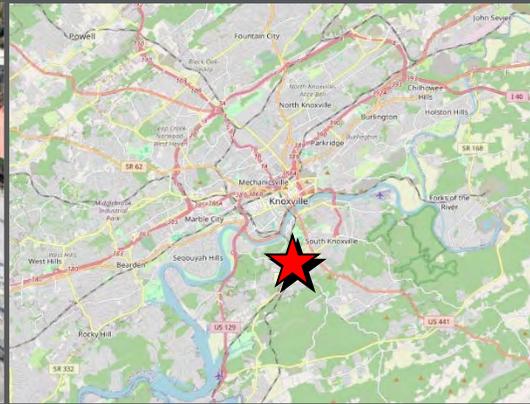


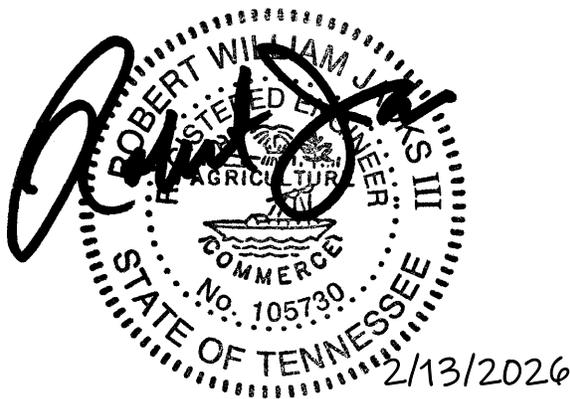


# Transportation Impact Study Maryville Pike Gas Station Knoxville, Tennessee



Revised February 13, 2026

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## EXECUTIVE SUMMARY

### **Preface:**

Shree Hari Enterprise, LLC, is proposing a commercial development adjacent to the intersection of Maryville Pike and Sims Road in South Knoxville, TN, and is referred to in this study as the "Maryville Pike Gas Station," as the formal name has not yet been chosen. The development is planned to include a convenience market with gas-fueling stations on a property of approximately 0.87 acres. It is anticipated to be fully built out and operational by 2027. The development will construct two entrances, one to the north at Sims Road and the other to the west at Maryville Pike (SR 33). This development will be located at the southeast corner of the signalized four-way intersection of Maryville Pike, Sims Road, and Edington Road.

The primary purpose of this study is to determine and evaluate the potential impacts of the proposed development on the adjacent transportation system. The study includes a review of the primary access roads, the proposed entrance intersections, and the adjacent signalized intersection. Recommendations and mitigation measures are offered if transportation operations are projected to be below recognized engineering standards.

### **Study Results:**

The significant findings of this study include the following:

- The Maryville Pike Gas Station development, featuring a 3,500 ft<sup>2</sup> convenience market with six gas fueling stations, is estimated to generate 1,221 vehicular trips on an average weekday at full build-out and occupancy. Of these daily trips, 120 are projected to occur during the AM peak hour and 114 in the PM peak hour in 2027. However, the majority of these calculated trips are expected to be comprised of motorists already traveling through the adjacent Maryville Pike and Sims Road corridors. As such, some of the generated trips will not be entirely new.
- Constructing two entrances for the proposed development is considered essential for customer vehicular access. These entrances are projected to operate with minimal vehicle delays and queues for motorists exiting the development in the future conditions.
- The Proposed West Entrance at Maryville Pike is currently designed in the site plan to provide full vehicular access to and from the development, allowing left- and right turns for entering and exiting vehicles. However, providing a full-access entrance would require a separate southbound left-turn lane on Maryville Pike, since the projected 2027 traffic volumes are expected to meet TDOT warrants. Due

to the complications and consequences of providing a separate turn lane on Maryville Pike at this location, it is recommended that the Proposed West Entrance be redesigned and constructed with a right-turn-in/right-turn-out (RIRO) configuration.

- In the existing conditions, the adjacent four-way signalized intersection of Maryville Pike at Sims Road and Edington Road was calculated to operate with moderate vehicle delays during peak hours with occasional large backups. This intersection operates with a single lane on each approach, without dedicated left-turn lanes or green arrow assignments, and, as a result, motorists suffer undue delay when left-turning vehicles face heavy oncoming traffic. Due to operational issues caused by the single lanes and the adjacent paved private parking lot area, cut-through traffic and other illegal vehicle movements were regularly observed.
- In the projected 2027 conditions at the signalized intersection of Maryville Pike at Sims Road and Edington Road, the proposed Maryville Pike Gas Station trip generation is expected to have only a minimal impact in the projected 2027 conditions. The proposed development is not expected to unduly affect the operations of the traffic signal that would require modifications.

### **Recommendations:**

The following summary recommendations are presented based on the study's analyses to reduce the impacts of the proposed development on the adjacent transportation system, while aiming to achieve an acceptable traffic flow and improved safety. More details regarding all the recommendations are discussed at the end of the report. The recommendations marked with an asterisk indicate an existing transportation need in the study area and are not associated with the proposed development's projected impacts.

### **Maryville Pike at Proposed West Entrance:**

- It is recommended that the Proposed West Entrance be designed and constructed with a right-turn-in/right-turn-out (RIRO) configuration at Maryville Pike, rather than allowing full access as currently proposed. It is recommended that the proposed RIRO entrance follow AASHTO and TDOT driveway entrance design standards and include the guidelines presented in the report.
- The civil site designer should ensure that the required intersection sight distance at the Proposed West Entrance is available and that vegetation, construction grading, and proposed signage do not interfere with this distance for exiting right turns with a RIRO configuration. Currently, the vegetation along the adjacent tributary, and especially where it crosses under Maryville Pike, is unmaintained.

It is recommended that the site development include eliminating vegetation as necessary along the tributary at its crossing under Maryville Pike to maximize sight distance to the south and ensure it is maintained in future conditions.

- The construction of the Proposed West Entrance on Maryville Pike (SR 33) will require a TDOT Highway Entrance Permit. The developer will need to apply for this permit and coordinate with TDOT regarding their specific requirements for this entrance.
- The development is strongly recommended to install overhead roadway lighting to delineate the Proposed West Entrance at Maryville Pike for night or low-light travel, particularly to illuminate the RIRO configuration with the raised concrete traffic island.

#### **Sims Road at Proposed North Entrance:**

- It is recommended that a Stop Sign (R1-1) be installed, and a 24" white stop bar be applied to the Proposed North Entrance approach at Sims Road. The stop bar should be applied at least 4 feet from the pavement edge of Sims Road and placed at the desired stopping point that maximizes sight distance.
- Sight distances from the Proposed North Entrance at Sims Road must not be impacted by future landscaping, vegetation, construction grading, and signage.
- The development should consider installing overhead roadway lighting to delineate the Proposed North Entrance at Sims Road for nighttime or low-light conditions.

#### **Maryville Pike at Sims Road and Edington Road:**

- \* • Due to existing operational and safety issues, it is recommended that the City of Knoxville and TDOT make improvements to this intersection when funding becomes available, including additional lanes, increased road lighting, and improved pavement marking visibility. Pavement marking visibility, however, is expected to be addressed in the interim, as this section of Maryville Pike is included in TDOT's "3-year Pavement Program" resurfacing list for fiscal year 2026. Pedestrian sidewalks identified in the City of Knoxville's 2020 "Sidewalk Study" should also be pursued, along with other enhancements, such as crosswalks, pedestrian buttons, and pedestrian signal heads at the traffic signal.
- \* • In the interim, until the intersection can be reconstructed with additional turning lanes, a few other options are potentially viable, including vehicle detection, time-of-day plans, and/or providing a separate leading left-turn phase for the northbound approach to Maryville Pike, as described in the report.

- \* • It is recommended that the City install pedestrian warning signage on Sims Road, Edington Road, and the northbound approach of Maryville Pike in advance of the signalized intersection. A Pedestrian Sign (W11-2) is recommended to be installed on these approaches, a minimum of 125 feet from the intersection, and to match the sign currently posted for the southbound approach of Maryville Pike in advance of the traffic signal.

**Maryville Pike Gas Station Internal Drives/Parking Lot Aisleways:**

- All drainage grates and covers for the commercial development must be pedestrian and bicycle-safe.
- Internal sidewalks are proposed along the front and side of the convenience market. Sidewalks should include ADA-compliant ramps with detectable surfaces, and internal sidewalks should be at least 5 feet wide to comply with City of Knoxville regulations.
- According to the City of Knoxville regulations, bicycle spaces must be provided for this proposed development. Per City of Knoxville standards, with 13 proposed vehicle parking spaces, four bicycle parking spaces should be provided for this development. These spaces should be designed in accordance with the regulations in Section 11.9 of the City of Knoxville's Zoning Code User's Manual.
- All internal parking space lines are to be white, except for handicapped markings. White pavement lane markings and arrows should also be considered to facilitate orderly internal vehicular movements.
- It is recommended that the civil site engineer consider including speed humps on the internal driveways within the development to reduce internal speeds and dissuade motorists from using the site as a cut-through route.
- The site layout should consider a designated, defined marked path from the existing KAT bus stop on Maryville Pike to the convenience market building.
- The construction of the Maryville Pike Gas Station should remove excess pavement outside the State's right-of-way and return it to an unpaved and grassed area to reduce undesirable vehicle movements outside the established road lanes.
- All road and intersection elements should be designed in accordance with the American Association of State Highway and Transportation Officials (AASHTO) and the Manual on Uniform Traffic Control Devices (MUTCD), as well as the City of Knoxville and TDOT specifications and guidelines, to ensure proper roadway operations.

## DESCRIPTION OF EXISTING CONDITIONS

- **STUDY AREA:**

The proposed Maryville Pike Gas Station location is shown on a map in Figure 1. This proposed development will be located southeast of and adjacent to the existing four-way, signalized intersection of Maryville Pike, Sims Road, and Edington Road in South Knoxville, TN. The development property is situated within the City of Knoxville limits. The development will have two access driveways, one to the north at Sims Road, located east of the signalized intersection, and one to the west at Maryville Pike, located south of the signalized intersection. The development will include a gas station and a convenience store and will also offer drive-through sales.

The development site will comprise three existing parcels, one of which is currently occupied by an abandoned corner convenience market that once operated a drive-through service. This existing building is approximately 1,500 square feet. According to aerial mapping history on [kgis.org](http://kgis.org), this building was constructed decades ago, and until 2007, access to the building and store was provided only via Sims Road, adjacent to and to the north of the building. In 2008, a looped drive-through lane was constructed on the property from Maryville Pike south of the signalized intersection. Additionally, over time, more of the southeast corner of the signalized intersection and development property became paved with asphalt. This existing building will be removed for construction.



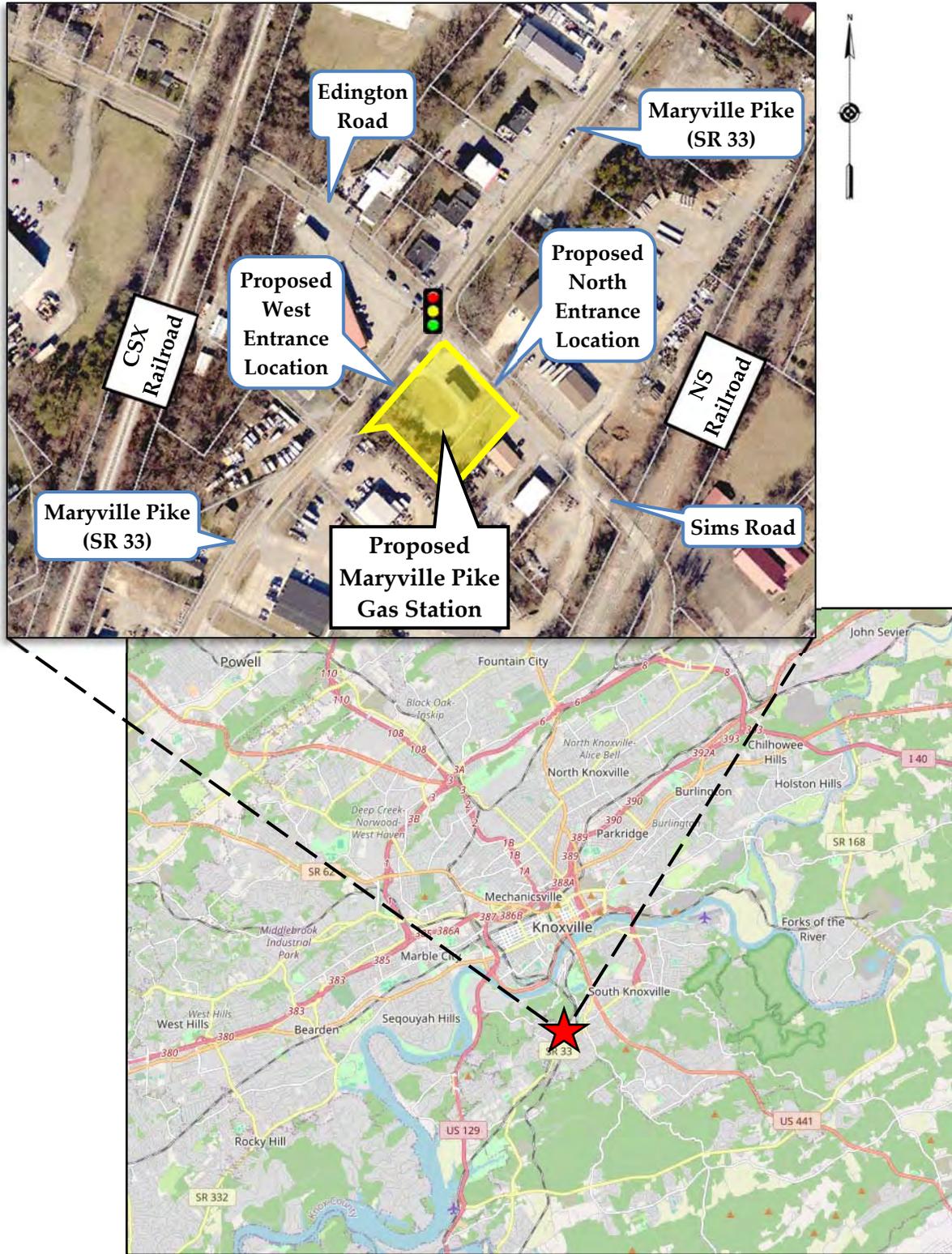
**View of Development Site South of Signalized Intersection at Maryville Pike  
(Looking Northeast)**

The proposed development property is situated in an urban/suburban area of South Knoxville, TN. It is also located in a transitional zone between residential developments and commercial,

industrial, and business properties. The surrounding area comprises a diverse mix of businesses, industries, and other non-residential land uses such as churches and small parks. Outside the immediate vicinity, numerous residential developments dot the landscape, consisting of single-family detached houses, apartments, and public housing.

The Maryville Pike Gas Station development property is bound on the north side by Sims Road, to the east by a small office building, Maryville Pike to the west, and a tributary to Goose Creek to the south along the property line. On the other side of this tributary, to the south, a general contractor occupies a large parcel. A small neighborhood grocery, Green Grocery, occupies the southwest corner of the adjacent signalized intersection and will be located directly across Maryville Pike from the proposed development. Furthermore, two active railroad lines are near the proposed development site, both running north-south and operated and owned by CSX and Norfolk Southern Railroads.

The proposed development site has relatively mild topography, sloping from north to south towards the tributary. Other than the building, asphalt, and utility poles, the site is devoid of any other constructed features, except an abandoned business signpost near Maryville Pike. The development site will comprise approximately 175 feet of road frontage along Sims Road and 200 feet of usable frontage along Maryville Pike.



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

▪ **EXISTING ROADWAYS:**

Table 1 lists the characteristics of the existing primary roadways near 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
Maryville Pike (SR 33)	Minor Arterial	40 mph	2 lanes undivided	25 feet	KAT Route 45	No sidewalks	No bike lanes
Sims Road	Minor Collector	30 mph	2 lanes undivided	19 feet	None *	No sidewalks	No bike lanes
Edington Road	Minor Collector	30 mph	2 lanes undivided	24 feet	None	No sidewalks	No bike lanes

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

<sup>2</sup> Measured from face of curbs and edges of pavement near project site

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

\* None near the proposed development site

**Maryville Pike (SR 33)** is categorized as a Minor Arterial and traverses northeast to southwest adjacent to the proposed development property. At the development site, the roadway has a 2-lane section with one lane in each direction, with no turn lanes at the adjacent traffic signal. To the north, Maryville Pike begins at a Y-intersection with Chapman Highway (US 441) on the south side of the Tennessee River near downtown Knoxville. To the south, Maryville Pike transitions to Old Knoxville Highway at the Blount County line, and the roadway continues towards Maryville, TN. This section of roadway, as described in Knoxville and Knox County, has a length of 5.7 miles.

Maryville Pike has a posted speed limit of 40 mph and a relatively straight horizontal alignment, with mild vertical changes near the proposed development site. A reduced speed limit of 35 mph is posted 575 feet north of the signalized intersection with Sims Road and Edington Road, for northbound travel on Maryville Pike. Bike lanes and sidewalks are not provided along Maryville Pike within the nearby area. Roadway illumination is provided along Maryville Pike and installed on utility poles on the west side of the roadway. Knoxville Area Transit (KAT) provides bus service along Maryville Pike at the proposed site, with a designated bus stop in front of the development site on the east side of the roadway, just south of the traffic signal.

The pavement markings along Maryville Pike adjacent to the development site include faded white lane lines and a double yellow centerline. The asphalt for the two travel lanes on Maryville Pike measured 25 feet wide, south of the traffic signal.

A traffic signal controls the adjacent four-way intersection of Maryville Pike at Sims Road and Edington Road. This signal is operated and maintained by the City of Knoxville, and the signal heads are hung on span wires supported by wooden utility poles. Crosswalks, pedestrian buttons, or indicators to assist pedestrian crossings are not provided on any of the approaches at the intersection. Each road approach at the traffic signal has a single lane without a dedicated left-turn lane,



so the signal provides no dedicated left-turn phases. The north and south approaches on Maryville Pike are provided with simultaneous green indications for all movements, followed by the east and west approaches on Sims Road and Edington Road.

**Sims Road** is classified as a Minor Collector and traverses between Maryville Pike and Brown Road from the northwest to southeast. Over its 1.1-mile length, it provides two lanes of travel and quickly transitions from an urban context at Maryville Pike to a rural, more undeveloped area to its southeast. Sims Road primarily provides access to a smattering of commercial land uses near Maryville Pike, to large, undeveloped, forested lots and parcels with single-family detached houses, and to Brown Road to the southeast. Three hundred fifty feet to the southeast of the proposed development site, Sims Road crosses at-grade with a Norfolk Southern railroad line. This railroad crossing is not provided with any crossing gates or warning signals, but is posted with warning signage and pavement markings in addition to posted Stop Signs (R1-1) on each approach of Sims Road.

Sims Road has a posted speed limit of 30 mph and does not have any bike lanes or sidewalks provided within the nearby study area. At the development site, roadway illumination is provided along the south side of Sims Road, installed on utility poles. KAT does not provide bus service along Sims Road at the development site. However, Route 45, Vestal, runs along Sims Road much farther to the southeast, traversing a short distance between Avenue A and Daylilly Drive.

Pavement markings along Sims Road adjacent to the development site are not provided except for a short distance as the roadway approaches the signalized intersection. These pavement markings at the traffic signal include only white lane lines, not a yellow centerline. The asphalt for the two travel lanes on Sims Road measured 19 feet in total width.

**Edington Road** is classified as a Minor Collector and traverses between Maryville Pike and Cherokee Trail from the southeast to northwest. Over its 0.8-mile length, it provides two lanes of travel, but is severely constricted 450 feet northwest of the signalized intersection of Maryville Pike and Sims Road. The majority of this constriction consists of an outdated, narrow, height-restricted railroad underpass below the CSX railroad line. This railroad underpass is provided with numerous warning signs in both directions, including "One Lane Underpass" and a height warning of "8'-10". Vehicles of appropriate size traverse the underpass in both directions, one at a time. The other constriction besides the railroad underpass is a short, width-constricted section of Edington Road, just east of the underpass. This width constriction just barely allows vehicles to travel in opposite directions simultaneously east of the underpass, due to a narrow bridge over a creek. Overall, this underpass and road width constriction at the bridge crossing are very detrimental to traffic flows along Edington Road.

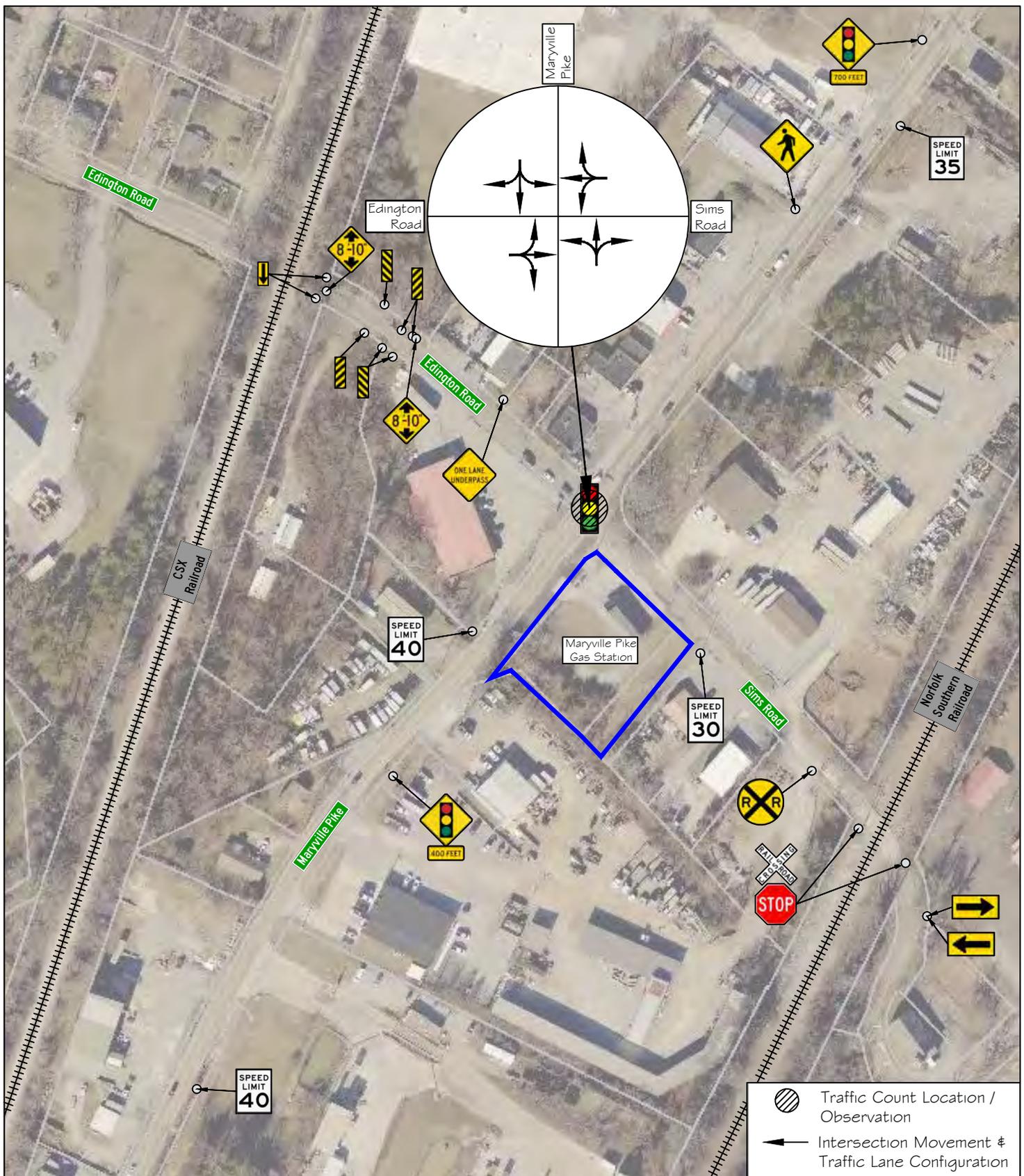


Edington Road primarily provides access to areas with single-family detached houses, but also provides access to several large apartment complexes. Beyond Edington Road's intersection with Cherokee Trail to the northwest, Cherokee Trail provides access to the University of Tennessee Medical Center and Alcoa Highway.

Edington Road has a posted speed limit of 30 mph and does not have any bike lanes or sidewalks provided within the nearby study area. Edington Road, however, does have a sidewalk on its north side, west of the railroad underpass. Roadway illumination installed on utility poles is provided along Edington Road, between the railroad underpass and the signalized intersection. KAT does not provide bus service along Edington Road.

Pavement markings along Edington Road near the development site include faded white lane lines and double yellow centerlines. The double yellow centerline is terminated, however, before the railroad underpass and bridge constriction. The asphalt pavement for the two travel lanes on Edington Road was measured at 24 feet in total width as it approaches the signalized intersection with Maryville Pike and Sims Road.

Figure 2 illustrates the location of the traffic count conducted for the study, as well as the current traffic signage along the roads in the vicinity of the development site and adjacent signalized intersection. The signage includes only warning and regulatory signs and does not include directional road signs. The pages following Figure 2 provide a further overview of the site study area, accompanied by photographs.



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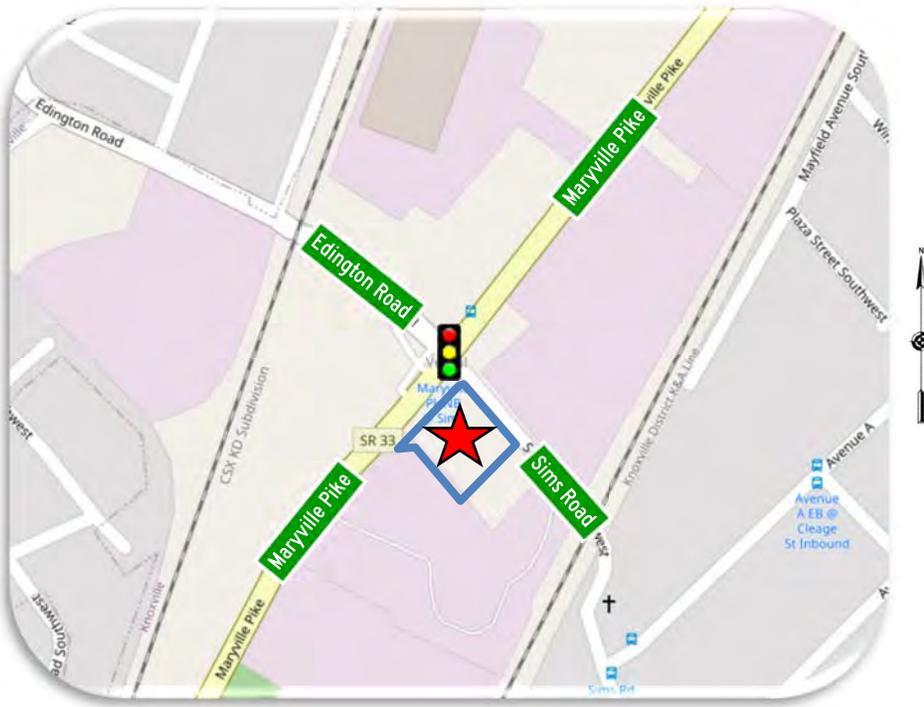


FIGURE 2

Maryville Pike Gas Station

Traffic Count Location, Traffic Signage & Existing Lane Configurations

PHOTO EXHIBITS



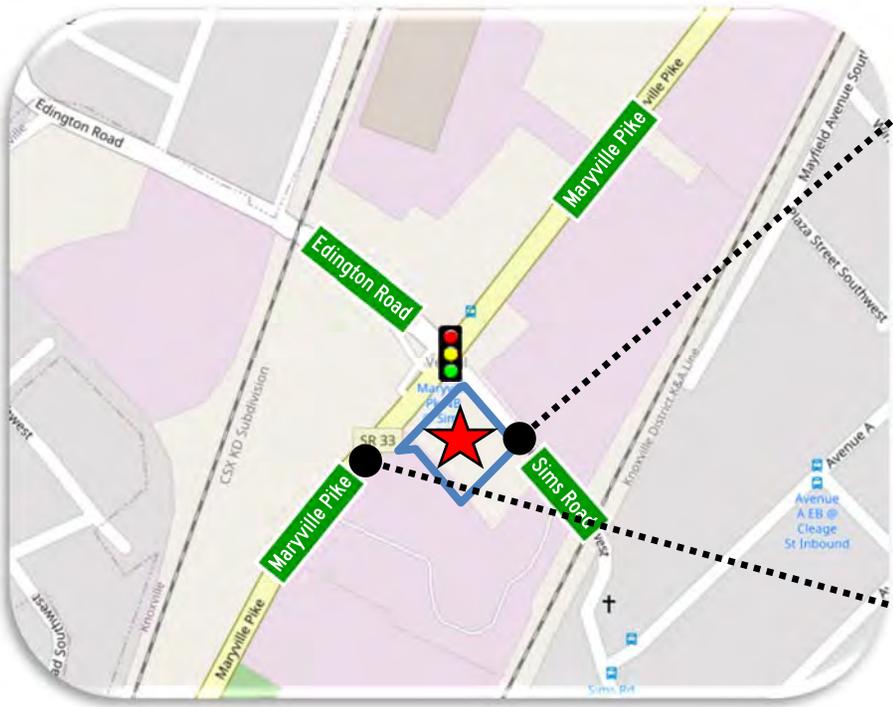
Proposed Development Site



Aerial View of Proposed Development Site  
(Looking Southeast)



Aerial View of Proposed Development Site  
(Looking Northwest)



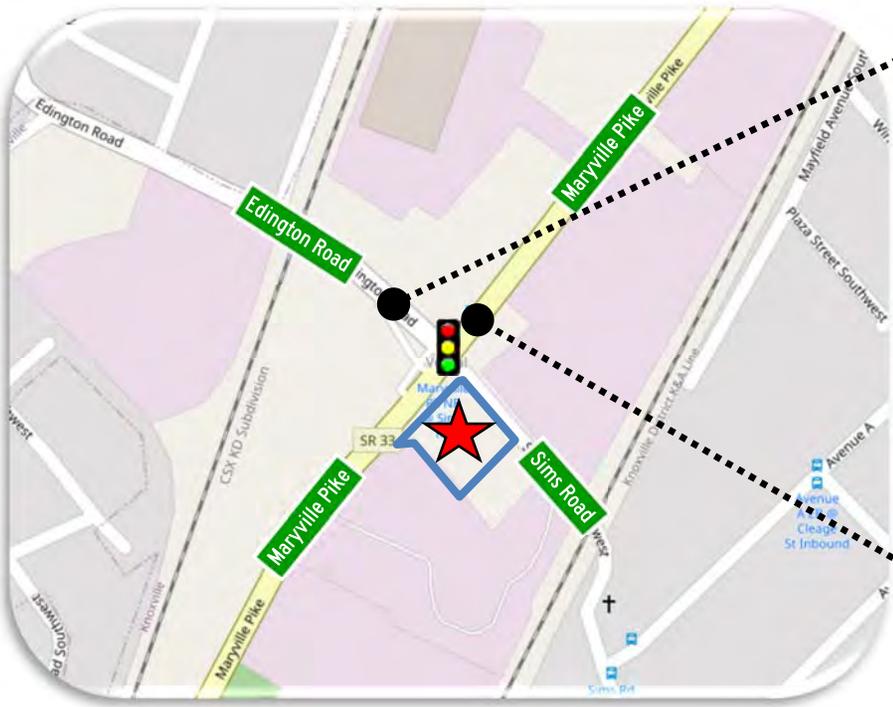
**Intersection of Maryville Pike at Sims Road & Edington Road**



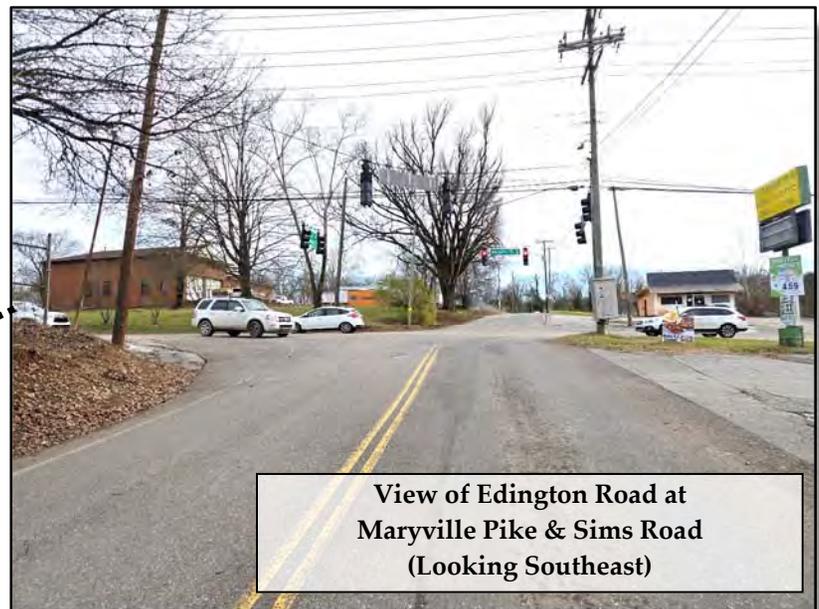
**View of Sims Road at Proposed North Entrance Location (Looking Northwest)**



**View of Maryville Pike at Proposed West Entrance Location (Looking Northeast)**



**Intersection of Maryville Pike at Sims Road & Edington Road**



**View of Edington Road at Maryville Pike & Sims Road (Looking Southeast)**



**View of Maryville Pike at Sims Road & Edington Road (Looking Southwest)**

▪ **EXISTING TRANSPORTATION VOLUMES PER MODE:**

Only one annual vehicular traffic count location is in the near vicinity, and the Tennessee Department of Transportation (TDOT) conducts it. The count location data is the following and can be viewed with further details in Appendix A:

○ Existing vehicular roadway traffic:

TDOT reported the following Average Annual Daily Traffic (AADT):

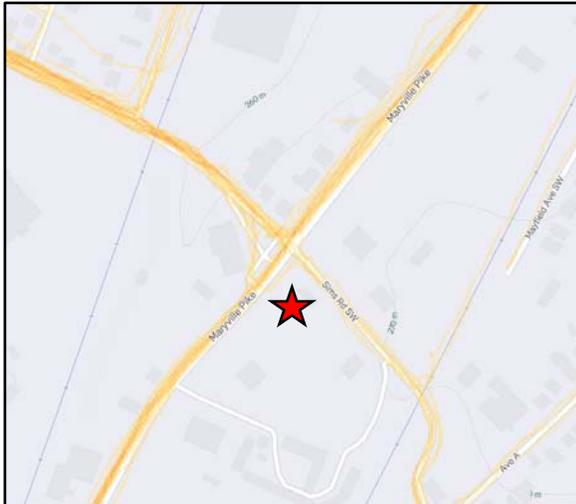
- Maryville Pike (SR 33), south of Clayton Road, and located southwest of the development site, recorded 6,112 vehicles per day in 2024. Between 2014 and 2024, this count station has reported an average annual growth rate of +1.7%.

○ Existing bicycle and pedestrian volumes:

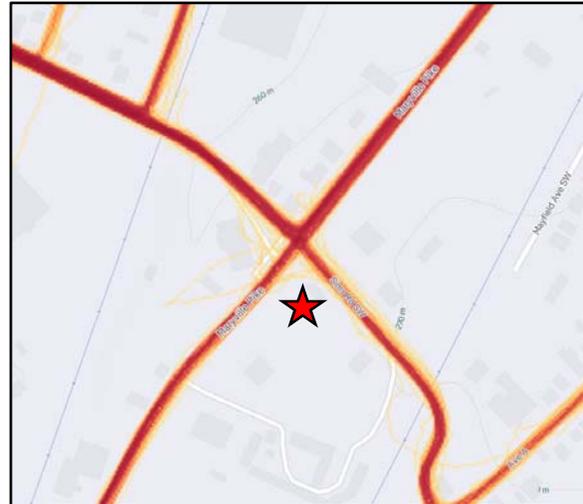
The average daily pedestrian and bicycle traffic along Maryville Pike, Sims Road, and Edington Road is unknown. However, even with the lack of sidewalks and bicycle lanes, during the traffic counts for this project at the traffic signal, several bicyclists and many pedestrians were observed at and around this intersection throughout the day.

An online website, [strava.com](https://www.strava.com), provides "heat" maps detailing routes taken by pedestrians, joggers, and bicyclists. The provided heat maps display data from the last two years, are updated monthly, and are compiled from individuals who have allowed their smart devices to track and record their routes (millions of users). The activities in the maps are represented on the roads by color intensities, with darker colors indicating higher activity.

The Strava heat maps show a surprisingly high level of bicyclist traffic on the roads surrounding the development site, particularly given the lack of sidewalks and bicycle facilities, and the relatively high amount of vehicular traffic along Maryville Pike. Some of this pedestrian and bicyclist traffic, as documented in Strava maps, is likely attributable to individuals patronizing the adjacent neighborhood grocery store, as observed during the traffic counts, and another existing convenience market on Maryville Pike near the signalized intersection. Overall, in the Strava maps, pedestrian activity is shown to be lower than bicyclist activity in the area, whereas the opposite was observed during the traffic count.



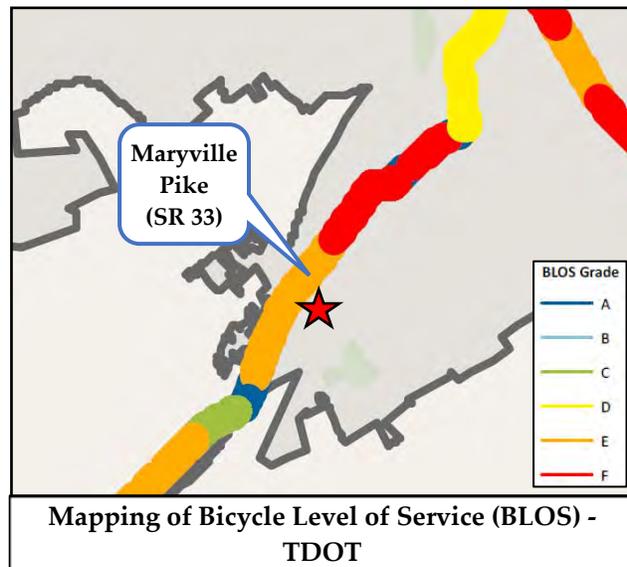
Strava Heat Map for Pedestrian and Joggers



Strava Heat Map for Bicyclists

▪ **PEDESTRIAN AND BICYCLE FACILITIES:**

Sidewalks and bike lanes are not provided along Maryville Pike, Sims Road, or Edington Road near the development site. TDOT has published mapping illustrating the Bicycle Level of Service (BLOS) for State Routes. BLOS is a nationally used measure of bicyclist comfort based on a roadway's geometry and traffic conditions. BLOS A designates the route as most suitable for bicyclists and BLOS F as the least suitable. Maryville Pike (SR 33) has poor E and F BLOS grades near the development site.

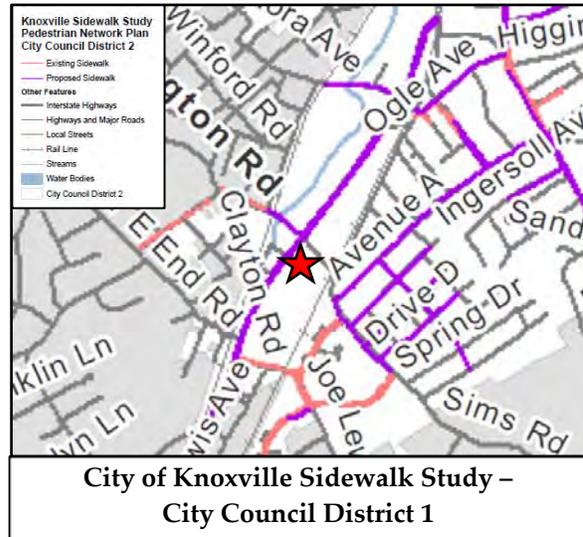


Mapping of Bicycle Level of Service (BLOS) - TDOT

Additionally, the City of Knoxville has designated Sims Road and Edington Road near the development site as "Comfortable Routes" for bicycle travel. A "Comfortable Route" is defined as a route based on low to medium traffic speeds and volumes, along with other criteria.

