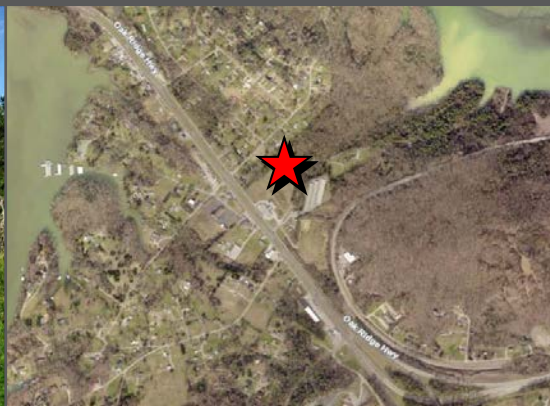


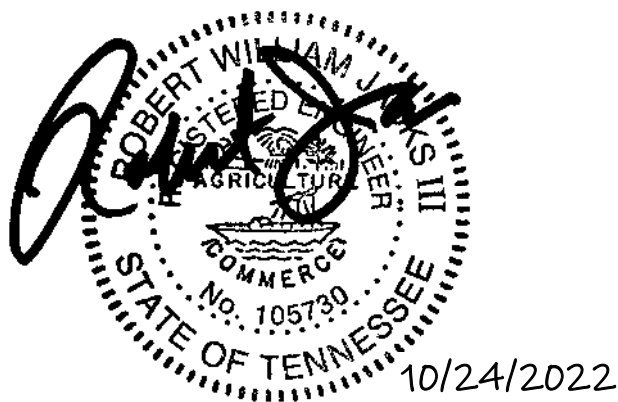


Transportation Impact Study Jim Jones Lane Subdivision Knox County, Tennessee



Revised October 2022

Prepared for:
Turner Homes, LLC
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11-SB-22-C / 11-B-22-DP
TIS Version 2
10/24/2022

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EXECUTIVE SUMMARY

Preface:

Turner Homes, LLC proposes constructing a residential development off Oak Ridge Highway at Jim Jones Lane in Northwest Knox County, TN. The proposed development will include 72 multi-family attached townhouses on 9.97 +/- acres and is referenced in this study as the “Jim Jones Lane Subdivision” since an official name has not been decided. The development will be built in a single phase and is anticipated to be fully built and occupied by 2025. The development proposes two entrances on Jim Jones Lane north of Oak Ridge Highway.

This study’s primary purpose is to determine and evaluate the potential impacts of the development on the adjacent transportation system. The study includes a review of the primary access roads and intersections and is a Level 1 study established by Knoxville/Knox County Planning. 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 Jim Jones Lane Subdivision development, with a total of 72 multi-family attached townhouses, is estimated to generate 711 trips at full build-out and occupancy on an average weekday. Of these daily trips, 40 are estimated to occur during the AM peak hour and 59 in the PM peak hour in 2025.
- High vehicle delays occur currently and are projected to continue to occur on Jim Jones Lane at the intersection with Oak Ridge Highway. Providing a southbound right-turn lane on Jim Jones Lane would reduce delays for right-turning motorists and reduce the potential for cut-thru traffic at the adjacent RaceWay gas station.
- The existing and projected traffic volumes on Oak Ridge Highway warrant a separate westbound right-turn lane at the intersection with Jim Jones Lane.
- Jim Jones Lane is approximately 60 feet wide at the intersection with Oak Ridge Highway, narrows to 24 feet wide at the driveway entrances at the RaceWay gas station and West Knox Solway Storage center, and then significantly reduced to 14 feet. Further to the north, Jim Jones Lane has pavement widths between 13 feet to 15.5 feet.

Recommendations:

The following recommendations are offered based on the study analyses to minimize the impacts of the proposed development on the adjacent transportation system while attempting to achieve an acceptable traffic flow and improved safety. The recommendations marked with an asterisk indicate an existing transportation need and are not explicitly associated with the proposed development's impacts in the projected conditions. More details regarding the recommendations are discussed at the end of the report.

- * • A westbound right-turn lane on Oak Ridge Highway is recommended to be constructed at Jim Jones Lane with 210 feet of storage and a taper length of 150 feet. The right-turn lane should include the appropriate right-turn arrow pavement markings as shown in the Tennessee Department of Transportation (TDOT) standard drawing T-M-4.
- * • Due to the current and projected high vehicle delays and queues for left-turning vehicles on Jim Jones Lane at Oak Ridge Highway, it is recommended that a separate southbound right-turn lane be constructed. This additional lane would allow southbound right-turning motorists to avoid the potential queue of left-turning motorists. It is recommended that the right-turn lane have a minimum storage length of 75 feet. The construction of a southbound right-turn lane will require modifications to the RaceWay gas station entrance on Jim Jones Lane.
 - Jim Jones Lane at the gas station entrance is recommended to be striped and include a "Do Not Block Intersection" (R10-7) sign. The roadway striping should include a box and center crosshatch with 4" white pavement lines. The sign should be installed on the southbound approach of Jim Jones Lane in advance of the gas station entrance.
 - It is recommended that a dotted white line be applied to Oak Ridge Highway that extends from the eastbound left-turn lane bay heading southwest to better guide drivers turning left out of Jim Jones Lane. The white dotted line should match the spacing, length, and width of the existing yellow dotted line on the opposite side of the median.
 - TDOT is currently in the design stage to improve the interchange of Pellissippi Parkway/Oak Ridge Highway southeast of the proposed development site. The proposed interchange improvements include a dedicated center acceleration lane for vehicles turning left from Jim Jones Lane onto eastbound Oak Ridge Highway. Based on the results of this study for the proposed development, this acceleration lane is highly recommended, as shown in the TDOT preliminary plan. This

acceleration lane will significantly improve the capability and safety of the left-turning vehicles from Jim Jones Lane to enter the eastbound traffic stream on Oak Ridge Highway. It is further recommended that the proposed recommendation of a westbound right-turn lane on Oak Ridge Highway at Jim Jones Lane be incorporated into the TDOT interchange plans since the existing volumes warrant the construction of a right-turn lane.

- During the review of this study, TDOT commented that if the proposed development is completed before the TDOT interchange improvement, they would require the developer to build the recommended westbound right-turn lane and also lengthen the existing eastbound left-turn lane in the center median of Oak Ridge Highway. Currently, the eastbound left-turn lane has a storage length of 95 feet and a taper length of 115 feet. As TDOT recommended, the left-turn lane should have 200 feet of storage and a taper length of 190 feet to meet the latest TDOT's Highway Safety Access Manual (HSAM) standards. This lengthening would increase the storage capacity by 105 feet and the taper length by 75 feet. This recommendation by TDOT to increase the length of the existing left-turn lane has been made even though the calculations showed that the existing storage length provided would be adequate in the projected conditions.
- A 25-mph Speed Limit (R2-1) sign is recommended to be posted near the beginning of the development entrances off Jim Jones Lane. It is also recommended that "Dead End" Signs (W14-1a) be posted at the front of the subdivision on Roads "A" and "B". These signs can be posted above or below the street name signs.
- It is recommended that Stop Signs (R1-1) be installed, and 24" white stop bars be applied to the Proposed Entrance approaches at Jim Jones Lane.
- New signage or future landscaping must not impact sight distances at the Proposed Entrance approaches on Jim Jones Lane. The site designer must ensure that the intersection and stopping sight distances are accounted for and provided in the design plans. A visual inspection determined that these sight distances are available at the entrance locations except possibly for the Road "B" Proposed Entrance. The road curvature and vegetation on Jim Jones Lane currently hinder the existing sight distance to the south. A licensed land surveyor must conduct a more definitive measurement. If the requirement is not met, the vegetation should be removed to ensure that the recommended sight distance is provided.
- Eleven of the seventy-two townhouses will have direct access to Jim Jones Lane via a shared frontage private driveway. A licensed land surveyor must measure

the sight distance from the proposed shared connection to ensure that the recommended intersection sight distance of 250 feet is available on Jim Jones Lane.

- If directed by the local post office, the site designer should include a centralized mail delivery center with a parking area within the development. The site plan does not show a general location, and a specific plan with a parking area should be designed and provided if required by the USPS.
- All drainage grates and covers for the residential development must be pedestrian and bicycle safe.
- Sidewalks are not proposed on the internal roadways. However, a sidewalk is proposed along the northern side of Jim Jones Lanes from the Road "B" Proposed Entrance up to the existing sidewalk system on Oak Ridge Highway. The sidewalk is recommended to be 5 feet minimum in width to meet Knox County regulations.
- All road grade and intersection elements should be designed to AASHTO, TDOT, and Knox County specifications and guidelines to ensure proper transportation operations.
- * • Jim Jones Lane is recommended to be widened to a minimum width of 18 feet between Oak Ridge Highway and the Road "B" Proposed Entrance, approximately 800 feet. The road widening should, at a minimum, begin at the driveway entrances for the RaceWay gas station and the West Knox Solway Storage center and continue up to the north and just past the Road "B" Proposed Entrance.

DESCRIPTION OF EXISTING CONDITIONS

- **STUDY AREA:**

The proposed location of this new residential development is shown on a map in Figure 1. This proposed development will be located off Oak Ridge Highway and along Jim Jones Lane in Northwest Knox County, TN. The development site is south of Melton Hill Lake, north of Oak Ridge Highway, and adjacent to an existing gas station. The development site is just under 2,500 feet northwest of the existing Oak Ridge Highway at Pellissippi Parkway interchange. The development will have two entrances on Jim Jones Lane.

As Knoxville/Knox County Planning requested, transportation impacts associated with the proposed development were analyzed at the unsignalized intersection of Oak Ridge Highway at Jim Jones Lane, where the proposed development will have road access to and from outside destinations.



**View of Proposed Development Site
(Looking Northeast from South Side of Development Property)**

The proposed development property is in a rural/suburbanized area. In the surrounding vicinity, large amounts of property are undeveloped but are commercialized along Oak Ridge Highway between the Oak Ridge Highway/Pellissippi Parkway interchange to the southeast and the Solway Bridge over Melton Hill Lake to the northwest. Around 2000, a gas station was constructed at the intersection of Oak Ridge Highway at Jim Jones Lane, and a self-storage facility was also constructed across Jim Jones Lane.

The proposed development site is currently undeveloped, with it nearly split between open areas that are maintained and areas covered with forest. The development property has 800 feet of road frontage along the west side of Jim Jones Lane just north of Oak Ridge Highway. The development property has some road frontage along Oak Ridge Highway but will not provide any road access for the development to the highway.

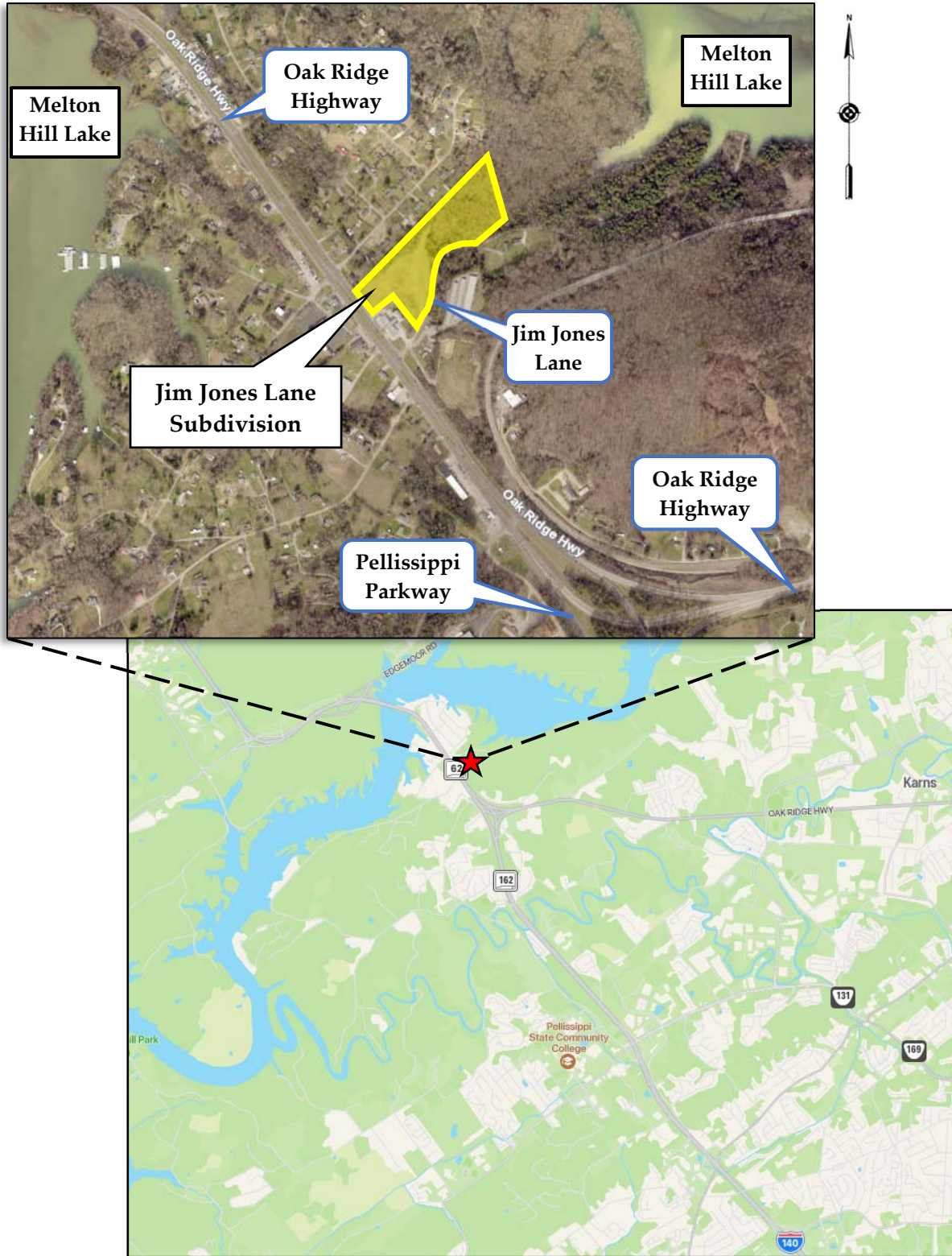


Figure 1
Location Map

▪ **EXISTING ROADWAYS:**

Table 1 lists the characteristics of the existing primary access roadways adjacent to the development property and included in the study:

TABLE 1
STUDY CORRIDOR CHARACTERISTICS

NAME	CLASSIFICATION ¹	SPEED LIMIT	LANES	ROAD WIDTH ²	TRANSIT ³	PEDESTRIAN FACILITIES	BICYCLE FACILITIES
Oak Ridge Highway (SR 62)	Major Arterial	45 mph	4 (with center median)	95 feet	None	Sidewalks on both sides of highway	No bike lanes
Jim Jones Lane	Local Street	Not Posted	2 undivided	13 - 24 feet	None	No sidewalks along roadway	No bike lanes

¹ 2018 Major Road Plan by Knoxville/Knox County Planning

² From edges of pavement or face of curbs

³ According to Knoxville Area Transit (KAT) System Map

Oak Ridge Highway (State Route 62) is classified as a Major Arterial and traverses in a generally northwest-southeast direction in the study area. On its western end, Oak Ridge Highway begins at the interchange with South Illinois Avenue and Edgemoor Road just northwest of the project site and just outside the Knox County line in Anderson County and across Melton Hill Lake. Oak Ridge Highway ends on its eastern end at the City of Knoxville limits, where it transitions to Western Avenue. It has a total length of just over 10 miles. State Route 62 begins in Putnam County, TN, and ends in downtown Knoxville, TN, at the West Summit Drive, Broadway, and Henley Street intersection.

Oak Ridge Highway near the development site currently consists of a 4-lane pavement section with a raised grass median that has a width of approximately 25 feet. Left-turn lanes in the center median are provided at several intersections in the study area on Oak Ridge Highway, and one is provided at Jim Jones Lane. The lanes on the highway are 12 feet wide with 8-foot paved shoulders outside the white edge lines. The highway edges are lined with concrete curb and gutters, and 5-foot sidewalks are provided outside the roadway. The sidewalks on Oak

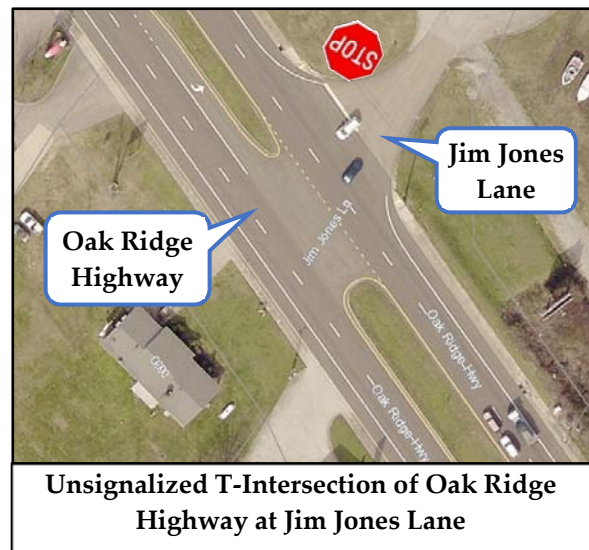


Oak Ridge Highway South of Jim Jones Lane (Looking North)

Ridge Highway adjacent to the development site are provided for approximately $\frac{3}{4}$ of a mile. Commercial and other developments are near the proposed development property along Oak Ridge Highway. These developments include gas stations, retail shops, a used car dealer, churches, and a recently established Solway Veterans Memorial.

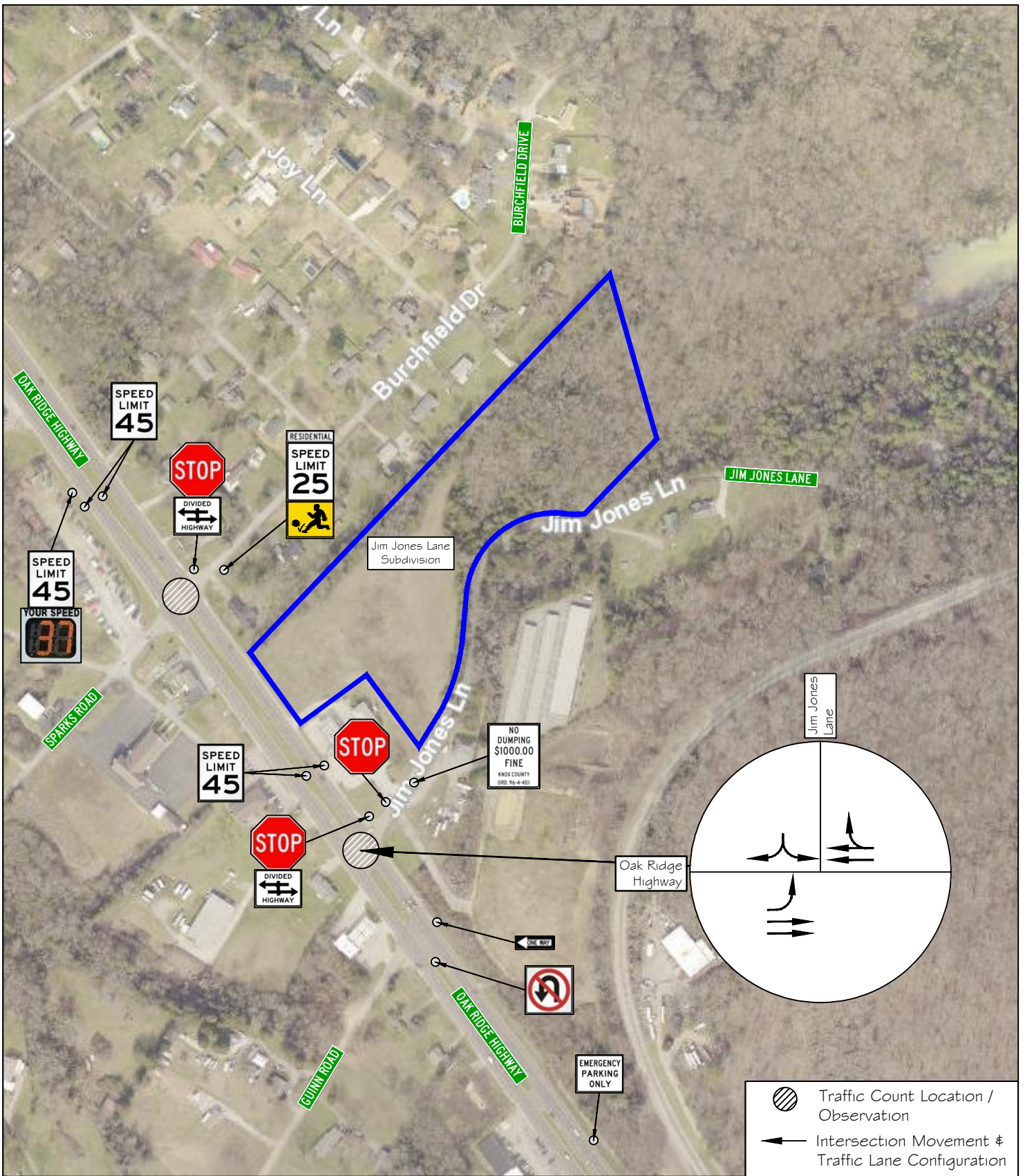
On Oak Ridge Highway, the speed limit is posted at 45-mph and is heavily emphasized with double posted speed limit signage and also includes a flashing white LED speed limit sign for westbound traffic southeast of the proposed development site. The speed limit is also currently emphasized by a portable radar speed sign for eastbound traffic northwest of the proposed development site. Utility streetlights are not provided on Oak Ridge Highway, but streetlights are provided at several of the businesses, including the adjacent RaceWay gas station.

Jim Jones Lane is a Local Street with a total length of 1,775 feet. This street traverses between Oak Ridge Highway on its south side to an abrupt dead-end on its north side. At Oak Ridge Highway, Jim Jones Lane is controlled by a Stop Sign (R1-1). Just north of the Oak Ridge Highway intersection, two private driveways on opposite sides of Jim Jones Lane provide access to a RaceWay gas station and the West Knox Solway Storage center. Jim Jones Lane has a substantially reduced pavement width to the north past these private commercial driveways.



Jim Jones Lane currently provides access to the two commercial developments near Oak Ridge Highway and also provides access to three residential houses and an aboveground AT&T vault. Between Oak Ridge Highway and the Proposed Entrances for the development, the pavement widths were measured every 100 feet, and the widths were measured to be between 13 feet to 16 feet. Jim Jones Lane does not have a posted speed limit and is assumed to be 25-mph.

Figure 2 shows the existing lane configurations of the intersection examined in the study, the traffic count locations for the study, and the current traffic road signage in the study area. The road signage shown in Figure 2 only includes warning and regulatory signage near the development site and adjacent to the studied intersection. The pages following Figure 2 give a further overview of the site study area with photographs.



11812 Black Road
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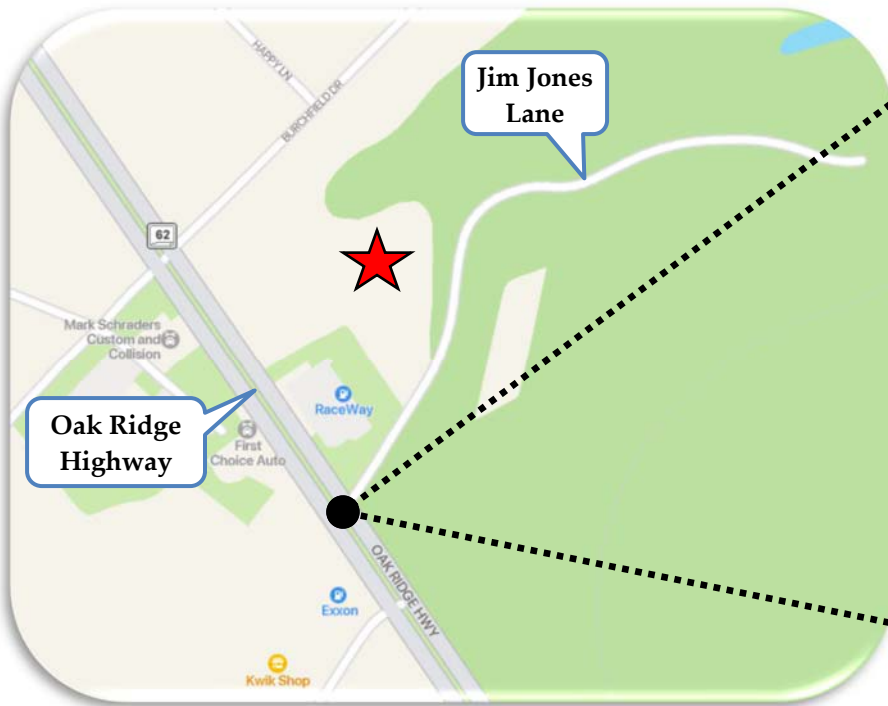


FIGURE 2

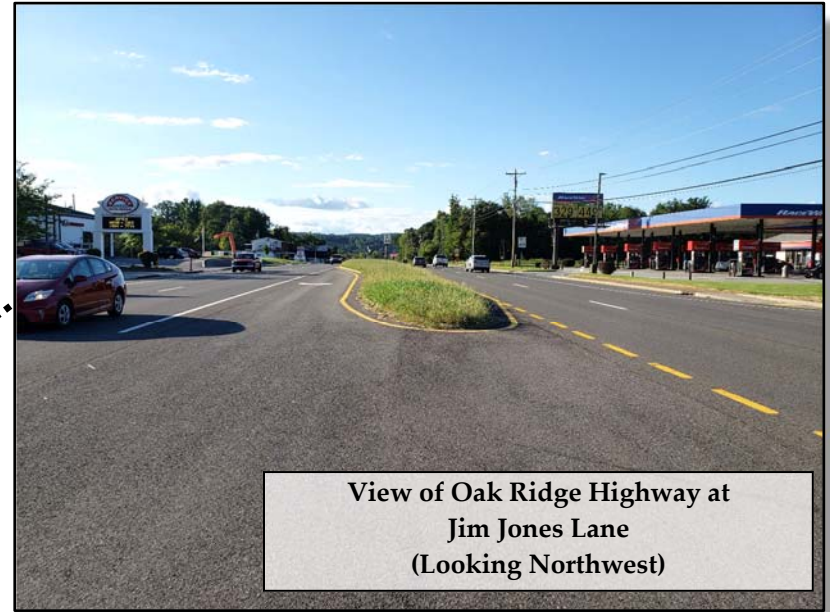
Jim Jones Lane Subdivision

Traffic Count Locations, Traffic Signage & Existing Lane Configurations

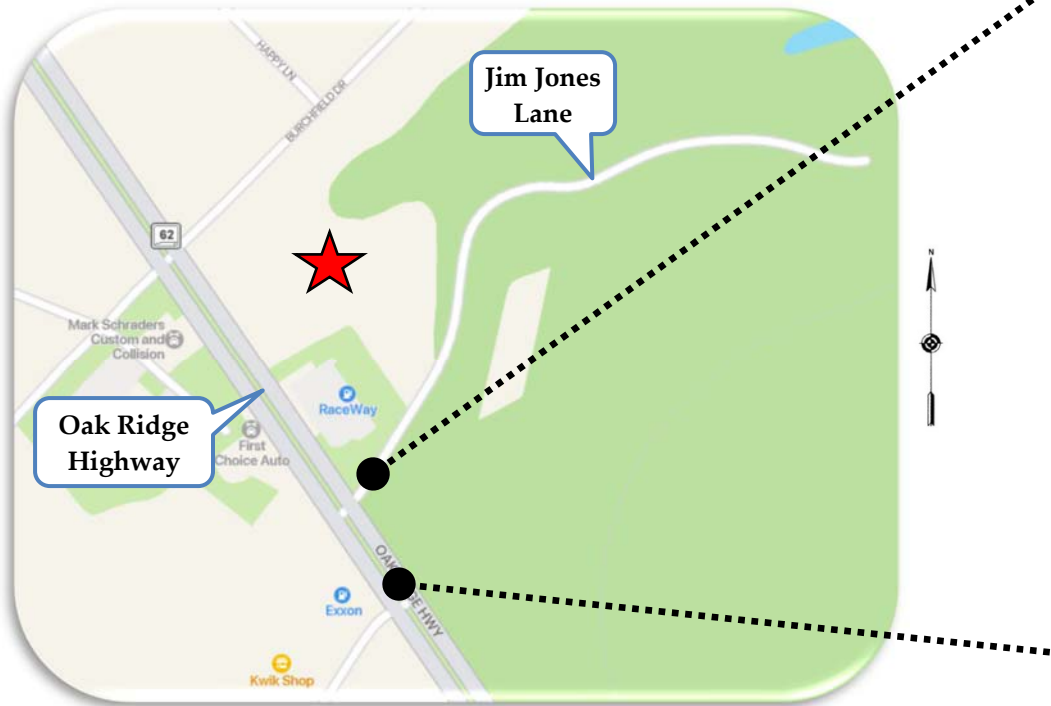
PHOTO EXHIBITS



Intersection of Oak Ridge Highway at Jim Jones Lane



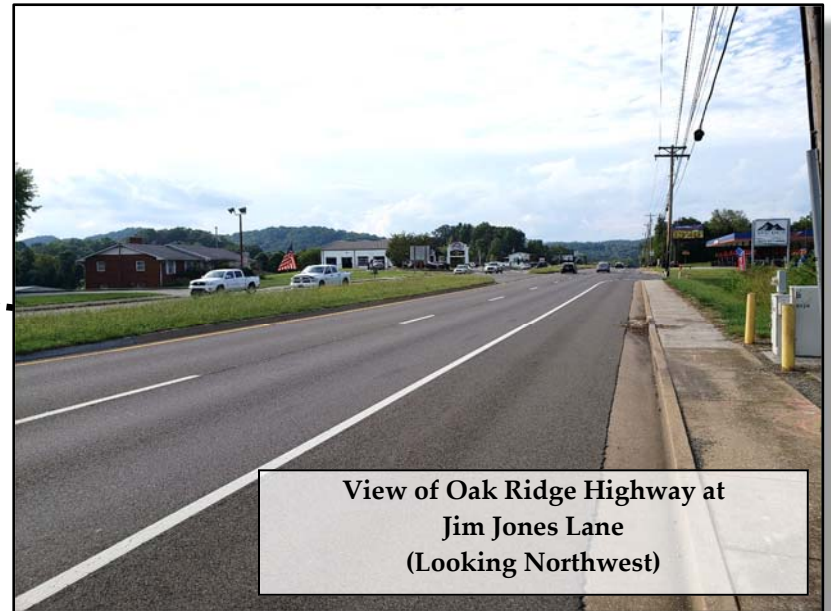
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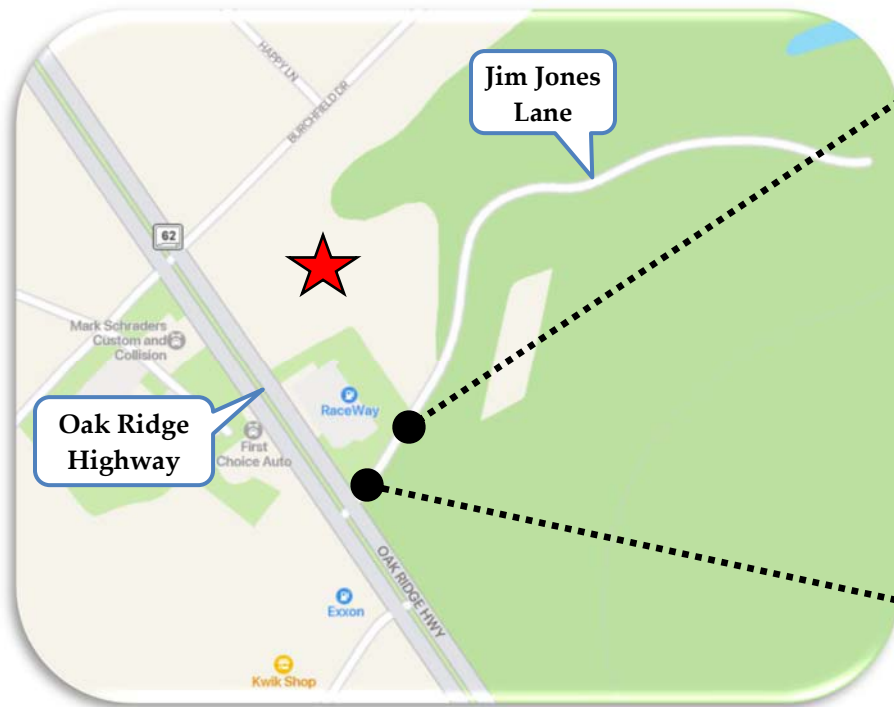
Intersection of Oak Ridge Highway at Jim Jones Lane



