectively. These lower levels of service are directly related to a large number of thru vehicles on West Governor John Sevier Highway (SR 168) in the peak periods that conflict with these future exiting turning movements.
  
- 1b) As part of the analysis of the intersection, the estimated queue lengths of the northbound exiting lane in the year 2025 were examined.

The previously mentioned Synchro Traffic Software includes SimTraffic. The Synchro portion of the software performs the macroscopic calculations for intersections and SimTraffic performs micro-simulation and animation of vehicular traffic. Both programs estimate 95th percentile vehicle queue lengths. The 95th percentile queue is a traditional measurement used when estimating vehicle queue distances. For this proposed intersection, the vehicle queue results were calculated from Synchro since SimTraffic is not able to accurately model intersections with continuous center two-way left-turn lanes (TWLTL) and their effects on vehicle gap acceptance. SimTraffic will only model vehicles to wait for gaps in both directions of traffic before turning (i.e. the vehicles are not allowed to cross halfway into the continuous center two-way left-turn lane (TWLTL) and wait for another gap to enter the opposite lane traffic stream). Due to this limitation, it is recommended that the Synchro 95<sup>th</sup> percentile vehicle queue results be used in these situations since it does account for two-stage left-turns if the median is sufficient enough to momentarily store a vehicle.




Based on the software results in Synchro with the projected volumes, the 95th percentile vehicle queue distance for the northbound approach at Road "A" with a single exiting lane was calculated to be 11 feet during the AM peak and 13 feet during the PM peak.

- 1c) As discussed earlier in Potential Safety Issues, Evaluation of Turn Lane Thresholds, the intersection of West Governor John Sevier Highway (SR 168) at Road "A" does not warrant an exclusive eastbound right-turn lane. However, after reviewing this study, the TDOT has recommended that a separate right-turn lane be constructed at Road "A". Typically, the length of a right-turn lane would be determined by calculating the stopping sight distance based on the observed operating speed. The length recommended in A Policy on Geometric Design of Highway and Streets by AASHTO is calculated to be 480 feet for eastbound vehicles to decelerate and stop from an observed 85<sup>th</sup> percentile speed of 55.7 mph. However, this recommended length is based on vehicles coming to a complete stop, and the right-turning vehicles coming off West Governor John Sevier Highway (SR 168) onto Road "A" will not completely stop. The civil site designer has proposed for a 75-foot right-turn storage length with a 50-foot taper. A diagram of this layout at Road "A" is provided below. The right-turn lane should be marked with the appropriate right-turn pavement marking symbols. With the recommended right-turn eastbound lane at Road "A", the capacity analysis was re-calculated, and the results are shown in Table 6.



**TABLE 6**  
**2025 INTERSECTION CAPACITY ANALYSIS RESULTS -**  
**WEST GOVERNOR JOHN SEVIER HIGHWAY (SR 168) AT ROAD "A"**  
**OPENING YEAR (WITH PROJECT) AND EB RIGHT TURN LANE**

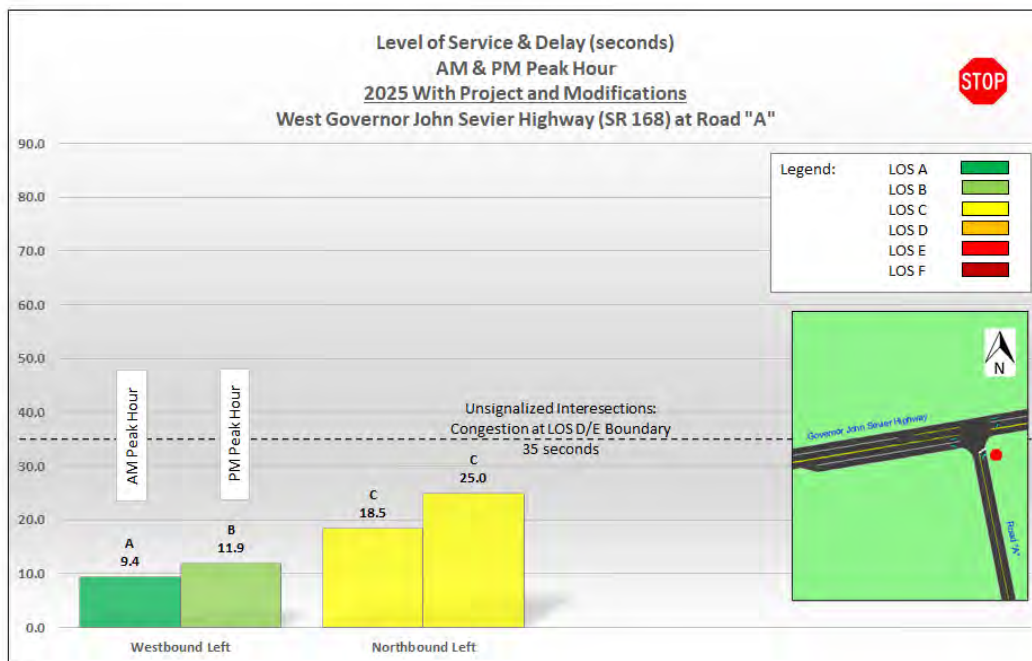
INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS	DELAY (seconds)	V/C	LOS	DELAY (seconds)	V/C
West Governor John Sevier Highway (SR 168) at Road "A"	 Unsignalized	Westbound Left	A	9.4	0.020	B	11.9	0.060
		Northbound Left	C	18.5	0.130	C	25.0	0.150

Note: All analyses were calculated in Synchro 8 software and reported using HCM 2000 intersection methodology

<sup>a</sup> Level of Service

<sup>b</sup> Average Delay (sec/vehicle)

<sup>c</sup> Volume-to-Capacity Ratio



- 1d) Sight distance at the new proposed Road "A" at West Governor John Sevier Highway (SR 168) intersection must not be impacted by new signage, future landscaping, or existing vegetation. The existing site is heavily forested and will need site clearing along the highway to ensure sight distances are adequate. Based on the highest observed and calculated 85<sup>th</sup> percentile speed of 55.7 mph on West Governor John Sevier Highway (SR 168), the required Intersection Sight Distance (ISD) is 655 feet and the Stopping Sight Distance (SSD) is 530 feet for westbound vehicles and 480 feet for eastbound vehicles. This should be verified in the design plans.

- 1e) It is recommended that the Road "A" entrance approach at West Governor John Sevier Highway (SR 168) be designed and constructed with a 24" white stop bar and a Stop Sign (R1-1). The continuous center two-way left-turn lane (TWLTL) of West Governor John Sevier Highway (SR 168) should be re-striped to accommodate the new intersection with the new turning movements. This would involve installing breaks in the striping in the existing continuous center two-way left-turn lane (TWLTL).
  
- 1f) After reviewing this study, TDOT and Knox County has recommended that the entrance for Road "A" be designed with a wider width of 30 feet to accommodate larger vehicles.



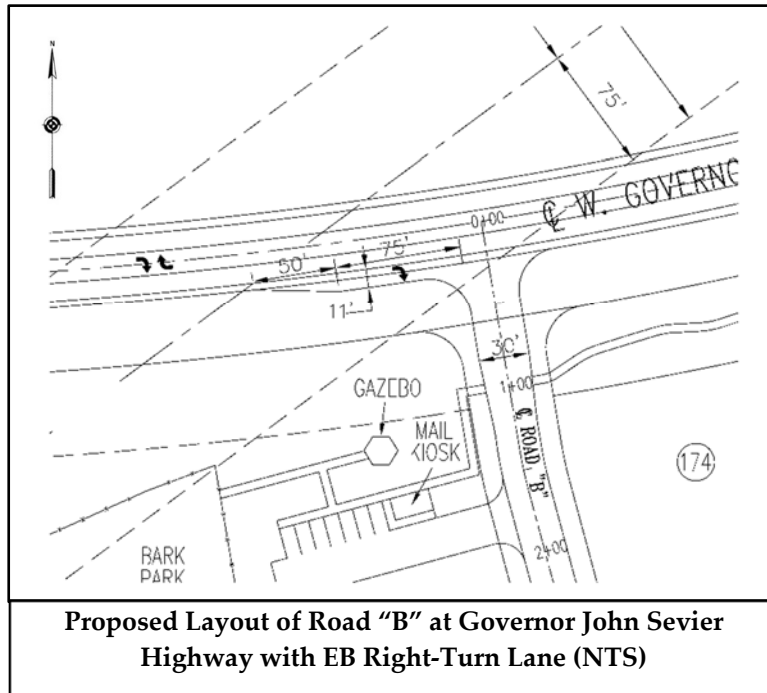
**West Governor John Sevier Highway (SR 168) at Road "B":**

- 2a) From the capacity calculations, it has been shown (Table 5) that westbound left-turns from West Governor John Sevier into the development at Road "B" should operate very well during the AM and PM peak periods once the development becomes fully occupied. The level of service for exiting vehicles at Road "B" with a single lane will operate at a reduced level. For the AM and PM peak periods, northbound exiting vehicles will operate at LOS D. These lower levels of service are directly related to a large number of thru vehicles on West Governor John Sevier Highway (SR 168) in the peak periods that conflict with these future exiting turning movements.
- 2b) As part of the analysis of the intersection, the estimated queue lengths of the northbound exiting lane in the year 2025 were examined.


As discussed in the previous section, with the limitations in the traffic software with respect to unsignalized divided highway intersections, it is recommended that the Synchro 95<sup>th</sup> percentile vehicle queue results be used since it does account for two-stage left-turns with a median sufficient to store a vehicle. Based on the software results in Synchro with the projected volumes, the 95<sup>th</sup> percentile queue distance for the northbound approach at Road "B" was calculated to be 29 feet during the AM peak and 17 feet during the PM peak.

- 2c) As discussed earlier in Potential Safety Issues, Evaluation of Turn Lane Thresholds, the intersection of West Governor John Sevier Highway (SR 168) at Road "B" does warrant an exclusive eastbound right-turn lane. Typically, the length of a right-turn lane would be determined by calculating the stopping sight distance based on the observed operating speed. The length recommended in A Policy on Geometric Design of Highway and Streets by AASHTO is calculated to be 480 feet for eastbound vehicles to decelerate and stop from an observed 85<sup>th</sup> percentile speed of 55.7 mph. However, this recommended length is based on vehicles coming to a complete stop, and the right-turning vehicles coming off West Governor John Sevier Highway (SR 168) onto Road "B" will not completely stop. The civil site designer has proposed for a 75-foot right-turn storage length with a 50-foot taper. A diagram of this layout at Road "B" is provided below. The right-turn lane should be marked with the appropriate right-turn pavement marking symbols. With the recommended right-turn eastbound lane at Road

“B”, the capacity analysis was re-calculated, and the results are shown in Table 7.



**TABLE 7**  
**2025 INTERSECTION CAPACITY ANALYSIS RESULTS -**  
**WEST GOVERNOR JOHN SEVIER HIGHWAY (SR 168) AT ROAD "B"**  
**OPENING YEAR (WITH PROJECT) AND EB RIGHT TURN LANE**

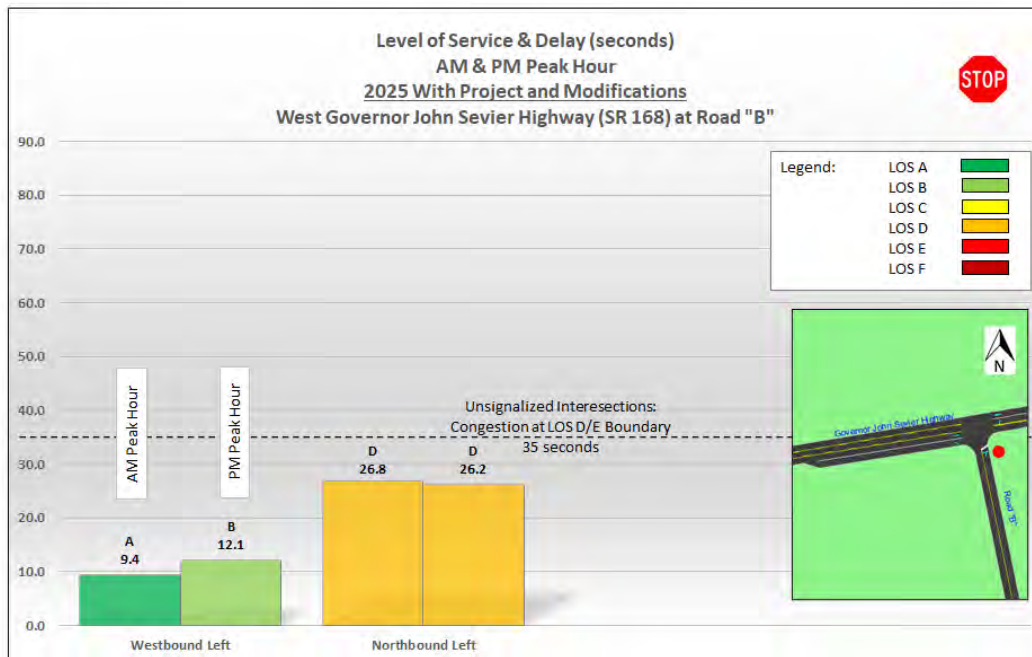
INTERSECTION	TRAFFIC CONTROL	APPROACH/MOVEMENT	AM PEAK			PM PEAK		
			LOS	DELAY (seconds)	V/C	LOS	DELAY (seconds)	V/C
West Governor John Sevier Highway (SR 168) at Road "B"	 Unsignalized	Westbound Left	A	9.4	0.010	B	12.1	0.030
		Northbound Left	D	26.8	0.290	D	26.2	0.190