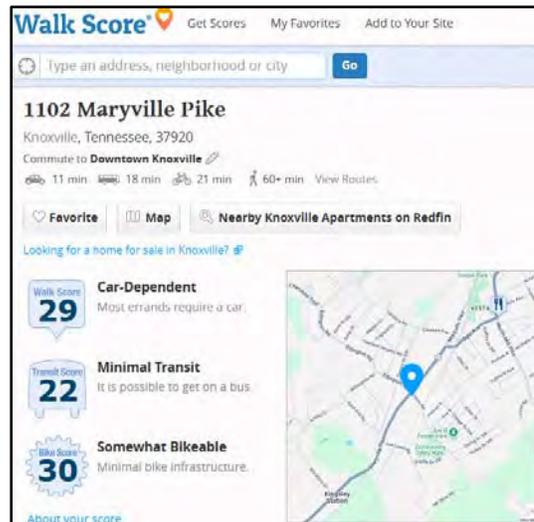
The City of Knoxville produced a report titled "Sidewalk Study" in June 2020. This study identified the City of Knoxville's existing sidewalk system, areas of need for sidewalks, and a framework for future sidewalk infrastructure. This study provided maps broken down by City Council Districts, showing both the existing and proposed recommended sidewalks. The

proposed development site is situated in City Council District 1. A map of this area, as depicted in this Knoxville study, is included in the adjacent image. The red lines indicate the locations of existing sidewalks, and the purple lines illustrate the proposed sidewalks. The map in the image designates areas outside the City with gray shading. Both Maryville Pike and the section of Edington Road between the traffic signal at Maryville Pike and the railroad underpass are within the City and are marked with a purple line indicating a proposed sidewalk. In the study, however, these proposed sidewalks are ranked relatively low. On Maryville Pike, the study estimated a cost of \$5.1 million for 5,753 feet of new sidewalk between the City limits at Caleb Road to Mayfield Avenue. For the short section of Edington Road between the traffic signal and railroad underpass, the study estimated \$472k for 567 feet of new sidewalk. It is currently unknown when these proposed sidewalks will be constructed, as they are dependent on the necessary funding.



▪ **WALK SCORE:**

A private company offers a 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 based on a patented system. According to the website, the numerical values assigned to the Walk Score and Bike Score are based on the distance to the closest amenity in various relevant categories (such as businesses, schools, and parks) and are graded from 0 to 100.



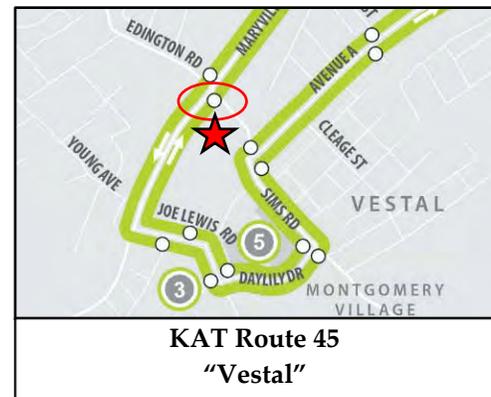
The project site is located in the City of Knoxville and is graded, with a Walk Score of 29 at the development property address (1102 Maryville Pike). This Walk Score indicates that the site is car-dependent, and most trips require a vehicle to reach the development property. The site is assigned a Bike Score of 30, indicating that minimal bike infrastructure is available. A Transit Score of 22 is assigned to the site, but this score is likely outdated, as a bus stop is currently located there on Maryville Pike. Overall, these scores suggest

that the development site has a slight potential to generate alternative transportation modes to and from the site.

Overall, it is expected that some pedestrian and bicycle traffic will occur, both to and from the proposed Maryville Pike Gas Station. Based on field observations and the recorded video of traffic counts at the signalized intersection, there is a reasonable probability that some non-vehicular trips will occur, as is currently the case for some customers traveling to and from the existing Green Grocery. Ultimately, however, with consultation with Knoxville/Knox County Planning, this study analysis assumed that the new development will not generate a significant number of measurable bicycle or pedestrian trips that would result in reduced vehicle trips; therefore, these potential reductions in vehicle trips are not included in the study analyses.

▪ **TRANSIT SERVICES:**

The City of Knoxville offers a network of public transit options through Knoxville Area Transit (KAT). The development site is located adjacent to this transit system, which runs along Maryville Pike and on Route 45, "Vestal". A bus station is located on the southeast corner of Maryville Pike at Sims Road and Edington Road in front of the proposed development site fronting Maryville Pike. This route has established bus service every 60 minutes at this bus stop, and this route map is

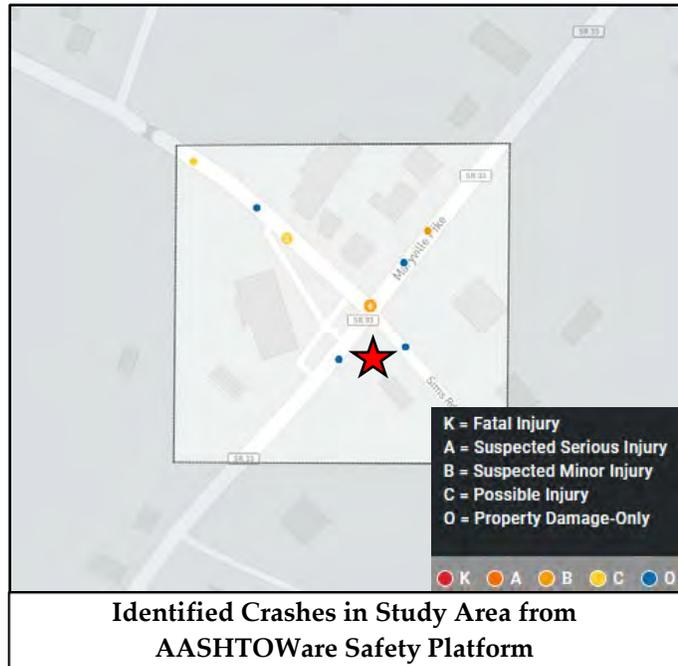


also included in Appendix B. It operates on weekdays and weekends. Other transit services in the area include the East Tennessee Human Resource Agency (ETHRA) and the Community Action Committee (CAC), which provide transportation services upon request.

Even though the public bus service is located adjacent to the development site and provides a stop there, after consultation with Knoxville/Knox County Planning, the proposed development was analyzed without expecting any reduction in vehicle trips due to public transit use.

▪ **CRASH DATA:**

For this project, access to the AASHTOWare Safety online platform was provided. This AASHTO (American Association of State Highway and Transportation Officials) platform is a component of several offerings that include compiling crash data for local state DOTs to use in safety analyses. TDOT provides vehicle crash data to this system and is an extension of its existing E-TRIMS (Enhanced Tennessee Roadway Information Management System) database. The crash data in the E-TRIMS system is from the statewide TITAN



(Tennessee Integrated Traffic Analysis Network) database. The TITAN database includes all reportable vehicle crash data from Tennessee law enforcement agencies.

In the vicinity of the proposed entrances for the development along the adjacent corridors, as shown in the above image, 14 crashes occurred during the past 3 years between December 8<sup>th</sup>, 2022, and December 8<sup>th</sup>, 2025. A summary of this data from the AASHTOWare Safety Platform is presented in Table 2. Of the 14 crashes, two involved alcohol impairment, two involved a truck or bus, two involved a utility pole, one involved a bridge rail, and one involved a distracted driver. Furthermore, one crash involved a pedestrian and one involved a bicycle (pedalcycle), with both occurring at the signalized intersection of Maryville Pike at Sims Road and Edington Road. Of the 14 crashes, six occurred at the signalized intersection, with the other eight nearby along the roadways. These six intersection crashes are highlighted in bold in the table.

Of the 14 crashes, 8 were property-damage-only (PDO) incidents without injuries or fatalities, three involved possible injuries, and three had suspected minor injuries. The crash types included five "no collision with a vehicle", five angle crashes, three rear-end crashes, and one head-on crash. The attributable driver actions involved in these 14 crashes included one "careless erratic driving", one "reckless negligent driving", one "driver distracted", one "lane departure", one "improper turn", one "following improperly", and three "failure to yield right of way". The remaining five other crashes were listed as "no contributing actions or unknown".

**TABLE 2**  
**CRASH DATA IN STUDY AREA**  
12/8/22 - 12/8/25

CRASH LOCATION	MANNER OF FIRST COLLISION	TYPE OF CRASH	TOTAL VEHICLES	VEHICLE MOST HARMFUL EVENT	DRIVER ACTIONS
Ramp	No Collision with Vehicle	(C) Possible Injury	1	Utility Pole	Careless Erratic Driving
Along Roadway	Head-On	(O) Property-Damage Only	2	Vehicle in Transport/ Vehicle in Transport	Improper Turn/ No Contributing Actions
<b>At an Intersection</b>	<b>Angle</b>	<b>(O) Property-Damage Only</b>	<b>2</b>	<b>Vehicle in Transport/ Vehicle in Transport</b>	<b>Failure to Yield Right of Way/ No Contributing Actions</b>
Along Roadway	No Collision with Vehicle	(C) Possible Injury	1	Bridge Rail	Lane Departure
Along Roadway	No Collision with Vehicle	(O) Property-Damage Only	1	Utility Pole	-
<b>At an Intersection</b>	<b>No Collision with Vehicle</b>	<b>(B) Suspected Minor Injury</b>	<b>1</b>	<b>Pedestrian</b>	-
<b>At an Intersection</b>	<b>Angle</b>	<b>(O) Property-Damage Only</b>	<b>2</b>	<b>Vehicle in Transport/ Vehicle in Transport</b>	<b>No Contributing Actions</b>
<b>At an Intersection</b>	<b>No Collision with Vehicle</b>	<b>(B) Suspected Minor Injury</b>	<b>1</b>	<b>Pedalcycle</b>	<b>No Contributing Actions</b>
<b>At an Intersection</b>	<b>Rear-End</b>	<b>(C) Possible Injury</b>	<b>2</b>	<b>Vehicle in Transport/ Vehicle in Transport</b>	<b>Driver Distracted/ No Contributing Actions</b>
Along Roadway	Rear-End	(B) Suspected Minor Injury	3	Vehicle in Transport/ Vehicle in Transport/ Vehicle in Transport	Following Improperly/ No Contributing Actions/ No Contributing Actions
Along Roadway	Angle	(O) Property-Damage Only	2	Vehicle in Transport/ Vehicle in Transport	Failure to Yield Right of Way/ No Contributing Actions
Along Roadway	Angle	(O) Property-Damage Only	2	Vehicle in Transport/ Vehicle in Transport	No Contributing Actions/ No Contributing Actions
Along Roadway	Angle	(O) Property-Damage Only	2	Vehicle in Transport/ Vehicle in Transport	Failure to Yield Right of Way/ No Contributing Actions
<b>At an Intersection</b>	<b>Rear-End</b>	<b>(O) Property-Damage Only</b>	<b>3</b>	<b>Vehicle in Transport/ Vehicle in Transport/ Vehicle in Transport</b>	<b>Reckless Negligent Driving/ No Contributing Actions/ No Contributing Actions</b>

From AASHTOWare Safety online platform

The City of Knoxville's Vision Zero Action Plan includes identifying a High Injury Network (HIN). According to the City, "This HIN identifies specific roads that bear a disproportionate amount of serious crashes. The HIN represents a small percentage of the overall roadway network in the City, but this small percentage account for a large portion of the life-altering crashes. Roads on the HIN that ranked particularly high for severe crashes are shown as a Tier 1 priority." Maryville Pike, near the development site, is identified in this network as Tier 2, as shown in the adjacent

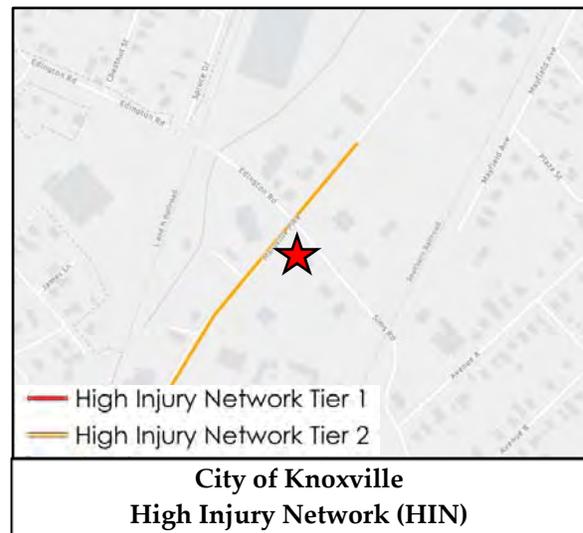


image. The City uses the HIN network to identify improvement strategies and safety countermeasures.

Overall, the past three years' crashes are typical at and near signalized intersections. In the study area, utility poles are identified as a prevalent non-vehicular crash target, along with the bridge rail at the point where Edington Road narrows east of the railroad underpass. Unfortunately, as observed in the field and during the traffic counts, the fair amount of pedestrian and bicyclist activity in the area has also led to a couple of conflicts with vehicles.

## PROJECT DESCRIPTION

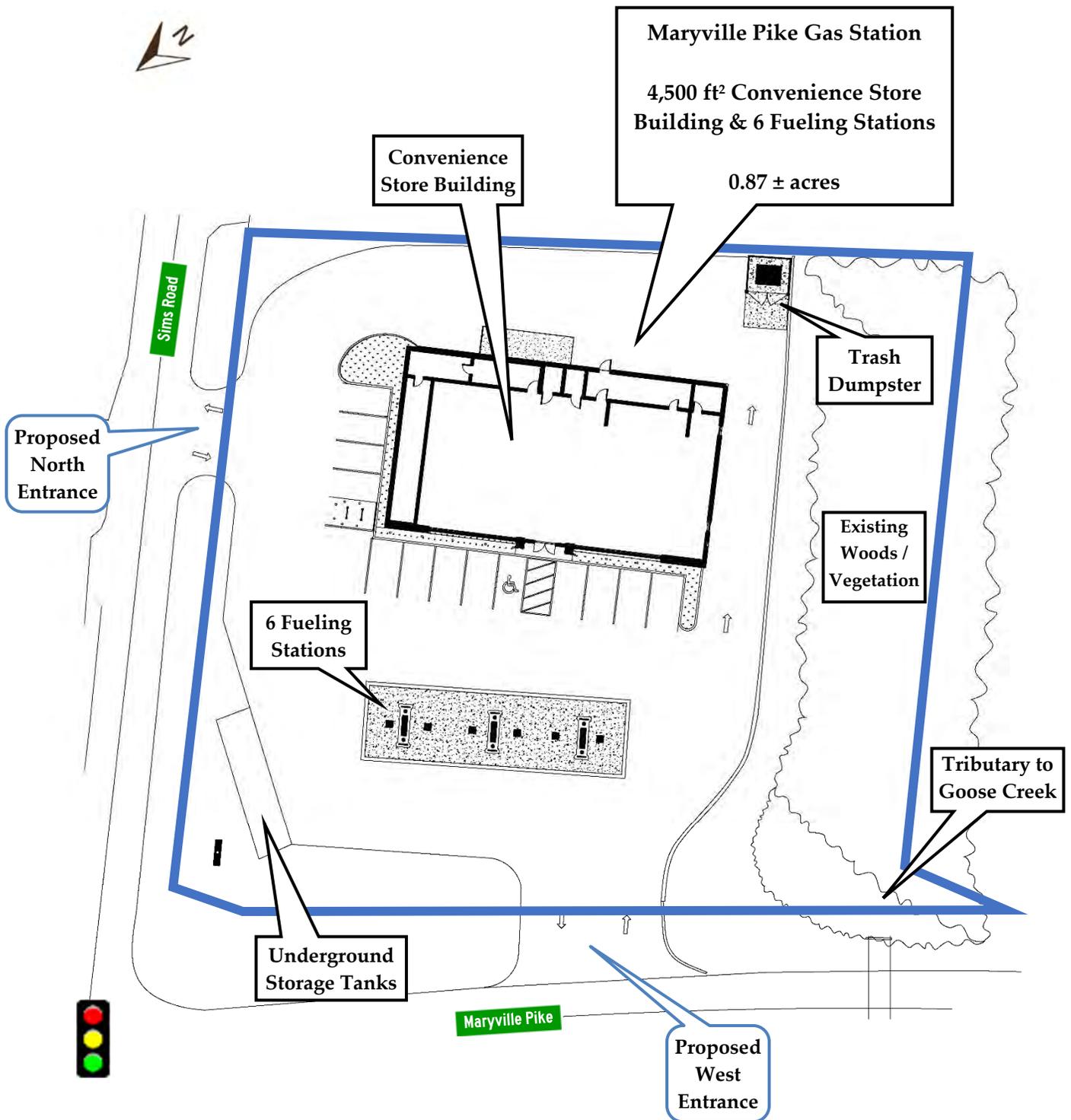
### ▪ LOCATION AND SITE PLAN:

The proposed plan layout, which includes a convenience market with a drive-through window service and six gas fueling stations, is provided by oysk<sup>3</sup> architects and is shown in Figure 3. The design proposes two entrances for the development: the Proposed North Entrance, tying into Sims Road to the north, and the Proposed West Entrance, tying into Maryville Pike to the west. The Proposed North Entrance at Sims Road will be 24 feet in width and approximately 170 feet southeast of the signalized intersection of Maryville Pike at Sims Road and Edington Road (centerline to centerline). The Proposed West Entrance at Maryville Pike is shown to be 40 feet in width and approximately 140 feet southwest of the signalized intersection (centerline to centerline).

The site plan in Figure 3 shows one proposed new building for the Maryville Pike Gas Station development on a 0.87-acre site. The building will be 4,500 square feet and will include a convenience market offering standard gas station merchandise, retail items, and deli services. Three MPDs (multiple product dispensers) with a total of six fueling positions will be constructed slightly northwest of the convenience market building. The underground storage fuel tanks will be on the northwestern edge of the property line near the corner of Maryville Pike and Sims Road. The convenience market is expected to operate from 5 a.m. to 10 p.m. daily. In addition to retail sales, the drive-through window will include deli services.

The overall site design shows 13 vehicle parking spaces, including one ADA-accessible parking space. Four parking spaces on the northern side of the building facing Sims Road will be reserved for compact vehicles. One trash dumpster is located in the southeastern (rear) portion of the development. Raised sidewalks and concrete areas will be provided in front of and on the northern side of the building. Additionally, a retaining wall, as needed, will be constructed along the southwestern edge of the site's footprint to avoid impacting the tributary to Goose Creek located along the property's edge and to provide a buffer.

The schedule for completing this new commercial development depends on construction timelines. This project is also contingent on permitting, design, and other regulatory approvals. Overall, the Maryville Pike Gas Station is expected to be built within a short timeframe. Based on this forecast, this study assumed that the total construction build-out of the development with full occupancy and operations would occur by 2027.



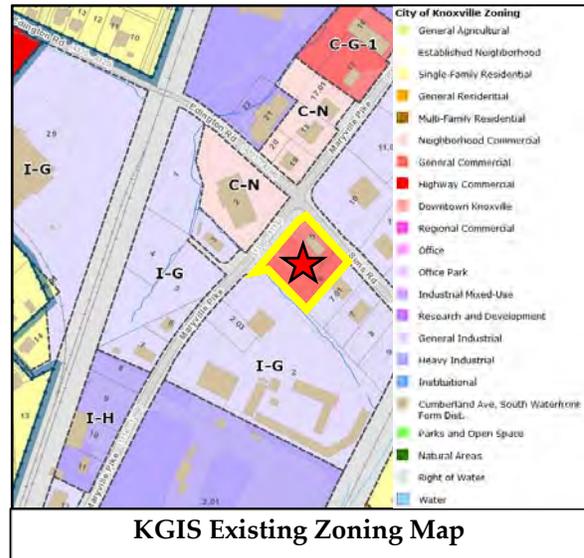
**Figure 3**  
**Proposed Plan Layout**  
**Maryville Pike Gas Station**

Not to Scale –  
Annotated by Ajax  
Engineering for  
Display Purposes

▪ **PROPOSED USES AND ZONING REQUIREMENTS:**

The three existing parcels comprising the Maryville Pike Gas Station development property are nearly square in shape when combined, are located within the City of Knoxville, TN, and are all zoned General Commercial (C-G-1). This zoning is not being proposed to be changed for this development.

The City of Knoxville zoning code states that the General Commercial (C-G-1) zoning district "is intended to provide for a heterogeneous mix of retail, personal service, office, and residential uses within and along Knoxville's commercial nodes and corridors."



The most recently published online KGIS zoning map is provided in Appendix C and shown above. The existing adjacent surrounding zoning and land uses are the following:

- All the properties adjacent to the development site are zoned General Industrial (I-G). Otherwise, the only nearby, differently zoned properties are to the north and northwest on the other side of Maryville Pike, and they are zoned Neighborhood Commercial (C-N). The properties zoned Neighborhood Commercial (C-N) include the Green Grocery on the south side of Edington Road, an office/retail building to the north, and an additional convenience market further north on the west side of Maryville Pike.
- The adjacent property to the southeast of the development site is an office building on the south side of Sims Road, currently occupied by a tire shop. The adjacent property to the southwest, across the tributary to Goose Creek, is occupied by a general contractor with access to Maryville Pike at two entrances. This contractor, in addition to several buildings, has a large open yard for construction equipment.

▪ **ON-SITE CIRCULATION:**

The internal drive and parking lot surfaces for the Maryville Pike Gas Station will be asphalt-paved, designed, and constructed in accordance with City of Knoxville regulations. The developer/owner will maintain the parking areas and internal pavement in the development after

construction, and it will remain privately owned. The drive-through lane for retail and deli sales will operate in a counter-clockwise direction, beginning at the front of the site and ending on the southwest side of the building, where the drive-through window will be located.

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

Besides customer and employee passenger vehicles, the internal pavement areas will provide access for service, delivery, maintenance, and fire protection/rescue vehicles. In particular, the site will also be designed for gasoline truck deliveries and other larger retail delivery trucks. None of these non-passenger-vehicle types should affect adjacent roadway operations, except when they occasionally enter and exit the development.

The development's internal pavement will accommodate larger vehicle types, as well as the standard passenger vehicles of customers and employees. The internal pavement areas will be designed and constructed to the City of Knoxville's specifications and are expected to be adequate for fire protection and rescue vehicles, trash collection trucks, single-unit and larger delivery trucks, and gasoline delivery trucks.

## ANALYSIS OF EXISTING AND PROJECTED CONDITIONS

### ▪ EXISTING TRAFFIC CONDITIONS:

This study collected traffic counts at the signalized intersection of Maryville Pike at Sims Road and Edington Road on Wednesday, December 10<sup>th</sup>, 2025, for a total of 6 hours during the AM and PM peak hours. An auxiliary traffic count was also conducted at a nearby convenience market on Maryville Pike, for two hours during the identified AM and PM peak hours at the signalized intersection. This abbreviated count is discussed in a later section of the report.

Manual traffic counts were conducted to identify and tabulate morning and afternoon peak-period volumes, as well as travel directions, at and near the proposed development site. The identified morning peak hour at the signalized intersection occurred from 7:30 to 8:30 a.m., and the afternoon peak hour occurred from 3:30 to 4:30 p.m. The manual tabulated traffic counts at the intersection can be reviewed in Figure 4 and Appendix D. Some observations of the vehicular traffic on the adjacent road corridors and signalized intersection include the following:

#### General Observations:

- During the traffic counts, 16 pedestrians were observed crossing at or near the intersection, as were five bicyclists and four individuals on electric scooters. The vast majority of the non-vehicular activity occurred in the afternoon, with only two pedestrians observed in the morning. Two bicyclists were observed traveling in the actual vehicle lanes, while the remaining were seen crossing Maryville Pike south of the signalized intersection. Likewise, all the electric scooter movements were observed crossing south of the signalized intersection. A fair number of pedestrians were observed crossing Edington Road near Maryville Pike; however, the bulk crossed south of the traffic signal on Maryville Pike. Nearly all of the non-vehicular activity at the intersection appeared associated with the adjacent Green Grocery.
- The majority of observed vehicles during the traffic count were passenger cars. However, school buses, as well as many dump trucks, concrete mixers, and KAT buses, were also observed. While a KAT bus stop is located at the proposed development site on Maryville Pike, none were observed during the traffic count stopping for passengers.
- During the morning peak hour, vehicular traffic on Maryville Pike at the development site was roughly 60/40, with 60% heading north and 40% heading south. During the afternoon peak, the northbound and southbound splits on Maryville Pike were roughly even, with a slightly larger amount of traffic heading northbound than southbound.

- Overall, the Sims Road approach at the traffic signal saw minimal vehicular traffic, with correspondingly low volumes entering from Edington Road and the Maryville Pike northbound and southbound approaches.
- With a single lane on each approach at the traffic signal, left-turn vehicle movements were problematic, particularly for trailing motorists traveling thru the intersection. The most significant impact from left-turn movements at the intersection was experienced by northbound thru motorists on Maryville Pike when others attempted to turn left onto Edington Road. Combined with high southbound traffic on Maryville Pike at times, northbound left-turning vehicles often had difficulty turning left onto Edington Road, causing backups on northbound Maryville Pike.

This difficulty in turning left, combined with a single lane, often led to illegal traffic maneuvers committed by other motorists trying to avoid the delay. One type of illegal movement included motorists passing the stopped left-turning vehicle on the outside, shifting towards the Sims Road approach while passing. This illegal movement was often "contagious" once one motorist was observed passing illegally in this manner. Some motorists "hop-scotched"/passed more than one vehicle. A couple of times, a motorist was observed not only passing the stopped left-turner but also one or two other vehicles caught in the queue. These illegal movements occurred throughout the day, but particularly during peak flows. In addition to passing illegally on the outside while others attempted to turn left onto Edington Road, many other motorists were observed cutting through the adjacent Green Grocery parking lot. These cut-through movements occurred during northbound backups from a stopped left-turner at the traffic signal. They also occurred when the northbound lane on Maryville Pike was provided a red signal indication, and "experienced" drivers who wanted to turn left onto Edington Road recognized that the leading vehicle in the queue on Maryville Pike at the signal was desiring to turn left but would be faced with a substantial wait with oncoming southbound traffic once the signal indication turned green.

The single eastbound lane on Edington Road at the traffic signal was also problematic, leading many vehicles to cut through the Green Grocery parking lot in the opposite direction, particularly during peak afternoon hours. During the afternoon peak hour, Edington Road experienced a significant influx of eastbound vehicles from the west, many of whom wanted to turn right onto Maryville Pike towards the south at the traffic signal. However, due to a single-lane approach at the traffic signal and this significant influx of traffic, the Green Grocery parking lot was an attractive alternative to avoid the

delays. This cut-through movement at the Green Grocery from west to south was more attractive than for motorists attempting the opposite cut-through movement, because it requires a more effortless right-turn into the parking lot and then a right-turn onto southbound Maryville Pike, versus the opposite cut-through maneuver of turning left into the grocery store parking lot from Maryville Pike and then a left-turn onto westbound Edington Road.

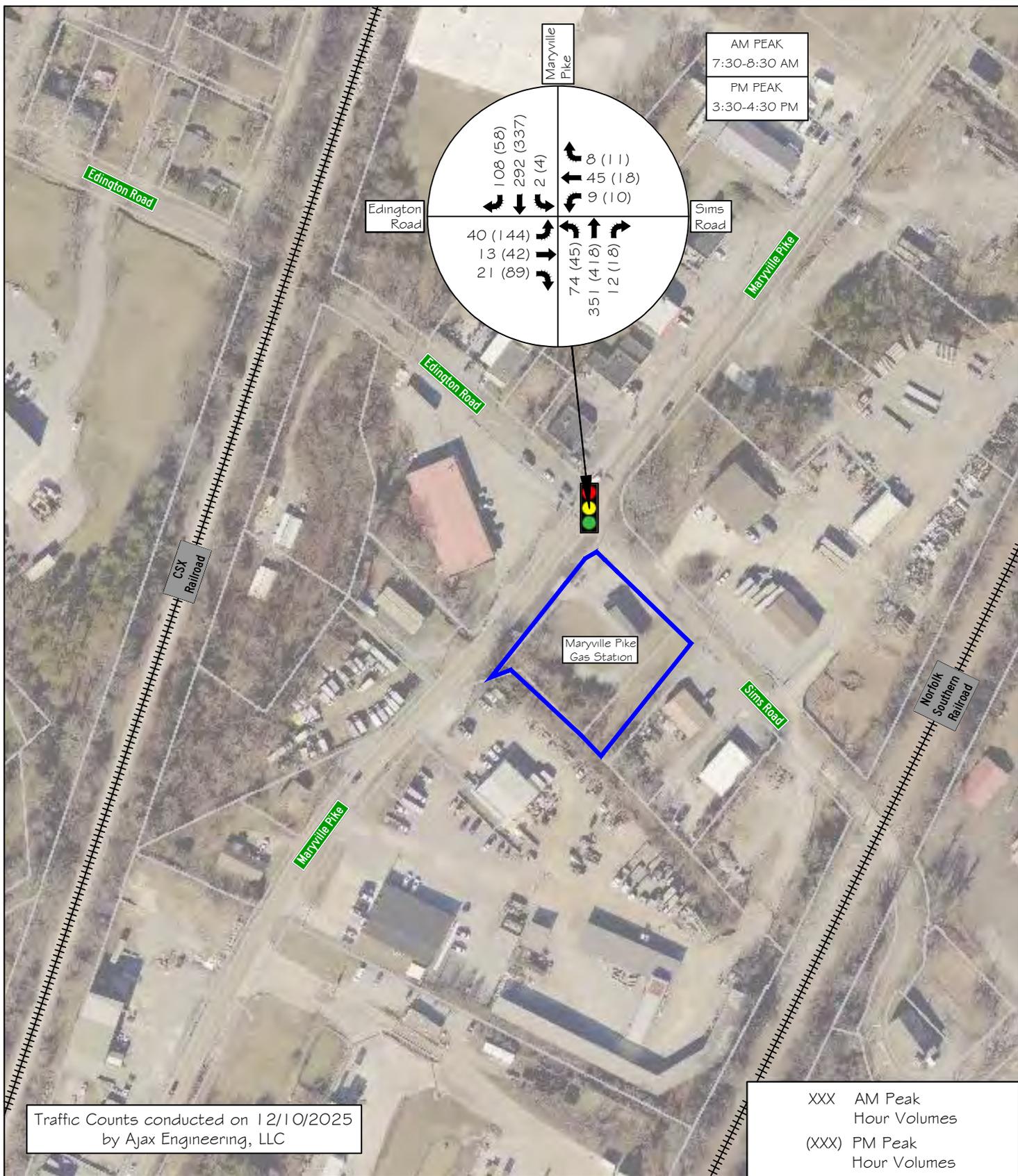
Due to the limited field of view of the traffic camera used for the traffic count, the amount of cut-through traffic in the grocery parking lot during the observed hours could not be fully verified. Still, it is estimated to be in the dozens based on the available observations of the motorists' behavior in the parking lot.

- As discussed and described, the most delay-causing activity at the traffic signal was when a motorist attempted to turn left from Maryville Pike onto Edington Road towards the west. The lack of a separate turn lane and the absence of protected green time for this movement, combined with high opposing traffic volumes at times, produced vehicle queues and frustration among trailing motorists,



often leading to the illegal traffic movements described. This situation led to more than one instance where the leading left-turning vehicle was unable to turn for a couple of cycle lengths. When finally able to turn due to a sufficient gap in traffic, only a few thru movements on Maryville Pike could make it through during the green indication, resulting in noticeable vehicle queues for several signal cycles.

- In general, many motorists during the traffic count at the traffic signal were observed to be quite willing to take risks and resort to illegal maneuvers to avoid delays. This openness to risky driving behavior can be attributable to single-lane approaches at the traffic signal and associated vehicle delays, as well as to the wide-open asphalt parking lot adjacent to the signal. Other illegal movements observed were red-light running. Furthermore, pedestrians and bicyclists, in addition to crossing mid-block outside the signalized intersection, did so before sunrise and after sunset. The roadway illumination at and around the intersection, while provided, is relatively weak.



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NOT TO SCALE



FIGURE 4

Maryville Pike Gas Station

2025 Peak Hour Traffic Volumes - Existing Traffic Conditions

Capacity analyses were conducted to determine the Level of Service (LOS) for the existing 2025 signalized intersection traffic volumes, as shown in Figure 4. The capacity analyses were calculated following the Highway Capacity Manual (HCM) methods and utilizing Synchro (Version 12) traffic software.

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 the 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). LOS designations, which are based on delay, are reported differently for unsignalized and signalized intersections. For example, a 20-second delay at an unsignalized intersection would indicate LOS C, representing the additional delay a motorist would experience while traveling through the intersection. Also, for example, a v/c ratio of 0.75 for an approach at an unsignalized intersection would indicate that it is operating at 75% of its available capacity. This difference is primarily due to the motorists' different expectations between the two road facilities. Generally, the LOS D/LOS E boundary 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 attempts to quantify delay, including 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

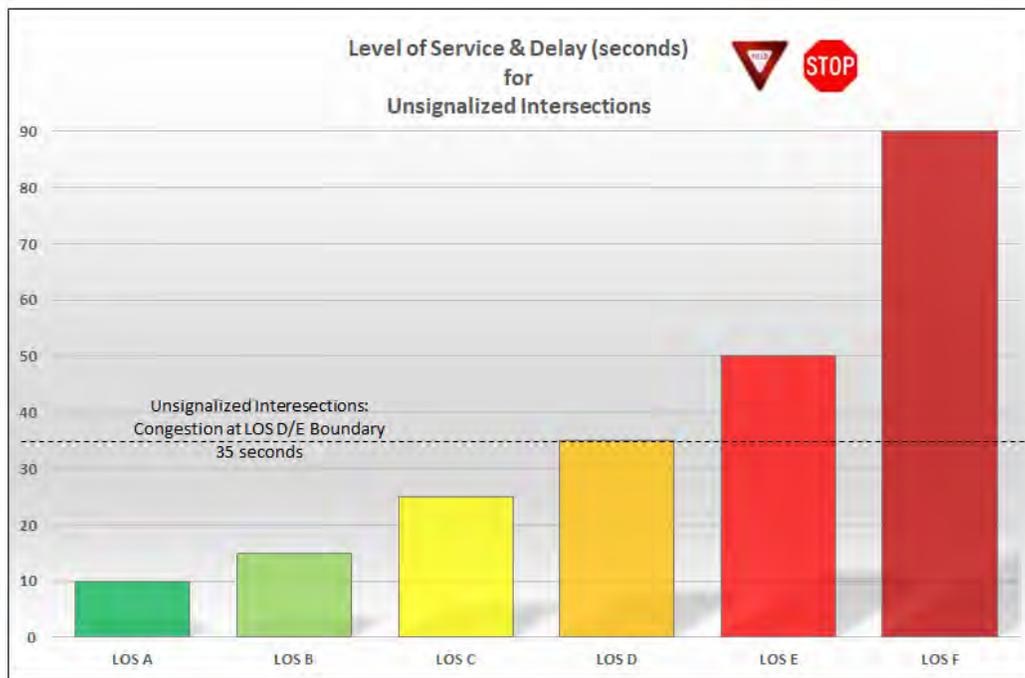
the delay for each minor approach and the left-turn movements on the major street. Table 3 lists the level of service criteria for unsignalized intersections. The analysis results for unsignalized intersections using HCM methodologies are conservative due to the more stringent vehicle gap parameters used. In normal road conditions, drivers are more willing to accept smaller gaps in traffic than the HCM methodology models. The unsignalized intersection methodology also does not account for more significant 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.

For signalized intersections, LOS is based on delay (in seconds) for various movements within the intersection and the overall operation of all the traffic entering the intersection. This delay measures driver discomfort, frustration, fuel consumption, and lost travel time, and depends on traffic signal cycle lengths, green phase lengths, and the quality of traffic progression. This control delay includes deceleration/acceleration delay, queue move-up time, and stopped delay time. For signalized intersections, in most instances, the upper limit of acceptable delay during peak hours is the LOS D/E boundary at 55 seconds. Table 4 lists the level of service criteria for signalized intersections.

**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, 7th Edition

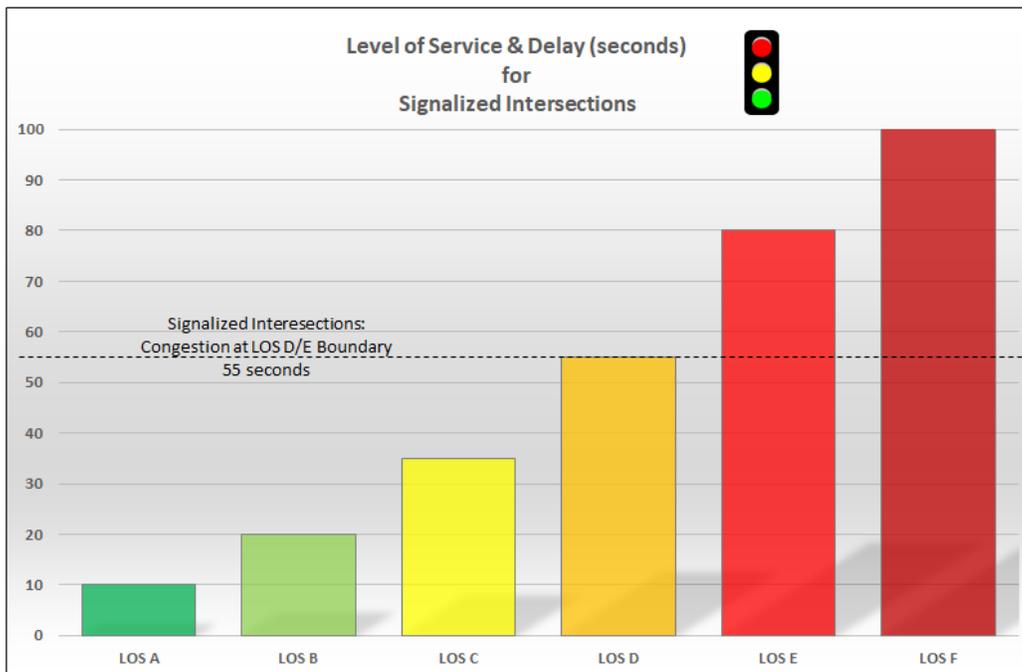


**TABLE 4**  
**LEVEL OF SERVICE AND DELAY FOR SIGNALIZED INTERSECTIONS**



LEVEL OF SERVICE	DESCRIPTION	CONTROL DELAY (seconds/vehicle)
A	Operation with very low control delay. Progression is extremely favorable and most vehicles do not stop at all.	≤10.0
B	Generally good level of progression. More vehicles stop than with LOS A, causing higher levels of average delay.	> 10 - 20
C	Higher delays with individual cycle failures may begin at this level. Many vehicles may still pass through without stopping.	> 20 - 35
D	Approaching unstable flow. The influence of congestion becomes more noticeable. Many vehicles stop.	> 35 - 55
E	Considered the limit of acceptable delay. High delays indicated by poor progression, long cycle lengths, and high v/c ratios.	> 55 - 80
F	Unacceptable delay occurs. Progression is extremely poor with long cycle lengths and high v/c ratios.	>80

Source: Highway Capacity Manual, 7th Edition



The intersection capacity results for the existing 2025 peak hour traffic are shown in Table 5. The intersection in the table is shown with a LOS (Level of Service) designation, delay (in seconds), and v/c ratio (volume-to-capacity ratio) for the AM and PM peak hours. Appendix E includes the worksheets for the existing 2025 peak hour capacity analyses.

As shown in Table 5, the signalized intersection of Maryville Pike at Sims Road and Edington Road is calculated to operate with a good LOS on all approaches, even with only single-lane approaches. The worst-performing calculated approach is Edington Road during the PM peak hour, with a LOS C due to heavy westbound traffic.

The signal timing used to analyze the signalized intersection was obtained from the City of Knoxville and is included in Appendix E. This traffic signal does not operate in coordination with any others and operates in isolation. The existing signal timing is split between concurrent, permissive north-south movements on Maryville Pike and east-west movements on Sims Road and Edington Road.

**TABLE 5**  
**INTERSECTION CAPACITY ANALYSIS RESULTS -**  
**2025 EXISTING TRAFFIC CONDITIONS**

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS <sup>a</sup>	DELAY <sup>b</sup> (seconds)	Max v/c <sup>c</sup>	LOS <sup>a</sup>	DELAY <sup>b</sup> (seconds)	Max v/c <sup>c</sup>
Maryville Pike (SB & NB) at Sims Road (WB) / Edington Road (EB)	 Signalized	Eastbound	B	17.3		C	34.8	
		Westbound	B	19.5		B	16.9	
		Northbound	B	15.6		B	16.9	
		Southbound	B	12.2		B	13.2	
		Summary	B	14.6	0.57	B	19.8	0.73

Note: All analyses were calculated in Synchro 12 software and reported with HCM 7<sup>th</sup> Edition methodology

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

▪ **PROJECTED TRAFFIC CONDITIONS WITHOUT THE PROJECT:**

Horizon year traffic conditions represent the projected traffic volumes in the study area without the proposed project being developed (no-build option). This proposed development's build-out and full occupancy are assumed to occur by 2027.

According to the TDOT count station in the study area, vehicular traffic has grown only slightly over the past few years. Specifically, the TDOT data shown in Appendix A indicate that Maryville Pike, located southwest of the development site, experienced an annual growth rate of 1.7% over the past decade, from 2014 to 2024.

Thus, to account for future traffic growth, this study used an annual rate of +2%, ensuring a conservative result. This assumed annual growth rate of 2% was

applied to the existing 2025 volumes tabulated at the signalized intersection to estimate future volumes in the horizon year of 2027, excluding traffic generated by the proposed development.