View of Jim Jones Lane at Oak Ridge Highway (Looking Southwest)



View of Oak Ridge Highway at Jim Jones Lane (Looking Northwest)



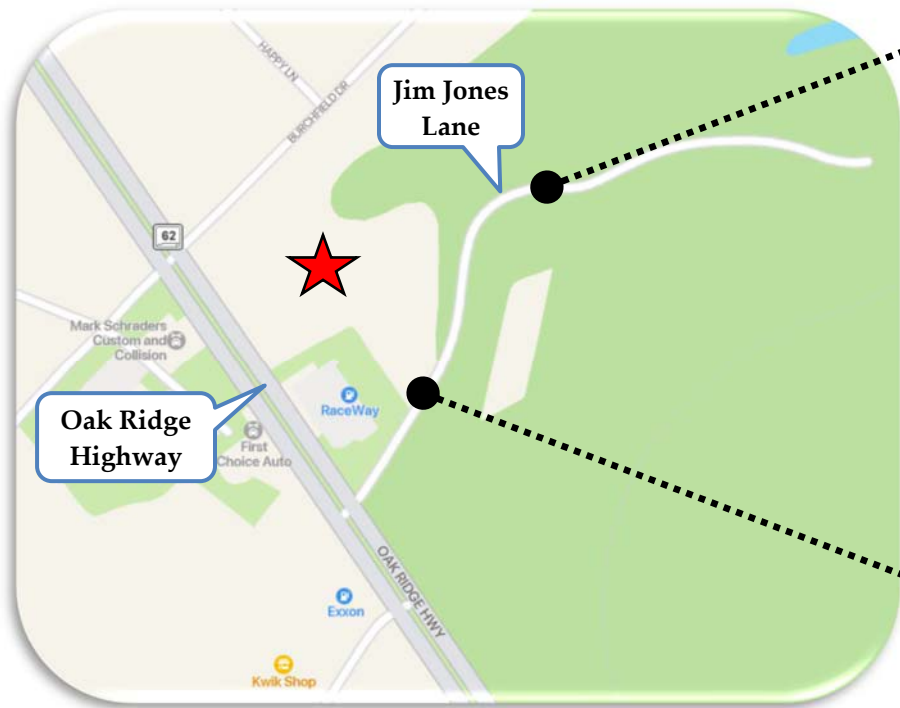
Jim Jones Lane



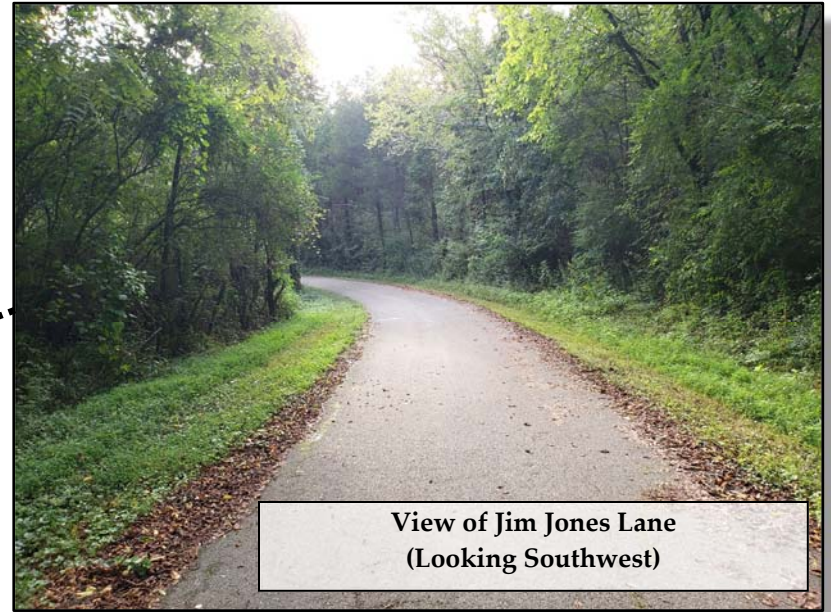
View of Jim Jones Lane (Looking Northeast)



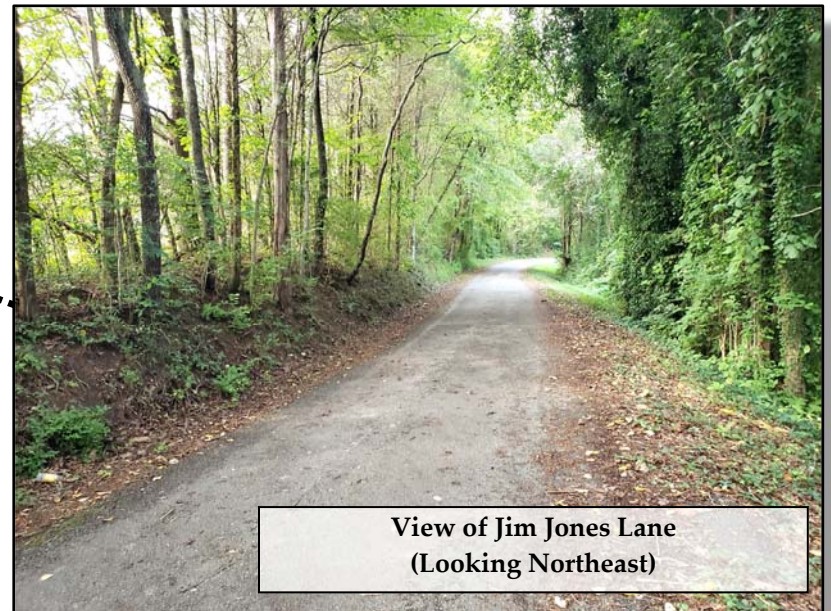
View of Jim Jones Lane (Looking Northeast)



Jim Jones Lane



View of Jim Jones Lane
(Looking Southwest)



View of Jim Jones Lane
(Looking Northeast)

▪ **EXISTING TRANSPORTATION VOLUMES PER MODE:**

One annual vehicular traffic count location exists nearby the study area, and TDOT conducts this count. The count location data is the following and can be viewed with further details in Appendix A:

- Existing vehicular roadway traffic:
TDOT reported an Average Daily Traffic (ADT) on Oak Ridge Highway, just southeast of the development site and Jim Jones Lane, at 48,147 vehicles per day in 2021. From 2011 to 2021, this count station has indicated a -0.8% average annual traffic growth rate.

- Existing bicycle and pedestrian volumes:
The average daily pedestrian and bicycle traffic is unknown along the studied roadways. Due to the lack of facilities (and the large vehicle volumes on Oak Ridge Highway), there is assumed minimal pedestrian and bicyclist activity on these roads in the study area. During the traffic counts for this project at Oak Ridge Highway at Jim Jones Lane, three bicyclists and no pedestrians were observed over 6 hours.



An online website, [strava.com](https://www.strava.com), provides “heat” maps detailing exercise routes taken by pedestrians, joggers, and bicyclists. The provided heat maps show the last two years of data, are updated monthly, and are gathered from individuals allowing their smart devices to track and compile their routes (millions of users). The activities in the maps are shown on the roads with color intensities with lighter colors signifying higher activity. The Strava heat maps



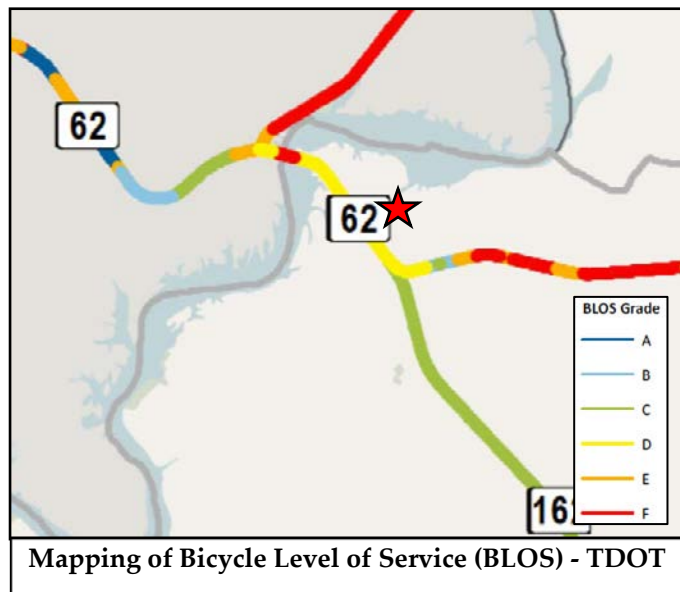
show some bicycle activity along Oak Ridge Highway and Pellissippi Parkway. Higher bicycle activity is shown on Solway Road south of the highway and Haw Ridge Park across Melton Hill Lake to the north. The Strava heat map data shows no pedestrian traffic along Oak Ridge Highway or Jim Jones Lane. Some pedestrian activity is recorded in the existing residential Burchfield Heights subdivision to the north, and large amounts are shown at Haw Ridge Park.

▪ **ON-STREET PARKING:**

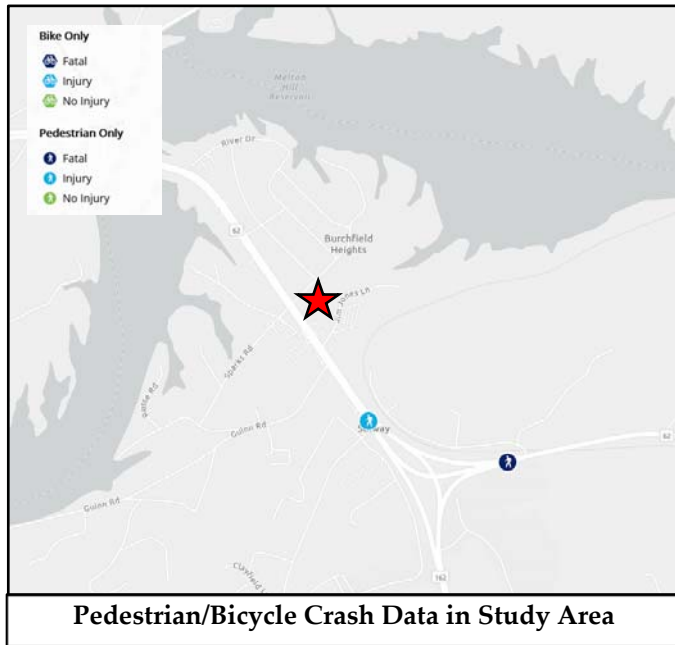
On-street parking was not observed during the site review and is not allowed on any studied roadways adjacent to the project site. Off-street parking facilities are provided at the adjacent RaceWay gas station and the West Knox Solway Storage center.

▪ **PEDESTRIAN AND BICYCLE FACILITIES:**

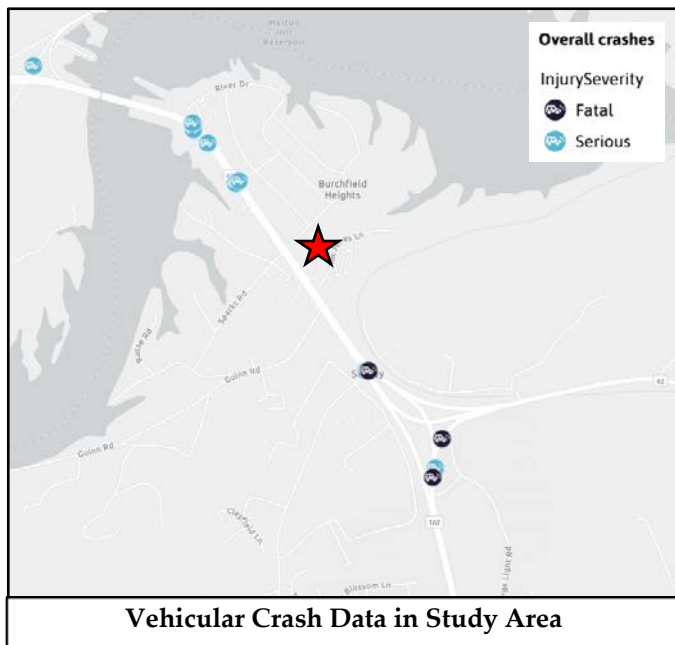
Bicycle facilities (lanes) are not available within the project site study area; however, Oak Ridge Highway is posted with signage designating it as a “Bike Route”. TDOT has published mapping illustrating the Bicycle Level of Service (BLOS) for state routes in Knox County and other counties. BLOS is 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. The BLOS mapping



for Oak Ridge Highway (SR 62) in the study area near the development site shows D grades. Based on these grades, the Strava heat map data, and the observed bicyclists in the traffic counts, the wide paved shoulders on Oak Ridge Highway near the development site appear appealing enough to attract some bicyclists even with the large vehicular volumes and higher vehicle speeds.



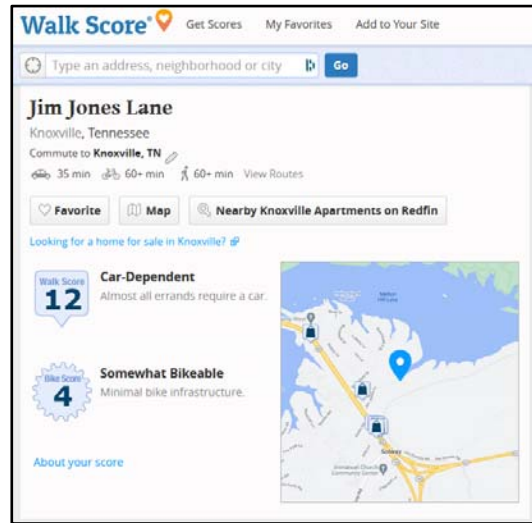
The Knoxville TPO provided a 2020 update to bicycle and pedestrian crash data for Knox County and other surrounding counties. According to the data, none of these incidents occurred near the development site or at the studied intersection in the past couple of years. The closest incidents occurred on Oak Ridge Highway southeast of the development site and near the interchange with Pellissippi Parkway. The incident on Oak Ridge Highway just north of the interchange involved a pedestrian crossing mid-block but not in a crosswalk, resulting in an injury. The other incident occurred on Oak Ridge Highway east of the interchange and resulted in a pedestrian fatality. Details of this incident were not provided, and an online search was unsuccessful in determining what occurred in this crash in November 2015.



The Knoxville TPO also provides data related to “Life-Altering Traffic Crashes”. This data lists “the location of 2,326 traffic crashes in the Knoxville region that resulted in a fatality or serious injury between January 2016 and June 2019.” Several “Serious” and “Fatal” crashes are shown on this TPO mapping in the surrounding area. These crashes occurred along Oak Ridge Highway, northwest and southeast of the development site, but none are adjacent to the site. The closest fatal crashes to the development site occurred at and near the interchange with Oak Ridge Highway and Pellissippi Parkway to the southeast. One of these fatal crashes was attributed to a DUI, and the other two were listed as single-motor vehicle crashes.

▪ **WALK SCORE:**

A private company offers an online website at 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 for the Walk Score and the Bike Score are based on the distance to the closest amenity in various relevant categories (businesses, schools, parks, etc.) and are graded from 0 to 100.



Appendix B shows maps and other information for the Walk Score, Bike Score, and Transit Score at the development property on Jim Jones Lane. The project site location is graded with a Walk Score of 12. This Walk Score indicates that almost all errands currently require a vehicle for travel at the development property. The site is graded with a Bike Score of 4, which means there is minimal bike infrastructure. The site is given a Transit Score of 0 since no public transportation locations are near the development site.

▪ **TRANSIT SERVICES:**

The City of Knoxville has a network of public transit opportunities offered by Knoxville Area Transit (KAT). Bus service is not available in the study area. The overall KAT bus system map is provided in Appendix C. The closest public transit bus stop to the development site is 7.7 miles away to the south by roadway. This bus stop is located on Sherrill Boulevard at Parkwest Medical Center on Route 16, “Cedar Bluff Connector”. It operates on weekdays and weekends; this route map is included in Appendix C. Recently, KAT has had to reduce its service schedule due to workforce shortages. These changes took place on August 29th, 2022, and the reduced schedule for Route 16 is also included in Appendix C. Other transit services in the area include the East Tennessee Human Resource Agency (ETHRA) and the Community Action Committee (CAC), which provides transportation services when requested.



PROJECT DESCRIPTION

▪ LOCATION AND SITE PLAN:

The proposed plan layout with 72 multi-family attached houses on 9.97 +/- acres is designed by Urban Engineering and is shown in Figure 3. As shown in the figure, two new streets will be constructed for the residential development off Jim Jones Lane. The total length of the new streets will be 812 feet (0.15 miles). Eleven of the 72 townhouses will have access to Jim Jones Lane via a shared frontage private driveway, and the other 61 townhouses will have access to Jim Jones Lane via Roads "A" and "B". Both Road "A" and "B" will end in cul-de-sacs. The subdivision will have only one vehicular access point for outside destinations, provided at the existing intersection of Jim Jones Lane at Oak Ridge Highway.

The 9.97-acre residential development will incorporate eight common areas, with a sizable majority in the center of the property, where the stormwater controls will be constructed. The minimum size of the multi-family attached townhouse lots will be just over 2,000 square feet, with a few lots closer to two-tenths of an acre. Each house will have a garage and driveway. Internal sidewalks are not proposed for this development. However, a sidewalk is proposed along the northern side of Jim Jones Lanes from the Road "B" Proposed Entrance up to the existing sidewalk system on Oak Ridge Highway.

As shown in Figure 3, to the north of Jim Jones Lane and the gas station, there is an existing RaceWay gas station entrance off Oak Ridge Highway on the proposed development property. This entrance will be removed or blocked when the subdivision is developed since it exists outside the gas station property line and on the development property. This action will reduce the gas station entrances from three to two – one on Jim Jones Lane and the other on Oak Ridge Highway.

The schedule for the completion of this new residential development is dependent on economic factors and construction timelines. This project is also contingent on permitting, design, and other regulatory approvals. Currently, the real estate market in the area is experiencing large amounts of activity and growth. This study assumed that the total construction build-out of the development and full occupancy would occur within the next three years (2025).

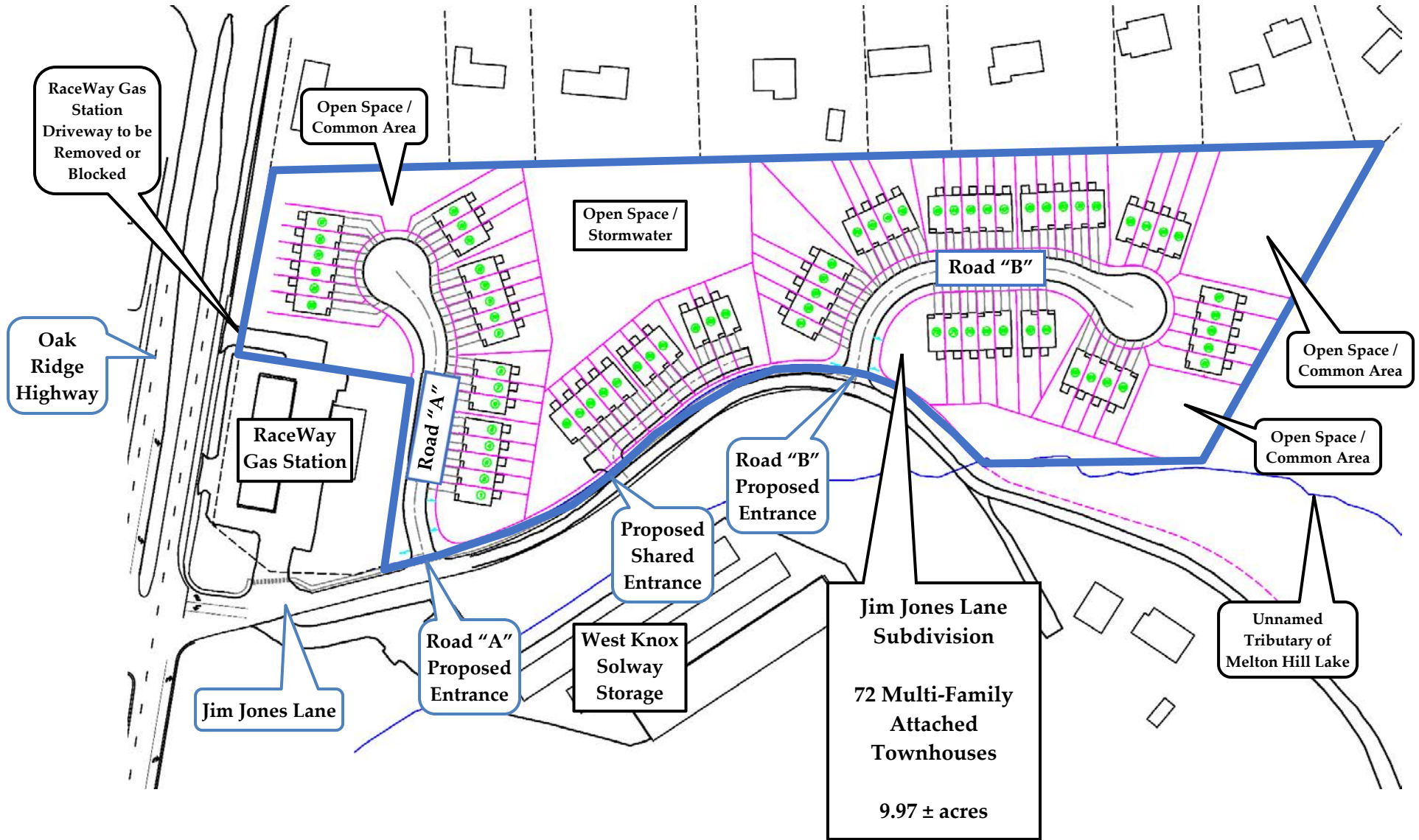


Figure 3
Proposed Plan Layout
Jim Jones Lane Subdivision

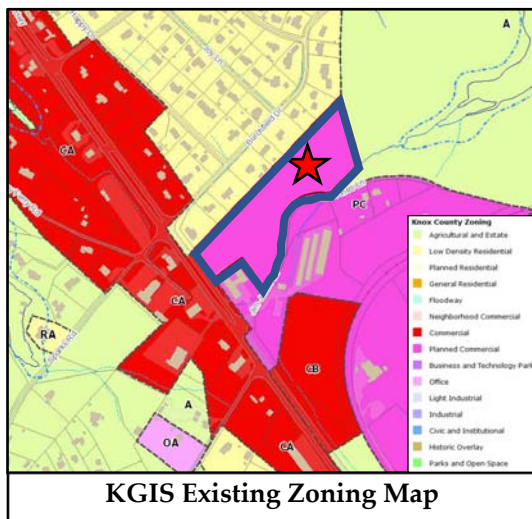


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▪ **PROPOSED USES AND ZONING REQUIREMENTS:**

The parcel comprising the Jim Jones Lane Subdivision development property is zoned as Planned Commercial (PC) within Knox County, TN. The development property was recently requested to be rezoned to the Planned Residential (PR) zone with up to 7.25 units per acre. This rezoning was approved by the Knoxville/Knox County Planning Commission and is now pending Knox County Commission approval. Uses permitted in the Planned Residential (PR) zone include single-family dwellings, duplexes, and multi-dwelling structures and developments. The most recent published online KGIS zoning map is provided in Appendix D. The existing adjacent surrounding zoning and land uses are the following:

- Nine parcels north and northwest of the development site are zoned as Exclusively Residential (RAE). These parcels contain single-family detached houses in the Burchfield Heights Subdivision. This subdivision was first developed in the 1950's.
- A large parcel to the northeast and east is zoned as Agricultural (A) and is owned by the Tennessee Valley Authority (TVA) as part of the development of the lake when the Melton Hill Dam was constructed. This property is undeveloped and entirely forested.
- All the properties to the southeast and south are zoned as Planned Commercial (PC). These parcels contain a few single-family residences, an aboveground AT&T vault, the West Knox Solway Storage center, and the RaceWay gas station.
- The properties across Oak Ridge Highway to the southwest and south are zoned as Commercial (CA) and consist of a church, a veteran's memorial, an auto repair shop, a gas station, and a single-family detached house.



KGIS Existing Zoning Map



KGIS Existing Land Use Map

▪ **DEVELOPMENT DENSITY:**

The Jim Jones Lane Subdivision development's proposed density is based on a maximum of 72 multi-family attached townhouses on 9.97 acres. Seventy-two townhouses on 9.97 acres compute to 7.22 dwelling units per acre, slightly less than the requested property rezoning to Planned Residential (PR) with 7.25 units per acre.

▪ **ON-SITE CIRCULATION:**

The total length of the two new streets within the development will be 812 feet (0.15 miles), designed and constructed to the Knox County, TN specifications. The development will have asphalt paved internal roadways and 8" extruded concrete curbs. The lane widths internally will be 13 feet each for a total 26-foot pavement width. The public right-of-way within the development will be 50 feet. Sidewalks are not proposed along the internal roads. However, a sidewalk is proposed along the northern side of Jim Jones Lanes from the Road "B" Proposed Entrance up to the existing sidewalk system on Oak Ridge Highway. Knox County will maintain the streets in the development after construction, and these will be dedicated public roads.

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

Besides residential passenger vehicles, the internal roadways will provide access to service, delivery, maintenance, and fire protection/rescue vehicles. None of these vehicle types will impact roadway operations other than when they occasionally enter and exit the development. It is expected that curbside private garbage collection services will be available for this residential subdivision.

The new public streets will be designed and constructed to Knox County specifications and are expected to be adequate for fire protection and rescue vehicles, truck collection trucks, and single-unit delivery trucks. The development's internal drives will accommodate the larger vehicle types and residents' standard passenger vehicles.

ANALYSIS OF EXISTING AND PROJECTED CONDITIONS

▪ EXISTING TRAFFIC CONDITIONS:

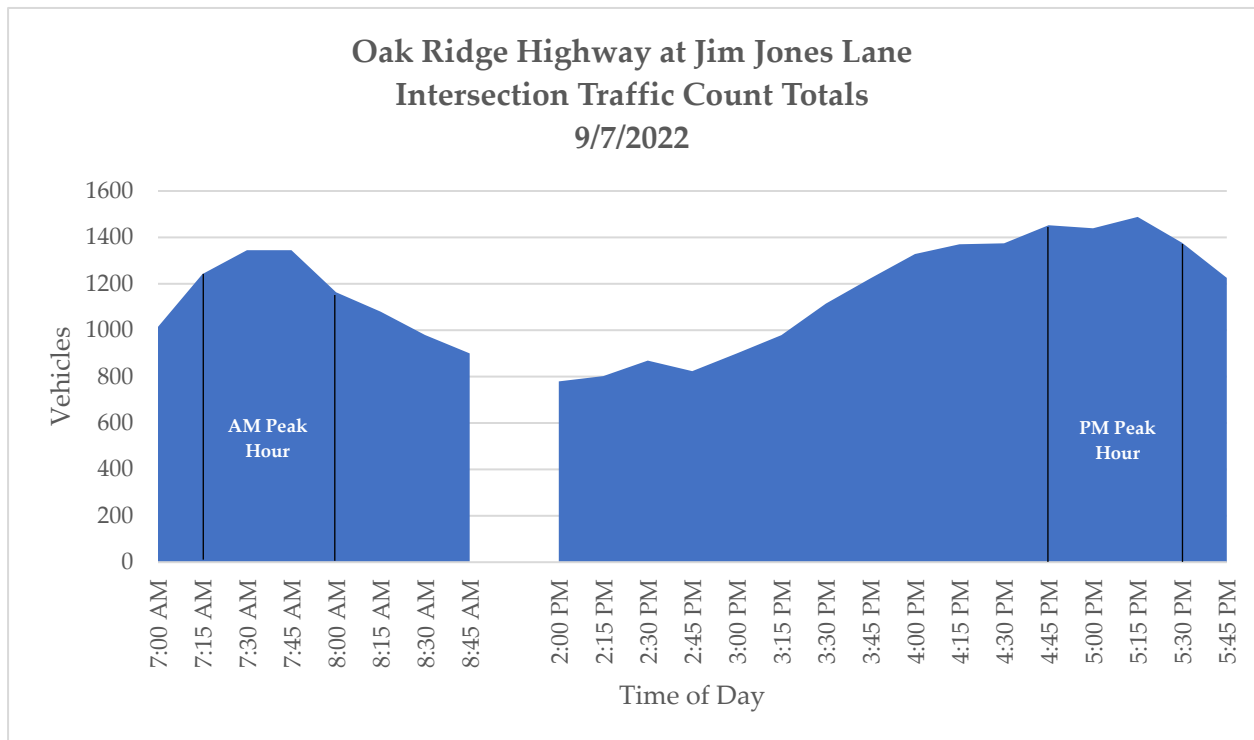
This study conducted a 6-hour traffic count at the unsignalized t-intersection of Oak Ridge Highway at Jim Jones Lane on Wednesday, September 9th, 2022. The manual traffic counts were conducted to tabulate the morning and afternoon peak period volumes and travel directions near the proposed development site. Based on the traffic volumes collected, the AM and PM peak hours were observed at 7:15 – 8:15 am and 4:45 – 5:45 pm at the intersection. Local county public schools were in session when the traffic counts were conducted. An additional abbreviated traffic count was conducted at the intersection of Oak Ridge Highway at Burchfield Drive during the peak hours observed at Jim Jones Lane. The traffic count at Burchfield Drive only tabulated the entering and exiting vehicles. This intersection is 780 feet to the northwest of the intersection of Oak Ridge Highway at Jim Jones Lane.