Note: All analyses were calculated in Synchro 8 software and reported using HCM 2000 intersection methodology

<sup>a</sup> Level of Service

<sup>b</sup> Average Delay (sec/vehicle)

<sup>c</sup> Volume-to-Capacity Ratio



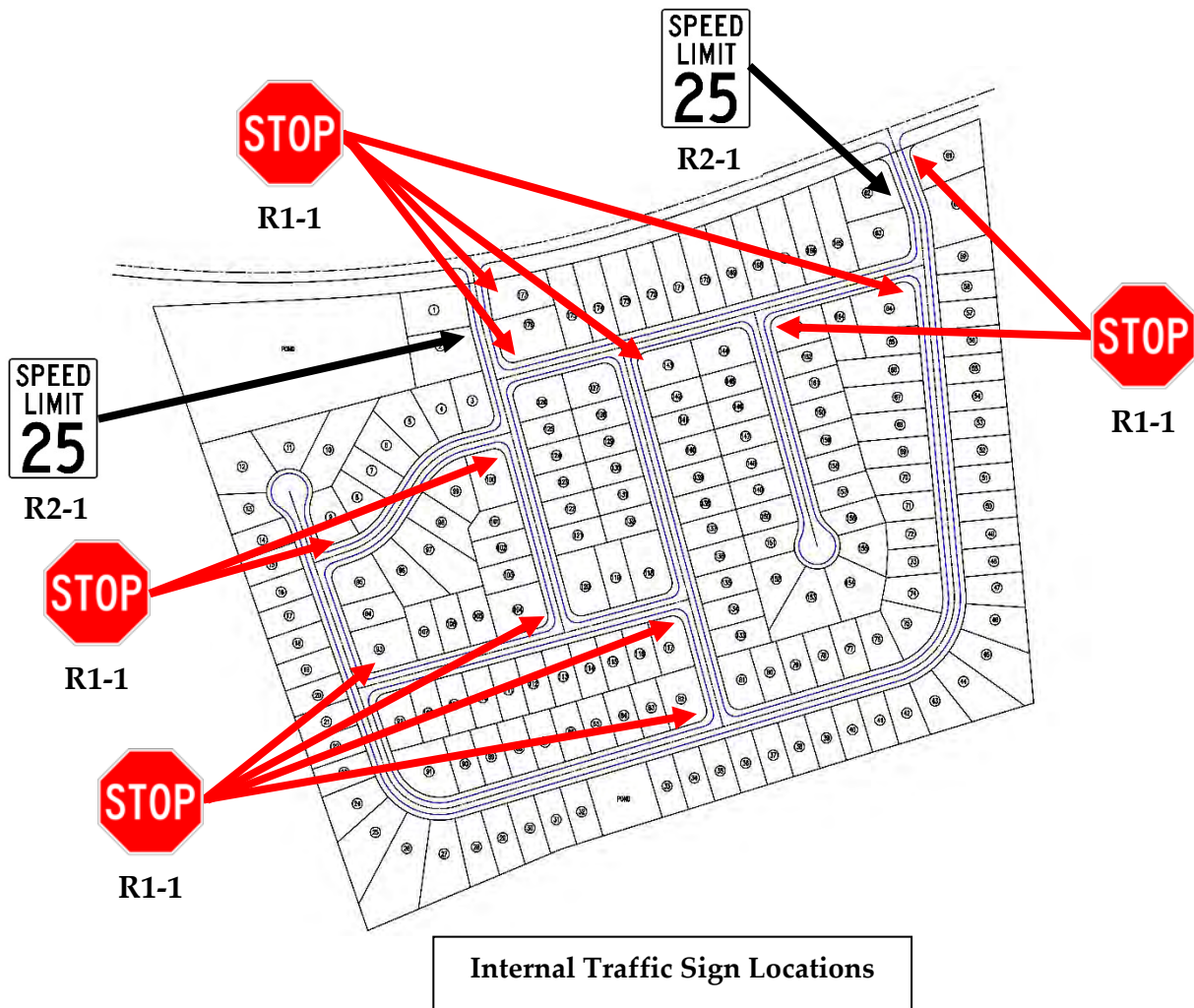
2d) Sight distance at the new proposed Road "B" at West Governor John Sevier Highway (SR 168) intersection must not be impacted by new signage, future landscaping, or existing vegetation. The existing site is heavily forested and will need site clearing along the highway to ensure sight distances are adequate. Based on the highest observed and calculated 85<sup>th</sup> percentile speed of 55.7 mph on West Governor John Sevier Highway (SR 168), the required Intersection Sight Distance (ISD) is 655 feet and the Stopping Sight Distance (SSD) is 530 feet for westbound vehicles and 480 feet for eastbound vehicles. This should be verified in the design plans.

- 2e) It is recommended that the Road "B" entrance approach at the intersection with West Governor John Sevier Highway (SR 168) be designed and constructed with a 24" white stop bar and a Stop Sign (R1-1). The continuous center two-way left-turn lane (TWLTL) of West Governor John Sevier Highway (SR 168) should be re-striped to accommodate the new intersection with the new turning movements. This would involve installing breaks in the striping in the existing continuous center two-way left-turn lane (TWLTL).
  
- 2f) After reviewing this study, TDOT and Knox County has recommended that the entrance for Road "B" be designed with a wider width of 30 feet to accommodate larger vehicles.



**Perry Smith Development on Governor John Sevier Highway Subdivision Internal Roads:** The current concept plan shows seven new streets being constructed within the development as shown in Figure 3.

- 3a) It is recommended that 25-mph Speed Limit Signs (R2-1) be posted near the front of both new streets off West Governor John Sevier Highway (SR 168).
- 3b) Stop Signs (R1-1) with white stop bars and the other traffic signage should be installed at the locations as shown below:



- 3c) Sight distance at the new intersections in the subdivision must not be impacted by new signage or future landscaping. For a posted speed limit of 25-mph in the subdivision, the intersection sight distance requirement is 250 feet. The stopping sight distance



required is 155 feet for a level road grade. The road layout designer should ensure that these sight distance lengths are met, and they should be labeled on the plans.

3d) All drainage grates and covers for the residential development need to be pedestrian and bicycle safe.

3e) Sidewalks are not shown on the concept plan. If the development does install internal sidewalks, they should have appropriate ADA compliant curbed ramps at intersection corners and the sidewalks are recommended to be 5 feet minimum in width.

3f) The United States Postal Service (USPS) has recently implemented changes to its guidelines for delivery in new residential subdivisions. If directed by the local post office, the designer should include an area within the development with a parking area for a centralized mail delivery center.



3g) Traffic calming measures might be needed for this development. The proposed Road "A" horizontal alignment within the development has a very long and straight road segment. The possible need for traffic calming measures inside the development for Road "A" will need to be coordinated with Knox County Engineering and Public Works during the detailed design phase. Speed humps could be considered to lower speeds through this portion of the subdivision.

3h) All road grade and intersection elements internally and externally should be designed to AASHTO, TDOT, and Knox County specifications and guidelines to ensure proper operation.



**TDOT and Knox County Driveway Regulations and Considerations:** TDOT has a detailed process for new entrances being constructed onto state highways. The Manual for Constructing Driveway Entrances on State Highways published by TDOT has several guidelines that pertain to this development.

- 4a) Number of Entrances: According to the TDOT manual, “For single-family residential properties, only one driveway shall be allowed unless the frontage is 200 feet or greater, then a second driveway may be allowed.” This residential development has over 1,800 feet of highway frontage property on West Governor John Sevier Highway (SR 168). Thus, with two entrances, this development is within the TDOT guidelines.
  
- 4b) It is recommended, and it is appropriate, that this development is constructed with two entrances at West Governor John Sevier Highway (SR 168). Providing two entrances would provide a secondary outlet for the subdivision and would be beneficial to ensure access during any potential road blockage or emergency. It is a long-standing practice by Knox County that residential subdivisions provide secondary outlets when developments exceed 150 lots. Furthermore, providing two entrances will spread the load of entering and exiting vehicles and will allow overall vehicle delays to stay below the congestion boundary of LOS D/E. The two entrances are spaced 950 feet apart and are not expected to interfere with traffic operations at one another.
  
- 4c) The Knox County requirement for intersection spacing on an arterial is 400 feet. This requirement is met based on the design of the entrances being spaced 950 feet apart.