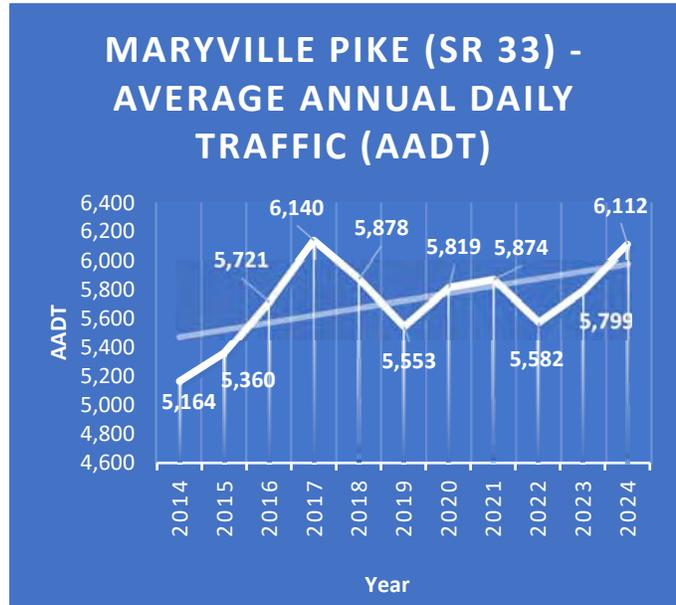
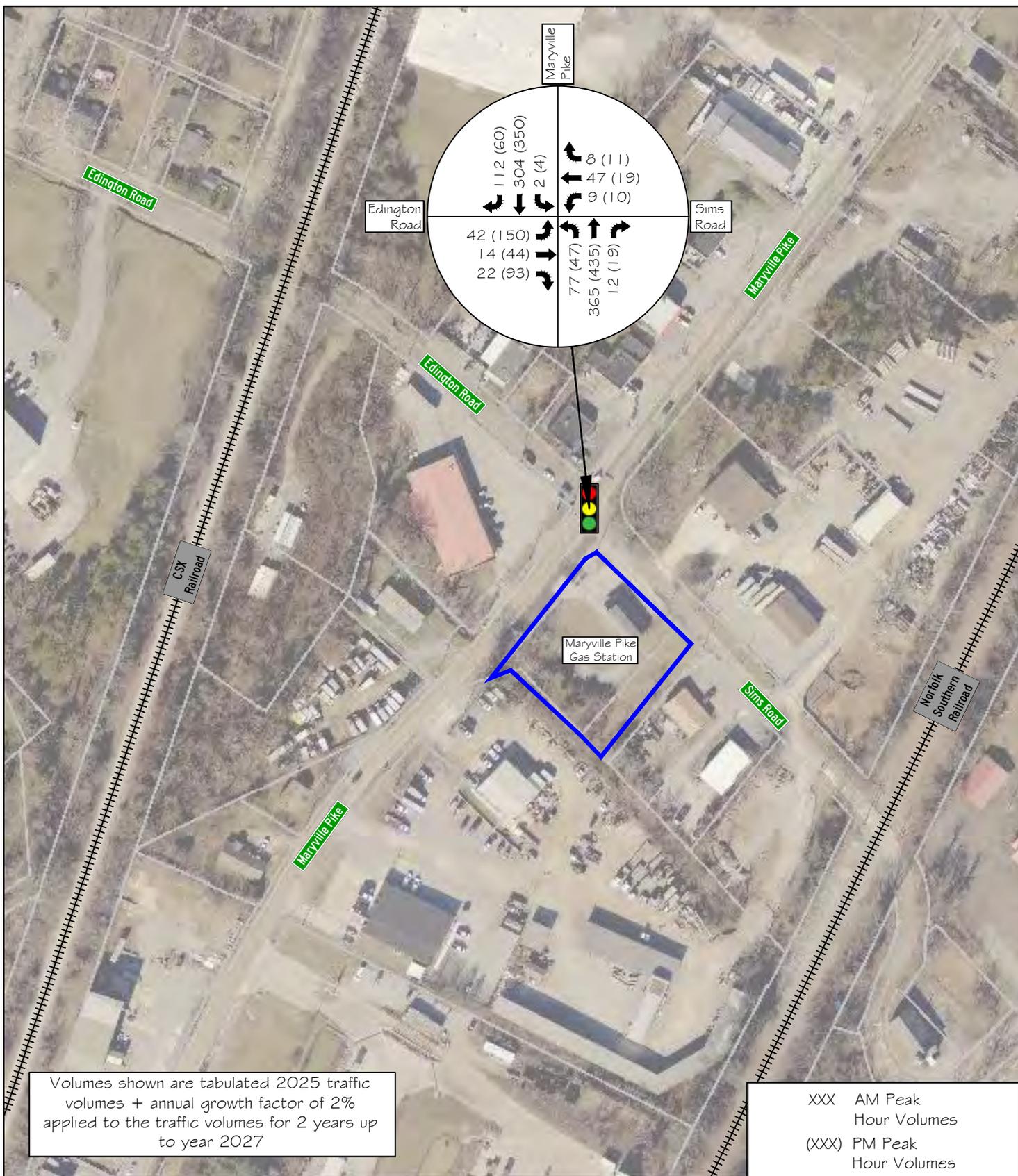


Figure 5 shows these projected 2027 horizon year traffic volumes at the signalized intersection of Maryville Pike at Sims Road and Edington Road, adjacent to where the Maryville Pike Gas Station will be located.



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FIGURE 5

Maryville Pike Gas Station

2027 Peak Hour Traffic Volumes -  
Projected Traffic Conditions  
Without the Project

Capacity analyses were conducted to determine the projected LOS in 2027, without any of the proposed Maryville Pike Gas Station development trips. The results are presented in Table 6, and Appendix E includes the capacity analysis worksheets generated by the software.

The results in Table 6 indicate just slightly worse vehicle delays at the intersection in the 2027 projected conditions compared to the existing 2025 conditions. The result shown is due to the increase in traffic volumes from the assumed 2% general growth over two years. Once again, the worst-performing approach at the intersection is Edington Road, shown slipping to LOS D.

**TABLE 6**  
**INTERSECTION CAPACITY ANALYSIS RESULTS -**  
**2027 PROJECTED TRAFFIC CONDITIONS WITHOUT THE PROJECT**

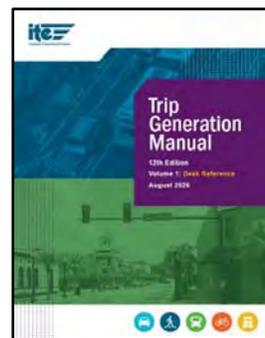
INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS <sup>a</sup>	DELAY <sup>b</sup> (seconds)	Max v/c <sup>c</sup>	LOS <sup>a</sup>	DELAY <sup>b</sup> (seconds)	Max v/c <sup>c</sup>
Maryville Pike (SB & NB) at Sims Road (WB) / Edington Road (EB)	 Signalized	Eastbound	B	17.3		D	37.0	
		Westbound	B	19.6		B	17.0	
		Northbound	B	16.1		B	17.8	
		Southbound	B	12.5		B	13.5	
		Summary	B	15.0	0.59	C	20.8	0.76

Note: All analyses were calculated in Synchro 12 software and reported with HCM 7<sup>th</sup> Edition methodology

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

▪ **TRIP GENERATION:**

A generated trip is a single or one-direction vehicle movement entering or exiting the study site. The estimated traffic generated by the proposed Maryville Pike Gas Station was calculated using rates and equations from the Trip Generation Manual, 12<sup>th</sup> Edition, an Institute of Transportation Engineers (ITE) publication. The Trip Generation Manual is the most widely used resource for determining trip generation rates in transportation impact studies. The Manual includes data for various land uses and provides equations for calculating generated trips based on development variables such as the number of dwelling units, building square footage, seats, or employees. The data and calculations from ITE for the development’s proposed land use are included in Appendix F.



For this development, the most appropriate land use in the Trip Generation Manual for the Maryville Pike Gas Station is Land Use #945, Convenience Store/Gas Station. For Land Use #945, the Trip Generation Manual presents various subcategories with different independent variables for calculating generated trips. These subcategories include the number of vehicle fueling positions (VFP) at the site, the convenience store's gross floor area (GFA), the number of employees, and peak-hour traffic on the adjacent roads. For the study, after consultation with Knoxville/Knox County Planning, it was determined that the most reasonable trip generation approach was to classify the subcategory by GFA (4-4.5k square feet) and use VFPs as the independent variable.

Therefore, as shown in Table 7a, the total weekday traffic trips generated by the Maryville Pike Gas Station could be expected to be 1,221 vehicles. The AM peak hour is calculated with 120 vehicle trips, and the PM peak hour with 114 vehicles.

**TABLE 7a**  
**TRIP GENERATION FOR MARYVILLE PIKE GAS STATION**  
4,500 ft<sup>2</sup> Convenience Store / Gas Station - GFA (4-5.5k) with 6 Vehicle Fueling Stations

ITE LAND USE CODE	LAND USE DESCRIPTION	INDEPENDENT VARIABLE	GENERATED DAILY TRAFFIC	TRIPS GENERATED IN AM PEAK HOUR			TRIPS GENERATED IN PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
#945	Convenience Store / Gas Station - GFA (4-5.5k)	6 Vehicle Fueling Positions	1,221	51%	49%		50%	50%	
				61	59	120	57	57	114
<b>Total Volume Site Trips</b>			<b>1,221</b>	<b>61</b>	<b>59</b>	<b>120</b>	<b>57</b>	<b>57</b>	<b>114</b>

Data from ITE Trip Generation Manual, 12<sup>th</sup> Edition / All data is calculated by using Average Rates

Furthermore, within this land use, the generated vehicle trips can be further categorized as primary (new) and pass-by trips.

*Methodology:*

Not all trips generated by a development are primary (new) trips. For some land uses, the trips generated by a proposed development are captured from the adjacent street system and do not generate an entirely "new" trip. A pass-by trip is an intermediate stop between an existing origin and a destination without a route diversion. These types of trips are known as pass-by trips and are assumed to consist of vehicles already traveling on the adjacent street. Considerable research has examined these trip types, and national and local rates have been published. Research has shown that fast food restaurants and larger convenience stores can experience pass-by trip rates of 75% or higher.

The Knoxville/Knox County Metropolitan Planning Commission (the previous name for Knoxville/Knox County Planning) issued a memo on March 12<sup>th</sup>, 1997, to establish agreed-upon pass-by trip rates for several land uses in Knox County for transportation studies. These land uses include fast-food restaurants, supermarkets, convenience markets, and shopping centers. In this memo, the pass-by rate allowable for convenience markets is 60%. This rate applies to sites adjacent to roadways with less than 10,000 ADT. This section of Maryville Pike at the development site is well below this ADT. However, while very similar, for this study, ITE's published pass-by rates from the 12th Edition were used, with the AM peak hour at 60% and the PM peak hour at 56%, because of their more recent research data. The pass-by rates from ITE are included in Appendix F.

The pass-by trips for the development were calculated using OTISS Pro 5.0 (Online Traffic Impact Study Software). OTISS Pro 5.0 is an online add-on tool for the ITE Trip Generation website application. The OTISS software was used to calculate the pass-by trip volumes at the Proposed West and North Entrances.

Thus, considering pass-by trips and the overall trip generation volumes for the development, it is estimated that 24 vehicles will enter and 24 will exit, for a total of 48 new trips during the AM peak hour in 2027. Similarly, it is estimated that 25 vehicles will enter and 25 will exit, resulting in a total of 50 new trips during the PM peak hour in 2027. A summary of this data is provided in T40able 7b. This table provides the breakdown of total trips before reductions, pass-by trips, and total new external trips.

**TABLE 7b**  
**TRIP GENERATION FOR MARYVILLE PIKE GAS STATION**  
**WITH PASS-BY VEHICLE TRIPS**

ITE LAND USE CODE	LAND USE DESCRIPTION	UNITS	GENERATED DAILY TRAFFIC	TRIPS GENERATED IN AM PEAK HOUR			TRIPS GENERATED IN PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
#945	Convenience Store / Gas Station - GFA (4-5.5k)	6 Vehicle Fueling Positions	1,221	51%	49%		50%	50%	
				61	59	120	57	57	114
<b>Total Vehicle Trips Before Reductions</b>				<b>61</b>	<b>59</b>	<b>120</b>	<b>57</b>	<b>57</b>	<b>114</b>
Pass-by Vehicle Trips - Convenience Store / Gas Station				-37	-35	-72	-32	-32	-64
<b>Total New External Vehicle Trips</b>				<b>24</b>	<b>24</b>	<b>48</b>	<b>25</b>	<b>25</b>	<b>50</b>

Internal Vehicle Trips calculated according to NCHRP Report 684 methods in the OTISS software

Pass-by Trip Assumed Percentages for Land Use #945: 60% in AM Peak Hour and 56% in PM Peak Hour based on ITE 12<sup>th</sup> Edition pass-by rates

▪ **TRIP DISTRIBUTION AND ASSIGNMENT:**

As discussed previously, an auxiliary traffic count was also conducted on December 10<sup>th</sup>, 2025. This count was conducted from 7:30 to 8:30 a.m. and from 3:30 to 4:30 p.m. during the identified AM and PM peak hours at the signalized intersection of Maryville Pike at Sims Road and Edington Road. This additional count was conducted at a nearby convenience market, Mojo's South Side Market, at the corner of Maryville Pike and Joe Lewis Road, approximately 1,500 feet to the south of the development site. This market has entrances to and from Maryville Pike and Joe Lewis Road. Joe Lewis Road traverses from Maryville Pike at its northwest end to Mt. Olive Road to the southeast and passes through Montgomery Village and other residences. This other convenience market used to offer gasoline sales, but no longer does. This auxiliary count was conducted to gather information on the relationship between this existing market and the nearby road system, the direction of travel for customers entering and exiting, and to correlate with the proposed Maryville Pike Gas Station.

The results of this auxiliary count are provided in Appendix F, and this includes the hand-taken notes where each entering vehicle at this other convenience market was observed traveling from and its direction of exiting travel. Further, for each vehicular customer, trips were classified as likely primary or pass-by trips based on the observed travel movements. During the AM peak hour, it was estimated that 59% of trips to Mojo's South Side Market were pass-by trips, and during the PM peak hour, 64% of trips were pass-by trips, very closely approximating the published rates from both Knoxville/Knox County and ITE.

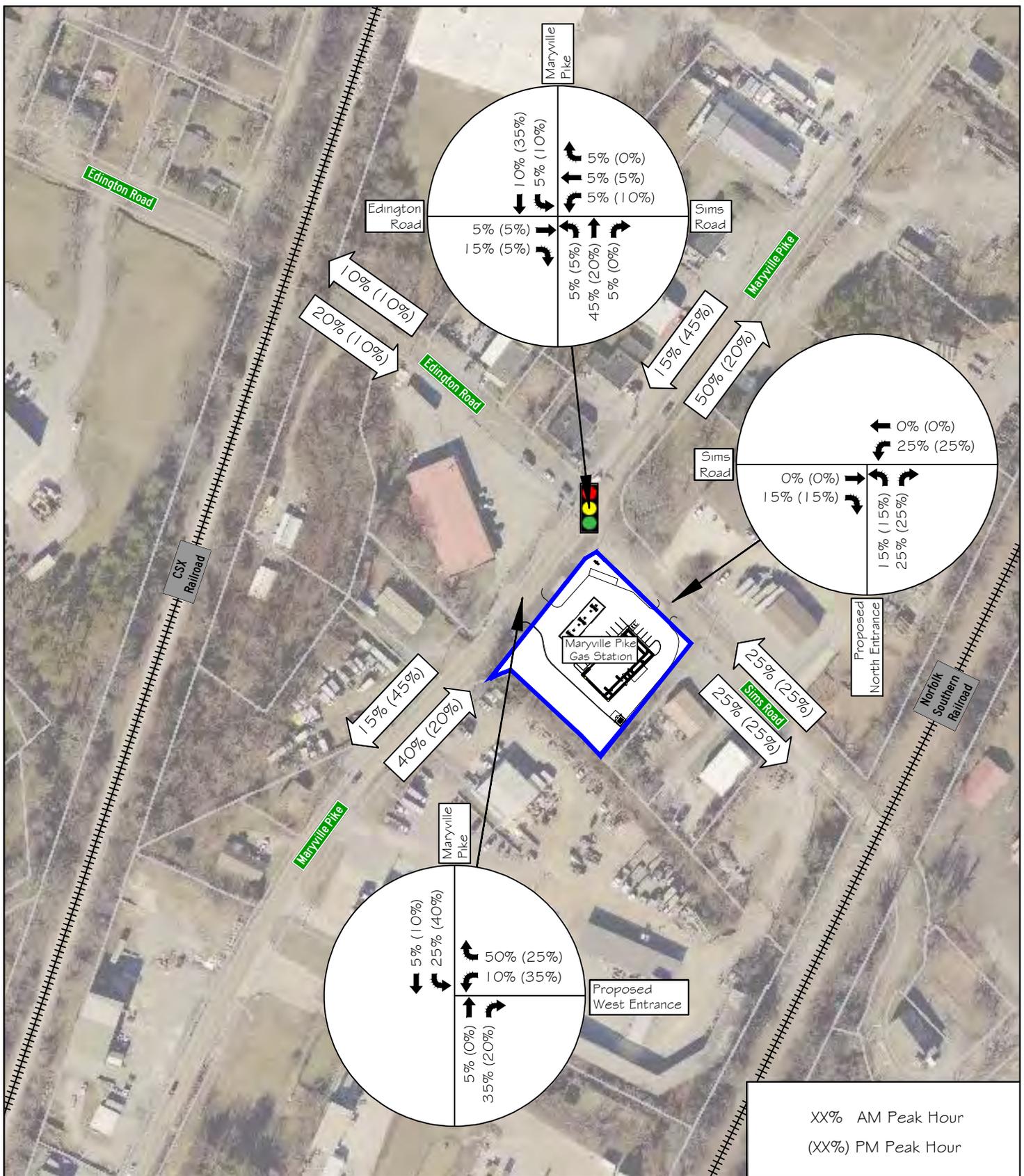
Overall, the projected trip distribution and assignment for the proposed Maryville Pike Gas Station are based on this auxiliary count data, the existing adjacent traffic volumes and directional flows at the traffic signal, and engineering judgment. For the generated trips to and from the Maryville Pike Gas Station, Table 8 shows the assumed travel direction percentages determined for each adjacent roadway and driveway. It was assumed that the Proposed West Entrance at Maryville Pike would serve 60% of the development's vehicle trips, and the Proposed North Entrance at Sims Road would serve 40%.

Figure 6 shows the breakdown of the assumed entering and exiting trip distributions at the Proposed West and North Entrances and the subsequent distributions at the adjacent signalized intersection based on the assumed values in Table 8. The percentages shown in Figure 6 and Table 8 pertain only to trips generated by the Maryville Pike Gas Station, as calculated from the trip generation data presented in Tables 7a and 7b. OTISS Pro 5.0 software was used to calculate

trip assignment volumes at the entrances and at the adjacent signalized intersection using the assumed percentages. The spreadsheets and output images calculated by the OTISS software for the generated trips, including pass-by trips, are presented in Appendix G.

Figure 7a shows the traffic assignment of the computed trips generated by the Maryville Pike Gas Station development at the intersections based on the assumed distribution of trips shown in Figure 6. Figure 7b illustrates the calculated pass-by trips at the proposed entrances. Since the pass-by trips are "captured" by the development from the adjacent road, the pass-by trips shown in Figure 7b entering the development are correspondingly removed (subtracted) from the adjacent thru movements on Maryville Pike and Sims Road and are shown as such.

ENTRANCE	ROADWAY / DIRECTION	AM PEAK HOUR		PM PEAK HOUR	
		INBOUND	OUTBOUND	INBOUND	OUTBOUND
Proposed West Entrance  60%	Maryville Pike - North	10%	45%	35%	20%
	Maryville Pike - South	35%	10%	20%	35%
	Sims Road - East	0%	0%	0%	0%
	Edington Road - West	15%	5%	5%	5%
Proposed North Entrance  40%	Maryville Pike - North	5%	5%	10%	0%
	Maryville Pike - South	5%	5%	0%	10%
	Sims Road - East	25%	25%	25%	25%
	Edington Road - West	5%	5%	5%	5%
Both Entrances  Summary 100%	Maryville Pike - North	15%	50%	45%	20%
	Maryville Pike - South	40%	15%	20%	45%
	Sims Road - East	25%	25%	25%	25%
	Edington Road - West	20%	10%	10%	10%
Total		100%	100%	100%	100%



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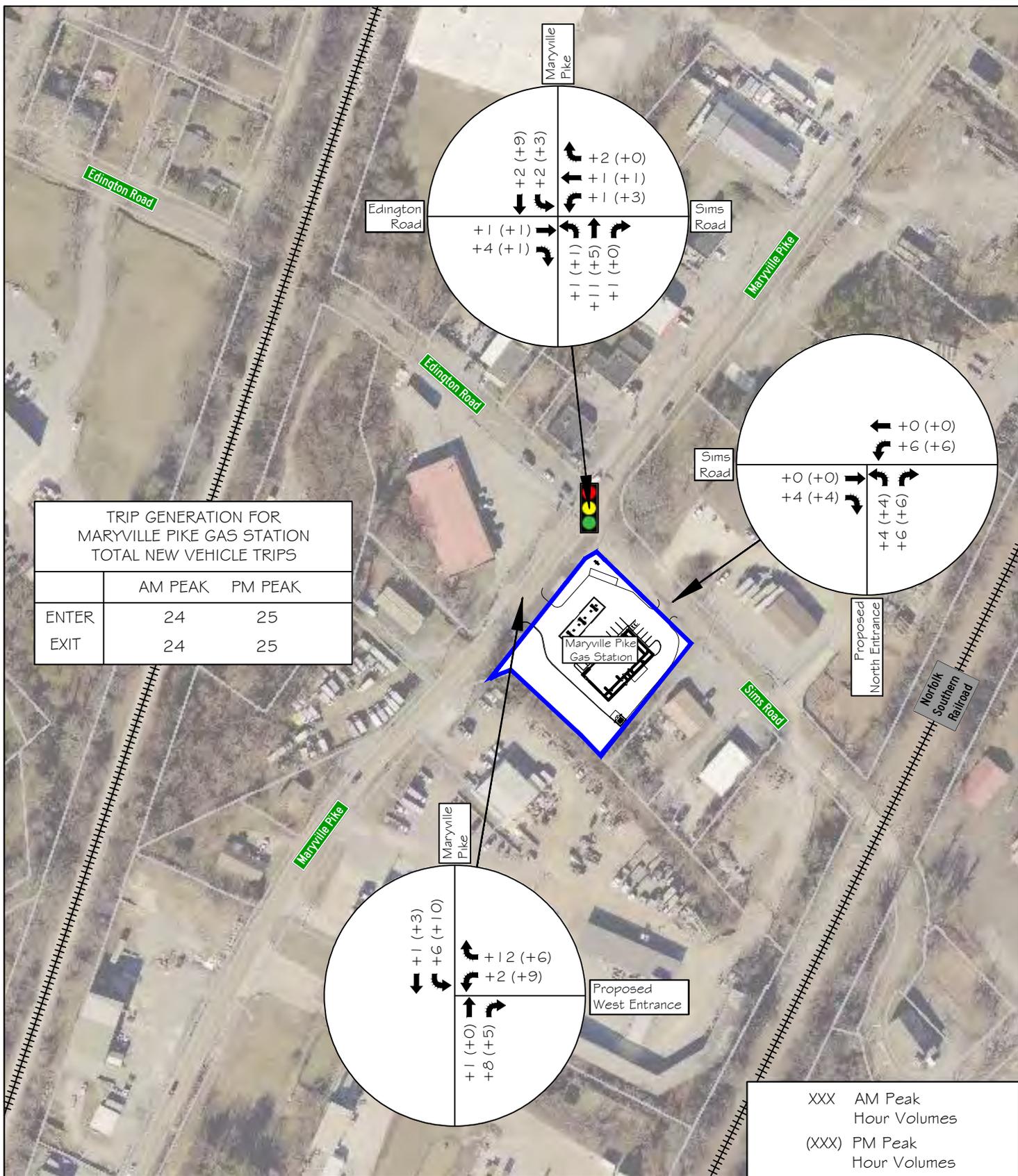
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FIGURE 6

Maryville Pike Gas Station

Directional Distribution of Generated Trips during AM and PM Peak Hour for Maryville Pike Gas Station



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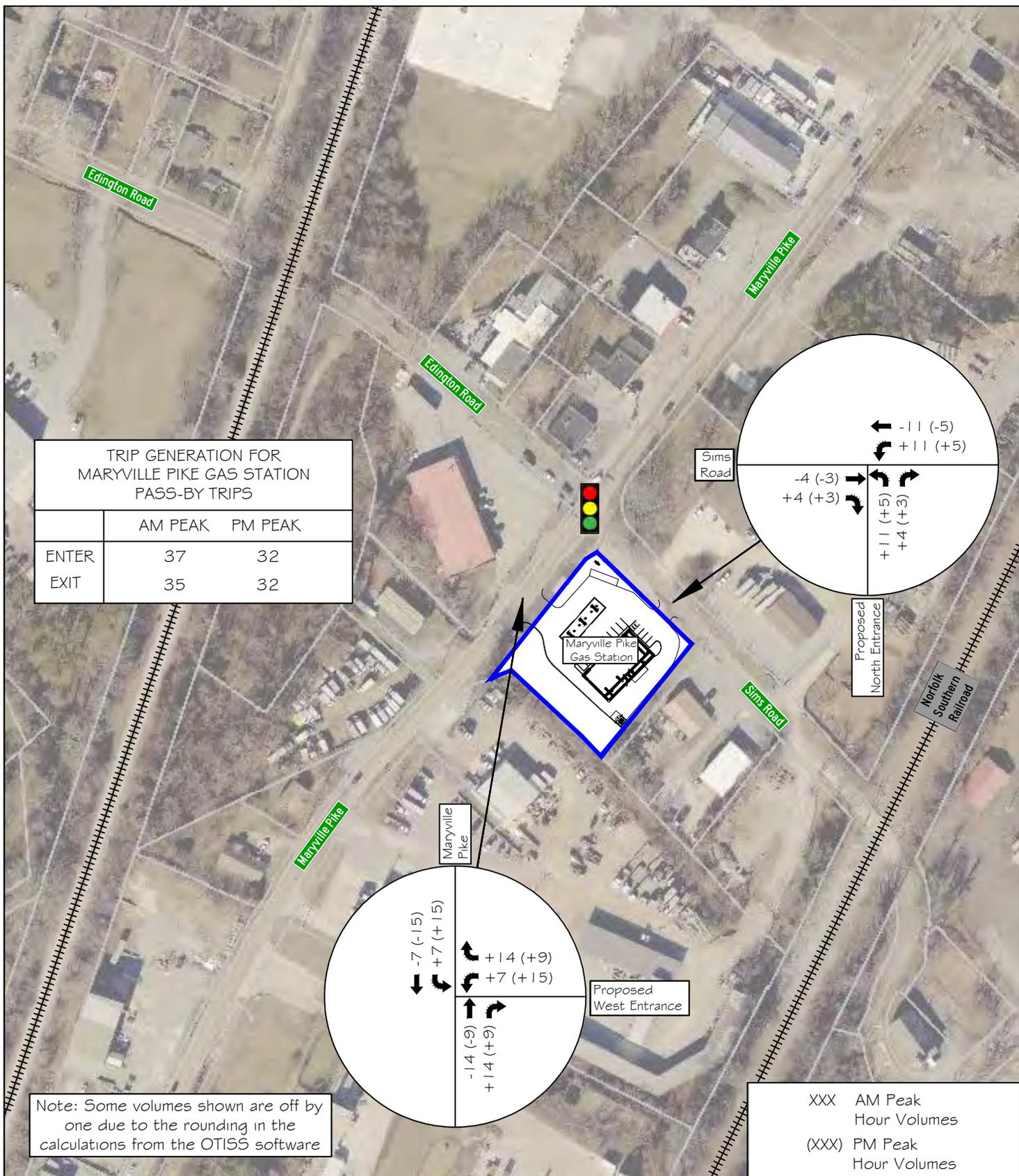
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FIGURE 7a

Maryville Pike Gas Station

Traffic Assignment of Generated Trips during AM and PM Peak Hour - Total New Vehicle Trips for Maryville Pike Gas Station



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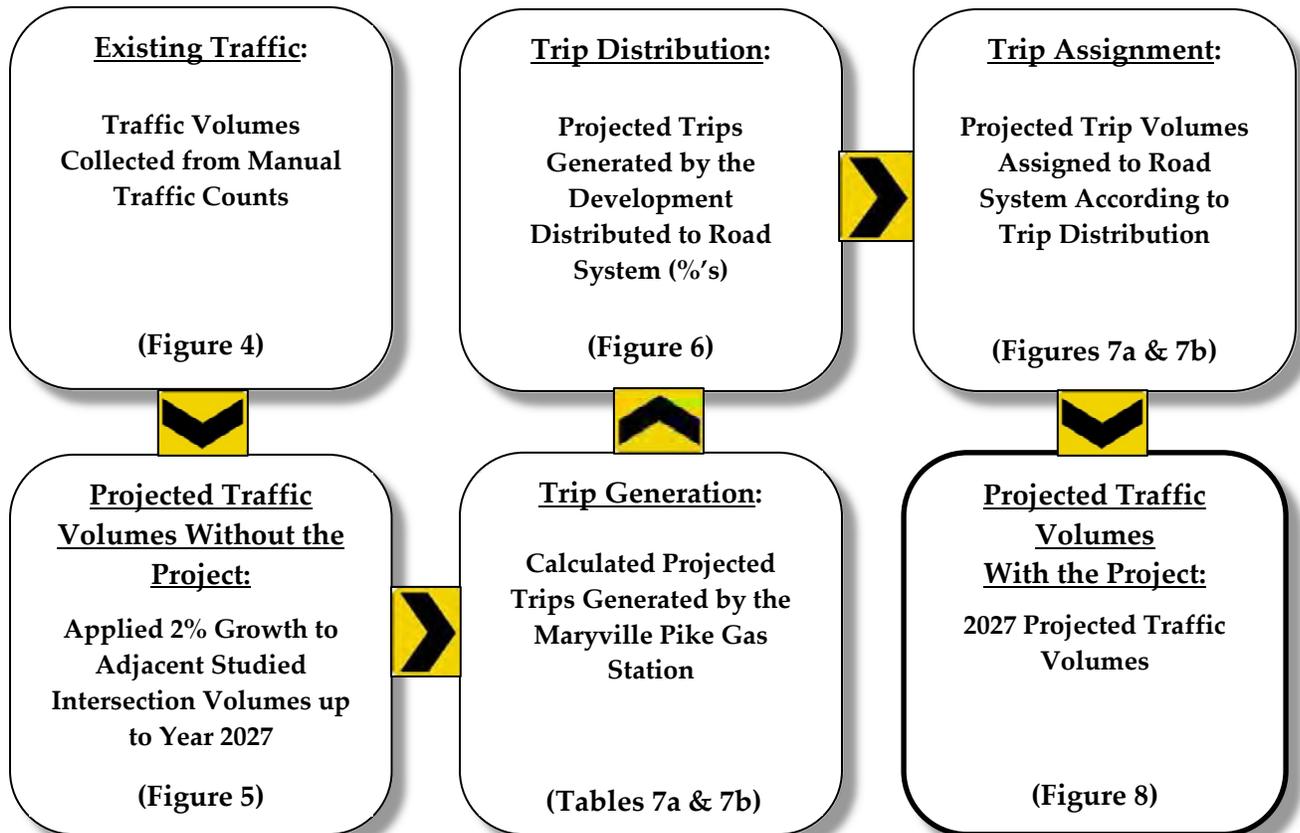
FIGURE 7b

Maryville Pike Gas Station

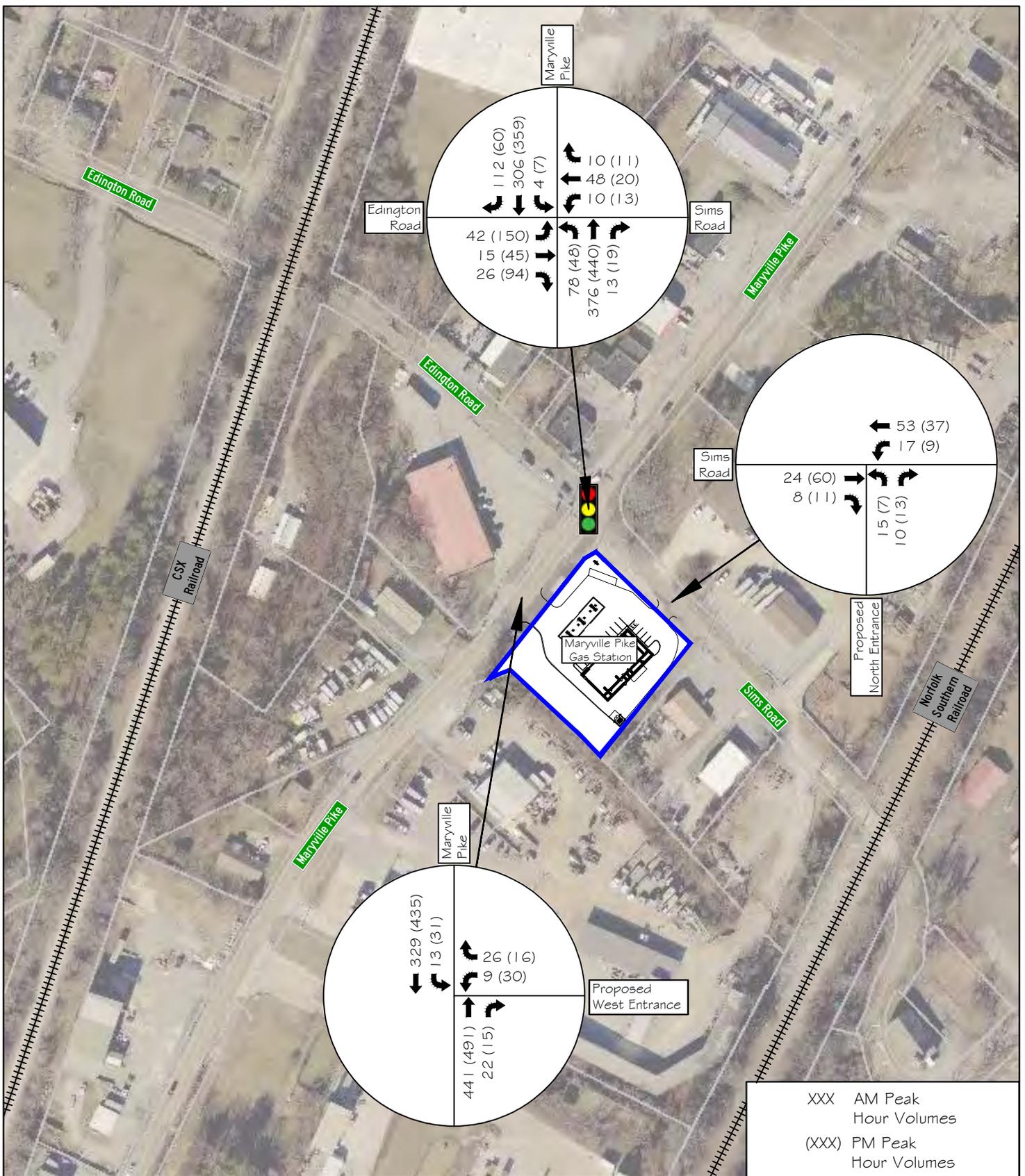
Traffic Assignment of Generated Trips during AM and PM Peak Hour - Pass-By Trips for Maryville Pike Gas Station

▪ **PROJECTED TRAFFIC CONDITIONS WITH THE PROJECT:**

Several additive steps were taken to estimate the total projected traffic volumes at the studied intersections when the Maryville Pike Gas Station is fully constructed and operational in 2027. The steps are illustrated below for clarity and review:



The calculated peak hour trips generated by the Maryville Pike Gas Station were added to the 2027 projected horizon year traffic (Figure 5) by following the predicted trip distributions and assignments (Figures 6, 7a, & 7b). This procedure was completed to obtain the total projected traffic volumes at the signalized intersection and proposed entrances when the development is built and in full operation by 2027. Figure 8 shows the projected 2027 AM and PM peak hour volumes, which includes the generated traffic to and from the Maryville Pike Gas Station at the Proposed West and North Entrances and at the adjacent signalized intersection.



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FIGURE 8

Maryville Pike Gas Station

2027 Peak Hour Traffic Volumes -  
 Projected Traffic Conditions  
 With the Project

Capacity analyses were conducted to determine the projected LOS with the new development traffic in 2027, as shown in Figure 8. The intersection capacity results for the projected 2027 peak hour traffic are shown in Table 9. Appendix E includes the capacity analysis worksheets from the software.

**TABLE 9**  
**INTERSECTION CAPACITY ANALYSIS RESULTS -**  
**2027 PROJECTED TRAFFIC CONDITIONS WITH THE PROJECT**

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS <sup>a</sup>	DELAY <sup>b</sup> (seconds)	Max v/c <sup>c</sup>	LOS <sup>a</sup>	DELAY <sup>b</sup> (seconds)	Max v/c <sup>c</sup>
Maryville Pike (SB & NB) at Sims Road (WB) / Edington Road (EB)	 Signalized	Eastbound	B	16.8		D	37.5	
		Westbound	B	19.3		B	17.5	
		Northbound	B	16.5		B	18.1	
		Southbound	B	12.6		B	13.8	
		Summary	B	15.1	0.61	C	21.1	0.77
Sims Road (WB & EB) at Proposed North Entrance (NB)	 Unsignalized	Northbound Left/Right	A	9.1	0.031	A	9.0	0.024
		Westbound Left	A	7.3	0.012	A	7.4	0.007
Maryville Pike (SB & NB) at Proposed West Entrance (WB)	 Unsignalized	Westbound Left	C	16.5	0.031	C	22.5	0.140
		Westbound Right	B	11.5	0.050	B	11.8	0.033
		Southbound Thru/Left	A	8.4	0.014	A	8.7	0.034

Note: All analyses were calculated in Synchro 12 software and reported with HCM 7<sup>th</sup> Edition methodology

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

As shown in Table 9, the signalized intersection is projected to experience slightly greater vehicle delays but relatively the same LOS in 2027 with the development traffic, as indicated by the previous results without the Maryville Pike Gas Station project (Table 6).

The unsignalized intersections of Maryville Pike at the Proposed West Entrance and Sims Road at the Proposed North Entrance are both calculated to operate with good to average LOS and minimal vehicle delays during the AM and PM peak hours. It should be noted that the results obtained at the Proposed West Entrance were based on dual-exit lanes, allowing separate left- and right-turns onto Maryville Pike, since the entrance is shown to be 40 feet wide in the site plan.

▪ **POTENTIAL TRANSPORTATION SAFETY ISSUES:**

The study area was investigated for potential existing and future safety issues that may arise as part of this proposed development. These transportation features are discussed in the following pages.

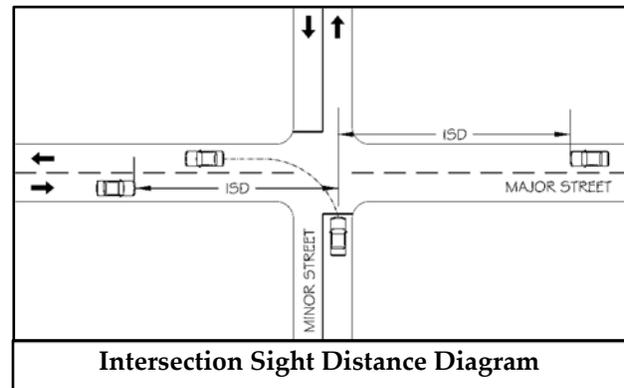
○ **EVALUATION OF SIGHT DISTANCE**

For intersections, sight distance evaluations are categorized into two types: Stopping Sight Distance (SSD) and Intersection Sight Distance (ISD).

*Methodology:*

SSD is the distance required for a motorist on a major street to perceive, react, and the vehicle to come to a complete stop before colliding with an object on 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 the required 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



**Intersection Sight Distance Diagram**

at a 4-way intersection: (1) a left-turn, (2) a right-turn, or (3) a crossing maneuver across the major street. For turns from the minor street, the ISD is needed to allow a stopped motorist to turn onto a major street without being overtaken by an approaching vehicle. The most critical ISD is for left turns from the minor street. The ISD for this maneuver includes the time to turn left and clear half of the intersection without conflicting with oncoming traffic from the left and accelerating to the road's operating speed without causing the approaching vehicles from the right to reduce their speed substantially.

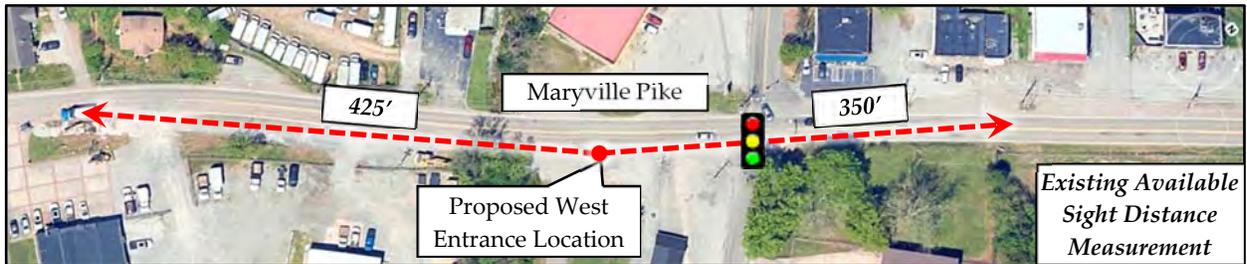
Maryville Pike has a posted speed limit of 40 miles per hour at the development site. With this posted speed at the Proposed West Entrance, the ISD is 445 feet, calculated based on AASHTO (American Association of State Highway and Transportation Officials) and TDOT guidance. This distance is required for a motorist to exit safely to the left (southbound) from the Proposed West Entrance onto Maryville Pike. For a vehicle exiting northbound from the Proposed West Entrance onto Maryville Pike, the required ISD is 385 feet.