The manual tabulated traffic counts of the intersection of Oak Ridge Highway at Jim Jones Lane can be reviewed in Figure 4 and Appendix E, and some observations from the count are listed below.

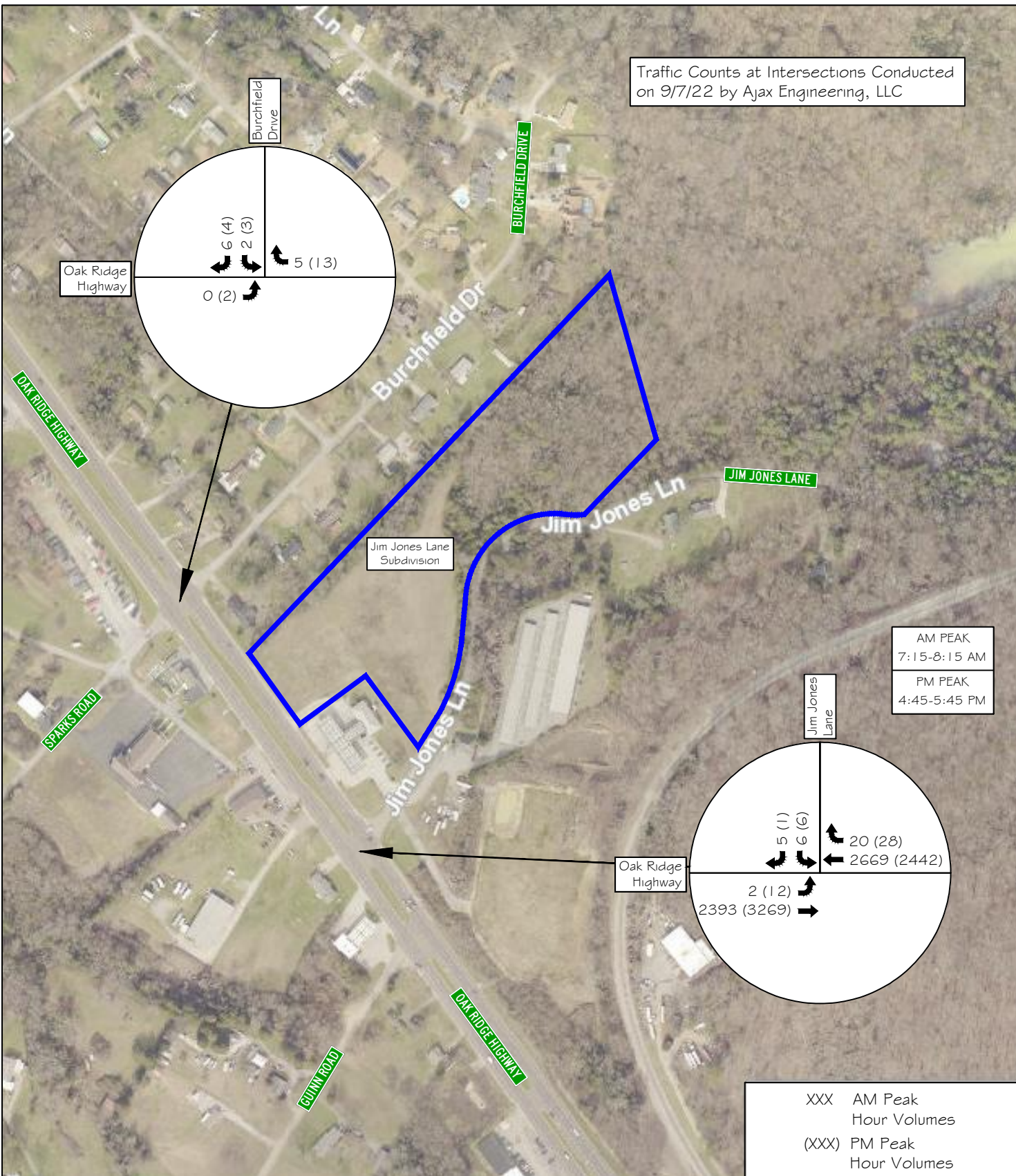
- Three bicyclists were observed during the traffic counts at the intersection of Oak Ridge Highway at Jim Jones Lane. One bicyclist was observed traveling west on the westbound paved shoulder of Oak Ridge Highway in the early afternoon. Another bicyclist was observed traveling on the eastbound sidewalk of Oak Ridge Highway, heading west. The third bicyclist was observed traveling east on the eastbound paved shoulder of Oak Ridge Highway in the afternoon. No pedestrians were observed at the intersection.
- Most of the observed traffic was passenger vehicles, but the traffic stream on Oak Ridge Highway also included public school buses, dump trucks, concrete mixer trucks, and semi-tractor trailers.
- Nearly all the observed entering and exiting vehicles on Jim Jones Lane at Oak Ridge Highway were traffic movements to and from the RaceWay gas station. A handful of vehicles entered and exited the West Knox Solway Storage center on Jim Jones Lane.
- Except for one, all vehicles observed turning left from Jim Jones Lane onto eastbound Oak Ridge Highway completed the turn in two distinct stages. The first stage included finding an appropriate gap in the traffic stream on Oak Ridge Highway and crossing the westbound travel lanes to the center median area. The second stage of the left turn

involved finding another gap in the eastbound traffic stream on Oak Ridge Highway and then entering the eastbound traffic stream. Due to the constant, high vehicle stream on Oak Ridge Highway, vehicle delays/wait times for this maneuver were observed to be minutes for turning vehicles in the peak hours to complete. Likewise, left turns from Oak Ridge Highway onto Jim Jones Lane were observed with high vehicle delays waiting to find a suitable gap in traffic in the opposing westbound traffic.

- Several U-turns were observed on Oak Ridge Highway at Jim Jones Lane during the 6-hour traffic count, most traveling east and turning back towards the west. A total of three U-turns in this direction were observed in the PM peak hour, and these were included in the left-turns on Oak Ridge Highway shown in the figures and calculations. No U-turns making this movement were observed during the AM peak hour. Also, no U-turns were observed in the peak hours in the opposite direction (heading west and turning back towards the east), but a few occurred in the off-peak times.
- The abbreviated traffic count at the intersection of Oak Ridge Highway at Burchfield Drive was conducted to quantify the entering and exiting traffic movements at a similar and adjacent land use. Most of the exiting traffic from the Burchfield Heights Subdivision on Burchfield Drive headed west towards Oak Ridge, and most of the entering traffic was from the east.



Traffic Counts at Intersections Conducted on 9/7/22 by Ajax Engineering, LLC



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FIGURE 4

Jim Jones Lane Subdivision

2022 Peak Hour Traffic Volumes -
 EXISTING TRAFFIC CONDITIONS

Capacity analyses were undertaken to determine the Level of Service (LOS) for the existing 2022 traffic volumes shown in Figure 4 at the studied intersection of Oak Ridge Highway at Jim Jones Lane. The capacity analyses were calculated following the Highway Capacity Manual (HCM) methods and Synchro Traffic Software (Version 11).

Methodology:


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



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

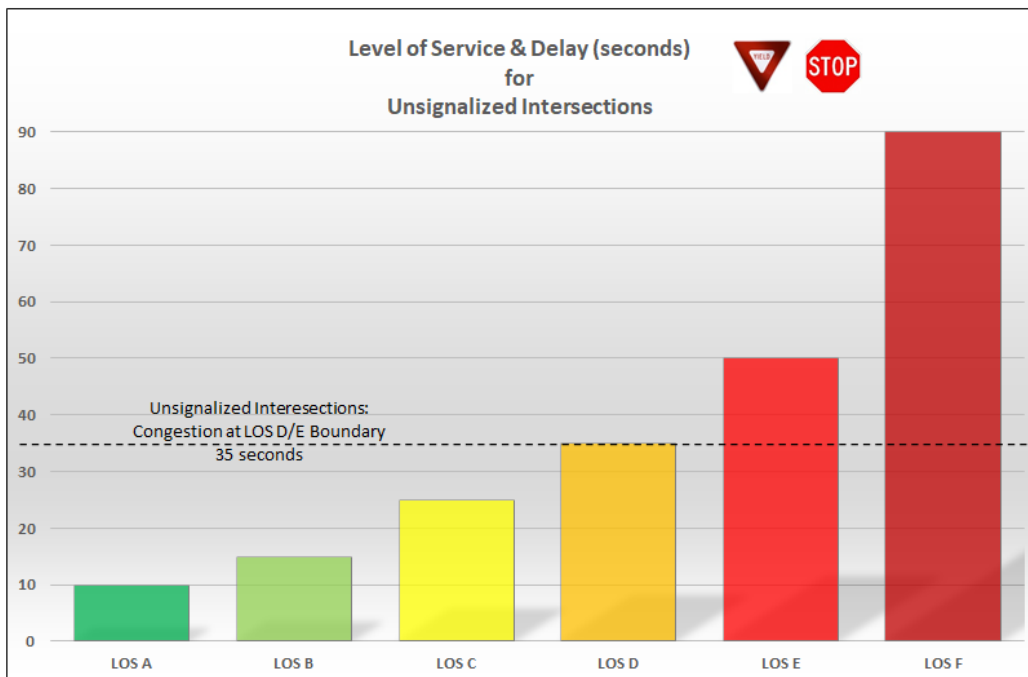
For unsignalized intersections, LOS is measured in terms of delay (in seconds). This measure is an attempt to quantify delay that includes travel time, driver discomfort, and fuel consumption. For unsignalized intersections, the analysis assumes that the mainline thru and right-turn traffic does not stop and is not affected by the traffic on the minor side streets. Thus, the LOS for a two-way stop (or yield) controlled intersection is defined by

the delay for each minor approach and major street left-turn movements. Table 2 lists the level of service criteria for unsignalized intersections. The analysis results of unsignalized intersections using the HCM methodologies are conservative due to the more significant vehicle gap parameters used in the method. More often, in normal road conditions, drivers are more willing to accept smaller gaps in traffic than what is modeled using the HCM methodology. The unsignalized intersection methodology also does not account for 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.

TABLE 2
LEVEL OF SERVICE AND DELAY FOR UNSIGNALIZED INTERSECTIONS 

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


Source: Highway Capacity Manual, 6th Edition



Intersection capacity results from the existing 2022 peak hour traffic are shown in Table 3. The intersection in the table is shown with a LOS designation, delay (in seconds), and v/c ratio (volume/capacity) for the AM and PM peak hours. Appendix F includes the worksheets for the existing 2022 peak hour capacity analyses.

As shown in Table 3, the existing 2022 movements exiting from Jim Jones Lane are calculated to be operating with very poor LOS and high vehicle delays in the AM and PM peak hours (and as observed). The traffic entering Jim Jones Lane from the west (eastbound left-turns) was calculated with a more reasonable LOS and moderate vehicle delays.

TABLE 3
2022 INTERSECTION CAPACITY ANALYSIS RESULTS -
EXISTING TRAFFIC CONDITIONS

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS ^a	DELAY ^b (seconds)	v/c ^c	LOS ^a	DELAY ^b (seconds)	v/c ^c
Oak Ridge Highway (EB & WB) at Jim Jones Lane (SB)	 Unsignalized	Eastbound Left	D	31.7	0.056	D	28.4	0.094
		Southbound Left/Right	F	323.3	0.847	F	230.7	0.552

Note: All analyses were calculated in Synchro 11 software and reported using HCM 2010 intersection methodology

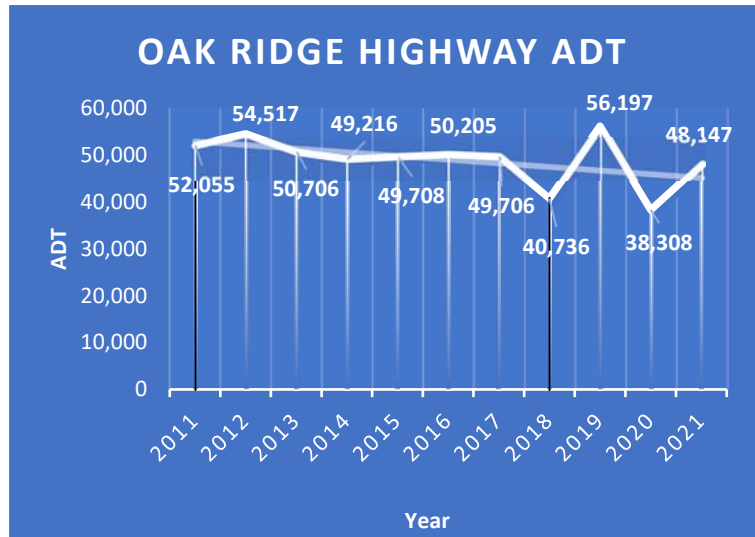
^a Level of Service, ^b Average Delay (sec/vehicle), ^c Volume-to-Capacity Ratio

Furthermore, the capacity calculations from the software showed that the southbound lane on Jim Jones Lane at Oak Ridge Highway has a projected 95th percentile vehicle queue length of 2.7 vehicles in the AM peak hour and 1.8 vehicles in the PM peak hour in the existing conditions. The 95th percentile vehicle queue is the recognized measurement in the traffic engineering profession as the design standard used when considering vehicle queue lengths. A 95th percentile vehicle queue length means 95% certainty that the vehicle queue will not extend beyond that point. Based on the software’s parameters of 25 feet per vehicle, this converts to a calculated vehicle queue length of 67.5 feet in the AM peak hour and 45 feet in the PM peak hour. Compared to the software results, the longest observed vehicle queue on Jim Jones Lane during the 6-hour traffic count was three passenger vehicles in length, approximately 75 feet.

▪ **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). The build-out and full occupancy for this proposed development is assumed to occur by 2025.

Vehicular traffic on Oak Ridge Highway in the study area has shown a slight negative annual growth over the past ten years (-0.8%), according to the TDOT traffic count station and as shown in Appendix A. For this study, a higher annual growth rate of 0.5% was used to calculate future growth on Oak Ridge Highway up to 2025 to account for potential traffic growth in the study area and provide a conservative analysis.



The growth rate of 0.5% was only applied to the thru Oak Ridge Highway volumes tabulated from the traffic count. This application calculated the intersection volumes in 2025 without the projected development traffic. Factors to the traffic volumes on Jim Jones Lane were not applied since traffic growth other than the proposed subdivision is not expected. Capacity analyses were undertaken to determine the projected LOS in 2025 without the project at the intersection. The results are shown in Table 4, and Appendix F includes the capacity analysis worksheets. The results in Table 4 are similar to the existing 2022 results shown in Table 3 but with higher vehicle delays. Figure 5 shows the projected 2025 traffic volumes without the project at the intersection during the AM and PM peak hours.

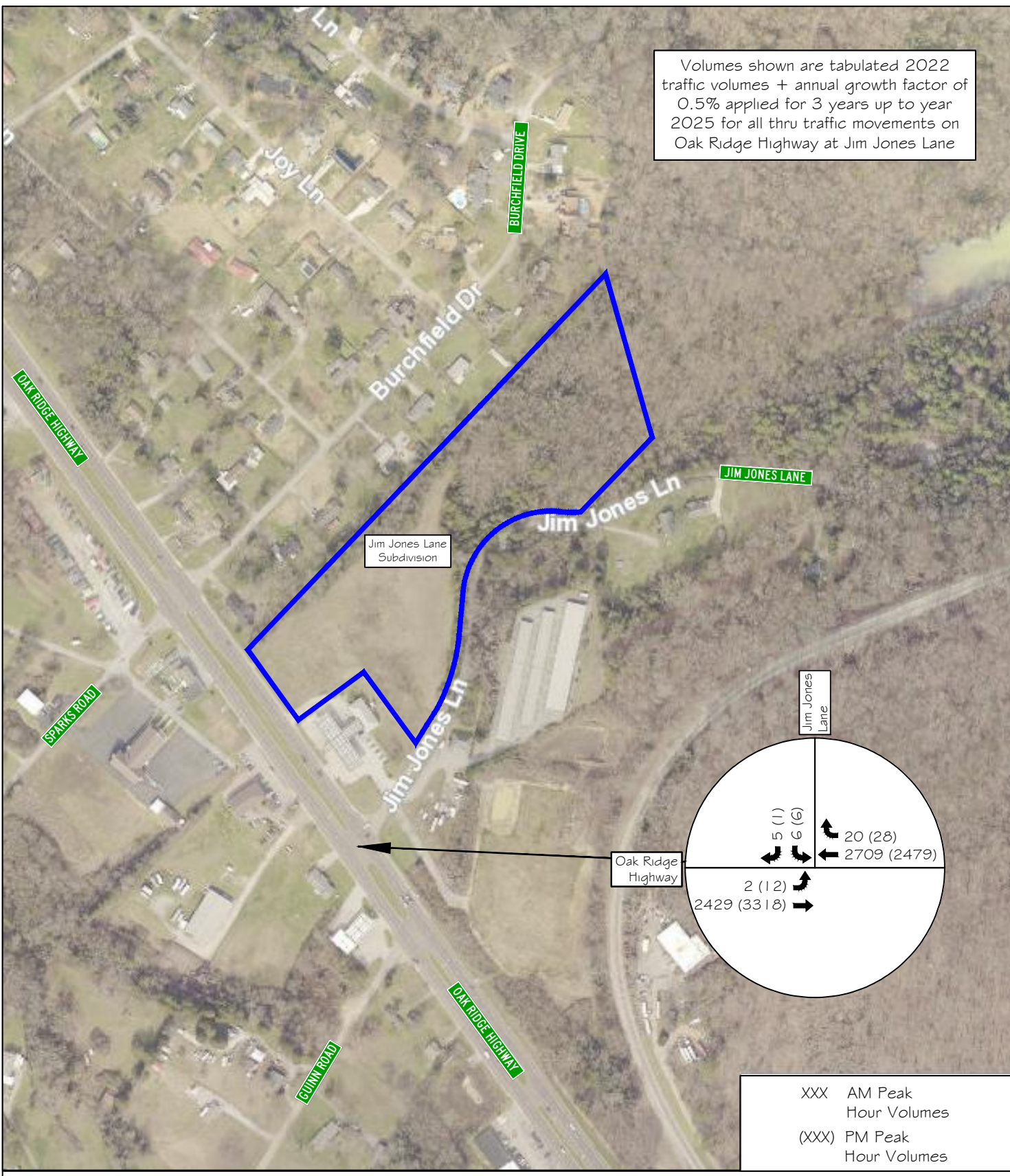
TABLE 4
2025 INTERSECTION CAPACITY ANALYSIS RESULTS -
PROJECTED TRAFFIC CONDITIONS (WITHOUT THE PROJECT)

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS ^a	DELAY ^b (seconds)	v/c ^c	LOS ^a	DELAY ^b (seconds)	v/c ^c
Oak Ridge Highway (EB & WB) at Jim Jones Lane (SB)		Eastbound Left	D	32.7	0.058	D	29.1	0.097
		Southbound Left/Right	F	363.0	0.913	F	256.3	0.593

Note: All analyses were calculated in Synchro 11 software and reported using HCM 2010 intersection methodology

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

Volumes shown are tabulated 2022 traffic volumes + annual growth factor of 0.5% applied for 3 years up to year 2025 for all thru traffic movements on Oak Ridge Highway at Jim Jones Lane



XXX AM Peak Hour Volumes
 (XXX) PM Peak Hour Volumes



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FIGURE 5
 Jim Jones Lane Subdivision
 2025 Peak Hour Traffic Volumes - PROJECTED TRAFFIC CONDITIONS (WITHOUT THE PROJECT)

▪ **TRIP GENERATION:**

A generated trip is a single or one-direction vehicle movement entering or exiting the study site. The estimated number of trips the multi-family townhouses will generate was calculated based on Knoxville/Knox County Planning equations. These equations were developed from an extensive local study to estimate townhouse (and apartment) trip generation in the surrounding area and were published in December 1999. For Knox County, these are the preferred trip generation rates to use for townhouses and apartments.

The data and calculations from the local study for the proposed land use are shown in Appendix G. A summary of this information is presented in the following table:

TABLE 5
TRIP GENERATION FOR JIM JONES SUBDIVISION
72 Attached Townhouses

ITE LAND USE CODE	LAND USE DESCRIPTION	UNITS	GENERATED DAILY TRAFFIC	GENERATED TRAFFIC AM PEAK HOUR			GENERATED TRAFFIC PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
Local Trip Rate	Townhouses	72 Townhouses	711	22%	78%		55%	45%	
				9	31	40	32	27	59

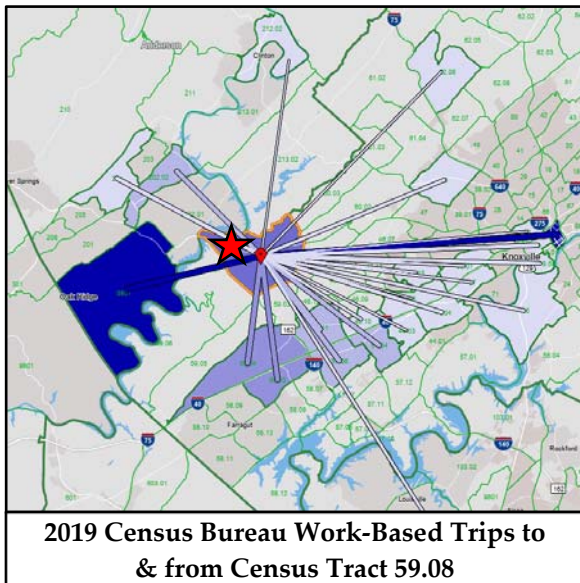
From Local Trip Rates and calculated by using Fitted Curve Equation

For the proposed residential development, with 72 multi-family attached townhouses, it is estimated that 9 vehicles will enter and 31 will exit, for a total of 40 generated trips during the AM peak hour in the year 2025. Similarly, it is estimated that 32 vehicles will enter and 27 will exit, for a total of 59 generated trips during the PM peak hour in the year 2025. The calculated trips generated for an average weekday are estimated to be 711 vehicles for the proposed development. No vehicle trip reductions were included in the calculations or analysis.

▪ **TRIP DISTRIBUTION AND ASSIGNMENT:**

The projected trip distribution and assignment for the Jim Jones Lane Subdivision development are based on several sources and engineering judgments. The first source is based on the existing traffic count volumes and the observed travel directions collected at the intersections on Oak Ridge Highway adjacent to the proposed development site.

During the traffic count, in the AM peak hour, slightly more thru traffic was observed traveling westbound towards Oak Ridge versus eastbound towards Knoxville. The AM peak hour split was 53% westbound and 47% eastbound. A more pronounced split on Oak Ridge Highway was observed in the PM peak hour in the opposite direction, with 57% eastbound and 43% westbound.



The second source for determining the projected trip distribution is based on work-related trips in the local area. Work-based trips will be a significant impetus for generated trips by the development, and these trips are more likely to travel to and from the west, south, southeast, and east. This assertion is based on data from the United States Bureau website for Census Tract 59.08, where the development property is located. Based on 2019 (latest available) census data and as shown in Appendix H, most work-based trips in the surrounding area correspond to Oak Ridge, downtown Knoxville, the University of Tennessee area, and areas of West Knoxville.

In addition to employment centers, some generated traffic will travel to and from public and private schools. Schools will be another impetus for external trip-making. The development property is currently zoned for Hardin Valley Elementary, Hardin Valley Middle, and Karns High School.

Hardin Valley Elementary and Middle Schools are approximately 5.5 miles away by roadway south of the development site via Oak Ridge Highway and Pellissippi Parkway. Karns High School is 3.9 miles away by roadway to the south and east of the development site. Karns High School will be accessed via Oak Ridge Highway to the south and then to the east from the

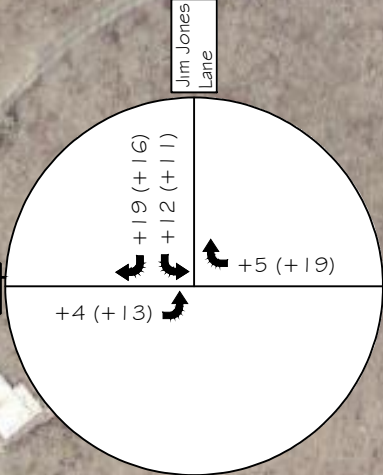
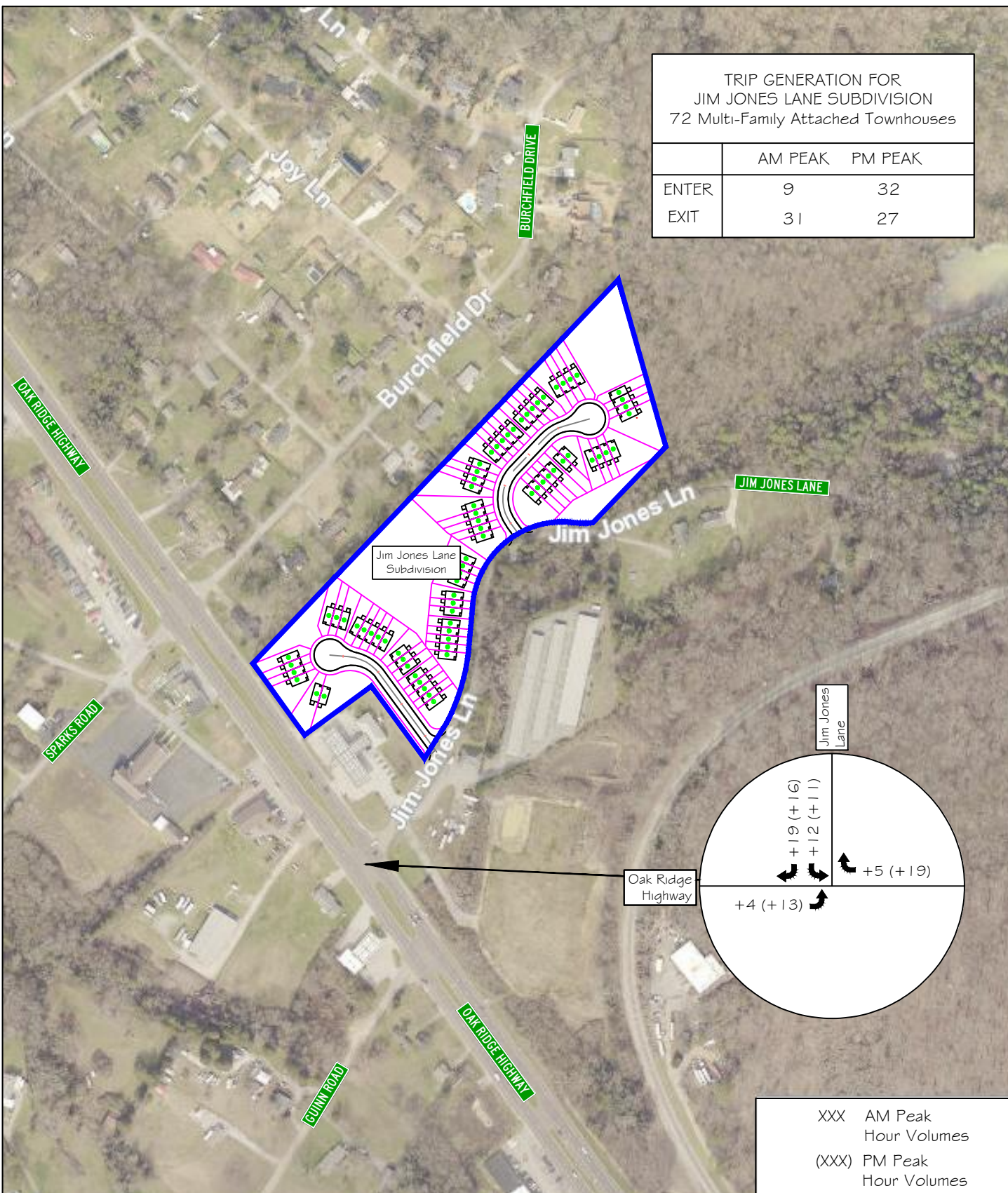
Pellissippi Parkway interchange.

The Knox County Schools Transportation Department has developed Parental Responsibility Zones (PRZ) to determine whether students are offered transportation services to and from school. The PRZ is defined as being 1.5 miles for grades 6 – 12 and 1.0 miles for grades K – 5 from where the students' parcel is accessed to the point where the buses unload at the school. This development will be outside the PRZ for all the zoned schools, and all school-age children attending public schools in the development will be able to utilize this service if desired.