**APPENDIX A**

**HISTORICAL TRAFFIC COUNT DATA**

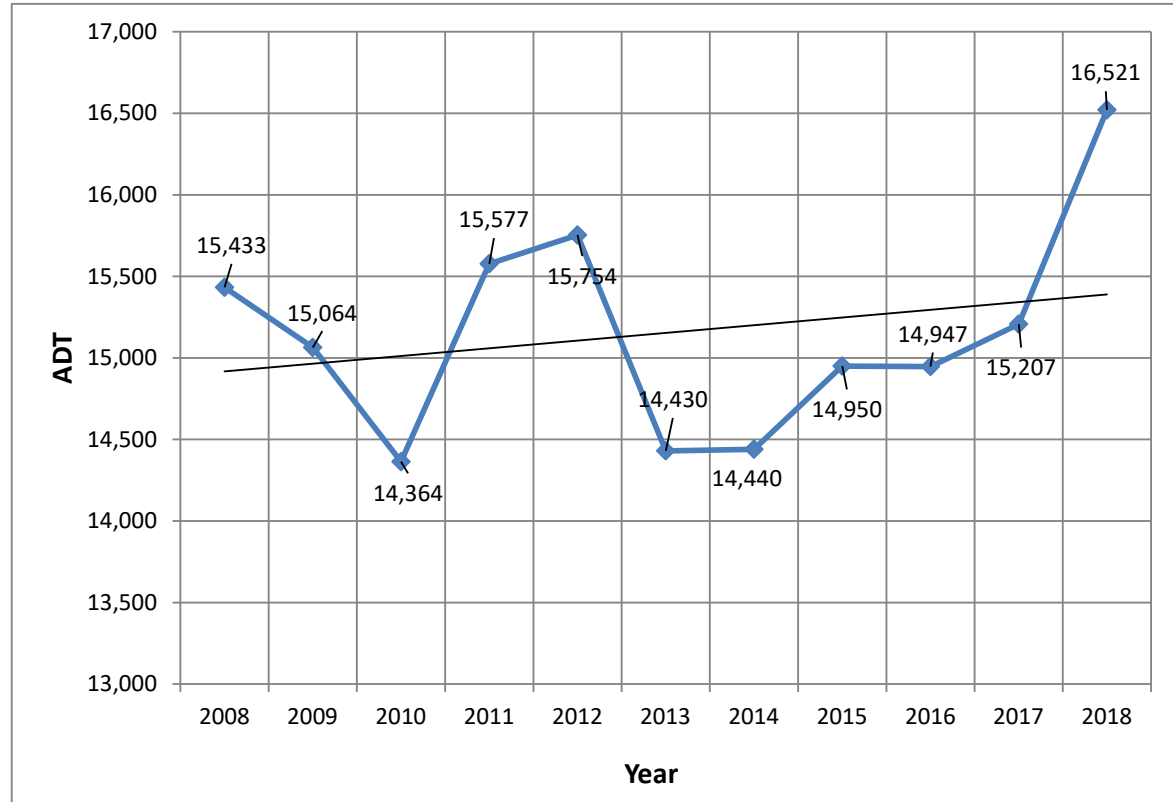
## Historical Traffic Counts

Organization: TDOT

Station ID #: 000290

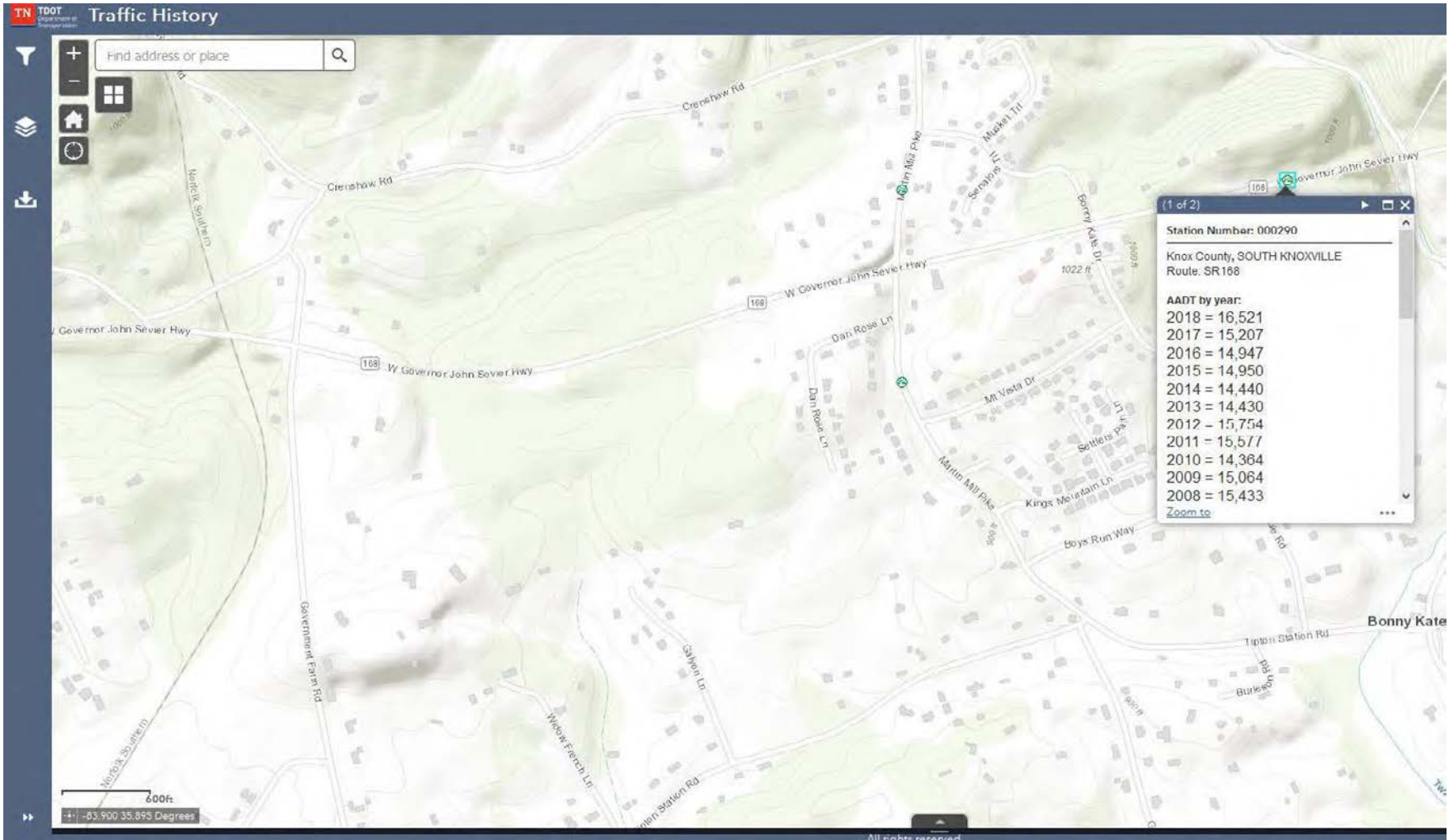
Location: West Governor John Sevier Highway (east of Martin Mill Pike)

YEAR	ADT	Trendline
2008	15,433	
2009	15,064	
2010	14,364	
2011	15,577	
2012	15,754	
2013	14,430	
2014	14,440	
2015	14,950	
2016	14,947	
2017	15,207	
2018	16,521	



2008 - 2018 Growth Rate = 7.0%

Average Annual Growth Rate = 0.7%




## **APPENDIX B**

### **WALK SCORE**

# WALKSCORE


(from walkscore.com)




**Walk Score**  [Get Scores](#) [Find Apartments](#) [My Favorites](#) [Add to Your Site](#)

Type an address, neighborhood or city


## 2500 West Governor John Sevier Highway

Knoxville, Tennessee, 37920

Commute to **Downtown Knoxville** 

 28 min  48 min  60+ min [View Routes](#)

[Favorite](#) [Map](#) [Nearby Apartments](#)


[Looking for a home for sale in Knoxville?](#) 

**Walk Score**  
**1**  
**Car-Dependent**  
Almost all errands require a car.

**Transit Score**  
**0**  
**Minimal Transit**  
It is possible to get on a bus.

**Bike Score**  
**9**  
**Somewhat Bikeable**  
Minimal bike infrastructure.

[About your score](#)  
[Add scores to your site](#)



## Scores for 2500 West Governor John Sevier Highway ✕

Walk Score  
**1**

Bike Score  
**9**



## Scores for 2500 West Governor John Sevier Highway ✕

Walk Score  
**1**

Bike Score  
**9**

Walk Score	Transit Score	Bike Score
------------	---------------	------------

Transit Score measures how well a location is served by public transit based on the distance and type of nearby transit lines.

<b>90-100</b>	<b>Rider's Paradise</b> World-class public transportation
<b>70-89</b>	<b>Excellent Transit</b> Transit is convenient for most trips
<b>50-69</b>	<b>Good Transit</b> Many nearby public transportation options
<b>25-49</b>	<b>Some Transit</b> A few nearby public transportation options
<b>0-24</b>	<b>Minimal Transit</b> It is possible to get on a bus



## Scores for 2500 West Governor John Sevier Highway ✖

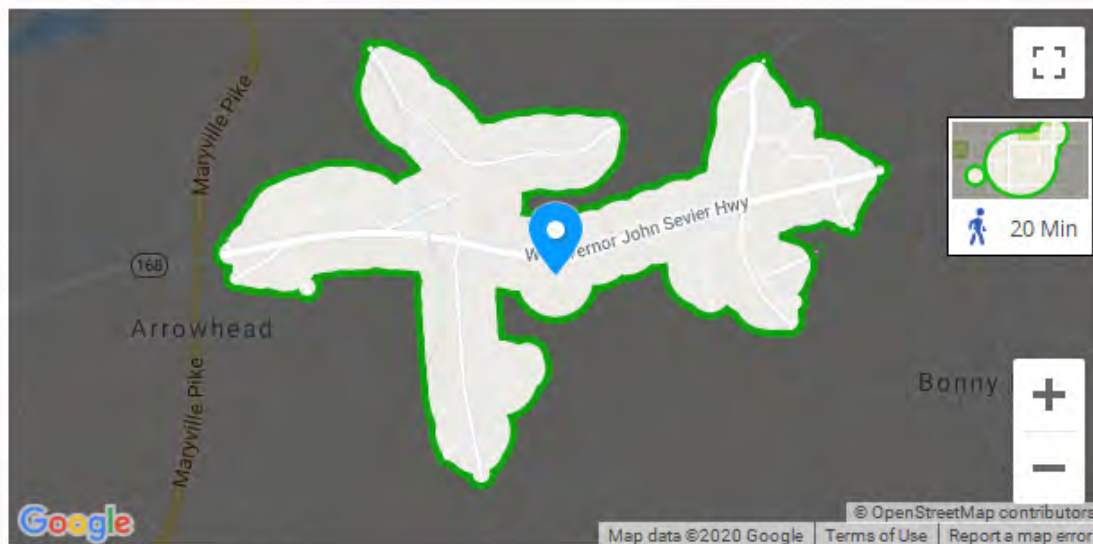


Walk Score	Transit Score	Bike Score
Bike Score measures whether an area is good for biking based on bike lanes and trails, hills, road connectivity, and destinations.		
90-100	<b>Biker's Paradise</b>	Daily errands can be accomplished on a bike
70-89	<b>Very Bikeable</b>	Biking is convenient for most trips
50-69	<b>Bikeable</b>	Some bike infrastructure
0-49	<b>Somewhat Bikeable</b>	Minimal bike infrastructure

## Travel Time Map

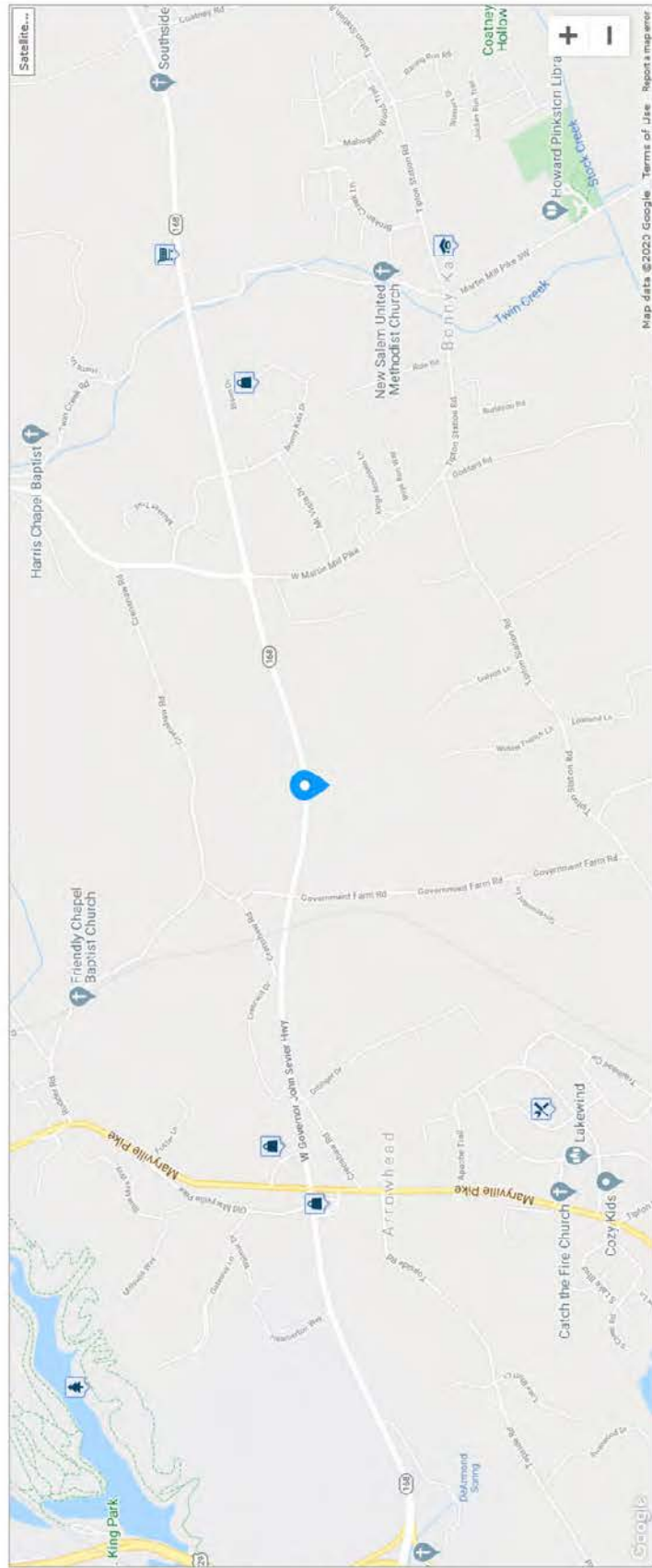
[Add to your site](#)

Explore how far you can travel by car, bus, bike and foot from 2500 West Governor John Sevier Highway.



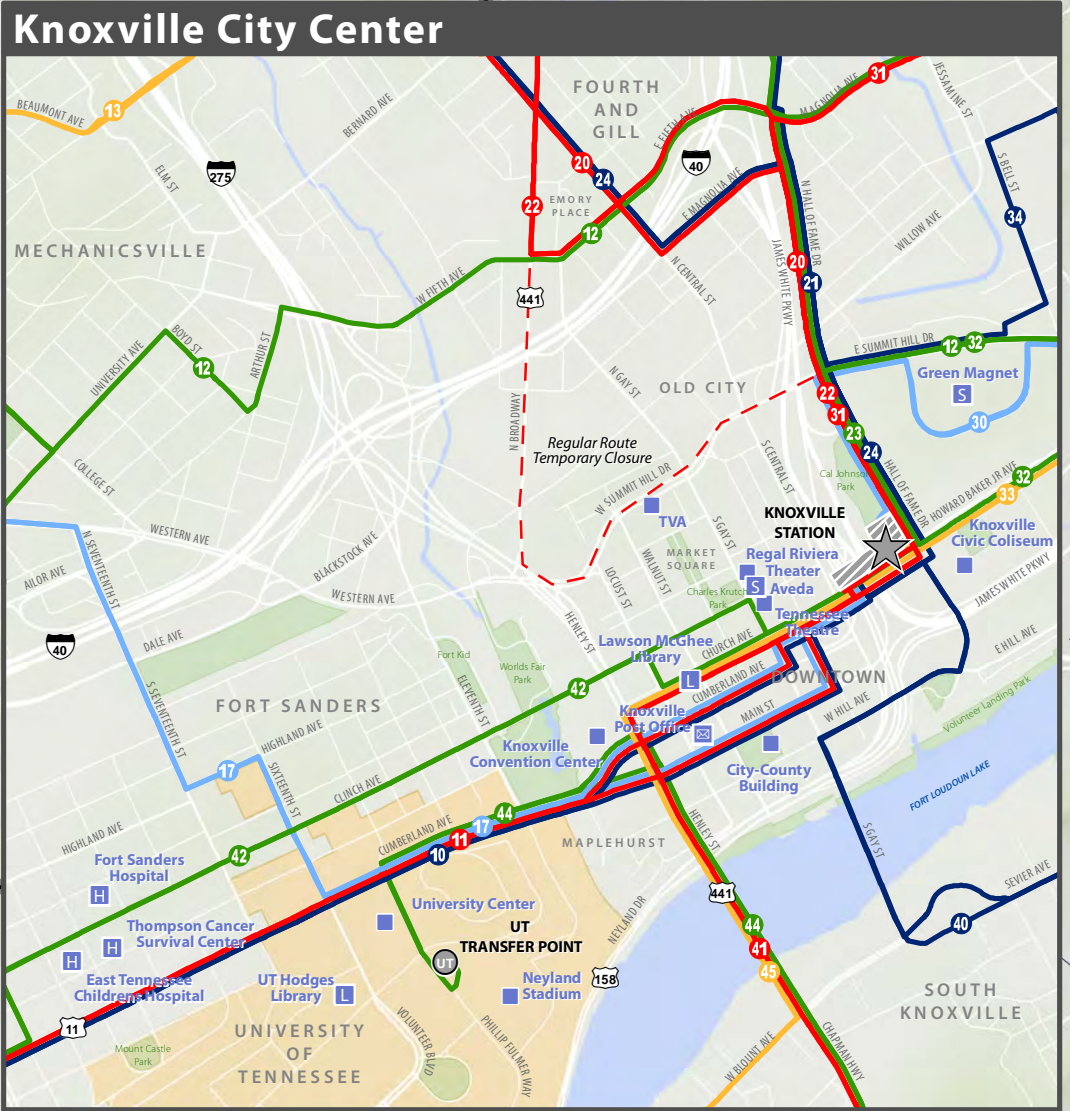
### What's Nearby

- Restaurants:** Sweet P's Barbeque & Sou H... 1.6mi >
- Coffee:** Paleo Foods Cafe 2.7mi >
- Bars:** Rage n Rebel and Grill 2.1mi >
- Groceries:** Fit Stop Drive Thru 9mi >
- Parks:** I.C. King Park 1.5mi >
- Schools:** Bonny Kate Elementary School 1.2mi >
- Shopping:** Dollar General 9mi >
- Entertainment:** Basement Records 3.1mi >
- Errands:** Rachel L Lemons 9mi >
- Search Nearby:** >