At the Proposed North Entrance location for the Maryville Pike Gas Station on Sims Road, where the posted speed limit is 30 mph, the ISD required for exiting left turns will be 335 feet and 290 feet for exiting right turns.

Visual observations of the sight distances at the Proposed West and North Entrances at Maryville Pike and Sims Road were undertaken. At the Proposed West Entrance location at Maryville Pike, using a Nikon Laser Rangefinder, the available sight distance was visually estimated to be a minimum of 425' to the south and 350' to the north, both of which are slightly less than the required ISD for an exiting left-turn movement. Further viewing distances are not available due to a horizontal curve on Maryville Pike to the south and a vertical curve to the north.

At the Proposed North Entrance location at Sims Road, the available sight distance was visually estimated to be a minimum of 350' to the west and 375' to the east, both of which exceed the required ISD for a 30 mph speed limit.

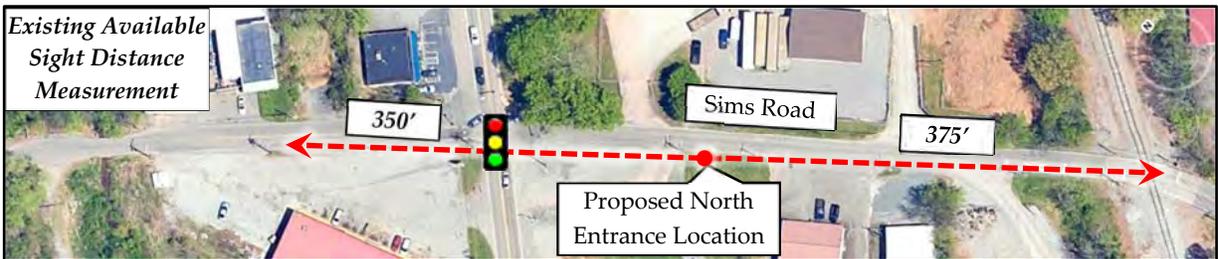
Images of the existing sight distances from these proposed entrance locations are labeled in the following with the required ISD and the rangefinder-measured sight distances in bolded italics.



View of Sight Distance on Maryville Pike at Proposed West Entrance Location (Looking South)



View of Sight Distance on Maryville Pike at Proposed West Entrance Location (Looking North)



View of Sight Distance on Sims Road at Proposed North Entrance Location (Looking West)



View of Sight Distance on Sims Road at Proposed North Entrance Location (Looking East)

○ **EVALUATION OF TURN LANE THRESHOLDS**

The need for separate entering turn lanes on Maryville Pike at the Proposed West Entrance was evaluated based on the projected 2027 volumes. An evaluation of the need for separate turning lanes on Sims Road at the Proposed North Entrance was not conducted, as volumes at this intersection are projected to be minimal.

The criteria used for these turn lane evaluations were based on TDOT's "Highway Safety Access Manual" procedures. This design policy relates vehicle volume thresholds based on prevailing speeds for two-lane and four-lane roadways. The Proposed West Entrance location on Maryville Pike is within a 40 mph speed zone; therefore, it was evaluated based on the posted speed limit. The worksheets for these evaluations are provided in Appendix H.

At the Proposed West Entrance intersection, a separate northbound right-turn lane is not projected to be warranted on Maryville Pike in the peak hour 2027 conditions. However, the projected volumes for southbound left-turn movements do meet warrants during the AM and PM peak hours for a separate southbound left-turn lane on Maryville Pike at the Proposed West Entrance in the 2027 conditions.

○ **PROJECTED VEHICLE QUEUES**

An additional software program was used to calculate the projected vehicle queues at the studied intersections during the 2027 AM and PM peak hours. The previously mentioned Synchro traffic software also includes SimTraffic, which was utilized to estimate the projected vehicle queues at the intersections.

The 95<sup>th</sup> percentile vehicle queue is the recognized measurement in the transportation engineering profession, serving as the design standard for considering vehicle queue lengths. A 95<sup>th</sup> percentile vehicle queue length means that 95% of the time, the vehicle queue will not exceed that point. The calculated vehicle queue results were based on averaging the outcomes from 10 one-hour traffic simulations in the software.

The 95<sup>th</sup> percentile vehicle queue lengths are shown in Table 10 for the 2027 projected peak hour conditions. The vehicle queue worksheet results from the SimTraffic software are in Appendix I. It should be noted again that the results obtained at the Proposed West Entrance were based on dual exit lanes, allowing separate left- and right-hand turns onto Maryville Pike, since the

entrance will be 40 feet wide, as previously noted.

**TABLE 10**  
**VEHICLE QUEUE SUMMARY -**  
**2027 PROJECTED PEAK HOUR TRAFFIC CONDITIONS WITH THE PROJECT**

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	95 <sup>th</sup> PERCENTILE VEHICLE QUEUE LENGTH (ft)	
			AM PEAK HOUR	PM PEAK HOUR
Maryville Pike (SB & NB) at Sims Road (WB) / Edington Road (EB)	 Signalized	Eastbound Left/Thru/Right	84	207
		Westbound Left/Thru/Right	64	56
		Northbound Left/Thru/Right	199	200
		Southbound Left/Thru/Right	196	283
Sims Road (WB & EB) at Proposed North Entrance (NB)	 Unsignalized	Westbound Left/Thru	12	11
		Northbound Left/Right	41	41
Maryville Pike (SB & NB) at Proposed West Entrance (WB)	 Unsignalized	Westbound Left	34	62
		Westbound Right	55	43
		Northbound Thru/Right	101	122
		Southbound Left/Thru	75	107

Note: 95<sup>th</sup> percentile vehicle queues were calculated in SimTraffic 12 software

Table 10 shows minimal vehicle queue lengths at the Proposed West and North Entrances for entering and exiting movements from the development site during the 2027 AM and PM peak hours.

The longest vehicle queues at the signalized intersection are calculated for the northbound lane on Maryville Pike, with a total queue length of 300 feet (199' + 101') in the AM peak hour and 322 feet (200' + 122') in the PM peak hour.

## CONCLUSIONS & RECOMMENDATIONS

The following is an overview of recommendations to minimize the transportation impacts of the Maryville Pike Gas Station on the adjacent transportation system while attempting to achieve an acceptable traffic flow and safety level.



**Maryville Pike at Proposed West Entrance:** This intersection is projected to operate with average vehicle delays and minimal queues based on the current proposed layout, which shows dual exit lanes and no additional entering turn lanes on Maryville Pike. However, operationally, this will need to be modified based on the previously discussed results, which indicate that southbound left-turn movements into the development from Maryville Pike will require a separate turn lane due to meeting TDOT warrant thresholds.

The Proposed West Entrance at Maryville Pike, as shown in the site layout plan, is located roughly halfway along the development property's road frontage. The location of this entrance is constrained by the proximity of the traffic signal to the north and the buffer that will be required along the tributary to Goose Creek to the south.

This warranted southbound left-turn lane on Maryville Pike due to vehicle volumes would also be essential to prevent vehicle queues from blocking each other between this entrance and the signalized intersection to the north. Due to the signalized intersection having only single-lane approaches, as described in the existing conditions, a northbound left-turning motorist on Maryville Pike attempting to turn onto Edington Road is hampered by the lack of a protected green arrow and by opposing southbound vehicles. This situation causes vehicle backups on Maryville Pike to the south of the traffic signal. If a separate left-turn lane is not provided on Maryville Pike at the Proposed West Entrance, and due to its proximity to the traffic signal, this northbound vehicle blockage could easily block a southbound left-turning motorist from turning into the Proposed West Entrance, resulting in a "left-turn lockup" on Maryville Pike due to the conflicting and overlapping left-turn movements and queues.

Furthermore, due to their close proximity to each other, providing a separate southbound left-turn lane in the center of Maryville Pike at the Proposed West Entrance would also require providing a separate northbound left-turn lane at the traffic signal. If a separate northbound left-turn lane is provided at the traffic signal, this would cause a cascade of other issues and needs that would include requiring modifying the south approach of

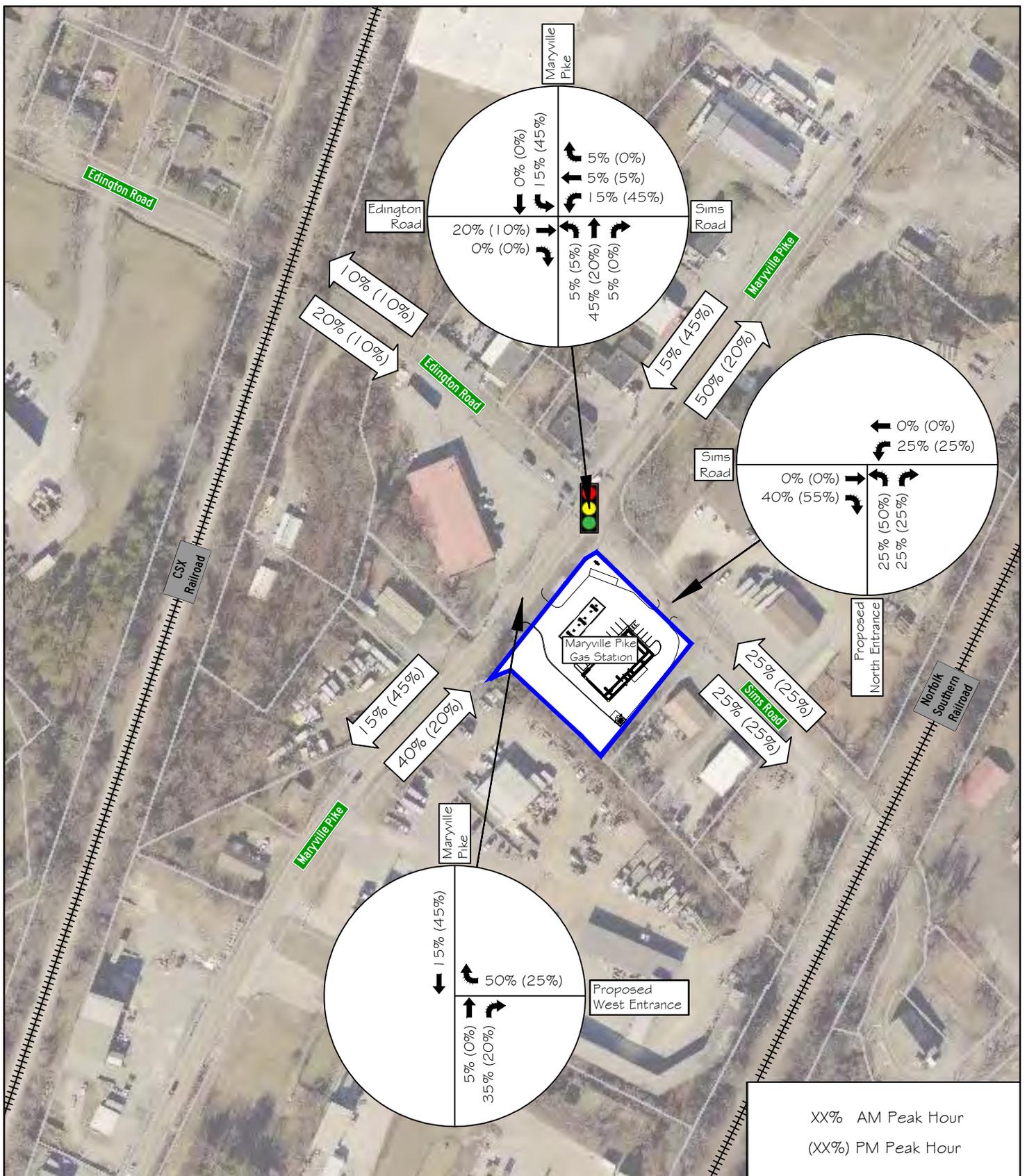
Maryville Pike at the traffic signal, replacing signal equipment and timing, and requiring utility pole and utility relocations, all within a limited amount of available right-of-way.

Thus, due to these issues and the high associated costs beyond the owner/developer's capability, it is recommended that the Proposed West Entrance be designed and constructed with a right-turn-in/right-turn-out (RIRO) configuration at Maryville Pike, rather than allowing full access as currently proposed. Modifying this entrance to operate as RIRO will necessarily require entering customers from the north on Maryville Pike to turn left at the traffic signal onto Sims Road, and exiting customers who wish to travel south will have to exit at Sims Road and then turn left at the traffic signal onto Maryville Pike.

Due to wholesale changes in traffic movements resulting from a RIRO configuration at the Proposed West Entrance to Maryville Pike, a revised analysis was undertaken to determine the effects of rerouting the projected customer paths into and out of the Maryville Pike Gas Station. This additional effort included a new capacity analysis and vehicle queue simulation, as performed previously; however, it used updated trip distributions and assignments, as shown in Figures 9, 10a, and 10b, along with updated projected traffic volumes shown in Figure 11. The results of the LOS and vehicle queue calculations with this revised RIRO configuration are included in Tables 11 and 12.

The results shown in Tables 11 and 12 indicate that all the studied intersections are expected to operate adequately with respect to vehicle delays and queues with the recommended revised RIRO design. None of the studied intersections are shown to be particularly affected by converting the Proposed West Entrance from a full-access entrance to a RIRO configuration. While single-lane approaches constrain flows at the existing traffic signal, the inclusion of the Maryville Pike Gas Station and the vehicle trips it will generate are expected to have minimal impact on the signalized intersection. Additionally, the Maryville Pike Gas Station development, with a RIRO entrance at Maryville Pike and a full-access entrance at Sims Road, is projected to be adequately served by these entrances with acceptable vehicle delays and queues.

It should be noted that with a RIRO configuration at the Proposed West Entrance, the number of pass-by trips is likely to be affected; however, for this revised analysis, it was assumed to remain the same, with an alternative route into and out of the proposed development site via the Proposed North Entrance at Sims Road and travel through the signalized intersection.



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

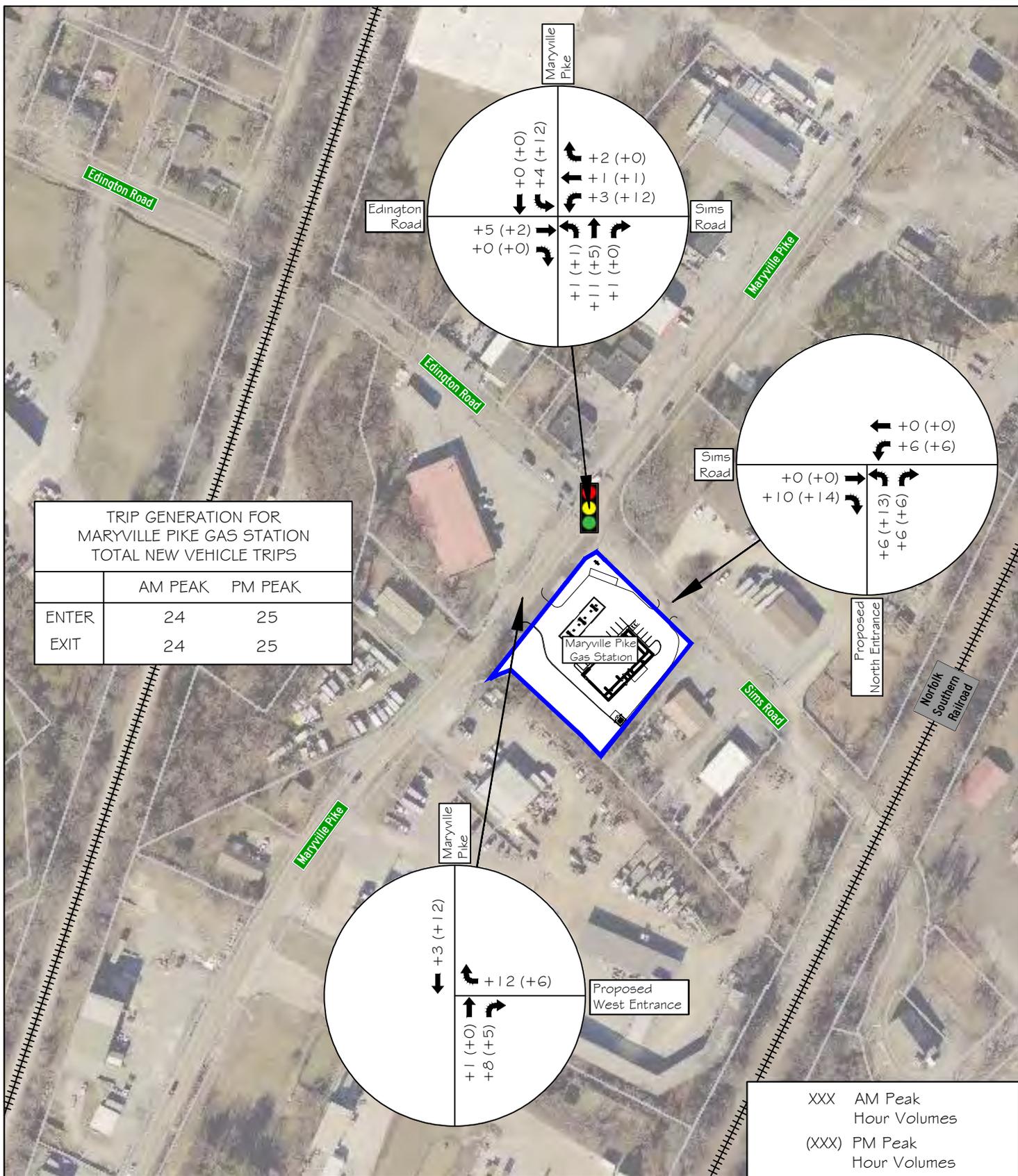
NOT TO SCALE



FIGURE 9

Maryville Pike Gas Station

Directional Distribution of Generated Trips during AM and PM Peak Hour for Maryville Pike Gas Station - RIRO ALT



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 Phone: (865) 556-0042  
 Email: ajaxengineering@gmail.com

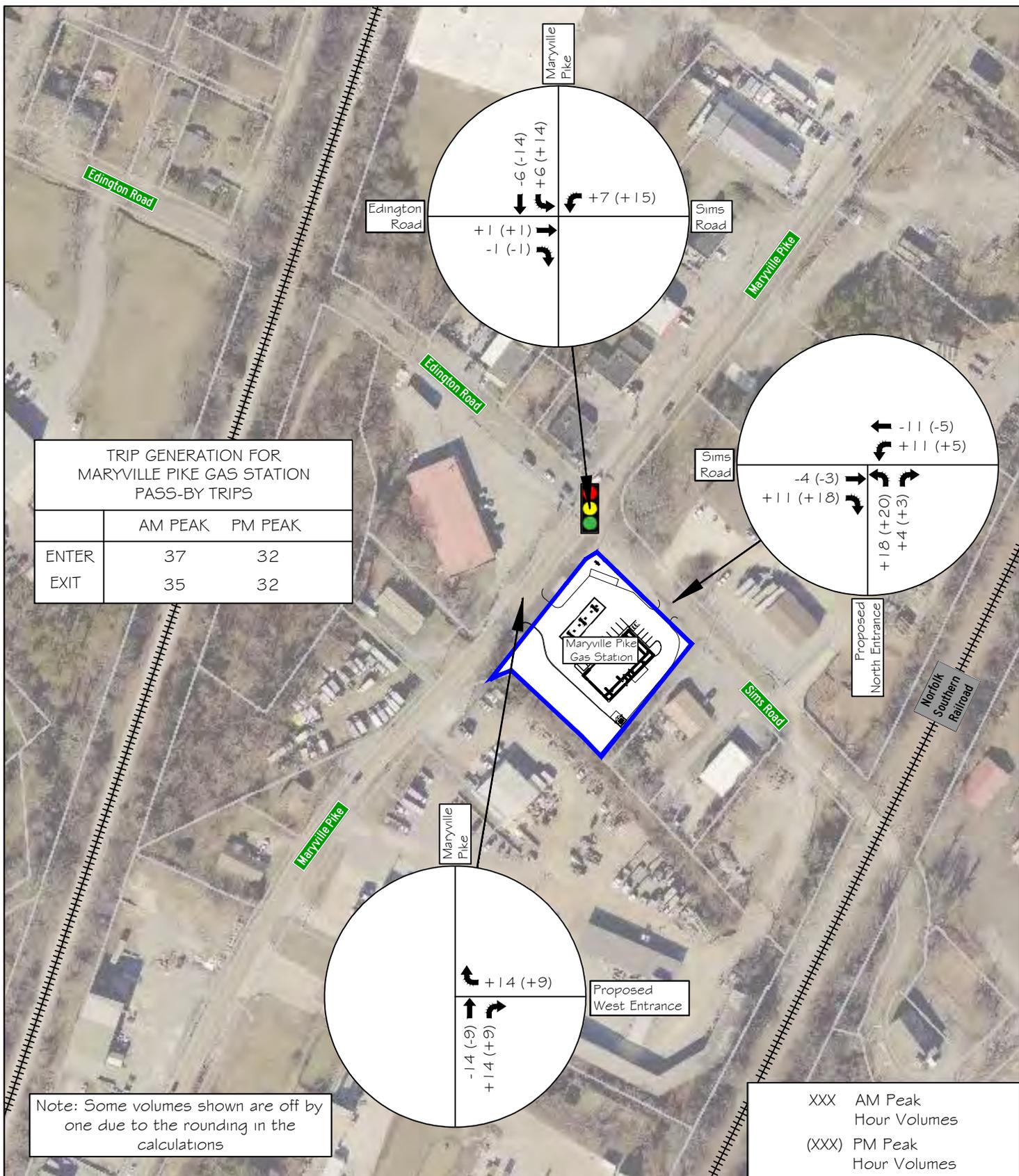
NOT TO SCALE



FIGURE 10a

Maryville Pike Gas Station

Traffic Assignment of Generated Trips during AM and PM Peak Hour - Total New Vehicle Trips for Maryville Pike Gas Station - RIRO ALT



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

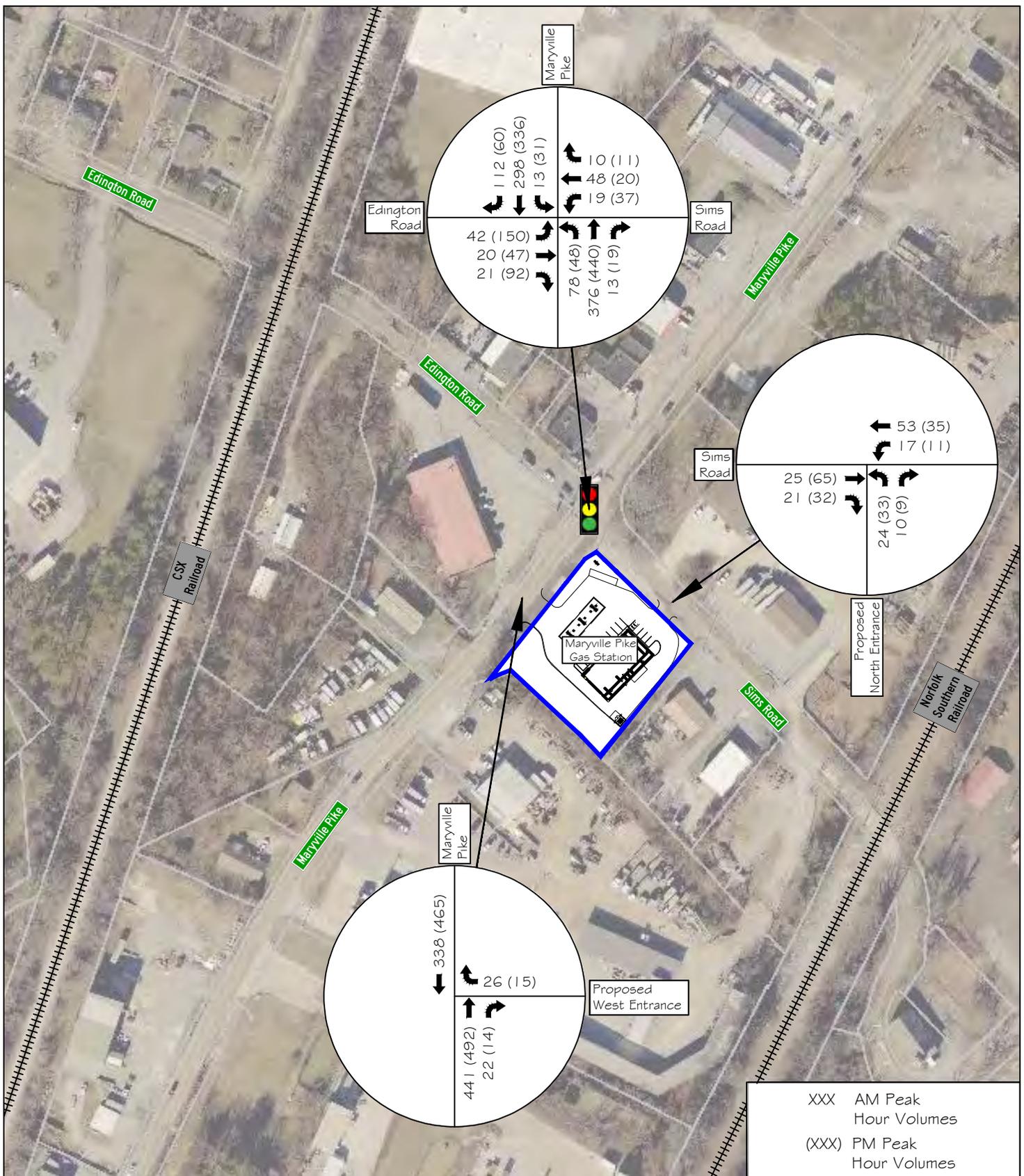
NOT TO SCALE



FIGURE 10b

Maryville Pike Gas Station

Traffic Assignment of Generated Trips during AM and PM Peak Hour - Pass-By Trips for Maryville Pike Gas Station - RIRO ALT



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

NOT TO SCALE



FIGURE 11

Maryville Pike Gas Station

2027 Peak Hour Traffic Volumes -  
 Projected Traffic Conditions  
 With the Project - RIRO ALT

**TABLE 11**  
**INTERSECTION CAPACITY ANALYSIS RESULTS -**  
**2027 PROJECTED TRAFFIC CONDITIONS WITH THE PROJECT**  
**WITH RIRO ALTERNATIVE**

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS <sup>a</sup>	DELAY <sup>b</sup> (seconds)	Max v/c <sup>c</sup>	LOS <sup>a</sup>	DELAY <sup>b</sup> (seconds)	Max v/c <sup>c</sup>
Maryville Pike (SB & NB) at Sims Road (WB) / Edington Road (EB)	 Signalized	Eastbound	B	18.2		D	38.9	
		Westbound	B	19.8		B	20.1	
		Northbound	B	16.5		B	18.1	
		Southbound	B	12.8		B	14.6	
		Summary	B	15.4	0.61	C	21.7	0.78
Sims Road (WB & EB) at Proposed North Entrance (NB)	 Unsignalized	Northbound Left/Right	A	9.3	0.043	A	9.6	0.056
		Westbound Left	A	7.3	0.012	A	7.4	0.008
Maryville Pike (SB & NB) at Proposed West Entrance (WB)	 Unsignalized	Westbound Right	B	11.5	0.050	B	11.8	0.031

Note: All analyses were calculated in Synchro 12 software and reported with HCM 7<sup>th</sup> Edition methodology

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

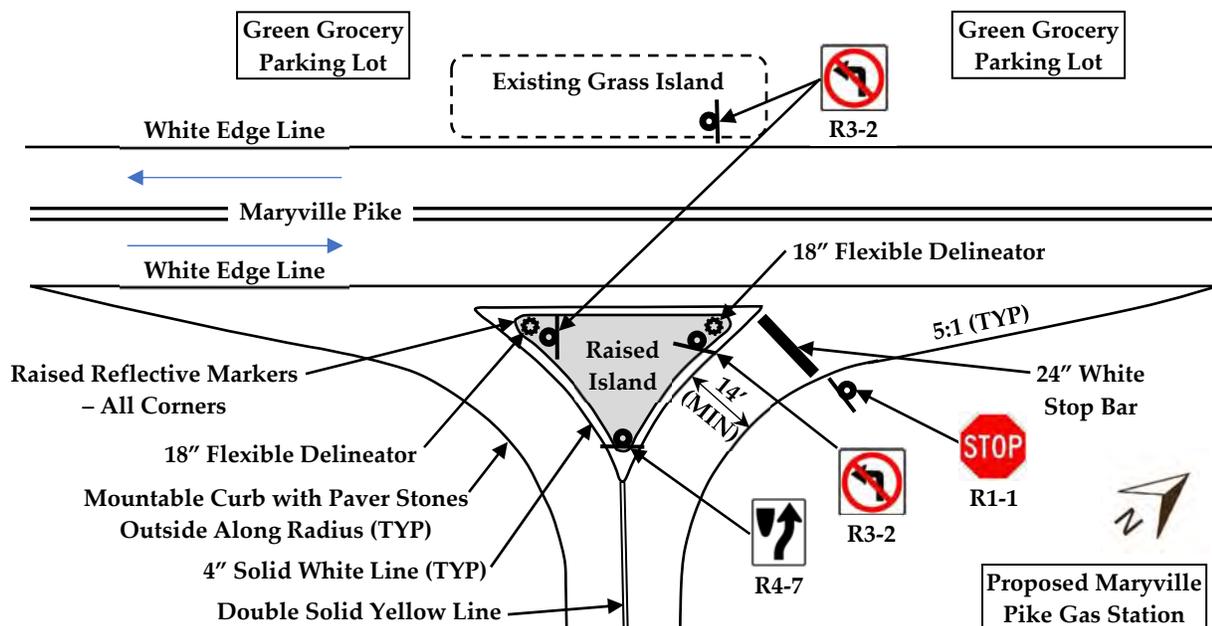
**TABLE 12**  
**VEHICLE QUEUE SUMMARY -**  
**2027 PROJECTED PEAK HOUR TRAFFIC CONDITIONS WITH THE PROJECT**  
**WITH RIRO ALTERNATIVE**

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	95 <sup>th</sup> PERCENTILE VEHICLE QUEUE LENGTH (ft)	
			AM PEAK HOUR	PM PEAK HOUR
Maryville Pike (SB & NB) at Sims Road (WB) / Edington Road (EB)	 Signalized	Eastbound Left/Thru/Right	77	196
		Westbound Left/Thru/Right	72	69
		Northbound Left/Thru/Right	189	193
		Southbound Left/Thru/Right	185	257
Sims Road (WB & EB) at Proposed North Entrance (NB)	 Unsignalized	Westbound Left/Thru	8	10
		Northbound Left/Right	46	49
Maryville Pike (SB & NB) at Proposed West Entrance (WB)	 Unsignalized	Westbound Right	51	39
		Northbound Thru/Right	112	145

Note: 95<sup>th</sup> percentile vehicle queues were calculated in SimTraffic 12 software

1a) It is recommended that the proposed RIRO entrance follow AASHTO and TDOT driveway entrance design standards, and the following guidelines should be considered in the design and construction to reduce the possibility of illegal left-turns at the entrance, both exiting and entering. The RIRO layout must be robust and command attention and respect to deter illegal left turns, especially given the observed motorists' propensity in the area to resort to risky, illegal maneuvers. A sketch of an RIRO layout is provided below (not to scale) and should incorporate the following:

- i) The entering and exiting lanes should have a width and an inner radius to accommodate the largest expected-sized vehicle entering and exiting at Maryville Pike. At a minimum, the lanes should be 14 feet in width.
- ii) The island should be constructed of raised concrete, with a minimum surface area of 100 square feet and a length of at least 40 feet along Maryville Pike.
- iii) The island should be offset by at least 4 feet from the thru lane's white edge line on Maryville Pike.
- iv) As shown below, traffic signage with breakaway posts at this intersection should include a Stop Sign (R1-1), a Keep Right Sign (R4-7), and No Left Turn Signs (R3-2). These signs should be installed facing the appropriate direction, with a minimum sign height of 7 feet above the ground surface. Three reflective raised markers should be located at each island's corner radius – one in the center of the island noses, then 2 foot spacing on either side.



1b) Based on the posted speed limit of 40 mph on Maryville Pike at the Proposed West Entrance location with a RIRO configuration, the required intersection sight distance is 385 feet for exiting right-turning vehicles. The existing sight distance to the south from the Proposed West Entrance location was visually estimated to be at least 425 feet. The civil site designer should ensure that the required intersection sight



**Existing Vegetation along Tributary at  
Maryville Pike  
(Looking South)**

distance at the Proposed West Entrance is available and that vegetation, construction grading, and proposed signage do not interfere with this distance for exiting right turns with a RIRO configuration. Currently, the vegetation along the adjacent tributary, and especially where it crosses under Maryville Pike, is unmaintained. It is recommended that the site development include eliminating vegetation as necessary along the tributary at its crossing under Maryville Pike to maximize sight distance to the south and ensure it is maintained in future conditions.

1c) The construction of the Proposed West Entrance on Maryville Pike (SR 33) will require a TDOT Highway Entrance Permit. The developer will need to apply for this permit and coordinate with TDOT regarding their specific requirements for this entrance.

1d) The development is strongly recommended to install overhead roadway lighting to delineate the Proposed West Entrance at Maryville Pike for night or low-light travel, particularly to illuminate the RIRO configuration with the raised concrete traffic island.



**Sims Road at Proposed North Entrance:** The 2027 projected level of service calculations for this intersection indicated minimal vehicle delays and queues. Based on the capacity analysis, the intersection will be able to handle entering and exiting traffic effectively.

- 2a) It is recommended that a Stop Sign (R1-1) be installed, and a 24" white stop bar be applied to the Proposed North Entrance approach at Sims Road. The stop bar should be applied at least 4 feet from the pavement edge of Sims Road and placed at the desired stopping point that maximizes sight distance.
- 2b) Sight distances from the Proposed North Entrance at Sims Road must not be impacted by future landscaping, vegetation, construction grading, and signage. Based on a posted speed limit of 30 mph on Sims Road, the required ISD is 335 feet looking to the east and west at the Proposed North Entrance.

The distance between the Proposed North Entrance and its intersection with Maryville Pike to the west is 170 feet. The available sight distance to the west will be acceptable, as vehicles from the Maryville Pike intersection traveling east will start from a stop or at a lower turning speed, well below the posted 30 mph speed limit. Otherwise, for oncoming eastbound vehicles crossing Maryville Pike from Edington Road during a green indication, the view will be adequate, as a minimum visual sight distance of 350 feet to the west was estimated. The sight distance to the east was visually estimated to be 375 feet, at least to the at-grade railroad crossing on Sims Road.

- 2c) Based on the analyses and calculations, a single exiting lane at the Proposed North Entrance at Sims Road will be adequate. Separate entering lanes for the development on Sims Road will not be necessary due to the low expected traffic volumes.
- 2d) The development should consider installing overhead roadway lighting to delineate the Proposed North Entrance at Sims Road for nighttime or low-light conditions.



**Maryville Pike at Sims Road and Edington Road:** As described previously, this intersection operates with a single lane on each approach without dedicated left-turn green times and, as such, suffers undue delay when left-turn movements face significant oncoming traffic.

- 3a) Due to operational issues caused by single lanes and the availability of adjacent large paved areas, cut-through traffic and other illegal vehicle movements are regularly observed. Furthermore, this section of Maryville Pike was observed to have a fair amount of pedestrian and bicycle activity in and around the signalized intersection and has been identified by the City of Knoxville as being in Tier 2 of its High Injury Network (HIN). Due to existing operational and safety issues, it is recommended that the City of Knoxville and TDOT make improvements to this intersection when funding becomes available.

Improvements that would significantly increase vehicular flow and safety include providing separate turn lanes at the intersection. The greatest need for additional lanes at this intersection is for separate left-turn lanes on the northbound and southbound approaches on Maryville Pike. Providing turn lanes would necessitate signal timing and traffic signal upgrades, including new signal heads. In addition, because of the attractiveness of cutting through the Green Grocery parking lot, providing a separate lane for eastbound right-turn movement from Edington Road onto southbound Maryville Pike would be very beneficial.

Besides providing additional lanes, other improvements at the intersection should include providing increased road lighting and improved pavement marking visibility. Pavement marking visibility, however, is expected to be addressed in the interim, as this section of Maryville Pike is included in TDOT's "3-year Pavement Program" resurfacing list for fiscal year 2026. Pedestrian sidewalks identified in the City of Knoxville's 2020 "Sidewalk Study" should also be pursued, along with other enhancements, such as crosswalks, pedestrian buttons, and pedestrian signal heads at the traffic signal.

Overall, in the projected 2027 conditions at the signalized intersection of Maryville Pike at Sims Road and Edington Road, the proposed Maryville Pike Gas Station trip generation is expected to have only a minimal impact on the intersection. The proposed development is not expected to affect the traffic signal's operations unduly and will not require modifications in the short term.

In the interim, until the intersection can be reconstructed with additional turning lanes, a few other options are potentially viable at a lower cost and within a shorter timeframe to reduce the number of failed cycles, cut-through traffic, and unsafe maneuvers. These include the following:

- i) Vehicle detection: install loop or video detectors on all approaches to enable true actuated operation. Detection would allow any unused green time on Sims Road and Edington Road to gap out early, shortening the cycle and reducing vehicle delays on the busier north-south approaches on Maryville Pike.
- ii) Optimization of timing/time-of-day (TOD) plans: since the traffic signal currently operates in isolated, max-recall mode without any scheduling, introducing TOD plans would allow custom timings for peak vs. off-peak periods, reducing unnecessary green time on the lower-volume east-west approaches of Sims Road and Edington Road during peaks and thereby minimizing northbound vehicle delays that encourage cut-through movements occurring via the Green Grocery parking lot.
- iii) Separate Left-Turn Phase: it would be feasible to introduce a leading protected left-turn phase for northbound movements on Maryville Pike without a dedicated new turn lane, using protected-permissive left-turn phasing for the existing shared lane. The northbound approach has been shown to be the most critical movement due to its heavier volumes and long queues, particularly in the AM peak. Providing this phasing would give northbound left-turn movements a leading green arrow before the south thru phase, thus reducing blocking by allowing lefts to turn unopposed initially. This modification would require signal head upgrades (to a 5-section head) to allow the display of a green arrow, and ensure any phasing avoids a "yellow trap". If this modification is implemented for the northbound approach, a Left Turn Yield on Green Sign (R10-12) should be installed.



A preliminary modified signal timing plan was developed in the Synchro traffic software, incorporating a northbound leading left-turn phase with a concurrent green indication for northbound thru (and right-turn) movements before the southbound movements on Maryville Pike. The results of this signal modification reduced vehicle delays on the northbound approach and would no doubt reduce the number of cut-through vehicles on the Green Grocery property from the south towards the west, and would also, optimistically, reduce the number of illegal

passing movements. However, this modification, which provides additional green time for northbound movements, will negatively impact the other approaches by slightly increasing their vehicle delays. Unfortunately, increasing vehicle delays on the Edington Road approach would likely increase the potential for cut-through traffic from the west towards the south, as is currently occurring, unless and until a separate right-turn lane is provided at the signal.

Capacity analyses were conducted to determine the projected LOS with the development traffic in 2027, including a potential leading northbound left-turn phase. The intersection capacity results for the projected 2027 peak hour traffic are shown in Table 13, and Appendix E includes the capacity analysis worksheets from the software.

**TABLE 13**  
**INTERSECTION CAPACITY ANALYSIS RESULTS -**  
**2027 PROJECTED TRAFFIC CONDITIONS WITH THE PROJECT**  
**WITH RIRO ALTERNATIVE & LEADING NORTHBOUND LEFT TURN MOVEMENT**

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS <sup>a</sup>	DELAY <sup>b</sup> (seconds)	Max v/c <sup>c</sup>	LOS <sup>a</sup>	DELAY <sup>b</sup> (seconds)	Max v/c <sup>c</sup>
Maryville Pike (SB & NB) at Sims Road (WB) / Edington Road (EB)	 Signalized	Eastbound	C	29.2		D	45.0	
		Westbound	C	27.7		B	18.1	
		Northbound	A	6.6		B	15.5	
		Southbound	A	16.1		B	29.4	
		Summary	B	13.8	0.63	C	26.8	0.86

Note: All analyses were calculated in Synchro 12 software and reported with HCM 7<sup>th</sup> Edition methodology

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

As shown in Table 13, the signalized intersection with the alternative phasing and timing reduces vehicle delays on the northbound approach compared to Table 11. However, it does increase vehicle delays on the other approaches to accommodate a leading northbound left-turn phase.

- 3b) With observed pedestrian and bicyclist activity in the area, the record of crashes occurring with these non-vehicular activities, and the potential for this to be increased with a new convenience market, it is recommended that the City install pedestrian warning signage on Sims Road, Edington Road, and the northbound approach of Maryville Pike in advance of the signalized intersection. A Pedestrian Sign (W11-2) is recommended to be installed on these approaches, a minimum of 125 feet from the intersection, and to

W11-2



match the sign currently posted for the southbound approach of Maryville Pike in advance of the traffic signal.