Figure 6 shows the projected distribution of traffic entering and exiting the proposed development at the studied intersection. The percentages shown in the figure only pertain to the trips generated by the proposed dwellings in the development calculated from the local trip rates. Ultimately, based on the observed traffic and the other information, a non-standard trip distribution was assumed. This assumed distribution projected that 60% of the generated exiting trips would head to the west (Oak Ridge) and 60% would enter from the east (Knoxville) in the AM and PM peak hours. Entering traffic from the west (Oak Ridge) was assumed to be 40%, and exiting traffic towards the east (Knoxville) was assumed to be 40% in the AM and PM peak hours. This non-standard distribution was assumed based on the observed travel, which is believed to be heavily influenced by the amount of traffic on Oak Ridge Highway during peak hours. The heavy amount of traffic on Oak Ridge Highway and the difficulty of entering and exiting the highway play a significant role in the trip patterns.

Figure 7 shows the traffic assignment of the computed trips generated by the development and is based on the assumed distribution of trips shown in Figure 6.

TRIP GENERATION FOR JIM JONES LANE SUBDIVISION 72 Multi-Family Attached Townhouses		
	AM PEAK	PM PEAK
ENTER	9	32
EXIT	31	27



XXX AM Peak
Hour Volumes
(XXX) PM Peak
Hour Volumes



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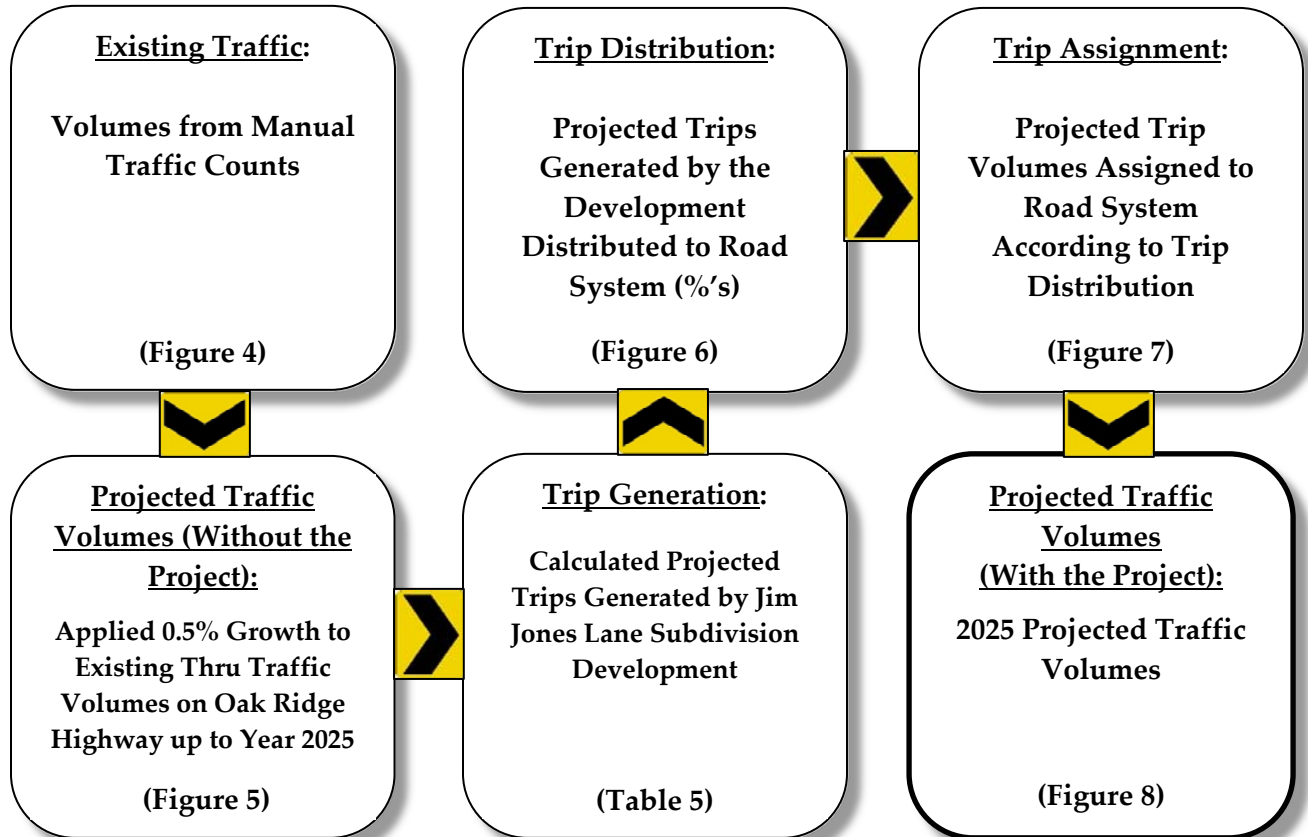
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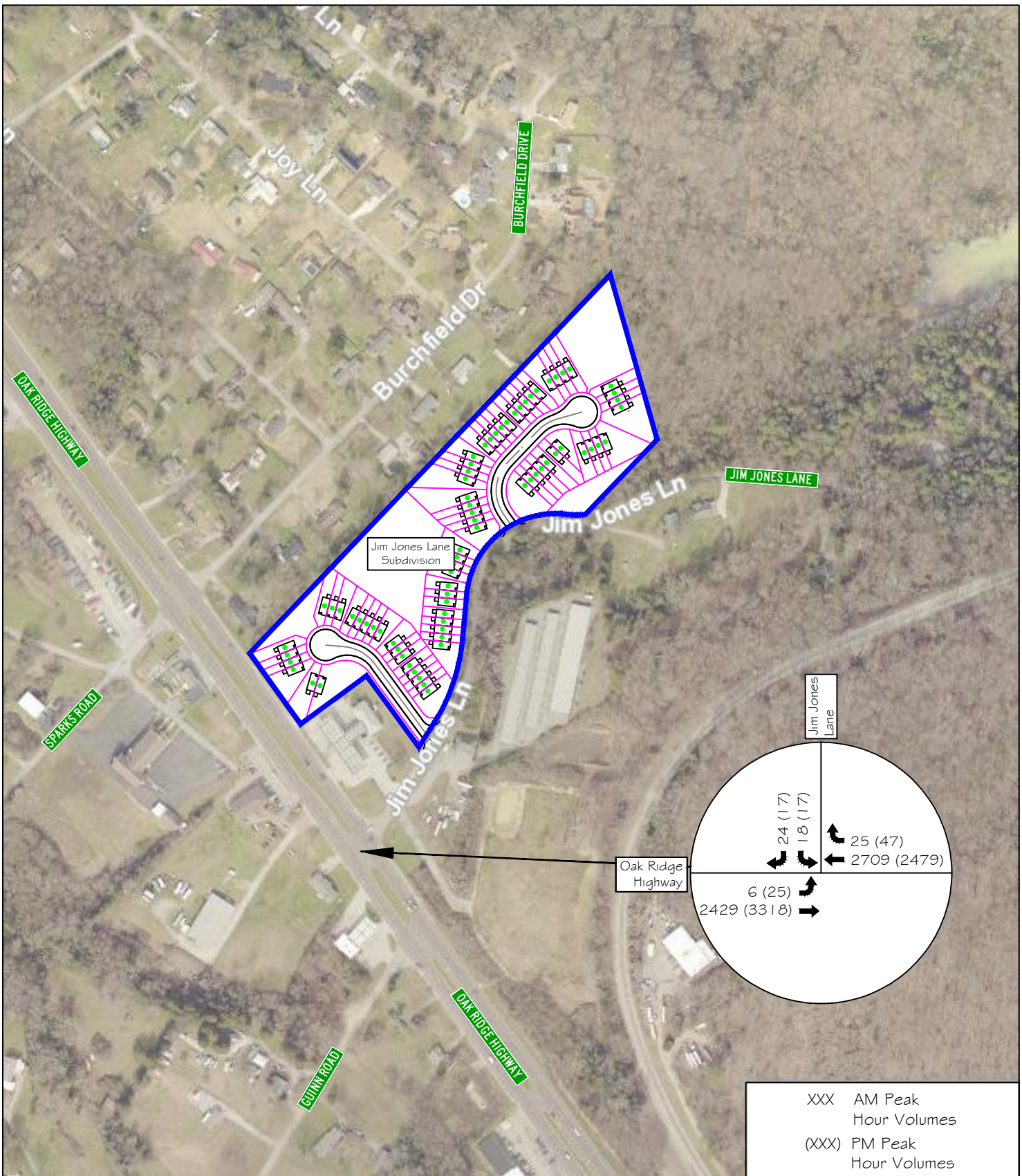
FIGURE 7
Jim Jones Lane Subdivision
Traffic Assignment of Generated Traffic
during AM and PM Peak Hour

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

Overall, several additive steps were taken to estimate the total projected traffic volumes at the studied intersection when the Jim Jones Lane Subdivision development is constructed and occupied in 2025. The steps are illustrated below for clarity and review:



The calculated peak hour traffic (Table 5) generated by the Jim Jones Lane Subdivision development was added to the 2025 horizon year traffic (Figure 5) by following the predicted trip distributions and assignments (Figures 6 and 7). This procedure was completed to obtain the total projected traffic volumes when the proposed development is fully built out and occupied in 2025. Figure 8 shows the projected 2025 AM and PM peak hours with the generated development traffic at the studied intersection.



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FIGURE 8

Jim Jones Lane Subdivision

2025 Peak Hour Traffic Volumes -
 PROJECTED TRAFFIC CONDITIONS
 (WITH THE PROJECT)

Capacity analyses were conducted to determine the projected LOS at the studied intersection with the development traffic in 2025. The results continued the previous calculations showing a result of LOS F and even more extreme high vehicle delays at the intersection for southbound left and right-turn movements from Jim Jones Lane. These results can be seen in Table 6, and Appendix F includes the worksheets for these capacity analyses.

TABLE 6
2025 INTERSECTION CAPACITY ANALYSIS RESULTS -
PROJECTED TRAFFIC CONDITIONS (WITH THE PROJECT)

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS ^a	DELAY ^b (seconds)	v/c ^c	LOS ^a	DELAY ^b (seconds)	v/c ^c
Oak Ridge Highway (EB & WB) at Jim Jones Lane (SB)	 Unsignalized	Eastbound Left	E	36.8	0.175	D	33.3	0.208
		Southbound Left/Right	F	1219.7	3.052	F	773.5	2.267

Note: All analyses were calculated in Synchro 11 software and reported using HCM 2010 intersection methodology

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

▪ **POTENTIAL TRANSPORTATION SAFETY ISSUES:**

The study area was investigated for potential existing and future safety issues when the development is constructed. These adjacent transportation system features are discussed in the following pages.

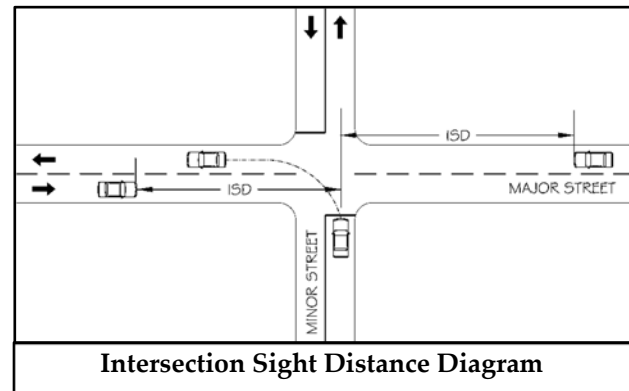
➤ **EVALUATION OF SIGHT DISTANCE**

For intersections, sight distance evaluations have two categories: 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 considered the desirable visibility distance standard for evaluating the safety of an intersection. ISD is based on the time required to perceive, react, and complete the desired traffic maneuver once a motorist on a minor street decides to perform a traffic maneuver. Three traffic maneuvers are available for



vehicles stopped on a minor street at a 4-way intersection: (1) left-turn, (2) right-turn, (3) or a crossing maneuver across the major street. For turns from the minor street, 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 the 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.

With a posted speed limit of 45-mph on Oak Ridge Highway at Jim Jones Lane, the ISD is 530 feet calculated based on AASHTO's (American Association of State Highway Transportation Officials) guidance and according to TDOT standards. With an assumed speed limit of 25-mph on Jim Jones Lane, a Knox County road, the ISD is 250 feet based on Knox County's requirement of providing 1 foot of sight distance per 1 mph of vehicle speed.

Oak Ridge Highway has a 1% road grade downhill from the east to the west at Jim Jones Lane. Based on the posted speed limit of 45-mph on Oak Ridge Highway and the existing road grade, the SSD is calculated to be 370 feet to the east and 355 feet to the west.

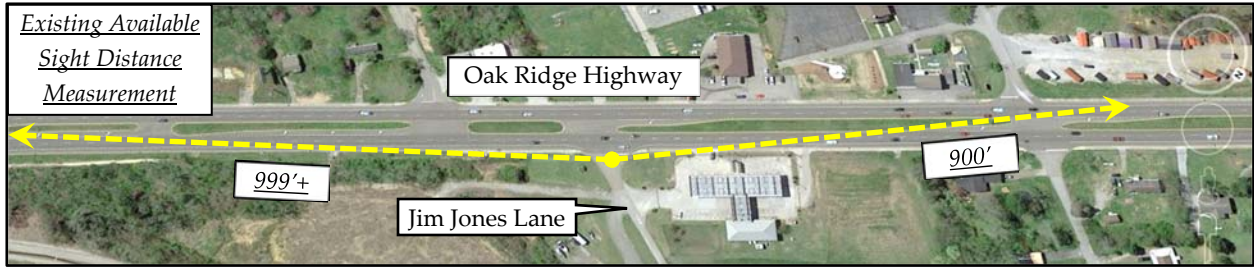
Jim Jones Lane has a 0.5% road grade downhill from the south to the north at the Road "A" Proposed Entrance. Based on an assumed speed limit of 25-mph on Jim Jones Lane and the existing road grade, the SSD is calculated to be 155 feet to the south and 155 feet to the north.

Jim Jones Lane has a 5% road grade downhill from the south to the north at the Road "B" Proposed Entrance. Based on an assumed speed limit of 25-mph on Jim Jones Lane and the existing road grade, the SSD is calculated to be 165 feet to the south and 145 feet to the north.

Visual observations of the sight distances at Jim Jones Lane at Oak Ridge Highway and the Proposed Entrance locations on Jim Jones Lane were undertaken. Using a Nikon Laser Rangefinder on Jim Jones Lane at Oak Ridge Highway, the available sight distance was visually estimated to be 999'+ feet (limit of the rangefinder) to the east (towards Knoxville) and 900' feet to the west (towards Oak Ridge). Based on visual observation, the available sight distances from Jim Jones Lane at Oak Ridge Highway will be adequate. A slightly longer sight distance may be available to the west but was reduced by the uncontrolled (un-mowed) grass vegetation in the center median on Oak Ridge Highway.

At the Road "A" Proposed Entrance on Jim Jones Lane, the available sight distance was measured to be 250 feet to the north and 275 feet to the south, which is the intersection of Jim Jones Lane at Oak Ridge Highway. At the Road "B" Entrance on Jim Jones Lane, the available sight distance was measured to be 250 feet to the north and 200 feet to the south. Longer sight distance to the south is hindered by the curvature of Jim Jones Lane and the roadside vegetation on the opposite side of the road in the interior of the road curve.

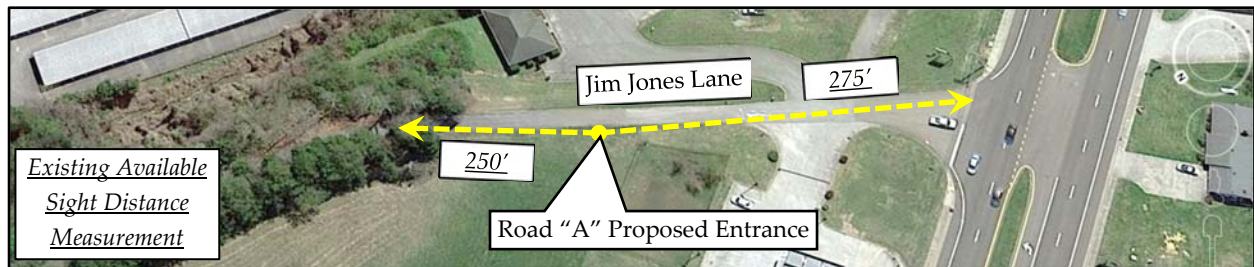
Images of the existing sight distances are labeled below with the ISD, SSD, and rangefinder measured sight distances.



View of Sight Distance on Oak Ridge Highway at Jim Jones Lane (Looking East)



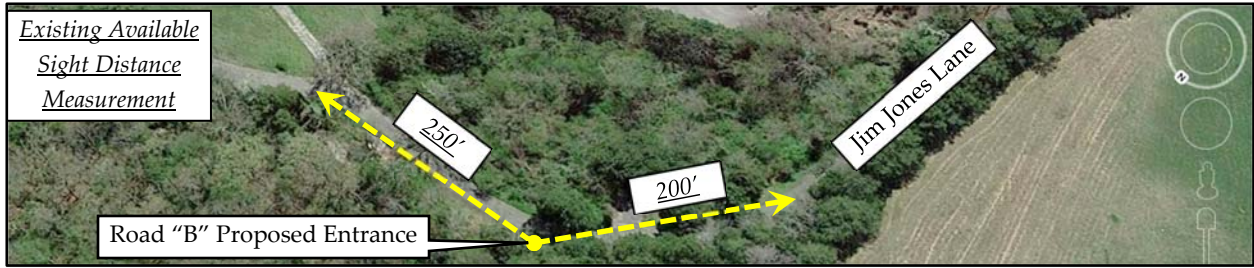
View of Sight Distance on Oak Ridge Highway at Jim Jones Lane (Looking West)



View of Sight Distance on Jim Jones Lane at Road "A" Proposed Entrance (Looking North)



View of Sight Distance on Jim Jones Lane at Road "A" Proposed Entrance (Looking South)



View of Sight Distance on Jim Jones Lane at Road "B" Proposed Entrance (Looking North)



View of Sight Distance on Jim Jones Lane at Road "B" Proposed Entrance (Looking South)

➤ EVALUATION OF TURN LANE THRESHOLDS

An evaluation of the need for separate turn lanes in the projected 2025 conditions was conducted for the intersection of Jim Jones Lane at Oak Ridge Highway. The evaluation did not include left-turn movements on Oak Ridge Highway at Jim Jones Lane since an existing separate left-turn lane is already provided in the center of the highway.

The criteria used for this turn lane evaluation were based on Knox County's "Access Control and Driveway Design Policy" and TDOT's "Highway System Access Manual". These design policies relate vehicle volume thresholds based on prevailing speeds for two-lane and four-lane roadways. Based on the posted speed limit on Oak Ridge Highway, the projected volumes were evaluated for 36 – 45 mph speeds.

According to Knox County's and TDOT's guidelines, a separate westbound right-turn lane on Oak Ridge Highway is warranted at Jim Jones Lane based on the projected 2025 peak hour traffic volumes.

A subsequent evaluation determined that the existing 2022 volumes currently warrant a separate westbound right-turn lane on Oak Ridge Highway at Jim Jones Lane. The worksheets for these evaluations are provided in Appendix I.

CONCLUSIONS & RECOMMENDATIONS

The following is an overview of recommendations to minimize the transportation impacts of the proposed Jim Jones Lane Subdivision development on the adjacent transportation system while attempting to achieve an acceptable traffic flow and improved safety. Figure 9, at the end of this section, provides an overview of the major external road recommendations.



Oak Ridge Highway at Jim Jones Lane: The existing and projected 2025 level of service calculations for the intersection of Oak Ridge Highway at Jim Jones Lane resulted in extremely poor LOS and substantial vehicle delays for vehicles wanting to turn left or right from Jim Jones Lane onto Oak Ridge Highway. The traffic volumes on Oak Ridge Highway during peak hours are so large that there are very few appropriate gaps in the traffic stream for entering motorists.

- 1a) Based on both the existing and projected 2025 traffic volumes, a separate westbound right-turn lane on Oak Ridge Highway is warranted and recommended for vehicles entering Jim Jones Lane. Existing roadway features, including the existing sidewalk, topography (fill slope will be required), utility poles, several aboveground utility pedestals, and assumed underground utilities, will increase the costs of constructing this lane. A sign for the West Knox Solway Storage center will also need to be relocated.

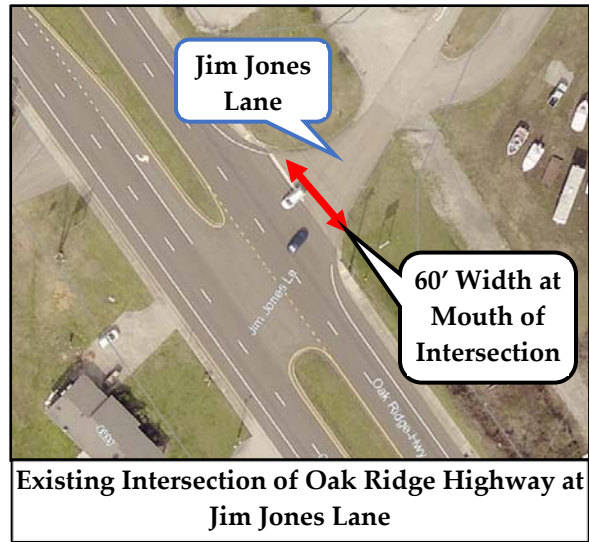


Westbound Approach of Oak Ridge Highway at Jim Jones Lane

Typically, the length of a turn lane would be determined by calculating the stopping sight distance based on the observed operating speed. Ignoring the slight 1% downward grade on the Oak Ridge Highway westbound approach at Jim Jones Lane, the stopping sight distance for this approach is calculated to be 360 feet for westbound vehicles to decelerate and stop from a posted speed limit of 45-mph. Thus, according to TDOT, the westbound right-turn lane at Jim Jones Lane is recommended to be constructed with 210 feet of storage and a taper length of 150 feet with a total length of 360 feet. The right-turn lane should include the appropriate right-turn arrow pavement

markings as shown in TDOT standard drawing T-M-4.


- 1b) The southbound lane on Jim Jones Lane at the intersection at Oak Ridge Highway is currently laid out as a single lane; however, the existing pavement width near the highway is suitable for two vehicles to be side-by-side to turn left and right concurrently.



Based on the calculations presented in the study, it is recommended that a separate southbound right-turn lane on Jim Jones Lane be constructed to allow for right turns to turn without potentially being hindered by vehicles experiencing long delays attempting to turn left onto Oak Ridge Highway.

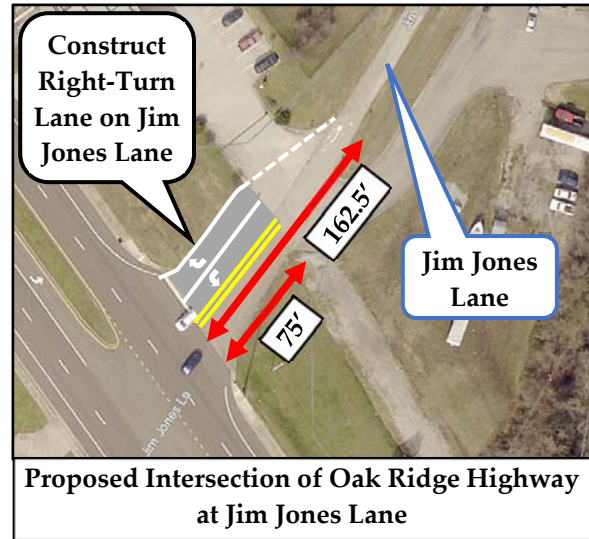
Capacity analyses were conducted to determine the projected LOS at the studied intersection with the development traffic in 2025 with a recommended westbound right-turn lane on Oak Ridge Highway and separate southbound left and right-turn lanes on Jim Jones Lane. The results maintained the previous calculations showing a result of LOS F and extremely high vehicle delays at the intersection for left-turn movements. However, with a separate southbound right-turn lane, most right-turning motorists will be able to escape the substantial delays from the left-turning motorists. These results can be seen in Table 7, and Appendix F includes the worksheets for these capacity analyses.

TABLE 7
2025 INTERSECTION CAPACITY ANALYSIS RESULTS -
PROJECTED TRAFFIC CONDITIONS (WITH THE PROJECT AND RIGHT-TURN LANES)

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS ^a	DELAY ^b (seconds)	v/c ^c	LOS ^a	DELAY ^b (seconds)	v/c ^c
Oak Ridge Highway (EB & WB) at Jim Jones Lane (SB)	 Unsignalized	Eastbound Left	E	36.8	0.175	D	33.3	0.208
		Southbound Left	F	1272.2	2.786	F	801.2	1.789
		Southbound Right	E	46.9	0.310	E	49.5	0.466

Note: All analyses were calculated in Synchro 11 software and reported using HCM 2010 intersection methodology
^a Level of Service, ^b Average Delay (sec/vehicle), ^c Volume-to-Capacity Ratio

With separate southbound left and right-turn lanes, the projected 2025 capacity calculations show that the southbound right-turn lane projected 95th percentile vehicle queue length is 1.2 vehicles in the AM peak hour and 2.1 vehicles in the PM peak hour. These lengths convert to a projected southbound right-turn vehicle queue length of 30 feet in the AM peak hour and 52.5 feet in the PM peak hour. It is recommended that the right-turn lane



have a minimum storage length of 75 feet which should be attainable since the distance between the white stop bar on Jim Jones Lane and the inside edge of the RaceWay gas station entrance is right at 75 feet, as shown in the image. The construction of a right-turn lane will require modifications to the gas station entrance on Jim Jones Lane.

With separate southbound left and right-turn lanes, the projected 2025 capacity calculations show that the southbound left-turn lane projected 95th percentile vehicle queue length is 6.5 vehicles in the AM peak hour and 4.6 vehicles in the PM peak hour. Based on the software's parameters of 25 feet per vehicle, this converts to a projected vehicle queue length of 162.5 feet in the AM peak hour and 115 feet in the PM peak hour. A vehicle queue distance of 162.5 feet would be just beyond the RaceWay gas station entrance on Jim Jones Lane, as shown in the above image. Thus, even with a separate right-turn lane on Jim Jones Lane, the potential exists for southbound right-turning motorists from the proposed subdivision to occasionally be blocked from entering the separate right-turn lane. This blockage should be infrequent and for short periods.

Overall, if a separate southbound right-turn lane is not constructed on Jim Jones Lane, it could be expected that a fair number of right-turning motorists will use the adjacent RaceWay gas station as a cut-thru to Oak Ridge Highway to avoid the vehicle queue. Even with separate left and right-turn lanes on Jim Jones Lane, it could be expected that an increase in U-turns may occur downstream at the intersection of Oak Ridge Highway at Burchfield Drive. These U-turns will result from either some RaceWay customers or residents in the proposed subdivision wanting to turn left towards the east, attempting to avoid the projected left-turn vehicle queues. It can be envisioned that these motorists

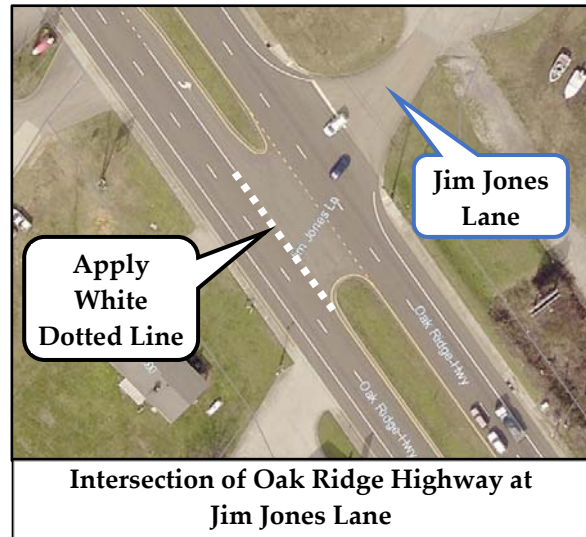
will assume that they can save time and avoid the vehicle queue by turning right onto Oak Ridge Highway and then performing a U-turn maneuver at Burchfield Drive back towards the east.

Jim Jones Lane at the gas station entrance is recommended to be striped and include a “Do Not Block Intersection” (R10-7) sign since a lengthy left-turn vehicle queue on Jim Jones Lane is projected. This recommendation is to avoid a vehicle backup onto Oak Ridge Highway from motorists turning left or right off Oak Ridge Highway and then turning left into the gas station. The roadway striping should include a box and center crosshatch with 4” white pavement lines. The sign should be installed on the southbound approach of Jim Jones Lane in advance of the gas station entrance.



R10-7

- 1c) It is recommended that a dotted white line be applied to Oak Ridge Highway that extends from the eastbound left-turn lane bay heading southwest to better guide drivers turning left out of Jim Jones Lane. The white dotted line should match the spacing, length, and width of the yellow dotted line on the opposite side of the median.