**APPENDIX C**

**KNOXVILLE AREA TRANSIT MAP AND INFORMATION**



**Legend**

- Transfer Point
- Lift Service Area Boundary

**Points of Interest**

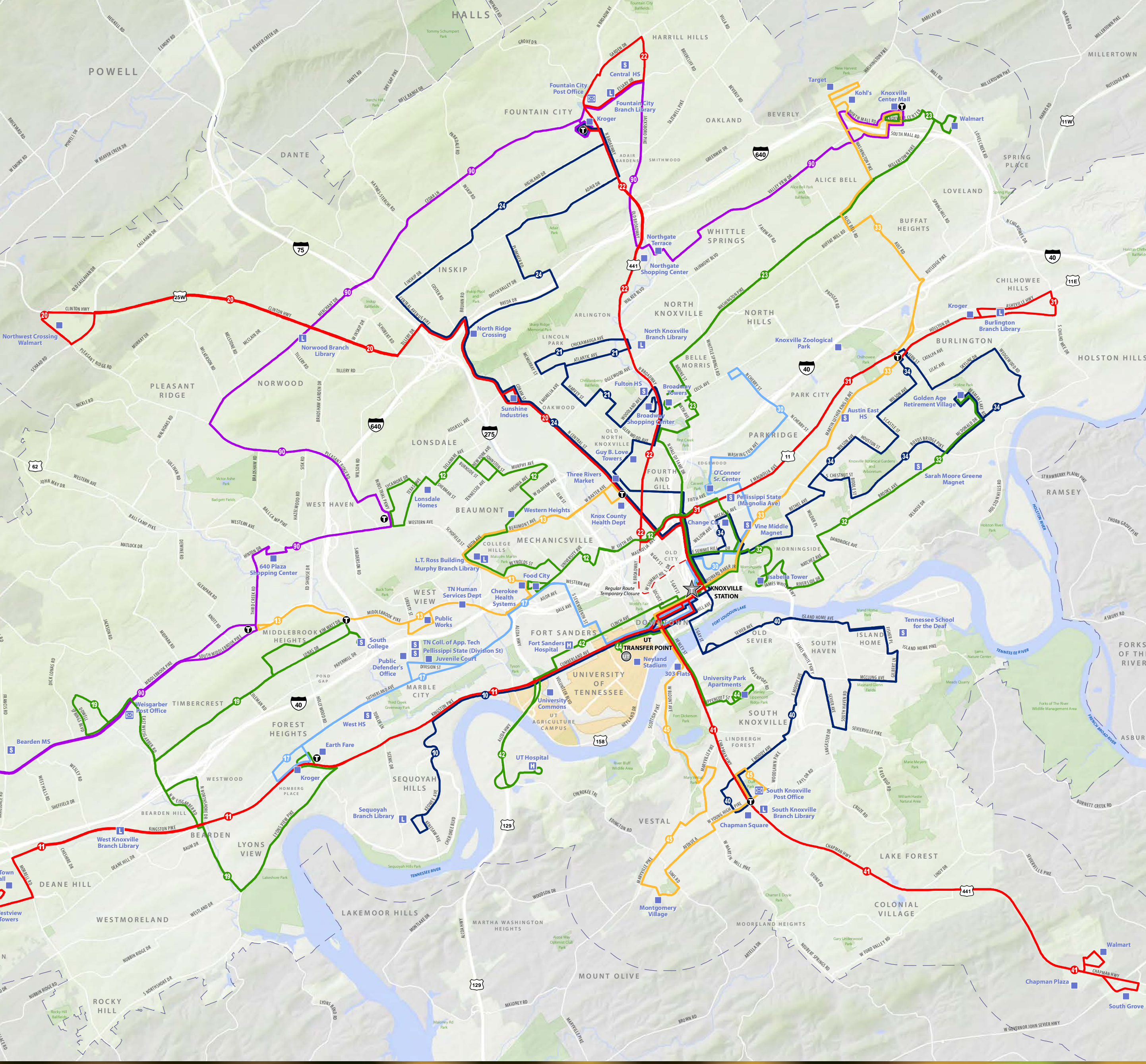
- Hospital
- Library
- Post Office
- School
- Point of Interest

**Distances**

0 5 10 Minutes Walking

0 5 10 Minutes Biking

0 0.5 1 Map Scale in Miles



# FARE INFORMATION

With a base fare of \$1.50, KAT offers a variety of passes. Please note that only the fares marked with an asterisk can be purchased when boarding the bus. Others are available at KAT's Customer Service Counter at Knoxville Station (301 Church Ave.) or by mail via [katbus.com](http://katbus.com).

FARE TYPE	REGULAR FARE	REDUCED FARE
One-Ride Pass*	\$1.50	\$0.75
1 Day Pass*	\$4.00	\$2.00
7 Day Pass	\$15.00	\$7.50
30 Day Pass	\$50.00	\$25.00
20 Ride Pass	\$25.00	\$12.50
Transfer*	\$0.50	\$0.25

## REDUCED FARE INFORMATION

A reduced fare is available to those who qualify. Qualifying individuals include seniors age 65 or over, Medicare card holders, students under the age of 18, and persons with disabilities. Proper identification (Medicare card or a valid KAT I.D. card) is required before boarding. For more information on how to obtain a discounted-fare I.D. visit [katbus.com/fares](http://katbus.com/fares) or call 637-3000.

## BUS STOPS ONLY!

KAT buses stop ONLY at locations designated by bus stop signs. Generally, bus stops are located at least every 1/4 mile along the route.

## KAT HOLIDAYS

KAT buses do not run on the following holidays:

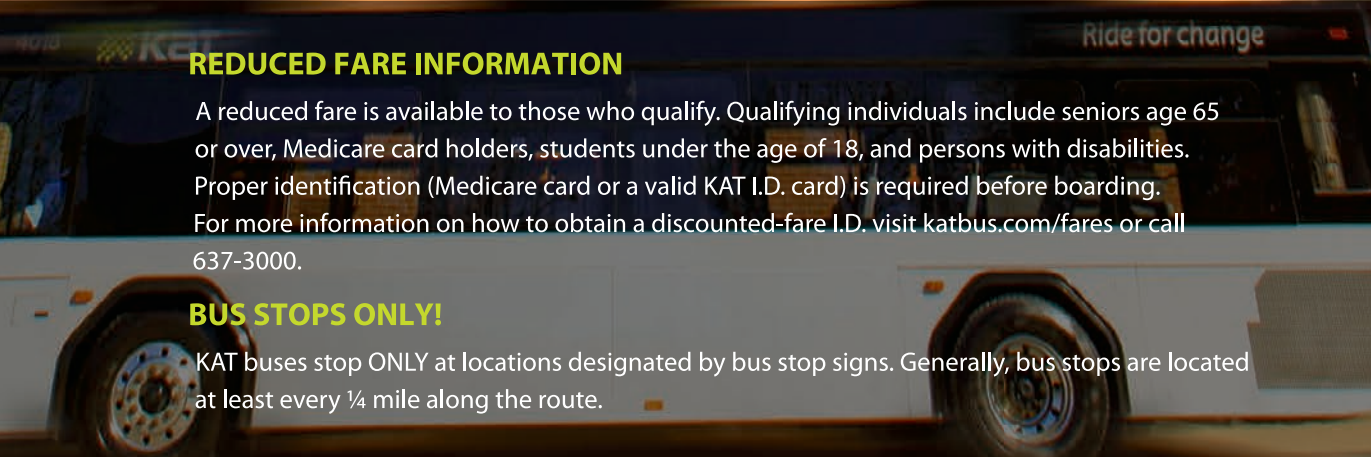
- New Year's Day
- Thanksgiving
- Independence Day
- Christmas

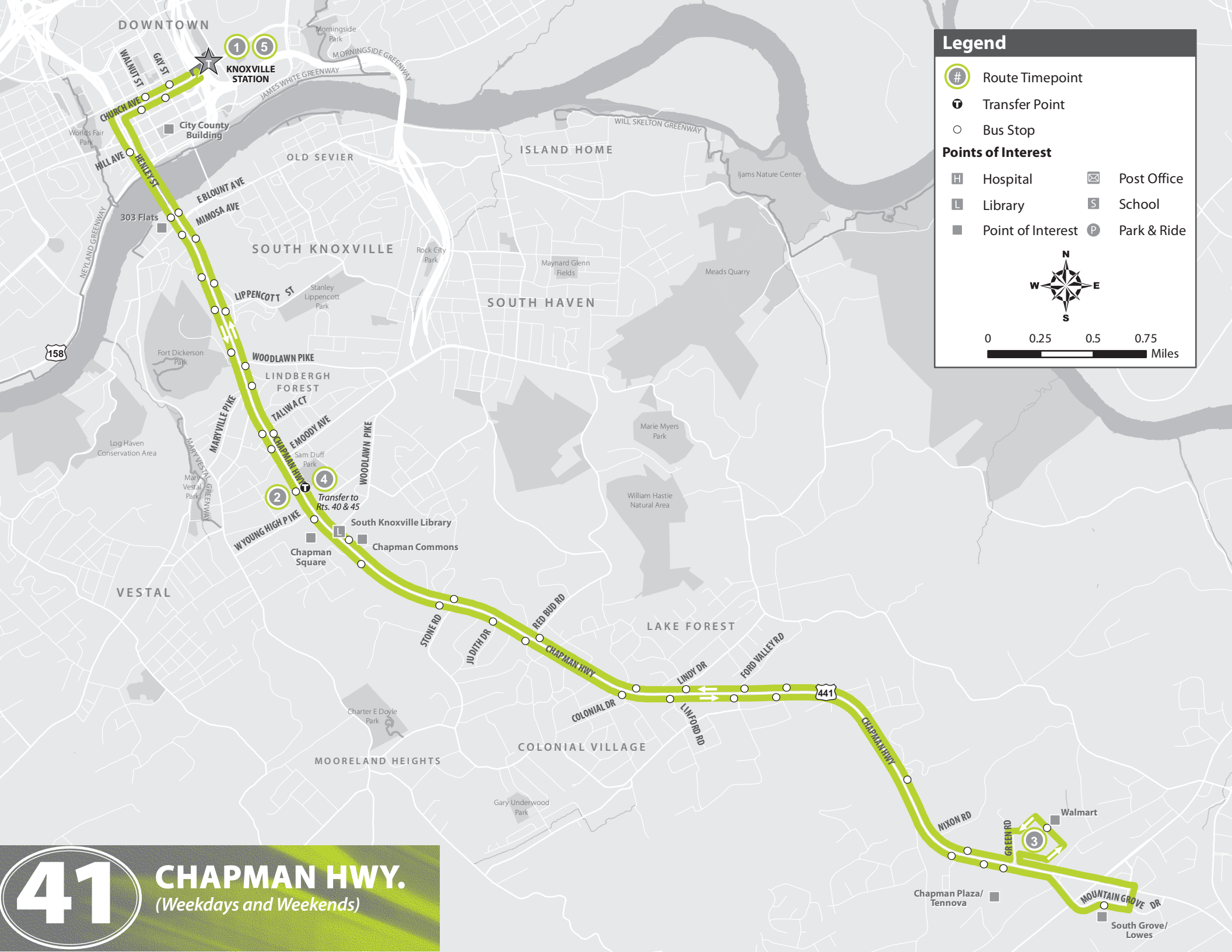
Please note that KAT's Knoxville Station Customer Service counter is also closed during those days.