- 3c) Controlling or eliminating the cut-through traffic occurring on the Green Grocery property will be difficult with enforcement or better-regulated and defined entrances on Edington Road and Maryville Pike. Ultimately, this is private property and would require cooperation between the City and the property owner to reduce these movements, which can be detrimental to customer safety.



**Maryville Pike Gas Station Internal Drives/Parking Lot Aisleways:** The current site plan shows two entrances for the proposed development site, with pavement areas designated to facilitate customer, employee, food, and gasoline deliveries.

- 4a) All drainage grates and covers for the commercial development must be pedestrian and bicycle-safe.
- 4b) Internal sidewalks are proposed along the front and side of the convenience market. Sidewalks should include ADA-compliant ramps with detectable surfaces, and internal sidewalks should be at least 5 feet wide to comply with City of Knoxville regulations.
- 4c) According to the City of Knoxville regulations, bicycle spaces must be provided for this proposed development. Per City of Knoxville standards, with 13 proposed vehicle parking spaces, four bicycle parking spaces should be provided for this development. These spaces should be designed in accordance with the regulations in Section 11.9 of the City of Knoxville's Zoning Code User's Manual.
- 4d) All internal parking space lines are to be white, except for handicapped markings. White pavement lane markings and arrows should also be considered to facilitate orderly internal vehicular movements.
- 4e) Cut-through traffic from the westbound Maryville Pike approach is not expected to occur on the Maryville Pike Gas Station property due to lower volumes towards the east on Sims Road. Still, it is recommended that the civil site engineer consider including speed humps on the internal driveways within the development to reduce internal speeds and dissuade motorists from using the site as a cut-through route. Cut-through opposite flows from Sims Road to southbound Maryville Pike will not be available due to the RIRO configuration at the Proposed West Entrance.
- 4f) The site layout should consider a designated, defined marked path from the existing KAT bus stop on Maryville Pike to the convenience market building. Installing a defined path across the property to and from the building would facilitate pedestrian or bicycle traffic to and from the transit stop.
- 4g) The existing corner of the intersection of Maryville Pike at Sims Road is occupied by copious amounts of asphalt pavement. The construction of the Maryville Pike Gas

Station should remove excess pavement outside the State's right-of-way and return it to an unpaved and grassed area to reduce undesirable vehicle movements outside the established road lanes.

- 4h) All road and intersection elements should be designed in accordance with the American Association of State Highway and Transportation Officials (AASHTO) and the Manual on Uniform Traffic Control Devices (MUTCD), as well as the City of Knoxville and TDOT specifications and guidelines, to ensure proper roadway operations.



**Existing Pavement at the Southeastern Corner of  
Signalized Intersection of Maryville Pike at Sims  
Road & Edington Road  
(Looking Northwest)**

**APPENDIX A**

**HISTORICAL TRAFFIC COUNT DATA**

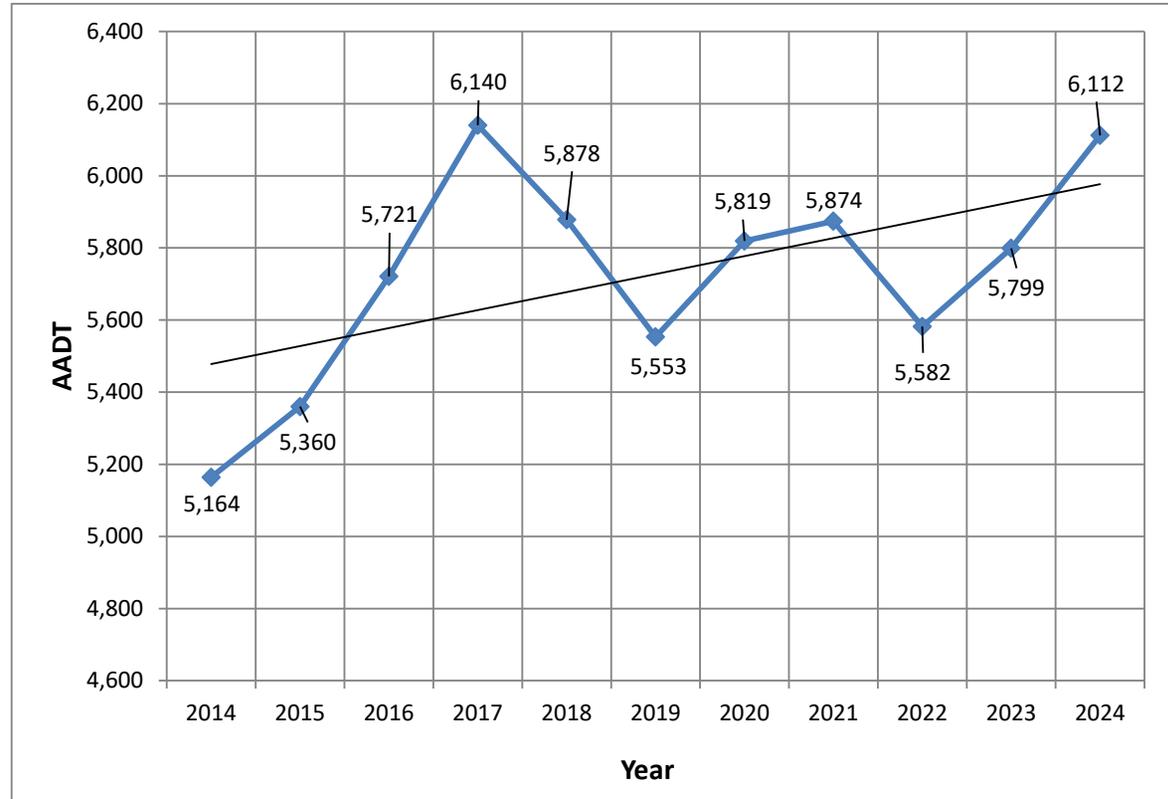
# Historical Traffic Counts

Organization: TDOT

Station ID #: 47000113

Location: Maryville Pike (SR 33), south of Clayton Road SW

YEAR	AADT	Trendline
2014	5,164	
2015	5,360	
2016	5,721	
2017	6,140	
2018	5,878	
2019	5,553	
2020	5,819	
2021	5,874	
2022	5,582	
2023	5,799	
2024	6,112	



2014 - 2024 Growth Rate = 18.4%

Average Annual Growth Rate = 1.7%

**Traffic Count (TCDS)**

Home
Locate
Locate All
Email This
Auto-Locate:

Disclaimer: Please note that the AADT displayed for the current year is only a preliminary estimate, updated adjustment factors have not yet been applied to the traffic count information to produce a final AADT.

List View All DIRs

Record
7576
of 16430
Goto Record

go

Location ID	47000113	MPO ID	
Type	SPOT	HPMS ID	
On NHS		On HPMS	
LRS ID	47S003301P00000	LRS Loc Pt.	4.17
SF Group	Urban Minor Arterial (2025)	Route Type	
AF Group	Region 1 Urban Minor Arterial (2025)	Route	
GF Group	Knox (2025)	Active	Yes
Class Dist Grp	Region 1 Urban Minor Arterial (2025)	Category	CC
Seas Class Grp			
WIM Group			
QC Group	Default		
Fnc'l Class	Minor Arterial	Milepost	
Located On	SR033		
Loc On Alias	MARYVILLE PK		
	SOUTH OF KNOXVILLE		

More Detail ▶

STATION DATA

Directions: 2-WAY NB SB

AADT							
Year	AADT	DHV-30	K %	D %	PA	BC	Src
2024	6,112 <sup>3</sup>		9	50	5,916 (97%)	196 (3%)	Grown from 2023
2023	5,799	539	9	50	5,426 (94%)	373 (6%)	
2022	5,582	607	11	70	5,424 (97%)	158 (3%)	
2021	5,874	573	10	70	5,680 (97%)	194 (3%)	
2020	5,819	898	15	70	5,734 (99%)	85 (1%)	

<< < > >> 1-5 of 40

**Location**

Location ID: 47000113  
 Located On: SR033 SOUTH OF KNOXVILLE  
 Direction: 2-WAY  
 AADT: 6112 (2024)  
 NB Count: 2883 (2024)  
 SB Count: 3229 (2024)

[View Detail in a New Search](#)  
[Go to Record in Current Search](#)

**APPENDIX B**

**KNOXVILLE AREA TRANSIT (KAT) MAP AND INFORMATION**



## Route 45 - Vestal WEEKDAY

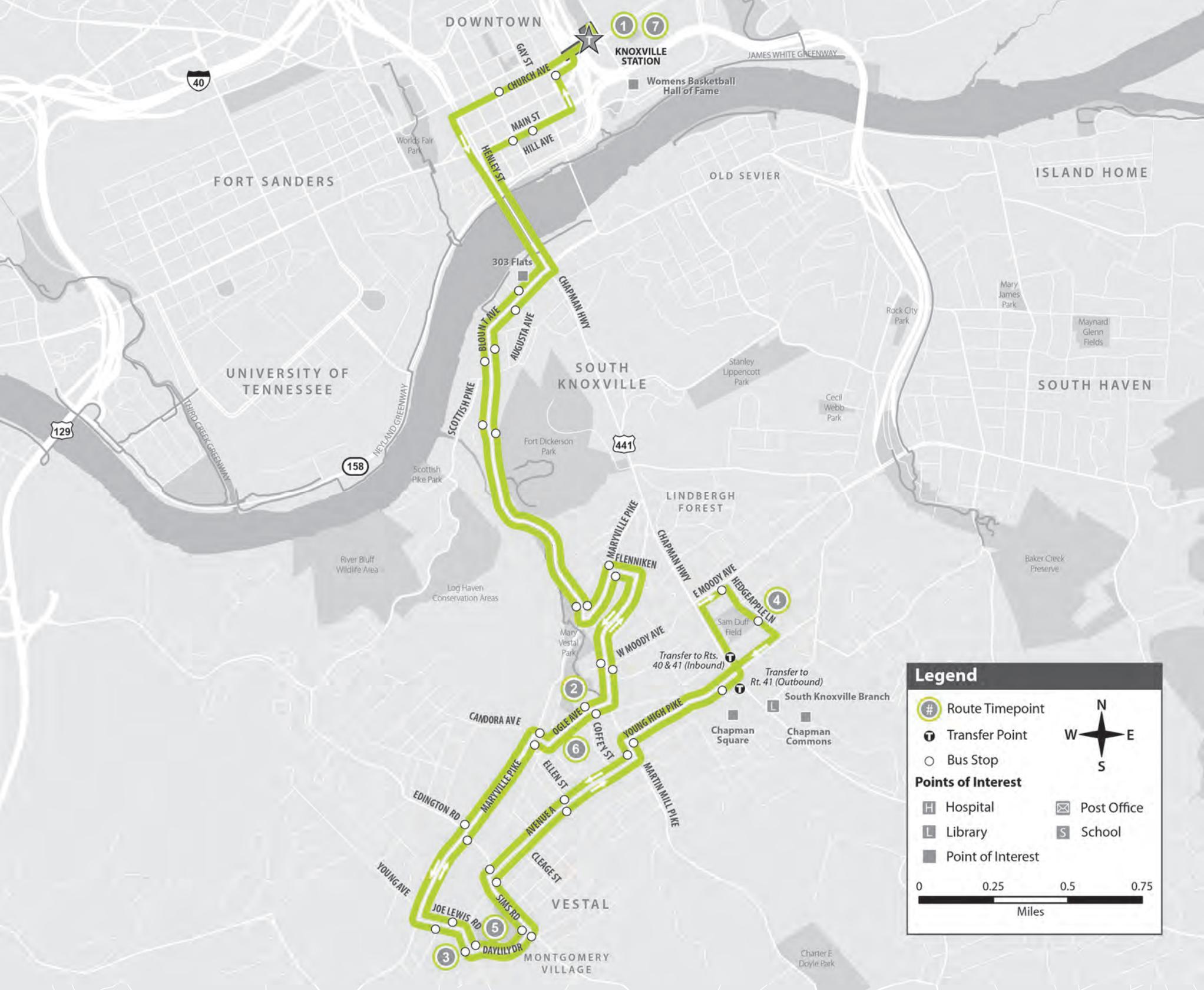
Going away from downtown			Going toward downtown			
Knoxville Station Bay S	Ogle Ave SB and Coffey St	Montgomery Village	Hedgeapple SB before Young High Pike	Montgomery Village	Ogle Ave NB and Coffey St	Knoxville Station Bay S
1	2	3	4	5	6	7
			5:38 AM	5:50 AM	5:55 AM	6:10 AM
6:15 AM	6:27 AM	6:30 AM	6:38 AM	6:50 AM	6:55 AM	7:10 AM
7:15 AM	7:27 AM	7:30 AM	7:38 AM	7:50 AM	7:55 AM	8:10 AM
8:15 AM	8:27 AM	8:30 AM	8:38 AM	8:50 AM	8:55 AM	9:10 AM
9:15 AM	9:27 AM	9:30 AM	9:38 AM	9:50 AM	9:55 AM	10:10 AM
10:15 AM	10:27 AM	10:30 AM	10:38 AM	10:50 AM	10:55 AM	11:10 AM
11:15 AM	11:27 AM	11:30 AM	11:38 AM	11:50 AM	11:55 AM	12:10 PM
12:15 PM	12:27 PM	12:30 PM	12:38 PM	12:50 PM	12:55 PM	1:10 PM
1:15 PM	1:27 PM	1:30 PM	1:38 PM	1:50 PM	1:55 PM	2:10 PM
2:15 PM	2:27 PM	2:30 PM	2:38 PM	2:50 PM	2:55 PM	3:10 PM
3:15 PM	3:27 PM	3:30 PM	3:38 PM	3:50 PM	3:55 PM	4:10 PM
4:15 PM	4:27 PM	4:30 PM	4:38 PM	4:50 PM	4:55 PM	5:10 PM
5:15 PM	5:27 PM	5:30 PM	5:38 PM	5:50 PM	5:55 PM	6:10 PM
6:15 PM	6:27 PM	6:30 PM	6:38 PM	6:50 PM	6:55 PM	7:10 PM
7:15 PM	7:27 PM	7:30 PM	7:38 PM	7:50 PM	7:55 PM	8:10 PM
8:15 PM	8:27 PM	8:30 PM	8:38 PM	8:50 PM	8:55 PM	9:10 PM
9:15 PM	9:27 PM	9:30 PM	9:38 PM	9:50 PM	9:55 PM	10:10 PM

## SATURDAY

Going away from downtown			Going toward downtown			
Knoxville Station Bay S	Ogle Ave SB and Coffey St	Montgomery Village	Hedgeapple SB before Young High Pike	Montgomery Village	Ogle Ave NB and Coffey St	Knoxville Station Bay S
1	2	3	4	5	6	7
			6:38 AM	6:50 AM	6:55 AM	7:10 AM
7:15 AM	7:27 AM	7:30 AM	7:38 AM	7:50 AM	7:55 AM	8:10 AM
8:15 AM	8:27 AM	8:30 AM	8:38 AM	8:50 AM	8:55 AM	9:10 AM
9:15 AM	9:27 AM	9:30 AM	9:38 AM	9:50 AM	9:55 AM	10:10 AM
10:15 AM	10:27 AM	10:30 AM	10:38 AM	10:50 AM	10:55 AM	11:10 AM
11:15 AM	11:27 AM	11:30 AM	11:38 AM	11:50 AM	11:55 AM	12:10 PM
12:15 PM	12:27 PM	12:30 PM	12:38 PM	12:50 PM	12:55 PM	1:10 PM
1:15 PM	1:27 PM	1:30 PM	1:38 PM	1:50 PM	1:55 PM	2:10 PM
2:15 PM	2:27 PM	2:30 PM	2:38 PM	2:50 PM	2:55 PM	3:10 PM
3:15 PM	3:27 PM	3:30 PM	3:38 PM	3:50 PM	3:55 PM	4:10 PM
4:15 PM	4:27 PM	4:30 PM	4:38 PM	4:50 PM	4:55 PM	5:10 PM
5:15 PM	5:27 PM	5:30 PM	5:38 PM	5:50 PM	5:55 PM	6:10 PM
6:15 PM	6:27 PM	6:30 PM	6:38 PM	6:50 PM	6:55 PM	7:10 PM
7:15 PM	7:27 PM	7:30 PM	7:38 PM	7:50 PM	7:55 PM	8:10 PM
8:15 PM	8:27 PM	8:30 PM	8:38 PM	8:50 PM	8:55 PM	9:10 PM
9:15 PM	9:27 PM	9:30 PM	9:38 PM	9:50 PM	9:55 PM	10:10 PM

## SUNDAY

Going away from downtown			Going toward downtown			
Knoxville Station Bay S	Ogle Ave SB and Coffey St	Montgomery Village	Hedgeapple SB before Young High Pike	Montgomery Village	Ogle Ave NB and Coffey St	Knoxville Station Bay S
1	2	3	4	5	6	7
8:15 AM	8:27 AM	8:30 AM	8:38 AM	8:50 AM	8:55 AM	9:10 AM
9:15 AM	9:27 AM	9:30 AM	9:38 AM	9:50 AM	9:55 AM	10:10 AM
10:15 AM	10:27 AM	10:30 AM	10:38 AM	10:50 AM	10:55 AM	11:10 AM
11:15 AM	11:27 AM	11:30 AM	11:38 AM	11:50 AM	11:55 AM	12:10 PM
12:15 PM	12:27 PM	12:30 PM	12:38 PM	12:50 PM	12:55 PM	1:10 PM
1:15 PM	1:27 PM	1:30 PM	1:38 PM	1:50 PM	1:55 PM	2:10 PM
2:15 PM	2:27 PM	2:30 PM	2:38 PM	2:50 PM	2:55 PM	3:10 PM
3:15 PM	3:27 PM	3:30 PM	3:38 PM	3:50 PM	3:55 PM	4:10 PM
4:15 PM	4:27 PM	4:30 PM	4:38 PM	4:50 PM	4:55 PM	5:10 PM
5:15 PM	5:27 PM	5:30 PM	5:38 PM	5:50 PM	5:55 PM	6:10 PM
6:15 PM	6:27 PM	6:30 PM	6:38 PM	6:50 PM	6:55 PM	7:10 PM
7:15 PM	7:27 PM	7:30 PM	7:38 PM	7:50 PM	7:55 PM	8:10 PM
8:15 PM	8:27 PM	8:30 PM	8:38 PM	8:50 PM	8:55 PM	



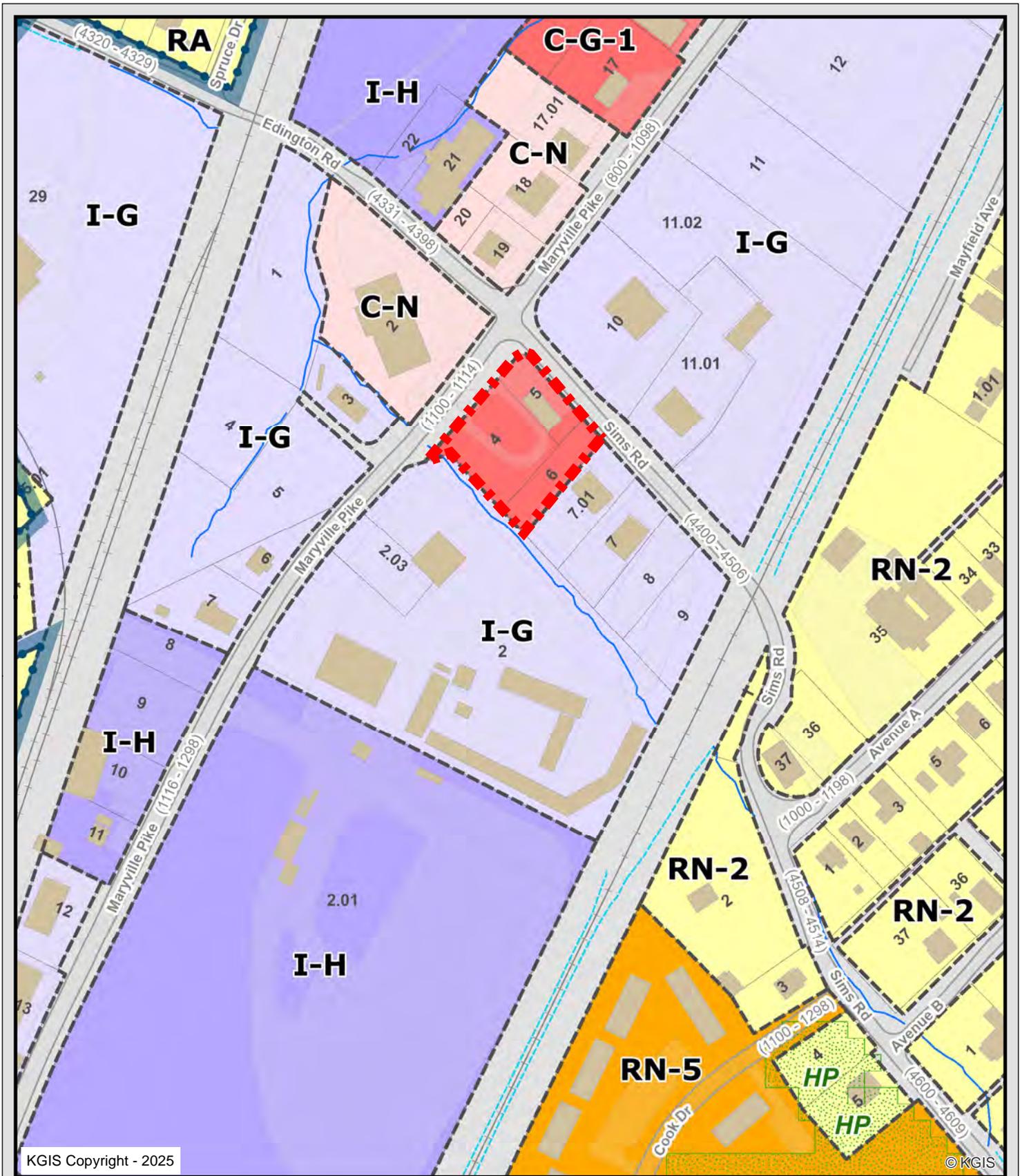
### Legend

- Route Timepoint
- Transfer Point
- Bus Stop
- Hospital
- Library
- Point of Interest
- Post Office
- School

Miles

**APPENDIX C**

**ZONING MAP**



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### Zoning Map 12.18.25

Knoxville - Knox County - KUB Geographic Information System



Printed: 12/18/2025 at 5:44:52 PM



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**APPENDIX D**

**MANUAL TRAFFIC COUNT DATA**

**TRAFFIC COUNT DATA**

Major Street: Maryville Pike (SB & NB)  
 Minor Street: Sims Road (WB) & Edington Road (EB)  
 Traffic Control: Traffic Signal

12/10/2025 (Wednesday)  
 Overcast, Colder, and Light Rain in Afternoon  
 Conducted by: Ajax Engineering

TIME BEGIN	Maryville Pike SOUTHBOUND			Sims Road WESTBOUND			Maryville Pike NORTHBOUND			Edington Road EASTBOUND			VEHICLE TOTAL	PEAK HOUR
	LT	THRU	RT	LT	THRU	RT	LT	THRU	RT	LT	THRU	RT		
7:00 AM	0	36	15	2	19	2	8	38	0	9	2	7	138	
7:15 AM	0	51	25	6	13	3	14	55	1	11	2	5	186	
7:30 AM	0	84	32	4	16	4	18	87	3	11	1	3	263	7:30 AM - 8:30 AM
7:45 AM	0	64	27	2	11	3	23	101	3	9	5	9	257	
8:00 AM	2	75	29	1	9	0	17	96	2	10	1	5	247	
8:15 AM	0	69	20	2	9	1	16	67	4	10	6	4	208	
8:30 AM	0	52	26	3	9	0	22	61	0	16	5	4	198	
8:45 AM	3	42	22	5	4	3	12	64	0	10	0	7	172	
<b>TOTAL</b>	<b>5</b>	<b>473</b>	<b>196</b>	<b>25</b>	<b>90</b>	<b>16</b>	<b>130</b>	<b>569</b>	<b>13</b>	<b>86</b>	<b>22</b>	<b>44</b>	<b>1669</b>	
2:00 PM	0	59	15	4	6	1	10	70	1	20	6	12	204	
2:15 PM	2	63	20	3	5	1	7	54	1	16	13	9	194	
2:30 PM	0	44	16	1	1	1	25	92	2	37	5	8	232	
2:45 PM	1	75	13	3	2	1	18	79	7	23	12	10	244	
3:00 PM	1	65	9	0	5	0	18	98	5	35	7	12	255	
3:15 PM	0	67	13	4	2	1	12	84	1	27	16	6	233	
3:30 PM	1	79	18	4	4	2	10	101	5	32	7	13	276	3:30 PM - 4:30 PM
3:45 PM	1	87	20	1	5	5	14	86	4	32	13	25	293	
4:00 PM	1	90	14	2	6	2	11	133	8	46	11	22	346	
4:15 PM	1	81	6	3	3	2	10	98	1	34	11	29	279	
4:30 PM	2	92	11	6	3	0	3	69	8	41	9	30	274	
4:45 PM	2	91	7	4	1	1	5	87	3	39	15	26	281	
5:00 PM	2	113	16	2	2	1	11	77	2	42	12	26	306	
5:15 PM	0	96	18	2	4	1	2	103	4	31	12	16	289	
5:30 PM	0	103	17	4	3	2	4	83	6	40	13	17	292	
5:45 PM	1	99	26	2	7	3	7	70	4	33	7	15	274	
<b>TOTAL</b>	<b>15</b>	<b>1304</b>	<b>239</b>	<b>45</b>	<b>59</b>	<b>24</b>	<b>167</b>	<b>1384</b>	<b>62</b>	<b>528</b>	<b>169</b>	<b>276</b>	<b>4272</b>	

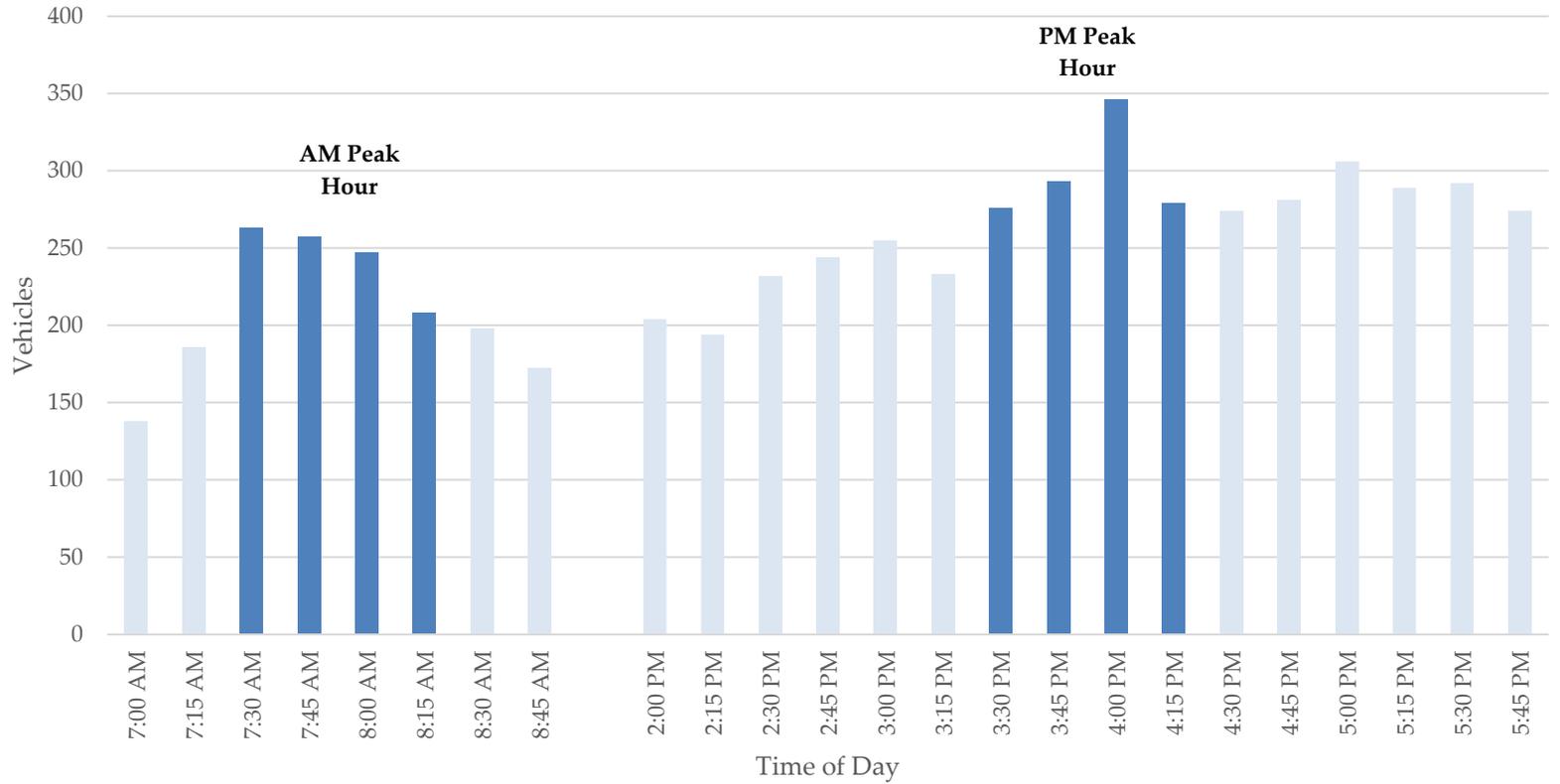
**2025 AM Peak Hour**                      **7:30 AM - 8:30 AM**

TIME BEGIN	Maryville Pike SOUTHBOUND			Sims Road WESTBOUND			Maryville Pike NORTHBOUND			Edington Road EASTBOUND		
	LT	THRU	RT	LT	THRU	RT	LT	THRU	RT	LT	THRU	RT
7:30 AM	0	84	32	4	16	4	18	87	3	11	1	3
7:45 AM	0	64	27	2	11	3	23	101	3	9	5	9
8:00 AM	2	75	29	1	9	0	17	96	2	10	1	5
8:15 AM	0	69	20	2	9	1	16	67	4	10	6	4
<b>TOTAL</b>	<b>2</b>	<b>292</b>	<b>108</b>	<b>9</b>	<b>45</b>	<b>8</b>	<b>74</b>	<b>351</b>	<b>12</b>	<b>40</b>	<b>13</b>	<b>21</b>
<b>TRUCK %</b>	<b>0.0%</b>	<b>3.4%</b>	<b>0.9%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.9%</b>	<b>8.3%</b>	<b>2.5%</b>	<b>0.0%</b>	<b>0.0%</b>
<b>PHF<sub>mvmt</sub></b>	<b>0.25</b>	<b>0.87</b>	<b>0.84</b>	<b>0.56</b>	<b>0.70</b>	<b>0.50</b>	<b>0.80</b>	<b>0.87</b>	<b>0.75</b>	<b>0.91</b>	<b>0.54</b>	<b>0.58</b>
<b>PHF<sub>app</sub></b>	<b>0.87</b>			<b>0.65</b>			<b>0.86</b>			<b>0.80</b>		
<b>PHF<sub>int</sub></b>	<b>0.93</b>											

**2025 PM Peak Hour**                      **3:30 PM - 4:30 PM**

TIME BEGIN	Maryville Pike SOUTHBOUND			Sims Road WESTBOUND			Maryville Pike NORTHBOUND			Edington Road EASTBOUND		
	LT	THRU	RT	LT	THRU	RT	LT	THRU	RT	LT	THRU	RT
3:30 PM	1	79	18	4	4	2	10	101	5	32	7	13
3:45 PM	1	87	20	1	5	5	14	86	4	32	13	25
4:00 PM	1	90	14	2	6	2	11	133	8	46	11	22
4:15 PM	1	81	6	3	3	2	10	98	1	34	11	29
<b>TOTAL</b>	<b>4</b>	<b>337</b>	<b>58</b>	<b>10</b>	<b>18</b>	<b>11</b>	<b>45</b>	<b>418</b>	<b>18</b>	<b>144</b>	<b>42</b>	<b>89</b>
<b>TRUCK %</b>	<b>0.0%</b>	<b>1.8%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>5.6%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>2.4%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>
<b>PHF<sub>mvmt</sub></b>	<b>1.00</b>	<b>0.94</b>	<b>0.73</b>	<b>0.63</b>	<b>0.75</b>	<b>0.55</b>	<b>0.80</b>	<b>0.79</b>	<b>0.56</b>	<b>0.78</b>	<b>0.81</b>	<b>0.77</b>
<b>PHF<sub>app</sub></b>	<b>0.92</b>			<b>0.89</b>			<b>0.79</b>			<b>0.87</b>		
<b>PHF<sub>int</sub></b>	<b>0.86</b>											

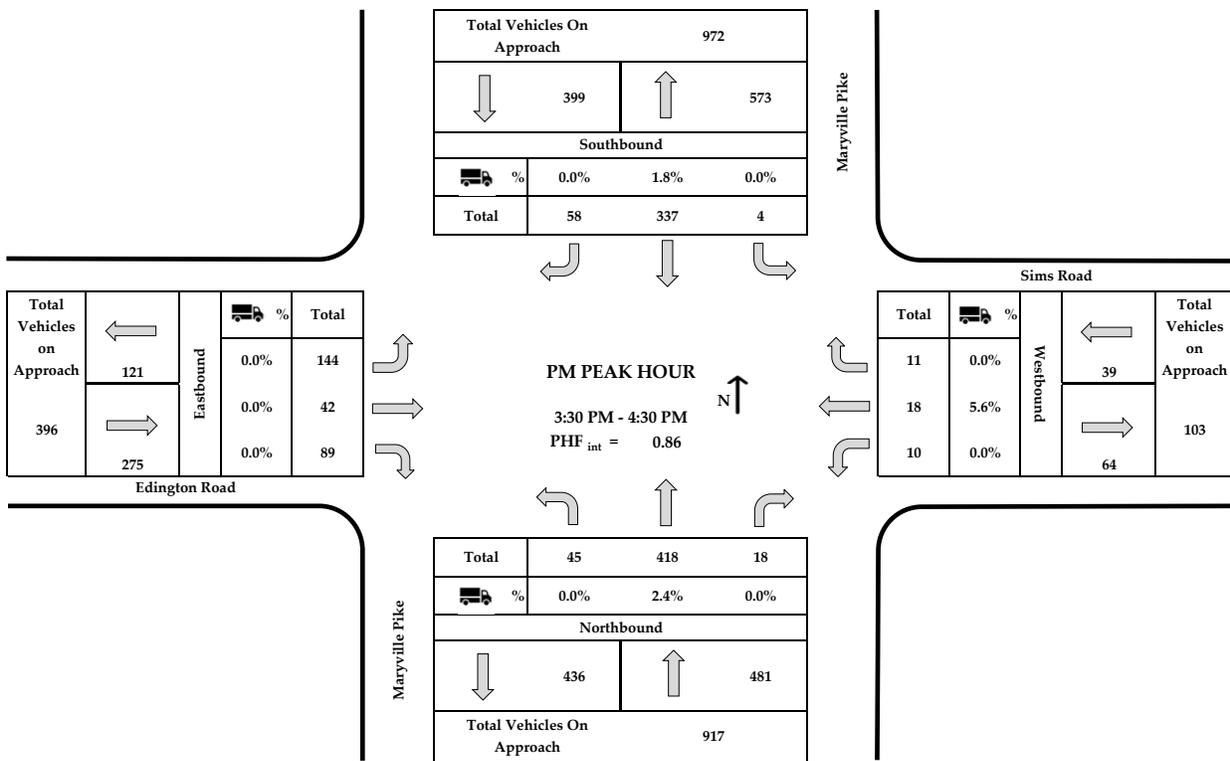
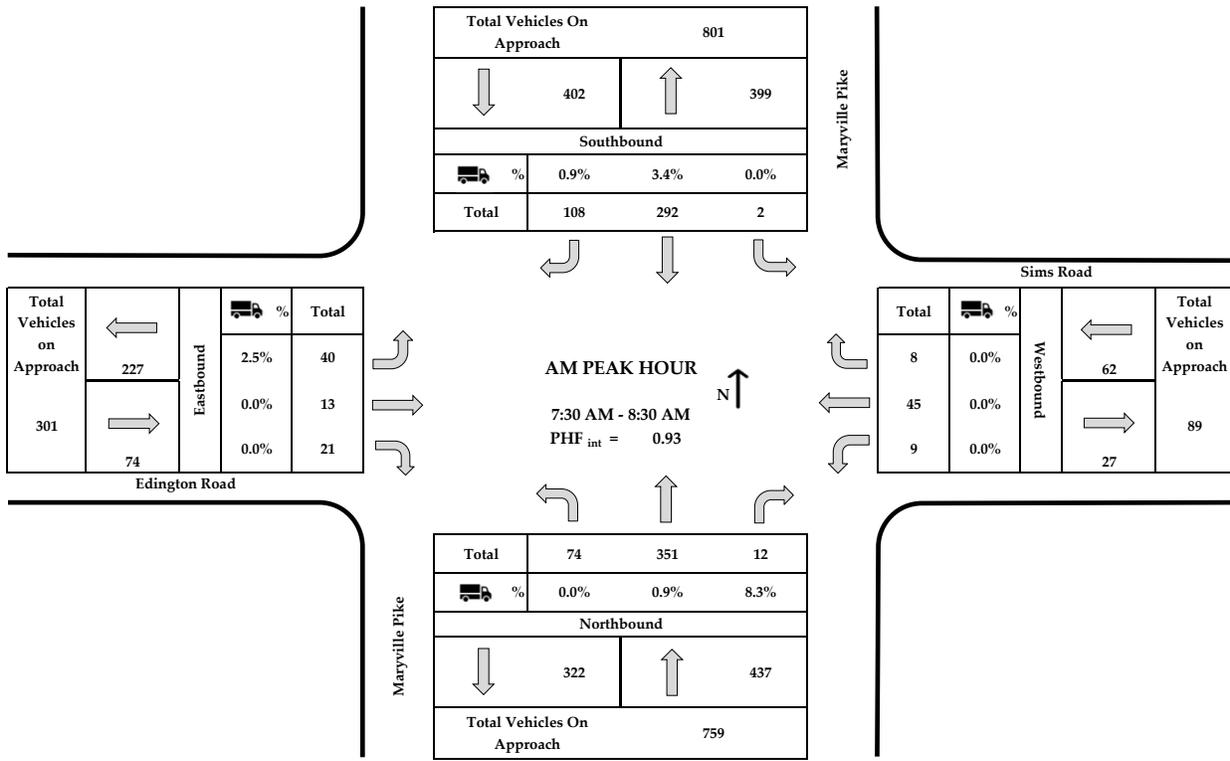
Maryville Pike at Sims Road & Edington Road  
Intersection Traffic Count Totals  
12/10/2025



**PEAK HOUR DATA**

Major Street: Maryville Pike (SB & NB)  
 Minor Street: Sims Road (WB) & Edington Road (EB)  
 Traffic Control: Traffic Signal

12/10/2025 (Wednesday)  
 Overcast, Colder, and Light Rain in Afternoon  
 Conducted by: Ajax Engineering



## **APPENDIX E**

### **CAPACITY ANALYSES – HCM WORKSHEETS (SYNCHRO 12)**

## EXISTING CONDITIONS

Lanes, Volumes, Timings  
 3: Maryville Pike & Edgington Road/Sims Road

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	13	21	9	45	8	74	351	12	2	292	108
Future Volume (vph)	40	13	21	9	45	8	74	351	12	2	292	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	9	9	9	11	11	11	11	11	11
Grade (%)		7%			-8%			4%			1%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.961			0.982			0.996			0.964	
Flt Protected		0.974			0.993			0.992				
Satd. Flow (prot)	0	1633	0	0	1734	0	0	1760	0	0	1720	0
Flt Permitted		0.838			0.965			0.857			0.998	
Satd. Flow (perm)	0	1405	0	0	1685	0	0	1521	0	0	1716	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			9			3			35	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		372			520			518			595	
Travel Time (s)		8.5			11.8			8.8			10.1	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%	0%	1%	8%	0%	3%	1%
Adj. Flow (vph)	43	14	23	10	48	9	80	377	13	2	314	116
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	80	0	0	67	0	0	470	0	0	432	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	11.5	11.5		11.5	11.5		13.0	13.0		13.0	13.0	
Total Split (s)	30.5	30.5		30.5	30.5		52.0	52.0		52.0	52.0	
Total Split (%)	37.0%	37.0%		37.0%	37.0%		63.0%	63.0%		63.0%	63.0%	
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0		45.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.5	4.5		4.5	4.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Act Effct Green (s)		25.0			25.0			45.0			45.0	
Actuated g/C Ratio		0.30			0.30			0.55			0.55	
v/c Ratio		0.18			0.13			0.57			0.45	
Control Delay (s/veh)		17.3			19.5			15.6			12.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay (s/veh)		17.3			19.5			15.6			12.2	
LOS		B			B			B			B	
Approach Delay (s/veh)		17.3			19.5			15.6			12.2	
Approach LOS		B			B			B			B	