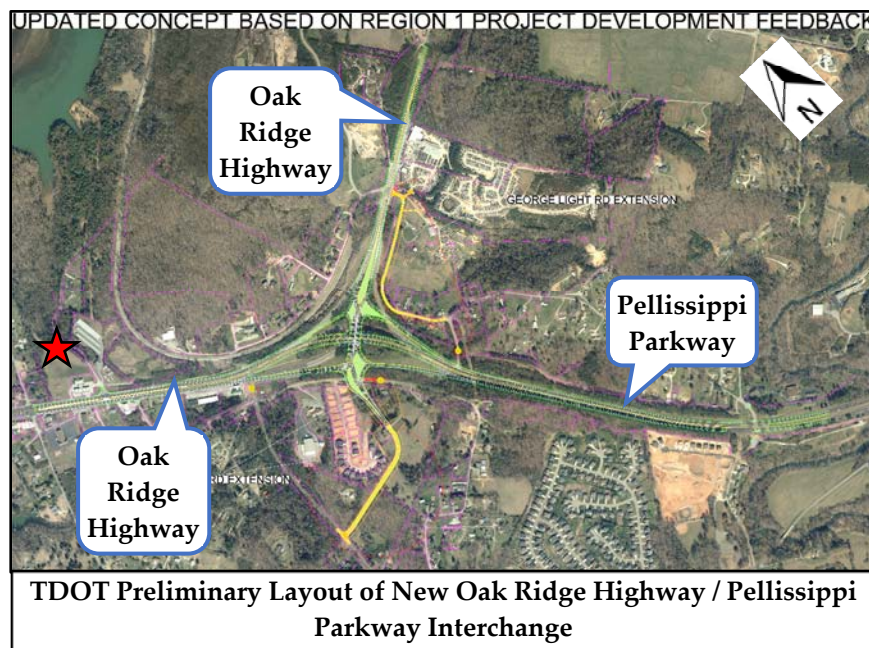


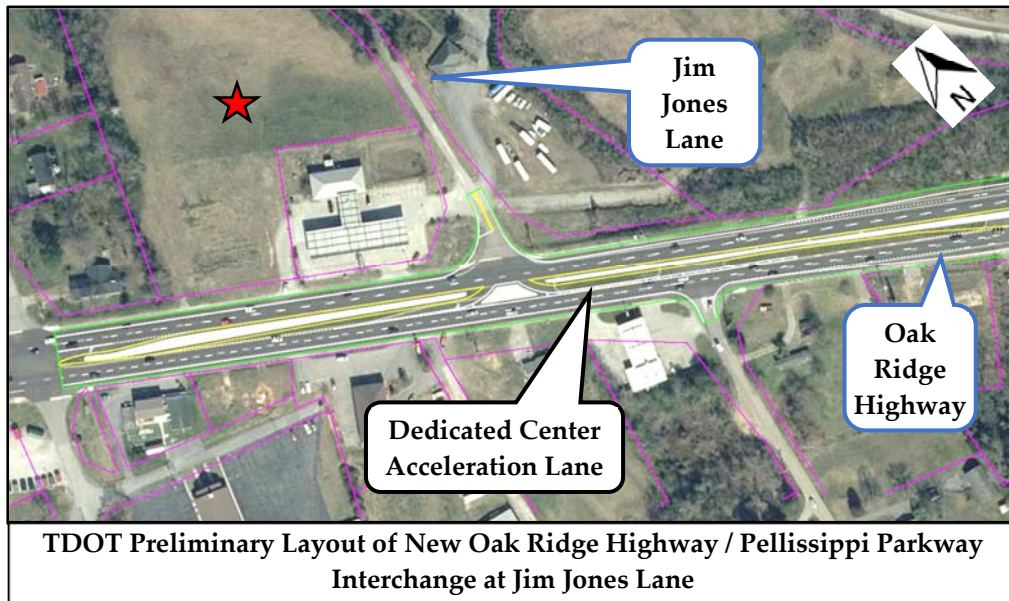
- 1d) The existing eastbound center left-turn lane on Oak Ridge Highway at Jim Jones Lane has a storage length of 95 feet. The projected 2025 capacity calculations determined that the 95th percentile vehicle queue length for the eastbound left-turn lane is projected to be 0.6 vehicles in the AM peak hour and 0.8 vehicles in the PM peak hour. These results translate to 15 feet in the AM peak hour and 20 feet in the PM peak hour, suggesting that the existing storage length of the eastbound left-turn lane of 95 feet will be more than adequate in the projected 2025 conditions.
- 1e) TDOT is currently in the design stage to improve the interchange of Pellissippi Parkway/Oak Ridge Highway southeast of the proposed development site. This project will greatly enhance safety and improve traffic flow for motorists traveling to and from

the area. Mike Conger, PE, with Knoxville/Knox County Planning, provided an image of the latest preliminary TDOT layout of the new interchange and is shown below. This layout is subject to change. At this time, this new interchange is expected to be fully reconstructed and opened by 2030.

The proposed TDOT improvements at this intersection include a dedicated center acceleration lane for vehicles turning left from Jim Jones Lane onto eastbound Oak Ridge Highway. Based on the results of this study for the proposed development, this acceleration lane is highly recommended, as shown in the TDOT preliminary plan. This acceleration lane will significantly improve the capability and safety of the left-turning vehicles from Jim Jones Lane to enter the eastbound traffic stream on Oak Ridge Highway. The preliminary layout, as shown, would also help reduce or eliminate westbound to eastbound U-turns at this intersection that conflict with the turning movements to and from Jim Jones Lane. This U-turn restriction is especially desirable since the westbound approach of Oak Ridge Highway at Jim Jones Lane does not have a separate left-turn lane as it does on the eastbound approach. An additional image is provided and is a close-up of the proposed improvements on Oak Ridge Highway at Jim Jones Lane.

It is further recommended that the proposed recommendation of a westbound right-turn lane on Oak Ridge Highway at Jim Jones Lane be incorporated into the TDOT interchange plans since the existing volumes warrant a right-turn lane.



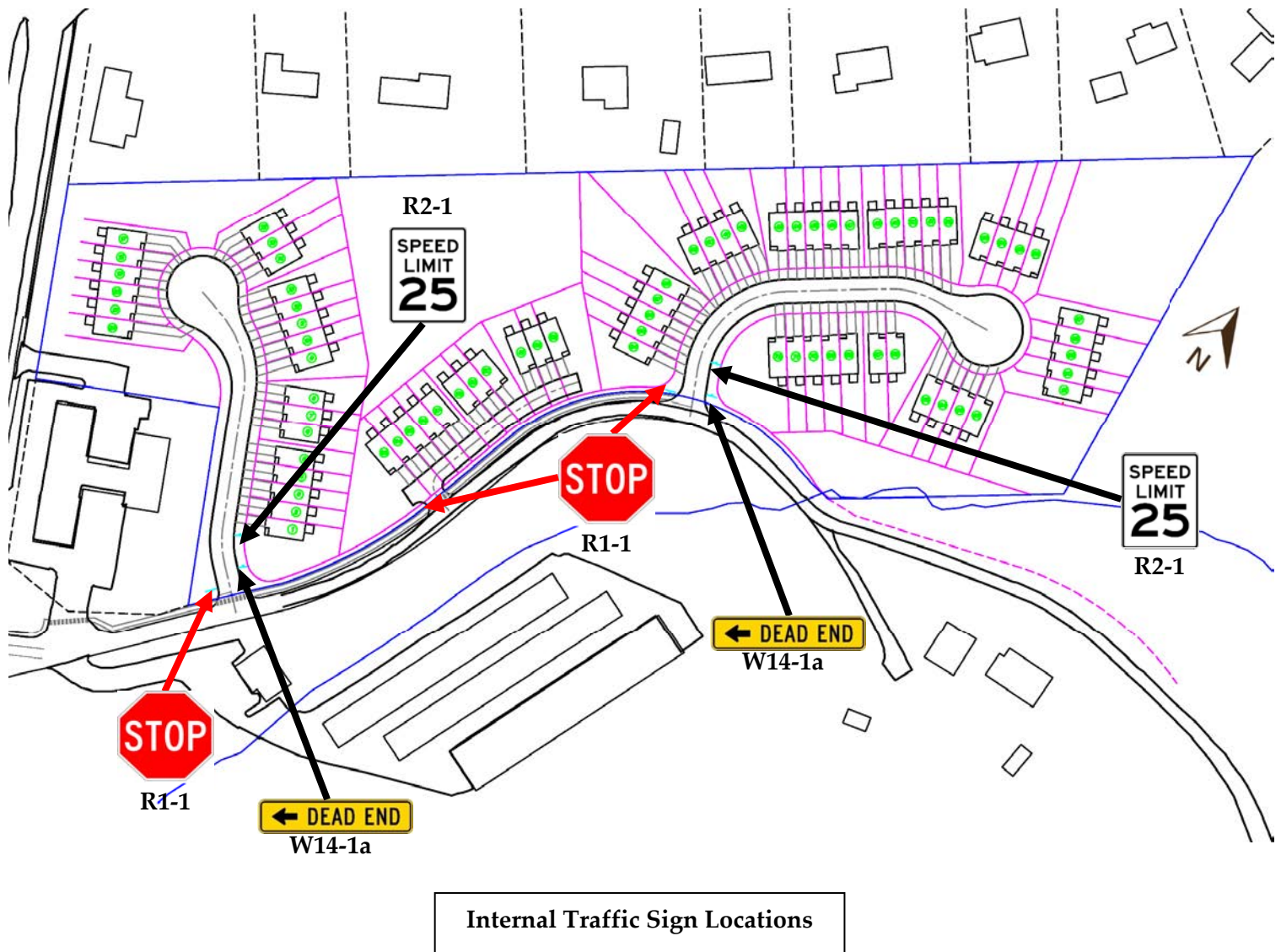


- 1f) During the review of this study, TDOT commented that if the proposed development is completed before the TDOT interchange improvement, they would require the developer to build the westbound right-turn lane and also lengthen the existing eastbound left-turn lane in the center median of Oak Ridge Highway. Currently, the eastbound left-turn lane has a storage length of 95 feet and a taper length of 115 feet. As recommended, the left-turn lane should have 200 feet of storage and a taper length of 190 feet to meet the latest TDOT's Highway Safety Access Manual (HSAM) standards. This lengthening would increase the storage capacity by 105 feet and the taper length by 75 feet. This recommendation by TDOT to increase the length of the existing left-turn lane has been made even though the calculations showed that the existing storage length provided would be adequate in the projected conditions.

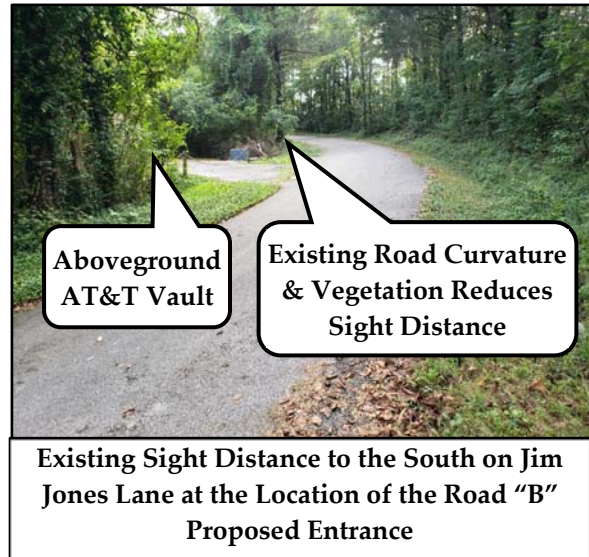


Jim Jones Lane Subdivision Internal Roads: The layout plan shows two entrances on Jim Jones Lane constructed for the development, as shown in Figure 3 and below.

- 2a) A 25-mph Speed Limit (R2-1) sign is recommended to be posted near the beginning of the development entrances off Jim Jones Lane on Road "A" and Road "B". It is also recommended that a "Dead End" Sign (W14-1a) be posted at the front of the subdivision entrances. These signs can be posted above or below the street name sign.
- 2b) Stop Signs (R1-1) with 24" white stop bars and other traffic signage are recommended to be installed at the road locations, as shown below:

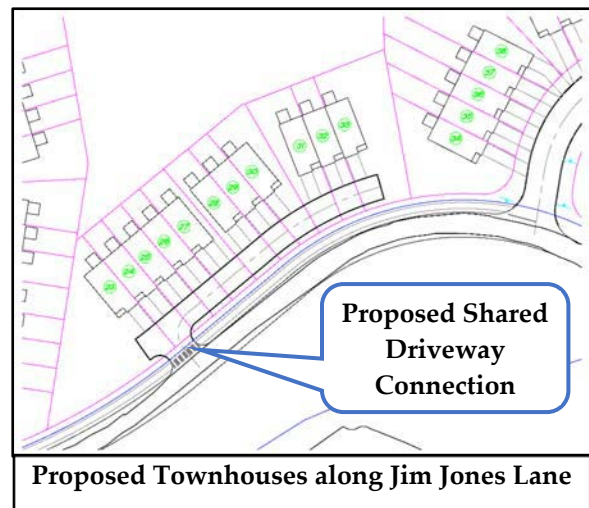


2c) Sight distance at the new intersections on Jim Jones Lane must not be impacted by new signage or future landscaping. With an assumed speed limit of 25-mph on Jim Jones Lane, the intersection sight distance is 250 feet. The required stopping sight distance at the Road "A" Proposed Entrance is 155 feet to the north and south. The required stopping sight distance at the Road "B" Proposed Entrance is 145 feet to the north and 165 feet to the south. Based on the visual



measurements, these distances will be met at the Proposed Entrance locations except for the view to the south from the Road "B" Proposed Entrance. The road curvature and vegetation on Jim Jones Lane currently hinder the existing sight distance. A licensed land surveyor must make a more definitive measurement. If the requirement is not met, the vegetation should be removed to ensure that the recommended sight distance is provided.

2d) Eleven of the seventy-two townhouses will have direct access to Jim Jones Lane via a shared frontage private driveway. A licensed land surveyor must measure the sight distance from the proposed shared connection to ensure that the recommended intersection sight distance of 250 feet is available on Jim Jones Lane.



2e) If directed by the local post office, the site designer should include a centralized mail delivery center with a parking area within the development. The site plan does not show a general location, and a specific plan with a parking area should be designed and provided if required by the USPS.

2f) All drainage grates and covers for the residential development must be pedestrian and

bicycle safe.

- 2g) Sidewalks are not proposed on the internal roadways. However, a sidewalk is proposed along the northern side of Jim Jones Lanes from the Road "B" Proposed Entrance up to the existing sidewalk system on Oak Ridge Highway. The sidewalk is recommended to be 5 feet minimum in width to meet Knox County regulations.

- 2h) All road grade and intersection elements should be designed to AASHTO, TDOT, and Knox County specifications and guidelines to ensure proper transportation operations.



Jim Jones Lane: For this study, road widths on Jim Jones Lane were measured every 100 feet. To the north of the RaceWay gas station and the West Knox Solway Storage center entrances, the pavement width of Jim Jones Lane is significantly reduced.



Station 0+00	= 14 feet
Station 1+00	= 13 feet
Station 2+00	= 14 feet
Station 3+00	= 15.5 feet
Station 4+00	= 14 feet
Station 5+00	= 13 feet
Station 6+00	= 14 feet
Station 7+00	= 15 feet
Station 8+00	= 13 feet

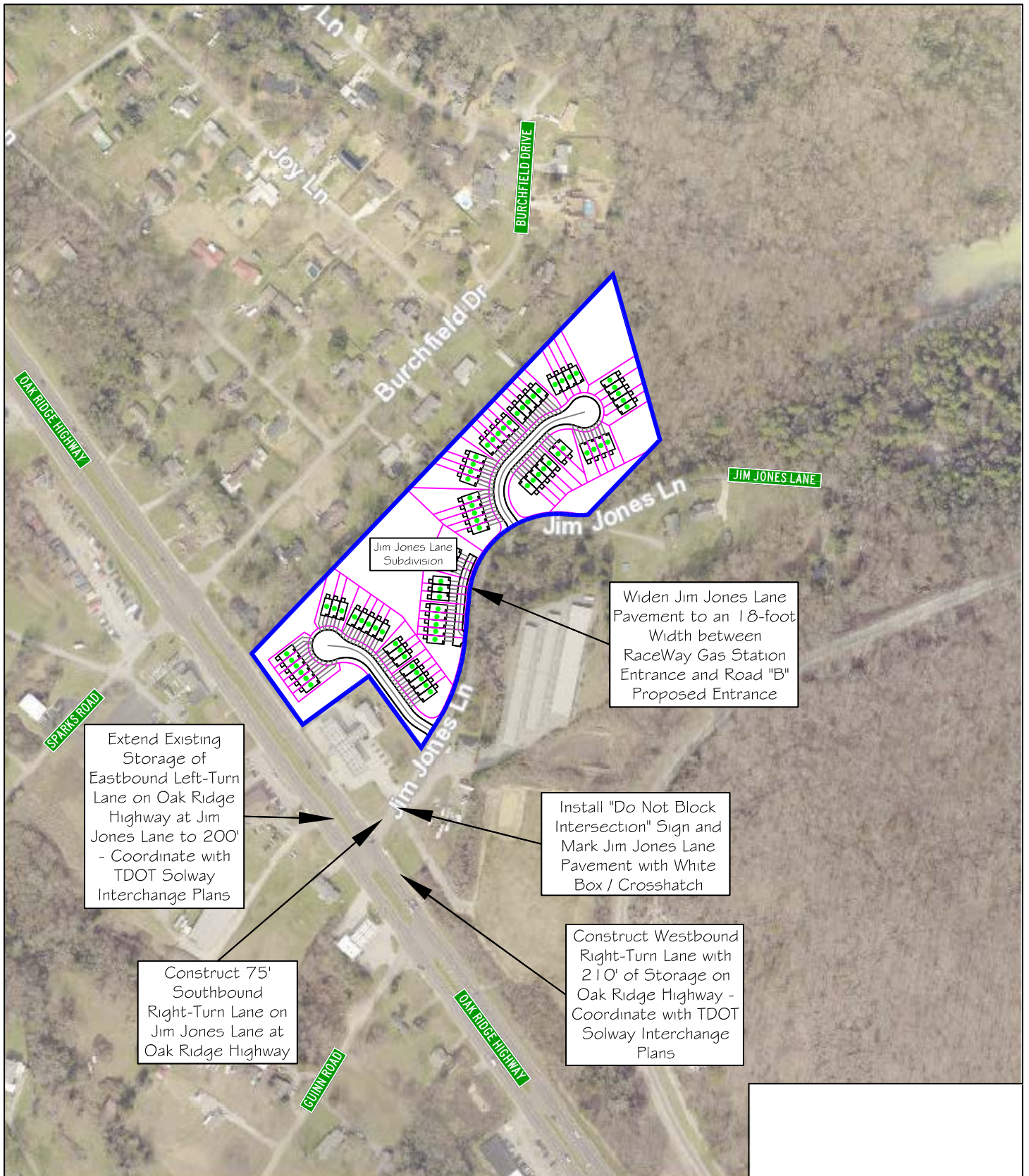
It should be noted that Jim Jones Lane has more pavement width than at first glance due to organic material build-up (leaves, pine needles, etc.) on the road's edge. This organic matter has built up due to low traffic volumes and motorists' tendency to travel towards the center of the road due to the lack of conflicting opposite traffic on Jim Jones Lane. Removal of the organic debris from the road surface may reveal more pavement than measured.

Jim Jones Lane is recommended to be widened to a minimum width of 18 feet between Oak Ridge Highway and the Road "B" Proposed Entrance, approximately 800 feet. The road widening should, at a minimum, begin at the driveway entrance for the RaceWay gas station and the West Knox Solway Storage center and continue up to the north and just past the Road "B" Proposed Entrance. Widening the pavement width of Jim Jones Lane to a minimum width of 18 feet would increase the roadway's capacity to 2,000 vehicles per day based on the Knox County informal standard. The projected amount of additional daily traffic that the Jim Jones Lane Subdivision will contribute is expected to be 711 vehicles per day. An ADT of 711 vehicles would indicate that the recommended road width of 18 feet



Existing Jim Jones Lane Pavement and Edge Obscured due to Organic Debris

would be more than adequate with respect to safety and capacity to serve the future residents and the few existing residents on Jim Jones Lane.



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

NOT TO SCALE



FIGURE 9

Jim Jones Lane Subdivision

Summary of Recommended External Road Improvements

APPENDIX A

HISTORICAL TRAFFIC COUNT DATA

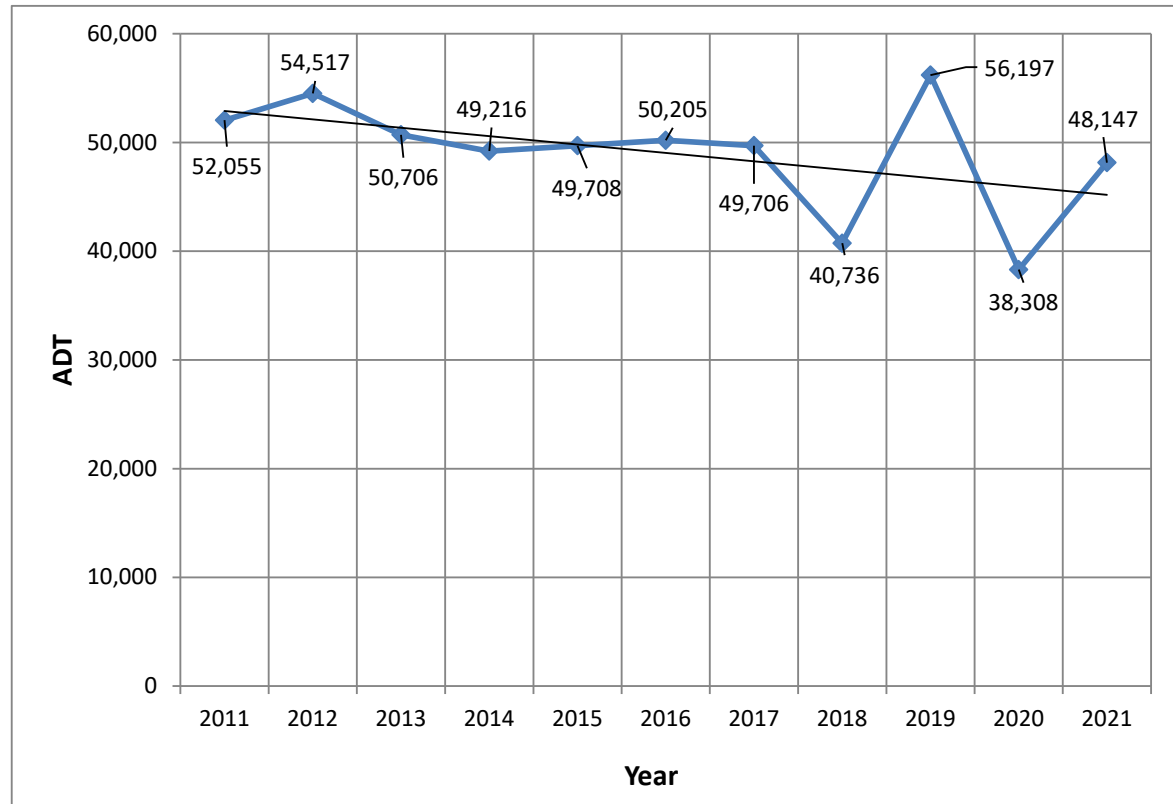
Historical Traffic Counts

Organization: TDOT

Station ID #: 47000082



Location: Oak Ridge Highway, south of Guinn Road

YEAR	ADT	
2011	52,055	Trendline
2012	54,517	
2013	50,706	
2014	49,216	
2015	49,708	
2016	50,205	
2017	49,706	
2018	40,736	
2019	56,197	
2020	38,308	
2021	48,147	



2011 - 2021 Growth Rate = -7.5%

Average Annual Growth Rate = -0.8%


Transportation Data Management System

[Home](#)
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[TTDS](#)
[RSMS](#)
[NMDS](#)
[WOTS](#)
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[Login](#)
[Locate](#)
[Locate All](#)
[Email This](#)

Auto-Locate OFF

[List View](#)
[All Data](#)

Record  137 of 660 [Goto Record](#) [go](#)

Location ID	4700002	MPO ID	
Type	SPOT	HPMS ID	
On HMS		On HPMS	
IRS ID	47SR082001	IRS Loc. Pt.	0.97
SF Group	Urban	Route Type	
AF Group	14	Route	
GF Group	Knox	Active	Yes
Class Dist Grp	14	Category	CC
Seas Class Grp			
WIM Group			
QC Group	Default		
Funct'l Class	Other Principal Arterial	Milepost	
Located On	OAK RIDGE HWY		
Loc On Alias	NEAR ANDERSON CO LINE		

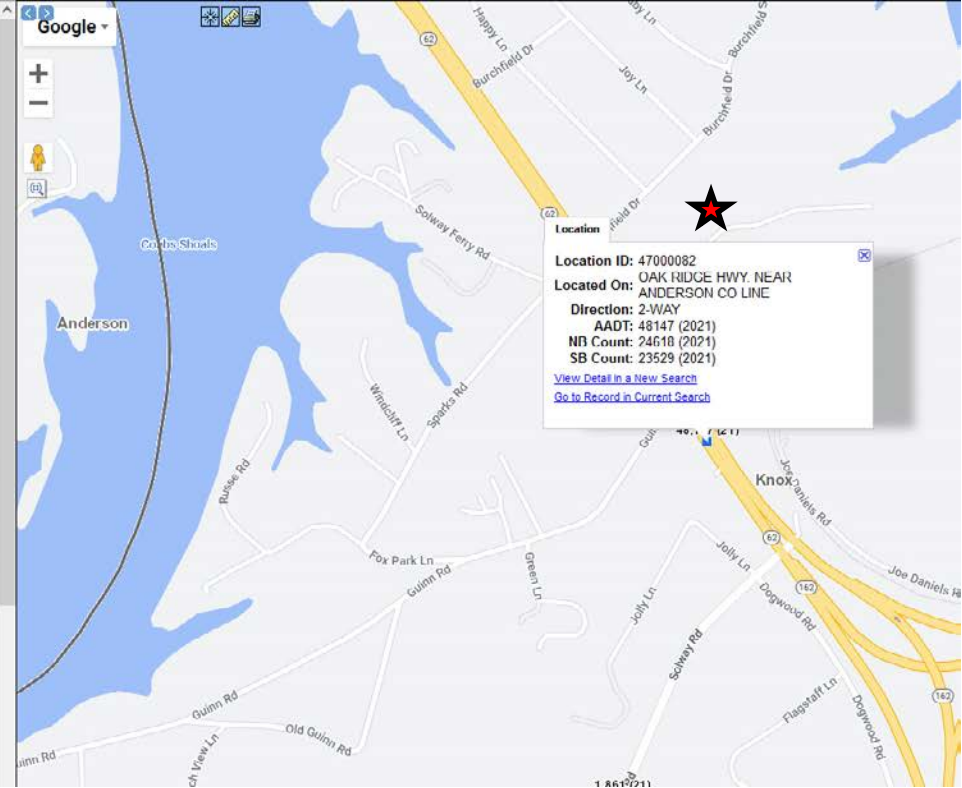
[More Detail](#)

STATION DATA

Directions: [2-WAY](#) [NB](#) [SB](#)

Year	AADT	DHV-30	K %	D %	PA	BC	Src
2021	40,147 ⁷		12	73	43,980 (91%)	4,187 (9%)	
2020	38,308	4,409	12	73	34,936 (91%)	3,372 (9%)	
2019	56,197		12	58			
2018	40,736		13	58			
2017	49,706 ²						

[<<](#)
[<](#)
[>](#)
[>>](#)
 1-5 of 37



Location ID: 47000082
Located On: OAK RIDGE HWY. NEAR ANDERSON CO LINE
Direction: 2-WAY
AADT: 48147 (2021)
NB Count: 24618 (2021)
SB Count: 23529 (2021)


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

APPENDIX B

WALK SCORE

WALKSCORE


(from walkscore.com)




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

Type an address, neighborhood or city


Jim Jones Lane

Knoxville, Tennessee

Commute to **Knoxville, TN** 

 35 min  60+ min  60+ min [View Routes](#)

[Favorite](#) [Map](#) [Nearby Knoxville Apartments on Redfin](#)

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

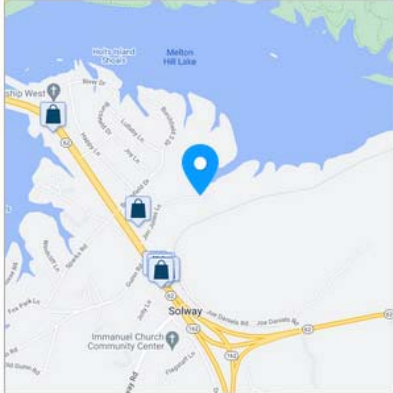
Walk Score
12

Car-Dependent
Almost all errands require a car.

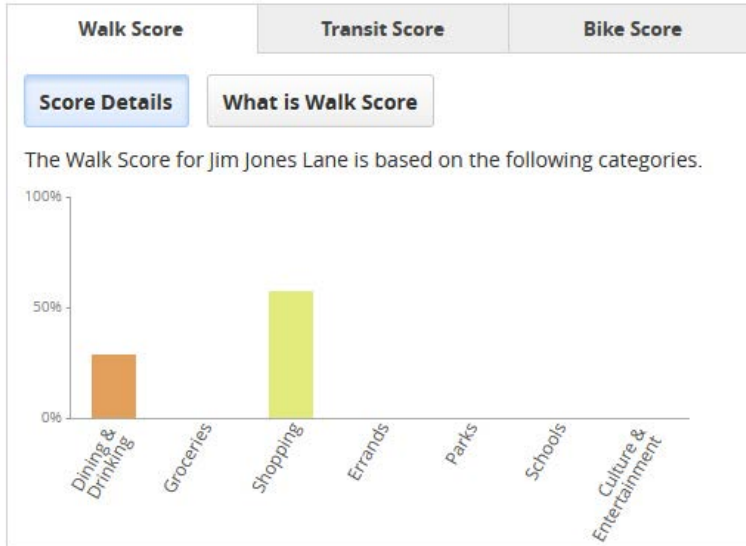
Bike Score
4

Somewhat Bikeable
Minimal bike infrastructure.