KAT buses run on a Saturday schedule on the following holidays:

- Martin Luther King, Jr. Day
- Day after Thanksgiving
- Memorial Day
- Christmas Eve
- Labor Day

*KAT's administrative offices are closed on all holidays listed above.*





### Legend

- Route Timepoint
  - Transfer Point
  - Bus Stop
- Points of Interest**
- Hospital
  - Library
  - Point of Interest
  - Post Office
  - School
  - Park & Ride



**41** **CHAPMAN HWY.**  
*(Weekdays and Weekends)*

**1** **5**  
**KNOXVILLE STATION**

**2** **4**  
**Transfer to Rts. 40 & 45**

**3**

158

441

Walmart

Chapman Plaza/  
Tennova

South Grove/  
Loves

DOWNTOWN

City County Building

OLD SEVIER

ISLAND HOME

SOUTH KNOXVILLE

SOUTH HAVEN

VESTAL

LAKE FOREST

MOORELAND HEIGHTS

COLONIAL VILLAGE

Walmart

Chapman Plaza/  
Tennova

South Grove/  
Loves

DOWNTOWN

City County Building

OLD SEVIER

ISLAND HOME

SOUTH KNOXVILLE

SOUTH HAVEN

VESTAL

LAKE FOREST

MOORELAND HEIGHTS

COLONIAL VILLAGE

Walmart

Chapman Plaza/  
Tennova

South Grove/  
Loves

# 41

## CHAPMAN HIGHWAY

(Weekdays and Weekends)

### SERVES:

- ★ Chapman Commons
- ★ Chapman Plaza
- ★ Chapman Square
- ★ Knoxville Station/Downtown
- ★ South Grove Shopping Center

South Knoxville Branch Library  
Tennova South  
Walmart



Effective Date: January 6, 2020

	Going away from Downtown			Going toward Downtown	
	Knoxville Station—Platform P	Chapman Hwy. past Moody	Walmart	Chapman Hwy. past Young High Pike	Knoxville Station
	1	2	3	4	5
WEEKDAY SCHEDULE					
A.M.			5:41	5:50	6:10
	6:15	6:26	6:41	6:50	7:10
	6:45	6:56	7:11	7:20	7:40
	7:15	7:26	7:41	7:50	8:10
	7:45	7:56	8:11	8:20	8:40
	8:15	8:26	8:41	8:50	9:10
	8:45	8:56	9:11	9:20	9:40
	9:15	9:26	9:41	9:50	10:10
	9:45	9:56	10:11	10:20	10:40
	10:15	10:26	10:41	10:50	11:10
	10:45	10:56	11:11	11:20	11:40
	11:15	11:26	11:41	11:50	12:10
	11:45	11:56	12:11	12:20	12:40
P.M.	12:15	12:26	12:41	12:50	1:10
	12:45	12:56	1:11	1:20	1:40
	1:15	1:26	1:41	1:50	2:10
	1:45	1:56	2:11	2:20	2:40
	2:15	2:26	2:41	2:50	3:10
	2:45	2:56	3:11	3:20	3:40
	3:15	3:26	3:41	3:50	4:10
	3:45	3:56	4:11	4:20	4:40
	4:15	4:26	4:41	4:50	5:10
	4:45	4:56	5:11	5:20	5:40
	5:15	5:26	5:41	5:50	6:10
	5:45	5:56	6:11	6:20	6:40
	6:15	6:26	6:41	6:50	7:10
	6:45	6:56	7:11	7:20	7:40
	7:15	7:26	7:41	7:50	8:10
	7:45	7:56	8:11	8:20	8:40
	8:15	8:26	8:41	8:50	9:10
	8:45	8:56	9:11	9:20	9:40
	9:15	9:26	9:41	9:50	10:10
	9:45	9:56	10:11	10:20	10:40
	10:15	10:26	10:41	10:50	11:10
	11:15	11:26	11:41	11:50	To Garage

	Going away from Downtown			Going toward Downtown	
	Knoxville Station—Platform P	Chapman Hwy. past Moody	Walmart	Chapman Hwy. past Young High Pike	Knoxville Station
	1	2	3	4	5
SATURDAY SCHEDULE					
A.M.	7:15	7:26	7:41	7:50	8:10
	7:45	7:56	8:11	8:20	8:40
	8:15	8:26	8:41	8:50	9:10
	8:45	8:56	9:11	9:20	9:40
	9:15	9:26	9:41	9:50	10:10
	9:45	9:56	10:11	10:20	10:40
	10:15	10:26	10:41	10:50	11:10
	10:45	10:56	11:11	11:20	11:40
	11:15	11:26	11:41	11:50	12:10
	11:45	11:56	12:11	12:20	12:40
P.M.	12:15	12:26	12:41	12:50	1:10
	12:45	12:56	1:11	1:20	1:40
	1:15	1:26	1:41	1:50	2:10
	1:45	1:56	2:11	2:20	2:40
	2:15	2:26	2:41	2:50	3:10
	2:45	2:56	3:11	3:20	3:40
	3:15	3:26	3:41	3:50	4:10
	3:45	3:56	4:11	4:20	4:40
	4:15	4:26	4:41	4:50	5:10
	4:45	4:56	5:11	5:20	5:40
	5:15	5:26	5:41	5:50	6:10
	5:45	5:56	6:11	6:20	6:40
	6:15	6:26	6:41	6:50	7:10
	6:45	6:56	7:11	7:20	7:40
	7:15	7:26	7:41	7:50	8:10
	7:45	7:56	8:11	8:20	8:40
	8:15	8:26	8:41	8:50	9:10
	8:45	8:56	9:11	9:20	9:40
	9:15	9:26	9:41	9:50	10:10
	9:45	9:56	10:11	10:20	10:40
	10:15	10:26	10:41	10:50	11:10
	10:45	10:56	11:11	11:20	11:40
	11:15	11:26	11:41	11:50	To Garage
SUNDAY SCHEDULE					
A.M.	8:15	8:26	8:41	8:50	9:10
	9:15	9:26	9:41	9:50	10:10
	10:15	10:26	10:41	10:50	11:10
	11:15	11:26	11:41	11:50	12:10
P.M.	12:15	12:26	12:41	12:50	1:10
	1:15	1:26	1:41	1:50	2:10
	2:15	2:26	2:41	2:50	3:10
	3:15	3:26	3:41	3:50	4:10
	4:15	4:26	4:41	4:50	5:10
	5:15	5:26	5:41	5:50	6:10
	6:15	6:26	6:41	6:50	7:10
	7:15	7:26	7:41	7:50	8:10
	8:15	8:26	8:41	To Garage	

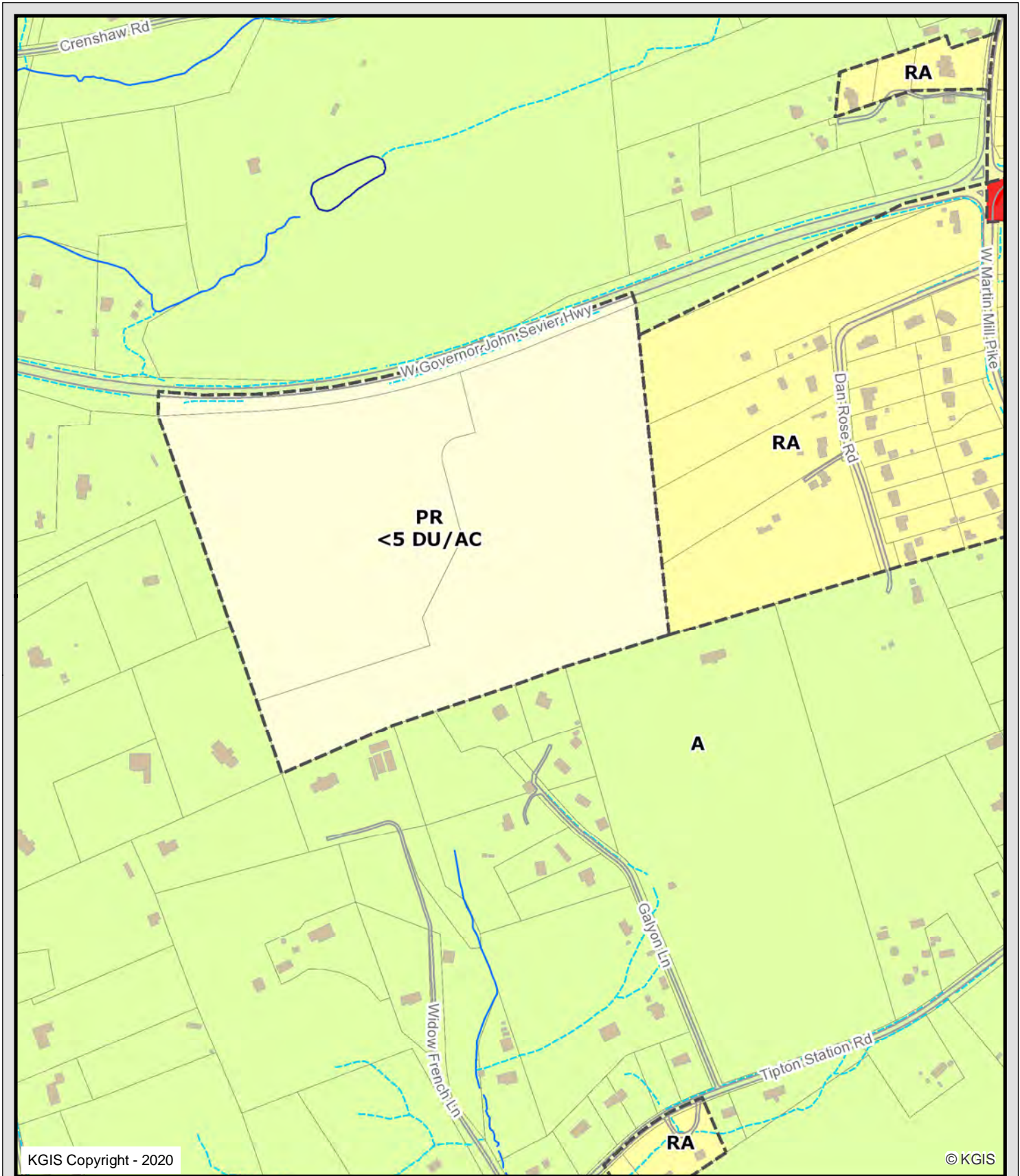
Need help reading this schedule?

Need other general information on how to ride?

[Click here to Download the General Schedule Information pdf](#) available from [katbus.com](http://katbus.com)

**APPENDIX D**

**ZONING MAP**



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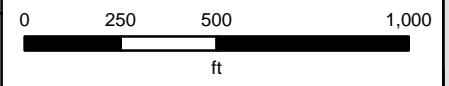
## John Sevier Highway Subdivision

Zoning Map

**Knoxville - Knox County - KUB Geographic Information System**



Printed: 5/18/2020 at 12:05:08 PM



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**APPENDIX E**

**MANUAL TRAFFIC COUNT DATA**

**CDM SMITH Inc.**  
 1100 Marion Street, Suite 300  
 Knoxville, TN 37921  
 (865) 963-4300

File Name : JohnSevier\_MartinMill  
 Site Code : 00000001  
 Start Date : 4/22/2016  
 Page No : 1

Groups Printed- Unshifted

Start Time	MARTIN MILL PK Southbound				JOHN SEVIER HWY Westbound				MARTIN MILL PK Northbound				JOHN SEVIER HWY 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	5	8	11	24	1	160	0	161	73	13	3	89	2	120	10	132	406
07:15 AM	4	24	24	52	4	195	5	204	98	38	7	143	9	159	16	184	583
07:30 AM	8	19	37	64	2	165	2	169	86	34	4	124	8	130	4	142	499
07:45 AM	5	19	13	37	4	207	4	215	34	24	8	66	1	163	9	173	491
Total	22	70	85	177	11	727	11	749	291	109	22	422	20	572	39	631	1979
08:00 AM	9	30	22	61	5	200	4	209	57	31	2	90	4	137	29	170	530
08:15 AM	2	11	11	24	6	189	1	196	50	21	6	77	6	107	20	133	430
08:30 AM	3	8	5	16	3	132	0	135	24	16	3	43	4	114	14	132	326
08:45 AM	2	2	10	14	0	119	1	120	29	11	7	47	1	92	10	103	284
Total	16	51	48	115	14	640	6	660	160	79	18	257	15	450	73	538	1570

\*\*\* BREAK \*\*\*

04:00 PM	4	17	8	29	9	166	5	180	28	29	8	65	10	257	28	295	569
04:15 PM	9	13	9	31	3	123	1	127	20	12	5	37	11	219	22	252	447
04:30 PM	10	9	10	29	12	168	3	183	26	14	5	45	8	234	32	274	531
04:45 PM	7	20	15	42	5	158	3	166	17	6	6	29	5	213	25	243	480
Total	30	59	42	131	29	615	12	656	91	61	24	176	34	923	107	1064	2027
05:00 PM	12	20	8	40	2	180	2	184	27	10	5	42	10	289	33	332	598
05:15 PM	11	21	4	36	4	151	2	157	27	11	7	45	8	197	14	219	457
05:30 PM	7	20	10	37	9	110	4	123	16	4	8	28	22	134	26	182	370
05:45 PM	13	14	6	33	4	115	4	123	15	7	5	27	5	221	24	250	433
Total	43	75	28	146	19	556	12	587	85	32	25	142	45	841	97	983	1858
Grand Total	111	255	203	569	73	2538	41	2652	627	281	89	997	114	2786	316	3216	7434
Apprch %	19.5	44.8	35.7		2.8	95.7	1.5		62.9	28.2	8.9		3.5	86.6	9.8		
Total %	1.5	3.4	2.7	7.7	1	34.1	0.6	35.7	8.4	3.8	1.2	13.4	1.5	37.5	4.3	43.3	

Start Time	MARTIN MILL PK Southbound				JOHN SEVIER HWY Westbound				MARTIN MILL PK Northbound				JOHN SEVIER HWY 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 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	4	24	24	52	4	195	5	204	98	38	7	143	9	159	16	184	583
07:30 AM	8	19	37	64	2	165	2	169	86	34	4	124	8	130	4	142	499
07:45 AM	5	19	13	37	4	207	4	215	34	24	8	66	1	163	9	173	491
08:00 AM	9	30	22	61	5	200	4	209	57	31	2	90	4	137	29	170	530
Total Volume	26	92	96	214	15	767	15	797	275	127	21	423	22	589	58	669	2103
% App. Total	12.1	43	44.9		1.9	96.2	1.9		65	30	5		3.3	88	8.7		
PHF	.722	.767	.649	.836	.750	.926	.750	.927	.702	.836	.656	.740	.611	.903	.500	.909	.902

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	10	9	10	29	12	168	3	183	26	14	5	45	8	234	32	274	531
04:45 PM	7	20	15	42	5	158	3	166	17	6	6	29	5	213	25	243	480
05:00 PM	12	20	8	40	2	180	2	184	27	10	5	42	10	289	33	332	598
05:15 PM	11	21	4	36	4	151	2	157	27	11	7	45	8	197	14	219	457
Total Volume	40	70	37	147	23	657	10	690	97	41	23	161	31	933	104	1068	2066
% App. Total	27.2	47.6	25.2		3.3	95.2	1.4		60.2	25.5	14.3		2.9	87.4	9.7		
PHF	.833	.833	.617	.875	.479	.913	.833	.938	.898	.732	.821	.894	.775	.807	.788	.804	.864

**APPENDIX F**

**ITE TRIP GENERATION RATES**

# Land Use: 210

## Single-Family Detached Housing

### Description

Single-family detached housing includes all single-family detached homes on individual lots. A typical site surveyed is a suburban subdivision.