# Lanes, Volumes, Timings

## 3: Maryville Pike & Edington Road/Sims Road

### Intersection Summary

Area Type: Other  
 Cycle Length: 82.5  
 Actuated Cycle Length: 82.5  
 Natural Cycle: 40  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.57  
 Intersection Signal Delay (s/veh): 14.6      Intersection LOS: B  
 Intersection Capacity Utilization 72.4%      ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 3: Maryville Pike & Edington Road/Sims Road



Lanes, Volumes, Timings  
 3: Maryville Pike & Edgington Road/Sims Road

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	42	89	10	18	11	45	418	18	4	337	58
Future Volume (vph)	144	42	89	10	18	11	45	418	18	4	337	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	9	9	9	11	11	11	11	11	11
Grade (%)		7%			-8%			4%			1%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.956			0.962			0.995			0.981	
Flt Protected		0.974			0.987			0.995			0.999	
Satd. Flow (prot)	0	1650	0	0	1626	0	0	1752	0	0	1761	0
Flt Permitted		0.811			0.896			0.921			0.995	
Satd. Flow (perm)	0	1374	0	0	1476	0	0	1621	0	0	1754	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			13			4			16	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		372			520			518			595	
Travel Time (s)		8.5			11.8			8.8			10.1	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	6%	4%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	167	49	103	12	21	13	52	486	21	5	392	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	319	0	0	46	0	0	559	0	0	464	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	11.5	11.5		11.5	11.5		13.0	13.0		13.0	13.0	
Total Split (s)	30.5	30.5		30.5	30.5		52.0	52.0		52.0	52.0	
Total Split (%)	37.0%	37.0%		37.0%	37.0%		63.0%	63.0%		63.0%	63.0%	
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0		45.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.5	4.5		4.5	4.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Act Effct Green (s)		25.0			25.0			45.0			45.0	
Actuated g/C Ratio		0.30			0.30			0.55			0.55	
v/c Ratio		0.73			0.10			0.63			0.48	
Control Delay (s/veh)		34.8			16.9			16.9			13.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay (s/veh)		34.8			16.9			16.9			13.2	
LOS		C			B			B			B	
Approach Delay (s/veh)		34.8			16.9			16.9			13.2	
Approach LOS		C			B			B			B	

# Lanes, Volumes, Timings

## 3: Maryville Pike & Edington Road/Sims Road

### Intersection Summary

Area Type: Other

Cycle Length: 82.5

Actuated Cycle Length: 82.5

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay (s/veh): 19.8

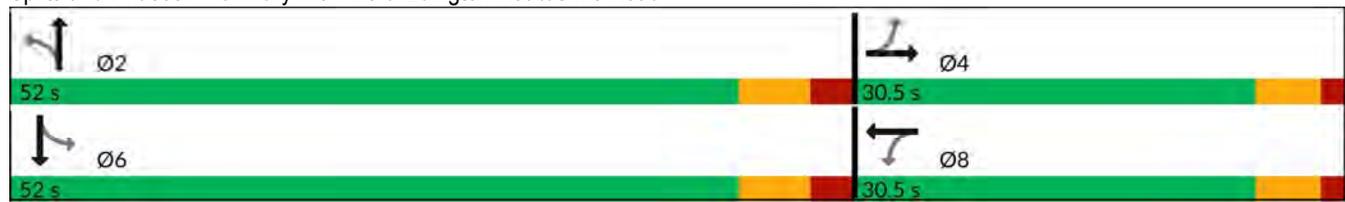
Intersection LOS: B

Intersection Capacity Utilization 85.4%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 3: Maryville Pike & Edington Road/Sims Road



## **PROJECTED CONDITIONS WITHOUT THE PROJECT**

Lanes, Volumes, Timings

3: Maryville Pike & Edgington Road/Sims Road

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	14	22	9	47	8	77	365	12	2	304	112
Future Volume (vph)	42	14	22	9	47	8	77	365	12	2	304	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	9	9	9	11	11	11	11	11	11
Grade (%)		7%			-8%			4%				1%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.961			0.983			0.996			0.964	
Flt Protected		0.974			0.993			0.992				
Satd. Flow (prot)	0	1633	0	0	1736	0	0	1760	0	0	1720	0
Flt Permitted		0.835			0.966			0.854			0.998	
Satd. Flow (perm)	0	1400	0	0	1689	0	0	1516	0	0	1716	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			9			3			35	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		372			520			518			595	
Travel Time (s)		8.5			11.8			8.8			10.1	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%	0%	1%	8%	0%	3%	1%
Adj. Flow (vph)	45	15	24	10	51	9	83	392	13	2	327	120
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	84	0	0	70	0	0	488	0	0	449	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	11.5	11.5		11.5	11.5		13.0	13.0		13.0	13.0	
Total Split (s)	30.5	30.5		30.5	30.5		52.0	52.0		52.0	52.0	
Total Split (%)	37.0%	37.0%		37.0%	37.0%		63.0%	63.0%		63.0%	63.0%	
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0		45.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.5	4.5		4.5	4.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Act Effct Green (s)		25.0			25.0			45.0			45.0	
Actuated g/C Ratio		0.30			0.30			0.55			0.55	
v/c Ratio		0.19			0.14			0.59			0.47	
Control Delay (s/veh)		17.3			19.6			16.1			12.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay (s/veh)		17.3			19.6			16.1			12.5	
LOS		B			B			B			B	
Approach Delay (s/veh)		17.3			19.6			16.1			12.5	
Approach LOS		B			B			B			B	

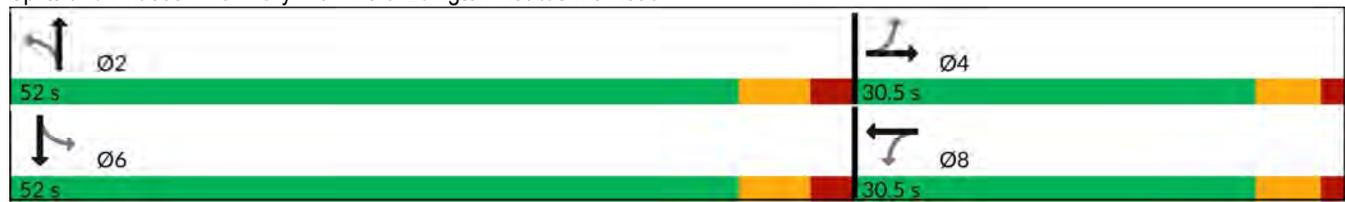
# Lanes, Volumes, Timings

## 3: Maryville Pike & Edington Road/Sims Road

### Intersection Summary

Area Type: Other  
 Cycle Length: 82.5  
 Actuated Cycle Length: 82.5  
 Natural Cycle: 40  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.59  
 Intersection Signal Delay (s/veh): 15.0      Intersection LOS: B  
 Intersection Capacity Utilization 74.4%      ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 3: Maryville Pike & Edington Road/Sims Road



Lanes, Volumes, Timings  
 3: Maryville Pike & Edgington Road/Sims Road

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	44	93	10	19	11	47	435	19	4	350	60
Future Volume (vph)	150	44	93	10	19	11	47	435	19	4	350	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	9	9	9	11	11	11	11	11	11
Grade (%)		7%			-8%			4%			1%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.956			0.963			0.995			0.980	
Flt Protected		0.975			0.987			0.995			0.999	
Satd. Flow (prot)	0	1652	0	0	1627	0	0	1752	0	0	1759	0
Flt Permitted		0.811			0.895			0.917			0.995	
Satd. Flow (perm)	0	1374	0	0	1475	0	0	1614	0	0	1752	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			13			4			16	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		372			520			518			595	
Travel Time (s)		8.5			11.8			8.8			10.1	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	6%	4%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	174	51	108	12	22	13	55	506	22	5	407	70
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	333	0	0	47	0	0	583	0	0	482	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	11.5	11.5		11.5	11.5		13.0	13.0		13.0	13.0	
Total Split (s)	30.5	30.5		30.5	30.5		52.0	52.0		52.0	52.0	
Total Split (%)	37.0%	37.0%		37.0%	37.0%		63.0%	63.0%		63.0%	63.0%	
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0		45.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.5	4.5		4.5	4.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Act Effct Green (s)		25.0			25.0			45.0			45.0	
Actuated g/C Ratio		0.30			0.30			0.55			0.55	
v/c Ratio		0.76			0.10			0.66			0.50	
Control Delay (s/veh)		37.0			17.0			17.8			13.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay (s/veh)		37.0			17.0			17.8			13.5	
LOS		D			B			B			B	
Approach Delay (s/veh)		37.0			17.0			17.8			13.5	
Approach LOS		D			B			B			B	

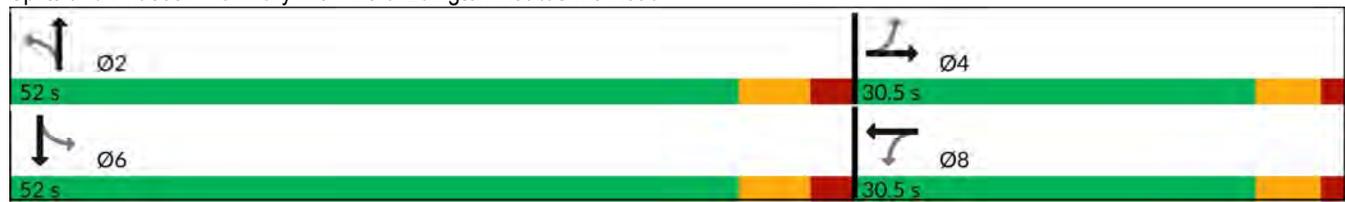
# Lanes, Volumes, Timings

## 3: Maryville Pike & Edington Road/Sims Road

### Intersection Summary

Area Type: Other  
 Cycle Length: 82.5  
 Actuated Cycle Length: 82.5  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.76  
 Intersection Signal Delay (s/veh): 20.8      Intersection LOS: C  
 Intersection Capacity Utilization 88.1%      ICU Level of Service E  
 Analysis Period (min) 15

Splits and Phases: 3: Maryville Pike & Edington Road/Sims Road



## **PROJECTED CONDITIONS WITH THE PROJECT**

Lanes, Volumes, Timings  
 3: Maryville Pike & Edgington Road/Sims Road

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	15	26	10	48	10	78	376	13	4	306	112
Future Volume (vph)	42	15	26	10	48	10	78	376	13	4	306	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	9	9	9	11	11	11	11	11	11
Grade (%)		7%			-8%			4%			1%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.958			0.980			0.996			0.964	
Flt Protected		0.975			0.993			0.992				
Satd. Flow (prot)	0	1631	0	0	1731	0	0	1760	0	0	1720	0
Flt Permitted		0.841			0.963			0.856			0.996	
Satd. Flow (perm)	0	1407	0	0	1678	0	0	1519	0	0	1713	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28			11			3			35	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		372			204			153			595	
Travel Time (s)		8.5			4.6			2.6			10.1	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%	0%	1%	8%	0%	3%	1%
Adj. Flow (vph)	45	16	28	11	52	11	84	404	14	4	329	120
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	89	0	0	74	0	0	502	0	0	453	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	11.5	11.5		11.5	11.5		13.0	13.0		13.0	13.0	
Total Split (s)	30.5	30.5		30.5	30.5		52.0	52.0		52.0	52.0	
Total Split (%)	37.0%	37.0%		37.0%	37.0%		63.0%	63.0%		63.0%	63.0%	
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0		45.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.5	4.5		4.5	4.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Act Effct Green (s)		25.0			25.0			45.0			45.0	
Actuated g/C Ratio		0.30			0.30			0.55			0.55	
v/c Ratio		0.20			0.14			0.61			0.48	
Control Delay (s/veh)		16.8			19.3			16.5			12.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay (s/veh)		16.8			19.3			16.5			12.6	
LOS		B			B			B			B	
Approach Delay (s/veh)		16.8			19.3			16.5			12.6	
Approach LOS		B			B			B			B	

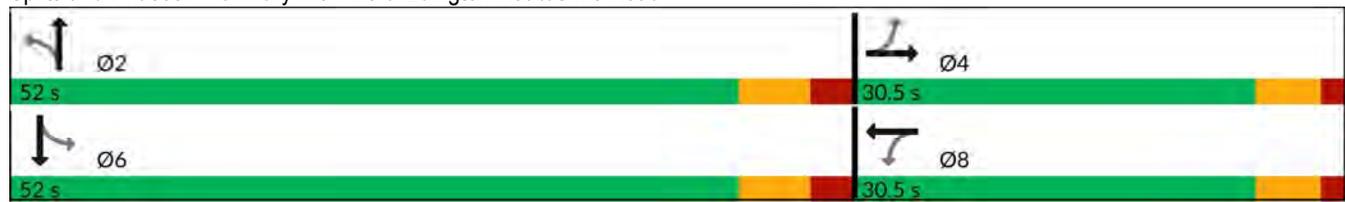
# Lanes, Volumes, Timings

## 3: Maryville Pike & Edington Road/Sims Road

### Intersection Summary

Area Type: Other  
 Cycle Length: 82.5  
 Actuated Cycle Length: 82.5  
 Natural Cycle: 45  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.61  
 Intersection Signal Delay (s/veh): 15.1      Intersection LOS: B  
 Intersection Capacity Utilization 75.7%      ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 3: Maryville Pike & Edington Road/Sims Road



HCM 7th TWSC  
 7: Proposed North Entrance & Sims Road

Intersection						
Int Delay, s/veh	2.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	24	8	17	53	15	10
Future Vol, veh/h	24	8	17	53	15	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	5	-	-	-5	5	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	27	9	19	59	17	11

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	36	0	128 31
Stage 1	-	-	-	-	31 -
Stage 2	-	-	-	-	97 -
Critical Hdwy	-	-	4.1	-	7.4 6.7
Critical Hdwy Stg 1	-	-	-	-	6.4 -
Critical Hdwy Stg 2	-	-	-	-	6.4 -
Follow-up Hdwy	-	-	2.2	-	3.5 3.3
Pot Cap-1 Maneuver	-	-	1589	-	841 1044
Stage 1	-	-	-	-	988 -
Stage 2	-	-	-	-	908 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1589	-	831 1044
Mov Cap-2 Maneuver	-	-	-	-	831 -
Stage 1	-	-	-	-	988 -
Stage 2	-	-	-	-	896 -

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	1.77	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	905	-	-	437	-
HCM Lane V/C Ratio	0.031	-	-	0.012	-
HCM Ctrl Dly (s/v)	9.1	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

HCM 7th TWSC  
 9: Maryville Pike & Proposed West Entrance

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	9	26	441	22	13	329
Future Vol, veh/h	9	26	441	22	13	329
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-1	-	1	-	-	-1
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	3
Mvmt Flow	10	29	490	24	14	366

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	897	502	0	0	514	0
Stage 1	502	-	-	-	-	-
Stage 2	394	-	-	-	-	-
Critical Hdwy	6.2	6.1	-	-	4.1	-
Critical Hdwy Stg 1	5.2	-	-	-	-	-
Critical Hdwy Stg 2	5.2	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	329	581	-	-	1061	-
Stage 1	629	-	-	-	-	-
Stage 2	701	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	323	581	-	-	1061	-
Mov Cap-2 Maneuver	323	-	-	-	-	-
Stage 1	629	-	-	-	-	-
Stage 2	689	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	12.8	0	0.32
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT	
Capacity (veh/h)	-	-	323	581	68	-
HCM Lane V/C Ratio	-	-	0.031	0.05	0.014	-
HCM Ctrl Dly (s/v)	-	-	16.5	11.5	8.4	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.2	0	-

Lanes, Volumes, Timings

3: Maryville Pike & Edgington Road/Sims Road

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	45	94	13	20	11	48	440	19	7	359	60
Future Volume (vph)	150	45	94	13	20	11	48	440	19	7	359	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	9	9	9	11	11	11	11	11	11
Grade (%)		7%			-8%			4%			1%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.956			0.966			0.995			0.981	
Flt Protected		0.975			0.986			0.995			0.999	
Satd. Flow (prot)	0	1652	0	0	1633	0	0	1752	0	0	1761	0
Flt Permitted		0.810			0.874			0.914			0.990	
Satd. Flow (perm)	0	1372	0	0	1448	0	0	1609	0	0	1745	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			13			4			16	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		372			204			153			595	
Travel Time (s)		8.5			4.6			2.6			10.1	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	6%	4%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	174	52	109	15	23	13	56	512	22	8	417	70
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	335	0	0	51	0	0	590	0	0	495	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	11.5	11.5		11.5	11.5		13.0	13.0		13.0	13.0	
Total Split (s)	30.5	30.5		30.5	30.5		52.0	52.0		52.0	52.0	
Total Split (%)	37.0%	37.0%		37.0%	37.0%		63.0%	63.0%		63.0%	63.0%	
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0		45.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.5	4.5		4.5	4.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Act Effct Green (s)		25.0			25.0			45.0			45.0	
Actuated g/C Ratio		0.30			0.30			0.55			0.55	
v/c Ratio		0.77			0.11			0.67			0.52	
Control Delay (s/veh)		37.5			17.5			18.1			13.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay (s/veh)		37.5			17.5			18.1			13.8	
LOS		D			B			B			B	
Approach Delay (s/veh)		37.5			17.5			18.1			13.8	
Approach LOS		D			B			B			B	

# Lanes, Volumes, Timings

## 3: Maryville Pike & Edington Road/Sims Road

### Intersection Summary

Area Type: Other  
 Cycle Length: 82.5  
 Actuated Cycle Length: 82.5  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.77  
 Intersection Signal Delay (s/veh): 21.1      Intersection LOS: C  
 Intersection Capacity Utilization 85.6%      ICU Level of Service E  
 Analysis Period (min) 15

Splits and Phases: 3: Maryville Pike & Edington Road/Sims Road



HCM 7th TWSC  
 7: Proposed North Entrance & Sims Road

Intersection						
Int Delay, s/veh	1.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	60	11	9	37	7	13
Future Vol, veh/h	60	11	9	37	7	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	5	-	-	-5	5	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	6	0	0
Mvmt Flow	67	12	10	41	8	14

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	79	0	134 73
Stage 1	-	-	-	-	73 -
Stage 2	-	-	-	-	61 -
Critical Hdwy	-	-	4.1	-	7.4 6.7
Critical Hdwy Stg 1	-	-	-	-	6.4 -
Critical Hdwy Stg 2	-	-	-	-	6.4 -
Follow-up Hdwy	-	-	2.2	-	3.5 3.3
Pot Cap-1 Maneuver	-	-	1532	-	833 985
Stage 1	-	-	-	-	936 -
Stage 2	-	-	-	-	950 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1532	-	827 985
Mov Cap-2 Maneuver	-	-	-	-	827 -
Stage 1	-	-	-	-	936 -
Stage 2	-	-	-	-	944 -

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	1.44	8.99
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	923	-	-	352	-
HCM Lane V/C Ratio	0.024	-	-	0.007	-
HCM Ctrl Dly (s/v)	9	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

HCM 7th TWSC  
 9: Maryville Pike & Proposed West Entrance

Intersection						
Int Delay, s/veh	1.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	16	491	15	31	435
Future Vol, veh/h	30	16	491	15	31	435
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-1	-	1	-	-	-1
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	2	0	0	2
Mvmt Flow	33	18	546	17	34	483

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1106	554	0	0	562	0
Stage 1	554	-	-	-	-	-
Stage 2	552	-	-	-	-	-
Critical Hdwy	6.2	6.1	-	-	4.1	-
Critical Hdwy Stg 1	5.2	-	-	-	-	-
Critical Hdwy Stg 2	5.2	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	250	544	-	-	1019	-
Stage 1	598	-	-	-	-	-
Stage 2	599	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	238	544	-	-	1019	-
Mov Cap-2 Maneuver	238	-	-	-	-	-
Stage 1	598	-	-	-	-	-
Stage 2	571	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	18.82	0	0.58
HCM LOS	C		

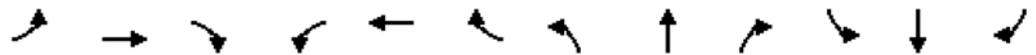
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	238	544	120	-
HCM Lane V/C Ratio	-	-	0.14	0.033	0.034	-
HCM Ctrl Dly (s/v)	-	-	22.5	11.8	8.7	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	0.1	-

**PROJECTED CONDITIONS WITH THE PROJECT –  
RIRO ALTERNATIVE**

Lanes, Volumes, Timings

3: Maryville Pike & Edington Road/Sims Road

RIRO ALT



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	42	20	21	19	48	10	78	376	13	13	298	112
Future Volume (vph)	42	20	21	19	48	10	78	376	13	13	298	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	9	9	9	11	11	11	11	11	11
Grade (%)		7%			-8%			4%			1%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.965			0.982			0.996			0.964	
Flt Protected		0.976			0.988			0.992			0.998	
Satd. Flow (prot)	0	1645	0	0	1725	0	0	1760	0	0	1717	0
Flt Permitted		0.839			0.931			0.856			0.981	
Satd. Flow (perm)	0	1414	0	0	1626	0	0	1519	0	0	1688	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			10			3			34	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		372			204			153			595	
Travel Time (s)		8.5			4.6			2.6			10.1	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%	0%	1%	8%	0%	3%	1%
Adj. Flow (vph)	45	22	23	20	52	11	84	404	14	14	320	120
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	90	0	0	83	0	0	502	0	0	454	0
Turn Type	Perm	NA										
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	11.5	11.5		11.5	11.5		13.0	13.0		13.0	13.0	
Total Split (s)	30.5	30.5		30.5	30.5		52.0	52.0		52.0	52.0	
Total Split (%)	37.0%	37.0%		37.0%	37.0%		63.0%	63.0%		63.0%	63.0%	
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0		45.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.5	4.5		4.5	4.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	Max	Max										
Act Effct Green (s)		25.0			25.0			45.0			45.0	
Actuated g/C Ratio		0.30			0.30			0.55			0.55	
v/c Ratio		0.20			0.17			0.61			0.49	
Control Delay (s/veh)		18.2			19.8			16.5			12.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay (s/veh)		18.2			19.8			16.5			12.8	
LOS		B			B			B			B	
Approach Delay (s/veh)		18.2			19.8			16.5			12.8	
Approach LOS		B			B			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 82.5

Actuated Cycle Length: 82.5

Natural Cycle: 45

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay (s/veh): 15.4

Intersection LOS: B

Intersection Capacity Utilization 73.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 3: Maryville Pike & Edington Road/Sims Road



Intersection						
Int Delay, s/veh	3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	24	21	17	53	24	10
Future Vol, veh/h	24	21	17	53	24	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	5	-	-	-5	5	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	27	23	19	59	27	11

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	50	0	135 38
Stage 1	-	-	-	-	38 -
Stage 2	-	-	-	-	97 -
Critical Hdwy	-	-	4.1	-	7.4 6.7
Critical Hdwy Stg 1	-	-	-	-	6.4 -
Critical Hdwy Stg 2	-	-	-	-	6.4 -
Follow-up Hdwy	-	-	2.2	-	3.5 3.3
Pot Cap-1 Maneuver	-	-	1570	-	832 1034
Stage 1	-	-	-	-	979 -
Stage 2	-	-	-	-	908 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1570	-	821 1034
Mov Cap-2 Maneuver	-	-	-	-	821 -
Stage 1	-	-	-	-	979 -
Stage 2	-	-	-	-	896 -

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	1.78	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	874	-	-	437	-
HCM Lane V/C Ratio	0.043	-	-	0.012	-
HCM Ctrl Dly (s/v)	9.3	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↖			↑
Traffic Vol, veh/h	0	26	441	22	0	338
Future Vol, veh/h	0	26	441	22	0	338
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-1	-	1	-	-	-1
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	3
Mvmt Flow	0	29	490	24	0	376

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	-	502	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	581	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	-	581	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

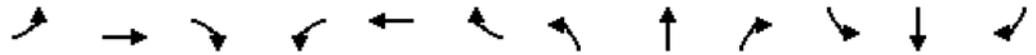
Approach	WB	NB	SB
HCM Ctrl Dly, s/v	11.52	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	581
HCM Lane V/C Ratio	-	-	0.05
HCM Ctrl Dly (s/v)	-	-	11.5
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.2

Lanes, Volumes, Timings

3: Maryville Pike & Edington Road/Sims Road

RIRO ALT



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	150	47	92	37	20	11	48	440	19	31	336	60
Future Volume (vph)	150	47	92	37	20	11	48	440	19	31	336	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	9	9	9	11	11	11	11	11	11
Grade (%)		7%			-8%			4%				1%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.957			0.978			0.995			0.981	
Flt Protected		0.975			0.974			0.995			0.996	
Satd. Flow (prot)	0	1654	0	0	1654	0	0	1752	0	0	1758	0
Flt Permitted		0.796			0.746			0.914			0.932	
Satd. Flow (perm)	0	1350	0	0	1267	0	0	1609	0	0	1645	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29			12			4			16	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		372			204			153			595	
Travel Time (s)		8.5			4.6			2.6			10.1	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	6%	4%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	174	55	107	43	23	13	56	512	22	36	391	70
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	336	0	0	79	0	0	590	0	0	497	0
Turn Type	Perm	NA										
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	11.5	11.5		11.5	11.5		13.0	13.0		13.0	13.0	
Total Split (s)	30.5	30.5		30.5	30.5		52.0	52.0		52.0	52.0	
Total Split (%)	37.0%	37.0%		37.0%	37.0%		63.0%	63.0%		63.0%	63.0%	
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0		45.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.5	4.5		4.5	4.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	Max	Max										
Act Effct Green (s)		25.0			25.0			45.0			45.0	
Actuated g/C Ratio		0.30			0.30			0.55			0.55	
v/c Ratio		0.78			0.20			0.67			0.55	
Control Delay (s/veh)		38.9			20.1			18.1			14.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay (s/veh)		38.9			20.1			18.1			14.6	
LOS		D			C			B			B	
Approach Delay (s/veh)		38.9			20.1			18.1			14.6	
Approach LOS		D			C			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 82.5

Actuated Cycle Length: 82.5

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay (s/veh): 21.7

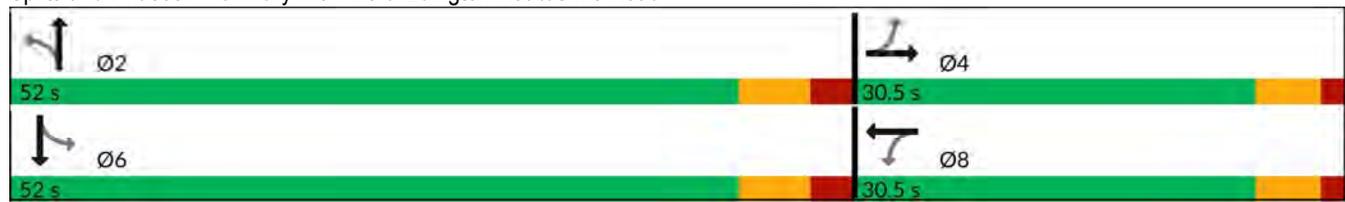
Intersection LOS: C

Intersection Capacity Utilization 68.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 3: Maryville Pike & Edington Road/Sims Road



Intersection						
Int Delay, s/veh	2.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	64	32	11	35	33	9
Future Vol, veh/h	64	32	11	35	33	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	5	-	-	-5	5	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	6	0	0
Mvmt Flow	71	36	12	39	37	10

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	107	0	152
Stage 1	-	-	-	-	89
Stage 2	-	-	-	-	63
Critical Hdwy	-	-	4.1	-	7.4
Critical Hdwy Stg 1	-	-	-	-	6.4
Critical Hdwy Stg 2	-	-	-	-	6.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	1497	-	809
Stage 1	-	-	-	-	917
Stage 2	-	-	-	-	948
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1497	-	802
Mov Cap-2 Maneuver	-	-	-	-	802
Stage 1	-	-	-	-	917
Stage 2	-	-	-	-	940

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	1.78	9.58
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	832	-	-	430	-
HCM Lane V/C Ratio	0.056	-	-	0.008	-
HCM Ctrl Dly (s/v)	9.6	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↖			↑
Traffic Vol, veh/h	0	15	492	14	0	465
Future Vol, veh/h	0	15	492	14	0	465
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-1	-	1	-	-	-1
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	2	0	0	2
Mvmt Flow	0	17	547	16	0	517

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	-	554	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.1	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	544	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	-	544	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	11.83	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	544
HCM Lane V/C Ratio	-	-	0.031
HCM Ctrl Dly (s/v)	-	-	11.8
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.1

**PROJECTED CONDITIONS WITH THE PROJECT –  
RIRO ALTERNATIVE & LEADING NB LEFT TURN**

Lanes, Volumes, Timings  
3: Maryville Pike & Edington Road/Sims Road

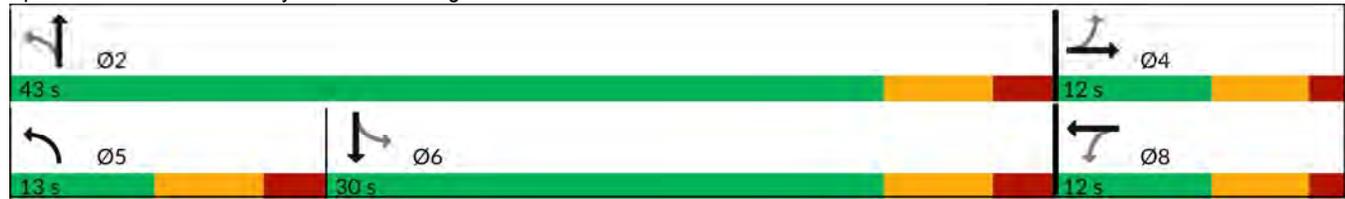
Timing Plan: Leading NB Left Turn  
RIRO ALT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	20	21	19	48	10	78	376	13	13	298	112
Future Volume (vph)	42	20	21	19	48	10	78	376	13	13	298	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	9	9	9	11	11	11	11	11	11
Grade (%)		7%			-8%			4%			1%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.965			0.982			0.996			0.964	
Flt Protected		0.976			0.988			0.992			0.998	
Satd. Flow (prot)	0	1645	0	0	1725	0	0	1760	0	0	1717	0
Flt Permitted		0.799			0.891			0.852			0.977	
Satd. Flow (perm)	0	1346	0	0	1556	0	0	1512	0	0	1681	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			11			5			40	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		372			204			153			595	
Travel Time (s)		8.5			4.6			2.6			10.1	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%	0%	1%	8%	0%	3%	1%
Adj. Flow (vph)	45	22	23	20	52	11	84	404	14	14	320	120
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	90	0	0	83	0	0	502	0	0	454	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	11.5	11.5		11.5	11.5		13.0	13.0		13.0	13.0	
Total Split (s)	12.0	12.0		12.0	12.0		13.0	43.0		30.0	30.0	
Total Split (%)	21.8%	21.8%		21.8%	21.8%		23.6%	78.2%		54.5%	54.5%	
Maximum Green (s)	6.5	6.5		6.5	6.5		6.0	36.0		23.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.5	4.5		4.5	4.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			7.0			7.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Act Effct Green (s)		6.5			6.5			36.0			23.0	
Actuated g/C Ratio		0.12			0.12			0.65			0.42	
v/c Ratio		0.50			0.43			0.49			0.63	
Control Delay (s/veh)		29.2			27.7			6.6			16.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay (s/veh)		29.2			27.7			6.6			16.1	
LOS		C			C			A			B	
Approach Delay (s/veh)		29.2			27.7			6.6			16.1	
Approach LOS		C			C			A			B	

Intersection Summary

Area Type:	Other
Cycle Length:	55
Actuated Cycle Length:	55
Natural Cycle:	55
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.63
Intersection Signal Delay (s/veh):	13.8
Intersection LOS:	B
Intersection Capacity Utilization:	73.2%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 3: Maryville Pike & Edington Road/Sims Road



Lanes, Volumes, Timings  
3: Maryville Pike & Edington Road/Sims Road

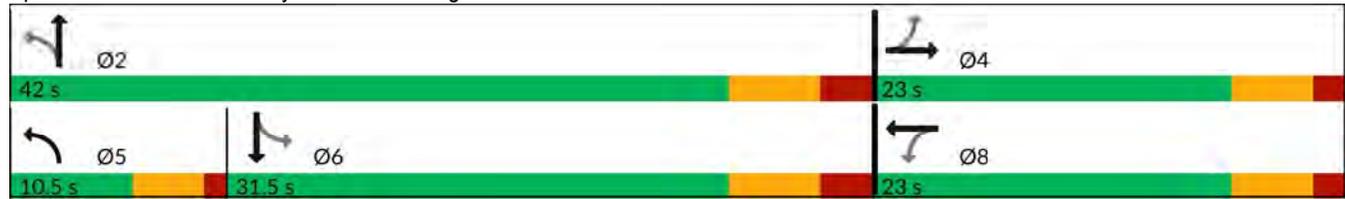
Timing Plan: Leading NB Left Turn  
RIRO ALT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	47	92	37	20	11	48	440	19	31	336	60
Future Volume (vph)	150	47	92	37	20	11	48	440	19	31	336	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	9	9	9	11	11	11	11	11	11
Grade (%)		7%			-8%			4%			1%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.957			0.978			0.995			0.981	
Flt Protected		0.975			0.974			0.995			0.996	
Satd. Flow (prot)	0	1654	0	0	1654	0	0	1752	0	0	1758	0
Flt Permitted		0.796			0.738			0.914			0.924	
Satd. Flow (perm)	0	1350	0	0	1253	0	0	1609	0	0	1631	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			13			5			15	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		372			204			153			595	
Travel Time (s)		8.5			4.6			2.6			10.1	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	6%	4%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	174	55	107	43	23	13	56	512	22	36	391	70
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	336	0	0	79	0	0	590	0	0	497	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	11.5	11.5		11.5	11.5		10.5	13.0		13.0	13.0	
Total Split (s)	23.0	23.0		23.0	23.0		10.5	42.0		31.5	31.5	
Total Split (%)	35.4%	35.4%		35.4%	35.4%		16.2%	64.6%		48.5%	48.5%	
Maximum Green (s)	17.5	17.5		17.5	17.5		6.0	35.0		24.5	24.5	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.5	4.5		4.5	4.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.0	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			7.0			7.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max	
Act Effct Green (s)		17.5			17.5			35.0			24.5	
Actuated g/C Ratio		0.27			0.27			0.54			0.38	
v/c Ratio		0.86			0.23			0.67			0.80	
Control Delay (s/veh)		45.0			18.1			15.5			29.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay (s/veh)		45.0			18.1			15.5			29.4	
LOS		D			B			B			C	
Approach Delay (s/veh)		45.0			18.1			15.5			29.4	
Approach LOS		D			B			B			C	

Intersection Summary

Area Type:	Other
Cycle Length:	65
Actuated Cycle Length:	65
Natural Cycle:	65
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.86
Intersection Signal Delay (s/veh):	26.8
Intersection LOS:	C
Intersection Capacity Utilization:	68.1%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 3: Maryville Pike & Edington Road/Sims Road



<b>Intersection Name: Maryville Pike &amp; Sims Road</b>					<b>Initials:</b>		<b>Date:</b>				
<b>Basic Timing (seconds)</b>		<b>Phase 1</b>	<b>Phase 2</b>	<b>Phase 3</b>	<b>Phase 4</b>	<b>Phase 5</b>	<b>Phase 6</b>	<b>Phase 7</b>	<b>Phase 8</b>		
<b>Min Green</b>			6		6						
<b>Gap / Extension</b>			2		2						
<b>Max 1</b>			45		25						
<b>Max 2</b>			50		30						
<b>Yellow Clearance</b>			4.5		4.0						
<b>Red Clearance</b>			2.5		1.5						
<b>Walk</b>											
<b>Pedestrian Clearance</b>											
<b>Max Recall</b>			X		X						
<b>Active (Enable) Phases</b>			X		X						
<b>Flashing Yellow Arrow</b>											
<b>Overlaps (1-4)</b>											
<b>Coordination Timing/(seconds)</b>											
<b>Split #</b>	<b>Coord. Phase</b>	<b>Phase 1</b>	<b>Phase 2</b>	<b>Phase 3</b>	<b>Phase 4</b>	<b>Phase 5</b>	<b>Phase 6</b>	<b>Phase 7</b>	<b>Phase 8</b>		
<b>Split 1</b>											
<b>Split 2</b>											
<b>Split 3</b>											
<b>Split 4</b>											
<b>Split 5</b>											
<b>Split 6</b>											
<b>Pattern Table</b>					<b>Lead</b>	<b>Lag</b>	<b>Fixed / Floating</b>				
<b>Pattern#</b>	<b>Cycle</b>	<b>Offset</b>	<b>Split</b>	<b>Seq. #</b>	<b>Phase #</b>		<b>Reference Point</b>				
							<b>Beginning of (Green/Yellow)</b>				
<b>1</b>							<b>Intersection ID#</b>				
<b>2</b>							<b>I/P Address</b>				
<b>3</b>							<b>Hub Address</b>				
<b>4</b>							<b>Radio Address</b>				
<b>5</b>							<b>Comm. Type</b>				
<b>6</b>							<b>Detection</b>				
<b>Day Plan Events</b>											
<b>Day Plan</b>	<b>HH:MM</b>		<b>Pattern</b>		<b>Day Plan</b>	<b>HH:MM</b>		<b>Pattern</b>			
<b>Year Plan Scheduler</b>											
<b>Plan</b>	<b>Month of Year: 01 - 12</b>				<b>Day of Month: 01 - 31</b>				<b>Plan</b>		
<b>Sequence</b>											
<b>1</b>			<b>2</b>			<b>3</b>			<b>4</b>		
Ring 1: 1-2 3-4			Ring 1: 1-2 3-4			Ring 1: 2-1 3-4			Ring 1: 2-1 3-4		
Ring 2: 5-6 7-8			Ring 2: 6-5 7-8			Ring 2: 5-6 7-8			Ring 2: 6-5 7-8		
<b>Notes:</b>											

**APPENDIX F**

**ITE TRIP GENERATION DATA**

# Land Use: 945

## Convenience Store/Gas Station

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### Description

A convenience store/gas station is a facility with a co-located convenience store and gas station. The convenience store sells groceries and other everyday items that a person may need or want as a matter of convenience. The gas station sells automotive fuels such as gasoline and diesel. The sites in this land use include both self-pump and attendant-pumped fueling positions and both pre-pay and post-pay operations.

A convenience store/gas station is typically located along a major thoroughfare to optimize motorist convenience. Extended hours of operation (with many open 24 hours, 7 days a week) are common at these facilities.

The convenience store product mix typically includes pre-packaged grocery items, beverages, dairy products, snack foods, confectionary, tobacco products, over-the-counter drugs, and toiletries. A convenience store may sell alcohol, often limited to beer and wine. Coffee and premade sandwiches are also commonly sold at a convenience store. Made-to-order food orders are sometimes offered. Some stores offer limited seating.

Convenience store (Land Use 851) is a related use.

### Land Use Subcategory

Multiple subcategories were added to this land use to allow for multi-variable evaluation of sites with single-variable data plots. All study sites are assigned to one of four subcategories, based on the number of vehicle fueling positions (VFP) at the site: (1) between 2 and 8 VFP, (2) between 9 and 15 VFP, (3) between 16 and 24 VFP, and (4) more than 24 VFP. For each VFP range subcategory, data plots are presented with GFA as the independent variable for all time periods and trip types for which data are available. The use of both GFA and VFP (as the independent variable and land use subcategory, respectively) provides a significant improvement in the reliability of a trip generation estimate when compared to the single-variable data plots in prior editions of *Trip Generation Manual*.

Further, the study sites were also assigned to one of four other subcategories, based on the gross floor area (GFA) of the convenience store at the site: (1) between 2,000 and 4,000 square feet, (2) between 4,000 and 5,500 square feet, (3) between 5,500 and 10,000 square feet, and (4) greater than 10,000 square feet. For each GFA subcategory range, data plots are presented with VFP as the independent variable for all time periods and trip types for which data are available. The use of both VFP and GFA (as the independent variable and land use subcategory, respectively) provides a significant improvement in the reliability of a trip generation estimate when compared to the single-variable data plots in prior editions of *Trip Generation Manual*.

When analyzing the convenience store/gas station land use with each combination of GFA and VFP values as described above, the two sets of data plots will produce two estimates of site generated trips. Both values can be considered when determining a site trip generation estimate.

Data plots are also provided for three additional independent variables: AM peak hour traffic on adjacent street, PM peak hour traffic on adjacent street, and employees. These independent variables are intended to be analyzed as single independent variables and do not have subcategories associated with them. Within the data plots and within the ITETripGen web app, these plots are found under the land use subcategory "none."

## **Additional Data**

The sites were surveyed in the 1990s, the 2000s, the 2010s, and the 2020s in Arizona, Arkansas, California, Delaware, Florida, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, Nevada, New Hampshire, New Jersey, Ohio, Pennsylvania, South Dakota, Texas, Utah, Vermont, Washington, and Wisconsin.