[About your score](#)



Scores for Jim Jones Lane



Scores for Jim Jones Lane



Walk Score	Transit Score	Bike Score
Transit Score measures how well a location is served by public transit based on the distance and type of nearby transit lines.		
90-100	Rider's Paradise World-class public transportation	
70-89	Excellent Transit Transit is convenient for most trips	
50-69	Good Transit Many nearby public transportation options	
25-49	Some Transit A few nearby public transportation options	
0-24	Minimal Transit It is possible to get on a bus	

Scores for Jim Jones Lane



Walk Score
12

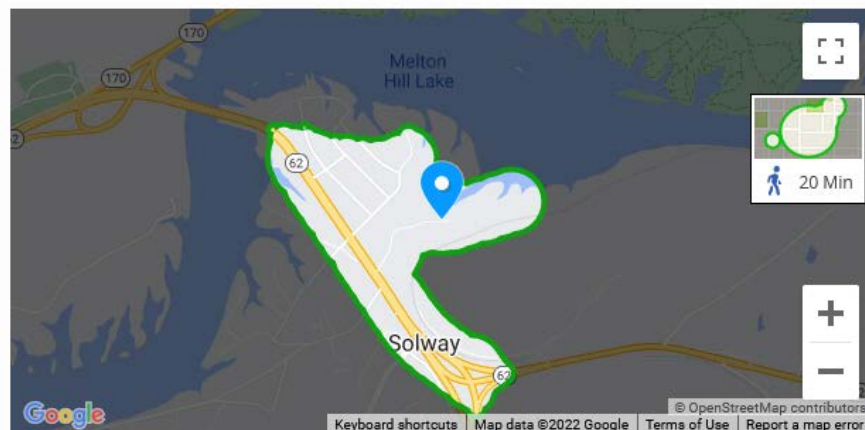
Bike Score
4

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

Travel Time Map

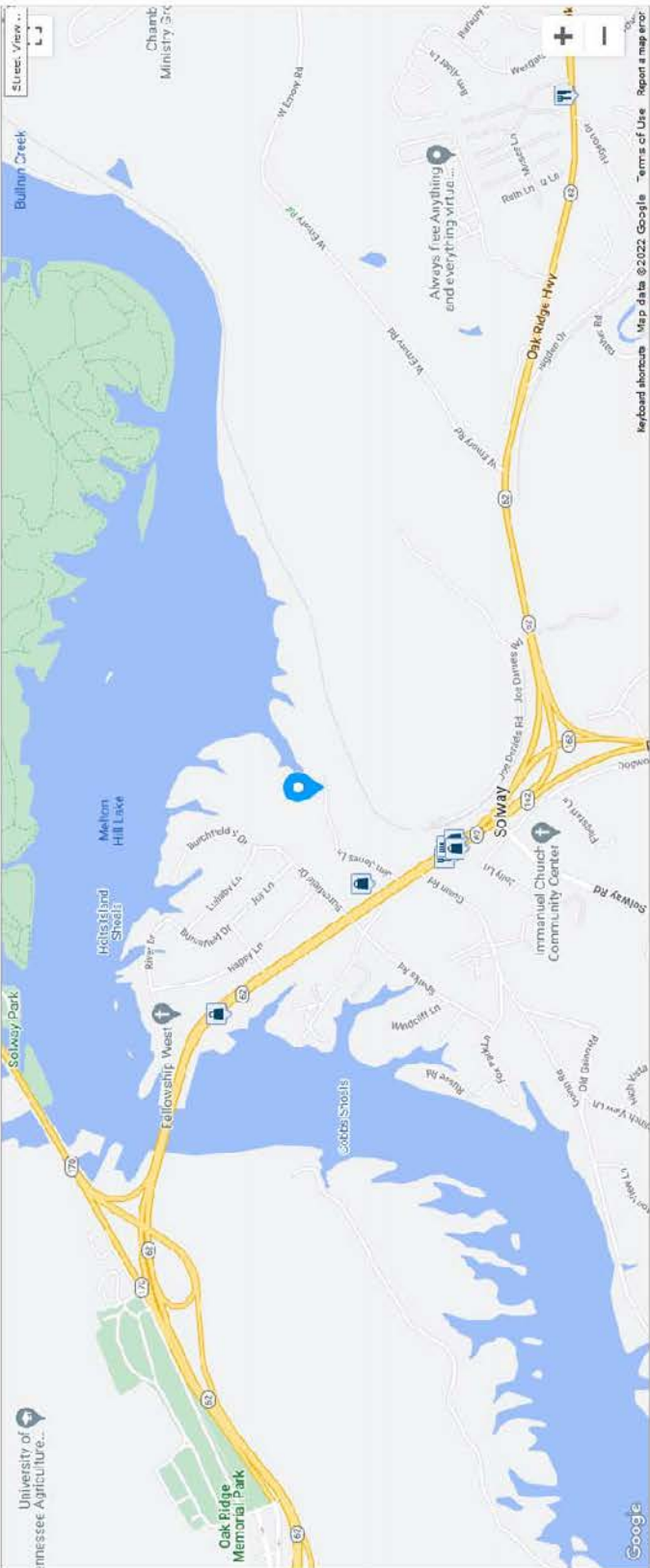
[Add to your site](#)

Explore how far you can travel by car, bus, bike and foot from Jim Jones Lane.



What's Nearby

- Restaurants:** D & E Hot Dog and Ice Cre... 1.1mi
- Coffee:** Tealicious - Hard 2.9mi
- Bars:**
- Groceries:** IGA 3.5mi
- Parks:** Hawk Ridge Park 1.4mi
- Schools:** Kamas High School 3.1mi
- Shopping:** Rainway RV & 3mi
- Entertainment:** Nechoc 3.8mi
- Ernolds:** R & Co Salon - Rese the Boss... 2.8mi
- Search nearby:**



APPENDIX C

KNOXVILLE AREA TRANSIT MAP AND INFORMATION

Knoxville City Center



Legend

- Transfer Point
- Lift Service Area Boundary

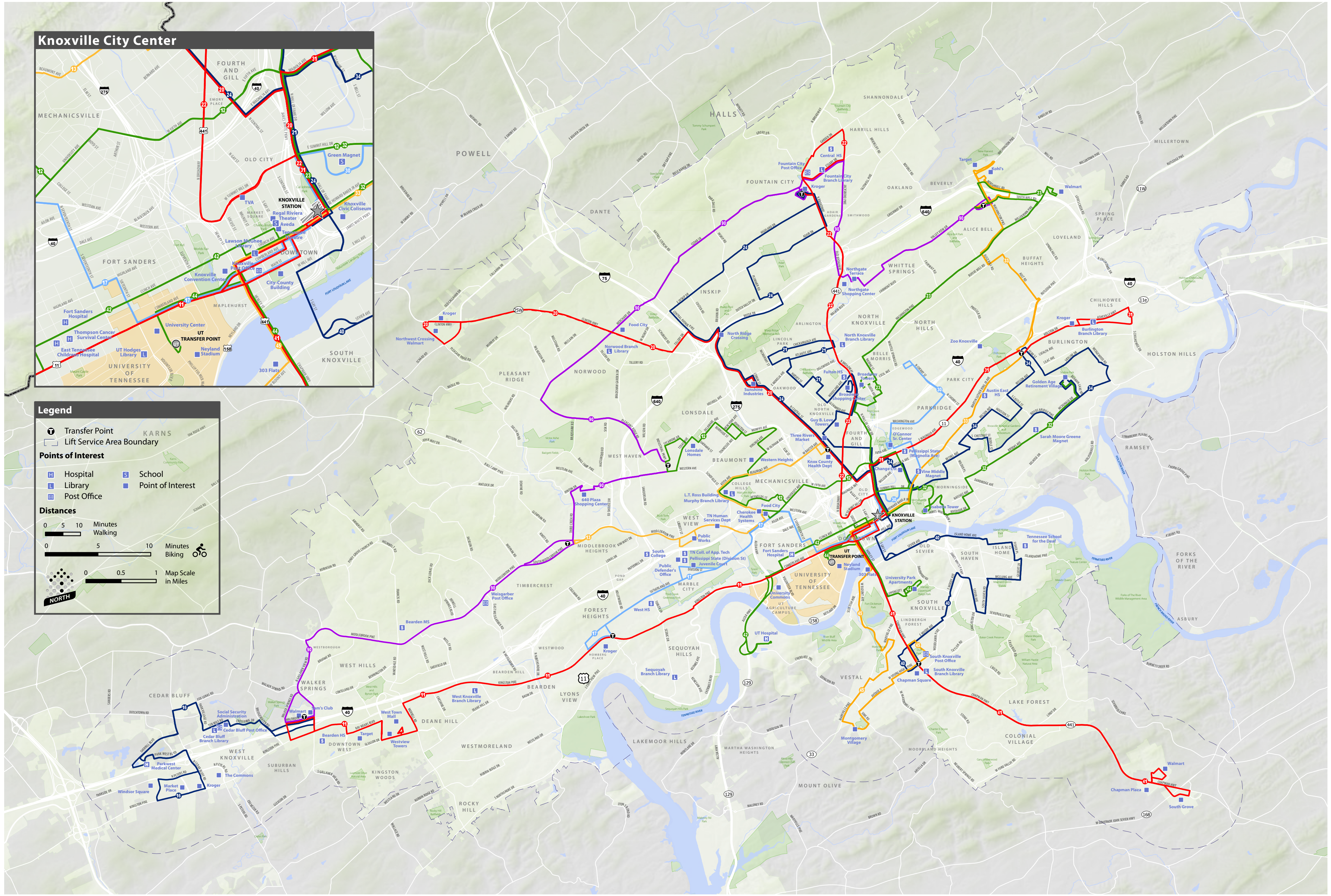
Points of Interest

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

Distances

- 0 5 10 Minutes Walking
- 0 5 10 Minutes Biking
- 0 0.5 1 Map Scale in Miles

NORTH



16 CEDAR BLUFF CONNECTOR

(Weekdays and Saturdays)



Legend

- Route Timepoint
- Transfer Point
- Bus Stop

Points of Interest

- Hospital
- Library
- Point of Interest
- Post Office
- School
- Park & Ride

0 0.25 0.5 Miles

Route 16 - Cedar Bluff: Weekdays

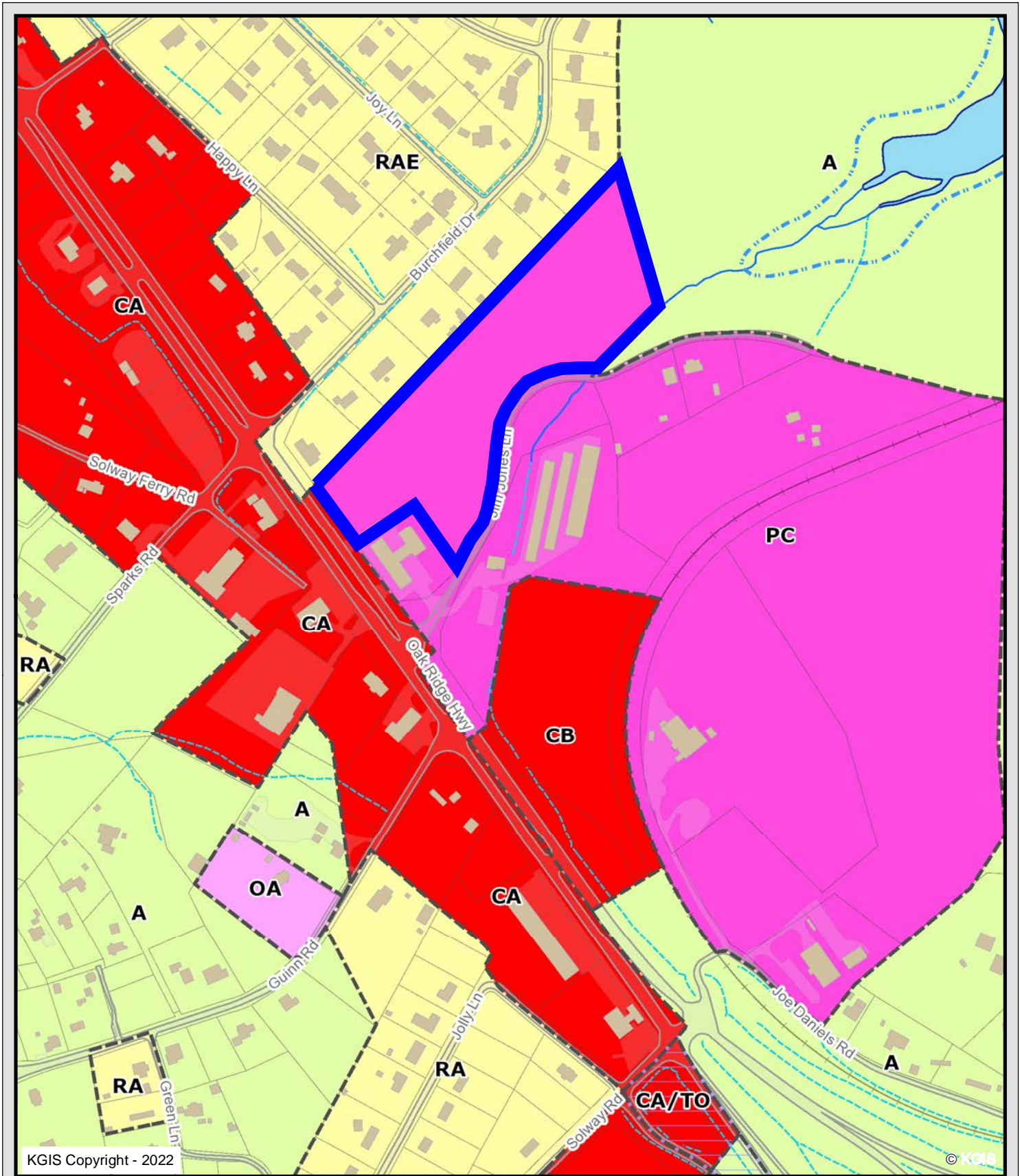
Going away from Walmart				Going to Walmart		
Walmart	Park Village @ Woodpark	Parkwest Hospital	Windsor Square	Parkwest Hospital	Cedar Bluff @ Fox Lonas	Walmart
1	2	3	4	5	6	7
6:15 AM	6:27 AM	6:32 AM	6:42 AM	6:50 AM	6:54 AM	7:10 AM
7:15 AM	7:27 AM	7:32 AM	7:42 AM	7:50 AM	7:54 AM	8:10 AM
8:15 AM	8:27 AM	8:32 AM	8:42 AM	8:50 AM	8:54 AM	9:10 AM
9:15 AM	9:27 AM	9:32 AM	9:42 AM	9:50 AM	9:54 AM	10:10 AM
10:15 AM	10:27 AM	10:32 AM	10:42 AM	10:50 AM	10:54 AM	11:10 AM
11:15 AM	11:27 AM	11:32 AM	11:42 AM	11:50 AM	11:54 AM	12:10 PM
12:15 PM	12:27 PM	12:32 PM	12:42 PM	12:50 PM	12:54 PM	1:10 PM
1:15 PM	1:27 PM	1:32 PM	1:42 PM	1:50 PM	1:54 PM	2:10 PM
2:15 PM	2:27 PM	2:32 PM	2:42 PM	2:50 PM	2:54 PM	3:10 PM
3:15 PM	3:27 PM	3:32 PM	3:42 PM	3:50 PM	3:54 PM	4:10 PM
4:15 PM	4:27 PM	4:32 PM	4:42 PM	4:50 PM	4:54 PM	5:10 PM
5:15 PM	5:27 PM	5:32 PM	5:42 PM	5:50 PM	5:54 PM	6:10 PM
6:15 PM	6:27 PM	6:32 PM	6:42 PM	6:50 PM	6:54 PM	7:10 PM
7:15 PM	7:27 PM	7:32 PM	7:42 PM	7:50 PM	7:54 PM	8:10 PM
8:15 PM	8:27 PM	8:32 PM	8:42 PM	8:50 PM	8:54 PM	9:10 PM
9:15 PM	9:27 PM	9:32 PM	9:42 PM	9:50 PM	9:54 PM	10:10 PM

Route 16 - Cedar Bluff: SATURDAYS

Going away from Walmart				Going to Walmart		
Walmart	Park Village @ Woodpark	Parkwest Hospital	Windsor Square	Parkwest Hospital	Cedar Bluff @ Fox Lonas	Walmart
1	2	3	4	5	6	7
7:15 AM	7:27 AM	7:32 AM	7:42 AM	7:50 AM	7:54 AM	8:10 AM
8:15 AM	8:27 AM	8:32 AM	8:42 AM	8:50 AM	8:54 AM	9:10 AM
9:15 AM	9:27 AM	9:32 AM	9:42 AM	9:50 AM	9:54 AM	10:10 AM
10:15 AM	10:27 AM	10:32 AM	10:42 AM	10:50 AM	10:54 AM	11:10 AM
11:15 AM	11:27 AM	11:32 AM	11:42 AM	11:50 AM	11:54 AM	12:10 PM
12:15 PM	12:27 PM	12:32 PM	12:42 PM	12:50 PM	12:54 PM	1:10 PM
1:15 PM	1:27 PM	1:32 PM	1:42 PM	1:50 PM	1:54 PM	2:10 PM
2:15 PM	2:27 PM	2:32 PM	2:42 PM	2:50 PM	2:54 PM	3:10 PM
3:15 PM	3:27 PM	3:32 PM	3:42 PM	3:50 PM	3:54 PM	4:10 PM
4:15 PM	4:27 PM	4:32 PM	4:42 PM	4:50 PM	4:54 PM	5:10 PM
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6:15 PM	6:27 PM	6:32 PM	6:42 PM	6:50 PM	6:54 PM	7:10 PM
7:15 PM	7:27 PM	7:32 PM	7:42 PM	7:50 PM	7:54 PM	8:10 PM
8:15 PM	8:27 PM	8:32 PM	8:42 PM	8:50 PM	8:54 PM	9:10 PM
9:15 PM	9:27 PM	9:32 PM	9:42 PM	9:50 PM	9:54 PM	10:10 PM

APPENDIX D

ZONING MAP



Existing Zoning on 9.12.22

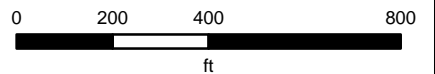
Jim Jones Lane Subdivision

Knoxville - Knox County - KUB Geographic Information System

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Printed: 9/12/2022 at 10:41:22 AM



APPENDIX E

MANUAL TRAFFIC COUNT DATA

TRAFFIC COUNT DATA

Major Street: Oak Ridge Highway (EB and WB)
 Minor Street: Jim Jones Lane (SB)
 Traffic Control: Stop Sign on Jim Jones Lane

9/7/2022 (Wednesday)
 Morning: Foggy / Afternoon: Mostly Sunny
 Conducted by: Ajax Engineering

TIME BEGIN	Jim Jones Lane		Oak Ridge Highway		Oak Ridge Highway		VEHICLE TOTAL	PEAK HOUR
	SOUTHBOUND LT	RT	WESTBOUND THRU	RT	EASTBOUND LT	THRU		
7:00 AM	0	0	546	4	0	464	1014	
7:15 AM	0	1	677	2	0	562	1242	7:15 AM - 8:15 AM
7:30 AM	0	1	687	5	0	652	1345	
7:45 AM	2	2	688	7	0	646	1345	
8:00 AM	4	1	617	6	2	533	1163	
8:15 AM	1	2	550	7	1	519	1080	
8:30 AM	0	1	506	3	0	469	979	
8:45 AM	3	1	501	3	0	392	900	
TOTAL	10	9	4772	37	3	4237	9068	
2:00 PM	3	1	348	5	0	422	779	
2:15 PM	2	0	356	2	1	441	802	
2:30 PM	1	1	381	6	4	476	869	
2:45 PM	4	1	381	4	1	432	823	
3:00 PM	2	0	406	1	2	489	900	
3:15 PM	1	1	438	4	1	533	978	
3:30 PM	2	1	470	6	2	633	1114	
3:45 PM	2	0	515	2	2	702	1223	
4:00 PM	2	0	532	7	2	785	1328	
4:15 PM	1	2	547	8	3	809	1370	
4:30 PM	2	0	578	12	2	780	1374	
4:45 PM	3	1	606	5	3	834	1452	4:45 PM - 5:45 PM
5:00 PM	0	0	631	6	2	800	1439	
5:15 PM	1	0	637	12	1	837	1488	
5:30 PM	2	0	568	5	3	798	1376	
5:45 PM	5	0	536	6	3	675	1225	
TOTAL	33	8	7930	91	32	10446	18540	

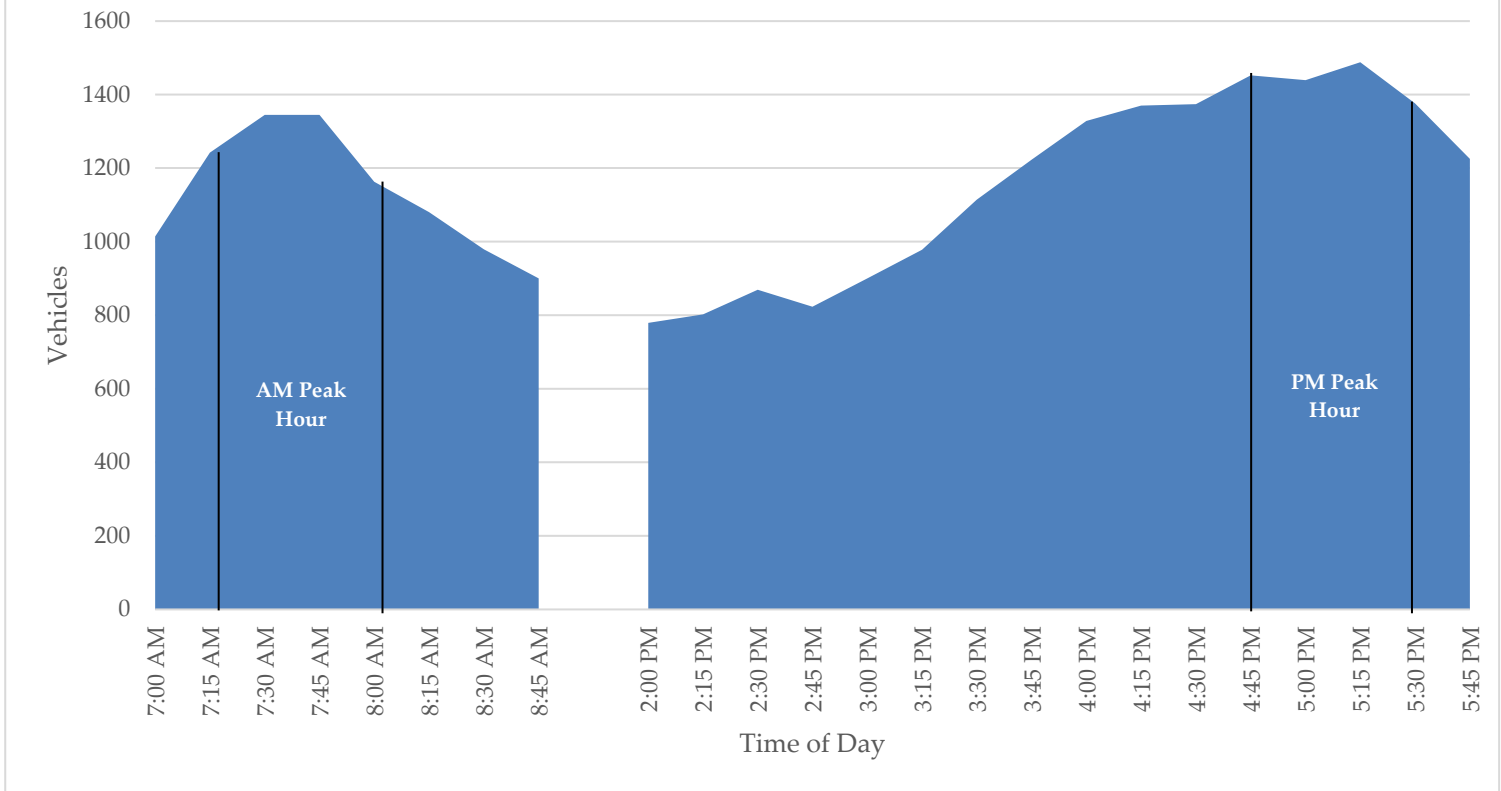
2022 AM Peak Hour **7:15 AM - 8:15 AM**

TIME BEGIN	Jim Jones Lane		Oak Ridge Highway		Oak Ridge Highway	
	SOUTHBOUND LT	RT	WESTBOUND THRU	RT	EASTBOUND LT	THRU
7:15 AM	0	1	677	2	0	562
7:30 AM	0	1	687	5	0	652
7:45 AM	2	2	688	7	0	646
8:00 AM	4	1	617	6	2	533
TOTAL	6	5	2669	20	2	2393
PHF	0.38	0.63	0.97	0.71	0.25	0.92
Truck %	0.0%	0.0%	1.4%	5.0%	0.0%	2.5%

2022 PM Peak Hour **4:45 PM - 5:45 PM**

TIME BEGIN	Jim Jones Lane		Oak Ridge Highway		Oak Ridge Highway	
	SOUTHBOUND LT	RT	WESTBOUND THRU	RT	EASTBOUND LT	THRU
4:45 PM	3	1	606	5	3	834
5:00 PM	0	0	631	6	2	800
5:15 PM	1	0	637	12	1	837
5:30 PM	2	0	568	5	3	798
TOTAL	6	1	2442	28	9	3269
PHF	0.50	0.25	0.96	0.58	0.75	0.98
Truck %	0.0%	0.0%	0.7%	0.0%	0.0%	0.7%

Oak Ridge Highway at Jim Jones Lane
Intersection Traffic Count Totals
9/7/2022



APPENDIX F

CAPACITY ANALYSES – HCM WORKSHEETS (SYNCHRO 11)

EXISTING CONDITIONS

HCM 2010 TWSC
 2: Oak Ridge Highway & Jim Jones Lane

09/14/2022

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑			↑↑						↔	
Traffic Vol, veh/h	2	2393	0	0	2669	20	0	0	0	6	0	5
Future Vol, veh/h	2	2393	0	0	2669	20	0	0	0	6	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	95	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	1	-
Grade, %	-	1	-	-	-1	-	-	0	-	-	2	-
Peak Hour Factor	25	92	90	90	97	71	90	90	90	38	90	63
Heavy Vehicles, %	0	2	0	0	1	5	0	0	0	0	0	0
Mvmt Flow	8	2601	0	0	2752	28	0	0	0	16	0	8

Major/Minor	Major1			Major2			Minor2			
Conflicting Flow All	2780	0	-	-	-	0		4083	5383	1390
Stage 1	-	-	-	-	-	-		2766	2766	-
Stage 2	-	-	-	-	-	-		1317	2617	-
Critical Hdwy	4.1	-	-	-	-	-		7.2	6.9	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-		6.2	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-		6.2	5.9	-
Follow-up Hdwy	2.2	-	-	-	-	-		3.5	4	3.3
Pot Cap-1 Maneuver	143	-	0	0	-	-		~ 1	0	124
Stage 1	-	-	0	0	-	-		25	31	-
Stage 2	-	-	0	0	-	-		189	38	-
Platoon blocked, %		-			-	-				
Mov Cap-1 Maneuver	143	-	-	-	-	-		~ 1	0	124
Mov Cap-2 Maneuver	-	-	-	-	-	-		20	0	-
Stage 1	-	-	-	-	-	-		24	0	-
Stage 2	-	-	-	-	-	-		189	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	\$ 323.3
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	143	-	-	-	28
HCM Lane V/C Ratio	0.056	-	-	-	0.847
HCM Control Delay (s)	31.7	-	-	-	\$ 323.3
HCM Lane LOS	D	-	-	-	F
HCM 95th %tile Q(veh)	0.2	-	-	-	2.7

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 TWSC
 2: Oak Ridge Highway & Jim Jones Lane

09/14/2022

Intersection												
Int Delay, s/veh	0.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑			↑↑						↔	
Traffic Vol, veh/h	12	3269	0	0	2442	28	0	0	0	6	0	1
Future Vol, veh/h	12	3269	0	0	2442	28	0	0	0	6	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	95	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	1	-
Grade, %	-	1	-	-	-1	-	-	0	-	-	2	-
Peak Hour Factor	75	98	90	90	96	58	90	90	90	50	90	25
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	16	3336	0	0	2544	48	0	0	0	12	0	4

Major/Minor	Major1			Major2			Minor2			
Conflicting Flow All	2592	0	-	-	-	0		4268	5936	1296
Stage 1	-	-	-	-	-	-		2568	2568	-
Stage 2	-	-	-	-	-	-		1700	3368	-
Critical Hdwy	4.1	-	-	-	-	-		7.2	6.9	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-		6.2	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-		6.2	5.9	-
Follow-up Hdwy	2.2	-	-	-	-	-		3.5	4	3.3
Pot Cap-1 Maneuver	170	-	0	0	-	-		~ 1	0	145
Stage 1	-	-	0	0	-	-		34	41	-
Stage 2	-	-	0	0	-	-		113	14	-
Platoon blocked, %		-			-	-				
Mov Cap-1 Maneuver	170	-	-	-	-	-		~ 1	0	145
Mov Cap-2 Maneuver	-	-	-	-	-	-		23	0	-
Stage 1	-	-	-	-	-	-		31	0	-
Stage 2	-	-	-	-	-	-		113	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	230.7
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	170	-	-	-	29
HCM Lane V/C Ratio	0.094	-	-	-	0.552
HCM Control Delay (s)	28.4	-	-	-	230.7
HCM Lane LOS	D	-	-	-	F
HCM 95th %tile Q(veh)	0.3	-	-	-	1.8

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

PROJECTED CONDITIONS (WITHOUT THE PROJECT)

HCM 2010 TWSC
 2: Oak Ridge Highway & Jim Jones Lane

09/14/2022

Intersection												
Int Delay, s/veh	1.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑			↑↑						↔	
Traffic Vol, veh/h	2	2429	0	0	2709	20	0	0	0	6	0	5
Future Vol, veh/h	2	2429	0	0	2709	20	0	0	0	6	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	95	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	1	-
Grade, %	-	1	-	-	-1	-	-	0	-	-	2	-
Peak Hour Factor	25	92	90	90	97	71	90	90	90	38	90	63
Heavy Vehicles, %	0	2	0	0	1	5	0	0	0	0	0	0
Mvmt Flow	8	2640	0	0	2793	28	0	0	0	16	0	8

Major/Minor	Major1			Major2			Minor2			
Conflicting Flow All	2821	0	-	-	-	0		4143	5463	1411
Stage 1	-	-	-	-	-	-		2807	2807	-
Stage 2	-	-	-	-	-	-		1336	2656	-
Critical Hdwy	4.1	-	-	-	-	-		7.2	6.9	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-		6.2	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-		6.2	5.9	-
Follow-up Hdwy	2.2	-	-	-	-	-		3.5	4	3.3
Pot Cap-1 Maneuver	138	-	0	0	-	-		~ 1	0	120
Stage 1	-	-	0	0	-	-		24	30	-
Stage 2	-	-	0	0	-	-		184	36	-
Platoon blocked, %		-			-	-				
Mov Cap-1 Maneuver	138	-	-	-	-	-		~ 1	0	120
Mov Cap-2 Maneuver	-	-	-	-	-	-		19	0	-
Stage 1	-	-	-	-	-	-		23	0	-
Stage 2	-	-	-	-	-	-		184	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	\$ 363
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	138	-	-	-	26
HCM Lane V/C Ratio	0.058	-	-	-	0.913
HCM Control Delay (s)	32.7	-	-	-	\$ 363
HCM Lane LOS	D	-	-	-	F
HCM 95th %tile Q(veh)	0.2	-	-	-	2.8