### Additional Data

The number of vehicles and residents had a high correlation with average weekday vehicle trip ends. The use of these variables was limited, however, because the number of vehicles and residents was often difficult to obtain or predict. The number of dwelling units was generally used as the independent variable of choice because it was usually readily available, easy to project, and had a high correlation with average weekday vehicle trip ends.

This land use included data from a wide variety of units with different sizes, price ranges, locations, and ages. Consequently, there was a wide variation in trips generated within this category. Other factors, such as geographic location and type of adjacent and nearby development, may also have had an effect on the site trip generation.

Single-family detached units had the highest trip generation rate per dwelling unit of all residential uses because they were the largest units in size and had more residents and more vehicles per unit than other residential land uses; they were generally located farther away from shopping centers, employment areas, and other trip attractors than other residential land uses; and they generally had fewer alternative modes of transportation available because they were typically not as concentrated as other residential land uses.

Time-of-day distribution data for this land use are presented in Appendix A. For the six general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:15 and 8:15 a.m. and 4:00 and 5:00 p.m., respectively. For the two sites with Saturday data, the overall highest vehicle volume was counted between 3:00 and 4:00 p.m. For the one site with Sunday data, the overall highest vehicle volume was counted between 10:15 and 11:15 a.m.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in California, Connecticut, Delaware, Illinois, Indiana, Maryland, Minnesota, Montana, New Jersey, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Vermont, and Virginia.

### Source Numbers

100, 105, 114, 126, 157, 167, 177, 197, 207, 211, 217, 267, 275, 293, 300, 319, 320, 356, 357, 367, 384, 387, 407, 435, 522, 550, 552, 579, 598, 601, 603, 614, 637, 711, 716, 720, 728, 735, 868, 903, 925, 936

# Single-Family Detached Housing (210)

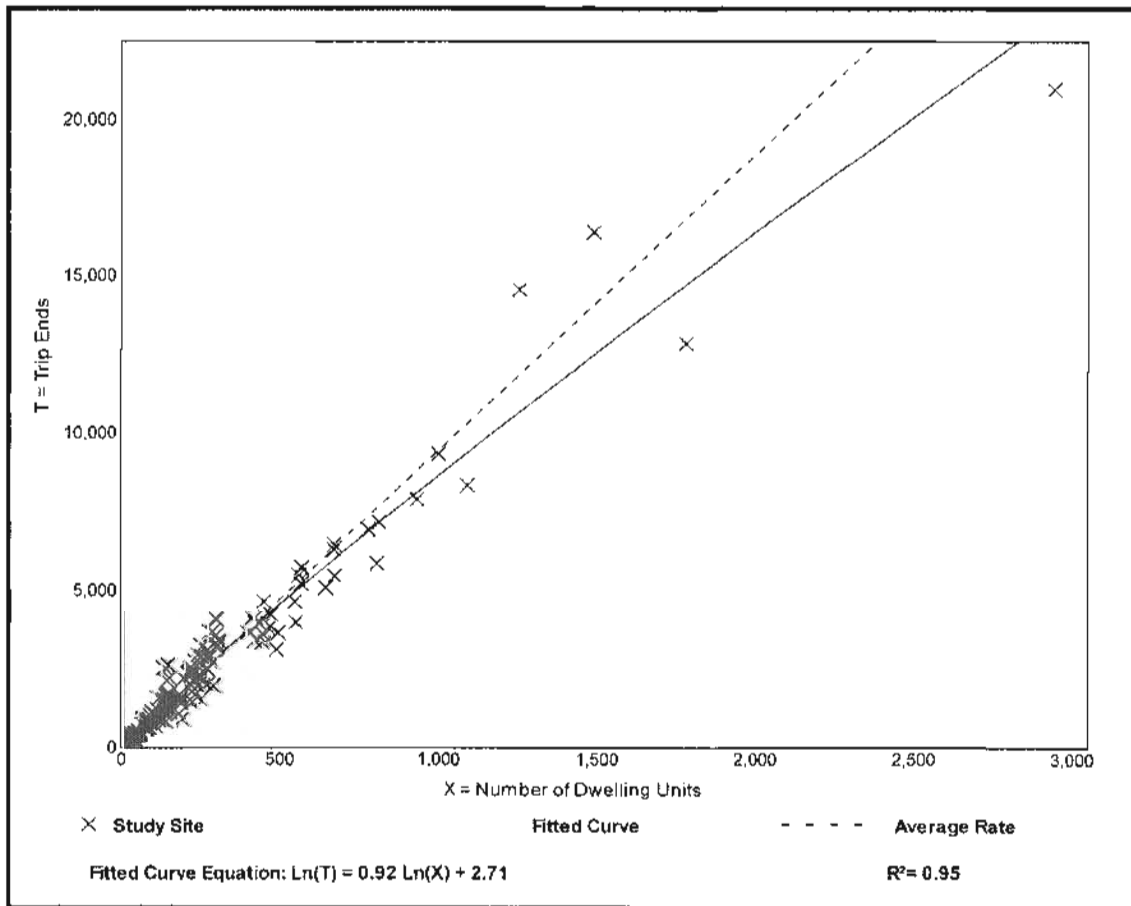
Vehicle Trip Ends vs: Dwelling Units  
On a: Weekday

Setting/Location: General Urban/Suburban  
Number of Studies: 159  
Avg. Num. of Dwelling Units: 264  
Directional Distribution: 50% entering, 50% exiting

### Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.44	4.81 - 19.39	2.10

### Data Plot and Equation



# Single-Family Detached Housing (210)

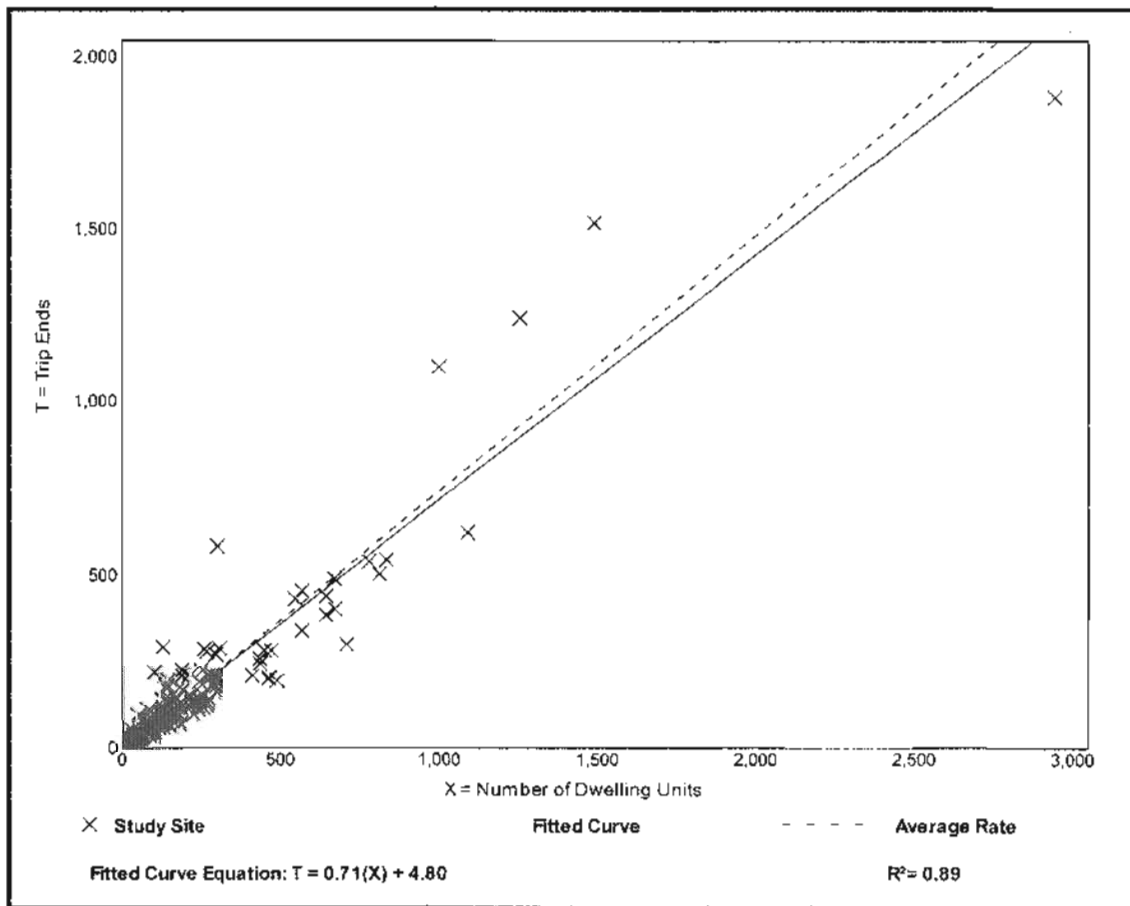
Vehicle Trip Ends vs: Dwelling Units  
 On a: Weekday,  
 Peak Hour of Adjacent Street Traffic,  
 One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban  
 Number of Studies: 173  
 Avg. Num. of Dwelling Units: 219  
 Directional Distribution: 25% entering, 75% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.74	0.33 - 2.27	0.27

## Data Plot and Equation



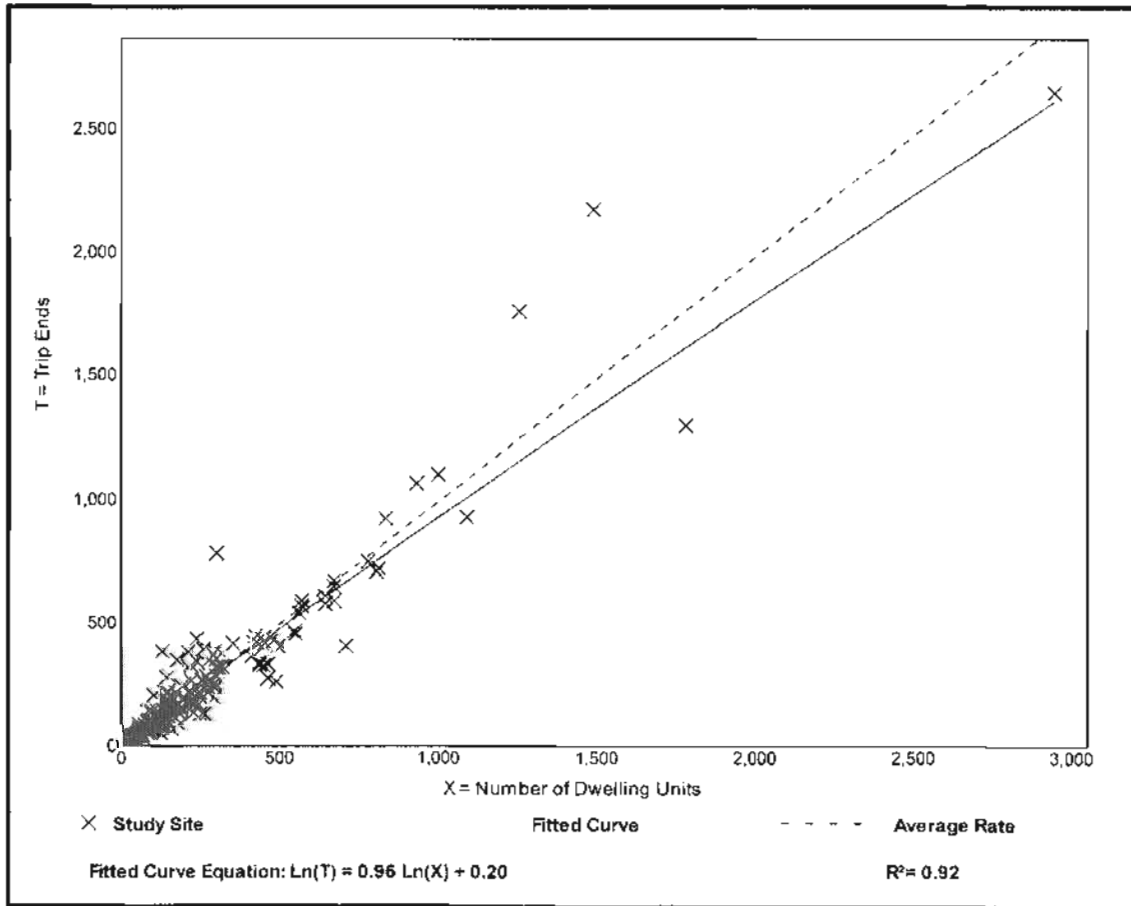
# Single-Family Detached Housing (210)