## **Source Numbers**

340, 350, 355, 359, 385, 617, 718, 810, 813, 844, 850, 853, 864, 865, 867, 869, 882, 883, 888, 904, 926, 927, 936, 938, 954, 960, 962, 1004, 1024, 1025, 1027, 1052, 1219, 1224, 1227, 1238, 1267

# Convenience Store/Gas Station - GFA (4-5.5k) (945)

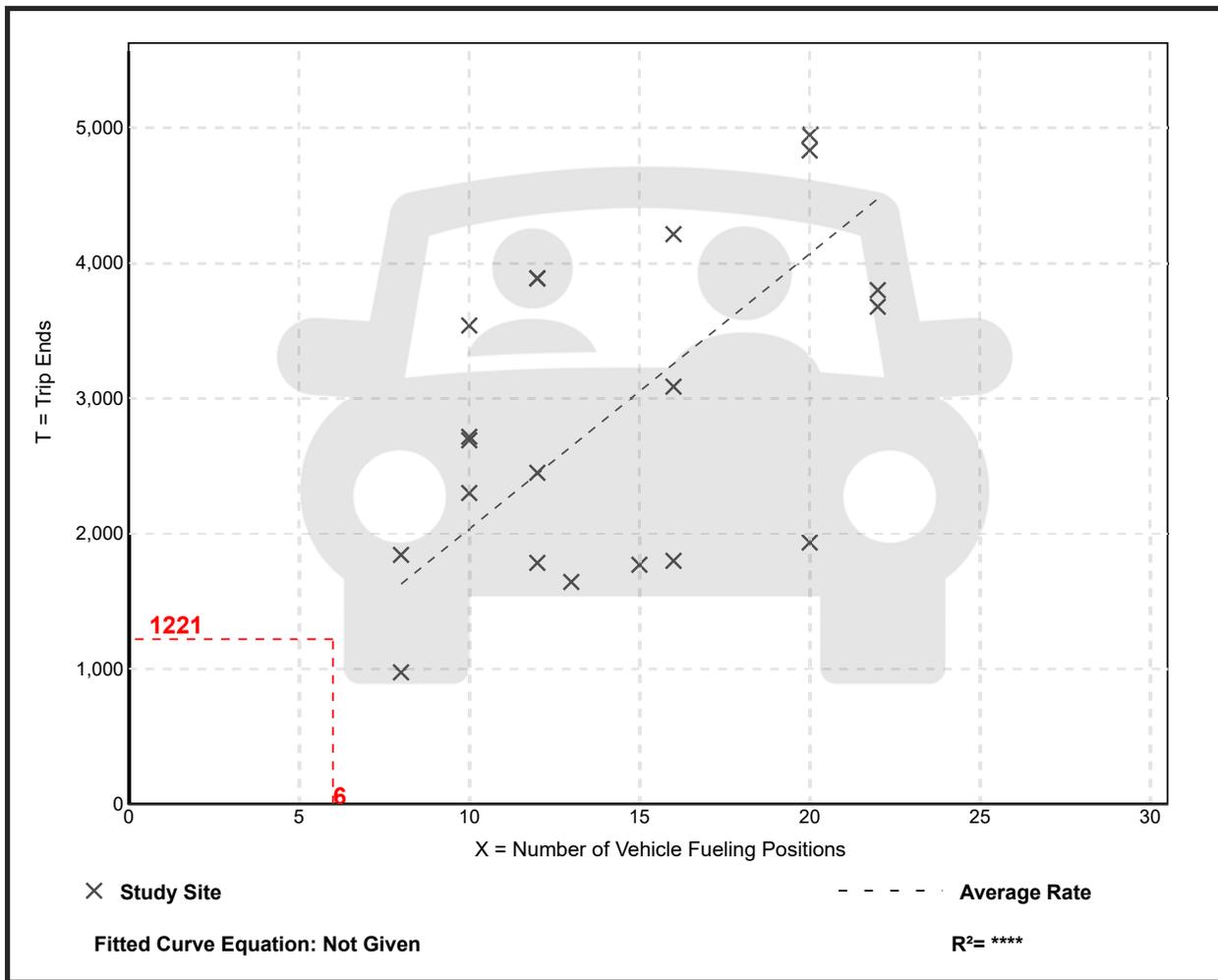
**Vehicle Trip Ends vs: Vehicle Fueling Positions**  
**On a: Weekday**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 20  
 Avg. Num. of Vehicle Fueling Positions: 14  
 Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
203.49	96.75 - 354.00	74.34

## Data Plot and Equation



# Convenience Store/Gas Station - GFA (4-5.5k) (945)

**Vehicle Trip Ends vs: Vehicle Fueling Positions**

**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: 35

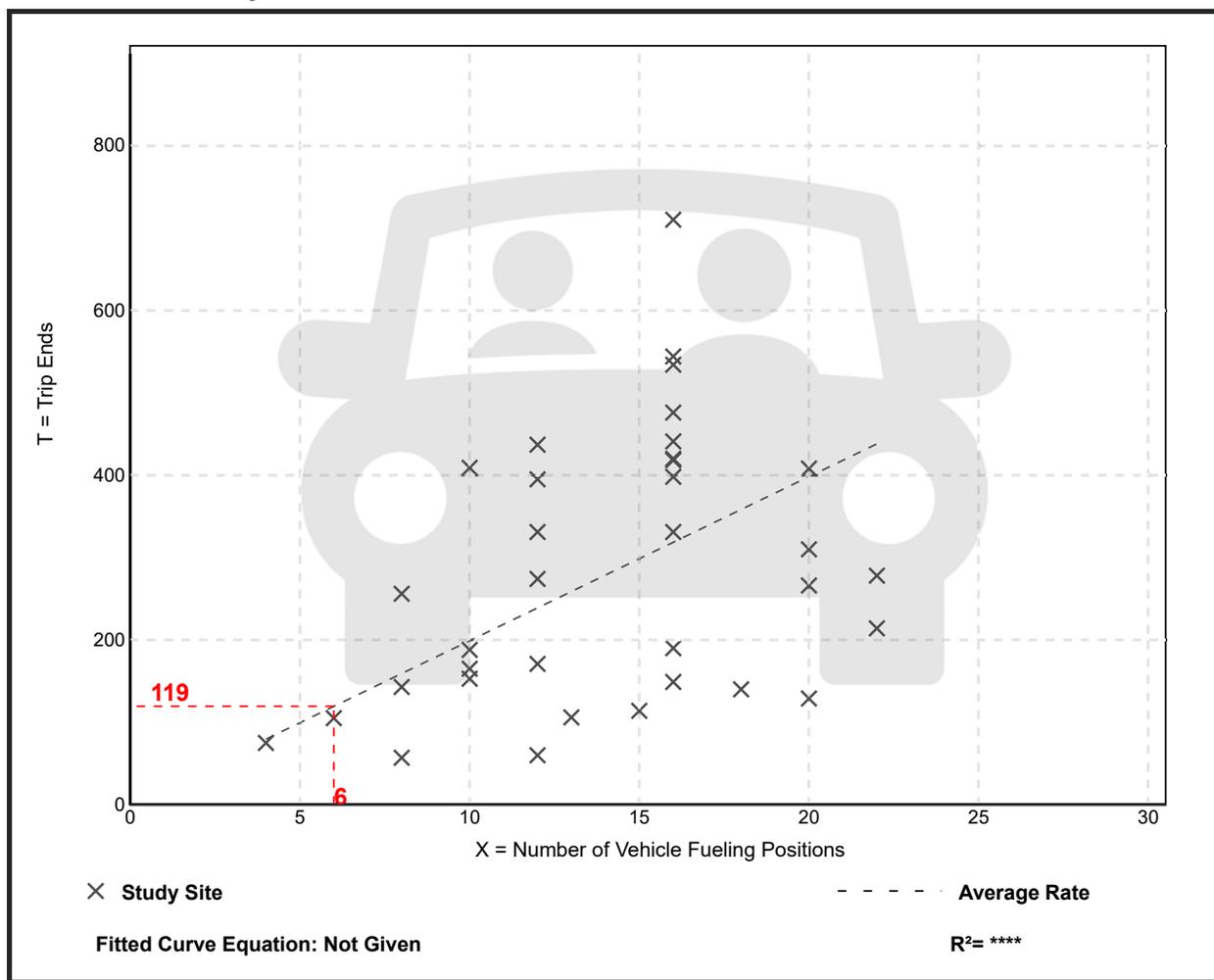
Avg. Num. of Vehicle Fueling Positions: 14

Directional Distribution: 51% entering, 49% exiting

## Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
19.91	5.00 - 44.38	10.64

## Data Plot and Equation



# Convenience Store/Gas Station - GFA (4-5.5k) (945)

**Vehicle Trip Ends vs: Vehicle Fueling Positions**

**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: 40

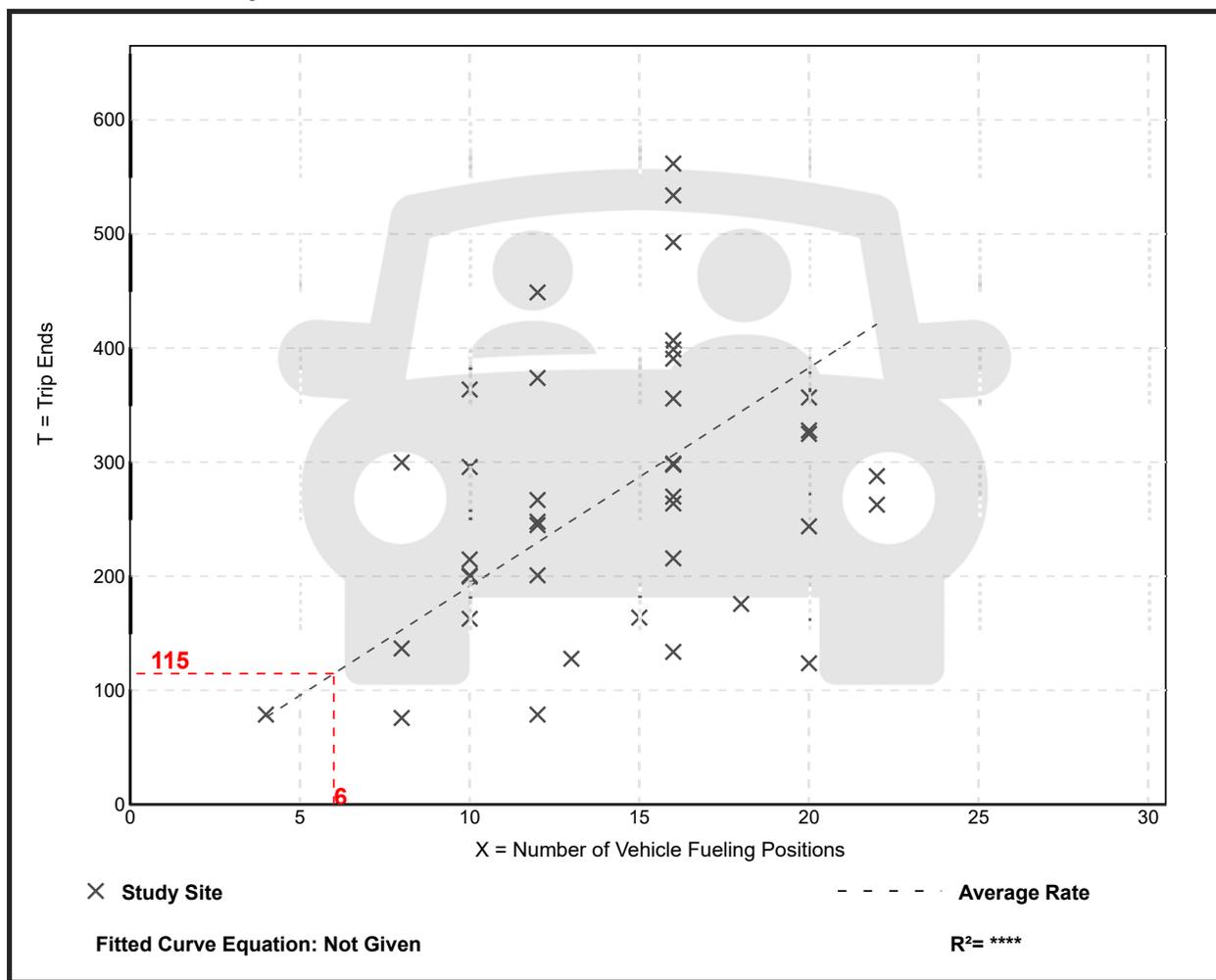
Avg. Num. of Vehicle Fueling Positions: 14

Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
19.15	6.20 - 37.50	8.46

## Data Plot and Equation



**Vehicle Pass-By Rates by Land Use**

Source: ITE Trip Generation Manual , 12th Edition

Land Use Code	945										
Land Use	Convenience Store/Gas Station										
Setting	General Urban/Suburban										
Time Period	Weekday AM Peak Period										
# Data Sites	16 Sites with between 2 and 8 VFP					28 Sites with between 9 and 20 VFP					
Average Pass-By Rate	60% for Sites with between 2 and 8 VFP					76% for Sites with between 9 and 20 VFP					
Pass-By Characteristics for Individual Sites											
GFA (000)	VFP	State or Province	Survey Year	# Interviews	Pass-By Trip (%)	Non-Pass-By Trips			Adj Street Peak Hour Volume	Source	
						Primary (%)	Diverted (%)	Total (%)			
2	8	Maryland	1992	46	87	13	0	13	2235	25	
2.1	6	Maryland	1992	26	58	23	19	42	2080	25	
2.1	6	Maryland	1992	26	58	23	19	42	2080	25	
2.2	8	Maryland	1992	31	47	34	19	53	1785	25	
2.2	< 8	Indiana	1993	79	56	6	38	44	635	2	
2.2	8	Maryland	1992	35	78	9	13	22	7080	25	
2.3	6	Maryland	1992	37	32	41	27	68	2080	25	
2.3	< 8	Kentucky	1993	58	64	5	31	36	1255	2	
2.3	6	Maryland	1992	37	32	41	27	68	2080	25	
2.4	< 8	Kentucky	1993	—	48	17	35	52	1210	2	
2.6	< 8	Kentucky	1993	—	72	15	13	28	940	2	
2.8	< 8	Kentucky	1993	—	54	11	35	46	1240	2	
3	< 8	Indiana	1993	62	74	10	16	26	790	2	
3.6	< 8	Kentucky	1993	49	67	4	29	33	1985	2	
3.7	< 8	Kentucky	1993	49	66	16	18	34	990	2	
4.694	12	Maryland	2000	—	72	—	—	28	2440	30	
4.694	12	Maryland	2000	—	78	—	—	22	1561	30	
4.694	12	Maryland	2000	—	79	—	—	21	2764	30	
4.848	12	Virginia	2000	—	55	—	—	45	1398	30	
5.06	12	Pennsylvania	2000	—	84	—	—	16	3219	30	
5.242	12	Virginia	2000	—	74	—	—	26	1160	30	
5.242	12	Virginia	2000	—	71	—	—	29	548	30	
5.488	12	Delaware	2000	—	80	—	—	20	—	30	
5.5	12	Pennsylvania	2000	—	85	—	—	15	2975	30	
4.2	< 8	Kentucky	1993	47	62	19	19	38	1705	2	
4.694	16	Maryland	2000	—	90	—	—	10	2278	30	
4.694	16	Delaware	2000	—	74	—	—	26	2185	30	
4.694	16	Delaware	2000	—	58	—	—	42	962	30	
4.694	16	Delaware	2000	—	84	—	—	16	2956	30	
4.694	16	New Jersey	2000	—	79	—	—	21	1859	30	
4.694	20	Delaware	2000	—	84	—	—	16	3864	30	
4.848	16	Virginia	2000	—	68	—	—	32	2106	30	
4.848	16	Virginia	2000	—	85	—	—	15	2676	30	
4.848	16	Virginia	2000	—	75	—	—	25	3244	30	
4.848	16	Virginia	2000	—	71	—	—	29	1663	30	
4.993	16	Pennsylvania	2000	—	75	—	—	25	1991	30	
5.094	16	New Jersey	2000	—	86	—	—	14	1260	30	
5.5	16	Pennsylvania	2000	—	82	—	—	18	1570	30	
5.543	16	Pennsylvania	2000	—	84	—	—	16	1933	30	
5.565	16	Pennsylvania	2000	—	77	—	—	23	2262	30	
5.565	16	Pennsylvania	2000	—	68	—	—	32	2854	30	
5.565	16	New Jersey	2000	—	58	—	—	42	1253	30	
5.565	16	New Jersey	2000	—	79	—	—	21	1928	30	
5.565	16	New Jersey	2000	---	84	---	---	16	1953	30	

**Vehicle Pass-By Rates by Land Use**

Source: ITE Trip Generation Manual, 12th Edition

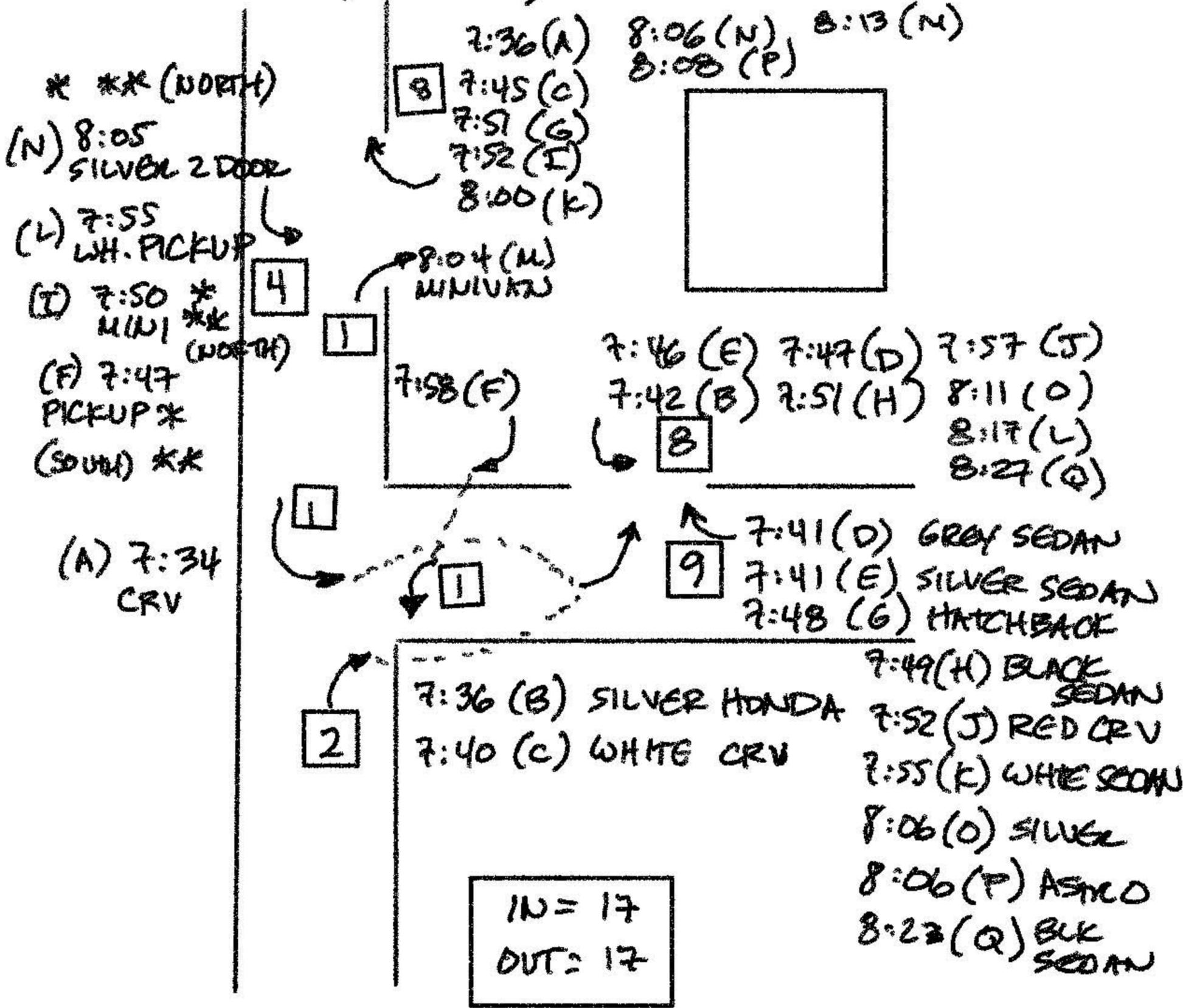
Land Use Code	945									
Land Use	Convenience Store/Gas Station									
Setting	General Urban/Suburban									
Time Period	Weekday PM Peak Period									
# Data Sites	12 Sites with between 2 and 8 VFP					28 Sites with between 9 and 20 VFP				
Average Pass-By Rate	56% for Sites with between 2 and 8 VFP					75% for Sites with between 9 and 20 VFP				
Pass-By Characteristics for Individual Sites										
GFA (000)	VFP	State or Province	Survey Year	# Interviews	Pass-By Trip (%)	Non-Pass-By Trips			Adj Street Peak Hour Volume	Source
						Primary (%)	Diverted (%)	Total (%)		
2.1	8	Maryland	1992	31	52	13	35	48	1785	25
2.1	6	Maryland	1992	30	53	20	27	47	1060	25
2.2	< 8	Indiana	1993	115	48	16	36	52	820	2
2.3	< 8	Kentucky	1993	67	57	16	27	43	1954	2
2.3	6	Maryland	1992	55	40	11	49	60	2760	25
2.4	< 8	Kentucky	1993	—	58	13	29	42	2655	2
2.6	< 8	Kentucky	1993	68	67	15	18	33	950	2
2.8	< 8	Kentucky	1993	—	62	11	27	38	2875	2
3	< 8	Indiana	1993	80	65	15	20	35	1165	2
3.6	< 8	Kentucky	1993	60	56	17	27	44	2505	2
3.7	< 8	Kentucky	1993	70	61	16	23	39	2175	2
4.2	< 8	Kentucky	1993	61	58	26	16	42	2300	2
4.694	12	Maryland	2000	—	78	—	—	22	3549	30
4.694	12	Maryland	2000	—	67	—	—	33	2272	30
4.694	12	Maryland	2000	—	66	—	—	34	3514	30
4.848	12	Virginia	2000	—	71	—	—	29	2350	30
5.06	12	Pennsylvania	2000	—	91	—	—	9	4181	30
5.242	12	Virginia	2000	—	70	—	—	30	2445	30
5.242	12	Virginia	2000	—	56	—	—	44	950	30
5.488	12	Delaware	2000	—	73	—	—	27	—	30
5.5	12	Pennsylvania	2000	—	84	—	—	16	4025	30
4.694	16	Maryland	2000	—	89	—	—	11	2755	30
4.694	16	Delaware	2000	—	73	—	—	27	1858	30
4.694	16	Delaware	2000	—	59	—	—	41	1344	30
4.694	16	Delaware	2000	—	72	—	—	28	3434	30
4.694	16	New Jersey	2000	—	81	—	—	19	1734	30
4.694	20	Delaware	2000	—	76	—	—	24	1616	30
4.848	16	Virginia	2000	—	67	—	—	33	2,954	30
4.848	16	Virginia	2000	—	78	—	—	22	3086	30
4.848	16	Virginia	2000	—	83	—	—	17	4143	30
4.848	16	Virginia	2000	—	73	—	—	27	2534	30
4.993	16	Pennsylvania	2000	—	72	—	—	28	2917	30
5.094	16	New Jersey	2000	—	86	—	—	14	1730	30
5.5	16	Pennsylvania	2000	—	90	—	—	10	2616	30
5.543	16	Pennsylvania	2000	—	87	—	—	13	2363	30
5.565	16	Pennsylvania	2000	—	81	—	—	19	2770	30
5.565	16	Pennsylvania	2000	—	76	—	—	24	3362	30
5.565	16	New Jersey	2000	—	61	—	—	39	1713	30
5.565	16	New Jersey	2000	—	86	—	—	14	1721	30
5.565	16	New Jersey	2000	---	81	---	---	19	2227	30

OTHER STORE:

AM

7:30-8:30

8:06 2 PDS 8:01 (EAST END ROAD)



\* = FROM EAST END ROAD

\*\* = DIDN'T RETURN TO EAST END ROAD

- A FROM N TO N (PRIMARY)
- B FROM S TO E (PASS-BY)
- C FROM S TO N (PASS-BY)
- D FROM E TO E (PRIMARY)
- E FROM E TO E (PRIMARY)
- F FROM W TO S (PASS-BY)
- G FROM E TO N (PASS-BY)
- H FROM E TO E (PRIMARY)

- I FROM W TO N (PASS-BY) ~
- J FROM E TO E (PRIMARY)
- K FROM E TO N (PASS-BY)
- L FROM N TO E (PASS-BY)
- M FROM S TO N (PASS-BY)
- N FROM NW TO N (PASS-BY) ~
- O FROM E TO E (PRIMARY)
- P FROM E TO N (PASS-BY)
- Q FROM E TO E (PRIMARY)

OTHER STORE:

AM

7:30-8:30

10 PASS-BY  
OUT OF 17 (59%)

- A FROM N TO N (PRIMARY)
- B FROM S TO E (PASS-BY)
- C FROM S TO N (PASS-BY)
- D FROM E TO E (PRIMARY)
- E FROM E TO E (PRIMARY)
- F FROM W TO S (PASS-BY)
- G FROM E TO N (PASS-BY)
- H FROM E TO E (PRIMARY)

- I FROM W TO N (PASS-BY) ~
- J FROM E TO E (PRIMARY)
- K FROM E TO N (PASS-BY)
- L FROM N TO E (PASS-BY)
- M FROM S TO N (PASS-BY)
- N FROM W TO N (PASS-BY) ~
- O FROM E TO E (PRIMARY)
- P FROM E TO N (PASS-BY)
- Q FROM E TO E (PRIMARY)

IN FROM  
MARYVILLE PIKE = 8

IN FROM  
JOE LEWIS = 9

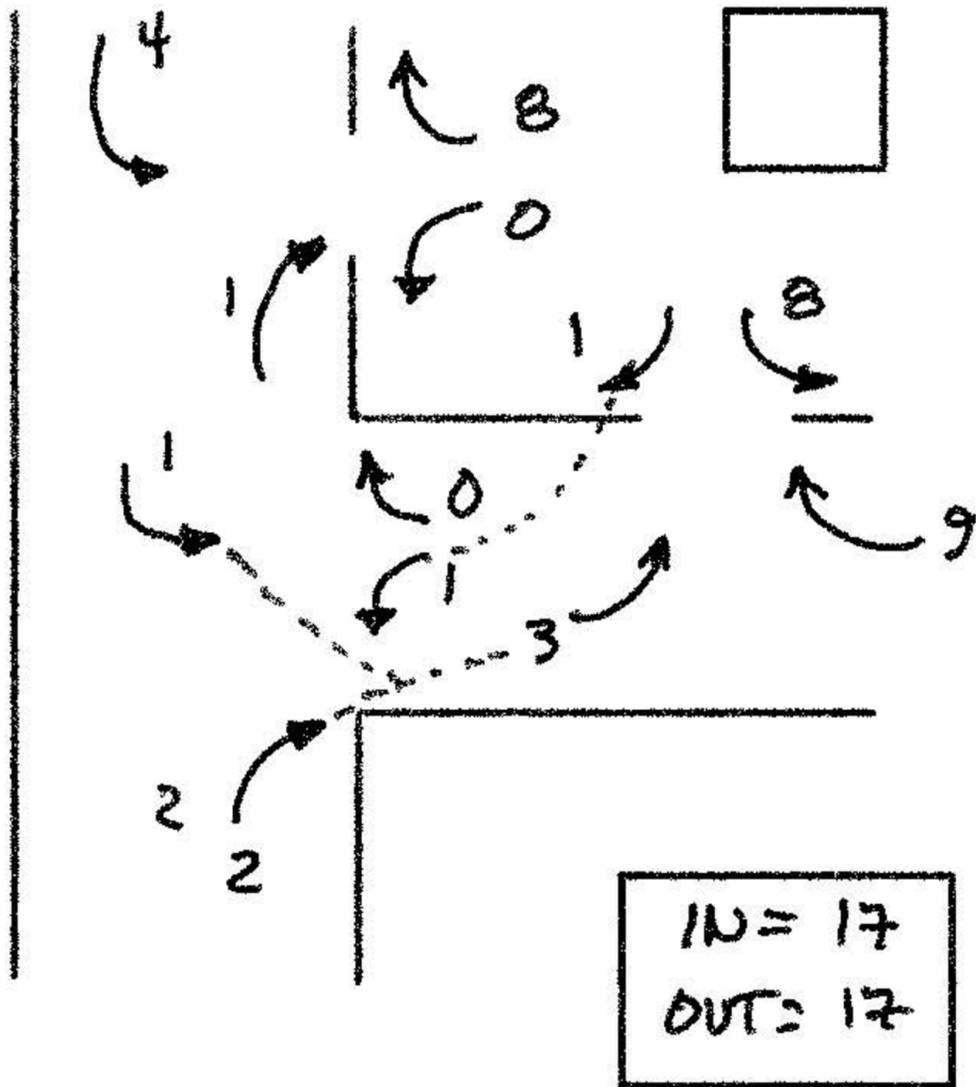
OUT TO  
MARYVILLE PIKE = 9

OUT TO  
JOE LEWIS = 8

ROUGHLY  
50/50  
TO/FROM  
MARYVILLE PIKE/  
JOE LEWIS

- 3 FROM WEST (18%)
- 2 FROM NORTH (11%)
- 3 FROM SOUTH (18%)
- 9 FROM EAST (53%)

- 0 TO WEST (0%)
- 8 TO NORTH (47%)
- 1 TO SOUTH (6%)
- 8 TO EAST (47%)



IN = 17  
OUT = 17



OTHER STORE:

PM

3:30 - 4:30

7 PASS-BY  
OUT OF 11 (64%)

- A FROM SOUTH TO NORTH (PASS-BY)
- B FROM EAST TO EAST (PRIMARY)
- C FROM EAST TO EAST (PRIMARY)
- D FROM SOUTH TO NORTH (PASS-BY)
- E FROM EAST TO SOUTH (PASS-BY)
- F FROM NORTH TO EAST (PASS-BY)
- G FROM NORTH TO EAST (PASS-BY)
- H FROM SOUTH TO SOUTH (PRIMARY)
- I FROM NORTH TO EAST (PASS-BY)
- J FROM SOUTH TO EAST (PASS-BY)
- K FROM EAST TO EAST (PRIMARY)
- L -

IN FROM  
MARYVILLE PIKE = 7

IN FROM  
JOE LEWIS = 6

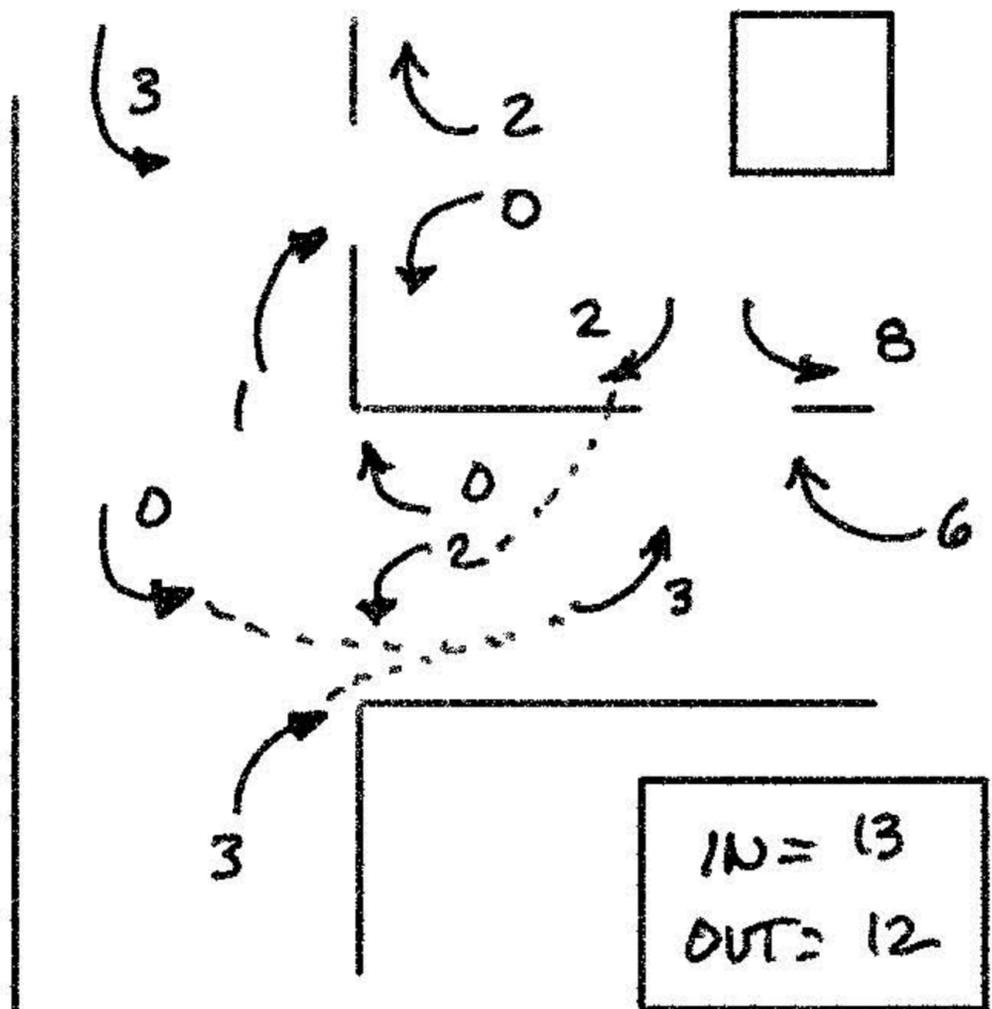
OUT TO  
MARYVILLE PIKE = 4

OUT TO  
JOE LEWIS = 8

ROUGHLY  
50/50  
FROM  
MARYVILLE PIKE/  
JOE LEWIS

BUT 25/75  
TO TO  
M'VILLE PIKE JOE LEWIS

(PEOPLE GOING  
HOME &  
STOPPING  
ON THE WAY?)



- 0 FROM WEST (0%)
- 3 FROM NORTH (23%)
- 4 FROM SOUTH (31%)
- 6 FROM EAST (46%)

- 0 TO WEST (0%)
- 2 TO NORTH (17%)
- 2 TO SOUTH (17%)
- 8 TO EAST (66%)

## **APPENDIX G**

### **OTISS SOFTWARE OUTPUTS**

# Turning Movement Volume AM PEAK HOUR

Trip Generation   Network Configuration   Driveway Distribution   Network Distribution   **Turning Movement Volumes**



Existing Traffic + - x o

# Turning Movement Volume AM PEAK HOUR

Trip Generation   Network Configuration   Driveway Distribution   Network Distribution   **Turning Movement Volumes**



Background Traffic + - x o

# Turning Movement Volume AM PEAK HOUR

Trip Generation   Network Configuration   Driveway Distribution   Network Distribution   **Turning Movement Volumes**



Site Generated Traffic-   +   -   x   o

# Turning Movement Volume AM PEAK HOUR

Trip Generation   Network Configuration   Driveway Distribution   Network Distribution   **Turning Movement Volumes**



Pass-by Traffic- + - x o

# Turning Movement Volume AM PEAK HOUR

Trip Generation   Network Configuration   Driveway Distribution   Network Distribution   **Turning Movement Volumes**



Build Traffic^ + - x o

# Turning Movement Volume PM PEAK HOUR

Trip Generation   Network Configuration   Driveway Distribution   Network Distribution   **Turning Movement Volumes**



Existing Traffic + - x o

# Turning Movement Volume PM PEAK HOUR

Trip Generation   Network Configuration   Driveway Distribution   Network Distribution   **Turning Movement Volumes**



Background Traffic + - x o

# Turning Movement Volume PM PEAK HOUR

Trip Generation   Network Configuration   Driveway Distribution   Network Distribution   **Turning Movement Volumes**



Site Generated Traffic + - x 📍

# Turning Movement Volume PM PEAK HOUR

Trip Generation   Network Configuration   Driveway Distribution   Network Distribution   **Turning Movement Volumes**

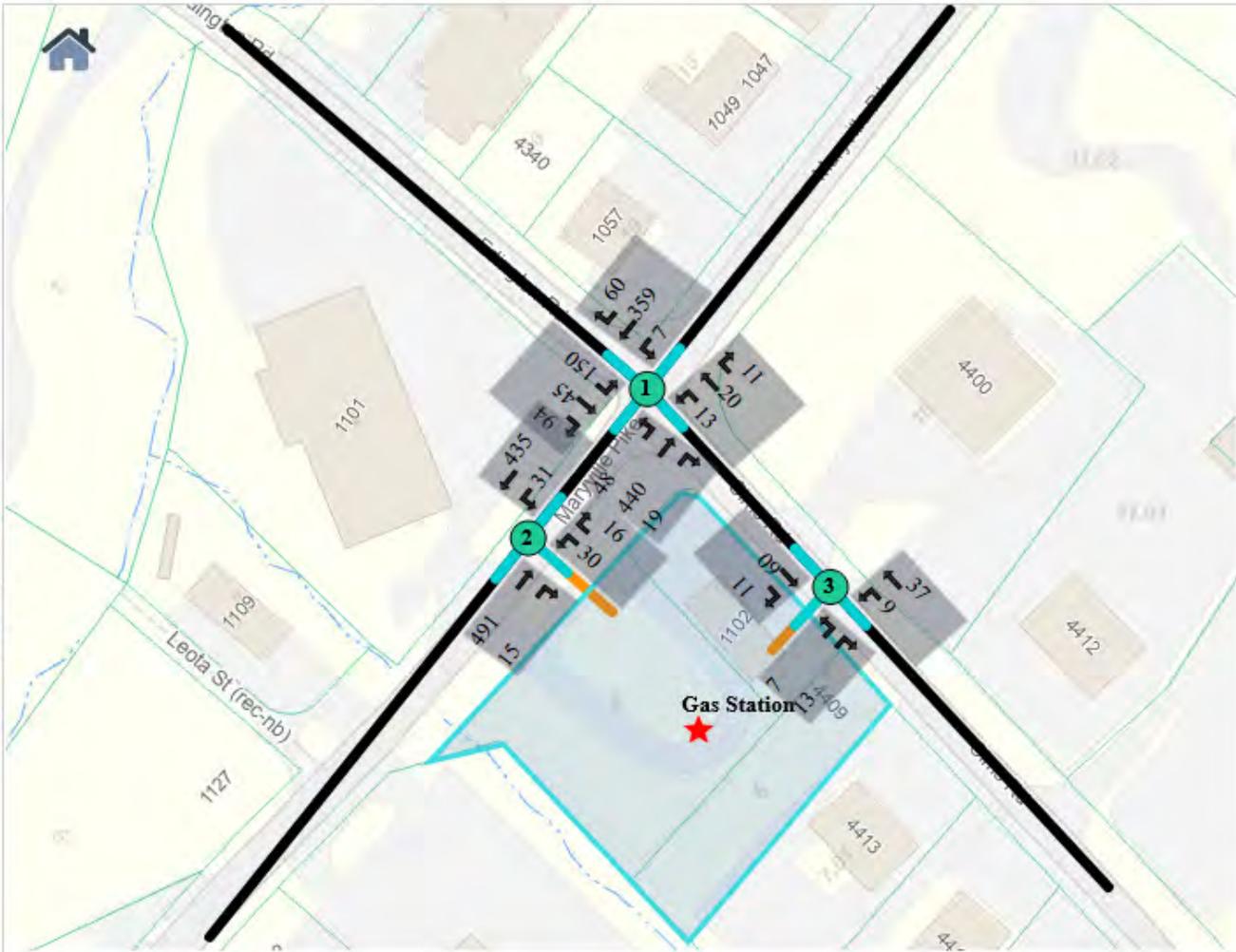


Pass-by Traffic

+ - × ○

# Turning Movement Volume PM PEAK HOUR

Trip Generation   Network Configuration   Driveway Distribution   Network Distribution   **Turning Movement Volumes**



Build Traffic ^ + - x o

**PROJECT DETAILS**

Project Name: Maryville Pike Gas Station	Type of Project:
Project No: 2530	City: Knoxville
Country:	Built-up Area(Sq.ft):
Analyst Name: Robert Jacks, P.E.	Clients Name:
Date: 12/28/2025	ZIP/Postal Code:
State/Province: Tennessee	No. of Scenarios: 2
Analysis Region:	

**SCENARIO SUMMARY**

Scenarios	Name	No. of Land Uses	Phases of Development	No. of Years to Project Traffic	User Group	Estimated New Vehicle Trips		
						Entry	Exit	Total
Scenario - 1	Projected 2027 AM Peak Hour	1	1	2		24	24	48

**Scenario - 1**  
 Scenario Name: Projected 2027 AM Peak Hour  
 User Group:  
 Dev. phase: 1  
 No. of Years to Project 2  
 Traffic:  
 Analyst Note:  
 Warning:

**VEHICLE TRIPS BEFORE REDUCTION**

Land Use & Data Source	Location	IV	Size	Time Period	Method	Entry	Exit	Total
					Rate/Equation	Split%	Split%	
945 - Convenience Store/Gas Station - GFA (4- Data Source: Trip Generation Manual, 12th Ed	General Urban/Suburban	Vehicle Fueling Positions	6	Weekday, Peak Hour of Adjacent Street Traffic,	Average	61	59	120
						19.91	51%	