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 TWSC
 2: Oak Ridge Highway & Jim Jones Lane

09/14/2022

Intersection												
Int Delay, s/veh	0.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑			↑↑						↔	
Traffic Vol, veh/h	12	3318	0	0	2479	28	0	0	0	6	0	1
Future Vol, veh/h	12	3318	0	0	2479	28	0	0	0	6	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	95	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	1	-
Grade, %	-	1	-	-	-1	-	-	0	-	-	2	-
Peak Hour Factor	75	98	90	90	96	58	90	90	90	50	90	25
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	16	3386	0	0	2582	48	0	0	0	12	0	4

Major/Minor	Major1			Major2			Minor2			
Conflicting Flow All	2630	0	-	-	-	0		4331	6024	1315
Stage 1	-	-	-	-	-	-		2606	2606	-
Stage 2	-	-	-	-	-	-		1725	3418	-
Critical Hdwy	4.1	-	-	-	-	-		7.2	6.9	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-		6.2	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-		6.2	5.9	-
Follow-up Hdwy	2.2	-	-	-	-	-		3.5	4	3.3
Pot Cap-1 Maneuver	165	-	0	0	-	-		~ 1	0	140
Stage 1	-	-	0	0	-	-		32	39	-
Stage 2	-	-	0	0	-	-		109	13	-
Platoon blocked, %		-			-	-				
Mov Cap-1 Maneuver	165	-	-	-	-	-		~ 1	0	140
Mov Cap-2 Maneuver	-	-	-	-	-	-		21	0	-
Stage 1	-	-	-	-	-	-		29	0	-
Stage 2	-	-	-	-	-	-		109	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	256.3
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	165	-	-	-	27
HCM Lane V/C Ratio	0.097	-	-	-	0.593
HCM Control Delay (s)	29.1	-	-	-	256.3
HCM Lane LOS	D	-	-	-	F
HCM 95th %tile Q(veh)	0.3	-	-	-	1.9

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

PROJECTED CONDITIONS (WITH THE PROJECT)

HCM 2010 TWSC
 2: Oak Ridge Highway & Jim Jones Lane

09/14/2022

Intersection												
Int Delay, s/veh	18.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑			↑↑						↔	
Traffic Vol, veh/h	6	2429	0	0	2709	25	0	0	0	18	0	24
Future Vol, veh/h	6	2429	0	0	2709	25	0	0	0	18	0	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	95	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	1	-
Grade, %	-	1	-	-	-1	-	-	0	-	-	2	-
Peak Hour Factor	25	92	90	90	97	71	90	90	90	38	90	63
Heavy Vehicles, %	0	2	0	0	1	5	0	0	0	0	0	0
Mvmt Flow	24	2640	0	0	2793	35	0	0	0	47	0	38

Major/Minor	Major1			Major2			Minor2			
Conflicting Flow All	2828	0	-	-	-	0		4179	5499	1414
Stage 1	-	-	-	-	-	-		2811	2811	-
Stage 2	-	-	-	-	-	-		1368	2688	-
Critical Hdwy	4.1	-	-	-	-	-		7.2	6.9	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-		6.2	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-		6.2	5.9	-
Follow-up Hdwy	2.2	-	-	-	-	-		3.5	4	3.3
Pot Cap-1 Maneuver	137	-	0	0	-	-		~ 1	0	120
Stage 1	-	-	0	0	-	-		~ 24	29	-
Stage 2	-	-	0	0	-	-		176	35	-
Platoon blocked, %		-	-	-	-	-				
Mov Cap-1 Maneuver	137	-	-	-	-	-		~ 1	0	120
Mov Cap-2 Maneuver	-	-	-	-	-	-		~ 17	0	-
Stage 1	-	-	-	-	-	-		~ 20	0	-
Stage 2	-	-	-	-	-	-		176	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	\$ 1219.7
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	137	-	-	-	28
HCM Lane V/C Ratio	0.175	-	-	-	3.052
HCM Control Delay (s)	36.8	-	-	-	\$ 1219.7
HCM Lane LOS	E	-	-	-	F
HCM 95th %tile Q(veh)	0.6	-	-	-	10.3

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 TWSC
 2: Oak Ridge Highway & Jim Jones Lane

09/14/2022

Intersection												
Int Delay, s/veh	12.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑			↑↑						↔	
Traffic Vol, veh/h	25	3318	0	0	2479	47	0	0	0	17	0	17
Future Vol, veh/h	25	3318	0	0	2479	47	0	0	0	17	0	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	95	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	1	-
Grade, %	-	1	-	-	-1	-	-	0	-	-	2	-
Peak Hour Factor	75	98	90	90	96	58	90	90	90	50	90	25
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	33	3386	0	0	2582	81	0	0	0	34	0	68

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	2663	0	-	-	-	0	4382	6075	1332
Stage 1	-	-	-	-	-	-	2623	2623	-
Stage 2	-	-	-	-	-	-	1759	3452	-
Critical Hdwy	4.1	-	-	-	-	-	7.2	6.9	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	6.2	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.2	5.9	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	160	-	0	0	-	-	~ 1	0	137
Stage 1	-	-	0	0	-	-	~ 31	38	-
Stage 2	-	-	0	0	-	-	104	12	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	160	-	-	-	-	-	~ 1	0	137
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 19	0	-
Stage 1	-	-	-	-	-	-	~ 25	0	-
Stage 2	-	-	-	-	-	-	104	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	\$ 773.5
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	160	-	-	-	45
HCM Lane V/C Ratio	0.208	-	-	-	2.267
HCM Control Delay (s)	33.3	-	-	-	\$ 773.5
HCM Lane LOS	D	-	-	-	F
HCM 95th %tile Q(veh)	0.8	-	-	-	10.7

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

PROJECTED CONDITIONS (WITH THE PROJECT & RIGHT TURN LANES)

HCM 2010 TWSC
 2: Oak Ridge Highway & Jim Jones Lane

09/15/2022

Intersection												
Int Delay, s/veh	11.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗↗			↗↗	↘					↗	↘
Traffic Vol, veh/h	6	2429	0	0	2709	25	0	0	0	18	0	24
Future Vol, veh/h	6	2429	0	0	2709	25	0	0	0	18	0	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	95	-	-	-	-	215	-	-	-	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	1	-
Grade, %	-	1	-	-	-1	-	-	0	-	-	2	-
Peak Hour Factor	25	92	90	90	97	71	90	90	90	38	90	63
Heavy Vehicles, %	0	2	0	0	1	5	0	0	0	0	0	0
Mvmt Flow	24	2640	0	0	2793	35	0	0	0	47	0	38

Major/Minor	Major1			Major2			Minor2			
Conflicting Flow All	2828	0	-	-	-	0		4161	5481	1397
Stage 1	-	-	-	-	-	-		2793	2793	-
Stage 2	-	-	-	-	-	-		1368	2688	-
Critical Hdwy	4.1	-	-	-	-	-		7.2	6.9	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-		6.2	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-		6.2	5.9	-
Follow-up Hdwy	2.2	-	-	-	-	-		3.5	4	3.3
Pot Cap-1 Maneuver	137	-	0	0	-	-		~ 1	0	123
Stage 1	-	-	0	0	-	-		~ 24	30	-
Stage 2	-	-	0	0	-	-		176	35	-
Platoon blocked, %		-	-	-	-	-				
Mov Cap-1 Maneuver	137	-	-	-	-	-		~ 1	0	123
Mov Cap-2 Maneuver	-	-	-	-	-	-		~ 17	0	-
Stage 1	-	-	-	-	-	-		~ 20	0	-
Stage 2	-	-	-	-	-	-		176	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	\$ 726
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	137	-	-	-	17	123
HCM Lane V/C Ratio	0.175	-	-	-	2.786	0.31
HCM Control Delay (s)	36.8	-	-	-	\$ 1272.2	46.9
HCM Lane LOS	E	-	-	-	F	E
HCM 95th %tile Q(veh)	0.6	-	-	-	6.5	1.2

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 TWSC
 2: Oak Ridge Highway & Jim Jones Lane

09/15/2022

Intersection												
Int Delay, s/veh	5.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗↗			↗↗	↘					↗	↘
Traffic Vol, veh/h	25	3318	0	0	2479	47	0	0	0	17	0	17
Future Vol, veh/h	25	3318	0	0	2479	47	0	0	0	17	0	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	95	-	-	-	-	215	-	-	-	-	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	1	-
Grade, %	-	1	-	-	-1	-	-	0	-	-	2	-
Peak Hour Factor	75	98	90	90	96	58	90	90	90	50	90	25
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	33	3386	0	0	2582	81	0	0	0	34	0	68

Major/Minor	Major1			Major2			Minor2			
Conflicting Flow All	2663	0	-	-	-	0		4341	6034	1291
Stage 1	-	-	-	-	-	-		2582	2582	-
Stage 2	-	-	-	-	-	-		1759	3452	-
Critical Hdwy	4.1	-	-	-	-	-		7.2	6.9	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-		6.2	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-		6.2	5.9	-
Follow-up Hdwy	2.2	-	-	-	-	-		3.5	4	3.3
Pot Cap-1 Maneuver	160	-	0	0	-	-		~ 1	0	146
Stage 1	-	-	0	0	-	-		~ 33	40	-
Stage 2	-	-	0	0	-	-		104	12	-
Platoon blocked, %		-			-	-				
Mov Cap-1 Maneuver	160	-	-	-	-	-		~ 1	0	146
Mov Cap-2 Maneuver	-	-	-	-	-	-		~ 19	0	-
Stage 1	-	-	-	-	-	-		~ 26	0	-
Stage 2	-	-	-	-	-	-		104	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	\$ 300.1
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	160	-	-	-	19	146
HCM Lane V/C Ratio	0.208	-	-	-	1.789	0.466
HCM Control Delay (s)	33.3	-	-	-	\$ 801.2	49.5
HCM Lane LOS	D	-	-	-	F	E
HCM 95th %tile Q(veh)	0.8	-	-	-	4.6	2.1

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

APPENDIX G

LOCAL TRIP GENERATION RATES

Local Apartment Trip Generation Study

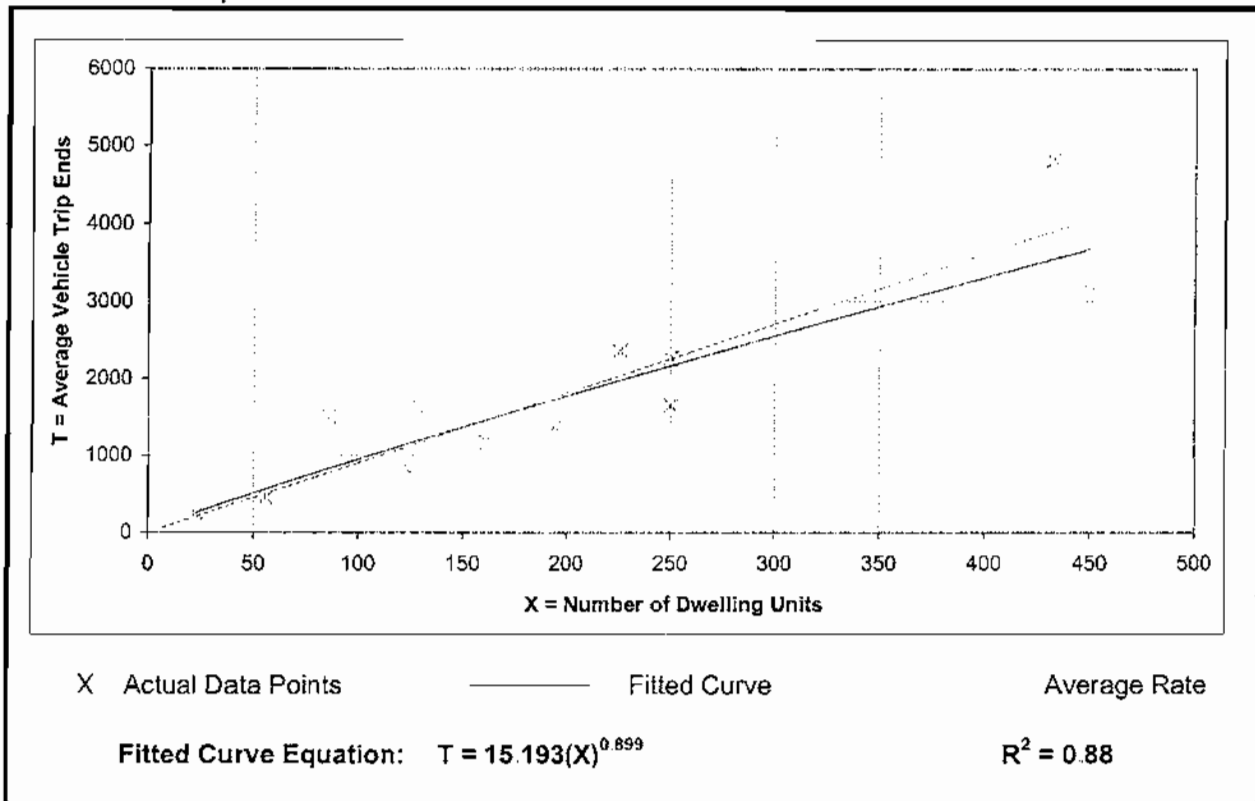
Average Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Number of Studies: 13
Average Number of Dwelling Units: 193
Directional Distribution: 50% entering, 50% exiting

Trip Generation Per Dwelling Unit

Average Rate	Ranges of Rates	Standard Deviation
9.03	6.59 - 17.41	2.47

Data Plot and Equation



Local Apartment Trip Generation Study

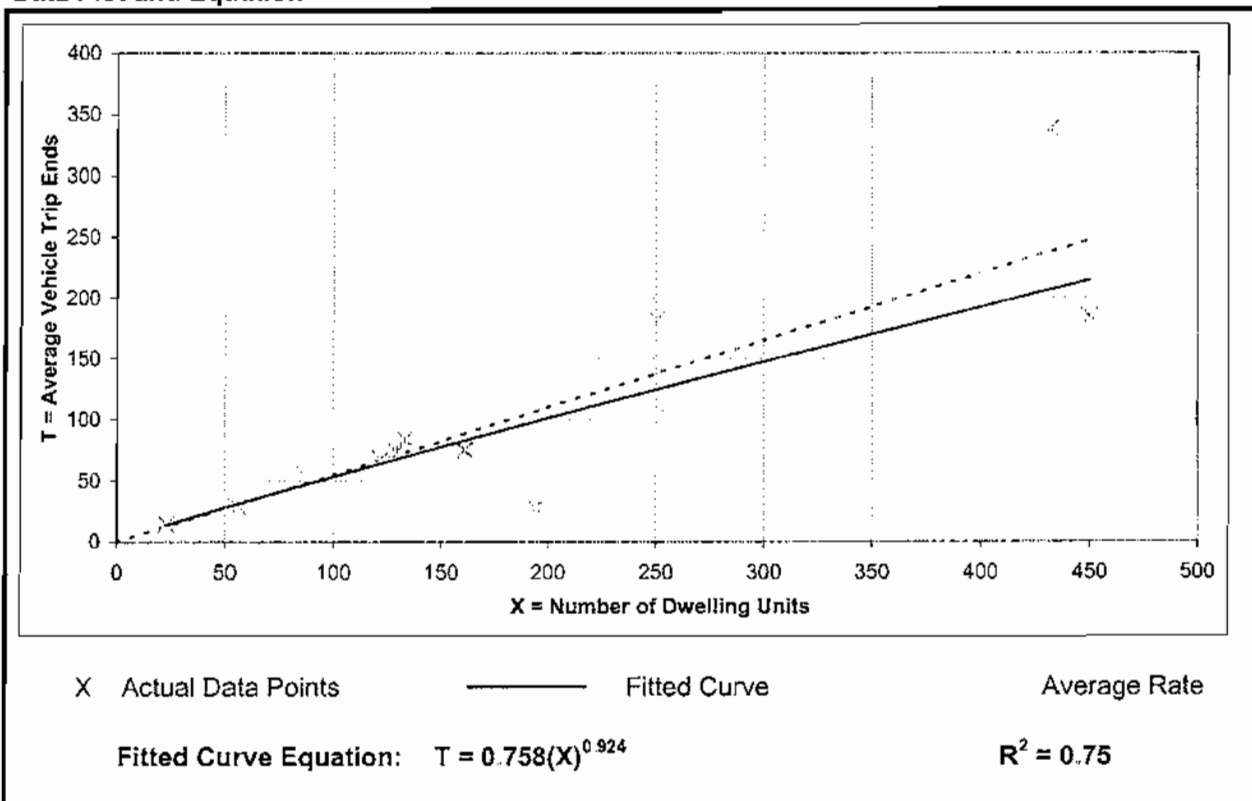
Average Vehicle Trip Ends vs: Dwelling Units
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 7 and 9 a.m.

Number of Studies: 13
 Average Number of Dwelling Units: 193
 Directional Distribution: 22% entering, 78% exiting

Trip Generation Per Dwelling Unit

Average Rate	Ranges of Rates	Standard Deviation
0.55	0.14 - 0.78	0.18

Data Plot and Equation



Local Apartment Trip Generation Study

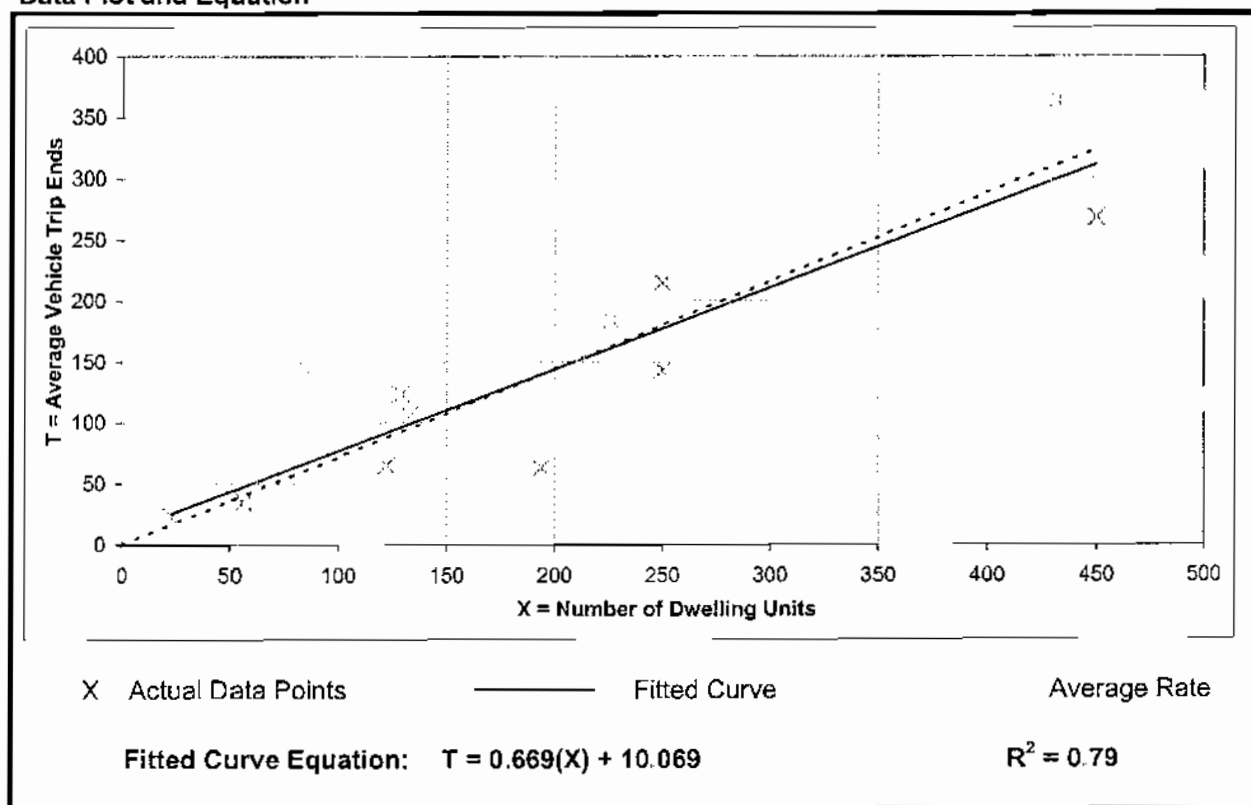
Average Vehicle Trip Ends vs: Dwelling Units
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 4 and 6 p.m.

Number of Studies: 13
 Average Number of Dwelling Units: 193
 Directional Distribution: 55% entering, 45% exiting

Trip Generation Per Dwelling Unit

Average Rate	Ranges of Rates	Standard Deviation
0.72	0.32 - 1.66	0.25

Data Plot and Equation



TRIP GENERATION FOR JIM JONES SUBDIVISION

72 Attached Townhouses

ITE LAND USE CODE	LAND USE DESCRIPTION	UNITS	GENERATED DAILY TRAFFIC	GENERATED TRAFFIC AM PEAK HOUR			GENERATED TRAFFIC PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
Local Trip Rate	Townhouses	72 Townhouses	711	22%	78%		55%	45%	
				9	31	40	32	27	59

From Local Trip Rates and calculated by using Fitted Curve Equation

TRIP GENERATION FOR JIM JONES SUBDIVISION

72 Townhouse Units

72 Townhouses = X

Weekday:

Fitted Curve Equation: $T = 15.193(X)^{0.899}$

$$T = 15 * 46.75$$

$$T = \underline{\underline{711 \text{ trips}}}$$

Peak Hour of Adjacent Traffic between 7 and 9 am:

Fitted Curve Equation: $T = 0.758(X)^{0.924}$

$$T = 0.758 * 52$$

$$T = \underline{\underline{40 \text{ trips}}}$$

Peak Hour of Adjacent Traffic between 4 and 6 pm:

Fitted Curve Equation: $T = 0.669(X)+10.069$

$$T = 0.669 * 72 + 10.07$$

$$T = \underline{\underline{59 \text{ trips}}}$$

APPENDIX H

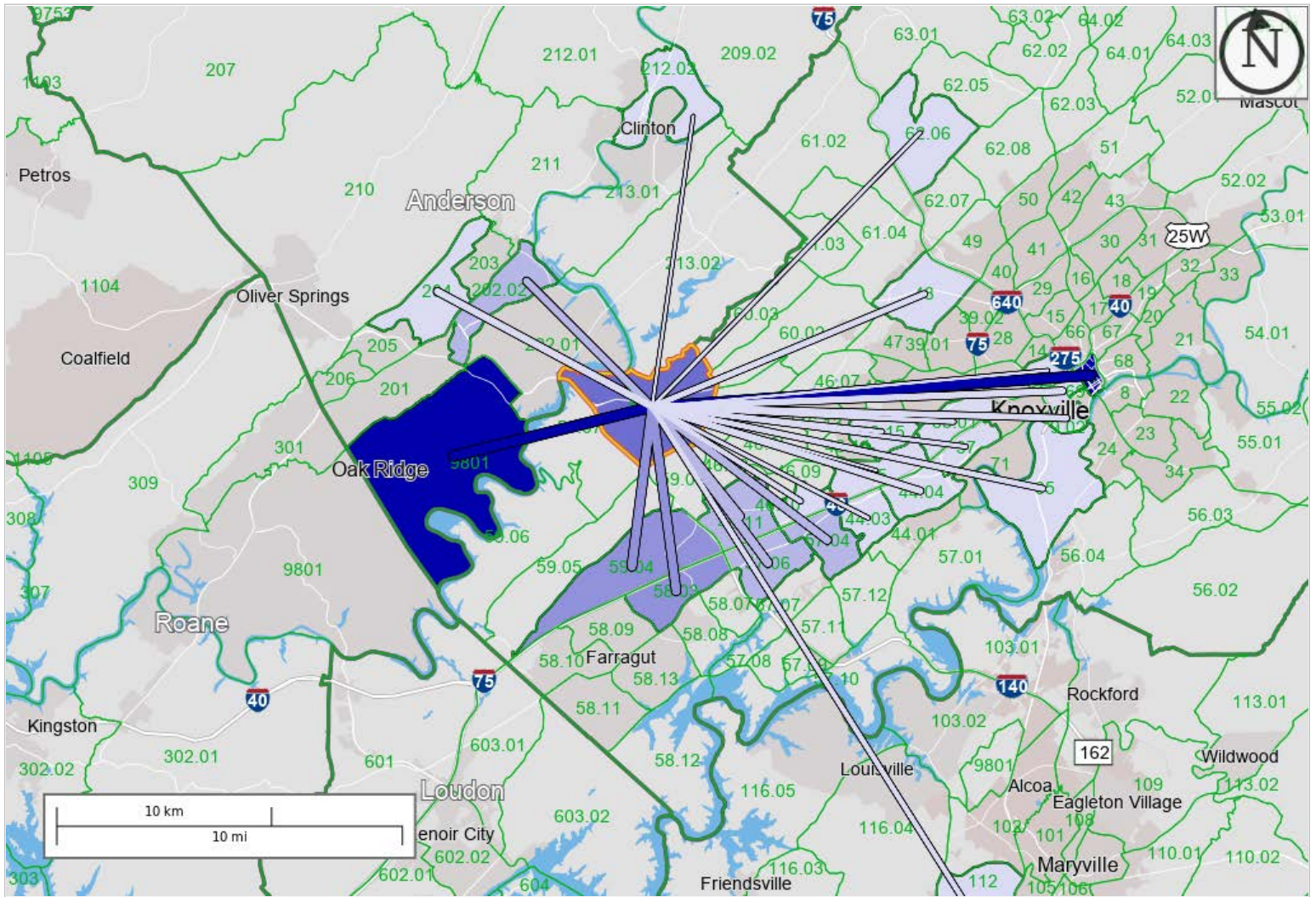
2019 CENSUS BUREAU DATA

Work Destination Report - Home Selection Area to Work Census Tracts All Jobs for All Workers in 2019

Created by the U.S. Census Bureau's OnTheMap <https://onthemap.ces.census.gov> on 09/06/2022

Counts of All Jobs from Home Selection Area to Work Census Tracts in 2019

All Workers



Map Legend

Job Count

- 148 - 168
- 127 - 147
- 106 - 126
- 85 - 105
- 64 - 84
- 43 - 63
- 21 - 42

Selection Areas

- 📍 Analysis Selection

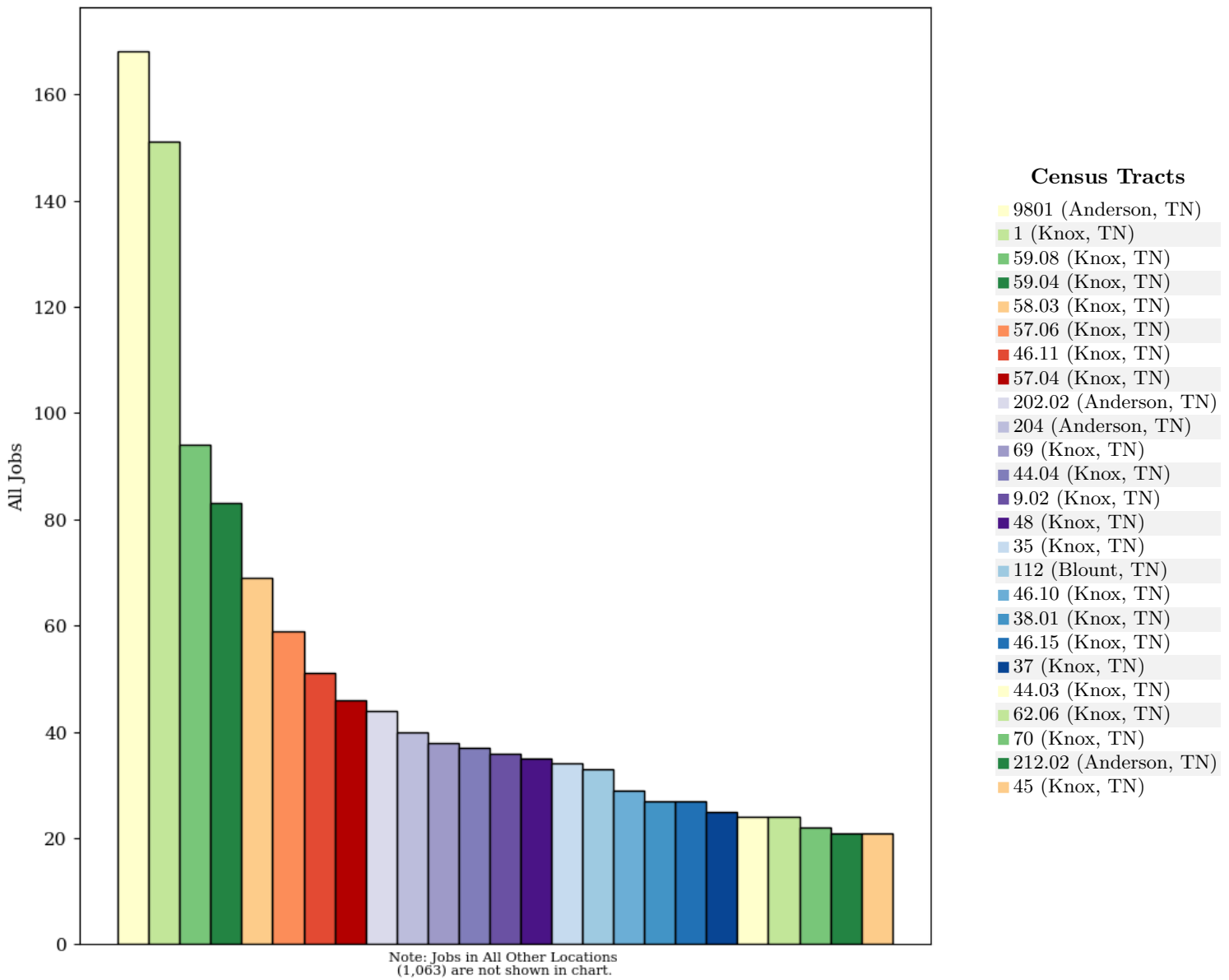
Job Count

- 📍 148 - 168
- 📍 127 - 147
- 📍 106 - 126
- 📍 85 - 105
- 📍 64 - 84
- 📍 43 - 63
- 📍 21 - 42



All Jobs from Home Selection Area to Work Census Tracts in 2019

All Workers



All Jobs from Home Selection Area to Work Census Tracts in 2019

All Workers

Census Tracts as Work Destination Area	2019	
	Count	Share
All Census Tracts	2,301	100.0
9801 (Anderson, TN)	168	7.3
1 (Knox, TN)	151	6.6
59.08 (Knox, TN)	94	4.1
59.04 (Knox, TN)	83	3.6
58.03 (Knox, TN)	69	3.0
57.06 (Knox, TN)	59	2.6
46.11 (Knox, TN)	51	2.2
57.04 (Knox, TN)	46	2.0
202.02 (Anderson, TN)	44	1.9
204 (Anderson, TN)	40	1.7

Census Tracts as Work Destination Area	2019	
	Count	Share
69 (Knox, TN)	38	1.7
44.04 (Knox, TN)	37	1.6
9.02 (Knox, TN)	36	1.6
48 (Knox, TN)	35	1.5
35 (Knox, TN)	34	1.5
112 (Blount, TN)	33	1.4
46.10 (Knox, TN)	29	1.3
38.01 (Knox, TN)	27	1.2
46.15 (Knox, TN)	27	1.2
37 (Knox, TN)	25	1.1
44.03 (Knox, TN)	24	1.0
62.06 (Knox, TN)	24	1.0
70 (Knox, TN)	22	1.0
212.02 (Anderson, TN)	21	0.9
45 (Knox, TN)	21	0.9
All Other Locations	1,063	46.2

Additional Information

Analysis Settings

Analysis Type	Destination
Destination Type	Census Tracts
Selection area as	Home
Year(s)	2019
Job Type	All Jobs
Selection Area	59.08 (Knox, TN) from Census Tracts
Selected Census Blocks	82
Analysis Generation Date	09/06/2022 13:57 - OnTheMap 6.8.1
Code Revision	f9358819d46a60bb89052036516a1c8fe8bbbbeac
LODES Data Version	20211018_1647

Data Sources

Source: U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics (Beginning of Quarter Employment, 2nd Quarter of 2002-2019).