**Vehicle Trip Ends vs: Dwelling Units**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**  
**Setting/Location: General Urban/Suburban**  
 Number of Studies: 190  
 Avg. Num. of Dwelling Units: 242  
 Directional Distribution: 63% entering, 37% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.99	0.44 - 2.98	0.31

## Data Plot and Equation



**TRIP GENERATION FOR PERRY SMITH DEVELOPMENT ON GOVERNOR JOHN SEVIER HIGHWAY**

**177 Single-Family Detached Houses**

ITE LAND USE CODE	LAND USE DESCRIPTION	UNITS	GENERATED DAILY TRAFFIC	GENERATED TRAFFIC AM PEAK HOUR			GENERATED TRAFFIC PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
#210	Single-Family Detached Housing	177 Houses	1,759	25%	75%		63%	37%	
				33	98	131	111	65	176
Total New Volume Site Trips			<b>1,759</b>	<b>33</b>	<b>98</b>	<b>131</b>	<b>111</b>	<b>65</b>	<b>176</b>

ITE Trip Generation Manual, 10th Edition  
 Trips calculated by using Fitted Curve Equation



# TRIP GENERATION FOR PERRY SMITH DEVELOPMENT ON GOVERNOR JOHN SEVIER HIGHWAY

## 177 Single-Family Detached Houses

177 Residential Houses = X

---

### Weekday:

Fitted Curve Equation:  $\ln(T) = 0.92 \ln(X) + 2.71$

$$\ln(T) = 0.92 * 5.18 + 2.71$$

$$\ln(T) = 7.47$$

$$\underline{\underline{T = 1,759 \text{ trips}}}$$

---

### Peak Hour of Adjacent Traffic between 7 and 9 am:

Fitted Curve Equation:  $T = 0.71(X) + 4.80$

$$T = 0.71 * 177 + 4.80$$

$$\underline{\underline{T = 131 \text{ trips}}}$$

---

### Peak Hour of Adjacent Traffic between 4 and 6 pm:

Fitted Curve Equation:  $\ln(T) = 0.96 \ln(X) + 0.2$

$$\ln(T) = 0.96 * 5.18 + 0.20$$

$$\ln(T) = 5.17$$

$$\underline{\underline{T = 176 \text{ trips}}}$$

**APPENDIX G**

**CAPACITY ANALYSES – HCM WORKSHEETS (SYNCHRO 8)**

**OPENING YEAR TRAFFIC CONDITIONS (WITH PROJECT)**

# HCM Unsignalized Intersection Capacity Analysis

## 5: Road "A" & Governor John Sevier Highway

5/20/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻		↻	↻	↻	
Volume (veh/h)	726	3	13	1218	12	25
Sign Control	Free			Free	Stop	
Grade	5%			-5%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	789	3	14	1324	13	27
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			792		2143	791
vC1, stage 1 conf vol					791	
vC2, stage 2 conf vol					1352	
vCu, unblocked vol			792		2143	791
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		94	93
cM capacity (veh/h)			837		210	393

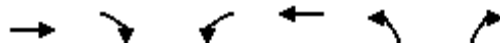
Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	792	14	1324	40
Volume Left	0	14	0	13
Volume Right	3	0	0	27
cSH	1700	837	1700	306
Volume to Capacity	0.47	0.02	0.78	0.13
Queue Length 95th (ft)	0	1	0	11
Control Delay (s)	0.0	9.4	0.0	18.5
Lane LOS		A		C
Approach Delay (s)	0.0	0.1		18.5
Approach LOS				C

Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization		74.1%	ICU Level of Service D
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 3: Road "B" & Governor John Sevier Highway

5/20/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩		↩	↩	↩	
Volume (veh/h)	714	11	7	1223	47	14
Sign Control	Free			Free	Stop	
Grade	5%			-5%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	793	12	8	1359	52	16
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			806		2174	799
vC1, stage 1 conf vol					799	
vC2, stage 2 conf vol					1374	
vCu, unblocked vol			806		2174	799
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		75	96
cM capacity (veh/h)			828		206	388

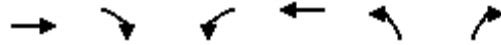
Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	806	8	1359	68
Volume Left	0	8	0	52
Volume Right	12	0	0	16
cSH	1700	828	1700	231
Volume to Capacity	0.47	0.01	0.80	0.29
Queue Length 95th (ft)	0	1	0	29
Control Delay (s)	0.0	9.4	0.0	26.9
Lane LOS		A		D
Approach Delay (s)	0.0	0.1		26.9
Approach LOS				D

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization		74.5%	ICU Level of Service
Analysis Period (min)		15	D

# HCM Unsignalized Intersection Capacity Analysis

## 5: Road "A" & Governor John Sevier Highway

5/20/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻		↻	↻	↻	
Volume (veh/h)	1150	13	29	857	5	25
Sign Control	Free			Free	Stop	
Grade	5%			-5%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1250	14	32	932	5	27
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			1264		2252	1257
vC1, stage 1 conf vol					1257	
vC2, stage 2 conf vol					995	
vCu, unblocked vol			1264		2252	1257
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			94		97	87
cM capacity (veh/h)			557		209	211

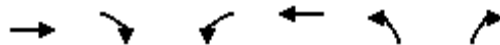
Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	1264	32	932	33
Volume Left	0	32	0	5
Volume Right	14	0	0	27
cSH	1700	557	1700	211
Volume to Capacity	0.74	0.06	0.55	0.15
Queue Length 95th (ft)	0	4	0	13
Control Delay (s)	0.0	11.9	0.0	25.2
Lane LOS		B		D
Approach Delay (s)	0.0	0.4		25.2
Approach LOS				D

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		71.3%	ICU Level of Service C
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 3: Road "B" & Governor John Sevier Highway

5/20/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩		↩	↩	↩	
Volume (veh/h)	1149	53	16	846	21	14
Sign Control	Free			Free	Stop	
Grade	5%			-5%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1277	59	18	940	23	16
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			1336		2282	1306
vC1, stage 1 conf vol					1306	
vC2, stage 2 conf vol					976	
vCu, unblocked vol			1336		2282	1306
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			97		89	92
cM capacity (veh/h)			523		205	197

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	1336	18	940	39
Volume Left	0	18	0	23
Volume Right	59	0	0	16
cSH	1700	523	1700	202
Volume to Capacity	0.79	0.03	0.55	0.19
Queue Length 95th (ft)	0	3	0	17
Control Delay (s)	0.0	12.1	0.0	27.0
Lane LOS		B		D
Approach Delay (s)	0.0	0.2		27.0
Approach LOS				D

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		73.7%	ICU Level of Service D
Analysis Period (min)		15	

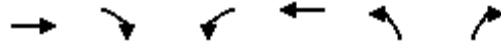
**OPENING YEAR TRAFFIC CONDITIONS (WITH PROJECT) AND MODIFICATIONS**



# HCM Unsignalized Intersection Capacity Analysis

## 5: Road "A" & Governor John Sevier Highway

6/19/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	
Volume (veh/h)	726	3	13	1218	12	25
Sign Control	Free			Free	Stop	
Grade	3%			-3%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	789	3	14	1324	13	27
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			792		2141	789
vC1, stage 1 conf vol					789	
vC2, stage 2 conf vol					1352	
vCu, unblocked vol			792		2141	789
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		94	93
cM capacity (veh/h)			837		210	394

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	789	3	14	1324	40
Volume Left	0	0	14	0	13
Volume Right	0	3	0	0	27
cSH	1700	1700	837	1700	307
Volume to Capacity	0.46	0.00	0.02	0.78	0.13
Queue Length 95th (ft)	0	0	1	0	11
Control Delay (s)	0.0	0.0	9.4	0.0	18.5
Lane LOS	A			C	
Approach Delay (s)	0.0		0.1		18.5
Approach LOS				C	

Intersection Summary					
Average Delay			0.4		
Intersection Capacity Utilization			74.1%	ICU Level of Service	D
Analysis Period (min)			15		

# HCM Unsignalized Intersection Capacity Analysis

## 3: Road "B" & Governor John Sevier Highway

6/19/2020

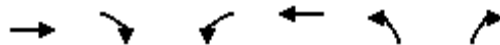


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Volume (veh/h)	714	11	7	1223	47	14
Sign Control	Free			Free	Stop	
Grade	3%			-3%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	793	12	8	1359	52	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			806		2168	793
vC1, stage 1 conf vol					793	
vC2, stage 2 conf vol					1374	
vCu, unblocked vol			806		2168	793
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		75	96
cM capacity (veh/h)			828		207	392
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	793	12	8	1359	68	
Volume Left	0	0	8	0	52	
Volume Right	0	12	0	0	16	
cSH	1700	1700	828	1700	232	
Volume to Capacity	0.47	0.01	0.01	0.80	0.29	
Queue Length 95th (ft)	0	0	1	0	29	
Control Delay (s)	0.0	0.0	9.4	0.0	26.8	
Lane LOS			A		D	
Approach Delay (s)	0.0		0.1		26.8	
Approach LOS					D	
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			74.5%		ICU Level of Service	D
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 5: Road "A" & Governor John Sevier Highway

6/19/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Volume (veh/h)	1150	13	29	857	5	25
Sign Control	Free			Free	Stop	
Grade	3%			-3%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1250	14	32	932	5	27
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			1264		2245	1250
vC1, stage 1 conf vol					1250	
vC2, stage 2 conf vol					995	
vCu, unblocked vol			1264		2245	1250
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			94		97	87
cM capacity (veh/h)			557		210	213

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	1250	14	32	932	33
Volume Left	0	0	32	0	5
Volume Right	0	14	0	0	27
cSH	1700	1700	557	1700	212
Volume to Capacity	0.74	0.01	0.06	0.55	0.15
Queue Length 95th (ft)	0	0	4	0	13
Control Delay (s)	0.0	0.0	11.9	0.0	25.0
Lane LOS			B		C
Approach Delay (s)	0.0		0.4		25.0
Approach LOS					C

Intersection Summary					
Average Delay			0.5		
Intersection Capacity Utilization			70.5%	ICU Level of Service	C
Analysis Period (min)			15		

# HCM Unsignalized Intersection Capacity Analysis

## 3: Road "B" & Governor John Sevier Highway

6/19/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Volume (veh/h)	1149	53	16	846	21	14
Sign Control	Free			Free	Stop	
Grade	3%			-3%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1277	59	18	940	23	16
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			1336		2252	1277
vC1, stage 1 conf vol					1277	
vC2, stage 2 conf vol					976	
vCu, unblocked vol			1336		2252	1277
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			97		89	92
cM capacity (veh/h)			523		210	205

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	1277	59	18	940	39
Volume Left	0	0	18	0	23
Volume Right	0	59	0	0	16
cSH	1700	1700	523	1700	208
Volume to Capacity	0.75	0.03	0.03	0.55	0.19
Queue Length 95th (ft)	0	0	3	0	17
Control Delay (s)	0.0	0.0	12.1	0.0	26.2
Lane LOS			B		D
Approach Delay (s)	0.0		0.2		26.2
Approach LOS					D

Intersection Summary					
Average Delay			0.5		
Intersection Capacity Utilization			70.5%	ICU Level of Service	C
Analysis Period (min)			15		

**APPENDIX H**

**SPOT SPEED STUDY**

## SPOT SPEED STUDY

Location: West Governor John Sevier Highway (between Martin Mill Pike and Government Farm Road)  
 Posted Speed Limit: 50 mph  
 Equipment: Bushnell Speedster III Radar Speed Gun  
 Direction: Eastbound

Date: 5/19/2020  
 Weather: Cloudy/Light Rain  
 Time: 11:30 AM  
 Pavement Conditions: Wet

Vehicle #	Speed (mph)
1	52
2	53
3	52
4	58
5	56
6	55
7	50
8	54
9	59
10	48
11	50
12	51
13	55
14	50
15	53
16	50
17	47
18	54
19	49
20	52
21	52
22	57
23	55
24	56
25	56

Vehicle #	Speed (mph)
26	48
27	53
28	52
29	51
30	55
31	54
32	51
33	55
34	50
35	52
36	45
37	55
38	47
39	51
40	55
41	59
42	55
43	52
44	51
45	52
46	51
47	48
48	48
49	54
50	58

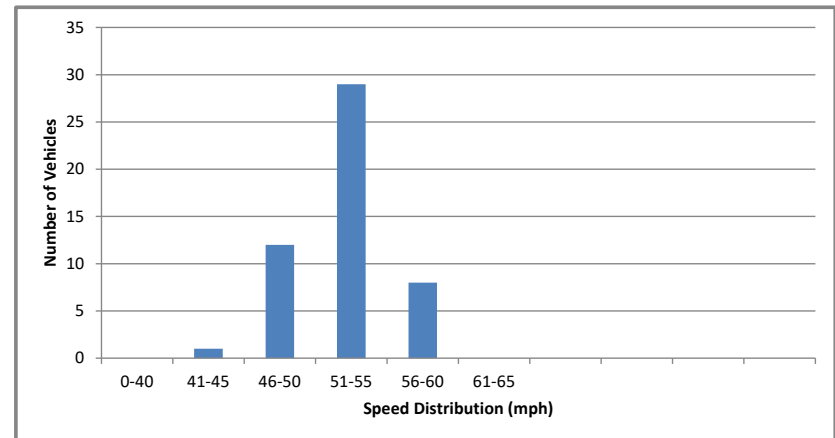
Sample Size Requirements (*ITE Manual of Transportation Engineering Studies*)

$$N = (S * K/E)^2$$

where: N = minimum number of measured speeds  
 S = estimated sample standard deviation (mph)  
 K = constant corresponding to desired confidence level  
 E = permitted error in the average speed estimate (mph)