**VEHICLE TO PERSON TRIP CONVERSION**

**BASELINE SITE VEHICLE CHARACTERISTICS:**

Land Use	Baseline Site Vehicle Mode Share		Baseline Site Vehicle Occupancy		Baseline Site Vehicle Directional Split	
	Entry (%)	Exit (%)	Entry	Exit	Entry (%)	Exit (%)
945 - Convenience Store/Gas Station - GFA (4-5.5k)	100	100	1	1	51	49

**ESTIMATED BASELINE SITE PERSON TRIPS:**

Land Use	Baseline Site Vehicle Mode Share		Baseline Site Vehicle Occupancy		Baseline Site Vehicle Directional Split	
	Entry (%)	Exit (%)	Entry	Exit	Entry (%)	Exit (%)
945 - Convenience Store/Gas Station - GFA (4-5.5k)	61	59	0	0	61	59
	120		0		120	

**VEHICLE TRIPS AFTER MULTI-MODAL ADJUSTMENT**

**MODE SHARE:**

Land Use	Personal Passenger Vehicle		Truck		Other Modes	
	Entry (%)	Exit (%)	Entry	Exit	Entry (%)	Exit (%)
945 - Convenience Store/Gas Station - GFA (4-5.5k)	100%	100%	0%	0%	0%	0%

**OCCUPANCY:**

Land Use	Vehicle	
	Entry	Exit
945 - Convenience Store/Gas Station - GFA (4-5.5k)	1.00	1.00

**ADJUSTED VEHICLE TRIPS:**

Land Use	Entry				Exit			
	Person Trips	Vehicle Mode Share (%)	Vehicle Occupancy	Vehical Trips	Person Trips	Vehicle Mode Share (%)	Vehicle Occupancy	Vehical Trips
945 - Convenience Store/Gas Station - GFA (4-	61	100%	1.00	61	59	100%	1.00	59

**INTERNAL VEHICLE TRIP REDUCTION**

**LAND USE GROUP ASSIGNMENT:**

Land Use	Land Use Group
945 - Convenience Store/Gas Station - GFA (4-5.5k)	Resturant

**BALANCED PERSON TRIPS:**

**INTERNAL PERSON TRIPS:**

945 - Convenience Store/Gas Station-GFA (4-5.5k)

Internal Person Trips From	Entry	Exit	Total
<b>Total Internal Person Trips</b>	<b>0</b>	<b>0</b>	<b>0</b>

**INTERNAL VEHICLE TRIPS AND CAPTURE:**

945 - Convenience Store/Gas Station-GFA (4-5.5k)

Total Internal Person Trips	Entry	Exit	Total
	0	0	0

Vehicle Mode Share	100%	100%	-
Vehicle Occupancy	1.00	1.00	-
<b>Total Vehicle Internal Trips</b>	<b>0</b>	<b>0</b>	<b>0</b>
Total External Vehicle Trips	61	59	120
<b>Internal Vehicle Trip Capture</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>

**PASS-BY VEHICLE TRIP REDUCTION**

Land Use	External Vehicle Trips		Pass-by Vehicle Trip %		Pass-by Vehicle Trips	
	Entry	Exit	Entry (%)	Exit (%)	Entry	Exit
945 - Convenience Store/Gas Station - GFA (4-5.5k)	61	59	60.00%	60.00%	37	35

**DIVERTED VEHICLE TRIP REDUCTION**

Land Use	External Vehicle Trips		Diverted Vehicle Trip %		Diverted Vehicle Trips	
	Entry	Exit	Entry (%)	Exit (%)	Entry	Exit
945 - Convenience Store/Gas Station - GFA (4-5.5k)	61	59	0.00%	0.00%	0	0

**EXTRA VEHICLE TRIP REDUCTION**

Land Use	External Vehicle Trips		Diverted Vehicle Trip %		Diverted Vehicle Trips	
	Entry	Exit	Entry (%)	Exit (%)	Entry	Exit
945 - Convenience Store/Gas Station - GFA (4-5.5k)	24	24	0.00%	0.00%	0	0

**NEW VEHICLE TRIPS**

Land Use	New Vehicle Trips		
	Entry	Exit	Total
945 - Convenience Store/Gas Station - GFA (4-5.5k)	24	24	48

Land Use	New Vehicle Trips (PPV)		
	Entry	Exit	Total
945 - Convenience Store/Gas Station - GFA (4-5.5k)	24	24	48

Land Use	New Vehicle Trips (Truck)		
	Entry	Exit	Total
945 - Convenience Store/Gas Station - GFA (4-5.5k)	0	0	0

**RESULTS**

Site Totals	Entry	Exit	Total
Vehicle Trips Before Reduction	61	59	120
Vehicle Trips After Multi-modal Adjustment	61	59	120
Internal Vehicle Trips	0	0	0
External Vehicle Trips	61	59	120
Internal Vehicle Trip Capture	0%	0%	0%
Pass-by Vehicle Trips	37	35	72
Diverted Vehicle Trips	0	0	0
Extra Reduced Vehicle Trips	0	0	0
New Vehicle Trips	24	24	48
PPV	24	24	48
Truck	0	0	0
Person Trips by Other Modes	0	0	0

Project: Maryville Pike Gas Station Trip Assignment Summary

Projected 2027 AM Peak Hour Report Generated by OTISS Pro

Assigned New Trips

Site	Routes	Inbound	Outbound
Gas Station	W Entrance <> N	2	11
	W Entrance <> S	8	2
	W Entrance <> E	0	0
	W Entrance <> W	4	1
	N Entrance <> N	2	2
	N Entrance <> S	1	1
	N Entrance <> E	6	6
	N Entrance <> W	2	2

Assigned Pass-by Trips

Site	Driveway	Turning Movement	Assigned Pass-by Trips
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Gas Station	North Entrance		
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**UnAssigned trips are more than 0 for some driveways**

Project: Maryville Pike Gas Station  
 Projected 2027 AM Peak Hour

1: Mville Pike at Sims  
 Report Generated by OTISS Pro

Configuration	Edington Road			Maryville Pike			Maryville Pike			Sims Road		
	EBL	EBT	EBR	SBL	SBT	SBR	NBL	NBT	NBR	WBL	WBT	WBR
Number of Lanes												
Shared?	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes
% Growth Over 2 Years	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor	1	12	1	1	1	1	1	1	1	1	1	1
Turning Volumes												
Existing Traffic	42	14	22	2	304	112	77	365	12	9	47	8
Background Traffic	0	2	4	2	2	0	1	11	1	1	2	2
Site Generated Trips	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips (Non-Primary)	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips (Non-Primary)	0	0	0	0	0	0	0	0	0	0	0	0
Extra Reduced Trips (Non-Primary)	0	0	0	0	0	0	0	0	0	0	0	0
Total Non-primary Trips												
Build Conditions	42	16	26	4	306	112	78	376	13	10	49	10
Redistributed Background Traffic												
Total Build Traffic												

Project: Maryville Pike Gas Station  
 Projected 2027 AM Peak Hour

2: Mville P at W Ent  
 Report Generated by OTISS Pro

Configuration	Maryville Pike		Maryville Pike		Street3	
	SBL	SBT	NBT	NBR	WBL	WBR
Number of Lanes						
Shared?	Yes			Yes	No	
% Growth Over 2 Years	0	0	0	0	0	0
Growth Factor	1	1	1	1	1	1
Turning Volumes						

Existing Traffic	0	335	454	0	0	0
Background Traffic	6	1	1	8	2	12
Site Generated Trips	7	-7	-14	14	7	14
Pass-by Trips (Non-Primary)	0	0	0	0	0	0
Diverted Trips (Non-Primary)	0	0	0	0	0	0
Extra Reduced Trips (Non-Primary)	7	-7	-14	14	7	14
Total Non-primary Trips						
Build Conditions	13	329	441	22	9	26
Redistributed Background Traffic						
Total Build Traffic						

Project: Maryville Pike Gas Station 3:Sims at North Ent  
Projected 2027 AM Peak Hour Report Generated by OTISS Pro

Configuration	Sims Road		Sims Road		Street3	
	WBL	WBT	EBT	EBR	NBL	NBR
Number of Lanes						
Shared?	Yes			Yes	Yes	
% Growth Over 2 Years	0	0	0	0	0	0
Growth Factor	1	1	1	1	1	1
Turning Volumes						
Existing Traffic	0	64	28	0	0	0
Background Traffic	6	0	0	5	5	6
Site Generated Trips	11	-11	-4	4	11	4
Pass-by Trips (Non-Primary)	0	0	0	0	0	0
Diverted Trips (Non-Primary)	0	0	0	0	0	0
Extra Reduced Trips (Non-Primary)	11	-11	-4	4	11	4
Total Non-primary Trips						

Build Conditions	17	53	24	9	16	10	
Redistributed Background Traffic							
Total Build Traffic							

**PROJECT DETAILS**

Project Name: Maryville Pike Gas Station	Type of Project:
Project No: 2530	City: Knoxville
Country:	Built-up Area(Sq.ft):
Analyst Name: Robert Jacks, P.E.	Clients Name:
Date: 12/28/2025	ZIP/Postal Code:
State/Province: Tennessee	No. of Scenarios: 2
Analysis Region:	

**SCENARIO SUMMARY**

Scenarios	Name	No. of Land Uses	Phases of Development	No. of Years to Project Traffic	User Group	Estimated New Vehicle Trips		
						Entry	Exit	Total
Scenario - 1	Projected 2027 PM Peak Hour	1	1	2		25	25	50

**Scenario - 2**  
 Scenario Name: Projected 2027 PM Peak Hour  
 User Group:  
 Dev. phase: 1  
 No. of Years to Project 2  
 Traffic :  
 Analyst Note:  
 Warning:

**VEHICLE TRIPS BEFORE REDUCTION**

Land Use & Data Source	Location	IV	Size	Time Period	Method	Entry	Exit	Total
					Rate/Equation	Split%	Split%	
945 - Convenience Store/Gas Station - GFA (4- Data Source: Trip Generation Manual, 12th Ed	General Urban/Suburban	Vehicle Fueling Positions	6	Weekday, Peak Hour of Adjacent Street Traffic,	Average	57	57	114
						19.15	50%	

**VEHICLE TO PERSON TRIP CONVERSION**

**BASELINE SITE VEHICLE CHARACTERISTICS:**

Land Use	Baseline Site Vehicle Mode Share		Baseline Site Vehicle Occupancy		Baseline Site Vehicle Directional Split	
	Entry (%)	Exit (%)	Entry	Exit	Entry (%)	Exit (%)
945 - Convenience Store/Gas Station - GFA (4-5.5k)	100	100	1	1	50	50

**ESTIMATED BASELINE SITE PERSON TRIPS:**

Land Use	Baseline Site Vehicle Mode Share		Baseline Site Vehicle Occupancy		Baseline Site Vehicle Directional Split	
	Entry (%)	Exit (%)	Entry	Exit	Entry (%)	Exit (%)
945 - Convenience Store/Gas Station - GFA (4-5.5k)	57	57	0	0	57	57
	114		0		114	

**VEHICLE TRIPS AFTER MULTI-MODAL ADJUSTMENT**

**MODE SHARE:**

Land Use	Personal Passenger Vehicle		Truck		Other Modes	
	Entry (%)	Exit (%)	Entry	Exit	Entry (%)	Exit (%)
945 - Convenience Store/Gas Station - GFA (4-5.5k)	100%	100%	0%	0%	0%	0%

**OCCUPANCY:**

Land Use	Vehicle	
	Entry	Exit
945 - Convenience Store/Gas Station - GFA (4-5.5k)	1.00	1.00

**ADJUSTED VEHICLE TRIPS:**

Land Use	Entry				Exit			
	Person Trips	Vehicle Mode Share (%)	Vehicle Occupancy	Vehical Trips	Person Trips	Vehicle Mode Share (%)	Vehicle Occupancy	Vehical Trips
945 - Convenience Store/Gas Station - GFA (4-	57	100%	1.00	57	57	100%	1.00	57

**INTERNAL VEHICLE TRIP REDUCTION**

**LAND USE GROUP ASSIGNMENT:**

Land Use	Land Use Group
945 - Convenience Store/Gas Station - GFA (4-5.5k)	Resturant

**BALANCED PERSON TRIPS:**

**INTERNAL PERSON TRIPS:**  
 945 - Convenience Store/Gas Station-GFA (4-5.5k)

Internal Person Trips From	Entry	Exit	Total
<b>Total Internal Person Trips</b>	<b>0</b>	<b>0</b>	<b>0</b>

**INTERNAL VEHICLE TRIPS AND CAPTURE:**  
 945 - Convenience Store/Gas Station-GFA (4-5.5k)

Total Internal Person Trips	Entry	Exit	Total
	0	0	0

Vehicle Mode Share	100%	100%	-
Vehicle Occupancy	1.00	1.00	-
<b>Total Vehicle Internal Trips</b>	<b>0</b>	<b>0</b>	<b>0</b>
Total External Vehicle Trips	57	57	114
<b>Internal Vehicle Trip Capture</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>

**PASS-BY VEHICLE TRIP REDUCTION**

Land Use	External Vehicle Trips		Pass-by Vehicle Trip %		Pass-by Vehicle Trips	
	Entry	Exit	Entry (%)	Exit (%)	Entry	Exit
945 - Convenience Store/Gas Station - GFA (4-5.5k)	57	57	56.00%	56.00%	32	32

**DIVERTED VEHICLE TRIP REDUCTION**

Land Use	External Vehicle Trips		Diverted Vehicle Trip %		Diverted Vehicle Trips	
	Entry	Exit	Entry (%)	Exit (%)	Entry	Exit
945 - Convenience Store/Gas Station - GFA (4-5.5k)	57	57	0.00%	0.00%	0	0

**EXTRA VEHICLE TRIP REDUCTION**

Land Use	External Vehicle Trips		Diverted Vehicle Trip %		Diverted Vehicle Trips	
	Entry	Exit	Entry (%)	Exit (%)	Entry	Exit
945 - Convenience Store/Gas Station - GFA (4-5.5k)	25	25	0.00%	0.00%	0	0

**NEW VEHICLE TRIPS**

Land Use	New Vehicle Trips		
	Entry	Exit	Total
945 - Convenience Store/Gas Station - GFA (4-5.5k)	25	25	50

Land Use	New Vehicle Trips (PPV)		
	Entry	Exit	Total
945 - Convenience Store/Gas Station - GFA (4-5.5k)	25	25	50

Land Use	New Vehicle Trips (Truck)		
	Entry	Exit	Total
945 - Convenience Store/Gas Station - GFA (4-5.5k)	0	0	0

**RESULTS**

Site Totals	Entry	Exit	Total
Vehicle Trips Before Reduction	57	57	114
Vehicle Trips After Multi-modal Adjustment	57	57	114
Internal Vehicle Trips	0	0	0
External Vehicle Trips	57	57	114
Internal Vehicle Trip Capture	0%	0%	0%
Pass-by Vehicle Trips	32	32	64
Diverted Vehicle Trips	0	0	0
Extra Reduced Vehicle Trips	0	0	0
New Vehicle Trips	25	25	50
PPV	25	25	50
Truck	0	0	0
Person Trips by Other Modes	0	0	0

Project: Maryville Pike Gas Station Trip Assignment Summary

Projected 2027 PM Peak Hour Report Generated by OTISS Pro

Assigned New Trips

Site	Routes	Inbound	Outbound
Gas Station	W Entrance <> N	9	5
	W Entrance <> S	5	9
	W Entrance <> E	0	0
	W Entrance <> W	2	2
	N Entrance <> N	3	0
	N Entrance <> S	0	3
	N Entrance <> E	6	6
	N Entrance <> W	2	2

Assigned Pass-by Trips

Site	Driveway	Turning Movement	Assigned Pass-by Trips
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Gas Station	North Entrance		
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**UnAssigned trips are more than 0 for some driveways**

Project: Maryville Pike Gas Station  
 Projected 2027 PM Peak Hour

1:Mville at Sims  
 Report Generated by OTISS Pro

Configuration	Edington Road			Maryville Pike			Maryville Pike			Sims Road		
	EBL	EBT	EBR	SBL	SBT	SBR	NBL	NBT	NBR	WBL	WBT	WBR
Number of Lanes												
Shared?	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes
% Growth Over 2 Years	0	0	0	0	0	0	0	0	0	0	0	0
Growth Factor	1	1	1	1	1	1	1	1	1	1	1	1
Turning Volumes												
Existing Traffic	150	44	93	4	350	60	47	435	19	10	19	11
Background Traffic	0	2	2	3	9	0	2	5	0	3	2	0
Site Generated Trips	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips (Non-Primary)	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips (Non-Primary)	0	0	0	0	0	0	0	0	0	0	0	0
Extra Reduced Trips (Non-Primary)	0	0	0	0	0	0	0	0	0	0	0	0
Total Non-primary Trips												
Build Conditions	150	46	95	7	359	60	49	440	19	13	21	11
Redistributed Background Traffic												
Total Build Traffic												

Project: Maryville Pike Gas Station  
 Projected 2027 PM Peak Hour

2:Mville at W Ent  
 Report Generated by OTISS Pro

Configuration	Maryville Pike		Maryville Pike		Street3	
	SBL	SBT	NBT	NBR	WBL	WBR
Number of Lanes						
Shared?	Yes			Yes	No	
% Growth Over 2 Years	0	0	0	0	0	0
Growth Factor	1	1	1	1	1	1
Turning Volumes						

Existing Traffic	0	453	501	0	0	0
Background Traffic	11	3	0	5	9	7
Site Generated Trips	21	-21	-10	10	21	10
Pass-by Trips (Non-Primary)	0	0	0	0	0	0
Diverted Trips (Non-Primary)	0	0	0	0	0	0
Extra Reduced Trips (Non-Primary)	21	-21	-10	10	21	10
Total Non-primary Trips						
Build Conditions	32	435	491	15	30	17
Redistributed Background Traffic						
Total Build Traffic						

Project: Maryville Pike Gas Station 3:Sims at North Ent  
Projected 2027 PM Peak Hour Report Generated by OTISS Pro

Configuration	Sims Road		Sims Road		Street3	
	WBL	WBT	EBT	EBR	NBL	NBR
Number of Lanes						
Shared?	Yes			Yes	Yes	
% Growth Over 2 Years	0	0	0	0	0	0
Growth Factor	1	1	1	1	1	1
Turning Volumes						
Existing Traffic	0	40	67	0	0	0
Background Traffic	6	0	0	5	5	6
Site Generated Trips	3	-3	-7	7	3	7
Pass-by Trips (Non-Primary)	0	0	0	0	0	0
Diverted Trips (Non-Primary)	0	0	0	0	0	0
Extra Reduced Trips (Non-Primary)	3	-3	-7	7	3	7
Total Non-primary Trips						

Build Conditions	9	37	60	12	8	13	
Redistributed Background Traffic							
Total Build Traffic							

**APPENDIX H**

**TDOT TURN LANE VOLUME THRESHOLD WORKSHEETS**

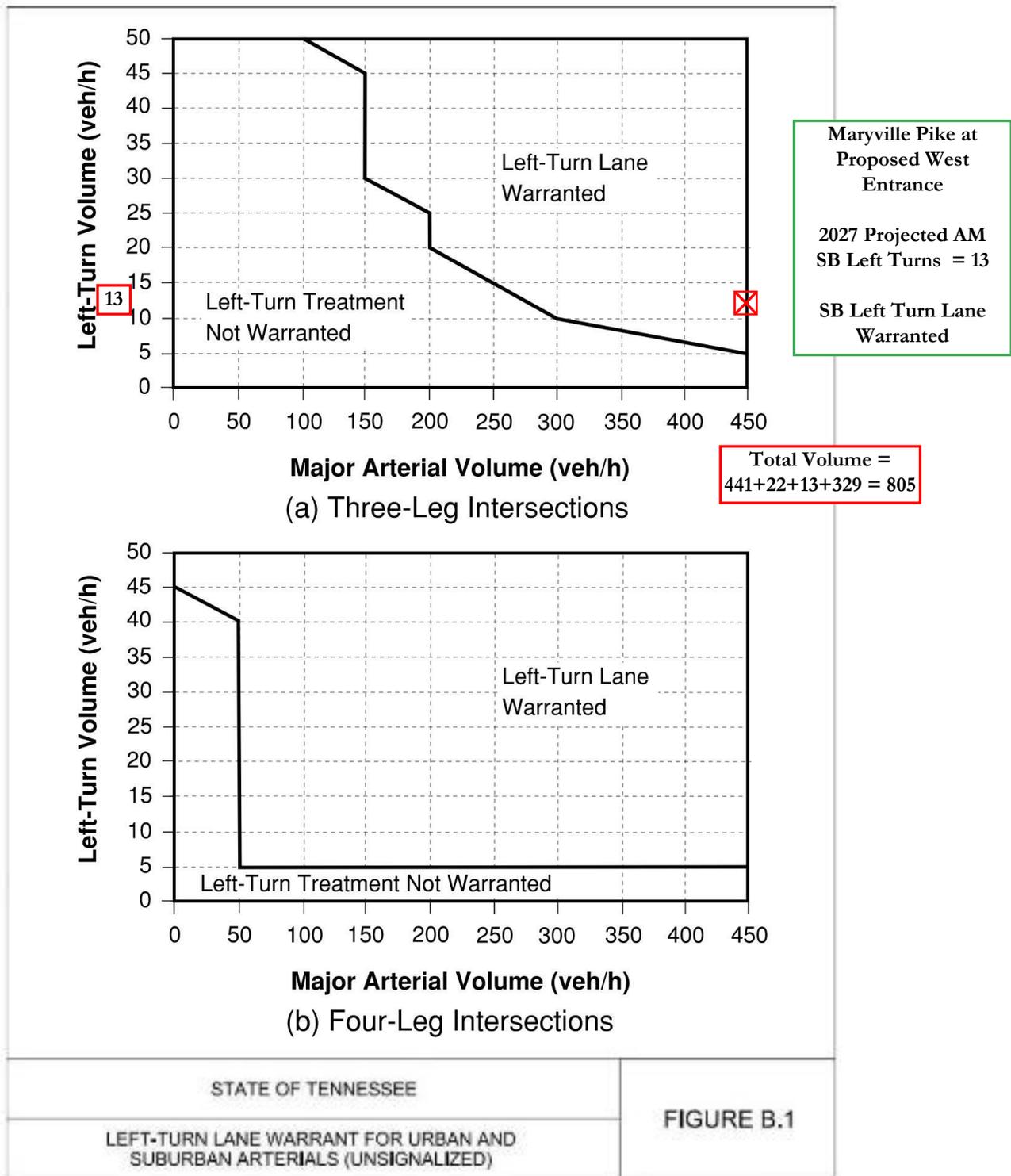


Figure B.1: Left-Turn Lane Warrant for Urban and Suburban Arterials (Unsignalized)

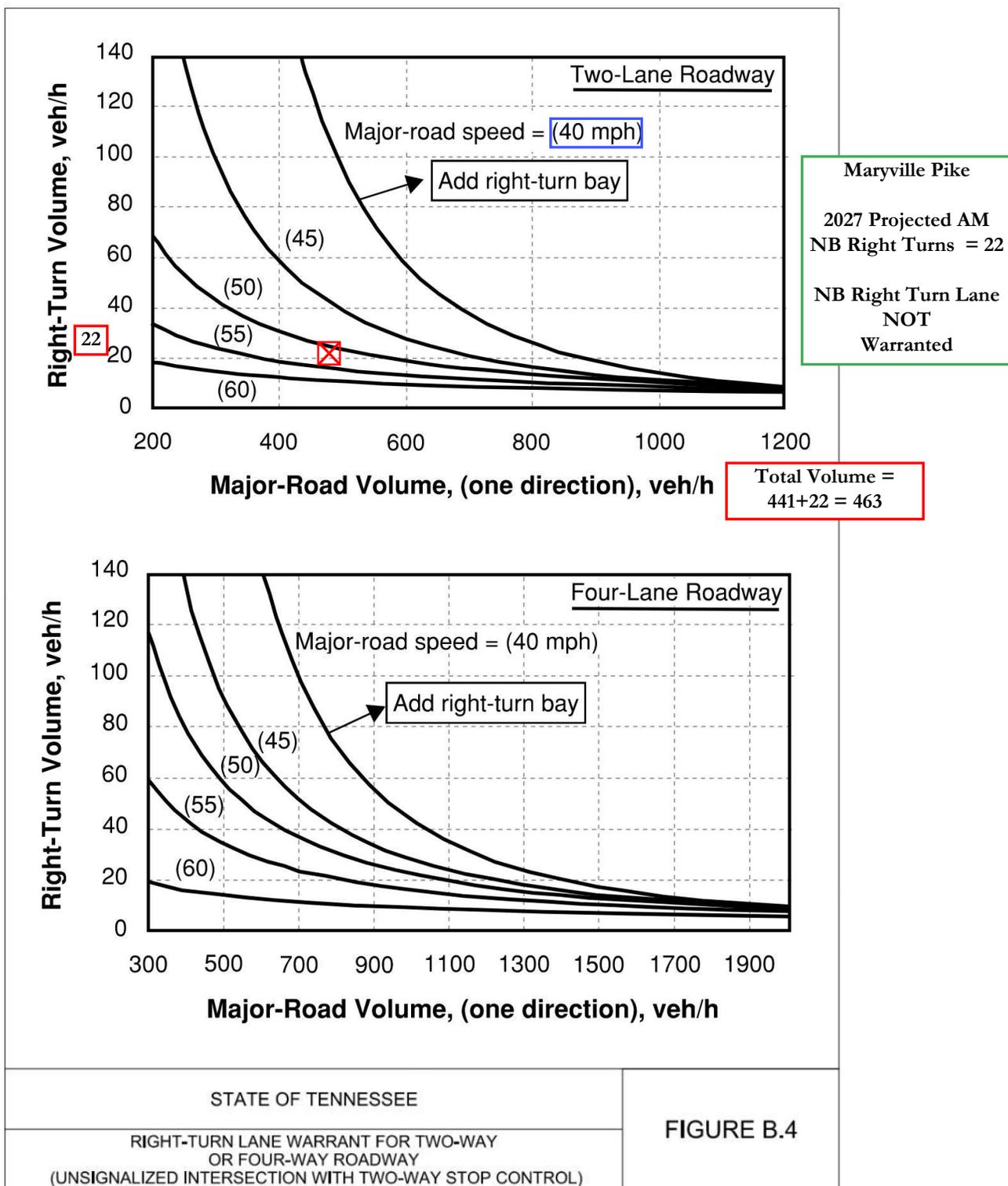


Figure B.4: Right-Turn Lane Warrant for Two-Way or Four-Way Roadway (Unsignalized Intersection with Two-Way Stop Control)

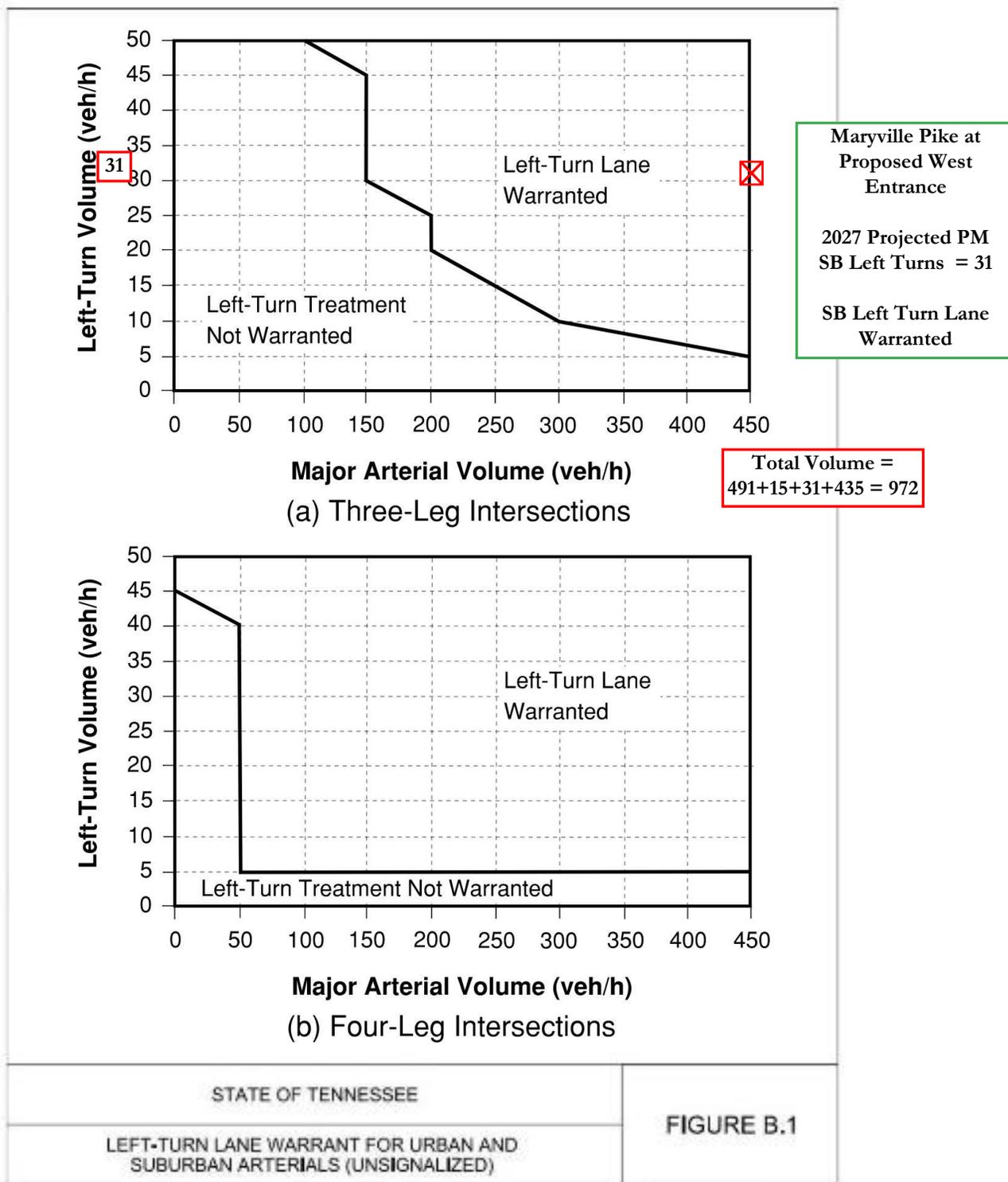


Figure B.1: Left-Turn Lane Warrant for Urban and Suburban Arterials (Unsignalized)

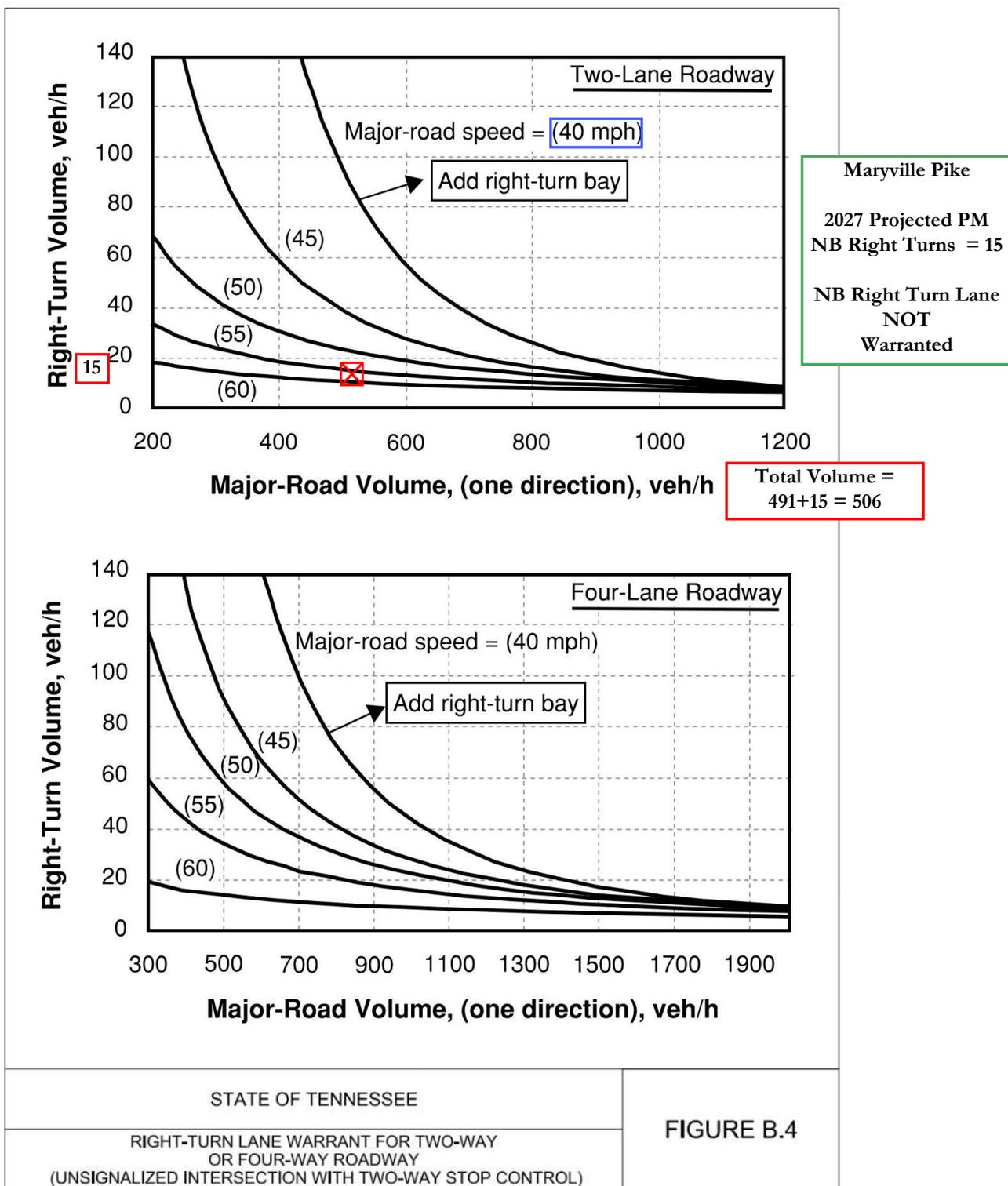


Figure B.4: Right-Turn Lane Warrant for Two-Way or Four-Way Roadway (Unsignalized Intersection with Two-Way Stop Control)

## **APPENDIX I**

### **VEHICLE QUEUE WORKSHEETS (SIMTRAFFIC 12)**

## Queuing and Blocking Report

### Intersection: 3: Maryville Pike & Edington Road/Sims Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	108	78	174	235
Average Queue (ft)	40	29	133	108
95th Queue (ft)	84	64	199	196
Link Distance (ft)	340	139	87	562
Upstream Blk Time (%)		0	26	
Queuing Penalty (veh)		0	120	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

### Intersection: 7: Proposed North Entrance & Sims Road

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	18	33
Average Queue (ft)	1	16
95th Queue (ft)	12	41
Link Distance (ft)	290	115
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

### Intersection: 9: Maryville Pike & Proposed West Entrance

Movement	WB	WB	NB	SB
Directions Served	L	R	TR	LT
Maximum Queue (ft)	41	69	177	99
Average Queue (ft)	10	22	25	19
95th Queue (ft)	34	55	101	75
Link Distance (ft)	83	83	332	87
Upstream Blk Time (%)	0	1	0	2
Queuing Penalty (veh)	0	0	0	5
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

### Network Summary

Network wide Queuing Penalty: 125

## Queuing and Blocking Report

### Intersection: 3: Maryville Pike & Edington Road/Sims Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	241	72	183	321
Average Queue (ft)	122	23	133	132
95th Queue (ft)	207	56	200	283
Link Distance (ft)	340	139	87	562
Upstream Blk Time (%)	0		23	0
Queuing Penalty (veh)	0		116	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

### Intersection: 7: Proposed North Entrance & Sims Road

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	19	42
Average Queue (ft)	1	15
95th Queue (ft)	11	41
Link Distance (ft)	290	115
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

### Intersection: 9: Maryville Pike & Proposed West Entrance

Movement	WB	WB	NB	SB
Directions Served	L	R	TR	LT
Maximum Queue (ft)	68	51	182	108
Average Queue (ft)	26	15	30	38
95th Queue (ft)	62	43	122	107
Link Distance (ft)	83	83	332	87
Upstream Blk Time (%)	2	0	0	5
Queuing Penalty (veh)	0	0	0	22
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

### Network Summary

Network wide Queuing Penalty: 137

Intersection: 3: Maryville Pike & Edington Road/Sims Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	102	92	173	208
Average Queue (ft)	37	34	130	105
95th Queue (ft)	77	72	189	185
Link Distance (ft)	340	139	95	562
Upstream Blk Time (%)			23	
Queuing Penalty (veh)			105	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Proposed North Entrance & Sims Road

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	12	42
Average Queue (ft)	1	22
95th Queue (ft)	8	46
Link Distance (ft)	290	115
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: Maryville Pike & Proposed West Entrance

Movement	WB	NB
Directions Served	R	TR
Maximum Queue (ft)	62	191
Average Queue (ft)	21	25
95th Queue (ft)	51	112
Link Distance (ft)	85	337
Upstream Blk Time (%)	1	0
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 105

Intersection: 3: Maryville Pike & Edington Road/Sims Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	222	82	176	338
Average Queue (ft)	119	33	133	131
95th Queue (ft)	196	69	193	257
Link Distance (ft)	340	139	95	562
Upstream Blk Time (%)		0	23	0
Queuing Penalty (veh)		0	115	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Proposed North Entrance & Sims Road

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	18	56
Average Queue (ft)	1	24
95th Queue (ft)	10	49
Link Distance (ft)	290	115
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: Maryville Pike & Proposed West Entrance

Movement	WB	NB
Directions Served	R	TR
Maximum Queue (ft)	45	204
Average Queue (ft)	13	37
95th Queue (ft)	39	145
Link Distance (ft)	85	337
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 115

**APPENDIX J**

**RESPONSE LETTER TO ADDRESS TIS REVIEW COMMENTS**



11812 Black Road  
Knoxville, Tennessee 37932  
Phone (865) 556-0042  
[ajaxengineering@gmail.com](mailto:ajaxengineering@gmail.com)

February 13, 2026

**PROJECT NAME:** Maryville Pike Gas Station (3-A-26-SU)  
**TO:** Knoxville/Knox County Planning, TDOT, and City of Knoxville  
**SUBJECT:** Response Document for the Maryville Pike Gas Station TIS Review Comments

Knoxville/Knox County Planning, TDOT, and City of Knoxville Staff:

The following response document addresses the comments in a letter from Mike Conger, P.E., dated February 3<sup>rd</sup>, 2026. This letter is added to the end of the revised report in Appendix J.

- 1) The TIS notes in a few places that pavement marking visibility should be improved, please add a note where appropriate that this portion of Maryville Pk (SR-33) is included on TDOT's 3-year Pavement Program resurfacing list for fiscal year 2026, which may address many of these locations.**

Response: A statement regarding pavement marking visibility and TDOT's resurfacing program has been included on Page 3, 1<sup>st</sup> bullet point under "Maryville Pike at Sims Road and Edington Road" and Page 65, second to last paragraph.

- 2) The operations of the traffic signal at Maryville Pk & Edington Rd/Sims Rd are noted throughout the report as being hindered by the lack of separate left-turn lanes, especially for the north and southbound approaches. While a long-term recommendation of major infrastructure improvement to add these lanes is offered in the TIS, it would be beneficial to also include a mention and analysis of potential interim measures that may help (either standalone or in combination as appropriate) including:**

- **Addition of vehicle detection**
- **Optimization of timing/time-of-day plans**
- **Introduction of a separate leading left-turn phase for the most critical movement, which appears to be the northbound left-turn to Edington Rd based on traffic volumes and the report's description of long queues, failed cycles and some vehicles choosing to bypass left-turners on the right shoulder.**

Response: A substantial discussion regarding interim solutions has been added to Pages 66-67 and includes an additional table (Table 13). Additional Synchro traffic software worksheets have been added to Appendix E based on interim alternative phasing

and timing. A brief statement regarding the potential for interim solutions has also been added to the last bullet point on Page 3 within the Executive Summary.

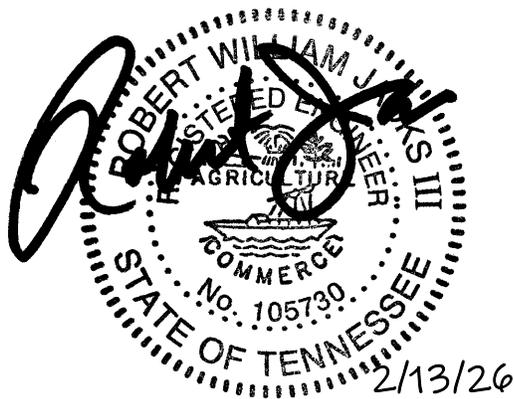
In addition to the revisions listed above, other changes in the report include the following:

- Updated Title Page with Revision Date
- Updated Table of Contents
- Updated Page Footers with Revision Date (and Page Numbers)
- Added Appendix J to include this response letter

If you have any questions or further comments, don't hesitate to contact me. We look forward to your approval of this revised report.

Sincerely,

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



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