Notes

1. Race, Ethnicity, Educational Attainment, and Sex statistics are beta release results and are not available before 2009.
2. Educational Attainment is only produced for workers aged 30 and over.
3. Firm Age and Firm Size statistics are beta release results for All Private jobs and are not available before 2011.

APPENDIX I

KNOX COUNTY AND TDOT TURN LANE VOLUME THRESHOLD WORKSHEETS

TABLE 5B

RIGHT-TURN LANE VOLUME THRESHOLDS
FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 36 TO 45 MPH

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	<100	100 - 199	200 - 249	250 - 299	300 - 349	350 - 399
Fewer Than 25 25 - 49 50 - 99						
100 - 149 150 - 199						
200 - 249 250 - 299					Yes	Yes
300 - 349 350 - 399			Yes	Yes	Yes	Yes
400 - 449 450 - 499		Yes	Yes	Yes	Yes	Yes
500 - 549 550 - 599	Yes	Yes	Yes	Yes	Yes	Yes
600 or More	Yes	Yes	Yes	Yes	2709 / 2 = 1354.5 * 1.05 = 1423	

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

Oak Ridge Highway at
Jim Jones Lane

2025 Projected AM
WB Right Turns = 25

Right Turn Lane
Warranted

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

TABLE 5B

RIGHT-TURN LANE VOLUME THRESHOLDS
FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 36 TO 45 MPH

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	<100	100 - 199	200 - 249	250 - 299	300 - 349	350 - 399
Fewer Than 25 25 - 49 50 - 99						
100 - 149 150 - 199						
200 - 249 250 - 299					Yes	Yes
300 - 349 350 - 399			Yes	Yes	Yes	Yes
400 - 449 450 - 499		Yes	Yes	Yes	Yes	Yes
500 - 549 550 - 599	Yes	Yes	Yes	Yes	Yes	Yes
600 or More	Yes	Yes	Yes	Yes	2479 / 2 = 1239.5 * 1.05 = 1302	

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

Oak Ridge Highway at
Jim Jones Lane

2025 Projected PM
WB Right Turns = 47

Right Turn Lane
Warranted

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

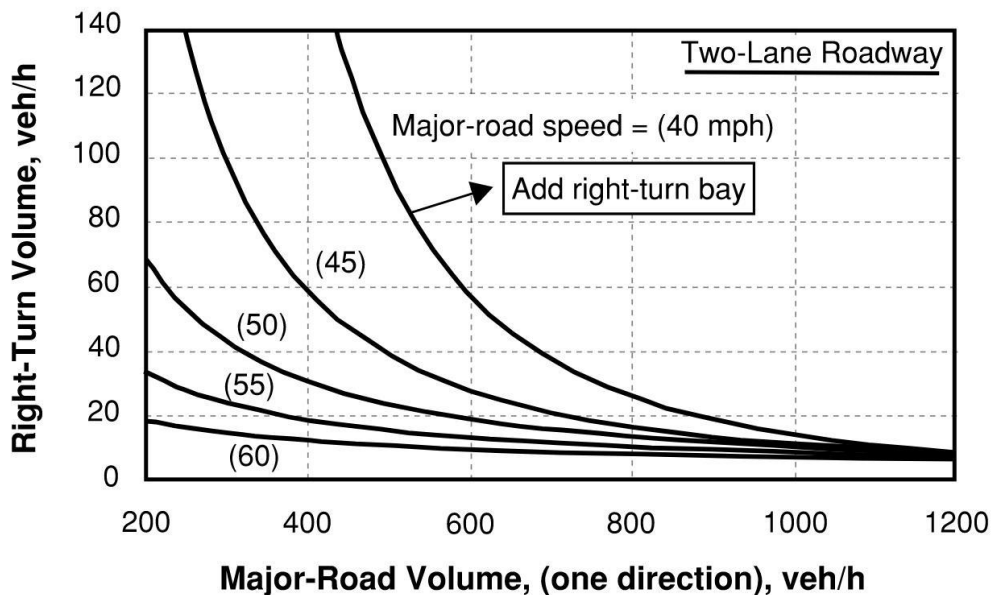


Figure 3-18: Right-Turn Lane Warrant along Two-Lane Roadway (Unsignalized Intersection with Two-Way Stop-Control)²⁴

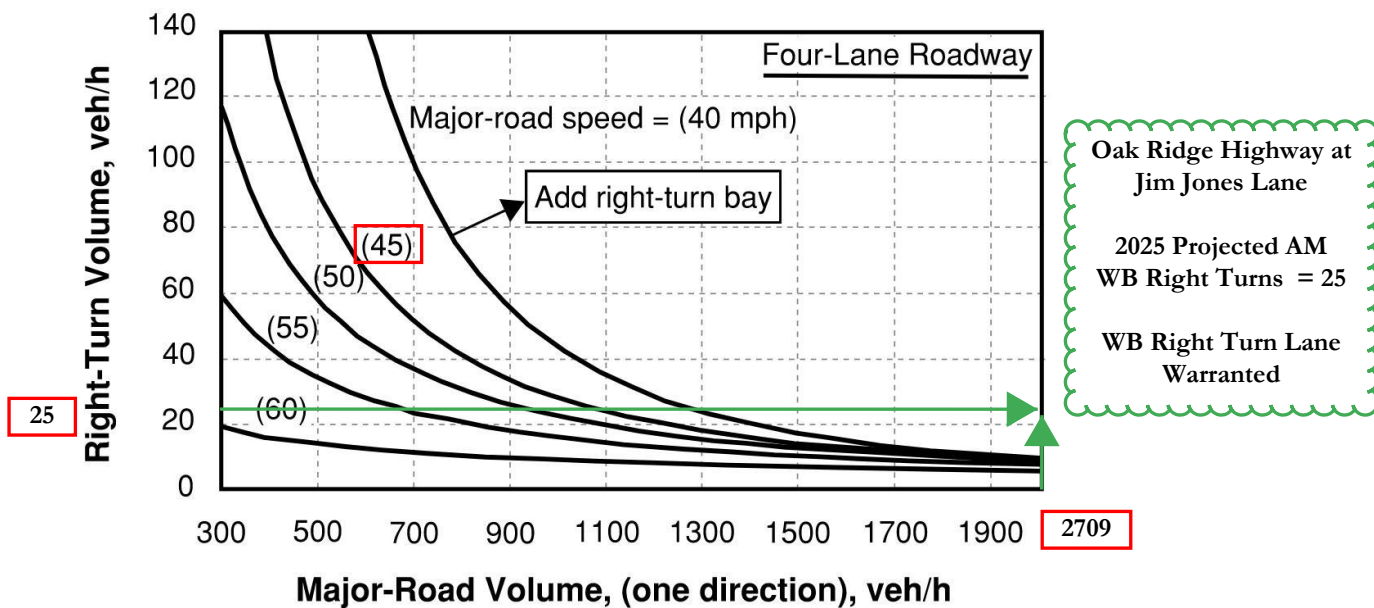


Figure 3-19: Right-Turn Lane Warrant along Four-Lane Roadway (Unsignalized Intersection with Two-Way Stop-Control)²⁵

²⁴ TRB, NCHRP 457, Evaluating Intersection Improvements (2001)

²⁵ TRB, NCHRP 457, Evaluating Intersection Improvements (2001)

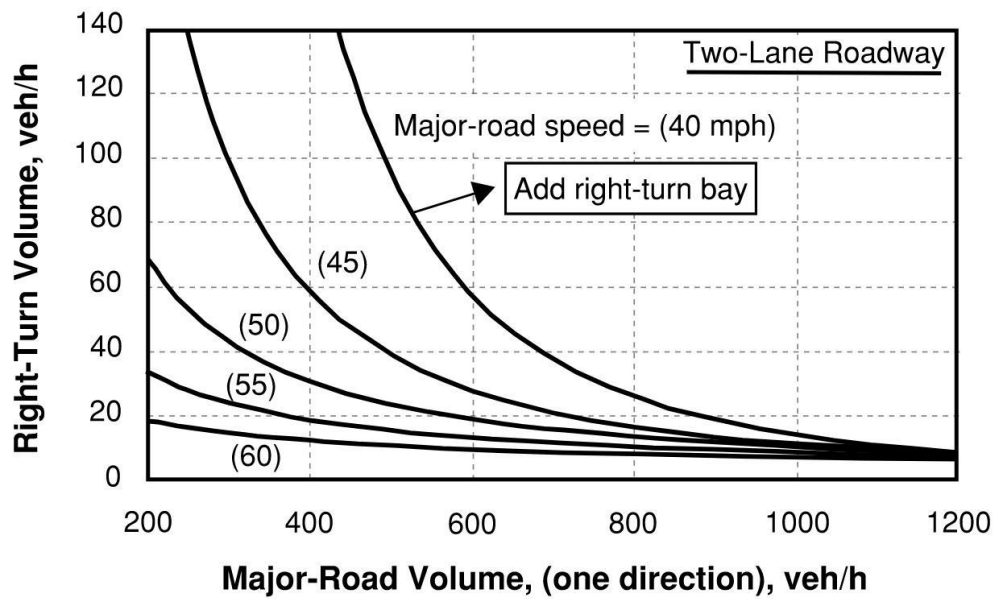


Figure 3-18: Right-Turn Lane Warrant along Two-Lane Roadway (Unsignalized Intersection with Two-Way Stop-Control)²⁴

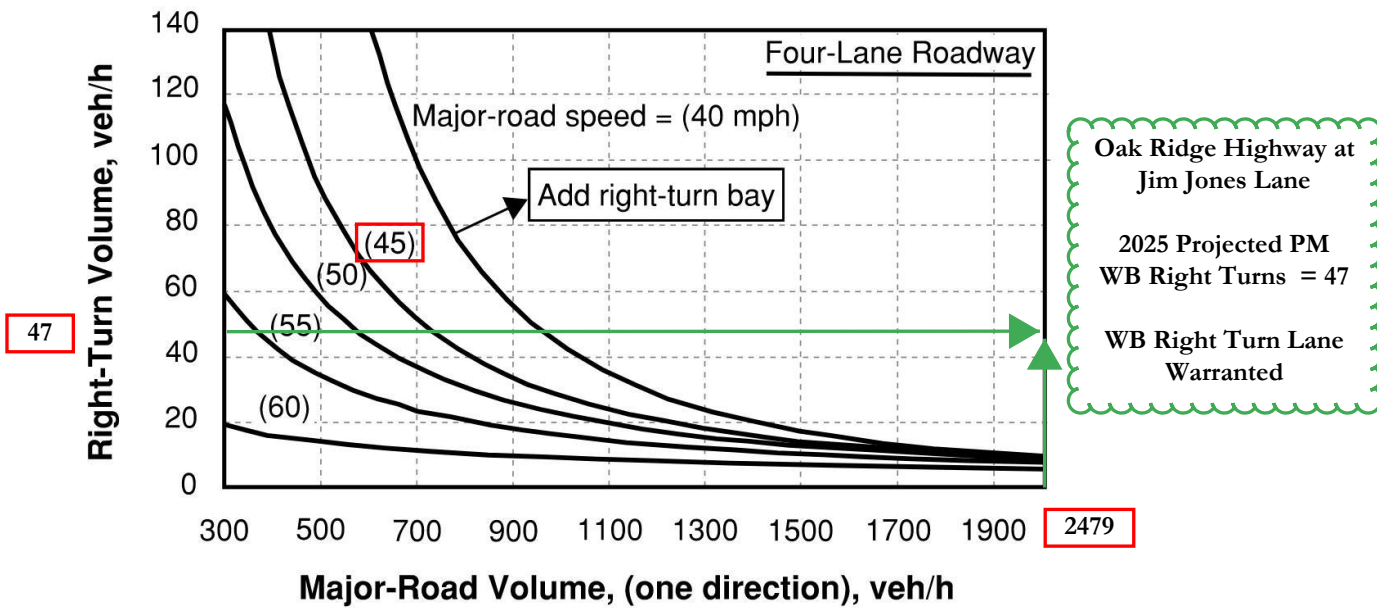


Figure 3-19: Right-Turn Lane Warrant along Four-Lane Roadway (Unsignalized Intersection with Two-Way Stop-Control)²⁵

²⁴ TRB, NCHRP 457, Evaluating Intersection Improvements (2001)

²⁵ TRB, NCHRP 457, Evaluating Intersection Improvements (2001)

TABLE 5B

RIGHT-TURN LANE VOLUME THRESHOLDS
FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 36 TO 45 MPH

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	<100	100 - 199	200 - 249	250 - 299	300 - 349	350 - 399
Fewer Than 25 25 - 49 50 - 99						
100 - 149 150 - 199						
200 - 249 250 - 299					Yes	Yes
300 - 349 350 - 399			Yes	Yes	Yes	Yes
400 - 449 450 - 499		Yes	Yes	Yes	Yes	Yes
500 - 549 550 - 599	Yes	Yes	Yes	Yes	Yes	Yes
600 or More	Yes	Yes	Yes	Yes	2669 / 2 = 1334.5 * 1.05 = 1402	

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

Oak Ridge Highway at
Jim Jones Lane

2022 Existing AM
WB Right Turns = 20

Right Turn Lane NOT
Warranted

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

TABLE 5B

RIGHT-TURN LANE VOLUME THRESHOLDS
FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 36 TO 45 MPH

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	<100	100 - 199	200 - 249	250 - 299	300 - 349	350 - 399
Fewer Than 25 25 - 49 50 - 99						
100 - 149 150 - 199						
200 - 249 250 - 299					Yes	Yes
300 - 349 350 - 399			Yes	Yes	Yes	Yes
400 - 449 450 - 499		Yes	Yes	Yes	Yes	Yes
500 - 549 550 - 599	Yes	Yes	Yes	Yes	Yes	Yes
600 or More	Yes	Yes	Yes	Yes	2442 / 2 = 1221 * 1.05 = 1283	

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

Oak Ridge Highway at
Jim Jones Lane

2022 Existing PM
WB Right Turns = 28

Right Turn Lane
Warranted

28

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

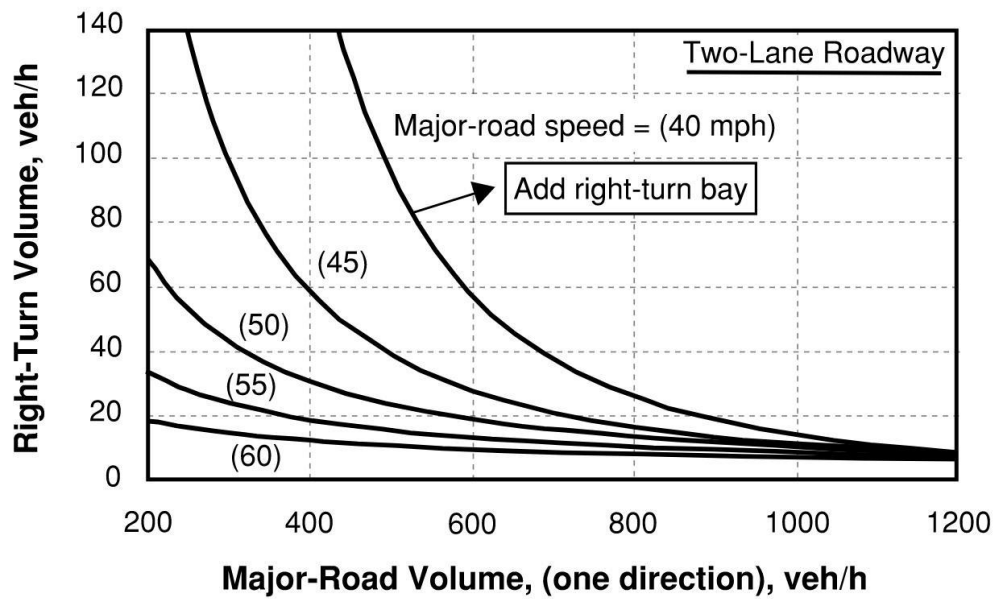


Figure 3-18: Right-Turn Lane Warrant along Two-Lane Roadway (Unsignalized Intersection with Two-Way Stop-Control)²⁴

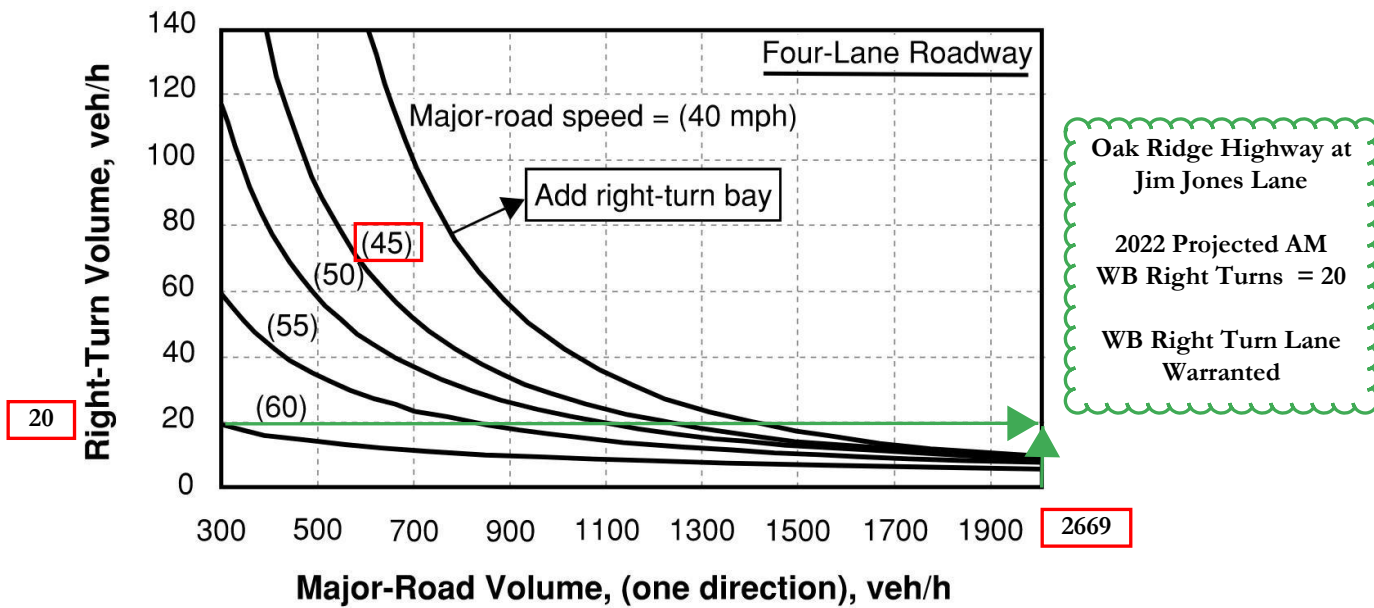


Figure 3-19: Right-Turn Lane Warrant along Four-Lane Roadway (Unsignalized Intersection with Two-Way Stop-Control)²⁵

²⁴ TRB, NCHRP 457, Evaluating Intersection Improvements (2001)

²⁵ TRB, NCHRP 457, Evaluating Intersection Improvements (2001)

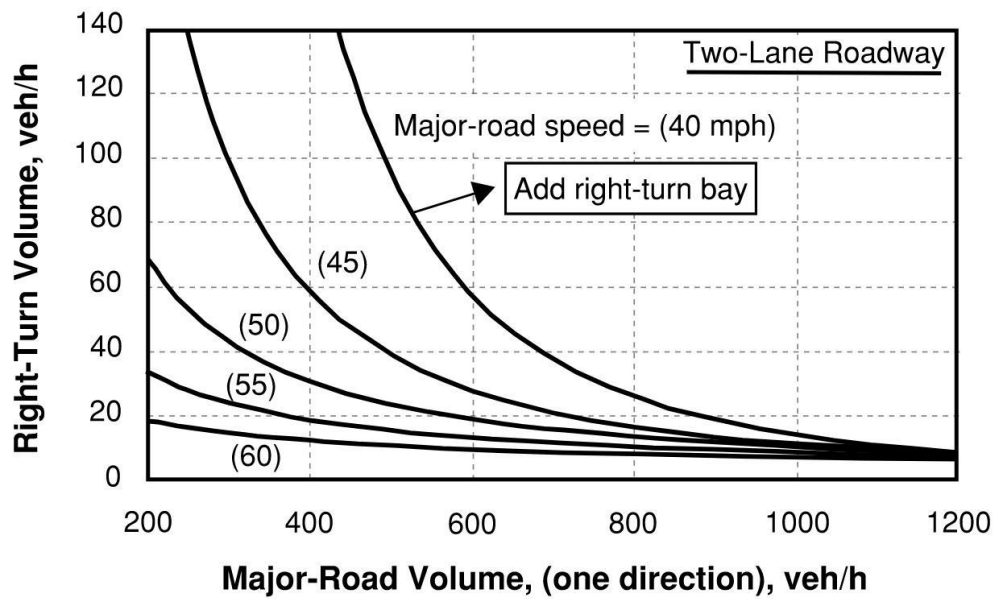


Figure 3-18: Right-Turn Lane Warrant along Two-Lane Roadway (Unsignalized Intersection with Two-Way Stop-Control)²⁴

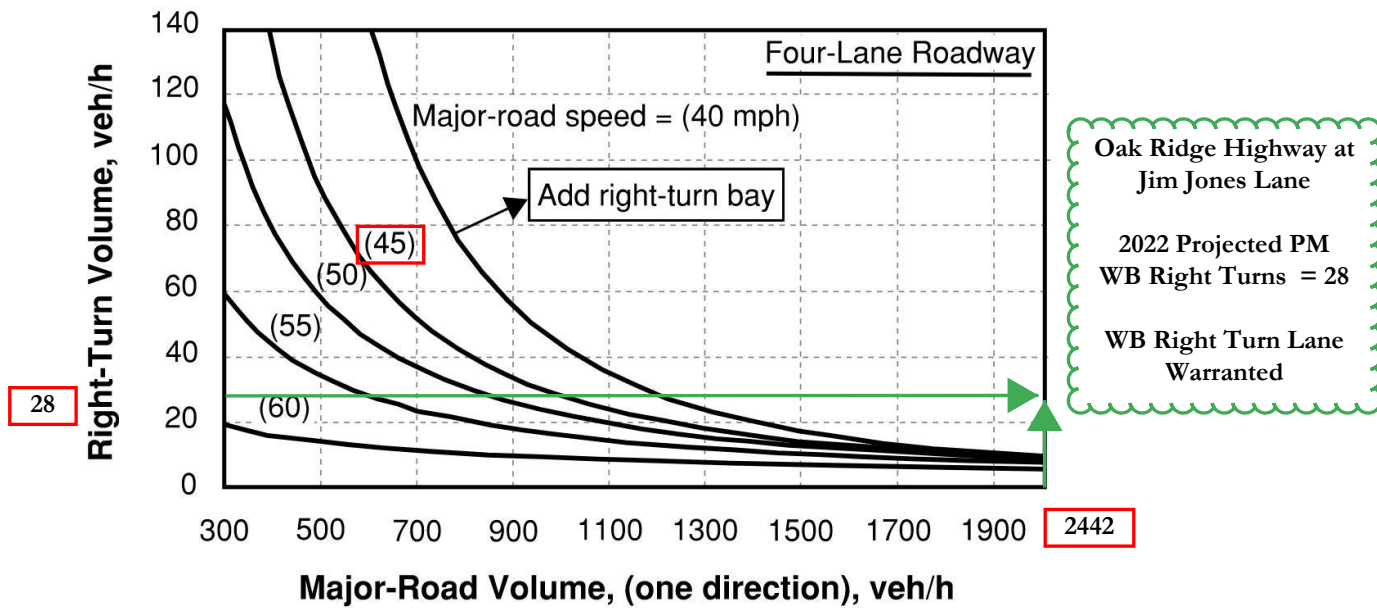


Figure 3-19: Right-Turn Lane Warrant along Four-Lane Roadway (Unsignalized Intersection with Two-Way Stop-Control)²⁵

²⁴ TRB, NCHRP 457, Evaluating Intersection Improvements (2001)

²⁵ TRB, NCHRP 457, Evaluating Intersection Improvements (2001)

APPENDIX J

RESPONSE LETTER TO ADDRESS REVIEW COMMENTS



CIVIL ENGINEERING / TRAFFIC ENGINEERING

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

October 24, 2022

PROJECT NAME: Jim Jones Lane Subdivision

TO: Knoxville-Knox County Planning

**SUBJECT: Comment Response Document for Jim Jones Lane Subdivision TIS -
From Email Comments dated October 18, 2022**

Knoxville-Knox County Planning, Knox County Engineering, & TDOT Staff:

The following response document addresses comments in an email from Mike Conger, PE, dated October 18, 2022. This letter is added to the end of the revised report in Appendix J.

Knox County EPW Comments:

1. **The recommended NO OUTLET signs at the subdivision street intersections should be DEAD END signs based on the MUTCD discussion of each sign's purpose.**

Response: This comment has been addressed on the top of Page 3 and Page 49 in the recommendation discussions and the image on Page 49.

2. **We would propose a dotted white line extending the turn bay lane line heading southwest on Oak Ridge Highway to better guide drivers turning left out of Jim Jones Lane.**

Response: This comment has been inserted on Page 46 as recommendation 1c and includes a new image. This new recommendation was also included in the summary of recommendations on Page 2.

TDOT Comments:

1. **TDOT agrees with the need for a right turn lane with this development. The right turn lane length meet stopping sight distance and have a 210' storage with a 150' taper [sic].**

Response: The revised recommendation right-turn lane dimensions have been updated on Page 2 in the first listed recommendation. This revised recommendation was also updated in the discussion at the bottom of Page 43.

2. **Although there is a TDOT project coming that will make improvements to this intersection, it is still in a planning and conceptual phase. The earliest it could be let is likely to be in Fall 2025. If this development will be completed before the TDOT project, TDOT would require the developer to build the right turn lane and lengthen the left turn lane to meet minimum standards. The dimensions for the left turn lane should be 190' taper and 200' storage to meet TDOT HSAM standards. TDOT would not require the developer to build the acceleration lane shown in the concept.**

Response: This comment regarding the left-turn lane has been addressed and inserted in the recommendations on Page 3 and Page 48.

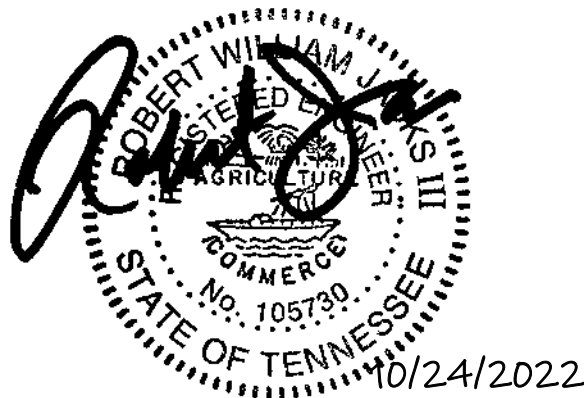
In addition to the revisions listed above, other changes in the report include the following:

- Updated Title Page
- Updated Table of Contents
- Updated Page Footers
- Made a few minor grammatical corrections
- Updated Page Numbers (Page 49 -)
- Updated image on Page 49
- Updated images in Figures 6 - 9
- On Pages 3 and 51, updated the number of and the description of the proposed townhouses along Jim Jones Lane
- On Pages 4 and 52, updated discussion about proposed sidewalks
- On Page 18, updated discussion regarding the project description
- Revised discussion regarding sidewalks and the proposed road lengths on Page 21
- Added Appendix J to include this response letter

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

Sincerely,

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



Ajax Engineering, LLC
11812 Black Road
Knoxville, TN 37932
ajaxengineering@gmail.com
© 2022 Ajax Engineering, LLC