S = 5 mph (Table 3-2, page 38)  
 K = 2.58 (Confidence level of 99% - Table 3-3, page 38)  
 E = 2 mph assumed error range

Therefore, N = 42 observations needed



Average speed = 52.5 mph  
 50th percentile speed = 52.0 mph  
 85th percentile speed = 55.7 mph

## SPOT SPEED STUDY

Location: West Governor John Sevier Highway (between Martin Mill Pike and Government Farm Road)  
 Posted Speed Limit: 50 mph  
 Equipment: Bushnell Speedster III Radar Speed Gun  
 Direction: Westbound

Date: 5/19/2020  
 Weather: Cloudy/Light Rain  
 Time: 11:30 AM  
 Pavement Conditions: Wet

Vehicle #	Speed (mph)
1	58
2	53
3	53
4	54
5	53
6	52
7	51
8	54
9	54
10	54
11	56
12	55
13	55
14	57
15	51
16	58
17	60
18	53
19	50
20	49
21	52
22	51
23	49
24	48
25	54

Vehicle #	Speed (mph)
26	53
27	53
28	52
29	54
30	50
31	51
32	54
33	51
34	58
35	55
36	53
37	52
38	50
39	51
40	54
41	55
42	53
43	52
44	50
45	52
46	50
47	53
48	55
49	54
50	55

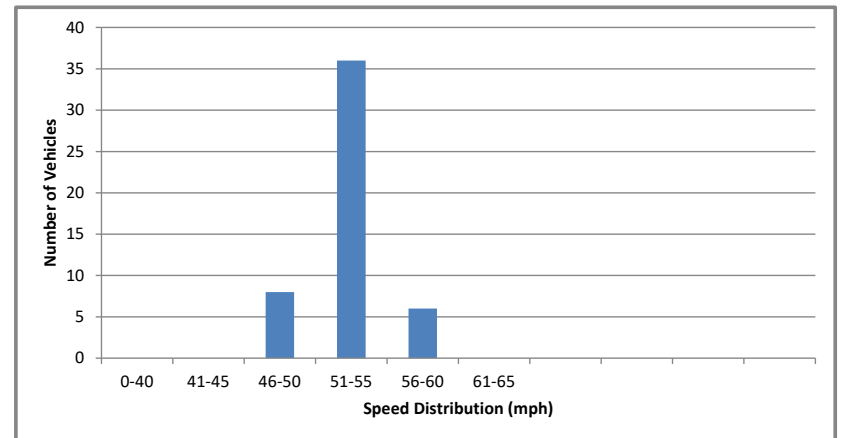
Sample Size Requirements (*ITE Manual of Transportation Engineering Studies*)

$$N = (S * K/E)^2$$

where: N = minimum number of measured speeds  
 S = estimated sample standard deviation (mph)  
 K = constant corresponding to desired confidence level  
 E = permitted error in the average speed estimate (mph)

S = 5 mph (Table 3-2, page 38)  
 K = 2.58 (Confidence level of 99% - Table 3-3, page 38)  
 E = 2 mph assumed error range

Therefore, N = 42 observations needed



Average speed = 53.1 mph  
 50th percentile speed = 53.0 mph  
 85th percentile speed = 55.0 mph

**APPENDIX I**

**KNOX COUNTY TURN LANE VOLUME THRESHOLD WORKSHEETS**



TABLE 7B

RIGHT-TURN LANE VOLUME THRESHOLDS  
FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 56 MPH OR OVER

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	<100	100 - 199	200 - 249	250 - 299	300 - 349	350 - 399
Fewer Than 25 25 - 49 50 - 99						
100 - 149 150 - 199					Yes	Yes Yes
200 - 249 250 - 299			Yes	Yes Yes	Yes Yes	Yes Yes
300 - 349 350 - 399	Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
400 - 449 450 - 499	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
500 - 549 550 - 599	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME * 726					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 600	+ / > 600
Fewer Than 25 25 - 49 50 - 99		Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
100 - 149 150 - 199	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
200 - 249 250 - 299	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
300 - 349 350 - 399	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
400 - 449 450 - 499	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
500 - 549 550 - 599	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

West Governor John Sevier Highway at Road "A"  
2025 Projected AM EB Right Turns = 2  
Turn Lane NOT Warranted

\* Or through volume only if a left-turn lane exists.

TABLE 7B

RIGHT-TURN LANE VOLUME THRESHOLDS  
FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 56 MPH OR OVER

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	<100	100 - 199	200 - 249	250 - 299	300 - 349	350 - 399
Fewer Than 25 25 - 49 50 - 99						
100 - 149 150 - 199					Yes	Yes Yes
200 - 249 250 - 299			Yes	Yes Yes	Yes Yes	Yes Yes
300 - 349 350 - 399	Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
400 - 449 450 - 499	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
500 - 549 550 - 599	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME * 714					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 600	+ / > 600
Fewer Than 25 25 - 49 50 - 99		Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
100 - 149 150 - 199	Yes Yes	Yes Yes	Yes Yes	Yes	Yes	Yes Yes
200 - 249 250 - 299	Yes Yes	Yes Yes	Yes Yes	Yes	Yes	Yes Yes
300 - 349 350 - 399	Yes Yes	Yes Yes	Yes Yes	Yes	Yes	Yes Yes
400 - 449 450 - 499	Yes Yes	Yes Yes	Yes Yes	Yes	Yes	Yes Yes
500 - 549 550 - 599	Yes Yes	Yes Yes	Yes Yes	Yes	Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

West Governor John Sevier Highway at Road "B"  
2025 Projected AM EB Right Turns = 11  
Turn Lane NOT Warranted

\* Or through volume only if a left-turn lane exists.

TABLE 7B

RIGHT-TURN LANE VOLUME THRESHOLDS  
FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 56 MPH OR OVER

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	<100	100 - 199	200 - 249	250 - 299	300 - 349	350 - 399
Fewer Than 25 25 - 49 50 - 99						
100 - 149 150 - 199					Yes	Yes Yes
200 - 249 250 - 299			Yes	Yes Yes	Yes Yes	Yes Yes
300 - 349 350 - 399	Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
400 - 449 450 - 499	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
500 - 549 550 - 599	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME * 1150					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 600	+ / > 600
Fewer Than 25 25 - 49 50 - 99		Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
100 - 149 150 - 199	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
200 - 249 250 - 299	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
300 - 349 350 - 399	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
400 - 449 450 - 499	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
500 - 549 550 - 599	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

West Governor John Sevier Highway at Road "A"  
2025 Projected PM EB Right Turns = 13  
Turn Lane NOT Warranted

\* Or through volume only if a left-turn lane exists.

TABLE 7B

RIGHT-TURN LANE VOLUME THRESHOLDS  
FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 56 MPH OR OVER

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	<100	100 - 199	200 - 249	250 - 299	300 - 349	350 - 399
Fewer Than 25 25 - 49 50 - 99						
100 - 149 150 - 199					Yes	Yes Yes
200 - 249 250 - 299			Yes	Yes Yes	Yes Yes	Yes Yes
300 - 349 350 - 399	Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
400 - 449 450 - 499	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
500 - 549 550 - 599	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME * 1149					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 600	+ / > 600
Fewer Than 25 25 - 49 50 - 99			Yes Yes	Yes Yes	Yes Yes	Yes Yes
100 - 149 150 - 199	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
200 - 249 250 - 299	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
300 - 349 350 - 399	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
400 - 449 450 - 499	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
500 - 549 550 - 599	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

West Governor John Sevier Highway at Road "B"  
2025 Projected PM EB Right Turns = 53  
Turn Lane Warranted

\* Or through volume only if a left-turn lane exists.

**APPENDIX J**

**RESPONSE LETTER TO ADDRESS REVIEW COMMENTS**



CIVIL ENGINEERING / TRAFFIC ENGINEERING

11812 Black Road  
Knoxville, Tennessee 37932  
Phone (865) 556-0042  
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June 22, 2020

**PROJECT NAME:** Perry Smith Development on Governor John Sevier Highway TIS

**TO:** Knoxville-Knox County Planning

**SUBJECT:** TIS Comment Response Document for Perry Smith Development on Governor John Sevier Highway TIS  
(7-SC-20-C & 7-C-20-UR)  
Review Comments dated June 16, 2020

Dear Knoxville-Knox County Planning Staff:

The following comment response document is submitted to address comments dated June 16, 2020.

**Reviewer Comment #1:** On the cover, please change the name "John Sevier Highway" to "Governor John Sevier Highway".

**Response:** The cover of the report was changed to "Perry Smith Development on Governor John Sevier Highway". The site designer and project owner developed the project as "Perry Smith Development on John Sevier Highway" and the TIS was following this naming convention. Nonetheless, this name change was made throughout the report to maintain consistency.

**Reviewer Comment #2:** Please provide attachments of diagrams within the study detailing the specific dimensions of turn-lanes (storage and tapers) at each access point.

**Response:** An diagram is provided in the report on Page 36 for the proposed intersection at Road "A" and on Page 40 for the proposed intersection at

Road "B" that shows the dimensions of the proposed turn lanes on West Governor John Sevier Highway. The civil site designer is proposing that the right-turn lanes into the development be constructed with 75 feet of storage and 50-foot tapers. These lanes are shown in the diagrams with a 11-foot width.

**Reviewer Comment #3:** On page 2 & 41, "NO OUTLET" signs are not an appropriate treatment for the subdivision entrances. MUTCD (Section 2C.26) stipulates that these may be used at an access point from which there is no other exit, but in this case there is another exit (Road A or Road B).

Response: Your comment is correct; these signs were inadvertently included in the report. All references to these signs have been removed from the report.

**Reviewer Comment #4:** On page 23, please add the generated through volumes at each study intersection. These simplify checking.

Response: On Page 23, the generated through traffic volumes were added to each intersection.

**Reviewer Comment #5:** On page 32, TDOT has recommended that a right-turn lane be installed at both access points.

Response: On Page 32, the report has been revised to state: "A separate right-turn lane at Road "A" is not warranted, however, after reviewing this study, the TDOT has recommended that a separate right-turn lane also be constructed at Road "A"." This revision has also been made at the end of Page 1 and on Page 36, section 1c.

**Reviewer Comment #6:** On page 33, the first full paragraph mentions an 85<sup>th</sup> percentile speed of 55 mph on Gov. John Sevier Hwy. This seems different than what was mentioned on page 32 for this road.

Response: On Page 33, the first full paragraph has been changed to state that the highest observed and calculated 85<sup>th</sup> percentile speed was 55.7 mph.

**Reviewer Comment #7:** On page 36, the study recommends separate left- and right-turn lanes for vehicles exiting the site. TDOT and Knox County recommend single lane approaches for vehicles exiting the site. The driveways are recommended to be wider (30 ft) in order to accommodate larger vehicles (i.e. moving trucks, delivery trucks, etc.).

Response: The report has been revised to reflect these recommendations. The recommendation for separate turn lanes at the entrances has been removed. This revision has resulted in removal on Page 1, removal in the Conclusions & Recommendations, changes to Table 6 on Page 37, changes to Table 7 on Page 41, and in Appendix G (LOS calculations). The driveway width recommendation of 30 feet has been added on Page 2, Page 38, and Page 42.

**Reviewer Comment #8: On page 37, do the sight distance requirements meet TDOT standards? Please refer to TDOT's Design Guidelines.**

Response: The sight distance discussion has been revised throughout the report to address this comment. The initial change to the sight distance discussion (beside the recommendations listed at the beginning of the report) is made on Page 33. The sight distances listed in the report are revised based on an 85<sup>th</sup> percentile speed of 58.7 mph and calculated from AASHTO's guidelines (Green Book). These revisions were made on Page 2, 33, 36, 37, 39, and 41.

- a. **What are the lengths of tapers and storage lengths for all turn lanes? Please discuss and comply with TDOT standards where they apply. Please show a figure for both access points pertaining to turn-lanes and pavement markings.**

Response: This comment has been addressed in Reviewer Comment #2.

**Reviewer Comment #9: On page 43, please add a statement as to the County requirement for intersection spacing along an arterial of 400 feet. This is satisfied.**

Response: On Page 45 (formerly Page 43), a statement was added under 4c stating this requirement is met. The heading of this section was also revised to include "Knox County".

**Reviewer Comment #10: On page A-11 (Appendix I), none of the right-turn lane worksheets are annotated. Please add volume to illustrate determination of satisfaction of warrants.**

Response: In Appendix I, all the pages have been updated to show the mainline thru volumes on the worksheets.

In addition to the requested revisions, other changes in the report include the following:



- Updated Title Page
- Updated Table of Contents
- Updated Page Footers
- Added Appendix J to include this response letter
- A couple minor grammatical changes

If you have any questions or further comments, please feel free to contact me at any time. I look forward to your review and approval.

Sincerely,

Ajax Engineering, LLC  
Robert W. Jacks, P.E.



6/22/2020

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